

Stormwater Division

MEMORANDUM

DATE: March 11, 2010
TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services
FROM: Jo Anna Ripley, Stormwater
PO: 270712
RE: Files Approved for Scanning

General File ID or BMP ID: JR031

PIN: 4510100021

Subdivision, Tract, Business or Owner

Name (if known):

Governors Land

Property Description:

Major Open Space #50

Site Address:

3231 Wingfield Lake Road

(For internal use only)

Box 14

Drawer: 7

Agreements: (in file as of scan date)

N

Book or Doc#:

Page:

Comments

JR-031

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

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

James City County, Virginia
Environmental Division

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

County Plan No.: S-21-93
Project Name: Governors Land
Stormwater Management Facility: Wingfield Lake East Timber Crib Wall
Phase: I II III

Information Received. Date: April 1 2002 AES
 Administrative Check.
 Record Drawing Date: 3/29/02 Cert; 3/29/02 DWG.
 ~~No~~ Construction Certification Date: _____
 RD/CC Standard Forms (Required after Feb 1st 2001 Only)
 ~~No~~ Insp/Maint Agreement Info: GWBW/.
 BMP Maintenance Plan Location: _____
 Other: _____

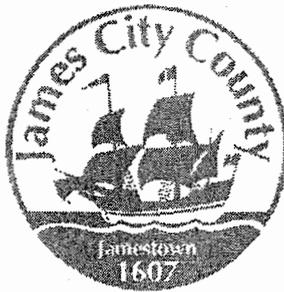
~~NA~~ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
 Yes No Location: None Apparent
 Assign County BMP ID Code Code: JR 031
 Log into Division's "As-Built" Tracking Log
 Add Location to GIS Database Map. Obtain GIS site information (GPIN, Owner, Site Area, Address, etc.)
 Preliminary Log into BMP Database (BMP ID #, Site Plan #, GPIN, Project Name)
 Active Project File Review (correspondence, H&H, etc.).
 Initial As-Built File setup (label, copy hydraulics, BMP information, etc.).
 Inspector Check of RD/CC. Joe B.
 Pre-Inspection Drawing Review - Approved Plan (Quick look prior to field inspection).
 Final Inspection (FI) Performed Date: 1/24/03 R.H.
 Record Drawing (RD) Review Date: 12/3/02 R.H.
 Construction Certification (CC) Review Date: None Rgd.
 Actions:
 No comments.
 Comments. Letter Forwarded. Date: Feb 17 '02
 Record Drawing (RD)
 Construction Certification (CC)
 Construction-Related (CR)
 Site Issues (SI)
 Other: _____

Second Submission: 4/25/03 AES (RD).
 Third Submission: _____
 Acceptable for stormwater management facility purposes (RD/CC/CR/Other). Proceed with bond release.
 Notify Darryl/Joan/Pat of acceptability using email (preferred), form or verbal.
 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.
 Digital Photographs obtained.
 ~~NO~~ Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable

Plan Reviewer: [Signature] P.E.

Date: 6/26/03



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: GOVERNOR'S LAND AT TWO RIVERS - KINGFIELD LAKE
Structure/BMP Name: TIMBER DECK POND
Project Location: EAST OF TWO RIVERS ROAD (ENTRANCE ROAD)
BMP Location: EAST OF CUL-DE-SAC OF KINGFIELD LAKE ROAD
County Plan No.: 5 - 21 - 93

Project Type: Residential Business Commercial Office Institutional Industrial Public Roadway Other _____
Tax Map/Parcel No.: (45-1) (1-13A)
BMP ID Code (if known): 1R031
Zoning District: POWHATAN DISTRICT
Land Use: RESIDENTIAL
Site Area (sf or acres): _____

Brief Description of Stormwater Management/BMP Facility: TIMBER STRUCTURE - RECENTLY REPLACED

Nearest Visible Landmark to SWM/BMP Facility: CUL-DE-SAC OF KINGFIELD LAKE ROAD

Nearest Vertical Ground Control (if known):
 JCC Geodetic Ground Control USGS Temporary Arbitrary Other
Station Number or Name: 336
Datum or Reference Elevation: 76.20
Control Description: JCC MAIN STATION
Control Location from Subject Facility: 6000 FEET DUE NORTH

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: SUMMER 1993
Facility Monitored by County Representative during Construction: Yes No Unknown
Name of Site Work Contractor Who Constructed Facility: CEDACREST MARINE
Name of Professional Firm Who Routinely Monitored Construction: _____
Date of Completion for SWM/BMP Facility: ~~JANUARY~~ FEBRUARY 2002 (REBUILT)
Date of Record Drawing/Construction Certification Submittal: MARCH 2002

(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: GOVERNOR'S LAND ASSOCIATES
Mailing Address: 9701 MILL POND RUN
TOANO, VIRGINIA
Business Phone: 757-234-5000 Fax: 757-234-5111
Contact Person: MR. JAMES H. BENNETT Title: VICE PRESIDENT - DEVELOPMENT

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

Firm Name: AES CONSULTING ENGINEERS
Mailing Address: 5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA, 23188
Business Phone: 757-253-0040
Fax: 757-220-8994
Responsible Plan Preparer: J. MARK BENNETT
Title: PROJECT MANAGER
Plan Name: WINDFIELD LAKE
Firm's Project No. 7173
Plan Date: MARCH 1993
Sheet No.'s Applicable to SWM/BMP Facility: 8 / 11 / 1 / 1

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

Name: ~~JACQUES~~ CEDACREST MARINE
Mailing Address: _____
Business Phone: _____
Fax: _____
Contact Person: _____
Site Foreman/Supervisor: _____
Specialty Subcontractors & Purpose (for BMP Construction Only): _____

Section 4 - Professional Certifications:

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

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: AES CONSULTING ENGINEERS
Mailing Address: 5240 OLDE TOWNE RD, SUITE 1
WILLIAMSBURG, VIRGINIA 23188
Business Phone: 757-253-0040
Fax: 757-220-8994

Name: V. MARC BENNETT
Title: SENIOR PROJECT MANAGER
Signature: *V. Marc Bennett*
Date: 3/29/07

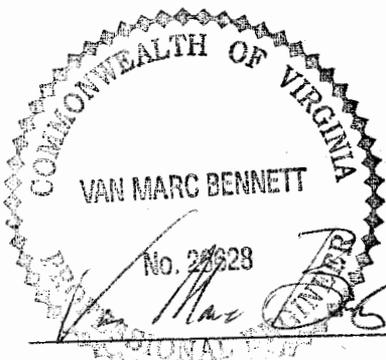
I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically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



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 reproducibles.
- 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.
- XX 4. Top widths, berm widths and embankment side slopes.
- XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.
- INC 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.

- XY 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.
- XY 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.
- INC 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.**
- XY 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.
- XY 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.
- INC 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.
- INC 20. BMP vicinity properly cleaned of stockpiles and construction debris.
- INC 21. No visual signs of erosion or channel degradation immediately downstream of facility.
- XY 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.)

- | | | |
|------------|------|--|
| <u>N/A</u> | A1. | All requirements of Section II, Minimum Standards, apply to Group A facilities. |
| | A2. | Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction. |
| | A3. | Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep. |
| | 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. |
| | A5. | Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes. |
| | 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. |
| | 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). |
| | A8. | No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure. |
| | A9. | Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility. |
| | A10. | Low flow orifice has a non-clogging mechanism. |
| | A11. | A pond drain pipe with valve was provided. |
| | A12. | Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope. |
| <u>N/A</u> | A13. | End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard. |

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

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

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)

- | | | |
|------------|-----|--|
| <u>N/A</u> | 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 (1/2) of the wetland surface area is planted. |
| | B7. | Topsoil or wetland mulch provided to support vigorous growth of wetland plants. |
| <u>N/A</u> | 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)

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

- N/A 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.
- N/A 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)

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)

- N/A 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.
- N/A 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)

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

- N/A 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.
- N/A 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)

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

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

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

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

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

- N/A G1. All requirements of Section II, Minimum Standards, apply to Group G facilities as applicable.
- N/A 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.
- N/A G3. Dedicated open space areas are in undisturbed common areas, conservation easements or are protected by other enforceable instruments that ensures perpetual protection.
- N/A G4. Provisions included to clearly specify how the natural vegetated areas utilized as dedicated open space will be managed and field identified (marked).
- N/A G5. Adequate protection measures were implemented during construction to protect the defined dedicated open space areas.
- N/A 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.)

- N/A SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.
- N/A SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.
- N/A 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 .)

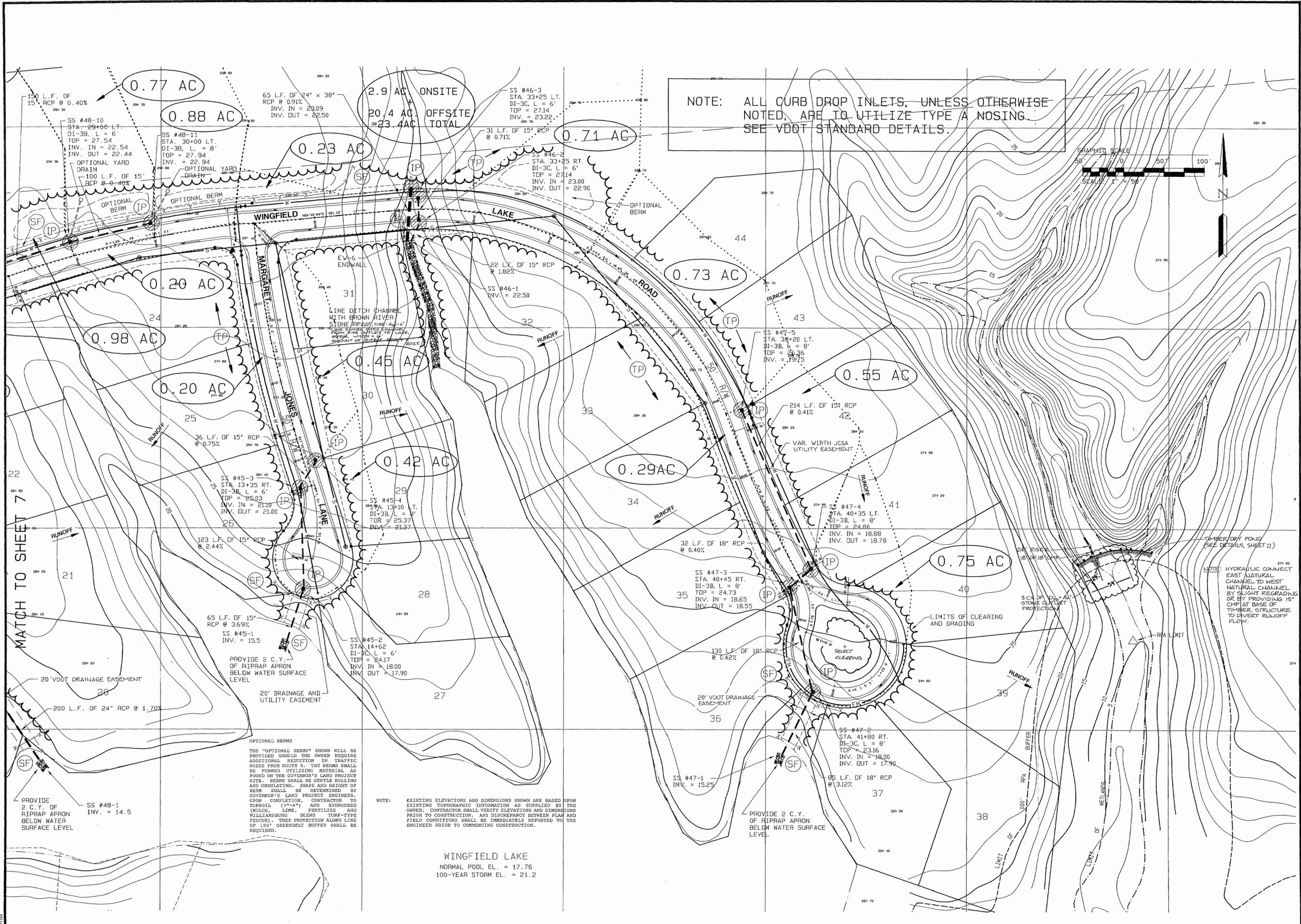
- N/A O1. All requirements of Section II, Minimum Standards, apply to this section.
- N/A O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.

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

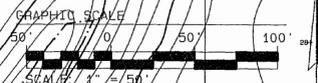
XIII. References *(The James City County Record Drawing and Construction Certification Forms and Checklists for Stormwater Management / BMP facilities were developed using the following sources and references.)*

- 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\SWMPProg\BMP\Certif\RDCC.wpd



NOTE: ALL CURB DROP INLETS, UNLESS OTHERWISE NOTED, ARE TO UTILIZE TYPE A NOSING. SEE VDOT STANDARD DETAILS.



DESIGNED	DATE	BY
DRAWN	DATE	BY
CHECKED	DATE	BY
IN CHARGE	DATE	BY
REVISION	DATE	BY
NO. DATE	REVISION / COMMENT / NOTE	



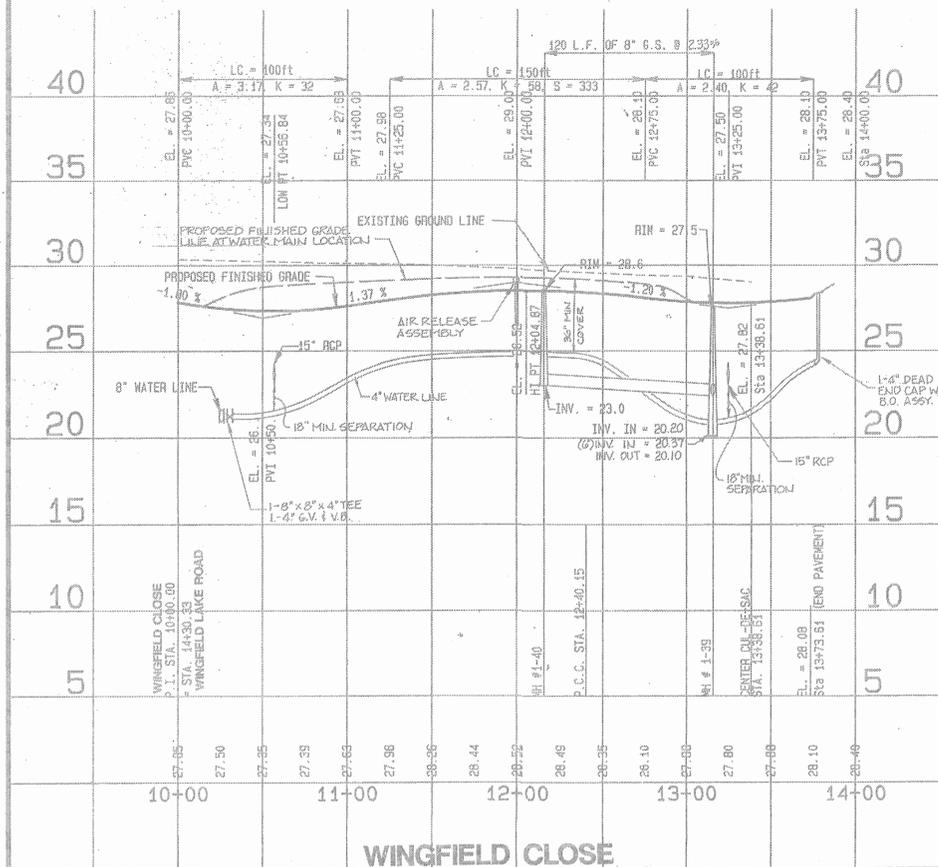
5248 Olde Towne Road, Suite 1
 Williamsburg, Virginia 23188
 (804) 253-0040
 Fax (804) 220-8994



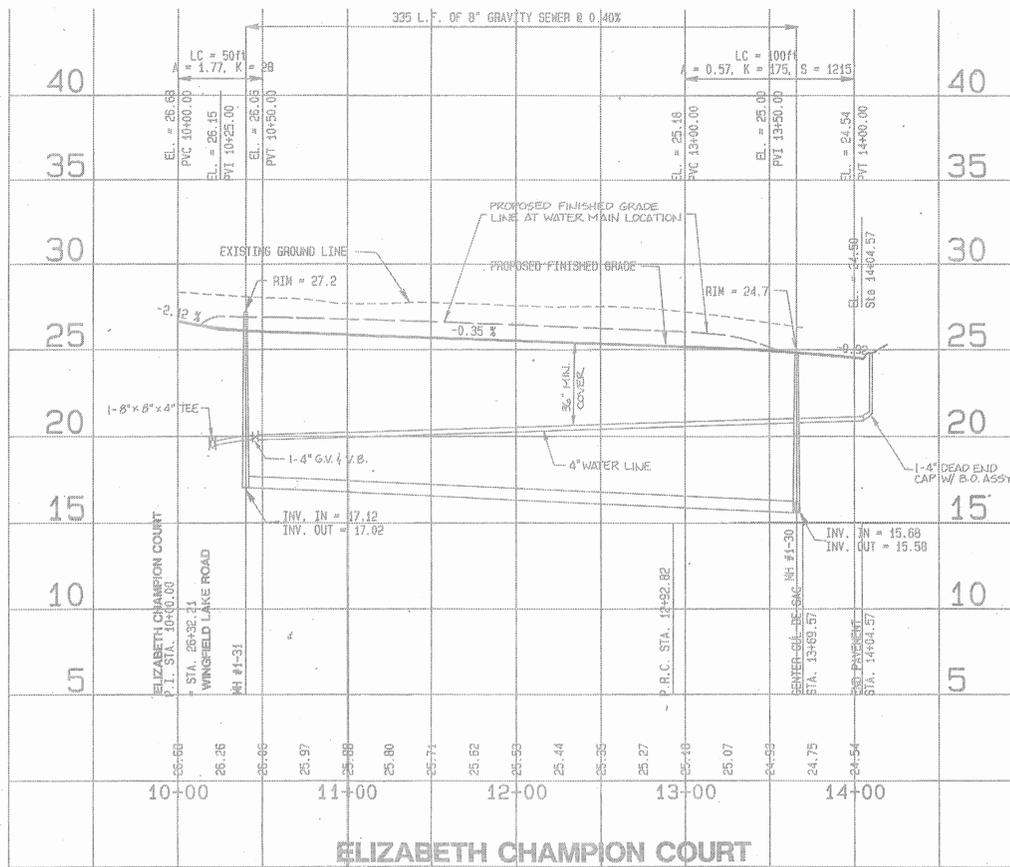
DRAINAGE AND EROSION CONTROL PLAN
 WINGFIELD LAKE
THE GOVERNORS LAND
At Two Rivers
 POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
Scale	Date
NOTED	MAR. 1993
Project No.	
7173	
Drawing No.	
8	

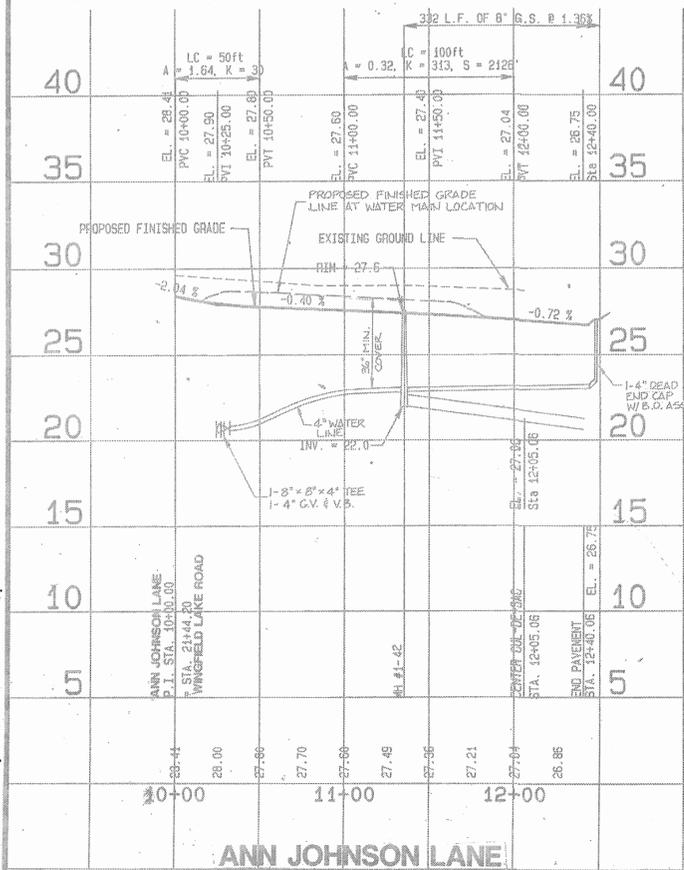
AWT 03.21.02-1301 717351r1.dwg



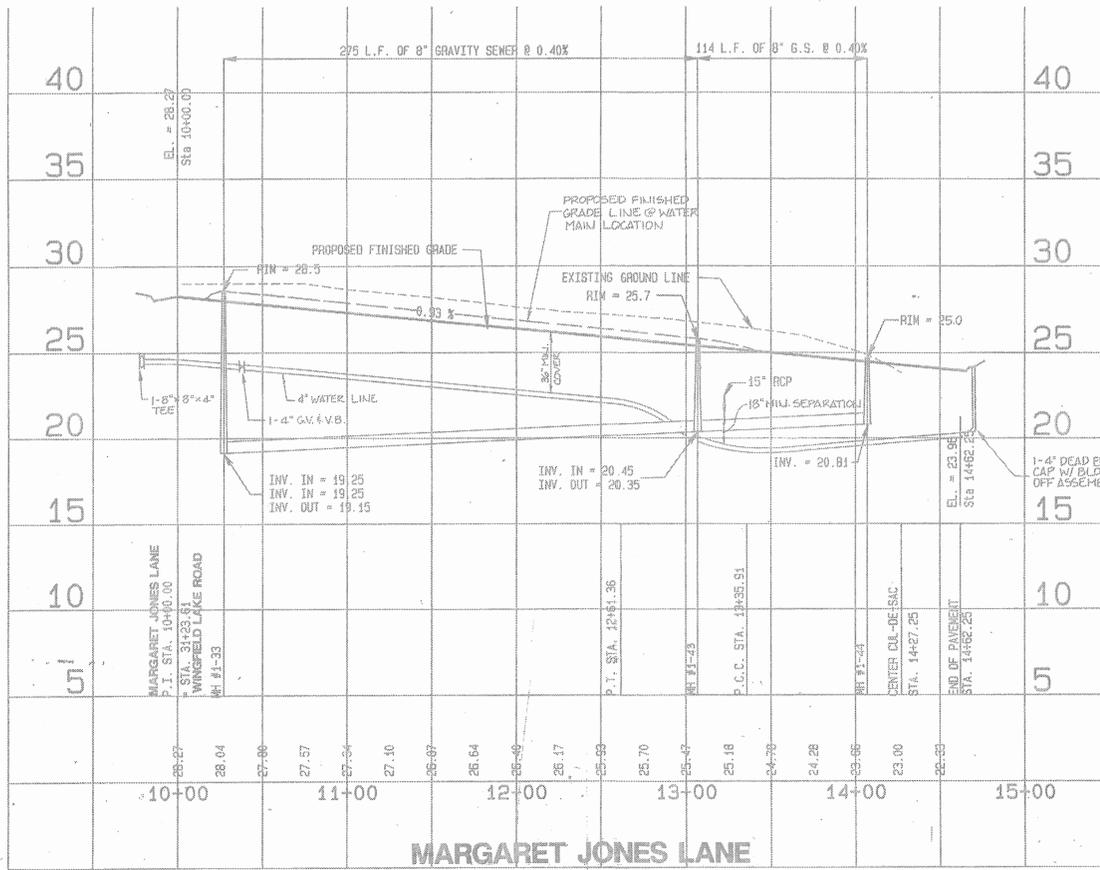
WINGFIELD CLOSE



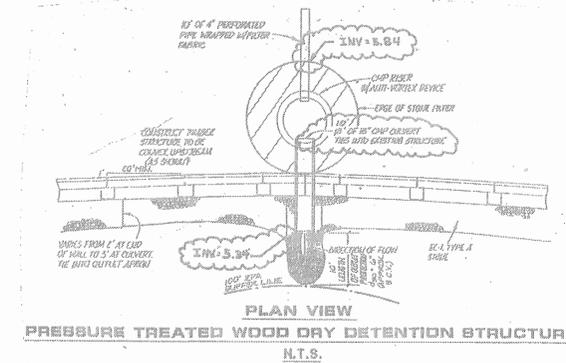
ELIZABETH CHAMPION COURT



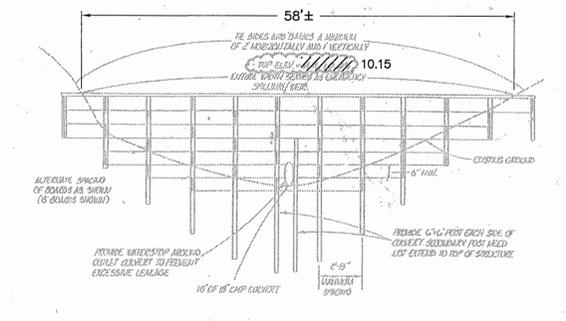
ANN JOHNSON LANE



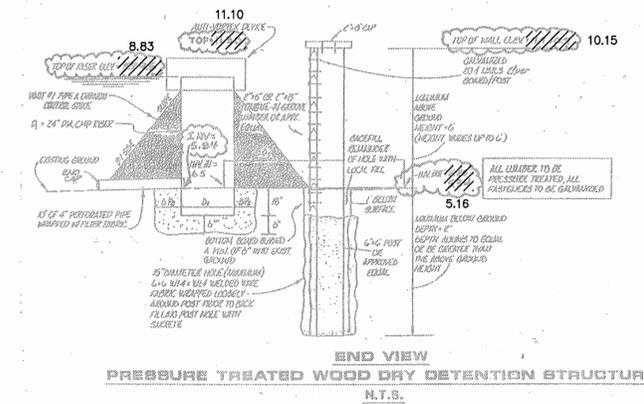
MARGARET JONES LANE



PLAN VIEW
PRESSURE TREATED WOOD DRY DETENTION STRUCTURE
N.T.S.



UPSTREAM ELEVATION
PRESSURE TREATED WOOD DRY DETENTION STRUCTURE
N.T.S.



END VIEW
PRESSURE TREATED WOOD DRY DETENTION STRUCTURE
N.T.S.

1"=50'
1"=5'

SCALE IN FEET

APPROVED
James City County
Environmental Division
By: *[Signature]*
Date: 6-26-03

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.

[Signature] (SEAL)
VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

RECORD DRAWING: 3/20/02

3	3/20/02	RECORD DRAWING	VMB
2	12/18	RECORD DRAWING	VMB
1	7/17/02	REVISION / COMMENT / NOTE	BY

5248 Old Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994



ROAD AND UTILITY PROFILES
ROADS OF 15' ± AND T
WINGFIELD LAKE
GOVERNOR'S LAND
THE
M. Roy Rivers
JAMES CITY COUNTY, VIRGINIA

Designed VMB Drawn
Scale NOTED Date MAR. 1993
Project No. 7173
Drawing No. 11

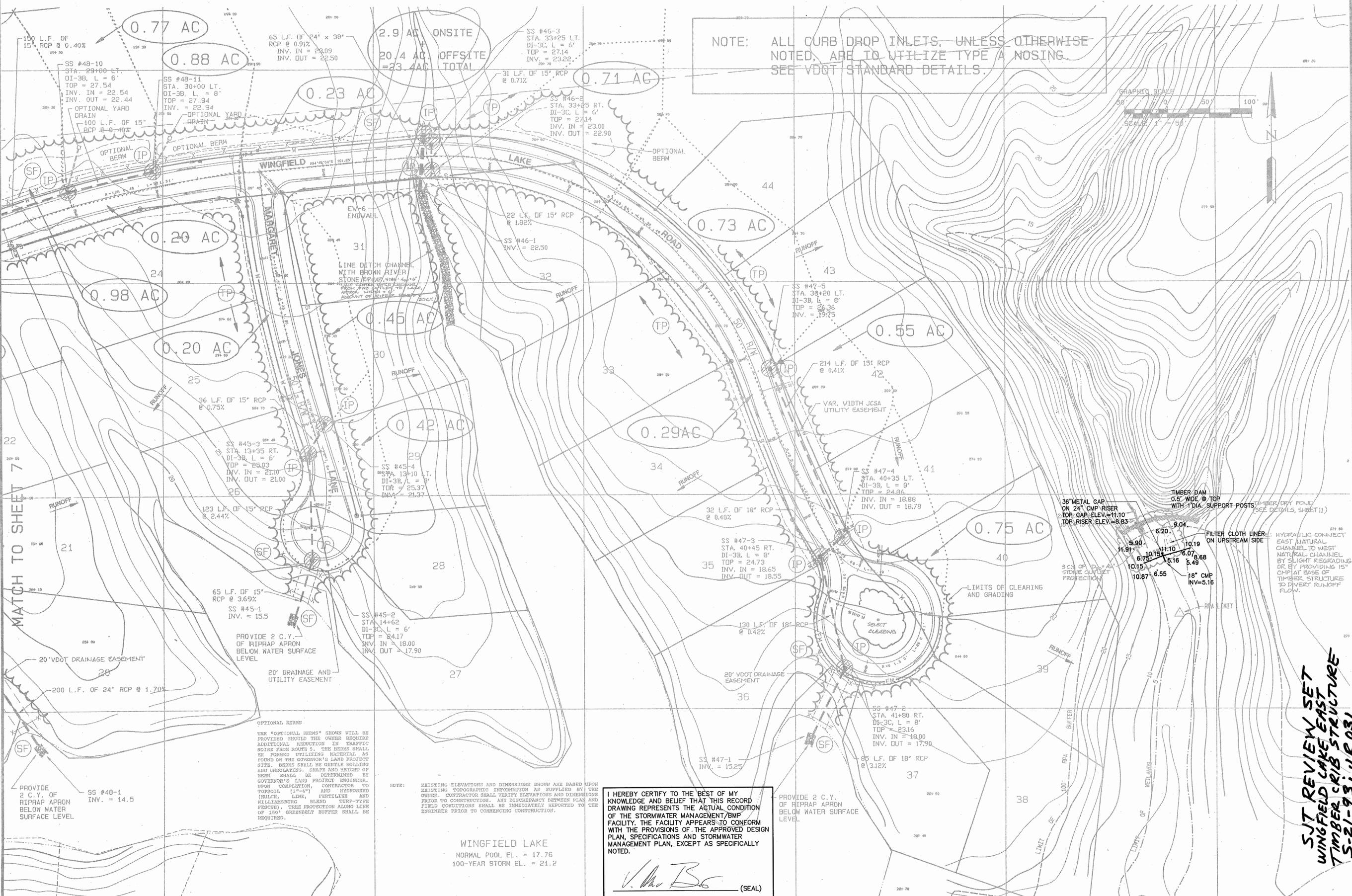
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2/14/02	REVISION	VMB	1
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1/15/02	REVISION	VMB	1
1/15/02	REVISION	VMB	1
1/15/02	REVISION	VMB	1

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 (804) 253-0040
 Fax (804) 220-8994



DRAINAGE AND EROSION CONTROL PLAN
 WINGFIELD LAKE
 THE GOVERNOR'S LAND
 JAMES CITY COUNTY
 VIRGINIA

Designed	VMB	Drawn	VMB
Scale	NOTED	Date	MAR, 1993
Project No.	7173	Sheet No.	8
Drawing No.	8	Revision	1



NOTE: ALL CURB DROP INLETS, UNLESS OTHERWISE NOTED, ARE TO UTILIZE TYPE A NOSING. SEE VDOT STANDARD DETAILS.



MATCH TO SHEET 7

03.21.02-11.03 7173511.dwg

THE "OPTIONAL BERMS" SHOWN WILL BE PROVIDED SHOULD THE OWNER REQUIRE ADDITIONAL REDUCTION IN TRAFFIC NOISE FROM ROUTE 5. THE BERMS SHALL BE FORMED UTILIZING MATERIAL AS FOUND ON THE GOVERNOR'S LAND PROJECT SITE. BERMS SHALL BE GENTLE ROLLING AND UNDEVELOPED. SHAPE AND HEIGHT OF BERMS SHALL BE DETERMINED BY GOVERNOR'S LAND PROJECT ENGINEER. UPON COMPLETION, CONTRACTOR TO TOPSOIL (3"-4") AND HYDROSEED (GRASS, LEGS, FERTILIZER AND WILLIAMSBERG BLEND TURF-TYPE FESCUE). TREE PROTECTION ALONG LINE OF 15' GREENBELT BUFFER SHALL BE REQUIRED.

NOTE: EXISTING ELEVATIONS AND DIMENSIONS SHOWN ARE BASED UPON EXISTING TOPOGRAPHIC INFORMATION AS SUPPLIED BY THE OWNER. CONTRACTOR SHALL VERIFY ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. ANY DISCREPANCY BETWEEN PLAN AND FIELD CONDITIONS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER PRIOR TO COMMENCING CONSTRUCTION.

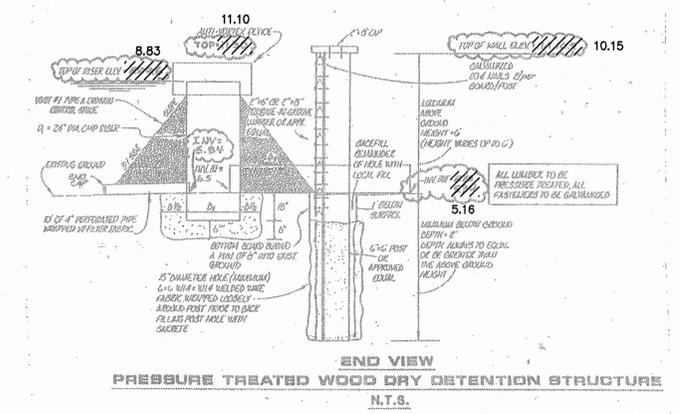
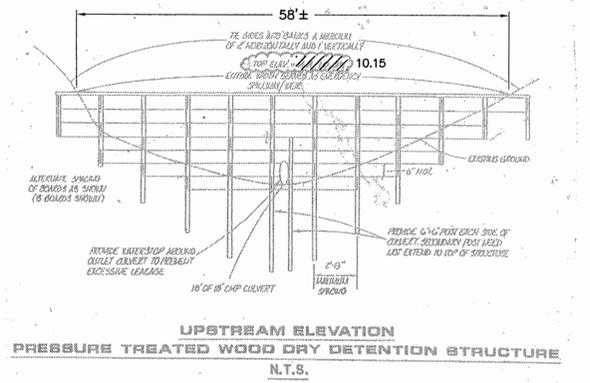
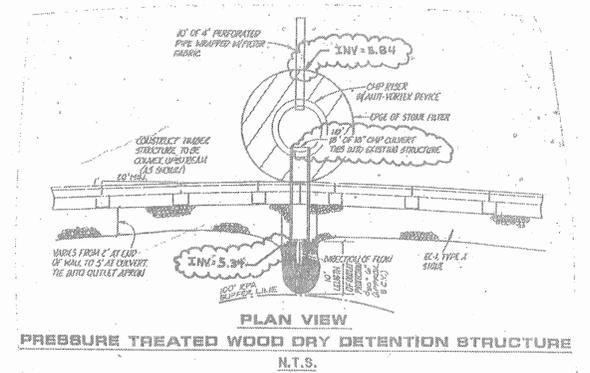
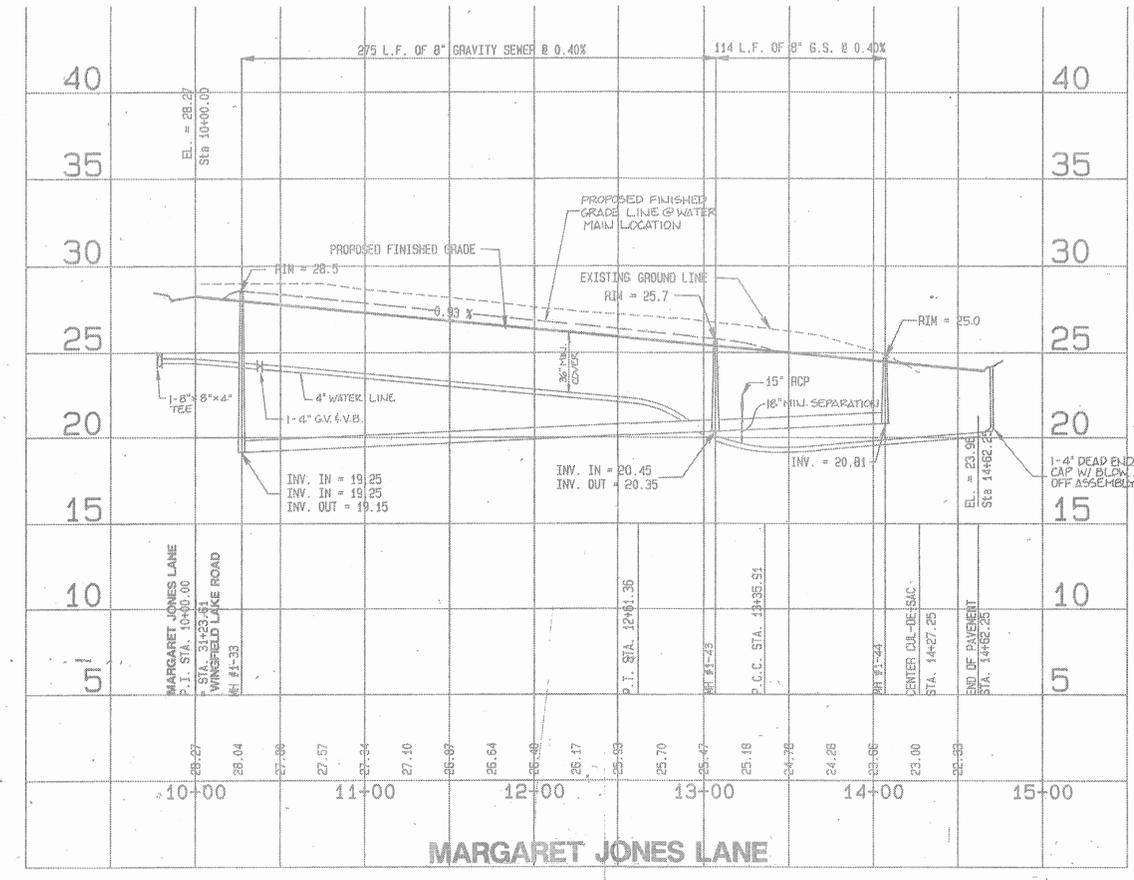
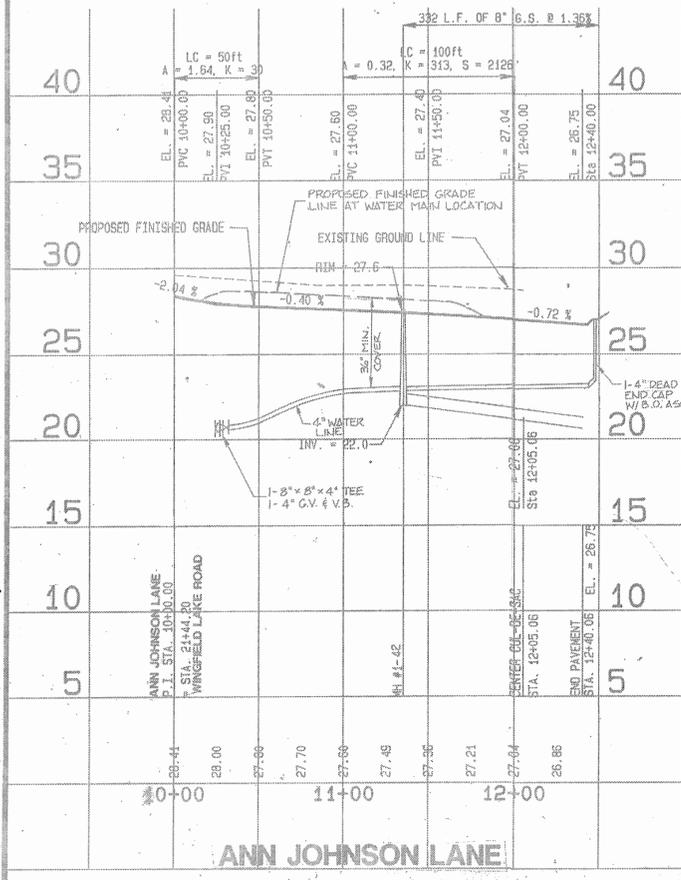
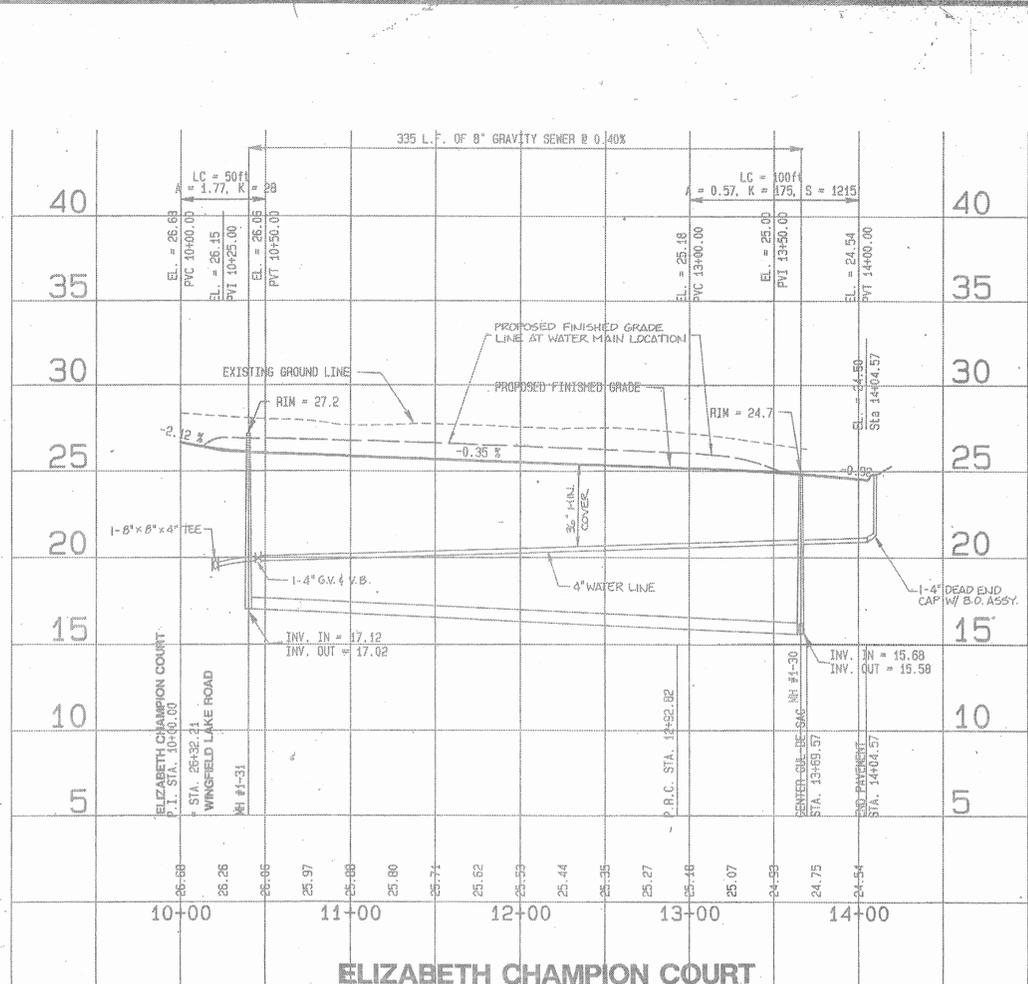
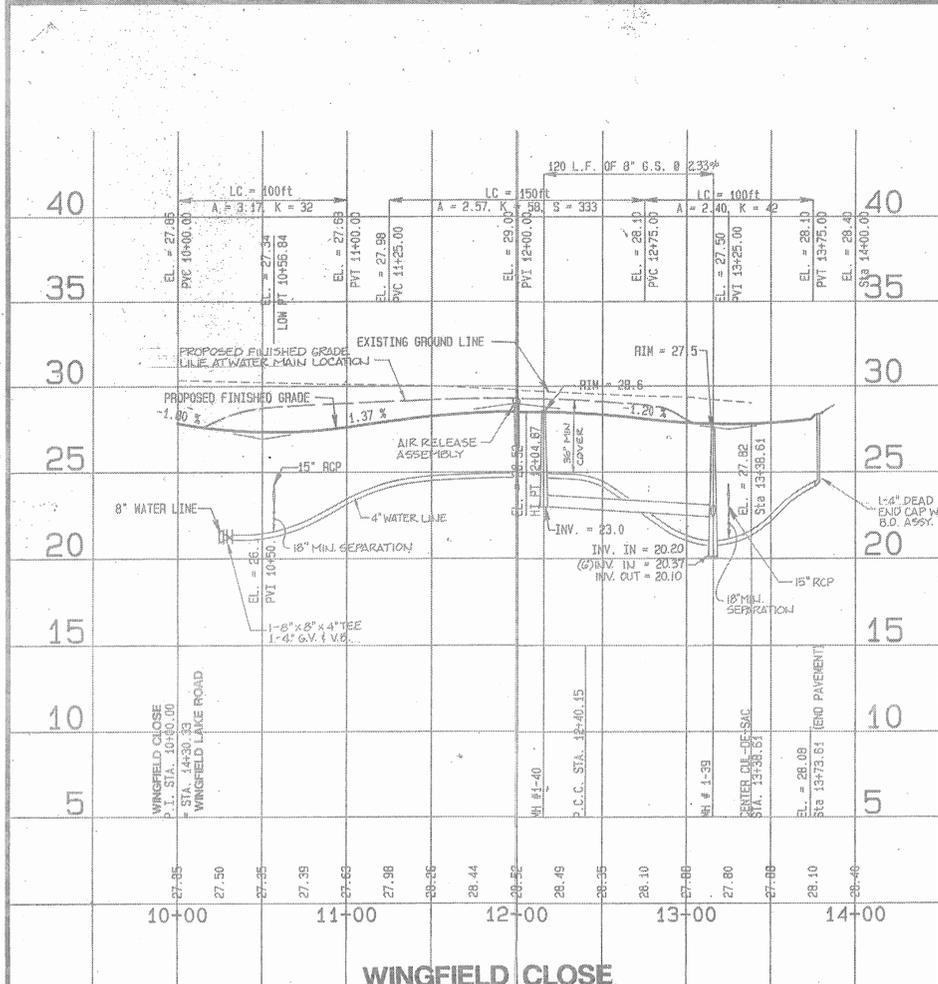
I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT/BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

V. M. B. (SEAL)
 VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

WINGFIELD LAKE
 NORMAL POOL EL. = 17.76
 100-YEAR STORM EL. = 21.2

RECORD DRAWING: 3/20/02

SJT REVIEW SET
 WINGFIELD LAKE EAST
 TIMBER CRIB STRUCTURE
 S-21-93, J.R.031



SCALE IN FEET
 1"=50'
 1"=5'

I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT/BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

V. M. B. (SEAL)
 VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

NO.	DATE	REVISION / COMMENT / NOTE
3	3/20/02	RECORD DRAWING
2	12/19/01	REVISED PER AGENCY REVIEW
1	12/19/01	REVISED PER AGENCY REVIEW

5248 Old Towne Road, Suite 1
 Williamsburg, Virginia 23188
 (804) 253-0040
 Fax (804) 220-8984

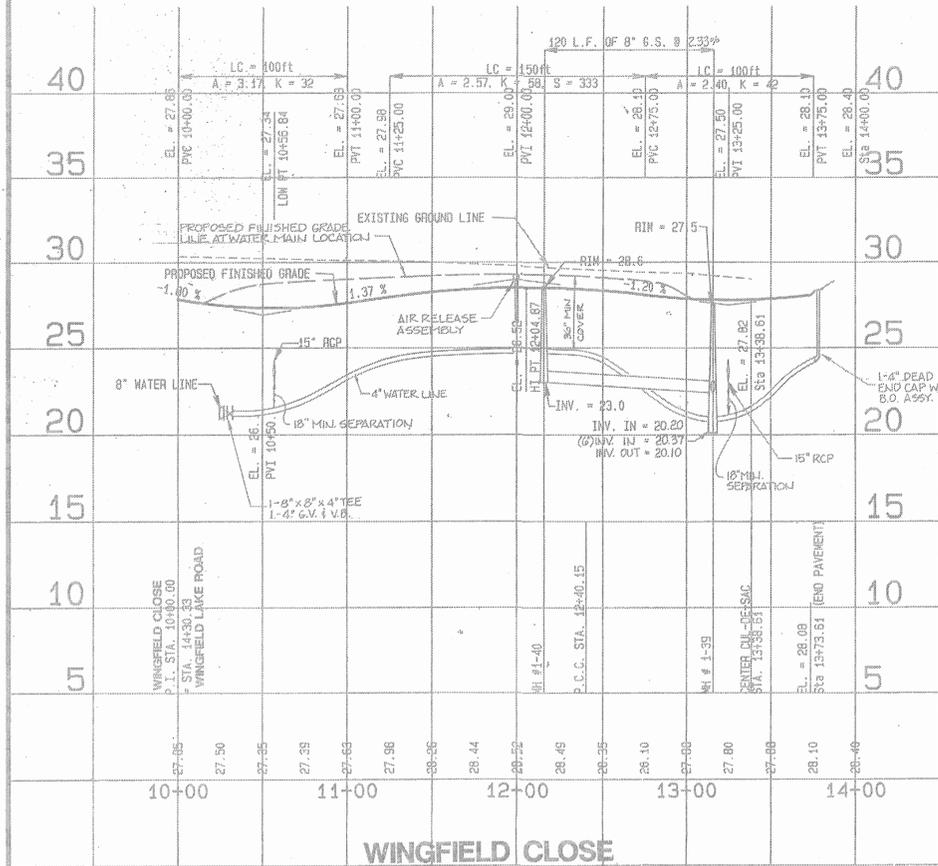


ROAD AND UTILITY PROFILES FOR ROADS "G", "H", "I", AND "J" WINGFIELD LAKE THE GOVERNORS LAND
V. M. B.
 CONSULTING ENGINEER JAMES CITY COUNTY VIRGINIA

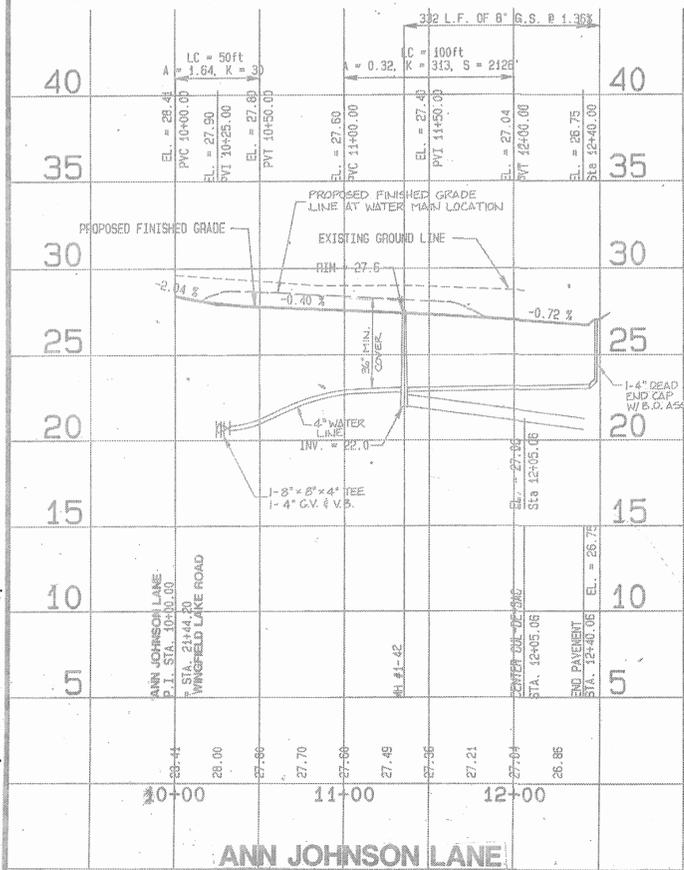
Designed	Drawn
VMB	
Scale	Date
NOTED	MAR. 1993
Project No.	
7173	
Drawing No.	
11	

RECORD DRAWING: 3/20/02

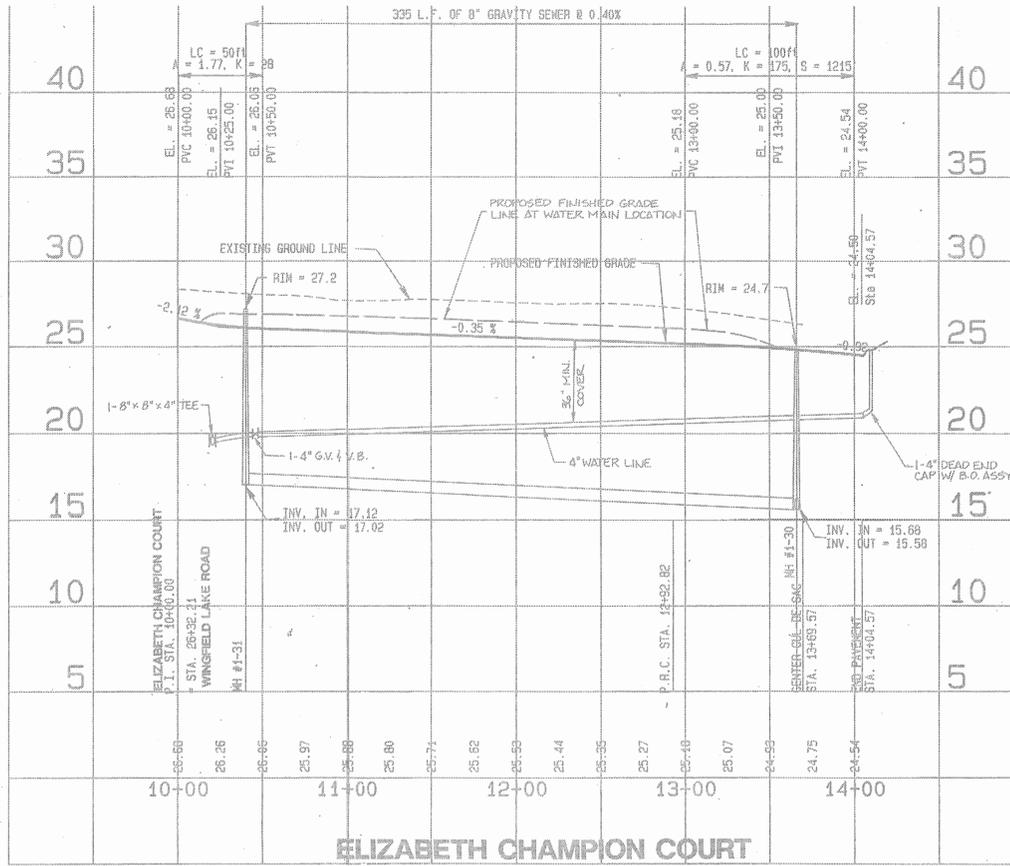
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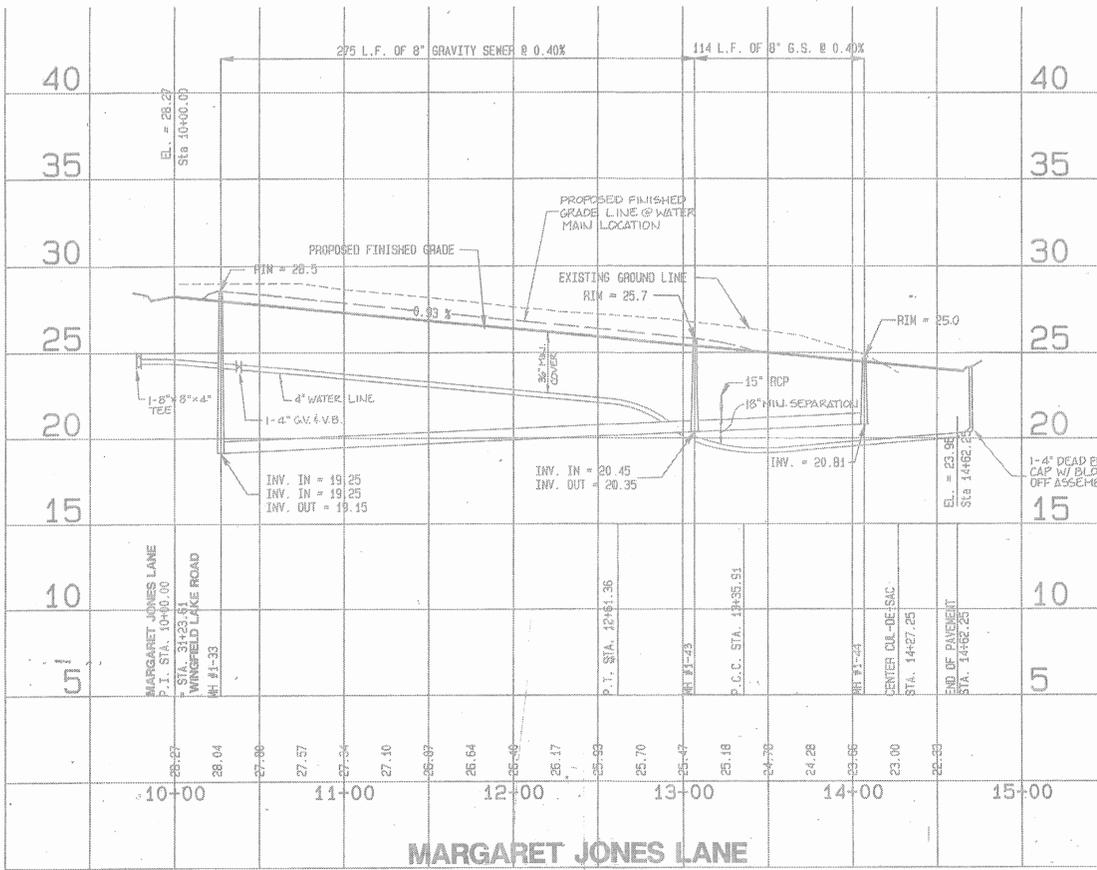
WINGFIELD CLOSE



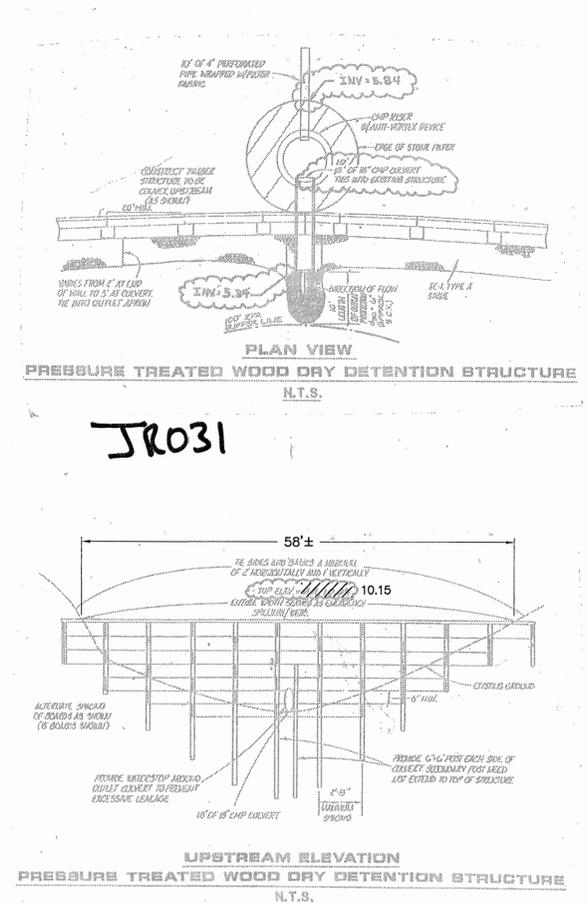
ANN JOHNSON LANE



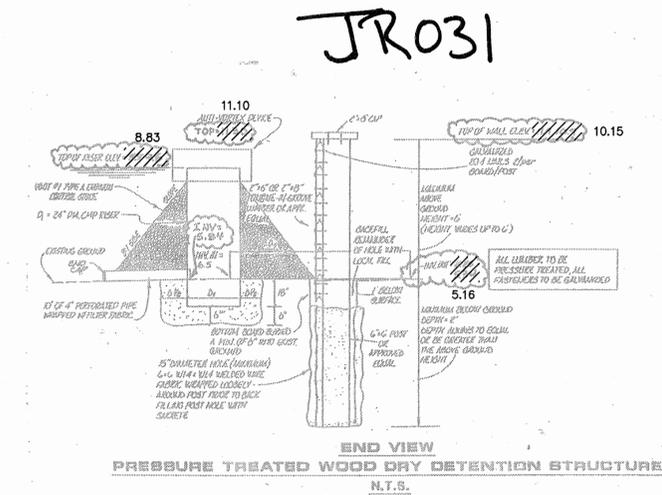
ELIZABETH CHAMPION COURT



MARGARET JONES LANE



UPSTREAM ELEVATION PRESSURE TREATED WOOD DRY DETENTION STRUCTURE N.T.S.



END VIEW PRESSURE TREATED WOOD DRY DETENTION STRUCTURE N.T.S.

1"=50'
1"=5'

SCALE IN FEET

APPROVED
James City County
Environmental Division
By: *[Signature]*
Date: 6-26-03

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.

[Signature] (SEAL)
VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

RECORD DRAWING: 3/20/02

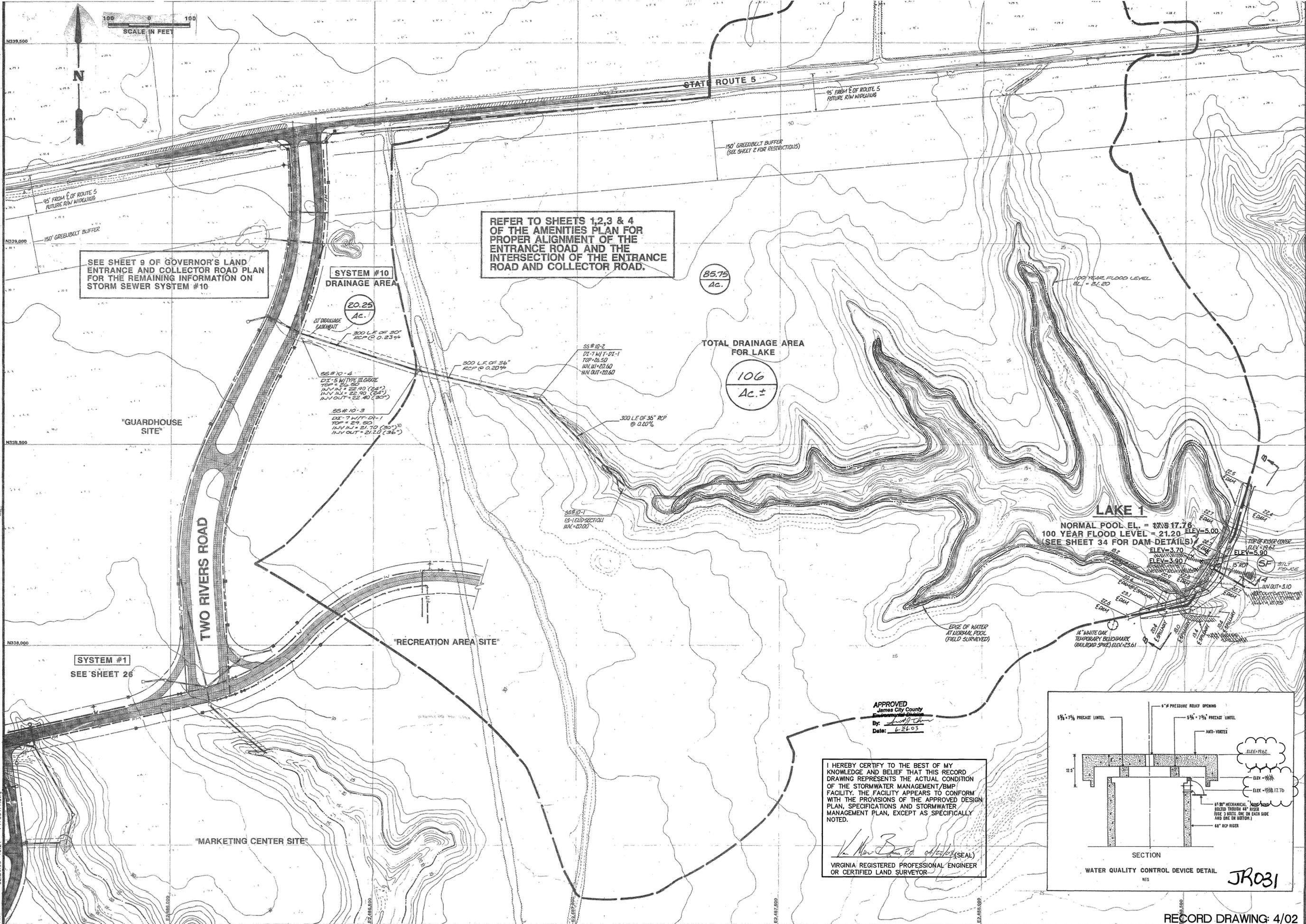
3	3/20/02	RECORD DRAWING	VMB
2	12/18	RECORD DRAWING	VMB
1	7/17/02	REVISION / COMMENT / NOTE	BY

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Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994



ROAD AND UTILITY PROFILES
"ROADS OF THE S. AND T."
WINGFIELD LAKE
GOVERNOR'S LAND
James City County
Virginia

Designed	VMB	Drawn	VMB
Scale	NOTED	Date	MAR. 1993
Project No.	7173	Drawing No.	11



SEE SHEET 9 OF GOVERNOR'S LAND ENTRANCE AND COLLECTOR ROAD PLAN FOR THE REMAINING INFORMATION ON STORM SEWER SYSTEM #10

REFER TO SHEETS 1,2,3 & 4 OF THE AMENITIES PLAN FOR PROPER ALIGNMENT OF THE ENTRANCE ROAD AND THE INTERSECTION OF THE ENTRANCE ROAD AND COLLECTOR ROAD.

SYSTEM #10 DRAINAGE AREA

20.25 Ac.

TOTAL DRAINAGE AREA FOR LAKE

106 Ac.±

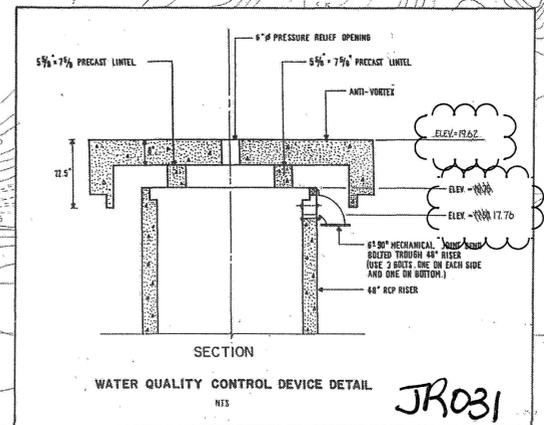
LAKE 1
 NORMAL POOL EL. = 17.76
 100 YEAR FLOOD LEVEL = 21.20
 (SEE SHEET 34 FOR DAM DETAILS)

SYSTEM #1
 SEE SHEET 26

APPROVED
 James City County
 Environmental Division
 By: *[Signature]*
 Date: 6-26-03

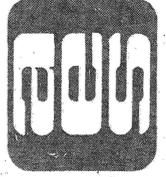
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[Signature]
 VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR



NO.	DATE	REVISION / COMMENT / NOTE	BY
7	3/03	REVISIONS AS PER JAMES CITY COUNTY REVIEW	WMB
6	4/02	RECORD DRAWING	WMB
5	6/01	AS-BUILT - WINGFIELD LAKE	WMB
4	10/00	REVISED PER FINAL COMMENTS	WMB
3	8/01/00	REVISED PER OWNER DEVELOPER	WMB
2	6/00	REVISED PER LCC REVIEW & LDT COMMENTS	WMB
1	5/00	REVISED PER J.C.C. COMMENTS	WMB

AES, a professional corporation
 5248 Old Towne Road, Suite 1
 Williamsburg, Virginia 23185
 804-253-0040
 Engineering, Planning, Surveying

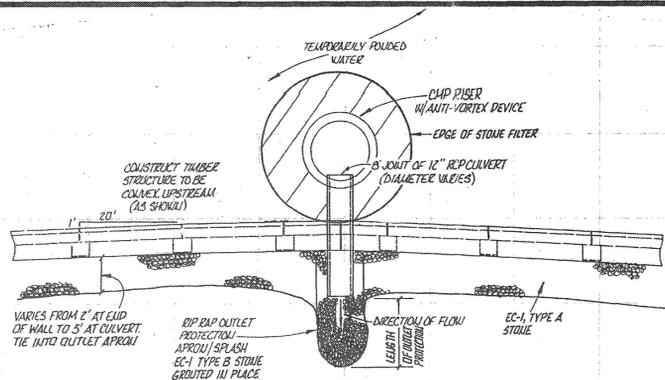


AS-BUILT - WINGFIELD LAKE
 STORMWATER MANAGEMENT PLAN
 LAKE 1
GOVERNOR'S LAND
 PHASE I
 OWNER/DEVELOPER: GOVERNOR'S LAND PARTNERS
 JAMES CITY COUNTY
 POWHATAN DISTRICT

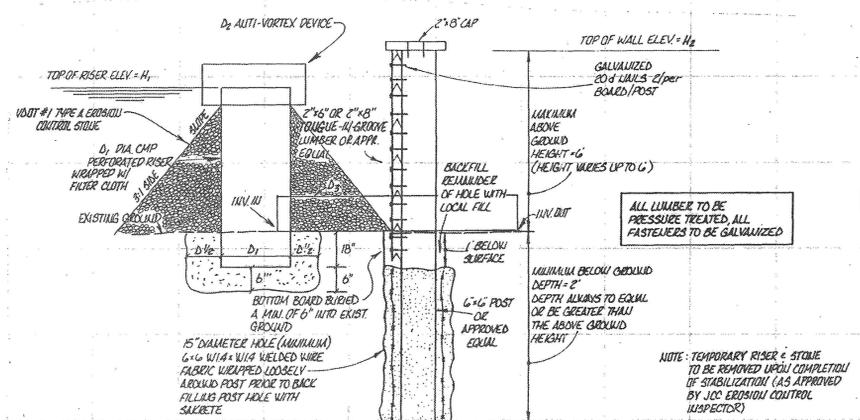
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Project No. 7173	
Drawing No.	

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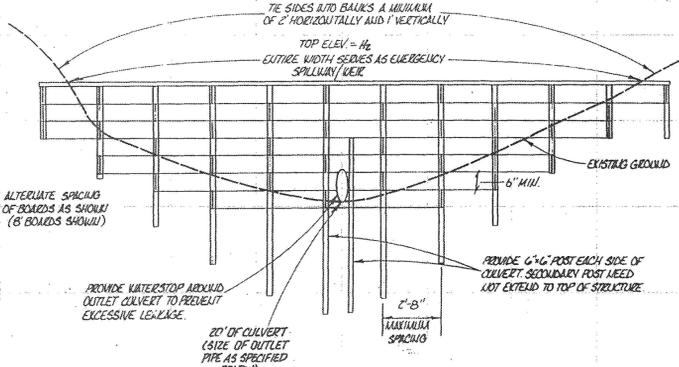
AWT 02.26.03-10.21 717351.r1.dwg



PLAN VIEW
PRESSURE TREATED WOOD DRY DETENTION STRUCTURE
N.T.S.



END VIEW
PRESSURE TREATED WOOD DRY DETENTION STRUCTURE
N.T.S.



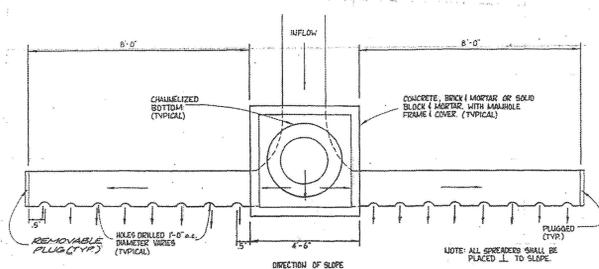
UPSTREAM ELEVATION
PRESSURE TREATED WOOD DRY DETENTION STRUCTURE
N.T.S.

TIMBER DRY DETENTION STRUCTURE DIMENSIONS

TIMBER STRUCTURE	ELEVATION OF RISER H ₁	ELEVATION OF STRUCTURE H ₂	RISER DIA D ₁	ANTI-VORTEX DIA D ₂	OUTLET PIPE DIA D ₃	ELEVATION OF INV. IN	ELEVATION OF INV. OUT
NO. 1	15'	16'	48"	72"	18"	10.5'	10.0
NO. 2	14'	15'	24"	36"	8"	9.0'	8.7
NO. 3	14'	15'	24"	36"	8"	9.0'	8.7
NO. 4	13'	14'	24"	36"	8"	8.0'	7.7

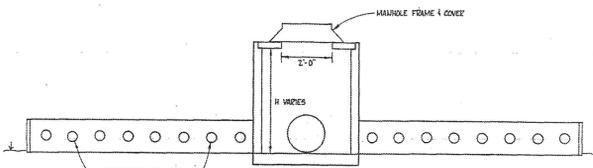
TIMBER DRY DETENTION STRUCTURE OUTLET PROTECTION

TIMBER STRUCTURE	10' WIDE RIFRAP APRON BEHIND WALL	OUTLET PROTECTION
NO. 1	20 CY EC-1 TYPE A	7 CY EC-1 TYPE B LENGTH = 25'
NO. 2	15 CY EC-1 TYPE A	3 CY EC-1 TYPE B LENGTH = 15'
NO. 3	15 CY EC-1 TYPE A	3 CY EC-1 TYPE B LENGTH = 15'
NO. 4	15 CY EC-1 TYPE A	3 CY EC-1 TYPE B LENGTH = 15'

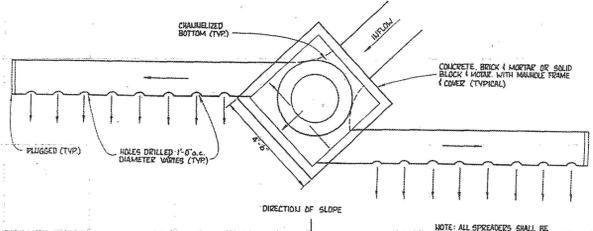


SYSTEM 15 H= 3' DIA. = 5"
SYSTEM 18 H= 2.5' DIA. = 3"

PLAN VIEW

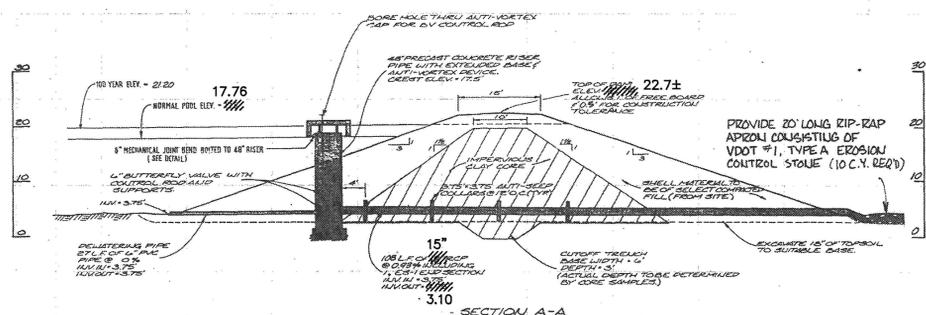


FRONT ELEVATION

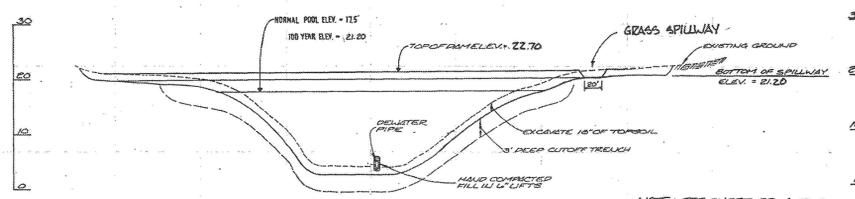


PLAN VIEW WHEN INFLOW PIPE IS SKEWED TO THE SLOPE OF THE LAND

SPREADER DETAILS



SECTION A-A

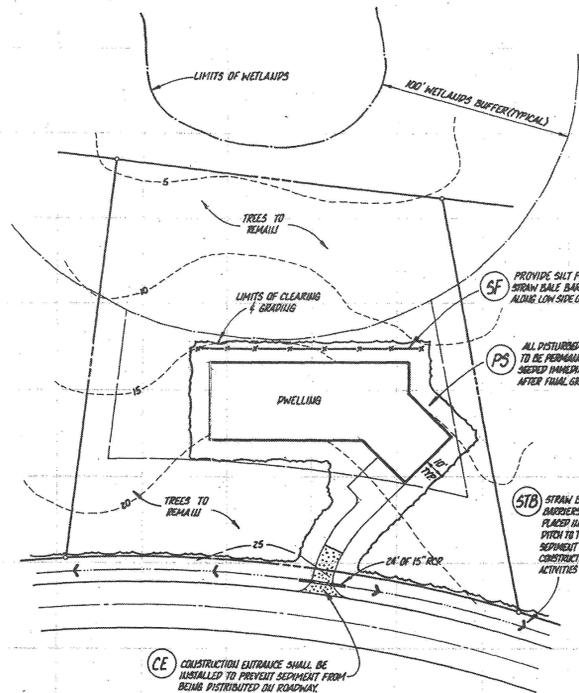


SECTION B-B

LAKE 1-DAM DETAILS
N.T.S.

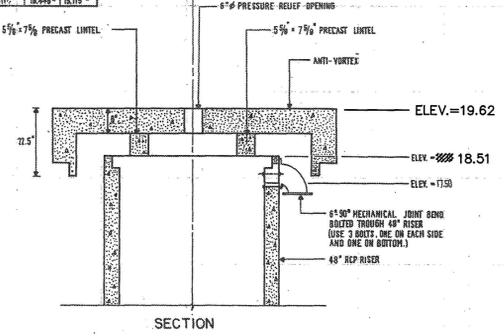
I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT/BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

V. M. Baker, P.E. 04/20/03 (SEAL)
VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

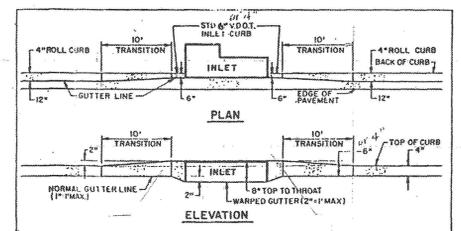


TYPICAL EROSION CONTROL PLAN FOR SITES THAT BORDER WETLANDS
NOT TO SCALE

STANDARD PIPE I.D.	CAP I.D.	PIPE JOINT WEIGHT	CAP WEIGHT
12"	21"	388 #	588 #
14"	23"	528 #	788 #
16"	25"	688 #	1088 #
18"	27"	888 #	1488 #
20"	29"	1128 #	1988 #
22"	31"	1428 #	2688 #
24"	33"	1788 #	3588 #
26"	35"	2228 #	4788 #
28"	37"	2748 #	6288 #
30"	39"	3348 #	8088 #
32"	41"	4028 #	10188 #
34"	43"	4788 #	12588 #
36"	45"	5628 #	15288 #
38"	47"	6548 #	18288 #
40"	49"	7548 #	21588 #
42"	51"	8628 #	25188 #
44"	53"	9788 #	29088 #
46"	55"	11028 #	33288 #
48"	57"	12448 #	37788 #
50"	59"	14048 #	43588 #
52"	61"	15828 #	50688 #
54"	63"	17788 #	59088 #
56"	65"	19928 #	68788 #
58"	67"	22248 #	79888 #
60"	69"	24848 #	92388 #



WATER QUALITY CONTROL DEVICE DETAIL
N.T.S.

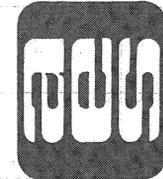


CURB TRANSITION DETAIL FOR 4\"/>

APPROVED
James City County
Environmental Division
By: *[Signature]*
Date: 4-26-03

NO.	DATE	REVISION / COMMENT / NOTE	BY
5	4/19/03	RECORD DRAWING	MB
4	10/20/02	ADD PERMITS	MB
3	8/17/02	REVISED PER COLLEGE PROJECT	MB
2	6/15/02	REVISED PER J.C.C. REVENUE LOT CHANGES	MB
1	5/27/02	REVISED PER J.C.C. CORRECTIVES	MB

AES, a professional corporation
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23185
(804) 253-0040
Engineering, Planning, Surveying



MISCELLANEOUS DETAILS
GOVERNOR'S LAND PHASE I
OWNER/DEVELOPER: GOVERNOR'S LAND PARTNERS
JAMES CITY COUNTY, VIRGINIA
POWhatan DISTRICT

Designed AES	Drawn AES
Scale 1" = 100'	Date FEB. 1990
Project No. 7173	
Drawing No. 34	

Insert as-builts here

Record Drawing/Construction Certification Submittal for a BMP Facility

Date:

April 30 2002

Inspector:

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

Project:

Governors Land

BMP Facility:

Wingfield Lake East Timber Structure

Plan No.

5-21-93

BMP ID Code:

VR031

I have received a transmittal for a Record Drawing and Construction Certification for the above referenced facility on April 1, 2002. Prior to full engineering review of these items and a field inspection, I am first forwarding the items to you to cursory review in case any major field changes were performed that I should be aware of and/or to ensure the record drawing accurately portrays what you saw in the field. Please review the drawing and return to me promptly so I can proceed with the review for certification purposes.

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

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

Scott

AES CONSULTING ENGINEERS

Engineering, Surveying and Planning

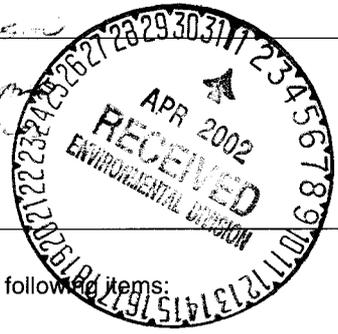
5248 Olde Towne Road, Suite 1
WILLIAMSBURG, VIRGINIA 23188

LETTER OF TRANSMITTAL

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

DATE <i>March 29, 2002</i>	JOB NO. <i>7173</i>
ATTENTION <i>Mrs. Weems</i>	
RE: <i>Governors Land BMP A - B...</i>	

TO *James Lee Carter Environmental*



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

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

COPIES	DATE	NO.	DESCRIPTION
<i>2</i>			<i>Revised Drawings for JB023 GOLF COURSE POND END FAIRWAY # 9</i>
<i>2</i>			<i>Revised Drawings for JB031 WINGFIELD LAKE EAST - TIMBER STRVLT</i>

THESE ARE TRANSMITTED as checked below:

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

REMARKS

COPY TO _____ SIGNED: *V. [Signature]*

If enclosures are not as noted, kindly notify us at once.

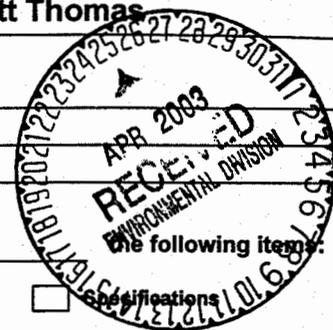
AES CONSULTING ENGINEERS

Engineering, Surveying and Planning
 5248 Olde Towne Road, Suite 1
 Williamsburg, Virginia 23188
 Phone: (757) 253-0040
 Fax: (757) 220-8994

LETTER OF TRANSMITTAL

DATE: 23-Apr-03	JOB NO. 7173-09
ATTENTION: Scott Thomas	
RE : Governor's Land	

TO : James City County
 Environmental Division
 101 Mounts Bay Road
 Williamsburg, VA 23187



WE ARE SENDING YOU: Attached Under separate cover via _____

Shop drawings Prints Plans Samples Specifications

Copy of letter Change order Other Construction Certification

COPIES	DATE	NO.	DESCRIPTION
1	4-23-03		As-Built drawing (Mylar) - Wingfield Lake JR017
1	4-23-03		As-Built drawing (Black line) - Wingfield Lake JR017
1	4-23-03		Memo responding to letter from County - Wingfield Lake JR017
1	4-23-03		As-Built drawing (Mylar) - Cypress Isle JR041
1	4-23-03		As-Built drawing (Black line) - Cypress Isle JR041
1	4-23-03		Memo responding to letter from County - Cypress Isle JR041
1	4-23-03		Routing computations using As-Built information JR041
1	4-23-03		As-Built drawing (Mylar) - Barrett's Point Pond JR042
1	4-23-03		As-Built drawing (Black line) - Barrett's Point Pond JR042
1	4-23-03		Memo responding to letter from County - Barrett's Point Pond JR042
1	4-23-03		As-Built drawing (Mylar) - Wythe-Hamlet Dry Pond JR040
1	4-23-03		As-Built drawing (Black line) - Wythe-Hamlet Dry Pond JR040
1	4-23-03		Memo responding to letter from County - Wythe-Hamlet Dry Pond JR040
1	4-23-03		As-Built drawing (Mylar) - Travis Pond Dry Pond #2
1	4-23-03		As-Built drawing (Black line) - Travis Pond Dry Pond #2
1	4-23-03		Memo responding to letter from County - Travis Pond Dry Pond #2
1	4-23-03		As-Built drawing (Mylar) - Two Rivers Point Timber Structure JR036
1	4-23-03		As-Built drawing (Black line) - Two Rivers Point Timber Structure JR036
1	4-23-03		Memo responding to letter from County - Two Rivers Point Timber JR036
1	4-23-03		As-Built drawing (Mylar) - Wingfield Lake Timber Structure JR031
1	4-23-03		As-Built drawing (Black line) - Wingfield Lake Timber Structure JR031
1	4-23-03		Memo responding to letter from County - Wingfield Lake Timber JR031

THESE ARE TRANSMITTED as checked below:

For Approval Approved as submitted Resubmit _____ copies for approval

For your use Approved as noted Submit _____ copies for distribution

As requested Returned for corrections Return _____ Corrected prints

For review and comment For Signature _____

FOR BIDS DUE _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS:

If you have any questions please contact me. Thank you.

COPIES TO: file

SIGNED: Victoria Bains
 Victoria Bains

HYDRAULIC REPORT FOR

GOVERNOR'S LAND

Job No. 7173

WINGFIELD LAKE SUBDIVISION

SYSTEM 10

prepared by

AES Consulting Engineers
5248 Olde Towne Road, St. 1
Williamsburg, VA. 23185

Revised Date: 3/16/93

STORM SEWER DESIGN / ANALYSIS

Return Period = 10 Yrs
 Rainfall file: JCC

Run Date: 03-17-1993
 File: A:SYSTEM10.ST3

LINE 1 / Q = 34.34 / HT = ^{Elevation 30" RCP} 30 / WID = 30 / N = .013 / L = 131 / JLC = 1.2

OUTFALL-SS10-15 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	20.67	28.22	18.32	7.17	21.47	29.10	-2.5	4.79
UPSTRM	21.39	25.88	19.23	7.63	22.29	20.64	1.12	4.50

Drainage area (ac) =	1.74	Slope of invert (%) =	0.6947
Runoff coefficient =	0.45	Slope energy grade line (%) =	0.6261
Time of conc (min) =	39.13	Critical depth (in) =	23.49
Inlet time (min) =	25.00	Natural ground elev. (ft) =	22.85
Intensity (in/hr) =	3.00	Upstream surcharge (ft) =	0.00
Cumulative C*A =	11.44	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	34.34	Line capacity (cfs) =	34.18

Q catchment (cfs) =	3.03	Inlet length (ft) =	0.00
Q carryover (cfs) =	52.06	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	55.08	Ponding width (ft) =	N/A

LINE 2 / Q = 24.78 / HT = ^{Elevation 30" RCP} 30 / WID = 30 / N = .013 / L = 130 / JLC = 1.2

S10-15 - SS10-1 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	22.47	30.00	19.23	5.05	22.87	0.00	1.12	4.91
UPSTRM	22.95	30.00	20.18	5.05	23.34	0.00	2.42	4.91

Drainage area (ac) =	2.40	Slope of invert (%) =	0.7308
Runoff coefficient =	0.40	Slope energy grade line (%) =	0.3650
Time of conc (min) =	38.41	Critical depth (in) =	19.96
Inlet time (min) =	22.00	Natural ground elev. (ft) =	25.10
Intensity (in/hr) =	3.04	Upstream surcharge (ft) =	0.27
Cumulative C*A =	8.16	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	24.78	Line capacity (cfs) =	35.06

Q catchment (cfs) =	3.96	Inlet length (ft) =	0.00
Q carryover (cfs) =	37.06	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	41.02	Ponding width (ft) =	N/A

LINE 3 / Q = 22.49 / HT = 30 / WID = 30 / N = .013 / L = 323 / JLC = 1.2

SS#10-1-SS#10-2.. / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.42	30.00	20.20	4.58	23.75	0.00	2.39	4.91
UPSTRM	24.39	30.00	21.22	4.58	24.72	0.00	6.19	4.91

Drainage area (ac) = 0.14 ✓
 Runoff coefficient = 0.45
 Time of conc (min) = 36.62
 Inlet time (min) = 8.00
 Intensity (in/hr) = 3.12 ✓
 Cumulative C*A = 7.20 ✓
 Q = CA * I (cfs) = 22.49 ✓

Slope of invert (%) = 0.3158
 Slope energy grade line (%) = 0.3007
 Critical depth (in) = 19.01
 Natural ground elev. (ft) = 29.91
 Upstream surcharge (ft) = 0.67
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 23.05 ✓

Q catchment (cfs) = 0.39
 Q carryover (cfs) = 36.66
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 37.06

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

LINE 4 / Q = 22.37 / HT = 30 / WID = 30 / N = .013 / L = 40 / JLC = 1.2

SS10-2 - SS10-16 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	24.78	30.00	21.22	4.56	25.10	0.00	6.19	4.91
UPSTRM	24.90	30.00	21.28	4.56	25.22	0.00	2.97	4.91

Drainage area (ac) = 0.40
 Runoff coefficient = 0.80
 Time of conc (min) = 36.39
 Inlet time (min) = 5.00
 Intensity (in/hr) = 3.13
 Cumulative C*A = 7.14
 Q = CA * I (cfs) = 22.37

Slope of invert (%) = 0.1500
 Slope energy grade line (%) = 0.2976
 Critical depth (in) = 18.96
 Natural ground elev. (ft) = 26.76
 Upstream surcharge (ft) = 1.12
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 15.88

Q catchment (cfs) = 2.27
 Q carryover (cfs) = 34.39
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 36.66

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

Not LARGE ENOUGH

LINE 5 / Q = 21.44 / HT = 30 / WID = 30 / N = .013 / L = 40 / JLC = 1.2

SS10-16 - SS10-17 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	25.29	30.00	21.28	4.37	25.58	0.00	2.97	4.91
UPSTRM	25.40	30.00	21.34	4.37	25.69	0.00	2.92	4.91

Drainage area (ac) = 1.60
 Runoff coefficient = 0.30
 Time of conc (min) = 36.17
 Inlet time (min) = 23.00
 Intensity (in/hr) = 3.15
 Cumulative C*A = 6.82
 Q = CA * I (cfs) = 21.44

Slope of invert (%) = 0.1500
 Slope energy grade line (%) = 0.2734
 Critical depth (in) = 18.57
 Natural ground elev. (ft) = 26.76
 Upstream surcharge (ft) = 1.56
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 15.88

Q catchment (cfs) = 1.94
 Q carryover (cfs) = 32.46
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 34.39

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

Not Large Enough

21.34
 2.5
 23.84
 1.56
 226
 Top = 26.76

EXISTING 30" RCP
 LINE 6 / Q = 12.77 / HT = 30 / WID = 30 / N = .013 / 2SL⁴⁰ = 226 / JLC = 1.2

SS10-17 - SS10-3. / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	25.75	30.00	21.34	2.60	25.86	0.00	2.92	4.91
UPSTRM	25.97	30.00	21.67	2.60	26.08	0.00	4.87	4.91

Drainage area (ac) = 0.69
 Runoff coefficient = 0.70
 Time of conc (min) = 34.92
 Inlet time (min) = 8.00
 Intensity (in/hr) = 3.21
 Cumulative C*A = 3.98
 Q = CA * I (cfs) = 12.77

Slope of invert (%) = 0.1460
 Slope energy grade line (%) = 0.0970
 Critical depth (in) = 14.33
 Natural ground elev. (ft) = 29.04
 Upstream surcharge (ft) = 1.80
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 15.67

Q catchment (cfs) = 3.02
 Q carryover (cfs) = 18.63
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 21.65

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

LINE 7 / Q = 7.44 / HT = 18 / WID = 18 / N = .013 / L = 220 / JLC = 1.2

SS10-3 - SS10-4.. / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	26.10	18.00	22.89	4.21	26.37	0.00	4.65	1.77
UPSTRM	27.20	18.00	24.52	4.21	27.48	0.00	4.01	1.77

Drainage area (ac) =	0.65	Slope of invert (%) =	0.7409
Runoff coefficient =	0.75	Slope energy grade line (%) =	0.5021
Time of conc (min) =	33.69	Critical depth (in) =	12.49
Inlet time (min) =	5.00	Natural ground elev. (ft) =	30.03
Intensity (in/hr) =	3.28	Upstream surcharge (ft) =	1.18
Cumulative C*A =	2.27	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	7.44	Line capacity (cfs) =	9.04

Q catchment (cfs) =	3.46	Inlet length (ft) =	0.00
Q carryover (cfs) =	10.25	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	13.71	Ponding width (ft) =	N/A

LINE 8 / Q = 4.16 / HT = 18 / WID = 18 / N = .013 / L = 250 / JLC = 1.2

SS10-4 - SS10-5 / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	27.53	18.00	24.52	2.35	27.62	0.00	4.01	1.77
UPSTRM	27.93	18.00	25.14	2.35	28.01	0.00	5.36	1.77

Drainage area (ac) =	0.00	Slope of invert (%) =	0.2480
Runoff coefficient =	0.00	Slope energy grade line (%) =	0.1570
Time of conc (min) =	32.31	Critical depth (in) =	9.34
Inlet time (min) =	0.00	Natural ground elev. (ft) =	32.00
Intensity (in/hr) =	3.36	Upstream surcharge (ft) =	1.29
Cumulative C*A =	1.24	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.16	Line capacity (cfs) =	5.23

Q catchment (cfs) =	0.00	Inlet length (ft) =	0.00
Q carryover (cfs) =	7.10	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	7.10	Ponding width (ft) =	N/A

LINE 9 / Q = 3.70 / HT = 15 / WID = 15 / N = .013 / L = 20 / JLC = 1.2

SS10-5 - SS10-6.. / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	28.03	15.00	25.39	3.01	28.17	0.00	5.36	1.23
UPSTRM	28.10	15.00	25.50	3.01	28.24	0.00	3.85	1.23

Drainage area (ac) =	0.35	Slope of invert (%) =	0.5500
Runoff coefficient =	0.60	Slope energy grade line (%) =	0.3282
Time of conc (min) =	8.33	Critical depth (in) =	9.23
Inlet time (min) =	5.00	Natural ground elev. (ft) =	30.60
Intensity (in/hr) =	6.16	Upstream surcharge (ft) =	1.35
Cumulative C*A =	0.60	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.70	Line capacity (cfs) =	4.79

Q catchment (cfs) =	1.49	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.77	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.25	Ponding width (ft) =	N/A

LINE 10 / Q = 2.57 / HT = 15 / WID = 15 / N = .013 / L = 300 / JLC = 1.2

SS10-6 - SS10-7 / DNLN = 9

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	28.26	15.00	25.50	2.09	28.33	0.00	3.85	1.23
UPSTRM	28.74	15.00	26.10	2.09	28.81	0.00	3.44	1.23

Drainage area (ac) =	0.28	Slope of invert (%) =	0.2000
Runoff coefficient =	0.65	Slope energy grade line (%) =	0.1585
Time of conc (min) =	6.67	Critical depth (in) =	7.70
Inlet time (min) =	5.00	Natural ground elev. (ft) =	30.80
Intensity (in/hr) =	6.59	Upstream surcharge (ft) =	1.39
Cumulative C*A =	0.39	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.57	Line capacity (cfs) =	2.89

Q catchment (cfs) =	1.29	Inlet length (ft) =	0.00
Q carryover (cfs) =	1.47	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.77	Ponding width (ft) =	N/A

LINE 11 / Q = 1.47 / HT = 15 / WID = 15 / N = .013 / L = 300 / JLC = .8

SS10-7 - SS10-8.. / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	28.82	15.00	26.10	1.20	28.84	0.00	3.44	1.23
UPSTRM	29.00	15.00	26.70	1.20	29.02	0.00	2.5	1.23

Drainage area (ac) =	0.32	Slope of invert (%) =	0.2000
Runoff coefficient =	0.65	Slope energy grade line (%) =	0.0582
Time of conc (min) =	5.00	Critical depth (in) =	5.83
Inlet time (min) =	5.00	Natural ground elev. (ft) =	30.45
Intensity (in/hr) =	7.09	Upstream surcharge (ft) =	1.05
Cumulative C*A =	0.21	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.47	Line capacity (cfs) =	2.89

Q catchment (cfs) =	1.47	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.47	Ponding width (ft) =	N/A

LINE 12 / Q = 4.70 / HT = 18 / WID = 18 / N = .013 / L = 80 / JLC = 1.2

SS10-3 - SS10-9.. / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	26.10	18.00	23.21	2.66	26.21	0.00	4.33	1.77
UPSTRM	26.21	17.99	24.71	2.66	26.32	0.67	3	1.77

Drainage area (ac) =	1.41	Slope of invert (%) =	1.8750
Runoff coefficient =	0.30	Slope energy grade line (%) =	0.1385
Time of conc (min) =	25.28	Critical depth (in) =	9.93
Inlet time (min) =	20.00	Natural ground elev. (ft) =	29.21
Intensity (in/hr) =	3.84	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.22	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.70	Line capacity (cfs) =	14.38

Q catchment (cfs) =	1.83	Inlet length (ft) =	0.00
Q carryover (cfs) =	3.09	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.93	Ponding width (ft) =	N/A

LINE 13 / Q = 3.11 / HT = 15 / WID = 15 / N = .013 / L = 80 / JLC = .9

SS10-4 - SS10-10. / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	27.53	15.00	24.77	2.54	27.63	0.00	4.01	1.23
UPSTRM	27.72	15.00	26.08	2.54	27.82	0.00	2.75	1.23

Drainage area (ac) = 0.85
Runoff coefficient = 0.35
Time of conc (min) = 10.33
Inlet time (min) = 10.00
Intensity (in/hr) = 5.73
Cumulative C*A = 0.54
Q = CA * I (cfs) = 3.11

Slope of invert (%) = 1.6375
Slope energy grade line (%) = 0.2326
Critical depth (in) = 8.47
Natural ground elev. (ft) = 30.08
Upstream surcharge (ft) = 0.39
Additional Q (cfs) = 0.00
Line capacity (cfs) = 8.26

Q catchment (cfs) = 1.72
Q carryover (cfs) = 1.43
Q captured (cfs) = 0.00
Q bypassed (cfs) = 3.15

Inlet length (ft) = 0.00
Gutter slope (ft/ft) = 0.0000
Cross slope (ft/ft) = 0.0000
Ponding width (ft) = N/A

LINE 14 / Q = 1.43 / HT = 15 / WID = 15 / N = .013 / L = 60 / JLC = .8

SS10-10 - SS10-11 / DNLN = 13

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	27.81	15.00	26.08	1.16	27.83	0.00	2.75	1.23
UPSTRM	28.11	5.73	27.50	3.31	28.28	14.58	-.25	0.43

Drainage area (ac) = 0.82
Runoff coefficient = 0.30
Time of conc (min) = 10.00
Inlet time (min) = 10.00
Intensity (in/hr) = 5.80
Cumulative C*A = 0.25
Q = CA * I (cfs) = 1.43

Slope of invert (%) = 2.3667
Slope energy grade line (%) = 0.7543
Critical depth (in) = 5.73
Natural ground elev. (ft) = 28.50
Upstream surcharge (ft) = 0.00
Additional Q (cfs) = 0.00
Line capacity (cfs) = 9.93

Q catchment (cfs) = 1.43
Q carryover (cfs) = 0.00
Q captured (cfs) = 0.00
Q bypassed (cfs) = 1.43

Inlet length (ft) = 0.00
Gutter slope (ft/ft) = 0.0000
Cross slope (ft/ft) = 0.0000
Ponding width (ft) = N/A

LINE 15 / Q = 2.17 / HT = 15 / WID = 15 / N = .013 / L = 115 / JLC = 1.2

SS10-5 - SS10-12 / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	28.03	15.00	25.39	1.77	28.08	0.00	5.36	1.23
UPSTRM	28.16	15.00	25.68	1.77	28.21	0.00	3.21	1.23

Drainage area (ac) = 0.26 Slope of invert (%) = 0.2522
 Runoff coefficient = 0.65 Slope energy grade line (%) = 0.1129
 Time of conc (min) = 31.67 Critical depth (in) = 7.07
 Inlet time (min) = 5.00 Natural ground elev. (ft) = 30.15
 Intensity (in/hr) = 3.40 Upstream surcharge (ft) = 1.23
 Cumulative C*A = 0.64 Additional Q (cfs) = 0.00
 Q = CA * I (cfs) = 2.17 Line capacity (cfs) = 3.24

Q catchment (cfs) = 1.20 Inlet length (ft) = 0.00
 Q carryover (cfs) = 1.65 Gutter slope (ft/ft) = 0.0000
 Q captured (cfs) = 0.00 Cross slope (ft/ft) = 0.0000
 Q bypassed (cfs) = 2.84 Ponding width (ft) = N/A

LINE 16 / Q = 1.65 / HT = 15 / WID = 15 / N = .013 / L = 300 / JLC = .8

SS10-11 - SS10-12 / DNLN = 15

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	28.22	15.00	25.68	1.34	28.25	0.00	3.21	1.23
UPSTRM	28.43	15.00	26.43	1.34	28.46	0.00	2.11	1.23

Drainage area (ac) = 1.88 Slope of invert (%) = 0.2500
 Runoff coefficient = 0.25 Slope energy grade line (%) = 0.0724
 Time of conc (min) = 30.00 Critical depth (in) = 6.16
 Inlet time (min) = 30.00 Natural ground elev. (ft) = 29.80
 Intensity (in/hr) = 3.50 Upstream surcharge (ft) = 0.75
 Cumulative C*A = 0.47 Additional Q (cfs) = 0.00
 Q = CA * I (cfs) = 1.65 Line capacity (cfs) = 3.23

Q catchment (cfs) = 1.65 Inlet length (ft) = 0.00
 Q carryover (cfs) = 0.00 Gutter slope (ft/ft) = 0.0000
 Q captured (cfs) = 0.00 Cross slope (ft/ft) = 0.0000
 Q bypassed (cfs) = 1.65 Ponding width (ft) = N/A

LINE 17 / Q = 3.09 / HT = 15 / WID = 15 / N = .013 / L = 50 / JLC = .9

SS10-9 - SS10-14. / DNLN = 12

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	26.34	15.00	24.96	2.52	26.44	0.00	3	1.23
UPSTRM	28.37	8.45	27.40	4.35	28.66	14.88	1.75	0.71

Drainage area (ac) =	2.67	Slope of invert (%) =	4.8800
Runoff coefficient =	0.30	Slope energy grade line (%) =	4.4425
Time of conc (min) =	25.00	Critical depth (in) =	8.45
Inlet time (min) =	25.00	Natural ground elev. (ft) =	30.40
Intensity (in/hr) =	3.86	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.80	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	3.09	Line capacity (cfs) =	14.27

Q catchment (cfs) =	3.09	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.09	Ponding width (ft) =	N/A

LINE 18 / Q = 6.79 / HT = 24 / WID = 24 / N = .013 / L = 60 / JLC = 1.2

SS10-17 - SS10-18 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	25.75	24.00	21.50	2.16	25.83	0.00	3.26	3.14
UPSTRM	25.81	24.00	21.68	2.16	25.88	0.00	3.14	3.14

Drainage area (ac) =	1.50	Slope of invert (%) =	0.3000
Runoff coefficient =	0.30	Slope energy grade line (%) =	0.0902
Time of conc (min) =	25.86	Critical depth (in) =	11.07
Inlet time (min) =	22.00	Natural ground elev. (ft) =	26.83
Intensity (in/hr) =	3.80	Upstream surcharge (ft) =	2.13
Cumulative C*A =	1.79	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	6.79	Line capacity (cfs) =	12.39

Q catchment (cfs) =	1.86	Inlet length (ft) =	0.00
Q carryover (cfs) =	6.75	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	8.61	Ponding width (ft) =	N/A

LINE 19 / Q = 5.18 / HT = 24 / WID = 24 / N = .013 / L = 155 / JLC = 1.2

SS10-18 - SS10-19 / DNLN = 18

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	25.89	24.00	21.78	1.65	25.94	0.00	3.04	3.14
UPSTRM	25.98	24.00	22.25	1.65	26.02	0.00	3.29	3.14

Drainage area (ac) = 2.70 ✓
 Runoff coefficient = 0.30
 Time of conc (min) = 25.00
 Inlet time (min) = 25.00
 Intensity (in/hr) = 3.86
 Cumulative C*A = 1.34 ✓
 Q = CA * I (cfs) = 5.18 ✓

Slope of invert (%) = 0.3032
 Slope energy grade line (%) = 0.0524
 Critical depth (in) = 9.67
 Natural ground elev. (ft) = 27.54
 Upstream surcharge (ft) = 1.73
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 12.45 ✓

Q catchment (cfs) = 3.13
 Q carryover (cfs) = 3.62
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 6.75

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

NEW LINE
 LINE 20 / Q = 3.43 / HT = 18 / WID = 18 / N = .013 / L = 77 / JLC = 1.2

SS10-19 - SS10-22 / DNLN = 19

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	26.03	18.00	22.35	1.94	26.08	0.00	3.69	1.77
UPSTRM	26.11	18.00	22.87	1.94	26.17	0.00	2.96	1.77

Drainage area (ac) = 0.12 ✓
 Runoff coefficient = 0.80
 Time of conc (min) = 7.14
 Inlet time (min) = 5.00
 Intensity (in/hr) = 6.46
 Cumulative C*A = 0.53 ✓
 Q = CA * I (cfs) = 3.43

Slope of invert (%) = 0.6753
 Slope energy grade line (%) = 0.1064
 Critical depth (in) = 8.47
 Natural ground elev. (ft) = 27.34
 Upstream surcharge (ft) = 1.74
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 8.63

Q catchment (cfs) = 0.68
 Q carryover (cfs) = 2.94
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 3.62

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

NEW LINE

LINE 21 / Q = 2.82 / HT = 15 / WID = 15 / N = .013 / L = 25 / JLC = 1.2

SS10-22 - SS10-21 / DNLN = 20

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	26.18	15.00	22.97	2.30	26.26	0.00	3.12	1.23
UPSTRM	26.23	15.00	23.07	2.30	26.31	0.00	3.02	1.23

Drainage area (ac) = 0.42 ✓ Slope of invert (%) = 0.4000
 Runoff coefficient = 0.55 ✓ Slope energy grade line (%) = 0.1909
 Time of conc (min) = 7.00 Critical depth (in) = 8.06
 Inlet time (min) = 7.00 Natural ground elev. (ft) = 27.34
 Intensity (in/hr) = 6.50 Upstream surcharge (ft) = 1.91
 Cumulative C*A = 0.43 ✓ Additional Q (cfs) = 0.00
 Q = CA * I (cfs) = 2.82 ✓ Line capacity (cfs) = 4.08 ✓

Q catchment (cfs) = 1.50 Inlet length (ft) = 0.00
 Q carryover (cfs) = 1.44 Gutter slope (ft/ft) = 0.0000
 Q captured (cfs) = 0.00 Cross slope (ft/ft) = 0.0000
 Q bypassed (cfs) = 2.94 Ponding width (ft) = N/A

NEW LINE

LINE 22 / Q = 1.44 / HT = 15 / WID = 15 / N = .013 / L = 44 / JLC = 1.2

SS1-21 - SS1-20 / DNLN = 21

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	26.32	15.00	23.17	1.17	26.35	0.00	2.92	1.23
UPSTRM	26.37	15.00	23.96	1.17	26.39	0.00	2.95	1.23

Drainage area (ac) = 0.29 ✓ Slope of invert (%) = 1.7955
 Runoff coefficient = 0.70 ✓ Slope energy grade line (%) = 0.1080
 Time of conc (min) = 5.00 Critical depth (in) = 5.76
 Inlet time (min) = 5.00 Natural ground elev. (ft) = 28.16
 Intensity (in/hr) = 7.09 Upstream surcharge (ft) = 1.16
 Cumulative C*A = 0.20 ✓ Additional Q (cfs) = 0.00
 Q = CA * I (cfs) = 1.44 ✓ Line capacity (cfs) = 8.65 ✓

Q catchment (cfs) = 1.44 Inlet length (ft) = 0.00
 Q carryover (cfs) = 0.00 Gutter slope (ft/ft) = 0.0000
 Q captured (cfs) = 0.00 Cross slope (ft/ft) = 0.0000
 Q bypassed (cfs) = 1.44 Ponding width (ft) = N/A

NEW LINE
 LINE 23 / Q = 2.79 / HT = 15 / WID = 15 / N = .013 / L = 222 / JLC = 1.2

SS10-15 - SS10-23 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	22.47	15.00	20.00	2.27	22.55	0.00	1.6	1.23
UPSTRM	23.46	8.01	22.79	4.18	23.73	14.96	3.29	0.67

Drainage area (ac) = 0.15 ✓
 Runoff coefficient = 0.80 ✓
 Time of conc (min) = 23.39
 Inlet time (min) = 5.00
 Intensity (in/hr) = 4.00
 Cumulative C*A = 0.70 ✓
 Q = CA * I (cfs) = 2.79 ✓

Slope of invert (%) = 1.2568
 Slope energy grade line (%) = 0.5307
 Critical depth (in) = 8.01
 Natural ground elev. (ft) = 27.34
 Upstream surcharge (ft) = 0.00
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 7.24 ✓

Q catchment (cfs) = 0.85
 Q carryover (cfs) = 2.33
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 3.18

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

NEW LINE
 LINE 24 / Q = 2.33 / HT = 15 / WID = 15 / N = .013 / L = 70 / JLC = 1.2

SS10-23 - SS10-24 / DNLN = 23

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.78	10.71	22.89	2.48	23.88	12.68	3.2	0.94
UPSTRM	24.08	8.74	23.17	3.13	24.23	14.79	2.92	0.74

Drainage area (ac) = 1.31 ✓
 Runoff coefficient = 0.44
 Time of conc (min) = 23.00
 Inlet time (min) = 23.00
 Intensity (in/hr) = 4.03
 Cumulative C*A = 0.58 ✓
 Q = CA * I (cfs) = 2.33 ✓

Slope of invert (%) = 0.4000
 Slope energy grade line (%) = 0.5078
 Critical depth (in) = 7.32
 Natural ground elev. (ft) = 27.34
 Upstream surcharge (ft) = 0.00
 Additional Q (cfs) = 0.00
 Line capacity (cfs) = 4.08 ✓

Q catchment (cfs) = 2.33
 Q carryover (cfs) = 0.00
 Q captured (cfs) = 0.00
 Q bypassed (cfs) = 2.33

Inlet length (ft) = 0.00
 Gutter slope (ft/ft) = 0.0000
 Cross slope (ft/ft) = 0.0000
 Ponding width (ft) = N/A

LINE 25 / Q = 6.73 / HT = 18 / WID = 18 / N = .013 / L = 260 / JLC = 1.2

SS10-15 - SS10-25 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	22.47	18.00	20.00	3.81	22.70	0.00	1.35	1.77
UPSTRM	23.54	18.00	21.55	3.81	23.76	0.00	3.9	1.77

Drainage area (ac) =	1.08 ✓	Slope of invert (%) =	0.5962
Runoff coefficient =	0.46 ✓	Slope energy grade line (%) =	0.4112
Time of conc (min) =	26.46	Critical depth (in) =	11.88
Inlet time (min) =	19.00	Natural ground elev. (ft) =	26.96
Intensity (in/hr) =	3.75	Upstream surcharge (ft) =	0.49
Cumulative C*A =	1.80 ✓	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	6.73 ✓	Line capacity (cfs) =	8.11 ✓

Q catchment (cfs) =	2.20	Inlet length (ft) =	0.00
Q carryover (cfs) =	5.66	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	7.86	Ponding width (ft) =	N/A

LINE 26 / Q = 4.98 / HT = 18 / WID = 18 / N = .013 / L = 190 / JLC = 1.2

SS10-25 - SS10-26 / DNLN = 25

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.81	18.00	21.65	2.82	23.93	0.00	3.8	1.77
UPSTRM	24.24	18.00	22.41	2.82	24.36	0.00	3.87	1.77

Drainage area (ac) =	0.24 ✓	Slope of invert (%) =	0.4000
Runoff coefficient =	0.70 ✓	Slope energy grade line (%) =	0.2247
Time of conc (min) =	25.40	Critical depth (in) =	10.22
Inlet time (min) =	5.00	Natural ground elev. (ft) =	27.78
Intensity (in/hr) =	3.83	Upstream surcharge (ft) =	0.33
Cumulative C*A =	1.30 ✓	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.98 ✓	Line capacity (cfs) =	6.64 ✓

Q catchment (cfs) =	1.19	Inlet length (ft) =	0.00
Q carryover (cfs) =	4.47	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	5.66	Ponding width (ft) =	N/A

NEW LINE
 LINE 27 / Q = 4.37 / HT = 18 / WID = 18 / N = .013 / L = 72 / JLC = 1.2

SS10-26 - SS10-27 / DNLN = 26

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	24.38	18.00	22.51	2.47	24.48	0.00	3.77	1.77
UPSTRM	24.51	18.00	22.80	2.47	24.60	0.00	3.87	1.77

Drainage area (ac) =	1.88 ✓	Slope of invert (%) =	0.4028
Runoff coefficient =	0.30 ✓	Slope energy grade line (%) =	0.1732
Time of conc (min) =	25.00	Critical depth (in) =	9.57
Inlet time (min) =	25.00	Natural ground elev. (ft) =	28.17
Intensity (in/hr) =	3.86	Upstream surcharge (ft) =	0.21
Cumulative C*A =	1.13 ✓	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.37 ✓	Line capacity (cfs) =	6.66 ✓

Q catchment (cfs) =	2.18	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.29	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.47	Ponding width (ft) =	N/A

NEW LINE
 LINE 28 / Q = 2.29 / HT = 15 / WID = 15 / N = .013 / L = 165 / JLC = 1.2

SS10-27 - SS10-28 / DNLN = 27

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	24.62	15.00	22.90	1.86	24.68	0.00	4.02	1.23
UPSTRM	24.89	14.76	23.59	1.87	24.94	3.75	2.92	1.22

Drainage area (ac) =	1.89 ✓	Slope of invert (%) =	0.4182
Runoff coefficient =	0.30 ✓	Slope energy grade line (%) =	0.1589
Time of conc (min) =	23.00	Critical depth (in) =	7.26
Inlet time (min) =	23.00	Natural ground elev. (ft) =	27.76
Intensity (in/hr) =	4.03	Upstream surcharge (ft) =	0.05
Cumulative C*A =	0.57 ✓	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.29 ✓	Line capacity (cfs) =	4.18 ✓

Q catchment (cfs) =	2.29	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.29	Ponding width (ft) =	N/A

NEW LINE
LINE 29 / Q = 2.20 / HT = 15 / WID = 15 / N = .013 / L = 95 / JLC = 1.2

SS10-17 - SS10-29 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	25.75	15.00	22.00	1.79	25.80	0.00	3.51	1.23
UPSTRM	25.92	15.00	22.71	1.79	25.97	0.00	2.92	1.23

Drainage area (ac) =	1.90 ✓	Slope of invert (%) =	0.7474
Runoff coefficient =	0.30	Slope energy grade line (%) =	0.1163
Time of conc (min) =	25.00	Critical depth (in) =	7.13
Inlet time (min) =	25.00	Natural ground elev. (ft) =	26.88
Intensity (in/hr) =	3.86	Upstream surcharge (ft) =	1.96
Cumulative C*A =	0.57	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.20 ✓	Line capacity (cfs) =	5.58

Q catchment (cfs) =	2.20	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.20	Ponding width (ft) =	N/A

HYDRAULIC REPORT FOR

GOVERNOR'S LAND

WINGFIELD LAKE SUBDIVISION

STORM SEWER SYSTEM #45

prepared by:

AES Consulting Engineers

Williamsburg, VA 23188

Date: 03/16/93

Return Period = 10 Yrs
 Rainfall file: JCC

Run Date: 03-16-1993
 File:

LINE 1 / Q = 4.51 / HT = 15 / WID = 15 / N = .013 / L = 65 / JLC = 1.2

SS45-1 - SS45-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	19.90	15.00	15.50	3.67	20.11	0.00	-1.25	1.23
UPSTRM	20.22	15.00	17.90	3.67	20.43	0.00	3.05	1.23

Drainage area (ac) =	0.42	Slope of invert (%) =	3.6923
Runoff coefficient =	0.70	Slope energy grade line (%) =	0.4872
Time of conc (min) =	8.88	Critical depth (in) =	10.19
Inlet time (min) =	8.00	Natural ground elev. (ft) =	22.21
Intensity (in/hr) =	6.04	Upstream surcharge (ft) =	1.07
Cumulative C*A =	0.75	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.51	Line capacity (cfs) =	12.41

Q catchment (cfs) =	1.84	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.96	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.80	Ponding width (ft) =	N/A

LINE 2 / Q = 2.80 / HT = 15 / WID = 15 / N = .013 / L = 123 / JLC = 1.2

SS45-2 - SS45-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	20.47	15.00	18.00	2.29	20.55	0.00	2.95	1.23
UPSTRM	21.67	8.04	21.00	4.19	21.94	14.96	2.78	0.67

Drainage area (ac) =	0.20	Slope of invert (%) =	2.4390
Runoff coefficient =	0.80	Slope energy grade line (%) =	1.1325
Time of conc (min) =	8.20	Critical depth (in) =	8.04
Inlet time (min) =	5.00	Natural ground elev. (ft) =	25.03
Intensity (in/hr) =	6.20	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.45	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.80	Line capacity (cfs) =	10.08

Q catchment (cfs) =	1.13	Inlet length (ft) =	0.00
Q carryover (cfs) =	1.83	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.96	Ponding width (ft) =	N/A

LINE 3 / Q = 1.83 / HT = 15 / WID = 15 / N = .013 / L = 36 / JLC = 1.2

~~SS45-3~~ - SS45-4 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	22.00	10.76	21.10	1.94	22.05	12.70	2.68	0.94
UPSTRM	22.16	7.46	21.37	3.00	22.30	15.00	2.75	0.61

Drainage area (ac) =	0.45	Slope of invert (%) =	0.7500
Runoff coefficient =	0.65	Slope energy grade line (%) =	0.2118
Time of conc (min) =	8.00	Critical depth (in) =	6.49
Inlet time (min) =	8.00	Natural ground elev. (ft) =	25.37
Intensity (in/hr) =	6.24	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.29	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.83	Line capacity (cfs) =	5.59

Q catchment (cfs) =	1.83	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.83	Fonding width (ft) =	N/A

HYDRAULIC REPORT FOR

GOVERNOR'S LAND

WINGFIELD LAKE SUBDIVISION

STROM SEWER SYSTEM #46

prepared by:

AES Consulting Engineers

Williamsburg, VA 23188

Date: 3/16/93

Return Period = 10 Yrs
 Rainfall file: JCC

Run Date: 03-16-1993
 File:

LINE 1 / Q = 2.86 / HT = 15 / WID = 15 / N = .013 / L = 22 / JLC = 1.2

SS46-1 - SS46-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.50	12.00	22.50	2.72	23.61	13.42	N/A	1.05
UPSTRM	23.58	8.12	22.90	4.22	23.85	14.95	2.98	0.68

Drainage area (ac) =	0.23	Slope of invert (%) =	1.8182
Runoff coefficient =	0.80	Slope energy grade line (%) =	1.0828
Time of conc (min) =	10.17	Critical depth (in) =	8.12
Inlet time (min) =	5.00	Natural ground elev. (ft) =	27.14
Intensity (in/hr) =	5.76	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.50	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.86	Line capacity (cfs) =	8.71

Q catchment (cfs) =	1.30	Inlet length (ft) =	0.00
Q carryover (cfs) =	1.81	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	3.12	Ponding width (ft) =	N/A

LINE 2 / Q = 1.81 / HT = 15 / WID = 15 / N = .013 / L = 31 / JLC = 1.2

SS46-2 - SS46-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.91	10.90	23.00	1.90	23.96	12.79	2.88	0.96
UPSTRM	24.04	8.33	23.22	2.59	24.14	14.91	2.67	0.70

Drainage area (ac) =	0.71	Slope of invert (%) =	0.7097
Runoff coefficient =	0.44	Slope energy grade line (%) =	0.1748
Time of conc (min) =	10.00	Critical depth (in) =	6.46
Inlet time (min) =	10.00	Natural ground elev. (ft) =	27.14
Intensity (in/hr) =	5.80	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.31	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.81	Line capacity (cfs) =	5.44

Q catchment (cfs) =	1.81	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.81	Ponding width (ft) =	N/A

HYDRAULIC REPORT FOR

GOVERNOR'S LAND

WINGFIELD LAKE SUBDIVISION

STORM SEWER SYSTEM #47

prepared by:

AES Consulting Engineers

Williamsburg, VA 23188

Date: 03/16/93

Return Period = 10 Yrs
 Rainfall file: JCC

Run Date: 03-17-1993
 File: A:SYSTEM47.ST3

LINE 1 / Q = 8.10 / HT = 18 / WID = 18 / N = .013 / L = 85 / JLC = 1.2

SS47-1 - SS47-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	19.90	18.00	15.25	4.58	20.23	0.00	-1.25	1.77
UPSTRM	20.41	18.00	17.90	4.58	20.73	0.00	3.76	1.77

Drainage area (ac) =	0.75	Slope of invert (%) =	3.1176
Runoff coefficient =	0.62	Slope energy grade line (%) =	0.5944
Time of conc (min) =	10.09	Critical depth (in) =	13.03
Inlet time (min) =	9.00	Natural ground elev. (ft) =	23.16
Intensity (in/hr) =	5.78	Upstream surcharge (ft) =	1.01
Cumulative C*A =	1.40	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	8.10	Line capacity (cfs) =	18.54

Q catchment (cfs) =	2.80	Inlet length (ft) =	0.00
Q carryover (cfs) =	6.04	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	8.84	Ponding width (ft) =	N/A

LINE 2 / Q = 5.55 / HT = 18 / WID = 18 / N = .013 / L = 130 / JLC = 1.2

SS47-2 - SS47-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	20.80	18.00	18.00	3.14	20.95	0.00	3.65	1.77
UPSTRM	21.16	18.00	18.55	3.14	21.31	0.00	4.68	1.77

Drainage area (ac) =	0.29	Slope of invert (%) =	0.4231
Runoff coefficient =	0.80	Slope energy grade line (%) =	0.2795
Time of conc (min) =	9.37	Critical depth (in) =	10.79
Inlet time (min) =	5.00	Natural ground elev. (ft) =	24.73
Intensity (in/hr) =	5.93	Upstream surcharge (ft) =	1.11
Cumulative C*A =	0.94	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	5.55	Line capacity (cfs) =	6.83

Q catchment (cfs) =	1.65	Inlet length (ft) =	0.00
Q carryover (cfs) =	4.40	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	6.04	Ponding width (ft) =	N/A

LINE 3 / Q = 4.20 / HT = 18 / WID = 18 / N = .013 / L = 32 / JLC = 1.2

SS47-3 - SS47-4 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	21.34	18.00	18.65	2.38	21.43	0.00	4.57	1.77
UPSTRM	21.39	18.00	18.78	2.38	21.48	0.00	4.57	1.77

Drainage area (ac) =	0.55	Slope of invert (%) =	0.4063
Runoff coefficient =	0.55	Slope energy grade line (%) =	0.1602
Time of conc (min) =	9.19	Critical depth (in) =	9.39
Inlet time (min) =	8.00	Natural ground elev. (ft) =	24.86
Intensity (in/hr) =	5.97	Upstream surcharge (ft) =	1.11
Cumulative C*A =	0.70	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.20	Line capacity (cfs) =	6.69

Q catchment (cfs) =	1.89	Inlet length (ft) =	0.00
Q carryover (cfs) =	2.51	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.40	Ponding width (ft) =	N/A

LINE 4 / Q = 2.51 / HT = 15 / WID = 15 / N = .013 / L = 214 / JLC = 1.2

SS47-4 - SS47-5 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	21.50	15.00	18.88	2.04	21.57	0.00	4.73	1.23
UPSTRM	21.90	15.00	19.75	2.04	21.97	0.00	5.36	1.23

Drainage area (ac) =	0.73	Slope of invert (%) =	0.4065
Runoff coefficient =	0.55	Slope energy grade line (%) =	0.1508
Time of conc (min) =	8.00	Critical depth (in) =	7.60
Inlet time (min) =	8.00	Natural ground elev. (ft) =	26.36
Intensity (in/hr) =	6.24	Upstream surcharge (ft) =	0.90
Cumulative C*A =	0.40	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.51	Line capacity (cfs) =	4.12

Q catchment (cfs) =	2.51	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.51	Ponding width (ft) =	N/A

HYDRAULIC REPORT FOR

GOVERNOR'S LAND

WINGFIELD LAKE SUBDIVISION

STORM SEWER SYSYTEM #48 ✓

prepared by:

AES Consulting Engineers

Williamsburg, VA 23188

Date: 3/17/93

Return Period = 10 Yrs
 Rainfall file: JCC

Run Date: 03-18-1993
 File:

LINE 1 / Q = 11.55 / HT = 24 / WID = 24 / N = .013 / L = 200 / JLC = 1.2

SS48-1 - SS48-2 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	19.90	24.00	14.50	3.68	20.11	0.00	-2	3.14
UPSTRM	20.42	24.00	17.90	3.68	20.63	0.00	4.8	3.14

Drainage area (ac) =	1.20	Slope of invert (%) =	1.7000
Runoff coefficient =	0.43	Slope energy grade line (%) =	0.2607
Time of conc (min) =	22.32	Critical depth (in) =	14.44
Inlet time (min) =	10.00	Natural ground elev. (ft) =	24.71
Intensity (in/hr) =	4.10	Upstream surcharge (ft) =	0.52
Cumulative C*A =	2.82	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	11.55	Line capacity (cfs) =	29.49

Q catchment (cfs) =	2.99	Inlet length (ft) =	0.00
Q carryover (cfs) =	11.59	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	14.58	Ponding width (ft) =	N/A

LINE 2 / Q = 9.55 / HT = 24 / WID = 24 / N = .013 / L = 100 / JLC = 1.2

SS48-2 - SS48-3 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	20.67	24.00	18.00	3.04	20.82	0.00	4.7	3.14
UPSTRM	20.85	24.00	18.40	3.04	21.00	0.00	4.78	3.14

Drainage area (ac) =	0.13	Slope of invert (%) =	0.4000
Runoff coefficient =	0.80	Slope energy grade line (%) =	0.1785
Time of conc (min) =	21.77	Critical depth (in) =	13.13
Inlet time (min) =	5.00	Natural ground elev. (ft) =	25.18
Intensity (in/hr) =	4.15	Upstream surcharge (ft) =	0.45
Cumulative C*A =	2.30	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	9.55	Line capacity (cfs) =	14.30

Q catchment (cfs) =	0.74	Inlet length (ft) =	0.00
Q carryover (cfs) =	10.85	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	N/A	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	11.59	Ponding width (ft) =	N/A

LINE 3 / Q = 1.29 / HT = 15 / WID = 15 / N = .013 / L = 25 / JLC = 1.2

SS48-3 - SS48-4 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	21.02	15.00	18.50	1.05	21.04	0.00	5.43	1.23
UPSTRM	21.16	5.53	20.51	3.15	21.31	14.47	3.42	0.41

Drainage area (ac) = 0.43 ✓ Slope of invert (%) = 8.0400
 Runoff coefficient = 0.50 Slope energy grade line (%) = 1.0705
 Time of conc (min) = 9.00 Critical depth (in) = 5.46
 Inlet time (min) = 9.00 Natural ground elev. (ft) = 25.18
 Intensity (in/hr) = 6.01 Upstream surcharge (ft) = 0.00
 Cumulative C*A = 0.22 ✓ Additional Q (cfs) = 0.00
 Q = CA * I (cfs) = 1.29 Line capacity (cfs) = 18.31

Q catchment (cfs) = 1.29 Inlet length (ft) = 0.00
 Q carryover (cfs) = 0.00 Gutter slope (ft/ft) = 0.0000
 Q captured (cfs) = 0.00 Cross slope (ft/ft) = 0.0000
 Q bypassed (cfs) = 1.29 Ponding width (ft) = N/A

LINE 4 / Q = 8.47 / HT = 24 / WID = 24 / N = .013 / L = 223 / JLC = 1.2

SS48-3 - SS48-5 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	21.02	24.00	18.50	2.70	21.14	0.00	4.68	3.14
UPSTRM	21.32	23.01	19.40	2.74	21.43	9.57	4.56	3.10

Drainage area (ac) = 0.10 Slope of invert (%) = 0.4036
 Runoff coefficient = 0.80 Slope energy grade line (%) = 0.1328
 Time of conc (min) = 20.53 Critical depth (in) = 12.37
 Inlet time (min) = 0.00 Natural ground elev. (ft) = 25.97
 Intensity (in/hr) = 4.27 Upstream surcharge (ft) = 0.00
 Cumulative C*A = 1.98 ✓ Additional Q (cfs) = 0.00
 Q = CA * I (cfs) = 8.47 ✓ Line capacity (cfs) = 14.37 ✓

Q catchment (cfs) = 0.00 Inlet length (ft) = 0.00
 Q carryover (cfs) = 9.56 Gutter slope (ft/ft) = 0.0000
 Q captured (cfs) = 0.00 Cross slope (ft/ft) = 0.0000
 Q bypassed (cfs) = 9.56 Ponding width (ft) = N/A

LINE 5 / Q = 1.39 / HT = 15 / WID = 15 / N = .013 / L = 25 / JLC = 1.2

SS48-5 - SS48-6 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	21.46	15.00	19.50	1.13	21.48	0.00	5.21	1.23
UPSTRM	21.97	5.66	21.30	3.28	22.14	14.54	3.42	0.42

Drainage area (ac) =	0.33	Slope of invert (%) =	7.2000
Runoff coefficient =	0.62	Slope energy grade line (%) =	2.6466
Time of conc (min) =	6.00	Critical depth (in) =	5.66
Inlet time (min) =	6.00	Natural ground elev. (ft) =	25.97
Intensity (in/hr) =	6.78	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.20	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.39	Line capacity (cfs) =	17.33
Q catchment (cfs) =	1.39	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.39	Ponding width (ft) =	N/A

LINE 6 / Q = 7.35 / HT = 18 / WID = 18 / N = .013 / L = 95 / JLC = 1.2

SS48-5 - SS48-7 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	21.46	18.00	19.50	4.16	21.73	0.00	4.96	1.77
UPSTRM	22.19	12.41	21.16	5.66	22.69	16.65	3.89	1.30

Drainage area (ac) =	2.50	Slope of invert (%) =	1.7474
Runoff coefficient =	0.30	Slope energy grade line (%) =	1.0166
Time of conc (min) =	20.00	Critical depth (in) =	12.41
Inlet time (min) =	20.00	Natural ground elev. (ft) =	26.56
Intensity (in/hr) =	4.33	Upstream surcharge (ft) =	0.00
Cumulative C*A =	1.70	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	7.35	Line capacity (cfs) =	13.88
Q catchment (cfs) =	3.25	Inlet length (ft) =	0.00
Q carryover (cfs) =	4.93	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	8.17	Ponding width (ft) =	N/A

LINE 7 / Q = 4.17 / HT = 18 / WID = 18 / N = .013 / L = 105 / JLC = 1.2

SS48-7 - SS48-8 / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	22.79	18.00	21.26	2.36	22.88	0.00	3.79	1.77
UPSTRM	22.93	14.29	21.74	2.77	23.05	14.56	3.7	1.50

Drainage area (ac) =	0.98 ✓	Slope of invert (%) =	0.4571
Runoff coefficient =	0.30	Slope energy grade line (%) =	0.1651
Time of conc (min) =	19.39	Critical depth (in) =	9.35
Inlet time (min) =	15.00	Natural ground elev. (ft) =	26.94
Intensity (in/hr) =	4.39	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.95 ✓	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	4.17 ✓	Line capacity (cfs) =	7.10 ✓

Q catchment (cfs) =	1.45	Inlet length (ft) =	0.00
Q carryover (cfs) =	3.48	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	4.93	Ponding width (ft) =	N/A

LINE 8 / Q = 1.13 / HT = 15 / WID = 15 / N = .013 / L = 31 / JLC = 1.2

SS48-8 - SS48-9 / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.07	14.81	21.84	0.93	23.09	14.90	3.85	1.22
UPSTRM	23.11	9.62	22.27	1.36	23.14	14.39	3.42	0.83

Drainage area (ac) =	0.20 ✓	Slope of invert (%) =	1.3871
Runoff coefficient =	0.80	Slope energy grade line (%) =	0.1538
Time of conc (min) =	5.00	Critical depth (in) =	5.11
Inlet time (min) =	5.00	Natural ground elev. (ft) =	26.94
Intensity (in/hr) =	7.09	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.14 ✓	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.13 ✓	Line capacity (cfs) =	7.61

Q catchment (cfs) =	1.13	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.13	Ponding width (ft) =	N/A

LINE 9 / Q = 2.22 / HT = 15 / WID = 15 / N = .013 / L = 150 / JLC = 1.2

SS48-8 - SS48-10 / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.07	14.81	21.84	1.81	23.13	14.90	3.85	1.22
UPSTRM	23.25	9.74	22.44	2.63	23.36	14.31	3.85	0.84

Drainage area (ac) =	0.77	Slope of invert (%) =	0.4000
Runoff coefficient =	0.30	Slope energy grade line (%) =	0.1562
Time of conc (min) =	18.56	Critical depth (in) =	7.15
Inlet time (min) =	15.00	Natural ground elev. (ft) =	27.54
Intensity (in/hr) =	4.49	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.50	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	2.22	Line capacity (cfs) =	4.08

Q catchment (cfs) =	1.14	Inlet length (ft) =	0.00
Q carryover (cfs) =	1.20	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	4.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	2.34	Ponding width (ft) =	N/A

LINE 10 / Q = 1.20 / HT = 15 / WID = 15 / N = .013 / L = 100 / JLC = 1.2

SS48-10 - SS48-11 / DNLN = 9

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	23.38	10.09	22.54	1.37	23.41	12.30	3.75	0.88
UPSTRM	23.58	6.36	22.94	2.43	23.67	14.82	3.75	0.49

Drainage area (ac) =	0.88	Slope of invert (%) =	0.4000
Runoff coefficient =	0.30	Slope energy grade line (%) =	0.1511
Time of conc (min) =	18.00	Critical depth (in) =	5.26
Inlet time (min) =	18.00	Natural ground elev. (ft) =	27.94
Intensity (in/hr) =	4.55	Upstream surcharge (ft) =	0.00
Cumulative C*A =	0.26	Additional Q (cfs) =	0.00
Q = CA * I (cfs) =	1.20	Line capacity (cfs) =	4.08

Q catchment (cfs) =	1.20	Inlet length (ft) =	0.00
Q carryover (cfs) =	0.00	Gutter slope (ft/ft) =	0.0000
Q captured (cfs) =	0.00	Cross slope (ft/ft) =	0.0000
Q bypassed (cfs) =	1.20	Ponding width (ft) =	N/A

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE WINGFIELD Close
ROAD "Q"

PROJ GOVERNOR'S LAND
WINGFIELD LAKE SUBDIVISION

DATE 3/13/93

SAG OR GRADE	SS#	INLET			STATION	DRAINAGE AREA (AC)	C	CA	W CA	I IN/HR	Q INCR (CFS)	Q CARRY- OVER (CFS)	Q _T GUTTER FLOW	S GUTTER SLOPE (FT/FT)	SX CROSS SLOPE (FT/FT)	T (SPREAD)	W (FT)	W/T	Sw (FT/FT)	Sw/Sx	Eo (#10)	a	Sw=a/(12W)	Se (FT/FT) = Sx + SwEo	L1 (FT) 15 P EFFEC LENGTH FT L/LT	d (FT)	E (#16)	h (FT)	Q: INTERC- EPTED CFS d/h	Qb CARRY- OVER CFS	T SPREAD @ SAG FT	SHEET OF REMARK
		NUMBER	TYPE	LENGTH (FT)																												
SAG	10-21	21	3C	6	10+57 RT	0.1	0.8	0.08	0.08	3.5	0.28	0.05	0.33	0.0015	0.0208	5.2	1.5	FLOW APPROACHING FROM STA 10+00 RT										T _{max} = 6.5				
		21	3C	6	10+57 RT	0.32	0.47	0.15	0.15	3.5	0.53	-	0.53	0.0015	0.0208	6.5	1.5	FLOW APPROACHING FROM STA 12+00 RT										T _{max} = 6.5				
		21	3C	6	10+57 RT	0.42	0.55	0.23	0.23	3.5	0.81	0.05	0.86											8.7	0.13	0.29	0.45		6.3	T _{max} = 6.5		
SAG	10-22	22	3A	2.5	10+57 LT	0.05	0.8	0.04	0.04	3.5	0.14		0.14	0.0015	0.0208	2.5	1.5	FLOW APPROACHING FROM STA 10+00 LF														
		22	3A	2.5	10+57 LT	0.07	0.8	0.06	0.06	3.5	0.21		0.21	0.0015	0.0208	3.4	1.5	FLOW APPROACHING FROM STA 12+00 LF														
		22	3A	2.5	10+57 LT	0.12	0.8	0.1	0.1	3.5	0.35		0.35											5.2	0.1	0.29	0.34		4.8	T _{max} = 6.5		
SAG	10-24	24	3C	9	13+25 RT	0.24	0.5	0.12	0.12	3.5	0.42	-	0.42	0.002	0.0208	6.2	1.5	FLOW APPROACHING FROM STA 12+00 RT										IN CUL-DE-SAC				
		24	3C	9	13+25 RT	1.07	0.42	0.45	0.45	3.5	1.0		1.0	0.002	0.0208	10.0	1.5	FLOW APPROACHING FROM STA 13+53 RT										IN CUL-DE-SAC				
		24	3C	9	13+25 RT	1.31	0.44	0.58	0.58	3.5	2.0		2.0											10.7	0.18	0.29	0.62		3.6	IN CUL-DE-SAC		
SAG	10-23	23	3A	2.5	13+25 LT	0.1	0.8	0.08	0.08	3.5	0.28	-	0.28	0.002	0.0208	4.1	1.5	FLOW APPROACHING FROM STA 12+00 LT										IN CUL-DE-SAC				
		23	3A	2.5	13+25 LT	0.1	0.8	0.08	0.08	3.5	0.28	-	0.28	0.002	0.0208	4.1	1.5	FLOW APPROACHING FROM STA 13+53 LT										IN CUL-DE-SAC				
		23	3A	2.5	13+25 LT	0.15	0.8	0.12	0.12	3.5	0.42	-	0.42											5.2	0.1	0.29	0.34		4.8	IN CUL-DE-SAC		

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE WINGFIELD LAKE ROAD "U" Rd.

PROJ Gouverneur's Land WINGFIELD LAKE SUBDIVISION

DATE 3/13/93

SAG OR GRADE	SS#	INLET			STATION	DRAINAGE AREA (AC)	C	CA	Σ CA	I IN/HR	Q INCR (CFS)	Q CARRY-OVER (CFS)	Q _T GUTTER FLOW	S GUTTER SLOPE (FT/FT)	SX CROSS SLOPE (FT/FT)	T (SPREAD)	W (FT)	W/T	SW (FT/FT)	SW/SX	Eo (#10)	a	SW=a/(12W)	Se (FT/FT) = Sx + SwEo	L _T (FT) 15 P EFFEC LENGTH FT	L/LT	d (FT)	E (#16)	h (FT)	Q: INTERCEPTED CFS	d/h	Q _b CARRY-OVER CFS	T SPREAD @ SAG FT	SHEET OF	REMARK
		NUMBER	TYPE	LENGTH (FT)																															
GRADE	10-19	19	3B	14	14+50 LT	2.7	0.3	0.81	0.81	3.5	2.8	-	2.8	0.0116	0.0208	9	1.5	0.17	0.0833	4	0.5	2"	0.11	0.076	14	1	1	2.7	0					T _{max} = 10.0	
GRADE	10-20	20	3B	6	13+86 RT	0.29	0.7	0.2	0.2	3.5	0.7	-	0.7	0.0116	0.0208	4.1	1.5	0.37	0.0833	4	0.86	2"	0.11	0.115	6.5	0.92		0.65	0.05					T _{max} = 10.0	
GRADE	10-18	18	3B	8	16+00 LT	1.5	0.3	0.45	0.45	3.5	1.6	-	1.6	0.0045	0.0208	9.2	1.5	0.16	0.0833	4	0.47	2"	0.11	0.073	8.7	0.92		1.5	0.1					T _{max} = 10.0	
SAG	10-17	17	3C	8	16+65 LT	0.5	0.3	0.15	0.15	3.5	0.53	0.1	0.63	0.0015	0.0208	7.2	1.5	FLOW APPROACHING FROM STA. 14+00 LT										T _{max} = 10							
		17	3C	8	16+65 LT	1.1	0.3	0.33	0.33	3.5	1.2	-	1.2	0.0015	0.0208	10	1.5	FLOW APPROACHING FROM STA. 17+50 LT										T _{max} = 10							
		17	3C	8	16+65 LT	1.6	0.3	0.48	0.48	3.5	1.7		1.7				1.5							10.7	0.17	0.29	0.59			8.2				T _{max} = 10	
SAG	10-16	16	3A	2.5	16+65 RT	0.13	0.8	0.1	0.1	3.5	0.35	-	0.35	0.0015	0.0208	5.4	1.5	FLOW APPROACHING FROM STA. 14+00 RT																	
		16	3A	2.5	16+65 RT	0.27	0.8	0.22	0.22	3.5	0.76		0.76	0.0015	0.0208	8	1.5	FLOW APPROACHING FROM STA. 18+00 RT																	
		16	3A	2.5	16+65 RT	0.40	0.8	0.32	0.32	3.5	1.12		1.12				1.5							5.2	0.2	0.29	0.69			9.6				T _{max} = 10.0	
GRADE	10-29	29	3B	10	17+50 LT	1.9	0.3	0.57	0.57	3.5	2.0	-	2.0	0.0036	0.0208	10	1.5	0.15	0.0833	4	0.44	2"	0.11	0.069	10	1	1	2	0					T _{max} = 10.0	
GRADE	10-28	28	3B	10	20+00 LT	1.89	0.3	0.57	0.57	3.5	2.0	-	2.0	0.0036	0.0208	10	1.5	0.15	0.0833	4	0.44	2"	0.11	0.069	10	1	1	2	0					T _{max} = 10	
GRADE	10-27	27	3B	10	21+15 LT	1.88	0.3	0.56	0.56	3.5	2.0	-	2.0	0.0036	0.0208	10	1.5	0.15	0.0833	4	0.44	2"	0.11	0.069	10	1	1	2	0					T _{max} = 10	
SAG	46-2	2	3C	6	33+25 RT	0.1	0.8	0.08	0.08	3.5	0.28		0.28	0.001	0.0208	5.2	1.5	FLOW APPROACHING FROM STA. 32+00 RT										T _{max} = 8							
		2	3C	6	33+25 RT	0.13	0.8	0.1	0.1	3.5	0.35		0.35	0.001	0.0208	5.8	1.5	FLOW APPROACHING FROM STA. 34+00 RT										T _{max} = 8							
		2	3C	6	33+25 RT	0.23	0.8	0.18	0.18	3.5	0.63		0.63		0.0208		1.5							8.7	0.1	0.29	0.34			4.8				T _{max} = 8	
SAG	46-3	3	3C	6	33+25 LT	0.17	0.4	0.1	0.1	3.5	0.35		0.35	0.0015	0.0208	5.2	1.5	FLOW APPROACHING FROM STA. 32+00 LT										T _{max} = 8							
		3	3C	6	33+25 LT	0.54	0.38	0.21	0.21	3.5	0.74		0.74	0.0015	0.0208	7.8	1.5	FLOW APPROACHING FROM STA. 34+00 LT										T _{max} = 8							
		3	3C	6	33+25 LT	0.71	0.44	0.31	0.31	3.5	1.09		1.09		0.0208		1.5							8.7	0.14	0.29	0.48			6.7				T _{max} = 8	

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

WINGFIELD LAKE RD.

GOVERNOR'S LAND

RTE ROAD "U"

PROJ WINGFIELD LAKE SUBDIVISION

DATE 3/17/93

SAG OR GRADE	SS#	INLET			STATION	DRAINAGE AREA (AC)	C	CA	K CA	I IN/HR	Q INCR (CFS)	Q CARRY-OVER (CFS)	Q _T GUTTER FLOW	S GUTTER SLOPE (FT/FT)	SX CROSS SLOPE (FT/FT)	T (SPREAD)	W (FT)	W/T	SW (FT/FT)	SW/SX	Eo (#10)	a	Sw=a/(12W)	Se(FT/FT)= Sx + SwEo	L _T (FT) IS P EFFEC LENGTH FT L/LT	d(FT)	E(#16)	h(FT)	Q _i INTERCEPTED CFS	d/h	Q _b CARRY-OVER CFS	T SPREAD @ SAG FT	SHEET OF REMARK
		NUMBER	TYPE	LENGTH (FT)																													
GRADE	47-5	5	3B	8	38+20 LF	0.73	0.55	0.4	0.4	3.5	1.4	-	1.4	0.0059	0.0208	7.6	1.5	0.20	0.0833	4	0.57	2"	0.11	0.0835	8.3	0.96	0.98	1.4	0.03	-	7.7	T _{MAX} = 8.0	
GRADE	47-4	4	3B	8	40+35 LF	0.55	0.55	0.3	0.3	3.5	1.05	-	1.05	0.0072	0.0208	6.5	1.5	0.23	0.0833	4	0.64	2"	0.11	0.0912	7.1	1.12	1	1.05	-	-	7.1	T _{MAX} = 8.0	
GRADE	47-3	3	3B	8	40+45 RT	0.29	0.8	0.23	0.23	3.5	0.81	-	0.81	0.0072	0.0208	5.6	1.5	0.27	0.0833	4	0.72	2"	0.11	0.10	6.7	1.2	1	0.8	-	-	6.7	T _{MAX} = 8.0	
SAG	47-2	2	3C	8	41+80 RT	0.20	0.8	0.16	0.16	3.5	0.56	-	0.56	0.0015	0.0208	6.8	1.5	FLOW APPROACHING FROM STA 41+00 RT										7.7	T _{MAX} = 11.5				
		2	3C	8	41+80 RT	0.55	0.55	0.3	0.3	3.5	1.05	-	1.05	0.0015	0.0208	9.5	1.5	FLOW APPROACHING FROM STA 43+00 RT										7.7	T _{MAX} = 11.5				
		2	3C	8	41+80 RT	0.75	0.62	0.62	0.46	3.5	1.61	-	1.61	0.0015	0.0208	1.5	1.5											7.7	T _{MAX} = 11.5				
SAG	48-7	7	3C	10	26+50 LT	1.3	0.3	0.39	0.39	3.5	1.4	-	1.4	0.0021	0.0208	9.5	1.5	FLOW APPROACHING FROM STA 24+50 LT										7.2	T _{MAX} = 9.5				
		7	3C	10	26+50 LT	1.2	0.3	0.36	0.36	3.5	1.3	-	1.3	0.002	0.0208	9.5	1.5	FLOW APPROACHING FROM STA 27+50 LT										7.2	T _{MAX} = 9.5				
		7	3C	10	26+50 LT	2.5	0.3	0.75	0.75	3.5	2.6	-	2.6	0.002	0.0208	1.5	1.5											7.2	T _{MAX} = 9.5				
GRADE	48-8	8	3B	8	27+50 LT	0.98	0.3	0.29	0.29	3.5	1.02	-	1.02	0.004	0.0208	7.1	1.5	0.21	0.0833	4	0.63	2"	0.11	0.090	6.8	1.17	1	1.02	-	-	6.8	T _{MAX} = 8.0	
GRADE	48-9	9	3B	6	27+50 RT	0.2	0.8	0.16	0.16	3.5	0.56	-	0.56	0.004	0.0208	5.0	1.5	0.30	0.0833	4	0.77	2"	0.11	0.106	4.7	1.3	1	0.56	-	-	4.7	T _{MAX} = 8.0	
GRADE	48-10	10	3B	6	29+00 LT	0.77	0.3	0.23	0.23	3.5	0.81	-	0.81	0.004	0.0208	6.1	1.5	0.25	0.0833	4	0.68	2"	0.11	0.096	5.9	1	1	0.81	-	-	5.9	T _{MAX} = 8.0	
GRADE	48-11	11	3B	8	30+00 LT	0.88	0.3	0.26	0.26	3.5	0.92	-	0.92	0.004	0.0208	6.8	1.5	0.22	0.0833	4	0.62	2"	0.11	0.089	6.6	1.2	1	0.92	-	-	6.6	T _{MAX} = 8.0	

DESIGN OF TIMBER DECK POND IN WINGFIELD LAKE SUBDIVISION

THE TIMBER DECK POND UNDER DESIGN IS INTENDED TO
DETAIN THE RUNOFF VOLUME PRODUCED BY THE
 $\frac{1}{2}$ " STORM FOR 6 HOURS

THUS VOLUME NECESSARY IS CALCULATED BY

$$\text{Volume of Pond} = \left(\frac{1}{2} \text{ " PER IMPERVIOUS ACRE} \right) (\text{DRAINAGE AREA}) V_r$$

$$\text{WHERE } V_r = 0.05 + (0.009) (\% \text{ IMPERVIOUS ACRE, POST DEVELOPMENT})$$

PROCEEDING WITH CALCULATIONS:

- DRAINAGE AREA NORTH OF ROUTE 5

DA = 20.0 AC ZONE A-1

DESCRIPTION OF SITE:

FEW RESIDENTIAL STRUCTURES AND FLAT TOP
LOT SIZES 1 AC ± AND UP
IMPERVIOUSNESS UP TO 15% (INCLUDES ROUTE 5)
USE 15%
NO DEVELOPMENT PLANNED

- DRAINAGE AREA SOUTH OF ROUTE 5

DA = 15.3 AC ZONE R-4

DESCRIPTION OF SITE

MAINLY SLOPING WITH NATURAL CHANNELS
FEW RESIDENTIAL LOTS PLANNED, ^{USUALLY} GREATER THAN 0.5 AC EACH
GREENBELT AREA
IMPERVIOUSNESS UP TO 23%
USE 23%

- APPROXIMATE IMPERVIOUSNESS FOR 35.3 AC. (POST DEVELOPMENT)

$$\frac{(20.0 \text{ AC})(15\%) + (15.3 \text{ AC})(23\%)}{35.3 \text{ AC}} = 18.7\%$$



DESIGN OF TIMBER DRY POND IN
MINDFIELD LAKE SUBDIVISION

USING $V_R = 0.05 + (0.009) (\% \text{ IMPERVIOUS AREA, POST DEVELOPMENT})$

$V_R = 0.05 + (0.009) (18.7)$

$V_R = 0.218$

THUS,

VOLUME = $(\frac{1}{2}')$ (35.3 AC) (0.218)
 = 3.85 AC IN
 = 0.32 AC FT
 = 139.70 CU FT
 = 517 CU YDS REQUIRED

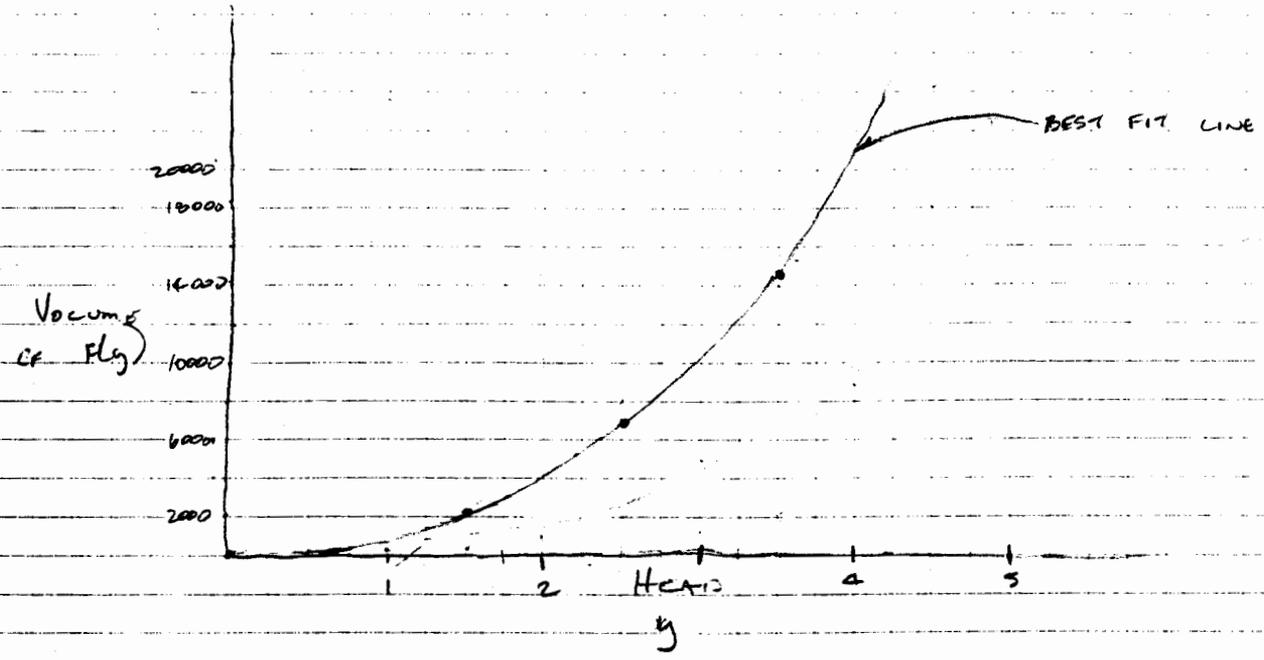
FOLLOWING IS STAGE / STORAGE FOR TIMBER STRUCTURE LOCATION

EL.	DEPTH	AREA (SF)	VOLUME (CY)	Σ VOLUME (CY)
6.5		0		
	0.5			
7.0		994	9	9 (243 CF)
	1.0			
8.0		3260	78	87 (2349 CF)
	1.0			
9.0		6180	175	262 (7674 CF)
	1.0			
10.0		9314	287	549 (14823 CF)
	1.0			
11.0		13659	425	974 (26248 CF)
	1.0			
12.0		17980	586	1560 (42120 CF)

THUS FOR 517 CY,
WATER SURFACE ELEVATION SHOULD BE 9.9 OR 3.4 FEET ABOVE
NATURAL GROUND

DESIGN OF TIMBER DRY POND IN WINGFIELD LAKE SUBDIVISION

FINDING AN EQUATION TO APPROXIMATE THE RELATIONSHIP BETWEEN HEAD (ELEVATION) AND VOLUME



FINDING APPROXIMATE EQUATION

$$F(y) = 1210 y^2 - 100y$$

$$F(y) = 1210 y^2 - 100y \quad \text{close!}$$

USING THE EQUATION

$$t = \int_{h_2}^{h_1} \frac{F(y) dy}{C a \sqrt{2gy}}$$

(ENGINEER'S HANDBOOK)
EQUATION FOR FALLING HEAD

- where h_1 = HEAD AT START, ft
- h_2 = HEAD AT END, ft
- t = time, sec. = 21600 sec
- C = COEFFICIENT OF DISCHARGE = 0.6
- g = 32.2 ft/sec²
- y = head on orifice at time t , ft
- a = area of orifice, ft²

Design of Timber Dry Pond in
Winfield Lake Subdivision

$$21600 = \frac{1}{a} \int_0^{3.4} \frac{1210y^2 - 100y}{(0.6)(\sqrt{64+4})\sqrt{y}} dy$$

$$21600 = \frac{1}{(0.6)(\sqrt{64+4})} \frac{1}{a} \int_0^{3.4} 1210y^{3/2} - 100y^{1/2} dy$$

$$104003 = \frac{1}{a} \int_0^{3.4} 1210y^{3/2} - 100y^{1/2} dy$$

$$104003 = \frac{1}{a} \left(1210 \left(\frac{2}{5}\right) y^{5/2} - 100 \left(\frac{2}{3}\right) y^{3/2} \right) \Big|_0^{3.4}$$

$$104003 = \frac{1}{a} (10317 - 418)$$

$$104003 = \frac{1}{a} 9899$$

$$9899 = 104003a$$

$$a = 0.10 \text{ sq ft} = 13.7 \text{ sq in} \approx 4" \phi$$

use 4" ϕ OUTLET PIPE TO DETAIN
1/2" STORM RUNOFF FOR 6 HOURS!

ANALYSIS FOR OUTFALL PROTECTION OF TIMBER DRY POND

IF DRY POND CONSTRUCTED AT LOCATION SHOWN ON PLANS,
NATURAL RELIEF OF GROUND AND TOP OF TIMBER
STRUCTURE WOULD FORM A TRAPEZOIDAL WEIR.

ALLOWING FOR 1' OF FREE BOARD AS A BMP, TOP OF
TIMBER STRUCTURE WOULD BE $9.9 + 1 = 10.9$

LENGTH OF WEIR APPROX 85 LONG

SIDE SLOPE APPROXIMATELY 3:1 BOTH SIDES

BY DEFINITION THE TIMBER STRUCTURE FORMS A BROAD CRESTED WEIR

BY DETERMINING THE AMOUNT OF FLOW FOR A DESIGN
STORM TO THE TIMBER STRUCTURE, THE DEPTH OF
WATER ACROSS THE "WEIR" (TIMBER STRUCTURE) CAN BE
DETERMINED, ASSUMING THAT THE TIMBER STRUCTURE
IS WITHHOLDING ITS MAXIMUM DETENTION VOLUME OF
517 CY.

USING THE RATIONAL METHOD TO FIND RATE OF FLOW
WE HAVE:

A = DRAINAGE AREA = 35.3 AC (TOTAL, ON-SITE & OFF-SITE)

C = RUNOFF COEFFICIENT (19% IMPERVIOUSNESS)

OFF-SITE: 20.0 AC

FLAT TOP

FEW STRUCTURES

$C_1 = 0.20$

ON-SITE: 15.3 AC

NATURAL RAVINS/CHANNELS
FEW STRUCTURES

$C_2 = 0.30$

$$C = \frac{C_1(20.0 \text{ AC}) + C_2(15.3 \text{ AC})}{35.3 \text{ AC}} = 0.24 = C$$

$$T_c = \begin{array}{l} 200' \text{ of overland flow @ } 0.3\% \\ 900' \text{ of shallow concentrated flow} \\ 950' \text{ of channel flow} \end{array} \quad \begin{array}{l} = 31 \text{ MINUTES} \\ = 12 \text{ MINUTES} \\ = 8 \text{ MINUTES} \\ \hline 51 \text{ MINUTES} = T_c \end{array}$$

FOR $T_c = 51$ MINUTE ? NORFOLK IDF CHART $I_{10} = 2.6 \text{ IN/HR}$

$$\begin{aligned} \text{SQ } Q_{10} &= C I_{10} A \\ Q_{10} &= (0.24)(2.6)(35.3 \text{ AC}) \\ Q_{10} &= 22.2 \text{ CFS} \end{aligned}$$

ANALYSIS FOR OUTFALL PROTECTION OF TIMBER DRY POND

So for $Q_{10} = 22.2$ cfs find DEPTH OF FLOW ACROSS
TIMBER STRUCTURE, ASSUME FULL DETENTION VOLUME

DISCHARGE FROM TRAPEZOIDAL WEIR CAN BE FOUND BY

$$Q = CL \left(H + \frac{V^2}{2g} \right)^{3/2}$$

where

- $C =$ discharge coefficient = 2.8
- $L =$ effective L of crest
- $H =$ head
- $V =$ velocity of approach
- $g = 32.2 \text{ ft/sec}^2$

assume $V = 2 \text{ ft/sec}$

then $22.2 \text{ cfs} = (2.8)(85) \left(H + \frac{4}{64.4} \right)^{3/2}$
 $0.09 = \left(H + 0.0621 \right)^{3/2}$
 $H = 0.14 \text{ ft} = 1.6'' \text{ over top of timber structure}$

Assume 40 cfs over weir - 100 yr. storm

$$40 = (2.8)(85) \left(H + 0.0621 \right)^{3/2}$$

$$(0.168)^{2/3} = H + 0.0621$$

$$.305 = H + 0.0621$$

$$H = 0.242' = 2.9''$$

$$\text{Area} = .24 \text{ ft}^2$$

$$V = \frac{Q}{A} = \frac{40}{.24} = 2 \frac{1}{2} \text{ sec}$$

$$x^2 = \frac{2V^2}{g} y$$

$$y = .6' \quad x^2 = \frac{2 \times 2^2}{32.2} \cdot .6$$

$$x = 1.2'$$

$$y = \frac{1}{2} g t^2$$

$$.6 = \frac{1}{2} 32.2 \times t^2$$

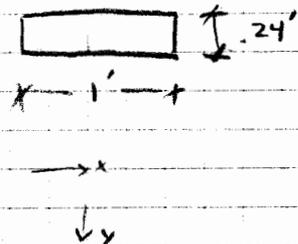
$$t = 0.6 \text{ sec}$$

$$v = \frac{1}{2} a t^2$$

$$v = \frac{1}{2} \times 32.2 \times .6^2$$

$$v = 6 \text{ fps}$$

$$\frac{40 \frac{\text{ft}^3}{\text{sec}}}{85.5 \text{ ft}} = \frac{.47 \text{ ft}^2}{\text{sec}}$$



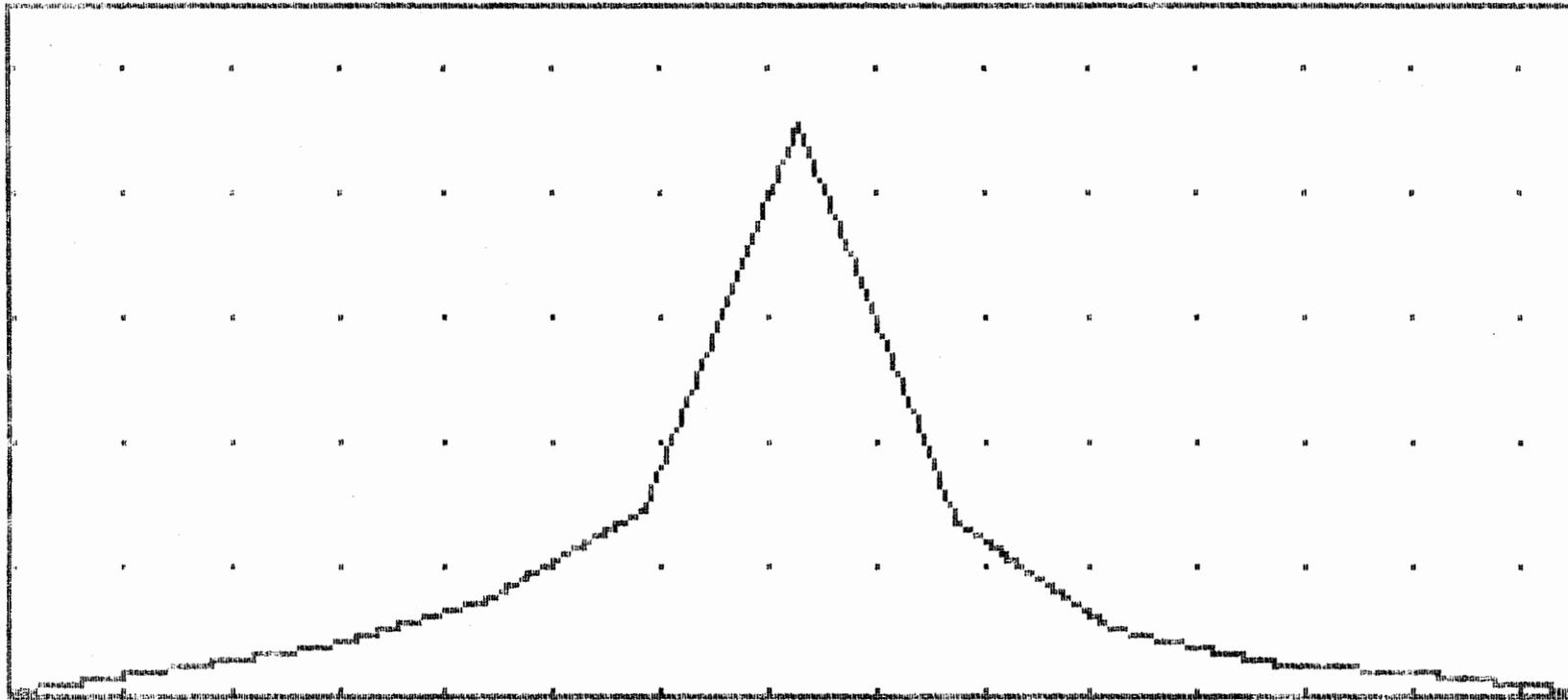
HYDROLOGIC REPORT FOR

GOVERNOR'S LAND

WINGFIELD LAKE SUBDIVISION

TIMBER DRY BMP

$Q_p = 22.7$ D RATIONAL 10 Yr



HGU = 35 min 1 VGU = 5.0 cfs

VOI = (cuft/acft) = 1.45402 / 3.338

HYDROLOGIC REPORT

WINGFIELD LAKE SUB....
 TIMBER DRY POND.....
 RUNOFF CALCULATION....

Hyd. No. 1

Hydrograph type = D RATIONAL	Peak discharge = 22.74 cfs
Storm frequency = 10 yr	Time interval = 1 min
Time of conc. = 51 min	Intensity = 2.68 in/hr
Runoff coeff. = .24	Basin area = 35.3 ac

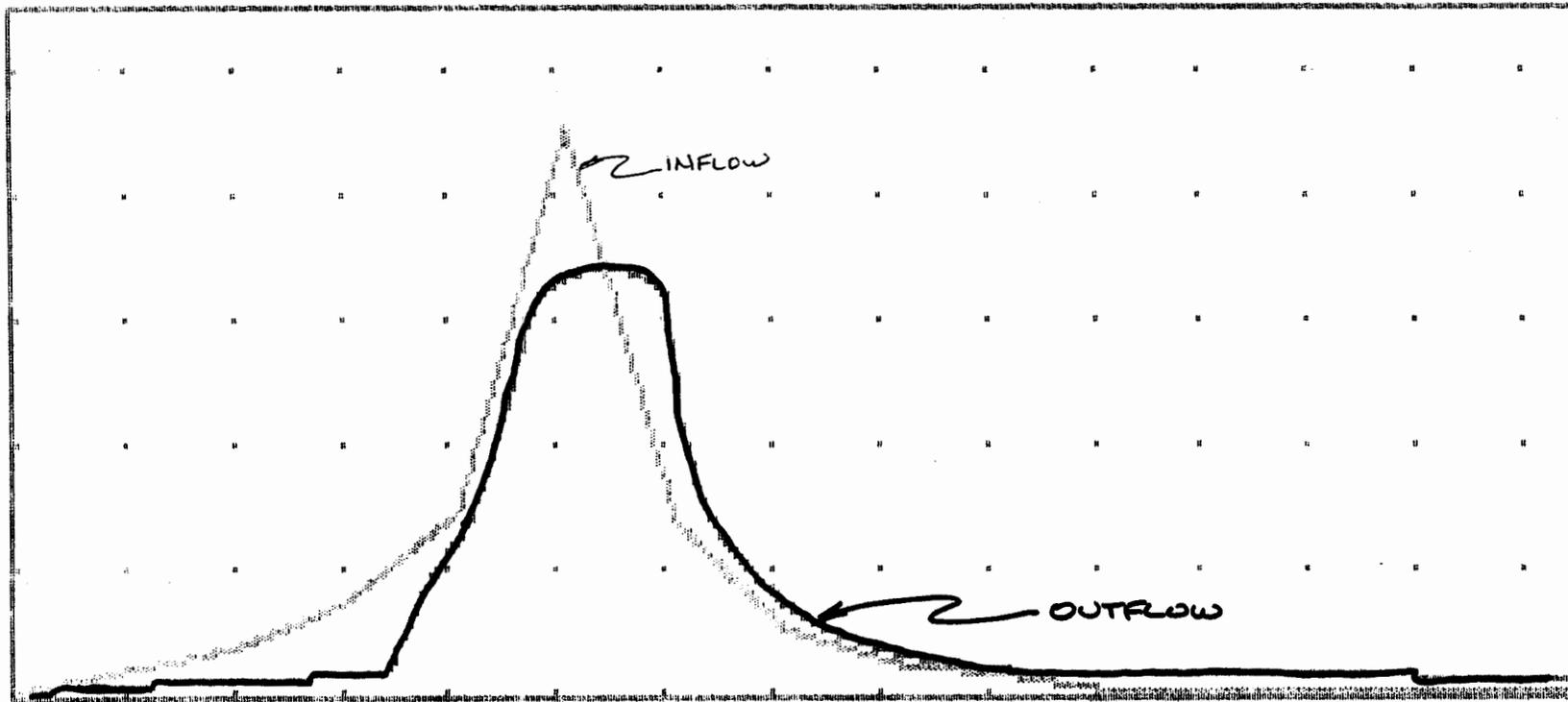
HYDROGRAPH DISCHARGE TABLE (INFLOW HYDROGRAPH)

TIME--OUTFLOW		TIME--OUTFLOW		TIME--OUTFLOW		TIME--OUTFLOW	
(hrs	cfs)	(hrs	cfs)	(hrs	cfs)	(hrs	cfs)
1.75	1.93	1.77	1.96	1.78	2.00	1.80	2.03
1.82	2.07	1.83	2.10	1.85	2.14	1.87	2.18
1.88	2.21	1.90	2.25	1.92	2.28	1.93	2.32
1.95	2.35	1.97	2.39	1.98	2.43	2.00	2.46
2.02	2.50	2.03	2.53	2.05	2.57	2.07	2.60
2.08	2.64	2.10	2.67	2.12	2.71	2.13	2.75
2.15	2.78	2.17	2.82	2.18	2.85	2.20	2.89
2.22	2.92	2.23	2.96	2.25	3.00	2.27	3.03
2.28	3.07	2.30	3.10	2.32	3.14	2.33	3.17
2.35	3.21	2.37	3.25	2.38	3.28	2.40	3.32
2.42	3.35	2.43	3.39	2.45	3.42	2.47	3.46
2.48	3.50	2.50	3.53	2.52	3.57	2.53	3.60
2.55	3.64	2.57	3.71	2.58	3.75	2.60	3.65
2.62	3.92	2.63	3.99	2.65	4.07	2.67	4.14
2.68	4.21	2.70	4.28	2.72	4.38	2.73	4.42
2.75	4.49	2.77	4.56	2.78	4.64	2.80	4.71
2.82	4.78	2.83	4.65	2.85	4.92	2.87	4.99
2.88	5.06	2.90	5.14	2.92	5.21	2.93	5.28
2.95	5.35	2.97	5.42	2.98	5.49	3.00	5.56
3.02	5.63	3.03	5.71	3.05	5.78	3.07	5.85
3.08	5.92	3.10	5.99	3.12	6.06	3.13	6.13
3.15	6.21	3.17	6.28	3.18	6.35	3.20	6.42
3.22	6.49	3.23	6.56	3.25	6.63	3.27	6.70
3.28	6.78	3.30	6.85	3.32	6.92	3.33	6.99
3.35	7.06	3.37	7.13	3.38	7.20	3.40	7.28
3.42	7.58	3.43	7.32	3.45	7.48	3.47	7.49
3.48	8.79	3.50	9.09	3.52	9.40	3.53	9.70
3.55	10.00	3.57	10.31	3.53	10.61	3.60	10.91
3.62	11.22	3.63	11.53	3.55	11.82	3.67	12.12

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME--OUTFLOW (hrs cfs)	TIME--OUTFLOW (hrs cfs)	TIME--OUTFLOW (hrs cfs)	TIME--OUTFLOW (hrs cfs)
3.68 12.43	3.70 12.73	3.72 13.03	3.73 13.34
3.75 13.64	3.77 13.94	3.78 14.25	3.80 14.55
3.82 14.85	3.83 15.16	3.85 15.46	3.87 15.76
3.88 16.07	3.90 16.37	3.92 16.67	3.93 16.98
3.95 17.28	3.97 17.58	3.98 17.89	4.00 18.19
4.02 18.49	4.03 18.79	4.05 19.10	4.07 19.40
4.08 19.70	4.10 20.01	4.12 20.31	4.13 20.61
4.15 20.92	4.17 21.22	4.18 21.52	4.20 21.83
4.22 22.13	4.23 22.43	4.25 22.74	4.27 22.42
4.28 22.11	4.30 21.80	4.32 21.49	4.33 21.18
4.35 20.86	4.37 20.55	4.38 20.24	4.40 19.93
4.42 19.61	4.43 19.30	4.45 18.99	4.47 18.68
4.48 18.37	4.50 18.05	4.52 17.74	4.53 17.43
4.55 17.12	4.57 16.81	4.58 16.49	4.60 16.18
4.62 15.87	4.63 15.56	4.65 15.25	4.67 14.93
4.68 14.62	4.70 14.31	4.72 14.00	4.73 13.69
4.75 13.37	4.77 13.06	4.78 12.75	4.80 12.44
4.82 12.13	4.83 11.81	4.85 11.50	4.87 11.19
4.88 10.88	4.90 10.57	4.92 10.25	4.93 9.94
4.95 9.63	4.97 9.32	4.99 9.01	5.00 8.69
5.02 8.38	5.03 8.07	5.05 7.76	5.07 7.44
5.08 7.13	5.10 6.82	5.12 6.74	5.13 6.65
5.15 6.57	5.17 6.48	5.18 6.40	5.20 6.31
5.22 6.23	5.23 6.14	5.25 6.06	5.27 5.97
5.28 5.89	5.30 5.80	5.32 5.72	5.33 5.63
5.35 5.55	5.37 5.47	5.38 5.38	5.40 5.30
5.42 5.21	5.43 5.13	5.45 5.04	5.47 4.96
5.48 4.87	5.50 4.79	5.52 4.70	5.53 4.62
5.55 4.53	5.57 4.45	5.58 4.36	5.60 4.28
5.62 4.19	5.63 4.11	5.65 4.03	5.67 3.94
5.68 3.86	5.70 3.77	5.72 3.69	5.73 3.60
5.75 3.52	5.77 3.43	5.78 3.35	5.80 3.26
5.82 3.18	5.83 3.09	5.85 3.01	5.87 2.92
5.88 2.84	5.90 2.75	5.92 2.67	5.93 2.59
5.95 2.50	5.97 2.47	5.98 2.45	6.00 2.42
6.02 2.39	6.03 2.37	6.05 2.34	6.07 2.31
6.08 2.29	6.10 2.26	6.12 2.23	6.13 2.21
6.15 2.18	6.17 2.15	6.18 2.13	6.20 2.10
6.22 2.07	6.23 2.05	6.25 2.02	6.27 1.99

$Q_p = 17.1$ RESERVOIR ROUTE 10 Yr



OUTFLOW HYDROGRAPH

HGU = 50 min

2

VGU = 5.0 cfs

MAX STORAGE = 30769

MAX ELEVATION = 11.28



ENGINEERING CONSULTING SERVICES, LTD.
Geotechnical • Construction Materials • Environmental

December 31, 2000

Mr. Jim Bennett, P.E.
Dominion Land Management Co.
P.O. Box 26532
Richmond, Virginia 23261

ECS Project No. 6221

RE: Governor's Land Dams - Embankment Evaluation
James City County, Virginia

Dear Mr. Bennett:

As requested, ECS, Ltd. conducted a subsurface soils exploration and engineering evaluation of eight (8) existing "earthen type" dams located within the Governor's Land Development in James City County, Virginia. The following dams were included in this evaluation:

- Fowler's Lake J
- Horne's Lake
- #12 Tee Box Dry Detention Pond
- Travis Pond
- Whittaker's Lake
- Bennett's Pond
- Founder's Hill Pond
- Wingfield Lake JR017

Included in Appendix I of this report are a boring location diagram (from site drawings provided by AES and/or WEG), the boring logs with a subsurface profile (by ECS), and the dam cross-section/schematic (from initial construction drawings provided by AES and/or WEG), for each dam referenced above.

The purpose of this subsurface exploration and engineering evaluation was to determine the composition of the existing dam and ascertain the nature of the subsurface soils underlying the dam. The data collected from the soil test borings was utilized to evaluate the general stability and condition of the existing dam. The findings and conclusions discussed herein are based on the results of our site reconnaissance, soil test borings, laboratory test results, and our understanding of the required dam construction.

It is our understanding that AES will perform an as-built survey with regard to slope gradient(s), elevation(s), and spillway structures.

SCOPE OF STUDY:

[Subsurface Exploration]:

The subsurface exploration was conducted by performing three (3) soil test borings along the approximate longitudinal centerline of each existing dam. The borings were typically extended to depths of 15 feet at each approximate shoulder and to a depth of 30 feet near the center of the dam, except as noted herein. Whittaker's Lake Dam had a 40-foot deep center boring and #12 Tee Box Dry Detention Pond had a 20-foot deep center boring. The Founder's Hill Detention Pond had borings extended to depths of 24-feet at the center and 16-feet at each approximate shoulder, below existing surface elevations.

The borings were performed with a truck mounted drill rig, which utilized mud-rotary procedures to advance the boreholes. Drilling fluid was used in this process. Soil sampling was continuous throughout the depth of the borings. At completion of the drilling operations, the boreholes were backfilled with the drilling fluid ("Bentonite Slurry").

Representative soil samples were obtained by means of the split-barrel sampling procedure in accordance with ASTM Specification D-1586. In this procedure, a 2-inch outside diameter (O.D.), split-barrel sampler is driven into the soil a distance of 24 inches by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through a 12 inch interval is termed the Standard Penetration Test (SPT) value and is indicated for each sample on the boring logs. This value can be used as a qualitative indication of the in-place relative density of cohesionless soils and relative consistency of cohesive soils. This indication is qualitative, since many factors can significantly affect the penetration resistance value and prevent a direct correlation between drill rigs, drilling procedures, and hammer rod sampler assemblies.

After recovery, representative portions of each sample were removed from the split-barrel sampler and sealed in glass jars. The samples were taken to our laboratory in Richmond, Virginia for visual classification and laboratory testing. Visual classifications were performed on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS). A brief description of the USCS and Reference Notes for Boring Logs are included in Appendix III.

[Laboratory Analysis]:

Representative soil samples collected from the soil test borings were subjected to laboratory testing for the purposes of substantiating the visual classifications and to determine the soil's pertinent engineering properties. Laboratory testing included natural moisture content determination, Atterberg Limits tests, and grain size analysis (percent passing the #200 sieve). The results of the laboratory testing are included in Appendix II of this report.

EXISTING DAM CHARACTERISTICS:

In general, each dam evaluated as part of this study is classified as a Zoned Earthen Dam. A zoned dam is defined by an inner core (typically a relatively impervious clay material) and an outer shell (typically a more granular or sandy material). It is our understanding that topography information will be provided by the project Civil Engineer (AES, Inc.), as part of their "as-built" survey.

The surface description of each dam is based on observations by ECS personnel during the drilling activities (October/November 2000).

• **Fowler's Lake Dam**

It is our estimation that the existing dam at Fowler's Lake is approximately 200 feet long. The front (pond) side of the dam is vegetated with grass. The topography of the crest of the dam is undulating, presumably for aesthetic reasons. The back (downstream) side of the dam was heavily vegetated with thick underbrush and small diameter trees.

• **Horne's Lake Dam**

It is our estimation that the existing dam at Horne's Lake is approximately 700 feet long. The front (pond) side of the dam is vegetated with grass. The topography of the crest of the dam is relatively flat. The back (downstream) side of the dam was heavily vegetated with thick brush and small diameter trees.

• **#12 Tee Box Dry Detention Pond**

It is our estimation that the existing dam at the dry detention pond at the #12 Tee Box is approximately 175 feet long. The front (pond) side of the dam is vegetated with grass and a few small trees. The topography of the crest of the dam is relatively flat with an asphalt golf cart path traversing along the centerline of the dam. The back (downstream) side of the dam was grass covered.

- **Travis Pond Dam**

It is our estimation that the existing dam at Travis Pond is approximately 200 feet long. The front (pond) side of the dam was vegetated with manicured grass. The topography of the crest of the dam is relatively flat. The back (downstream) side of the dam was vegetated with manicured grass.

- **Whittaker's Lake Dam**

It is our estimation that the existing dam at Whittaker Lake is approximately 400 feet long. The front side of the dam was vegetated with grass. The topography of the crest of the dam is relatively flat. The backside of the dam was heavily vegetated with underbrush and small trees.

- **Bennett's Pond Dam**

It is our estimation that the existing dam at Bennett's Pond is approximately 330 feet long. The front side of the dam was lightly vegetated with tall grass. The topography of the crest of the dam is relatively flat. The backside of the dam is vegetated with manicured grass.

- **Founder's Hill Pond Dam**

It is our estimation that the existing dam at Founder's Hill detention pond is approximately 85 feet long. The front side of the dam was lightly vegetated with tall grass. The topography of the crest of the dam is relatively flat. The backside of the dam is vegetated with manicured grass. Organic debris was observed partially blocking the spillway pipe on the backside of the dam, with 2 to 3 inches of water in the pipe.

- **Wingfield Lake Dam**

Plan and topography information was not available for Wingfield Lake Dam; however, from the site reconnaissance it is estimated that the dam is approximately 300 feet long. The front side of the dam was vegetated with grass. The topography of the crest of the dam is relatively flat. The backside of the dam is heavily wooded with underbrush and small to medium trees.

RESULTS OF THE BORINGS AND LABORATORY TESTING:

The following discussions provide a general overview of the composition of each dam and the underlying subsurface conditions.

It should be noted that mud-rotary drilling procedures involve the use of a "bentonite slurry" that temporarily seals the borehole, and therefore, groundwater readings are difficult to obtain during drilling. In this regard, the presence of water below the surface is determined from visual inspection of each soil sample obtained from the split-spoon sampler. Actual soil moisture and/or the water conditions within each soil strata can be obtained from the boring logs. Be advised that the water level referenced at completion of the drilling (lower left corner of the boring logs) may not accurately represent the static water table level. Groundwater commentary (provided below) for each dam is based on the visual inspection of each soil sample. It is common for most subsurface soils to possess moist to wet properties. Soils classified as very wet to saturated typically indicate the presence of the static water table.

It should also be noted that a majority of the fill samples evaluated contained some organic debris. Typically, the organic debris was in the form of small root and wood material (in trace amounts), which is considered typical in most cases when fill for dam embankments is obtained from on-site or nearby borrow sources where shallow excavating and/or scraping operations are performed. The presence of this organic material, in small quantities or trace amounts, is considered acceptable.

- **Fowler's Lake Dam**

The results of our soil test borings and laboratory testing indicates that the existing dam, at the areas and depths sampled, is generally comprised of fill material to depths of about 8 to 19 feet below top of dam surface. The fill layers, which comprise the top shell and the inner core, are classified as Clayey SAND (SC), Silty SAND (SM), and Fat CLAY (CH). The sandy soils are loose in density and the clay soils are very soft to very stiff in consistency. The transitions from the fill material into the natural original soils were relatively clean. In this regard, it appears that proper steps were taken to remove heavy topsoil and/or thick vegetation prior to fill placement. The transition between the fill (clay core) and the original ground surface in boring B-2, which was performed near the center of the dam, was marked by the presence of a layer of orangish brown, Sandy Lean CLAY (CL). This stratum was observed between the approximate depths of 14 feet and 18 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of erratic deposits of medium dense to dense Silty and Clayey SANDS (SM, SC and SP) and soft to very stiff Sandy Lean CLAY (CL).

and/or thick vegetation prior to fill placement. The transition between the fill material (clay core) and the original ground surface in boring B-2, which was performed near the center of the dam, was marked by the presence of a layer of orangish brown and gray, Fat CLAY with fine sand (CH). This stratum was observed between the approximate depths of 8.0 feet and 12.0 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of deposits of loose to medium dense Silty SAND (SM), very soft to medium stiff Fat CLAY (CH), and soft to stiff sandy CLAY (CL).

Significant moisture was not observed within the dam fill material. Groundwater was encountered in borings B-2 and B-3 at depths of about 17 feet and 5 feet below top of the dam surface, respectively. The presence of water at this depth indicates that there is seepage below the dam. The normal pool elevation for this dam is relatively shallow; therefore, the water encountered at these depths does not present a problem with the stability of the dam.

- **Wingfield Lake Dam**

The results of our soil test borings and laboratory testing indicates that the existing dam, at the areas and depths sampled, is generally comprised of fill material to depths of about 15 to 30 feet below top of dam surface. The fill layers, which comprise the top shell and the inner core, are classified as **Fat CLAY (CH)**. The **clay soils are soft to medium stiff** in consistency. The transitions from the fill material into the natural original soils were not determined along the shoulders of the dam (borings B-1 and B-3). With regard to the center boring (B-2), it appears that **proper steps were taken to remove heavy topsoil and/or thick vegetation** prior to fill placement. The transition between the fill material (clay core) and the original ground surface in boring B-2, which was performed near the center of the dam, was marked by the presence of a layer of **bluish gray Fat CLAY** with fine sand (CH). This stratum was observed between the approximate depths of 30.0 feet and 34.0 feet, and appears to represent the original ground surface.

The natural soils underlying the fill material generally consist of deposits of Fat CLAY (CH), clayey SAND (SC), fine to coarse SAND trace silt (SP), and sandy Lean CLAY (CL).

Significant moisture was not observed within the dam fill material.

ENGINEERING EVALUATION AND CONCLUSIONS:

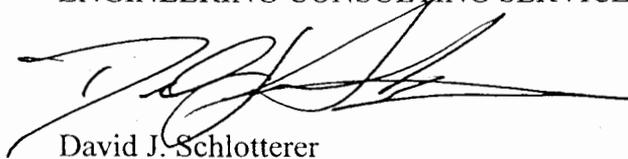
Based on the results of our soil test borings and laboratory testing, it is our opinion that the existing dams *satisfy* the current state dam design criteria, and/or other commonly accepted dam design criteria, with regard to embankment composition (material type and density) and overall stability. In general, the dams are classified as Zoned Earthen Dam structures, comprised predominantly of an impervious clay core with clayey and sandy soils comprising the shell.

General maintenance, however, should be provided for each dam on a routine basis. This should include annual inspections for surface erosion or vertical and horizontal cracking in the embankment. In addition, the toe drain and stilling basin should be inspected for erosion and loss of rip-rap, seepage beyond the toe drain, or increased flow or movement of fines through the drains. All large bushes and trees should be removed from the embankment face (both front and back sides), and animal burrows or other holes/cavities along the embankment should be thoroughly inspected and filled as appropriate.

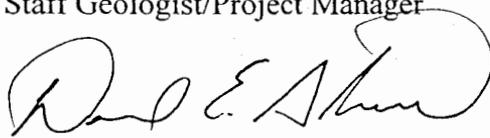
ECS, Ltd. has appreciated the opportunity to be of service to you on this project. Please contact this office should you have any questions or need further assistance.

Respectfully,

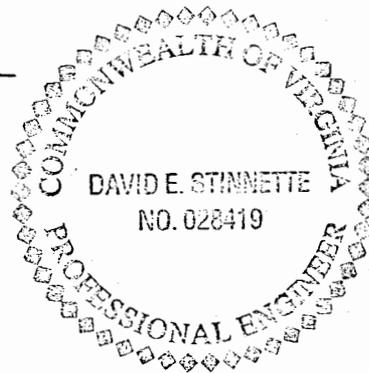
ENGINEERING CONSULTING SERVICES, LTD.



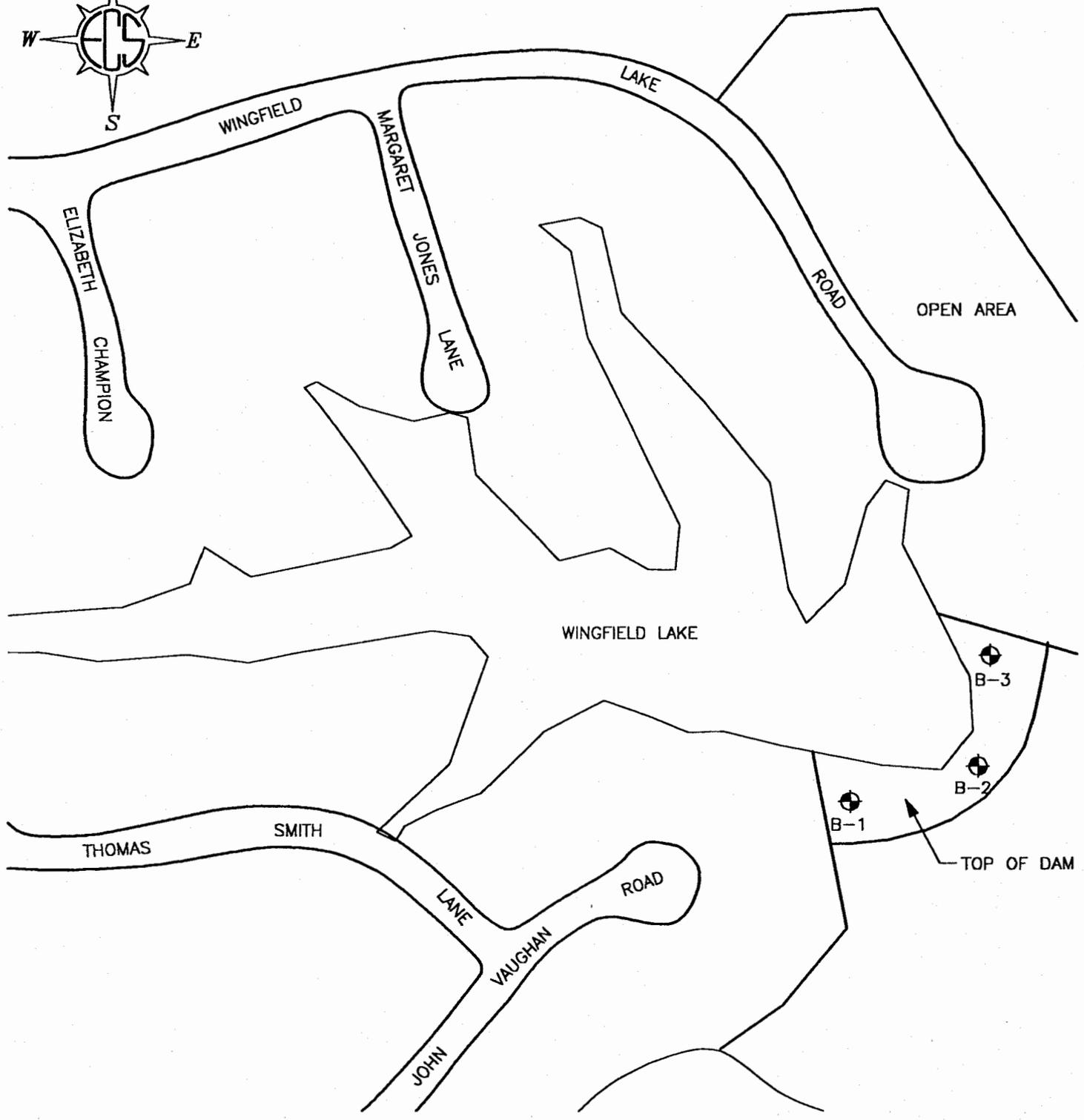
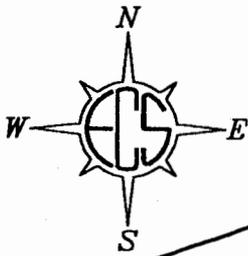
David J. Schlotterer
Staff Geologist/Project Manager



David E. Stinnette, P.E.
Engineering Services Manager



Copies: (3) Jim Bennett (Dominion Land Management Co.)



⊕ - Approximate Boring Location

Scale: 1"=200'

PREPARED FOR:

DOMINION LAND MANAGEMENT



BORING LOCATION DIAGRAM

GOVERNOR'S LAND
WINGFIELD LAKE
JAMES CITY COUNTY, VIRGINIA
ECS, LTD. PROJECT NO. 6221

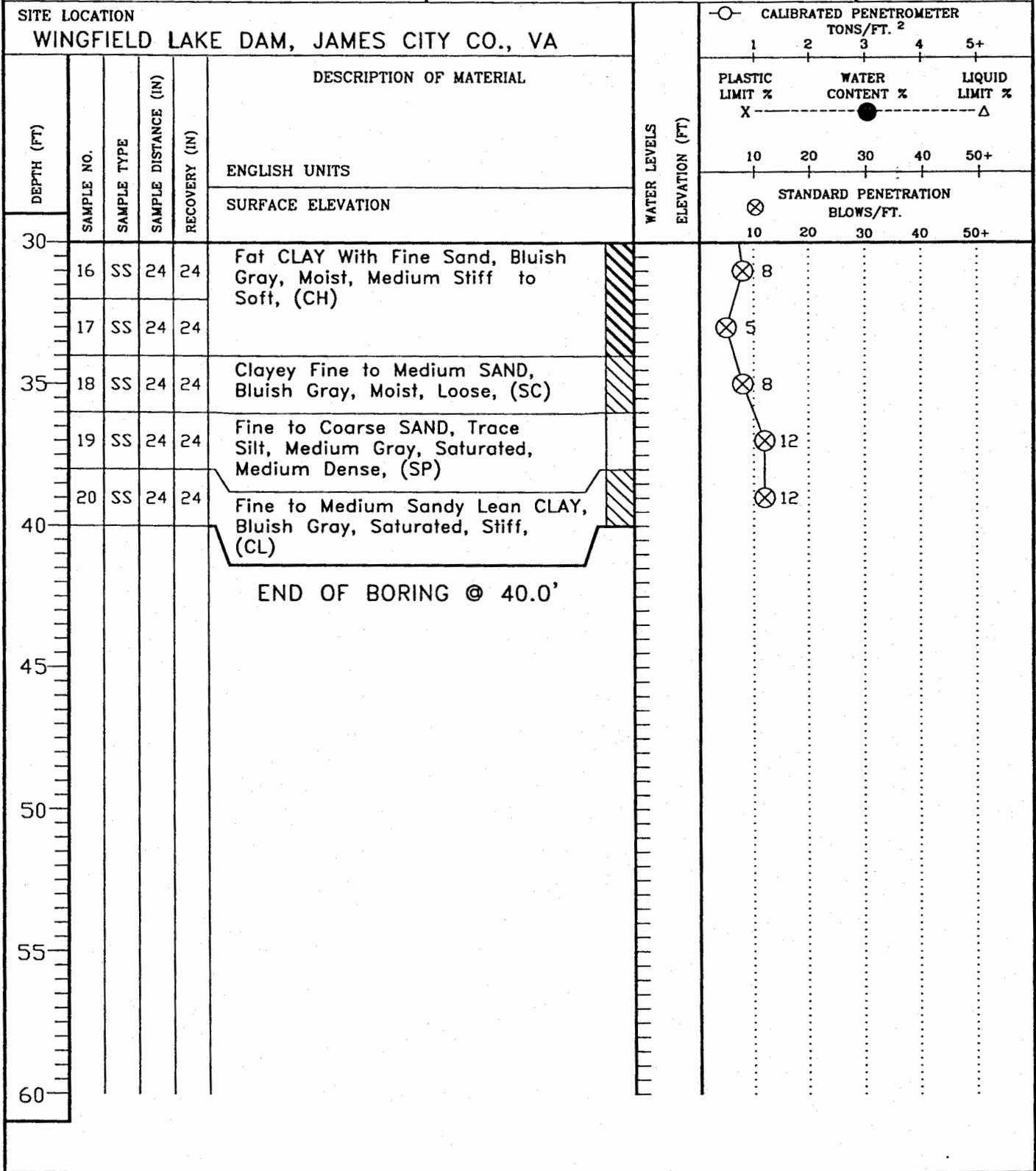
CLIENT DOMINION LAND MANAGEMENT CO.	JOB # 6221	BORING # B-2	SHEET 1 OF 2	ECS LTD
PROJECT NAME GOVERNOR'S LAND DAMS (EMBANKMENT EVAL.)	ARCHITECT-ENGINEER AES, INC.			

SITE LOCATION WINGFIELD LAKE DAM, JAMES CITY CO., VA					DESCRIPTION OF MATERIAL	WATER LEVELS ELEVATION (FT)						
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	RECOVERY (IN)			ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION BLOWS/FT.
							SURFACE ELEVATION		X	●	Δ	
0	1	SS	24	24			Topsoil-1", (FILL)					
	2	SS	24	24	Fine Sandy SILT With Roots, Tan, Dry, Soft, (ML-FILL)							
5	3	SS	24	24	Fat CLAY, Trace Fine Sand, Trace Tiny Roots and Organics, Orangish Brown and Gray, Moist, Soft to Medium Stiff, (CH-FILL)							
	4	SS	24	24								
	5	SS	24	24								
10	6	SS	24	24								
	7	SS	24	24								
15	8	SS	24	24								
	9	SS	24	24								
	10	SS	24	24								
20	11	SS	24	24								
	12	SS	24	24								
25	13	SS	24	24								
	14	SS	24	24								
30	15	SS	24	24								

CONTINUED ON NEXT PAGE.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL				
▽WL DRY	WS OR (D)	BORING STARTED	10-23-00	TOPSOIL DEPTH 1"
▽WL(AB)	▽WL(AC)	BORING COMPLETED	11-20-00	CAVE IN DEPTH ● 37.3'
▽WL		RIG FISHBURNE FOREMAN ED		DRILLING METHOD HOLLOW STEM AUGER

CLIENT DOMINION LAND MANAGEMENT CO.	JOB # 6221	BORING # B-2	SHEET 2 OF 2	ECS LTD
PROJECT NAME GOVERNOR'S LAND DAMS (EMBANKMENT EVAL.)	ARCHITECT-ENGINEER AES, INC.			

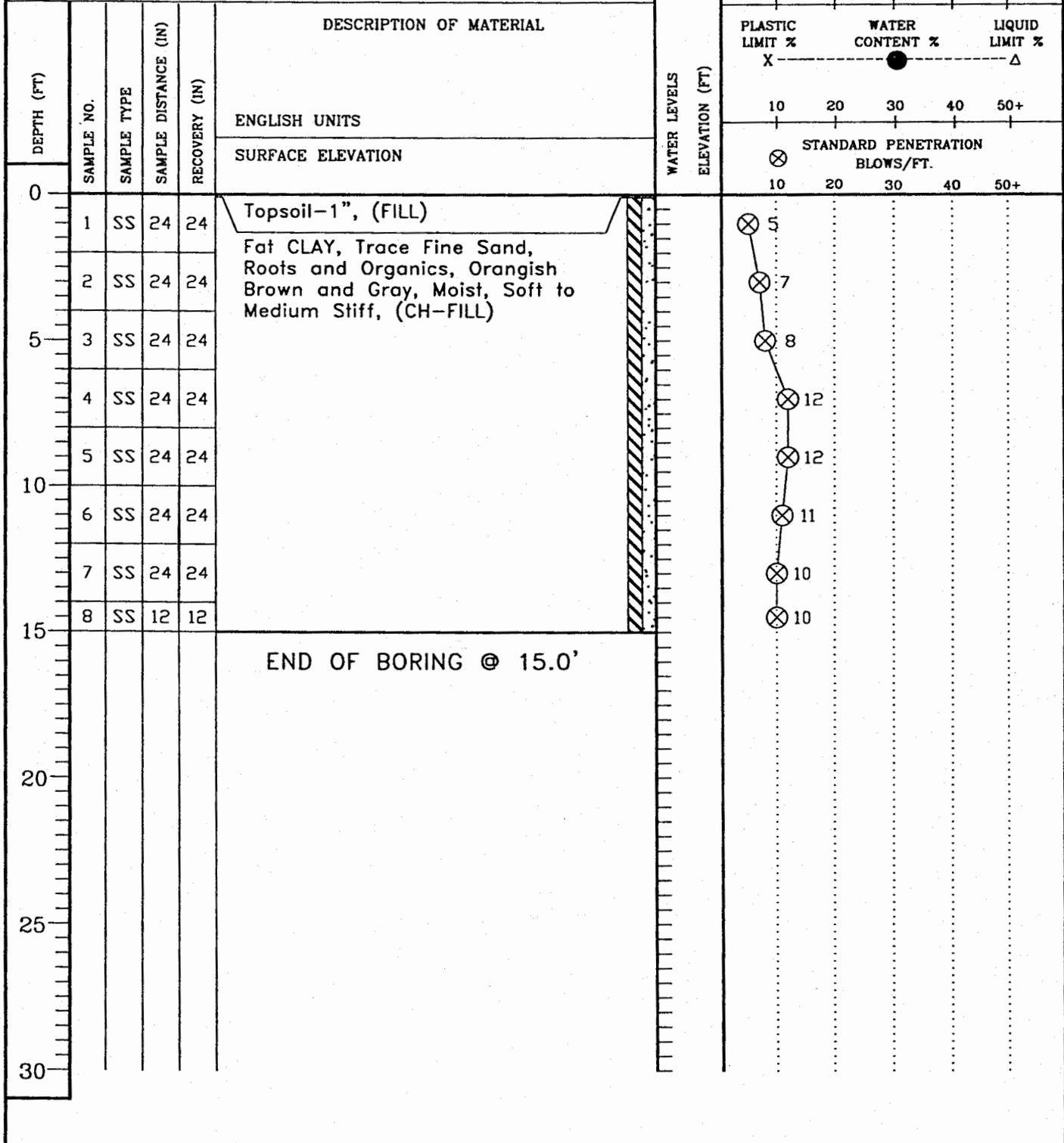


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

▽WL DRY	WS OR (WD)	BORING STARTED	10-23-00	TOPSOIL DEPTH 1"
▽WL(AB)	▽WL(AC)	BORING COMPLETED	11-20-00	CAVE IN DEPTH ● 37.3'
▽WL		RIG FISHBURNE FOREMAN ED		DRILLING METHOD HOLLOW STEM AUGER

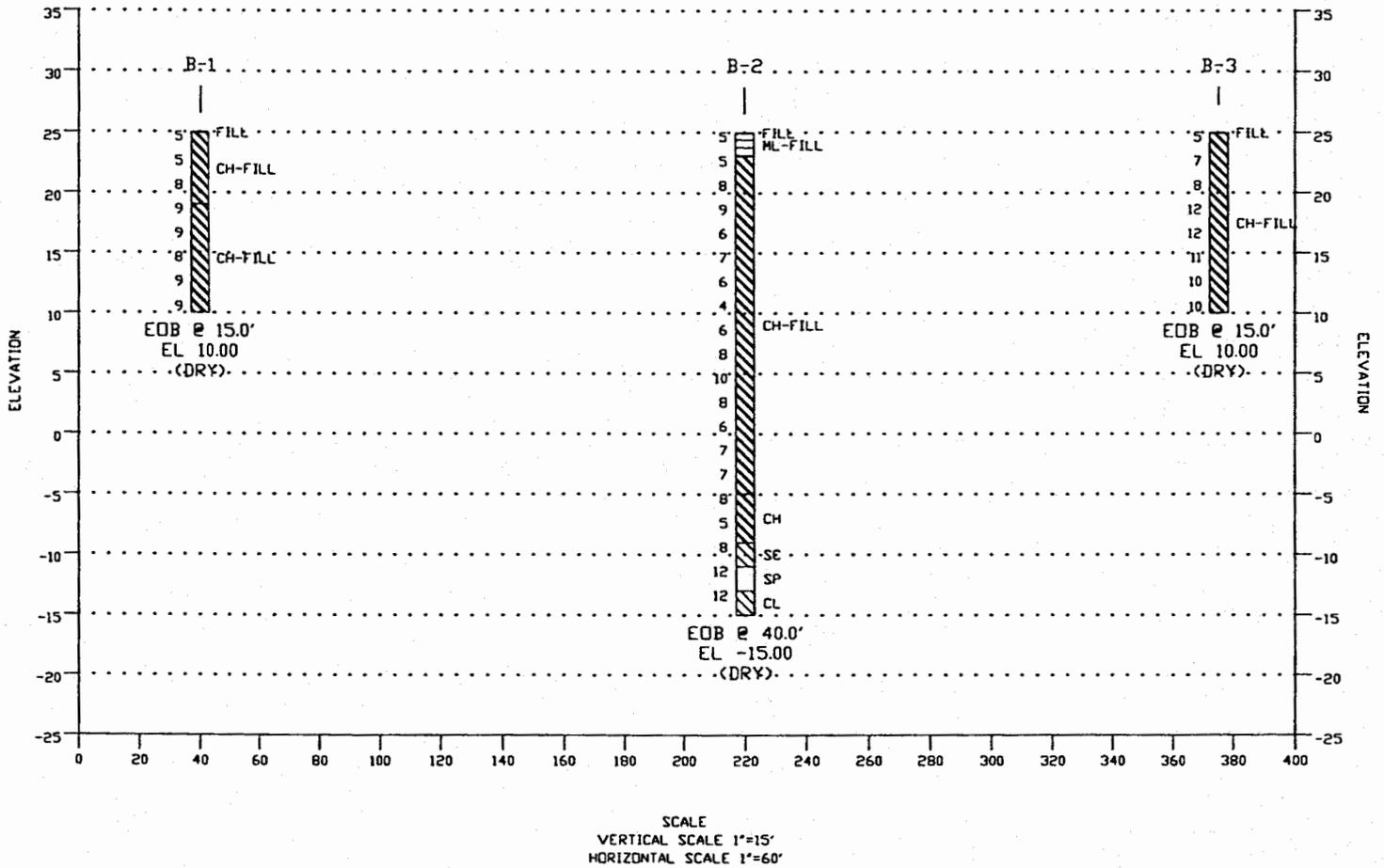
CLIENT DOMINION LAND MANAGEMENT CO.	JOB # 6221	BORING # B-3	SHEET 1 OF 1	ECS LTD
PROJECT NAME GOVERNOR'S LAND DAMS (EMBANKMENT EVAL.)	ARCHITECT-ENGINEER AES, INC.			

SITE LOCATION
WINGFIELD LAKE DAM, JAMES CITY CO., VA



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

▽WL	WS OR (WD)	BORING STARTED	10-23-00	
▽WL(AB)	▽WL(AC)	BORING COMPLETED	10-23-00	CAVE IN DEPTH ●
▽WL		RIG FISHBURNE FOREMAN ED		DRILLING METHOD HOLLOW STEM AUGER



PREPARED FOR:

DOMINION LAND MGMNT. CO.



GENERALIZED CROSS SECTION

WINGFIELD LAKE
 GOVERNOR'S LAND DAMS
 JAMES CITY COUNTY, VIRGINIA

ECS, LTD. PROJECT NO. 6221

Memorandum

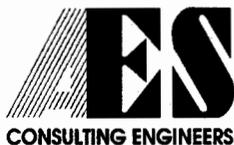
DATE: April 23, 2003
TO: Scott Thomas
FROM: Victoria Bains
SUBJECT: Wingfield Lake Timber Structure, County BMP ID Code: JR031

In response to your letter dated February 17, 2003 AES Consulting Engineers has taken several actions.

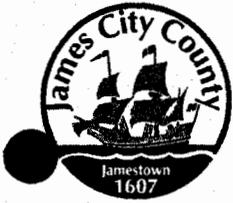
Construction Certification:
No further action required.

Record Drawings:
No further action required.

Construction – Related Items:
Organic material and debris was cleared for approximately 30 feet out from the timber wall on both the upstream and downstream sides. Rock filter was reestablished that surrounds the riser and stone on downstream side was replaced. Outflow protection was reestablished per approved plans.



5248 Olde Towne Road • Suite 1 • Williamsburg, Virginia 23188
(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com



DEVELOPMENT MANAGEMENT

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

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

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

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

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

February 17, 2003

Mr. James H. Bennett
Governors Land Associates
9701 Mill Pond Run
Toano, Va. 23168

*Reinspect
6-2-03*

Re: Governor's Land - Wingfield Lake
County Plan No. S -21-93
Timber Crib Wall
County BMP ID Code: JR 031

Dear Mr. Bennett:

The Environmental Division has reviewed a record drawing as submitted to our office for the above referenced BMP facility. The record drawing provides as-built information for a timber crib wall situated in a wooded area east of the cul-de-sac at the end of Wingfield Lake Road.

Based on our review of the project and a concurrent field inspection as performed on January 24th 2003, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility at the site:

Construction Certification:

- ✓ Action*
1. Based on a review of the approved plan and active file for the project, there appears to be no construction certification requirement imposed on this BMP.

Record Drawing:

- ✓ OK
6-26-03*
2. The record drawing set dated March 20th 2002 is **satisfactory**. Please forward one reproducible and one blue/black line set of the record drawings to our office

Construction - Related Items:

- ✓ OK
6-2-03*
3. Clean and remove accumulated vegetation, sediment and organic material from the rock filter which surrounds the riser structure. Inflow through the low flow orifice shall not be obstructed.

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

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Joe Buchite at 757-253-6643 if you have any further comments or questions.

Sincerely,



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

cc: Marc Bennett, AES - via fax
Joe Buchite, JCC Environmental Division Inspector

G:\AsBuilts\S2193.jr031

Scott Thomas

From: Scott Thomas
Sent: Wednesday, November 08, 2000 2:13 PM
To: Mike Woolson
Subject: Governors Land BMP's

Mike

Here are my comments for the 3 BMP facilities we looked at in Governors Land on October 25th.

JR 017 Governors Land - Wingfield Lake

Description: Large lake (wet pond) at end of John Vaughan and Wingfield Lake Roads.

1. Certification of the constructed pond fill embankment is requested.
2. Clean and remove trees and woody vegetation on the downslope embankment. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure.
3. Clean and remove trees and vegetation within 15 feet of the pond riser and clean all weirs and orifices.
4. Clean and remove vegetation and establish riprap outlet protection at the downstream pond barrel outfall.
5. Remove large, dead woody debris from the emergency spillway.
6. Remove previously installed downstream toe silt fence which is deteriorated.

JR 031 Governors Land - Wingfield Drive

Description: Timber crib detention structure in back of 3251 Wingfield Lake Road, Lot 40.

1. An 8 inch diameter tree located between the timber crib wall and riser structure has fallen and caused serious structural damage to the pretreated wood structure. The wall is 45 degree offset from vertical. Inspection by a qualified professional is required to assess the structural and stormwater integrity of the timber crib wall and outlet barrel pipe and overall impact to function of the basin. A report with recommendations for action/repair is required.
2. Clean and remove all debris from along the upstream base of wall and within 15 feet of the riser.
3. Outlet protection is required at the downstream pond barrel outfall.
4. The EC-1 Type A stone (toe protection) required along the downstream edge of wall was not visible and needs installed.

JR 016 Governors Land - Travis Pond

Description: Large wet pond at end of Travis Close Road near Golf Course Hole 9.

1. Certification of the constructed pond fill embankment is requested.
2. Fill and stabilize erosion gullies which have formed on the downstream embankment.
3. Clean and remove construction debris from the downstream embankment toe and at the pond barrel outfall. A considerable amount of 1 to 3 foot size concrete rubble was present and is severely restricting outflow from the pond barrel and may have damaged the pipe.
4. The valve control mechanism was not visible on the concrete riser. The design plans requires a 12 inch PVC dewatering pipe with a 6 inch butterfly valve. It is unclear if the drain and valve were installed since an access hatch or inspection port was not present on the riser cap.

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

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

BMP ID # JR031 PIN 4420100016 Responsible Party: GOVERNORS LAND

Site Address: 3231 WINGFIELD LAKE ROAD District: 3

Location (other):

Date: 2/16/2010 Inspector: TC

(3 or 4 requires attention):

Structure Type: **Manufactured BMP****Total Score 4**

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
1. Forebay Score:	0	(see PLAN)
2. Inlet(s):	2	
*3. Outlet:	1	Erosion at the outlet discharge point install Rip RAP at discharge (12')
*4. Principal Spillway:	4	The riser structure has failed, inspect and develop a plane for repair. Remove all trees and woody vegetation within 10' of the riser. Remove riser AND re-install AND ENCASE in concrete. SEAL Barrel at timber wall
5. Emergency Spillway:	2	
6. Basin Bottom and Side Slopes:	1	
7. Safety Devices:	0	
*8. Embankments:	3	The timber wall is eroded and allows stormwater flow underneath. Remove all trees and woody vegetation within 10' of the wall. Remove sheeting on timber wall ENDS and drive 8' sheeting to replace sheeting
*9. Structural Components:	2	Settling cracking bulging misalignment or deterioration
*10. Media:	0	

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

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

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
11. Routine Maintenance:	2	
12. Condition of Aquatic Environment:	0	
13. Vegetation:	1	
*14. Storage Volume:	1	
15. Debris/Sediment Accumulation:	2	Excessive woody debris, sediment or floatable material.
16. Standing Water:	1	
17. Safety and Aquatic Bench:	0	
18. Side Slope Vegetation:	0	
19. Other:	3	This BMP needs urgent repairs. Please contact the Stormwater Division.

Checked below identify corrective work required on your stormwater management facility.

- Remove all trees and other woody vegetation from the embankment (earthen dam) and also within 10' of the toe of the embankment slope.
- Remove all trees and other woody vegetation from within 10' of the principal spillway, any principal inlet devices, and the principal outfall.
- Remove all trees and other woody vegetation from within 10' of any inlet structures, such as: pipes, end sections, concrete channels, flumes, rip rap channels, etc.
- Remove all trees and other woody vegetation from within the emergency spillway and also from within 10' of the spillway.
- Investigate the cause of any settlement, sink holes, subsidence, or erosion, noted on the report and develop and implement an appropriate plan to correct the deficiencies noted permanently.
- Remove all accumulated sediment, leaves and debris from within any pipes, end sections, concrete channels, emergency spillways, flumes, rip rap channels, etc. and dispose of the material in an appropriate method and location.
- Stabilize any disturbed, unstable, denuded or bare soil areas, by installing top soil and planting a permanent grass seed to establish an effective grass ground cover over these areas.
- All grassed areas of the BMP such as: access roads, emergency spillways, embankments (earthen dam), or other non-treed areas, shall be maintained at a minimum grass height of 8", and should not be subjected to low mowing.
- Trees and woody vegetation should be cut flush with the ground, and smaller trees and limbs (less than 4" dia) may be processed with a wood chipper and dispersed in natural areas.



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

Database Inventory No. (if known): VR031
 Name of Facility: Wingfield Lake - Governors Land BMP No.: 2 of 2 Date: 10/25/00
 Location: 3251 WINGFIELD LAKE RD. (End Wingfield LAKE RD - Lot 40)
3251 Wingfield LAKE RD
 Name of Owner: Governors Land Management (Commission)
 Inspector: SJ Thomas, MP Woolson
 Type of Facility: Timber Crib Dry Det
 Weather Conditions: Sunny, Cool 70's

Riser West

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

- O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory.
- Routine - The item checked requires attention, but does not present an immediate threat to the function of the BMP.
- Urgent - The item checked requires immediate attention to keep the BMP operational and prevent damage to the facility.

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes: <i>TIMBER CRIB WALL</i>				
Grass Height	X			
Vegetation Condition	X			
Tree Growth			X	<i>7" φ Tree, 5' FROM U/S SIDE OF</i>
Erosion				<i>WALL FELL & COLLAPSED WALL.</i>
Trash & Debris				<i>WALL OFFSET 12" O/S NEAR</i>
Seepage				<i>45° ANGLE. Needs repaired</i>
Fencing or Benches				
Interior Landscaping/Planted Areas: <input type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input checked="" type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions	X			
Trash & Debris	X			<i>MINOR AT BASE WALL</i>
Floating Material	X			
Erosion		X		<i>AT BASE WALL NEAR RISER</i>
Sediment	X			
Dead Plant		X		<i>Trees within interior facility</i>
Aesthetics	X			<i>Wall Collapse.</i>
Other				
<i>Approx 60' wall timber crib wall; RPA directly O/S (20')</i>				

GPIN 4420100016

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None (Detention Basin)				
Shoreline Erosion	X			
Algae	X			
Trash & Debris		X		Tree branches, litter
Sediment	X			
Aesthetics	X			
Other				
Inflow Structures (Describe Locations): <i>Riser 24" ϕ CMP with CMP Cap; Perforated Riser w/ #1 stone</i>				
Condition of Structure	X			Primary inflow
Erosion		X		Fallen tree north of riser and at riser
Trash and Debris	X			
Sediment	X			
Aesthetics	X			
Other				
Principal Flow Control Structure - Intake, Riser, etc. (Describe Location): <i>Riser 24" ϕ CMP w/ CMP CAP, Perf. Riser with No. 1 stone</i>				
Condition of Structure	X			
Corrosion	X			None
Trash and Debris		X		clean riser, cap + Adj area
Sediment				
Aesthetics				
Other				
Principal Outlet Structure - Barrel, Conduit, etc. : <i>18" CMP Barrel</i>				
Condition of Structure			X	Questionable. Fallen wall may have sheared or damaged
Settlement			X	outflow pipe.
Trash & Debris	X			
Sediment	X			
Erosion	X			
Other				
Emergency Spillway (Overflow): <i>None - Top of Wall. Crest</i>				
Vegetation				
Lining				
Erosion	X		X	EC-1 Type A o/s Toe PAD is missing
Trash & Debris				
Other				
<i>No signs of OHW overtopping wall.</i>				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	X			
Animal Burrows	X			
Graffiti	X			
Other	X			
Surrounding Perimeter Conditions:				
Land Uses	X			Good wooded condition. Natural Area
Vegetation	X			High trees. Bare/Leaves Ground
Trash & Debris	X			
Aesthetics	X			
Access /Maintenance Roads or Paths				Through lots. No distinct Access path to facility Lot 39-40.
Other				Closest Home Lot 40 200'

Remarks:

- Tree Collapse & WALL DAMAGE
 - Debris at Base wall up. Clean within 15' of riser
 - Outflow Barrel. Wall shear may have damaged.
 - Need E-1 Type A toe erosion pad.
- Damage from fallen tree questionable. Professional to assess possible damage to wall, riser & barrel.

Overall Environmental Division Internal Rating: 1 (FAILURE IMMINENT)

Signature: *Larry Thomas*
 Title: Civil Engineer Environmental Division

Date: 10/25/00



**JAMES CITY COUNTY
ENVIRONMENTAL DIVISION
BMP INSPECTION CHECKLIST
DRY POND**

Name of Facility: Grow Land Timber Structure BMP No.: _____ Date: 1/27/98
 Location: off Whitakers Island Rd
 Name of Owner: _____
 Inspector: _____
 Type of Facility: Timber Dry Structure

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.
 O.K. - the item checked is in good condition and the maintenance program is adequate.
 Routine - The item checked requires attention, but does not present an immediate threat to the BMP function.
 Urgent - The item checked requires immediate attention to keep the BMP operational and prevent damage to the facility.

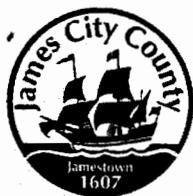
Provide an explanation and details in the comment column if routine or urgent are marked.

FACILITY ITEM	O.K.	ROUTINE	URGENT	COMMENTS
EMBANKMENTS AND SIDE SLOPES:				
Grass Height	NA			
Vegetation Condition	NA			
Erosion			✓	upstream channel eroding
Weed Growth	NA			
Trash and Debris			✓	
Lining	NA			
Safety Fencing	NA			
CONSTRUCTED WETLANDS (SHALLOW MARSH):				
Vegetation Condition	NA			
Trash and Debris				
Floatables				
Erosion				
Sediment				
Dead Plant Removal				
Water Level				
Other				
BOTTOM OF DETENTION BASINS:				
* Vegetation			✓	Needs to have dead trees removed
Erosion	NA		✓	Upstream channel eroding
Standing Water		✓		
Trash and Debris		✓		Needs debris removal near dam
Sediment		✓		" sediment " " "
Aesthetics	✓			

FACILITY ITEM	O.K.	ROUTINE	URGENT	COMMENTS
Other				
INLET STRUCTURE (DESCRIBE LOCATION):				
Condition of Structure		✓		
Erosion			✓	Outlet undermined - erosion
Trash and Debris		✓		
Sediment				
Aesthetics		✓		Channel eroding
Other				
INLET STRUCTURE (DESCRIBE LOCATION):				
Condition of Structure				
Erosion				
Trash and Debris				
Sediment				
Aesthetics				
Other				
INLET STRUCTURE (DESCRIBE LOCATION):				
Condition of Structure				
Erosion				
Trash and Debris				
Sediment				
Aesthetics				
Other				
OUTLET STRUCTURE (DESCRIBE LOCATION):				
Condition of Structure			✓	Covered w/ debris
Erosion		✓	✓	Structure undermined
Trash and Debris			✓	Outlet covered
Sediment			✓	
Aesthetics			✓	Needs debris removal
Other				
EMERGENCY SPILLWAY AND DAM:				
Vegetation	NA			
Lining		✓		Needs more riprap
Erosion				
Trash and Debris			✓	Needs removal from front face
Dam Condition				Structure being undermined by flows
Other				in several places

NUISANCE CONDITIONS AT THE FACILITY:				
Mosquito Breeding				
Animal Burrows				
Graffiti				
Other				
PERIMETER CONDITIONS AT THE FACILITY:				
Grass Height				
Vegetation Condition				
Trash and Debris				
Aesthetics				
Other				Erosion in upstream channel

REMARKS:



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

5-21-93

County BMP ID Code (if known): IR-031

Name of Facility: Wingfield Lake East BMP No.: 2 of 2 Date: 1/24/03

Location: Governor's Land

Name of Owner: _____

Name of Inspector: Rick Hall

Type of Facility: Dry Detention - Timber crib wall

Weather Conditions: Clear, cold Type: Final Inspection County BMP Inspection Program Owner Inspection
some snow

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			<u>Natural Woodland RAVINE</u>
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches				
Interior Landscaping/Planted Areas: <input checked="" type="checkbox"/> None <input type="checkbox"/> Constructed Wetland/Shallow Marsh <input type="checkbox"/> Naturally Established Vegetation				
Vegetated Conditions				
Trash & Debris				
Floating Material				
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: <input type="checkbox"/> Permanent Pool (Retention Basin) <input type="checkbox"/> Shallow Marsh (Detention Basin) <input checked="" type="checkbox"/> None, Dry (Detention Basin)				
Shoreline Erosion				
Algae				
Trash & Debris				
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations): <i>STREAM CHANNEL</i>				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	NA			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): <i>GAT. RISER</i>				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. : <i>CMP - 18"</i>				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓	✓		<i>NOT APPARENT, CHANNEL</i>
Other				
Emergency Spillway (Overflow): <i>PART OF RISER, OR TOP OF WALL.</i>				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other				
Surrounding Perimeter Conditions:				
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths		✓		No direct access
Other				

Remarks:

Wall is in good condition, appears to have been recently rebuilt.
 Riser cap is approx. one foot higher than top of wall.
 Stone around riser base is laden with sediment.
 No outlet protection.

Overall Environmental Division Internal Rating: 3

ST 2-14-03

Signature: *Rick Hall*
 Title: Envir. Specialist

Date: 1/24/03

Date Record Created:

WS_BMPNO:

Print Record

Created By:

JR031

PRINTED ON
Thursday, March 11, 2010
1:04:36 PM

WATERSHED JR
 BMP ID NO 031
 PLAN NO S-21-93
 TAX PARCEL (44-2)(1-16)
 PIN NO 4420100016
 CONSTRUCTION DATE 1/1/1990
 PROJECT NAME Governors Land -Wingfield Lake Rd.
 FACILITY LOCATION 3251 Wingfield Lake Road (behind Lot 40)
 CITY-STATE Williamsburg, Va. 23185
 CURRENT OWNER Governors Land Management Co.
 OWNER ADDRESS 2700 Two Rivers Road
 OWNER ADDRESS 2
 CITY-STATE-ZIP CODE Williamsburg, Va. 23185
 OWNER PHONE
 MAINT AGREEMENT Yes
 EMERG ACTION PLAN No

MAINTENANCE PLAN

SITE AREA acre

LAND USE

old BMP TYP

JCC BMP CODE

POINT VALUE

SVC DRAIN AREA acres

SERVICE AREA DESCRI

IMPERV AREA acres

RECV STREAM

EXT DET-WQ-CTRL

WTR QUAL VOL acre-ft

CHAN PROT CTRL

CHAN PROT VOL acre-ft

SW/FLOOD CONTROL

GEOTECH REPORT

No
 1444
 Res Planned Com
 Timber Crib Wall
 F1 Timber Walls
 2

35

SF Lots and Roadways Governors Land

UT to James River

Yes 0

No 0

Yes

No

CTRL STRUC DESC

CTRL STRUC SIZE inches

OTLT BARRL DESC

OTLT BARRL SIZE inch

EMERG SPILLWAY

DESIGN HW ELEV

PERM POOL ELEV

2-YR OUTFLOW cfs

10-YR OUTFLOW cfs

REC DRAWING

CONSTR CERTIF

LAST INSP DATE 1/24/2003

INTERNAL RATING

MISC/COMMENTS

Timber crib wall in woods. Repaired due to fallen tree.

CMP Riser

24

CMP Barrel

18

No

10.9

None

1.00

22.74

Yes

No

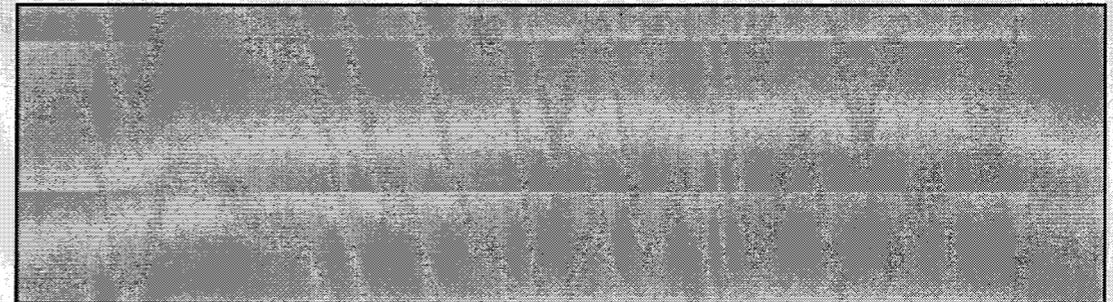
Inspected by:

3

Get Last BMP No

Return to Menu

Additional Comments:



MEMORANDUM

To: Stormwater Scanned Documents - BMP Record Drawings
From: Patrick Menichino, Stormwater Specialist
Date: January 25, 2012
Subject: Governor's Land Timber Wall BMP
BMP ID#: JR-031

This BMP has been altered or modified from its original design and the changes were:

- ✓ Reviewed and approved by the Stormwater Division.

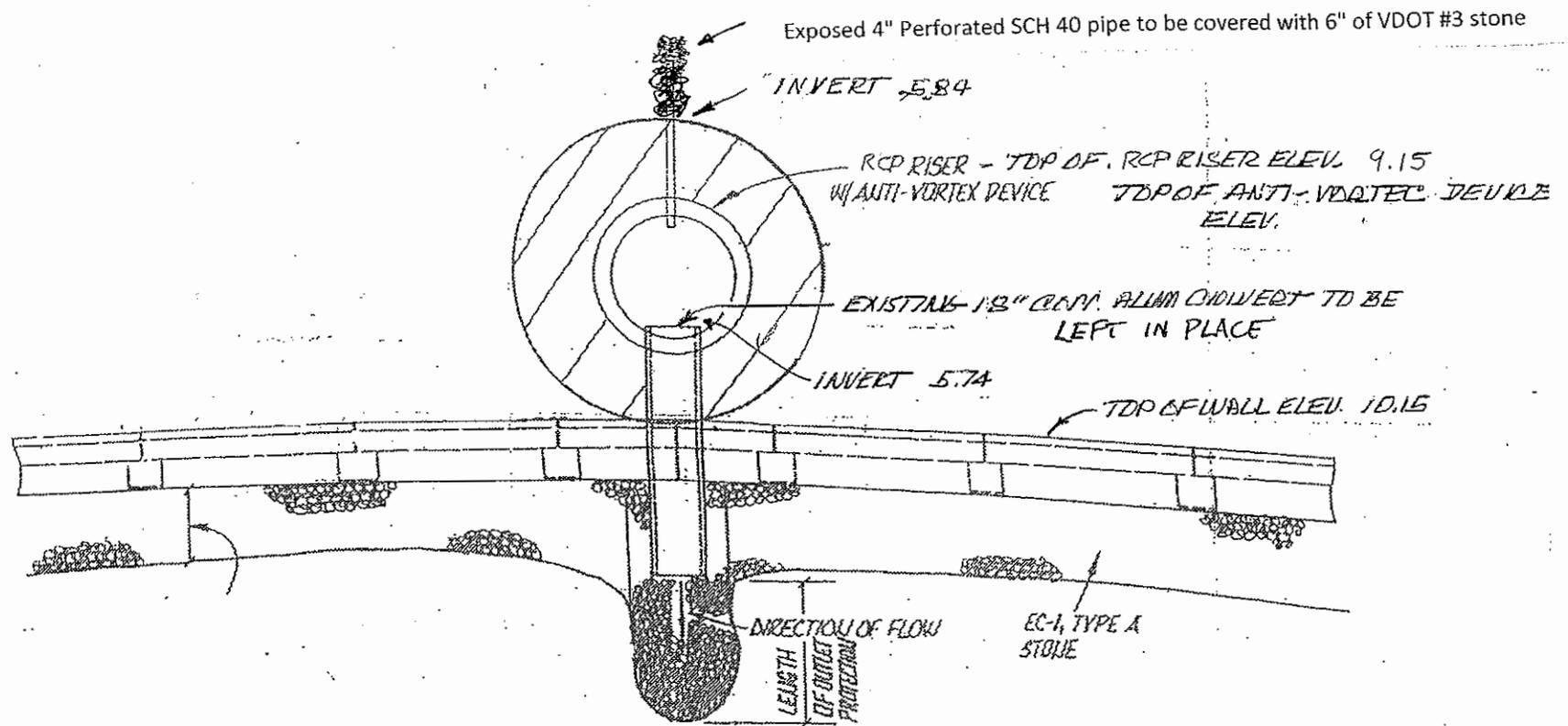
Not approved by the Stormwater Division.

Comments:

Field inspection of this BMP revealed that the Timber Wall was severely undermined do to flaws in the original design. Governor's Land through its contractor provided a revised design for the structure and completed the structural changes in the field in August 2011.

These changes do not affect the stormwater hydraulics of the facility.

(See Modification Plan dated 5/3/11)



CONSTRUCTION NOTES:

Riprap Class I will be placed on the downstream side
And under laid with filter fabric.

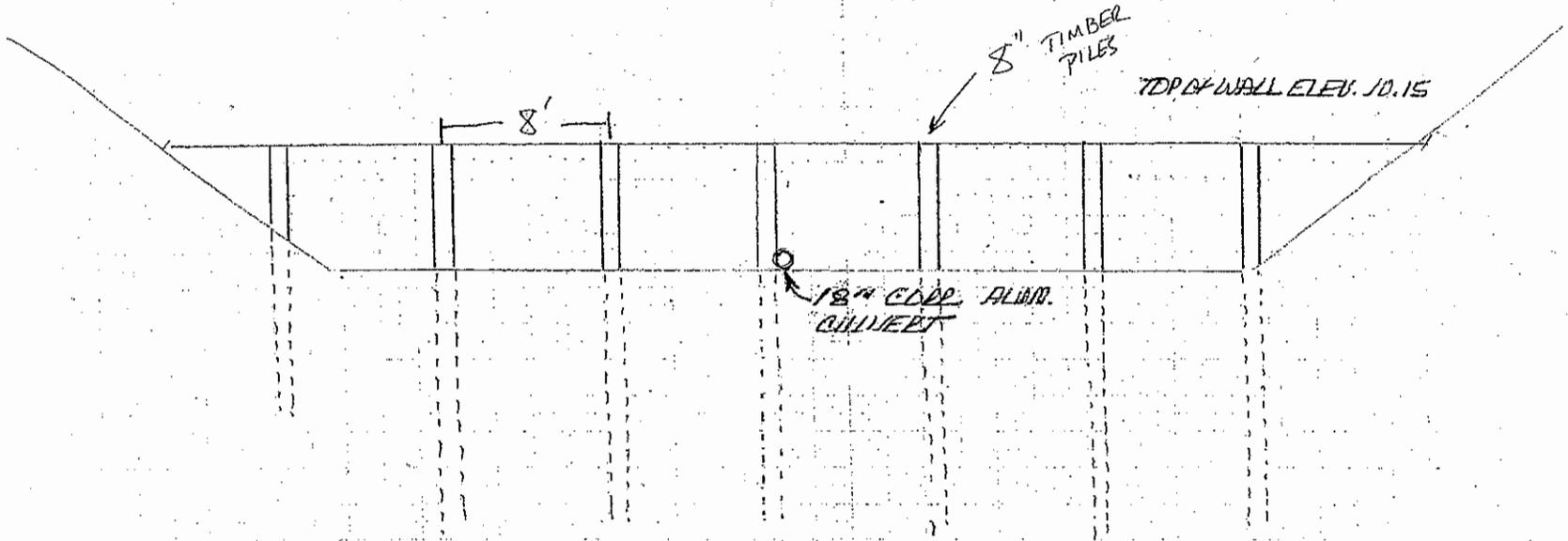
Filter fabric will be installed on the upstream
Side of the 2 X 6 sheeting from the wall crest to 4'
Below existing grade.

Approved by: *PTM*
5/3/11

2011 Modifications to Governor's
Land BMP Structure # J2031
James City County, Virginia
29-Apr-11
Henry S. Branscome, LLC

ELEVATION
GOVERNOR'S LAND
TIMBER WALL REPAIRS

TOTAL WALL
WIDTH VARIES



EMBEDMENT LENGTH = 2X VISIBLE LENGTH
FOR BOTH PILES AND SHEETING

Contractor to verify that T & G wall is tight
@ 4' below existing grade.

SEE CROSS SECTION
FOR WALL DETAILS

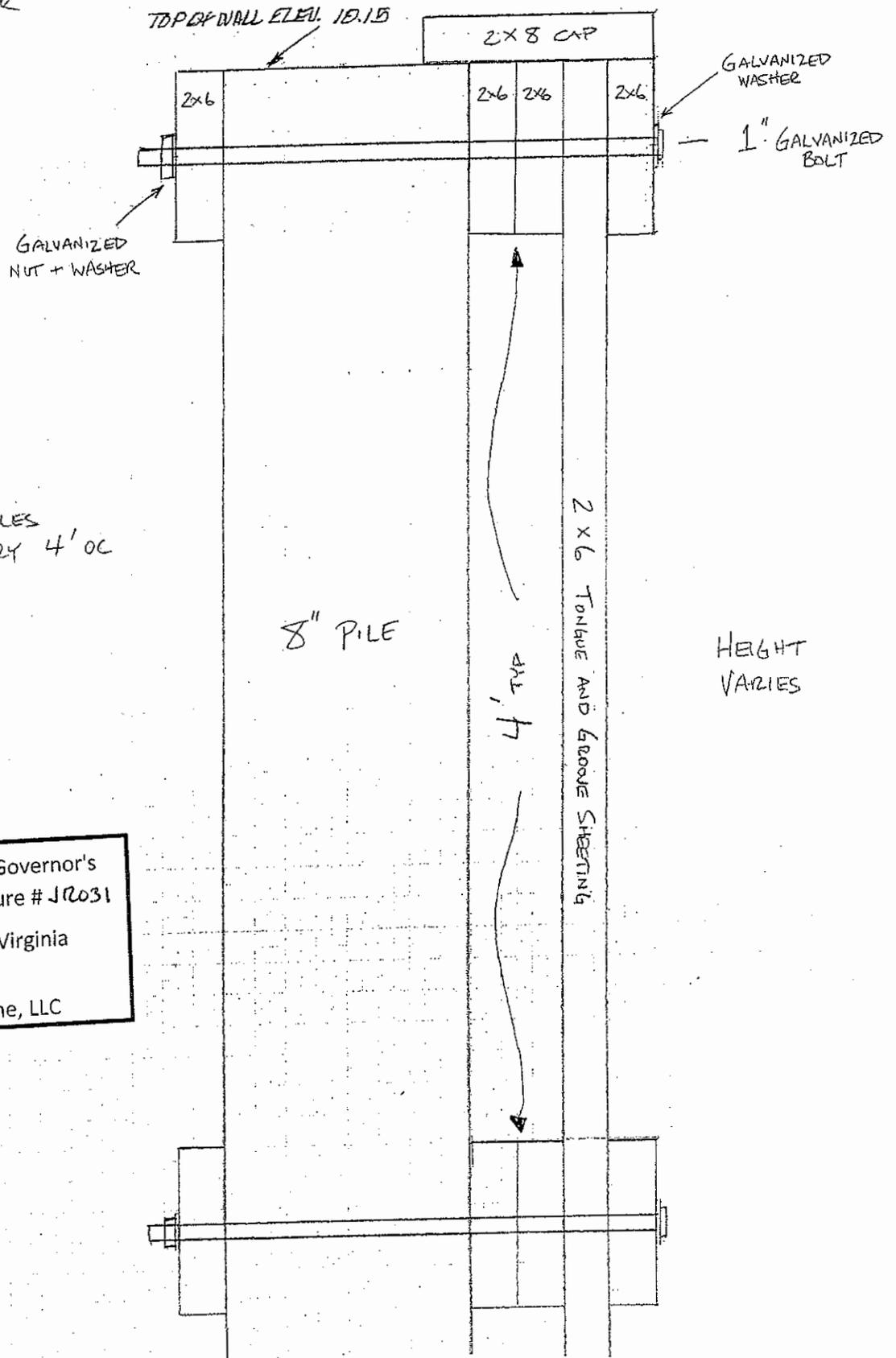
HENRY S. BRANSCOME, LLC
4/19/11

2011 Modifications to Governor's Land BMP Structure # JR031 James City County, Virginia 29-Apr-11 Henry S. Branscome, LLC

1" = 10'

HENRY S. BRANSCOME, LLC
GOVERNOR'S LAND TIMBER
WALL REPAIRS
4/19/11

JR031



* CONNECTION TO PILES
TO BE MADE EVERY 4' OC

8" PILE

4' TYP

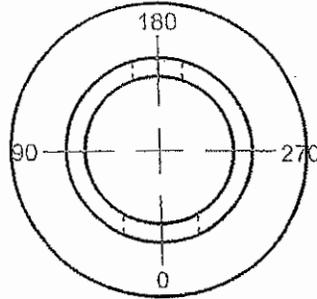
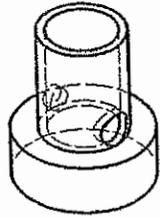
2 X 6 TONGUE AND GROOVE SHEETING

HEIGHT
VARIES

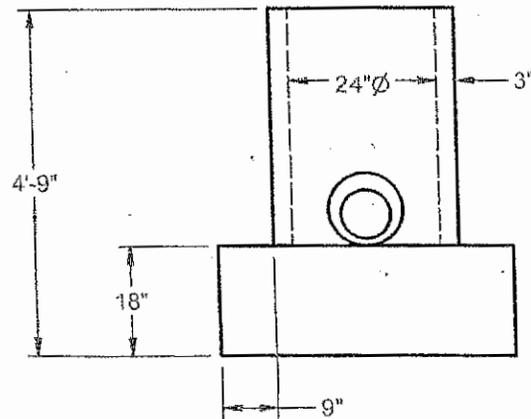
2011 Modifications to Governor's
Land BMP Structure # JR031
James City County, Virginia
29-Apr-11
Henry S. Branscome, LLC

1" = 5"

24" I.D. BMP STRUCTURE # JR031
1 ea



2011 Modifications to Governor's
Land BMP Structure # JR031
James City County, Virginia
29-Apr-11
Henry S. Branscome, LLC



FG = 9.15

APTB = 3.26

ITB = 5.57

SPECIFICATIONS

- 1 BASE STEEL - #4 @ 8" O.C.E.W. (Top);
- 2 WALL STEEL - PER ASTM C76 CL. III
- 3
- 4
- 5
- 6 4000 PSI CONCRETE, GRADE 60 STEEL
- 7 NO STEPS

- SPECIAL NOTES:
- 1 NO COATING REQUIRED
 - 2 TRASH RACK BY CONTRACTOR

PC #	WEIGHT	PIECE DESCRIPTION	PRODUCT CODE
1	3648	24" I.D. X 4'-9" BASE SECTION	

PC #	DEG/ DIR	PIPE SIZE	PIPE INVERT	HOLE SIZE	BOOT TYPE	HOLE INVERT	HOLE RAISE
1	0	18" core ALUM	5.74	20	NONE	5.57	24" C/L
1	180	4 PVC	5.84	8	KNT S006-5	5.67	23 1/2" C/L

GOVERNORS LAND DESIGN BY: RS
HENRY S. BRANSCOME LLC DATE: 4/20/2011

ORDER #: 10383813 SCALE: 1:30
REVISD DATE: DESCRIPTION:

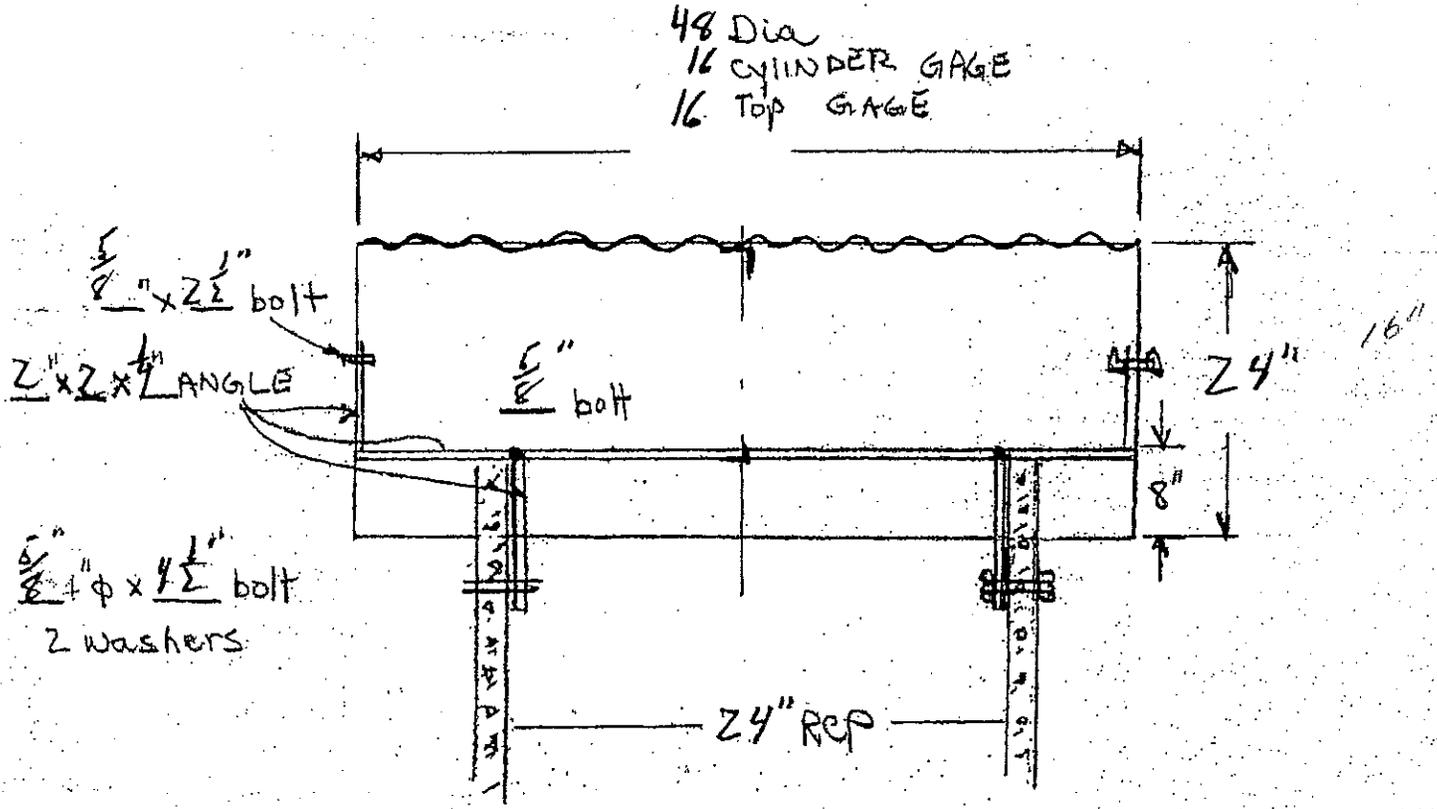


10383813.JR031.iaw

4/20/2011

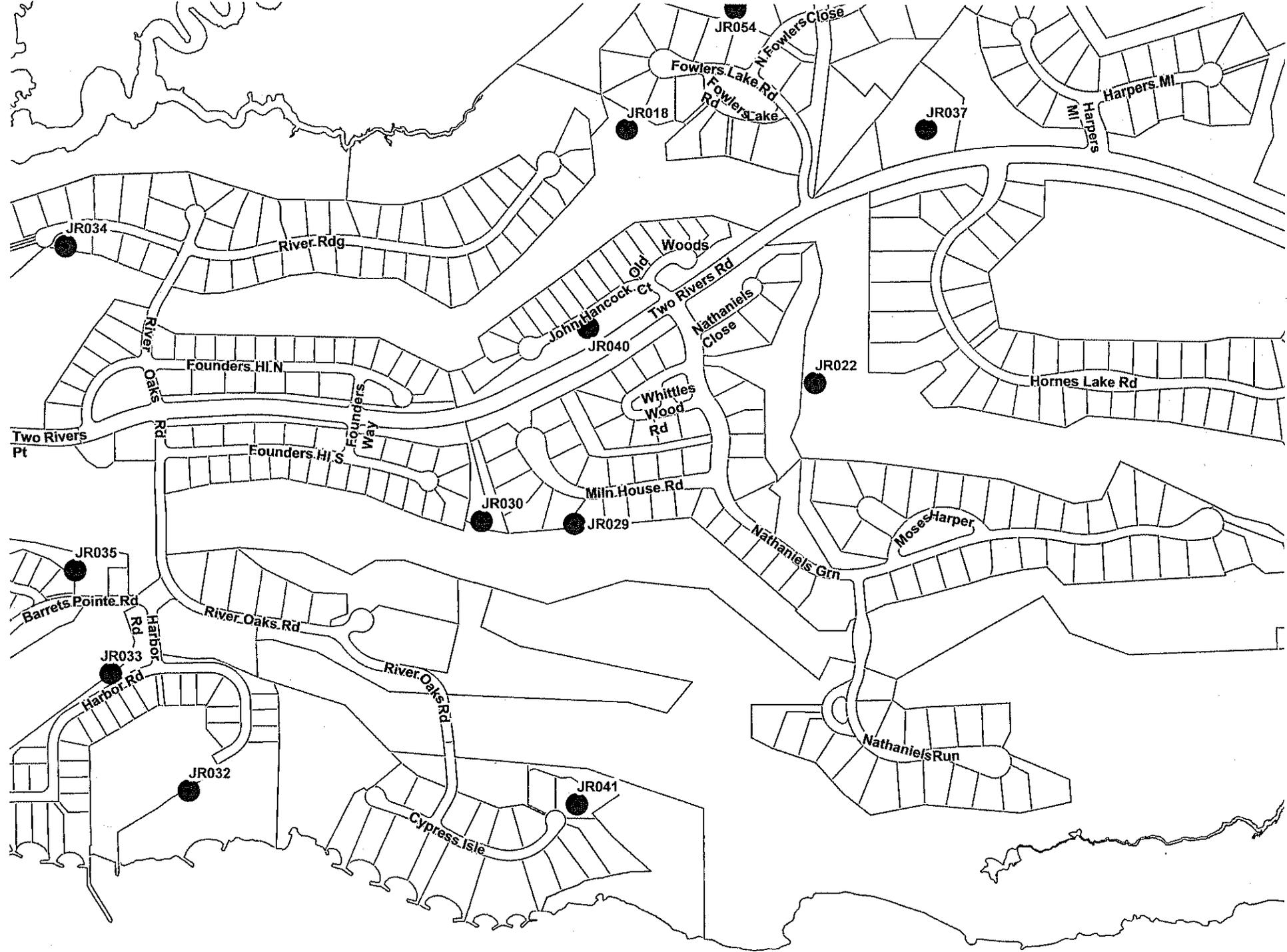
R-048-05-00-MH-T-SE-M-0-0

CONTRACTOR TO PROVIDE ACCESS
HATCHES ON ALL ANTI-
VORTEX STRUCTURES



Approved by: *PM*
5/3/11

2011 Modifications to Governor's	JR045
Land BMP Structure # →	JR031
James City County, Virginia	JR027
29-Apr-11	
Henry S. Branscome, LLC	



JR018

JR054

JR037

JR034

River Rdg

Woods

John Hancock Ct

JR040

Whittles Wood Rd

JR022

Hornes Lake Rd

Founders HI N

Founders HI S

Mill House Rd

JR030

JR029

Nathaniel's Grn

Mose Harper

JR035

Barretts Pointe Rd

River Oaks Rd

JR033

Harbor Rd

River Oaks Rd

JR032

JR041

Nathaniel's Run

Cypress Isle



JR025

JR045

JR026

JR023

JR016

JR056

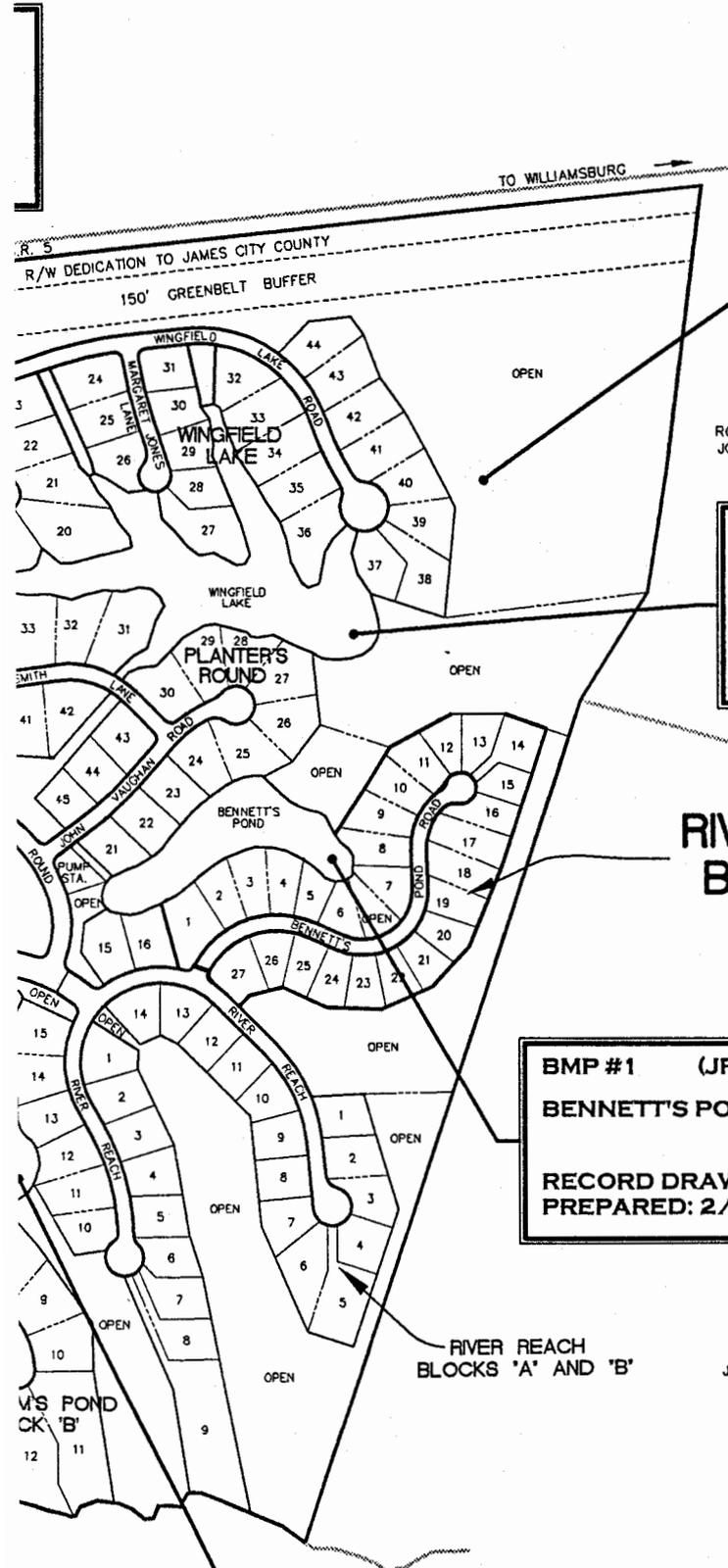
JR055

JR027

JR019

JR028

JR020



BMP #8 (JR031)
TIMBER STRUCTURE

RECORD DRAWING
PREPARED: 3/02

N/F
ROBERT H.
JONES JR.

BMP #18 (JR017)
WINGFIELD LAKE

RECORD DRAWING
PREPARED:

RIVER REACH
BLOCK 'C'

BMP #1 (JR021)
BENNETT'S POND

RECORD DRAWING
PREPARED: 2/02

N/F
JANICE LEE INGRAM

BMP #17 (JR020)
KITCHUM'S POND