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: **PC040**

DATE VERIFIED: **October 23, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 13, 2010

TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC040

PIN: 38301000009

Subdivision, Tract, Business or Owner Name (if known): Powhatan Secondary

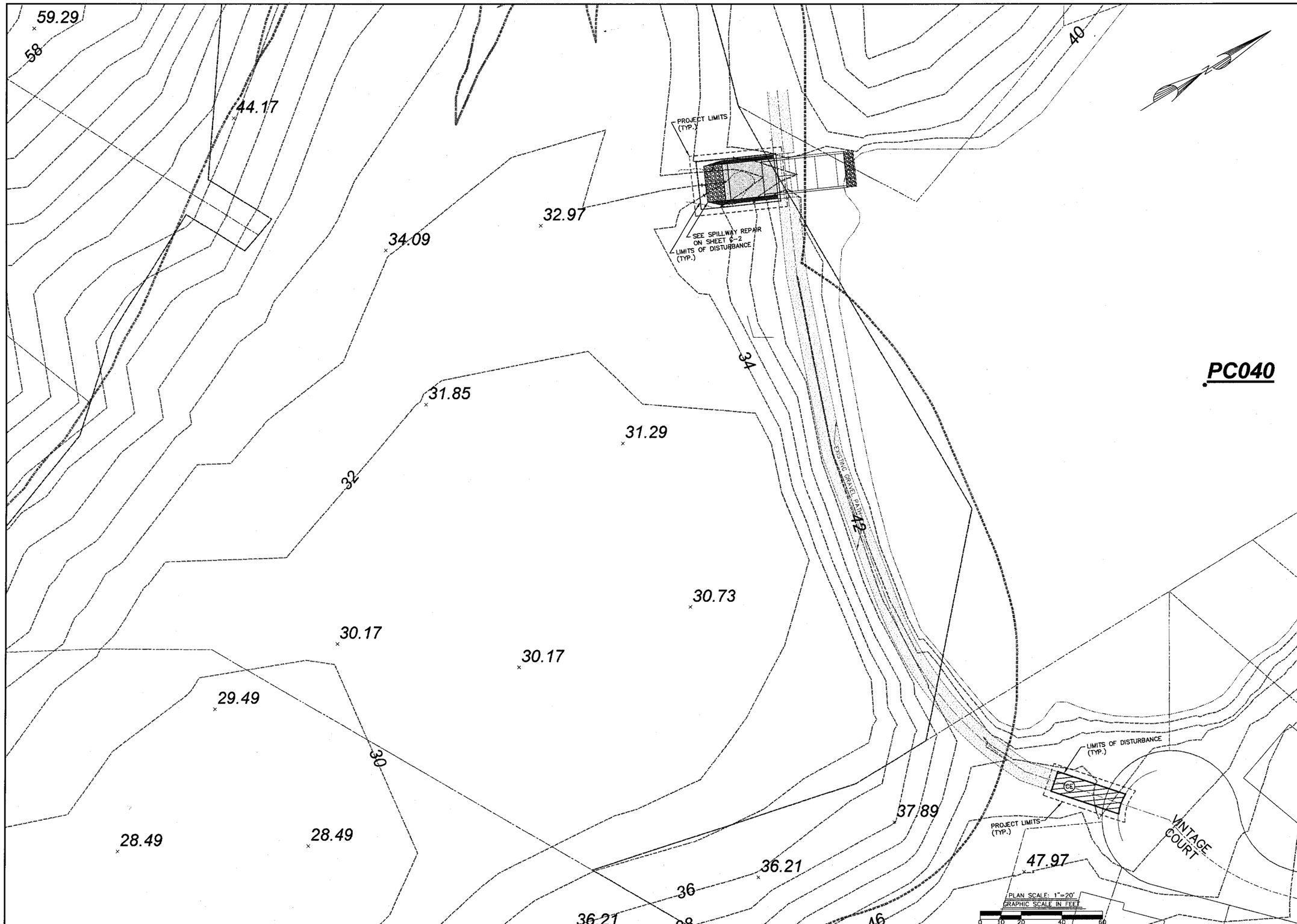
Property Description:

Site Address: 4551 News Road

(For internal use only) **Box** 4 **Drawer:** 3

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

Comments



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Fax. (757) 253-2696
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Tel. (757) 499-2030
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Email: lmdg@landmarkdg.com

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11/05/09

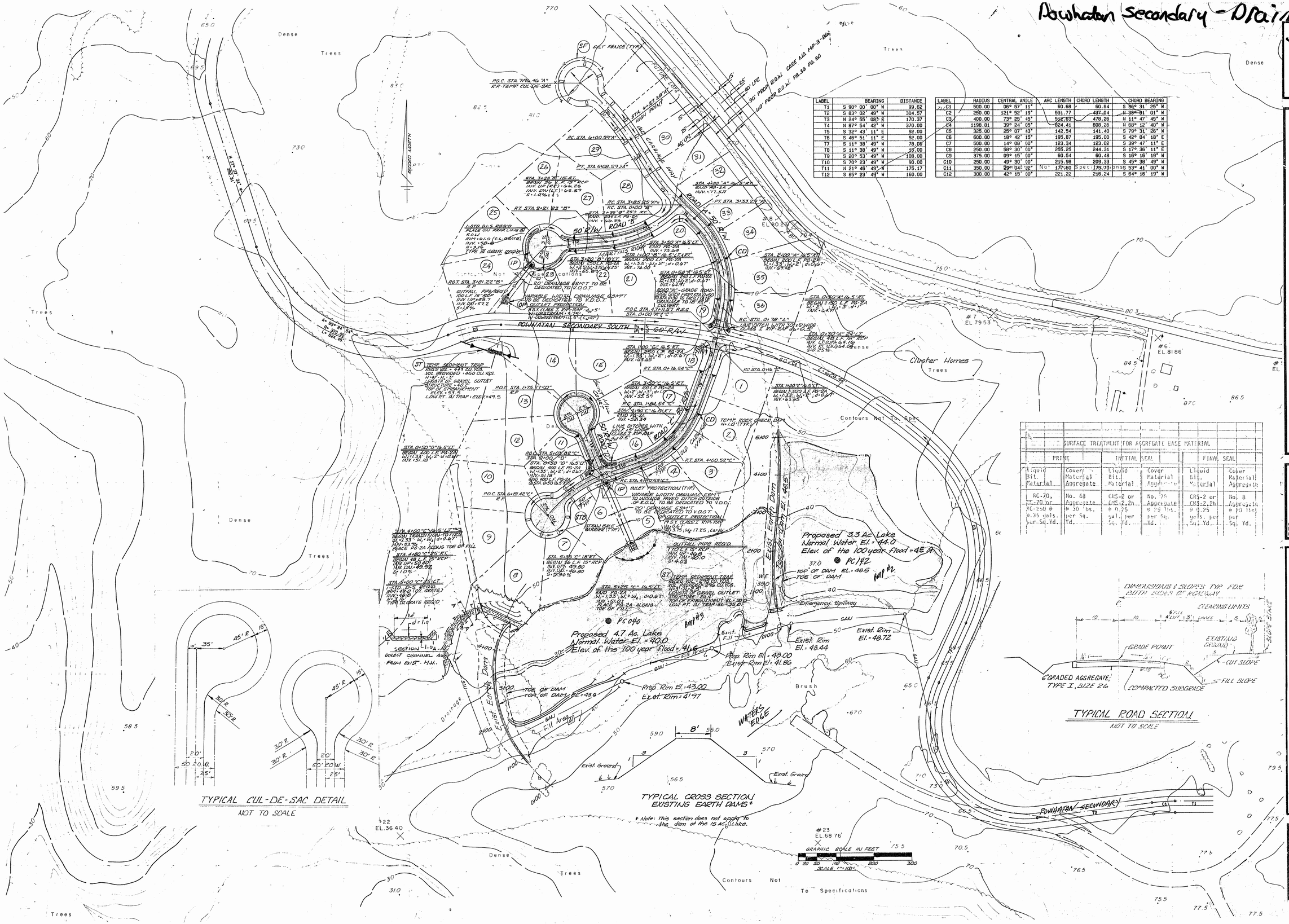
DRAWING STATUS
- Interoffice Review
- Client for Review
- Pre Approval Bidding

COUNTY APPROVAL
- 1st Submittal
- 2nd Submittal
- 3rd Submittal
- Approved

RE-CERTIFICATION
POWHATAN SECONDARY
BMP #03
SPILLWAY REPAIR
JAMES CITY COUNTY
VIRGINIA

Designed: JWB	Date: 11/05/09
Checked: JWB	Scale: 1"=20'
File Mgr./Drawn: LMDG	CADD File name: C-1
Project Number: 1780041-000.65	Dwg. File No.: XXXXX X
Drawing Number	C-1

Powhatan Secondary - Drainage
Sect 2/3



LABEL	BEARING	DISTANCE
T1	S 90° 00' 00" W	99.62
T2	S 83° 02' 49" W	304.57
T3	N 24° 55' 08" E	170.37
T4	N 87° 54' 42" W	370.00
T5	S 32° 43' 11" E	92.00
T6	S 46° 51' 11" E	52.00
T7	S 11° 38' 49" W	78.08
T8	S 11° 38' 49" W	16.00
T9	S 20° 53' 49" W	108.00
T10	S 70° 23' 49" W	90.00
T11	N 21° 46' 49" W	175.17
T12	S 85° 23' 49" W	160.00

LABEL	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	CHORD BEARING
C1	500.00	06° 57' 11"	60.68	60.64	S 86° 31' 25" W
C2	250.00	121° 52' 19"	531.77	437.04	N 38° 01' 01" W
C3	400.00	73° 25' 45"	512.63	478.26	N 11° 47' 45" W
C4	1198.81	39° 24' 05"	824.41	808.26	N 68° 12' 40" W
C5	325.00	25° 07' 43"	142.54	141.40	S 79° 31' 26" W
C6	600.00	18° 42' 15"	195.87	195.00	S 42° 04' 18" E
C7	500.00	14° 08' 00"	123.34	123.02	S 39° 47' 11" E
C8	250.00	58° 30' 00"	255.25	244.31	S 17° 36' 11" E
C9	375.00	09° 15' 00"	60.54	60.48	S 16° 16' 19" W
C10	250.00	49° 30' 00"	215.98	209.33	S 45° 36' 49" W
C11	350.00	29° 04' 22"	177.60	175.70	S 53° 41' 00" W
C12	300.00	42° 15' 00"	221.22	216.24	S 64° 16' 19" W

SURFACE TREATMENT FOR AGGREGATE BASE MATERIAL					
PRIME		INITIAL SEAL		FINAL SEAL	
Liquid Bit. Material	Cover Material Aggregate	Liquid Bit. Material	Cover Material Aggregate	Liquid Bit. Material	Cover Material Aggregate
RC-70, MC-70 or XC-250 @ 0.35 gals. per Sq. Yd.	No. 68 Aggregate @ 30 lbs. per Sq. Yd.	CRS-2 or CMS-2,2h @ 0.25 gal. per Sq. Yd.	No. 78 Aggregate @ 20 lbs. per Sq. Yd.	CRS-2 or CMS-2,2h @ 0.25 gals. per Sq. Yd.	No. 8 Aggregate @ 20 lbs. per Sq. Yd.

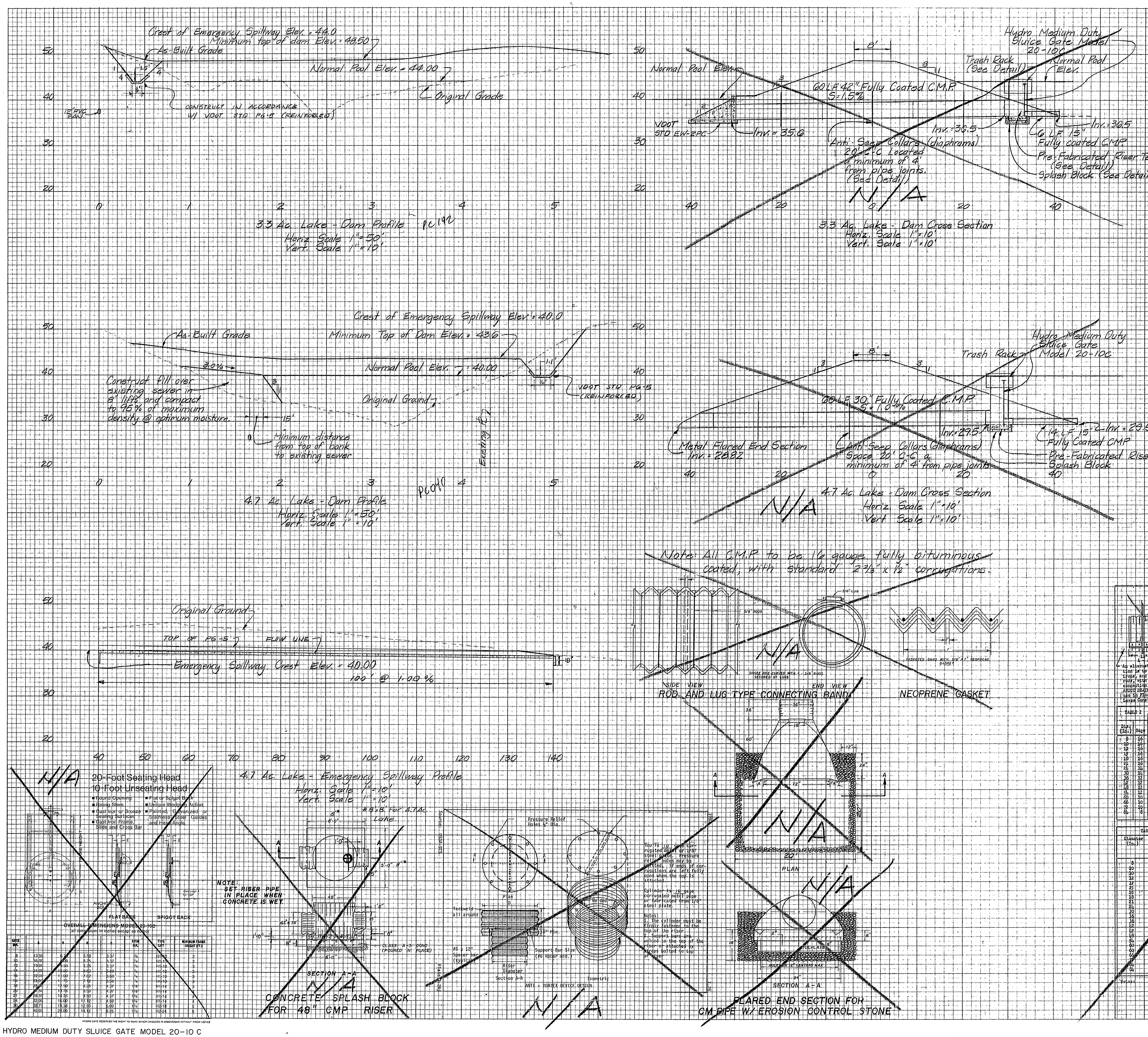
Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

DES. N.L.S. 1/20/2
DWN. B.S.S./H.P.
CHK. N.H.M.
DATE 9/18/86

BEAMER CONSTRUCTION CO.
POWHATAN OF WILLIAMSBURG SECONDARY
SUBDIVISION PHASES II & III
GEOMETRIC & DRAINAGE PLAN

PROJ. NO. 78-41
FLD. BK. NO.
SHEET 2 OF 8
DWG. 2114 W

PC040_POWHATAN_SECONDARY_PHASE_2_&_3_LARGER_LAKE - 004



Langley and McDonald
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ENGINEERS-PLANNERS-SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

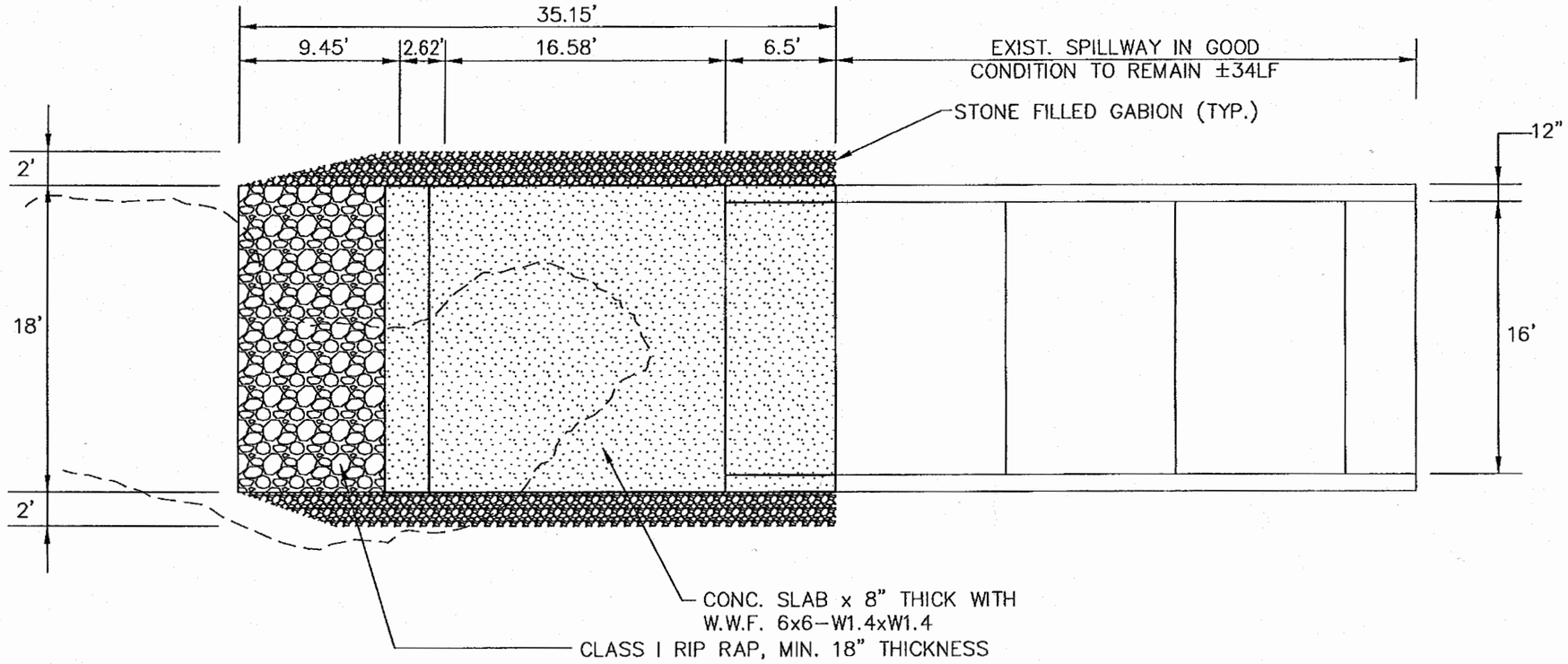
DES.	WCS
DWN.	WCS
CHK.	
DATE	August 26, 1988

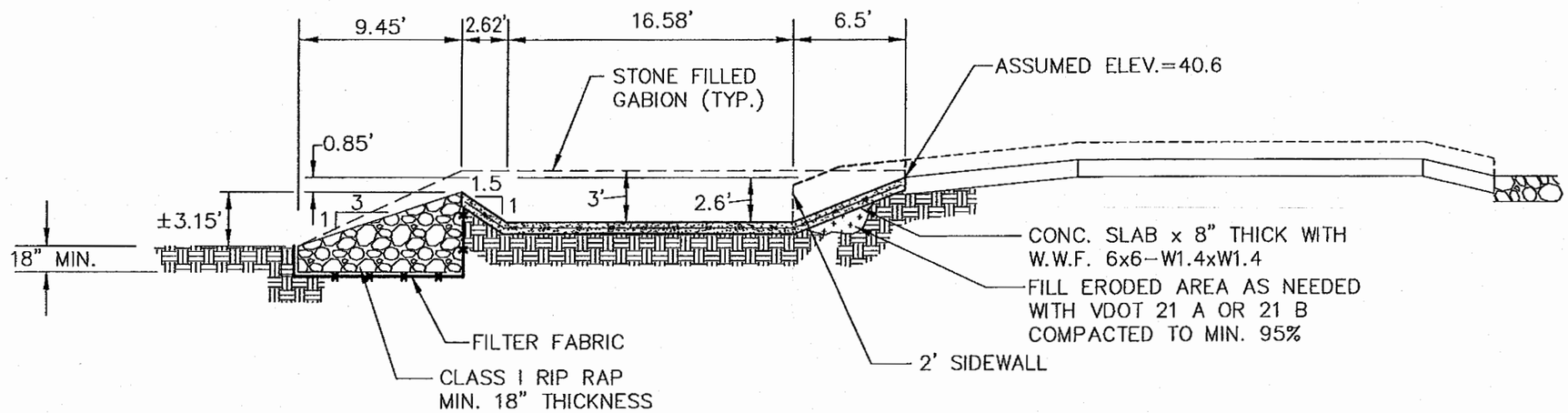
BEAMER CONSTRUCTION CO.
POWHATAN OF WILLIAMSBURG SECONDARY
SUBDIVISION PHASES II & III
DAM DETAILS

PROJ. NO.	78-41
FLD. BK. NO.	
SHEET	2A OF 8
DWG.	2114WA

PC040_POWHATAN_SECONDARY_PHASE_2_&_3_LARGER_LAKE - 005

PC040

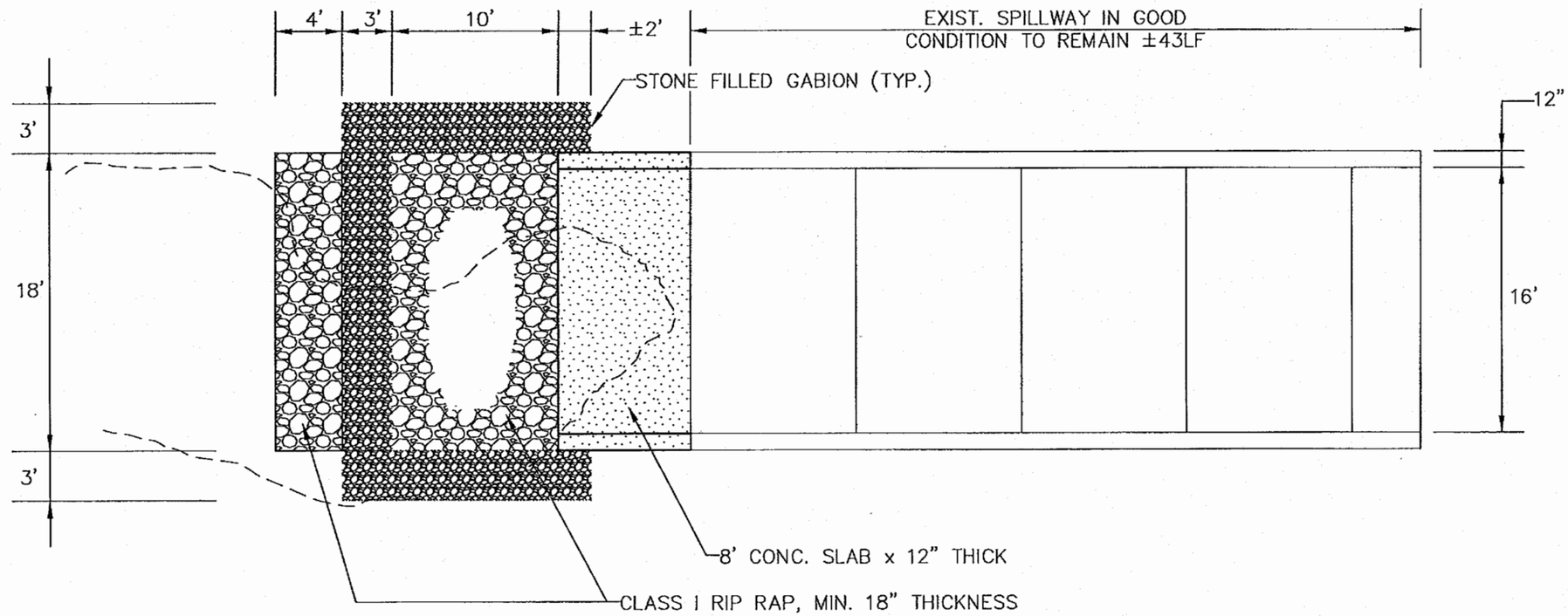


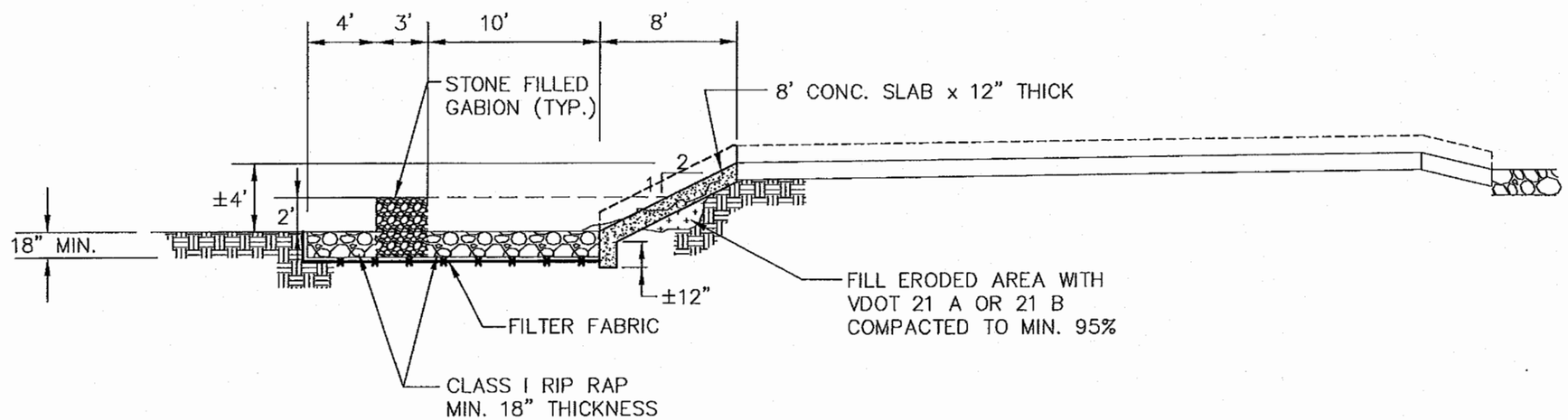


ALTERNATE #2
SPILLWAY REPAIR

SCALE: 1/8"=1'-0"
REVISED: 10/23/2009

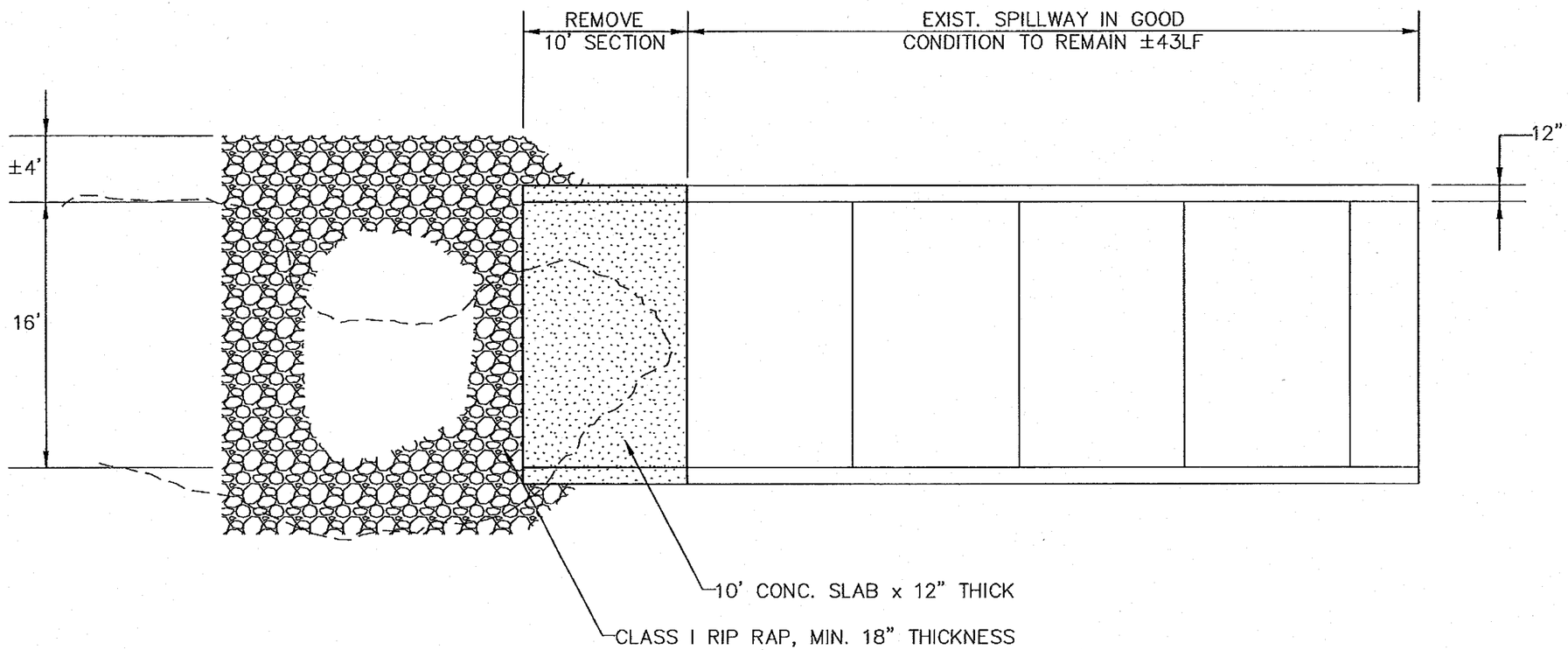
10/2009

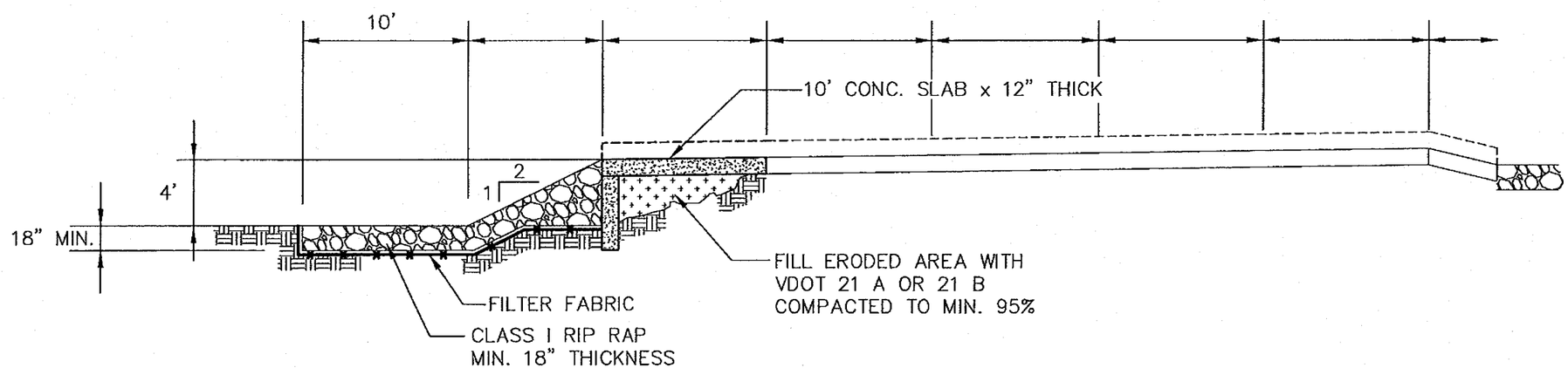




ALTERNATE #2
SPILLWAY REPAIR

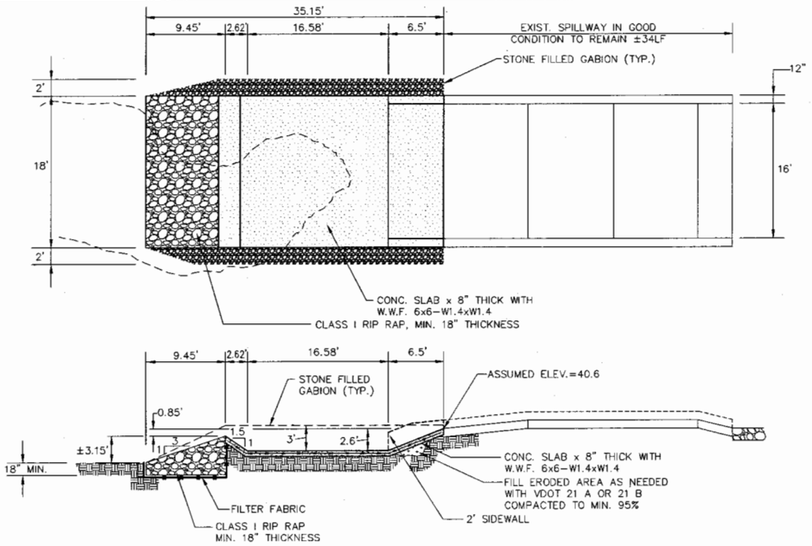
SCALE: 1/8"=1'-0"





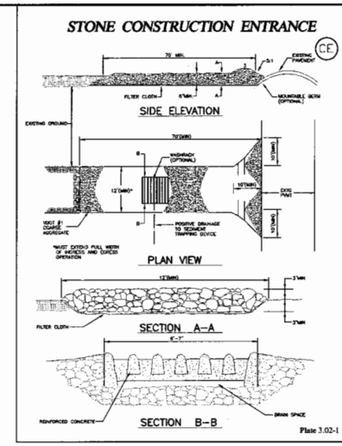
ALTERNATE #1
SPILLWAY REPAIR

SCALE: 1/8"=1'-0"



ALTERNATE #2
SPILLWAY REPAIR

SCALE: 1/8"=1'-0"
REVISED: 10/23/2009



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11/05/09

DRAWING STATUS
Interoffice Review
Client for Review
Pre Approval Bidding

COUNTY APPROVAL
1st Submittal
2nd Submittal
3rd Submittal
Approved

DETAIL SHEET

POWHATAN SECONDARY
BMP #03
SPILLWAY REPAIR

JAMES CITY COUNTY VIRGINIA

Designed: JWB	Date: 11/05/09
Checked: JWB	Scale: AS NOTED
File Mgr./Drawn: LMDG	CADD File name: C-2.dwg
Project Number: 1780041-000.65	Dwg. File No.: XXXXX X
Drawing Number	C-2

James City County

James City County Environmental Division
Standard Erosion and Sediment Control Notes
Revised October 1, 2009

The following standard erosion and sediment control (E&SC) notes shall become part of approved erosion and sediment control plans for all plan of development projects in James City County, Virginia.

1. All the provisions of Virginia Erosion and Sediment Control Law and Regulations, Minimum Standards, Handbooks, and Technical Bulletins as published by the Virginia Soil & Water Conservation Board and/or the Virginia Department of Conservation and Recreation, Division of Soil & Water Conservation shall apply to the project.

2. Minimum Standards # 1 through # 19 of the Virginia Erosion and Sediment Control Regulations (4VAC50-30-40) shall apply to the project.

3. The Owner or Applicant shall be responsible to register for coverage under the General Permit for Discharge of Stormwater from Construction Activities, in accordance with current requirements of the Virginia Stormwater Management Program (VSMP) and the Virginia Department of Conservation and Recreation.

4. The Owner or Applicant shall provide the name of an individual holding a valid Responsible Land Disturber (RLD) certificate of competence who will be responsible for the land-disturbing activity prior to engaging in the land-disturbing activity. This will be necessary prior to issuance of a land-disturbing permit for the project. The RLD is required to attend the preconstruction conference for the project.

5. The Contractor is responsible to contact Miss Utility (Dial 811 in VA or 1-800-552-7001) prior to any utility or site work excavations.

6. All erosion and sediment control measures shall be planned, designed, implemented, installed and maintained in accordance with the provisions of the latest edition of the Virginia Erosion and Sediment Control Handbook (VESCH). The Contractor shall maintain, inspect and repair all erosion and sediment control measures as needed throughout the life of the project to ensure continued acceptable performance.

7. A preconstruction conference (meeting) shall be held on site between the County Environmental Division, the Owner-Applicant, the Responsible Land-Disturber (RLD), the Contractor and other responsible agencies, as applicable, prior to issuance of a land-disturbing permit. The Owner or Applicant is required to coordinate scheduling of the preconstruction conference between all applicable parties. The Contractor shall submit a Sequence of Construction to the County Environmental Division for review and approval prior to the preconstruction meeting.

8. All perimeter erosion and sediment control measures shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.

9. Additional safety fence or dust control measures, in accordance with the provisions of Minimum Standards & Specs. 3.01 and 3.39 of the Virginia Erosion and Sediment Control Handbook (VESCH), may be required to be implemented in addition to that shown on the approved plan in order to ensure adequate protection of the health, safety and welfare of the public or if site conditions change, become apparent or alter significantly following the date of plan approval.

10. Erosion and sediment control measures may require minor field adjustments at or following time of construction to ensure their intended purpose is accomplished, to ensure adequate protection of the health, safety and welfare of the public, or if site conditions change, become apparent or alter significantly following the date of plan approval. County Environmental Division approval shall be required for any deviation of erosion and sediment control measures from the approved plan.

11. Off-site waste or borrow areas shall be approved by the County Environmental Division prior to the import of any borrow or export of any waste to or from the project site.

12. Culvert and storm drain inlet protections, in accordance with the provisions of Minimum Standards & Specs. 3.07 & 3.08 of the Virginia Erosion and Sediment Control Handbook (VESCH), may be removed at the discretion of the assigned County Environmental Division inspector should placement of the measure result in excessive road flooding or traffic hazard or result in the redirection of drainage onto or toward existing lots, driveways or structures. Decisions shall be made on a case-by-case basis based on field situations encountered.

13. Drainage facilities shall be installed and functional within 30 days following completion of rough grading at any point within the project.

14. No more than 300 feet of trench may be open at one time for underground utility lines, including storm water conveyances. All other provisions of Minimum Standard # 16 of the Virginia Erosion and Sediment Control regulations apply.

15. If disturbed area stabilization is to be accomplished during the months of December, January or February, stabilization shall consist of Mulching in accordance with Minimum Standard & Spec. 3.35 of the Virginia Erosion and Sediment Control Handbook (VESCH). Seeding will then take place as soon as the season permits.

16. The term seeding, final vegetative cover or stabilization on the approved plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed, in accordance with Minimum Standards & Specs. 3.29 through 3.37 of the Virginia Erosion and Sediment Control Handbook (VESCH), as applicable. Irrigation, if necessary, shall comply with all applicable outdoor water use restrictions of the James City Service Authority.

17. Temporary erosion and sediment control measures shall not be removed until all disturbed areas are stabilized. Removal shall not occur without authorization by the County Environmental Division. Disturbances associated with the removal of temporary erosion and sediment control measures shall be properly stabilized.

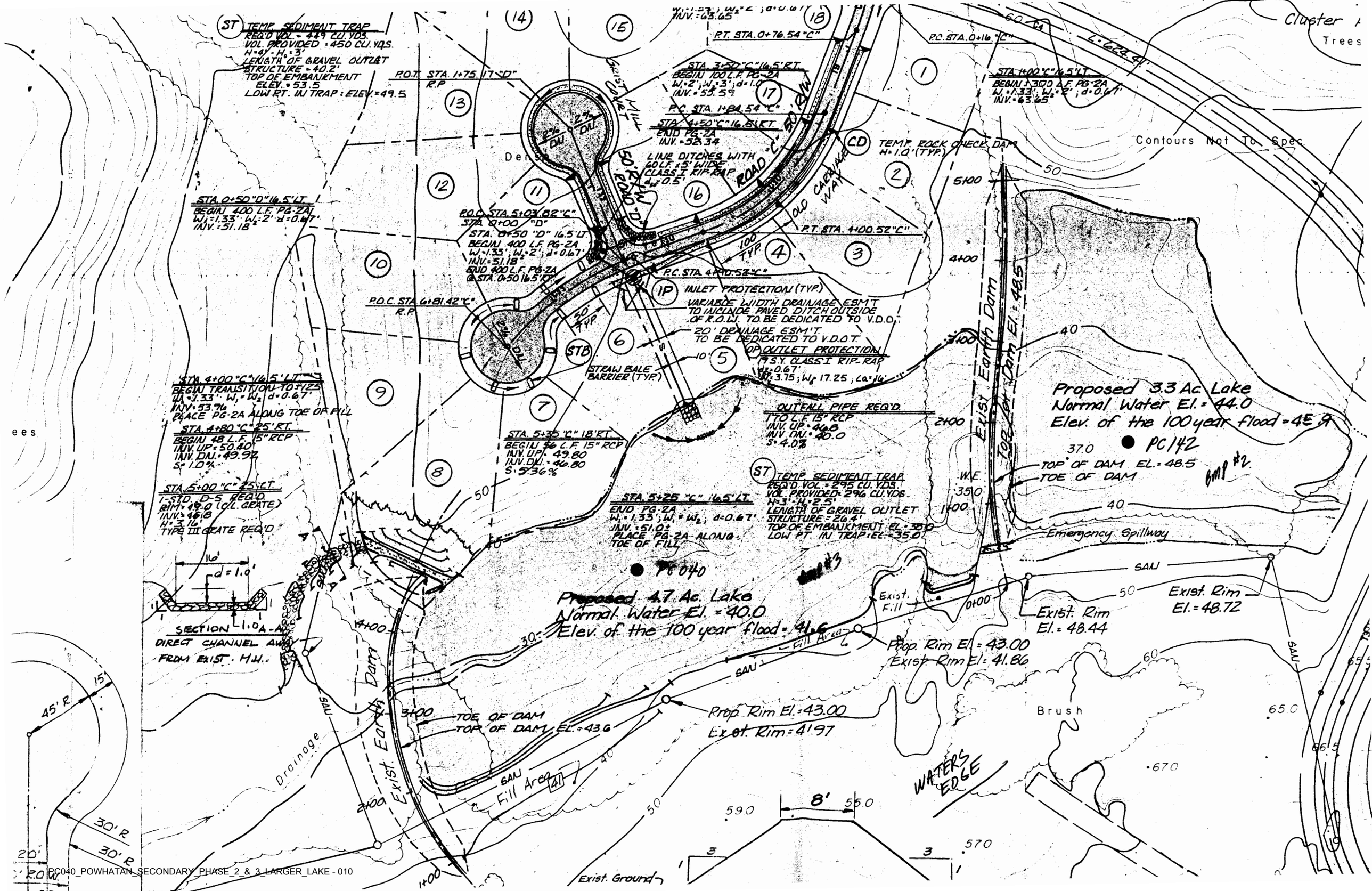
18. No sediment trap or sediment basin shall be removed until a) at least 75 percent of the single-family lots within the drainage area to the trap or basin have been sold to a third party for the construction of homes (unrelated to the developer); and/or, b) 60 percent of the single-family lots within the drainage area to the trap or basin are completed and stabilized. A bulk sale of the lots to another builder does not satisfy this provision. Sediment traps and sediment basins shall not be removed without authorization of the County Environmental Division.

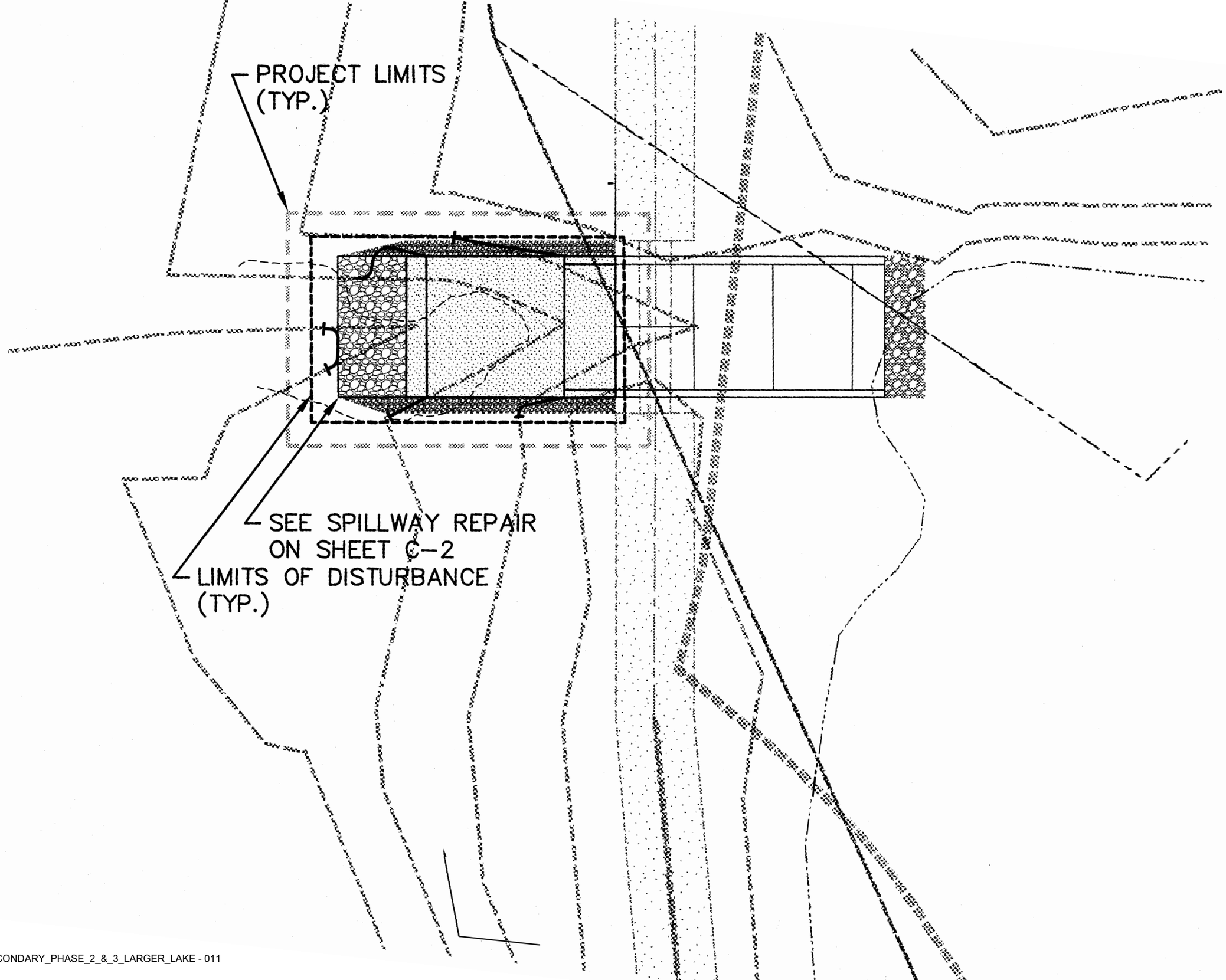
19. Applicable provisions of the County BMP Manual (James City County Guidelines for Design and Construction of Stormwater Management BMPs) and the Virginia Stormwater Management Handbook (VSMH) apply to the project.

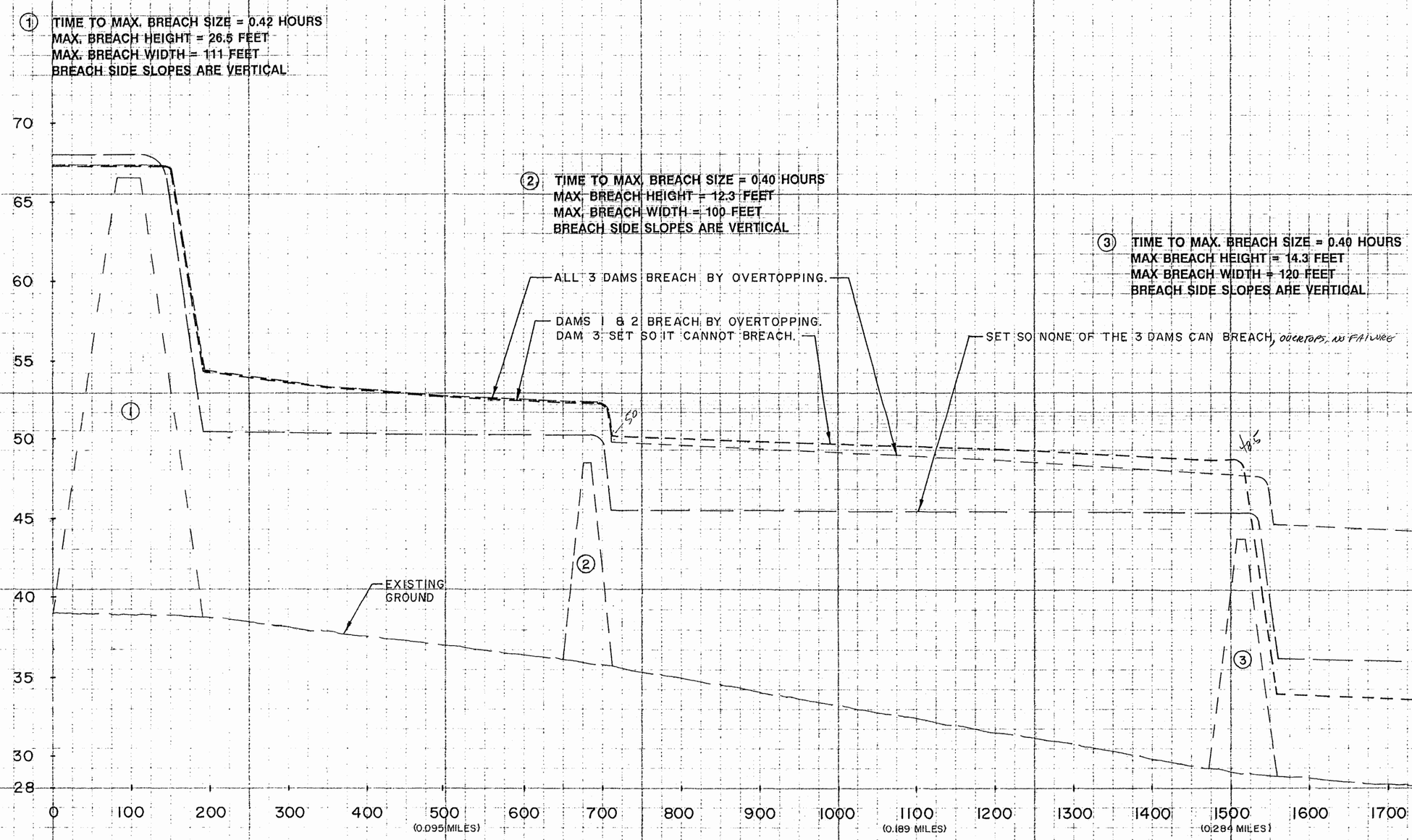
20. Design and construction of private-type storm drainage systems, outside VDOT right-of-way, shall be performed in accordance with the current version of the James City County Environmental Division, Stormwater Drainage Conveyance Systems (Non-BMP related), General Design and Construction Guidelines.

21. Record Drawings (Asbuilts) and Construction Certifications are required for all stormwater facilities including stormwater management/BMP facilities and storm drainage conveyance systems. Record drawings and construction certifications must meet established program requirements of both the County Environmental and Stormwater Divisions.

22. All stormwater facilities including BMPs, storm drainage pipes, stormwater conveyances, inlets, manholes, outfalls and roadside and other open channels shall be inspected by the County Stormwater Division and geotechnical engineer in accordance with established County Stormwater Division program requirements.


ST TEMP. SEDIMENT TRAP
REQ'D VOL. = 449 CU. YDS.
VOL. PROVIDED = 450 CU. YDS.
H = 4' - H₀ = 3'
LENGTH OF GRAVEL OUTLET STRUCTURE = 40.2'
TOP OF EMBANKMENT ELEV. = 53.5
LOW PT. IN TRAP: ELEV. = 49.5
P.O.T. STA. 1+75.17 "D" R.P.
P.T. STA. 0+76.54 "C"
P.C. STA. 0+16 "C"
STA. 3+50 "C" 16.5' RT.
BEGIN 100 L.F. PG-2A
W₁ = 2'; W₂ = 3'; d = 1.0'
INV. = 53.59
P.C. STA. 1+84.54 "C"
STA. 4+50 "C" 16.5' RT.
END PG-2A
INV. = 52.34
STA. 1+00 "C" 16.5' LT.
BEGIN 300 L.F. PG-2A
W₁ = 1.33'; W₂ = 2'; d = 0.67'
INV. = 63.65
L = 624.41'
Cluster
Trees
Contours Not To Spec.
CD TEMP. ROCK CHECK DAM H = 1.0' (TYP.)
LINE DITCHES WITH 60 L.F. x 3' WIDE CLASS I RIP-RAP d₅₀ = 0.5'
ROAD "C" 50' R/W
ROAD "D" 50' R/W
OLD CARRIAGE WAY
STA. 0+50 "D" 16.5' LT.
BEGIN 400 L.F. PG-2A
W₁ = 1.33'; W₂ = 2'; d = 0.67'
INV. = 51.18
P.O.C. STA. 5+03.82 "C"
STA. 0+00 "D"
STA. 0+50 "D" 16.5' LT.
BEGIN 400 L.F. PG-2A
W₁ = 1.33'; W₂ = 2'; d = 0.67'
INV. = 51.18
END 400 L.F. PG-2A
@ STA. 0+50 16.5' RT.
P.T. STA. 4+00.52 "C"
P.C. STA. 4+00.52 "C"
P.O.C. STA. 6+81.42 "C" R.P.
IP INLET PROTECTION (TYP.)
VARIABLE WIDTH DRAINAGE ESM'T TO INCLUDE PAVED DITCH OUTSIDE OF R.O.W. TO BE DEDICATED TO V.D.O.T.
20' DRAINAGE ESM'T. TO BE DEDICATED TO V.D.O.T.
OP OUTLET PROTECTION
19 S.Y. CLASS I RIP-RAP
d₅₀ = 0.67'
R = 3.75; W_b 17.25; L_a = 16'
STB STRAW BALE BARRIER (TYP.)
STA. 4+00 "C" 16.5' LT.
BEGIN TRANSITION TO 4'/25
W₁ = 1.33'; W₂ = W₂; d = 0.67'
INV. = 53.76
PLACE PG-2A ALONG TOE OF FILL
STA. 4+80 "C" 25' RT.
BEGIN 48 L.F. 15" RCP
INV. UP = 50.40
INV. DN. = 49.92
S = 1.0%
STA. 5+00 "C" 25' LT.
1-STD. D-5 REQ'D.
RIM = 49.0 (C/L GRATE)
INV. = 46.8
H = 3.16'
TYPE III GRATE REQ'D
STA. 5+35 "C" 18' RT.
BEGIN 56 L.F. 15" RCP
INV. UP = 49.80
INV. DN. = 46.80
S = 5.36%
OUTFALL PIPE REQ'D.
170 L.F. 15" RCP
INV. UP = 46.8
INV. DN. = 40.0
S = 4.0%
ST TEMP. SEDIMENT TRAP
REQ'D VOL. = 295 CU. YDS.
VOL. PROVIDED = 296 CU. YDS.
H = 3' - H₀ = 2.5'
LENGTH OF GRAVEL OUTLET STRUCTURE = 26.4'
TOP OF EMBANKMENT EL. = 38.0
LOW PT. IN TRAP EL. = 35.0
STA. 5+25 "C" 16.5' LT.
END PG-2A
W₁ = 1.33'; W₁ = W₂; d = 0.67'
INV. = 51.0±
PLACE PG-2A ALONG TOE OF FILL
Exist. Earth Dam
Top of Dam El. = 48.5
TOP OF DAM EL. = 48.5
TOE OF DAM
Emergency Spillway
Proposed 3.3 Ac. Lake
Normal Water El. = 44.0
Elev. of the 100 year flood = 45.9
PC142
BMP #2
PC040
BMP #3
Proposed 4.7 Ac. Lake
Normal Water El. = 40.0
Elev. of the 100 year flood = 41.6
SECTION A-A
d = 1.0'
16'
1.0
DIRECT CHANNEL AWAY FROM EXIST. M.H.
Exist. Fill
Exist. Rim El. = 48.44
Exist. Rim El. = 48.72
Prop. Rim El. = 43.00
Exist. Rim El. = 41.86
Fill Area
SAN
TOE OF DAM
TOP OF DAM EL. = 43.6
Prop. Rim El. = 43.00
Exist. Rim = 41.97
Drainage
Brush
WATER'S EDGE
Exist. Ground
8'
45' R.
30' R.
20'


PROJECT LIMITS
(TYP.)
SEE SPILLWAY REPAIR
ON SHEET C-2
LIMITS OF DISTURBANCE
(TYP.)



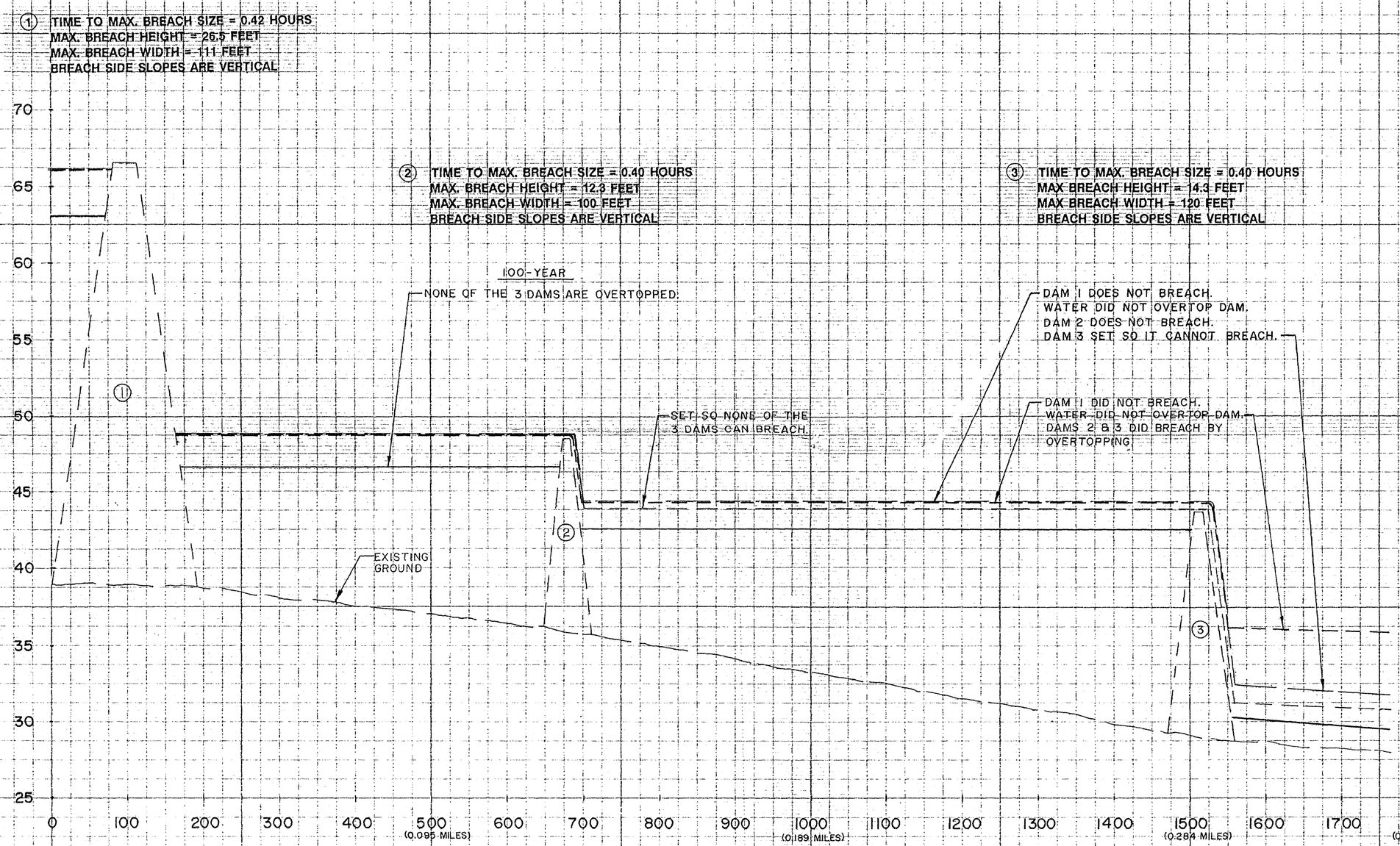
PMF

WATER SURFACE ELEVATIONS
RENNICK'S POND
DAM BREAK ANALYSIS

SCALE
HORIZ. 1" = 100'
VERT. 1" = 5'

Smith Dermer Normann
Engineers & Planners
2101 Executive Drive, Tower Box 50
Hampton, Virginia 23666
Telephone 804-826-4800/Norfolk 804-627-5900

FIGURE 1 OF 4 880099.00



1/2 PMF & 100 YEAR

WATER SURFACE ELEVATIONS

RENNICK'S POND

DAM BREAK ANALYSIS

SCALE

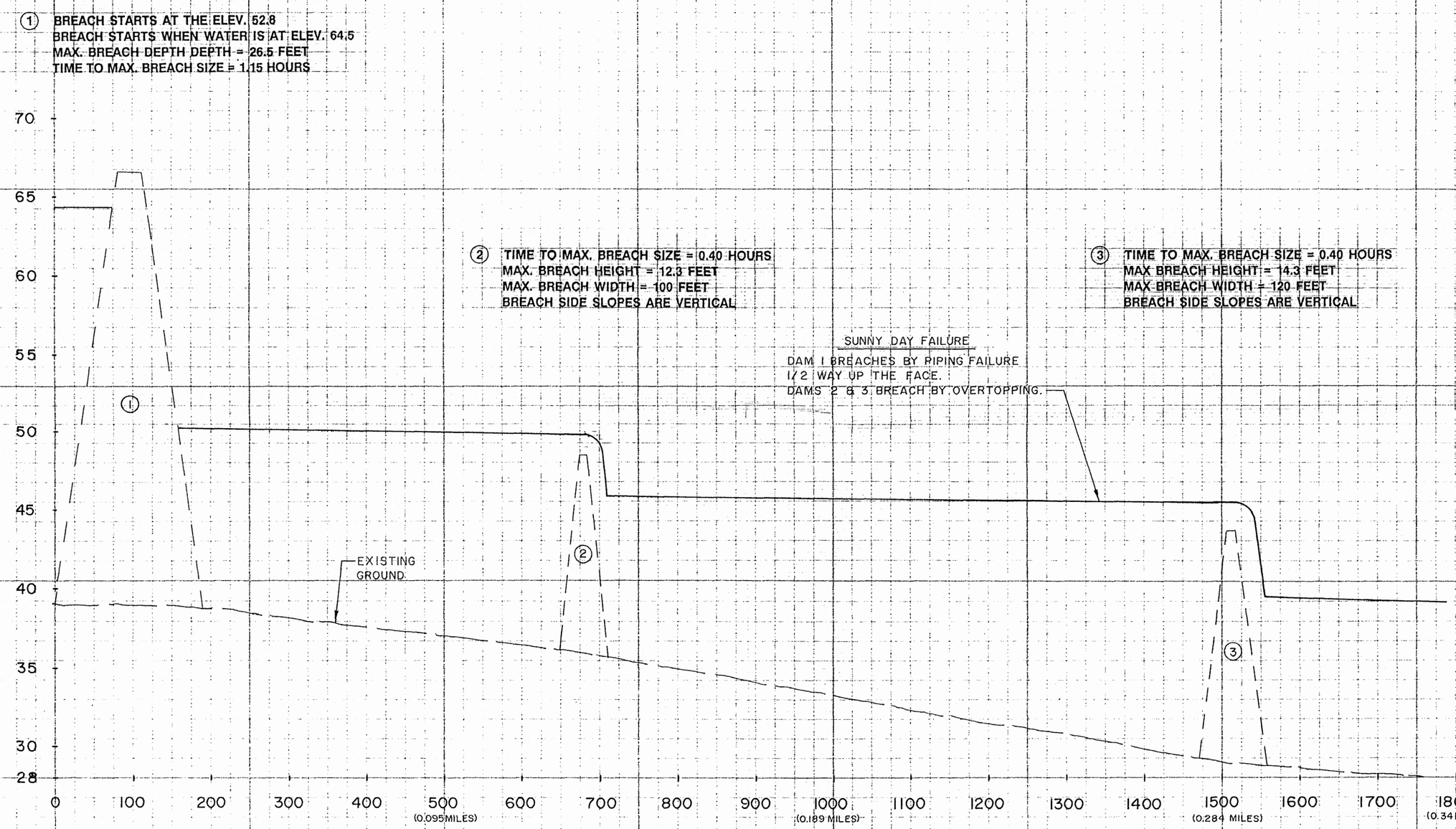
HORIZ. 1" = 100'

VERT. 1" = 5'

Smith Dermer Normann
Engineers & Planners
2101 Executive Drive, Tower Box 50
Hampton, Virginia 23666
Telephone 804-826-4800/Norfolk 804-627-6900

FIGURE 2 OF 4

88059.00



SCALE

HORIZ. 1" = 100'
VERT. 1" = 5'

PMF

WATER SURFACE ELEVATIONS
RENNICK'S POND
DAM BREAK ANALYSIS

Smith Dermer Normann
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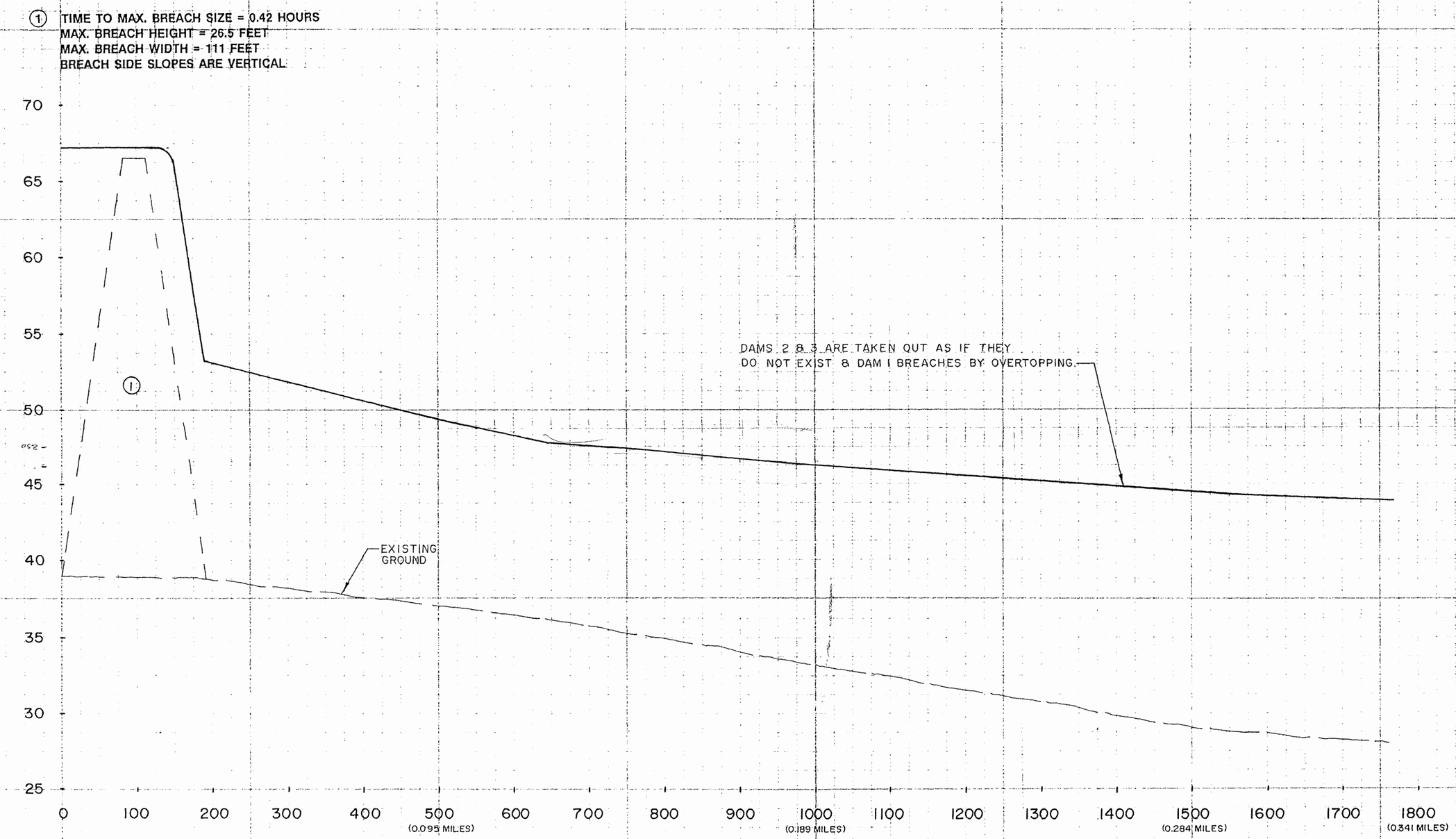
Hampton, Virginia 23666
Telephone 804-826-4800/Norfolk 804-627-6900

FIGURE 3 OF 4 88049.00



PMF

WATER SURFACE ELEVATIONS
RENNICK'S POND
DAM BREAK ANALYSIS

SCALE

HORIZ. 1" = 100'
VERT. 1" = 5'

Smith Dewey Normann
Engineers & Planners
2101 Executive Drive, Tower Box 50
Hampton, Virginia 23666
Telephone 804-826-4800/Norfolk 804-627-6900

FIGURE 4 OF 4

88049 00

LABEL	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	CHORD BEARING
C1	500.00	06 57' 11"	60.88	60.64	S 86 31' 26" W
C2	250.00	121 52' 19"	531.77	437.04	N 36 01' 01" W
C3	400.00	73 26' 45"	512.63	478.26	N 11 47' 45" W
C4	1199.81	39 24' 05"	824.41	808.26	N 68 12' 40" W
C5	325.00	25 07' 48"	142.54	141.40	S 78 79 31' 26" W
C6	375.00	09 15' 00"	60.54	60.48	S 16 16' 19" W
C7	350.00	02 10' 38"	13.30	13.30	S 69 18' 30" W

LABEL	BEARING	DISTANCE
T1	S 90 00' 00" W	99.82
T2	S 83 02' 49" W	304.57
T3	N 24 66' 08" E	170.37
T4	N 87 54' 42" W	370.00
T5	S 32 43' 11" E	92.00
T6	S 46 51' 11" E	52.00
T7	S 11 38' 49" W	78.00
T8	S 11 38' 49" W	16.00
T9	S 20 53' 49" W	108.00
T10	S 70 23' 49" W	90.00

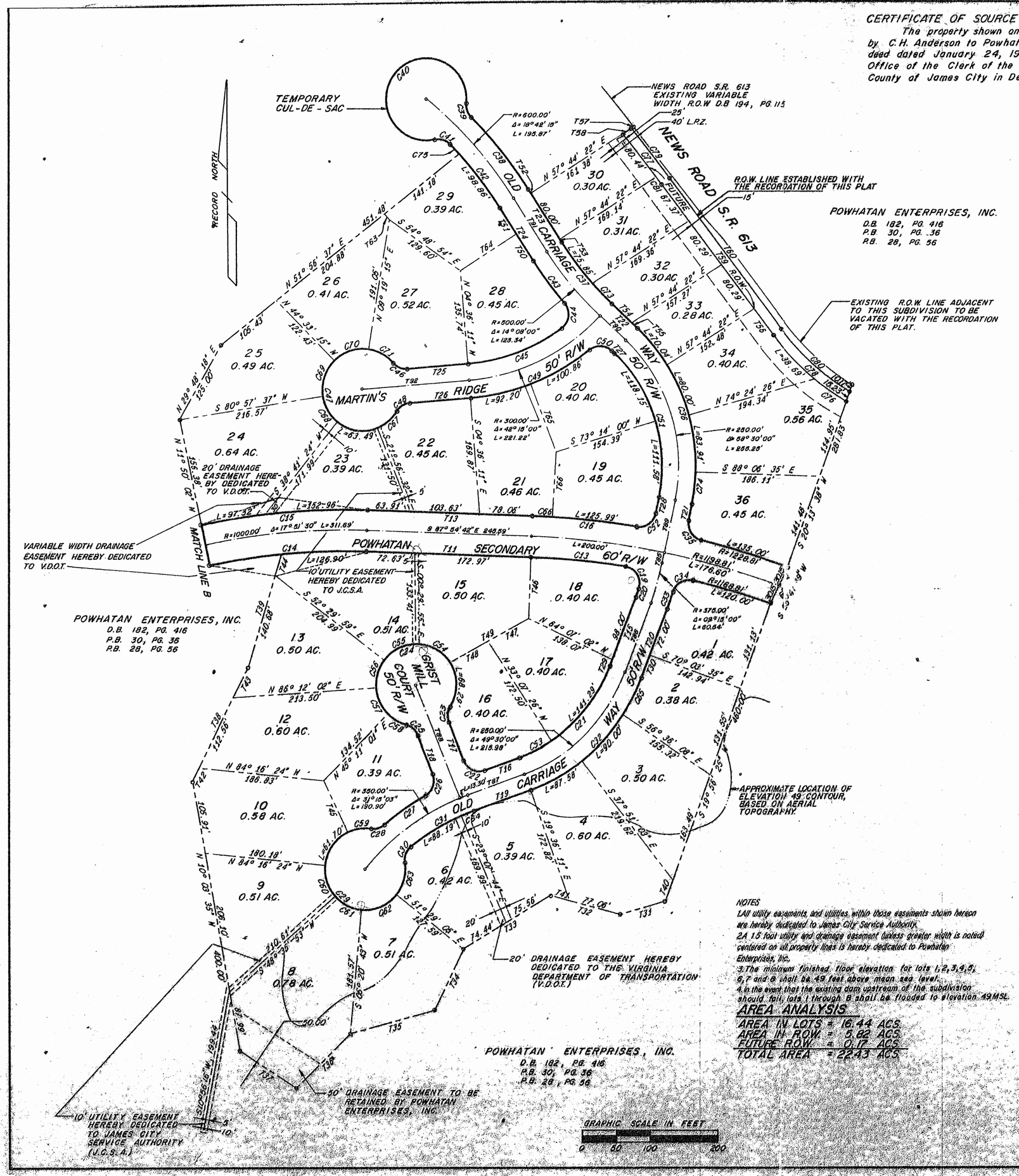
Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

DES.	EDZ
DWN.	EDZ
CHK.	NHM
DATE	SEPT. 18, 1986

BEAMER CONSTRUCTION CO.
POWHATAN OF WILLIAMSBURG SECONDARY
DRAINAGE AREAS
5-40-86

PROJ. NO.	75-41
FLD. BK. NO.	
SHEET	OF
DWG.	2118 W

PC040_POWHATAN_SECONDARY_PHASE_2_&_3_LARGER_LAKE - 016



CERTIFICATE OF SOURCE OF TITLE

The property shown on this plat was conveyed by C.H. Anderson to Powhatan Enterprises, Inc. by deed dated January 24, 1978 and recorded in the Office of the Clerk of the Circuit Court of the County of James City in Deed Book 182 Page 416.

COMMONWEALTH OF VIRGINIA
NORMAN H. MASON
No 1376
LAND SURVEYOR

SURVEYOR'S CERTIFICATE

I hereby certify that to the best of my knowledge and belief, all of the requirements of the Board of Supervisors and Ordinances of the County of James City, Virginia, regarding the platting of subdivisions within the County have been complied with.

Given under my hand this 17TH day of AUGUST, 1989.

Norman H. Mason
State Certified Land Surveyor

OWNER'S CERTIFICATE

This subdivision of property as shown hereon is with the free consent and in accordance with the desires of the undersigned Owner.

POWHATAN ENTERPRISES, INC.

By: [illegible]

Attest: Norman H. Mason

STATE OF
COUNTY OF TO WIT:

I Virginia J. Bordner a Notary Public in and for the City and State aforesaid do hereby certify that Lewis Vincent E. Bennett & Norman H. Mason whose names are signed to the foregoing writing bearing date of the 17th day of August have acknowledged the same before me in my City and State aforesaid.

Given unto my hands this 17th day of August, 1989.

Virginia J. Bordner
Notary Public

My commission expires Sept. 12, 1990

LABEL	BEARING	DISTANCE
T9	S 00° 00' 00" E	60.00
T11	N 87° 54' 42" W	245.59
T13	S 87° 54' 42" E	245.59
T15	S 20° 53' 49" W	108.00
T16	S 70° 23' 49" W	55.17
T17	N 21° 46' 49" W	58.04
T18	S 21° 46' 49" E	59.57
T19	N 70° 23' 49" E	90.00
T20	N 20° 53' 49" E	108.00
T21	N 11° 38' 49" E	24.00
T22	N 46° 51' 11" W	52.00
T23	N 32° 43' 11" W	92.00
T24	S 32° 43' 11" E	92.00
T25	S 85° 23' 49" W	91.26
T26	N 85° 23' 49" E	91.26
T27	S 46° 51' 11" E	5.59
T28	S 11° 38' 49" W	24.00
T29	S 20° 53' 49" W	10.00
T30	N 20° 53' 49" E	36.00
T31	S 73° 56' 25" W	70.00
T32	N 75° 03' 35" W	108.00
T33	S 58° 56' 25" W	150.00
T34	S 25° 56' 25" W	100.00
T35	S 74° 56' 25" W	130.00
T36	S 45° 36' 50" W	113.60
T37	N 57° 03' 35" W	100.00
T38	N 26° 56' 25" E	195.00
T39	N 16° 31' 25" E	173.07
T40	S 19° 56' 25" W	33.83
T41	N 75° 03' 35" W	30.94
T42	N 26° 56' 25" E	22.44
T43	N 26° 56' 25" E	50.00
T44	N 16° 31' 25" E	32.39
T45	N 25° 21' 15" W	83.42
T46	S 02° 05' 18" W	90.05
T47	S 61° 17' 25" W	69.38
T48	S 61° 17' 25" W	64.68
T49	S 61° 17' 25" W	134.06
T50	N 32° 43' 11" W	46.00
T51	N 32° 43' 11" W	46.00
T52	S 32° 43' 11" E	7.47
T53	S 32° 43' 11" E	4.53
T54	S 46° 51' 11" E	40.93
T55	S 46° 51' 11" E	11.07
T56	S 37° 10' 24" E	48.16
T57	S 57° 44' 22" W	2.04
T58	S 57° 44' 22" W	15.11
T59	S 37° 10' 24" E	276.12
T60	S 37° 10' 24" E	276.12
T61	N 20° 13' 38" E	10.17
T63	S 40° 35' 30" E	11.27
T64	N 57° 16' 49" E	98.75
T65	S 20° 51' 28" E	106.00
T66	S 03° 29' 13" W	95.00

LABEL	BEARING	DISTANCE
T85	S 11° 38' 49" W	16.00
T86	S 20° 53' 49" W	108.00
T87	S 70° 23' 49" W	90.00
T88	N 21° 46' 49" W	175.17
T89	S 11° 38' 49" W	70.00
T90	S 46° 51' 11" E	52.00
T91	S 32° 43' 11" E	92.00
T92	S 85° 23' 49" W	160.00

CERTIFICATE OF APPROVAL

This subdivision known as Powhatan of Williamsburg Secondary Phase II and Parcels III, IV & V Subdivision is approved by the undersigned in accordance with existing subdivision regulations and may be admitted to record.

8-21-89 — Highway Engineer

8-21-89 — Health Officer

Date — Agent or Representative of Governing Body

STATE OF VIRGINIA, COUNTY OF JAMES CITY

In the clerk's office of the circuit court of the County of James City this _____ day of _____, 1989. The map shown hereon was presented and admitted to the record as the law directs.

Teste: _____, Clerk

Plat Book: _____ Page: _____

NOTES

1. All utility easements and utilities within those easements shown hereon are hereby dedicated to James City Service Authority.
2. A 15 foot utility and drainage easement (unless greater width is noted) centered on all property lines is hereby dedicated to Powhatan Enterprises, Inc.
3. The minimum finished floor elevation for lots 1, 2, 3, 4, 5, 6, 7 and 8 shall be 49 feet above mean sea level.
4. In the event that the existing dam upstream of the subdivision should fail, lots 1 through 8 shall be flooded to elevation 49 MSL.

AREA ANALYSIS

AREA IN LOTS = 16.44 ACS.
AREA IN ROW = 5.82 ACS.
FUTURE ROW = 0.17 ACS.
TOTAL AREA = 22.43 ACS.

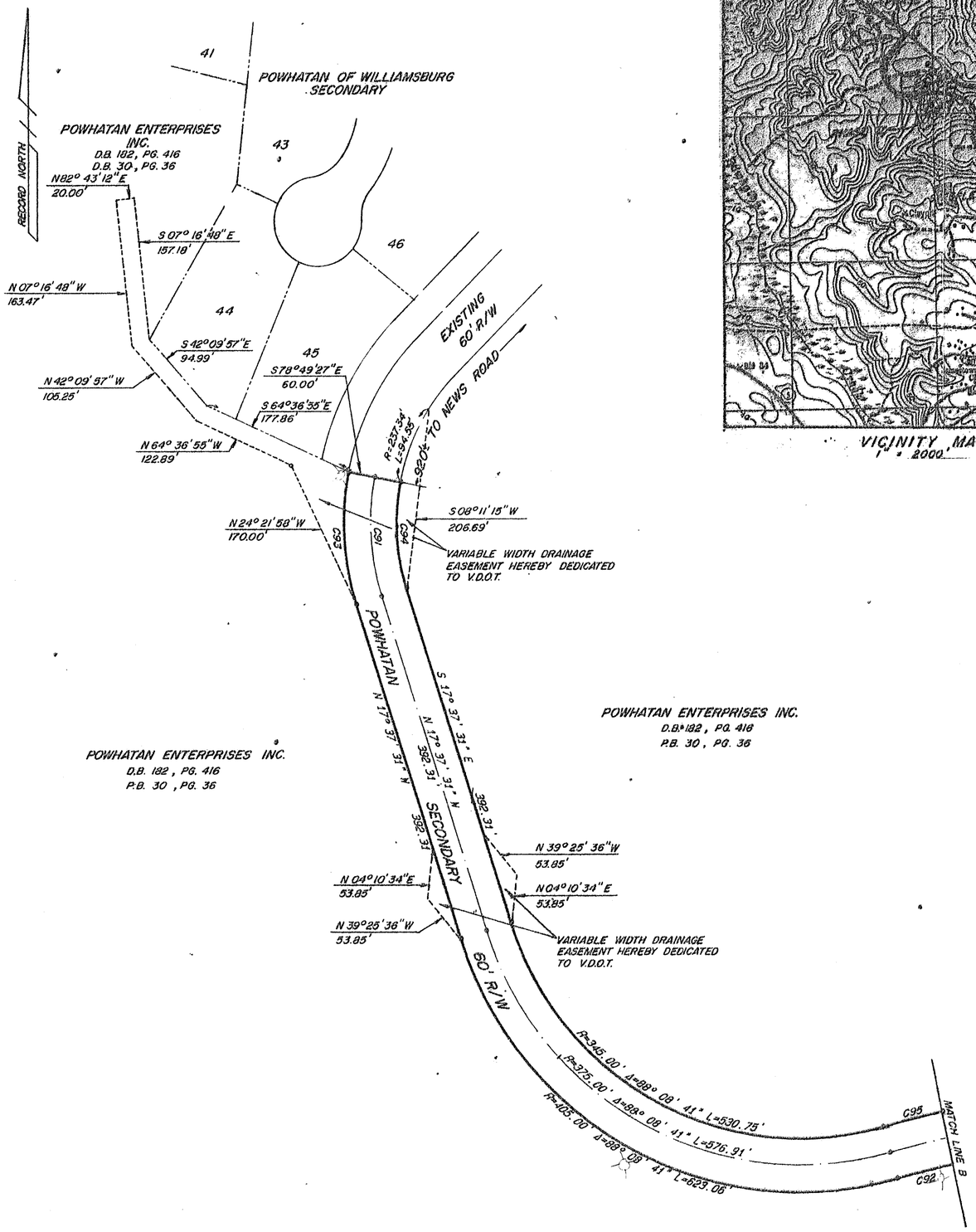
PLAT OF
POWHATAN OF WILLIAMSBURG SECONDARY
PHASE II

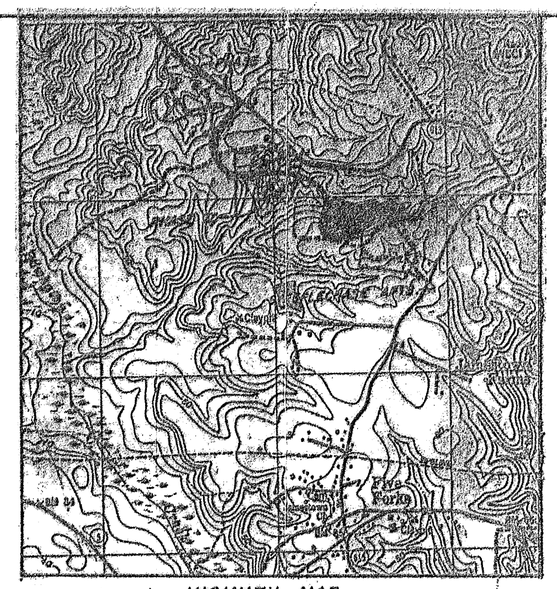
A SUBDIVISION OF PROPERTY OF
POWHATAN ENTERPRISES, INC.
JAMES CITY COUNTY, VIRGINIA
SCALE: 1"=100' JULY 7, 1989
Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS PLANNERS SURVEYORS
VIRGINIA BEACH – WILLIAMSBURG, VIRGINIA

SHEET 1 OF 2

3081 W

PC040_POWHATAN_SECONDARY_PHASE_2_&_3_LARGER_LAKE - 017





VICINITY MAP
1" = 2000'

LABEL	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	CHORD BEARING
C91	257.34	29° 49' 04"	134.39	132.99	N 03° 13' 29" W
C92	970.00	03° 56' 10"	66.64	66.62	S 76° 11' 53" W
C93	297.34	28° 49' 04"	149.47	147.90	N 03° 13' 29" W
C94	237.34	28° 49' 04"	119.31	118.05	S 03° 13' 29" E
C95	1030.00	03° 56' 10"	70.78	70.74	N 76° 11' 53" E
C13	1168.81	06° 55' 41"	141.33	141.25	N 84° 26' 52" W
C14	970.00	13° 55' 20"	235.70	235.12	S 85° 07' 38" W
C15	1030.00	13° 55' 20"	250.28	249.66	N 85° 07' 38" E
C18	1228.81	07° 16' 24"	155.99	155.88	S 84° 16' 30" E
C19	25.00	99° 44' 12"	43.52	38.23	S 31° 06' 55" E
C20	350.00	02° 08' 38"	13.10	13.10	S 19° 49' 30" W
C21	225.00	49° 30' 00"	194.39	188.40	S 49° 38' 49" W
C22	25.00	87° 49' 22"	38.32	34.68	N 65° 41' 30" W
C23	25.00	53° 58' 05"	23.55	22.69	N 05° 12' 14" E
C24	60.00	287° 56' 10"	301.53	70.59	S 68° 13' 11" W
C25	25.00	53° 58' 05"	23.55	22.69	S 48° 45' 51" E
C26	25.00	82° 49' 09"	36.14	33.07	S 19° 37' 46" W
C27	375.00	11° 21' 05"	74.29	74.17	S 55° 21' 48" W
C28	25.00	48° 52' 25"	21.33	20.68	S 74° 07' 28" W
C29	60.00	287° 31' 44"	301.10	70.99	S 45° 12' 11" E
C30	25.00	60° 17' 29"	26.31	25.11	N 21° 10' 42" E
C31	323.00	19° 04' 22"	108.19	107.69	N 60° 51' 38" E
C32	275.00	49° 30' 00"	237.58	230.26	N 45° 38' 49" E
C33	400.00	03° 50' 52"	26.86	26.86	N 18° 58' 23" E
C34	25.00	87° 00' 31"	37.96	34.42	N 60° 33' 12" E
C35	25.00	87° 42' 52"	38.27	34.64	N 32° 12' 37" W
C36	275.00	58° 30' 00"	280.78	268.74	N 17° 36' 11" W
C37	475.00	14° 08' 00"	117.17	116.87	N 39° 47' 11" W
C38	625.00	12° 23' 40"	135.20	134.94	N 38° 55' 01" W
C39	25.00	50° 52' 35"	22.20	21.48	N 19° 10' 33" W
C40	60.00	287° 47' 56"	301.38	70.70	S 41° 51' 46" W
C41	25.00	57° 28' 22"	25.08	24.04	S 73° 18' 01" E
C42	575.00	11° 50' 39"	118.86	118.65	S 38° 38' 30" E
C43	525.00	08° 26' 42"	77.38	77.31	S 36° 56' 32" E
C44	28.00	95° 12' 57"	41.55	36.93	S 06° 26' 35" W
C45	275.00	31° 20' 45"	150.45	149.58	S 69° 43' 27" W
C46	25.00	53° 58' 05"	23.55	22.69	N 67° 37' 08" W
C47	60.00	287° 56' 10"	301.53	70.59	S 04° 36' 11" E
C48	25.00	53° 58' 05"	23.55	22.69	N 58° 24' 46" E
C49	325.00	34° 02' 12"	193.07	190.24	N 68° 22' 43" E
C50	25.00	81° 47' 12"	35.69	32.73	S 87° 44' 47" E
C51	225.00	58° 30' 00"	229.73	219.88	S 17° 36' 11" E
C52	25.00	87° 42' 53"	38.27	34.64	S 55° 30' 15" W
C53	225.00	13° 31' 15"	53.10	52.97	S 63° 38' 12" W
C54	60.00	57° 28' 17"	60.18	57.69	N 61° 45' 46" W
C55	60.00	52° 00' 08"	54.46	52.61	S 63° 30' 03" W
C56	60.00	41° 17' 59"	43.25	42.32	S 16° 51' 01" W
C57	60.00	41° 01' 01"	42.95	42.04	S 24° 18' 28" E
C58	60.00	30° 55' 55"	32.39	32.00	S 60° 16' 56" E
C59	60.00	33° 54' 56"	35.52	35.00	S 81° 36' 13" W
C60	60.00	47° 07' 43"	49.35	47.97	S 17° 30' 15" E
C61	60.00	43° 15' 10"	45.29	44.23	S 83° 01' 42" E
C62	60.00	56° 49' 48"	59.51	57.10	N 66° 35' 49" E
C63	60.00	47° 28' 58"	49.72	48.31	N 14° 46' 27" E
C64	328.00	03° 31' 33"	20.00	20.00	N 68° 38' 02" E
C65	275.00	12° 30' 03"	60.00	59.88	N 27° 08' 51" E
C66	1228.81	01° 23' 56"	30.00	30.00	S 87° 12' 44" E
C67	60.00	36° 37' 45"	38.36	37.71	S 49° 44' 36" W
C68	60.00	42° 16' 14"	44.27	43.27	N 30° 10' 30" W
C69	60.00	54° 29' 08"	57.08	54.93	N 18° 12' 11" E
C70	60.00	53° 52' 30"	56.42	54.36	N 72° 23' 00" E
C71	60.00	40° 02' 39"	41.93	41.09	S 60° 38' 28" E
C73	475.00	04° 59' 05"	41.32	41.31	S 44° 21' 38" E
C74	275.00	09° 45' 24"	46.83	46.77	S 06° 46' 07" W
C75	575.00	01° 59' 34"	20.00	20.00	N 43° 34' 02" W
C76	372.00	09° 08' 38"	59.04	58.98	S 55° 22' 49" E
C77	2019.79	01° 53' 50"	93.37	93.37	S 38° 07' 18" E
C78	372.00	22° 45' 13"	147.73	146.76	S 48° 33' 00" E
C79	2034.79	01° 51' 40"	92.08	92.07	S 38° 06' 14" E
C80	357.00	22° 20' 08"	139.17	138.23	S 48° 20' 28" E
C81	2019.79	00° 15' 48"	12.93	12.93	S 37° 18' 17" E

GRAPHIC SCALE IN FEET
0 50' 100' 200'

PLAT OF
POWHATAN OF WILLIAMSBURG SECONDARY
PHASE II

A SUBDIVISION OF PROPERTY OF
POWHATAN ENTERPRISES, INC.
JAMES CITY COUNTY, VIRGINIA
SCALE: 1"=100' JULY 7, 1989
Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS PLANNERS SURVEYORS
VIRGINIA BEACH – WILLIAMSBURG, VIRGINIA

SHEET 2 OF 2

3050AW

HYDROLOGIC STUDY FOR

POWHATAN

POWHATAN OF WILLIAMSBURG SECONDARY II

JAMES CITY COUNTY, VIRGINIA

by

LANGLEY & McDONALD, P.C.

204 PACKETTS COURT

WILLIAMSBURG, VIRGINIA 23185

6/27/89

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LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR

POWHATAN

S. C. S. HYDROGRAPH

BASIN IDENTIFICATION 15 AC. LAKE
BASIN DISCHARGES INTO 3.3 AC. LAKE

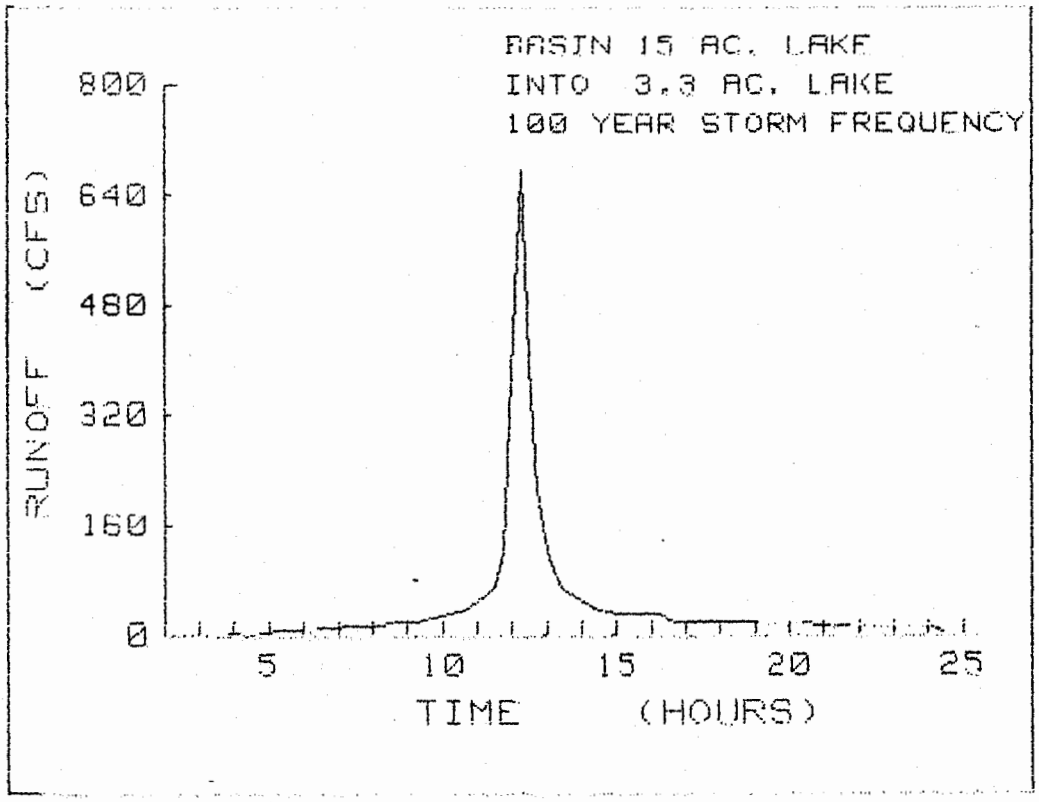
BASIN AREA	=	121.00	ACRES
BASIN CURVE NUMBER	=	89.00	
24-HOUR PRECIPITATION	=	8.50	INCHES
AVERAGE BASIN SLOPE	=	3.3	%
HYDRAULIC LENGTH	=	3300.0	FEET
BASIN LAG	=	.30	HOURS

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
1.00	0.0	1.25	0.0	1.50	0.0	1.75	0.0
2.00	0.0	2.25	0.0	2.50	0.0	2.75	0.0
3.00	.2	3.25	.6	3.50	1.1	3.75	1.6
4.00	2.1	4.25	2.6	4.50	3.5	4.75	4.2
5.00	4.8	5.25	5.4	5.50	5.9	5.75	6.3
6.00	6.8	6.25	7.4	6.50	8.8	6.75	9.8
7.00	10.5	7.25	11.0	7.50	11.4	7.75	11.8
8.00	12.2	8.25	13.2	8.50	16.0	8.75	17.6
9.00	18.5	9.25	19.5	9.50	21.9	9.75	23.8
10.00	26.2	10.25	29.7	10.50	33.6	10.75	38.3
11.00	46.5	11.25	55.1	11.50	72.5	11.75	122.5
12.00	375.6	12.25	674.9	12.50	397.3	12.75	209.5
13.00	121.4	13.25	85.5	13.50	65.0	13.75	55.6
14.00	47.5	14.25	42.2	14.50	35.0	14.75	31.7
15.00	30.8	15.25	30.5	15.50	30.4	15.75	30.4
16.00	30.4	16.25	28.7	16.50	22.6	16.75	19.5
17.00	18.6	17.25	18.4	17.50	18.3	17.75	18.3
18.00	18.3	18.25	18.3	18.50	18.3	18.75	18.3
19.00	18.2	19.25	18.2	19.50	18.2	19.75	18.2
20.00	18.2	20.25	17.5	20.50	14.4	20.75	12.8
21.00	12.4	21.25	12.3	21.50	12.2	21.75	12.2
22.00	12.2	22.25	12.2	22.50	12.2	22.75	12.2
23.00	12.2	23.25	12.2	23.50	12.2	23.75	12.1
24.00	11.6	24.25	5.7	24.50	1.7	24.75	.5
25.00	.1	25.25	0.0	25.50	0.0	25.75	0.0
26.00	0.0	26.25	0.0	26.50	0.0	26.75	0.0

LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR POWHATAN



LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR

POWHATAN

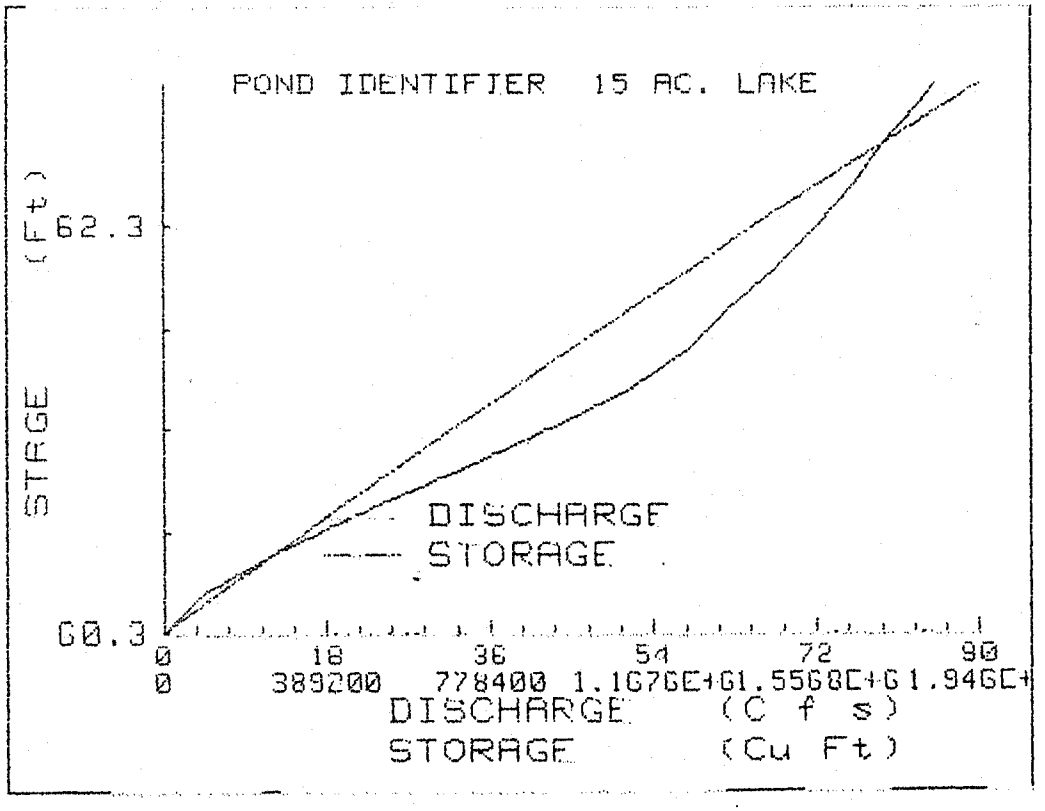
STAGE, STORAGE & DISCHARGE

POND IDENTIFIER 15 AC. LAKE

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
60.3	0.0	0.0	0.0
60.5	131874.3	4.4	297.5
60.7	266137.2	12.4	603.8
60.9	402788.7	21.9	917.0
61.1	541649.6	32.1	1235.8
61.3	682361.6	42.2	1558.6
61.5	824745.6	51.2	1884.0
61.7	968801.6	57.9	2210.8
61.9	1114529.6	62.3	2539.0
62.1	1261921.6	67.7	2872.0
62.3	1410961.6	72.2	3207.7
62.5	1561641.6	76.3	3546.6
62.7	1713961.6	79.4	3888.2
62.9	1867921.6	83.2	4234.1
63.0	1945516.6	85.0	4408.4

HYDROLOGIC REPORT FOR

POWHATAN



LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR

POWHATAN

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 15 AC. LAKE
100 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
3.00	0.0	.2	0.0	0.0	.2	0.0	.2
3.25	.2	.6	.2	0.0	1.0	0.0	1.0
3.50	.6	1.1	1.0	0.0	2.7	0.0	2.6
3.75	1.1	1.6	2.6	0.0	5.3	.1	5.3
4.00	1.6	2.1	5.3	.1	8.9	.1	8.8
4.25	2.1	2.6	8.8	.1	13.4	.2	13.2
4.50	2.6	3.5	13.2	.2	19.1	.3	18.8
4.75	3.5	4.2	18.8	.3	26.3	.4	25.9
5.00	4.2	4.8	25.9	.4	34.6	.5	34.1
5.25	4.8	5.4	34.1	.5	43.8	.6	43.1
5.50	5.4	5.9	43.1	.6	53.7	.8	52.9
5.75	5.9	6.3	52.9	.8	64.3	1.0	63.3
6.00	6.3	6.8	63.3	1.0	75.5	1.1	74.3
6.25	6.8	7.4	74.3	1.1	87.4	1.3	86.1
6.50	7.4	8.8	86.1	1.3	101.1	1.5	99.6
6.75	8.8	9.8	99.6	1.5	116.7	1.7	115.0
7.00	9.8	10.5	115.0	1.7	133.6	2.0	131.6
7.25	10.5	11.0	131.6	2.0	151.0	2.2	148.8
7.50	11.0	11.4	148.8	2.2	168.9	2.5	166.4
7.75	11.4	11.8	166.4	2.5	187.2	2.8	184.4
8.00	11.8	12.2	184.4	2.8	205.8	3.0	202.7
8.25	12.2	13.2	202.7	3.0	225.1	3.3	221.8
8.50	13.2	16.0	221.8	3.3	247.6	3.7	244.0
8.75	16.0	17.6	244.0	3.7	273.9	4.1	269.8
9.00	17.6	18.5	269.8	4.1	301.9	4.5	297.3
9.25	18.5	19.5	297.3	4.5	330.8	5.3	325.6
9.50	19.5	21.9	325.6	5.3	361.8	6.1	355.7
9.75	21.9	23.8	355.7	6.1	395.3	7.0	388.4
10.00	23.8	26.2	388.4	7.0	431.4	7.9	423.5
10.25	26.2	28.7	423.5	7.9	470.5	8.9	461.5
10.50	28.7	33.6	461.5	8.9	515.0	10.1	504.9
10.75	33.6	38.3	504.9	10.1	566.7	11.4	555.3
11.00	38.3	46.5	555.3	11.4	628.6	13.2	615.4
11.25	46.5	55.1	615.4	13.2	703.9	15.4	688.5
11.50	55.1	72.5	688.5	15.4	800.6	18.4	782.3
11.75	72.5	122.5	782.3	18.4	958.8	23.2	935.6
12.00	122.5	375.0	935.6	23.2	1410.5	37.6	1372.9

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 15 AC. LAKE
100 YEAR STORM FREQUENCY (CONT'D)

12.25	375.6	674.9	1372.9	37.6	2385.9	60.2	2325.7
12.50	674.9	397.3	2325.7	60.2	3337.7	73.7	3264.0
12.75	397.3	209.5	3264.0	73.7	3797.0	78.6	3718.4
13.00	209.5	121.4	3718.4	78.6	3970.7	80.3	3890.3
13.25	121.4	85.5	3890.3	80.3	4016.8	80.8	3936.0
13.50	85.5	65.0	3936.0	80.8	4005.6	80.7	3924.8
13.75	65.0	55.6	3924.8	80.7	3964.6	80.3	3884.4
14.00	55.6	47.5	3884.4	80.3	3907.1	79.6	3827.5
14.25	47.5	42.2	3827.5	79.6	3837.5	79.0	3758.5
14.50	42.2	35.0	3758.5	79.0	3756.8	78.2	3678.6
14.75	35.0	31.7	3678.6	78.2	3667.1	77.4	3589.7
15.00	31.7	30.8	3589.7	77.4	3574.9	76.5	3498.3
15.25	30.8	30.5	3498.3	76.5	3483.1	75.5	3407.6
15.50	30.5	30.4	3407.6	75.5	3393.0	74.4	3318.6
15.75	30.4	30.4	3318.6	74.4	3305.1	73.3	3231.8
16.00	30.4	30.4	3231.8	73.3	3219.3	72.3	3147.0
16.25	30.4	28.7	3147.0	72.3	3133.9	71.2	3062.7
16.50	28.7	22.6	3062.7	71.2	3042.9	70.0	2972.9
16.75	22.6	19.5	2972.9	70.0	2945.1	68.6	2876.5
17.00	19.5	18.6	2876.5	68.6	2846.0	67.3	2778.7
17.25	18.6	18.4	2778.7	67.3	2748.5	65.7	2682.8
17.50	18.4	18.3	2682.8	65.7	2653.9	64.2	2589.7
17.75	18.3	18.3	2589.7	64.2	2562.1	62.7	2499.5
18.00	18.3	18.3	2499.5	62.7	2473.4	61.4	2411.9
18.25	18.3	18.3	2411.9	61.4	2387.1	60.3	2326.8
18.50	18.3	18.3	2326.8	60.3	2303.1	59.1	2244.0
18.75	18.3	18.3	2244.0	59.1	2221.4	58.0	2163.4
19.00	18.3	18.2	2163.4	58.0	2141.9	56.5	2085.4
19.25	18.2	18.2	2085.4	56.5	2065.4	54.9	2010.5
19.50	18.2	18.2	2010.5	54.9	1992.1	53.4	1938.7
19.75	18.2	18.2	1938.7	53.4	1921.7	52.0	1869.7
20.00	18.2	18.2	1869.7	52.0	1854.2	50.4	1803.8
20.25	18.2	17.5	1803.8	50.4	1789.1	48.6	1740.5
20.50	17.5	14.4	1740.5	48.6	1723.8	46.8	1677.0
20.75	14.4	12.8	1677.0	46.8	1657.4	45.0	1612.5
21.00	12.8	12.4	1612.5	45.0	1592.8	43.2	1549.6
21.25	12.4	12.3	1549.6	43.2	1531.1	41.4	1489.8
21.50	12.3	12.2	1489.8	41.4	1472.9	39.5	1433.4
21.75	12.2	12.2	1433.4	39.5	1418.3	37.8	1380.5
22.00	12.2	12.2	1380.5	37.8	1367.1	36.2	1330.9

HYDROLOGIC REPORT FOR POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 15 AC. LAKE
100 YEAR STORM FREQUENCY (CONT'D)

22.25	12.2	12.2	1330.9	36.2	1319.1	34.7	1284.4
22.50	12.2	12.2	1284.4	34.7	1274.1	33.3	1240.8
22.75	12.2	12.2	1240.8	33.3	1231.9	32.0	1199.9
23.00	12.2	12.2	1199.9	32.0	1192.3	30.7	1161.6
23.25	12.2	12.2	1161.6	30.7	1155.2	29.5	1125.7
23.50	12.2	12.2	1125.7	29.5	1120.5	28.4	1092.1
23.75	12.2	12.1	1092.1	28.4	1088.0	27.4	1060.6
24.00	12.1	11.6	1060.6	27.4	1057.0	26.4	1030.6
24.25	11.6	5.7	1030.6	26.4	1021.5	25.2	996.3
24.50	5.7	1.7	996.3	25.2	978.4	23.9	954.5
24.75	1.7	.5	954.5	23.9	932.8	22.4	910.4
25.00	.5	.1	910.4	22.4	888.6	21.0	867.6
25.25	.1	0.0	867.6	21.0	846.7	19.8	826.9
25.50	0.0	0.0	826.9	19.8	807.2	18.6	788.6
25.75	0.0	0.0	788.6	18.6	770.1	17.4	752.6
26.00	0.0	0.0	752.6	17.4	735.2	16.4	718.8
26.25	0.0	0.0	718.8	16.4	702.4	15.4	687.0
26.50	0.0	0.0	687.0	15.4	671.6	14.5	657.2
26.75	0.0	0.0	657.2	14.5	642.7	13.6	629.1
27.00	0.0	0.0	629.1	13.6	615.6	12.8	602.8
27.25	0.0	0.0	602.8	12.8	590.0	12.0	578.0
27.50	0.0	0.0	578.0	12.0	566.0	11.4	554.6
27.75	0.0	0.0	554.6	11.4	543.1	10.8	532.3
28.00	0.0	0.0	532.3	10.8	521.5	10.3	511.3
28.25	0.0	0.0	511.3	10.3	501.0	9.7	491.3
28.50	0.0	0.0	491.3	9.7	481.6	9.2	472.4
28.75	0.0	0.0	472.4	9.2	463.2	8.7	454.4
29.00	0.0	0.0	454.4	8.7	445.7	8.3	437.4
29.25	0.0	0.0	437.4	8.3	429.2	7.8	421.3
29.50	0.0	0.0	421.3	7.8	413.5	7.4	406.1
29.75	0.0	0.0	406.1	7.4	398.6	7.0	391.6
30.00	0.0	0.0	391.6	7.0	384.5	6.7	377.9
30.25	0.0	0.0	377.9	6.7	371.2	6.3	364.9
30.50	0.0	0.0	364.9	6.3	358.5	6.0	352.5
30.75	0.0	0.0	352.5	6.0	346.6	5.7	340.9
31.00	0.0	0.0	340.9	5.7	335.2	5.4	329.8
31.25	0.0	0.0	329.8	5.4	324.4	5.1	319.3
31.50	0.0	0.0	319.3	5.1	314.2	4.8	309.4
31.75	0.0	0.0	309.4	4.8	304.5	4.6	299.9
32.00	0.0	0.0	299.9	4.6	295.4	4.4	291.0

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 15 AC. LAKE
100 YEAR STORM FREQUENCY (CONT'D)

32.25	0.0	0.0	291.0	4.4	286.6	4.2	282.4
32.50	0.0	0.0	282.4	4.2	278.1	4.1	274.0
32.75	0.0	0.0	274.0	4.1	269.9	4.0	265.9
33.00	0.0	0.0	265.9	4.0	261.9	3.9	258.1
33.25	0.0	0.0	258.1	3.9	254.2	3.8	250.4
33.50	0.0	0.0	250.4	3.8	246.7	3.6	243.0
33.75	0.0	0.0	243.0	3.6	239.4	3.5	235.8
34.00	0.0	0.0	235.8	3.5	232.3	3.4	228.8
34.25	0.0	0.0	228.8	3.4	225.4	3.3	222.1
34.50	0.0	0.0	222.1	3.3	218.7	3.2	215.5
34.75	0.0	0.0	215.5	3.2	212.3	3.1	209.1
35.00	0.0	0.0	209.1	3.1	206.0	3.0	202.9
35.25	0.0	0.0	202.9	3.0	199.9	3.0	196.9
35.50	0.0	0.0	196.9	3.0	194.0	2.9	191.1
35.75	0.0	0.0	191.1	2.9	188.2	2.8	185.5
36.00	0.0	0.0	185.5	2.8	182.7	2.7	180.0
36.25	0.0	0.0	180.0	2.7	177.3	2.6	174.6
36.50	0.0	0.0	174.6	2.6	172.0	2.5	169.5
36.75	0.0	0.0	169.5	2.5	166.9	2.5	164.5
37.00	0.0	0.0	164.5	2.5	162.0	2.4	159.6
37.25	0.0	0.0	159.6	2.4	157.2	2.3	154.9
37.50	0.0	0.0	154.9	2.3	152.6	2.3	150.3
37.75	0.0	0.0	150.3	2.3	148.0	2.2	145.9
38.00	0.0	0.0	145.9	2.2	143.7	2.1	141.5
38.25	0.0	0.0	141.5	2.1	139.4	2.1	137.4
38.50	0.0	0.0	137.4	2.1	135.3	2.0	133.3
38.75	0.0	0.0	133.3	2.0	131.3	1.9	129.3
39.00	0.0	0.0	129.3	1.9	127.4	1.9	125.5
39.25	0.0	0.0	125.5	1.9	123.6	1.8	121.8
39.50	0.0	0.0	121.8	1.8	120.0	1.8	118.2
39.75	0.0	0.0	118.2	1.8	116.4	1.7	114.7
40.00	0.0	0.0	114.7	1.7	113.0	1.7	111.3
40.25	0.0	0.0	111.3	1.7	109.6	1.6	108.0
40.50	0.0	0.0	108.0	1.6	106.4	1.6	104.8
40.75	0.0	0.0	104.8	1.6	103.2	1.5	101.7
41.00	0.0	0.0	101.7	1.5	100.2	1.5	98.7
41.25	0.0	0.0	98.7	1.5	97.2	1.4	95.8
41.50	0.0	0.0	95.8	1.4	94.4	1.4	93.0
41.75	0.0	0.0	93.0	1.4	91.6	1.4	90.2
42.00	0.0	0.0	90.2	1.4	88.9	1.3	87.5

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 15 AC. LAKE
100 YEAR STORM FREQUENCY (CONT'D)

42.25	0.0	0.0	87.5	1.3	86.2	1.3	84.9
42.50	0.0	0.0	84.9	1.3	83.7	1.2	82.4
42.75	0.0	0.0	82.4	1.2	81.2	1.2	80.0
43.00	0.0	0.0	80.0	1.2	78.8	1.2	77.6
43.25	0.0	0.0	77.6	1.2	76.5	1.1	75.3
43.50	0.0	0.0	75.3	1.1	74.2	1.1	73.1
43.75	0.0	0.0	73.1	1.1	72.0	1.1	70.9
44.00	0.0	0.0	70.9	1.1	69.9	1.0	68.8
44.25	0.0	0.0	68.8	1.0	67.8	1.0	66.8
44.50	0.0	0.0	66.8	1.0	65.8	1.0	64.8
44.75	0.0	0.0	64.8	1.0	63.9	.9	62.9
45.00	0.0	0.0	62.9	.9	62.0	.9	61.1
45.25	0.0	0.0	61.1	.9	60.1	.9	59.2
45.50	0.0	0.0	59.2	.9	58.4	.9	57.5
45.75	0.0	0.0	57.5	.9	56.6	.8	55.8
46.00	0.0	0.0	55.8	.8	55.0	.8	54.1
46.25	0.0	0.0	54.1	.8	53.3	.8	52.5
46.50	0.0	0.0	52.5	.8	51.7	.8	51.0
46.75	0.0	0.0	51.0	.8	50.2	.7	49.5
47.00	0.0	0.0	49.5	.7	48.7	.7	48.0
47.25	0.0	0.0	48.0	.7	47.3	.7	46.6
47.50	0.0	0.0	46.6	.7	45.9	.7	45.2
47.75	0.0	0.0	45.2	.7	44.5	.7	43.9
48.00	0.0	0.0	43.9	.7	43.2	.6	42.6
48.25	0.0	0.0	42.6	.6	41.9	.6	41.3
48.50	0.0	0.0	41.3	.6	40.7	.6	40.1
48.75	0.0	0.0	40.1	.6	39.5	.6	38.9
49.00	0.0	0.0	38.9	.6	38.3	.6	37.8
49.25	0.0	0.0	37.8	.6	37.2	.6	36.6
49.50	0.0	0.0	36.6	.6	36.1	.5	35.6
49.75	0.0	0.0	35.6	.5	35.0	.5	34.5
50.00	0.0	0.0	34.5	.5	34.0	.5	33.5
50.25	0.0	0.0	33.5	.5	33.0	.5	32.5
50.50	0.0	0.0	32.5	.5	32.0	.5	31.5
50.75	0.0	0.0	31.5	.5	31.1	.5	30.6
51.00	0.0	0.0	30.6	.5	30.1	.4	29.7
51.25	0.0	0.0	29.7	.4	29.2	.4	28.8
51.50	0.0	0.0	28.8	.4	28.4	.4	28.0
51.75	0.0	0.0	28.0	.4	27.5	.4	27.1
52.00	0.0	0.0	27.1	.4	26.7	.4	26.3

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POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 15 AC. LAKE
100 YEAR STORM FREQUENCY (CONT'D)

52.25	0.0	0.0	26.3	.4	25.9	.4	25.6
52.50	0.0	0.0	25.6	.4	25.2	.4	24.8
52.75	0.0	0.0	24.8	.4	24.4	.4	24.1
53.00	0.0	0.0	24.1	.4	23.7	.4	23.4
53.25	0.0	0.0	23.4	.4	23.0	.3	22.7
53.50	0.0	0.0	22.7	.3	22.3	.3	22.0
53.75	0.0	0.0	22.0	.3	21.7	.3	21.3
54.00	0.0	0.0	21.3	.3	21.0	.3	20.7
54.25	0.0	0.0	20.7	.3	20.4	.3	20.1
54.50	0.0	0.0	20.1	.3	19.8	.3	19.5
54.75	0.0	0.0	19.5	.3	19.2	.3	18.9
55.00	0.0	0.0	18.9	.3	18.6	.3	18.4
55.25	0.0	0.0	18.4	.3	18.1	.3	17.8
55.50	0.0	0.0	17.8	.3	17.6	.3	17.3
55.75	0.0	0.0	17.3	.3	17.0	.3	16.8
56.00	0.0	0.0	16.8	.3	16.5	.2	16.3
56.25	0.0	0.0	16.3	.2	16.0	.2	15.8
56.50	0.0	0.0	15.8	.2	15.6	.2	15.3
56.75	0.0	0.0	15.3	.2	15.1	.2	14.9
57.00	0.0	0.0	14.9	.2	14.7	.2	14.4
57.25	0.0	0.0	14.4	.2	14.2	.2	14.0
57.50	0.0	0.0	14.0	.2	13.8	.2	13.6
57.75	0.0	0.0	13.6	.2	13.4	.2	13.2
58.00	0.0	0.0	13.2	.2	13.0	.2	12.8
58.25	0.0	0.0	12.8	.2	12.6	.2	12.4
58.50	0.0	0.0	12.4	.2	12.2	.2	12.1
58.75	0.0	0.0	12.1	.2	11.9	.2	11.7
59.00	0.0	0.0	11.7	.2	11.5	.2	11.4
59.25	0.0	0.0	11.4	.2	11.2	.2	11.0
59.50	0.0	0.0	11.0	.2	10.9	.2	10.7
59.75	0.0	0.0	10.7	.2	10.5	.2	10.4
60.00	0.0	0.0	10.4	.2	10.2	.2	10.1
60.25	0.0	0.0	10.1	.2	9.9	.1	9.8
60.50	0.0	0.0	9.8	.1	9.6	.1	9.5
60.75	0.0	0.0	9.5	.1	9.3	.1	9.2
61.00	0.0	0.0	9.2	.1	9.1	.1	8.9
61.25	0.0	0.0	8.9	.1	8.8	.1	8.7
61.50	0.0	0.0	8.7	.1	8.5	.1	8.4
61.75	0.0	0.0	8.4	.1	8.3	.1	8.2
62.00	0.0	0.0	8.2	.1	8.0	.1	7.9

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 15 AC. LAKE
100 YEAR STORM FREQUENCY (CONT'D)

62.25	0.0	0.0	7.9	.1	7.8	.1	7.7
62.50	0.0	0.0	7.7	.1	7.6	.1	7.5
62.75	0.0	0.0	7.5	.1	7.3	.1	7.2
63.00	0.0	0.0	7.2	.1	7.1	.1	7.0
63.25	0.0	0.0	7.0	.1	6.9	.1	6.8
63.50	0.0	0.0	6.8	.1	6.7	.1	6.6
63.75	0.0	0.0	6.6	.1	6.5	.1	6.4
64.00	0.0	0.0	6.4	.1	6.3	.1	6.2
64.25	0.0	0.0	6.2	.1	6.1	.1	6.0
64.50	0.0	0.0	6.0	.1	6.0	.1	5.9
64.75	0.0	0.0	5.9	.1	5.8	.1	5.7
65.00	0.0	0.0	5.7	.1	5.6	.1	5.5
65.25	0.0	0.0	5.5	.1	5.4	.1	5.4
65.50	0.0	0.0	5.4	.1	5.3	.1	5.2
65.75	0.0	0.0	5.2	.1	5.1	.1	5.0
66.00	0.0	0.0	5.0	.1	5.0	.1	4.9
66.25	0.0	0.0	4.9	.1	4.8	.1	4.8
66.50	0.0	0.0	4.8	.1	4.7	.1	4.6
66.75	0.0	0.0	4.6	.1	4.5	.1	4.5
67.00	0.0	0.0	4.5	.1	4.4	.1	4.3
67.25	0.0	0.0	4.3	.1	4.3	.1	4.2
67.50	0.0	0.0	4.2	.1	4.2	.1	4.1
67.75	0.0	0.0	4.1	.1	4.0	.1	4.0
68.00	0.0	0.0	4.0	.1	3.9	.1	3.9
68.25	0.0	0.0	3.9	.1	3.8	.1	3.7
68.50	0.0	0.0	3.7	.1	3.7	.1	3.6
68.75	0.0	0.0	3.6	.1	3.6	.1	3.5
69.00	0.0	0.0	3.5	.1	3.5	.1	3.4
69.25	0.0	0.0	3.4	.1	3.4	0.0	3.3

MAXIMUM OUTFLOW = 80.8 C.F.S.
MAXIMUM STORAGE = 1771186.7 CU FT.
MAXIMUM ELEVATION = 62.8 FEET

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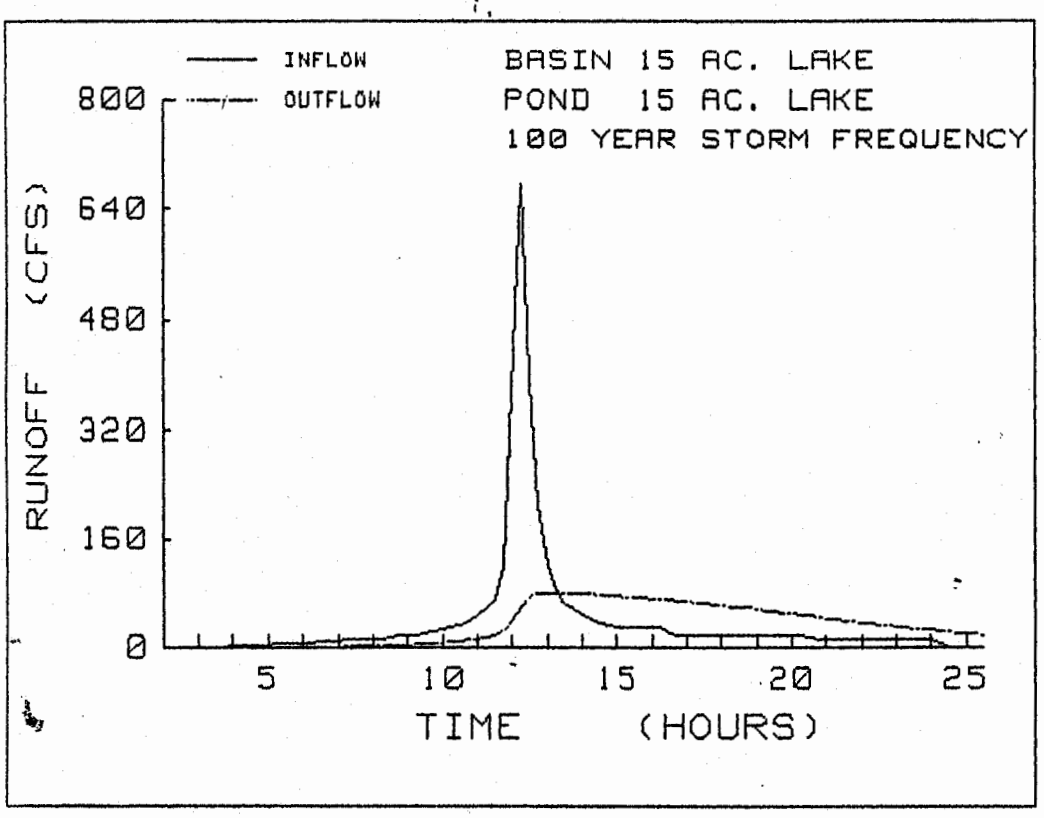

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HYDROLOGIC REPORT FOR

POWHATAN

S. C. S. HYDROGRAPH

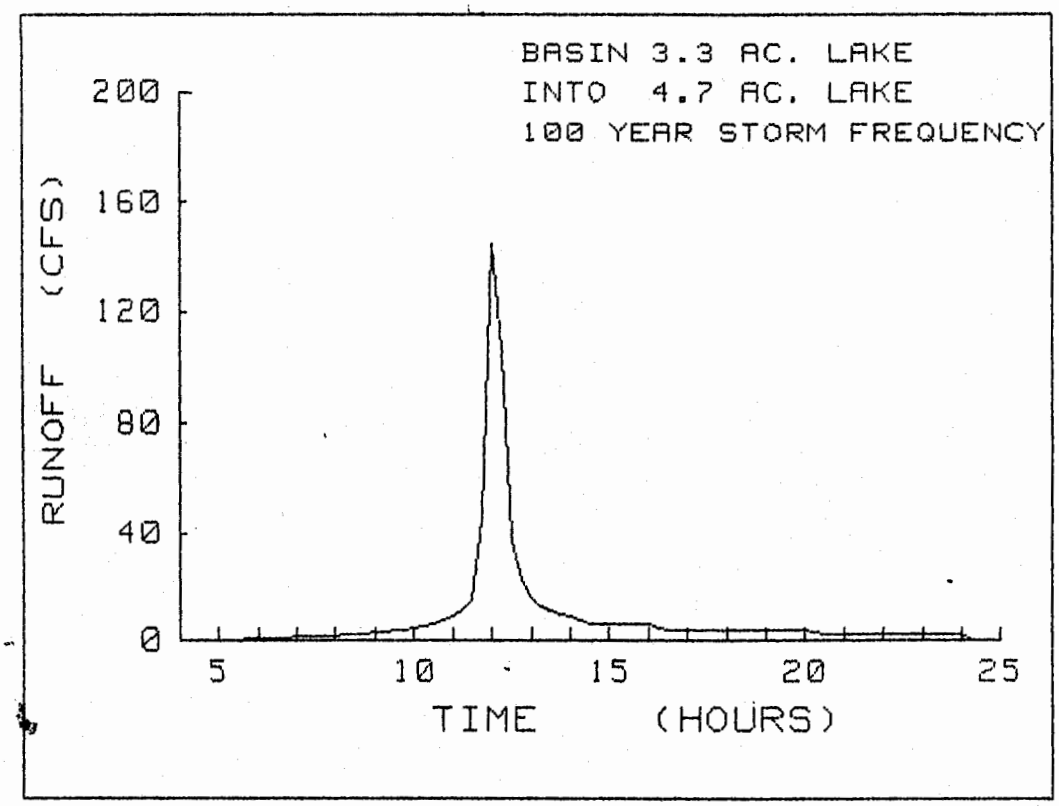
BASIN IDENTIFICATION 3.3 AC. LAKE
BASIN DISCHARGES INTO 4.7 AC. LAKE

BASIN AREA	=	25.50	ACRES
BASIN CURVE NUMBER	=	83.00	
24-HOUR PRECIPITATION	=	8.50	INCHES
AVERAGE BASIN SLOPE	=	4.0	%
HYDRAULIC LENGTH	=	1200.0	FEET
BASIN LAG	=	.17	HOURS

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
3.00	0.0	3.25	0.0	3.50	0.0	3.75	0.0
4.00	0.0	4.25	0.0	4.50	.1	4.75	.2
5.00	.3	5.25	.4	5.50	.5	5.75	.6
6.00	.7	6.25	.9	6.50	1.1	6.75	1.2
7.00	1.3	7.25	1.4	7.50	1.5	7.75	1.6
8.00	1.7	8.25	2.1	8.50	2.5	8.75	2.7
9.00	2.8	9.25	3.2	9.50	3.6	9.75	4.0
10.00	4.4	10.25	5.3	10.50	6.1	10.75	7.6
11.00	8.8	11.25	12.1	11.50	14.7	11.75	45.7
12.00	145.1	12.25	105.9	12.50	37.7	12.75	22.3
13.00	15.8	13.25	13.0	13.50	11.3	13.75	9.8
14.00	8.8	14.25	7.3	14.50	6.3	14.75	6.2
15.00	6.2	15.25	6.2	15.50	6.2	15.75	6.2
16.00	6.2	16.25	4.9	16.50	3.9	16.75	3.8
17.00	3.7	17.25	3.7	17.50	3.7	17.75	3.7
18.00	3.7	18.25	3.7	18.50	3.7	18.75	3.7
19.00	3.7	19.25	3.7	19.50	3.6	19.75	3.6
20.00	3.6	20.25	3.1	20.50	2.6	20.75	2.5
21.00	2.5	21.25	2.5	21.50	2.5	21.75	2.5
22.00	2.5	22.25	2.5	22.50	2.4	22.75	2.4
23.00	2.4	23.25	2.4	23.50	2.4	23.75	2.4
24.00	2.4	24.25	.5	24.50	0.0	24.75	0.0
25.00	0.0	25.25	0.0	25.50	0.0	25.75	0.0
26.00	0.0	26.25	0.0	26.50	0.0	26.75	0.0

HYDROLOGIC REPORT FOR POWHATAN



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HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
DISCHARGES INTO 4.7 AC. LAKE

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
2.00	0.0	2.25	0.0	2.50	0.0	2.75	0.0
3.00	0.0	3.25	0.0	3.50	0.0	3.75	.1
4.00	.1	4.25	.2	4.50	.4	4.75	.6
5.00	.8	5.25	1.1	5.50	1.3	5.75	1.5
6.00	1.8	6.25	2.2	6.50	2.6	6.75	2.9
7.00	3.3	7.25	3.6	7.50	4.0	7.75	4.4
8.00	4.7	8.25	5.5	8.50	6.2	8.75	6.7
9.00	7.3	9.25	8.5	9.50	9.7	9.75	11.0
10.00	12.3	10.25	14.2	10.50	16.1	10.75	19.0
11.00	22.0	11.25	27.5	11.50	33.1	11.75	68.9
12.00	182.7	12.25	166.2	12.50	111.5	12.75	100.9
13.00	96.1	13.25	93.8	13.50	92.0	13.75	90.0
14.00	88.4	14.25	86.3	14.50	84.5	14.75	83.6
15.00	82.8	15.25	81.7	15.50	80.6	15.75	79.6
16.00	78.5	16.25	76.1	16.50	73.8	16.75	72.4
17.00	71.0	17.25	69.4	17.50	67.9	17.75	66.4
18.00	65.1	18.25	64.0	18.50	62.8	18.75	61.7
19.00	60.1	19.25	58.6	19.50	57.0	19.75	55.6
20.00	54.0	20.25	51.6	20.50	49.3	20.75	47.4
21.00	45.6	21.25	43.8	21.50	42.0	21.75	40.3
22.00	38.7	22.25	37.2	22.50	35.7	22.75	34.4
23.00	33.1	23.25	31.9	23.50	30.8	23.75	29.8
24.00	28.8	24.25	25.7	24.50	23.9	24.75	22.4
25.00	21.0	25.25	19.8	25.50	18.6	25.75	17.4
26.00	16.4	26.25	15.4	26.50	14.5	26.75	13.6
27.00	12.8	27.25	12.0	27.50	11.4	27.75	10.8
28.00	10.3	28.25	9.7	28.50	9.2	28.75	8.7
29.00	8.3	29.25	7.8	29.50	7.4	29.75	7.0
30.00	6.7	30.25	6.3	30.50	6.0	30.75	5.7
31.00	5.4	31.25	5.1	31.50	4.8	31.75	4.6
32.00	4.4	32.25	4.2	32.50	4.1	32.75	4.0
33.00	3.9	33.25	3.8	33.50	3.6	33.75	3.5
34.00	3.4	34.25	3.3	34.50	3.2	34.75	3.1
35.00	3.0	35.25	3.0	35.50	2.9	35.75	2.8
36.00	2.7	36.25	2.6	36.50	2.5	36.75	2.5
37.00	2.4	37.25	2.3	37.50	2.3	37.75	2.2
38.00	2.1	38.25	2.1	38.50	2.0	38.75	1.9

HYDROLOGIC REPORT FOR

POWHATAN

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY (CONT'D)

39.00	1.9	39.25	1.8	39.50	1.8	39.75	1.7
40.00	1.7	40.25	1.6	40.50	1.6	40.75	1.5
41.00	1.5	41.25	1.4	41.50	1.4	41.75	1.4
42.00	1.3	42.25	1.3	42.50	1.2	42.75	1.2
43.00	1.2	43.25	1.1	43.50	1.1	43.75	1.1
44.00	1.0	44.25	1.0	44.50	1.0	44.75	.9
45.00	.9	45.25	.9	45.50	.9	45.75	.8
46.00	.8	46.25	.8	46.50	.8	46.75	.7
47.00	.7	47.25	.7	47.50	.7	47.75	.7
48.00	.6	48.25	.6	48.50	.6	48.75	.6
49.00	.6	49.25	.6	49.50	.5	49.75	.5
50.00	.5	50.25	.5	50.50	.5	50.75	.5
51.00	.4	51.25	.4	51.50	.4	51.75	.4
52.00	.4	52.25	.4	52.50	.4	52.75	.4
53.00	.4	53.25	.3	53.50	.3	53.75	.3
54.00	.3	54.25	.3	54.50	.3	54.75	.3
55.00	.3	55.25	.3	55.50	.3	55.75	.3
56.00	.2	56.25	.2	56.50	.2	56.75	.2
57.00	.2	57.25	.2	57.50	.2	57.75	.2
58.00	.2	58.25	.2	58.50	.2	58.75	.2
59.00	.2	59.25	.2	59.50	.2	59.75	.2
60.00	.2	60.25	.1	60.50	.1	60.75	.1
61.00	.1	61.25	.1	61.50	.1	61.75	.1
62.00	.1	62.25	.1	62.50	.1	62.75	.1
63.00	.1	63.25	.1	63.50	.1	63.75	.1
64.00	.1	64.25	.1	64.50	.1	64.75	.1
65.00	.1	65.25	.1	65.50	.1	65.75	.1
66.00	.1	66.25	.1	66.50	.1	66.75	.1
67.00	.1	67.25	.1	67.50	.1	67.75	.1
68.00	.1	68.25	.1	68.50	.1	68.75	.1
69.00	.1	69.25	0.0	69.50	0.0	69.75	0.0
70.00	0.0	70.25	0.0	70.50	0.0	70.75	0.0

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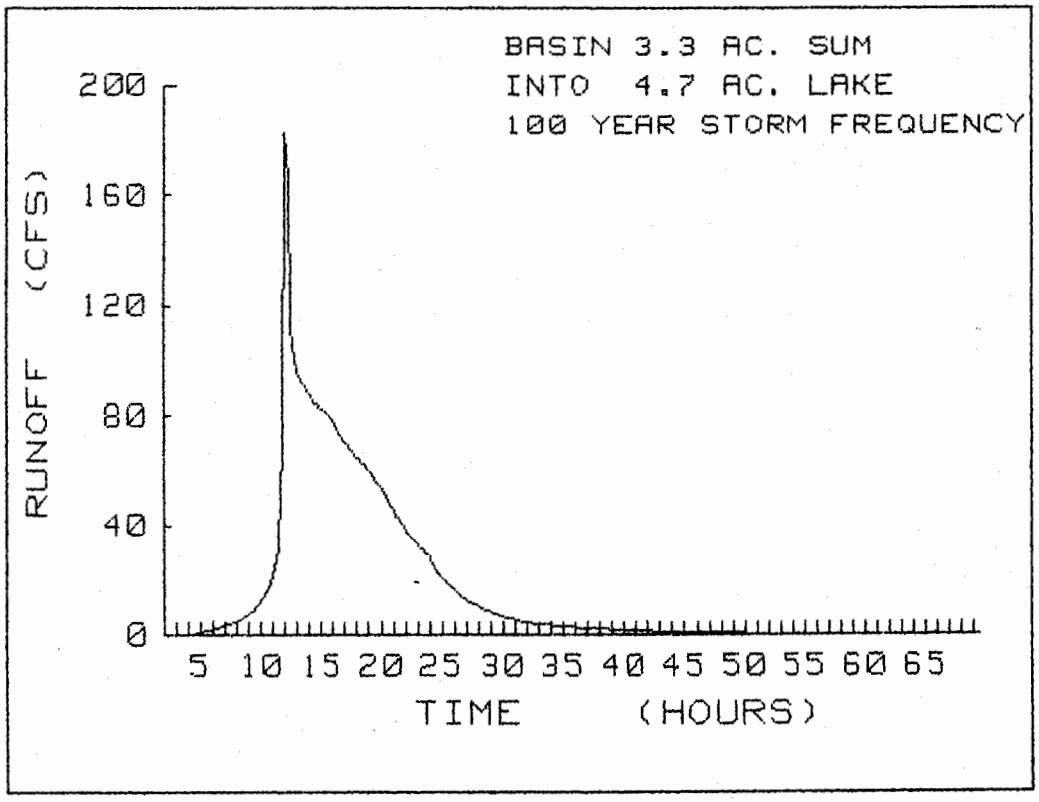

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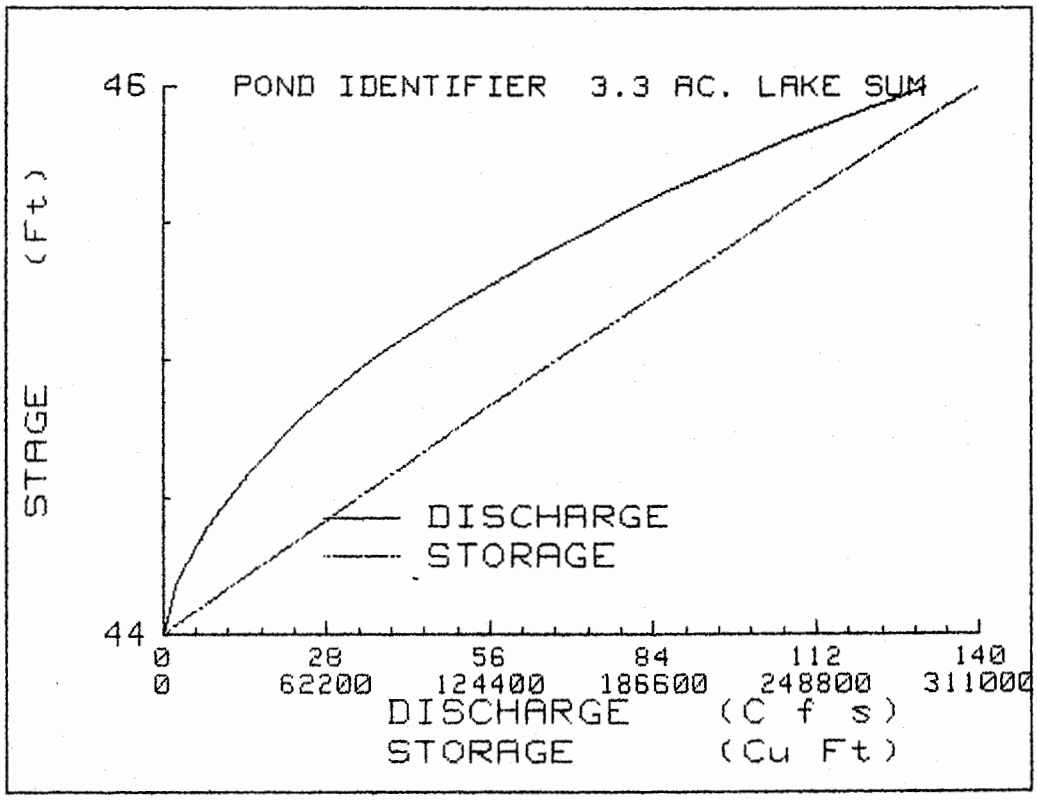
POWHATAN

STAGE, STORAGE & DISCHARGE

POND IDENTIFIER 3.3 AC. LAKE SUM

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
44.0	0.0	0.0	0.0
44.2	29200.0	2.5	67.4
44.4	58800.0	7.5	138.2
44.6	88800.0	14.8	212.1
44.8	119200.0	24.2	289.1
45.0	150000.0	35.9	369.2
45.2	181200.0	49.9	452.5
45.4	212800.0	66.2	539.1
45.6	244800.0	85.1	629.1
45.8	277200.0	106.5	722.5
46.0	310000.0	130.5	819.4

HYDROLOGIC REPORT FOR POWHATAN



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POWHATAN

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. LAKE SUM
100 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
3.75	0.0	.1	0.0	0.0	.1	0.0	.1
4.00	.1	.1	.1	0.0	.3	0.0	.3
4.25	.1	.2	.3	0.0	.6	0.0	.6
4.50	.2	.4	.6	0.0	1.2	0.0	1.1
4.75	.4	.6	1.1	0.0	2.1	.1	2.0
5.00	.6	.8	2.0	.1	3.3	.1	3.2
5.25	.8	1.1	3.2	.1	5.0	.2	4.8
5.50	1.1	1.3	4.8	.2	7.0	.3	6.7
5.75	1.3	1.5	6.7	.3	9.3	.3	9.0
6.00	1.5	1.8	9.0	.3	12.0	.4	11.6
6.25	1.8	2.2	11.6	.4	15.1	.6	14.5
6.50	2.2	2.6	14.5	.6	18.7	.7	18.0
6.75	2.6	2.9	18.0	.7	22.8	.8	22.0
7.00	2.9	3.3	22.0	.8	27.3	1.0	26.3
7.25	3.3	3.6	26.3	1.0	32.3	1.2	31.1
7.50	3.6	4.0	31.1	1.2	37.5	1.4	36.2
7.75	4.0	4.4	36.2	1.4	43.2	1.6	41.6
8.00	4.4	4.7	41.6	1.6	49.1	1.8	47.3
8.25	4.7	5.5	47.3	1.8	55.7	2.0	53.7
8.50	5.5	6.2	53.7	2.0	63.2	2.3	60.9
8.75	6.2	6.7	60.9	2.3	71.5	2.8	68.7
9.00	6.7	7.3	68.7	2.8	80.0	3.4	76.7
9.25	7.3	8.5	76.7	3.4	89.1	4.0	85.1
9.50	8.5	9.7	85.1	4.0	99.3	4.7	94.5
9.75	9.7	11.0	94.5	4.7	110.5	5.5	104.9
10.00	11.0	12.3	104.9	5.5	122.7	6.4	116.3
10.25	12.3	14.2	116.3	6.4	136.4	7.4	129.0
10.50	14.2	16.1	129.0	7.4	152.0	8.9	143.1
10.75	16.1	19.0	143.1	8.9	169.4	10.6	158.8
11.00	19.0	22.0	158.8	10.6	189.2	12.5	176.7
11.25	22.0	27.5	176.7	12.5	213.6	15.0	198.7
11.50	27.5	33.1	198.7	15.0	244.4	18.7	225.7
11.75	33.1	68.9	225.7	18.7	309.0	27.1	281.9
12.00	68.9	182.7	281.9	27.1	506.4	60.0	446.3
12.25	182.7	166.2	446.3	60.0	735.2	109.6	625.5
12.50	166.2	111.5	625.5	109.6	793.6	124.1	669.5
12.75	111.5	60.3	669.5	124.1	757.8	115.2	642.6

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

13.00	100.9	96.1	642.6	115.2	724.4	106.9	617.4
13.25	96.1	93.8	617.4	106.9	700.4	101.4	599.0
13.50	93.8	92.0	599.0	101.4	683.4	97.5	585.9
13.75	92.0	90.0	585.9	97.5	670.3	94.5	575.8
14.00	90.0	88.4	575.8	94.5	659.7	92.1	567.6
14.25	88.4	86.3	567.6	92.1	650.2	89.9	560.3
14.50	86.3	84.5	560.3	89.9	641.2	87.8	553.3
14.75	84.5	83.6	553.3	87.8	633.6	86.1	547.5
15.00	83.6	82.8	547.5	86.1	627.8	84.8	543.0
15.25	82.8	81.7	543.0	84.8	622.7	83.7	539.0
15.50	81.7	80.6	539.0	83.7	617.6	82.7	534.9
15.75	80.6	79.6	534.9	82.7	612.5	81.6	530.9
16.00	79.6	78.5	530.9	81.6	607.4	80.5	526.8
16.25	78.5	76.1	526.8	80.5	600.9	79.2	521.7
16.50	76.1	73.8	521.7	79.2	592.5	77.4	515.1
16.75	73.8	72.4	515.1	77.4	584.0	75.6	508.4
17.00	72.4	71.0	508.4	75.6	576.2	74.0	502.2
17.25	71.0	69.4	502.2	74.0	568.7	72.4	496.2
17.50	69.4	67.9	496.2	72.4	561.1	70.8	490.3
17.75	67.9	66.4	490.3	70.8	553.7	69.3	484.4
18.00	66.4	65.1	484.4	69.3	546.7	67.8	478.9
18.25	65.1	64.0	478.9	67.8	540.1	66.4	473.7
18.50	64.0	62.8	473.7	66.4	534.0	65.3	468.8
18.75	62.8	61.7	468.8	65.3	528.0	64.1	463.9
19.00	61.7	60.1	463.9	64.1	521.6	62.9	458.7
19.25	60.1	58.6	458.7	62.9	514.5	61.6	452.9
19.50	58.6	57.0	452.9	61.6	507.0	60.1	446.8
19.75	57.0	55.6	446.8	60.1	499.3	58.7	440.6
20.00	55.6	54.0	440.6	58.7	491.5	57.2	434.3
20.25	54.0	51.6	434.3	57.2	482.7	55.6	427.1
20.50	51.6	49.3	427.1	55.6	472.5	53.6	418.9
20.75	49.3	47.4	418.9	53.6	462.0	51.7	410.4
21.00	47.4	45.6	410.4	51.7	451.8	49.7	402.1
21.25	45.6	43.8	402.1	49.7	441.8	48.1	393.8
21.50	43.8	42.0	393.8	48.1	431.5	46.3	385.2
21.75	42.0	40.3	385.2	46.3	421.2	44.6	376.6
22.00	40.3	38.7	376.6	44.6	410.9	42.9	368.1
22.25	38.7	37.2	368.1	42.9	401.0	41.2	359.8
22.50	37.2	35.7	359.8	41.2	391.5	39.6	351.9
22.75	35.7	34.4	351.9	39.6	382.4	38.1	344.3

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

23.00	34.4	33.1	344.3	38.1	373.8	36.6	337.2
23.25	33.1	31.9	337.2	36.6	365.6	35.3	330.3
23.50	31.9	30.8	330.3	35.3	357.7	34.2	323.5
23.75	30.8	29.8	323.5	34.2	349.9	33.1	316.8
24.00	29.8	28.8	316.8	33.1	342.3	32.0	310.4
24.25	28.8	25.7	310.4	32.0	332.9	30.6	302.3
24.50	25.7	23.9	302.3	30.6	321.3	28.9	292.4
24.75	23.9	22.4	292.4	28.9	309.9	27.2	282.6
25.00	22.4	21.0	282.6	27.2	298.9	25.6	273.2
25.25	21.0	19.8	273.2	25.6	288.4	24.1	264.3
25.50	19.8	18.6	264.3	24.1	278.5	22.9	255.6
25.75	18.6	17.4	255.6	22.9	268.7	21.7	247.0
26.00	17.4	16.4	247.0	21.7	259.1	20.5	238.6
26.25	16.4	15.4	238.6	20.5	249.9	19.4	230.5
26.50	15.4	14.5	230.5	19.4	240.9	18.3	222.6
26.75	14.5	13.6	222.6	18.3	232.4	17.3	215.1
27.00	13.6	12.8	215.1	17.3	224.2	16.3	207.9
27.25	12.8	12.0	207.9	16.3	216.5	15.3	201.2
27.50	12.0	11.4	201.2	15.3	209.3	14.5	194.8
27.75	11.4	10.8	194.8	14.5	202.6	13.8	188.7
28.00	10.8	10.3	188.7	13.8	196.0	13.2	182.8
28.25	10.3	9.7	182.8	13.2	189.5	12.6	177.0
28.50	9.7	9.2	177.0	12.6	183.4	12.0	171.4
28.75	9.2	8.7	171.4	12.0	177.4	11.4	166.0
29.00	8.7	8.3	166.0	11.4	171.7	10.8	160.9
29.25	8.3	7.8	160.9	10.8	166.2	10.3	155.9
29.50	7.8	7.4	155.9	10.3	160.9	9.7	151.2
29.75	7.4	7.0	151.2	9.7	155.9	9.3	146.6
30.00	7.0	6.7	146.6	9.3	151.1	8.8	142.3
30.25	6.7	6.3	142.3	8.8	146.5	8.3	138.2
30.50	6.3	6.0	138.2	8.3	142.2	7.9	134.3
30.75	6.0	5.7	134.3	7.9	138.0	7.5	130.5
31.00	5.7	5.4	130.5	7.5	134.1	7.2	126.8
31.25	5.4	5.1	126.8	7.2	130.1	6.9	123.2
31.50	5.1	4.8	123.2	6.9	126.2	6.7	119.5
31.75	4.8	4.6	119.5	6.7	122.3	6.4	115.9
32.00	4.6	4.4	115.9	6.4	118.4	6.1	112.3
32.25	4.4	4.2	112.3	6.1	114.8	5.9	109.0
32.50	4.2	4.1	109.0	5.9	111.5	5.6	105.9
32.75	4.1	4.0	105.9	5.6	108.3	5.4	103.0

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

33.00	4.0	3.9	103.0	5.4	105.4	5.2	100.2
33.25	3.9	3.8	100.2	5.2	102.7	5.0	97.7
33.50	3.8	3.6	97.7	5.0	100.1	4.8	95.3
33.75	3.6	3.5	95.3	4.8	97.7	4.6	93.1
34.00	3.5	3.4	93.1	4.6	95.4	4.5	90.9
34.25	3.4	3.3	90.9	4.5	93.2	4.3	88.9
34.50	3.3	3.2	88.9	4.3	91.2	4.2	87.0
34.75	3.2	3.1	87.0	4.2	89.2	4.0	85.2
35.00	3.1	3.0	85.2	4.0	87.3	3.9	83.5
35.25	3.0	3.0	83.5	3.9	85.6	3.8	81.8
35.50	3.0	2.9	81.8	3.8	83.9	3.6	80.2
35.75	2.9	2.8	80.2	3.6	82.2	3.5	78.7
36.00	2.8	2.7	78.7	3.5	80.6	3.4	77.2
36.25	2.7	2.6	77.2	3.4	79.1	3.3	75.8
36.50	2.6	2.5	75.8	3.3	77.7	3.2	74.5
36.75	2.5	2.5	74.5	3.2	76.3	3.1	73.2
37.00	2.5	2.4	73.2	3.1	74.9	3.0	71.9
37.25	2.4	2.3	71.9	3.0	73.6	2.9	70.7
37.50	2.3	2.3	70.7	2.9	72.4	2.8	69.6
37.75	2.3	2.2	69.6	2.8	71.2	2.7	68.4
38.00	2.2	2.1	68.4	2.7	70.0	2.7	67.3
38.25	2.1	2.1	67.3	2.7	68.9	2.6	66.3
38.50	2.1	2.0	66.3	2.6	67.8	2.5	65.3
38.75	2.0	1.9	65.3	2.5	66.7	2.4	64.3
39.00	1.9	1.9	64.3	2.4	65.7	2.4	63.3
39.25	1.9	1.8	63.3	2.4	64.6	2.4	62.2
39.50	1.8	1.8	62.2	2.4	63.4	2.3	61.1
39.75	1.8	1.7	61.1	2.3	62.3	2.3	60.0
40.00	1.7	1.7	60.0	2.3	61.1	2.2	58.9
40.25	1.7	1.6	58.9	2.2	59.9	2.2	57.7
40.50	1.6	1.6	57.7	2.2	58.7	2.2	56.6
40.75	1.6	1.5	56.6	2.2	57.5	2.1	55.4
41.00	1.5	1.5	55.4	2.1	56.3	2.1	54.2
41.25	1.5	1.4	54.2	2.1	55.1	2.0	53.1
41.50	1.4	1.4	53.1	2.0	53.9	2.0	51.9
41.75	1.4	1.4	51.9	2.0	52.7	1.9	50.7
42.00	1.4	1.3	50.7	1.9	51.5	1.9	49.6
42.25	1.3	1.3	49.6	1.9	50.3	1.8	48.5
42.50	1.3	1.2	48.5	1.8	49.1	1.8	47.3
42.75	1.2	1.2	47.3	1.8	48.0	1.8	46.2

HYDROLOGIC REPORT FOR POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

43.00	1.2	1.2	46.2	1.8	46.8	1.7	45.1
43.25	1.2	1.1	45.1	1.7	45.7	1.7	44.0
43.50	1.1	1.1	44.0	1.7	44.6	1.6	42.9
43.75	1.1	1.1	42.9	1.6	43.4	1.6	41.9
44.00	1.1	1.0	41.9	1.6	42.4	1.6	40.8
44.25	1.0	1.0	40.8	1.6	41.3	1.5	39.8
44.50	1.0	1.0	39.8	1.5	40.2	1.5	38.8
44.75	1.0	.9	38.8	1.5	39.2	1.4	37.8
45.00	.9	.9	37.8	1.4	38.2	1.4	36.8
45.25	.9	.9	36.8	1.4	37.2	1.4	35.8
45.50	.9	.9	35.8	1.4	36.2	1.3	34.9
45.75	.9	.8	34.9	1.3	35.3	1.3	34.0
46.00	.8	.8	34.0	1.3	34.3	1.3	33.1
46.25	.8	.8	33.1	1.3	33.4	1.2	32.2
46.50	.8	.8	32.2	1.2	32.5	1.2	31.3
46.75	.8	.7	31.3	1.2	31.6	1.2	30.5
47.00	.7	.7	30.5	1.2	30.8	1.1	29.7
47.25	.7	.7	29.7	1.1	29.9	1.1	28.8
47.50	.7	.7	28.8	1.1	29.1	1.1	28.1
47.75	.7	.7	28.1	1.1	28.3	1.0	27.3
48.00	.7	.6	27.3	1.0	27.6	1.0	26.5
48.25	.6	.6	26.5	1.0	26.8	1.0	25.8
48.50	.6	.6	25.8	1.0	26.0	1.0	25.1
48.75	.6	.6	25.1	1.0	25.3	.9	24.4
49.00	.6	.6	24.4	.9	24.6	.9	23.7
49.25	.6	.6	23.7	.9	23.9	.9	23.1
49.50	.6	.5	23.1	.9	23.3	.9	22.4
49.75	.5	.5	22.4	.9	22.6	.8	21.8
50.00	.5	.5	21.8	.8	22.0	.8	21.2
50.25	.5	.5	21.2	.8	21.3	.8	20.6
50.50	.5	.5	20.6	.8	20.7	.8	20.0
50.75	.5	.5	20.0	.8	20.2	.7	19.4
51.00	.5	.4	19.4	.7	19.6	.7	18.9
51.25	.4	.4	18.9	.7	19.0	.7	18.3
51.50	.4	.4	18.3	.7	18.5	.7	17.8
51.75	.4	.4	17.8	.7	18.0	.7	17.3
52.00	.4	.4	17.3	.7	17.4	.6	16.8
52.25	.4	.4	16.8	.6	16.9	.6	16.3
52.50	.4	.4	16.3	.6	16.5	.6	15.8
52.75	.4	.4	15.8	.6	16.0	.6	15.4

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

53.00	.4	.4	15.4	.6	15.5	.6	15.0
53.25	.4	.3	15.0	.6	15.1	.6	14.5
53.50	.3	.3	14.5	.6	14.6	.5	14.1
53.75	.3	.3	14.1	.5	14.2	.5	13.7
54.00	.3	.3	13.7	.5	13.8	.5	13.3
54.25	.3	.3	13.3	.5	13.4	.5	12.9
54.50	.3	.3	12.9	.5	13.0	.5	12.5
54.75	.3	.3	12.5	.5	12.6	.5	12.2
55.00	.3	.3	12.2	.5	12.3	.4	11.8
55.25	.3	.3	11.8	.4	11.9	.4	11.5
55.50	.3	.3	11.5	.4	11.6	.4	11.1
55.75	.3	.3	11.1	.4	11.2	.4	10.8
56.00	.3	.2	10.8	.4	10.9	.4	10.5
56.25	.2	.2	10.5	.4	10.6	.4	10.2
56.50	.2	.2	10.2	.4	10.3	.4	9.9
56.75	.2	.2	9.9	.4	10.0	.4	9.6
57.00	.2	.2	9.6	.4	9.7	.4	9.3
57.25	.2	.2	9.3	.4	9.4	.3	9.1
57.50	.2	.2	9.1	.3	9.1	.3	8.8
57.75	.2	.2	8.8	.3	8.9	.3	8.5
58.00	.2	.2	8.5	.3	8.6	.3	8.3
58.25	.2	.2	8.3	.3	8.3	.3	8.0
58.50	.2	.2	8.0	.3	8.1	.3	7.8
58.75	.2	.2	7.8	.3	7.9	.3	7.6
59.00	.2	.2	7.6	.3	7.6	.3	7.4
59.25	.2	.2	7.4	.3	7.4	.3	7.1
59.50	.2	.2	7.1	.3	7.2	.3	6.9
59.75	.2	.2	6.9	.3	7.0	.3	6.7
60.00	.2	.2	6.7	.3	6.8	.2	6.5
60.25	.2	.1	6.5	.2	6.6	.2	6.3
60.50	.1	.1	6.3	.2	6.4	.2	6.2
60.75	.1	.1	6.2	.2	6.2	.2	6.0
61.00	.1	.1	6.0	.2	6.0	.2	5.8
61.25	.1	.1	5.8	.2	5.8	.2	5.6
61.50	.1	.1	5.6	.2	5.7	.2	5.5
61.75	.1	.1	5.5	.2	5.5	.2	5.3
62.00	.1	.1	5.3	.2	5.3	.2	5.1
62.25	.1	.1	5.1	.2	5.2	.2	5.0
62.50	.1	.1	5.0	.2	5.0	.2	4.8
62.75	.1	.1	4.8	.2	4.9	.2	4.7

HYDROLOGIC REPORT FOR POWHATAN

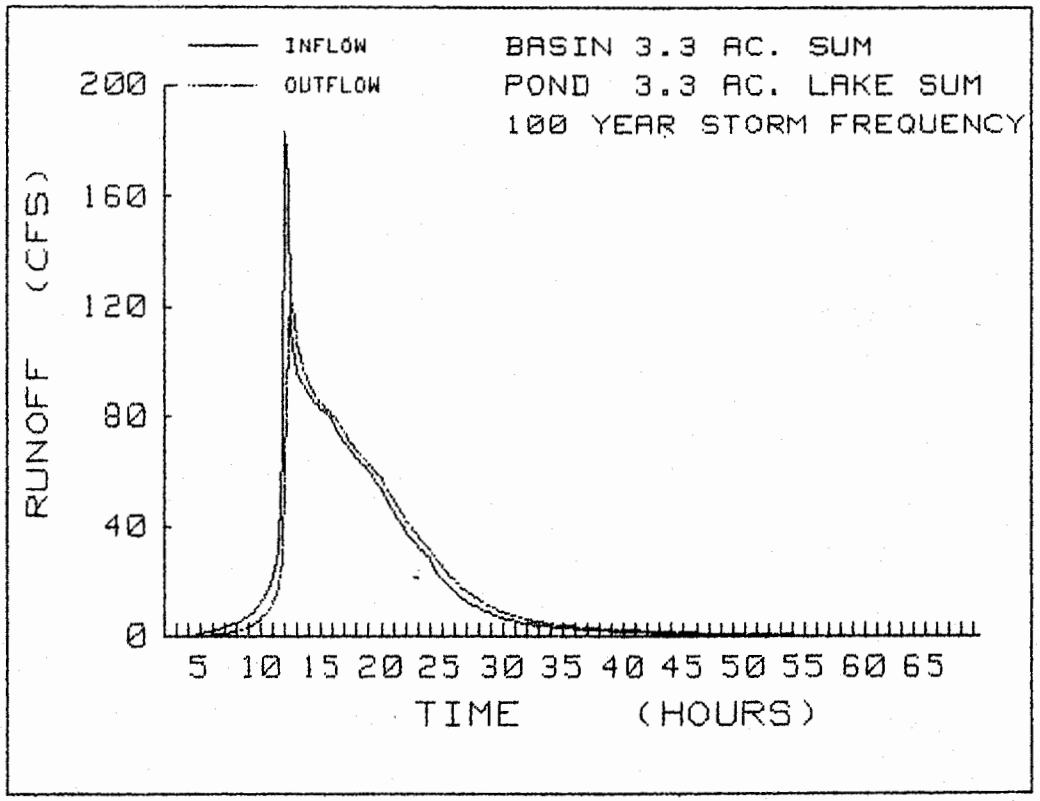
BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

63.00	.1	.1	4.7	.2	4.7	.2	4.6
63.25	.1	.1	4.6	.2	4.6	.2	4.4
63.50	.1	.1	4.4	.2	4.5	.2	4.3
63.75	.1	.1	4.3	.2	4.3	.2	4.2
64.00	.1	.1	4.2	.2	4.2	.2	4.0
64.25	.1	.1	4.0	.2	4.1	.1	3.9
64.50	.1	.1	3.9	.1	4.0	.1	3.8
64.75	.1	.1	3.8	.1	3.8	.1	3.7
65.00	.1	.1	3.7	.1	3.7	.1	3.6
65.25	.1	.1	3.6	.1	3.6	.1	3.5
65.50	.1	.1	3.5	.1	3.5	.1	3.4
65.75	.1	.1	3.4	.1	3.4	.1	3.3
66.00	.1	.1	3.3	.1	3.3	.1	3.2
66.25	.1	.1	3.2	.1	3.2	.1	3.1
66.50	.1	.1	3.1	.1	3.1	.1	3.0
66.75	.1	.1	3.0	.1	3.0	.1	2.9
67.00	.1	.1	2.9	.1	2.9	.1	2.8
67.25	.1	.1	2.8	.1	2.8	.1	2.7
67.50	.1	.1	2.7	.1	2.8	.1	2.7
67.75	.1	.1	2.7	.1	2.7	.1	2.6
68.00	.1	.1	2.6	.1	2.6	.1	2.5
68.25	.1	.1	2.5	.1	2.5	.1	2.4
68.50	.1	.1	2.4	.1	2.5	.1	2.4
68.75	.1	.1	2.4	.1	2.4	.1	2.3
69.00	.1	.1	2.3	.1	2.3	.1	2.2
69.25	.1	0.0	2.2	.1	2.2	.1	2.2
69.50	0.0	0.0	2.2	.1	2.1	.1	2.0
69.75	0.0	0.0	2.0	.1	2.0	.1	1.9
70.00	0.0	0.0	1.9	.1	1.8	.1	1.8
70.25	0.0	0.0	1.8	.1	1.7	.1	1.6
70.50	0.0	0.0	1.6	.1	1.6	.1	1.5
70.75	0.0	0.0	1.5	.1	1.5	.1	1.4
71.00	0.0	0.0	1.4	.1	1.3	0.0	1.3

MAXIMUM OUTFLOW = 124.1 C.F.S.
MAXIMUM STORAGE = 301275.6 CU FT.
MAXIMUM ELEVATION = 45.9 FEET

LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR POWHATAN



HYDROLOGIC REPORT FOR

POWHATAN

S. C. S. HYDROGRAPH

BASIN IDENTIFICATION 4.7 AC. LAKE
BASIN DISCHARGES INTO TRIBUTARY OF POWHATAN CREEK

BASIN AREA	=	21.30	ACRES
BASIN CURVE NUMBER	=	87.00	
24-HOUR PRECIPITATION	=	8.50	INCHES
AVERAGE BASIN SLOPE	=	3.8	%
HYDRAULIC LENGTH	=	1200.0	FEET
BASIN LAG	=	.17	HOURS

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
2.00	0.0	2.25	0.0	2.50	0.0	2.75	0.0
3.00	0.0	3.25	0.0	3.50	.1	3.75	.2
4.00	.2	4.25	.4	4.50	.5	4.75	.6
5.00	.7	5.25	.8	5.50	.8	5.75	.9
6.00	1.0	6.25	1.2	6.50	1.4	6.75	1.5
7.00	1.6	7.25	1.7	7.50	1.8	7.75	1.9
8.00	1.9	8.25	2.4	8.50	2.8	8.75	2.9
9.00	3.0	9.25	3.4	9.50	3.7	9.75	4.1
10.00	4.5	10.25	5.3	10.50	6.0	10.75	7.4
11.00	8.5	11.25	11.5	11.50	13.9	11.75	41.2
12.00	126.7	12.25	94.4	12.50	33.3	12.75	19.5
13.00	13.6	13.25	11.2	13.50	9.7	13.75	8.4
14.00	7.5	14.25	6.3	14.50	5.4	14.75	5.3
15.00	5.3	15.25	5.3	15.50	5.3	15.75	5.3
16.00	5.3	16.25	4.2	16.50	3.3	16.75	3.2
17.00	3.2	17.25	3.2	17.50	3.2	17.75	3.2
18.00	3.2	18.25	3.1	18.50	3.1	18.75	3.1
19.00	3.1	19.25	3.1	19.50	3.1	19.75	3.1
20.00	3.1	20.25	2.6	20.50	2.2	20.75	2.1
21.00	2.1	21.25	2.1	21.50	2.1	21.75	2.1
22.00	2.1	22.25	2.1	22.50	2.1	22.75	2.1
23.00	2.1	23.25	2.0	23.50	2.0	23.75	2.0
24.00	2.0	24.25	.4	24.50	0.0	24.75	0.0
25.00	0.0	25.25	0.0	25.50	0.0	25.75	0.0
26.00	0.0	26.25	0.0	26.50	0.0	26.75	0.0

LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
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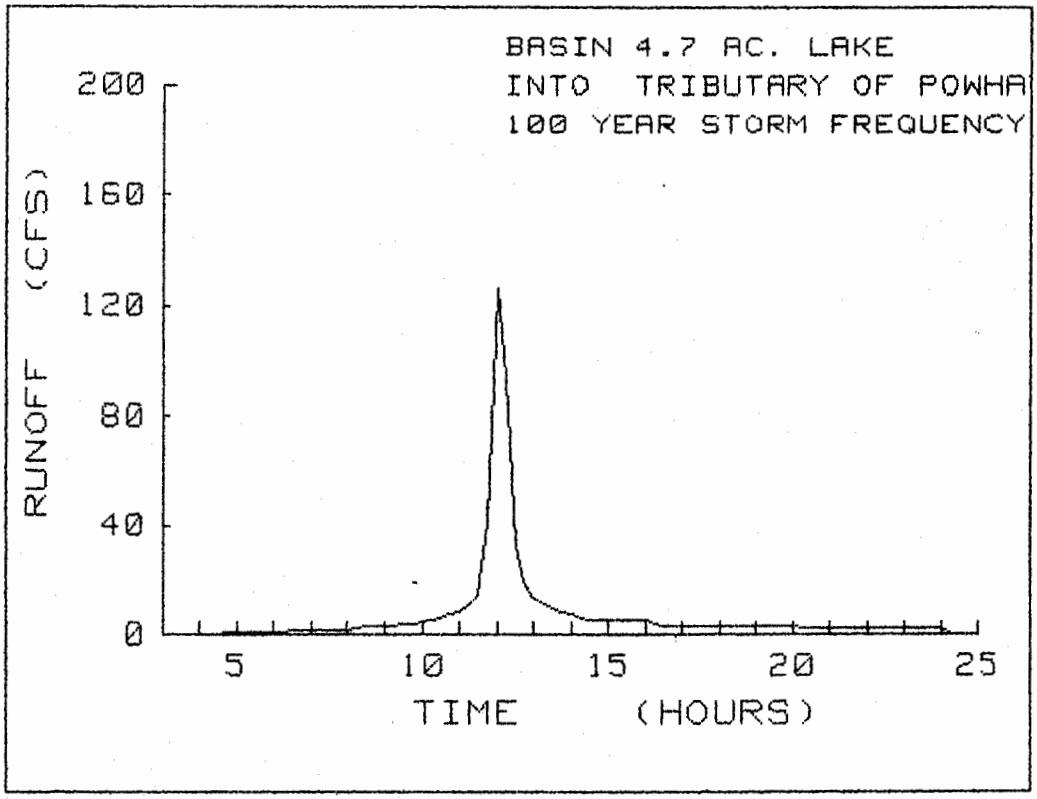
HYDROLOGIC REPORT FOR POWHATAN



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HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
DISCHARGES INTO TRIBUTARY OF POWHATAN CREEK

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
2.00	0.0	2.25	0.0	2.50	0.0	2.75	0.0
3.00	0.0	3.25	0.0	3.50	.1	3.75	.2
4.00	.2	4.25	.4	4.50	.5	4.75	.7
5.00	.8	5.25	.9	5.50	1.1	5.75	1.3
6.00	1.4	6.25	1.8	6.50	2.1	6.75	2.4
7.00	2.6	7.25	2.9	7.50	3.2	7.75	3.4
8.00	3.7	8.25	4.4	8.50	5.1	8.75	5.7
9.00	6.4	9.25	7.4	9.50	8.5	9.75	9.7
10.00	10.9	10.25	12.7	10.50	14.9	10.75	18.0
11.00	21.0	11.25	26.4	11.50	32.6	11.75	68.3
12.00	186.7	12.25	204.0	12.50	157.4	12.75	134.7
13.00	120.6	13.25	112.6	13.50	107.2	13.75	102.9
14.00	99.6	14.25	96.2	14.50	93.2	14.75	91.4
15.00	90.1	15.25	89.0	15.50	87.9	15.75	86.9
16.00	85.8	16.25	83.3	16.50	80.7	16.75	78.8
17.00	77.2	17.25	75.6	17.50	74.0	17.75	72.4
18.00	71.0	18.25	69.6	18.50	68.4	18.75	67.3
19.00	66.0	19.25	64.7	19.50	63.2	19.75	61.8
20.00	60.3	20.25	58.2	20.50	55.8	20.75	53.8
21.00	51.9	21.25	50.2	21.50	48.5	21.75	46.7
22.00	45.0	22.25	43.3	22.50	41.7	22.75	40.2
23.00	38.7	23.25	37.4	23.50	36.2	23.75	35.1
24.00	34.0	24.25	31.0	24.50	28.9	24.75	27.2
25.00	25.6	25.25	24.1	25.50	22.9	25.75	21.7
26.00	20.5	26.25	19.4	26.50	18.3	26.75	17.3
27.00	16.3	27.25	15.3	27.50	14.5	27.75	13.8
28.00	13.2	28.25	12.6	28.50	12.0	28.75	11.4
29.00	10.8	29.25	10.3	29.50	9.7	29.75	9.3
30.00	8.8	30.25	8.3	30.50	7.9	30.75	7.5
31.00	7.2	31.25	6.9	31.50	6.7	31.75	6.4
32.00	6.1	32.25	5.9	32.50	5.6	32.75	5.4
33.00	5.2	33.25	5.0	33.50	4.8	33.75	4.6
34.00	4.5	34.25	4.3	34.50	4.2	34.75	4.0
35.00	3.9	35.25	3.8	35.50	3.6	35.75	3.5
36.00	3.4	36.25	3.3	36.50	3.2	36.75	3.1
37.00	3.0	37.25	2.9	37.50	2.8	37.75	2.7
38.00	2.7	38.25	2.6	38.50	2.5	38.75	2.4

HYDROLOGIC REPORT FOR POWHATAN

HYDROGRAPH RUNOFF VALUES
100 YEAR STORM FREQUENCY (CONT'D)

39.00	2.4	39.25	2.4	39.50	2.3	39.75	2.3
40.00	2.2	40.25	2.2	40.50	2.2	40.75	2.1
41.00	2.1	41.25	2.0	41.50	2.0	41.75	1.9
42.00	1.9	42.25	1.8	42.50	1.8	42.75	1.8
43.00	1.7	43.25	1.7	43.50	1.6	43.75	1.6
44.00	1.6	44.25	1.5	44.50	1.5	44.75	1.4
45.00	1.4	45.25	1.4	45.50	1.3	45.75	1.3
46.00	1.3	46.25	1.2	46.50	1.2	46.75	1.2
47.00	1.1	47.25	1.1	47.50	1.1	47.75	1.0
48.00	1.0	48.25	1.0	48.50	1.0	48.75	.9
49.00	.9	49.25	.9	49.50	.9	49.75	.8
50.00	.8	50.25	.8	50.50	.8	50.75	.7
51.00	.7	51.25	.7	51.50	.7	51.75	.7
52.00	.6	52.25	.6	52.50	.6	52.75	.6
53.00	.6	53.25	.6	53.50	.5	53.75	.5
54.00	.5	54.25	.5	54.50	.5	54.75	.5
55.00	.4	55.25	.4	55.50	.4	55.75	.4
56.00	.4	56.25	.4	56.50	.4	56.75	.4
57.00	.4	57.25	.3	57.50	.3	57.75	.3
58.00	.3	58.25	.3	58.50	.3	58.75	.3
59.00	.3	59.25	.3	59.50	.3	59.75	.3
60.00	.2	60.25	.2	60.50	.2	60.75	.2
61.00	.2	61.25	.2	61.50	.2	61.75	.2
62.00	.2	62.25	.2	62.50	.2	62.75	.2
63.00	.2	63.25	.2	63.50	.2	63.75	.2
64.00	.2	64.25	.1	64.50	.1	64.75	.1
65.00	.1	65.25	.1	65.50	.1	65.75	.1
66.00	.1	66.25	.1	66.50	.1	66.75	.1
67.00	.1	67.25	.1	67.50	.1	67.75	.1
68.00	.1	68.25	.1	68.50	.1	68.75	.1
69.00	.1	69.25	.1	69.50	.1	69.75	.1
70.00	.1	70.25	.1	70.50	.1	70.75	.1
71.00	0.0	71.25	0.0	71.50	0.0	71.75	0.0
72.00	0.0	72.25	0.0	72.50	0.0	72.75	0.0

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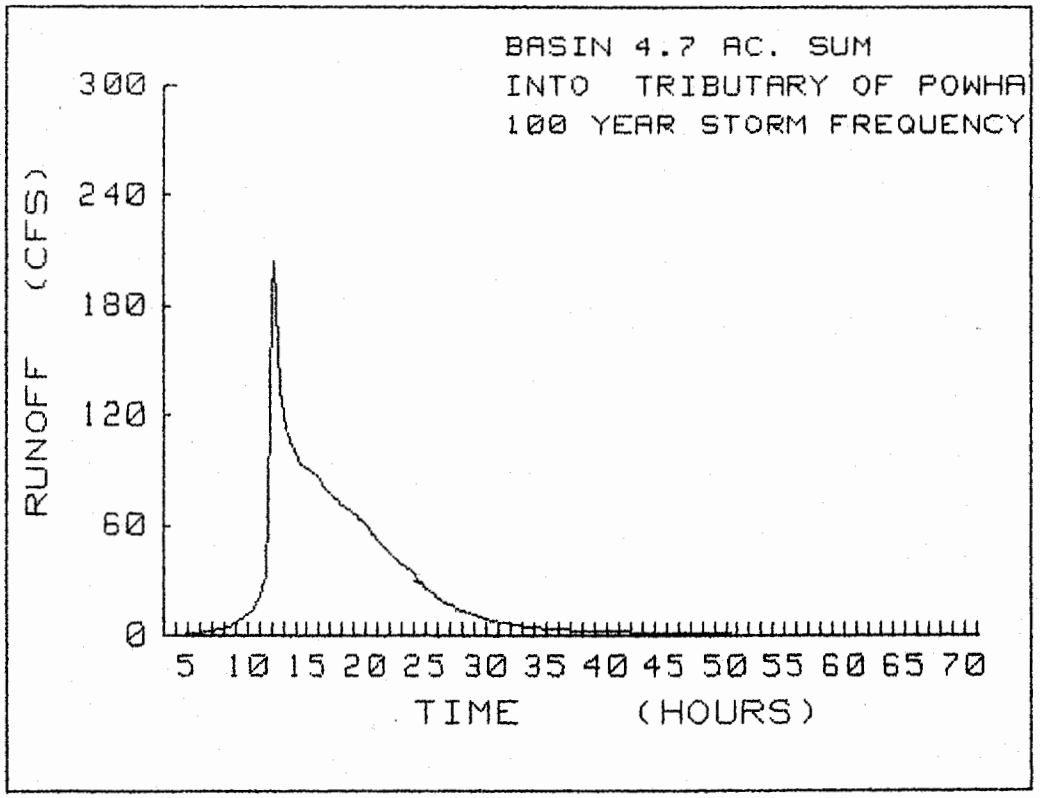
HYDROLOGIC REPORT FOR POWHATAN



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HYDROLOGIC REPORT FOR

POWHATAN

STAGE, STORAGE & DISCHARGE

POND IDENTIFIER 4.7 AC. LAKE SUM

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
40.0	0.0	0.0	0.0
40.2	40600.0	4.8	95.0
40.4	82400.0	14.0	197.1
40.6	125400.0	26.7	305.3
40.8	169600.0	42.5	419.4
41.0	215000.0	61.5	539.3
41.2	261400.0	83.5	664.4
41.4	308600.0	108.7	794.4
41.6	356600.0	136.9	929.3
41.8	405400.0	168.3	1069.2
42.0	455000.0	202.9	1214.0

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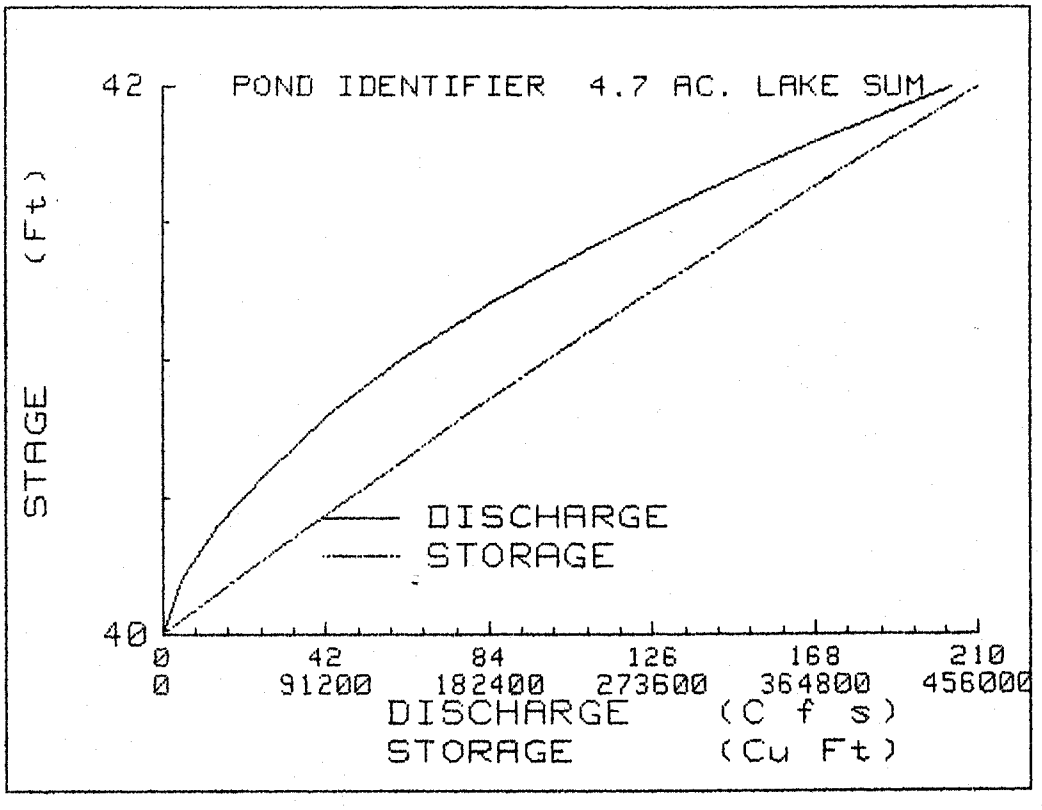

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HYDROLOGIC REPORT FOR

POWHATAN

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
3.50	0.0	.1	0.0	0.0	.1	0.0	.1
3.75	.1	.2	.1	0.0	.3	0.0	.3
4.00	.2	.2	.3	0.0	.7	0.0	.7
4.25	.2	.4	.7	0.0	1.2	.1	1.2
4.50	.4	.5	1.2	.1	2.0	.1	1.9
4.75	.5	.7	1.9	.1	3.0	.2	2.8
5.00	.7	.8	2.8	.2	4.1	.2	3.9
5.25	.8	.9	3.9	.2	5.5	.3	5.2
5.50	.9	1.1	5.2	.3	7.0	.3	6.6
5.75	1.1	1.3	6.6	.3	8.6	.4	8.2
6.00	1.3	1.4	8.2	.4	10.5	.5	9.9
6.25	1.4	1.8	9.9	.5	12.6	.6	12.0
6.50	1.8	2.1	12.0	.6	15.2	.8	14.4
6.75	2.1	2.4	14.4	.8	18.1	.9	17.2
7.00	2.4	2.6	17.2	.9	21.3	1.1	20.2
7.25	2.6	2.9	20.2	1.1	24.7	1.2	23.4
7.50	2.9	3.2	23.4	1.2	28.2	1.4	26.8
7.75	3.2	3.4	26.8	1.4	32.0	1.6	30.4
8.00	3.4	3.7	30.4	1.6	35.9	1.8	34.1
8.25	3.7	4.4	34.1	1.8	40.4	2.0	38.4
8.50	4.4	5.1	38.4	2.0	45.9	2.3	43.6
8.75	5.1	5.7	43.6	2.3	52.0	2.6	49.4
9.00	5.7	6.4	49.4	2.6	58.8	3.0	55.9
9.25	6.4	7.4	55.9	3.0	66.7	3.3	63.3
9.50	7.4	8.5	63.3	3.3	75.9	3.8	72.1
9.75	8.5	9.7	72.1	3.8	86.4	4.3	82.1
10.00	9.7	10.9	82.1	4.3	98.3	5.1	93.3
10.25	10.9	12.7	93.3	5.1	111.8	6.3	105.5
10.50	12.7	14.9	105.5	6.3	126.7	7.6	119.1
10.75	14.9	18.0	119.1	7.6	144.3	9.2	135.0
11.00	18.0	21.0	135.0	9.2	164.8	11.1	153.7
11.25	21.0	26.4	153.7	11.1	190.1	13.4	176.7
11.50	26.4	32.6	176.7	13.4	222.3	17.0	205.4
11.75	32.6	68.3	205.4	17.0	289.4	24.8	264.6
12.00	68.3	186.7	264.6	24.8	494.9	54.5	440.4
12.25	186.7	204.0	440.4	54.5	776.7	105.2	671.5
12.50	204.0	157.4	671.5	105.2	927.6	136.5	791.1

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

12.75	157.4	134.7	791.1	136.5	946.7	140.8	805.9
13.00	134.7	120.6	805.9	140.8	920.4	135.0	785.4
13.25	120.6	112.6	785.4	135.0	883.5	127.3	756.2
13.50	112.6	107.2	756.2	127.3	848.7	120.0	728.7
13.75	107.2	102.9	728.7	120.0	818.8	113.8	705.0
14.00	102.9	99.6	705.0	113.8	793.8	108.5	685.3
14.25	99.6	96.2	685.3	108.5	772.5	104.4	668.1
14.50	96.2	93.2	668.1	104.4	753.1	100.7	652.5
14.75	93.2	91.4	652.5	100.7	736.5	97.4	639.0
15.00	91.4	90.1	639.0	97.4	723.1	94.9	628.2
15.25	90.1	89.0	628.2	94.9	712.5	92.8	619.7
15.50	89.0	87.9	619.7	92.8	703.8	91.1	612.7
15.75	87.9	86.9	612.7	91.1	696.3	89.7	606.7
16.00	86.9	85.8	606.7	89.7	689.6	88.4	601.2
16.25	85.8	83.3	601.2	88.4	681.9	86.9	595.0
16.50	83.3	80.7	595.0	86.9	672.2	85.0	587.2
16.75	80.7	78.8	587.2	85.0	661.7	83.0	578.6
17.00	78.8	77.2	578.6	83.0	651.6	81.3	570.3
17.25	77.2	75.6	570.3	81.3	641.8	79.5	562.3
17.50	75.6	74.0	562.3	79.5	632.3	77.9	554.5
17.75	74.0	72.4	554.5	77.9	623.0	76.2	546.8
18.00	72.4	71.0	546.8	76.2	614.0	74.6	539.3
18.25	71.0	69.6	539.3	74.6	605.2	73.1	532.1
18.50	69.6	68.4	532.1	73.1	597.0	71.7	525.3
18.75	68.4	67.3	525.3	71.7	589.3	70.3	519.0
19.00	67.3	66.0	519.0	70.3	582.0	69.0	513.0
19.25	66.0	64.7	513.0	69.0	574.7	67.7	507.0
19.50	64.7	63.2	507.0	67.7	567.1	66.4	500.7
19.75	63.2	61.8	500.7	66.4	559.4	65.0	494.3
20.00	61.8	60.3	494.3	65.0	551.4	63.6	487.8
20.25	60.3	58.2	487.8	63.6	542.6	62.1	480.6
20.50	58.2	55.8	480.6	62.1	532.5	60.4	472.1
20.75	55.8	53.8	472.1	60.4	521.3	58.6	462.6
21.00	53.8	51.9	462.6	58.6	509.7	56.8	452.9
21.25	51.9	50.2	452.9	56.8	498.1	55.0	443.1
21.50	50.2	48.5	443.1	55.0	486.8	53.2	433.6
21.75	48.5	46.7	433.6	53.2	475.6	51.4	424.2
22.00	46.7	45.0	424.2	51.4	464.4	49.6	414.8
22.25	45.0	43.3	414.8	49.6	453.4	47.9	405.5
22.50	43.3	41.7	405.5	47.9	442.6	46.2	396.4

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

22.75	41.7	40.2	396.4	46.2	432.0	44.5	387.5
23.00	40.2	38.7	387.5	44.5	421.8	42.9	378.9
23.25	38.7	37.4	378.9	42.9	412.1	41.5	370.6
23.50	37.4	36.2	370.6	41.5	402.7	40.2	362.5
23.75	36.2	35.1	362.5	40.2	393.6	38.9	354.7
24.00	35.1	34.0	354.7	38.9	384.8	37.7	347.1
24.25	34.0	31.0	347.1	37.7	374.3	36.3	338.0
24.50	31.0	28.9	338.0	36.3	361.7	34.5	327.2
24.75	28.9	27.2	327.2	34.5	348.9	32.7	316.1
25.00	27.2	25.6	316.1	32.7	336.3	31.0	305.3
25.25	25.6	24.1	305.3	31.0	324.1	29.3	294.8
25.50	24.1	22.9	294.8	29.3	312.5	27.7	284.9
25.75	22.9	21.7	284.9	27.7	301.8	26.3	275.6
26.00	21.7	20.5	275.6	26.3	291.5	25.1	266.5
26.25	20.5	19.4	266.5	25.1	281.4	23.9	257.5
26.50	19.4	18.3	257.5	23.9	271.3	22.7	248.6
26.75	18.3	17.3	248.6	22.7	261.5	21.5	240.0
27.00	17.3	16.3	240.0	21.5	251.9	20.4	231.5
27.25	16.3	15.3	231.5	20.4	242.6	19.3	223.3
27.50	15.3	14.5	223.3	19.3	233.8	18.3	215.5
27.75	14.5	13.8	215.5	18.3	225.5	17.3	208.2
28.00	13.8	13.2	208.2	17.3	217.9	16.4	201.5
28.25	13.2	12.6	201.5	16.4	210.8	15.6	195.2
28.50	12.6	12.0	195.2	15.6	204.1	14.8	189.3
28.75	12.0	11.4	189.3	14.8	197.8	14.1	183.7
29.00	11.4	10.8	183.7	14.1	191.8	13.5	178.3
29.25	10.8	10.3	178.3	13.5	185.8	13.0	172.8
29.50	10.3	9.7	172.8	13.0	179.9	12.4	167.4
29.75	9.7	9.3	167.4	12.4	174.0	11.9	162.1
30.00	9.3	8.8	162.1	11.9	168.2	11.4	156.8
30.25	8.8	8.3	156.8	11.4	162.6	10.9	151.7
30.50	8.3	7.9	151.7	10.9	157.0	10.4	146.7
30.75	7.9	7.5	146.7	10.4	151.7	9.9	141.8
31.00	7.5	7.2	141.8	9.9	146.6	9.4	137.2
31.25	7.2	6.9	137.2	9.4	141.9	9.0	132.9
31.50	6.9	6.7	132.9	9.0	137.5	8.6	128.9
31.75	6.7	6.4	128.9	8.6	133.3	8.2	125.1
32.00	6.4	6.1	125.1	8.2	129.4	7.9	121.5
32.25	6.1	5.9	121.5	7.9	125.6	7.5	118.0
32.50	5.9	5.6	118.0	7.5	122.0	7.2	114.8

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

32.75	5.6	5.4	114.8	7.2	118.6	6.9	111.7
33.00	5.4	5.2	111.7	6.9	115.3	6.6	108.7
33.25	5.2	5.0	108.7	6.6	112.3	6.3	106.0
33.50	5.0	4.8	106.0	6.3	109.4	6.1	103.4
33.75	4.8	4.6	103.4	6.1	106.7	5.8	100.9
34.00	4.6	4.5	100.9	5.8	104.2	5.6	98.6
34.25	4.5	4.3	98.6	5.6	101.7	5.4	96.4
34.50	4.3	4.2	96.4	5.4	99.5	5.2	94.3
34.75	4.2	4.0	94.3	5.2	97.3	5.0	92.3
35.00	4.0	3.9	92.3	5.0	95.3	4.8	90.5
35.25	3.9	3.8	90.5	4.8	93.4	4.7	88.7
35.50	3.8	3.6	88.7	4.7	91.4	4.6	86.8
35.75	3.6	3.5	86.8	4.6	89.4	4.5	84.9
36.00	3.5	3.4	84.9	4.5	87.4	4.4	83.0
36.25	3.4	3.3	83.0	4.4	85.3	4.3	81.0
36.50	3.3	3.2	81.0	4.3	83.3	4.2	79.1
36.75	3.2	3.1	79.1	4.2	81.2	4.1	77.1
37.00	3.1	3.0	77.1	4.1	79.2	4.0	75.2
37.25	3.0	2.9	75.2	4.0	77.1	3.9	73.3
37.50	2.9	2.8	73.3	3.9	75.1	3.8	71.4
37.75	2.8	2.7	71.4	3.8	73.2	3.7	69.5
38.00	2.7	2.7	69.5	3.7	71.2	3.6	67.6
38.25	2.7	2.6	67.6	3.6	69.3	3.5	65.8
38.50	2.6	2.5	65.8	3.5	67.4	3.4	64.0
38.75	2.5	2.4	64.0	3.4	65.6	3.3	62.3
39.00	2.4	2.4	62.3	3.3	63.9	3.2	60.7
39.25	2.4	2.4	60.7	3.2	62.2	3.1	59.1
39.50	2.4	2.3	59.1	3.1	60.7	3.0	57.6
39.75	2.3	2.3	57.6	3.0	59.2	3.0	56.2
40.00	2.3	2.2	56.2	3.0	57.8	2.9	54.9
40.25	2.2	2.2	54.9	2.9	56.4	2.8	53.6
40.50	2.2	2.2	53.6	2.8	55.1	2.8	52.3
40.75	2.2	2.1	52.3	2.8	53.8	2.7	51.1
41.00	2.1	2.1	51.1	2.7	52.6	2.6	49.9
41.25	2.1	2.0	49.9	2.6	51.4	2.6	48.8
41.50	2.0	2.0	48.8	2.6	50.2	2.5	47.7
41.75	2.0	1.9	47.7	2.5	49.1	2.5	46.6
42.00	1.9	1.9	46.6	2.5	48.0	2.4	45.6
42.25	1.9	1.8	45.6	2.4	46.9	2.4	44.5
42.50	1.8	1.8	44.5	2.4	45.8	2.3	43.5

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

42.75	1.8	1.8	43.5	2.3	44.8	2.2	42.5
43.00	1.8	1.7	42.5	2.2	43.8	2.2	41.6
43.25	1.7	1.7	41.6	2.2	42.8	2.1	40.6
43.50	1.7	1.6	40.6	2.1	41.8	2.1	39.7
43.75	1.6	1.6	39.7	2.1	40.8	2.0	38.8
44.00	1.6	1.6	38.8	2.0	39.9	2.0	37.9
44.25	1.6	1.5	37.9	2.0	38.9	2.0	37.0
44.50	1.5	1.5	37.0	2.0	38.0	1.9	36.1
44.75	1.5	1.4	36.1	1.9	37.1	1.9	35.2
45.00	1.4	1.4	35.2	1.9	36.2	1.8	34.4
45.25	1.4	1.4	34.4	1.8	35.3	1.8	33.6
45.50	1.4	1.3	33.6	1.8	34.5	1.7	32.7
45.75	1.3	1.3	32.7	1.7	33.6	1.7	31.9
46.00	1.3	1.3	31.9	1.7	32.8	1.6	31.2
46.25	1.3	1.2	31.2	1.6	32.0	1.6	30.4
46.50	1.2	1.2	30.4	1.6	31.2	1.6	29.6
46.75	1.2	1.2	29.6	1.6	30.4	1.5	28.9
47.00	1.2	1.1	28.9	1.5	29.7	1.5	28.2
47.25	1.1	1.1	28.2	1.5	28.9	1.5	27.5
47.50	1.1	1.1	27.5	1.5	28.2	1.4	26.8
47.75	1.1	1.0	26.8	1.4	27.4	1.4	26.1
48.00	1.0	1.0	26.1	1.4	26.7	1.3	25.4
48.25	1.0	1.0	25.4	1.3	26.0	1.3	24.7
48.50	1.0	1.0	24.7	1.3	25.4	1.3	24.1
48.75	1.0	.9	24.1	1.3	24.7	1.2	23.5
49.00	.9	.9	23.5	1.2	24.1	1.2	22.8
49.25	.9	.9	22.8	1.2	23.4	1.2	22.2
49.50	.9	.9	22.2	1.2	22.8	1.1	21.7
49.75	.9	.8	21.7	1.1	22.2	1.1	21.1
50.00	.8	.8	21.1	1.1	21.6	1.1	20.5
50.25	.8	.8	20.5	1.1	21.0	1.1	20.0
50.50	.8	.8	20.0	1.1	20.4	1.0	19.4
50.75	.8	.7	19.4	1.0	19.9	1.0	18.9
51.00	.7	.7	18.9	1.0	19.4	1.0	18.4
51.25	.7	.7	18.4	1.0	18.8	.9	17.9
51.50	.7	.7	17.9	.9	18.3	.9	17.4
51.75	.7	.7	17.4	.9	17.8	.9	16.9
52.00	.7	.6	16.9	.9	17.3	.9	16.4
52.25	.6	.6	16.4	.9	16.8	.8	16.0
52.50	.6	.6	16.0	.8	16.4	.8	15.5

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

52.75	.6	.6	15.5	.8	15.9	.8	15.1
53.00	.6	.6	15.1	.8	15.5	.8	14.7
53.25	.6	.6	14.7	.8	15.0	.8	14.3
53.50	.6	.5	14.3	.8	14.6	.7	13.9
53.75	.5	.5	13.9	.7	14.2	.7	13.5
54.00	.5	.5	13.5	.7	13.8	.7	13.1
54.25	.5	.5	13.1	.7	13.4	.7	12.7
54.50	.5	.5	12.7	.7	13.0	.7	12.4
54.75	.5	.5	12.4	.7	12.7	.6	12.0
55.00	.5	.4	12.0	.6	12.3	.6	11.7
55.25	.4	.4	11.7	.6	12.0	.6	11.4
55.50	.4	.4	11.4	.6	11.6	.6	11.0
55.75	.4	.4	11.0	.6	11.3	.6	10.7
56.00	.4	.4	10.7	.6	11.0	.6	10.4
56.25	.4	.4	10.4	.6	10.7	.5	10.1
56.50	.4	.4	10.1	.5	10.4	.5	9.8
56.75	.4	.4	9.8	.5	10.1	.5	9.5
57.00	.4	.4	9.5	.5	9.8	.5	9.3
57.25	.4	.3	9.3	.5	9.5	.5	9.0
57.50	.3	.3	9.0	.5	9.2	.5	8.7
57.75	.3	.3	8.7	.5	8.9	.4	8.5
58.00	.3	.3	8.5	.4	8.7	.4	8.3
58.25	.3	.3	8.3	.4	8.4	.4	8.0
58.50	.3	.3	8.0	.4	8.2	.4	7.8
58.75	.3	.3	7.8	.4	8.0	.4	7.6
59.00	.3	.3	7.6	.4	7.7	.4	7.3
59.25	.3	.3	7.3	.4	7.5	.4	7.1
59.50	.3	.3	7.1	.4	7.3	.4	6.9
59.75	.3	.3	6.9	.4	7.1	.4	6.7
60.00	.3	.2	6.7	.4	6.9	.3	6.5
60.25	.2	.2	6.5	.3	6.7	.3	6.3
60.50	.2	.2	6.3	.3	6.5	.3	6.1
60.75	.2	.2	6.1	.3	6.3	.3	6.0
61.00	.2	.2	6.0	.3	6.1	.3	5.8
61.25	.2	.2	5.8	.3	5.9	.3	5.6
61.50	.2	.2	5.6	.3	5.8	.3	5.5
61.75	.2	.2	5.5	.3	5.6	.3	5.3
62.00	.2	.2	5.3	.3	5.4	.3	5.1
62.25	.2	.2	5.1	.3	5.3	.3	5.0
62.50	.2	.2	5.0	.3	5.1	.3	4.9

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

62.75	.2	.2	4.9	.3	5.0	.2	4.7
63.00	.2	.2	4.7	.2	4.8	.2	4.6
63.25	.2	.2	4.6	.2	4.7	.2	4.4
63.50	.2	.2	4.4	.2	4.5	.2	4.3
63.75	.2	.2	4.3	.2	4.4	.2	4.2
64.00	.2	.2	4.2	.2	4.3	.2	4.1
64.25	.2	.1	4.1	.2	4.1	.2	3.9
64.50	.1	.1	3.9	.2	4.0	.2	3.8
64.75	.1	.1	3.8	.2	3.9	.2	3.7
65.00	.1	.1	3.7	.2	3.8	.2	3.6
65.25	.1	.1	3.6	.2	3.7	.2	3.5
65.50	.1	.1	3.5	.2	3.6	.2	3.4
65.75	.1	.1	3.4	.2	3.5	.2	3.3
66.00	.1	.1	3.3	.2	3.4	.2	3.2
66.25	.1	.1	3.2	.2	3.3	.2	3.1
66.50	.1	.1	3.1	.2	3.2	.2	3.0
66.75	.1	.1	3.0	.2	3.1	.2	2.9
67.00	.1	.1	2.9	.2	3.0	.1	2.8
67.25	.1	.1	2.8	.1	2.9	.1	2.8
67.50	.1	.1	2.8	.1	2.8	.1	2.7
67.75	.1	.1	2.7	.1	2.7	.1	2.6
68.00	.1	.1	2.6	.1	2.6	.1	2.5
68.25	.1	.1	2.5	.1	2.6	.1	2.4
68.50	.1	.1	2.4	.1	2.5	.1	2.4
68.75	.1	.1	2.4	.1	2.4	.1	2.3
69.00	.1	.1	2.3	.1	2.4	.1	2.2
69.25	.1	.1	2.2	.1	2.3	.1	2.2
69.50	.1	.1	2.2	.1	2.2	.1	2.1
69.75	.1	.1	2.1	.1	2.1	.1	2.0
70.00	.1	.1	2.0	.1	2.1	.1	2.0
70.25	.1	.1	2.0	.1	2.0	.1	1.9
70.50	.1	.1	1.9	.1	1.9	.1	1.8
70.75	.1	.1	1.8	.1	1.8	.1	1.7
71.00	.1	0.0	1.7	.1	1.7	.1	1.7
71.25	0.0	0.0	1.7	.1	1.6	.1	1.5
71.50	0.0	0.0	1.5	.1	1.5	.1	1.4
71.75	0.0	0.0	1.4	.1	1.3	.1	1.2
72.00	0.0	0.0	1.2	.1	1.2	.1	1.1
72.25	0.0	0.0	1.1	.1	1.1	.1	1.0
72.50	0.0	0.0	1.0	.1	1.0	0.0	.9

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HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
100 YEAR STORM FREQUENCY (CONT'D)

MAXIMUM OUTFLOW = 140.8 C.F.S.
MAXIMUM STORAGE = 362646.8 CU FT.
MAXIMUM ELEVATION = 41.6 FEET

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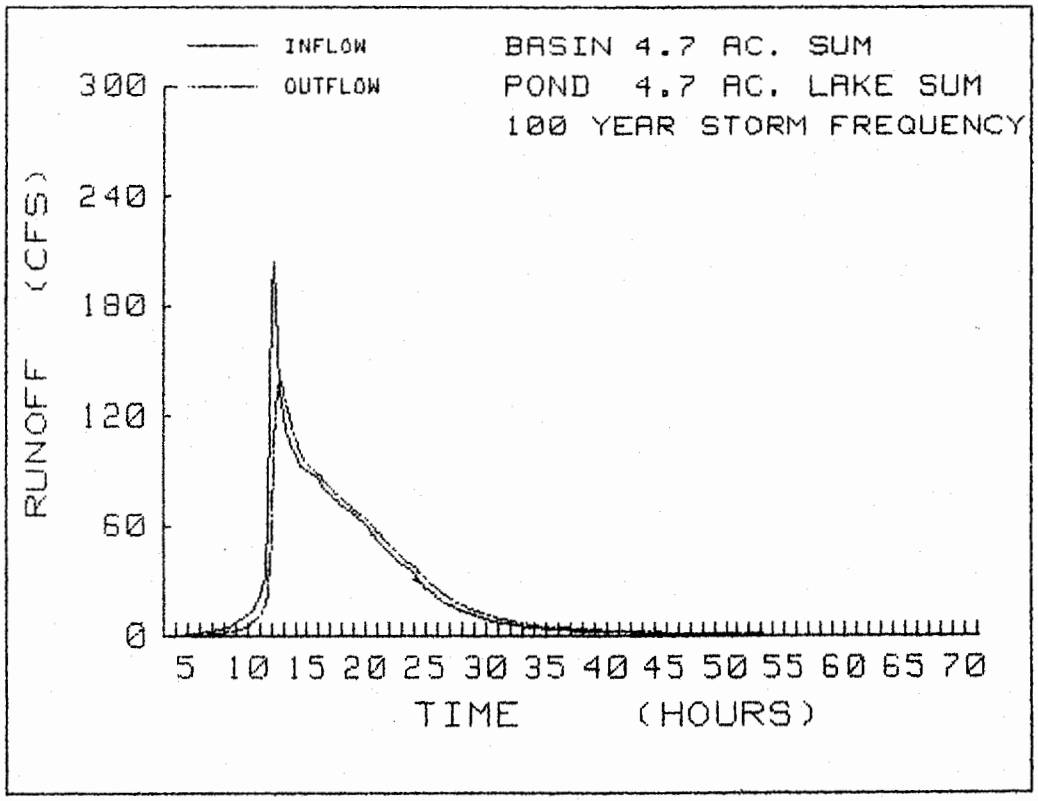
HYDROLOGIC REPORT FOR POWHATAN



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HYDROLOGIC REPORT FOR

POWHATAN

S. C. S. HYDROGRAPH

BASIN IDENTIFICATION 15 AC. LAKE
BASIN DISCHARGES INTO 3.3 AC. LAKE

BASIN AREA	=	121.00	ACRES
BASIN CURVE NUMBER	=	89.00	
24-HOUR PRECIPITATION	=	5.75	INCHES
AVERAGE BASIN SLOPE	=	3.3	%
HYDRAULIC LENGTH	=	3300.0	FEET
BASIN LAG	=	.30	HOURS

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
2.00	0.0	2.25	0.0	2.50	0.0	2.75	0.0
3.00	0.0	3.25	0.0	3.50	0.0	3.75	0.0
4.00	0.0	4.25	.2	4.50	.6	4.75	.9
5.00	1.3	5.25	1.6	5.50	2.0	5.75	2.3
6.00	2.5	6.25	2.9	6.50	3.6	6.75	4.2
7.00	4.6	7.25	5.0	7.50	5.3	7.75	5.6
8.00	5.9	8.25	6.5	8.50	8.0	8.75	9.0
9.00	9.6	9.25	10.3	9.50	11.7	9.75	12.9
10.00	14.3	10.25	15.9	10.50	18.9	10.75	21.8
11.00	26.8	11.25	32.2	11.50	42.9	11.75	74.0
12.00	234.7	12.25	432.4	12.50	256.9	12.75	136.4
13.00	79.4	13.25	56.2	13.50	42.8	13.75	36.6
14.00	31.3	14.25	27.9	14.50	23.1	14.75	21.0
15.00	20.3	15.25	20.2	15.50	20.1	15.75	20.1
16.00	20.1	16.25	19.0	16.50	15.0	16.75	12.9
17.00	12.4	17.25	12.2	17.50	12.1	17.75	12.1
18.00	12.1	18.25	12.1	18.50	12.1	18.75	12.1
19.00	12.1	19.25	12.1	19.50	12.1	19.75	12.1
20.00	12.0	20.25	11.6	20.50	9.6	20.75	8.5
21.00	8.2	21.25	8.2	21.50	8.1	21.75	8.1
22.00	8.1	22.25	8.1	22.50	8.1	22.75	8.1
23.00	8.1	23.25	8.1	23.50	8.1	23.75	8.0
24.00	7.7	24.25	3.8	24.50	1.1	24.75	.3
25.00	.1	25.25	0.0	25.50	0.0	25.75	0.0
26.00	0.0	26.25	0.0	26.50	0.0	26.75	0.0

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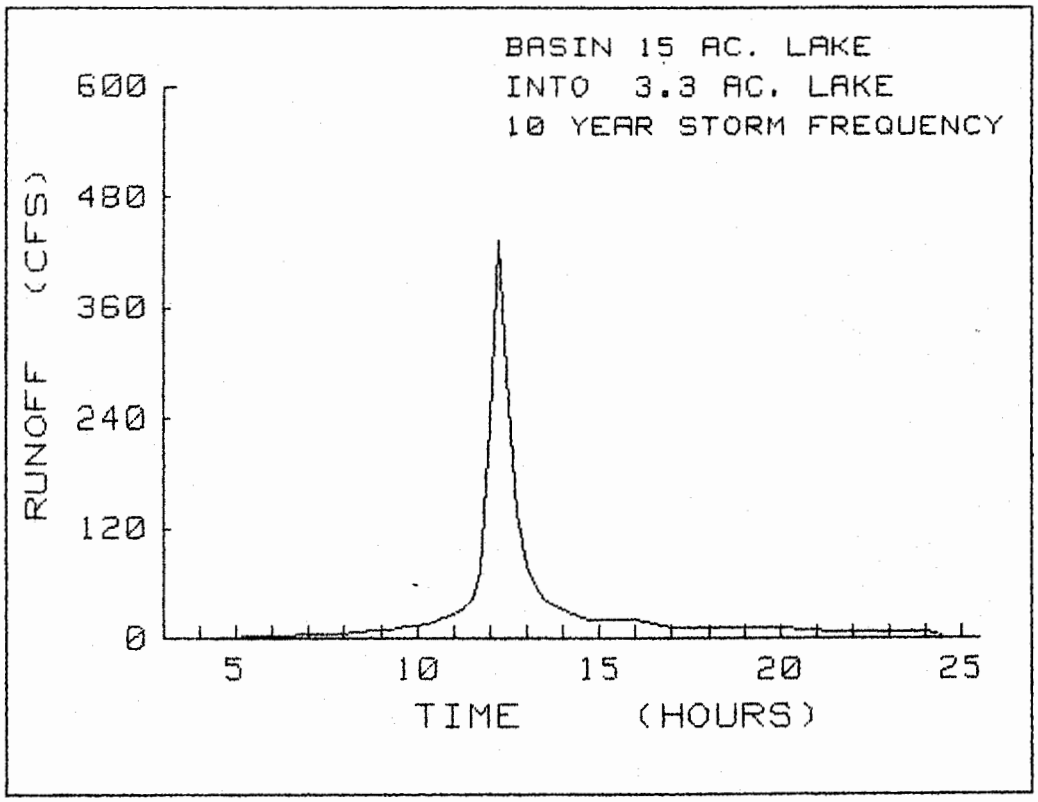

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HYDROLOGIC REPORT FOR

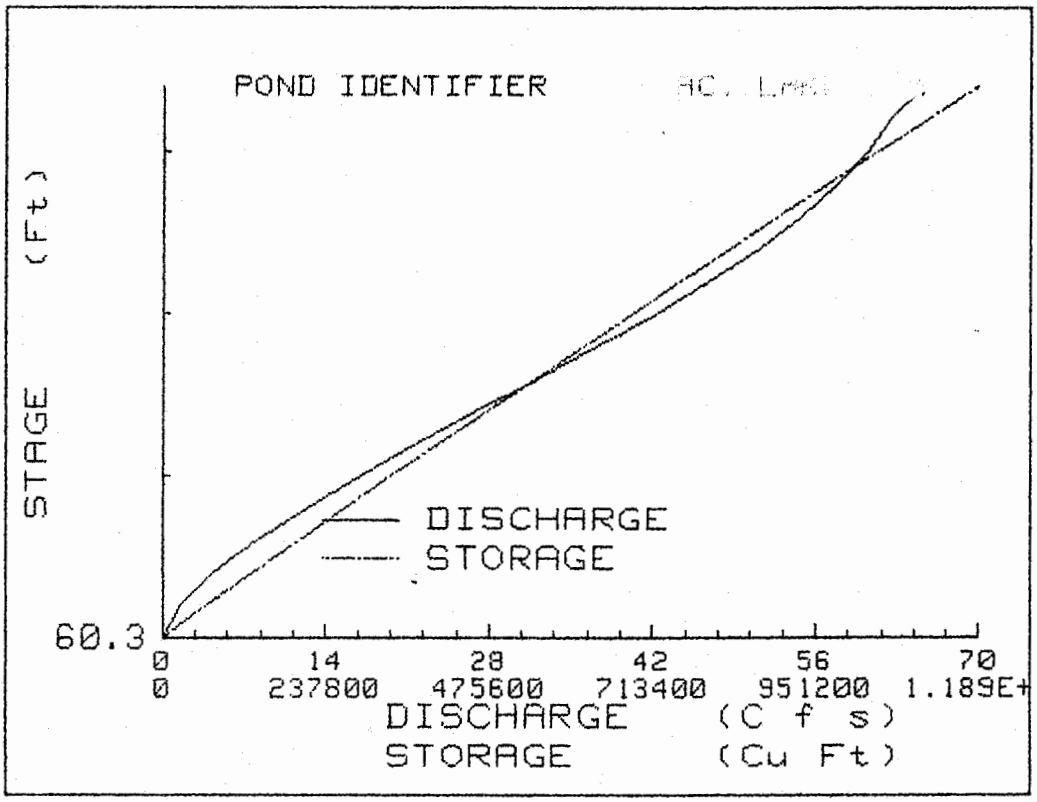
POWHATAN

STAGE, STORAGE & DISCHARGE

POND IDENTIFIER

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
60.3	0.0	0.0	0.0
60.4	65638.5	1.6	147.5
60.5	131874.2	4.4	297.5
60.6	198707.1	8.1	449.7
60.7	266137.1	12.4	603.8
60.8	334164.3	17.0	759.6
60.9	402788.5	21.9	917.0
61.0	472010.0	26.9	1075.8
61.1	541739.0	32.1	1236.0
61.2	611886.0	37.2	1396.9
61.3	682451.0	42.2	1558.8
61.4	753434.0	46.8	1721.1
61.5	824835.0	51.2	1884.2
61.6	896654.0	54.8	2047.4
61.7	968891.0	57.9	2211.0
61.8	1041546.0	60.4	2374.9
61.9	1114619.0	62.3	2539.2
62.0	1188110.0	65.2	2705.4

HYDROLOGIC REPORT FOR POWHATAN



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HYDROLOGIC REPORT FOR POWHATAN

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER
10 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
4.25	0.0	.2	0.0	0.0	.2	0.0	.2
4.50	.2	.6	.2	0.0	1.0	0.0	1.0
4.75	.6	.9	1.0	0.0	2.5	0.0	2.5
5.00	.9	1.3	2.5	0.0	4.7	.1	4.6
5.25	1.3	1.6	4.6	.1	7.5	.1	7.4
5.50	1.6	2.0	7.4	.1	10.9	.1	10.8
5.75	2.0	2.3	10.8	.1	14.9	.2	14.7
6.00	2.3	2.5	14.7	.2	19.4	.2	19.2
6.25	2.5	2.9	19.2	.2	24.4	.3	24.2
6.50	2.9	3.6	24.2	.3	30.5	.3	30.2
6.75	3.6	4.2	30.2	.3	37.7	.4	37.3
7.00	4.2	4.6	37.3	.4	45.7	.5	45.2
7.25	4.6	5.0	45.2	.5	54.3	.6	53.7
7.50	5.0	5.3	53.7	.6	63.4	.7	62.7
7.75	5.3	5.6	62.7	.7	72.9	.8	72.1
8.00	5.6	5.9	72.1	.8	82.9	.9	82.0
8.25	5.9	6.5	82.0	.9	93.5	1.0	92.5
8.50	6.5	8.0	92.5	1.0	106.0	1.1	104.8
8.75	8.0	9.0	104.8	1.1	120.7	1.3	119.4
9.00	9.0	9.6	119.4	1.3	136.6	1.5	135.1
9.25	9.6	10.3	135.1	1.5	153.4	1.7	151.7
9.50	10.3	11.7	151.7	1.7	172.0	2.1	169.9
9.75	11.7	12.9	169.9	2.1	192.4	2.4	190.0
10.00	12.9	14.3	190.0	2.4	214.7	2.9	211.8
10.25	14.3	15.9	211.8	2.9	239.2	3.3	235.9
10.50	15.9	18.9	235.9	3.3	267.4	3.8	263.5
10.75	18.9	21.8	263.5	3.8	300.4	4.5	295.9
11.00	21.8	26.8	295.9	4.5	339.9	5.4	334.5
11.25	26.8	32.2	334.5	5.4	388.0	6.6	381.4
11.50	32.2	42.9	381.4	6.6	449.9	8.1	441.8
11.75	42.9	74.0	441.8	8.1	550.6	10.9	539.7
12.00	74.0	234.7	539.7	10.9	837.6	19.4	818.1
12.25	234.7	432.4	818.1	19.4	1465.9	39.3	1426.5
12.50	432.4	256.9	1426.5	39.3	2076.6	55.4	2021.2
12.75	256.9	136.4	2021.2	55.4	2359.2	60.2	2299.0
13.00	136.4	79.4	2299.0	60.2	2454.7	61.3	2393.4
13.25	79.4	58.2	2393.4	61.3	2467.7	61.5	2406.2

HYDROLOGIC REPORT FOR POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 4.7 AC. LAKE
10 YEAR STORM FREQUENCY (CONT'D)

13.50	56.2	42.8	2406.2	61.5	2443.7	61.2	2382.5
13.75	42.8	36.6	2382.5	61.2	2400.7	60.7	2340.0
14.00	36.6	31.3	2340.0	60.7	2347.3	60.0	2287.3
14.25	31.3	27.9	2287.3	60.0	2286.5	59.1	2227.4
14.50	27.9	23.1	2227.4	59.1	2219.4	58.0	2161.3
14.75	23.1	21.0	2161.3	58.0	2147.4	56.7	2090.7
15.00	21.0	20.3	2090.7	56.7	2075.4	55.3	2020.0
15.25	20.3	20.2	2020.0	55.3	2005.2	53.9	1951.4
15.50	20.2	20.1	1951.4	53.9	1937.8	52.4	1885.4
15.75	20.1	20.1	1885.4	52.4	1873.3	50.9	1822.4
16.00	20.1	20.1	1822.4	50.9	1811.8	49.2	1762.5
16.25	20.1	19.0	1762.5	49.2	1752.4	47.6	1704.8
16.50	19.0	15.0	1704.8	47.6	1691.1	45.9	1645.2
16.75	15.0	12.9	1645.2	45.9	1627.1	44.1	1583.0
17.00	12.9	12.4	1583.0	44.1	1564.1	42.4	1521.8
17.25	12.4	12.2	1521.8	42.4	1504.0	40.5	1463.5
17.50	12.2	12.1	1463.5	40.5	1447.3	38.8	1408.5
17.75	12.1	12.1	1408.5	38.8	1394.0	37.1	1356.9
18.00	12.1	12.1	1356.9	37.1	1344.1	35.5	1308.5
18.25	12.1	12.1	1308.5	35.5	1297.2	34.0	1263.2
18.50	12.1	12.1	1263.2	34.0	1253.4	32.7	1220.7
18.75	12.1	12.1	1220.7	32.7	1212.3	31.3	1180.9
19.00	12.1	12.1	1180.9	31.3	1173.8	30.1	1143.7
19.25	12.1	12.1	1143.7	30.1	1137.8	28.9	1108.8
19.50	12.1	12.1	1108.8	28.9	1104.1	27.8	1076.2
19.75	12.1	12.1	1076.2	27.8	1072.5	26.8	1045.7
20.00	12.1	12.0	1045.7	26.8	1043.0	25.9	1017.2
20.25	12.0	11.6	1017.2	25.9	1014.9	25.0	990.0
20.50	11.6	9.6	990.0	25.0	986.1	24.1	962.0
20.75	9.6	8.5	962.0	24.1	956.0	23.1	932.9
21.00	8.5	8.2	932.9	23.1	926.6	22.2	904.4
21.25	8.2	8.2	904.4	22.2	898.5	21.3	877.2
21.50	8.2	8.1	877.2	21.3	872.2	20.5	851.7
21.75	8.1	8.1	851.7	20.5	847.4	19.7	827.7
22.00	8.1	8.1	827.7	19.7	824.2	19.0	805.2
22.25	8.1	8.1	805.2	19.0	802.4	18.3	784.0
22.50	8.1	8.1	784.0	18.3	781.9	17.7	764.2
22.75	8.1	8.1	764.2	17.7	762.7	17.1	745.6
23.00	8.1	8.1	745.6	17.1	744.7	16.6	728.1
23.25	8.1	8.1	728.1	16.6	727.7	16.1	711.6

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

23.50	8.1	8.1	711.6	16.1	711.7	15.6	696.1
23.75	8.1	8.0	696.1	15.6	696.6	15.1	681.5
24.00	8.0	7.7	681.5	15.1	682.1	14.7	667.4
24.25	7.7	3.8	667.4	14.7	664.2	14.2	650.0
24.50	3.8	1.1	650.0	14.2	640.7	13.5	627.2
24.75	1.1	.3	627.2	13.5	615.2	12.7	602.4
25.00	.3	.1	602.4	12.7	590.1	12.0	578.1
25.25	.1	0.0	578.1	12.0	566.2	11.3	554.8
25.50	0.0	0.0	554.8	11.3	543.5	10.7	532.8
25.75	0.0	0.0	532.8	10.7	522.1	10.1	511.9
26.00	0.0	0.0	511.9	10.1	501.8	9.6	492.3
26.25	0.0	0.0	492.3	9.6	482.7	9.0	473.7
26.50	0.0	0.0	473.7	9.0	464.7	8.5	456.1
26.75	0.0	0.0	456.1	8.5	447.6	8.1	439.6
27.00	0.0	0.0	439.6	8.1	431.5	7.7	423.9
27.25	0.0	0.0	423.9	7.7	416.2	7.3	408.9
27.50	0.0	0.0	408.9	7.3	401.6	6.9	394.7
27.75	0.0	0.0	394.7	6.9	387.8	6.6	381.2
28.00	0.0	0.0	381.2	6.6	374.6	6.3	368.3
28.25	0.0	0.0	368.3	6.3	362.0	6.0	356.1
28.50	0.0	0.0	356.1	6.0	350.1	5.7	344.4
28.75	0.0	0.0	344.4	5.7	338.7	5.4	333.3
29.00	0.0	0.0	333.3	5.4	327.9	5.1	322.8
29.25	0.0	0.0	322.8	5.1	317.6	4.9	312.8
29.50	0.0	0.0	312.8	4.9	307.9	4.7	303.2
29.75	0.0	0.0	303.2	4.7	298.6	4.4	294.1
30.00	0.0	0.0	294.1	4.4	289.7	4.3	285.4
30.25	0.0	0.0	285.4	4.3	281.2	4.1	277.1
30.50	0.0	0.0	277.1	4.1	273.0	3.9	269.1
30.75	0.0	0.0	269.1	3.9	265.1	3.8	261.3
31.00	0.0	0.0	261.3	3.8	257.5	3.7	253.9
31.25	0.0	0.0	253.9	3.7	250.2	3.5	246.7
31.50	0.0	0.0	246.7	3.5	243.2	3.4	239.8
31.75	0.0	0.0	239.8	3.4	236.4	3.3	233.1
32.00	0.0	0.0	233.1	3.3	229.9	3.1	226.7
32.25	0.0	0.0	226.7	3.1	223.6	3.0	220.6
32.50	0.0	0.0	220.6	3.0	217.6	2.9	214.7
32.75	0.0	0.0	214.7	2.9	211.7	2.8	208.9
33.00	0.0	0.0	208.9	2.8	206.1	2.7	203.4
33.25	0.0	0.0	203.4	2.7	200.8	2.6	198.2

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER [illegible] LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

33.50	0.0	0.0	198.2	2.6	195.6	2.5	193.1
33.75	0.0	0.0	193.1	2.5	190.6	2.4	188.2
34.00	0.0	0.0	188.2	2.4	185.8	2.3	183.4
34.25	0.0	0.0	183.4	2.3	181.1	2.2	178.9
34.50	0.0	0.0	178.9	2.2	176.7	2.1	174.5
34.75	0.0	0.0	174.5	2.1	172.4	2.1	170.3
35.00	0.0	0.0	170.3	2.1	168.3	2.0	166.3
35.25	0.0	0.0	166.3	2.0	164.3	1.9	162.4
35.50	0.0	0.0	162.4	1.9	160.4	1.8	158.6
35.75	0.0	0.0	158.6	1.8	156.8	1.8	155.0
36.00	0.0	0.0	155.0	1.8	153.2	1.7	151.5
36.25	0.0	0.0	151.5	1.7	149.8	1.6	148.2
36.50	0.0	0.0	148.2	1.6	146.5	1.6	144.9
36.75	0.0	0.0	144.9	1.6	143.3	1.6	141.8
37.00	0.0	0.0	141.8	1.6	140.2	1.5	138.7
37.25	0.0	0.0	138.7	1.5	137.2	1.5	135.7
37.50	0.0	0.0	135.7	1.5	134.2	1.5	132.7
37.75	0.0	0.0	132.7	1.5	131.3	1.4	129.9
38.00	0.0	0.0	129.9	1.4	128.4	1.4	127.0
38.25	0.0	0.0	127.0	1.4	125.7	1.4	124.3
38.50	0.0	0.0	124.3	1.4	122.9	1.3	121.6
38.75	0.0	0.0	121.6	1.3	120.3	1.3	119.0
39.00	0.0	0.0	119.0	1.3	117.7	1.3	116.4
39.25	0.0	0.0	116.4	1.3	115.1	1.2	113.8
39.50	0.0	0.0	113.8	1.2	112.6	1.2	111.4
39.75	0.0	0.0	111.4	1.2	110.2	1.2	109.0
40.00	0.0	0.0	109.0	1.2	107.8	1.2	106.6
40.25	0.0	0.0	106.6	1.2	105.4	1.1	104.3
40.50	0.0	0.0	104.3	1.1	103.1	1.1	102.0
40.75	0.0	0.0	102.0	1.1	100.9	1.1	99.8
41.00	0.0	0.0	99.8	1.1	98.7	1.1	97.6
41.25	0.0	0.0	97.6	1.1	96.6	1.0	95.5
41.50	0.0	0.0	95.5	1.0	94.5	1.0	93.4
41.75	0.0	0.0	93.4	1.0	92.4	1.0	91.4
42.00	0.0	0.0	91.4	1.0	90.4	1.0	89.4
42.25	0.0	0.0	89.4	1.0	88.5	1.0	87.5
42.50	0.0	0.0	87.5	1.0	86.5	.9	85.6
42.75	0.0	0.0	85.6	.9	84.7	.9	83.7
43.00	0.0	0.0	83.7	.9	82.8	.9	81.9
43.25	0.0	0.0	81.9	.9	81.0	.9	80.1

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 4.7 AC. LAKE
10 YEAR STORM FREQUENCY (CONT'D)

43.50	0.0	0.0	80.1	.9	79.3	.9	78.4
43.75	0.0	0.0	78.4	.9	77.5	.8	76.7
44.00	0.0	0.0	76.7	.8	75.9	.8	75.0
44.25	0.0	0.0	75.0	.8	74.2	.8	73.4
44.50	0.0	0.0	73.4	.8	72.6	.8	71.8
44.75	0.0	0.0	71.8	.8	71.0	.8	70.3
45.00	0.0	0.0	70.3	.8	69.5	.8	68.7
45.25	0.0	0.0	68.7	.8	68.0	.7	67.2
45.50	0.0	0.0	67.2	.7	66.5	.7	65.8
45.75	0.0	0.0	65.8	.7	65.1	.7	64.4
46.00	0.0	0.0	64.4	.7	63.7	.7	63.0
46.25	0.0	0.0	63.0	.7	62.3	.7	61.6
46.50	0.0	0.0	61.6	.7	60.9	.7	60.3
46.75	0.0	0.0	60.3	.7	59.6	.6	59.0
47.00	0.0	0.0	59.0	.6	58.3	.6	57.7
47.25	0.0	0.0	57.7	.6	57.0	.6	56.4
47.50	0.0	0.0	56.4	.6	55.8	.6	55.2
47.75	0.0	0.0	55.2	.6	54.6	.6	54.0
48.00	0.0	0.0	54.0	.6	53.4	.6	52.8
48.25	0.0	0.0	52.8	.6	52.2	.6	51.7
48.50	0.0	0.0	51.7	.6	51.1	.6	50.6
48.75	0.0	0.0	50.6	.6	50.0	.5	49.5
49.00	0.0	0.0	49.5	.5	48.9	.5	48.4
49.25	0.0	0.0	48.4	.5	47.9	.5	47.3
49.50	0.0	0.0	47.3	.5	46.8	.5	46.3
49.75	0.0	0.0	46.3	.5	45.8	.5	45.3
50.00	0.0	0.0	45.3	.5	44.8	.5	44.3
50.25	0.0	0.0	44.3	.5	43.8	.5	43.4
50.50	0.0	0.0	43.4	.5	42.9	.5	42.4
50.75	0.0	0.0	42.4	.5	42.0	.5	41.5
51.00	0.0	0.0	41.5	.5	41.0	.4	40.6
51.25	0.0	0.0	40.6	.4	40.2	.4	39.7
51.50	0.0	0.0	39.7	.4	39.3	.4	38.9
51.75	0.0	0.0	38.9	.4	38.4	.4	38.0
52.00	0.0	0.0	38.0	.4	37.6	.4	37.2
52.25	0.0	0.0	37.2	.4	36.8	.4	36.4
52.50	0.0	0.0	36.4	.4	36.0	.4	35.6
52.75	0.0	0.0	35.6	.4	35.2	.4	34.8
53.00	0.0	0.0	34.8	.4	34.4	.4	34.1
53.25	0.0	0.0	34.1	.4	33.7	.4	33.3

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

53.50	0.0	0.0	33.3	.4	33.0	.4	32.6
53.75	0.0	0.0	32.6	.4	32.2	.3	31.9
54.00	0.0	0.0	31.9	.3	31.5	.3	31.2
54.25	0.0	0.0	31.2	.3	30.9	.3	30.5
54.50	0.0	0.0	30.5	.3	30.2	.3	29.9
54.75	0.0	0.0	29.9	.3	29.5	.3	29.2
55.00	0.0	0.0	29.2	.3	28.9	.3	28.6
55.25	0.0	0.0	28.6	.3	28.3	.3	28.0
55.50	0.0	0.0	28.0	.3	27.7	.3	27.4
55.75	0.0	0.0	27.4	.3	27.1	.3	26.8
56.00	0.0	0.0	26.8	.3	26.5	.3	26.2
56.25	0.0	0.0	26.2	.3	25.9	.3	25.6
56.50	0.0	0.0	25.6	.3	25.3	.3	25.1
56.75	0.0	0.0	25.1	.3	24.8	.3	24.5
57.00	0.0	0.0	24.5	.3	24.2	.3	24.0
57.25	0.0	0.0	24.0	.3	23.7	.3	23.5
57.50	0.0	0.0	23.5	.3	23.2	.3	22.9
57.75	0.0	0.0	22.9	.3	22.7	.2	22.5
58.00	0.0	0.0	22.5	.2	22.2	.2	22.0
58.25	0.0	0.0	22.0	.2	21.7	.2	21.5
58.50	0.0	0.0	21.5	.2	21.3	.2	21.0
58.75	0.0	0.0	21.0	.2	20.8	.2	20.6
59.00	0.0	0.0	20.6	.2	20.3	.2	20.1
59.25	0.0	0.0	20.1	.2	19.9	.2	19.7
59.50	0.0	0.0	19.7	.2	19.5	.2	19.3
59.75	0.0	0.0	19.3	.2	19.0	.2	18.8
60.00	0.0	0.0	18.8	.2	18.6	.2	18.4
60.25	0.0	0.0	18.4	.2	18.2	.2	18.0
60.50	0.0	0.0	18.0	.2	17.8	.2	17.6
60.75	0.0	0.0	17.6	.2	17.4	.2	17.3
61.00	0.0	0.0	17.3	.2	17.1	.2	16.9
61.25	0.0	0.0	16.9	.2	16.7	.2	16.5
61.50	0.0	0.0	16.5	.2	16.3	.2	16.2
61.75	0.0	0.0	16.2	.2	16.0	.2	15.8
62.00	0.0	0.0	15.8	.2	15.6	.2	15.5
62.25	0.0	0.0	15.5	.2	15.3	.2	15.1
62.50	0.0	0.0	15.1	.2	15.0	.2	14.8
62.75	0.0	0.0	14.8	.2	14.6	.2	14.5
63.00	0.0	0.0	14.5	.2	14.3	.2	14.2
63.25	0.0	0.0	14.2	.2	14.0	.2	13.9

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

63.50	0.0	0.0	13.9	.2	13.7	.1	13.6
63.75	0.0	0.0	13.6	.1	13.4	.1	13.3
64.00	0.0	0.0	13.3	.1	13.1	.1	13.0
64.25	0.0	0.0	13.0	.1	12.8	.1	12.7
64.50	0.0	0.0	12.7	.1	12.6	.1	12.4
64.75	0.0	0.0	12.4	.1	12.3	.1	12.1
65.00	0.0	0.0	12.1	.1	12.0	.1	11.9
65.25	0.0	0.0	11.9	.1	11.8	.1	11.6
65.50	0.0	0.0	11.6	.1	11.5	.1	11.4
65.75	0.0	0.0	11.4	.1	11.2	.1	11.1
66.00	0.0	0.0	11.1	.1	11.0	.1	10.9
66.25	0.0	0.0	10.9	.1	10.8	.1	10.6
66.50	0.0	0.0	10.6	.1	10.5	.1	10.4
66.75	0.0	0.0	10.4	.1	10.3	.1	10.2
67.00	0.0	0.0	10.2	.1	10.1	.1	10.0
67.25	0.0	0.0	10.0	.1	9.9	.1	9.8
67.50	0.0	0.0	9.8	.1	9.6	.1	9.5
67.75	0.0	0.0	9.5	.1	9.4	.1	9.3
68.00	0.0	0.0	9.3	.1	9.2	.1	9.1
68.25	0.0	0.0	9.1	.1	9.0	.1	8.9
68.50	0.0	0.0	8.9	.1	8.8	.1	8.7
68.75	0.0	0.0	8.7	.1	8.6	.1	8.6
69.00	0.0	0.0	8.6	.1	8.5	.1	8.4
69.25	0.0	0.0	8.4	.1	8.3	.1	8.2
69.50	0.0	0.0	8.2	.1	8.1	.1	8.0
69.75	0.0	0.0	8.0	.1	7.9	.1	7.8
70.00	0.0	0.0	7.8	.1	7.7	.1	7.7
70.25	0.0	0.0	7.7	.1	7.6	.1	7.5
70.50	0.0	0.0	7.5	.1	7.4	.1	7.3
70.75	0.0	0.0	7.3	.1	7.3	.1	7.2
71.00	0.0	0.0	7.2	.1	7.1	.1	7.0
71.25	0.0	0.0	7.0	.1	6.9	.1	6.9
71.50	0.0	0.0	6.9	.1	6.8	.1	6.7
71.75	0.0	0.0	6.7	.1	6.6	.1	6.6
72.00	0.0	0.0	6.6	.1	6.5	.1	6.4
72.25	0.0	0.0	6.4	.1	6.4	.1	6.3
72.50	0.0	0.0	6.3	.1	6.2	.1	6.2
72.75	0.0	0.0	6.2	.1	6.1	.1	6.0
73.00	0.0	0.0	6.0	.1	6.0	.1	5.9
73.25	0.0	0.0	5.9	.1	5.8	.1	5.8

LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 15 AC. LAKE
POND IDENTIFIER [illegible] LAKE SL[illegible]
10 YEAR STORM FREQUENCY (CONT'D)

73.50	0.0	0.0	5.8	.1	5.7	.1	5.6
73.75	0.0	0.0	5.6	.1	5.6	.1	5.5
74.00	0.0	0.0	5.5	.1	5.5	.1	5.4
74.25	0.0	0.0	5.4	.1	5.3	.1	5.3
74.50	0.0	0.0	5.3	.1	5.2	.1	5.2
74.75	0.0	0.0	5.2	.1	5.1	.1	5.1
75.00	0.0	0.0	5.1	.1	5.0	.1	4.9
75.25	0.0	0.0	4.9	.1	4.9	.1	4.8
75.50	0.0	0.0	4.8	.1	4.8	.1	4.7
75.75	0.0	0.0	4.7	.1	4.7	.1	4.6
76.00	0.0	0.0	4.6	.1	4.6	0.0	4.5

MAXIMUM OUTFLOW = 61.5 C.F.S.
MAXIMUM STORAGE = 1082781.4 CU FT.
MAXIMUM ELEVATION = 61.9 FEET

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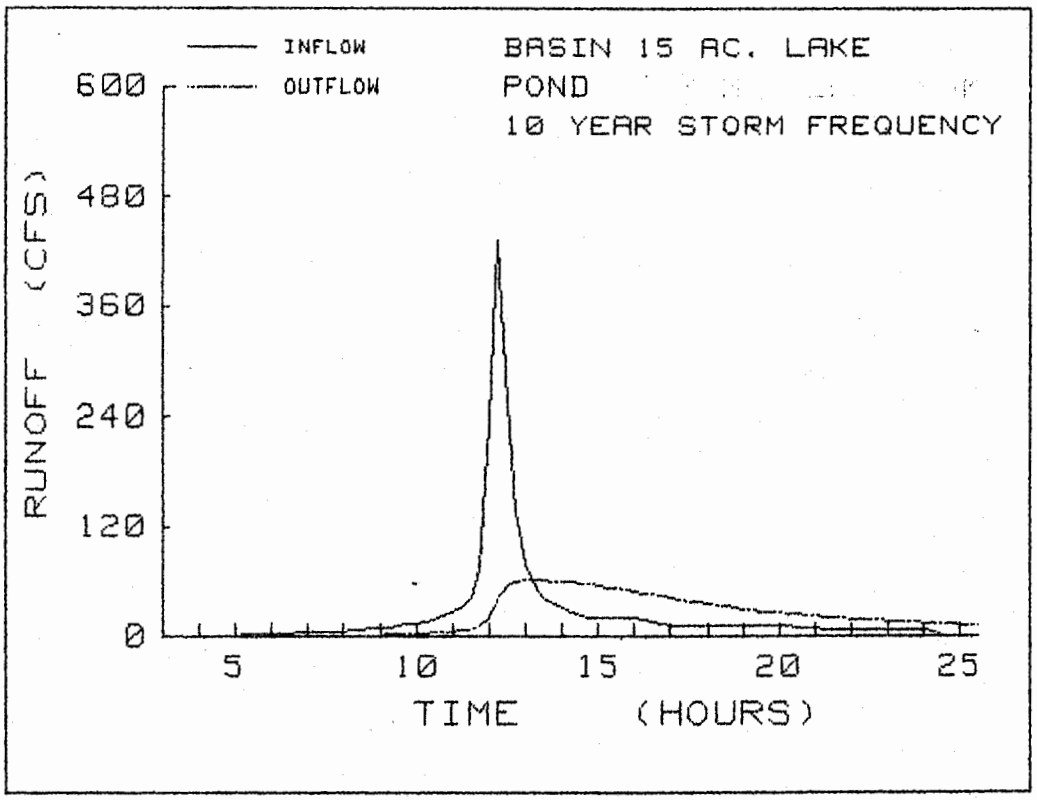

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POWHATAN

S. C. S. HYDROGRAPH

BASIN IDENTIFICATION 3.3 AC. LAKE
BASIN DISCHARGES INTO 4.7 AC. LAKE

BASIN AREA	=	25.50	ACRES
BASIN CURVE NUMBER	=	83.00	
24-HOUR PRECIPITATION	=	5.75	INCHES
AVERAGE BASIN SLOPE	=	4.0	%
HYDRAULIC LENGTH	=	1200.0	FEET
BASIN LAG	=	.17	HOURS

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
4.00	0.0	4.25	0.0	4.50	0.0	4.75	0.0
5.00	0.0	5.25	0.0	5.50	0.0	5.75	0.0
6.00	.1	6.25	.1	6.50	.2	6.75	.3
7.00	.4	7.25	.4	7.50	.5	7.75	.5
8.00	.6	8.25	.8	8.50	1.0	8.75	1.1
9.00	1.2	9.25	1.4	9.50	1.6	9.75	1.9
10.00	2.1	10.25	2.6	10.50	3.0	10.75	3.8
11.00	4.5	11.25	6.4	11.50	8.0	11.75	25.7
12.00	87.0	12.25	65.7	12.50	23.8	12.75	14.2
13.00	10.1	13.25	8.3	13.50	7.2	13.75	6.3
14.00	5.6	14.25	4.7	14.50	4.1	14.75	4.0
15.00	4.0	15.25	4.0	15.50	4.0	15.75	4.0
16.00	4.0	16.25	3.1	16.50	2.5	16.75	2.4
17.00	2.4	17.25	2.4	17.50	2.4	17.75	2.4
18.00	2.4	18.25	2.4	18.50	2.4	18.75	2.3
19.00	2.3	19.25	2.3	19.50	2.3	19.75	2.3
20.00	2.3	20.25	2.0	20.50	1.7	20.75	1.6
21.00	1.6	21.25	1.6	21.50	1.6	21.75	1.6
22.00	1.6	22.25	1.6	22.50	1.6	22.75	1.6
23.00	1.6	23.25	1.5	23.50	1.5	23.75	1.5
24.00	1.5	24.25	.3	24.50	0.0	24.75	0.0
25.00	0.0	25.25	0.0	25.50	0.0	25.75	0.0
26.00	0.0	26.25	0.0	26.50	0.0	26.75	0.0

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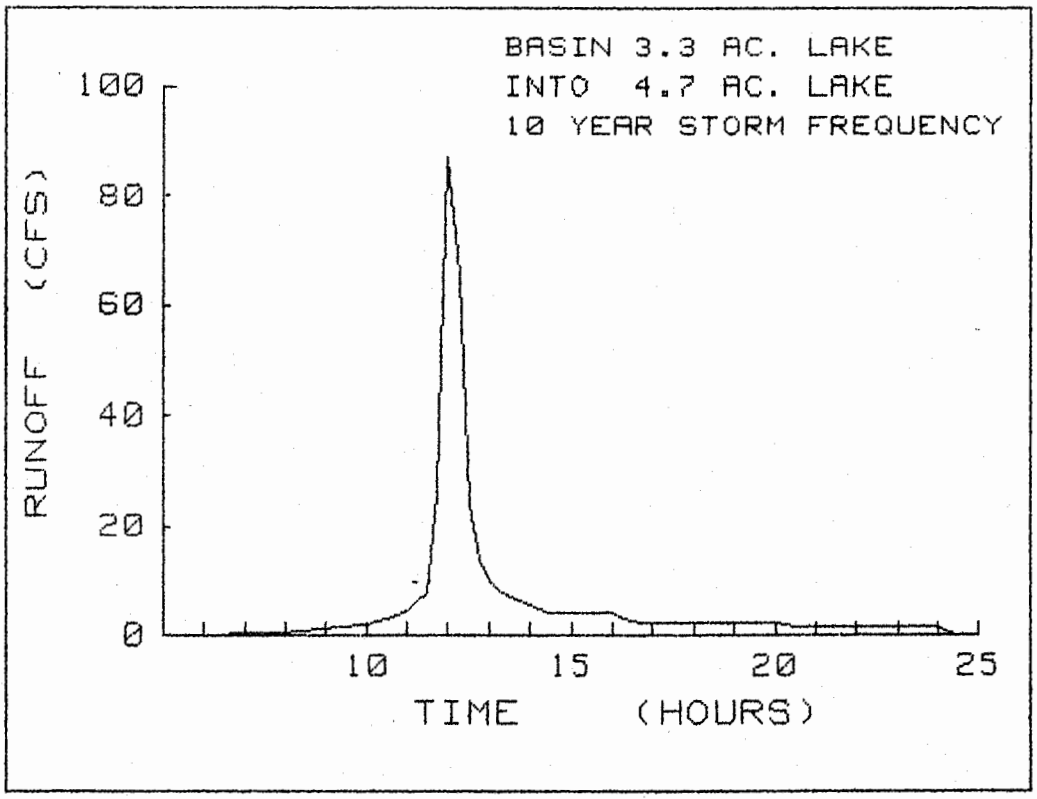

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POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
DISCHARGES INTO 4.7 AC. LAKE

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
3.00	0.0	3.25	0.0	3.50	0.0	3.75	0.0
4.00	0.0	4.25	0.0	4.50	0.0	4.75	0.0
5.00	.1	5.25	.1	5.50	.1	5.75	.2
6.00	.3	6.25	.4	6.50	.5	6.75	.7
7.00	.9	7.25	1.0	7.50	1.2	7.75	1.3
8.00	1.5	8.25	1.8	8.50	2.1	8.75	2.4
9.00	2.7	9.25	3.1	9.50	3.7	9.75	4.3
10.00	4.9	10.25	5.9	10.50	6.8	10.75	8.3
11.00	10.0	11.25	13.0	11.50	16.1	11.75	36.6
12.00	106.5	12.25	105.1	12.50	79.1	12.75	74.3
13.00	71.4	13.25	69.8	13.50	68.4	13.75	67.0
14.00	65.6	14.25	63.7	14.50	62.1	14.75	60.7
15.00	59.3	15.25	57.9	15.50	56.4	15.75	54.9
16.00	53.2	16.25	50.8	16.50	48.4	16.75	46.6
17.00	44.8	17.25	42.9	17.50	41.2	17.75	39.5
18.00	37.9	18.25	36.4	18.50	35.0	18.75	33.7
19.00	32.4	19.25	31.2	19.50	30.1	19.75	29.1
20.00	28.2	20.25	27.0	20.50	25.7	20.75	24.8
21.00	23.8	21.25	22.9	21.50	22.1	21.75	21.3
22.00	20.6	22.25	19.9	22.50	19.3	22.75	18.7
23.00	18.1	23.25	17.6	23.50	17.1	23.75	16.7
24.00	16.2	24.25	14.5	24.50	13.5	24.75	12.7
25.00	12.0	25.25	11.3	25.50	10.7	25.75	10.1
26.00	9.6	26.25	9.0	26.50	8.5	26.75	8.1
27.00	7.7	27.25	7.3	27.50	6.9	27.75	6.6
28.00	6.3	28.25	6.0	28.50	5.7	28.75	5.4
29.00	5.1	29.25	4.9	29.50	4.7	29.75	4.4
30.00	4.3	30.25	4.1	30.50	3.9	30.75	3.8
31.00	3.7	31.25	3.5	31.50	3.4	31.75	3.3
32.00	3.1	32.25	3.0	32.50	2.9	32.75	2.8
33.00	2.7	33.25	2.6	33.50	2.5	33.75	2.4
34.00	2.3	34.25	2.2	34.50	2.1	34.75	2.1
35.00	2.0	35.25	1.9	35.50	1.8	35.75	1.8
36.00	1.7	36.25	1.6	36.50	1.6	36.75	1.6
37.00	1.5	37.25	1.5	37.50	1.5	37.75	1.4
38.00	1.4	38.25	1.4	38.50	1.3	38.75	1.3
39.00	1.3	39.25	1.2	39.50	1.2	39.75	1.2

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HYDROLOGIC REPORT FOR POWHATAN

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY (CONT'D)

40.00	1.2	40.25	1.1	40.50	1.1	40.75	1.1
41.00	1.1	41.25	1.0	41.50	1.0	41.75	1.0
42.00	1.0	42.25	1.0	42.50	.9	42.75	.9
43.00	.9	43.25	.9	43.50	.9	43.75	.8
44.00	.8	44.25	.8	44.50	.8	44.75	.8
45.00	.8	45.25	.7	45.50	.7	45.75	.7
46.00	.7	46.25	.7	46.50	.7	46.75	.6
47.00	.6	47.25	.6	47.50	.6	47.75	.6
48.00	.6	48.25	.6	48.50	.6	48.75	.5
49.00	.5	49.25	.5	49.50	.5	49.75	.5
50.00	.5	50.25	.5	50.50	.5	50.75	.5
51.00	.4	51.25	.4	51.50	.4	51.75	.4
52.00	.4	52.25	.4	52.50	.4	52.75	.4
53.00	.4	53.25	.4	53.50	.4	53.75	.3
54.00	.3	54.25	.3	54.50	.3	54.75	.3
55.00	.3	55.25	.3	55.50	.3	55.75	.3
56.00	.3	56.25	.3	56.50	.3	56.75	.3
57.00	.3	57.25	.3	57.50	.3	57.75	.2
58.00	.2	58.25	.2	58.50	.2	58.75	.2
59.00	.2	59.25	.2	59.50	.2	59.75	.2
60.00	.2	60.25	.2	60.50	.2	60.75	.2
61.00	.2	61.25	.2	61.50	.2	61.75	.2
62.00	.2	62.25	.2	62.50	.2	62.75	.2
63.00	.2	63.25	.2	63.50	.1	63.75	.1
64.00	.1	64.25	.1	64.50	.1	64.75	.1
65.00	.1	65.25	.1	65.50	.1	65.75	.1
66.00	.1	66.25	.1	66.50	.1	66.75	.1
67.00	.1	67.25	.1	67.50	.1	67.75	.1
68.00	.1	68.25	.1	68.50	.1	68.75	.1
69.00	.1	69.25	.1	69.50	.1	69.75	.1
70.00	.1	70.25	.1	70.50	.1	70.75	.1
71.00	.1	71.25	.1	71.50	.1	71.75	.1
72.00	.1	72.25	.1	72.50	.1	72.75	.1
73.00	.1	73.25	.1	73.50	.1	73.75	.1
74.00	.1	74.25	.1	74.50	.1	74.75	.1
75.00	.1	75.25	.1	75.50	.1	75.75	.1
76.00	0.0	76.25	0.0	76.50	0.0	76.75	0.0

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POWHATAN

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY (CONT'D)

77.00	0.0	77.25	0.0	77.50	0.0	77.75	0.0

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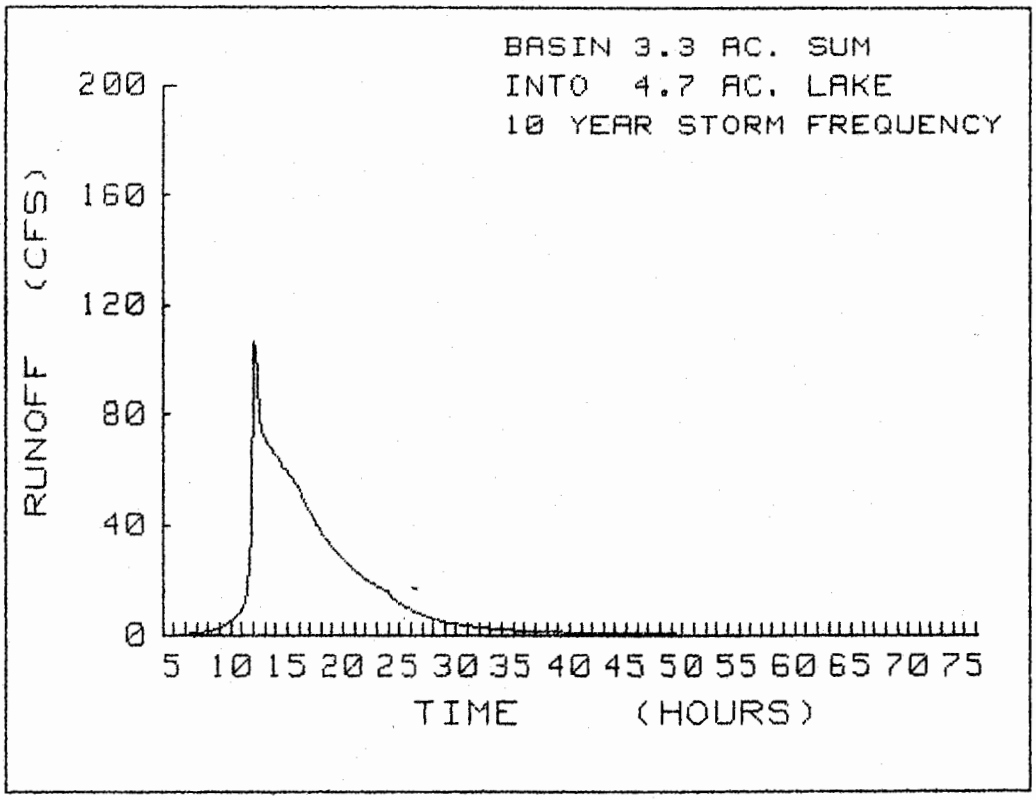

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HYDROLOGIC REPORT FOR

POWHATAN

STAGE, STORAGE & DISCHARGE

POND IDENTIFIER 3.3 AC. SUM

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
44.0	0.0	0.0	0.0
44.2	29200.0	2.5	67.4
44.4	58800.0	7.5	138.2
44.6	88800.0	14.8	212.1
44.8	119200.0	24.2	289.1
45.0	150000.0	35.9	369.2
45.2	181200.0	49.9	452.5
45.4	212800.0	66.2	539.1
45.6	244800.0	85.1	629.1
45.8	277200.0	106.5	722.5
46.0	310000.0	130.5	819.4

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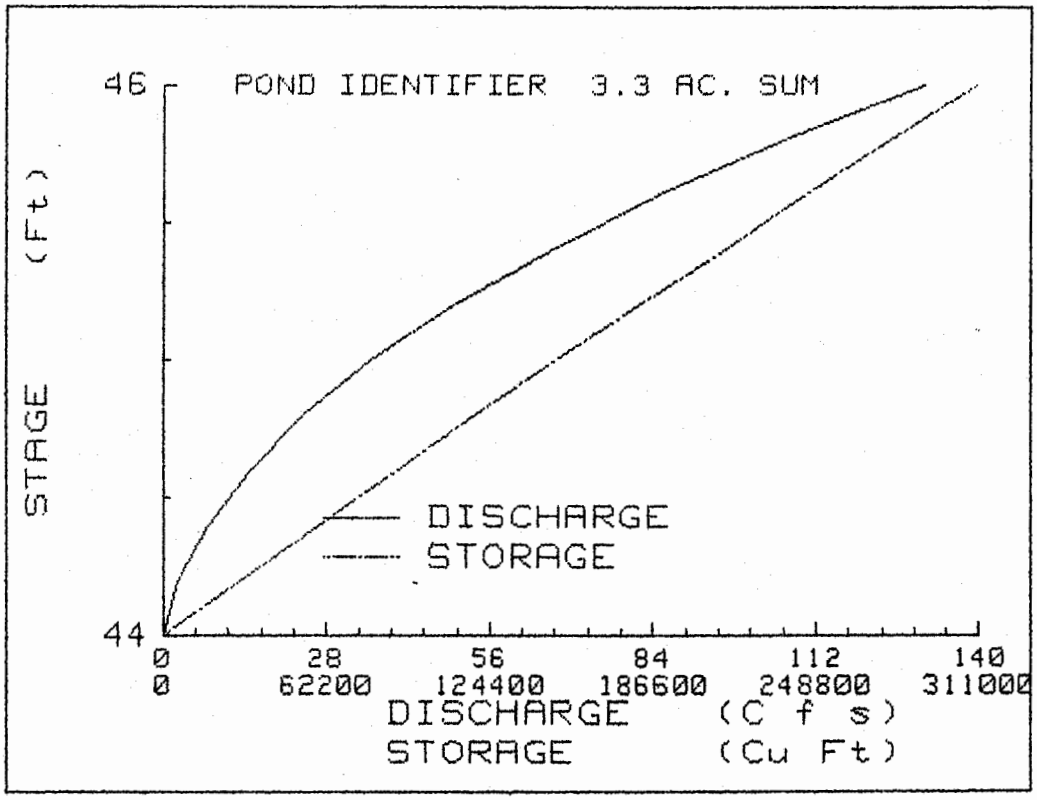

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HYDROLOGIC REPORT FOR

POWHATAN

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. SUM
10 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
5.00	0.0	.1	0.0	0.0	.1	0.0	0.0
5.25	.1	.1	0.0	0.0	.2	0.0	.2
5.50	.1	.1	.2	0.0	.4	0.0	.4
5.75	.1	.2	.4	0.0	.6	0.0	.6
6.00	.2	.3	.6	0.0	1.0	0.0	1.0
6.25	.3	.4	1.0	0.0	1.6	.1	1.6
6.50	.4	.5	1.6	.1	2.4	.1	2.4
6.75	.5	.7	2.4	.1	3.5	.1	3.4
7.00	.7	.9	3.4	.1	4.8	.2	4.6
7.25	.9	1.0	4.6	.2	6.3	.2	6.1
7.50	1.0	1.2	6.1	.2	8.0	.3	7.7
7.75	1.2	1.3	7.7	.3	10.0	.4	9.6
8.00	1.3	1.5	9.6	.4	12.1	.4	11.6
8.25	1.5	1.8	11.6	.4	14.5	.5	14.0
8.50	1.8	2.1	14.0	.5	17.4	.6	16.8
8.75	2.1	2.4	16.8	.6	20.7	.8	19.9
9.00	2.4	2.7	19.9	.8	24.2	.9	23.4
9.25	2.7	3.1	23.4	.9	28.3	1.0	27.2
9.50	3.1	3.7	27.2	1.0	33.0	1.2	31.8
9.75	3.7	4.3	31.8	1.2	38.5	1.4	37.1
10.00	4.3	4.9	37.1	1.4	44.9	1.6	43.3
10.25	4.9	5.9	43.3	1.6	52.4	1.9	50.5
10.50	5.9	6.8	50.5	1.9	61.3	2.2	59.0
10.75	6.8	8.3	59.0	2.2	71.9	2.8	69.1
11.00	8.3	10.0	69.1	2.8	84.6	3.7	80.9
11.25	10.0	13.0	80.9	3.7	100.1	4.8	95.3
11.50	13.0	16.1	95.3	4.8	119.6	6.2	113.4
11.75	16.1	36.6	113.4	6.2	159.9	9.6	150.2
12.00	36.6	106.5	150.2	9.6	283.6	23.5	260.1
12.25	106.5	105.1	260.1	23.5	448.1	49.1	399.0
12.50	105.1	79.1	399.0	49.1	534.1	65.3	468.8
12.75	79.1	74.3	468.8	65.3	557.0	70.0	487.0
13.00	74.3	71.4	487.0	70.0	562.8	71.2	491.6
13.25	71.4	69.8	491.6	71.2	561.6	70.9	490.7
13.50	69.8	68.4	490.7	70.9	558.0	70.2	487.8
13.75	68.4	67.0	487.8	70.2	553.0	69.1	483.9
14.00	67.0	65.8	483.9	69.1	547.3	67.9	479.4

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HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. SUM
10 YEAR STORM FREQUENCY (CONT'D)

14.25	65.6	63.7	479.4	67.9	540.8	66.6	474.2
14.50	63.7	62.1	474.2	66.6	533.5	65.2	468.3
14.75	62.1	60.7	468.3	65.2	525.9	63.7	462.2
15.00	60.7	59.3	462.2	63.7	518.5	62.3	456.2
15.25	59.3	57.9	456.2	62.3	511.0	60.9	450.1
15.50	57.9	56.4	450.1	60.9	503.4	59.5	443.9
15.75	56.4	54.9	443.9	59.5	495.7	58.0	437.7
16.00	54.9	53.2	437.7	58.0	487.7	56.5	431.2
16.25	53.2	50.8	431.2	56.5	478.7	54.8	423.9
16.50	50.8	48.4	423.9	54.8	468.3	52.8	415.5
16.75	48.4	46.6	415.5	52.8	457.6	50.8	406.8
17.00	46.6	44.8	406.8	50.8	447.3	49.0	398.3
17.25	44.8	42.9	398.3	49.0	437.0	47.3	389.8
17.50	42.9	41.2	389.8	47.3	426.6	45.5	381.1
17.75	41.2	39.5	381.1	45.5	416.2	43.8	372.5
18.00	39.5	37.9	372.5	43.8	406.1	42.1	364.0
18.25	37.9	36.4	364.0	42.1	396.3	40.4	355.9
18.50	36.4	35.0	355.9	40.4	386.9	38.8	348.0
18.75	35.0	33.7	348.0	38.8	377.9	37.3	340.6
19.00	33.7	32.4	340.6	37.3	369.3	35.9	333.4
19.25	32.4	31.2	333.4	35.9	361.2	34.7	326.5
19.50	31.2	30.1	326.5	34.7	353.2	33.5	319.6
19.75	30.1	29.1	319.6	33.5	345.3	32.4	313.0
20.00	29.1	28.2	313.0	32.4	337.8	31.3	306.5
20.25	28.2	27.0	306.5	31.3	330.4	30.2	300.2
20.50	27.0	25.7	300.2	30.2	322.7	29.1	293.6
20.75	25.7	24.8	293.6	29.1	315.0	28.0	287.0
21.00	24.8	23.8	287.0	28.0	307.6	26.9	280.7
21.25	23.8	22.9	280.7	26.9	300.6	25.9	274.7
21.50	22.9	22.1	274.7	25.9	293.9	24.9	269.0
21.75	22.1	21.3	269.0	24.9	287.6	24.0	263.5
22.00	21.3	20.6	263.5	24.0	281.5	23.3	258.2
22.25	20.6	19.9	258.2	23.3	275.4	22.5	252.9
22.50	19.9	19.3	252.9	22.5	269.6	21.8	247.8
22.75	19.3	18.7	247.8	21.8	263.9	21.1	242.8
23.00	18.7	18.1	242.8	21.1	258.4	20.4	238.0
23.25	18.1	17.6	238.0	20.4	253.2	19.8	233.4
23.50	17.6	17.1	233.4	19.8	248.3	19.2	229.1
23.75	17.1	16.7	229.1	19.2	243.7	18.6	225.1
24.00	16.7	16.2	225.1	18.6	239.3	18.1	221.2

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HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. SUM
10 YEAR STORM FREQUENCY (CONT'D)

24.25	16.2	14.5	221.2	18.1	233.8	17.4	216.4
24.50	14.5	13.5	216.4	17.4	226.9	16.6	210.4
24.75	13.5	12.7	210.4	16.6	220.0	15.7	204.3
25.00	12.7	12.0	204.3	15.7	213.3	14.9	198.4
25.25	12.0	11.3	198.4	14.9	206.8	14.3	192.6
25.50	11.3	10.7	192.6	14.3	200.4	13.6	186.8
25.75	10.7	10.1	186.8	13.6	194.0	13.0	181.0
26.00	10.1	9.6	181.0	13.0	187.7	12.4	175.3
26.25	9.6	9.0	175.3	12.4	181.5	11.8	169.7
26.50	9.0	8.5	169.7	11.8	175.5	11.2	164.3
26.75	8.5	8.1	164.3	11.2	169.7	10.6	159.1
27.00	8.1	7.7	159.1	10.6	164.2	10.1	154.1
27.25	7.7	7.3	154.1	10.1	159.0	9.6	149.4
27.50	7.3	6.9	149.4	9.6	154.1	9.1	145.0
27.75	6.9	6.6	145.0	9.1	149.5	8.6	140.8
28.00	6.6	6.3	140.8	8.6	145.1	8.2	136.9
28.25	6.3	6.0	136.9	8.2	140.9	7.8	133.1
28.50	6.0	5.7	133.1	7.8	137.0	7.4	129.6
28.75	5.7	5.4	129.6	7.4	133.2	7.2	126.1
29.00	5.4	5.1	126.1	7.2	129.4	6.9	122.5
29.25	5.1	4.9	122.5	6.9	125.7	6.6	119.0
29.50	4.9	4.7	119.0	6.6	122.0	6.4	115.6
29.75	4.7	4.4	115.6	6.4	118.3	6.1	112.2
30.00	4.4	4.3	112.2	6.1	114.8	5.9	108.9
30.25	4.3	4.1	108.9	5.9	111.4	5.6	105.8
30.50	4.1	3.9	105.8	5.6	108.3	5.4	102.9
30.75	3.9	3.8	102.9	5.4	105.2	5.2	100.1
31.00	3.8	3.7	100.1	5.2	102.3	5.0	97.4
31.25	3.7	3.5	97.4	5.0	99.6	4.8	94.8
31.50	3.5	3.4	94.8	4.8	96.9	4.6	92.4
31.75	3.4	3.3	92.4	4.6	94.4	4.4	90.0
32.00	3.3	3.1	90.0	4.4	92.0	4.2	87.8
32.25	3.1	3.0	87.8	4.2	89.7	4.1	85.7
32.50	3.0	2.9	85.7	4.1	87.5	3.9	83.6
32.75	2.9	2.8	83.6	3.9	85.4	3.8	81.7
33.00	2.8	2.7	81.7	3.8	83.4	3.6	79.8
33.25	2.7	2.6	79.8	3.6	81.5	3.5	78.0
33.50	2.6	2.5	78.0	3.5	79.6	3.3	76.3
33.75	2.5	2.4	76.3	3.3	77.8	3.2	74.6
34.00	2.4	2.3	74.6	3.2	76.1	3.1	73.0

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POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. SUM
10 YEAR STORM FREQUENCY (CONT'D)

34.25	2.3	2.2	73.0	3.1	74.5	3.0	71.5
34.50	2.2	2.1	71.5	3.0	72.9	2.9	70.0
34.75	2.1	2.1	70.0	2.9	71.4	2.8	68.6
35.00	2.1	2.0	68.6	2.8	69.9	2.7	67.3
35.25	2.0	1.9	67.3	2.7	68.5	2.6	66.0
35.50	1.9	1.8	66.0	2.6	67.2	2.5	64.7
35.75	1.8	1.8	64.7	2.5	65.9	2.4	63.4
36.00	1.8	1.7	63.4	2.4	64.5	2.4	62.1
36.25	1.7	1.6	62.1	2.4	63.1	2.3	60.8
36.50	1.6	1.6	60.8	2.3	61.7	2.3	59.5
36.75	1.6	1.6	59.5	2.3	60.3	2.2	58.1
37.00	1.6	1.5	58.1	2.2	59.0	2.2	56.8
37.25	1.5	1.5	56.8	2.2	57.7	2.1	55.6
37.50	1.5	1.5	55.6	2.1	56.4	2.1	54.3
37.75	1.5	1.4	54.3	2.1	55.1	2.0	53.1
38.00	1.4	1.4	53.1	2.0	53.9	2.0	51.9
38.25	1.4	1.4	51.9	2.0	52.7	1.9	50.8
38.50	1.4	1.3	50.8	1.9	51.5	1.9	49.7
38.75	1.3	1.3	49.7	1.9	50.4	1.8	48.6
39.00	1.3	1.3	48.6	1.8	49.3	1.8	47.5
39.25	1.3	1.2	47.5	1.8	48.2	1.8	46.4
39.50	1.2	1.2	46.4	1.8	47.1	1.7	45.4
39.75	1.2	1.2	45.4	1.7	46.1	1.7	44.4
40.00	1.2	1.2	44.4	1.7	45.1	1.7	43.4
40.25	1.2	1.1	43.4	1.7	44.1	1.6	42.5
40.50	1.1	1.1	42.5	1.6	43.1	1.6	41.5
40.75	1.1	1.1	41.5	1.6	42.2	1.5	40.6
41.00	1.1	1.1	40.6	1.5	41.2	1.5	39.7
41.25	1.1	1.0	39.7	1.5	40.3	1.5	38.9
41.50	1.0	1.0	38.9	1.5	39.5	1.4	38.0
41.75	1.0	1.0	38.0	1.4	38.6	1.4	37.2
42.00	1.0	1.0	37.2	1.4	37.7	1.4	36.4
42.25	1.0	1.0	36.4	1.4	36.9	1.4	35.6
42.50	1.0	.9	35.6	1.4	36.1	1.3	34.8
42.75	.9	.9	34.8	1.3	35.3	1.3	34.0
43.00	.9	.9	34.0	1.3	34.5	1.3	33.3
43.25	.9	.9	33.3	1.3	33.8	1.2	32.5
43.50	.9	.9	32.5	1.2	33.0	1.2	31.8
43.75	.9	.8	31.8	1.2	32.3	1.2	31.1
44.00	.8	.8	31.1	1.2	31.6	1.2	30.5

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POND IDENTIFIER 3.3 AC. SUM
10 YEAR STORM FREQUENCY (CONT'D)

44.25	.8	.8	30.5	1.2	30.9	1.1	29.8
44.50	.8	.8	29.8	1.1	30.3	1.1	29.1
44.75	.8	.8	29.1	1.1	29.6	1.1	28.5
45.00	.8	.8	28.5	1.1	28.9	1.1	27.9
45.25	.8	.7	27.9	1.1	28.3	1.0	27.3
45.50	.7	.7	27.3	1.0	27.7	1.0	26.7
45.75	.7	.7	26.7	1.0	27.1	1.0	26.1
46.00	.7	.7	26.1	1.0	26.5	1.0	25.5
46.25	.7	.7	25.5	1.0	25.9	1.0	25.0
46.50	.7	.7	25.0	1.0	25.4	.9	24.4
46.75	.7	.6	24.4	.9	24.8	.9	23.9
47.00	.6	.6	23.9	.9	24.3	.9	23.4
47.25	.6	.6	23.4	.9	23.7	.9	22.9
47.50	.6	.6	22.9	.9	23.2	.9	22.4
47.75	.6	.6	22.4	.9	22.7	.8	21.9
48.00	.6	.6	21.9	.8	22.2	.8	21.4
48.25	.6	.6	21.4	.8	21.7	.8	20.9
48.50	.6	.6	20.9	.8	21.3	.8	20.5
48.75	.6	.5	20.5	.8	20.8	.8	20.0
49.00	.5	.5	20.0	.8	20.4	.7	19.6
49.25	.5	.5	19.6	.7	19.9	.7	19.2
49.50	.5	.5	19.2	.7	19.5	.7	18.8
49.75	.5	.5	18.8	.7	19.1	.7	18.4
50.00	.5	.5	18.4	.7	18.6	.7	18.0
50.25	.5	.5	18.0	.7	18.2	.7	17.6
50.50	.5	.5	17.6	.7	17.8	.7	17.2
50.75	.5	.5	17.2	.7	17.5	.6	16.8
51.00	.5	.4	16.8	.6	17.1	.6	16.4
51.25	.4	.4	16.4	.6	16.7	.6	16.1
51.50	.4	.4	16.1	.6	16.3	.6	15.7
51.75	.4	.4	15.7	.6	16.0	.6	15.4
52.00	.4	.4	15.4	.6	15.6	.6	15.1
52.25	.4	.4	15.1	.6	15.3	.6	14.7
52.50	.4	.4	14.7	.6	15.0	.5	14.4
52.75	.4	.4	14.4	.5	14.6	.5	14.1
53.00	.4	.4	14.1	.5	14.3	.5	13.8
53.25	.4	.4	13.8	.5	14.0	.5	13.5
53.50	.4	.4	13.5	.5	13.7	.5	13.2
53.75	.4	.3	13.2	.5	13.4	.5	12.9
54.00	.3	.3	12.9	.5	13.1	.5	12.6

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10 YEAR STORM FREQUENCY (CONT'D)

54.25	.3	.3	12.6	.5	12.8	.5	12.4
54.50	.3	.3	12.4	.5	12.6	.5	12.1
54.75	.3	.3	12.1	.5	12.3	.5	11.8
55.00	.3	.3	11.8	.5	12.0	.4	11.6
55.25	.3	.3	11.6	.4	11.8	.4	11.3
55.50	.3	.3	11.3	.4	11.5	.4	11.1
55.75	.3	.3	11.1	.4	11.2	.4	10.8
56.00	.3	.3	10.8	.4	11.0	.4	10.6
56.25	.3	.3	10.6	.4	10.8	.4	10.4
56.50	.3	.3	10.4	.4	10.5	.4	10.1
56.75	.3	.3	10.1	.4	10.3	.4	9.9
57.00	.3	.3	9.9	.4	10.1	.4	9.7
57.25	.3	.3	9.7	.4	9.9	.4	9.5
57.50	.3	.3	9.5	.4	9.6	.4	9.3
57.75	.3	.2	9.3	.4	9.4	.3	9.1
58.00	.2	.2	9.1	.3	9.2	.3	8.9
58.25	.2	.2	8.9	.3	9.0	.3	8.7
58.50	.2	.2	8.7	.3	8.8	.3	8.5
58.75	.2	.2	8.5	.3	8.6	.3	8.3
59.00	.2	.2	8.3	.3	8.5	.3	8.1
59.25	.2	.2	8.1	.3	8.3	.3	8.0
59.50	.2	.2	8.0	.3	8.1	.3	7.8
59.75	.2	.2	7.8	.3	7.9	.3	7.6
60.00	.2	.2	7.6	.3	7.7	.3	7.5
60.25	.2	.2	7.5	.3	7.6	.3	7.3
60.50	.2	.2	7.3	.3	7.4	.3	7.1
60.75	.2	.2	7.1	.3	7.3	.3	7.0
61.00	.2	.2	7.0	.3	7.1	.3	6.8
61.25	.2	.2	6.8	.3	6.9	.3	6.7
61.50	.2	.2	6.7	.3	6.8	.2	6.5
61.75	.2	.2	6.5	.2	6.6	.2	6.4
62.00	.2	.2	6.4	.2	6.5	.2	6.3
62.25	.2	.2	6.3	.2	6.4	.2	6.1
62.50	.2	.2	6.1	.2	6.2	.2	6.0
62.75	.2	.2	6.0	.2	6.1	.2	5.9
63.00	.2	.2	5.9	.2	6.0	.2	5.7
63.25	.2	.2	5.7	.2	5.8	.2	5.6
63.50	.2	.1	5.6	.2	5.7	.2	5.5
63.75	.1	.1	5.5	.2	5.6	.2	5.4
64.00	.1	.1	5.4	.2	5.5	.2	5.3

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BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. SUM
10 YEAR STORM FREQUENCY (CONT'D)

64.25	.1	.1	5.3	.2	5.3	.2	5.1
64.50	.1	.1	5.1	.2	5.2	.2	5.0
64.75	.1	.1	5.0	.2	5.1	.2	4.9
65.00	.1	.1	4.9	.2	5.0	.2	4.8
65.25	.1	.1	4.8	.2	4.9	.2	4.7
65.50	.1	.1	4.7	.2	4.8	.2	4.6
65.75	.1	.1	4.6	.2	4.7	.2	4.5
66.00	.1	.1	4.5	.2	4.6	.2	4.4
66.25	.1	.1	4.4	.2	4.5	.2	4.3
66.50	.1	.1	4.3	.2	4.4	.2	4.2
66.75	.1	.1	4.2	.2	4.3	.2	4.1
67.00	.1	.1	4.1	.2	4.2	.2	4.0
67.25	.1	.1	4.0	.2	4.1	.2	3.9
67.50	.1	.1	3.9	.2	4.0	.1	3.9
67.75	.1	.1	3.9	.1	3.9	.1	3.8
68.00	.1	.1	3.8	.1	3.8	.1	3.7
68.25	.1	.1	3.7	.1	3.8	.1	3.6
68.50	.1	.1	3.6	.1	3.7	.1	3.5
68.75	.1	.1	3.5	.1	3.6	.1	3.5
69.00	.1	.1	3.5	.1	3.5	.1	3.4
69.25	.1	.1	3.4	.1	3.4	.1	3.3
69.50	.1	.1	3.3	.1	3.4	.1	3.2
69.75	.1	.1	3.2	.1	3.3	.1	3.2
70.00	.1	.1	3.2	.1	3.2	.1	3.1
70.25	.1	.1	3.1	.1	3.2	.1	3.0
70.50	.1	.1	3.0	.1	3.1	.1	3.0
70.75	.1	.1	3.0	.1	3.0	.1	2.9
71.00	.1	.1	2.9	.1	2.9	.1	2.8
71.25	.1	.1	2.8	.1	2.9	.1	2.8
71.50	.1	.1	2.8	.1	2.8	.1	2.7
71.75	.1	.1	2.7	.1	2.8	.1	2.7
72.00	.1	.1	2.7	.1	2.7	.1	2.6
72.25	.1	.1	2.6	.1	2.6	.1	2.5
72.50	.1	.1	2.5	.1	2.6	.1	2.5
72.75	.1	.1	2.5	.1	2.5	.1	2.4
73.00	.1	.1	2.4	.1	2.5	.1	2.4
73.25	.1	.1	2.4	.1	2.4	.1	2.3
73.50	.1	.1	2.3	.1	2.4	.1	2.3
73.75	.1	.1	2.3	.1	2.3	.1	2.2
74.00	.1	.1	2.2	.1	2.3	.1	2.2

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POWHATAN

BASIN IDENTIFIER 3.3 AC. SUM
POND IDENTIFIER 3.3 AC. SUM
10 YEAR STORM FREQUENCY (CONT'D)

74.25	.1	.1	2.2	.1	2.2	.1	2.1
74.50	.1	.1	2.1	.1	2.2	.1	2.1
74.75	.1	.1	2.1	.1	2.1	.1	2.0
75.00	.1	.1	2.0	.1	2.1	.1	2.0
75.25	.1	.1	2.0	.1	2.0	.1	2.0
75.50	.1	.1	2.0	.1	2.0	.1	1.9
75.75	.1	.1	1.9	.1	1.9	.1	1.9
76.00	.1	0.0	1.9	.1	1.9	.1	1.8
76.25	0.0	0.0	1.8	.1	1.8	.1	1.7
76.50	0.0	0.0	1.7	.1	1.7	.1	1.6
76.75	0.0	0.0	1.6	.1	1.6	.1	1.5
77.00	0.0	0.0	1.5	.1	1.4	.1	1.4
77.25	0.0	0.0	1.4	.1	1.3	0.0	1.3

MAXIMUM OUTFLOW = 71.2 C.F.S.
MAXIMUM STORAGE = 221239.2 CU FT.
MAXIMUM ELEVATION = 45.5 FEET

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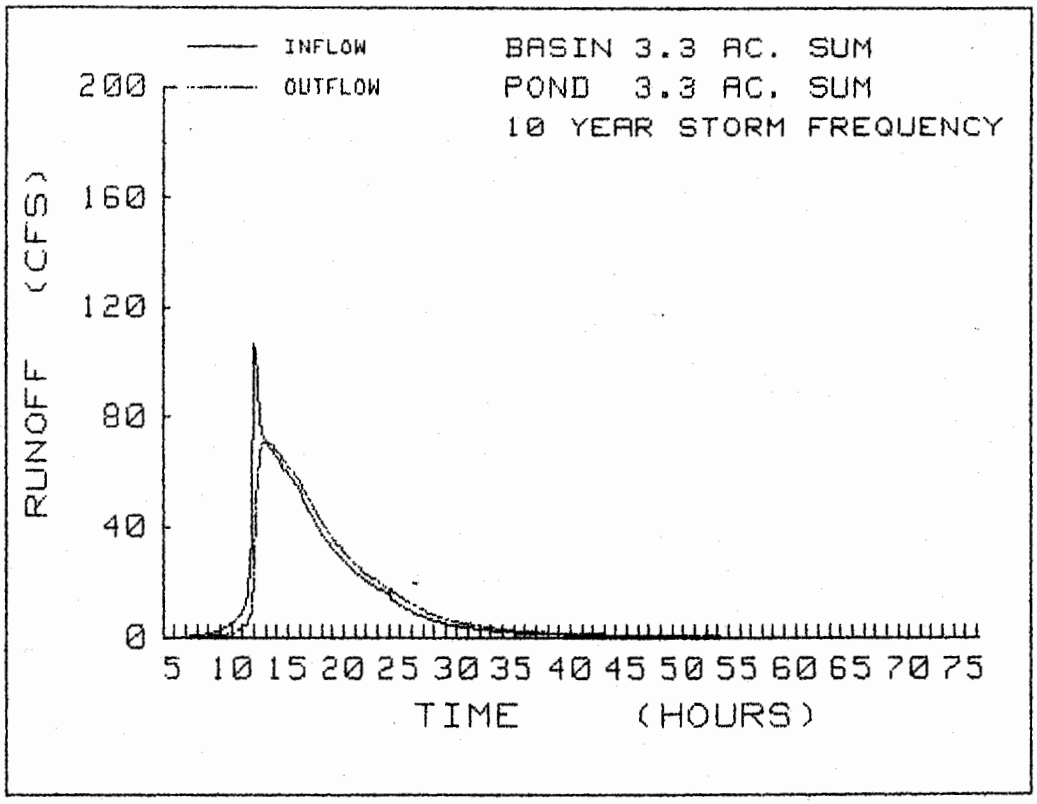

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POWHATAN

S. C. S. HYDROGRAPH

BASIN IDENTIFICATION 4.7 AC. LAKE
BASIN DISCHARGES INTO TRIBUTARY OF POWHATAN CREEK

BASIN AREA	=	21.30	ACRES
BASIN CURVE NUMBER	=	87.00	
24-HOUR PRECIPITATION	=	5.75	INCHES
AVERAGE BASIN SLOPE	=	3.8	%
HYDRAULIC LENGTH	=	1200.0	FEET
BASIN LAG	=	.17	HOURS

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
3.00	0.0	3.25	0.0	3.50	0.0	3.75	0.0
4.00	0.0	4.25	0.0	4.50	0.0	4.75	.1
5.00	.1	5.25	.2	5.50	.2	5.75	.3
6.00	.3	6.25	.4	6.50	.5	6.75	.6
7.00	.6	7.25	.7	7.50	.8	7.75	.8
8.00	.9	8.25	1.1	8.50	1.3	8.75	1.4
9.00	1.5	9.25	1.7	9.50	1.9	9.75	2.1
10.00	2.3	10.25	2.8	10.50	3.2	10.75	4.1
11.00	4.8	11.25	6.5	11.50	8.0	11.75	24.6
12.00	79.1	12.25	60.4	12.50	21.5	12.75	12.7
13.00	8.9	13.25	7.3	13.50	6.3	13.75	5.5
14.00	4.9	14.25	4.1	14.50	3.5	14.75	3.5
15.00	3.5	15.25	3.5	15.50	3.5	15.75	3.4
16.00	3.4	16.25	2.7	16.50	2.2	16.75	2.1
17.00	2.1	17.25	2.1	17.50	2.1	17.75	2.1
18.00	2.1	18.25	2.1	18.50	2.0	18.75	2.0
19.00	2.0	19.25	2.0	19.50	2.0	19.75	2.0
20.00	2.0	20.25	1.7	20.50	1.4	20.75	1.4
21.00	1.4	21.25	1.4	21.50	1.4	21.75	1.4
22.00	1.4	22.25	1.4	22.50	1.3	22.75	1.3
23.00	1.3	23.25	1.3	23.50	1.3	23.75	1.3
24.00	1.3	24.25	.3	24.50	0.0	24.75	0.0
25.00	0.0	25.25	0.0	25.50	0.0	25.75	0.0
26.00	0.0	26.25	0.0	26.50	0.0	26.75	0.0

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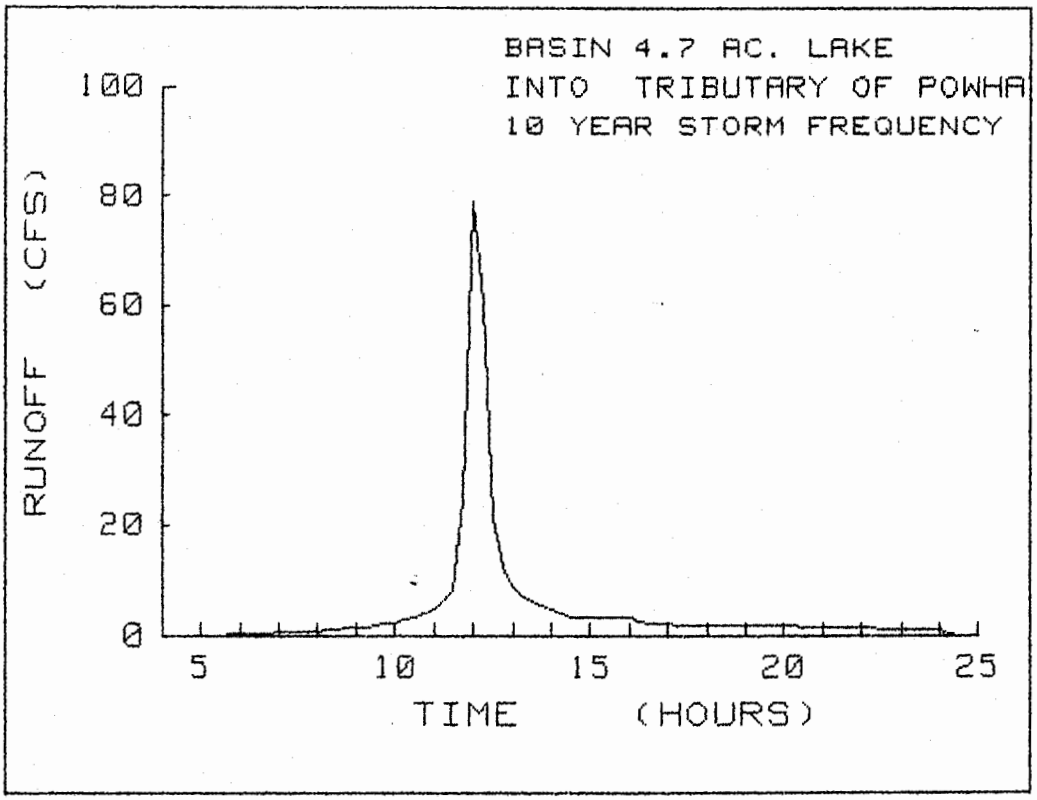

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BASIN IDENTIFIER 4.7 AC. SUM
DISCHARGES INTO TRIBUTARY OF POWHATAN CREEK

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY

TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.	TIME HOUR	RUNOFF C.F.S.
3.00	0.0	3.25	0.0	3.50	0.0	3.75	0.0
4.00	0.0	4.25	0.0	4.50	0.0	4.75	.1
5.00	.1	5.25	.2	5.50	.2	5.75	.3
6.00	.4	6.25	.5	6.50	.6	6.75	.7
7.00	.8	7.25	.9	7.50	1.1	7.75	1.2
8.00	1.3	8.25	1.6	8.50	1.9	8.75	2.2
9.00	2.4	9.25	2.7	9.50	3.1	9.75	3.6
10.00	4.0	10.25	4.8	10.50	5.5	10.75	6.9
11.00	8.5	11.25	11.3	11.50	14.2	11.75	34.2
12.00	102.6	12.25	109.5	12.50	86.8	12.75	82.7
13.00	80.1	13.25	78.2	13.50	76.5	13.75	74.6
14.00	72.9	14.25	70.7	14.50	68.7	14.75	67.2
15.00	65.8	15.25	64.4	15.50	62.9	15.75	61.5
16.00	60.0	16.25	57.6	16.50	55.0	16.75	52.9
17.00	51.1	17.25	49.3	17.50	47.6	17.75	45.8
18.00	44.1	18.25	42.5	18.50	40.9	18.75	39.4
19.00	37.9	19.25	36.7	19.50	35.5	19.75	34.4
20.00	33.3	20.25	32.0	20.50	30.5	20.75	29.4
21.00	28.3	21.25	27.3	21.50	26.3	21.75	25.4
22.00	24.6	22.25	23.9	22.50	23.2	22.75	22.5
23.00	21.8	23.25	21.1	23.50	20.5	23.75	19.9
24.00	19.4	24.25	17.7	24.50	16.6	24.75	15.7
25.00	14.9	25.25	14.3	25.50	13.6	25.75	13.0
26.00	12.4	26.25	11.8	26.50	11.2	26.75	10.6
27.00	10.1	27.25	9.6	27.50	9.1	27.75	8.6
28.00	8.2	28.25	7.8	28.50	7.4	28.75	7.2
29.00	6.9	29.25	6.6	29.50	6.4	29.75	6.1
30.00	5.9	30.25	5.6	30.50	5.4	30.75	5.2
31.00	5.0	31.25	4.8	31.50	4.6	31.75	4.4
32.00	4.2	32.25	4.1	32.50	3.9	32.75	3.8
33.00	3.6	33.25	3.5	33.50	3.3	33.75	3.2
34.00	3.1	34.25	3.0	34.50	2.9	34.75	2.8
35.00	2.7	35.25	2.6	35.50	2.5	35.75	2.4
36.00	2.4	36.25	2.3	36.50	2.3	36.75	2.2
37.00	2.2	37.25	2.1	37.50	2.1	37.75	2.0
38.00	2.0	38.25	1.9	38.50	1.9	38.75	1.8
39.00	1.8	39.25	1.8	39.50	1.7	39.75	1.7

HYDROLOGIC REPORT FOR POWHATAN

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY (CONT'D)

40.00	1.7	40.25	1.6	40.50	1.6	40.75	1.5
41.00	1.5	41.25	1.5	41.50	1.4	41.75	1.4
42.00	1.4	42.25	1.4	42.50	1.3	42.75	1.3
43.00	1.3	43.25	1.2	43.50	1.2	43.75	1.2
44.00	1.2	44.25	1.1	44.50	1.1	44.75	1.1
45.00	1.1	45.25	1.0	45.50	1.0	45.75	1.0
46.00	1.0	46.25	1.0	46.50	.9	46.75	.9
47.00	.9	47.25	.9	47.50	.9	47.75	.8
48.00	.8	48.25	.8	48.50	.8	48.75	.8
49.00	.7	49.25	.7	49.50	.7	49.75	.7
50.00	.7	50.25	.7	50.50	.7	50.75	.6
51.00	.6	51.25	.6	51.50	.6	51.75	.6
52.00	.6	52.25	.6	52.50	.5	52.75	.5
53.00	.5	53.25	.5	53.50	.5	53.75	.5
54.00	.5	54.25	.5	54.50	.5	54.75	.5
55.00	.4	55.25	.4	55.50	.4	55.75	.4
56.00	.4	56.25	.4	56.50	.4	56.75	.4
57.00	.4	57.25	.4	57.50	.4	57.75	.3
58.00	.3	58.25	.3	58.50	.3	58.75	.3
59.00	.3	59.25	.3	59.50	.3	59.75	.3
60.00	.3	60.25	.3	60.50	.3	60.75	.3
61.00	.3	61.25	.3	61.50	.2	61.75	.2
62.00	.2	62.25	.2	62.50	.2	62.75	.2
63.00	.2	63.25	.2	63.50	.2	63.75	.2
64.00	.2	64.25	.2	64.50	.2	64.75	.2
65.00	.2	65.25	.2	65.50	.2	65.75	.2
66.00	.2	66.25	.2	66.50	.2	66.75	.2
67.00	.2	67.25	.2	67.50	.1	67.75	.1
68.00	.1	68.25	.1	68.50	.1	68.75	.1
69.00	.1	69.25	.1	69.50	.1	69.75	.1
70.00	.1	70.25	.1	70.50	.1	70.75	.1
71.00	.1	71.25	.1	71.50	.1	71.75	.1
72.00	.1	72.25	.1	72.50	.1	72.75	.1
73.00	.1	73.25	.1	73.50	.1	73.75	.1
74.00	.1	74.25	.1	74.50	.1	74.75	.1
75.00	.1	75.25	.1	75.50	.1	75.75	.1
76.00	.1	76.25	.1	76.50	.1	76.75	.1

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HYDROLOGIC REPORT FOR

POWHATAN

HYDROGRAPH RUNOFF VALUES
10 YEAR STORM FREQUENCY (CONT'D)

77.00	.1	77.25	0.0	77.50	0.0	77.75	0.0
78.00	0.0	78.25	0.0	78.50	0.0	78.75	0.0

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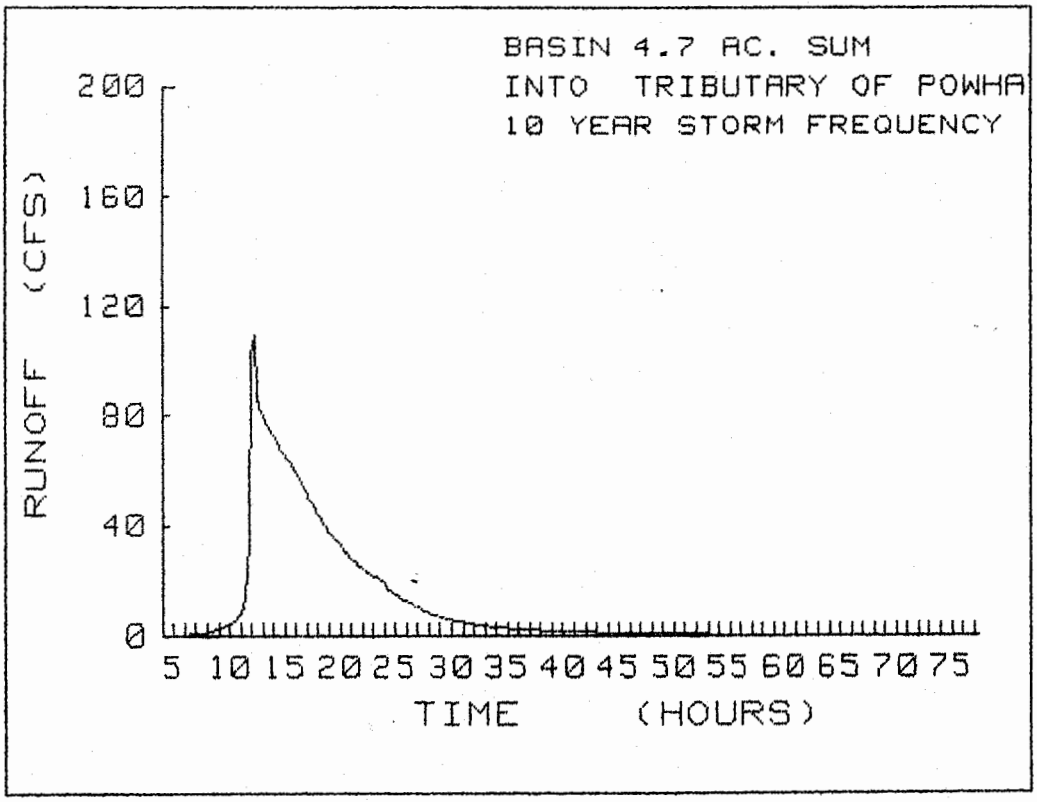
HYDROLOGIC REPORT FOR POWHATAN



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HYDROLOGIC REPORT FOR

POWHATAN

STAGE, STORAGE & DISCHARGE

POND IDENTIFIER 4.7 AC. LAKE SUM

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
40.0	0.0	0.0	0.0
40.2	40600.0	4.8	95.0
40.4	82400.0	14.0	197.1
40.6	125400.0	26.7	305.3
40.8	169600.0	42.5	419.4
41.0	215000.0	61.5	539.3
41.2	261400.0	83.5	664.4
41.4	308600.0	108.7	794.4
41.6	356600.0	136.9	929.3
41.8	405400.0	168.3	1069.2
42.0	455000.0	202.9	1214.0

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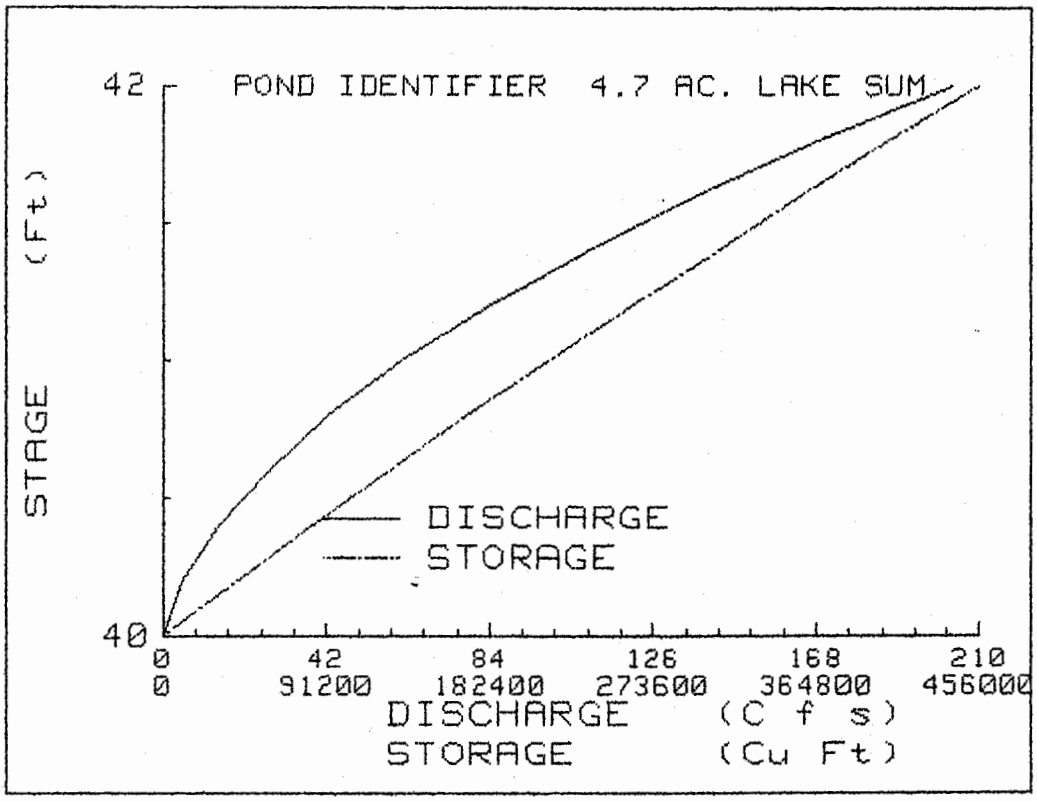
HYDROLOGIC REPORT FOR POWHATAN



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HYDROLOGIC REPORT FOR

POWHATAN

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
4.75	0.0	.1	0.0	0.0	.1	0.0	.1
5.00	.1	.1	.1	0.0	.2	0.0	.2
5.25	.1	.2	.2	0.0	.5	0.0	.5
5.50	.2	.2	.5	0.0	.9	0.0	.8
5.75	.2	.3	.8	0.0	1.3	.1	1.2
6.00	.3	.4	1.2	.1	1.8	.1	1.7
6.25	.4	.5	1.7	.1	2.5	.1	2.3
6.50	.5	.6	2.3	.1	3.3	.2	3.1
6.75	.6	.7	3.1	.2	4.3	.2	4.1
7.00	.7	.8	4.1	.2	5.4	.3	5.1
7.25	.8	.9	5.1	.3	6.6	.3	6.3
7.50	.9	1.1	6.3	.3	8.0	.4	7.6
7.75	1.1	1.2	7.6	.4	9.4	.5	8.9
8.00	1.2	1.3	8.9	.5	10.9	.5	10.4
8.25	1.3	1.6	10.4	.5	12.8	.6	12.1
8.50	1.6	1.9	12.1	.6	15.1	.8	14.3
8.75	1.9	2.2	14.3	.8	17.7	.9	16.8
9.00	2.2	2.4	16.8	.9	20.4	1.0	19.4
9.25	2.4	2.7	19.4	1.0	23.4	1.2	22.3
9.50	2.7	3.1	22.3	1.2	26.9	1.4	25.6
9.75	3.1	3.6	25.6	1.4	30.9	1.6	29.4
10.00	3.6	4.0	29.4	1.6	35.4	1.8	33.6
10.25	4.0	4.8	33.6	1.8	40.6	2.0	38.5
10.50	4.8	5.5	38.5	2.0	46.7	2.3	44.4
10.75	5.5	6.9	44.4	2.3	54.4	2.7	51.7
11.00	6.9	8.5	51.7	2.7	64.2	3.2	61.0
11.25	8.5	11.3	61.0	3.2	77.6	3.9	73.7
11.50	11.3	14.2	73.7	3.9	95.3	4.8	90.5
11.75	14.2	34.2	90.5	4.8	134.2	8.3	125.8
12.00	34.2	102.6	125.8	8.3	254.3	20.7	233.6
12.25	102.6	109.5	233.6	20.7	425.0	43.4	381.6
12.50	109.5	86.8	381.6	43.4	534.5	60.7	473.7
12.75	86.8	82.7	473.7	60.7	582.4	69.1	513.3
13.00	82.7	80.1	513.3	69.1	607.0	73.4	533.6
13.25	80.1	78.2	533.6	73.4	618.5	75.4	543.1
13.50	78.2	76.5	543.1	75.4	622.4	76.1	546.3
13.75	76.5	74.8	546.3	76.1	621.3	75.9	545.3

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HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

14.00	74.6	72.9	545.3	75.9	616.9	75.2	541.7
14.25	72.9	70.7	541.7	75.2	610.1	74.0	536.2
14.50	70.7	68.7	536.2	74.0	601.6	72.5	529.1
14.75	68.7	67.2	529.1	72.5	592.6	70.9	521.7
15.00	67.2	65.8	521.7	70.9	583.9	69.3	514.5
15.25	65.8	64.4	514.5	69.3	575.4	67.8	507.5
15.50	64.4	62.9	507.5	67.8	567.0	66.4	500.6
15.75	62.9	61.5	500.6	66.4	558.7	64.9	493.8
16.00	61.5	60.0	493.8	64.9	550.3	63.4	486.8
16.25	60.0	57.6	486.8	63.4	540.9	61.8	479.1
16.50	57.6	55.0	479.1	61.8	529.9	60.0	469.9
16.75	55.0	52.9	469.9	60.0	517.8	58.1	459.7
17.00	52.9	51.1	459.7	58.1	505.7	56.2	449.5
17.25	51.1	49.3	449.5	56.2	493.7	54.3	439.5
17.50	49.3	47.6	439.5	54.3	482.1	52.4	429.7
17.75	47.6	45.8	429.7	52.4	470.6	50.6	420.0
18.00	45.8	44.1	420.0	50.6	459.3	48.8	410.5
18.25	44.1	42.5	410.5	48.8	448.2	47.1	401.1
18.50	42.5	40.9	401.1	47.1	437.4	45.4	392.0
18.75	40.9	39.4	392.0	45.4	426.9	43.7	383.2
19.00	39.4	37.9	383.2	43.7	416.7	42.2	374.6
19.25	37.9	36.7	374.6	42.2	407.0	40.8	366.2
19.50	36.7	35.5	366.2	40.8	397.7	39.5	358.2
19.75	35.5	34.4	358.2	39.5	388.6	38.2	350.3
20.00	34.4	33.3	350.3	38.2	379.8	37.0	342.7
20.25	33.3	32.0	342.7	37.0	371.0	35.8	335.2
20.50	32.0	30.5	335.2	35.8	361.9	34.5	327.3
20.75	30.5	29.4	327.3	34.5	352.7	33.3	319.5
21.00	29.4	28.3	319.5	33.3	343.9	32.0	311.9
21.25	28.3	27.3	311.9	32.0	335.4	30.9	304.6
21.50	27.3	26.3	304.6	30.9	327.3	29.7	297.6
21.75	26.3	25.4	297.6	29.7	319.5	28.6	290.9
22.00	25.4	24.6	290.9	28.6	312.3	27.6	284.6
22.25	24.6	23.9	284.6	27.6	305.5	26.7	278.8
22.50	23.9	23.2	278.8	26.7	299.2	25.9	273.2
22.75	23.2	22.5	273.2	25.9	292.9	25.2	267.7
23.00	22.5	21.8	267.7	25.2	286.7	24.5	262.2
23.25	21.8	21.1	262.2	24.5	280.6	23.8	256.8
23.50	21.1	20.5	256.8	23.8	274.7	23.1	251.6
23.75	20.5	19.9	251.6	23.1	269.0	22.4	246.6

HYDROLOGIC REPORT FOR POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

24.00	19.9	19.4	246.6	22.4	263.5	21.8	241.7
24.25	19.4	17.7	241.7	21.8	257.0	21.0	236.0
24.50	17.7	16.6	236.0	21.0	249.3	20.1	229.2
24.75	16.6	15.7	229.2	20.1	241.4	19.2	222.3
25.00	15.7	14.9	222.3	19.2	233.7	18.3	215.4
25.25	14.9	14.3	215.4	18.3	226.3	17.4	208.9
25.50	14.3	13.6	208.9	17.4	219.4	16.6	202.8
25.75	13.6	13.0	202.8	16.6	212.8	15.8	196.9
26.00	13.0	12.4	196.9	15.8	206.5	15.1	191.4
26.25	12.4	11.8	191.4	15.1	200.4	14.4	186.0
26.50	11.8	11.2	186.0	14.4	194.6	13.8	180.8
26.75	11.2	10.6	180.8	13.8	188.8	13.3	175.6
27.00	10.6	10.1	175.6	13.3	183.0	12.7	170.3
27.25	10.1	9.6	170.3	12.7	177.2	12.2	165.0
27.50	9.6	9.1	165.0	12.2	171.4	11.7	159.8
27.75	9.1	8.6	159.8	11.7	165.8	11.2	154.6
28.00	8.6	8.2	154.6	11.2	160.3	10.7	149.6
28.25	8.2	7.8	149.6	10.7	154.9	10.2	144.7
28.50	7.8	7.4	144.7	10.2	149.8	9.7	140.0
28.75	7.4	7.2	140.0	9.7	144.9	9.3	135.6
29.00	7.2	6.9	135.6	9.3	140.4	8.9	131.5
29.25	6.9	6.6	131.5	8.9	136.2	8.5	127.7
29.50	6.6	6.4	127.7	8.5	132.2	8.1	124.1
29.75	6.4	6.1	124.1	8.1	128.4	7.8	120.6
30.00	6.1	5.9	120.6	7.8	124.8	7.5	117.3
30.25	5.9	5.6	117.3	7.5	121.3	7.1	114.2
30.50	5.6	5.4	114.2	7.1	118.0	6.9	111.2
30.75	5.4	5.2	111.2	6.9	114.9	6.6	108.3
31.00	5.2	5.0	108.3	6.6	111.9	6.3	105.6
31.25	5.0	4.8	105.6	6.3	109.0	6.0	103.0
31.50	4.8	4.6	103.0	6.0	106.3	5.8	100.5
31.75	4.6	4.4	100.5	5.8	103.7	5.6	98.1
32.00	4.4	4.2	98.1	5.6	101.2	5.3	95.9
32.25	4.2	4.1	95.9	5.3	98.8	5.1	93.7
32.50	4.1	3.9	93.7	5.1	96.6	4.9	91.7
32.75	3.9	3.8	91.7	4.9	94.4	4.7	89.7
33.00	3.8	3.6	89.7	4.7	92.3	4.6	87.7
33.25	3.6	3.5	87.7	4.6	90.1	4.5	85.6
33.50	3.5	3.3	85.6	4.5	87.9	4.4	83.5
33.75	3.3	3.2	83.5	4.4	85.6	4.3	81.3

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

34.00	3.2	3.1	81.3	4.3	83.3	4.2	79.2
34.25	3.1	3.0	79.2	4.2	81.0	4.1	77.0
34.50	3.0	2.9	77.0	4.1	78.7	4.0	74.8
34.75	2.9	2.8	74.8	4.0	76.5	3.8	72.6
35.00	2.8	2.7	72.6	3.8	74.2	3.7	70.5
35.25	2.7	2.6	70.5	3.7	71.9	3.6	68.3
35.50	2.6	2.5	68.3	3.6	69.7	3.5	66.2
35.75	2.5	2.4	66.2	3.5	67.6	3.4	64.2
36.00	2.4	2.4	64.2	3.4	65.6	3.3	62.3
36.25	2.4	2.3	62.3	3.3	63.7	3.2	60.5
36.50	2.3	2.3	60.5	3.2	61.9	3.1	58.8
36.75	2.3	2.2	58.8	3.1	60.1	3.0	57.1
37.00	2.2	2.2	57.1	3.0	58.5	2.9	55.5
37.25	2.2	2.1	55.5	2.9	56.9	2.9	54.0
37.50	2.1	2.1	54.0	2.9	55.3	2.8	52.6
37.75	2.1	2.0	52.6	2.8	53.9	2.7	51.2
38.00	2.0	2.0	51.2	2.7	52.5	2.6	49.8
38.25	2.0	1.9	49.8	2.6	51.1	2.6	48.5
38.50	1.9	1.9	48.5	2.6	49.8	2.5	47.3
38.75	1.9	1.8	47.3	2.5	48.5	2.4	46.1
39.00	1.8	1.8	46.1	2.4	47.3	2.4	44.9
39.25	1.8	1.8	44.9	2.4	46.1	2.3	43.8
39.50	1.8	1.7	43.8	2.3	45.0	2.3	42.7
39.75	1.7	1.7	42.7	2.3	43.9	2.2	41.7
40.00	1.7	1.7	41.7	2.2	42.8	2.2	40.7
40.25	1.7	1.6	40.7	2.2	41.8	2.1	39.7
40.50	1.6	1.6	39.7	2.1	40.8	2.0	38.8
40.75	1.6	1.5	38.8	2.0	39.8	2.0	37.8
41.00	1.5	1.5	37.8	2.0	38.9	2.0	36.9
41.25	1.5	1.5	36.9	2.0	38.0	1.9	36.1
41.50	1.5	1.4	36.1	1.9	37.1	1.9	35.2
41.75	1.4	1.4	35.2	1.9	36.2	1.8	34.4
42.00	1.4	1.4	34.4	1.8	35.4	1.8	33.6
42.25	1.4	1.4	33.6	1.8	34.6	1.7	32.8
42.50	1.4	1.3	32.8	1.7	33.8	1.7	32.1
42.75	1.3	1.3	32.1	1.7	33.0	1.7	31.3
43.00	1.3	1.3	31.3	1.7	32.2	1.6	30.6
43.25	1.3	1.2	30.6	1.6	31.5	1.6	29.9
43.50	1.2	1.2	29.9	1.6	30.8	1.5	29.3
43.75	1.2	1.2	29.3	1.5	30.1	1.5	28.6

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

44.00	1.2	1.2	28.6	1.5	29.4	1.5	27.9
44.25	1.2	1.1	27.9	1.5	28.8	1.4	27.3
44.50	1.1	1.1	27.3	1.4	28.1	1.4	26.7
44.75	1.1	1.1	26.7	1.4	27.5	1.4	26.1
45.00	1.1	1.1	26.1	1.4	26.9	1.3	25.5
45.25	1.1	1.0	25.5	1.3	26.3	1.3	25.0
45.50	1.0	1.0	25.0	1.3	25.7	1.3	24.4
45.75	1.0	1.0	24.4	1.3	25.1	1.3	23.9
46.00	1.0	1.0	23.9	1.3	24.6	1.2	23.3
46.25	1.0	1.0	23.3	1.2	24.0	1.2	22.8
46.50	1.0	.9	22.8	1.2	23.5	1.2	22.3
46.75	.9	.9	22.3	1.2	23.0	1.2	21.8
47.00	.9	.9	21.8	1.2	22.5	1.1	21.3
47.25	.9	.9	21.3	1.1	22.0	1.1	20.9
47.50	.9	.9	20.9	1.1	21.5	1.1	20.4
47.75	.9	.8	20.4	1.1	21.0	1.1	20.0
48.00	.8	.8	20.0	1.1	20.5	1.0	19.5
48.25	.8	.8	19.5	1.0	20.1	1.0	19.1
48.50	.8	.8	19.1	1.0	19.7	1.0	18.7
48.75	.8	.8	18.7	1.0	19.2	1.0	18.3
49.00	.8	.7	18.3	1.0	18.8	.9	17.9
49.25	.7	.7	17.9	.9	18.4	.9	17.5
49.50	.7	.7	17.5	.9	18.0	.9	17.1
49.75	.7	.7	17.1	.9	17.6	.9	16.7
50.00	.7	.7	16.7	.9	17.2	.9	16.3
50.25	.7	.7	16.3	.9	16.8	.8	16.0
50.50	.7	.7	16.0	.8	16.5	.8	15.6
50.75	.7	.6	15.6	.8	16.1	.8	15.3
51.00	.6	.6	15.3	.8	15.8	.8	15.0
51.25	.6	.6	15.0	.8	15.4	.8	14.6
51.50	.6	.6	14.6	.8	15.1	.8	14.3
51.75	.6	.6	14.3	.8	14.7	.7	14.0
52.00	.6	.6	14.0	.7	14.4	.7	13.7
52.25	.6	.6	13.7	.7	14.1	.7	13.4
52.50	.6	.5	13.4	.7	13.8	.7	13.1
52.75	.5	.5	13.1	.7	13.5	.7	12.8
53.00	.5	.5	12.8	.7	13.2	.7	12.5
53.25	.5	.5	12.5	.7	12.9	.6	12.3
53.50	.5	.5	12.3	.6	12.6	.6	12.0
53.75	.5	.5	12.0	.6	12.4	.6	11.7

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

54.00	.5	.5	11.7	.6	12.1	.6	11.5
54.25	.5	.5	11.5	.6	11.8	.6	11.2
54.50	.5	.5	11.2	.6	11.6	.6	11.0
54.75	.5	.5	11.0	.6	11.3	.6	10.8
55.00	.5	.4	10.8	.6	11.1	.6	10.5
55.25	.4	.4	10.5	.6	10.8	.5	10.3
55.50	.4	.4	10.3	.5	10.6	.5	10.1
55.75	.4	.4	10.1	.5	10.4	.5	9.8
56.00	.4	.4	9.8	.5	10.1	.5	9.6
56.25	.4	.4	9.6	.5	9.9	.5	9.4
56.50	.4	.4	9.4	.5	9.7	.5	9.2
56.75	.4	.4	9.2	.5	9.5	.5	9.0
57.00	.4	.4	9.0	.5	9.3	.5	8.8
57.25	.4	.4	8.8	.5	9.1	.5	8.6
57.50	.4	.4	8.6	.5	8.9	.4	8.4
57.75	.4	.3	8.4	.4	8.7	.4	8.3
58.00	.3	.3	8.3	.4	8.5	.4	8.1
58.25	.3	.3	8.1	.4	8.3	.4	7.9
58.50	.3	.3	7.9	.4	8.1	.4	7.7
58.75	.3	.3	7.7	.4	8.0	.4	7.6
59.00	.3	.3	7.6	.4	7.8	.4	7.4
59.25	.3	.3	7.4	.4	7.6	.4	7.2
59.50	.3	.3	7.2	.4	7.5	.4	7.1
59.75	.3	.3	7.1	.4	7.3	.4	6.9
60.00	.3	.3	6.9	.4	7.1	.4	6.8
60.25	.3	.3	6.8	.4	7.0	.4	6.6
60.50	.3	.3	6.6	.4	6.8	.3	6.5
60.75	.3	.3	6.5	.3	6.7	.3	6.3
61.00	.3	.3	6.3	.3	6.5	.3	6.2
61.25	.3	.3	6.2	.3	6.4	.3	6.1
61.50	.3	.2	6.1	.3	6.3	.3	5.9
61.75	.2	.2	5.9	.3	6.1	.3	5.8
62.00	.2	.2	5.8	.3	6.0	.3	5.7
62.25	.2	.2	5.7	.3	5.9	.3	5.6
62.50	.2	.2	5.6	.3	5.7	.3	5.4
62.75	.2	.2	5.4	.3	5.6	.3	5.3
63.00	.2	.2	5.3	.3	5.5	.3	5.2
63.25	.2	.2	5.2	.3	5.4	.3	5.1
63.50	.2	.2	5.1	.3	5.2	.3	5.0
63.75	.2	.2	5.0	.3	5.1	.3	4.9

HYDROLOGIC REPORT FOR

POWHATAN

BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

64.00	.2	.2	4.9	.3	5.0	.3	4.8
64.25	.2	.2	4.8	.3	4.9	.2	4.7
64.50	.2	.2	4.7	.2	4.8	.2	4.6
64.75	.2	.2	4.6	.2	4.7	.2	4.5
65.00	.2	.2	4.5	.2	4.6	.2	4.4
65.25	.2	.2	4.4	.2	4.5	.2	4.3
65.50	.2	.2	4.3	.2	4.4	.2	4.2
65.75	.2	.2	4.2	.2	4.3	.2	4.1
66.00	.2	.2	4.1	.2	4.2	.2	4.0
66.25	.2	.2	4.0	.2	4.1	.2	3.9
66.50	.2	.2	3.9	.2	4.0	.2	3.8
66.75	.2	.2	3.8	.2	3.9	.2	3.7
67.00	.2	.2	3.7	.2	3.9	.2	3.7
67.25	.2	.2	3.7	.2	3.8	.2	3.6
67.50	.2	.1	3.6	.2	3.7	.2	3.5
67.75	.1	.1	3.5	.2	3.6	.2	3.4
68.00	.1	.1	3.4	.2	3.5	.2	3.4
68.25	.1	.1	3.4	.2	3.5	.2	3.3
68.50	.1	.1	3.3	.2	3.4	.2	3.2
68.75	.1	.1	3.2	.2	3.3	.2	3.1
69.00	.1	.1	3.1	.2	3.2	.2	3.1
69.25	.1	.1	3.1	.2	3.2	.2	3.0
69.50	.1	.1	3.0	.2	3.1	.2	2.9
69.75	.1	.1	2.9	.2	3.0	.2	2.9
70.00	.1	.1	2.9	.2	3.0	.1	2.8
70.25	.1	.1	2.8	.1	2.9	.1	2.8
70.50	.1	.1	2.8	.1	2.8	.1	2.7
70.75	.1	.1	2.7	.1	2.8	.1	2.6
71.00	.1	.1	2.6	.1	2.7	.1	2.6
71.25	.1	.1	2.6	.1	2.7	.1	2.5
71.50	.1	.1	2.5	.1	2.6	.1	2.5
71.75	.1	.1	2.5	.1	2.5	.1	2.4
72.00	.1	.1	2.4	.1	2.5	.1	2.4
72.25	.1	.1	2.4	.1	2.4	.1	2.3
72.50	.1	.1	2.3	.1	2.4	.1	2.3
72.75	.1	.1	2.3	.1	2.3	.1	2.2
73.00	.1	.1	2.2	.1	2.3	.1	2.2
73.25	.1	.1	2.2	.1	2.2	.1	2.1
73.50	.1	.1	2.1	.1	2.2	.1	2.1
73.75	.1	.1	2.1	.1	2.1	.1	2.0

LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR

POWHATAN

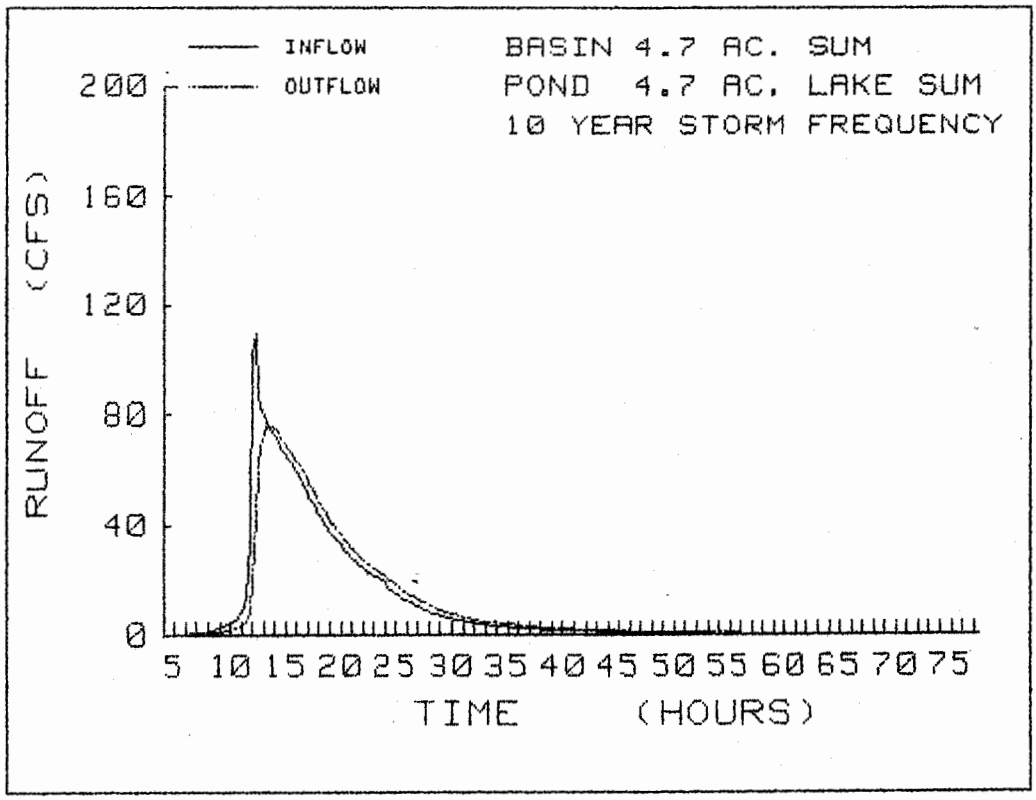
BASIN IDENTIFIER 4.7 AC. SUM
POND IDENTIFIER 4.7 AC. LAKE SUM
10 YEAR STORM FREQUENCY (CONT'D)

74.00	.1	.1	2.0	.1	2.1	.1	2.0
74.25	.1	.1	2.0	.1	2.0	.1	1.9
74.50	.1	.1	1.9	.1	2.0	.1	1.9
74.75	.1	.1	1.9	.1	2.0	.1	1.9
75.00	.1	.1	1.9	.1	1.9	.1	1.8
75.25	.1	.1	1.8	.1	1.9	.1	1.8
75.50	.1	.1	1.8	.1	1.8	.1	1.7
75.75	.1	.1	1.7	.1	1.8	.1	1.7
76.00	.1	.1	1.7	.1	1.8	.1	1.7
76.25	.1	.1	1.7	.1	1.7	.1	1.6
76.50	.1	.1	1.6	.1	1.7	.1	1.6
76.75	.1	.1	1.6	.1	1.6	.1	1.5
77.00	.1	.1	1.5	.1	1.6	.1	1.5
77.25	.1	0.0	1.5	.1	1.5	.1	1.4
77.50	0.0	0.0	1.4	.1	1.4	.1	1.3
77.75	0.0	0.0	1.3	.1	1.3	.1	1.2
78.00	0.0	0.0	1.2	.1	1.1	.1	1.1
78.25	0.0	0.0	1.1	.1	1.0	.1	1.0
78.50	0.0	0.0	1.0	.1	.9	0.0	.9

MAXIMUM OUTFLOW = 76.1 C.F.S.
MAXIMUM STORAGE = 245817.0 CU FT.
MAXIMUM ELEVATION = 41.1 FEET

LANGLEY & McDONALD P.C.
WILLIAMSBURG, VIRGINIA
6/27/89

HYDROLOGIC REPORT FOR POWHATAN



PC040 - Spillway Repair
10/2011

Subject: Powhatan Secondary BMP #3 Stilling Basin
Computed: JWB Checked: _____

LANDMARK DESIGN GROUP

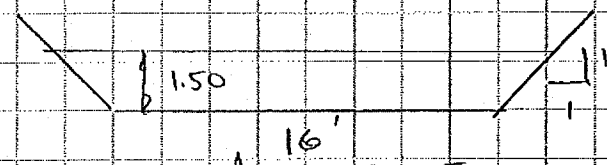
Project # _____
Client _____
Date _____ Sheet # 1

Engineers • Planners • Surveyors • Landscape Architects • Environmental Scientists

Design for Free Hydraulic Jump.
Ref HEC-14, Pub No. FHWA-NHI-06-086
Flow info from Pond Routing by LMDG 6/27/09

$Q_{100} = 141$ cfs
Depth $= 1.60'$

(1) Determine Normal Depth y_0
Based on Manning's EQ



$$v_0 = \frac{1.49}{n}(R_h)^{2/3}\sqrt{S_0}$$

$$= \frac{1.49}{0.015}(1.297)^{2/3}\sqrt{0.033}$$

$$R_h = \frac{A}{P} = \frac{26.25}{20.24} = 1.297$$

$$v_0 = 21.46 \text{ fps}$$

$$y_0 = 0.79\left(\frac{nQ}{\sqrt{S_0}\,W}\right)^{3/5} = 0.79\left(\frac{0.015(141)}{\sqrt{0.033}(19)}\right)^{3/5} = 0.59'$$

Try $y_0 = 0.7'$ $\quad v_0 = \frac{1.49(0.65)^{2/3}\sqrt{0.033}}{0.015} = 13.54 \quad R_h = \frac{11.69}{17.98} = 0.65$

$$y_0 = 0.79\left(\frac{0.015(141)}{\sqrt{0.033}(17.4)}\right)^{3/5} = 0.62'$$

Try $y_0 = 0.65'$ $\quad v_0 = \frac{1.49(0.61)^{2/3}\sqrt{0.033}}{0.015} = \boxed{12.93 \text{ fps}} \quad R_h = \frac{10.82}{17.84} = 0.61$

$$y_0 = 0.79\left(\frac{0.015(141)}{\sqrt{0.033}(17.3)}\right)^{3/5} = \boxed{0.62'} \leftarrow \text{ok}$$

$$F_{r_0} = \frac{v_0}{\sqrt{g y_0}} = \frac{12.93}{\sqrt{32.2(0.62)}} = \boxed{2.89}$$

Subject _____

Computed _____ Checked _____

LANDMARK DESIGN GROUP

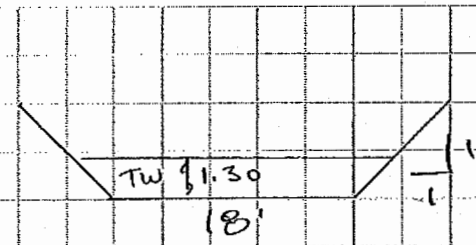
Project # _____

Client _____

Date _____ Sheet # _____

Engineers • Planners • Surveyors • Landscape Architects • Environmental Scientists

CALCULATE TAIL WATER DEPTH
– ASSUME RECEIVING CHANNEL W = 18'



Try $y_n = 1.30'$

$$v_n = \frac{1.49}{0.03}(1.16)^{2/3}\sqrt{0.01} = 5.48 \text{ fps}$$

$$y_n = 0.79\left[\frac{0.03(141)}{\sqrt{0.01}(20.16)}\right]^{3/5} = 1.22$$

$$R_h = \frac{A}{P} = \frac{25.09}{21.68} = 1.16$$

Try $y_n = 1.20$

$$v_n = \frac{1.49}{0.03}(1.08)^{2/3}\sqrt{0.01} = 5.22$$

$$y_n = 0.79\left[\frac{0.03(141)}{\sqrt{0.01}(20.40)}\right]^{3/5} = 1.22$$

$$R_h = \frac{23.04}{21.39} = 1.08$$

Try $y_n = 1.22$

$$v_n = \frac{1.49(1.09)^{2/3}\sqrt{0.01}}{0.03} = 5.27 \text{ fps}$$

$$y_n = 0.79\left[\frac{0.03(141)}{\sqrt{0.01}(20.44)}\right]^{3/5} = 1.22 \checkmark$$

$$R_h = \frac{23.45}{21.45} = 1.09$$

Subject _____

Computed _____ Checked _____

LANDMARK DESIGN GROUP

Project # _____

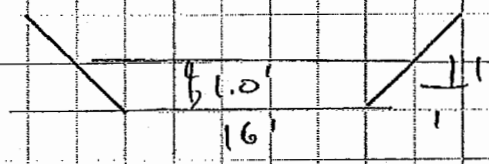
Client _____

Date _____ Sheet # 3

Engineers • Planners • Surveyors • Landscape Architects • Environmental Scientists

(2) CALCULATE TAILWATER DEPTH

- ASSUME RECEIVING CHANNEL W = 16'



$R_h = \frac{17}{18.83} = 0.90$

Try $y_n = 1.0$

$V_n = \frac{1.49}{0.03}(0.90)^{2/3}\sqrt{0.01} = 4.64$ fps

$y_n = 0.79\left(\frac{0.03(141)}{\sqrt{0.01}(18)}\right)^{3/5} = 1.32$

Try $y = 1.32$

$R_h = \frac{22.84}{19.73} = 1.16$

$V_n = \frac{1.49}{0.03}(1.16)^{2/3}\sqrt{0.01} = 5.48$ fps

$y_n = 0.79\left(\frac{0.03(141)}{\sqrt{0.01}(18.64)}\right)^{3/5} = 1.29$

Try $y = 1.30$

$R_h = \frac{22.49}{19.68} = 1.14$

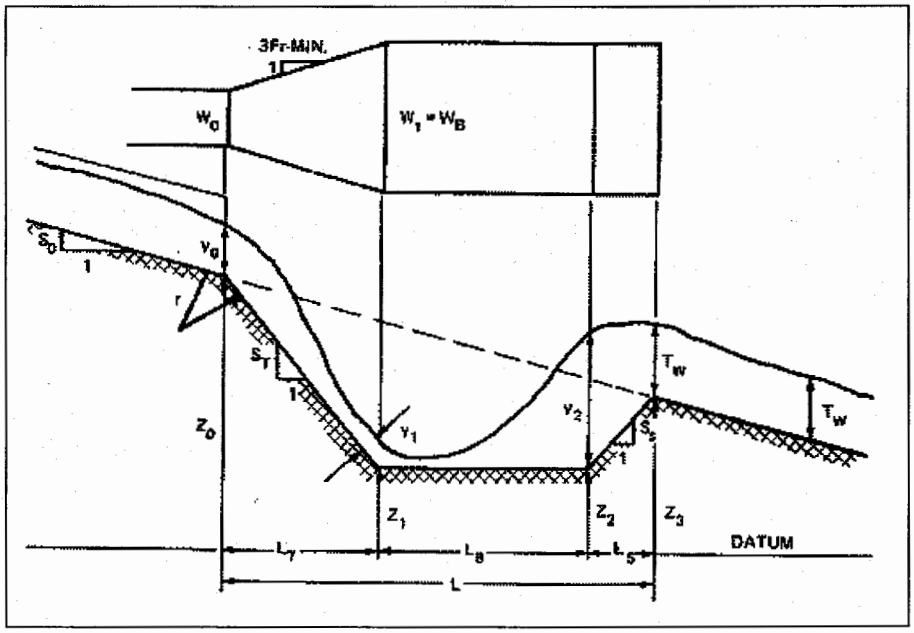
$V_n = \frac{1.49}{0.03}(1.14)^{2/3}\sqrt{0.01} = 5.42$ fps

$y_n = 0.79\left(\frac{0.03(141)}{\sqrt{0.01}(18.6)}\right)^{3/5} = \boxed{1.29}$

Stilling Basin Design
From Chapter 8, HEC14 - Publication No. FHWA-NHI-06-086

Given:

$Q =$	141	ft^3/s	Flow from Culvert
$S_0 =$	0.0330	ft/ft	Slope of Culvert
$S_T =$	0.4000	ft/ft	Slope into Basin
$S_S =$	0.6700	ft/ft	Slope out of Basin
$W_0 =$	16.00	ft	Diameter of Culvert (Width)
$W_B =$	18	ft	From Figure 8.1 (Will check value later)
$g =$	32.2	ft/s^2	Gravity Constant
$Y_0 =$	0.62	ft	Depth in Pipe*
$z_0 =$	40.6	ft	Invert Elevation of Pipe
$z_1 = z_2 =$	38	ft	Bottom Elevation of Stilling Basin
$V_0 =$	12.93	ft/s	Velocity out of pipe*
$Fr_0 =$	2.89		Froude Number*
TW=	1.22	ft	Tailwater Depth of Downstream Channel



The Froude number used to determine jump efficiency and to evaluate the suitability of alternative stilling basins as described in Table 8.1 is defined in Equation 8.1.

$$Fr_1 = \frac{V_1}{\sqrt{gy_1}} \tag{8.1}$$

where,

Fr_1 = Froude number at the entrance to the basin

V_1 = velocity entering the basin, m/s (ft/s)

y_1 = depth entering the basin, m (ft)

g = acceleration due to gravity, m/s² (ft/s²)

To solve for the velocity and depth entering the basin, the energy balance is written from the culvert outlet to the basin. Substituting $Q/(y_1W_B)$ for V_1 and solving for Q results in:

$$Q = y_1W_B\left[2g(z_o - z_1 + y_o - y_1) + V_o^2\right]^{1/2} \tag{8.2}$$

where,

W_B = width of the basin, m/s (ft/s)

V_o = culvert outlet velocity, m/s (ft/s)

y_1 = depth entering the basin, m (ft)

y_o = culvert outlet depth, m (ft)

z_1 = ground elevation at the basin entrance, m (ft)

z_o = ground elevation at the culvert outlet, m (ft)

Equation 8.2 has three unknowns y_1, W_B, and z_1. The depth y_1 can be determined by trial and error if W_B and z_1 are assumed. W_B should be limited to the width that a jet would flare naturally in the slope distance L.

$$W_B \le W_o + \frac{2L_T\sqrt{S_T^2 + 1}}{3Fr_o} \tag{8.3}$$

where,

L_T = length of transition from culvert outlet to basin, m (ft)

S_T = slope of the transition, m/m (ft/ft)

Formula: $Q = y_1*W_B*sqrt(2*g(z_0-z_1+y_0-y_1)+V_0^2)$ Eqn (8.2)

Solve for: y_1

y_1	Q	
0	0.00	
0.1	34.54	
0.2	68.46	
0.21	71.82	
0.22	75.18	
0.23	78.52	
0.24	81.86	
0.25	85.20	
0.26	88.53	
0.27	91.85	
0.271	92.18	
0.272	92.51	
0.273	92.84	
0.274	93.18	
0.275	93.51	
0.276	93.84	
0.277	94.17	
0.278	94.50	
0.279	94.83	
0.28	95.16	
0.29	98.47	
0.3	101.78	
0.4	134.47	
0.42	140.93	<--Use this value
0.45	150.58	
0.47	156.97	
0.475	158.57	
0.485	161.76	
0.5	166.53	
0.6	197.94	
0.7	228.71	
0.8	258.81	
0.9	288.25	
1	317.00	

Velocity Entering Stilling Basin

Formula: $V_1 = Q/(y_1*W_B)$ Page 8-2

$V_1 =$ 18.65 ft/s

Froude No. Entering Stilling Basin

Formula: $Fr_1 = V_1/(sqrt(g*y_1))$ Eqn (8.1)

$Fr_1 =$ 5.07

Conjugate Depth

Values of C		Basin Type
C =	1.00	Free Jump Basin
C =	1.00	USBR Type III
C =	1.10	USBR Type IV
C=	0.89	SAF Stilling Basin
C=	0.00	SAF Stilling Basin
C=	0.00	SAF Stilling Basin

Formula: $y_2 = (C*y_1*(sqrt(1+8*Fr_1^2)-1))/2$ Eqn (8.4)

$y_2 =$ 2.81

Stilling Basin Transitional Length (L_T) Eqn 8.5

Formula: $L_T = (z_0-z_1)/S_T$

$L_T =$ 6.50 ft

Check Value of W_B

Formula: $W_B \leq W_0 + (2*L_T*(sqrt(S_T^2+1))/(3*Fr_0))$ Eqn (8.3)

$W_B \leq$ 17.61 ft

0 <-- 1 if value is ok

Stilling Basin Bottom Length (L_B)

From Figure 8.2:

$L_B/y_2 =$ 5.9

$L_B =$ 16.58 ft ✓

Stilling Basin Sill Length (L_S)

Formula: $L_S = (L_T(S_T-S_O)-L_B*S_O)/(S_S+S_O)$ Eqn (8.6)

$L_S =$ 2.62 ft

Elevation at Tailwater Entrance (z_3)

Formula: $z_3 = L_S * S_S + z_1$ 38' **Eqn (8.7)**

$z_3 =$ **39.75 ft**

$Y_2 + Z_2 < Z_3 + T_w$

$2.81 + 0 < 1.75 + 1.22$

$2.81 < 2.97$ - ok - jump occurs in basin

Pow. Secard Dams.

1) Inc. ht of spillway to 1.25'

2) Concrete the spillway to a point beyond the sewer line

3) Provide a drain for the lower edge of the dam to keep H_2O from seeping out + ~~draining~~ piping.

4) Provide rr @ end of 3.3 ac lake Spillway to prevent undermining of spillway @ end.

5) Put cut-off walls @ both ends of both spillways (check Rolling Woods)

6) Inc the height of the outside wall of the 4.7 ac lake spillway around the bend.

— Compare to dam safety elev. + flow ivels. etc.

PC 142 BMP#3 d
PC 040 BMP#2

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VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject: POWHATAN SECONDARY PHASES II & III DRAINAGE CALC.
Computed By _____ Checked By _____

Project No. _____
Client _____
Date _____ Sheet No. _____

BASIN No. 1 (INCLUDES SUB-BASINS 1-A ; 1-B ; 1-C

SUB-BASIN 1-A (To check ① adequacy of PG-2A & ② to size the pipe culvert @ sta. 3+20 "B"

$A = 2.3$ AC
$C_w = .41$
$CA = .933$
$I_2 = 4$ in/hr
$I_{10} = 5.2$ in/hr
$Q_2 = 3.73$ CFS
$Q_{10} = 4.85$ CFS

C_w COMPUTATIONS
Area in Lots = 1.9 AC @ .35 = .665 ✓
Area in Pavement = .17 AC @ .9 = .153 ✓
Area in Ditch/Shoulder = .23 @ .5 = .115 ✓
.933 ÷ 2.3 = .41

Time of Concentration
Overland Flow Time:
$L = 200'$
$C = .35$
$S = 4.5\%$
$T_c = 13$ min
Channel Time < 1 min
TOTAL $T_c = 14$ min

1. Calculate depth of flow in PG-2A with 2:1 & 3:1 sideslopes ; $S = 6\%$ & $Q_{10} = 4.9$ CFS:
   $d = .475'$
2. Calculate capacity of 15" RCP $S = 1.0\%$ = 6.4 CFS

SUB-BASIN 1-B (To ① check adequacy of grated inlet in sump condition & ② to size outfall pipe)

$A = 2.7$ AC (1-A + 1B)
$C_w = 0.45$
$CA = 1.21$
$I_2 = 4$
$I_{10} = 5.2$
$Q_2 = 4.8$ CFS
$Q_{10} = 6.3$ CFS

C_w - Computations
Area in Lots = 2.0 AC @ .35 = .70
Area in pavement = .40 AC @ .9 = .36
Area in ditch/shoulder = .30 AC @ .5 = .15
1.21 ÷ 2.7 = .45

$T_c = 14$ min

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VIRGINIA BEACH · WILLIAMSBURG, VIRGINIA

Subject: POWHATAN SECONDARY PHASES II & III - DRAINAGE CALC.
Computed By: WCS Checked By: MHM

Project No. 78-41
Client: BEAMER
Date: Sheet No.

1. Calculate adequacy of DI-5 w/ TYPE II grate in sump
Given: $Q_{10} = 6.3$ CFS
$W = 3'$; $L = 3.33'$
FIND: Depth of flow
$P = 2(3 + 3.33) = 12.66$
From Chart 14: $d = 0.3'$ (inlet operates as weir)

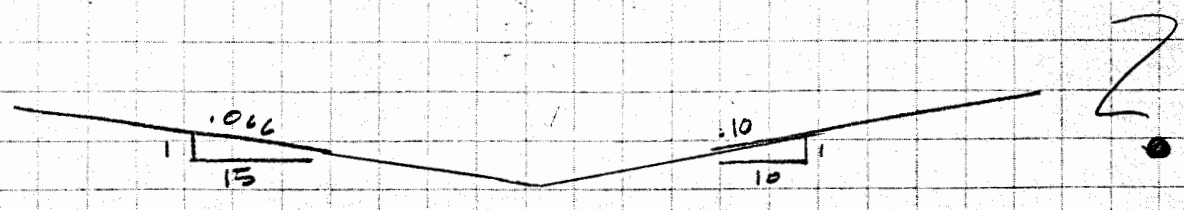
2. Capacity of 15" RCP @ $S = 1.5\% = 7.9$ CFS; $V = 6.4$ FPS

SUB-BASIN 1-C (To Address General Criteria No. 7, Stormwater Management.)

$A = 6.7$ AC (1-A + 1-B + 1-C)
$C_w = .39$
$CA = 2.61$
$I_2 = 3.5$
$Q_2 = 9.1$ CFS

Area in lots = 6 ac @ .35 = 2.1
" " pavement = .4 @ .9 = .36
" " ditch/shoulder .3 @ .5 = .15
2.61 ÷ 6.7 = .39

Time of Concentration
Overland Flow Time
$L = 500'$
$S = .05$ (5%)
$C = .35$
$T_c = 19$ min



Calculate Velocity in given X-section:
$n = .06$?
$S = .066$?
$d = .53$
$Q = 9.1$ CFS
$V = 2.6$ FPS acceptable
$WP = 13.3'$

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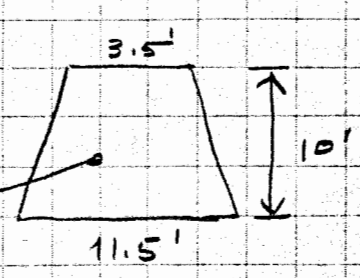
Subject: Powhatan Secondary
Phases II & III - Drainage
Computed By: WCS Checked By: MJM

Project No. 78-41
Client: Beamer
Date: Sheet No.

Basin 1: Calculate dimensions & riprap size - outlet protection

1. Tailwater = .53' < 1/2 PIPE DIAMETER ∴ min tailwater cond.
2. L_a = 10' ; d_{50} = .5'
3. Upstream width = 3 x 1.25 = 3.75'
4. Downstream width = 10 + 1.5' = 11.5



115 SF - 40 SF = 75 SF OR 8 S.Y.

BASIN 2 - (To calculate ① capacity of PG-2A and ② 18" RCP at sta. 0+30 "A")

A = 1.5 ac
C_w = .44
CA = .665
I_{10} = 5.3
Q_{10} = 3.5 CFS

Area in lots = 1.1 @ .35 = .385
" " pvmt = .20 @ .9 = .180
" " shoulder/ditch = .20 @ .5 = .100
.665 ÷ 1.5 = .44

Time of Concentration
1. Overland Flow time
L = 230'
C = .35
S = 4.3%
T_c = 15 min

1. Calculate capacity of PG-2A w/ 2:1 & 3:1 sideslopes
Q_{10} = 3.5 CFS ; S = .02 ft/ft (worst case)
d = .515'
2. Capacity of 18" RCP @ S = 0.25% = 5.2 CFS
V = 3 FPS

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Subject Powhatan Secondary II & III Drainage Calc.
Computed By WCS Checked By MHM

Project No. 78-41
Client
Date Sheet No.

BASIN 3 (Includes Sub-basins 3A - 3B - 3C - 3D)

Subbasin 3A (To calculate capacity of @ PG-2A and @ 15" RCP STA 4+50' & STA 4+80 "C")

A = 2.2 AC
C_w = .43
CA = .941
I_2 = 3.8
I_{10} = 5.3
Q_2 = 3.6 CFS
Q_{10} = 5 CFS

C_w
Area in lots = 1.73 @ .35 = .606
Area in pvmt = .25 @ .9 = .225
Area in ditch/shoulder = .22 @ .5 = .110
.941 ÷ 2.2 =

Overland Flow Time
L = 300'
S = .06 6%
C = .35
T_c = 15 min

1. Capacity of PG-2A S = 3% sideslopes = 2:1 ; 3:1
Q_{10} = 5 CFS d = .545'

2. Capacity of 15" RCP S = 1.0% = 6.4 CFS

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Subject: Powhatan Secondary Phases II & III
Computed By: WKS Checked By: TWM

Project No. 78-41
Client: BEAMER
Date: Sheet No.

Sta. 4+75 ± ROAD "C" & STA 0+30 "A"

Given: Vee shaped channel 1' deep w/ 2:1 & 3:1 sideslopes (TYP. Roadside ditch) @ 2% slope.

Calculate: Stable rip rap size for bottom and sideslopes of ditch

Solution: (FROM EROSION & SEDIMENT CONTROL HANDBOOK)

1. From Plate 1.37b $d_{50} = .25'$
2. sideslopes steeper than 3:1
3. From Plate 1.37c; $B/d = 0$; $Z = 2$; $K_1 = .925$
4. From Plate 1.37d; for $d_{50} = 3''$, $\phi = 35°$
5. From Plate 1.37e; for $Z = 2$ and $\phi = 35°$, $K_2 = .67$
6. $d_{50} \times K_1/K_2 = d'_{50} = .35' = 4''$

Given: Preceding channel has a curved section with a radius of 50'

Calculate: stable rip rap size ...

Solution:

1. $R_0 = 20$
2. $B_0/R_0 = 5/20 = .25$
3. Plate 1.37f for $B_0/R_0 = .25$; $K_3 = 1.05$
4. $d'_{50} \times K_3 = d_{50c} = .37$ use .5

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Subject: Powhatan Secondary II & III Drainage Calc.
Computed By: WJCS Checked By: MHM

Project No. 78-41
Client: Beamer
Date: Sheet No.

Sub-basin No. 3B (To check capacity of 15" RCP)

A = 2.9 (includes 3A)
C_w = .46
CA = 1.34
I_{10} = 5.3
Q_{10} = 7.1 CFS

Area in lots = 2.1 @ .35 = .735
" " pvmt = .43 @ .9 = .387
" " shoulder/ditch = .37 @ .5 = .215
1.337 ÷ 2.9

T_c = 15 min
Capacity of 15" RCP @ 9.27% = 19.6 CFS

Sub-basin No 3C to check adequacy of DI-5 in sump and adequacy of outfall pipe

A = .3
C = .75
I_{10} = 7 in/hr
Q_{10} = 1.6 CFS

1. To check depth at inlet:
   P_{lr} = 2(3 + 3.33) = 12.66
   for Q = 1.5 & P = 12.66 d = .125 (operates as weir)

2. To check adequacy of outfall pipe
   A = 3.2
   C_w = .49
   I_{10} = 5.3
   Q_{10} = 8.3 CFS

Capacity of 15" RCP @ 4.91% = 14.3 CFS

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Subject: Powhatan Secondary II & III Drainage Calc.
Computed By: WLS Checked By: MHM

Project No. 78-41
Client: Beamer
Date: 2/24/86 Sheet No.

Road "C" Outlet Protection Design

1. Pipe discharges on to slope with no defined channel. Minimum tailwater conditions exist.
2. $L_a = 16'$; $d_{50} = .60'$
3. Upstream width = 3.75'
4. Downstream width = 17.25'

19 s.y. Class I riprap $d_{50} = .67'$

Sub-basin 3-D to size sediment trap. for Road "C" outfall.

A = 4.4 AC

Required volume = 4.4 x 67 cu. yds = 295 cu. yds.

Basin 1-C - To calculate storage volume of sediment trap at road "B" outfall.

A = 6.7 AC 6.7 ac x 67 = 449 cu. yds

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Subject: Powhatan Secondary Phases II & III - drainage calcs
Computed By: VKS Checked By:

Project No. 78-41
Client: Beazer
Date: Sheet No.:

Basin No. 4 To check capacity of PG-2A
Given: 2:1 & 3:1 sideslopes; d = 1.0'; S = 3.35%

A = 1.5 AC.
C_w = .47
I_{10} = 5.5 in/hr
Q_{10} = 3.9 CFS
depth of flow = .485

		C_w		
PVMT	.18 ac	@ .9	=	.162
DITCH/SHOULDER	.18 ac	@ .5	=	.090
LOTS	1.14	@ .4	=	.456
				.708 ÷ 1.5 = .47

Overland Flow Time
L = 150'
S = 3%
C = .4
T_c = 12 min

Channel Time (Kirphich)
L = 300'
ΔEL = 5'
T_c = 0.6 min

PC 0240

Darryl Cook

From: Scott Thomas
Sent: Wednesday, October 28, 2009 9:59 AM
To: Darryl Cook
Cc: William Cain
Subject: RE: Powhatan BMP#3 Revised Stilling Basin

- No LDP reqd for outfall improv.
- No RPA exception reqd for outfall
- need to see access route

I agree with your thinking on the matter. This was based on a site specific, case-by-case evaluation though. The demarcation is still maintenance/repair (no permit) versus improvement (needs permit). Therefore, although not a true and basic maintenance/repair (no permit) project, the owner has taken the initiative to sink money into an improved OP design so that the same problem does not reoccur, has kept the Stormwater Division and our Division in the loop, and has provided us some concept computations and sketches for review. Therefore, no permit or RPA exception is necessary for this component of the work. This is only for the energy dissipater and existing spillway repair.

Access is a different matter. If a new access is necessary to perform the work, applicable review will be needed.

(Please put copies of these email correspondences in the PC040 BMP Asbuilt file for record of these decisions.)

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

Visit:
www. jccegov.com
www. protectedwithpride.org

From: Darryl Cook
Sent: Wednesday, October 28, 2009 8:32 AM
To: Scott Thomas
Cc: William Cain
Subject: RE: Powhatan BMP#3 Revised Stilling Basin

I agree more with your initial assessment where you felt that the repair of the outfall was not an improvement than with this latest assessment of the work. While I agree that there is a change in the stilling basin, it is not a change that affects the performance of the BMP – the inflow and outflow characteristics of the facility are not changed. And except for any possible access issues, there is no additional RPA impact here as it is within the existing grandfathered impact area. The access still has not been discussed with them and that may require a land disturbing permit and RPA exception unless they are using the top of the dam.

My concern is in adding additional cost and time to a process that is something we all want to move forward. These guys may have the resources to develop the additional plan you are looking for but other neighborhoods may not. How detailed of an e&s plan are you looking for?

From: Scott Thomas
Sent: Tuesday, October 27, 2009 2:10 PM
To: Darryl Cook
Cc: William Cain
Subject: RE: Powhatan BMP#3 Revised Stilling Basin

Darryl Cook

From: James Brawley [JBrawley@landmarkdg.com]
Sent: Monday, November 16, 2009 3:00 PM
To: Darryl Cook
Cc: cj jones
Subject: RE: Powhatan Secondary BMP#3 - JCC #PC040

Darryl: Thanks, I will revise the plan to show the silt fence and add a note indicating the need for a certification.

Jamie

From: Darryl Cook [mailto:decook@james-city.va.us]
Sent: Monday, November 16, 2009 2:57 PM
To: James Brawley
Cc: cj jones
Subject: RE: Powhatan Secondary BMP#3 - JCC #PC040

Jamie – everything looks to be complete but the contractor needs to be aware that silt fence will be needed at the location of the repair.

As this repair involved the preparation of an engineered drawing, we are going to need the construction of the stilling basin certified by an engineer using our standard construction certification form for new BMP construction. The entire existing dam structure does **not** need to be certified, only the repair work.

Please keep us or have the HOA keep us in the loop as this moves forward. We will need to be contacted when they start the work so we can be involved with oversight of the work.

From: James Brawley [mailto:JBrawley@landmarkdg.com]
Sent: Monday, November 09, 2009 9:08 AM
To: Darryl Cook
Subject: RE: Powhatan Secondary BMP#3 - JCC #PC040

Darryl: Per your request, I have attached two plan sheets for the Powhatan dam spillway repairs. The plan sheet shows the access way and grading. Access is off Vintage Court which allows access to the site by way of the existing gravel path. Small amount of grading shown on the plan as well to grade the bank back at the location of the stilling basin side walls.

A detail sheet is also included which shows the layout of the stilling basin and repairs to the existing slab.

Please review that attached and let me know if there is anything else you need shown.

Thanks for your help.

Sincerely,

Jamie

From: Darryl Cook [mailto:decook@james-city.va.us]
Sent: Tuesday, November 03, 2009 7:15 AM
To: James Brawley
Subject: Powhatan Secondary BMP#3 - JCC #PC040

Jamie – the design you sent of the revised stilling basin lined with concrete for the above BMP is approved. For installation of the stilling basin, no RPA exception or land disturbing permit will be required.

However, before proceeding with the work, you or Powhatan Secondary need to submit a plan showing the access that will be used to conduct the work. Please forward a layout to me of the route that will be used to access the stilling basin area showing any clearing and grading that will occur. If the access road results in more than 2500 square feet of disturbance, a land disturbing permit will be required. Also if the access involves clearing or disturbance in the RPA, an RPA exception will be required. Thanks.

Darryl E. Cook
James City County - County Engineer
287 McLaws Circle, Suite 1
Williamsburg, VA 23185
Phone: 757-259-1442
Fax: 757-259-5833
email: decook@james-city.va.us

LANDMARK
DESIGN GROUP

Powhatan Secondary, BMP #3
JCC BMP# PC0~~29~~40
Spillway Inspection Report
James City County, Virginia

September 14th, 2009 - See revised design + calculations dated 10/2009

Introduction:

The LandMark Design Group, Inc. performed a field inspection of the existing concrete spillway structure on September 02, 2009. At the time of the inspection the water level of the BMP pond had been drawn down by pumping approximately 3 feet so that the condition of the upstream and downstream ends of the spillway could be observed. The objective of our observations was to evaluate the condition of the existing concrete spillway and provide recommendations for any necessary repairs.

The Powhatan Secondary BMP #3 Dam is located in the Waterford section of Powhatan of Williamsburg Secondary in James City County. Available information indicates that the dam was built sometime during the mid-nineteen nineties and no plans for the structure are available.

The dam and spillway are the third in a series of BMPs which serve this part of the Powhatan Secondary development.

The date of the last dam/spillway inspection is not known.

The dam is an earthen embankment with a single concrete spillway. The embankment slope is approximately 3H: 1V. The crest width is approximately 20 feet with a height of approximately 14 feet. The crest length is approximately 420 feet. The existing concrete spillway is approximately 16 feet wide by 50 feet long with a spillway elevation of approximately 41.6. An existing 4' wide timber pedestrian bridge crosses over the spillway.

1. Primary Concrete Spillway General Condition:

Based on our observations during the field visit, the existing concrete spillway appeared to be in stable condition. However we observed some problems, which should be addressed.

The concrete spillway slab appears to be un-reinforced, 8 to 12 inches in thickness and is constructed of six (6) sections, five at 10 feet long by 16 feet wide and one at 4 feet long by 16 feet wide for a total length of approximately 54 feet. The upstream end of the spillway consists of a single 4 foot wide section of slab which is sloped approximately 1 foot toward the pond. The upstream end of the spillway is protected with rip-rap which appears to be VDOT Class A1, composed of stones approximately 25 to 75 pounds each. A 12" high curb section runs along both sides of the spillway with 4" diameter PVC drains spaced at 8 feet on center on the downstream half only, no drains were located on the upstream half of the spillway.

Engineers • Planners • Surveyors • Landscape Architects • Environmental Scientists
4029 Ironbound Road, Suite 100, Williamsburg, VA 23188 (757) 253-2975 FAX: (757) 229-0049 lmdg@landmarkdg.com

The most downstream section of the spillway has been undermined by erosion to a depth of approximately 4 feet, and extending upstream approximately 8 feet from the downstream toe. The joint adjacent to the next slab upstream has opened approximately 1 inch horizontally and has been displaced approximately 1 inch vertically. The vertical displacement of the joint indicates that the downstream section of the slab has settled an amount which is at least equal to the upstream displacement. The joint has opened to the extent that water appears to have been flowing through the joint, possibly contributing to the erosion beneath the slab.

The four (4) upstream sections of the concrete spillway slab appear to be in good condition with no cracks, spalls, settlement or open joints noted at the time of the inspection. No undermining was found at the upstream end of the spillway and no voids were noted when beneath the upstream sections of the spillway slabs when sounded with a hammer during the inspection.

The channel downstream from the spillway appears to be heavily eroded along the banks. Although some rip-rap was present along the banks of the channel, no rip-rap was noted at the base of the spillway. A large erosion hole approximately 10 feet wide by 4 feet deep has formed at the downstream end of the spillway. The receiving channel appears to be poorly aligned with respect to the spillway and is partially blocked by fallen trees and debris. The lack of rip-rap and poor channel alignment appear to be contributing to additional erosion at the base of the spillway and within the downstream channel.

2. Conclusions

Our inspection of the Powhatan Secondary BMP #3 spillway indicates that in general the spillway slab is in good condition with the exception of the most downstream slab section which has been almost entirely undermined and is in danger of collapse. In addition the downstream channel is eroding and is poorly aligned with respect to the spillway.

3. Recommendations

Based on the inspections performed, we recommended the following actions be taken to address the problems:

- The downstream end of the concrete spillway should be removed.
- All joints should be filled with a water resistant, flexible material.
- All vegetation and roots within the limits of the spillway should be removed.
- The downstream end of the concrete spillway should be replaced using one of the two options provided on the attached exhibits.

  Exhibit A shows the concrete replacement similar to the existing configuration with a realignment of the downstream channel.

  Exhibit B shows a revised concrete spillway with a turned down slab section leading to a riprap lined plunge pool and realigned downstream channel section.

Please review the attached information and let me know if you would like to discuss the alternatives presented. Once a repair method has been chosen, we will discuss the chosen alternative with a representative of James City County to ensure that they will approve of the proposed repairs. We will then prepare a plan which will be suitable for obtaining bids from Contractors for the work.

Please call me if you have any questions regarding any of the above.

Sincerely,

The LandMark Design Group

James W. Brawley, P.E.
Senior Associate

LANDMARK
DESIGN GROUP

Date Record Created:

Created By:

WS_BMPNO: PC040

PRINTED ON
Thursday, March 04, 2010
2:19:22 PM

WATERSHED	PC
BMP ID NO	040
PLAN NO	
TAX PARCEL	(38-3)(1-9)
PIN NO	3830100009
CONSTRUCTION DATE	
PROJECT NAME	Powhatan Secondary
FACILITY LOCATION	4551 News Road
CITY-STATE	Williamsburg, VA
CURRENT OWNER	Powhatan Enterprises Inc.
OWNER ADDRESS	13441 Warwick Blvd.
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Newport News, VA 23602
OWNER PHONE	
MAINT AGREEMENT	No
EMERG ACTION PLAN	No

MAINTENANCE PLAN	No
SITE AREA acre	0
LAND USE	
old BMP TYP	Wet Pond
JCC BMP CODE	A2 Wet Pond
POINT VALUE	10
SVC DRAIN AREA acres	165
SERVICE AREA DESCRI	
IMPERV AREA acres	
RECV STREAM	
EXT DET-WQ-CTRL	No
WTR QUAL VOL acre-ft	0
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	0
SW/FLOOD CONTROL	No
GEOTECH REPORT	No

CTRL STRUC DESC	
CTRL STRUC SIZE inches	
OTLT BARRL DESC	
OTLT BARRL SIZE inch	0
EMERG SPILLWAY	Yes
DESIGN HW ELEV	41.60
PERM POOL ELEV	40.00
2-YR OUTFLOW cfs	
10-YR OUTFLOW cfs	76.10
REC DRAWING	No
CONSTR CERTIF	No

LAST INSP DATE 8/10/2004 Inspected by:

INTERNAL RATING 3

MISC/COMMENTS

BMP # 3; 21.2 acre da next to BMP; 4.7 acre lake

Get Last BMP No | Return to Menu | Print Record

Additional Comments: