



## 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- STORMW ATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HA VE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

**BMPNUMBER:** PC071

**DATE VERIFIED:** January 05, 2017

**QUALITY ASSURANCE TECHNICIAN:** Charles E. Lovett II

**LOCATION:** WILLIAMSBURG, VIRGINIA



# Stormwater Division

## MEMORANDUM

**DATE:** January 05, 2017  
**TO:** Virginia Correctional Enterprises Document Management Services  
**FROM:** Charles Lovett II, Stormwater Administrative Assistant  
**BMP:** PC071  
**RE:** Files Approved for Scanning

<b>NAME PDF/SCANNED FILE:</b>		Historic Powhatan Resort Entrance Revisions	
<b>BMP ID OR GEN FILE NUMBER:</b>	PC071	<b>OWNER NAME :</b>	HISTORIC POWHANTAN RESORT
<b>PIN:</b>	3740300001A	<b>SITE ADDRESS:</b>	4300 FITHIAN LANE
		<b>LEGAL DESCRIPTION:</b>	COMM AREA S-1 POW PLAN

<b>MAINTENANCE AGREEMENT IN FILE:</b>	YES	<b>BOOK/PAGE OR DOCUMENT NO:</b>	130017798	<b>OTHER DESCRIPTION:</b>	A2-Wet Pond
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<b>BOX NO:</b>	N/A	<b>COMMENTS:</b>	N/A



## County Record Checklist

\*Directions: Please check the type of file for scanning and check the documents enclosed in the file. Remove any budget documents, contractor financial statements or any documents with account numbers.

### Stormwater Projects, General Site/Subdivision (from ERP) and Stream Restoration Files

Order of Contents: File Name: \_\_\_\_\_

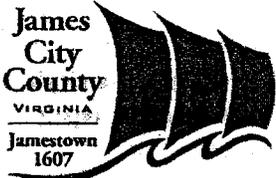
	a.	Certification of Authenticity (placed in the file at the time of certification)
	b.	Memorandum of files approved for scanning
	c.	This checklist
<input type="checkbox"/>	1.	Maintenance Agreement
<input type="checkbox"/>	2.	Deeds/Easements/Agreements/Property Records
<input type="checkbox"/>	3.	Record Drawings (As Builts)
<input type="checkbox"/>	4.	Construction Drawings
<input type="checkbox"/>	5.	Warranties
<input type="checkbox"/>	6.	Project development documentation
<input type="checkbox"/>	7.	Reports
<input type="checkbox"/>	8.	Specifications and engineering calculations
<input type="checkbox"/>	9.	Permitting (ex. wetlands permit, SWPPP)
<input type="checkbox"/>	10.	Inspections
<input type="checkbox"/>	11.	Correspondence
<input type="checkbox"/>	12.	Misc. (ex. photos)

### Stormwater Stormwater Mangement Facilities (BMP) Files

Order of Contents: File Name: PC071

	a.	Certification of Authenticity (placed in the file at the time of certification)
	b.	Memorandum of files approved for scanning
	c.	This checklist
<input checked="" type="checkbox"/>	1.	Maintenance Agreement
<input type="checkbox"/>	2.	Deeds/Easements/Agreements/Property Records
<input checked="" type="checkbox"/>	3.	Construction Certificate
<input checked="" type="checkbox"/>	4.	Record Drawing (as-built plan)
<input checked="" type="checkbox"/>	5.	Construction Drawings
<input type="checkbox"/>	6.	Design Calculations
<input checked="" type="checkbox"/>	7.	Reports
<input type="checkbox"/>	8.	Correspondence
<input type="checkbox"/>	9.	Inspection Records
<input checked="" type="checkbox"/>	10.	Misc. (ex. photos)

130017798



COUNTY OF JAMES CITY, VIRGINIA

Engineering and Resource Protection Division  
101-E Mounts Bay Road  
Williamsburg, VA 23185  
757-253-6670  
jamescitycountyva.gov

**DECLARATION OF COVENANTS**  
**INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM**

Please type or print legibly in black ink. Covenantor(s) should submit this form to the JCC Engineering and Resource Protection Division, 101-E Mounts Bay Road, Williamsburg, VA 23185.

THIS DECLARATION OF COVENANTS, made this 12 day of July, 20 13, between Historic Powhatan Resort Owners Association (The), and all successors in interest, ("COVENANTOR(S)"), owner(s) of the following property:

Parcel Identification Number(s): 3740300001A  
Legal Description(s): COMM AREA S-1 POW PLAN

Project or Subdivision Name: Powhatan Plantation  
Document/Instrument No(s): \_\_\_\_\_  
or Deed Book 444, Page No. 301  
and the County of James City, Virginia ("COUNTY.")

WITNESSETH:

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

1. The COVENANTOR(S) shall provide maintenance for the drainage system including any runoff control facilities, conveyance systems and associated easements, hereinafter referred to as the "SYSTEM," located on and serving the above-described property to ensure that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.
2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the SYSTEM to ensure that the SYSTEM is properly maintained.
3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the SYSTEM for the COUNTY, its agent and its contractor.
4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the SYSTEM for the purpose of inspecting, monitoring, operating, installing, constructing, reconstructing, maintaining or repairing the SYSTEM.
5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the SYSTEM in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work, and the COUNTY may assess the COVENANTOR(S) and/or all property served by the SYSTEM for the cost of the work and any applicable penalties.

Prepared by (Name, Address & Phone):  
MATT LITTLE  
3601 IRONBOUND RD  
WILLIAMSBURG, VA 23188  
757-812-9443

Return to:  
JCC Attorney's Office  
101-D Mount's Bay Road  
Williamsburg, VA 23185  
(757) 253-6612

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

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

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

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

IN WITNESS WHEREOF, the COVENANTOR(S) has executed this DECLARATION OF COVENANTS as of the date first above written.

COVENANTOR(S)

Dale Young 07/12/13  
Signature

DALE P YOUNG - ASSOCIATION BOARD MEMBER  
Print Name and Title

ACKNOWLEDGMENT

COMMONWEALTH OF VIRGINIA  
CITY/COUNTY OF James City, to wit:

I hereby certify that on this 12<sup>th</sup> day of July, 2013, before the subscribed, a Notary Public for the Commonwealth of Virginia, personally appeared Dale Young and did acknowledge the foregoing instrument to be his/her Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 12<sup>th</sup> day of July, 2013

[SEAL]

[Signature]  
Notary Public ROBYN L. SWANSON

Notary Registration Number: 150730

My Commission expires: 3/31/13

Approved as to form:

[Signature]  
County Attorney

*Recorded 7/30/2013 9:52 AM*



**James City County Environmental Division  
Stormwater Management/BMP Record Drawing and  
Construction Certification Review Tracking Form**

Project Name: Historic Poughkeepsie Plantation

County Plan No.: SP-0034-2013

Stormwater Management Facility: Pipe

BMP Phase #:  I  II  III

Information Package Received. Date/By: 8/18/2014

Completeness Check:

Record Drawing Date/By: 8/18/2014 William Felts

Construction Certification Date/By: 8/18/2014 Matthew Gumpalcy

RD/CC Standard Forms (Required for all BMPs after Feb 1<sup>st</sup> 2001 Only)

Insp/Maint Agreement # / Date: 130017798 7/30/2013

BMP Maintenance Plan Location: NA

Other: \_\_\_\_\_

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

Yes  No Location: \_\_\_\_\_

Assign County BMP ID Code #: Code: NA PIPE

Preliminary Input/Log into Division's "As-Built Tracking Log"

Add Location to GIS Map. Obtain basic site information (GPIN, Owner, Address, etc.)

Preliminary Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)

Active Project File Review (correspondence, H&H, design computations, etc.)

Initial As-Built File setup (File label, folder, copy plan/details/design information, etc.)

Inspector Check of RD/CC (forward to Inspector using transmittal for cursory review)

Pre-Inspection Drawing Review of Approved Plan (Quick look prior to Field Inspection)

Final Inspection (FI) Performed Date: 8/18

Record Drawing (RD) Review Date: \_\_\_\_\_

Construction Certification (CC) Review Date: \_\_\_\_\_

Actions:

No comments.

Comments. Letter Forwarded. Date: \_\_\_\_\_

Record Drawing (RD)

Construction Certification (CC)

Construction-Related (CR)

Site Issues (SI)

Other : \_\_\_\_\_

Second Submission: \_\_\_\_\_

Reinspection (if necessary): \_\_\_\_\_

Acceptable for SWM Purposes (RD/CC/CR/Other). Ok to proceed with bond release.

Complete "Surety Request Form".

Check/Clean active file of any remaining material and finish "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.

Obtain Digital Photographs of BMP and save into County BMP Inventory.

Request mylar/reproducible from As-Built plan preparer.

Complete "As-built Tracking Log".

Last check of BMP Access Database (County BMP Inventory).

Add BMP to JCC Hydrology & Hydraulic database (optional).

Add BMP to Municipal BMP list (if a County-owned facility)

Add BMP to PRIDE BMP ratings database.

**Final Sign-Off**

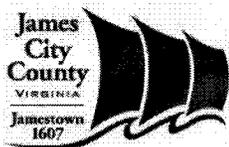
Inspector: Carly Johns

Date: 8/20/14

Chief Engineer: \_\_\_\_\_

Date: \_\_\_\_\_

\*\*\* See separate checklist, if needed.



# Stormwater Management/BMP Facilities Record Drawing and Construction Certification Forms

Environmental Division

AUG 18 2014

RECEIVED

(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: Storm As-built of The Historic Powhatan Resort Sidewalk & Parking Space Additions  
Structure/BMP Name: n/a (structures drain to BMP Facilities approved in MP-0002-1985 & MP-0001-1992)  
Project Location: The Historic Powhatan Resort, 4300 Fithian Lane, James City County, Virginia  
BMP Location: n/a  
County Plan No.: \_\_\_\_\_

Project Type:  Residential  Business  Office  Industrial  Roadway  
 Commercial  Institutional  Public  Other  
Tax Map/Parcel No.: Parcel ID 3740300001A  
BMP ID Code (if known): \_\_\_\_\_  
Zoning District: PUD-R  
Land Use: Timeshares  
Site Area (sf or acres): 127.43 Acres

Brief Description of Stormwater Management/BMP Facility: \_\_\_\_\_  
Various culverts / sidewalk improvements to facilitate proper drainage patterns  
\_\_\_\_\_  
\_\_\_\_\_

Nearest Visible Landmark to SWM/BMP Facility: n/a

Nearest Vertical Ground Control (if known):

JCC Geodetic Ground Control  USGS  Temporary  Arbitrary  Other

Station Number or Name: No. 321  
Datum or Reference Elevation: 78.72 (NGVD29)  
Control Description: 3 1/4" disk in concrete set approx. 2" below the ground surface  
Control Location from Subject Facility: \_\_\_\_\_

Located at intersection of Ironbound Road and Fifthian Lane, north of entrance to Powhatan Plantation

**Stormwater Management/BMP Facilities  
Record Drawing and Construction Certification Forms**

**Section 2 - Stormwater Management/BMP Facility Construction Information:**

Pre-Construction Meeting Held for Construction of SWM/BMP Facility:  Yes  No  Unknown  
Approx. Construction Start Date for SWM/BMP Facility: unknown  
Facility Monitored by County Representative during Construction:  Yes  No  Unknown  
Name of Site Work Contractor Who Constructed Facility: unknown  
Name of Professional Firm Who Routinely Monitored Construction: unknown  
Date of Completion for SWM/BMP Facility: unknown  
Date of Record Drawing/Construction Certification Submittal: 06/26/2014

*(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 Engineering and Resource Protection 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: The Historic Powhatan Resort  
Mailing Address: 3601 Ironbound Road  
Williamsburg, Virginia 23188  
Business Phone: (757) 220-1200 ext. 13702 Fax: (757) 253-0987  
Contact Person: Matt Little Title: Assistant Chief Engineer

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: LandTech Resources, Inc.  
Mailing Address: 3925 Midlands Road  
Williamsburg, Virginia 23188  
Business Phone: (757) 565-1677  
Fax: (757) 565-0782  
Responsible Plan Preparer: Kenny M. Jenkins II  
Title: Senior Engineer  
Plan Name: Site Plan of the Historic Powhatan Resort Sidewalk & Parking Space Additions  
Firm's Project No. 11-289  
Plan Date: 08/31/2012  
Sheet No.'s Applicable to SWM/BMP Facility: n/a / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

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

Firm Name: Toano Contractors, Inc.  
Mailing Address: 8589 Richmond Road  
Toano, Virginia 23168  
Business Phone: (757) 566-0097

**Stormwater Management/BMP Facilities  
Record Drawing and Construction Certification Forms**

Fax: n/a  
Contact Person: unknown  
Site Foreman/Supervisor: unknown  
Specialty Subcontractors and Purpose (for BMP Construction Only):  
n/a

**Section 4 - Professional Certifications:**

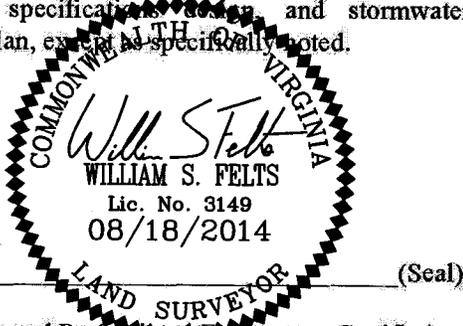
**Certifying Professionals:** *(Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional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

**Record Drawing Certification**

Firm Name: LandTech Resources, Inc.  
Mailing Address: 3925 Midlands Road  
Williamsburg, Virginia 23188  
Business Phone: (757) 565-1677  
Fax: (757) 565-0782  
Name: William Felts  
Title: Vice President  
Signature: *William Felts*  
Date: 08/18/2014

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 to the provisions of the approved design plan, specifications, and stormwater management plan, except as specifically noted.

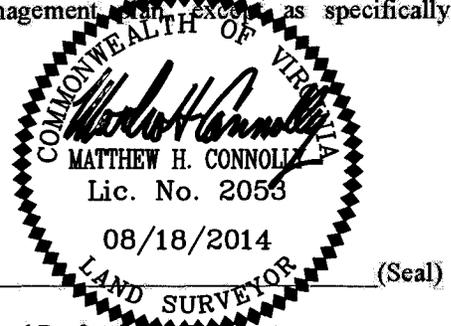


Virginia Registered Professional Engineer or Certified Land Surveyor

**Construction Certification**

Firm Name: LandTech Resources, Inc.  
Mailing Address: 3925 Midlands Road  
Williamsburg, Virginia 23188  
Business Phone: (757) 565-1677  
Fax: (757) 565-0782  
Name: Matt Connolly  
Title: President  
Signature: *Matthew H. Connolly*  
Date: 08/18/2014

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 plan, specifications, and stormwater management plan, except as specifically noted.



Virginia Registered Professional Engineer

**Section 5 - Record Drawing and Construction Certification Requirements and Instructions:**

- Pre-Construction Meeting - Provides an opportunity to review SWM/BMP facility construction, maintenance and operation plans and addresses any questions regarding construction and/or monitoring of the structure. The design engineer, certifying professionals (if different), Owner/Applicant, Contractor and County representative(s) are encouraged to attend the preconstruction meeting. Advanced notice to the Engineering and Resource Protection Division is requested. Usually, this requirement can be met simultaneously with Erosion and Sediment Control preconstruction meetings held for the project.
- A fully completed *STORMWATER MANAGEMENT / BMP FACILITIES, RECORD DRAWING and CONSTRUCTION CERTIFICATION FORM* and *RECORD DRAWING CHECKLIST*. All applicable sections shall be completed in their entirety and certification statements signed and sealed by the registered professional responsible for individual record drawing and/or construction certification.
- The Record Drawing shall be prepared by a Registered Professional Engineer or Certified Land Surveyor for the drainage system of the project including any Best Management Practices.
- Construction Certification - Construction of Stormwater Management / BMP facilities which contain impoundments, embankments and related engineered appurtenances including subgrade preparation, compacted soils, structural fills, liners, geosynthetics, filters, seepage controls, cutoffs, toe drains, hydraulic flow control structures, etc. shall be visually observed and monitored by a Registered Professional Engineer or his/her authorized representative. The Engineer must certify that the structure, embankment and associated appurtenances were built in accordance with the approved design plan, specifications and stormwater management plan and standard accepted construction practice and shall submit a written certification and/or drawings to the Engineering and Resource Protection Division as required. Soil and compaction test reports, concrete test reports, inspection reports, logs and other required construction material or installation documentation may be required by the Engineering and Resource Protection Division to substantiate the certification, if specifically requested. The Engineer shall have the authority and responsibility to make minor changes to the approved plan, in coordination with the assigned County inspector, in order to compensate for unsafe or unusual conditions encountered during construction such as those related to bedrock, soils, groundwater, topography, etc. as long as changes do not adversely affect the integrity of the structure(s). Major changes to the approved design plan or structure must be reviewed and approved by the original design professional and the James City County Environmental Division.
- Record Drawing and Construction Certifications are required within **thirty (30) days** of the completion of Stormwater Management / BMP facility construction. Submittals must be reviewed and accepted by James City County Engineering and Resource Protection Division prior to final inspection, acceptance and bond/surety release.

**Dual Purpose Facilities** - Completion of construction also includes an interim stage for Stormwater Management / BMP facilities which serve dual purpose as temporary sediment basins during construction and as permanent stormwater management / BMP facilities following construction, once development and stabilization are substantially complete. For these dual purpose facilities, construction certification is required once the temporary sediment basin phase of construction is complete. Final record drawing and construction certification of additional permanent components is required once permanent facility construction is complete.

*Interim Construction Certification* is required for those dual purpose embankment-type facilities that are generally ten (10) feet or greater in dam height (\*) and may not be converted, modified or begin function as a permanent SWM / BMP structure for a period generally ranging from six (6) to eighteen (18) months or more from issuance of a Land Disturbance permit for construction.

Interim or final record drawing and construction certifications are not required for temporary sediment basins which are designed and constructed in accordance with current minimum standards and specifications for temporary sediment basins per the Virginia Erosion and Sediment Control Handbook (VESCH); have a temporary service life of less than eighteen (18) months; and will be removed completely once associated disturbed areas are stabilized, unless a distinct hazard to the public's health, safety and welfare is determined by the Engineering and Resource Protection Division due to the size or presence of the structure or due to evidence of improper construction.

(\*Note: Dam Height as referenced above is generally defined as the vertical distance from the natural bed of the stream or waterway at the downstream toe of the embankment to the top of the embankment structure in accordance with 4VAC50-20-30, Virginia Impoundment Structure Regulations and the Virginia Dam Safety Program.)

- Record Drawings shall provide, at a minimum, all information as shown within these requirements and the attached **RECORD DRAWING CHECKLIST** specific to the type of SWM/BMP facility being constructed. Other additional record data may be formally requested by the James City County Engineering and Resource Protection Division. (*Note: Refer to the current edition of the James City County Guidelines for Design and Construction of Stormwater Management BMP's manual for a complete list of acceptable BMP's. Currently there are over 20 acceptable water quality type BMP's accepted by the County.*)
- Record Drawings shall consist of blue/black line prints and a reproducible (mylar, sepia, diazo, etc.) set of the approved stormwater management plan including applicable plan views, profiles, sections, details, maintenance plans, etc. as related to the subject SWM / BMP facility. The set shall indicate "**RECORD DRAWING**" in large text in the lower right hand corner of each sheet with record elevations, dimensions and data drawn in a clearly annotated format and/or boxed beside design values. Approved design plan values, dimensions and data shall not be removed or erased. Drawing sheet revision blocks shall be modified as required to indicate record drawing status. Elevations to the nearest 0.1' are sufficiently accurate except where higher accuracy is needed to show positive drainage. Certification statements as shown in Section 4 of the Record Drawing and Construction Certification Form, *or similar forms thereof*, and professional signatures and seals, with dates matching that of the record drawing status in the revision or title block, are also required on all associated record drawing plans, prints or reproducible.
- Submission Requirements - Initial and subsequent submissions for review shall consist of a minimum of one (1) blue/black line set for record drawings and one copy of the construction certification documents with appropriate transmittal. Under certain circumstances, it is understood that the record drawing and construction certification submissions may be performed by different professional firms. Therefore, record drawing submission may be in advance of construction certification or vice versa. Upon approval and prior to release of bond/surety, final submission shall include one (1) reproducible set of the record drawings, one (1) blue/black line set of the record drawings and one (1) copy of the construction certification. Also for current and/or future incorporation into the County BMP database and GIS system,

it is requested that the record drawings also be submitted to the Engineering and Resource Protection Division on a diskette or CD-ROM in an acceptable electronic file format such as \*.dxf, \*.dwg, etc. or in a standard scanned and readable format. The electronic file requirement can be discussed and coordinated with Engineering and Resource Protection Division staff at the time of final submission.

**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.
- N/A 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.
- N/A 4. Top widths, berm widths, and embankment side slopes.
- N/A 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 Engineering and Resource Protection 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.

- N/A 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.
- N/A 8. Elevation of the principal spillway crest or outlet crest of the structure.
- N/A 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.
- N/A 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- N/A 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.
- N/A 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.**
- N/A 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**
- N/A 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- N/A 15. Outlet barrel diameter, length, slope, type, and thickness class of material and type of flared end sections, headwall or endwall.
- N/A 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.
- N/A 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- N/A 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.



James City County, Virginia  
Environmental Division

PLANNING DIVISION

APR 17 2013

RECEIVED

Environmental Division

APR 19 2013

Erosion and Sediment Control and  
Stormwater Management Design Plan Checklists

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RECEIVED

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GENERAL INFORMATION

Project Name: Powhatan Resort Entrance Revisions

Owner / Applicant: Powhatan Resort / Matt Little

Plan Preparer: LandTech Resources Email: \_\_\_\_\_

Project Location: 3601 Ironbound Rd 23188

Tax Map / Parcel: 3740300001A

County Plan No. (if known): SP-30-13

County BMP Type: N/A ( - )

Other information submitted in addition to this checklist (Check all that apply):

- Design or Construction Drawings (Plans, Profiles, Details, etc.).
- Erosion & Sediment Control Plan (Plans, Details, etc.).
- Erosion & Sediment Control Plan Design Report.
- Stormwater Management Design Plan (Plans, Profiles, Details, etc.).
- Stormwater Management Design Report.
- Other, List: \_\_\_\_\_

Issue Date

March 1, 2001

**JAMES CITY COUNTY, VIRGINIA  
ENVIRONMENTAL DIVISION**

***EROSION AND SEDIMENT CONTROL PLAN CHECKLIST***

**I. GENERAL:**

Yes No N/A

- FAMILIARITY* with current versions of Chapter 8, Erosion and Sedimentation Control and Chapter 23, Chesapeake Bay Preservation ordinances of the Code of James City County, Virginia and the Virginia Erosion and Sediment Control Handbook (VESCH).
- LAND DISTURBING PERMIT AND SILTATION AGREEMENT* with surety are required for the project.
- VARIANCE* if necessary, requested in writing, for the plan approving authority to waive or modify any of the minimum standards and specifications of the VESCH deemed inappropriate based on site conditions specific to this review case only. Variances which are approved shall be properly documented in the plan and become part of the approved erosion and sediment control plan for the site.

**II. SITE PLAN:**

Yes No N/A

- VICINITY MAP* locating the site in relation to the surrounding area. Include any major landmarks which might assist in physically locating the site.
- INDICATE NORTH* direction in relation to the site.
- LIMITS OF CLEARING AND GRADING* for the site including that required for implementation of erosion and sediment controls, stockpile areas and utilities.
- DISTURBED AREA ESTIMATES* in acres or square feet for the project.
- EXISTING TOPOGRAPHY* or contours for the site at no more than 5 foot contour interval.
- FINAL TOPOGRAPHY*, contours or proposed site grading in accordance with the design plan which indicates changes to existing topography and drainage patterns at no more than 2 foot contour interval (or 1 foot contours where required).
- EXISTING AND PROPOSED SPOT ELEVATIONS* to supplement existing and proposed contours, topography or site grading information. Spot elevations may replace final contours in some instances, especially if terrain is in a low lying area or relatively flat.
- EXISTING VEGETATION* including existing tree lines, grassed or unique vegetation areas.

Yes No N/A

- EXISTING SITE FEATURES* including roads, buildings, homes, utilities, streams, fences, structures and other important surface features of the site.
- SOILS MAP* with soil symbols, boundaries and legend in accordance with the current Soil Survey of James City and York Counties and the City of Williamsburg, Virginia.
- ENVIRONMENTAL INVENTORY* in accordance with Section 23-10(2) of the Chesapeake Bay Preservation Ordinance of James City County. Inventory generally includes: tidal shores and wetlands, non-tidal wetlands, resource protection area, hydric soils and slopes steeper than 25 percent. For wetlands, provide a copy of issued permits or satisfactory evidence that appropriate permits are being pursued for the entire project.
- 100-YEAR FLOODPLAIN LIMITS* or any special flood hazard areas or flood zones based on appropriate Federal Management Agency Flood Insurance Rate Maps (FIRMs) or Flood Hazard Boundary Maps (FHBMs) of James City County, Virginia.
- DRAINAGE AREAS* for offsite and onsite areas, existing or proposed as applicable. Include drainage divides and directional labels for all subareas at points of interest and size (in acres), weighted runoff coefficient or curve number and times of concentration for each subarea.
- CRITICAL EROSION AREAS* which require special consideration or unique erosion and sediment control measures. Refer to the VESCH, Chapter 6 for criteria.
- DEVELOPMENT PLAN* for the site showing all improvements such as buildings, structures, parking areas, access roadways, above and below ground utilities, stormwater management and drainage facilities, trails or sidewalks, proposed vegetation and landscaping, amenities, etc.
- LOCATION OF PRACTICES* proposed for erosion and sediment control, tree protection and temporary stormwater management due to land disturbance activities at the site. Use standard abbreviations, labels and symbols consistent for plan views based on minimum standards and specifications in Chapter 3 of the VESCH.
- TEMPORARY STOCKPILE AREAS* or staging and equipment storage areas as required for onsite or offsite construction activities or indicate that none are anticipated for this project.
- OFFSITE LAND DISTURBING AREAS* including borrow sites, waste areas, utility extensions, etc. and required erosion and sediment controls. If none are anticipated for the project, then indicate on the plans by general or erosion and sediment control notes.
- DETAILS* or alternately, appropriate reference to current minimum standards and specifications of the VESCH for each measure proposed for the project. Non-modified, standard duplicated details (silt fence, diversion dikes, etc.) may be referenced to the current version of the VESCH. Specific dimensional or modified standards (basins, traps, outlet protections, check dams, etc.) require presentation on detail sheets. Schedules or tables may be used for multiple site measures such as sediment traps, basins, channels, slope drains, etc. Any modification to standard details should be clearly defined, explained and illustrated.

Yes No N/A

*MAINTENANCE PLAN* or alternately, appropriate reference to current minimum standards and specifications of the VESCH, outlining the inspection frequency and maintenance requirements for all erosion and sediment control measures proposed for the project.

*TRENCH DEWATERING* methods and erosion and sediment controls, if anticipated for the project.

*CONSTRUCTION SEQUENCE* outlining the anticipated sequence for installation of erosion and sediment controls and site, grading and utility work to be performed for the project by the site contractor.

*PHASING PLAN* if required for larger project sites that are to be developed in stages or phases.

*STANDARD COUNTY NOTES* are required to be placed on the erosion and sediment control plan. Refer to the standard James City County Erosion and Sediment Control Notes dated May 5, 1999.

*PROFESSIONAL SEAL AND SIGNATURE* required on final and complete approved plans, drawings, technical reports and specifications.

### III. NARRATIVE:

Yes No N/A

*PROJECT DESCRIPTION* briefly describing the nature and purpose of the land disturbing activity and the acreage to be disturbed.

*EXISTING SITE CONDITIONS* description of existing topography, land use, cover and drainage patterns at the site.

*ADJACENT AREA* descriptions of neighboring onsite or offsite areas such as streams, lakes, property, roads, etc. and potential impacts due to concentrated flow or runoff from the land disturbing activity.

*OFFSITE DISTURBED AREA* descriptions of proposed borrow sites, waste or surplus areas, utility extensions and erosion and sediment controls to be implemented.

*SOILS DESCRIPTION* briefly summarizing site, disturbed area and drainage basin soils including name, unit, hydrologic soil group (HSG) classification, surface runoff potential, erodibility, permeability, depth, texture, structure, erosion hazards, shrink-swell potential, limitations for use and anticipated depths to bedrock and the seasonal water table, as applicable.

*CRITICAL AREAS* on the site which many have potentially serious erosion and sediment control problems and special considerations required (ie. steep slopes, hydric soils, channels, springs, sinkholes, water supply reservoirs, groundwater recharge areas, etc.)

Yes No N/A

*PROPOSED EROSION & SEDIMENT CONTROL MEASURES* inclusive to the specific erosion and sediment control plan as proposed for the land disturbing activity. Measures should be consistent with those proposed on the site drawings. Address general use, installation, limitations, sequencing and maintenance requirements for each control measure.

*STABILIZATION MEASURES* required for the site, either temporary or permanent, and during and following construction including temporary and permanent seeding and mulching, paving, stone, soil stabilization blankets and matting, sodding, landscaping or special stabilization techniques to be utilized at the site.

*STORMWATER MANAGEMENT CONSIDERATIONS* for the site, either of temporary or permanent nature, and strategies, sequences and measures required for control. May reference the stormwater management plan for the site, if prepared, for permanent stormwater management facilities and control of drainage once the site is stabilized.

#### IV. CALCULATIONS:

Yes No N/A

*CALCULATIONS AND COMPUTATIONS* associated with hydrology, hydraulics and design of proposed temporary and permanent erosion and sediment control measures including: sediment traps and basins, diversions, stormwater conveyance channels, culverts, slope drains, outlet protections, etc. Computations are not required on the construction plan and may be attached in a supplemental erosion and sediment control plan design report, if presented in a clear and organized format.

*TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET* submitted for each basin along with schematic or sketch cross-section showing applicable design and construction data, storage volumes (wet-dry), dimensions and elevations. Peak design runoff to be based on the 2- or 25-year design storm event based on maximum disturbed site conditions (existing, interim or proposed conditions) in accordance with Minimum Standard 3.14 of the VESCH.

**JAMES CITY COUNTY, VIRGINIA  
ENVIRONMENTAL DIVISION**

**STORMWATER MANAGEMENT DESIGN PLAN CHECKLIST**

**I. GENERAL:**

Yes No N/A

- FAMILIARITY* with current versions of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual; Chapter 8, Erosion and Sediment Control and Chapter 23, Chesapeake Bay Preservation ordinances of the Code of James City County, Virginia; the Virginia Erosion and Sediment Control Handbook (VESCH); and the Virginia Stormwater Management Handbook (VSMH).
- WAIVER OR EXCEPTION* if necessary, requested in writing, for the plan approving authority to waive or except the requirements of Chapter 23, Chesapeake Bay Preservation ordinance in accordance with procedure established in Sections 23-14 through 23-17 of the ordinance. Applies to this review case only.
- VARIANCE REQUEST* if necessary, requested in writing for the plan approving authority to waive or modify any of the minimum standards and specifications of the VESCH deemed inappropriate based on site conditions specific to this review case only. Variances which are approved shall be properly documented in the plan and become part of the approved erosion and sediment control plan for the site.
- PROFESSIONAL SEAL AND SIGNATURE* required on final and complete approved stormwater management plans, drawings, technical reports and specifications.
- WORKSHEET FOR BMP POINT SYSTEM* to ensure the stormwater management plan for the project attains at least 10 BMP points (New Development) or traditional pollutant load reduction computations per the Chesapeake Bay Local Assistance Manual (Redevelopment Only).
- PROPOSED CONSERVATION EASEMENT AREAS* for any natural open space points claimed in the BMP worksheet.
- INSPECTION/MAINTENANCE AGREEMENT* is required to be prepared and executed with the County for the project.
- FEMA FIRM PANEL* reference with designated special flood hazard areas or zone designations associated with the site, as applicable.
- DRAINAGE AREA MAP* at a maximum scale of 1"=200' scale showing drainage area boundaries for pre- and postdevelopment conditions and associated time of concentration flow paths. Labels to include drainage area size, runoff coefficient or curve number and time of concentration for each subarea shown on the map.

Yes No N/A

*SOILS MAP* with soil symbols, boundaries and legend in accordance with the current Soil Survey of James City and York Counties and the City of Williamsburg, Virginia with approximate locations of the project site, BMPs and applicable drainage basins.

*STORMWATER MANAGEMENT NARRATIVE* in a brief and simple format which describes the project; location; site and drainage basin soil characteristics; receiving water or drainage facility; existing site and drainage basin conditions (topography, land use, cover, slopes, etc.); proposed site development; proposed stormwater management and drainage plan including County BMP type selected; summary of hydrology and hydraulics; maintenance program; and any special assumptions utilized for development of the stormwater management and drainage design plan or computations.

*TEMPORARY STORMWATER MANAGEMENT* (if applicable) for control of stormwater runoff encountered during construction activities in addition to measures provided in the erosion and sediment control plan or stormwater management/drainage plan for the site. Adequate protection measures or sequencing provided.

*MODIFICATION PLAN* clearly defined for temporary sediment control structures which will be converted to permanent SWM/BMP structures. Includes appropriate hydrologic and hydraulic computations, conversions, sequencing and cleanout information or details. Normally related to primary control structures associated with dry detention or wet retention ponds. Normally not permitted for Group C or D categories such as bioretention, infiltration and filtering system facilities.

*STORMWATER MANAGEMENT and DRAINAGE DESIGN REPORT* in a bound 8-1/2 x 11 inch size format. Report shall generally include a title sheet, date, project identification, owner and preparer information, table of contents, narrative, summaries and computations as required. Computations may include: backwater, closed conduit, headwater, hydraulic, hydraulic grade line, hydrology, inlet, open channel, storm sewer, water quality, extended detention or stream channel protection and multi-stage storm routing calculations, as applicable, for the project. Computation data may include hand or computer generated computations, maps or schematics. All information should be presented in a clear, easy to follow format and should closely match construction plan information.

*PLAN VIEW* at 1 inch = 50 ft. scale or less (1" = 40', 1" = 30', etc.)

- North arrow and plan legend.
- Property lines.
- Adjacent property information.
- Existing site features and existing impervious cover areas.
- Impervious cover tabulations.
- Existing drainage facilities (natural or manmade).
- Existing environmentally sensitive areas (RPA, wetlands, floodplain, steep slopes, critical soils, buffers, etc.).
- Existing and proposed contours (1' or 2' contour interval) and spot elevations as necessary to define high and low topography.
- Existing and proposed easement locations.

Yes No N/A

- |                                     |                          |                                     |   |
|-------------------------------------|--------------------------|-------------------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed site improvements and proposed impervious cover areas.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed stormwater conveyance, drainage and management facilities with appropriate labeled construction data and information.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed landscaping and seeding plans (disturbed areas, pond interior, etc.).  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed slope stabilization areas (riprap, blankets, mattings, walls, etc.).   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Delineation of permanent pools and the 1-, 2-, 10- and 100-year Design Water Surface Elevations.  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Delineation of ponding, headwater, surcharge or backwater areas which may affect adjacent existing or proposed buildings, structures or upstream adjacent properties. |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Test boring locations with reference surface elevations (if known).   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Risers, barrels, underdrains, overflows and outlet protections.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Emergency spillway level section and outlet channel.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Existing and proposed site utilities and protection measures.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Erosion and sediment control measures (for site or BMP).  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Maintenance or access corridors to permanent stormwater management, BMP or drainage facilities.   |

## II. STORMWATER CONVEYANCE SYSTEMS:

Yes No N/A

- |                                     |                          |                                     |  |
|-------------------------------------|--------------------------|-------------------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <i>PLAN VIEWS</i>  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Storm drain lengths, sizes, types, classes and slopes for all segments. Label directly on plan or use structure/pipe schedule.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Access structure (inlets, manholes, junctions, etc.) rim elevations, inverts, type and required grate or top unit and lengths labeled.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | All structure numbers labeled.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Adequate horizontal clearance from other site utilities or structures.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <i>PROFILES</i> generally are not required but are encouraged to expedite review. If not provided, ensure all pipe segments have adequate minimum cover, do not exceed maximum depths of cover for the type/class of pipe specified and do not conflict with other site utilities or excavation areas. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <i>DETAILS</i>   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Typical storm drain bedding details or reference note.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Standard details or reference note for all proposed access structure types (inlets, manholes, junctions, etc.).  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Inlet shaping detail or applicable reference note.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Step detail or applicable reference note (if depth 4 ft. or more).   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Typical open channel details with designation, location, shape, type, bottom width, top width, lining, slope, length, side slope, and installation depth required for construction. Channel design data as necessary may also be included.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Outlet protections at all pipe outfalls.   |

Yes No N/A

- STORMWATER CONVEYANCE SYSTEM COMPUTATIONS**
- Storm Sewer Design computations based on 10-year design event.
  - Hydraulic Grade Line computations based on 10-year design event.
  - Inlet computations based on current VDOT procedure for spread, ponding depth and grate size required.
  - Culvert Headwater computations. Design based on 10-year design storm event and check only for 100-year storm event.
  - Open Channel computations based on 2-year design event for velocity and 10-year design event for capacity.
  - Standard outlet protection or special energy dissipators.
  - Pipe thickness design computations, as required, for selected pipe type (live load, minimum cover, maximum height of cover, etc.).
  - Adequate channel computations for receiving channels (based on field measured channel section data).

### III. STORMWATER MANAGEMENT / BMP FACILITIES:

Yes No N/A

- HYDROLOGY** - An SCS based methodology is required for the design of stormwater management/BMP facilities with watersheds exceeding 20 acres. Under 20 acres, other generally accepted methodologies such as the modified rational, critical storm are allowable. Refer to Chapter 5 of the VESCH or Chapter 5 of the VSMH.
- Runoff Curve Number or Coefficient determinations: predeveloped and ultimate development land use scenarios.
  - Time of concentration: predeveloped and ultimate development indicating overland, shallow concentrated, and channel flow components (200 ft. maximum length for overland flow).
  - Hydrograph generation (tabular or graphical): pre- and postdevelopment conditions for the 1-, 2-, 10-, and 100-year design storm events.
- FACILITY CONFIGURATION and MINIMUM SEPARATIONS**
- Screening and layout consistent with Section 24-98(d) of the Chapter 24 Zoning ordinance (landscaping, screening, visibility, etc.).
  - Basic considerations for safety and unauthorized entry.
  - Proper length to width ratio (Typically 2H:1V).
  - Facilities with deep pools (4 feet or more in depth) provided with two benches. Fifteen (15) ft. safety bench outward from normal pool at maximum 6 percent slope and aquatic bench inward from normal shoreline below normal pool. Narrower widths may be considered on a case-by-case basis.
  - Pond buffer minimum 25 feet outward from maximum design WSEL. Additional setbacks may be required to permanent structures.
  - No trees, shrubs or woody plants within 15 feet of embankment toe or 25 feet from principal spillway structure.

Yes No N/A

- Infiltration and filtering system facilities generally located at least 100 feet horizontally from any water supply well; 100 feet from any downslope building; and 25 feet from any upslope buildings, unless site specific investigation allows for reduced separation.

Yes No N/A

*HYDRAULIC COMPUTATIONS*

- Elevation- or Stage- Storage curve and/or tabular data.
- Weir / Orifice Control - Extended Detention.
- Weir / Orifice Control - riser 1-year control for channel protection.
- Weir / Orifice Control - riser 2-year control for quantity (if required).
- Weir / Orifice Control - riser 10-year control for quantity (if required).
- Inlet / Outlet (barrel) control - (All Storms).
- Check for barrel control prior to riser orifice flow to prevent slug flow-water hammer conditions.
- Emergency spillway capacity and depth of flow.
- Elevation - Discharge (Outlet Rating) curve and/or table. Provide all supporting calculations and/or design assumptions.
- Adequate channel computations for receiving channel. May be waived if facility is designed based on current Stream Channel Protection criteria.

*POND or RESERVOIR ROUTING*

- Storage-Indication Routing of postdeveloped inflow hydrographs for the 1-, 2-, 10-, and 100-year design storms. Preference is for structure to discharge up to the 10-year storm through the principal spillway and pass the 100-year storm with a minimum 1 foot of freeboard through a combination principal and emergency spillways. If no emergency spillway is provided, riser must be large enough to pass the design high water flow and trash without overtopping the facility, have 3 square feet or more of cross-sectional area, contain a hood type inlet and have a minimum freeboard of 2 feet. Token spillways with minimum 8 ft. width are also recommended at or above the design 100-year storm elevation.
- Downstream hydrographs at established study points, if conditions warrant (ie. facility discharge combined with uncontrolled bypass).

*MISCELLANEOUS COMPUTATIONS*

- Water quality volume for permanent pool based on selected BMP treatment volume (WQv).
- Water quality volume for extended detention based on selected BMP treatment volume (WQv) with drawdown computations.
- Drawdown computations for the 1-year, 24 hour detention for stream channel protection criteria.
- Pond drain computations (within 24 hours).
- Anti-seep collar design (concrete preferred) or match material type.
- Filter diaphragm design (or alternative method of controlling seepage).

Yes No N/A

- Riser / base structure flotation analyses. FS = 1.25 minimum.
- Downstream danger reach study and/or emergency action plan (if conditions warrant).
- Upstream backwater analyses onto offsite adjacent property (if conditions warrant).
- 100 year floodplain impacts (if conditions warrant).

Yes No N/A

- GEOTECHNICAL REQUIREMENTS**
  - Geotechnical Report with recommendations specific to BMP facility type selected. Report prepared by a registered professional engineer. Requires submission, review and approval prior to issuance of Land Disturbance Permit.
  - Initial Feasibility Testing requirements satisfied as per Appendix E of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual. (Infiltration, Bioretention and Filtering System BMP types only).
  - Concept Design Testing requirements satisfied as per Appendix E of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual. (Infiltration, Bioretention and Filtering System BMP types only).
  - Minimum Boring locations: borrow area, pool area, principal control structure, top of facility near one abutment and emergency spillway if provided.
  - Boring logs with Unified Soil Classification (ASTM D2487), soils descriptions and depths to bedrock and the seasonal water table indicated.
  - Standard County Record Drawing/Construction Certification note provided on plan. *Note: It is understood that preparation of record drawings and construction certifications as required for project facilities may not necessarily be performed by the plan preparer. These components may be performed by others.*

**PRINCIPAL SPILLWAY PROFILE AND ASSOCIATED DETAILS**

- EXISTING GROUND AND PROPOSED GRADE**
  - Embankment or excavation side slopes labeled (3H:1V maximum).
  - Minimum top width labeled (per VESCH or VSMH requirements).
  - Removal of unsuitable material under proposed facility (per Geotechnical Report requirements).

Yes No N/A

*CORE TRENCH*

- Material (per plan or Geotechnical Report).
- Bottom width (4' minimum or greater as dictated by Geotechnical Report recommendations).
- Side slopes (1:1 maximum steepness)
- Depth (4' minimum or greater as dictated by Geotechnical Report).

*PRINCIPAL CONTROL STRUCTURE. RISER OR SIMILAR STRUCTURE (DETAILS REQUIRED FOR ALL ITEMS)*

- Durable, watertight, resistant material (concrete preferred).
- Riser diameter is at least 1.25 times larger than barrel diameter.
- All pertinent dimensions and elevations shown.
- Control orifice or weir dimensions and elevations shown.
- Trash rack - removable - for each release.
- Anti-vortex device, baffle or plate.
- Riser base structure with dimensions and embedment specifications (concrete preferred).
- Interior access (steps, ladders, etc.) for maintenance for structures over 4 feet in height. Excessively high risers may need some form of exterior access on top portion.
- Low flow orifice with trash rack device.

*PRINCIPAL CONTROL STRUCTURE OUTLET BARREL*

- Material (ASTM C-361 reinforced concrete pipe) with watertight joints. Prior approval required for all other pipe material (other RCP types, CMP, CPP, PVC, etc.).
- Support and bedding requirements for barrel - concrete cradles, etc. or as recommended by the Geotechnical Report.
- Pipe inverts, length, size, class and slope shown.
- Flared end section or endwall provided on barrel outlet.

*SEEPAGE CONTROL*

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

*ANTI-SEEP COLLARS*

- Anti-seep collar, concrete preferred.
- Size - 15 percent increase in length of saturation using outside pipe diameter.
- Spacing and location on barrel (located at least 2 feet from a pipe joint).

- FILTER DIAPHRAGMS*
- Design based on latest NRCS design methods and certified by a professional engineer.

Yes No N/A

- ELEVATION AND DIMENSIONAL DESIGN DATA*
- Top of facility - construction height and settled height (10 percent settlement).
- Crest of principal control structure spillway at least one (1) foot below crest of emergency spillway, if provided.
- Minimum freeboard of one (1) foot above the 100-year design high water elevation for facilities with an emergency spillway.
- Minimum freeboard of two (2) feet above the 100-year design high water elevation for facilities without an emergency spillway or in accordance with the SCS National Engineering Handbook (prior approval required).
- Basin Sediment Clean-Out elevation (permanent mode). Typically 10 to 25 percent of water quality volume.
  
- CROSS SECTION THROUGH FACILITY*
- Existing Ground.
- Proposed grade.
- Top of facility - 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.
  
- EMERGENCY SPILLWAY PROFILE*
- Existing ground.
- Inlet, level (control) and outlet sections per SCS.
- Spillway and crest elevations.
  
- PRETREATMENT DEVICES* of adequate depth and properly designed using required pretreatment volumes for the selected County BMP facility type. Including, but not limited to: sediment forebays, sediment basins, sumps, grass channels, gravel diaphragms, plunge pools, chamber separators, manufactured systems or other acceptable methods.

Yes No N/A

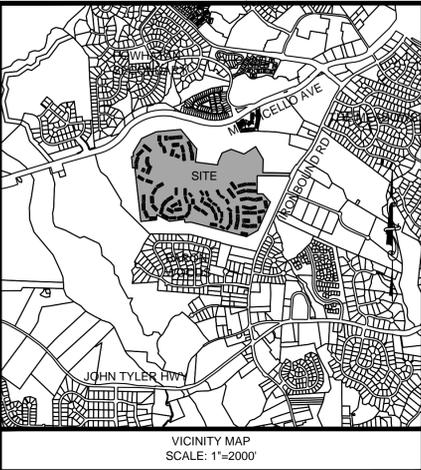
*CONSTRUCTION SPECIFICATIONS and NOTES*

- Anticipated sequence of construction for BMP (consistent with erosion and sediment control plan).
- Provisions to control base stream or storm flow conditions encountered during construction.
- Site and subgrade preparation requirements.
- Embankment, fill and backfill material soil and placement (lift) thickness requirements.
- Compaction and soil moisture content requirements.
- Geosynthetics for drainage, filtration, moisture barrier, separation, and reinforcement purposes.
- Clay or synthetic (PVC or HDPE) pond liners.
- Storm drain, underdrain and pipe conduit requirements.
- Minimum depth of pipe cover for temporary (construction) and final cover conditions.
- Permanent shutoff valve and pond drain.
- Concrete requirements for structural components.
- Riprap and slope protection.
- Access or maintenance road surface, base, subbase.
- Temporary and permanent stabilization measures.
- Temporary or permanent safety fencing.
- BMP Landscaping (deep, shallow, fringe, perimeter, etc.)
- Dust and traffic control (if warranted).
- Construction monitoring and certification by professional.
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

*MAINTENANCE PROVISIONS*

- Entity responsible for maintenance identified..
- Maintenance Plan which outlines the long-term schedule for inspection/maintenance of the facility and forebays
- Maintenance access from public right-of-way or publicly traveled road.
- Maintenance easement provided encompassing high water pool and buffer, principal and emergency spillways, outlet structures, forebays, embankment area and possible sediment-removal stockpile areas.
- Minimum 6 foot wide public safety shelf (landing) or alternative fencing.





# STORM AS-BUILT OF THE HISTORIC POWHATAN RESORT SIDEWALK & PARKING SPACE ADDITIONS

JAMES CITY COUNTY

BERKELY DISTRICT

VIRGINIA

## STATISTICAL INFORMATION

ZONE	PUD-R
DISTRICT	BERKELEY
PARCEL ID NO.	3740300001A
HYDROLOGIC UNIT CODE (HUC)	JL31
EXISTING USE	TIMESHARES
WATER	PUBLIC-JAMES CITY SERVICE AUTHORITY (INSIDE PSA)
SEWER	PUBLIC-JAMES CITY SERVICE AUTHORITY (INSIDE PSA)
SITE AREA	127.43 AC.

**NOTES:**

- 1) PER FEMA MAP NUMBER 51095C0120C DATED 9/28/07 THE SITE APPEARS TO BE IN FLOOD ZONE "X".
- 2) TOPOGRAPHIC SURVEY SHOWN HEREON IS BASED ON A FIELD SURVEY PERFORMED BY LANDTECH RESOURCES, INC. - FEBRUARY 2012.
- 3) THE EXISTENCE AND LOCATION (HORIZONTAL AND VERTICAL) OF EXISTING UTILITIES ARE NOT GUARANTEED AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
- 4) THE PROFESSIONAL ENGINEER WHOSE SEAL IS AFFIXED HEREON SHALL ACT AS THE "RESPONSIBLE LAND DISTURBER" FOR THE PLAN REVIEW PHASE OF THIS PROJECT. ONCE THE PLANS ARE APPROVED BY THE COUNTY THE OWNER/DEVELOPER SHALL PROVIDE THE COUNTY WITH THE NAME OF THE "RESPONSIBLE LAND DISTURBER" FOR THE CONSTRUCTION PHASE OF THE PROJECT.
- 5) THERE ARE NO ANTICIPATED OFFSITE LAND DISTURBING AREA ASSOCIATED WITH THE DEVELOPMENT OF THIS SITE.
- 6) THE OWNER WILL BE REQUIRED TO OBTAIN A VSMP PERMIT FROM THE VIRGINIA DEPARTMENT OF CONSERVATION & RECREATION IF THE DISTURBED AREA IS GREATER THAN 2,500 SF. THIS PERMIT WILL REQUIRE A STORMWATER POLLUTION PREVENTION PLAN.
- 7) STORMWATER RUNOFF FROM THE SITE DRAINS TO EXISTING ONSITE STORMWATER MANAGEMENT/BMP FACILITIES APPROVED IN MASTER PLAN MP-0002-1985 AND MP-0001-1992, THEREFORE ADDITIONAL STORMWATER QUALITY AND QUANTITY TREATMENT IS NOT REQUIRED FOR THIS PROPOSED IMPERVIOUS AREA ADDITION.
- 8) A LAND DISTURBING PERMIT AND SILTATION AGREEMENT, WITH SURETY ARE REQUIRED FOR THIS PROJECT.
- 9) HORIZONTAL DATUM AND VERTICAL DATUM BASED ON JCC GEODETIC MONUMENTATION STATION NO. 321.
- 10) THE SITE IS LOCATED IN SUBWATERSHED 210 OF THE POWHATAN CREEK WATERSHED.
- 11) THE CONTRACTOR SHALL BE VIGILANT AND MONITOR CONSTRUCTION (PARTICULARLY IN THE VICINITY OF THE MANOR HOUSE) TO ENSURE THAT NO HISTORICAL SITES ARE DISTURBED.
- 12) ALL NEW UTILITIES SHALL BE PLACED UNDERGROUND.
- 13) A BUILDING PERMIT AND SEPARATE SUBMITTAL IS REQUIRED FOR THE RETAINING WALL.
- 14) RECORD DRAWING AND CONSTRUCTION CERTIFICATION: THE STORMWATER MANAGEMENT/BMP FACILITY AND ASSOCIATED STORMWATER CONVEYANCE SYSTEMS PROPOSED FOR THIS PROJECT WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY. THIS ACTIVITY SHALL BE ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH CURRENT COUNTY GUIDELINES.
- 15) THIS DEVELOPMENT PLAN INCREASES THE IMPERVIOUS AREA OF THE SITE BY 2% AND INCREASES THE IMPERVIOUS AREA OF SUBWATERSHED 210 BY 0.4%. BMP PC 174 AND PC 121 WILL BE OVER EXCAVATED TO PROVIDE ADDITIONAL WATER VOLUME.

## OWNER/DEVELOPER

THE HISTORIC POWHATAN RESORT  
3601 IRONBOUND ROAD  
WILLIAMSBURG, VIRGINIA 23188  
CONTACT: MATT LITTLE  
PHONE: (757) 220-1200 EXT 13702  
FAX: (757) 253-0987

NO.	DATE	REVISION / COMMENT / NOTE

# RECORD DRAWING

**LandTech Resources, Inc.**  
Surveying • GPS • Engineering

3925 Midlands Rd, Williamsburg, VA 23188  
Phone: (757) 565-1677 Fax: (757) 565-0782  
web: landtechresources.com

COMMONWEALTH OF VIRGINIA  
*Matthew H. Connoy*  
MATTHEW H. CONNOY  
Lic. No. 48347  
06/16/2014  
PROFESSIONAL ENGINEER

JOB: 11-289  
DWG NO: 11-289  
DATE: 06/16/14  
DRAWN BY: MHC  
SHEET: C1 OF 19



SEE SHEET C4 FOR CONTINUATION

LAKE  
PC 009

BEFORE DIGGING CALL "MISS UTILITY"  
OF VIRGINIA AT 1 - 800 - 552 - 7001

**RECORD DRAWING**

SEE SHEET C6 FOR CONTINUATION

**STORM AS-BUILT OF  
THE HISTORICPOWHATAN RESORT  
SIDE WALK & PARKING SPACE ADDITIONS**

James City County Virginia

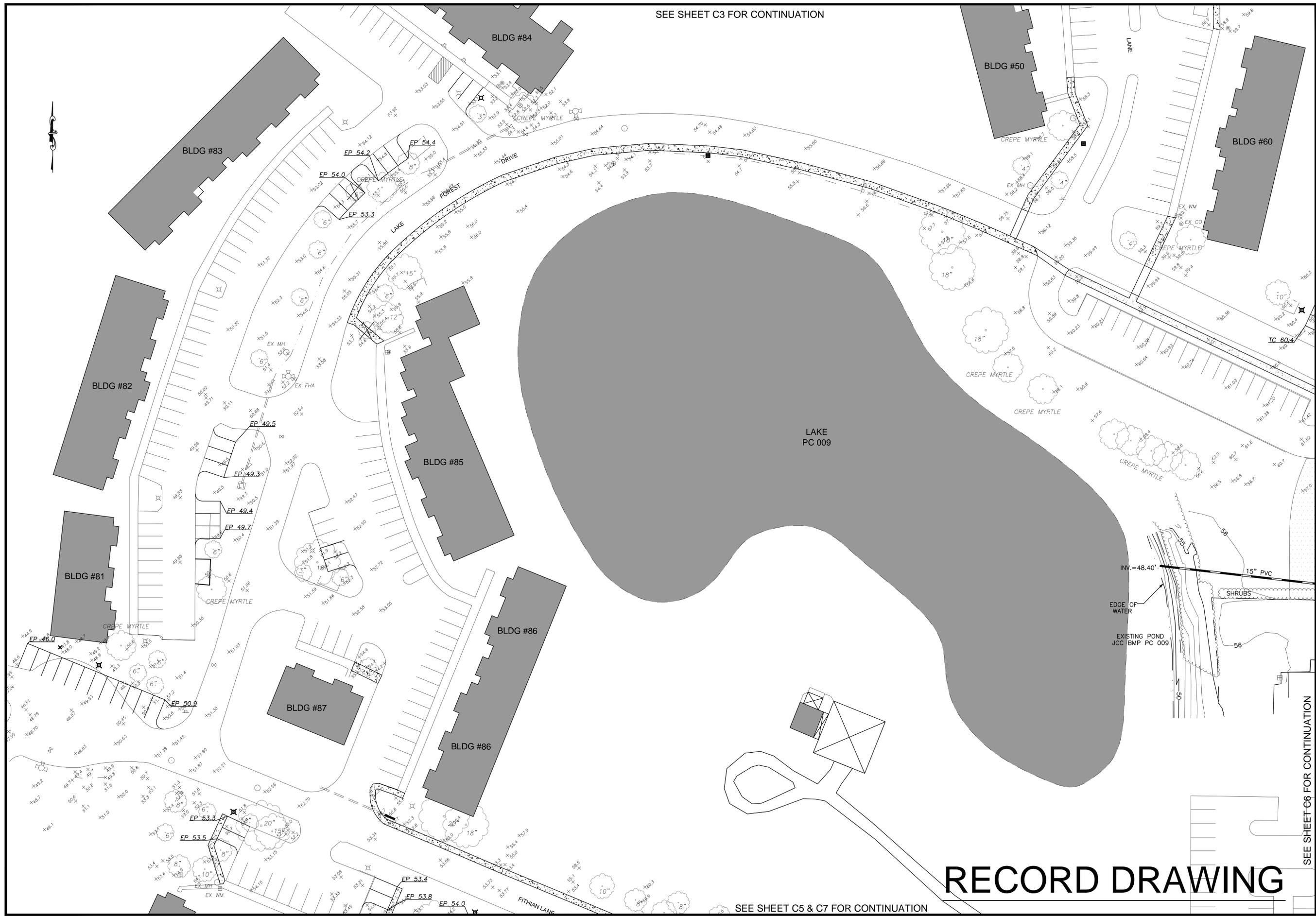
NO.	DATE	REVISION / COMMENT / NOTE



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 3925 Midlands Rd., Williamsburg, VA 23188  
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SCALE: 1" = 30'  
 DATE: 6/16/14  
 JOB: 11-289  
 DRAWN BY: MHC  
 SHEET: C3 OF 19

SEE SHEET C3 FOR CONTINUATION



# RECORD DRAWING

SEE SHEET C5 & C7 FOR CONTINUATION

**STORM AS-BUILT OF  
THE HISTORICPOWHATAN RESORT  
SIDE WALK & PARKING SPACE ADDITIONS**

James City County Virginia

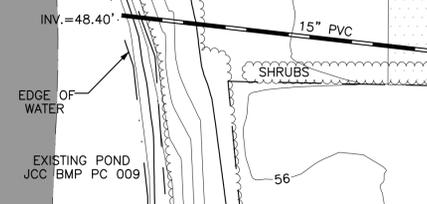
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 Phone: (757) 565-1677 Fax: (757) 565-0782  
 web: landtechresources.com

SEE SHEET C6 FOR CONTINUATION

SCALE: 1" = 30'
DATE: 06/16/2014
JOB: 11-289
DRAWN BY: MHC
SHEET: C4 OF 19





SEE SHEET C4 FOR CONTINUATION

SEE SHEET C7 FOR CONTINUATION

**STORM AS-BUILT OF  
THE HISTORIC POWHATAN RESORT  
SIDE WALK & PARKING SPACE ADDITIONS**

James City County Virginia

NO.	DATE	REVISION / COMMENT / NOTE



**LandTech Resources, Inc.**  
 Surveying • GPS • Engineering  
 3925 Midlands Rd., Williamsburg, VA 23186  
 Phone: (757) 565-1677 Fax: (757) 565-0782  
 web: landtechresources.com

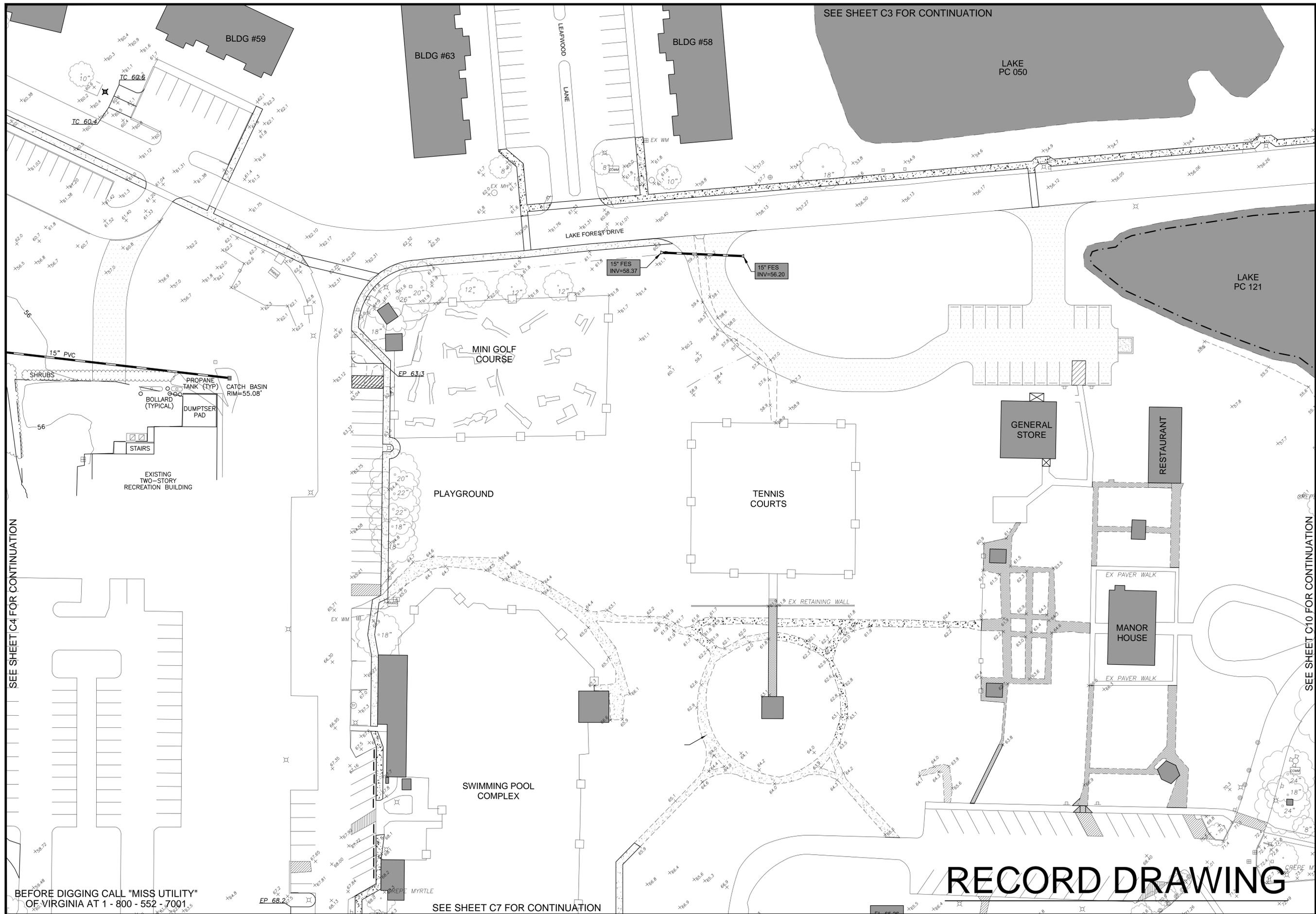
SCALE: 1" = 30'
DATE: 06/16/2014
JOB: 11-289
DRAWN BY: MHC
SHEET: C5 OF 19

BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1 - 800 - 552 - 7001

**RECORD DRAWING**

SEE SHEET C8 FOR CONTINUATION

LAKE PC 071



SEE SHEET C4 FOR CONTINUATION

BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1-800-552-7001

SEE SHEET C7 FOR CONTINUATION

SEE SHEET C3 FOR CONTINUATION

SEE SHEET C10 FOR CONTINUATION

**RECORD DRAWING**

**STORM AS-BUILT OF THE HISTORIC POWHATAN RESORT SIDE WALK & PARKING SPACE ADDITIONS**

James City County Virginia

NO.	DATE	REVISION / COMMENT / NOTE



**LandTech Resources, Inc.**  
 Surveying • GPS • Engineering  
 3925 Midland Rd., Williamsburg, VA 23188  
 Phone: (757) 565-1677 Fax: (757) 565-0782  
 web: landtechresources.com

SCALE: 1" = 30'  
 DATE: 06/16/2014  
 JOB: 11-289  
 DRAWN BY: MHC  
 SHEET: C6 OF 19





SEE SHEET C5 & C7 FOR CONTINUATION

LAKE  
PC 071

BLDG #47

BLDG #42

BLDG #34

BLDG #46

BLDG #33

BLDG #36

BLDG #43

BLDG #39

BLDG #45

BLDG #32

BLDG #38

BLDG #37

BLDG #44

BLDG #31

BLDG #30

BLDG #29

BEFORE DIGGING CALL "MISS UTILITY"  
OF VIRGINIA AT 1 - 800 - 552 - 7001

**RECORD DRAWING**

**STORM AS-BUILT OF  
THE HISTORICPOWHATAN RESORT  
SIDE WALK & PARKING SPACE ADDITIONS**

James City County  
Virginia

NO.	DATE	REVISION / COMMENT / NOTE



**LandTech Resources, Inc.**  
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SCALE: 1" = 30'  
DATE: 06/16/2014  
JOB: 11-289  
DRAWN BY: MHC  
SHEET: C8 OF 19

SEE SHEET C9 FOR CONTINUATION











SEE SHEET C14 FOR CONTINUATION

SEE SHEET C11 FOR CONTINUATION

BEFORE DIGGING CALL "MISS UTILITY"  
OF VIRGINIA AT 1 - 800 - 552 - 7001

**RECORD DRAWING**

SEE SHEET C12 FOR CONTINUATION

**STORM AS-BUILT OF  
THE HISTORICPOWHATAN RESORT**  
SIDE WALK & PARKING SPACE ADDITIONS  
James City County Virginia

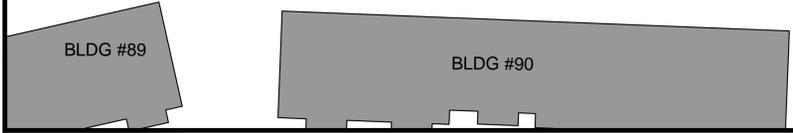
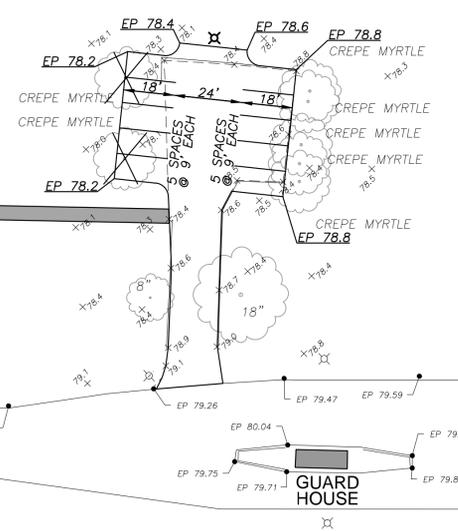
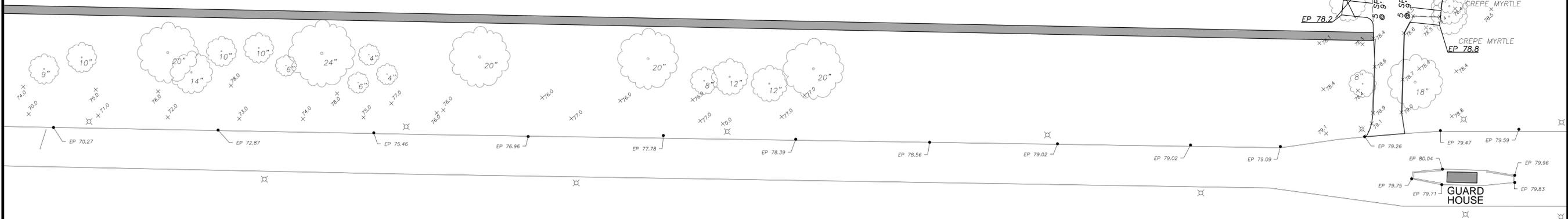
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3925 Midlans Rd. Williamsburg, VA 23188  
Phone: (757) 565-1677 Fax: (757) 565-0782  
web: landtechresources.com

SCALE: 1" = 30'
DATE: 06/16/2014
JOB: 11-289
DRAWN BY: MHC
SHEET: C13 OF 19

SEE SHEET C10 FOR CONTINUATION



SEE SHEET C13 FOR CONTINUATION

# RECORD DRAWING

NO.	DATE	REVISION / COMMENT / NOTE



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 3925 Midlons Rd., Williamsburg, VA 23188  
 Phone: (757) 565-1677 Fax: (757) 565-0782  
 web: landtechresources.com

SCALE: 1" = 30'  
 DATE: 06/16/2014  
 JOB: 11-289  
 DRAWN BY: MHC  
 SHEET: C14 OF 19

**STORM AS-BUILT OF  
 THE HISTORICPOWHATAN RESORT  
 SIDE WALK & PARKING SPACE ADDITIONS**  
 James City County  
 Virginia

**SP-0030-2013**

**PLANNING DIVISION**

**APR 17 2013**

**RECEIVED**

**Environmental Division**

**APR 19 2013**

**RECEIVED**

**Erosion and Sediment  
Control Narrative**

for

**Powhatan Resort  
Entrance Revisions  
3601 Ironbound Road**

**March 13, 2013**

**Project Number 13-019**

**FINAL  
COMPS.  
(ENTRANCE)**

**LandTech Resources, Inc.**  
205 Bulifants Blvd., Ste. E, Williamsburg, VA  
Phone 757-565-1677 Fax 757-565-0782

**Erosion and Sediment  
Control Narrative**

for

**Powhatan Resort  
Entrance Revisions  
3601 Ironbound Road**

**March 13, 2013**

**Project Number 13-019**



**LandTech Resources, Inc.**  
205 Bulifants Blvd., Ste. E, Williamsburg, VA  
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    Permanent Seeding – 3.32

## **PROJECT DESCRIPTION**

The project consists of the construction of a new sign, 200' of new fence and a 48' extension of the 18" RCP entrance culvert at The Historic Powhatan Resort at 3601 Ironbound Road in James City County, Virginia. The site is 127.43 acres and the project area is 1,575 +/- sf. The total disturbed area is approximately 1,575 sf.

## **EXISTING CONDITIONS**

Currently the site is open and contains numerous trees, sign and fences at the entrance to the resort.

## **ADJACENT AREAS**

The site is bounded on the north, south and west by open space in the resort and on the east by Ironbound Road and residential lots on the east of Ironbound Road.

## **OFF-SITE AREA**

There are no off-site areas proposed to be disturbed in association with this project. However, if it becomes necessary to disturb off-site areas, a revised erosion and sediment control plan will be prepared and submitted to the county for review and approval.

## **SOILS**

### **Slagle fine sandy loam (29B)**

This soil is deep, gently sloping, and moderately well drained.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 50 inches. It is mostly mottled yellowish brown clay loam to a depth of 25 inches. Below this depth, the subsoil is mostly mottled clay loam and sandy clay loam. The substratum is mottled sandy clay loam to a depth of at least 60 inches.

In this Slagle soil, permeability is moderate in the upper part of the subsoil and moderately slow or slow in the lower part. The erosion hazard is moderate and the subsoil has moderate shrink-swell potential.

## **CRITICAL EROSION AREAS**

The critical erosion area associated with this site is the existing roadside ditch and storm sewer drainage system that drain to the existing entrance along Ironbound Road. To prevent sediment from contaminating these areas, it is imperative that the contractor install all erosion and sediment control measures shown on these plans before any land disturbing activities commence.

Regular inspection and maintenance is also required for all erosion and sediment control measures to keep them functioning as designed.

## **EROSION AND SEDIMENT CONTROL MEASURES**

Unless otherwise indicated, all structural and vegetative erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the latest edition of Virginia Erosion and Sediment Control Handbook (VESCH). The minimum standards shall be adhered to unless otherwise waived or approved by variance.

### **STRUCTURAL PRACTICES**

#### **Rock Check Dam – 3.20**

Rock check dam shall be installed to reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the ditch. This practice also traps sediment generated from adjacent areas or the ditch itself, mainly by ponding of the stormwater runoff.

### **VEGETATIVE PRACTICES**

#### **Permanent Seeding – 3.32**

All denuded areas, which will be left dormant for extended periods of time, shall be seeded with permanent vegetation immediately following grading. Selection of the seed mixture will depend on the time of year it is applied.

### **MANAGEMENT STRATEGIES**

- Sediment trapping measures will be installed as the first step in grading and will be seeded and mulched immediately following installation.
- Temporary seeding or other stabilization will follow immediately after grading.
- The contractor shall be responsible for the installation and maintenance of all erosion and sediment control practices depicted on the Plans.
- After achieving adequate stabilization, the temporary controls will be cleaned and removed. Any areas disturbed in the removal process shall be graded, top soiled, and seeded accordingly.

### **PERMANENT STABILIZATION**

All areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Seeding shall be accomplished with Kentucky 31 Tall Fescue according to Standards and Specifications 3.32, Permanent Seeding of the VESCH. Soil stabilization blankets will be installed over slopes, which have been brought to final grade and have been seeded to protect the slopes from rill and gully erosion and to allow seed to germinate properly. Mulch (straw or fiber) will be used on relatively flat areas. In all seeding operations, seed, fertilizer and lime will be applied prior to mulching.

## **STORMWATER MANAGEMENT**

The project consists of the construction of a new sign, 200' of new fence and a 48' extension of the 18" RCP entrance culvert at The Historic Powhatan Resort at 3601 Ironbound Road in James City County, Virginia. Since there is no increase in the impervious area of the site there is no additional stormwater management required.

## **MAINTENANCE**

In general, all erosion and sediment control measures will be checked daily and after each significant rainfall. The following items will be checked in particular:

### **Rock Check Dam – 3.20**

Check dams shall be checked for sediment accumulation after each runoff-producing storm event. Sediment shall be removed when it reaches one half of the original height of the measure.

Regular inspections shall be made to insure that the center of the dam is lower than the edges. Erosion caused by high flows around the edges of the dam shall be corrected immediately.

### **Permanent Seeding – 3.32**

The seeded/mulched areas should be checked regularly to ensure that a good stand is established and maintained. Areas should be fertilized, mulched and re-seeded as needed. When it is clear that plants have not germinated on an area or have died, these areas must be re-seeded immediately to prevent erosion damage. However, it is extremely important to determine for what reason germination did not take place and make any corrective action necessary prior to re-seeding the area.

- Fertilizer shall be applied using approved fertilization methods and equipment.
- Formulations and application rates shall conform to the guidelines given in VESCH.

**Erosion and Sediment  
Control Narrative**

for

**Powhatan Resort Sidewalk &  
Parking Space Additions  
3601 Ironbound Road**

**May 11, 2012  
Revised July 20, 2012**

**Project Number 11-289  
JCC SP-0038-2012**

**LandTech Resources, Inc.**  
205 Bulifants Blvd., Ste. E, Williamsburg, VA  
Phone 757-565-1677 Fax 757-565-0782

Environmental Division

AUG 15 2012

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PLANNING DIVISION

AUG 14 2012

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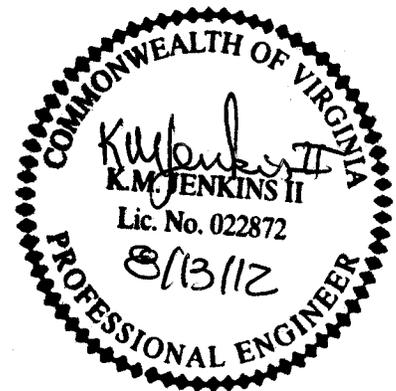
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- Permanent Seeding – 3.32

Culvert Design Calculations  
Special Stormwater Criteria

APPENDIX A  
APPENDIX B

## **PROJECT DESCRIPTION**

The project consists of the construction of 198 new parking spaces and additional sidewalk to connect all units to the central recreation facility on the site of The Historic Powhatan Resort at 3601 Ironbound Road in James City County, Virginia. The site is 127.43 acres and the project area is 3.0 +/- acres with a total of increase 114,489 sf of impervious area after the project is complete. The total disturbed area is approximately 3.0 acres.

## **EXISTING CONDITIONS**

Currently the site is open and contains numerous buildings, parking lots and recreational facilities. The site is currently served by 5 existing wet pond BMP's that will treat the additional runoff from the increase in impervious area.

## **ADJACENT AREAS**

The site is bounded on the north and west by woods and Monticello Ave., on the south by residential lots and on the east by Ironbound Road and residential lots.

## **OFF-SITE AREA**

There are no off-site areas proposed to be disturbed in association with this project. However, if it becomes necessary to disturb off-site areas, a revised erosion and sediment control plan will be prepared and submitted to the county for review and approval.

## **SOILS**

### **Craven fine sandy loam (10B)**

This soil is deep, gently sloping and moderately well drained.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale olive fine sandy loam 5 inches thick. The subsoil extends to a depth of 42 inches. It is yellowish brown clay in the upper part and yellowish brown sandy clay loam with gray mottles in the middle and lower parts. The substratum extends to a depth of at least 72 inches is brownish yellow fine sandy loam mottled with gray in the upper part and gray loamy fine sand mottled with yellow in the lower part.

The permeability of this Craven soil is slow and the erosion hazard is moderate. The subsoil is plastic and has moderate shrink-swell potential.

### **Craven fine sandy loam (10C)**

This soil is deep, strongly sloping and moderately well drained.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale olive fine sandy loam 5 inches thick. The subsoil extends to a depth of 42 inches. It is yellowish brown clay in the upper part and yellowish brown sandy clay loam with gray mottles in the middle and lower parts. The substratum extends to a depth of at least 72 inches. It is brownish yellow fine sandy loam with gray mottles in the upper part and gray loamy fine sand with yellow mottles in the lower part.

The permeability of this Craven soil is slow and the erosion hazard is moderate. The subsoil is plastic and has moderate shrink-swell potential.

### **Craven-Uchee complex (11C)**

This complex consists of moderately well drained Craven soils and well drained Uchee soils.

Typically, the surface layer of the Craven soils is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale olive fine sandy loam 5 inches thick. The subsoil extends to a depth of 42 inches. It is yellowish brown clay in the upper part and yellowish brown sandy clay loam mottled with gray in the middle and lower parts. The substratum to a depth of at least 72 inches is brownish yellow fine sandy loam mottled with gray in the upper part and gray loamy fine sand mottled with yellow in the lower part.

Typically, the surface layer of the Uchee soils is dark grayish brown loamy fine sand about 5 inches thick. The subsurface layer is light yellowish brown and very pale brown loamy fine sand 19 inches thick. The subsoil extends to a depth of 56 inches. It is strong brown sandy clay loam above a depth of 36 inches and strong brown sandy clay loam and clay mottled with gray and red from 36 to 56 inches. The substratum from 56 inches to at least 65 inches is variegated red, brown, and gray stratified sandy loam and sandy clay loam.

In the Craven soils, permeability is slow; and in the Uchee soils, it is moderate in the upper part of the subsoil and moderately slow in the lower part. The erosion hazard is severe and the subsoil has moderate shrink-swell potential.

### **Kempsville-Emporia fine sandy loams (19B)**

This complex consists of deep, gently sloping, well drained soils that are so intermingled that it is not practical to separate them at the scale used in mapping.

Typically, the surface layer of this Kempsville soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam 10 inches thick. The subsoil extends to a depth of 55 inches. It is yellowish brown and strong brown fine sandy loam and sandy clay loam to a depth of 32 inches. Below this, the subsoil is mottled fine sandy loam that is somewhat firm and compact over yellowish brown sandy clay loam. The substratum is yellowish brown fine sandy loam to a depth of at least 68 inches.

Typically, the surface layer of Emporia soils is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale brown loam 9 inches thick. The subsoil extends to a

depth of 58 inches. It is yellowish brown loam with mostly strong mottles in the upper part, yellowish brown, firm sandy clay loam with strong brown and gray mottles in the middle part, and mottled gray and brown firm sandy clay loam in the lower part. The substratum is variegated brown, red and gray firm sandy clay loam to a depth of at least 75 inches.

The permeability of the Kempsville soil is moderate. In these Emporia soils, permeability is moderate in the upper part of the subsoil and moderately slow to slow in the lower part. The erosion hazard is moderate. The subsoil of the Kempsville soil has low shrink-swell potential, and that of the Emporia soil has moderate shrink-swell potential.

### **Slagle fine sandy loam (29B)**

This soil is deep, gently sloping, and moderately well drained.

Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam 5 inches thick. The subsoil extends to a depth of 50 inches. It is mostly mottled yellowish brown clay loam to a depth of 25 inches. Below this depth, the subsoil is mostly mottled clay loam and sandy clay loam. The substratum is mottled sandy clay loam to a depth of at least 60 inches.

In this Slagle soil, permeability is moderate in the upper part of the subsoil and moderately slow or slow in the lower part. The erosion hazard is moderate and the subsoil has moderate shrink-swell potential.

### **Udorthents, loamy (35)**

This unit consists of deep, well drained and moderately well drained loamy soil material in areas where the soils have been disturbed during excavation and grading.

Included in mapping are small areas of undisturbed, well drained Caroline, Emporia, Suffolk, Pamunkey, and Uchee soils, moderately well drained Slagle and Izagora soils, and poorly drained Bethera soils.

The permeability ranges from moderately rapid to slow. The erosion hazard ranges from slight to severe.

## **CRITICAL EROSION AREAS**

The critical erosion area associated with this site is the existing ditch and storm sewer drainage system that drain to the existing onsite BMP's. To prevent sediment from contaminating these areas, it is imperative that the contractor install all erosion and sediment control measures shown on these plans before any land disturbing activities commence. Regular inspection and maintenance is also required for all erosion and sediment control measures to keep them functioning as designed.

## **EROSION AND SEDIMENT CONTROL MEASURES**

Unless otherwise indicated, all structural and vegetative erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the latest edition of Virginia Erosion and Sediment Control Handbook (VESCH). The minimum standards shall be adhered to unless otherwise waived or approved by variance.

### **STRUCTURAL PRACTICES**

#### **Silt Fence – 3.05**

Silt fence shall be placed around the limits of clearing to intercept and detain small amounts of sediment from disturbed areas during construction operations.

#### **Inlet Protection – 3.07**

Inlet protection shall be installed to prevent sediment from entering the storm drainage system prior to permanent stabilization of the disturbed area.

#### **Culvert Inlet Protection – 3.08**

Culvert inlet protection shall be installed to prevent sediment from entering, accumulating in and being transferred by a culvert prior to permanent stabilization of a disturbed project area.

#### **Tree Preservation & Protection – 3.38**

Tree preservation and protection shall be installed to protect desirable trees from mechanical and other injury during land disturbing and construction activity.

### **VEGETATIVE PRACTICES**

#### **Permanent Seeding – 3.32**

All denuded areas, which will be left dormant for extended periods of time, shall be seeded with permanent vegetation immediately following grading. Selection of the seed mixture will depend on the time of year it is applied.

### **MANAGEMENT STRATEGIES**

- Sediment trapping measures will be installed as the first step in grading and will be seeded and mulched immediately following installation.
- Temporary seeding or other stabilization will follow immediate after grading.
- The contractor shall be responsible for the installation and maintenance of all erosion and sediment control practices depicted on the Plans.

- After achieving adequate stabilization, the temporary controls will be cleaned and removed. Any areas disturbed in the removal process shall be graded, top soiled, and seeded accordingly.

## **PERMANENT STABILIZATION**

All areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Seeding shall be accomplished with Kentucky 31 Tall Fescue according to Standards and Specifications 3.32, Permanent Seeding of the VESCH. Soil stabilization blankets will be installed over slopes, which have been brought to final grade and have been seeded to protect the slopes from rill and gully erosion and to allow seed to germinate properly. Mulch (straw or fiber) will be used on relatively flat areas. In all seeding operations, seed, fertilizer and lime will be applied prior to mulching.

## **STORMWATER MANAGEMENT**

This project is for the construction of 198 new parking spaces and additional sidewalk to connect all units to the central recreation facility on the site of The Historic Powhatan Resort at 3601 Ironbound Road in James City County, Virginia. The site is 127.43 acres and the project area is 3.0 +/- acres with a total of increase 114,489 sf of impervious area after the project is complete. The increase in impervious area drains to the onsite five wet pond BMP's. These five wet ponds are part of the approved masterplan's MP-0002-1985 and MP-0001-1992 for the development and have been designed to treat the stormwater runoff from both a water quality and water quantity standpoint. Since the additional stormwater runoff is treated by the existing onsite wet pond BMP's, no additional stormwater management is required.

## **CALCULATIONS**

Appendix A contains culvert design calculations.

Appendix B contains Special Stormwater Criteria (SSC) calculations

## **MAINTENANCE**

In general, all erosion and sediment control measures will be checked daily and after each significant rainfall. The following items will be checked in particular:

### **Silt Fence – 3.05**

Silt Fences shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting.

Should the fabric on a silt fence decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately one-half the height of the barrier.

Any sediment deposits remaining in place after the silt fence is no longer required shall be dressed to conform with the existing grade, prepared and seeded.

### **Inlet Protection – 3.07**

The structure shall be inspected after each rain and repairs made as needed.

Sediment shall be removed and the trap restored to its original dimensions when sediment has accumulated to one half the design depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.

Structures shall be removed and the area stabilized when the remaining drainage area has been properly stabilized.

### **Culvert Inlet Protection – 3.08**

The structure shall be inspected after each rain and repairs made as needed.

Sediment shall be removed and the impoundment restored to its original dimensions when sediment has accumulated to one-half the design depth. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems.

Temporary structures shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

### **Permanent Seeding – 3.32**

The seeded/mulched areas should be checked regularly to ensure that a good stand is established and maintained. Areas should be fertilized, mulched and re-seeded as needed. When it is clear that plants have not germinated on an area or have died, these areas must be re-seeded immediately to prevent erosion damage. However, it is extremely important to determine for what reason germination did not take place and make any corrective action necessary prior to re-seeding the area.

- Fertilizer shall be applied using approved fertilization methods and equipment.
- Formulations and application rates shall conform to the guidelines given in VESCH.

**APPENDIX A**

CULVERT DESIGN  
Culvert #1

$c = \underline{.69}$   
 $A = \underline{.32}$  Ac.  
OVERLAND FLOW

	<u>C</u>	<u>A</u>	<u>CA</u>
Road/Concrete	.90	.20	.18
Grass	.30	.12	.04
		<u>.32</u>	<u>.22</u>

$L = \underline{40}$  ft.  
 $S = \underline{2.0}$  %  
 $T_c = \underline{3}$  min.

CHANNEL FLOW

$H = \underline{1}$  ft.  
 $L = \underline{200}$  ft.  
 $T_c = \underline{2}$  min.

$T_c = \underline{5}$  min

$i_{10} = \underline{7.2}$  in/hr

$Q = CAi = (\underline{.69})(\underline{.32} \text{ Ac.})(\underline{7.2} \text{ in/hr})$

$Q = \underline{1.59}$  cfs  
 $L = \underline{12}$  ft.  
 $S = \underline{0.5}$  %  
 $HW = \underline{1}$  ft.

$Inv_i = \underline{66.0}$   
 $Inv_o = \underline{65.94}$

INLET CONTROL

$D = \underline{12}$  in. or 1.0 ft.

$HW/D = \underline{.79}$

$HW = (\underline{1.0} \text{ ft.})(\underline{.79}) = \underline{.79} \text{ ft.} < \underline{1.0} \text{ ft.}$

# Culvert Report

## Culvert #1

Invert Elev Dn (ft) = 65.94  
 Pipe Length (ft) = 12.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 66.00  
 Rise (in) = 12.0  
 Shape = Cir  
 Span (in) = 12.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

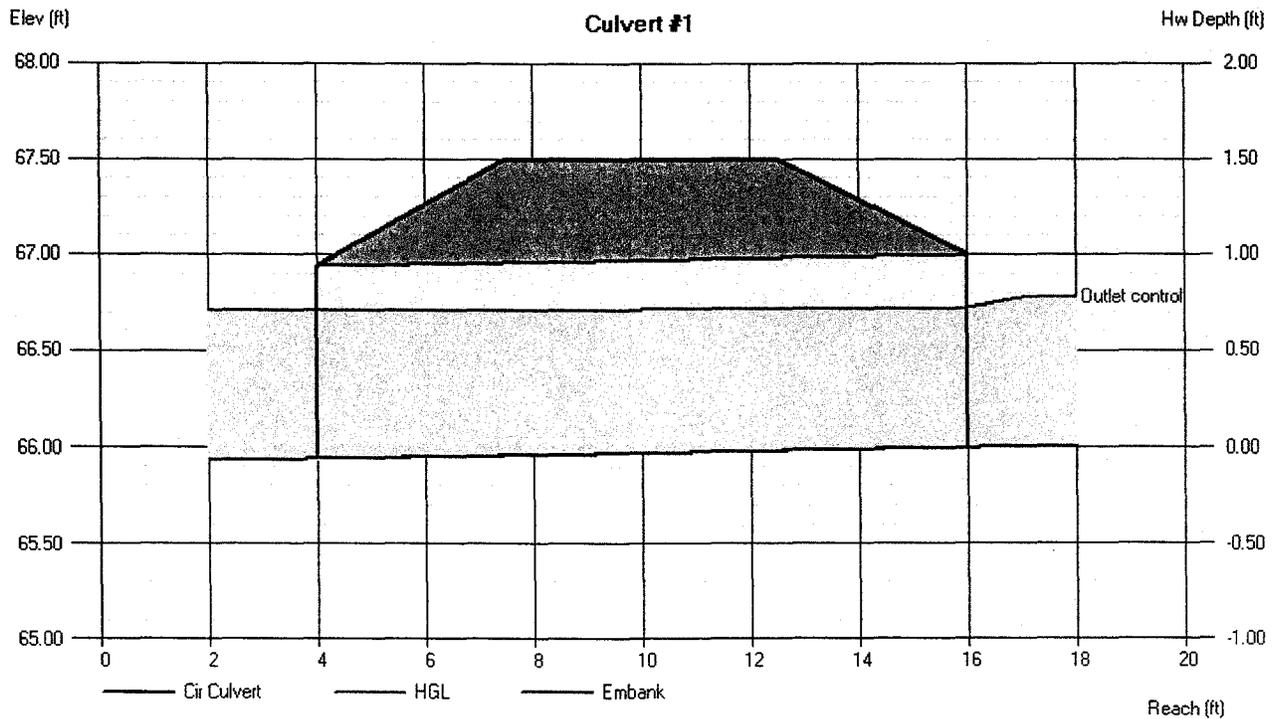
Top Elevation (ft) = 67.50  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 1.59  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 1.59  
 Qpipe (cfs) = 1.59  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 2.45  
 Veloc Up (ft/s) = 2.60  
 HGL Dn (ft) = 66.71  
 HGL Up (ft) = 66.73  
 Hw Elev (ft) = 66.78  
 Hw/D (ft) = 0.78  
 Flow Regime = Outlet Control



CULVERT DESIGN  
Culvert #2

$c = \underline{.39}$   
 $A = \underline{.51}$  Ac.  
OVERLAND FLOW

	<u>C</u>	<u>A</u>	<u>CA</u>
Road/Concrete	<u>.90</u>	<u>.24</u>	<u>.22</u>
Grass	<u>.30</u>	<u>.27</u>	<u>.08</u>
		<u>.51</u>	<u>.30</u>

$L = \underline{\quad}$  ft.  
 $S = \underline{\quad}$  %  
 $T_c = \underline{\quad}$  min.

CHANNEL FLOW

$H = \underline{\quad}$  ft.  
 $L = \underline{\quad}$  ft.  
 $T_c = \underline{\quad}$  min.

$T_c = \underline{5}$  min

$i_{10} = \underline{7.2}$  in/hr

$Q = CAi = (\underline{.59})(\underline{.51} \text{ Ac.})(\underline{7.2} \text{ in/hr})$

$Q = \underline{2.17}$  cfs

$Inv_i = \underline{66.50}$

$L = \underline{16}$  ft.

$Inv_o = \underline{66.42}$

$S = \underline{0.5}$  %

$HW = \underline{1.5}$  ft.

INLET CONTROL

$D = \underline{18}$  in. or 1.5 ft.

$HW/D = \underline{.54}$

$HW = (\underline{1.5} \text{ ft.})(\underline{.54}) = \underline{.81} \text{ ft.} < \underline{1.5} \text{ ft.}$

# Culvert Report

## Culvert #2

Invert Elev Dn (ft) = 66.42  
 Pipe Length (ft) = 16.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 66.50  
 Rise (in) = 18.0  
 Shape = Cir  
 Span (in) = 18.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

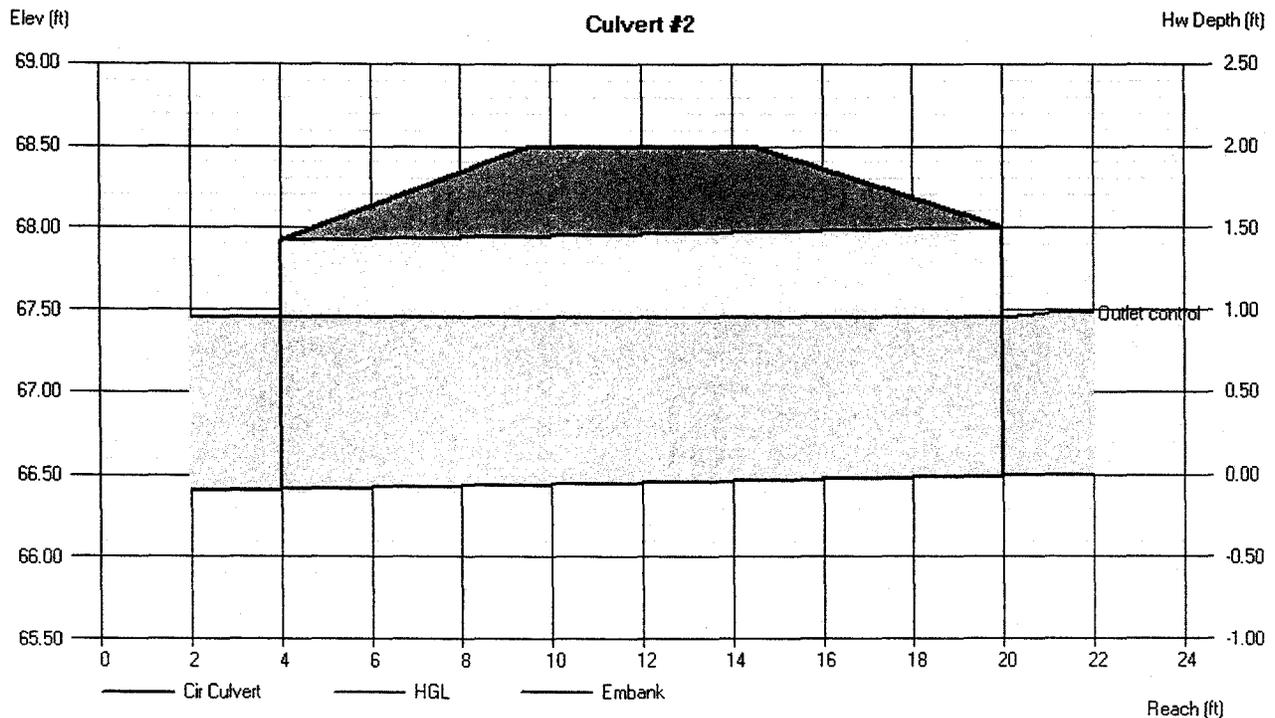
Top Elevation (ft) = 68.50  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 2.17  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 2.17  
 Qpipe (cfs) = 2.17  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 1.68  
 Veloc Up (ft/s) = 1.83  
 HGL Dn (ft) = 67.45  
 HGL Up (ft) = 67.45  
 Hw Elev (ft) = 67.48  
 Hw/D (ft) = 0.65  
 Flow Regime = Outlet Control



CULVERT DESIGN  
Culvert #3

$c = \underline{.66}$   
 $A = \underline{.29}$  Ac.  
OVERLAND FLOW

Road/Concrete  
 Grass

<u>C</u>	<u>A</u>	<u>CA</u>
.90	.17	.15
.30	.12	.04
	.29	.19

$L = \underline{\quad}$  ft.  
 $S = \underline{\quad}$  %  
 $T_c = \underline{\quad}$  min.

CHANNEL FLOW

$H = \underline{\quad}$  ft.  
 $L = \underline{\quad}$  ft.  
 $T_c = \underline{\quad}$  min.

$T_c = \underline{5}$  min

$i_{10} = \underline{7.2}$  in/hr

$Q = CAi = (\underline{.66})(\underline{.29} \text{ Ac.})(\underline{7.2} \text{ in/hr})$

$Q = \underline{1.38}$  cfs  
 $L = \underline{12}$  ft.  
 $S = \underline{0.5}$  %  
 $HW = \underline{1.0}$  ft.

$Inv_i = \underline{67.50}$   
 $Inv_o = \underline{67.44}$

INLET CONTROL

$D = \underline{12}$  in. or 1.0 ft.

$HW/D = \underline{.70}$        $HW = (\underline{1.0} \text{ ft.})(\underline{.70}) = \underline{.70} \text{ ft.} < \underline{1.0} \text{ ft.}$

# Culvert Report

## Culvert #3

Invert Elev Dn (ft) = 67.44  
 Pipe Length (ft) = 12.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 67.50  
 Rise (in) = 12.0  
 Shape = Cir  
 Span (in) = 12.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

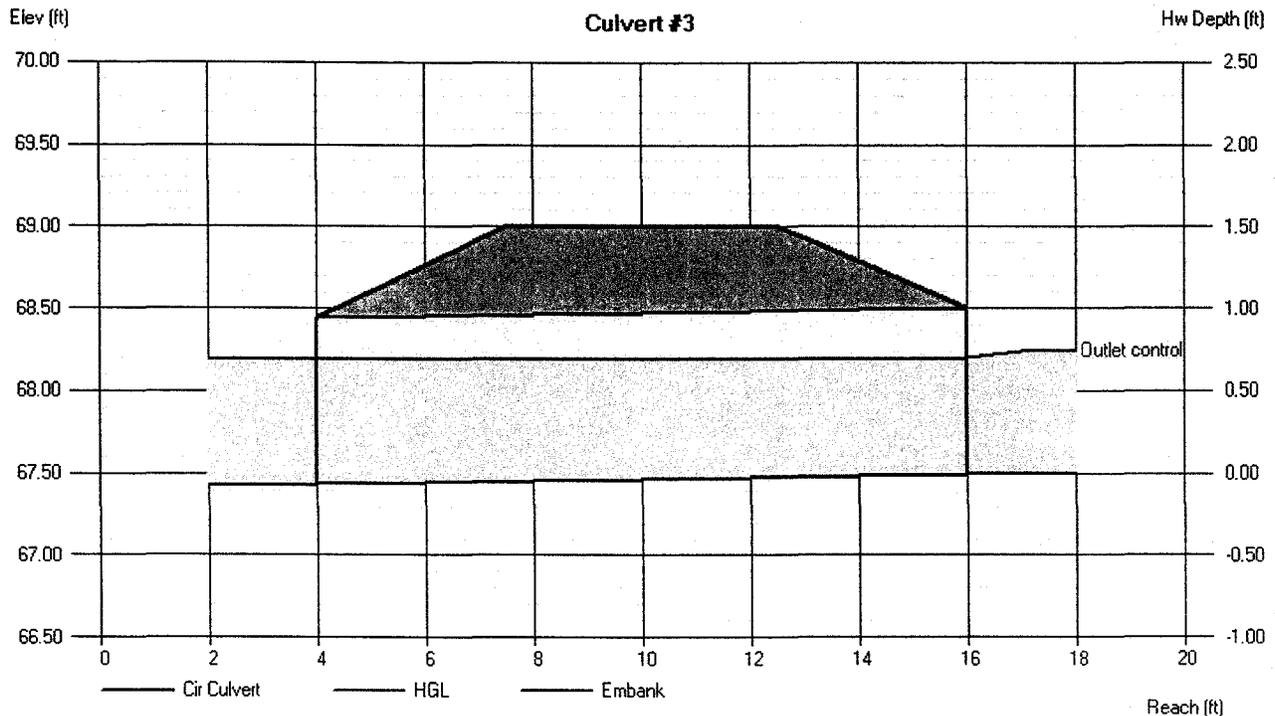
Top Elevation (ft) = 69.00  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 1.38  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 1.38  
 Qpipe (cfs) = 1.38  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 2.18  
 Veloc Up (ft/s) = 2.35  
 HGL Dn (ft) = 68.19  
 HGL Up (ft) = 68.20  
 Hw Elev (ft) = 68.24  
 Hw/D (ft) = 0.74  
 Flow Regime = Outlet Control



CULVERT DESIGN  
 Culvert #4

$c = .28$   
 $A = 4.25 \text{ Ac.}$   
OVERLAND FLOW

	$C$	$A$	$CA$
Road	.90	.51	.46
Gross	.20	3.74	.75
		4.25	1.21

$L = 80 \text{ ft.}$   
 $S = 1.0 \%$   
 $T_c = 12 \text{ min.}$

CHANNEL FLOW

$H = 20 \text{ ft.}$   
 $L = 1850 \text{ ft.}$   
 $T_c = 14 \text{ min.}$

$T_c = 26 \text{ min}$

$i_{10} = 3.9 \text{ in/hr}$

$Q = CAI = (.28)(4.25 \text{ Ac.})(3.9 \text{ in/hr})$

$Q = 4.64 \text{ cfs}$   
 $L = 24 \text{ ft.}$   
 $S = 0.5 \%$   
 $HW = 1.17 \text{ ft.}$   
 $Inv_i = 57.00$   
 $Inv_o = 56.88$

INLET CONTROL

$D = 14 \text{ in. or } 1.17 \text{ ft. (USE 23" x 14" HE RCP)}$

$HW/D = .78$   
 $HW = (1.17 \text{ ft.})(.78) = .91 \text{ ft.} < 1.17 \text{ ft.}$

# Culvert Report

## Culvert #4

Invert Elev Dn (ft) = 56.88  
Pipe Length (ft) = 24.00  
Slope (%) = 0.50  
Invert Elev Up (ft) = 57.00  
Rise (in) = 14.0  
Shape = Ell  
Span (in) = 23.0  
No. Barrels = 1  
n-Value = 0.013  
Inlet Edge = Projecting  
Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

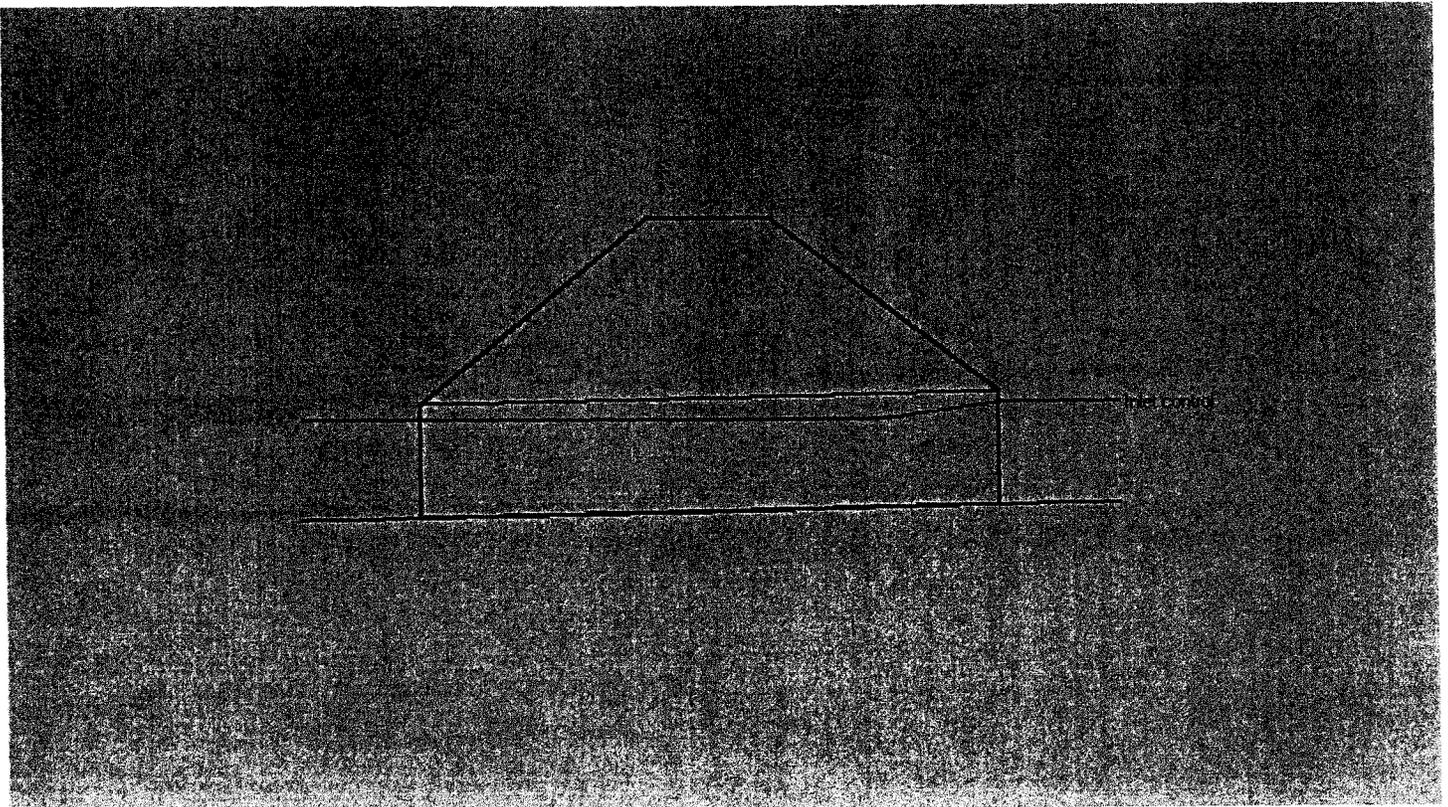
Top Elevation (ft) = 60.00  
Top Width (ft) = 5.00  
Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
Qmax (cfs) = 4.64  
Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 4.64  
Qpipe (cfs) = 4.64  
Qovertop (cfs) = 0.00  
Veloc Dn (ft/s) = 2.93  
Veloc Up (ft/s) = 3.31  
HGL Dn (ft) = 57.87  
HGL Up (ft) = 57.88  
Hw Elev (ft) = 58.05  
Hw/D (ft) = 0.90  
Flow Regime = Inlet Control



CULVERT DESIGN

Culvert #5

$c = .37$   
 $A = 3.10$  Ac.  
OVERLAND FLOW

	<u>C</u>	<u>A</u>	<u>CA</u>
ROAD	.40	0.37	0.33
Grass	.30	2.73	0.82
		3.10	1.15

$L = 80$  ft.  
 $S = 1.0$  %  
 $T_c = 12$  min.

CHANNEL FLOW

$H = 16$  ft.  
 $L = 1350$  ft.  
 $T_c = 11$  min.

$T_c = 23$  min

$i_{10} = 4.15$  in/hr

$Q = CAi = (.37)(3.10 \text{ Ac.})(4.15 \text{ in/hr})$

$Q = 4.76$  cfs

$Inv_i = 62.50$

$L = 12$  ft.

$Inv_o = 62.44$

$S = 0.5$  %

$HW = 1.17$  ft.

INLET CONTROL

$D = 14$  in. or  $1.17$  ft. (USE 23" x 14" HE RCP)

$HW/D = .80$

$HW = (1.17 \text{ ft.})(.80) = .94 \text{ ft.} < 1.17 \text{ ft.}$

# Culvert Report

## Culvert #5

Invert Elev Dn (ft) = 62.44  
 Pipe Length (ft) = 12.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 62.50  
 Rise (in) = 14.0  
 Shape = Ell  
 Span (in) = 23.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

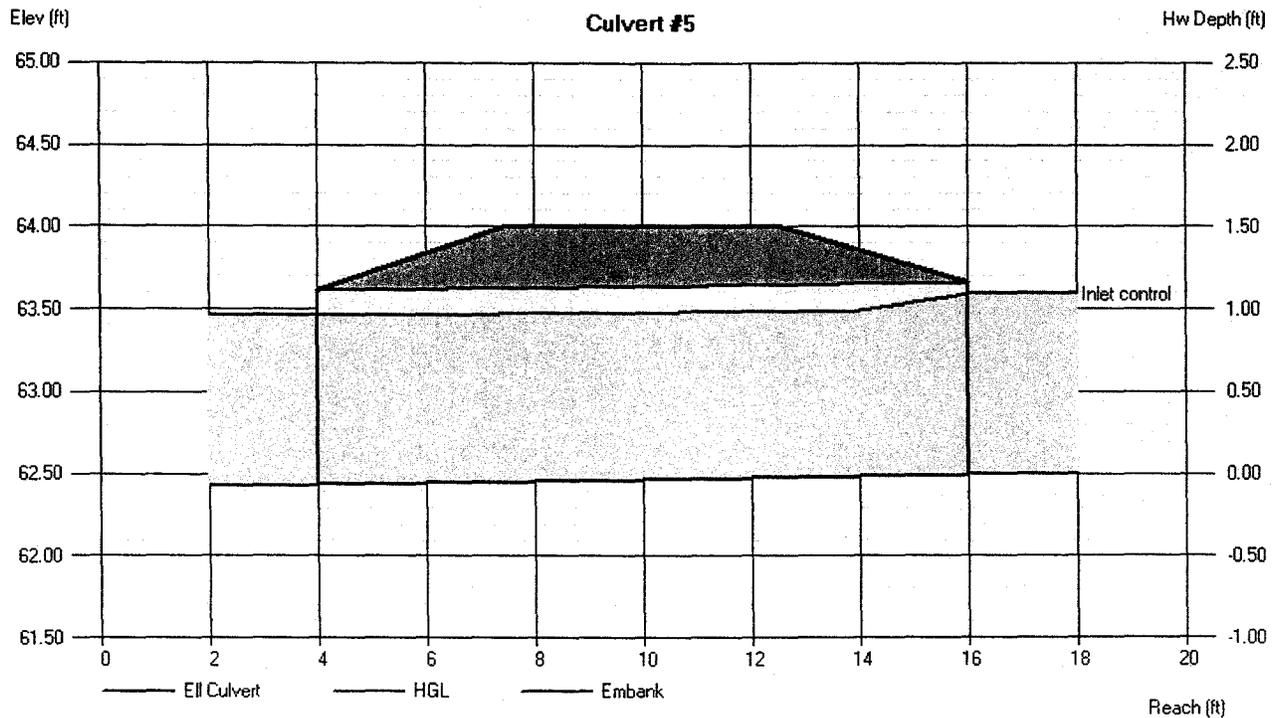
Top Elevation (ft) = 64.00  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 4.76  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 4.76  
 Qpipe (cfs) = 4.76  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 2.87  
 Veloc Up (ft/s) = 3.00  
 HGL Dn (ft) = 63.46  
 HGL Up (ft) = 63.49  
 Hw Elev (ft) = 63.59  
 Hw/D (ft) = 0.93  
 Flow Regime = Inlet Control



CULVERT DESIGN  
 Culvert #6

$c = .37$   
 $A = 3.10$  Ac.  
OVERLAND FLOW

	$\frac{C}{A}$	$\frac{A}{CA}$	$\frac{CA}{CA}$
Road	.90	.37	0.33
Grass	.30	2.73	0.82
		3.10	1.15

$L = 80$  ft.  
 $S = 1.0$  %  
 $T_c = 12$  min.

CHANNEL FLOW

$H = 16$  ft.  
 $L = 1350$  ft.  
 $T_c = 11$  min.

$T_c = 23$  min

$i_{10} = 4.15$  in/hr

$Q = CAi = (.37)(3.10 \text{ Ac.})(4.15 \text{ in/hr})$

$Q = 4.76$  cfs  
 $L = 12$  ft.  
 $S = 0.5$  %  
 $HW = 1.17$  ft.  
 $Inv_i = 62.00$   
 $Inv_o = 61.94$

INLET CONTROL

$D = 14$  in. or  $1.17$  ft. (USE 23" x 14" HE REP)

$HW/D = .80$        $HW = (1.17 \text{ ft.})(.80) = .94 \text{ ft.} < 1.17 \text{ ft.}$

# Culvert Report

## Culvert #6

Invert Elev Dn (ft) = 62.44  
 Pipe Length (ft) = 12.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 62.50  
 Rise (in) = 14.0  
 Shape = Ell  
 Span (in) = 23.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

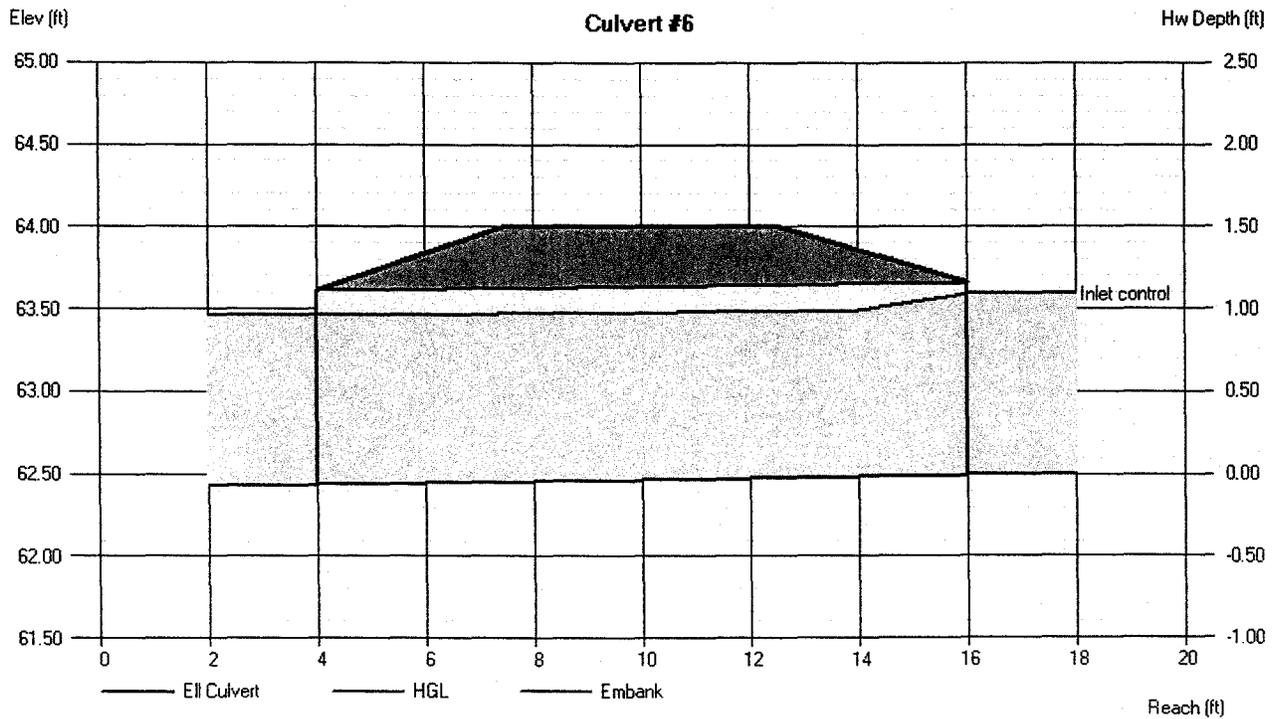
Top Elevation (ft) = 64.00  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 4.76  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 4.76  
 Qpipe (cfs) = 4.76  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 2.87  
 Veloc Up (ft/s) = 3.00  
 HGL Dn (ft) = 63.46  
 HGL Up (ft) = 63.49  
 Hw Elev (ft) = 63.59  
 Hw/D (ft) = 0.93  
 Flow Regime = Inlet Control



CULVERT DESIGN  
 Culvert #7

$c = .40$   
 $A = .48$  Ac.  
OVERLAND FLOW

	$C$	$A$	$CA$
Road	.90	.08	.07
Grass	.30	.40	.12
		.48	.19

$L =$  \_\_\_\_\_ ft.  
 $S =$  \_\_\_\_\_ %  
 $T_c =$  \_\_\_\_\_ min.

CHANNEL FLOW

$H =$  \_\_\_\_\_ ft.  
 $L =$  \_\_\_\_\_ ft.  
 $T_c =$  \_\_\_\_\_ min.

$T_c =$  5 min

$i_{10} =$  7.2 in/hr

$Q = CAi = (.40)(.48 \text{ Ac.})(7.2 \text{ in/hr})$

$Q =$  1.38 cfs  
 $L =$  16 ft.  
 $S =$  0.5 %  
 $HW =$  1.0 ft.

$Inv_1 =$  65.68  
 $Inv_0 =$  65.60

INLET CONTROL

$D =$  12 in. or 1.0 ft.

$HW/D =$  .71       $HW = (1.0 \text{ ft.})(.71) = .71 \text{ ft.} < 1.0 \text{ ft.}$

# Culvert Report

## Culvert #7

Invert Elev Dn (ft) = 65.60  
 Pipe Length (ft) = 16.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 65.68  
 Rise (in) = 12.0  
 Shape = Cir  
 Span (in) = 12.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

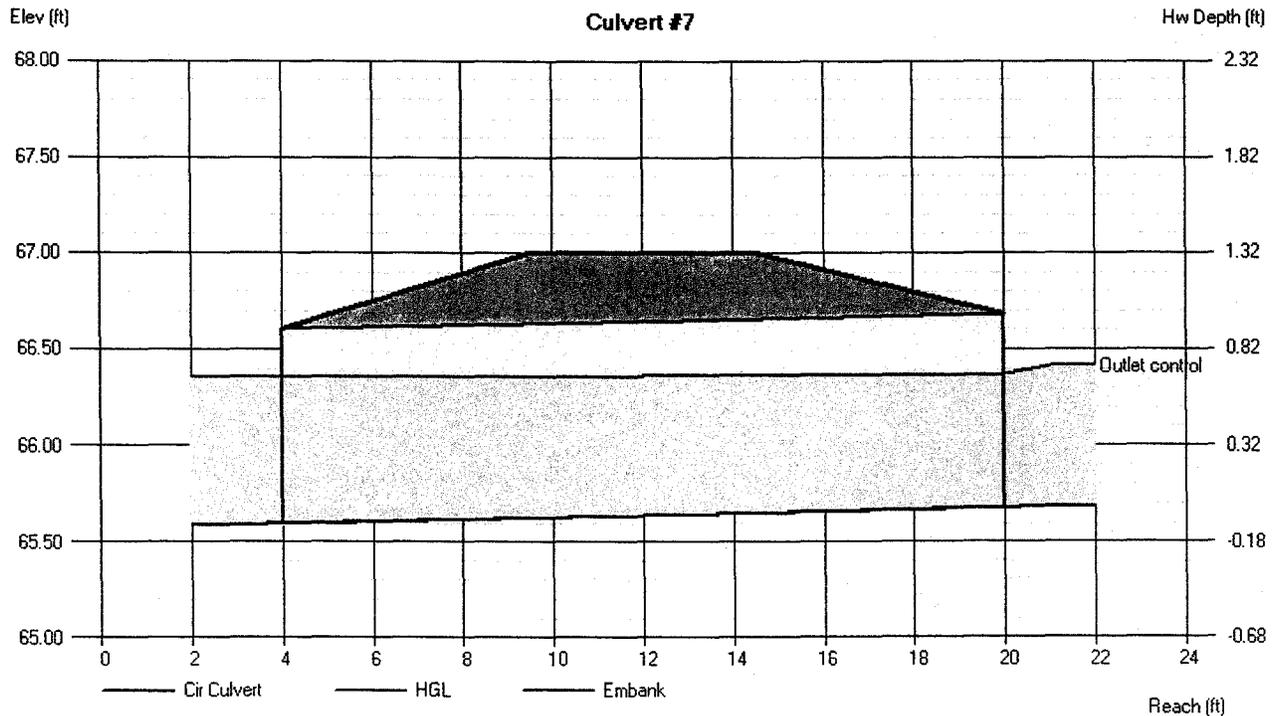
Top Elevation (ft) = 67.00  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 1.38  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 1.38  
 Qpipe (cfs) = 1.38  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 2.18  
 Veloc Up (ft/s) = 2.40  
 HGL Dn (ft) = 66.35  
 HGL Up (ft) = 66.37  
 Hw Elev (ft) = 66.41  
 Hw/D (ft) = 0.73  
 Flow Regime = Outlet Control



CULVERT DESIGN

Culvert # 8

$c = \underline{.67}$   
 $A = \underline{.12}$  Ac.  
OVERLAND FLOW

	$c$	$A$	$cA$
Road	<u>.90</u>	<u>.07</u>	<u>.06</u>
Grass	<u>.30</u>	<u>.05</u>	<u>.02</u>
		<u>.12</u>	<u>.08</u>

$L = \underline{\quad}$  ft.  
 $S = \underline{\quad}$  %  
 $T_c = \underline{\quad}$  min.

CHANNEL FLOW

$H = \underline{\quad}$  ft.  
 $L = \underline{\quad}$  ft.  
 $T_c = \underline{\quad}$  min.

$T_c = \underline{5}$  min

$i_{10} = \underline{7.2}$  in/hr

$Q = CAi = (\underline{.67})(\underline{.12} \text{ Ac.})(\underline{7.2} \text{ in/hr})$

$Q = \underline{0.58}$  cfs  
 $L = \underline{12}$  ft.  
 $S = \underline{0.5}$  %  
 $HW = \underline{1.0}$  ft.

$Inv_i = \underline{69.56}$   
 $Inv_o = \underline{69.50}$

INLET CONTROL

$D = \underline{12}$  in. or 1.0 ft.

$HW/D = \underline{0.5}$        $HW = (\underline{1.0} \text{ ft.})(\underline{0.5}) = \underline{0.5} \text{ ft.} < \underline{1.0} \text{ ft.}$

# Culvert Report

## Culvert #8

Invert Elev Dn (ft) = 69.50  
 Pipe Length (ft) = 12.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 69.56  
 Rise (in) = 12.0  
 Shape = Cir  
 Span (in) = 12.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

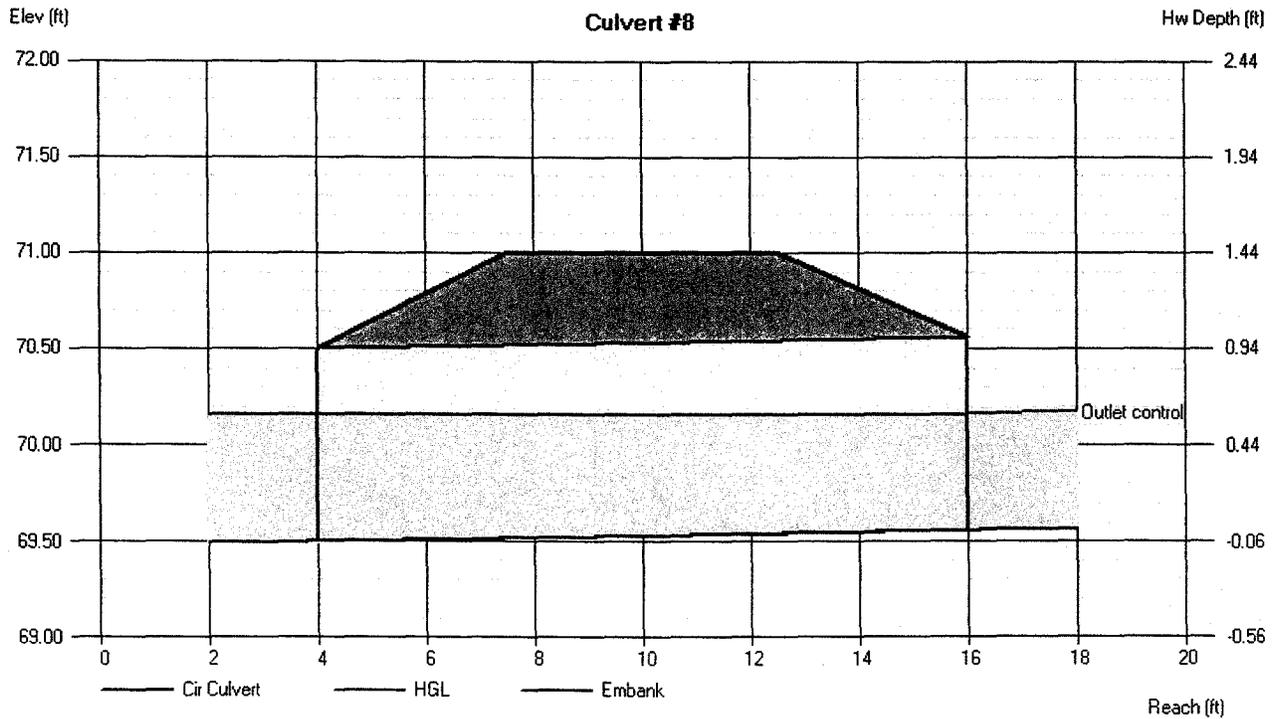
Top Elevation (ft) = 71.00  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 0.58  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 0.58  
 Qpipe (cfs) = 0.58  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 1.06  
 Veloc Up (ft/s) = 1.18  
 HGL Dn (ft) = 70.16  
 HGL Up (ft) = 70.16  
 Hw Elev (ft) = 70.17  
 Hw/D (ft) = 0.61  
 Flow Regime = Outlet Control



CULVERT DESIGN  
Culvert #9

$c = \underline{.30}$   
 $A = \underline{.11}$  Ac.  
OVERLAND FLOW

$L = \underline{\quad}$  ft.  
 $S = \underline{\quad}$  %  
 $T_c = \underline{\quad}$  min.

CHANNEL FLOW

$H = \underline{\quad}$  ft.  
 $L = \underline{\quad}$  ft.  
 $T_c = \underline{\quad}$  min.

$T_c = \underline{5}$  min

$i_{10} = \underline{7.2}$  in/hr

$Q = CAi = (\underline{.30})(\underline{.11} \text{ Ac.})(\underline{7.2} \text{ in/hr})$

$Q = \underline{0.24}$  cfs

$Inv_i = \underline{73.16}$

$L = \underline{12}$  ft.

$Inv_o = \underline{73.10}$

$S = \underline{0.5}$  %

$HW = \underline{1.0}$  ft.

INLET CONTROL

$D = \underline{12}$  in. or 1.0 ft.

$HW/D = \underline{0.5}$

$HW = (\underline{1.0} \text{ ft.})(\underline{0.5}) = \underline{0.5} \text{ ft.} < \underline{1.0} \text{ ft.}$

# Culvert Report

## Culvert #9

Invert Elev Dn (ft) = 73.10  
 Pipe Length (ft) = 12.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 73.16  
 Rise (in) = 12.0  
 Shape = Cir  
 Span (in) = 12.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

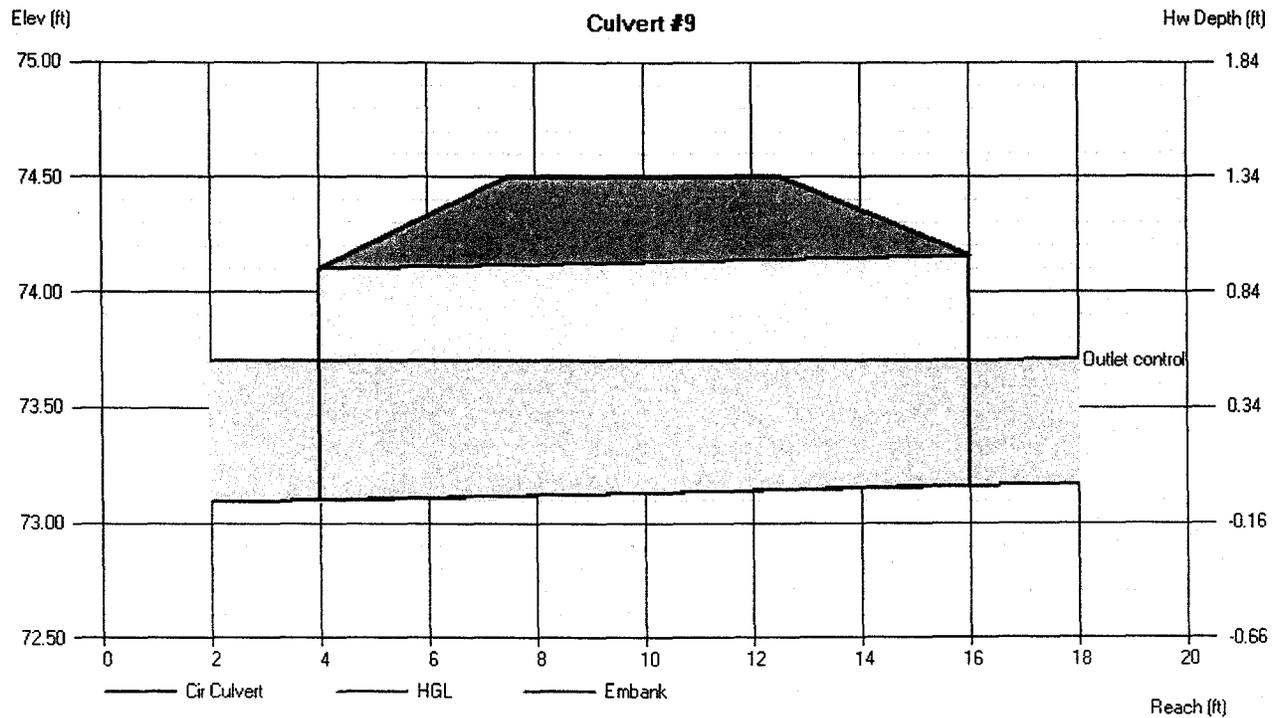
**Embankment**  
 Top Elevation (ft) = 74.50  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 0.24  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 0.24  
 Qpipe (cfs) = 0.24  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 0.49  
 Veloc Up (ft/s) = 0.55  
 HGL Dn (ft) = 73.70  
 HGL Up (ft) = 73.70  
 Hw Elev (ft) = 73.70  
 Hw/D (ft) = 0.54  
 Flow Regime = Outlet Control



CULVERT DESIGN  
 Culvert #10

$c = \underline{.30}$   
 $A = \underline{.10}$  Ac.

OVERLAND FLOW

$L = \underline{\quad}$  ft.  
 $S = \underline{\quad}$  %  
 $T_c = \underline{\quad}$  min.

CHANNEL FLOW

$H = \underline{\quad}$  ft.  
 $L = \underline{\quad}$  ft.  
 $T_c = \underline{\quad}$  min.

$T_c = \underline{5}$  min

$i_{10} = \underline{7.2}$  in/hr

$Q = CAi = (\underline{.30})(\underline{.10} \text{ Ac.})(\underline{7.2} \text{ in/hr})$

$Q = \underline{0.22}$  cfs

$Inv_i = \underline{75.56}$

$L = \underline{12}$  ft.

$Inv_o = \underline{75.50}$

$S = \underline{0.5}$  %

$HW = \underline{1.0}$  ft.

INLET CONTROL

$D = \underline{12}$  in. or 1.0 ft.

$HW/D = \underline{0.5}$

$HW = (\underline{1.0} \text{ ft.})(\underline{0.5}) = \underline{0.5} \text{ ft.} < \underline{1.0} \text{ ft.}$

# Culvert Report

## Culvert #10

Invert Elev Dn (ft) = 75.50  
 Pipe Length (ft) = 12.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 75.56  
 Rise (in) = 12.0  
 Shape = Cir  
 Span (in) = 12.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

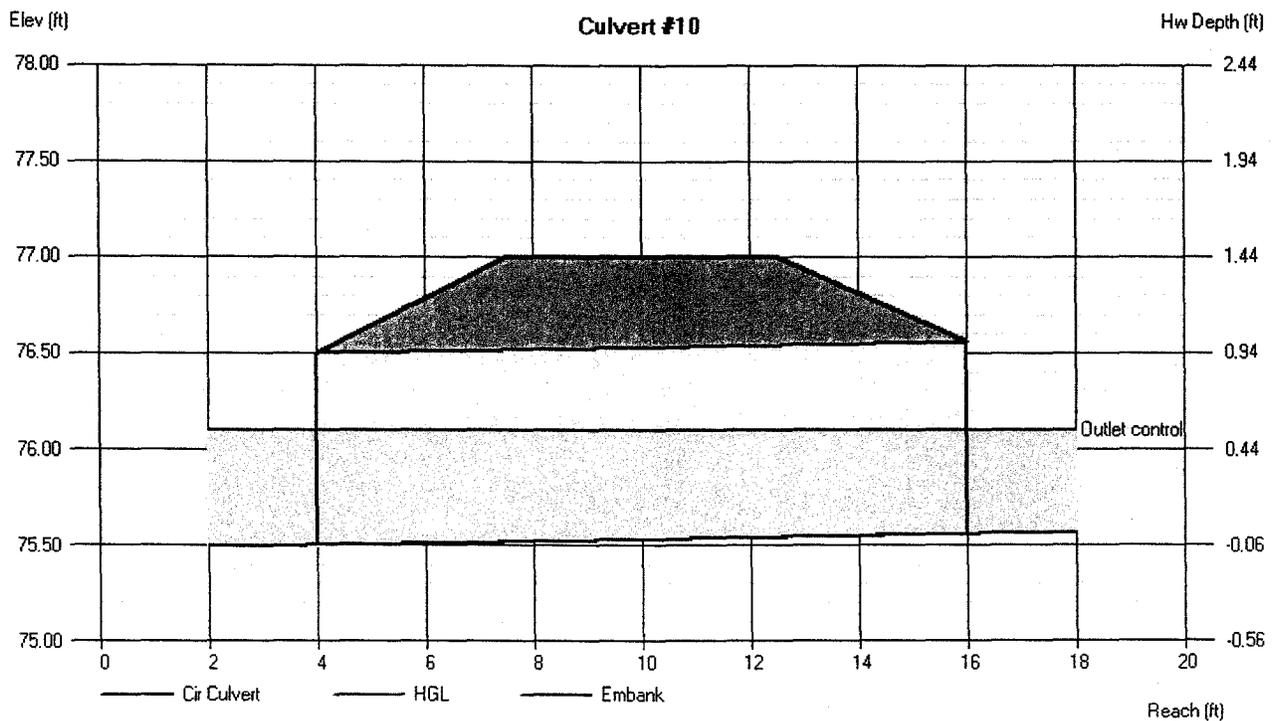
Top Elevation (ft) = 77.00  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 0.22  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 0.22  
 Qpipe (cfs) = 0.22  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 0.45  
 Veloc Up (ft/s) = 0.51  
 HGL Dn (ft) = 76.10  
 HGL Up (ft) = 76.10  
 Hw Elev (ft) = 76.10  
 Hw/D (ft) = 0.54  
 Flow Regime = Outlet Control



CULVERT DESIGN  
Culvert #11

$c = \underline{.30}$   
 $A = \underline{.28}$  Ac.  
OVERLAND FLOW

$L = \underline{\quad}$  ft.  
 $S = \underline{\quad}$  %  
 $T_c = \underline{\quad}$  min.

CHANNEL FLOW

$H = \underline{\quad}$  ft.  
 $L = \underline{\quad}$  ft.  
 $T_c = \underline{\quad}$  min.

$T_c = \underline{5}$  min

$i_{10} = \underline{7.2}$  in/hr

$Q = CAI = (\underline{.30})(\underline{.28} \text{ Ac.})(\underline{7.2} \text{ in/hr})$

$Q = \underline{0.60}$  cfs  
 $L = \underline{16}$  ft.  
 $S = \underline{0.5}$  %  
 $HW = \underline{1.0}$  ft.

$Inv_i = \underline{74.00}$   
 $Inv_o = \underline{73.92}$

INLET CONTROL

$D = \underline{12}$  in. or 1.0 ft.

$HW/D = \underline{0.5}$        $HW = (\underline{1.0} \text{ ft.})(\underline{0.5}) = \underline{0.5} \text{ ft.} < \underline{1.0} \text{ ft.}$

# Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc.

Friday, Jul 20 2012

## Culvert #11

Invert Elev Dn (ft) = 73.92  
 Pipe Length (ft) = 16.00  
 Slope (%) = 0.50  
 Invert Elev Up (ft) = 74.00  
 Rise (in) = 12.0  
 Shape = Cir  
 Span (in) = 12.0  
 No. Barrels = 1  
 n-Value = 0.013  
 Inlet Edge = Projecting  
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

### Embankment

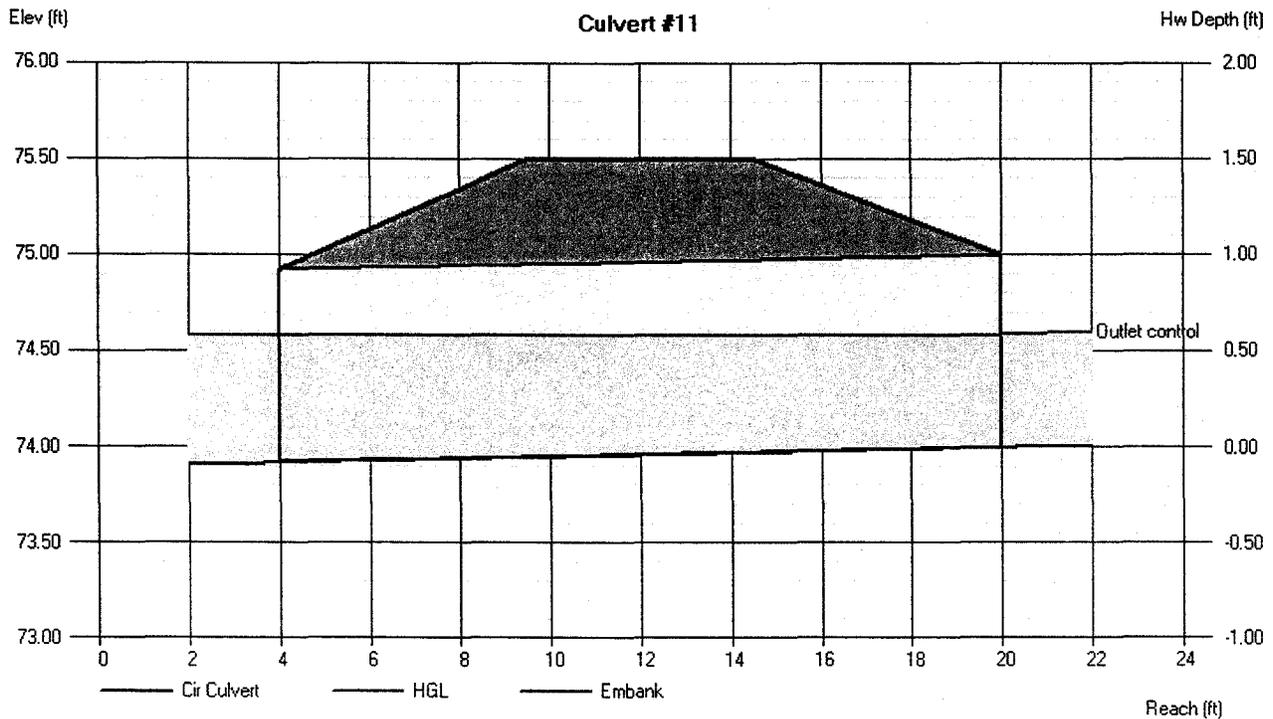
Top Elevation (ft) = 75.50  
 Top Width (ft) = 5.00  
 Crest Width (ft) = 10.00

### Calculations

Qmin (cfs) = 0.00  
 Qmax (cfs) = 0.60  
 Tailwater Elev (ft) = (dc+D)/2

### Highlighted

Qtotal (cfs) = 0.60  
 Qpipe (cfs) = 0.60  
 Qovertop (cfs) = 0.00  
 Veloc Dn (ft/s) = 1.09  
 Veloc Up (ft/s) = 1.26  
 HGL Dn (ft) = 74.58  
 HGL Up (ft) = 74.58  
 Hw Elev (ft) = 74.60  
 Hw/D (ft) = 0.60  
 Flow Regime = Outlet Control



**APPENDIX B**

# LandTech Resources, Inc.

Surveying • Engineering • GPS

201 Bulifants Blvd., Suite A, Williamsburg, VA 23188  
 Phone: (757) 565-1677 Fax: (757) 565-0782  
 web: landtechresources.com

PROJECT NAME Powhatan Plantation

PROJECT NO. 11-289

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY KWT DATE 7/24/12

SCALE \_\_\_\_\_

## POWHATAN CREEK SPECIAL STORMWATER CRITERIA

STEP 1: Per SSC Table SSC-1 the development is required to achieve 3 unit measures from the SSCP Menu.

STEP 2: Determine SSCP

<u>Type</u>	<u>Unit</u>	<u>Description</u>
SSCP #24	1	Inspection/Maintenance Agreement for onsite BMPs
SSCP #33	(0.5 x 2) 1	Enhanced shoreline erosion control (retaining wall in two ponds)
SSCP #33	(0.5 x 2) 1	Enhanced shoreline landscaping and stabilization (sodding/aquatic beach)
<hr/>		
Total SSC units	3	



# Stormwater Division

## MEMORANDUM

**DATE:** March 13, 2010  
**TO:** Michael J. Gillis, Virginia Correctional Enterprises Document Management Services  
**FROM:** Jo Anna Ripley, Stormwater  
**PO:** 270712  
**RE:** Files Approved for Scanning

---

**General File ID or BMP ID:** PC071

**PIN:** 3740300001A

**Subdivision, Tract, Business or Owner**

**Name (if known):**

Powhatan Plantation

**Property Description:**

Timeshare common area

**Site Address:**

4300 Fithian LN

*(For internal use only)*

**Box** 4

**Drawer:** 3

**Agreements:** (in file as of scan date) N

**Book or Doc#:**

**Page:**

Comments

FILE IS EMPTY except for memo and printout from BMP database

Date Record Created:

Created By:

WS\_BMPNO:

PC071

**PRINTED ON  
Thursday, March 04, 2010  
11:33:07 AM**

WATERSHED PC  
 BMP ID NO 071  
 PLAN NO  
 TAX PARCEL (37-4)(3-1A)  
 PIN NO 3740300001A  
 CONSTRUCTION DATE  
 PROJECT NAME Powhatan Plantation Phase 5  
 FACILITY LOCATION  
 CITY-STATE  
 CURRENT OWNER  
 OWNER ADDRESS  
 OWNER ADDRESS 2  
 CITY-STATE-ZIP CODE  
 OWNER PHONE  
 MAINT AGREEMENT No  
 EMERG ACTION PLAN No

MAINTENANCE PLAN

No

SITE AREA acre

0

LAND USE

old BMP TYP

Wet Pond

JCC BMP CODE

A2 Wet Pond

POINT VALUE

SVC DRAIN AREA acres

9.01

SERVICE AREA DESCRI

IMPERV AREA acres

RECV STREAM

EXT DET-WQ-CTRL

Yes

WTR QUAL VOL acre-ft

16.94

CHAN PROT CTRL

No

CHAN PROT VOL acre-ft

0

SW/FLOOD CONTROL

No

GEOTECH REPORT

No

CTRL STRUC DESC

Riser

CTRL STRUC SIZE inches

48

OTLT BARRL DESC

RCP Barrel

OTLT BARRL SIZE inch

24

EMERG SPILLWAY

No

DESIGN HW ELEV

PERM POOL ELEV

49.2

2-YR OUTFLOW cfs

10-YR OUTFLOW cfs

REC DRAWING

No

CONSTR CERTIF

No

LAST INSP DATE 9/21/2000

Inspected by:

INTERNAL RATING

4

MISC/COMMENTS

Pond D. Wet Pond Design 7.

[Get Last BMP No](#)

[Return to Menu](#)

[Print Record](#)

Additional Comments:

