



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.

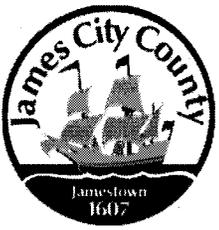
BMP NUMBER: JR047

DATE VERIFIED: June 19, 2012

QUALITY ASSURANCE TECHNICIAN: Leah Hardenbergh

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA



Stormwater Division

MEMORANDUM

DATE: March 11, 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: JR047

PIN: 5140200001A

Subdivision, Tract, Business or Owner

Name (if known):

Kingsmill

Property Description:

Common Area Sandys Fort

Site Address:

(For internal use only)

Box 12

Drawer: 7

Agreements: (in file as of scan date)

N

Book or Doc#:

Page:

Comments

JR-047

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

1. As-built plan
2. Completed construction certification
- ③ Construction Plan
- ④ Design Calculations
5. Watershed Map
6. Maintenance Agreement
7. Correspondence with owners
- ⑧ Inspection Records
9. Enforcement Actions

James City County, Virginia
Environmental Division

Stormwater Management/BMP Facilities
Record Drawing/Construction Certification
Review Tracking Form

County Plan No.: S-85-97
Project Name: BLOCK KINGSMILL EAST - SANDYS FORT
Stormwater Management Facility: WET POND # 5

Phase: I II III
 Information Received. Date: 3/23/01 AES.
 Administrative Check.
 Record Drawing. Date: 3/23/01 AES
 Construction Certification. Date: MARCH 5 2001 PSI
 RD/CC Standard Forms (Required after Feb 1st 2001 Only)
 Insp/Maint Agreement. Info: _____
 Other: _____

Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
 Yes No Note/Sheet: Note # 18 on sheet 18.

Assign County BMP ID Code Code: JR 047

Log into Division's "As-Built" Tracking Log
 Add Location to GIS Database Map. Obtain GIS site information (GPIN, Owner, Site Area, Address, etc.)
 Preliminary Log into BMP Database (BMP ID #, Site Plan #, GPIN, Project Name)
 Active Project File Review (correspondence, H&H, etc.)
 Initial As-Built File setup (label, copies of hydraulics, etc.)
 Inspector Check of RD/CC. MIKE

Pre-Inspection Drawing Review (Quick look prior to field inspection).
 Final Inspection (FI) Date: 11/02/01. SJT/mow
 Record Drawing (RD) Review Date: 11/06/01. SJT
 Construction Certification (CC) Review Date: 11/06/01. SJT

Actions:
 No comments.
 Comments. Letter Forwarded. Date: 11/06/01
 Record Drawing (RD)
 Construction Certification (CC)
 Construction-Related (CR)
 Site Issues (SI)
 Other: _____

Second Submission: RD OK, FI ok
 Third Submission: _____

Acceptable for stormwater management facility purposes (RD/CC/CR/Other). Proceed with bond release.
 Notify Darryl & Joan of acceptability using email (preferred) or verbal.
 Clean active file of all stormwater management related material and finish/establish "As-Built" file.
 Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
 Copy Final Inspection Report into County BMP Inspection Program file.
 Digital Photographs obtained.
 Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable
Plan Reviewer: [Signature] Date: 3/30/04



James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built" plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 - Site Information:

Project Name: KINGMILL EAST SANDY'S FORT
 Structure/BMP Name: WET POND # 5
 Project Location: SANDY'S FORT SECTION
 BMP Location: _____
 County Plan No.: S - 85 - 97

Project Type: Residential Business Tax Map/Parcel No.: PART OF (51-4)(1-8)
 Commercial Office BMP ID Code (if known): JR 047
 Institutional Industrial Zoning District: R-4
 Public Roadway Land Use: _____
 Other Site Area (sf or acres): 61,375 AC.

Brief Description of Stormwater Management/BMP Facility: PHASE 1 WET POND

Nearest Visible Landmark to SWM/BMP Facility: GEORGE SANDYS / JCSA PUMP STA. 9-4

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
 Station Number or Name: _____
 Datum or Reference Elevation: _____
 Control Description: _____
 Control Location from Subject Facility: _____

Section 2 - Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: Yes No Unknown
Approx. Construction Start Date for SWM/BMP Facility: UNKNOWN 6/1/98
Facility Monitored by County Representative during Construction: Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: GEORGE NICE & SONS
Name of Professional Firm Who Routinely Monitored Construction: PSI
Date of Completion for SWM/BMP Facility: _____
Date of Record Drawing/Construction Certification Submittal: _____

(Note: Record Drawing and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. Record Drawings and Construction Certifications must be reviewed and approved by the James City County Environmental Division prior to final inspection, acceptance and bond or surety release.)

Section 3 - Owner / Designer / Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: BUSCH PROPERTIES
Mailing Address: 300 MCLAWS CIRCLE, SUITE 106
WILLIAMSBURG, VA
Business Phone: 253-3917 Fax: 253-3929
Contact Person: TOM DANN Title: _____

Design Professional: *(Note: Professional Engineer or Certified Land Surveyor responsible for the design and preparation of plans and specifications for the Stormwater Management / BMP facility.)*

Firm Name: AES CONSULTING ENGINEERS
Mailing Address: 5248 GIDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VA 23188
Business Phone: 253-0040
Fax: 220-8994
Responsible Plan Preparer: MARK RICHARDSON
Title: PROJECT MANAGER
Plan Name: KINGSMILL EAST SANDY'S FORT
Firm's Project No. 7753-6
Plan Date: _____
Sheet No.'s Applicable to SWM/BMP Facility: 1 1 2 1 3 1 4 1

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*

Name: GEORGE NICE & SONS
Mailing Address: 143 SKIMMID ROAD
WILLIAMSBURG, VA 23185
Business Phone: 565-2885
Fax: 565-1526
Contact Person: RAY NICE
Site Foreman/Supervisor: JERRY NICE
Specialty Subcontractors & Purpose (for BMP Construction Only): _____

Section 4 - Professional Certifications:

Certifying Professionals: (Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional Engineer is responsible for the inspection, monitoring and certification of Stormwater Management / BMP facilities during its construction.)

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES CONSULTING ENGINEERS
Mailing Address: 524B OLDF TOWNE ROAD
SUITE 1 WILLIAMSBURG, VA 23188
Business Phone: 253-0040
Fax: 220-8994

Name: G. ARCHER MARSTON III P.E.
Title: _____

Signature: [Handwritten Signature]
Date: 3/23/01

I hereby certify to the best of my judgement, knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.

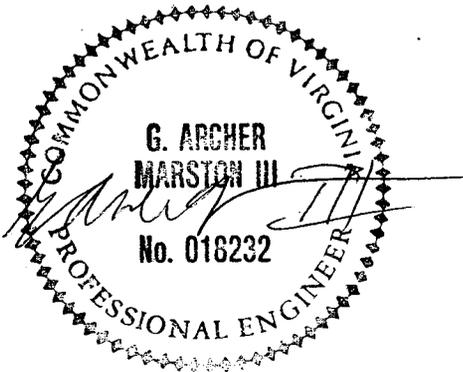
Construction Certification

Firm Name: _____
Mailing Address: _____
Business Phone: _____
Fax: _____

Name: _____
Title: _____

Signature: _____
Date: _____

I hereby certify to the best of my judgement, knowledge and belief that this Stormwater Management / BMP facility was monitored and constructed in accordance with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.



_____ (Seal)
Virginia Registered Professional Engineer
or Certified Land Surveyor

_____ (Seal)
Virginia Registered
Professional Engineer



VR047
5-85-97

March 5, 2001

Mr. Tom Dunn
Busch Properties
300 McLaws Circle
Suite 106
Williamsburg, VA 23187

Re: Earthwork Certification (County Plan S-85-97)
Sandy's Fort - Wet Pond #2 and Wet Pond #5
Williamsburg, VA
PSI Project Number: 239-80041

Dear Mr. Dunn:

We have received a request from AES Consulting Engineers for a report certifying the referenced storm water management ponds were constructed in accordance with James City County standards. We are familiar with the County document for these types of structures; however, the preparation of this document was not required at the time of the permitting and construction of the dams.

We have been in contact with Scott Thomas of the Environmental Division of James City County (the Division which is requesting this documentation). We suggested that a letter be prepared to complete a portion of the document, since the entire document could not be prepared (since PSI had no knowledge of these requirements prior to or during construction). Mr. Thomas indicated that this letter was sufficient for the County's needs. Therefore, PSI offers the following geotechnical statements regarding wet ponds #2 and #5.

- 1) The earth embankments were constructed in accordance with the plan requirements with regard to soil density and soil type. PSI provided full-time inspection of these earthwork activities.
- 2) No discrepancies regarding soil compaction remain at this time (for those soil layers tested by PSI).

MHR

Earthwork Certification (County Plan S-85-97)

Sandy's Fort - Wet Ponds #2 and #5

Williamsburg, VA

PSI Project Number: 239-80041

Page 2 of 2

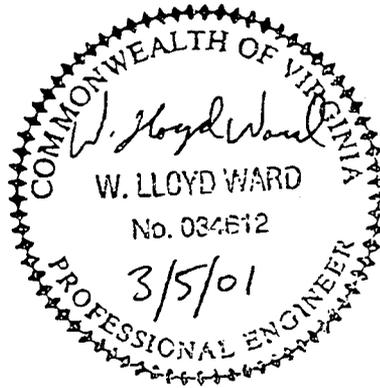
Should you have any additional questions, please do not hesitate to call our office at (757) 249-3811.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

W. Lloyd Ward P.E.
Project Engineer

Karl Higgins III P.E.
Branch Manager

Cc: Mark Richardson (AES Consulting Engineers) fx 220-8994
Scott Thomas, P.E. (JCC Environmental Division) fx 259-4032
Ray Nice, (George Nice and Sons) fx 565-1526



AES CONSULTING ENGINEERS

Engineering, Surveying and Planning

5248 Olde Towne Road, Suite 1
WILLIAMSBURG, VIRGINIA 23188

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

LETTER OF TRANSMITTAL

Deliver

DATE 3/23/01	JOB NO. 7753-6
ATTENTION	
RE: Sandy's Fort BMP #2 & #5 JR046 JR047 Record Drawings 5-85-97	

TO JCC Environmental Division

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

- Shop drawings Prints Plans Samples Specifications
 Copy of letter Change order _____

COPIES	DATE	NO.	DESCRIPTION
1		1	Wet Pond Certifications
4		2	Record Drawings



THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
 For your use Approved as noted Submit _____ copies for distribution
 As requested Returned for corrections Return _____ corrected prints
 For review and comment _____
 FOR BIDS DUE _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS

COPY TO _____ SIGNED: Mark Richardson

DAM CONSTRUCTION NOTES

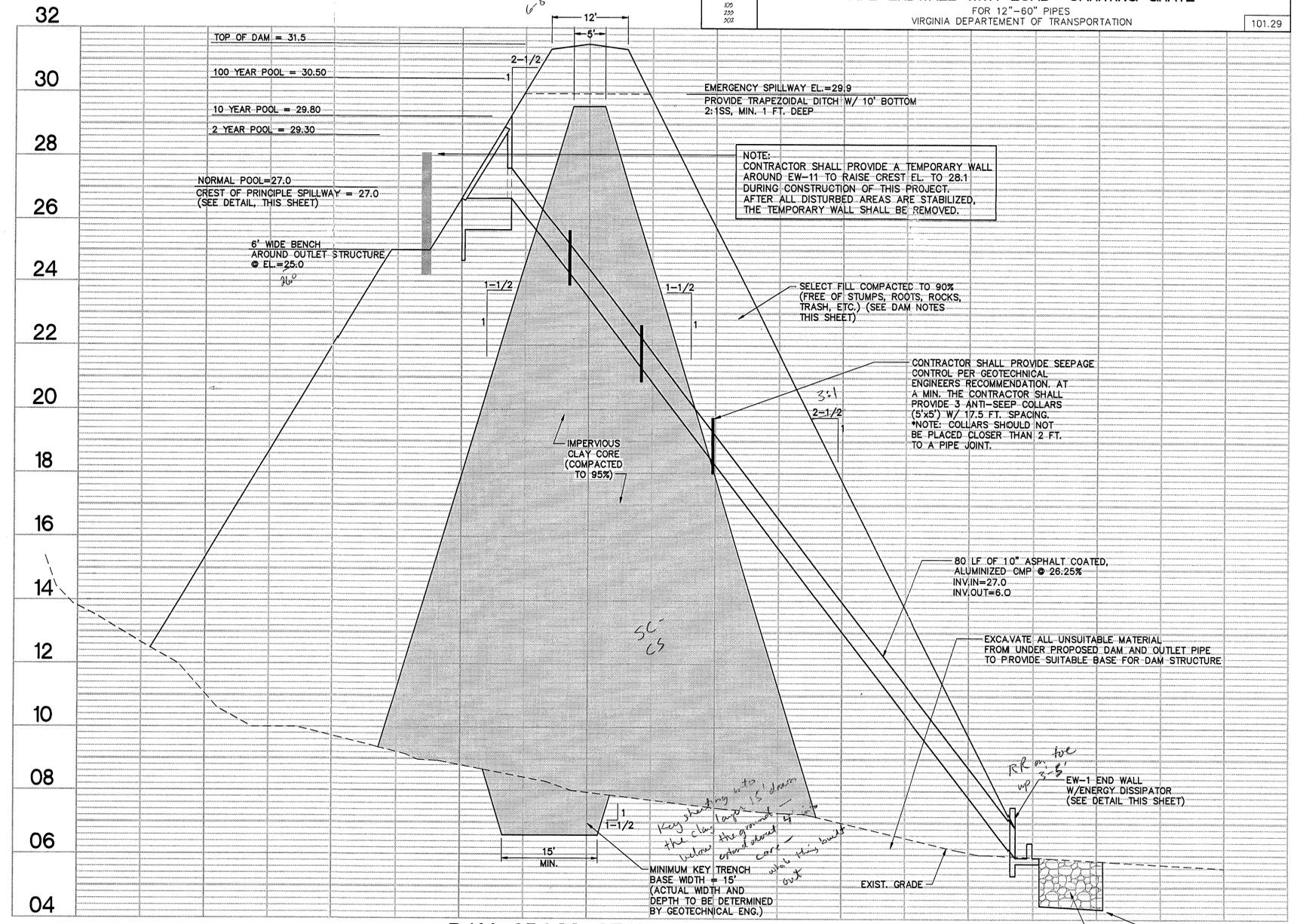
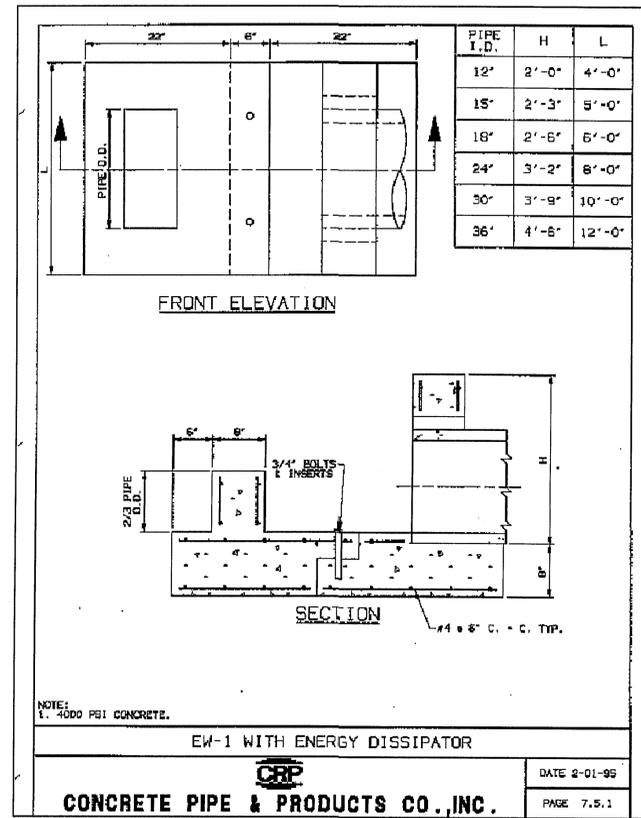
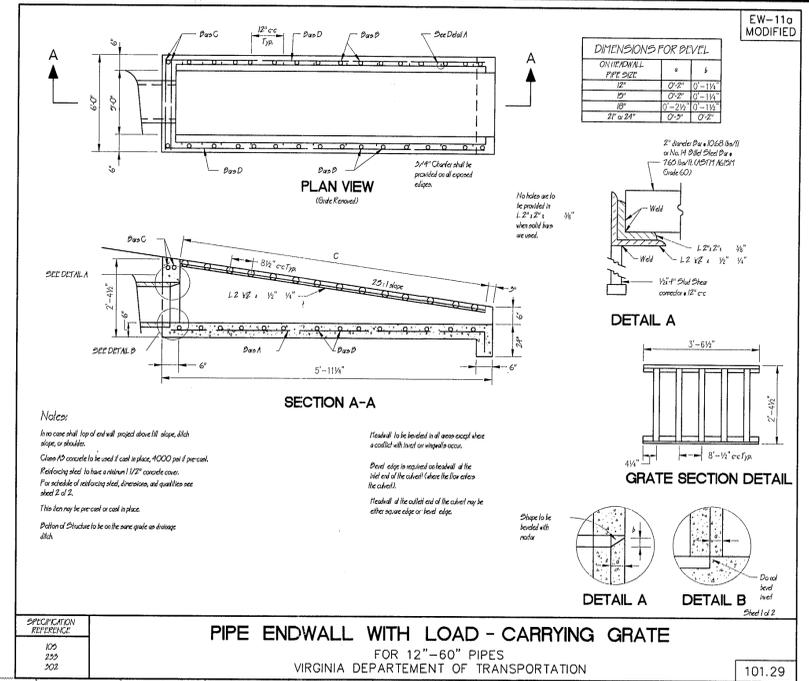
- 1. A GEOTECHNICAL SUBSURFACE EXPLORATION AT THE PROPOSED DAM SITE SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE. THE GEOTECHNICAL INVESTIGATION WILL DETERMINE KEY TRENCH DEPTH AND WIDTH ACCORDING TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. THE CONTRACTOR SHALL SUBMIT TO THE OWNER/CONTRACTOR AND JAMES CITY COUNTY CODE COMPLIANCE, HIS/HER RECOMMENDATIONS FOR DAM DESIGN, TRENCH WIDTH, DEPTH, SEEPAGE CONTROL, ETC. THESE RECOMMENDATIONS ARE HEREBY MADE A PART OF THE DAM'S CONSTRUCTION SPECIFICATIONS. ADDITIONALLY, THE GEOTECHNICAL ENGINEER WILL ENSURE PROPER MATERIALS AND DAM CONSTRUCTION METHODS ARE USED DURING CONSTRUCTION. AFTER CONSTRUCTION, A PROFESSIONAL GEOTECHNICAL ENGINEER SHALL ALSO SUBMIT A LETTER TO JAMES CITY COUNTY CERTIFYING THAT THE DAM WAS BUILT IN ACCORDANCE WITH APPROVED PLANS, SPECIFICATIONS, AND GEOTECHNICAL REPORT.**
- 2. SITE PREPARATION:** THE CONTRACTOR SHALL STRIP ALL AREAS OF THE PERMANENT CONSTRUCTION TO REMOVE ALL UNSUITABLE MATERIALS. THE UNSUITABLE MATERIALS TO BE REMOVED BY STRIPPING SHALL INCLUDE ALL TOPSOIL, DEBRIS AND VEGETABLE MATTER, INCLUDING STUMPS AND ROOTS, AND ALL OTHER MATERIALS WHICH MAY BE UNSUITABLE FOR USE IN THE PERMANENT CONSTRUCTION.
- 3. EMBANKMENT:** THE EXPOSED SUBGRADE SOILS SHALL BE CAREFULLY INSPECTED BY THE GEOTECHNICAL ENGINEER. ANY UNSUITABLE MATERIALS THUS EXPOSED SHALL BE REMOVED AND REPLACED WITH A WELL COMPACTED, SUITABLE MATERIAL. DENSITY TESTING, AT THE DISCRETION OF THE GEOTECHNICAL ENGINEER, SHALL BE PERFORMED AT THIS TIME. THE EMBANKMENT SHALL BE KEYED INTO THE UNDISTURBED (EXISTING) SOIL STRATUM. EMBANKMENT SHOULD BE KEYED AS SPECIFIED BY THE GEOTECHNICAL ENGINEER (WIDTH = 6 FT. MINIMUM). THE EMBANKMENT FOUNDATION AND ABUTMENTS SHALL BEAR ON FIRM AND STABLE EXISTING SUBGRADE WHICH HAS BEEN PREPARED SO AS TO REMOVE ALL ORGANIC, LOOSE, AND GENERALLY UNSUITABLE MATERIAL.

THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED BORROW AREAS. IT SHALL BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOOD VEGETATION, OVERSIZED STONES, ROCKS, OR OTHER OBJECTIONABLE MATERIAL SOILS WHICH ARE APPROVED FOR THE CONSTRUCTION OF THE IMPERVIOUS CLAY CORE, AS DEFINED BY THE UNIFIED SOIL CLASSIFICATION SYSTEM, ARE CH, INORGANIC CLAYS OF HIGH PLASTICITY; CL, INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY; GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS; SC, (WITH GEOTECHNICAL ENGINEER'S APPROVAL) CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES. MATERIALS TO BE USED FOR THE CONSTRUCTION OF THE SHELL SHALL BE SELECT BACKFILL FREE OF STUMPS, ROOTS, ROCKS, TRASH, ETC. AND SHALL BE MORE PERVIOUS THAN THE IMPERVIOUS CLAY CORE. AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED A MINIMUM DEPTH OF 4 INCHES PRIOR TO PLACEMENT OF FILL. THE FILL MATERIAL'S MOISTURE CONTENT SHALL BE +3 TO -2 PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D2216 (I.E. IN GENERAL THE FILL MATERIAL SHOULD CONTAIN SUFFICIENT MOISTURE SO THAT IT CAN BE FORMED INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION). FILL MATERIAL WILL BE PLACED IN 6 TO 8-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL. FIRST LIFT ON SUBGRADE MAY BE PLACED AT A DEPTH UP TO 36 INCHES TO BRIDGE SUBGRADE WITH GREATER THAN OPTIMUM MOISTURE CONTENT. COMPACTION, AS NOTED ON PLAN, SHALL BE OBTAINED GENERALLY BY USING A SHEEPSFOOT COMPACTOR. FINISHED GRADES SHALL BE MERGED INTO THE EXISTING GRADES.

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

5. **SEEPAGE CONTROL:** THE GEOTECHNICAL ENGINEER SHALL RECOMMEND A SEEPAGE CONTROL METHOD IF ANTI-SEEP COLLARS ARE DEEMED INADEQUATE.

- 6. PRINCIPAL SPILLWAY:** THE BOTTOM OF THE SPILLWAY RISER FOUNDATION BASE EXCAVATION SHALL BE OBSERVED BY THE GEOTECHNICAL ENGINEER TO ENSURE THAT ALL UNSUITABLE AND LOOSE MATERIALS ARE REMOVED AND THAT ACCEPTABLE BEARING CONDITIONS EXIST IN THE FOUNDATION'S BASE. ALL JOINTS IN THE PRINCIPAL SPILLWAY STRUCTURE SHALL BE OF WATER-TIGHT CONSTRUCTION. PERVIOUS MATERIALS SUCH AS SAND, GRAVEL OR CRUSHED STONE SHALL NOT BE USED AS BACKFILL AROUND THE BARREL. FILL MATERIAL SHALL BE PLACED AROUND THE PIPE IN 4-INCH LAYERS AND COMPACTED BY HAND TO THE SAME DENSITY AS THE EMBANKMENT. A MINIMUM OF TWO FEET OF FILL SHALL BE HAND-COMPACTED OVER THE BARREL BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
- 7. VEGETATIVE STABILIZATION:** FINAL VEGETATIVE COVER (STABILIZATION) SHALL CONSIST OF TOPSOILING, LIMING, FERTILIZING, SEEDING, AND MULCHING TO ASSURE A FIRM STAND OF GRASS AS SOON AS PRACTICAL. SEDIMENT BASINS AND OTHER TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED ONLY WHEN STABILIZATION IS COMPLETE. FINAL VEGETATIVE COVER SHALL BE PROVIDED IN ACCORDANCE WITH THE FOLLOWING:
 TOPSOIL: AT LEAST 2" THICKNESS OBTAINED FROM STOCKPILES ON SITE, FREE OF LARGE DEBRIS.
 LINE: KENTUCKY 31 TALL FESCUE 250#/ACRE (6#1,000 S.F.)
 FERTILIZER: 10/20/20 MIX, 1,000#/ACRE (25#1,000 S.F.)
 MULCH: STRAW OR HAY (LOCALLY OBTAINED) 4,000#/ACRE (90#1,000 S.F.)



NO.	DATE	REVISION / COMMENT	BY
1	10/17/97	REVISED PER ACC COMMENTS	CAH
2	2/27/98	REVISED PER ACC COMMENTS	CAH
3	3/25/98	REVISED PER DEVELOPER	CAH



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



NOTES AND DETAILS - WET POND #5

SANDY'S FORT

OWNER/DEVELOPER: BUSCH PROPERTIES, INC.

JAMES CITY COUNTY, VIRGINIA

Designed CAH/GAM
Scale NOTED
Date 9/19/97
Project No. 7753-6
Drawing No. 17

Camille Keton

PSI - 757-473-9533

Flatten

HYDROLOGIC REPORT FOR

KINGSMILL EAST

SANDYS FORT

WET POND #5

AES JOB NUMBER 7753-6

**DARRYL
COOK**

*OK
4/22/98
incl. revisions
dated 7/22/98*

AES CONSULTING ENGINEERS

**5248 OLDE TOWNE ROAD
WILLIAMSBURG, VA. 23188**

AUGUST 28, 1997

REVISED FEBRUARY 6, 1998

WET POND # 5

#7753-6
8/18/97

PRE-DEVELOPMENT

DA = 8.7 AC WOODED → C = 0.25

POST DEVELOPMENT

DA = 16.9 AC

MULTI-FAMILY 8.95 AC → C = 0.65

SINGLE FAMILY 7.95 AC → C = 0.35

COMPOSITE C = 0.50 ✓ ←

BMP DESIGN

DA = 17 AC 50% IMP.

TRY 2.5 VR - 8 PTS.

NP VOL = 2.5 (1/2" / AC) (DA) Rv

$R_v = 0.05 + (0.009)(\% \text{ IMP.}) = 0.05 + 0.009(50) = \underline{\underline{0.5}}$

MIN NP VOL = 2.5 (1/2) (16.9) (0.5) (1/2) (43,560) = 38,342 CF

SET NP = 27.0 → VOL = 48,781 CF ✓

61,506 Ft³

WET POND #5

11/14/97

TIME OF CONCENTRATION (OVERLAND → SEELYE CHART
CHANNEL → KIRPICH CHART)

PRE-DEV

$$DA = 8.7 \text{ AC} \quad L = 900'$$

$$\text{OVERLAND FLOW} \rightarrow L = 250' \quad \Delta z = 10' \quad S = 4\% \quad T_c = 16 \text{ min}$$

$$\text{CHANNEL FLOW} \rightarrow L = 450' \quad \Delta z = 64' \quad T_c = 2 \text{ min}$$

$T_{c \text{ PRE}} = 18 \text{ min}$

 ←

POST-DEV

$$DA = 16.9 \text{ AC} \quad L = 1,250'$$

$$\text{OVERLAND FLOW} \rightarrow L = 300' \quad \Delta z = 10' \quad S = 3\% \quad T_c = 18 \text{ min}$$

$$\text{CHANNEL FLOW} \rightarrow L = 950' \quad \Delta z = 56' \quad T_c = 6 \times 0.2 = 1.2 \text{ min}$$

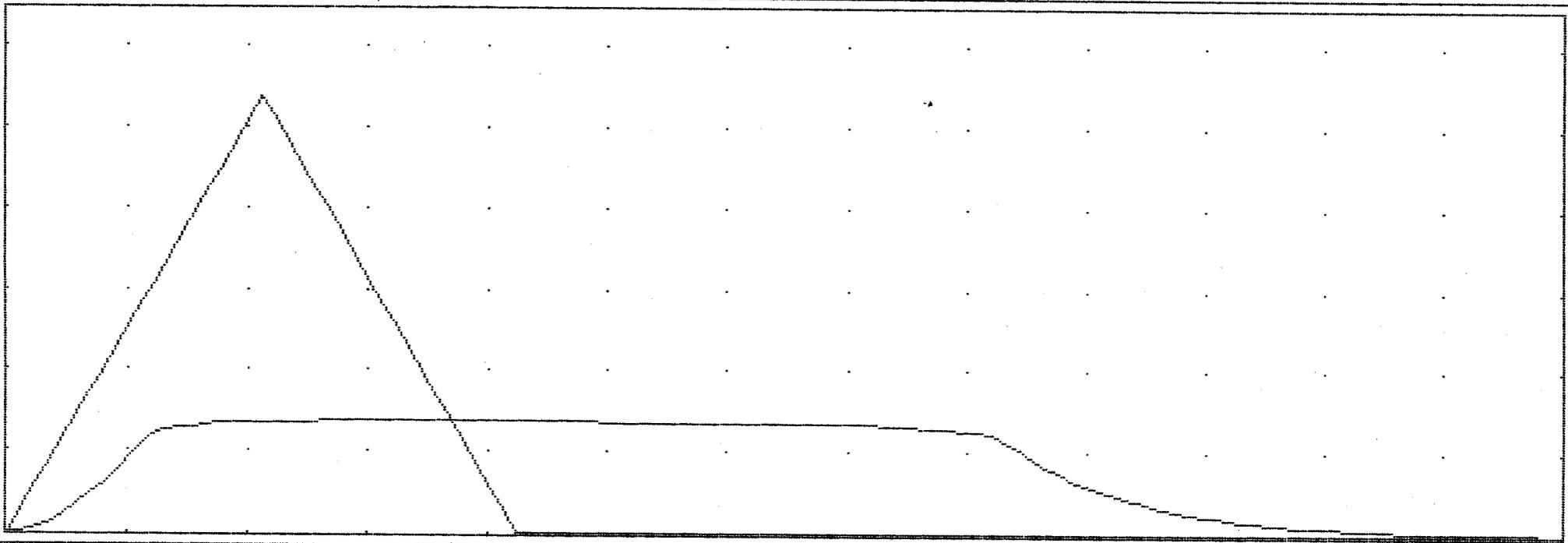
$T_{c \text{ POST}} = 19 \text{ min}$

 ←

Qp = 6.9

RESERVOIR ROUTE

2 Yr



HGU = 9 min

4

UGU = 5.0 cfs

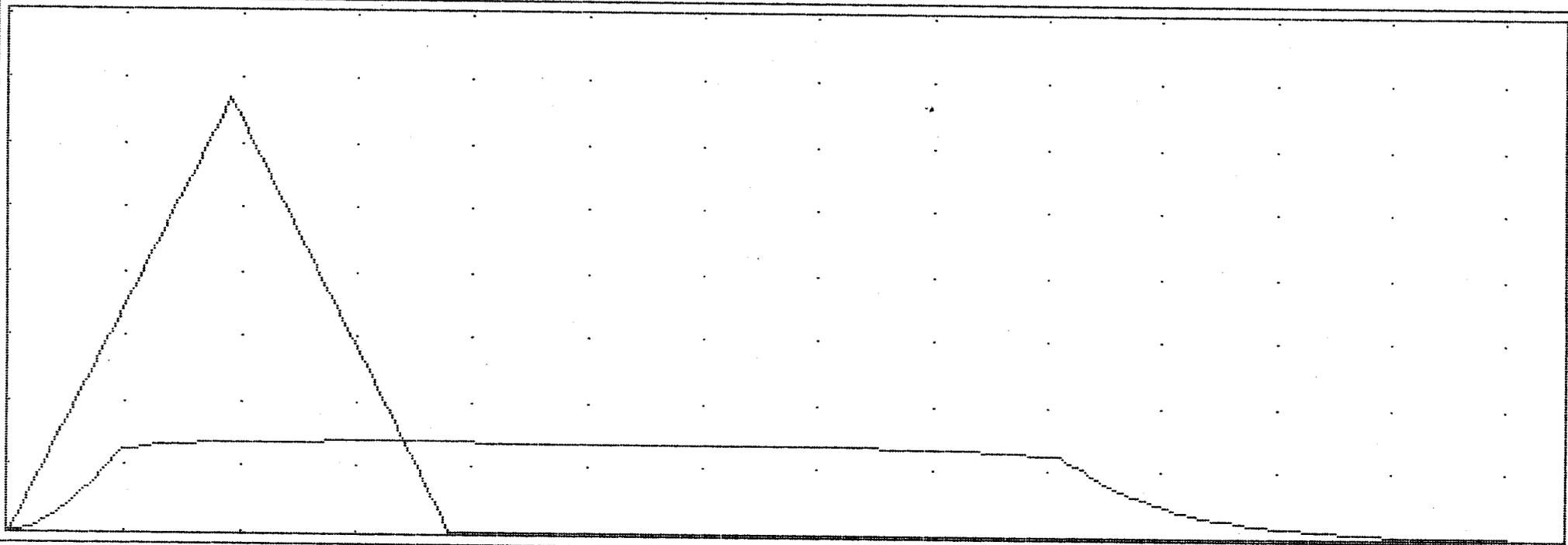
MAX STORAGE = 19142

MAX ELEVATION = 28.64

Qp = 7.0

RESERVOIR ROUTE

10 Yr



HGU = 10 min

6

UGU = 5.0 cfs

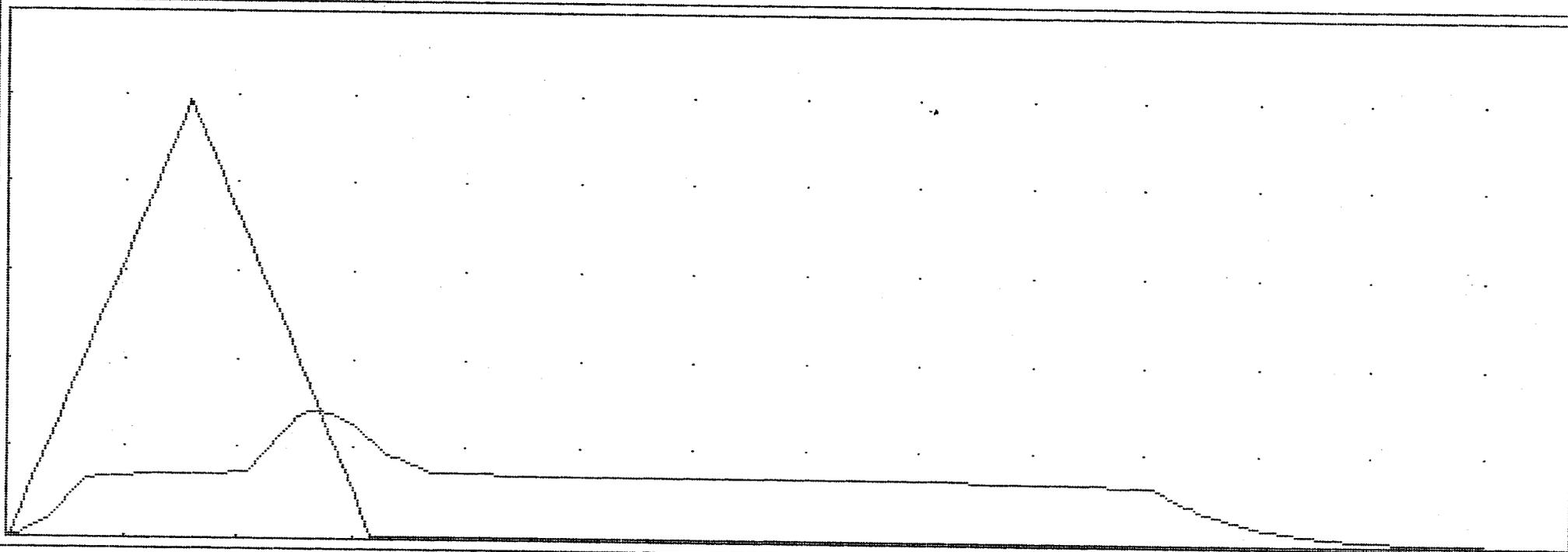
MAX STORAGE = 26065

MAX ELEVATION = 29.24

Qp = 14.0

RESERVOIR ROUTE

100 Yr



HGU = 12 min

10

UGU = 10.0 cfs

MAX STORAGE = 40604

MAX ELEVATION = 30.37

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project KINGSMILL - SANDYS FORT

Basin # WET POND #5 Location ADJ. TO JAMES RIVER

Total area draining to basin: 16.9 acres.

Basin Volume Design

Wet Storage:

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

$$67 \text{ cu. yds.} \times \underline{16.9} \text{ acres} = \underline{1,132} \text{ cu. yds. (30,572 CF)}$$
2. Available basin volume = 1,164 cu. yds. at elevation 22.5. (From storage - elevation curve) (31,434 CF)
3. Excavate 0 cu. yds. to obtain required volume*.
 * Elevation corresponding to required volume = invert of the dewatering orifice.
4. Available volume before cleanout required.

$$33 \text{ cu. yds.} \times \underline{16.9} \text{ acres} = \underline{558} \text{ cu. yds. (15,058 CF)}$$
5. Elevation corresponding to cleanout level = 20.0±
 (From Storage - Elevation Curve)
6. Distance from invert of the dewatering orifice to cleanout level = not reqd ft.
 (Min. = 1.0 ft.)

Dry Storage:

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

$$67 \text{ cu. yds.} \times \underline{16.9} \text{ acres} = \underline{1,132} \text{ cu. yds. (30,572 CF)}$$

8. Total available basin volume at crest of riser* = 2,281 cu. yds. at elevation 28.1. (From Storage - Elevation Curve)

* Minimum = 134 cu. yds./acre of total drainage area. $2,281 \text{ cy} > 2,264 \text{ c}$

9. Diameter of dewatering orifice = not req. in.
10. Diameter of flexible tubing = not req. in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 28.1
 Top of Dam = 31.5
 Design High Water = 30.4
 Upstream Toe of Dam = 12.0

Basin Shape

12. $\frac{\text{Length of Flow}}{\text{Effective Width}} = \frac{L}{W_e} = \frac{170}{80}$
 If > 2 , baffles are not required 2.2
 If < 2 , baffles are required _____

Runoff

13. $Q_2 = \underline{7.0}$ cfs (From Chapter 5)
 14. $Q_{25} = \underline{15.0}$ cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2 = \underline{7}$ cfs. (riser and barrel)
 Without emergency spillway, required spillway capacity $Q_p = Q_{25} = \underline{\quad}$ cfs. (riser and barrel)

16. With emergency spillway:

$$\text{Assumed available head (h)} = \underline{2} \text{ ft. (Using } Q_2)$$

$$h = \text{Crest of Emergency Spillway Elevation} - \text{Crest of Riser Elevation}$$

Without emergency spillway:

$$\text{Assumed available head (h)} = \underline{\hspace{2cm}} \text{ ft. (Using } Q_{25})$$

$$h = \text{Design High Water Elevation} - \text{Crest of Riser Elevation}$$

17. Riser diameter (D_r) = 48 in. Actual head (h) = 1.7 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 95 ft.

$$\text{Head (H) on barrel through embankment} = \underline{15} \text{ ft.}$$

(From Plate 3.14-7).

19. Barrel diameter = 10 in.

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

20. Trash rack and anti-vortex device

$$\text{Diameter} = \underline{84} \text{ inches.}$$

$$\text{Height} = \underline{24} \text{ inches.}$$

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p = \underline{8}$ cfs.

22. Bottom width (b) = 10 ft.; the slope of the exit channel (s) = $\frac{\underline{0.2}}{\underline{20}}$ ft./foot; and the minimum length of the exit channel (x) = $\frac{\underline{0.2}}{\underline{20}}$ ft.

(From Table 3.14-C).

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 16 ft.
 Slope of upstream face of embankment (Z) = 3 :1.
 Slope of principal spillway barrel (S_b) = 6.3 %
 Length of barrel in saturated zone (L_s) = 140 ft.
24. Number of collars required = 3 dimensions = 7' x 7'
 (from Plate 3.14-12).

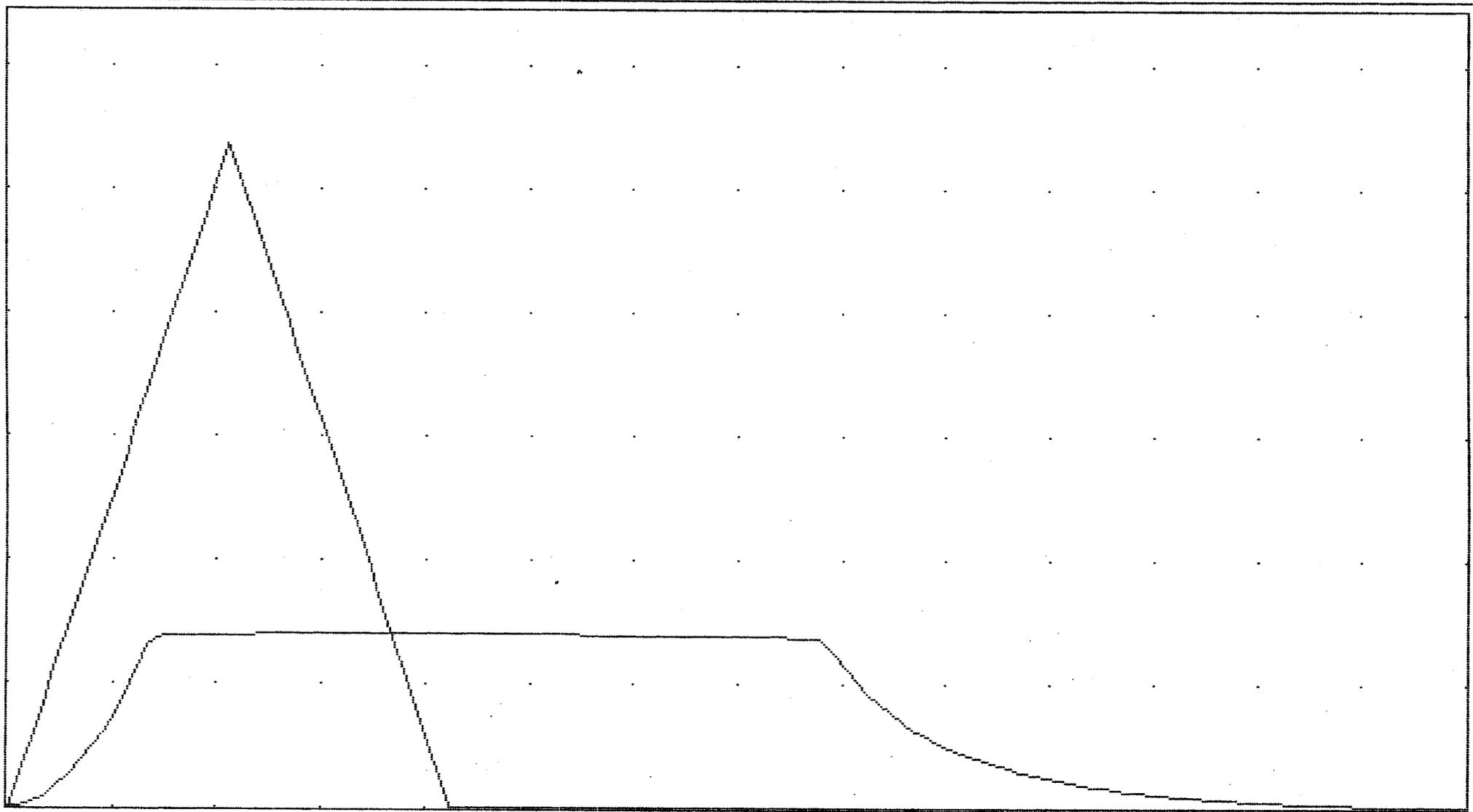
Final Design Elevations

25. Top of Dam = 31.5
 Design High Water = 30.4
 Emergency Spillway Crest = 30.0
 Principal Spillway Crest = 28.1
 Dewatering Orifice Invert = not req'd
 Cleanout Elevation = 20.0
 Elevation of Upstream Toe of Dam
 or Excavated Bottom of "Wet Storage
 Area" (if excavation was performed) = 12.0

Qp = 7.0

RESERVOIR ROUTE

2 Yr



HGU = 9 min

4

UGU = 5.0 cfs

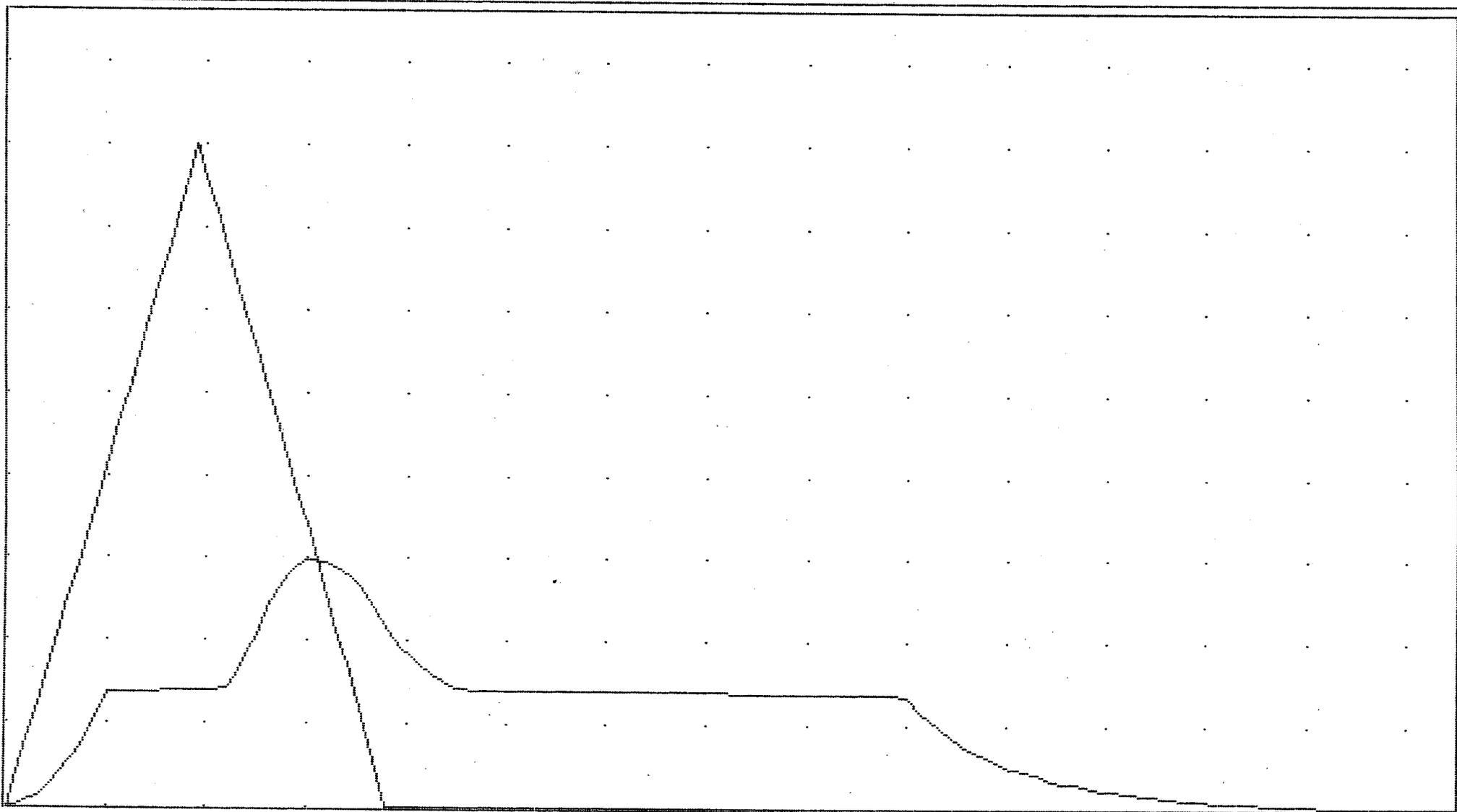
MAX STORAGE = 19182

MAX ELEVATION = 29.65

Qp = 15.0

RESERVOIR ROUTE

25 Yr



HGU = 10 min

8

UGU = 5.0 cfs

MAX STORAGE = 29663

MAX ELEVATION = 30.41

HYDROLOGIC REPORT FOR

KINGSMILL EAST

SANDYS FORT

WET POND #5

AES JOB NUMBER 7753-6

AES CONSULTING ENGINEERS

5248 OLDE TOWNE ROAD

WILLIAMSBURG, VA. 23188

AUGUST 28, 1997

REVISED JULY 14, 1998

1. RESERVOIR No = 3. 2. RESERVOIR NAME = WET POND #5.

3. $S = K_s * Z^b$

$K_s = 0$ $b = 0$

START ELEV = 0..... INCREMENT = 0...

STAGE	ELEVATION	CO	AREA	INC STORAGE	TOT STORAGE
ft	ft	sq ft	cu ft	cu ft	
4	0.00	27.00.	9553....	0	0
5	3.00	30.00.	13719...	34908	34908
6	5.00	32.00.	16709...	30428	65336
7	0.00	0.00.	0.....	0	0
8	0.00	0.00.	0.....	0	0
9	0.00	0.00.	0.....	0	0
10	0.00	0.00.	0.....	0	0
11	0.00	0.00.	0.....	0	0
12	0.00	0.00.	0.....	0	0
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

CULVERT STRUC A. $Q = C_o A [2gh/k]^{.5}$ CULVERT STRUC B. $Q = C_o A [2gh/k]^{.5}$

1. WIDTH (in) = 10.

9. WIDTH (in) = 0..

2. HEIGHT (in) = 10.

10. HEIGHT (in) = 0..

3. No. BARRELS = 1..

11. No. BARRELS = 0..

4. INVERT ELEV. = 27.....

12. INVERT ELEV. = 0.....

5. $C_o = 0.60$

13. $C_o = 0.60$

6. CULVERT LENGTH (ft) = 80..

14. CULVERT LENGTH (ft) = 0...

7. CULVERT SLOPE (%) = 26.3

15. CULVERT SLOPE (%) = 0...

8. MANNING'S N-VALUE = .018

16. MANNING'S N-VALUE = .013

17. MULTI-STAGE OPTION ? (Y/N) N

WEIR STRUCTURE A.

$Q = C_w L H^{EXP}$

WEIR STRUCTURE B.

$Q = C_w L H^{EXP}$

18. CREST LENGTH (ft) = 6.....

23. CREST LENGTH (ft) = 10.....

19. CREST ELEVATION = 27.....

24. CREST ELEVATION = 29.9...

20. $C_w = 3.00$

25. $C_w = 3.00$

21. EXP = 1.50

26. EXP = 1.50

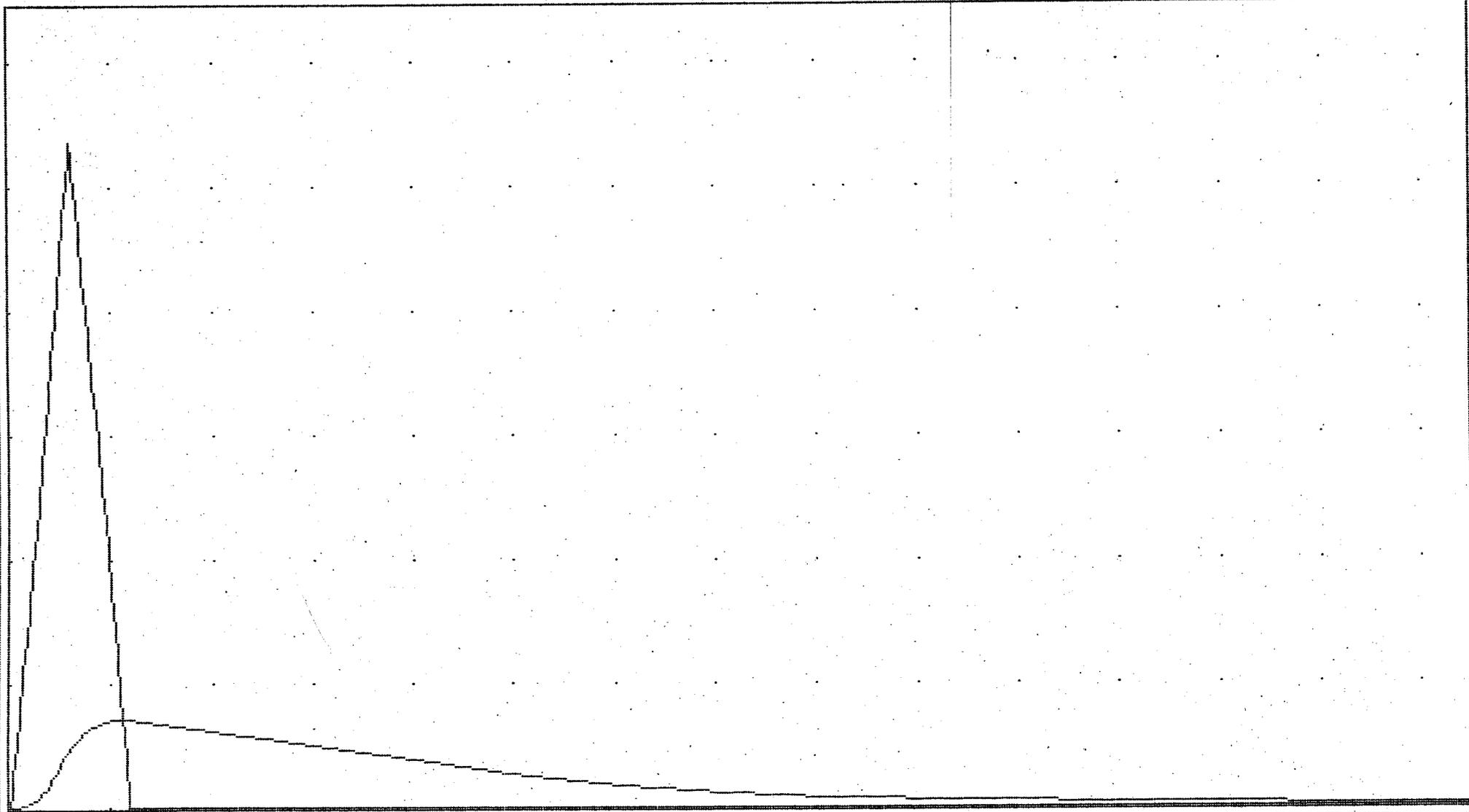
22. MULTI-STAGE OPTION ? (Y/N) Y

27. MULTI-STAGE OPTION ? (Y/N) N

Qp = 3.6

RESERVOIR ROUTE

2 Yr



HGU = 32 min

4

UGU = 5.0 cfs

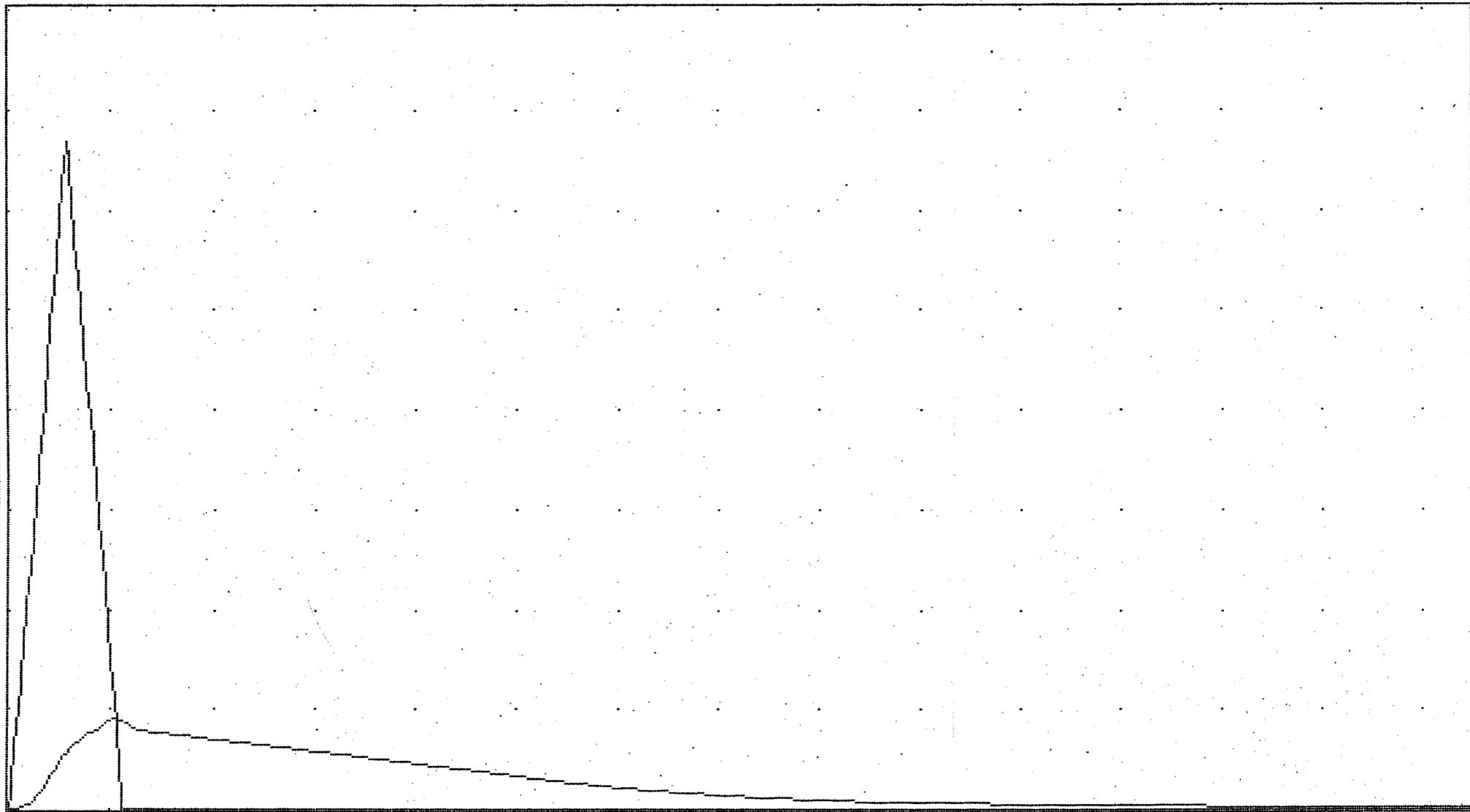
MAX STORAGE = 26281

MAX ELEVATION = 29.26

Qp = 4.5

RESERVOIR ROUTE

10 Yr



HGU = 34 min

6

UGU = 5.0 cfs

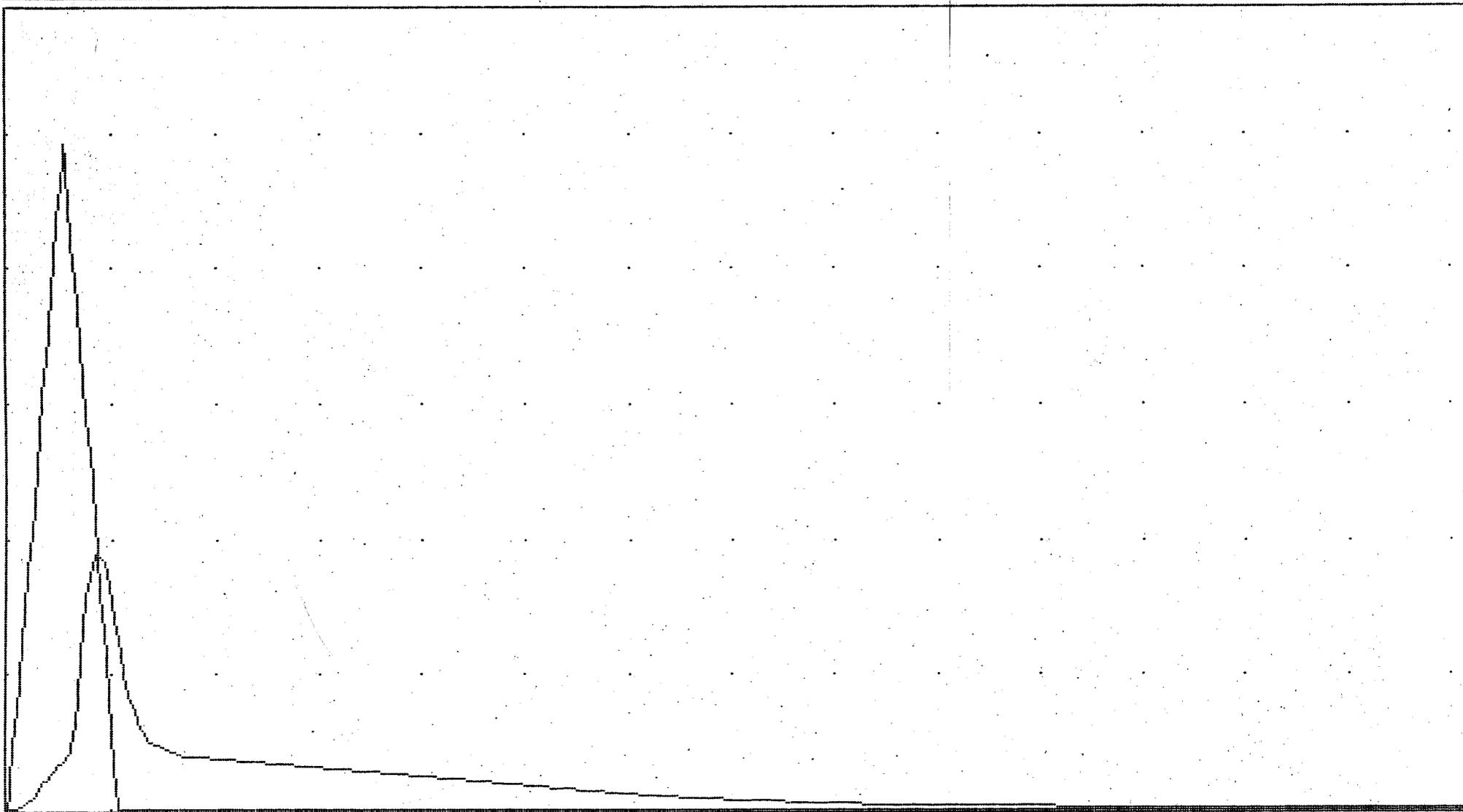
MAX STORAGE = 32977

MAX ELEVATION = 29.83

Qp = 19.0

RESERVOIR ROUTE

100 Yr



HGU = 36 min

10

UGU = 10.0 cfs

MAX STORAGE = 42627

MAX ELEVATION = 30.51

**GEOTECHNICAL
ENGINEERING SERVICES
REPORT**

For the

**KINGSMILL EAST – SANDY'S
FORT DEVELOPMENT
JAMES CITY COUNTY, VIRGINIA**

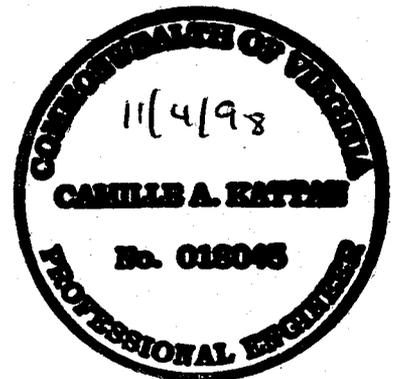
Prepared For

**George Nice & Sons, Inc.
143 Skimino Road
Williamsburg, Virginia 23185**

Prepared by

**Professional Service Industries, Inc.
11835 Canon Boulevard
Suite C-108
Newport News, Virginia 23606
Telephone (757) 873-4611
Fax (757) 873-4612**

**PSI Project No. 239-85083-1
November 3, 1998**



A handwritten signature in black ink that reads "Camille A. Kattan".

**Camille A. Kattan, P.E.
District Manager
VA Reg. No. 18045**



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APPENDIX

- I. Figure 1: Site Location Plan
- Figure 2: Boring Location Plan – Pond #5
- Figure 3: Boring Location Plan – Pond #2
- II. Logs of Borings
- III. Soil Boring Profile
- IV. Figure 4-8: Laboratory Test Data

November 3, 1998

*George Nice & Sons, Inc.
Re: The Kingsmill East – Sandy’s Fort Development
PSI Project No. 239-85083-1*



1.0 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

Authorization to proceed with this project was issued by George Nice & Sons, Inc. through acceptance of PSI Proposal (239-8p134) dated July 1, 1998.

1.2 PROJECT DESCRIPTION

The Kingsmill East - Sandy's Fort Development is planned to be an extension of the existing Kingsmill residential development. The proposed roadways within the extension consist of Wareham's Pond Road East and three culverts presently identified as "Roads A, B, and C" totaling approximately 3,200 linear feet of paved roadway. A total of 35 residential lots are planned to be located along the roadways.

Topographic maps indicate that the site is generally hilly throughout. A relatively steep slope appears to be formed where a ridgeline along the eastern portion of the site intersects a lower lying area identified as wetlands. Stormwater generated throughout the proposed development appears to be routed to two locations of the ridge/wetland intersection. The stormwater runoff will be detained in two proposed wet ponds identified as Wet Pond #2 and Wet Pond #5. The locations of these ponds are shown in the appended Site Plan (Figure 1).

The proposed design of the wet ponds consists of the construction of embankment dams across valleys of the "U" shaped ridgelines. The length of the dams from ridge to ridge is approximately 140 feet at the normal pool elevation. The existing side slopes of the ridges are approximately 1 vertical to 1 horizontal (1V:1H) and in some locations steeper. Cross-section diagrams indicate that the proposed dams are approximately 140 feet in width at the base and 12 feet in width at the crest. The existing valley elevations within the damn area of Wet Pond #2 range from +13 to +17 feet. The proposed normal pool elevation for this damn is +28 feet and the 100-year pool elevation is estimated to be +31.4 feet. The proposed crest elevation of the damn is +33.2 feet, giving a maximum height of the damn of approximately 20 feet. For Wet Pond #5, the existing valley elevation within the damn area ranges from +6 to +12 feet. The proposed normal

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pool elevation for this damn is +27 feet and the 100-year pool elevation is estimated to be +30.4 feet. The proposed crest elevation of the damn is +31.5 feet, giving a maximum height of the damn of approximately 24 feet.

The damns are designed with overflow structures at the normal pool elevations. These structures route excess water through the bases of the damns to outlet structures at the dry side of the damns. Emergency spillways are proposed at elevations just below the 100-year pool elevations. The emergency spillways route water through a trapezoidal ditch over the crest of the damn.

1.3 PURPOSE

The purpose of this study was explore the subsurface conditions within the proposed damn areas of Wet Pond #2 and Wet Pond #5, and to evaluate the results of exploration with respect to the following: 1) slope stability of the damn; 2) seepage patterns of the damn; 3) potential settlement of the damn; and 4) recommendations for damn design and construction.

1.4 SCOPE OF WORK PERFORMED

To explore the subsurface conditions, Professional Service Industries, Inc. (PSI) performed a total of 2 Standard Penetration Test borings to total depths of 50 feet and a total of 4 hand auger borings to approximate depths of 15 feet below the existing ground surface. In the SPT borings, split spoon soil sampling was performed virtually continuously to a depth of 10 feet and at intervals of 5 feet thereafter. In the hand auger borings soil samples were collected from each soil stratum encountered. Representative soil samples were placed in sealed containers and returned to our Newport News laboratory for evaluation and testing. Groundwater levels were recorded in the borings at the time of drilling.

The collected soil samples were visually classified in the laboratory by a Geotechnical Engineer. An opinion was formed of the site soil stratigraphy, and laboratory testing was subsequently performed to estimate the engineering properties of the soil strata. Laboratory testing of the subsurface soil samples primarily included Minus #200 sieve analysis to determine the percent clay and silt of the soil strata.

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In addition, laboratory testing was performed on representative soil samples of possible fill material to be used for construction of the dams. Testing of the fill materials included Minus #200 sieve analysis, Atterberg Limits testing, and moisture-density relationship testing.

The results of subsurface exploration and testing were used to perform a three-dimensional seepage analysis of the dam under varying conditions. The test results were also used to evaluate side slopes of the dam and to calculate estimated settlement of the dam due to compression of the underlying soils. The results of our exploration and analysis along with our recommendations for design and construction of the dam are presented in this report.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, surface water, groundwater or air, on or below or around this site. Any statements contained in this report or on the boring profiles regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of the client.

2.0 SUBSURFACE CONDITIONS

The locations of the soil borings are identified in the appended Boring Location Plans (Figures 2 and 3) as B-1 through B-6. The results of exploration and testing performed in the valleys indicated the presence of recent alluvium deposits to a depth of approximately 8 feet, underlain by older marine deposits extending to the boring termination depths of 50 feet. The alluvium deposits primarily consisted of very loose silty sands often containing organic silts. The Standard Penetration Test results, N-values, ranged from 1 to 5 blows per foot (bpf) within these deposits (0 to 8 feet below ground surface).

The marine deposits consisted of a yellowish brown sand layer with shell fragments from 8 to 12 feet. At the location of soil boring B-2, a greenish-gray silty sand with shell fragments was encountered beneath the yellowish-brown sand layer at the approximate depth interval of 12 to 17 feet. Underlying the greenish-gray silty sand at boring location B-2 and underlying the yellowish-brown sand at boring location B-1, a greenish-gray silty clay was encountered. The silty clay layer extended to depths ranging from 22 to 27 feet, with an average thickness of approximately 10 feet. At boring location B-2, a greenish-gray silty sand with shell fragments was encountered below the silty clay layer and extended to the boring termination depth of 50 feet. At boring location B-1, inter-bedded layers of

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greenish-gray silty sand and silty clay were encountered to the boring termination depth of 50 feet, with silty-sands predominating at depths below 32 feet. The N-values recorded within the marine deposits ranged from 8 to 15 indicating loose to medium dense granular soils, and medium stiff clay soils. Groundwater levels were encountered at approximate depths of 2 feet at both pond base locations.

The results obtained from hand auger soil borings performed in the existing valley side slopes varied from location to location. Along the sides of the valley at Wet Pond #2, sandy clays and clayey sands were encountered to a depth of 3 feet, and were underlain by a silty sand with varying degrees of shell fragments to the boring termination depths of 15 feet. Along the sides of the valley at Wet Pond #5, sandy silts and clays containing significant shell fragments were encountered from land surface to depths ranging from 8 to 10 feet. Underlying this layer, a clayey sand was encountered to the boring termination depths of 15 feet. Groundwater was not encountered at these boring locations. The hand auger boring termination elevations were approximately equivalent to the bottom elevation of the valleys.

Laboratory testing consisted of Minus #200 sieve analysis to determine the percent clay and silt present in the soil samples. The results of sieve analysis are summarized below in Table 1.

Table 1: Summary of Laboratory Test Data – Subsurface Soils

Boring Location	Depth (feet)	Soil Description	USCS ⁽¹⁾	Passing No. 200 Sieve (%)
B-1	2 – 4	Dark Brown Silty Sand	SM	26.4
B-1	4 – 6	Dark Brown Silty Sand	SM	45.4
B-1	8 – 10	Yellowish-Brown Slightly Silty Sand	SP-SM	11.0
B-1	18 – 20	Greenish-Gray Silty Clay	CL	74.1
B-2	0 - 2	Gray Silty Sand	SM	33.6
B-2	2 – 4	Gray Silty Sand	SM	14.4
B-2	4 – 6	Dark Brown Silty Sand	SM	37.0
B-2	6 – 8	Gray Silty Sand	SM	35.4
B-2	8 – 10	Yellowish-Brown Slightly Silty Sand	SP-SM	11.4

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Boring Location	Depth (feet)	Soil Description	USCS ⁽¹⁾	Passing No. 200 Sieve (%)
B-2	18 - 20	Greenish-Gray Silty Clay	CL	56.7
B-2	43 - 45	Greenish-Gray Silty Sand	SM	13.3
B-3	1 - 10	Mixture Sandy Silt with Marine Shell Fragments	ML	31.4
B-4	1 - 8	Orangish-Brown Sandy Clay	CL	60.5
B-4	8 - 15	Orangish-Brown Clayey Sand	SC	37.0
B-5	3 - 15	Tan Silty Sand with Marine Shell Fragments	SM	47.0
(1)USCS = Unified Soil Classification System				

Boring logs are provided in the Appendix of this report. The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs provide a more specific description of the subsurface conditions encountered and should be reviewed. The stratifications shown on the boring logs represent the condition only at the actual boring location. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual.

Fill materials desired for use in the project consist of on-site borrow soils. The borrow soils were observed in the field to range from clayey sands to sandy clays. Stockpiled soils appeared to contain a mixture of these two soils. A representative soil sample of each borrow material was obtained and returned to PSI's laboratory for subsequent laboratory testing including moisture content determination, Minus #200 sieve analysis, Atterberg limits testing and moisture-density relationship testing. The results of testing are summarized below in Table 2.

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Table 2: Summary of Laboratory Test Data – Borrow Soils

Sample No.	Sample Description	Natural Moisture Content (%)	Passing #200 Sieve (%)	Liquid Limit (%)	Plasticity Index (%)	Optimum Moisture (%)	Maximum Dry Density
1	Light Reddish Brown and Gray Sandy Clay (CL)	18.9	66.7	41	23	14.5	113.0
2	Reddish Brown and Gray Clayey Sand (SC)	17.3	37.7	28	12	12.5	118.0

3.0 EVALUATION AND RECOMMENDATIONS

3.1 SEEPAGE

PSI performed a three-dimensional seepage analysis to evaluate seepage forces and rates for the proposed clay core damn design. The analysis was performed utilizing a computer model implementing a finite element analysis and traditional flow net theory. The results of preliminary analysis indicated that the seepage rates occurring through the bases and sides of the damns are unacceptable due to the porous granular soils and shell fragments encountered in the upper portion of the soil profile and the relatively large difference in head occurring from the wet pond side of the damn to the dry side of the damn.

To prevent excessive seepage in these areas, the cut-off trench for this damn would be required to extend to minimum depths ranging from approximately 14 to 19 feet into the existing ground surface, and would be required to extend along the full length of the damn into the existing valley walls.

PSI recommends the installation of steel sheet piles as opposed to the use of a cut-off trench. The pilings should be continuously driven the full length of the damns and should extend horizontally a minimum distance of 20 feet into the existing valley walls from the intersection of the crest of the damn and the existing valley walls. The piling tip elevations should be a minimum of 20 feet below the existing ground surface elevations at all piling locations.

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The piling butts should extend a minimum of 3 feet above the existing ground surface at all piling locations to key into the damn fill materials. A representative of PSI should be present during piling installation to verify pile location and depth.

PSI further recommends use of anti-seep collars along the overflow pipe running through the base of the damn. The anti-seep collars should be a minimum of 5 feet by 5 feet in size. The collars should be spaced a minimum of 18 feet apart, and should not be spaced closer than 2 feet to a pipe joint.

3.2 FILL MATERIALS AND PLACEMENT

PSI recommends utilizing the on-site clayey sands and sandy clays for the entirety of the damn cross section. A representative of PSI should be present at all times to observe the fill type to ensure that the borrow materials are consistent with those evaluated for this project. Sampling of the borrow materials should be performed frequently. The samples should be analyzed to determine the percent fines and the Standard Proctor Maximum Dry Density (ASTM D698). All fill materials should contain a minimum of 35 percent by weight of fines and should be classified as clayey sand (SC) or sandy clay (CL). When questionable fill materials are encountered, all use of these materials should be discontinued until laboratory testing results are obtained by PSI.

Fill materials should be placed in maximum 10-inch lifts and compacted to 98 percent of the Standard Proctor Maximum Dry Density for the fill material. Based on the natural moisture contents of the fill materials recorded at the time of this evaluation and the optimum moisture contents recorded during Proctor analysis, some drying out of the fill materials may be required to obtain the required percent compaction of these materials.

The fill materials should be placed in accordance with the above criteria to an elevation slightly above the design piling butt elevations, prior to installation of the pilings. This will provide a better seal between the fill soils and the sheet piling and will reduce excessive seepage along the piling/fill interface.

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The surface of the damn slopes should be constructed approximately 12 inches above grade. Subsequent to compaction of the slopes, the excess fill should be cut to the design grade to achieve proper slopes. This method will ensure that proper compaction is obtained along the damn side slopes, and will prevent deterioration of the side slopes due to equipment operation.

3.3 SLOPE STABILITY

Evaluation of slope stability was performed by utilizing a computer model based on the UTexas 3 Method. To maintain a minimum factor of safety of 1.5 against failure, our analysis indicated that slopes no steeper than 2½ horizontal to 1 vertical (2½H:1V) will be required on the pond side of the damns and slopes no steeper than 3.0 horizontal to 1 vertical (3H:1V) will be required on the discharge or dry side of the damn.

PSI also recommends installation of a relatively shallow drainage ditch at the toe of the dry side of the damn. The drainage ditch should be designed to adequately route stormwater runoff away from the base of the damn.

3.4 SETTLEMENT

Settlement of the soils underlying the center of the damn is estimated to range from approximately 8 to 10 inches. Approximately six inches of the estimated settlements are attributed to the granular compression of the upper very loose sands. This type of settlement will occur almost immediately as the fill loads are applied. The remaining estimated settlements are attributed to consolidation settlement of the deeper clay layers and the degradation of organics in the upper silty sands. These types of settlement are gradual and can take years to complete; however, 90 percent of the settlement would likely occur within the first three to six months after fill placement.

PSI recommends placing the stormwater drainage pipe that extends through the base of the damn approximately 6 inches above the desired elevation. During construction of the discharge pipe to the overflow riser, possible total settlements of this magnitude should be expected, and differential settlements on the order of approximately 2 to 4 inches should be expected for the entire pipe length.

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4.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by PSI for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in our recommendations are required. If PSI is not retained to perform these functions, PSI can not be responsible for the impact of those conditions on the performance of the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete the Geotechnical Engineer should be provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of George Nice & Sons, Inc. and their consultants for the specific application to the proposed The Kingsmill East – Sandy's Fort Development.

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Re: The Kingsmill East – Sandy's Fort Development
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APPENDIX

- I. Figure 1: Site Location Plan
- Figure 2: Boring Location Plan – Pond #5
- Figure 3: Boring Location Plan – Pond #2
- II. Logs of Borings
- III. Soil Boring Profile
- IV. Figures 4-8: Laboratory Test Data



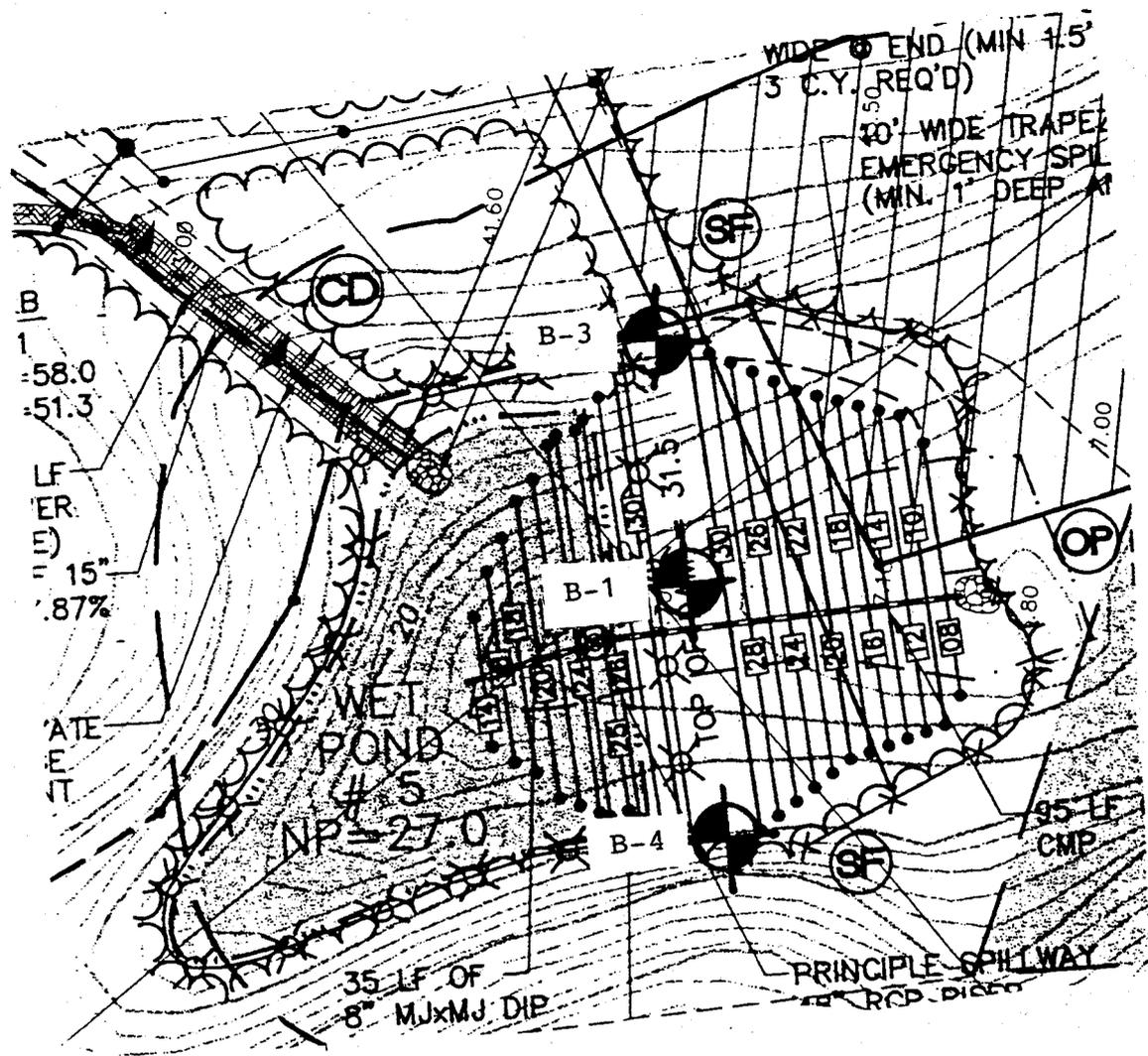
APPENDIX I

Figure 1: Site Location Plan

Figure 2: Boring Location Plan – Pond #5

Figure 3: Boring Location Plan – Pond #2





LEGEND

 B-1: Indicates Approximate Boring Location

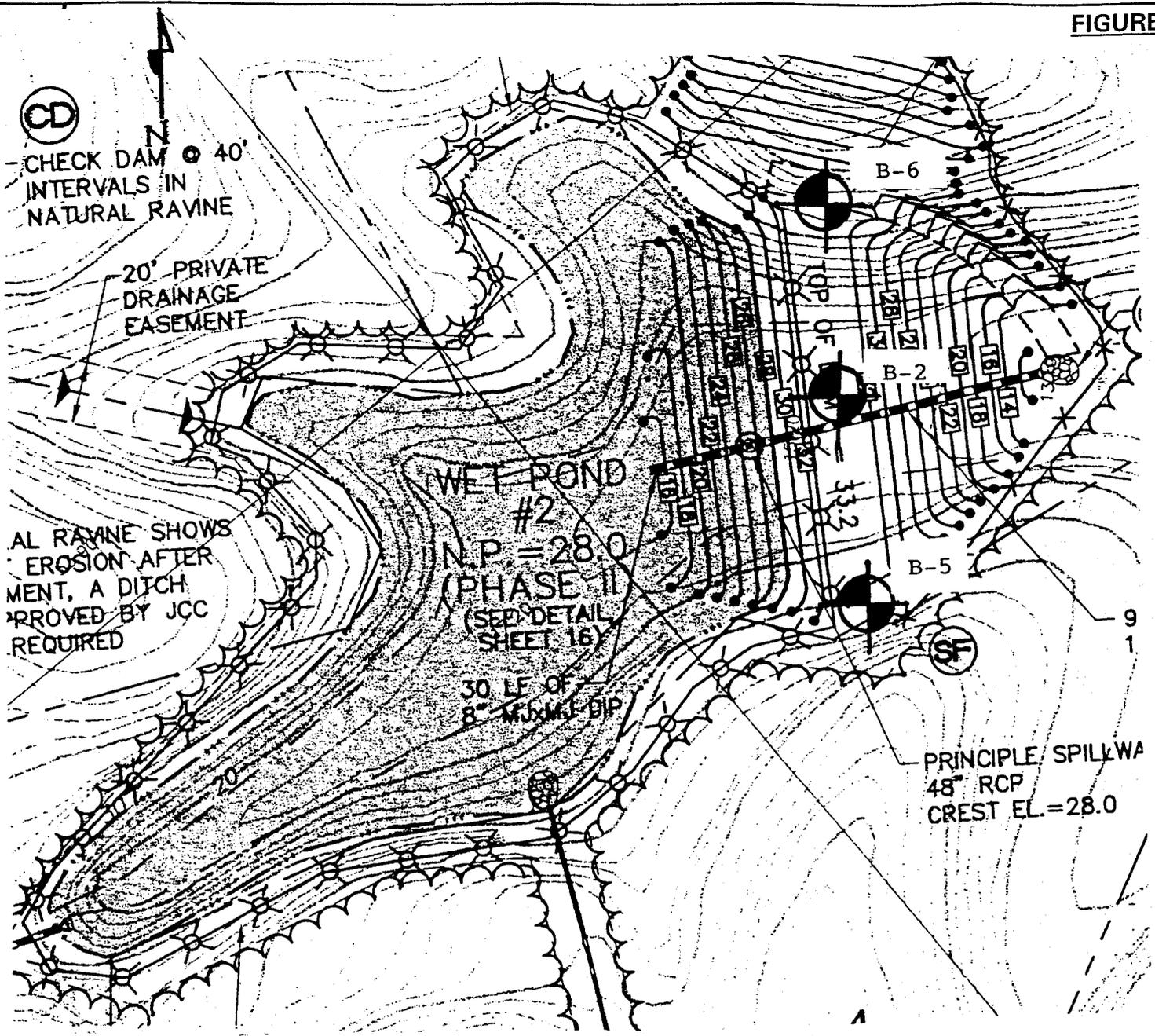
Adapted from AES Consulting Engineers Civil Drawing - #9, dated 9/19/97

BORING LOCATION PLAN - WET POND #5

PROJECT NAME: The Kingsmill East - Sandy's Fort Development
 LOCATION: James City County, Virginia
 PSI PROJECT NUMBER: 239-85083-1
 CLIENT: George Nice & Sons, Inc.

SCALE: 1" = 50'
 DATE: 07/27/99

Professional Service Industries, Inc.



Legend



B-6: Indicates Approximate Boring Location

Adapted from AES Consulting Engineers Civil Drawing - #7, dated 9/19/97

BORING LOCATION PLAN - WET POND #2

PROJECT NAME: The Kingsmill East - Sandy's Fort Development

LOCATION: James City County, Virginia

SCALE: 1" = 50'

PSI PROJECT NUMBER: 239-85083-1

DATE: 07/27/98

CLIENT: George Nice & Sons, Inc.

Professional Service Industries, Inc.

APPENDIX II

Logs of Borings



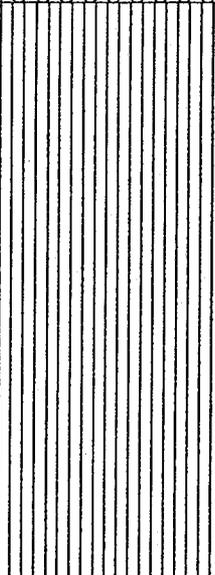
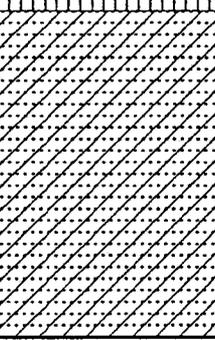
PROFESSIONAL SERVICE INDUSTRIES, INC.		PROJECT NO. 239-85083-1	SHEET 1 OF 2
Project Name THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT		Date 6/22/98	
Client GEORGE NICE & SONS, INC.	Boring Location SEE BORING LOCATION PLAN		Hole No. B-2
Project Location JAMES CITY COUNTY, VIRGINIA	Drill Method MUD DRILLING	Station	Depth of Hole:(Ft) 50
Name of Foreman T. JONES	Water Level Observations: (all levels noted in feet)	Noted on Rods:(Ft) 1.5	At Completion:(Ft)
Name of Inspector S WALL, EIT/C KATTAN, PE	After	Hours	Feet
Signature of Inspector			Cave in at:(Ft)

DEPTH	LEGEND	CLASSIFICATION OF MATERIAL (Description)	SAMPLE NO.	BLOWS/6" N-VALUES	RECOVERY (INCHES)	REMARKS
0		GRAY TO DARK BROWN SILTY SAND (SM), VERY LOOSE TO LOOSE	1	1 1		6" TOPSOIL
			2	0 1		
		SATURATED SOILS ENCOUNTERED BELOW 1.5 FEET	3	3 3		
		TRACE OF SHELL FRAGMENTS ENCOUNTERED AT 3.0 FEET	4	2 1		
5		TRACE OF GRAVEL ENCOUNTERED AT 6.0 FEET	5	1 1		
			6	1 1		
			7	WOH/12"		WOH=WEIGHT-OF-HAMMER
			8	1 2		
		YELLOWISH-BROWN SLIGHTLY SILTY SAND (SP-SM) WITH SHELL FRAGMENTS, LOOSE	9	2 3		
			10	3 4		
		GREENISH-GRAY SILTY SAND (SM) WITH SHELL FRAGMENTS, LOOSE	11			
			12	5		
15			13	4 5		
		GREENISH-GRAY SILTY CLAY (CL), MEDIUM STIFF	14			
			15	5		
20			16	3 5		
			17			
			18	3		
25			19	4 5		
			20			
		GREENISH-GRAY SILTY SAND (SM) WITH SHELL FRAGMENTS, LOOSE TO MEDIUM DENSE	21	7		
			22	8 7		
30			23			
			24	7		
35			25	7 7		

Project	THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT	HOLE NO.	B-2
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PROFESSIONAL SERVICE INDUSTRIES, INC.		PROJECT NO.	239-85083-1	SHEET 1 OF 1
Project Name		THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT		Date 06/30/98
Client		Boring Location		Hole No.
GEORGE NICE & SONS, INC.		WET POND #5		B-3
Project Location		Drill Method	Station	Depth of Hole:(Ft)
JAMES CITY COUNTY, VIRGINIA		HAND AUGER		15
Name of Foreman		Water Level Observations: (all levels noted in feet)	Noted on Rods:(Ft)	At Completion:(Ft)
SCOTT WALL, E.I.T.				
Name of Inspector		After	Hours	Feet
CAMILLE A. KATTAN, P.E.				Cave in at:(Ft)

Signature of Inspector

DEPTH	LEGEND	CLASSIFICATION OF MATERIAL (Description)	REMARKS
0		TOPSOIL AND ROOTS ("FILL")	
1.5		TAN SANDY SILT (ML) WITH SIGNIFICANT SHELL FRAGMENTS	
3			
4.5			
6			
7.5			
9			
10.5		ORGANISH-BROWN CLAYEY SAND (SC)	
12			
13.5			
15		BORING TERMINATION AT 15 FT.	

Project	THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT	HOLE NO.	B-3
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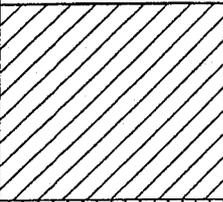
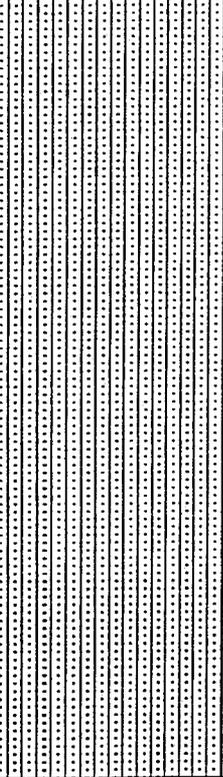
PROFESSIONAL SERVICE INDUSTRIES, INC.		PROJECT NO.	239-85083-1	SHEET 1 OF 1	
Project Name		THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT		Date	06/30/98
Client		GEORGE NICE & SONS, INC.		Boring Location	WET POND #5
Project Location		JAMES CITY COUNTY, VIRGINIA		Hole No.	B-4
Name of Foreman		SCOTT WALL, E.I.T.		Drill Method	HAND AUGER
Name of Inspector		CAMILLE A. KATTAN, P.E.		Station	
Signature of Inspector				Depth of Hole:(Ft)	15
		Water Level Observations: (all levels noted in feet)		Noted on Rods:(Ft)	At Completion:(Ft)
		After		Hours	Feet
				Cave in at:(Ft)	

DEPTH	LEGEND	CLASSIFICATION OF MATERIAL (Description)	REMARKS
0		1' OF NATIVE TOPSOIL	
1.5		ORANGISH BROWN SANDY CLAY (CL) WITH SIGNIFICANT SHELL FRAGMENTS	
3			
4.5			
6			
7.5			
9		ORANGISH BROWN CLAYEY SAND (SC)	
10.5			
12			
13.5			
15		BORING TERMINATION AT 15 FT.	

Project	THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT	HOLE NO.	B-4
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PROFESSIONAL SERVICE INDUSTRIES, INC.		PROJECT NO. 239-85083-1	SHEET 1 OF 1
Project Name THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT		Date 06/30/98	
Client GEORGE NICE & SONS, INC.	Boring Location WET POND #5		Hole No. B-5
Project Location JAMES CITY COUNTY, VIRGINIA	Drill Method HAND AUGER	Station	Depth of Hole:(Ft) 15
Name of Foreman SCOTT WALL, E.I.T.	Water Level Observations: (all levels noted in feet)	Noted on Rods:(Ft)	At Completion:(Ft)
Name of Inspector CAMILLE A. KATTAN, P.E.	After	Hours	Feet
Cave in at:(Ft)			

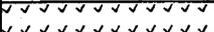
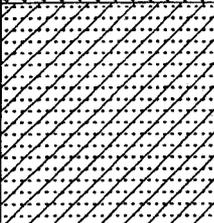
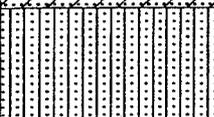
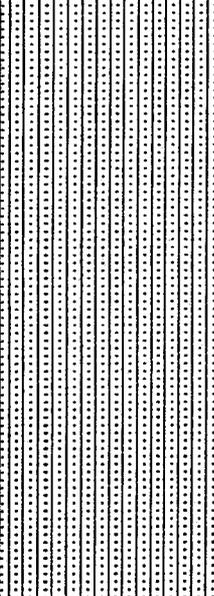
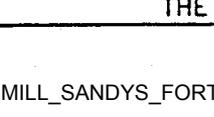
Signature of Inspector

DEPTH	LEGEND	CLASSIFICATION OF MATERIAL (Description)	REMARKS	
0		ORANGE SANDY CLAY (CL)		
1.5				
3		TAN SILTY SAND (SM) WITH NO SHELL TO SIGNIFICANT SHELL FRAGMENTS		
4.5				
6				
7.5				
9				
10.5				
12				
13.5				
15				
		BORING TERMINATION AT 15 FT.		

Project THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT	HOLE NO. B-5
---	--------------

PROFESSIONAL SERVICE INDUSTRIES, INC.		PROJECT NO. 239-85083-1	SHEET 1 OF 1
Project Name THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT		Date 06/30/98	
Client GEORGE NICE & SONS, INC.	Boring Location WET POND #5		Hole No. B-6
Project Location JAMES CITY COUNTY, VIRGINIA	Drill Method HAND AUGER	Station	Depth of Hole:(Ft) 15
Name of Foreman SCOTT WALL, E.I.T.	Water Level Observations: (all levels noted in feet)	Noted on Rods:(Ft)	At Completion:(Ft)
Name of Inspector CAMILLE A. KATTAN, P.E.	After	Hours	Feet
Cave In at:(Ft)			

Signature of Inspector

DEPTH	LEGEND	CLASSIFICATION OF MATERIAL (Description)	REMARKS
0		6" TOPSOIL	
1.5		ORGANISH BROWN CLAYEY SAND (SC)	
3			
4.5		TAN SILTY SAND (SM)	
6			
7.5			
9			
10.5			
12			
13.5			
15		BORING TERMINATION AT 15 FT.	

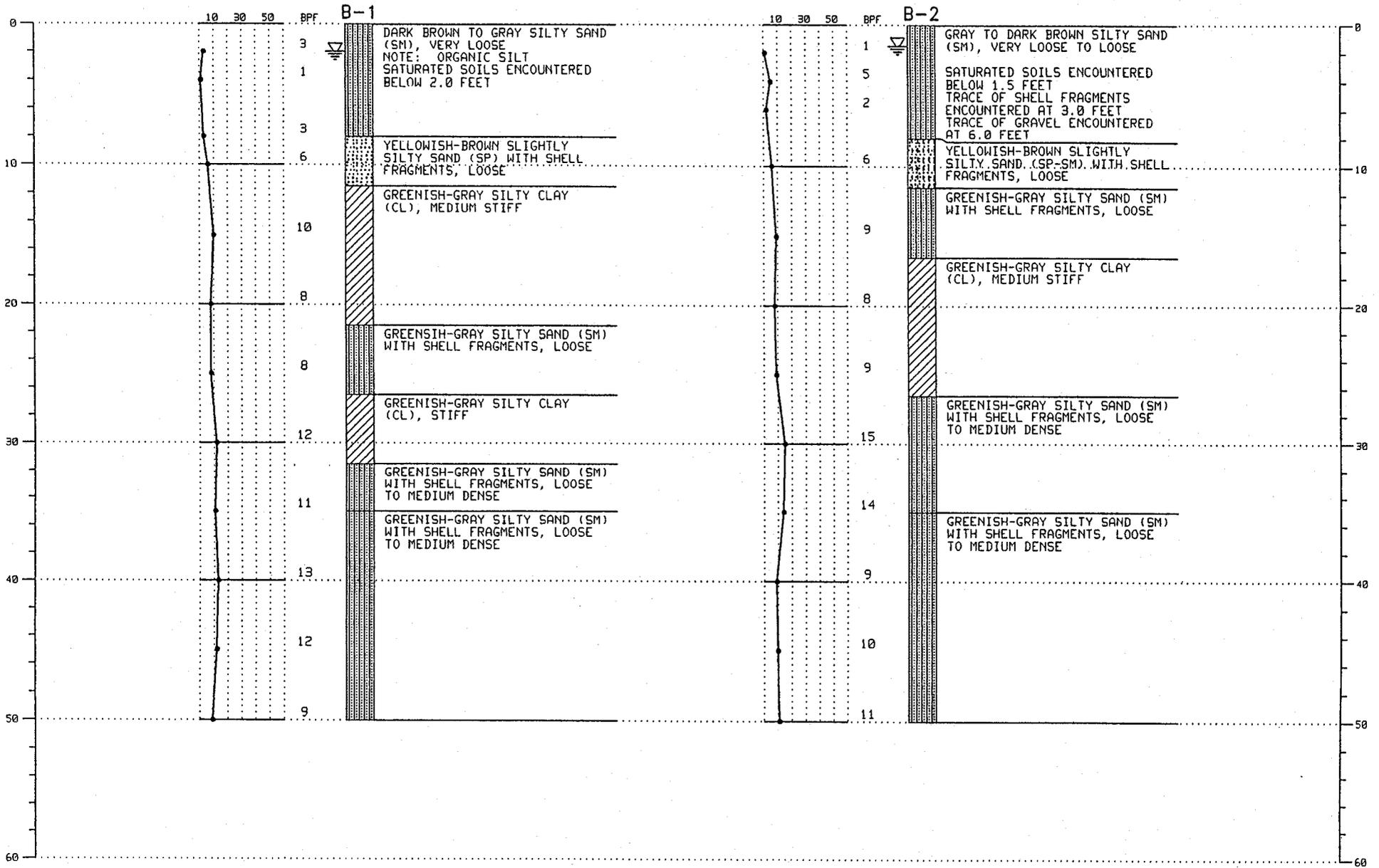
Project THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT	HOLE NO. B-6
---	--------------

APPENDIX III

Soil Boring Profile



BORING PROFILE THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT

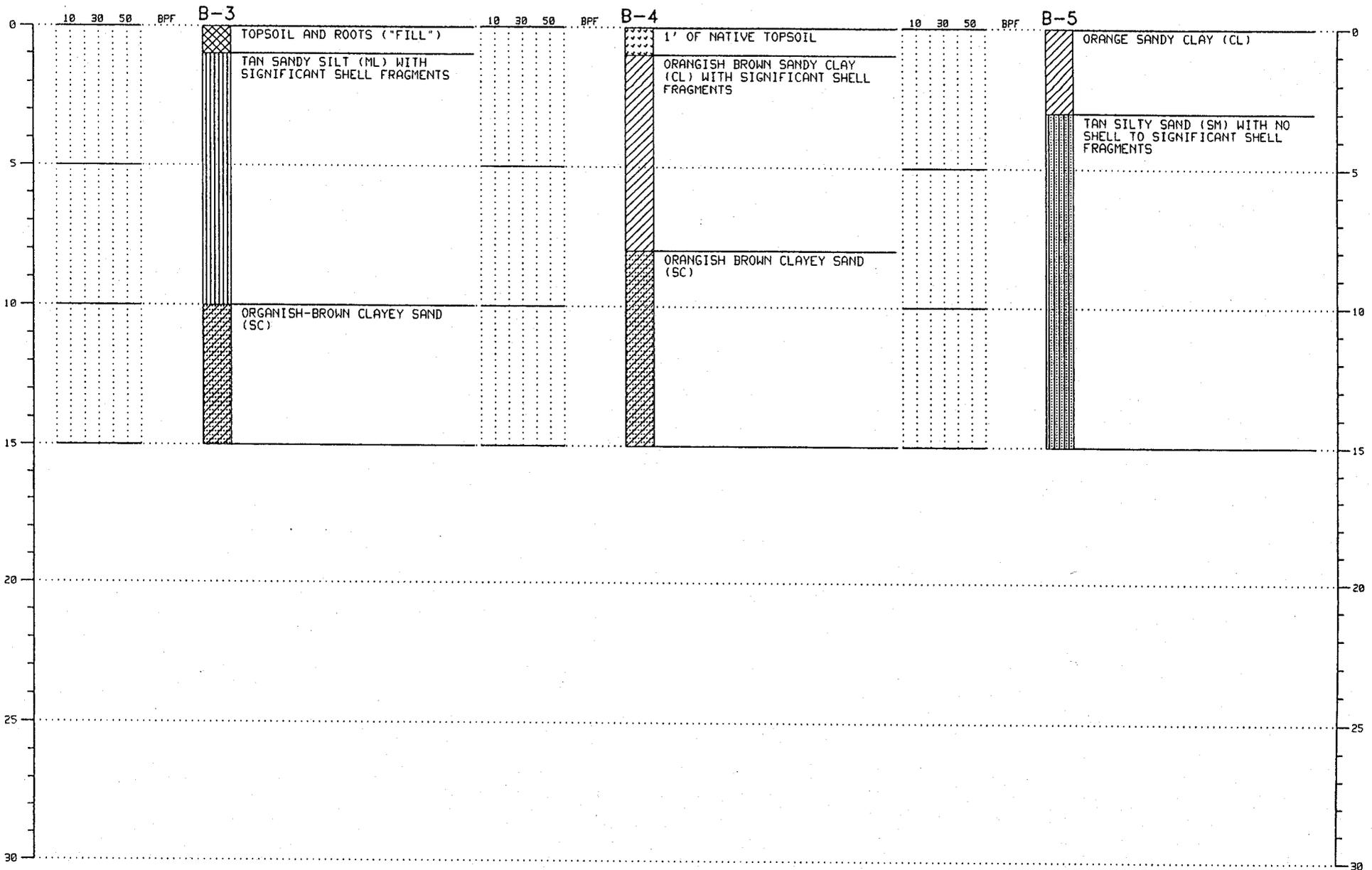


Strata symbols

- Silty sand
- Poorly graded sand
- Poorly graded sand with silt
- Low plasticity clay

PROFESSIONAL SERVICE INDUSTRIES

BORING PROFILE THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT

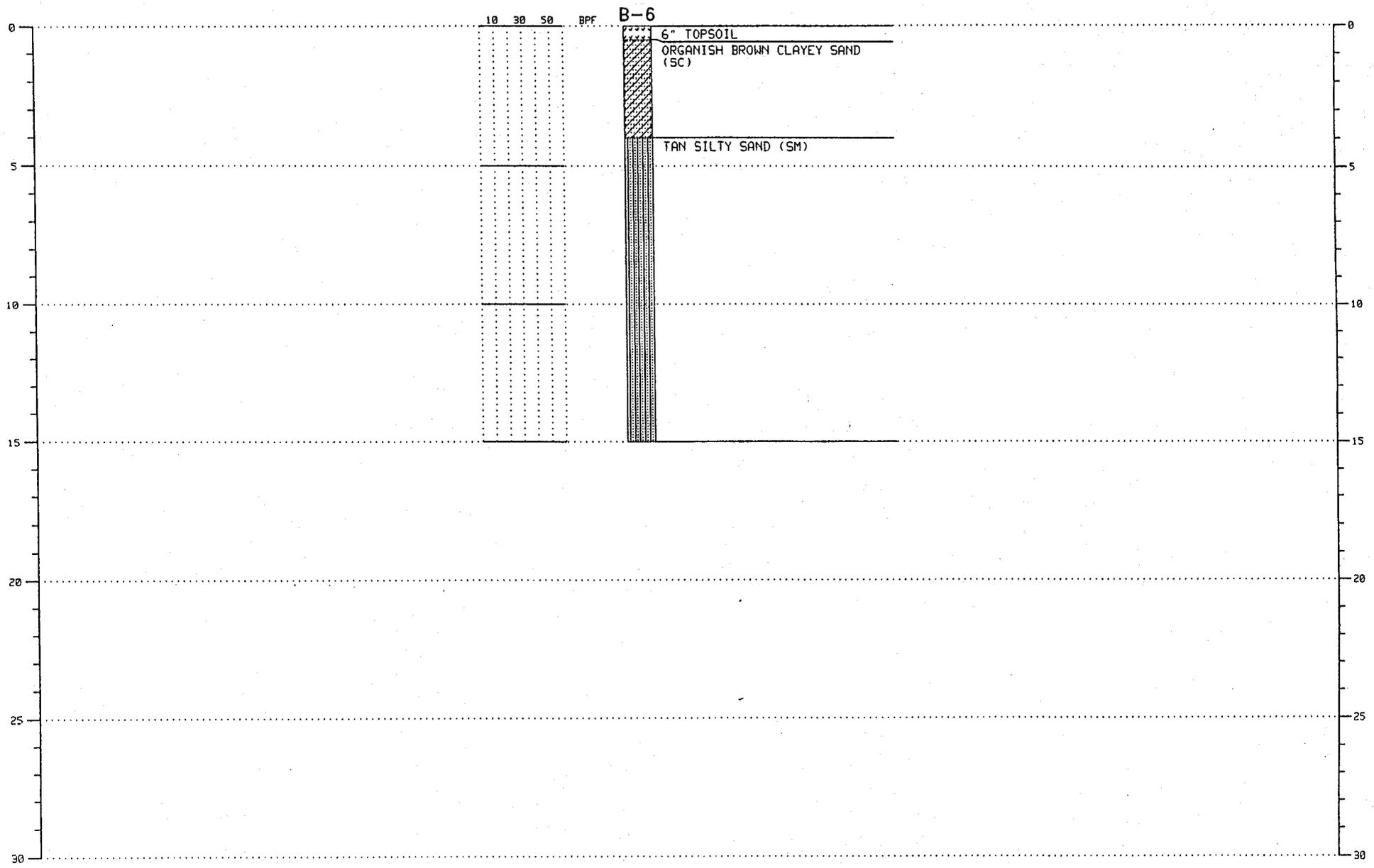


Strata symbols

-  Fill
-  Silt
-  Topsoil
-  Silty sand
-  Clayey sand
-  Low plasticity clay

PROFESSIONAL SERVICE INDUSTRIES

BORING PROFILE THE KINGSMILL EAST - SANDY'S FORT DEVELOPMENT



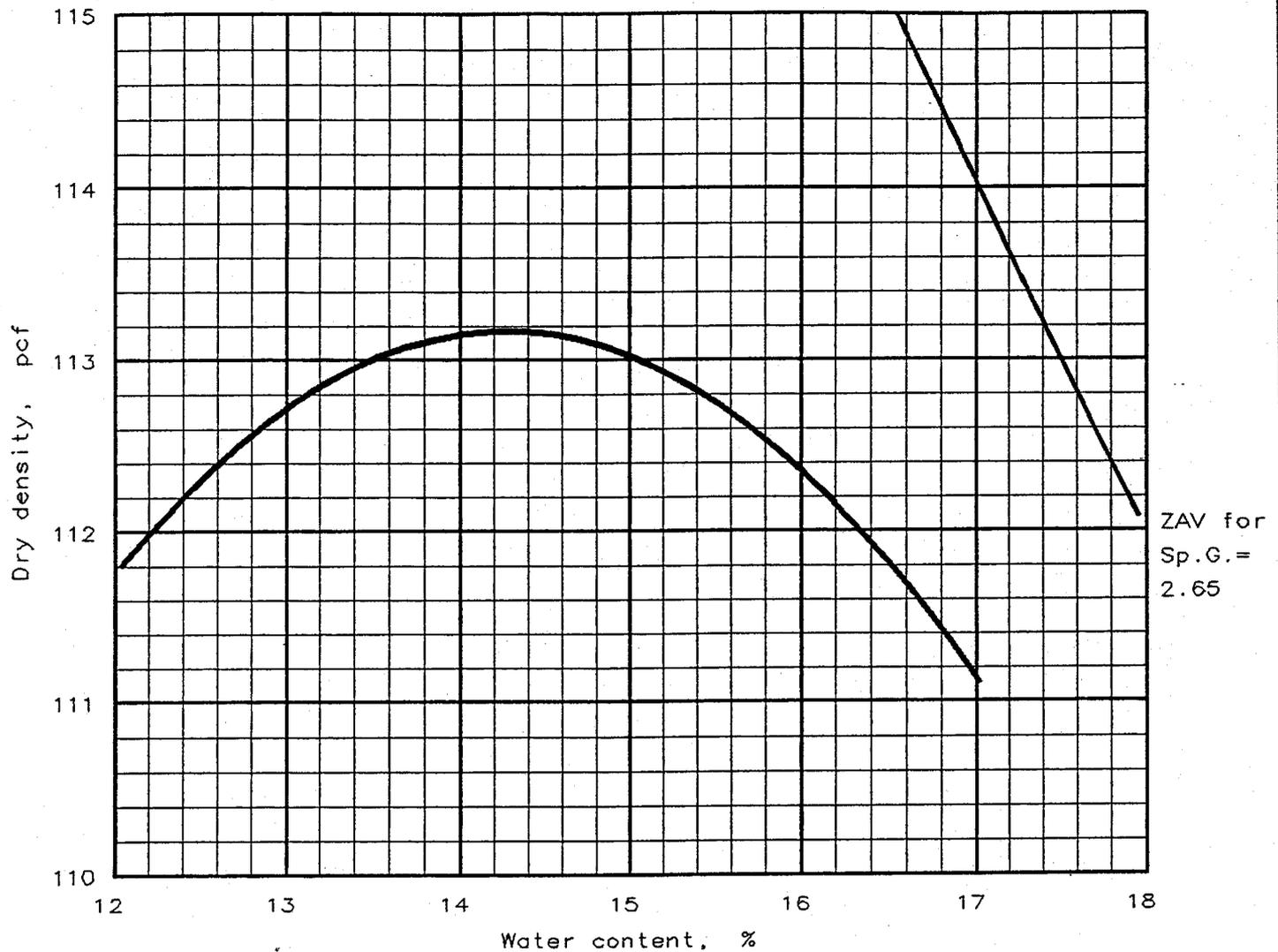
- Strata symbols**
-  Fill
 -  Silt
 -  Topsoil
 -  Silty sand
 -  Clayey sand
 -  Low plasticity clay

APPENDIX IV

Figures 4-8: Laboratory Test Data



MOISTURE-DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-91 Procedure A, Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
	CL		18.9 %	2.65	41	23	- %	66.7 %

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 113.0 pcf Optimum moisture = 14.5 %	LT REDDISH BROWN W/GREY SANDY CLAY
Project No.: 85083-239 * Project: SANDY'S FORT Location: WILLIAMSBURG, VA ON SITE MAT. -STOCKPILE FOR DAM Date: 07-10-98	Remarks: SAMPLED 07-08-98 TESTED BY DR PROCTOR #1
MOISTURE-DENSITY RELATIONSHIP TEST PROFESSIONAL SERVICE INDUSTRIES, INC.	Fig. No. 4

MOISTURE-DENSITY RELATIONSHIP TEST

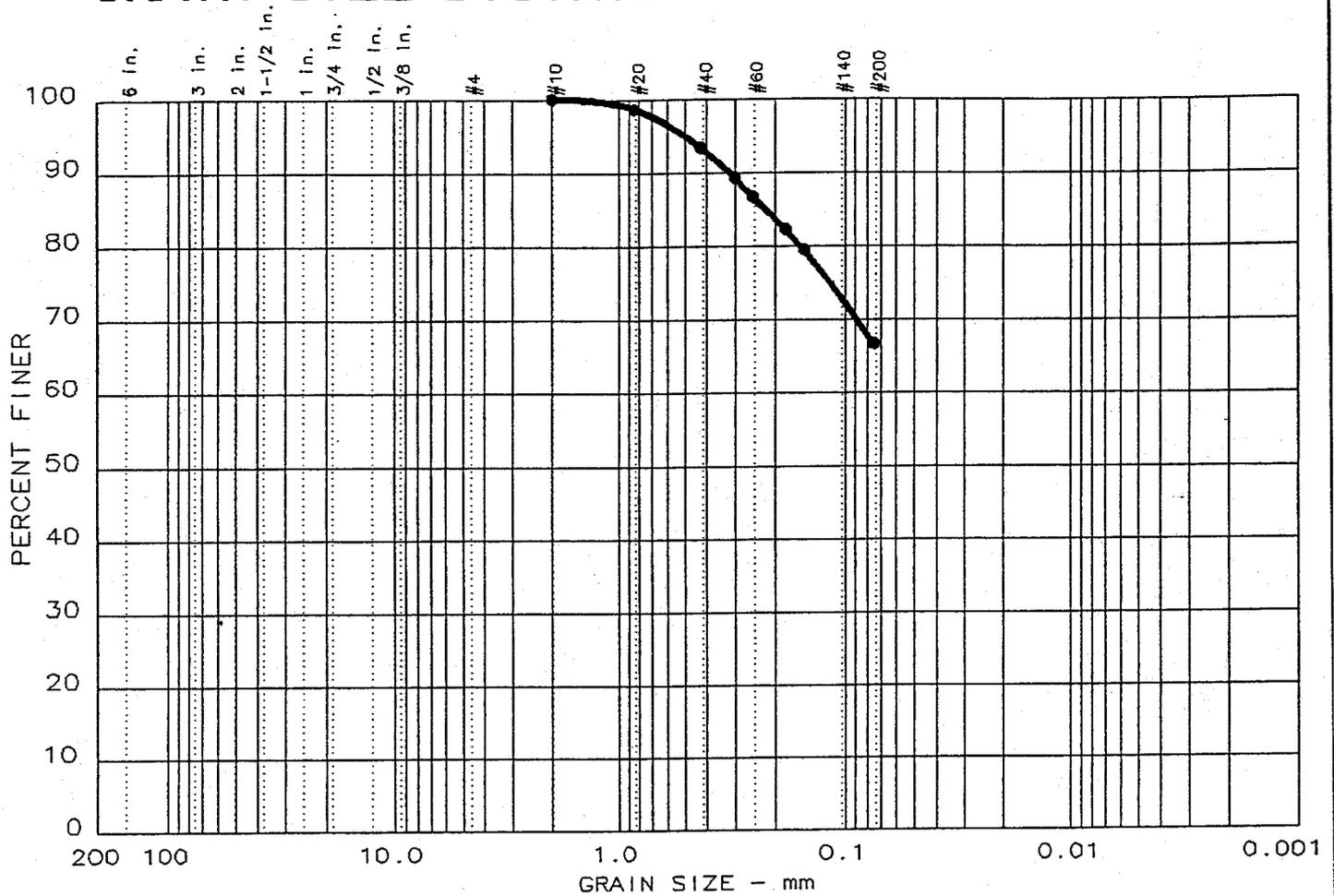


Test specification: ASTM D 698-91 Procedure A, Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
	SC		17.3 %	2.65	28	12	- %	37.7 %

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 118.0 pcf Optimum moisture = 12.5 %	REDDISH BROWN W/GREY CLAYEY SAND
Project No.: 85083-239 * Project: SANDY'S FORT Location: WILLIAMSBURG, VA ON SITE MAT. -STOCKPILE FOR DAM Date: 07-10-98	Remarks: SAMPLED 07-08-98 TESTED BY DR PROCTOR #2
MOISTURE-DENSITY RELATIONSHIP TEST PROFESSIONAL SERVICE INDUSTRIES, INC.	Fig. No. 5

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
● 1	0.0	0.0	33.3	66.7	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
● 41	23	0.219							

MATERIAL DESCRIPTION	USCS	AASHTO
● LT REDDISH BROWN W/GREY	CL	A-7-6(13.3)

Project No.: 85083-239
 Project: SANDY'S FORT
 ● Location: WILLIAMSBURG, VA

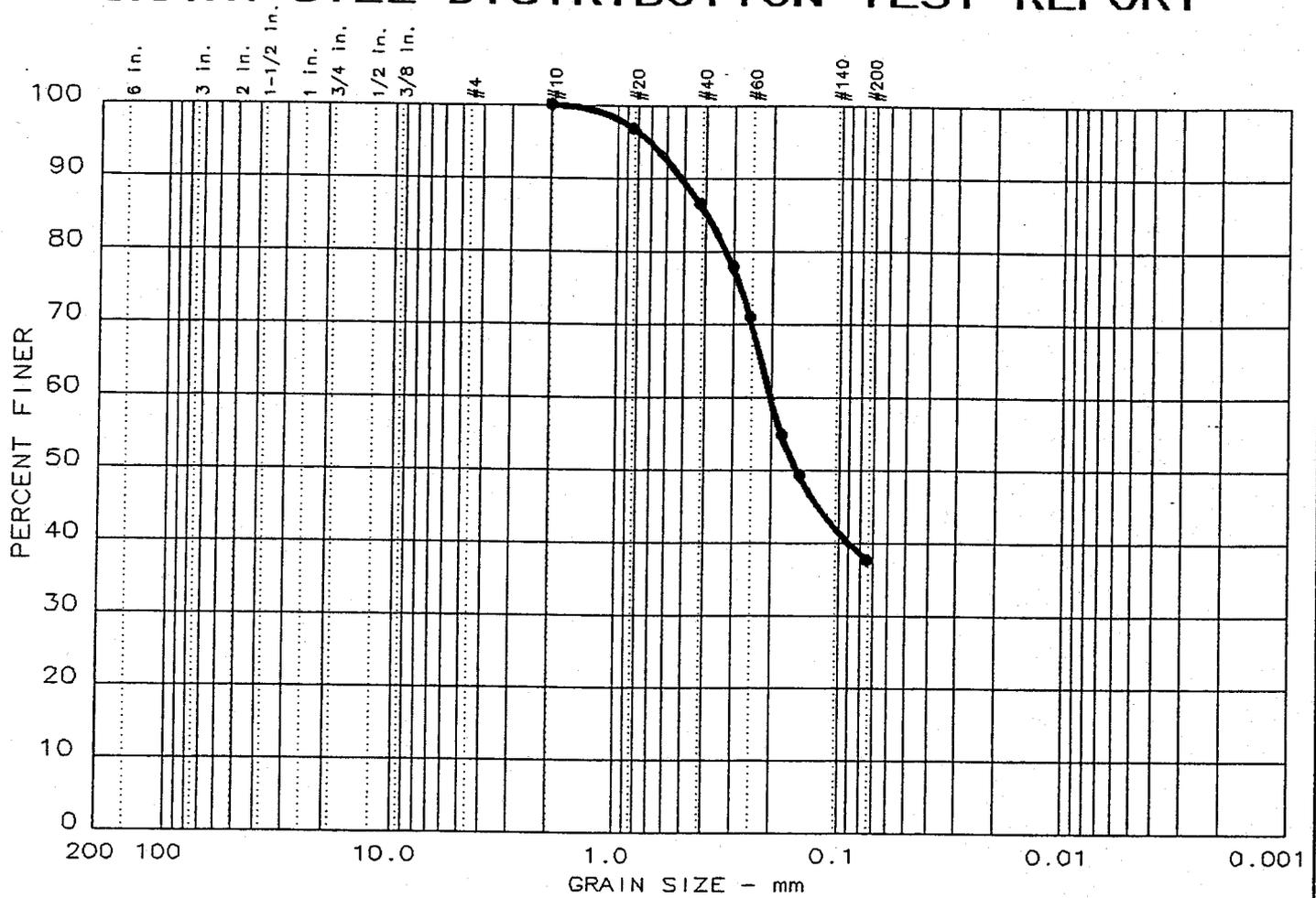
Date: 07-13-98

GRAIN SIZE DISTRIBUTION TEST REPORT
 PROFESSIONAL SERVICE INDUSTRIES, INC.

Remarks:
 SAMPLE #1

Fig. No.: 6

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
● 2	0.0	0.0	62.3	37.7	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
● 28	12	0.394	0.201	0.154					

MATERIAL DESCRIPTION	USCS	AASHTO
● REDDISH BROWN W/GREY	SC	A-6(0.9)

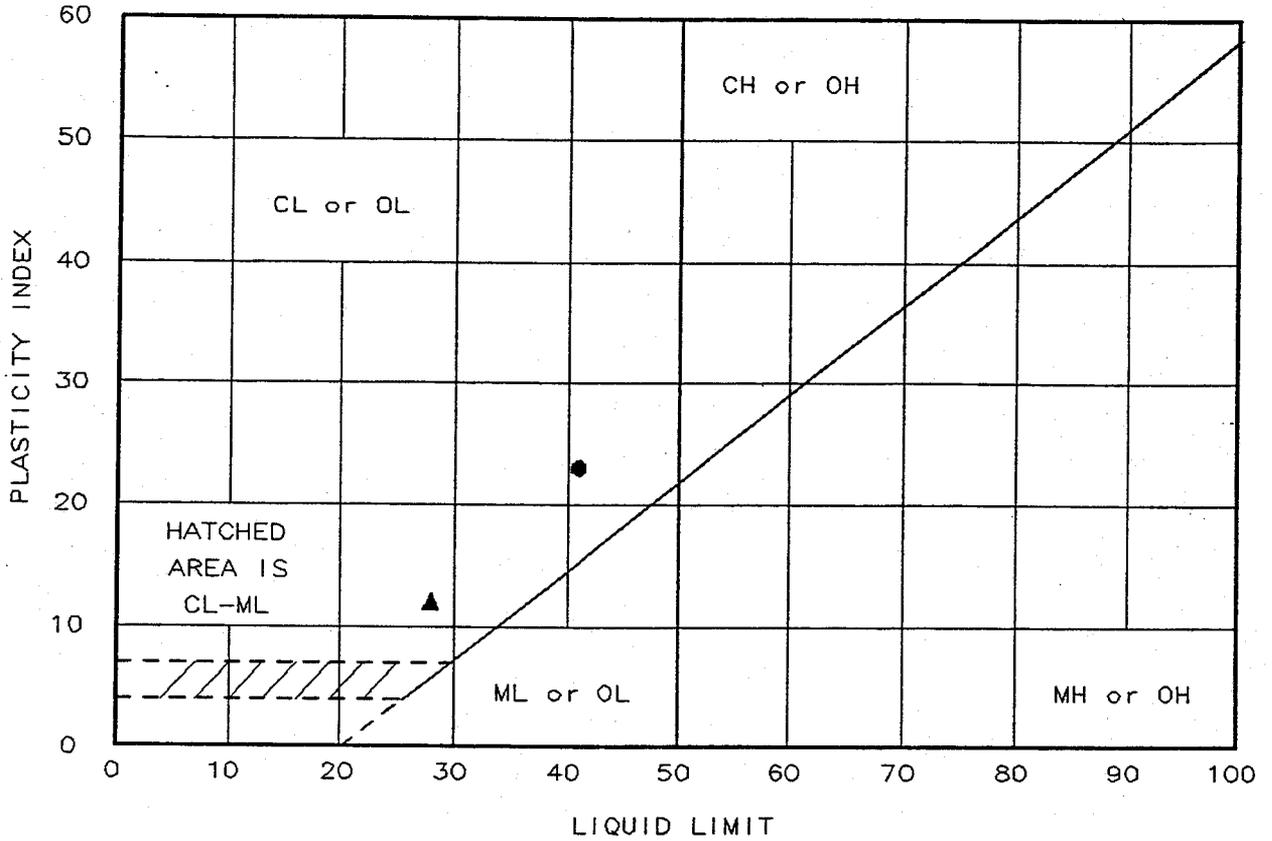
Project No.: 85083-239
 Project: SANDY'S FORT
 ● Location: WILLIAMSBURG, VA
 Date: 07-13-98

Remarks:
 SAMPLE #2

GRAIN SIZE DISTRIBUTION TEST REPORT
PROFESSIONAL SERVICE INDUSTRIES, INC.

Fig. No.: 7

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-90
● SAMPLE #1 DEPTH= STOCKPILE NAT. MOISTURE=18.9%	41	18	23	66.7	CL, Sandy lean clay
▲ SAMPLE #2 DEPTH= STOCKPILE NAT. MOISTURE=17.3%	28	16	12	37.7	SC, Clayey sand

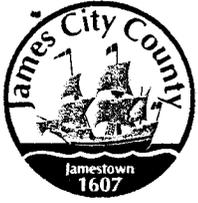
Project No.: 85083-239
 Project: SANDY'S FORT

 Client: RAY NICE
 Location: WILLIAMSBURG, VA

 Date: 07-13-98

Remarks:

LIQUID AND PLASTIC LIMITS TEST REPORT
GEODESIGN CONSULTANTS, INC.



DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 259-4116

November 6, 2001

Busch Properties Inc.
100 Kingsmill Road
Williamsburg, Va. 23185
Attn: Mr. Thomas E. Dunn,
Director, Construction

Re: Kingsmill East - Sandy's Fort
County Plan S-85-97
Stormwater Management Facilities - Wet Pond # 2 & # 5
County BMP ID Code: JR 046 & JR 047

Dear Mr. Dunn:

The Environmental Division has reviewed record drawing and construction certification information as forwarded to our office for the above referenced project. The record drawings provide as-built information for two wet pond facilities located near to Andrew Lindsey and George Sandys (roads).

Based on our review of information as submitted and a concurrent field observation as performed on November 2nd 2001, the following items must be addressed prior to release of the developer's surety instrument associated with stormwater management/BMP facilities **JR 046** (Wet Pond # 2 at Andrew Lindsey) and **JR 047** (Wet Pond # 5 at George Sandys).

Inspection/Maintenance Agreement:

1. Based on a review of our active file/records for the project, Environmental Division comments under S-85-97 dated October 17, 1997 required a Declaration of Covenants, Inspection/Maintenance agreement to be executed with the County for the BMP facility for this project. None was found. Please forward the executed inspection/maintenance agreement to our office. (Note: Also, correspondence from the engineer dated December 2nd 1997 responding to our November 1997 comment's indicated that an inspection/maintenance agreement shall be executed with the County.)

Construction Certification:

2. The construction certification dated March 5th 2001, as forwarded to our office for both facilities, is satisfactory.

Record Drawings:

3. Wet Pond # 2. Show the following additional information on record drawing Sheet 1 of 4: Construction information for the storm drain pipe system which traverses between Lots 3 and 4 and enters the pond on the south side. Include pipe size, inverts and structure types to at least one structure back from the outfall at the pond. (Note: This system corresponds to storm drainage structures SS # 3a to SS # 1a on the approved plan). Also, if possible, label Road C as Andrew Lindsey and Road A as Edward Grindon.

4. If possible add the following identifiers to the bottom right hand corners of the record drawing set: JR 046 to Sheet 1 and 3; JR 047 to Sheet 2 and 4; and S-85-97 to all sheets.

Construction-Related:

5. Provisions of the approved plan required safety signs to be placed around the perimeter of both wet pond facilities. Based on our field observations, the signs were not present.
6. Wet Pond # 2. Remove logs and wood debris piled up on the interior basin slope just above the principal flow control structure near the fence. The control structure is the 5' x 5' concrete box with grate on the upstream side of the dual pipes through the dam embankment.
7. Wet Pond # 2. Clean vegetation 5 to 10 feet from the principal flow control structure. Live vegetation is starting to work it's way across the bar grate and into the riser.
8. Wet Pond # 2. Clear and remove the 18-inch tree which has fallen across the rock outlet protection pad at the outfall end of the dual barrels through the dam.
9. Wet Pond # 5. Remove small size trees (6-8 total) on the downstream embankment; along the south edge of the concrete emergency spillway and at the area where flow enters the emergency spillway on the upstream embankment. Trees should not obstruct flow into the emergency spillway.
10. Wet Pond # 5. Remove trash, leaves and debris from within the principal flow structure at the upstream end of the 10-inch barrel through the dam and from within the headwall structure located at the downstream (outfall) end of the barrel.
11. Wet Pond # 5. Remove leaves, debris, a fallen tree and live tree saplings from within the rock outfall protection pad at the end of the emergency spillway.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Mike Woolson, at 757-253-6823 if you have any further comments or questions.

Sincerely,



Scott J. Thomas, P.E.
Civil Engineer
Environmental Division

cc: Mark Richardson, AES (fax)

G:\SWMProg\AsBuilts\S8597.jr046

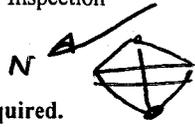


**James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities**

S-85-97

County BMP ID Code (if known): JR047
 Name of Facility: KINGSMILL - SANDYS FORT WET POND #5 BMP No.: 2 of 2 Date: 11/02/01
 Location: South of JCSA Pump Sta 9-4, GEORGE SANDYS ROAD
 Name of Owner: BUSCH CONSTRUCTION -
 Name of Inspector: SJ Thomas, MIKE WOODSON
 Type of Facility: WET POND
 Weather Conditions: Sunny Mild 70's Type: Final Inspection County BMP Inspection Program Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.



- O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
- Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
- Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes: <u>O/S EMB 2H:1V EARTH; U/S 2H:1V</u>				
Grass Height	✓			<u>2-4" HIGH</u>
Vegetation Condition	✓			
Tree Growth		✓		<u>REMOVE TREES ON D/S EMB LOGS (6) AND TREES ON U/S EMB NEAR EMERG SALLWAY. REMOVE SMALL TREES ALONG ES. (MINOR CUTTING)</u>
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			<u>None observed</u>
Fencing or Benches				
Interior Landscaping/Planted Areas: <input checked="" type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions				<u>Wet Pool. 2' @ Riser</u>
Trash & Debris				<u>4 or 5' deep in mid pool?</u>
Floating Material				
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other				
<u>Services SF Lots Road's + Not wood Area.</u>				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input checked="" type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion	X			Minor south side.
Algae	X			(NP 3' deep +)
Trash & Debris	X			Some Leaves.
Sediment	X			
Aesthetics	X			NATURAL.
Other				
Inflows (Describe Types/Locations): 2 storm drains - 24" @ west (back); 15" RCP @ NW				
Condition of Structure	X			PIPE 1 - 24" TO 100' LONG CLASS 1 RIPRAP CHANNEL.
Erosion	X			
Trash and Debris	X			
Sediment	X			Minor @ both outfalls, 15" is free of sed, not obstructed & visible.
Aesthetics				
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Location): 5x5 Box, sloped with 2" BAR @ 8" OC.				
Condition of Structure	X			
Corrosion	X			
Trash and Debris		X	X	Remove trash + debris from grate + box. ^{leaves}
Sediment	X			
Aesthetics		X		
Other				
Principal Outlet Structure - Barrel, Conduit, etc.: 10" BCCMP TO 4x3 OUTLET HEADWALL				
Condition of Structure	X			MINOR CORROSION PIPE SURFACE.
Settlement	X			
Trash & Debris		X		REMOVE LEAVES + DEBRIS FROM OUTFALL END SECTION
Erosion/Sediment	X			
Outlet Protection				CLASS 1 14'x8'
Other				
Emergency Spillway (Overflow): 10' WIDE CONC; 6" DEEP				
Vegetation	X			
Lining	X			
Erosion	X			
Trash & Debris		X	X	REMOVE LEAVES, FALLEN TREES AND LINE SAPLINGS IN OP @ END ES. (BLACK WILLOW)
Other		X		REMOVE TREES U/S ES.

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	X			
Animal Burrows	X			
Graffiti	X			
Other				
Surrounding Perimeter Conditions: <i>steep fliped; Natural Woods + GRASS. PS to north</i>				
Land Uses	X			<i>WOOD, GRASS</i>
Vegetation	X			
Trash & Debris	X			
Aesthetics				<i>NATURAL remote valley setting</i>
Access /Maintenance Roads or Paths	X			<i>Good from PS 9-4</i>
Other				

Remarks:

- D Trees o/s embankment (6 or 8) AND ALONG ES.
- X Remove trees + saplings in OP @ end of em spillway
- D Clear Leaves, fallen trees and live trees from OP @ end ES. (BLACK WILLOW)
- D Clear trees u/s side emb. @ ES. (CANNOT OBSTRUCT FLOW)
- D Clear + remove trash, leaves + debris primary flow control box AND GRATE (Leaves, branches, plastic, trash cans, wood debris, fence posts.)
- P Removes debris at fall end section of barrel through dam.

Overall Environmental Division Internal Rating: 3 (*Trash + Trees*)

Signature: *Sandy Thomas P.E.*
 Title: *Civil Engineer ENV DIV.*

Date: *11/2/01*

Date Record Created:

WS_BMPNO:

Print Record

Created By:

JR047

WATERSHED JR
BMP ID NO 047
PLAN NO S-85-97
TAX PARCEL (51-4)(2-1A)
PIN NO 5140200001A
CONSTRUCTION DATE 6/1/1998
PROJECT NAME Kingsmill East-Sandys Fort
FACILITY LOCATION Wet Pnd # 5 (South of 132 George Sandys)
CITY-STATE Williamsburg, Va. 23185
CURRENT OWNER Busch Properties Inc.
OWNER ADDRESS One Busch Place
OWNER ADDRESS 2
CITY-STATE-ZIP CODE St. Louis, MO 63118
OWNER PHONE
MAINT AGREEMENT No
EMERG ACTION PLAN No

PRINTED ON
Thursday, March 11, 2010
12:37:51 PM

MAINTENANCE PLAN

SITE AREA acre

LAND USE

old BMP TYP

JCC BMP CODE

POINT VALUE

SVC DRAIN AREA acres

SERVICE AREA DESCR

IMPERV AREA acres

RECV STREAM

EXT DET-WQ-CTRL

WTR QUAL VOL acre-ft

CHAN PROT CTRL

CHAN PROT VOL acre-ft

SW/FLOOD CONTROL

GEOTECH REPORT

No

61.375

Resid Planned Co

Wet Pond

A2 Wet Pond

8

16.92

SF Lots, roads & woods

8.50

UT of James River

Yes

0.88

No

0

Yes

Yes

CTRL STRUC DESC

CTRL STRUC SIZE inches

OTLT BARRL DESC

OTLT BARRL SIZE inch

EMERG SPILLWAY

DESIGN HW ELEV

PERM POOL ELEV

2-YR OUTFLOW cfs

10-YR OUTFLOW cfs

REC DRAWING

CONSTR CERTIF

LAST INSP DATE 11/2/2001

INTERNAL RATING

MISC/COMMENTS

Also see JR 046. Princ flow cont struct modified. South of JCSA PS 9-4.

Conc Box

60 x 60

BCCMP

10

Yes

30.51

26.5

3.60

4.50

Yes

Yes

Inspected by:

3

[Get Last BMP No](#)

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Additional Comments:

