POOR QUALITY

ORIGINAL(S) FOLLOW

THIS IS THE BEST COPY AVAILABLE

VCE DOCUMENT CONVERSION

JR 030

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 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
Structure/BMP Name: TIMBER DRY DETENTION
Project Location: TWO RIVERS ROAD APPROXIMATELY 6000' EAST OF CHICKAHOMINY RIVER
BMP Location: SOUTHEAST OF CUL-DE-SAC OF FOUNDER'S HILL SOUTH
County Plan No.: 5 - 29 - 95

Project Type: ☑ Residential ☐ Business ☐ Commercial ☐ Office ☐ Institutional ☐ Industrial ☐ Public ☐ Roadway ☐ Other _____

Tax Map/Parcel No.: (43-2)(8-0-1A)
BMP ID Code (if known): JR030
Zoning District:: R-4
Land Use: RESIDENTIAL / OPEN SPACE
Site Area (sf or acres): _____

Brief Description of Stormwater Management/BMP Facility:
TIMBER WALL STRUCTURE FOR STORMWATER DETENTION

Nearest Visible Landmark to SWM/BMP Facility: TEE OF 15TH FAIRWAY (LOCATED SOUTHWEST OF FACILITY)

Nearest Vertical Ground Control (if known):
☑ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☐ Other
Station Number or Name: 348
Datum or Reference Elevation: 12.79
Control Description: MAIN STATION 348
Control Location from Subject Facility: LOCATE 8000'± NORTHWEST OF FACILITY

Section 2 - Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☐ Yes ☐ No ☑ Unknown
Approx. Construction Start Date for SWM/BMP Facility: 1995
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☑ Unknown
Name of Site Work Contractor Who Constructed Facility: UNKNOWN
Name of Professional Firm Who Routinely Monitored Construction: UNKNOWN
Date of Completion for SWM/BMP Facility: 1995 (9/01/95)
Date of Record Drawing/Construction Certification Submittal: 2/02

(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
Mailing Address: 9701 MILL POND RUN
TOANO, VIRGINIA
Business Phone: 757-234-5000 Fax: 757-234-5111
Contact Person: MR. JIM 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: V. MARC BENNETT
Title: SENIOR PROJECT MANAGER
Plan Name: FOUNDER'S HILL (BM3, POD 3)
Firm's Project No. 7173
Plan Date: MARCH 1995
Sheet No.'s Applicable to SWM/BMP Facility: 10 / 13 / ____ / ____ / ____

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

UNKNOWN
Name:
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: 5248 OLDE TOWNE ROAD, 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: 2/22/02

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

COMMONWEALTH OF VIRGINIA
VAN MARC BENNETT
No. 26628
PROFESSIONAL ENGINEER

V. Marc Bennett (Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

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

Name: _____
Title: _____

Signature: _____
Date: _____

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

_____ (Seal)

Virginia Registered Professional Engineer

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.

N/A 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.

N/A 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.

INC 8. Elevation of the principal spillway crest or outlet crest of the structure.

xx 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.

xx 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.

N/A 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacings (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

N/A 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**

N/A 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**

Xx 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.

Xx 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.

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.

Xx 20. BMP vicinity properly cleaned of stockpiles and construction debris.

Xx 21. No visual signs of erosion or channel degradation immediately downstream of facility. (REPAIRED

INC 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.)*

N/A 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.

N/A 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)*

N/A B1. Same requirements as Group A Wet Ponds.

____ B2. Minimum 2:1 length to width flow path provided across the facility.

____ B3. Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep).

____ B4. Wetland type landscaping provided in accordance with approved plan. Includes correct pondscaping zones, plant species, planting arrangements, wetland beds, etc. Wetland plants include 5 to 7 emergent wetland species. Individual plants at 18 inches on center in clumps.

____ B5. Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures).

____ B6. No more than one-half (½) of the wetland surface area is planted.

____ B7. Topsoil or wetland mulch provided to support vigorous growth of wetland plants.

N/A 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)*

XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.

XX F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.

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.

XX F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.

XX F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.

INC F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.

XX 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.

XX 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. (REPAIRED)

XX F15. No visual signs of erosion or channel degradation immediately downstream of facility. (REPAIRED)

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.

James City County, Virginia
Environmental Division

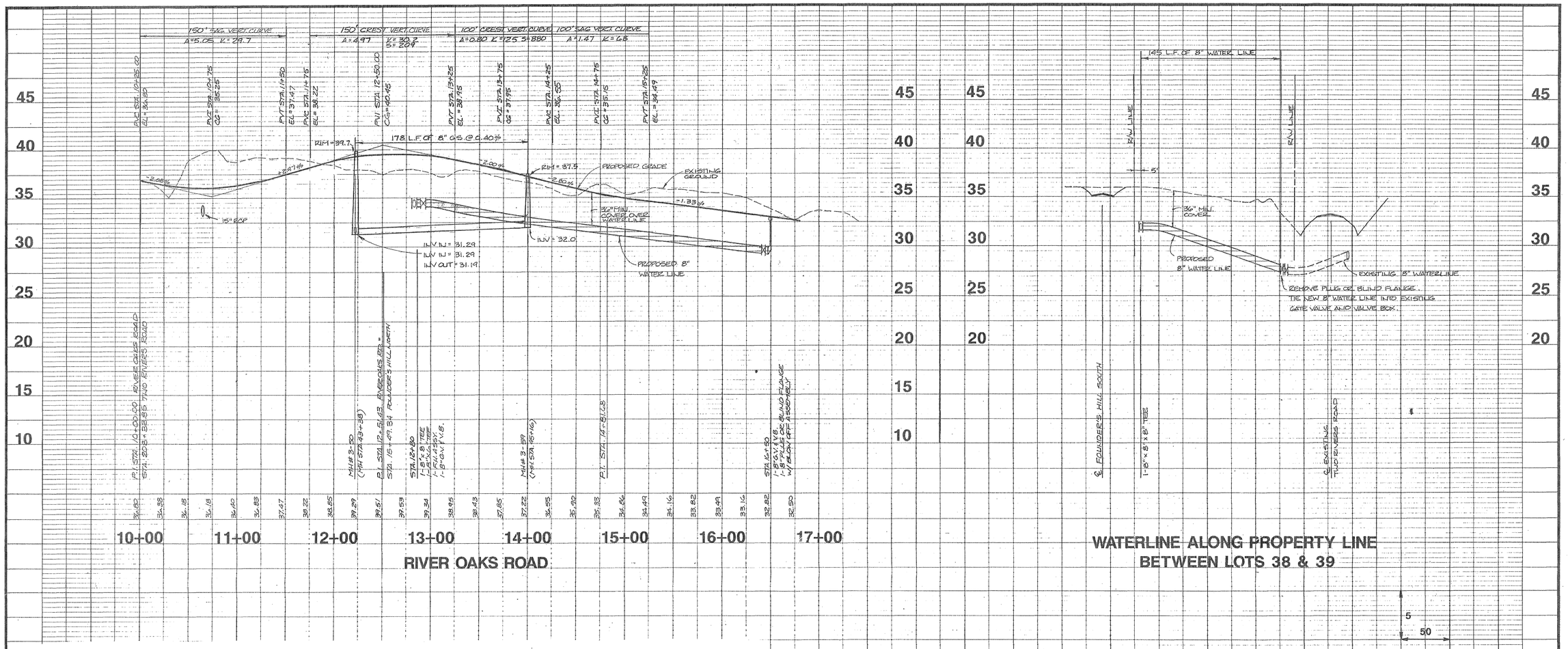
Stormwater Management/BMP Facilities
Record Drawing/Construction Certification
Review Tracking Form

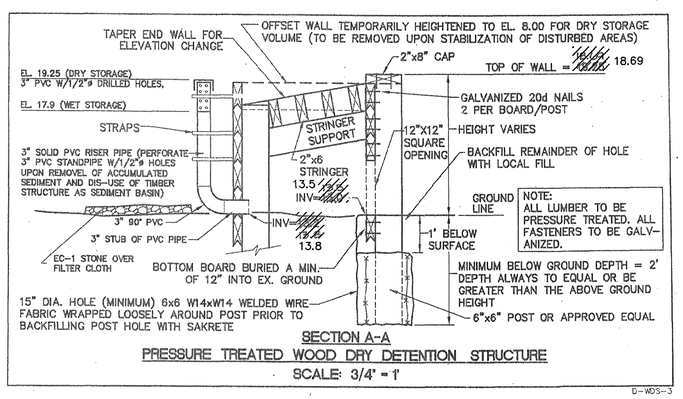
County Plan No.: S-29-95 BAY 3 POND 3
Project Name: Governors Land - Founders Hill
Stormwater Management Facility: Timber Crib Wall (EAST OF 1750 Founders Hill South)
Phase: ☐ I ☐ II ☐ III

- ☑ Information Received. Date: 02/22/02
- ☑ Administrative Check.
  - ☑ Record Drawing Date: 02/19/97
  - ☐ No Construction Certification Date: Required.
  - ☑ RD/CC Standard Forms (Required after Feb 1st 2001Only)
  - ☐ Insp/Maint Agreement Info: CAN'T FIND IN LOG;
  - ☐ BMP Maintenance Plan Location: NO RQD.
  - ☐ Other:
- ☑ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
  ☑ Yes ☐ No Location: Note #18, Sheet 9 required AB+CC
- ☑ Assign County BMP ID Code Code: JR030
- ☑ 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: 2/5/03 RH.
- ☑ Record Drawing (RD) Review Date: 1/9/03 RH
- ☑ Construction Certification (CC) Review Date:
- ☑ Actions:
  - ☐ No comments.
  - ☐ Comments. Letter Forwarded. Date: 2/18/03 SJT.
    - ☐ Record Drawing (RD)
    - ☑ Construction Certification (CC)
    - ☑ Construction-Related (CR)
    - ☐ Site Issues (SI)
    - ☐ Other :
- ☐ Second Submission: 5/16/03 AES CRD
- ☐ Third Submission:
- ☐ Acceptable for stormwater managment 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.
- ☐ Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable

Plan Reviewer: [signature] P.E. Date: 6/26/03



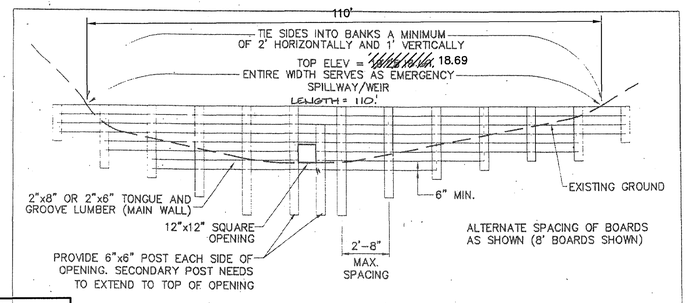


SECTION A-A

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 3/4" = 1'

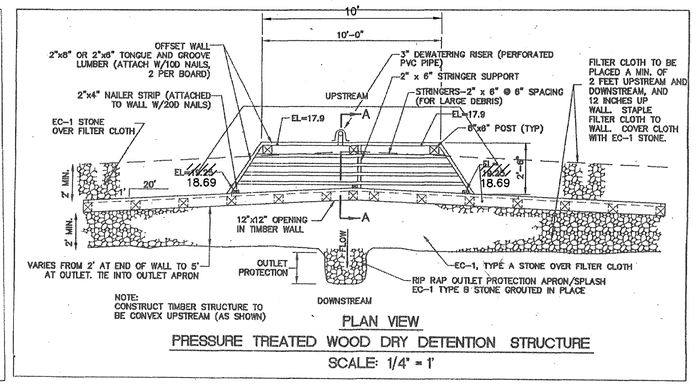
D-WDS-3



UPSTREAM ELEVATION

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 1/4" = 1'



PLAN VIEW

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 1/4" = 1'

BMP TIMBER STRUCTURE

BMP TIMBER STRUCTURE TO INITIALLY FUNCTION AS A TEMPORARY DAM FOR SEDIMENT CONTAINMENT. THE TIMBER STRUCTURE'S MAIN WALL AND OFFSET WALL SHALL BE INITIALLY CONSTRUCTED TO A TOP ELEVATION OF 19.25. A 3" PVC RISER PIPE SHALL BE PERMANENTLY ATTACHED TO THE OFFSITE WALL. THE TOP 1'-4" OF THE 3" RISER PIPE SHALL BE PERFORATED WITH 1/2" DIAMETER HOLES (EVERY 3-4"). THE SEDIMENT CONTAINMENT AREA SHALL HAVE A WET STORAGE VOLUME OF 965 CY (APPROXIMATELY EL 17.9), AND AN ADDITIONAL DRY STORAGE OF 1,248 CY (APPROXIMATELY EL 19.25).
ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN SEDIMENT VOLUME EQUALS 483 CY (APPROXIMATELY EL. 16.75).

UPON STABILIZATION OF UPSTREAM AREAS, ALL ACCUMULATED SEDIMENT SHALL BE REMOVED. THE TOP OF THE UPSTREAM FACE OF THE OFFSET WALL SHALL BE LOWER TO EL 17.9. THE END WALLS OF THE OFFSET WALL SHALL BE TAPERED TO SPECIFIED ELEVATIONS. STRINGERS ARE TO BE PLACED BETWEEN END WALLS OF OFFSET WALL. PERFORATED PORTION OF 3" PVC RISER TO BE REMOVED. REMAINDER OF 3" PVC RISER TO BE PERFORATED WITH 1/2 DIAMETER HOLES (EVERY 3-4").

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], P.E. 2/22/05 (SEAL)

VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

APPROVED
James City County
Environmental Division
By: [signature]
Date: 6-6-05

RECORD DRAWING - 2/19/97

No.	DATE	REVISION / COMMENT / NOTE	BY
4	2/19/97	RECORD DRAWING	VMB
3	12/19/97	RECORD DRAWINGS	VMB
2	6/1/95	REVISIONS AS PER OWNER	VMB
1	5/1/95	GENERAL REVISIONS & REDESIGN	VMB

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

PROFILE - RIVER OAKS ROAD
FOUNDER'S HILL (BAY 3, POD 3)
THE GOVERNOR'S LAND at Two Rivers
JAMES CITY COUNTY
POWHATAN DISTRICT
VIRGINIA

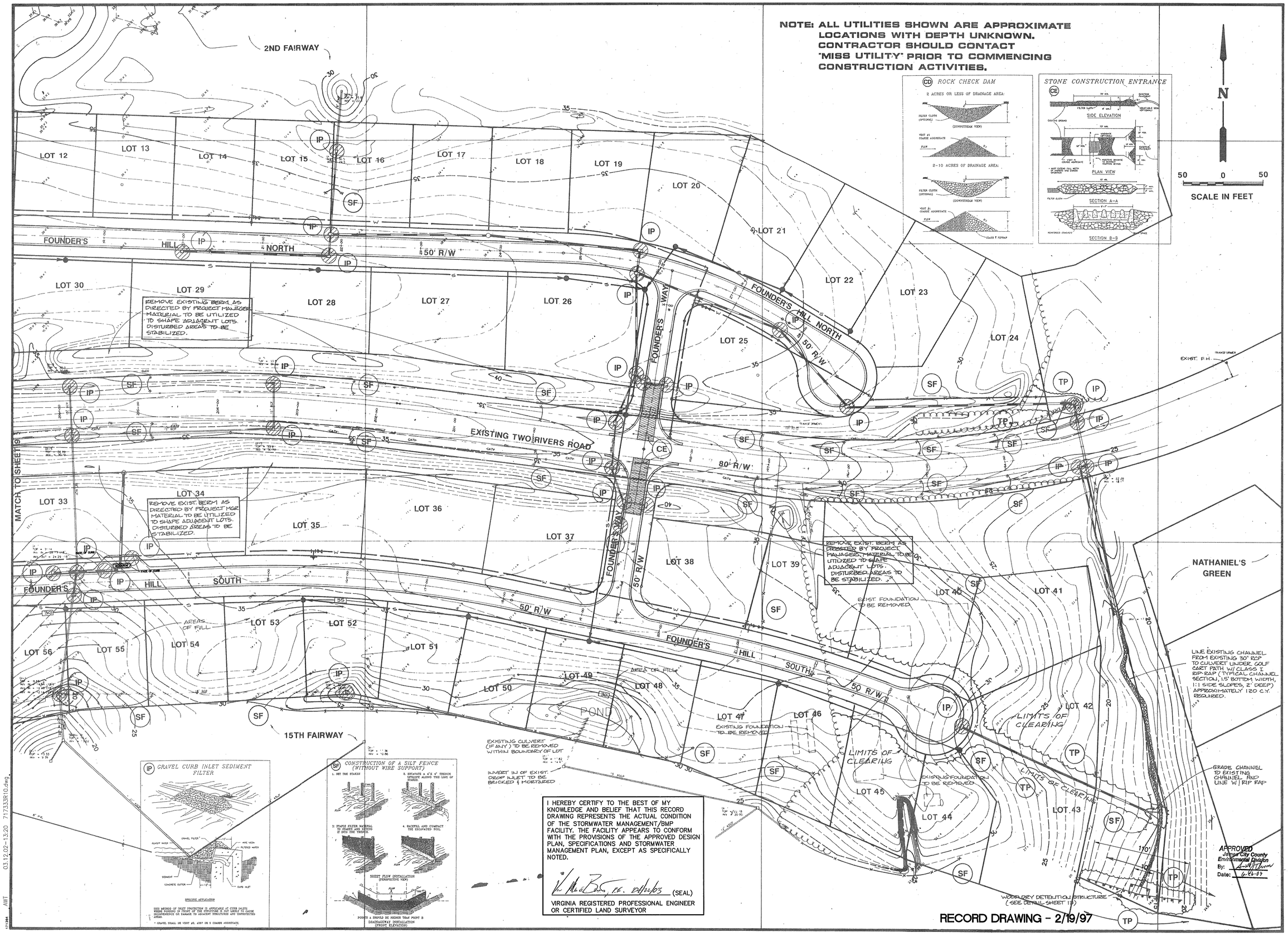
Designed	Drawn
VMB	AES
Scale	Date
NOTED	MAR., 1995
Project No.	
7173	
Drawing No.	
13	

RECORD DRAWING 2/19/97

03.12.02-13:21 717333R13.dwg

AWT

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS WITH DEPTH UNKNOWN. CONTRACTOR SHOULD CONTACT "MISS UTILITY" PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.



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.

_____, P.E., 02/20/03 (SEAL)

VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

APPROVED
James City County Environmental Division
By: _____
Date: 6-26-03

RECORD DRAWING - 2/19/97

No.	DATE	REVISION / COMMENT / NOTE	BY
4	2/19/97	RECORD DRAWING	VMB
3	2/14/97	RECORD DRAWINGS	VMB
2	6/15	REVISIONS AS PER OWNER	VMB
1	5/95	GENERAL REVISIONS AND REDESIGN	VMB

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

AES CONSULTING ENGINEERS

GRADING AND EROSION CONTROL PLAN
FOUNDER'S HILL (BAY 3, POD 3)
THE GOVERNOR'S LAND at Two Rivers
JAMES CITY COUNTY, VIRGINIA
POWHATAN DISTRICT

Designed	Drawn
VMB	AES
Scale	Date
1"=50'	MAR., 1995
Project No.	
7173	
Drawing No.	
10	

03.12.02-13:20 717333R10.dwg
AWT
173264

NOTE: ALL UTILITIES SHOWN ARE APPROXIMATE LOCATIONS WITH DEPTH UNKNOWN. CONTRACTOR SHOULD CONTACT "MISS UTILITY" PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.

2ND FAIRWAY

LOT 12 · LOT 13 · LOT 14 · LOT 15 · LOT 16 · LOT 17 · LOT 18 · LOT 19 · LOT 20 · LOT 21 · LOT 22 · LOT 23 · LOT 24 · LOT 25 · LOT 26 · LOT 27 · LOT 28 · LOT 29 · LOT 30 · LOT 33 · LOT 34 · LOT 35 · LOT 36 · LOT 37 · LOT 38 · LOT 39 · LOT 40 · LOT 41 · LOT 42 · LOT 43 · LOT 44 · LOT 45 · LOT 46 · LOT 47 · LOT 48 · LOT 49 · LOT 50 · LOT 51 · LOT 52 · LOT 53 · LOT 54 · LOT 55 · LOT 56

FOUNDER'S HILL NORTH 50' R/W

FOUNDER'S HILL SOUTH 50' R/W

FOUNDER'S WAY 50' R/W

EXISTING TWO RIVERS ROAD 80' R/W

MATCH TO SHEET 9

REMOVE EXISTING BERM AS DIRECTED BY PROJECT MANAGER. MATERIAL TO BE UTILIZED TO SHAPE ADJACENT LOTS. DISTURBED AREAS TO BE STABILIZED.

REMOVE EXIST. BERM AS DIRECTED BY PROJECT MANAGER. MATERIAL TO BE UTILIZED TO SHAPE ADJACENT LOTS. DISTURBED AREAS TO BE STABILIZED.

REMOVE EXIST. BERM AS DIRECTED BY PROJECT MGR. MATERIAL TO BE UTILIZED TO SHAPE ADJACENT LOTS. DISTURBED AREAS TO BE STABILIZED.

AREAS OF FILL

EXIST FOUNDATION TO BE REMOVED

EXISTING FOUNDATION TO BE REMOVED

EXISTING CULVERT (IF ANY) TO BE REMOVED WITHIN BOUNDARY OF LOT

INVERT IN OF EXIST. DROP INLET TO BE BLOCKED & MORTARED

15TH FAIRWAY

POND

LIMITS OF CLEARING

EXIST. F.H.

NATHANIEL'S GREEN

BEGINNING OF FOUNDERS HILL

GPIN 4320800042 GOV LAND FOUNDERS HILL SOUTH

GPIN 4320800043 GOV LAND FOUNDERS HILL SOUTH

LINE EXISTING CHANNEL FROM EXISTING 30" RCP TO CULVERT UNDER GOLF CART PATH W/ CLASS I, RIP RAP (TYPICAL CHANNEL SECTION, 15' BOTTOM WIDTH, 1:1 SIDE SLOPES, 2' DEEP) APPROXIMATELY 120 C.Y. REQUIRED.

GRADE CHANNEL TO EXISTING CHANNEL AND LINE W/ RIP RAP

CLEAN OF BEAVER DAMS

INV.?

LOT 42 GPIN 4320800042 1756 FOUNDERS HILL SOUTH

LOT 43 GPIN 4320800043 1756 FOUNDERS HILL SOUTH MARY P. WATERS 0.52 AC. ZONED R4

110' · 10'

WOODLEY DETENTION STRUCTURE (SEE DETAIL SHEET 13)

SUT REVIEW SET JR030, 5-29-95

RECORD DRAWING - 2/19/97

ROCK CHECK DAM

2 ACRES OR LESS OF DRAINAGE AREA

2-10 ACRES OF DRAINAGE AREA

(CONTOURED VIEW)

STONE CONSTRUCTION ENTRANCE

SIDE ELEVATION · PLAN VIEW · SECTION A-A · SECTION B-B

GRAVEL CURB INLET SEDIMENT FILTER

SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE PONDING IN FRONT OF THE STRUCTURE IS NOT LIKELY TO CAUSE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND INFRASTRUCTURE.

* GRAVEL SHALL BE TYPE #8, #89 OR #9 COARSE AGGREGATE.

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

1. SET THE STAKES
2. EXCAVATE A 4"X 4" TRENCH UPHILL ALONG THE LINE OF STAKES
3. STAPLE FILTER MATERIAL TO STAKES AND TUCK IT INTO THE TRENCH
4. BACKFILL AND COMPACT THE EXCAVATED SOIL

SHEET FLOW INSTALLATION (PERSPECTIVE VIEW)

POINT A SHOULD BE HIGHER THAN POINT B

DRAINAGEWAY INSTALLATION (FRONT ELEVATION)

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.

(SEAL)

VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY
4	2/19/97	RECORD DRAWING	VMB
3	2/1/97	RECORD DRAWINGS	VMB
2	6/95	REVISIONS AS PER OWNER	VMB
1	5/95	GENERAL REVISIONS AND REDESIGN	VMB

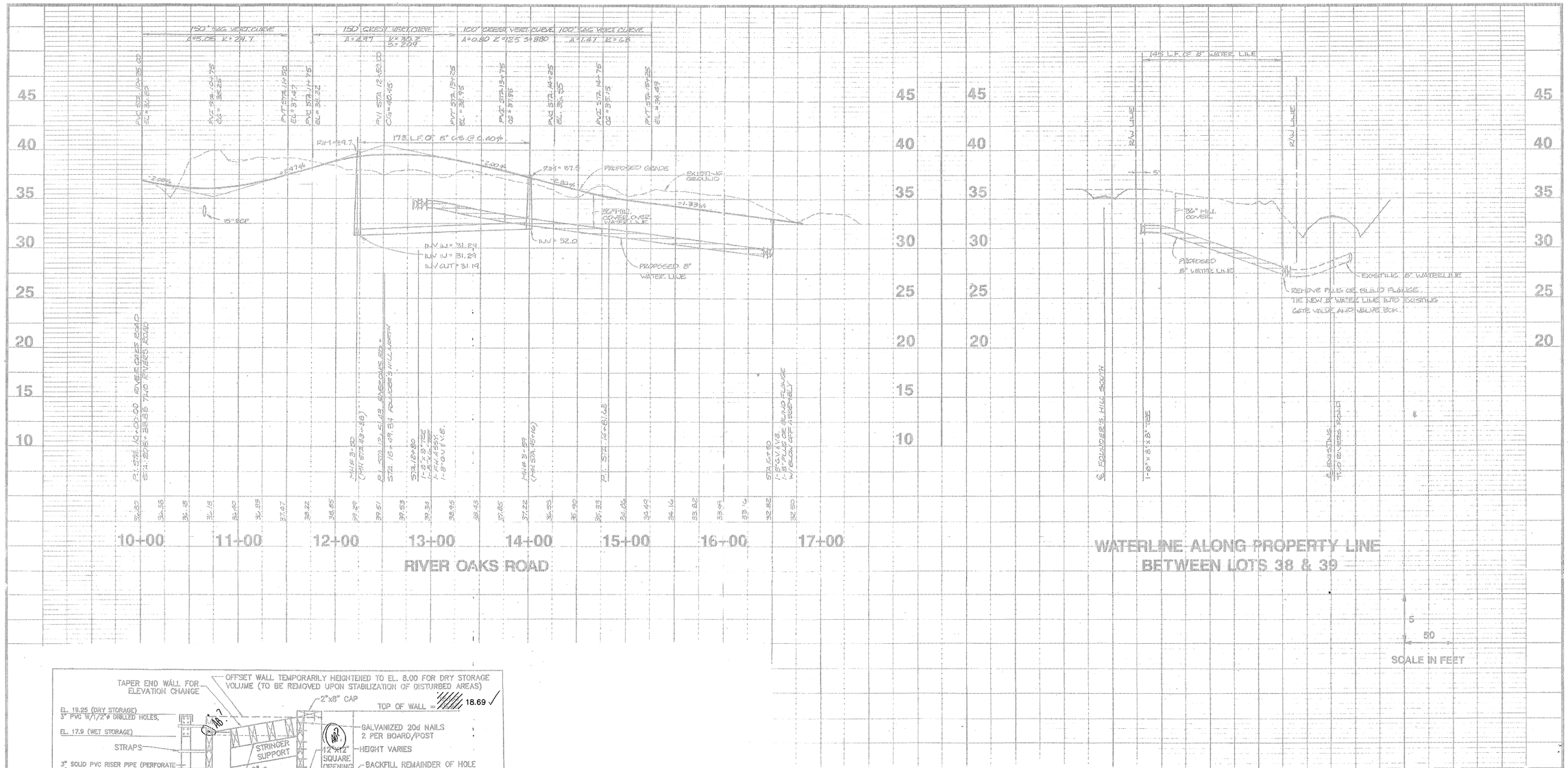
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994

CONSULTING ENGINEERS

GRADING AND EROSION CONTROL PLAN
FOUNDER'S HILL (BAY 3, POD 3)
THE GOVERNOR'S LAND at Two Rivers
JAMES CITY COUNTY, VIRGINIA
POWHATAN DISTRICT

Designed VMB	Drawn AES
Scale 1"=50'	Date MAR. 1995
Project No. 7173	
Drawing No. 10	

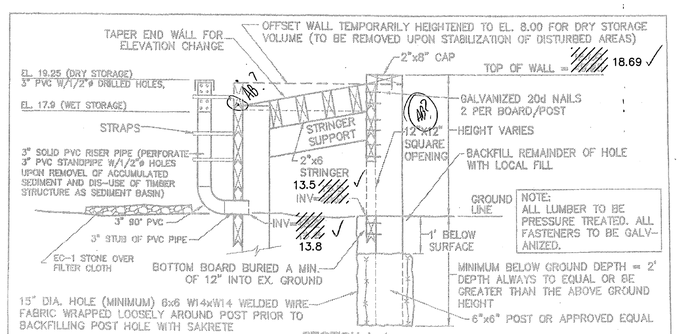
02.22.02-14:56 717333R10.dwg, AWT



No	DATE	REVISION / COMMENT / NOTE	BY
4	2/19/97	RECORD DRAWING	VMB
3	1/24/96	REVISED DRAINAGE	AES
2	6/95	REVISIONS AS PER OWNER	AES
1	5/95	GENERAL REVISIONS & REDESIGN	AES

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

AES CONSULTING ENGINEERS

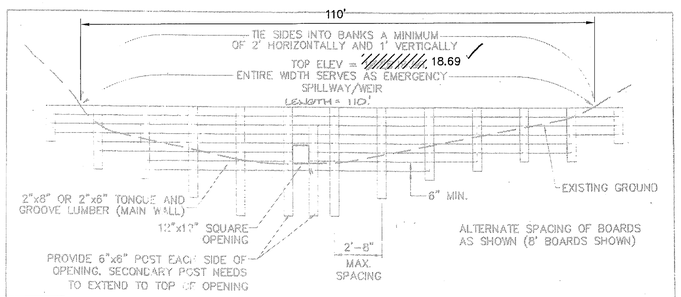


SECTION A-A

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 3/4" = 1'

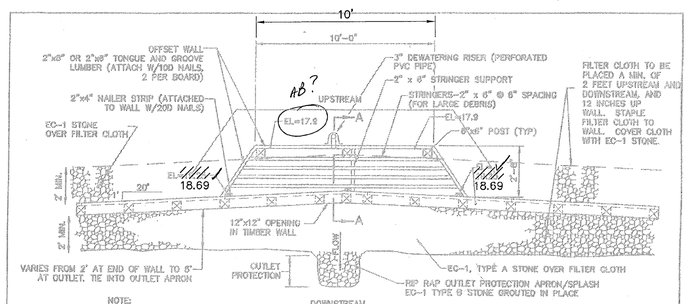
D-WDS-3



UPSTREAM ELEVATION

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 1/4" = 1'



PLAN VIEW

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 1/4" = 1'

BMP TIMBER STRUCTURE

BMP TIMBER STRUCTURE TO INITIALLY FUNCTION AS A TEMPORARY DAM FOR SEDIMENT CONTAINMENT. THE TIMBER STRUCTURE'S MAIN WALL AND OFFSET WALL SHALL BE INITIALLY CONSTRUCTED TO A TOP ELEVATION OF 19.25. A 3" PVC RISER PIPE SHALL BE PERMANENTLY ATTACHED TO THE OFFSITE WALL. THE TOP 1'-4" OF THE 3" RISER PIPE SHALL BE PERFORATED WITH 1/2" DIAMETER HOLES (EVERY 3-4"). THE SEDIMENT CONTAINMENT AREA SHALL HAVE A WET STORAGE VOLUME OF 965 CY (APPROXIMATELY EL 17.9), AND AN ADDITIONAL DRY STORAGE OF 1,248 CY (APPROXIMATELY EL 19.25). ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN SEDIMENT VOLUME EQUALS 483 CY (APPROXIMATELY EL. 16.75).

UPON STABILIZATION OF UPSTREAM AREAS, ALL ACCUMULATED SEDIMENT SHALL BE REMOVED. THE TOP OF THE UPSTREAM FACE OF THE OFFSET WALL SHALL BE LOWER TO EL 17.9. THE END WALLS OF THE OFFSET WALL SHALL BE TAPERED TO SPECIFIED ELEVATIONS. STRINGERS ARE TO BE PLACED BETWEEN END WALLS OF OFFSET WALL. PERFORATED PORTION OF 3" PVC RISER TO BE REMOVED. REMAINDER OF 3" PVC RISER TO BE PERFORATED WITH 1/2 DIAMETER HOLES (EVERY 3-4").

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.

(SEAL)

VIRGINIA REGISTERED PROFESSIONAL ENGINEER OR CERTIFIED LAND SURVEYOR

PROFILE - RIVER OAKS ROAD
FOUNDER'S HILL (BAY 3, POD 3)
THE GOVERNOR'S LAND
at Two Rivers
JAMES CITY COUNTY
VIRGINIA
POWHATAN DISTRICT

Designed	Drawn
VMB	AES
Scale	Date
NOTED	MAR., 1995
Project No.	
7173	
Drawing No.	
13	

RECORD DRAWING - 2/19/97

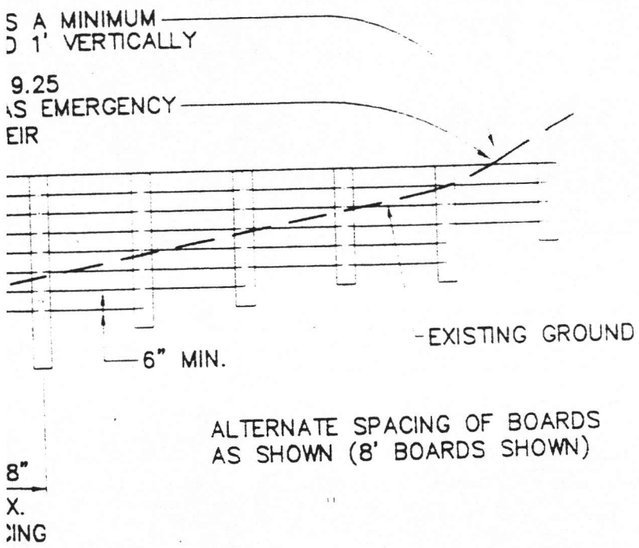
RECORD DRAWING 2/19/97

02.22.02-11:15 717333R13.dwg

AWT

Gov Land Foundation
2700 Two Rivers Road
Wmt VA 23185

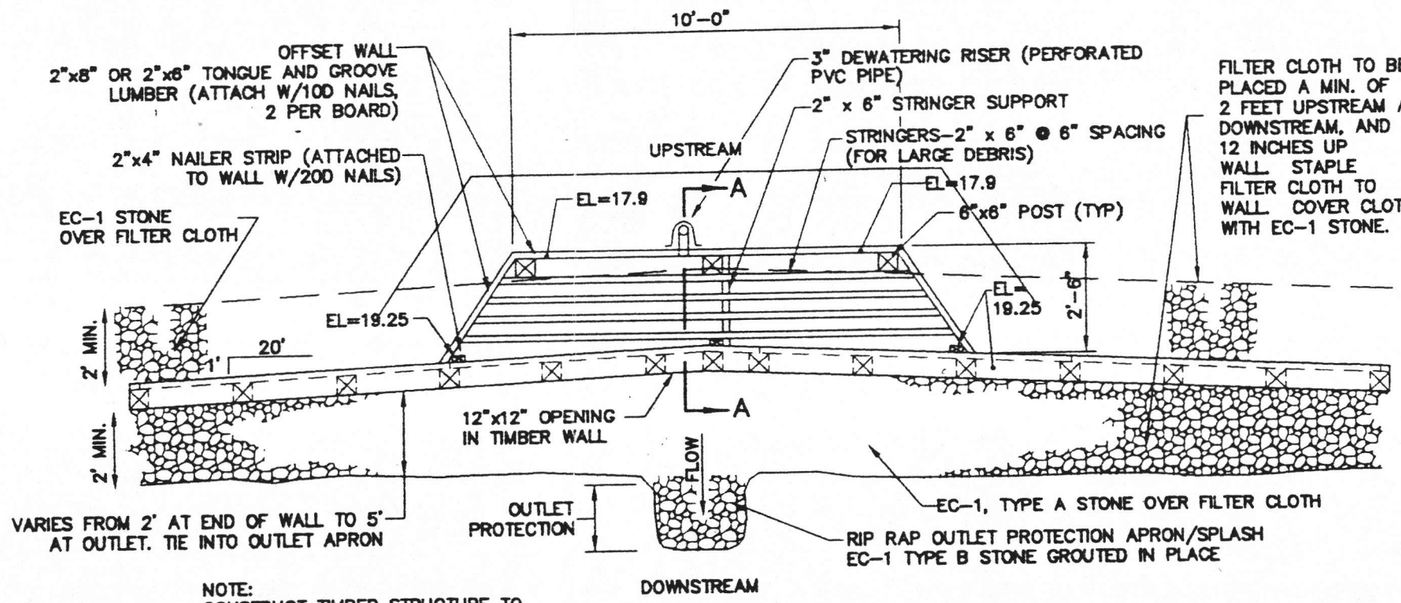
SCALE IN FEET



EVATION

IY DETENTION STRUCTURE

4" = 1'



NOTE:
CONSTRUCT TIMBER STRUCTURE TO BE CONVEX UPSTREAM (AS SHOWN)

PLAN VIEW

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 1/4" = 1'

CONSULTING

PROFILE - RIVER OAKS ROAD
FOUNDER'S HILL (BAY 3, POD 3)

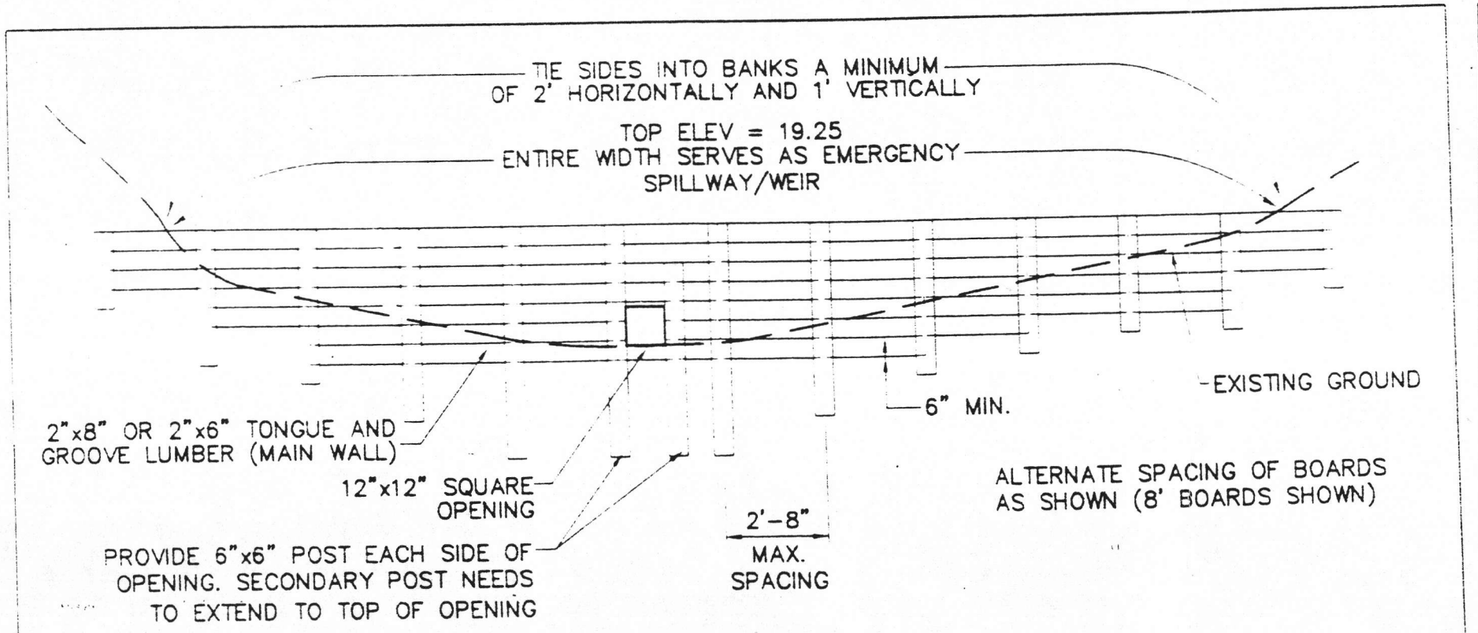
THE GOVERNOR'S LAND
At Two Rivers

JAMES CITY COUNTY

VIRGINIA

POWHATAN DISTRICT

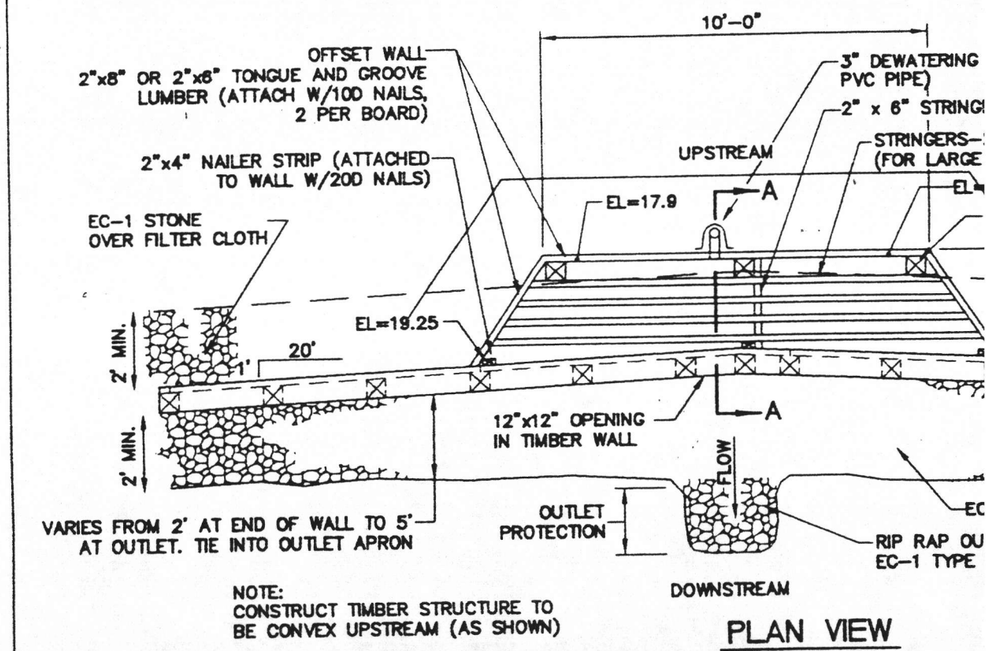
Designed	Drawn
VMB	AES
Scale	Date
NOTED	MAR.,1995
Project No.	
7173	
Drawing No.	
13	



UPSTREAM ELEVATION

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

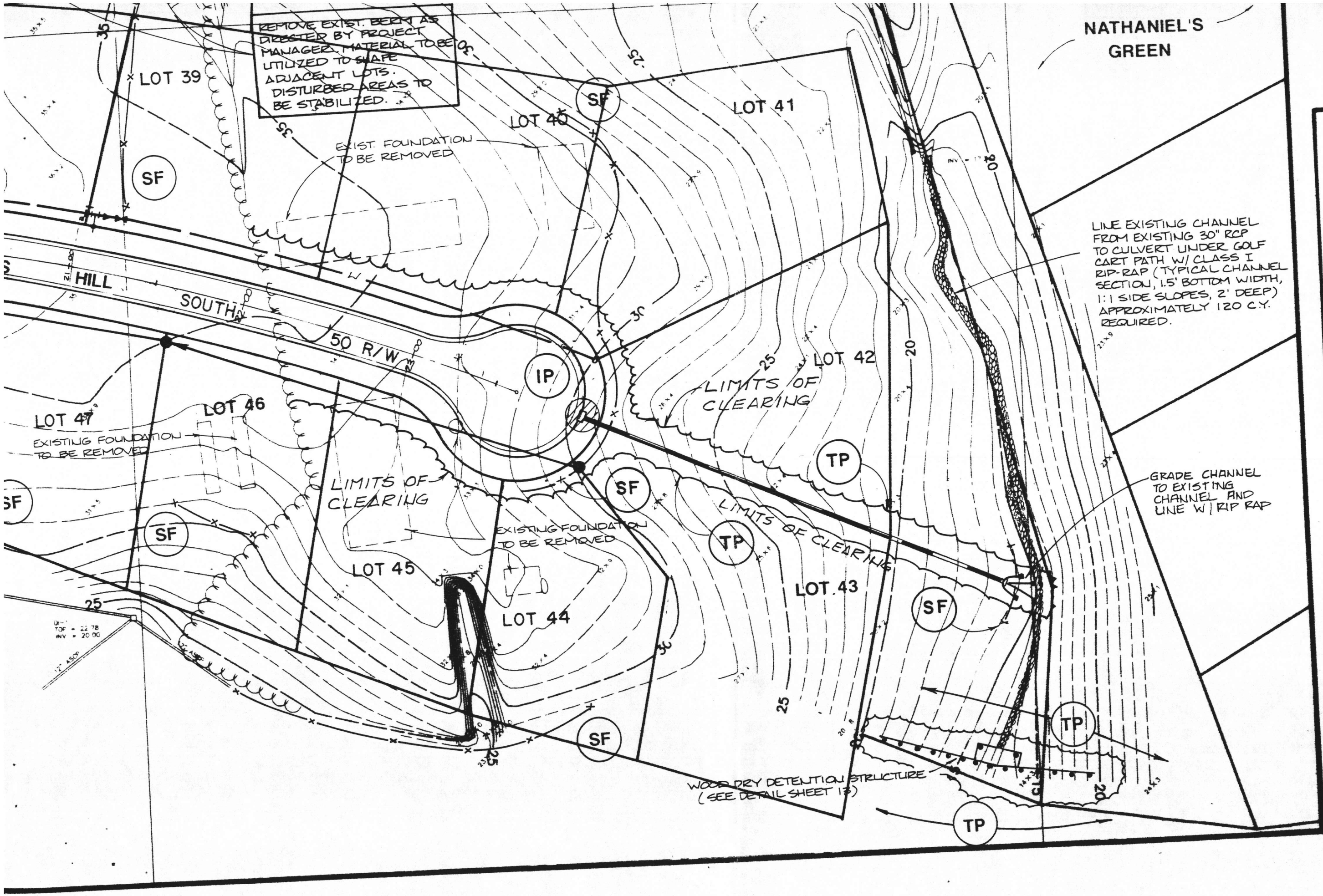
SCALE: 1/4" = 1'



PLAN VIEW

PRESSURE TREATED WOOD DRY DETEN

SCALE: 1/4" = 1'



CONSU

GRADING AND EROSION CONTROL PLAN
FOUNDER'S HILL (BAY 3, POD 3)

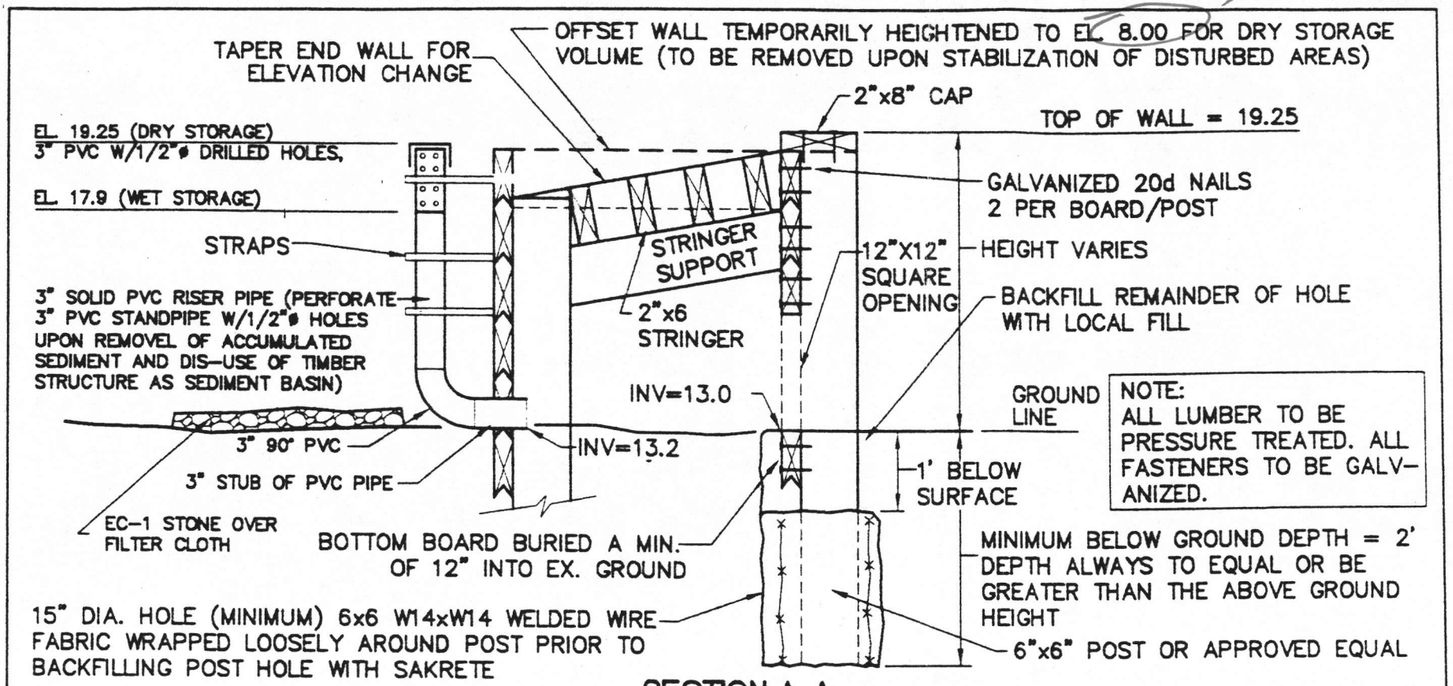
THE GOVERNOR'S LAND
At Two Rivers

JAMES CITY COUNTY VIRGINIA

POWHATAN DISTRICT

Designed VMB	Drawn AES
Scale 1"=50'	Date MAR.,199
Project No. 7173	
Drawing No. 10	

wrong elv.



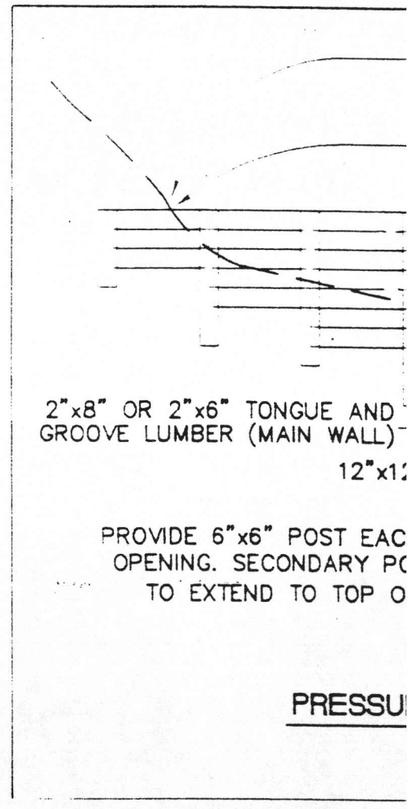
NOTE:
ALL LUMBER TO BE PRESSURE TREATED. ALL FASTENERS TO BE GALVANIZED.

SECTION A-A

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 3/4" = 1'

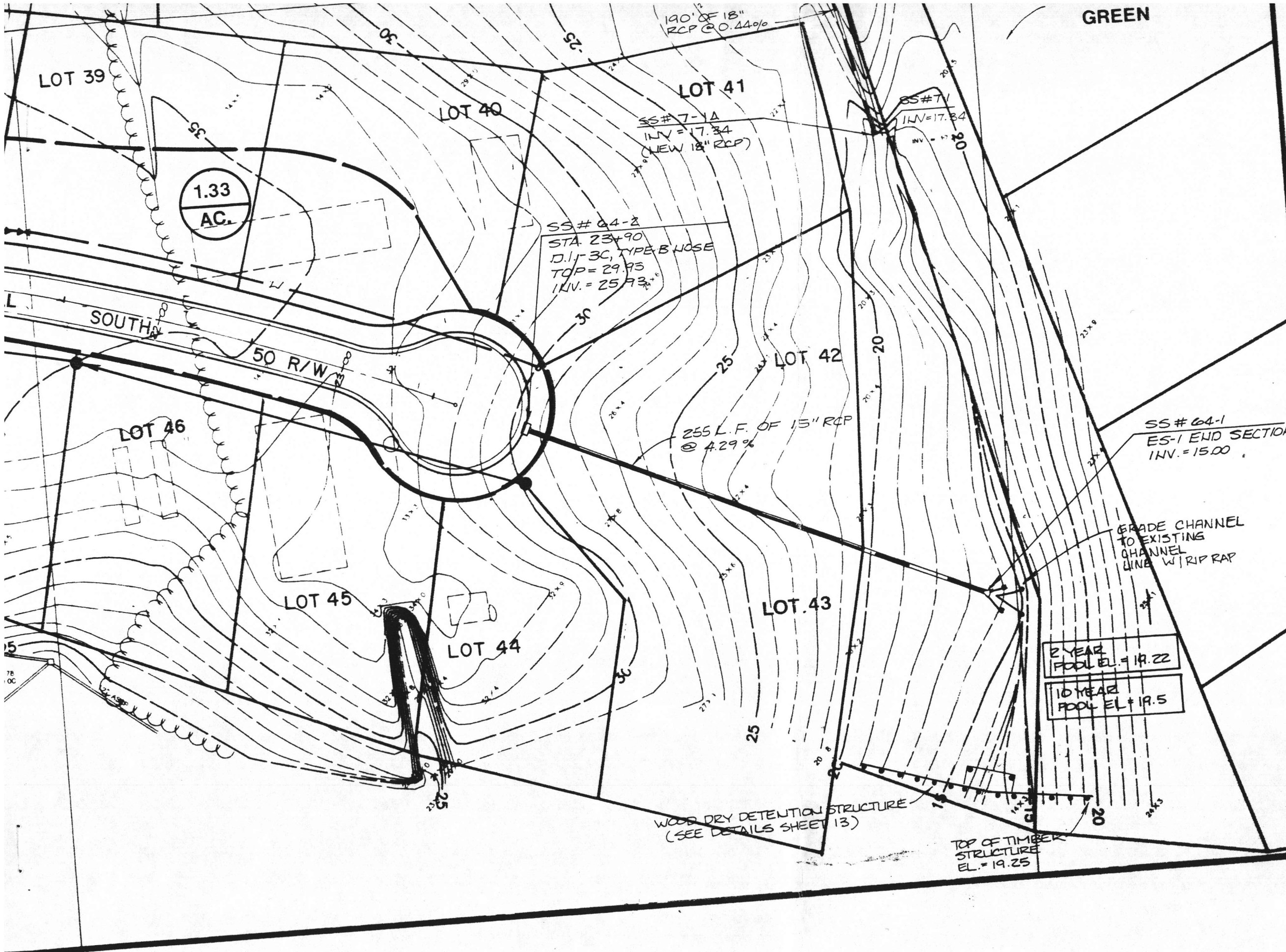
D-WDS-3



BMP TIMBER STRUCTURE

BMP TIMBER STRUCTURE TO INITIALLY FUNCTION AS A TEMPORARY DAM FOR SEDIMENT CONTAINMENT. THE TIMBER STRUCTURE'S MAIN WALL AND OFFSET WALL SHALL BE INITIALLY CONSTRUCTED TO A TOP ELEVATION OF 19.25. A 3" PVC RISER PIPE SHALL BE PERMANENTLY ATTACHED TO THE OFFSITE WALL. THE TOP 1'-4" OF THE 3" RISER PIPE SHALL BE PERFORATED WITH 1/2" DIAMETER HOLES (EVERY 3-4"). THE SEDIMENT CONTAINMENT AREA SHALL HAVE A WET STORAGE VOLUME OF 965 CY (APPROXIMATELY EL 17.9), AND AN ADDITIONAL DRY STORAGE OF 1,248 CY (APPROXIMATELY EL 19.25).
ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN SEDIMENT VOLUME EQUALS 483 CY (APPROXIMATELY EL. 16.75).

UPON STABILIZATION OF UPSTREAM AREAS, ALL ACCUMULATED SEDIMENT SHALL BE REMOVED. THE TOP OF THE UPSTREAM FACE OF THE OFFSET WALL SHALL BE LOWER TO EL 17.9. THE END WALLS OF THE OFFSET WALL SHALL BE TAPERED TO SPECIFIED ELEVATIONS. STRINGERS ARE TO BE PLACED BETWEEN END WALLS OF OFFSET WALL. PERFORATED PORTION OF 3" PVC RISER TO BE REMOVED. REMAINDER OF 3" PVC RISER TO BE PERFORATED WITH 1/2 DIAMETER HOLES (EVERY 3-4").



STORM SEWER PLAN
FOUNDER'S HILL (BAY 3, POD 3)

THE GOVERNOR'S LAND
At Two Rivers
JAMES CITY COUNTY
VIRGINIA

POWHATAN DISTRICT

Designed VMB	Drawn AES
Scale 1"=50'	Date MAR.,1995
Project No. 7173	
Drawing No. 8	

CONSULTING

THE GOVERNOR'S LAND
At Two Rivers
JAMES CITY COUNTY
VIRGINIA

JR030

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Governor's Land, Founder's Hill / Founders Hill North - Right Side DATE March 8, 1995 Revised May 11, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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/L_T	d(FT)	E(#16)	h(FT)	Q: INTERC-EPTED CFS d/h	Qb CARRY-OVER CFS	T SPREAD @ SAG FT T/Sx	SHEET ___ OF ___ REMARK
					10+75	0.07	0.7	0.05	0.05	3.5	0.17	-	0.17	0.0015	0.0208	3.8	2		0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 10+00 RIGHT											
SAG	SS#63-4	3	B	4	10+75	0.52	0.44	0.23	0.24	3.5	0.84	-	0.84	-	0.0208				0.08	4	-	-	-	-	7.6	0.13	0.6	0.21		6.3		T MAX = 7.0
					10+75	0.04	0.7	0.03	0.19	3.5	0.67	-	0.67	0.0015	0.0208	7.0	2	0.29	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 12+00 RIGHT											T MAX = 7.0
					11+00	0.41	0.4	0.16	0.16	3.5	0.56	-	0.56	0.0054	0.0208	4.2	2	0.48	0.08	4												T MAX = 7.0
GRADE	SS#63-5	3	B	4	12+00	0.18	0.4	0.07	0.22	3.5	0.78	-	0.78	0.0054	0.0208	5.4	2	0.37	0.08	4	0.86	4	0.17	0.16	4	1	1	0.78		0		T MAX = 7.0
					13+00	0.2	0.4	0.08	0.15	3.5	0.52	-	0.52	0.0054	0.0208	3.9	2	0.63	0.08	4												T MAX = 7.0
					14+00	0.18	0.4	0.07	0.07	3.5	0.25		0.25	0.0054	0.0208	1.9	2		0.08	4												T MAX = 7.0

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Governor's Land, Founder's Hill — Founder's Hill North - Right Side DATE Revised Mar 11, 1995 — March 8, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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) IS P EFFEC LENGTH FT	L/L_T	d(FT)	E(#16)	h(FT)	Q; INTERCEPTED CFS d/h	Qb CARRY-OVER CFS	T SPREAD FT X/T @ SAG	SHEET ___ OF ___ REMARK
					17+00	0.14	0.6	0.08	0.08	3.5	0.28	-	0.28	0.0042	0.0208	2.4	2	0.83	0.0833	4													T_{MAX} = 7.0
					18+00	0.11	0.6	0.07	0.15	3.5	0.52	-	0.52	0.0042	0.0208	4.3	2	0.45	0.0833	4													T_{MAX} = 7.0
					19+00	0.11	0.6	0.07	0.22	3.5	0.77	-	0.77	0.0042	0.0208	5.75	2	0.88	0.0833	4											—		T_{MAX} = 7.0
GRADE	SS#7-20	3	B	6	20+00	0.11	0.6	0.07	0.29	3.5	1.00	-	1.00	0.0042	0.0208	6.5	2	0.31	0.0833	4	0.78	4	0.16	0.15	5	1					0		T_{MAX} = 7.0
					21+00	0.11	0.6	0.07	0.07	3.5	0.25	-	0.25	0.0042	0.0208	2.2	2	0.91	0.0833	4													T_{MAX} = 7.0
GRADE	SS#7-19	3	B	4	21+85	0.09	0.6	0.05	0.12	3.5	0.42	-	0.42	0.0042	0.0208	3.6	2	0.56	0.0833	4	0.967	4	0.16	0.18	3	0.75	0.87	0.37	0.05				T_{MAX} = 7.0

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Governor's Land — Founder's Hill / Founder's Hill North - Right Side DATE March 9, 1995 Revised May 11, 1995

Sag or Grade	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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/L_T	d(FT)	E(#16)	h(FT)	Q: INTERC-EPTED CFS d/h	Qb CARRY-OVER CFS	T SPREAD SAG FT T/T@ Sx	SHEET ___ OF ___ REMARK
					23+00	0.18	0.5	0.09	0.09	3.5	0.32		0.32	0.0042	0.0208	2.7	2		0.0833	4												TMAX = 7.0
					24+00	0.16	0.5	0.10	0.19	3.5	0.67		0.70	0.0042	0.0208	5.0	2		0.0833	4												TMAX = 7.0
					25+00	0.17	0.6	0.10	0.29	3.5	1.01		1.01	0.0042	0.0208	6.5	2		0.0833	4												TMAX = 7.0
GRADE	SS#7-15	3	BB	6	25+75	0.07	0.6	0.04	0.33	3.5	1.2	-	1.2	0.0042	0.0833	6.7	2	0.30	0.0833	4	0.77	4	0.167	0.15	5	1	1	1.2	—		TMAX = 7.0
					27+00	0.09	0.6	0.05	0.05	3.5	0.18		0.18	0.0042	0.0208	1.7	2	0.88	0.0833	4												TMAX = 7.0
GRADE	SS#7-13	3	BB	4	27+75	0.17	0.5	0.09	0.14	3.5	0.49		0.49	0.011	0.0208	2.8	2	0.71	0.0833	4	0.95	4	0.167	0.18	4	1	1	0.49	—		TMAX = 7.0
					29+03.74	0.31	0.5	0.16	0.16	3.5	0.56	0.01	0.57	0.001	0.03	6	2		0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 27+75 R											TMAX = 10
SAG	SS#7-12	3	AA-	2.5	29+03.74				0.39	3.5	1.4		1.4		—				0.0833						5.2	0.21	0.33	0.63		10.0		IN CUL-DE-SAC TMAX = 10 IN CUL-DE-SAC

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ GOVERNOR'S LAND - FOUNDER'S HILL RIVER OAKS ROAD - LEFT SIDE DATE MARCH 11, 1995 REVISED MAY 22, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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	Lt(FT)15 P EFFEC LENGTH FT	L/Lt	d(FT)	E(#16)	h(FT)	Q: INTERCEPTED CFS	d/h	Qb CARRY-OVER CFS	T SPREAD @ SAG FT 1/Sx	REMARK
					10+75	0.04	0.8	0.03	0.03	3.5	0.11		0.11	0.001	0.0208	>2	2.0	0.94	0.0833	4	CHECK	SPREAD	OF	FLOW	APPROACHING	FROM	STA	10+00	LEFT					TMAX = 8.5
SAG	SS#8-21	3	A	2.5	10+75	0.46	0.41	0.19	0.19	3.5	0.67		0.67	—	0.0208	-	2.0									6.1	0.14	0.21	0.67		6.7		TMAX = 8.5
					10+75	0.21	0.4	0.08	0.16	3.5	0.56		0.56	0.001	0.0208	7.2	2.0	0.27	0.0833	4	CHECK	SPREAD	OF	FLOW	APPROACHING	FROM	STA.	15+49	LEFT					TMAX = 8.5
					11+00	0.21	0.4	0.08	0.08	3.5	0.29		0.29	0.0255	0.0208	1.6	2.0	0.25	0.0833	4													TMAX = 8.5
					14+00	0.27	0.43	0.12	0.12	3.5	0.42		0.42	0.015	0.0208	1.9	2.0	0.63															TMAX = 8.5
					15+00	0.25	0.44	0.11	0.23	3.5	0.81		0.81	0.013	0.0208	4.2	2.0	0.33															TMAX = 8.5
					16+00	0.11	0.60	0.07	0.30	3.5	1.05		1.05	0.013	0.0208	5.0	2.0	0.28															TMAX = 8.5

SHEET ____ OF ____

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

GOVERNOR'S LAND - FOUNDER'S HILL - REVISED MAY 22, 1995

RTE _____ PROJ RIVER OAKS ROAD - RIGHT SIDE DATE MARCH 11, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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)	S_X 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	Lt(FT)15 P EFFEC LENGTH FT L/Lt	d(FT)	E(#16)	h(FT)	Q; INTERCEPTED CFS d/h	Qb CARRY-OVER CFS	T SPREAD @ SAG FT T/Sx	SHEET ___ OF ___ REMARK
					10+75	0.04	0.08	0.03	0.03	3.5	0.11		0.11	0.001	0.0208	>2	2.0		0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 10+00 RIGHT											TMAX = 8.5
SAG	SS# B-22	3	A	25	10+75	0.20	0.60	0.12	0.12	3.5	0.42		0.42		0.0208		2.0			4					6.1	0.11	0.21	0.52		5.3'	TMAX = 8.5
					10+75	0.06	0.7	0.04	0.04	3.5	0.32		0.32	0.001	0.0208	5.2	2.0	0.39	0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 15+49 RIGHT											TMAX = 8.5
					11+00	0.10	0.5	0.05	0.05	3.5	0.18		0.18	0.0255	0.0208	1.5	2.0	1.3	0.0833	4											TMAX = 8.5
					14+00	0.23	0.45	0.10	0.10	3.5	0.35		0.35	0.015	0.0208	1.9	2.0	1.05													TMAX = 8.5
					15+00	0.23	0.4	0.09	0.19	3.5	0.67		0.67	0.013	0.0208	3.6	2.0														TMAX = 8.5
					16+00	0.06	0.7	0.04	0.23	3.5	0.80		0.80	0.013	0.0208	4.1	2.0														TMAX = 8.5

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

REV. MAY 15, 1995

RTE _____ PROJ GOVERNOR'S LAND - FOUNDER'S HILL FOUNDER'S WAY - LEFT SIDE DATE MARCH 11, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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	LT(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 FT @ SAG T/Sw	SHEET ____ OF ____ REMARK
GRADE	SS#7-29	3	B	8	11+20	0.25	0.6	0.15	0.29	3.5	1.02		1.02	0.021	0.0208	7.0	2.0	0.5	0.08	4	0.98	4	0.16	0.18	7	1		1		1.02	—		TMAX = 7.0
					11+50	0.3	0.5	0.15	0.15	3.5	0.45		0.45	0.001	0.0208	6.4	2.0	0.44	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 11+00 LEFT												TMAX = 7.0
SAG	SS#7-27	3	A	2.5	11+50	0.14	—						0.56		0.0208	—	2.0		0.08	4					6.1	0.12	0.33	0.36		5.8			TMAX = 7.0
					11+50	0.04	0.7	0.03	0.03	3.5	0.11		0.11	0.0025	0.0208	1.6	2.0	0.94	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 12+18 LEFT												TMAX = 7.0
					13+00	0.01	0.7	0.04	0.04	3.5	0.15		0.15	0.0025	0.0208	2.0	2.0	0.75	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 12+18 LEFT												TMAX = 7.0
SAG	SS#7-23	3	A	2.5	13+00					3.5			0.40		0.0208		2.0		0.08	4					5.2	0.3	0.29	0.45		6.25			TMAX = 7.0
					13+00	0.11	0.6	0.07	0.07	3.5	0.25		0.25	0.0025	0.0208	3.4	2.0	0.44	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 14+42 LEFT												TMAX = 7.0

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Founder's Way - Right Side (Governor's Land - Founder's Hill) DATE March 11, 1995 (REV. MAY 15, 1995)

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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	Lt (FT) 15	P EFFEC LENGTH FT L/Lt	d (FT)	E (#16)	h (FT)	Qi INTERCEPTED CFS d/h	Qb CARRY-OVER CFS	T SPREAD FT @ SAG Sw	SHEET ___ OF ___ REMARK
					11+00	0.06	0.7	0.04	0.04	3.5	0.15		0.15	0.0212	0.02	1.30	1.5	1	0.08	4													T MAX = 7.0
					11+50	0.04	0.7	0.03	0.07	3.5	0.25		0.25	0.0212	0.02	1.55	1.5	0.44	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 11+00 RIGHT												T MAX = 7.0
SAG	SS#7-28	3	A	2.5	11+50	0.14	0.7	0.10	0.10	3.5	0.36		0.36		0.02		1.5		0.08	4					5.2	<0.13	0.29	0.45		< 6.25		T MAX = 7.0
					11+50	0.04	0.7	0.03	0.03	3.5	0.11		0.11	0.0025	0.02	1.6	1.5	0.94	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 12+18 RIGHT												T MAX 7.0
					13+00	0.05	0.7	0.04	0.04	3.5	0.15		0.15	0.0025	0.02	2.0	1.5	0.75	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 12+19 RIGHT												T MAX = 7.0
SAG	SS#7-24	3	A	2.5	13+00	0.13	0.7	0.10	0.10	3.5	0.36		0.36		0.02		1.5		0.08	4					5.2	<0.13	0.29	0.45		< 6.25		T MAX = 7.0
					13+00	0.08	0.7	0.06	0.06	3.5	0.21		0.21	0.0026	0.02	2.8	1.5	0.54	0.08	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 14+42 RIGHT												T MAX = 7.0

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ GOVERNOR'S LAND, FOUNDER'S HILL FOUNDER'S HILL SOUTH-LEFT SIDE

REVISED MAY 15, 1995
DATE MARCH 6, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	STATION	DRAINAGE AREA (AC)	C	CA	ΣCA	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/L_T	d(FT)	E(#16)	h(FT)	Q: INTERCEPTED CFS	d/h	Qb CARRY-OVER CFS	T SPREAD FT	SHEET ___ OF ___ REMARK
					11+00	0.21	0.5	0.11	0.11	3.5	0.39	—	0.46	0.0219	0.0208	2.1	2.0	0.71	0.0833	4															
																																			T MAX = 7.0
					12+00	0.20	0.43	0.09	0.20	3.5	0.70	—	0.81	0.0188	0.0208	4.1	2.0	0.37	0.0833	4															
GRADE (FLANKING)	SS#8-25	3	B	6	12+30	0.30	0.45	0.14	0.34	3.5	1.19	—	1.19	0.0180	0.0208	5.4	2.0	0.28	0.0833	4	0.73	3.5	0.19	0.16	9		0.67		0.84		1.00		0.2		T MAX = 7.0
					12+60	0.09	0.6	0.05	0.05	3.5	0.18	0.2	0.38	0.00	0.0208	5.1	2.0		0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 10+00 L														T MAX = 7.0
SAG	SS#8-24	3	A	2.5	12+60	0.5	0.48	0.24	0.24	3.5	0.84	—	0.84	—	0.0208	—		—	0.0833	4	—	—	—	—											T MAX = 7.0
					12+60	0.40	0.48	0.19	0.19	3.5	0.67	—	0.67	0.001	0.0208		2.0	0.23	0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA 14+75 L														T MAX = 7.0
GRADE (FLANKING)	SS#8-26	3	B	8	13+18	0.07	0.5	0.04	0.48	3.5	1.66	—	1.66	0.016	0.0208	6.0	2.0	0.33	0.0833	4	0.775	4	0.25	0.21	7		1		1		1.66		—		T MAX = 7.0
					14+00	0.36	0.43	0.15	0.44	3.5	1.54	—	1.54	0.029	0.0208	4.8	2.0		0.0833	4															T MAX = 7.0
					15+00	0.26	0.5	0.13	0.29	3.5	1.02	—	1.02	0.0060	0.0208	6.25	2.0																		
					16+00	0.32	0.52	0.16	0.16	3.5	0.56		0.56	0.015	0.0208	2.6																			
																																			T MAX = 7.0
					18+00	0.19	0.5	0.1	0.1	3.5	0.35	—	0.35	0.0075	0.0208	7.6	2.0																		T MAX = 7.0
					19+00	0.06	0.7	0.04	0.14	3.5	0.49		0.49	0.0075	0.0208	3.4	2.0				GUTTER FLOW CARRIED TO STA 11+00 LEFT - ROAD "B"														T MAX = 7.0

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Governor's Land, Founder's Hill — Founder's Hill South-Left Side

Revised May 15, 1995
DATE March 7, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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	LT(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 T/Sx	SHEET ___ OF 4 REMARK
					20+00	0.04	0.45	0.02	0.02	3.5	0.06	–	0.06	0.0075	0.0208	1.7	2.0	0.85	0.0833	4													TMAX = 7.0
					21+00	0.20	0.45	0.09	0.11	3.5	0.39	–	0.39	0.008	0.0208	2.7	2.0	0.74	0.0833	4													TMAX = 7.0
					22+00	0.21	0.45	0.09	0.20	3.5	0.70	–	0.70	0.01	0.0208	4.0	2.0	0.5	0.0833	4													TMAX = 7.0
					23+00	0.22	0.45	0.10	0.30	3.5	1.05	–	1.05	0.0150	0.0208	4.8	2.0	0.42	0.0833	4													TMAX = 7.0
					24+00	0.16	0.8	0.13	0.43	3.5	1.51	–	1.51	0.002	0.0208	11.5	2.0		0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 19+25 LEFT													IN CUL-DE-SAC
																																	TMAX = 15'

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ GOVERNOR'S LAND – FOUNDER'S HILL, FOUNDER'S HILL SOUTH – RIGHT SIDE DATE MARCH 6, 1995 REV. MAY 15, 1995

SHEET 1 OF ____

SAG OC GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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/L_T	d(FT)	E(#16)	h(FT)	Q; INTERC-EPTED CFS	d/h	Qb CARRY-OVER CFS	T SPREAD FT @ SAG $\frac{1}{Sx}$	REMARK
					11+00	0.05	0.75	0.04	0.04	3.5	0.14	—	0.14	0.0219	0.0208	1.2	1.5	1.25	0.0833	4															
																																			T MAX = 7.0
					12+00	0.06	0.75	0.05	0.09	3.5	0.32	—	0.32	0.0188	0.0208	1.5	1.5	1.0	0.0833	4															
																																			T MAX 7.0
					12+55	0.03	0.75	0.02	0.11	3.5	0.39	—	0.39	0.002	0.0208	4.8	1.5	0.31	0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 10+00 R														T MAX 7.0
SAG	SS#3-23	3	C	8	12+55						0.98	—	0.98	—	0.0208	—	—	—	0.0833	4	—	—	—	—	10.7	0.12	0.33	0.36		5.8					T MAX = 7.0
					12+55	0.03	0.75	0.02	0.17	3.5	0.59	—	0.59	0.0015	0.0208	6.9	2	0.34	0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 14+75 R														T MAX = 7.0
					13+00	0.06	0.75	0.04	0.15	3.5	0.54	—	0.54	0.016	0.0208	2.7	2	0.45	0.0833	4															
																																			T MAX 7.0
					14+00	0.06	0.75	0.04	0.11	3.5	0.40	—	0.40	0.029	0.0208	1.70	2		0.0833	4															
																																			T MAX
					15+00	0.06	0.75	0.04	0.07	3.5	0.26	—	0.26	0.0060	0.0208	1.95	2		0.0833	4															
																																			T MAX =
												—				—	—						—	—	—											
					16+00	0.04	0.75	0.03	0.03	3.5	0.11	—	0.11	0.0150	0.0208	1.5	2		0.0833	4															T MAX =
																																			T MAX =
					18+00	0.07	0.75	0.05	0.05	3.5	0.18	—	0.18	0.0075	0.0208	1.75																			
																																			T MAX =
					19+00	0.07	0.75	0.05	0.10	3.5	0.35	—	0.35	0.0075	0.0208	2.4																			

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ GOVERNOR'S LAND, FOUNDER'S HILL FOUNDER'S HILL SOUTH - RIGHT SIDE DATE MARCH 7, 1995 REV. MAY 15, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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	LT(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
					20+00	0.07	0.75	0.05	0.15	3.5	0.52	–	0.52	0.0075	0.0208	3.45	2	0.58	0.0833	4															
																																			TMAX = 6.5
					21+00	0.07	0.75	0.05	0.20	3.5	0.70	–	0.70	0.0080	0.0208	4.4	2	0.88	0.0833	4															
																																			TMAX = 6.5
					22+00	0.06	0.75	0.05	0.33	3.5	1.16	–	1.16	0.0100	0.0208	5.5	2	0.68	0.0833	4															
																																			TMAX = 6.5
					23+00	0.06	0.75	0.05	0.38	3.5	1.33	–	1.33	0.0150	0.0208	5.5	2	0.45	0.0833	4															
																																			TMAX = 6.5
					24+00	0.10	0.80	0.08	0.46	3.5	1.61	–	1.61	0.0010	0.0208	12	2	0.17	0.0833	4	CHECK SPREAD OF FLOW APPROACHING FROM STA. 19+25 R														IN CUL-DE-SAC
SAG	95#6-2	3	C	6	24+00								3.10	–	0.0208	–	–	–	0.0833	4	–	–	–	–	9.6	0.28	0.33	0.85		14				TMAX = 15
																																			IN CUL-DE-SAC
																																			TMAX = 15'

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.

____ G2. Constructed impervious areas appear to conform with locations indicated on the approved plan and appear less than sixty (60) percent impervious in accordance with the requirements of the James City County Chesapeake Bay Preservation Ordinance.

____ G3. Dedicated open space areas are in undisturbed common areas, conservation easements or are protected by other enforceable instruments that ensures perpetual protection.

____ G4. Provisions included to clearly specify how the natural vegetated areas utilized as dedicated open space will be managed and field identified (marked).

____ G5. Adequate protection measures were implemented during construction to protect the defined dedicated open space areas.

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.

____ SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.

____ SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).

____ 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.

XIII. References

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

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

File: Shared\SWMProg\BMP\Certif\RDCC.wpd

AES CONSULTING ENGINEERS
Engineering, Surveying and Planning
5248 Olde Towne Road, Suite 1
WILLIAMSBURG, VIRGINIA 23188

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

LETTER OF TRANSMITTAL

DATE	JOB NO.
2/22/02	7173

ATTENTION: Mr. Mike Woolsey

RE: Governor's Land
Founder's Hill

TO James City Environmental Division

FEB 2002
RECEIVED
ENVIRONMENTAL DIVISION

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

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
2			Record Drawing of Timber Structure in Founder's Hill
1			Certification Checklist
			JR030
			5-29-95

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

Mike,

We are getting caught up with the old stuff. With the next iteration, we will will have a map showing location of all BMPs in Governor's Land, and identifying where Record Drawings have been supplied

COPY TO _____ SIGNED: Marc B

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

GOVERNOR'S LAND
BAY 3, POD 3 SUBDIVISION

TABLE 4

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
DESIGN TYPE 3	6	x	2.02 %	=	0.12
		x		=	
		x		=	
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 0.12

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit (0.1 per 1%)		Points for Natural Open Space
	x		=	

C. TOTAL WEIGHTED POINTS

Structural BMP Points	+	Natural Open Space Points	=	TOTAL

NOTE: THIS SUBDIVISION HAS HAD A OVERALL BMP PLAN APPROVED BY JAMES CITY COUNTY STAFF. IN ACCORDANCE WITH THE OVERALL BMP PLAN, THE AREA OF BAY 3, POD 3 SUBDIVISION IS TO BE SERVED BY A DESIGN TYPE 3 (6 POINT) BMP, THUS PROVIDING 0.12 BMP POINT TOWARDS AN AGGREGATE OF 10 BMP POINTS.

Construction Certification for Stormwater Management/BMP Facilities

Governors Land BMP Facility #10 (Founders Hill)
James City County, Virginia

Prepared By:

Robert C. Moss, PE
Earthworks Consulting Engineers, Inc.
4305 Cutshaw Ave.
Richmond, Virginia 23230
Phone: (804) 355-4567
Fax: (804) 355-5958

Prepared For:

James H. Bennett, PE
Governor's Land Associates
120 Tredegar Street
Richmond, Virginia 23219
Phone: (804) 819-2352
Fax: (804) 819-2209

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

This certification pertains to the embedment and stability of the facility's timber posts, whose construction was not monitored but was later investigated by an engineer utilizing test pits to ascertain post embedment, soil support, and concrete encasement of posts.

Exception: Erosion is occurring around posts in vicinity of timber structure opening. Armor stone and fabric is to be added to this area.

By:

Robert C. Moss, PE
Earthworks Consulting Engineers, Inc.

COMMONWEALTH OF VIRGINIA
ROBERT C. MOSS, III
No. 019982
PROFESSIONAL ENGINEER

Dated: 4-23-03

2-27

Joe.
Any issues that
you are aware of.

PTM

Scott, 2-28-02

I found a few minor problems with this timber structure. First the 3" PVC dewatering riser is missing. Also the rip rap lined ditch leading to the structure has been filled with leaves and is causing a drainage problem.

Joe

5-29-95

Record Drawing/Construction Certification Submittal for a BMP Facility

Date: 2/26/02

Inspector:
- [x] Pat Menichino
- [ ] Gerry Lewis
- [ ] Beth Davis
- [ ] Mike Woolson
- [x] Joe Buchite
- [ ] Other: _____

Project: Governors Land Founders Hill (Bay 3 Pod 3) (Note: East of 1756 Founders Hill South, Lot 43)
BMP Facility: Timber Crib Wall
Plan No. 5-29-95
BMP ID Code: JR 030

I have received a transmittal for a [x] Record Drawing and [ ] Construction Certification for the above referenced facility on Feb 22 02. 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

SWMProg\BMP\ConInsp\Insp.trans

BAY 3 P003

2 YR 19.22 WSEL
10 YR 19.5 WSEL

TOP WALL 19.25
Design Type 3 6 pts.

DA 28.8AC
7.1AC impervious
Treats 1.0" per DA
2YR 14.43cfs @ 19.21 EL

James City County, Virginia
Environmental Division

JR030

Stormwater Management/BMP
Record Drawing Review Form

County Plan No. S-29-95

Project Name: Gov. Land - Founders Hill

Stromwater Management Faciltiy: JR-030 Timber Crib Wall

Component	Approved Plan	Record Drawing	OK
Top of dam (lowest point)	18.69		
Top of ~~Dam~~ WALL (reported)	~~19.25~~	18.69	
Top width of dam	—		
Crest of riser Wet STORAGE	17.9		
Crest of Emerg. Spillway	17.9 / 19.25		
Low Water elevation	—		
Normal Water level	—		
Bottom of pond elevation	NA		
Inflow Pipe size (1)	—		
Inflow Pipe size (2)	—		
Inflow Pipe size (3)	—		
~~Barrel~~ RISER Diameter (inches)	3" PVC		
100 yr Storm Elevation	NA		
Trash rack/anti-vortex type	NA		
Forbay, baffle wall, etc.	NO		
Pond drain elevation	NA		
6"x6" POSTS CENTERS	2'8"		

2x8 OR 2x6 tongue & GROOVE

Date: 1-9-03

No seal on RD

Name: R. Hall

1-18-03

POOR QUALITY

ORIGINAL(S) FOLLOW

THIS IS THE BEST COPY AVAILABLE

VCE DOCUMENT CONVERSION

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: 16-May-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

MAY 2003

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

[ ] Shop drawings [X] Prints [X] Plans [ ] Samples [ ] Specifications

[X] Copy of letter [ ] Change order [X] Other Construction Certification

COPIES	DATE	NO.	DESCRIPTION
1	5-15-03		As-Built drawing (Mylar) – Founder's Hill Timber Wall JR030
1	5-15-03		As-Built drawing (Black line) – Founder's Hill Timber Wall JR030
1	5-15-03		Memo responding to letter from County – Founder's Hill Timber Wall JR030
1	5-15-03		As-Built drawing (Mylar) – Fowler's Lake Block "B" Timber Wall JR054
1	5-15-03		As-Built drawing (Black line) – – Fowler's Lake Block "B" Timber Wall JR054
1	5-15-03		Memo responding to letter from County – – Fowler's Lake Block "B" Timber Wall JR054
1	5-15-03		As-Built drawing (Mylar) – The Harbor @ Two Rivers JR033
1	5-15-03		As-Built drawing (Black line) – The Harbor @ Two Rivers JR033
1	5-15-03		Memo responding to letter from County – The Harbor @ Two Rivers JR033
1	5-15-03		As-Built drawing (Mylar) – River Oaks North BMP JR034
1	5-15-03		As-Built drawing (Black line) – River Oaks North BMP JR034
1	5-15-03		Memo responding to letter from County – River Oaks North BMP JR034
1	5-16-03		As-Built drawing (Mylar) – Bennett's Pond JR021
1	5-16-03		As-Built drawing (Black line) – Bennett's Pond JR021
1	5-16-03		Memo responding to letter from County – Bennett's Pond JR021

THESE ARE TRANSMITTED as checked below:

[X] 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

S:\JOBS\7173\09\Wordproc\Document\JCC Transmittal3.doc

Rev. 5/16/03

Memorandum

DATE: **May 14, 2003**

TO: **Scott Thomas**

FROM: **Victoria Bains**

SUBJECT: **Founder's Hill, County BMP ID Code: JR030**

In response to your letter dated February 18, 2003 AES Consulting Engineers has taken several actions.

Construction Certification:
Being provided by Earthworks Consulting Engineers, Inc.

Record Drawings:
No further action required.

Construction – Related Items:
Sediment, debris and organic matter have been cleared and removed from facility. The stone located next to the timber wall has been cleared of any debris and more stone has been added per design of approved plans.

AES CONSULTING ENGINEERS

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 18, 2002/3 SAT.

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

Reinspect 6-2-03

Re: Governor's Land - Founder's Hill
County Plan No. S-29-95
Timber Crib Wall
County BMP ID Code: JR 030

Dear Mr. Bennett:

The Environmental Division has reviewed a record drawing as submitted to our office on February 22nd 2002 for the above referenced BMP. The record drawing provides as-built information for a timber crib wall situated east of the cul-de-sac at the end of Founder's Hill South.

Based on our review of the project and a concurrent field inspection as performed on February 5th 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:

OK ECE INC 4-23-03

1. In accordance with the Note # 18 on Sheet 9 of the approved plan, construction certification was required for this stormwater management/BMP facility. None was provided. The certification can be in letter format or by use of the certification statements in Section 4 of the *James City County, Stormwater Management / BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*.

Record Drawing:

OK 6-26-03

2. The record drawing set dated February 19th 1997 is **satisfactory.** Please forward one reproducible and one blue/black line set of the record drawings to our office.

Construction - Related Items:

Vertical PVC Missing – to be taken care of NO REINSPECT NECESSARY.

3. Properly convert the BMP from function as a temporary sediment trapping measure and put into service as permanent extended detention BMP. This includes installing all stringers (timber) and the 3-inch riser device is arranged, anchored and perforated properly. Refer to "BMP Timber Structure" specifications on the lower left hand side of approved plan Sheet 13 (and Sheet 2 of the record drawing).

4. Clean accumulated organic (leaf) material, debris and vegetation (vines) from along both sides of the timber wall and clean leaves from the top of riprap in the inflow channel on the upstream side of the wall and along the base stone on the downstream side of the wall. *(Note: Cleaning of the riprap channel is only required at the outlet end of the channel in the proximity of the upstream face of the timber wall within about 25 ft. of the perforated riser device.)*

OK 6/3/03

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\S2995.jr030

JR030
FOUNDERS HILL TCW

Design of BMP Facility
Governor's Land at Two Rivers
Bay 3, Pod 3
FOUNDER'S HILL

Detemining a pre-development discharge rate (i.e., pre-development 2-year 24-hour storm peak discharge rate) for BMP

Pre-Development Conditions

-- Drainage Area = 23.50 Ac.

-- Soil Type Breakdown

Hydro. Group	Pre-dev. Use	CN Assigned	Acres	CN * Ac.
A	Woods, fair condition	36	0.00	0.0
B	Woods, fair condition	60	0.00	0.0
C	Woods, fair condition	74	6.11	452.1
D	Woods, fair condition	80	17.39	1391.2
TOTALS			23.50	1843.3
Weighted CN =				78.4

-- Time of Concentration

Overland flow

T=((0.007*(n*L)^0.8)/((P^0.5)*(s^0.4))
where
T=travel time (hours)

n=Manning's roughness coefficient	=	0.38
L=flow length (feet)	=	200.00
P=2-year, 24-hour rainfall (inches)	=	3.50
s=slope of hyd. grade line (ft/ft)	=	0.01

T= 1.00 hours

Design of BMP Facility
Governor's Land at Two Rivers
Bay 3, Pod 3
FOUNDER'S HILL

Shallow concentrated flow

T=L/(3600*V)
where
T=travel time (hours)
L=flow length (feet) = 420.00
V=average velocity (ft/sec) = 0.25

T= 0.47 hours

Channel flow

T=L/(3600*V)
where
T=travel time (hours)
L=flow length (feet) = 600.00
V=average velocity (ft/sec) = 2.00

T= 0.08 hours

Total time concentration (sum of travel times)

Tc= 1.55 hours

Ave. basin slope= 1.50 %

Design of BMP Facility
Governor's Land at Two Rivers
Bay 3, Pod 3
FOUNDER'S HILL

Post-Development Conditions

-- Drainage Area = 28.80 Ac.

-- Soil Type Breakdown

Hydro. Group	Post-dev. Use	CN Assigned	Acres	CN * Ac.
C	Right -of-ways	87	0.5	43.5
	1/2 acre lots	80	4.1	328.0
	Golf Course	74	0.1	7.4
	Open Space	73	1.4	102.2
D	Right -of-ways	87	6.4	556.8
	1/3 acre lots	81	9.3	753.3
	1/2 acre lots	85	1.0	85.0
	Golf Course	80	2.8	224.0
	Open Space	79	3.2	252.8
TOTALS			28.8	2353.0
Weighted CN =				81.7

Design of BMP Facility
Governor's Land at Two Rivers
Bay 3, Pod 3
FOUNDER'S HILL

-- Time of Concentration

Overland flow

T=((0.007*(n*L)^0.8)/((P^0.5)*(s^0.4))
where
T=travel time (hours)

n=Manning's roughness coefficient	=	0.40
L=flow length (feet)	=	200.00
P=100-year, 24-hour rainfall (inches)	=	5.60
s=slope of hyd. grade line (ft/ft)	=	0.01

T= 0.82 hours

Shallow concentrated flow

T=L/(3600*V)
where
T=travel time (hours)

L=flow length (feet)	=	300.00
V=average velocity (ft/sec)	=	0.75

T= 0.11 hours

Channel flow

T=L/(3600*V)
where
T=travel time (hours)

L=flow length (feet)	=	600.00
V=average velocity (ft/sec)	=	2.00

T= 0.08 hours

Total time concentration (sum of travel times)

Tc= 1.01 hours

Design of BMP Facility
Governor's Land at Two Rivers
Bay 3, Pod 3
FOUNDER'S HILL

-- Ave. basin slope= 1.50 %

Proposed estimated pond volume by elevation

Elevation	Depth	Area (sq. ft.)	Volume (cu. ft.)	Volume (cu. yd.)	Sum Volume (cu. ft.)	Sum Volume (cu. yd.)
13	0	149				
14	1	750	450	17	450	17
15	1	2289	1520	56	1969	73
16	1	6087	4188	155	6157	228
17	1	11862	8975	332	15132	560
18	1	18514	15188	563	30320	1123
19	1	25582	22048	817	52368	1940
20	1	33645	29614	1097	81981	3036
21	1	0	0	0	81981	3036
22	1	0	0	0	81981	3036
23	1	0	0	0	81981	3036

Design of BMP Facility
Governor's Land at Two Rivers
Bay 3, Pod 3
FOUNDER'S HILL

Determining volume of 1.0-inch storm runoff

Volume =(1"/Acre)*(Drainage Area)*Vr

Vr = 0.05 + (0.009)*(% of impervious post development area)

Impervious post development area

Impervious lot area	4.0 Ac.
Impervious open space and golf course	0.8 Ac.
Impervious road development	2.3 Ac.
Total impervious area	7.1 Ac.
% impervious post development area =	24.5 %

Vr = 0.27

Vol. of pond = 0.65 Ac. ft.
28260 cu. ft.
1047 cu. yd.

Elevation of pool associated with required volume = 17.9

Determining release rate for Design Type 3 BMP

Average Release Rate = Vol. of pond / (24 hours * 60 min. * 60 sec.)

Ave. Release Rate = 0.33 cfs

Design of BMP Facility
Governor's Land at Two Rivers
Bay 3, Pod 3
FOUNDER'S HILL

Sizing orifice for proper release rate

Using orifice equation

Amount of Head (feet)	Required Area of orifice (sq. ft.)	Area of orifice (sq. in.)	Size of orifice diameter in inches	
4.9	0.043	6.25	2.82	<-- use 3" diameter

HYDROLOGIC REPORT FOR

GOVERNOR'S LAND

FOUNDER'S HILL
BAY 3, POD 3 SUBDIVISION

2-YEAR PRE-DEVELOPMENT

HYDROGRAPH FOR BMP

prepared by

AES Consulting Engineers

5248 Olde Towne Road

Williamsburg, Virginia

HYDROLOGIC REPORT

FOUNDER'S HILL
BAY 3, POD 3 BMP.....
PRE-DEVELOPMENT 2 YEAR
.....

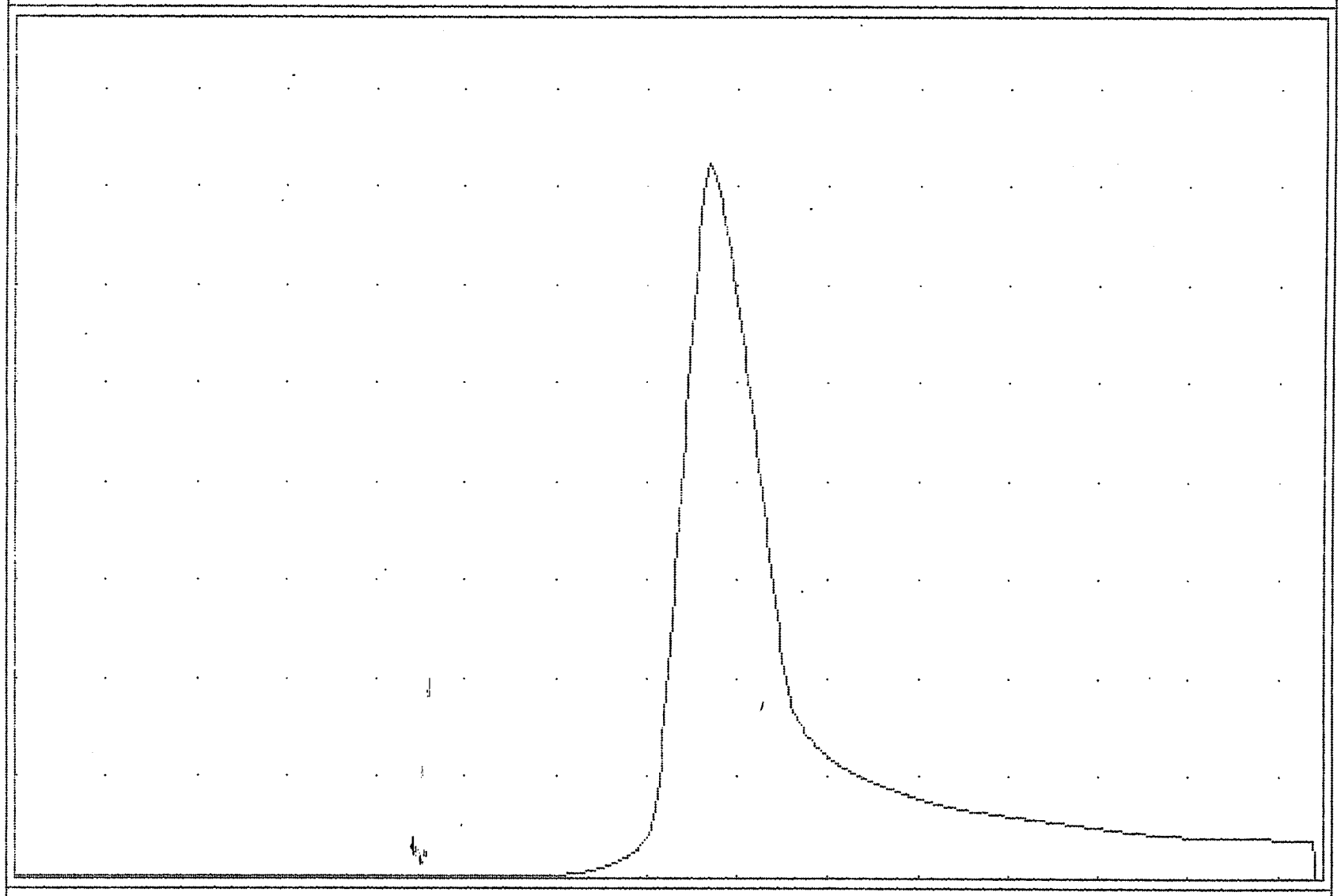
Hyd. No. 1

Hydrograph type	= S.C.S. RUNOFF	Peak discharge	= 14.49 cfs
Storm frequency	= 2 yr	Time interval	= 2 min
Basin area	= 23.5 ac	Basin curve No.	= 78.4
Ave basin slope	= 1.5 %	Hydraulic len	= 1220 ft
Basin lag	= 54.0 min	Time of concen	= 90.00 min
Total precip.	= 3.50 in	Distribution	= S.C.S. II

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfS)	
12.03	3.84	12.07	4.33	12.10	4.82	12.13	5.33
12.17	5.84	12.20	6.35	12.23	6.88	12.27	7.40
12.30	7.93	12.33	8.47	12.37	9.01	12.40	9.55
12.43	10.09	12.47	10.62	12.50	11.15	12.53	11.67
12.57	12.17	12.60	12.65	12.63	13.11	12.67	13.52
12.70	13.89	12.73	14.19	12.77	14.40	12.80	14.49
12.83	14.48	12.87	14.38	12.90	14.26	12.93	14.12
12.97	13.96	13.00	13.80	13.03	13.62	13.07	13.44
13.10	13.24	13.13	13.03	13.17	12.82	13.20	12.59
13.23	12.36	13.27	12.12	13.30	11.88	13.33	11.63
13.37	11.37	13.40	11.11	13.43	10.84	13.47	10.57
13.50	10.30	13.53	10.02	13.57	9.74	13.60	9.45
13.63	9.16	13.67	8.87	13.70	8.58	13.73	8.28
13.77	7.98	13.80	7.68	13.83	7.37	13.87	7.06
13.90	6.75	13.93	6.44	13.97	6.13	14.00	5.83
14.03	5.52	14.07	5.22	14.10	4.92	14.13	4.64
14.17	4.37	14.20	4.11	14.23	3.88	14.27	3.68

Qp = 4.5 S.C.S. RUNOFF 2 Yr



HGU = 100 min 1 VGU = 2.0 cfs

VOL = (cuft/acft) = 127212 / 2.920

HYDROLOGIC REPORT FOR

GOVERNOR'S LAND

Founder's Hill
BAY 3, POD 3 SUBDIVISION

2-YEAR POST-DEVELOPMENT

HYDROGRAPH FOR BMP

prepared by

AES Consulting Engineers

5248 Olde Towne Road

Williamsburg, Virginia

HYDROLOGIC REPORT

Founder's Hill
BAY 3, POD 3 BMP.....
POST-DEVELOPMENT 2-YR.
.....

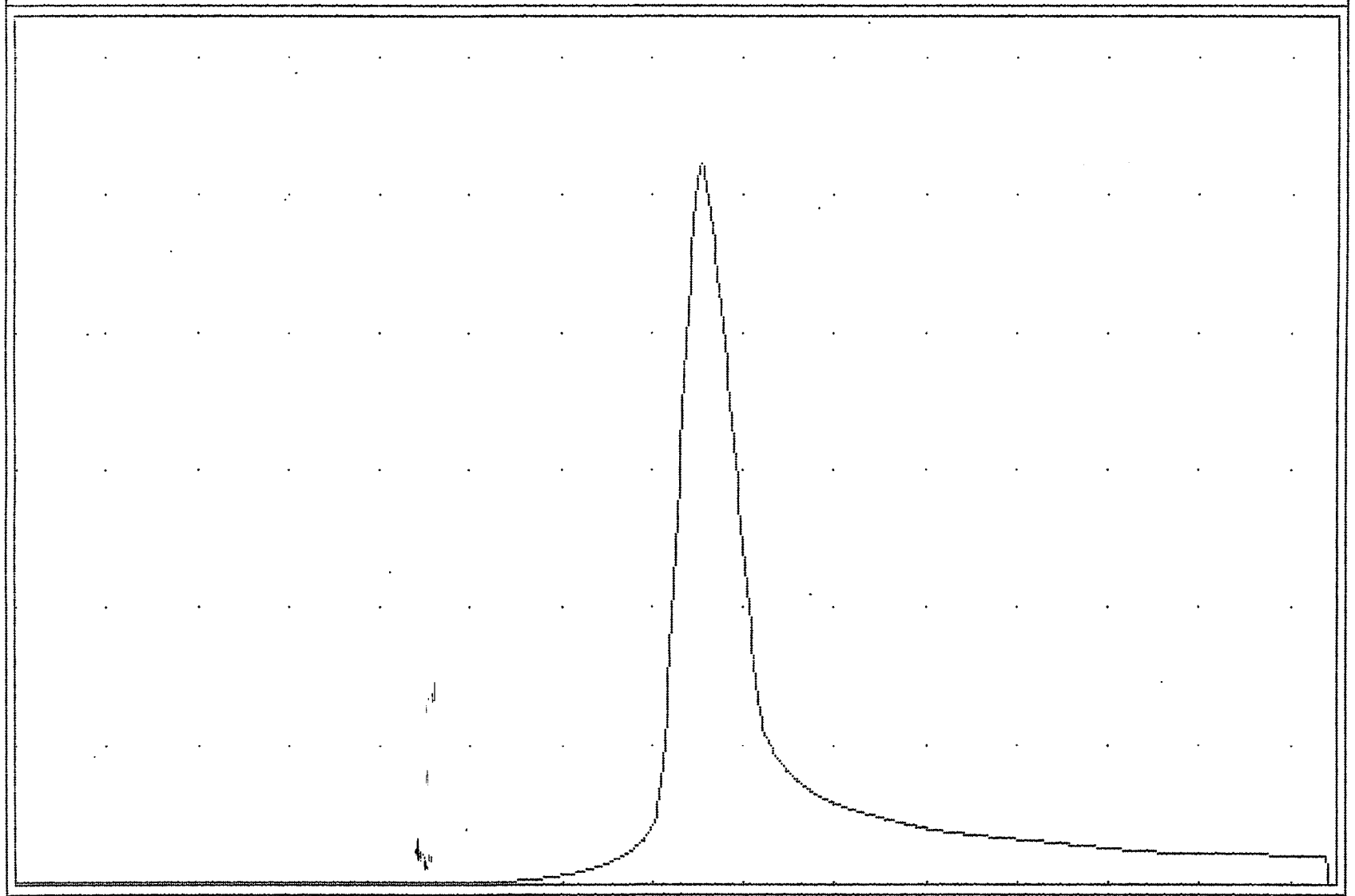
Hyd. No. 2

Hydrograph type	= S.C.S. RUNOFF	Peak discharge	= 26.16 cfs
Storm frequency	= 2 yr	Time interval	= 2 min
Basin area	= 28.8 ac	Basin curve No.	= 81.7
Ave basin slope	= 1.5 %	Hydraulic len	= 1100 ft
Basin lag	= 39.0 min	Time of concen	= 65.00 min
Total precip.	= 3.50 in	Distribution	= S.C.S. II

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfS)	
11.77	2.87	11.80	3.27	11.83	3.80	11.87	4.47
11.90	5.32	11.93	6.35	11.97	7.49	12.00	8.68
12.03	9.90	12.07	11.12	12.10	12.37	12.13	13.62
12.17	14.89	12.20	16.16	12.23	17.42	12.27	18.67
12.30	19.89	12.33	21.07	12.37	22.19	12.40	23.23
12.43	24.19	12.47	25.01	12.50	25.65	12.53	26.05
12.57	26.16	12.60	25.99	12.63	25.63	12.67	25.19
12.70	24.71	12.73	24.21	12.77	23.69	12.80	23.13
12.83	22.56	12.87	21.96	12.90	21.33	12.93	20.69
12.97	20.03	13.00	19.36	13.03	18.66	13.07	17.96
13.10	17.24	13.13	16.52	13.17	15.78	13.20	15.04
13.23	14.29	13.27	13.54	13.30	12.78	13.33	12.02
13.37	11.27	13.40	10.53	13.43	9.79	13.47	9.08
13.50	8.39	13.53	7.74	13.57	7.13	13.60	6.58
13.63	6.13	13.67	5.78	13.70	5.53	13.73	5.36
13.77	5.21	13.80	5.07	13.83	4.94	13.87	4.82
13.90	4.70	13.93	4.59	13.97	4.49	14.00	4.39
14.03	4.30	14.07	4.22	14.10	4.14	14.13	4.06

Qp = 6.2 S.C.S. RUNOFF 2 Yr



HGU = 100 min 2 VGU = 5.0 cfs

VOL = (cuft/acft) = 180150 / 4.136

```
 Option 1                          STAGE / STORAGE TABLE                          R to reset
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
: 1. RESERVOIR No = 1.     2. RESERVOIR NAME = B3,P3 BMP...
: 3. S = Ks * Z^b
:      Ks = 0............     b = 0..........
:      START ELEV = 0.....    INCREMENT = 0...
:
:      STAGE      ELEVATION      CO AREA       INC STORAGE      TOT STORAGE
:      ft         ft             sq ft         cu ft            cu ft
:
:  4     0.00        13.00.      149.....          0                0
:  5     1.00        14.00.      750.....        449              449
:  6     2.00        15.00.      2289....       1519             1968
:  7     3.00        16.00.      6087....       4188             6156
:  8     4.00        17.00.      11862...       8974            15130
:  9     5.00        18.00.      18514...      15188            30318
: 10     6.00        19.00.      25582...      22048            52366
: 11     7.00        20.00.      33645...      29613            81979
: 12     0.00         0.00.      0.......          0                0
: 13     0.00         0.00.      0.......          0                0
: 14     0.00         0.00.      0.......          0                0
:
:
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
Change item number: 0                                                                  DY to cont
```

```
 Reservoir No. 1                        OUTLET STRUCTURES
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
  CULVERT STRUC  A. Q=CoA[2gh/k]^.5     CULVERT STRUC  B. Q=CoA[2gh/k]^.5
:
: 1. WIDTH  (in)     = 15.                 9. WIDTH  (in)     = 3..
: 2. HEIGHT (in)     = 15.                10. HEIGHT (in)     = 3..
: 3. No. BARRELS     = 1..                11. No. BARRELS     = 1..
: 4. INVERT ELEV.    = 13.......          12. INVERT ELEV.    = 13.2.....
: 5. Co = 0.60                            13. Co = 0.60
: 6. CULVERT LENGTH (ft) = 1...           14. CULVERT LENGTH (ft) = 0...
: 7. CULVERT SLOPE (%)   = 0...           15. CULVERT SLOPE (%)   = 0...
: 8. MANNING'S N-VALUE   = .013           16. MANNING'S N-VALUE   = .013
:                                         17. MULTI-STAGE OPTION ? (Y/N) Y
:
: WEIR STRUCTURE A.       Q=CwLH^EXP      WEIR STRUCTURE B.       Q=CwLH^EXP
:
: 18. CREST LENGTH (ft)  = 10.7...        23. CREST LENGTH (ft)  = 122....
: 19. CREST ELEVATION    = 17.9...        24. CREST ELEVATION    = 19.25..
: 20. Cw = 3.00                           25. Cw = 3.00
: 21. EXP = 1.50                          26. EXP = 1.50
: 22. MULTI-STAGE OPTION ? (Y/N) Y        27. MULTI-STAGE OPTION ? (Y/N) N
:
:
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
Change item number: 0                                                                  DY to cont
```

HYDROLOGIC REPORT

STAGE / STORAGE / DISCHARGE

RESERVOIR NUMBER = 1

RESERVOIR NAME = B3,P3 BMP... (* Controlled by Culv Structure A)
STORAGE VALUES WERE INPUT MANUALLY

DISCHARGE VALUES: CULVERT STRUCT A. Q = .6 *A*[2gh/k]^.5 * 1
* CULVERT STRUCT B. Q = .6 *A*[2gh/k]^.5 * 1
* WEIR STRUCT A. Q = 3 * 10.7 * H ^ 1.5
WEIR STRUCT B. Q = 3 * 122 * H ^ 1.5

ELEVATION	DISCHARGE (cfs)			
	CULVERT A	CULVERT B	WEIR A	WEIR B
13.00	0.00	0.00	0.00	0.00
14.00	3.80	0.19	0.00	0.00
15.00	6.91	0.31	0.00	0.00
16.00	9.11	0.39	0.00	0.00
17.00	10.85	0.45	0.00	0.00
18.00	12.36	0.51	1.02	0.00
19.00	13.70	0.00	37.03	0.00
20.00	14.92	0.00	97.69	237.72
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00

STAGE	ELEVATION	INC STOR cu ft	TOT STOR cu ft	OUTFLOW cfs
0.00	13.00	0	0	0.00
1.00	14.00	449	449	0.19
2.00	15.00	1519	1968	0.31
3.00	16.00	4188	6156	0.39
4.00	17.00	8974	15130	0.45
5.00	18.00	15188	30318	1.53
6.00	19.00	22048	52366	13.70
7.00	20.00	29613	81979	252.64
0.00	0.00	0	0	0.00
0.00	0.00	0	0	0.00
0.00	0.00	0	0	0.00

HYDROLOGIC REPORT FOR

GOVERNOR'S LAND

FOUNDER'S HILL SUBDIVISION

2-YEAR POST-DEVELOPMENT

ROUTED HYDROGRAPH THRU BMP

prepared by

AES Consulting Engineers

5248 Olde Towne Road

Williamsburg, Virginia

HYDROLOGIC REPORT

FOUNDER'S HILL BMP....
2-YR. POST-DEVELOPMENT
ROUTED THRU BMP.....

Hyd. No. 12

Hydrograph type = RESERVOIR ROUTE Peak discharge = 14.43 cfs
Storm frequency = 2 yr Time interval = 2 min
Inflow hyd. no. = 2 Reservoir no. = 1

HYDROGRAPH DISCHARGE TABLE

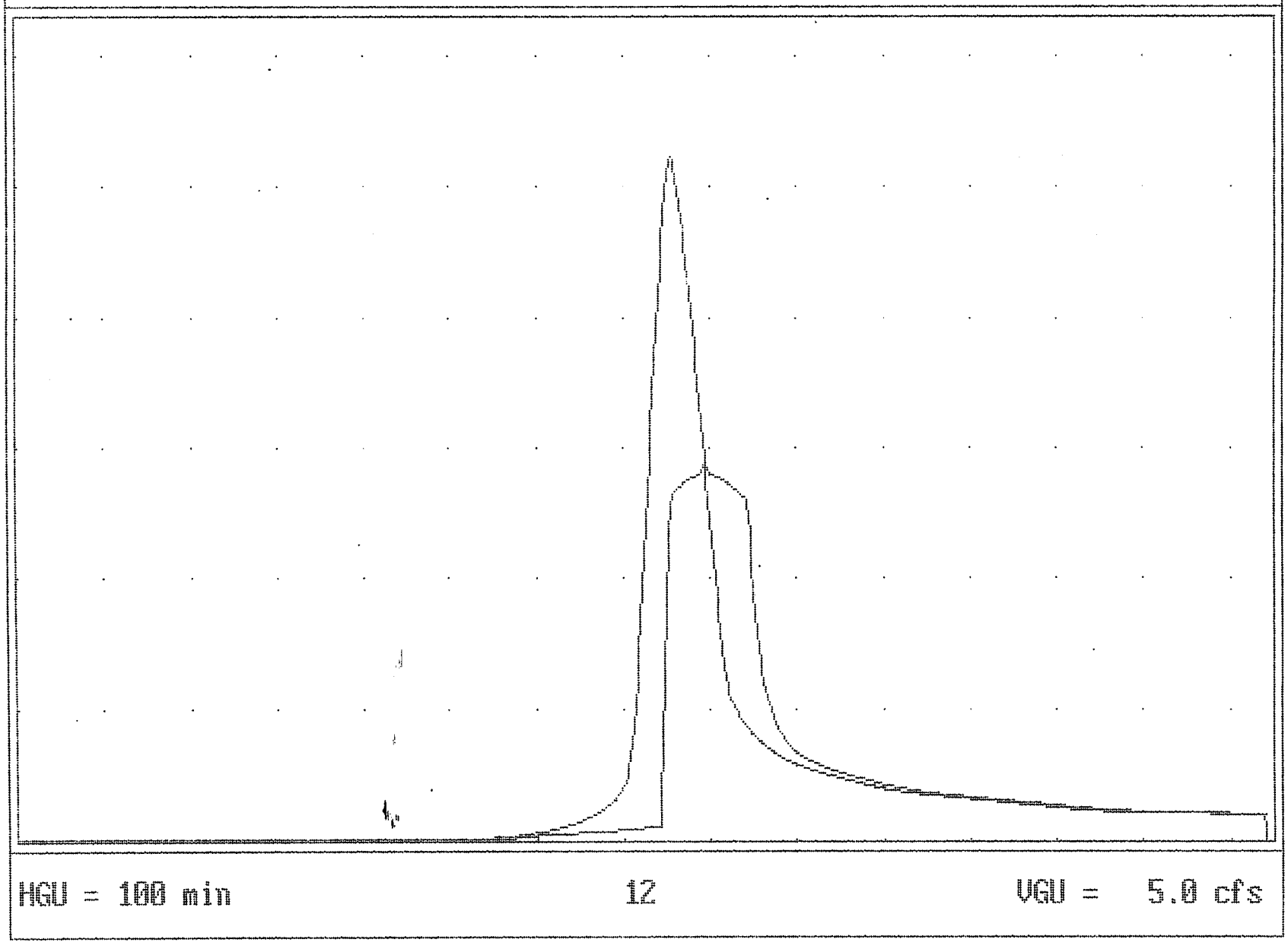
TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
11.90	5.32	6.35	101.65	102.42	0.39
11.93	6.35	7.49	112.53	113.31	0.39
11.97	7.49	8.68	125.57	126.36	0.40
12.00	8.68	9.90	140.93	141.74	0.40
12.03	9.90	11.12	158.69	159.51	0.41
12.07	11.12	12.37	178.87	179.71	0.42
12.10	12.37	13.62	201.49	202.36	0.43
12.13	13.62	14.89	226.60	227.48	0.44
12.17	14.89	16.16	254.20	255.11	0.45
12.20	16.16	17.42	284.32	285.24	0.46
12.23	17.42	18.67	316.96	317.90	0.47
12.27	18.67	19.89	352.10	353.05	0.48
12.30	19.89	21.07	389.68	390.65	0.49
12.33	21.07	22.19	429.65	430.64	0.49
12.37	22.19	23.23	471.89	472.90	0.50
12.40	23.23	24.19	513.26	517.31	2.03
12.43	24.19	25.01	552.07	560.68	4.30
12.47	25.01	25.65	587.36	601.26	6.95
12.50	25.65	26.05	618.66	638.02	9.68
12.53	26.05	26.16	646.45	670.36	11.95
12.57	26.16	25.99	672.80	698.66	12.93
12.60	25.99	25.63	698.70	724.95	13.13
12.63	25.63	25.19	723.87	750.31	13.22
12.67	25.19	24.71	748.08	774.69	13.31
12.70	24.71	24.21	771.20	797.98	13.39

HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
14.13	4.06	3.99	624.68	645.16	10.24
14.17	3.99	3.92	614.21	632.73	9.26
14.20	3.92	3.85	605.25	622.12	8.43
14.23	3.85	3.79	597.44	613.02	7.79
14.27	3.79	3.73	590.64	605.08	7.22
14.30	3.73	3.67	584.69	598.15	6.73
14.33	3.67	3.61	579.49	592.09	6.30
14.37	3.61	3.55	574.93	586.76	5.92
14.40	3.55	3.50	570.86	582.09	5.61
14.43	3.50	3.45	567.20	577.91	5.36
14.47	3.45	3.40	563.89	574.14	5.13

Maximum outflow (cfs) = 14.43
Maximum storage (cu ft) = 58624
Maximum elevation (ft) = 19.21

Qp = 14.4 RESERVOIR ROU. 2 Yr



MAX STORAGE = 58624

MAX ELEVATION = 19.21

GOVERNOR'S LAND
FOUNDER'S HILL

CHANNEL ADEQUACY OF OUTFALL FOR RIVER OAKS ROAD DRAINAGE

— PEAK RUNOFF RATE FOR REACH A USING 2-YEAR STORM

DRAINAGE AREA :	2.11 AC	(PROJECT SITE)	@ 0.45	RUNOFF COEFF.
	1.35 AC	(UNDEVELOPED)	@ 0.30	RUNOFF COEFF
TOTAL AREA	3.46 AC		Σ CA	1.35

WEIGHTED RUNOFF COEFF = 0.40

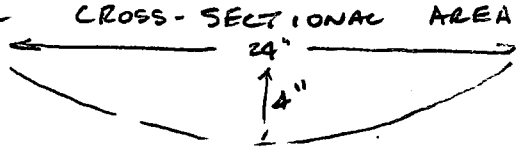
TIME OF CONCENTRATION FOR DRAINAGE AREA OF REACH A = 20 MIN.

INTENSITY FOR 2-YEAR STORM = 3.4 IN/HR

$Q_2 = CI_2A = (0.40)(3.4)(3.46) = 4.7$ CFS

— EXISTING CHANNEL PARAMETERS OF REACH A :

AVERAGE BANKFULL CROSS-SECTIONAL AREA = 0.43 □'



HYDRAULIC RADIUS $= \dfrac{(.2)^2(0.33)}{(1.5)(2)^2 + 4(0.33)^2} = \dfrac{1.32}{6 + 0.43} = 0.20$

SLOPE = (31 − 17.5)/200 = 6.75 %

MAXIMUM PERMISSIBLE VELOCITY = 2.5 FT/SEC (SANDY LOAM SOIL)
REDUCTION IN PERMISSIBLE VELOCITY (MODERATE MEANDER) 13 %

FINAL MAX PERMISSIBLE VELOCITY = 2.2 FT/SEC.

CORRECTION TO PERMISSIBLE VELOCITY BASED UPON AVERAGE DEPTH OF FLOW A/T = 0.43/2 = 0.21 ⟹ CORR. FACTOR ≈ 0.7

MAX. PERMISSIBLE VELOCITY = 1.5 FT/SEC

— ROUGHNESS COEFFICIENT IN REACH A (n)

CHANNEL IN EARTH	0.02
DEGREE OF IRREGULARITY	0.015
SHAPE OF CROSS-SECTION	0.015
OBSTRUCTIONS	0.02
VEGETATION	0.002
TOTAL n	0.0720

- BACKFUL VELOCITY = V = 1.84 m/s > PERMISSIBLE VELOCITY OF 1.5 FT/SEC
  CAPACITY Q = 0.79 CFS < 4.7 CFS (PEAK RUNOFF RATE)

  CHANNEL MODIFICATIONS REQUIRED FOR REACH A !

- PEAK RUNOFF RATE FOR REACH B USING 2-YEAR STORM

DRAINAGE AREA :	2.11 AC	(PROJECT SITE)	@ 0.45	RUNOFF COEFF
	1.35 AC	(UNDEVELOPED)	@ 0.30	RUNOFF COEFF.
	2.00 AC	(UNDEVELOPED)	@ 0.30	RUNOFF COEFF.
	5.46 AC	ΣCA =	1.95	

WEIGHTED RUNOFF COEFF = 0.36

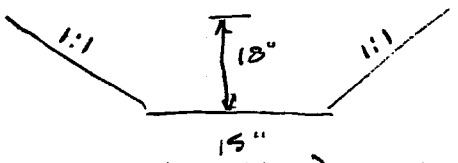
TIME OF CONCENTRATION FOR DRAINAGE AREA OF REACH B = 20 MIN

INTENSITY FOR 2-YEAR STORM = 3.4 IN/HR

$Q_2 = CI_2A = (0.36)(3.4)(5.46) = 6.7$ CFS

- EXISTING CHANNEL PARAMETERS OF REACH B:

AVERAGE BACKFULL CROSS-SECTIONAL AREA $= (1.25)(1.5) + 1(1.5) = 3.37$



HYDRAULIC RADIUS $\dfrac{(1.25)(1.5) + 1(1.5)}{1.25 + (2)(1.5)(\sqrt{1^2+1})} = \dfrac{1.87 + 1.5}{1.25 + 4.24} = 0.61$

SLOPE : $(17.5 - 8)/250 = 3.80\%$

MAX. PERMISSIBLE VELOCITY = 3.0 FT/SEC. SILT LOAM
REDUCTION IN PERMISSIBLE VELOCITY (SLIGHT MEANDER) = 10%
PERMISSIBLE VELOCITY = 2.7 FT/SEC
CORRECTION TO PERMISSIBLE VELOCITY FOR AVERAGE DEPTH OF FLOW
A/r = 3.37/4.25 = 0.79 ⟹ CORRECTION FACTOR = 0.77

MAX. PERMISSIBLE VELOCITY = 2.1 FT/SEC

- ROUGHNESS COEFFICIENT IN REACH B (n)

CHANNEL IN EARTH	0.02
DEGREES OF IRREGULARITY	0.005
SHAPE OF CROSS-SECTION	0.005
OBSTRUCTIONS	0.012
VEGETATION	0.000
	0.042

→ BANKFULL VELOCITY = V = 4.97 FT/SEC > PERMISSIBLE VELOCITY OF 2.1 FT/SEC
CAPACITY Q = 16.75 CFS > 6.7 CFS (PEAK RUNOFF RATE)

VELOCITY AT 2-YEAR STORM FLOW

DEPTH	HYDRAULIC RADIUS	CROSS-SECTIONAL AREA	V	Q
0.75'	1.50/3.37 = 0.45	1.50	4.06	6.09

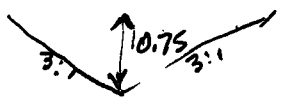
NOTE: 2-YEAR STORM FLOW VELOCITY WILL EXCEED PERMISSIBLE VELOCITY.

CHANNEL MODIFICATIONS REQUIRED FOR REACH B!

REACH A MODIFICATIONS

Q_2 = 4.7 CFS
Q_{10} = (0.40)(4.5)(3.46) = 6.22 CFS
SLOPE = 0.0675 FT/FT

TRY "V" CHANNEL 0.75' DEEP
3:1 SIDE SLOPES, RIP-RAP LINED (CLASS I RIP-RAP)



CROSS-SECTIONAL AREA = 1.69

HYDRAULIC RADIUS $= \frac{3(0.75)}{2\sqrt{3^2+1}} = \frac{2.25}{6.32} = 0.36$

$V = \frac{1.49}{0.039}(0.36)^{2/3}(0.0675)^{1/2} = 5.0$

Q = VA = 8.45 CFS (ADEQUATE)

→ USE "V" CHANNEL, 1' DEEP, 3:1 SIDE SLOPES, LINED WITH CLASS I RIP-RAP

REACH B MODIFICATIONS

Q_2 = 6.7 CFS
Q_{10} = 8.8 CFS
SLOPE = 0.0380 FT/FT

TRY LINING EXISTING CHANNEL WITH CLASS I RIP-RAP

$V = \frac{1.49}{0.035}(0.61)^{2/3}(0.0380)^{1/2} = 5.97$

Q = VA = (5.97)(3.37) = 20.11 CFS (ADEQUATE)

→ LINE EXISTING CHANNELL WITH CLASS I RIP-RAP

SYSTEM 64

STORM SEWER TABULATION

DATA FILE: A:SYSTEM64.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 05-16-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769 PAGE 1 OF 1

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)	PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
1	1.3	0.60	0.8	0.8	10.0	5.81	4.63	14.8	15	175	5.257	4.555	5.14	27.47	26.20	SS#64-1 - SS#64-2
							4.63 0.0		15				3.78	19.50	17.00	OUTFALL

SYSTEM 63

STORM SEWER TABULATION

DATA FILE: a:SYSTEM63.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 05-16-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)		PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
5	0.8	0.40	0.3	0.3	10.0	5.81	1.81		4.1	15	25	0.400	0.241	1.48	34.97	33.64	SS#63-5 - SS#63-6
							1.81	0.0		15				1.48	34.91	33.54	4
4	0.6	0.40	0.2	0.5	10.1	5.78	3.10		4.3	15	115	0.443	0.197	2.52	34.79	33.54	SS#63-4 - SS#63-5
							3.10	0.0		15				2.52	34.56	33.03	3
3	0.5	0.44	0.2	0.8	15.0	5.00	3.82		4.7	15	25	0.520	0.351	3.11	34.38	33.03	SS#63-3 - SS#63-4
							3.82	0.0		15				3.11	34.29	32.90	2
2	0.5	0.48	0.2	1.0	15.1	4.98	4.91		6.1	18	60	0.333	0.186	3.25	34.10	32.90	SS#63-2 - SS#63-3
							4.91	0.0		18				3.05	33.98	32.70	1
1	0.0	0.00	0.0	1.0	15.5	4.93	4.86		6.1	18	255	0.333	0.258	3.85	33.71	32.70	SS#63-1 - SS#63-2
							4.86	0.0		18				3.21	33.05	31.85	OUTFALL

2.40 0.90

STORM SEWER TABULATION

SYSTEM #8

DATA FILE: a:SYSTEM8.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 05-23-1995

* NOTE: THE ORIGINAL PORTIONS OF THIS STORM SEWER SYSTEM WERE APPROVED WITH THE PLANS FOR "THE HARBOR AT TWO RIVERS" SUBDIVISION PLANS. ADDITIONS AND ADJUSTMENTS TO THE STORM SEWER ARE MARKED.

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

STORM SEWER ADJUSTED FOR FOUNDERS HILL PLANS

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)	PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
30	0.2	0.65	0.1	0.1	5.0	7.00	0.91	7.1	15	31	1.226	0.049	0.75	34.02	32.80	SS#8-21 - SS#8-22
							0.91 0.0		15				0.74	34.01	32.42	29
29	0.5	0.40	0.2	0.3	12.0	5.45	1.71	4.1	15	55	0.400	0.070	1.39	33.97	32.42	SS#8-7 - SS#8-21
							1.71 0.0		15				1.39	33.93	32.20	12
12	0.5	0.41	0.2	0.5	12.3	5.40	2.74	6.1	15	56	0.893	0.180	2.23	33.84	32.20	SS#8-6 - SS#8-7..
							2.74 0.0		15				2.23	33.74	31.70	11
11	0.5	0.51	0.3	0.8	12.6	5.35	4.07	4.6	15	300	0.503	0.398	3.32	33.54	31.70	SS#8-2 - SS#8-6..
							4.07 0.0		15				3.32	32.34	30.19	10
10	0.9	0.40	0.3	2.2	25.3	3.93	8.78	15.7	18	49	2.224	0.700	4.97	31.88	30.19	SS#8-29 - SS#8-2.
							8.78 0.0		18				4.97	31.54	29.10	9
9	0.0	0.00	0.0	2.2	25.6	3.91	8.73	15.3	18	68	2.132	0.692	4.94	31.08	29.10	SS#8-28 - SS#8-29
							8.73 0.0		18				4.94	30.61	27.65	8
8	0.0	0.00	0.0	2.2	26.0	3.88	8.67	14.9	18	120	2.000	0.682	4.90	30.17	27.65	SS#8-26 - SS#8-28
							8.67 0.0		18				4.91	29.35	25.25	7
7	1.0	0.50	0.5	2.7	26.6	3.83	10.49	16.4	18	56	2.446	0.999	5.94	28.69	25.15	SS#8-23 - SS#8-26
							10.49 0.0		18				5.94	28.13	23.78	6
6	0.5	0.48	0.3	3.3	26.9	3.81	12.61	25.9	18	26	6.077	1.445	7.14	27.18	23.68	SS#8-23 - SS#8-24
							12.61 0.0		18				7.14	26.81	22.10	5
5	0.4	0.75	0.3	3.6	27.1	3.80	13.69	25.9	18	126	6.079	6.079	14.50	22.89	22.10	SS#8-9 TO SS#8-23
							13.69 0.0		18				14.50	15.23	14.44	4
4	0.9	0.50	0.4	4.4	27.8	3.75	16.38	28.6	24	232	1.599	0.931	6.80	13.57	12.14	SS#8-10 - SS#8-9
							16.38 0.0		24				5.21	11.41	8.43	3
3	0.4	0.61	0.2	5.3	29.1	3.66	19.27	28.6	24	316	1.595	0.916	7.36	10.40	8.85	SS#8-12 - SS#8-10
							19.27 0.0		24				6.14	7.51	3.81	2
2	0.2	0.90	0.2	6.6	30.8	3.55	23.47	35.9	30	30	0.767	0.328	4.78	7.15	3.49	SS#8-14 - SS#8-12
							23.47 0.0		30				4.78	7.06	3.26	1
1	0.3	0.80	0.2	7.7	31.0	3.54	27.19	35.1	30	30	0.733	0.440	5.54	6.53	3.26	SS#8-13 - SS#8-14
							27.19 0.0		30				5.54	6.40	3.04	OUTFALL

STORM SEWER TABULATION (continued)
DATA FILE: a:SYSTEM8.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 05-23-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINES ADJUSTED FOR FOUNDER'S HILL PLANS

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, DFQ (CFS)		PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
14	0.3	0.45	0.1	0.1	8.0	6.22	0.87		7.3	15	56	1.286	0.027	0.71	32.74	31.50	SS#8-4 - SS#8-5
							0.87	0.0		15				0.71	32.73	30.78	13
13	0.3	0.65	0.2	0.4	8.3	6.15	2.26		3.1	15	250	0.236	0.122	1.84	32.65	30.78	SS#8-2 - SS#8-4
							2.26	0.0		15				1.84	32.34	30.19	10
15	1.9	0.40	0.8	0.8	25.0	3.96	3.01		7.7	15	56	1.411	0.350	2.45	32.54	30.98	SS#8-2 - SS#8-3
							3.01	0.0		15				2.45	32.34	30.19	10
16	0.7	0.50	0.3	0.3	15.0	5.00	1.65		10.3	18	365	0.970	1.045	4.21	18.69	18.00	SS#8-9 - SS#8-8
							1.65	0.0		18				4.21	14.87	14.46	4
17	3.9	0.30	1.2	1.2	24.0	4.04	4.73		34.7	30	7	0.714	0.219	0.96	7.52	3.54	SS#8-12 - SS#8-15
							4.73	0.0		30				0.96	7.51	3.49	2
19	0.3	0.67	0.2	0.2	7.0	6.46	1.17		5.9	15	31	0.839	0.078	0.95	7.26	4.11	SS#8-16 - SS#8-17
							1.17	0.0		15				0.95	7.24	3.85	18
18	0.1	0.90	0.0	0.8	23.0	4.12	3.43		6.9	18	115	0.426	0.106	1.94	7.18	3.75	SS#8-14 - SS#8-16
							3.43	0.0		18				1.94	7.06	3.26	1
22	0.4	0.48	0.2	0.2	22.0	4.21	0.81		3.7	15	31	0.323	0.042	0.66	7.48	4.50	SS#8-19 - SS#8-20
							0.81	0.0		15				0.66	7.47	4.40	21
21	0.7	0.50	0.3	0.5	22.2	4.20	2.28		3.9	15	83	0.361	0.124	1.85	7.41	4.40	SS#8-18 - SS#8-19
							2.28	0.0		15				1.85	7.31	4.10	20
20	0.1	0.90	0.1	0.6	22.6	4.16	2.51		6.3	18	70	0.357	0.057	1.42	7.28	4.10	SS#8-16 - SS#8-18
							2.51	0.0		18				1.42	7.24	3.85	18
28	0.2	0.84	0.1	0.1	5.0	7.00	0.94		4.9	12	50	1.900	1.644	3.09	34.56	34.00	SS32-10 - SS32-12
							0.94	0.0		12				1.63	33.74	33.05	26
26	0.1	0.90	0.1	0.2	5.3	6.92	1.37		3.4	12	120	0.900	0.291	3.52	33.55	33.05	SS32-9 - SS32-10
							1.37	0.0		12				1.74	33.20	31.97	25
25	0.2	0.90	0.1	0.5	5.9	6.73	3.53		6.1	12	44	2.886	1.401	5.26	32.77	31.97	SS32-8 - SS32-9
							3.53	0.0		12				4.49	32.15	30.70	24
24	0.1	0.80	0.1	0.6	6.2	6.67	4.08		10.0	12	127	7.874	5.101	5.63	31.56	30.69	SS32-3 - SS32-8
							4.08	0.0		12				5.20	25.08	20.69	23

STORM SEWER TABULATION (continued)
DATA FILE: a:SYSTEM8.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 05-23-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, DFQ (CFS)		PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
23	0.1	0.80	0.0	0.7	6.9	6.48	4.23		25.0	15	53	14.981	14.981	14.72	21.05	20.69	SS8-10 - SS32-3
							4.23	0.0		15				14.72	13.11	12.75	3
27	0.2	0.80	0.2	0.2	5.0	7.00	1.34		3.4	12	110	0.936	0.441	3.45	33.68	33.00	SS32-9 - SS32-11
							1.34	0.0		12				1.71	33.20	31.97	25
31	0.7	0.45	0.3	0.3	10.0	5.81	1.86		17.2	15	35	7.086	0.204	1.51	28.20	26.26	SS#8-24 - SS#8-25
							1.86	0.0		15				1.51	28.13	23.78	6

POOR QUALITY

ORIGINAL(S) FOLLOW

THIS IS THE BEST COPY AVAILABLE

VCE DOCUMENT CONVERSION

STORM SEWER TABULATION
SYSTEM #7

DATA FILE: SYSTEM7.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 06-01-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

EXISTING SYSTEM ALONG TWO RIVERS ROAD

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)	PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
5	0.7	0.40	0.3	0.3	15.0	5.00	1.40	15.4	15	56	5.679	3.811	3.29	28.10	27.46	SS7-5 - SS7-6
							1.40 0.0		15				1.14	25.97	24.28	4
4	1.0	0.30	0.3	1.7	25.0	3.96	6.55	6.6	18	295	0.390	0.368	3.72	25.76	24.28	SS7-4 - SS7-5
							6.55 0.0		18				3.71	24.67	23.13	3
3	1.2	0.30	0.4	2.0	26.6	3.83	7.72	12.6	18	240	1.442	0.528	5.39	24.26	23.13	SS7-3 - SS7-4
							7.72 0.0		18				4.37	23.00	19.67	2
2	1.1	0.62	0.7	8.7	35.1	3.30	28.69	67.1	30	56	2.679	1.200	7.63	21.46	19.67	SS7-2 - SS7-3
							28.69 0.0		30				5.84	20.79	18.17	1
* 1	1.2	0.70	0.9	9.6	35.4	3.29	31.40	40.9	35	190	0.437	0.368	6.94	20.04	18.17	SS7-1 - SS7-2
							31.40 0.0		35				6.43	19.34	17.34	OUTFALL
7	0.3	0.40	0.1	0.1	10.0	5.81	0.70	9.6	15	56	2.214	0.696	2.65	29.22	28.76	SS7-7 - SS7-8
							0.70 0.0		15				0.57	28.83	27.52	6
6	0.9	0.30	0.3	1.1	23.1	4.11	4.43	6.8	15	296	1.098	0.809	5.04	28.36	27.52	SS7-5 - SS7-7
							4.43 0.0		15				3.61	25.97	24.27	4
9	0.4	0.70	0.3	0.3	5.0	7.00	1.86	9.0	15	56	1.946	1.309	3.61	30.08	29.29	SS7-9 - SS7-10
							1.86 0.0		15				1.58	29.33	28.20	8
8	1.4	0.30	0.4	0.7	22.0	4.21	2.89	3.8	15	200	0.340	0.187	2.73	29.21	28.20	SS7-7 - SS7-9
							2.89 0.0		15				2.36	28.83	27.52	6
18	0.4	0.62	0.2	0.2	7.0	6.46	1.56	4.2	15	185	0.422	0.388	3.41	34.32	33.60	SS7-19 - SS7-20,
							1.56 0.0		15				1.95	33.60	32.82	17
17	0.2	0.60	0.1	0.4	8.0	6.22	2.25	23.2	15	25	12.880	11.803	3.86	33.32	32.72	SS7-18 - SS7-19
							2.25 0.0		15				2.47	30.37	29.50	16
16	0.4	0.70	0.3	1.3	15.6	4.92	6.30	7.5	18	200	0.515	0.361	3.57	30.13	27.98	SS7-17 - SS7-18
							6.30 0.0		18				3.57	29.41	26.95	15
15	0.0	1.00	0.0	1.3	16.7	4.78	6.12	7.6	18	192	0.521	0.340	3.47	29.19	26.85	SS7-16 - SS7-17
							6.12 0.0		18				3.47	28.53	25.85	14
14	0.2	0.70	0.2	1.4	17.8	4.65	6.71	21.2	24	25	0.880	0.088	2.14	28.45	25.75	SS7-15 - SS7-16
							6.71 0.0		24				2.14	28.43	25.53	13

* FOR THE PURPOSES OF CALCULATION, THE INITIAL 18" (NEW) AND 30" (EXISTING) [illegible] #7 WERE APPROXIMATED BY 35"

STORM SEWER TABULATION (continued)
DATA FILE: SYSTEM7.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 06-01-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, DFQ (CFS)	PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
13	0.6	0.53	0.3	3.3	17.9	4.63	15.31 15.31 0.0	21.5	24 24	192	0.901	0.458	4.87 4.87	27.98 27.10	25.53 23.80	SS7-13 - SS7-15 12
12	0.3	0.52	0.1	3.4	19.0	4.52	15.53 15.53 0.0	21.4	24 24	128	0.896	0.472	4.94 4.94	26.65 26.05	23.80 22.65	SS7-12 - SS7-13 11
11	0.6	0.60	0.4	3.8	19.7	4.44	16.87 16.87 0.0	21.8	24 24	285	0.930	0.556	5.37 5.37	25.51 23.92	22.65 20.00	SS7-11 - SS7-12 10
10	7.3	0.30	2.2	6.0	35.0	3.31	19.82 19.82 0.0	26.5	24 24	24	1.375	0.769	6.31 6.31	23.18 23.00	20.00 19.67	SS7-3 - SS7-11 2
19	1.3	0.48	0.6	0.6	15.0	5.00	3.02 3.02 0.0	4.5	15 15	105	0.476	0.327	2.46 2.46	30.71 30.37	28.50 28.00	SS7-18 - SS7-21 16
22	0.1	0.70	0.1	0.1	5.0	7.00	0.64 0.64 0.0	4.1	15 15	25	0.400	0.240	1.59 1.26	30.18 30.12	29.68 29.58	SS7-23 - SS7-24 21
21	0.1	0.70	0.1	0.2	5.1	6.96	1.27 1.27 0.0	21.0	15 15	15	10.533	2.058	3.18 1.03	29.93 29.62	29.48 27.90	SS7-22 - SS7-23 20
20	0.7	0.55	0.4	1.6	12.0	5.45	8.46 8.46 0.0	12.5	18 18	124	1.427	0.577	5.07 4.79	29.14 28.43	27.80 26.03	SS7-15 - SS7-22 13
26	0.1	0.70	0.1	0.1	5.0	7.00	0.69 0.69 0.0	4.1	15 15	25	0.400	0.056	0.80 0.71	30.73 30.72	29.90 29.80	SS7-27 - SS7-28 25
25	0.3	0.50	0.2	0.5	11.2	5.59	2.92 2.92 0.0	10.2	15 15	32	2.500	-0.110	4.21 2.38	30.39 30.43	29.70 28.90	SS7-26 - SS7-27 24
24	0.4	0.65	0.2	0.8	11.3	5.56	4.21 4.21 0.0	5.1	15 15	56	0.625	0.425	3.43 3.43	30.21 29.97	28.80 28.45	SS7-25 - SS7-26 23
23	0.4	0.65	0.2	1.0	11.7	5.51	5.49 5.49 0.0	8.7	18 18	65	0.692	0.248	3.16 3.11	29.78 29.62	28.35 27.90	SS7-22 - SS7-25 20
27	0.5	0.55	0.3	0.3	11.0	5.62	1.55 1.55 0.0	5.3	15 15	30	0.667	0.294	2.09 1.60	30.81 30.72	30.00 29.80	SS7-27 - SS7-29 25

STORM SEWER TABULATION
SYSTEM #7

DATA FILE: SYSTEM7.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 06-01-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, AdQ (CFS)	PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
5	0.7	0.40	0.3	0.3	15.0	5.00	1.40 1.40 0.0	15.4	15 15	56	5.679	3.811	3.29 1.14	28.10 25.97	27.46 24.28	SS7-5 - SS7-6 4
4	1.0	0.30	0.3	1.7	25.0	3.96	6.55 6.55 0.0	6.6	18 18	295	0.390	0.368	3.72 3.71	25.76 24.67	24.28 23.13	SS7-4 - SS7-5 3
3	1.2	0.30	0.4	2.0	26.6	3.83	7.72 7.72 0.0	12.6	18 18	240	1.442	0.328	5.39 4.37	24.26 23.00	23.13 19.67	SS7-3 - SS7-4 2
2	1.1	0.62	0.7	8.7	35.1	3.30	28.69 28.69 0.0	67.1	30 30	56	2.679	1.200	7.63 5.84	21.46 20.79	19.67 18.17	SS7-2 - SS7-3 1
* 1	1.2	0.70	0.9	9.6	35.4	3.29	31.40 31.40 0.0	40.9	35 35	190	0.437	0.368	6.94 6.43	20.04 19.34	18.17 17.34	SS7-1 - SS7-2 OUTFALL
7	0.3	0.40	0.1	0.1	10.0	5.81	0.70 0.70 0.0	9.6	15 15	56	2.214	0.696	2.65 0.57	29.22 28.83	28.76 27.52	SS7-7 - SS7-8 6
6	0.9	0.30	0.3	1.1	23.1	4.11	4.43 4.43 0.0	6.8	15 15	296	1.098	0.809	5.04 3.61	28.36 25.97	27.52 24.27	SS7-5 - SS7-7 4
9	0.4	0.70	0.3	0.3	5.0	7.00	1.86 1.86 0.0	9.0	15 15	56	1.946	1.309	3.61 1.58	30.08 29.33	29.29 28.20	SS7-9 - SS7-10 8
8	1.4	0.30	0.4	0.7	22.0	4.21	2.89 2.89 0.0	3.8	15 15	200	0.340	0.187	2.73 2.36	29.21 28.83	28.20 27.52	SS7-7 - SS7-9 6
18	0.4	0.62	0.2	0.2	7.0	6.46	1.56 1.56 0.0	4.2	15 15	185	0.422	0.388	3.41 1.95	34.32 33.60	33.60 32.82	SS7-19 - SS7-20 17
17	0.2	0.50	0.1	0.4	8.0	6.22	2.25 2.25 0.0	23.2	15 15	25	12.880	11.803	3.86 2.47	33.32 30.37	32.72 29.50	SS7-18 - SS7-19 16
16	0.4	0.70	0.3	1.3	15.6	4.92	6.30 6.30 0.0	7.5	18 18	200	0.515	0.361	3.57 3.57	30.13 29.41	27.98 26.95	SS7-17 - SS7-16 15
15	0.0	1.00	0.0	1.3	16.7	4.78	6.12 6.12 0.0	7.6	18 18	192	0.521	0.340	3.47 3.47	29.19 28.53	26.85 25.85	SS7-16 - SS7-17 14
14	0.2	0.70	0.2	1.4	17.8	4.65	6.71 6.71 0.0	21.2	24 24	25	0.880	0.098	2.14 2.14	28.45 28.43	25.75 25.53	SS7-15 - SS7-16 13

EXISTING TWO RIVERS ROAD

* FOR THE PURPOSES OF CALCULATION, THE INITIAL 18" (NEW) AND 30" (EXISTING) [illegible] #7 WERE APPROXIMATED BY 35"

STORM SEWER TABULATION (continued)
DATA FILE: SYSTEM7.ST3
RAINFALL FILE: JCC.RN3
PRINTED: 06-01-1995

10 YEAR DESIGN STORM Q = CIA I = 65.128/ (Tc + 13.200) ^ 0.769

LINE No.	INC AREA (AC)	RNOFF COEFF (C)	INC C*A	SUM C*A	TIME CONC (MIN)	RNFAL INT I (IPH)	TOTAL FLOW Q=CA*I, DFQ (CFS)	PIPE CAP (CFS)	SIZE HT/W (IN)	PIPE LEN (FT)	PIPE SLOPE (%)	HYD GRD SLOPE (%)	VEL UP/DN (FPS)	HYD GRD UP/DOWN (FT)	INVERT UP/DOWN (FT)	COMMENTS/ DOWNSTREAM LINE #
13	0.6	0.53	0.3	3.3	17.9	4.63	15.31 15.31 0.0	21.5	24 24	192	0.901	0.458	4.87 4.87	27.98 27.10	25.53 23.80	SS7-13 - SS7-15 12
12	0.3	0.52	0.1	3.4	19.0	4.52	15.53 15.53 0.0	21.4	24 24	128	0.896	0.472	4.94 4.94	26.65 26.05	23.80 22.65	SS7-12 - SS7-13 11
11	0.6	0.60	0.4	3.8	19.7	4.44	16.87 16.87 0.0	21.8	24 24	285	0.930	0.556	5.37 5.37	25.51 23.92	22.65 20.00	SS7-11 - SS7-12 10
10	7.3	0.30	2.2	6.0	35.0	3.31	19.82 19.82 0.0	26.5	24 24	24	1.375	0.769	6.31 6.31	23.18 23.00	20.00 19.67	SS7-3 - SS7-11 2
19	1.3	0.48	0.6	0.6	15.0	5.00	3.02 3.02 0.0	4.5	15 15	105	0.476	0.327	2.46 2.46	30.71 30.37	28.50 28.00	SS7-18 - SS7-21 16
22	0.1	0.70	0.1	0.1	5.0	7.00	0.64 0.64 0.0	4.1	15 15	25	0.400	0.240	1.59 1.26	30.18 30.12	29.68 29.58	SS7-23 - SS7-24 21
21	0.1	0.70	0.1	0.2	5.1	6.96	1.27 1.27 0.0	21.0	15 15	15	10.533	2.058	3.18 1.03	29.93 29.62	29.48 27.90	SS7-22 - SS7-23 20
20	0.7	0.55	0.4	1.6	12.0	5.45	8.46 8.46 0.0	12.5	18 18	124	1.427	0.577	5.07 4.79	29.14 28.43	27.80 26.03	SS7-15 - SS7-22 13
26	0.1	0.70	0.1	0.1	5.0	7.00	0.69 0.69 0.0	4.1	15 15	25	0.400	0.056	0.80 0.71	30.73 30.72	29.90 29.80	SS7-27 - SS7-29 25
25	0.3	0.50	0.2	0.5	11.2	5.59	2.92 2.92 0.0	10.2	15 15	32	2.500	-0.110	4.21 2.38	30.39 30.43	29.70 28.90	SS7-26 - SS7-27 24
24	0.4	0.65	0.2	0.8	11.3	5.56	4.21 4.21 0.0	5.1	15 15	56	0.625	0.425	3.43 3.43	30.21 29.97	28.80 28.45	SS7-25 - SS7-26 23
23	0.4	0.65	0.2	1.0	11.7	5.51	5.49 5.49 0.0	8.7	18 18	65	0.692	0.248	3.16 3.11	29.78 29.62	28.35 27.90	SS7-22 - SS7-25 20
27	0.5	0.55	0.3	0.3	11.0	5.62	1.55 1.55 0.0	5.3	15 15	30	0.667	0.294	2.09 1.60	30.81 30.72	30.00 29.80	SS7-27 - SS7-29 25

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Governor's Land, Founder's Hill — Founder's Hill North - Left Side DATE Revised May 11, 1995 — March 8, 1995

Sag or Grade	SS#	INLET Number	INLET Type	INLET Length (FT)	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	L_T(FT) 15	P Effec Length FT L/L_T	d (FT)	E (#16)	h (FT)	Q; Interc-epted CFS	d/h	Qb Carry-over CFS	T Spread @ Sag FT 1/Sx	Sheet ___ of ___ Remark
					10+75	0.07	0.7	0.05	0.05	3.5	0.17	—	0.17	0.0015	0.0208	3.8	2	0.53	0.53	4	Check spread of flow approaching from sta. 10+00 left												T max = 7.0
Sag	SS#63-3	3	B	4	10+75				0.23	3.5	0.81	—	0.81	—	0.0208				0.08	4	—	—	—	—	7.6	0.13	0.6	0.21		6.3		T max = 7.0
					10+75	0.10	0.53	0.05	0.18	3.5	0.60	—	0.6	0.0015	0.0208	6.5	2	0.23	0.08	4	Check spread of flow approaching from sta. 12+00 left												T max = 7.0
					11+00	0.29	0.45	0.13	0.13	3.5	0.45	—	0.45	0.0054	0.0208	3.4	2	0.68	0.08	4													T max = 7.0
Grade	SS#63-6	3	B	4	12+00	0.26	0.48	0.12	0.37	3.5	1.3		1.3	0.0054	0.0208	7.0	2	0.29	0.08	4	0.75	4	0.16	0.14	6	1	1	1.3	0			T max = 7.0
					13+00	0.21	0.48	0.10	0.26	3.5	0.88	—	0.88	0.0054	0.0208	5.5	2	0.50	0.08	4													T max = 7.0
					14+00	0.31	0.48	0.15	0.15	3.5	0.52	—	0.52	0.0054	0.0208	3.9	2	0.51	0.08	4													T max = 7.0

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Governor's Land, Founder's Hill — Founder's Hill North - Left Side

Revised May 11, 1995
DATE March 8, 1995

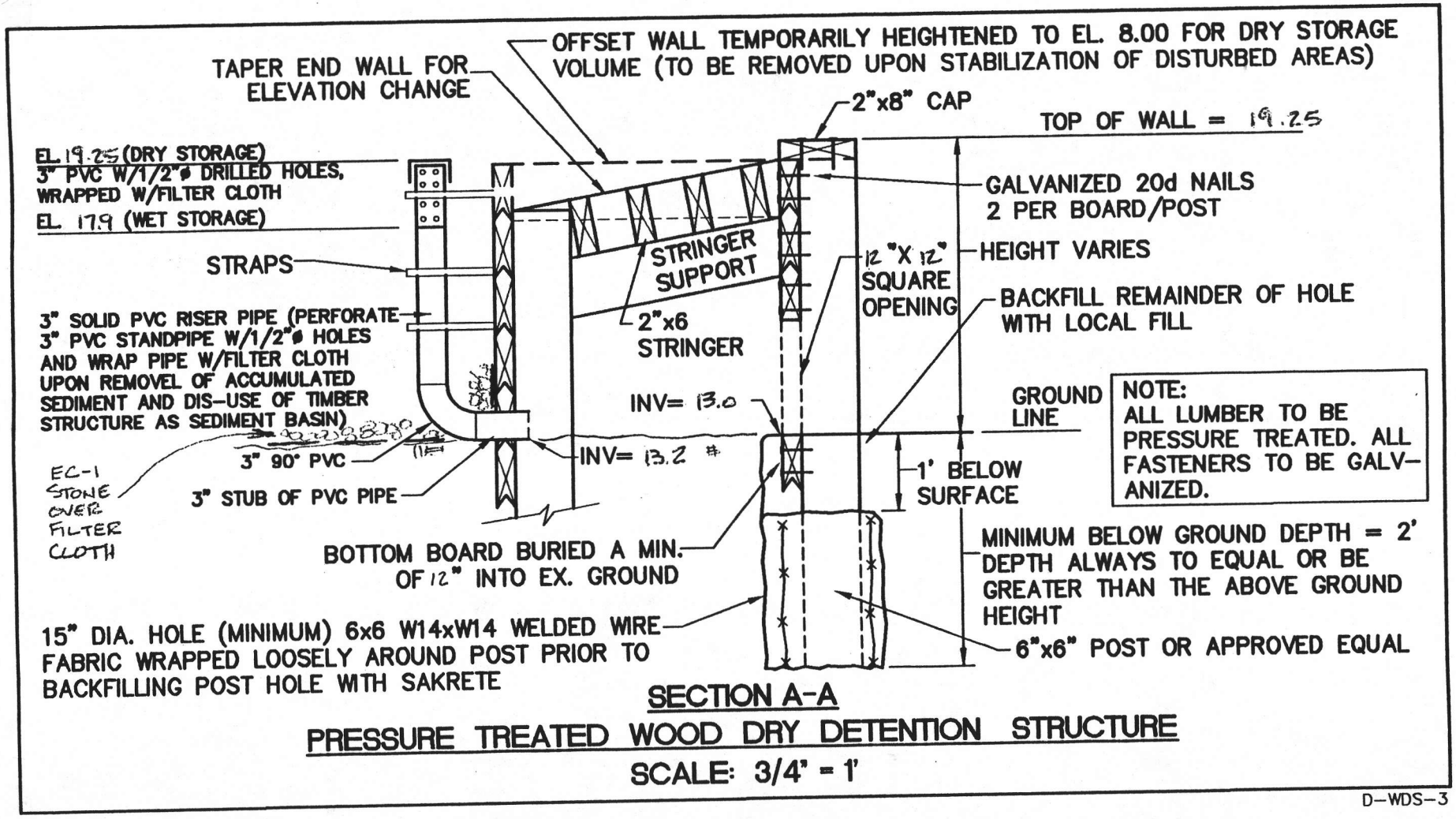
SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	STATION	DRAINAGE AREA (AC)	C	CA	Σ CA	I IN/HR	Q INCR (CFS)	Q CARRY-OVER (CFS)	Q_T GUTTER FLOW	S GUTTER SLOPE (FT/FT)	SX CROSS SLOPE (FT/FT)	T(SPREAD)	W(FT)	W/T	Sw(FT/FT)	Sw/Sx	Eo(#10)	a	Sw=a/(12W)	Se(FT/FT)= Sx + SwEo	Lt(FT)15 P EFFEC LENGTH FT	L/Lt	d(FT)	E(#16)	h(FT)	Q; INTERC-EPTED CFS	d/h	Qb CARRY-OVER CFS	T SPREAD @ SAG FT x1/Sx	SHEET ___ OF ___ REMARK
					17+00	0.17	0.65	0.11	0.11	3.5	0.38	-	0.38	0.0042	0.0208	3.8	2.0	0.52	0.0833	4														
																																		T MAX = 7.0
					18+00	0.06	0.7	0.04	0.15	3.5	0.52		0.52	0.0042	0.0208	4.3	2.0	0.47	0.0833	4														
																																		TMAX = 7.0
					19+00	0.06	0.7	0.04	0.19	3.5	0.66		0.66	0.0042	0.0208	5.0	2.0	0.40	0.0833	4														
																																		TMAX = 7.0
					20+00	0.06	0.7	0.04	0.23	3.5	0.80		0.80	0.0042	0.0208	5.7	2.0	0.35	0.0833	4														
																																		TMAX = 7.0
					21+00	0.05	0.7	0.04	0.27	3.5	0.95		0.95	0.0042	0.0208	6.4	2.0	0.31	0.0833	4														
																																		TMAX = 7.0
GRADE	SS#7-18	3	BC	6	21+85	0.05	0.7	0.04	0.31	3.5	1.08		1.08	0.0042	0.0208	6.8	2.0	0.29	0.0833	4	0.75	4	0.16	0.14	5	1	1	1.08	—					TMAX = 7.0

STORM WATER INLET COMPUTATIONS

Form LD 204
Rev 6-85

RTE _____ PROJ Governor's Land, Founder's Hill — Founder's Hill North - Left Side DATE March 9, 1995 Revised May 11, 1995

SAG OR GRADE	SS#	INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	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	Lt(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
					23+00	0.07	0.7	0.05	0.07	3.5	0.18		0.18	0.0042	0.0208	1.8	2		0.0833	4													Tmax=7.0
					24+00	0.06	0.7	0.04	0.09	3.5	0.32		0.32	0.0042	0.0208	2.8	2		0.0833	4													Tmax=7.0
					25+00	0.06	0.7	0.04	0.13	3.5	0.46		0.46	0.0042	0.0208	4.0	2		0.0833	4													Tmax=7.0
GRADE	SS#7-	3	B8	4	25+75	0.04	0.7	0.03	0.16	3.5	0.56		0.56	0.0042	0.0208	4.6	2	0.43	0.0833	4	0.93	4	0.167	0.18	3.5	1	1	0.56	—				Tmax=7.0
					26+00	0.07	0.7	0.05	0.05	3.5	0.17		0.17	0.0042	0.0208	1.9	2		0.0833	4													Tmax=7.0
					27+00	0.06	0.7	0.04	0.09	3.5	0.32		0.32	0.0042	0.0208	3.0	2		0.0833	4													Tmax=7.0
					27+75	0.04	0.7	0.03	0.12	3.5	0.42		0.42	0.0108	0.0208	2.6	2	0.77	0.0833	4													Tmax=7.0
					29+08.74	0.14	0.8	0.11	0.23	3.5	0.80		0.80	0.001	0.0208	8.3	2			4	CHECK SPREAD OF FLOW APPROACHING FROM STA 27+75													Tmax=10.0 in cul-de-sac



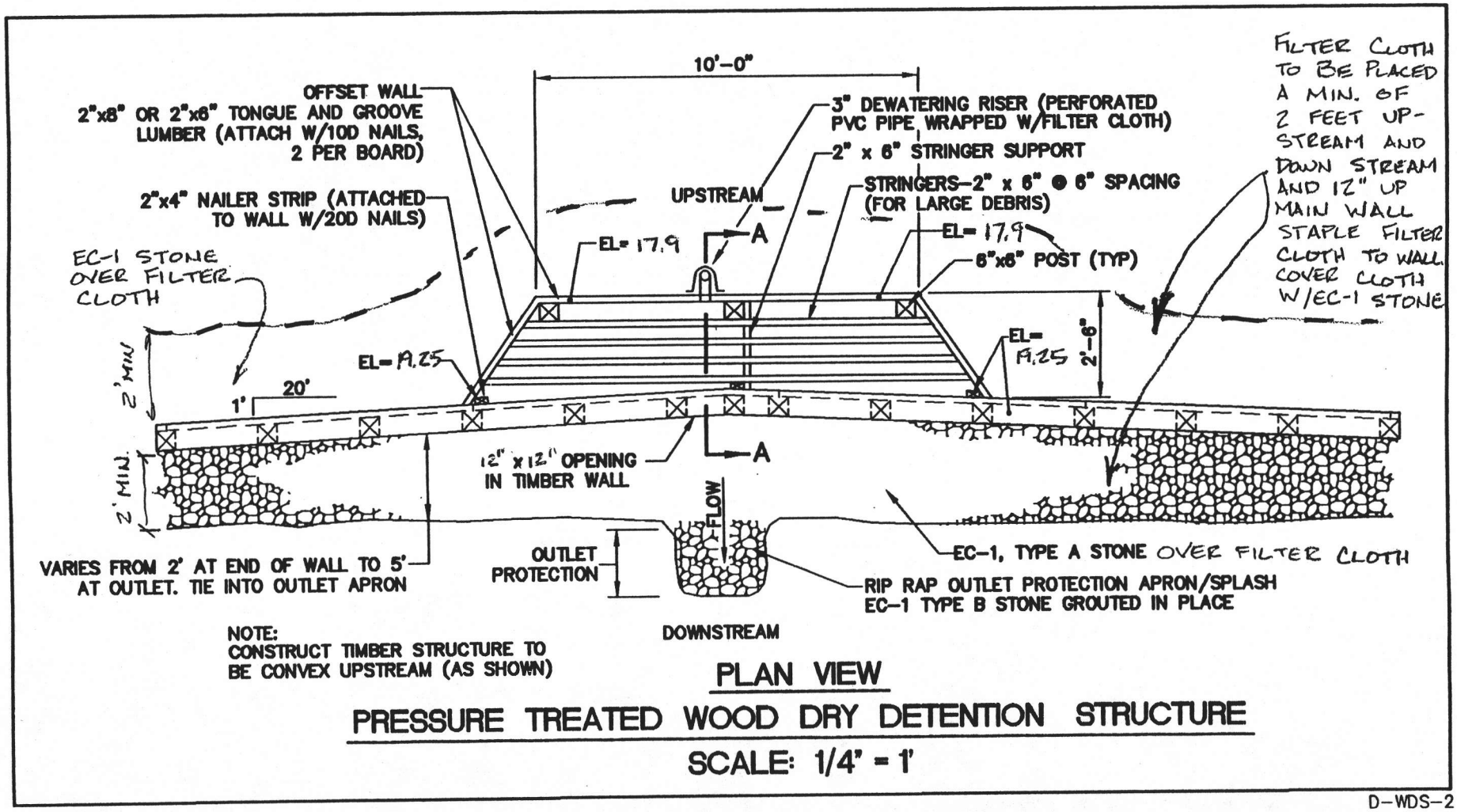
SECTION A-A

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 3/4" = 1'

D-WDS-3

FOUNDER'S HILL
6/14/95



NOTE:
CONSTRUCT TIMBER STRUCTURE TO BE CONVEX UPSTREAM (AS SHOWN)

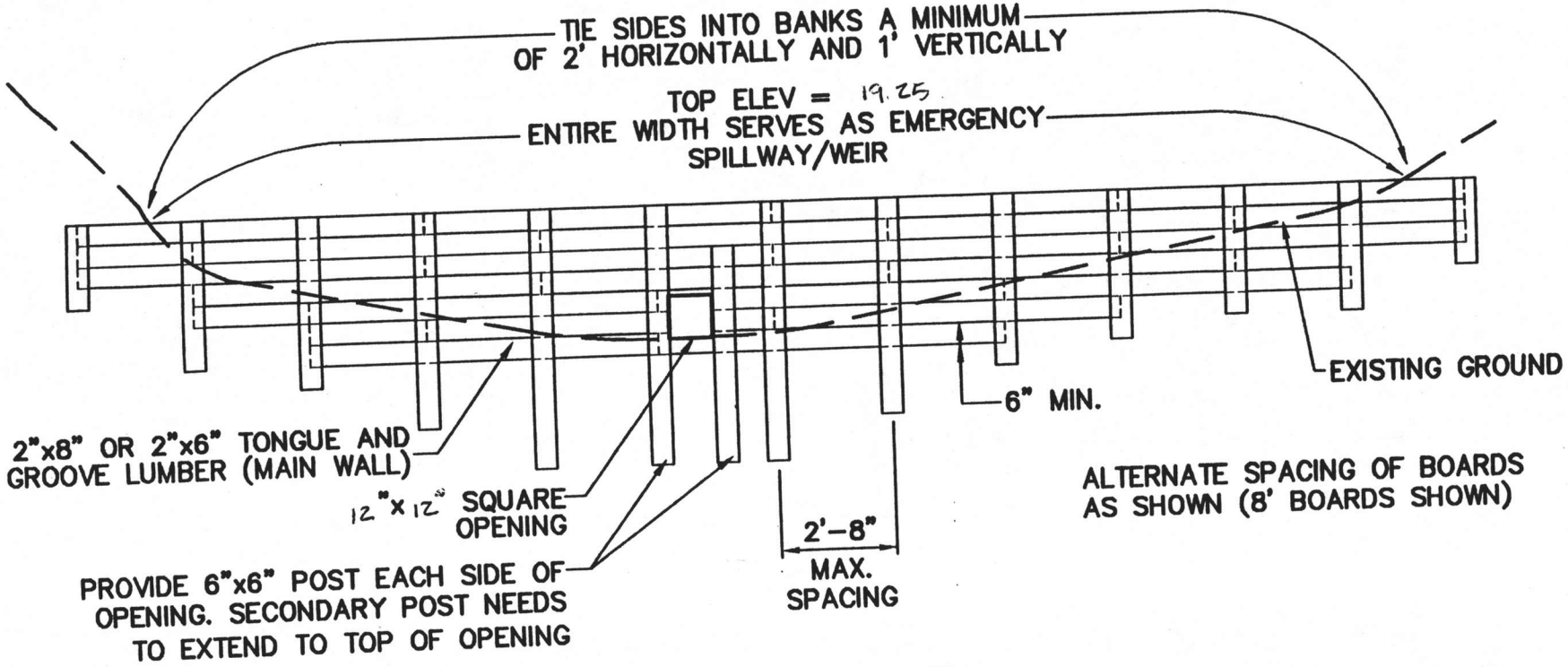
PLAN VIEW

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 1/4" = 1'

D-WDS-2

FOUNDER'S HILL
6/14/95



UPSTREAM ELEVATION

PRESSURE TREATED WOOD DRY DETENTION STRUCTURE

SCALE: 1/4" = 1'

D-WDS-1

FOUNDER'S HILL
6/14/95

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

5-29-95

County BMP ID Code (if known): JR-030

Name of Facility: Founders Hill BMP No.: ____ of ____ Date: 2/5/03

Location: Governor's Land - East of 1756 Founders Hill South

Name of Owner: " " Lot 43

Name of Inspector: Rick Hall

Type of Facility: Timber crib wall

Weather Conditions: _____ Type: ☐ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			Natural woodland -
Vegetation Condition	✓			
Tree Growth	✓			
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			
Fencing or Benches				
Interior Landscaping/Planted Areas: ☒ None ☐ Constructed Wetland/Shallow Marsh ☐ 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: ☐ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☒ None, Dry (Detention Basin)				
Shoreline Erosion				
Algae				
Trash & Debris				
Sediment				
Aesthetics				
Other				
Inflows (Describe Types/Locations): 12" RCP from curb				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type):				
Condition of Structure		✓	? ✓	Stringers on offset
Corrosion	✓			wall installed wrong
Trash and Debris		✓		not attached to endwalls.
Sediment	✓			PVC riser pipe absent.
Vegetation	✓			
Other				
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris		✓		
Erosion/Sediment	✓			
Outlet Protection	✓			
Other				
Emergency Spillway (Overflow): Offset wall				
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	✓			
Other				

Remarks:

Length of wall is "S" shaped.
A lot of leaves, sticks and vines on both side of wall.
PVC riser elbow missing vertical section
current elevation approx 6" above groundwater.

Overall Environmental Division Internal Rating: 2

Signature: [signature] **Date:** 2/5/03

Title: Envir. Spec

SWMProg\BMP\CoInspProg\DetRet.wpd

WATERSHED	JR	MAINTENANCE PLAN	No	CTRL STRUC DESC	Square Orif
BMP ID NO	030	SITE AREA acre		CTRL STRUC SIZE inches	12"x12"
PLAN NO	S-29-95	LAND USE	SFRES	OTLT BARRL DESC	PVC
TAX PARCEL	(43-02)(08-1A)	old BMP TYP	Timber Wall	OTLT BARRL SIZE inch	3
PIN NO	4320800001A	JCC BMP CODE			
CONSTRUCTION DATE	9/1/1995	POINT VALUE	6	EMERG SPILLWAY	No
PROJECT NAME	Governors Land Founders Hill			DESIGN HW ELEV	18.75
FACILITY LOCATION	Behind (east) of 1756 Founders Hill S			PERM POOL ELE	na
CITY-STATE	Williamsburg, Va. 23185	SVC DRAIN AREA acres	28.8	2-YR OUTFLOW cfs	14.43
CURRENT OWNER	Governors Land Foundation			10-YR OUTFLOW cfs	
OWNER ADDRESS	2700 Two Rivers Road			REC DRAWING	Yes
OWNER ADDRESS 2		SERVICE AREA DESCRI	SF Lots, Roads and Woods		
CITY-STATE-ZIP CODE	Williamsburg, Va. 23185	IMPERV AREA acres	7.10	CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of James River		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	Yes	LAST INSP DATE	10/17/2001
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	4
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	Bay 3 Pod 3. Timber wall w/ 3" perf pipe. DHW estimated based on AB top wall el.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu