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: **WC059**

DATE VERIFIED: **July 13, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 12, 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: WC059

PIN: 0540100015

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

Property Description: Richardsons Mill

Site Address: 9351 Six Mount Zion Road

(For internal use only) **Box** #22 **Drawer:** 8

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

Comments

Owner as of 3/12/10: GS Stonehouse Green Land Sub LLC Tract Legal Description: Tract 1 GS Stonehouse Green Land Sub LLC

12.10100038 MND
0640100001

Printed On 10/17/2011 By JCCATTY

BOOK0732 PAGE0988

004986

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

SP-28-95 (WARE CREEK ROADWAY PHASE)

THIS DECLARATION, made this 10TH day of March, 19 95, between Stonehouse, Inc., and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: Part of Tax Map (6-4) Parcel (1-1), D.B. 393, Pg. 285 and Tax Map (12-1) Parcel 38, D.B. 589, Pg. 59 (Stonehouse Commerce Park), and James City County, Virginia, hereinafter referred to as the "COUNTY."

(6-4)(1-1)
DB 393 p. 285

WITNESSETH:

We, the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTOR(S) shall provide maintenance for the runoff control facility, hereinafter referred to as the "FACILITY," located on and serving the above-described property to ensure that the FACILITY is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations.

2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the FACILITY to ensure that the FACILITY is properly maintained.

3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the FACILITY for the COUNTY, its agent and its contractor.

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the FACILITY for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the FACILITY.

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the FACILITY in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work, and the COUNTY may assess the COVENANTOR(S) and/or all property served by the FACILITY for the cost of the work and any applicable penalties.

6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance, repair, operation or use of the FACILITY.

7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the FACILITY. The COVENANTOR(S)' shall supply the COUNTY with a copy of any document of transfer, executed by both parties.

8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the FACILITY.

9. This DECLARATION shall be recorded in the County Land Records.

1-2

Printed On 10/17/2011 By JCCATTY

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 10th day of March, 1995.

COVENANTOR(S)

James D. Franklin
VICE PRESIDENT

ATTEST:

Stephen D. Tan

COVENANTOR(S)

ATTEST:

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF Williamsburg

I, the undersigned Notary Public, in and for the jurisdiction aforesaid, do certify that James D. Franklin, whose name is signed as such to the foregoing writing bearing date 10th day of March, 1995 this day sworn the same before me in my jurisdiction aforesaid.

GIVEN under my hand this 10th day of March, of 1995.

Janice M. Thompson
Notary Public

My Commission expires: February 28, 1999

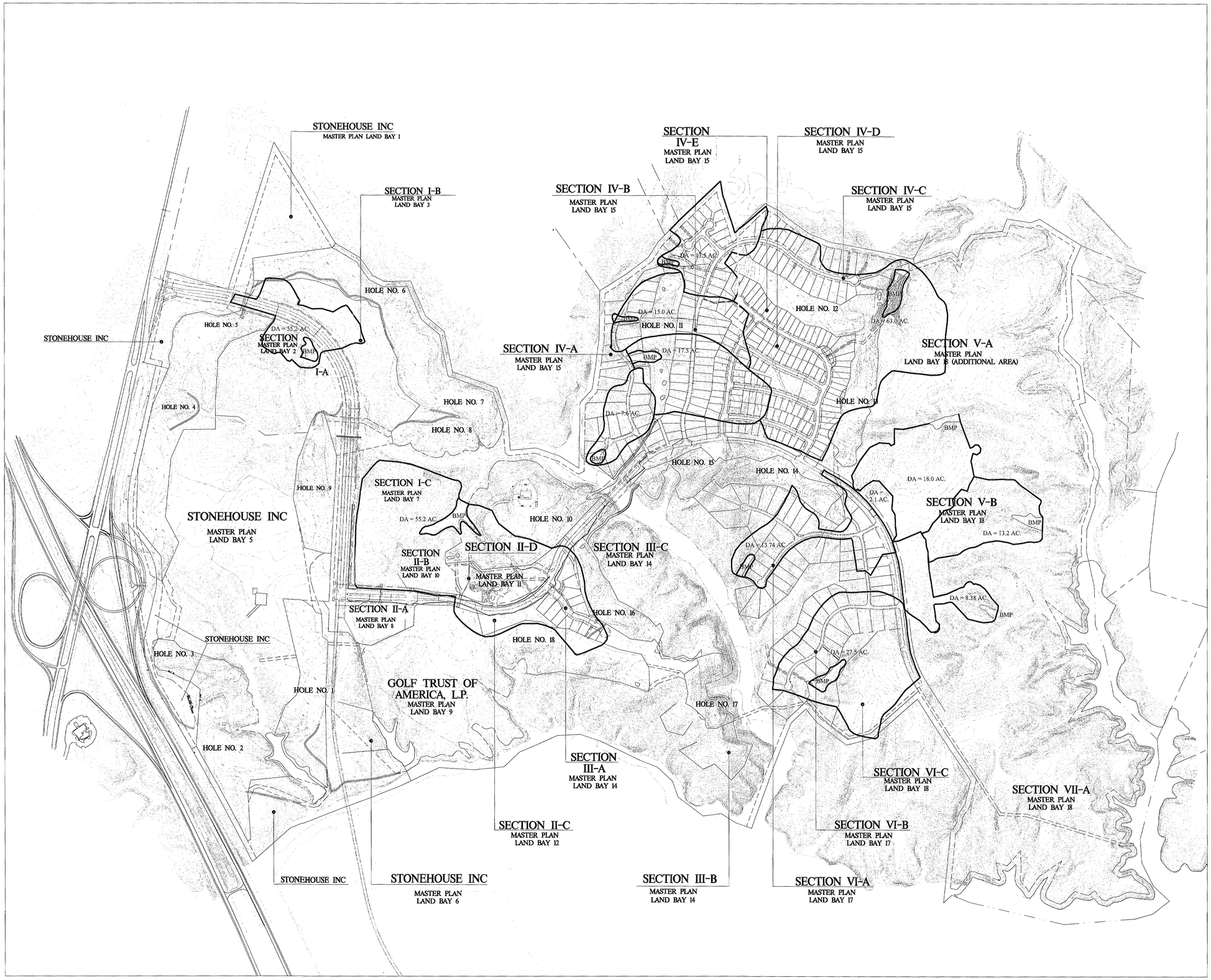
Approved as to form:

Leo P. Rogers

VIRGINIA: City of Williamsburg and County of [illegible]
In [illegible] the [illegible] Court of the City [illegible] James City, the 5 April 95. This Covenant [illegible] annexed and admitted [illegible] 12:47 [illegible] o'clock
Teste: [illegible] Clerk
[illegible] Deputy Clerk

0261U.Wpf
Revised 9/92

WC059_RICHARDSON_MILL_POND - 004



PHASE I
Master Stormwater Attenuation Plan

Date: February 19,1999

Langley and McDonald, P.C.

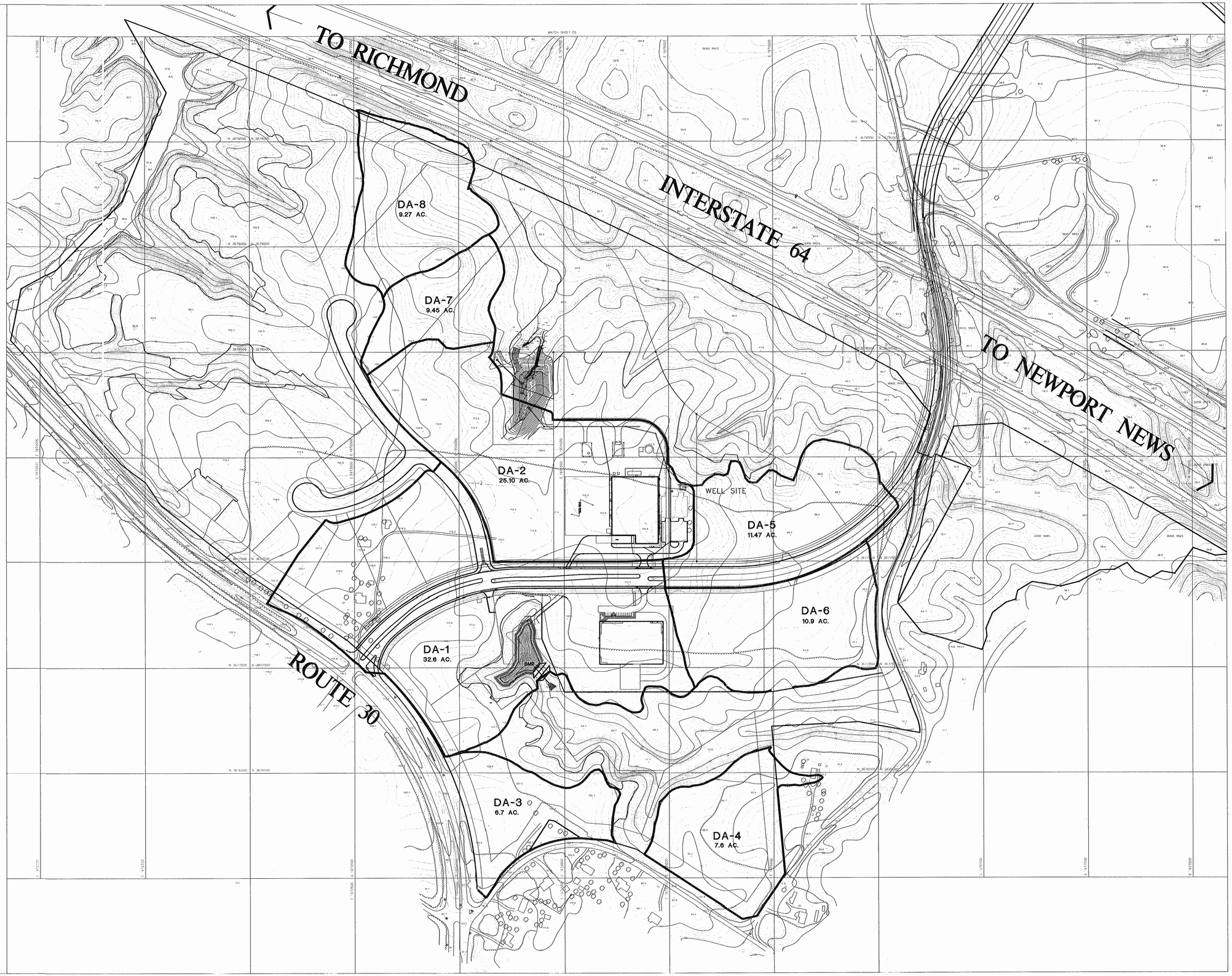
GRAPHIC SCALE

0 400 800 1600

WC059_RICHARDSON_MILL_POND - 005

STONEHOUSE COMMERCE PARK

MASTER DRAINAGE PLAN



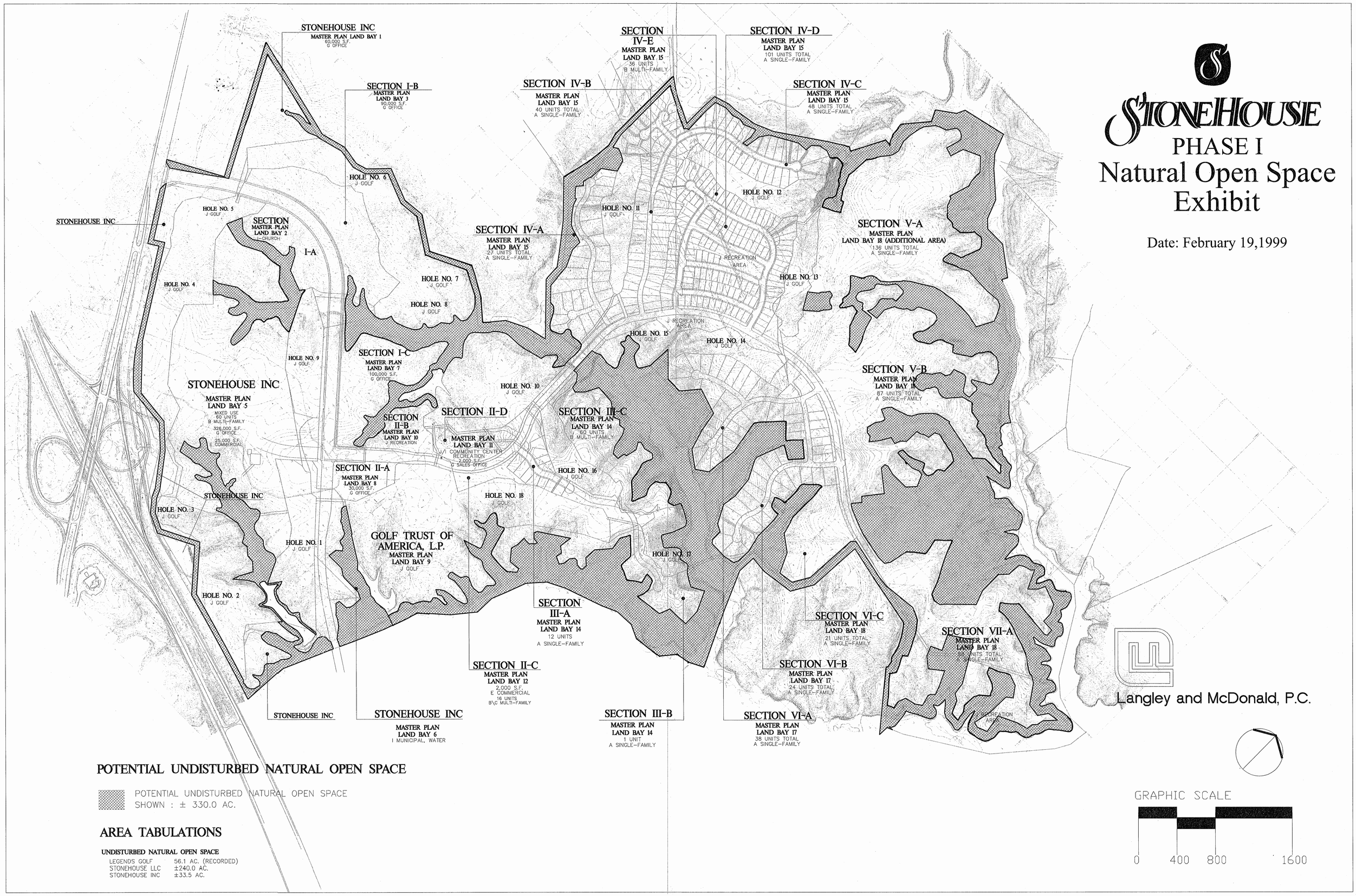
GRAPHIC SCALE: 1"=200'

0' 200' 400' 800'

WC 059

STONEHOUSE
PHASE I
Natural Open Space Exhibit

Date: February 19,1999



POTENTIAL UNDISTURBED NATURAL OPEN SPACE

POTENTIAL UNDISTURBED NATURAL OPEN SPACE
SHOWN : ± 330.0 AC.

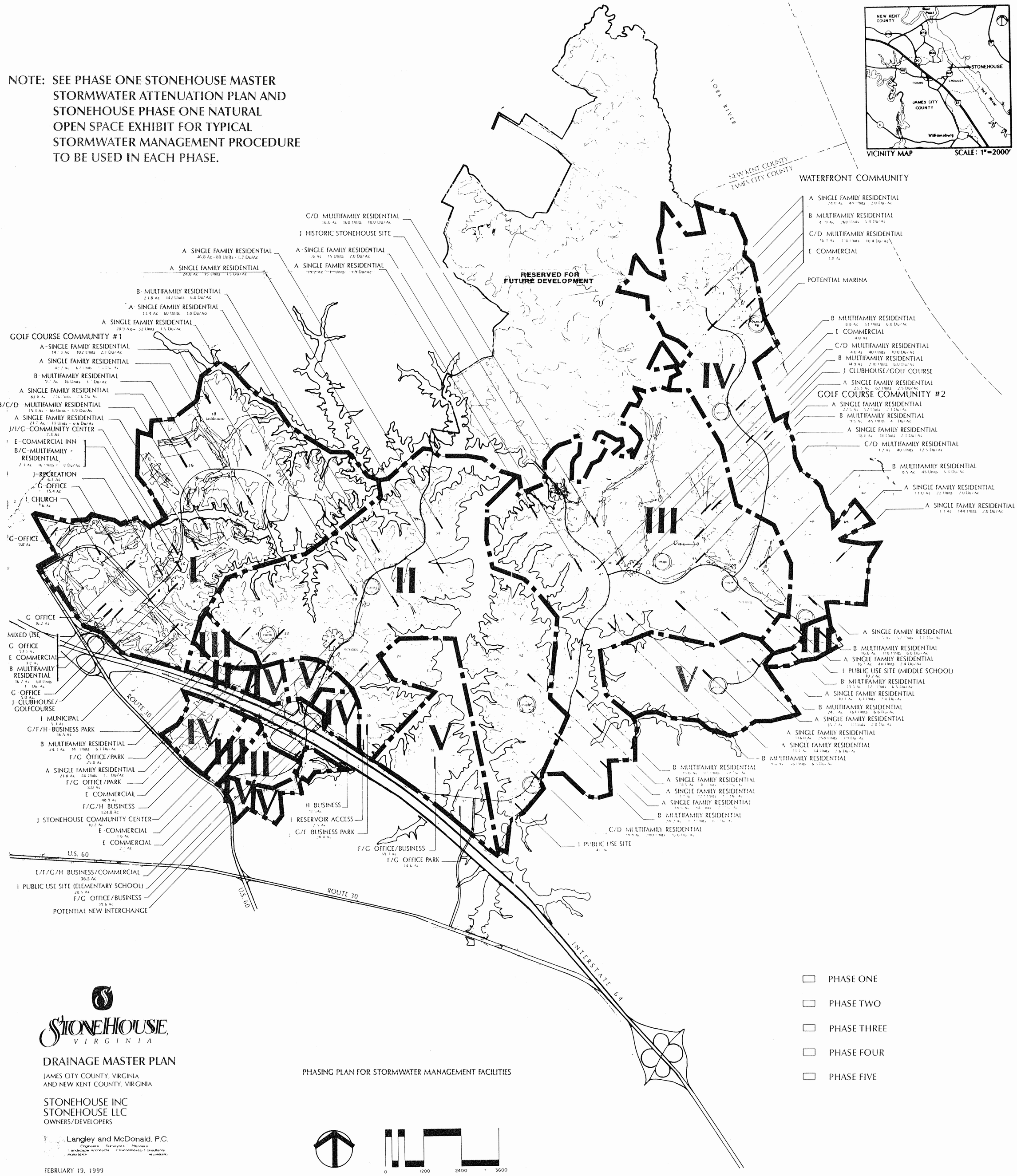
AREA TABULATIONS

UNDISTURBED NATURAL OPEN SPACE

LEGENDS GOLF	56.1 AC. (RECORDED)
STONEHOUSE LLC	±240.0 AC.
STONEHOUSE INC	±33.5 AC.

WC059_RICHARDSON_MILL_POND - 007

NOTE: SEE PHASE ONE STONEHOUSE MASTER STORMWATER ATTENUATION PLAN AND STONEHOUSE PHASE ONE NATURAL OPEN SPACE EXHIBIT FOR TYPICAL STORMWATER MANAGEMENT PROCEDURE TO BE USED IN EACH PHASE.



STONEHOUSE, VIRGINIA

DRAINAGE MASTER PLAN

JAMES CITY COUNTY, VIRGINIA
AND NEW KENT COUNTY, VIRGINIA

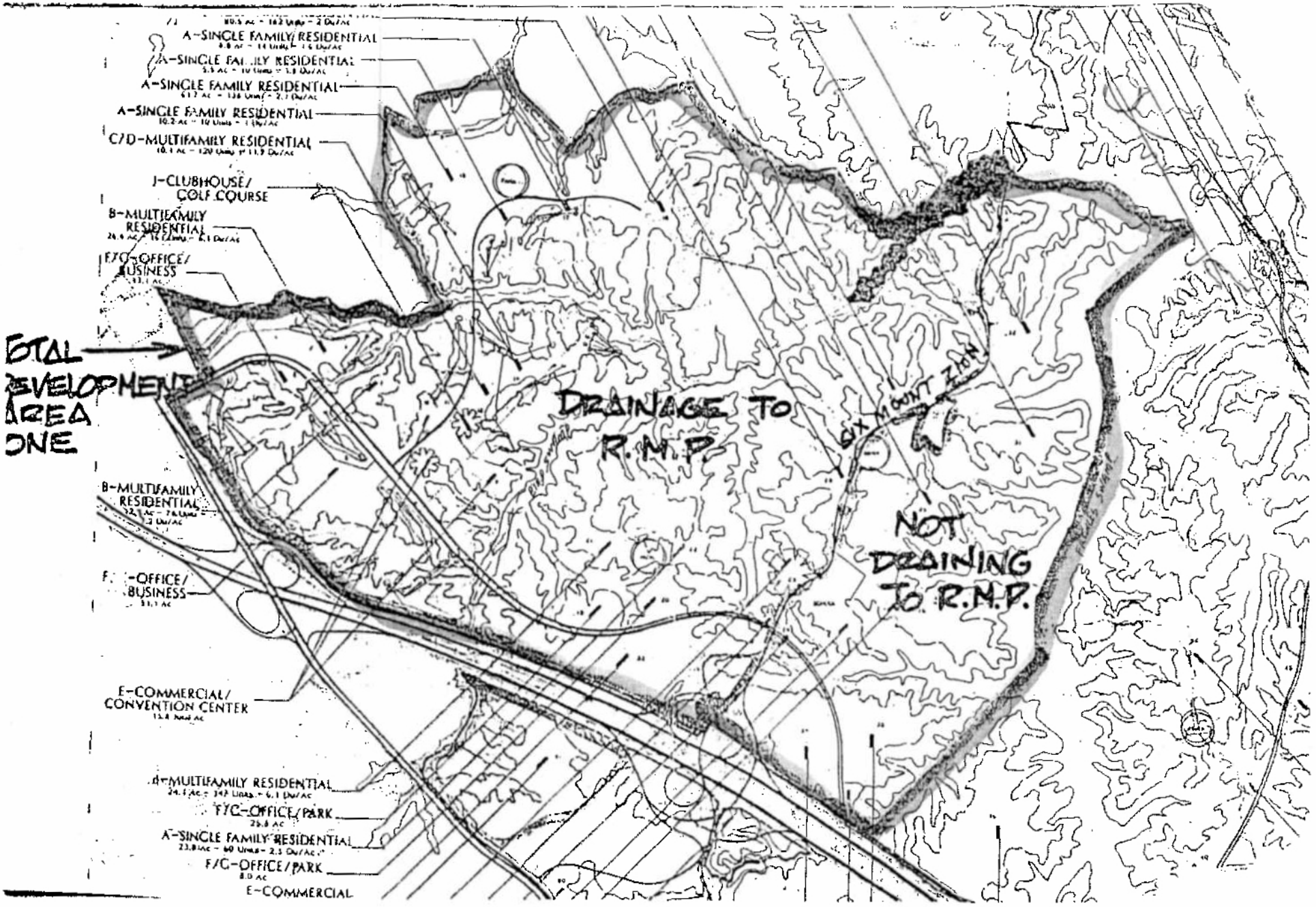
STONEHOUSE INC
STONEHOUSE LLC
OWNERS/DEVELOPERS

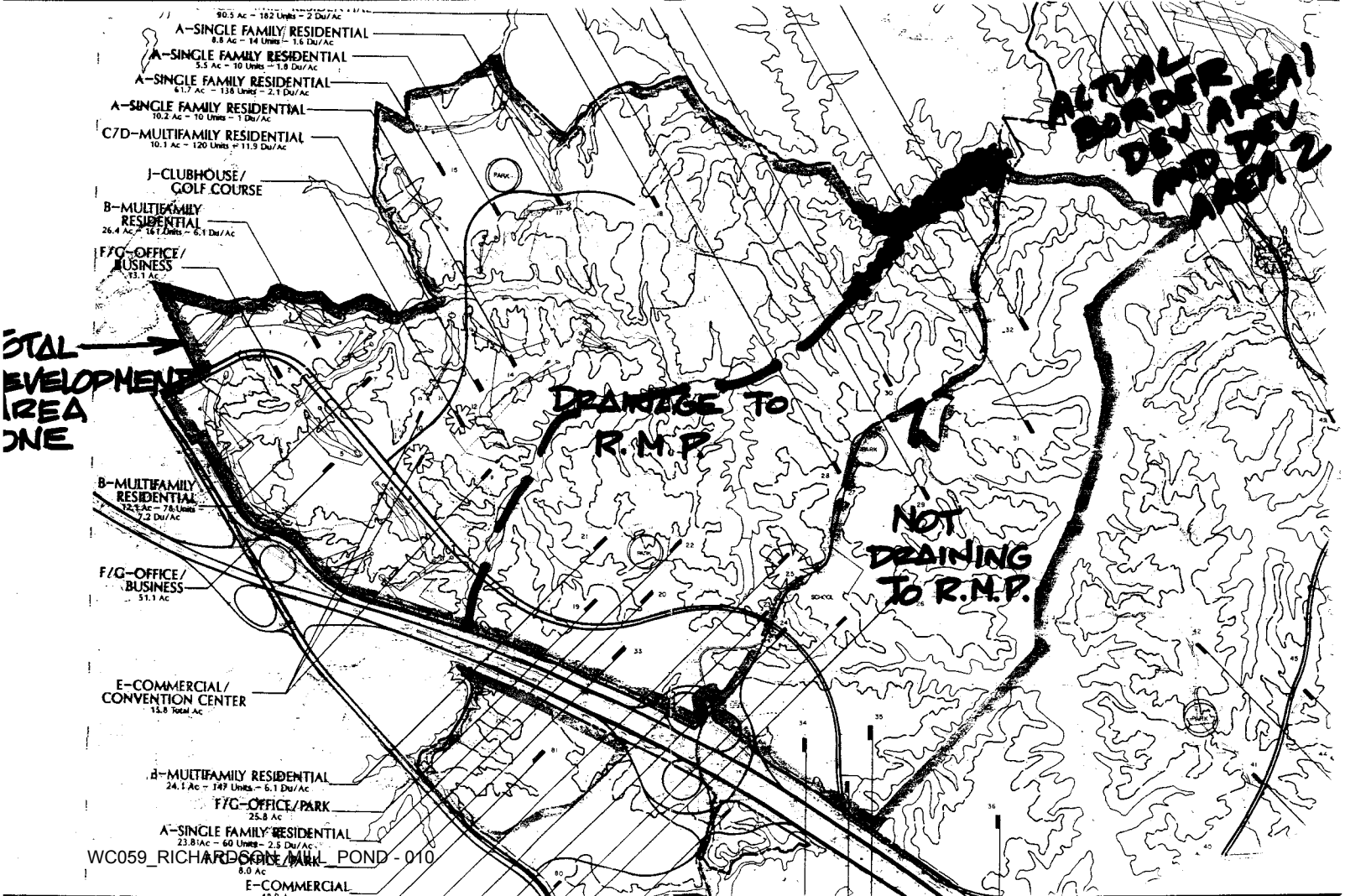
Langley and McDonald, P.C.
Engineers · Surveyors · Planners
Landscape Architects · Environmental Consultants
AURA BEACH · MELBOURNE

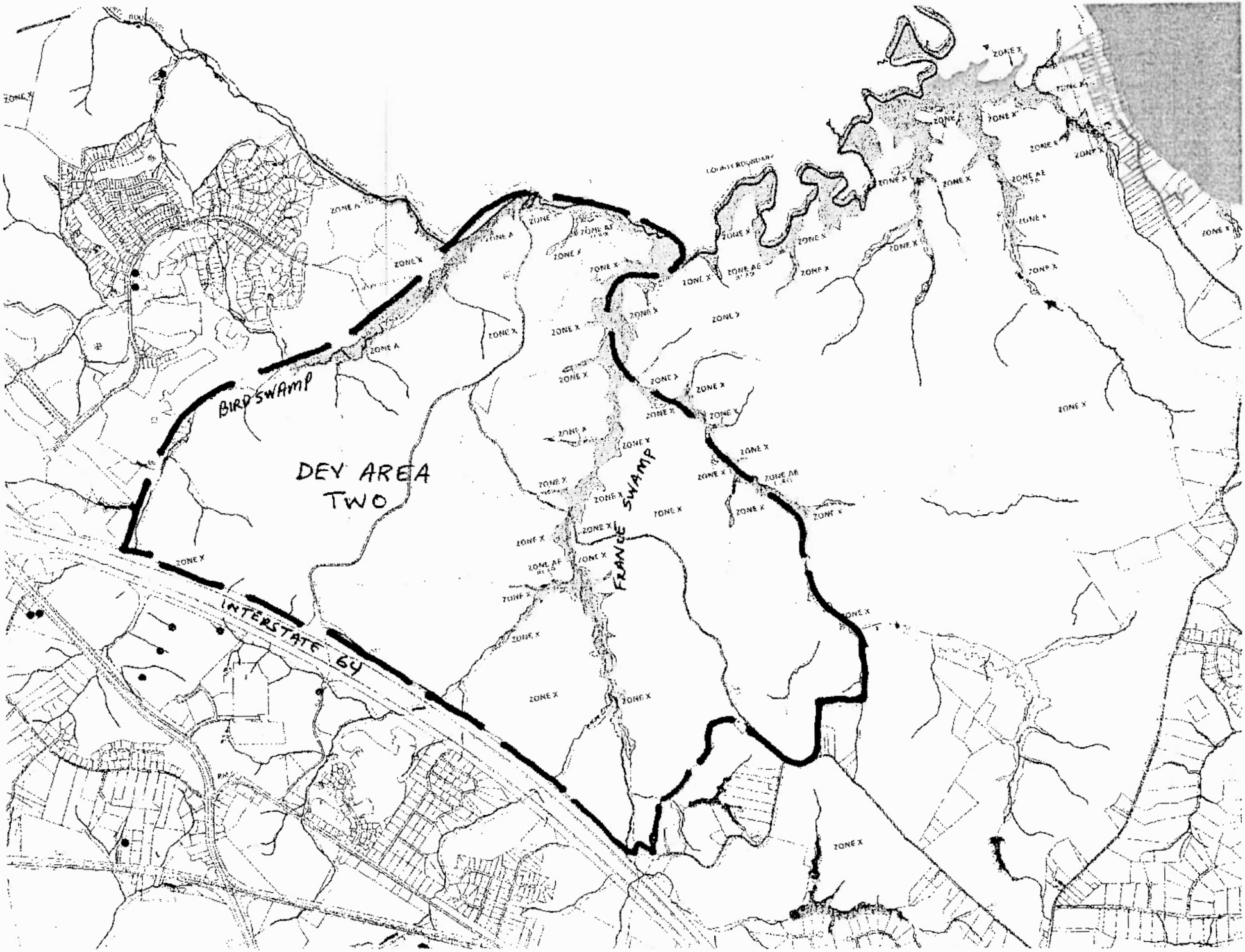
FEBRUARY 19, 1999

PHASING PLAN FOR STORMWATER MANAGEMENT FACILITIES

WC059_RICHARDSON_MILL_POND - 008

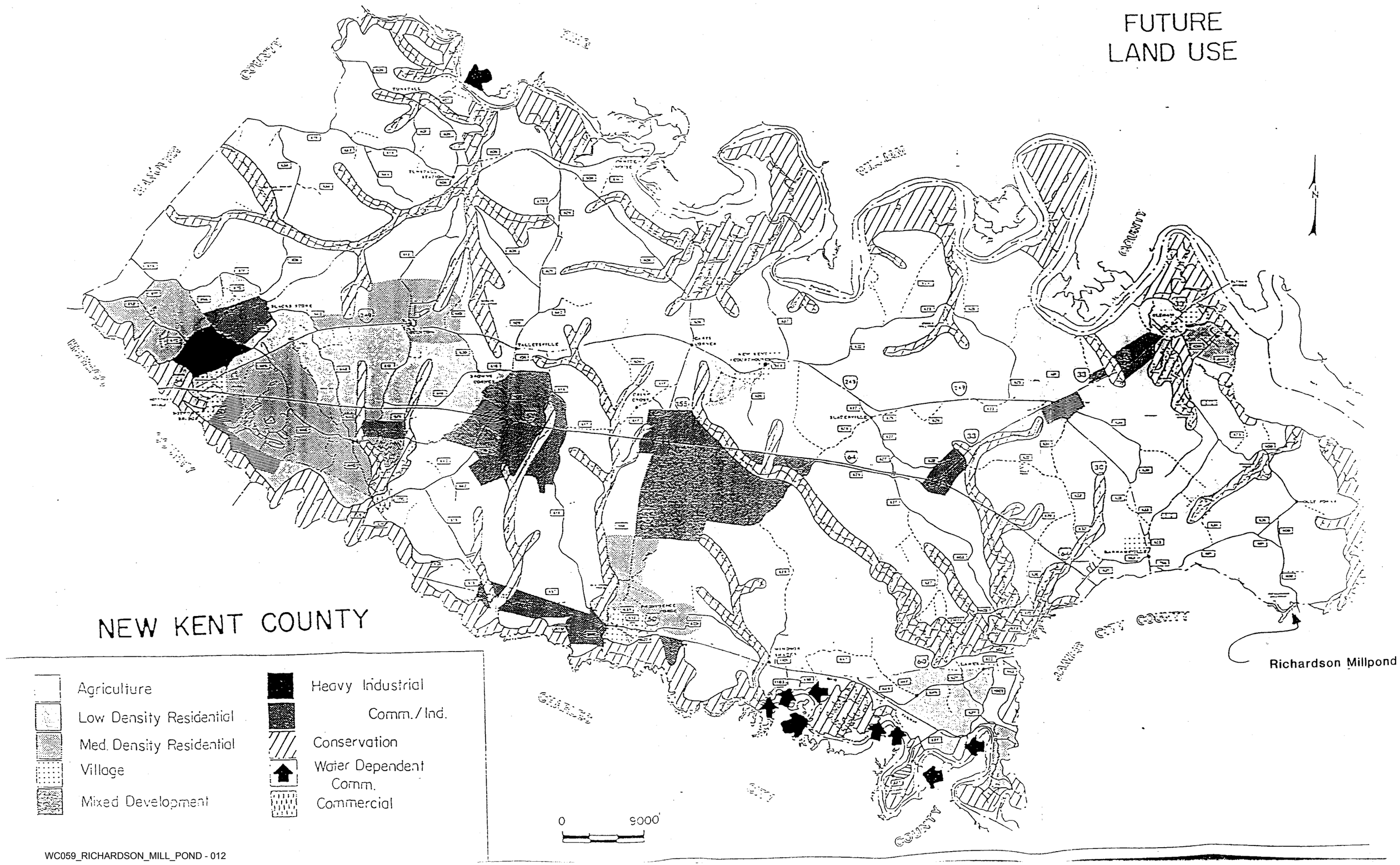

A-SINGLE FAMILY RESIDENTIAL
A-SINGLE FAMILY RESIDENTIAL
A-SINGLE FAMILY RESIDENTIAL
A-SINGLE FAMILY RESIDENTIAL
C/D-MULTIFAMILY RESIDENTIAL
J-CLUBHOUSE/ GOLF COURSE
B-MULTIFAMILY RESIDENTIAL
F/C-OFFICE/ BUSINESS
TOTAL DEVELOPMENT AREA ONE
DRAINAGE TO R.M.P.
MOUNT ZION
NOT DRAINING TO R.M.P.
B-MULTIFAMILY RESIDENTIAL
F/C-OFFICE/ BUSINESS
E-COMMERCIAL/ CONVENTION CENTER
D-MULTIFAMILY RESIDENTIAL
F/C-OFFICE/PARK
A-SINGLE FAMILY RESIDENTIAL
F/C-OFFICE/PARK
E-COMMERCIAL


90.5 Ac – 182 Units – 2 Du/Ac
A-SINGLE FAMILY RESIDENTIAL
8.8 Ac – 14 Units – 1.6 Du/Ac
A-SINGLE FAMILY RESIDENTIAL
5.5 Ac – 10 Units – 1.8 Du/Ac
A-SINGLE FAMILY RESIDENTIAL
61.7 Ac – 138 Units – 2.1 Du/Ac
A-SINGLE FAMILY RESIDENTIAL
10.2 Ac – 10 Units – 1 Du/Ac
C/D-MULTIFAMILY RESIDENTIAL
10.1 Ac – 120 Units – 11.9 Du/Ac
J-CLUBHOUSE/
GOLF COURSE
B-MULTIFAMILY
RESIDENTIAL
26.4 Ac – 161 Units – 6.1 Du/Ac
F/G-OFFICE/
BUSINESS
33.1 Ac
TOTAL
DEVELOPMENT
AREA
ONE
B-MULTIFAMILY
RESIDENTIAL
12.1 Ac – 78 Units
7.2 Du/Ac
F/G-OFFICE/
BUSINESS
51.1 Ac
E-COMMERCIAL/
CONVENTION CENTER
15.8 Total Ac
d-MULTIFAMILY RESIDENTIAL
24.1 Ac – 149 Units – 6.1 Du/Ac
F/G-OFFICE/PARK
25.8 Ac
A-SINGLE FAMILY RESIDENTIAL
23.8 Ac – 60 Units – 2.5 Du/Ac
F/G-OFFICE/PARK
8.0 Ac
E-COMMERCIAL
DRAINAGE TO
R.M.P.
NOT
DRAINING
TO R.M.P.
ACTUAL
BORDER
DEV AREA
AND DEV
AREA 2
PARK
SCHOOL


BIRD SWAMP
DEY AREA
TWO
FRANCE SWAMP
INTERSTATE 64
ZONE X
ZONE A
ZONE AE

Map 14

FUTURE LAND USE



WC059_RICHARDSON_MILL_POND - 012

RICHARDSON MILLPOND STUDY

FOR THE

STONEHOUSE DEVELOPMENT

JAMES CITY COUNTY, VIRGINIA

PREPARED FOR:

STONEHOUSE, L.L.C.

SEPTEMBER 10, 1996

WC 059

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

5544 Greenwich Road, Virginia Beach, VA 23462
(804) 473-2000 FAX: (804) 497-7933

201 Packets Court, Williamsburg, VA 23185
(804) 253-2975 FAX: (804) 229-0049

RICHARDSON MILLPOND STUDY

FOR THE

STONEHOUSE DEVELOPMENT

JAMES CITY COUNTY, VIRGINIA

PREPARED FOR:

STONEHOUSE, L.L.C.
P.O. BOX 759
TOANO, VA 23168

SEPTEMBER 10, 1996

RICHARDSON MILLPOND STUDY
EXECUTIVE SUMMARY

We have concluded the study of Richardson Millpond with respect to the water quality volume provided by the impoundment, and the hydraulic capacity of the outlet structures to convey runoff from various design storm events. As indicated in our proposal dated July 11, the following tasks have been accomplished:

Task 1 - Prepare a hydrographic map of the pond

Langley and McDonald performed a hydrographic survey of Richardson Millpond utilizing a prism pole method on an approximate 50 foot grid. The purpose of the survey was to provide underwater contour data so that the permanent pool volume of the pond could be determined. Based upon the survey, the lowest elevation in the lake is 3.3 feet, the normal pool elevation is 9.5 feet, and the permanent pool volume is 103.2 acre-feet. A copy of the survey is enclosed.

Task 2 - Determine the hydraulic capacity of the pond's outlet structures and the adequacy of the downstream channel to convey increased flows anticipated under fully developed conditions. Review the apparent structural integrity of the outlet structures utilizing a surface visual review. recent failure repaired by VDOT.

Langley and McDonald utilized the U.S. Army Corps of Engineers' HEC-1 computer program to estimate runoff hydrographs for the pond's watershed from various storm events. The 3,960-acre watershed was divided into 16 sub-areas for the analysis. Runoff from these sub-areas was calculated by the curve number method established by the Soil Conservation Service.

The model was initially run to calculate runoff from existing development conditions within the watershed. Drainage areas, curve numbers, and times of concentration for each subarea were estimated for the existing condition analysis. Utilizing the 24-hour rainfall values for James City County, runoff hydrographs for the 2-, 10-, and 100-year storm events were estimated through the use of HEC-1. Storage provided by BMP#1 at Legends and Richardson Millpond were accounted for in the model. There are numerous other storage locations throughout the watershed including off-site impoundments, and beaver dams. Within the scope of this study insufficient data is available to model the flow attenuation provided by these structures. Therefore, data from a USGS gauging station and rainfall data from the City of Williamsburg was used to calibrate the model.

The United States Geological Survey (USGS) maintained a recording station at the outfall of Richardson Millpond where stage data was collected from 1979 through 1985. Based upon the data collected, the USGS has estimated peak flowrates for various storm events, including the 2-, 10-, and 100-year storms. The maximum stage data collected during this period occurred on September 27, 1985. This data showed a maximum stage of 12.6'. Rainfall data obtained from John Kellum of the City of Williamsburg showed 1.9" of rainfall occurred from 3 PM to Midnight on September 26

and 5.92" of rainfall occurred from Midnight to 6:30 AM on September 27, 1985. This gives a total of 7.28" of rainfall in a 15.5 hour period, which exceeds the 100-year, 24 hour storm event. This data was used to calibrate the results of the HEC-1 model. Adjustments were made to the input data of our existing condition model to produce peak pond elevations of similar magnitude as recorded by USGS. Without changing the drainage area and curve number for the sub-areas, our estimates for the times of concentration of the sub-areas were increased to produce results similar to those of the USGS. We realize that the times of concentration used in the model appear unrealistic. However, by accepting the results of the USGS as "real-world", our goal was to match the results of our existing condition model with those of the USGS. We are assuming that, by adjusting the times of concentration in the model, we are accounting for the storage that actually occurs within the watershed during a storm event but is not represented explicitly in the model.

Following our validation of the existing condition model with the USGS data, the watershed was modeled under future development conditions. An impervious rate of 25% was assumed for each sub-basin within the watershed. Curve numbers within the model were changed to reflect future development, and future runoff hydrographs were computed. Peak flowrates and lake elevations resulting from the existing and future condition models are as follows:

RICHARDSON MILLPOND					
		EXISTING DEVELOPMENT		FUTURE DEVELOPMENT	
STORM EVENT	USGS PEAK FLOW (cfs)	HEC-1 PEAK FLOW (cfs)	HEC-1 PEAK ELEV. (ft)	HEC-1 PEAK FLOW (cfs)	HEC-1 PEAK ELEV. (ft)
2-YR	49 57	113	10.7	179	11.1
10-YR	108 131	288	11.6	390	12.0
25-YR	153 178	401	12.1	519	12.5
100-YR	249 259	588	12.8	722	13.2

$\chi^2 = .50$

The elevation of the roadway at the low point along the dam is 14.6'. Therefore, overtopping of the roadway is not expected to occur during the 100-year storm under future development conditions. Based upon the results of this analysis, we consider the outlet structure of Richardson Millpond to be adequate to convey runoff from future development within the watershed.

Cross-sections of the downstream channel were field surveyed to estimate hydraulic capacity and channel adequacy based on Virginia Erosion and Sediment Control Regulations. The location of the sections and copies of the cross sections are included in the report as well as water depth and velocity calculations.

Based upon these results, we would request that James City County not require any additional on-site flow attenuation measures for development areas within Stonehouse that discharge to an adequate channel. We acknowledge that hydraulic capacity and channel characteristics as they relate to erosion and sedimentation may require attenuation and/or channel stability improvements on a case by case basis within the watershed.

Task 3 - Determination of CBPA compliance

Previous calculations have indicated that an 8-point BMP serving this watershed would satisfy the Chesapeake Bay Preservation Act (CBPA) regulations for Stonehouse development within the Richardson Millpond watershed. A wet pond with a permanent pool volume of 2.5 times the volume produced by the mean storm (2.5 V_r) is equivalent to an 8-point BMP. The 2.5 V_r volume for the 3,960-acre watershed draining to Richardson Millpond at an impervious rate of 25% is 102.1 acre-feet. The 103.2 acre-feet actually provided by Richardson Millpond exceeds the 2.5 V_r wet pond volume requirement. Therefore, no additional BMP's should be required for CBPA compliance for those areas draining to the pond.

The impervious rate used in the BMP calculations (25%) was estimated on the high side to provide a conservative appraisal. Based upon the master plan for Stonehouse, we do not anticipate exceeding a composite rate of 20 percent impervious for areas within Stonehouse draining to Richardson Millpond (approximately 1,750 acres). The 25% impervious rate is also considered conservative for those areas outside of Stonehouse draining to the pond.

Geotechnical Engineering Study

Schnabel Engineering has completed their evaluation of the condition of the existing earth dam and spillways, and a copy of their report is enclosed as Appendix B. As indicated in their executive summary, their evaluation indicates that the existing dam is in relatively good condition, and the embankment is considered stable. However, seepage was encountered beneath and around both spillway structures, causing the development of voids beneath the spillway slabs. Several immediate actions are recommended to address this situation, including filling of existing voids, sealing seepage paths, and installation of drainage filters and erosion protection at the spillways. In addition, they recommend select tree removal, caulking of cracks and joints, and the implementation of an inspection program.

Other actions anticipated to be necessary in the future are also included in the report. These actions include additional tree removal, periodic repair of the slope, upstream erosion protection, and modification and/or replacement of the spillway walls.

We recommend that the immediate actions identified by Schnabel Engineering be implemented as soon as possible. The hydraulic capacity study and CBPA compliance evaluation should be forwarded to James City County for their approval. Following your authorization, we will forward this information to the County for their review.

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Appendices:

A: Hydrographic Map
B: Geotechnical Engineering Study by Schnable Engineering Associates

RICHARDSON MILL POND STUDY
SUMMARY OF RESULTS

Hydrographic Survey of Richardson Mill Pond

Langley and McDonald performed a hydrographic survey of Richardson Mill Pond utilizing a prism pole method on an approximate 50 foot grid. The purpose of the survey was to provide underwater contour data so that the permanent pool volume of the pond could be determined. Based upon the survey, the lowest elevation in the lake is 3.3 feet, the normal pool elevation is 9.5 feet, and the permanent pool volume is 103.2 acre-feet.

Determine the hydraulic capacity of the pond's outlet structures and the adequacy of the downstream channel to convey increased flows anticipated under fully developed conditions.

Langley and McDonald utilized the U.S. Army Corps of Engineers' HEC-1 computer program to estimate runoff hydrographs for the pond's watershed from various storm events. The 3,960-acre watershed was divided into 16 sub-areas for the analysis. Runoff from these sub-areas was calculated by the curve number method established by the Soil Conservation Service.

The model was initially run to calculate runoff from existing development conditions within the watershed. Drainage areas, curve numbers, and times of concentration for each subarea were estimated for the existing condition analysis. Utilizing the 24-hour rainfall values for James City County, runoff hydrographs for the 2-, 10-, 25-, and 100-year storm events were estimated through the use of HEC-1. Storage provided by BMP#1 at Legends and Richardson Mill Pond were accounted for in the model. Although there are other potential storage locations throughout the watershed (off-site impoundments, beaver dams, etc.), inadequate data is available to model the flow attenuation provided by these structures.

The United States Geological Survey (USGS) maintained a recording station at the outfall of Richardson Mill Pond where they collected stage data from 1979 through 1985. The maximum stage data collected during this period was used to calibrate the results of the HEC-1 model. Adjustments were made to the input data of our existing condition model to produce peak pond elevations of similar magnitude as recorded by USGS. Without changing the drainage area and curve number for the sub-areas, our estimates for the times of concentration of the sub-areas had to be substantially increased to produce results similar to those of the USGS. We realize that the times of concentration used in the model appear unrealistic. However, by accepting the results of the USGS as "real-world", our goal was to match the results of our existing condition model with those of the USGS. We are assuming that, by adjusting the times of concentration in the model, we are accounting for the storage that actually occurs within the watershed during a storm event but is not represented explicitly in the model.

Following our validation of the existing condition model with the USGS data, the watershed was modelled under future development conditions. An impervious rate of 25% was assumed for each sub-basin within the watershed. Curve numbers within the model were changed to reflect future development, and runoff hydrographs were recomputed. Peak flowrates and lake elevations resulting from the existing and future condition models are as follows:

RICHARDSON MILL POND					
		EXISTING DEVELOPMENT		FUTURE DEVELOPMENT	
STORM EVENT	USGS PEAK FLOW (cfs)	HEC-1 PEAK FLOW (cfs)	HEC-1 PEAK ELEV. (ft)	HEC-1 PEAK FLOW (cfs)	HEC-1 PEAK ELEV. (ft)
2-YR	49	113	10.7	179	11.1
10-YR	108	288	11.6	390	12.0
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100-YR	249	588	12.8	722	13.2

The elevation of the roadway at the low point along the dam is 14.6'. Therefore, overtopping of the roadway is not expected to occur during the 100-year storm under future development conditions. Based upon the results of this analysis, we consider the outlet structure of Richardson Mill Pond to be adequate to convey runoff from future development within the watershed.

Cross-sections of the downstream channel were field surveyed to estimate hydraulic capacity. No significant increases in velocity are anticipated in the downstream channel under the post-development flows.

CBPA COMPLIANCE

Previous calculations have indicated that an 8-point BMP serving this watershed would satisfy the Chesapeake Bay Preservation Act (CBPA) regulations for Stonehouse development within the Richardson Mill Pond watershed. A wet pond with a permanent pool volume of 2.5 times the volume produced by the mean storm (2.5 V_r) is equivalent to an 8-point BMP. The 2.5 V_r volume for the 3,960-acre watershed draining to Richardson Mill Pond at an impervious rate of 25% is 102.1 acre-feet. The 103.2 acre-feet actually provided by Richardson Mill Pond exceeds the 2.5 V_r wet pond volume requirement. Therefore, no additional BMP's should be required for CBPA compliance for those areas draining to the pond.

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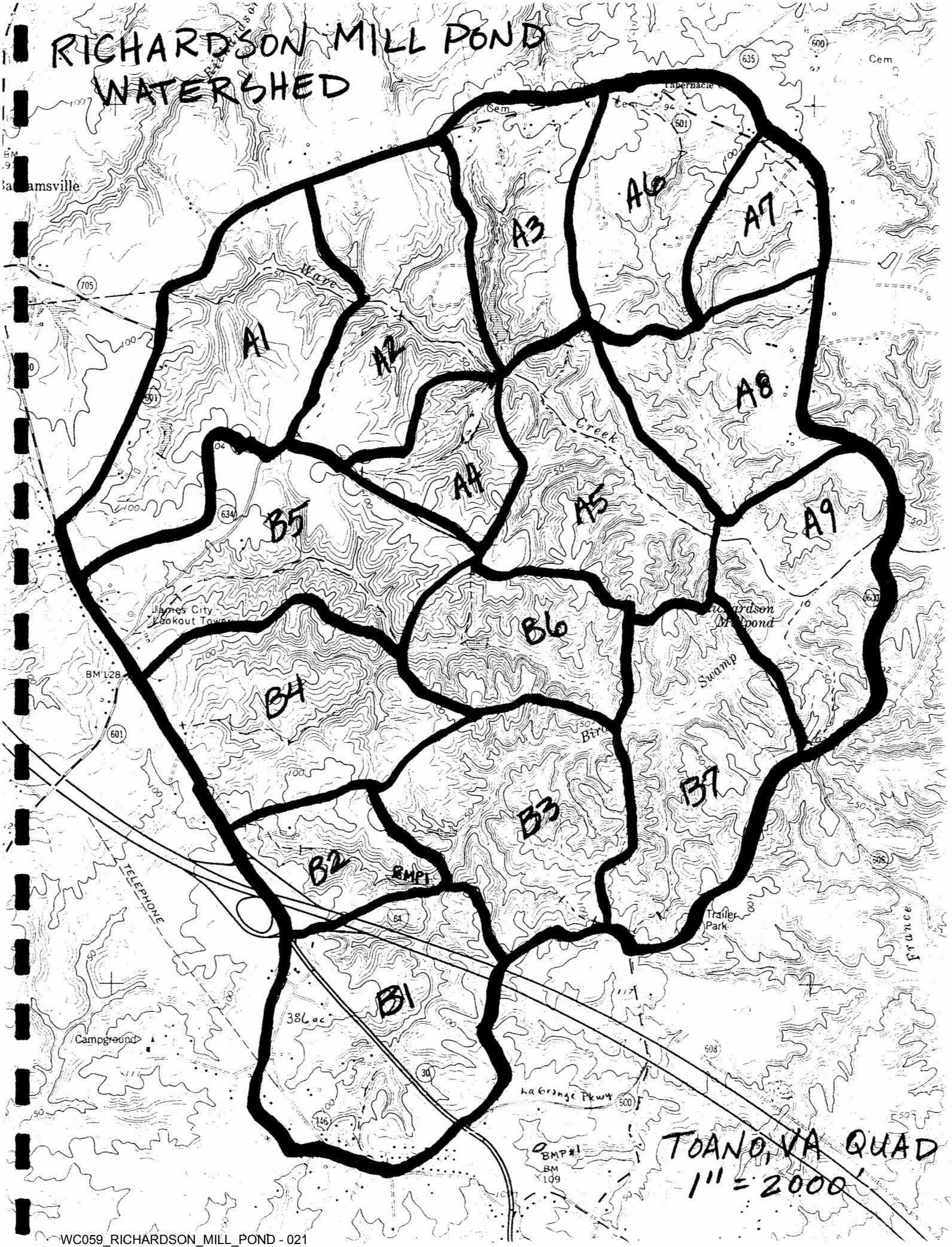
RICHARDSON MILL POND
WATERSHED
A1
A2
A3
A4
A5
A6
A7
A8
A9
B1
B2
B3
B4
B5
B6
B7
BMP1
BMP#1
Tabernacle
Cem
Warr
Creek
Swamp
James City
Lookout Tower
BM 128
Richardson
Millpond
Trailer
Park
France
TELEPHONE
Campground
386 ac
La Grange Pkwy
BM
109
TOANO, VA QUAD
1" = 2000'

Langley and McDonald, P.C.
ENGINEERS • SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS • ENVIRONMENTAL CONSULTANTS
VIRGINIA BEACH • WILLIAMSBURG, VIRGINIA

Subject RICHARDSON MILL POND

Computed By DBT Checked By

Project No. 96038-0445
Client STONEHOUSE
Date 9/12/96 Sheet No.

WATER QUALITY VOLUME FOR CHES. BAY COMPLIANCE

WATERSHED AREA TO RICHARDSON MILLPOND = 3,960 AC

MAXIMUM FUTURE % IMP = 25

$R_V = .05 + .009(25) = 0.275$

$V_R = \frac{0.45''}{12} \times 0.275 \times 3960 \text{ AC} = 40.8 \text{ AC-FT}$

8-FT BMP $\rightarrow 2.5\ V_R = 102.1$ AC-FT

VOLUME PROVIDED UNDER CURRENT CONDITION = 103.2 AC-FT

103.2 AC-FT > 102.1 AC-FT O.K.

POND-2 Version: 5.17
S/N:

RICHARDSON MILL POND
DATA FROM HYDROGRAPHIC SURVEY
L&M JOB 96038-0445

CALCULATED 09-12-1996 16:50:38
DISK FILE: c:\jobs\millpond\RMP-EX .VOL

Planimeter scale: 1 inch = 208.71 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
3.29	0.00	0.00	0.00	0.00	0.00
4.00	2.25	2.25	2.25	0.53	0.53
5.00	9.57	9.57	16.46	5.49	6.02
6.00	14.35	14.35	35.64	11.88	17.90
7.00	20.75	20.75	52.36	17.45	35.35
8.00	26.59	26.59	70.83	23.61	58.96
9.00	28.87	28.87	83.17	27.72	86.68
9.52	34.79	34.79	95.35	16.53	103.21

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Langley and McDonald, P.C.
ENGINEERS • SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS • ENVIRONMENTAL CONSULTANTS
VIRGINIA BEACH • WILLIAMSBURG, VIRGINIA

Subject RICHARDSON MILL POND

Computed By DBT Checked By _____

Project No. 96038-0445
Client STONEHOUSE
Date 9/12/96 Sheet No. _____

HEC-1 Model - DIVIDE THE WATERSHED INTO 16 SUB-AREAS FOR HYDROGRAPH COMPUTATION.

SUB AREA	CN EXIST.	CN FUTURE	DRAINAGE AREA (AC)
A1	68	76	320.3
A2	70	76	281.1
A3	65	69	193.8
A4	67	75	113.5
A5	64	76	280.3
A6	58	65	237.9
A7	59	69	118.3
A8	61	71	226.4
A9	63	75	237.6
B1	70	77	386.0
B2	77	78	118.5
B3	69	79	292.1
B4	68	78	306.3
B5	67	74	344.6
B6	70	80	187.9
B7	69	79	315.0
TOTAL			3959.6

LAND USE	SOIL TYPE A	B	C	D
WOODS	30	55	70	77
CROPLAND	67	78	85	89
DEVELOPMENT (25% IMP)	54	70	80	85

* FUTURE CONDITIONS → 25% IMP.

TELEPHONE CONVERSATION RECORD

Langley and McDonald

Date _____ Time _____ Project Name _____

Company _____ Project No. _____

Person _____ Phone No. _____ Route to: 1_____ 2_____ 3_____ File _____

AREA	A SOILS	B SOILS	C SOILS	D SOILS	TOTAL ACREAGE
A-1	14.52 AC	105.76 AC	184.04 AC	15.96 AC	320.28 AC
A-2	1.52 AC	140.96 AC	89.72 AC	49.92 AC	281.12 AC
A-3	32.80 AC	143.12 AC	5.16 AC	12.72 AC	193.80 AC
A-4	4.56 AC	41.96 AC	64.64 AC	2.36 AC	113.52 AC
A-5	8.04 AC	97.08 AC	155.40 AC	19.80 AC	280.32 AC
A-6	83.44 AC	151.84 AC	1.24 AC	1.36 AC	237.88 AC
A-7	6.60 AC	108.60 AC	3.08 AC	-0-	118.28 AC
A-8	-0-	211.00 AC	15.36 AC	-0-	226.36 AC
A-9	3.08	115.20 AC	89.72 AC	29.60 AC	237.60 AC
"A" TOTALS	154.56 AC	1,115.52 AC	608.36 AC	130.72 AC	2,009.16 AC
B-1	3.46 AC	124.00 AC	235.56 AC	22.48 AC	386.00 AC
B-2	-0-	36.52 AC	55.36 AC	26.64 AC	118.52 AC
B-3	-0-	31.08 AC	239.80 AC	21.20 AC	292.08 AC
B-4	1.60 AC	76.48 AC	218.16 AC	10.04 AC	306.28 AC
B-5	19.80 AC	148.84 AC	162.92 AC	13.00 AC	344.56 AC
B-6	-0-	13.08 AC	156.00 AC	18.80 AC	187.88 AC
B-7	1.36 AC	31.00 AC	255.52 AC	27.08 AC	314.96 AC
"B" TOTALS	26.72 AC	461.00 AC	1,323.32 AC	139.24 AC	1,950.28 AC
GRAND TOTALS	181.28 AC	1,576.52 AC	1,931.68 AC	269.96 AC	3,959.44 AC

If any of the above is incorrect or fails to accurately record our conversation, please contact me.

By: WC059_RICHARDSON_MILL_POND - 025

Langley and McDonald, P.C.
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LANDSCAPE ARCHITECTS • ENVIRONMENTAL CONSULTANTS
VIRGINIA BEACH • WILLIAMSBURG, VIRGINIA

Subject RICHARDSON MILL POND

Computed By DBT Checked By

Project No. 96038-0445
Client STONEHOUSE
Date 9/12/96 Sheet No.

RICHARDSON MILL POND

ELEV	SURFACE AREA
9.52 (NORMAL POOL)	34.79 AC
15.0	81.18 AC
20.0	133.05 AC

STAGE-DISCHARGE → SEE OUTPUT FOR EACH SPILLWAY

ELEV	NORTH S'WAY	SOUTH S'WAY	TOTAL CFS
9.52	0	0	0
10.0	24	6	30
10.5	50	36	86
11.0	90	77	167
11.5	139	133	272
12.0	191	197	388
12.5	250	270	520
13.0	309	350	659
13.5	371	426	797
14.0	432	500	932
14.5	489	566	1055

NORTH SPILLWAY

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CURRENT DATE: 09-12-1996                                  FILE DATE: 09-12-1996
CURRENT TIME: 15:47:28                                    FILE NAME: RMP-N

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DDDDDDDDDDDDDDDDDDDDDDDDDDD   FHWA CULVERT ANALYSIS    DDDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDD     HY-8, VERSION 4.3      DDDDDDDDDDDDDDDDDDDDDDDDDDD
ZDDDBDDDDDDDDDDDDDDDDDDDDDDDDDDDDBDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3 C 3          SITE DATA       3          CULVERT SHAPE, MATERIAL, INLET      3
3 U CDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD4
3 L 3  INLET   OUTLET  CULVERT 3 BARRELS                                      3
3 V 3  ELEV.    ELEV.  LENGTH  3 SHAPE       SPAN   RISE  MANNING   INLET     3
3   3  (FT)     (FT)    (FT)   3 MATERIAL    (FT)   (FT)    n      TYPE       3
3 1 3   9.52     8.63   15.06  3 2 RCB       7.65   4.20   .013   CONVENTIONAL3
3 2 3                          3                                              3
3 3 3                          3                                              3
3 4 3                          3                                              3
3 5 3                          3                                              3
3 6 3                          3                                              3
@DDDADDDDDDDDDDDDDDDDDDDDDDDDDDDDADDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY

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SUMMARY OF CULVERT FLOWS (CFS)          FILE: RMP-N              DATE: 09-12-1996
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ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
9.52	0	0	0	0	0	0	0	0	1
10.53	50	50	0	0	0	0	0	0	1
11.12	100	100	0	0	0	0	0	0	1
11.61	150	150	0	0	0	0	0	0	1
12.09	200	200	0	0	0	0	0	0	1
12.52	250	250	0	0	0	0	0	0	1
12.93	300	300	0	0	0	0	0	0	1
13.33	350	350	0	0	0	0	0	0	1
13.74	400	400	0	0	0	0	0	0	1
14.15	450	450	0	0	0	0	0	0	1
14.60	500	500	0	0	0	0	0	0	1
14.61	501	501	0	0	0	0	0	OVERTOPPING	

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DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
  SUMMARY OF ITERATIVE SOLUTION ERRORS   FILE: RMP-N          DATE: 09-12-1996
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HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
9.52	0.00	0	0	0.00
10.53	0.00	50	0	0.00
11.12	0.00	100	0	0.00
11.61	0.00	150	0	0.00
12.09	0.00	200	0	0.00
12.52	0.00	250	0	0.00
12.93	0.00	300	0	0.00
13.33	0.00	350	0	0.00
13.74	0.00	400	0	0.00
14.15	0.00	450	0	0.00
14.60	0.00	500	0	0.00

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  <1> TOLERANCE (FT) = 0.010                    <2> TOLERANCE (%) = 1.000
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
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CURRENT DATE: 09-12-1996 FILE DATE: 09-12-1996
CURRENT TIME: 15:47:28 FILE NAME: RMP-N

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (7.65 BY 4.2) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	9.52	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	-6.63
50	10.53	1.01	1.01	1-S2n	0.22	0.69	9.21	0.35	3.50	-5.94
100	11.12	1.60	1.60	1-S2n	0.43	1.10	10.57	0.62	4.54	-5.58
150	11.61	2.09	2.09	1-S2n	0.55	1.44	11.45	0.86	5.27	-5.30
200	12.09	2.57	2.57	1-S2n	0.66	1.75	12.14	1.08	5.84	-5.04
250	12.52	3.00	3.00	1-S2n	0.77	2.03	12.71	1.29	6.32	-4.82
300	12.93	3.41	3.41	1-S2n	0.88	2.29	13.21	1.48	6.74	-4.61
350	13.33	3.81	3.81	1-S2n	0.96	2.54	13.64	1.66	7.10	-4.41
400	13.74	4.22	4.22	5-S2n	1.05	2.77	14.05	1.86	7.43	-4.23
450	14.15	4.63	4.63	5-S2n	1.14	3.00	14.41	2.04	7.74	-4.05
500	14.60	5.08	5.08	5-S2n	1.23	3.22	14.75	2.22	8.01	-3.89

El. inlet face invert 9.52 ft El. outlet invert 8.63 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	9.52
OUTLET STATION (FT)	15.03
OUTLET ELEVATION (FT)	8.63
NUMBER OF BARRELS	2
SLOPE (V-FT/H-FT)	0.0592
CULVERT LENGTH ALONG SLOPE (FT)	15.06

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	7.65 FT
BARREL RISE	4.20 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.013
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

CURRENT DATE: 09-12-1996
CURRENT TIME: 15:47:28

FILE DATE: 09-12-1996
FILE NAME: RMP-N

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DDDDDDDDDDDDDDDDDDDDDDDDD TAILWATER DDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

******* REGULAR CHANNEL CROSS SECTION ****************

BOTTOM WIDTH (FT)	20.00
SIDE SLOPE H/V (X:1)	1.0
CHANNEL SLOPE V/H (FT/FT)	0.020
MANNING'S N (.01-0.1)	0.045
CHANNEL INVERT ELEVATION (FT)	2.00
CULVERT NO.1 OUTLET INVERT ELEVATION	8.63 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	DEPTH (FT)	VEL. (FPS)	SHEAR (PSF)
0.00	2.00	0.000	0.00	0.00	0.00
50.00	2.69	0.744	0.69	3.50	0.86
100.00	3.05	0.782	1.05	4.54	1.31
150.00	3.33	0.803	1.33	5.27	1.67
200.00	3.59	0.817	1.59	5.84	1.98
250.00	3.81	0.827	1.81	6.32	2.26
300.00	4.02	0.835	2.02	6.74	2.52
350.00	4.22	0.841	2.22	7.10	2.77
400.00	4.40	0.845	2.40	7.43	3.00
450.00	4.58	0.849	2.58	7.74	3.22
500.00	4.74	0.853	2.74	8.01	3.42

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DDDDDDDDDDDDDDDDDDDDDDDDD ROADWAY OVERTOPPING DATA DDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	317.00
CREST LENGTH (FT)	317.00
OVERTOPPING CREST ELEVATION (FT)	14.61

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CURRENT DATE: 09-12-1996 FILE DATE: 09-12-1996
CURRENT TIME: 15:51:41 FILE NAME: RMP-S

SOUTH SPILLWAY

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DDDDDDDDDDDDDDDDDDDDDDDDDD   FHWA CULVERT ANALYSIS    DDDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDD    HY-8, VERSION 4.3       DDDDDDDDDDDDDDDDDDDDDDDDDD
ZDDDBDDDDDDDDDDDDDDDDDDDDDDDDDDDBDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD?
3 C 3          SITE DATA        3          CULVERT SHAPE, MATERIAL, INLET     3
3 U CDDDDDDDDDDDDDDDDDDDDDDDDDDDEDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD4
3 L 3  INLET   OUTLET  CULVERT  3 BARRELS                                     3
3 V 3  ELEV.   ELEV.   LENGTH   3 SHAPE        SPAN   RISE  MANNING   INLET   3
3   3  (FT)    (FT)     (FT)    3 MATERIAL     (FT)   (FT)     n      TYPE    3
3 1 3  9.90    9.66    16.90    3 2 RCB       10.75   3.40   .013  CONVENTIONAL3
3 2 3                           3                                             3
3 3 3                           3                                             3
3 4 3                           3                                             3
3 5 3                           3                                             3
3 6 3                           3                                             3
@DDDADDDDDDDDDDDDDDDDDDDDDDDDDDDADDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDY
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SUMMARY OF CULVERT FLOWS (CFS) FILE: RMP-S DATE: 09-12-1996

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
9.90	0	0	0	0	0	0	0	0	1
10.74	50	50	0	0	0	0	0	0	1
11.23	100	100	0	0	0	0	0	0	1
11.64	150	150	0	0	0	0	0	0	1
12.02	200	200	0	0	0	0	0	0	1
12.37	250	250	0	0	0	0	0	0	1
12.69	300	300	0	0	0	0	0	0	1
13.01	350	350	0	0	0	0	0	0	1
13.33	400	400	0	0	0	0	0	0	1
13.66	450	450	0	0	0	0	0	0	1
14.00	500	500	0	0	0	0	0	0	1
14.61	580	580	0	0	0	0	0	OVERTOPPING	

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SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: RMP-S DATE: 09-12-1996

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
9.90	0.00	0	0	0.00
10.74	0.00	50	0	0.00
11.23	0.00	100	0	0.00
11.64	0.00	150	0	0.00
12.02	0.00	200	0	0.00
12.37	0.00	250	0	0.00
12.69	0.00	300	0	0.00
13.01	0.00	350	0	0.00
13.33	0.00	400	0	0.00
13.66	0.00	450	0	0.00
14.00	0.00	500	0	0.00

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<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

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CURRENT DATE: 09-12-1996 FILE DATE: 09-12-1996
CURRENT TIME: 15:51:41 FILE NAME: RMP-S

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (10.75 BY 3.4) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	9.90	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	-7.66
50	10.74	0.84	0.84	1-S2n	0.35	0.55	5.92	0.39	3.50	-6.97
100	11.23	1.33	1.33	1-S2n	0.53	0.88	7.19	0.65	4.54	-6.61
150	11.64	1.74	1.74	1-S2n	0.70	1.15	8.01	0.87	5.27	-6.33
200	12.02	2.12	2.12	1-S2n	0.83	1.39	8.65	1.07	5.84	-6.07
250	12.37	2.47	2.47	1-S2n	0.97	1.62	9.18	1.27	6.32	-5.85
300	12.69	2.79	2.79	1-S2n	1.09	1.83	9.64	1.45	6.74	-5.64
350	13.01	3.11	3.11	1-S2n	1.20	2.02	10.06	1.62	7.10	-5.44
400	13.33	3.43	3.43	5-S2n	1.31	2.21	10.43	1.78	7.43	-5.26
450	13.66	3.76	3.76	5-S2n	1.42	2.39	10.77	1.94	7.74	-5.08
500	14.00	4.10	4.10	5-S2n	1.52	2.57	11.08	2.10	8.01	-4.92

El. inlet face invert 9.90 ft El. outlet invert 9.66 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	9.90
OUTLET STATION (FT)	16.90
OUTLET ELEVATION (FT)	9.66
NUMBER OF BARRELS	2
SLOPE (V-FT/H-FT)	0.0142
CULVERT LENGTH ALONG SLOPE (FT)	16.90

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	10.75 FT
BARREL RISE	3.40 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.013
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

CURRENT DATE: 09-12-1996 FILE DATE: 09-12-1996
CURRENT TIME: 15:51:41 FILE NAME: RMP-S

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DDDDDDDDDDDDDDDDDDDDDDDDD TAILWATER DDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

******* REGULAR CHANNEL CROSS SECTION ****************

BOTTOM WIDTH (FT)	20.00
SIDE SLOPE H/V (X:1)	1.0
CHANNEL SLOPE V/H (FT/FT)	0.020
MANNING'S N (.01-0.1)	0.045
CHANNEL INVERT ELEVATION (FT)	2.00
CULVERT NO.1 OUTLET INVERT ELEVATION	9.66 FT

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	DEPTH (FT)	VEL. (FPS)	SHEAR (PSF)
0.00	2.00	0.000	0.00	0.00	0.00
50.00	2.69	0.744	0.69	3.50	0.86
100.00	3.05	0.782	1.05	4.54	1.31
150.00	3.33	0.803	1.33	5.27	1.67
200.00	3.59	0.817	1.59	5.84	1.98
250.00	3.81	0.827	1.81	6.32	2.26
300.00	4.02	0.835	2.02	6.74	2.52
350.00	4.22	0.841	2.22	7.10	2.77
400.00	4.40	0.845	2.40	7.43	3.00
450.00	4.58	0.849	2.58	7.74	3.22
500.00	4.74	0.853	2.74	8.01	3.42

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DDDDDDDDDDDDDDDDDDDDDDDDD ROADWAY OVERTOPPING DATA DDDDDDDDDDDDDDDDDDDDDDDDD
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	317.00
CREST LENGTH (FT)	317.00
OVERTOPPING CREST ELEVATION (FT)	14.61

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Langley and McDonald, P.C.
ENGINEERS • SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS • ENVIRONMENTAL CONSULTANTS
VIRGINIA BEACH • WILLIAMSBURG, VIRGINIA

Subject RICHARDSON MILL POND

Computed By DBT Checked By _____

Project No. 96038-0445
Client STONEHOUSE
Date 9/12/96 Sheet No. _____

BMP #1 AT LEGENDS

DATA IN MODEL FROM ROUTING CALCULATIONS BY WILLIAMSBURG ENVIRONMENTAL GROUP.

RAINFALL DATA:

24-HR DEPTHS (IN)		STORM
3.4		2-YR
5.28		10-YR
6.35		25-YR
8.0	OR	100-YR

MODEL CALIBRATION

USGS MAX. STAGE 12.6' ON 9/27/85.

WILLIAMSBURG RAINFALL DATA (JOHN KELLUM PROVIDED)

9/26/85	3:00 PM → 12:00 AM	1.9"
9/27/85	12:01 AM → 6:30 AM	5.92"

7.82" TOTAL IN 15.5 HRS

∴ CALL THIS THE 100-YR STORM.

CALIBRATE MODEL TO ACHIEVE FLOOD ELEV. CLOSE TO 12.6 IN 100-YR STORM.

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CALIBRATION

ADJUST T_c's TO ACCOUNT FOR STORAGE OCCURRING THROUGHOUT WATERSHED, BUT NOT MODELED (OFFSITE PONDS, BEAVER DAMS, ETC.). MATCH PEAK STAGE FOR 100-YR EVENT. → T_c's MULTIPLIED BY 18 TO CALIBRATE TO 100-YR MEASURED PEAK.

RESULTS

STORM	PRE-DEVELOPMENT QIN	QOUT	ELEV.	POST-DEVELOPMENT QIN	QOUT	ELEV.
2-YR	123	113	10.7	191	179	11.1
10-YR	301	288	11.6	407	390	12.0
25-YR	418	401	12.1	539	519	12.5
100-YR	611	588	12.8	752	722	13.2

ROAD AT ELEV 14.6. ∴ NO OVERTOPPING.

YORK COUNTY, VA

08/14/96
02:29 PM

DEPTH-DURATION-FREQUENCY TABLE

DURATION	2-yr [in]	5-yr [in]	10-yr [in]	25-yr [in]	50-yr [in]	100-yr [in]
5 min	0.47	0.54	0.60	0.68	0.74	0.81
10 min	0.75	0.90	1.00	1.16	1.28	1.40
15 min	0.95	1.14	1.28	1.49	1.65	1.81
30 min	1.27	1.56	1.77	2.07	2.31	2.54
60 min	1.60	2.00	2.28	2.68	2.99	3.30
2 hr	1.80	2.27	2.61	3.08	3.45	3.82
3 hr	2.00	2.55	2.94	3.48	3.91	4.33
6 hr	2.50	3.26	3.78	4.51	5.08	5.65
12 hr	2.95	3.89	4.53	5.43	6.13	6.83
24 hr	3.40	4.52	5.28	6.35	7.18	8.00

INTENSITY-DURATION-FREQUENCY TABLE

DURATION	2-yr [in/hr]	5-yr [in/hr]	10-yr [in/hr]	25-yr [in/hr]	50-yr [in/hr]	100-yr [in/hr]
5 min	5.64	6.50	7.16	8.16	8.94	9.72
10 min	4.52	5.38	6.01	6.94	7.67	8.40
15 min	3.80	4.57	5.14	5.96	6.60	7.24
30 min	2.54	3.12	3.54	4.14	4.61	5.08
60 min	1.60	2.00	2.28	2.68	2.99	3.30
2 hr	0.90	1.14	1.30	1.54	1.72	1.91
3 hr	0.67	0.85	0.98	1.16	1.30	1.44
6 hr	0.42	0.54	0.63	0.75	0.85	0.94
12 hr	0.25	0.32	0.38	0.45	0.51	0.57
24 hr	0.14	0.19	0.22	0.26	0.30	0.33

IDF EQUATIONS

R	g	h
2	124	18
5	159	20
10	183	21
25	218	22
50	246	22
100	273	23

Ir = g/(h + Td)

VALID ONLY UP
TO 2 HOURS

Td = duration (mins)

INPUT

Duration	2-yr P [in]	100-yr P [in]	Source
5 min	0.47	0.81	NOAA HYDRO-35
15 min	0.95	1.81	NOAA HYDRO-35
60 min	1.60	3.30	NOAA HYDRO-35
24 hr	3.40	8.00	USWB TP-40

Quick TR-55 Ver.5.46 S/N:
Executed: 16:05:56 09-12-1996 C:\JOBS\MILLPOND\RMP.TCT

RICHARDSON MILL POND
SUBAREA A1

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.1700	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0170	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.45	= 0.45

SHALLOW CONCENTRATED FLOW

Segment ID				
Surface (paved or unpaved)?		Unpaved	Unpaved	
Flow length, L	ft	2500.0	6000.0	
Watercourse slope, s	ft/ft	0.0300	0.0100	
$Avg.V = Csf * (s)^{0.5}$	ft/s	2.7946	1.6135	
where: Unpaved Csf = 16.1345				
Paved Csf = 20.3282				
T = L / (3600*V)	hrs	0.25 +	1.03	= 1.28

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	= 0.00

::

TOTAL TIME (hrs) 1.73

Quick TR-55 Ver.5.46 S/N:
Executed: 16:07:07 09-12-1996 C:\JOBS\MILLPOND\RMP.TCT

RICHARDSON MILL POND
SUBAREA A2

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID				
Surface description				
Manning's roughness coeff., n		0.1700		
Flow length, L (total < or = 300)	ft	300.0		
Two-yr 24-hr rainfall, P2	in	3.400		
Land slope, s	ft/ft	0.0100		
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.56		= 0.56

SHALLOW CONCENTRATED FLOW

Segment ID				
Surface (paved or unpaved)?		Unpaved	Unpaved	
Flow length, L	ft	3500.0	2500.0	
Watercourse slope, s	ft/ft	0.0300	0.0070	
$Avg.V = Csf * (s)^{0.5}$	ft/s	2.7946	1.3499	
where: Unpaved Csf = 16.1345				
Paved Csf = 20.3282				
T = L / (3600*V)	hrs	0.35	+ 0.51	= 0.86

CHANNEL FLOW

Segment ID				
Cross Sectional Flow Area, a	sq.ft	0.00		
Wetted perimeter, Pw	ft	0.00		
Hydraulic radius, r = a/Pw	ft	0.000		
Channel slope, s	ft/ft	0.0000		
Manning's roughness coeff., n		0.0000		
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000		
Flow length, L	ft	0		
T = L / (3600*V)	hrs	0.00		= 0.00

::

TOTAL TIME (hrs) 1.42

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RICHARDSON MILL POND
SUBAREA A3

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.1700	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0100	

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.56 = 0.56

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	2500.0	3000.0
Watercourse slope, s	ft/ft	0.0300	0.0070
Avg.V = Csf * (s)$^{0.5}$	ft/s	2.7946	1.3499

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.25 + 0.62 = 0.87

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::

TOTAL TIME (hrs) 1.42

Quick TR-55 Ver.5.46 S/N:
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RICHARDSON MILL POND
SUBAREA A4

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.1700	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0200	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.42	= 0.42

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	2000.0	500.0
Watercourse slope, s	ft/ft	0.0300	0.0200
$Avg.V = Csf * (s)^{0.5}$	ft/s	2.7946	2.2818

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V)	hrs	0.20	+	0.06	= 0.26

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000
Flow length, L	ft	0
T = L / (3600*V)	hrs	0.00 = 0.00

::

TOTAL TIME (hrs) 0.68

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RICHARDSON MILL POND
SUBAREA A5

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0800	

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.48 = 0.48

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	1000.0	4500.0
Watercourse slope, s	ft/ft	0.0520	0.0030

$$Avg.V = Csf * (s)^{0.5}$$ ft/s 3.6792 0.8837

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.08 + 1.41 = 1.49

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::

TOTAL TIME (hrs) 1.97

Quick TR-55 Ver.5.46 S/N:
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RICHARDSON MILL POND
SUBAREA A6

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID				
Surface description				
Manning's roughness coeff., n		0.1700		
Flow length, L (total < or = 300)	ft	300.0		
Two-yr 24-hr rainfall, P2	in	3.400		
Land slope, s	ft/ft	0.0100		
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.56		= 0.56

SHALLOW CONCENTRATED FLOW

Segment ID				
Surface (paved or unpaved)?		Unpaved	Unpaved	
Flow length, L	ft	2000.0	4000.0	
Watercourse slope, s	ft/ft	0.0300	0.0080	
$Avg.V = Csf * (s)^{0.5}$	ft/s	2.7946	1.4431	
where: Unpaved Csf = 16.1345				
Paved Csf = 20.3282				
T = L / (3600*V)	hrs	0.20	+ 0.77	= 0.97

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	= 0.00

::

TOTAL TIME (hrs) 1.53

Quick TR-55 Ver.5.46 S/N:
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RICHARDSON MILL POND
SUBAREA A7

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID		
Surface description		
Manning's roughness coeff., n		0.4000
Flow length, L (total < or = 300)	ft	300.0
Two-yr 24-hr rainfall, P2	in	3.400
Land slope, s	ft/ft	0.0200

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.84 = 0.84

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	1500.0	3000.0
Watercourse slope, s	ft/ft	0.0300	0.0130
Avg.V = Csf * (s)$^{0.5}$	ft/s	2.7946	1.8396

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.15 + 0.45 = 0.60

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::

TOTAL TIME (hrs) 1.44

Quick TR-55 Ver.5.46 S/N:
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RICHARDSON MILL POND
SUBAREA A8

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.1700	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0100	

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.56 = 0.56

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	2500.0	3500.0
Watercourse slope, s	ft/ft	0.0300	0.0023
Avg.V = Csf * (s)$^{0.5}$	ft/s	2.7946	0.7738

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.25 + 1.26 = 1.50

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::

TOTAL TIME (hrs) 2.06

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RICHARDSON MILL POND
SUBAREA A9

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.1000	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.44	= 0.44

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	2000.0	
Watercourse slope, s	ft/ft	0.0450	0.0023
$Avg.V = Csf * (s)^{0.5}$	ft/s	3.4226	0.7738

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V)	hrs	0.16	= 0.16

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000
Flow length, L	ft	0
T = L / (3600*V)	hrs	0.00 = 0.00

::

TOTAL TIME (hrs) 0.60

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RICHARDSON MILL POND
SUBAREA B1

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.1500	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0200	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.38	= 0.38

SHALLOW CONCENTRATED FLOW

Segment ID				
Surface (paved or unpaved)?		Unpaved	Unpaved	
Flow length, L	ft	1500.0	4500.0	
Watercourse slope, s	ft/ft	0.0330	0.0100	
$Avg.V = Csf * (s)^{0.5}$	ft/s	2.9310	1.6135	
where: Unpaved Csf = 16.1345				
Paved Csf = 20.3282				
T = L / (3600*V)	hrs	0.14 +	0.77	= 0.92

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	= 0.00

::

TOTAL TIME (hrs) 1.30

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RICHARDSON MILL POND
SUBAREA B2

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID					
Surface description					
Manning's roughness coeff., n		0.1500			
Flow length, L (total < or = 300)	ft	300.0			
Two-yr 24-hr rainfall, P2	in	3.400			
Land slope, s	ft/ft	0.0200			
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.38		=	0.38

SHALLOW CONCENTRATED FLOW

Segment ID					
Surface (paved or unpaved)?		Unpaved	Unpaved		
Flow length, L	ft	1200.0	2500.0		
Watercourse slope, s	ft/ft	0.0400	0.0080		
$Avg.V = Csf * (s)^{0.5}$	ft/s	3.2269	1.4431		
where: Unpaved Csf = 16.1345					
Paved Csf = 20.3282					
T = L / (3600*V)	hrs	0.10	+ 0.48	=	0.58

CHANNEL FLOW

Segment ID					
Cross Sectional Flow Area, a	sq.ft	0.00			
Wetted perimeter, Pw	ft	0.00			
Hydraulic radius, r = a/Pw	ft	0.000			
Channel slope, s	ft/ft	0.0000			
Manning's roughness coeff., n		0.0000			
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000			
Flow length, L	ft	0			
T = L / (3600*V)	hrs	0.00		=	0.00

::

TOTAL TIME (hrs) 0.97

Quick TR-55 Ver.5.46 S/N:
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RICHARDSON MILL POND
SUBAREA B3

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0200	

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.84 = 0.84

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	700.0	5500.0
Watercourse slope, s	ft/ft	0.0570	0.0090
Avg.V = Csf * (s)$^{0.5}$	ft/s	3.8521	1.5307

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.05 + 1.00 = 1.05

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::

TOTAL TIME (hrs) 1.88

Quick TR-55 Ver.5.46 S/N:
Executed: 16:20:27 09-12-1996 C:\JOBS\MILLPOND\RMP.TCT

RICHARDSON MILL POND
SUBAREA B4

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.1700	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0200	

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.42 = 0.42

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	2000.0	2500.0
Watercourse slope, s	ft/ft	0.0400	0.0100
Avg.V = Csf * (s)$^{0.5}$	ft/s	3.2269	1.6135

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.17 + 0.43 = 0.60

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::

TOTAL TIME (hrs) 1.02

Quick TR-55 Ver.5.46 S/N:
Executed: 16:22:41 09-12-1996 C:\JOBS\MILLPOND\RMP.TCT

RICHARDSON MILL POND
SUBAREA B5

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.1700	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0200	
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.42	= 0.42

SHALLOW CONCENTRATED FLOW

Segment ID				
Surface (paved or unpaved)?		Unpaved	Unpaved	
Flow length, L	ft	2000.0	5000.0	
Watercourse slope, s	ft/ft	0.0300	0.0130	
$Avg.V = Csf * (s)^{0.5}$	ft/s	2.7946	1.8396	
where: Unpaved Csf = 16.1345				
Paved Csf = 20.3282				
T = L / (3600*V)	hrs	0.20 +	0.75	= 0.95

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	= 0.00

::

TOTAL TIME (hrs) 1.38

Quick TR-55 Ver.5.46 S/N:
Executed: 16:23:40 09-12-1996 C:\JOBS\MILLPOND\RMP.TCT

RICHARDSON MILL POND
SUBAREA B6

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID				
Surface description				
Manning's roughness coeff., n		0.4000		
Flow length, L (total < or = 300)	ft	300.0		
Two-yr 24-hr rainfall, P2	in	3.400		
Land slope, s	ft/ft	0.0200		
$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$	hrs	0.84		= 0.84

SHALLOW CONCENTRATED FLOW

Segment ID				
Surface (paved or unpaved)?		Unpaved	Unpaved	
Flow length, L	ft	1200.0	3000.0	
Watercourse slope, s	ft/ft	0.0750	0.0050	
Avg.V = Csf * (s)$^{0.5}$	ft/s	4.4186	1.1409	
where: Unpaved Csf = 16.1345				
Paved Csf = 20.3282				
T = L / (3600*V)	hrs	0.08	+ 0.73	= 0.81

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$	ft/s	0.0000	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	= 0.00

::

TOTAL TIME (hrs) 1.64

Quick TR-55 Ver.5.46 S/N:
Executed: 16:24:51 09-12-1996 C:\JOBS\MILLPOND\RMP.TCT

RICHARDSON MILL POND
SUBAREA B7

Tt COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID			
Surface description			
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.400	
Land slope, s	ft/ft	0.0200	

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.84 = 0.84

SHALLOW CONCENTRATED FLOW

Segment ID			
Surface (paved or unpaved)?		Unpaved	Unpaved
Flow length, L	ft	700.0	5800.0
Watercourse slope, s	ft/ft	0.0900	0.0080

Avg.V = $Csf * (s)^{0.5}$ ft/s 4.8404 1.4431

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.04 + 1.12 = 1.16

CHANNEL FLOW

Segment ID		
Cross Sectional Flow Area, a	sq.ft	0.00
Wetted perimeter, Pw	ft	0.00
Hydraulic radius, r = a/Pw	ft	0.000
Channel slope, s	ft/ft	0.0000
Manning's roughness coeff., n		0.0000

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::

TOTAL TIME (hrs) 1.99

```
*************************************
*                                   *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*            MAY  1991              *
*          VERSION 4.0.1E           *
*                                   *
* RUN DATE 09/12/1996 TIME 12:30:23 *
*                                   *
*************************************
```

```
*************************************
*                                   *
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET          *
*     DAVIS, CALIFORNIA 95616       *
*        (916) 756-1104             *
*                                   *
*************************************
```

EXISTING CONDITIONS

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

```
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.       :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID    RICHARDSON MILLPOND WATERSHED STUDY          EXISTING CONDITIONS
  2           ID    L&M JOB 96038-0445    2-YEAR STORM
              *DIAGRAM
  3           IT      30                    300
  4           IO       5
              *
              *

  5           KK      A1
  6           BA     0.5
              * 2-YEAR STORM     5 min  15 min  60 min    2 hr    3 hr    6 hr   12 hr   24 hr
  7           PH                  0.47    0.95     1.6     1.8       2     2.5    2.95     3.4
              * 10-YEAR STORM
              *                    0.6    1.28    2.28    2.61    2.94    3.78    4.53    5.28
              * 25-YEAR STORM
              *                   0.68    1.49    2.68    3.08    3.48    4.51    5.43    6.35
              * 100-YEAR STORM
              *                   0.81    1.81     3.3    3.82    4.33    5.65    6.83       8
  8           LS              68
  9           UD    18.0
              *      1

 10           KK     SA2
 11           RS       4    FLOW      -1
 12           RC    0.07    0.07    0.07    3220   0.005
 13           RX       0     180     310     310     320     320     400     600
 14           RY      70      40      25      23      23      25      40      70

 15           KK      A2
 16           BA    0.44
 17           LS              70
 18           UD   15.48
              *   0.86

 19           KK      A3
 20           BA     0.3
 21           LS              65
 22           UD   14.94
              *   0.83

 23           KK      A4
 24           BA    0.18
 25           LS              67
 26           UD    6.66
              *   0.37

 27           KK   J@SA5 COMBINE SA2, A2, A3, A4
 28           HC       4

 29           KK     SA5
 30           RS       6    FLOW      -1
 31           RC    0.07    0.07    0.07    5060   0.002
 32           RX       0     150     255     255     265     265     350     480
 33           RY      50      14      13      11      11      13      14      50
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 34           KK      A5
 35           BA    0.44
 36           LS              64
 37           UD   20.88
              *   1.16

 38           KK  J@RMP1 COMBINE SA5, A5
 39           HC       2

 40           KK      A6
 41           BA    0.37
 42           LS              58
 43           UD   16.38
              *   0.91

 44           KK      A7
 45           BA    0.18
 46           LS              59
 47           UD   15.66
              *   0.87

 48           KK   J@SA8 COMBINE A7, A8
 49           HC       2

 50           KK     SA8
 51           RS       4    FLOW      -1
 52           RC    0.07    0.07    0.07    3540   0.004
 53           RX       0      85     180     180     190     190     225     350
 54           RY      40      20      18      16      16      18      20      40

 55           KK      A8
 56           BA    0.35
 57           LS              61
 58           UD   21.78
              *   1.21

 59           KK      A9
 60           BA    0.37
 61           LS              63
 62           UD    6.48
              *   0.36

 63           KK  J@RMP2 COMBINE SA8, A8, A9
 64           HC       3

 65           KK      B1
 66           BA   0.603
 67           LS              70
 68           UD   13.68
              *   0.76
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  69          KK     B2
  70          BA  0.185
  71          LS            78
  72          UD   1.00

  73          KK    BMP1 STONEHOUSE BMP#1 - WEG CALCULATIONS
  74          RS      1    ELEV   45.00
  75          SV   6.32    8.57   23.55   24.87   26.18   27.49   31.44   32.75   34.07   39.32
  76          SE  45.00    45.9    50.1    50.4    50.7    51.0    51.9    52.2    52.5    53.7
  77          SQ      0     8.1    12.1    17.6    54.6   110.2   350.2     449     557    1058

  78          KK   J@SB3 COMBINE B1, BMP1
  79          HC      2

  80          KK     SB3
  81          RS      6    FLOW      -1
  82          RC   0.07    0.07    0.07    4160   0.005
  83          RX      0     150     255     255     265     265     290     420
  84          RY     70      30      29      27      27      29      30      70

  85          KK     B4
  86          BA  0.479
  87          LS            68
  88          UD  10.98
              *  0.61

  89          KK     B5
  90          BA  0.538
  91          LS            67
  92          UD  14.94
              *  0.83

  93          KK   J@SB6 COMBINE B4, B5
  94          HC      2

  95          KK     SB6
  96          RS      5    FLOW      -1
  97          RC   0.07    0.07    0.07    4280   0.004
  98          RX      0     190     270     270     280     280     390     460
  99          RY     50      25      20      18      18      20      25      50

 100          KK     B3
 101          BA  0.456
 102          LS            69
 103          UD  20.52
              *  1.14

 104          KK     B6
 105          BA  0.294
 106          LS            70
 107          UD  17.82
              *  0.99
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 108          KK   J@SB7 COMBINE SB3, SB6, B3, B6
 109          HC       4

 110          KK     SB7
 111          RS       4    FLOW      -1
 112          RC    0.07    0.07    0.07    2960   0.002
 113          RX       0      60      70      85     270     330     380     500
 114          RY      40      20      15      12      12      15      30      40

 115          KK      B7
 116          BA   0.492
 117          LS             69
 118          UD   21.42
              *    1.19

 119          KK  J@RMP3 COMBINE SB7, B7
 120          HC       2

 121          KK   J@RMP COMBINE J@RMP1, J@RMP2, J@RMP3
 122          HC       3

 123          KK     RMP RICHARDSON MILLPOND
 124          RS       1    ELEV    9.52
 125          SA   34.79   38.85   43.08   47.32   51.55   55.78   60.01   64.25   68.48   72.71
 126          SE    9.52      10    10.5      11    11.5      12    12.5      13    13.5      14
 127          SQ       0      30      86     167     272     388     520     659     797     932
 128          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   5        A1
             V
             V
  10       SA2
            .
            .
  15        .          A2
            .           .
            .           .
  19        .           .         A3
            .           .          .
            .           .          .
  23        .           .          .         A4
            .           .          .          .
            .           .          .          .
  27     J@SA5.................................
             V
             V
  29       SA5
            .
            .
  34        .          A5
            .           .
            .           .
  38     J@RMP1............
            .
            .
  40        .          A6
            .           .
            .           .
  44        .           .         A7
            .           .          .
            .           .          .
  48        .       J@SA8...........
            .           V
            .           V
  50        .         SA8
            .           .
            .           .
  55        .           .         A8
            .           .          .
            .           .          .
  59        .           .          .         A9
            .           .          .          .
            .           .          .          .
  63        .      J@RMP2......................
            .           .
            .           .
  65        .           .         B1
            .           .          .
            .           .          .
  69        .           .          .         B2
            .           .          .          V
            .           .          .          V
  73        .           .          .       BMP1
```

```
 78          .           .       J@SB3............
             .           .          V
             .           .          V
 80          .           .        SB3
             .           .          .
             .           .          .
 85          .           .          .        B4
             .           .          .         .
             .           .          .         .
 89          .           .          .         .        B5
             .           .          .         .         .
             .           .          .         .         .
 93          .           .          .     J@SB6............
             .           .          .         V
             .           .          .         V
 95          .           .          .       SB6
             .           .          .         .
             .           .          .         .
100          .           .          .         .        B3
             .           .          .         .         .
             .           .          .         .         .
104          .           .          .         .         .        B6
             .           .          .         .         .         .
             .           .          .         .         .         .
108          .           .       J@SB7.................................
             .           .          V
             .           .          V
110          .           .        SB7
             .           .          .
             .           .          .
115          .           .          .        B7
             .           .          .         .
             .           .          .         .
119          .           .      J@RMP3............
             .           .          .
             .           .          .
121       J@RMP.......................
             V
             V
123        RMP
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

RMP= RICHARDSON MILL POND

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             MAY   1991               *
*           VERSION 4.0.1E             *
*                                      *
*  RUN DATE  09/03/1996  TIME  10:49:38 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
```

```
                    RICHARDSON MILLPOND WATERSHED STUDY        EXISTING CONDITIONS
                    L&M JOB 96038-0445    2-YEAR STORM

  4 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                    NMIN         30  MINUTES IN COMPUTATION INTERVAL
                   IDATE     1    0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE     7    0  ENDING DATE
                  NDTIME       0530  ENDING TIME
                   ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL    0.50 HOURS
                  TOTAL TIME BASE  149.50 HOURS

        ENGLISH UNITS
            DRAINAGE AREA         SQUARE MILES
            PRECIPITATION DEPTH   INCHES
            LENGTH, ELEVATION     FEET
            FLOW                  CUBIC FEET PER SECOND
            STORAGE VOLUME        ACRE-FEET
            SURFACE AREA          ACRES
            TEMPERATURE           DEGREES FAHRENHEIT
```

PRE-2

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	11.	32.50	10.	8.	4.	0.50		
ROUTED TO	SA2	11.	33.00	10.	8.	4.	0.50	23.47	33.00
HYDROGRAPH AT	A2	12.	29.50	12.	9.	4.	0.44		
HYDROGRAPH AT	A3	6.	29.50	6.	5.	2.	0.30		
HYDROGRAPH AT	A4	8.	20.50	7.	4.	1.	0.18		
4 COMBINED AT	J@SA5	30.	29.50	30.	24.	11.	1.42		
ROUTED TO	SA5	30.	30.50	30.	24.	11.	1.42	13.08	30.50
HYDROGRAPH AT	A5	6.	35.50	6.	5.	3.	0.44		
2 COMBINED AT	J@RMP1	36.	31.00	36.	29.	13.	1.86		
HYDROGRAPH AT	A6	4.	32.00	4.	3.	1.	0.37		
HYDROGRAPH AT	A7	2.	31.00	2.	2.	1.	0.18		
2 COMBINED AT	J@SA8	6.	31.50	6.	5.	2.	0.55		
ROUTED TO	SA8	6.	32.00	6.	5.	2.	0.55	16.47	32.00
HYDROGRAPH AT	A8	4.	36.50	4.	3.	2.	0.35		
HYDROGRAPH AT	A9	12.	20.50	11.	6.	2.	0.37		
3 COMBINED AT	J@RMP2	15.	22.00	15.	12.	6.	1.27		
HYDROGRAPH AT	B1	18.	28.00	18.	13.	5.	0.60		
HYDROGRAPH AT	B2	54.	13.50	23.	7.	2.	0.19		
ROUTED TO	BMP1	10.	17.00	9.	7.	2.	0.19	47.44	17.00
2 COMBINED AT	J@SB3	26.	27.50	25.	18.	7.	0.79		
ROUTED TO	SB3	26.	28.00	25.	18.	7.	0.79	28.22	28.00
HYDROGRAPH AT	B4	15.	25.50	15.	10.	4.	0.48		
HYDROGRAPH AT	B5	12.	29.50	12.	9.	4.	0.54		
2 COMBINED AT	J@SB6	26.	27.00	26.	19.	7.	1.02		
ROUTED TO	SB6	26.	28.00	26.	19.	7.	1.02	19.68	28.00
HYDROGRAPH AT	B3	9.	35.00	9.	8.	4.	0.46		
HYDROGRAPH AT	B6	7.	32.00	7.	6.	2.	0.29		
4 COMBINED AT	J@SB7	68.	28.50	64.	49.	21.	2.55		

ROUTED TO	SB7	66.	28.50	64.	49.	21.	2.08	12.28	28.00
HYDROGRAPH AT	B7	9.	36.00	9.	8.	4.	0.49		
2 COMBINED AT	J@RMP3	74.	29.50	72.	56.	25.	3.05		
3 COMBINED AT	J@RMP	123.	29.50	120.	97.	44.	6.18		
ROUTED TO	RMP	113.	33.50	111.	91.	43.	6.18	10.66	33.50

*** NORMAL END OF HEC-1 ***

PRE-2

```
****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            MAY   1991                *
*         VERSION 4.0.1E               *
*                                      *
* RUN DATE  09/03/1996  TIME  10:49:46 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*        609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616         *
*         (916) 756-1104               *
*                                      *
****************************************
```

```
                    RICHARDSON MILLPOND WATERSHED STUDY        EXISTING CONDITIONS
                    L&M JOB 96038-0445    10-YEAR STORM

  4 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                    NMIN         30  MINUTES IN COMPUTATION INTERVAL
                   IDATE     1    0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE     7    0  ENDING DATE
                  NDTIME       0530  ENDING TIME
                   ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL    0.50 HOURS
                   TOTAL TIME BASE  149.50 HOURS

        ENGLISH UNITS
             DRAINAGE AREA         SQUARE MILES
             PRECIPITATION DEPTH   INCHES
             LENGTH, ELEVATION     FEET
             FLOW                  CUBIC FEET PER SECOND
             STORAGE VOLUME        ACRE-FEET
             SURFACE AREA          ACRES
             TEMPERATURE           DEGREES FAHRENHEIT
```

PRE-10

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	26.	32.00	26.	21.	9.	0.50		
ROUTED TO	SA2	26.	32.50	26.	21.	9.	0.50	24.17	32.50
HYDROGRAPH AT	A2	28.	29.50	28.	21.	9.	0.44		
HYDROGRAPH AT	A3	16.	29.00	16.	12.	5.	0.30		
HYDROGRAPH AT	A4	20.	20.00	18.	9.	3.	0.18		
4 COMBINED AT	J@SA5	75.	29.00	74.	60.	26.	1.42		
ROUTED TO	SA5	75.	30.50	74.	60.	26.	1.42	13.28	30.50
HYDROGRAPH AT	A5	17.	35.50	17.	14.	7.	0.44		
2 COMBINED AT	J@RMP1	91.	31.00	89.	73.	33.	1.86		
HYDROGRAPH AT	A6	13.	31.00	13.	10.	4.	0.37		
HYDROGRAPH AT	A7	7.	30.00	7.	5.	2.	0.18		
2 COMBINED AT	J@SA8	20.	30.50	20.	15.	7.	0.55		
ROUTED TO	SA8	20.	31.50	20.	15.	7.	0.55	17.37	31.50
HYDROGRAPH AT	A8	11.	36.50	11.	10.	5.	0.35		
HYDROGRAPH AT	A9	35.	20.00	32.	16.	6.	0.37		
3 COMBINED AT	J@RMP2	44.	21.50	42.	37.	17.	1.27		
HYDROGRAPH AT	B1	43.	27.50	42.	30.	12.	0.60		
HYDROGRAPH AT	B2	106.	13.50	47.	15.	5.	0.19		
ROUTED TO	BMP1	17.	17.00	15.	12.	5.	0.19	50.35	17.00
2 COMBINED AT	J@SB3	54.	27.50	53.	41.	17.	0.79		
ROUTED TO	SB3	54.	28.00	53.	41.	17.	0.79	29.28	28.00
HYDROGRAPH AT	B4	38.	24.50	36.	24.	9.	0.48		
HYDROGRAPH AT	B5	32.	29.00	31.	23.	10.	0.54		
2 COMBINED AT	J@SB6	66.	26.50	65.	47.	19.	1.02		
ROUTED TO	SB6	66.	27.50	65.	47.	19.	1.02	20.41	27.50
HYDROGRAPH AT	B3	22.	35.00	22.	18.	9.	0.46		
HYDROGRAPH AT	B6	17.	32.00	16.	13.	6.	0.29		
4 COMBINED AT	J@SB7	153.	28.50	150.	117.	50.	2.55		

ROUTED TO	SB7	153.	29.50	150.	117.	50.	2.55	12.05	25.50
HYDROGRAPH AT	B7	23.	36.00	23.	19.	9.	0.49		
2 COMBINED AT	J@RMP3	172.	30.00	169.	135.	60.	3.05		
3 COMBINED AT	J@RMP	301.	30.00	297.	242.	110.	6.18		
ROUTED TO	RMP	288.	33.00	284.	233.	109.	6.18	11.57	33.00

PRE-10

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             MAY   1991               *
*           VERSION 4.0.1E             *
*                                      *
* RUN DATE  09/03/1996  TIME  10:49:54 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
```

```
                    RICHARDSON MILLPOND WATERSHED STUDY        EXISTING CONDITIONS
                    L&M JOB 96038-0445    25-YEAR STORM

  4 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                    NMIN         30  MINUTES IN COMPUTATION INTERVAL
                   IDATE     1    0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE     7    0  ENDING DATE
                  NDTIME       0530  ENDING TIME
                   ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL    0.50 HOURS
                   TOTAL TIME BASE  149.50 HOURS

        ENGLISH UNITS
            DRAINAGE AREA        SQUARE MILES
            PRECIPITATION DEPTH  INCHES
            LENGTH, ELEVATION    FEET
            FLOW                 CUBIC FEET PER SECOND
            STORAGE VOLUME       ACRE-FEET
            SURFACE AREA         ACRES
            TEMPERATURE          DEGREES FAHRENHEIT
```

PRE-25

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	36.	32.00	36.	29.	13.	0.50		
ROUTED TO	SA2	36.	32.50	36.	29.	13.	0.50	24.62	32.50
HYDROGRAPH AT	A2	39.	29.50	38.	29.	12.	0.44		
HYDROGRAPH AT	A3	23.	29.00	22.	17.	7.	0.30		
HYDROGRAPH AT	A4	28.	20.00	26.	13.	5.	0.18		
4 COMBINED AT	J@SA5	105.	29.00	103.	83.	37.	1.42		
ROUTED TO	SA5	104.	30.00	103.	83.	37.	1.42	13.41	30.00
HYDROGRAPH AT	A5	24.	35.50	24.	20.	10.	0.44		
2 COMBINED AT	J@RMP1	126.	31.00	125.	102.	46.	1.86		
HYDROGRAPH AT	A6	20.	30.50	19.	15.	7.	0.37		
HYDROGRAPH AT	A7	10.	30.00	10.	8.	3.	0.18		
2 COMBINED AT	J@SA8	30.	30.50	30.	23.	10.	0.55		
ROUTED TO	SA8	30.	31.00	30.	23.	10.	0.55	17.70	31.00
HYDROGRAPH AT	A8	17.	36.50	16.	14.	7.	0.35		
HYDROGRAPH AT	A9	50.	20.00	46.	24.	8.	0.37		
3 COMBINED AT	J@RMP2	64.	21.50	62.	54.	25.	1.27		
HYDROGRAPH AT	B1	59.	27.50	57.	42.	17.	0.60		
HYDROGRAPH AT	B2	137.	13.50	61.	19.	6.	0.19		
ROUTED TO	BMP1	57.	15.00	29.	16.	6.	0.19	50.71	15.00
2 COMBINED AT	J@SB3	70.	27.50	69.	55.	23.	0.79		
ROUTED TO	SB3	70.	28.00	69.	55.	23.	0.79	29.33	28.00
HYDROGRAPH AT	B4	52.	24.50	51.	33.	12.	0.48		
HYDROGRAPH AT	B5	44.	29.00	43.	33.	13.	0.54		
2 COMBINED AT	J@SB6	93.	26.50	90.	65.	26.	1.02		
ROUTED TO	SB6	93.	27.00	90.	65.	26.	1.02	20.89	27.00
HYDROGRAPH AT	B3	30.	35.00	30.	25.	12.	0.46		
HYDROGRAPH AT	B6	23.	32.00	23.	18.	8.	0.29		
4 COMBINED AT	J@SB7	208.	28.50	204.	158.	69.	2.55		

ROUTED TO	DB7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HYDROGRAPH AT	B7	32.	36.00	31.	26.	13.	0.49		
2 COMBINED AT	J@RMP3	235.	29.50	230.	183.	82.	3.05		
3 COMBINED AT	J@RMP	418.	30.00	411.	336.	153.	6.18		
ROUTED TO	RMP	401.	32.50	395.	326.	152.	6.18	12.05	32.50

PRE-25

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****************************************                    ****************************************
*                                      *                    *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             MAY  1991                *                    *   HYDROLOGIC ENGINEERING CENTER      *
*          VERSION 4.0.1E              *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
* RUN DATE  09/03/1996  TIME  10:50:02 *                    *         (916) 756-1104               *
*                                      *                    *                                      *
****************************************                    ****************************************
```

RICHARDSON MILLPOND WATERSHED STUDY EXISTING CONDITIONS
L&M JOB 96038-0445 100-YEAR STORM

```
 4 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          5  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT         HYDROGRAPH TIME DATA
                   NMIN         30  MINUTES IN COMPUTATION INTERVAL
                  IDATE     1    0  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE     7    0  ENDING DATE
                 NDTIME       0530  ENDING TIME
                 ICENT          19  CENTURY MARK

            COMPUTATION INTERVAL    0.50 HOURS
                 TOTAL TIME BASE  149.50 HOURS

       ENGLISH UNITS
           DRAINAGE AREA        SQUARE MILES
           PRECIPITATION DEPTH  INCHES
           LENGTH, ELEVATION    FEET
           FLOW                 CUBIC FEET PER SECOND
           STORAGE VOLUME       ACRE-FEET
           SURFACE AREA         ACRES
           TEMPERATURE          DEGREES FAHRENHEIT
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

PRE-100

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	53.	32.00	52.	42.	19.	0.50		
ROUTED TO	SA2	53.	32.50	52.	42.	19.	0.50	25.38	32.50
HYDROGRAPH AT	A2	56.	29.50	55.	42.	18.	0.44		
HYDROGRAPH AT	A3	34.	29.00	34.	25.	10.	0.30		
HYDROGRAPH AT	A4	41.	19.50	38.	19.	7.	0.18		
4 COMBINED AT	J@SA5	153.	29.00	151.	122.	54.	1.42		
ROUTED TO	SA5	153.	30.00	151.	122.	54.	1.42	13.63	30.00
HYDROGRAPH AT	A5	37.	35.00	36.	30.	15.	0.44		
2 COMBINED AT	J@RMP1	186.	31.00	183.	150.	68.	1.86		
HYDROGRAPH AT	A6	31.	30.50	31.	24.	10.	0.37		
HYDROGRAPH AT	A7	16.	29.50	16.	12.	5.	0.18		
2 COMBINED AT	J@SA8	48.	30.50	47.	36.	15.	0.55		
ROUTED TO	SA8	48.	31.00	47.	36.	15.	0.55	18.27	31.00
HYDROGRAPH AT	A8	26.	36.00	25.	21.	11.	0.35		
HYDROGRAPH AT	A9	76.	19.50	70.	36.	12.	0.37		
3 COMBINED AT	J@RMP2	99.	21.50	96.	83.	38.	1.27		
HYDROGRAPH AT	B1	85.	27.50	83.	60.	24.	0.60		
HYDROGRAPH AT	B2	187.	13.00	83.	27.	9.	0.19		
ROUTED TO	BMP1	138.	14.00	54.	22.	9.	0.19	51.10	14.00
2 COMBINED AT	J@SB3	142.	14.00	95.	79.	33.	0.79		
ROUTED TO	SB3	138.	15.00	95.	78.	33.	0.79	29.54	15.00
HYDROGRAPH AT	B4	77.	24.50	74.	49.	18.	0.48		
HYDROGRAPH AT	B5	65.	29.00	64.	48.	20.	0.54		
2 COMBINED AT	J@SB6	136.	26.50	133.	96.	38.	1.02		
ROUTED TO	SB6	136.	27.00	133.	96.	38.	1.02	21.45	27.00
HYDROGRAPH AT	B3	44.	34.50	44.	37.	18.	0.46		
HYDROGRAPH AT	B6	33.	32.00	33.	26.	12.	0.29		
4 COMBINED AT	J@SB7	298.	26.50	292.	227.	100.	2.55		

HYDROGRAPH AT	B7	46.	35.50	45.	39.	19.	0.49		
2 COMBINED AT	J@RMP3	337.	29.50	330.	262.	119.	3.05		
3 COMBINED AT	J@RMP	611.	29.50	601.	491.	225.	6.18		
ROUTED TO	RMP	588.	32.50	580.	479.	224.	6.18	12.75	32.50

PRE-100

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             MAY   1991               *
*          VERSION 4.0.1E              *
*                                      *
*  RUN DATE  09/12/1996  TIME  12:30:23 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
```

FUTURE CONDITIONS

```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

```
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::        Haestad Methods, Inc.     :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID    RICHARDSON MILLPOND WATERSHED STUDY         FUTURE CONDITIONS
  2           ID    L&M JOB 96038-0445    2-YEAR STORM        25% IMPERVIOUS
              *DIAGRAM
  3           IT      30                    300
  4           IO       5
              *
              *

  5           KK      A1
  6           BA     0.5
              * 2-YEAR STORM     5 min  15 min  60 min    2 hr    3 hr    6 hr   12 hr   24 hr
  7           PH                  0.47    0.95     1.6     1.8       2     2.5    2.95     3.4
              * 10-YEAR STORM
              *                   0.6    1.28    2.28    2.61    2.94    3.78    4.53    5.28
              * 25-YEAR STORM
              *                  0.68    1.49    2.68    3.08    3.48    4.51    5.43    6.35
              * 100-YEAR STORM
              *                  0.81    1.81     3.3    3.82    4.33    5.65    6.83       8
              *            68
  8           LS             76
  9           UD    18.0
              *      1

 10           KK     SA2
 11           RS       4    FLOW      -1
 12           RC    0.07    0.07    0.07    3220   0.005
 13           RX       0     180     310     310     320     320     400     600
 14           RY      70      40      25      23      23      25      40      70

 15           KK      A2
 16           BA    0.44
              *            70
 17           LS             76
 18           UD   15.48
              *   0.86

 19           KK      A3
 20           BA     0.3
              *            65
 21           LS             69
 22           UD   14.94
              *   0.83

 23           KK      A4
 24           BA    0.18
              *            67
 25           LS             75
 26           UD    6.66
              *   0.37
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  27          KK   J@SA5 COMBINE SA2, A2, A3, A4
  28          HC       4

  29          KK     SA5
  30          RS       6    FLOW      -1
  31          RC    0.07    0.07    0.07    5060   0.002
  32          RX       0     150     255     255     265     265     350     480
  33          RY      50      14      13      11      11      13      14      50

  34          KK      A5
  35          BA    0.44
              *            64
  36          LS              76
  37          UD   20.88
              *   1.16

  38          KK  J@RMP1 COMBINE SA5, A5
  39          HC       2

  40          KK      A6
  41          BA    0.37
              *            58
  42          LS              65
  43          UD   16.38
              *   0.91

  44          KK      A7
  45          BA    0.18
              *            59
  46          LS              69
  47          UD   15.66
              *   0.87

  48          KK   J@SA8 COMBINE A7, A8
  49          HC       2

  50          KK     SA8
  51          RS       4    FLOW      -1
  52          RC    0.07    0.07    0.07    3540   0.004
  53          RX       0      85     180     180     190     190     225     350
  54          RY      40      20      18      16      16      18      20      40

  55          KK      A8
  56          BA    0.35
              *            61
  57          LS              71
  58          UD   21.78
              *   1.21
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 59           KK      A9
 60           BA    0.37
              *            63
 61           LS             75
 62           UD    6.48
              *   0.36

 63           KK  J@RMP2 COMBINE SA8, A8, A9
 64           HC       3

 65           KK      B1
 66           BA   0.603
              *            70
 67           LS             77
 68           UD   13.68
              *   0.76

 69           KK      B2
 70           BA   0.185
 71           LS             78
 72           UD    1.00

 73           KK    BMP1 STONEHOUSE BMP#1 - WEG CALCULATIONS
 74           RS       1    ELEV   45.00
 75           SV    6.32    8.57   23.55   24.87   26.18   27.49   31.44   32.75   34.07   39.32
 76           SE   45.00    45.9    50.1    50.4    50.7    51.0    51.9    52.2    52.5    53.7
 77           SQ       0     8.1    12.1    17.6    54.6   110.2   350.2     449     557    1058

 78           KK   J@SB3 COMBINE B1, BMP1
 79           HC       2

 80           KK     SB3
 81           RS       6    FLOW      -1
 82           RC    0.07    0.07    0.07    4160   0.005
 83           RX       0     150     255     255     265     265     290     420
 84           RY      70      30      29      27      27      29      30      70

 85           KK      B4
 86           BA   0.479
              *            68
 87
 88           LS             78
 89           UD   10.98
              *   0.61

 90           KK      B5
 91           BA   0.538
              *            67
 92           LS             74
 93           UD   14.94
              *   0.83
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 94           KK   J@SB6 COMBINE B4, B5
 95           HC      2

 96           KK     SB6
 97           RS      5    FLOW     -1
 98           RC    0.07    0.07    0.07    4280   0.004
 99           RX      0     190     270     270     280     280     390     460
100           RY     50      25      20      18      18      20      25      50

101           KK      B3
102           BA   0.456
              *            69
103           LS             79
104           UD   20.52
              *   1.14

105           KK      B6
106           BA   0.294
              *            70
107           LS             80
108           UD   17.82
              *   0.99

109           KK   J@SB7 COMBINE SB3, SB6, B3, B6
110           HC      4

111           KK     SB7
112           RS      4    FLOW     -1
113           RC    0.07    0.07    0.07    2960   0.002
114           RX      0      60      70      85     270     330     380     500
115           RY     40      20      15      12      12      15      30      40

116           KK      B7
117           BA   0.492
              *            69
118           LS             79
119           UD   21.42
              *   1.19

120           KK  J@RMP3 COMBINE SB7, B7
121           HC      2

122           KK   J@RMP COMBINE J@RMP1, J@RMP2, J@RMP3
123           HC      3

124           KK     RMP RICHARDSON MILLPOND
125           RS      1    ELEV    9.52
126           SA   34.79   38.85   43.08   47.32   51.55   55.78   60.01   64.25   68.48   72.71
127           SE    9.52      10    10.5      11    11.5      12    12.5      13    13.5      14
128           SQ       0      30      86     167     272     388     520     659     797     932
129           ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  5         A1
             V
             V
 10        SA2
            .
            .
 15         .          A2
            .           .
            .           .
 19         .           .          A3
            .           .           .
            .           .           .
 23         .           .           .          A4
            .           .           .           .
            .           .           .           .
 27      J@SA5.................................
             V
             V
 29        SA5
            .
            .
 34         .          A5
            .           .
            .           .
 38     J@RMP1............
            .
            .
 40         .          A6
            .           .
            .           .
 44         .           .          A7
            .           .           .
            .           .           .
 48         .       J@SA8............
            .           V
            .           V
 50         .         SA8
            .           .
            .           .
 55         .           .          A8
            .           .           .
            .           .           .
 59         .           .           .          A9
            .           .           .           .
            .           .           .           .
 63         .       J@RMP2........................
            .           .
            .           .
 65         .           .          B1
            .           .           .
            .           .           .
 69         .           .           .          B2
            .           .           .           V
            .           .           .           V
 73         .           .           .         BMP1
```

```
 78          .           .       J@SB3.............
             .           .          V
             .           .          V
 80          .           .         SB3
             .           .          .
             .           .          .
 85          .           .          .          B4
             .           .          .           .
             .           .          .           .
 90          .           .          .           .          B5
             .           .          .           .           .
             .           .          .           .           .
 94          .           .          .       J@SB6............
             .           .          .           V
             .           .          .           V
 96          .           .          .         SB6
             .           .          .           .
             .           .          .           .
101          .           .          .           .          B3
             .           .          .           .           .
             .           .          .           .           .
105          .           .          .           .           .          B6
             .           .          .           .           .           .
             .           .          .           .           .           .
109          .           .       J@SB7.................................
             .           .          V
             .           .          V
111          .           .         SB7
             .           .          .
             .           .          .
116          .           .          .          B7
             .           .          .           .
             .           .          .           .
120          .           .      J@RMP3............
             .           .          .
             .           .          .
122      J@RMP.......................
            V
            V
124       RMP
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             MAY   1991               *                    *   HYDROLOGIC ENGINEERING CENTER      *
*          VERSION 4.0.1E              *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
* RUN DATE  09/12/1996  TIME  12:47:21 *                    *          (916) 756-1104              *
*                                      *                    *                                      *
****************************************                    ****************************************
```

RICHARDSON MILLPOND WATERSHED STUDY FUTURE CONDITIONS
L&M JOB 96038-0445 2-YEAR STORM 25% IMPERVIOUS

```
4 IO        OUTPUT CONTROL VARIABLES
                 IPRNT          5  PRINT CONTROL
                 IPLOT          0  PLOT CONTROL
                 QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT        HYDROGRAPH TIME DATA
                  NMIN         30  MINUTES IN COMPUTATION INTERVAL
                 IDATE     1    0  STARTING DATE
                 ITIME       0000  STARTING TIME
                    NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE     7    0  ENDING DATE
                NDTIME       0530  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL    0.50 HOURS
                TOTAL TIME BASE  149.50 HOURS

      ENGLISH UNITS
          DRAINAGE AREA        SQUARE MILES
          PRECIPITATION DEPTH  INCHES
          LENGTH, ELEVATION    FEET
          FLOW                 CUBIC FEET PER SECOND
          STORAGE VOLUME       ACRE-FEET
          SURFACE AREA         ACRES
          TEMPERATURE          DEGREES FAHRENHEIT
```

POST-2

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	16.	32.00	16.	13.	6.	0.50		
ROUTED TO	SA2	16.	32.50	16.	13.	6.	0.50	23.73	32.50
HYDROGRAPH AT	A2	16.	29.50	16.	12.	5.	0.44		
HYDROGRAPH AT	A3	8.	29.00	8.	6.	2.	0.30		
HYDROGRAPH AT	A4	12.	20.00	11.	6.	2.	0.18		
4 COMBINED AT	J@SA5	43.	29.00	43.	35.	15.	1.42		
ROUTED TO	SA5	43.	30.50	43.	35.	15.	1.42	13.13	30.50
HYDROGRAPH AT	A5	13.	35.00	12.	10.	5.	0.44		
2 COMBINED AT	J@RMP1	55.	31.00	54.	44.	20.	1.86		
HYDROGRAPH AT	A6	7.	31.00	7.	5.	2.	0.37		
HYDROGRAPH AT	A7	5.	30.00	4.	3.	1.	0.18		
2 COMBINED AT	J@SA8	12.	30.50	11.	9.	4.	0.55		
ROUTED TO	SA8	12.	31.50	11.	9.	4.	0.55	16.85	31.50
HYDROGRAPH AT	A8	7.	36.50	7.	6.	3.	0.35		
HYDROGRAPH AT	A9	26.	19.50	24.	12.	4.	0.37		
3 COMBINED AT	J@RMP2	31.	21.00	29.	24.	11.	1.27		
HYDROGRAPH AT	B1	26.	27.50	25.	18.	7.	0.60		
HYDROGRAPH AT	B2	54.	13.50	23.	7.	2.	0.19		
ROUTED TO	BMP1	10.	17.00	9.	7.	2.	0.19	47.44	17.00
2 COMBINED AT	J@SB3	34.	27.50	33.	24.	10.	0.79		
ROUTED TO	SB3	34.	28.00	33.	24.	10.	0.79	28.59	28.00
HYDROGRAPH AT	B4	26.	24.50	25.	16.	6.	0.48		
HYDROGRAPH AT	B5	19.	29.00	18.	14.	6.	0.54		
2 COMBINED AT	J@SB6	43.	26.50	41.	30.	12.	1.02		
ROUTED TO	SB6	43.	27.00	41.	30.	12.	1.02	19.98	27.00
HYDROGRAPH AT	B3	15.	35.00	15.	13.	6.	0.46		
HYDROGRAPH AT	B6	12.	32.00	11.	9.	4.	0.29		
4 COMBINED AT	J@SB7	[illegible]	28.50	97.	73.	31.	2.55		

ROUTED TO	SB7	55.	29.00	51.	15.	31.	2.55	12.42	29.00
HYDROGRAPH AT	B7	16.	35.50	16.	13.	6.	0.49		
2 COMBINED AT	J@RMP3	113.	29.50	110.	85.	38.	3.05		
3 COMBINED AT	J@RMP	191.	29.50	187.	152.	69.	6.18		
ROUTED TO	RMP	179.	33.00	176.	145.	69.	6.18	11.06	33.00

POST-2

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****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             MAY  1991                *                    *   HYDROLOGIC ENGINEERING CENTER      *
*          VERSION 4.0.1E              *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  09/12/1996  TIME  12:47:29 *                    *         (916) 756-1104               *
*                                      *                    *                                      *
****************************************                    ****************************************
```

RICHARDSON MILLPOND WATERSHED STUDY FUTURE CONDITIONS
L&M JOB 96038-0445 10-YEAR STORM 25% IMPERVIOUS

```
4 IO        OUTPUT CONTROL VARIABLES
                 IPRNT          5  PRINT CONTROL
                 IPLOT          0  PLOT CONTROL
                 QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT        HYDROGRAPH TIME DATA
                  NMIN         30  MINUTES IN COMPUTATION INTERVAL
                 IDATE     1    0  STARTING DATE
                 ITIME       0000  STARTING TIME
                    NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE     7    0  ENDING DATE
                NDTIME       0530  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL    0.50 HOURS
                TOTAL TIME BASE  149.50 HOURS

      ENGLISH UNITS
          DRAINAGE AREA        SQUARE MILES
          PRECIPITATION DEPTH  INCHES
          LENGTH, ELEVATION    FEET
          FLOW                 CUBIC FEET PER SECOND
          STORAGE VOLUME       ACRE-FEET
          SURFACE AREA         ACRES
          TEMPERATURE          DEGREES FAHRENHEIT
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

POST-10

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	35.	32.00	34.	27.	12.	0.50		
ROUTED TO	SA2	35.	32.50	34.	27.	12.	0.50	24.56	32.50
HYDROGRAPH AT	A2	35.	29.50	34.	26.	11.	0.44		
HYDROGRAPH AT	A3	19.	29.00	19.	14.	6.	0.30		
HYDROGRAPH AT	A4	27.	19.50	25.	13.	4.	0.18		
4 COMBINED AT	J@SA5	95.	29.00	93.	76.	33.	1.42		
ROUTED TO	SA5	95.	30.00	93.	76.	33.	1.42	13.37	30.00
HYDROGRAPH AT	A5	27.	35.00	26.	22.	11.	0.44		
2 COMBINED AT	J@RMP1	119.	31.00	118.	97.	44.	1.86		
HYDROGRAPH AT	A6	19.	30.50	18.	14.	6.	0.37		
HYDROGRAPH AT	A7	11.	29.50	11.	8.	3.	0.18		
2 COMBINED AT	J@SA8	29.	30.50	29.	22.	10.	0.55		
ROUTED TO	SA8	29.	31.00	29.	22.	10.	0.55	17.67	31.00
HYDROGRAPH AT	A8	17.	36.00	17.	15.	7.	0.35		
HYDROGRAPH AT	A9	57.	19.50	52.	26.	9.	0.37		
3 COMBINED AT	J@RMP2	69.	21.00	67.	56.	26.	1.27		
HYDROGRAPH AT	B1	55.	27.50	53.	39.	15.	0.60		
HYDROGRAPH AT	B2	106.	13.50	47.	15.	5.	0.19		
ROUTED TO	BMP1	17.	17.00	15.	12.	5.	0.19	50.35	17.00
2 COMBINED AT	J@SB3	66.	27.50	64.	49.	20.	0.79		
ROUTED TO	SB3	66.	27.50	64.	49.	20.	0.79	29.32	27.50
HYDROGRAPH AT	B4	54.	24.50	52.	34.	13.	0.48		
HYDROGRAPH AT	B5	41.	29.00	40.	30.	12.	0.54		
2 COMBINED AT	J@SB6	91.	26.00	88.	64.	25.	1.02		
ROUTED TO	SB6	91.	27.00	88.	64.	25.	1.02	20.86	27.00
HYDROGRAPH AT	B3	31.	34.50	31.	26.	12.	0.46		
HYDROGRAPH AT	B6	23.	32.00	23.	18.	8.	0.29		
4 COMBINED AT	J@SB7	203.	28.00	198.	154.	66.	2.55		

ROUTED TO	B7	200.	29.00	195.	161.	65.	[illegible]	[illegible]	[illegible]
HYDROGRAPH AT	B7	32.	35.50	32.	27.	13.	0.49		
2 COMBINED AT	J@RMP3	230.	29.50	225.	179.	79.	3.05		
3 COMBINED AT	J@RMP	407.	29.50	400.	328.	149.	6.18		
ROUTED TO	RMP	390.	32.50	384.	318.	148.	6.18	12.01	32.50

POST-10

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****************************************                    ****************************************
*                                      *                    *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             MAY  1991                *                    *   HYDROLOGIC ENGINEERING CENTER      *
*          VERSION 4.0.1E              *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
* RUN DATE  09/12/1996  TIME  12:47:37 *                    *         (916) 756-1104               *
*                                      *                    *                                      *
****************************************                    ****************************************
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RICHARDSON MILLPOND WATERSHED STUDY FUTURE CONDITIONS
L&M JOB 96038-0445 25-YEAR STORM 25% IMPERVIOUS

```
4 IO        OUTPUT CONTROL VARIABLES
                 IPRNT          5  PRINT CONTROL
                 IPLOT          0  PLOT CONTROL
                 QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT        HYDROGRAPH TIME DATA
                  NMIN         30  MINUTES IN COMPUTATION INTERVAL
                 IDATE     1    0  STARTING DATE
                 ITIME       0000  STARTING TIME
                    NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE     7    0  ENDING DATE
                NDTIME       0530  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL    0.50 HOURS
                TOTAL TIME BASE  149.50 HOURS

      ENGLISH UNITS
          DRAINAGE AREA        SQUARE MILES
          PRECIPITATION DEPTH  INCHES
          LENGTH, ELEVATION    FEET
          FLOW                 CUBIC FEET PER SECOND
          STORAGE VOLUME       ACRE-FEET
          SURFACE AREA         ACRES
          TEMPERATURE          DEGREES FAHRENHEIT
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

POST-25

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	46.	32.00	45.	37.	16.	0.50		
ROUTED TO	SA2	46.	32.50	45.	37.	16.	0.50	25.07	32.50
HYDROGRAPH AT	A2	46.	29.50	45.	35.	14.	0.44		
HYDROGRAPH AT	A3	26.	29.00	26.	19.	8.	0.30		
HYDROGRAPH AT	A4	36.	19.50	33.	17.	6.	0.18		
4 COMBINED AT	J@SA5	127.	29.00	125.	102.	45.	1.42		
ROUTED TO	SA5	127.	30.00	125.	102.	45.	1.42	13.52	30.00
HYDROGRAPH AT	A5	36.	35.00	35.	30.	14.	0.44		
2 COMBINED AT	J@RMP1	160.	31.00	158.	130.	59.	1.86		
HYDROGRAPH AT	A6	26.	30.50	26.	20.	9.	0.37		
HYDROGRAPH AT	A7	15.	29.50	15.	11.	5.	0.18		
2 COMBINED AT	J@SA8	41.	30.50	41.	31.	13.	0.55		
ROUTED TO	SA8	41.	31.00	41.	31.	13.	0.55	18.06	31.00
HYDROGRAPH AT	A8	24.	36.00	23.	20.	10.	0.35		
HYDROGRAPH AT	A9	76.	19.50	69.	35.	12.	0.37		
3 COMBINED AT	J@RMP2	93.	21.50	90.	76.	35.	1.27		
HYDROGRAPH AT	B1	73.	27.50	71.	51.	20.	0.60		
HYDROGRAPH AT	B2	137.	13.50	61.	19.	6.	0.19		
ROUTED TO	BMP1	57.	15.00	29.	16.	6.	0.19	50.71	15.00
2 COMBINED AT	J@SB3	84.	27.00	82.	64.	27.	0.79		
ROUTED TO	SB3	84.	27.50	82.	64.	27.	0.79	29.37	27.50
HYDROGRAPH AT	B4	71.	24.50	68.	45.	17.	0.48		
HYDROGRAPH AT	B5	55.	28.50	54.	41.	17.	0.54		
2 COMBINED AT	J@SB6	121.	26.00	118.	85.	33.	1.02		
ROUTED TO	SB6	121.	26.50	118.	84.	33.	1.02	21.38	26.50
HYDROGRAPH AT	B3	41.	34.50	40.	34.	16.	0.46		
HYDROGRAPH AT	B6	31.	31.50	30.	24.	11.	0.29		
4 COMBINED AT	J@SB7	[illegible]	28.50	259.	201.	87.	2.55		

ROUTED TO	JB7	204.	29.00	200.	201.	87.	2.00	10.12	28.00
HYDROGRAPH AT	B7	42.	35.50	42.	35.	17.	0.49		
2 COMBINED AT	J@RMP3	300.	29.50	295.	234.	104.	3.05		
3 COMBINED AT	J@RMP	539.	29.50	530.	435.	198.	6.18		
ROUTED TO	RMP	519.	32.00	512.	423.	197.	6.18	12.50	32.00

POST-25

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*                                      *                    *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             MAY   1991               *                    *   HYDROLOGIC ENGINEERING CENTER      *
*        VERSION 4.0.1E                *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
* RUN DATE  09/12/1996  TIME  12:47:45 *                    *         (916) 756-1104               *
*                                      *                    *                                      *
****************************************                    ****************************************
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                        RICHARDSON MILLPOND WATERSHED STUDY          FUTURE CONDITIONS
                        L&M JOB 96038-0445    100-YEAR STORM            25% IMPERVIOUS

  4 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                      NMIN         30  MINUTES IN COMPUTATION INTERVAL
                     IDATE     1    0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     7    0  ENDING DATE
                    NDTIME       0530  ENDING TIME
                     ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL    0.50 HOURS
                     TOTAL TIME BASE  149.50 HOURS

          ENGLISH UNITS
              DRAINAGE AREA         SQUARE MILES
              PRECIPITATION DEPTH   INCHES
              LENGTH, ELEVATION     FEET
              FLOW                  CUBIC FEET PER SECOND
              STORAGE VOLUME        ACRE-FEET
              SURFACE AREA          ACRES
              TEMPERATURE           DEGREES FAHRENHEIT
```

POST-100

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	A1	65.	32.00	64.	51.	23.	0.50		
ROUTED TO	SA2	65.	32.00	64.	51.	23.	0.50	25.57	32.00
HYDROGRAPH AT	A2	65.	29.00	64.	48.	20.	0.44		
HYDROGRAPH AT	A3	38.	29.00	38.	28.	12.	0.30		
HYDROGRAPH AT	A4	51.	19.50	47.	24.	8.	0.18		
4 COMBINED AT	J@SA5	180.	29.00	177.	144.	63.	1.42		
ROUTED TO	SA5	180.	30.00	177.	144.	63.	1.42	13.76	30.00
HYDROGRAPH AT	A5	50.	35.00	49.	42.	20.	0.44		
2 COMBINED AT	J@RMP1	226.	30.50	222.	183.	83.	1.86		
HYDROGRAPH AT	A6	39.	30.50	38.	30.	13.	0.37		
HYDROGRAPH AT	A7	22.	29.50	22.	17.	7.	0.18		
2 COMBINED AT	J@SA8	61.	30.00	60.	47.	20.	0.55		
ROUTED TO	SA8	61.	31.00	60.	47.	20.	0.55	18.57	31.00
HYDROGRAPH AT	A8	34.	36.00	33.	29.	14.	0.35		
HYDROGRAPH AT	A9	107.	19.50	97.	49.	17.	0.37		
3 COMBINED AT	J@RMP2	134.	21.00	130.	110.	51.	1.27		
HYDROGRAPH AT	B1	101.	27.50	98.	71.	28.	0.60		
HYDROGRAPH AT	B2	187.	13.00	83.	27.	9.	0.19		
ROUTED TO	BMP1	138.	14.00	54.	22.	9.	0.19	51.10	14.00
2 COMBINED AT	J@SB3	144.	14.00	110.	89.	37.	0.79		
ROUTED TO	SB3	140.	15.00	110.	89.	37.	0.79	29.54	15.00
HYDROGRAPH AT	B4	98.	24.50	95.	62.	23.	0.48		
HYDROGRAPH AT	B5	78.	28.50	76.	57.	24.	0.54		
2 COMBINED AT	J@SB6	169.	26.00	164.	118.	47.	1.02		
ROUTED TO	SB6	169.	26.50	164.	118.	47.	1.02	21.60	26.50
HYDROGRAPH AT	B3	56.	34.50	55.	46.	22.	0.46		
HYDROGRAPH AT	B6	42.	31.50	41.	33.	15.	0.29		
4 COMBINED AT	J@SB7	364.	28.00	356.	276.	121.	2.55		

HYDROGRAPH AT	B7	58.	35.50	57.	49.	24.	0.49		
2 COMBINED AT	J@RMP3	412.	29.00	404.	321.	145.	3.05		
3 COMBINED AT	J@RMP	752.	29.00	740.	607.	279.	6.18		
ROUTED TO	RMP	722.	32.00	713.	593.	277.	6.18	13.23	32.00

POST-100

Langley and McDonald, P.C.
ENGINEERS • SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS • ENVIRONMENTAL CONSULTANTS
VIRGINIA BEACH • WILLIAMSBURG, VIRGINIA

Subject RICHARDSON MILL POND
Computed By DBT Checked By

Project No. 96038-0445
Client STONEHOUSE
Date 9/12/96 Sheet No.

DOWNSTREAM CHANNEL ADEQUACY

SECTION A - ~25'-30' D/S OF SPILLWAYS

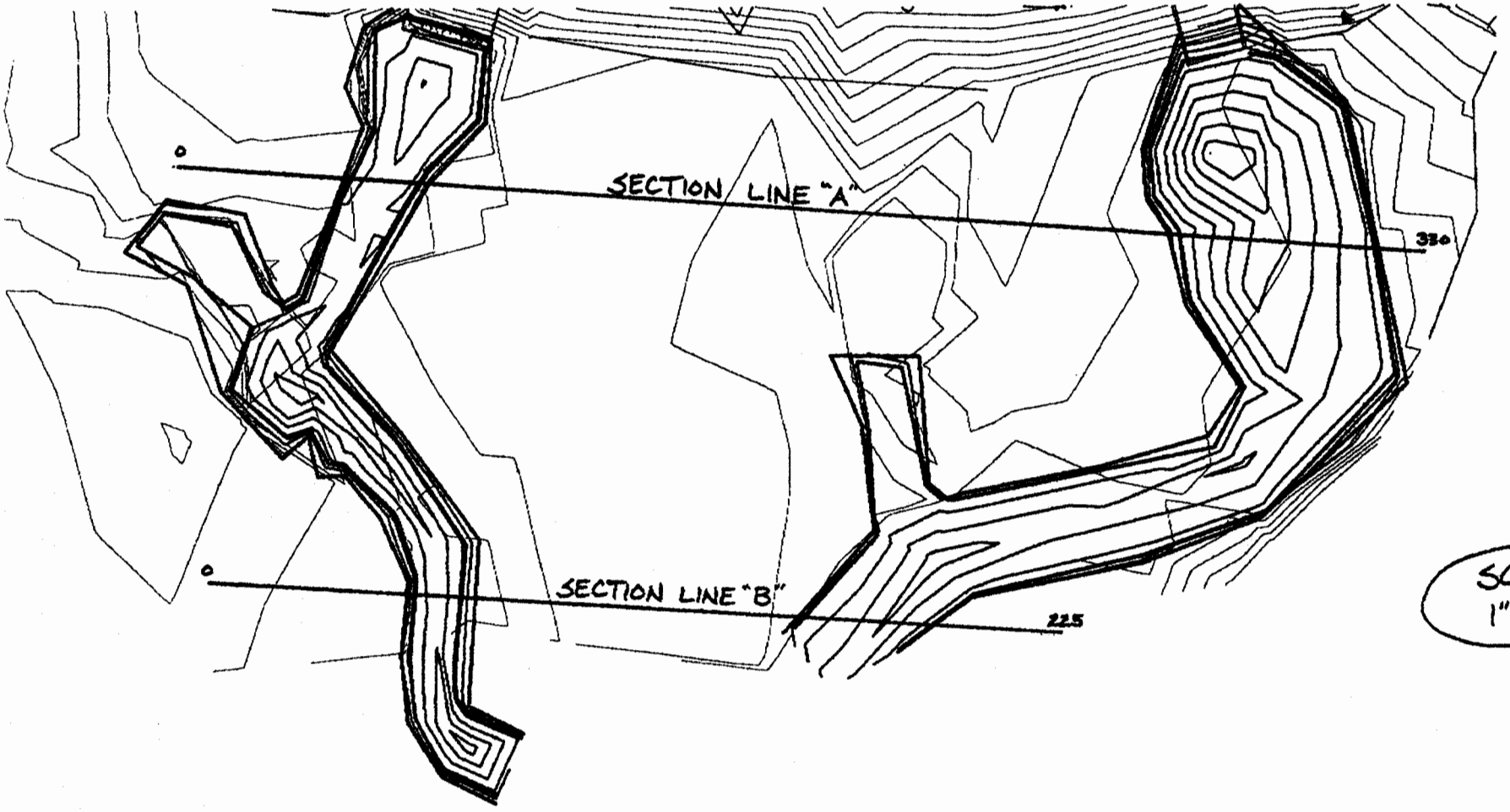
	PRE DEVELOPMENT			POST-DEVELOPMENT		
	Q (CFS)	V (FPS)	Y (FT)	Q (CFS)	V (FPS)	Y (FT)
2-YR	113	2.02	2.33	179	2.22	2.89
10-YR	288	2.46	3.51	390	2.64	3.95

SECTION B - ~125' DOWNSTREAM OF S'WAYS

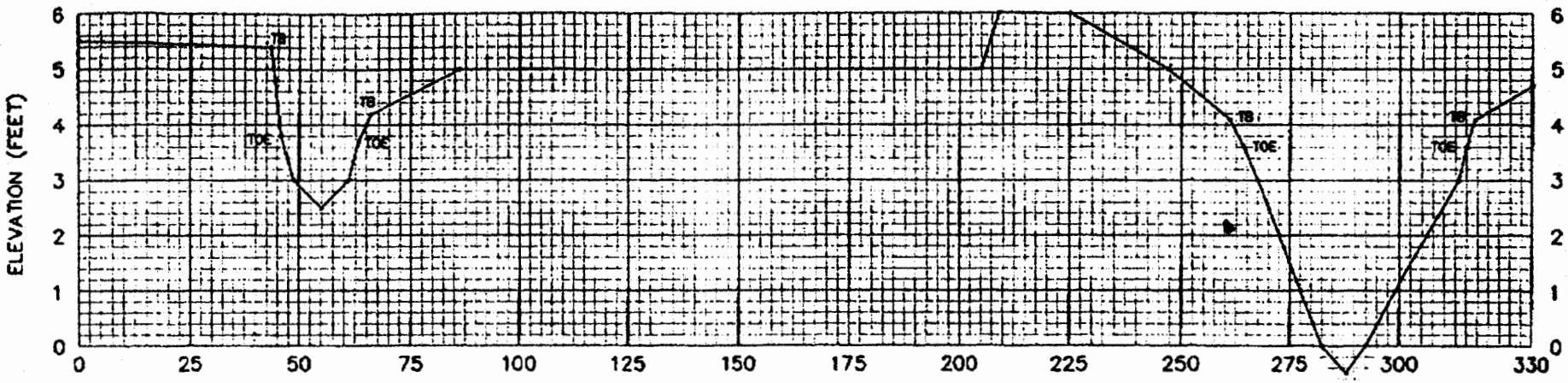
	PRE-DEV.			POST-DEV.		
	Q (CFS)	V (FPS)	Y (FT)	Q (CFS)	V (FPS)	Y (FT)
2-YR	113	1.98	3.58	179	2.10	4.67
10-YR	288	2.21	4.08	390	1.95	5.09

NO SIGNIFICANT INCREASES IN CHANNEL VELOCITY.

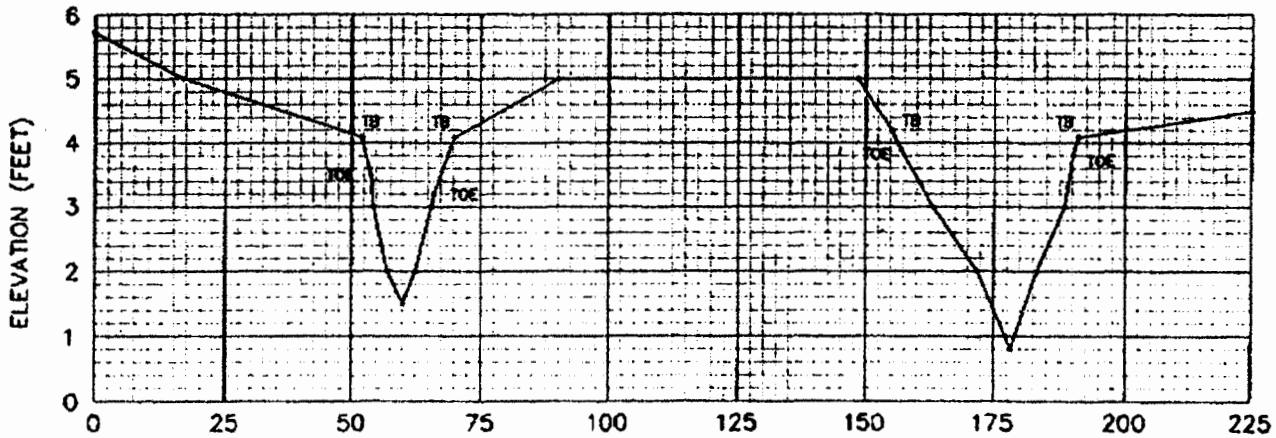
SEE ATTACHED PRINTOUTS.



SCALE:
1" = 30'



SECTION "A"



SECTION "B"

SECTION "A"

NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Q (CFS) ? 113
S (FT/FT) ? .045 24HR PRE "A"

Enter up to 20 cross-section points.
Enter (Return) only for distance to end.

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.5	.6	225	6	.6
43.5	5.4	.6	247	5	.6
45.5	3.8	.3	261	4.1	.6
55	2.5	.2	264	3.6	.3
61	3	.2	282.5	0	.2
63	3.7	.3	292.5	0	.2
66	4.2	.6	313	3	.2
86	5	.6	315	3.6	.3
205	5	.6	317	4.1	.6
209	6	.6	330	4.7	.6

RESULTS
==========
Y= 2.33 FT
A= 55.91 SF
P= 38.32 FT
V= 2.02 FPS
F= 0.29 SUB-CRITICAL FLOW

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

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NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Q (CFS) ? 179
S (FT/FT) ? .045 24HR POST "A"

Enter up to 20 cross-section points.
Enter (Return) only for distance to end.

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.5	.6	225	6	.6
43.5	5.4	.6	247	5	.6
45.5	3.8	.3	261	4.1	.6
55	2.5	.2	264	3.6	.3
61	3	.2	282.5	0	.2
63	3.7	.3	292.5	0	.2
66	4.2	.6	313	3	.2
86	3	.6	315	3.6	.3
205	5	.6	317	4.1	.6
209	6	.6	330	4.7	.6

RESULTS
==========
Y= 2.89 FT
A= 80.51 SF
P= 52.75 FT
V= 2.22 FPS
F= 0.32 SUB-CRITICAL FLOW

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

---

NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED [illegible]

10 YR PRE "A"

RESULTS
==========

Y= 3.51 FT
A= 117.30 SF
P= 65.95 FT
V= 2.46 FPS
F= 0.32 SUB-CRITICAL FLOW

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.5	.6	225	6	.6
43.5	5.4	.6	247	5	.6
45.5	3.8	.3	261	4.1	.6
55	2.5	.2	264	3.6	.3
61	3	.2	282.5	0	.2
63	3.7	.3	292.5	0	.2
66	4.2	.6	313	3	.2
86	5	.6	315	3.6	.3
205	5	.6	317	4.1	.6
209	6	.6	330	4.7	.6

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Q (CFS) ? 390
S (FT/FT) ? .045

10 YR POST "A"

Enter up to 20 cross-section points.
Enter (Return) only for distance to end.

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.5	.6	225	6	.6
43.5	5.4	.6	247	5	.6
45.5	3.8	.3	261	4.1	.6
55	2.5	.2	264	3.6	.3
61	3	.2	282.5	0	.2
63	3.7	.3	292.5	0	.2
66	4.2	.6	313	3	.2
86	5	.6	315	3.6	.3
205	5	.6	317	4.1	.6
209	6	.6	330	4.7	.6

RESULTS
==========

Y= 3.95 FT
A= 147.68 SF
P= 74.73 FT
V= 2.64 FPS
F= 0.33 SUB-CRITICAL FLOW

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

"A"

SECTION "B"

NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Q (CFS) ? 113
S (FT/FT) ? .045

2YR PRE "B"

RESULTS
==========
Y= 3.58 FT
A= 56.98 SF
P= 45.76 FT
V= 1.98 FPS
F= 0.31 SUB-CRITICAL FLOW

Enter up to 20 cross-section points.
Enter (Return) only for distance to end.

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.7	.6	148	5	.6
17	5	.6	155	4.2	.6
52	4.1	.6	157	3.9	.3
53.5	3.5	.3	172	2	.2
57	2	.2	178	.8	.2
60	1.5	.2	183	2	.2
62.5	2	.2	188.5	3	.2
66	3.2	.3	190	3.8	.3
70	4.1	.6	191	4.1	.6
90	5	.6	225	4.5	.6

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

---

NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Q (CFS) ? 179
S (FT/FT) ? .045

2YR POST "B"

RESULTS
==========
Y= 4.08 FT
A= 81.13 SF
P= 54.52 FT
V= 2.21 FPS
F= 0.31 SUB-CRITICAL FLOW

Enter up to 20 cross-section points.
Enter (Return) only for distance to end.

CROSS-SECTION POINTS

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.7	.6	148	5	.6
17	5	.6	155	4.2	.6
52	4.1	.6	157	3.9	.3
53.5	3.5	.3	172	2	.2
57	2	.2	178	.8	.2
60	1.5	.2	183	2	.2
62.5	2	.2	188.5	3	.2
66	3.2	.3	190	3.8	.3
70	4.1	.6	191	4.1	.6
90	5	.6	225	4.5	.6

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

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NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Enter up to 20 cross-section points.

10 YR PRE "B"

RESULTS

==========

Y= 4.67 FT
A= 136.89 SF
P= 128.79 FT
V= 2.10 FPS
F= 0.36 SUB-CRITICAL FLOW

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.7	.6	148	5	.6
17	5	.6	155	4.2	.6
52	4.1	.6	157	3.9	.3
53.5	3.5	.3	172	2	.2
57	2	.2	178	.8	.2
60	1.5	.2	183	2	.2
62.5	2	.2	188.5	3	.2
66	3.2	.3	190	3.8	.3
70	4.1	.6	191	4.1	.6
90	5	.6	225	4.5	.6

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

---

NATURAL CHANNELS

VARIABLES LIST:
Y - FLOW ELEVATION Q - FLOWRATE S - CHANNEL SLOPE

VARIABLE TO BE SOLVED (Y,Q OR S) ? Y

Q (CFS) ? 390
S (FT/FT) ? .045

Enter up to 20 cross-section points.
Enter (Return) only for distance to end.

CROSS-SECTION POINTS

10 YR POST "B"

RESULTS

==========

Y= 5.09 FT
A= 200.17 SF
P= 211.73 FT
V= 1.95 FPS
F= 0.35 SUB-CRITICAL FLOW

DIST	ELEV	COEFF	DIST	ELEV	COEFF
0	5.7	.6	148	5	.6
17	5	.6	155	4.2	.6
52	4.1	.6	157	3.9	.3
53.5	3.5	.3	172	2	.2
57	2	.2	178	.8	.2
60	1.5	.2	183	2	.2
62.5	2	.2	188.5	3	.2
66	3.2	.3	190	3.8	.3
70	4.1	.6	191	4.1	.6
90	5	.6	225	4.5	.6

(Shift) (Prt Sc) print (Return) repeat (Space Bar) back to menu

---

B

REVISED MASTER PLAN WITH 25% SLOPE

1 PAR #	2 LAND USE	3 NET DV AREA	4 DENSTY DU/AC	5 # UNITS	6 SQ. FOOT X1,000	7 IMPRV RATE	8 BUFFER AREA	9 ROAD AREA	10 PATH AREA	11 WETLAND AREA	12 IMP AREA	13 NET IMP SURFAC
14	A- Single family residential	12.8	0.8	10.0		14%	45.1	0.0	0.0		2.2	4%
15	A- Single family residential	76.3	1.8	138.0		19%	23.2	3.7	1.5		17.4	17%
16	A- Single family residential	6.1	1.6	10.0		18%	11.9	0.0	0.0		1.2	7%
17	A- Single family residential	12.9	1.1	14.0		15%	11.8	0.0	0.0		2.1	8%
18	A- Single family residential	128.0	1.4	182		17%	122.6	3.2	1.3		25.3	10%
22	A - Single family residential	33.4	1.8	60		19%	59.0	0.0			6.9	8%
28	A - Single family residential	30.0	1.0	30		15%	22.7	0.0			4.7	9%
29	A - Single family residential	45.0	2.9	130		25%	47.1	1.0	0.9		12.6	13%
31	A - Single family residential	29.4	4.1	120		31%	46.2	0.0			9.6	13%
32	A - Single family residential	94.1	2.2	210		21%	147.8	5.0	0.6		24.4	10%
	Subtotal A - SFR	468.0		904.0			537.4	12.9	4.3	0.0	106.6	10%
1	B - Multifamily residential	26.8	6.0	161		45%	10.0	0.0	0.0		12.2	33%
7	B - Multifamily residential	15.2	5.1	78		40%	9.2	0.0			6.2	25%
21	B - Multifamily residential	44.8	3.3	147		26%	39.2	0.0			12.0	14%
30	B - Multifamily residential	29.1	1.0	30		15%	68.8	0.0			5.1	5%
	Subtotal B - MFR	115.9		416.0			127.2	0.0	0.0	0.0	35.4	15%
12	C/D - Multifamily residential	9.9	12.1	120		50%	18.1	0.0	0.1		5.2	18%
	Subtotal D - MFR	9.9		120			18.1	0.0	0.1	0.0	5.2	18%
8	E - Convention Center	8.8	0.0	0	250 Rooms	65%	10.4	0.8	0.3		6.4	32%
10	E - Commercial	5.2	0.0	0	25	70%	2.5	0.5	0.2		4.0	48%
23	E - Commercial	3.6	0.0	0	4	65%	0.6	2.3	0.3		3.8	56%
24	E - Commercial	2.8	0.0	0	8	65%	2.2	2.3	0.3		3.3	44%
33	E - Commercial	83.7	0.0	0.0	300	65%	29.2	0.0	0.0		54.7	48%
	Subtotal E - Comm.	104.1		0.0	337.0		44.9	5.9	1.1	0.0	72.3	46%
2	F/G - Office/Business	14.7	0.0	0	608	65%	5.9	3.9	0.8		12.2	48%
4	F/G - Office/Business	5.6	0.0	0		65%	2.1	3.0	0.6		5.7	50%
5	F/G - Office/Business	52.9	0.0	0		65%	20.9	9.9	2.1		41.2	48%
19	G - Office Park	9.0			90	65%	9.2	3.3	0.7		8.2	37%
20	G - Office Park	17.9	0.0	0	190	65%	2.9	5.7	1.2		15.5	56%
26	G - Office Park	55.1			400.0	65%	68.4	1.9	0.8		37.9	30%
34	G - Office Park	28.5			285.0	65%	32.2	0.0	0.0		18.8	31%
35	F - Business Park	31.5	0.0	0	280	65%	41.2	6.3	1.3		25.1	31%
81	F/G/H/ - R&D/Business	42.9	0.0	0	400	65%	33.1	0.0	0.0		28.2	37%
	Subtotal F/G/H	258.1		0	2253.0		215.9	34.0	7.5	0.0	192.8	37%
28	I - Municipal/School	21.0	0.0	0		55%	114.0	0.0	0.0		12.7	9%
38	I - Municipal Use	4.0	0.0	0		55%	0.0	0.0	0.0		2.2	55%
	Subtotal Public Use	25.0		0			114.0	0.0	0.0	0.0	14.9	11%
21	J - Park	3.0	0.0	0		1%	2.4	0.1	0.1		0.1	3%
25	J - Community Center	12.2	0.0	0		65%	6.9	0.0	0.0		8.0	42%
27	J - Park	7.6	0.0	0		1%	4.9	1.5	0.6		1.2	8%
	J - Recreation/Golf	242.2	0.0	0		2%	0.0	0.0	0.0		4.8	2%
6		13.8	0.0	0		1%	6.8	2.7	0.6		2.0	8%
9		6.3	0.0	0		1%	0.0	0.0	0.5		0.2	3%
13		7.2	0.0	0		1%	0.0	1.6	0.7		1.3	13%
	Subtotal J - Rec.	292.3		0.0			21.0	5.9	2.5	0.0	17.7	8%
	Total	1273.3		1440.0	2590.0		1078.5	58.7	15.5	0.0	444.9	18%
	Total area in acres	2426.0										

REVISED MASTER PLAN WITH 25% SLOPE
LAND DRAINING TO RICHARDSON'S MILL POND

1 PAR #	2 LAND USE	3 NET DV AREA	4 DENSTY DU/AC	5 # UNITS	6 SQ. FOOT X1,000	7 IMPRV RATE	8 BUFFER AREA	9 ROAD AREA	10 PATH AREA	11 WETLAND AREA	12 IMP AREA	13 NET IMP SURFAC
14	A- Single family residential	12.8	0.8	10.0		14%	45.1	0.0	0.0		2.2	4%
15	A- Single family residential	76.3	1.8	138.0		19%	23.2	3.7	1.5		17.4	17%
16	A- Single family residential	6.1	1.6	10.0		18%	11.9	0.0	0.0		1.2	7%
17	A- Single family residential	12.9	1.1	14.0		15%	11.8	0.0	0.0		2.1	8%
18	A- Single family residential	128.0	1.4	182		17%	122.6	3.2	1.3		25.3	10%
29	A - Single family residential	45.0	2.9	130		25%	47.1	1.0	0.9		12.6	13%
31	A - Single family residential	29.4	4.1	120		31%	46.2	0.0	0.0		9.6	13%
32A	A - Single family residential	57.0	0.7	40		13%	113.5	3.0	0.6		10.5	6%
	Subtotal A - SFR	367.5		644.0			421.4	10.9	4.3	0.0	81.0	10%
1	B - Multifamily residential	26.8	6.0	161		45%	10.0	0.0	0.0		12.2	33%
7	B - Multifamily residential	15.2	5.1	78		40%	9.2	0.0	0.0		6.2	25%
	Subtotal B - MFR	42.0		239.0			19.2	0.0	0.0	0.0	18.3	30%
12	C/D - Multifamily residential	9.9	12.1	120		50%	18.1	0.0	0.1		5.2	18%
	Subtotal D - MFR	9.9		120			18.1	0.0	0.1	0.0	5.2	18%
8	E - Convention Center	8.8	0.0	0	250 Rooms	65%	10.4	0.8	0.3		6.4	32%
10	E - Commercial	5.2	0.0	0	25	70%	2.5	0.5	0.2		4.0	48%
24	E - Commercial	2.8	0.0	0	8	65%	2.2	2.3	0.3		3.3	44%
	Subtotal E - Comm.	16.8		0.0	33.0		15.1	3.6	0.8	0.0	13.8	38%
2	F/G - Office/Business	14.7	0.0	0	808	65%	5.9	3.9	0.8		12.2	48%
4	F/G - Office/Business	5.6	0.0	0		65%	2.1	3.0	0.6		5.7	50%
5	F/G - Office/Business	52.9	0.0	0		65%	20.9	9.9	2.1		41.2	48%
26	G - Office Park	55.1			400.0	65%	68.4	1.9	0.8		37.9	30%
34	G - Office Park	28.5			285.0	65%	32.2	0.0	0.0		18.8	31%
35	F - Business Park	31.5	0.0	0	280	65%	41.2	6.3	1.3		25.1	31%
	Subtotal F/G/H	188.3		0.0	1573.0		170.7	25.0	5.6	0.0	141.0	38%
26	I - Municipal/School	21.0	0.0	0		55%	114.0	0.0	0.0		12.7	9%
38	I - Municipal Use	4.0	0.0	0		55%	0.0	0.0	0.0		2.2	55%
	Subtotal Public Use	25.0		0			114.0	0.0	0.0	0.0	14.9	11%
21	J - Park	3.0	0.0	0		1%	2.4	0.1	0.1		0.1	3%
27	J - Park	7.6	0.0	0		1%	4.9	1.5	0.6		1.2	8%
	J - Recreation/Golf	242.2	0.0	0		2%	0.0	0.0	0.0		4.8	2%
6		13.8	0.0	0		1%	6.8	2.7	0.6		2.0	8%
9		6.3	0.0	0		1%	0.0	0.0	0.5		0.2	3%
13		7.2	0.0	0		1%	0.0	1.6	0.7		1.3	13%
	Subtotal J - Rec.	280.1		0.0			14.1	5.9	2.5	0.0	9.7	3%
	Subtotal area draining to R. M. Pond	929.6		1003.0	1606.0		772.6	45.4	13.3	0.0	283.8	16%
	Total area	1760.9										

DEVELOPMENT TOTALS

	ACREAGE	UNITS	SQ FOOT
A - Single family residential	468.0	904	
B - Multi family residential	115.9	416	
D - Multi family residential	9.9	120	
Total Residential	593.8	1440	
Recreation/Community Center	292.3		
Pathway	15.5		
TOTAL RECREATIONAL	307.8		
TOTAL RESIDENTIAL/RECREATIONAL	901.6		
E - Commercial	104.1		8
G&FH - Office/Business	258.1		2253
TOTAL COMMERCIAL/OFFICE	362.2		2261
Public Use	25.0		
Roads	58.7		
TOTAL ROADS	58.7		
TOTAL DEVELOPMENT AREA	1347.5		

COLUMN DESCRIPTIONS

1	PARCEL
2	LAND USE
3	NET DEVELOPABLE AREA
4	UNITS/NET DEVELOPABLE AREA
5	NUMBER OF UNITS PER PARCEL
8	IMPERVIOUS RATE (RPOD NUMBERS)
9	BUFFER AREA
10	ROAD AREA
11	PATH AREA
12	WETLANDS
13	(NET DEVELOPABLE AREA * IMPERVIOUS RATE) + ((BUFFER + WETLANDS) * 1%) + (ROAD * 60%) + (PATH * 33%)
14	(NET DEVELOPABLE AREA * IMPERVIOUS RATE) + ((BUFFER + WETLANDS) * 1%) + (ROAD * 60%) + (PATH * 33%) / (NET DEVELOPABLE AREA + BUFFER + ROAD + PATH + WETLANDS)
15	COUNTY
16	PHASE 7.0
0	ABOVE OR BELOW IMPOUNDMENT

SED MASTER PLAN WITH 25% SLOPE
ND NOT DRAINING TO RICHARDSON'S MILL POND

1 PAR #	2 LAND USE	3 NET DV AREA	4 DENSTY DU/AC	5 # UNITS	6 SQ. FOOT X1,000	7 IMPRV RATE	8 BUFFER AREA	9 ROAD AREA	10 PATH AREA	11 WETLAND AREA	12 IMP AREA	13 NET IMP SURFAC
22	A - Single family residential	33.4	1.8	60		19%	59.0	0.0			6.9	8%
28	A - Single family residential	30.0	1.0	30		15%	22.7	0.0	0.0		4.7	9%
32B	A - Single family residential	37.1	3.0	170		26%	34.3	2.0	0.0		11.2	15%
	Subtotal A - SFR	100.5		260.0			116.0	2.0	0.0	0.0	22.8	10%
21	B - Multifamily residential	44.8	3.3	147		26%	39.2	0.0	0.0		12.0	14%
30	B - Multifamily residential	29.1	1.0	30		15%	68.8	0.0			5.1	5%
	Subtotal B - MFR	73.9		177.0			108.0	0.0	0.0	0.0	17.1	9%
23	E - Commercial	3.6	0.0	0	4	65%	0.6	2.3	0.3		3.8	56%
33	E - Commercial	83.7	0.0	0.0	300	65%	29.2	0.0	0.0		54.7	48%
81	F/G/H/ - R&D/Business	42.9	0.0	0	400	65%	33.1	0.0	0.0		28.2	37%
19	G - Office Park	9.0			90	65%	9.2	3.3	0.7		8.2	37%
20	G - Office Park	17.9	0.0	0	190	65%	2.9	5.7	1.2		15.5	56%
	Subtotal F/G/H	157.1		0.0	984.0		75.0	11.3	2.2	0.0	110.4	45%
25	J - Community Center	12.2	0.0	0		65%	6.9	0.0	0.0	0.0	8.0	42%
	Subtotal J - Rec.	12.2		0.0			6.9	0.0	0.0	0.0	8.0	42%
	Subtotal area not draining to R. M. Pond	343.7		437.0	984.0		305.9	13.3	2.2	0.0	158.3	24%
	Total area	665.1										
	Overall Total	1273.3		1440.0	2590.0		1078.5	58.7	15.5	0.0	442.1	
	Total area in acres	2426.0										

May 9, 1995

STONEHOUSE
RICHARDSON'S MILL POND (R.M.P.)

OVERALL AVERAGE 18% IMPERVIOUS PROPOSED
(SEE ATTACHED)

ASSUME CONSERVATIVELY 20% IMPERVIOUS

CALCULATIONS ON BMP SHEET:

-	ASSUME	R.M.P.	8.0 MIN BMP
-	ASSUME	WEG #1	11.0 BMP
_	ASSUME	WEG #2	11.0 BMP

NEED FOR 10 PTS. 984 AC. UNDISTURBED NATURAL OPEN SPACE

TOTAL DEV. AREA ONE	2425 AC.
TOTAL STONEHOUSE TO R.M.P.	1761 AC.
BUFFER (25% SLOPE/WETLANDS)	1078 AC.

1748	ACRES WITHIN STONEHOUSE
+2268	ACRES OUTSIDE STONEHOUSE
4016	ACRES DRAINING TO RICHARDSON'S MILL POND

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
WEG #1	11	x	$\frac{100}{2425}$	=	0.45
WEG #2	11	x	$\frac{44}{2425}$	=	0.20
R.M.P.	8	x	$\frac{1748-144}{2425}$	=	5.29
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 5.94

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
$\frac{984}{2425}$	x	10 (0.1 per 1%)	=	4.06

C. TOTAL WEIGHTED POINTS

5.94	+	4.06	=	10.00
Structural BMP Points		Natural Open Space Points		TOTAL

WEG #1 = 100 AC.
WEG #2 = 44 AC.
TOTAL STONEHOUSE ACREAGE TO R.M.P. = 1748 AC.
TOTAL STONEHOUSE ACREAGE DEVELOPMENT AREA ONE 2425 AC.

DRAINAGE, STORMWATER MANAGEMENT, AND EROSION CONTROL DESIGN

AT 20% IMPERVIOUS OVERALL

VOLUME REQUIREMENTS AT 20% IMPERVIOUS

$$V_r - \frac{(R_m)(R_v)}{12} \times AC$$

$R_v = [0.05 + 0.009I] = 0.05 + 0.009\ (20) = 0.230$

$R_m = 0.45"$ FOR WET DETENTION DESIGNS

$A_c = 4016$

$$V_r = \frac{(0.45)(0.23)}{12} \times 4016\ AC = 34.64\ ac.ft. = 1{,}508{,}831\ cu.ft.$$

FOR A 9 POINT BMP	$V_r \times 4$	= 6,035,325 cu.ft.
FOR AN 8 POINT BMP	$V_r \times 2.5$	= 3,772,078 cu.ft.

VOLUME AVAILABLE IN R.M.P.

130 ac.ft. X 43,560 = 5,662,800 cu.ft.

APPENDIX B
GEOTECHNICAL ENGINEERING STUDY
PREPARED BY SCHNABLE ENGINEERING ASSOCIATES

Geotechnical Engineering Study
Richardson Millpond Dam
New Kent County, Virginia

Project 963392

September 4, 1996

Prepared for:

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COMMONWEALTH OF VIRGINIA
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PROFESSIONAL ENGINEER

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Senior Associate

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Senior Associate

EXECUTIVE SUMMARY

Our evaluation of Richardson Millpond Dam indicates the existing dam is in relatively good condition. Based on our observations and subsurface exploration data, the existing embankment is considered stable in its existing configuration. Ground water levels within the embankment indicate embankment seepage is not a problem. Therefore, remedial grading of the embankment and installation of embankment seepage controls are not considered necessary.

However, there are several problems which should be addressed. Some of problems are significant enough to warrant immediate action, particularly in the area of the two spillways. Others problems will eventually require attention, but do not require immediate action.

Seepage is currently occurring beneath and immediately around both spillway structures. This seepage has caused the development of voids beneath the spillway slabs. Continued uncontrolled seepage will further erode soils from beneath these structures and will ultimately result in their failure. Therefore, we recommend several actions be taken immediately to address these problems. These actions are:

- Both spillway slabs should be grouted. This will both fill the existing voids and will help seal existing seepage paths.

- Drainage filters should be installed at the bottom of the spillway walls. These filters will collect seepage through the embankment along the outside of the wall and allow it to dissipate safely. Also, a drainage filter should be installed at the downstream end of both spillway slabs to collect seepage along the concrete soil interface.

- Either grout-filled bag or riprap erosion protection should be installed at the downstream end of the north spillway. Similarly, erosion protection should be provided on either side of the spillways to protect the drainage filters.

- All trees should be removed from within 15 ft of the spillways. Stumps and roots should be removed and replaced with compacted fill.

- All cracks and joints in the spillway concrete should be caulked to prevent flow of water into them.

- All voids/animal borrows should be filled with grout.

- An inspection program should be implemented to detect the development of undesirable conditions.

We anticipate several other actions will be required in the future. However, these actions are not necessary immediately and their implementation should be determined based on the periodic inspections of the dam. These actions include:

- Ultimately, all trees should be removed from the embankment. However, because of the location of the trees and the width of the embankment, we do not consider this an immediate concern. The trees along the embankment should be checked during periodic inspections, and any dead or dying trees should be promptly removed.

- Wave erosion of the upstream face is expected to continue. At this time, it is not considered significant. As this erosion progresses, however, periodic repair of the slope will be required to prevent damage to the roadway and/or spillway structures. Future installation of erosion protection may be required on the upstream face if the rate of erosion continues.

- It is unclear if movement of the downstream portion of the north spillway walls is occurring. The grouting of the spillway and the installation of filters may eliminate any movement that may be occurring. If monitoring indicates movement is continuing, it will be necessary to modify or replace these wall sections at some future date.

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Appendices:

Appendix A: Subsurface Exploration Data

1. INTRODUCTION

1.1 Scope of Services

The objective of this study is to evaluate the condition of the exiting earth dam and spillways, and to provide recommendations for remedial construction. The scope of this study is as defined in our proposal for this project dated August 14, 1996, (P63315). Our services included site reconnaissance, subsurface exploration, field engineering, and development of geotechnical engineering recommendations.

1.2 Site Description

The existing dam is located on Ware Creek along the New Kent / James City County border. Route 600 crosses the dam. The dam is an earth embankment with two concrete chute spillways. The embankment is about 250 ft long and has a crest elevation generally between about El 14 and 15. The toe of the dam is generally between about El 4 and 6. The crest width ranges from about 15 to 25 ft. The embankment slopes are typically between 2H:1V and 3H:1V.

The chute spillways consist of concrete slabs with concrete walls about 2 to 4 ft high. The south spillway has a weir elevation of 9.90 and is about 20 ft wide. The north spillway has a slightly lower weir elevation of El 9.52 and is about 15 ft wide. The normal pool of the pond is about El 9.8. The normal tailwater elevation is about El 4.5.

We understand the existing pond is to be used as a BMP for the Stonehouse Development. We further understand a hydrologic and hydraulic analyses of the pond and spillways indicate the existing spillways are adequate to handle the anticipated flows.

We obtained the site information from the topographic site data provided by Langley and McDonald and through our site visits.

WC059_RICHARDSON_MILL_POND - 110

2. DATA COLLECTION AND ANALYSIS

2.1 Geology

We reviewed existing geologic data and information in our files. Based on this review, the geologic stratigraphy at this site represents a valley eroded through the Bacons Castle Formation into the underlying Yorktown Formation. In the valley bottom, the Yorktown Formation has partially eroded and been replaced with recent alluvial deposits.

2.2 Data Collection Techniques

Three test borings were drilled at this site under our observation by Ayers and Ayers, Inc. of Powhatan, Virginia. The test borings were drilled along the embankment crest. Additionally, personnel from our office excavated three hand auger probes during our site visits. Two of the hand auger probes were in the embankment slopes near the spillways. The third was drilled at the embankment toe near the middle of the dam. Specific observations, remarks, and logs for the borings and hand auger probes, classification criteria and sampling protocols are included in Appendix A. Approximate test boring and hand auger probe locations are shown in Figure A1 in Appendix A. Soil samples will be retained up to 45 days beyond the issuance of this report, unless other disposition is requested.

Senior engineering personnel conducted a site reconnaissance of the dam embankment and spillways. The embankment reconnaissance included walking the dam to identify areas of instability, seepage and erosion. The spillway reconnaissance include a visual inspection of the spillway structures and surrounding embankments, and soundings of the slab with a rock hammer to identify voids beneath the slabs. Details of our observations are presented in Section 2.5.

2.3 Generalized Subsurface Stratigraphy

We have characterized the following generalized subsurface soil stratigraphy based on the test boring and hand auger probe data presented in Appendix A:

Stratum A:
Stratum A represents dam embankment fill. These soils were encountered from the ground surface to depths of 0.5 to 8.5 ft. Stratum A consists of loose to firm density silty sand FILL.

Stratum B:

We encountered Stratum B below Stratum A to depths of 17 ft in Borings B-1 and B-3, and to the bottom of Boring B-2 and the hand auger probes, 5.5 ft to 35 ft. Stratum B consists of loose to firm density CLAYEY SAND (SC) and POORLY GRADED SAND WITH SILT (SP-SM). This stratum represents recent alluvial deposits.

Stratum C:

Stratum C represents the Yorktown Formation. We encountered this stratum below Stratum B to the bottom of Borings B-1 and B-3, 30 ft. Stratum C consists of loose to firm density SILTY SAND (SM).

2.4 Ground Water

Water level readings which were obtained in the borings and hand auger probes during and after completion are noted in the logs. We observed ground water during drilling in all of the borings at depths of 8 to 8.5 ft, about El 5.9 to 6.8, and in the hand auger probes at depths of 4.7 to 5.3 ft, about El 3.6. Water observation wells were installed in all borings and hand auger probes. We recorded ground water levels in the wells along the embankment crest (Borings B-1 through B-3) at depths of 7.2 to 8.8 ft, El 5.6 to 7.6. We recorded ground water levels in the wells in the downstream slope (Hand Augers HA-1 and HA-3) and at the downstream toe (Hand Auger HA-2) at depths of 1.1 to 4.5 ft, El 4.1 to 5.2. These water level readings were obtained 7 days after completion of drilling.

The ground water levels on the logs show our estimate of the hydrostatic water table at the time of the water level readings. Fluctuations in the hydrostatic water table should be anticipated depending on variations in precipitation, surface runoff, reservoir pool levels, evaporation, stream levels and similar factors.

2.5 Site Reconnaissance

2.5.1 Embankment

In general, the existing dam embankment is in good shape. We observed no indication of embankment seepage or instability. Two marsh areas were identified downstream of the embankment. However, no flow from the direction of the embankment was observed. These areas appeared to be low lying, natural marsh areas that are not related to the dam.

Minor wave erosion was observed on the upstream face. Large trees are growing on both the upstream and downstream slopes.

Several voids were observed in the embankment. Three were observed on the upstream face along the guard rail extending south from the bridge of the north spillway. Another similar void was observed behind the guard rail extending north from the north spillway along the crest of the downstream slope. Finally, several voids were observed along north spillway walls. These voids are of the size and shape of large animal borrows, but do not show any signs of recent use.

2.5.2 North Spillway

Because the north spillway has a constant flow of water several inches deep, detailed observation of spillway conditions was difficult. We used sand bags to divert flow from specific areas. However, all flow could not be eliminated.

In general, the concrete of the north spillway structure appears to be in good condition. No spalling was observed. The surface of the slab appeared soft when struck with a rock hammer. This soft surface layer could be scraped away to reveal hard concrete below. This layer was only about 1/8 of an inch thick and probably represents weathering due to the constant flow of water over the slab.

The downstream 12 ft of the spillway walls appear to be of more recent construction. An apparent construction joint separated these sections from the remainder of the wall. The joint on the north wall is relatively narrow, but the joint in the south wall is open about 1 inch. We did not see any indication that this section of wall has moved relative to the slab, or that the slab has moved. The joints between both spillway walls and the base slab appear to have been patched in the past, but a joint between the patch and the concrete remains.

Several cracks were observed in the slab. These cracks extend from the joint in the south wall (12 ft up from the downstream end) to the downstream edge of the slab. The longest crack extends to about the middle of the downstream edge of the slab. These cracks are tight and no obvious horizontal or vertical displacement was observed.

We did not observe seepage flows from around the spillway walls. However, the slopes behind both walls appeared to have been eroded, particularly behind the south wall.

Several voids/animal borrows were observed in these areas as noted in Section 2.5.1 above. The areas behind both walls contain a large concentration of tree roots from the large trees growing near the spillways.

Sounding of the north spillway slab revealed several hollow sounding areas. We also observed a large void extending from the downstream end of the spillway up under the slab. This void extends at least 37 inches up under the slab at its south edge and about 30 inches at the middle of the slab. The void was not present at the north edge of the slab.

2.5.3 South Spillway

At the time of our visits, there was little or no flow through the south spillway. Therefore, we were able to observed the entire spillway section.

In general, the concrete of the south spillway structure appears to be in good condition. No spalling was observed. A couple of minor cracks were observed in the walls. The surface of the slab was hard when struck with a rock hammer. We observed a crack at the downstream end of the slab.

The south spillway has a horizontal sill about 2 ft wide at the downstream end of the chute. We observed seepage from the joint between the spillway slab and this sill. It also appeared soil was being eroded through this joint. Seepage was also observed from the crack in the slab. Near the junction of this crack and the joint with the sill, the seepage pressure was sufficient to squirt water 3 inches vertically.

Sand bags were present behind both spillway walls. Significant flows of water were observed from these areas. We observed indications of soil erosion by seepage in these areas. The areas behind both walls contain a large concentration of tree roots from the large trees growing near the spillways.

Sounding of the north spillway slab revealed numerous hollow sounding areas indicating the presence of voids. These areas were distributed throughout the slab.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Discussion

Our evaluation of Richardson Millpond Dam indicates the existing dam is in relatively good condition. Based on our observations and subsurface exploration data, the existing embankment is considered stable in its existing configuration. Ground water levels within the embankment indicate embankment seepage is not a problem. Therefore, remedial grading of the embankment and installation of embankment seepage controls are not considered necessary.

However, there are several problems which should be addressed. Some of problems are significant enough to warrant immediate action, particularly in the area of the two spillways. Others problems will eventually require attention, but do not require immediate action. Brief discussions of both immediate and future actions are presented below. Recommended details of remedial construction are presented in subsequent sections.

3.2 Recommended Immediate Actions

Seepage is currently occurring beneath and immediately around both spillway structures. This seepage has caused the development of voids beneath the slab. Continued uncontrolled seepage will further erode soils from beneath these structures and will ultimately result in their failure. Therefore, we recommend several actions be taken immediately to address these problems. These actions are:

- Both spillway slabs should be grouted. This will both fill the existing voids and will help seal existing seepage paths.

- Drainage filters should be installed at the bottom of the spillway walls. These filters will collect seepage through the embankment along the outside of the wall and allow it to dissipate safely. Also, a drainage filter should be installed at the downstream end of both spillway slabs to collect seepage along the concrete soil interface.

- Either grout-filled bag or riprap erosion protection should be installed at the downstream end of the north spillway. Similarly, erosion protection should be provided on either side of the spillways to protect the drainage filters.

- All trees should be removed from within 15 ft of the spillways. Stumps and roots should be removed and replaced with compacted fill.

- All cracks and joints in the spillway concrete should be caulked to prevent flow of water into them.

- All voids/animal borrows should be filled with grout.

- An inspection program should be implemented to detect the development of undesirable conditions.

- Crack gages should be installed on the cracks in the walls of the north spillway. Crack gages should be monitored as part of the inspection program.

3.3 Other Actions

Ultimately, all trees should be removed from the embankment. However, because of the location of the trees and the width of the embankment, we do not consider this an immediate concern. However, the trees along the embankment should be checked during periodic inspections, and any dead or dying trees should be promptly removed.

Wave erosion of the upstream face is expected to continue. At this time, it is not considered significant. As this erosion progresses, however, periodic repair of the slope will be required to prevent damage to the roadway and/or spillway structures. Future installation of erosion protection may be required on the upstream face if the rate of erosion increases.

It is unclear if movement of the downstream portion of the north spillway walls is occurring. The grouting of the spillway and the installation of filters may eliminate any movement that is occurring. If monitoring indicates movement is occurring, it will be necessary to modify or replace these sections of walls at some future date.

3.4 Details of Recommended Remedial Construction

3.4.1 Grouting

The voids beneath the existing spillway slabs should be grouted. The grouting program, including the grout mix, should be designed by a specialty contractor with at least 5 years

of experience in providing similar services. The grouting program should be submitted to the civil and geotechnical engineers for review.

In addition to grouting the voids beneath the slabs, we recommend a grout cutoff be established to reduce seepage along the underside of the slab. This cutoff should be constructed by grouting a line of holes perpendicular to the axis of the spillway. This line should be constructed near the top of the spillway. Grout holes should extend at least 3 ft below the base of the slab, and should be on a maximum spacing of 18 inches. This line should extend at least 5 ft laterally beyond the limits of the spillways. Cutoffs should be installed just downstream of the bridges over the spillways.

The existing voids/animal borrows should be filled with grout. This grout should consist of a fluid sand/cement/bentonite mix which will fill the voids by gravity.

Following grouting, we recommend that all joints and cracks be filled as necessary and caulked to prevent seepage into the subgrade materials. The caulk should be a flexible waterproof material.

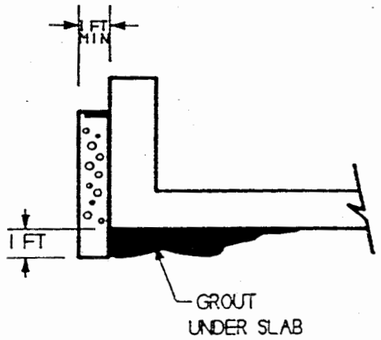
3.4.2 Spillway Drainage Filters

We recommend drainage filters be installed for both spillway structures. These filters will collect seepage which follows the soil/concrete interface and discharge it safely without erosion of soils from behind and beneath the spillways. These filters should be constructed of VDOT No. 78 aggregate wrapped in drainage geotextile. Drainage geotextile should consist of Mirafi 140N or equivalent. All edges of geotextile should be overlapped at least 18 inches to prevent intrusion of soil into the filter. Recommended drainage filter details are shown on Figures 1 and 2.

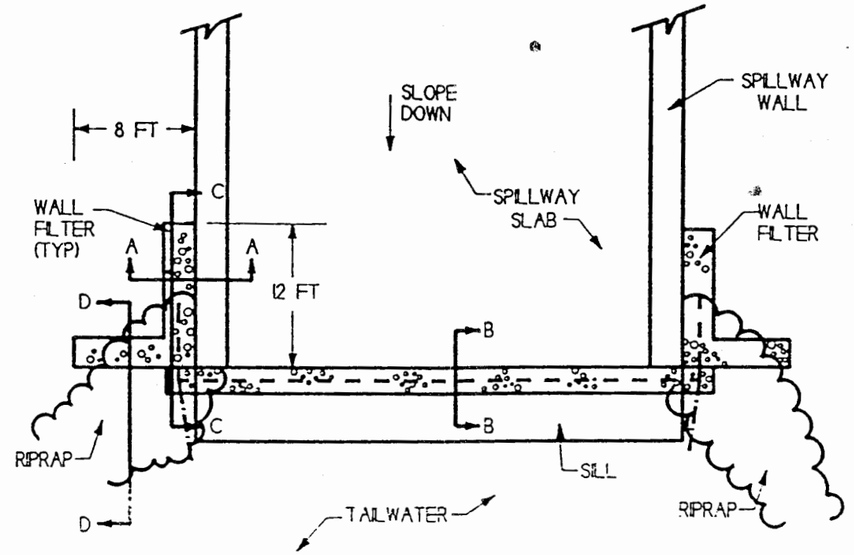
Seepage collected by the filters should be discharged through 4 inch diameter corrugated polyethylene tubing per ASTM F-405. The tubing inside the filter should be slotted. Unslotted tubing should extend to the discharge point beyond the erosion protection.

3.4.3 Tree Removal

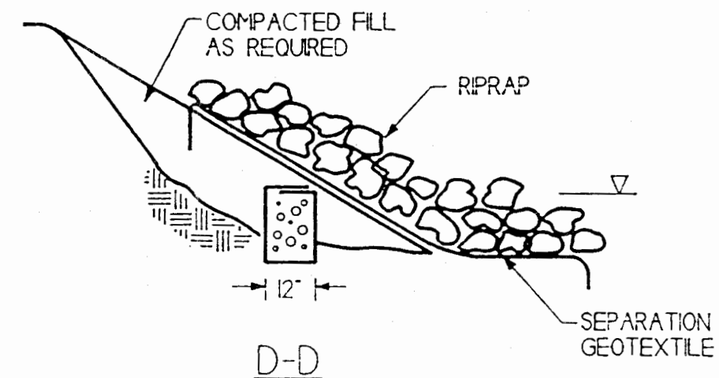
All trees should be removed from within 15 ft of the existing spillways. Also, any dead or dying trees on the embankment should be removed. Stumps and roots should be removed to at least 2 ft below the ground surface. Excavations should be backfilled with compacted structural fill as described in Section 3.4.5.



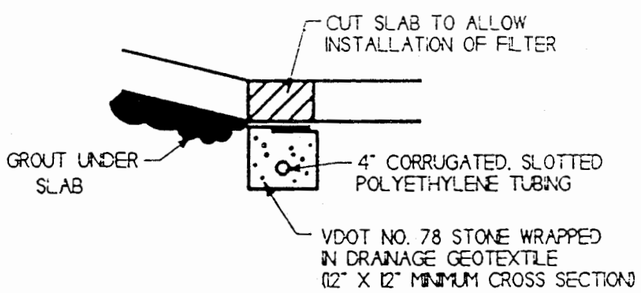
A-A



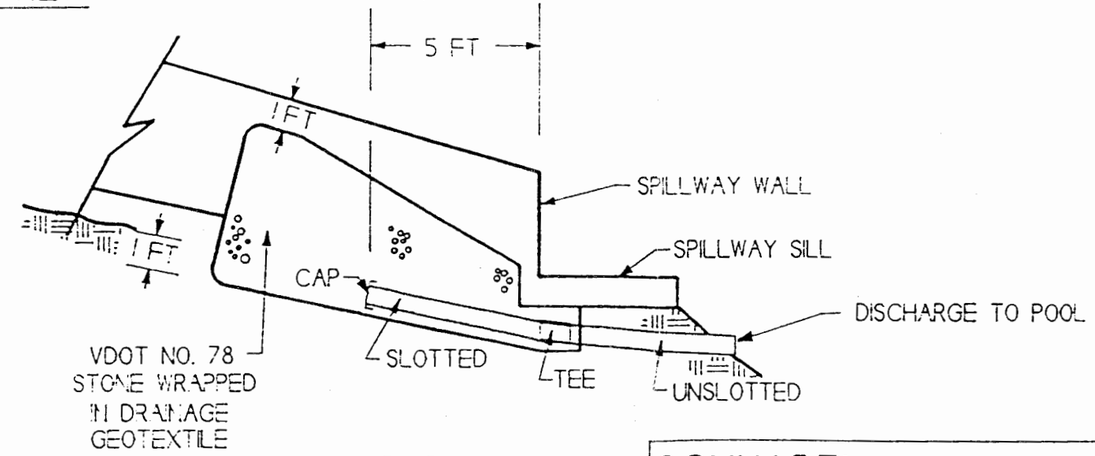
PLAN VIEW



D-D



B-B



C-C

LEGEND

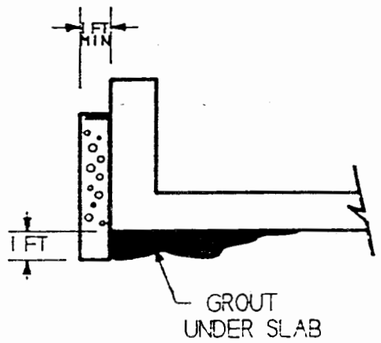
- FILTER (VDOT NO. 78 STONE WRAPPED IN DRAINAGE GEOTEXTILE)
- SLOTTED PIPE (4" CORRUGATED, SLOTTED POLYETHYLENE TUBING (ASTM F-405))
- UNSLOTTED PIPE (4" CORRUGATED, SLOTTED POLYETHYLENE TUBING (ASTM F-405))

SCHNABEL ENGINEERING ASSOCIATES [redacted]

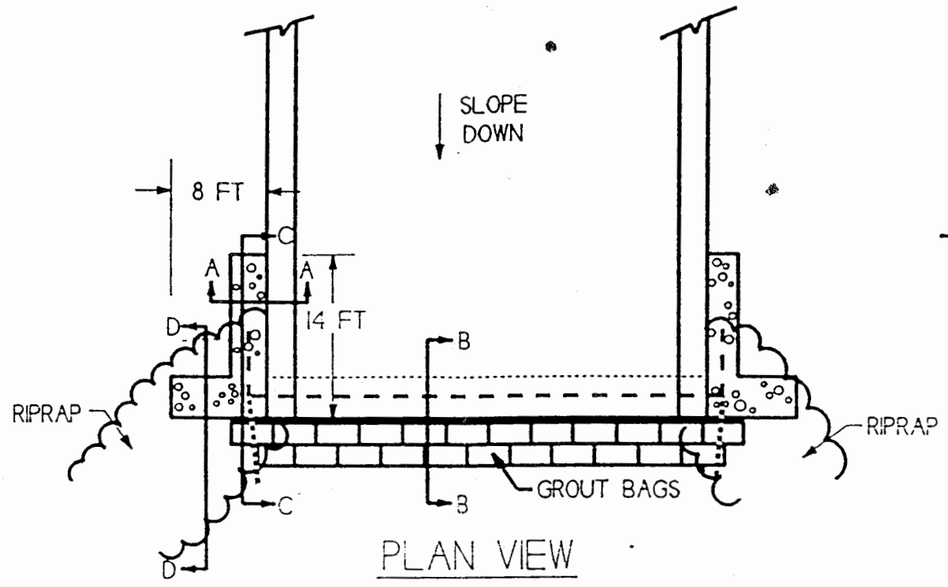
RICHARDSON MILLPOND DAM, ROUTE 600

NEW KENT COUNTY, VIRGINIA

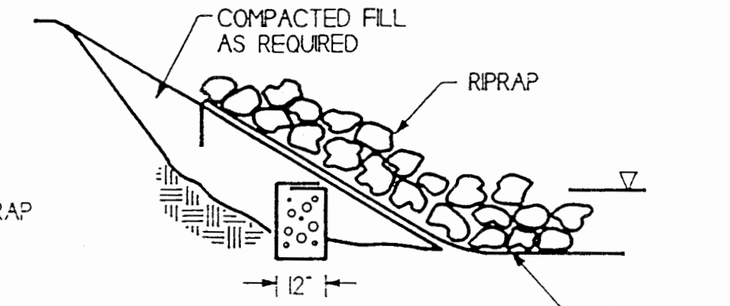
RECOMMENDED SPILLWAY DETAILS-SOUTH SPILLWAY	SCALE NO SCALE	DATE 9-4-96	REVISED DATE
	DRAWN BY VAM	CHECKED BY JS	REVISED DATE
	CONTRACT NO. 963392	FIGURE 1	REVISED DATE



A-A



PLAN VIEW



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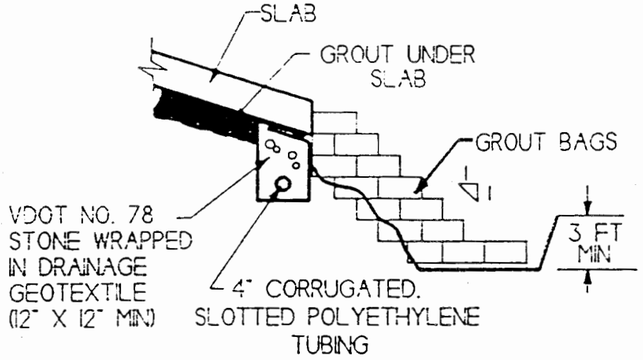
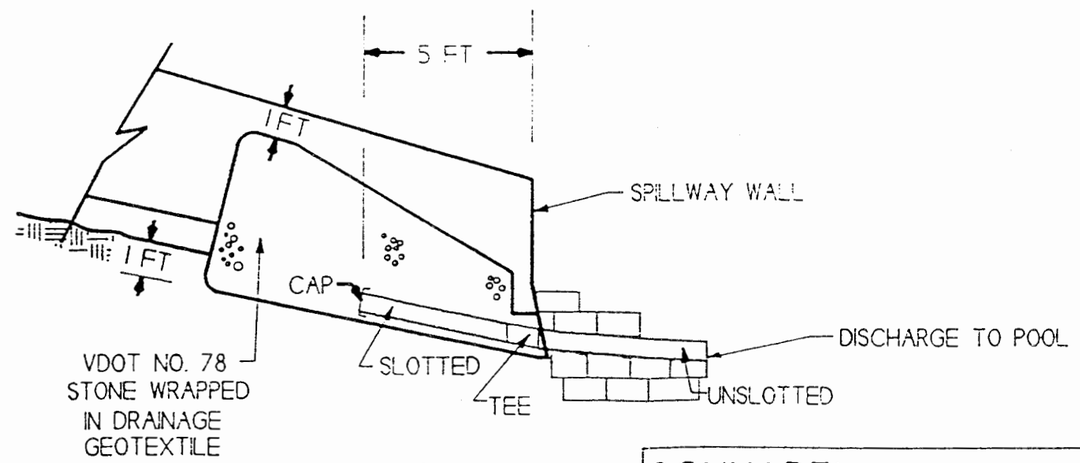


B-B



C-C

LEGEND

- FILTER (VDOT NO. 78 STONE WRAPPED IN DRAINAGE GEOTEXTILE)
- SLOTTED PIPE (4" CORRUGATED. SLOTTED POLYETHYLENE TUBING [ASTM F-405])
- UNSLOTTED PIPE (4" CORRUGATED. SLOTTED POLYETHYLENE TUBING [ASTM F-405])

SCHNABEL ENGINEERING ASSOCIATES [redacted]

RICHARDSON MILLPOND DAM. ROUTE 600

NEW KENT COUNTY. VIRGINIA

RECOMMENDED SPILLWAY DETAILS - NORTH SPILLWAY	SCALE NO SCALE	DATE 9-4-96	REVISED DATE
	DRAWN BY VAM	CHECKED BY JS	REVISED DATE
	CONTRACT NO. 963392	FIGURE 2	REVISED DATE

3.4.4 Erosion Protection

Erosion protection should be provided at the downstream end of the north spillway. This erosion protection should consist of a series of grout-filled bags stacked at the base of the spillway. The grout bag stack should have a downstream face no steeper than 1H:1V. The base of the stack should be at least three ft below the stream bottom. Grout bags should extend at least two ft laterally beyond the spillway walls. Recommendations for erosion protection at the base of the north spillway are shown on Figure 2. The grout bag stack should be installed by a specialty contractor with at least 5 years experience in similar applications. The grout bag contractor should provide details for grout bag installation, including grout design, bag configuration and reinforcing requirements. These details should be submitted to the civil and geotechnical engineers for review.

Erosion protection should also be provided at the toe of the embankment slopes behind the spillway walls of both the north and south spillways. This erosion protection may consist of grout bag stacks and/or riprap. If riprap is used, it should be placed on a separation geotextile such as Mirafi 700X. The separation geotextile should be embedded at least two ft at the top and bottom of the riprap. Riprap size should be selected to accommodate the anticipated flows in the basins at the base of the spillway. Recommendations for erosion protection behind the spillway walls are shown on Figures 1 and 2.

3.4.5 Earthwork for Remedial Construction

Subgrades to receive compacted structural fill should be stripped of vegetation, topsoil, organic matter, and loose soils. Subgrades should be observed by the geotechnical engineer prior to placing fill.

Compacted structural fill should consist of material classifying CL, ML, SC, SM, SP, SW, GC, GM, GP, or GW per ASTM D-2487. Non-organic, on-site soils are expected to meet this criterion.

Compacted structural fill should be placed in maximum 8-inch thick horizontal, loose lifts and should be compacted to at least 95 percent of maximum dry density per ASTM D-698, Standard Proctor. Only light hand-operated tamping equipment should be used within 10 ft of walls.

3.4.6 Inspection Program

The recommendations presented above are intended to correct deficiencies detected during our exploration. We recommend the dam be monitored on a regular basis to check for development of problems. The dam should be inspected by the owners personnel at least quarterly, and after major precipitation events. This inspection should include:

- Observation of the embankments for sloughing, slope failures, cracking, seepage and voids.
- Checking for dead or dying trees.
- Checking for seepage beneath and around the spillways.
- Checking for cracking, signs of movement, and loss of joint seals in the spillways.
- Check crack gages.

In addition to the quarterly inspection, we recommend the dam be inspected once every two years by the geotechnical engineer. Any deficiencies noted during the inspections should be corrected promptly.

4. CONSTRUCTION CONSIDERATIONS

4.1 Remedial Construction

The sequence of remedial construction will be very important on this project. We recommend tree removal be done first. Removing trees after other activities are completed may result in damage to the remedial construction. Tree removal should be performed carefully to avoid damaging existing structures.

Tree removal should be followed by grouting. Grouting at this point will help reduce seepage that must be handled during subsequent construction operations. Also, grouting first will prevent clogging and contamination of the filters with grout. It may be necessary to plug some voids at the edges of the slabs to prevent loss of grout. After completion of the grouting, the remaining activities can be accomplished.

We anticipate that ground water will be encountered during excavation for installing filters. This ground water can probably be controlled by pumping from sumps. A well point system may also be used to dewater the excavation, if needed. Dewatering methods should be the responsibility of the Contractor.

Because voids or other highly permeable zones may be encountered, the contractor should be prepared for seepage emergencies. The contractor should maintain a supply of sand bags, drainage geotextile and VDOT No. 78 stone on site during all activities involving excavation.

4.2 Engineering Services During Construction

The engineering recommendations provided in this report are based on the information obtained in the subsurface exploration and during our site visits. However, variations in the composition and construction of the existing dam are expected to be encountered during remedial construction. The nature and extent of these variations may not become evident until during remedial construction. To account for this variability, professional observation, monitoring and testing of actual subsurface conditions during remedial construction should be provided as an extension of our engineering services. These services will also help in evaluating the Contractor's conformance with the plans and specifications. Because of our unique position to understand the intent of the geotechnical engineering recommendations, retaining us for these services will allow us to provide consistent service through the project construction.

4.3 General Specification Recommendations

An allowance should be established to account for possible additional costs that may be required to construct earthwork grouting and drains as recommended in this report. Additional costs may be incurred for various reasons including variation of soil between borings, discovery of unanticipated conditions, need for borrow fill material, wet on-site soils, obstructions, temporary dewatering, etc.

This report may be made available to prospective bidders for informational purposes. We would recommend that the project specifications contain the following statement:

> "A geotechnical engineering report has been prepared for this project by Schnabel Engineering Associates. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed represent the Geotechnical Engineer's interpretation of the subsurface conditions, tests, and the results of analyses conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, before bidding independent exploration, tests and analyses. This report may be examined by bidders at the office of the Owner or copies may be obtained from the Owner at nominal charge."

Test boring and hand auger data included in Appendix A should be included in the contract documents.

5. LIMITATIONS

The analyses and recommendations submitted in this report are based on the information revealed by our exploration. An attempt has been made to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction.

This report has been prepared to aid in the evaluation of this dam and to assist in its management. It is intended for use concerning this specific project. Our recommendations are based on the project information described in Section 1.2. Substantial changes in the facility, anticipated flows, water levels and grades should be brought to our attention so we can modify our recommendations as needed. We would appreciate an opportunity to review the plans and specifications as they pertain to the recommendations contained in this report and to submit our comments to you based on this review.

We have prepared this report according to generally accepted geotechnical engineering practices. No other warranty, express or implied, is made as to the professional advice included in this report.

SUBSURFACE EXPLORATION DATA

Subsurface Exploration Procedures
General Notes for Subsurface Exploration Logs
Identification of Soil
Test Boring Logs, B-1 through B-3
Hand Auger Logs, HA-1 through HA-3
Location Plan, Figure A1

SUBSURFACE EXPLORATION PROCEDURES

Test Boring Procedure

The borings were advanced by turning a hollow-stem auger. A plug device was used to block off the center opening in the hollow-stem auger to prevent cuttings from entering the augers during drilling. At the designated depth, drillers removed the plug and performed the Standard Penetration Test, as defined below. Water or drilling fluid was not introduced into the boring using this procedure, unless indicated on individual logs. Water level data are indicated on the logs.

Standard Penetration Test Results

The numbers in the Sampling Data column of the boring logs represent Standard Penetration Test (SPT) results. Each number represents the blows needed to drive a 2-inch O.D., 1-3/8 inch I.D. split-spoon sampler 6 inches, using a 140-pound hammer falling 30 inches. The sampler is typically driven a total of 18 inches. The first 6 inches are considered a seating interval. The total of the number of blows for the second and third 6-inch intervals is the SPT N value. The Standard Penetration Test is conducted per ASTM D-1586.

Hand Auger Probes

Our personnel excavated hand auger probes using a 3-inch O.D. hand auger. We visually classified the soil encountered according to ASTM D-2487. Geostick Penetrometer readings were taken during excavation. Geostick Penetrometer readings give a general indication of the soil's in place density or consistency. Geostick penetrations are shown in the remarks column as "GP= ".

Soil Classification Criteria

The group symbols on the boring and hand auger logs represent the Unified Soil Classification System Group Symbols (ASTM D-2487) based on visual observation and limited laboratory testing of the samples. Criteria for visual identification of soil samples are included in this appendix. Some variation may be expected between samples visually classified and samples classified in the laboratory.

Water Observation Wells

Temporary water observation wells were installed in all borings and hand auger probes by inserting a hand-slotted, 1¼-inch PVC pipe in each of these borings. The pipe was capped and area surrounding the pipe was backfilled with cuttings from the respective test boring and hand auger probe.

Test Boring and Hand Auger Probe Location and Elevation Survey

Our personnel located test borings and hand auger probes by taping from existing features. Approximate test boring and hand auger probe locations are shown in Figure A1. Ground surface elevations at the test boring and hand auger probe locations were estimated from topographic data provided by Langley and McDonald. These locations and elevations should be considered no more accurate than the methods and plans used to obtain them.

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GENERAL NOTES FOR SUBSURFACE EXPLORATION LOGS

1. NUMBERS IN SAMPLING DATA COLUMN NEXT TO STANDARD PENETRATION TEST (SPT) SYMBOLS INDICATE BLOWS REQUIRED TO DRIVE A 2 INCH O.D., 1-3/8 INCH I.D. SAMPLING SPOON 6 INCHES USING A 140 POUND HAMMER FALLING 30 INCHES. THE STANDARD PENETRATION TEST N VALUE IS THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER 12 INCHES, AFTER A 6 INCH SEATING INTERVAL. THE STANDARD PENETRATION TEST IS PERFORMED IN ACCORDANCE WITH ASTM D-1586.

2. VISUAL CLASSIFICATION OF SOIL IS IN ACCORDANCE WITH TERMINOLOGY SET FORTH IN "IDENTIFICATION OF SOIL." THE ASTM D-2487 GROUP SYMBOLS (e.g. CL) SHOWN IN THE CLASSIFICATION COLUMN ARE BASED ON VISUAL OBSERVATIONS.

3. ESTIMATED GROUND WATER LEVELS INDICATED BY ▼; THESE LEVELS ARE ONLY ESTIMATES FROM AVAILABLE DATA AND MAY VARY WITH PRECIPITATION, POROSITY OF THE SOIL, SITE TOPOGRAPHY, ETC.

4. REFUSAL AT THE SURFACE OF ROCK, BOULDER, OR OBSTRUCTION IS DEFINED AS AN SPT RESISTANCE OF 100 BLOWS FOR 2 INCHES OR LESS OF PENETRATION.

5. THE LOGS AND RELATED INFORMATION DEPICT SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC LOCATIONS AND AT THE PARTICULAR TIME WHEN DRILLED OR EXCAVATED. SOIL CONDITIONS AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THESE LOCATIONS. ALSO, THE PASSAGE OF TIME MAY RESULT IN A CHANGE IN THE SUB-SURFACE SOIL AND GROUND WATER CONDITIONS AT THE TEST BORING, TEST PIT AND/OR HAND AUGER LOCATIONS.

6. THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL AND ROCK TYPES AS OBTAINED FROM THE SUBSURFACE EXPLORATION. SOME VARIATION MAY ALSO BE EXPECTED VERTICALLY BETWEEN SAMPLES TAKEN. THE SOIL PROFILE, WATER LEVEL OBSERVATIONS AND PENETRATION RESISTANCES PRESENTED ON THESE LOGS HAVE BEEN MADE WITH REASONABLE CARE AND ACCURACY AND MUST BE CONSIDERED ONLY AN APPROXIMATE REPRESENTATION OF SUBSURFACE CONDITIONS TO BE ENCOUNTERED AT THE PARTICULAR LOCATION.

7. KEY TO SYMBOLS AND ABBREVIATIONS:

5+10+15	STANDARD PENETRATION TEST
3T 24/18	2" OR 3" UNDISTURBED TUBE SAMPLE LENGTH PUSHED/RECOVERY (IN INCHES)
W	WATER CONTENT
PM	PRESSUREMETER TEST (IN REMARKS COLUMN)
do	DITTO
WOW	WATER OBSERVATION WELL
PP	POCKET PENETROMETER READING (TSF)
FID (OVA)	FLAME IONIZATION DETECTOR READING (PPM)
PID	PHOTOIONIZATION DETECTOR READING (PPM)
GP	GEOSTICK PENETRATION READING (INCHES)

SCHNABEL ENGINEERING ASSOCIATES, INC.

Consulting Geotechnical Engineers

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES (ASTM D-2487-83)

			SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels - More than 50% of coarse fraction retained on No. 4 sieve Coarse, 3/4" to 3" Fine, No. 4 to 3/4"	Clean Gravels Less than 5% fines	GW	Well graded gravel
			GP	Poorly graded gravel
		Gravels with Fines More than 12% fines	GM	Silty gravel
			GC	Clayey gravel
	Sands - 50% or more of coarse fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	Well-graded sand
			SP	Poorly graded sand
		Sands with Fines More than 12% fines	SM	Silty sand
			SC	Clayey sand
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays - Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	Lean clay
			ML	Silt
		Organic	OL	Organic clay
				Organic silt
	Silts and Clays - Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	Fat clay
			MH	Elastic silt
		Organic	OH	Organic clay
				Organic silt
Highly Organic Soils	Primarily organic matter, dark in color and organic odor		PT	Peat

II. DEFINITION OF MINOR COMPONENT PROPORTIONS

Minor Component	Approximate Percentage of Fraction by Weight
Adjective Form	
Gravelly, Sandy	30% or more coarse grained
With	
Sand, Gravel	15% or more coarse grained
Silty, Clay	5% to 12% fine grained
Trace	
Sand, Gravel	Less than 15% coarse grained
Silty, Clay	Less than 5% fine grained

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS - Unified Soil Classification Symbols are shown above as group symbols. Use a Line Chart for laboratory identification. Dual symbols are used for borderline classifications.

BOULDERS & COBBLES - Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles ranged from 3 to 12 inch size.

DISINTEGRATED ROCK - Residual rock material with a standard penetration resistance (SPT) between 60 blows per foot and refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

ROCK FRAGMENTS - Angular pieces of rock, distinguished from transported gravel, which have separated from original vein or strata and are present in a soil matrix.

QUARTZ - A hard silica mineral often found in residual soils.

IRONITE - Iron oxide deposited within a soil layer forming cemented deposits.

CEMENTED SAND - Usually localized rock-like deposits within a soil stratum composed of sand grains cemented by calcium carbonate or other materials.

MICA - A soft plate of silica mineral found in many rocks, and in residual or transported soil derived therefrom.

ORGANIC MATERIALS - (Excluding Peat):
- Topsoil - Surface soils that support plant life and which contain considerable amounts of organic matter;
- Organic Matter - Soil containing organic colloids throughout its structure;
- Lignite - Hard, brittle decomposed organic matter with low fixed carbon content (a low grade of coal).

FILL - Man-made deposit containing soil, rock and often foreign matter.

PROBABLE FILL - Soils which contain no visually detected foreign matter but which are suspect with regard to origin.

LENSES - 0 to ½ inch seam of minor soil component.

LAYERS - ½ to 12 inch seam of minor soil component.

POCKET - Discontinuous body of minor soil component.

COLOR SHADES - Light to dark to indicate substantial difference in color.

MOISTURE CONDITIONS - Wet, moist, or dry to indicate visual appearance of specimen.

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	**Project:** Richardson Millpond Dam Rt. 600 New Kent County, Virginia	**Contract Number:** 963392 **Boring Number:** B-1 **Sheet:** 1 of 1

Boring Contractor: Ayers and Ayers, Inc.
Powhatan, Virginia

Boring Foreman: C. Jamerson

Drilling Method: 2¼" Hollow Stem Auger

Drilling Equipment: CME-55

SEA Representative: T. Woodall

Dates Started: 8/22/96 **Finished:** 8/22/96

Location: See Location Plan, Figure A1

Ground Surface Elevation: 14.4±

Ground Water Observations

	Date	Time	Depth	Casing	Caved
Encountered	8/22	1:13	8.5	--	--
Completion	8/22	1:33	28.5	--	--
W.O.W.	8/22	1:42	26.5	--	--
W.O.W.	8/23	9:41	9.0	--	--
W.O.W.	8/29	3:10	8.8	--	--

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
	Fine to coarse silty sand FILL, moist - brown	FILL		A		6+6+6		EMBANKMENT FILL
	do, with gravel, contains root fragments					3+2+2		
					5	4+4+3		
						3+2+3		
8.5			5.9			2+1+1		
	Fine to coarse clayey sand, wet - gray	SC		B				ALLUVIUM
	do, contains fat clay pockets				10	2+2+2		
					15	WOH\6"+1+2		
17.0			-2.6					
	Fine to coarse silty sand, wet - gray	SM		C				YORKTOWN FORMATION
					20	2+3+4		
					25	3+3+5		
					30	4+5+7		
30.0	Boring terminated at 30.0 ft		-15.6					

Comments:
Water Observation Well (WOW) installed to 28.9 ft.

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	**Project:** Richardson Millpond Dam Rt. 600 New Kent County, Virginia	**Contract Number:** 963392 **Boring Number:** B-2 **Sheet:** 1 of 2

Boring Contractor: Ayers and Ayers, Inc.
Powhatan, Virginia

Boring Foreman: C. Jamerson

Drilling Method: 2¼" Hollow Stem Auger

Drilling Equipment: CME-55

SEA Representative: T. Woodall

Dates Started: 8/22/96 **Finished:** 8/22/96

Location: See Location Plan, Figure A1

Ground Surface Elevation: 14.8±

Ground Water Observations

	Date	Time	Depth	Casing	Caved
Encountered	8/22	10:00	8.0	--	--
Completion	8/22	11:30	29.0	--	--
W.O.W.	8/22	11:58	6.0	--	--
W.O.W.	8/23	9:54	7.4	--	--
W.O.W.	8/29	3:12	7.6	--	--

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
	Fine to coarse silty sand with gravel FILL, contains root fragments, moist - brown	FILL				5+6+4		
	do, contains pockets of lean clay - red					3+3+3		EMBANKMENT FILL
				A	5	3+3+3		
						3+2+3		
	do, wet							
8.5	Fine to coarse clayey sand, wet - gray	SC	6.3			1+2+2		
					10	1+1+2		
						1+1+2		
	do, with gravel				15	1+2+4		
	do, contains fat clay pockets			B		2+4+2		
20.0	Fine to medium poorly graded sand with silt, wet - gray	SP-SM	-5.2		20			ALLUVIUM
	do, contains wood fragments - gray and black				25	4+3+3		
					30	3+4+7		

continued on next page

Comments:
Water Observation Well (WOW) installed to 27.3 ft.

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	**Project:** Richardson Millpond Dam Rt. 600 New Kent County, Virginia	**Contract Number:** 963392 **Boring Number:** B-2 **Sheet:** 2 of 2

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
	Fine to medium poorly graded sand with silt, contains wood fragments, wet - gray and black	SP-SM		B		6+8+11		ALLUVIUM
35.0	Boring terminated at 35.0 ft		-20.2		35			

Comments:
Water Observation Well (WOW) installed to 27.3 ft.

SCHNABEL ENGINEERING ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS TEST BORING LOG	**Project:** Richardson Millpond Dam Rt. 600 New Kent County, Virginia	**Contract Number:** 963392 **Boring Number:** B-3 **Sheet:** 1 of 1

Boring Contractor: Ayers and Ayers, Inc.
Powhatan, Virginia

Boring Foreman: C. Jamerson

Drilling Method: 2¼" Hollow Stem Auger

Drilling Equipment: CME-55

SEA Representative: T. Woodall

Dates Started: 8/22/96 **Finished:** 8/22/96

Location: See Location Plan, Figure A1

Ground Surface Elevation: 14.8±

Ground Water Observations

	Date	Time	Depth	Casing	Caved
Encountered	8/22	--	8.0	--	--
Completion	8/22	--	Dry	--	--
W.O.W.	8/22	12:06	24.0	--	--
W.O.W.	8/23	9:56	7.5	--	--
W.O.W.	8/29	3:13	7.2	--	--

DEPTH (FT.)	STRATA DESCRIPTION	CLASS.	ELEV. (FT.)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	W (%)	REMARKS
	Fine to coarse silty sand with gravel FILL, moist - brown	FILL		A		6+5+4		EMBANKMENT FILL
	do, contains root fragments and fat clay pockets					4+3+3		
					5	2+1+2		
						3+1+2		
8.0			6.8					
	Fine to coarse clayey sand, wet - gray	SC		B		1+1+1		ALLUVIUM
					10	WOH\6"+1+3		
					15	1+1+1		
17.0			-2.2					
	Fine to medium silty sand, moist - gray	SM		C		2+4+4		YORKTOWN FORMATION
					20			
					25	3+3+5		
						4+5+7		
30.0			-15.2		30			
	Boring terminated at 30.0 ft							

Comments:
Water Observation Well (WOW) installed to 29.7 ft

SCHNABEL
ENGINEERING ASSOCIATES

[redacted]

HAND AUGER LOG

CONTRACT NO: 963392

HAND AUGER NO: HA-1

PROJECT: Richardson Millpond Dam

New Kent County, Virginia

DATE: 8/22/96

LOCATION: See Figure A1

SURFACE ELEVATION: 7.8±

SEA REPRESENTATIVE: T. Woodall

GROUND WATER ELEVATION: See Table

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION OF SOILS & OBSERVATIONS.	STRATUM	REMARKS
		Firm density, fine to coarse silty sand with gravel FILL, moist - brown	A	GP=2" GP=2" EMBANKMENT FILL GP=3" GP=5"
		do, wet		
3.4	4.4	Loose density, fine to coarse clayey sand (SC), wet - gray	B	GP=5" ALLUVIUM
5.0	2.8	Hand auger terminated at 5.0 ft		

GROUNDWATER OBSERVATIONS

DATE	ELEVATION
8/22	4.7
8/23	3.8
8/29	4.1

SCHNABEL
ENGINEERING ASSOCIATES

[redacted]

HAND AUGER LOG

CONTRACT NO: 963392

PROJECT: Richardson Millpond Dam
New Kent County, Virginia

LOCATION: See Figure A1

SEA REPRESENTATIVE: T. Woodall

HAND AUGER NO: HA-2

DATE: 8/22/96

SURFACE ELEVATION: 6.3±

GROUND WATER ELEVATION: See Table

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION OF SOILS & OBSERVATIONS.	STRATUM	REMARKS
0.5	5.8	Firm density, fine to coarse silty sand FILL, contains root fragments, moist - brown	A	GP=2" EMBANKMENT FILL
		Loose density, fine to coarse clayey sand (SC), contains root fragments, moist - gray		
		do. wet		GP=4"
				GP=8"
				ALLUVIUM
			B	GP=6"
				GP=6"
				GP=5"
5.5	.8	Hand auger terminated at 5.5 ft		

GROUNDWATER OBSERVATIONS

DATE	ELEVATION
8/22	5.3
8/23	5.1
8/29	5.2

SCHNABEL
ENGINEERING ASSOCIATES

[redacted]

HAND AUGER LOG

CONTRACT NO: 963392

PROJECT: Richardson Millpond Dam

New Kent County, Virginia

LOCATION: See Figure A1

SEA REPRESENTATIVE: T. Woodall

HAND AUGER NO: HA-3

DATE: 8/22/96

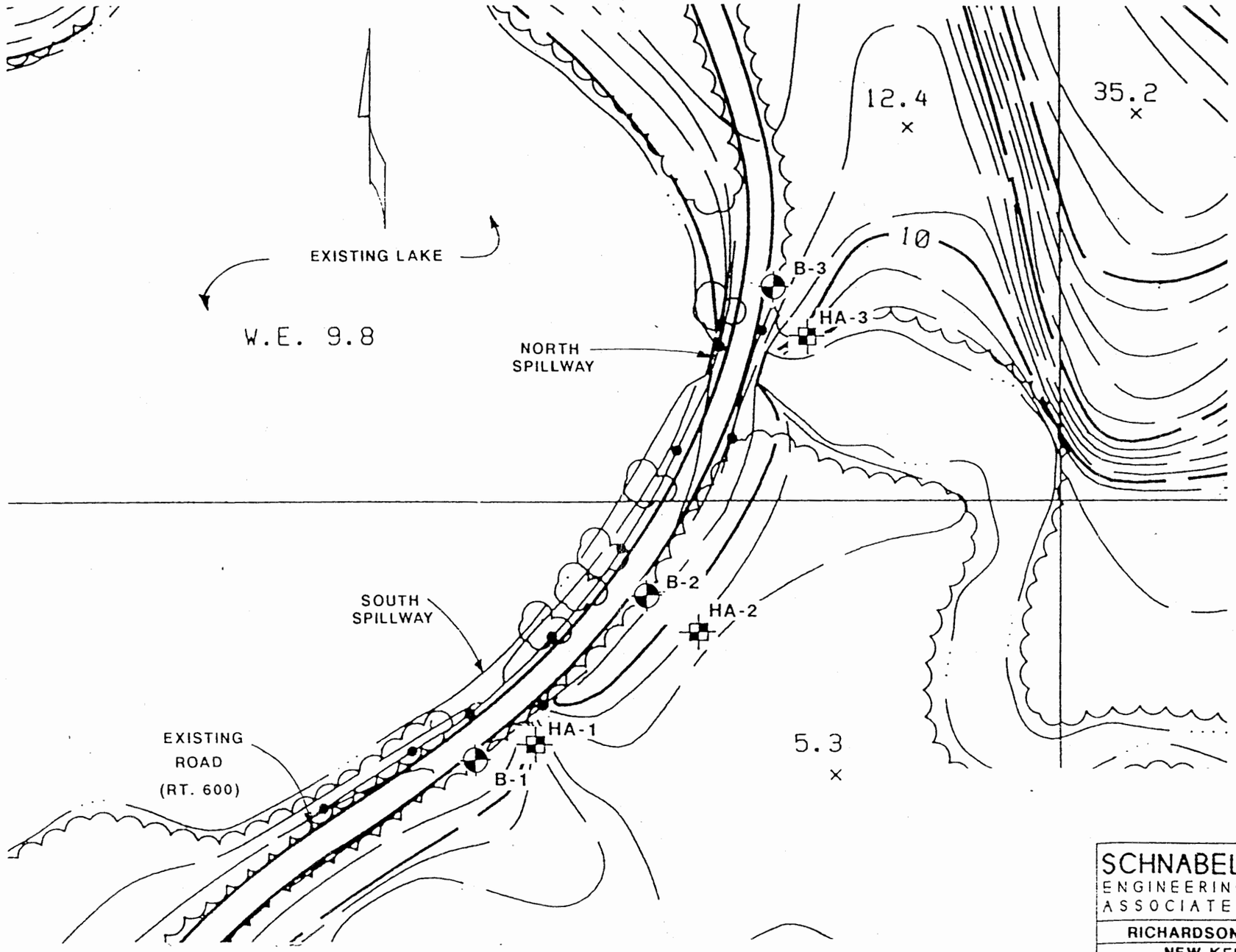
SURFACE ELEVATION: 8.8±

GROUND WATER ELEVATION: See Table

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION OF SOILS & OBSERVATIONS.	STRATUM	REMARKS
		Firm density, fine to coarse silty sand with gravel FILL, contains root fragments, moist - brown	A	GP=2" GP=2" GP=2" EMBANKMENT FILL GP=3" GP=4½"
4.1	4.7	Loose density, fine to coarse clayey sand (SC), contains root fragments, wet - gray	B	GP=6" ALLUVIUM GP=5"
5.5	3.3	Hand auger terminated at 5.5 ft		

GROUNDWATER OBSERVATIONS

DATE	ELEVATION
8/22	5.2
8/23	3.6
8/29	4.3



LEGEND

APPROXIMATE TEST BORING LOCATION

APPROXIMATE HAND AUGER PROBE LOCATION

SCHNABEL ENGINEERING ASSOCIATES [redacted]

RICHARDSON MILLPOND DAM, RT. 600

NEW KENT COUNTY, VIRGINIA

LOCATION PLAN	SCALE 1"=50'	DATE 9-4-96	REVISED DATE
	DRAWN BY VAM	CHECKED BY JS	REVISED DATE
	PROJECT NO. 963392	FIGURE A1	REVISED DATE

May 9, 1995

STONEHOUSE
RICHARDSON'S MILL POND (R.M.P.)

OVERALL AVERAGE (SEE ATTACHED)	18% IMPERVIOUS PROPOSED
ASSUME CONSERVATIVELY	20% IMPERVIOUS

CALCULATIONS ON BMP SHEET:

-	ASSUME	R.M.P.	8.0 MIN BMP
-	ASSUME	WEG #1	11.0 BMP
_	ASSUME	WEG #2	11.0 BMP

NEED FOR 10 PTS. 984 AC. UNDISTURBED NATURAL OPEN SPACE

TOTAL DEV. AREA ONE	2425 AC.
TOTAL STONEHOUSE TO R.M.P.	1761 AC.
BUFFER (25% SLOPE/WETLANDS)	1078 AC.

1748	ACRES WITHIN STONEHOUSE
+2268	ACRES OUTSIDE STONEHOUSE
4016	ACRES DRAINING TO RICHARDSON'S MILL POND

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
WEG #1	11	x	$\frac{100}{2425}$	=	0.45
WEG #2	11	x	$\frac{44}{2425}$	=	0.20
R.M.P.	8	x	$\frac{1748-144}{2425}$ - mill BMP	=	5.29
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 5.94

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
$\frac{984}{2425}$	x	10 (0.1 per 1%)	=	4.06

C. TOTAL WEIGHTED POINTS

5.94	+	4.06	=	10.00
Structural BMP Points		Natural Open Space Points		TOTAL

WEG #1 = 100 AC.
WEG #2 = 44 AC.
TOTAL STONEHOUSE ACREAGE TO R.M.P. = 1748 AC.
TOTAL STONEHOUSE ACREAGE DEVELOPMENT AREA ONE 2425 AC.

DRAINAGE, STORMWATER MANAGEMENT, AND EROSION CONTROL DESIGN

AT 12.8% IMPERVIOUS COMPOSITE

VOLUME REQUIREMENTS — AT 20% IMPERVIOUS WITHIN STONEHOUSE (2426 AC.)/ 5% OUTSIDE STONEHOUSE (2268 AC.)

$$V_r - \frac{(R_m)(R_v)}{12} \times AC$$

$R_v = [0.05 + 0.009I] = 0.05 + 0.009\ (12.8) = 0.165$

R_m = 0.45" FOR WET DETENTION DESIGNS

$A_c = 4016$

$$V_r = \frac{(0.45)(0.165)}{12} \times 4016\ AC = 24.8\ ac.ft. = 1{,}082{,}422\ cu.ft.$$

FOR A 9 POINT BMP	$V_r \times 4$	= 4,329,690 cu.ft.	= 99.5 ac ft
FOR AN 8 POINT BMP	$V_r \times 2.5$	= 2,706,055 cu.ft.	= 62.2 " "

VOLUME AVAILABLE IN R.M.P.

130 ac.ft. X 43,560 = 5,662,800 cu.ft.

(GREATER THAN A 9 POINT BMP)

@ 20% IMP for entire w/shed 4 VR = 138.5
@ 19% " " " " " = 133.1
@ 18.5% " " " " " = 130.4

DRAINAGE, STORMWATER MANAGEMENT, AND EROSION CONTROL DESIGN

AT 20% IMPERVIOUS OVERALL

VOLUME REQUIREMENTS AT 20% IMPERVIOUS

$$V_r - \frac{(R_m)(R_v)}{12} \times AC$$

$$R_v = [0.05 + 0.009I] = 0.05 + 0.009\ (20) = 0.230$$

R_m = 0.45" FOR WET DETENTION DESIGNS

A_c = 4016

$$V_r = \frac{(0.45)(0.23)}{12} \times 4016\ AC = 34.64\ ac.ft. = 1{,}508{,}831\ cu.ft.$$

FOR A 9 POINT BMP	V_r x 4	= 6,035,325 cu.ft.
FOR AN 8 POINT BMP	V_r x 2.5	= 3,772,078 cu.ft.

VOLUME AVAILABLE IN R.M.P.

130 ac.ft. X 43,560 = 5,662,800 cu.ft.

May 9, 1995

STONEHOUSE
RICHARDSON'S MILL POND (R.M.P.)

OVERALL AVERAGE (SEE ATTACHED)	18% IMPERVIOUS PROPOSED
ASSUME CONSERVATIVELY	20% IMPERVIOUS

CALCULATIONS ON BMP SHEET:

-	ASSUME	R.M.P.	8.0 MIN BMP
-	ASSUME	WEG #1	11.0 BMP
_	ASSUME	WEG #2	11.0 BMP

NEED FOR 10 PTS. 984 AC. UNDISTURBED NATURAL OPEN SPACE

TOTAL DEV. AREA ONE	2425 AC.
TOTAL STONEHOUSE TO R.M.P.	1761 AC.
BUFFER (25% SLOPE/WETLANDS)	1078 AC.

1748	ACRES WITHIN STONEHOUSE
+2268	ACRES OUTSIDE STONEHOUSE
4016	ACRES DRAINING TO RICHARDSON'S MILL POND

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
WEG #1	11	x	$\frac{100}{2425}$	=	0.45
WEG #2	11	x	$\frac{44}{2425}$	=	0.20
R.M.P.	8	x	$\frac{1748-144}{2425}$ - onsite BMP	=	5.29
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 5.94

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
$\frac{984}{2425}$	x	10 (0.1 per 1%)	=	4.06

C. TOTAL WEIGHTED POINTS

5.94	+	4.06	=	10.00
Structural BMP Points		Natural Open Space Points		TOTAL

WEG #1 = 100 AC.
WEG #2 = 44 AC.
TOTAL STONEHOUSE ACREAGE TO R.M.P. = 1748 AC.
TOTAL STONEHOUSE ACREAGE DEVELOPMENT AREA ONE 2425 AC.

DRAINAGE, STORMWATER MANAGEMENT, AND EROSION CONTROL DESIGN

AT 12.8% IMPERVIOUS COMPOSITE

VOLUME REQUIREMENTS — AT 20% IMPERVIOUS WITHIN STONEHOUSE (2426 AC.)/ 5% OUTSIDE STONEHOUSE (2268 AC.)

$$V_r - \frac{(R_m)(R_v)}{12} \times AC$$

$$R_v = [0.05 + 0.009I] = 0.05 + 0.009\ (12.8) = 0.165$$

R_m = 0.45" FOR WET DETENTION DESIGNS

A_c = 4016

$$V_r = \frac{(0.45)(0.165)}{12} \times 4016\ AC = 24.8\ ac.ft. = 1{,}082{,}422\ cu.ft.$$

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VOLUME AVAILABLE IN R.M.P.

130 ac.ft. X 43,560 = 5,662,800 cu.ft.

(GREATER THAN A 9 POINT BMP)

@ 20% IMP for entire w/shed 4 VR = 138.5
@ 19% " " " " " = 133.1
@ 18.5% " " " " " = 130.4

DRAINAGE, STORMWATER MANAGEMENT, AND EROSION CONTROL DESIGN

AT 20% IMPERVIOUS OVERALL

VOLUME REQUIREMENTS AT 20% IMPERVIOUS

$$V_r - \frac{(R_m)(R_v)}{12} \times AC$$

$$R_v = [0.05 + 0.009I] = 0.05 + 0.009\ (20) = 0.230$$

R_m = 0.45" FOR WET DETENTION DESIGNS

$A_c = 4016$

$$V_r = \frac{(0.45)(0.23)}{12} \times 4016\ AC = 34.64\ ac.ft. = 1{,}508{,}831\ cu.ft.$$

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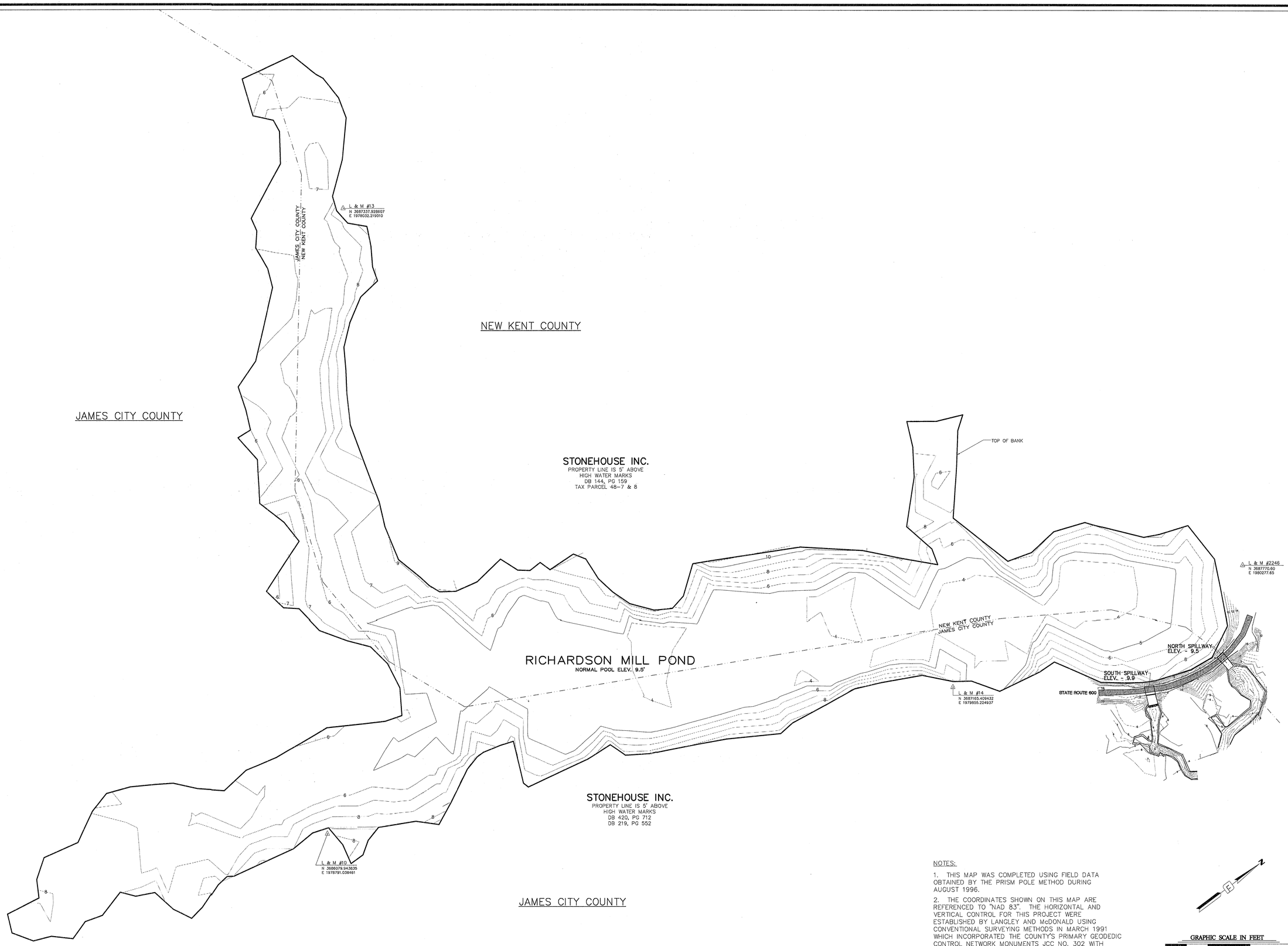
VOLUME AVAILABLE IN R.M.P.

130 ac.ft. X 43,560 = 5,662,800 cu.ft.



NOTES:

1. THIS MAP WAS COMPLETED USING FIELD DATA OBTAINED BY THE PRISM POLE METHOD DURING AUGUST 1996.

2. THE COORDINATES SHOWN ON THIS MAP ARE REFERENCED TO "NAD 83". THE HORIZONTAL AND VERTICAL CONTROL FOR THIS PROJECT WERE ESTABLISHED BY LANGLEY AND McDONALD USING CONVENTIONAL SURVEYING METHODS IN MARCH 1991 WHICH INCORPORATED THE COUNTY'S PRIMARY GEODEDIC CONTROL NETWORK MONUMENTS JCC NO. 302 WITH JCC 302RM3AZ AND JCC NO. 340 WITH JCC NO. 340 RM3AZ.

COMMONWEALTH OF VIRGINIA
JOHN L. HUTCHERSON
No. 1370
LAND SURVEYOR

Langley and McDonald, P.C.
Engineers • Surveyors • Planners
Landscape Architects • Environmental Consultants
VIRGINIA BEACH WILLIAMSBURG

DES.	JLH
DWN.	JSR
CHK.	JLH
DATE	SEPT. 17,1996

APPENDIX "A"
HYDROGRAPHIC MAP OF RICHARDSON MILL POND BELOW NORMAL POOL ELEVATION

PROJ. NO.	96038-0445
SCALE	1" = 100'
SHEET	1 OF 1
DWG.	

WC059_RICHARDSON_MILL_POND - 146

Scott Thomas

From: Adam Kinsman
Sent: Monday, June 18, 2007 12:38 PM
To: Scott Thomas; Darryl Cook; Melanie Davis; Larry Foster
Subject: FW: Stonehouse FOIA
Importance: High
Attachments: stonehouse foia.pdf

From: Adam Kinsman
Sent: Monday, June 18, 2007 12:38 PM
To: Scott Thomas; Darryl Cook; Melanie Davis; Larry Foster
Subject: Stonehouse FOIA
Importance: High

Attached is a FOIA request for information related to the Stonehouse development and its use of the Richardson Mill Pond. Please review the attachment and call me **on or before WEDNESDAY, JUNE 20** to let me know whether or not you have any documents responsive to the request. As always, please forward this along to any staff member who may have responsive documents and please keep track of your time spent in fulfilling this request.

Thank you,
Adam

Adam

- RMP File - Copy All
- SH - GEN - Copy Yellow TABS
- SH - GEN - Copy Yellow TABS
- SH ALT SW mgmt File - Copy Yellow TABS
- SH Dev AREA TWO MSWP - Copy Yellow TABS (PERTAINS TO RMP)
- CAN'T FIND RMP I/M Agreement? I know it exists.

SJT Time 2.5 hrs.

BEAN KINNEY & KORMAN PC
ATTORNEYS

2300 WILSON BOULEVARD
7TH FLOOR
ARLINGTON, VA 22201
PHONE 703.525.4000
FAX 703.525.2207

JONATHAN C. KINNEY
Ext: 305
Fax 703.525.2207
JKinney@beankinney.com

June 8, 2007

Received
JUN 15 2007
Human Resources

JUN 2007
RECEIVED
COUNTY
ATTORNEY
JAMES CITY COUNTY
VA

James City County
Attn: FOIA Officer
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Re: **Freedom of Information Request - Richardson Mill Pond/Siltation and Fish Kill Issues**

Gentlemen:

We represent the owners of one-half of the Richardson Mill Pond and certain adjoining property owners on the New Kent County side of the Richardson Mill Pond. For the purposes of this representation the "Richardson Mill Pond" is a pond located off of Holly Fork Road (Route 600) that is located approximately one-half in New Kent County and one-half in James City County. Over the past number of years the health of the pond appears to be deteriorating. There is major silting in the pond; this silting is occurring at a rate much more rapidly than before. Additionally, there have been a number of fish kills in the pond which was not an occurrence prior to certain development activities by Stonehouse Development, LLC, Stonehouse LLC, Stonehouse, Inc., Association at Stonehouse, Inc., Prudential Realty and their predecessors in interest and associates (hereinafter "Stonehouse").

The purpose of this letter is to officially request a copy of all governmental agreements between James City County and Stonehouse, including the parties included in the definition of Stonehouse listed above and their predecessors in interest, affiliates and parties connected with the development of Stonehouse relating to the use of the Richardson Mill Pond.

We are specifically requesting:

1. Any agreements between Stonehouse and James City County that relates to the ability of Stonehouse to use the waters of Richardson Mill Pond; to discharge into the waters of Richardson Mill Pond; or connected to the development of Stonehouse that specifically relate to the use of the Richardson Mill Pond either as (i) a BMP, (ii) wet pond, or (iii) as part of a stormwater management/drainage system.

Insp Maint Agmt - not able to locate

H:\User\Jkinney\KINNEY\James City\FOIA 0507 request.wpd

2. The existence of any bond, bonding agreements or escrows to ensure performance of agreements regarding the use of Richardson Mill Pond; None left

3. Any agreements between Stonehouse and James City County that relate to the ability of Stonehouse to use water from Richardson Mill Pond for irrigation or other purposes; and None

4, Any agreements regarding the levels at Richardson Mill Pond to be maintained and the maximum amount of water to be withdrawn from Richardson Mill Pond on a daily, weekly, monthly and/or annual basis. None

In accordance with the Virginia Freedom of Information Act, Section 2.2-3700 et seq., we are making the formal request referenced above. In accordance with Section 2.2-3704, we are willing to pay reasonable charges for copying, search time and computer time expended in supplying the information requested.

If you have any questions regarding the specific nature of this request, please do not hesitate to call me.

Sincerely,

BEAN, KINNEY & KORMAN, P.C.

Jonathan C. Kinney

JCK:dsi

H:\User\Jkinney\KINNEY\James City\FOIA 0507 request.wpd

Declaration of Covenants Log

Covenantor(s)		Property Location or other Identifying Information	Date copy sent to E & S (Joan E.)
87)	Legacy Greensprings, Limited Partnership	Detention Basin located between Parcel F, Parcel G and S.R. 614	3-8-95
88)	McG Outlet Center Limited Partnership	5715 Richmond Road SP-107-94	3-29-95
89)	Timothy K. Johnston	7191 Richmond Road Tax Map (23-2) (1-44)	4-7-95
90)	Busch Properties, Inc.	Tax Map (50-1) (1-1) (North Quarter) Kingsmill Village	4-19-95
91)	Stonehouse, Inc.	Part of Tax Map (6-4) Parcel (1-1), and Tax Map (12-1) Parcel 38	4-19-95
92)	Riverside Healthcare Assoc.	3400 John Tyler Highway	5-19-95
93)	Powhatan Enterprises, Inc.	Powhatan of Williamsburg Secondary	5-19-95
94)	King of Glory Lutheran Church	4897 Longhill Road	6-20-95
95)	Donald E. Newsom	7242 Merrimac Trail	7-14-95
96)	James H. Neal	7151 Richmond Road Deed Book 684, Page 109	7-21-95
97)	Busch Properties, Inc.	Kingsmill Resort Center 101-D Kingsmill Road	8-10-95
98)	University Square Associates	Williamsburg Crossing Multi-family Crossing 104 Kings Way	8-10-95
99)	Greensprings Plantation	Tax Map (46-1)(1-1)	8-17-95
100)	Merrimac Trail Assoc, LLC.	7346 Merrimac Trail	8-25-95
101)	VA Peninsula Regional Jail Authority	9320 Merrimac Trail	9-11-95
102)	W-JCC Public Schools	new Rt. 5 High School 3751 John Tyler Highway	9-28-95

Declaration of Covenants Log

	Covenantor(s)	Property Location or other Identifying Information	Date copy sent to E & S (Joan E.)
174)	Atlantic Homes Development	Longhill Station, Section 2	9-25-98
175)	Centex Homes	on Route 1480 (Powhatan Secondary)	10-16-98
176)	Christian Life Center Thomas M. Wells	4451 Longhill Road	10-16-98
177)	Old Capitol Lodge, #629	103 Howard Drive	11-18-98
178)	Governor's Land Associates	Club Villas Subdivision	1-6-99
179)	Governor's Land Associates	Cypress Isle Subdivision	1-6-99
180)	Norfolk Paint Co., Inc.	5540 Olde Towne Road	2-2-99
181)	Ironbound Road Mini Storage Associates, LC	4010 Ironbound Road	2-2-99
182)	Williamsburg Health Investors	Jamestown Road, Tax Map Parcel No. (47-3) (01-70)	2-25-99
183)	John Thayer-Smith t/a Mini Mix Concrete	1571 Manufacture Dr.	3-12-99
184)	Jerry and Christine Dye	Lot 274 Subdivision Plat First Colony, Section 4A	4-9-99
185)	John and Gloria Meyering	100 Shellbank Drive	4-16-99
186)	Realtec, Inc.	Ford's Colony, §31 Lots 1-35	4-29-99
187)	Centex Homes	Powhatan Secondary Rte 1480	5-5-99
188)	Riverside Hospital, Inc.	Parcel #22, Williamsburg Crossing Shopping Center	5-26-99
189)	John Deere Vehicle Group	3000 Meadowview Circle	6-14-99
190)	Kingsmill Resort	Kingsmill Marina	7-16-99
191)	Governor's Land Associates	Fowler's Lake, Block "B"	8-10-99
192)	S.A. and C.F. Seaman	1584 Manufacture Drive	8-19-99
193)	Stonehouse, L.L.C.	Stonehouse Subdivision	8-19-99

FILE -
Stonehouse Comm'l

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

MAR 1997
RECEIVED
DEVELOPMENT
MANAGEMENT

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

February 28, 1997

Mr. Wayland N. Bass
County Engineer
James City County
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Re: Stonehouse Chesapeake Bay
Preservation Ordinance Compliance
L&M # 96038-0145

Dear Mr. Bass:

Enclosed is a corrected map of the areas discussed in our letters of June 27, 1995 and February 24, 1997. I apologize that the map sent earlier deleted part of the acreage included in the calculations. I have also attached a spreadsheet showing the areas of the parcels included in the drainage calculations. These areas were prepared from larger scale maps and consequently should present a fairly accurate picture of the areas.

The entire area shown highlighted on the plan is approximately 2,426 acres. Of this area, 1,748 acres drain to Richardson Millpond. The area east of route 600, 678 acres, does not drain to Richardson Millpond, and is labeled on the map. About 50% of this area will remain in undisturbed natural open space, including the wetland and drainage systems and the 25% slopes. This comprises 338.5 acres.

When these areas are used in the calculations on the Worksheet for BMP Point System included with our letter dated February 24, 1997, it is shown that a total of 776 acres of undisturbed natural open space is required within the 2,426 acres in order to meet the 10 points. As shown on our maps, the available open space within Phase One is greater than that needed to meet the requirement.

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

I know these numbers are complex. I hope the map and this explanation helps to clarify our calculations. I will be out of town until March 10, and will call when I return to see if you have any questions. Thank you very much for your assistance.

Sincerely,

LANGLEY AND McDONALD, P.C.

Vaughn B. Rinner, C.L.A.
Principal

VBR/
Enclosures

cc: Jim Franklin w/Attachments

REVISED MASTER PLAN WITH 25% SLOPE

1 PAR #	2 LAND USE	3 NET DV AREA	4 DENSTY DU/AC	5 # UNITS	6 SQ. FOOT X1,000	7 IMPRV RATE	8 BUFFER AREA	9 ROAD AREA	10 PATH AREA	11 WETLAND AREA	12 IMP AREA	13 NET IMP SURFAC
14	A- Single family residential	12.8	0.8	10.0		14%	45.1	0.0	0.0		2.2	4%
15	A- Single family residential	76.3	1.8	138.0		19%	23.2	3.7	1.5		17.4	17%
16	A- Single family residential	6.1	1.6	10.0		18%	11.9	0.0	0.0		1.2	7%
17	A- Single family residential	12.9	1.1	14.0		15%	11.8	0.0	0.0		2.1	8%
18	A- Single family residential	128.0	1.4	182		17%	122.6	3.2	1.3		25.3	10%
22	A - Single family residential	33.4	1.8	60		19%	59.0	0.0			6.9	8%
28	A - Single family residential	30.0	1.0	30		15%	22.7	0.0			4.7	9%
29	A - Single family residential	45.0	2.9	130		25%	47.1	1.0	0.9		12.6	13%
31	A - Single family residential	29.4	4.1	120		31%	46.2	0.0			9.6	13%
32	A - Single family residential	94.1	2.2	210		21%	147.8	5.0	0.6		24.4	10%
	Subtotal A - SFR	468.0		904.0			537.4	12.9	4.3	0.0	106.6	10%
1	B - Multifamily residential	26.8	6.0	161		45%	10.0	0.0	0.0		12.2	33%
7	B - Multifamily residential	15.2	5.1	78		40%	9.2	0.0			6.2	25%
21	B - Multifamily residential	44.8	3.3	147		26%	39.2	0.0			12.0	14%
30	B - Multifamily residential	29.1	1.0	30		15%	68.8	0.0			5.1	5%
	Subtotal B - MFR	115.9		416.0			127.2	0.0	0.0	0.0	35.4	15%
12	C/D - Multifamily residential	9.9	12.1	120		50%	18.1	0.0	0.1		5.2	18%
	Subtotal D - MFR	9.9		120			18.1	0.0	0.1	0.0	5.2	18%
8	E - Convention Center	8.8	0.0	0	250 Rooms	65%	10.4	0.8	0.3		6.4	32%
10	E - Commercial	5.2	0.0	0	25	70%	2.5	0.5	0.2		4.0	48%
23	E - Commercial	3.6	0.0	0	4	65%	0.6	2.3	0.3		3.8	56%
24	E - Commercial	2.8	0.0	0	8	65%	2.2	2.3	0.3		3.3	44%
33	E - Commercial	83.7	0.0	0.0	300	65%	29.2	0.0	0.0		54.7	48%
	Subtotal E - Comm.	104.1		0.0	337.0		44.9	5.9	1.1	0.0	72.3	46%
2	F/G - Office/Business	14.7	0.0	0	304	65%	5.9	3.9	0.8		12.2	48%
4	F/G - Office/Business	5.6	0.0	0		65%	2.1	3.3	0.6		5.7	50%
5	F/G - Office/Business	52.9	0.0	0		65%	20.9	9.9	2.1		41.2	48%
19	G - Office Park	9.0			9.2	65%	9.2	3.3	0.7		8.2	37%
20	G - Office Park	17.9	0.0	0	19.0	65%	2.9	5.7	1.2		15.5	56%
26	G - Office Park	55.1			400.0	65%	68.4	1.9	0.8		37.9	30%
34	G - Office Park	28.5			285.0	65%	32.2	0.0	0.0		18.8	31%
35	F - Business Park	31.5	0.0	0	280	65%	41.2	6.3	1.3		25.1	31%
61	F/G/H/ - R&D/Business	42.9	0.0	0	400	65%	33.1	0.0	0.0		28.2	37%
	Subtotal F/G/H	258.1		0	2253.0		215.9	34.0	7.5	0.0	192.8	37%
26	I - Municipal/School	21.0	0.0	0		55%	114.0	0.0	0.0		12.7	9%
36	I - Municipal Use	4.0	0.0	0		55%	0.0	0.0	0.0		2.2	55%
	Subtotal Public Use	25.0		0			114.0	0.0	0.0	0.0	14.9	11%
21	J - Park	3.0	0.0	0		1%	2.4	0.1	0.1		0.1	3%
25	J - Community Center	12.2	0.0	0		65%	6.9	0.0	0.0		8.0	42%
27	J - Park	7.6	0.0	0		1%	4.9	1.5	0.6		1.2	8%
	J - Recreation/Golf	242.2	0.0	0		2%	0.0	0.0	0.0		4.8	2%
6		13.8	0.0	0		1%	6.8	2.7	0.6		2.0	8%
9		6.3	0.0	0		1%	0.0	0.0	0.5		0.2	3%
13		7.2	0.0	0		1%	0.0	1.6	0.7		1.3	13%
	Subtotal J - Rec.	292.3		0.0			21.0	5.9	2.5	0.0	17.7	6%
	Total	1273.3		1440.0	2590.0		1078.5	58.7	15.5	0.0	444.9	18%
	Total area in acres	2426.0										

STONEHOUSE

P.O. Drawer 759
Toano, Virginia
23168.0759

757.566.2300
FAX 757.566.1125

WEB:
www.stonehouseva.com

February 26, 1997

Mr. Darryl E. Cook
James City County
Office of Code Compliance
P. O. Box JC
Williamsburg, VA 23187

Subject: Case No. SP-78-96 Mill Pond Run/Richardson's Mill Pond

Dear Mr. Cook:

This is to advise you that Stonehouse will again discuss with the Virginia Department of Transportation the improvements necessary for stabilization of the Richardson's Mill Pond dam as recommended in the Schnabel Engineering Associates, Inc. report dated September 4, 1996. Hopefully we will be able to convince VDOT to perform the work since it is within the right-of-way of and is a safety issue for Route 600.

If VDOT decides not to perform the work Stonehouse will request permission from VDOT to work within the right-of-way to complete the improvements itself or to fund VDOT forces to accomplish the work no later than June 1, 1997. Per our discussion, it is my understanding that if Stonehouse is not given such permission by VDOT, the County will consider that Stonehouse has done all it can toward corrections at the dam and will consider our obligation as fulfilled.

I will keep you informed on our discussions with VDOT and on field activities as they occur. If you have any questions, please contact me.

Sincerely,

check w/ ~~Jim Brewer~~ Beverly Monzingo

James D. Franklin
Development Manager

JDF/rcc

File · Stonehouse General

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(804) 253-6671
E-MAIL: devtman@james-city.va.us
Fax: (804) 253-6850

CODE COMPLIANCE
(804) 253-6626
E-MAIL: codecomp@james-city.va.us

COUNTY ENGINEER
(804) 253-6678

INTEGRATED PEST MANAGEMENT
(804) 253-2620

PLANNING
(804) 253-6685
E-MAIL: planning@james-city.va.us

February 13, 1997

John L. Hutcherson, P.E., L.S.
Langley and McDonald, P.C.
201 Packets Court
Williamsburg, VA 23185

RE: Stonehouse Chesapeake Bay
Preservation Ordinance Compliance

Dear Mr. Hutcherson:

The natural open space/conservation easement calculations for Stonehouse outlined in your January 27 letter do not meet County requirements and is therefore not approvable. Please submit revised calculations and a revised map. Conservation easements should not be deeded on a per development acre basis but section by section as development occurs. In preparing your revised calculations we refer you to the Kendleton Subdivision recently submitted by your firm. We allow conservation easement areas that do not drain to a structural BMP to be removed from the denominator.

Sincerely,

Wayland N. Bass
County Engineer

WNB/jt

cc: Darryl Cook
Jim Franklin

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

FEB 1997
RECEIVED
CODE COMPLIANCE
OFFICE

February 24, 1997

Mr. Wayland N. Bass
County Engineer
James City County
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Re: Stonehouse Chesapeake Bay
Preservation Ordinance Compliance
L&M # 96038-0145

Dear Mr. Bass:

In response to your letter of February 13, 1997, we would like to submit the attached plans showing the general areas of undisturbed natural open space that are being retained within the Phase One area of Stonehouse to meet the required open space for Chesapeake Bay Preservation Ordinance Compliance. There are now three entities controlling land in Phase One of Stonehouse: 1) Legends owning the golf course; 2) Stonehouse Inc. controlling most of the commercial land, Fieldstone Parkway and the well pumping and water storage facility; and 3) Stonehouse L.L.C. developing the residential land.

Pursuant to your letter dated February 13, 1997, we are submitting the revised 10 point calculation worksheet, removing from the denominator only the natural open space areas of the 2,425 acres that do not drain to Richardson Millpond, our structural BMP. This includes what is currently estimated to be 338.5 acres in Phase Two of Stonehouse. These revised calculations show that a total of 776 acres of undisturbed natural open space is required in Development Area One (both Phases One and Two of Stonehouse) to meet the 10 points required over the total of 2,426 acres, of which Phase One comprises 1,020 acres. With 1,650 acres of developable area in Development Area One, 0.47 acres of undisturbed natural open space will need to be provided for each acre of land developed to result in the total required natural open space. As shown in the table below, Phase One has a total developable area of 644.01 acres, resulting in a requirement of 302.68 acres of undisturbed natural open space.

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One plan provided is a composite map showing the undisturbed natural open space available in the land controlled in Phase One by all three entities. A summary of the overall developable area and undisturbed natural open space available to be placed in easements within Phase One as it develops is as follows and as shown on the attached exhibit:

	Developable Area	Undisturbed Natural Open Space Available
Legends Golf	111.60	99.40
Stonehouse L.L.C.	433.48	243.02
Stonehouse Inc.	98.93	33.57
Totals	644.01	375.99

The dedication of the necessary open space will be provided by each of the three controlling entities on a section by section basis in accordance with your letters of June 27, 1995 and February 13, 1997. Through 1997, the area planned for development includes a total of 295.40 developable acres, including area in the golf course and Sections II, III and IV as well as Fieldstone Parkway and the water pumping and storage facility. The natural open space required for this amount of development is 138.84 acres.

A summary of the areas required for development to date and anticipated during 1997 is as follows:

	1997 Developable Area	1997 Undisturbed Natural Open Space Available
Legends Golf	111.60	99.40
Stonehouse L.L.C.	177.54	83.44
Stonehouse Inc.	6.26	6.23
Totals	295.4	189.07

Legends is providing a separate plan of their natural open space area. The second plan included with this letter shows a composite of the acreage areas from which the easements proposed for dedication to the County at this time will be provided.

We are prepared to move forward with the preparation of an easement plat for 138.84 acres within this area upon your approval of the calculations provided and areas shown. If you have any questions, please let us know. Thank you very much for your attention to this matter.

Sincerely,

LANGLEY AND McDONALD, P.C.

Vaughn B. Rinner, C.L.A.
Principal

VBR/
Enclosures

cc: Jim Franklin w/Attachments

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

January 27, 1997

Mr. Wayland Bass
County Engineer
Department of Development Management
P.O. Box 8784
Williamsburg, VA 23187-8784

Re: Stonehouse Chesapeake Bay
Preservation Ordinance Compliance

Dear Mr. Bass:

I wish to thank you and Darryl Cook for your time on January 17, 1997, to discuss the Chesapeake Bay Preservation Ordinance Compliance for Phase One of the Development Area One of the Stonehouse Project with Jim Franklin and me. Please reference our letter of May 3, 1995 from Vaughn Rinner to you regarding the Stonehouse Chesapeake Bay Preservation Ordinance Compliance. Submitted with that letter was the backup documentation and calculations showing the County 10 point system compliance.

Since that time we have submitted the Hydraulic and Structural Analysis of the existing Richardson Mill Pond embankment structure in a separate report that has shown that the dam is hydraulically and structurally adequate. At the time the original 10 point calculation was prepared the entire Stonehouse Development Area One of 2,426 acres was included in the denominator of the structural BMP point allocations. Since that time, on numerous other projects, such as the James River Commerce Center, you have allowed Langley and McDonald to subtract the natural open space that will be dedicated to the County from the denominator of the Structural BMP Calculation regardless of the location of the natural open space above or below the BMP. I have enclosed a revised worksheet for BMP point system, Table No. 3 which shows revised calculations based on subtracting the natural open space from the denominator for the structural BMP. Based on this revised calculation, we have determined that the total required natural open space dedication for Stonehouse Development Area One will be 560 acres.

Assuming that our revised calculation of required natural open space is satisfactory, we have calculated the required dedication of natural open space per gross area. This calculation shows that

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Mr. Wayland Bass
County Engineer
Department of Development Management

January 27, 1997

.231 acres of natural open space will need to be dedicated for each gross acre of area developed within the Stonehouse Development Area One. As we discussed in our meeting, we propose to dedicate adequate natural open space for our requirement for gross area of the project that we expect to develop during 1997. This projection for calendar year 1997 is 232 gross acres of development. This equates to a requirement of 53.5 acres of natural open space that will be dedicated during 1997 in order to keep the natural open space current with the actual development within the Development Area One.

I have attached herewith an exhibit entitled "Stonehouse Phase One Natural Open Space Exhibit" that shows the general area that we propose to dedicate in 1997. We believe that this is a reasonable approach of keeping tract of natural open space dedication.

We request that you and Darryl Cook review this concept in hopes that you will concur with our reasoning and grant approval of this request. When we have received written concurrence from you that this area will meet the Chesapeake Bay Preservation Ordinance natural open space requirements, we will prepare an easement plat for this area.

Should you have any questions or wish to discuss this matter, please do not hesitate to call at 253-2975.

Very truly yours,

LANGLEY AND McDONALD, P.C.

John L. Hutcherson, P.E., L.S.
Senior Associate

JLH/amh
Enclosure
cc: Mr. Darryl Cook w/Enclosure
Mr. Jim Franklin w/Enclosure

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

December 6, 1996

Southern Virginia Regulatory Section
94-0816-16 (Mill Swamp and Bird Swamp)
(L&M No. 89-046-602)

Stonehouse, Inc.
c/o Mr. Robert Kerr
Langley and McDonald, P.C.
5544 Greenwich Road
Virginia Beach, Virginia 23462

Dear Mr. Kerr:

This letter is in reference to the proposed temporary impacts associated with three utility line crossings, (a force main, a gravity sewer, and a water line) which will be installed in Development Area One at Stonehouse in James City County, Virginia. The sewer force main will cross Bird Swamp to connect with James City County Service Authority force main along Route 64, as shown on the drawings entitled " Stonehouse, Inc. Sanitary Force Main Extension to Connect the Commerce Park Force Main to Development Area 1", dated May 6, 1996. The gravity sewer line and the water line will cross Mill Swamp on opposite sides of the Mill Pond Run Road bridge, as shown on the drawings entitled "Mill Pond Run (Formerly Called 'Clubhouse Road') at Stonehouse for Stonehouse L.L.C.", dated May 1996. In accordance with your request of November 13, 1996, your Department of the Army Permit, issued on December 16, 1994, is hereby modified to allow for the temporary impacts to wetlands and waters of the United States. All other conditions of the original permit remain unchanged. Please be advised that all conditions of the original and modified Virginia Water Protection Permit become conditions of this authorization.

All wetland area temporarily impacted by the work must be returned to preexisting elevations. If the wetland area does not revegetate naturally within one year, then a planting scheme will be required.

Please obtain all necessary State and Local authorizations for the proposed work. Should you need further assistance or have any questions, please contact Melissa Schaup at (804) 441-7489.

Sincerely,

R. Harold Jones
Chief, Southern Virginia
Regulatory Section

Copies Furnished:

Environmental Protection Agency, Philadelphia
National Marine Fisheries Service, Oxford
U. S. Fish and Wildlife Service, White Marsh
Virginia Department of Environmental Quality, Virginia Beach

DEPARTMENT OF DEVELOPMENT MANAGEMENT
P. O. Box 8784
Williamsburg, Virginia 23187-8784

County Government Center, 101-E Mounts Bay Road

(1) JCH
(2) NHH
(3) FILE
89046

Development Manager
(804) 253-6671

Code Compliance
253-6626

County Engineer
253-6679

Planning
253-6685

Integrated Pest Management
253-2630

June 27, 1995

Ms. Vaughn B. Rinner, Principal
Langley and McDonald
5544 Greenwich Road
Virginia Beach, VA 23462

Dear Ms. Rinner:

I am writing in reply to your letter regarding BMPs for Stonehouse Development Area #1. We agree that Richardsons Mill Pond can serve as the water quality BMP for this area provided that post development conditions (i.e. land use, impervious cover, flows) agree with pre-development assumptions prior to the submittal of site plans (exclusive of road and utility plans) for areas utilizing Richardsons Mill Pond as a BMP. Please submit structural and hydraulic analysis of the existing dam for post development conditions to ensure adequacy of the dam.

We agree that conservation easements can be deeded to the County incrementally as major sections are developed. This is how we handle these easements in similar developments at other locations in the County. The conservation areas shown on the Stonehouse Master Plan will serve as the natural open space/conservation easement plan to guide both the County and the developer during the development process.

Sincerely,

Wayland N. Bass
County Engineer

WNB/sf

cc: Darryl E. Cook

Rec'd 6/28/95
L&M

Fax: (804) 253-6850

Langley and McDonald, P.C.
Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
JOSEPH McDONALD
1906-1982

May 3, 1995

MAY 1995
RECEIVED
DEVELOPMENT
MANAGEMENT

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA 23187-8784

Re: Stonehouse Chesapeake Bay Preservation
Ordinance Compliance

Dear Mr. Bass:

This letter is written as a review of our discussion of May 2, 1995. That discussion focussed on the Chesapeake Bay Ordinance compliance for Stonehouse. Our specific focus was the involvement of Richard's Mill Pond as a major BMP facility. Essentially, we are proposing that Richardson's Mill Pond be accepted as the BMP facility for water quality purposes under the Chesapeake Bay Preservation Ordinance. It is proposed that Richardson's Mill Pond serve this function for an area shown on the accompanying drawing as Development Area One. Development Area One includes all of the Phase I area of Stonehouse plus portions of Phase II and commercial development areas of Phases III-V. The drawing also shows the areas of Development Area One from which runoff flows to Richardson's Mill Pond and the areas that do not flow to Richardson's Mill Pond.

Accompanying this letter is a development summary of Stonehouse Development Area One showing land use areas and densities along with assumed impervious areas. The tabulations key to the parcel numbers shown on the Master Plan. The first tabulation is as summary of the entire area; the following two pages summarize the areas flowing to Richardson's Mill Pond and the areas that do not. The buffer areas included on these computations are areas of 25% plus slopes and wetland areas that would have been included in the reservoir had the reservoir been constructed. As you can see from the accompanying calculations, the overall impervious rate is determined to be 18%. The impervious rate is significant because it is the determining factor in storage volume required to meet certain BMP point designations.

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Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

Also accompanying this letter are several sheets of computations. These sheets of computations include the three step 10 point system worksheet and calculations of volume and storage for Richardson's Mill Pond. The 10 point system worksheets indicate that a total of 10 points are derived considering that approximately 144 acres drain through already accepted 11 point BMP's before they actually drain into Richardson's Mill Pond. You will note that based on our discussions, no series computations have been utilized. The areas draining to these 11 point BMPs are assigned only the 11 points and no credit is taken for the series impact of additional treatment in Richardson's Mill Pond. The remaining acreage of 1,604 acres within Stonehouse that drains to Richardson's Mill Pond is shown as being treated by an 8 point BMP (Richardson's Mill Pond).

The available storage volume of 5,662,800 cubic feet in Richardson's Mill Pond is shown on the accompanying calculations. Assuming 20% impervious surface levels in Stonehouse, which is in excess of that anticipated, and 5% impervious for areas outside of Stonehouse which also drain to the pond, the calculations show that the volume of the pond is actually in excess of that required for a 9 point BMP. As we discussed in our May 2 meeting, the areas outside Stonehouse, some of which are in New Kent County, actually haven virtually no impervious surface on them.

Our conclusion in going through these calculations is that Richardson's Mill Pond provides a BMP that is adequate to serve the Chesapeake Bay requirements of all of Development Area One. There would be no need for additional water quality BMPs in this area. It is recognized that water quantity (flow attenuation) BMPs will be required. These will be addressed in the development plans as they are produced.

We also discussed Stonehouse's concern with encumbering land with natural open space easements in the early stages of the development. James City County's computational system does not require structural BMPs until an impervious rate of over 10% occurs. It can be seen from the accompanying calculations and the acreage of buffer area that substantial development can occur prior

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

to reaching an impervious rate of 10% in Development Area One. We are requesting that no open space easements be required until an impervious rate in excess of 10% is achieved in Development Area One. At that time, Stonehouse would expect to provide required open space easements for areas that have been developed to that point. These open space easements would be of an acreage necessary to meet the 10 point requirements of land developed to the point where such easements are required, that being the time when an impervious rate over 10% occurs.

We plan to provide a running account of the impervious rate with the submittal of each development plan within Development Area One. That impervious rate would be based upon the total area of Development Area One. It is shown in the 10 point system worksheet that a total of 984 acres of undisturbed natural open space would be necessary to achieve the 10 points over the total of 2,426 acres if the BMP credit for Richardson's Mill Pond were only 8 points. In actuality, the BMP credit for the pond will be greater than this. Net developable area within Development Area One is 1,347 acres. With our conservative 8 point BMP calculations, for every acre of development within Development Area One an area of .7 acres undisturbed natural open space is required. At such time as the 10% impervious rate occurs, we would expect to calculate the acreage of open easement required by a ratio of net developable area to required open space according to 10 point calculations reflecting impervious surface and agreed-upon Richardson's Mill Pond BMP point values.

Please review this letter and the accompanying drawing and calculations. We would appreciate your approval of our two requests which are again stated as follows:

1. That Richardson's Mill Pond be accepted as the Chesapeake Bay BMP for all of Development Area One, based upon the accompanying calculations.

2. That recordation of undisturbed natural space easements be delayed until such time as an impervious rate of 10% is achieved in Development Area One. At that time, open space

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

easements would be required based upon an established ratio for all areas developed to the point of reaching a 10% impervious rate, and for additional development as it occurs.

The time which you and Darryl spent in reviewing this with us on May 2 and the additional time which we know will be required to review this transmittal is very much appreciated. We believe that this presents a very realistic and practical approach to water quality planning for the Stonehouse development, and your efforts in working with Stonehouse Inc. are appreciated.

Very truly yours,

LANGLEY AND McDONALD, P.C.

Vaughn B. Rinner
Principal

NHM/VBR/amh
Enclosures
cc: Jim Franklin w/enclosures

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
RICHMOND DISTRICT
2430 Pine Forest Drive
COLONIAL HEIGHTS, VA 23834
www.VDOT.Virginia.gov

Gregory A. Whirley
COMMISSIONER

October 25, 2011

Mr. Tom Page
VP, General Manager
GS Virginia
4011 West Chase Blvd.
Suite 175
Raleigh, NC 27607

Re: Bridge Structure 6001 on Route 600 (Holly Fork Road) over Ware Creek in New Kent County

Dear Sir:

This letter was originally sent to the trustees of the adjoining property as our research indicated this section of the dam belonged to them. From further research and our phone conversations, it has come to our attention that Stonehouse owns the portion of the earthen dam structure that includes the noted structure over the spillway for the impoundment known as Richardson's Pond. The right of way for the public roadway (route 600) is, we believe, provided by a prescriptive easement.

In accordance with the Code of Virginia the owner must maintain the substructure, i.e., all elements below and supporting the steel beams (see Attachment A), whereas the Virginia Department of Transportation (VDOT) owns and maintains the superstructure; the beams and metal decking with asphalt. VDOT also maintains the paved roadway crossing the dam and appurtenant guardrail. The Hampton Roads District of VDOT maintains the structure (6901) over the overflow spillway just south of this location in James City County.

In accordance with federal regulations under the purview of the National Bridge Inspection Standards (NBIS) – 23 CFR 650(C), VDOT inspects the bridge on at least a bi-annual basis. In accordance with the above referenced section of the Code, we are transmitting to you a summary of the general condition and recommendations of the inspection team for the substructure.

OVERALL CONDITION: Good – Timber retaining wall exhibits decay and broken members. Backwall and breastwall of each abutment exhibit cracks up to ½" wide at random locations with one area of spall up to 3" in diameter. Concrete spillway channel floor is deteriorated throughout.

NOTE: Apart from the inspection, it has come to our attention that there is a breach in the earthen dam behind the south abutment. Evidence for this is found in the continual settlement and ongoing repairs of the roadway pavement behind the abutment. There is an area of slumping fill underneath the

guardrail on the southwest corner of the structure. Also, at the area behind the southeast retaining wall for the spillway/channel floor, there is a significant amount of water flowing out of the dam structure, with signs of bank failure from the erosion effects of the water. Attachment B contains an aerial photograph of the site and a series of photographs for the items noted above. With the "piping" effect of such breaches, it is a matter of time before the dam weakens enough to washout, including the roadway approach pavement. This concern was heightened with tropical storm Lee and the increased pressure and flow of the encroaching water through the dam. The subsequent cavity in the dam embankment resulted in a large void and failed pavement. Of vital concern to VDOT is the possibility of the water induced erosion within the embankment encroaching upon the south abutment foundation, undermining the abutment and resulting in a failure of the bridge.

RECOMMENDATIONS:

1. Evaluate and repair the breach in the dam as soon as possible.
2. Repair hole in southeast retaining wall and backfill behind it.
2. Seal cracks and separation gaps in abutments.
3. Recast spillway/channel floor.

The action plan and any pertinent drawings or sketches for bridge related maintenance noted above, or dam repair that will affect the structural nature or integrity of the bridge, will need to be reviewed by the District Structure and Bridge Engineer, Mr. Gary A. Martin, P.E. before remedial work may commence. Bridge related maintenance that requires an engineering design will require stamping and sealing of the calculations and pertinent drawings or sketches by a licensed professional engineer.

Mr. Gary A. Martin, P.E.
Virginia Department of Transportation – Richmond District
Structure and Bridge Division
2430 Pine Forest Drive
Colonial Heights, Virginia 23834

I am attaching my business card for your information and in order for you to contact me if you so desire.

Sincerely,

Thomas F. Lester, P.E.
District Structure and Bridge Safety Inspection Program Manager
Virginia Department of Transportation – Richmond District

Attachment

GS Stonehouse
Green Land Sub LLC

RECEIVED
NOV 13 2007
ENVIRONMENTAL DIVISION

November 6, 2007

Mr. Scott Thomas, P.E.
Director
James City County Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia

Dear Mr. Thomas:

We appreciate the level of attention and interest in the ongoing review of rezoning application Z-4-07/MP-4-07 to amend the master plan and proffers for the continued development at Stonehouse. James City County's proactive approach to implementing unique environmental management practices should lend to our development of a context sensitive community. We appreciate you taking the time to meet with us at your offices on November 5th. During that meeting we discussed the remaining environmental issues related to proffer conditions and we feel we now have reached agreement on how to resolve those issues in a manner that provides benefit for all parties involved.

Additionally, we discussed the issues related to the current status of the dam located along Six Mount Zion Road at the north end of Richardson's Mill Pond. It is our understanding that through a negotiation process during previous development phases of the existing Stonehouse it was agreed that the pond could serve as a water quality Best Management Practice (BMP). Further, we understand through the ongoing review process the dam was identified as not being properly permitted through the Virginia Department of Conservation and Recreation (DCR). We note the review comment from the James City County Environmental Division dated May 17, 2005 that states "evidence of the dam safety permit from the Virginia Soil and Water Conservation Board will be required prior to final approval and land disturbing permit issuance for the plan of development by the Environmental Division, unless the impounding structure is specifically excluded from the regulations."

We have no intention of trying to get credit for use of the pond for stormwater quality control. Our design approach will be to provide the required stormwater quantity and quality measures within each area as submitted for site plan review. This will include the use of a variety of BMP devices and techniques including the implementation of low impact development practices where applicable. Further, we will provide analysis of Richardson's Mill Pond to provide an understanding of the stage storage relationship impacts to the total volume of water retained behind the dam during select storm events.

17228 Lancaster Highway, Suite 201 Charlotte, North Carolina 28277

We have submitted to DCR for their review a permitting package which outlines the rehabilitation of the dam in order to get the structure permitted. The only remaining item required is the consent of the property owner on the New Kent county side of the pond and dam. Our initial efforts to obtain his approval have been unsuccessful. We have also had a site visit with USACE and DEQ to verify delineation/identification of stream and wetland impacts and discuss mitigation needs.

In the meantime, we will look to move forward with ongoing development in existing Stonehouse (areas west of Six Mount Zion Rd). Based upon our discussion during the meeting on the 5th, it is our understanding if we propose to manage stormwater quantity and quality without the use of Richardson's Mill Pond as a credited BMP, your Division will review and approve acceptable site plans in advance of completion of rehabilitation and permitting of the dam. If your recollection of the above is different from what I have described, please let me know as soon as possible. You can reach me at 919-832-9998.

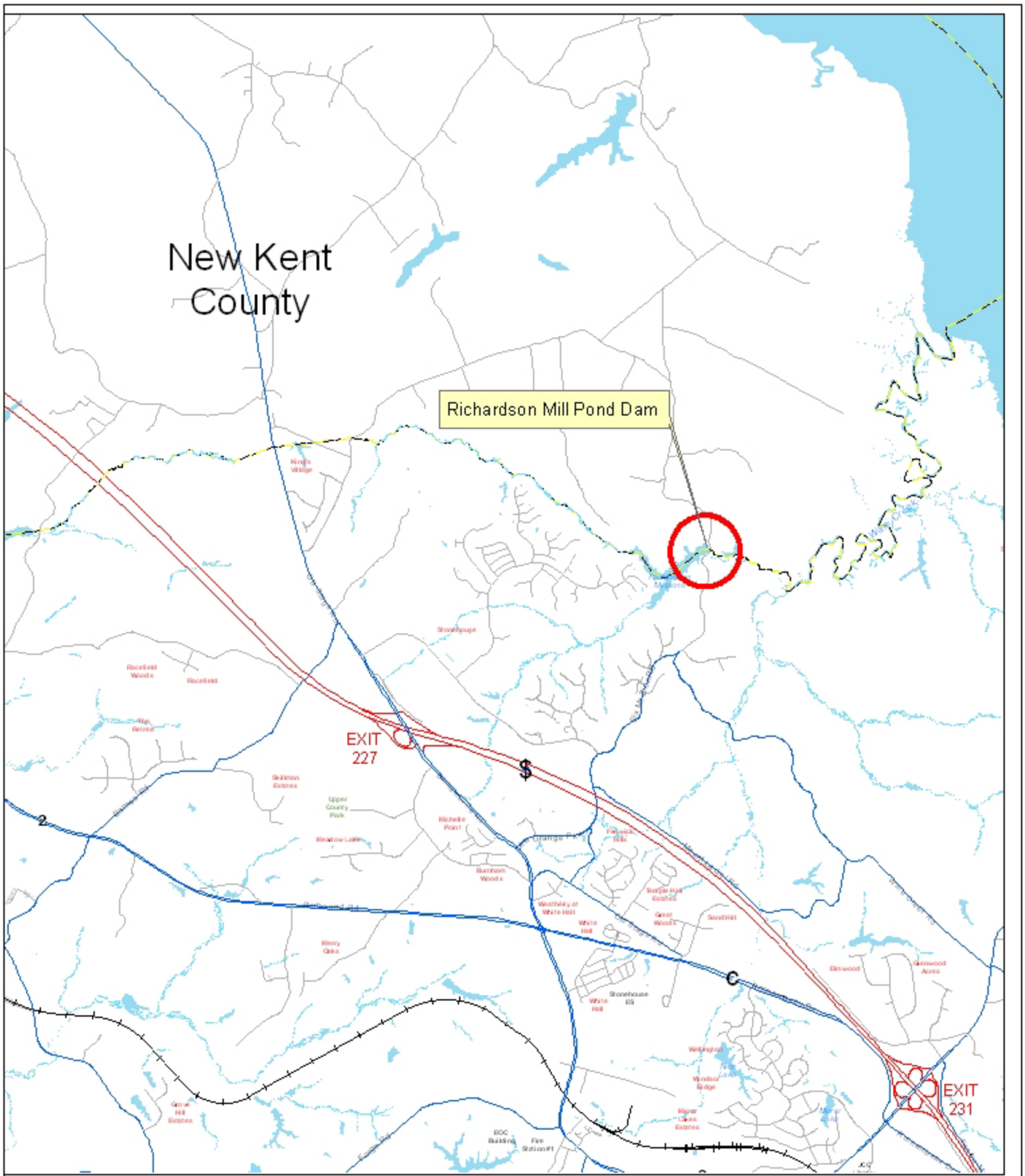
We will continue to provide updates to you regarding our progress with the required permitting of the dam.

Sincerely,

Thomas D. Page

Tom Page
GS Virginia

cc: Mr. Ross Massey, P.E., Chas. H. Sells, Inc.
Mr. Vernon Geddy, Attorney



Location Map
Richardson Mill Pond Dam

This drawing is neither a legally recorded map nor a survey and is not intended to be used as such. The information displayed is a compilation of records, information, and data obtained from various sources, and James City County is not responsible for its accuracy or how current it may be. If discrepancies are found, please contact the Real Estate Assessment Division of James City County, Mapping/GIS Section.
Aerial Imagery Copyright 2005 James City County.

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James City County
VIRGINIA
Jamestown 1607

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jamescitycountyva.gov

Building Safety and Permits 757-253-6620
Engineering and Resource Protection 757-253-6670
Planning 757-253-6685
Zoning Enforcement 757-253-6671

July 10, 2012

Mr. Mike Etchemendy
GS Stonehouse Green Land Sub LLC
Greenfield Partners
11950 Democracy Drive, Suite 310
Reston, VA 20190

Re: Richardson Mill Pond Dam
SR 600 Six Mount Zion Road
James City County, Virginia

Dear Mr. Etchemendy:

As you may be aware, Richardson Mill Pond dam is situated within the Stonehouse development project site on the border of James City and New Kent Counties on Ware Creek. The drainage area to Richardson Mill Pond is approximately 4,000 acres and it receives drainage from Stonehouse Development Area One and Land Bays 1, 3, 5, 8 and 14 and Tracts 3, 10 and 12 from the GS Stonehouse Green Land Sub LLC portions of the Stonehouse project.

Based on our records, in June of 1995 the County agreed to a proposal to allow Richardson Mill Pond (R.M.P.) to serve as a structural BMP for water quality compliance for a large portion of the Stonehouse development project – in particular the area known as Stonehouse Development Area One. The lake was assigned an 8-point value as a BMP in accordance with the County's 10-point system for water quality BMP's and serves approximately 1,600 acres within Stonehouse. The area defined as Stonehouse Development Area One included a portion of the GS Stonehouse development. It is an area identified on the exhibit map as the area "drainage to R.M.P." that portion draining to Bird Swamp which includes area east to include Six Mount Zion Road (high point) and additional area identified as "not draining to R.M.P." which goes even further east of Six Mount Zion Road extending to Frances Swamp. See Attachment 1 for this information.

As a result of rainfall events associated with Hurricane Irene in August of 2011, the dam embankment and flow control structures associated with the Richardson Mill Pond Dam were discovered to have deteriorated conditions which threaten the structural integrity and stormwater function of the facility to function as an impounding structure and as a stormwater management Best Management Practice (BMP). In September 2011, the Virginia Department of Transportation (VDOT) closed SR600 Six Mount Zion/Holly Forks Road due to threatening conditions. This condition has become increasingly worse since December of 2011. Various rainfall events have increased visible signs of piping along the south abutment of the north (primary) spillway. The average rate of seepage is estimated at 7-10 cubic feet per second.

The County is requesting that GS Stonehouse Green Land Sub LLC repair Richardson Mill Pond dam to establish proper stormwater function and to achieve adequate structural integrity in order for the facility to continue to serve as an impounding structure and a stormwater management/BMP. Otherwise, the County will not approve any additional development plans or issue permits for any future GS Stonehouse development projects which drain to Richardson Mill Pond or are situated within the original water quality compliance area identified as the Development Area One area "not draining to R.M.P." as shown on the exhibit map in the attachments. The basis to support this statement is as follows:

- You are the owner of the James City County portion of the dam.

- The dam is subject to Virginia impounding structure and dam safety regulations and requirements.

- In a letter issued by Thomas F. Lester, District Structure and Bridge Safety Inspection Program Manager for VDOT Richmond District dated October 25, 2011 VDOT gave instruction to GS Virginia (Tom Page) that the owner of the property must maintain the substructure, all elements below and supporting the steel beams, Code of Virginia reference §33.1-176, and also provided specific recommendations for repair of the dam. See Attachment 2.

- Many of the Declaration of Covenants – Inspection/Maintenance Agreements as obtained prior to issuance of land-disturbing permits and as recorded in land records for early and more current phases of the Stonehouse project transfer obligation for maintenance of runoff control facilities from the developer to new owners. Any of the agreements linked to the parent parcel with connection to the dam parcels Richardson Mill Pond Tract (Tax Parcel No. 0610100001) and Cedar Point Tract (Tax Parcel No. 0610100002) would thus transfer assignment of obligated maintenance of the runoff control facility to the new parcel owner. Particular reference is made to the recorded inspection maintenance agreement dated March 10, 1995 Instrument # 004986, Deed Book 0732, pages 988-989 which references the parent Stonehouse parcel Tax Map (6-4)(1-1) and as obtained during the approval process for SP-28-95 Ware Creek Roadway Phase 1 (now Fieldstone Parkway). This parcel was the parent parcel for most of the entire Stonehouse property. It is recorded in County land records and binds subsequent owners of the property served by the facility. See Attachment 3.

- Land Bays 1, 3, 5, 8 and 14 and Tracts 3, 10 and 12 drain directly to Richardson Mill Pond dam (ie. the area "draining directly to R.M.P.) and Land Bays 2 and 11A which are within the limit of the Stonehouse Area One exhibit area draining to Frances Swamp (ie. the area "not draining to R.M.P."). All are dependent upon Richardson Mill Pond dam for stormwater quality compliance by the 1995 approval.

- Commitments made to the County during the rezoning case Z-04-07. During the review of the rezoning case, the County's Environmental Division (now Engineering and Resource Protection) had concerns about the ability to approve plans and issue land-disturbing permits without evidence of a dam safety permit from the state for Richardson Mill Pond. In a letter from GS Virginia to the Environmental Division dated November 6, 2007 (Tom Page) there was a commitment to provide analysis of Richardson Mill Pond and confirmation that a permitting package submittal was made to Virginia DCR dam safety. It is our understanding that since 2007 no further progress has been made on this effort. See Attachment 4.

- James City County is deemed a local program and plan-approving authority for erosion and sediment control purposes in accordance with Virginia Erosion and Sediment Control law (Title 10.1, Chapter 5, Article 4 of the Code of Virginia). A local erosion and sediment control program must be consistent with the criteria, techniques, and methods as outlined in the Minimum Standards 4VAC50-30-40 of the Virginia Erosion and Sediment Control regulations. Minimum Standard # 19 of these regulations requires that concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. As a documented runoff control facility, Richardson Mill Pond would be considered as a receiving facility. The County, as plan-approving authority under Virginia E&S law, could not approve a plan which discharges into a known inadequate, damaged or failed receiving drainage facility, unless a plan was in place to correct those deficiencies. The County's jurisdiction on this matter applies to a point downstream where the total drainage area is one hundred times greater than the contributing area of the project site (ie. 1 percent rule). Therefore, as Richardson Mill Pond has a known total drainage area of 4,000 acres then the County can apply the Minimum Standard # 19 criteria to any land bay in excess of 40 acres in size. Therefore, it would appear that this could affect anticipated development plans and/or permits for Land Bays 5 and 14 and Tracts 3, 10, and 12.

- A closed SR600 Six Mount Zion/Holly Forks public road could adversely affect the flow pattern of traffic intended within the Stonehouse master planned development. This could affect assumptions made during past rezoning efforts (Z-04-07/MP-04-07) as part of the traffic impact analyses "Stonehouse Traffic Impact Analysis".

- In addition, a closed SR600 Six Mount Zion/Holly Forks public road could generally affect the public's health, safety, welfare, especially during times of emergency conditions.

Again, the County' position on this matter is as follows. The County is requesting that GS Stonehouse Green Land Sub LLC repair Richardson Mill Pond dam to establish proper stormwater function and to achieve adequate structural integrity in order for the facility to continue to serve as an impounding structure and a stormwater management/BMP. Otherwise, the County will not approve any additional development plans or issue permits for any future GS Stonehouse development projects which drain to Richardson Mill Pond or are situated within the original water quality compliance area identified as the Development Area One area "not draining to R.M.P." as shown on the exhibit map in the attachments. Further, the County respectfully requests that a timeline be developed to accomplish this request and be provided to the County within 30 days.

We thank you for your commitment to the Stonehouse planned unit development in James City County and feel that this is an important matter to address as that development progresses. We look forward to review of this correspondence and continued dialogue on this matter. Please contact me at our office at 253-6670 if you have any questions or comments.

Sincerely,

Scott J. Thomas, P.E.
Director
Engineering and Resource Protection

SJT/sjt
Attachments

cc: Allen Murphy, Development Manager (via email)
Adam Kinsman, Assistant County Attorney (via email)
Steven Snell, VADCR Regional Dam Safety Engineer (via email)
Ellen Cook, Planning (via email)
Amy Walker, New Kent County (via email)
Vernon Geddy (via email)

GSStonehouse\RichardsonMillPond\Notification_071012

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
P.O. BOX R
SANDSTON, 23150-0210

DAVID R. GEHR
COMMISSIONER

R. H. RILEY, JR.
RESIDENT ENGINEER
TEL (804) 737-6441
TEL (804) 328-3044
FAX (804) 328-3041

November 26, 1996

Mr. John Hutcherson
Langley and McDonald P.C.
201 Packets Court
Williamsburg, VA 23185

SUBJECT: Stonehouse Phase II
Extension of Clubhouse Road
Route 30, James City County

Dear Mr. Hutcherson:

We received a copy of the Study and the Suffolk District findings regarding the Richardson Millpond Spillway. We appreciate the opportunity to review the study, however we do not have any comments at this time concerning this matter.

Sincerely,

R. H. Riley, Jr.
Resident Engineer

RHR,Jr./ar
Enclosure

TRANSPORTATION FOR THE 21ST CENTURY

96038-0155

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
P.O. BOX HD
WILLIAMSBURG, 23187-3608

DAVID R. GEHR
COMMISSIONER

QUINTIN D. ELLIOTT
RESIDENT ENGINEER

November 25, 1996

Mr. John L. Hutcherson
Langley and McDonald, P.C.
210 Packets Court
Williamsburg, VA 23185

Ref: Stonehouse
Proposed Bridge over Mill Pond Run
Route 30, James City County

Dear Mr. Hutcherson:

We have completed our review of the proposed bridge plans and your revisions pertaining to the safety features for the above referenced project.

The bridge plans, as submitted, were found to be satisfactory. Therefore, the department recommends approval of the bridge design shown.

An accounts receivable number will be set up to provide inspection services, and a consultant inspector will be assigned to the project.

If we can be of further assistance in this matter, please advise.

Sincerely,

Quintin D. Elliott
Resident Engineer

Beverly Mozingo

By: Beverly E. Mozingo
Asst. Resident Engineer

BEM/ehw

RECEIVED
DEC 2 1996
By

WE KEEP VIRGINIA MOVING

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
P.O. BOX HD
WILLIAMSBURG, 23187-3608

DAVID R. GEHR
COMMISSIONER

QUINTIN D. ELLIOTT
RESIDENT ENGINEER

October 28, 1996

RECEIVED
OCT 31 1996
Commonwealth of Virginia
Department of Transportation
Sandston Residency Office

MEMORANDUM

To: Mr. Bob Riley

From: Quintin D. Elliott

Subject: Stonehouse Phase II
Extension of Clubhouse Road
Route 30, James City County

Enclosed is a copy of a Study and the Suffolk District findings regarding the Richardson Millpond Spillway. This is being forwarded to you since the north bridge and spillway is in your residency.

Please provide any comments directly to Mr. John Hutcherson at Langley and McDonald, P.C., 201 Packets Court, Williamsburg, VA 23185.

Please return the study when you are finished with it.

Should you have any further questions concerning this matter, please advise.

Quintin D. Elliott
Resident Engineer

Beverly Mozingo

By: Beverly E. Mozingo
Asst. Resident Engineer

BEM/ehw
Attachment

COMMONWEALTH of VIRGINIA

DAVID R. GEHR
COMMISSIONER

DEPARTMENT OF TRANSPORTATION
P. O. BOX 1070
SUFFOLK, 23439-1070

JAMES C. CLEVELAND
DISTRICT ADMINISTRATOR
PHONE (804) 925-2511
FAX (804) 925-1618

October 24 , 1996

Stonehouse
Phase II
Extension of Club
House Road
Route 30
James City County

MEMORANDUM

TO: Mr. Quintin D. Elliott

We are returning to you the Richardson Millpond study for the Stonehouse Development. The study has been reviewed as requested to determine if the existing drainage systems can adequately handle the additional runoff that will be contributed by the above subject development.

The consulting engineers hydraulic analysis indicates the existing outlet structures of Richardson Millpond are adequate to convey runoff from future development within the watershed. The hydralic analysis was found to be satisfactory.

A structural analysis of the embankment structure that supports Route 600 indicates that the existing dam embankment was observed to be in generally good shape with no indications of seepage or instability. There was found to be voids and seepage currently occurring beneath and immediately around the spillway structure. Continued uncontrolled seepage will further erode soils from beneath the slab and will ultimately result in failure of the spillway. The September 25, 1996 event revealed the instability caused by the seepage.

OCT 25 1996

WE KEEP VIRGINIA MOVING

The engineer's recommended countermeasures included filling the existing voids beneath and around the spillway with grout. Mr. Jim Brewer of your office indicated by phone that he plans to do just that by this Friday, October 25, 1996 . Hopefully this will seal off the existing seepage paths and stabilize the embankment around the spillway.

Another recommendation is to install drainage filters at the downstream end of the spillway. It would seem to be better to block the seepage rather than try to collect it at the downstream end. This may not be necessary if the grouting succeeds in sealing off the seepage paths. The previous work at the southwest corner of the bridge, when fill material was placed on a portion of the spillway wall and wingwall, appears to be working well. A similar countermeasure at the northwest corner in front of the recent undermining should work just as well.

The recommendation that all trees should be removed within 15ft. of the existing spillway would reduce the likelihood of the roots cracking or lifting up the spillway slab and walls. Care should be taken not to destabilize the embankment when stumps and roots are removed to at least 2ft. below the ground as suggested.

Mr. Brewers comments were that he intends to do regular maintenance on the structure as per usual. This, along with pumping grout into the voids and providing a barrier at the northwest corner, should go a long ways towards correcting the current deficiencies of the outlet structure.

This study should be forwarded to Richmond District since the north bridge and spillway is in their jurisdiction.

If we may be of any further assistance, please advise.

E. N. Hollowell
Transportation Engineering
Programs Supervisor

Jack S. Harrell

By: J. S. Harrell
District River
Mechanics Engineer

JSH:bjo
cc: Mr. J. C. Cleveland
cc: Mr. C. M. Clarke

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
P.O. BOX HD
WILLIAMSBURG, 23187-3608

DAVID R. GEHR
COMMISSIONER

QUINTIN D. ELLIOTT
RESIDENT ENGINEER

October 28, 1996

Mr. John Hutcherson
Langley and McDonald
210 Packets Court
Williamsburg, VA 23185

Ref: Stonehouse, Phase II
Route 30, James City County

Dear Mr. Hutcherson:

We have completed our hydraulic review for the above referenced project, and we offer the following comments and recommendations.

The consulting engineer's hydraulic analysis indicates that the existing outlet structures of Richardson Millpond are adequate to convey runoff from future development within the watershed. The hydraulic analysis was found to be satisfactory.

A structural analysis of the embankment structure that supports Route 600 indicates that the existing dam embankment was observed to be in generally good shape with no indications of seepage or instability. There were found to be voids and seepage currently occurring beneath and immediately around the spillway structure. Continued uncontrolled seepage will further erode soil from beneath the slab and will ultimately result in failure of the spillway. The September 25, 1996 event revealed the instability caused by the seepage.

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- Continued -

WE KEEP VIRGINIA MOVING

JP

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The study will be forwarded to the Richmond District since the north bridge and spillway is in their jurisdiction. I am requesting that they respond directly to you.

If we can be of further assistance in this matter, please advise.

Sincerely,

Quintin D. Elliott
Resident Engineer

Beverly Mozingo

By: Beverly E. Mozingo
Asst. Resident Engineer

BEM/ehw

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
P. O. BOX 1070
SUFFOLK, 23439-1070

DAVID R. GEHR
COMMISSIONER

JAMES C. CLEVELAND
DISTRICT ADMINISTRATOR
PHONE (804) 925-2511
FAX (804) 925-1618

October 24 , 1996

Stonehouse
Phase II
Extension of Club
House Road
Route 30
James City County

MEMORANDUM

TO: Mr. Quintin D. Elliott

We are returning to you the Richardson Millpond study for the Stonehouse Development. The study has been reviewed as requested to determine if the existing drainage systems can adequately handle the additional runoff that will be contributed by the above subject development.

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RECEIVED VDOT

OCT 25 1996

WILLIAMSBURG RESIDENCY

WE KEEP VIRGINIA MOVING

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This study should be forwarded to Richmond District since the north bridge and spillway is in their jurisdiction.

If we may be of any further assistance, please advise.

E. N. Hollowell
Transportation Engineering
Programs Supervisor

Jack S. Harrell

By: J. S. Harrell
District River
Mechanics Engineer

JSH:bjo
cc: Mr. J. C. Cleveland
cc: Mr. C. M. Clarke

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
P.O. BOX HD
WILLIAMSBURG, 23187-3608

DAVID R. GEHR
COMMISSIONER

QUINTIN D. ELLIOTT
RESIDENT ENGINEER

October 28, 1996

MEMORANDUM

To: Mr. Bob Riley

From: Quintin D. Elliott

Subject: Stonehouse Phase II
Extension of Clubhouse Road
Route 30, James City County

Enclosed is a copy of a Study and the Suffolk District findings regarding the Richardson Millpond Spillway. This is being forwarded to you since the north bridge and spillway is in your residency.

Please provide any comments directly to Mr. John Hutcherson at Langley and McDonald, P.C., 201 Packets Court, Williamsburg, VA 23185.

Please return the study when you are finished with it.

Should you have any further questions concerning this matter, please advise.

Quintin D. Elliott
Resident Engineer

Beverly Mozingo

By: Beverly E. Mozingo
Asst. Resident Engineer

BEM/ehw
Attachment

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

July 16, 1996

Southern Virginia Regulatory Section
94-0816-16 (Mill Swamp)
(L&M No. 96-038-0190)

Stonehouse, Inc.
c/o Mr. Robert Kerr
Langley and McDonald, P.C.
5544 Greenwich Road
Virginia Beach, Virginia 23462

Dear Mr. Kerr:

This letter is in reference to the proposed impacts associated with the temporary, earthen causeway, which will be installed for the construction of Bridge Number One, in Development Area One at Stonehouse in James City County, Virginia. In accordance with your request of June 21, 1996, your Department of the Army Permit, issued on December 16, 1994, is hereby modified to allow for the temporary impacts to wetlands and waters of the United States. All other conditions of the original permit remain unchanged. Please be advised that all conditions of the original and modified Virginia Water Protection Permit become conditions of this authorization.

The use of the temporary, earthen causeway should be combined with matting where applicable. In addition, the fill must be removed and the wetland area must be returned to preexisting elevations. If the wetland area does not revegetate naturally within one year, then a planting scheme will be required.

Please obtain all necessary State and Local authorizations for the proposed work. Should you need further assistance or have any questions, please contact Melissa Schaup at (804) 441-7489.

Sincerely,

R. Harold Jones
Chief, Southern Virginia
Regulatory Section

Copies Furnished:

Environmental Protection Agency, Philadelphia
National Marine Fisheries Service, Oxford
U. S. Fish and Wildlife Service, White Marsh
Virginia Department of Environmental Quality, Virginia Beach

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural Resources

5636 Southern Boulevard
Virginia Beach, Virginia 23462
Fax (757) 518-2103
http://www.deq.state.va.us

Thomas L. Hopkins
Director

Francis L. Daniel
Tidewater Regional Director
(757) 518-2000

August 8, 1996

Mr. Robert P. Kerr
Langley and McDonald, P.C.
5544 Greenwich Road
Virginia Beach, Virginia 23462

Dear Mr. Kerr,

This letter is in response to your request for a modification to permit number 94-0816. This modification requests a provision for creation of a temporary earthen causeway combined with matting to allow for construction of Bridge #1.

Considering the proposed impacts are temporary,and that the Army Corps of Engineers has required planting if the the impacted area does not revegitate, the Department of Environmental Quality has no objections to this permit modification.

If you have any questions, please do not hesitate to contact Traycie L. West at (804) 518-2155.

Sincerely,

Robert F. Jackson, Jr.
Environmental Manager
Planning & Permit Support

cc: U.S. Army Corps of Engineers
Virginia Marine Resources Commission
File

An Agency of the Natural Resources Secretariat

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

January 27, 1997

Mr. Wayland Bass
County Engineer
Department of Development Management
P.O. Box 8784
Williamsburg, VA 23187-8784

Re: Stonehouse Chesapeake Bay
Preservation Ordinance Compliance

Dear Mr. Bass:

I wish to thank you and Darryl Cook for your time on January 17, 1997, to discuss the Chesapeake Bay Preservation Ordinance Compliance for Phase One of the Development Area One of the Stonehouse Project with Jim Franklin and me. Please reference our letter of May 3, 1995 from Vaughn Rinner to you regarding the Stonehouse Chesapeake Bay Preservation Ordinance Compliance. Submitted with that letter was the backup documentation and calculations showing the County 10 point system compliance.

Since that time we have submitted the Hydraulic and Structural Analysis of the existing Richardson Mill Pond embankment structure in a separate report that has shown that the dam is hydraulically and structurally adequate. At the time the original 10 point calculation was prepared the entire Stonehouse Development Area One of 2,426 acres was included in the denominator of the structural BMP point allocations. Since that time, on numerous other projects, such as the James River Commerce Center, you have allowed Langley and McDonald to subtract the natural open space that will be dedicated to the County from the denominator of the Structural BMP Calculation regardless of the location of the natural open space above or below the BMP. I have enclosed a revised worksheet for BMP point system, Table No. 3 which shows revised calculations based on subtracting the natural open space from the denominator for the structural BMP. Based on this revised calculation, we have determined that the total required natural open space dedication for Stonehouse Development Area One will be 560 acres.

Assuming that our revised calculation of required natural open space is satisfactory, we have calculated the required dedication of natural open space per gross area. This calculation shows that

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Mr. Wayland Bass
County Engineer
Department of Development Management

January 27, 1997

.231 acres of natural open space will need to be dedicated for each gross acre of area developed within the Stonehouse Development Area One. As we discussed in our meeting, we propose to dedicate adequate natural open space for our requirement for gross area of the project that we expect to develop during 1997. This projection for calendar year 1997 is 232 gross acres of development. This equates to a requirement of 53.5 acres of natural open space that will be dedicated during 1997 in order to keep the natural open space current with the actual development within the Development Area One.

I have attached herewith an exhibit entitled "Stonehouse Phase One Natural Open Space Exhibit" that shows the general area that we propose to dedicate in 1997. We believe that this is a reasonable approach of keeping tract of natural open space dedication.

We request that you and Darryl Cook review this concept in hopes that you will concur with our reasoning and grant approval of this request. When we have received written concurrence from you that this area will meet the Chesapeake Bay Preservation Ordinance natural open space requirements, we will prepare an easement plat for this area.

Should you have any questions or wish to discuss this matter, please do not hesitate to call at 253-2975.

Very truly yours,

LANGLEY AND McDONALD, P.C.

John L. Hutcherson, P.E., L.S.
Senior Associate

JLH/amh
Enclosure
cc: Mr. Darryl Cook w/Enclosure
Mr. Jim Franklin w/Enclosure

DEPARTMENT OF DEVELOPMENT MANAGEMENT
P. O. Box 8784
Williamsburg, Virginia 23187-8784

County Government Center, 101-E Mounts Bay Road

(1) JZH
(2) NHM
(3) FILE
89046

Development Manager
(804) 253-6671

Code Compliance
253-6626

County Engineer
253-6678

Planning
253-6685

Integrated Pest Management
253-2620

June 27, 1995

Ms. Vaughn B. Rinner, Principal
Langley and McDonald
5544 Greenwich Road
Virginia Beach, VA 23462

Dear Ms. Rinner:

I am writing in reply to your letter regarding BMPs for Stonehouse Development Area #1. We agree that Richardsons Mill Pond can serve as the water quality BMP for this area provided that post development conditions (i.e. land use, impervious cover, flows) agree with pre-development assumptions prior to the submittal of site plans (exclusive of road and utility plans) for areas utilizing Richardsons Mill Pond as a BMP. Please submit structural and hydraulic analysis of the existing dam for post development conditions to ensure adequacy of the dam.

We agree that conservation easements can be deeded to the County incrementally as major sections are developed. This is how we handle these easements in similar developments at other locations in the County. The conservation areas shown on the Stonehouse Master Plan will serve as the natural open space/conservation easement plan to guide both the County and the developer during the development process.

Sincerely,

Wayland N. Bass

Wayland N. Bass
County Engineer

WNB/sf

cc: Darryl E. Cook

Rec'd 6/28/95
L&M.

Fax: (804) 253-6850

File - Stonehouse
General

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

May 3, 1995

MAY 1995
RECEIVED
DEVELOPMENT
MANAGEMENT

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA 23187-8784

Re: Stonehouse Chesapeake Bay Preservation
Ordinance Compliance

Dear Mr. Bass:

This letter is written as a review of our discussion of May 2, 1995. That discussion focussed on the Chesapeake Bay Ordinance compliance for Stonehouse. Our specific focus was the involvement of Richard's Mill Pond as a major BMP facility. Essentially, we are proposing that Richardson's Mill Pond be accepted as the BMP facility for water quality purposes under the Chesapeake Bay Preservation Ordinance. It is proposed that Richardson's Mill Pond serve this function for an area shown on the accompanying drawing as Development Area One. Development Area One includes all of the Phase I area of Stonehouse plus portions of Phase II and commercial development areas of Phases III-V. The drawing also shows the areas of Development Area One from which runoff flows to Richardson's Mill Pond and the areas that do not flow to Richardson's Mill Pond.

Accompanying this letter is a development summary of Stonehouse Development Area One showing land use areas and densities along with assumed impervious areas. The tabulations key to the parcel numbers shown on the Master Plan. The first tabulation is as summary of the entire area; the following two pages summarize the areas flowing to Richardson's Mill Pond and the areas that do not. The buffer areas included on these computations are areas of 25% plus slopes and wetland areas that would have been included in the reservoir had the reservoir been constructed. As you can see from the accompanying calculations, the overall impervious rate is determined to be 18%. The impervious rate is significant because it is the determining factor in storage volume required to meet certain BMP point designations.

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

Also accompanying this letter are several sheets of computations. These sheets of computations include the three step 10 point system worksheet and calculations of volume and storage for Richardson's Mill Pond. The 10 point system worksheets indicate that a total of 10 points are derived considering that approximately 144 acres drain through already accepted 11 point BMP's before they actually drain into Richardson's Mill Pond. You will note that based on our discussions, no series computations have been utilized. The areas draining to these 11 point BMPs are assigned only the 11 points and no credit is taken for the series impact of additional treatment in Richardson's Mill Pond. The remaining acreage of 1,604 acres within Stonehouse that drains to Richardson's Mill Pond is shown as being treated by an 8 point BMP (Richardson's Mill Pond).

The available storage volume of 5,662,800 cubic feet in Richardson's Mill Pond is shown on the accompanying calculations. Assuming 20% impervious surface levels in Stonehouse, which is in excess of that anticipated, and 5% impervious for areas outside of Stonehouse which also drain to the pond, the calculations show that the volume of the pond is actually in excess of that required for a 9 point BMP. As we discussed in our May 2 meeting, the areas outside Stonehouse, some of which are in New Kent County, actually haven virtually no impervious surface on them.

Our conclusion in going through these calculations is that Richardson's Mill Pond provides a BMP that is adequate to serve the Chesapeake Bay requirements of all of Development Area One. There would be no need for additional water quality BMPs in this area. It is recognized that water quantity (flow attenuation) BMPs will be required. These will be addressed in the development plans as they are produced.

We also discussed Stonehouse's concern with encumbering land with natural open space easements in the early stages of the development. James City County's computational system does not require structural BMPs until an impervious rate of over 10% occurs. It can be seen from the accompanying calculations and the acreage of buffer area that substantial development can occur prior

to reaching an impervious rate of 10% in Development Area One. We are requesting that no open space easements be required until an impervious rate in excess of 10% is achieved in Development Area One. At that time, Stonehouse would expect to provide required open space easements for areas that have been developed to that point. These open space easements would be of an acreage necessary to meet the 10 point requirements of land developed to the point where such easements are required, that being the time when an impervious rate over 10% occurs.

We plan to provide a running account of the impervious rate with the submittal of each development plan within Development Area One. That impervious rate would be based upon the total area of Development Area One. It is shown in the 10 point system worksheet that a total of 984 acres of undisturbed natural open space would be necessary to achieve the 10 points over the total of 2,426 acres if the BMP credit for Richardson's Mill Pond were only 8 points. In actuality, the BMP credit for the pond will be greater than this. Net developable area within Development Area One is 1,347 acres. With our conservative 8 point BMP calculations, for every acre of development within Development Area One an area of .7 acres undisturbed natural open space is required. At such time as the 10% impervious rate occurs, we would expect to calculate the acreage of open easement required by a ratio of net developable area to required open space according to 10 point calculations reflecting impervious surface and agreed-upon Richardson's Mill Pond BMP point values.

Please review this letter and the accompanying drawing and calculations. We would appreciate your approval of our two requests which are again stated as follows:

1. That Richardson's Mill Pond be accepted as the Chesapeake Bay BMP for all of Development Area One, based upon the accompanying calculations.

2. That recordation of undisturbed natural space easements be delayed until such time as an impervious rate of 10% is achieved in Development Area One. At that time, open space

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

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The time which you and Darryl spent in reviewing this with us on May 2 and the additional time which we know will be required to review this transmittal is very much appreciated. We believe that this presents a very realistic and practical approach to water quality planning for the Stonehouse development, and your efforts in working with Stonehouse Inc. are appreciated.

Very truly yours,

LANGLEY AND McDONALD, P.C.

Vaughn B. Rinner
Principal

NHM/VBR/amh
Enclosures
cc: Jim Franklin w/enclosures

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

(1) JAM
(2) JLH
(3) FILE
89046

May 3, 1995

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA 23187-8784

RICHARDSON MILL POND (NO 3)

Re: Stonehouse Chesapeake Bay Preservation Ordinance Compliance

Dear Mr. Bass:

This letter is written as a review of our discussion of May 2, 1995. That discussion focussed on the Chesapeake Bay Ordinance compliance for Stonehouse. Our specific focus was the involvement of Richard's Mill Pond as a major BMP facility. Essentially, we are proposing that Richardson's Mill Pond be accepted as the BMP facility for water quality purposes under the Chesapeake Bay Preservation Ordinance. It is proposed that Richardson's Mill Pond serve this function for an area shown on the accompanying drawing as Development Area One. Development Area One includes all of the Phase I area of Stonehouse plus portions of Phase II and commercial development areas of Phases III-V. The drawing also shows the areas of Development Area One from which runoff flows to Richardson's Mill Pond and the areas that do not flow to Richardson's Mill Pond.

Accompanying this letter is a development summary of Stonehouse Development Area One showing land use areas and densities along with assumed impervious areas. The tabulations key to the parcel numbers shown on the Master Plan. The first tabulation is as summary of the entire area; the following two pages summarize the areas flowing to Richardson's Mill Pond and the areas that do not. The buffer areas included on these computations are areas of 25% plus slopes and wetland areas that would have been included in the reservoir had the reservoir been constructed. As you can see from the accompanying calculations, the overall impervious rate is determined to be 18%. The impervious rate is significant because it is the determining factor in storage volume required to meet certain BMP point designations.

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

Also accompanying this letter are several sheets of computations. These sheets of computations include the three step 10 point system worksheet and calculations of volume and storage for Richardson's Mill Pond. The 10 point system worksheets indicate that a total of 10 points are derived considering that approximately 144 acres drain through already accepted 11 point BMP's before they actually drain into Richardson's Mill Pond. You will note that based on our discussions, no series computations have been utilized. The areas draining to these 11 point BMPs are assigned only the 11 points and no credit is taken for the series impact of additional treatment in Richardson's Mill Pond. The remaining acreage of 1,604 acres within Stonehouse that drains to Richardson's Mill Pond is shown as being treated by an 8 point BMP (Richardson's Mill Pond).

The available storage volume of 5,662,800 cubic feet in Richardson's Mill Pond is shown on the accompanying calculations. Assuming 20% impervious surface levels in Stonehouse, which is in excess of that anticipated, and 5% impervious for areas outside of Stonehouse which also drain to the pond, the calculations show that the volume of the pond is actually in excess of that required for a 9 point BMP. As we discussed in our May 2 meeting, the areas outside Stonehouse, some of which are in New Kent County, actually have virtually no impervious surface on them.

Our conclusion in going through these calculations is that Richardson's Mill Pond provides a BMP that is adequate to serve the Chesapeake Bay requirements of all of Development Area One. There would be no need for additional water quality BMPs in this area. It is recognized that water quantity (flow attenuation) BMPs will be required. These will be addressed in the development plans as they are produced.

We also discussed Stonehouse's concern with encumbering land with natural open space easements in the early stages of the development. James City County's computational system does not require structural BMPs until an impervious rate of over 10% occurs. It can be seen from the accompanying calculations and the acreage of buffer area that substantial development can occur prior

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LANGLEY AND McDONALD, P.C.

Vaughn B. Rinner
Principal

NHM/VBR/amh
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GEORGE E. LANGLEY
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1906-1982

May 3, 1995

MAY 1995
RECEIVED
DEVELOPMENT
MANAGEMENT

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA 23187-8784

Re: Stonehouse Chesapeake Bay Preservation
Ordinance Compliance

Dear Mr. Bass:

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Very truly yours,

LANGLEY AND McDONALD, P.C.

Vaughn B. Rinner
Principal

NHM/VBR/amh
Enclosures
cc: Jim Franklin w/enclosures

WC-059

GS Stonehouse
Green Land Sub LLC

RECEIVED
NOV 1 ...
ENVIRONMENTAL DIVISION

November 6, 2007

Mr. Scott Thomas, P.E.
Director
James City County Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia

Dear Mr. Thomas:

We appreciate the level of attention and interest in the ongoing review of rezoning application Z-4-07/MP-4-07 to amend the master plan and proffers for the continued development at Stonehouse. James City County's proactive approach to implementing unique environmental management practices should lend to our development of a context sensitive community. We appreciate you taking the time to meet with us at your offices on November 5th. During that meeting we discussed the remaining environmental issues related to proffer conditions and we feel we now have reached agreement on how to resolve those issues in a manner that provides benefit for all parties involved.

Additionally, we discussed the issues related to the current status of the dam located along Six Mount Zion Road at the north end of Richardson's Mill Pond. It is our understanding that through a negotiation process during previous development phases of the existing Stonehouse it was agreed that the pond could serve as a water quality Best Management Practice (BMP). Further, we understand through the ongoing review process the dam was identified as not being properly permitted through the Virginia Department of Conservation and Recreation (DCR). We note the review comment from the James City County Environmental Division dated May 17, 2005 that states "evidence of the dam safety permit from the Virginia Soil and Water Conservation Board will be required prior to final approval and land disturbing permit issuance for the plan of development by the Environmental Division, unless the impounding structure is specifically excluded from the regulations."

We have no intention of trying to get credit for use of the pond for stormwater quality control. Our design approach will be to provide the required stormwater quantity and quality measures within each area as submitted for site plan review. This will include the use of a variety of BMP devices and techniques including the implementation of low impact development practices where applicable. Further, we will provide analysis of Richardson's Mill Pond to provide an understanding of the stage storage relationship impacts to the total volume of water retained behind the dam during select storm events.

17228 Lancaster Highway, Suite 201 Charlotte, North Carolina 28277

We have submitted to DCR for their review a permitting package which outlines the rehabilitation of the dam in order to get the structure permitted. The only remaining item required is the consent of the property owner on the New Kent county side of the pond and dam. Our initial efforts to obtain his approval have been unsuccessful. We have also had a site visit with USACE and DEQ to verify delineation/identification of stream and wetland impacts and discuss mitigation needs.

In the meantime, we will look to move forward with ongoing development in existing Stonehouse (areas west of Six Mount Zion Rd). Based upon our discussion during the meeting on the 5th, it is our understanding if we propose to manage stormwater quantity and quality without the use of Richardson's Mill Pond as a credited BMP, your Division will review and approve acceptable site plans in advance of completion of rehabilitation and permitting of the dam. If your recollection of the above is different from what I have described, please let me know as soon as possible. You can reach me at 919-832-9998.

We will continue to provide updates to you regarding our progress with the required permitting of the dam.

Sincerely,

Thomas D. Page

Tom Page
GS Virginia

cc: Mr. Ross Massey, P.E., Chas. H. Sells, Inc.
Mr. Vernon Geddy, Attorney

James City County

Working in Partnership with all Citizens to achieve a Quality Community

Land Records

All Sites | Advanced Search

Land Records > 001-099 > 064 > 0640100001

001-099

Map Sheet Range 001 to 099

Actions | View: All Documents

Type	Name	Case Number	Map ID	Classification	File Contains	Owner_Title	CrossRef	Roll Number	Modified	Modified By	Author	Created By	Description	Keywords	Start Date	Scan Date	OriginalDocumentProfile	FriendlyVersionID
	931611P	93-1611-P	0640100001	R DOCUMENTS	Documents	STONEHOUSE, INC.		WP971	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	962000P	96-2000-P	0640100001	R DOC. & SMALL DWGS.	Documents	STONEHOUSE, LLC		WP991	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	971097P	97-1097-P	0640100001	R DOCUMENTS	Documents	THE LEGENDS GROUP		WP991	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP000162	BP-00-0162	0640100001	C Documents & Drawings	Documents	Stonehouse Cart Barn		BP200113	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP013914	BP-01-3914	0640100001	Building Permits - Commercial	Documents	STONEHOUSE DEVELOPMENT		BP2002-15	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP040620	BP-04-0620	0640100001	Building Permits - Commercial	Documents	LIBERTY PROPERTY TRUST		BP2005-2	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP040620P	BP-04-0620P	0640100001	Building Permits-Commercial	Documents	Liberty Property Trust			8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP-05-0394	BP-05-0394	0640100001	Building Permits - Commercial	Documents	STONEHOUSE AT WILLIAMSBURG		BP2007-9	8/24/2009 10:39 AM	Patrick Page	Records Management	Patrick Page		-------		4/18/2007	LandRecords	2.0
	BP053459	BP-05-3459	0640100001	Building Permits - Commercial	Documents	STONEHOUSE GLEN/LLC		BP2007-8	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	2.0
	BP951573	BP-95-1573	0640100001	C DOCUMENTS	Documents	STONEHOUSE, INC.		BP20015	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP952044	BP-95-2044	0640100001	C Documents & Drawings	Documents	Legends Group		BP200017	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP953261	BP-95-3261	0640100001	C Docs.&Sm.Drawings	Documents	Legends Golf		BP20003	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP961072	BP-96-1072	0640100001	C Documents & Drawings	Documents	Stonehouse Golf Club		BP200016	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP961580	BP-96-1580	0640100001	C DOCUMENTS	Documents	LEGENDS GROUP		BP200113	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP961638	BP-96-1638	0640100001	C Documents	Documents	Stonehouse Inc.		BP20004	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP972223	BP-97-2223	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSELLC		BP993	8/24/2009 10:41 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP972710	BP-97-2710	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE GOLF		BP200010	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	BP980061	BP-98-0061	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE, L.L.C.		BP9810	3/21/2011 4:52 PM	Sylvia Davis	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	C12301	C-123-01	0640100001	Conceptual	Documents	Stonehouse, Sec. 7A Ph. 1		C2002-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	C14106	C-141-06	0640100001	Conceptual	Documents	STONEHOUSE GLEN		C2007-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------			LandRecords	1.0
	C-141-06P	C-141-06P	0640100001	Conceptual	Documents	Stonehouse Glen			8/24/2009 10:39 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------		6/1/2007	LandRecords	1.0
	CBS01005	CBS-01-005	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		4/13/2009		
	CBS01007	CBS-01-007	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		4/13/2009		
	CBS02009	CBS-02-009	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		4/14/2009		
	CBS02010	CBS-02-010	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		4/14/2009		
	CBS97001	CBS-97-001	0640100001	Ches Bay Slope Exceptions	Documents & Drawings	Langley & McDonald	SP-030-97		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		10/29/2008		
	CBS97007	CBS-97-007	0640100001	Ches Bay Slope Exceptions	Documents	Langley & McDonald	S-030-97		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		10/29/2008		
	CBS97012	CBS-97-012	0640100001	Ches Bay Slope Exceptions	Documents	Langley & McDonald	SP-028-97		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		10/29/2008		
	CBS98006	CBS-98-006	0640100001	Ches Bay Slope Exceptions	Documents	Langley & McDonald	S-012-98		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		-------		10/31/2008		

	HW105	HW-1-05	0640100001	Height Waivers	Documents	STONEHOUSE COMMERCE PARK		HW2005-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S10002	S-100-02	0640100001	Subdivision	Documents	RICHARDSON'S MILL, SECTION ONE	S-99-01;	S2005-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S1098	S-10-98	0640100001	Subdivision	Documents	STONEHOUSE COMMERCE		S981	8/24/2009 10:41 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S1298	S-12-98	0640100001	Subdivision	Documents	STONEHOUSE, SECTION IVC		S995	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S2401	S-24-01	0640100001	Subdivision	Documents	STONEHOUSE/ BENT TREE/ PHASE ONE	S-3-99;	S2001-2	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S2496	S-24-96	0640100001	Subdivision	Documents	STONEHOUSEVDOT		S996	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S3797	S-37-97	0640100001	Subdivision	Documents	STONEHOUSE, PHASE ONE		S997A	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S399	S-3-99	0640100001	Subdivision	Documents	STONEHOUSE BENT TREE	S-50-99;	S20011	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S4299	S-42-99	0640100001	Subdivision	Documents	STONEHOUSE/SECT.5-B	S-3-99;S-74-00;	S2001-2	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S5099	S-50-99	0640100001	Subdivision	Documents	STONEHOUSE, BENT TREE	S-3-99;	S20002	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S6405	S-64-05	0640100001	Subdivisions	Documents	STONEHOUSE COMMERCE PARK, S-D		S2006-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S6801	S-68-01	0640100001	Subdivision	Documents	STONEHOUSE, BENT TREE, PHASE THREE	S-81-99;	S2002-2	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S703	S-7-03	0640100001	Subdivisions	Documents	STONEHOUSE, RICHARDSONS MILL/S-2		S2005-2	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S7102	S-71-02	0640100001	Subdivisions	Documents	STONEHOUSE COMMERCE PARK		S2003-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S7400	S-74-00	0640100001	Subdivision	Documents	STONEHOUSE BENT TREE/PHASE 2	S-42-99;	S2001-2	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S7597	S-75-97	0640100001	Subdivision	Documents	STONEHOUSEPHASE ONE		S981	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S7697	S-76-97	0640100001	Subdivision	Documents	STONEHOUSEPHASE ONE	S-75-97;	S981	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S8199	S-81-99	0640100001	Subdivision	Documents	STONEHOUSE, BENT TREE SECT. 5-B	S-68-01;	S2004-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S8497	S-84-97	0640100001	Subdivision	Documents	STONEHOUSE, PHASE ONE		S982	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S8697	S-86-97	0640100001	Subdivision	Documents	STONEHOUSE L.L.C.		S981	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S9099	S-90-99	0640100001	Subdivision	Documents	STONEHOUSE, OVERLOOK		S20001	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S9299	S-92-99	0640100001	Subdivision	Documents	STONEHOUSE, ORCHARD HILL	S-98-97;S-89-98;	S20001	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S9397	S-93-97	0640100001	Subdivision	Documents	STONEHOUSE, L.L.C.		S991	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	S9897	S-98-97	0640100001	Subdivision	Documents	STONEHOUSESECTION 4D		S994	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP101	SP-1-01	0640100001	C DOC., PHOTO & DWGS.	Documents	STONEHOUSE NATURE TRAIL		SP20011	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP1401	SP-14-01	0640100001	Site Plans - Commercial	Documents	MILL POND PARK		SP2001-3	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP14197	SP-141-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE		SP991	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP196	SP-1-96	0640100001	C DOCUMENTS & DRAWINGS	Documents	LAGRANGE TRACT		SP971	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP2697	SP-26-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE SALES CENTER		SP983	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP2895	SP-28-95	0640100001	C DOCUMENTS & DRAWINGS	Documents	WARE CREEK ROADWAY		SP972	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP2897	SP-28-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	WASTEWATER LIFT STATION		SP993	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP3297	SP-32-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE WATERLINE		SP982	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP3405	SP-34-05	0640100001	Building Permits Residential	Documents	FIELDSTONE PARKWAY SITE PLAN AMEND.	SP-108-03;	SP2005-2	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP3598	SP-35-98	0640100001	C DOCUMENTS & DRAWINGS	Documents	LEGENDS @ STONEHOUSE		SP981	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP3796	SP-37-96	0640100001	C DOCUMENTS	Documents	CART STORAGE TEMPORARY		SP20002	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0
	SP4797	SP-47-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	MILL POND RUN		SP20002	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	-------	LandRecords	1.0

	SP5297	SP-52-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	THE LEGENDS AT STONE		SP972	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SP5496	SP-54-96	0640100001	C DOCUMENTS & DRAWINGS	Documents	LEGENDS CLUBHOUSE		SP971	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SP5801	SP-58-01	0640100001	Building Permits Residential	Documents	FERNANDEZ LIFT STATION/STONEHOUSE	S-68-01;	SP2001-3	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SP6899	SP-68-99	0640100001	Building Permits Residential	Documents	STONEHOUSE COMMERCE	SP-141-97;SP-47-99;	SP996	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SP7297	SP-72-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	LEGENDS AT STONEHOUSE		SP973	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SP7896	SP-78-96	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSEPHASE TWO		SP993	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	sp7996	SP-79-96	0640100001	Site Plan	Documents	STONEHOUSE - SANITARY MAIN FORCE EXTENSION		SPP97-3	1/4/2011 4:32 PM	Sylvia Davis	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SP8200	SP-82-00	0640100001	Site Plans - Commercial	Documents	LaGRANGE PARKWAY EXTENSION		SP2002-1	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SP9695	SP-96-95	0640100001	C DOCUMENTS & DRAWINGS	Documents	SOLAREX		SP982	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SUP1796	SUP-17-96	0640100001	C DOCUMENTS	Documents	PRIMCO PERSONAL		SUP971	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	SUP205	SUP-2-05	0640100001	Building Permits Residential	Documents	MICHAEL VERGAKIS	HW-1-05;	SUP2005-1	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	W798	W-7-98	0640100001	C DOCUMENTS	Documents	STONEHOUSE, INC.		W2000-1	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0
	Z00112003	Z-0011-2003	0640100001	Zoning	Documents, Drawings, Other Color Information	STONEHOUSE	Z-15-05;Z-4-07;MP-12-05;MP-4-07;	Z2010-1	6/20/2011 8:12 AM	Audrey Page	Records Management	Sylvia Davis		------	11/2/2009		
	Z00112003P	Z00112003P	0640100001	Zoning	Photos, Maps and or Brochures	Stonehouse	Z00112003		2/16/2010 2:30 PM	Audrey Page	Records Management	Audrey Page		------	2/16/2010		
	Z298	Z-2-98	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE		Z99-1	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	------		LandRecords	1.0

Date Record Created:

Created By:

WS_BMPNO: WC059

Print Form

PRINTED ON:
Friday, March 12, 2010
2:53:41 PM

WATERSHED	WC
BMP ID NO	059
PLAN NO	
TAX PARCEL	(4-4)(1-24)
PIN NO	0440100024
CONSTRUCTION DATE	
PROJECT NAME	Stonehouse-Richardsons Mill Pond
FACILITY LOCATION	State Route 600 and Ware Creek
CITY-STATE	Toano, Va. 23011
CURRENT OWNER	Stonehouse Development Company LLC
OWNER ADDRESS	120 Tredegar St.
OWNER ADDRESS 2	6th Floor
CITY-STATE-ZIP CODE	Richmond, Va. 23219
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu

MAINTENANCE PLAN	No	CTRL STRUC DESC	Conc. Spillw
SITE AREA acre		CTRL STRUC SIZE inches	
LAND USE		OTLT BARRL DESC	Conc. Spillw
old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	
JCC BMP CODE	A2 Wet Pond		
POINT VALUE	8	EMERG SPILLWAY	Yes
		DESIGN HW ELEV	13.2
		PERM POOL ELEV	9.5
SVC DRAIN AREA acres	3960	2-YR OUTFLOW cfs	179.00
		10-YR OUTFLOW cfs	390.00
		REC DRAWING	No
SERVICE AREA DESCRI	Stonhouse & Surrounding Area		
IMPERV AREA acres	990.00	CONSTR CERTIF	No
RECV STREAM	Ware Creek		
EXT DET-WQ-CTRL	Yes	LAST INSP DATE	Inspected by:
WTR QUAL VOL acre-ft	103.2	INTERNAL RATING	
CHAN PROT CTRL	No		
CHAN PROT VOL acre-ft	0	MISC/COMMENTS	
SW/FLOOD CONTROL	Yes	Provides WQ 2.5 Vr; Road El. 14.6; 25% imperv.	
GEOTECH REPORT	Yes		

Additional Comments:

ENVIRONMENTAL DIVISION REVIEW COMMENTS
STONEHOUSE 1998 REZONING & MASTER PLAN AMENDMENTS
PLAN NO. Z-2,3-98
May 8, 1998 DEC

1. The Master Stormwater Management Plan for Phase I needs to be updated to include the revisions to the Phase I plan. The drainage plan needs to show how the revised plan will obtain compliance with the county's Chesapeake Bay Preservation Ordinance's 10-point system.

2. A condition needs to be added to the proffers that addresses ongoing compliance of the overall project with the 10-point system. The condition needs to state that each Phase of the Stonehouse project will meet the 10-point criteria as required under the Chesapeake Bay Preservation Ordinance (Regulations) or other procedure adopted pursuant to those regulations. A drainage plan will be submitted to demonstrate this compliance prior to or with the first subdivision or site plan submitted in each Phase.

CODE COMPLIANCE REVIEW COMMENTS
STONEHOUSE - CLUBHOUSE ROAD, PHASE II
PLAN NO. SP-78-96
~~August 20, 2003~~ printed date

RICHARDSON MILL POND STUDY

The following comments pertain to the information provided in the study dated September 10, 1996, by Langley and McDonald:

1. The pond is adequately sized and can serve as an 8-point wet pond BMP for the Stonehouse project.

2. An Inspection/Maintenance Agreement needs to be executed with the county for the pond's pool area and arrangements need to be made with VDOT, the owner of the dam, to ensure long-term maintenance of the dam embankment.

3. The geotechnical portion of the report recommends several improvements to the dam, some that need to be accomplished immediately and some that can be delayed for a period of time. The improvements that are to be accomplished immediately need to be done as soon as possible. Also, an evaluation should be performed on the emergency work recently done by VDOT personnel to determine if it satisfies some of the recommendations of the study. A mechanism needs to be established that will ensure accomplishment of both the short- and long-term improvements contained in the study.

4. Compliance with the Chesapeake Bay Ordinance 10-point stormwater criteria needs to be addressed for this project as well as the entire Stonehouse project. This needs to include a BMP calculation worksheet that demonstrates how this project meets the county's criteria. Provide conservation easements for all Natural Open Space areas claimed in the BMP worksheet that can be determined or set aside at this time.

5. Please clarify the modelling assumptions for the pond's watershed. Was the entire watershed assumed to be at 25% impervious or just those areas owned by Stonehouse? How good an assumption is the impervious cover rate for those areas not under Stonehouse control? If an acceptable response is given to the issues related to the modelling assumptions, then we concur that there is an adequate channel downstream of the pond and no additional flow attenuation would be required by the pond for stormwater management purposes related to the downstream channel. Also, the outlet structure is adequately sized to convey the flows from future development in the watershed.

6. There may be the need to require additional detention within Stonehouse to protect stream channels upstream from Richardson Mill Pond. Channel adequacy for these streams needs to be addressed in a comprehensive way that includes an analysis of buildout conditions and timing of peak flows from various watersheds in Stonehouse.

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Attachment A
Code of Virginia

§33.1-176. Duty of owner or occupier of dam

Every owner or occupier of a dam shall, so far as any state highway passes over the same, keep such dam in good order, at least twelve feet wide at the top, and also keep in good order the substructure of a bridge of like width over the pier heads, floodgates or any wastecut through or around the dam; provided, however, that when the above has been done, the superstructure of any such bridge shall be maintained by the Commonwealth Transportation Commissioner. The Commissioner shall inspect all such bridges and report to the owner in writing needed repairs. If such owner fails to comply with the provisions of this article, he shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be fined two dollars for every such failure of twenty-four hours. But if a milldam is carried away or destroyed by flood or any other extraordinary natural cause, the owner or occupier thereof shall not be subject to such fine until one month after any mill, operated in whole or in part by water impounded by such dam, has been put into operation by such waterpower.

. completion

– Daily Press

We've been down this road before

Richardson's Mill Pond

By Cortney Langley

JAMES CITY — Don't hold your breath for Six Mount Zion Road to reopen anytime soon. It's proving to be Jolly Pond Road deja vu.

The road has been closed since Hurricane Irene blew through last August and damaged the supporting dam.

First, officials had to figure out who owned the dam. The Stonehouse developer is taking responsibility.

The owners met in October with VDOT and reps from New Kent and James City, with a follow-up in early November. Dam safety officials from Virginia are in the loop as well.

Together they've developed a preliminary game plan on what needs to be researched before any decisions are made, explained Scott Thomas, director of James City's Engineering & Resource Protection Division.

"It's very similar to the Jolly Pond Dam situation," he said. The dam is privately owned, subject to state requirements, with a VDOT state road running over top.

"There are some differences," he said. Richardson's Mill Pond is an official stormwater retention pond for almost 3,000 acres of the Stonehouse development.

That's the main reason county staff are involved right now, explained General Services manager John Horne, to make sure that the compromised dam doesn't present water quality issues downstream.

Thomas said that although the dam has been damaged, almost all of the basin's effectiveness remains intact.

"But the more it erodes or is damaged..." he said.

So there are two issues that have to be dealt with, he explained. First is the dam and the water quality.

Then the road.

"It's very complicated," he said.

VDOT's involvement comes mainly after the dam fix has been sorted out.

Drivers ignoring barrier at bridge

'In a hurry, 6 minutes is a lot of time'

By Amy Jo Martin

NEW KENT — Ever since last September, the bridge over Richardson Mill Pond in Barhamsville has been closed because the road has crumbled dangerously. That hasn't stopped drivers from crossing.

"Someone has filled the hole in the road with dirt and thrown the VDOT barricades in the pond," said Peggy Carmine, who lives nearby.

It's a more dangerous version of Jolly Pond Road, which was closed for years by VDOT.

According to VDOT, the dam sustained pipe damage from Hurricane Irene last September, which in turn caused erosion to Six Mount Zion Road, which runs directly over the dam.

Six Mount Zion Road, near the Stonehouse residential development straddling New Kent and James City, was closed by VDOT after the storm.

"Part of the road has washed away, leaving a shell of the road behind," VDOT spokesman Dawn Eischen said Monday. "There is nothing substantial holding up the road. It's a hazard."

According to Carmine, drivers have been routinely crossing the bridge rather than taking a six-minute detour out of the neighborhood.

"There is a four-foot deep hole in the road and yet people keep going across it," she said.

John Pitts, another nearby resident, agreed. "I sell produce, and I don't want to run all the way through Barhamsville just to get to Williamsburg," he said.

"VDOT has fixed this area twice. Why don't they come here and do it right? It just doesn't make sense. If this is a state-maintained road, then the state needs to maintain it."

Carmine added that neighbors are concerned about how the bridge closing could affect emergency response times.

New Kent Fire Chief Tommy Hicks said Monday the road closing could cause a short delay for New Kent firefighters, cautioning that any delay can have dire consequences.

In a worst-case scenario, up to 20 minutes could be added to the response time, Hicks said.

"Because of the detour, we are facing insignificant increases in response time," noted Joe McLaughlin Jr., chief deputy for the New Kent Sheriff's Office.

VDOT plans on repairing the 30-foot Six Mount Zion Road once the owner, Greenfield Partners LLC of Connecticut, repairs the dam.

Greenfield Partners met last fall with VDOT, the Virginia Department of Conservation & Recreation, and New Kent and James City counties to discuss action for getting the road up and running.

According to Eischen, Greenfield Partners managing director Jim Duszynski told the group he would get dam repair estimates. To repair the dam, Greenfield must first submit permit requests. Calls to Greenfield Partners were not returned.

Residents are eager for the bridge to be repaired. "We are all tired of it," Carmine said. "We just want the Stonehouse people to get out there and fix it."

— Tidewater Review

292

100022773 100011092 100013960

Tax Map #'s: 0440100028, 0530100025, 0530100023, 0530100024, 0530100010, 0530100020, 1310100019, 1310100008A, 1210100047, ~~1210100048~~, and 0640100001

Re-recorded to correct erroneous tax map.

Prepared By
~~And Return To:~~ Christina E. Hassan, Esquire
Hogan Lovells US LLP
Park Place II Ninth Floor
7930 Jones Branch Drive
McLean, VA 22102-3302

Return to:
Geddy Harris Franck & Hickman
1177 Jamestown Rd
Wbg VA 23185

THIS DEED IS EXEMPT FROM RECORDATION AND GRANTOR TAXES PURSUANT TO VA. CODE § 58.1-811 A. (10) AND C (1)

To be re-recorded in the correct sequence.

DEED OF BARGAIN AND SALE

THIS DEED OF BARGAIN AND SALE, made this 2nd day of June 2010, between **GS STONEHOUSE GREEN LAND LLC,** a Delaware limited liability company, Grantor, and **GS STONEHOUSE GREEN LAND SUB 3 LLC,** a Delaware limited liability company, Grantee, whose address is 50 North Water Street, South Norwalk, Connecticut 06854.

WITNESSETH:

That for and in consideration of the sum of Ten and 00/100 Dollars ($10.00), cash in hand paid, and other good and valuable consideration, the receipt of which is hereby acknowledged, the said Grantor does grant and convey, with **SPECIAL WARRANTY** unto the Grantee, in fee simple, the following described property, to-wit:

See Exhibit A attached hereto and incorporated herein.

Together with all the improvements thereon and appurtenances thereto and all right, title and interest of Grantor in and to the land lying in the bed of any streets, roads and highways adjacent to said property.

To have and to hold the above-described property, together with each and every title, right, privilege, appurtenance and advantage thereunto belong, or in anywise appertaining, unto

and for the proper use only, benefit and behoove forever of Grantee, its successors and assigns, in fee simple forever.

This conveyance is made subject to the following (a) conditions, restrictions, encroachments, protrusions, covenants, proffers and easements of record or apparent on the ground affecting the property conveyed hereby; (b) rights of riparian landowners to the use and continued flow of the rivers, streams and creeks running over, upon, adjacent to and through the Property; and (c) the terms of applicable zoning ordinances and proffers.

Grantor, for itself and its successors and assigns, does hereby covenant with the said Grantee, and its successors and assigns, to warrant specially the property hereby granted and conveyed, and to execute such further assurances of the said property as may be requisite.

REMAINDER OF PAGE INTENTIONALLY BLANK

WITNESS the following signature and seal:

GS STONEHOUSE GREEN LAND LLC, a Delaware limited liability company

By:_____(SEAL)
Barry P. Marcus, Senior Vice President

STATE OF Connecticut
CITY/COUNTY OF Norwalk / Fairfield

The foregoing instrument was acknowledged before me this 7 day of June, 2010, by Barry P. Marcus, Senior Vice President, of GS Stonehouse Green Land LLC on behalf of the company.

_____
NOTARY PUBLIC

My Commission Expires:_____
Notary Registration No. :_____

Jennifer Montanaro
Notary Public
Fairfield Cty. CT
My Commission Expires 5-31-13

Exhibit A
Property Description

LAND BAY 1

Tax Parcel ID No.: 0440100028

13.1105 acres shown as Parcel E on a "Boundary Line Adjustment Plat of Property Owned by Stonehouse, Inc. and Golf Trust of America, L.P." made by Langley and McDonald, P.C., dated 5/5/97, recorded in Plat Book 66, Pages 89-93.

Being a portion of the property conveyed to GS Stonehouse Green Land Sub, LLC, by Special Warranty Deed dated October 31, 2006 from Stonehouse Capital, LLC, Commerce Park at Stonehouse, LLC, Six Hundred North, LLC, Fairmont Investment, LLC, Mount Laurel, LLC, Stonehouse Glen, LLC, Fieldstone Investment, LLC, Tymar Capital, LLC, Cimarron Capital, LLC and JTL Stonewill Joint Venture, LLC, which deed is recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City as Instrument No. 060027006.

LAND BAY 8

Parcel I:

Tax Parcel ID No. 0530100025

That certain property shown as "Parcel R-5" on that certain "SUBDIVISION PLAT SHOWING STONEHOUSE GLEN SECTION 1 & 2 AND RIGHT OF WAY OF FIELDSTONE PARKWAY BEING A SUBDIVISION OF THE PROPERTY OF FIELDSTONE INVESTMENT, LLC AND STONEHOUSE GLEN, LLC" dated May 31, 2006, prepared by LandMark Design Group, recorded in the Clerk's Office for the City of Williamsburg and the County of James City as Instrument No. 060016179.

Being a portion of the property conveyed to GS Stonehouse Green Land Sub, LLC, by Special Warranty Deed dated October 31, 2006 from Stonehouse Capital, LLC, Commerce Park at Stonehouse, LLC, Six Hundred North, LLC, Fairmont Investment, LLC, Mount Laurel, LLC, Stonehouse Glen, LLC, Fieldstone Investment, LLC, Tymar Capital, LLC, Cimarron Capital, LLC and JTL Stonewill Joint Venture, LLC, which deed is recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City as Instrument No. 060027006.

Parcel II:

Tax Parcel ID Nos. 0530100023 and 0530100024

All that property shown as "BMP #6" and "Parcel R-4" on that certain plat entitled "SUBDIVISON PLAT SHOWING STONEHOUSE GLEN SECTION 1 & 2 AND RIGHT OF WAY OF FIELDSTONE PARKWAY BEING A SUBDIVISION OF THE PROPERTY OF FIELDSTONE INVESTMENT, LLC AND STONEHOUSE GLEN, LLC" dated May 31, 2006, prepared by LandMark Design Group, recorded in the Clerk's Office for the City of Williamsburg and the County of James City as Instrument Number 060016179. Together with all the rights, title and interest in and to that certain easement conveyed to Fieldstone Investment, LLC under that certain Benefit Pathway and Utility Easement dated May 15, 2006, recorded in the aforementioned Clerk's Office as Document No. 060012689.

Being a portion of the property conveyed to GS Stonehouse Green Land Sub, LLC, by Special Warranty Deed dated October 31, 2006 from Stonehouse Capital, LLC, Commerce Park at Stonehouse, LLC, Six Hundred North, LLC, Fairmont Investment, LLC, Mount Laurel, LLC, Stonehouse Glen, LLC, Fieldstone Investment, LLC, Tymar Capital, LLC, Cimarron Capital, LLC and JTL Stonewill Joint Venture, LLC, which deed is recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City as Instrument No. 060027006.

LAND BAY 14

Parcel I:

Tax Parcel ID No. 0530100010

Section III-C containing 16.0620 acres, all as shown on "Subdivision Plat of Stonehouse Development Area One, Phase 1, Section I-B, Section II-A, Section III-C, Being a Subdivision of Properties Owned by Stonehouse Limited Liability Company and Stonehouse, Inc.", made by Langley and McDonald, Inc., dated November 19, 1999, last revised December 9, 1999, recorded in Plat Book 75, Pages 93-97.

Being a portion of the property conveyed to GS Stonehouse Green Land Sub, LLC, by Special Warranty Deed dated October 31, 2006 from Stonehouse Capital, LLC, Commerce Park at Stonehouse, LLC, Six Hundred North, LLC, Fairmont Investment, LLC, Mount Laurel, LLC, Stonehouse Glen, LLC, Fieldstone Investment, LLC, Tymar Capital, LLC, Cimarron Capital, LLC and JTL Stonewill Joint Venture, LLC, which deed is recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City as Instrument No. 060027006.

Parcel II:

Tax Parcel ID No. 0530100020

All that certain piece, parcel or tract of land, situate, lying and being in Stonehouse Magisterial District, James City County, Virginia, and being more particularly shown and described on that certain plat entitled "Composite Plat Showing a Portion of Parcel A, Stonehouse Development Company, L.L.C., prepared by G.T. Wilson, Jr., L.S., dated January 14, 2004 and revised March 18, 2004, a copy of which is recorded in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City as Instrument No. 040008576, which plat was recorded with that certain Deed of Bargain and Sale from Stonehouse Development Company, LLC, a Virginia limited liability company, to 2J Investments, LLC, a Virginia limited liability company, dated March 16, 2004 and recorded March 25, 2004 in the aforesaid Clerk's Office as Instrument No. 040008576, and to which plat reference is hereby made for a more particular description of such property.

Being a portion of the property conveyed to GS Stonehouse Green Land Sub, LLC by Special Warranty Deed dated December 15, 2006 from 2J Investments, L.L.C., which deed is recorded in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City as Instrument No. 060030587.

TRACT 9

Tax Parcel ID No.: 1310100019

ALL THAT certain tract of land lying in Stonehouse District, James City County, Virginia, containing 48.21 acres, more or less, and being in the residue of the "Tankard" Tract, known among the tax recorded for said county as Tax Map 13-1 (1-19). Reference is made to that plat of survey recorded in the Clerk's Office, Circuit Court, James City County, Virginia, in Plat Book 50, Page 14, and Deed recorded in Deed Book 420, Page 712, that plat recorded in Plat Book 88, Pages 43-44, and that Deed recorded as Instrument Number 020027159.

Tax Parcel ID No.: 1310100008A

Parcel I: ALL THAT certain tract or parcel of land situate, lying and being in Stonehouse District, James City County, Virginia, known and designated as "35.0 Acres, +/-" on a certain plat entitled "Survey of 35 Acres +/- for Conveyance to: Jackie L., Gary M. & Steve L. Massie from: Leon Carr Avery & Maxie G. Avery", made by AES, a professional corporation, dated March 11, 1982, which plat is recorded in the Clerk's Office, Circuit Court, James City County, Virginia, in Plat Book 37, Page 24.

Parcel II: ALL THAT certain tract or parcel of land, situate, lying and being in Stonehouse District, James City County, Virginia, known and designated as "7.31 acres", on plat entitled "Boundary Survey of 7.31 Acres Located on the North Line of Route 30", made by AES, a professional corporation, dated December 17, 1984, and described by metes and bounds in that certain deed recorded in the Clerk's Office aforesaid in Deed Book 262, Page 455.

Portions of the property being further described as follows:

Legal Description for Massie Tract 1:

All that certain piece or parcel of land situated in James City County, Virginia containing 48.00 acres more or less, designated as Tax Parcel #1310100019 by the James City County Assessors office and being shown as Tract I on a plat titled SURVEY OF PROPERTIES STANDING IN THE NAME OF FIELDSTONE INVESTMENT, LLC AS DESIGNATED BY PARCEL IDENTIFICATION NUMBERS: PIN: 1310100008A & PIN: 1310100019 dated 10-9-06 and prepared by LandTech Resources, Williamsburg, VA. and being more particularly described as follows:

Beginning at the most southerly corner of Lot 10, Section 2 of the Sand Hill Subdivision, said point being marked by an iron pipe; thence from said Point Of Beginning following the line common with the property herein described and Lot 10, Lot 9 and Lot 8, Section 2 of the Sand Hill Subdivision N19°49'17"E, 441.90 feet to an iron pipe; thence following the line common with the property herein described and the property now or formerly of Kinney and Johnson, trustees N24°38'06"E, 677.11 feet to an iron rod at the southerly right of way line of Sand Hill Road; thence following the southerly right of way line of Sand Hill Road the following courses: along a curve to the left having a radius of 159.00 feet an arc length of 58.63 feet, a chord distance of 58.30 feet, and a chord bearing of N89°29'12"E to an iron rod; thence N78°55'23"E, 104.77 feet to an iron rod at the intersection of southerly right of way line of Sand Hill Road and the south westerly right of way line of Interstate Route 64; thence following the south westerly right of way line of Interstate Route 64 the following courses: along a curve to the right having a radius of 28,497.89 feet, an arc length of 2,005.99 feet, a chord distance of 2,005.57 feet, and a chord bearing of S40°58'22"E to an iron rod; thence S13°04'03'W, 62.18 feet to an iron rod; thence S59°46'58"E, 136.50 feet to an iron rod; thence along a curve to the right having a radius of 28,497.89 feet an arc length of 573.33 feet, a chord distance of 573.32 feet and a chord bearing of S38°02'47"E to an iron rod; thence leaving the south westerly right of way line of Interstate Route 64 and following the line common with the property herein described and the property now or formerly of Altizer the following courses: S32°01'54"W, 178.80 feet to an iron rod; thence S57°20'49"W, 161.50 feet to an iron T-bar; thence following the line common with the property herein described and the property now or formerly of Milton & Lee, Reilly and Jackson N56°00'33"W, 785.03 feet to an iron pipe; thence following the line common with the property herein described and the property now or formerly of Fieldstone Investment, LLC, said line being marked by painted and marked trees the following courses: N56°07'41"W, 1,326.91 feet to an iron pipe; thence S68°15'24"W, 259.77 feet to an iron T-bar; thence N86°43'56"W, 194.00 feet to a tree; thence N68°06'56"W, 179.71 feet to an iron T-bar; thence N72°18'56'W, 179.00 feet to an iron T-bar, thence N73°43'29"W, 159.47 feet to a Walnut Tree; thence following the line common with the property herein described and the property now or formerly of Mereau N66°08'23"E, 134.24 feet to a Hickory Tree; thence following the line common with the property herein described and the property now or formerly of Burrell the following courses: N69°17'01"E, 91.38 feet to an iron rod; thence S77°00'33"E, 236,30 feet to an iron pipe; thence following the line common with the property herein described and Lot 10, Section 2 of the Sand Hill Subdivision

S84°02'51"E, 105.35 feet and returning to the point of beginning.

Legal Description for Massie Tract 2:

All that certain piece or parcel of land situated in James City County, Virginia containing 41.95 acres more or less, designated as Tax Parcel #1310100008A by the James City County Assessors office and being shown as Tract 2 on a plat titled SURVEY OF PROPERTIES STANDING IN THE NAME OF FIELDSTONE INVESTMENT, LLC AS DESIGNATED BY PARCEL IDENTIFICATION NUMBERS: PIN: 1310100008A & PIN; 1310100019 dated 10-9-06 and prepared by LandTech Resources, Williamsburg, VA. and being more particularly described as follows:

Commencing at a Point on the northerly right of way line of Rochambeau Drive at its intersection with the easterly right of way line of Sand Hill Road; thence following the northerly right of way line of Rochambeau Drive in a south easterly direction approximately 823' feet to an iron pipe at the common corner of the property herein described and the property now or formerly of Bradby, said point being The True Point Of Beginning; thence from said Point Of Beginning, leaving the northerly right of way line of Rochambeau Drive and following the line common with the property herein described and the property now or formerly of Bradby N24°34'56"E, 537.26 feet to an iron pipe; thence N22°32'19'W, 165.63 feet to an iron pipe; thence following the line common with the property herein described and the property now or formerly of Bradby, Lapham and Carroll N70°42'20"W, 394.06 feet to an iron rod; thence following the line common with the property herein described and the property now or formerly of Sligh N25°11'45"E, 184.04 feet to a Walnut free; thence following the line common with the property herein described and the Property now or formerly of Fieldstone Investment, LLC, said line being marked by painted and marked trees the following courses: S73°43'29"E, 159.47 feet to an iron T-bar; thence S72°18'56"E, 179.00 feet to an iron T-bar; thence S68°06'56"E, 179.71 feet to tree; thence S86°43'56"E, 194.00 feet to an iron T-bar; thence N68°15'24"E, 259.77 feet to an iron pipe; thence S56°07'41"E., 1,326.91 feet to an iron pipe; thence following the line common with the property herein described and the property now or formerly of Jackson the following two courses: S18°47'32"W, 447.68 feet to an iron pipe; thence S22°59'39"W, 531.17 feet to an iron pipe; on the northerly right of way line of Rochambeau Drive thence following the northerly right of way line of Rochambeau Drive the following courses: N62°43'32"W, 141.29 feet; thence following the centerline of a stream along a tie line course of N09°03'49"W, 297.36 feet to the intersection of two streams; thence following a tie line course of S52°28'21"W, 264.72 feet to a point; thence N62'43'32'W, 1,304.46 feet and returning to the point of beginning.

TRACT 13

Tax Parcel ID Nos.: 1210100047, 1210100048, and 0640100001

"LAGRANGE" Tract, containing (i) 223.89 acres as depicted on that plat of survey dated August 26, 1988 made by Charles J. Kerns, Jr., L.S., recorded in Plat Book 50, Page 11, as conveyed to

Chesapeake Corporation by Sheldon Lumber Company, Incorporated, dated April 29. 1987, recorded in Deed Book 393, Page 285, and (ii) 4.75 acres, depicted as Parcel B on plat of survey dated 3/29/84 made by AES, recorded in Deed Book 246, page 313, as conveyed to Stonehouse Inc. by deed from Howard V. Clayton and Marion P. Clayton dated January 28, 1992, recorded Deed Book 549, Page 59. LESS AND EXCEPT the following described property:

1. 15.00 acres depicted on "Plat of Section A of Stonehouse Commerce Park at Stonehouse for Stonehouse, Inc." dated 10/10/95, made by Langley and McDonald, P.C., recorded in Plat Book 62, Pages 94-96, as conveyed to Amoco/Enron Solar by deed dated October 12, 1995, recorded in Deed Book 758, Page 721;

2. 11.1906 acres, depicted as Parcel A on "Plat of Section A of Stonehouse Commerce Park at Stonehouse for Stonehouse Inc." dated 10/10/95, made by Langley and McDonald, P.C. recorded in Plat Book 62, Pages 94-96, as conveyed to The Industrial Development Authority of James City County by deed dated September 30, 1996 recorded in Deed Book 809, Page 728;

3. 4.600 acres, depicted as Stonehouse Commerce Park, Section B, Parcel A on that plat entitled "Plat of Section B of Stonehouse Commerce Park at Stonehouse for Stonehouse Inc." made by Langley and McDonald, P.C., dated 1/23/98, recorded in Plat Book 68, Pages 60-61, as conveyed to The Barre Company, L.L.C., by deed dated March 3, 1998, recorded as Document No. 98-4099;

4. 6.245 acres, as depicted on "Plat of Boundary Line Adjustment Stonehouse Commerce Park Between Avid Realty, L.L.C. and Stonehouse Inc." dated May 2, 2002, made by AES Consulting Engineers, recorded in the Clerk's Office aforesaid in Plat Book 87, Page 89, of which 3.100 acres, depicted as Stonehouse Commerce Park, Section B, Parcel B on that plat entitled "Plat of Section B of Stonehouse Commerce Park at Stonehouse for Stonehouse Inc." made by Langley and McDonald, P.C., dated 1/23/98, recorded in Plat Book 68, Pages 60-61, was conveyed to Avid Realty, L.L.C., by deed from Stonehouse Inc., dated June 23, 1998, recorded as Document No. 98-11721;

5. 74.3712 acres, depicted as "Stonehouse Commerce Park, Section C, Parcel A" on the plat entitled "Plat of Section C of Stonehouse Commerce Park at Stonehouse Commerce Park at Stonehouse for Stonehouse Inc." made by Langley and McDonald, P.C., dated 3/22/99, recorded in Plat Book 73, Pages 38-39, as conveyed to Wachovia Capital Investments, Inc., by deed from Stonehouse Inc. dated May 17, 1999, recorded as Document No. 99-11248;

6. 4.1278 acres, depicted as "Stonehouse Commerce Park, New Parcel B-1, Section C" on the plat entitled "Resubdivision Plat of Section C, Parcel B of Stonehouse Commerce Park at Stonehouse Commerce Park at Stonehouse for Stonehouse Inc." made by Landmark Design Group, dated 4/5/00, recorded in Plat Book 77, Pages 28-29, as conveyed to Friendship Partnership, LLC. by deed from Stonehouse Inc. dated April 6, 2000, recorded as document No. 00-7666;

7. Parcel A-2B containing 4151 S.F., Parcel A-2A containing 2750 S.F. and Parcel A-lA containing 2050 S.F., all as depicted on "Resubdivision Plat of Section A, Parcel A of Stonehouse Commerce Park at Stonehouse for the Industrial Development Authority of the County of James City, Virginia"

made by Landmark Design Group, dated March 17, 2000, last revised June 23, 2000, recorded in Plat Book 78, Pages 4-5, and as conveyed to The Industrial Development Authority of James City County by three deeds from Stonehouse Inc. dated June 26, 2000, June 23, 2000 and June 23, 2000, recorded as Document Numbers 00-12706,00-12707 and 00-12708, respectively;

8. All that certain lot, piece or parcel of land with all improvements thereon and appurtenances thereunto belonging, situate, lying and being in the County of James City, Virginia, known and designated as "New Parcel," consisting of 10.3± acres, more or less, as shown on that certain plat entitled, "SUBDIVISION OF THE PROPERTY OF STONEHOUSE AT WILLIAMSBURG, LLC AT STONEHOUSE COMMERCE PARK STONEHOTJSE DISTRICT, JAMES CITY COUNTY, VIRGINIA, made by Landmark Design Group, dated October 24, 2003, and revised October 28, 2003, and recorded in the Clerk's Office of the Circuit Court for the County of James City, Virginia as Instrument No. 030039997, to which reference is here made;

9. All that certain lot, piece or parcel of land with all improvements thereon and appurtenances thereunto belonging, situate, lying and being in the County of James City, Virginia, known and designated as "Parcel A 24,157 S.F., .05689 AC." on that certain plat entitled, "SUBDIVISION PLAT OF PARCEL A & PARCEL B SECTION D, STONEHOUSE COMMERCE PARK BEING A PORTION OF THE PROPERTY OF COMMERCE PARK AT STONEHOUSE, LLC", made by Landmark Design Group, dated September 26, 2005, attached hereto as Exhibit A-I, and the easement rights to be conveyed therewith as noted on the aforementioned plat;

10. All that property shown as "NEW RIGHT OF WAY" on that certain plat entitled "PLAT SHOWING RIGHT OF WAY BEING THE EXTENSION OF LAGRANGE PARKWAY AND RE-ALIGNMENT OF A PORTION OF STATE ROUTE 600", dated July 8, 2002, last revised January 16, 2003, prepared by LandMark Design Group, recorded in the Clerk's Office for the City of Williamsburg and the County of James City as Instrument Number 030010861.

11. That certain lot or parcel of land located in the Stonehouse District of James City County, Virginia shown and set out as "Parcel B, 100,898 S. F., 2.3163 AC." on the plat of subdivision entitled "Subdivision Plat of Parcel A & Parcel B, Section D, Stonehouse Commerce Park Being a Portion of the Property of Commerce Park at Stonehouse, LLC", prepared by Landmark Design Group and dated February 16, 2006, consisting of three sheets, which plat of subdivision is recorded in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City as Instrument No. 060009197.

Together with the reservation of easements set forth in the following Deeds of Conveyance: Deed Book 758 Page 721, Deed Book 809 Page 728, Document No. 980004099, Document No. 980011721, Document No. 990011248; Document No. 00007666; and Document No. 020022341.

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 8 Feb 2010
at 10:45 AM/PM. The taxes imposed by Virginia Code Section 58.1-801, 58.1-802 & 58.1-814 have been paid.
STATE TAX LOCAL TAX ADDITIONAL TAX
$ $ $
TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B. Woolridge Clerk

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 7 June 2010
at 3:30 AM/PM. The taxes imposed by Virginia Code Section 58.1-801, 58.1-802 & 58.1-814 have been paid.
STATE TAX LOCAL TAX ADDITIONAL TAX
$ $ $
TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B. Woolridge Clerk

\\DB - 083526/000049 - 457034 v2

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 10-25-2010
at 2:14 AM/PM. The taxes imposed by Virginia Code Section 58.1-801, 58.1-802 & 58.1-814 have been paid.
STATE TAX LOCAL TAX ADDITIONAL TAX
$ $ $
TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B. Woolridge Clerk

808

090 030988

Tax Map #'s: 0540100015; 0540100016; 0630100005; 0630100006; 0540100002; 0540100011; and 0540100012

Return To: J. Brown
Terra Nova Title
1735 DeSales St. NW
Suite 401
Washington DC 20036

Title Insurer: First American Title Insurance Company

Prepared By
~~And Return To~~: Vernon M. Geddy, III, Esquire
Geddy, Harris, Franck & Hickman
1177 Jamestown Road
Williamsburg, VA 23185

THIS DEED IS EXEMPT FROM RECORDATION AND GRANTOR TAXES PURSUANT TO VA. CODE § 58.1-810(1)

DEED OF CONFIRMATION

THIS DEED OF CONFIRMATION, made this 18th day of November, 2009, by and among **GS STONEHOUSE GREEN LAND SUB LLC,** a Delaware limited liability company, Grantor, **GS STONEHOUSE GREEN LAND LLC,** a Delaware limited liability company, to be indexed as Grantor and Grantee, and **GS STONEHOUSE GREEN LAND SUB 2, LLC,** a Delaware limited liability company, to be indexed as Grantee, all of whose addresses are 50 North Water Street, South Norwalk, Connecticut 06854.

RECITALS

WHEREAS, there was a Boundary Line Adjustment Plat recorded by GS Stonehouse Green Land Sub LLC on November 7, 2008 as Instrument No. 080027247 combining several parcels of land into Tracts 1, 2, 3 and 4 as shown and set out on the Plat;

WHEREAS, by Deed of Assumption recorded immediately prior hereto, GS Stonehouse Green Land Sub LLC has conveyed to GS Stonehouse Green Land LLC Tracts 1, 2, 3 and 4 LESS AND EXCEPT 310.35 acres of land, and more fully described therein;

WHEREAS, by Deed of Assumption recorded immediately prior hereto, GS Stonehouse Green Land LLC has conveyed to GS Stonehouse Green Land Sub 2, LLC Tracts 1, 2, 3 and 4 LESS AND EXCEPT 310.35 acres of land, and as more fully described therein;

WHEREAS, by Special Warranty Deed recorded immediately prior hereto, GS Stonehouse Green Land Sub LLC has conveyed to GS Stonehouse Green Land LLC a parcel of land containing approximately 310.35 acres and which is part of Tracts 1, 3 and 4, and as more fully described therein;

WHEREAS, by Special Warranty Deed recorded immediately prior hereto, GS Stonehouse Green Land LLC has conveyed to GS Stonehouse Green Land Sub 2, LLC a parcel of land containing approximately 310.35 acres and which is part of Tracts 1, 3 an 4, and as more fully described therein;

WHEREAS, it was neither the Grantors or Grantees intent to subdivide Tracts 1, 2, 3 and 4 as were created by said Boundary Line Adjustment Plat;

WHEREAS, the sole purpose of having separate conveyances of the property constituting Tracts 1, 2, 3, and 4 from GS Stonehouse Green Land Sub LLC to GS Stonehouse Green Land LLC and from GS Stonehouse Green Land LLC to Stonehouse Green Land Sub 2, LLC was to clarify the assumption by GS Stonehouse Greenland Sub 2, LLC of the property remaining subject to the liens for the benefit of American Bank of Texas (the "Lender") described in the Deeds of Assumption as required by the Lender.

WHEREAS, by Additional Collateral Deed of Trust recorded immediately prior hereto, GS Stonehouse Green Land Sub 2, LLC has subjected the parcel of land containing approximately 310.35 acres and which is part of Tracts 1, 3 an 4, and as more fully described therein, to a lien for the benefit of the Lender, after which Lender has a lien on all of the property described on Exhibit "A" hereto.

WHEREAS,GS Stonehouse Green Land Sub LLC, as Grantor, GS Stonehouse Green Land LLC, as Grantor and Grantee, and GS Stonehouse Green Land Sub 2, LLC, as Grantor and Grantee in this instrument, hereby confirm that the abovementioned 310.35 acres, more or less, is in fact merged with and a part of Tracts 1, 2, 3 and 4 and that there has not been a subdivision of the property in question shown and set out on the Boundary Line Adjustment Plat, and that for all intents and purposes, the property conveyed by the Deeds of Assumption and Special Warranty Deeds described above to GS Stonehouse Green Land LLC and then to GS Stonehouse Green Land Sub 2, LLC is more particularly described on Exhibit "A" attached hereto.

WITNESSETH:

That for and in consideration of the sum of Ten and 00/100 Dollars ($10.00), cash in hand paid, and other good and valuable consideration, the receipt of which is hereby acknowledged, GS Stonehouse Green Land Sub LLC does confirm the grant and conveyance, with SPECIAL WARRANTY unto GS Stonehouse Green Land LLC, and GS Stonehouse Green Land LLC does confirm the grant and conveyance, with SPECIAL WARRANTY unto GS Stonehouse Green Land Sub 2, LLC, of all of the following described property, to-wit:

See Exhibit A attached hereto and incorporated herein.

Together with all the improvements thereon and appurtenances thereto.

This conveyance is made subject to all other conditions, restrictions and easements of record or apparent on the ground affecting the property conveyed hereby.

WITNESS the following signature and seal:

GS STONEHOUSE GREEN LAND SUB LLC

By:_____(SEAL)
Barry P. Marcus, Senior Vice President

STATE OF Connecticut
CITY/COUNTY OF Fairfield

The foregoing instrument was acknowledged before me this 13 day of November, 2009, by Barry P. Marcus, Senior Vice President, of GS Stonehouse Green Land Sub LLC on behalf of the company.

_____
NOTARY PUBLIC

My Commission Expires:_____
Notary Registration No. :_____

Jennifer Montanaro
Notary Public
Fairfield Cty. CT
My Commission Expires 5-31-13

GS STONEHOUSE GREEN LAND LLC

By:_____(SEAL)
Barry P. Marcus, Senior Vice President

STATE OF Connecticut
CITY/COUNTY OF Fairfield

The foregoing instrument was acknowledged before me this 13 day of November, 2009, by Barry P. Marcus, Senior Vice President, of GS Stonehouse Green Land LLC on behalf of the company.

_____
NOTARY PUBLIC

My Commission Expires:_____
Notary Registration No. :_____

Jennifer Montanaro
Notary Public
Fairfield Cty. CT
My Commission Expires 5-31-13

GS STONEHOUSE GREEN LAND SUB 2, LLC

By:_____(SEAL)
Barry P. Marcus, Senior Vice President

STATE OF Connecticut
CITY/COUNTY OF Fairfield

The foregoing instrument was acknowledged before me this 13 day of November, 2009, by Barry P. Marcus, Senior Vice President, of GS Stonehouse Green Land Sub 2 LLC on behalf of the company.

_____
NOTARY PUBLIC

My Commission Expires:_____
Notary Registration No. :_____

Jennifer Montanaro
Notary Public
Fairfield Cty. CT
My Commission Expires 5-31-13

Exhibit A
Property Description

TRACT ONE

Tax Parcel No. 0540100015 Richardson's Mill Pond Parcel

That certain tract or parcel of land located in James City County, Virginia shown and designated as "Tract One 272.98± AC." on the plat entitled "Boundary Line Adjustment of the Properties of GS Stonehouse Green Land Sub, LLC" made by LandMark Design Group and dated 08-21-08, which plat is recorded in the Clerk's Office as Instrument No. 080027247.

TRACT TWO

Tax Parcel No. 0540100016

That certain tract or parcel of land located in James City County, Virginia shown and designated as "Tract Two 587.43± AC." on the plat entitled "Boundary Line Adjustment of the Properties of GS Stonehouse Green Land Sub, LLC" made by LandMark Design Group and dated 08-21-08, which plat is recorded in the Clerk's Office as Instrument No. 080027247.

TRACT THREE

Tax Parcel No. 0630100005

That certain tract or parcel of land located in James City County, Virginia shown and designated as "Tract Three 3031.43± AC." on the plat entitled "Boundary Line Adjustment of the Properties of GS Stonehouse Green Land Sub, LLC" made by LandMark Design Group and dated 08-21-08, which plat is recorded in the Clerk's Office as Instrument No. 080027247.

TRACT FOUR

Tax Parcel No. 0630100006

That certain tract or parcel of land located in James City County, Virginia shown and designated as "Tract Four 38.74 AC." on the plat entitled "Boundary Line Adjustment of the Properties of GS Stonehouse Green Land Sub, LLC" made by LandMark Design Group and dated 08-21-08, which plat is recorded in the Clerk's Office as Instrument No. 080027247.

TRACT FIVE

Tax Parcel No.: 0540100002

"LAGRANGE" Tract, containing 203.29 acres, more or less, being Parcels A, B and D on a plat of survey made by John B. Vance, Jr., C.L.S., dated February 5, 1972, recorded in Plat Book 29, Page 40. Being the same land conveyed to the Chesapeake Corporation of Virginia by Littleberry James Haley, Jr., et al., by deed dated March 30, 1981, recorded in Deed Book 212, Page 411.

LESS AND EXCEPT all lands lying north of the southerly boundary line of "Fieldstone Parkway" shown on that certain plat entitled "SUBDIVISION PLAT SHOWING STONEHOUSE GLEN SECTION 1 & 2 AND RIGHT OF WAY OF FIELDSTONE PARKWAY BEING A SUBDIVISION OF THE PROPERTY OF FIELDSTONE INVESTMENT, LLC AND STONEHOUSE GLEN, LLC" dated May 31, 2006, prepared by LandMark Design Group, recorded in the Clerk's Office for the City of Williamsburg and the County of James City as Instrument Number 060016179.

TRACT SIX

Tax Parcel No.: 0540100011

"SLATER" Tract, containing 158 acres, more or less, as depicted on a plat thereof dated May 4, 1914, made by Sidney Smith, Surveyor, recorded in Plat Book 2, Page 50, including the church lot and the James Taylor Lot shown on the plat. LESS AND EXCEPT that portion of the property conveyed to the Commonwealth of Virginia for Route 600 recorded in Deed Book 53, Page 186. Being the same property conveyed to The Chesapeake Corporation of Virginia by A.D. Slater and wife by deed dated December 13, 1972, recorded in Deed Book 143, Page 425.

TRACT SEVEN

Tax Parcel No.: 0540100012

"FILICHKO" Tract, containing 10.238 acres, being more particularly shown and described on a plat of survey by B.C. Littlepage, C.L.S., dated November 5, 1971, recorded in Plat Book 29, Page 6, being the same property conveyed to Chesapeake Corporation by John R. Filichko and wife by deed dated April 11, 1988, recorded in Deed Book 387, Page 143. LESS AND EXCEPT that property shown as "NEW RIGHT OF WAY" on that certain plat entitled "PLAT SHOWING RIGHT OF WAY BEING THE EXTENSION OF LAGRANGE PARKWAY AND RE-ALIGNMENT OF A PORTION OF STATE ROUTE 600", dated July 8, 2002, last revised January 16, 2003, prepared by LandMark Design Group, recorded in the Clerk's Office for the City of Williamsburg and the County of James City as Instrument Number 030010861.

ALL of the aforesaid Tracts being a portion of the property conveyed to GS Stonehouse Green Land Sub, LLC, by Special Warranty Deed dated October 31, 2006 from Stonehouse Capital, LLC, Commerce Park at Stonehouse, LLC, Six Hundred North, LLC, Fairmont Investment, LLC, Mount Laurel, LLC, Stonehouse Glen, LLC, Fieldstone Investment, LLC, Tymar Capital, LLC, Cimarron Capital, LLC and JTL Stonewill Joint Venture, LLC, which deed is recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City as Instrument No. 060027006.

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 14 Nov. 09
at 12:11 AM/PM. The taxes imposed by Virginia Code Section 58.1-801, 58.1-802 & 58.1-814 have been paid.

STATE TAX	LOCAL TAX	ADDITIONAL TAX
$	$	$

TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B. Woolridge Clerk

Printed On 10/17/2011 By JCCATTY

Richardson's Mill Pond

020 020273

WATER RIGHTS AGREEMENT

THIS WATER RIGHTS AGREEMENT (this "Agreement") is made and delivered as of the 19th day of August, 2002, by and between **STONEHOUSE INC.**, a Virginia corporation ("Stonehouse") (to be indexed as Grantor) and **THE TRADITION GOLF CLUB AT STONEHOUSE LLC**, a Delaware limited liability company ("Tradition") (to be indexed as Grantee);

WITNESSETH:

WHEREAS, Stonehouse is the owner of certain property located in James City County, Virginia (the "County") which is part of a residential and commercial development known as "Stonehouse," all as set out in the Stonehouse Master Plan approved by the County pursuant to the PUD provisions of the County Zoning Ordinance (the "Development");

WHEREAS, pursuant to the approved Stonehouse Master Plan, the Development includes an 18-hole golf course called The Tradition Golf Club at Stonehouse (the "Golf Course");

WHEREAS, Richardson's Mill Pond (also located within the Development) (the "Pond") is the main water source for irrigation of the Golf Course;

WHEREAS, Tradition is the current owner and operator of the Golf Course and desires to insure that the water source for irrigation of the Golf Course will remain in place and that Tradition will be permitted to continue to withdraw surface water from the Pond for irrigation purposes; and

WHEREAS, Stonehouse agrees that Tradition shall continue to have such withdrawal right, and further desires to transfer to Tradition all rights and privileges set forth in the Golf Course Irrigation Agreement between Stonehouse and the James City Service Authority ("JCSA") dated June 1, 1995 relating to irrigation of the Golf Course (the "JCSA Agreement").

NOW, THEREFORE, for and in consideration of the mutual covenants and conditions herein contained, and other valuable considerations, the receipt and sufficiency of which are hereby acknowledged, the parties do hereby agree as follows:

1. Tradition shall have the right and privilege, without cost, to withdraw surface water from the Pond in order to irrigate the Golf Course. Tradition's total annual consumption shall not exceed 60,000,000 gallons per calendar year; provided, however, Tradition shall, at a minimum, be entitled to draw up to 350,000 gallons per day from the Pond to irrigate the Golf Course during the golf course growing season ("Tradition Share"). The foregoing covenant and agreement shall run with the land and bind every owner now or hereafter acquiring an interest in the Development. However, should Tradition cease to withdraw surface water from the Pond for the purpose of golf course irrigation for a period of

SEP-4 02 0320

twelve (12) continuous months, the Tradition's rights under this Agreement shall forever terminate.

2. Stonehouse does hereby assign and transfer to Tradition all right, title and privilege of Stonehouse under the JCSA Agreement, the Tradition Share, and any and all associated governmental permits and approvals to the extent the same relates to irrigation of the Golf Course (collectively, the "Irrigation Rights").

3. Tradition does hereby assume from Stonehouse all of Stonehouse's responsibilities and obligations relating to the Irrigation Rights.

4. Stonehouse represents and warrants to Tradition that Stonehouse has the full right and title to assign its interest in the Irrigation Rights and that Stonehouse has made no other assignment, conveyance or other transfer of such interest.

5. Tradition agrees to indemnify and hold Stonehouse harmless from and against any claims, demands, liabilities and expenses (including, without limitation, court costs and attorneys' fees) incurred by Stonehouse arising out of any default relative to the Irrigation Rights which default arises after the date of this Agreement.

6. This Agreement is subject to force majeure. In the event that Traditions is unable to withdraw all or a portion of the annual or per diem consumption of water from the Pond due to of acts of God, weather conditions, damage or destruction of the dam, or other conditions or delays beyond the control of Stonehouse, then this Agreement shall be suspended without penalty to Stonehouse until such situation or condition is remedied. Nothing contained herein shall obligate Stonehouse to remedy, mitigate or repair such situation or condition.

7. This Agreement may be executed in separate counterparts, each of which when so executed shall be an original, but all of such counterparts shall together constitute but one and the same instrument. This Agreement shall be deemed executed and delivered by a party if the party's signature appears on a facsimile or original of this Agreement received by the other party.

8. The provisions of this Agreement shall be binding upon, and inure to the benefit of, the parties hereto and their respective successors and assigns.

[SIGNATURES APPEAR ON NEXT PAGES]

SEP-48 0321

IN WITNESS WHEREOF, the parties have caused this Agreement to be duly executed as of the date and year first above written.

"STONEHOUSE"

STONEHOUSE INC., a Virginia corporation

By: Stephen M. Campitell
Name: STEPHEN M. CAMPITELL
Title: VICE PRESIDENT

STATE OF VIRGINIA)
) to wit:
CITY/COUNTY OF New Kent)

The foregoing instrument was acknowledged before me this 19th day of August, 2002, by Stephen M. Campitell, as Vice President of Stonehouse Inc., a Virginia corporation, on behalf of the corporation.

In witness whereof, I have hereunto set my hand and official seal.

Wanda F. Watkins
Notary Public

My commission expires: 12-31-06

SEP-4 02 0322

Printed On 10/17/2011 By JCCATTY

"TRADITION"

THE TRADITION GOLF CLUB AT STONEHOUSE LLC, a Delaware limited liability company

By: Paul E Mauk
Paul E. Mauk, Manager

(MA) MASSACHUSETTS

STATE OF ~~VIRGINIA~~)
) to wit:
CITY/COUNTY OF Suffolk)

The foregoing instrument was acknowledged before me this 23rd day of August, 2002, by Paul E. Mauk, as Manager of The Tradition Golf Club at Stonehouse LLC, a Virginia limited liability company, on behalf of the company.

In witness whereof, I have hereunto set my hand and official seal.

Ivett R. Stabehl
Notary Public

My commission expires: IVETT R. STABEHL
Notary Public
Commonwealth of Massachusetts
My Commission Expires
January 31, 2009

SEP-4-02 0323

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 4 Sept. 02
at 11:46 AM/PM. The taxes imposed by Virginia Code Section 58.1-801, 58.1-802 & 58.1-814 have been paid.

STATE TAX	LOCAL TAX	ADDITIONAL TAX
$	$	$

TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B. Woolridge Clerk

4 – 4

FRAN

James City County
VIRGINIA
Jamestown 1607

Development Management
101-A Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187-8784
P: 757-253-6671
F. 757-253-6822
devman@james-city.va.us

jamescitycountyva.gov

Building Safety and Permits 757-253-6620
Engineering and Resource Protection 757-253-6670
Planning 757-253-6685
Zoning Enforcement 757-253-6671

July 10, 2012

Mr. Mike Etchemendy
GS Stonehouse Green Land Sub LLC
Greenfield Partners
11950 Democracy Drive, Suite 310
Reston, VA 20190

Re: Richardson Mill Pond Dam
SR 600 Six Mount Zion Road
James City County, Virginia

Dear Mr. Etchemendy:

As you may be aware, Richardson Mill Pond dam is situated within the Stonehouse development project site on the border of James City and New Kent Counties on Ware Creek. The drainage area to Richardson Mill Pond is approximately 4,000 acres and it receives drainage from Stonehouse Development Area One and Land Bays 1, 3, 5, 8 and 14 and Tracts 3, 10 and 12 from the GS Stonehouse Green Land Sub LLC portions of the Stonehouse project.

Based on our records, in June of 1995 the County agreed to a proposal to allow Richardson Mill Pond (R.M.P.) to serve as a structural BMP for water quality compliance for a large portion of the Stonehouse development project in particular the area known as Stonehouse Development Area One. The lake was assigned an 8-point value as a BMP in accordance with the County's 10-point system for water quality BMP's and serves approximately 1,600 acres within Stonehouse. The area defined as Stonehouse Development Area One included a portion of the GS Stonehouse development. It is an area identified on the exhibit map as the area "drainage to R.M.P." that portion draining to Bird Swamp which includes area east to include Six Mount Zion Road (high point) and additional area identified as "not draining to R.M.P." which goes even further east of Six Mount Zion Road extending to Frances Swamp. See Attachment 1 for this information.

As a result of rainfall events associated with Hurricane Irene in August of 2011, the dam embankment and flow control structures associated with the Richardson Mill Pond Dam were discovered to have deteriorated conditions which threaten the structural integrity and stormwater function of the facility to function as an impounding structure and as a stormwater management Best Management Practice (BMP). In September 2011, the Virginia Department of Transportation (VDOT) closed SR600 Six Mount Zion/Holly Forks Road due to threatening conditions. This condition has become increasingly worse since December of 2011. Various rainfall events have increased visible signs of piping along the south abutment of the north (primary) spillway. The average rate of seepage is estimated at 7-10 cubic feet per second.

The County is requesting that GS Stonehouse Green Land Sub LLC repair Richardson Mill Pond dam to establish proper stormwater function and to achieve adequate structural integrity in order for the facility to continue to serve as an impounding structure and a stormwater management/BMP. Otherwise, the County will not approve any additional development plans or issue permits for any future GS Stonehouse development projects which drain to Richardson Mill Pond or are situated within the original water quality compliance area identified as the Development Area One area "not draining to R.M.P." as shown on the exhibit map in the attachments. The basis to support this statement is as follows:

- You are the owner of the James City County portion of the dam.

- The dam is subject to Virginia impounding structure and dam safety regulations and requirements.

- In a letter issued by Thomas F. Lester, District Structure and Bridge Safety Inspection Program Manager for VDOT Richmond District dated October 25, 2011 VDOT gave instruction to GS Virginia (Tom Page) that the owner of the property must maintain the substructure, all elements below and supporting the steel beams, Code of Virginia reference §33.1-176, and also provided specific recommendations for repair of the dam. See Attachment 2.

- Many of the Declaration of Covenants – Inspection/Maintenance Agreements as obtained prior to issuance of land-disturbing permits and as recorded in land records for early and more current phases of the Stonehouse project transfer obligation for maintenance of runoff control facilities from the developer to new owners. Any of the agreements linked to the parent parcel with connection to the dam parcels Richardson Mill Pond Tract (Tax Parcel No. 0610100001) and Cedar Point Tract (Tax Parcel No. 0610100002) would thus transfer assignment of obligated maintenance of the runoff control facility to the new parcel owner. Particular reference is made to the recorded inspection maintenance agreement dated March 10, 1995 Instrument # 004986, Deed Book 0732, pages 988-989 which references the parent Stonehouse parcel Tax Map (6-4)(1-1) and as obtained during the approval process for SP-28-95 Ware Creek Roadway Phase 1 (now Fieldstone Parkway). This parcel was the parent parcel for most of the entire Stonehouse property. It is recorded in County land records and binds subsequent owners of the property served by the facility. See Attachment 3.

- Land Bays 1, 3, 5, 8 and 14 and Tracts 3, 10 and 12 drain directly to Richardson Mill Pond dam (ie. the area "draining directly to R.M.P.) and Land Bays 2 and 11A which are within the limit of the Stonehouse Area One exhibit area draining to Frances Swamp (ie. the area "not draining to R.M.P."). All are dependent upon Richardson Mill Pond dam for stormwater quality compliance by the 1995 approval.

- Commitments made to the County during the rezoning case Z-04-07. During the review of the rezoning case, the County's Environmental Division (now Engineering and Resource Protection) had concerns about the ability to approve plans and issue land-disturbing permits without evidence of a dam safety permit from the state for Richardson Mill Pond. In a letter from GS Virginia to the Environmental Division dated November 6, 2007 (Tom Page) there was a commitment to provide analysis of Richardson Mill Pond and confirmation that a permitting package submittal was made to Virginia DCR dam safety. It is our understanding that since 2007 no further progress has been made on this effort. See Attachment 4.

- James City County is deemed a local program and plan-approving authority for erosion and sediment control purposes in accordance with Virginia Erosion and Sediment Control law (Title 10.1, Chapter 5, Article 4 of the Code of Virginia). A local erosion and sediment control program must be consistent with the criteria, techniques, and methods as outlined in the Minimum Standards 4VAC50-30-40 of the Virginia Erosion and Sediment Control regulations. Minimum Standard # 19 of these regulations requires that concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. As a documented runoff control facility, Richardson Mill Pond would be considered as a receiving facility. The County, as plan-approving authority under Virginia E&S law, could not approve a plan which discharges into a known inadequate, damaged or failed receiving drainage facility, unless a plan was in place to correct those deficiencies. The County's jurisdiction on this matter applies to a point downstream where the total drainage area is one hundred times greater than the contributing area of the project site (ie. 1 percent rule). Therefore, as Richardson Mill Pond has a known total drainage area of 4,000 acres then the County can apply the Minimum Standard # 19 criteria to any land bay in excess of 40 acres in size. Therefore, it would appear that this could affect anticipated development plans and/or permits for Land Bays 5 and 14 and Tracts 3, 10, and 12.

- A closed SR600 Six Mount Zion/Holly Forks public road could adversely affect the flow pattern of traffic intended within the Stonehouse master planned development. This could affect assumptions made during past rezoning efforts (Z-04-07/MP-04-07) as part of the traffic impact analyses "Stonehouse Traffic Impact Analysis".

- In addition, a closed SR600 Six Mount Zion/Holly Forks public road could generally affect the public's health, safety, welfare, especially during times of emergency conditions.

Again, the County' position on this matter is as follows. The County is requesting that GS Stonehouse Green Land Sub LLC repair Richardson Mill Pond dam to establish proper stormwater function and to achieve adequate structural integrity in order for the facility to continue to serve as an impounding structure and a stormwater management/BMP. Otherwise, the County will not approve any additional development plans or issue permits for any future GS Stonehouse development projects which drain to Richardson Mill Pond or are situated within the original water quality compliance area identified as the Development Area One area "not draining to R.M.P." as shown on the exhibit map in the attachments. Further, the County respectfully requests that a timeline be developed to accomplish this request and be provided to the County within 30 days.

We thank you for your commitment to the Stonehouse planned unit development in James City County and feel that this is an important matter to address as that development progresses. We look forward to review of this correspondence and continued dialogue on this matter. Please contact me at our office at 253-6670 if you have any questions or comments.

Sincerely,

Scott J. Thomas, P.E.
Director
Engineering and Resource Protection

SJT/sjt
Attachments

cc: Allen Murphy, Development Manager (via email)
Adam Kinsman, Assistant County Attorney (via email)
Steven Snell, VADCR Regional Dam Safety Engineer (via email)
~~Ellen Cook, Planning (via email)~~
Amy Walker, New Kent County (via email)
Vernon Geddy (via email)

GS Stonehouse\RichardsonMillPond\Notification_071012

James City County
Working in Partnership with all Citizens to achieve a Quality Community

Land Records

All Sites | Advanced Search

Land Records > 001-099 > 064 > 0640100001

001-099

Map Sheet Range 001 to 099

Actions • View: **All Documents**

Type	Name	Case Number	Map ID	Classification	File Contains	Owner_Title	CrossRef	Roll Number	Modified	Modified By	Author	Created By	Description	Keywords	Start Date	Scan Date	OriginalDocumentProfile	FriendlyVersionID
	931611P	93-1611-P	0640100001	R DOCUMENTS	Documents	STONEHOUSE, INC.		WP971	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	962000P	96-2000-P	0640100001	R DOC. & SMALL DWGS.	Documents	STONEHOUSE, LLC		WP991	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	971097P	97-1097-P	0640100001	R DOCUMENTS	Documents	THE LEGENDS GROUP		WP991	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP000162	BP-00-0162	0640100001	C Documents & Drawings	Documents	Stonehouse Cart Barn		BP200113	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP013914	BP-01-3914	0640100001	Building Permits - Commercial	Documents	STONEHOUSE DEVELOPMENT		BP2002-15	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP040620	BP-04-0620	0640100001	Building Permits - Commercial	Documents	LIBERTY PROPERTY TRUST		BP2005-2	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP040620P	BP-04-0620P	0640100001	Building Permits-Commercial	Documents	Liberty Property Trust			8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP-05-0394	BP-05-0394	0640100001	Building Permits - Commercial	Documents	STONEHOUSE AT WILLIAMSBURG		BP2007-9	8/24/2009 10:39 AM	Patrick Page	Records Management	Patrick Page		--------		4/18/2007	LandRecords	2.0
	BP053459	BP-05-3459	0640100001	Building Permits - Commercial	Documents	STONEHOUSE GLEN/LLC		BP2007-8	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	2.0
	BP951573	BP-95-1573	0640100001	C DOCUMENTS	Documents	STONEHOUSE, INC.		BP20015	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP952044	BP-95-2044	0640100001	C Documents & Drawings	Documents	Legends Group		BP200017	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP953261	BP-95-3261	0640100001	C Docs.&Sm.Drawings	Documents	Legends Golf		BP20003	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP961072	BP-96-1072	0640100001	C Documents & Drawings	Documents	Stonehouse Golf Club		BP200016	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP961580	BP-96-1580	0640100001	C DOCUMENTS	Documents	LEGENDS GROUP		BP200113	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP961638	BP-96-1638	0640100001	C Documents	Documents	Stonehouse Inc.		BP20004	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP972223	BP-97-2223	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSELLC		BP993	8/24/2009 10:41 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP972710	BP-97-2710	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE GOLF		BP200010	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	BP980061	BP-98-0061	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE, L.L.C.		BP9810	3/21/2011 4:52 PM	Sylvia Davis	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	C12301	C-123-01	0640100001	Conceptual	Documents	Stonehouse, Sec. 7A Ph. 1		C2002-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	C14106	C-141-06	0640100001	Conceptual	Documents	STONEHOUSE GLEN		C2007-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------			LandRecords	1.0
	C-141-06P	C-141-06P	0640100001	Conceptual	Documents	Stonehouse Glen			8/24/2009 10:39 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		6/1/2007	LandRecords	1.0
	CBS01005	CBS-01-005	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		4/13/2009		
	CBS01007	CBS-01-007	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		4/13/2009		
	CBS02009	CBS-02-009	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		4/14/2009		
	CBS02010	CBS-02-010	0640100001	Ches Bay Slope Exceptions	Documents	AES			8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		4/14/2009		
	CBS97001	CBS-97-001	0640100001	Ches Bay Slope Exceptions	Documents & Drawings	Langley & McDonald	SP-030-97		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		10/29/2008		
	CBS97007	CBS-97-007	0640100001	Ches Bay Slope Exceptions	Documents	Langley & McDonald	S-030-97		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		10/29/2008		
	CBS97012	CBS-97-012	0640100001	Ches Bay Slope Exceptions	Documents	Langley & McDonald	SP-028-97		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		10/29/2008		
	CBS98006	CBS-98-006	0640100001	Ches Bay Slope Exceptions	Documents	Langley & McDonald	S-012-98		8/24/2009 10:47 AM	Patrick Page	Records Management	Patrick Page		--------		10/31/2008		

HW105	HW-1-05	0640100001	Height Waivers	Documents	STONEHOUSE COMMERCE PARK		HW2005-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S10002	S-100-02	0640100001	Subdivision	Documents	RICHARDSON'S MILL, SECTION ONE	S-99-01;	S2005-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S1098	S-10-98	0640100001	Subdivision	Documents	STONEHOUSE COMMERCE		S981	8/24/2009 10:41 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S1298	S-12-98	0640100001	Subdivision	Documents	STONEHOUSE, SECTION IVC		S995	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S2401	S-24-01	0640100001	Subdivision	Documents	STONEHOUSE/ BENT TREE/ PHASE ONE	S-3-99;	S2001-2	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S2496	S-24-96	0640100001	Subdivision	Documents	STONEHOUSEVDOT		S996	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S3797	S-37-97	0640100001	Subdivision	Documents	STONEHOUSE, PHASE ONE		S997A	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S399	S-3-99	0640100001	Subdivision	Documents	STONEHOUSE BENT TREE	S-50-99;	S20011	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S4299	S-42-99	0640100001	Subdivision	Documents	STONEHOUSE/SECT.5-B	S-3-99;S-74-00;	S2001-2	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S5099	S-50-99	0640100001	Subdivision	Documents	STONEHOUSE, BENT TREE	S-3-99;	S20002	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S6405	S-64-05	0640100001	Subdivisions	Documents	STONEHOUSE COMMERCE PARK, S-D		S2006-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S6801	S-68-01	0640100001	Subdivision	Documents	STONEHOUSE, BENT TREE, PHASE THREE	S-81-99;	S2002-2	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S703	S-7-03	0640100001	Subdivisions	Documents	STONEHOUSE, RICHARDSONS MILL/S-2		S2005-2	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S7102	S-71-02	0640100001	Subdivisions	Documents	STONEHOUSE COMMERCE PARK		S2003-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S7400	S-74-00	0640100001	Subdivision	Documents	STONEHOUSE BENT TREE/PHASE 2	S-42-99;	S2001-2	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S7597	S-75-97	0640100001	Subdivision	Documents	STONEHOUSEPHASE ONE		S981	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S7697	S-76-97	0640100001	Subdivision	Documents	STONEHOUSEPHASE ONE	S-75-97;	S981	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S8199	S-81-99	0640100001	Subdivision	Documents	STONEHOUSE, BENT TREE SECT. 5-B	S-68-01;	S2004-1	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S8497	S-84-97	0640100001	Subdivision	Documents	STONEHOUSE, PHASE ONE		S982	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S8697	S-86-97	0640100001	Subdivision	Documents	STONEHOUSE L.L.C.		S981	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S9099	S-90-99	0640100001	Subdivision	Documents	STONEHOUSE, OVERLOOK		S20001	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S9299	S-92-99	0640100001	Subdivision	Documents	STONEHOUSE, ORCHARD HILL	S-98-97;S-89-98;	S20001	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S9397	S-93-97	0640100001	Subdivision	Documents	STONEHOUSE, L.L.C.		S991	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
S9897	S-98-97	0640100001	Subdivision	Documents	STONEHOUSESECTION 4D		S994	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP101	SP-1-01	0640100001	C DOC., PHOTO & DWGS.	Documents	STONEHOUSE NATURE TRAIL		SP20011	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP1401	SP-14-01	0640100001	Site Plans - Commercial	Documents	MILL POND PARK		SP2001-3	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP14197	SP-141-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE		SP991	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP196	SP-1-96	0640100001	C DOCUMENTS & DRAWINGS	Documents	LAGRANGE TRACT		SP971	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP2697	SP-26-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE SALES CENTER		SP983	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP2895	SP-28-95	0640100001	C DOCUMENTS & DRAWINGS	Documents	WARE CREEK ROADWAY		SP972	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP2897	SP-28-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	WASTEWATER LIFT STATION		SP993	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP3297	SP-32-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE WATERLINE		SP982	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP3405	SP-34-05	0640100001	Building Permits Residential	Documents	FIELDSTONE PARKWAY SITE PLAN AMEND.	SP-108-03;	SP2005-2	8/24/2009 10:46 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP3598	SP-35-98	0640100001	C DOCUMENTS & DRAWINGS	Documents	LEGENDS @ STONEHOUSE		SP981	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP3796	SP-37-96	0640100001	C DOCUMENTS	Documents	CART STORAGE TEMPORARY		SP20002	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0
SP4797	SP-47-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	MILL POND RUN		SP20002	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------	LandRecords	1.0

SP5297	SP-52-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	THE LEGENDS AT STONE		SP972	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SP5496	SP-54-96	0640100001	C DOCUMENTS & DRAWINGS	Documents	LEGENDS CLUBHOUSE		SP971	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SP5801	SP-58-01	0640100001	Building Permits Residential	Documents	FERNANDEZ LIFT STATION/STONEHOUSE	S-68-01;	SP2001-3	8/24/2009 10:43 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SP6899	SP-68-99	0640100001	Building Permits Residential	Documents	STONEHOUSE COMMERCE	SP-141-97;SP-47-99;	SP996	8/24/2009 10:44 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SP7297	SP-72-97	0640100001	C DOCUMENTS & DRAWINGS	Documents	LEGENDS AT STONEHOUSE		SP973	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SP7896	SP-78-96	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSEPHASE TWO		SP993	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
sp7996	SP-79-96	0640100001	Site Plan	Documents	STONEHOUSE - SANITARY MAIN FORCE EXTENSION		SPP97-3	1/4/2011 4:32 PM	Sylvia Davis	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SP8200	SP-82-00	0640100001	Site Plans - Commercial	Documents	LaGRANGE PARKWAY EXTENSION		SP2002-1	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SP9695	SP-96-95	0640100001	C DOCUMENTS & DRAWINGS	Documents	SOLAREX		SP982	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SUP1796	SUP-17-96	0640100001	C DOCUMENTS	Documents	PRIMCO PERSONAL		SUP971	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
SUP205	SUP-2-05	0640100001	Building Permits Residential	Documents	MICHAEL VERGAKIS	HW-1-05;	SUP2005-1	8/24/2009 10:45 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
W798	W-7-98	0640100001	C DOCUMENTS	Documents	STONEHOUSE, INC.		W2000-1	8/24/2009 10:40 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0
Z00112003	Z-0011-2003	0640100001	Zoning	Documents, Drawings, Other Color Information	STONEHOUSE	Z-15-05;Z-4-07;MP-12-05;MP-4-07;	Z2010-1	6/20/2011 8:12 AM	Audrey Page	Records Management	Sylvia Davis		--------	11/2/2009		
Z00112003P	Z00112003P	0640100001	Zoning	Photos, Maps and or Brochures	Stonehouse	Z00112003		2/16/2010 2:30 PM	Audrey Page	Records Management	Audrey Page		--------	2/16/2010		
Z298	Z-2-98	0640100001	C DOCUMENTS & DRAWINGS	Documents	STONEHOUSE		Z99-1	8/24/2009 10:42 AM	Patrick Page	Records Management	Patrick Page	Land Records	--------		LandRecords	1.0

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
RICHMOND DISTRICT
2430 Pine Forest Drive
COLONIAL HEIGHTS, VA 23834
www.VDOT.Virginia.gov

Gregory A. Whirley
COMMISSIONER

October 25, 2011

Mr. Tom Page
VP, General Manager
GS Virginia
4011 West Chase Blvd.
Suite 175
Raleigh, NC 27607

Re: Bridge Structure 6001 on Route 600 (Holly Fork Road) over Ware Creek in New Kent County

Dear Sir:

This letter was originally sent to the trustees of the adjoining property as our research indicated this section of the dam belonged to them. From further research and our phone conversations, it has come to our attention that Stonehouse owns the portion of the earthen dam structure that includes the noted structure over the spillway for the impoundment known as Richardson's Pond. The right of way for the public roadway (route 600) is, we believe, provided by a prescriptive easement.

In accordance with the Code of Virginia the owner must maintain the substructure, i.e., all elements below and supporting the steel beams (see Attachment A), whereas the Virginia Department of Transportation (VDOT) owns and maintains the superstructure; the beams and metal decking with asphalt. VDOT also maintains the paved roadway crossing the dam and appurtenant guardrail. The Hampton Roads District of VDOT maintains the structure (6901) over the overflow spillway just south of this location in James City County.

In accordance with federal regulations under the purview of the National Bridge Inspection Standards (NBIS) – 23 CFR 650(C), VDOT inspects the bridge on at least a bi-annual basis. In accordance with the above referenced section of the Code, we are transmitting to you a summary of the general condition and recommendations of the inspection team for the substructure.

OVERALL CONDITION: Good – Timber retaining wall exhibits decay and broken members. Backwall and breastwall of each abutment exhibit cracks up to ½" wide at random locations with one area of spall up to 3" in diameter. Concrete spillway channel floor is deteriorated throughout.

NOTE: Apart from the inspection, it has come to our attention that there is a breach in the earthen dam behind the south abutment. Evidence for this is found in the continual settlement and ongoing repairs of the roadway pavement behind the abutment. There is an area of slumping fill underneath the

guardrail on the southwest corner of the structure. Also, at the area behind the southeast retaining wall for the spillway/channel floor, there is a significant amount of water flowing out of the dam structure, with signs of bank failure from the erosion effects of the water. Attachment B contains an aerial photograph of the site and a series of photographs for the items noted above. With the "piping" effect of such breaches, it is a matter of time before the dam weakens enough to washout, including the roadway approach pavement. This concern was heightened with tropical storm Lee and the increased pressure and flow of the encroaching water through the dam. The subsequent cavity in the dam embankment resulted in a large void and failed pavement. Of vital concern to VDOT is the possibility of the water induced erosion within the embankment encroaching upon the south abutment foundation, undermining the abutment and resulting in a failure of the bridge.

RECOMMENDATIONS:

1. Evaluate and repair the breach in the dam as soon as possible.
2. Repair hole in southeast retaining wall and backfill behind it.
2. Seal cracks and separation gaps in abutments.
3. Recast spillway/channel floor.

The action plan and any pertinent drawings or sketches for bridge related maintenance noted above, or dam repair that will affect the structural nature or integrity of the bridge, will need to be reviewed by the District Structure and Bridge Engineer, Mr. Gary A. Martin, P.E., before remedial work may commence. Bridge related maintenance that requires an engineering design will require stamping and sealing of the calculations and pertinent drawings or sketches by a licensed professional engineer.

Mr. Gary A. Martin, P.E.
Virginia Department of Transportation – Richmond District
Structure and Bridge Division
2430 Pine Forest Drive
Colonial Heights, Virginia 23834

I am attaching my business card for your information and in order for you to contact me if you so desire.

Sincerely,

Thomas F. Lester, P.E.
District Structure and Bridge Safety Inspection Program Manager
Virginia Department of Transportation – Richmond District

Attachment

Attachment A
Code of Virginia

§33.1-176. Duty of owner or occupier of dam

Every owner or occupier of a dam shall, so far as any state highway passes over the same, keep such dam in good order, at least twelve feet wide at the top, and also keep in good order the substructure of a bridge of like width over the pier heads, floodgates or any wastecut through or around the dam; provided, however, that when the above has been done, the superstructure of any such bridge shall be maintained by the Commonwealth Transportation Commissioner. The Commissioner shall inspect all such bridges and report to the owner in writing needed repairs. If such owner fails to comply with the provisions of this article, he shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be fined two dollars for every such failure of twenty-four hours. But if a milldam is carried away or destroyed by flood or any other extraordinary natural cause, the owner or occupier thereof shall not be subject to such fine until one month after any mill, operated in whole or in part by water impounded by such dam, has been put into operation by such waterpower.

Stonehouse James City County meeting 11/15/11

Richardson's Mill Pond Status Update

1. DCR – Submittal Requirements
2. VDOT letter of 10/25/11 (received 11/10/11)
    a. Requires repair to Structure 6001 on the County line.
3. Zoning process identified lack of dam certification
4. Stonehouse Green efforts in 2007 to correct issues identified in Landmark report so Stonehouse Green could utilize Richardson's Mill Pond.
5. Direction from James City County to address SWM/BMP requirements on-site for each tract/landbay written into rezoning.
6. Current status of design and construction at Recreation Center, Tract 12, and Landbay 3.
7. Stonehouse Green plans for SWM/BMP going forward.
8. Stakeholders identified:
    a. Stonehouse HOA (Millpond)
    b. Stonehouse Golf Course
    c. VDOT
    d. James City County
    e. New Kent County
    f. Stonehouse Green
    g. Kinney et al (New Kent County)
9. Landowners identified:
    a. Stonehouse HOA (Millpond)
    b. Stonehouse Green
    c. Kinney et al (New Kent County)
10. Next Steps

PC 184
PC

This is our master log

Pickup maint. agreement from Courthouse

I believe this is the DOC-I/M Agreement for R.M.P, but don't have copy

Declaration of Covenants Log

	Covenantor(s)	Property Location or other Identifying Information	Date copy sent to E & S (Joan E.)
87)	Legacy Greensprings, Limited Partnership	Detention Basin located between Parcel F, Parcel G and S.R. 614	3-8-95
88)	McG Outlet Center Limited Partnership	5715 Richmond Road SP-107-94	3-29-95
89)	Timothy K. Johnston	7191 Richmond Road Tax Map (23-2) (1-44)	4-7-95
90)	Busch Properties, Inc.	Tax Map (50-1) (1-1) (North Quarter) Kingsmill Village	4-19-95
91)	Stonehouse, Inc.	Part of Tax Map (6-4) Parcel (1-1), and Tax Map (12-1) Parcel 38	4-19-95
92)	Riverside Healthcare Assoc.	3400 John Tyler Highway	5-19-95
93)	Powhatan Enterprises, Inc.	Powhatan of Williamsburg Secondary	5-19-95
94)	King of Glory Lutheran Church	4897 Longhill Road	6-20-95
95)	Donald E. Newsom	7242 Merrimac Trail	7-14-95
96)	James H. Neal	7151 Richmond Road Deed Book 684, Page 109	7-21-95
97)	Busch Properties, Inc.	Kingsmill Resort Center 101-D Kingsmill Road	8-10-95
98)	University Square Associates	Williamsburg Crossing Multi-family Crossing 104 Kings Way	8-10-95
99)	Greensprings Plantation	Tax Map (46-1)(1-1)	8-17-95
100)	Merrimac Trail Assoc, LLC.	7346 Merrimac Trail	8-25-95
101)	VA Peninsula Regional Jail Authority	9320 Merrimac Trail	9-11-95
102)	W-JCC Public Schools	new Rt. 5 High School 3751 John Tyler Highway	9-28-95

0104010001
1010100088

would be at WJCC Courthouse

Leann
564-2360
209-8246

11070M3

Date Record Created: 1/20/2011

WS_BMPNO: PC252

Created By: Scott Thomas

WATERSHED	PC
BMP ID NO	252
PLAN NO	S-35-87
TAX PARCEL	(47-04)(11-02)
PIN NO	4741100002
CONSTRUCTION DATE	
PROJECT NAME	Lakewood Section 2
FACILITY LOCATION	100 Lakewood Drive
CITY-STATE	Williamsburg, VA 23185
CURRENT OWNER	Settlers Mill Inc.
OWNER ADDRESS	111 Old Colony Lane
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, VA 23185
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu

MAINTENANCE PLAN	No	CTRL STRUC DESC	None
SITE AREA acre	14.4	CTRL STRUC SIZE inches	
LAND USE	SF Residential	OTLT BARRL DESC	RCP Barrel
old BMP TYP	Dry Pond	OTLT BARRL SIZE inch	18
JCC BMP CODE	F2 Dry ED with forebay		
POINT VALUE		EMERG SPILLWAY	No
		DESIGN HW ELEV	46.14
		PERM POOL ELEV	None
SVC DRAIN AREA acres	18.15	2-YR OUTFLOW cfs	10.04
		10-YR OUTFLOW cfs	11.75
		REC DRAWING	Yes
SERVICE AREA DESCRIP	Subdivision, church and roadway		
IMPERV AREA acres		CONSTR CERTIF	Yes
RECV STREAM	Tidal MS Powhatan Creek		
EXT DET-WQ-CTRL	No	LAST INSP DATE	1/12/2001
WTR QUAL VOL acre-ft	0	INTERNAL RATING	4
CHAN PROT CTRL	No		
CHAN PROT VOL acre-ft	0		
SW/FLOOD CONTROL	Yes		
GEOTECH REPORT	No		

Inspected by

MISC/COMMENTS

form. Lakewood Sec 2 at entrance. See SP-66-02, SP-121-02 and SP-111-10 for BMP & riser modifications Grace Covenant Pres Church. Also see Building Permit file for 100 Lakewood

Additional Comments: was formerly MC003 in old BMP database. Found that manmade drainage systems actually take drainage back across Jamestown Road to the Powhatan subwatershed.

Tuesday, Oct 18, 2011 11:01 AM
User: joannad Computer: STWJARIPLEY Os: Windows NT Version: 5.1

Date Record Created:

WS_BMPNO: PC184

Created By:

WATERSHED	PC
BMP ID NO	184
PLAN NO	SP-66-02
TAX PARCEL	4730100073B
PIN NO	
CONSTRUCTION DATE	9/1/2003
PROJECT NAME	Grace Covenant Presbyterian Church
FACILITY LOCATION	1677 Jamestown Road
CITY-STATE	Williamsburg, Va. 23188
CURRENT OWNER	Grace Covenant Presbyterian Church
OWNER ADDRESS	108 Ingram Road
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, Va. 23185
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu

MAINTENANCE PLAN	Yes	CTRL STRUC DESC	DI-7
SITE AREA acre	7.28	CTRL STRUC SIZE inches	
LAND USE	Church	OTLT BARRL DESC	
old BMP TYP	Bioretention	OTLT BARRL SIZE inch	15
JCC BMP CODE	D1 Bioretention		
POINT VALUE	8	EMERG SPILLWAY	No
		DESIGN HW ELEV	Na
		PERM POOL ELEV	Na
SVC DRAIN AREA acres	2.7	2-YR OUTFLOW cfs	16.40
		10-YR OUTFLOW cfs	23.85
		REC DRAWING	Yes
SERVICE AREA DESCRIP	Parking		
IMPERV AREA acres	1.18	CONSTR CERTIF	No
RECV STREAM	Powhatan Creek		
EXT DET-WQ-CTRL	No	LAST INSP DATE	8/28/2008
WTR QUAL VOL acre-ft		INTERNAL RATING	
CHAN PROT CTRL	No	MISC/COMMENTS	
CHAN PROT VOL acre-ft			
SW/FLOOD CONTROL	No		
GEOTECH REPORT	No		

Inspected by: Greg Johnson

Additional Comments:

Tuesday, Oct 18, 2011 11:02 AM
User: joannad Computer: STWJARIPLEY Os: Windows NT Version: 5.1

Frances Geissler

From: Duszynski, Jim [JimD@greenfieldpartners.com]
Sent: Wednesday, October 26, 2011 10:22 AM
To: Frances Geissler; 'Chad.baker@vdot.virginia.gov'; 'Mike.cade@vdot.virginia.gov'; William Cain; 'r.carroll@vdot.virginia.gov'; 'Hgoodman3023@gmail.com'; 'Tracy.lassiter@vdot.virginia.gov'; 'Tom.lester@vdot.virginia.gov'; 'Reginal.patterson@vdot.virginia.gov'; 'mhrandall@cox.net'; 'Roger Schmidt'; 'mjvenable@co.newkent.va.us'; Mike Woolson
Cc: John Horne; Etchemendy, Mike; Bennion, David
Subject: Re: Meeting Summary - Richardson Mill pond Oct 24, 2011

Thank you, Fran. I believe the meeting summary accurately reflects the discussion we had on Monday, October 24th.

Jim Duszynski
11950 Democracy Drive
Suite 310
Reston, VA 20190

Office) 703-437-8800
Direct) 703-437-8813
Cell) 703-987-8048

From: Frances Geissler <FGeissler@james-city.va.us>
Date: Wed, 26 Oct 2011 09:47:06 -0400
To: "'Chad.baker@vdot.virginia.gov'" <Chad.baker@vdot.virginia.gov>, "'Mike.cade@vdot.virginia.gov'" <Mike.cade@vdot.virginia.gov>, William Cain <wacain@james-city.va.us>, "'r.carroll@vdot.virginia.gov'" <r.carroll@vdot.virginia.gov>, Jim Duszynski <JimD@GreenfieldPartners.com>, "'Hgoodman3023@gmail.com'" <Hgoodman3023@gmail.com>, "'Tracy.lassiter@vdot.virginia.gov'" <Tracy.lassiter@vdot.virginia.gov>, "'Tom.lester@vdot.virginia.gov'" <Tom.lester@vdot.virginia.gov>, "'Reginal.patterson@vdot.virginia.gov'" <Reginal.patterson@vdot.virginia.gov>, "'mhrandall@cox.net'" <mhrandall@cox.net>, 'Roger Schmidt' <rog11ter7@verizon.net>, "'mjvenable@co.newkent.va.us'" <mjvenable@co.newkent.va.us>, Mike Woolson <mwoolson@james-city.va.us>
Cc: John Horne <jtphorne@james-city.va.us>
Subject: Meeting Summary - Richardson Mill pond Oct 24, 2011

Real Estate Property Information

File Help

10-26-2011 10:55:50

Real Estate Property Information

1-Property | 2-Supplements | 3-Assessments | 4-Owners | 5-Balances | 7-Yearly

RPC: 7631 Parent RPC: 0

Created: 1-1-1984 Land Use Yrs:

Term:

Active Parcel

Inactive

Last Modified: REAL 9/2/2009 4

Subdivision: 10002 Subdivisions

COMMERCIAL - STONEHOUSE - PUD

Eff Dates: 11-7-2008 Thru: 1-1-2079

Map: (06-4)(01-0-0001-)

Parcel Id: 0640100001

GIS/GPIN:

Geo Code:

Group ID: 0 Yr Blt: 0 Sq Ft: 0

Acreage: 91.0600 Lots: 0 Length: 0 Width: 0

Frontage: 0 ERU: 1.000 Census Tract: 0000.00

State Class: 5 - Agric/Undeveloped 20

St Exempt: NO EXEMPTION

Legal Description: P-27 STONEHOUSE TRACT PROPERTY IS 3 SEPARATE PIECES SEE MAP 2ND

Situs Address: 9770 SIX MT ZION RD TOANO VA 23168-9341

District 1: NORMAL

District 2: NORMAL

District 3: No District

Note: DED AC FOR 0630100005; PROPERTY IS PIECES11/08; DED 2.94 AC FOR 1210100048 &

Acct Num	Item	Owner's Name	Aquired
556550	11	GS STONEHOUSE GREEN LAND LLC 50 N WATER STREET NORWALK CT 06854-2278	6-7-2010

Doc #: 100011093 Deed Book: Purch Price: 0

Plat: 060009197 Deed Page:

Mort Co	Mortgage Comp Name	Eff Date	St

Tx Yr	Land Value	Imp Value	Total Value	Credit Value	St
2012	264000	20000	284000	0.00	10
2011	264000	20000	284000	0.00	10
2010	264000	20000	284000	0.00	10

View Value

View Legal

Value Eff Date: 7-1-2009

Prop Note: 02/98 SUBBED SEE PROVAL; PA199810%500000

Real_Est

Search Prop | Print | Exit

Wednesday, Oct 26, 2011 10:56 AM
User: joannad Computer: STWJARIPLEY Os: Windows NT Version: 5.1

DED AC FOR 0630100005; PROPERTY IS PIECES11/08; DED 2.94 AC FOR 1210100048 & 49 4/2006; DED AC FOR PARCELS 1-23 & (13-1)(1-23) & (14-1)(1-46) 4/04; SEE EXONERATIONS & SUPPLEMENT FOR FY2004

DNE

(12-1)(1-38) what was created

(12-1)[0100038] → (12-1)(1-40)

(6-4)(1-1) 0640100001

(6-3)(1-5)

(12-1)(1-48)

(12-1)(1-49)

(12-1)(1-23)

(14-1)(1-46)

out of parcels

I was also able to find a letter from GS Stonehouse, Green Land Sub LLC as received by our Division on November 6, 2007 during the review of rezoning case Z-04-07 which has specific commitment from this developer on the rehabilitation and permitting (ie. dam safety permitting). This letter is attached. They acknowledge a submittal to DCR dam safety and were working out some issues. This demonstrates commitment to RMP even before Hurricane Irene and subsequent failures in 2011.

I am not sure of the approach from here, but I will go over it all with Adam. I would suggest the County would probably want to encourage a meeting between all the parties and put this information or position forth and go from there by mediating the situation.

Scott J. Thomas
Director
Engineering and Resource Protection

101-E Mounts Bay Road
Williamsburg, VA 23185
P: 757-253-6605
F: 757-259-4032
jccegov.com

Frances Geissler

From: Scott Thomas
Sent: Wednesday, February 01, 2012 5:39 PM
To: Frances Geissler; William Cain; Mike Woolson
Subject: FYI - Richardson Mill Pond (Update)
Attachments: GSStonehouse_110607.pdf

I have pretty much completed my research on just about everything I could think of relative to Stonehouse-Richardson Mill Pond (RMP) issue. I wanted to provide you an update. I have scheduled a meeting with Adam on Monday to go over all of this. I have not heard from Vernon Getty or Jim Duszynski relative to our November 15, 2011 meeting or my request on January 23, 2012 on what information they may have found. The Association at Stonehouse has informed us of whom will be our primary contact relative to any discussions. His name is Ken Kievit 757-369-2500. The HOA Board at Millpond at Stonehouse appointed him on Jan 25 20012 to be their liaison with the County regarding the dam issue at the RMP.

I have researched through information provided by STW division (asbuilt files, courthouse search), general information in our office, JCC land record information (rezonings, subdivision plans, site plans), information in our office from past rezonings and proffer work, physical search of all active files in our office, DOC-I/M agreement information in conjunction with County Attorneys office, our site's project database, dedicated NOS records and records search by tax map. I have also looked at any other agreements I found along the way including current covenants of the Assoc. at Stonehouse, extrinsic structure agreements, and agreements between the Assoc. at Stonehouse (HOA) and the current Stonehouse Developer Green Land Sub LLC. The real estate office provided a copy of current covenants for the Association instrument # 970015414.

In summary, this is what I conclude. I started with the most very earliest development phases in Stonehouse by Stonehouse Inc. Similar to other master planned projects, usually the first site or subdivision plan triggers comments about DOC-I/M agreement. We could not find a distinct DOC-I/M received for the entire project right of the gate in early development phases 1994-1996. There is a tons of correspondence back and forth from the Developer and County asking for RMP to receive credit and the County granting that request. There are numerous comments in site plan reviews and rezoning reviews about this. There are various DOC-I/M agreements for several development land bays since then in Stonehouse Development Area One (ie. Legends Golf Course, Benttree, Richardsons Mill sections, Fieldstone Parkway Road extension, Stonehouse Glens, Amenity H, and the Commerce Park).

You will need to scan the following two land records to get a sense of the most compelling information about when the County was pressing the issue and what information was provided. Go to County land records under the parent parcel # 0640100001 or find the following plans **SP-47-97** Stonehouse Mill Pond Run Section 2 –and-**SP-78-96** Stonehouse Clubhouse Road (Mill Pond Run) Section 1 and Stonehouse Phase 2 Clubhouse Road (now Fieldstone Parkway) to review this. There is also a study of RMP dated September 1996 which may have been around the time it was repaired. You can find these at the following link also.

http://landrecs/001099/Forms/AllItems.aspx?RootFolder=%2f001099%2f064%2f0640100001&FolderCTID=&View=%7b76622863%2dD1DA%2d4BC1%2dA28F%2d00DDC53CA7E5%7d

I believe the DOC-I/M agreement which was found for Part of Tax Map (6-4) Parcel (1-1) as obtained from Stonehouse Inc. March 10, 1995 would bind original developer and successors to some kind of maintenance obligation to RMP. I believe, but cannot confirm yet, that this I/M agreement was obtained during the review of County case no. SP-28-95 Ware Creek Roadway, Phase I or the two SP's referenced above. I am see if our Division file for this case is still in Richmond records, but it may be destroyed by now given the time lapse. Most of the parent parcel for Stonehouse started as the (6-4)(1-1) parcel. This all in combination with commitments demonstrated throughout the entire Stonehouse Development process would bind Development Area One and the Legends Golf Course to some kind of maintenance responsibility as contributors to RMP in addition to the owners of the dam.

GS Stonehouse
Green Land Sub LLC

RECEIVED
NOV 13 2007
ENVIRONMENTAL DIVISION

November 6, 2007

Mr. Scott Thomas, P.E.
Director
James City County Environmental Division
101 Mounts Bay Road
Williamsburg, Virginia

Dear Mr. Thomas:

We appreciate the level of attention and interest in the ongoing review of rezoning application Z-4-07/MP-4-07 to amend the master plan and proffers for the continued development at Stonehouse. James City County's proactive approach to implementing unique environmental management practices should lend to our development of a context sensitive community. We appreciate you taking the time to meet with us at your offices on November 5th. During that meeting we discussed the remaining environmental issues related to proffer conditions and we feel we now have reached agreement on how to resolve those issues in a manner that provides benefit for all parties involved.

Additionally, we discussed the issues related to the current status of the dam located along Six Mount Zion Road at the north end of Richardson's Mill Pond. It is our understanding that through a negotiation process during previous development phases of the existing Stonehouse it was agreed that the pond could serve as a water quality Best Management Practice (BMP). Further, we understand through the ongoing review process the dam was identified as not being properly permitted through the Virginia Department of Conservation and Recreation (DCR). We note the review comment from the James City County Environmental Division dated May 17, 2005 that states "evidence of the dam safety permit from the Virginia Soil and Water Conservation Board will be required prior to final approval and land disturbing permit issuance for the plan of development by the Environmental Division, unless the impounding structure is specifically excluded from the regulations."

We have no intention of trying to get credit for use of the pond for stormwater quality control. Our design approach will be to provide the required stormwater quantity and quality measures within each area as submitted for site plan review. This will include the use of a variety of BMP devices and techniques including the implementation of low impact development practices where applicable. Further, we will provide analysis of Richardson's Mill Pond to provide an understanding of the stage storage relationship impacts to the total volume of water retained behind the dam during select storm events.

17228 Lancaster Highway, Suite 201 Charlotte, North Carolina 28277

We have submitted to DCR for their review a permitting package which outlines the rehabilitation of the dam in order to get the structure permitted. The only remaining item required is the consent of the property owner on the New Kent county side of the pond and dam. Our initial efforts to obtain his approval have been unsuccessful. We have also had a site visit with USACE and DEQ to verify delineation/identification of stream and wetland impacts and discuss mitigation needs.

In the meantime, we will look to move forward with ongoing development in existing Stonehouse (areas west of Six Mount Zion Rd). Based upon our discussion during the meeting on the 5th, it is our understanding if we propose to manage stormwater quantity and quality without the use of Richardson's Mill Pond as a credited BMP, your Division will review and approve acceptable site plans in advance of completion of rehabilitation and permitting of the dam. If your recollection of the above is different from what I have described, please let me know as soon as possible. You can reach me at 919-832-9998.

We will continue to provide updates to you regarding our progress with the required permitting of the dam.

Sincerely,

Thomas D. Page

Tom Page
GS Virginia

cc: Mr. Ross Massey, P.E., Chas. H. Sells, Inc.
Mr. Vernon Geddy, Attorney

Frances Geissler

From: Pat Menichino
Sent: Friday, December 02, 2011 1:59 PM
To: Frances Geissler
Subject: FW: Richardson's Mill Pond
Attachments: JCC Meeting agenda 11 15 11 (2).docx

FYI

From: Scott Thomas
Sent: Friday, December 02, 2011 11:18 AM
To: Pat Menichino
Subject: RE: Richardson's Mill Pond

The article in the VA Gazette on Wed. pretty much summarized it – research finding mode

- Discussed RMP is a BMP, what it serves and how it evolved
- Discussed their claims that as the new section of SH does not rely on RMP for WQ, they have no responsibility other than the ownership of the dam. We disputed that saying about a 1/3 of the drainage area to RMP pond comes from the new sections and big storm events from the new development would contribute
- Asked their legal counsel, who was present, to research and provide all recorded instruments
- Gave advice on our permit requirements for actual dam repair (at road)
- They discussed their discussions with VA DCR dam safety

Scott J. Thomas
Director
James City County
Division of Engineering & Resource Protection

From: Pat Menichino
Sent: Friday, December 02, 2011 8:37 AM
To: Scott Thomas
Subject: RE: Richardson's Mill Pond

Scott,

You didn't attach the agenda.

Can you also summarize the major points of discussion and the meeting's outcome.

Thanks,
Pat

From: Scott Thomas
Sent: Wednesday, November 30, 2011 3:38 PM
To: Pat Menichino
Subject: RE: Richardson's Mill Pond

Here is the meeting agenda as prepared by Jim Duszynski for the meeting we had on November 15.

Scott J. Thomas
Director
James City County
Division of Engineering & Resource Protection

From: Pat Menichino
Sent: Tuesday, November 29, 2011 1:54 PM
To: Scott Thomas
Subject: Richardson's Mill Pond

Scott,

Can you email me an update on the meeting you had with the Richardson's Mill Pond people? We (Stormwater) want to stay active in helping to bring about a resolution to this issue.

Pat

Patrick T. Menichino
Project Manager
Stormwater Specialist
General Services Department
5320 Palmer Lane, Suite 2A
Williamsburg, VA 23188
P: 757-259-1443
F: 757-259-5833
jccEgov.com

Frances Geissler

From: Scott Thomas
Sent: Monday, January 23, 2012 9:50 AM
To: Frances Geissler
Cc: William Cain; Mike Woolson
Subject: RE: Holly Forks Rd

We made it clear at the meeting November 15 that water quality and ability to handle larger storms need to be separated. We cited drainage area that their part of the development contributed to RMP and that the dam embankment/spillway needed to safely pass the flows.

Scott J. Thomas
Director
James City County
Division of Engineering & Resource Protection

From: Frances Geissler
Sent: Monday, January 23, 2012 8:48 AM
To: Scott Thomas
Cc: John Horne; Pat Menichino
Subject: FW: Holly Forks Rd

Scott: We need to talk about this – I left you a voice mail on Friday. Jim Duszynski was very clear at the Ware Cr Steering Committee meeting Thursday that he did not feel he had any immediate work to do on RMP since the current capacity of the pond 'probably meets' the treatment need – per ERP engineers. That isn't the standard, as you know – the facility needs to be structurally sound and in good operating order. We usually take that to mean that the facility is structurally and operationally consistent with the approved as-built drawings. In this case we'll settle for structurally sound with the approved normal pool elevation – per the approved plan.

If you all believe that the pond as it is currently operating meets the stormwater design need, then your division will need to send us documentation of that termination. The determination will need to have sufficient engineering calculation and guidance for us to ensure the operation is adequate.

Regardless of the final pool elevation, the outfalls need to be stabilized. There is no way around that as long as this structure is a BMP.

We need to get this resolved quickly so the County can be on the same page.

THANKS

From: John Horne
Sent: Monday, January 23, 2012 8:00 AM
To: Robert Middaugh
Cc: Frances Geissler
Subject: RE: Holly Forks Rd

I think this might be what we call Six Mount Zion Road that goes over the dam at Richardson Mill Pond. It does serve the Stonehouse Subdivision area. The dam and road were damaged during Irene. Fran's division is leading our efforts and I'll have her update both of us.

From: Robert Middaugh
Sent: Monday, January 23, 2012 7:26 AM
To: John Horne
Subject: Fwd: Holly Forks Rd

Is this up in Stonehouse subdiv?

Sent from my iPhone

Begin forwarded message:

> **From:** George Williams <gpw1001@aol.com>
> **Date:** January 22, 2012 8:06:37 PM EST
> **To:** JCC Board <JCCBoard@james-city.va.us>
> **Subject: Holly Forks Rd**
>
> Mr. Kennedy, can you tell me please the current standing of the Holly Forks Rd repairs? I understand FEMA gave the state the funds to repair any and all roadway damages due to the past years storms. Did the County apply for these funds, did VDOT, and if ether did, when will the work start? The funding won't last forever and with the county and VDOT struggling in funding, we shouldn't let this opportunity pass.
>
> George P Williams / Crystal Glass Cleaning & Exteriors
> (757)784-1350c

This is our master log

I believe this is the DOC-I/M Agreement for R.M.P, but don't have copy

Declaration of Covenants Log

	Covenantor(s)	Property Location or other Identifying Information	Date copy sent to E & S (Joan E.)
87)	Legacy Greensprings, Limited Partnership	Detention Basin located between Parcel F, Parcel G and S.R. 614	3-8-95
88)	McG Outlet Center Limited Partnership	5715 Richmond Road SP-107-94	3-29-95
89)	Timothy K. Johnston	7191 Richmond Road Tax Map (23-2) (1-44)	4-7-95
90)	Busch Properties, Inc.	Tax Map (50-1) (1-1) (North Quarter) Kingsmill Village	4-19-95
91)	Stonehouse, Inc.	Part of Tax Map (6-4) Parcel (1-1), and Tax Map (12-1) Parcel 38	4-19-95
92)	Riverside Healthcare Assoc.	3400 John Tyler Highway	5-19-95
93)	Powhatan Enterprises, Inc.	Powhatan of Williamsburg Secondary	5-19-95
94)	King of Glory Lutheran Church	4897 Longhill Road	6-20-95
95)	Donald E. Newsom	7242 Merrimac Trail	7-14-95
96)	James H. Neal	7151 Richmond Road Deed Book 684, Page 109	7-21-95
97)	Busch Properties, Inc.	Kingsmill Resort Center 101-D Kingsmill Road	8-10-95
98)	University Square Associates	Williamsburg Crossing Multi-family Crossing 104 Kings Way	8-10-95
99)	Greensprings Plantation	Tax Map (46-1)(1-1)	8-17-95
100)	Merrimac Trail Assoc, LLC.	7346 Merrimac Trail	8-25-95
101)	VA Peninsula Regional Jail Authority	9320 Merrimac Trail	9-11-95
102)	W-JCC Public Schools	new Rt. 5 High School 3751 John Tyler Highway	9-28-95

would be at WJCC Courthouse

LANDMARK
DESIGN GROUP

Dev Area One Audit 2ND SVB

May 9, 2006

Darryl Cook, P.E.
James City County
101 Mounts Bay Road
Williamsburg, VA 23187

Re: Task 6 - Stonehouse Development Area One, Overall Chesapeake Bay Preservation Ordinance Compliance Audit

Dear Darryl,

Attached are 4 copies of the Task 6 report. One full size color figure is included. Our responses to your comments of April 7, 2006, are provided below. Our responses address only Task 6. Comments for Stonehouse Development Area Two are being submitted separately.

1. Area One Audit. Pursuant to previous comment # 14, an audit of Development Area One was provided. This audit is entitled "Task 6, Stonehouse Development Area One, Overall Chesapeake Bay Preservation Ordinance Compliance Audit, May 2005". The purpose of the audit is to ensure those previous water quality assumptions in Development Area One are still valid and if Richardson Mill Pond is providing an acceptable level of service as previously intended and agreed to. The following are comments on the May 2005 audit report:

   a. In paragraph one, scope of services Page 1, the County did not retain LandMark Design Group to perform the audit. The County, through comments on the rezoning and master stormwater management plan, requested that this audit be performed.

      Sentence revised as requested.

   b. Richardson Mill Pond (RMP) was previously approved as an 8-point BMP, it cannot receive credit as a 10-point BMP unless upgraded with features consistent with a 10-point BMP (ie. forebay, benches, buffer, side slopes, extended detention pool, etc.).

      RMP changed to an 8-point BMP.

   c. In Task 2 on Page 2, the narrative states that it can be concluded that RMP provides the WQV required for a 10-point wet ED pond. In order to meet the requirements of a 10-point wet ED pond, it must be demonstrated that required storage volume is in both the normal (permanent) pool and the extended detention dry volume. Usually this is split 1 inch per impervious acre in the permanent pool and 1 inch per impervious acre in the extended detention pool. Although the normal pool may have enough volume to meet water quality requirements by itself, this would not meet our current 10-point BMP criteria.

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

RMP changed to an 8-point BMP.

d. The Development Area One stormwater management facilities (ie. WC 037 through WC 043) cannot receive credit as 4-point BMPs. Although evaluated based on 1 inch per impervious acre (or in some cases 24 hour detention of the 1-inch rainfall applied to the drainage area), these basins were not specifically approved nor designed as water quality BMPs only quantity control facilities. Throughout review of Development Area One water quality compliance was based on RMP, not specific stormwater management facilities within Stonehouse unit phases.

WC037 through WC043 changed to 4-point BMP's.

e. It is unclear if Development Area One met intended NOS acreages pledged per compliance agreements in 1995/1997. Based on a letter dated January 27, 1997, it appears that 0.231 acres on natural open space was necessary to be dedicated for each gross area developed within the Stonehouse Development Area One.

Separate issued to be discussed with Owner.

2. BMP Worksheet. The following comments pertain the BMP Worksheet as provided in the audit report for Stonehouse Development Area One.

a. The worksheet shows 1838 acres as used in the denominator for 10-point compliance purposes. This is based on a total area of the site (2473 acres) less RPA/RPA buffer outside RMP drainage area (163.7 acres) less RPA inside RMP drainage area (251.2 acres) less a subtraction of UNOS (220.7). Although NOS areas not draining to BMPs can be taken out of the total site area, the RPA inside RMP drainage area and UNOS cannot. Revise the denominator in the BMP worksheet accordingly.

Denominator revised as requested.

b. As indicated above, RMP cannot receive 10-point credit for onsite or offsite credit unless upgraded accordingly. Therefore, it must be analyzed in the worksheet as an 8-point BMP consistent with previous approvals.

RMP changed to an 8-point BMP.

c. As indicated above, BMPs WC 037 through WC 043 cannot receive 4-point credit as those facilities were not specifically designed or approved as 4-point BMPs. In order to take BMP credit, appropriate features and design criteria (upgrades) would need to be met.

WC037 through WC043 changed to 4-point BMP's.

d. Provide a map (exhibit) which shows those areas which took credit in the BMP worksheet using the 0.10 points per 1 percent site area method (414.9 acres) and the 0.15 points per 1 percent site area method (220.7 acres).

Exhibit attached.

e. No north arrow or scale was provided on the Area One-Land Use Map.

North arrow and scale added to Land Use Map.

Best regards,

The Landmark Design Group, Inc.

Rosanne Marr

Rosanne T. Marr, P.E.
Senior Associate

RTM/mjh

File: 2002261-508.06

SWM-003-05

LANDMARK DESIGN GROUP

RECEIVED
MAY 12 2006
ENVIRONMENTAL DIVISION

May 8, 2006

Darryl Cook, P.E.
James City County
101 Mounts Bay Road
Williamsburg, VA 23187

Re: Stonehouse Development Area 2, Master Stormwater Management Plan, County Plan No. SWM-03-05

Dear Darryl,

Attached are 10 sets of revised plans. Our responses to your comments of April 7, 2006, are provided below. Our responses address only the Development Area Two Master Stormwater Plan. Task 6 - Stonehouse Development Area One is being submitted separately.

Our comment responses are based in part on the previous agreement with James City County staff regarding the stormwater requirements for Stonehouse Development Areas One and Two as described in the attached letter dated May 3, 1995, and letter dated June 27, 1995, from James City County staff agreeing to the specified requirements.

Based on the previous Master Plan of Development, Richardson's Mill Pond is to serve as the Stormwater BMP for both quality and quantity for all of Development Area One which includes all of the Stonehouse project west of France Swamp. The current revised Master Plan of Development for Stonehouse redefines parts of Development Area One as being within Development Area Two. However, this does not affect the stormwater management requirements for these areas (Development Areas IIa, IIb and IIc), which will still be served by the Richardson's Mill Pond regional BMP.

During subsequent meetings with James City County staff, Landmark Design Group agreed to modify the original agreement as follows:

Development Area IIa	Stormwater quality provided by Richardson's Mill Pond. Stormwater quantity only BMPs to be provided on a land bay by land bay basis. These BMP's are not required to achieve 10 points.
Development Area IIb	General stormwater quality provided by Richardson's Mill Pond. Additional on-site stormwater quality to be provided where feasible. Stormwater quantity only BMPs to be provided on a land bay by land bay basis. These BMP's are not required to achieve 10 points.
Development Area IIc	Full quality and quantity 10 point BMPs to be provided on a land bay by land bay basis.

In addition, it was agreed that for Development Area IIb the determination of feasibility of any additional on-site stormwater quality to be provided is at the sole discretion of the Owner's development engineer who may consider economic factors, existing site constraints, aesthetics, and any other factors deemed

appropriate, with the understanding that every effort will be made to provide the maximum quality treatment possible within this development area.

ENVIRONMENTAL:
April 7, 2006

The following comments pertain to a single sheet 1 inch = 600 ft. scale overall master stormwater management plan drawing as revised on January 18, 2006, and a supplemental report entitled "Task 6 – Stonehouse Development Area One, Overall Chesapeake Bay Preservation Ordinance, Compliance Audit" dated May 2005. Both were provided for the Development Area Two master stormwater management plan. Both were received by the Environmental Division on January 19, 2006.

General:

1. Label US Route 60 Richmond Road (near the Stonehouse Commerce Park) and Bird Swamp on the MSWP.

   Actually Route 30.

2. General Note # 7 is incorrect. FEMA FIRM map panel 10B shows Special Flood Hazard Area (SFHA) Zone A, Zone AE and Zone X in addition to regular Zone X (area outside the 500-year floodplain) within Development Area Two.

   Corrected.

Chesapeake Bay Preservation:

3. Response to previous comment # 8 is noted; however, it appears many of the proposed master planned structural BMP locations will be situated within RPA/RPA buffer area. This includes 24, 29, 32A and 32B. This may require a water quality impact assessment and administrative or Chesapeake Bay Board approval. (Also, the BMPs in the east part of the Development Area Two are situated in areas in which no designation is given, ie. wetlands, natural open space, RPAs, etc.).

   BMP's have been relocated to outside RPA buffer area.

4. A legend and linework was provided to address previous comment # 6 (RPA limits). It is very difficult to differentiate the linework and line types for "approximate RPA" and "agreed RPA". For example the heavy dashed line type for "approximate RPA" closely resembles land bay delineators and in many cases the "approximate RPA" is shown with a heavy solid line rather than the dashed linetype in the legend. Also, there are many areas where a small dashed linetype (resembling "agreed RPA") was used with a heavy, solid line type which does not match anything in the legend. See the proposed school site as an example. Also, in the east part of Development Area 2, it is very difficult to determine the linework features. For example, in Land Bay 42 near BMP # 42b, it is unclear if the linework is wetlands, steep slopes, RPA, RPA buffer or dedicated NOS. The solid linework in the east Land Bays 40, 41, 42, 44, 45, etc. is not on the sheet legend.

MEMORANDUM

Date: April 8, 2004

To: Karen Drake, Senior Planner

From: Scott J. Thomas, Senior Engineer SJT
Environmental Division

Subject: Guidance for Stormwater Management (Master) Plan
Stonehouse Development Area 2

Pursuant to language in Proffer # 10(b), as reviewed under the revised proffers and master plan in County Plan No. Z-11-03/MP-11-03, prior to final approval by the County of any site or subdivision plan for development of any portion of the property within Development Area 2, the owner shall submit to the County Environmental Division director a stormwater management (master) plan for review and approval in accordance with then current County Code. The proffer specifically excludes subdivision plans for Stonehouse Glen being part of the Development Area 2 stormwater master plan. These sections are generally understood to be defined as Land Bay 21 and 22 and plans of development assigned County subdivision plan numbers S-98-03 (Glen Section 1) and S-116-03 (Glen Section 2).

The purpose of this memorandum is to provide advance guidance on two specific items that will be expected to be addressed as part of the stormwater master plan for Development Area 2. This is in addition to that normally expected in a standard stormwater master plan as prepared for a planned development community. These two additional items area:

1) Development Area 2 Compliance with the 10-point System.
2) Assessment of Water Quality Compliance using Richardson Mill Pond

Development Area 2 Compliance with the 10-point system

In order to ensure ongoing compliance of the overall project with the 10-point system, it will need to be shown that Development Area 2 will meet the 10-point criteria as established by the Chesapeake Bay Preservation ordinance and the County BMP manual. Compliance of Development Area 2 as a whole will need to be demonstrated prior to or with the first plan of development for Development Area 2. This does not include that as outlined above for Stonehouse Glen Section 1 and Section 2.

Assessment of Water Quality Compliance using Richardson Mill Pond

Past development sections of Stonehouse, mainly Development Area One, has occurred under the assumption that Richardson Mill Pond is providing an acceptable level of water quality control from a master plan perspective. Although this assumption may continue for the balance of Development Area One and the portion of Development Area 2 that drains to the pond, the stormwater master plan for Development Area 2 needs to provide a component that confirms if Richardson Mill Pond is providing an acceptable level of quality control as previously assumed.

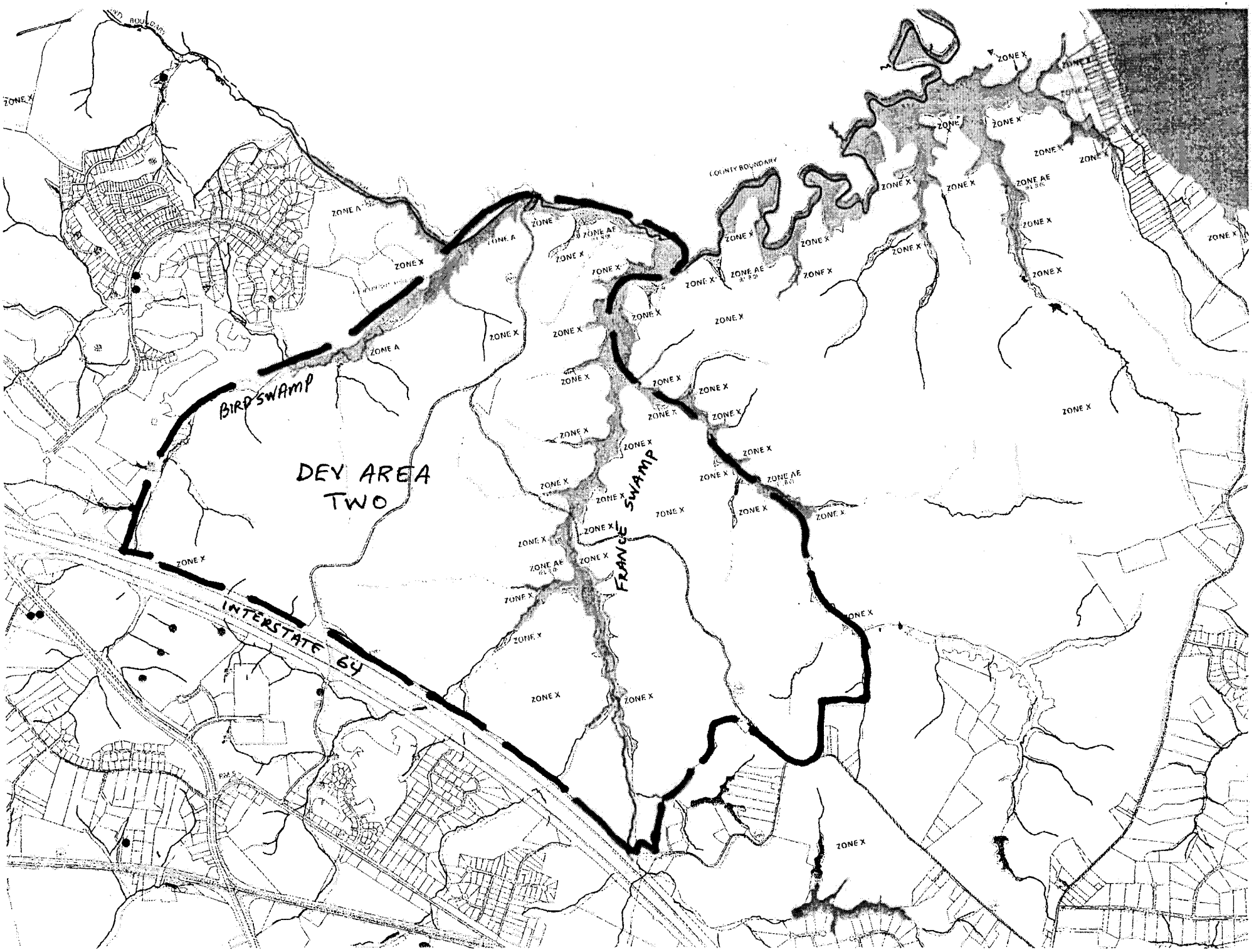
This will include an assessment of the pond itself as well as upland natural wetlands and streams which convey stormwater from the development sections to the water quality BMP (ie. Bird Swamp).

Reference is made to the following two correspondence letters (attached). One is a letter from Langley and McDonald, P.C. dated May 3rd 1995 and the second is response/approval by the County Engineer dated June 27th 1995. In the correspondence, it was requested that Richardson Mill Pond be accepted as the BMP to achieve water quality compliance under the Chesapeake Bay Preservation ordinance for Development Area One. However, Development Area One is defined by narrative and maps as all of the Phase I area of Stonehouse plus portions of Phase II and commercial development areas of Phases III through V. Therefore, Development Area One as defined in the request and subsequent approval is common with the west portion of Development Area 2 which drains to Richardson Mill Pond. If Richardson Mill Pond is to be included in any part of the stormwater master plan for any part of Development Area 2 (excluding Stonehouse Glen) then this assessment will need to be performed.

Hopefully, this will provide some clarification to what our Division expects for the stormwater management (master) plan submission for Development Area 2 under Proffer # 10(b).

Attachments

cc: Darryl Cook, Director Environmental Division
Bill Cain, Civil Engineer Environmental Division
Wayland Bass, County Engineer


DEV AREA TWO
BIRD SWAMP
FRANCE SWAMP
INTERSTATE 64
COUNTY BOUNDARY
ZONE X
ZONE A
ZONE AE

DEPARTMENT OF DEVELOPMENT MANAGEMENT
P. O. Box 8784
Williamsburg, Virginia 23187-8784

County Government Center, 101-E Mounts Bay Road

(1) JCH
(2) NHH
(3) FILE
89046

Development Manager
(804) 253-6671

Code Compliance
253-6626

County Engineer
253-6673

Planning
253-6685

Integrated Pest Management
253-2620

June 27, 1995

Ms. Vaughn B. Rinner, Principal
Langley and McDonald
5544 Greenwich Road
Virginia Beach, VA 23462

Dear Ms. Rinner:

I am writing in reply to your letter regarding BMPs for Stonehouse Development Area #1. We agree that Richardsons Mill Pond can serve as the water quality BMP for this area provided that post development conditions (i.e. land use, impervious cover, flows) agree with pre-development assumptions prior to the submittal of site plans (exclusive of road and utility plans) for areas utilizing Richardsons Mill Pond as a BMP. Please submit structural and hydraulic analysis of the existing dam for post development conditions to ensure adequacy of the dam.

We agree that conservation easements can be deeded to the County incrementally as major sections are developed. This is how we handle these easements in similar developments at other locations in the County. The conservation areas shown on the Stonehouse Master Plan will serve as the natural open space/conservation easement plan to guide both the County and the developer during the development process.

Sincerely,

Wayland N. Bass
County Engineer

WNB/sf

cc: Darryl E. Cook

Rec'd 6/28/95
L&M.

Fax: (804) 253-6850

Langley and McDonald, P.C.
Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
JOSEPH McDONALD
1906-1982

May 3, 1995

MAY 1995
RECEIVED
DEVELOPMENT
MANAGEMENT

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA 23187-8784

Re: Stonehouse Chesapeake Bay Preservation
Ordinance Compliance

Dear Mr. Bass:

This letter is written as a review of our discussion of May 2, 1995. That discussion focussed on the Chesapeake Bay Ordinance compliance for Stonehouse. Our specific focus was the involvement of Richard's Mill Pond as a major BMP facility. Essentially, we are proposing that Richardson's Mill Pond be accepted as the BMP facility for water quality purposes under the Chesapeake Bay Preservation Ordinance. It is proposed that Richardson's Mill Pond serve this function for an area shown on the accompanying drawing as Development Area One. Development Area One includes all of the Phase I area of Stonehouse plus portions of Phase II and commercial development areas of Phases III-V. The drawing also shows the areas of Development Area One from which runoff flows to Richardson's Mill Pond and the areas that do not flow to Richardson's Mill Pond.

Accompanying this letter is a development summary of Stonehouse Development Area One showing land use areas and densities along with assumed impervious areas. The tabulations key to the parcel numbers shown on the Master Plan. The first tabulation is as summary of the entire area; the following two pages summarize the areas flowing to Richardson's Mill Pond and the areas that do not. The buffer areas included on these computations are areas of 25% plus slopes and wetland areas that would have been included in the reservoir had the reservoir been constructed. As you can see from the accompanying calculations, the overall impervious rate is determined to be 18%. The impervious rate is significant because it is the determining factor in storage volume required to meet certain BMP point designations.

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX (804) 497-[illegible]3

201 Packets Court
Williamsburg, VA 23185
(804) 253-[illegible]975
FAX (804) 229-[illegible]049

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

Also accompanying this letter are several sheets of computations. These sheets of computations include the three step 10 point system worksheet and calculations of volume and storage for Richardson's Mill Pond. The 10 point system worksheets indicate that a total of 10 points are derived considering that approximately 144 acres drain through already accepted 11 point BMP's before they actually drain into Richardson's Mill Pond. You will note that based on our discussions, no series computations have been utilized. The areas draining to these 11 point BMPs are assigned only the 11 points and no credit is taken for the series impact of additional treatment in Richardson's Mill Pond. The remaining acreage of 1,604 acres within Stonehouse that drains to Richardson's Mill Pond is shown as being treated by an 8 point BMP (Richardson's Mill Pond).

The available storage volume of 5,662,800 cubic feet in Richardson's Mill Pond is shown on the accompanying calculations. Assuming 20% impervious surface levels in Stonehouse, which is in excess of that anticipated, and 5% impervious for areas outside of Stonehouse which also drain to the pond, the calculations show that the volume of the pond is actually in excess of that required for a 9 point BMP. As we discussed in our May 2 meeting, the areas outside Stonehouse, some of which are in New Kent County, actually haven virtually no impervious surface on them.

Our conclusion in going through these calculations is that Richardson's Mill Pond provides a BMP that is adequate to serve the Chesapeake Bay requirements of all of Development Area One. There would be no need for additional water quality BMPs in this area. It is recognized that water quantity (flow attenuation) BMPs will be required. These will be addressed in the development plans as they are produced.

We also discussed Stonehouse's concern with encumbering land with natural open space easements in the early stages of the development. James City County's computational system does not require structural BMPs until an impervious rate of over 10% occurs. It can be seen from the accompanying calculations and the acreage of buffer area that substantial development can occur prior

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

to reaching an impervious rate of 10% in Development Area One. We are requesting that no open space easements be required until an impervious rate in excess of 10% is achieved in Development Area One. At that time, Stonehouse would expect to provide required open space easements for areas that have been developed to that point. These open space easements would be of an acreage necessary to meet the 10 point requirements of land developed to the point where such easements are required, that being the time when an impervious rate over 10% occurs.

We plan to provide a running account of the impervious rate with the submittal of each development plan within Development Area One. That impervious rate would be based upon the total area of Development Area One. It is shown in the 10 point system worksheet that a total of 984 acres of undisturbed natural open space would be necessary to achieve the 10 points over the total of 2,426 acres if the BMP credit for Richardson's Mill Pond were only 8 points. In actuality, the BMP credit for the pond will be greater than this. Net developable area within Development Area One is 1,347 acres. With our conservative 8 point BMP calculations, for every acre of development within Development Area One an area of .7 acres undisturbed natural open space is required. At such time as the 10% impervious rate occurs, we would expect to calculate the acreage of open easement required by a ratio of net developable area to required open space according to 10 point calculations reflecting impervious surface and agreed-upon Richardson's Mill Pond BMP point values.

Please review this letter and the accompanying drawing and calculations. We would appreciate your approval of our two requests which are again stated as follows:

1. That Richardson's Mill Pond be accepted as the Chesapeake Bay BMP for all of Development Area One, based upon the accompanying calculations.

2. That recordation of undisturbed natural space easements be delayed until such time as an impervious rate of 10% is achieved in Development Area One. At that time, open space

Mr. Wayland N. Bass
County Engineer
Department of Development Management
P.O. box 8784
Williamsburg, VA

May 3, 1995

easements would be required based upon an established ratio for all areas developed to the point of reaching a 10% impervious rate, and for additional development as it occurs.

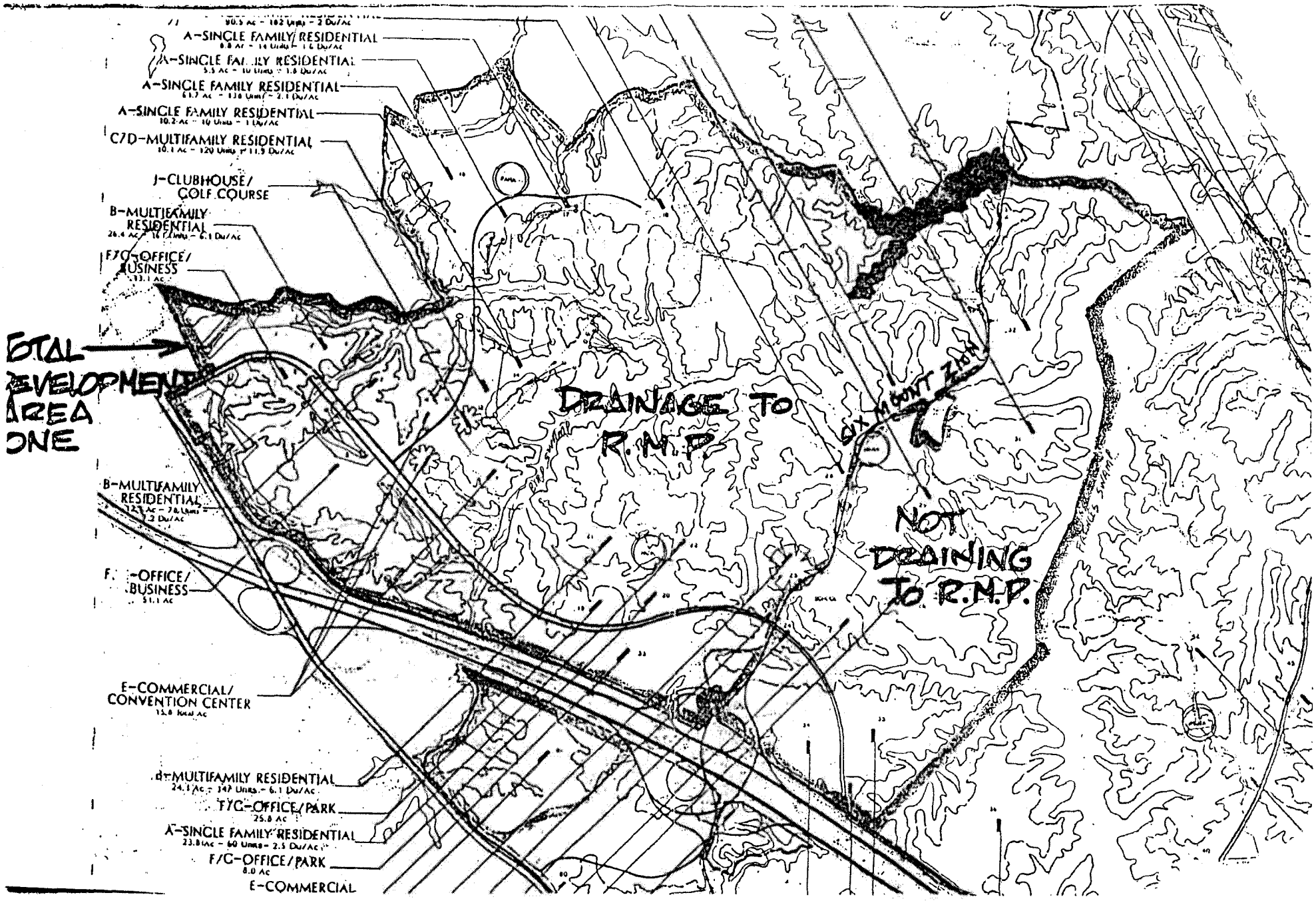
The time which you and Darryl spent in reviewing this with us on May 2 and the additional time which we know will be required to review this transmittal is very much appreciated. We believe that this presents a very realistic and practical approach to water quality planning for the Stonehouse development, and your efforts in working with Stonehouse Inc. are appreciated.

Very truly yours,

LANGLEY AND McDONALD, P.C.

Vaughn B. Rinner
Principal

NHM/VBR/amh
Enclosures
cc: Jim Franklin w/enclosures


A-SINGLE FAMILY RESIDENTIAL
A-SINGLE FAMILY RESIDENTIAL
A-SINGLE FAMILY RESIDENTIAL
A-SINGLE FAMILY RESIDENTIAL
C/D-MULTIFAMILY RESIDENTIAL
J-CLUBHOUSE/ GOLF COURSE
B-MULTIFAMILY RESIDENTIAL
F/G-OFFICE/ BUSINESS
TOTAL DEVELOPMENT AREA ONE
DRAINAGE TO R.M.P.
SIX MOUNT ZION
NOT DRAINING TO R.M.P.
B-MULTIFAMILY RESIDENTIAL
F/G-OFFICE/ BUSINESS
E-COMMERCIAL/ CONVENTION CENTER
MULTIFAMILY RESIDENTIAL
F/G-OFFICE/PARK
25.8 Ac
A-SINGLE FAMILY RESIDENTIAL
F/G-OFFICE/PARK
8.0 Ac
E-COMMERCIAL

RESOLUTION

CASE NO. SUP-7-94. STONEHOUSE, INC.

WHEREAS, the Board of Supervisors of James City County has adopted by ordinance specific land uses that shall be subjected to a special use permit process; and

WHEREAS, the applicant has applied for a special use permit to develop land in the RP, Reservoir Protection Overlay District, a portion of the Stonehouse, Inc., planned community project zoned Planned Unit Development, Commercial, on property identified as Parcel (1-1) on James City County Real Estate Tax Map No. (6-4).

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, does hereby approve the issuance of Special Use Permit No. SUP-7-94 as described herein with the following conditions:

1. An Inspection/Maintenance Agreement as approved by the County Attorney shall be executed for the entire project prior to final approval of the first site or subdivision plan containing impervious surface.

2. All BMP facilities will be either infiltration trenches or wet pond facilities. These structures shall be designed as either design 7 wet ponds or design 8 infiltration trenches in accordance with the James City County Chesapeake Bay 3-Step Evaluation Procedure or other procedure adopted pursuant to the Chesapeake Bay Preservation Regulations. Both of these facilities are 9-point BMPs that are designed to remove 50 percent of the phosphorous loads.

3. Each section of the Stonehouse project will meet the 10-point criteria as required under the Chesapeake Bay Preservation Regulations, or other procedure adopted pursuant to those regulations.

4. Soils tests shall be provided to the Division of Code Compliance for any infiltration BMP prior to final site plan approval to verify the suitability of the soils fort the infiltration of water. Construction of any infiltration BMPs shall be delayed until disturbed areas draining to the trenches are stabilized. This shall be noted on the approved development plans.

5. If the water quality monitoring program reveals that the stormwater management plan developed is not achieving the assumed level of pollutant control, additional stormwater control measures can be required by James City County for future site or subdivision plans in the Stonehouse project.

Perry M. DePue
Chairman, Board of Supervisors

ATTEST:

David B. Norman
Clerk to the Board

SUPERVISOR	VOTE
MAGOON	ABSTAIN
EDWARDS	AYE
TAYLOR	AYE
SISK	AYE
DEPUE	AYE

Adopted by the Board of Supervisors of James City County, Virginia, this 6th day of June, 1994.

sp-7-94.res

General Services - Stormwater Division

MEMORANDUM

DATE: October 24, 2011

TO: Distribution List

FROM: Fran Geissler

RE: Richardson Mill Pond Site Visit Meeting Summary

Richardson Mill Pond (JCC BMP Number WC059) is a stormwater management facility serving the Stonehouse Development Areas I and II (a, b, & c). The James City County – New Kent County border runs through the center and western branches of the pond. Two spillways serve the pond: the northern one located half in New Kent County and half in James City and the southern spillway, located completely in James City. At this time, the southern wing wall of the northern spillway is experiencing severe piping which has eroded the subgrade and is threatening the integrity of the bridge decking. The southern wing wall of the southern spillway is also experiencing piping but the erosion has not reached the point of damaging the bridge or roadway. Erosion at the northern spillway has damaged the roadway such that it is no longer safe for vehicular traffic and State Route 600, Six Mount Zion Road, which runs along the top of the Mill Pond dam has been closed to traffic since Hurricane Irene, September 2 & 3, 2011.

After introductions, Mr. Jim Duszynski, Managing Director, Greenfield Partners, newly representing the developer and owner of the pond, raised concerns regarding the long-term liability of maintaining the dam, particularly since there is a public asset running across the top of the impoundment. He asked whether there are any opportunities for cost sharing the repair. He also asked how committed the state agency and local governments are to keeping the roadway open.

- The Virginia Department of Transportation (VDOT) stated that they have no responsibility to maintain the dam and no interest in opening the roadway without adequate repair. VDOT is responsible for the 30-foot wide pavement and the bridge decking for the two spillways. Once the dam owner repairs the piping, VDOT will repair the roadway and decking (if needed). Until then the road will remain closed.
- James City County Stormwater Division stated that the County's interest is focused on maintaining the integrity of the stormwater management facility and implementing the

agreements worked out during the plan review phase of the development. When a facility is not in sound operating condition, the owner is responsible for maintenance. There has been no indication to Stormwater Division staff that the County's interest extends to maintaining either the roadway or the impoundment.

- New Kent County staff stated that their interest extended to ensuring that any work, beyond that needed for maintenance, on the New Kent County portion is in accordance with County ordinances and regulations. Staff had not been provided with direction regarding opening the roadway.
- The Virginia Department of Conservation and Recreation (VDCR) regulates impoundments of certain sizes and they have specific requirements for such facilities. Mr. Steve Snell, PE, VDCR Dam Safety Engineer was unable to attend the meeting. Mr. Duszynski will contact Mr. Snell directly.

The discussion then moved to any local permitting needed to complete the repairs. Both Counties and VDOT were clear that a repair in-kind would not require any local permits. Should the owner, after consulting with engineering expertise, determine that an upgrade to the impoundment would be necessary, James City County would expect the owner to submit a site plan and go through the normal development review process, including permits and required record drawings. Similarly, if upgrades were planned on the New Kent County side of the northern spillway, New Kent County would expect the owner to go through their development review process and secure any needed permits. Since VDOT only owns the roadway pavement, no land use permits would be required from VDOT for any work on the impoundment.

In conclusion, Mr. Duszynski stated that he will secure estimates from geotechnical consultants regarding repairs. He will also be contacting the elected officials in each County to discuss future shared maintenance responsibilities.

Going forward, agency contacts are (contact information attached):

- VDOT – Rossie Carroll
- James City County Stormwater Division – Pat Menichino
- James City County Engineering & Resource Protection Division – Bill Cain
- Stonehouse I HOA – Howard Goodman

Meeting Participants Contact Information

NAME	ORGANIZATION	EMAIL	PHONE
Chad Baker	Ashland VDOT	Chad.baker@vdot.virginia.gov	804-640-2862
Mike Cade	Ashland VDOT	Mike.cade@vdot.virginia.gov	804-752-5524
Bill Cain	JCC Engineering & Resource Protection	wacain@james-city.va.us	757-253-6702
Rossie Carroll	WBG VDOT	r.carroll@vdot.virginia.gov	757-253-5140
Jim Duszynski	Stonehouse Green	jimd@greenfieldpartners.com	703-437-8813
Fran Geissler	JCC Stormwater	fgeissler@james-city.va.us	757-259-1440
Howard Goodman	Stonehouse HOA G&M	Hgoodman3023@gmail.com	-
Tracy Lassiter	WBG VDOT	Tracy.lassiter@vdot.virginia.gov	757-253-4611
Tom Lester	VDOT Bridge – RIC District	Tom.lester@vdot.virginia.gov	804-796-4421
Reggie Patterson	Ashland VDOT	Reginal.patterson@vdot.virginia.gov	-
Mike Randall	Stonehouse HOA G&M	mhrandall@cox.net	757-566-3405
Roger Schmidt	Stonehouse HOA G&M	Rog11ter7@verizon.net	757-566-7660
Matt Venable	New Kent County Environmental	mjvenable@co.newkent.va.us	804-966-8542
Mike Woolson	JCC Engineering & Resource Protection	mwoolson@james-city.va.us	757-253-6670

~~① outside concrete wall~~

VDOT has prescriptive easement - only the pavement 30' wide
⇒ they will make repairs to roadway
~~Est~~ Overhase Green - is this their problem in perpetuity? why should they cost share? maintain this dam?

How interested is JCC in maintaining an open roadway

Wand conserving owns North to side

So what is the long term liability?
will there be cost sharing to maintain roadway

WANTS SHARED MAINTENANCE
OR Close road

NK will send an email re their expectations
need copy of file for Stonehouse meeting pm
VDOT will need landuse permits since Stonehouse
No JCC submittal due to maintenance

Structure modifications ⟹ site plans + record drawings

Structure Maintenance ⟹ no plans or permits

Structure will get geotech estimate
+ will be contacting supervisors directly
+ will contact DCR dam safety

Regional will be VDOT contact

Steve Snell P.E.

Steven.Snell@dcr.
virginia.gov

JAMES CITY COUNTY GENERAL SERVICES - MEETING PARTICIPANTS CONTACT INFORMATION

TOPIC: DATE:

	No.	NAME	ORGANIZATION	EMAIL	PHONE
6	1	FRAN GEISSLER	JCC - STORM	fgeissler@james-city.va.us	257-1440
8	2	Tracy Lassiter	Wmbg. VDOT	Tracy.Lassiter@VDOT.virginia.gov	253-4611
4	3	Rossie Carroll	Wmbg VDOT	R.Carroll@VDOT.Virginia.gov	253-5140
3	4	MATT VENABLE	New Kent Env.	Mjvenable@co.NewKent.VA.US	804 966-8542
9	5	Tom Lester	VDOT Bridge Rich. Dist	Tom.Lester@VDOT.Virginia.gov	804-796-4421
11	6	MIKE RANDALL	Stonehouse Eng'M	mrandall@cox.net	757-566-3405
14	7	Michael Woolson	JCC ERP	mwoolson@james-city.va.us	253-6670
3	8	BILL CAIN	JCC ERP	WCAIN@JAMES-CITY.VA.US	253-6702
12	9	Roger Schmidt	Stonehouse Eng'M	roglter7@verizon.net	566-1660
5	10	JIM DUSZYNSKI	STONEHOUSE GREEN	JIMD@GREENFIELDPARTNERS.COM	703-437-8813
8	11	Mike Cade	Ashland VDOT	mike.cade@vdot.virginia.gov	804-752-5524
1	12	Chad Baker	Ashland/VDOT	Chad.Baker@vdot.virginia.gov	640-2862

JAMES CITY COUNTY GENERAL SERVICES - MEETING PARTICIPANTS CONTACT INFORMATION

TOPIC: DATE:

No.	NAME	ORGANIZATION	EMAIL	PHONE
1	Reggie Patterson	VDOT - Ashland	Reginald.Patterson@VDOT.virginia.gov	
2	Howard Goodman	STONEHOUSE G&M	hgoodman3023@gmail.com	
3				
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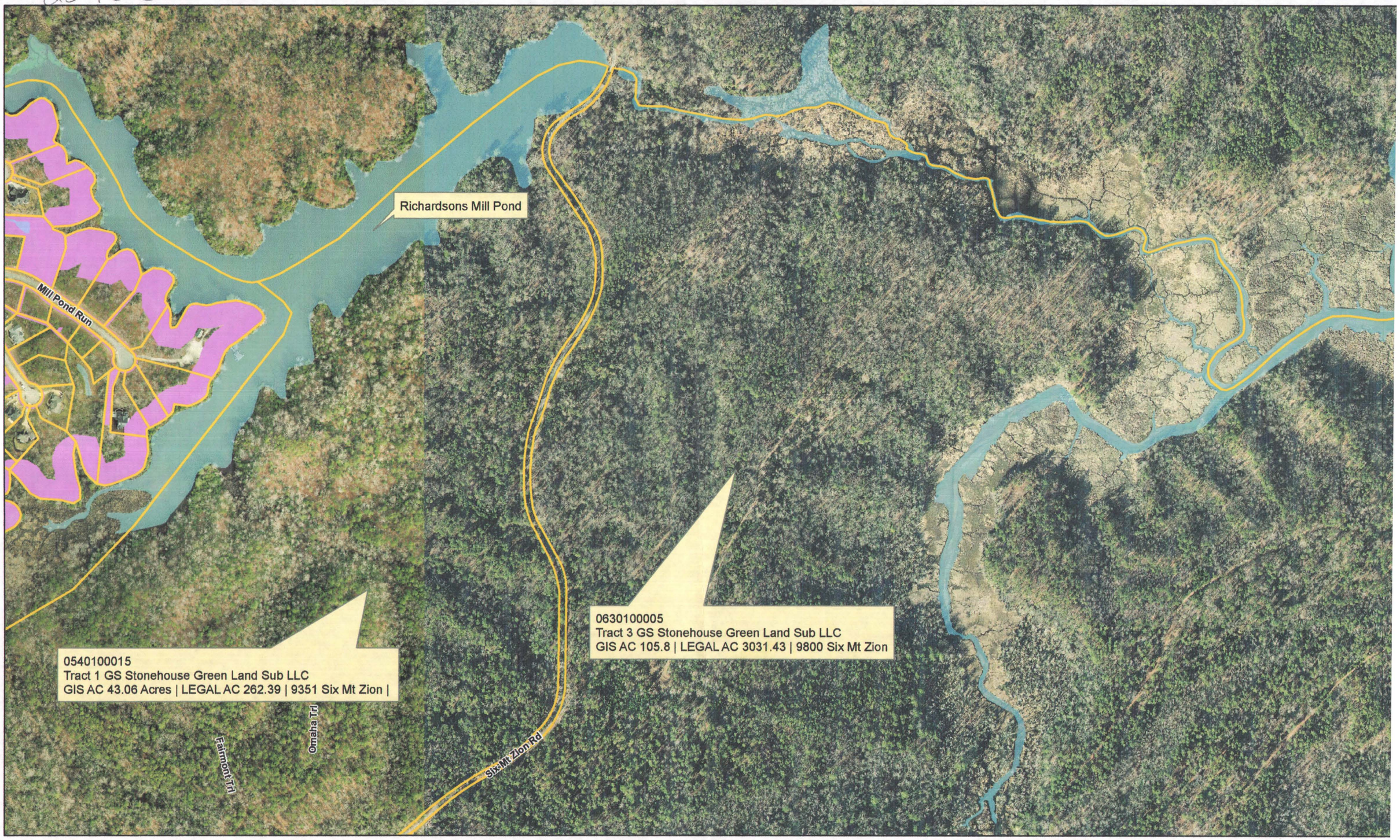
2243 BW

James City County - Stormwater Division



This drawing is neither a legally recorded map nor a survey and is not intended to be used as such. The information displayed is a compilation of records, information, and data obtained from various sources, and James City County is not responsible for its accuracy or how current it may be.

1 inch = 400 feet

0 200 400

N

080027247

LINE TABLE		
LINE	LENGTH	BEARING
L1	244.49'	S57°50'22"E
L2	366.32'	S46°41'53"E
L3	256.82'	S65°47'49"E
L4	439.84'	S56°08'49"E
L5	580.04'	N89°45'11"E
L6	230.14'	S49°40'09"E
L7	738.76'	S31°00'38"E
L8	225.00'	S49°00'38"E
L9	240.00'	S72°00'38"E
L10	210.00'	N88°28'22"E
L11	721.78'	N46°55'52"E
L12	491.04'	N49°14'17"E
L13	417.88'	N56°27'44"E
L14	144.51'	S57°21'20"E
L15	464.29'	S80°34'50"E
L16	433.10'	N82°32'44"E
L17	364.30'	S71°39'24"E
L18	602.42'	N53°22'58"E
L19	321.75'	S87°44'47"E
L20	450.97'	N81°09'06"E
L21	381.29'	N80°37'55"W
L22	352.94'	N24°27'12"E
L23	545.80'	S28°48'16"W
L24	635.80'	S88°21'17"E
L25	475.28'	N21°38'47"E
L26	678.10'	N28°38'44"W
L27	339.68'	N90°00'00"W
L28	344.17'	N81°38'16"W
L29	242.16'	N29°45'20"E
L30	298.77'	N76°26'07"E
L31	763.28'	N16°46'41"E
L32	1169.83'	S51°57'54"E
L33	1090.70'	S37°42'22"E
L34	530.11'	S87°52'47"E
L35	810.00'	N08°15'47"W
L36	295.79'	S12°08'07"W
L37	298.26'	S58°00'21"E
L38	666.02'	S16°32'59"E
L39	264.14'	S21°02'45"W
L40	695.87'	S16°59'41"E
L41	299.17'	S54°57'18"W
L42	31.56'	S44°57'23"W
L43	44.23'	S36°14'58"W
L44	140.68'	S62°00'42"W
L45	190.07'	S48°54'19"W
L46	107.51'	S61°25'14"W
L47	95.33'	S65°32'57"W
L48	71.47'	S35°25'06"W
L49	201.10'	N50°17'26"E
L50	127.00'	N41°47'26"E
L51	133.05'	S48°50'29"E
L52	130.27'	S04°35'34"W
L53	159.83'	S40°48'57"E
L54	387.55'	S01°30'16"E
L55	533.46'	N30°57'54"E
L56	99.52'	S54°18'43"E
L57	450.80'	N30°58'07"E
L58	99.31'	S47°19'06"E
L59	87.40'	S57°08'01"E
L60	416.27'	S64°03'25"W
L61	42.32'	S69°24'34"W
L62	147.79'	S59°30'15"W
L63	172.02'	S65°53'43"W
L64	180.33'	S84°27'32"W
L65	56.51'	S59°51'10"W
L66	78.30'	S32°46'47"E
L67	142.49'	S85°27'09"E
L68	280.67'	S75°32'08"E
L69	94.51'	N89°34'14"E
L70	85.02'	S86°50'13"E
L71	109.46'	N88°51'30"E
L72	290.30'	S87°59'01"E
L73	136.85'	N88°48'33"E
L74	129.10'	S29°47'52"W
L75	87.40'	S39°42'50"W
L76	141.99'	S02°12'36"W
L77	81.87'	S06°19'44"E
L78	334.44'	N79°12'44"W
L79	94.43'	S22°38'42"E
L80	193.81'	N85°46'16"W
L81	294.88'	N79°35'28"W

LINE TABLE		
LINE	LENGTH	BEARING
L82	105.06'	N76°04'42"W
L83	142.00'	N68°26'42"W
L84	227.68'	S86°07'25"W
L85	232.93'	S12°16'42"E
L86	92.84'	S51°00'34"E
L87	213.20'	S09°47'54"E
L88	269.21'	S39°30'53"E
L89	60.71'	S14°37'08"E
L90	206.84'	S71°21'06"W
L91	108.93'	S71°21'06"W
L92	130.70'	S58°19'42"W
L93	95.40'	S71°28'39"W
L94	185.12'	S77°49'35"W
L95	430.81'	S71°33'56"W
L96	101.15'	S67°20'16"W
L97	130.43'	S68°44'21"W
L98	230.75'	S33°59'52"E
L99	129.22'	S33°59'52"E
L100	95.64'	S36°04'42"E
L101	448.38'	S33°25'04"E
L102	579.76'	S34°36'12"E
L103	89.13'	S33°21'13"E
L104	326.73'	S30°51'23"E
L105	149.83'	S06°13'16"W
L106	350.71'	S02°13'16"W
L107	104.10'	S30°01'47"E
L108	193.96'	S35°40'48"E
L109	89.02'	S31°02'30"W
L110	174.43'	S10°13'41"W
L111	187.76'	S25°45'19"E
L112	388.43'	S01°25'41"W
L113	96.60'	S45°43'44"W
L114	19.16'	S44°54'41"W
L115	97.89'	S54°00'04"W
L116	208.93'	S58°18'41"W
L117	151.70'	S50°07'41"W
L118	72.30'	S60°19'41"W
L119	145.01'	S67°48'31"W
L120	244.16'	S76°41'30"W
L121	288.32'	S59°31'41"W
L122	491.76'	S21°00'41"W
L123	35.89'	S12°31'41"W
L124	82.59'	S38°31'41"W
L125	100.83'	S20°32'41"W
L126	558.72'	S02°48'41"W
L127	96.58'	S07°25'02"W
L128	93.54'	S15°09'06"W
L129	62.90'	S71°17'41"W
L130	319.20'	S51°17'41"W
L131	109.29'	S23°14'41"W
L137	309.79'	N62°17'51"W
L138	555.07'	N46°43'02"W
L139	152.86'	N37°52'54"W
L140	153.03'	N57°16'22"W
L141	852.02'	N48°59'01"W
L142	152.65'	N40°19'43"W
L143	252.06'	N56°30'01"W
L144	751.68'	N51°44'52"W
L145	252.22'	N47°11'26"W
L146	251.80'	N57°59'55"W
L147	1221.63'	N55°11'01"W
L148	171.59'	N58°34'17"W
L149	760.96'	N57°51'21"W
L150	201.23'	N54°41'46"W
L151	150.92'	N65°05'51"W
L152	320.04'	N59°56'46"W
L153	50.60'	N59°40'00"W
L154	354.93'	N50°37'59"W
L155	51.05'	N43°09'32"W
L156	425.46'	N50°29'45"W
L157	235.40'	N62°55'39"W
L158	352.08'	N11°28'30"W
L159	5.94'	S82°10'14"W
L160	26.07'	S85°54'49"E
L161	58.51'	N45°48'30"E
L162	139.87'	N69°17'48"E
L163	86.22'	N18°04'06"E
L164	49.22'	N35°53'30"E
L165	63.37'	N48°20'13"E
L166	37.64'	N83°18'41"E
L167	10.21'	N41°43'25"W

LINE TABLE		
LINE	LENGTH	BEARING
L168	592.75'	N23°14'41"E
L169	231.83'	N51°17'41"E
L170	87.51'	N54°34'12"E
L171	44.83'	N71°17'41"E
L172	104.88'	N63°09'12"E
L173	612.23'	N02°48'41"E
L174	100.83'	N20°32'41"E
L175	35.09'	N42°05'12"E
L176	82.59'	N38°31'41"E
L177	84.54'	N28°03'05"E
L178	35.89'	N12°31'41"E
L179	491.76'	N21°00'41"E
L180	288.32'	N59°31'41"E
L181	98.22'	N84°45'14"E
L182	65.75'	N82°41'41"E
L183	54.46'	N60°19'41"E
L184	103.28'	S34°03'48"E
L185	158.80'	S33°19'09"E
L186	201.19'	S28°44'04"E
L187	100.59'	S19°04'27"E
L188	185.49'	S69°38'04"E
L189	75.47'	S66°48'37"E
L190	295.54'	N79°06'25"E
L191	263.59'	S66°34'58"E
L192	306.30'	S40°12'01"E
L193	160.09'	S15°05'11"E
L194	138.04'	S01°24'31"E
L195	102.56'	S10°42'21"W
L196	249.52'	S16°48'21"E
L197	253.18'	S18°43'53"E
L198	164.59'	N37°16'19"W
L199	105.68'	N09°40'04"W
L200	89.44'	N40°40'51"E
L201	174.43'	N10°13'41"E
L202	187.76'	N25°45'19"W
L203	388.43'	N01°25'41"E
L204	103.39'	N39°50'31"E
L205	103.12'	N50°58'29"E
L206	255.77'	N58°18'41"E
L207	151.70'	N50°07'41"E
L208	28.80'	N60°19'41"E
L209	103.59'	N34°03'48"W
L210	156.54'	N33°19'09"W
L211	204.92'	N28°44'04"W
L212	49.70'	S77°22'42"E
L213	102.20'	N19°04'27"W
L214	183.19'	N69°38'04"W
L215	50.47'	N77°22'42"W
L216	76.70'	N66°48'37"W
L217	296.71'	S79°06'25"W
L218	263.36'	N66°34'58"W
L219	305.78'	N40°12'01"W
L220	159.43'	N15°05'11"W
L221	137.42'	N01°24'31"W
L222	102.49'	N10°42'52"E
L223	250.01'	N16°48'21"W
L224	249.72'	N18°43'53"W
L225	427.93'	N41°46'00"W
L226	263.19'	N50°19'12"W
L227	131.59'	S86°36'59"W
L228	136.88'	S87°33'40"W
L229	371.10'	S86°23'02"W
L230	154.70'	S07°23'11"E
L231	111.60'	S30°15'49"W
L232	229.50'	S20°18'11"E
L233	294.20'	S33°21'49"W
L234	338.80'	S54°56'49"W
L235	171.42'	S29°50'02"W
L236	242.80'	S24°22'36"W
L237	223.60'	S66°41'02"W
L238	117.80'	S30°18'59"W
L239	179.15'	S85°09'05"W
L240	378.91'	S01°42'28"W
L241	301.69'	N68°28'27"W
L242	131.55'	S27°59'30"W
L243	180.01'	S57°21'20"W
L244	8.14'	N68°32'39"W
L245	11.04'	N88°27'44"W
L246	73.06'	S54°30'58"W
L247	102.97'	N73°20'59"W
L248	427.93'	N41°46'00"W

CURVE TABLE						
CURVE	LENGTH	RADIUS	TANGENT	CHORD	CHORD BEARING	DELTA
C62	247.42'	2835.52'	123.79'	247.34'	S35°37'14"E	4°59'58"
C63	107.25'	585.46'	53.78'	107.08'	S23°03'39"E	10°52'00"
C64	163.54'	569.63'	82.34'	162.98'	S28°09'08"E	16°26'59"
C65	166.36'	494.92'	83.97'	165.58'	S63°53'43"E	19°15'32"
C66	179.78'	420.70'	91.29'	178.42'	S59°36'18"E	24°29'06"
C67	189.95'	275.09'	98.94'	186.20'	S59°10'48"E	39°33'43"
C68	111.30'	316.22'	56.23'	110.73'	S62°30'48"E	20°10'02"
C69	193.92'	909.54'	97.33'	193.55'	S62°18'58"E	12°12'57"
C70	125.79'	109.31'	70.89'	118.98'	S44°44'11"E	65°55'52"
C71	427.19'	1492.92'	215.06'	425.73'	S10°05'03"E	16°23'42"
C72	145.43'	106.58'	86.58'	134.41'	S39°56'58"E	78°10'39"
C73	177.51'	313.52'	91.20'	175.14'	N87°31'58"E	32°26'20"
C74	420.98'	2323.01'	211.07'	420.41'	N70°01'21"E	10°23'00"
C75	165.58'	223.97'	86.78'	161.84'	S87°06'17"E	42°21'32"
C76	128.73'	165.17'	67.83'	125.50'	S83°51'53"E	44°39'19"
C77	130.97'	226.18'	67.38'	129.15'	S85°25'27"E	33°10'39"
C78	118.98'	235.26'	60.79'	117.72'	S55°15'05"E	28°58'38"
C79	87.08'	179.58'	44.42'	86.23'	S28°57'11"E	27°47'06"
C80	85.24'	316.91'	42.88'	84.99'	S09°56'32"E	15°24'41"
C81	122.42'	558.80'	61.45'	122.17'	S01°38'54"W	12°33'23"
C82	151.67'	317.25'	77.31'	150.23'	S04°43'02"E	27°23'33"
C83	184.88'	303.91'	95.40'	182.05'	S34°01'38"E	34°51'23"
C84	105.53'	444.69'	53.02'	105.29'	S45°07'23"E	13°35'51"
C85	378.29'	670.54'	194.33'	373.29'	S49°19'43"E	32°19'26"
C86	283.21'	325.00'	151.31'	274.34'	S40°20'56"E	49°55'45"
C87	240.85'	206.09'	136.30'	227.37'	S04°27'51"W	66°57'28"
C88	214.14'	227.67'	115.73'	206.34'	S02°18'48"W	53°53'28"
C89	319.08'	1203.06'	160.48'	318.14'	S18°21'56"E	15°11'46"
C90	333.74'	1140.18'	168.07'	332.55'	S32°24'22"E	16°46'15"
C91	183.49'	346.54'	93.95'	181.35'	N54°20'18"E	30°20'16"
C92	282.98'	165.98'	189.88'	249.93'	N11°34'11"E	97°41'00"
C93	213.11'	502.46'	108.18'	211.52'	N25°07'17"W	24°18'04"
C94	312.05'	507.46'	161.13'	307.15'	N16°38'43"E	35°13'56"
C95	392.17'	934.93'	199.01'	389.30'	N22°14'41"E	24°02'00"
C96	264.24'	420.74'	136.64'	259.92'	N07°45'49"W	35°59'00"
C97	218.59'	460.74'	111.39'	216.55'	N12°09'49"W	27°11'00"
C98	192.41'	321.56'	99.18'	189.55'	N18°34'12"E	34°17'01"
C99	55.02'	592.96'	27.53'	55.00'	N55°39'12"E	5°18'58"
C100	160.81'	1125.92'	80.54'	160.67'	N54°13'11"E	8°11'00"
C101	207.56'	1165.92'	104.06'	207.29'	N55°13'41"E	10°12'00"
C102	37.97'	100.00'	19.22'	37.74'	N07°41'02"E	21°45'17"
C103	188.16'	2676.96'	94.12'	188.12'	N31°50'54"E	4°01'38"
C105	174.15'	401.80'	88.46'	172.79'	N19°21'43"E	24°50'00"
C106	142.80'	229.94'	73.79'	140.51'	N18°12'57"W	35°34'57"
C107	242.39'	470.27'	123.95'	239.72'	N19°57'37"W	29°31'55"
C108	77.30'	220.96'	39.05'	76.90'	N22°18'45"W	20°02'37"
C109	176.46'	465.35'	89.30'	175.41'	N51°57'34"W	21°43'36"
C110	204.73'	470.16'	104.01'	203.11'	N45°41'23"W	24°56'56"

CURVE TABLE						
CURVE	LENGTH	RADIUS	TANGENT	CHORD	CHORD BEARING	DELTA
C111	93.95'	477.98'	47.13'	93.80'	N28°16'36"W	11°15'42"
C112	250.14'	2865.52'	125.15'	250.07'	N35°35'52"W	5°00'06"
C113	113.54'	595.46'	56.94'	113.37'	N23°08'58"W	10°55'30"
C114	149.61'	539.63'	75.29'	149.13'	N27°55'56"W	15°53'05"
C115	151.99'	464.92'	76.68'	151.31'	N64°12'43"W	18°43'49"
C116	195.24'	450.70'	99.18'	193.72'	N59°29'42"W	24°49'14"
C117	172.81'	245.09'	90.17'	169.25'	N59°07'55"W	40°23'50"
C118	122.60'	346.22'	61.95'	121.96'	N62°44'34"W	20°17'19"
C119	186.25'	879.54'	93.48'	185.90'	N62°20'13"W	12°07'59"
C120	156.26'	139.31'	87.51'	148.20'	N44°38'44"W	64°16'05"
C121	434.46'	1522.92'	218.71'	432.98'	N10°02'54"W	16°20'43"
C122	105.14'	76.58'	62.75'	97.07'	N40°00'24"W	78°39'33"
C123	159.16'	283.52'	81.74'	157.08'	S87°43'43"W	32°09'49"
C124	423.78'	2353.01'	212.47'	423.21'	S70°01'58"W	10°19'09"
C125	186.58'	253.97'	97.73'	182.41'	N87°01'32"W	42°05'33"
C126	107.98'	135.17'	57.06'	105.13'	N83°51'58"W	45°46'15"
C127	148.65'	256.18'	76.48'	146.57'	N85°19'21"W	33°14'45"
C128	133.46'	265.26'	68.17'	132.05'	N55°08'35"W	28°49'33"
C129	100.91'	209.56'	51.45'	99.93'	N28°51'20"W	27°35'11"
C130	92.85'	346.91'	46.70'	92.57'	N09°52'02"W	15°20'05"
C131	129.21'	588.60'	64.86'	128.95'	N01°44'32"E	12°34'39"
C133	137.30'	287.25'	69.99'	135.99'	N04°48'08"W	27°23'09"
C134	166.57'	273.91'	85.95'	164.01'	N34°00'34"W	34°50'35"
C135	113.91'	474.69'	57.23'	113.64'	N45°01'54"W	13°44'59"
C136	362.72'	640.54'	186.37'	357.90'	N49°16'19"W	32°26'43"
C137	308.51'	355.00'	164.76'	298.89'	N40°25'30"W	49°47'32"
C138	270.68'	236.09'	152.41'	256.10'	N04°30'26"E	65°41'22"
C139	183.47'	197.67'	98.94'	176.96'	N02°03'16"E	53°10'47"
C140	323.14'	1233.06'	162.50'	322.22'	N18°26'21"W	15°00'54"
C141	322.88'	1110.18'	162.59'	321.74'	N32°31'49"W	16°39'49"
C142	189.19'	665.13'	95.24'	188.55'	S43°45'54"E	16°17'50"
C143	190.02'	635.13'	95.73'	189.31'	N44°03'56"W	17°08'31"
C144	218.61'	743.32'	110.10'	217.82'	N40°14'34"W	16°51'03"
C145	155.03'	743.86'	77.80'	154.75'	N41°25'16"W	11°56'29"
C146	70.84'	558.23'	35.47'	70.79'	N44°42'48"W	7°16'16"
C147	71.89'	121.90'	37.02'	70.85'	N85°02'12"W	33°47'17"
C148	192.27'	510.96'	97.28'	191.14'	N87°03'25"W	21°33'35"
C149	181.87'	377.83'	92.73'	180.12'	S70°48'12"W	27°34'49"
C150	129.93'	476.26'	65.37'	129.53'	S85°33'20"W	15°37'51"
C170	144.27'	317.03'	73.41'	143.03'	N36°16'54"E	26°04'26"
C171	122.85'	322.49'	62.18'	122.11'	N59°11'23"E	21°49'35"
C172	153.27'	694.08'	76.95'	152.96'	N78°58'49"E	12°39'09"
C173	186.10'	555.00'	93.93'	185.23'	S73°42'19"W	19°12'43"
C400	500.70'	595.82'	266.20'	486.09'	S11°32'39"E	48°08'55"
C401	215.64'	326.17'	111.93'	211.74'	S72°02'17"E	37°52'48"
C402	211.12'	277.53'	110.96'	206.07'	N77°48'17"W	43°35'08"

LINE TABLE		
LINE	LENGTH	BEARING
L250	50.40'	N17°07'33"E
L251	157.58'	N01°04'14"E
L252	129.70'	N07°14'05"W
L253	256.38'	N07°02'42"W
L254	259.45'	N07°19'11"E
L255	178.60'	N09°15'15"W
L256	224.88'	N25°35'02"W
L257	374.97'	N08°58'01"W
L258	321.14'	N13°59'43"E
L259	122.36'	N07°10'27"W
L260	239.97'	N21°15'02"W
L261	277.23'	N11°30'41"E
L262	167.32'	N01°09'13"W
L263	140.69'	N09°48'22"W
L264	77.77'	N02°50'55"W
L265	68.47'	N15°53'04"W
L266	75.23'	N24°03'24"W
L287	105.20'	N61°16'43"W
L321	57.47'	S85°21'08"E
L322	111.93'	N46°18'59"E
L323	41.10'	N17°07'33"E
L324	520.23'	S66°16'10"E
L325	807.87'	S09°00'53"W
L326	11.42'	N27°51'59"W
L327	483.46'	S23°14'41"W
L328	9.79'	S41°43'25"E
L329	38.67'	S83°18'41"W
L400	419.30'	S30°12'14"W
L401	955.71'	S20°50'02"E
L402	160.46'	S42°04'46"W
L403	1344.38'	S87°09'05"W

LINE TABLE		
LINE	LENGTH	BEARING
L404	603.87'	N68°15'37"W
L405	421.58'	S79°45'16"W
L406	316.35'	N77°48'21"W
L407	251.08'	S70°34'10"W
L408	154.82'	N81°43'42"W
L409	597.23'	S75°58'15"W
L410	550.58'	N85°21'33"W
L411	538.95'	N70°31'39"W
L412	659.93'	N75°51'11"W
L413	315.80'	N09°24'26"E
L414	517.80'	N44°26'44"W
L415	457.30'	S89°19'06"W
L416	82.91'	S66°48'37"E
L417	180.43'	N81°08'30"E

City of Williamsburg & County of James City
Circuit Court: This PLAT was recorded on 7 November 2008
at 10:25 AM/PM PB ___ PG ___
DOCUMENT # 080027247
BETSY B. WOOLRIDGE, CLERK
Betsy B. Woolridge Clerk

8 Large/Small Plat(s) Recorded herewith as # 080027247

COMMONWEALTH OF VIRGINIA
8-21-08
PETER FARRELL
LIC. No. 002036
LAND SURVEYOR

BOUNDARY LINE ADJUSTMENT
OF THE PROPERTIES OF
GS STONEHOUSE GREEN LAND SUB, LLC

STONEHOUSE MAGISTERIAL DISTRICT
JAMES CITY COUNTY, VIRGINIA

DATE: 08-21-08 SCALE: 1"=500'
SHEET 8 OF 8

LANDMARK DESIGN GROUP
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Landscape Architects • Environmental Consultants
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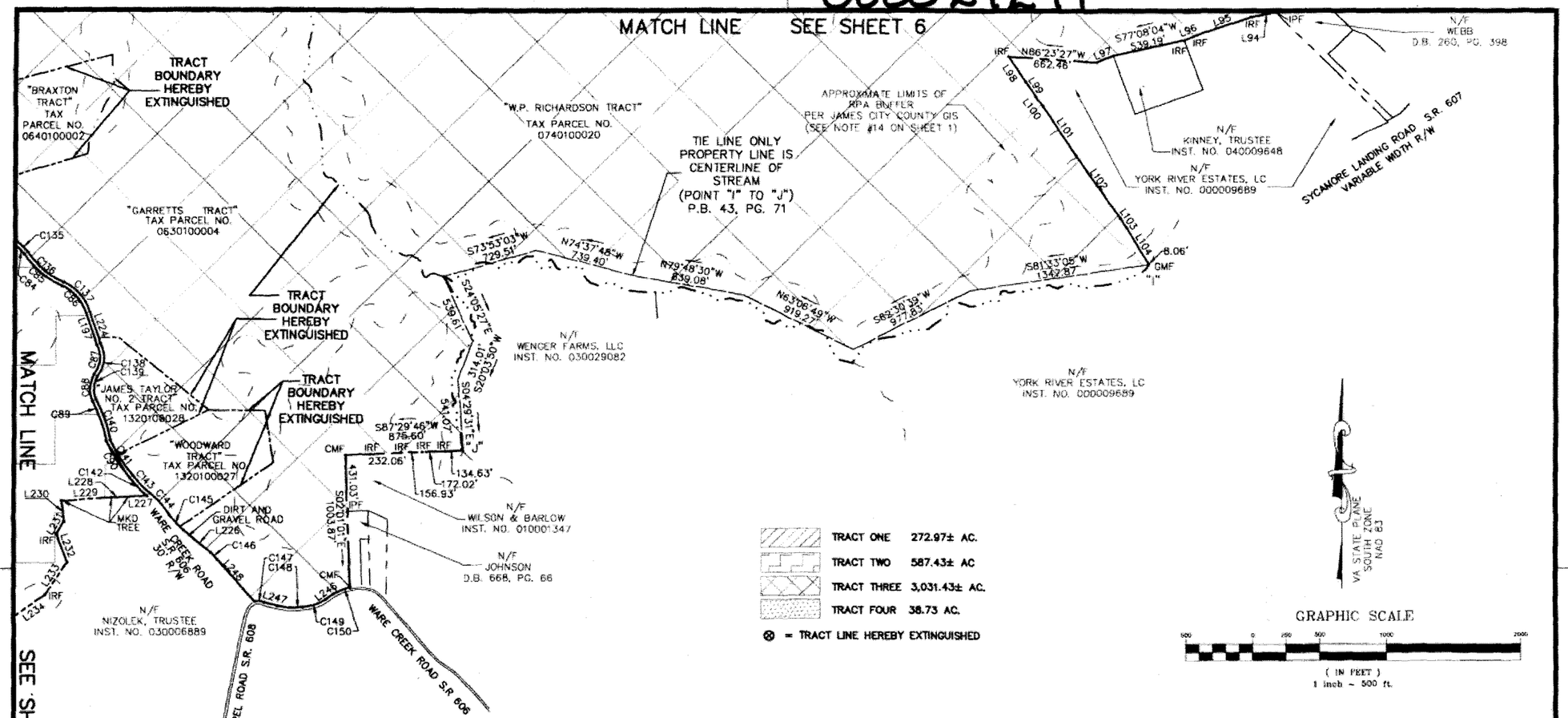
PROJ. NO. : 2007008-000.15 DWG. NO. 18602W

0800027247



CURVE TABLE						
CURVE	LENGTH	RADIUS	TANGENT	CHORD	CHORD BEARING	DELTA
C1	86.16'	506.30'	43.19'	86.06'	S51°51'53"E	9°45'03"
C2	99.16'	203.99'	50.58'	98.18'	S51°33'54"E	27°51'01"
C3	222.74'	267.41'	118.29'	216.36'	S36°30'55"E	47°43'28"
C4	307.81'	712.53'	156.34'	305.42'	S25°36'32"E	24°45'06"
C5	69.02'	340.50'	34.63'	68.90'	S21°52'00"W	11°36'52"
C6	125.46'	1028.05'	62.81'	125.38'	S34°17'30"W	6°59'31"
C7	328.57'	464.29'	171.51'	321.76'	S17°41'20"W	40°32'52"
C8	138.18'	911.10'	69.23'	138.05'	S08°45'04"W	8°41'24"
C9	270.19'	1743.91'	135.37'	269.92'	S09°52'13"W	8°52'38"
C10	167.89'	3918.64'	83.96'	167.87'	S05°02'48"W	2°27'17"
C11	152.97'	382.06'	77.52'	151.95'	S49°45'46"W	22°56'22"
C12	329.80'	207.33'	211.50'	296.11'	S15°48'28"W	91°08'29"
C13	467.75'	452.46'	257.20'	447.20'	S04°38'43"W	59°13'56"
C14	408.94'	974.93'	207.52'	405.95'	S22°14'41"W	24°02'00"
C15	289.36'	460.74'	149.63'	284.63'	S07°45'49"E	35°59'00"
C16	199.62'	420.74'	101.72'	197.75'	S12°09'49"E	27°11'00"
C17	168.47'	281.56'	86.84'	165.97'	S18°34'12"W	34°17'01"
C18	77.31'	547.96'	38.72'	77.25'	S48°57'12"W	8°05'02"
C19	166.52'	1165.92'	83.40'	166.38'	S54°13'11"W	8°11'00"
C20	200.44'	1125.92'	100.49'	200.18'	S55°13'41"W	10°12'00"
C21	126.28'	401.97'	63.66'	125.76'	S68°31'40"W	17°59'57"
C22	206.03'	306.48'	107.08'	202.17'	S40°16'11"W	38°31'00"
C23	109.00'	736.20'	54.60'	108.90'	S18°46'11"W	8°29'00"
C24	135.37'	298.31'	68.87'	134.21'	S25°31'41"W	26°00'00"
C25	81.21'	258.73'	40.94'	80.87'	S29°32'11"W	17°59'00"
C26	110.50'	357.03'	55.70'	110.06'	S11°40'41"W	17°44'00"
C27	266.19'	338.10'	140.42'	259.36'	S48°44'25"W	45°06'32"

CURVE TABLE						
CURVE	LENGTH	RADIUS	TANGENT	CHORD	CHORD BEARING	DELTA
C28	74.78'	214.22'	37.77'	74.40'	S61°17'41"W	20°00'00"
C29	137.29'	280.44'	70.05'	135.93'	S37°16'11"W	28°03'00"
C36	3714.98'	24705.33'	1861.00'	3711.48'	N67°35'30"W	8°36'56"
C38	429.26'	958.50'	218.29'	425.68'	N09°26'22"E	25°39'34"
C39	74.01'	495.00'	37.07'	73.94'	N79°01'41"E	8°33'59"
C40	166.76'	754.08'	83.72'	166.42'	N78°53'24"E	12°40'15"
C41	147.07'	382.49'	74.46'	146.17'	N59°17'31"E	22°01'52"
C42	161.75'	357.03'	82.29'	160.37'	N36°13'24"E	25°57'26"
C43	117.71'	240.44'	60.06'	116.54'	N37°16'11"E	28°03'00"
C44	59.07'	169.22'	29.84'	58.77'	N61°17'41"E	20°00'00"
C45	365.42'	378.10'	198.40'	351.37'	N30°29'56"E	55°22'29"
C46	98.12'	317.03'	49.46'	97.73'	N11°40'41"E	17°44'00"
C47	33.48'	218.73'	16.77'	33.45'	N24°55'47"E	8°46'11"
C48	69.53'	338.31'	34.89'	69.41'	N18°24'57"E	11°46'32"
C49	103.08'	696.20'	51.63'	102.99'	N16°46'11"E	8°29'00"
C50	179.14'	266.48'	93.10'	175.79'	N40°16'11"E	38°31'00"
C51	113.71'	361.97'	57.33'	113.24'	N68°31'40"E	17°59'57"
C52	149.55'	383.10'	75.74'	148.60'	N71°30'41"E	22°22'00"
C53	25.40'	20.00'	14.74'	23.73'	S83°17'15"E	72°46'09"
C54	156.89'	2646.96'	78.47'	156.86'	S32°10'32"W	3°23'45"
C55	189.62'	431.80'	96.36'	188.10'	S19°16'21"W	25°09'37"
C56	162.86'	259.94'	84.20'	160.21'	S17°56'32"E	35°53'53"
C57	228.87'	440.27'	117.08'	226.30'	S19°51'22"E	29°47'04"
C58	90.01'	250.96'	45.49'	89.53'	S22°07'13"E	20°32'58"
C59	188.65'	495.35'	95.48'	187.51'	S51°46'01"E	21°49'14"
C60	189.33'	440.16'	96.15'	187.87'	S45°41'17"E	24°38'42"
C61	101.91'	507.98'	51.13'	101.74'	S28°17'10"E	11°29'41"

City of Williamsburg & County of James City
Circuit Court, This PLAT was recorded on 17 November 2008
at 10:25 AM/PM PB — PG —
DOCUMENT # 0800027247
BETSY B. WOOLRIDGE, CLERK
Clerk

COMMONWEALTH OF VIRGINIA
8-21-08
PETER FARRELL
LIC. No. 002036
LAND SURVEYOR

BOUNDARY LINE ADJUSTMENT
OF THE PROPERTIES OF
GS STONEHOUSE GREEN LAND SUB, LLC

STONEHOUSE MAGISTERIAL DISTRICT
JAMES CITY COUNTY, VIRGINIA

DATE: 08-21-08 SCALE: 1"=500'
SHEET 5 OF 8

2 Large/Sewer Plat(s) Recorded herewith as # 0800027247

LANDMARK DESIGN GROUP
Engineers • Planners • Surveyors
Landscape Architects • Environmental Consultants
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Email: lmdg@landmarkdg.com

PROJ. NO. : 2007008-000.15 DWG. NO. 18605W

080027247

BOUNDARY LINE ADJUSTMENT
OF THE PROPERTIES OF
GS STONEHOUSE GREEN LAND SUB, LLC

STONEHOUSE MAGISTERIAL DISTRICT
JAMES CITY COUNTY, VIRGINIA

DATE: 08-21-08 SCALE: 1"=500'
SHEET 4 OF 8

City of Williamsburg & County of James City
Circuit Court
This PLAT was recorded on 10-25 at 11:00 AM/PM in PB. — PG. —
DOCUMENT # 080027247
BETSY B. WOODRUFF, CLERK
By Deputy Clerk

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

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Tel. (757) 473-2000
Fax (757) 497-7933
Email: lmdg@landmarkdg.com

GRAPHIC SCALE
500 0 250 500 1000 2000
(IN FEET)
1 inch = 500 ft.

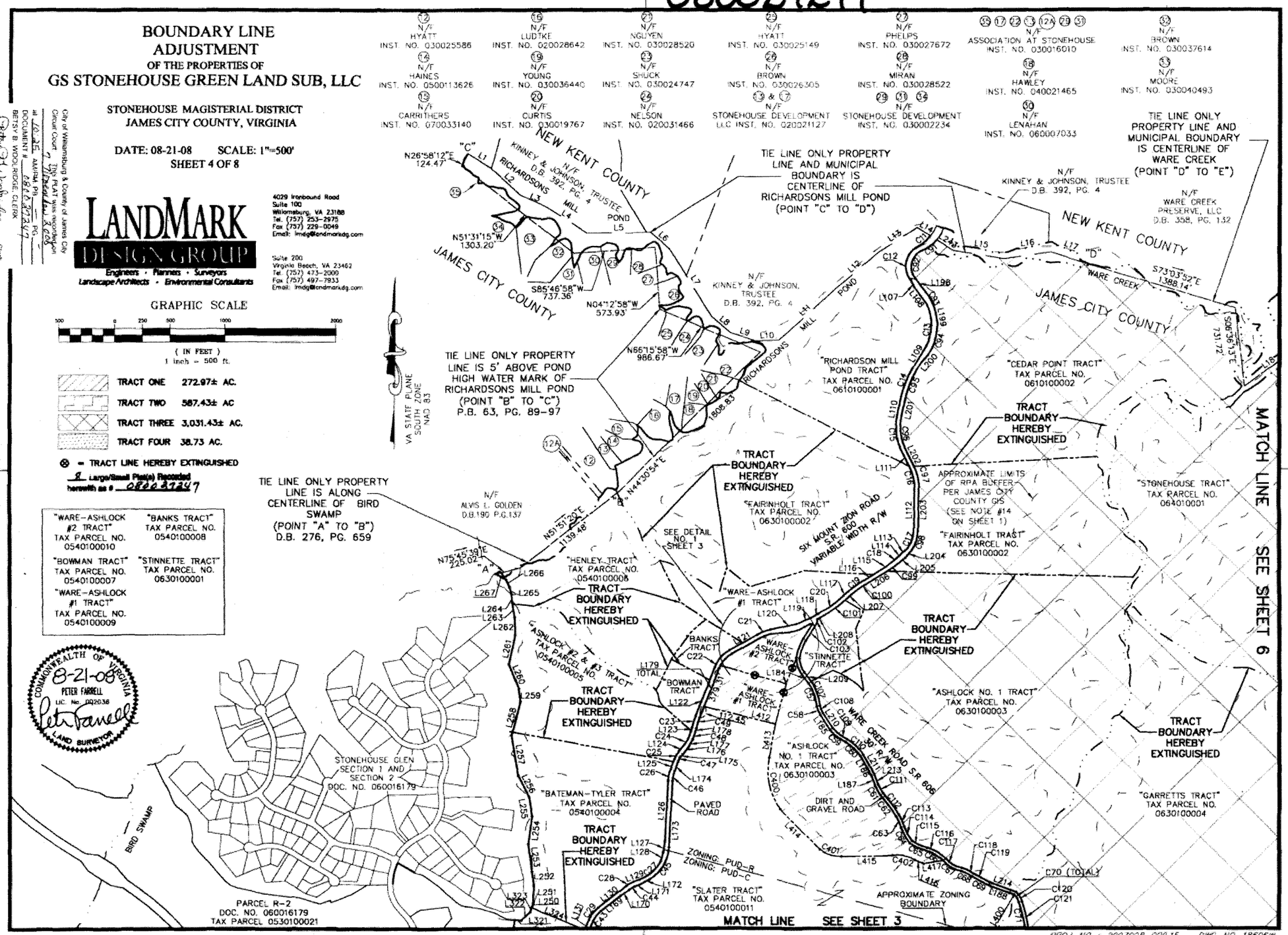
TRACT ONE 272.97± AC.
TRACT TWO 587.43± AC
TRACT THREE 3,031.43± AC.
TRACT FOUR 38.73 AC.

⊗ = TRACT LINE HEREBY EXTINGUISHED

9 Large/Small Plat(s) Recorded hereunto as # 080027247

"WARE-ASHLOCK #2 TRACT" TAX PARCEL NO. 0540100010
"BANKS TRACT" TAX PARCEL NO. 0540100008
"BOWMAN TRACT" TAX PARCEL NO. 0540100007
"STINNETTE TRACT" TAX PARCEL NO. 0630100001
"WARE-ASHLOCK #1 TRACT" TAX PARCEL NO. 0540100009

COMMONWEALTH OF VIRGINIA
8-21-08
PETER FARRELL
LIC. No. 002038
LAND SURVEYOR



PROJ. NO. : 2007008 000.15 DWG. NO. 18606W

080027247

MATCH LINE SEE SHEET 4

FIELDSTONE PARKWAY

GS STONEHOUSE GREEN LAND SUB, LLC PARCEL R-1 DOC. NO. 060016179 TAX PARCEL 0540100014

GS STONEHOUSE GREEN LAND SUB, LLC PART OF "LAGRANGE TRACT" TAX PARCEL NO. 0540100002

PART OF "LAGRANGE TRACT" TAX PARCEL NO. 0540100002

"SLATER TRACT" TAX PARCEL NO. 0540100011

TIE LINE ONLY PROPERTY LINE IS CENTERLINE OF STREAM/RAVINE

"FILICHKO TRACT" TAX PARCEL NO. 0540100012

"ENOS TRACT" TAX PARCEL NO. 0540100013

APPROXIMATE LIMITS OF RPA BUFFER PER JAMES CITY COUNTY GIS (SEE NOTE #14 ON SHEET 1)

"GARRETTS TRACT" TAX PARCEL NO. 0630100004

WARE CREEK ROAD S.R. 606 VARIABLE WIDTH R/W

SIX MOUNT ZION ROAD S.R. 600 VARIABLE WIDTH R/W

TRACT BOUNDARY HEREBY EXTINGUISHED

TRACT BOUNDARY HEREBY EXTINGUISHED

"CLOPTON TRACT" TAX PARCEL NO. 1310100021

"TANKARD TRACT" TAX PARCEL NO. 1310100022

MOUNT LAUREL ROAD S.R. 606

INTERSTATE ROUTE 64 VARIABLE WIDTH R/W

N/F RAINES INST. NO. 020025207

N/F GREENLEAF INST. NO. 980002978

N/F JAMES CITY COUNTY D.B. 270, PG. 413

T-BAR

MKD TREE

105.99'

187.08'

VA STATE PLANE SOUTH ZONE NAD 83

TRACT ONE	272.97± AC.	
TRACT TWO	587.43± AC	
TRACT THREE	3,031.43± AC.	
TRACT FOUR	38.73 AC.	

⊗ = TRACT LINE HEREBY EXTINGUISHED

"WARE-ASHLOCK #1 TRACT"

"WARE-ASHLOCK #2 TRACT"

"BANKS TRACT"

"BOWMAN TRACT"

"STINNETTE TRACT"

"SLATER TRACT"

SIX MOUNT ZION ROAD S.R. 600

WARE CREEK ROAD S.R. 606

TRACT BOUNDARY HEREBY EXTINGUISHED

DETAIL 1 SEE SHEET 4 1"=200'

COMMONWEALTH OF VIRGINIA 8-21-08 PETER FARRELL LIC. No. 002036 LAND SURVEYOR

GRAPHIC SCALE

300 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

MATCH LINE SEE SHEET 5

City of Williamsburg & County of James City
Circuit Court. This PLAT was recorded on 7 November, 2008
at 10:35 AM/PM PB — PG —
DOCUMENT # 080027247
BETSY B. WOOLRIDGE, CLERK
Clerk

BOUNDARY LINE ADJUSTMENT
OF THE PROPERTIES OF
GS STONEHOUSE GREEN LAND SUB, LLC

STONEHOUSE MAGISTERIAL DISTRICT
JAMES CITY COUNTY, VIRGINIA

DATE: 08-21-08 SCALE: 1"=500'

8 Large/Small Plat(s) Recorded herewith as # 080027247

SHEET 3 OF 8

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

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

Suite 200
Virginia Beach, VA 23462
Tel. (757) 473-2000
Fax (757) 497-7933
Email: lmdg@landmarkdg.com

PROJ. NO. : 2007008-000.15 DWG. NO. 18667W

080027247

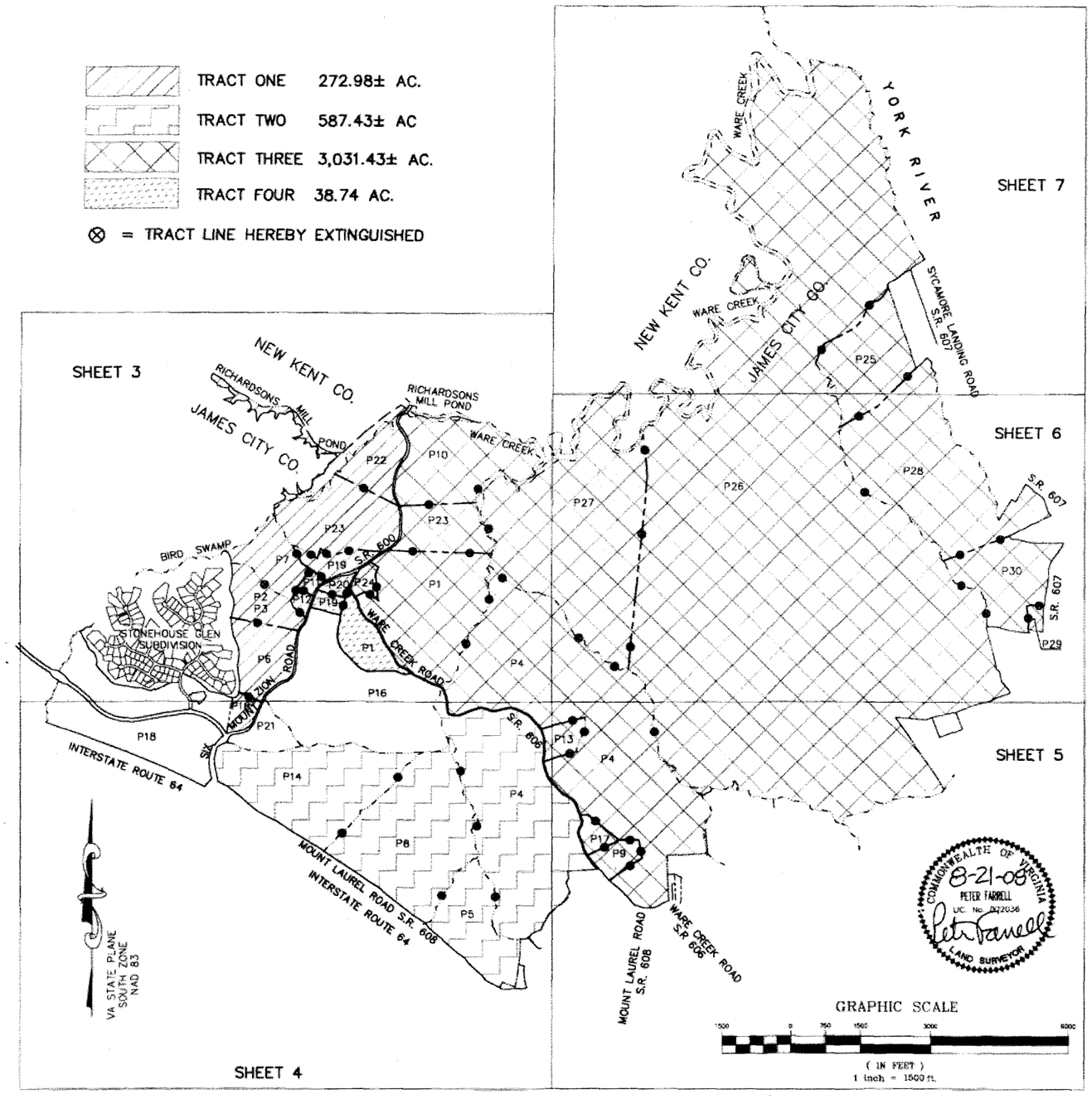
TRACT ONE 272.98± AC.

TRACT TWO 587.43± AC

TRACT THREE 3,031.43± AC.

TRACT FOUR 38.74 AC.

⊗ = TRACT LINE HEREBY EXTINGUISHED



TRACT ONE CONSISTS OF 272.98± ACRES BEING:

REFERENCE	TAX PARCEL NO.	PARCEL NAME	ZONING	AREA (AC.)
P2 & P3	0540100005	ASHLOCK #2 & #3	PUD-R	30.55±
P6	0540100004	BATEMAN-TYLER	PUD-R	41.47±
P7	0540100006	HENLEY	PUD-R	35.39±
P12	0540100007	BOWMAN	PUD-R	4.13
P22	0610100001	RICHARDSONS MILL POND	PUD-R	52.08±
P11	0540100008	BANKS	PUD-R	3.97
PART OF P18	0540100002	LAGRANGE	PUD-R	9.63
PART OF P19	0540100009	WARE ASHLOCK #1	PUD-R	15.45
PART OF P23	0630100002	FARINHOLT	PUD-R	80.31±

TRACT TWO CONSISTS OF 587.43± ACRES BEING:

REFERENCE	TAX PARCEL NO.	PARCEL NAME	ZONING	AREA (AC.)
P5	1310100022	TANKARD	PUD-C	68.27±
P8	1310100021	CLOPTON	PUD-C	162.23±
P14	0540100013	ENOS	PUD-C	136.82±
PART OF P4	0630100004	GARRETTS	PUD-R	220.11±

TRACT THREE CONSISTS OF 3,031.43± ACRES BEING:

REFERENCE	TAX PARCEL NO.	PARCEL NAME	ZONING	AREA (AC.)
P9	1320100027	WOODWARD	PUD-R	14.00
P10	0610100002	CEDAR POINT	PUD-R	102.74±
P13	0640100002	BRAXTON	PUD-R	13.27±
P17	1320100028	JAMES TAYLOR #2	PUD-R	9.25
P24	0630100001	STINNETTE	PUD-R	6.89±
P25	0710100001	LEE	PUD-R	77.78±
P26	0740100020	W.P. RICHARDSON	PUD-R	1,697.04±
P27	0640100001	STONEHOUSE	PUD-R	289.83±
P28	0740100021	GARRETT LEE	PUD-R	199.75±
P29	0740100029	JAMES TAYLOR	PUD-R	4.22
P30	0740100022	IVYDALE	PUD-R	71.19±
PART OF P23	0630100002	FARINHOLT	PUD-R	44.75±
PART OF P4	0630100004	GARRETTS	PUD-R	366.97±
PART OF P1	0630100003	ASHLOCK #1	PUD-R	133.75±

TRACT FOUR CONSISTS OF 38.74 ACRES BEING:

REFERENCE	TAX PARCEL NO.	PARCEL NAME	ZONING	AREA (AC.)
PART OF P19	0540100009	WARE ASHLOCK #1	PUD-R	5.78
PART OF P1	0630100003	ASHLOCK #1	PUD-R	27.90
P20	0540100010	WARE ASHLOCK #2	PUD-R	5.06

RESIDUAL PARCELS CONSIST OF 178.18± ACRES BEING:

REFERENCE	TAX PARCEL NO.	PARCEL NAME	ZONING	AREA (AC.)
P16	0540100011	SLATER	PUD-R	158.05±
P21	0540100012	FILICHKO	PUD-R	20.13±

City of Williamsburg & County of James City
Circuit Court: This PLAT was recorded on 11 November 2008
at 10:25 AM/PM PB — PG —
DOCUMENT # 080027247
BETSY B. WOOLRIDGE, CLERK
Clerk

BOUNDARY LINE ADJUSTMENT

OF THE PROPERTIES OF

GS STONEHOUSE GREEN LAND SUB, LLC

STONEHOUSE MAGISTERIAL DISTRICT
JAMES CITY COUNTY, VIRGINIA

DATE: 08-21-08 SCALE: 1"=1500'

X Large/Small Plat(s) Recorded herewith as # 080027247

SHEET 2 OF 8

LANDMARK DESIGN GROUP
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PROJ. NO. : 2007008-000.15 DWG. NO. 18608W

080027247

CERTIFICATE OF SOURCE OF TITLE: GS STONEHOUSE GREEN LAND SUB, LLC

THE PROPERTY SHOWN ON THIS PLAT WAS CONVEYED BY STONEHOUSE CAPITAL, LLC, SIX HUNDRED NORTH, LLC, FAIRMONT INVESTMENT, LLC, MOUNT LAUREL, LLC, STONEHOUSE GLEN, LLC, FIELDSTONE INVESTMENT, LLC, TYMAR CAPITAL, LLC, CIMARRON CAPITAL, LLC AND JTL STONEWLL JOINT VENTURE, LLC TO GS STONEHOUSE GREEN LAND SUB, LLC BY DEED DATED 10/31/06 AND RECORDED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF THE COUNTY OF JAMES CITY AS INSTRUMENT NO. 060027006

OWNER'S CERTIFICATE: GS STONEHOUSE GREEN LAND SUB, LLC

THE SUBDIVISION OF LAND SHOWN ON THIS PLAT AND KNOWN AS "BOUNDARY LINE ADJUSTMENT OF GS STONEHOUSE GREEN LAND SUB LLC" IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRE OF THE UNDERSIGNED OWNERS, PROPRIETORS, AND/OR TRUSTEES.

GS STONEHOUSE GREEN LAND SUB, LLC

BY: David L. Guy 9/15/08
SIGNATURE DATE

DAVID L. Guy Development MANAGER
NAME PRINTED TITLE

CERTIFICATE OF NOTARIZATION:

STATE OF North Carolina CITY/COUNTY OF Mecklenburg
I, Mary E. Kwiat A NOTARY PUBLIC IN AND FOR THE CITY/COUNTY AND STATE AFORESAID, DO HEREBY CERTIFY THAT THE PERSONS WHOSE NAMES ARE SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN THE CITY/COUNTY AFORESAID, GIVEN UNDER MY NAME THIS 15th DAY OF September, 2008. MY COMMISSION EXPIRES 4/5/11

Mary E Kwiat
(SIGNATURE) (REGISTRATION NO.)

CERTIFICATE OF APPROVAL:

THIS SUBDIVISION IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE ADMITTED TO RECORD.

8/22/08 Prabit C. Das, P.E.
DATE VIRGINIA DEPARTMENT OF TRANSPORTATION

10/10/08 Ellen Cook
DATE SUBDIVISION AGENT OF JAMES CITY COUNTY

SURVEYOR'S CERTIFICATE:

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE OR BELIEF, THIS PLAT COMPLIES WITH 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.

COMMONWEALTH OF VIRGINIA 8-21-08 PETER FARRELL LIC. No. 002036 LAND SURVEYOR

8-21-08 Pete Farrell
DATE PETER FARRELL, LS NO. 002036

STATE OF VIRGINIA, COUNTY OF JAMES CITY:

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT THE PLAT SHOWN HEREON WAS PRESENTED AND ADMITTED TO RECORD THIS 7 November 2008 @ 10:25 Am

AS THE LAW DIRECTS.
TESTE: Betty B. Woolridge CLERK
By Claudia Hornkohl, Dep Clerk

DOCUMENT NO. 080027247

NOTES:

1. THIS PROPERTY IS JAMES CITY COUNTY TAX PARCELS: 0540100005, 0540100002, 0540100004, 0540100009, 0540100008, 0630100003, 0540100006, 1320100027, 0610100002, 0540100008, 0540100007, 0640100002, 1320100028, 0540100010, 0610100001, 0630100002, 0630100001, 0710100001, 0740100020, 0640100001, 0630100004, 0740100021, 0740100029, 0540100011, 0540100012 & 0740100022 AND ARE ZONED: PUD-R. AND 1310100022, 1310100021, 0540100013, AND ARE ZONED PUD-C.

2. THIS PROPERTY APPEARS TO LIE WITHIN FLOOD ZONE X, ZONE X(SHADED) AND ZONE AE ACCORDING TO FEDERAL EMERGENCY MANAGEMENT AGENCY-NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY PANELS NO. 51095C0035C, NO. 51095C0045C, NO. 51095C0055C, AND NO. 51095C0065C, ALL DATED SEPT. 28, 2007.

3. THIS SITE IS TO BE SERVED BY PUBLIC WATER AND PUBLIC SEWER.

4. ALL NEW UTILITIES SHALL BE PLACED UNDERGROUND.

5. THE REFERENCES USED IN THE PREPARATION OF THIS PLAT ARE:

(JAMES CITY COUNTY)	(JAMES CITY COUNTY)
INST. NO. 060027006	D.B 122, PG. 651
(SOURCE DEED)	P.B 2, PG. 11
P.B 10, PG. 35	D.B 57, PG. 346
P.B. 6, PG. 5	P.B 40, PG. 19
P.B 25, PG. 22	D.B 720, PG. 883
D.B 6, PG. 226	D.B. 221, PG. 280
P.B 39, PG. 66	P.B. 20, PG. 53-54
P.B 50, PG. 6-9	P.B. 40, PG. 79
P.B 50, PG. 12-14	P.B. 43, PG 70-71
P.B 61, PG. 35	P.B. 40, PG. 77
P.B 12, PG. 37	S.H.P.B. 1, PG. 17-19
P.B 50, PG. 15	P.B 89, PG. 29-33
P.B 10, PG. 42	P.B 83, PG. 42-44
P.B 2, PG. 50	P.B 40, PG. 45
P.B 29, PG. 40	P.B 43, PG. 89
P.B 29, PG. 6	D.B 135, PG. 141
P.B 9, PG. 18	D.B 122, PG. 651
P.B 87, PG. 58-60	(NEW KENT COUNTY)
P.B 22, PG. 35	P.B 16, PG. 52-54
P.B. 16, PG 18	P.B. 15, PG. 123
	P.B. 15, PG. 124

6. COORDINATE VALUES SHOWN BASED ON JAMES CITY COUNTY GEODETIC CONTROL MONUMENT STA. NO. 340
N 3680567.54
E 11970044.785

7. THIS PLAT WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT AND THEREFORE MAY NOT DEPICT ALL TITLE MATTERS AND/OR ENCUMBRANCES AFFECTING THE SUBJECT PROPERTY.

8. UNLESS OTHERWISE NOTED, ALL DRAINAGE EASEMENTS DESIGNATED ON THIS PLAT SHALL REMAIN PRIVATE.

9. NEW MONUMENTS WILL BE SET IN ACCORDANCE WITH SECTIONS 19-34 THROUGH 19-36 OF THE JAMES CITY COUNTY SUBDIVISION ORDINANCE.

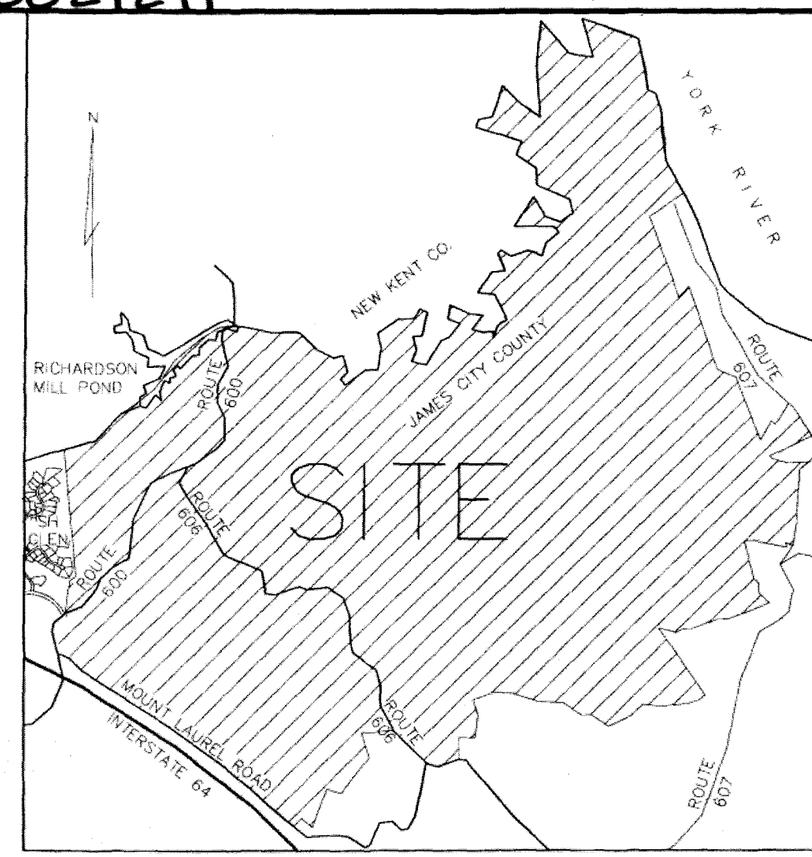
10. SIGNS SHALL COMPLY WITH ARTICLE 2, DIVISION 3 OF THE JAMES CITY COUNTY ZONING ORDINANCE.

11. ANY EXISTING UNUSED WELLS SHALL BE ABANDONED IN ACCORDANCE WITH STATE PRIVATE WELL REGULATIONS AND THE JAMES CITY COUNTY CODE.

12. THIS PROPERTY LIES WITHIN A RESOURCE PROTECTON AREA AND A RESOURCE MANAGEMENT AREA AND IS SUBJECT TO JAMES CITY COUNTY'S CHESAPEAKE BAY PRESERVATION ORDINANCE.

13. WETLANDS AND LANDS WITHIN RESOURCE PROTECTION AREAS SHALL REMAIN IN A NATURAL UNDISTURBED STATE EXCEPT FOR THOSE ACTIVITIES PERMITTED BY SECTION 23-7(c)(1) OF THE JAMES CITY COUNTY CODE.

14. NO FURTHER SUBDIVISION AND/OR DEVELOPMENT OF THE PARCELS SHOWN HEREON WILL BE APPROVED WITHOUT THE REQUIRED WETLAND DELINEATION AND MAPPING AND ESTABLISHMENT OF AN APPROVED RPA BUFFER PER COUNTY CODE SECTION 23-7(C).



VICINITY MAP 1"=2000'

BOUNDARY LINE ADJUSTMENT
OF THE PROPERTIES OF
GS STONEHOUSE GREEN LAND SUB, LLC

STONEHOUSE MAGISTERIAL DISTRICT
JAMES CITY COUNTY, VIRGINIA

DATE: 08-21-08
SHEET 1 OF 8

1 Large/Small Plat(s) Recorded herewith as # 080027247

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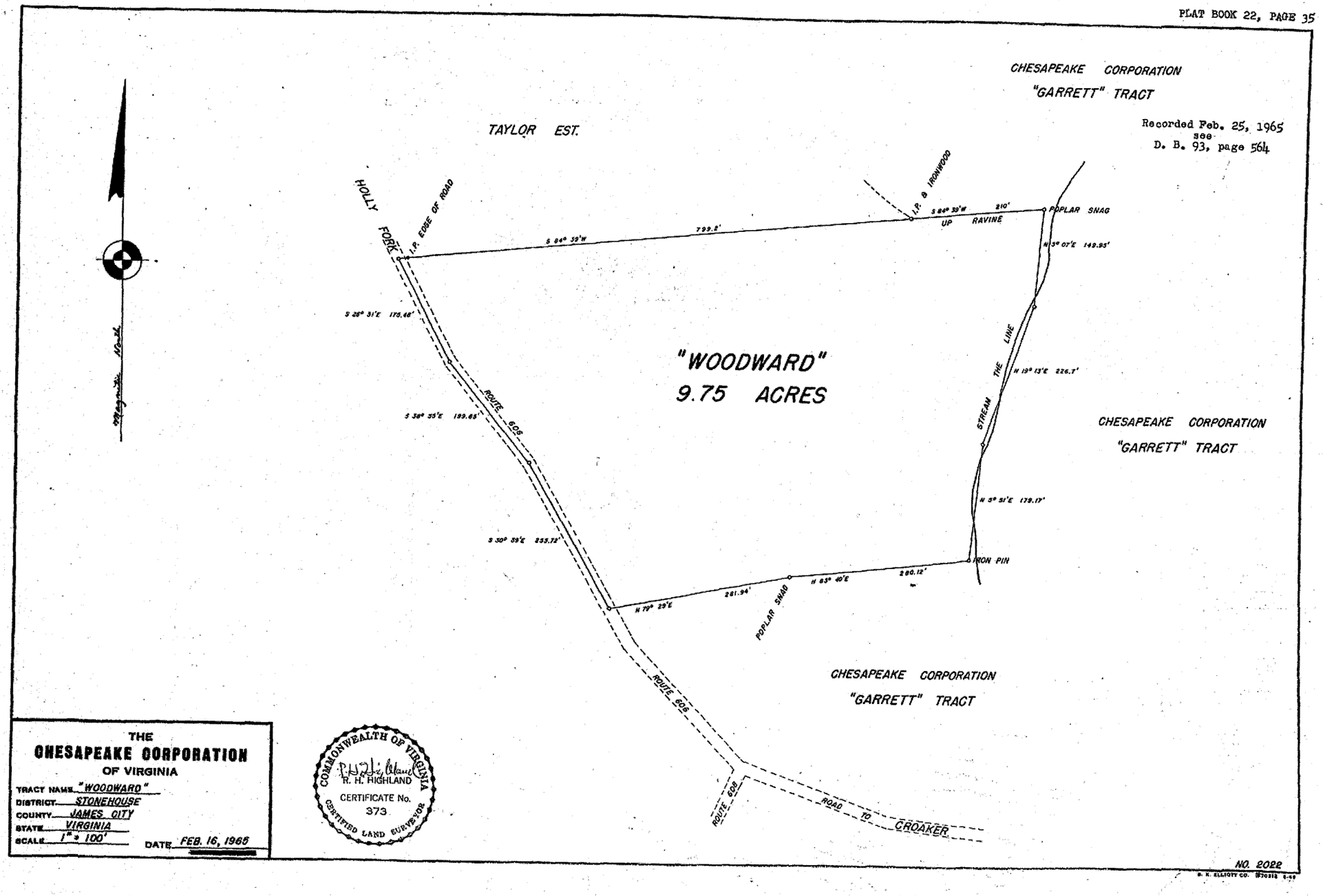
PROJ. NO. : 2007008-000.15 DWG. NO. 18609W

POOR QUALITY

ORIGINAL(S) FOLLOW

THIS IS THE BEST COPY AVAILABLE

VCE DOCUMENT CONVERSION


CHESAPEAKE CORPORATION
"GARRETT" TRACT
Recorded Feb. 25, 1965
see
D. B. 93, page 564
TAYLOR EST.
HOLLY FORK
I.P. EDGE OF ROAD
I.P. & IRONWOOD
S 84° 39'W 799.2'
S 84° 39'W 210'
UP RAVINE
POPLAR SNAG
N 3° 07'E 149.95'
S 28° 31'E 175.48'
"WOODWARD"
9.75 ACRES
ROUTE 606
S 38° 35'E 199.65'
THE STREAM LINE
N 19° 13'E 226.7'
CHESAPEAKE CORPORATION
"GARRETT" TRACT
N 5° 51'E 179.17'
S 30° 39'E 235.72'
IRON PIN
N 63° 40'E 280.12'
N 79° 29'E 281.94'
POPLAR SNAG
CHESAPEAKE CORPORATION
"GARRETT" TRACT
ROUTE 606
ROUTE 606
ROAD TO CROAKER
THE
CHESAPEAKE CORPORATION
OF VIRGINIA
TRACT NAME "WOODWARD"
DISTRICT STONEHOUSE
COUNTY JAMES CITY
STATE VIRGINIA
SCALE 1" = 100'
DATE FEB. 16, 1965
COMMONWEALTH OF VIRGINIA
R. H. HIGHLAND
CERTIFICATE No.
373
CERTIFIED LAND SURVEYOR
NO. 2022

080027247

BOUNDARY LINE ADJUSTMENT
OF THE PROPERTIES OF
GS STONEHOUSE GREEN LAND SUB, LLC

STONEHOUSE MAGISTERIAL DISTRICT
JAMES CITY COUNTY, VIRGINIA

DATE: 08-21-08 SCALE: 1"=500'
SHEET 7 OF 8

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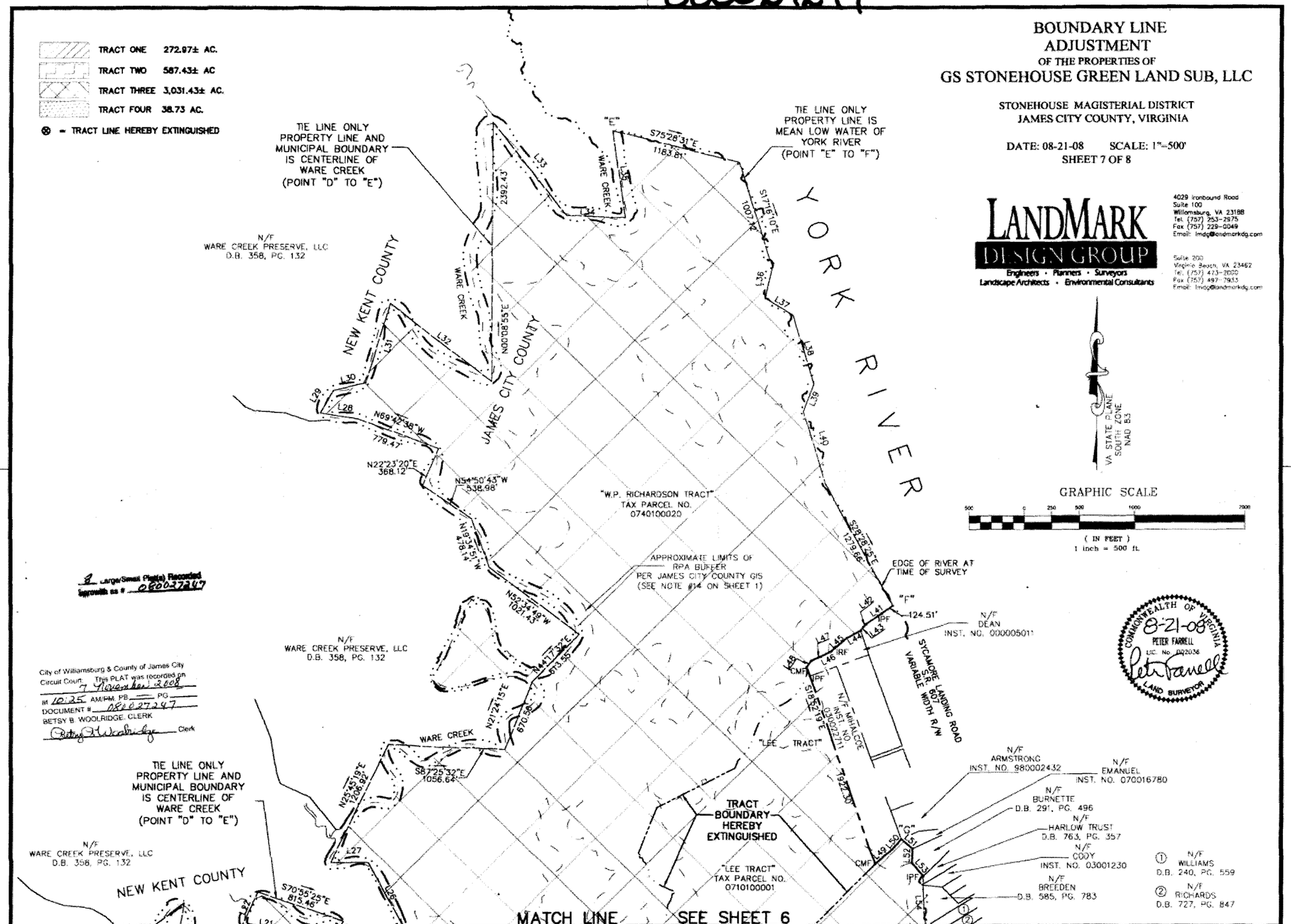

1 Large/Small Plat(s) Recorded
Instrument as # 080027247

City of Williamsburg & County of James City
Circuit Court. This PLAT was recorded on
7 November 2008
at 10:25 AM/PM PB ___ PG ___
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BETSY B. WOOLRIDGE, CLERK
Betsy B. Woolridge Clerk

PROJ. NO. : 2007008-000.15 DWG. NO. 18603W

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BOUNDARY LINE ADJUSTMENT
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STONEHOUSE MAGISTERIAL DISTRICT
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DATE: 08-21-08 SCALE: 1"=500'
SHEET 6 OF 8

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Fax (757) 497-7933
Email: lmdg@landmarkdg.com

GRAPHIC SCALE
500 0 250 500 1000 2000
(IN FEET)
1 inch = 500 ft.

COMMONWEALTH OF VIRGINIA
8-21-08
PETER FARRELL
L/C. No. 002038
LAND SURVEYOR

TRACT ONE	272.97± AC.
TRACT TWO	587.43± AC
TRACT THREE	3,031.43± AC.
TRACT FOUR	38.73 AC.

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City of Williamsburg & County of James City
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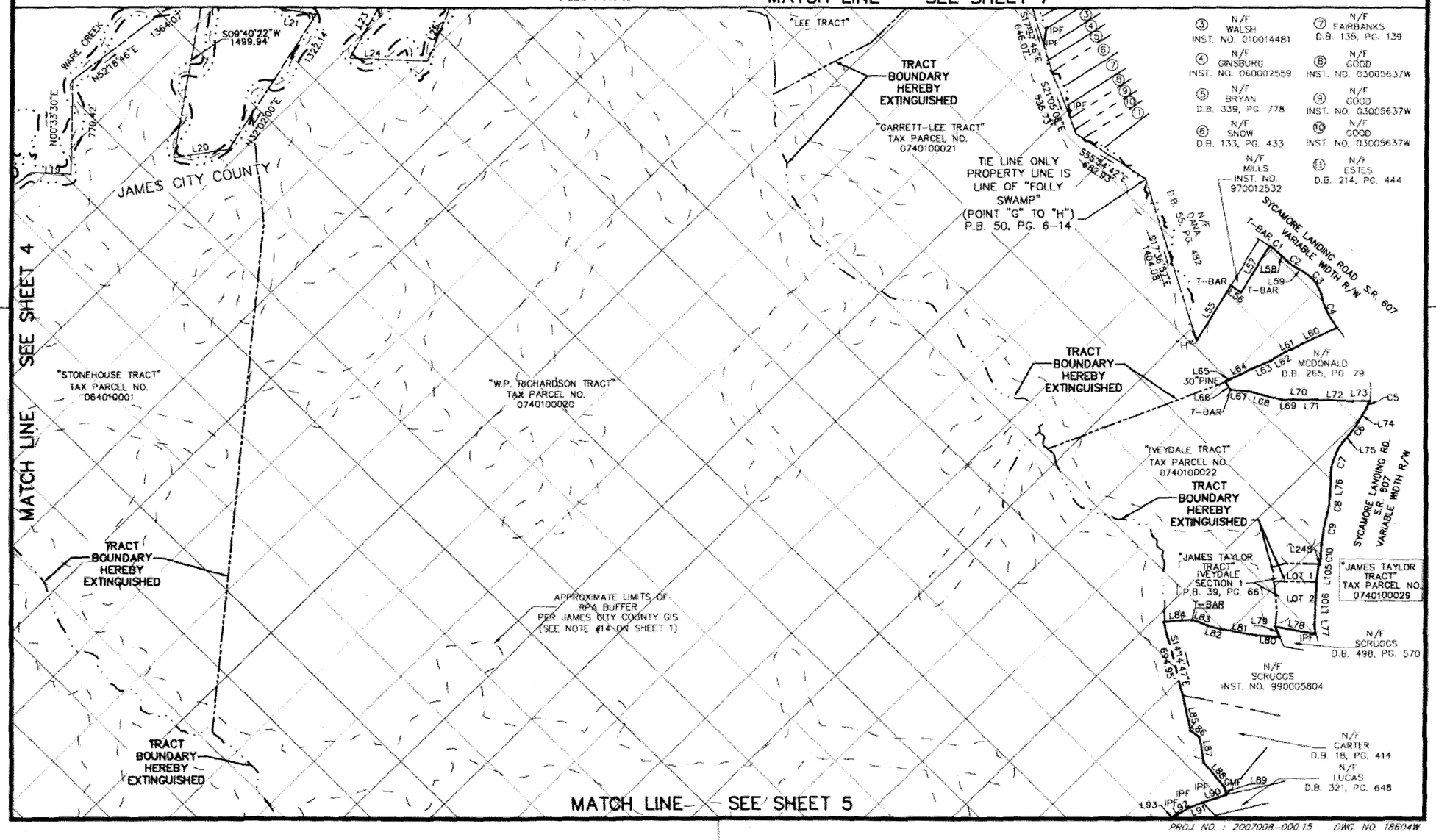
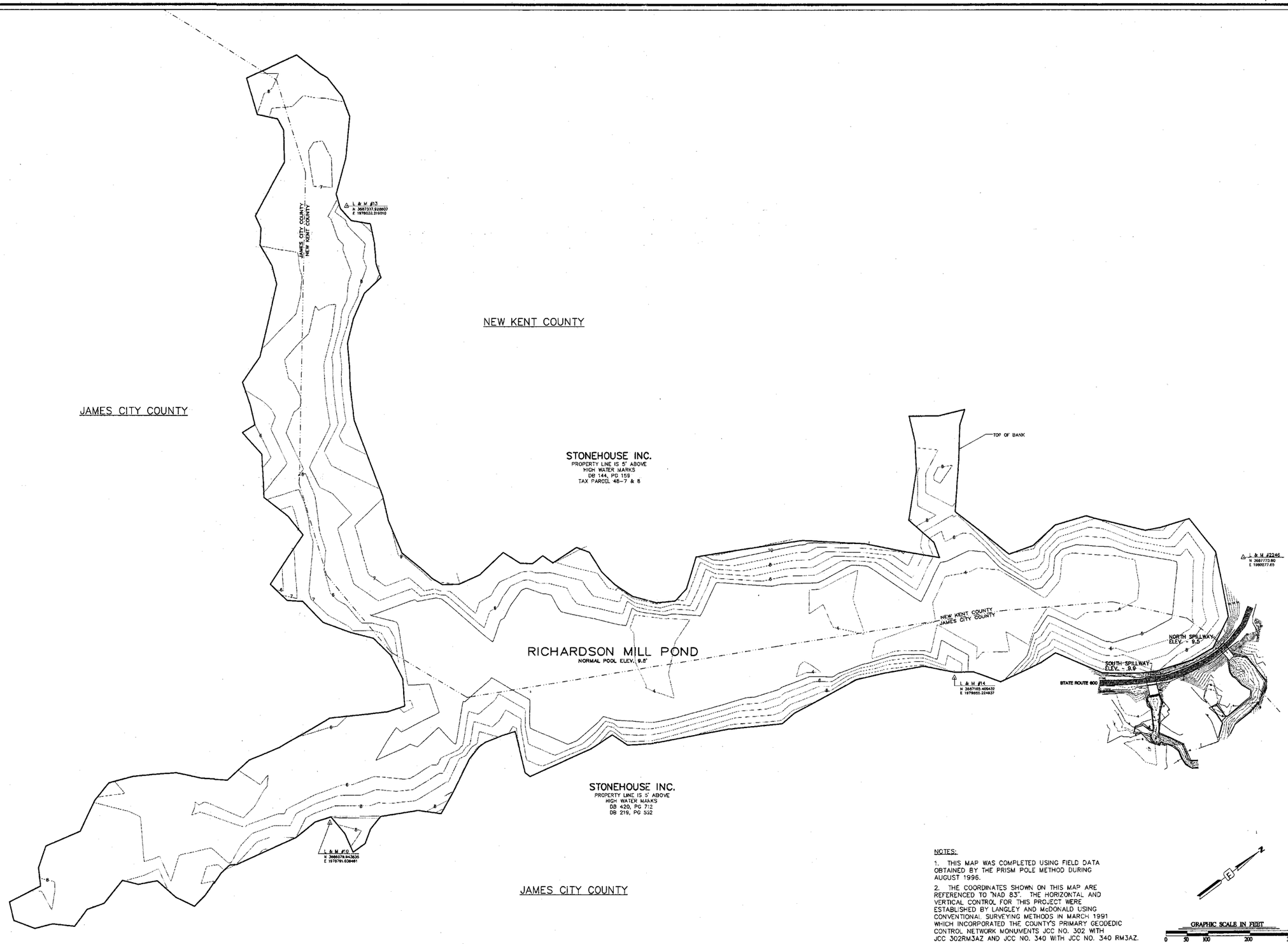
DOCUMENT # 080027247
BETSY B. WOOLRIDGE, CLERK
Clerk

VA STATE PLANE SOUTH ZONE NAD 83

MATCH LINE SEE SHEET 7



PROJ. NO. : 2007008-000.15 DWG. NO. 18604W



NOTES:

1. THIS MAP WAS COMPLETED USING FIELD DATA OBTAINED BY THE PRISM POLE METHOD DURING AUGUST 1996.

2. THE COORDINATES SHOWN ON THIS MAP ARE REFERENCED TO "NAD 83". THE HORIZONTAL AND VERTICAL CONTROL FOR THIS PROJECT WERE ESTABLISHED BY LANGLEY AND McDONALD USING CONVENTIONAL SURVEYING METHODS IN MARCH 1991 WHICH INCORPORATED THE COUNTY'S PRIMARY GEODEDIC CONTROL NETWORK MONUMENTS JCC NO. 302 WITH JCC 302RM3AZ AND JCC NO. 340 WITH JCC NO. 340 RM3AZ.

COMMONWEALTH OF VIRGINIA
JOHN L. HUTCHERSON
No. 1370
LAND SURVEYOR

Langley and McDonald, P.C.
Engineers • Surveyors • Planners
Landscape Architects • Environmental Consultants
VIRGINIA BEACH WILLIAMSBURG

DES.	JLH
DWN.	JSR
CHK.	JLH
DATE	SEPT. 17, 1996

APPENDIX "A"
HYDROGRAPHIC MAP OF RICHARDSON MILL POND BELOW NORMAL POOL ELEVATION

PROJ. NO.	96038-0445
SCALE	1" = 100'
SHEET	1 OF 1
DWG.	

South wall PIPING BOTH SPILL WAYS

420/712
219/552