



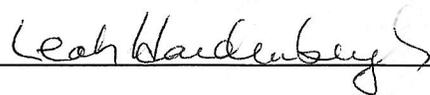
CERTIFICATE OF AUTHENTICITY

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.

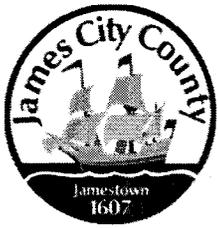
BMP NUMBER: PC131

DATE VERIFIED: October 17, 2012

QUALITY ASSURANCE TECHNICIAN: Leah Hardenbergh



LOCATION: WILLIAMSBURG, VIRGINIA



Stormwater Division

MEMORANDUM

DATE: March 9, 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: PC131

PIN: 3830100019

Subdivision, Tract, Business or Owner

Name (if known):

Cromwell Ridge

Property Description:

Powhatan Plantation Property

Site Address:

(For internal use only)

Box 07 (seven)

Drawer: 1

Agreements: (in file as of scan date)

Y

Book or Doc#:

736

Page: 787

970015117

98000658

Comments

**James City County, Virginia
Environmental Division**

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

County Plan No.: SP-105-97
 Project Name: CROMWELL RIDGE @ POWHATAN SECONDARY
 Stormwater Management Facility: DRY POND

Phase: I II III

Information Received. Date: NOV 6 2007 VHB

Administrative Check.

Record Drawing Date: NOV 2 2001 VHB

Construction Certification Date: _____

RD/CC Standard Forms (Required after Feb 1st 2001 Only)

Insp/Maint Agreement Info: 1/m # 98 0000568 1/15/98

Other: _____

Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.

Yes No Note/Sheet: Sheet 3 of 11 (2 notes); Note #18 Sheet 8 of 11

Assign County BMP ID Code Code: PC131

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.

Pre-Inspection Drawing Review (Quick look prior to field inspection).

Final Inspection (FI) Date: 11/29/01

Record Drawing (RD) Review Date: 11/30/01

Construction Certification (CC) Review Date: _____

Actions:

No comments.

Comments. Letter Forwarded. Date: 11/29/01

Record Drawing (RD)

Construction Certification (CC)

Construction-Related (CR)

Site Issues (SI) Both - separate.

Other: _____

Second Submission: RD Approved 12/11/01.

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).

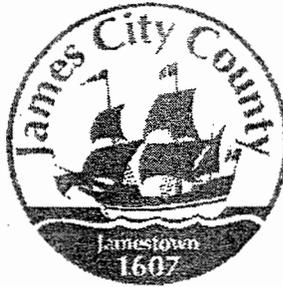
Copy Final Inspection Report into County BMP Inspection Program file.

Digital Photographs obtained.

Add to JCC Hydrology & Hydraulic database (optional) NO

BMP Certification Information Acceptable

Plan Reviewer: _____ Date: _____



**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: CROMWELL RIDGE
 Structure/BMP Name: _____
 Project Location: POWHATAN SECONDARY
 BMP Location: SOUTH OF CROMWELL LANE (Behind 3909 Cromwell Lane)
 County Plan No.: SP - 105 - 97

Project Type: Residential Business Tax Map/Parcel No.: (38.5)(1-9)(1-19)
 Commercial Office BMP ID Code (if known): PC131
 Institutional Industrial Zoning District: RA
 Public Roadway Land Use: RESIDENTIAL PLANNED COMMUNITY
 Other _____ Site Area (sf or acres): 9.076 ACRES

Brief Description of Stormwater Management/BMP Facility: THIS FACILITY IS A DRY TYPE DETENTION BASIN

Nearest Visible Landmark to SWM/BMP Facility: UNITS 1-6 (3909 Cromwell Lane)

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: March 1998
Facility Monitored by County Representative during Construction: Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: VICO CONSTRUCTION CORP.
Name of Professional Firm Who Routinely Monitored Construction: _____
Date of Completion for SWM/BMP Facility: April 1998
Date of Record Drawing/Construction Certification Submittal: NOVEMBER 5, 2001

(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: DONALD MOORE / MARSHA-LYNN BUILDING CORP.
Mailing Address: 4400 HOLLAND OFFICE PARK SUITE 222
VIRGINIA BEACH, VA 23452
Business Phone: 757-490-5900 Fax: 757-490-4425
Contact Person: DONALD MOORE 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: SLEDD & ASSOCIATES, PC.
Mailing Address: 11032 ROCK LANDING DRIVE, SUITE 203
NEWPORT NEWS, VA 23606
Business Phone: 757-873-3386
Fax: 757-873-0757
Responsible Plan Preparer: ALVIN D. SLEDD
Title: _____
Plan Name: CROMWELL RIDGE AT POWHATAN SECONDARY
Firm's Project No. 97-003
Plan Date: 7/10/97
Sheet No.'s Applicable to SWM/BMP Facility: ___ / ___ / ___ / ___ / ___

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

Name: VICO CONSTRUCTION CORP.
Mailing Address: P.O. BOX 6168
CHESAPEAKE, VA 23323
Business Phone: 757-487-3441
Fax: 757-487-8680
Contact Person: PAT VIOLA
Site Foreman/Supervisor: DAVIS SMITH & PAT VIOLA
Specialty Subcontractors & Purpose (for BMP Construction Only):
N/A

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 / RMP Facilities

Record Drawing Certification

Firm Name: _____
Mailing Address: _____

Business Phone: _____
Fax: _____
Name: FRANK GIL MUNDY, II
Title: LAND SURVEYOR
Signature: Frank G. Mundy, II
Date: 11-05-01

I hereby certify to the best of my 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 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

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

I. Methods and Presentation: (Required for all Stormwater Management / BMP facilities.)

- XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.
- XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.
- XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).
- XX 4. All plan sheet revision blocks modified to indicate date and record drawing status.
- XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

II. Minimum Standards: (Required for all Stormwater Management / BMP facilities, as applicable.)

- XX 1. All requirements of Section I (Methods and Presentation) apply to this section.
- XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.
- XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.
- XX 4. Top widths, berm widths and embankment side slopes.
- XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.
- XX 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.
- N/A 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.
- XX 8. Elevation of the principal spillway crest or outlet crest of the structure.

- XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- Per plan 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacings (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.
- per plan 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**
- per plan 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- XX 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- XX 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.
- per plan 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.
- N/A 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.
- N/A 18. Maintenance plan taken from approved design plan transposed onto record drawing set.
- N/A 19. Fencing location and type, if applicable to facility.
- Yes 20. BMP vicinity properly cleaned of stockpiles and construction debris.
21. No visual signs of erosion or channel degradation immediately downstream of facility.
- N/A 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

VIII. Group F - Extended Dry Detention (*Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay*)

- XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.
- XX F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.
- N/A F3. Timber wall BMP used in intermittent stream only. (ie. Prohibited in perennial streams.)
- N/A F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.
- N/A F5. A reverse slope pipe, vertical stand pipe or mini-barrel and riser was provided to prevent clogging.
- _____ F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- N/A F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.
- XX F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.
- N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.
- N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.
- N/A F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.
- XX F12. Stilling basin or standard outlet protection provided at principal spillway outlet.
- N/A F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, slope is less than twenty (20) percent and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, standpipe and timber wall, as applicable.
- XX F14. No visual signs of undercutting of timber walls or clogging of the low orifice were present.
- _____ F15. No visual signs of erosion or channel degradation immediately downstream of facility.
- XX F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.

**STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST**

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

X. Storm Drainage Systems (Associated with BMP's Only)

(Includes all incidental stormwater drainage conveyance systems associated with SWM/BMP facilities such as onsite or offsite storm drains, open channels, inlets, manholes, junctions, outlet protections, deflectors, etc. These facilities are external to the treatment function of, but are directly associated with drainage to and/or from a constructed SWM/BMP facility. The intent of this portion of the certification is to accurately identify the type and quantity of inflow or outflow points associated with the facility for future reference. The Professional may use his/her own discretion to determine inclusive facilities to meet the intent of this section. As a general rule, storm drainage systems would include incidental facilities to the nearest access structure upslope or downslope from the normal physical limits of the facility or 800 feet of storm drainage conveyance system length, whichever is less.)

- XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.
- XX SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.
- XX SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).
- XX SD4. Material type, size or diameter, class, invert elevations, lengths and slopes for all pipe segments.
- XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

(Includes any non-typical, specialty, manufactured or innovative stormwater management/BMP practices or systems generally accepted for use as or in conjunction with other acceptable stormwater management / BMP practices. Requires evidence of prior satisfactory industry use and prior Environmental Division approval, waiver or exception .)

- _____ O1. All requirements of Section II, Minimum Standards, apply to this section.
- _____ O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.

Record Drawing/Construction Certification Submittal for a BMP Facility

Date: 11/08/01

Inspector: Pat Menichino
 Gerry Lewis
 Beth Davis
 Mike Woolson
 Joe Buchite
 Other: _____

WHO WATCHED?
CONSTRUCTION.

Project: CROMWELL RIDGE AT POWHATAN SECONDARY
BMP Facility: DRY POND
Plan No. SP-105-97
BMP ID Code: PC131

I have received a transmittal for a Record Drawing and Construction Certification for the above referenced facility on NOV 6TH 2001. Prior to full engineering review of these items and a field inspection, I am first forwarding the items to you to cursory review in case any major field changes were performed that I should be aware of and/or to ensure the record drawing accurately portrays what you saw in the field. Please review the drawing and return to me promptly so I can proceed with the review for certification purposes.

During my review, I will look at issues related to the BMP and its primary inflow and outflow conveyance systems, and will make comment in the following areas: Record Drawing (RD), Construction Certification (CC) and Construction-Related (CR) punch list items. If you have any other related non-BMP site issues such as erosion, stabilization, removal of erosion & sediment controls, etc. that are not related to the BMP, I can easily add these items to any comment letter that I may forward to the Owner/Engineer. Let me know if any outstanding site issues remain.

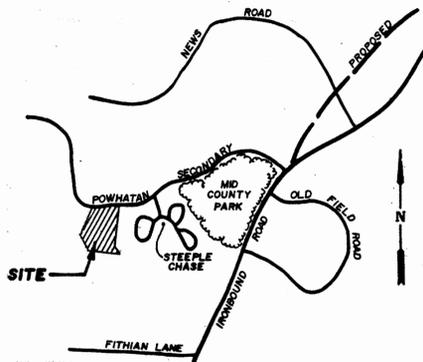
If I don't hear from you I will ask you if any other outstanding issues remain before I forward any letters to the Owner/Engineer.

Scott

SWMPProg\BMP\ConInsp\Insp.trans

None of the Above!

DAVE Meador WAS
the inspector.



VICINITY MAP SCALE 1"=2000'

YORK COUNTY PRIMARY GEODETIC CONTROL MARKER NO. 117 IS LOCATED AT THE INTERSECTION OF ROUTE 171 AND STATE ROUTE 782.
 X= 12092230.626
 Y= 3575699.750

ABBREVIATIONS

CD	CHECK DAM
CE	CONSTRUCTION ENTRANCE
CIP	CULVERT INLET PROTECTION
CL	CLASS
CO	CLEAN OUT
DI	DROP INLET
ELEV.	ELEVATION
EXIST.	EXISTING
FF	FINISHED FLOOR PLAN
FHA	FIRE HYDRANT ASSEMBLY
FM	FORCE MAIN
HORZ.	HORIZONTAL
HP	HIGH POINT
INV.	INVERT
IP	INLET PROTECTION
L	LENGTH
LP	LOW POINT OR LIGHT POLE
MAX.	MAXIMUM
MH	MANHOLE
MIN.	MINIMUM
NTS	NOT TO SCALE
P	PAVEMENT ELEVATION
PS	PERMANENT SEEDING
PVC	POINT OF VERTICAL CURVE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
R	RADIUS
R/W OR ROW	RIGHT-OF-WAY
REQ'D	REQUIRED
RTC	ROLL TOP CURB
SAN.	SANITARY
SF	SILT FENCE
SSMH	SAN. SEWER MANHOLE
STA	STATION
SY	SQUARE YARD
TC	TOP OF CURB
TP	TREE PROTECTION
TYP	TYPICAL
VDOT	VIRGINIA DEPARTMENT OF TRANSPORTATION
VERT.	VERTICAL
W/	WITH
W/O	WITHOUT
WL OR W	WATERLINE

STORM SEWER & BMP RECORD DRAWINGS OF CROMWELL RIDGE AT POWHATAN SECONDARY JAMES CITY COUNTY, VIRGINIA

SITE STATISTICS

SITE ZONING	R-4 (RESIDENTIAL PLANNED COMMUNITY)
SITE AREA	5.076 ACRES (221,097 S.F.)
TAX MAP PARCEL NUMBER	(38-3)(1-9)(1-19)
NUMBER OF BUILDINGS	9
NUMBER OF UNITS	52
NUMBER OF STORIES	2
BUILDING FLOOR AREA	91,190± S.F. (MAY VARY WITH FINAL UNIT MIX)
BUILDING HEIGHT	26 FT. ±
BUILDING COVERAGE	55,900± S.F. (MAY VARY WITH FINAL UNIT MIX.) (25±%)
OTHER IMPERVIOUS AREA	54,900± S.F. (25±%)
TOTAL IMPERVIOUS AREA	110,800± S.F. (25±%)
PARKING SPACES REQUIRED @ 2 PER UNIT	104
PARKING SPACES DESIGNED	110 (INCLUDES 52 IN GARAGES, 52 IN DRIVEWAYS, & 6 VISITOR PARKING)
LANDSCAPED OPEN SPACE REQUIRED	2.030 ACRES (40%)
LANDSCAPED OPEN SPACE DESIGNED	2.532 ACRES (50±%)
TOTAL DISTRIBUTION AREA (INCLUDING OFF-SITE)	5.45± ACRES

APPROXIMATELY 50% OF THE SITE IS WOODED WITH MIXED HARDWOODS AND SOFTWOODS, PREDOMINANTLY OAK AND PINE, AVERAGING 6" TO 14" IN DIAMETER. THE REMAINDER OF THE SITE IS GRASS AND BRUSH.

ONSITE SOIL UNITS ARE KEMPSVILLE-EMPORIA FINE SANDY LOAM AND SLAGLE FINE SANDY LOAM. THESE SOILS TYPICALLY EXHIBIT MODERATE SHRINK-SWELL POTENTIAL, HOWEVER, SITE SPECIFIC INFORMATION IS NOT AVAILABLE. (REF: SOIL SURVEY OF JAMES CITY & YORK COUNTIES AND THE CITY OF WILLIAMSBURG PUBLISHED BY SOIL CONSERVATION SERVICE)

DENOTES ITEMS WHICH HAVE BEEN FIELD VERIFIED BY VANASSE HANGEN BRUSTLIN, INC.

I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT / BMP FACILITY.

Frank G. Mundy
 FRANK G. MUNDY, L.S.

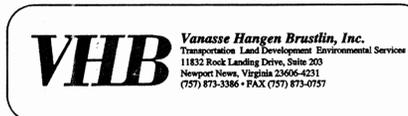


SHEET INDEX

1. COVER
2. GRADING & UTILITY PLAN
3. PROFILE
4. NOTES & DETAILS
5. TOPOGRAPHIC SURVEY OF DETENTION BASIN

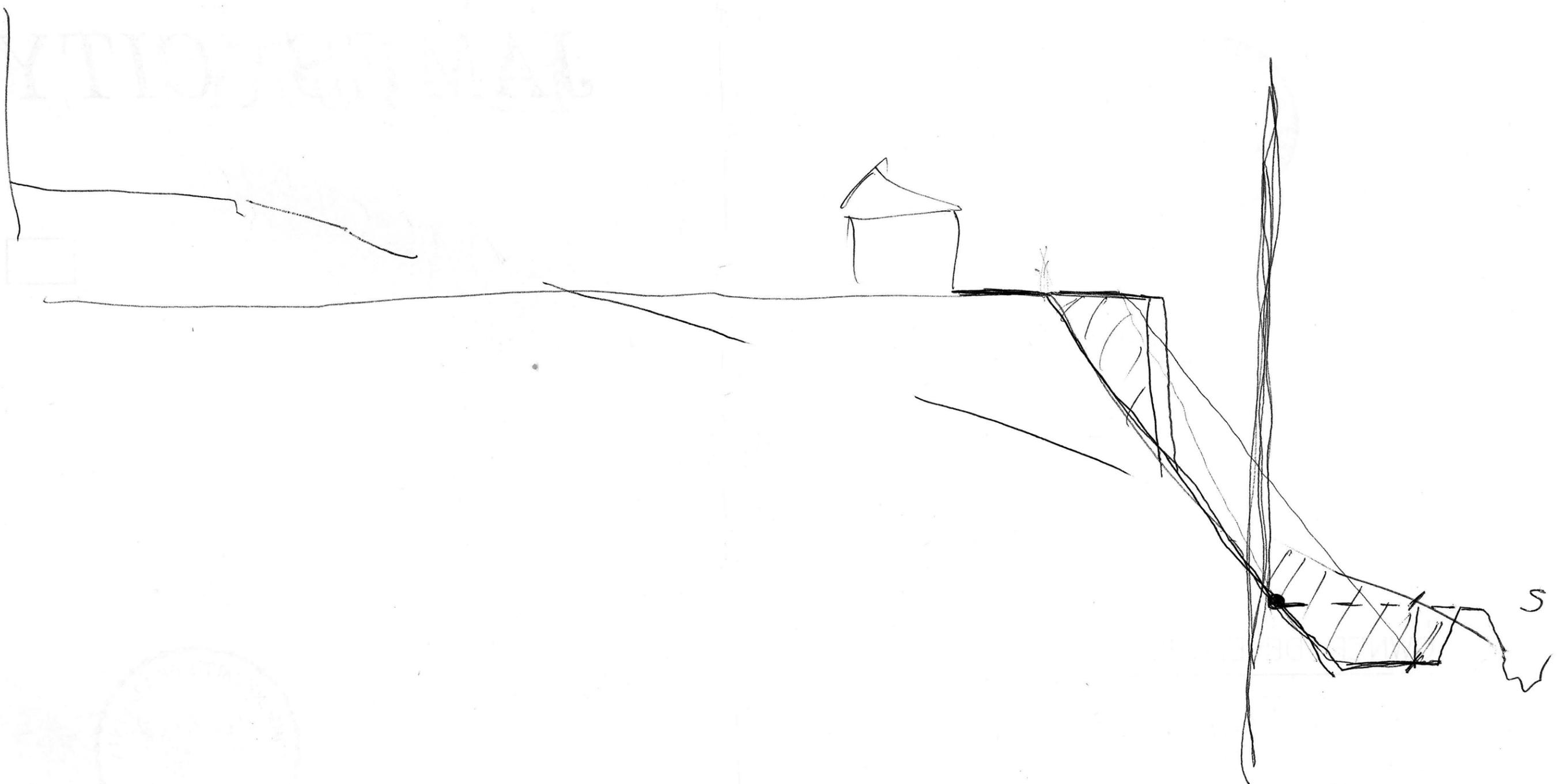
OWNER/DEVELOPER

DONALD MOORE
 MARSHA-LYNN BUILDING CORP.
 4480 HOLLAND OFFICE PARK
 SUITE 222
 VIRGINIA BEACH, VA 23452
 FAX: (757) 490-5900



APPROVED NOV 20 2001

202



I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT / BMP FACILITY.

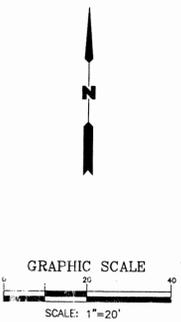
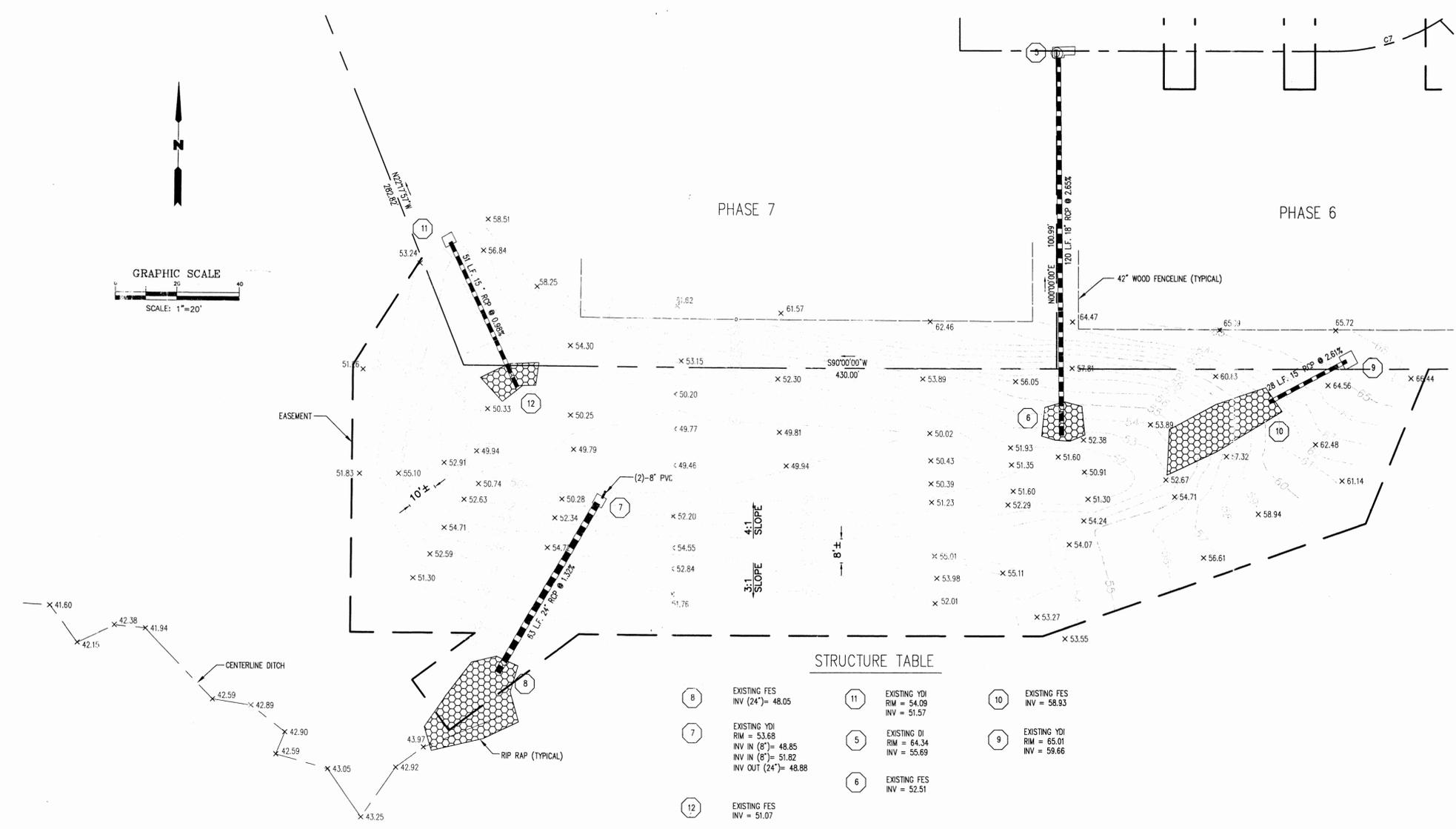
Frank G. Mundy, L.S.
FRANK G. MUNDY, L.S.

NO.	DATE	REVISIONS	BY
1	10/25/97	REV. PER COUNTY & VDOT REVIEW COMMENTS RECEIVED 9/26/97.	
2	8/30/01	BMP RECORD DRAWING	

VHB
Vannasse Hangen Brustlin, Inc.
Professional Land Development & Environmental Services
11822 Lee Road, Suite 200
Newport News, Virginia 23606-4231
(757) 873-3386 • FAX (757) 873-0757



**CROMWELL RIDGE
AT
POWATAN SECONDARY**
JAMES CITY COUNTY, VIRGINIA
BMP POND RECORD DRAWINGS



STRUCTURE TABLE

8	EXISTING FES INV (24")= 48.05	11	EXISTING YDI RIM = 54.09 INV = 51.57	10	EXISTING FES INV = 58.93
7	EXISTING YDI RIM = 53.68 INV IN (8")= 48.85 INV IN (8")= 51.82 INV OUT (24")= 48.88	5	EXISTING DI RIM = 64.34 INV = 55.69	9	EXISTING YDI RIM = 65.01 INV = 59.66
12	EXISTING FES INV = 51.07	6	EXISTING FES INV = 52.51		

NOTES:

- THE DRAWING IS INTENDED TO REPRESENT THE ASBUILT EXISTING CONDITIONS OF THE BMP POND LOCATED ON THE SUBJECT PROPERTY AND IS BASED ON A CURRENT FIELD SURVEY PERFORMED BY VHB ON 8/30/01.
- THE BOUNDARY AND EASEMENTS SHOWN DO NOT REFLECT A BOUNDARY SURVEY AND SHOULD NOT BE USED AS SUCH.
- VERTICAL DATUM IS BASED ON CONSTRUCTION DOCUMENTS OF THE PROJECT.

SCALE: NONE

DATE: 09/27/01 / 7/10/97

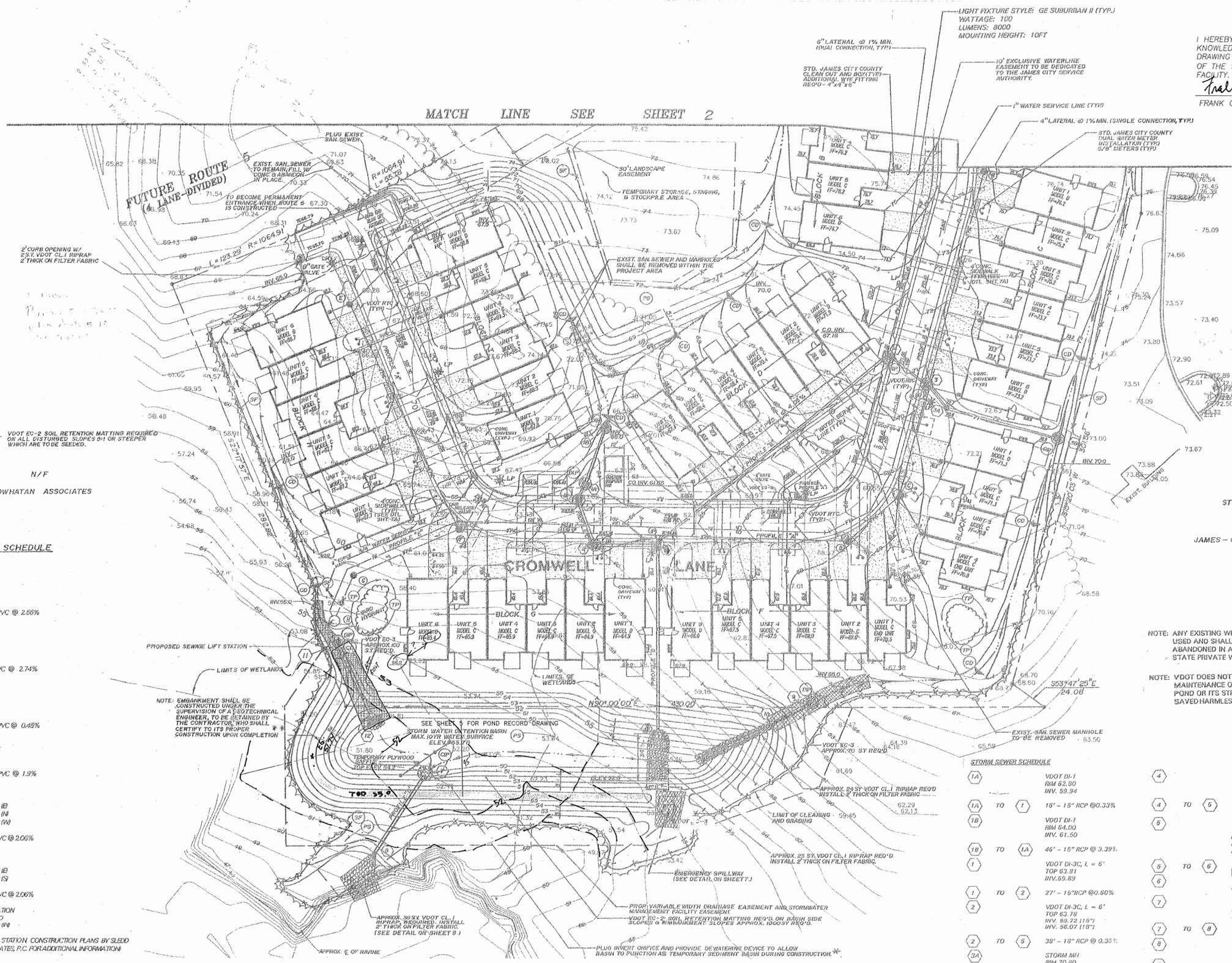
DESIGNED: _____

DRAWN: MDC

CHECKED: FGM

PROJECT NO. 30807/97-003

SHEET NO. 5 OF 5



I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT / BMP FACILITY.

Frank G. Munro
FRANK G. MUNRO, L.S.

SANITARY SEWER SCHEDULE

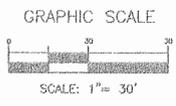
(B)	SAN MH RM 74.65 INV. 67.40 INV. 67.30
(B) TO (C)	20" - 8" PVC @ 2.56%
(C)	SAN MH RM 68.00 INV. 61.90 INV. 61.85
(C) TO (D)	45" - 8" PVC @ 2.74%
(D)	SAN MH RM 67.95 INV. 60.00 INV. 68.62
(D) TO (F)	24" - 8" PVC @ 0.45%
(E)	SAN MH RM 67.35 INV. 61.01
(E) TO (F)	155" - 8" PVC @ 1.9%
(F)	SAN MH RM 64.30 INV. 57.64 (B) INV. 58.06 (H) INV. 55.50 (M)
(F) TO (G)	71" - 8" PVC @ 2.06%
(G)	SAN MH RM 53.00 INV. 54.03 (B) INV. 52.08 (S)
(G) TO (H)	28" - 8" PVC @ 2.06%
(H)	LIFT STATION TOP 56.50 INV. 51.00 (H)

SEE LIFT STATION CONSTRUCTION PLANS BY SLEED & ASSOCIATES, P.C. FOR ADDITIONAL INFORMATION

NOTE: EMBANKMENT SHALL BE CONSTRUCTED UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER, TO BE RETAINED BY THE CONTRACTOR WHO SHALL CERTIFY TO ITS PROPER CONSTRUCTION UPON COMPLETION

RESTRAINED JOINT REQUIREMENTS FOR WATER LINE

PIPE SIZE	BEND	MIN. LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING
8"	90	18.0 FT
	45	10.5 FT
	22-1/2	6.0 FT
	11-1/4	3.25 FT
	BLOW/OFF	65.0 FT
4"	45	8.0 FT



STORM SEWER SCHEDULE

(1A)	VDOT DI-1 RIM 62.80 INV. 58.94	(4)	VDOT DI-3B, L = 6" TOP 71.14 INV. 66.35
(1A) TO (1)	18" - 15" RCP @ 0.33%	(4) TO (5)	18" - 15" RCP @ 5.21%
(1B)	VDOT DI-1 RIM 64.00 INV. 61.60	(5)	VDOT DI-3B, L = 6" TOP 64.34 INV. 57.94 (18" W) INV. 55.76 (15") INV. 53.45 (15" S) INV. 55.63
(1B) TO (1A)	46" - 15" RCP @ 3.39%	(5) TO (6)	120" - 18" RCP @ 2.65% LENGTH INCLUDES ES-1 VDDT ES-1 INV. 52.40 INV. 52.31
(1)	VDOT DI-3C, L = 6" TOP 63.31 INV. 59.89	(6)	VDDT ES-1 RIM 53.88 INV. 52.60 (SEE DETAIL ON SHT. 7) INV. 48.88
(1) TO (2)	27" - 18" RCP @ 0.60%	(6) TO (7)	63" - 24" RCP @ 1.32% LENGTH INCLUDES ES-1 VDDT ES-1 INV. 52.40 INV. 48.09
(2)	VDOT DI-3C, L = 6" TOP 63.78 INV. 59.72 (15") INV. 56.07 (18")	(7) TO (8)	VDDT ES-1 RIM 54.09 INV. 52.40 INV. 51.57
(2) TO (5)	38" - 18" RCP @ 0.35%	(8) TO (9)	VDDT ES-1 RIM 54.09 INV. 52.40 INV. 51.57
(3A)	STORM MH RIM 70.90 INV. 66.50	(9) TO (10)	63" - 18" RCP @ 2.61% LENGTH INCLUDES ES-1 VDDT ES-1 INV. 52.40 INV. 51.57
(3A) TO (3)	16" - 12" RCP @ 0.40%	(10) TO (11)	63" - 18" RCP @ 2.61% LENGTH INCLUDES ES-1 VDDT ES-1 INV. 52.40 INV. 51.57
(3B)	VDOT DI-1 RIM 70.00 INV. 66.78	(11) TO (12)	61" - 15" RCP @ 0.98% LENGTH INCLUDES ES-1 VDDT ES-1 INV. 52.40 INV. 51.07
(3B) TO (3A)	70" - 12" RCP @ 0.40%		
(3)	VDOT DI-1 - 3B, L = 6" TOP 70.89 INV. 65.44 (15") INV. 66.44 (12")		
(3) TO (4)	27" - 15" RCP @ 0.33%		

* NOTE: DURING PROJECT CONSTRUCTION, THE 8" ORIFICE AT THE INVERT OF THE OUTLET STRUCTURE SHALL BE PLUGGED TEMPORARILY SO THAT THE DETENTION BASIN WILL FUNCTION AS A TEMPORARY SEDIMENT BASIN. THE CONTRACTOR SHALL PROVIDE A TEMPORARY 8 INCH DIAMETER DEWATERING ORIFICE WITH A 10 INCH DIAMETER PERFORATED RISER IN ACCORDANCE WITH SECTION 3.14 OF THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, 1992 EDITION," AT INVERT ELEVATION 51.5. AFTER THE COMPLETION OF LAND DISTURBING ACTIVITIES THE DEWATERING DEVICE SHALL BE REMOVED AND THE TEMPORARY OPENING BLOCKED. ACCUMULATED SEDIMENT SHALL BE REMOVED AND THE ORIFICE AT THE INVERT OF THE OUTLET STRUCTURE SHALL BE UNPLUGGED AND THE BASIN CONVERTED TO A STORMWATER MANAGEMENT FACILITY.

- * EMBANKMENT NOTES
- ALL DAM CONSTRUCTION SHALL BE UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER TO BE RETAINED BY THE OWNER.
 - IMPERVIOUS CUT-OFF TRENCH ALONG EMBANKMENT CENTERLINE TO EXTEND A MINIMUM OF 3.5 FT. BELOW EXISTING GROUND. ACTUAL DEPTH OF CUT-OFF TO BE DETERMINED IN THE FIELD BY THE GEOTECHNICAL ENGINEER. BACKFILL WITH SC CONTAINING NO LESS THAN 34% OF FINES OR CL MATERIAL PLACED IN LOOSE LIFTS OF 6 TO 8 INCHES IN DEPTH AND COMPACTED TO 100% OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D998.
 - REMOVE ALL ORGANIC AND UNSUITABLE MATERIAL FROM BENEATH EMBANKMENT TO A MINIMUM DEPTH OF 18 INCHES OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER AND REPLACE WITH SC-CL MATERIAL CONTAINING MORE THAN 34% FINES BY WEIGHT COMPACTED IN 6 TO 8 INCH LIFTS TO 100% OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D998.
 - DAM EMBANKMENT TO BE CONSTRUCTED OF SC-CL MATERIAL CONTAINING MORE THAN 34% FINES BY WEIGHT AND COMPACTED AS ABOVE.
 - VDDT EC-2 SOIL RETENTION MATTING IS REQUIRED ON THE DOWNSTREAM FACE OF THE EMBANKMENT AND THROUGH THE EMERGENCY SPILLWAY. EC-2 MATTING IS TO BE INSTALLED ON THE UPSTREAM FACE AND POND BANKS.

NO.	DATE	REVISIONS	BY
1	10/25/97	REV. PER COUNTY & VDOT REVIEW	
2	1/8/98	ADDED STREET LIGHTS	
3	1/21/98	REV. PER JCC COMMENTS DTD. 12/23/97 AND VDOT COMMENTS DTD. 1/12/98	
4	8/30/01	BMP RECORD DRAWING	

Vanasse Hangen Brustlin, Inc.
Transportation Land Development Environmental Services
1652 Rte. 28, Suite 200
Newport News, Virginia 23606-4233
(757) 873-3386 • FAX (757) 873-0751



CROMWELL RIDGE AT POWATAN SECONDARY
JAMES CITY COUNTY, VIRGINIA
RECORD DRAWINGS

SCALE: 1" = 30'

DATE: 09/27/01 / 7/10/97

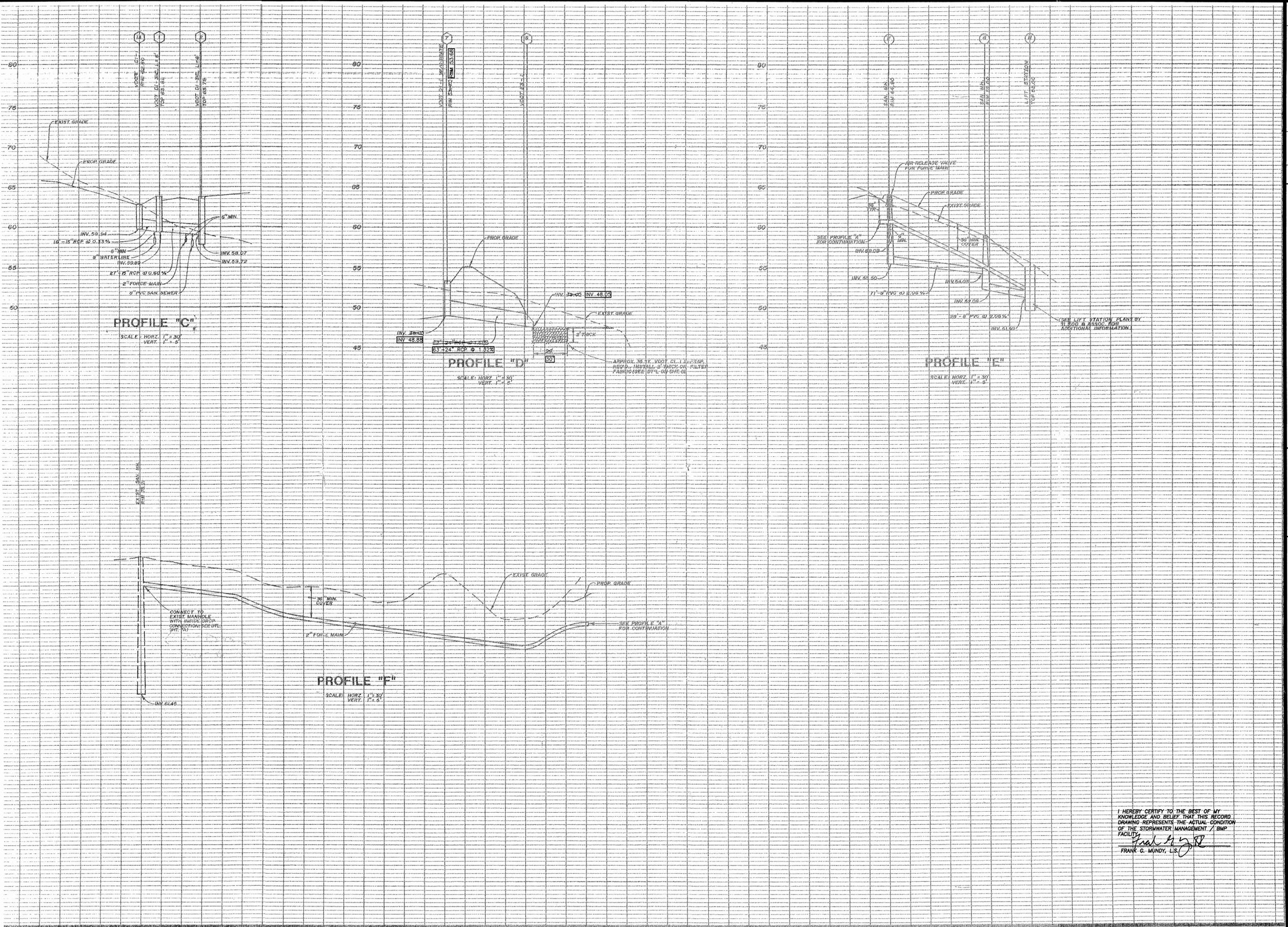
DESIGNED: _____

DRAWN: MDC

CHECKED: FGM

PROJECT NO. 30807/97-003

SHEET NO. 2 OF 5



NO.	DATE	REVISIONS	BY
1	8/20/01	BMP RECORD DRAWING	

Vannesse Henson Brustlin, Inc.
 Transportation Land Development Environmental Services
 11832 Rock Landing Drive, Suite 203
 Newport News, Virginia 23606-4231
 (757) 873-3386 • FAX (757) 873-0757



CROMWELL RIDGE
 AT
POWATAN SECONDARY
 JAMES CITY COUNTY, VIRGINIA
RECORD DRAWINGS

I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT / BMP FACILITY.
 Frank G. Mundy, L.S.

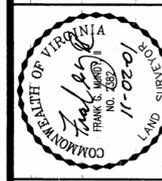
SCALE: AS NOTED
 DATE: 09/27/01 / 7/10/97
 DESIGNED: _____
 DRAWN: MDC
 CHECKED: FGM
 PROJECT NO. 30807/97-003
 SHEET NO. 3 of 5

I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT / BMP FACILITY.

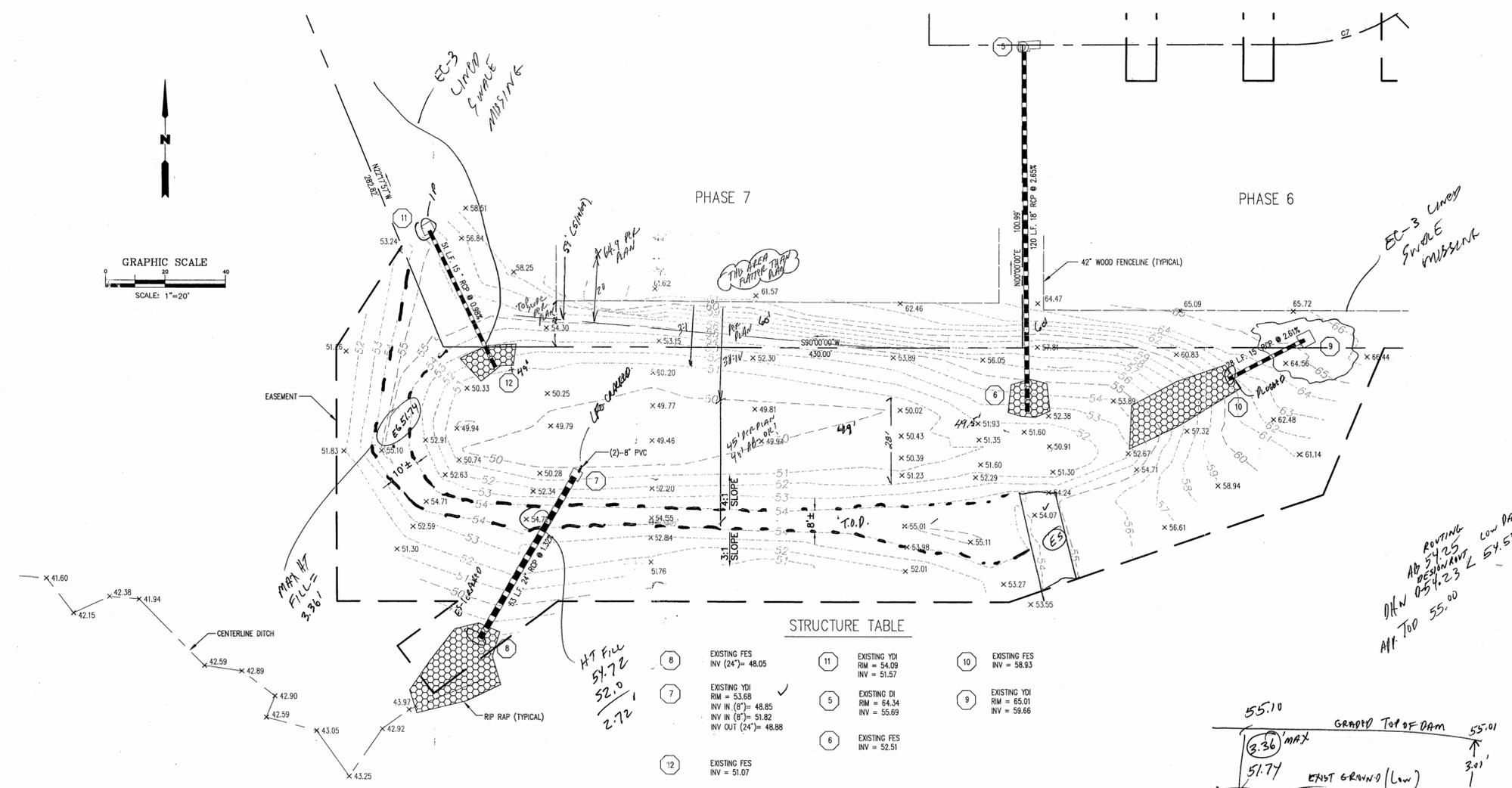
Frank G. Mundy
FRANK G. MUNDY, L.S.

NO.	DATE	REVISIONS	BY
1	10/25/97	REV. PER COUNTY & VDOT REVIEW	
2	8/30/01	COMMENTS RECEIVED 9/28/97. BMP RECORD DRAWING	

VHB
Vanasse Hangen Brustlin, Inc.
Environmental Services
11823 Rock Landing Drive, Suite 403
Norfolk News, Virginia 23506-4231
(757) 873-3386 • FAX (757) 873-0757

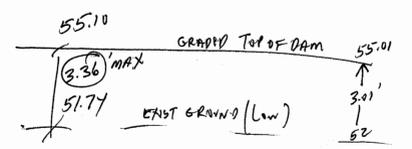


CROMWELL RIDGE
AT
POWATAN SECONDARY
JAMES CITY COUNTY, VIRGINIA
BMP POND RECORD DRAWINGS



STRUCTURE TABLE

8	EXISTING FES INV (24")= 48.05	11	EXISTING YDI RIM = 54.09 INV = 51.57	10	EXISTING FES INV = 58.93
7	EXISTING YDI RIM = 53.68 INV IN (8")= 48.85 INV IN (6")= 51.82 INV OUT (24")= 48.88	5	EXISTING DI RIM = 64.34 INV = 55.69	9	EXISTING YDI RIM = 65.01 INV = 59.66
12	EXISTING FES INV = 51.07	6	EXISTING FES INV = 52.51		



NOTES:

1. THE DRAWING IS INTENDED TO REPRESENT THE ASBUILT EXISTING CONDITIONS OF THE BMP POND LOCATED ON THE SUBJECT PROPERTY AND IS BASED ON A CURRENT FIELD SURVEY PERFORMED BY VHB ON 8/30/01.
2. THE BOUNDARY AND EASEMENTS SHOWN DO NOT REFLECT A BOUNDARY SURVEY AND SHOULD NOT BE USED AS SUCH.
3. VERTICAL DATUM IS BASED ON CONSTRUCTION DOCUMENTS OF THE PROJECT.

SCALE: NONE

DATE: 09/27/01 / 7/10/97

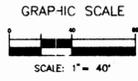
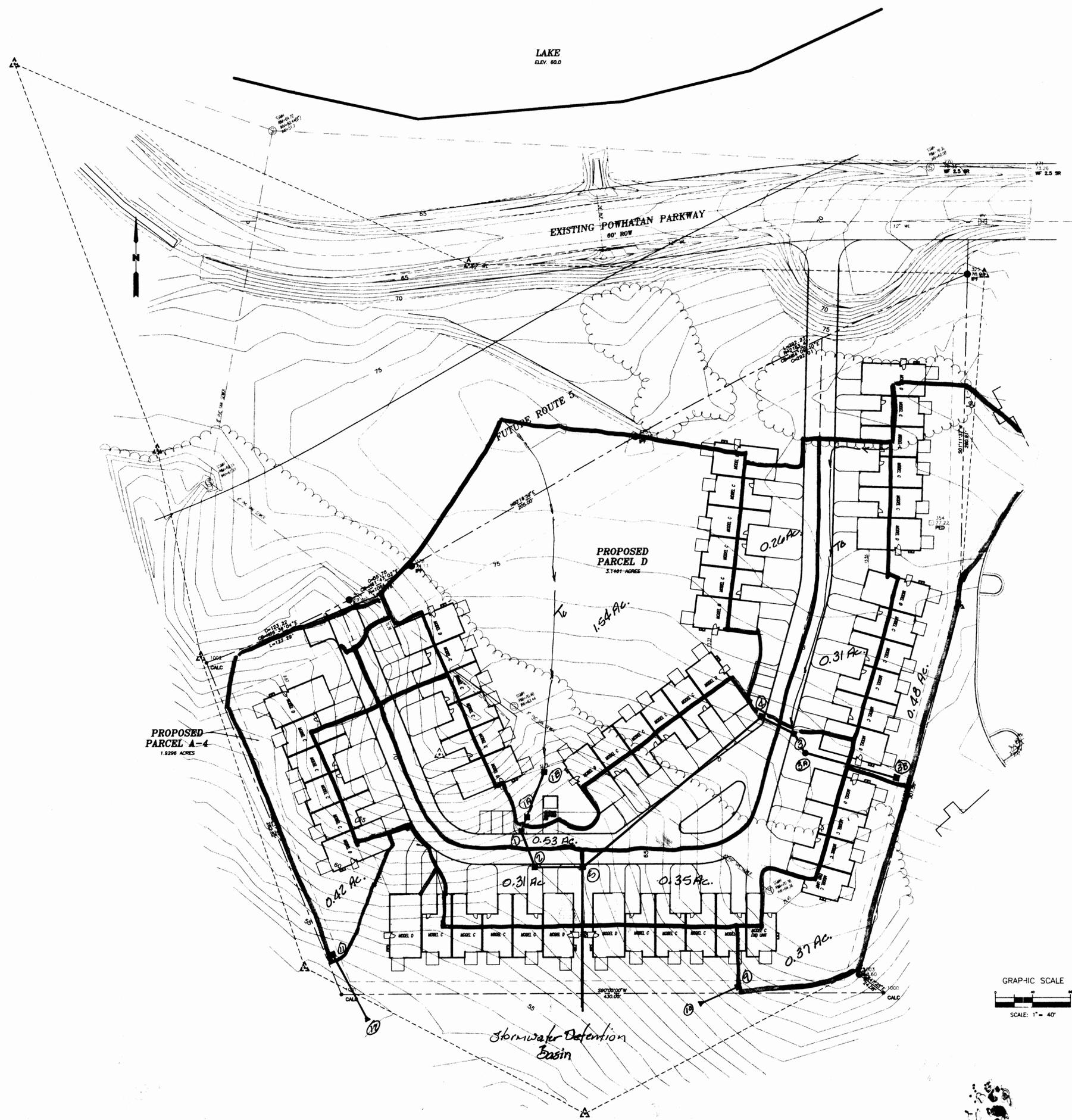
DESIGNED: _____

DRAWN: MDC

CHECKED: FGM

PROJECT NO. 30807/97-003

SHEET NO. 5 of 5



Original Calculations =
4/24/97
Revised: 10/29/97

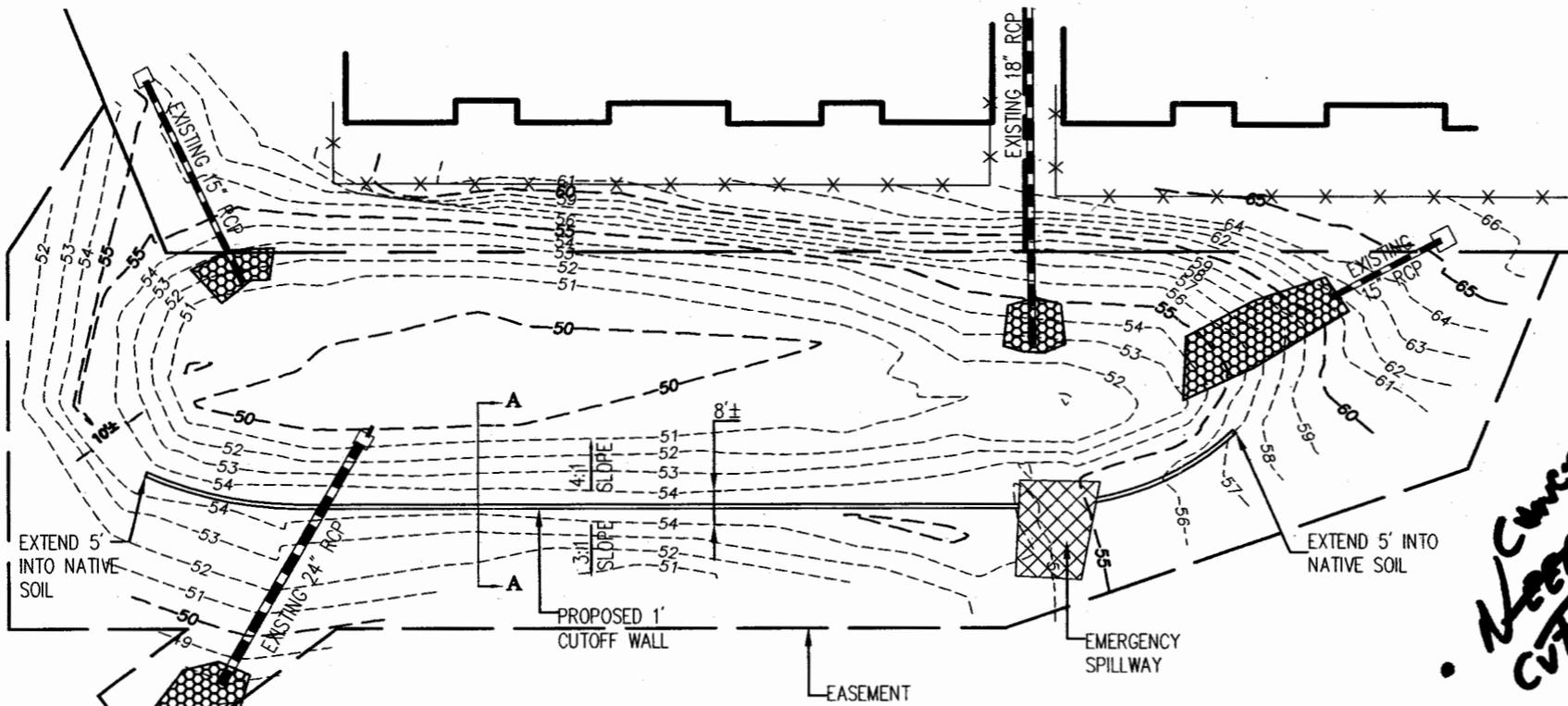
NO.	DATE	REVISIONS	BY

SLEDD & ASSOCIATES, P.C.
ENGINEERS PLANNERS SURVEYORS
11832 ROCK LANDING DRIVE, SUITE 203
NEWPORT NEWS, VIRGINIA 23606
(757) 873-3386



PROPOSED TOWNHOME DEVELOPMENT
POWHATAN SECONDARY
JAMES CITY COUNTY, VA.
*CONCEPT PLAN
DRAINAGE AREA MAP*

SCALE:	1" = 40'
DATE:	3/26/97
DESIGNED:	GCT
DRAWN:	SJB
CHECKED:	
PROJECT NO.	97-003
SHEET NO.	1 of 1

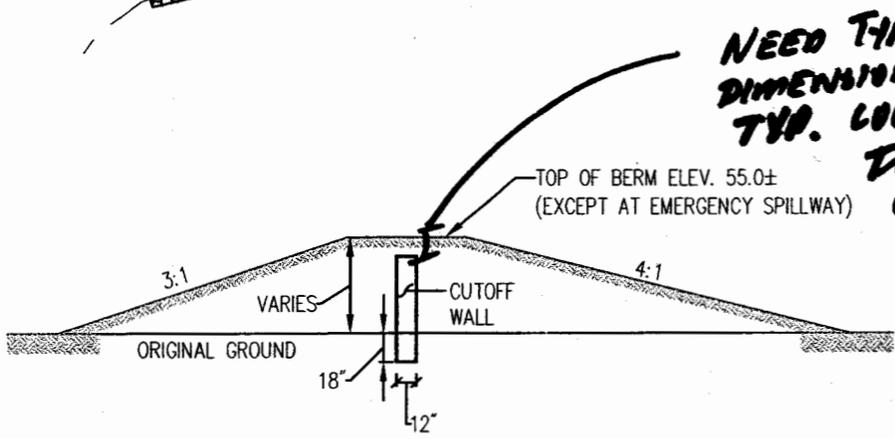


C.O.W =
CUT OFF WALL.

*Concrete
Need space for
CUTOFF WALL Material
i.e. clay Bentonite,
etc.*

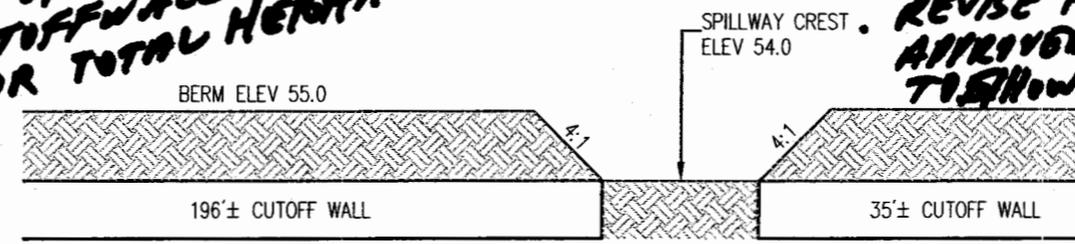
*ETS CONTRU
CONST COST FOR
CUTOFF WALL
NEEDED.*

*REVISE PREV
APPROVED AS-BUILT
TO SHOW FINAL
C.O.W.*



SECTION A - A
SCALE: 1"=10'

*NEED TYPICAL
DIMENSION FOR
TYP. LOCATION
TOP OF
CUTOFF WALL
OR TOTAL HEIGHT.*



CUT VIEW OF BERM, WALL AND SPILLWAY

**STAMP &
SEAL**

Date	11/20/02
Scale	1" = 40'
VHBCad File Name	30807exh
Project Number	30807.00

**Exhibit Showing
Earth Berm Cutoff Wall
Cromwell Ridge
at Powhatan Secondary**
James City County, Virginia

VHAB
Vanasse
Hangen
Brustlin
Inc.
Transportation, Land Development
and Environmental Services
11832 Rock Landing Drive, Suite 203, Newport News
Virginia 23606 757/873-3386 • Fax 757/873-0757

The purpose of the erosion control measures shown on these plans shall be to preclude the transport of all waterborne sediments resulting from construction activities from entering onto adjacent properties or State waters. If field inspection reveals the inadequacy of the plan to confine sediment to the project site, all appropriate modifications will be made to correct any plan deficiencies. In addition to these notes, all provisions of the Virginia Erosion and Sediment Control Regulations shall apply to this project.

1. All erosion and sediment control measures shall be installed and maintained in accordance with the Virginia Erosion and Sediment Control Handbook; 3rd Edition, 1992. The contractor shall be thoroughly familiar with all applicable measures contained therein that may be pertinent to this project, including Minimum Standards 1 through 19. If the approved Erosion and Sediment Control plan is found to be inadequate in the field, the Minimum Standards will apply in addition to the provisions of the approved plan.

2. As a prerequisite to approval of an erosion and sediment control plan for land-disturbing activities, the name of a Responsible Land-Disturber shall be provided. The Responsible Land-Disturber shall be an individual who holds a valid certificate of competence issued by the Virginia Department of Conservation and is defined as the person in charge of and responsible for carrying out the land-disturbing activity. Permits or plans without this information are deemed incomplete and will not be approved until proper notification is received. Also, if the person designated as Responsible Land-Disturber changes between the time of plan approval and the scheduled preconstruction meeting, the Environmental Division shall be informed of the change, in writing, 24-hours in advance of the preconstruction meeting.

3. A preconstruction meeting shall be held on site between the County, the Developer, the Project Engineer, the Responsible Land-Disturber and the Contractor prior to issuance of the Land Disturbing Permit. The Contractor shall submit a Sequence of Construction to the County for approval prior to the preconstruction meeting. The designated Responsible Land-Disturber is required to attend the preconstruction meeting for the project.

4. All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from VDOT is required prior to any construction activities within State right-of-ways. Where sediment is transported onto a public road surface, the road shall be thoroughly cleaned at the end of each day (Std & Spec 3.02).

5. Sediment basins and traps (Std & Spec 3.13 and 3.14), perimeter dikes (Std & Spec 3.09 and 3.12), sediment filter barriers (Std. & Spec 3.05) and other measures intended to trap sediment on-site must be constructed as a first step in grading and must be made functional prior to any upslope land disturbance taking place. Earthen structures such as dams, dikes and diversions must be seeded and mulched immediately after installation. Periodic inspections of the erosion control measures by the owner or owners representative shall be made to assess their condition. Any necessary maintenance of the measures shall be accomplished immediately and shall include the repair of measures damaged by any subcontractor including those of the public utility companies.

6. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 3.10) and slope drain (Std. & Spec. 3.15) shall be installed prior to the end of each working day.

7. Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Environmental Division approval will be required for other deviations from the approved plan.

8. The Contractor shall place soil stockpiles at the locations shown on the plan. Soil stockpiles shall be stabilized or protected with sediment trapping measures. Off-site waste or borrow areas shall be approved by the Environmental Division prior to the import of any borrow or export of any waste to or from the project site.

9. The Contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of the same (Std & Spec 3.18). This includes installation of erosion control stone or paved ditches where required. Any drainage outfalls required for a street must be completed before street grading or utility installation begins.

10. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

11. No more than 300 feet of sanitary sewer, storm drain, water or underground utility lines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).

12. If disturbed area stabilization is to be accomplished during the months of December, January or February, stabilization shall consist of mulching (Std & Spec 3.35). Seeding will then take place as soon as the season permits.

13. The term Seeding, Final Vegetative Cover or Stabilization on this plan shall mean the successful germination and establishment of a stable grass cover from a property prepared seedbed containing the specified amounts of seed, lime and fertilizer (Std & Spec 3.32). Irrigation shall be required as necessary to ensure establishment of grass cover.

14. All slopes steeper than 3H:1V shall require the use of erosion control blankets and matting to aid in the establishment of a vegetative cover. Installation shall be in accordance with Std. & Spec. 3.35, Mulch, Std. & Spec. 3.36, Soil Stabilization Blankets and Matting and Manufacturers Instructions. No slopes shall be created steeper than 2H:1 V.

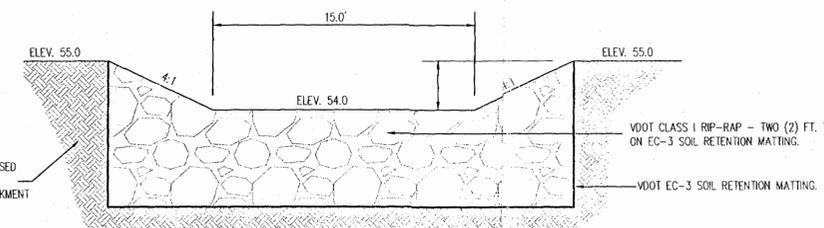
15. Inlet protection (Std & Spec 3.07 and 3.08) shall be provided for all storm drain and culvert inlets following construction of the same.

16. Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the

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

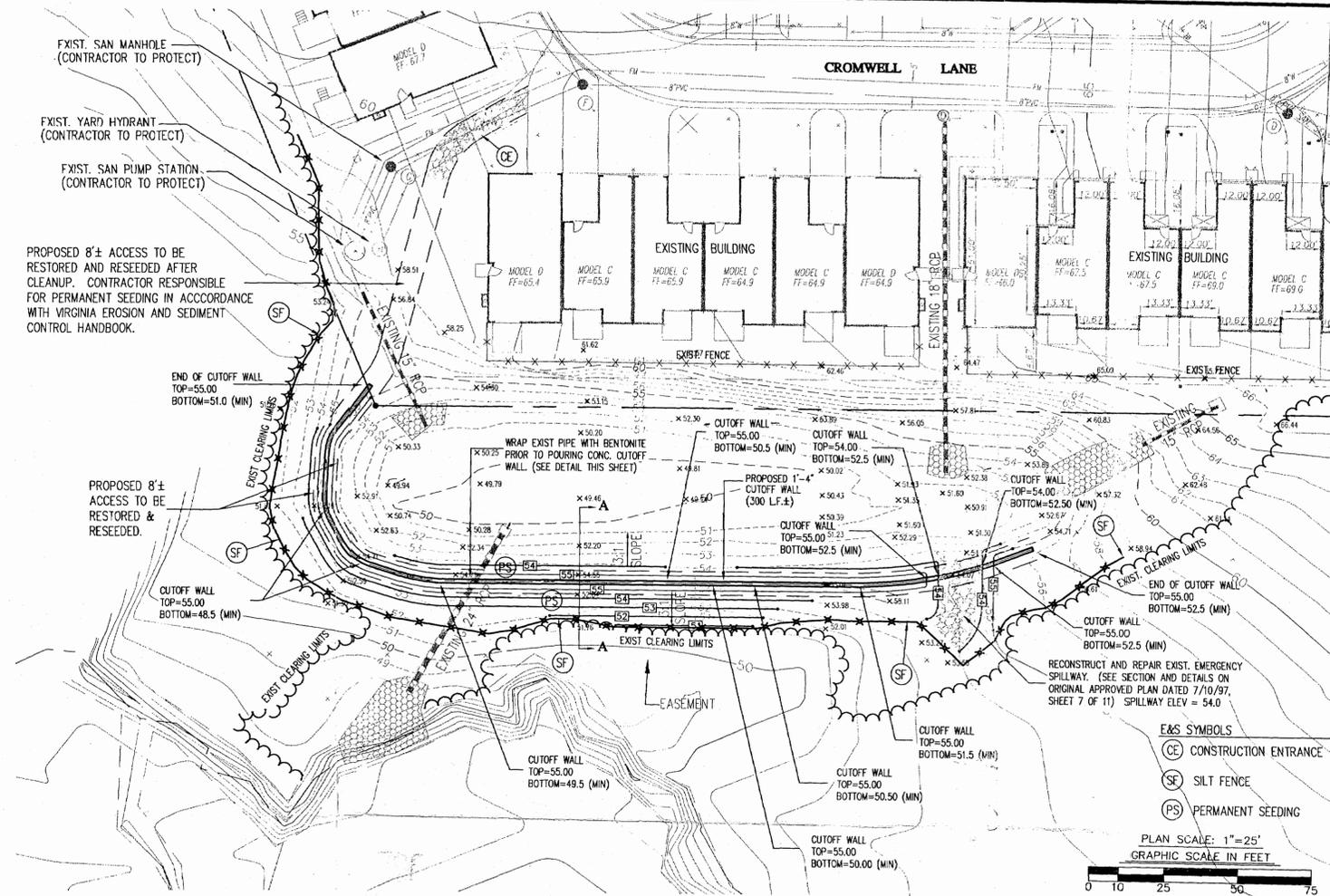
20. Record Drawings (As-Builts) and Construction Certifications are both required for newly constructed or modified stormwater management/BMP facilities. Certification activities shall be adequately coordinated and performed before, during and following construction in accordance with the current version of the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions.

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



ELEVATION AT EMERGENCY SPILLWAY

N.T.S.



BMP Modification Plan

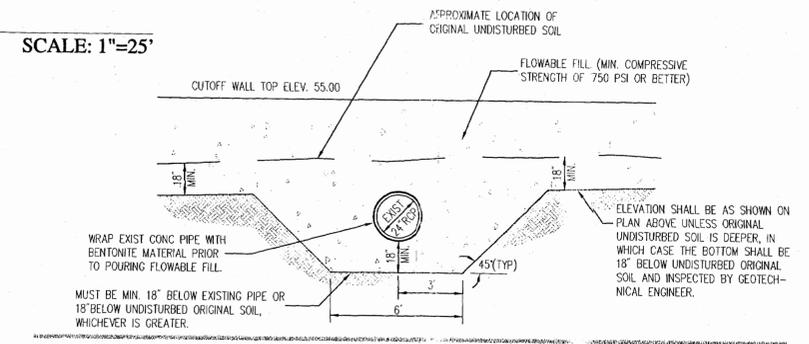
CONSTRUCTION & EROSION CONTROL EVENT SCHEDULE

1. INSTALL CONSTRUCTION ENTRANCE.
2. INSTALL SILT FENCING AS SHOWN ON THIS PLAN.
3. EXCAVATE CUTOFF WALL TRENCH. EXCAVATED TRENCH SHALL BE FORMWORK UNLESS NEAR VERTICAL WALLS CAN NOT BE ACHIEVED AND MAINTAINED.
4. SPREAD EXCAVATION MATERIAL ON OUTSIDE SLOPE OF BMP WITH MODIFIED SLOPE NOT EXCEEDING 3:1.
5. WRAP EXISTING 24" OUTFALL PIPE WITH BENTONITE MATERIAL.
6. POUR FLOWABLE FILL INTO EXCAVATED TRENCH. TOP OF WALL SHALL BE AT ELEVATION 55.00 EXCEPT FOR THE AREA OF THE EMERGENCY SPILLWAY.
7. PERFORM CHECK OF EROSION CONTROL MEASURES.
8. INSTALL TOPSOIL AND PERMANENT SEEDING ON ALL DISTURBED AREAS.
9. INSTALL VDOT EC-3 SOIL RETENTION MATTING ON ALL DISTURBED AREAS.
10. REMOVE STONE AND REPAIR AREA AT CONSTRUCTION ENTRANCE.
11. CLEAN UP.
12. REMOVE TEMPORARY EROSION & SEDIMENT CONTROL MEASURES AFTER FINAL STABILIZATION OF SITE.

GENERAL NOTES:

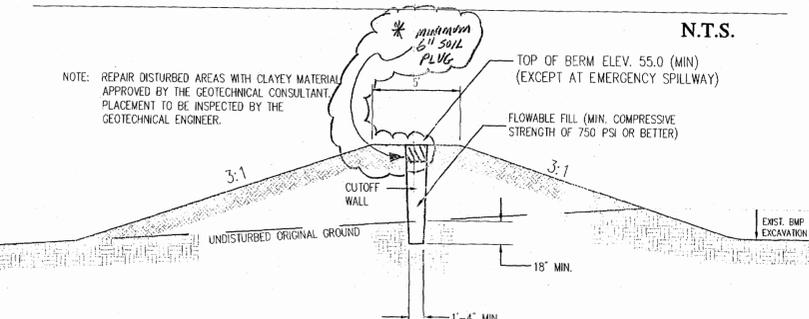
1. ALL WORK INCLUDING PLACEMENT OF SOIL MATERIALS MUST BE PERFORMED UNDER THE SUPERVISION OF THE CONTRACTOR'S GEOTECHNICAL ENGINEER, WHO SHALL CERTIFY TO ITS PROPER CONSTRUCTION UPON COMPLETION.
2. ALL BACKFILL MATERIAL MUST BE CLAYEY (SC-CL) MATERIAL, OR OTHER MATERIAL APPROVED BY CONTRACTOR'S GEOTECHNICAL ENGINEER.
3. CONTRACTOR RESPONSIBLE FOR PERMITS AND COORDINATION OF INSPECTION BY JAMES CITY COUNTY ENVIRONMENTAL DEPARTMENT.
4. CONTRACTOR SHALL RESTORE THE TOP OF THE BMP BERM TO THE SECTION SHOWN ON THIS PLAN TO A MINIMUM ELEVATION OF 55.0.
5. EXCAVATED FOUNDATION FOR CUTOFF WALL TO BE INSPECTED BY GEOTECHNICAL ENGINEER TO VERIFY SATISFACTORY MATERIALS PRIOR TO CONSTRUCTION OF THE CUTOFF WALL.
6. FLOWABLE FILL SHALL MEET A MINIMUM COMPRESSIVE STRENGTH OF 750 PSI. CONTRACTOR SHALL SUBMIT MANUFACTURER'S PRODUCT INFORMATION FOR THE BENTONITE MATERIAL SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
7. IMPVIOUS CUTOFF WALL ALONG THE CENTERLINE OF THE EMBANKMENT SHALL EXTEND A MINIMUM DEPTH OF 18 INCHES BELOW UNDISTURBED ORIGINAL SOIL.
8. ALL DAM EMBANKMENT MATERIAL SHALL BE SC-CL MATERIAL CONTAINING MORE THAN 34% FINES BY WEIGHT AND COMPACTED IN 6 TO 8 INCH LIFTS TO 100% OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D698.
9. VDOT EC-3 SOIL RETENTION MATTING IS REQUIRED ON ALL DISTURBED AREAS THROUGH THE EMERGENCY SPILLWAY.

SCALE: 1"=25'



Detail thru Cutoff Wall at Outfall/Pipe

N.T.S.



Section A-A

N.T.S.



Vanasse Hangen Brustlin, Inc.
Transportation
Land Development
Environmental Services
11832 Rock Landing Drive, Suite 203
Newport News, Virginia 23606-4231
757 873 3386 • FAX 757 873 0757

CUTOFF WALL PLAN

APPROVED AS NOTED
James City County
Environmental Division
By: *Alvin D. Sledd, Jr.*
Date: 11-16-02

E&S SYMBOLS
CE CONSTRUCTION ENTRANCE
SF SILT FENCE
PS PERMANENT SEEDING

PLAN SCALE: 1"=25'
GRAPHIC SCALE IN FEET

Revision	Date	Approved

Designed by MRG Drawn by MRG Checked by
CAD checked by Approved by ADS
Scale 1"=30' Date 12/05/02
Project Title

**Cromwell Ridge
at Powhatan Secondary**
James City County
Virginia
issued for
Site Plan Approval

**BMP Modification Plan
for
Earth Berm Cutoff Wall**

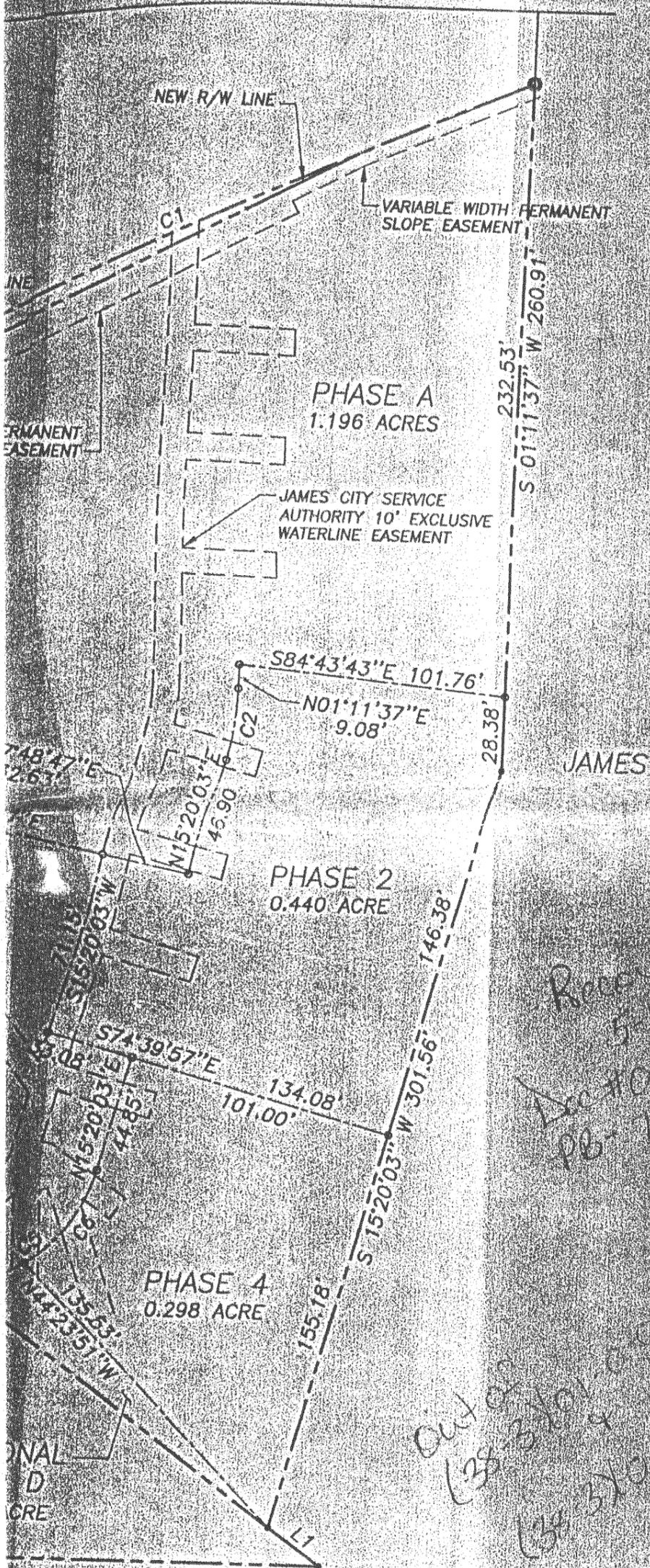
Drawing Number
C-01
Sheet 1 of 1
VBCad File Name
31407-BMPMod
Project Number
31407

ALVIN D. SLEDD, JR.
NO. 6758
12/12/02
PROFESSIONAL ENGINEER

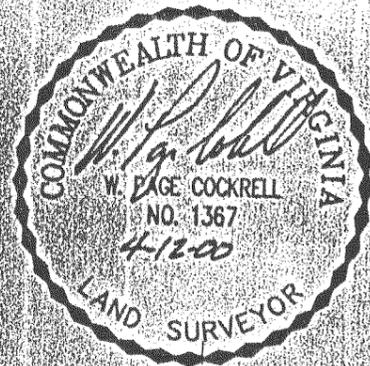
BOUNDARY

NOTES:

1. MERIDIAN BASED ON PLAT RECORDED IN D.B. 803, PG. 740.
2. TAX MAP FOR PARCEL (38-3) (1-9) (1-19)
3. TOTAL AREA OF PHASE 5 = 1.122 ACRES
4. TOTAL REMAINING AREA OF PARCEL D = 0.038 ACRE
5. TOTAL AREA OF ADDITIONAL LAND = 1.379 ACRES
6. PROPERTY LINES AS SHOWN BASED UPON OTHER AVAILABLE INFORMATION AND DOES NOT REPRESENT A RESURVEY OF THE BOUNDARIES.
7. IN ADDITION TO THE EASEMENTS DEPICTED HEREON, THE FOLLOWING EASEMENTS AFFECT THE PROPERTY:
 - A. EASEMENT TO VIRGINIA ELECTRIC AND POWER COMPANY RECORDED IN D.B. 39, PG. 465, ET SEQ.
 - B. EASEMENT TO VIRGINIA ELECTRIC AND POWER COMPANY RECORDED IN D.B. 42, PG. 497, ET SEQ.
 - C. EASEMENT TO CHESAPEAKE & POTOMAC TELEPHONE COMPANY RECORDED IN D.B. 117, PG. 149, ET SEQ.
 - D. EASEMENTS CONTAINED IN THAT CERTAIN DECLARATION OF COVENANTS AND RESTRICTIONS RECORDED IN D.B. 215, PG. 722, ET SEQ., AS AMENDED, INCLUDING THE AMENDMENT RECORDED DOCUMENT NO. 970015116, ON SEPTEMBER 16, 1997 AT PG. 219, ET SEQ.
 - E. EASEMENTS CONTAINED IN THAT CERTAIN DECLARATION OF COVENANTS INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY RECORDED IN D.B. 736, PG. 787, ET SEQ.
 - F. LIMITATIONS CONTAINED IN THAT CERTAIN PROFFER AGREEMENT RECORDED IN D.B. 790, PG. 34, ET SEQ.
 - G. LIMITATIONS CONTAINED IN THAT CERTAIN PROFFER AGREEMENT RECORDED IN D.B. 803, PG. 740, ET SEQ.
 - H. DEED OF EASEMENT FOR DRAINAGE, MAINTENANCE AND FACILITIES RECORDED IN DOCUMENT NO. 970015117, ON SEPTEMBER 16, 1997, AT PG. 224, ET SEQ.
 - I. EASEMENTS CONTAINED IN THAT CERTAIN DECLARATION OF COVENANTS INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM RECORDED IN DOCUMENT NO. 98000658, ON JUNE 15, 1998 AT PG. 33, ET SEQ.
 - J. EASEMENTS TO VIRGINIA ELECTRIC AND POWER COMPANY RECORDED IN DOCUMENT NO. 980022434, ON NOVEMBER 18, 1998, AT PG. 339, ET SEQ.



JAMES OXFORD LIMITED PARTNERSHIP



THE UNDERSIGNED CERTIFIES THAT THESE PLATS ARE ACCURATE AND COMPLY WITH THE PROVISIONS OF CODE OF VIRGINIA SECTION 55-79.58.A AND THAT ALL UNITS OR PORTIONS THEREOF DEPICTED HEREON AND ALL COMMON ELEMENTS HAVE BEEN SUBSTANTIALLY COMPLETED.

SIGNED: W. Page Cockrell
W. PAGE COCKRELL, L.S.

EXHIBIT B-4

SUPPLEMENTAL CONDOMINIUM PLAT OF

CROMWELL RIDGE CONDOMINIUMS

JAMES CITY COUNTY, VIRGINIA

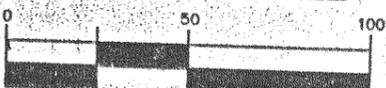
DATE: 4/12/00 SHEET 1 OF 5 SCALE: 1"=50'

PROJECT NO: 30807.00 DRAWN BY: SAA

VHB Vanasse Hangen Brustlin, Inc.

Recorded 3:29 PM day of May 2000
DOCUMENT # 000009564
Cindy Lebold Clark Clerk

GRAPHIC SCALE



MAPPED

11 18 mm



N/F
POWHATAN ASSOCIATES

JAMES OXFORD

5' PERMANENT SLOPE EASEMENT

VARIABLE WIDTH TEMPORARY CONSTRUCTION EASEMENT

PROPOSED 10' EXCLUSIVE WATERLINE EASEMENT TO BE DEDICATED TO JAMES CITY SERVICE AUTHORITY

JAMES CITY SERVICE AUTHORITY 10' EXCLUSIVE WATERLINE EASEMENT

JAMES CITY SERVICE AUTHORITY 10' EXCLUSIVE WATERLINE EASEMENT

PROPOSED VARIABLE WIDTH DRAINAGE EASEMENT 27,804 SF

PHASE 5
1.122 ACRES

PHASE 3
0.640 ACRE

PHASE 2
0.440 ACRE

PHASE 4
0.298 ACRE

ADDITIONAL LAND A-4
1.341 ACRES

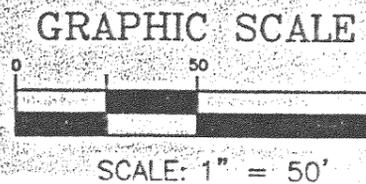
ADDITIONAL LAND D
0.038 ACRE

N 90°00'00" W 430.00'

N/F
POWHATAN ASSOCIATES

LEGEND

- PROPERTY BOUNDARY LINE
- - - PHASE LINE



Recorded 3:29 PM 19 day of May 2000
 DOCUMENT # 000009564
 [Signature] Clerk

*Recorded
 5-19-00
 Doc # 000009564
 PG- 77/56*

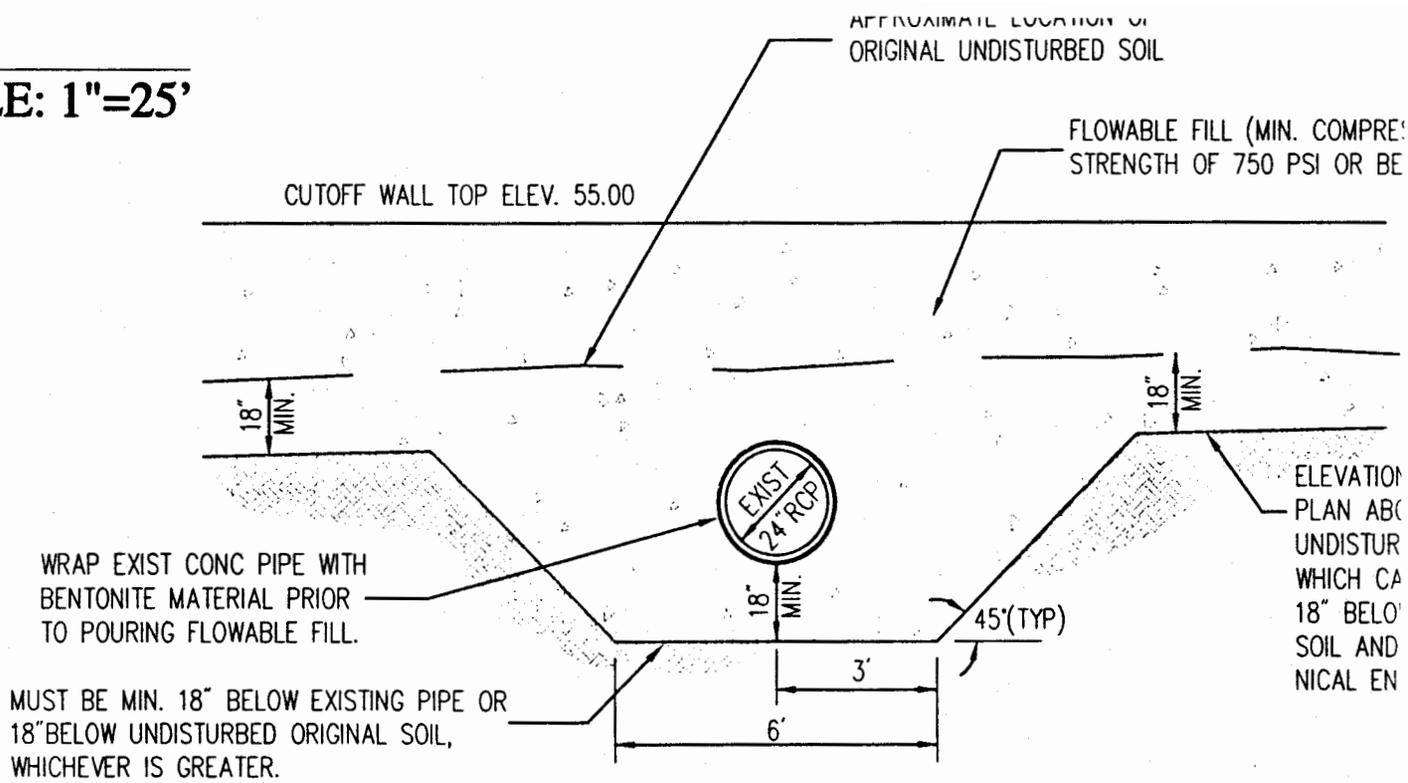
*Out of
 (28-370) 0000
 (38-370) 0000*

MAPPED!

11 18 2000

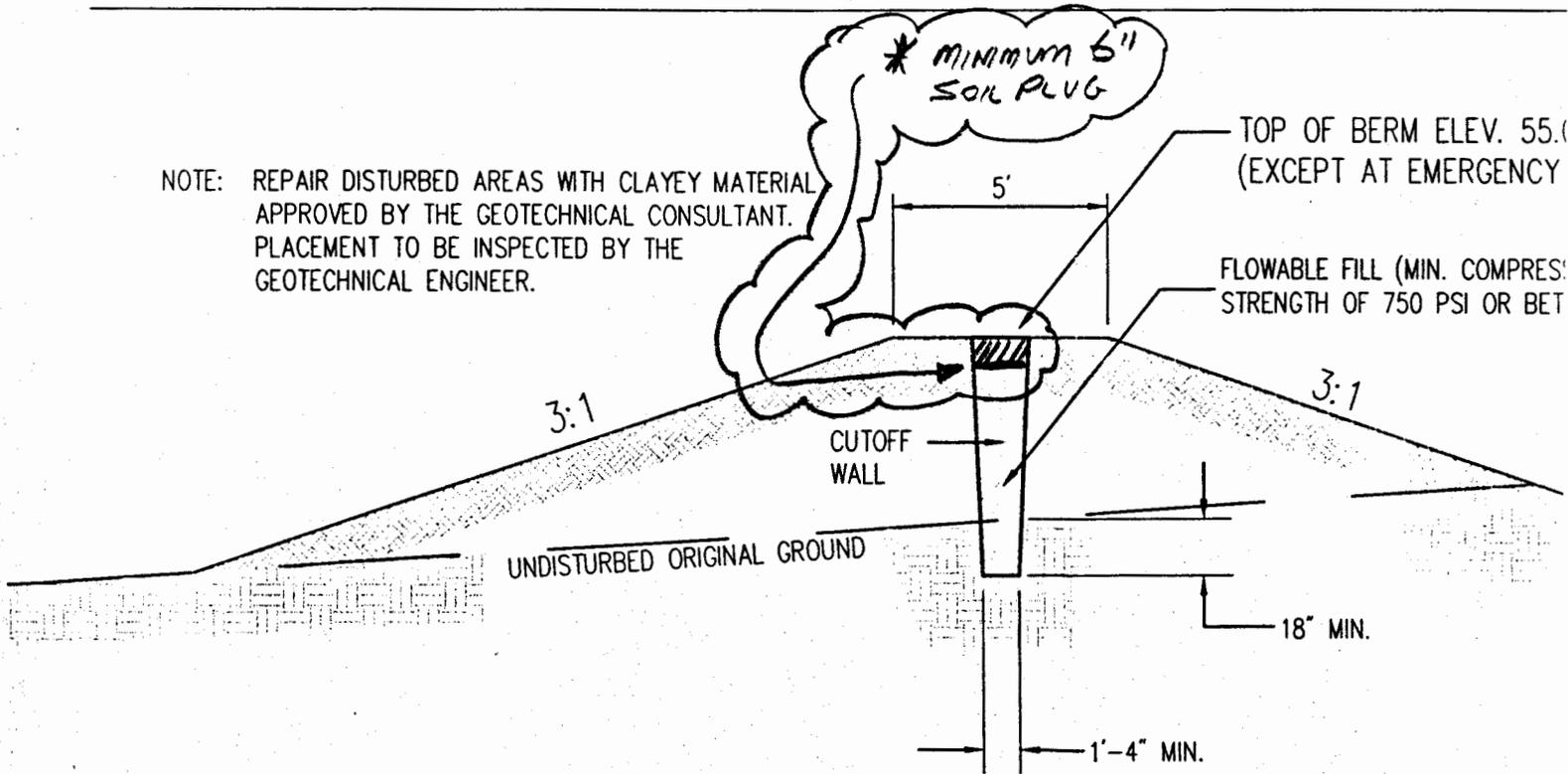
DATE RECORDED

SCALE: 1"=25'



Detail thru Cutoff Wall at Outfall Pipe

NOTE: REPAIR DISTURBED AREAS WITH CLAYEY MATERIAL APPROVED BY THE GEOTECHNICAL CONSULTANT. PLACEMENT TO BE INSPECTED BY THE GEOTECHNICAL ENGINEER.



Section A-A

MANHOLE
(OR TO PROTECT)

HYDRANT
(OR TO PROTECT)

WATER PUMP STATION
(OR TO PROTECT)

ACCESS TO BE
RESEDED AFTER
TRACTOR RESPONSIBLE
SEEDING IN ACCORDANCE
EROSION AND SEDIMENT
CONTROL PLAN.

CROMWELL LANE

WALL
OPTIONS

EXISTING BUILDING

EXISTING BUILDING

OPTION 2
LITTLE WALL

OPTION 1
BIG WALL

END OF CUTOFF WALL
TOP=55.00
BOTTOM=51.0 (MIN)

WRAP EXIST PIPE WITH BENTONITE
PRIOR TO POURING CONC. CUTOFF
WALL. (SEE DETAIL THIS SHEET)

PROPOSED 1'-4"
CUTOFF WALL
(300 L.F.±)

CUTOFF WALL
TOP=55.00
BOTTOM=52.5 (MIN)

CUTOFF WALL
TOP=54.00
BOTTOM=52.5 (MIN)

CUTOFF WALL
TOP=54.00
BOTTOM=52.50 (MIN)

END OF CUTOFF WALL
TOP=55.00
BOTTOM=52.5 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=52.5 (MIN)

RECONSTRUCT AND REPAIR EXIST. EMERGENCY
SPILLWAY. (SEE SECTION AND DETAILS ON
ORIGINAL APPROVED PLAN DATED 7/10/97,
SHEET 7 OF 11) SPILLWAY ELEV = 54.0

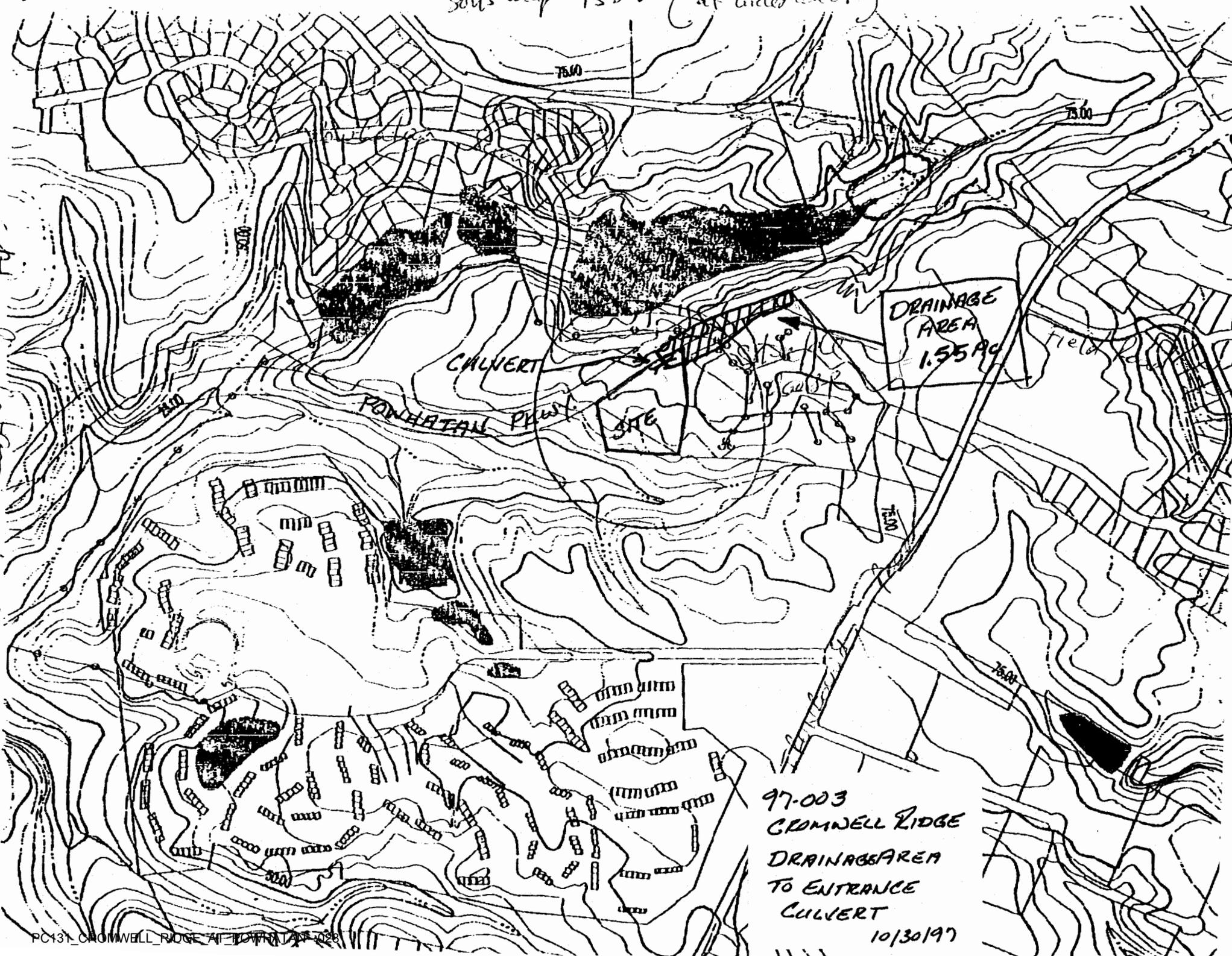
CUTOFF WALL
TOP=55.00
BOTTOM=51.5 (MIN)

E&S SYMBOLS

(CE) CONSTRUCTION ENTRANCE

Soils map 13.00 (at grid lines)

apt
97-003



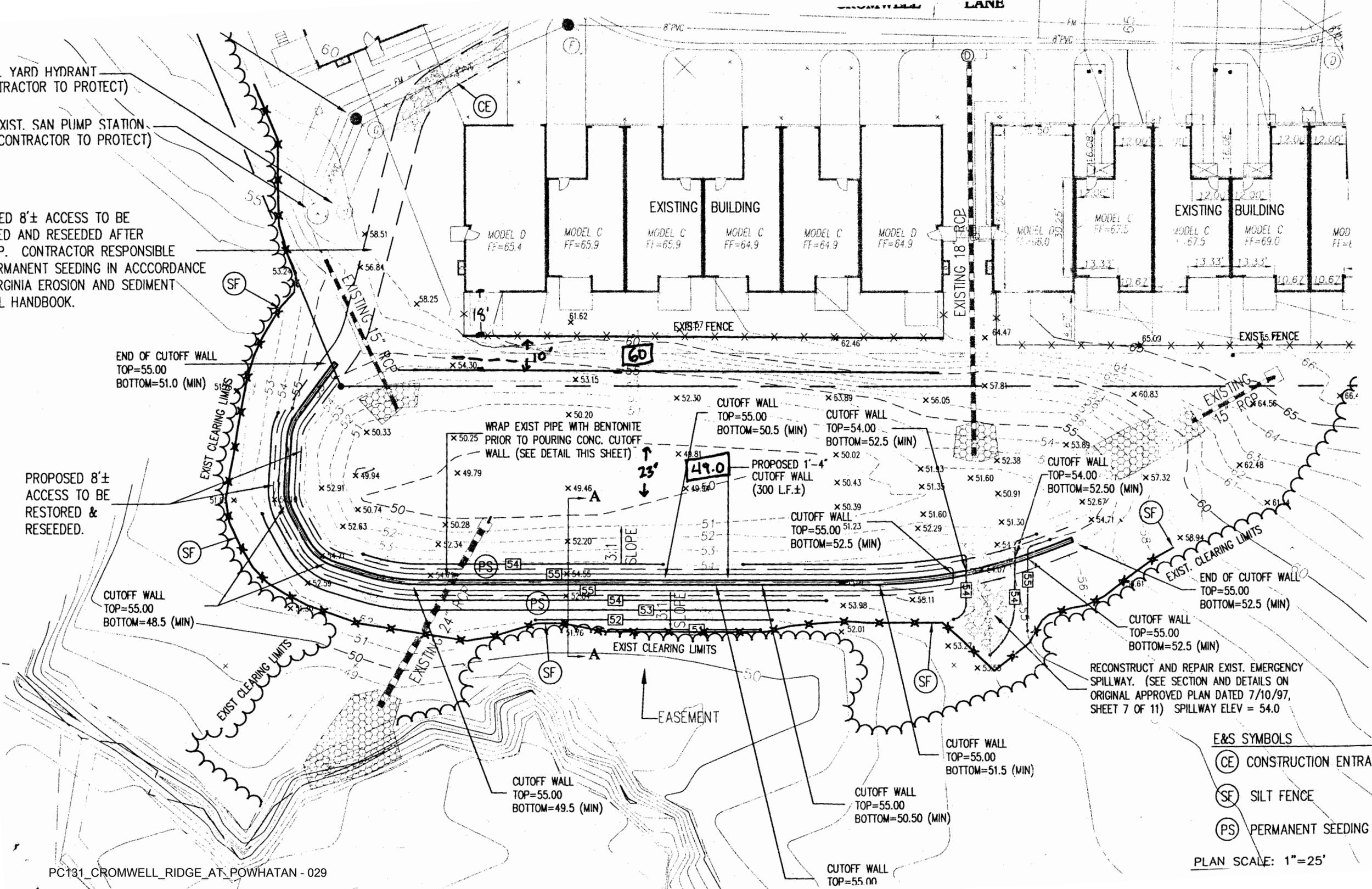
97-003
 CROMWELL RIDGE
 DRAINAGE AREA
 TO ENTRANCE
 CULVERT
 10/30/97

ST. YARD HYDRANT
(CONTRACTOR TO PROTECT)

EXIST. SAN PUMP STATION
(CONTRACTOR TO PROTECT)

PROPOSED 8'± ACCESS TO BE
RESTORED AND RESEEDED AFTER
UP. CONTRACTOR RESPONSIBLE
PERMANENT SEEDING IN ACCORDANCE
WITH VIRGINIA EROSION AND SEDIMENT
CONTROL HANDBOOK.

PROPOSED 8'±
ACCESS TO BE
RESTORED &
RESEEDED.



END OF CUTOFF WALL
TOP=55.00
BOTTOM=51.0 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=50.5 (MIN)

CUTOFF WALL
TOP=54.00
BOTTOM=52.5 (MIN)

CUTOFF WALL
TOP=54.00
BOTTOM=52.50 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=48.5 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=49.5 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=50.50 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=51.5 (MIN)

END OF CUTOFF WALL
TOP=55.00
BOTTOM=52.5 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=52.5 (MIN)

RECONSTRUCT AND REPAIR EXIST. EMERGENCY
SPILLWAY. (SEE SECTION AND DETAILS ON
ORIGINAL APPROVED PLAN DATED 7/10/97,
SHEET 7 OF 11) SPILLWAY ELEV = 54.0

- E&S SYMBOLS**
- (CE) CONSTRUCTION ENTRANCE
 - (SF) SILT FENCE
 - (PS) PERMANENT SEEDING

PLAN SCALE: 1"=25'

8' W x 150' = 1,200 S.F. < 2,500 S.F.

3913

New wooden deck (4 ft wide)

25' POND BUFFER / SETBACK

END OF CUTOFF WALL
TOP=55.00
BOTTOM=51.0 (MIN)

WRAP EXIST PIPE WITH BENTONITE
PRIOR TO POURING CONC CUTOFF
WALL

BMP ID CODE: PC-131

CUTOFF WALL
TOP=55.00
BOTTOM=50.5 (MIN)

CUTOFF WALL
TOP=54.00
BOTTOM=52.5 (MIN)

PROPOSED 1'-4"
CUTOFF WALL
(300 LF.±)

CUTOFF WALL
TOP=55.00
BOTTOM=52.5 (MIN)

CUTOFF WALL
TOP=54.00
BOTTOM=52.50 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=48.5 (MIN)

END OF CUTOFF WALL
TOP=55.00
BOTTOM=52.5 (MIN)

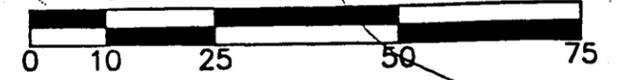
RECONSTRUCT AND REPAIR EXIST. EMERGENCY
SPILLWAY. (SEE SECTION AND DETAILS ON
ORIGINAL APPROVED PLAN DATED 7/10/97,
SHEET 7 OF 11) SPILLWAY ELEV = 54.0

CUTOFF WALL
TOP=55.00
BOTTOM=49.5 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=50.50 (MIN)

CUTOFF WALL
TOP=55.00
BOTTOM=51.5 (MIN)

PLAN SCALE: 1"=25'
GRAPHIC SCALE IN FEET



Prepared from plan by YHB dated 12/12/02

Introduction

The site, located in James City County, is a proposed townhouse development. This report is prepared to analyze the hydrologic and hydraulic conditions of this development and to implement a surface water management plan to control any excess runoff created by post-development activities. To the north of this site is the existing Powhatan Parkway with right-of-way dedication for future Route 5; to the east is Steeple Chase Apartment Complex; to the west and south are wooded parcels.

Methodology

The assessment of stormwater runoff is based upon the Soil Conservation Service Method as described in Technical Release No. 20 and the National Engineering Handbook, Chapter 4. Theoretical storms are modeled with the 24 hour SCS Unitless Hydrograph utilizing a Type II rainfall distribution. Hydrographic generations and routings are accomplished via the U.S. Army Corps of Engineers, Hydrologic Engineering Center Program No. 1 (HEC-1). The HEC-1 Program is tailored to model the SCS Method for hydrograph generations and to perform routings by the Modified PULS Method. The Modified PULS Method performs iterative solutions for the continuity equation (outflow = inflow +/- storage) with the intermediate values of the routing curve obtained through linear interpolation.

Storm sewer conduits are sized by applying the Rational Method utilizing the Norfolk rainfall intensity/duration curves. Conduit capacity is based on full flow within a reinforced concrete pipe using a Mannings roughness coefficient of 0.013.

Model Philosophy

The HEC-1 model is designed to simulate the surface runoff response of a river basin to precipitation by representing the basin as an interconnected system of hydrologic and hydraulic components. Each component models an aspect of the precipitation-runoff process within a portion of the basin, commonly referred to as a subbasin. A component may represent a surface runoff entity, a stream channel, or a reservoir. Representation of a component requires a set of parameters, which specify the particular characteristics of the component, and mathematical relations that describe the physical processes. The result of the modeling process is the computation of streamflow hydrographs at desired locations in the river basin.

2. Post-Development Conditions

Table 3 – Hydrologic Parameters

Watersheds	Drainage Area (Ac)	SCS Curve Number	Time of Conc. (Hrs)
Offsite	.12	---	---
Det. Basin	.35	Weighted	---
Onsite	4.88	CN 90	.49
Direct Discharge	.27	---	.44

Table 4 – Hydrologic Model Flow Rates

Watershed	Storm Frequency Years		
	Peak Flow Rates (CFS)		
	2	10	100
From Det. Basin	3	9	29
Direct Discharge	1	1	2
Peak Flows (Combined Hydrographs)	3	10	30

Conclusion

The on-site and off-site areas will discharge stormwater runoffs into the detention basin (at the southwestern corner of the site) which subsequently discharges through an outlet structure into an existing deep ditch downstream of it. The detention basin limits the post-developed discharges for the 2-year and the 10-year to pre-developed runoff rates.

0.12
0.35
4.88
0.27

5.52

```

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1         ID
2         ID
3         ID      POWHATAN SECONDARY    TOWNHOUSES
4         ID      JAMES CITY COUNTY
5         ID      VIRGINIA
6         ID
7         ID      SLEDD & ASSOCIATES, P.C.
8         ID
9         ID      POST-DEVELOPED  CONDITION HYDROLOGICAL ANALYSIS
10        ID
11        ID
12        ID      TYPE II  RAINFALL DISTRIBUTION
13        ID      2, 10, 100 YEAR
14        ID      RETURN FREQUENCY EVENTS
15        ID
16        ID      5/02/97 rwe
17        ID
          *DIAGRAM
18        IT      5      0      0      289
19        IO      5
20        JR      PREC .43529  .682      1

21        KK      DA-1
22        KM      TRIBUTARY TO DETENTION BASIN
23        PB      8.5
24        IN      5
25        PC 0.0000 0.00101 0.00202 0.00305 0.00408 0.00513 0.00618 0.00725 0.00832 0.00941
26        PC 0.0105 0.01161 0.01272 0.01385 0.01498 0.01613 0.01728 0.01845 0.01962 0.02081
27        PC 0.0220 0.02321 0.02442 0.02565 0.02688 0.02813 0.02938 0.03065 0.03192 0.03321
28        PC 0.0345 0.03581 0.03712 0.03845 0.03978 0.04113 0.04248 0.04385 0.04522 0.04661
29        PC 0.0480 0.04941 0.05084 0.05229 0.05376 0.05525 0.05676 0.05829 0.05984 0.06141
30        PC 0.0630 0.06461 0.06624 0.06789 0.06956 0.07125 0.07296 0.07469 0.07644 0.07821
31        PC 0.0800 0.08181 0.08364 0.08549 0.08736 0.08925 0.09116 0.09309 0.09504 0.09701
32        PC 0.0990 0.10101 0.10304 0.10509 0.10716 0.10925 0.11136 0.11349 0.11564 0.11781
33        PC 0.1200 0.12225 0.12460 0.12705 0.12960 0.13225 0.13500 0.13785 0.14080 0.14385
34        PC 0.1470 0.15020 0.15340 0.15660 0.15980 0.16300 0.16628 0.16972 0.17332 0.17708
35        PC 0.1810 0.18512 0.18948 0.19408 0.19892 0.20400 0.20940 0.21520 0.22140 0.22800
36        PC 0.2230 0.24268 0.25132 0.26092 0.27148 0.28300 0.30684 0.35436 0.43079 0.56786
37        PC 0.6630 0.68196 0.69864 0.71304 0.72516 0.73500 0.74344 0.75136 0.75876 0.76564
38        PC 0.7720 0.77796 0.78364 0.78904 0.79416 0.79900 0.80360 0.80800 0.81220 0.81620
39        PC 0.8200 0.82367 0.82726 0.83079 0.83424 0.83763 0.84094 0.84419 0.84736 0.85047
40        PC 0.8535 0.85647 0.85936 0.86219 0.86494 0.86763 0.87024 0.87279 0.87526 0.87767
41        PC 0.8800 0.88229 0.88455 0.88679 0.88900 0.89119 0.89335 0.89549 0.89760 0.89969
42        PC 0.9018 0.90379 0.90580 0.90779 0.90975 0.91169 0.91360 0.91549 0.91735 0.91919
43        PC 0.9210 0.92279 0.92455 0.92629 0.92800 0.92969 0.93135 0.93299 0.93460 0.93619
44        PC 0.9377 0.93929 0.94080 0.94229 0.94375 0.94519 0.94660 0.94799 0.94935 0.95069
45        PC 0.9520 0.95330 0.95459 0.95588 0.95716 0.95844 0.95971 0.96098 0.96224 0.96350
46        PC 0.9647 0.96600 0.96724 0.96848 0.96971 0.97094 0.97216 0.97338 0.97459 0.97580
47        PC 0.9770 0.97820 0.97939 0.98058 0.98176 0.98294 0.98411 0.98528 0.98644 0.98760
48        PC 0.9887 0.98990 0.99104 0.99218 0.99331 0.99444 0.99556 0.99668 0.99779 0.99890
49        BA .00836
          * DRAINAGE AREA INCL. OFFSITE-.12Ac, & DB- .35Ac
50        LS      90
51        UD      .29
    
```

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

52	KK	DB							
53	KM	ROUTE THRU DET. BASIN							
54	RS	1	ELEV	49.0					
55	SV	0	.05997	.19583	.36644	.57693	.83192	1.13664	
56	SE	49.0	50.0	51.0	52.0	53.0	54.0	55.0	
57	SQ	0	1.37	2.17	2.75	3.22	11.8	86.64	
58	SE	49.0	50.0	51.0	52.0	53.0	54.0	55.0	
59	KK	DA-2							
60	KM	DIRECT DISCHARGE TO N.E. OF SITE							
61	BA	.00042							
62	LS		88						
63	UD	.264							
64	KK	SUB-1							
65	KM	ADD HYDRO. FOR TOTAL RUNOFF FROM SITE							
66	HC	2							
67	ZZ								

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
21	DA-1	
	V	
	V	
52	DB	
	.	
	.	
59	.	DA-2
	.	.
	.	.
64	SUB-1.....	

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* SEPTEMBER 1990 *
* VERSION 4.0 *
*
* RUN DATE 05/06/1997 TIME 10:29:23 *
*
*****

```

```

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

```

POWHATAN SECONDARY TOWNHOUSES
 JAMES CITY COUNTY
 VIRGINIA

SLEDD & ASSOCIATES, P.C.

POST-DEVELOPED CONDITION HYDROLOGICAL ANALYSIS

TYPE II RAINFALL DISTRIBUTION
 2, 10, 100 YEAR
 RETURN FREQUENCY EVENTS

5/02/97 rwe

19 10 OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN 5 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 289 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 2 0 ENDING DATE
 NDTIME 0000 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 24.00 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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.44 .68 1.00

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION			
				RATIO 1	RATIO 2	RATIO 3	
				.44	.68	1.00	
HYDROGRAPH AT	DA-1	.01	1	FLOW	13.	22.	34.
				TIME	10.17	10.17	10.17
ROUTED TO	DB	.01	1	FLOW	3.	9.	29.
				TIME	10.75	10.58	10.33
** PEAK STAGES IN FEET **							
			1	STAGE	52.48	53.70	54.23
				TIME	10.75	10.58	10.33
HYDROGRAPH AT	DA-2	.00	1	FLOW	1.	1.	2.
				TIME	10.17	10.17	10.17
2 COMBINED AT	SUB-1	.01	1	FLOW	3.	10.	30.
				TIME	10.33	10.50	10.33

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

Elapsed Time - 00:00:04.01 (4.01 Seconds)

NORMAL END OF HEC-1

STANDARD FOR CONDUIT OUTLET PROTECTION

Design Input

DESIGN STORM FLOW = 10.00 cfs
VERTICAL DIMENSION OF OUTLET = 24.00 inches
HORIZONTAL DIMENSION OF OUTLET = 24.00 inches
TAILWATER DEPTH AT OUTLET = 0.30 feet

In accordance with SCS Standards

MINIMUM WIDTH OF APRON AT OUTLET = 6.0 feet
MINIMUM LENGTH OF APRON = 20.4 feet
MINIMUM WIDTH OF APRON AT APRON END = 26.4 feet
MEDIAN SIZE OF RIP-RAP = 6.8 inches

NOTES CONCERNING RIP-RAP APRON:

-
1. The apron shall be constructed of a well-graded mixture of rip-rap such that 50% of the mixture, by weight, shall be of stones smaller than 7.0 inches.
 2. The largest stone size in the mixture shall be 11.0 inches.
 3. The rip-rap apron shall be constructed on a bedding of filter fabric on four (4) inches of 3/4 inch clean stone.
 4. Rip-rap and filter fabric shall meet the Standards of the governing Soil Conservation District as well as the requirements of the local municipality.
 5. Where there is a well-defined channel downstream of the apron, the width of the apron at it's end shall be at least equal to the bottom width of the receiving channel.
 6. Where a well-defined channel is to be constructed in the place of an apron, the channel bottom is to be lined with 7.0 inch rip-rap laid 1.75 feet thick. This lining shall extend up the channel banks to protect against a flow depth of at least 1.3 feet.
 7. No bends or curves are permitted in the rip-rap apron.
 8. The bottom grade of any apron or channel lining shall be level (0.00%) through the entire 21.0 feet.
 9. There shall be no overfall from the end of the apron to the receiving waterway.

USE VDOT CLI

PROJECT 97003 CROMWELL/POWHATAN
 RUN DATE 07-24-1997

```

=====
INLET NUMBER 1          LENGTH  6.0          STATION

DRAINAGE AREA = 0.210 ACRES    C VALUE = .900    CA = 0.189
DRAINAGE AREA = 0.050 ACRES    C VALUE = .300    CA = 0.015
DRAINAGE AREA = 0.210 ACRES    C VALUE = .900    CA = 0.189
DRAINAGE AREA = 0.060 ACRES    C VALUE = .300    CA = 0.018
SUM CA= 0.411 INT= 3.50 CFS= 1.439 CO= 0.000 GUTTER FLOW= 1.439
  
```

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) IS 7.71 (ft.)

```

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXXXX
P EFFEC. LENGTH = 9.60          H = 0.460
DEPTH OF WATER = 0.16          SPREAD = 7.78
  
```

```

=====
INLET NUMBER 2          LENGTH  6.0          STATION

DRAINAGE AREA = 0.210 ACRES    C VALUE = .900    CA = 0.189
DRAINAGE AREA = 0.050 ACRES    C VALUE = .300    CA = 0.015
DRAINAGE AREA = 0.030 ACRES    C VALUE = .900    CA = 0.027
DRAINAGE AREA = 0.020 ACRES    C VALUE = .300    CA = 0.006
SUM CA= 0.237 INT= 3.50 CFS= 0.829 CO= 0.000 GUTTER FLOW= 0.829
  
```

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) IS 7.64 (ft.)

```

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXXXX
P EFFEC. LENGTH = 9.60          H = 0.460
DEPTH OF WATER = 0.11          SPREAD = 5.39
  
```

```

=====
INLET NUMBER 3          LENGTH  6.0          STATION

DRAINAGE AREA = 0.210 ACRES    C VALUE = .900    CA = 0.189
DRAINAGE AREA = 0.100 ACRES    C VALUE = .300    CA = 0.030
SUM CA= 0.219 INT= 3.50 CFS= 0.767 CO= 0.000 GUTTER FLOW= 0.767
  
```

GUTTER SLOPE = 0.0280 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

```

SPREAD   W   W/T   SW   SW/SX   Eo   a   S'W   SE
  2.21  2.0  0.90  0.0833  4.0   1.00  3.5  0.146  0.167
  
```

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXXXX
REQUIRED LENGTH= 6.4 EFFICIENCY= 0.99
CFS INTERCEPTED= 0.76 CFS CARRYOVER= 0.01

=====

INLET NUMBER 4	LENGTH 6.0	STATION
----------------	------------	---------

DRAINAGE AREA = 0.190 ACRES C VALUE = .900 CA = 0.171
DRAINAGE AREA = 0.070 ACRES C VALUE = .300 CA = 0.021
SUM CA= 0.192 INT= 3.50 CFS= 0.672 CO= 0.000 GUTTER FLOW= 0.672

GUTTER SLOPE = 0.0280 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
2.11	2.0	0.95	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXXXX
REQUIRED LENGTH= 6.1 EFFICIENCY= 1.00
CFS INTERCEPTED= 0.67 CFS CARRYOVER= 0.00

=====

INLET NUMBER 5	LENGTH 6.0	STATION 1
----------------	------------	-----------

DRAINAGE AREA = 0.240 ACRES C VALUE = .900 CA = 0.216
DRAINAGE AREA = 0.110 ACRES C VALUE = .300 CA = 0.033
SUM CA= 0.249 INT= 3.50 CFS= 0.871 CO= 0.000 GUTTER FLOW= 0.871

GUTTER SLOPE = 0.0310 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
2.28	2.0	0.88	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXXXX
REQUIRED LENGTH= 7.0 EFFICIENCY= 0.97
CFS INTERCEPTED= 0.85 CFS CARRYOVER= 0.03

6/24/97

Cromwell Ridge

STORM SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. 97-003 Powhatan Secondary
 COUNTY James City DISTRICT _____
 DESCRIPTION 10 year design storm, KCP, n=0.013

SHEET 1 OF 1

FROM POINT	TO POINT	AREA DRAIN. "A"	RUN-OFF COEF.	CA		INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS		LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
		ACRES	C	INCRE-MENT	ACCUM-ULATED				UPPER END	LOWER END				C.F.S.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1A	1	0.23	0.9	0.21													
		1.31	0.3	0.39	0.60	18	4.74	2.84	59.94	59.89	16	0.33	15	3.7	3.0	0.1	
1	2	0.42	0.9	0.38													
		0.11	0.3	0.03	1.01	18.1	4.74	4.79	59.89	59.72	27	0.60	15	5.1	4.0	0.1	
3	4	0.21	0.9	0.19													
		0.10	0.3	0.03	0.22	9	6.25	1.38	65.44	65.35	27	0.33	15	3.7	3.0	0.1	
4	5	0.19	0.9	0.17													
		0.07	0.3	0.02	0.41	9.1	6.22	2.55	65.35	57.43	184	4.30	15	14.5	10.5	0.3	
2	5	0.24	0.9	0.22													
		0.07	0.3	0.02	1.25	18.2	4.72	5.90	58.07	57.94	38	0.35	18	6.4	3.5	0.2	
5	6	0.24	0.9	0.22													
		0.11	0.3	0.03	1.91	18.4	4.69	8.96	56.5	52.50	122	3.28	18	19	10.5		2" includes 65-1

Storm Drainage:

① Runoff coefficients: $Paved = 0.9$
 $Grass etc = 0.3$

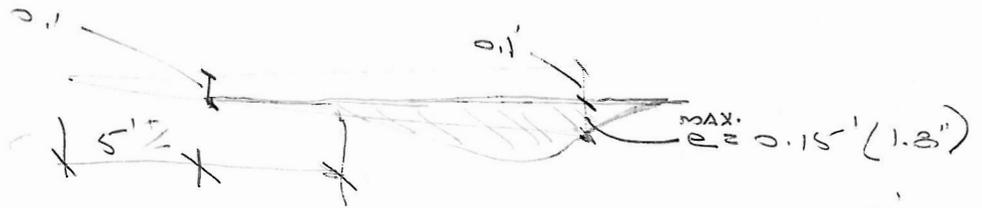
② Av. Coeff. (C_w) for design of roadway storm system: $0.67(0.9) + 0.33(0.3) = \boxed{0.70}$

② for inlets on grade: a) depth at curb = 0.15' or less for 2" (3.5") storm

b) DI "L" = 6' " "

∴ c) 2.75 - 3.1% inlet can handle ~ 0.9 cfs

d) $0.9 \div (3.5 \times 0.7) = 0.37 \text{ AC} \Rightarrow \text{Use } 0.35 \text{ to } 0.4$



③ $C_w = 0.24 \text{ AC @ } 0.9$ (roofs, etc.)
 $+ 0.59 \text{ AC @ } 0.3$ (grass-slopes, woods)
 $0.85 \text{ AC @ } \boxed{0.46}$

④ $C_w = 0.20$
 $0.57 \text{ AC @ } 0.9$
 $+ 0.45 \text{ AC @ } 0.3$
 $0.57 \text{ AC @ } \boxed{0.48}$
 0.45

⑤ $C_w = 0.23 \text{ AC @ } 0.9$
 $+ 1.03 \text{ AC @ } 0.3$
 $1.26 \text{ AC @ } \boxed{0.41}$

All inlets on grade: VDOT DI-3B, L=6'
 All inlets in swamp: VDOT DI-3C, L=6'

To 1A:
 $220' \text{ OL (C=0.5) @ } 2.3\% = 18'$
 $+ 100' \text{ swale @ } 8\% = 1'$

To 3:
 $35' \text{ OL @ } 2\% = 8'$
 $+ 210' \text{ gutter @ } 2\% = 1.1'$
 $\underline{\quad\quad}$
 $9'$

Total 19'
~~Use 15'~~

LD-7
HYDRAULIC GRADE LINE

* Inv. + 0.8d = 10yr WSE
** Inv. + 0.8d

PROJECT 97-003
Cromwell Ridge @ Powhatan
Secondary
6/24/97
1/1

INLET STATION	Outlet Water Surface Elev.	D _o	Q _o	L _o	S _{f_o} %	H _f	JUNCTION LOSS												Final H	Inlet Water Surface Elev.	Rim Elev.
							V _o	H _o	Q _i	V _i	Q _i V _i	$\frac{V_i^2}{2g}$	H _i	Angle	H _Δ	H _t	$1.3 H_t$	$0.5 H_t$			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
5	* 53.70	18	8.96	122	0.70	0.85	10.5	0.43	5.9	3.5		0.19	0.07	90°	0.13	0.63	0.82	0.41	1.24	54.96	64.11
4	** 58.43	15	2.55	184	0.15	0.28	10.5	0.43	1.38	3.0		0.14	0.05	90°	0.10	0.58	0.75	0.38	0.66	59.09	65.35
3	** 66.35	15	1.33	27	0.05	0.01	3.0	0.04	-	-		-	-	-	-	0.04	0.05	0.05	0.06	66.41	70.88
2	** 59.14	18	5.9	38	0.30	0.11	3.5	0.05	4.79	4.0		0.25	0.09	70°	0.15	0.29	0.38	0.19	0.30	59.44	63.45
1	** 60.72	15	4.79	27	0.53	0.14	4.0	0.06	2.84	3.0		0.14	0.05	50°	0.07	0.18	0.23	0.12	0.26	60.98	63.48
1A	60.98	15	2.84	16	0.18	0.03	3.0	0.04	-	-		-	-	-	-	0.04	0.05	-	0.08	61.06	62.80

$H_i = 0.35 \frac{V_i^2}{2g}$
 $H_o = 0.25 \frac{V_o^2}{2g}$
 $H_{\Delta} = K \frac{V_i^2}{2g}$
 FINAL $H = H_f + H_t$
 90° K = 0.70
 50° K = 0.47
 20° K = 0.16
 $H_t = H_o + H_i + H_{\Delta}$
 80° K = 0.66
 40° K = 0.38
 15° K = 0.10
 70° K = 0.61
 30° K = 0.28
 100° K = 0.55
 25° K = 0.22

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* SEPTEMBER 1990 *
* VERSION 4.0 *
* RUN DATE 05/06/1997 TIME 10:29:23 *

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

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:: 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 -AMSK- 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

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION		
				RATIO 1	RATIO 2	RATIO 3
				.44	.68	1.00
HYDROGRAPH AT	DA-1	.01	1 FLOW	4.	10.	18.
			TIME	10.42	10.42	10.33

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

Elapsed Time - 00:00:03.35 (3.35 Seconds)

NORMAL END OF HEC-1

POWHATAN TOWNHOUSES
 JAMES CITY COUNTY

Tc COMPUTATIONS FOR: PRE-DEVELOPED

SHEET FLOW (Applicable to Tc only)

Segment ID	A		
Surface description	LT. WOODS		
Manning's roughness coeff., n	0.4000		
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.700	
Land slope, s	ft/ft	0.0230	
		0.8	
		.007 * (n*L)	
T =	hrs	0.76	= 0.76
		0.5 0.4	
		P2 * s	

SHALLOW CONCENTRATED FLOW

Segment ID	A		
Surface (paved or unpaved)?	Unpaved		
Flow length, L	ft	350.0	
Watercourse slope, s	ft/ft	0.0540	
		0.5	
Avg.V = Csf * (s)	ft/s	3.7493	
where: Unpaved Csf = 16.1345			
Paved Csf = 20.3282			
T = L / (3600*V)	hrs	0.03	= 0.03

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	
		2/3 1/2	
		1.49 * r * s	
V =	ft/s	0.0000	
		n	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	= 0.00

.....
 TOTAL TIME (hrs) 0.78

POWHATAN TOWNHOUSES
 JAMES CITY COUNTY

Tc COMPUTATIONS FOR: POST-DEVELOPED

SHEET FLOW (Applicable to Tc only)

Segment ID	A	
Surface description	LAWNS	
Manning's roughness coeff., n		0.4000
Flow length, L (total < or = 300)	ft	200.0
Two-yr 24-hr rainfall, P2	in	3.700
Land slope, s	ft/ft	0.0348
		0.8
		.007 * (n*L)
T = -----	hrs	0.46
		0.5 0.4
		P2 * s

+ pipe flow
 $s = 0.35\%$
 $L = 180'$
 $D = 24"$
 $V_{full} = \frac{Q}{A} = \frac{13.38}{K} = 4.26 \text{ f/s}$
 $Time = \frac{L}{V_{full}} = \frac{180}{4.26} = 0.01 \text{ hr}$

SHALLOW CONCENTRATED FLOW

Segment ID	B	
Surface (paved or unpaved)?	Unpaved	
Flow length, L	ft	130.0
Watercourse slope, s	ft/ft	0.0154
		0.5
Avg.V = Csf * (s)	ft/s	2.0022
where: Unpaved Csf = 16.1345		
Paved Csf = 20.3282		
T = L / (3600*V)	hrs	0.02
		= 0.02

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
		$\frac{2}{3} \quad \frac{1}{2}$
		$1.49 * r * s$
V = -----	ft/s	0.0000
		n
Flow length, L	ft	0
T = L / (3600*V)	hrs	0.00
		= 0.00

.....
 TOTAL TIME (hrs) 0.48 + 0.01 = 0.49 hrs

POWHATAN TOWNHOUSES
 JAMES CITY COUNTY

Tc COMPUTATIONS FOR: DIR.DISC. N/E

SHEET FLOW (Applicable to Tc only)

Segment ID		C	
Surface description		LAWN	
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	85.0	
Two-yr 24-hr rainfall, P2	in	3.700	
Land slope, s	ft/ft	0.0070	
		0.8	
		.007 * (n*L)	
T =	-----	hrs	0.44 = 0.44
	0.5 0.4		
	P2 * s		

SHALLOW CONCENTRATED FLOW

Segment ID		
Surface (paved or unpaved)?		
Flow length, L	ft	0.0
Watercourse slope, s	ft/ft	0.0000
		0.5
Avg.V = Csf * (s)	ft/s	0.0000
where: Unpaved Csf = 16.1345		
Paved Csf = 20.3282		
T = L / (3600*V)	hrs	0.00 = 0.00

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	
		2/3 1/2	
		1.49 * r * s	
V =	-----	ft/s	0.0000
	n		
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00 = 0.00	

.....

TOTAL TIME (hrs) 0.44

HYDROLOGIC REPORT FOR

POW

POND DEPTH VS STORAGE PROVIDED

POND IDENTIFIER db

ELEV feet	DEPTH feet	AREA sq.ft.	VOLUME cu.ft.	SUM VOL cu.ft.		
49.0		0.0		0.0		
50.0	1.0	5224.3	2612.1	2612.1	.05997	Ac.ft.
51.0	1.0	6612.3	5918.3	8530.4	.19583	Ac.ft.
52.0	1.0	8251.4	7431.9	15962.3	.36644	Ac.ft.
53.0	1.0	10085.9	9168.7	25130.9	.57693	Ac.ft.
54.0	1.0	12129.5	11107.7	36238.6	.83192	Ac.ft.
55.0	1.0	14417.3	13273.4	49512.0	1.13664	Ac.ft.

HYDROLOGIC REPORT FOR

POW

STAGE, STORAGE + DISCHARGE

POND IDENTIFIER db

- 1 = 8 INCH CIRCULAR ORIFICE - INVERT 49
- 2 = 7.5 FOOT BROAD CRESTED WEIR - INVERT 53.5
- 3 = 15 FOOT BROAD CRESTED WEIR - INVERT 54

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
49.00	0.0	0.000	0.0
50.00	2612.1	1.372	18.8
51.00	8530.4	2.170	59.0
52.00	15962.3	2.745	109.2
53.00	25130.9	3.218	170.8
54.00	36238.6	11.798	253.4
55.00	49512.0	86.638	416.7

Quick TR-55 Ver.5.44 S/N:1315460080
Executed: 09:11:02 05-02-1997

POWHATAN TOWNHOUSES
JAMES CITY COUNTY

RUNOFF CURVE NUMBER DATA

.....

Composite Area: PRE-DEVELOPED

SURFACE DESCRIPTION	AREA (acres)	CN
29B SLAGLE FINE SANDY LOAM 'C'	2.90	70
17 JOHNSTON COMPLEX 'D'	1.40	77
19B KEMPSVILLE-EMPORIA 'B/C'	0.90	70
COMPOSITE AREA --->	5.20	71.9 (72)

.....

Composite Area: POST-DEVELOPED

SURFACE DESCRIPTION	AREA (acres)	CN
29B SLAGLE FINE SANDY LOAM 'C'	2.90	90
17 JOHNSTON COMPLEX 'D'	1.40	92
19B KEMPSVILLE-EMPORIA 'B/C'	0.90	88
COMPOSITE AREA --->	5.20	90.2 (90)

.....

* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* SEPTEMBER 1990 *
* VERSION 4.0 *
* RUN DATE 05/06/1997 TIME 10:25:10 *

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

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

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

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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

2 ID

3 ID

4 ID POWHATAN SECONDARY TOWNHOUSES

5 ID JAMES CITY COUNTY

6 ID VIRGINIA

7 ID

8 ID SLEDD & ASSOCIATES, P.C.

9 ID

10 ID PRE-DEVELOPED CONDITION HYDROLOGICAL ANALYSIS

11 ID

12 ID

13 ID TYPE II RAINFALL DISTRIBUTION

14 ID 2, 10, 100 YEAR

15 ID RETURN FREQUENCY EVENTS

16 ID

17 ID 5/02/97 rwe

18 ID

*DIAGRAM

19 IT 5 0 0 289

20 IO 5

21 JR PREC .43529 .682 1

22 KK DA-1

23 KM TRIBUTARY TO DETENTION BASIN

24 PB 8.5

25 IN 5

26 PC 0.0000 0.00101 0.00202 0.00305 0.00408 0.00513 0.00618 0.00725 0.00832 0.00941

27 PC 0.0105 0.01161 0.01272 0.01385 0.01498 0.01613 0.01728 0.01845 0.01962 0.02081

28 PC 0.0220 0.02321 0.02442 0.02565 0.02688 0.02813 0.02938 0.03065 0.03192 0.03321

29 PC 0.0345 0.03581 0.03712 0.03845 0.03978 0.04113 0.04248 0.04385 0.04522 0.04661

30 PC 0.0480 0.04941 0.05084 0.05229 0.05376 0.05525 0.05676 0.05829 0.05984 0.06141

31 PC 0.0630 0.06461 0.06624 0.06789 0.06956 0.07125 0.07296 0.07469 0.07644 0.07821

32 PC 0.0800 0.08181 0.08364 0.08549 0.08736 0.08925 0.09116 0.09309 0.09504 0.09701

33 PC 0.0990 0.10101 0.10304 0.10509 0.10716 0.10925 0.11136 0.11349 0.11564 0.11781

34 PC 0.1200 0.12225 0.12460 0.12705 0.12960 0.13225 0.13500 0.13785 0.14080 0.14385

35 PC 0.1470 0.15020 0.15340 0.15660 0.15980 0.16300 0.16628 0.16972 0.17332 0.17708

36 PC 0.1810 0.18512 0.18948 0.19408 0.19892 0.20400 0.20940 0.21520 0.22140 0.22800

37 PC 0.2230 0.24268 0.25132 0.26092 0.27148 0.28300 0.30684 0.35436 0.43079 0.56786

38 PC 0.6630 0.68196 0.69864 0.71304 0.72516 0.73500 0.74344 0.75136 0.75876 0.76564

39 PC 0.7720 0.77796 0.78364 0.78904 0.79416 0.79900 0.80360 0.80800 0.81220 0.81620

40 PC 0.8200 0.82367 0.82726 0.83079 0.83424 0.83763 0.84094 0.84419 0.84736 0.85047

41 PC 0.8535 0.85647 0.85936 0.86219 0.86494 0.86763 0.87024 0.87279 0.87526 0.87767

42 PC 0.8800 0.88229 0.88455 0.88679 0.88900 0.89119 0.89335 0.89549 0.89760 0.89969

43 PC 0.9018 0.90379 0.90580 0.90779 0.90975 0.91169 0.91360 0.91549 0.91735 0.91919

44 PC 0.9210 0.92279 0.92455 0.92629 0.92800 0.92969 0.93135 0.93299 0.93460 0.93619

45 PC 0.9377 0.93929 0.94080 0.94229 0.94375 0.94519 0.94660 0.94799 0.94935 0.95069

46 PC 0.9520 0.95330 0.95459 0.95588 0.95716 0.95844 0.95971 0.96098 0.96224 0.96350

47 PC 0.9647 0.96600 0.96724 0.96848 0.96971 0.97094 0.97216 0.97338 0.97459 0.97580

48 PC 0.9770 0.97820 0.97939 0.98058 0.98176 0.98294 0.98411 0.98528 0.98644 0.98760

49 PC 0.9887 0.98990 0.99104 0.99218 0.99331 0.99444 0.99556 0.99668 0.99779 0.99890

50 BA .00813

51 LS 72

52 UD 0.47

53 ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT

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

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

22 DA-1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* SEPTEMBER 1990 *
* VERSION 4.0 *
*
* RUN DATE 05/06/1997 TIME 10:25:10 *
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*
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*
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POWHATAN SECONDARY TOWNHOUSES
 JAMES CITY COUNTY
 VIRGINIA

SLEDD & ASSOCIATES, P.C.

PRE-DEVELOPED CONDITION HYDROLOGICAL ANALYSIS

TYPE II RAINFALL DISTRIBUTION
 2, 10, 100 YEAR
 RETURN FREQUENCY EVENTS

5/02/97 rwe

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

IT HYDROGRAPH TIME DATA
 NMIN 5 MINUTES IN COMPUTATION INTERVAL
 IDATE 1 0 STARTING DATE
 ITIME 0000 STARTING TIME
 NQ 289 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 2 0 ENDING DATE
 NDTIME 0000 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
 TOTAL TIME BASE 24.00 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

JP MULTI-PLAN OPTION
 NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
 RATIOS OF PRECIPITATION
 .44 .68 1.00

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project Cromwell Ridge

Basin # _____ Location James City County

Total area draining to basin: 5.35 acres.

Basin Volume Design

Storage is OK!

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).
 $67 \text{ cu. yds.} \times \underline{5.35} \text{ acres} = \underline{358} \text{ cu. yds.}$

2. Available basin volume = 450 cu. yds. at elevation 51.5. (From storage - elevation curve)

3. Excavate _____ cu. yds. to obtain required volume*.

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

4. Available volume before cleanout required.

$$33 \text{ cu. yds.} \times \underline{5.35} \text{ acres} = \underline{177} \text{ cu. yds.}$$

5. Elevation corresponding to cleanout level = 50.5.

(From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 1 ft. (Min. = 1.0 ft.)

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).
 $67 \text{ cu. yds.} \times \underline{5.35} \text{ acres} = \underline{358} \text{ cu. yds.}$

8. Total available basin volume at crest of riser* = $\frac{1200}{2}$ cu. yds. at elevation 53.7. (From Storage - Elevation Curve)

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

9. Diameter of dewatering orifice = 8 in.

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

Preliminary Design Elevations

11. Crest of Riser = 53.7
 Top of Dam = 55' *.3 Higher?*
 Design High Water = 54
 Upstream Toe of Dam = 49

Basin Shape

12. $\frac{\text{Length of Flow}}{\text{Effective Width}} = \frac{L}{We} =$ _____

If > 2, baffles are not required Easterly end of Basin

If < 2, baffles are required for westerly end of Basin

Runoff

13. $Q_2 =$ 10.5 cfs (From Chapter 5)

14. $Q_{25} =$ 16.7 cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2 =$ 10.5 cfs. (riser and barrel)

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

16. With emergency spillway:

Assumed available head (h) = 0.3 ft. (Using Q_2)

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

✗ Without emergency spillway:

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

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

17. Riser diameter (D_r) = ^(EQUIVALENT) 36" in. Actual head (h) = 0.5 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 62 ft.

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

(From Plate 3.14-7).

19. Barrel diameter = 24 in.

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

20. Trash rack and anti-vortex device

Diameter = _____ inches.

Height = _____ inches.

(From Table 3.14-D).

} Rev. Trash rack proposed - 11/24/14 = 300'
All water flows - no anti-vortex device needed.

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p =$ _____ cfs.

22. Bottom width (b) = _____ ft.; the slope of the exit channel (s) = _____ ft./foot; and the minimum length of the exit channel (x) = _____ ft.

(From Table 3.14-C).

Anti-Seep Collar Design

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

Final Design Elevations

25. Top of Dam = 55
 Design High Water = 54
 Emergency Spillway Crest = 54 .3 Higher than crest
 Principal Spillway Crest = 53.7
 Dewatering Orifice Invert = 51.5
 Cleanout Elevation = 50.5
 Elevation of Upstream Toe of Dam
 or Excavated Bottom of "Wet Storage
 Area" (if excavation was performed) = _____

- E. If more than one collar is used, the spacing between collars should be 14 times the projection of the collar above the barrel.
- F. Collars should not be located closer than 2 feet to a pipe joint.
- G. See Plate 3.14-13 for details of the anti-seep collar.

XII. Anchoring the Principal Spillway

- A. The principal spillway must be firmly anchored to prevent its floating.
- B. If the riser is over 10 feet high, the forces acting on the spillway must be calculated. A method of anchoring the spillway which provides a safety factor of 1.25 must be used (downward forces = 1.25 x upward forces).
- C. If the riser is 10 feet or less in height, choose one of the two methods in Plate 3.14-14 to anchor the principal spillway.

XIII. Dewatering

- A. Refer to Plate 3.14-15 for details and orientation.
- B. Calculation of the diameter of the dewatering orifice:

Use a modified version of the discharge equation for a vertical orifice and a basic equation for the area of a circular orifice.

Naming the variables:

A = flow area of orifice, in square feet

d = diameter of circular orifice, in inches

h = average driving head (maximum possible head measured from radius of orifice to crest of principal spillway divided by 2), in feet

Q = volumetric flowrate through orifice needed to achieve approximate 6-hour drawdown, cubic feet per second

S = total storage available in dry storage area, cubic feet

$Q = S / 21,600$ seconds

STORM SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. 77-003 *Cromwell Ridge Powhatan Secondary*
 COUNTY James City DISTRICT _____
 DESCRIPTION 10-year design storm, RCP 1150.013
 SHEET 1 OF 1

FROM POINT	TO POINT	AREA DRAIN. "A"	RUN-OFF COEF.	CA		INLET TIME	RAIN FALL	RUNOFF Q	INVERT ELEVATIONS		LENGTH	SLOPE	DIA.	CAPA-CITY	VEL.	FLOW TIME	REMARKS
		ACRES	C	INCRE-MENT	ACCUM-ULATED	MIN-UTES	IN./HR.	C.F.S.	UPPER END	LOWER END	FT.	FT./FT.	IN.	C.F.S.	F.P.S.	SEC.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1B-1A	1	0.23	0.9	0.21													
		1.31	0.3	0.31	0.60	18	4.74	2.84	59.94	59.89	16	0.33	15	3.7	3.0	0.1	
1.	2	0.42	0.9	0.38													
		0.11	0.3	0.03	1.01	18.1	4.74	4.79	59.89	59.72	27	0.60	15	5.1	4.0	0.1	
3B-3A	3	0.48	0.5	0.24	0.24	12.5	5.6	1.3	66.78	66.44	86	0.40	12	2.3	2.9	0.5	
3	4	0.21	0.9	0.19													
		0.10	0.3	0.03	0.11	12.5	5.6	1.3	66.78	66.44	27	0.33	15	3.7	3.0	0.1	
					0.44	13.0	5.5	2.5									
4	5	0.19	0.9	0.17													
		0.07	0.3	0.02	0.11	12.5	5.6	1.3	65.35	57.43	184	0.30	15	14.5	10.5	0.3	
					0.65	13.1	5.5	3.6		55.74		5.21					
2	5	0.24	0.9	0.32													
		0.07	0.3	0.02	1.01	18.2	4.72	5.90	58.07	57.94	38	0.35	18	6.4	3.5	0.2	
5	6	0.24	0.9	0.22													
		0.11	0.3	0.03	0.11	18.4	4.69	2.11	56.5	52.50	122	3.28	18	11	10.5		2" include 65-1
					2.15			10.1									
9	10	0.11	0.9	0.10													
		0.24	0.3	0.08	0.18	14.5	5.2	2.2	59.50	59.0	22	2.27	15	10	8	-	
11	12	0.11	0.9	0.10													
		0.31	0.3	0.09	0.19	13.4	5.38	1.0	51.50	51.00	48	1.04	15	6.7	5.4	-	

LD- 7
HYDRAULIC GRADE LINE

* Inlet 10.21 - 10.25
** Inlet 10.21

PROJECT 99-003
Cromwell Ridge at Powhatan
Secondary

INLET STATION	Outlet Water Surface Elev.	D _o	Q _o	L _o	S _{f_o} %	H _f	JUNCTION LOSS												Final H	Inlet Water Surface Elev.	Rim Elev.
							V _o	H _o	Q _i	V _i	Q _i V _i	$\frac{V_i^2}{2g}$	H _i	Angle	H _Δ	H _t	$1.3 \frac{H_t}{H_i}$	$0.5 \frac{H_t}{H_i}$			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
5	53.20	18	8.1 10.1	122	0.70 0.80	0.05 0.98	10.5	0.43	5.9	3.5		2.14	0.07	70°	0.13	0.63	0.82	0.41	1.26 1.39	54.76 55.09	64.11
4	52.43	15	2.5 3.6	181	0.05 0.21	0.18 0.39	11.5	0.43	1.38	1.1		2.14	0.05	70°	0.10	0.53	0.75	0.38	0.66 0.77	54.01 59.20	70.81
3	66.30	15	1.5 2.5	27	0.05 0.09	0.00 0.02	4.0	0.04	-	-		-	-	-	0.04	0.05	0.03	0.00 0.07	66.11 66.42	70.55	
2	57.10	15	1.5 2.5	38	0.30	0.11	3.5	0.05	4.79	4.0		0.25	0.01	70°	0.15	0.29	0.38	0.19	0.30	57.44	63.45
1	60.72	15	1.5 2.5	27	2.3	0.11	4.0	0.06	2.84	3.0		0.14	0.05	50°	0.07	0.18	0.23	0.12	0.26	60.78	63.48
1A	60.13	15	2.8	100	0.18	0.03	3.0	0.04	-	-		-	-	-	0.04	0.05	-	0.08	61.06	62.80	
3B	66.42	12	1.3	86	0.13	0.11	2.9	0.03	1.3	2.9		0.13	0.04	40°	0.05	0.15	0.20	-	0.31	66.73	70.00
9	60.0	15	2.2	22	0.11	0.02	3.4	0.11	-	-		-	-	-	0.11	0.15	-	0.17	60.17	62.0	
11	50.7	15	1.0	48	0.03	0.02	6.7	0.17	-	-		-	-	-	0.17	0.23	-	0.25	-	54.0	

$H_i = 0.35 \frac{V_i^2}{2g}$
 $H_o = 0.25 \frac{V_o^2}{2g}$
 $H_{\Delta} = K \frac{V_i^2}{2g}$
 FINAL H = H_f + H_t
 90° K = 0.70
 50° K = 0.47
 20° K = 0.16
 $H_t = H_o + H_i + H_{\Delta}$
 80° K = 0.66
 40° K = 0.38
 15° K = 0.10
 70° K = 0.61
 30° K = 0.28
 25° K = 0.22

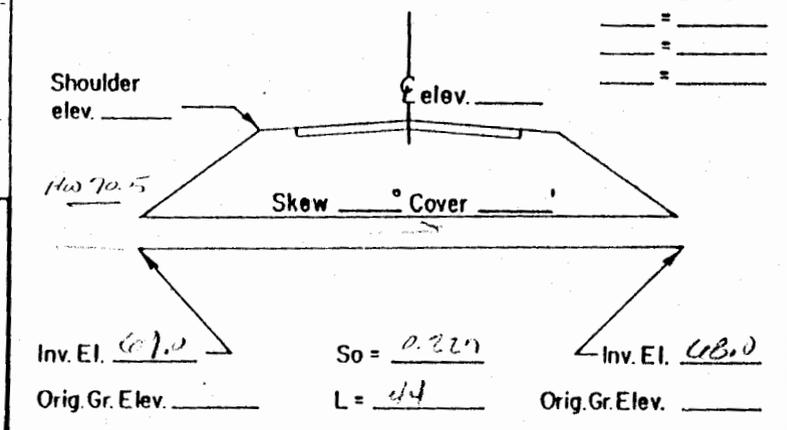
22(5-18)

Project 97-003 Plan Sheet No. _____ Designer DWC Sheet 1 of 1
Cromwell Ridge - Powhatan Secondary - James City County Rev. Date _____ Date 10/30/97

HYDROLOGICAL DATA:
 DA = 1.55 AC. $C_w = (0.25 \times 0.9) + (1.30)(0.35) = 0.44$
 $T_c = 10.0$ min.
 $I_{10} = 4.98$
 $Q_{10} = (1.55)(0.44)(4.98) = 3.4$ CFS

AHW Controls STATION: _____
 100yr. Flood plain _____ elev. _____
 Design AHW depth _____ elev. _____
 Structures _____ elev. _____

freq. T Welev.
10 = 69.5



DISCHARGES USED
 Q 10 = 3.4 CFS
 Q _____ = _____ CFS

RISK ASSESSMENT ADT _____
 Detours Available _____, Length _____
 Over topping Stage _____
 Flood Plain Management _____
 Criteria and Significant Impact _____

CULVERT TYPE & SIZE	Q	Q/B	HEADWATER COMPUTATIONS										CONT. HW. ELEV.	OUTLET VELOCITY		End Treat.	COMMENTS
			INLET CONT.		OUTLET CONTROL									C.M.	Smooth		
			HW/D	HW	K _e	dc	$\frac{d_c}{D}$	h _o	H	LSo	HW						
18" Conc.	3.4	-	0.60	1.0'	0.5	0.7	1.10	0.5	0.1	1.0	0.5	70.5					

$H_{ws} = H + h_o - LSo$
 $= 1.1 + 0.5 - 1 = 0.6$

Design Flood Exceed. Prob. _____ Elev. _____
 Over top Flood Exceed. Prob. _____ Elev. _____
 Base Flood 1% Exceed. Prob. _____ Elev. _____

SUMMARY & RECOMMENDATIONS:

(Rev. 1/85)

STORM SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. 97-003 Cromwell Ridge
 COUNTY James City DISTRICT _____
 DESCRIPTION 10-year design storm, EOP, 11-0-013

Rev. 10/29/97

SHEET 1 OF 1

FROM POINT	TO POINT	AREA DRAIN "A"	RUN-OFF COEF.	CA		INLET TIME	RAIN FALL	RUNOFF Q	INVERT ELEVATIONS		LENGTH	SLOPE	DIA.	CAPA-CITY	VEL.	FLOW TIME	REMARKS
		ACRES	C	INCRE-MENT	ACCUM-ULATED	MIN-UTES	IN./HR	C.F.S.	UPPER END	LOWER END	FT.	FT./FT.	IN.	C.F.S.	F.P.S.	SEC.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1B-1A	1	0.23	0.9	0.21													
		1.31	0.3	0.31	0.60	18	4.74	2.84	59.94	59.89	10	0.33	15	3.7	3.0	0.1	
1.	2	0.42	0.9	0.38													
		0.11	0.3	0.03	1.01	18.1	4.74	4.79	59.89	59.72	27	0.60	15	5.1	4.0	0.1	
3B-3A	3	0.48	0.5	0.24	0.24	12.5	5.6	1.3	66.78	66.44	86	0.40	12	2.3	2.9	0.5	
3	4	0.21	0.9	0.19													
		0.10	0.3	0.03	0.21	12.5	5.6	1.3	65.44	65.35	27	0.33	15	3.7	3.0	0.1	
					0.44	13.0	5.5	2.5									
4	5	0.19	0.9	0.17													
		0.07	0.3	0.02	0.44	13.0	5.5	2.5	65.35	65.13	184	0.30	15	14.5	10.5	0.3	
					0.65	13.1	5.5	3.6		55.74		5.21					
2	5	0.24	0.9	0.32													
		0.07	0.3	0.02	1.01	18.2	4.72	5.90	58.07	57.94	38	0.35	18	6.4	3.5	0.2	
5	6	0.24	0.9	0.22													
		0.11	0.3	0.03	0.65	13.1	5.5	3.6	56.5	52.50	122	3.28	18	11	10.5		2" minimum 66-1
					2.15			10.1									
9	10	0.11	0.9	0.10													
		0.24	0.3	0.08	0.18	14.5	5.2	2.2	59.50	59.0	22	2.27	15	10	8	-	
11	12	0.11	0.9	0.10													
		0.31	0.3	0.09	0.19	13.4	5.38	1.0	51.50	51.00	48	1.04	15	6.7	5.4	-	

LD-7
HYDRAULIC GRADE LINE

* Inv. 10.81 - 10% rise
** Inv. 10.81

PROJECT 99-003
Cromwell Ridge at Powhatan
Secondary

1/1

INLET STATION	Outlet Water Surface Elev.	D _o	Q _o	L _o	S _f %	H _f	JUNCTION LOSS												Final H	Inlet Water Surface Elev.	Rim Elev.
							V _o	H _o	Q _i	V _i	Q _i V _i	$\frac{V_i^2}{2g}$	H _i	Angle	H _Δ	H _t	1.3 H _t	0.5 H _t			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
5	53.20	18	8.1	122	0.70	0.05	10.5	0.43	5.9	3.5		2.14	0.07	90°	0.13	0.63	0.82	0.41	126	54.96	64.11
			10.1		0.80	0.98													1.39	55.09	
4	58.43	15	2.2	131	0.75	0.16	11.5	0.43	1.38	1.1		2.14	0.05	90°	0.10	0.53	0.75	0.38	2.66	54.1	70.81
			3.6		0.21	0.39													0.77	59.20	
3	66.30	15	1.4	27	0.75	0.0	6.0	0.04	-	-		-	-	-	0.04	0.05	0.03	0.03	2.66	64.47	70.55
			2.5		0.09	0.02													0.07	66.42	
2	57.10	15	0.7	38	0.30	0.11	3.5	0.05	4.99	4.0		0.25	0.01	90°	0.15	0.29	0.38	0.19	0.30	57.44	63.45
1	60.72	15	1.1	27	0.33	0.11	4.0	0.06	2.84	3.0		0.14	0.05	50°	0.07	0.18	0.23	0.12	0.26	60.78	63.48
1A	60.45	15	2.81	16	0.18	0.03	3.0	0.04	-	-		-	-	-	0.04	0.05	-	0.08	61.06	62.80	
3B	66.42	12	1.3	86	0.13	0.11	2.9	0.03	1.3	2.9		0.13	0.04	40°	0.05	0.15	0.20	-	0.31	66.73	70.00
9	60.0	15	2.2	22	0.11	0.02	5.4	0.11	-	-		-	-	-	0.11	0.15	-	0.17	60.17	62.0	
11	50.7	15	1.0	48	0.03	0.02	6.7	0.17	-	-		-	-	-	0.17	0.23	-	0.25		54.0	

$H_i = 0.35 \frac{V_i^2}{2g}$
 $H_o = 0.25 \frac{V_o^2}{2g}$
 $H_{\Delta} = K \frac{V_i^2}{2g}$
 FINAL H = H_f + H_t
 90° K = 0.70
 50° K = 0.47
 20° K = 0.16
 $H_t = H_o + H_i + H_{\Delta}$
 80° K = 0.66
 40° K = 0.38
 15° K = 0.10
 70° K = 0.61
 30° K = 0.28
 100° K = 0.55
 25° K = 0.22

STORM SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. 77-003 Cromwell Ridge
 COUNTY James City DISTRICT _____
 DESCRIPTION 10 year design storm, COP = 0.013

Rev. 10/29/97

SHEET 1 OF 1

FROM POINT	TO POINT	AREA DRAIN "A"	RUN-OFF COEF.	CA		INLET TIME MINUTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS		LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
		ACRES	C	INCREMENT	ACCUMULATED				UPPER END	LOWER END				C.F.S.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
18-1A	1	0.23	0.9	0.21													
		1.31	0.3	0.31	0.00	18	4.74	2.84	59.94	59.89	10	0.33	15	3.7	3.0	0.1	
1	2	0.42	0.9	0.38													
		0.11	0.3	0.03	1.01	18.1	4.74	4.79	59.89	59.72	27	0.60	15	5.1	4.0	0.1	
3B-3A	3	0.48	0.5	0.24	0.24	12.5	5.6	1.3	66.78	66.44	86	0.40	12	2.3	2.9	0.5	
3	4	0.21	0.9	0.19													
		0.10	0.3	0.03	0.21	12.5	5.6	1.3	65.44	65.35	27	0.33	15	3.7	3.0	0.1	
					0.44	13.0	5.5	2.5									
4	5	0.19	0.9	0.17													
		0.07	0.3	0.02	0.41	12.1	6.0	2.5	65.35	57.73	184	0.30	15	14.5	10.5	0.3	
					0.65	13.1	5.5	3.6		55.74		5.21					
2	5	0.24	0.9	0.32													
		0.07	0.3	0.02	1.01	18.2	4.72	5.90	58.07	57.94	38	0.35	18	6.4	3.5	0.2	
5	6	0.24	0.9	0.22													
		0.11	0.3	0.03	1.11	18.4	4.69	2.16	56.5	56.50	122	3.28	18	11	10.5		"inclusion 65-1"
					2.15			10.1									
9	10	0.11	0.9	0.10													
		0.24	0.3	0.08	0.18	14.5	5.2	2.2	59.50	59.0	22	2.27	15	10	8	-	
11	12	0.11	0.9	0.10													
		0.31	0.3	0.09	0.19	13.4	5.38	1.0	51.50	51.00	48	1.04	15	6.7	5.4	-	

LD- 7
HYDRAULIC GRADE LINE

* Inlet to 3" - 10% rise
** Inlet to 2.1

PROJECT 97-003
Cromwell Ridge at Powhatan
Secondary

INLET STATION	Outlet Water Surface Elev.	D _o	Q _o	L _o	S _f %	H _f	JUNCTION LOSS												Final H	Inlet Water Surface Elev.	Rim Elev.
							V _o	H _o	Q _i	V _i	Q _i V _i	$\frac{V_i^2}{2g}$	H _i	Angle	H _Δ	H _t	$1.3 H_t$	$0.5 H_t$			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
5	58.70	18	8.1	122	0.10	0.05	10.5	0.43	5.9	3.5		2.14	0.07	90°	0.13	0.63	0.82	0.41	126	58.70	64.11
			10.1		0.80	0.98													1.39	55.09	
4	58.43	15	2.5	181	0.15	0.10	11.5	0.43	1.38	1.1		2.14	0.05	75°	0.10	0.53	0.75	0.38	106	58.43	70.81
			3.6		0.21	0.39													0.77	59.20	
3	66.3	15	1.5	27	0.15	0.02	5.0	0.04	-	-		-	-	-	0.04	0.05	0.03	0.03	106	66.3	70.55
			2.5		0.09	0.02													0.07	66.42	
2	57.10	15	0.7	38	0.30	0.11	3.5	0.05	4.79	4.0		0.25	0.01	90°	0.15	0.29	0.38	0.19	0.30	57.44	63.45
1	60.72	15	1.1	27	0.15	0.11	4.0	0.06	2.84	3.0		0.14	0.05	50°	0.05	0.18	0.23	0.12	0.26	60.72	63.48
1A	60.73	15	2.84	16	0.18	0.03	3.0	0.04	-	-		-	-	-	0.04	0.05	-	0.03	61.04	62.80	
3B	66.42	12	1.3	86	0.13	0.11	2.9	0.03	1.3	2.9		0.13	0.04	40°	0.05	0.15	0.20	-	0.31	66.73	70.00
9	60.0	15	2.2	22	0.11	0.02	5.4	0.11	-	-		-	-	-	0.11	0.15	-	0.17	60.17	62.0	
11	50.7	15	1.0	48	0.03	0.02	6.7	0.17	-	-		-	-	-	0.17	0.23	-	0.25	-	54.0	

$H_i = 0.35 \frac{V_i^2}{2g}$ $H_o = 0.25 \frac{V_o^2}{2g}$ $H_{\Delta} = K \frac{V_i^2}{2g}$ FINAL H = H_f + H_t 90° K = 0.70 50° K = 0.47 20° K = 0.16
 $H_t = H_o + H_i + H_{\Delta}$ 80° K = 0.66 40° K = 0.38 15° K = 0.10
 70° K = 0.61 30° K = 0.28
 100° K = 0.55 25° K = 0.22

**JAMES CITY COUNTY
STORMWATER DETENTION BASIN DESIGN CHECKLIST**

I. STORMWATER MANAGEMENT COMPUTATIONS

- A. **HYDROLOGY** - An SCS-based methodology is required for stormwater detention structures with watersheds exceeding 20 acres. Under 20 acres, other generally accepted methodologies such as the modified rational, critical storm are allowable. See Chapter 5, VESCH for more information.

- X RCN determinations: predeveloped and ultimate development land use scenarios.
- X Time of concentration: predeveloped and ultimate development indicating overland, shallow concentrated, and channel flow components.
- X Hydrograph generation: predevelopment and ultimate development peak flows for 2-, 10-, and 100-year design storms.

B. **RESERVOIR ROUTING**

- X Storage indication routing of ultimate development hydrographs for 2-, 10-, and 100-year design storms. Structure must discharge up to 10-year storm through principal spillway and pass the 100-year storm with 1 foot of freeboard through a combination of the principal and emergency spillways.
- Downstream hydrographs at established study points (if required).

C. **HYDRAULIC COMPUTATIONS**

- X Elevation-Storage (curve)
- Weir/Orifice control - extended detention control.
- X Weir/Orifice control - riser 2 year control.
- X Weir/Orifice control - riser 10 year control.
- Inlet/Outlet (barrel) control - (all storms).
- Check for barrel control prior to riser orifice flow to prevent slug flow-water hammer conditions.
- X Emergency spillway capacity.
- X Elevation-Discharge (provide supporting calculations and/or design assumptions).

D. **MISCELLANEOUS COMPUTATIONS**

- Water quality volume for permanent pool.
- Water quality volume for extended detention with drawdown computations.

- _____ Anti-seep collar design.
- _____ Filter diaphragm design (or alternative method of controlling seepage).
- _____ Riser structure flotation analysis (factor of safety = 1.2 min.).
- _____ Danger reach study (if required).
- _____ 100 year floodplain impacts (if required).

II. SOILS INVESTIGATION

- _____ Geotechnical report.
- _____ Minimum boring locations: borrow area; pool area; principal spillway; top of dam near one abutment or emergency spillway if provided.
- _____ Boring logs with Unified Soil Classification, and soil description, with depth to bedrock, seasonal water table.

III. STORMWATER MANAGEMENT PLAN

A. PLAN VIEW 1"=50' or less (40', 30', etc.)

1. GENERAL TERMS

- _____ North arrow.
- _____ Sealed by P.E.
- _____ Existing and proposed contours (1' or 2' interval).
- _____ Existing and proposed improvements.
- _____ Delineation of permanent/extended detention, 2, 10, and 100-year pools.
- _____ Locations of test borings.
- _____ Outflow pipe, outlet protection (detail required), and outfall channel.
- _____ Emergency spillway level section and outlet channel.
- _____ Existing and proposed utility location/protection.

B. MAINTENANCE ITEMS

- _____ Person or organization responsible for maintenance.
- _____ Inspection and maintenance agreement.
- _____ Maintenance access from public right-of-way or publicly traveled road.
- _____ Maintenance easement, minimum 15 feet around 100-year pool elevation.
- _____ Forebay (if proposed).
- _____ Temporary erosion and sediment control measures for pond construction.
- _____ Fence, or minimum 6' wide safety shelf for public safety.
- _____ Provisions for use as a temporary sediment basin with cleanout schedule and instructions for conversion to permanent facility.

C. PRINCIPAL SPILLWAY PROFILE AND ASSOCIATED DETAILS

1. EXISTING GROUND AND PROPOSED GRADE

- Dam side slopes labeled.
- Top width labeled (per VESCH).
- Removal of unsuitable material under proposed dam (per geotechnical report).

2. CORE TRENCH

- Materials (per construction specifications)
- Bottom width (4' minimum or greater as dictated by geotechnical report)
- Side slopes (1:1 maximum steepness)
- Depth (4' minimum or greater as dictated by the geotechnical report)

3. RISER OR SIMILAR STRUCTURE (DETAIL REQUIRED)

- Materials (as required)
- All structure dimensions
- Control orifice dimensions
- Trash rack - removable - for each release (detail as required for construction)
- Anti-vortex device (detail as required for construction)
- Proper structure footing
- Maintenance access

4. BARREL

- Materials (ASTM C-361 or as required)
- Support for concrete barrels-concrete cradles, etc. (detail required)
- Gauge and corrugation size for metal barrels

5. SEEPAGE CONTROL

- Phreatic line (4:1 slope measured from the intersection of the dam and the principal spillway design high water.

a. ANTI-SEEP COLLAR

- Anti-seep collar (detail required)
- Size - 15% increase in length of saturation using outside pipe diameter

_____ Spacing and location on barrel (located at least 2' from a pipe joint)

b. FILTER DIAPHRAGM

_____ Design based on latest SCS methods and certified by a professional geotechnical engineer

6. OUTFALL PROTECTION

- Size for maximum barrel release (but not greater than 10 year storm)
- Cross-section at end of barrel in accordance with receiving channel section
- _____ Endsection with footer
- Outfall dimensions
- Slope - 0%
- Rip-rap size, VDOT Classification
- Thickness (1.5 Times Maximum Stone Diameter)
- Approved filter fabric (nonwoven)

7. ELEVATIONS

- Top of dam - construction height and settled height (10% settlement)
- Crest of emergency spillway
- Crest of riser structure
- Inverts of control release orifice/weirs
- _____ Pools: permanent; extended detention; 2-year; 10-year; 100-year; and appropriate safety storms
- Appropriate freeboard per SCS National Engineering Handbook, provide minimum one foot of free board above the 100-year design highwater.
- Inlet and outlet inverts of pipes (with slopes in %)

D. CROSS SECTION THROUGH DAM ALONG CENTERLINE

- _____ Existing ground
- _____ Proposed grade
- _____ Top of dam - constructed and settled
- _____ Location of emergency spillway with side slopes labeled (emergency spillway in cut)
- _____ Bottom of core trench (4' minimum)
- _____ Location of each soil boring
- _____ Barrel location
- _____ Existing and proposed utility location/protection

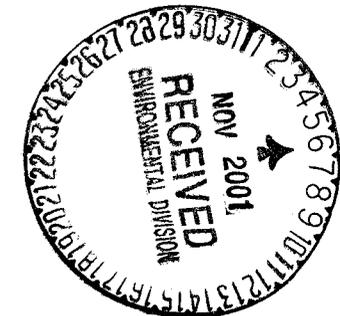
CROMWELL RIDGE DETENTION BASIN
PROJECT NUMBER 3080700
OCTOBER 1,2001

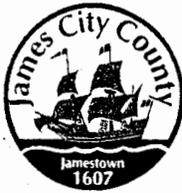
POST DEVELOPMENT CONDITIONS FLOW RATES

<u>WATERSHED</u>	<u>24 HOUR STORM FREQUENCY AND FLOW RATES (CFS)</u>					
	<u>PER 5/97 CALCULATIONS</u>			<u>PER 10/01 CALCULATIONS</u>		
	<u>2 YEAR</u>	<u>10 YEAR</u>	<u>100 YEAR</u>	<u>2 YEAR</u>	<u>10 YEAR</u>	<u>100 YEAR</u>
FROM DETENTION BASIN	3	9	29	3	9	24
DIRECT DISCHARGE	1	1	2	1	1	2
COMBINED RATES AT REACH	3	10	30	3	10	26

ROUTING.

As-Built Check





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) 253-2620

BY: _____ DATE: _____ SHEET _____ OF _____
CHKD: _____ DATE: _____ PROJECT NO. _____
APRVD: _____ DATE: _____

Block G (3889 to 3909)
SP-105-97 Cromwell Ridge
County BMP 10 Loop

Typical Plan

32' from E Road ±
UNITS 50' Long

UNIT FT RANGE
~~65.4 to 65.4~~ to 64.9 to 65.1 to 65.9
(Avg 65.4)
20' FROM TOP SLOPE

20' from Corner/END UNITS TO TOP OF SLOPE (YARD)

FENCES NOT ON APPROVED PLAN

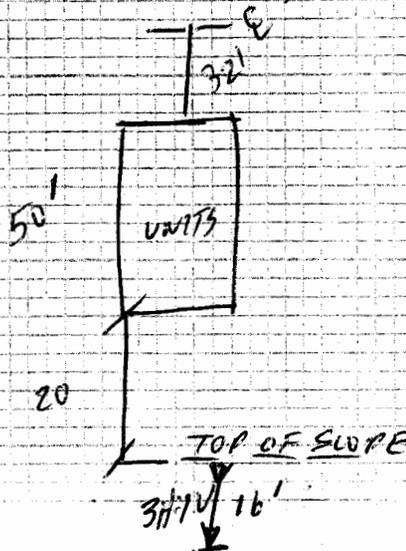
NO MAJOR UTILITIES. MAY HAVE INCIDENTAL UTILITIES.

PLAN TOP SLOPE EL. 55.0

PLAN SLOPE $5' \text{ RISE} / 16' \text{ RUN} = 3H:1V \pm$

AS-BUILT VHB

POWD
* SLOPE BACK UNITS BLOCK G (PH 7) GRADED PER PLAN
AT 3H:1V



- * TYPICALLY STABILITY NOT AN ISSUE IF 3H:1V
- * PLAN PREPARERS RESPONSIBLE TO ENSURE SLOPES ARE ENGINEERED IF STRUCTURE INVOLVED
- * NEEDS TO BE STABILIZED & VEG.

SP-97-04, Cromwell Ridge Yard Improvements

- ◆ Site is located on Cromwell Ridge Condominium Association Property
- ◆ Tax Map ID (38-3)(14-1A)
- ◆ Property is zoned R-4, Residential Planned Community, with proffers
- ◆ Berkeley Magisterial District
- ◆ Powhatan Creek Watershed

General Notes:

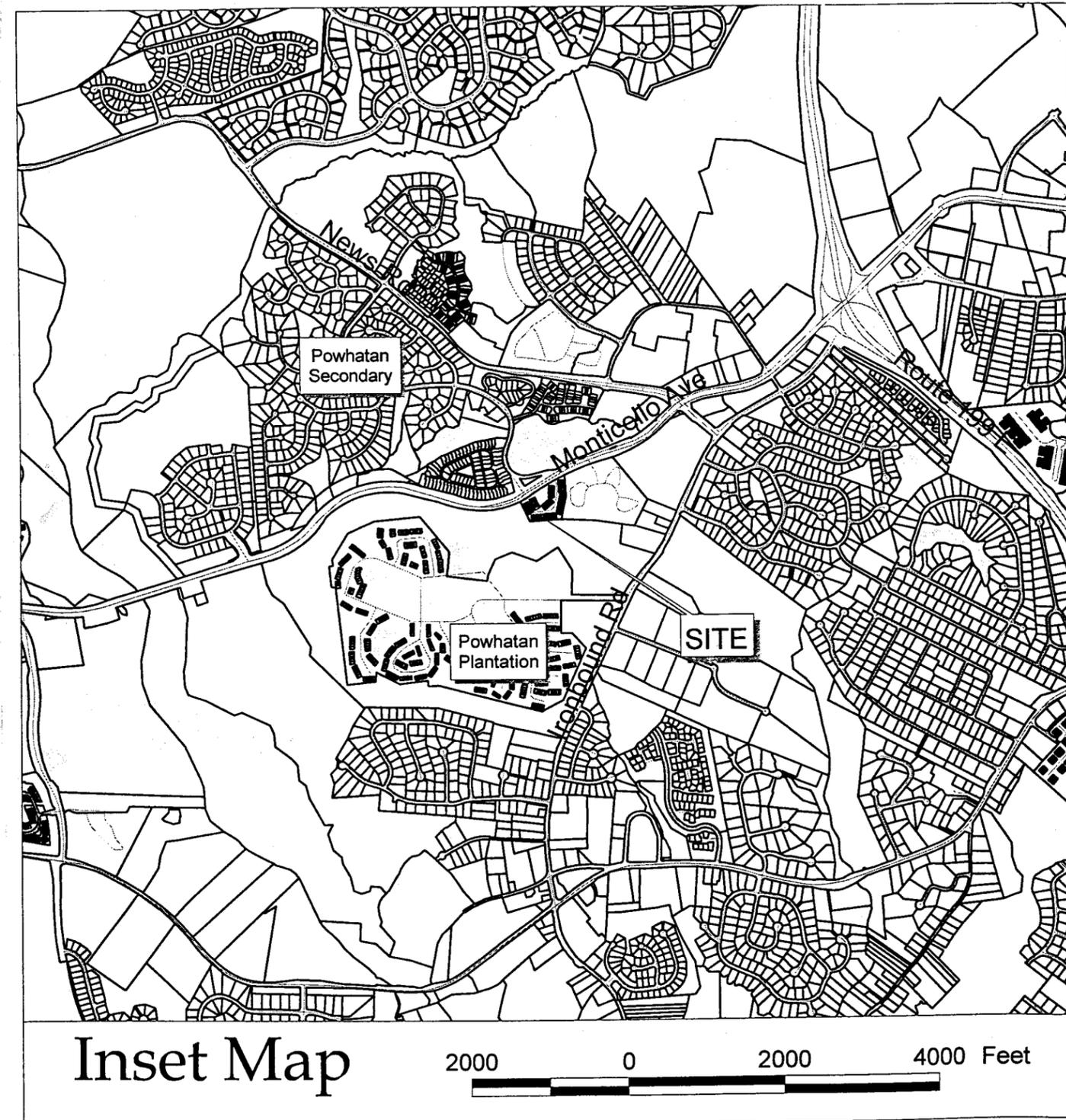
- ◆ Amendment to SP-105-97 to add four foot wide by 122.5 foot long (490 sq. ft.) wood deck behind 3909 Cromwell Lane through 3889 Cromwell Lane.
- ◆ Deck is located on condominium association property adjacent BMP (ID Code: PC-131)

Sheet Index:

1. Cover Sheet
2. Layout
3. Erosion and Sediment Control Notes



COUNTY OF JAMES CITY FINAL SITE PLAN	
APPROVALS	DATE
Fire Dept. _____	_____
Health Dept. _____	_____
VDOT _____	_____
Planning _____	_____
Environ. _____	_____
Zoning _____	_____
JCS _____	_____
County Eng. _____	_____
REA _____	_____
Other _____	_____



James City County Environmental Division
Erosion and Sediment Control Notes
Revised 7/6/01

The purpose of the erosion control measures shown on these plans shall be to preclude the transport of all waterborne sediments resulting from construction activities from entering onto adjacent properties or State waters. If field inspection reveals the inadequacy of the plan to confine sediment to the project site, all appropriate modifications will be made to correct any plan deficiencies. In addition to these notes, all provisions of the Virginia Erosion and Sediment Control Regulations shall apply to this project.

1. All erosion and sediment control measures shall be installed and maintained in accordance with the Virginia Erosion and Sediment Control Handbook, 3rd Edition, 1992. The contractor shall be thoroughly familiar with all applicable measures contained therein that may be pertinent to this project, including Minimum Standards 1 through 19. If the approved Erosion and Sediment Control plan is found to be inadequate in the field, the Minimum Standards will apply in addition to the provisions of the approved plan.

2. As a prerequisite to approval of an erosion and sediment control plan for land-disturbing activities, the name of a Responsible Land-Disturber shall be provided. The Responsible Land-Disturber shall be an individual who holds a valid certificate of competence issued by the Virginia Department of Conservation and is defined as the person in charge of and responsible for carrying out the land-disturbing activity. Permits or plans without this information are deemed incomplete and will not be approved until proper notification is received. Also, if the person designated as Responsible Land-Disturber changes between the time of plan approval and the scheduled preconstruction meeting, the Environmental Division shall be informed of the change, in writing, 24-hours in advance of the preconstruction meeting.

3. A preconstruction meeting shall be held on site between the County, the Developer, the Project Engineer, the Responsible Land-Disturber and the Contractor prior to issuance of the Land Disturbing Permit. The Contractor shall submit a Sequence of Construction to the County for approval prior to the preconstruction meeting. The designated

Responsible Land-Disturber is required to attend the preconstruction meeting for the project.

4. All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from the Virginia Department of Transportation is required prior to any construction activities within State right-of-ways. Where sediment is transported onto a public road surface, the road shall be thoroughly cleaned at the end of each day (Std & Spec 3.02).

5. Sediment basins and traps (Std & Spec 3.13 and 3.14), perimeter dikes (Std & Spec 3.09 and 3.12), sediment filter barriers (Std. & Spec 3.05) and other measures intended to trap sediment on-site must be constructed as a first step in grading and must be made functional prior to any upslope land disturbance taking place. Earthen structures such as dams, dikes and diversions must be seeded and mulched immediately after installation. Periodic inspections of the erosion control measures by the owner or owners representatives shall be made to assess their condition. Any necessary maintenance of the measures shall be accomplished immediately and shall include the repair of measures damaged by any subcontractor including those of the public utility companies.

6. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 3.10) and slope drain (Std. & Spec. 3.15) shall be installed prior to the end of each working day.

7. Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Environmental Division approval will be required for other deviations from the approved plan.

8. The Contractor shall place soil stockpiles at the locations shown on the plan. Soil stockpiles shall be stabilized or protected with sediment trapping measures. Off-site waste or borrow areas shall be approved by the Environmental Division prior to the import of any borrow or export of any waste to or from the project site.

9. The Contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of the same (Std & Spec 3.18). This includes installation of erosion control stone or paved ditches where required. Any drainage outfalls required for a street must be completed before street grading or utility installation begins.

10. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

11. No more than 300 feet of sanitary sewer, storm drain, water or underground utility lines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).

12. If disturbed area stabilization is to be accomplished during the months of December, January or February, stabilization shall consist of mulching (Std & Spec 3.35). Seeding will then take place as soon as the season permits.

13. The term Seeding, Final Vegetative Cover or Stabilization on this plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime and fertilizer (Std & Spec 3.32). Irrigation shall be required as necessary to ensure establishment of grass cover.

14. All slopes steeper than 3H:1V shall require the use of erosion control blankets and mattings to aid in the establishment of a vegetative cover. Installation shall be in accordance with Std. & Spec. 3.35, Mulching, Std. & Spec. 3.36, Soil Stabilization Blankets and Matting and Manufacturers Instructions. No slopes shall be created steeper than 2H:1V.

15. Inlet protection (Std & Spec 3.07 and 3.08) shall be provided for all storm drain and culvert inlets following construction of the same.

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

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

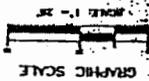
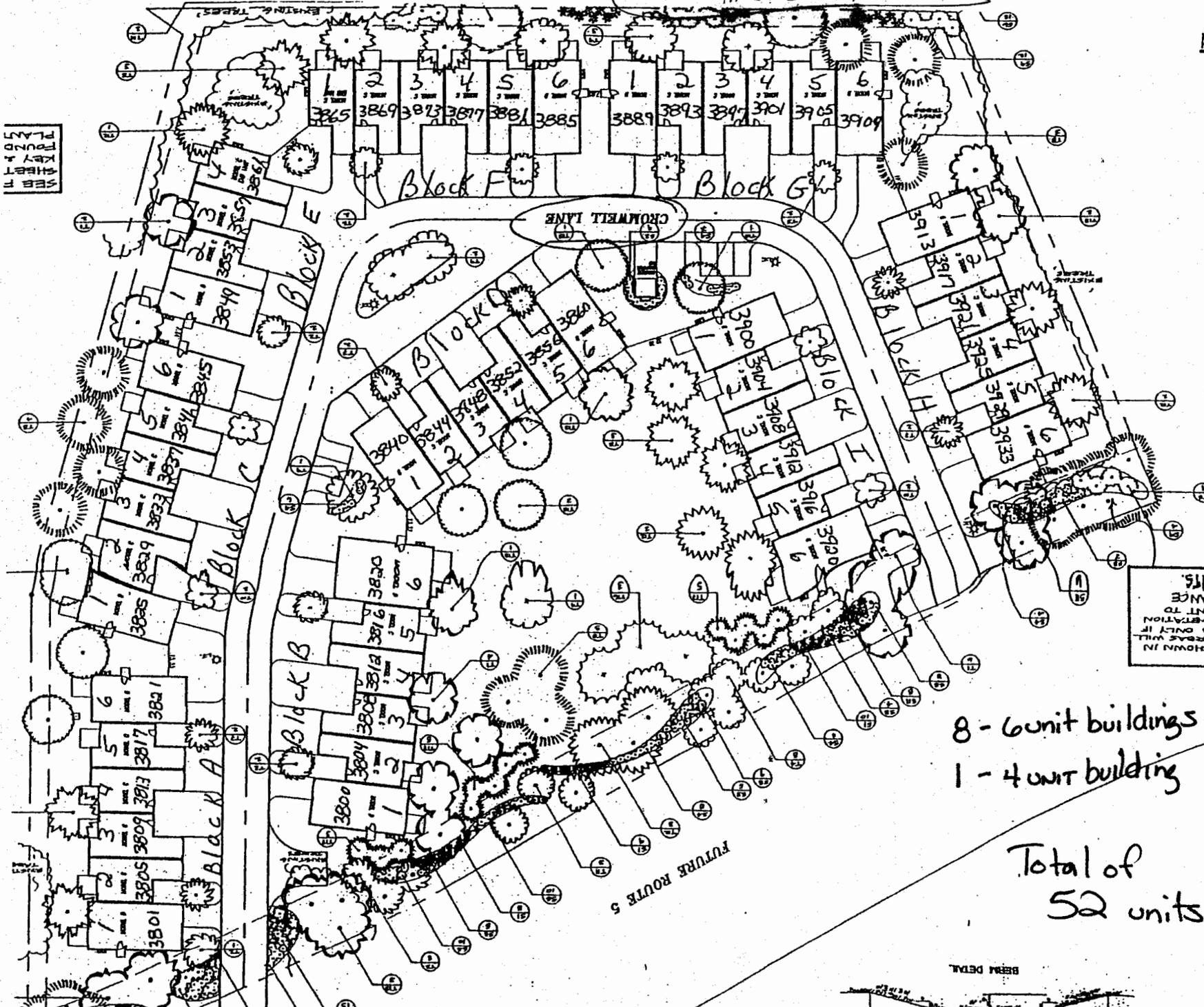
18. Temporary erosion control measures such as silt fence are not to be removed until all disturbed areas are stabilized. Trapped sediment shall be spread, seeded and mulched. After the project and stabilization is complete, all erosion and sediment control measures shall be removed within 30 days.

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

20. Record Drawings (As-Builts) and Construction Certifications are both required for newly constructed or modified stormwater management/BMP facilities. Certification activities shall be adequately coordinated and performed before, during and following construction in accordance with the current version of the James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions.

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

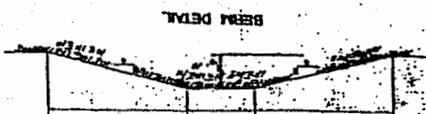
SEE PLAN
KEY SHEET
50

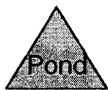
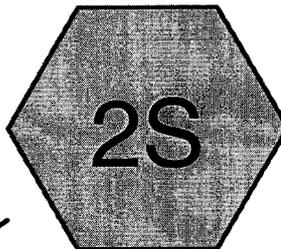
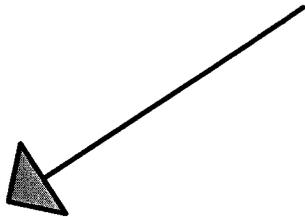
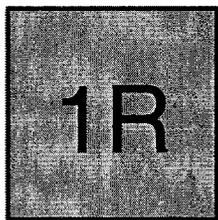
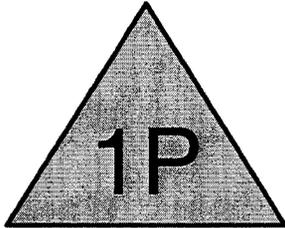
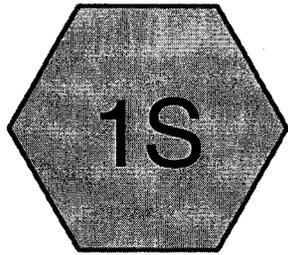


NOTE:
PLANTINGS SHOWN IN
THIS AREA WILL
BE PROVIDED ONLY IF
EXISTING VEGETATION TO
IS INCUMBENT TO
MEET ORDINANCE
REQUIREMENTS.

8 - 6 unit buildings
1 - 4 unit building

Total of
52 units





Drainage Diagram for Cromwell Ridge
Prepared by VHB, INC. 10/1/2001
HydroCAD® 6.00 s/n 001238 © 1986-2001 Applied Microcomputer Systems



Project: CROMWELL RIDGE Project # 3080700
 Location: Sheet of
 Calculated by: Date:
 Checked by: Date:
 Title:

PERFORMANCE CHECK - EXISTING OMP/DETENTION BASIN

PROCEDURE:

- USE RECORD DRAWING INFORMATION FOR VOLUMES & OUTLET STRUCTURE, etc. FOR MODEL & ROUTINGS
- USE ORIGINAL DESIGN REPORT & CALCULATIONS FOR DRAINAGE AREAS, TIMES OF CONCENTRATION, CURVE NUMBERS, ETC.

DRAINAGE AREA = 5.20 ACRES ONSITE + 0.12 ACRES OFFSITE
 TOTAL = 5.32 ACRES to pond

CN = 90

T_C = 0.49 HRS = 29.4 MINUTES

STORAGE:

ELEV.	AREA (SF)	(A1+A2)/2	VOL (CF)	ΣVOL (CF)
48.9	-	-	-	-
50.0	2065	1032	1135	1135
51.0	5213	3639	3639	4774
52.0	7523	6368	6368	11,142
53.0	9534	8528	8528	14,896
54.0	11,492	10513	10513	25,409
54.5	13,136	12314	6157	31,566



Computations

Project: CROMWELL RIDGE Project # 3080700
 Location: Sheet of
 Calculated by: Date:
 Checked by: Date:
 Title

BASIN OUTLET STRUCTURE

E.S. = 15' WEIR (C=2.6) ✓

24" RCP C 1.32% ✓

TOP OF D.I. = 53.68 ✓
 (P=9.0', GA=2.33 SF)
 PER ORIG. CALC'S P=7.5 → USE

(TEMP. DEWATERING ORIFICE)
 8" ORIFICE INH. 51.82 ✓
 THIS IS SUPPOSED TO BE BLOCKED FOLLOWING TSB MODE. (OK NOT IN MODEL)
 8" ORIFICE INH. 48.85 ✓

50% 24 HR. STORMS - RAINFALL PER STATE SWM HANDBOOK

2 yr = 3.5"
 10 yr = 5.8"
 100 yr = 8.0"

DIRECT DISCHARGE TO OUTLET CHANNEL (PER ORIG. CALC'S)

A = 0.27 ACRES
 CN = 90
 T_c = 0.44 HRS = 26.4 MIN.

USE DOWNSTREAM CHANNEL REGRD TO COMBINE HYDROGRAPHS

Cromwell Ridge

Type II 24-hr Rainfall=3.50"

Prepared by VHB, INC.

Page 1

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10/1/2001

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Type II 24-hr Rainfall=3.50"
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Inflow to Detention Basin

Tc=29.4 min CN=90 Area=5.320 ac Runoff= 11.32 cfs 1.007 af

Subcatchment 2S: Direct to Outlet Channel

Tc=26.4 min CN=90 Area=0.270 ac Runoff= 0.61 cfs 0.051 af

Reach 1R: Downstream Channel

Inflow= 3.30 cfs 1.053 af
Length= 50.0' Max Vel= 3.0 fps Capacity= 216.61 cfs Outflow= 3.30 cfs 1.053 af

Pond 1P: Existing Detention Basin

Peak Storage= 15,390 cf Inflow= 11.32 cfs 1.007 af
Primary= 3.06 cfs 1.002 af Outflow= 3.06 cfs 1.002 af

Runoff Area = 5.590 ac Volume = 1.058 af Average Depth = 2.27"

Cromwell Ridge

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Subcatchment 1S: Inflow to Detention Basin

Runoff = 11.32 cfs @ 12.23 hrs, Volume= 1.007 af

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

Area (ac)	CN	Description
5.320	90	Post Development

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.4					Direct Entry, Tc per Original Calc's

Subcatchment 2S: Direct to Outlet Channel

Runoff = 0.61 cfs @ 12.19 hrs, Volume= 0.051 af

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

Area (ac)	CN	Description
0.270	90	Post Development

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.4					Direct Entry, Per Original Calc's

Reach 1R: Downstream Channel

Inflow = 3.30 cfs @ 12.37 hrs, Volume= 1.053 af
Outflow = 3.30 cfs @ 12.37 hrs, Volume= 1.053 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.40'
Capacity at bank full= 216.61 cfs
Inlet Invert= 43.97', Outlet Invert= 43.05'
2.00' x 3.00' deep channel, n= 0.030 Length= 50.0' Slope= 0.0184 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: Existing Detention Basin

Inflow = 11.32 cfs @ 12.23 hrs, Volume= 1.007 af
Outflow = 3.06 cfs @ 12.76 hrs, Volume= 1.002 af, Atten= 73%, Lag= 32.1 min
Primary = 3.06 cfs @ 12.76 hrs, Volume= 1.002 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Cromwell Ridge

Type II 24-hr Rainfall=3.50"

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Page 3

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10/1/2001

Peak Elev= 52.50' Storage= 15,390 cf

Plug-Flow detention time= 45.2 min calculated for 0.998 af (99% of inflow)

Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.90	0	0	0
50.00	2,065	1,136	1,136
51.00	5,213	3,639	4,775
52.00	7,523	6,368	11,143
53.00	9,534	8,529	19,671
54.00	11,492	10,513	30,184
54.50	13,136	6,157	36,341

Primary OutFlow (Free Discharge)

- 1=Culvert
- 2=Orifice/Grate
- 3=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	48.85'	24.0" x 63.0' long Culvert RCP, groove end w/headwall, Ke= 0.200 Outlet Invert= 48.05' S= 0.0127 '/' n= 0.013 Cc= 0.900
2	Device 1	48.85'	8.0" Vert. Orifice/Grate C= 0.600
3	Device 1	53.68'	2.74' x 2.74' Horiz. Orifice/Grate Limited to weir flow C= 0.600

Cromwell Ridge

Type II 24-hr Rainfall=5.80"

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Subcatchment 1S: Inflow to Detention Basin

Runoff = 21.04 cfs @ 12.22 hrs, Volume= 1.924 af

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

Area (ac)	CN	Description
5.320	90	Post Development

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.4					Direct Entry, Tc per Original Calc's

Subcatchment 2S: Direct to Outlet Channel

Runoff = 1.14 cfs @ 12.19 hrs, Volume= 0.098 af

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

Area (ac)	CN	Description
0.270	90	Post Development

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.4					Direct Entry, Per Original Calc's

Reach 1R: Downstream Channel

Inflow = 9.77 cfs @ 12.57 hrs, Volume= 2.013 af
Outflow = 9.71 cfs @ 12.58 hrs, Volume= 2.013 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.1 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.71'
Capacity at bank full= 216.61 cfs
Inlet Invert= 43.97', Outlet Invert= 43.05'
2.00' x 3.00' deep channel, n= 0.030 Length= 50.0' Slope= 0.0184 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: Existing Detention Basin

[82] Warning: Early inflow requires earlier time span

Inflow = 21.04 cfs @ 12.22 hrs, Volume= 1.924 af
Outflow = 9.37 cfs @ 12.57 hrs, Volume= 1.916 af, Atten= 55%, Lag= 20.8 min
Primary = 9.37 cfs @ 12.57 hrs, Volume= 1.916 af

Cromwell Ridge

Type II 24-hr Rainfall=5.80"

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Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 53.97' Storage= 29,896 cf

Plug-Flow detention time= 63.8 min calculated for 1.909 af (99% of inflow)

Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.90	0	0	0
50.00	2,065	1,136	1,136
51.00	5,213	3,639	4,775
52.00	7,523	6,368	11,143
53.00	9,534	8,529	19,671
54.00	11,492	10,513	30,184
54.50	13,136	6,157	36,341

Primary OutFlow (Free Discharge)

- 1=Culvert
- 2=Orifice/Grate
- 3=Orifice/Grate

#	Routing	Invert	Outlet Devices
1	Primary	48.85'	24.0" x 63.0' long Culvert RCP, groove end w/headwall, Ke= 0.200 Outlet Invert= 48.05' S= 0.0127 '/' n= 0.013 Cc= 0.900
2	Device 1	48.85'	8.0" Vert. Orifice/Grate C= 0.600
3	Device 1	53.68'	2.74' x 2.74' Horiz. Orifice/Grate Limited to weir flow C= 0.600

Cromwell Ridge

Type II 24-hr Rainfall=8.00"

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Subcatchment 1S: Inflow to Detention Basin

Runoff = 30.23 cfs @ 12.22 hrs, Volume= 2.813 af

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

Area (ac)	CN	Description
5.320	90	Post Development

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.4					Direct Entry, Tc per Original Calc's

Subcatchment 2S: Direct to Outlet Channel

Runoff = 1.64 cfs @ 12.19 hrs, Volume= 0.143 af

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

Area (ac)	CN	Description
0.270	90	Post Development

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.4					Direct Entry, Per Original Calc's

Reach 1R: Downstream ChannelInflow = 25.79 cfs @ 12.37 hrs, Volume= 2.945 af
Outflow = 25.19 cfs @ 12.38 hrs, Volume= 2.945 af, Atten= 2%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.2 fps, Min. Travel Time= 0.2 min

Avg. Velocity = 2.4 fps, Avg. Travel Time= 0.4 min

Peak Depth= 1.15'

Capacity at bank full= 216.61 cfs

Inlet Invert= 43.97', Outlet Invert= 43.05'

2.00' x 3.00' deep channel, n= 0.030 Length= 50.0' Slope= 0.0184 '/'

Side Slope Z-value= 2.0 '/'

Pond 1P: Existing Detention BasinInflow = 30.23 cfs @ 12.22 hrs, Volume= 2.813 af
Outflow = 24.24 cfs @ 12.38 hrs, Volume= 2.802 af, Atten= 20%, Lag= 9.2 min
Primary = 19.20 cfs @ 12.38 hrs, Volume= 2.706 af
Secondary = 5.04 cfs @ 12.38 hrs, Volume= 0.097 af

Cromwell Ridge

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Type II 24-hr Rainfall=8.00"

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10/1/2001

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 54.25' Storage= 33,257 cf

Plug-Flow detention time= 54.4 min calculated for 2.802 af (100% of inflow)

Storage and wetted areas determined by Prismatic sections

*ABTOD = 54.55 LOW
DHW = 54.25
0.35' FB*

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
48.90	0	0	0
50.00	2,065	1,136	1,136
51.00	5,213	3,639	4,775
52.00	7,523	6,368	11,143
53.00	9,534	8,529	19,671
54.00	11,492	10,513	30,184
54.50	13,136	6,157	36,341

Primary OutFlow (Free Discharge)

- ↑ 1=Culvert
- ↑ 2=Orifice/Grate
- ↑ 3=Orifice/Grate

Secondary OutFlow (Free Discharge)

- ↑ 4=Emergency Spillway

#	Routing	Invert	Outlet Devices
1	Primary	48.85'	24.0" x 63.0' long Culvert RCP, groove end w/headwall, Ke= 0.200 Outlet Invert= 48.05' S= 0.0127 ' n= 0.013 Cc= 0.900
2	Device 1 * ✓	48.85'	8.0" Vert. Orifice/Grate C= 0.600
3	Device 1	53.68'	2.74' x 2.74' Horiz. Orifice/Grate Limited to weir flow C= 0.600
4	Secondary	54.00'	15.0' long x 20.0' breadth Emergency Spillway Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

** Low Flow 8"
Temp 8" not included.*

Cromwell Ridge

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Type II 24-hr Rainfall=8.00"

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Pond 1P: Existing Detention Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
48.90	0.00	0.00	0.00	54.10	14.75	13.48	1.27
49.00	0.08	0.08	0.00	54.20	20.80	17.20	3.60
49.10	0.20	0.20	0.00	54.30	27.93	21.30	6.63
49.20	0.37	0.37	0.00	54.40	35.98	25.73	10.25
49.30	0.57	0.57	0.00	54.50	44.81	30.49	14.32
49.40	0.78	0.78	0.00				
49.50	0.95	0.95	0.00				
49.60	1.08	1.08	0.00				
49.70	1.21	1.21	0.00				
49.80	1.32	1.32	0.00				
49.90	1.42	1.42	0.00				
50.00	1.52	1.52	0.00				
50.10	1.61	1.61	0.00				
50.20	1.69	1.69	0.00				
50.30	1.78	1.78	0.00				
50.40	1.85	1.85	0.00				
50.50	1.93	1.93	0.00				
50.60	2.00	2.00	0.00				
50.70	2.07	2.07	0.00				
50.80	2.14	2.14	0.00				
50.90	2.20	2.20	0.00				
51.00	2.27	2.27	0.00				
51.10	2.33	2.33	0.00				
51.20	2.39	2.39	0.00				
51.30	2.45	2.45	0.00				
51.40	2.50	2.50	0.00				
51.50	2.56	2.56	0.00				
51.60	2.61	2.61	0.00				
51.70	2.67	2.67	0.00				
51.80	2.72	2.72	0.00				
51.90	2.77	2.77	0.00				
52.00	2.82	2.82	0.00				
52.10	2.87	2.87	0.00				
52.20	2.92	2.92	0.00				
52.30	2.97	2.97	0.00				
52.40	3.01	3.01	0.00				
52.50	3.06	3.06	0.00				
52.60	3.11	3.11	0.00				
52.70	3.15	3.15	0.00				
52.80	3.20	3.20	0.00				
52.90	3.24	3.24	0.00				
53.00	3.28	3.28	0.00				
53.10	3.33	3.33	0.00				
53.20	3.37	3.37	0.00				
53.30	3.41	3.41	0.00				
53.40	3.45	3.45	0.00				
53.50	3.49	3.49	0.00				
53.60	3.53	3.53	0.00				
53.70	3.67	3.67	0.00				
53.80	5.10	5.10	0.00				
53.90	7.35	7.35	0.00				
54.00	10.18	10.18	0.00				

Cromwell Ridge

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Type II 24-hr Rainfall=8.00"

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10/1/2001

Pond 1P: Existing Detention Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
48.90	0	0	54.10	11,821	31,416
49.00	188	103	54.20	12,150	32,647
49.10	375	207	54.30	12,478	33,878
49.20	563	310	54.40	12,807	35,110
49.30	751	413	54.50	13,136	36,341
49.40	939	516			
49.50	1,126	620			
49.60	1,314	723			
49.70	1,502	826			
49.80	1,690	929			
49.90	1,877	1,033			
50.00	2,065	1,136			
50.10	2,380	1,500			
50.20	2,695	1,864			
50.30	3,009	2,227			
50.40	3,324	2,591			
50.50	3,639	2,955			
50.60	3,954	3,319			
50.70	4,269	3,683			
50.80	4,583	4,047			
50.90	4,898	4,411			
51.00	5,213	4,775			
51.10	5,444	5,412			
51.20	5,675	6,048			
51.30	5,906	6,685			
51.40	6,137	7,322			
51.50	6,368	7,959			
51.60	6,599	8,596			
51.70	6,830	9,232			
51.80	7,061	9,869			
51.90	7,292	10,506			
52.00	7,523	11,143			
52.10	7,724	11,996			
52.20	7,925	12,848			
52.30	8,126	13,701			
52.40	8,327	14,554			
52.50	8,529	15,407			
52.60	8,730	16,260			
52.70	8,931	17,113			
52.80	9,132	17,966			
52.90	9,333	18,818			
53.00	9,534	19,671			
53.10	9,730	20,723			
53.20	9,926	21,774			
53.30	10,121	22,825			
53.40	10,317	23,876			
53.50	10,513	24,928			
53.60	10,709	25,979			
53.70	10,905	27,030			
53.80	11,100	28,082			
53.90	11,296	29,133			
54.00	11,492	30,184			

Cromwell Ridge Elevation Changes:

1. Bottom of basin depth changed from 53.05 to 48.5 feet.
2. Bottom length of basin did not change.
3. Bottom width of basin did not change.
4. Slopes remained at 3:1.
5. Top of slope height changed from 55 feet to 59-60 feet.
6. Area from edge of fence to top of slope did not change per plan even though it was brought up the width is 8' 10".

In my opinion the capacity of the basin was increased with the cleaned out depth and build up of out slopes.

Greg - ^{did you} write this or ^{did the contractor?}

1) Need to compare these elevations to the asbuilt plan on record in storm water, may be different than original plan.

2) Can I see the Landscape plan?

SCOTT

SEE ME IF ANY QUESTIONS



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

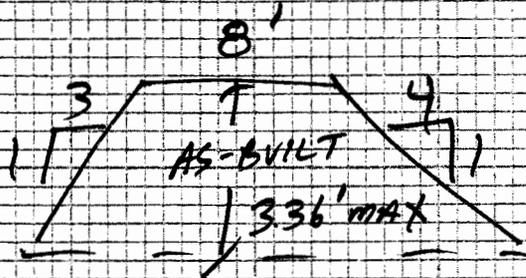
BY: _____ DATE: _____ SHEET ____ OF _____
CHKD: _____ DATE: _____ PROJECT NO. _____
APRVD: _____ DATE: _____

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COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 253-2620



HT VARIES
FROM 0 TO
3.36' MAX.

Length = 280 feet

Center #t = 3.5 feet

3.0 CY / LF OF EMBANKMENT

$$(3.0)(280) = 840 \text{ C.Y.}$$

RECONSTRUCTION OF EARTH EMBANKMENT

$$840 \text{ C.Y.} \times \$10/\text{C.Y.} = \$8,400$$

3% Testing +
Inspection

250.

\$8,650

SAY \$8,500

\$10,000

**VICO CONSTRUCTION CORPORATION
4001 S MILITARY HIGHWAY
CHESAPEAKE, VIRGINIA 23321**

TEL 757-487-3441

FAX 757-487-8680

FAX TRANSMITTAL

DATE 31 MARCH 2003

**TO JAMES CITY COUNTY
ENVIRONMENTAL DIVISION**

ATTN SCOTT THOMAS

FAX 757-259-4032 TEL 757-253-6670

FROM GERRY JAMIAS

PROJECT CROMWELL RIDGE

**NUMBER OF PAGES INCLUDING THIS COVER SHEET 5
IF YOU DO NOT RECEIVE THE NUMBER OF PAGES INDICATED, PLEASE CONTACT ME IMMEDIATELY**

MESSAGE

**TRANSMITTING HERewith IS A SITE INSPECTION REPORT FROM
McCALLUM DONE 13 FEB 2003 FOR THE ABOVE MENTIONED PROJECT.**

FAX SENT BY GERRY ON THE DATE INDICATED ABOVE @

VICO JOB# 828

McCALLUM TESTING LABORATORIES, INC.**FLOWABLE FILL PLACEMENT LOG**

CLIENT: VICO
 PROJECT: Cromwell Ridge
 DATE: 2/13/03
 CONTRACTOR: VICO
 SUPPLIER: Custom

SPECIFICATION REQUIREMENTS:
 STRENGTH (PSI @ 28 DAYS): 750
 SLUMP (INCHES): 10
 AIR (%):
 UNIT WEIGHT (PCF):
 MIX DESIGN NO.: 10-44

LOCATION Cutoff Wall Trench

TRUCK NO.	186	166	167	93	100	166	167	93
TICKET NO.	8525	8571	8600	8668	8724	8975	9133	9226
LOAD (CU.YDS.)	9	9	9	8	9	9	9	8
TOTAL (CU.YDS.)	9	18	27	35	44	53	62	70
SLUMP (INCHES)	10						10	
AIR (%)								
UNIT WEIGHT (PCF)								
AIR TEMP. (°F)	35						42	
FLOWABLE FILL TEMP. (°F)	55						60	
WATER WITHHELD (GALS./YD ³)	2	2	2	2	2	2	2	2
WATER ADDED (GALS.)								
TEST CYLINDERS	5						5	
TRUCK LOADED	753	753	756	806	815	915	955	1015
TRUCK ARRIVED	810	812	822	830	839	938	1035	1945
TRUCK EMPTY	829	845	858	900	920	1030	1055	1110
SET NO.	1						2	

LOCATION Cutoff Wall Trench

TRUCK NO.	168	180	166	167				
TICKET NO.	9240	9351	9375	9546				
LOAD (CU.YDS.)	9	9	9	9				
TOTAL (CU.YDS.)	79	88	97	106				
SLUMP (INCHES)				10				
AIR (%)								
UNIT WEIGHT (PCF)								
AIR TEMP. (°F)				45				
FLOWABLE FILL TEMP. (°F)				57				
WATER WITHHELD (GALS./YD³)	2	2	2	2				
WATER ADDED (GALS.)								
TEST CYLINDERS				5				
TRUCK LOADED	1020	1040	1055	1135				
TRUCK ARRIVED	1040	1110	1124	1200				
TRUCK EMPTY	1120	1150	1210	1235				
SET NO.				3				

LOCATION

TRUCK NO.								
TICKET NO.								
LOAD (CU.YDS.)								
TOTAL (CU.YDS.)								
SLUMP (INCHES)								
AIR (%)								
UNIT WEIGHT (PCF)								
AIR TEMP. (°F)								
FLOWABLE FILL TEMP. (°F)								
WATER WITHHELD (GALS./YD³)								
WATER ADDED (GALS.)								
TEST CYLINDERS								
TRUCK LOADED								
TRUCK ARRIVED								
TRUCK EMPTY								
SET NO.								

Should you have any questions concerning this report, please contact this office at your convenience.

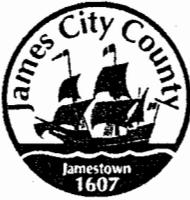
Very truly yours,

McCALLUM TESTING LABORATORIES, INC.

Philip S. Bernick
Director of Operations

Douglas S. Kinloch, E.
Chief Engineer





DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
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INTEGRATED PEST MANAGEMENT
(757) 253-2620

TO LED FOR
REVIEW 5/16/02

May 16, 2002

Pat E. Viola
Vico Construction Corporation
P.O. Box 6186
Chesapeake, Va. 23323

Re: Cromwell Ridge at Powhatan Secondary
County Plan No. SP-105-97
County BMP ID Code: PC 131

NEVER SENT.
AGREEMENT
NEVER
MATERIALIZED.

Dear Mr. Viola:

The Environmental Division has reviewed your request dated March 7th 2002. The intent of your letter is to request variance from construction certification requirements imposed for the above referenced stormwater management facility.

For this specific project, several notes were present on Sheets 3 and 8 of the approved plan set which required proper monitoring and construction certification of the stormwater management facility. Note # 18 on Sheet 8 of the approved plan indicated the following:

“As-built drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgement, knowledge and belief, the structure was constructed in accordance with the approval plans and specifications”.

As this note, along with two other similar notes on Sheet 3, were present on the approved plans and specifications, it was responsibility of the Owner/Contractor to ensure a professional engineer was present during the construction process to observe construction and to provide construction certification once the structure was completed.

Although recently, we have strengthened and provided better definition to the record drawing (as-built) and construction certification process for stormwater management facilities, the requirement for construction certification by a registered professional engineer has not changed.

In full consideration of your letter, there was an apparent failure by the Owner/Contractor to locate geotechnical information collected during construction of the dam or the services of a professional engineer was not retained during construction to provide proper certification construction certification. The basis of your variance request states that the earthen fill berm for the dam is of a minor nature, the

JCC Environmental Division performed inspections during construction, the facility has weathered three hurricanes successfully. Furthermore, an offer was extended by Vico Construction Corporation, sitework contractor responsible for construction of the BMP, to provide an extended defect/warranty bond specifically for the facility.

Although we agree that the earthen berm around the south side of the facility is of relatively small height (3.4 feet maximum height based on as-built drawings), proper construction of the earthen embankment component of the basin is critical for success of the facility as a stormwater management/best management practice. This portion of facility construction warranted proper observation and certification by an engineer.

In full consideration of your dilemma, a certification letter or statement by a non-licensed professional engineer cannot be accepted by our division as it contradicts our past and current policy for proper certification of BMP facilities. Also, post-construction testing may be very invasive to the integrity of the dam embankment and affect stabilized conditions around the facility and yet ~~achieve~~ ^{NOT} desired results to provide proper certification to fulfill current County requirements.

Therefore, based on a full review of the approved design plan, land-uses and information as submitted including the record drawing, standard information forms, an as-built hydraulic routing by VHB (November 5, 2001) and the contents of your letter request, it has been determined that for *this specific review case only*, the construction certification requirement will be waived for this project with the understanding that an extended warranty/defect bond in the amount of \$ 10,000 will be posted by Vico Construction Corporation for a period of two (2) years to cover any defects, deficiencies or failures specifically to components and appurtenances associated with construction of the dam embankment.

The primary reasons for granting the exception request is as follows:

- The earthen fill embankment, which would require proper certification, is of relatively small height (less than 3.5 feet maximum) and design high water for the facility, as re-computed based on as-built conditions, is well below top of dam.
- Observations of construction, as performed by our assigned inspector, could generally be used to support the claim in your letter that the embankment was constructed in accordance with approval plans and specifications. However, the assigned inspector at the time of construction of this facility is no longer with James City County and information as such cannot be confirmed. *(Also, please note that inspections by the Environmental Division are for compliance purposes only.)*
- The facility shows no apparent signs of stress, failure or malfunction since completion almost five years ago.
- There are no obvious signs indicating threatening conditions to stormwater function or structural integrity of the stormwater management facility.
- The facility appears to have been maintained in an acceptable level of service since completion of construction.

In addition, all punch-list items related to the BMP as outlined in our previous November 30th 2001 letter must be properly completed to the satisfaction of the Environmental Division before we will proceed with the release of the Owner's posted surety for the project. Terms and conditions of the extended warranty must be worked out with Vico Construction Corporation to the satisfaction of the Environmental Division and the County Attorney's office.

In closing, I stress to you that granting variances of this nature are seldom, if rarely, performed by our division. Lack of knowledge about the certification process or overlooking items that are clearly delineated on approved plans are not normally justification to grant a variance. For this specific case, many factors and the overall age and general function of the facility were weighed into the decision.

I highly recommend that you and other individuals within your organization who routinely construct stormwater management and drainage facilities in James City County review and familiarize yourselves with our current requirements. This includes Note # 20 of the *James City County Environmental Division, Erosion and Sediment Control notes dated July 6th 2001* and our current record drawing/construction certification packet entitled *James City County Environmental Division, Stormwater Management /BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. These items are attached for your use and reference.

If you have any additional questions or comments, you can contact me at 253-6673. Thank you for your consideration on this matter.

Sincerely,

Darryl E. Cook, P.E.
Director, Environmental Division

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

cc: Donald Moore/Marsha Lynn Building Corporation
Leo Rogers, Deputy County Attorney

SWMProg\AsBuilts\Variance\PC131.0

REVIEW 5/16/02
6/18/02

MANAGEMENT

TO: Leo Rogers
FROM: Scott Thomas

DATE: 6/19/02

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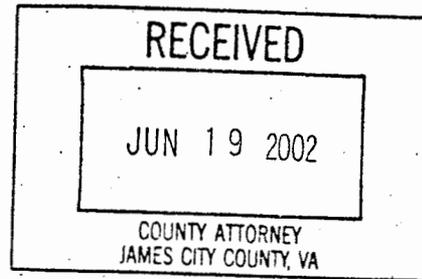
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INTEGRATED PEST MANAGEMENT
(757) 253-2620

- For Your Comments
- For Your Approval
- Note & Return
- Note & File
- Reply & Send Me Copy
- Take Appropriate Action
- For Review & Comment

- Call Me
- See Me
- FYI
- Signature

May 16, 2002



COMMENTS:
 NEED TO REVIEW AGREEMENT
 FOR EXTENDED WARRANTY IN
 LIEU OF CONSTRUCTION CERTIFICATION
 (NOTE: NEW AGREEMENT)
 THE FOLLOWING IS ATTACHED.

- 1) ORIGINAL LETTER FROM ENV DIV TO DEVELOPER (NOV 30 '01)
- 2) REQUEST FROM VICO REQUESTING VARIANCE AND OFFERING TO PROVIDE EXTENDED WARRANTY.
- *3) AGREEMENT
- 4) LETTER TO ACCOMPANY AGREEMENT.

I presume you will need to meet with me and Darryl to discuss.

Scott Thomas
 6-18-02
 x 6639

Secondary

is reviewed your request dated March 7th 2002. The intent of your action certification requirements imposed for the above facility.

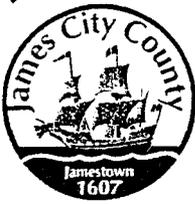
1 notes were present on Sheets 3 and 8 of the approved plan set construction certification of the stormwater management facility. plan indicated the following:

provided for all detention/BMP facilities. Also upon completion, n/BMP facilities shall be certified by a professional engineer ring construction. The certification shall state that to the best ge and belief, the structure was constructed in accordance with ations".

er similar notes on Sheet 3, were present on the approved plans of the Owner/Contractor to ensure a professional engineer was to observe construction and to provide construction certification

Although recently, we have strengthened and provided better definition to the record drawing (as-built) and construction certification process for stormwater management facilities, the requirement for construction certification by a registered professional engineer has not changed.

In full consideration of your letter, there was an apparent failure by the Owner/Contractor to locate geotechnical information collected during construction of the dam or the services of a professional engineer was not retained during construction to provide proper certification construction certification. The basis of your variance request states that the earthen fill berm for the dam is of a minor nature, the



DEVELOPMENT MANAGEMENT

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November 30, 2001

Donald Moore/Marsha Lynn Building Corporation.
4480 Holland Office Park, Suite 222
Virginia Beach, Va. 23452
Attn: Mr. Donald Moore

Re: Cromwell Ridge at Powhatan Secondary
County Plan SP-105-97
Stormwater Management Facility
County BMP ID Code: PC 131

Dear Mr. Moore:

The Environmental Division has reviewed a record drawing dated November 2nd 2001 and certification forms for the above referenced project. The record drawing and completed forms provide as-built information for a dry detention facility located in the southwest portion of the site.

Based on our review of information as submitted and a concurrent field observation as performed on November 29th 2001, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. In accordance with Note # 18 on Sheet 8 and two other additional notes on Sheet 3 of the approved plan, construction certification for the stormwater management/BMP facility is required. None was provided. This is especially important since the facility has an engineered and compacted earthen embankment. The certification can be in letter format or by use of the standard certification statements in Section 4 of the JCC, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions.

Record Drawing:

2. The record drawing set dated November 2nd 2001 (5 sheets) is satisfactory. Please forward one reproducible and one blue/black line set of the record drawings to our office.

Construction-Related Items:

3. EC-3 lined graded swales as proposed at the east and west ends of the basin (near to inlet structure # 9 and # 11 respectively) were not found in the field. These lined swales are required per Sheet 3 of the approved plan.
4. Remove silt fence inlet protection around storm drain inlet structure # 11 (near the sewage pump station) and entrenched silt fence from along the entire south and west downstream toe of the dam.

5. Clean and remove the large truck tire and various pieces of construction/wood debris located in the area around the concrete riser box structure.
6. Clean and remove sediment from the outfall end of the 15-inch RCP storm drain inflow pipe at the east end of the basin. The outfall end of the pipe was fully clogged with sediment. This is the storm drain pipe which flows into the basin from inlet structure # 9.
7. Stabilize the large disturbed soil area around storm drain inlet structure # 9 (east end of basin) with seed and mulch.
8. Clean trash and wood debris from the north interior pond slope. This is the interior basin slope closest to the wood fence located in back of the building units.
9. Clean rock, trash and wood debris from the ES-1 flared end section at the outfall end of the 15-RCP storm drain inflow pipe at the west corner of the basin. This is the storm drain pipe which flows into the basin from inlet structure # 11.
10. The 8-inch PVC low flow orifice on the riser pipe is cracked at the end opposite the riser. Cut the broken piece off and clean sediment and debris from around the pipe opening. The low flow orifice is the lowest opening on the riser which is situated at the bottom of the basin.
11. Per Sheets 3 and 7 of the approved plan, the higher level 8-inch PVC orifice on the riser was a temporary orifice used during temporary sediment basin mode. This orifice is to be removed once the pond is converted to final BMP mode. The plan states that after completion of land-disturbing activities, the dewatering orifice shall be removed and the temporary opening blocked.
12. The ES-1 concrete flared end section at the outfall end of the 24-inch RCP barrel through the dam is cracked in half on the right side and needs replaced. It appears the end section cannot be repaired.
13. Remove fallen trees from at the outfall end of the 24-inch RCP barrel through the dam and from within the downstream rock outlet protection pad. Flow out of the basin must not be obstructed by debris.
14. Based on our field visit, the trash rack on top of the riser structure was a DI-1 flat grate top. Sheet 4 of the approved plan called for an inclined-type trash rack constructed of # 4 rebar. Final configuration of the trash rack must meet the provisions of the approved plan.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Beth Davis, at 757-253-6702 if you have any further comments or questions.

Sincerely,



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

cc: Alvin D. Sledd, Sledd & Assoc. PC (via fax)
Pat Viola, VICO Construction Corp. (via fax)

G:\SWMProg\AsBuilts\SP10597.pc131

Project: Cromwell Ridge at Powhatan Secondary
Plan No.: SP-105-97
BMP ID Code: PC 131
RE: Resolution of Construction Certification Issue for BMP
Date: December 19th 2002

Darryl

Log this in as an E&S project for 2002. I don't believe it needs to go through planning as all work is confined to the limits of BMP embankment and it could be considered as BMP construction/maintenance revisions to the previously approved plan. I don't see anyone else needing to see the plan except us.

To refresh your memory, I had issued a letter Nov 30th 2001 (attached) that construction certification was needed for the BMP. Vico had trouble providing this.

They then submitted a variance request to the construction certification requirement and offered to provide an extended warranty agreement. We tried to get this to work with Leo and it fell through.

Vico, through Sledd & Associates, then submitted a request dated November 20th 2002 (attached) to provide a cutoff wall through the dam embankment as an alternative to the previous construction certification requirement.

I then issued a letter dated November 26th 2002 (attached) stating that this proposal was feasible; however, I had additional comments on the design plan and specs. for the cutoff wall. Based on their second submission and my review ***I am ok with the plan and feel it is the best way to resolve the original certification issue. They will need to certify and provide asbuilts for cutoff wall construction.***

I have two questions for you:

1. Please look at the plan & specs. and let me know if you have any comments?
2. How do we issue approval-via letter or use my approval stamp-and should it come through me or you?

Scott

Reviewed w/
DEC 1-10-02
OK for APPROVAL

**Transportation
Land Development
Environmental
Services**



SLEDD ASSOCIATES

imagination | innovation | energy Creating results for our clients and communities



Vanasse Hangen Brustlin, Inc.

December 12, 2002

Mr. Scott J. Thomas, P.E.
Environment Division
James City County
101 Mounts Bay Road
Post Box Office 8784
Williamsburg, Virginia 23187-8784

Re: Cromwell Ridge at Powhatan Secondary
County Plan No. SP-105-97
County BMP ID Code: PC 131
James City County, Virginia
(VHB# 31407.00)

Dear Mr. Thomas:

In response to your letter dated November 26, 2002 to Mr. Pat Viola, VICO Construction Corporation, please find enclosed the Construction Plan for modifications to the BMP for review and approval. Three (3) pints are enclosed for your use.

Please call should you have any questions or comments. Thank you for your assistance.

Sincerely,

VANASSE HANGEN BRUSTLIN, INC.

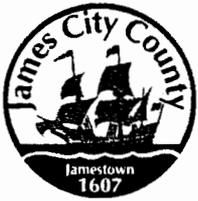
Alvin D. Sledd, P. E.
Office Manager

ADS/bll

Enclosures

cc: Mr. Pat Viola, VICO Construction Corporation (w/plan)

SJT
FILE



DEVELOPMENT MANAGEMENT

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November 26, 2002

Pat E. Viola
Vico Construction Corporation
P.O. Box 6186
Chesapeake, Va. 23323

Re: Cromwell Ridge at Powhatan Secondary
County Plan No. SP-105-97
County BMP ID Code: PC 131

Dear Mr. Viola:

The Environmental Division has reviewed a request dated November 20th 2002 as prepared by VHB/Sledd & Associates to construct a concrete cut-off wall to satisfy outstanding construction certification issues associated with the above referenced stormwater management facility.

Brief History & Information

For this specific project, several notes were present on Sheets 3 and 8 of the approved plan set which required proper monitoring and construction certification of the earth embankment for the stormwater management facility. Note # 18 on Sheet 8 of the approved plan indicated the following:

“As-built drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgement, knowledge and belief, the structure was constructed in accordance with the approval plans and specifications”.

This note, along with two other similar notes on Sheet 3, were present on the approved plans for the project. Therefore, it was responsibility of the developer/contractor to ensure a professional engineer was present during the construction of the BMP to observe installation and construction of the dam embankment and to provide proper certification once the structure was completed. Although recently, we have strengthened and provided better definition to the record drawing (as-built) and construction certification process for stormwater management facilities, the requirement for construction certification by a registered professional engineer has not changed.

Upon submission of the as-built drawings for the stormwater management facility, a final inspection was performed at the BMP. Following final inspection, a letter was issued by the Environmental Division (dated November 30th 2001) which outlined items that remained to be addressed by the owner/contractor before we could reduce or release the developer's surety for the project. This letter consisted of fourteen outstanding items which needed to be addressed. One pertained to construction certification, one pertained to the record drawing and the remaining twelve pertained to construction (field) related items. To our knowledge, all items listed in that letter have been addressed and satisfied, except for Item # 1 which pertained to the need for construction certification of the BMP.

Following issuance of above referenced letter from the Environmental Division, our office received a letter from Vico Construction Corporation dated March 7th 2002 requesting waiver of the construction certification requirement for the BMP facility. The letter indicated the owner/contractor was unable to locate geotechnical information collected during construction of the dam and there was subsequent difficulty to provide proper construction certification. Also, the letter stated that since the earthen fill berm for the dam was of a minor nature, the James City County Environmental Division performed inspections during construction and the facility has weathered three hurricanes successfully, construction certification should be waived. Furthermore, an offer was extended by Vico Construction Corporation, to provide an extended defect/warranty bond specifically for the facility. Due to several factors, a cooperative attempt to draft such an agreement failed and it was deemed that an alternate course of action were necessary to close the project in a timely manner.

Following several discussions between you and I, we then received the most recent letter from VHB/Sledd & Associates dated November 20th 2002.

Cut-Off Wall Proposal:

In full consideration, the basis of the request is to construct a concrete cutoff wall to satisfy construction certification requirements for the existing earthen structure. If traditional post-construction geotechnical test pits or drillings were performed, a risk would be involved to perform invasive operations which could threaten the integrity of the dam embankment as well as stabilized condition of the surrounding area and yet still not achieve desired results to provide proper certification to fulfill current County requirements. A cutoff wall as such would render the existing earthen embankment as a secondary (auxiliary) structure as long as the primary cut-off wall as proposed was properly designed, constructed and certified. Therefore, it has been determined that for *this specific review case only*, postconstruction installation of a cut-off wall as proposed is feasible to resolve the situation. However, prior to approval of the plan as presented, the following comments must be addressed:

- ✓ 1. **A professional seal and signature is required on the Earth Berm Cutoff Wall Exhibit;**
- ✓ 2. **Provide specifications for type of concrete to be used for the cutoff wall;**
- ✓ 3. **Show a typical dimension for total height of the cutoff wall or a typical dimension from top of the cutoff wall to top of dam. This information will be necessary to properly construct the field;**
- ✓ 4. **Although work would be part of a previously approved plan and active Land-Disturbing permit, provide a narrative or show plan measures as necessary for erosion and sediment control due to access and trenching associated with installation of the cutoff wall;**

✓ 5. Construction certification of the cutoff wall will be required consistent with current County guidelines. Refer to pages 3 and 4 of the *James City County, Environmental Division, Stormwater Management / BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*;

NOTE #20
6. A record drawing (as-built) will be necessary to show the final location of the cutoff wall as constructed along the embankment. The asbuilt should reflect horizontal location along with any typical standard details. The previously approved asbuilt may be modified or a new certified asbuilt, specific only to cutoff wall construction, may be submitted.

✓ 7. All disturbed areas associated with access and construction of the cutoff wall shall be properly stabilized with permanent seed and mulch or matting.

Please address the above related comments and submit the concept plan back to our office for review and approval before commencing with the operation. Once approved, all work should be coordinated with myself and the assigned Environmental Division inspector for the project, Mr. Joe Buchite (757-253-6643). It will be your responsibility to provide proper advance notification to homeowner association members or residents who live in the vicinity of the BMP, as appropriate, of the proposed work activity. If you have any additional questions or comments, you can contact me at 253-6673. Thank you for your consideration on this matter.

Sincerely,



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

cc: Alvin D. Sledd, VHB/Sledd & Assoc. (via fax)

SWMProg\AsBuilts\Variance\PC131.1



DEVELOPMENT MANAGEMENT

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INTEGRATED PEST MANAGEMENT
(757) 253-2620

July 19, 2002

Pat E. Viola
Vico Construction Corporation
P.O. Box 6186
Chesapeake, Va. 23323

Re: Cromwell Ridge at Powhatan Secondary
County Plan No. SP-105-97
County BMP ID Code: PC 131

Dear Mr. Viola:

The Environmental Division has reviewed your request dated March 7th 2002. The intent of your letter is to request variance from construction certification requirements imposed for the above referenced stormwater management facility.

Brief History & Information

For this specific project, several notes were present on Sheets 3 and 8 of the approved plan set which required proper monitoring and construction certification of the stormwater management facility. Note # 18 on Sheet 8 of the approved plan indicated the following:

“As-built drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgement, knowledge and belief, the structure was constructed in accordance with the approval plans and specifications”.

As this note, along with two other similar notes on Sheet 3, were present on the approved plans and specifications, it was responsibility of the Developer/Contractor to ensure a professional engineer was present during the construction of the BMP to observe installation and construction and to provide proper certification once the structure was completed.

Although recently, we have strengthened and provided better definition to the record drawing (as-built) and construction certification process for stormwater management facilities, the requirement for construction certification by a registered professional engineer has not changed.

Variance Request

In full consideration of your letter, there was an apparent failure by the Developer/Contractor to locate geotechnical information collected during construction of the dam or the services of a professional engineer was not retained during construction to provide proper construction certification. The basis of your variance request states that the earthen fill berm for the dam is of a minor nature, the James City County Environmental Division performed inspections during construction and the facility has weathered three hurricanes successfully. Furthermore, an offer was extended by Vico Construction Corporation, sitework contractor responsible for construction of the BMP, to provide an extended defect/warranty bond specifically for the facility.

Although we agree that the earthen berm around the south side of the facility is of relatively small height (3.4 feet maximum height based on as-built drawings), proper construction of the earthen embankment component of the basin is critical for success of the facility as a stormwater management/best management practice. This portion of facility construction warranted proper observation and certification by an engineer.

In full consideration of your dilemma, a certification letter or statement by a non-licensed professional engineer cannot be accepted by our division as it contradicts our past and current policy for proper certification of BMP facilities. Also, post-construction testing may be very invasive to the integrity of the dam embankment and affect stabilized conditions around the facility and yet still not achieve desired results to provide proper certification to fulfill current County requirements.

Determination

Based on a full review of the approved design plan, surrounding land-uses, a final inspection, and information as submitted including the record drawing, standard information forms, an as-built hydraulic routing by VHB (November 5, 2001) and the contents of your letter request, it has been determined that for *this specific review case only*, the construction certification requirement will be waived for this project with the understanding that an extended warranty/defect bond in the amount of \$10,000 will be posted by Vico Construction Corporation for a period of two (2) years to cover any defects, deficiencies or failures specifically to components and appurtenances associated with construction of the dam embankment.

The primary reasons for granting the exception request is as follows:

- The earthen fill embankment, which would require proper certification, is of relatively small height (less than 3.5 feet maximum) and design high water for the facility, as re-computed based on as-built conditions, is well below top of dam.
- Observations of construction, as performed by our assigned inspector, could generally be used to support the claim in your letter that the embankment was constructed in accordance with approval plans and specifications. However, the assigned inspector at the time of construction of this facility is no longer with James City County and information as such cannot be confirmed. *(Also, please note that inspections by the Environmental Division are for compliance purposes only.)*
- The facility shows no apparent signs of stress, failure or malfunction since completion almost five years ago.

- There are no obvious signs indicating threatening conditions to the stormwater function or structural integrity of the stormwater management facility.
- The facility appears to have been maintained in an acceptable level of service since completion of construction.

Other Issues

In addition, all punch-list items related to the BMP as outlined in our previous November 30th 2001 letter must be reinspected and properly completed to the satisfaction of the Environmental Division and the agreement (as attached) must be fully completed, reviewed by the Environmental Division and the County Attorney's office and recorded prior to release of the Developers erosion and sediment control surety currently being held for the project.

In closing, I stress to you that granting variances of this nature are seldom, if rarely, performed by our division. Lack of knowledge about the certification process or overlooking items that are clearly delineated on approved plans are not normally justification to grant a variance. For this specific case, many factors and the overall age and general function of the facility were weighed into the decision.

I highly recommend that you and other individuals within your organization who routinely construct stormwater management and drainage facilities in James City County review and familiarize yourselves with our current requirements. This includes Note # 20 of the *James City County Environmental Division, Erosion and Sediment Control notes dated July 6th 2001* and our current record drawing/construction certification packet entitled *James City County Environmental Division, Stormwater Management /BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. These items are attached for your use and reference.

If you have any additional questions or comments, you can contact me at 253-6673. Thank you for your consideration on this matter.

Sincerely,



Darryl E. Cook, P.E.
Director, Environmental Division

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

cc: Donald Moore/Marsha Lynn Building Corporation
Leo Rogers, Deputy County Attorney

SWMProg\AsBuilts\Variance\PC131.0



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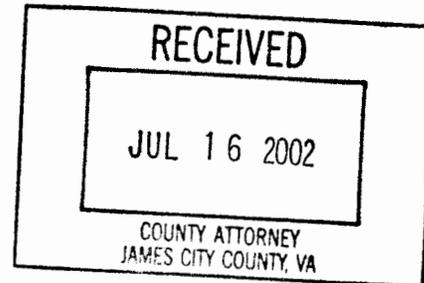
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July 15, 2002

Pat E. Viola
Vico Construction Corporation
P.O. Box 6186
Chesapeake, Va. 23323

Re: Cromwell Ridge at Powhatan Secondary
County Plan No. SP-105-97
County BMP ID Code: PC 131



Dear Mr. Viola:

The Environmental Division has reviewed your request dated March 7th 2002. The intent of your letter is to request variance from construction certification requirements imposed for the above referenced stormwater management facility.

For this specific project, several notes were present on Sheets 3 and 8 of the approved plan set which required proper monitoring and construction certification of the stormwater management facility. Note # 18 on Sheet 8 of the approved plan indicated the following:

“As-built drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgement, knowledge and belief, the structure was constructed in accordance with the approval plans and specifications”.

As this note, along with two other similar notes on Sheet 3, were present on the approved plans and specifications, it was responsibility of the Developer/Contractor to ensure a professional engineer was present during the construction of the BMP to observe installation and construction and to provide proper certification once the structure was completed.

Although recently, we have strengthened and provided better definition to the record drawing (as-built) and construction certification process for stormwater management facilities, the requirement for construction certification by a registered professional engineer has not changed.

In full consideration of your letter, there was an apparent failure by the Developer/Contractor to locate geotechnical information collected during construction of the dam or the services of a professional engineer was not retained during construction to provide proper construction certification. The basis of your variance request states that the earthen fill berm for the dam is of a minor nature, the James City

County Environmental Division performed inspections during construction and the facility has weathered three hurricanes successfully. Furthermore, an offer was extended by Vico Construction Corporation, sitework contractor responsible for construction of the BMP, to provide an extended defect/warranty bond specifically for the facility.

Although we agree that the earthen berm around the south side of the facility is of relatively small height (3.4 feet maximum height based on as-built drawings), proper construction of the earthen embankment component of the basin is critical for success of the facility as a stormwater management/best management practice. This portion of facility construction warranted proper observation and certification by an engineer.

In full consideration of your dilemma, a certification letter or statement by a non-licensed professional engineer cannot be accepted by our division as it contradicts our past and current policy for proper certification of BMP facilities. Also, post-construction testing may be very invasive to the integrity of the dam embankment and affect stabilized conditions around the facility and yet still not achieve desired results to provide proper certification to fulfill current County requirements.

Therefore, based on a full review of the approved design plan, surrounding land-uses, a final inspection, and information as submitted including the record drawing, standard information forms, an as-built hydraulic routing by VHB (November 5, 2001) and the contents of your letter request, it has been determined that for this specific review case only, the construction certification requirement will be waived for this project with the understanding that an extended warranty/defect bond in the amount of \$ 10,000 will be posted by Vico Construction Corporation for a period of two (2) years to cover any defects, deficiencies or failures specifically to components and appurtenances associated with construction of the dam embankment.

The primary reasons for granting the exception request is as follows:

- The earthen fill embankment, which would require proper certification, is of relatively small height (less than 3.5 feet maximum) and design high water for the facility, as re-computed based on as-built conditions, is well below top of dam.
- Observations of construction, as performed by our assigned inspector, could generally be used to support the claim in your letter that the embankment was constructed in accordance with approval plans and specifications. However, the assigned inspector at the time of construction of this facility is no longer with James City County and information as such cannot be confirmed. *(Also, please note that inspections by the Environmental Division are for compliance purposes only.)*
- The facility shows no apparent signs of stress, failure or malfunction since completion almost five years ago.
- There are no obvious signs indicating threatening conditions to the stormwater function or structural integrity of the stormwater management facility.
- The facility appears to have been maintained in an acceptable level of service since completion of construction.

In addition, all punch-list items related to the BMP as outlined in our previous November 30th 2001 letter must be reinspected and properly completed to the satisfaction of the Environmental Division and the agreement (as attached) must be fully completed, reviewed by the Environmental Division and the County Attorney's office and recorded prior to release of the Developers erosion and sediment control surety currently being held for the project.

In closing, I stress to you that granting variances of this nature are seldom, if rarely, performed by our division. Lack of knowledge about the certification process or overlooking items that are clearly delineated on approved plans are not normally justification to grant a variance. For this specific case, many factors and the overall age and general function of the facility were weighed into the decision.

I highly recommend that you and other individuals within your organization who routinely construct stormwater management and drainage facilities in James City County review and familiarize yourselves with our current requirements. This includes Note # 20 of the *James City County Environmental Division, Erosion and Sediment Control notes dated July 6th 2001* and our current record drawing/construction certification packet entitled *James City County Environmental Division, Stormwater Management /BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. These items are attached for your use and reference.

If you have any additional questions or comments, you can contact me at 253-6673. Thank you for your consideration on this matter.

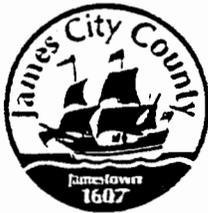
Sincerely,

Darryl E. Cook, P.E.
Director, Environmental Division

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

cc: Donald Moore/Marsha Lynn Building Corporation
Leo Rogers, Deputy County Attorney

SWMProg\AsBuilts\Variance\PC131.0



JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670

Fax Number: 757-259-4032

DATE SENT: 1-10-03

Name: ALVIN SLEDD
 Firm or Company: VHB, INC.
 Facsimile Number: 757-873-0157
 Number of pages including this transmittal: 4
 From: Scott J. Thomas

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

Comments: RE: Cutoff Wall at Cromwell Ridge BMP
Plan is approved as noted. Corrections are
not required from your office on the design plan.
As-built's should reflect final configuration.

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



SCOTT J. THOMAS. P.E.
CIVIL ENGINEER

ENVIRONMENTAL DIVISION

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

December 21, 2001

Community Resources
Pinewood Plaza, Suite 480
1919 Commerce Drive
Hampton, Va. 23666
Atten: Ms. Colletta V. Ellworth-Wicker, CMCA, AMS

Re: Cromwell Ridge
County Plan No. SP-105-97
County BMP ID Code: PC 131

Dear Ms. Ellsworth-Wicker:

It was a pleasure to meet with you and other residents of Cromwell Ridge on Thursday December 20th. As indicated at that meeting, I am forwarding some "*first contact*" information to you relative to maintenance of stormwater management facilities.

Information as attached includes: a brochure entitled *Best Management Practices Education Program for Homeowners Associations*; landscaping tips for stormwater management BMP's, watershed awareness tips, a sample maintenance plan for a wet pond stormwater management facility; and three brochures related to liability and maintenance, including an informational brochure entitled *A Guide for Maintaining and Operating BMP's*. This publication is distributed through our office in response to a cooperative effort from the Hampton Roads Regional Stormwater Management Committee and HR STORM, a regional stormwater education program by the Hampton Roads Planning District Commission.

I have also attached a location map and copies of information in our BMP database relative to the dry pond BMP. The pond maintenance plans can be expanded upon further should the homeowner's association need additional assistance.

Our division is always readily available to assist owners and HOA representatives with guidance related to stormwater management facilities and drainage and we look forward working with you in the future. In the meantime, if you have any additional questions or comments, call me at 757-253-6639.

Sincerely,

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

SWMPProg\Education\Subdivisions\CromRidge.let1

McCALLUM

TESTING LABORATORIES, INC.

Geotechnical Engineering, Materials Testing & Environmental Services

March 28, 2003

VICO
P.O. Box 6186
Chesapeake, VA 23323

Attention: Pat Viola

Subject: Site Inspection - 2/11/03 & 2/12/03
Cromwell Ridge
Williamsburg, Virginia
MTL Project 033808

Dear Mr. Viola:

On these dates, our senior technician, Eric Frame, was provided at the above mentioned project to make inspections of the unsuitable soils and materials undercutting from the core area of the retention pond dam. The Site Contractor undercut to a minimum depth of 18 inches into the underlying undisturbed subgrade as required. All areas undercut are to be backfilled with 750 psi flowable fill.

Based on the results of our inspection, it is our opinion that the areas inspected are being prepared in accordance with the BMP Modification Plan.

The site contractor's representative was made aware of our inspection results.

The attached print indicates the locations undercut on these dates.

1306 HAYWARD AVENUE, CHESAPEAKE, VA 23320 ♦ P.O. BOX 13337, CHESAPEAKE, VA 23321-0337
PHONE (757) 420-2520 ♦ FAX (757) 424-2874

RECEIVED MAR 31 2003

McCALLUM

TESTING LABORATORIES, INC.

Geotechnical Engineering, Materials Testing & Environmental Services

March 13, 2003

VICO
P.O. Box 6186
Chesapeake, VA 23323

Attention: Pat Viola

Subject: Flowable Fill Testing and Inspection - 2/13/03
Cromwell Ridge
Williamsburg, Virginia
MTL Project 033808

Dear Mr. Viola:

On this date, our technician, Alex Swafford, was on site to provide testing and inspection services relative to flowable fill placement operations. The flowable fill was sampled in accordance with ASTM C 172. Three sets of five flowable fill test cylinders were molded (ASTM C 31) for laboratory compressive strength testing (ASTM C 39) of the 750 psi flowable fill being placed. In addition, slump tests (ASTM C 143) were performed on the plastic concrete.

On this date, flowable fill was placed in a cutoff wall trench at the locations shown on the attached plan. The results of our field tests are shown on the attached Flowable Fill Placement Log.

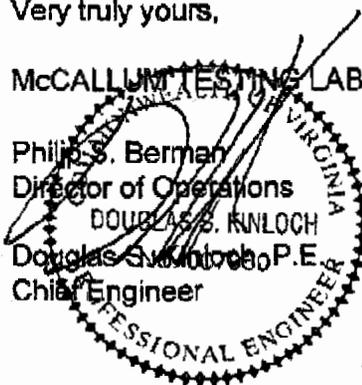
The on-site contractor's supervision was notified of all test results. Should you have any questions concerning this report, please contact this office at your convenience.

Very truly yours,

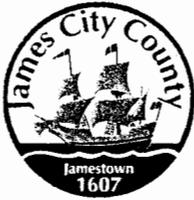
McCALLUM TESTING LABORATORIES, INC.

Philip S. Berman
Director of Operations

DOUGLAS S. KINLOCH
Douglas S. Kinloch, P.E.
Chief Engineer



1808 HAYWARD AVENUE, CHESAPEAKE, VA 23320 ♦ P.O. BOX 13337, CHESAPEAKE, VA 23325-0337
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DEVELOPMENT MANAGEMENT

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planning@james-city.va.us

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

November 30, 2001

Donald Moore/Marsha Lynn Building Corporation.
4480 Holland Office Park, Suite 222
Virginia Beach, Va. 23452
Attn: Mr. Donald Moore

Re: Cromwell Ridge at Powhatan Secondary
County Plan SP-105-97
Stormwater Management Facility
County BMP ID Code: PC 131

Dear Mr. Moore:

The Environmental Division has reviewed a record drawing dated November 2nd 2001 and certification forms for the above referenced project. The record drawing and completed forms provide as-built information for a dry detention facility located in the southwest portion of the site.

Based on our review of information as submitted and a concurrent field observation as performed on November 29th 2001, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

✓
①
4-01-03

1. In accordance with Note # 18 on Sheet 8 and two other additional notes on Sheet 3 of the approved plan, construction certification for the stormwater management/BMP facility is required. None was provided. This is especially important since the facility has an engineered and compacted earthen embankment. The certification can be in letter format or by use of the standard certification statements in Section 4 of the JCC, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions.

*NOT AVAILABLE. WAIVER REQUEST SENT 3/7/02
Agreement VIA County Attorney. Agreement NEVER
materialized. cutoff wall option proposed,
approved & certified.*

✓
RVD
12-11-01

Record Drawing:

2. The record drawing set dated November 2nd 2001 (5 sheets) is satisfactory. Please forward one reproducible and one blue/black line set of the record drawings to our office.

Construction-Related Items:

③

3. EC-3 lined graded swales as proposed at the east and west ends of the basin (near to inlet structure # 9 and # 11 respectively) were not found in the field. These lined swales are required per Sheet 3 of the approved plan.

*EAST END CHANNEL CHANGE OK, SWALE SE CORNER BACK
TO INLET # 3B. SMALL SWALE TO INLET # 9. SWALES INSTALLED.*

4

4. Remove silt fence inlet protection around storm drain inlet structure # 11 (near the sewage pump station) and entrenched silt fence from along the entire south and west downstream toe of the dam.

✓ 5. Clean and remove the large truck tire and various pieces of construction/wood debris located in the area around the concrete riser box structure.

6. Clean and remove sediment from the outfall end of the 15-inch RCP storm drain inflow pipe at the east end of the basin. The outfall end of the pipe was fully clogged with sediment. This is the storm drain pipe which flows into the basin from inlet structure # 9.

✓ 7. Stabilize the large disturbed soil area around storm drain inlet structure # 9 (east end of basin) with seed and mulch.

✓ 8. Clean trash and wood debris from the north interior pond slope. This is the interior basin slope closest to the wood fence located in back of the building units.

✓ 9. Clean rock, trash and wood debris from the ES-1 flared end section at the outfall end of the 15-RCP storm drain inflow pipe at the west corner of the basin. This is the storm drain pipe which flows into the basin from inlet structure # 11.

✓
4-01-03 (10)

10. The 8-inch PVC low flow orifice on the riser pipe is cracked at the end opposite the riser. Cut the broken piece off and clean sediment and debris from around the pipe opening. The low flow orifice is the lowest opening on the riser which is situated at the bottom of the basin.

✓ 11. Per Sheets 3 and 7 of the approved plan, the higher level 8-inch PVC orifice on the riser was a temporary orifice used during temporary sediment basin mode. This orifice is to be removed once the pond is converted to final BMP mode. The plan states that after completion of land-disturbing activities, the dewatering orifice shall be removed and the temporary opening blocked.

✓ 12. The ES-1 concrete flared end section at the outfall end of the 24-inch RCP barrel through the dam is cracked in half on the right side and needs replaced. It appears the end section cannot be repaired.

13. Remove fallen trees from at the outfall end of the 24-inch RCP barrel through the dam and from within the downstream rock outlet protection pad. Flow out of the basin must not be obstructed by debris.

✓ 14. Based on our field visit, the trash rack on top of the riser structure was a DI-1 flat grate top. Sheet 4 of the approved plan called for an inclined-type trash rack constructed of # 4 rebar. Final configuration of the trash rack must meet the provisions of the approved plan.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Beth Davis, at 757-253-6702 if you have any further comments or questions.

Sincerely,

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

cc: Alvin D. Sledd, Sledd & Assoc. PC (via fax)
Pat Viola, VICO Construction Corp. (via fax)

G:\SWMPProg\AsBuilts\SP10597.pc131

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Vanasse Hangen Brustlin, Inc.

November 20, 2002

SP-105-97
PC 131

Mr. Scott J. Thomas, P.E.
Environment Division
James City County
101 Mounts Bay Road
Post Box Office 8784
Williamsburg, Virginia 23187-8784

Re: Cromwell Ridge Subdivision
James City County, Virginia
(VHB# 30807.00)

Dear Mr. Thomas:

This correspondence is in regard to the existing stormwater detention basin constructed to support the referenced project. In particular, it is our understanding that the construction of the dam, which forms one side of the basin, was not monitored for compliance with soil material and material placement specifications. Therefore, James City County is requiring additional measures to insure the long-term stability of the earth dam.

On behalf of the Contractor, VICO Construction Corporation, we request approval to construct a concrete "cut-off wall" within the dam as indicated on the attached sketch. The concrete wall would penetrate original ground at each end and at the bottom of the structure. Due to difficulties in accessing the site by construction equipment, the options for improving the dam are limited.

We appreciate your consideration of this request. If you have any questions or comments, please call.

Sincerely,

VANASSE HANGEN BRUSTLIN, INC.

Alvin D. Sledd, P. E.
Office Manager

ADS/bll

Enclosures

cc: Mr. Pat Viola, VICO Construction Corporation

P:\97003\docs\letters\Ltr. To Scott Thomas 2.doc

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Newport News, Virginia 23606-4231
757.873.3386 • FAX 757.873.0757
email: info@vhb.com
www.vhb.com



DEVELOPMENT MANAGEMENT

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COUNTY ENGINEER
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INTEGRATED PEST MANAGEMENT
(757) 253-2620

April 8, 2004

Mr. Charles Griggs
Cromwell Ridge Condominium HOA
3805 Cromwell Lane
Williamsburg, Va. 23188

Re: Cromwell Ridge
County Plan No. SP-105-97
County BMP ID Code: PC 131

Dear Mr. Griggs:

As a follow-up to our meeting on March 16th 2004, I am forwarding information relative to two topics as discussed about the dry detention pond BMP situated in the southwest portion of the Cromwell Ridge community. The first is relative to various requests to extend yards out from the back of Blocks G and F toward the stormwater pond. The second pertains to providing you with basic information about maintenance of the dry BMP. Although I have talked with the land management company for Cromwell Ridge (ie. Community Resources of Virginia) on several occasions in the past, I will consider this as our "first contact" with actual members of the community homeowner's association.

Block F & G Back Yard Areas

Two different ideas were discussed about the situation behind Blocks F (3865 to 3885 Cromwell Lane) and Block G (3889 to 3909 Cromwell Lane). The more complex idea was to extend back yard areas out about 10 to 15 feet from Block G and the west end of Block F from the existing landscape fence toward the pond - similar to that at the east end of Block F. The more simpler version was to extend out from the existing fence line behind Block G about 4 feet to create a walkway and small landing between the back of the units and the pond slope.

Before expanding further in detail about these two options, some history about the plan of development and subsequent plan approval by the County must be presented. This plan was assigned a County Plan number of SP-105-97, which means that it was presented for review in 1997. The plan was approved by the County sometime after that time and construction probably began in 1998. Our Division does not design, layout or engineer plans of development, we only review them against then current County ordinances and regulations, specifically the Chesapeake Bay Preservation ordinance and the Erosion and Sediment Control ordinance. This may include the review of Chesapeake Bay Preservation, drainage, erosion and sediment control and stormwater drainage and management plans as presented by the applicant (developer) and his plan preparer (engineer).

The BMP for this project is a dry detention basin which serves a drainage area of about 5.35 acres and 3.5 acres of impervious cover within the subdivision. Impervious cover consists of any paved or hard (impermeable) surfaces such as roads, sidewalks, driveways, roofs, patios, etc. The stormwater pond was provided to meet ordinance requirements at that time which required that BMPs be provided to offset the impacts of development (impervious areas) for stormwater quality and quantity (flooding) control purposes. A dry-type detention pond temporarily stores runoff and is normally dry during non-rainfall periods. Pondered areas that are present in the bottom of the facility are only shallow marsh (low) areas that will hold water to promote the growth of wetland vegetation, which aid in the uptake of nutrients and pollutants in stormwater. Following a bigger storm event the basin will fill and then draw down over a 24 to 72 hour period. The principal spillway structure for this BMP is a DI-1 concrete riser situated in the southwest corner of the basin. It has an 8-inch low flow orifice (which should be kept clean) to draw down ponded water. If water levels raise higher than the 8-inch orifice can handle the next flow control structure in sequence is a square opening in the top of the concrete structure. The crest of this spillway is about 5 feet higher than the opening of the 8-inch low flow pipe. Water from within the pond which enters the principal spillway box exits the pond through a 24-inch concrete pipe which goes through the dam and empties into the natural stream in back (south) of the pond. The next flow control structure in sequence is an emergency spillway which is a 15 ft. wide and about 1 ft. deep grassed open channel situated in the southeast corner of the basin. Should water in the pond ever go higher than the principal spillway, the emergency spillway structure is there to release flow from the pond so it does not ever overtop the earthen dam (fill). During the 100-year storm, the maximum water level in the pond should rise to about Elevation 54.25 which is about ½ of a foot over the principal (riser) spillway and about a foot below the top of dam. During this larger storm event, the emergency spillway should discharge flow only a couple tenths-of-a-foot deep. If functioning properly, normal storm events should reach an elevation just below the top of the riser and the pond should draw down in about 24 to 36 hours.

Although the pond looks very big and deep, in it's deepest point it is only about 6 foot deep between the low point in the basin and top of dam. Total storage volume to top of dam is about 49,500 cubic feet. The reason it looks so massive in size is that due to site design, the finished floor and yard elevations for Block G were established at approximate Elev. 65; therefore, there is a grade change between the bottom of the basin and the yard/building areas of Block G of about 15.5 feet in about 40 feet. This is the reason for the steep interior graded slope on the north side of the basin, which ranges from about 3 horizontal to 1 vertical (ie. 3H:1V) to 4H:1V.

Based on the plan of development as past presented, there was obviously a limitation of space in this corner of the site to provide for required stormwater management volume and yet still maximize development of the site for Cromwell Lane and units in Block F and G. Unfortunately, the "pinch" is where the back yards meet the interior graded side slope of the basin.

Based on our review of the plan of development, there was no obvious reason to question the stability of the 3H:1V slope between the basin and the back yard of the units. At the time of approval, our stormwater management standards had no provisions to establish a pond buffer and typically a 3H:1V slope situated at least 15 feet away from the building unit structures would not have caused any serious alarms with our division plan reviewers, as this is a typically used site cut-fill gradient that does not usually require the need for any thorough stability-structural analyses. However, I would like to note that it is the design professional's responsibility to ensure plans as presented are safe with regards to the public's health, safety and welfare. This would include the stability of the interior graded basin slope as designed. However, it should also be noted that there also a duty and obligation by the owner to maintain the intent of that original site design. Although the slope may be stable, conditions can change rather quickly such that an unforeseen danger could present itself. Some examples of this include erosion of the slope due fallen trees, illicit dumping of trash-debris-waste material, directing downspout drainage onto the slope, nuisance

animal burrows or perhaps lack of maintenance on the BMP. As previously stated the basin is supposed to be a dry detention pond with a shallow marsh. Should any of the principal or emergency spillway structures become clogged and a permanent pool of water remain present in the basin for a long period of time, these saturated conditions could change the conditions of the slope. The slope should be monitored frequently and necessary corrections made immediately as part of the maintenance plan for the site and the BMP.

Lastly, I would like to mention that the stormwater basin is situated in a variable width drainage easement which eventually is transferred over to the homeowner association by the recorded inspection/maintenance agreement for the development. According to our files, there is an inspection/maintenance agreement in the County Land Records for this project, #980000568 dated 1/15/98.

Option 1 – Fully Extend Back Yards

This option is a complex idea to extend the back yard areas of Block G and the west end of Block F out (southward) about 10 or 15 feet from the existing landscape fence toward the pond - similar to the east end of Block F. To do this could be very complicated and expensive from a design, engineering and construction standpoint. For example, to create a suitable back yard which extends out approximately 15 feet from the existing landscape fence, this would result in the need for a fully designed retaining wall approximately 325 feet long which extends along the back of Block F and G and along the west side of the Block G end unit (3909 Cromwell). Height from top of wall to bottom of wall would range between 0 feet and about 12 feet tall at the highest. As placement of the wall would encroach into the storage volume area of the stormwater basin, an evaluation would need performed to redesign (and construct) basin changes to still meet stormwater requirements. Also, a wall at that location and of such height introduces many other factors such the need to relocate utilities that may be present, a significant amount of imported fill to backfill the wall/yards, construction impact to residents, the need for a proper structural-stability design, and various safety, liability and maintenance issues. By standard rule of thumb, costs for fully designed and constructed retaining walls could be as much as \$100 per linear foot, resulting in a cost of at least \$30,000 for the wall.

Option 2 – Partially Extend Back Yards for Shelf/Walkway Purposes

This second option is a simpler, and perhaps a more practical idea, to extend out about 4 feet from the existing fence line behind Block G to create a walkway and small landing between the back of the units and the pond slope. This would appear to result in the need for a smaller landscape-type wall approximately 90 feet long which extends along the back of the first four end units of Block and along the west side of the Block G end unit (3909 Cromwell). Height from top of wall to bottom of wall would range between 0 feet and about 5 feet tall at the highest. Placement of a wall at this location would be well outside the design high water level of the stormwater basin, so there would be no major evaluations or changes required to the pond (as long as it does not encroach into design high water Elev. 54.25). A wall at that location may result in the need to relocate utilities that may be present, a small amount of imported fill to backfill the wall/yards, minor construction impact to residents, and the need for a less intensive structural-stability design by a professional. Safety, liability and maintenance issues would still be present; however, not as significant as the other option. Estimated cost for design and construction of this type of wall for this option would probably be around \$6,000 or \$8,000.

Please note that this information should not be construed as a recommendation or encouragement by our Division to pursue any of the two alternatives, but only to provide some basic design and cost considerations for the ideas as discussed. Full design and structural plans would need to be prepared by a qualified professional, including land-surveys to determine whether the retaining walls are situated

on unit-lot property or HOA controlled easement around the stormwater basin. In addition, proper building and land-disturbing permits would be necessary through the County.

BMP Maintenance

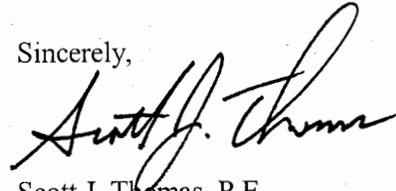
Also as we discussed, I am forwarding some "**first contact**" information for your community association to use relative to maintenance of stormwater management facilities. I had previously forwarded a first contact packet to Ms. Colletta Ellworth-Wicker with Community Resources back in December of 2001. This information was forwarded to her following a meeting we had with her and some residents of Cromwell Ridge.

Information as attached includes: a watershed education brochure from our PRIDE program (www.protectedwithpride.org); a brochure entitled *Best Management Practices Education Program for Homeowners Associations*; landscaping tips for stormwater management BMP's; watershed awareness tips; a sample maintenance plan for wet/dry pond type stormwater management facilities; and several brochures related to liability, maintenance and watersheds. One of the brochures is a good informational handout entitled *A Guide for Maintaining and Operating BMP's*. This publication is distributed through our office in response to a cooperative effort from the Hampton Roads Regional Stormwater Management Committee and HR STORM, a regional stormwater education program offered by the Hampton Roads Planning District Commission.

I have also attached a map showing the general location of the dry pond stormwater management facility within Cromwell Ridge and copies of specific information about the BMP from our County BMP Inventory/Inspection program database.

It was a pleasure to meet with you and discuss these issues. Our division is always readily available to assist HOA representatives with guidance related to stormwater management facilities and drainage. If you have any questions or comments, call me at 757-253-6639.

Sincerely,



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

SJT/sjt



SWMPProg\SWMPProg\Educ\HOAs\CromRidge.fc2

Scott Thomas

Modified:

Wed 1/16/2002 3:16 PM

PC 131

SP-105-97

Date: 1/16/02

Project: Cromwell Ridge Drainage Plan Changes

As a result of my understanding of main concerns offered by the HOA via a meeting me and John Horne attended with Cromwell Ridge residents and their land management firm and based on comments issued by the JCC Env Div dated 11/30/01, me and Beth Davis met with the contractor Vico (Pat Viola) to discuss outstanding issues that remained for bond release. The meeting was held to go over punch list site and BMP cleanup issues. I also discussed other E&SC issues that were important to the residents based on our meeting with the HOA, mainly erosion at the common area and near the satellite sewage pump station.

All comments relative to the letter dated 11/30/01 are still stand as outstanding and are required to be addressed fully, with the following exception:

1) Common Area. The southwest corner of the common area, between Block I Unit 1 and Block D Unit 8 still has gully erosion. This was a primary area of concern at the HOA meeting and an area of concern by staff comment. This area drains the common area and is where two parabolic shaped swales, which run adjacent to Units Block I and Block D, form to converge a single swale which flows to Inlet # 1B. It is clearly evident based on field visit, that methods to attempt to stabilize this area fell short of our expectations for erosion control. EC-2 matting was present just prior to the inlet and the channels still had gully erosion approximately 50' upland on each side. Our discussion was to reshape the parabolic channel, establish matting and seed and mulch throughout the affected area which is from the inlet upland approximately 50 feet each way at both single channels. The contractor mentioned that sodding may be more effective to stabilize rather than matting and seed and mulch. There was no opposition from Env Div staff should sod be elected for use. If sod was used, it should be used from the inlet to where the channels converge to at least 25' upland along both channels. EC-2 could be used the rest of the way where gully erosion was present.

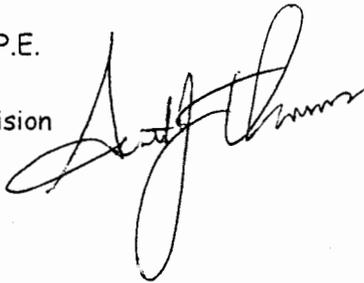
2) Swale Southeast Corner. The approved plan showed a grade swale from Inlet # 3B (near Block C Unit 6 & Block E Unit 1) completely around Block E to Inlet # 9 near Block F Unit 2. Due to topography and grading differences, the drainage plan varied from the approved plan. Site grading and swale alignments now goes from a high point (at the SE corner of the site) back to Inlet # 3B where it enters the storm drainage system. From the same high point, another smaller less pronounced swale runs along Block F to Inlet # 9. The change as such reduces the amount of overland and swale surface flow by dropping it into the storm pipe system quicker. This change was acceptable to staff as based on our field visits and meetings, the surface soils at the site are clearly highly erodible sandy materials. These materials are difficult to establish permanent seed & mulch on and are carried away easily by concentrated flow. To follow the approved plan at this location (ie. swale around the entire SE corner) would tend to concentrate more runoff/flow in a channel resulting in probable persistent channel and stabilization erosion problems. Therefore, the minor change in the drainage plan at this location was considered appropriate. It was understood the any or all disturbed/bare soil areas at these locations still needed appropriate stabilization.

3) Graded Swale behind Block H. The approved plan called for a shallow depth (less than 1 ft. deep) triangular shaped channel behind these units to direct surface runoff toward the west corner of the BMP. Based on our field

visits, it appeared the grading plan at Block H varied significantly as the backyards are higher in fill than proposed. Furthermore, fences and other site utilities were subsequently installed along the corridor where the swale alignment was proposed. The units are set higher in elevation natural ground, therefore, drainage from the units appears adequate. Drainage from the back of these units generally works its way in the direction as proposed by plan. Back downspouts from the units were not causing any significant erosion or concentrated drainage into the adjacent natural wooded area. This wooded area is naturally flat with no pronounced stream channels. Grading a swale as proposed would impact existing features established in back of the units including fences, utilities, the pad site fill slope and the adjacent natural wooded area. In addition, drainage currently works its way in an overland (toward the woods) and concentrated (to Inlet # 11) fashion. Establishing a more definitive channel in back of these units would tend to concentrate drainage more to the inlet and eliminate overland flow; thus introducing the possibility for channel erosion as outlined above. Also the vicinity at the lower end of the channel is at the location where the satellite sewage pumping station is situated. Concentrating flow more to this area is not a good decision as it introduces the possibility of scour, undermining, infiltration and damage to electrical/mechanical devices associated with the SPS. Although this upper portion of channel can be eliminated, our position was that disturbed/bare soil area along the fenceline needed stabilized with matting or seed and mulch and the EC-3 lined lower portion of the swale from Inlet # 11 to the BMP needed installed per the approved plan. This portion of channel was necessary to direct flow to the BMP from the driveway between Block G and Block H. Should Inlet # 11 become clogged, overflow should be directed to the basin, not the natural wooded area uncontrolled.

Based on my complete review of the approved plan, file material, as-builts, meeting with the HOA and its representatives, and field visits to the site, it is my judgement that the above decisions were proper alterations to the approved plan and in the best interests of future tenants and maintenance effort by the HOA.

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

A handwritten signature in black ink, appearing to read 'Scott J. Thomas', written over the typed name and title.

Transportation
Land Development
Environmental
Services



Vanasse Hangen Brustlin, Inc.
SLEDD ASSOCIATES

11832 Rock Landing Drive Suite 203
Newport News, Virginia 23606
757 873-3386
757 873-0757

Transmittal

To: Mr. Scott Thoms
Civil Engineer
Environmental Division
James City County

Date: December 20, 2001



Project No.: 30807.00/97-005

From: Louis M. Penci, L. S.

Re: Cromwell Ridge at Powhatan Secondary
Storm Sewer & BMP Record Drawings
James City County, Virginia

We are hereby forwarding via delivery, the following items per your letter dated November 30, 2001:

- One (1) reproducible set of the referenced Record Drawings
- One (1) blackline set of the referenced Record Drawings

Vico Construction Corporation

P. O. BOX 8188
CHESAPEAKE, VIRGINIA 23323

(757) 487-3441
FAX (757) 487-8680

March 7, 2002

PC 131
SP-105-97

JCC
Environmental Division

Attention: Mr. Scott Thomas

Re: Cromwell Ridge

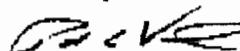
Dear Mr. Thomas,

I am writing in regards to the above referenced project's retention pond. After a thorough search of our files, we are unable to locate our controlled fill reports for the fill at the retention pond berm. Consequently, I have also asked McCallum Testing to research their files; however, their efforts came up short as well.

I am embarrassed to have to request a variance for this issue and apologize accordingly. At this stage I request a variance because of several mitigating reasons. First, I would like to point out that the minor berm fill placed was only one and a half to three and a half feet high. Secondly, the access to remedy the lacking fill is nearly impossible to achieve due to the confined and inaccessible location of the berm. Thirdly, the fill was placed during JCC Environmental Division spot inspections. Lastly, the pond has successfully weathered three hurricanes, including two back to back, without any failure of the berm fill.

With the above in mind, I request that you grant me a variance. I make this request with the idea in mind that I am willing to warrant my work for an extended period (1-2 years) through some form of Defect Surety placed by our firm. I hope you will find the above acceptable and grant a variance. Once again I apologize for the inconvenience and assure you that this will not reoccur in the future.

Sincerely,



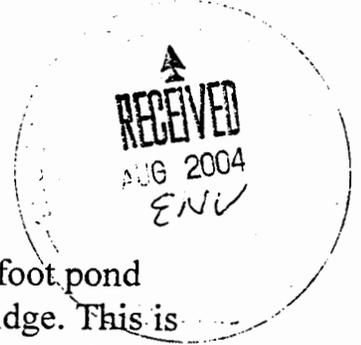
Pat E. Viola

File Name: cromwellbermbvariance

FILE : PC131
CROMWELL RIDGE
ASBUILT FILE

Mr. Scott Thomas
James City County
Environmental Division

August 4, 2004



Dear Mr. Thomas,

We would like to request a variance to the 25 foot pond buffer standard proposed for the retention pond at Cromwell Ridge. This is because the proposal for the wooden deck does encroach into the set back, however it is well above the designed high water elevation of the BMP.

This proposal for the four foot wide wooden deck is located behind houses in Blocks F and G.

Sincerely

A handwritten signature in cursive script, appearing to read "Charles P. Griggs".

Charles P. Griggs
Member Board of Directors
Cromwell Ridge Condominium Association

LOCATION: Cromwell Ridge, Behind (South) 3909 to 3889 Cromwell Lane (County BMP ID Code: PC 131)

Variance request as submitted by the Cromwell Ridge Condominium Association dated August 4, 2004 for encroachment into the pond buffer for installation of a 4 ft. wide by 125 ft. long wood deck walkway was found to be acceptable. Efforts should be made to preserve existing vegetation in the buffer during construction and to landscape or stabilize impacted buffer area to resemble meadow or forest area with native trees, shrubs and ground cover to the greatest extent possible.

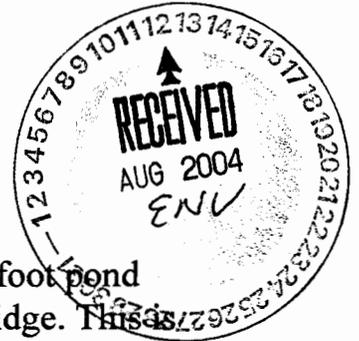
A handwritten signature in cursive script, appearing to read "Scott J. Thomas".

Scott J. Thomas
Senior Engineer
Environmental Division

08-18-04
Date

Mr. Scott Thomas
James City County
Environmental Division

August 4, 2004



Dear Mr. Thomas,

We would like to request a variance to the 25 foot pond buffer standard proposed for the retention pond at Cromwell Ridge. This is because the proposal for the wooden deck does encroach into the set back, however it is well above the designed high water elevation of the BMP.

This proposal for the four foot wide wooden deck is located behind houses in Blocks F and G.

Sincerely

A handwritten signature in cursive script, appearing to read "Charles P. Griggs".

Charles P. Griggs
Member Board of Directors
Cromwell Ridge Condominium Association



SLEDD ASSOCIATES

imagination | innovation | energy Creating results for our clients and benefits for our communities

Vanasse Hangen Brustlin, Inc.

November 5, 2001



Mr. Scott J. Thomas, P.E.
Environment Division
James City County
101 Mounts Bay Road
Post Box Office 8784
Williamsburg, Virginia 23187-8784

Re: Cromwell Ridge
James City County, Virginia
(VHB# 30807.00)

Dear Mr. Thomas,

As requested by Mr. Pat Viola, VICO Construction Corporation, we are forwarding the following for your use:

- Storm Sewer and Pump Record Drawings 1 set
- Stormwater Management/BMP Facilities Record Drawing and Construction Certification Form 1 copy
- Detention Basin Calculations, Volume/Storage, Hydraulic Routing 1 copy

Please call if you have any questions or comments. **(AS-BUILT ROUTING)**

Sincerely,

VANASSE HANGEN BRUSTLIN, INC.

Alvin D. Sledd, P. E.
Director of Land Engineering

ADS/cls

cc: Mr. Pat Viola, VICO Construction Corp.

11832 Rock Landing Drive
Suite 203
Newport News, Virginia 23606-4231
757.873.3386 • FAX 757.873.0757
email: info@vhb.com
www.vhb.com

COMMUNITY RESOURCES OF VIRGINIA

Pinewood Plaza
1919 Commerce Drive, Suite 480
Hampton, Virginia 23666
(757) 826-8357 • Fax (757) 825-2253



May 17, 2002

James City County, Environmental Division
John Horn
101 Mounts Bay Road
P.O. Box 8784
Williamsburg, VA 23187-8784

Sent via facsimile and regular U.S. mail

Dear Mr. Horn

The Board of Directors of the Cromwell Ridge Condominium Owners' Association, Inc., would like to ask that you and Scott Thomas please provide your presence at the Board of Directors Meeting.

The meeting is scheduled for 7:00 p.m. on the evening of May 23, 2002. The location of the meeting is going to be the Powhatan Secondary Community Center.

Please contact the Management office at (757) 826-8357 if you may have any questions or concerns.

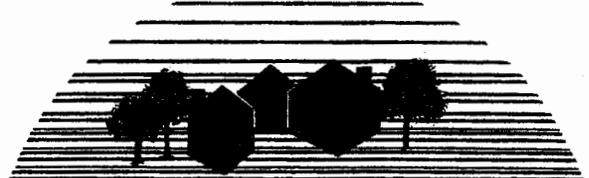
Best Regards,

C.T. Wood, Jr. CMCA®
Community Manager
Cromwell Ridge COA, Inc.

Xc: Scott Thomas
Board of Directors

*John Horne & Scott Thomas
Attended this meeting.*

*Attended 5/23/02
Issues
1. Remaining Unstabilized Area
2. SOD - 50007
3. SCOPE BACK OF BLOCK G
UNITS*



Managing America's Neighborhoods Since 1988

Vico Construction Corporation

P.O. Box 6186
Chesapeake, VA 23323

Phone: (757) 487-3441

Fax: (757) 487-8680

DATE: 3.15.02

V
I
C
O

F
A
X

To: JCC

Attn: Mr Scott Thomas

Fax#:

From: PAT VIOLA

Subject: CROMWELL RIDGE

No. of Pages Including This Cover Sheet: 2

If you do not receive the number of pages indicated please contact us immediately

Message: PLEASE FIND

FOLLOWING REV LETTER

AS DISCUSSED

OV

Date Faxed _____ Time Faxed _____ Faxed by _____

PROP TOD = 55.0
DHW = 34.25

Vico Construction Corporation

P.O. Box 6186
Chesapeake, VA 23323

Phone: (757) 487-3441

Fax: (757) 487-8680

DATE: 3-29-02

V
I
C
O

F
A
X

To: SCOTT THOMAS

Attn: _____

Fax#: 1-757-259-4032

From: GARY ALBERTSON FOR PAT VIOLA

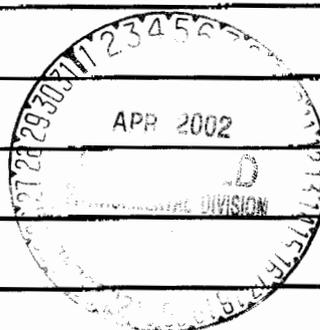
Subject: _____

No. of Pages Including This Cover Sheet: 11

If you do not receive the number of pages indicated please contact us immediately

Message: Defect (WARRANTY EXTENSION)

Agreement Examples



Date Faxed _____ Time Faxed _____ Faxed by _____

JAMES CITY COUNTY

TO: <u>Leo Rogers</u>	DATE: <u>7/15/02</u>
FROM: <u>Scott Thomas</u>	

- For Your Comments
 - For Your Approval
 - Note & Return
 - Note & File
 - Reply & Send Me Copy
 - Take Appropriate Action
 - For Review & Comment
- Call Me
 - See Me
 - FYI
 - Signature

COMMENTS: 2nd Review
Corrections per your
comments.

(P.S. Vico has been bugging me to death on trying to finish this. Me, you and Darryl should probably meet on this one it's ok + I send to them for completion.)

7/15/02 Scott x6639
7-15-02

Scott
Much better
HOA need to be
a party. Leo

• HOA is going to allow to let contractor
 Cromwell Ridge Condominium Owners' Association, Inc.

#1
 Becky Marshall
 Lynn Building Corp.
 757-490-4925
 HOA owes. [Timeshare OWNED]
 IF HOA does own it's ground.
 IF HOA does own need their consent

1. Check with Community Resources of Virginia, Community Manager C.T. Wood JR (Cromwell Ridge (adm.))

JAMES CITY COUNTY

TO: <u>Leo Rogers</u>	DATE: <u>6/19/02</u>
FROM: <u>Scott Thomas</u>	

- For Your Comments
 - For Your Approval
 - Note & Return
 - Note & File
 - Reply & Send Me Copy
 - Take Appropriate Action
 - For Review & Comment
- Call Me
 - See Me
 - FYI
 - Signature
- 6/20/02*
See Comment
** Agreement*

COMMENTS:

NEED TO REVIEW AGREEMENT FOR EXTENDED WARRANTY IN LIEU OF CONSTRUCTION CERTIFICATION (NOTE: NEW AGREEMENT) THE FOLLOWING IS ATTACHED.

- 1) ORIGINAL LETTER FROM ENV DIV TO DEVELOPER (NOV 30 '01)
- 2) REQUEST FROM VICO REQUESTING VARIANCE AND OFFERING TO PROVIDE EXTENDED WARRANTY.
- * 3) AGREEMENT
- 4) LETTER TO ACCOMPANY AGREEMENT.

I presume you will need to meet with me and Darryl to discuss.

Scott Thomas
6-18-02
* 6639

Vico Construction Corporation

P.O. Box 6186
Chesapeake, VA 23323

Phone: (757) 487-3441

Fax: (757) 487-8680

DATE: 3-28-03

V
I
C
O

F
A
X

To: SCOTT THOMAS

Attn: _____

Fax#: 1-757-259-4032

From: Gary Albenson for PAT Vioh

Subject: Cromwell Ridge

No. of Pages Including This Cover Sheet: 5

If you do not receive the number of pages indicated please contact us immediately

Message:

APPROVED PC131
 James City County
 Environmental Division SP-105-97
 By: [Signature]
 Date: 4-01-03 Construction Testing +
 Certification data
 for cutoff wall.

Note: no change to previously approved as-built,
only installation of cutoff wall.

Date Faxed _____ Time Faxed _____ Faxed by _____



James City County Environmental Division

Stormwater Management / BMP Inspection Report

Detention and Retention Pond Facilities

SP-105-97
3830100019

County BMP ID Code (if known): PC131

Name of Facility: Cromwell Ridge @ Powhatan Secondary BMP No.: 1 of 1 Date: 11/29/01

Location: BACK OF BLOCK 6 Cromwell Lane (SW Corner) Behind 3909 Cromwell Ln.

Name of Owner: Royal Court Inc.

Name of Inspector: S. Thomas

Type of Facility: Dry Pond

Weather Conditions: Cloudy, 60'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>SMALL EMB South & West Sides; 3H:1V DS; 3H:1V US, TOD = 6' +</u>				
Grass Height	<input checked="" type="checkbox"/>			
Vegetation Condition	<input checked="" type="checkbox"/>			<u>Natural cover DS</u>
Tree Growth	<input checked="" type="checkbox"/>			<u>None on fill; some along toe.</u>
Erosion	<input checked="" type="checkbox"/>			
Trash & Debris		<input checked="" type="checkbox"/>		<u>Remove SF South + West of toe, st. # 11</u>
Seepage	<input checked="" type="checkbox"/>			<u>None observed</u>
Fencing or Benches	<input checked="" type="checkbox"/>			<u>Basin 150' x 50'</u>
Interior Landscaping/Planted Areas: <input type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input checked="" type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	<input checked="" type="checkbox"/>	<u>Heavy</u>		<u>Cattails cover 80% of pond bottom. Appear non-obstructive to basin flow. Bottom 8" bow</u>
Trash & Debris	<input checked="" type="checkbox"/>			
Floating Material	<input checked="" type="checkbox"/>			<u>Flow orific function. Water flow thru basin.</u>
Erosion	<input checked="" type="checkbox"/>			
Sediment	<input checked="" type="checkbox"/>			
Dead Plant	<input checked="" type="checkbox"/>			
Aesthetics	<input checked="" type="checkbox"/>			<u>Heavy Cattail</u>
Other				
Notes: <u>Services Road, Units & Common Areas</u>				

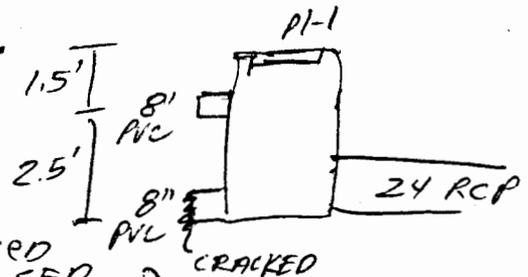
Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion	X			Some pooling 6" deep
Algae	X			center + west end + at riser
Trash & Debris		X		Trash + Debris @ Riser
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations): ① 15" RCP NW Corner; ② 18" RCP North Central; ③ 15" RCP to riprap ch East.				
Condition of Structure	X			OK, Rock Riprap
Erosion	X			Pipe 2, slight erosion
Trash and Debris		X		Pipe #1 trash, debris
Sediment		X		Pipe #3 fully clogged w/ sed.
Outlet Protection	X			Adequate, stable
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): Conc Box 3.5' x 3.5' x 4' High w/ D1-1 Flat grate.				
Condition of Structure	X	X		Bottom Low Flow 8" PVC ORIF. CRACK AT PND
Corrosion	X			SED @ BOTTOM LF ORIF.
Trash and Debris		X		Tire, Styrofoam, Wood debris
Sediment	X	X		6" to 1' outside riser, OK inside
Vegetation	X			
Other				D1-1 Grate 30" x 30"; Dual 8" ORIFICES
Principal Outlet Structure - Barrel, Conduit, etc.: 24" RCP				
Condition of Structure			X	END SECTION ES-1 CRACKED IN 1/2.
Settlement	X			
Trash & Debris		X		Remove Fallen Trees across OP
Erosion/Sediment	X			
Outlet Protection	X			CLASS I 20 x 10
Other				Adjacent Natural Channel Debris.
Emergency Spillway (Overflow): 12' w Trap Shape; Grass; 1.5' deep				
Vegetation	X			
Lining	X			
Erosion	X			None.
Trash & Debris				
Other				
Notes:				

Nuisance Type Conditions:				
Mosquito Breeding	X			None Evident.
Animal Burrows	X			
Graffiti	X			
Other				

Surrounding Perimeter Conditions: North - 2 units Buildings; South Woods				
Land Uses	X			Fence within 5' top of basin slope
Vegetation		X		Stabilize east end near inlet #9 (East end)
Trash & Debris	X			
Aesthetics	X			
Access /Maintenance Roads or Paths	X			TOP OF DAM CLEAR ACCESS EAST OR WEST SIDES
Other				YARDS CLOSE TO BMP; FENCED

Remarks:

- Remove SF inlet protection, SD #11 (near SPS) and along entire south and west ds emb. top.
- Clean + remove truck tire, ^{styrofoam} wood debris away from riser (right side)
- Clean + Remove Sed from outfall pipe #3 East End. 15" Fully clogged with sediment.
- Stabilize area around inlet at SD struct #9 (East end of BMP) with seed + mulch.
- Clean trash + wood debris from north interior pond slope (building side)
- Clean rock, trash + debris from end section of inflow pipe # (15" RCP at northwest corner of basin).
- 8" PVC ORIFICE (BOTTOM) IS CRACKED AT END. CUT OFF FLUSH, CLEAN SED FROM AREA (ESTABLISH UNOBSTRUCTED FLOW)
- Replace ES-1 end section. Cracked in half on right side. Remove fallen trees across OP



Overall Environmental Division Internal Rating: 2 (CRACKED ES-1 & SED in inflow pipe)

*Per sheet 3 of 7 of plans, the higher level 8" PVC orifice in the riser (EL 53.68 per as-built) is a temporary orifice, to be removed for final conversion.

Signature: Judy Thomas PE Date: 11/29/01 4:35pm

Title: Civil Engineer ENV DIV

SWMPProg\BMP\CoInspProg\DetRet.wpd

- Trash rack in field was a PI-1 flat grate. Approved plan sheet 4 called for an inclined trash rack constructed of #4 rebar. See sheet 4 of 5 of approved plan.

" After completion of LD activities the dewatering orifice shall be removed and the temporary opening blocked.

James City County Stormwater Division Stormwater Management Facility (SWMF) Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

Total Score (3 or 4 requires attention): **2** ID #: PC131 Date: 9/21/2009 District: 3 Inspector: RH

Location: CROMWELL RIDGE

Structure Type: Detention

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
1. Forebay Score:	0	
2. Inlet(s):	2	Erosion at the inlet discharge point
*3. Outlet:	2	Headwall/end section undermined separated from barrel
*4. Principal Spillway:	1	
5. Emergency Spillway:	2	Woody vegetation growing in spillway
6. Basin Bottom and Side Slopes:	1	<i>Stein Weekly</i>
7. Safety Devices:	0	
*8. Embankments:	2	Woody vegetation within 10 feet of embankment
*9. Structural Components:	2	Settling cracking bulging misalignment and deterioration
*10. Media:	0	
11. Routine Maintenance:	2	

James City County Stormwater Division Stormwater Management Facility (SWMF) Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
12. Condition of Aquatic Environment:	0	
13. Vegetation:	2	Overall vegetation poor spotty unwanted or invasive weeds
*14. Storage Volume:	1	
15. Debris/Sediment Accumulation:	1	
16. Standing Water:	1	
17. Safety and Aquatic Bench:	0	
18. Side Slope Vegetation:	2	
19. Other:	0	

Additional Comments:

BMP is in generally good condition.

Immediate attention should be given to repairing or stabilizing the flared end section of the barrel outlet from the pond. Flared end section has separated from the preceding pipe section allowing water to wash under this section which will eventually cause it to dislodge further or fall off completely. The flared end needs to be re-attached or sealed to the previous section and it must be securely supported with rip-rap or other material to prevent it from moving and separating again.

The interior and exterior slopes of the embankment needs to have all small trees and sapling cut flush with the ground, leave roots in place. The embankment has many bare spots that are subject to erosion. The top and sides of the embankment needs to be re-seeded to establish a good cover of grass. The grass should be maintained at 6-8 in height. Other side slope areas should be maintained with taller grasses to provide a 25 foot buffer around the basin bottom.

For office use only: PI 383010001
 Area ID #: 752 Area: CROMWELL RIDGE SUBDIVISION
 Other Desc: POWHATAN

JAMES CITY COUNTY
ENVIRONMENTAL DIVISION
POST OFFICE BOX 8784
WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6670

INSPECTION REPORT – EROSION AND SEDIMENT CONTROL

Date: December 5, 2001 Permittee: Royal Court, Incorporated
Project: Cromwell Ridge at Powhatan Secondary 4480 Holland Office Park
Phone/Fax: (757) 490-5900 Phone Suite 222
(757) 490-4925 Fax Virginia Beach, VA 23452

An inspection of the above referenced project was conducted on November 28, 2001, the following represents an evaluation of that projects compliance with James City County's Environmental Regulations. Items below are deficiencies that must be corrected.

- Repair sinkholes at drop inlet number 3B.
- Repair sinkholes at drop inlet number 9.
- Remove inlet protection from drop inlet number 11 once area is stabilized with a vegetative cover.
- Remove inlet protection from drop inlet number 1B once area is stabilized with a vegetative cover.
- Remove silt fence from the perimeter of the BMP.
- Install earth swale as shown on the approved plan behind building units indicated as Block H and stabilize with a vegetative cover.
- Install earth swales as shown on the approved plan at the east and west ends of the basin (near inlet number 9 and 11) and stabilize with EC-3.
- Stabilize earth swales behind building units indicated as Blocks B, D, and I as shown on the approved plan with a vegetative cover.
- Stabilize earth swale behind building units indicated as Blocks E and F as shown on the approved plan with a vegetative cover.

Notice is hereby given that those deficiencies listed shall be corrected in accordance with James City County's Environmental Requirements on or before December 10, 2001. The site will be reinspected at that time and you are invited to accompany the inspector on that date. Failure to comply with this report will result in Enforcement Actions.

Beth Davis
JCC Environmental Division Inspector
757-253-6670

Donald Moore
Project Representative Notified

3/00

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	DI-1 Inlet
BMP ID NO	131	SITE AREA acre	5.076	CTRL STRUC SIZE inches	
PLAN NO	SP-105-97	LAND USE	Res Planned Com	OTLT BARRL DESC	RCP Barrel
TAX PARCEL	(38-03)(01-19)	old BMP TYP	Dry Pond	OTLT BARRL SIZE inch	24
PIN NO	3830100019	JCC BMP CODE			
CONSTRUCTION DATE	6/1/1998	POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Cromwell Ridge @ Powhatan Secondary			DESIGN HW ELEV	54.23 <i>54.25 (AB)</i>
FACILITY LOCATION	Back of Block 6 Cromwell Lane (SW Corn)			PERM POOL ELEV	n/a
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres	5.35	2-YR OUTFLOW cfs	3.00
CURRENT OWNER	Royal Court, Inc.			10-YR OUTFLOW cfs	9.00
OWNER ADDRESS	4480 Holland Office Park			REC DRAWING	No
OWNER ADDRESS 2	Suite 222	SERVICE AREA DESCR	Buildings, Roadways & Common Area		
CITY-STATE-ZIP CODE	Virginia Beach, Va. 23452	IMPERV AREA acres	3.50	CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	Yes	LAST INSP DATE	7/6/2001
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0		Inst # 980000658 1/15/98. Bond not released.
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

*PRELIM.
NO RD/CC RECEIVED.*

07-09-01

Date Record Created:

WS_BMPNO:

Print Record

Created By:

PC131

WATERSHED PC
BMP ID NO 131
PLAN NO SP-105-97
TAX PARCEL (38-3)(1-19)
PIN NO 3830100019
CONSTRUCTION DATE 6/1/1998
PROJECT NAME Cromwell Ridge @ Powhatan Secondary
FACILITY LOCATION Back of Block 6 Cromwell Lane (SW Corn)
CITY-STATE Williamsburg, Va. 23188
CURRENT OWNER Royal Court, Inc.
OWNER ADDRESS 4480 Holland Office Park
OWNER ADDRESS 2 Suite 222
CITY-STATE-ZIP CODE Virginia Beach, Va. 23452
OWNER PHONE
MAINT AGREEMENT Yes
EMERG ACTION PLAN No

PRINTED ON
Tuesday, March 09, 2010
4:38:06 PM

MAINTENANCE PLAN No
SITE AREA acre 5.076
LAND USE Res Planned Com
old BMP TYP Dry Pond
JCC BMP CODE F2 Dry ED with forebay
POINT VALUE

SVC DRAIN AREA acres 5.35

SERVICE AREA DESCR Buildings, Roadways & Common Area

IMPERV AREA acres 3.50

RECV STREAM UT of Powhatan Creek

EXT DET-WQ-CTRL Yes

WTR QUAL VOL acre-ft 0.58

CHAN PROT CTRL No

CHAN PROT VOL acre-ft 0

SW/FLOOD CONTROL Yes

GEOTECH REPORT No

CTRL STRUC DESC DI-1 Inlet

CTRL STRUC SIZE inches 30" x 30"

OTLT BARRL DESC RCP Barrel

OTLT BARRL SIZE inch 24

EMERG SPILLWAY Yes

DESIGN HW ELEV 54.25

PERM POOL ELEV n/a

2-YR OUTFLOW cfs 3.00

10-YR OUTFLOW cfs 9.00

REC DRAWING Yes

CONSTR CERTIF No

LAST INSP DATE 3/4/2002

Inspected by:

INTERNAL RATING 3

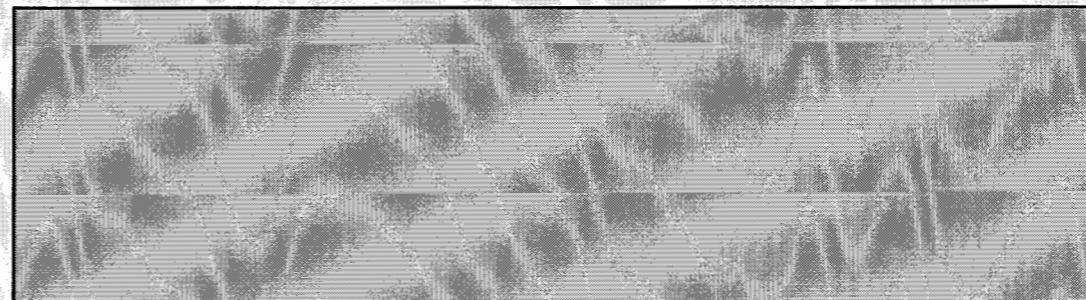
MISC/COMMENTS

Inst # 980000658 1/15/98. Cut-off wall installed Spring 2003.

[Get Last BMP No](#)

[Return to Menu](#)

Additional Comments:



Sheet 30F11

CROMWELL RIDGE
10/30/97

Note #1. All Dam Const. shall be under supervision of a Geotech Engineer to be retained by Owner

Note on Dam: Emb shall be constructed under the supervision of a Geotech Eng. To be retained by the Contractor, who shall certify to its proper construction upon completion.

Note #18 - Sheet 80F11

All drawings must be provided.
CC must be provided.

RETENTION BASIN

MANAGING Assoc.

Community Resources of VA.
Pinewood PLAZA
1919 Commerce Drive

DAN FERREY - Bd Pres.

564-9205 ; 1-973-476-9706

 HighMark™

PRIDE DEMO
April 28 2007
BMP Planting

SMINK, THOMAS & ASSOCIATES, P.C.

ATTORNEYS AT LAW

Paul E. Thomas, Esq.

*ATTORNEY
FOR COMM.
ASSOC.*

Holland Plaza Office Building
4176 South Plaza Trail • Suite 128
Virginia Beach, VA 23452

Telephone: (757) 491-4141
Fax: (757) 491-2253
Email: sminkthoma@aol.com



Land Disturbing Permit Application

James City County
Environmental Division
P.O. Box 8784
Williamsburg, VA 23187-8784
Telephone: (757) 253-6670

Landowner

Name: Cromwell Ridge Condominium Owners Association Date: 3/24/09

Mailing Address: c/o Associa - Community Group (Managing Agent) Phone: (757) 345-6400

Williamsburg Office, 50 Breamar Creek, Williamsburg, VA 23188 Fax: (757) 345-6424

Project: Maintenance and Erosion Repair of Association Detention Pond

Project Street Address: rear of Units # 3865 through # 3909 (blocks F & G) Cromwell Lane, James City

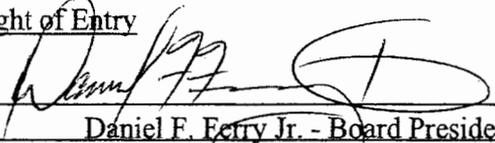
Total Size of Tract or Lot: Approximately seven (7) acres

Total Area to Be Disturbed: Approximately 1/3 acre disturbance

Description of Land Disturbing Activity:

Removal of accumulated debris, construction materials and vegetation overgrowth. Repair and fill erosion of slopes. Muck-out accumulated sediment in detention pond basin. Clear all inlets of accumulated debris and soils. Repair inlet flow rip-rap areas. Install silt screening around overflow chamber inlet, and repair rip-rap area. Repair and extend existing roof drain corrugated piping to toe of slope. Clear vegetation on both sides of detention pond overflow swale. Re-grade and compact existing slopes. Install matting on slopes and seed slopes. Landscape slopes as required, with approved native species to prevent future slope erosion. Provide survey and elevations.

Right of Entry

I,  (Signature) hereby grant designated officials of James City County,
(Daniel F. Entry Jr. - Board President (Print Name and Title)

Virginia, the right to enter my property for the purpose of inspection or monitoring for compliance with the approved erosion and sediment plan on the above-referenced project.

Cromwell Ridge BMP Modification- The purpose of this project is to provide a larger safer area for resident to exit their residence in the event of an emergency and to correct the erosion problem occurring around the decks and to prevent future erosion occurring.

Leader lines have been installed and buried on all downspouts, out falling into the bottom of the BMP.

Area has had extensive landscaping installed in addition to EC-2 matting and grass seed for stabilization. One change to the landscaping plan was changed do to location of plantings on dam. The number of plantings was reduced however some of the plants identified to be planted on the dam were incorporated with other areas on the BMP or added to the homeowner side of the BMP.

Emergency spillway has been cleaned of debris and tree/shrubs to ensure a positive flow from BMP. In addition the dam portion has been had trees and brush cut back to ground level to enhance the safety of the dam structure.

Information taken from original record drawing for Cromwell Ridge at Powhatan Secondary dated December 12, 2002 and a plan submitted by ABBA Construction on current BMP modification.

1. The dam side of the BMP there was no change from original elevations to current elevations.
2. The bottom depth on original plan indicated an elevation of 49.5 the modified plan indicates an elevation of 49.00 (-.50 feet).
3. Bottom width of basin did not change original plan indicated width as 23 feet and modified plan shows same width.
4. Home owner side of BMP original plan top of slope elevation is 60.00 and modification plan did not change elevation.
5. The next elevation on original plan is 55.00 with the modification plan the elevation has been raised 5 feet to 60.00 leveling off the top slope with 5 foot of elevation and extending the top of slope 10 feet from edge of fence and aligning the top in a more straight line.
6. Slope elevations remained the same at 3:1.

In my opinion the capacity of the basin has not changed with the modification based on information provided above. Additionally the areas that were prone to erosion have been improve and additional plants have been added to the project.

Submitted by:

Gregory B. Johnson

OK
Aunt J. Thomas
06-17-09

Storm Water Management Approach

In order to evaluate the pre- and post-developed runoff rates, the following procedure was utilized:

1. Identify major watersheds.
2. Calculate the existing (pre-developed) runoff rate from the watersheds using the SCS method.
3. Design interior site grading and sub-watershed boundaries.
4. Assess post-developed runoff rates and design detention basin outlet structures to control runoff rates.

The detention basin used a combination of an eight (8) inch orifice and drop inlet modeled as a weir. The drop inlet (weir) has a coefficient of 3.08 with a designed head of 0.6 foot and breadth of 0.5 foot. The emergency spill way is a 15 foot broad crested weir. It has a coefficient of 2.68 with a breadth of 5 feet and a designed height of 1 foot. The stage, storage and discharge computation presents the cumulative outflow of the flow devices.

Design Specifics

1. Pre-Developed Conditions

Table 1 - Hydrologic Parameters

Watersheds	Drainage Area (Ac)	SCS Curve Number	Time of Conc. (Hrs)
Drainage Point #1	5.2	72	0.78

Table 2 - Hydrologic Model Flow Rates

Watersheds	Storm Frequency (Years) Peak Flow Rates (CFS)		
	2	10	100
Drainage Point #1	4	10	18

IMPORTANT MESSAGE

FOR

SCOTT

DATE

6/11

TIME

A.M.

P.M.

WHILE YOU WERE OUT

M

Pat VIOCA

CROMWELL RIDGE @

OF

VICO

POWHATAN SECONDARY
SP-105-97

PHONE NO.

472-4115, 487-3441

TELEPHONED

PLEASE CALL

CALLED TO SEE YOU

WILL CALL AGAIN

WANTS TO SEE YOU

RUSH

RETURNED YOUR CALL

MESSAGE

close out Cromwell Ridge

- talk about as-built + certif.

45,000 Bown

Sledd + Assoc.

o Comment # 8 Sept 16 '97: AB Bown Rgd; Const Cert Rgd.

o Resp. Sledd + Assoc Dec 4 '97: Note shown on sheet 3.

SIGNED

CASCADE

POWHATAN CROMWELL RIDGE AT POWHATAN - 157

PRINTED IN U.S.A.

000 009564

This document was drafted by Shuttleworth, Ruloff, Giordano & Swain, P. C., 4525 South Boulevard, Suite 300, Virginia Beach, Virginia 23452 (757) 671-6000

FOURTH AMENDMENT TO CONDOMINIUM DECLARATION AND BYLAWS
OF THE CROMWELL RIDGE CONDOMINIUM EXPANDING THE CONDOMINIUM BY
THE ADDITION OF ADDITIONAL LAND
(PHASE 5 1.122 ACRE)
AND CREATING UNITS AND LIMITED COMMON ELEMENTS
ON ADDITIONAL LAND
(PHASE 5, UNITS 1, 2, 3, 4, 5 AND 6)

This Fourth Amendment to the Condominium Declaration and Bylaws of Cromwell Ridge Condominium, is made this March 31, 2000, by ROYAL COURT, INC., a Virginia Corporation, (the "Declarant"), as developer and owner of the real property situated in James City County, Virginia, which was subjected to a Condominium regime known as Cromwell Ridge Condominium, pursuant to the Virginia Condominium Act, said Declaration (the "Original Declaration") being recorded in the Clerk's Office of the Circuit Court of James City County, Virginia, in Instrument No. 990013276, on June 21, 1999, at Page 240, *et seq.*, and said Bylaws, (the "Original Bylaws"), being recorded in the Clerk's Office in Instrument No. 990013277, on June 21, 1999, at Page 262, *et seq.*, and

WHEREAS, the Declarant did reserve in the Original Declaration the right to create additional Units and Limited common elements on Additional land pursuant to the Code of Virginia 1950, as amended, Section 55-79.39 *et seq.*; and

WHEREAS, it is the intention of the Declarant to expand the Condominium by the addition of a portion of the Additional land and to create six (6) additional Units with Limited common elements appertaining thereto from such portion of the Additional land;

MAY 198 0263

MAY 19 02 64

NOW, THEREFORE, this Amendment to the Condominium Original Declaration and Bylaws is recorded pursuant to the Virginia Condominium Act and does amend and supplement the Original Declaration and Bylaws in the following respects:

1. **Expansion of the Condominium.** The Declarant does hereby expand the Condominium by the addition of a portion of the land designated as Additional land on the Condominium Plat recorded in the aforesaid Clerk's Office as a part of Exhibit B to the Original Declaration, as amended. The said portion of Additional land added to the Condominium is designated and shown as "PHASE 5 1.122 ACRES" on the Supplemental Plats and Plans attached hereto as Exhibit B-4.

2. **Creation of additional Units.** The Declarant does hereby create upon said portion of the Additional land, six (6) additional Units as described and shown on the Supplemental Plats and Plans attached hereto as Exhibit B-4 together with Limited common elements appertaining to said Units.

3. **Designation of Unit Numbers; Dimensions.** The Units are identified by the numbers 1, 2, 3, 4, 5 and 6 in Building I. The dimensions of the Units may be determined from the Plats and Plans.

4. **Definition of Units and Limited common elements.** Each Unit and Limited common element created by this Amendment shall be defined and described in a fashion identical to the description of Condominium units and Limited common elements as found in the Original Declaration, which said description of Units and Limited common elements is hereby incorporated by reference.

Haynes Furniture Store, Jefferson Avenue - Paved Ditch

CITY OF NEWPORT NEWS

ESCROW AGREEMENT

THIS AGREEMENT, made and entered into this 4th day of February, 2002, by, between and among the City of Newport News (City), Vico Construction Corporation P.O. Box 6186, Chesapeake, Virginia 23323 (Contractor), Bank of Hampton Roads (Name of Bank), 852 N. George Washington Hwy, Chesapeake, Virginia 23323 (Address of Bank), bank with its principal office located in the Commonwealth (hereinafter referred to collectively as "Bank").

I.

The City and the Contractor hereby enter into an agreement with respect to a guarantee being provided by the Contractor to the City of Newport News relative to work performed on the Haynes Furniture paved ditch to correct certain construction imperfections; this is to cover a period of ten (10) years.

II.

In order to assure full and satisfactory performance by the Contractor of its obligations under the agreement, the City requires a bond in the amount of Forty Thousand Dollars (\$40,000). The Contractor has, with the approval of the City, elected to have its funds in the amount of Forty Thousand Dollars (\$40,000) held in escrow by the Bank. This agreement sets forth the terms of the escrow. The Bank shall not be deemed a party to, bound by, or required to inquire into the terms of the agreement or any other instrument or agreement between the City and the Contractor.

EA-1

INITIAL EA

Haynes Furniture Store, Jefferson Avenue - Paved Ditch

III.

The City shall pay to the Bank Forty Thousand Dollars (\$40,000) of the Contractor's funds being held by the City as guarantee for the work. Except as to amounts actually withdrawn from escrow by the City, the Contractor shall look solely to the Bank for the payment of funds escrowed for purposes of this guarantee.

The risk of loss by diminution of the principal of any funds invested under the terms of this contract shall be solely upon the Contractor.

Funds and securities held by the Bank pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien, or other process whatsoever. Contractor agrees not to assign, pledge, discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety.

IV.

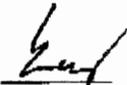
Upon receipt of checks drawn by the City and made payable to it as escrow agent, the Bank shall promptly notify the Contractor, negotiate the same and deposit or invest and reinvest the proceeds in approved securities in accordance with the written instruction of the Contractor. In no event shall the Bank invest the escrowed funds in any security not approved.

V.

The following securities, and none other, are approved securities for all purposes of this Agreement.

1. United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness of United States Treasury Bills,
2. Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States,

EA-2

INITIAL 

Haynes Furniture Store, Jefferson Avenue - Paved Ditch

VI.

The Contractor may from time to time withdraw the whole or any portion of the escrow funds by depositing with the Bank approved securities in an amount equal to, or in excess of, the amount so withdrawn. Any securities so deposited or withdrawn shall be valued at such time of deposit or withdrawal at the lower of par or market value, the latter as determined by the Bank. Any securities so deposited shall thereupon become a part of the escrowed fund.

Upon receipt of a direction signed by the City Manager, Director of Finance, Director of Engineering, or Director of Public Utilities, the Bank shall pay the principal of the fund, or any specified amount thereof, to the City. Such payment shall be made in cash as soon as is practicable after receipt of the direction.

Upon receipt of a direction signed by the City Manager or Director of Engineering, the Bank shall pay and deliver the principal of the fund, or any specified amount thereof, to the Contractor, in cash or in kind, as may be specified by the Contractor. Such payment and delivery shall be made as soon as is practicable after receipt of the direction.

VII.

For its services hereunder the Bank shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Bank and the Contractor. Such fee and any other costs of administration of this Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

EA-4

INITIAL 

Haynes Furniture Store, Jefferson Avenue - Paved Ditch

3. Bonds or notes of the Commonwealth of Virginia,
4. Bonds of any political subdivision of the Commonwealth of Virginia, if such bonds carried, at the time of purchase by the Bank or deposit by the Contractor, a Standard and Poor's or Moody's Investors Service rating of at least "A", and
5. Certificates of deposit issued by commercial banks located within the Commonwealth, including, but not limited to, those insured by the Bank and its affiliates.
6. Any bonds, notes, or other evidences of indebtedness listed in Sections (1) through (3) may be purchased pursuant to a repurchase agreement with a bank, within or without the Commonwealth of Virginia having a combined capital, surplus and undivided profit of not less than \$25,000,000, provided the obligation of the Bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the Bank is collateralized by the securities themselves, and the securities have on the date of the repurchase agreement a fair market value equal to at least 100% of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

No security is approved hereunder which matures more than five years after the date of its purchase by the Bank of deposit by the Contractor.

EA-3

INITIAL EA

Surety, has caused the same to be signed in its name and its corporation seal to be
 hereto affixed and attested by its duly authorized Attorney in Fact, this _____ day of
 _____, 20____,

By: _____

 Title

ATTEST:

 Secretary

By: _____
 Attorney in Fact

KNOW ALL MEN BY THESE PRESENTS, that _____

_____ with

its principal office at _____,

as Principal, and _____

_____, organized under

the laws of the State of _____, and

having its principal office in the City of _____, State of

_____, as Surety, are held and

firmly bound unto the City of Chesapeake, Virginia, in the sum of _____

_____ lawful money of the United States of America, for

the payment of which well and truly to be made we bind ourselves, our successors and

assigns, jointly and severally, firmly by these presents.

The conditions of this obligation is such that, whereas, the Principal has entered into an agreement with the City of Chesapeake, Virginia, dated the _____ day of _____, 20_____, relating to all physical improvements therein fully set forth, a copy of which is attached hereto as a part thereof.

NOW THEREFORE, if the said Principal shall well and truly perform each and every provision of the said agreement, then this obligation to be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the said _____, Principal, has signed and sealed this bond and the said _____,

IN WITNESS WHEREOF, the said

, Principal, has signed and sealed

this bond this _____ day of _____, 20_____.

By:

Surety

APPROVED AS TO FORM:

Assistant City Attorney

NOTARIZATION OF SIGNATURES

STATE OF VIRGINIA,
CITY OF CHESAPEAKE, to-wit:

The foregoing instrument bearing date of _____,
20_____, was acknowledged before me this _____ day of _____,
20_____, by _____ (name) _____ (title),
and _____ (name) _____ (title),
respectively, of _____ (firm)

Notary Public

My Commission Expires: _____

STATE OF VIRGINIA,
CITY OF CHESAPEAKE, to-wit:

The foregoing instrument bearing date of _____,
20_____, was acknowledged before me this _____ day of _____,
20_____, by _____ (name) _____ (title),
and _____ (name) _____ (title),
respectively, of _____ (firm)

Notary Public

My Commission Expires: _____

City Attorney's Office
City of Chesapeake
Municipal Center
P.O. Box 15225
Chesapeake, Virginia
2328-5225
(57) 382-6586
cc: (757) 382-8749

EXCAVATION BOND

KNOW ALL MEN BY THESE PRESENTS, That _____

(Landowner and Principal), with its principal office at _____

_____, as Principal, and _____

organized under the laws of the State of _____

_____, and

having its principal office in the City of _____

_____, State of _____,

as Surety, are held and firmly bound unto the City of Chesapeake, Virginia, in the sum of \$ _____

lawful money of the United States of America, for the payment of which well and truly to be made we bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

The condition of this obligation is such that, whereas the Principal proposed to excavate materials in accordance with Chapter 26 of the Chesapeake City Code from an area containing _____ acres located at _____, in the City of Chesapeake, Virginia.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall comply with the approved plan of construction and operation for the above-referenced excavation and with the requirements under Chapter 26 of the Chesapeake City Code, including reclamation requirements, and to comply with all other requirements of said Code, then this obligation shall be null and void; otherwise, it shall remain in full force and effect until released by the City of Chesapeake, Virginia.

Attorney's Office
of Chesapeake
Municipal Center
Box 15225
Chesapeake, Virginia
266-5225
(7) 382-6586
(757) 382-8749

Haynes Furniture Store, Jefferson Avenue - Paved Ditch

Bank of Hampton Roads

BANK

BY

Julie R. Anderson
PRESIDENT/VICE PRESIDENT
Senior

STATE OF VIRGINIA
CITY OF CHESAPEAKE, to wit:

The foregoing instrument bearing date of February 4, 2002, was acknowledged
before me this 4th day of February, 2002, by Julie R. Anderson
Senior Vice President of Bank of Hampton Roads (Name)
(Title) (Firm)

Sharon M. [Signature]
Notary Public

My Commission Expires: Aug. 31, 2002

EA-6

INITIAL EA

Haynes Furniture Store, Jefferson Avenue - Paved Ditch

VIII.

The new income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the Bank's fee or any other costs of administration such income shall be deemed a part of the principal of the fund.

WITNESS the following signatures, all as of the day and year first above written.

CITY OF NEWPORT NEWS

BY _____
CITY MANAGER

ATTEST:

CITY CLERK

Vico Construction Corporation
CONTRACTOR

BY Emil A. Viola
EMIL A. VIOLA, PRESIDENT

STATE OF VIRGINIA
CITY OF CHESAPEAKE, to wit:

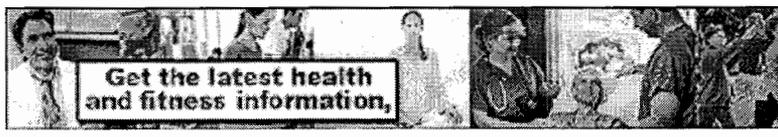
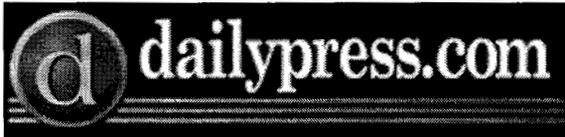
The foregoing instrument bearing date of February 4, 2002, was acknowledged before me this 4th day of February, 2002, by Emil A. Viola, President, of Vico Construction Corporation.

Beverly S. Patterson
Notary Public

My Commission Expires: August 31, 2005

EA-5

INITIAL EA



HAMPTON ROADS, VIRGINIA September 10, 2002 2:50 PM

Free 7-day search

Paid search

Currently: 79° F
Overcast
Humidity: 94%
Chance of precip: 47%

FORECAST

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MONEY/WORK

JCC condo group says contractorwork poor

By Patti Rosenberg
Daily Press

September 10, 2002

JAMES CITY -- The condo association at Cromwell Ridge, one of James City County's newest communities, is suing Virginia Beach-based Marsha Lynn Building Corp., citing shoddy construction.

Robert E. Ruloff, Marsha Lynn Building Corp.'s attorney, said Monday that he had not been served with the lawsuit yet and could not comment.

Cromwell Ridge is a 60-unit condo development consisting of two-story townhouse structures located off Monticello Avenue just west of Monticello Marketplace.

Construction of the development started in 1999. In the past year, units have generally been selling in the range of \$135,000 to \$150,000.

According to the lawsuit, the builder failed to:

- grade the areas around the building to allow for proper drainage,
- properly support and construct building foundations,
- use proper materials and methods in the construction of sidewalks, curbs, gutters and roads,
- properly construct roofs,
- properly construct the community's retention pond,
- clear the area of rocks and plant vegetation to prevent erosion.

As a result, the lawsuit says:

Roads, driveways, sidewalks, curbs and gutters have cracked. Foundations have sagged. Improperly sloped driveways have caused damage to vehicles. Water and moisture has accumulated around buildings, causing long-term puddles, erosion, insect infestation and an increased risk of termites.

The condo association is seeking \$400,000 in damages, which is what it would cost to fix the problems, said Carolyn Musika, the association's president.

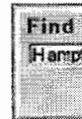
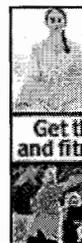
She declined to elaborate further.

Patti Rosenberg can be reached at 229-5751 or by e-mail at prosenberg@dailypress.com

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- Yard, Marines make peace
- Bender's home to treasures for memory lane's travelers
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- Will these piggies go to market?



LARGE
LAKE

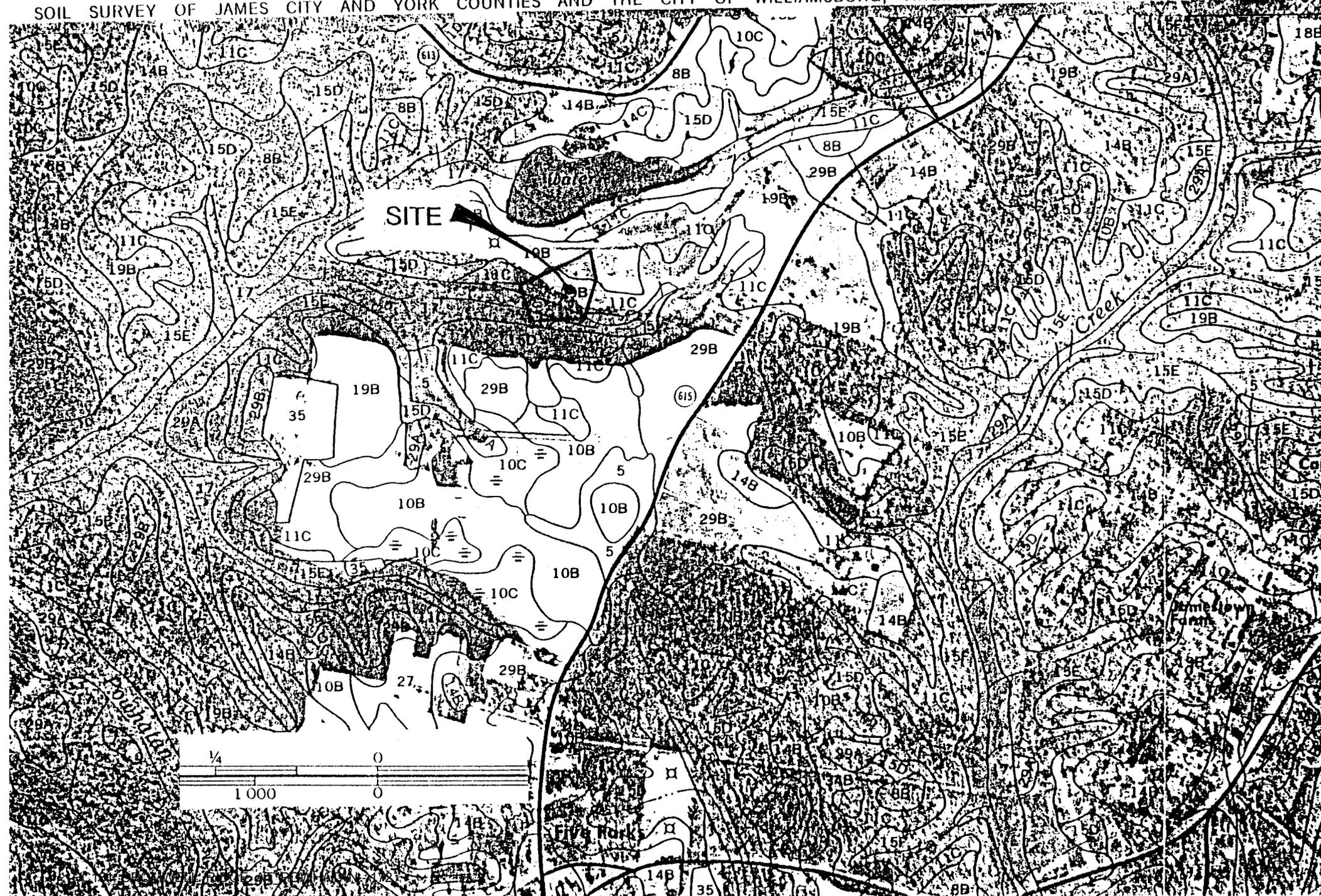
ALT ROUTE 5
PROPOSED

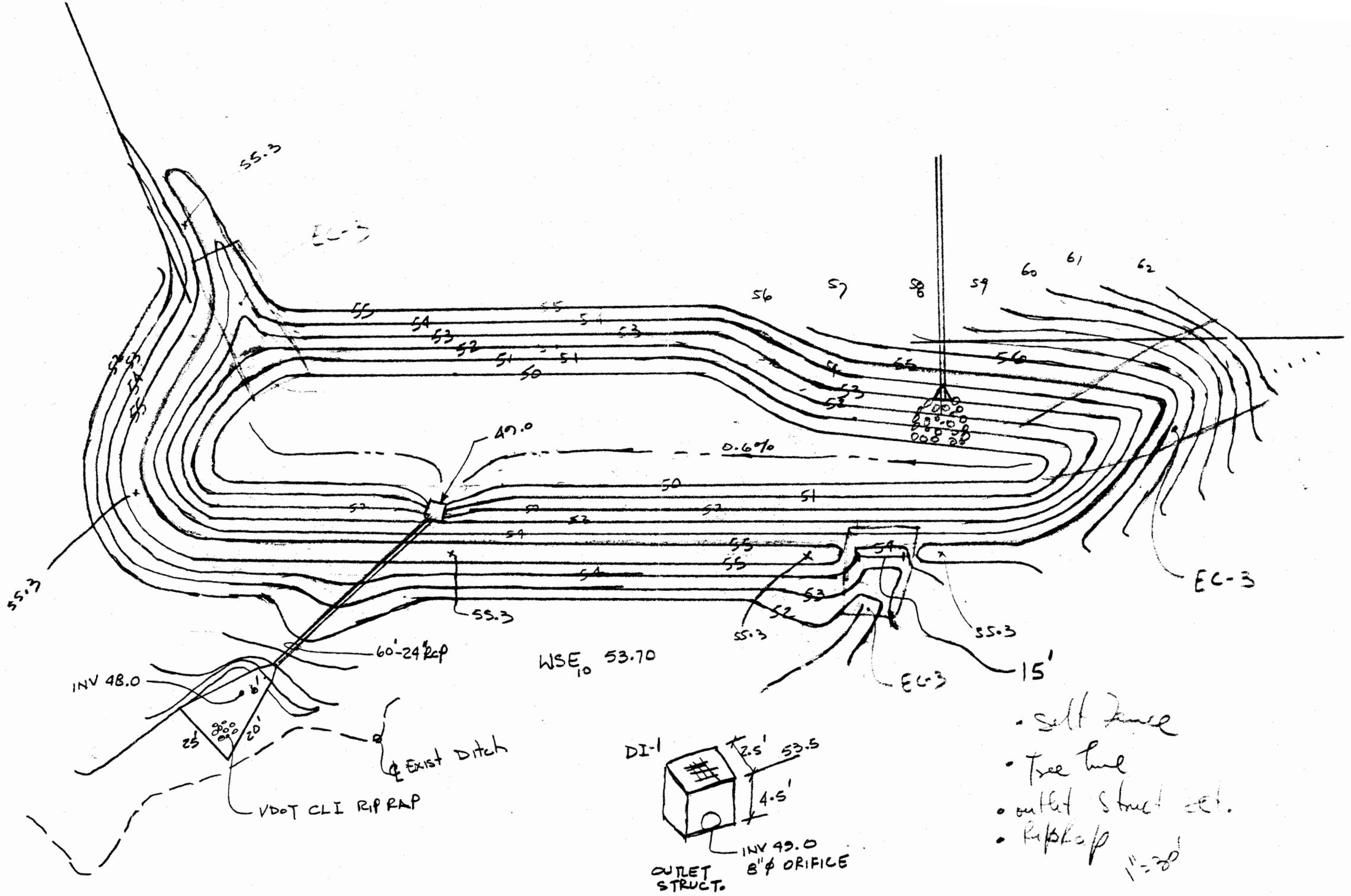
CROMWELL
RIDGE @
POWHATAN
SECOND.

• PC131

UT OF PL

SOIL SURVEY OF JAMES CITY AND YORK COUNTIES AND THE CITY OF WILLIAMSBURG, VIRGINIA — SHEET NUMBER 22





- salt fence
- tree line
- outlet struct set.
- riprap 1"=20'



" DRAFT FOR REVIEW "

COUNTY OF JAMES CITY, VIRGINIA

EXTENDED WARRANTY AGREEMENT IN LIEU OF CONSTRUCTION CERTIFICATION

THIS AGREEMENT, made and entered into this ____ day of _____, 2002, by, between and among _____ ("CONTRATOR"), and the COUNTY OF JAMES CITY, VIRGINIA, a political subdivision ("COUNTY.")

WHEREAS, the County and the Contractor hereby enter into an Agreement with respect to a guarantee being provided by the Contractor to the County relative to work performed on an approved stormwater management/Best Management Practice known as _____ under approved County Plan No. _____ and with an assigned County BMP ID Code of _____ ("Subject Facility").

Following construction of the above subject Stormwater Management/Best Management Practice facility, the Owner/Contractor was duly obligated to submit certification documents relative to such facility in accordance with Standard County Erosion and Sediment Control Note # _____ on Sheet _____ of the approved plan and in accordance with the process and forms outlined in the *James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. Due to extenuating circumstances, the Owner/Contractor has failed to properly submit such certification documentation and the Contractor has formally requested and agreed to enter into this Agreement for a period of two (2) years. The Agreement only covers the following specifically described components or appurtenances associated with proper stormwater function or structural integrity of the subject Stormwater Management/Best Management Practice facility:

_____.

WHEREAS, the County, upon full review of the circumstances has determined that in lieu of submission of certification documentation as normally required and in the best interest of protection of the health, safety and welfare of the public, desires to ensure the adequate performance of the subject Stormwater Management/Best Management Practice facility,

WHEREAS, the Contractor has posted sufficient bond, letter of credit, certified check, cashier's check, or escrow fund, ("Security Instrument") pursuant to existing ordinances, approved as to form by the County Attorney, and with surety satisfactory to the County in the amount of _____ guaranteeing the correction of any defects, deficiencies or failures which affect the stormwater function or structural integrity of the aforementioned components or appurtenances of the subject Stormwater Management/Best Management Practice facility.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH: That for and in consideration of the premises and the approval of the covenants and agreements herein contained, the parties agree as follows:

1. A signed and recorded, Declaration of Covenants, Inspection/Maintenance of Drainage System, is in the County Land Records and on file with the James City County Environmental Division, granting the County, it's agent and it's contractor a right of entry to the system for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the system.

2. Should any defect, deficiency or failure arise which affects the stormwater function or structural integrity of the aforementioned components or appurtenances of the subject facility, the Contractor will obtain full consent and approval from the current Owner of the Stormwater Management/Best Management Practice facility to properly inspect, test, access and perform work on the subject facility as required to restore the facility back to the approved plan condition or to the satisfaction of the Environmental Division of James City County.

3. The Contractor does covenant and agree that it will, without cost to the County of James City, within ninety (90) days of notice of defect, deficiency or failure of listed components or appurtenances of the subject facility or notification from the County, repair or reconstruct such components or appurtenances to the approval of the County and the provisions of the approved plan. If, in the sole judgement of the County, circumstances beyond the control of the Contractor prevent the Contractor from completing the work in the time set forth herein, then the County may at it's sole discretion grant an extension of time for completion of said improvements.

4. In the event the County calls, collects or otherwise draws on the Security Instrument pledged under this Agreement, Contractor agrees to either pay, or have the County use the proceeds of the draw to pay a reasonable administrative fee of \$ 35.00 plus any costs actually incurred by the County in drawing on the Security Instrument. The charge for an administrative fee plus costs shall apply regardless of whether the County later accepts a renewal or amendment of the Security Instrument.

5. It is mutually understood and agreed that this Agreement does not relieve the Contractor of any responsibilities or requirements placed upon them by the various ordinances of the County applicable to such work and work will be done in strict accordance with the provisions of such ordinances.

6. The Contractor does hereby agree to indemnify, protect and save harmless the County from and against all losses and physical damages to property, and bodily injury or death to any person or persons, which may arise out of or be caused by the defect, deficiency or failure of listed components or appurtenances of the subject facility or that arising out of the repair or reconstruction of the same.

IN WITNESS WHEREOF, the parties hereto being first duly authorized, have affixed their signatures on the date first above written.

ATTEST:

Approved as to form:

County Attorney

CONTRACTOR: _____(SEAL)
(Print Name & Title)

By: _____
(Signature)

COUNTY OF JAMES CITY, VIRGINIA

By: _____
County Agent

REVIEW

COUNTY OF JAMES CITY, VIRGINIA

EXTENDED WARRANTY AGREEMENT IN LIEU OF CONSTRUCTION CERTIFICATION

THIS AGREEMENT, made and entered into this _____ day of _____, 2002, by, between and among _____ ("CONTRACTOR"), and the COUNTY OF JAMES CITY, VIRGINIA, a political subdivision ("COUNTY.")

Add HOA as a Party

adequate construction of

WHEREAS, the County and the Contractor hereby enter into an Agreement with respect to a guarantee being provided by the Contractor to the County relative to work performed on an approved stormwater management/Best Management Practice known as _____ under approved County Plan No. _____ and with an assigned County BMP ID Code of _____ ("Subject Facility").

location of Property?

WHEREAS

Following construction of the above subject Stormwater Management/Best Management Practice facility, the Owner/Contractor was duly obligated to submit certification documents relative to such facility in accordance with Standard County Erosion and Sediment Control Note # _____ on Sheet _____ of the approved plan and in accordance with the process and forms outlined in the *James City County Environmental Division, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. Due to extenuating circumstances, the Owner/Contractor has failed to properly submit such certification documentation and the Contractor has formally requested and agreed to enter into this Agreement for a period of two (2) years. The Agreement only covers the following specifically described components or appurtenances associated with proper stormwater function or structural integrity of the Subject Stormwater Management/Best Management Practice facility:

WHEREAS, the County, upon full review of the circumstances has determined that in lieu of submission of certification documentation as normally required and in the best interest of protection of the health, safety and welfare of the public, desires to ensure the adequate performance of the Subject Stormwater Management/Best Management Practice facility,

WHEREAS, the Contractor has posted sufficient bond, letter of credit, certified check, cashier's check, or escrow fund, (^{Surety} "Security Instrument") pursuant to existing ordinances, approved as to form by the County Attorney, and with surety satisfactory to the County in the amount of _____ guaranteeing the correction of any defects, deficiencies or failures which affect the stormwater function or structural integrity of the aforementioned components or appurtenances of the Subject Stormwater Management/Best Management Practice facility.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH: That for and in consideration of the premises and the approval of the covenants and agreements herein contained, the parties agree as follows:

1. A ^{recorded} signed and recorded, Declaration of Covenants, Inspection/Maintenance of Drainage System, is in the County Land Records and on file with the James City County Environmental Division, granting the County, its agent and its contractor a right of entry to the system for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the system.

2. Should any defect, deficiency or failure arise which affects the stormwater function or structural integrity of the aforementioned components or appurtenances of the Subject Facility, the Contractor will obtain full consent and approval from the current Owner of the Stormwater Management/Best Management Practice Facility to properly inspect, test, access and perform work on the Subject Facility as required to restore the Subject Facility back to the approved plan condition or to the satisfaction of the Environmental Division of James City County.

3. The Contractor does covenant and agree that it will, without cost to the County of James City, within ninety (90) days of notice of defect, deficiency or failure of listed components or appurtenances of the Subject Facility or notification from the County, repair or reconstruct such components or appurtenances to the approval of the County and the provisions of the approved plan. If, in the sole judgment of the County, circumstances beyond the control of the Contractor prevent the Contractor from completing the work in the time set forth herein, then the County may at its sole discretion grant an extension of time for completion of said improvements.

4. In the event the County calls, collects or otherwise draws on the Security Instrument pledged under this Agreement, Contractor agrees to either pay, or have the County use the proceeds of the draw to pay a reasonable administrative fee of \$ 35.00 plus any costs actually incurred by the County in drawing on the Security Instrument. The charge for an administrative fee plus costs shall apply regardless of whether the County later accepts a renewal or amendment of the Security Instrument.

5. It is mutually understood and agreed that this Agreement does not relieve the Contractor of any responsibilities or requirements placed upon them by the various ordinances of the County applicable to such work and work will be done in strict accordance with the provisions of such ordinances.

6. The Contractor does hereby agree to indemnify, protect and save harmless the County from and against all losses and physical damages to property, and bodily injury or death to any person or persons, which may arise out of or be caused by the defect, deficiency or failure of listed components or appurtenances of the subject facility or that arising out of the repair or reconstruction of the same.

Subject Facility to determine whether its ^{stormwater function or} structural integrity is adequate. If found to be adequate, in the sole discretion of the County, then the County shall release the Surety and this Agreement shall expire.

IN WITNESS WHEREOF, the parties hereto being first duly authorized, have affixed their signatures on the date first above written.

ATTEST:

Approved as to form:

County Attorney

CONTRACTOR: _____ (SEAL)
(Print Name & Title)

By: _____
(Signature)

COUNTY OF JAMES CITY, VIRGINIA

By: _____
County Agent