



## CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMWATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

**BMP NUMBER:** CC034

**DATE VERIFIED:** October 24, 2012

**QUALITY ASSURANCE TECHNICIAN:** Leah Hardenbergh



**LOCATION:** WILLIAMSBURG, VIRGINIA



# Stormwater Division

## MEMORANDUM

Date: March 23, 2012  
To: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services  
From: Leah Hardenbergh  
PO: 110426  
Re: Files Approved for Scanning

---

**General File ID or BMP ID:** CC034  
**PIN:** 4840100010D  
**Owner Name (if known):** WILLIAMSBURG WINERY  
**Legal Property Description:** PARCEL 2C WILLIAMSBURG FARMS, INC.  
**Site Address:** 5810 WESSEX HUNDRED

*(For internal use only):*

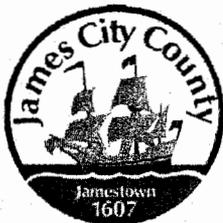
**Box # 1**

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

**Contents for Stormwater Management Facilities As-built Files**

Each file is to contain:

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



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

- Project Name: Wedmore Place at the Williamsburg Winery  
County Plan No.: SP-03-04  
Stormwater Management Facility: Wet Pond / Ducic Pond  
BMP Phase #:  I  II  III  
 Information Package Received. Date/By: 1/4/2010  
 Completeness Check:  
 Record Drawing Date/By: 12/16/2009 Charles Calhoun  
 Construction Certification Date/By: 3/5/2010 K. Jenkins  
 RD/CC Standard Forms (Required for all BMPs after Feb 1<sup>st</sup> 2001 Only)  
 Insp/Maint Agreement # / Date: \_\_\_\_\_  
 BMP Maintenance Plan Location: \_\_\_\_\_  
 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: CC034  
 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: 1/11/2010  
 Record Drawing (RD) Review Date: 1/11/2010  
 Construction Certification (CC) Review Date: 3/16/2010  
 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**

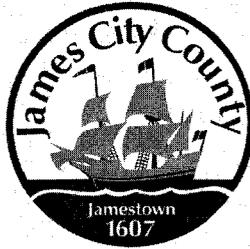
Inspector: [Signature]

Date: 3/16/10

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

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

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



James City County, Virginia  
Environmental Division

Stormwater Management / BMP Facilities  
Record Drawing and Construction Certification Forms

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

Section 1 - Site Information:

Project Name: WEDMORE PLACE AT THE WILLIAMSBURG WINERY  
Structure/BMP Name: WINERY DUCK POND  
Project Location: SOUTH OF WILLIAMSBURG AIRPORT  
BMP Location: SOUTH OF WINERY  
County Plan No.: \_\_\_\_\_

Project Type:  Residential  Business  Commercial  Office  Institutional  Industrial  Public  Roadway  Other \_\_\_\_\_  
Tax Map/Parcel No.: 4840100010D  
BMP ID Code (if known): N/A  
Zoning District: R8  
Land Use: WINERY  
Site Area (sf or acres): 3.0 AC.

Brief Description of Stormwater Management/BMP Facility:

SEDIMENT FOREBAY AND OUTFALL ADDED TO EXISTING POND

Nearest Visible Landmark to SWM/BMP Facility: WILLIAMSBURG AIRPORT

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

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

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

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

**Section 3 - Owner / Designer / Contractor Information:**

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

Name: WEDMORE PLACE, LLC  
Mailing Address: 5800 WESSEX HUNDRED  
WILLIAMSBURG VIRGINIA 23185  
Business Phone: 258-0899 Fax: -  
Contact Person: PATRICK DUFFELER Title: -

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

Firm Name: LANDTECH RESOURCES, INC  
Mailing Address: 205 BULIFANTS BLD. WILLIAMSBURG  
VIRGINIA 23188  
Business Phone: 565-1677  
Fax: 565-0782  
Responsible Plan Preparer: KENNY JENKINS  
Title: ENGINEER  
Plan Name: WEDMORE PLACE AT THE WILLIAMSBURG WINERY  
Firm's Project No. 04-686  
Plan Date: 2-14-05 LAST REVISED 6-6-06  
Sheet No.'s Applicable to SWM/BMP Facility: C11 / C15 / \_\_\_ / \_\_\_ / \_\_\_

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

Name: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Business Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_  
Contact Person: \_\_\_\_\_  
Site Foreman/Supervisor: \_\_\_\_\_  
Specialty Subcontractors & Purpose (for BMP Construction Only): \_\_\_\_\_

The Wedmore Place at the  
Willrausburg Winery BMP  
Post-Construction Inspection

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

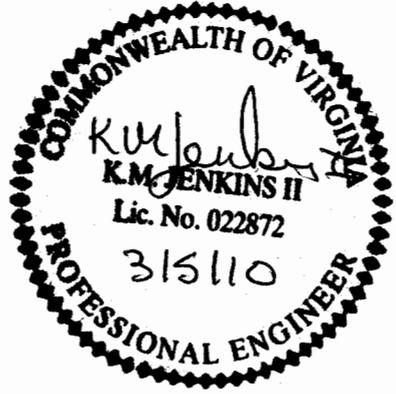
Firm Name: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Business Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_  
  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
  
Signature: \_\_\_\_\_  
Date: \_\_\_\_\_

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

Construction Certification

Firm Name: LandTech Resources, Inc  
Mailing Address: 205-E Bolifants Blvd  
Willrausburg, Va. 23188  
Business Phone: (757) 565-1677  
Fax: (757) 565-0782  
  
Name: Kenneth Jenkins  
Title: Senior Engineer  
  
Signature: Kenneth Jenkins  
Date: 3/5/10

I hereby certify to the best of my knowledge and belief that this Stormwater Management/BMP facility was ~~constructed~~ constructed in accordance with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted. This statement is based on my Post-Construction Inspection on 3/5/10.



\_\_\_\_\_  
( Seal )  
  
Virginia Registered Professional Engineer  
or Certified Land Surveyor

\_\_\_\_\_  
( Seal )  
  
Virginia Registered  
Professional Engineer

**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: 205 BULIFANTS BLVD  
WILLIAMSBURG VA 23188  
Business Phone: 565-1677  
Fax: 565-0782

Name: CHARLES A. CALHOUN  
Title: LAND SURVEYOR  
Signature: *Charles A. Calhoun*  
Date: 12/16/09

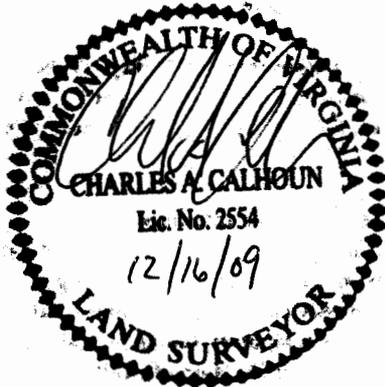
I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically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

**Construction Certification**

Firm Name: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
Business Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Date: \_\_\_\_\_

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



\_\_\_\_\_  
( Seal )  
Virginia Registered Professional Engineer  
or Certified Land Surveyor

\_\_\_\_\_  
( Seal )  
Virginia Registered  
Professional Engineer

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

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

- ~~XX~~ 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.
- ~~XX~~ 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- ~~XX~~ 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.**
- ~~XX~~ 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- ~~XX~~ 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.
- ~~XX~~ 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.
- ~~XX~~ 21. No visual signs of erosion or channel degradation immediately downstream of facility.
- ~~XX~~ 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES  
RECORD DRAWING CHECKLIST

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

III. Group A - Wet Ponds ( Includes A-1 Small Wet Ponds; A-2 Wet Ponds; A-3 Wet Ext Det Ponds. )

- XX A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.
- XX A2. Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.
- XX A3. Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.
- N/A A4. Access for maintenance and equipment is provided to the forebay(s). Access corridors are at least 12 ft. wide, have a maximum slope of 15 percent and are adequately stabilized to withstand heavy equipment or vehicle use.
- N/A A5. Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.
- N/A A6. Pond liner (if required) provided. Either clay liners, polyliners, bentonite liners or use of chemical soil additives based on requirements of the approved plan.
- N/A A7. Minimum 6 percent slope safety bench extending a minimum of 15 feet outward from normal pool edge and/or an aquatic bench extending a minimum of 10 feet inward from the normal shoreline with a maximum depth of 12 inches below the normal pool elevation, if applicable, per the approved design plans. (Note: Safety benches may be waived if pond side slopes are no steeper than 4H:1V).
- XX A8. No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure. VEGETATION AS SHOWN.
- N/A A9. Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.
- XX A10. Low flow orifice has a non-clogging mechanism.
- N/A A11. A pond drain pipe with valve was provided.
- N/A A12. Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.
- N/A A13. End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard.

• POND WAS EXISTING.

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

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

**N/A** IV.    **Group B - Wetlands** ( Includes B-1 Shallow Marsh; B-2 Ext Det Shallow Wetlands; B-3 Pond Wetland System and B-4 Pocket Wetland )

- B1.    Same requirements as Group A Wet Ponds.
- B2.    Minimum 2:1 length to width flow path provided across the facility.
- B3.    Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep).
- B4.    Wetland type landscaping provided in accordance with approved plan. Includes correct pondscaping zones, plant species, planting arrangements, wetland beds, etc. Wetland plants include 5 to 7 emergent wetland species. Individual plants at 18 inches on center in clumps.
- B5.    Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures).
- B6.    No more than one-half (½) of the wetland surface area is planted.
- B7.    Topsoil or wetland mulch provided to support vigorous growth of wetland plants.
- B8.    Planting zones staked or flagged in field and locations subsequently established by appropriate field surveying methods for record drawing presentation.

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

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

**N/A**    **V.    Group C - Infiltration Practices**    ( Includes C-1 Infiltration Trench; C-2 Infiltration Trench; C-3 Infiltration Basin; and C-4 Infiltration Basin )

- C1. All requirements of Section II, Minimum Standards, apply to Group C facilities as applicable.
- C2. Facility is not located on fill slopes or on natural ground in excess of six (6) percent.
- C3. Pretreatment devices provided prior to entry into the infiltration facility. Acceptable pretreatment devices include sediment forebays, sediment basins, sediment traps, sump pits or inlets, grass channels, plunge pools or other acceptable measures.
- C4. Three (3) or more of the following pretreatment devices provided to protect long term integrity of structure: grass channel; grass filter strip; bottom sand layer; upper filter fabric layer; use of washed bank run gravel aggregate.
- C5. Sides of infiltration practice lined with filter fabric.
- C6. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.
- C7. Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.
- C8. Minimum one hundred (100) foot separation horizontally from any known water supply well and minimum one hundred (100) foot separation upslope from any building.
- C9. Minimum twenty-five (25) foot separation down gradient from any structure.
- C10. Stormwater outfalls provided for overflow associated with larger design storms.
- C11. No visual signs of erosion or channel degradation immediately downstream of facility.
- C12. Facility does not currently cause any apparent surface or subsurface water problems to downgrade properties.
- C13. Observation well provided.
- C14. Adequate, direct access provided to the facility for future maintenance, operation and inspection.

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

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

**N/A VI.    Group D - Filtering Systems**    ( Includes D-1 Bioretention Cells; D-2 Surface Sand Filters; D-3 Underground Sand Filters; D-4 Perimeter Sand Filters; D-5 Organic Filters; and D-6 Pocket Sand Filters )

- D1.    All requirements of Section II, Minimum Standards, apply to Group D facilities.
- D2.    Sediment pretreatment devices provided.
- D3.    For D-1 BMPs (Bioretention Cells), pretreatment consisting of a grass filter strip below level spreader (deflector); a gravel diaphragm; and mulch and planting soil layers were provided.
- D4.    For D-1 BMPs (Bioretention Cells), plantings consist of native plant species; vegetation provided was based on zones of hydric tolerances; trees and understory of shrubs and herbaceous materials were provided; woody vegetation is absent from inflow locations; and trees are located around facility perimeter.
- D5.    Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.
- D6.    No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed .
- D7.    Filtering system is off-line from storm drainage conveyance system.
- D8.    Overflow outlet has adequate erosion protection.
- D9.    Deflector, diversion, flow splitter or regulator structure provided to divert the water quality volume to the filtering structure.
- D10.    Minimum four (4) inch perforated underdrain provided in a clean aggregate envelope layer beneath the facility.
- D11.    Minimum fifty (50) foot separation from any slope fifteen (15) percent or greater. Minimum one hundred (100) foot separation horizontally from any known water supply well. Minimum one hundred (100) foot separation upslope and twenty-five (25) foot separation downslope from any building.
- D12.    Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.
- D13.    No visual signs of erosion or channel degradation immediately downstream of facility.
- D14.    Adequate, direct access provided to the pretreatment area and/or filter bed for future maintenance.

**STORMWATER MANAGEMENT / BMP FACILITIES  
AS-BUILT PLAN CHECKLIST**

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

**N/A VII.    Group E - Open Channel Systems**    ( Includes E-1 Wet Swales (Check Dams); E-2 Dry Swales; and E-3 Biofilters )

- E1.    All requirements of Section II, Minimum Standards, apply to Group E facilities as applicable.
- E2.    Open channel system has constructed longitudinal slope of less than four (4) percent.
- E3.    No visual signs of erosion in the open channel system's soil and/or vegetative cover.
- E4.    Open channel side slopes are no steeper than 2H:1V at any location. Preferred channel sideslope is 3H:1V or flatter.
- E5.    No visual signs of ponding are present at any location in the open channel system, except at rock check dam locations for E-1 systems (Wet Swales).
- E6.    For E-2 BMPs (Dry Swales), an underdrain system was provided.
- E7.    Treated timber or rock check dams provided as pretreatment devices for the open channel system.
- E8.    Gravel diaphragm provided in areas where lateral sheet flow from impervious surfaces are directly connected to the open channel system.
- E9.    Grass cover/stabilization in the open channel system appears adaptable to the specific soils and hydric conditions for the site and along the channel system.
- E10.    Open channel system areas with grass covers higher than four (4) to six (6) inches were properly mowed.
- E11.    Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.
- E12.    No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.
- E13.    For E-3 BMPs (Biofilters), the bottom width is six (6) feet maximum at any location.
- E14.    For E-3 BMPs (Biofilters), sideslopes are 3H:1V maximum at any location.
- E15.    For E-3 BMPs (Biofilters), the constructed channel slope is less than or equal to three (3) percent at any location.
- E16.    For E-3 BMPs (Biofilters), the constructed grass channel is approximately equivalent to the constructed roadway length.

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

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

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

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

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

**N/A**

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

**IX.    Group G - Open Spaces**            ( Includes All Open Space Types G-1; G-2; and G-3 )

- \_\_\_\_\_ G1.    All requirements of Section II, Minimum Standards, apply to Group G facilities as applicable.
- \_\_\_\_\_ G2.    Constructed impervious areas appear to conform with locations indicated on the approved plan and appear less than sixty (60) percent impervious in accordance with the requirements of the James City County Chesapeake Bay Preservation Ordinance.
- \_\_\_\_\_ G3.    Dedicated open space areas are in undisturbed common areas, conservation easements or are protected by other enforceable instruments that ensures perpetual protection.
- \_\_\_\_\_ G4.    Provisions included to clearly specify how the natural vegetated areas utilized as dedicated open space will be managed and field identified (marked).
- \_\_\_\_\_ G5.    Adequate protection measures were implemented during construction to protect the defined dedicated open space areas.
- \_\_\_\_\_ G6.    Dedicated open space areas were not disturbed during construction (ie. cleared, grubbed or graded).

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

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

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

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

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

**XII.    Other Systems**

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

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

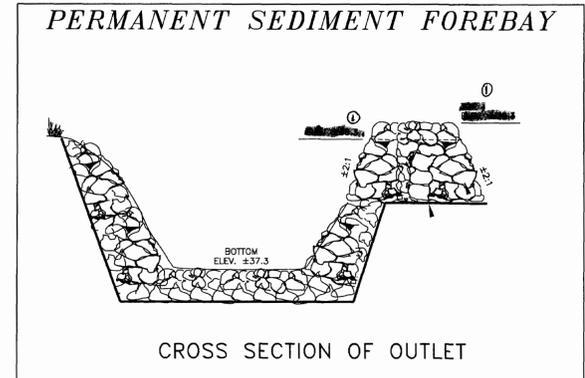
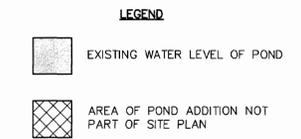
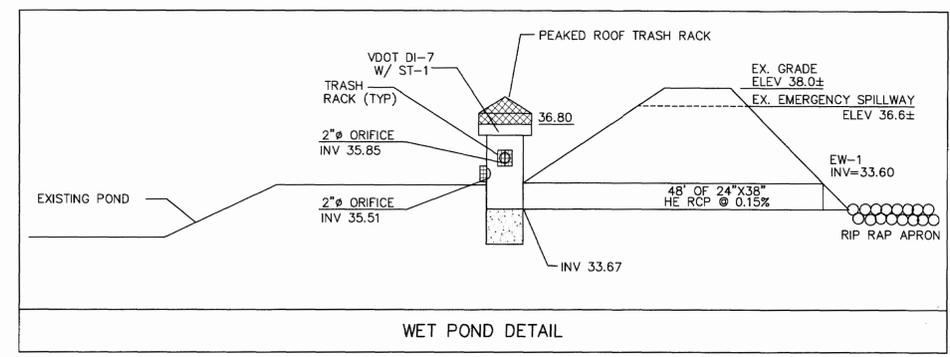
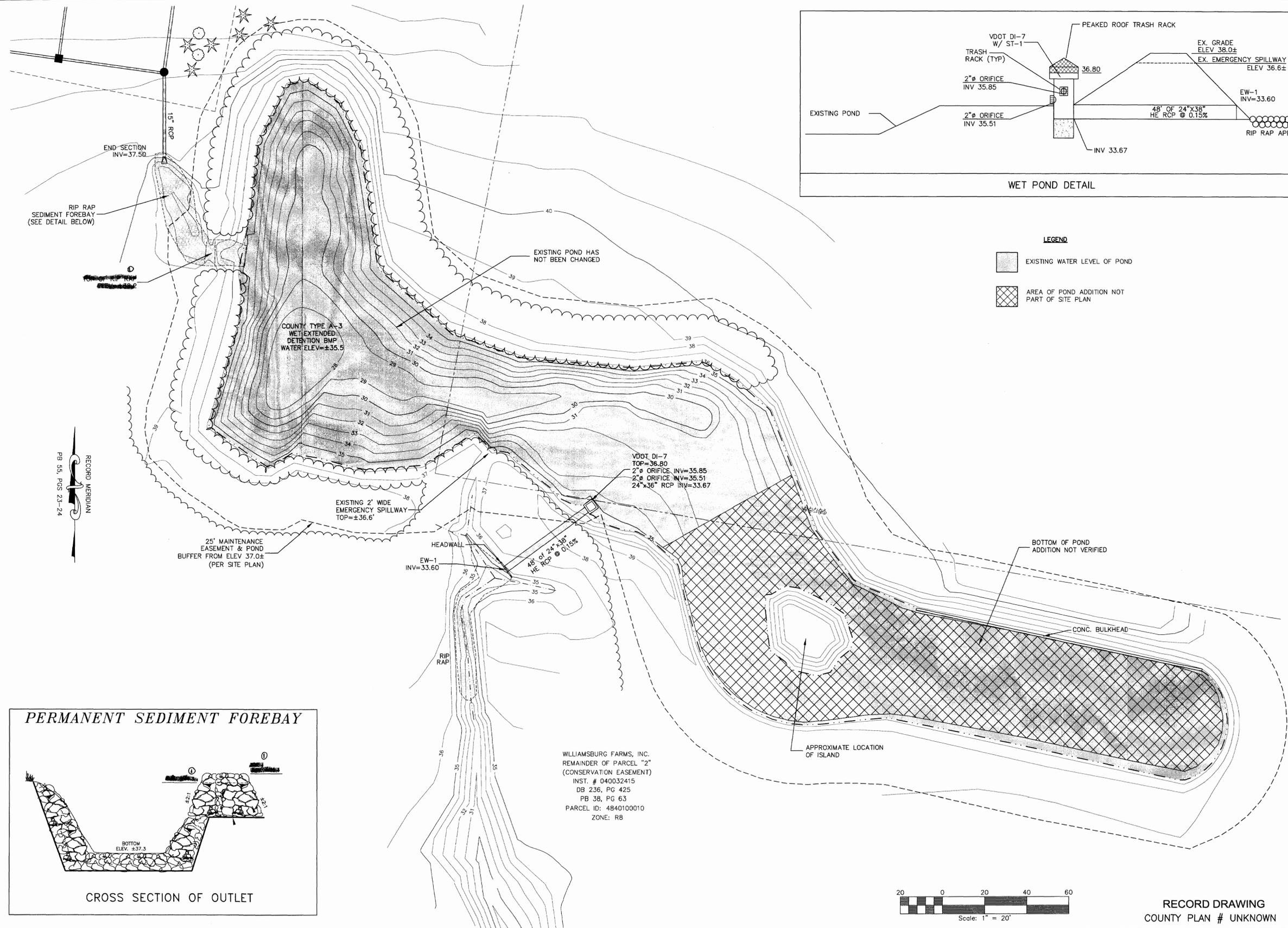
**STORMWATER MANAGEMENT / BMP FACILITIES  
RECORD DRAWING CHECKLIST**

**XIII. References**    *( The James City County Record Drawing and Construction Certification Forms and Checklists for Stormwater Management / BMP facilities were developed using the following sources and references. )*

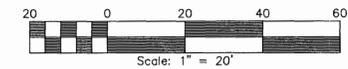
- Baltimore County, Maryland Soil Conservation District, As-Built Stormwater Management Pond Checklist.
- James City County, Virginia, Guidelines for Design and Construction of Stormwater Management BMP's (October 1999).
- James City County, Virginia, Stormwater Detention/Retention Basin Design Checklist and Erosion and Sediment Control and Stormwater Management Design Plan Checklists.
- James City County Stormwater Policy Framework, Final Report of the James City County BMP Policy Project, October 1998, The Center for Watershed Protection.
- Prince Georges County, Maryland, As-Built Requirements Retention or Detention Pond/Basin.
- Prince William County, Virginia, Stormwater Management Fact Sheet.
- Stafford County, Virginia, As-Built Plan Checklist.
- Stormwater Management Design Manual, NRCS Maryland Code No. 378, Pond Standards and Specifications.
- USEPA/Watershed Management Institute, Stormwater Management Inspection Forms.
- Virginia Impounding Structure Regulations (Dam Safety), Department of Conservation & Recreation, 1997.
- Virginia Erosion and Sediment Control Handbook, Third Edition 1992, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.
- Virginia Stormwater Management Handbook, 1999 edition, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

File: Shared\SWMProg\BMP\CertifRDCC\_fillable.wpd





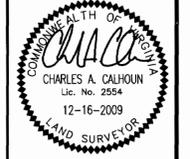
WILLIAMSBURG FARMS, INC.  
 REMAINDER OF PARCEL "2"  
 (CONSERVATION EASEMENT)  
 INST. # 040032415  
 DB 236, PG 425  
 PB 38, PG 63  
 PARCEL ID: 4840100010  
 ZONE: R8



RECORD DRAWING  
 COUNTY PLAN # UNKNOWN

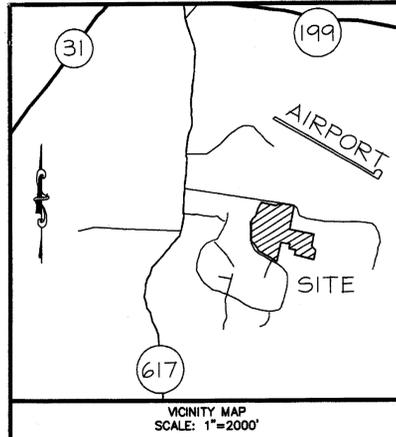
BMP ASBUILT  
**WEDMORE PLACE AT  
 THE WILLIAMSBURG WINERY**  
 COUNTRY INN  
 James City County  
 Virginia

NO.	DATE	REVISION / COMMENT / NOTE



**LandTech Resources, Inc.**  
 Surveying • GPS • Engineering  
 205-F Bullfinch Blvd., Williamsburg, VA 23188  
 Phone: (757) 565-1627 Fax: (757) 565-0782  
 web: landtechresources.com

SCALE: 1" = 20'  
 DATE: 12-16-2009  
 JOB: 04-686  
 DRAWN BY: WSF  
 SHEET: 2 OF 2



# SITE PLAN OF WEDMORE PLACE AT THE WILLIAMSBURG WINERY

JAMES CITY COUNTY VIRGINIA

## TABLE OF CONTENTS

SHEET NO.	SHEET NO.
C1	COVER SHEET
C2	EXISTING CONDITIONS
C3	OVERALL PLAN
C4	LAYOUT PLAN
C5	GRADING PLAN
C6	UTILITY PLAN
C7	LIGHTING PLAN
C8	EROSION AND SEDIMENT CONTROL PLAN PHASE I
C9	EROSION AND SEDIMENT CONTROL PLAN PHASE II
C10	WATERLINE AND FORCEMAIN PLAN
C11	BMP PLAN
C12	PUMP STATION DETAILS
C13	PROFILE SHEET
C14	DETAIL SHEET
C15	DETAIL SHEET
C16	DETAIL SHEET
L1	LANDSCAPE PLAN

**SP-030-05**

COUNTY OF JAMES CITY  
FINAL SITE PLAN

APPROVALS	DATE
Fire Dept. <i>KS/KS</i>	3/28/05
Health Dept. <i>CF/KS</i>	4/14/05
VDOT <i>BAV/KS</i>	5/23/05
Planning <i>A</i>	7/23/05
Environ. <i>DEG/KS</i>	4/14/05
Zoning Admin <i>JA/KS</i>	9/21/05
JCSA <i>JA/KS</i>	4/14/05
County Eng. <i>WAT/KS</i>	4/14/05
REA <i>MS/KS</i>	4/14/05
Other:	

RECEIVED  
PLANNING DEPARTMENT  
SEP 2005

### STATISTICAL INFORMATION

ZONE	R8
DISTRICT	ROBERTS
PARCEL ID NO.	4840100010D
ADDRESS	5810 WESSEX HUNDRED
PROPOSED USE	28 ROOM COUNTRY INN W/ 8 FUTURE ROOMS
WATER	PUBLIC
SEWER	PRIVATE
PARCEL AREA	70.31 AC.
DISTURBED AREA	4.3± AC.
PROJECT AREA	3.00 AC.
COUNTRY INN AREA	13,736 SF
OTHER BUILDING AREA	3,120 SF (SHED, POOLHOUSE, FUTURE GUEST ROOMS)
PAVED AREA	1.46 AC.
TOTAL IMPERVIOUS AREA	1.85 AC (3%)
GREEN AREA	68.46 AC. (97%)
PARKING LOT AREA	55,685 SF
PARKING LOT GREEN AREA	15,135 SF (27%)
PARKING SPACES	
REQUIRED:	40
PROVIDED:	43
H/C REQUIRED:	2
H/C PROVIDED:	2
LOADING SPACES	
REQUIRED:	2
PROVIDED:	2
BUILDING HEIGHT	30' (3 STORY)
MAX BUILDING HEIGHT	30'
ITE CODE	330
PEAK HOUR TRIP GENERATION	18

#### SPECIAL USE CASE NO. SUP-13-04 CONDITIONS:

- THIS SUP SHALL BE VALID FOR THE OPERATION OF A HOTEL WITH A 15,000-SQUARE-FOOT BUILDING FOOTPRINT, AND ACCESSORY USES THERETO. THE HOTEL SHALL BE LIMITED TO A MAXIMUM OF 36 ROOMS.
- THE PROPERTY SHALL BE DEVELOPED GENERALLY IN ACCORDANCE WITH THE CONCEPTUAL LAYOUT SUBMITTED WITH THE APPLICATION TITLED "CONCEPTUAL LAYOUT OF COUNTRY INN AND WILLIAMSBURG WINERY" PREPARED BY PATRICK DUFFELER, DATED MARCH 22, 2004, WITH MINOR CHANGES APPROVED BY THE DEVELOPMENT REVIEW COMMITTEE.
- THE BUILDING SHALL BE CONSISTENT, AS DETERMINED BY THE PLANNING DIRECTOR, WITH THE BUILDING ELEVATIONS SUBMITTED WITH THIS APPLICATION TITLED "WEDMORE PLACE AT THE WILLIAMSBURG WINERY" PREPARED BY HOPKE AND ASSOCIATES, INC., DATED DECEMBER 11, 2003. THE BUILDING SHALL NOT EXCEED 30 FEET IN HEIGHT.
- PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY, THE INN SHALL BE CONNECTED TO THE JAMES CITY SERVICE AUTHORITY PUBLIC WATER AND SEWER SYSTEM.
- THE APPLICANT SHALL BE RESPONSIBLE FOR DEVELOPING AND ENFORCING WATER CONSERVATION STANDARDS TO BE SUBMITTED AND APPROVED BY THE JAMES CITY SERVICE AUTHORITY PRIOR TO FINAL SITE PLAN APPROVAL. THE STANDARDS MAY INCLUDE, BUT SHALL NOT BE LIMITED TO, SUCH WATER CONSERVATION MEASURES AS LIMITATIONS ON THE INSTALLATION AND USE OF IRRIGATION SYSTEMS, THE USE OF APPROVED LANDSCAPING MATERIALS INCLUDING THE USE OF DROUGHT TOLERANT PLANTS WHERE APPROPRIATE, AND THE USE OF WATER-CONSERVING FIXTURES TO PROMOTE WATER CONSERVATION AND MINIMIZE THE USE OF PUBLIC WATER RESOURCES.
- THERE SHALL NOT BE ANY SPECIAL EVENT, PARTY, OR GATHERING ON THE PROPERTY, INDOOR OR OUTDOOR, WHICH GENERATES OVER 1,000 PERSONS PER DAY.
- ANY NEW EXTERIOR SITE LIGHTING SHALL BE LIMITED TO FIXTURES WHICH ARE HORIZONTALLY MOUNTED ON LIGHT POLES OR OTHER STRUCTURES NOT TO EXCEED 15 FEET IN HEIGHT ABOVE GROUND LEVEL AND SHALL BE RECESSED FIXTURES WITH NO BULB, LENS, OR GLOBE EXTENDING BELOW THE CASING. THE CASING SHALL BE OPAQUE AND SHALL COMPLETELY SURROUND THE ENTIRE LIGHT FIXTURE AND LIGHT SOURCE IN SUCH A MANNER THAT ALL LIGHT WILL BE DIRECTED DOWNWARD AND THE LIGHT SOURCE IS NOT VISIBLE FROM THE SIDE. NO GLARE, DEFINED AS 0.1 FOOTCANDLE OR HIGHER SHALL EXTEND OUTSIDE THE PROPERTY LINES.
- NO OUTDOOR AMPLIFIED MUSIC OR LOUD SPEAKERS IN CONNECTION WITH THE OPERATION OF THE INN SHALL BE AUDIBLE OUTSIDE THE BOUNDARIES OF THE PROPERTY.
- ANY NEW SIGNAGE ON LAKE POWELL ROAD SHALL BE COMBINED WITH THE EXISTING SIGN IN ACCORDANCE WITH ARTICLE II, DIVISION 3 OF THE ZONING ORDINANCE AND SHALL BE APPROVED BY THE PLANNING DIRECTOR. THE SIGN SHALL ONLY BE EXTERNALLY ILLUMINATED.
- PRIOR TO FINAL SITE PLAN APPROVAL, THE APPLICANT SHALL DEDICATE TO THE COUNTY OR ANOTHER COUNTY APPROVED LAND CONSERVATION ENTITY, A CONSERVATION EASEMENT OF APPROXIMATELY 50 ACRES, IDENTIFIED ON THE DRAWING TITLED "WILLIAMSBURG FARMS: AREA PROPOSED TO BE DEDICATED TO CONSERVATION EASEMENT" DATED 2004, SUBSTANTIALLY IN THE FORM OF THE COUNTY'S NATURAL OPEN SPACE EASEMENT AS APPROVED BY THE COUNTY ATTORNEY. THE EXACT BOUNDARIES OF THE CONSERVATION EASEMENT SHALL BE SHOWN ON THE SITE PLAN FOR THE INN. THE CONSERVATION EASEMENT SHALL REMAIN UNDISTURBED AND IN ITS NATURAL STATE. WITH PRIOR APPROVAL OF THE COUNTY ENGINEER, DEAD, DISEASED, AND DYING TREES OR SHRUBBERY OR POISONOUS OR INVASIVE PLANTS MAY BE REMOVED FROM THE CONSERVATION AREA.
- CONSTRUCTION ON THIS PROJECT SHALL COMMENCE WITHIN THIRTY-SIX (36) MONTHS FROM THE DATE OF APPROVAL OF THIS SPECIAL USE PERMIT OR THIS PERMIT SHALL BE VOID. CONSTRUCTION SHALL BE DEFINED AS OBTAINING PERMITS FOR BUILDING CONSTRUCTION, INSTALLATION, AND FINAL INSPECTION OF FOOTINGS AND/OR FOUNDATIONS.
- THIS SPECIAL USE PERMIT IS NOT SEVERABLE. INVALIDATION OF ANY WORD, PHRASE, CLAUSE, SENTENCE, OR PARAGRAPH SHALL INVALIDATE THE REMAINDER.

#### NOTES:

- PER FEMA COMMUNITY PANEL NUMBER 510201 00458 DATED 2/6/91 THE SITE APPEARS TO BE IN FLOOD ZONE "X".
- TOPOGRAPHIC SURVEY SHOWN HEREON IS BASED ON A FIELD SURVEY PERFORMED BY LANDTECH RESOURCES, INC. - DECEMBER 2004.
- BOUNDARY PER PLAN BY LANDTECH RESOURCES, INC., DATED 12/13/04, AND RECORDED ON DECEMBER 29, 2004 IN INSTRUMENT NO. 040032415.
- THE EXISTENCE AND LOCATION (HORIZONTAL AND VERTICAL) OF EXISTING UTILITIES ARE NOT GUARANTEED AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
- THERE ARE NO OFF-SITE LAND DISTURBING AREAS ASSOCIATED WITH THE DEVELOPMENT OF THIS SITE.
- ALL UTILITIES SHALL BE PLACED UNDERGROUND.
- PER "SOIL SURVEY OF JAMES CITY AND YORK COUNTIES AND THE CITY OF WILLIAMSBURG, VIRGINIA" THE ON-SITE SOIL IS CRAVEN-UCHEE COMPLEX (11C) AND SLAGLE (29A & 29B).
- 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.
- THIS SITE IS LOCATED IN THE COLLEGE CREEK WATERSHED OF JAMES CITY COUNTY.
- ANY EXISTING UNUSED WELLS SHALL BE ABANDONED IN ACCORDANCE WITH STATE PRIVATE WELL REGULATIONS AND JAMES CITY COUNTY CODE.
- VDH PERMITS ARE REQUIRED FOR BOTH THE LODGING AND ANY FOOD SERVICE FACILITIES. PLANS AND APPLICATIONS FOR PERMITS SHALL BE SUBMITTED AND APPROVED PRIOR TO CONSTRUCTION. PERMITS FOR OPERATION WILL BE ISSUED AFTER INSPECTION DETERMINES THAT CONSTRUCTION AND OPERATION ARE IN COMPLIANCE WITH VIRGINIA BOARD OF HEALTH REGULATIONS GOVERNING TRANSIENT LODGING AND FOOD.
- A VSMR PERMIT IS REQUIRED FROM THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION. THIS PERMIT WILL REQUIRE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
- WAVER OF THE BMP AQUATIC BENCH VARIANCE WAS APPROVED ON 6/30/05 BY THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION.

ENVIRONMENTAL INVENTORY IN ACCORDANCE WITH SECTION 23-10(2) OF THE CHESAPEAKE BAY PRESERVATION ORDINANCE:

PER SITE TOPOGRAPHY, JAMES CITY COUNTY TAX MAP ATLAS, AND RICHMOND+BURY, INC. LETTER DATED 1/17/05, THE FOLLOWING COMPONENTS DO NOT APPEAR TO BE PRESENT WITHIN THE LIMITS OF CONSTRUCTION OF THIS PROJECT:

- TIDAL WETLANDS;
- TIDAL SHORES;
- NONTIDAL WETLANDS CONNECTED BY SURFACE FLOW AND CONTIGUOUS TO TIDAL WETLANDS OR WATER BODIES WITH PERENNIAL FLOW (i.e. RPA WETLANDS);
- A 100-FOOT BUFFER AREA LOCATED ADJACENT TO AND LANDWARD OF THE COMPONENTS LISTED IN ITEMS 1, THROUGH 3, ABOVE, AND ALONG BOTH SIDES OF ANY WATER BODY WITH PERENNIAL FLOW;
- NONTIDAL WETLANDS NOT INCLUDED IN ITEM 3 (i.e. RMA WETLANDS);
- 100-YEAR FLOODPLAINS AS DESIGNATED BY CHAPTER 24 OF THE COUNTY CODE; AND
- SLOPES 25 PERCENT OR GREATER.

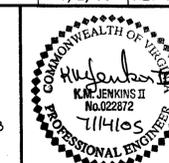
NO.	DATE	REVISION / COMMENT / NOTE
2	7/13/05	REV PER JCC LTR DTD 7/1/05
1	5/2/05	REV PER JCC LTR DTD 4/20/05

### OWNER/DEVELOPER

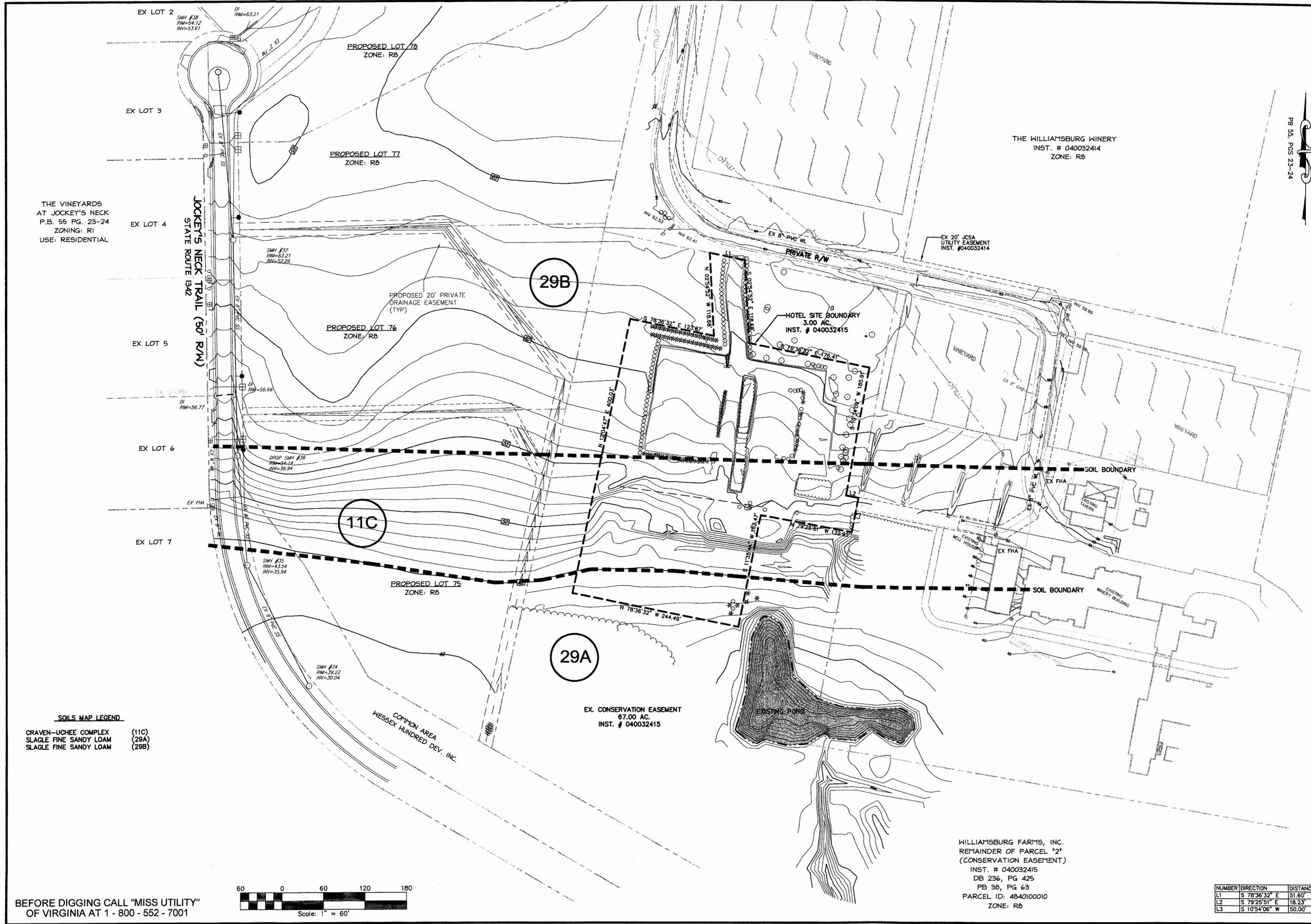
WEDMORE PLACE, LLC  
5800 WESSEX HUNDRED  
WILLIAMSBURG, VA. 23185  
(757) 258-0899  
MR. PATRICK DUFFELER

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

5810-F Moorestown Road, Williamsburg, VA 23188  
Phone: (757) 565-1677 Fax: (757) 565-0782  
web: landtechresources.com



JOB: 04-686  
DWG NO: 04-686CS  
DATE: 2/14/05  
DRAWN BY: KMJ  
SHEET: C1 OF 17



RECORD MERIDIAN  
PB 55, PGS 23-24

**WEDMORE PLACE AT  
THE WILLIAMSBURG WINERY**  
COUNTRY INN  
EXISTING CONDITIONS

Virginia

James City County

NO.	DATE	REVISION / COMMENT / NOTE
2	7/13/05	REV PER JCC LTR DTD 7/1/05
1	5/2/05	REV PER JCC LTR DTD 4/20/05



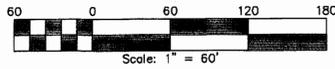
**LandTech Resources, Inc.**  
Surveying • GPS • Engineering  
5810-F Moorestown Road, Williamsburg, VA 23186  
Phone: (757) 565-1677 Fax: (757) 565-0762  
web: landtechresources.com

SCALE: 1" = 60'  
DATE: 2/14/05  
JOB: 04-686  
DRAWN BY: KMJ  
SHEET: C2 OF 17

NUMBER	DIRECTION	DISTANCE
L1	S 78°36'33" E	51.60'
L2	S 79°25'51" E	18.23'
L3	S 10°54'06" W	50.00'

**SOILS MAP LEGEND**  
(11C) CRAVEN-UCHEE COMPLEX  
(29A) SLAGLE FINE SANDY LOAM  
(28B) SLAGLE FINE SANDY LOAM

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



WILLIAMSBURG FARMS, INC.  
REMAINDER OF PARCEL "2"  
(CONSERVATION EASEMENT)  
INST. # 040032415  
DB 236, PG 425  
PB 38, PG 63  
PARCEL ID: 4840100010  
ZONE: R8





TITLE	SYMBOL	KEY	NO.
CONSTRUCTION ENTRANCE		CE	3.02
SILT FENCE		SF	3.05
INLET PROTECTION		IP	3.07
DIVERSION DIKE		DD	3.09
SEDIMENT TRAP		ST	3.13
OUTLET PROTECTION		OP	3.18
DEWATERING STRUCTURE		DS	3.26
PERMANENT SEEDING		PS	3.32
SOIL STABILIZATION BLANKETS AND MATTING (EC-2)		EM	3.36
TREE PROTECTION		TP	3.38

RECORD MERIDIAN  
PB 55, POS 23-24

**MAINTENANCE**  
IN GENERAL, ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER SIGNIFICANT RAINFALL. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR:

1. THE SILT FENCE WILL BE CHECKED REGULARLY FOR SEDIMENT CLEANOUT.
2. THE GRAVEL INLET PROTECTION WILL BE CHECKED REGULARLY FOR A SEDIMENT BUILDUP WHICH WILL PREVENT DRAINAGE. IF THE GRAVEL IS CLOGGED BY SEDIMENT, IT SHALL BE REMOVED AND CLEANED OR REPLACED.
3. THE SEEDED AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS SHOULD BE FERTILIZED AND RESEDED AS NEEDED.

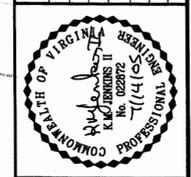
**PERMANENT STABILIZATION**  
ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING. SEEDING SHALL BE DONE WITH KENTUCKY 31 TALL FESCUE ACCORDING TO STD. & SPEC. 3.32, "PERMANENT SEEDING". OF THE VESCH. EROSION BLANKETS WILL BE INSTALLED OVER FILL SLOPES WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDED TO PROTECT THE SLOPES FROM RILL AND GULLY EROSION TO ALLOW THE 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. SOIL STABILIZATION MATTING TO BE VESCH TYPICAL TREATMENT-1 (JUTE MESH).

**WEDMORE PLACE AT  
THE WILLIAMSBURG WINERY  
COUNTRY INN  
EROSION AND SEDIMENT CONTROL PLAN PHASE 2**

Virginia

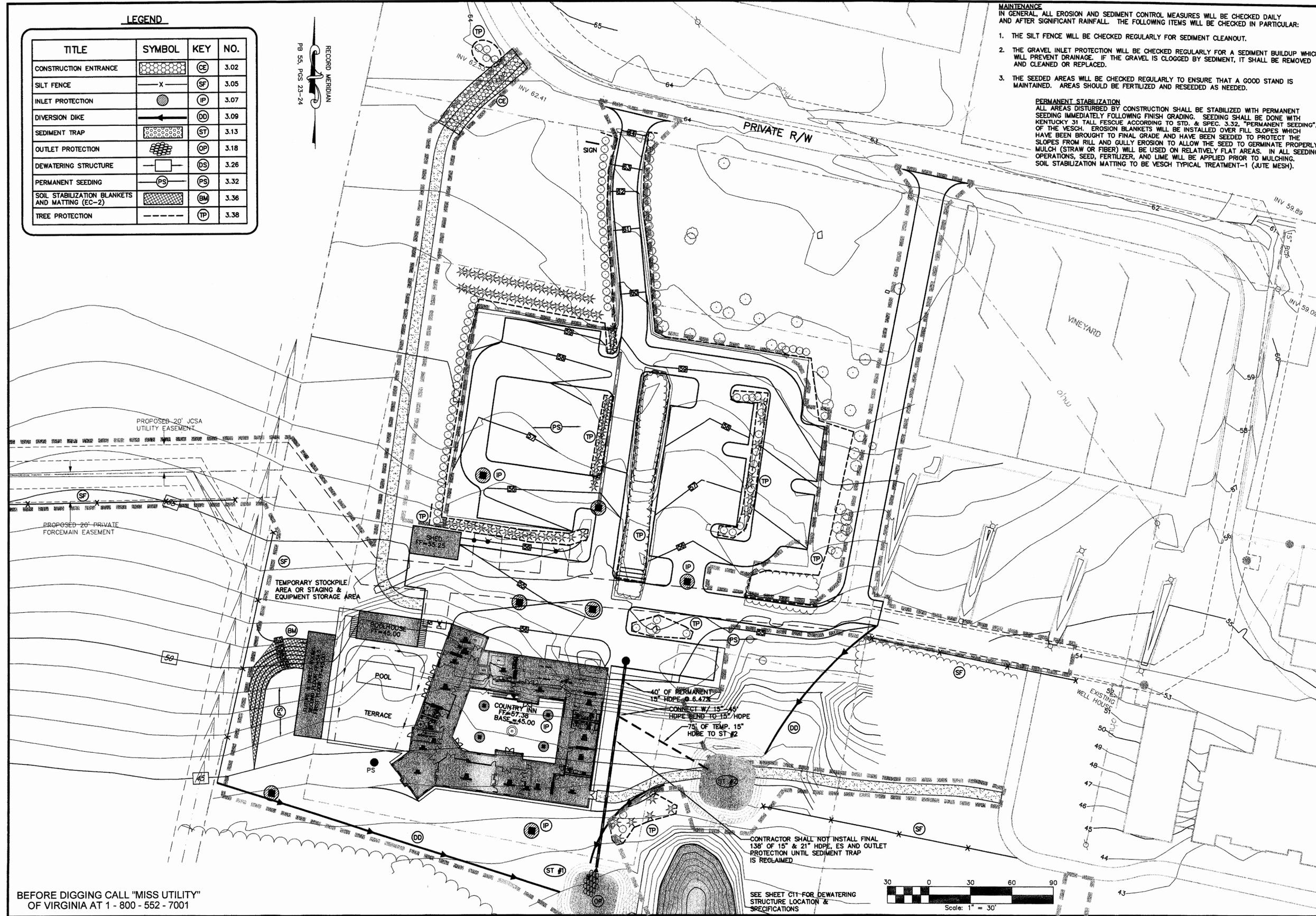
James City County

NO.	DATE	REVISION / COMMENT / NOTE
2	7/13/05	REV PER JCC LTR DTD 7/13/05
1	5/2/05	REV PER JCC LTR DTD 4/20/05



**LandTech Resources, Inc.**  
Surveying, GPS, Engineering  
5910-F Moorabain Road, Williamsburg, VA 23186  
Phone: (757) 566-1677 Fax: (757) 566-0782  
web: landtechresources.com

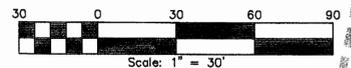
SCALE: 1" = 30'  
DATE: 2/14/05  
JOB: 04-686  
DRAWN BY: KMJ  
SHEET: C9 OF 17

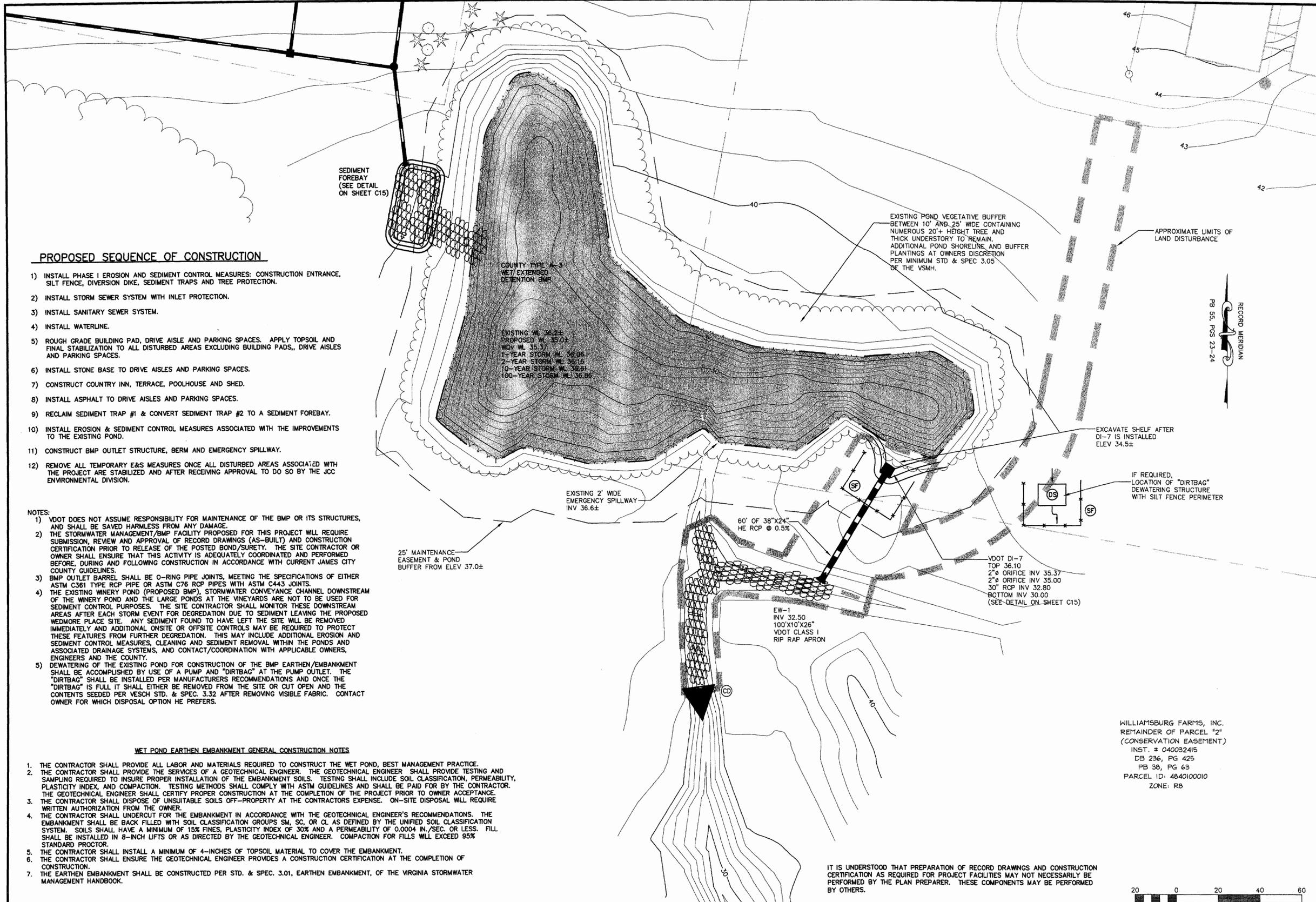


BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1 - 800 - 552 - 7001

CONTRACTOR SHALL NOT INSTALL FINAL 138' OF 15" & 21" HDPE, ES AND OUTLET PROTECTION UNTIL SEDIMENT TRAP IS RECLAIMED.

SEE SHEET C11 FOR DEWATERING STRUCTURE LOCATION & SPECIFICATIONS





**PROPOSED SEQUENCE OF CONSTRUCTION**

- 1) INSTALL PHASE I EROSION AND SEDIMENT CONTROL MEASURES: CONSTRUCTION ENTRANCE, SILT FENCE, DIVERSION DIKE, SEDIMENT TRAPS AND TREE PROTECTION.
- 2) INSTALL STORM SEWER SYSTEM WITH INLET PROTECTION.
- 3) INSTALL SANITARY SEWER SYSTEM.
- 4) INSTALL WATERLINE.
- 5) ROUGH GRADE BUILDING PAD, DRIVE AISLE AND PARKING SPACES. APPLY TOPSOIL AND FINAL STABILIZATION TO ALL DISTURBED AREAS EXCLUDING BUILDING PADS, DRIVE AISLES AND PARKING SPACES.
- 6) INSTALL STONE BASE TO DRIVE AISLES AND PARKING SPACES.
- 7) CONSTRUCT COUNTRY INN, TERRACE, POOLHOUSE AND SHED.
- 8) INSTALL ASPHALT TO DRIVE AISLES AND PARKING SPACES.
- 9) RECLAIM SEDIMENT TRAP #1 & CONVERT SEDIMENT TRAP #2 TO A SEDIMENT FOREBAY.
- 10) INSTALL EROSION & SEDIMENT CONTROL MEASURES ASSOCIATED WITH THE IMPROVEMENTS TO THE EXISTING POND.
- 11) CONSTRUCT BMP OUTLET STRUCTURE, BERM AND EMERGENCY SPILLWAY.
- 12) REMOVE ALL TEMPORARY E&S MEASURES ONCE ALL DISTURBED AREAS ASSOCIATED WITH THE PROJECT ARE STABILIZED AND AFTER RECEIVING APPROVAL TO DO SO BY THE JCC ENVIRONMENTAL DIVISION.

**NOTES:**

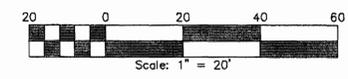
- 1) VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE BMP OR ITS STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE.
- 2) THE STORMWATER MANAGEMENT/BMP FACILITY PROPOSED FOR THIS PROJECT WILL REQUIRE SUBMISSION, REVIEW AND APPROVAL OF RECORD DRAWINGS (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY. THE SITE CONTRACTOR OR OWNER SHALL ENSURE THAT THIS ACTIVITY IS ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH CURRENT JAMES CITY COUNTY GUIDELINES.
- 3) BMP OUTLET BARREL SHALL BE O-RING PIPE JOINTS, MEETING THE SPECIFICATIONS OF EITHER ASTM C361 TYPE RCP PIPE OR ASTM C76 RCP PIPES WITH ASTM C443 JOINTS.
- 4) THE EXISTING WINERY POND (PROPOSED BMP), STORMWATER CONVEYANCE CHANNEL DOWNSTREAM OF THE WINERY POND AND THE LARGE PONDS AT THE VINEYARDS ARE NOT TO BE USED FOR SEDIMENT CONTROL PURPOSES. THE SITE CONTRACTOR SHALL MONITOR THESE DOWNSTREAM AREAS AFTER EACH STORM EVENT FOR DEGRADATION DUE TO SEDIMENT LEAVING THE PROPOSED WEDMORE PLACE SITE. ANY SEDIMENT FOUND TO HAVE LEFT THE SITE WILL BE REMOVED IMMEDIATELY AND ADDITIONAL ONSITE OR OFFSITE CONTROLS MAY BE REQUIRED TO PROTECT THESE FEATURES FROM FURTHER DEGRADATION. THIS MAY INCLUDE ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES, CLEANING AND SEDIMENT REMOVAL WITHIN THE PONDS AND ASSOCIATED DRAINAGE SYSTEMS, AND CONTACT/COORDINATION WITH APPLICABLE OWNERS, ENGINEERS AND THE COUNTY.
- 5) DEWATERING OF THE EXISTING POND FOR CONSTRUCTION OF THE BMP EARTHEN/EMBANKMENT SHALL BE ACCOMPLISHED BY USE OF A PUMP AND "DIRTBAG" AT THE PUMP OUTLET. THE "DIRTBAG" SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND ONCE THE "DIRTBAG" IS FULL IT SHALL EITHER BE REMOVED FROM THE SITE OR CUT OPEN AND THE CONTENTS SEEDED PER VESCH STD. & SPEC. 3.32 AFTER REMOVING VISIBLE FABRIC. CONTACT OWNER FOR WHICH DISPOSAL OPTION HE PREFERS.

**WET POND EARTHEN EMBANKMENT GENERAL CONSTRUCTION NOTES**

1. THE CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS REQUIRED TO CONSTRUCT THE WET POND, BEST MANAGEMENT PRACTICE.
2. THE CONTRACTOR SHALL PROVIDE THE SERVICES OF A GEOTECHNICAL ENGINEER. THE GEOTECHNICAL ENGINEER SHALL PROVIDE TESTING AND SAMPLING REQUIRED TO INSURE PROPER INSTALLATION OF THE EMBANKMENT SOILS. TESTING SHALL INCLUDE SOIL CLASSIFICATION, PERMEABILITY, PLASTICITY INDEX, AND COMPACTION. TESTING METHODS SHALL COMPLY WITH ASTM GUIDELINES AND SHALL BE PAID FOR BY THE CONTRACTOR. THE GEOTECHNICAL ENGINEER SHALL CERTIFY PROPER CONSTRUCTION AT THE COMPLETION OF THE PROJECT PRIOR TO OWNER ACCEPTANCE.
3. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE SOILS OFF-PROPERTY AT THE CONTRACTORS EXPENSE. ON-SITE DISPOSAL WILL REQUIRE WRITTEN AUTHORIZATION FROM THE OWNER.
4. THE CONTRACTOR SHALL UNDERCUT FOR THE EMBANKMENT IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. THE EMBANKMENT SHALL BE BACK FILLED WITH SOIL CLASSIFICATION GROUPS SM, SC, OR CL AS DEFINED BY THE UNIFIED SOIL CLASSIFICATION SYSTEM. SOILS SHALL HAVE A MINIMUM OF 15% FINES, PLASTICITY INDEX OF 30% AND A PERMEABILITY OF 0.0004 IN./SEC. OR LESS. FILL SHALL BE INSTALLED IN 8-INCH LIFTS OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER. COMPACTION FOR FILLS WILL EXCEED 95% STANDARD PROCTOR.
5. THE CONTRACTOR SHALL INSTALL A MINIMUM OF 4-INCHES OF TOPSOIL MATERIAL TO COVER THE EMBANKMENT.
6. THE CONTRACTOR SHALL ENSURE THE GEOTECHNICAL ENGINEER PROVIDES A CONSTRUCTION CERTIFICATION AT THE COMPLETION OF CONSTRUCTION.
7. THE EARTHEN EMBANKMENT SHALL BE CONSTRUCTED PER STD. & SPEC. 3.01, EARTHEN EMBANKMENT, OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK.

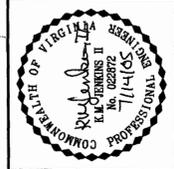
BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1 - 800 - 552 - 7001

IT IS UNDERSTOOD THAT PREPARATION OF RECORD DRAWINGS AND CONSTRUCTION CERTIFICATION AS REQUIRED FOR PROJECT FACILITIES MAY NOT NECESSARILY BE PERFORMED BY THE PLAN PREPARER. THESE COMPONENTS MAY BE PERFORMED BY OTHERS.



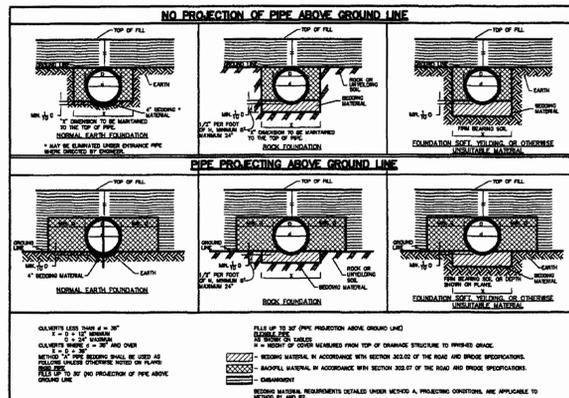
**WEDMORE PLACE AT THE WILLIAMSBURG WINERY**  
 COUNTRY INN  
 BMP PLAN  
 Virginia  
 James City County

NO.	DATE	REVISION / COMMENT / NOTE
2	7/13/05	REV PER JCC LTR DTD 7/17/05
1	5/2/05	REV PER JCC LTR DTD 4/20/05

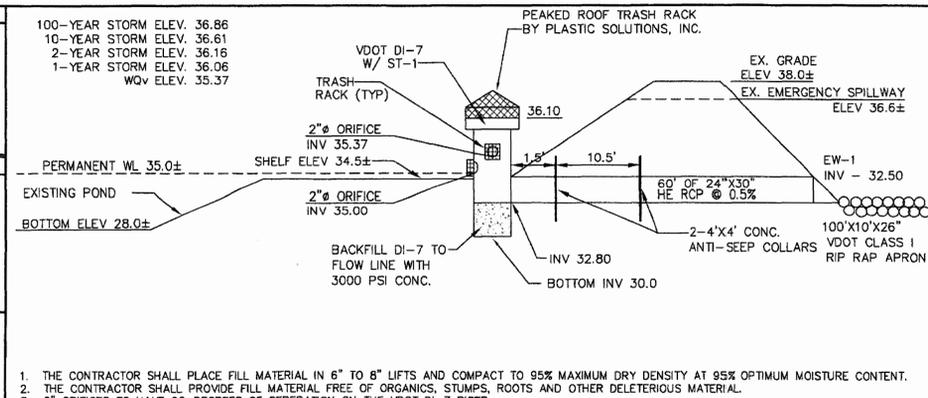


**LandTech Resources, Inc.**  
 Surveying, GPS, Engineering  
 5810-F Piedmonte Road, Williamsburg, VA 23186  
 Phone: (757) 565-3677 Fax: (757) 565-0782  
 web: landtechresources.com

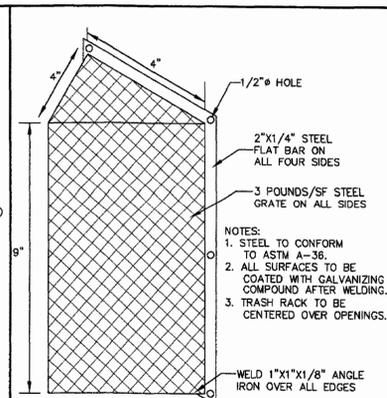
SCALE: 1" = 20'  
 DATE: 2/14/05  
 JOB: 04-686  
 DRAWN BY: KMJ  
 SHEET: C11 OF 17



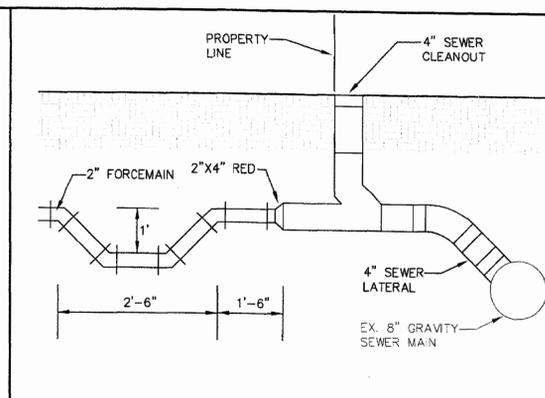
INSTALLATION OF PIPE CULVERTS AND STORM SEWERS  
PIPE BEDDING - METHOD "A" (FILLS UP TO 30')



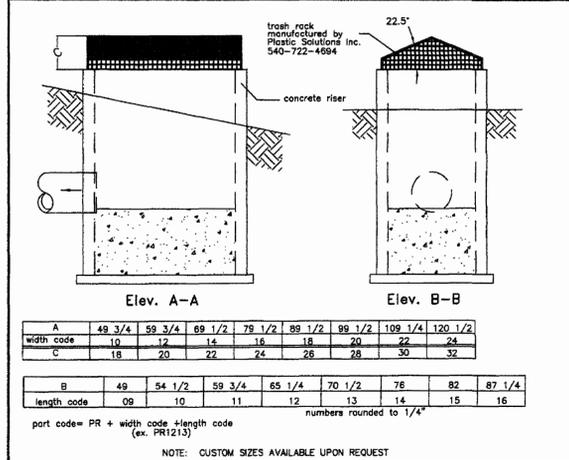
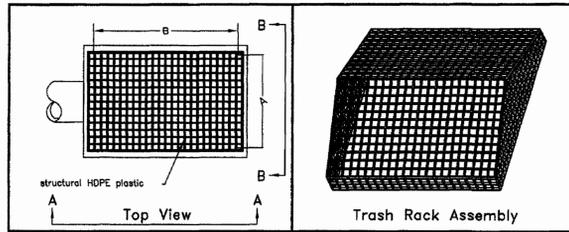
WET POND DETAIL



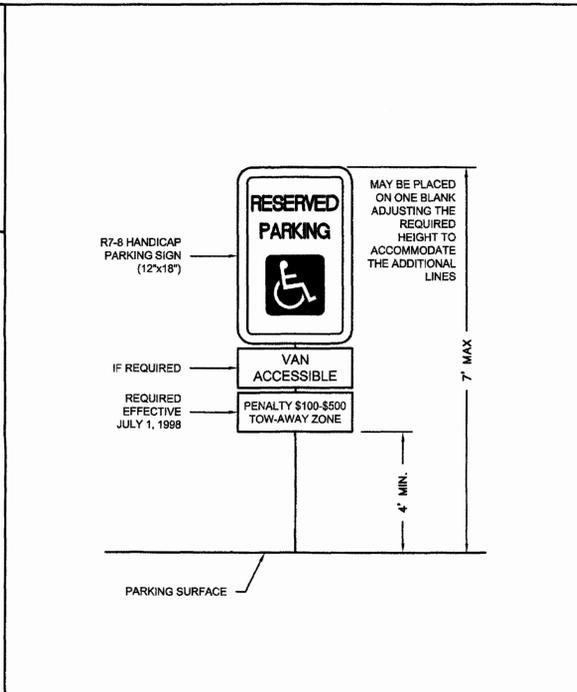
TRASH RACK DETAIL



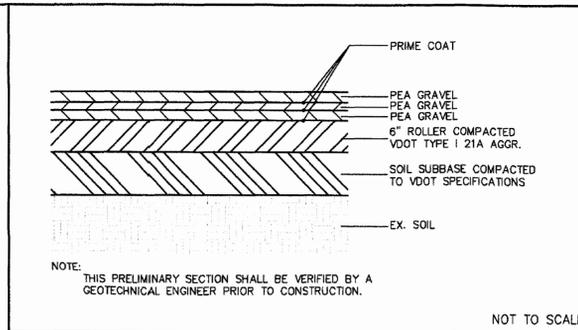
FORCEMAIN CONNECTION TO SEWER CLEANOUT



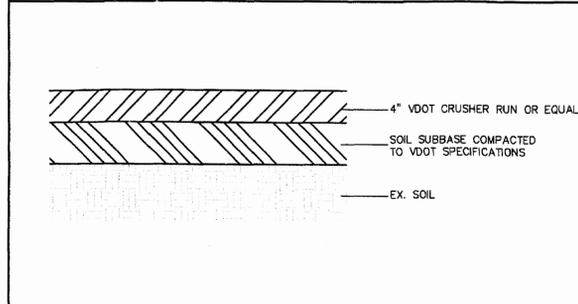
PEAKED ROOF TRASH RACK



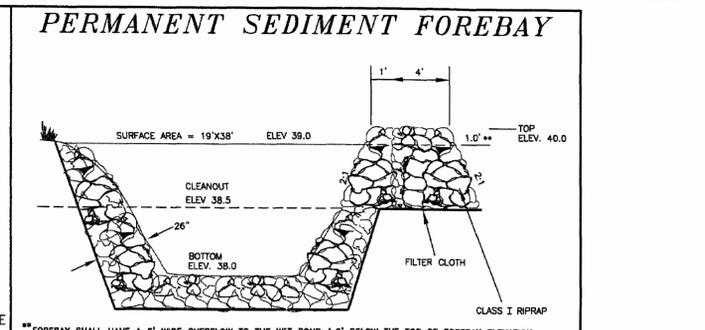
TYP. HC PARKING SIGN



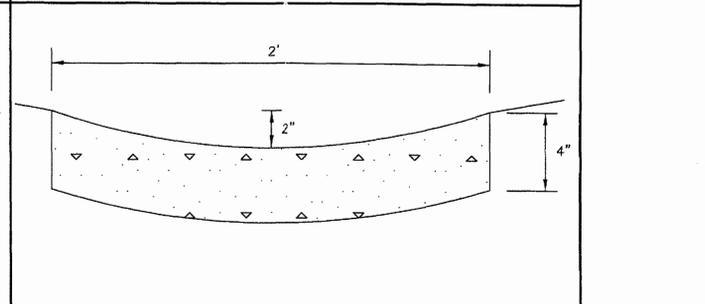
PAVEMENT SECTION



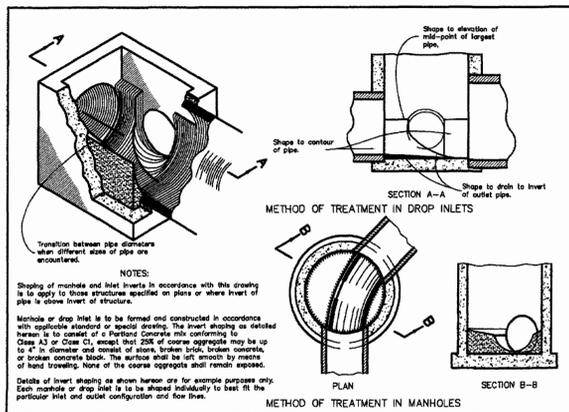
GRAVEL PATH SECTION



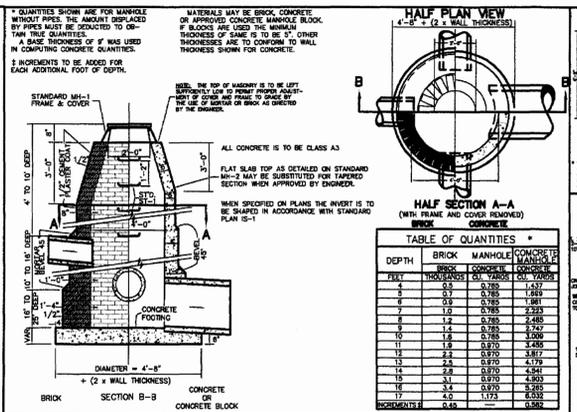
CROSS SECTION OF OUTLET



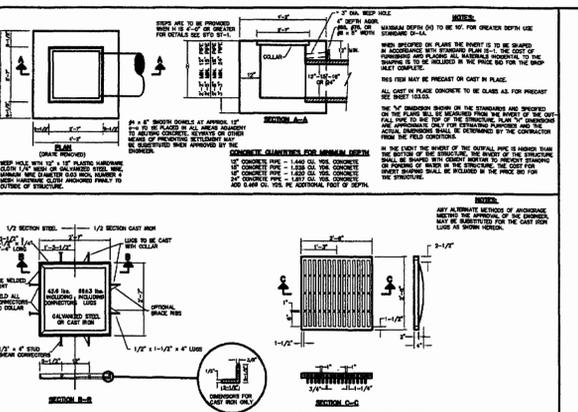
2' WIDE CONCRETE GUTTER



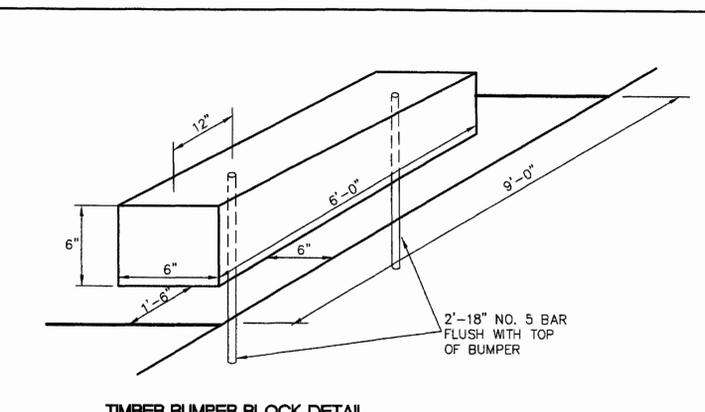
STANDARD METHOD OF SHAPING MANHOLE & INLET INVERTS IS-1



MANHOLE FOR 12"-48" PIPE CULVERTS



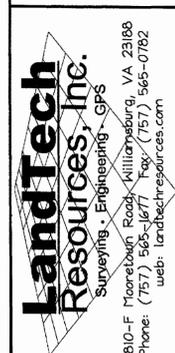
STANDARD DROP INLET 12" - 24" PIPE MAXIMUM DEPTH (H) = 10'



TIMBER BUMPER BLOCK DETAIL NOT TO SCALE

WEDMORE PLACE AT  
THE WILLIAMSBURG WINERY  
COUNTRY INN  
DETAIL SHEET

NO.	DATE	REVISION / COMMENT / NOTE
2	7/13/05	REV PER JCC LTR DTD 7/1/05
1	5/2/05	REV PER JCC LTR DTD 4/29/05



SCALE: 1" = 20'  
DATE: 2/14/05  
JOB: 04-686  
DRAWN BY: KMJ  
SHEET: C15 OF 17

Virginia  
James City County

LandTech Resources, Inc.  
Surveying - Engineering - GPS  
5810-F MacArthur Road Williamsburg, VA 23188  
Phone: (757) 565-3611 Fax: (757) 565-0782  
web: landtechresources.com





**Erosion and Sediment  
Control Narrative**

for

**Wedmore Place at  
The Williamsburg Winery**

February 22, 2005  
Revised April 25, 2005  
Revised July 13, 2005

3RD

**Project Number 04-686**

**LandTech Resources, Inc.**  
5810-F Mooretown Road, Williamsburg, VA  
Phone 757-565-1677 Fax 757-565-0782

**Erosion and Sediment  
Control Narrative**

for

**Wedmore Place at  
The Williamsburg Winery**

February 22, 2005  
Revised April 25, 2005  
Revised July 13, 2005

Project Number 04-686



**LandTech Resources, Inc.**  
5810-F Mooretown Road, Williamsburg, VA  
Phone 757-565-1677 Fax 757-565-0782

## TABLE OF CONTENTS

### SECTION

PROJECT DESCRIPTION

EXISTING CONDITIONS

ADJACENT AREAS

OFF-SITE AREA

SOILS

Craven-Uchee complex (11C)

Slagle fine sandy loam (29A)

Slagle fine sandy loam (29B)

CRITICAL EROSION AREAS

EROSION AND SEDIMENT CONTROL MEASURES

STRUCTURAL PRACTICES

Temporary Stone Construction Entrance – 3.02

Silt Fence – 3.05

Storm Drain Inlet Protection – 3.07

Temporary Diversion Dike – 3.09

Temporary Sediment Trap – 3.13

Outlet Protection – 3.18

Rock Check Dam – 3.20

Dewatering Structure – 3.26

Soil Stabilization Blankets and Matting – 3.36

Tree Preservation and Protection – 3.38

VEGETATIVE PRACTICES

Permanent Seeding – 3.32

MANAGEMENT STRATEGIES

PERMANENT STABILIZATION

STORMWATER MANAGEMENT

CALCULATIONS

MAINTENANCE

- Temporary Stone Construction Entrance – 3.02
- Silt Fence – 3.05
- Storm Drain Inlet Protection – 3.07
- Temporary Diversion Dike – 3.09
- Temporary Sediment Trap – 3.13
- Rock Check Dam – 3.20
- Dewatering Structure – 3.26
- Permanent Seeding – 3.32
- Soil Stabilization Blankets and Matting – 3.36

APPENDICES

BMP Design	APPENDIX A
Onsite Storm Sewer System	APPENDIX B
Sediment Trap Design	APPENDIX C
Environmental Inventory	APPENDIX D

## **PROJECT DESCRIPTION**

The project consists of the construction of a 13,736 sf (footprint) 3-story country inn at The Williamsburg Winery in James City County, Virginia. The site is 70.31 acres with a total of 1.85 acres of additional area to be covered by impervious surfaces after construction is complete. The total disturbed area is approximately 4.3 acres.

## **EXISTING CONDITIONS**

Currently the site is wooded in the front and open in the rear. The front half of the site is flat and rear drops off 10'+/- to an existing wet pond.

## **ADJACENT AREAS**

The site is bounded on the north and east by additional land of The Williamsburg Winery. The site is bounded on the south and west by existing residential lots of the Vineyards at Jockey's Neck.

## **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-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 extends to a depth of at least 72 inches. It is brownish yellow fine sandy loam mottled with gray in the upper part and gray loamy fine sand with yellow mottles 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 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 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. The subsoil of both soils has moderate shrink-swell potential.

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

This soil is deep, nearly level, 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, it is mostly mottled clay loam and sandy clay loam. The substratum is mottled sandy clay loam to a depth of at least 60 inches.

The permeability of this Slagle soil is moderate in the upper part of the subsoil and moderately slow or slow in the lower part. The erosion hazard is slight and the subsoil 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, it is mostly mottled clay loam and sandy clay loam. The substratum is mottled sandy clay loam to a depth of at least 60 inches.

The permeability of this Slagle soil 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 pond and downstream receiving channel located on the southern side of the site. To prevent sediment from leaving the site to this area, 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**

### **Temporary Stone Construction Entrance – 3.02**

A construction entrance shall be provided at the point of ingress and egress to reduce the amount of mud transported onto paved public roads by motor vehicles and runoff.

### **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.

### **Storm Drain Inlet Protection – 3.07**

Storm drain protection is installed at all drainage inlets to prevent sediment from entering the storm drainage systems prior to permanent stabilization for the disturbed areas.

### **Temporary Diversion Dike – 3.09**

Temporary diversion dikes are to be installed along the perimeter of the disturbed area to divert sediment-laden runoff to the sediment traps.

### **Temporary Sediment Trap – 3.13**

Temporary sediment traps will be installed to detain sediment-laden runoff from the disturbed site long enough to allow the majority of the sediment to settle out.

### **Outlet Protection – 3.18**

Outlet protection shall be provided to prevent scour at stormwater outlets, to protect the outlet structure, and to minimize the potential for downstream erosion.

### **Rock Check Dam – 3.20**

A rock check dam shall be provided to reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the ditch.

### **Dewatering Structure – 3.26**

If required, a “DIRTBAG” will be provided to filter sediment-laden water during the excavation and installation of the new outlet structure for the existing wet pond.

### **Soil Stabilization Blankets and Matting – 3.36**

Jute mesh shall be provided to aid in controlling erosion on the fill slopes by providing a microclimate which protects young vegetation and promotes its establishment.

### **Tree Preservation and Protection – 3.38**

Tree preservation and protection shall be provided 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 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**

This project is for the construction of a 13,736 sf (footprint) 3-story country inn at The Williamsburg Winery. The current site contains existing trees and a wet pond. After development the site will contain approximately 1.85 impervious acres. To meet the stormwater quality requirements of the James City County BMP Point System and the stormwater quantity requirements of Minimum Standard 19 of the Virginia Stormwater Management Handbook an

existing pond will be converted to a Wet Extended Detention Pond (Type A-3 BMP) to treat the additional stormwater runoff. The wet pond will treat the first two-inches of runoff, and the post-development runoff from the 1-year, 2-year, 10-year, and 100-year storms. The existing wet pond will be retrofitted with a VDOT DI-7 outlet structure. The pond will release the first-flush of two-inches of runoff per impervious acre over 24 hours to meet the stormwater quality requirements of the James City County BMP Point System. The 1-year channel protection volume is released over 24-hours at a maximum rate of 0.20 cfs. The 2-year post-development storm of 10.84 cfs is released at 1.74 cfs, which is less than the pre-development rate of 5.68 cfs. The 10-year post development storm of 23.08 cfs is released at 14.29 cfs, which is slightly greater than the pre-development rate of 13.56 cfs. The 100-year post-development storm of 35.09 cfs is released at 30.01 cfs with 1.14 feet of freeboard. BMP design calculations are provided in Appendix A.

## **CALCULATIONS**

Appendix B contains design calculations for the onsite storm sewer conveyance system.

## **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:

### **Temporary Stone Construction Entrance – 3.02**

The entrance shall be maintained in a condition, which will prevent tracking or flow of mud onto public rights-of-way. This may require periodic dressing with additional stone or the washing and reworking of existing stone as conditions demand. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. The use of water trucks to remove materials dropped, washed, or tracked onto roadways will not be permitted under any circumstances.

### **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.

#### **Storm Drain 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 the 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.

#### **Temporary Diversion Dike – 3.09**

The measure shall be inspected after every storm and repairs made to the dike, flow channel, outlet or sediment trapping facility, as necessary. Once every two weeks, whether a storm event has occurred or not, the measure shall be inspected and repairs made if needed. Damages caused by construction traffic or other activity must be repaired before the end of each working day.

#### **Temporary Sediment Trap – 3.13**

Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design volume of the wet storage. Sediment removal from the basin shall be deposited in a suitable area and in a manner that it will not erode and cause sedimentation problems.

Filter stone shall be regularly checked to ensure that filtration performance is maintained. Stone choked with sediment shall be removed and cleaned or replaced.

The structure should be checked regularly to ensure that it is structurally sound and has not been damaged by erosion or construction equipment. The height of the stone outlet should be checked to ensure that its center is at least 1 foot below the top of the embankment.

#### **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.

#### **Dewatering Device – 3.20**

The filtering device must be inspected frequently and repaired or replaced once the sediment build-up prevents the structure from functioning as designed.

The accumulated sediment which is removed from the dewatering device shall be spread on-site and stabilized or disposed of at an approved disposal site as per approved plans.

### **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.
- Maintain a ground cover or organic mulch around trees that is adequate to prevent erosion, protect roots, and hold water.

### **Soil Stabilization Blankets and Matting – 3.36**

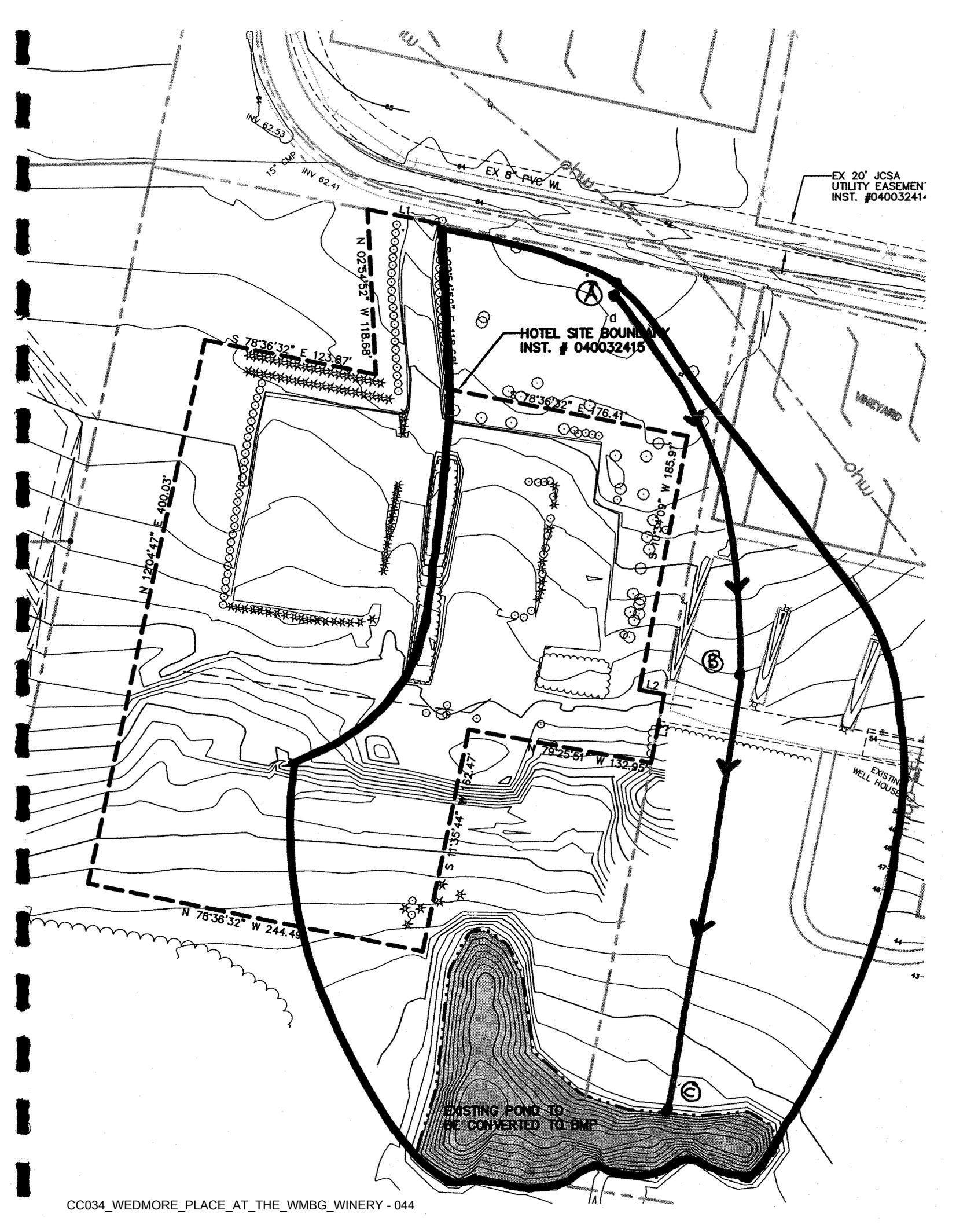
All soil stabilization blankets and matting should be inspected periodically following installation, particularly after rainstorms to check for erosion and undermining. Any dislocation or failure should be repaired immediately. If washouts or breakage occurs, reinstall the material after repairing damage to the slope. Continue to monitor these areas until which time they become permanently stabilized, at that time an annual inspection should be adequate.

**APPENDIX A**

EX 20' JCSA  
UTILITY EASEMENT  
INST. #04003241

HOTEL SITE BOUNDARY  
INST. # 040032415

EXISTING POND TO  
BE CONVERTED TO BMP



# Worksheet 2: Runoff curve number and runoff

Project <b>Wedmore Place</b>	By <b>KMJ</b>	Date <b>11/27/05</b>
Location <b>James City County, Va.</b>	Checked	Date

Check one:  Present  Developed

## 1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description  (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN <sup>1/</sup>			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi <sup>2</sup> <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Figure 2-3	Figure 2-4		
Craven-Uchce sogle (C)	Herbaceous (Good Cover)	74			4.28	316.72
Craven-Uchce sogle (C)	Gravel	89			.43	38.27

<sup>1/</sup> Use only one CN source per line

Totals ➡ **4.71** **354.99**

$$CN \text{ (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{354.99}{4.71} = 75.4$$
 ; Use CN ➡ **75**

## 2. Runoff

	Storm #1	Storm #2	Storm #3	Storm #1
Frequency ..... yr	1	2	10	100
Rainfall, P (24-hour) ..... in	2.8	3.5	5.8	8.0
Runoff, Q ..... in	0.8	1.3	3.1	5.0

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

# Worksheet 3: Time of Concentration (T<sub>c</sub>) or travel time (T<sub>t</sub>)

Project <b>Wedmore Place</b>	By <b>KMJ</b>	Date <b>1/27/05</b>
Location <b>James City County</b>	Checked	Date

Check one:  Present  Developed  
 Check one:  T<sub>c</sub>  T<sub>t</sub> through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.  
 Include a map, schematic, or description of flow segments.

### Sheet flow (Applicable to T<sub>c</sub> only)

	Segment ID	<b>AB</b>		
1. Surface description (table 3-1) .....		<b>Grass</b>		
2. Manning's roughness coefficient, n (table 3-1) .....		<b>0.15</b>		
3. Flow length, L (total L + 300 ft) ..... ft		<b>300</b>		
4. Two-year 24-hour rainfall, P <sub>2</sub> ..... in		<b>3.5</b>		
5. Land slope, s ..... ft/ft		<b>.027</b>		
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T <sub>t</sub> ..... hr		<b>.33</b>	+	<b>.33</b>

### Shallow concentrated flow

	Segment ID	<b>BC</b>		
7. Surface description (paved or unpaved) .....		<b>Unpaved</b>		
8. Flow length, L .....ft		<b>325</b>		
9. Watercourse slope, s ..... ft/ft		<b>.065</b>		
10. Average velocity, V (figure 3-1) ..... ft/s		<b>4.1</b>		
11. $T_t = \frac{L}{3600 V}$ Compute T <sub>t</sub> ..... hr		<b>.02</b>	+	<b>.02</b>

### Channel flow

	Segment ID			
12. Cross sectional flow area, a ..... ft <sup>2</sup>				
13. Wetted perimeter, p <sub>w</sub> ..... ft				
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ..... ft				
15. Channel slope, s ..... ft/ft				
16. Manning's roughness coefficient, n .....				
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ..... ft/s				
18. Flow length, L ..... ft				
19. $T_t = \frac{L}{3600 V}$ Compute T <sub>t</sub> ..... hr			+	
20. Watershed or subarea T <sub>c</sub> or T <sub>t</sub> (add T <sub>t</sub> in steps 6, 11, and 19) ..... Hr				<b>.35</b>

### Worksheet 5a: Basic watershed data

Project <b>Wedmore Place</b>				Location <b>James City County</b>				By <b>KMS</b>		Date <b>11/27/05</b>	
Check one: <input checked="" type="checkbox"/> Present <input type="checkbox"/> Developed				Frequency (yr)				Checked		Date	
<del>Subarea name</del> <b>STORM</b>	Drainage area	Time of concentration	Travel time through subarea	Downstream subarea names	Travel time summation to outlet	24-hr rainfall	Runoff curve number	Runoff	$A_m Q$	Initial abstraction	$I_a/P$
	$A_m$ (mi <sup>2</sup> )	$T_c$ (hr)	$T_t$ (hr)		$\Sigma T_t$ (hr)	$P$ (in)	$CN$	$Q$ (in)	$A_m Q$ (mi <sup>2</sup> -in)	$I_a$ (in)	$I_a/P$
1	.0074	0.35				2.8	75	0.8	.0059	.667	.24
2	.0074	0.35				3.5	75	1.3	.0096	.667	.19
10	.0074	0.35				5.8	75	3.1	.0229	.667	.12
100	.0074	0.35				8.0	75	5.0	.0370	.667	.08

From worksheet 3

From worksheet 2

From table 5-1

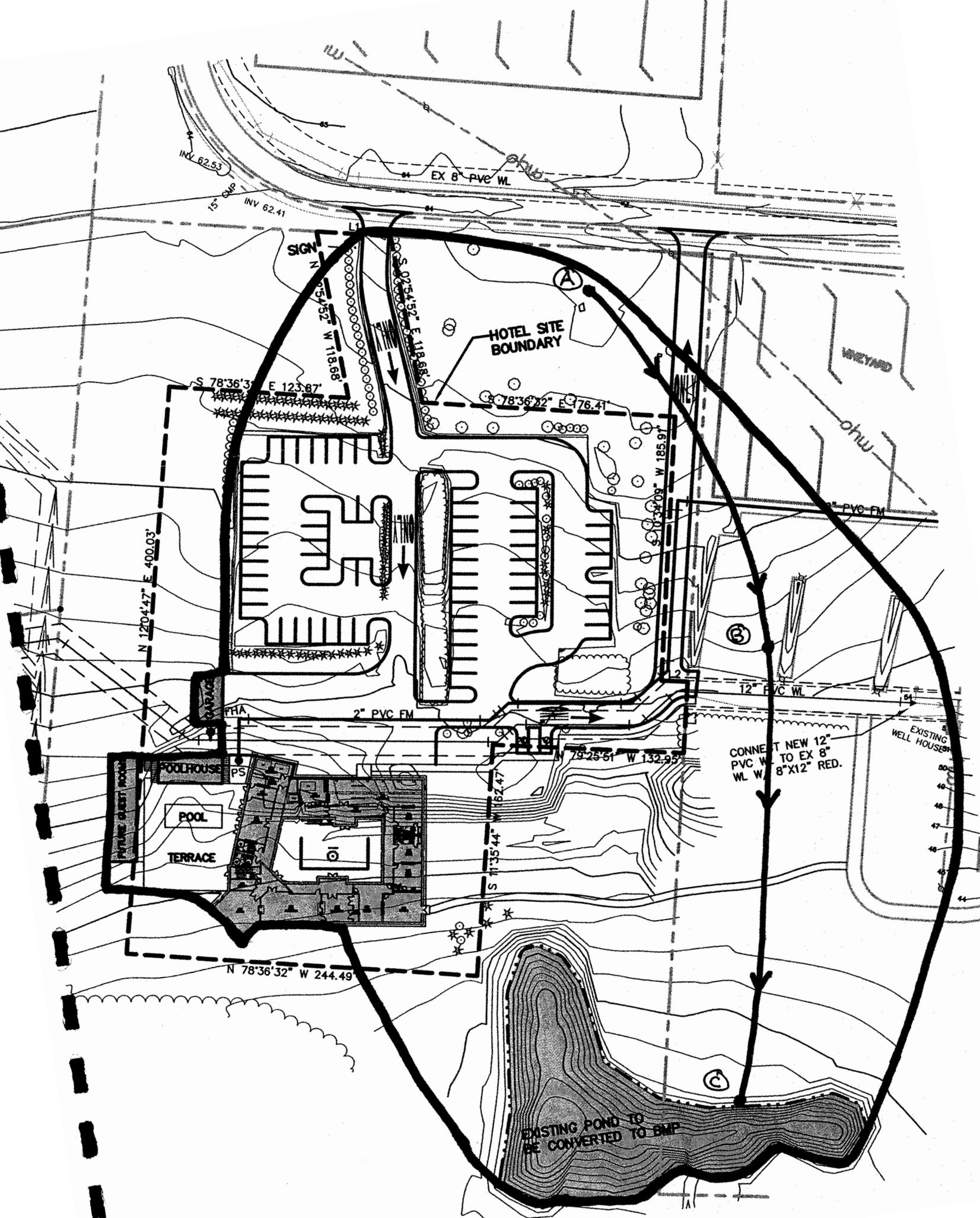
210-VI-TR-55, Second Ed., June 1986)

D-5

### Worksheet 5b: Basic watershed data

Project <b>Wedmore Place</b>		Location <b>James City County</b>			By <b>KMJ</b>		Date <b>1/27/05</b>											
Check one: <input checked="" type="checkbox"/> Present <input type="checkbox"/> Developed		Frequency (yr)			Checked		Date											
<b>Subarea name</b> <b>STARN</b>	Basic watershed data used <sup>1/</sup>				Select and enter hydrograph times in hours from exhibit 5-II <sup>2/</sup>													
	Subarea $T_c$ (hr)	$\Sigma T_t$ to outlet (hr)	$I_a/P$	$A_m Q$ (mi <sup>2</sup> -in)			12.3	12.4										
					Discharges at selected hydrograph times <sup>3/</sup> (cfs)													
<b>1</b>	<b>.35</b>		<b>.24</b>	<b>.0059</b>					<b>2.92</b>									
<b>2</b>	<b>.35</b>		<b>.19</b>	<b>.0096</b>					<b>5.68</b>									
<b>10</b>	<b>.35</b>		<b>.12</b>	<b>.0229</b>					<b>13.56</b>									
<b>100</b>	<b>.35</b>		<b>.08</b>	<b>.0370</b>					<b>21.90</b>									
Composite hydrograph at outlet																		

- <sup>1/</sup> Worksheet 5a. Rounded as needed for use with exhibit 5.
- <sup>2/</sup> Enter rainfall distribution type used.
- <sup>3/</sup> Hydrograph discharge for selected times is  $A_m Q$  multiplied by tabular discharge from appropriate exhibit 5.



# Worksheet 2: Runoff curve number and runoff

Project <b>Wedmore Place</b>	By <b>KMJ</b>	Date <b>11/27/05</b>
Location <b>James City County</b>	Checked	Date

Check one:  Present  Developed

## 1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description  (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN <sup>1/</sup>			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi <sup>2</sup> <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Figure 2-3	Figure 2-4		
Craven-Uchee sogle (C)	Herbaceous (Good Cover)	74			3.82	282.68
Craven-Uchee sogle (C)	Gravel	89			0.43	38.27
Craven-Uchee sogle (C)	Road / Road	98			1.85	181.30

<sup>1/</sup> Use only one CN source per line

Totals ➡ **6.10** **502.25**

$$CN \text{ (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{502.25}{6.10} = 82.3$$
 ; Use CN ➡ **82**

## 2. Runoff

	Storm #1	Storm #2	Storm #3	Storm #1
Frequency ..... yr	1	2	10	100
Rainfall, P (24-hour) ..... in	2.8	3.5	5.8	8.0
Runoff, Q ..... in	1.2	1.8	3.8	5.8

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

# Worksheet 3: Time of Concentration (T<sub>c</sub>) or travel time (T<sub>t</sub>)

Project <b>Wedmore Place</b>	By <b>KMJ</b>	Date <b>11/27/05</b>
Location <b>James City County</b>	Checked	Date

Check one:  Present  Developed

Check one:  T<sub>c</sub>  T<sub>t</sub> through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.  
Include a map, schematic, or description of flow segments.

## Sheet flow (Applicable to T<sub>c</sub> only)

	Segment ID		
1. Surface description (table 3-1) .....	<b>AB</b>		
2. Manning's roughness coefficient, n (table 3-1) .....	<b>Grass</b>		
3. Flow length, L (total L † 300 ft) .....	<b>0.15</b>		
4. Two-year 24-hour rainfall, P <sub>2</sub> .....	<b>300</b>		
5. Land slope, s .....	<b>3.5</b>		
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T <sub>t</sub> .....	<b>.027</b>		
	<b>.33</b>	+	<b>.33</b>

## Shallow concentrated flow

	Segment ID		
7. Surface description (paved or unpaved) .....	<b>BC</b>		
8. Flow length, L .....	<b>Unpaved</b>		
9. Watercourse slope, s .....	<b>325</b>		
10. Average velocity, V (figure 3-1) .....	<b>.065</b>		
11. $T_t = \frac{L}{3600 V}$ Compute T <sub>t</sub> .....	<b>4.1</b>		
	<b>.02</b>	+	<b>.02</b>

## Channel flow

	Segment ID		
12. Cross sectional flow area, a .....			
13. Wetted perimeter, p <sub>w</sub> .....			
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r .....			
15. Channel slope, s .....			
16. Manning's roughness coefficient, n .....			
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V .....			
18. Flow length, L .....			
19. $T_t = \frac{L}{3600 V}$ Compute T <sub>t</sub> .....		+	
20. Watershed or subarea T <sub>c</sub> or T <sub>t</sub> (add T <sub>t</sub> in steps 6, 11, and 19) .....			<b>.35</b>

### Worksheet 5a: Basic watershed data

Project <b>Wedmore Place</b>				Location <b>James City County</b>				By <b>KMS</b>		Date <b>1/27/05</b>	
Check one: <input type="checkbox"/> Present <input checked="" type="checkbox"/> Developed				Frequency (yr)				Checked		Date	
<del>Subarea name</del> <b>STORM</b>	Drainage area  $A_m$ (mi <sup>2</sup> )	Time of concentration  $T_c$ (hr)	Travel time through subarea  $T_t$ (hr)	Downstream subarea names	Travel time summation to outlet  $\Sigma T_t$ (hr)	24-hr rainfall  $P$ (in)	Runoff curve number  $CN$	Runoff  $Q$ (in)	$A_m Q$ (mi <sup>2</sup> -in)	Initial abstraction  $I_a$ (in)	$I_a/P$
1	.0095	.35				2.8	82	1.2	.0114	0.439	.16
2	.0095	.35				3.5	82	1.8	.0171	0.439	.13
10	.0095	.35				5.8	82	3.8	.0361	0.439	.08
100	.0095	.35				8.0	82	5.8	.0551	0.439	.05

From worksheet 3

From worksheet 2

From table 5-1

210-VI-TR-55, Second Ed., June 1986)

D-5

### Worksheet 5b: Basic watershed data

Project <b>Wedmore Place</b>		Location <b>James City County</b>			By <b>KMS</b>		Date <b>1/27/05</b>							
Check one: <input type="checkbox"/> Present <input checked="" type="checkbox"/> Developed		Frequency (yr)			Checked		Date							
<b>Subarea name</b> <b>STORM</b>	Basic watershed data used <sup>1/</sup>				Select and enter hydrograph times in hours from exhibit 5-II <sup>2/</sup>									
	Subarea $T_c$ (hr)	$\Sigma T_t$ to outlet (hr)	$I_a/P$	$A_m Q$ (mi <sup>2</sup> -in)			12.3							
					Discharges at selected hydrograph times <sup>3/</sup> (cfs)									
1	.35		.16	.0114			6.75							
2	.35		.13	.0171			10.12							
10	.35		.08	.0361			21.37							
100	.35		.05	.0551			32.62							
Composite hydrograph at outlet														

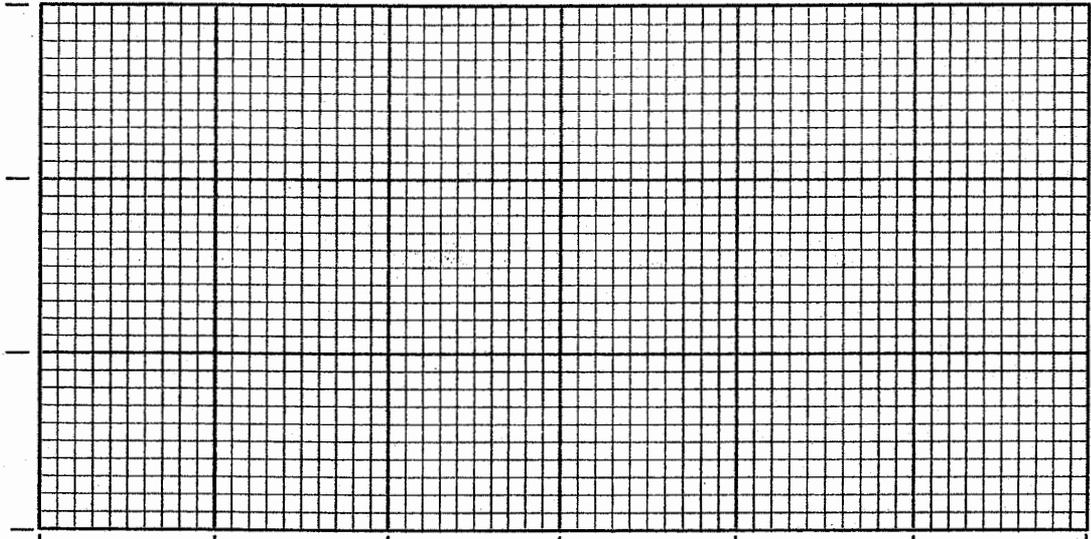
- 1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
- 2/ Enter rainfall distribution type used.
- 3/ Hydrograph discharge for selected times is  $A_m Q$  multiplied by tabular discharge from appropriate exhibit 5.

# Worksheet 6a: Detention basin storage, peak outflow discharge ( $q_o$ ) known

Project <b>Wedmore Place</b>	By <b>KMJ</b>	Date <b>1/27/05</b>
Location <b>James City County</b>	Checked	Date

Check one:  Present  Developed

Elevation or  stage



Detention basin storage ( acre feet )

1. Data:

Drainage area .....  $A_m = 0.0095$  mi<sup>2</sup>  
 Rainfall distribution type ( I, IA, II, III ) = **II**

1st Stage	2nd Stage
-----------	-----------

2. Frequency ..... yr 

1	2
---	---

3. Peak inflow discharge  $q_i$  ..... ft<sup>3</sup>/s 

6.75	10.12
------	-------

  
 (from worksheet 4 or 5b)

4. Peak outflow discharge  $q_u$  ..... ft<sup>3</sup>/s 

2.92	5.68
------	------

<sup>1/</sup>

5. Compute  $\frac{q_o}{q_i}$  ..... 

0.43	0.56
------	------

6.  $\frac{V_s}{V_r}$  ..... 

0.31	0.26
------	------

  
 ( Use  $\frac{q_o}{q_i}$  with figure 6-1)

7. Runoff, Q ..... in 

1.2	1.8
-----	-----

  
 ( From worksheet 2)

8. Runoff volume  $V_r$  ..... ac ft 

0.61	0.91
------	------

  
 ( $V_r = QA_m$  53.33)

9. Storage volume,  $V_s$  ..... ac-ft 

0.19	0.24
------	------

  
 ( $V_s = V_r ( \frac{V_s}{V_r} )$  8,300cf 10,500cf)

10. Maximum storage  $E_{max}$  (from plot) 

--	--

<sup>1/</sup> 2nd stage  $q_o$  includes 1st stage  $q_o$ .

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMJ DATE 11/27/05

SCALE \_\_\_\_\_

## WET EXTENDED DETENTION POND BMP A-3

Treatment Volume = 2.0 inches / impervious acre

Impervious Area = 1.83 ac. = 80,586 sf

$$WQV = \frac{80,586 \text{ sf} \times 2 \text{ in} \times 1 \text{ ft}}{12 \text{ in}} = 13,432 \text{ cf}$$

Dry Storage = 6,716 cf

Wet Storage = 6,716 cf

$$Q_{24 \text{ HR}} = \frac{6,716 \text{ cf} \times 1 \text{ hr} \times 1 \text{ m}}{24 \text{ hr} \times 60 \text{ m} \times 60 \text{ s}} = .078 \text{ cfs}$$

## Worksheet for BMP Point System

**A. STRUCTURAL BMP POINT ALLOCATION**

<u>BMP</u>	<u>BMP Points</u>		<u>Fraction of Site Served by BMP</u>	=	<u>Weighted BMP Points</u>
<u>A-3</u>	<u>10</u>	x	<u>1.0</u>	=	<u>10</u>
<u> </u>	<u> </u>	x	<u> </u>	=	<u> </u>
<u> </u>	<u> </u>	x	<u> </u>	=	<u> </u>
<u> </u>	<u> </u>	x	<u> </u>	=	<u> </u>

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 10

**B. NATURAL OPEN SPACE CREDIT**

<u>Fraction of Site</u>		<u>Natural Open Space Credit</u>	=	<u>Points for Natural Open Space</u>
<u>∅</u>	x	<u>∅</u> <small>(0.1 per 1%)</small>	=	<u>∅</u>
<u> </u>	x	<u> </u> <small>(0.15 per 1%)</small>	=	<u> </u>

TOTAL NATURAL OPEN SPACE CREDIT: ∅

**C. TOTAL WEIGHTED POINTS**

<u>10.0</u>	+	<u>∅</u>	=	<u>10</u>
Structural BMP Points		Natural Open Space Points		Total

**1-Year Hydrograph**

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:46:42  
 Input: WP1.IN  
 Output: WP1.OUT

===== PROGRAM EXECUTION =====

NUMBER OF STORMS TO BE MODELED : 1  
 NUMBER OF CHANNELS : 0  
 NUMBER OF SUBAREAS : 1  
 UPSTREAM HYDROGRAPHS ENTER AT : 0 LOCATIONS  
 NUMBER OF TIME STEPS : 300  
 COMPUTATIONAL TIME INCREMENT : .100 Hours

NOTE: The DURATION of the final computed hydrograph(s) for this watershed system will be 30.000 hours.

===== UNIT HYDROGRAPH METHODOLOGY =====

The SCS DIMENSIONLESS UNIT HYDROGRAPH is used in all runoff computations. The peak rate factor (PRF) for all unit hydrographs is 484 (U.S. Customary units) or 2.08356 (Metric units).

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:46:42  
 Input: WP1.IN  
 Output: WP1.OUT

===== SUBAREA DATA =====

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0095	.350	82.00	.0	

Composite Watershed Curve Number = 82.00  
 Minimum Subarea Time of Concentration = .350 hours.

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:46:42  
 Input: WPl.IN  
 Output: WPl.OUT

RETURN PERIOD (yrs): 1

===== RAINFALL HYETOGRAPH INFORMATION =====

RAINFALL HYETOGRAPH: SCS TYPE II  
 RAINFALL DURATION: 24.00 Hours  
 RAINFALL DEPTH: 2.80 Inches

RAINFALL HYETOGRAPH,  
 SCS TYPE II  
 Time (Hours), Total Depth (Inches):

.000,	.00	2.000,	.06	4.000,	.13	6.000,	.22
7.000,	.27	8.000,	.34	8.500,	.37	9.000,	.41
9.500,	.46	9.750,	.48	10.000,	.51	10.500,	.57
11.000,	.66	11.500,	.79	11.750,	1.00	12.000,	1.86
12.500,	2.06	13.000,	2.16	13.500,	2.24	14.000,	2.30
16.000,	2.46	20.000,	2.67	24.000,	2.80		

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 Input: WPl.IN  
 Output: WPl.OUT

RETURN PERIOD (yrs): 1

SUBAREA 1 SUBAREA 1 SUBAREA 1 SUBAREA 1

AREA (square miles) : .0095  
 TIME OF CONCENTRATION (hrs): .35  
 RUNOFF CURVE NUMBER : 82.00  
 BASEFLOW (cfs) : .00  
 DOWNSTREAM CHANNELS :

SUBAREA RUNOFF (cfs)

TIME: (hrs)	+0.00 hrs	+1.10 hrs	+2.20 hrs	+3.30 hrs	+4.40 hrs	+5.50 hrs	+6.60 hrs	+7.70 hrs	+8.80 hrs	+9.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02
10.00	.02	.03	.04	.05	.05	.06	.07	.09	.11	.13
11.00	.14	.17	.21	.26	.30	.34	.45	.75	1.39	2.99
12.00	5.60	7.35	6.43	4.52	3.13	2.43	1.99	1.59	1.27	1.08
13.00	.98	.89	.81	.73	.69	.66	.64	.60	.56	.53
14.00	.52	.51	.52	.51	.50	.49	.47	.45	.43	.41

15.00	.39	.38	.36	.35	.34	.32	.31	.30	.30	.29
16.00	.28	.28	.27	.27	.27	.27	.26	.26	.26	.26
17.00	.26	.25	.25	.25	.25	.24	.24	.24	.24	.24
18.00	.23	.23	.23	.23	.23	.22	.22	.22	.22	.22
19.00	.21	.21	.21	.21	.20	.20	.20	.20	.20	.19
20.00	.19	.19	.19	.18	.18	.18	.18	.18	.17	.17
21.00	.17	.17	.17	.17	.16	.16	.16	.16	.16	.16
22.00	.16	.15	.15	.15	.15	.15	.15	.15	.15	.15
23.00	.15	.15	.14	.14	.14	.14	.14	.14	.14	.14
24.00	.14	.13	.09	.05	.03	.02	.01	.00	.00	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK RUNOFF (cfs): 7.35  
 TIME TO PEAK (hrs): 12.10

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:46:42  
 Input: WPl.IN  
 Output: WPl.OUT

RETURN PERIOD (yrs): 1

===== DOWNSTREAM HYDROGRAPH =====

TIME: (hrs)	DISCHARGE (cfs)									
	+0.00 hrs	+0.10 hrs	+0.20 hrs	+0.30 hrs	+0.40 hrs	+0.50 hrs	+0.60 hrs	+0.70 hrs	+0.80 hrs	+0.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02
10.00	.02	.03	.04	.05	.05	.06	.07	.09	.11	.13
11.00	.14	.17	.21	.26	.30	.34	.45	.75	1.39	2.99
12.00	5.60	7.35	6.43	4.52	3.13	2.43	1.99	1.59	1.27	1.08
13.00	.98	.89	.81	.73	.69	.66	.64	.60	.56	.53
14.00	.52	.51	.52	.51	.50	.49	.47	.45	.43	.41
15.00	.39	.38	.36	.35	.34	.32	.31	.30	.30	.29
16.00	.28	.28	.27	.27	.27	.27	.26	.26	.26	.26
17.00	.26	.25	.25	.25	.25	.24	.24	.24	.24	.24
18.00	.23	.23	.23	.23	.23	.22	.22	.22	.22	.22
19.00	.21	.21	.21	.21	.20	.20	.20	.20	.20	.19
20.00	.19	.19	.19	.18	.18	.18	.18	.18	.17	.17
21.00	.17	.17	.17	.17	.16	.16	.16	.16	.16	.16
22.00	.16	.15	.15	.15	.15	.15	.15	.15	.15	.15
23.00	.15	.15	.14	.14	.14	.14	.14	.14	.14	.14
24.00	.14	.13	.09	.05	.03	.02	.01	.00	.00	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK DISCHARGE (cfs): 7.35  
 TIME TO PEAK (hrs): 12.10

Hydrograph Saved In: WPl.DAT

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:46:42  
 Input: WPl.IN  
 Output: WPl.OUT

RETURN PERIOD (yrs): 1

===== HYDROLOGIC SUMMARY =====  
 ===== Volumes, Losses, and Discharges =====

SCS TYPE II Hyetograph.  
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.  
 APPLIED RAINFALL DEPTH (inches): 2.80

	VOLUME OF RAINFALL APPLIED (ac-ft)	VOLUME OF RUNOFF (ac-ft)	RAINFALL LOSSES (percent)	PEAK DISCHARGE (cfs)	PEAK DISCHARGE (cfs/ac)
SUBAREA 1	1.4187	.61665	56.53	7.345	1.208
TOTAL WATERSHED	1.4187	.61665	56.53	7.345	1.208

TOTAL WATERSHED AREA (square miles): .0095  
 TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft): .6167  
 COMPOSITE WATERSHED CURVE NUMBER: 82.00  
 MINIMUM SUBAREA TIME OF CONCENTRATION: .350 hours.

NOTE: "VOLUME OF RUNOFF" includes surface runoff only; baseflows are not included in this summation. The "TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED" includes all baseflows.

1

**2-Year Hydrograph**

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:56:54  
 Input: WP2.IN  
 Output: WP2.OUT

===== PROGRAM EXECUTION =====

NUMBER OF STORMS TO BE MODELED : 1  
 NUMBER OF CHANNELS : 0  
 NUMBER OF SUBAREAS : 1  
 UPSTREAM HYDROGRAPHS ENTER AT : 0 LOCATIONS  
 NUMBER OF TIME STEPS : 300  
 COMPUTATIONAL TIME INCREMENT : .100 Hours

NOTE: The DURATION of the final computed hydrograph(s) for this watershed system will be 30.000 hours.

===== UNIT HYDROGRAPH METHODOLOGY =====

The SCS DIMENSIONLESS UNIT HYDROGRAPH is used in all runoff computations. The peak rate factor (PRF) for all unit hydrographs is 484 (U.S. Customary units) or 2.08356 (Metric units).

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:56:54  
 Input: WP2.IN  
 Output: WP2.OUT

===== SUBAREA DATA =====

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0095	.350	82.00	.0	

Composite Watershed Curve Number = 82.00  
 Minimum Subarea Time of Concentration = .350 hours.

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:56:54  
 Input: WP2.IN  
 Output: WP2.OUT

RETURN PERIOD (yrs): 2

===== RAINFALL HYETOGRAPH INFORMATION =====

RAINFALL HYETOGRAPH: SCS TYPE II  
 RAINFALL DURATION: 24.00 Hours  
 RAINFALL DEPTH: 3.50 Inches

RAINFALL HYETOGRAPH,  
 SCS TYPE II  
 Time (Hours), Total Depth (Inches):

.000, .00	2.000, .08	4.000, .17	6.000, .28
7.000, .34	8.000, .42	8.500, .47	9.000, .51
9.500, .57	9.750, .60	10.000, .63	10.500, .71
11.000, .82	11.500, .99	11.750, 1.25	12.000, 2.32
12.500, 2.57	13.000, 2.70	13.500, 2.80	14.000, 2.87
16.000, 3.08	20.000, 3.33	24.000, 3.50	

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 Input: WP2.IN  
 Output: WP2.OUT

RETURN PERIOD (yrs): 2

SUBAREA 1 SUBAREA 1 SUBAREA 1 SUBAREA 1

AREA (square miles) : .0095  
 TIME OF CONCENTRATION (hrs): .35  
 RUNOFF CURVE NUMBER : 82.00  
 BASEFLOW (cfs) : .00  
 DOWNSTREAM CHANNELS :

SUBAREA RUNOFF (cfs)

TIME: (hrs)	+ .00 hrs	+ .10 hrs	+ .20 hrs	+ .30 hrs	+ .40 hrs	+ .50 hrs	+ .60 hrs	+ .70 hrs	+ .80 hrs	+ .90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	.00	.00	.00	.00	.00	.00	.01	.01	.02	.02
9.00	.02	.03	.04	.04	.05	.06	.06	.07	.08	.09
10.00	.10	.11	.13	.14	.16	.17	.19	.22	.26	.29
11.00	.31	.35	.42	.50	.57	.62	.81	1.30	2.30	4.70
12.00	8.46	10.84	9.38	6.54	4.48	3.45	2.81	2.23	1.78	1.50
13.00	1.35	1.23	1.11	1.01	.95	.92	.88	.82	.77	.73
14.00	.71	.71	.71	.70	.69	.66	.64	.61	.59	.56

15.00	.54	.52	.50	.48	.46	.44	.43	.41	.40	.39
16.00	.38	.38	.37	.37	.36	.36	.36	.36	.35	.35
17.00	.35	.34	.34	.34	.34	.33	.33	.33	.32	.32
18.00	.32	.31	.31	.31	.31	.30	.30	.30	.29	.29
19.00	.29	.29	.28	.28	.28	.27	.27	.27	.26	.26
20.00	.26	.26	.25	.25	.25	.24	.24	.24	.24	.23
21.00	.23	.23	.23	.22	.22	.22	.22	.22	.21	.21
22.00	.21	.21	.21	.20	.20	.20	.20	.20	.20	.20
23.00	.20	.20	.19	.19	.19	.19	.19	.19	.19	.19
24.00	.19	.17	.13	.07	.04	.02	.01	.01	.00	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK RUNOFF (cfs): 10.84  
 TIME TO PEAK (hrs): 12.10

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:56:54  
 Input: WP2.IN  
 Output: WP2.OUT

RETURN PERIOD (yrs): 2

===== DOWNSTREAM HYDROGRAPH =====

DISCHARGE (cfs)

TIME: (hrs)	+0.00 hrs	+1.10 hrs	+2.20 hrs	+3.30 hrs	+4.40 hrs	+5.50 hrs	+6.60 hrs	+7.70 hrs	+8.80 hrs	+9.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8.00	.00	.00	.00	.00	.00	.00	.01	.01	.02	.02
9.00	.02	.03	.04	.04	.05	.06	.06	.07	.08	.09
10.00	.10	.11	.13	.14	.16	.17	.19	.22	.26	.29
11.00	.31	.35	.42	.50	.57	.62	.81	1.30	2.30	4.70
12.00	8.46	10.84	9.38	6.54	4.48	3.45	2.81	2.23	1.78	1.50
13.00	1.35	1.23	1.11	1.01	.95	.92	.88	.82	.77	.73
14.00	.71	.71	.71	.70	.69	.66	.64	.61	.59	.56
15.00	.54	.52	.50	.48	.46	.44	.43	.41	.40	.39
16.00	.38	.38	.37	.37	.36	.36	.36	.36	.35	.35
17.00	.35	.34	.34	.34	.34	.33	.33	.33	.32	.32
18.00	.32	.31	.31	.31	.31	.30	.30	.30	.29	.29
19.00	.29	.29	.28	.28	.28	.27	.27	.27	.26	.26
20.00	.26	.26	.25	.25	.25	.24	.24	.24	.24	.23
21.00	.23	.23	.23	.22	.22	.22	.22	.22	.21	.21
22.00	.21	.21	.21	.20	.20	.20	.20	.20	.20	.20
23.00	.20	.20	.19	.19	.19	.19	.19	.19	.19	.19
24.00	.19	.17	.13	.07	.04	.02	.01	.01	.00	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK DISCHARGE (cfs): 10.84  
 TIME TO PEAK (hrs): 12.10

Hydrograph Saved In: WP2.DAT

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 15:56:54  
 Input: WP2.IN  
 Output: WP2.OUT

RETURN PERIOD (yrs): 2

===== HYDROLOGIC SUMMARY =====  
 ===== Volumes, Losses, and Discharges =====

SCS TYPE II Hyetograph.  
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.  
 APPLIED RAINFALL DEPTH (inches): 3.50

	VOLUME OF RAINFALL APPLIED (ac-ft)	VOLUME OF RUNOFF (ac-ft)	RAINFALL LOSSES (percent)	PEAK DISCHARGE (cfs)	PEAK DISCHARGE (cfs/ac)
SUBAREA 1	1.7733	.89848	49.33	10.836	1.782
TOTAL WATERSHED	1.7733	.89848	49.33	10.836	1.782

TOTAL WATERSHED AREA (square miles): .0095  
 TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft): .8985  
 COMPOSITE WATERSHED CURVE NUMBER: 82.00  
 MINIMUM SUBAREA TIME OF CONCENTRATION: .350 hours.

NOTE: "VOLUME OF RUNOFF" includes surface runoff only; baseflows are not included in this summation. The "TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED" includes all baseflows.

1

## **10-Year Hydrograph**

```

1***** SCSHYDRO *****
***** Version 3.21 *****
***** COMPUTER-AIDED HYDROLOGY & HYDRAULICS *****

```

```

PROJECT: WEDMORE PLACE
User: LandTech Resources
Date: 01/27/2005 Thursday
Time: 16:01:31
Input: WP10.IN
Output: WP10.OUT

```

```

===== PROGRAM EXECUTION =====

```

```

NUMBER OF STORMS TO BE MODELED : 1
NUMBER OF CHANNELS : 0
NUMBER OF SUBAREAS : 1
UPSTREAM HYDROGRAPHS ENTER AT : 0 LOCATIONS
NUMBER OF TIME STEPS : 300
COMPUTATIONAL TIME INCREMENT : .100 Hours

```

NOTE: The DURATION of the final computed hydrograph(s) for this watershed system will be 30.000 hours.

```

===== UNIT HYDROGRAPH METHODOLOGY =====

```

The SCS DIMENSIONLESS UNIT HYDROGRAPH is used in all runoff computations. The peak rate factor (PRF) for all unit hydrographs is 484 (U.S. Customary units) or 2.08356 (Metric units).

```

1***** SCSHYDRO *****
***** Version 3.21 *****
***** COMPUTER-AIDED HYDROLOGY & HYDRAULICS *****

```

```

PROJECT: WEDMORE PLACE
User: LandTech Resources
Date: 01/27/2005 Thursday
Time: 16:01:31
Input: WP10.IN
Output: WP10.OUT

```

```

===== SUBAREA DATA =====

```

SUBAREA ID NO	AREA (mi2)	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0095	.350	82.00	.0	

Composite Watershed Curve Number = 82.00  
Minimum Subarea Time of Concentration = .350 hours.

```

1***** SCSHYDRO *****

```

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:01:31  
 Input: WP10.IN  
 Output: WP10.OUT

RETURN PERIOD (yrs): 10

===== RAINFALL HYETOGRAPH INFORMATION =====

RAINFALL HYETOGRAPH: SCS TYPE II  
 RAINFALL DURATION: 24.00 Hours  
 RAINFALL DEPTH: 5.80 Inches

RAINFALL HYETOGRAPH,  
 SCS TYPE II  
 Time (Hours), Total Depth (Inches):

.000,	.00	2.000,	.13	4.000,	.28	6.000,	.46
7.000,	.57	8.000,	.70	8.500,	.77	9.000,	.85
9.500,	.95	9.750,	1.00	10.000,	1.05	10.500,	1.18
11.000,	1.36	11.500,	1.64	11.750,	2.07	12.000,	3.85
12.500,	4.26	13.000,	4.48	13.500,	4.63	14.000,	4.76
16.000,	5.10	20.000,	5.52	24.000,	5.80		

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 Input: WP10.IN  
 Output: WP10.OUT

RETURN PERIOD (yrs): 10

SUBAREA 1 SUBAREA 1 SUBAREA 1 SUBAREA 1

AREA (square miles) : .0095  
 TIME OF CONCENTRATION (hrs): .35  
 RUNOFF CURVE NUMBER : 82.00  
 BASEFLOW (cfs) : .00  
 DOWNSTREAM CHANNELS :

SUBAREA RUNOFF (cfs)

TIME: (hrs)	+ .00 hrs	+ .10 hrs	+ .20 hrs	+ .30 hrs	+ .40 hrs	+ .50 hrs	+ .60 hrs	+ .70 hrs	+ .80 hrs	+ .90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	.00	.01	.01	.02	.02	.03	.03	.04	.04	.05
7.00	.05	.06	.07	.08	.09	.10	.11	.11	.12	.13
8.00	.14	.14	.16	.17	.19	.20	.21	.22	.24	.25
9.00	.26	.27	.30	.32	.34	.35	.37	.39	.42	.44
10.00	.45	.48	.53	.58	.63	.66	.70	.79	.88	.95
11.00	1.00	1.10	1.29	1.50	1.66	1.77	2.22	3.42	5.76	10.97
12.00	18.68	23.08	19.60	13.51	9.15	6.95	5.58	4.40	3.48	2.92
13.00	2.62	2.38	2.14	1.94	1.82	1.75	1.69	1.57	1.46	1.39
14.00	1.36	1.34	1.34	1.33	1.30	1.26	1.21	1.16	1.11	1.06

15.00	1.02	.97	.93	.90	.86	.83	.80	.78	.76	.74
16.00	.72	.71	.70	.69	.68	.68	.67	.67	.66	.65
17.00	.65	.64	.64	.63	.63	.62	.61	.61	.60	.60
18.00	.59	.59	.58	.57	.57	.56	.56	.55	.55	.54
19.00	.54	.53	.52	.52	.51	.51	.50	.50	.49	.48
20.00	.48	.47	.47	.46	.46	.45	.45	.44	.44	.43
21.00	.43	.42	.42	.41	.41	.40	.40	.40	.39	.39
22.00	.39	.38	.38	.38	.37	.37	.37	.37	.37	.36
23.00	.36	.36	.36	.36	.36	.35	.35	.35	.35	.35
24.00	.35	.32	.23	.13	.07	.04	.02	.01	.01	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK RUNOFF (cfs): 23.08  
 TIME TO PEAK (hrs): 12.10

\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:01:31  
 Input: WP10.IN  
 Output: WP10.OUT

RETURN PERIOD (yrs): 10

===== DOWNSTREAM HYDROGRAPH =====

DISCHARGE (cfs)

TIME: (hrs)	+0.00 hrs	+0.10 hrs	+0.20 hrs	+0.30 hrs	+0.40 hrs	+0.50 hrs	+0.60 hrs	+0.70 hrs	+0.80 hrs	+0.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6.00	.00	.01	.01	.02	.02	.03	.03	.04	.04	.05
7.00	.05	.06	.07	.08	.09	.10	.11	.11	.12	.13
8.00	.14	.14	.16	.17	.19	.20	.21	.22	.24	.25
9.00	.26	.27	.30	.32	.34	.35	.37	.39	.42	.44
10.00	.45	.48	.53	.58	.63	.66	.70	.79	.88	.95
11.00	1.00	1.10	1.29	1.50	1.66	1.77	2.22	3.42	5.76	10.97
12.00	18.68	23.08	19.60	13.51	9.15	6.95	5.58	4.40	3.48	2.92
13.00	2.62	2.38	2.14	1.94	1.82	1.75	1.69	1.57	1.46	1.39
14.00	1.36	1.34	1.34	1.33	1.30	1.26	1.21	1.16	1.11	1.06
15.00	1.02	.97	.93	.90	.86	.83	.80	.78	.76	.74
16.00	.72	.71	.70	.69	.68	.68	.67	.67	.66	.65
17.00	.65	.64	.64	.63	.63	.62	.61	.61	.60	.60
18.00	.59	.59	.58	.57	.57	.56	.56	.55	.55	.54
19.00	.54	.53	.52	.52	.51	.51	.50	.50	.49	.48
20.00	.48	.47	.47	.46	.46	.45	.45	.44	.44	.43
21.00	.43	.42	.42	.41	.41	.40	.40	.40	.39	.39
22.00	.39	.38	.38	.38	.37	.37	.37	.37	.37	.36
23.00	.36	.36	.36	.36	.36	.35	.35	.35	.35	.35
24.00	.35	.32	.23	.13	.07	.04	.02	.01	.01	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK DISCHARGE (cfs): 23.08  
 TIME TO PEAK (hrs): 12.10

Hydrograph Saved In: WP10.DAT

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:01:31  
 Input: WP10.IN  
 Output: WP10.OUT

RETURN PERIOD (yrs): 10

===== HYDROLOGIC SUMMARY =====  
 ===== Volumes, Losses, and Discharges =====

SCS TYPE II Hyetograph.  
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.  
 APPLIED RAINFALL DEPTH (inches): 5.80

	VOLUME OF RAINFALL APPLIED (ac-ft)	VOLUME OF RUNOFF (ac-ft)	RAINFALL LOSSES (percent)	PEAK DISCHARGE (cfs)	PEAK DISCHARGE (cfs/ac)
SUBAREA 1	2.9387	1.9171	34.76	23.080	3.796
TOTAL WATERSHED	2.9387	1.9171	34.76	23.080	3.796

TOTAL WATERSHED AREA (square miles): .0095  
 TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft): 1.9171  
 COMPOSITE WATERSHED CURVE NUMBER: 82.00  
 MINIMUM SUBAREA TIME OF CONCENTRATION: .350 hours.

NOTE: "VOLUME OF RUNOFF" includes surface runoff only; baseflows are not included in this summation. The "TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED" includes all baseflows.

1

## 100-Year Hydrograph

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:05:51  
 Input: WP100.IN  
 Output: WP100.OUT

===== PROGRAM EXECUTION =====

NUMBER OF STORMS TO BE MODELED : 1  
 NUMBER OF CHANNELS : 0  
 NUMBER OF SUBAREAS : 1  
 UPSTREAM HYDROGRAPHS ENTER AT : 0 LOCATIONS  
 NUMBER OF TIME STEPS : 300  
 COMPUTATIONAL TIME INCREMENT : .100 Hours

NOTE: The DURATION of the final computed hydrograph(s) for this watershed system will be 30.000 hours.

===== UNIT HYDROGRAPH METHODOLOGY =====

The SCS DIMENSIONLESS UNIT HYDROGRAPH is used in all runoff computations. The peak rate factor (PRF) for all unit hydrographs is 484 (U.S. Customary units) or 2.08356 (Metric units).

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:05:51  
 Input: WP100.IN  
 Output: WP100.OUT

===== SUBAREA DATA =====

SUBAREA ID NO	AREA (mi <sup>2</sup> )	TIME OF CONCENTRATION (hrs)	CURVE NUMBER	BASEFLOW (cfs)	DOWNSTREAM CHANNELS
1	.0095	.350	82.00	.0	

Composite Watershed Curve Number = 82.00  
 Minimum Subarea Time of Concentration = .350 hours.

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:05:51  
 Input: WP100.IN  
 Output: WP100.OUT

RETURN PERIOD (yrs): 100

===== RAINFALL HYETOGRAPH INFORMATION =====

RAINFALL HYETOGRAPH: SCS TYPE II  
 RAINFALL DURATION: 24.00 Hours  
 RAINFALL DEPTH: 8.00 Inches

RAINFALL HYETOGRAPH,  
 SCS TYPE II  
 Time (Hours), Total Depth (Inches):

.000, .00	2.000, .18	4.000, .38	6.000, .64
7.000, .78	8.000, .96	8.500, 1.06	9.000, 1.18
9.500, 1.30	9.750, 1.38	10.000, 1.45	10.500, 1.63
11.000, 1.88	11.500, 2.26	11.750, 2.86	12.000, 5.30
12.500, 5.88	13.000, 6.18	13.500, 6.39	14.000, 6.56
16.000, 7.04	20.000, 7.62	24.000, 8.00	

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 Input: WP100.IN  
 Output: WP100.OUT

RETURN PERIOD (yrs): 100

SUBAREA 1 SUBAREA 1 SUBAREA 1 SUBAREA 1

AREA (square miles) : .0095  
 TIME OF CONCENTRATION (hrs): .35  
 RUNOFF CURVE NUMBER : 82.00  
 BASEFLOW (cfs) : .00  
 DOWNSTREAM CHANNELS :

SUBAREA RUNOFF (cfs)

TIME: (hrs)	+ .00 hrs	+ .10 hrs	+ .20 hrs	+ .30 hrs	+ .40 hrs	+ .50 hrs	+ .60 hrs	+ .70 hrs	+ .80 hrs	+ .90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02
5.00	.03	.03	.04	.05	.06	.07	.07	.08	.09	.10
6.00	.10	.11	.12	.14	.15	.16	.17	.18	.18	.19
7.00	.20	.21	.23	.26	.28	.29	.30	.31	.32	.34
8.00	.34	.36	.39	.42	.44	.46	.48	.50	.53	.54
9.00	.56	.58	.62	.66	.69	.71	.74	.78	.82	.85
10.00	.88	.92	1.01	1.10	1.17	1.21	1.29	1.44	1.59	1.71
11.00	1.78	1.93	2.25	2.60	2.85	3.01	3.72	5.66	9.33	17.33
12.00	28.82	35.09	29.57	20.27	13.66	10.32	8.24	6.47	5.11	4.27
13.00	3.82	3.46	3.11	2.82	2.64	2.55	2.45	2.28	2.12	2.02
14.00	1.96	1.94	1.94	1.92	1.88	1.82	1.75	1.68	1.60	1.53

15.00	1.47	1.41	1.35	1.29	1.25	1.20	1.16	1.12	1.09	1.06
16.00	1.04	1.02	1.01	.99	.98	.98	.97	.96	.95	.94
17.00	.93	.92	.92	.91	.90	.89	.88	.88	.87	.86
18.00	.85	.84	.83	.83	.82	.81	.80	.79	.78	.78
19.00	.77	.76	.75	.74	.74	.73	.72	.71	.70	.69
20.00	.69	.68	.67	.66	.65	.65	.64	.63	.62	.62
21.00	.61	.60	.60	.59	.59	.58	.57	.57	.56	.56
22.00	.55	.55	.54	.54	.54	.53	.53	.53	.52	.52
23.00	.52	.52	.51	.51	.51	.51	.51	.50	.50	.50
24.00	.50	.46	.33	.19	.10	.05	.03	.01	.01	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK RUNOFF (cfs): 35.09  
 TIME TO PEAK (hrs): 12.10

\*\*\*\*\*  
 1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:05:51  
 Input: WP100.IN  
 Output: WP100.OUT

RETURN PERIOD (yrs): 100

===== DOWNSTREAM HYDROGRAPH =====

DISCHARGE (cfs)

TIME: (hrs)	+0.00 hrs	+0.10 hrs	+0.20 hrs	+0.30 hrs	+0.40 hrs	+0.50 hrs	+0.60 hrs	+0.70 hrs	+0.80 hrs	+0.90 hrs
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02
4.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02
5.00	.03	.03	.04	.05	.06	.07	.07	.08	.09	.10
6.00	.10	.11	.12	.14	.15	.16	.17	.18	.18	.19
7.00	.20	.21	.23	.26	.28	.29	.30	.31	.32	.34
8.00	.34	.36	.39	.42	.44	.46	.48	.50	.53	.54
9.00	.56	.58	.62	.66	.69	.71	.74	.78	.82	.85
10.00	.88	.92	1.01	1.10	1.17	1.21	1.29	1.44	1.59	1.71
11.00	1.78	1.93	2.25	2.60	2.85	3.01	3.72	5.66	9.33	17.33
12.00	28.82	35.09	29.57	20.27	13.66	10.32	8.24	6.47	5.11	4.27
13.00	3.82	3.46	3.11	2.82	2.64	2.55	2.45	2.28	2.12	2.02
14.00	1.96	1.94	1.94	1.92	1.88	1.82	1.75	1.68	1.60	1.53
15.00	1.47	1.41	1.35	1.29	1.25	1.20	1.16	1.12	1.09	1.06
16.00	1.04	1.02	1.01	.99	.98	.98	.97	.96	.95	.94
17.00	.93	.92	.92	.91	.90	.89	.88	.88	.87	.86
18.00	.85	.84	.83	.83	.82	.81	.80	.79	.78	.78
19.00	.77	.76	.75	.74	.74	.73	.72	.71	.70	.69
20.00	.69	.68	.67	.66	.65	.65	.64	.63	.62	.62
21.00	.61	.60	.60	.59	.59	.58	.57	.57	.56	.56
22.00	.55	.55	.54	.54	.54	.53	.53	.53	.52	.52
23.00	.52	.52	.51	.51	.51	.51	.51	.50	.50	.50
24.00	.50	.46	.33	.19	.10	.05	.03	.01	.01	.00
25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PEAK DISCHARGE (cfs): 35.09  
 TIME TO PEAK (hrs): 12.10

Hydrograph Saved In: WP100.DAT

1\*\*\*\*\* SCSHYDRO \*\*\*\*\*  
 \*\*\*\*\* Version 3.21 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 01/27/2005 Thursday  
 Time: 16:05:51  
 Input: WP100.IN  
 Output: WP100.OUT

RETURN PERIOD (yrs): 100

===== HYDROLOGIC SUMMARY =====  
 ===== Volumes, Losses, and Discharges =====

SCS TYPE II Hyetograph.  
 SCS DIMENSIONLESS UNIT HYDROGRAPH was used.  
 APPLIED RAINFALL DEPTH (inches): 8.00

	VOLUME OF RAINFALL APPLIED (ac-ft)	VOLUME OF RUNOFF (ac-ft)	RAINFALL LOSSES (percent)	PEAK DISCHARGE (cfs)	PEAK DISCHARGE (cfs/ac)
SUBAREA 1	4.0533	2.9535	27.14	35.086	5.771
TOTAL WATERSHED	4.0533	2.9535	27.14	35.086	5.771

TOTAL WATERSHED AREA (square miles): .0095  
 TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED (ac-ft): 2.9535  
 COMPOSITE WATERSHED CURVE NUMBER: 82.00  
 MINIMUM SUBAREA TIME OF CONCENTRATION: .350 hours.

NOTE: "VOLUME OF RUNOFF" includes surface runoff only; baseflows are not included in this summation. The "TOTAL VOLUME OF DISCHARGE LEAVING WATERSHED" includes all baseflows.

1

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/19/05

SCALE \_\_\_\_\_

## DESIGN SEDIMENT FOREBAY

Treatment Volume = 0.1 inches per impervious acre

Impervious Area = 1.85 = 80,586 cf

Forebay Volume =  $\frac{80,586 \text{ cf} \times 0.1 \text{ in}}{12 \text{ in}} = 672 \text{ cf}$

Forebay Dimensions: Depth = 3'

Bottom Area = 15' x 15'

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/7/05

SCALE \_\_\_\_\_

Compute Stream Channel Protection Volume (C<sub>pv</sub>):

Step 1. Develop Site Hydrologic + TR-55 Input Parameters

Condition	CN	T <sub>c</sub>	Q <sub>a</sub> , 1-Year ST.	Q <sub>i</sub> , 1-Year
Pre Developed	75	.35	0.8	2.92
Developed	82	.35	1.2	6.75

Step 2. Utilize MDE Method to Compute Storage Volume

Initial Abstraction (I<sub>a</sub>) for CN of 82 is 0.439

$$I_a/P = 0.439/2.8 = 0.16$$

$$T_c = 0.35 \text{ hr}$$

From TR-55, Exhibit 4-II:

$$g_u = 600 \text{ cm/hr}$$

$$Q_o/Q_i = 0.03$$

From TR-55, Figure 6.1

For Type II Distribution

$$V_s/V_r = 0.683 - 1.43(Q_o/Q_i) + 1.64(Q_o/Q_i)^2 - 0.804(Q_o/Q_i)^3$$

$$V_s/V_r = 0.683 - 1.43(0.03) + 1.64(0.03)^2 - 0.804(0.03)^3$$

$$V_s/V_r = 0.683 - 0.043 + 0.002 - 0$$

$$V_s/V_r = 0.638$$

$$V_s = 0.638(1.2'')(\frac{1}{2})(6.10) = 0.3892 \text{ ac-ft} = 16,952 \text{ cf}$$

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/7/05

SCALE \_\_\_\_\_

Step 3. Define average EO Release Rate

$$Q_0 = \frac{16,952 \text{ cf}}{24 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ m}} \times \frac{1 \text{ m}}{60 \text{ s}} = .20 \text{ cfs}$$

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMJ DATE 2/7/05

SCALE \_\_\_\_\_

## WET POND STAGE - STORAGE

### WET ELEVATION

ELEV (ft)	ΔELEV (ft)	SA (sf)	STORAGE (cf)	ACCUM STORAGE (cf)
28.0		1198		0
	1.0		2,099	
29.0		3000		2,099
	1.0		4,546	
30.0		6092		6,645
	1.0		7,283	
31.0		8474		13,928
	1.0		9,549	
32.0		10,624		23,477
	1.0		11,659	
33.0		12,694		35,136
	1.0		13,722	
34.0		14,750		48,858
	1.0		15,812	
35.0		16,874		64,670

Wet Storage Volume of 6,716 cf is stored within the wet portion of the existing pond.

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/7/05

SCALE \_\_\_\_\_

## WET POND STAGE-STORAGE

### DRY ELEVATIONS

ELEV (ft)	ΔELEV (ft)	SA (sf)	STORAGE (cf)	ACCUM STORAGE (cf)
35.0		16,874		0
	1.0		18,067	
36.0		19,260		18,067
	1.0		20,674	
37.0		22,088		38,741
	1.0		23,578	
38.0		25,068		62,319

Water Quality Volume of 6,716 cf rises to elev 35.37

Channel Protection Volume of 16,952 cf rises to elev 35.94

Top of Existing Pond Elev 38.0

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/7/05

SCALE \_\_\_\_\_

## DESIGN ORIFICE TO PASS WATER QUALITY VOLUME OVER 24-HRS

$$Q = 0.6 A \sqrt{2gh} \text{ - orifice equation}$$

orifice invert @ Elev 35.00

$$Q = .078 \text{ cfs}$$

$$h = 35.37 - 35.00 = 0.37'$$

$$.078 = 0.6 A \sqrt{2(32.2)(.37)}$$

$$A = \pi r^2 = .0266 \text{ ft}^2$$

$$r = .0921'$$

USE 2.00" DIAMETER AT  
ORIFICE ELEV 35.00

$$A = .0218 \text{ ft}^2$$

ELEV	H	Q
35.00	0	0
35.37	.37	.06
36.0	1.0	.11
37.0	2.0	.15
38.0	3.0	.18

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMJ DATE 2/7/05

SCALE \_\_\_\_\_

DESIGN ORIFICE TO PASS  
1-YEAR POST-DEVELOPMENT  
STORM OVER 24-HRS

$$Q = 0.6A \sqrt{2gh} \quad \text{- orifice equation}$$

orifice invert @ elev 35.37

$$Q = 0.19 \text{ cfs} - 0.08 \text{ cfs} = 0.11 \text{ cfs}$$

$$h = 35.94 - 35.37 = 0.57$$

$$0.11 = 0.6A \sqrt{2(32.2)(0.57)}$$

$$A = \pi r^2 = 0.0303 \text{ ft}^2$$

$$r = 0.0981'$$

USE 2.00" DIAMETER ORIFICE  
AT ELEV 35.37,  $A = 0.0218 \text{ ft}^2$

ELEV	H	Q
35.37	0	0
36.00	0.63	0.08
37.00	1.63	0.13
38.00	2.63	0.17

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KWT DATE 2/7/05

SCALE \_\_\_\_\_

## DESIGN OUTLET WEIR

$$Q = CLH^{3/2}$$

VDOT DI-7

$$L = 3' \times 4 = 12'$$

$$C = 3.1$$

ELEV	H	Q
36.10	0	0
37.00	0.90	31.76
38.00	1.90	97.43

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/7/05

SCALE \_\_\_\_\_

## DESIGN OUTLET BARREL

60' of 38" x 24" HE RCP @ 0.5%

INVT = 32.80

INV<sub>0</sub> = 32.50

Q	d <sub>n</sub>	d <sub>c</sub>	d <sub>n</sub>	R	H	h <sub>o</sub>	L <sub>S<sub>0</sub></sub>	HW	HW ELEV
0	—	—	—	—	—	—	—	—	32.80
5	.70	.74	4.42	.40	.76	1.62	.30	2.08	35.88
10	1.01	1.06	5.36	.54	.97	1.78	.30	2.45	35.25
15	1.28	1.31	5.96	.63	1.13	1.91	.30	2.74	35.54
20	1.53	1.52	6.37	.70	1.24	2.01	.30	2.95	35.75
25	1.79	1.70	6.65	.75	1.33	2.10	.30	3.13	35.93
30	2.14	1.87	6.72	.76	1.35	2.19	.30	3.24	36.04
35	2.50	2.50	7.13	.63	1.61	2.50	.30	3.81	36.61
50	2.50	2.50	10.18	.63	3.29	2.50	.30	5.49	38.29

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 3.4 ft.  
 Slope of upstream face of embankment (Z) = 3 :1.  
 Slope of principal spillway barrel ( $S_b$ ) = 0.5 %  
 Length of barrel in saturated zone ( $L_s$ ) = 25 ft.
24. Number of collars required = 2 dimensions = 4' x 4'  
 (from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = \_\_\_\_\_  
 Design High Water = \_\_\_\_\_  
 Emergency Spillway Crest = \_\_\_\_\_  
 Principal Spillway Crest = \_\_\_\_\_  
 Dewatering Orifice Invert = \_\_\_\_\_  
 Cleanout Elevation = \_\_\_\_\_  
 Elevation of Upstream Toe of Dam  
 or Excavated Bottom of "Wet Storage  
 Area" (if excavation was performed) = \_\_\_\_\_

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/9/05

SCALE \_\_\_\_\_

## DESIGN EMERGENCY SPILLWAY

Gross Spillway

Elevation = 36.60

Bottom width = 2'

Slope = 8%

Length = 53'

Sideslope = 3:1

n = .03

Elev	H	Q
36.60	0	0
37.00	.40	7.22
38.00	1.40	98.00

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/9/05

SCALE \_\_\_\_\_

## STAGE - STORAGE - DISCHARGE

STAGE (ft)	STORAGE (ac-ft)	DISCHARGE (cfs)
35.00	0.3874	0.00
35.37	0.4076	0.06
36.00	0.4421	0.19
36.10	0.4486	0.20
36.60	0.4811	13.40
37.00	0.5071	39.30
38.00	0.5755	134.24

**1 –Year Routing**





4098	.000	.037	35.227
4104	.000	.037	35.226
4110	.000	.037	35.225
4116	.000	.036	35.225
4122	.000	.036	35.224
4128	.000	.036	35.223
4134	.000	.036	35.222
4140	.000	.036	35.222
4146	.000	.036	35.221
4152	.000	.036	35.220
4158	.000	.036	35.219
4164	.000	.035	35.219
4170	.000	.035	35.218
4176	.000	.035	35.217
4182	.000	.035	35.216
4188	.000	.035	35.216
4194	.000	.035	35.215
4200	.000	.035	35.214
4206	.000	.035	35.214
4212	.000	.035	35.213
4218	.000	.034	35.212
4224	.000	.034	35.211
4230	.000	.034	35.211
4236	.000	.034	35.210
4242	.000	.034	35.209
4248	.000	.034	35.209
4254	.000	.034	35.208
4260	.000	.034	35.207
4266	.000	.033	35.206
4272	.000	.033	35.206
4278	.000	.033	35.205
4284	.000	.033	35.204
4290	.000	.033	35.204
4296	.000	.033	35.203
4302	.000	.033	35.202
4308	.000	.033	35.202
4314	.000	.033	35.201
4320	.000	.032	35.200

1\*\*\*\*\* PONDOPT \*\*\*\*\*  
 \*\*\*\*\* Version 1.83 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 04/26/2005 Tuesday  
 Time: 11:48:53  
 Output: WPPL.OUT

ROUTING SUMMARY -----  
 SIMULATION MODE -----  
 FOR THE ABOVE CASE -----

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	36.058	.440	7.345	.196

**2 –Year Routing**





4098	.000	.039	35.242
4104	.000	.039	35.241
4110	.000	.039	35.240
4116	.000	.039	35.240
4122	.000	.039	35.239
4128	.000	.039	35.238
4134	.000	.038	35.237
4140	.000	.038	35.236
4146	.000	.038	35.236
4152	.000	.038	35.235
4158	.000	.038	35.234
4164	.000	.038	35.233
4170	.000	.038	35.232
4176	.000	.038	35.232
4182	.000	.037	35.231
4188	.000	.037	35.230
4194	.000	.037	35.229
4200	.000	.037	35.229
4206	.000	.037	35.228
4212	.000	.037	35.227
4218	.000	.037	35.226
4224	.000	.037	35.225
4230	.000	.036	35.225
4236	.000	.036	35.224
4242	.000	.036	35.223
4248	.000	.036	35.222
4254	.000	.036	35.222
4260	.000	.036	35.221
4266	.000	.036	35.220
4272	.000	.036	35.219
4278	.000	.035	35.219
4284	.000	.035	35.218
4290	.000	.035	35.217
4296	.000	.035	35.217
4302	.000	.035	35.216
4308	.000	.035	35.215
4314	.000	.035	35.214
4320	.000	.035	35.214

1\*\*\*\*\* PONDOPT \*\*\*\*\*  
 \*\*\*\*\* Version 1.83 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 04/26/2005 Tuesday  
 Time: 11:50:04  
 Output: WPP2.OUT

ROUTING SUMMARY -----  
 SIMULATION MODE -----  
 FOR THE ABOVE CASE -----

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	36.158	.486	10.836	1.735

**10-Year Routing**





264	.000	.000	35.000
270	.000	.000	35.000
276	.000	.000	35.000
282	.000	.000	35.000
288	.000	.000	35.000
294	.000	.000	35.000
300	.000	.000	35.000
306	.000	.000	35.000
312	.000	.000	35.000
318	.000	.000	35.000
324	.000	.000	35.000
330	.000	.000	35.000
336	.000	.000	35.000
342	.000	.000	35.000
348	.000	.000	35.000
354	.001	.000	35.000
360	.003	.000	35.000
366	.006	.000	35.000
372	.010	.000	35.000
378	.015	.000	35.001
384	.021	.000	35.001
390	.026	.000	35.001
396	.032	.000	35.002
402	.038	.000	35.003
408	.043	.001	35.004
414	.049	.001	35.005
420	.054	.001	35.006
426	.060	.001	35.007
432	.070	.001	35.008
438	.081	.002	35.010
444	.090	.002	35.011
450	.099	.002	35.013
456	.107	.002	35.015
462	.114	.003	35.018
468	.121	.003	35.020
474	.128	.004	35.023
480	.135	.004	35.025
486	.145	.005	35.028
492	.159	.005	35.031
498	.174	.006	35.034
504	.188	.006	35.038
510	.199	.007	35.042
516	.210	.007	35.046
522	.224	.008	35.050
528	.238	.009	35.055
534	.250	.010	35.060
540	.261	.011	35.065
546	.275	.011	35.070
552	.296	.012	35.076
558	.317	.013	35.082
564	.335	.014	35.089
570	.350	.015	35.095
576	.367	.017	35.103
582	.391	.018	35.110
588	.417	.019	35.118
594	.438	.021	35.127
600	.454	.022	35.135
606	.481	.023	35.145
612	.531	.025	35.155
618	.584	.027	35.166
624	.626	.029	35.178
630	.656	.031	35.190
636	.702	.033	35.204
642	.790	.035	35.219
648	.883	.038	35.235
654	.955	.041	35.254
660	1.005	.044	35.273
666	1.097	.048	35.294
672	1.293	.052	35.318
678	1.504	.056	35.346
684	1.663	.061	35.377

4098	.000	.040	35.244
4104	.000	.039	35.243
4110	.000	.039	35.242
4116	.000	.039	35.241
4122	.000	.039	35.241
4128	.000	.039	35.240
4134	.000	.039	35.239
4140	.000	.039	35.238
4146	.000	.038	35.237
4152	.000	.038	35.237
4158	.000	.038	35.236
4164	.000	.038	35.235
4170	.000	.038	35.234
4176	.000	.038	35.233
4182	.000	.038	35.233
4188	.000	.038	35.232
4194	.000	.037	35.231
4200	.000	.037	35.230
4206	.000	.037	35.229
4212	.000	.037	35.229
4218	.000	.037	35.228
4224	.000	.037	35.227
4230	.000	.037	35.226
4236	.000	.037	35.226
4242	.000	.036	35.225
4248	.000	.036	35.224
4254	.000	.036	35.223
4260	.000	.036	35.223
4266	.000	.036	35.222
4272	.000	.036	35.221
4278	.000	.036	35.220
4284	.000	.036	35.220
4290	.000	.035	35.219
4296	.000	.035	35.218
4302	.000	.035	35.217
4308	.000	.035	35.217
4314	.000	.035	35.216
4320	.000	.035	35.215

1\*\*\*\*\* PONDPT \*\*\*\*\*  
 \*\*\*\*\* Version 1.83 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 04/26/2005 Tuesday  
 Time: 11:51:18  
 Output: WPP10.OUT

ROUTING SUMMARY -----  
 SIMULATION MODE -----  
 FOR THE ABOVE CASE -----

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	36.614	.698	23.080	14.290

**100-Year Routing**





264	.000	.000		35.000
270	.000	.000		35.000
276	.002	.000		35.000
282	.005	.000		35.000
288	.011	.000		35.000
294	.018	.000		35.001
300	.026	.000		35.001
306	.034	.000		35.002
312	.042	.000		35.002
318	.050	.001		35.003
324	.058	.001		35.004
330	.066	.001		35.006
336	.074	.001		35.007
342	.082	.001		35.009
348	.090	.002		35.011
354	.097	.002		35.012
360	.105	.002		35.015
366	.113	.003		35.017
372	.125	.003		35.019
378	.137	.004		35.022
384	.148	.004		35.025
390	.158	.005		35.028
396	.167	.005		35.031
402	.176	.006		35.035
408	.184	.006		35.038
414	.192	.007		35.042
420	.200	.007		35.046
426	.212	.008		35.050
432	.233	.009		35.054
438	.256	.010		35.059
444	.275	.010		35.065
450	.290	.011		35.070
456	.303	.012		35.076
462	.314	.013		35.082
468	.325	.014		35.089
474	.335	.015		35.095
480	.345	.017		35.102
486	.361	.018		35.109
492	.388	.019		35.116
498	.417	.020		35.124
504	.441	.022		35.133
510	.459	.023		35.142
516	.478	.024		35.151
522	.501	.026		35.161
528	.525	.028		35.171
534	.545	.029		35.181
540	.561	.031		35.192
546	.583	.033		35.203
552	.619	.035		35.215
558	.656	.037		35.228
564	.686	.039		35.241
570	.709	.041		35.254
576	.735	.044		35.269
582	.776	.046		35.283
588	.819	.048		35.299
594	.852	.051		35.315
600	.877	.054		35.332
606	.920	.057		35.350
612	1.007	.060		35.369
618	1.098	.064		35.388
624	1.167	.068		35.409
630	1.213	.072		35.431
636	1.287	.077		35.453
642	1.435	.082		35.478
648	1.591	.088		35.506
654	1.707	.094		35.536
660	1.782	.101		35.568
666	1.929	.108		35.602
672	2.253	.116		35.641
678	2.597	.125		35.686
684	2.848	.136		35.736

4098	.000	.040	35.245
4104	.000	.040	35.244
4110	.000	.039	35.243
4116	.000	.039	35.242
4122	.000	.039	35.241
4128	.000	.039	35.240
4134	.000	.039	35.240
4140	.000	.039	35.239
4146	.000	.039	35.238
4152	.000	.038	35.237
4158	.000	.038	35.236
4164	.000	.038	35.236
4170	.000	.038	35.235
4176	.000	.038	35.234
4182	.000	.038	35.233
4188	.000	.038	35.233
4194	.000	.038	35.232
4200	.000	.037	35.231
4206	.000	.037	35.230
4212	.000	.037	35.229
4218	.000	.037	35.229
4224	.000	.037	35.228
4230	.000	.037	35.227
4236	.000	.037	35.226
4242	.000	.037	35.226
4248	.000	.036	35.225
4254	.000	.036	35.224
4260	.000	.036	35.223
4266	.000	.036	35.223
4272	.000	.036	35.222
4278	.000	.036	35.221
4284	.000	.036	35.220
4290	.000	.036	35.220
4296	.000	.035	35.219
4302	.000	.035	35.218
4308	.000	.035	35.217
4314	.000	.035	35.217
4320	.000	.035	35.216

1\*\*\*\*\* PONDLOPT \*\*\*\*\*  
 \*\*\*\*\* Version 1.83 \*\*\*\*\*  
 \*\*\*\*\* COMPUTER-AIDED HYDROLOGY & HYDRAULICS \*\*\*\*\*

PROJECT: WEDMORE PLACE  
 User: LandTech Resources  
 Date: 04/26/2005 Tuesday  
 Time: 11:52:24  
 Output: WPP100.OUT

ROUTING SUMMARY -----  
 SIMULATION MODE -----  
 FOR THE ABOVE CASE -----

STORM NUMBER	PEAK STAGE (ft)	PEAK STORAGE (ac-ft)	PEAK INFLOW (cfs)	PEAK OUTFLOW (cfs)
1	36.856	.818	35.086	30.006

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

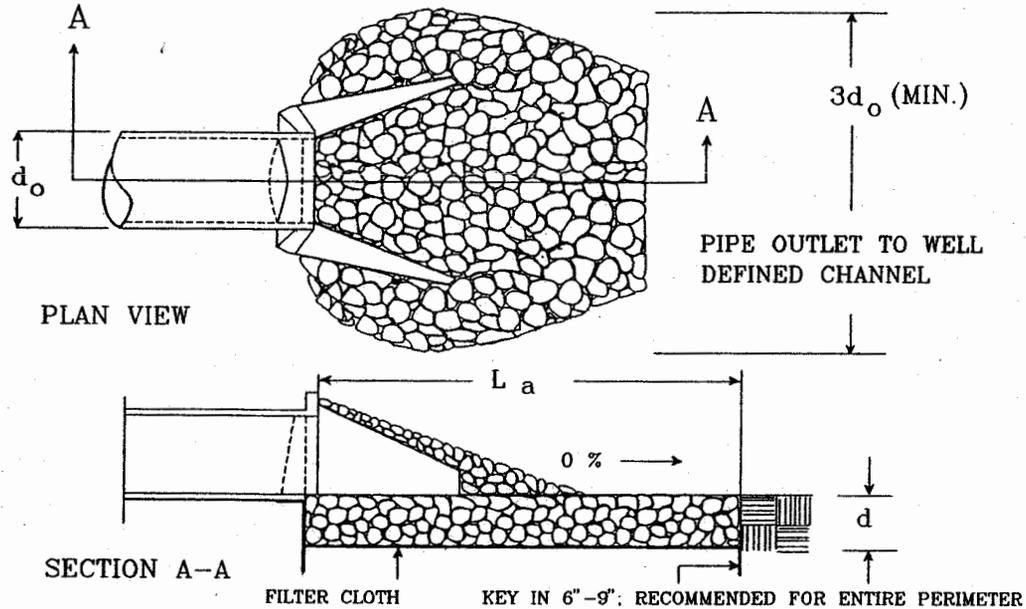
PROJECT NO. 04-686

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

CALCULATED BY HMJ DATE 2/9/05

SCALE \_\_\_\_\_

## DESIGN OUTLET PROTECTION



- NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION BASKET, OR CONCRETE.  
 2.  $L_a$  IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18-3 AND 3.18-4.  
 3.  $d = 1.5$  TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

Plate 3.18-4

$$Q_{DESIGN} = 29.00 \text{ cfs}$$

$$d = 2.5'$$

$$3d = 8'$$

$$L_a = 10'$$

$$w = d + .4L_a = 7'$$

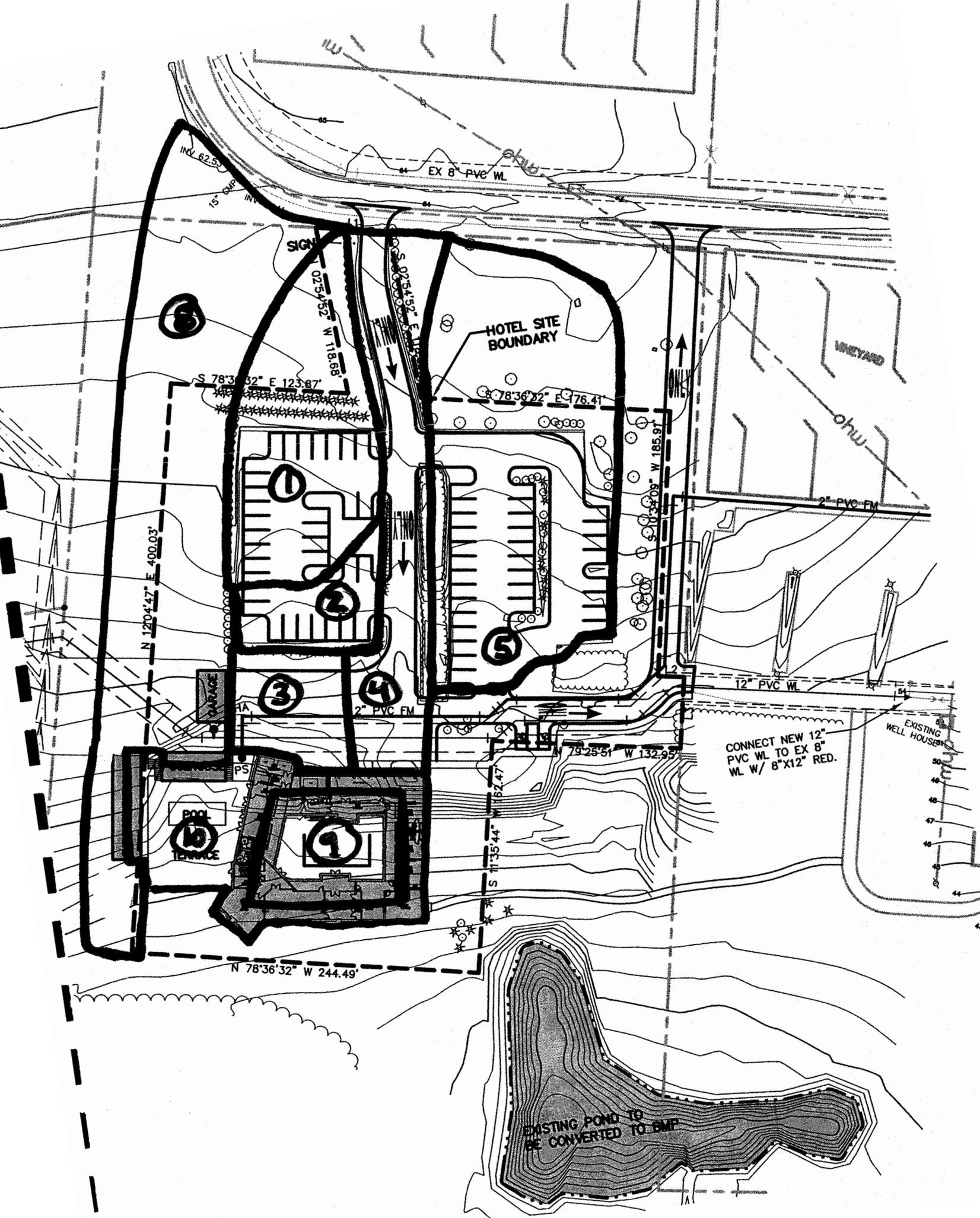
$$d_{50} = .2'$$

USE MIN. 8' x 10' x 26"

VDOT CLASS I

RIP RAP APRON

**APPENDIX B**



JOB 04-686

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

CALCULATED BY KMS DATE 2/14/05

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

DA- 1

c = 0.47  
A = 0.45 Ac.

Road  
Grass

	<u>C</u>	<u>A</u>	<u>CA</u>
Road	<u>0.90</u>	<u>0.17</u>	<u>0.15</u>
Grass	<u>0.20</u>	<u>0.28</u>	<u>0.06</u>
		<u>0.45</u>	<u>0.21</u>

OVERLAND FLOW

L = 175 ft.  
S = 3.4 %  
Tc = 10.5 min.

CHANNEL FLOW

H = 1.5 ft.  
L = 75 ft.  
Tc = 0.5 min.

Tc = 11 min.

i<sub>10</sub> = 5.8 in/hr

Q = CAi = (0.47) (0.45 Ac.) (5.8 in/hr) (C<sub>f</sub> 1.0)

C<sub>f</sub> for storms 25 yr+  
(VDOT Manual Pg. 1-11)

Q = 1.23 cfs

Q<sub>DT</sub> = CAI = (0.47) (0.45) (4.0) = 0.83 cfs

DA- 2

c = .64  
 A = .14 Ac.

	<u>C</u>	<u>A</u>	<u>CA</u>
Road	<u>.90</u>	<u>.09</u>	<u>.08</u>
Grass	<u>.20</u>	<u>.05</u>	<u>.01</u>
		<u>.14</u>	<u>.09</u>

OVERLAND FLOW

L = — ft.

S = — %

Tc = — min.

CHANNEL FLOW

H = — ft.

L = — ft.

Tc = — min.

Tc = 5 min.

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

$Q = CAi = (\underline{.64})(\underline{.14} \text{ Ac.})(\underline{7.2} \text{ in/hr})(C_f \underline{1.0})$

$C_f$  for storms 25 yr+  
 (VDOT Manual Pg. 1-11)

Q = 0.65 cfs

$Q_{PI} = CAI = (.64)(.14)(4.0) = 0.36 \text{ cfs}$

JOB 04-686

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

CALCULATED BY KMS DATE 2/14/05

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

DA- 3

c= .82  
A= .17 Ac.

	<u>C</u>	<u>A</u>	<u>CA</u>
Road	<u>.90</u>	<u>.14</u>	<u>.13</u>
Grass	<u>.20</u>	<u>.03</u>	<u>.01</u>
		<u>.17</u>	<u>.14</u>

OVERLAND FLOW

L= 1 ft.

S= 1 %

Tc= 1 min.

CHANNEL FLOW

H= 1 ft.

L= 1 ft.

Tc= 1 min.

Tc= 5 min.

$i_{10} =$ 7.2 in/hr

$Q = CAi = (.82)(.17 \text{ Ac.})(7.2 \text{ in/hr})(C_f 1.0)$

$C_f$  for storms 25 yr+  
(VDOT Manual Pg. 1-11)

Q= 1.00 cfs

$Q_{DI} = CAI (.82)(.17)(4.0) = 0.56 \text{ cfs}$

DA- 4

c= .68  
A= .34 Ac:

Road  
Grass

<u>C</u>	<u>A</u>	<u>CA</u>
<u>.90</u>	<u>.23</u>	<u>.21</u>
<u>.20</u>	<u>.11</u>	<u>.02</u>
	<u>.34</u>	<u>.23</u>

OVERLAND FLOW

L= 300 ft.  
S= 2.7 %  
Tc= 9.5 min.

CHANNEL FLOW

H= — ft.  
L= — ft.  
Tc= — min.

Tc= 9.5 min.

i<sub>10</sub> = 6.1 in/hr

Q = CAi = (.68) (.34 Ac.) (6.1 in/hr) (C<sub>f</sub> 1.0)

C<sub>f</sub> for storms 25 yr+  
(VDOT Manual Pg. 1-11)

Q = 1.41 cfs

Q<sub>DI</sub> = CAI = (.68)(.34)(4.0) = 0.92 cfs

JOB 04-686

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

CALCULATED BY KMS DATE 2/14/05

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

DA- 5

c = .47  
A = .92 Ac.

Road  
Grass

C	A	CA
<u>.90</u>	<u>.39</u>	<u>.32</u>
<u>.20</u>	<u>.57</u>	<u>.11</u>
	<u>.92</u>	<u>.43</u>

OVERLAND FLOW

L = 300 ft.  
S = 3.0 %  
Tc = 13 min.

CHANNEL FLOW

H = — ft.  
L = — ft.  
Tc = — min.

Tc = 13 min.

i<sub>10</sub> = 5.4 in/hr

Q = CAI = (.47) (.92 Ac.) (5.4 in/hr) (C<sub>f</sub> 1.0)

C<sub>f</sub> for storms 25 yr+  
(VDOT Manual Pg. 1-11)

Q = 2.34 cfs

Q<sub>0.1</sub> = CAI = (.47)(.92)(4.6) = 1.73 cfs

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMS DATE 2/23/05

SCALE \_\_\_\_\_

## DESIGN DI-1

$$Q = 1.73 \text{ cfs (Worst Case DA-5)}$$

$$S_x = 0.01 \text{ ft/ft}$$

5+0 DI-1

$$W = 2.5'$$

$$L = 2.5'$$

$$P = 2(W+L) = 2(2.5+2.5) = 10'$$

From Chart 14,  $d = 0.16'$

$$T = d/S_x = \frac{0.16}{0.01} = 16' \text{ OK}$$

USE VDOT DI-1

LandTech Resources, Inc.

Storm Drainage Design

Phone: (757) 565-1677 Fax: (757) 565-0782

Project Manager: Kenny Jenkins

Project Engineer: Kenny Jenkins

For Tc Accumulation, Use VELOCITY (1) from Pipe Slope or (2) V=Q/A : 1

Project Number: 04-686

Project: Wedmore Place

Year Storm: 10

Structure		Rational Formula: $Q = CiA$									Pipe Data					Mannings Formula				
From	To	Area "A" (ac)	Coefficient "C"	CA		Inlet Time		Rain (in/hr)	Runoff, Q (cfs)		Inverts		Length (ft)	Slope (%)	Diameter (in)	Velocity (ft/sec)		Capacity (cfs)	Flow Time (min)	Manning's N
				Incremental	Cumulative	Incremental	Cumulative		Incremental	Cumulative	UPstream	DOWN-stream				Based on Q/A	Based on pipe slope			
From	To	Area	C	CAinc	CAcum	Timeinc	TimeCum	Rain	Qinc	Qcum	InvertUp	InvertDown	Length	Slope	Diameter	VelocityQA	VelocityS	Capacity	FlowTime	Manning'sN
1	2	0.45	0.5	0.21	0.21	11	11.00	5.76	1.22	1.22	53.70	53.00	85	0.82%	15	0.99	4.78	5.86	0.30	0.013
2	4	0.14	0.6	0.09	0.30	5	11.30	5.71	0.51	1.72	49.00	48.40	72	0.83%	15	1.40	4.81	5.90	0.25	0.013
3	4	0.17	0.8	0.14	0.14	5	5.00	6.96	0.97	0.97	49.00	48.40	50	1.20%	15	0.79	5.77	7.08	0.14	0.013
5	4	0.92	0.5	0.46	0.46	10	9.50	6.02	2.77	2.77	48.80	48.40	70	0.57%	15	2.26	3.98	4.88	0.29	0.013
4	6	0.34	0.7	0.24	1.14	13	13.00	5.45	1.30	6.20	48.30	47.80	42	1.19%	15	5.05	5.74	7.05	0.12	0.013
6	11	0.00	0.0	0.00	1.14	0	13.12	5.43	0.00	6.18	47.70	38.00	130	7.46%	15	5.04	16.99	20.85	0.13	0.011
11																				

LandTech Resources, Inc.

Hydraulic Grade Line (HGL) Calculations

Project Number: 04-686

Project: Wedmore Place

Date: 2.15.05

From Structure	STRUCTURE LOSSES												HGL @ FROM	Performance Checks & Intermediate Computations								
	HGL		Velocity Head V <sup>2</sup> /2g (ft)	Invert Shaped?	Surface Flow?	Bend Losses		ENTRANCE		EXIT (ft)	TOTAL (ft)	HGL @ FROM		Rim/Flowline (Max. Allow. Elevation)	Freeboard (ft)	Elev., top of pipe @ From	Structure #: FROM-TO	TC plus Pipe Flow Time	Elevation at 80% Full Flow	Too Shallow?	Computed Pipe Dia.	
	Slope (%)	Fall (ft)				Angle (deg)	@ To (ft)	@ From (ft)	@ To (ft)													@ From (ft)
	HGL Slope	HGL Fall				Bend Angle	Bend@To	Bend@From	Entr@To													Entr@From
1	0.036%	0.030	0.02	Y	Y	0	0.000	0.000	0.004	0.000	0.005	0.003	54.70	56.20	1.50	55.14	1-2	11.30	54.70	80% D	8.3	
2	0.071%	0.051	0.03	Y	Y	60	0.015	0.000	0.008	0.004	0.011	0.009	50.00	55.50	5.50	50.44	2-4	11.55	50.00	80% D	9.4	
3	0.023%	0.011	0.01	Y	Y	0	0.000	0.000	0.002	0.000	0.003	0.002	50.00	54.80	4.80	50.44	3-4	5.14	50.00	80% D	7.1	
5	0.184%	0.129	0.08	Y	Y	45	0.028	0.000	0.020	0.000	0.028	0.018	49.80	54.80	5.00	50.24	5-4	9.79	49.80	80% D	12.1	
4	0.923%	0.387	0.40	Y	Y	0	0.000	0.028	0.099	0.020	0.139	0.122	49.30	55.30	6.00	49.74	4-6	13.12	49.30	80% D	14.3	
6	0.656%	0.853	0.39	Y	Y	30	0.095	0.000	0.098	0.099	0.138	0.154	48.70	55.70	7.00	49.14	6-11	13.25	48.70	80% D	9.5	

Tailwater Elevation at Outfall point # 11):

39.87

DA- 8

c= .23  
 A= 1.07 Ac.

	<u>C</u>	<u>A</u>	<u>CA</u>
Roof	<u>.90</u>	<u>.05</u>	<u>.05</u>
Grass	<u>.20</u>	<u>1.02</u>	<u>.20</u>
		<u>1.07</u>	<u>.25</u>

OVERLAND FLOW

L= 300 ft.  
 S= 1.7 %  
 Tc= 25 min.

CHANNEL FLOW

Shallow Conc. Flow

H= — ft.  
 L= — ft.  
 Tc= — min.

L= 280  
 S= 3.6%

V= 3.0 fps  
 Tc= 2 min

Tc= 27 min.

$i_{10} =$  3.8 in/hr

$Q = CAi = (.23)(1.07 \text{ Ac.})(3.8 \text{ in/hr})(C_f 1.0)$

$C_f$  for storms 25 yr+  
 (VDOT Manual Pg. 1-11)

$Q =$  0.94 cfs

$Q_{DAI} = CAI = (.23)(1.07)(4.0) = 0.98 \text{ cfs}$

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMJ DATE 2/23/05

SCALE \_\_\_\_\_

## DESIGN DI-1

$$Q = 0.98 \quad (\text{Worst Case DA-8})$$

$$s_x = 0.01 \text{ ft/ft}$$

STD DI-1

$$w = 2.5'$$

$$L = 2.5'$$

$$P = 2(w+L) = 2(2.5+2.5) = 10'$$

From Chart 14,  $d = 0.11$

$$T = d/s_x = \frac{0.11}{0.01} = 11' \quad \text{OK}$$

USE VDOT DI-1

JOB 04-686

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

CALCULATED BY KWJ DATE 2/17/05

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

DA- 9'

c= .90

A= .18 Ac.

OVERLAND FLOW

L= — ft.

S= — %

Tc= — min.

CHANNEL FLOW

H= — ft.

L= — ft.

Tc= — min.

Tc= 5 min.

$i_{10} =$  7.2 in/hr

$$Q = CAi = (.90)(.18 \text{ Ac.})(7.2 \text{ in/hr})(C_f 1.0)$$

$C_f$  for storms 25 yr+  
(VDOT Manual Pg. 1-11)

Q= 1.17 cfs

$$Q_{DI} = CAI = (.90)(.18)(4.0) = 0.65 \text{ cfs}$$

Per Nyloplast Inline Drain Grate Inlet  
Capacity charts:

USE 18" Grate with 12" Outlet Pipe



# Inline Drains

Go To Main Menu

Print

Exit

Inlet Capacity Chart

Installation Details

How To Order

CAD Drawing

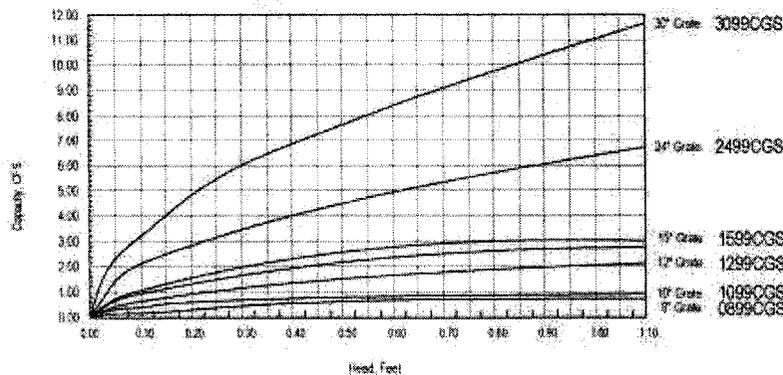
Installation Photos

### Nyloplast Standard Grate Inlet Capacity Chart

This chart is based on equations from the FAA Airport Drainage AC 150/5320-5B, 1970, Page 35. Certain assumptions have been made and no two installations will necessarily perform the same way. Safety factors should change with site conditions such that a safety factor 1.25 should be used for an inlet in pavement, and a safety factor of 2.0 should be used in turf areas.

Basin Outlet Pipe Size	Flow Rate CFS *
4"	0.229
6"	0.992
8"	1.441
10"	2.618
12"	4.152
15"	7.128
18"	12.193
24"	26.621
30"	52.173

Nyloplast Standard Grates 5" - 30"



\* Maximum flow capacity before drain basin begins to backfill. Calculation based on an average pipe slope of 1%.

THIS PRINT DISCLOSES SUBJECT MATTER IN WHICH NYLOPLAST HAS PROPRIETARY RIGHTS. THE RECEIPT OR POSSESSION OF THIS PRINT DOES NOT CONFER, BY PAPER, OR LICENSE THE USE OF THE DESIGN OR TECHNICAL INFORMATION SHOWN HEREIN. REPRODUCTION OF THIS PRINT OR ANY INFORMATION CONTAINED HEREIN, OR MANUFACTURE OF ANY ARTICLE HEREFROM FOR THE DISCLOSURE TO OTHERS IS FORBIDDEN EXCEPT BY SPECIFIC WRITTEN PERMISSION FROM NYLOPLAST.

DRAWN BY: ANA	MATERIAL:
DATE: 01MAR00	
APP'D BY: GJA	PROJECT NO. NAME:
DATE: 07MAR00	GRATE / COVER:
DWG SIZE: A	SCALE: 1:2 SHEET: 1 OF 1

3130 VERONA AVE.  
 BUFORD, GA 30059  
 PHN (770) 822-2443  
 FAX (770) 822-2491  
 www.nyloplast-usa.com

TITLE:  
 8" - 30" STANDARD INLET CAPACITY

DWG NO. 7881-119-001 REV. C

JOB 04-686

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

CALCULATED BY KMJ DATE 2/21/05

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

DA- 10

c= .90

A= .32 Ac.

OVERLAND FLOW

L= — ft.

S= — %

Tc= — min.

CHANNEL FLOW

H= — ft.

L= — ft.

Tc= — min.

Tc= 5 min.

$i_{10}$  = 7.2 in/hr

$$Q = CAi = (.90) (.32 \text{ Ac.}) (7.2 \text{ in/hr}) (C_f 1.0)$$

$C_f$  for storms 25 yr+  
(VDOT Manual Pg. 1-11)

Q = 2.07 cfs

LandTech Resources, Inc.

Storm Drainage Design

Phone: (757) 565-1677 Fax: (757) 565-0782

Project Manager: Kenny Jenkins

Project Engineer: Kenny Jenkins

For Tc Accumulation, Use VELOCITY (1) from Pipe Slope or (2) V=Q/A : 1

Project Number: 04-686

Project: Wedmore Place

Year Storm: 10

Structure		Rational Formula: Q = CiA									Pipe Data				Mannings Formula					
From	To	Area "A" (ac)	Coefficient "C"	CA		Inlet Time		Rain (in/hr)	Runoff, Q (cfs)		Inverts		Length (ft)	Slope (%)	Diameter (in)	Velocity (ft/sec)		Capacity (cfs)	Flow Time (min)	Manning's N
				Incremental	Cumulative	Incremental	Cumulative		Incremental	Cumulative	UP-stream	DOWN-stream				Based on Q/A	Based on pipe slope			
From	To	Area	C	CAinc	CAcum	Timeinc	TimeCum	Rain	Qinc	Qcum	InvertUp	InvertDown	Length	Slope	Diameter	VelocityQA	VelocityS	Capacity	FlowTime	Manning'sN
8	10	1.07	0.2	0.25	0.25	13	13.00	5.45	1.34	1.34	39.40	38.40	190	0.53%	12	1.71	3.89	3.05	0.81	0.011
9	10	0.18	0.9	0.16	0.16	5	5.00	6.96	1.13	1.13	38.70	38.40	60	0.50%	12	1.43	3.79	2.98	0.26	0.011
10	11	0.32	0.9	0.29	0.70	5	13.81	5.33	1.53	3.71	38.30	38.00	50	0.60%	15	3.02	4.82	5.91	0.17	0.011
11	ES	2.02	0.5	1.09	1.79	13	13.99	5.31	5.79	9.48	37.90	37.70	48	0.42%	21	3.94	5.03	12.09	0.16	0.011
ES																				

LandTech Resources, Inc.

Hydraulic Grade Line (HGL) Calculations

Project Number: 04-686

Project: Wedmore Place

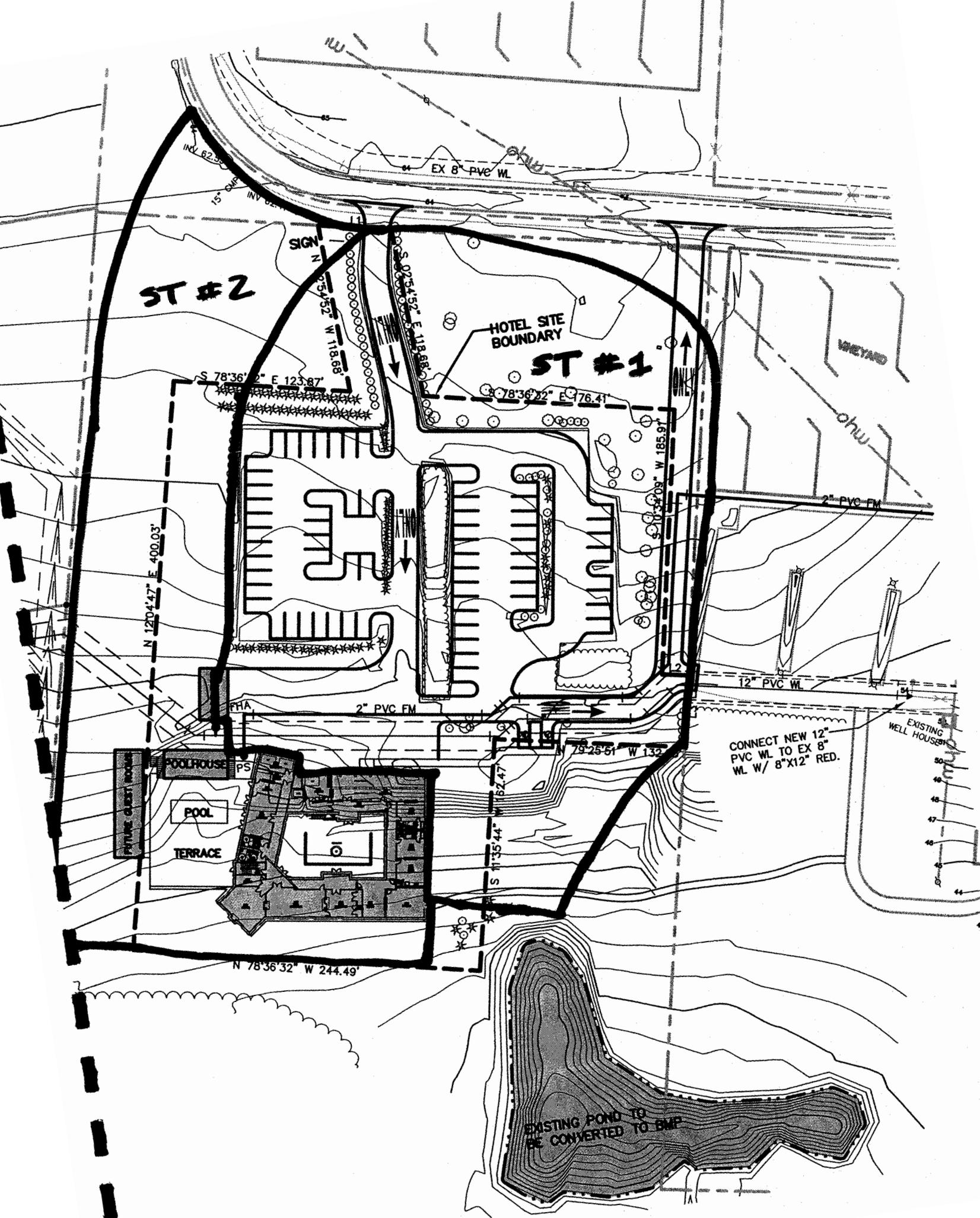
Date: 7.1.05

From Structure	STRUCTURE LOSSES												HGL @ FROM	Performance Checks & Intermediate Computations										
	HGL		Velocity Head V <sup>2</sup> /2g (ft)	Invert Shaped?	Surface Flow?	Bend Losses						ENTRANCE		EXIT (ft)	TOTAL (ft)	HGL @ FROM	Rim/Flowline (Max. Allow. Elevation)	Freeboard (ft)	Elev. top of pipe @ From	Structure #'s: FROM-TO	TC plus Pipe Flow Time	Elevation at 80% Full Flow	Too Shallow?	Computed Pipe Dia.
	Slope (%)	Fall (ft)				Angle (deg)	@ To (ft)	@ From (ft)	@ To (ft)	@ From (ft)														
	HGL Slope	HGL Fall				Bend Angle	Bend To	Bend From	Entr To	Entr From														
8	0.101%	0.193	0.05	Y	Y	0	0.000	0.000	0.011	0.000	0.016	0.010	40.20	43.00	2.80	40.57	8-10	13.81	40.20	80% D	8.8			
9	0.072%	0.043	0.03	Y	Y	0	0.000	0.000	0.008	0.000	0.011	0.007	39.51	44.00	4.49	39.87	9-10	5.26	39.50	HGL	8.3			
10	0.236%	0.118	0.14	Y	Y	90	0.102	0.000	0.035	0.011	0.050	0.040	39.46	42.00	2.54	39.74	10-11	13.99	39.30	HGL	12.6			
11	0.257%	0.123	0.24	Y	Y	90	0.174	0.102	0.060	0.035	0.084	0.144	39.30	42.50	3.20	39.88	11-ES	14.15	39.30	80% D	19.2			

Tailwater Elevation at Outfall point # ES):

38.70

**APPENDIX C**



# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMJ DATE 2/18/05

SCALE \_\_\_\_\_

## DESIGN SEDIMENT TRAP No. 1

$$\text{Area} = 1.97 \text{ ac.}$$

$$\text{Initial Storage} = 1.97 \text{ ac} \times 134 \frac{\text{cyd}}{\text{ac}} = 264 \text{ cyd}$$

$$\text{Dry Storage} = 132 \text{ cyd}$$

$$\text{Wet Storage} = 132 \text{ cyd}$$

Calculate Wet Storage:

$$V_1 = 132 \text{ cyd} = 3,564 \text{ cf}$$

$$D_1 = 4'$$

$$V_1 = .85 \times A_1 \times D_1$$

$$3564 = .85 \times A_1 \times 4$$

$$A_1 = 1048 \text{ sf} = 33' \times 33'$$

Calculate Dry Storage:

$$V_2 = 132 \text{ cyd} = 3,564 \text{ cf}$$

$$D_2 = 3'$$

$$A_1 = 1048 \text{ sf}$$

$$V_2 = \frac{A_1 + A_2}{2} \times D_2 \Rightarrow 3,564 = \frac{1048 + A_2}{2} \times 3'$$

$$A_2 = 1328 \text{ sf} = 36' \times 36'$$

$$L = 1.97 \times 6 = 12'$$

# LandTech Resources, Inc.

Surveying • Engineering • GPS

5810-F Mooretown Road, Williamsburg, VA 23188

Phone: (757) 565-1677 Fax: (757) 565-0782

web: landtechresources.com

PROJECT NAME Wedmore Place

PROJECT NO. 04-686

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

CALCULATED BY KMJ DATE 2/21/04

SCALE \_\_\_\_\_

## DESIGN SEDIMENT TRAP No. 2

$$\text{Area} = 2.80 \text{ ac}$$

$$\text{Initial Storage} = 2.80 \text{ ac} \times 134 \text{ cyd/ac} = 376 \text{ cyd}$$

$$\text{Dry Storage} = 188 \text{ cyd}$$

$$\text{Wet Storage} = 188 \text{ cyd}$$

Calculate Wet Storage:

$$V_1 = 188 \text{ cyd} = 5,076 \text{ cf}$$

$$D_1 = 4'$$

$$V_1 = .85 \times A_1 \times D_1$$

$$5,076 = .85 \times A_1 \times 4'$$

$$A_1 = 1492 \text{ sf} = 39' \times 39'$$

Calculate Dry Storage:

$$V_2 = 188 \text{ cyd} = 5,076 \text{ cf}$$

$$D_2 = 3'$$

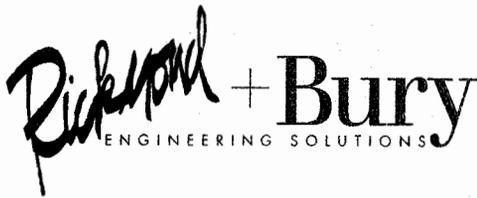
$$A_1 = 1492 \text{ sf}$$

$$V_2 = \frac{A_1 + A_2}{2} \times D_2 \Rightarrow 5,076 = \frac{1492 + A_2}{2} \times 3$$

$$A_2 = 1892 \text{ sf} = 44' \times 44'$$

$$L = 2.80 \times 6 = 17'$$

**APPENDIX D**



January 17, 2005

Mr. Kenneth M. Jenkins, P.E.  
LandTech Resources, Inc.  
5810-F Mooretown Road  
Williamsburg, VA 23188

RE: Williamsburg Winery Hotel  
Environmental Inventory  
RBI Project No. 05102

Dear Mr. Jenkins:

In accordance with Section 23-10 of James City County's Plan of Development, Rickmond+Bury, Inc. has completed an Environmental Inventory on the referenced property. The project site consists of one subdivided parcel of land approximately 3.08 acres in size that belongs to the Williamsburg Winery. The physical address of the property is 5800 Wessex Hundred Road in James City County, Virginia. It is bordered to north by Wessex Hundred Road, to the east by the Williamsburg Winery, to the south by undeveloped land and a farm pond, and to the west by the Vineyards at Jockeys Neck. Currently, the site is undeveloped land.

Based on review of available mapping and photographic resources and a site inspection, the property is composed entirely of upland areas. Vegetation on the property consists of Virginia pine (*Pinus virginiana*), loblolly pine (*Pinus taeda*), cedar (*Juniperus virginiana*), cherry (*Prunus serotina*), smooth sumac (*Rhus glabra*), winged sumac (*Rhus copallina*), broomsedge (*Andropogon virginica*), docks (*Rumex sp.*), dog fennel (*Eupatorium capillifolium*), wild onion (*Allium canadense*), golden rod (*Solidago rugosa*), and honeysuckle (*Lonicera japonica*). Soils on the property have sandy loam texture and exhibit chromas of 3 through 6 (Munsell Soil Color Charts). No indicators of hydrology were observed on the property.

As the property is located entirely in uplands, it does not contain tidal wetlands, tidal shores, nontidal wetlands connected by surface flow and contiguous to tidal wetlands, water bodies with perennial flow, or nontidal wetlands that are not listed above. In addition, water bodies with perennial flow do not appear to be located within 100 feet of the property. Due to the absence of these components, Resource Protection Area (RPA) buffers do not affect this site.

One small farm pond is located to the south of the site. The pond is proposed to be utilized as a stormwater management feature. This pond has relatively steep banks and no streams or ditches that flow into it. The banks of the pond do not contain wetlands. This pond discharges to a narrow

BURY+PARTNERS-VIRGINIA, INC.  
1643 Merrimac Trail  
Williamsburg, Virginia 23185  
(757) 229-1776  
FAX (757) 229-4683  
[www.rickmondbury.com](http://www.rickmondbury.com)

Fairfax · Warrenton · Williamsburg, Virginia  
Austin · Dallas · Houston · San Antonio · Temple, Texas

drainage ravine/stream system that flows to the south. At the time of the inspection, the stream appeared to exhibit weak primary and secondary field indicators for perennial flow using the North Carolina Division of Water Quality Stream Classification Method. The stream does not appear to be perennial within 100 feet of the pond. Therefore, an RPA buffer is not required around the stream or the pond.

Based on the topographic maps provided by the James City County's GIS/Mapping Section, the site does not contain areas with slopes greater than 30 percent. Elevations on the site range between 45 and 65 feet above mean sea level.

There are no areas with highly erodible soils on the property. According to the Soil Survey of James City and York Counties and the City of Williamsburg, Virginia two soil types occur onsite. These soils are Craven-Uchee complex (11C) and Slagle fine sandy loam (29A and 29B). Both of these soils are moderately well drained with gentle to moderate slopes. Neither of the soils that occur onsite are listed as hydric soils.

The final resource areas that are required to be identified by the ordinance are areas within the 100-Year Flood Zone. The site is shown on the National Flood Insurance Maps (Community Panel 510201 0045B dated February 6, 1991) produced by FEMA as being in Flood Zone X (areas outside the 500-year flood plain).

This concludes the Environmental Inventory of the subdivided hotel parcel located at 5800 Wessex Hundred Road. Should you have any questions or wish to discuss conditions on the property, please call me at 229-1776.

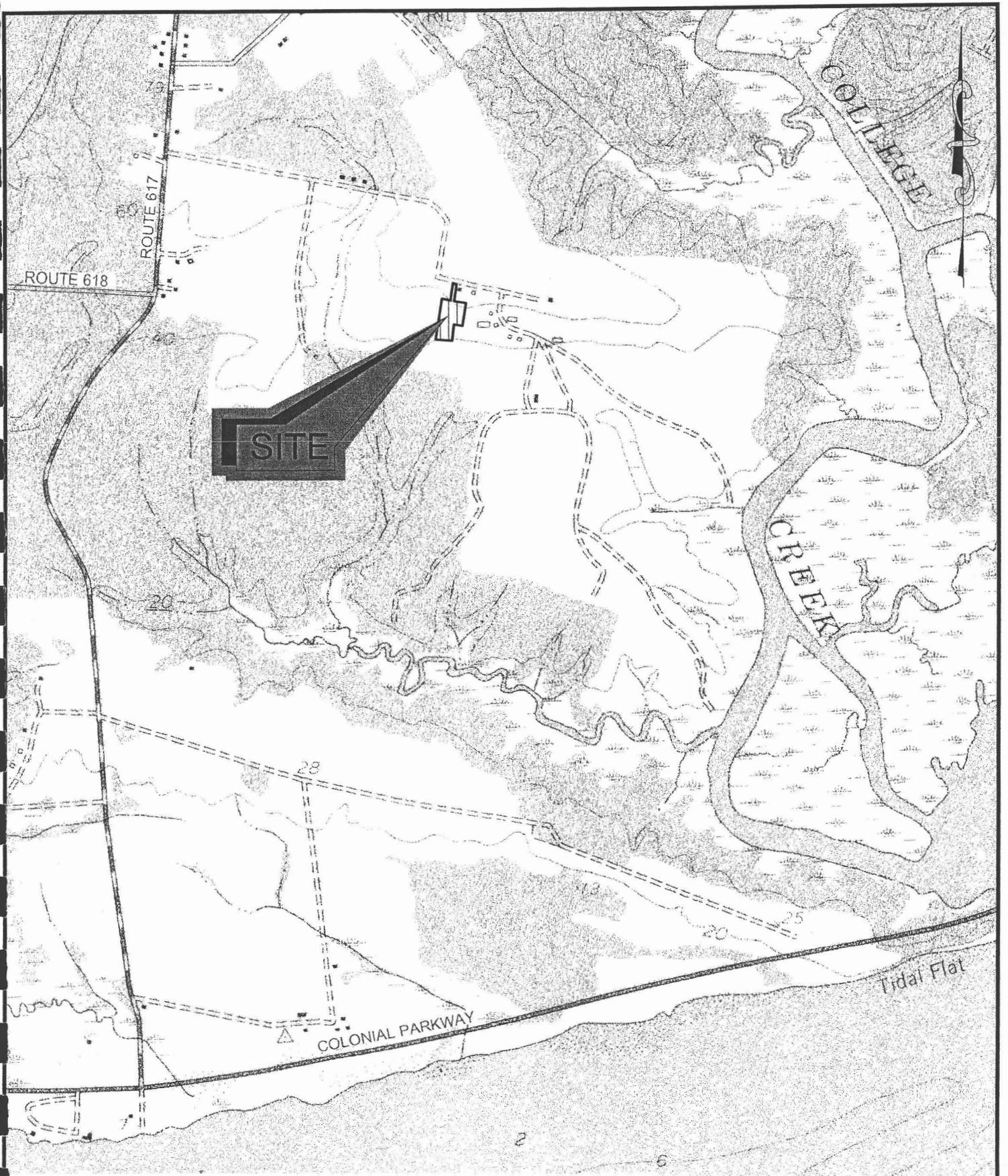
Sincerely,

RICKMOND+BURY, INC



Matthew A. Roth  
Senior Environmental Scientist

I:\05102 Williamsburg Winery Hotel\Environmental Inventory\ei.landtech.1.17.05.doc



SOURCE: USGS 7.5 Minute Topographic Map Series Hog Island, Virginia



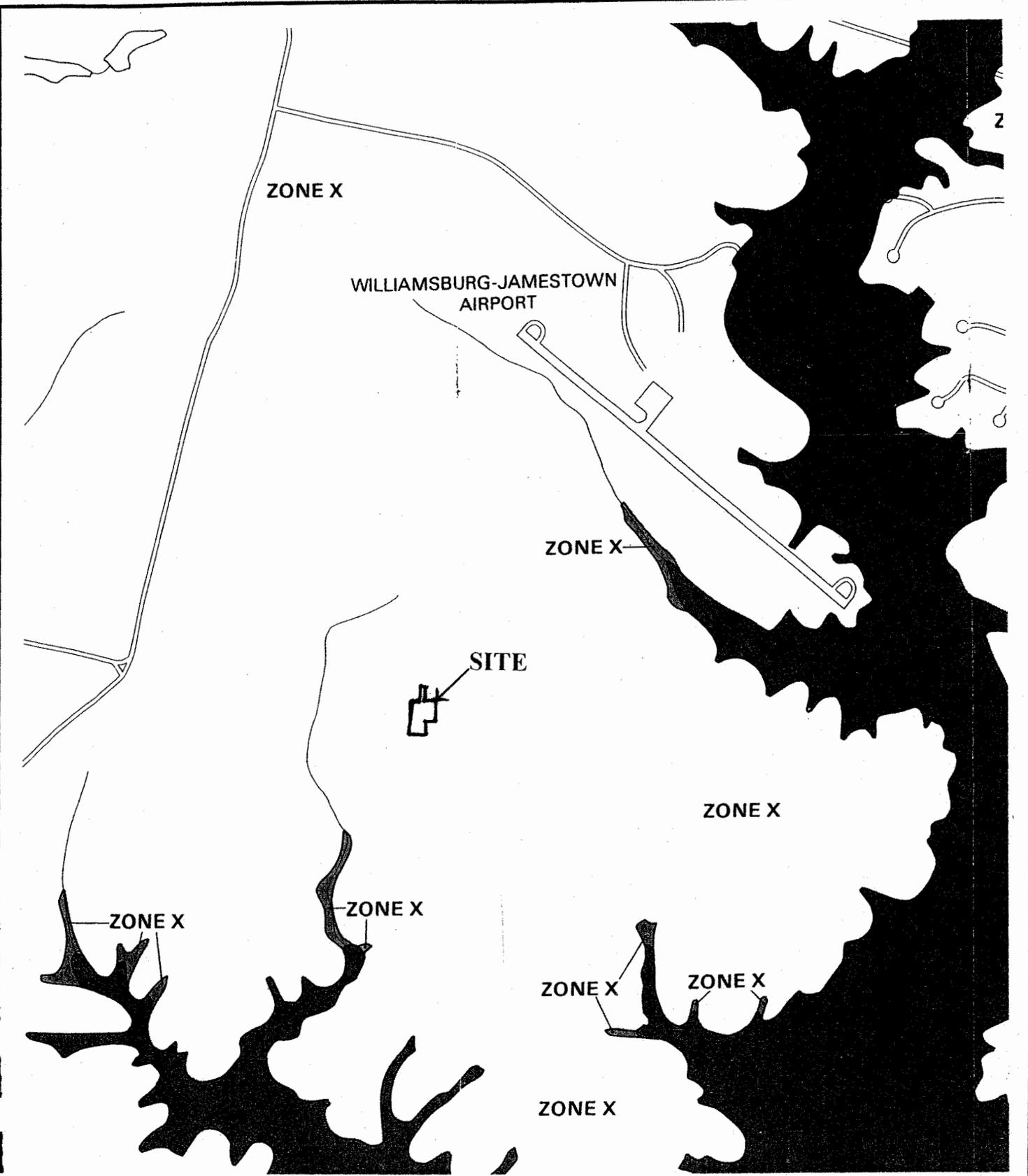
**Rickmond Engineering, Inc.**

Engineering      Surveying      Environmental  
 1643 Merrimac Trail      Vint Hill, P.O. Box 861647  
 Williamsburg, VA 23185      Warrenton, VA 20187  
 Voice: (757)229-1776      Voice: (540)349-7730  
 Fax: (757)229-4683      Fax: (540)349-7731  
 www.rickmond.com

**WILLIAMSBURG WINERY  
HOTEL**

VICINITY MAP  
 JAMES CITY COUNTY, VA

PROJ. NO:	05102
DWG:	vicinity.DWG
DATE:	1/14/05
SCALE:	NOT TO SCALE
SHEET:	1 OF 1

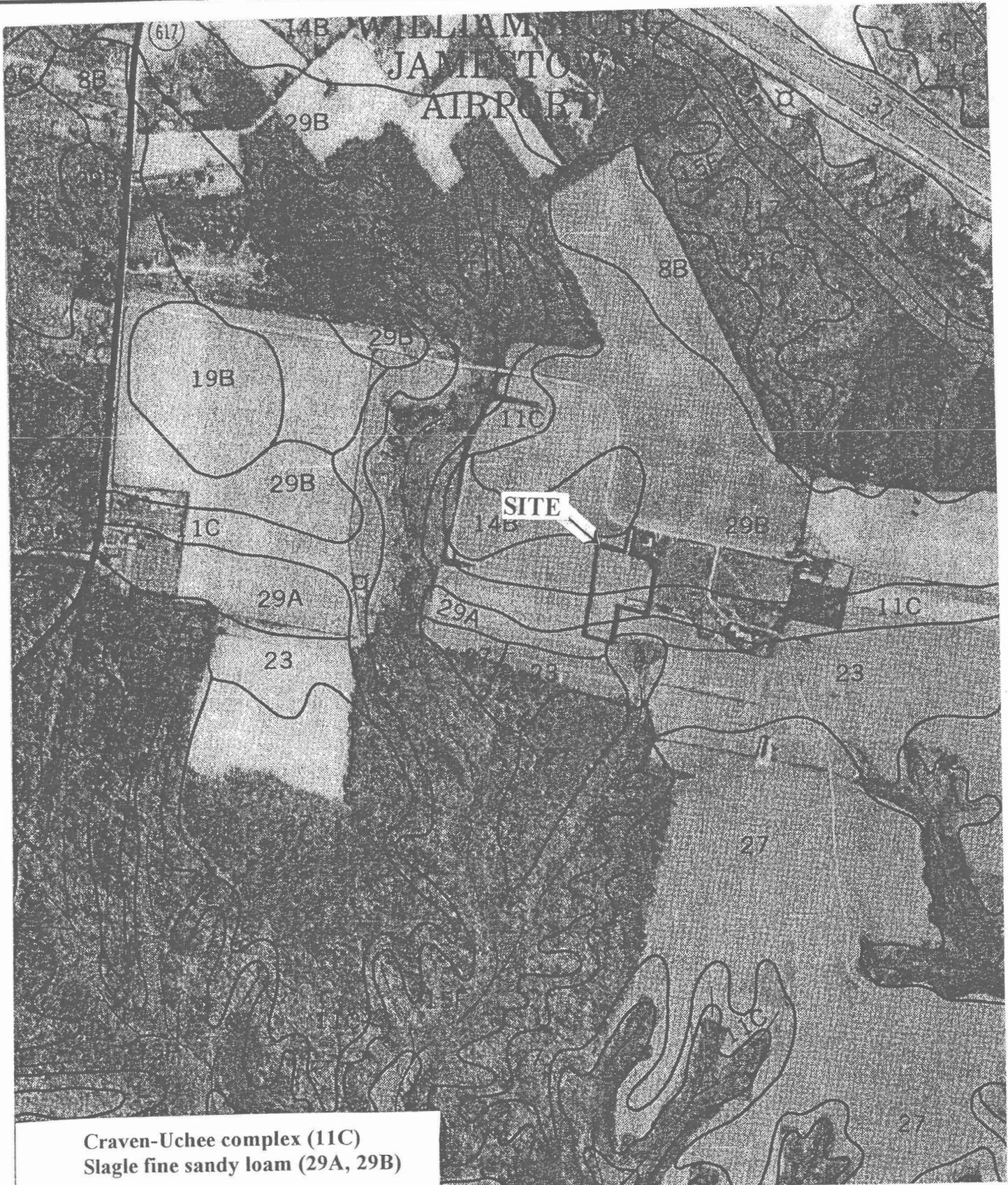


SOURCE: FEMA FLOOD INSURANCE RATE MAP, JAMES CITY COUNTY, VIRGINIA  
 COMMUNITY PANEL NUMBER 510201 0045B DATE: 2/6/91

**Rickmond + Bury**  
 ENGINEERING SOLUTIONS  
 1043 Merrimac Trail  
 Williamsburg, Virginia 23185  
 Tel. (757)229-1770 Fax (757)229-4663  
 Rickmond+Bury, Inc. ©Copyright 2004

WILLIAMSBURG WINERY HOTEL  
 JAMES CITY COUNTY, VA  
 FLOOD ZONE MAP

PROJ. NO:	05102
DWG:	05102.floodzone.DWG
DATE:	1/13/05
SCALE:	1"=500'
SHEET:	1 OF 1



Craven-Uchee complex (11C)  
 Slagle fine sandy loam (29A, 29B)

SOURCE: SOIL SURVEY OF JAMES CITY AND YORK COUNTIES AND THE CITY OF WILLIAMSBURG, VIRGINIA

**Richard + Bury**  
 ENGINEERING SOLUTIONS  
 1643 Merrimac Trail  
 Williamsburg, Virginia 23106  
 Tel. (757)228-1776 Fax (757)228-4683  
 Richmond+Bury, Inc. ©Copyright 2004

WILLIAMSBURG WINERY HOTEL  
 JAMES CITY COUNTY, VA

SOILS MAP

PROJ. NO:	05102
DWG:	05102.soils.DWG
DATE:	1/13/05
SCALE:	NOT TO SCALE
SHEET:	1 OF 1

# LandTech Resources, Inc.

5810-F Mooretown Road, Williamsburg, VA 23188

Phone 757-565-1677

Fax 757-565-0782



April 5, 2005

Mr. Darryl Cook, P.E.  
James City County Environmental Division  
101-E Mounts Bay Rd.  
Williamsburg, Va. 23185

Re: Wedmore Place at  
The Williamsburg Winery  
Project No. 04-686

Dear Mr. Cook:

This letter is to request a waiver to the safety/aquatic bench requirement for a Wet Pond BMP per the James City County Guidelines for Design and Construction of Stormwater Management BMP's.

The proposed BMP for the Wedmore Place Country Inn and parking lot is an existing 0.40 acre wet pond. The existing pond is approximately 8 feet deep with 4:1 slopes and is surrounded by an existing landscape buffer with numerous mature trees greater than 20 feet in height and thick underbrush. The construction of safety/aquatic bench in the existing pond would re-suspend any sediment in the pond and cause extensive damage to the existing landscape buffer around the pond perimeter. Based on the negative impacts to the existing pond that would be associated with the construction of the safety/aquatic bench we request that the safety/aquatic bench requirement be waived.

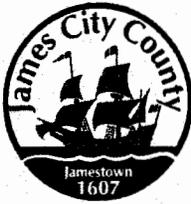
Thank you for your consideration with this waiver request and if additional information is required please contact me at your earliest convenience.

Sincerely,

LandTech Resources, Inc.

*(Signature)*  
Kenneth M. Jenkins, P.E.  
Senior Engineer

Cc: Patrick Duffeler



## DEVELOPMENT MANAGEMENT

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

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

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

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

COUNTY ENGINEER  
(757) 253-6678  
MOSQUITO CONTROL  
(757) 259-4116

June 30, 2005

Mr. Kenneth M. Jenkins  
LandTech Resources Inc.  
5810-F Mooretown Road  
Williamsburg, Va. 23188

Re: Pond Bench Variance Request  
Wedmore Place at the Williamsburg Winery  
County Plan No. SP-30-05

Dear Mr. Jenkins:

The Environmental Division is in receipt of your written request dated April 5, 2005 to obtain variance from the County BMP manual for elimination of aquatic and safety benches associated with the BMP for the above referenced project. The pond is an existing feature which will be upgraded in minimal fashion to meet current County requirements due to the development of the Country Inn. Currently the pond is about a half-acre in size, is about 8 feet deep, interior side slopes are about 4H:1V and there is a substantial amount of existing and established vegetative buffer around the pond.

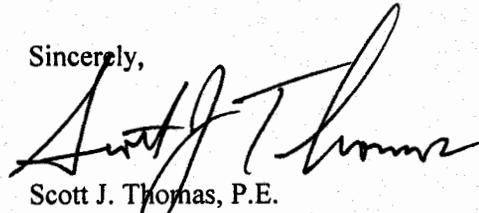
Based on our review of information as submitted, the variance as requested is hereby **approved**. The variance was considered appropriate due to information as submitted in the letter request and revised plans and details including: 1) the BMP is an existing pond with a significant amount of established pond buffer vegetation; 2) the pond is in a relatively remote location in relation to most of the buildings in the winery compound; 3) disturbance to the periphery pond area would detract from the scenic character of the winery site; and 4) safety benches are not required if interior side slopes are 4H:1V or gentler.

The following conditions apply to approval of this waiver request:

1. The owner should be made completely aware that the aquatic bench was eliminated from the BMP.
2. Additional pond shoreline and buffer supplemental plantings should be performed in accordance with notes on Sheet C11 of the approved plan.
3. The variance approval shall become part of the approved site stormwater management plan.
4. Record drawings and construction certification will be required for improvements proposed at the BMP. The asbuilts should generally show locations where supplemental plantings were incorporated in the pond buffer.

Please note that approval of this variance, with the conditions stated, in no way implies final approval of a site or subdivision plan as required by the Chapter 24 Zoning or Chapter 19 Subdivisions of the County Code; nor, does it constitute final approval of an erosion and sediment control or stormwater management plan as required by Chapter 8 Erosion and Sediment Control and Chapter 23 Chesapeake Bay Preservation of the County Code. Approval of this variance is also contingent upon no major (substantial) changes in the development plan, the subject best management practice facility, or if site conditions change, become apparent or alter significantly following the date of this approval.

Sincerely,



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

SJT/sjt

cc: Matt Arcieri, Planning Division (via email)

SWMPProg/Variances/SPvar/Var063005.SP3005