Stormwater Division

MEMORANDUM

DATE: March 4, 2010

TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC118

PIN: 3210100012

Subdivision, Tract, Business or Owner Name (if known): James City County

Property Description: Warhill Tract Parcel 1

Site Address: 5700 Warhill Trail and 4615 Opportunity Way

(For internal use only) **Box** 5 **Drawer:** 3

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

Comments

James City County Engineering and Resource Protection Division
Stormwater Management/BMP Record Drawing and Construction Certification Review Tracking Form

Project Name: Warhill Trail Dam Removal
County Plan No. (List any amendments): SP-026-11
Stormwater Management Facility Type: _____
BMP Phase #: ☐ I ☐ II ☐ III

- ☒ Information Package Submittal Date: 8/8/12
- ☐ Completeness Check:
  - ☒ Record Drawing Date/By: 8/8/12
  - ☒ Construction Certification Date/By: 8/7/12
  - ☒ RD/CC Standard Forms (Ensure that all forms for the BMP type are included)
  - ☐ Insp/Maint Agreement # / Date: _____
  - ☐ BMP Maintenance Plan Location: _____
  - ☐ Special Considerations: _____
- ☒ Standard E&SC Notes on Approved Plan Requiring RD/CC or County comment in plan review
  Location (sheet #): _____
- ☒ **County BMP ID Code #:** PC-118 (removal of dam)
- ☒ Log into Division's "As-Built Tracking Log"
- ☒ Obtain basic site information (GPIN, Owner, Address, etc.)
- ☒ Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
- ☒ Copy from Active Project File (correspondence, H&H, design computations, etc.).
- ☒ Create As-Built File using Project File information (File label, folder, copy plan/details/design information, etc.).
- ☒ Inspector Review of RD/CC (consult with Chief Engineer prior to completion of comments).
- ☒ Record Drawing Review against Approved Plan prior to Field Inspection.
- ☒ Final Site Inspection (FI) Performed Date: 8/11/12
- ☒ Record Drawing (RD) Review Date: 8/17/12
- ☒ Construction Certification (CC) Review Date: 8/17/12
- ☐ Actions:
  - ☒ No comments.
  - ☐ Comments. Letter Forwarded. Date:
  - ☐ Record Drawing (RD)
  - ☐ Construction Certification (CC)
  - ☐ Construction-Related (CR)
  - ☐ Site Issues (SI)
  - ☐ Other : _____
- ☐ Resubmittal (# and date): _____
- ☐ Re-inspection (if necessary): _____
- ☒ Drainage System Information Acceptable (RD/CC/System Info). Ok for bond release.
- ☒ Complete "Surety Request Form".
- ☒ Final Inspection of active file copying any relevant information to "As-Built" file.
- ☒ On County BMP Inventory (Phase I, II or III).
- ☐ Copy Final Inspection Report into County BMP Inspection Program file.
- ☐ Provide Digital Photographs of BMP and save into County BMP Inventory.
- ☐ Request mylar/reproducible from As-Built plan preparer.
- ☐ Complete "As-built Tracking Log".
- ☐ Last check of BMP Access Database (County BMP Inventory).
- ☐ Add BMP to JCC Hydrology & Hydraulic database (optional).
- ☐ Add BMP to Municipal BMP list (if a County-owned facility)
- ☐ Add BMP to PRIDE BMP ratings database.

BMP removed out of service

Final Sign-Off

Inspector: _____ Date: 8/17/12

Chief Engineer: _____ Date: 8/17/12

*** See separate checklist, if needed.

WILL RECORD THIS INFORMATION, UNDER PC-118
NO LONGER CONSIDERED A BMP.
9-20-12

Environmental Division

AUG 08 2012

RECEIVED

RECEIVED ON

AUG 1 '12

Stormwater Division

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: War Hill Trail Dam Removal
Structure/BMP Name: War Hill Trail Dam
Project Location: James City County, Virginia
BMP Location: James City County, Virginia
County Plan No.: SP - 026 - 11M

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

Tax Map/Parcel No.: 3210100012
BMP ID Code (if known): PC 11B
Zoning District:: Public Lands
Land Use: Public Use
Site Area (sf or acres): _____

Brief Description of Stormwater Management/BMP Facility:
4 New smooth 36" culvert pipes were installed under War Hill Trail a Riprap stilling basin and conveyance channel were constructed.

Nearest Visible Landmark to SWM/BMP Facility: War Hill Trail

Nearest Vertical Ground Control (if known):
☐ JCC Geodetic Ground Control ☐ USGS ☑ Temporary ☐ Arbitrary ☐ Other
Station Number or Name: BM-1
Datum or Reference Elevation: NGVD29
Control Description: Spike and Cap in grassy area on the east side of War Hill Trail over old spillway
Control Location from Subject Facility: 75' south

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: 03/03/2012
Facility Monitored by County Representative during Construction: ☑ Yes ☐ No ☐ Unknown
Name of Site Work Contractor Who Constructed Facility: Howard Brothers Construction
Name of Professional Firm Who Routinely Monitored Construction: WEG
Date of Completion for SWM/BMP Facility: 05/05/2012
Date of Record Drawing/Construction Certification Submittal: 05/10/2012

(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: James City County, Virginia
Mailing Address: 5320 Palmer Lane, Suite 2A
Williamsburg, Va. 23188
Business Phone: (757) 253-6670 Fax: (757) 259-4032
Contact Person: Darryl Cook Title:

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

Firm Name: Williamsburg Environmental Group, Inc.
Mailing Address: 5209 Center Street
Williamsburg, Virginia 23188
Business Phone: (757) 220-6869
Fax: (757) 229-4507
Responsible Plan Preparer: Daniel Proctor, P.E.
Title: Professional Engineer
Plan Name: War Hill Trail Dam Removal
Firm's Project No. 4424
Plan Date: 3/18/11
Sheet No.'s Applicable to SWM/BMP Facility: 3 / 4 / 5 / 9 /

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

Name: Howard Brothers Construction
Mailing Address: P.O. Box 96
Providence Forge, Va. 23140
Business Phone: (804) 966-2762
Fax: (804) 966-9214
Contact Person: Sam Howard
Site Foreman/Supervisor: Martin Howard
Specialty Subcontractors & Purpose (for BMP Construction Only):

Fax: _____
Contact Person: _____
Site Foreman/Supervisor: _____
Specialty Subcontractors and 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: HIS Land Surveying, Inc.
Mailing Address: P.O. Box 100
Providence Forge, Va 23140
Business Phone: 804-966-7017
Fax: 804-966-7140
Name: Dean E. Raynes
Title: _____
Signature: _____
Date: _____

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

Construction Certification

Firm Name: GET SOLUTIONS
Mailing Address: 1592 PENNIMAN ROAD, SUITE E
WILLIAMSBURG, VA 23185
Business Phone: (757) 564-6452
Fax: (757) 564-6453
Name: DAVID J. GORDWIER, P.E.
Title: SENIOR ENGINEER
Signature: _____
Date: 8/2/12

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

_____ (Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

COMMONWEALTH OF VIRGINIA
7/26/2012
DEAN E. RAYNES
Lic. No. 1633
LAND SURVEYOR

ional Engineer

COMMONWEALTH OF VIRGINIA
DAVID J GORDWIER, JR
Lic. No. 038969
8/2/12
PROFESSIONAL ENGINEER

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.)*

____ A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.

N/A A2. Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.

N/A 3. Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.

N/A A4. Access for maintenance and equipment is provided to the forebay(s). Access corridors are at least 12 ft. wide, have a maximum slope of 15 percent and are adequately stabilized to withstand heavy equipment or vehicle use.

N/A A5. Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.

N/A A6. Pond liner (if required) provided. Either clay liners, polyliners, bentonite liners or use of chemical soil additives based on requirements of the approved plan.

N/A A7. Minimum 6 percent slope safety bench extending a minimum of 15 feet outward from normal pool edge and/or an aquatic bench extending a minimum of 10 feet inward from the normal shoreline with a maximum depth of 12 inches below the normal pool elevation, if applicable, per the approved design plans. (Note: Safety benches may be waived if pond side slopes are no steeper than 4H:1V).

XX A8. No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure.

N/A A9. Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.

N/A A10. Low flow orifice has a non-clogging mechanism.

N/A A11. A pond drain pipe with valve was provided.

N/A A12. Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.

N/A A13. End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard.

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: War Hill Trail Dam Removal
Structure/BMP Name: War Hill Trail Dam
Project Location: James City County, Virginia
BMP Location: James City County, Virginia
County Plan No.: SP - 026 - 11M

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

Tax Map/Parcel No.: 3210100012
BMP ID Code (if known): ____
Zoning District:: Public Lands
Land Use: Public Use
Site Area (sf or acres): ____

Brief Description of Stormwater Management/BMP Facility:
4 New smooth 36" culvert pipes were installed under War Hill Trail a Riprap stilling basin and conveyance channel were constructed.

Nearest Visible Landmark to SWM/BMP Facility: War Hill Trail

Nearest Vertical Ground Control (if known):
☐ JCC Geodetic Ground Control ☐ USGS ☑ Temporary ☐ Arbitrary ☐ Other
Station Number or Name: BM-1
Datum or Reference Elevation: NGVD29
Control Description: Spike and Cap in grassy area on the east side of War Hill Trail over old spillway
Control Location from Subject Facility: 75' south

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: 03/03/2012
Facility Monitored by County Representative during Construction: ☑ Yes ☐ No ☐ Unknown
Name of Site Work Contractor Who Constructed Facility: Howard Brothers Construction
Name of Professional Firm Who Routinely Monitored Construction: WEG
Date of Completion for SWM/BMP Facility: 05/05/2012
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Firm Name: HIS Land Surveying, Inc.
Mailing Address: P.O. Box 100
Providence Forge, Va. 23140
Business Phone: (804) 966-7017
Fax: (804) 966-7140

Name: Dean E. Raynes
Title: Land Surveyor #1633

Signature:
Date: June 4, 2012

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

Construction Certification

Firm Name
Mailing Address:
Business Phone:
Fax:

Name:
Title:

Signature:
Date:

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Virginia Registered Professional Engineer

Environmental Division
AUG 16 2012
RECEIVED ON
RECEIVED AUG 1 '12
Stormwater Division

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

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Contact Person: Sam Howard
Site Foreman/Supervisor: Martin Howard
Specialty Subcontractors & Purpose (for BMP Construction Only):

Fax: _____
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Site Foreman/Supervisor: _____
Specialty Subcontractors and Purpose (for BMP Construction Only): _____

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Title: _____
Signature: _____
Date: _____

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Construction Certification

Firm Name: GET SOLUTIONS
Mailing Address: 1592 PENNIMAN ROAD, SUITE E
WILLIAMSBURG, VA 23185
Business Phone: (757) 564-6452
Fax: (757) 564-6453
Name: DAVID J. GORDINIER, P.E.
Title: SENIOR ENGINEER
Signature: _____
Date: 8/2/12

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

_____ (Seal)
Virginia Registered Professional Engineer or Certified Land Surveyor

COMMONWEALTH OF VIRGINIA
7/26/2012
DEAN E. RAYNES
Lic. No. 1633
LAND SURVEYOR

_____ Professional Engineer

COMMONWEALTH OF VIRGINIA
DAVID J GORDINIER, JR
Lic. No. 038069
8/2/12
PROFESSIONAL ENGINEER

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.)*

____ A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.

N/A A2. Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.

N/A 3. Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.

N/A A4. Access for maintenance and equipment is provided to the forebay(s). Access corridors are at least 12 ft. wide, have a maximum slope of 15 percent and are adequately stabilized to withstand heavy equipment or vehicle use.

N/A A5. Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.

N/A A6. Pond liner (if required) provided. Either clay liners, polyliners, bentonite liners or use of chemical soil additives based on requirements of the approved plan.

N/A A7. Minimum 6 percent slope safety bench extending a minimum of 15 feet outward from normal pool edge and/or an aquatic bench extending a minimum of 10 feet inward from the normal shoreline with a maximum depth of 12 inches below the normal pool elevation, if applicable, per the approved design plans. (Note: Safety benches may be waived if pond side slopes are no steeper than 4H:1V).

XX A8. No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure.

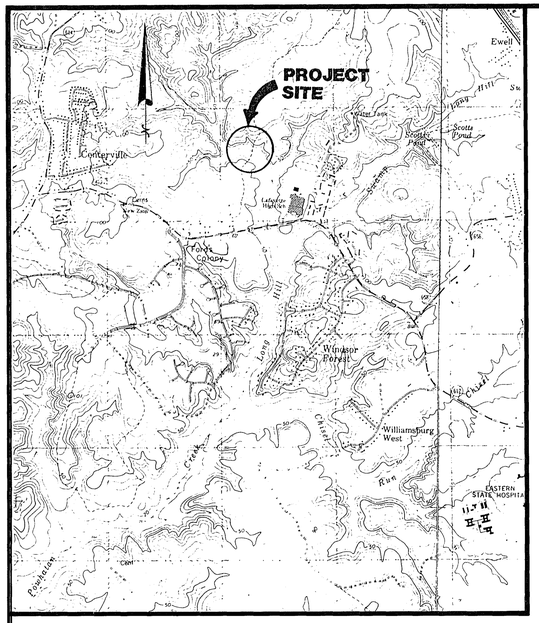
N/A A9. Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.

N/A A10. Low flow orifice has a non-clogging mechanism.

N/A A11. A pond drain pipe with valve was provided.

N/A A12. Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.

N/A A13. End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard.



VICINITY MAP

SCALE: 1" = 2000'

EROSION & SEDIMENTATION CONTROL MEASURES

ALL EROSION & SEDIMENTATION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH JAMES CITY COUNTY EROSION AND SEDIMENTATION CONTROL ORDINANCE. THE CONTRACTOR SHALL SECURE A COPY OF THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK AND THOROUGHLY FAMILIARIZE HIMSELF WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.

THE PURPOSE OF SUCH MEASURES INCLUDING (BUT NOT LIMITED TO) THOSE SHOWN ON THIS PLAN SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR INTO STATE WATERS. ALL SEDIMENTS MUST BE CONFINED TO THE PROJECT SITE AT THE LOCATIONS SHOWN ON THIS PLAN.

THE FOLLOWING SEQUENCE OF EVENTS AND EROSION CONTROL MEASURES SHALL BE INCORPORATED INTO THE CONSTRUCTION SCHEDULE FOR THIS PROJECT AND SHALL APPLY TO ALL CONSTRUCTION ACTIVITIES WITHIN THE PROJECT LIMITS:

1. LAND CLEARING AND GRUBBING (IF REQUIRED) SHALL BE LIMITED TO AREAS OF WORKABLE SIZE.
2. TEMPORARY SEDIMENT BASINS, DIKES, EROSION CONTROL STONE, STRAW BALE BARRIERS, ETC., SHALL BE PLACED DURING CLEARING, GRUBBING, EARTH MOVING, AND ROUGH GRADING ACTIVITIES. ALL TEMPORARY STRUCTURES SHALL BE CHECKED PERIODICALLY AND REPAIRED AS NECESSARY.
3. THE CONTRACTOR SHALL STOCKPILE CLEARING AND GRUBBING DEBRIS AT THE LOCATION(S) INDICATED ON THIS PLAN OR APPROVED BY THE ENGINEER.
4. THE CONTRACTOR SHALL STRIP AND STOCKPILE TOPSOIL AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. STRAW BALE BARRIERS SHALL BE PLACED AT THE TOE OF THE STOCKPILE AFTER STRIPPING OF TOPSOIL IS COMPLETE.
5. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT.
6. ALL TEMPORARY EROSION CONTROL MEASURES (SEDIMENT BASINS, STRAW BALE BARRIERS, DIKES, ETC.) SHALL HAVE BEEN INSTALLED PRIOR TO OR DURING CLEARING, GRUBBING AND/OR ROUGH GRADING ACTIVITIES.
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    - MULCH: STRAW OR HAY, 2000 #/ACRE
11. ALL STORM WATER MANAGEMENT FACILITIES INCLUDING EROSION CONTROL STONE ARE TO BE INSTALLED AND MADE OPERATION WITHIN 30 DAYS FOLLOWING THE START OF CONSTRUCTION. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL OTHER UNDERGROUND UTILITIES.
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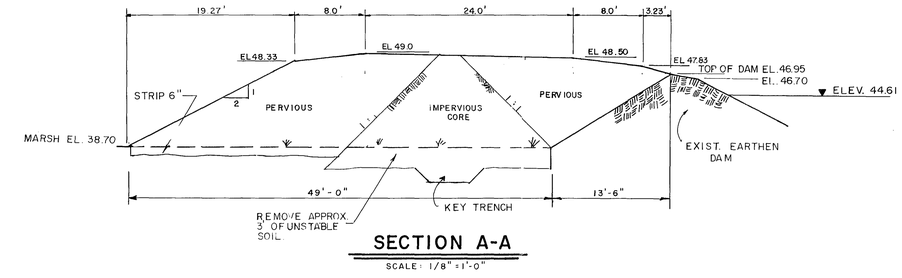
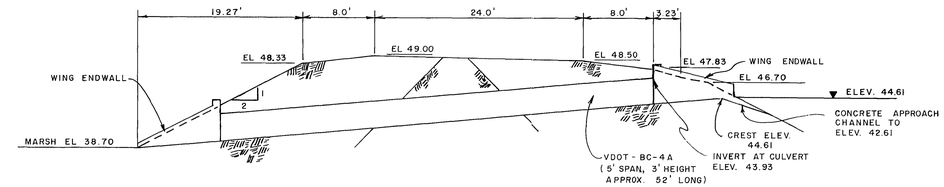


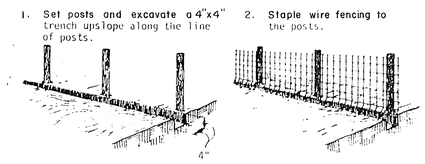
SECTION A-A

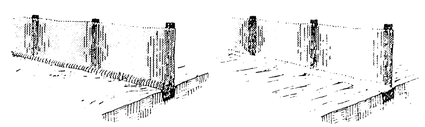
SCALE: 1/8" = 1'-0"

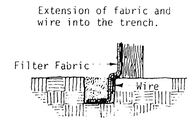


SECTION B-B

SCALE: 1/8" = 1'-0"

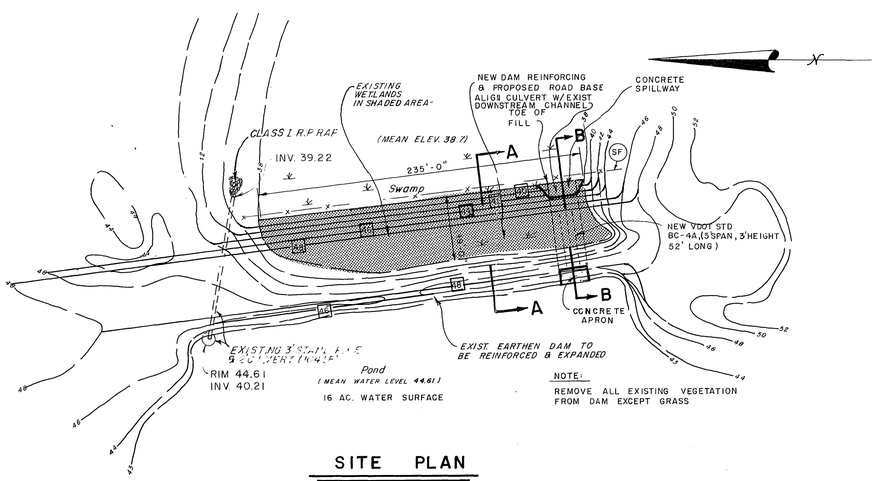






SILT FENCE

NTS



SITE PLAN

SCALE: 1" = 50'

LEGEND

- 40 — EXISTING CONTOURS
- 40 — NEW CONTOURS
- SF — SILT FENCE

Rickmond Engineering, Inc.
Civil Engineering
Environmental Engineering
Land Development Planning
1643-C Merrimac Trail
Williamsburg, Va. 23185
(804)229-1776 or 875-1785

Designed By:	Drawn By:	Approved By:	Scale:	Date:	Job No.:
RS	BMc	DCR	As Noted	11-12-87	87169

COMMONWEALTH OF VIRGINIA
L. C. RICHMOND, JR.
No. 9648
PROFESSIONAL ENGINEER

No.	By	Revision	App.	Date
4	CEC	Rev per Telecon by DC dtd 2-25-88	RCS	2-25-88
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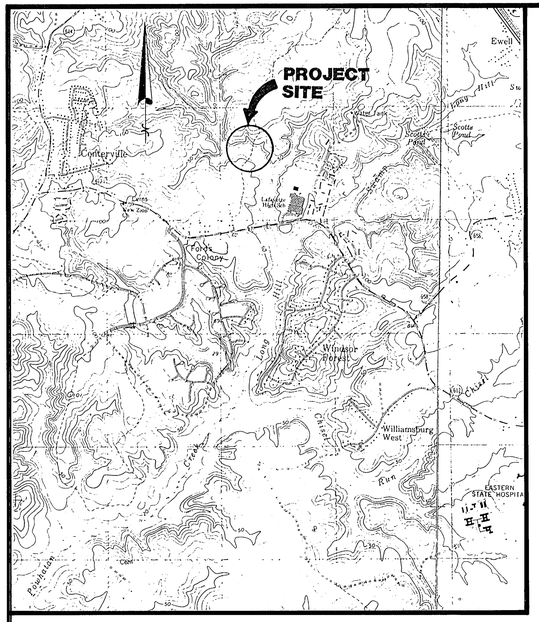
1	BMc	NEW SHEET ADDED	DCR	12-10-87

BEAVER DAM LAKE

JAMES CITY COUNTY VIRGINIA

Job Number	Sheet No.
87169	3



VICINITY MAP

SCALE: 1" = 2000'

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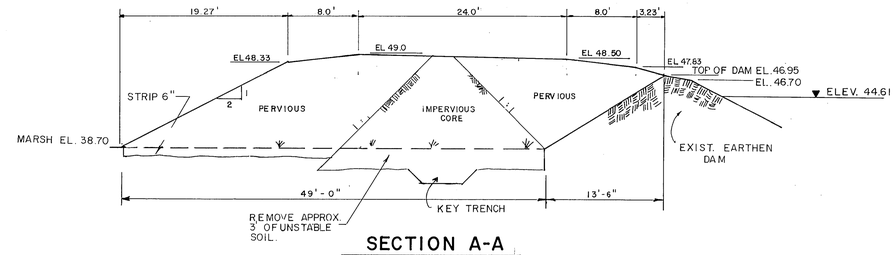
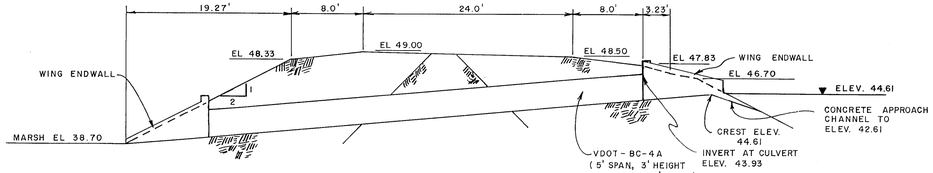


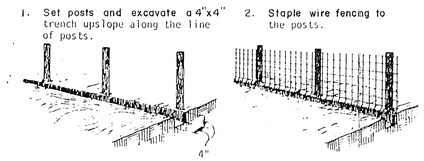
SECTION A-A

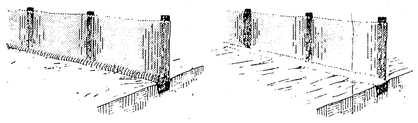
SCALE: 1/8" = 1'-0"

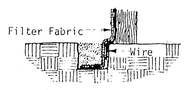


SECTION B-B

SCALE: 1/8" = 1'-0"

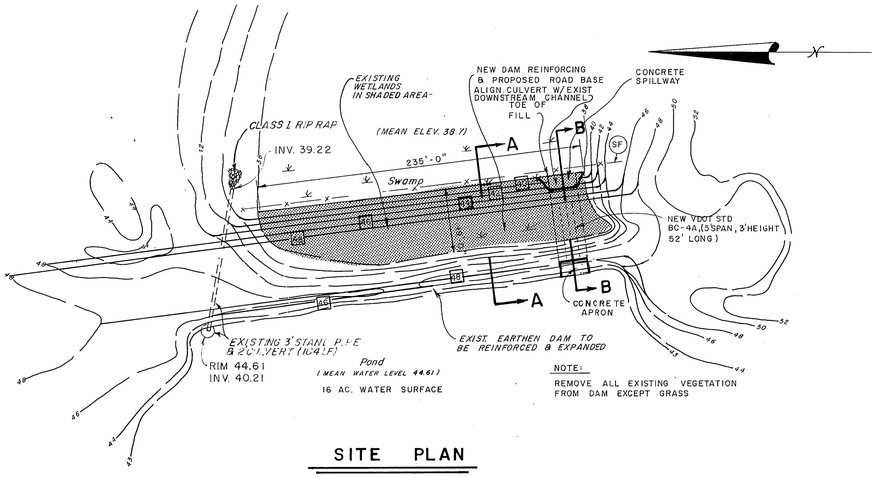






SILT FENCE

NTS



SITE PLAN

SCALE: 1" = 50'

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Designed By:	Drawn By:	Approved By:	Scale:	Date:	Job No.:
RS	B Mc	DCR	As Noted	11-12-87	87169

COMMONWEALTH OF VIRGINIA — B. C. RICHMOND, JR. — No. 9648 — PROFESSIONAL ENGINEER

No.	By	Revision	App.	Date
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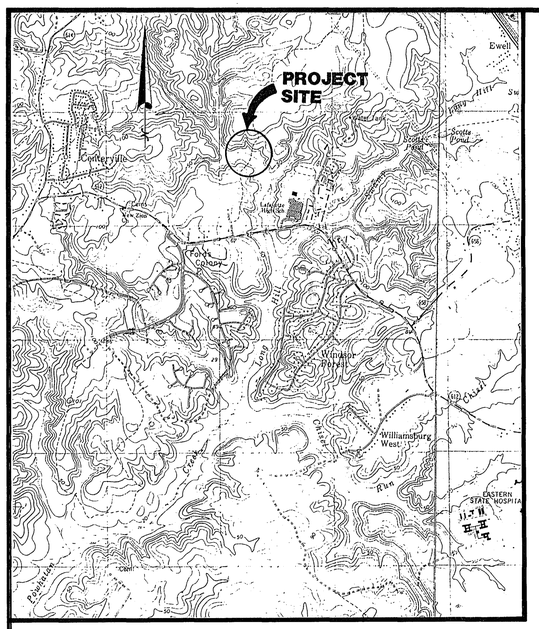
BEAVER DAM LAKE

JAMES CITY COUNTY VIRGINIA

Job Number	Sheet No.
87169	3



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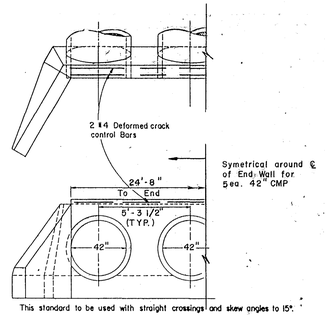


This standard to be used with straight crossings and skew angles to 15°.

Cost of Bars for crack control to be included in price bid per cubic yard concrete.

All cast in place concrete to be Class A3. For precast See Sheet 101.18.

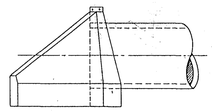
Quantities given are for one endwall.

All dimensions not given in tables are same as those for single endwalls for same size pipe.

On shallow fills, where endwalls are 1' or less below shoulder line, the top of the endwall shall be constructed parallel to the grade of the road.

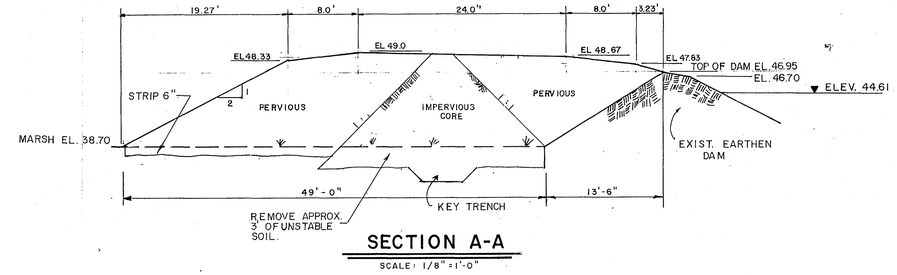
This item may be precast or cast in place.

In no case shall top of endwall project above fill slope, ditch slope, or shoulder.



ENDWALL FOR MULTIPLE PIPE CULVERTS
EW-7

NTS



SECTION A-A

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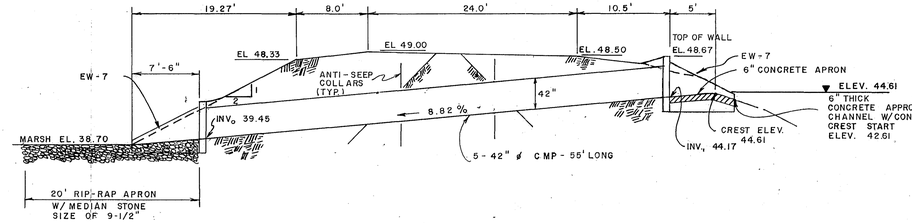
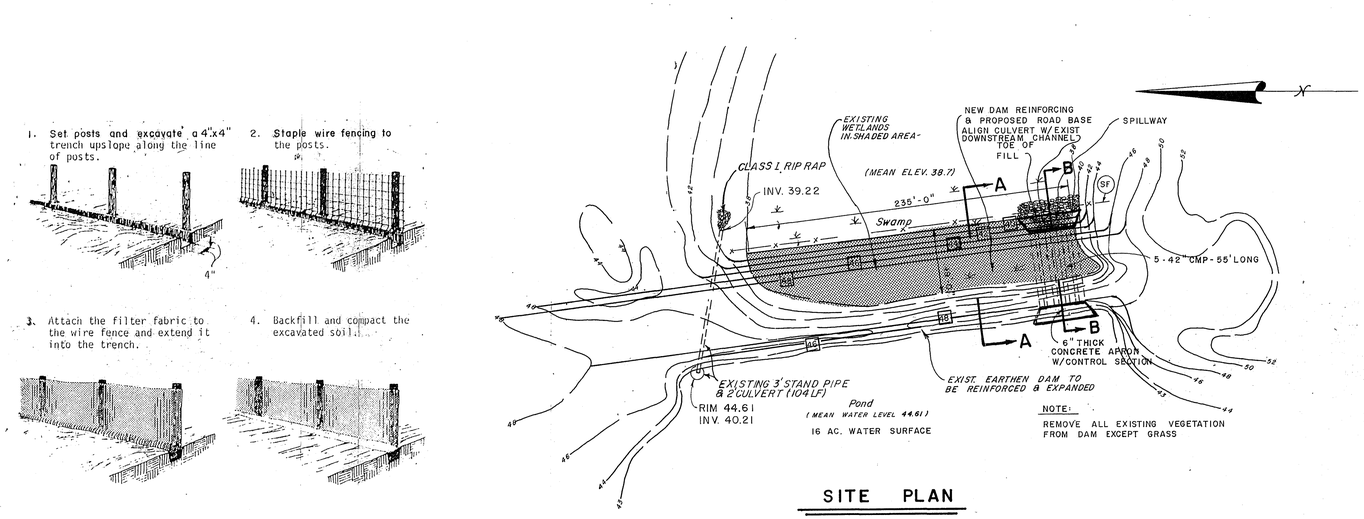


SECTION B-B

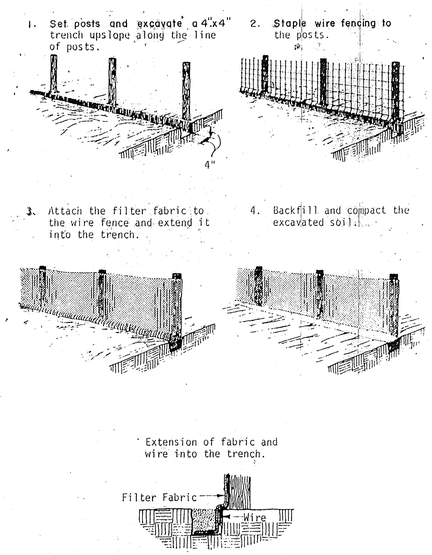
SCALE: 1/8" = 1'-0"



NOTE:
REMOVE ALL EXISTING VEGETATION FROM DAM EXCEPT GRASS

SITE PLAN

SCALE: 1" = 50'



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COMMONWEALTH OF VIRGINIA
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PROFESSIONAL ENGINEER

No.	By	Revision	Date	App.
6	B.Mc	Rev. per Telecon w/Darryl Cook (Added 2 Pipes)	12-15-88	RCS
5	B.Mc	Rev. Spillway as per Engineer	2-20-88	RCS
4	CEC	Rev per Telecon by DC dtd 2-25-88	2-25-88	RCS
3	B.Mc	Rev per Telecon Dtd. 2-22-88	2-22-88	DCR
2	B.Mc	Rev. SEC. B-B Added Ltr. from Co. Rev'd. 2-4-88	2-06-88	DCR
1	B.Mc	NEW SHEET ADDED	12-10-87	DCR

BEAVER DAM LAKE

JAMES CITY COUNTY, VIRGINIA

Job Number	Sheet No.
87169	3

SP- 0026- 2011

WARHILL TRAIL DAM REMOVAL CONSTRUCTION PLANS
(SP-026-11)
JAMES CITY COUNTY, VIRGINIA

Environmental Division
OCT 10 2011
RECEIVED

RECEIVED
JUN 2011
Planning Department

COUNTY OF JAMES CITY
FINAL SITE PLAN

APPROVALS		DATE
Fire Dept.	JB / JN	7/23/11
Health Dept.		
VDOT	RC / JN	7/13/11
Planning	CMJ	7/20/11
Environ.	SII / JN	7/5/11
Zoning Adm.	MOB	7/29/11
	DAV / JN	7/6/11
Utility Eng.		
HEA		
Other		

APPLICANT

JAMES CITY COUNTY, VIRGINIA
5320 PALMER LANE, SUITE 2A
WILLIAMSBURG, VIRGINIA 23188
ATTN: MR. DARRYL COOK

BASE INFORMATION

AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA 23188
PHONE: (757) 253-0040
FAX: (757) 220-8994
ATTN: THOMAS SUBLETT

ENVIRONMENTAL ENGINEER

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
5209 CENTER STREET
WILLIAMSBURG, VIRGINIA 23188
PHONE: (757) 220-6869
FAX: (757) 229-4507
ATTN: DANIEL PROCTOR, P.E.

STATISTICAL DATA

TOTAL PROJECT AREA:	2.91 ACRES
AREA OF DISTURBANCE:	1.40 ACRES

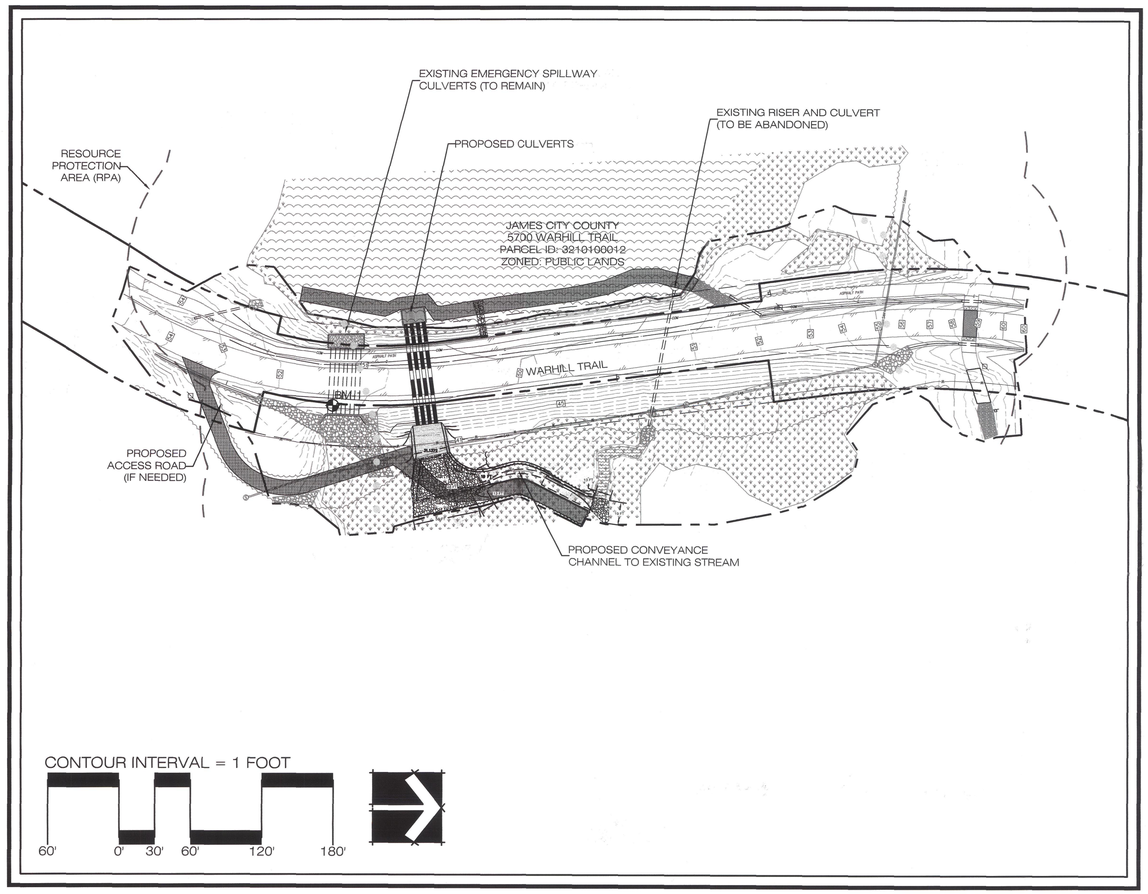
BENCHMARKS

THE BENCHMARK (BM-1) FOR THE PROPOSED WARHILL TRAIL DAM PROJECT IS PROVIDED BY AES CONSULTING ENGINEERS, BENCHMARK DATA ARE AS FOLLOWS:

NORTHING: 3644509.968
EASTING: 11986218.863
ELEVATION: 51.219 FT MSL

THE NORTHING AND EASTING PROVIDED ARE BASED ON NAD STATE PLANE NORTH 1983.

TOPOGRAPHIC INFORMATION PROVIDED IS BASED ON NGVD29 VERTICAL DATUM.



PROJECT NARRATIVE:

WARHILL TRAIL DAM IS LOCATED WITHIN THE LONG HILL SWAMP DRAINAGE BASIN IN JAMES CITY COUNTY, VIRGINIA. THE SITE IS SITUATED SOUTH OF CENTERVILLE ROAD (ROUTE 614), NORTH OF LONGHILL ROAD (ROUTE 612), AND IS BISECTED BY WARHILL TRAIL. THIS PROJECT INVOLVES ABANDONING ITS USE AS A DAM, DEWATERING THE UPSTREAM POND, AND IMPROVING CONVEYANCE CAPACITY THROUGH THE INSTALLATION OF NEW CULVERTS. THE PROPOSED CULVERT DESIGN BALANCES THE CONVEYANCE CAPACITY AT WARHILL TRAIL WITH DOWNSTREAM FLOOD RISK WHILE REMOVING THE USE OF THE ROAD CROSSING AS A DAM.

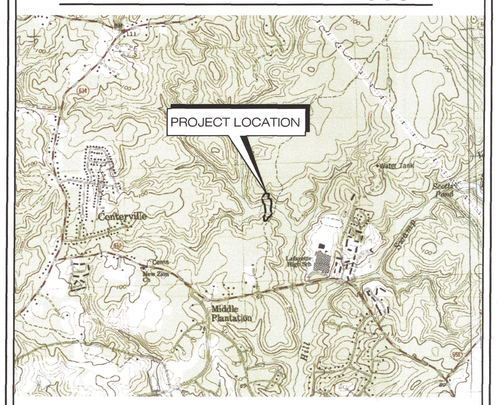
EXISTING STORMWATER STRUCTURES CONSIST OF A 36-INCH RISER CONNECTED TO A 24-INCH BARREL, IN ADDITION TO FOUR 54-INCH CULVERTS SERVING AS THE EMERGENCY SPILLWAY. THE EXISTING RISER STRUCTURE IS TO BE REMOVED AND THE EXISTING BARREL IS TO BE ABANDONED IN PLACE. FOUR NEW 36-INCH SMOOTH WALL STEEL PIPES (JACK AND BORED) ARE PROPOSED AT A LOWER ELEVATION THAN THE EXISTING NORMAL POOL TO INCREASE CONVEYANCE CAPACITY AT THE CROSSING. THE EXISTING EMERGENCY SPILLWAY CULVERTS SHALL REMAIN IN PLACE.

ADDITIONALLY, AN EXISTING 12-INCH SANITARY SEWER LINE AS WELL AS A 12-INCH WATER LINE WILL BE ENCASED IN A 24-INCH SPLIT STEEL ENCASEMENT FOR IMPROVED PROTECTION AS THESE UTILITIES ARE LOCATED BENEATH THE PROPOSED OUTFALL. A CONVEYANCE CHANNEL SHALL BE CONSTRUCTED TO DIRECT OUTFLOWS FROM THE PROPOSED STORMWATER PIPES TO THE EXISTING STREAM CHANNEL DOWNSTREAM.

SHEET INDEX:

1. COVER
2. EXISTING CONDITIONS
3. PROPOSED IMPROVEMENTS
4. CROSS-SECTIONS
5. EROSION AND SEDIMENT CONTROL PLAN
6. EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
7. GENERAL NOTES AND DETAILS
8. PLANTING PLAN
9. HYDROLOGIC AND HYDRAULIC SUMMARY

VICINITY MAP: 1" = 2000'



SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHY MAP, NORGE, VA QUADRANGLE, 2000.

LATITUDE: 37° 19' 11.67" N
LONGITUDE: 76° 46' 8.95" W

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

DATE: 3/18/2011
FIRST SUBMITTAL

CURRENTLY OBTAINING U.S. ARMY CORPS OF ENGINEERS PERMIT AND VSMP GENERAL CONSTRUCTION PERMIT.

THE WARHILL TRAIL DAM REMOVAL PROJECT IS IN THEPOWHATAN CREEK WATERSHED SUB WATERSHED 205 DRAINING TO THE LOWER JAMES RIVER.

THE LOCATION OF EXISTING UTILITIES AS SHOWN IS APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL PUBLIC OR PRIVATE UTILITIES WHICH LIE IN OR ADJACENT TO THE CONSTRUCTION SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING, AT HIS EXPENSE, ALL EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR SHALL CALL MISS UTILITY AT (800)257-7777 FORTY-EIGHT (48) HOURS PRIOR TO ANY EXCAVATION

RESPONSIBLE LAND DISTURBER STATEMENT

DANIEL PROCTOR, CERT #43834, SHALL ACT AS THE "RESPONSIBLE LAND DISTURBER" FOR PURPOSE OF PLAN APPROVAL ONLY. PRIOR TO ISSUANCE OF A LAND DISTURBING PERMIT, THE CONTRACTOR SHALL PROVIDE THE NAME OF A "RESPONSIBLE LAND DISTURBER" WHO SHALL ASSUME RESPONSIBILITY AS THE "RESPONSIBLE LAND DISTURBER" FOR THE CONSTRUCTION PHASE OF THE PROJECT. THE CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION SHOULD THE "RESPONSIBLE LAND DISTURBER" CHANGE DURING CONSTRUCTION.

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
5209 CENTER STREET
WILLIAMSBURG, VA 23188
(757) 220-6869

REVISIONS:

DATE		DATE
6/17/11	REVISED PER COUNTY COMMENTS	

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

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Environmental Consultants

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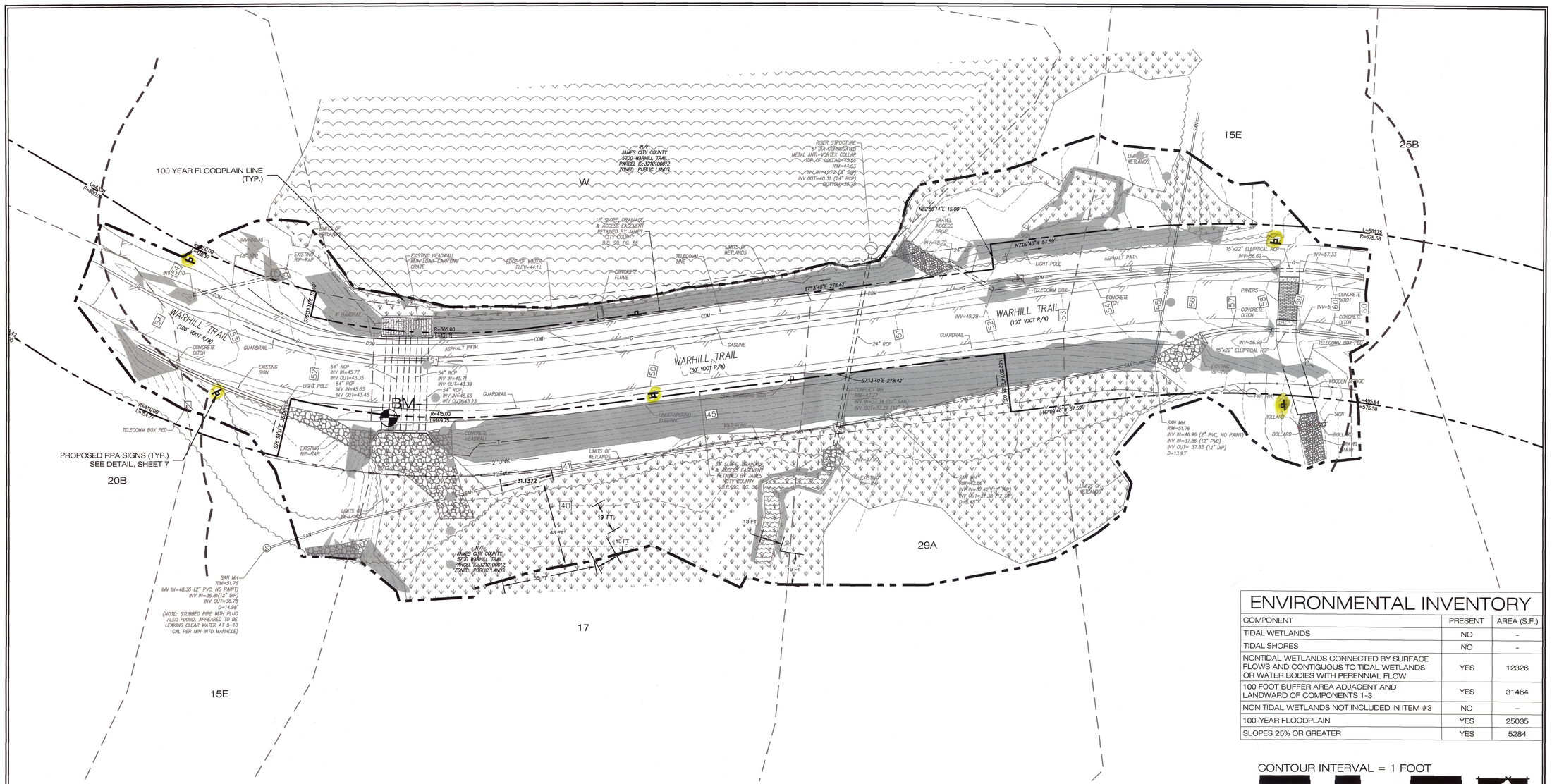

EXISTING CONDITIONS

SCALE: 1 INCH = 30 FEET

ENVIRONMENTAL INVENTORY

COMPONENT	PRESENT	AREA (S.F.)
TIDAL WETLANDS	NO	-
TIDAL SHORES	NO	-
NONTIDAL WETLANDS CONNECTED BY SURFACE FLOWS AND CONTIGUOUS TO TIDAL WETLANDS OR WATER BODIES WITH PERENNIAL FLOW	YES	12326
100 FOOT BUFFER AREA ADJACENT AND LANDWARD OF COMPONENTS 1-3	YES	31464
NON TIDAL WETLANDS NOT INCLUDED IN ITEM #3	NO	–
100-YEAR FLOODPLAIN	YES	25035
SLOPES 25% OR GREATER	YES	5284

CONTOUR INTERVAL = 1 FOOT

30' 0' 15' 30' 60' 90'

LEGEND:

- SURVEYED NON-TIDAL WETLAND LIMITS
- SURVEYED NON-TIDAL STREAM CHANNEL LIMITS
- PROJECT LIMITS
- EXISTING TOPOGRAPHY
- EXISTING TREE LINE
- EXISTING COMMUNICATION UTILITY LINE
- EXISTING SANITARY SEWER LINE
- EXISTING WATER LINE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING STORM PIPE
- EXISTING EDGE OF PAVEMENT
- EXISTING RIPRAP
- STEEP SLOPES (GREATER THAN 25%)
- 15E SOIL SERIES LIMITS AND MAP SYMBOL
- RESOURCE PROTECTION AREA (RPA)
- 100 YEAR FLOODPLAIN
- PROPOSED RPA SIGNS (SEE DETAIL, SHEET 7)

SOILS CHARACTERISTICS TABLE:

SOIL GROUP	NAME	HSG	DEPTH TO WATER ft	DEPTH TO BEDROCK ft	PERMEABILITY in/hr
15E	EMPORIA COMPLEX, 15 TO 25%	C	3-4.5	>5	0.06-1.98
17	JOHNSTON COMPLEX	D	0	>5	1.98-5.95
20B	KENANSVILLE LOAMY FINE SAND	A	4-6	>5	0.57-5.95
25B	NORFOLK FINE SANDY LOAM	B	4-6	>5	0.57-1.98
29A	SLAGLE FINE SANDY LOAM	C	1.5-3	>5	0-0.57

SOURCE: USDA-NRCS SOIL SURVEY FOR JAMES CITY COUNTY, VIRGINIA; DATE: AUGUST, 2010.

EXISTING CONDITIONS SUMMARY:

THE WARHILL TRAIL DAM IS LOCATED IN JAMES CITY COUNTY, VIRGINIA. THE SITE IS LOCATED WITHIN THE LONG HILL SWAMP DRAINAGE BASIN. THE EXISTING CONVEYANCE STRUCTURES CONSIST OF A 36" RISER (CREST ELEVATION = 44.03 FT) WITH A 24" RCP BARREL (INVERT UP = 40.31 FT, INVERT DOWN = 37.90 FT, LENGTH = 115 FT) THAT SETS THE NORMAL POOL ELEVATION AT 44.03 FT AND (4) 54" RCP BARRELS THAT SERVE AS THE EMERGENCY SPILLWAY (APPROX. INVERT UP = 45.7 FT).

THERE ARE CURRENTLY DAM SAFETY CONCERNS AT THE WARHILL TRAIL DAM AS WELL AS CAPACITY AND DOWNSTREAM FLOODING ISSUES THAT THE COUNTY INTENDS TO ADDRESS WITH THIS PROJECT.

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WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
Environmental Consultants

ENVIRONMENTAL RESOURCE INVENTORY
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:
DATE:
6/17/11 REVISED PER COUNTY COMMENTS.

DRAWN BY: CSH
DESIGNED BY: CSH/DAP
DATE: 3/18/11
CHECKED BY: DAP/WDB
SCALE: 1"=30'
SHEET: 2
JOB#: 4424

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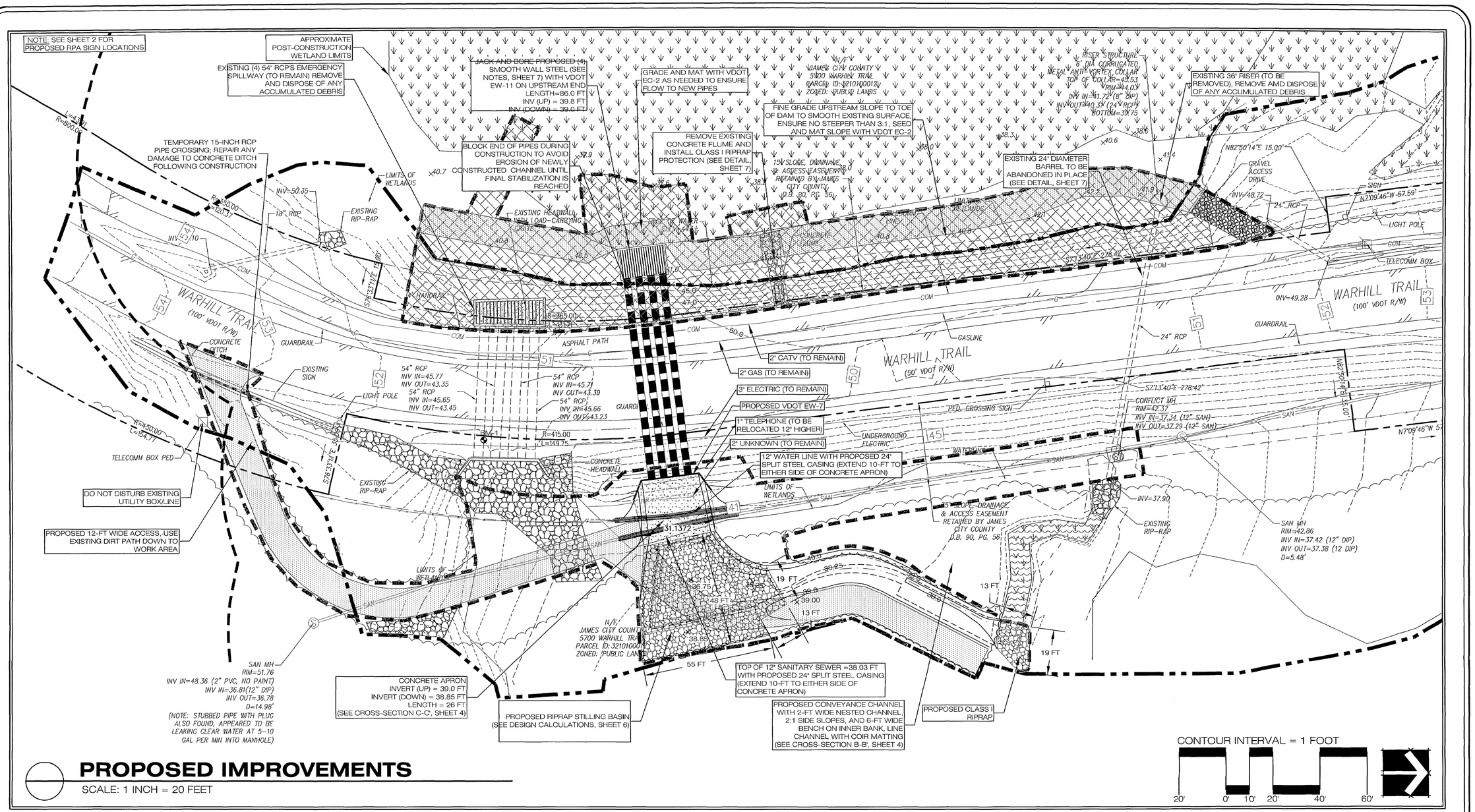

PROPOSED IMPROVEMENTS

SCALE: 1 INCH = 20 FEET

LEGEND:

APPROXIMATE WETLAND LIMITS	RESOURCE PROTECTION AREA (RPA)	EXISTING ELECTRIC LINE	EXISTING RIGHT-OF-WAY	PROPOSED 24-INCH SPLIT STEEL CASING
APPROXIMATE STREAM CHANNEL LIMITS	EXISTING COMMUNICATION UTILITY LINE	EXISTING STORM PIPE	PROPOSED HEADWALL WITH LOAD CARRYING GRATE AND JACKED PIPES	PROPOSED ACCESS ROUTE
PROJECT LIMITS	EXISTING SANITARY SEWER LINE	EXISTING HEADWALL WITH LOAD CARRYING GRATE AND 4-54" RCP'S	PROPOSED GRADING	PROPOSED EMBANKMENT STABILIZATION (SEEDING AND EC-2 MATTING)
EXISTING TOPOGRAPHY	EXISTING WATER LINE	EXISTING EDGE OF PAVEMENT	PROPOSED CONCRETE APRON	APPROXIMATE POST-CONSTRUCTION WETLAND LIMITS
EXISTING TREE LINE	EXISTING GAS LINE	EXISTING RIPRAP	PROPOSED RIPRAP OUTLET PROTECTION	APPROXIMATE LIMITS OF DISTURBANCE

OUTLET STRUCTURE DESIGN SUMMARY

EXISTING OUTLET STRUCTURE:

RISER STRUCTURE:	36" STANDPIPE, CREST ELEVATION = 44.03 FT (MSL), TO BE REMOVED
OUTLET BARREL:	24" RCP, LENGTH = 115.0 FT, INVERT (UP) = 40.31 FT (MSL), INVERT (DOWN) = 37.9 FT (MSL), TO BE ABANDONED IN PLACE (SEE DETAIL, SHEET 7)
EMERGENCY SPILLWAY:	(4) 54" RCP'S WITH HEADWALL AND LOAD-CARRYING GRATE, LENGTH = 56.0 FT, INVERT (UP) = (1) 45.65, (2) 45.77, (3) 45.71, (4) 45.66 FT; INVERT (DOWN) = (1) 43.45, (2) 43.35, (3) 43.39, (4) 43.23 FT, TO REMAIN IN PLACE

PROPOSED OUTLET STRUCTURE:

PRIMARY OUTLET:	(4) 36" SMOOTH WALL STEEL PIPES (SEE NOTES ON SHEET 7), LENGTH = 86.0 FT, INVERT (UP) = 39.8 FT, INVERT (DOWN) = 39.0 FT (MSL)
HEADWALL:	USE STANDARD VDOT EW-11 WITH LOAD-CARRYING GRATE AS SIZED FOR 36" PIPES
ENDWALL:	USE STANDARD CAST-IN-PLACE VDOT EW-7 AS SIZED FOR MULTIPLE 42" PIPE CULVERTS (BUT MODIFIED TO USE 36" PIPES)

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WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
Environmental Consultants

PROPOSED IMPROVEMENTS
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:

DATE:	
6/17/11	REVISED PER COUNTY COMMENTS

DRAWN BY: CSH	DESIGNED BY: CSH/DAP
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SCALE: 1"=20'	
SHEET: 3	
JOB#: 4424	

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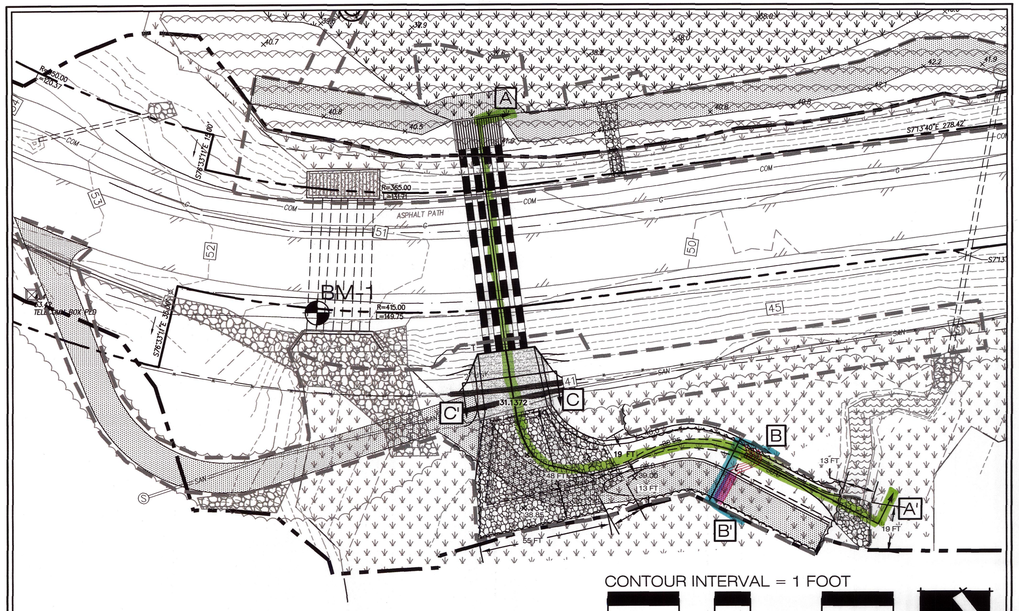
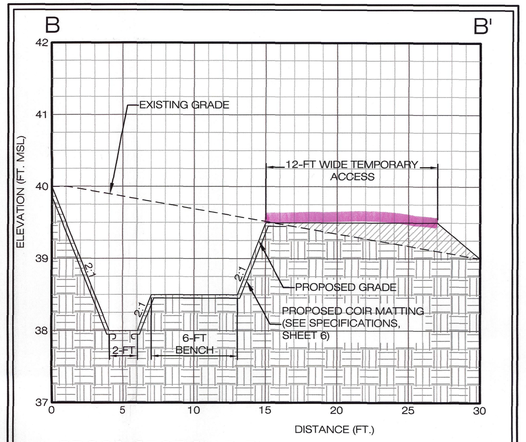
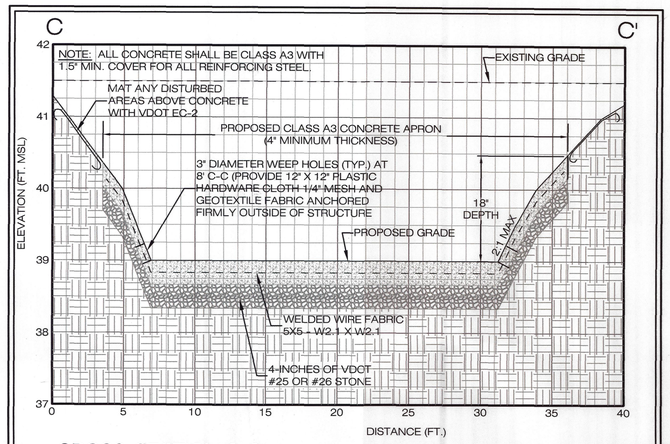


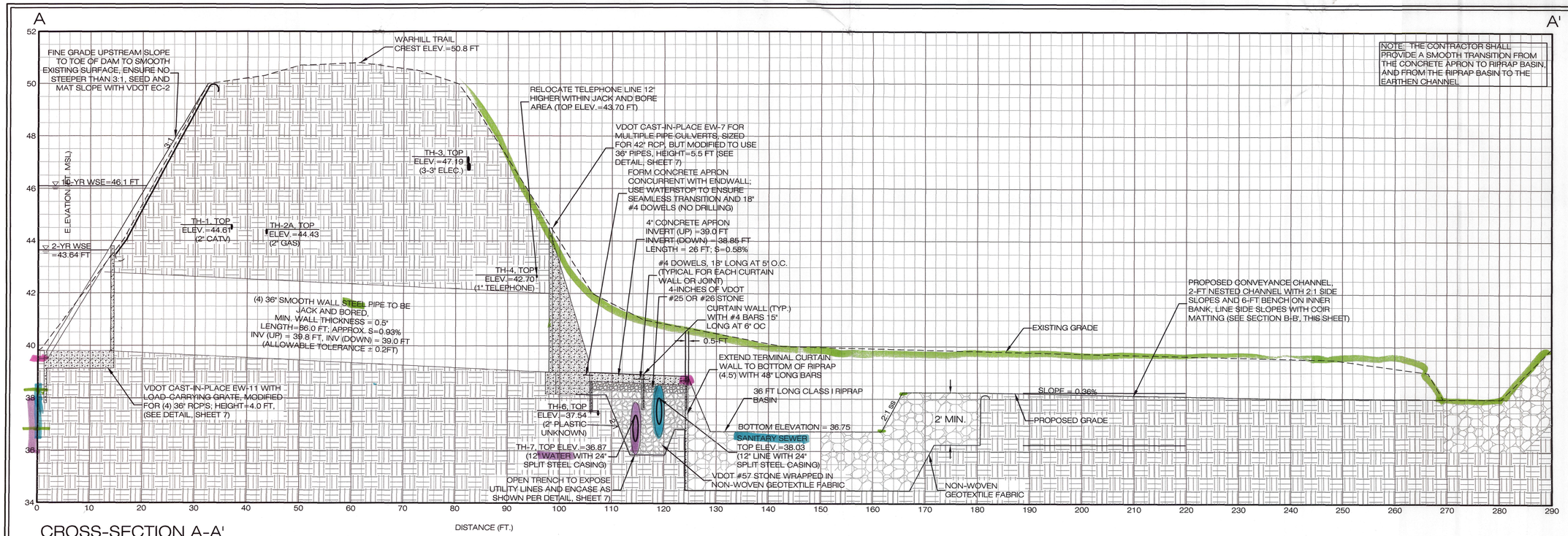
CROSS-SECTION LOCATIONS
SCALE: 1 INCH = 30 FEET



CROSS-SECTION B-B'
VERTICAL SCALE: 1" = 1' HORIZONTAL SCALE: 1" = 5'



CROSS-SECTION C-C'
VERTICAL SCALE: 1" = 1' HORIZONTAL SCALE: 1" = 5'



CROSS-SECTION A-A'
VERTICAL SCALE: 1" = 2' HORIZONTAL SCALE: 1" = 10'

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WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
Environmental Consultants

CROSS-SECTIONS
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:
DATE:

DATE	
6/17/11	REVISED PER COUNTY COMMENTS

DRAWN BY: CSH
DESIGNED BY: CSH/DAP
DATE: 3/18/11
CHECKED BY: DAP/WDB
SCALE: 1"=30'
SHEET: 4
JOB#: 4424

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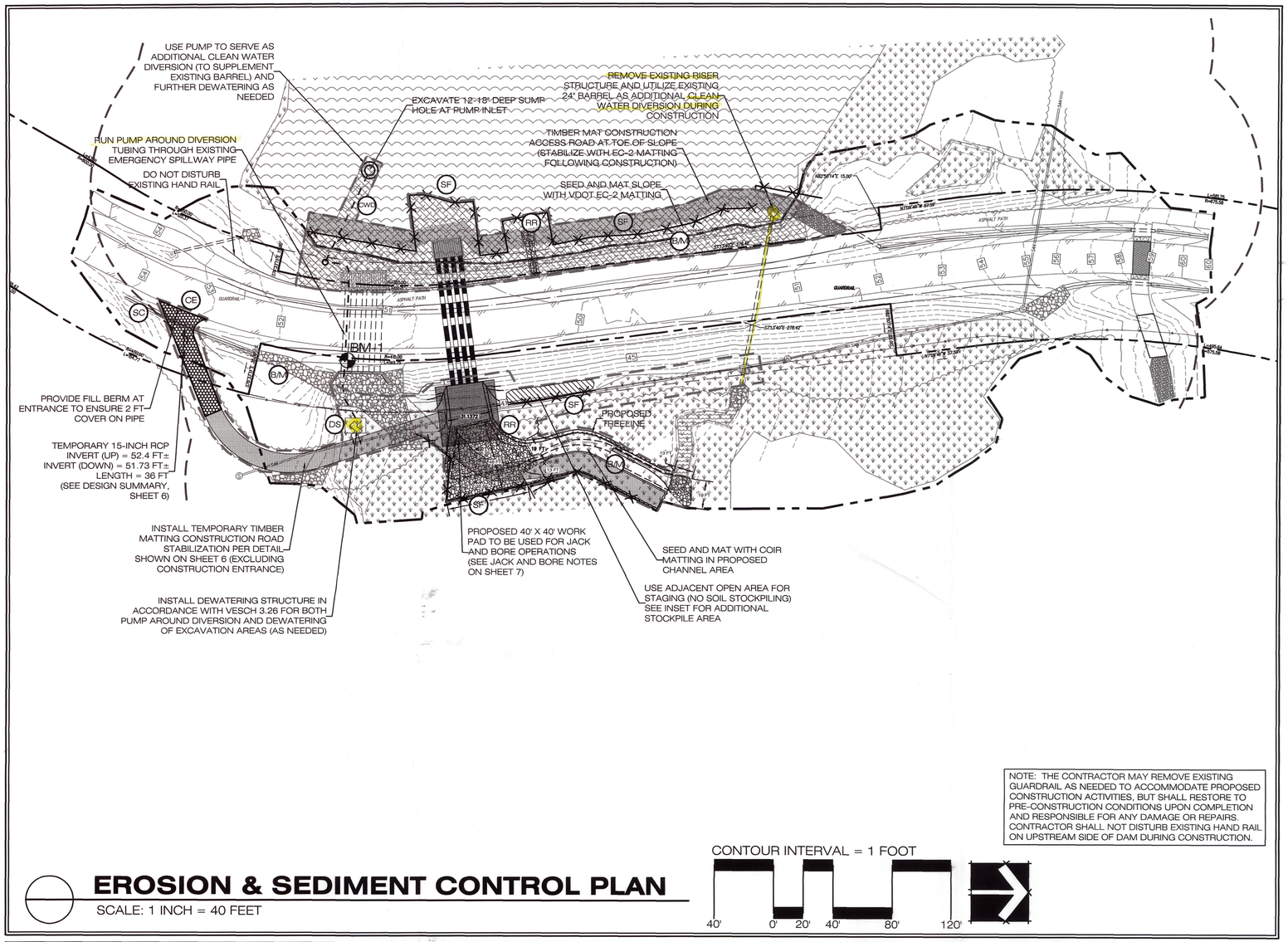
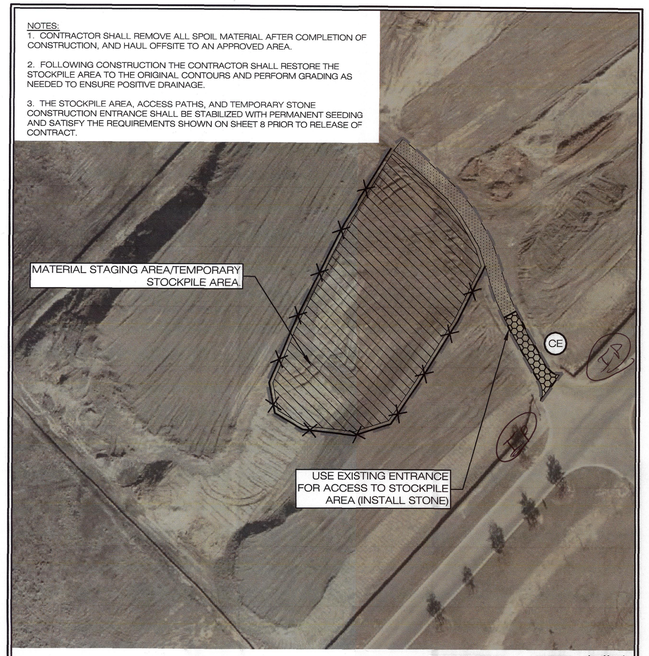


NOTES:
1. CONTRACTOR SHALL REMOVE ALL SPOIL MATERIAL AFTER COMPLETION OF CONSTRUCTION, AND HAUL OFFSITE TO AN APPROVED AREA.

2. FOLLOWING CONSTRUCTION THE CONTRACTOR SHALL RESTORE THE STOCKPILE AREA TO THE ORIGINAL CONTOURS AND PERFORM GRADING AS NEEDED TO ENSURE POSITIVE DRAINAGE.

3. THE STOCKPILE AREA, ACCESS PATHS, AND TEMPORARY STONE CONSTRUCTION ENTRANCE SHALL BE STABILIZED WITH PERMANENT SEEDING AND SATISFY THE REQUIREMENTS SHOWN ON SHEET 8 PRIOR TO RELEASE OF CONTRACT.



STOCKPILE AREA

SCALE: 1 INCH = 100 FEET

NOTE: THE CONTRACTOR MAY REMOVE EXISTING GUARDRAIL AS NEEDED TO ACCOMMODATE PROPOSED CONSTRUCTION ACTIVITIES, BUT SHALL RESTORE TO PRE-CONSTRUCTION CONDITIONS UPON COMPLETION AND RESPONSIBLE FOR ANY DAMAGE OR REPAIRS. CONTRACTOR SHALL NOT DISTURB EXISTING HAND RAIL ON UPSTREAM SIDE OF DAM DURING CONSTRUCTION.

EROSION & SEDIMENT CONTROL PLAN

SCALE: 1 INCH = 40 FEET

CONTOUR INTERVAL = 1 FOOT

40' 0' 20' 40' 80' 120'

LEGEND:

- APPROXIMATE WETLAND LIMITS
- APPROXIMATE STREAM CHANNEL LIMITS
- PROJECT LIMITS
- EXISTING TOPOGRAPHY
- EXISTING TREE LINE
- EXISTING STORM PIPE
- EXISTING HEADWALL WITH LOAD CARRYING GRATE AND 4-54" RCP'S
- EXISTING EDGE OF PAVEMENT
- EXISTING RIPRAP
- PROPOSED GRADING
- PROPOSED HEADWALL WITH LOAD CARRYING GRATE AND 4-36" RCP'S
- PROPOSED EMBANKMENT STABILIZATION (SEED AND MAT WITH VDOT EC-2)
- PROPOSED CONCRETE APRON
- PROPOSED TIMBER MAT CONSTRUCTION ROAD STABILIZATION (CRS)
- TEMPORARY SILT FENCE (SF)
- TEMPORARY STONE CONSTRUCTION ENTRANCE
- TEMPORARY PIPE CROSSING
- PROPOSED STAGING AREA
- PROPOSED RIPRAP OUTLET PROTECTION (RR)
- APPROXIMATE LIMITS OF DISTURBANCE
- (CE) TEMPORARY DEWATERING STRUCTURE
- (SC) TEMPORARY WORK PAD

EROSION AND SEDIMENT CONTROL NARRATIVE:

AN EROSION AND SEDIMENT CONTROL PLAN HAS BEEN DEVELOPED TO PRECLUDE THE TRANSPORT OF WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING STATE WATERS. EROSION AND SEDIMENT CONTROL WILL BE PROVIDED USING A COMBINATION OF MEASURES WHICH INCLUDE 1) SILT FENCE, 2) A TEMPORARY STONE CONSTRUCTION ENTRANCE, 3) ACCESS ROADWAY AND WORK PAD, 4) TEMPORARY CULVERT CROSSING, AND 5) TIMBER MATTING. THESE STRUCTURES WILL BE CONSTRUCTED IN ACCORDANCE WITH JAMES CITY COUNTY REQUIREMENTS AND THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK (THIRD EDITION, 1992).

THE SITE IS LOCATED WITHIN THE LONG HILL SWAMP DRAINAGE BASIN. THE PRIMARY GOAL OF THE EROSION AND SEDIMENT CONTROL PLAN IS TO PROTECT DOWNSTREAM WATERCOURSES FROM SEDIMENT CONTAMINATION. EXTREME CARE SHALL BE TAKEN TO ENSURE THAT ALL DOWNSTREAM WATERCOURSES REMAIN FREE OF SEDIMENT DURING THE MODIFICATION OF THE POND. ALL JURISDICTIONAL PERMITS RELEVANT TO THE IMPACT OF WATERWAYS TO INSTALL THE CULVERT IMPROVEMENTS SHALL BE OBTAINED PRIOR TO CONSTRUCTION.

THE E&S CONTROL PLAN WILL RELY PREDOMINANTLY ON DRAWING DOWN THE EXISTING WATER LEVEL USING A PUMP-AROUND DIVERSION (RUN THROUGH EXISTING EMERGENCY SPILLWAY CULVERT) AND PROTECTING WATERCOURSES WITH SILT FENCE DURING CONSTRUCTION ACTIVITIES.

THE JAMES CITY COUNTY INSPECTOR HAS THE AUTHORITY TO ADD OR DELETE E&S CONTROLS AS NEEDED IN THE FIELD AS CONDITIONS WARRANT. IN ADDITION, NO EROSION AND SEDIMENT CONTROLS CAN BE REMOVED WITHOUT PRIOR WRITTEN CONSENT OF THE JAMES CITY COUNTY INSPECTOR.

THE PROPOSED LIMITS OF DISTURBANCE IS 1.40 ACRES

CONSTRUCTION SEQUENCE:

1. INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THIS SHEET INCLUDING SILT FENCE, CONSTRUCTION ENTRANCE, AND TEMPORARY CULVERT CROSSING USE UPLAND AREAS FOR MATERIAL STAGING (SURROUND WITH SILT FENCE).

2. INSTALL TEMPORARY TIMBER MAT ACCESS ROAD. (Revision - eliminate one side)

3. REMOVE EXISTING 36" STANDPIPE RISER STRUCTURE BUT MAINTAIN EXISTING 24" RCP BARREL TO SERVE AS A CLEAN WATER DIVERSION DURING CONSTRUCTION.

4. USE PUMP TO SERVE AS ADDITIONAL CLEAN WATER DIVERSION (TO SUPPLEMENT EXISTING BARREL) AND LOWER WATER LEVELS ENOUGH TO ACCOMMODATE CONSTRUCTION ACTIVITIES. RUN PUMP AROUND DIVERSION TUBING THROUGH EXISTING EMERGENCY SPILLWAY PIPE. USE DEWATERING STRUCTURE PER VESCH 3.26 AT DISCHARGE.

5. INSTALL SILT FENCE ALONG UPSTREAM TOE OF SLOPE AFTER DEWATERED.

6. PERFORM GRADING OPERATIONS OF OUTFALL CONVEYANCE CHANNEL AND INSTALL RIPRAP OUTLET PROTECTION AT TRANSITION WITH MAIN CHANNEL. DEWATER EXCAVATION AREAS AS NEEDED DURING CONSTRUCTION, DISCHARGING THROUGH AN APPROVED FILTERING DEVICE PER VESCH STD. AND SPEC. 3.26 AS NEEDED.

7. CONSTRUCT 40' X 40' WORK PAD FOR JACK AND BORE OPERATIONS (SEE NOTES, SHEET 7). DEWATER EXCAVATION AREAS AS NEEDED DURING CONSTRUCTION, DISCHARGING THROUGH AN APPROVED FILTERING DEVICE PER VESCH STD. & SPEC. 3.26 AS NEEDED. ENSURE WASTE WATER AND/OR SOIL SOIL FROM JACK AND BORE OPERATIONS ARE ADEQUATELY CONTAINED. SURROUND WORK PAD WITH SILT FENCE.

8. COMMENCE JACK AND BORE OPERATIONS TO INSTALL THE (4) 36" SMOOTH WALL STEEL PIPES.

9. INSTALL 24-INCH SPLIT STEEL CASING ON EXISTING SANITARY SEWER LINE AND EXISTING WATER LINE AS SHOWN ON SHEET 4. BACKFILL WITH VDOT #57 STONE WRAPPED IN NON-WOVEN GEOTEXTILE FABRIC.

10. INSTALL HEADWALL, ENDWALL, AND CONCRETE APRON AS SHOWN ON SHEET 3.

11. PERFORM FINAL GRADING AND INSTALL RIPRAP BASIN.

12. ABANDON EXISTING 24" RCP BARREL IN PLACE PER VDOT SPECIFICATIONS AS SHOWN ON SHEET 7.

13. PERFORM MINOR GRADING AND STABILIZATION OF UPSTREAM DAM EMBANKMENT SLOPE AS SHOWN ON THIS SHEET.

14. REMOVE REMAINING TEMPORARY TIMBER MATS FROM ACCESS ROAD AND DEWATERING STRUCTURE AND REPAIR ANY DAMAGE TO WETLAND AREAS AND EXISTING RIPRAP APRON BELOW EMERGENCY SPILLWAY PIPES.

15. PERFORM PLANTING AND SEEDING IN ACCORDANCE WITH SHEET 8.

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EROSION AND SEDIMENT CONTROL PLAN
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:

DATE	
6/17/11	REVISED PER COUNTY COMMENTS

DRAWN BY: CSH
DESIGNED BY: CSH/DAP
DATE: 3/18/11
CHECKED BY: DAP/WDB
SCALE: AS SHOWN
SHEET: 5
JOB#: 4424

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EROSION AND SEDIMENT CONTROL NARRATIVE

EROSION AND SEDIMENT CONTROL NOTES

1. THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS SHALL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATION SHALL APPLY TO THIS PROJECT.

2. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A DISPOSAL AREA.

3. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.

4. ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING A LIVE WATERCOURSE SHALL BE MET.

5. PERIODIC INSPECTIONS OF ALL EROSION CONTROL MEASURES SHALL BE MADE BY THE CONTRACTOR TO ASSESS THEIR CONDITION. INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY 7 CALENDAR DAYS. THIS INCLUDES INSPECTION AFTER EVERY RUNOFF PRODUCING RAINFALL EVENT AND THE REPAIR OF MEASURES DAMAGED BY SUB-CONTRACTORS. ANY NECESSARY REPAIRS OR CLEAN UP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT THE TIME OF CONSTRUCTION TO ENSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. APPROVAL BY THE ENGINEER WILL BE REQUIRED FOR ANY DEVIATIONS FROM THE APPROVED PLANS.

7. ADDITIONAL EROSION CONTROL DEVICES MAY BE REQUIRED BY JAMES CITY COUNTY, STATE INSPECTOR, ENGINEER, OWNER, OR HIS DESIGNATED AGENT IF DEEMED NECESSARY.

8. ALL EROSION CONTROL DEVICES SHALL BE IN PLACE AND FUNCTIONAL AT ALL TIMES AND IF REMOVED FOR CONSTRUCTION PROGRESS, SHALL BE REPLACED BY THE CLOSE OF EACH WORKDAY.

9. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION.

10. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

11. ALL SLOPES SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.36 (B/M) AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.

12. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. OUTFALL CHANNELS FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE OR PAVED DITCHES WHERE REQUIRED.

13. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGETATIVE ESTABLISHMENT OR MULCHING.

14. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY, OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATION 3.35 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK THIRD EDITION, 1992. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

15. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED AND FERTILIZER IN ACCORDANCE WITH THE SEEDING SCHEDULE LOCATED ON SHEET 8.

16. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.

PROJECT DESCRIPTION

THE WARHILL TRAIL DAM PROJECT IS LOCATED IN JAMES CITY COUNTY, VIRGINIA WITHIN THE LONG HILL SWAMP DRAINAGE BASIN. THE PURPOSE OF THIS PROJECT IS TO PROVIDE CULVERT IMPROVEMENTS TO ENHANCE STORMWATER CONVEYANCE CAPACITY AT THE DAM WHILE MINIMIZING DOWNSTREAM FLOODING CONCERNS. THE PROPOSED CULVERT IMPROVEMENTS WILL LOWER THE EXISTING NORMAL POOL ELEVATION FROM 44.03 FT (MSL) TO APPROXIMATELY 39.8 FT (MSL) BY ABANDONING THE EXISTING PRIMARY OUTLET STRUCTURE AND REPLACING WITH (4) 36" BARRELS AT A LOWER INVERT ELEVATION. THE EMERGENCY SPILLWAY CULVERTS (4-54" RCP'S) WILL REMAIN IN PLACE. APPROXIMATELY 0.82 ACRES OF LAND DISTURBANCE ARE PROPOSED DURING CONSTRUCTION.

EXISTING CONDITIONS

THE TOTAL CONTRIBUTING WATERSHED TO THE PROPOSED CULVERTS IS APPROXIMATELY 1,274 ACRES. CONVEYANCE CAPACITY OF THE EXISTING OUTLET STRUCTURES IS LIMITED. SOME MINOR EMBANKMENT EROSION HAS BEEN NOTED IN THE FIELD.

SOILS

SEE NRCS SOIL SPECIFICATIONS ON SHEET 2.

ADJACENT AREAS

ADJACENT ROADWAYS WILL BE PROTECTED THROUGH THE USE OF A CONSTRUCTION ENTRANCE. DOWNSTREAM CHANNELS WILL BE PROTECTED BY PROPOSED E&S MEASURES AS SPECIFIED ON SHEET 5. ADJACENT WOODED AREAS OUTSIDE OF THE LIMITS OF DISTURBANCE SHALL BE PROTECTED THROUGH THE USE OF SILT FENCE, BUT TREE PROTECTION MAY BE ADDED IF DETERMINED NECESSARY IN THE FIELD.

OFFSITE BORROW MATERIAL

NO OFFSITE BORROW IS ANTICIPATED. IF DETERMINED NECESSARY AT A LATER DATE, THE CONTRACTOR SHALL PROVIDE GEOTECHNICAL CERTIFICATION THAT BORROW MATERIAL CONFORMS TO THE REQUIRED SPECIFICATIONS REFERENCED HEREIN. ALL ACTIVITIES ASSOCIATED WITH THE BORROW OPERATIONS SHALL INCLUDE ADEQUATE EROSION AND SEDIMENT CONTROL MEASURES. CONTRACTOR SHALL COORDINATE WITH GEOTECHNICAL ENGINEER AND DCR AS NEEDED AND INCLUDE VSMP GENERAL CONSTRUCTION PERMIT.

CRITICAL EROSION AREAS:

CRITICAL AREAS INCLUDE THE RECEIVING STREAM CHANNEL AND STEEP SLOPES. ALL SLOPES SHALL BE STABILIZED WITH PERMANENT SEEDING AND BLANKETING/MATTING IMMEDIATELY UPON REACHING FINAL GRADE. THE SITE SHALL BE PROTECTED THROUGH THE USE OF EROSION AND SEDIMENT CONTROL MEASURES AS SPECIFIED ON SHEET 5.

SEEPAGE ALONG SLOPES:

PROPOSED SLOPE STABILIZATION CONSISTS OF BLANKETING AND MATTING IMMEDIATELY FOLLOWING GRADING OPERATIONS. IF EXCESSIVE GROUNDWATER SEEPAGE IS IDENTIFIED WITHIN A PARTICULAR AREA DURING CONSTRUCTION, PREVENTING ADEQUATE STABILIZATION, THE CONTRACTOR SHALL EMPLOY SEEPAGE CONTROL MEASURES SUCH AS A SUBSURFACE DRAIN PER VESCH 3.28 AS NEEDED.

STRUCTURAL PRACTICES

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992. THE MINIMUM STANDARDS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS, LATEST EDITION SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE, IN WRITING.

1. TEMPORARY STONE CONSTRUCTION ENTRANCE - STD. & SPEC. 3.02 - A CONSTRUCTION ENTRANCE SHALL BE EMPLOYED TO REDUCE THE AMOUNT OF MATERIAL TRANSPORTED OFF-SITE BY CONSTRUCTION VEHICLES. THE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED AT THE LOCATION SHOWN ON SHEET 5 FOR THE DURATION OF THE CONSTRUCTION AND STABILIZATION.

2. CONSTRUCTION ROAD STABILIZATION - STD. & SPEC. 3.03 - CONSTRUCTION ROAD STABILIZATION SHALL BE APPLIED TO THE ACCESS ROADWAY TO REDUCE THE POTENTIAL FOR EROSION BY CONSTRUCTION TRAFFIC. TIMBER MATS ARE PROPOSED INSTEAD OF GRAVEL.

3. SILT FENCE - STD. & SPEC. 3.05 - SILT FENCE SHALL BE INSTALLED AS SHOWN ON SHEET 5, IN ORDER TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT FROM THE DISTURBED AREAS DURING CONSTRUCTION OPERATIONS.

4. OUTLET PROTECTION - STD. & SPEC. 3.18 - A CONCRETE APRON AS WELL AS CLASS I RIPRAP OUTLET PROTECTION ARE PROPOSED FOR ENERGY DISSIPATION AT THE PROPOSED CULVERT OUTFALL LOCATION.

5. DEWATERING STRUCTURE - STD AND SPEC 3.26 - DURING EXCAVATION/CONSTRUCTION OF THE CULVERT AND EMBANKMENT IMPROVEMENTS, DEWATERING OPERATIONS SHALL BE EMPLOYED AS NEEDED TO ADDRESS GROUNDWATER CONCERNS AND ENSURE ADEQUATELY COMPACTED FILL. FILTERING OF DISCHARGE FROM DEWATERING PUMP SHALL BE PROVIDED IN ACCORDANCE WITH VESCH 3.26.

6. SOIL STABILIZATION BLANKETS AND MATTING - STD. & SPEC. 3.36 - STABILIZATION MATTING SHALL BE IMMEDIATELY APPLIED TO ALL DISTURBED AREAS UPON REACHING FINAL GRADE. COIR MATTING IN ACCORDANCE WITH THE SPECIFICATIONS ON THIS SHEET SHALL BE USED FOR THE DOWNSTREAM CHANNEL IMPROVEMENTS, BUT STANDARD VDOT EC-2 IS ACCEPTABLE ELSEWHERE.

7. TEMPORARY VEHICULAR STREAM CROSSING - STD. & SPEC. 3.24 - TEMPORARY 15-INCH DIAMETER RCP SHALL BE INSTALLED BENEATH THE CONSTRUCTION ENTRANCE WITHIN THE EXISTING ROADSIDE DITCH. ANY DAMAGE TO THE DITCH DURING CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR.

NON-STRUCTURAL PRACTICES

1. TEMPORARY SEEDING - STD. & SPEC. 3.31
ALL EXPOSED SOIL SURFACES THAT ARE NOT TO BE FINE-GRADED FOR PERIODS LONGER THAN 30 DAYS SHALL RECEIVE TEMPORARY SEEDING. SELECTION OF THE TEMPORARY SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992 AND APPROVED BY THE ENGINEER.

2. PERMANENT SEEDING - STD. & SPEC. 3.32
PERMANENT SEEDING SHALL BE USED TO STABILIZE DISTURBED AREAS BROUGHT TO FINAL GRADE BY ESTABLISHING PERENNIAL VEGETATIVE COVER. SELECTION OF THE PERMANENT SEED MIXTURE SHALL BE IN ACCORDANCE WITH THE SEEDING SCHEDULE LOCATED ON SHEET 8.

3. TOPSOILING - STD. & SPEC. 3.30
TOPSOIL WILL BE STRIPPED FROM AREAS TO BE GRADED AND STOCKPILED SEPARATELY FOR LATER USE WHERE APPLICABLE.

4. MULCHING - STD. & SPEC. 3.35 - AREAS WHICH HAVE BEEN PERMANENTLY OR TEMPORARILY SEEDED SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING. MULCHING SHALL BE USED IN FALL FOR WINTER COVER AND DURING HOT AND DRY SUMMER MONTHS.

MAINTENANCE PRACTICES

IN GENERAL, ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CHECKED DAILY AND AFTER EACH SIGNIFICANT RAINFALL BY THE CONTRACTOR. THE FOLLOWING ITEMS WILL BE CHECKED IN PARTICULAR:

3.02 - TEMPORARY STONE CONSTRUCTION ENTRANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODICALLY TOPDRESSING THE ENTRANCE WITH ADDITIONAL STONE OR WASHING THE EXISTING STONE.

3.05 - SILT FENCE - SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT AND WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED. CLOSE ATTENTION SHALL BE PAID TO REPAIR DAMAGED SILT FENCE RESULTING FROM END RUNS AND UNDERCUTTING. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE, THE FABRIC SHALL BE REPLACED PROMPTLY.

3.26 - DEWATERING STRUCTURE - THE FILTERING DEVICE MUST BE INSPECTED FREQUENTLY. THE ACCUMULATED SEDIMENT WHICH IS REMOVED FROM THE DEVICE MUST BE SPREAD ON-SITE AND STABILIZED OR PROPERLY DISPOSED OF.

EROSION AND SEDIMENT CONTROL MINIMUM STANDARDS

THE INTENT OF THIS SECTION IS TO SUMMARIZE HOW THE EROSION AND SEDIMENT CONTROL MEASURES PROPOSED IN THE EROSION AND SEDIMENT CONTROL PLAN SATISFY THE 19 MINIMUM STANDARDS SET FORTH IN THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS (4VAC50-30-40). THE FOLLOWING IS A BRIEF SYNOPSIS OF THE MINIMUM STANDARDS (MS) AND HOW THEY ARE ADDRESSED IN THE PLAN:

MS-1 STABILIZATION OF DENUDED AREAS - WITHIN SEVEN DAYS, PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS THAT MAY REMAIN DORMANT FOR LONGER THAN 30 DAYS. TEMPORARY AND PERMANENT SEEDING, MULCHING, BLANKETS AND MATTING, AND RIPRAP ARE SPECIFIED IN THE PLAN FOR STABILIZATION OF DENUDED AREAS.

MS-2 STABILIZATION OF SOIL STOCKPILES - DURING CONSTRUCTION, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES, SUCH AS SILT FENCE.

MS-3 ESTABLISHMENT OF PERMANENT VEGETATION - A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE, AND WILL INHIBIT EROSION.

MS-4 TIMING AND STABILIZATION OF SEDIMENT TRAPPING MEASURES - ALL SEDIMENT TRAPPING MEASURES (INCLUDING SILT FENCE) SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

MS-5 STABILIZATION OF EARTHEN STRUCTURES - STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES IMMEDIATELY AFTER INSTALLATION AS SPECIFIED IN THE PLAN.

MS-6 SEDIMENT TRAP AND BASINS - SEDIMENT TRAPS AND BASINS ARE NOT USED IN THIS PLAN.

MS-7 DESIGN, CONSTRUCTION, AND STABILIZATION OF CUT AND FILL SLOPES - CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. MOST SLOPES ARE PROPOSED TO BE STABILIZED WITH BLANKETING AND MATTING AS SHOWN ON THE E&S PLAN. SLOPES FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

MS-8 CONCENTRATED RUNOFF DOWN SLOPES - CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME, OR SLOPE DRAIN STRUCTURE.

MS-9 ADEQUATE DRAINAGE PROTECTION FROM WATER SEEPS - IF THE CONTRACTOR IDENTIFIES WATER SEEPAGE FROM A SLOPE FACE, ADEQUATE DRAINAGE PER VESCH 3.28 OR OTHER APPROPRIATE PROTECTION SHALL BE PROVIDED.

MS-10 STORM SEWER INLET PROTECTION - NOT APPLICABLE FOR THIS PLAN SINCE THERE ARE NO STORM SEWER INLETS AFFECTED BY THE PROPOSED CONSTRUCTION.

MS-11 STORMWATER CONVEYANCE PROTECTION - BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL. LINING SHALL BE INSTALLED.

MS-12 WORK IN LIVE WATERCOURSE - THE WATERCOURSE ONSITE SHALL BE IMPACTED AND PROPER PERMITS OBTAINED PRIOR TO CONSTRUCTION. TEMPORARY DISTURBANCE WITHIN THE WETLAND AREAS SHALL BE LIMITED, CONTAINED WITHIN THE LIMITS SHOWN ON THIS PLAN AND RESTORED FOLLOWING CONSTRUCTION IN ACCORDANCE WITH THE PLANTING PLAN.

MS-13 CROSSING LIVE WATERCOURSE - NO LIVE WATERCOURSE CROSSING/DISTURBANCE IS PROPOSED WITH THIS PROJECT. IMPACTS ARE LIMITED TO THE TO THE ADJACENT WETLAND AREAS AND OPEN WATERS (TO BE DETERMINED).

MS-14 REGULATION OF WATERCOURSE CROSSING - NO LIVE WATERCOURSE CROSSING/DISTURBANCE IS PROPOSED WITH THIS PROJECT. IMPACTS ARE LIMITED TO THE TO THE ADJACENT WETLAND AREAS AND OPEN WATERS (TO BE DETERMINED).

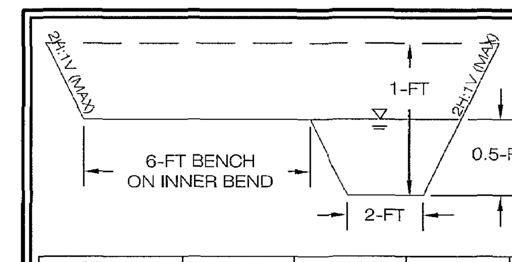
MS-15 STABILIZATION OF WATERCOURSE - THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.

MS-16 UNDERGROUND UTILITY LINE INSTALLATION - THE EXISTING TELEPHONE LINE SHALL BE RELOCATED BY THE CONTRACTOR AS REFERENCED ON SHEET 3. 24" SPLIT STEEL CASING SHALL BE INSTALLED AROUND THE EXISTING 12" SANITARY SEWER LINE AS WELL AS THE 12" WATER LINE. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY. MATERIAL USED FOR BACKFILLING TRENCHES SHALL VDOT #57 STONE IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE REGULATIONS. APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.

MS-17 VEHICULAR SEDIMENT TRACKING - WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE ROADWAY. WHERE SEDIMENT IS TRANSPORTED INTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.

MS-18 REMOVAL OF TEMPORARY MEASURES - ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER THE FINAL SITE STABILIZATION OR WHEN TEMPORARY MEASURES ARE NO LONGER NEEDED.

MS-19 STORMWATER MANAGEMENT - THE PROPOSED SITE IMPROVEMENTS DO NOT RESULT IN ANY ADDITIONAL IMPERVIOUS COVER OR SIGNIFICANT CHANGES TO LANDUSE CHARACTERISTICS OF THE PROJECT AREA.



NOTES:

1) THE PROPOSED CONVEYANCE CHANNEL IS INTENDED TO PASS BETWEEN THE 1.5" AND 2" STORM EVENT WITHIN THE 2-FT WIDE NESTED CHANNEL.

2) A 6-FT WIDE BENCH IS PROVIDED ALONG THE INNER BANK FOR ADDITIONAL CONVEYANCE DURING LARGER STORM EVENTS.

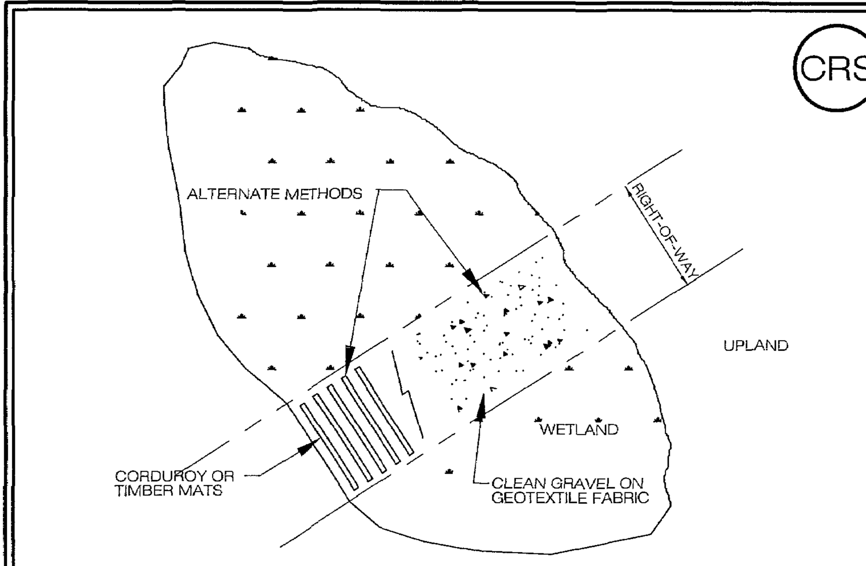
3) OUTFALL CHANNEL TO BE LINED WITH COIR MATTING UP TO THE TOP OF CHANNEL.

DESIGN CONDITIONS	CHANNEL TOP WIDTH, W (FT)	CHANNEL SLOPE (FT/FT)	CHANNEL FLOW (CFS)	CHANNEL DEPTH, D (FT)	CHANNEL VELOCITY (FT/S)	CHANNEL SHEAR STRESS (LB/SF)
NESTED CHANNEL	4	0.006 (MAX)	2.38	0.50	1.65	0.13
BANK FULL	12	0.006 (MAX)	13.37	1.00	1.91	0.21

DETAIL: CONVEYANCE CHANNEL

NTS

CRS



NOTES:
1) USE EVERYWHERE VEHICULAR ACCESS CROSSES EXISTING WETLANDS

2) ALL MATTING, GRAVEL AND/OR EXCESS SUBSOIL TO BE REMOVED FOLLOWING CONSTRUCTION.

3) FOLLOWING CONSTRUCTION, THE ORIGINAL ELEVATIONS SHALL BE RESTORED, THE TOPSOIL REPLACED, AND THE DISTURBED AREA SEEDED WITH WETLAND SEED MIX.

DETAIL: WETLAND CROSSING

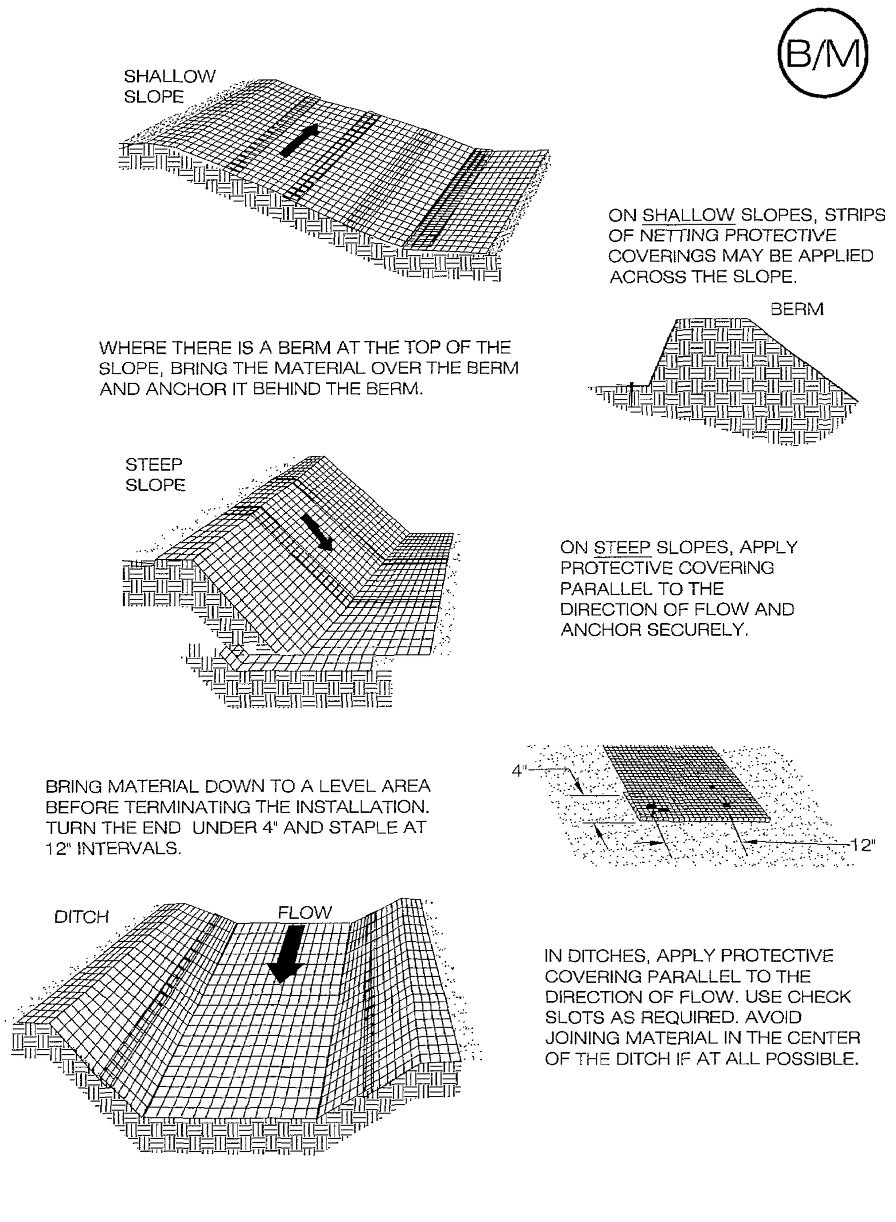
NTS

TEMPORARY CULVERT CROSSING:

PIPE SIZE (IN.)	DRAINAGE AREA	TC NUMBER	CURVE NUMBER	INVERT UP (FT)	INVERT DOWN (FT)	10 YEAR FLOW	10 YR VELOCITY (CFS)	HEAD WATER (FT)	HW./DIA.	MATERIAL
15"	4.88 AC	0.345 HR	52.0	52.4±	51.72±	4.09 CFS	6.87	53.65	1.0	RCP

NOTE: PROVIDE FILL BERM AT ENTRANCE TO ENSURE 2 FT COVER ON PIPE

B/M



DETAIL: EC-2 MATTING INSTALLATION

NTS

VESCH STD & SPEC 3.36

STILLING BASIN CALCULATIONS

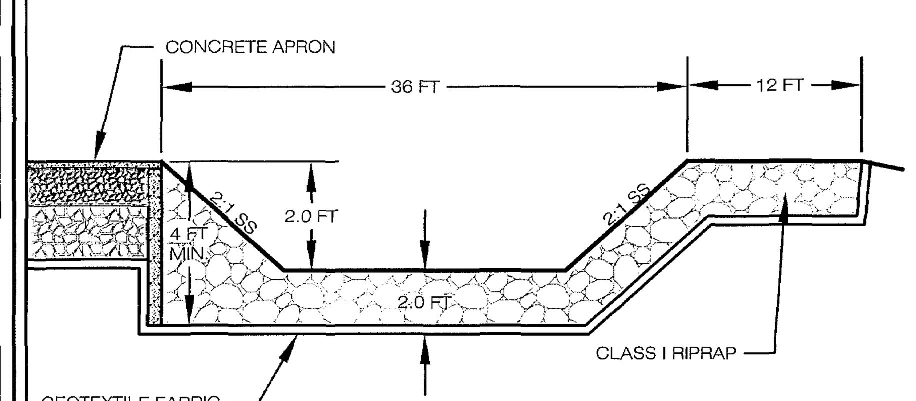
22' concrete apron

SLOPE:	0.58%
25-YR FLOW:	701.03 CFS
FLOW AREA (PER PIPE):	55.31 SF
VELOCITY:	12.67 FPS
FROUDE NUMBER:	1.66

HEC-14 ANALYSIS:

d_E =	2.1 FT (EQUIVALENT DEPTH)	Ls =	32.8 ft (LENGTH OF POOL)
d_{50}/d_E =	2.8 FT	Lb =	36 ft (MIN. LENGTH OF BASIN)
d_{50} =	0.75 FT (MINIMUM RIPRAP SIZE)	$3d_{50}$ =	2.25 ft (MIN. APPROACH RIPRAP THICKNESS)
d_{50} =	1.0 FT	$2d_{50}$ =	1.5 ft (MIN. REMAINDER RIPRAP THICKNESS)
h_s/d_E =	0.93 FT	TW =	0.65 ft
h_s =	2.0 FT (SCOUR DEPTH)	TW/d_E =	0.87
h_s/d_{50} =	2.7 FT		$TW/d_E<0.75$ (low tailwater condition)

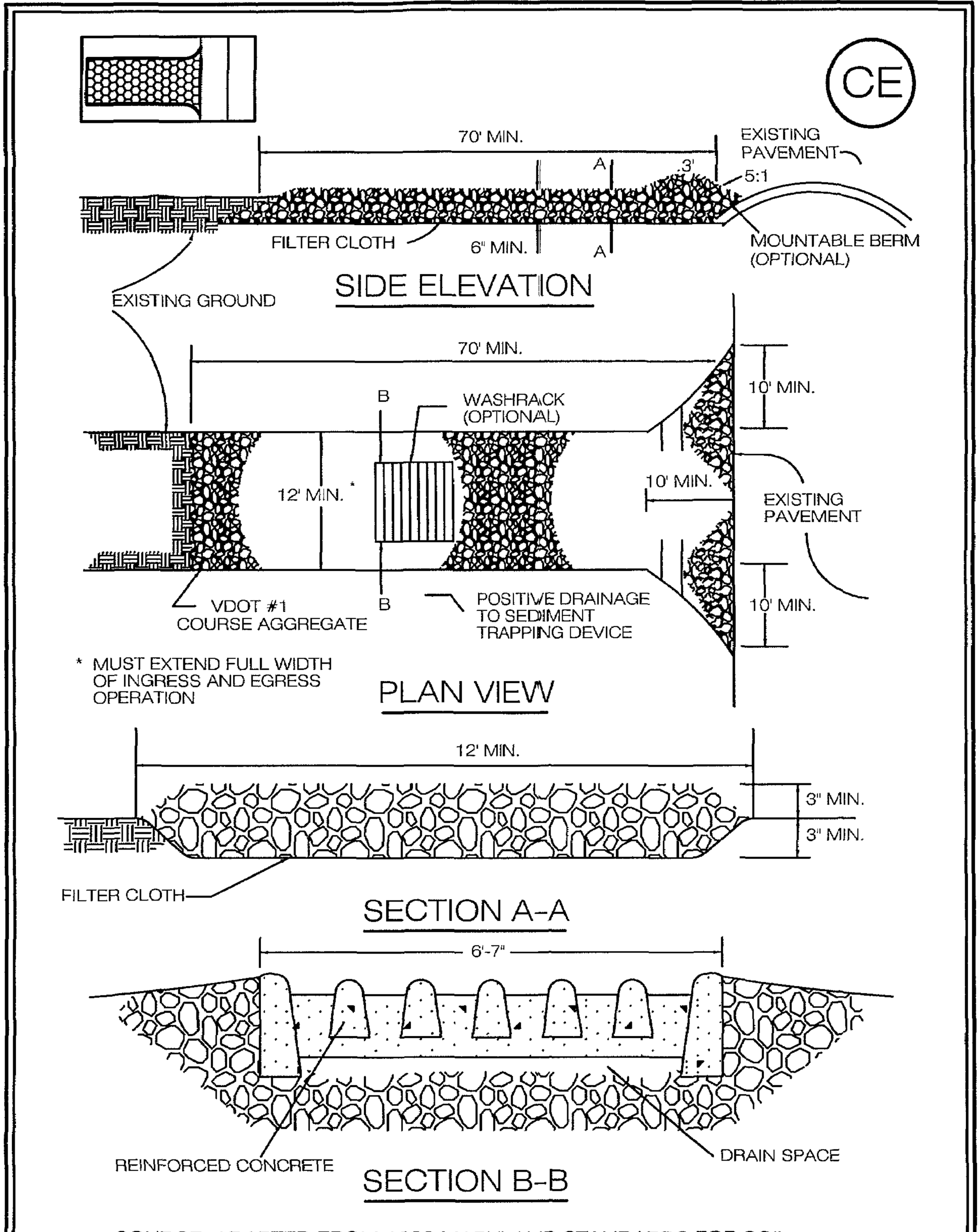
$2<h_s/d_{50}<4$
USE CLASS I RIPRAP WITH GEOTEXTILE MATTING



DETAIL: STILLING BASIN

SCALE: NTS

CE



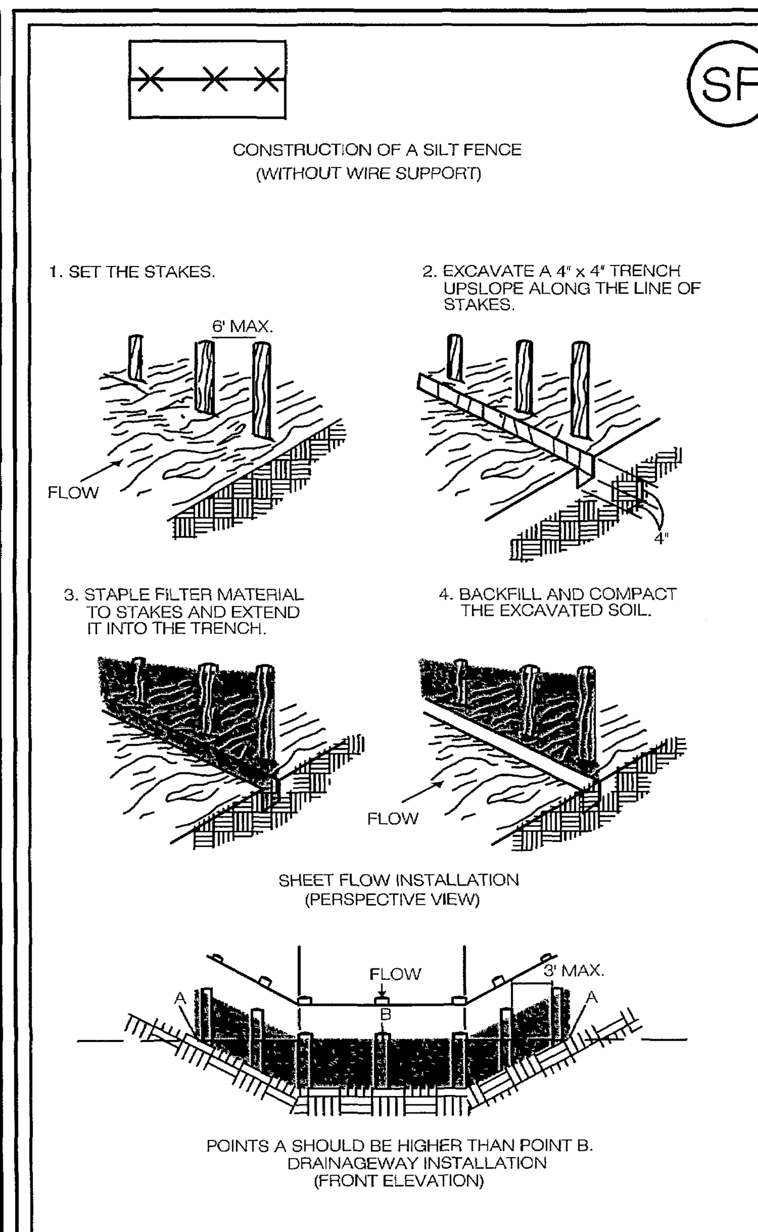
SOURCE: ADAPTED FROM 1983 MARYLAND STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL, AND VA. DSWC.

DETAIL: TEMPORARY STONE CONSTRUCTION ENTRANCE

NTS

VESCH STD & SPEC 3.02

SF



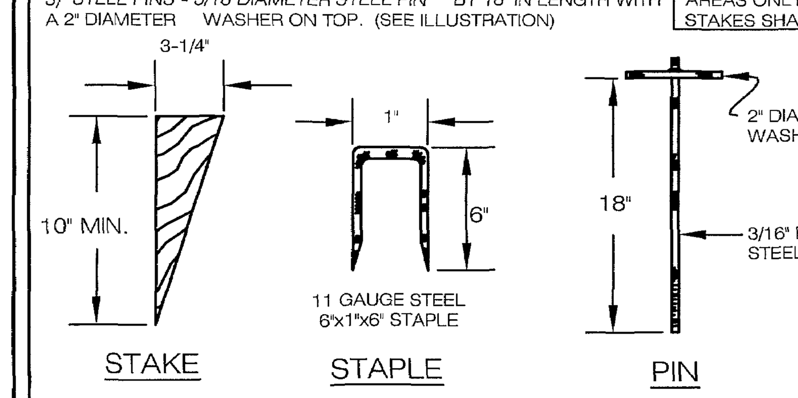
DETAIL: SILT FENCE

NTS

VESCH STD & SPEC 3.05

1) 1x4 TRIANGULAR SURVEY STAKE - MINIMUM 10" IN LENGTH. PLACEMENT OF THE STAKE ACROSS THE FLOW OF THE WATER IS THOUGHT TO PROVIDE A "PINBALL EFFECT" TO HELP SLOW THE VELOCITY.
2) 11 GAUGE STEEL - MINIMUM 1" WIDE BY 6" IN LENGTH STEEL STAPLE - 2"x8" STAPLE MAY BE REQUIRED IN CERTAIN SOIL CONDITIONS.
3) STEEL PINS - 3/16 DIAMETER STEEL PIN BY 18" IN LENGTH WITH A 2" DIAMETER WASHER ON TOP. (SEE ILLUSTRATION)

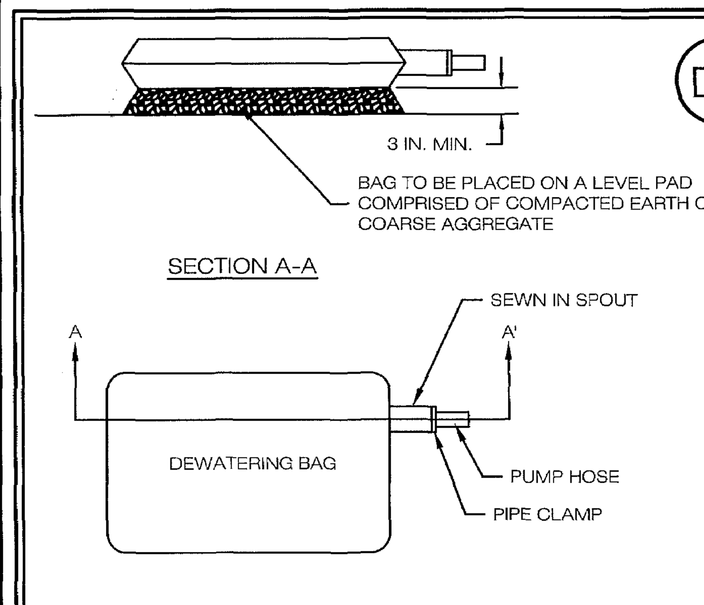
NOTE: IN ACCORDANCE WITH EC-2 STANDARD AND SPECIFICATIONS, THE FOLLOWING ANCHOR OPTIONS ARE FEASIBLE. HOWEVER FOR THE COIR MATTING AREAS ONLY WOODEN STAKES SHALL BE USED.



DETAIL: SOIL MATTING ANCHORS

NTS

DS



DETAIL : DEWATERING BAG STRUCTURE

SEE VDOT STANDARDS FOR EC-8 DETAIL

NTS

COIR MATTING SPECIFICATIONS

PRODUCT NAME	WEIGHT	THICKNESS	TENSILE STRENGTH	ELONGATION WARP X FILL	FLEXIBILITY (MG-CM)	PERMISSIBLE FLOW VELOCITY	STANDARD SIZE	"C" FACTOR	OPEN AREA
COIR MATTING									
ECOMATTING CM-700 OR EQUIVALENT	700 GR/M^2	0.30 IN.	1348 X 626 LB/FT	34% X 38%	65030 X 29590	11 FT/SEC	6.6 X 164 FT	0.002	50%
	(20.6 OZ/YD2)					(OBSERVED)	(120 SQ.YDS/ROLL)		

5209 Center Street
Williamsburg, Virginia 23188
(757) 220-6869

1011 Boulder Springs Drive, Suite 225
Richmond, Virginia 23225
(804) 267-3474

150 Riverside Parkway, Suite 301
Fredericksburg, Virginia 22406
(540) 785-5544

Environmental Consultants

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:

DATE:	
6/17/11	REVISED PER COUNTY COMMENTS

DRAWN BY: CSH
DESIGNED BY: CSH/DAP
DATE: 3/18/11
CHECKED BY: DAP/WDB
SCALE: 1"=30'

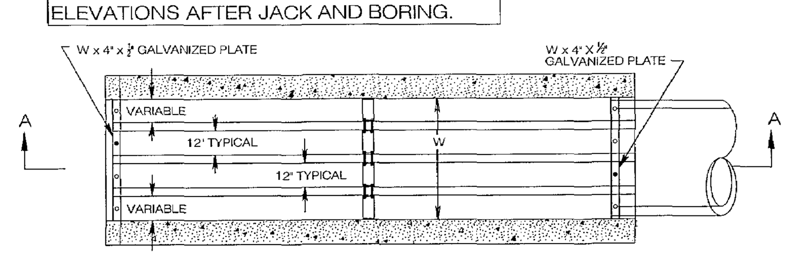
SHEET: 6

JOB#: 4424

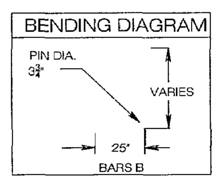
I:\4400s\4424-Warhill Trail\Stormwater Analysis\Site Plans\CONSTRUCTION PLANS\4424_Warhill Trail_Construction Plans (05-11-11).dwg

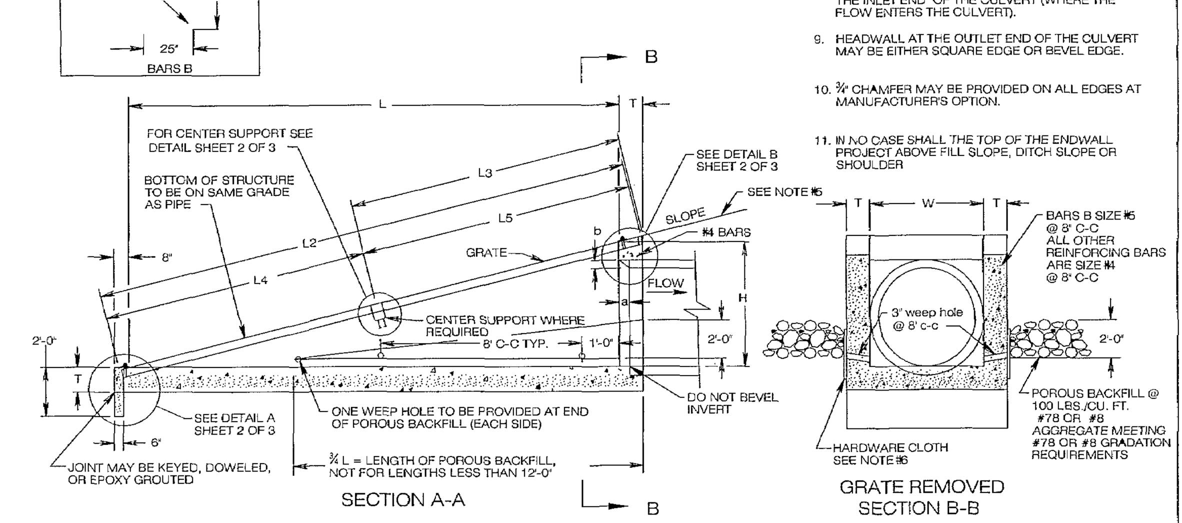
EW-11

MODIFIED TO ACCOMMODATE 4 PIPES AND DIMENSIONS ADJUSTED PER AS-BUILT PIPE ELEVATIONS AFTER JACK AND BORING.



PLAN VIEW





NOTES:

1. THIS ITEM MAY BE PRECAST OR CAST IN PLACE. ALL CAST CONCRETE TO BE CLASS A3. FOR PRECAST USE 4000 PSI MINIMUM. REINFORCING STEEL TO HAVE A MINIMUM 1½" COVER.
2. FOR TABULATION OF DIMENSIONS AND QUANTITIES SEE SHEET 3 OF 3.
3. ALL PIPE FOR GRATE, STRUCTURAL TUBING, AND RELATED HARDWARE TO BE GALVANIZED.
4. STANDARD EW-11 TO BE INSTALLED SO THE GRATE CONFIGURATION IS ALWAYS PERPENDICULAR TO THE EDGE OF THE SHOULDER.
5. SLOPE AS SPECIFIED ON TYPICAL SECTION.
6. WEEP HOLE WITH 12" X 12" PLASTIC HARDWARE CLOTH ¼" MESH OR GALVANIZED STEEL WIRE, MINIMUM WIRE DIAMETER 0.03" NUMBER 4 MESH HARDWARE CLOTH ANCHORED FIRMLY OUTSIDE OF STRUCTURE.
7. HEADWALL TO BE BEVELED IN ALL AREAS EXCEPT WHERE A CONFLICT WITH INVERT OR WINGWALLS OCCUR.
8. BEVEL EDGE IS REQUIRED ON THE HEADWALL OF THE INLET END OF THE CULVERT (WHERE THE FLOW ENTERS THE CULVERT).
9. HEADWALL AT THE OUTLET END OF THE CULVERT MAY BE EITHER SQUARE EDGE OR BEVEL EDGE.
10. ¾" CHAMFER MAY BE PROVIDED ON ALL EDGES AT MANUFACTURER'S OPTION.
11. IN NO CASE SHALL THE TOP OF THE ENDWALL PROJECT ABOVE FILL SLOPE, DITCH SLOPE OR SHOULDER

PIPE SIZE	H	L	W	T	PIPE GRATE PIPE O.D.	NO. OF PIPES	L2
33" OR 36"	4'-0"	12'-0"	4'-0"	8"	4"	3	13'-7 3/4"

SHEET 1 OF 3

PIPE ENDWALL WITH LOAD-CARRYING GRATE FOR 12"-60" PIPES
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE 105 233 302

101.26

UTILITY CONTACT INFORMATION:

UTILITY COMPANY	TELEPHONE NUMBER
JAMES CITY COUNTY PLANNING DIVISION	1-757-253-6685
JAMES CITY COUNTY ENVIRONMENTAL DIVISION	1-757-253-6670
JAMES CITY COUNTY STORMWATER DIVISION	1-757-259-1460
JAMES CITY COUNTY SERVICE AUTHORITY	1-757-253-6805
DOMINION VIRGINIA POWER	1-888-667-3000
VERIZON	1-757-954-6222
CENTER FOR EMERGENCY HEALTH SERVICES	1-757-253-8051
COX COMMUNICATIONS	1-757-224-4269
VIRGINIA NATURAL GAS	1-877-572-3342
MISS UTILITY	1-800-552-7001

JAMES CITY COUNTY CERTIFICATION

THE CONTRACTOR SHALL ENSURE A RECORD DRAWING AND CONSTRUCTION CERTIFICATION IS ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING, AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION. STORMWATER MANAGEMENT / BMP FACILITIES RECORD DRAWING AND CONSTRUCTION CERTIFICATION STANDARD FORMS AND INSTRUCTIONS.

GENERAL NOTES:

1. ALL UTILITIES, INCLUDING ALL POLES AND STRUCTURES, SHALL BE RELOCATED AS NECESSARY AT EITHER THE CONTRACTOR'S OR UTILITY OWNER'S EXPENSE PRIOR TO CONSTRUCTION.

2. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING ROADS, UTILITIES OR ANY OTHER EXISTING SITE FEATURES WHICH OCCUR AS A RESULT OF PROJECT CONSTRUCTION WITHIN OR CONTIGUOUS TO EXISTING RIGHT OF WAY.

3. ADDITIONAL DITCH LININGS SHALL BE PROVIDED, AT THE CONTRACTOR'S EXPENSE, AS DETERMINED NECESSARY BY THE COUNTY INSPECTOR DURING FIELD REVIEW.

4. THE CONTRACTOR MAY REMOVE EXISTING GUARD RAIL AS NEEDED TO ACCOMMODATE PROPOSED CONSTRUCTION ACTIVITIES, BUT SHALL RESTORE TO PRE-CONSTRUCTION CONDITIONS UPON COMPLETION AND RESPONSIBLE FOR ANY DAMAGE OR REPAIRS.

5. THE PROPERTY DELINEATED HEREON IS IDENTIFIED AS 5700 WARHILL TRAIL, PARCEL ID #3210100012 AND ZONED PUBLIC LANDS.

6. THE TOPOGRAPHIC CONTOUR INTERVAL IS ONE (1) FOOT.

7. UNLESS OTHERWISE NOTED, ALL PROPOSED ELEVATIONS AS SHOWN HEREON ARE FINISHED GRADE.

8. ALLOWABLE TOLERANCE FOR JACK AND BORE PIPE INSTALLATION SHALL BE ±0.2 FT FROM THE ELEVATIONS SPECIFIED HEREIN.

9. MAINTAIN A MINIMUM VERTICAL CLEARANCE OF ONE (1) FOOT BETWEEN CROSSING OF ALL UTILITIES LINES UNLESS OTHERWISE NOTED.

11. 1. ALL CONSTRUCTION METHODS AND MATERIALS ASSOCIATED WITH THIS PROJECT SHALL CONFORM TO THE LATEST EDITIONS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD AND BRIDGE SPECIFICATIONS, THE VDOT ROAD AND BRIDGE STANDARDS, THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS, AND THE COUNTY DESIGN AND CONSTRUCTION STANDARDS MANUAL. IN THE EVENT OF CONFLICT BETWEEN ANY OF THESE STANDARDS, SPECIFICATIONS, OR PLANS, THE MOST STRINGENT SHALL GOVERN.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE OWNER AND THE ENGINEER OF ANY CHANGES OR CONDITIONS ATTACHED TO PERMITS OBTAINED FROM JAMES CITY COUNTY, OR ANY OTHER AUTHORITY ISSUING PERMITS.

13. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING TRUCKS AND/OR EQUIPMENT OF MUD, PRIOR TO ENTERING THE VDOT RIGHT-OF-WAY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS OF MUD AND/OR ALLAY DUST, OR TAKE WHATEVER MEASURES NECESSARY TO ENSURE THAT THE STREETS ARE KEPT IN A CLEAN AND DUST FREE CONDITION AT ALL TIMES.

13. APPROVAL OF THIS PLAN SHALL IN NO WAY GRANT PERMISSION BY THE COUNTY FOR THE CONTRACTOR TO TRESPASS ON OFF-SITE PROPERTIES.

14. THE CONTRACTOR SHALL VISIT THE SITE AND SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING CONSTRUCTION.

15. THE CONTRACTOR SHALL CLEAR THE SITE OF ALL TREES, BUILDINGS, FOUNDATIONS, ETC. WITHIN THE LIMITS OF CONSTRUCTION, AND SHALL BE RESPONSIBLE FOR COORDINATING ANY DISCONNECTION OF EXISTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND ABANDONING ALL EXISTING WELLS AND/OR SEPTIC DRAIN FIELDS AND COORDINATING THEIR ABANDONMENT WITH THE JAMES CITY COUNTY HEALTH DEPARTMENT.

16. ALL LAND ON OR OFF-SITE WHICH IS DISTURBED BY CONSTRUCTION AND WHICH IS NOT BUILT UPON OR SURFACED, SHALL BE ADEQUATELY STABILIZED TO CONTROL EROSION AND SEDIMENTATION.

17. WILLIAMSBURG ENVIRONMENTAL GROUP, INC. DOES NOT CERTIFY TO THE LOCATION OF OR THE EXISTENCE OF ANY EXISTING UNDERGROUND UTILITIES. THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE RECORDS. THIS DOES NOT CONSTITUTE A GUARANTEE OF THEIR ACTUAL LOCATIONS OR THAT THEY HAVE ALL BEEN SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DIGGING OF TEST HOLES PRIOR TO BEGINNING ANY CONSTRUCTION, THESE TEST HOLES WILL BE MADE TO VERIFY ALL CROSSINGS BETWEEN NEW AND EXISTING FACILITIES AND AT CRITICAL GRADE CHANGES IF CONDITIONS ARE FOUND IN THE FIELD WHICH ARE MATERIALLY DIFFERENT FROM THE PLANS. THE CONTRACTOR SHALL NOTIFY WILLIAMSBURG ENVIRONMENTAL GROUP, INC. SO THAT APPROPRIATE REVISIONS CAN BE MADE TO THE PLANS.

18. CONTRACTOR SHALL NOTIFY OPERATORS WHO MAINTAIN EXISTING UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATION OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NO MORE THAN TEN (10) WORKING DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION. CONTRACTOR SHALL CONTACT "MISS UTILITY" AT 1-800-552-7001 PRIOR TO COMMENCEMENT OF ANY EXCAVATION.

19. ALL TESTS, STUDIES. ETC., WILL BE CARRIED OUT AT THE EXPENSE OF THE CONTRACTOR.

20. THE APPROVAL OF THESE PLANS SHALL IN NO WAY RELIEVE THE OWNER OF COMPLYING WITH OTHER APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS.

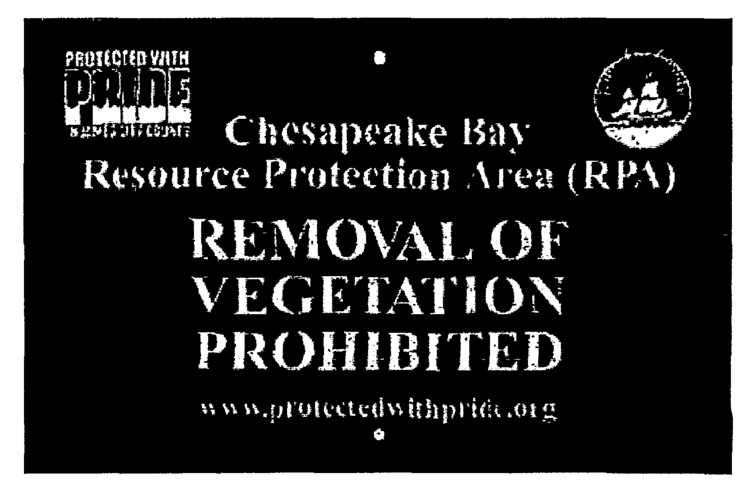
21. CBR TEST SHALL BE PERFORMED PRIOR TO DETERMINATION OF FINAL SUBGRADE ELEVATION. SUBBASE DEPTH IS BASED ON A CBR VALUE OF SIX (6) UNLESS OTHERWISE NOTED. SOILS TESTS OF SUBGRADE SHALL BE SUBMITTED FOR ACTUAL DETERMINATION OF REQUIRED SUBBASE THICKNESS PRIOR TO CONSTRUCTION, ALL SUBGRADE TO BE COMPACTED TO 95% DENSITY AT ±2% OF OPTIMUM MOISTURE CONTENT PER ASTM D698 METHOD UNLESS OTHERWISE DIRECTED BY AN APPROVED GEOTECHNICAL REPORT.

5. ALL MATERIALS USED FOR FILL OR BACKFILL SHALL BE FREE OF WOOD, ROOTS, ROCKS, BOULDERS, OR ANY OTHER NONCOMPACTIBLE SOIL TYPE MATERIAL. UNSATISFACTORY MATERIALS ALSO INCLUDE MAN-MADE FILLS AND REFUSE DEBRIS DERIVED FROM ANY SOURCE.

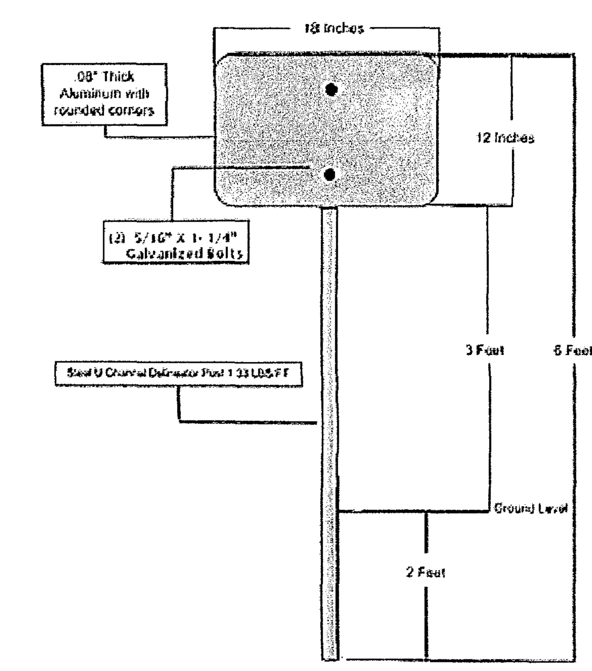
6. ALL EXCAVATIONS, INCLUDING TRENCHES, SHALL BE KEPT DRY TO PROTECT THEIR INTEGRITY.

7. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS, SPECIFICATIONS, AND SITE CONDITIONS OR ANY INCONSISTENCIES OR AMBIGUITIES IN DRAWINGS OR SPECIFICATIONS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER, IN WRITING, WHO SHALL PROMPTLY ADDRESS SUCH INCONSISTENCIES OR AMBIGUITIES. WORK COMPLETED BY THE CONTRACTOR AFTER HIS DISCOVERY OF SUCH DISCREPANCIES, INCONSISTENCIES, OR AMBIGUITIES SHALL BE DONE AT THE CONTRACTOR'S RISK.

8. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR SHALL ARRANGE THE MEETING WITH THE JAMES CITY COUNTY ENGINEER.



James City County
RPA/CONSERVATION EASEMENT SIGN INSTALLATION GUIDELINES
(18 Inches X 12 Inches)



- SIGNS SHALL BE 12" HIGH X 18" WIDE OR 6" HIGH X 8" WIDE DEPENDING ON LOCATION, SITE, ETC. (SPECIFIC SUBMITTALS ARE REQUIRED).
- SIGN BLANKS SHALL BE 0.08" THICK ALUMINUM WITH ROUNDED CORNERS (R-3/4")
- BLANKS SHALL BE SPRAY PAINTED BOTH SIDES WITH GREEN ACRYLIC AUTOMOTIVE ENAMEL PAINT (TONE #343C).
- SIGNS SHALL CONTAIN COUNTY STANDARD MESSAGE PAINTED WITH WHITE ENAMEL INK, MESSAGES SHALL BE SITE SPECIFIC (WATERSHED, CONSERVATION EASEMENT, AND/OR RESOURCE PROTECTION AREA).
- SIGNS SHALL BE DRILLED WITH 3/8" HOLES TOP AND BOTTOM AND ATTACHED TO THE POSTS WITH - 5/16" X 1-1/4" GALVANIZED BOLTS.
- POSTS SHALL BE STEEL U-CHANNEL, WEIGHING 1.33 LBS / FT
- POSTS SHALL BE PAINTED WITH GREEN ACRYLIC AUTOMOTIVE ENAMEL PAINT (TONE #343C) OR GALVANIZED, W/ 3/8" HOLES ON 1" CENTERS FULL LENGTH.
- SIGN MOUNTING HEIGHT SHALL BE APPROXIMATELY 4 FT ABOVE GROUND DEPENDING ON LOCATION; AND PLACEMENT SHALL BE IN ACCORDANCE WITH APPROVED PLAN.
- POSTS SHALL BE DRIVEN INTO THE GROUND 2 FT.

DETAIL: RPA SIGN

NTS

JACK AND BORE NOTES NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANTICIPATING AND LOCATING UNDERGROUND UTILITIES AND OBSTRUCTIONS.
2. SMOOTH WALL STEEL PIPE SHALL CONFORM TO THE REQUIREMENTS OF ASTM A149 WITH A MINIMUM WALL THICKNESS OF 0.500 INCH OR ASTM A53 STANDARD WEIGHT CLASS AND SHALL HAVE BEVELED EDGES SUITABLE FOR WELDING OR BE THREADED.
3. PIPE MATERIAL SHALL BE NEW AND UNUSED.
4. PIPE SECTIONS SHALL BE JOINED WITH CONTINUOUS FULL CIRCUMFERENTIAL WELDS PERFORMED BY A CERTIFIED WELDER. PIPE AND WELDS SHALL RECEIVE A BITUMINOUS COATING.
5. PROVIDE FOR A 40FT X 40FT EXCAVATED WORK PAD TO BE USED FOR JACK AND BORE OPERATIONS. THE WORK PAD SHALL BE TEMPORARILY STABILIZED WITH FOUR (4) INCHES OF VDOT STONE UNDERLAIN WITH NON-WOVEN GEO-TEXTILE OR TIMBER MATS. THE WORK PAD SHALL BE SURROUNDED WITH SILT FENCE, AND ALL WASTEWATER AND/OR SOIL ADEQUATELY CONTAINED. SPOIL MATERIAL SHALL BE HAULED TO THE TEMPORARY STOCKPILE AREA AS NEEDED, BUT ULTIMATELY REMOVED FROM THE SITE.
6. THE CONTRACTOR SHALL SUBMIT TO THE COUNTY A COMPLETE PLAN AND SCHEDULE FOR JACK AND BORE PIPE INSTALLATION PRIOR TO BEGINNING SUCH WORK. THE SUBMISSION SHALL INCLUDE COMPLETE DETAILS FOR DEWATERING; SOIL STABILIZATION; JACKING AND RECEIVING PITS; JACKS; REACTION BLOCK; BORING EQUIPMENT; SHEETING, SHORING, AND BRACING FOR PROTECTING THE ROADBED; INSTALLATION SEQUENCE; MATERIALS; AND EQUIPMENT. THE CONTRACTOR SHALL NOT PROCEED WITH PIPE INSTALLATION UNTIL THE PLAN HAS BEEN REVIEWED AND ACCEPTED BY THE COUNTY.
7. CONSTRUCTION SHALL BE PERFORMED IN SUCH A MANNER THAT THE GROUND SURFACE ABOVE THE PIPE LINE WILL NOT SETTLE. THE HOLE SHALL BE BORED MECHANICALLY WITH A SUITABLE BORING ASSEMBLY DESIGNED TO PRODUCE A SMOOTH, STRAIGHT SHAFT AND SO OPERATED THAT THE COMPLETED SHAFT SHALL BE AT THE ESTABLISHED LINE AND GRADE. THE SIZE OF THE BORED HOLE SHALL BE OF SUCH DIAMETER TO PROVIDE AMPLE CLEARANCE FOR BELLS OR OTHER JOINTS. THE HOLES SHALL BE BORED MECHANICALLY. THE BORING SHALL BE DONE BY USING EITHER A PILOT HOLE OR A DRY BORE METHOD.
8. IN OPERATING JACKS, EVEN PRESSURE SHALL BE APPLIED TO ALL JACKS USED. SUITABLE BRACING BETWEEN JACKS AND THE JACKING HEAD SHALL BE PROVIDED SO THAT PRESSURE SHALL BE APPLIED TO THE PIPE UNIFORMLY AROUND THE RING OF THE PIPE. THE JACKING HEAD SHALL BE OF SUCH WEIGHT AND DIMENSIONS THAT IT SHALL NOT BEND OR DEFLECT WHEN FULL PRESSURE IS APPLIED AT THE JACK. THE JACKING HEAD SHALL BE PROVIDED WITH AN OPENING FOR THE REMOVAL OF EXCAVATED MATERIAL AS THE JACKING PROCEEDS. THE PIPE TO BE JACKED SHALL BE SET ON GUIDES THAT ARE STRAIGHT AND SECURELY BRACED TOGETHER IN SUCH MANGER AS TO SUPPORT THE SECTION OF PIPE AND TO DIRECT IT IN THE PROPER LINE AND GRADE.
9. INSTALLATION OF THE PIPELINE SHALL IMMEDIATELY FOLLOW HEADING OR TUNNELING EXCAVATION. VOIDS OCCURRING BEHIND THE PIPE DURING INSTALLATION SHALL BE FILLED WITH HYDRAULIC CEMENT GROUT, PLACED UNDER PRESSURE, UPON COMPLETION OF THE JACK AND BORE OPERATION.
10. THE CONTRACTOR SHALL REPLACE OR REPAIR, AS DIRECTED BY THE COUNTY, PIPE THAT IS DAMAGED DURING JACKING OPERATIONS AT HIS OWN EXPENSE. JOINTS OF STEEL PIPE SHALL BE BUTT-WELDED WATERTIGHT, AS INSTALLATION PROGRESSES.
11. WHEN WORK IS STOPPED, THE HEADING SHALL BE BULK HEADED.
12. WHEN THE CONTRACTOR ENCOUNTERS AN OBSTRUCTION DURING THE JACKING AND BORING OPERATION THAT STOPS THE FORWARD PROGRESS OF THE WORK FOR MORE THAN 60 MINUTES, THE FOLLOWING PROCEDURE SHALL BE FOLLOWED:
    a. THE CONTRACTOR SHALL NOTIFY THE COUNTY IMMEDIATELY UPON ENCOUNTERING AN OBSTRUCTION THAT STOPS THE FORWARD PROGRESS OF THE WORK. THE COUNTY SHALL VERIFY THAT AN OBSTRUCTION HAS STOPPED THE FORWARD PROGRESS OF THE WORK IN EXCESS OF 60 MINUTES AND THAT THE CONTRACTOR'S EFFORTS TO REMOVE OR BORE THROUGH AN OBSTRUCTION HAVE BEEN DELIBERATELY AND DILIGENTLY PURSUED.
    b. THE CONTRACTOR SHALL CONSULT WITH THE COUNTY AND OFFER APPROPRIATE OPTIONS FOR CONSIDERATION. UPON AUTHORIZATION BY THE COUNTY, THE CONTRACTOR SHALL PROCEED WITH REMOVAL OF THE OBSTRUCTION BY OTHER METHODS.

REINFORCED CONCRETE NOTES:

1. PROVIDE CAST-IN-PLACE CONCRETE WHERE SHOWN ON THE DRAWINGS INCLUDING ALL REINFORCING, FORMWORK, AND ACCESSORIES NEEDED FOR A COMPLETE AND PROPER INSTALLATION.

2. WITHIN (14) CALENDAR DAYS OF RECEIVING NOTICE TO PROCEED, THE CONTRACTOR SHALL SUBMIT A MATERIALS LIST OF ITEMS TO BE PROVIDED AS PART OF THE REINFORCED CONCRETE WORK, A REINFORCING STEEL DESIGN PROVIDED BY A LICENSED STRUCTURAL ENGINEER, CERTIFICATES OF COMPLIANCE FOR THE CONCRETE REINFORCING, MANUFACTURERS SPECIFICATIONS AND DATA FOR THE WATERSTOPS TO BE USED AND A COMPLETE MIX DESIGN INCLUDING CERTIFICATES OF COMPLIANCE FOR ALL MATERIALS TO BE INCORPORATED INTO THE CONCRETE, PREPARED IN COMPLIANCE WITH ACI 301.

3. PRIOR TO INSTALLING REINFORCING , SUBMIT SHOP DRAWINGS OF REINFORCING STEEL PREPARED IN ACCORDANCE WITH ACI 301. ALL LAP SPLICES SHALL BE 36 BAR DIAMETERS MINIMUM. CONTRACTOR IS RESPONSIBLE FOR OBTAINING STRUCTURAL ENGINEERING REVIEW AND SEAL FOR CONCRETE AND STEEL ELEMENTS.

4. DESIGN, ERECT, SUPPORT, BRACE AND MAINTAIN FORMWORK SO IT WILL SAFELY SUPPORT VERTICAL AND LATERAL LOADS WHICH MIGHT BE APPLIED UNTIL SUCH LOADS CAN BE SUPPORTED SAFELY BY THE CONCRETE STRUCTURE. CONSTRUCT FORMS TO THE EXACT SIZES, LINES AND DIMENSIONS SHOWN, AND AS REQUIRED TO OBTAIN ACCURATE ALIGNMENT, LOCATION, GRADES, LEVEL, AND PLUMB WORK IN THE FINISHED STRUCTURE.

5. ALL CONCRETE REINFORCING SHALL BE DEFORMED BARS COMPLYING WITH ASTM A 615, GRADE 60. BENDING AND DETAILING OF REINFORCING SHALL BE IN ACCORDANCE WITH ACI 318 AND THE CRSI "MANUAL OF STANDARD PRACTICES."

6. THE MATERIALS AND THE CONCRETE MIX DESIGN USED IN THE CONCRETE SHALL COMPLY WITH THE FOLLOWING STANDARDS;
A) PORTLAND CEMENT: ASTM C150, TYPE I OF II LOW ALKALINE.
B) COARSE AGGREGATE, WELL GRADED CRUSHED ROCK OR WASHED GRAVEL COMPLYING WITH ASTM C33 WITH THE MAXIMUM SIZE OF 1" AND A MINIMUM SIZE BEING RETAINED ON THE #4 SIEVE.
C) FINE AGGREGATE: WELL GRADED NATURAL WASHED SANDS OF HARD AND DURABLE PARTICLES VARYING FROM PARTICLES PASSING 3/8" SCREEN OF WHICH A LEAST 12% SHALL PASS A 50 MESH SCREEN.
D) WATER: CLEAN AND POTABLE
E) WATER/CEMENT RATIO OF NOT MORE THAN 0.50.
F) CALCIUM CHLORIDE SHALL NOT BE USED AS AN ADMIXTURE, NOR AS AN INGREDIENT IN ANY ADMIXTURE. CHLORIDE IONS IN ADMIXTURES SHALL NOT EXCEED .01% BY WEIGHT OF CEMENT CONTENT.

7. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI AND MAXIMUM SLUMP OF 4" AND AN ENTRAINED AIR CONTENT OF 4 TO 6 PERCENT.

8. PRIOR TO PLACING CONCRETE, CLEAN REINFORCING AND REMOVE LOOSE RUST AND MILL SCALE, EARTH AND OTHER MATERIALS THAT REDUCE BOND WITH CONCRETE. POSITION, SUPPORT, AND SCOUR REINFORCING AGAINST DISPLACEMENT BY FORMS, CONSTRUCTION ACTIVITIES, AND THE CONCRETE PLACEMENT OPERATIONS.

9. DO NOT USE CONCRETE THAT HAS STOOD FOR 30 MINUTES AFTER LEAVING THE MIXER OR CONCRETE THAT IS NOT PLACED WITHIN 75 MINUTES AFTER WATER IS FIRST INTRODUCED INTO THE MIX. DO NOT USE CONCRETE WHICH BECOMES NONPLASTIC.

10. PRIOR TO PLACING CONCRETE, REMOVE ANY FOREIGN MATTER ACCUMULATED IN THE FORMS. WET WOOD FORMS SUFFICIENTLY TO TIGHTEN UP CRACKS AND WET OTHER MATERIALS SUFFICIENTLY TO MAINTAIN WORKABILITY OF THE CONCRETE.

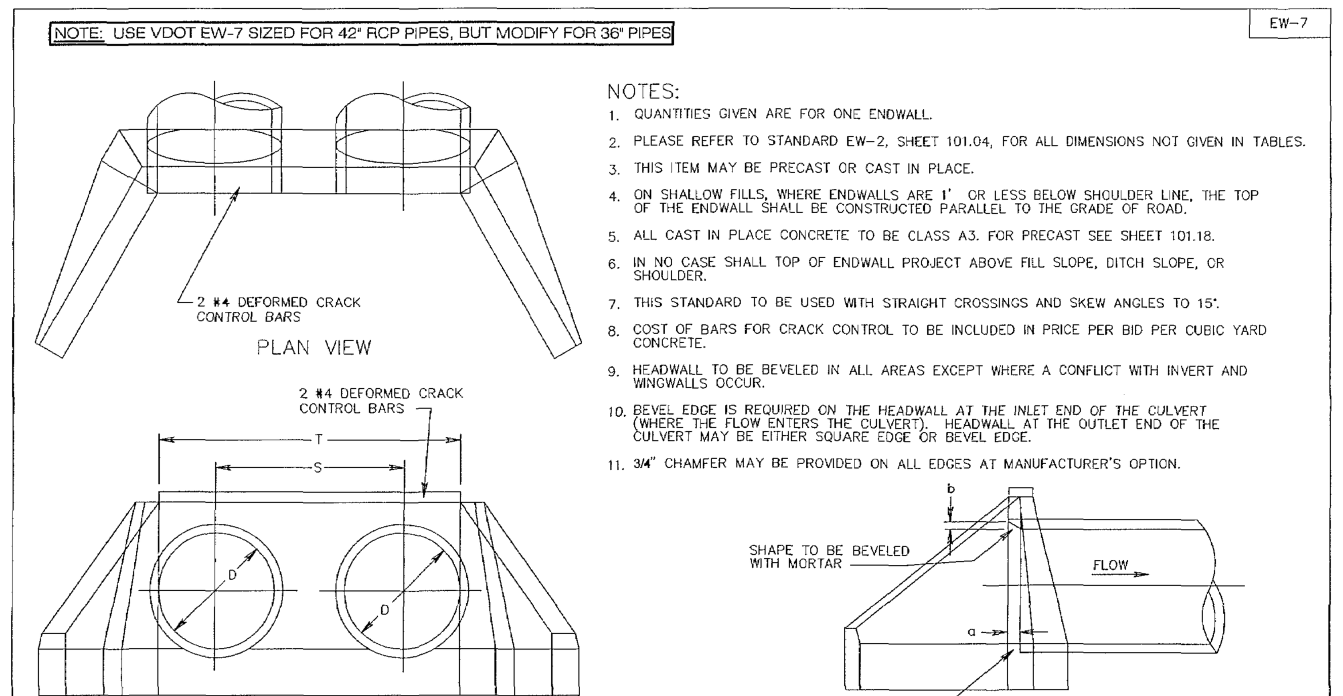
11. DEPOSIT CONCRETE AS NEAR AS PRACTICAL IN ITS FINAL LOCATION. PERFORM CONCRETE PLACING AT SUCH A RATE THAT CONCRETE WHICH IS BEING INTEGRATED WITH FRESH CONCRETE IS STILL PLASTIC. DEPOSIT CONCRETE IN HORIZONTAL LAYERS NO DEEPER THAN 24". DO NOT VIBRATE FORMS OR REINFORCEMENT OR USE VIBRATORS TO TRANSPORT CONCRETE INSIDE THE FORMS.

12. PROVIDE A STEEL TROWEL FINISH TO THE TOP SLAB. AFTER STRIPPING FORMS REMOVE ALL FINS AND FILL ANY SMALL HOLES WITH MORTAR CONSISTING OF A 50/50 MIX PORTLAND CEMENT AND SAND. REPAIR AND REPLACE DEFICIENT WORK AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.

13. THE OWNER WILL PROVIDE SPECIAL INSPECTION INCLUDING INSPECTION OF THE CONCRETE REINFORCEMENT, FORMWORK, SAMPLING AND TESTING OF THE CONCRETE. THE CONTRACTOR SHALL NOTIFY THE SPECIAL INSPECTOR PRIOR TO CONCEALING WORK TO BE INSPECTED AND PRIOR TO EACH CONCRETE PLACEMENT. THE CONTRACTOR SHALL PROVIDE ACCESS FOR TESTING AND INSPECTION AND SHALL PROVIDE ALL DOCUMENTATION REQUIRED BY THE INSPECTORS.

NOTE: USE VDOT EW-7 SIZED FOR 42" RCP PIPES, BUT MODIFY FOR 36" PIPES

EW-7



NOTES:
1. QUANTITIES GIVEN ARE FOR ONE ENDWALL.
2. PLEASE REFER TO STANDARD EW-2, SHEET 101.04, FOR ALL DIMENSIONS NOT GIVEN IN TABLES.
3. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
4. ON SHALLOW FILLS, WHERE ENDWALLS ARE 1' OR LESS BELOW SHOULDER LINE, THE TOP OF THE ENDWALL SHALL BE CONSTRUCTED PARALLEL TO THE GRADE OF ROAD.
5. ALL CAST IN PLACE CONCRETE TO BE CLASS A3. FOR PRECAST SEE SHEET 101.18.
6. IN NO CASE SHALL TOP OF ENDWALL PROJECT ABOVE FILL SLOPE, DITCH SLOPE, OR SHOULDER.
7. THIS STANDARD TO BE USED WITH STRAIGHT CROSSINGS AND SKEW ANGLES TO 15°.
8. COST OF BARS FOR CRACK CONTROL TO BE INCLUDED IN PRICE PER BID PER CUBIC YARD CONCRETE.
9. HEADWALL TO BE BEVELED IN ALL AREAS EXCEPT WHERE A CONFLICT WITH INVERT AND WINGWALLS OCCUR.
10. BEVEL EDGE IS REQUIRED ON THE HEADWALL AT THE INLET END OF THE CULVERT (WHERE THE FLOW ENTERS THE CULVERT). HEADWALL AT THE OUTLET END OF THE CULVERT MAY BE EITHER SQUARE EDGE OR BEVEL EDGE.
11. 3/4" CHAMFER MAY BE PROVIDED ON ALL EDGES AT MANUFACTURER'S OPTION.

FOR CONCRETE PIPE

D	S	T	FILL SLOPE 1?:1 CONCRETE ONE DBL. ENDWALL CUBIC YARDS	FILL SLOPE 1?:1 INCREASE FOR EACH ADDITIONAL PIPE CUBIC YDS.	FILL SLOPE 2:1 CONCRETE ONE DBL. ENDWALL CUBIC YARDS	FILL SLOPE 2:1 INCREASE FOR EACH ADDITIONAL PIPE CUBIC YDS.	a	b
42"	6'-0"	9'-6"	4.829	1.271	5.493	1.255	0'-4-1/2"	0'-3-1/2"

FOR CORRUGATED METAL PIPE

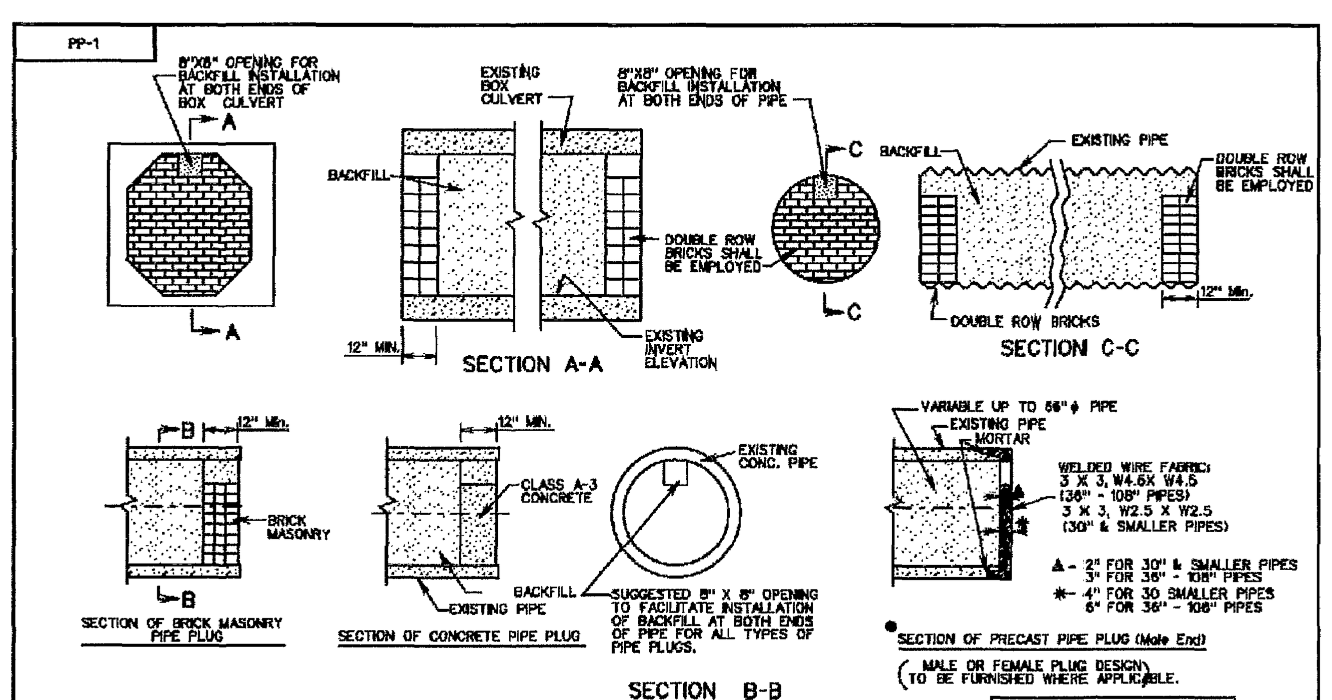
D	S	T	FILL SLOPE 1?:1 CONCRETE ONE DBL. ENDWALL CUBIC YARDS	FILL SLOPE 1?:1 INCREASE FOR EACH ADDITIONAL PIPE CUBIC YDS.	FILL SLOPE 2:1 CONCRETE ONE DBL. ENDWALL CUBIC YARDS	FILL SLOPE 2:1 INCREASE FOR EACH ADDITIONAL PIPE CUBIC YDS.	a	b
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SPECIFICATION REFERENCE 105 302

STANDARD ENDWALLS FOR MULTIPLE PIPE CULVERTS 42"-96" PIPE
VIRGINIA DEPARTMENT OF TRANSPORTATION

101.17

PP-1



NOTES:
BACKFILL IS TO BE EITHER FLOWABLE BACKFILL OR FINE AGGREGATE AS PER THE SPECIFICATIONS AND IS TO BE PAID AS CUBIC YARDS OF FLOWABLE BACKFILL.
FOR PLACEMENT OF STRUCTURES, SEE ROADWAY PLAN SHEETS.
CONCRETE BRICK MAY BE USED IN LIEU OF CLAY BRICK. JUMBO BRICK WILL BE PERMITTED.
● PRECAST NOTES :
CONCRETE TO BE 4000 P. S. I. MIN. COMPRESSIVE STRENGTH.
CONCRETE AND REINFORCING STEEL SHALL BE IN ACCORDANCE WITH AASHTO M170.
DETAIL SHOWN FOR PRECAST PLUG IS REPRESENTATIVE ONLY, OTHER MANUFACTURER'S DESIGN WILL BE ACCEPTABLE UPON APPROVAL BY THE ENGINEER.

QUANTITIES

PIPE SIZE	CU. YDS BACKFILL PER LINEAR FOOT	CU. YDS PER EACH CONC. PLUG
12"	0.029	.013
15"	0.045	.029
18"	0.065	.049
24"	0.116	.100
30"	0.182	.166
36"	0.262	.246
42"	0.356	.340
48"	0.465	.449
54"	0.589	.573
60"	0.727	.711
66"	0.880	.864
72"	1.047	1.031
78"	1.229	1.213
84"	1.425	1.409
90"	1.636	1.620
96"	1.862	1.846
102"	2.102	2.086
108"	2.356	2.340

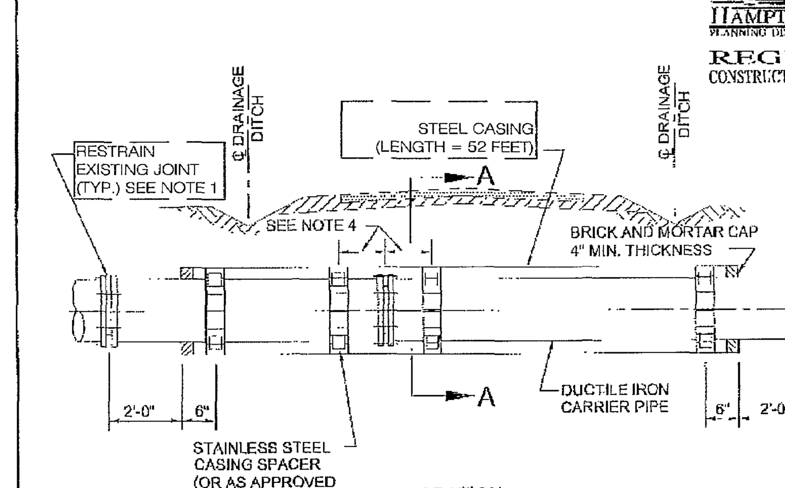
VDOT ROAD AND BRIDGE STANDARDS

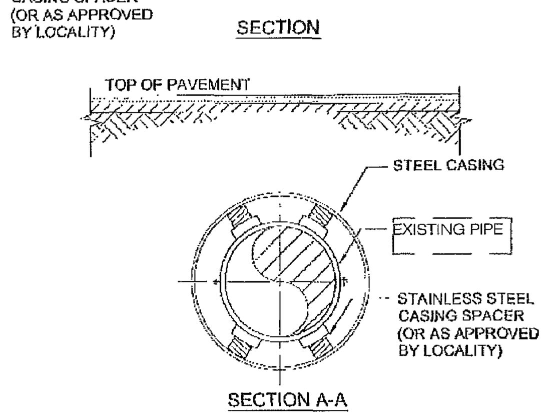
SHEET 1 OF 1 | REVISION DATE | 107.23

DETAILS FOR BACKFILLING ABANDONED CULVERTS
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

HAMPTON ROADS PLANNING DISTRICT COMMISSION
REGIONAL CONSTRUCTION STANDARDS





SEE WS_04, SHEET 2 OF 2 FOR NOTES.

STEEL CASING DETAIL
NOT TO SCALE

REFERENCE	CATEGORY	DATE	SHEET No.	DETAIL No.
200,801-804	WATER & SANITARY	12/10	1 OF 2	WS_04

HAMPTON ROADS PLANNING DISTRICT COMMISSION
REGIONAL CONSTRUCTION STANDARDS

STEEL CASING PIPE SELECTION CHART

EXISTING PIPE SIZE	4"	6"	8"	12"	16"
STEEL CASING PIPE SIZE (O.D.)	12"	18"	18"	24"	30"

NOTES:

1. ALL JOINTS INSIDE OF CASING PIPE AND ONE JOINT BEYOND SHALL BE RESTRAINED MEGALUG RESTRAINED HARNESS OR APPROVED EQUAL.
2. INSTALL CASING PIPE AS SHOWN ON DRAWINGS
3. STAINLESS STEEL SPACERS
SPACERS SHALL BE BOLT-ON STYLE WITH A TWO PIECE SHELL MADE FROM T-304 STAINLESS STEEL OF A MINIMUM 14 GAUGE THICKNESS. THE SHELL SHALL BE LINED WITH A RIBBED PVC SHEET OF A 0.090" THICKNESS THAT OVERLAPS THE EDGES. RUNNERS MADE FROM UHMW POLYMER, SHALL BE ATTACHED TO RISERS AT APPROPRIATE POSITIONS TO PROPERLY LOCATE THE CARRIER WITHIN THE CASING AND TO EASE INSTALLATION. RISERS TO BE MADE FROM T-304 STAINLESS STEEL OF A MINIMUM 14 GAUGE THICKNESS AND SHALL BE ATTACHED TO THE SHELL BY MIG WELDING. ALL WELDS SHALL BE FULLY PASSIVATED. ALL FASTENERS SHALL BE MADE FROM T-304 STAINLESS STEEL. CASING SPACERS SHALL BE MODEL CCS AS MANUFACTURED BY CASCADE WATERWORKS MANUFACTURING COMPANY OF YORKVILLE, IL., MODEL SSI AS MANUFACTURED BY ADVANCE PRODUCTS & SYSTEMS, INC. OF LAFAYETTE, LA., OR APPROVED EQUAL.
4. SPACER WIDTH AND PLACEMENT INTERVALS
IN ALL INSTANCES SPACER SHOULD BE PLACED TO SUPPORT THE CARRIER WITHIN TWO FEET OF THE END OF EACH PIPE JOINT. CONSULT SPACER MANUFACTURER FOR RECOMMENDATIONS ON SPACER WIDTH AND ADDITIONAL PLACEMENT INTERVALS.
5. THE SPLIT CASING SHALL HAVE A CONTINUOUS BUTT WELD DONE BY A CERTIFIED WELDER. A BITUMINOUS COATING SHALL BE APPLIED OVER THE WELD. STEEL THICKNESS SHOULD BE 0.5 INCHES MINIMUM.
6. WITH THE USE OF THE SPLIT STEEL CASING THERE WILL BE NO DISTURBANCE TO THE EXISTING PIPES
7. USE 24 INCH STEEL CASING FOR BOTH WATER AND SEWER LINES.

STEEL CASING DETAIL
NOT TO SCALE

REFERENCE	CATEGORY	DATE	SHEET No	DETAIL No.
200,801-804	WATER & SANITARY	12/10	2 OF 2	WS_04

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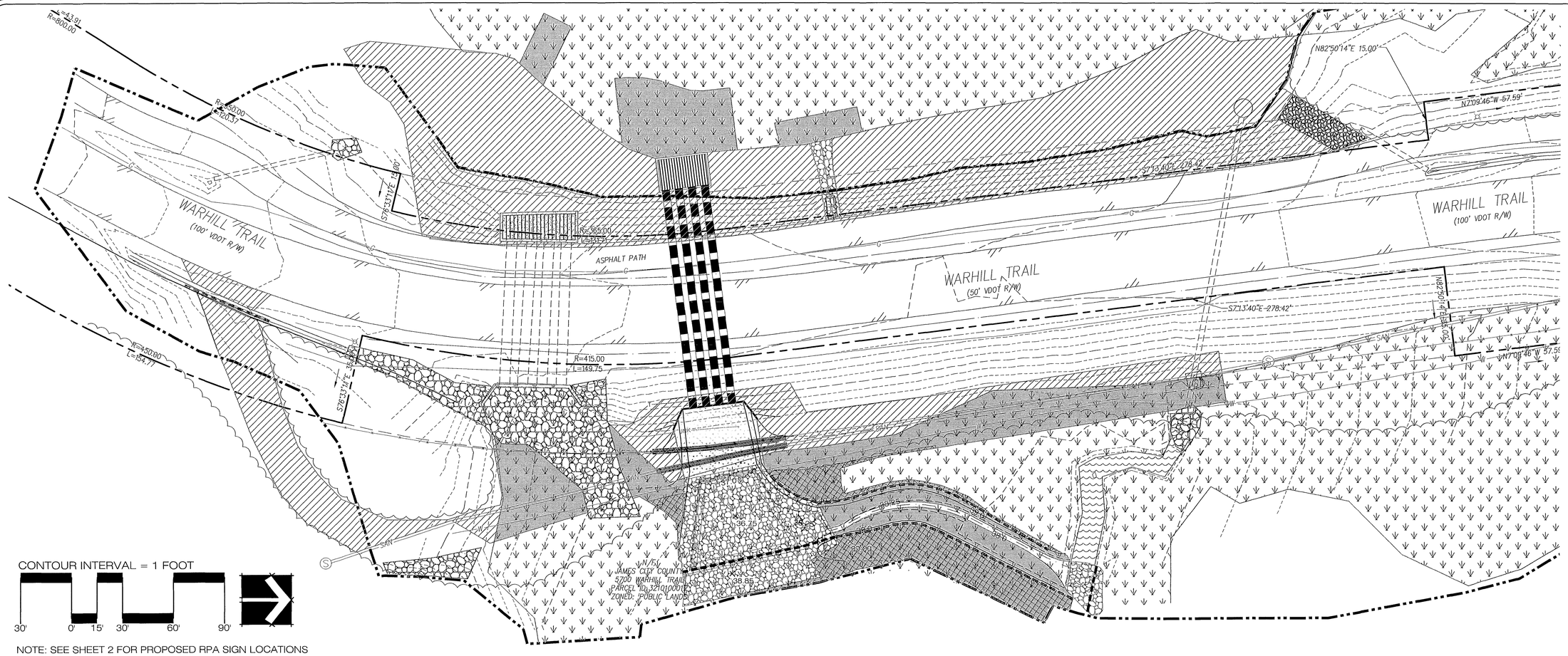
Environmental Consultants

GENERAL NOTES AND DETAILS
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:
DATE:
6/17/11 REVISED PER COUNTY COMMENTS

DRAWN BY: CSH
DESIGNED BY: CSH/DAP
DATE: 3/18/11
CHECKED BY: DAP/WDB
SCALE: 1"=30'
SHEET: 7
JOB#: 4424



CONTOUR INTERVAL = 1 FOOT

30' 0' 15' 30' 60' 90'

NOTE: SEE SHEET 2 FOR PROPOSED RPA SIGN LOCATIONS

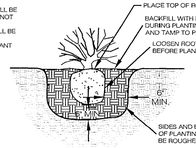
LEGEND:

- APPROXIMATE WETLAND LIMITS
- APPROXIMATE STREAM CHANNEL LIMITS
- PROJECT LIMITS
- EXISTING TOPOGRAPHY
- EXISTING TREE LINE
- EXISTING STORM PIPE
- EXISTING HEADWALL WITH LOAD CARRYING GRATE AND 4-54" RCP'S
- EXISTING EDGE OF PAVEMENT
- EXISTING RIPRAP
- EXISTING COMMUNICATION UTILITY LINE
- EXISTING SANITARY SEWER LINE
- EXISTING WATER LINE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- PROPOSED LIVE STAKE PLANTING
- PROPOSED GENERAL STABILIZATION SEED MIX
- EXISTING RIGHT-OF-WAY
- PROPOSED HEADWALL WITH LOAD CARRYING GRATE AND JACKED PIPES
- PROPOSED GRADING
- PROPOSED CONCRETE APRON
- PROPOSED RIPRAP OUTLET PROTECTION
- PROPOSED 24-INCH SPLIT STEEL CASING
- PROPOSED WETLAND STABILIZATION SEED MIX
- PROPOSED WETLAND PLANTING

PROPOSED PLANTING SCHEDULE

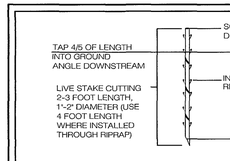
LEGEND	QUANTITY	BOTANICAL NAME	COMMON NAME	SPECIFICATION	HEIGHT	INDICATOR	REMARKS
		WETLAND STABILIZATION SEED MIX (0.19 ACRES)					
	7%	PANICUM DICHOTOMIFLORUM	SMOOTH PANIC GRASS	SEED	-	FACW-	CONTRACTOR SHALL SEED AT A RATE OF 25 LBS/AC. APPLY SHREDDED STRAW AT 2 TONS/ACRE, EXCEPT FOR AREAS WHERE MATTING IS PROPOSED.
	10%	ECHINOCHLOA MURICATA	BARNYARD GRASS	SEED	-	FACW+	
	25%	ELYMUS VIRGINICUS	VIRGINIA WILD RYE	SEED	-	FACW-	
	8%	LOLIUM MULTIFLORUM	ANNUAL RYE	SEED	-	NI	
	30%	UROCHLOA RAMOSA	BROWN TOP MILLET	SEED	-	NI	
	20%	ZIZANIA AQUATICA	WILD RICE	SEED	-	OBL	
		GENERAL STABILIZATION SEED MIX (0.46 ACRES)					
	17%	CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	SEED	-	FACU	CONTRACTOR SHALL SEED AT A RATE OF 25 LBS/AC. APPLY SHREDDED STRAW AT 2 TONS/ACRE, EXCEPT FOR AREAS WHERE MATTING IS PROPOSED.
	25%	ELYMUS VIRGINICUS	VIRGINIA WILD RYE	SEED	-	FACW-	
	10%	LOLIUM MULTIFLORUM	ANNUAL RYE	SEED	-	NI	
	18%	PANICUM VIRGATUM	SWITCHGRASS	SEED	-	FAC	
	30%	UROCHLOA RAMOSA	BROWN TOP MILLET	SEED	-	NI	
		WETLAND PLANTING (0.05 ACRES)					
	4	ACER RUBRUM	RED MAPLE	#1 CONTAINER	24' MIN.	FAC	PLANT DENSITIES BASED ON 400 STEMS/ACRE PLUS MORTALITY. SPACE PLANTS APPROX. 9 FT. O.C. LOCATE PLANTS ACCORDING TO INDICATOR STATUS. DISTRIBUTE PLANTS RANDOMLY AMONG SPECIES.
	4	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	#1 CONTAINER	24' MIN.	FAC+	
	4	LIQUIDAMBAR STYRACIFLUA	SWEETGUM	#1 CONTAINER	24' MIN.	FAC	
	4	MORELLA CERIFERA	WAX MYRTLE	#1 CONTAINER	24' MIN.	FAC	
	4	PLATANUS OCCIDENTALIS	SYCAMORE	#1 CONTAINER	24' MIN.	FACW-	
	4	QUERCUS PALUSTRIS	PIN OAK	#1 CONTAINER	24' MIN.	FACW	
	3	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	#1 CONTAINER	24' MIN.	FACW-	
		LIVE STAKES (300 L.F.)					
	66	CORNUS AMOMUM	SILKY DOGWOOD	LIVE STAKE	3' MIN.	FACW	LIVE STAKES SHALL BE LOCATED IN DOUBLE ROWS AT 3' ON CENTER ON BOTH SIDES OF THE STREAM CHANNEL.
	34	CORNUS AMOMUM	SILKY DOGWOOD	LIVE STAKE	4' MIN.	FACW	
	66	SALIX NIGRA	BLACK WILLOW	LIVE STAKE	3' MIN.	FACW+	
	34	SALIX NIGRA	BLACK WILLOW	LIVE STAKE	4' MIN.	FACW+	

NOTES:
1. PLANTING HOLE SHALL BE OF SUFFICIENT SIZE AS NOT TO CRAMP THE ROOTS.
2. PLANTING HOLE SHALL BE TAMPED WITH FOOT TO SECURE CONTAINER PLANT MATERIAL IN SOIL.



DETAIL: #1 CONTAINER INSTALLATION

NTS



DETAIL: LIVE STAKE INSTALLATION

NTS

PLANTING AND SEEDING NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS OF ALL EXISTING UTILITIES WITHIN THE PROJECT AREA PRIOR TO THE COMMENCEMENT OF PLANTING OPERATIONS.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH WEG THE LAYOUT OF ALL WORK COVERED UNDER THESE PLANS.

3. ALL PLANT MATERIAL, UNLESS OTHERWISE SPECIFIED, SHALL BE UNIFORMLY BRANCHED AND HAVE A VIGOROUS ROOT SYSTEM. PLANT MATERIAL SHALL BE HEALTHY, VIGOROUS, AND FREE FROM DEFECTS, DECAY, DISEASES, INSECT PEST EGGS, AND ALL FORMS OF INFESTATION. ALL PLANT MATERIAL SHALL BE FRESH, FREE FROM TRANSPLANT SHOCK OR VISIBLE WILT. PLANTS DEEMED UNHEALTHY WILL BE REJECTED.

4. ALL PLANT MATERIAL SHALL MEET THE MINIMUM SPECIFICATIONS AND STANDARDS DESCRIBED IN THE CURRENT ISSUE OF "THE AMERICAN STANDARD FOR NURSERY STOCK", PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, 1250 I STREET, N.W., SUITE 500, WASHINGTON, D.C. 20005.

5. ALL CONTAINER STOCK SHALL HAVE BEEN PROPAGATED IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL. CONTAINER STOCK WITH POORLY DEVELOPED ROOT SYSTEMS WILL NOT BE ACCEPTED.

6. PLANTS WILL BE PREPARED FOR SHIPMENT IN A MANNER THAT WILL NOT CAUSE DAMAGE TO THE BARK, BUDS, BRANCHES, STEMS, OR OVERALL SHAPE OF THE STOCK. CONTAINER GROWN PLANTS WILL BE TRANSPORTED IN THE CONTAINERS IN WHICH THEY HAVE BEEN GROWN.

7. PLANTS NOT INSTALLED ON THE DAY OF ARRIVAL ONSITE SHALL BE STORED AND PROTECTED BY THE CONTRACTOR. OUTSIDE STORAGE AREAS WILL BE SHADED AND PROTECTED FROM THE WIND AND SUN. PLANTS STORED ONSITE SHALL BE PROTECTED FROM ANY DRYING AT ALL TIMES BY COVERING THE BALLS OR ROOTS WITH MOIST SAWDUST, WET BURLAP, WOODCHIPS, SHREDDED BARK, PEAT MOSS, OR OTHER SIMILAR MULCHING MATERIAL.

8. NO SUBSTITUTIONS IN SIZE OR VARIETY OF PLANT MATERIAL WITHOUT THE PRIOR APPROVAL OF WEG.

9. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD. NOTIFY WEG OF ANY VARIANCE FROM PLAN.

10. LIVE STAKES SHALL BE INSTALLED DURING THEIR DORMANCY PERIOD.

11. NO PLANTING IS TO OCCUR WHEN THE SOIL IS FROZEN.

12. THE CONTRACTOR MAY BE RESPONSIBLE FOR REPLANTING ANY PLANT MATERIAL INSTALLED WITHOUT APPROVAL BY WEG.

13. HOLES FOR INDIVIDUAL PLANTINGS SHALL BE EXCAVATED TO PRODUCE VERTICAL SIDES AND FLAT BOTTOMS. ALL PLANTING HOLES SHALL HAVE ROUGHED, SCARIFIED SIDES AND BOTTOMS.

14. CONTAINERIZED PLANTS SHALL BE SET IN THE PLANTING PIT AT THE PROPER DEPTH ON TAMPED SOIL. SOIL REMOVED FROM THE PLANTING PIT AND SHALL THEN BE FILLED AROUND THE ROOTS AND TAMPED.

15. DURING PLANTING THE CONTRACTOR SHALL WATER EACH CONTAINERIZED PLANT INSTALLED WITH A MINIMUM OF 1 GALLON OF WATER, UNLESS OTHERWISE DIRECTED BY WEG DUE TO EXISTING SITE CONDITIONS AND SATURATIONS.

16. APPLY SLOW RELEASE FERTILIZER OR AGRIFORM TABLET TO ALL PLANTS AS PER MANUFACTURER'S DIRECTIONS ON LABEL AT PLANTING.

17. THE CONTRACTOR SHALL RESTORE DISTURBED AREAS TO INDICATED FINAL GRADES IF DISTURBED BY THE INSTALLATION OF PLANT MATERIAL.

18. SEED CONTAINING PROHIBITED OR RESTRICTED NOXIOUS WEEDS WILL NOT BE ACCEPTED. SEED SHALL NOT CONTAIN IN EXCESS OF 0.5% WEED SEED.

19. CONTRACTOR TO DETERMINE EXACT AMOUNT OF STABILIZATION SEED MIXES REQUIRED BASED ON ACTUAL DISTURBANCE.

20. PLANTING SHALL TAKE PLACE OUTSIDE THE GROWING SEASON (MARCH 27 - NOVEMBER 12) UNLESS APPROVED BY JAMES CITY COUNTY OR ITS REPRESENTATIVE.

PROJECT MAINTENANCE AND WARRANTY:

1. THE CONTRACTOR SHALL PROVIDE A WARRANTY FOR 100% SURVIVAL OF WOODY STEMS AND LIVE STAKES AT THE END OF EACH COMPLETE GROWING SEASON FOLLOWING PLANTING, VERIFIED BY THE ADMINISTRATOR BY COUNTING EVERY WOODY STEM AND LIVE STAKE, AND 80% SURVIVAL OF HERBACEOUS COVER OF SEEDED AREAS, VERIFIED BY THE ADMINISTRATOR BY VISUAL OBSERVATION OF SEEDED AREAS, THROUGH THE END OF TWO COMPLETE GROWING SEASONS WITHOUT COST TO THE COUNTY.

2. CONTRACTOR SHALL MAINTAIN ALL SEEDED AREAS AND INSTALLED WOODY PLANTS WITHIN THE PROJECT LIMITS UNTIL FINAL ACCEPTANCE OF THE PROJECT BY WEG.

3. FINAL PAYMENT TO THE CONTRACTOR SHALL BE AUTHORIZED, FOLLOWING PLANTING, ONCE A SITE INSPECTION HAS BEEN COMPLETED AND APPROVED BY WEG.

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WILLIAMSBURG ENVIRONMENTAL GROUP, INC.
Environmental Consultants

PLANTING PLAN
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:

DATE:	PLANTING AREA REVISIONS
6/16/11	

DRAWN BY: JMH/GIF
DESIGNED BY: JMH/DLM
DATE: 3/18/11
CHECKED BY: DAP/WDB
SCALE: 1"=30'
SHEET: 8
JOB#: 4424

I:\4400s\4424-Warhill Trail\Stormwater Analysis\Site Plans\CONSTRUCTION PLANS\4424 Warhill Trail Planting Plan (6-16-11).dwg

WATERSHED MAP
SCALE: 1 INCH = 600 FEET

HYDROLOGY NARRATIVE:

THIS GRAPHIC SUMMARIZES THE RESULTS OF THE HYDROLOGIC AND HYDRAULIC ANALYSES AT WARHILL TRAIL DAM. THE PROPOSED CULVERT IMPROVEMENTS ARE IDENTIFIED ON SHEET 3. THE CONTRIBUTING DRAINAGE AREA TO THIS FACILITY IS APPROXIMATELY 1,274 ACRES.

INITIAL HYDROLOGIC MODELS WERE OBTAINED FROM WARHILL TRAIL DAM (PC118) ALTERNATIVES ANALYSIS PREPARED BY THE TIMMONS GROUP IN 2006 , BUT SOME REFINEMENTS HAVE BEEN MADE. THE HYDROLOGIC MODELING HAS BEEN PERFORMED FOR BOTH EXISTING LAND COVER CONDITIONS AND FULL BUILDOUT LANDUSE, CONSISTENT WITH THE MODELING PREPARED WITH THE UPPER POWHATAN CREEK FLOOD STUDY (UPPER POWHATAN CREEK STUDY REVISED FEBRUARY 2011).

TIME OF CONCENTRATION VALUES HAVE BEEN CALCULATED FOR EACH SUBWATERSHED USING THE AVERAGE BASIN SLOPE METHOD RATHER THAN THE TR-55 FLOW SEGMENT METHOD DUE TO THE LARGE DRAINAGE AREA AND SUBSTANTIAL CHANNEL FLOW CONTRIBUTION.

ADDITIONALLY, THERE ARE TWO ADJACENT STORMWATER PONDS LOCATED ON THE WARHILL SPORTS COMPLEX PROPERTY THAT HAVE BEEN INCLUDED IN THE HYDROLOGIC MODEL. PC 105 IS AN UPSTREAM POND THAT FEEDS INTO PC 118. PC 106 IS LOCATED ON THE OTHER SIDE OF THE COMPLEX AND DRAINS TO A TRIBUTARY THAT JOINS WITH THE MAIN CHANNEL AT A DOWNSTREAM CONFLUENCE. AS-BUILT DATA FOR THE RISER STRUCTURE OF PC 105 WAS AVAILABLE FROM COUNTY RECORDS AND USED HEREIN. HOWEVER, AS-BUILT DATA FOR PC 106 WAS UNAVAILABLE, THEREFORE, THE DESIGN CONFIGURATION WAS UTILIZED INSTEAD.

WATERSHED SUMMARY TABLES:

EXISTING WATERSHED CONDITIONS

	AREA (AC)	CN	TC (HRS)
DA 1A	88.96	69	0.850
DA 1B	108.16	73	0.767
DA PC 106	117.12	69	1.133
DA PC 105	224.64	68	1.497
DA PC 118	1049.6	69	1.932

PROPOSED WATERSHED CONDITIONS

	AREA (AC)	CN	TC (HRS)
DA 1A	88.96	76	0.705
DA 1B	108.16	87	0.497
DA PC 106	117.12	97	0.412
DA PC 105	224.64	94	0.627
DA PC 118	1049.6	81	1.363

HYDROLOGIC & HYDRAULIC SUMMARY

HYDROLOGIC SUMMARY	2-YEAR CFS	10-YEAR CFS	25-YEAR CFS	100-YEAR CFS
PC118:				
EXISTING LANDUSE:				
EXISTING STRUCTURE	47.32	176.91	311.99	756.49
PROPOSED STRUCTURE	186.95	298.17	429.7	721.2
FULL-BUILDOUT:				
EXISTING STRUCTURE	146.65	382.12	702.67	1,959.05
PROPOSED STRUCTURE	283.38	511.86	701.03	1,468.19
NODE 1A:				
EXISTING LANDUSE:				
EXISTING STRUCTURE	122.46	304.80	449.79	872.31
PROPOSED STRUCTURE	207.78	428.23	594.26	893.69
FULL-BUILDOUT:				
EXISTING STRUCTURE	285.77	643.12	984.95	2,201.38
PROPOSED STRUCTURE	404.42	820.26	1,162.99	1,798.97
ROUTED PEAK ELEVATIONS (PC118)	2-YEAR FT	10-YEAR FT	25-YEAR FT	100-YEAR FT
EXISTING LANDUSE:				
EXISTING STRUCTURE	46.29	48.10	49.22	50.83
PROPOSED STRUCTURE	43.64	46.10	47.61	49.64
FULL-BUILDOUT:				
EXISTING STRUCTURE	47.79	49.73	50.76	51.79
PROPOSED STRUCTURE	45.79	48.26	49.52	51.18

NOTE: TOP OF ROAD ELEVATION = 50.13 FT (MSL). THE PROPOSED IMPROVEMENTS RESULT IN A REDUCTION IN PEAK WATER SURFACE ELEVATIONS VERSUS EXISTING CONDITIONS. NO OVERTOPPING IS EXPECTED UP TO THE 100 YEAR DESIGN STORM (ALTHOUGH PRESENT UNDER EXISTING CONDITIONS) FOR EXISTING LAND USE CHARACTERISTICS. HOWEVER SLIGHT 100-YEAR OVERTOPPING IS EXPECTED AFTER FULL BUILDOUT, BUT DUE TO THE ROADWAY CLASSIFICATION FOR WARHILL TRAIL, 100-YEAR FREEBOARD WOULD NOT BE NECESSARY FOR THE PROPOSED CULVERT DESIGN. NEARLY 2 FEET OF FREEBOARD IS EXPECTED FOR THE ROADWAY DESIGN STORM (10 YEAR).

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HYDROLOGIC AND HYDRAULIC SUMMARY
WARHILL TRAIL DAM
JAMES CITY COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DANIEL A. PROCTOR
Lic. No. 43834
6/17/11
PROFESSIONAL ENGINEER

REVISIONS:

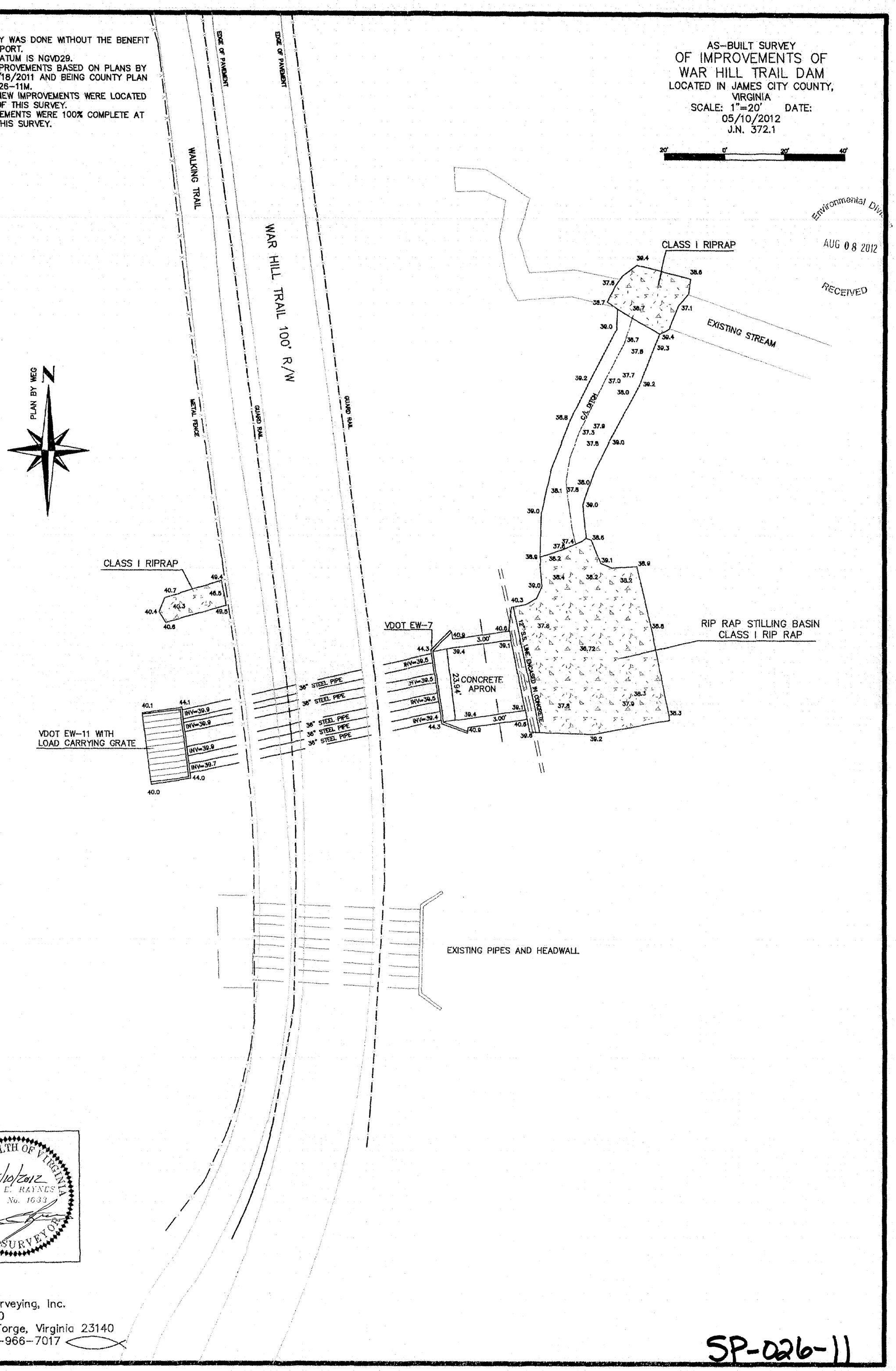
DATE:	
6/17/11	REVISED PER COUNTY COMMENTS

DRAWN BY: CSH
DESIGNED BY: CSH/DAP
DATE: 3/18/11
CHECKED BY: DAP/WDB
SCALE: 1"=600'
SHEET: 9
JOB#: 4424

I:\4400s\4424-Warhill Trail\Stormwater Analysis\Site Plans\CONSTRUCTION PLANS\4424_Warhill Trail_Construction Plans (05-11-11).dwg

NOTES:
1. THIS SURVEY WAS DONE WITHOUT THE BENEFIT OF A TITLE REPORT.
2.ELEVATION DATUM IS NGVD29.
3. EXISTING IMPROVEMENTS BASED ON PLANS BY WEG DATED 3/18/2011 AND BEING COUNTY PLAN NUMBER SP-026-11M.
4. ONLY THE NEW IMPROVEMENTS WERE LOCATED AT THE TIME OF THIS SURVEY.
5. ALL IMPROVEMENTS WERE 100% COMPLETE AT THE TIME OF THIS SURVEY.

AS-BUILT SURVEY
OF IMPROVEMENTS OF WAR HILL TRAIL DAM
LOCATED IN JAMES CITY COUNTY, VIRGINIA
SCALE: 1"=20' DATE: 05/10/2012
J.N. 372.1



COMMONWEALTH OF VIRGINIA
05/10/2012
DEAN E. RAYNES
Lic. No. 1633
LAND SURVEYOR

HIS Land Surveying, Inc.
P.O. Box 100
Providence Forge, Virginia 23140
Phone: 804-966-7017

Environmental Div
AUG 08 2012
RECEIVED

SP-026-11
PC-118

Carl M.
HENSHAW
Drainage Products Inc.
Since 1998

13300 RAMBLEWOOD
P.O. Box 3329
CHESTER, Va. 23831

Phone: 804-706-1313
Fax: 804-706-1330

RECEIVED ON
AUG 12 '09
Stormwater Division

Fax

To:	Spotswood Johnson	From:	Gary Potter
Fax:	757-259 5833	Pages:	3
Phone:		Date:	8/12/2009
Re:	WARHILL DAM	CC:	

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• Comments:

Here are the shop drawings you requested.

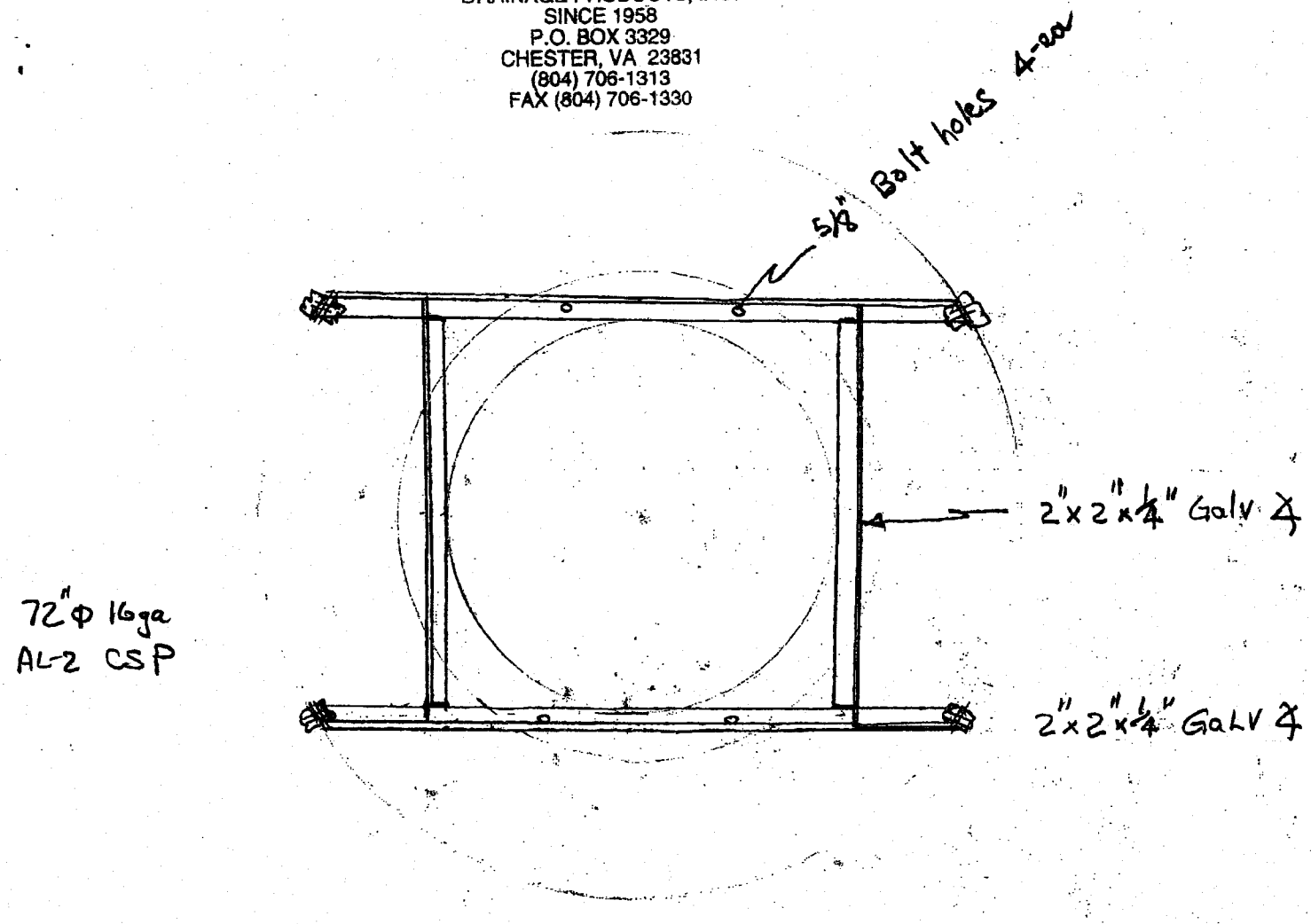
I tweaked Mr Bass's drawing

(1) changed the support steel mounting to the riser from 1¼" x 1¼" x ¼" to 2" x 2" x ¼"

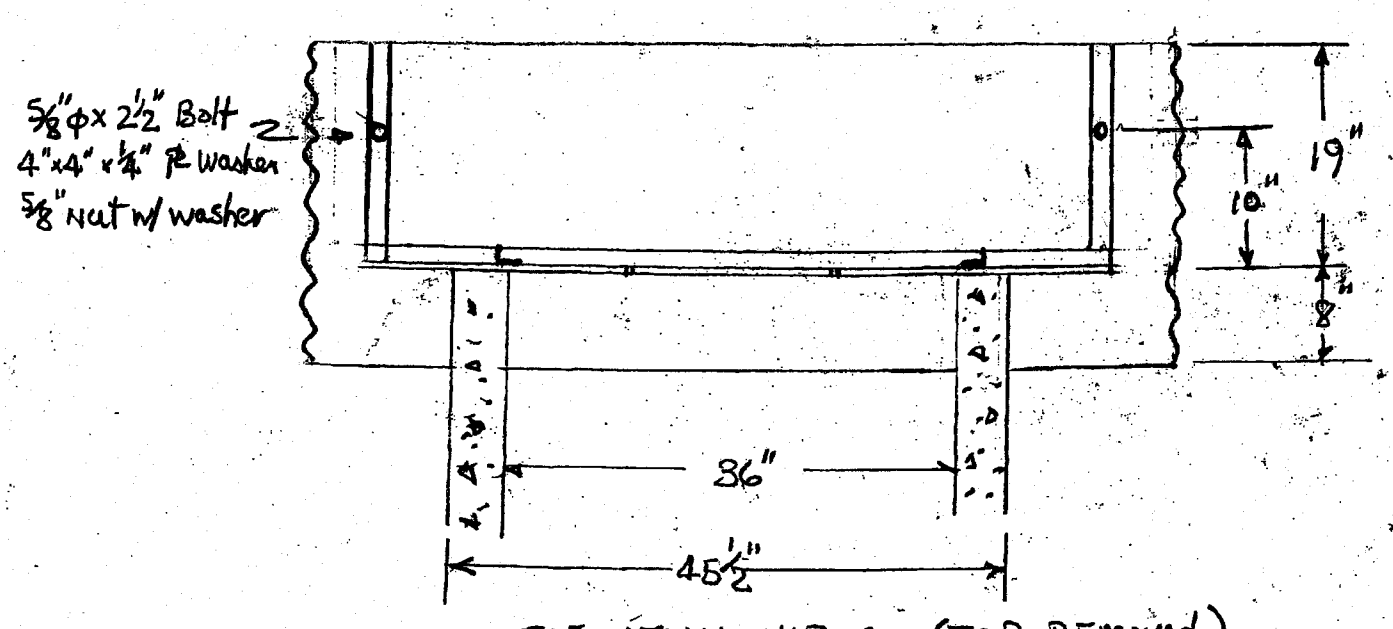
(2) Made the assembly 2pc by having the mounting frame separate from the 72" CSP. CSP would be bolted to the frame after the frame is mounted to the 36" RCP.

You'll need to provide the anchor bolts for attaching to RCP. We'll provide the fastners & plate washers for attaching the 72" CSP to the frame.

CARL M. HENSHAW
DRAINAGE PRODUCTS, INC.
SINCE 1958
P.O. BOX 3329
CHESTER, VA 23831
(804) 706-1313
FAX (804) 706-1330



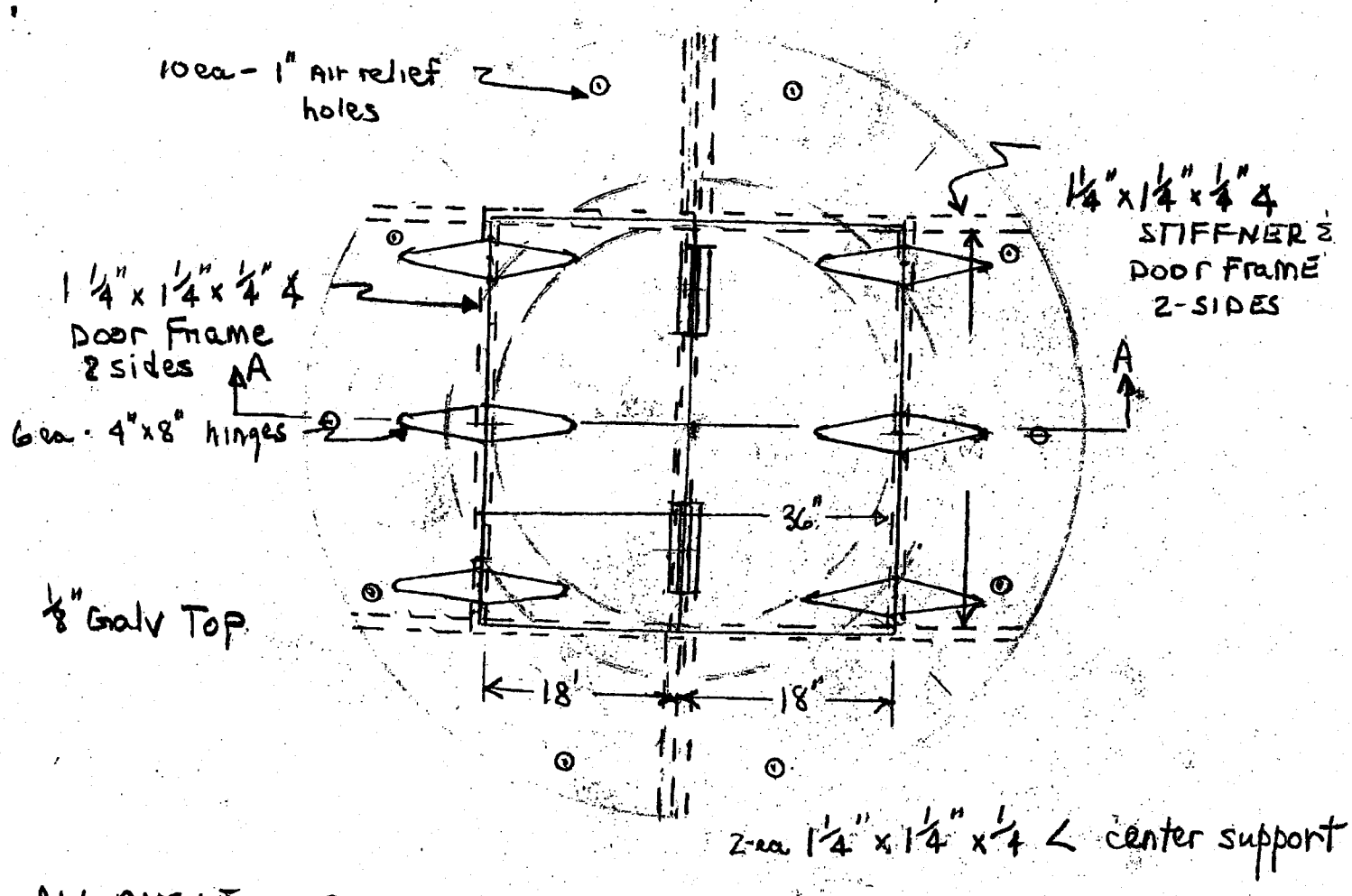
Top VIEW (Top Removed)



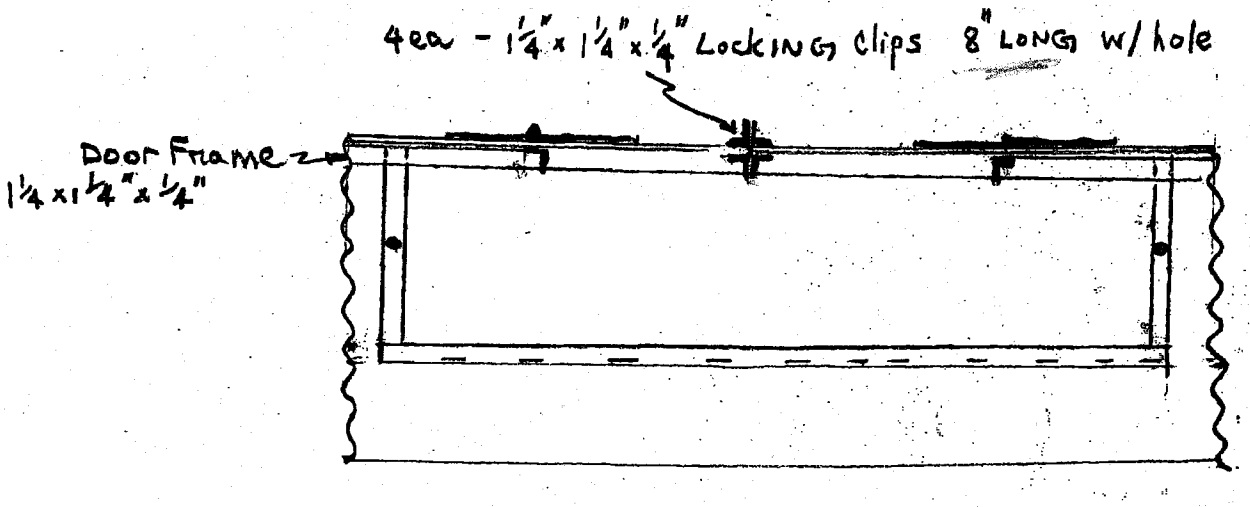
ELEVATION VIEW (TOP Removed)

WARHILL DAM

8-12-09



1) ALL ANGLE IS GALV.
2) WELDS PAINTED WITH COLD GALV.



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WARHILL DAM 8-12-09

Warhill

A. 1. From Entrance to Powerline

2. Adjacent to powerline from entrance rd. to high pt. before Longhill Swamp
60' wide x ~~4000~~ 2500 = 3.4

3. From Powerline southwest to ex. large pond - across dam circle back to south east & joins with road from powerline making a loop.
50' x 5700 + 5000 x 50' = 6.5 + 5.7
TOTAL 15.6

B. Clearing -
100 x 2400 = 240,000 = 5.5

A-4	60ac
A-2	39ac
C-3	6ac
D-1	9ac
	114ac

WARHILL

- E&S - SWM
- from Dr. Study.

node 1030

Subbasins - 10, 15, 30, 90, 100, 110

Ex 2 yr - 135.4 cfs

Ult 2 yr - 338.7 cfs

Ult Dev.

10 - 857.7 cfs

25 - 1275.9 cfs

100 - 1761.7 cfs

w/ OPTION B CONTROLS - 128.5 cfs

SITE 3 - on site - expand

SITES 1 (1A), 2, 3, 4, 5, 6 all above Beaver Pond

	2 YR Rel.	10 Yr Rel	STOR. VOL
SITE 1 -	25	60	36
2 -	20	50	24
3 -	10	15	19
~~4 -~~	~~10~~		
5 -	$10	35	14
6 -	30	60	26

RICKMOND ENGINEERING, INC.
208 C Packets Court
WILLIAMSBURG, VIRGINIA 23185
(804) 253-2233

JOB 87169
SHEET NO. 71 OF 82
CALCULATED BY RCS DATE 17 Dec 87
CHECKED BY DATE
SCALE

2 YR RUN — FOR

elev - ~~584~~ 46.3
Release 133.2 ✓
ACFt - 50.9 ac ft.

10 YR RUN —

Release - 297.7 cfs
Depth - 47.5
Stor - 100.8

25 YR RUN -

Release - 440.3
Depthe - 48.4
Stor - 138.7

100 YR

Release - 584 cfs BEAVER LAKE DAM
Depth - 49.1 DESIGN
&
Storage - 166.8

Design - ok

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(804) 875-1785

JOB 88169 WARHILL E&S
SHEET NO. 72 OF
CALCULATED BY RCS DATE 2/12/88
CHECKED BY DATE
SCALE NTS

Primary spillway (EXISTING) will handle approximately 35 CFS. Flow rate for two year storm is 129 CFS design spillway for (129 - 35 = 94 CFS)

use 20 ft wide spillway to start:

$$Q = C_s b H^{3/2} \quad \therefore \quad H = \left(\frac{Q}{C_s b}\right)^{2/3}$$

$$= \left(\frac{94}{4(20)}\right)^{2/3}$$

$$= 1.11 \text{ ft}$$

Design Auxillary spillway for 10 year storm which is 365 CFS. Again primary (existing) spillway handles approximately 38 CFS

∴ Design auxillary spillway for (365 - 38 = 327 CFS)

First use the same spillway as above

@ a 2.7 ft depth: $Q = C_s b H^{3/2} = 4(20)(2.7)^{3/2}$

$$= 355 \text{ CFS}$$

USE 3.0 X 20 BOX CULVERT

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JOB 88169 WAKHILL E&S
SHEET NO. 73 OF
CALCULATED BY RCS DATE 2/12/88
CHECKED BY DATE
SCALE NTS

* DESIGN DATA

$Q_2 = 129$ CFS

$Q_{10} = 365$ CFS

$L = 52'$

$S = 0.0882$ FT/FT

H_M 4.07' (CULVERT INVERT TO 1' BELOW CREST OF EMBANKMENT)

CALCULATE USE PL4A W/ 5' W x 3' H OPN'GS OF CONCRETE.

* FIND HW
USING INLET CONTROL NOMOGRAPH (VDOT)

W/ D = 3 $\frac{Q_{10}}{B} = \frac{365}{20} = 18.25$

$\frac{HW}{D} = 1.31$ HW = 3.93' < 4.07' OK

* ASSUME TW = 1.5' FOR OUTLET CONTROL

$d_c = .315\sqrt[3]{(Q/B)^2} = 2.11'$ from chart 15

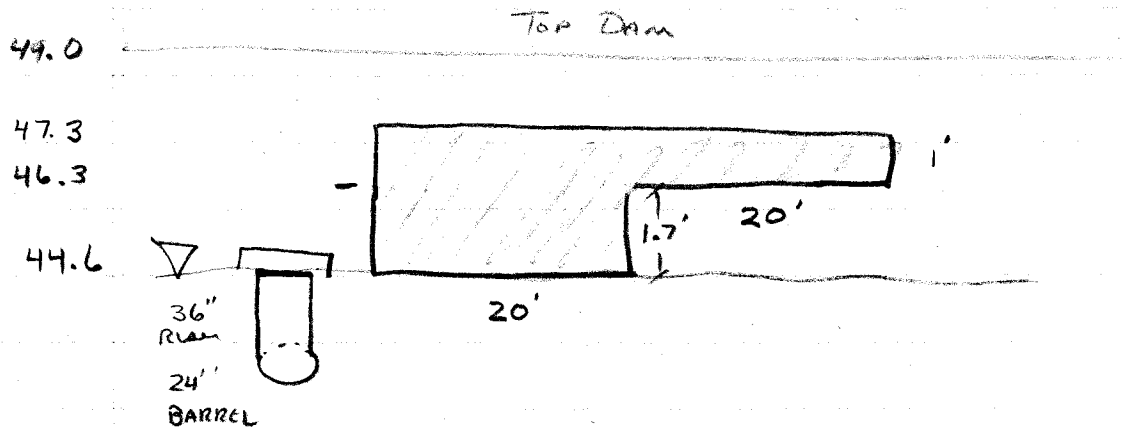
D = 3 $h_o = \frac{2.11+3}{2} = 2.56'$

H = .87 (from chart & Nomograph)

$HW = 2.35 + 2.56 - 52(.0886)$
$= 0.3' < 3.93'$ inlet control

INLET CONTROL GOVERNS

Design



WARHILL - BEAVER POND

STORM FLOWS

2 YR

Ex + W.H.	BASELINE	EXISTING FLOW-CDM	FUTURE #3 -CDM	DETETION OPTION B	CONSULTANT Ex.	CONSULTANT FUT	B.P. w/ 24" PIPE & 35' E.S. @ elev. 45.6 -
317	114.	135	339	128	71	82	127 EL = 46.7

use 20' Box Culvert Q_2 out = 128.7 elev - 46.3

10 YR

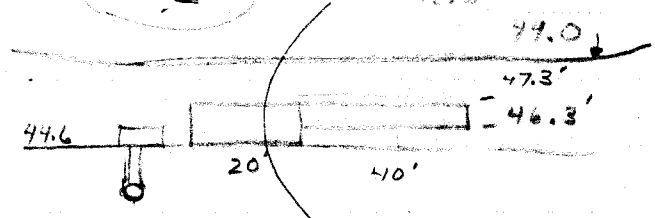
Ex + W.H.	POW CK. STUDY	EXISTING FLOW	FUT. #3 CDM	CONSULTANT Ex.	CONSULTANT PROP.	B.P. w/ 24" PIPE, 35' E.S. - 45.6 50' E.S. - 46.6
626	374	422 500	857	225	250	402 - EL. 47.5

Q_{10} OUT = 365.5 elev. 47.3 top = 47.9 91.8 ac ft.

30 @ 46.3 Q_{10} OUT = 351 elev. 47.4

100 YR.

Ex + W.H. Dev	POW CK. STUDY	EX. -CDM FLOW	FUT #3 CDM	Consultant Ex	Consultant PROP	W/ Top @ 49.0 + 40' E.S.
1204	705	1081 1100	1761	—	562	846.2 48.6



w 30' E.S - elev 48.8 Q = 815

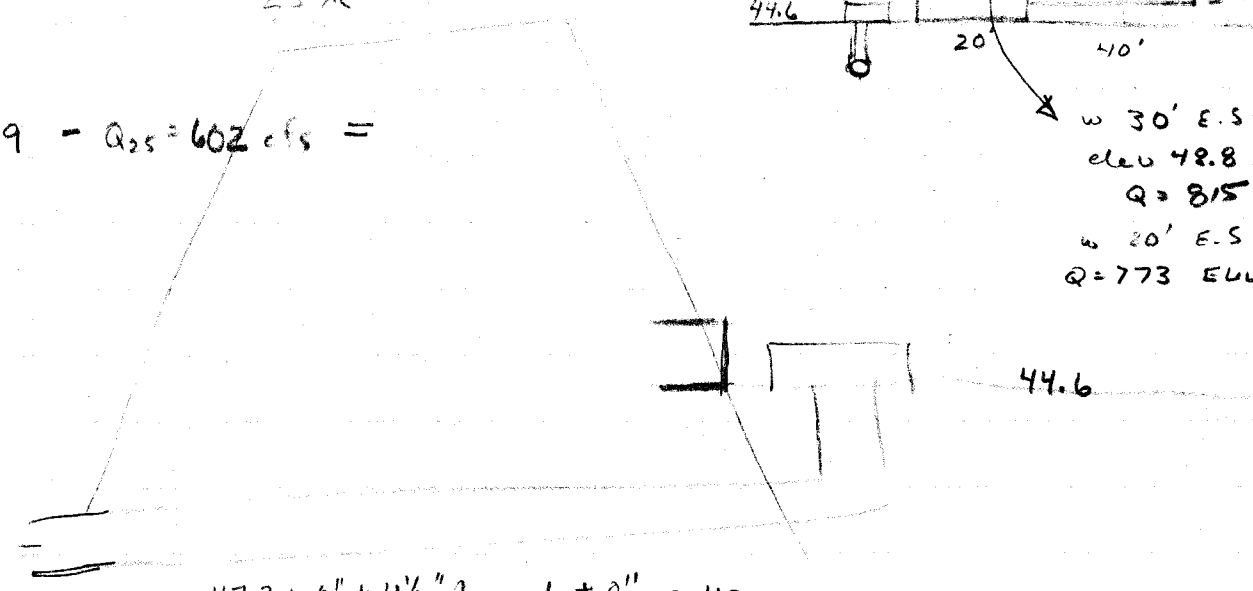
w 20' E.S - Q = 773 ELEV = 49.0

Ex + WH 25 YR

884

25 YR 47.

- 47.9 - Q_{25} = 602 cfs =



47.3 + 8" + 4½" Pavement + 8" = 49.0

WARHILL BP -

RUN w/ SCENARIO 1

FILE - INPUT LAND USE - WHBPS1.DAT

WHBPS100.OUT

RUN W/ EXISTING FLOWS

WHBPEX.DAT

WHBPE100.OUT

10 -	EX CN -	SCEN 1	SCEN 2	SEN 3	USE	
10 -	69	79	81	84	80 ✓	
15 -	68	78	78	79	78 ✓	
30 -	65	74	77	80	74 ✓	
90 -	69	75	75	75	75 ✓	
100 -	71	79	79	79	76 ✓	1/3 ac lot's
110 -	63	72	72	73	72 ✓	

RUN WATERSHED w/ OPTION B

STLINK - 10 YR.

1) SCENAR3.DAT - INPUT DATA FILE - LAND USE
2) SCEN3OPB.OUT - OUTPUT FILE
3) OPTB.DT2 - ROUTING FILE
4) SCEN3OPB.BIN - EXTRAN FILE

10 YR. EXTRAN

1) FINWCRX.DAT
2) SCEN3BS .OUT
3) SCEN3OPB.BIN
4) SCEN3BDE.OUT

	10 YR EXISTING w/ ~~BASINS~~	10 YR SCEN3-UNCONT.	100 YR EXIST	100 YR SCEN3-UNCONT
1000	190	336.8	402	567
1010	172	324	381	545
1015	145	290	350	528
1020	249	485	638	960
1110	180.1	357	367	685
1025	389	776	975	1584
1030	422	857	705 1081	1761

374 cfs Pow. Cr. - 250 cfs - Rick

Pow Cr. Rick - 562

25 - 6.5 Must Pass 50 YR - w 0 freeboard.

50 - 7.3

100 - 8.0

25 YR - SCENARIO 3 671.5 cfs out - elev 47.9 119.2 Ac-ft.

25 YR - EXISTING w/ Warhill 477.4 - elev 47.7 106.7 Ac ft.

PASSES - 25 + 0.2' freebd.

_ 5 _ _ 4

NODE	Ex. 2YR	FUT #3 Uncontrolled	WARHILL OPT B	RUN #1 w/ 24"-44.6 E.S.-45.6 Musk- 0.015 0.19	RUN #2 w/ same Musk 0.03 0.19	RUN #3 w/ same Musk 0.025 0.19	RUN #4 w/ same Musk [illegible]
1000	71.4	185.1	23.4		191		
1010	60.7	168.7	23.5				
1015	51.0	139.5	23.4				
1020	82.9	220.1	52.2	190.	126	152	161
1110	77.7	184.5	140.5		195	195	195
1025	125.4	313.6	104.0	324	246	265	289
1030	135.4	338.7	128.5 ✓	363	251	282	317
			K x	B.P. EL. 46.6	BP EL 46.5	EL 46.5	EL 46.5
— calibrated for Muskingham			0.02; 0.19	161s	141.9 - 5.28A.	148.6 5.28	155.3 5.28A

TRY ADD 24" PIPE - $Q = C1 \cdot A \cdot \sqrt{2gH} =$

24" = 3.14

1' = $\frac{128.5}{.75 \times \sqrt{64.4}}$ = 21.3 Ft²

$Q = .75 \times 3.14 \times \sqrt{64.4 \times 2}$ = 26.7 cfs x [illegible]

Top Rd - 47.87

2' = $\frac{128.5}{.75 \times \sqrt{128}}$ = 15.1 Ft²

	Q2	MAX Depth	Ac-Ft
E.S. @ 45.6 w/ 48" Pipe -	164.8	46.4	56.3
E.S. @ 46.6 w/ 48" Pipe	90.8	46.9	74.2
w/ 66" Pipe	99.0	46.8	69.6
w/ 10' weir	105.9	46.8	69.9
w/ 13' weir	114.1	46.7	66.6
* w/ 16' weir E.S. @ 45.6 - L=30	121.3	46.6	62.4
w/ 24" Pipe E.S. @ 45.6 - L=35	118.6	46.7	68.0
w/ 24" Pipe E.S. @ 45.6 - L=35'	127.0	46.7	66.1
	Q10		
w/ 24" pipe E.S @ 46.6 - 35'	292	47.6	103.3
"	Q100 1082.6	48.4	135.2
E.S @ 45.6 L=35' w/ 24" Pipe - 46.6 - 50'	Q10 402	47.5	100.6
100	Q100 1087	48.3	132.9
100 YR. SCEN. 1	Q100 - 1037	48.3	131.6
100 YR. EXISTING	Q100 814	48.1	125.9

= 32 SF. - 2 - 48" Pipes - 10 24" Pipes or

Use 24" Pipe w/ 35' E.S., -1' deep

Q10 - Ex. 422.

10 YR.

100 YR.

DESIGN

- 24" Barrel - 36" Riser 44.6
- 35' Prin - Weir 35' @ 45.6
- 50' Secon. Weir 50' @ 46.6
- over road - 100 YR.

WARHILL TRACT 8/7/94
POND EVALUATION

POND NEAR WATER TOWER AT SEASONS TRACE, TOP OF RIZER PIPE IS CLOGGED (PARTIALLY) I OPENED IT AS BEST I COULD. IT NEEDS A TRASH RACK (ANTI-VORTEX) DEVICE INSTALLED AND A EMERGENCY SPILLWAY PIPE CULVERT INSTALLED.

* BEAVER POND - THE TRASH RACK IS OFF AND SITTING UP ON THE EMBANKMENT NEAR BY. RIZER PIPE IS CLOGGED FROM DEBRIS FROM BEAVERS. EMERGENCY SPILLWAY PIPES ARE SERVING AS A DRAIN DOWN. THE OUTFALL IS UNDERMINED AND WASHED OUT SOMEWHAT. RIPRAP COULD BE USED TO FILL IN THIS AREA.

UPPER POND UPSTREAM FROM BEAVER POND DOESN'T SEEM TO HAVE ANY PROBLEMS. RIZER PIPE IS IN WITH TRASH RACK AND NO PROBLEMS WITH THE OUTFALL

* THE LAST SEVERAL TIMES THIS PIPE HAS BEEN CLEANED OUT - RICHARD GARRETT JAMES CITY COUNTY FIREFIGHTER DID THE WORK. I SPOKE TO HIM ABOUT IT. HE ESTIMATES ABOUT 4 HRS WORK TO CLEAN IT OUT.

RICKMOND ENGINEERING, INC.
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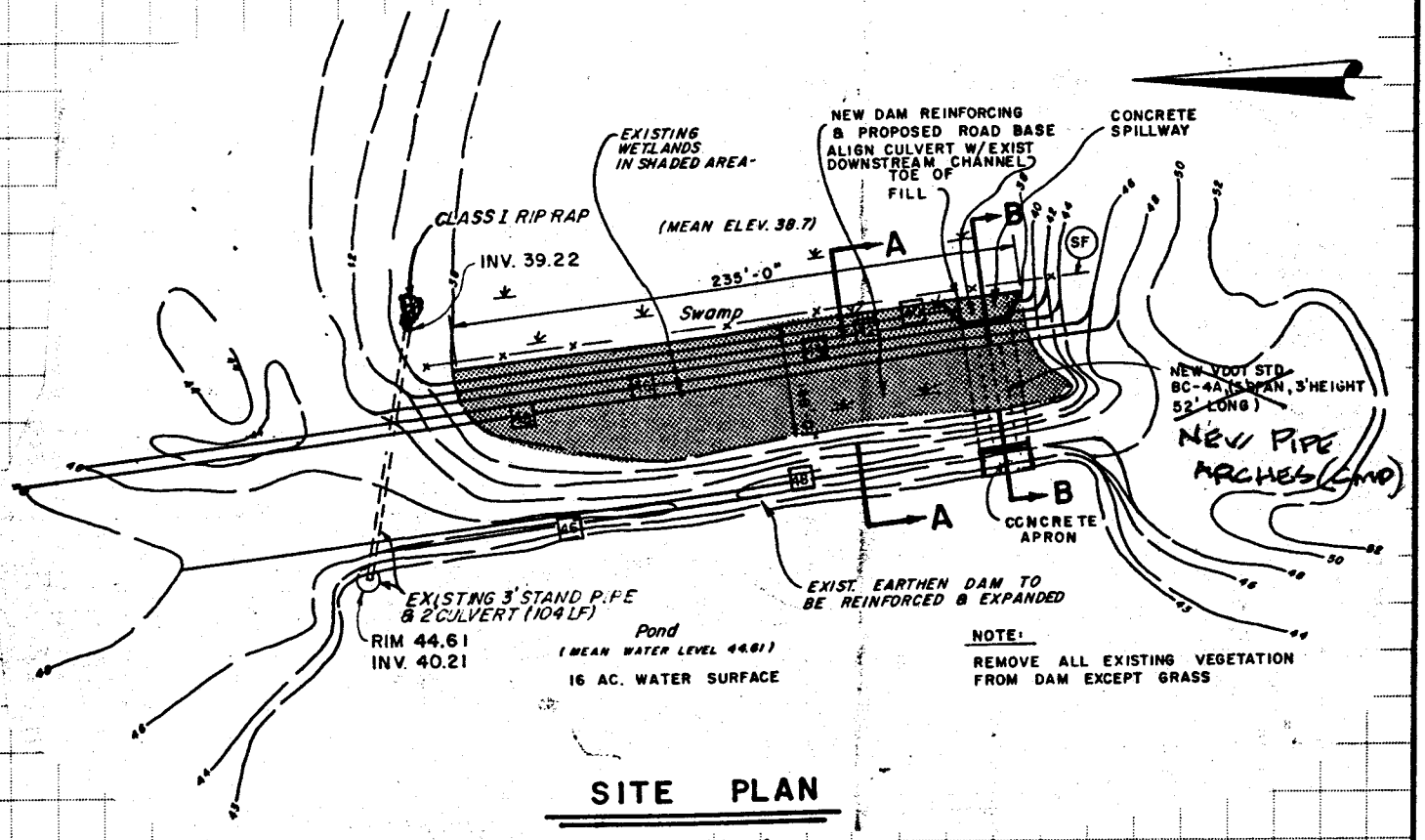
(804) 875-1785

JOB VARHILL E&S (87169)
SHEET NO. 1 OF
CALCULATED BY RCS DATE 8-8-88
CHECKED BY DATE
SCALE NTS

VARHILL TRACT - BEAVER LAKE DAM

DESCRIPTION: Redesign spillway @ developers direction to construct pipe arch system in lieu of concrete box culverts.



SITE PLAN

SCALE: NTS

Total flow to be passed by spillway = Q50 = 250 to 300 cfs (per Daryl Cook of JCC Code Compliance).

RVS'D 12/2/88
RVS'D 12/15/88

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JOB 87169 WARHILL E&S
SHEET NO. 2 OF
CALCULATED BY KMJ DATE 12/2/88
CHECKED BY RCG DATE 12/3/88
SCALE NTS

Determine Culvert size for Beaver Lake Dam

Inlet Control Assumed:
Free Outfall + TW=0, use multiple 42" CMP

$A = 9.62 ft^2$
$C_d = .62$
$H = 4'$

$Q = C_d A_o \sqrt{2gH}$

$= .62(9.62)\sqrt{2(32.2)(4)}$

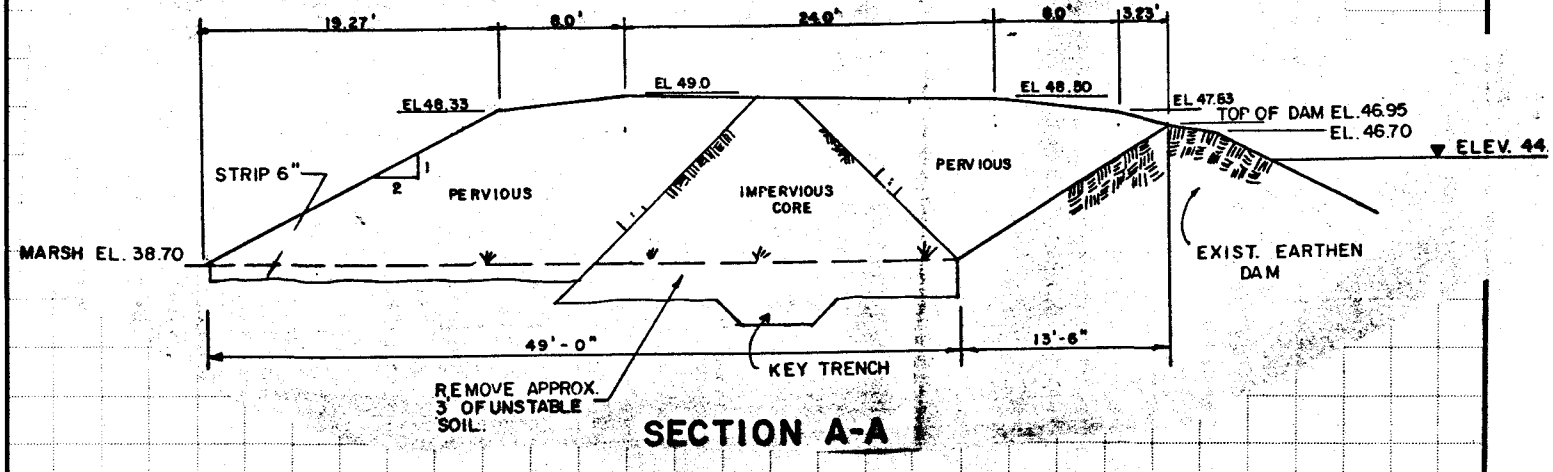
using Steel Pipe HDBK
42"ϕ PIPE NETS 60CFS = 95.7cfs/pipe

Use 5 ~~8~~ 42" CMP with
total capacity of ~~287~~ 300 cfs OK
Rel

$\frac{Q_{60}}{Q_{full}} = \frac{260}{287} = .91$

$r = \frac{9.62}{11.00} = (.87)(1.12) = .97$

$V = \frac{1.49}{.024}(.97)^{2/3}(.088)^{1/2} = 18.0 fps$



SECTION A-A

Rev'd 12/15/88 DCG

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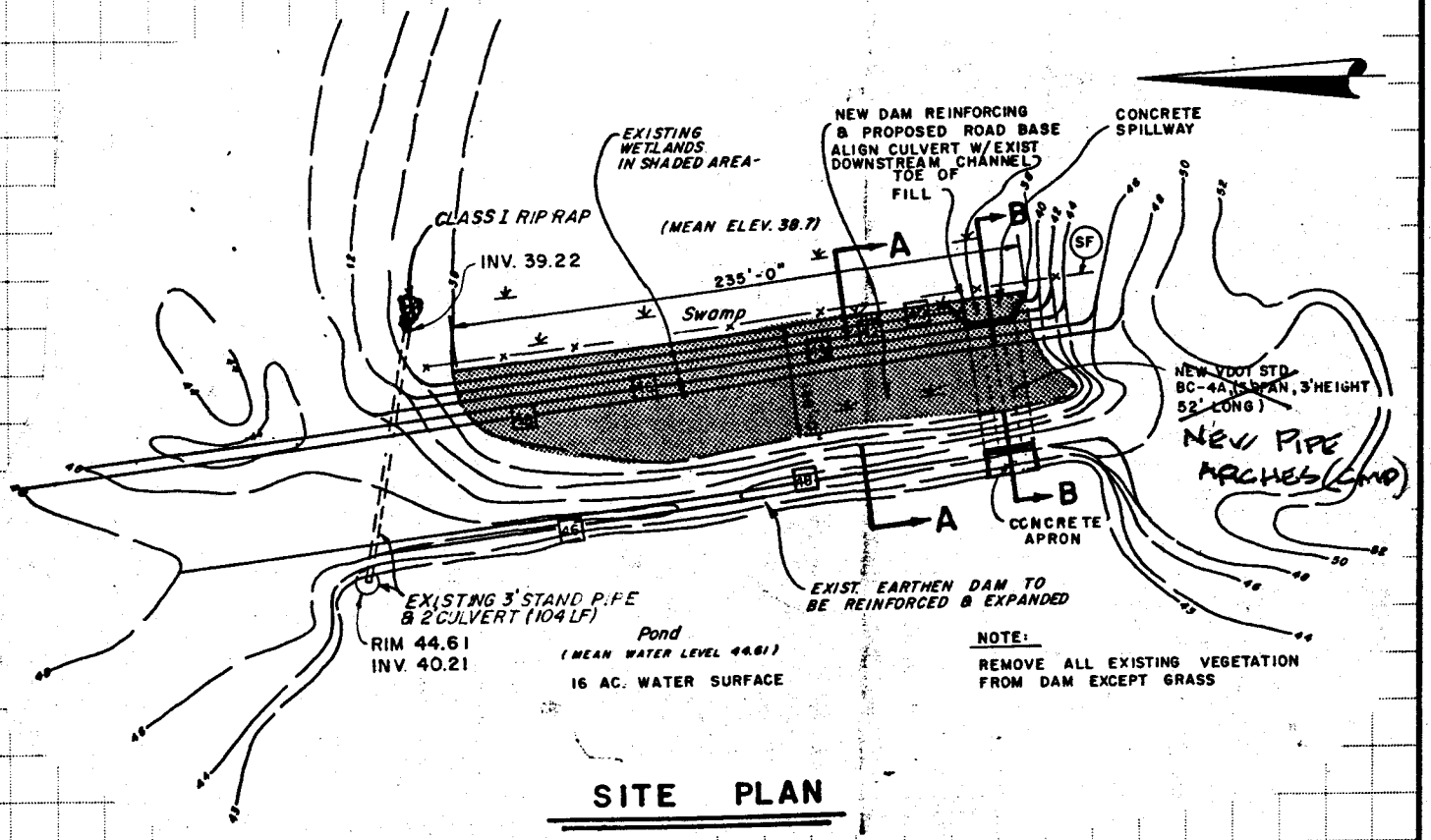

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RVS'D 12/2/88
RVS'D 12/15/88

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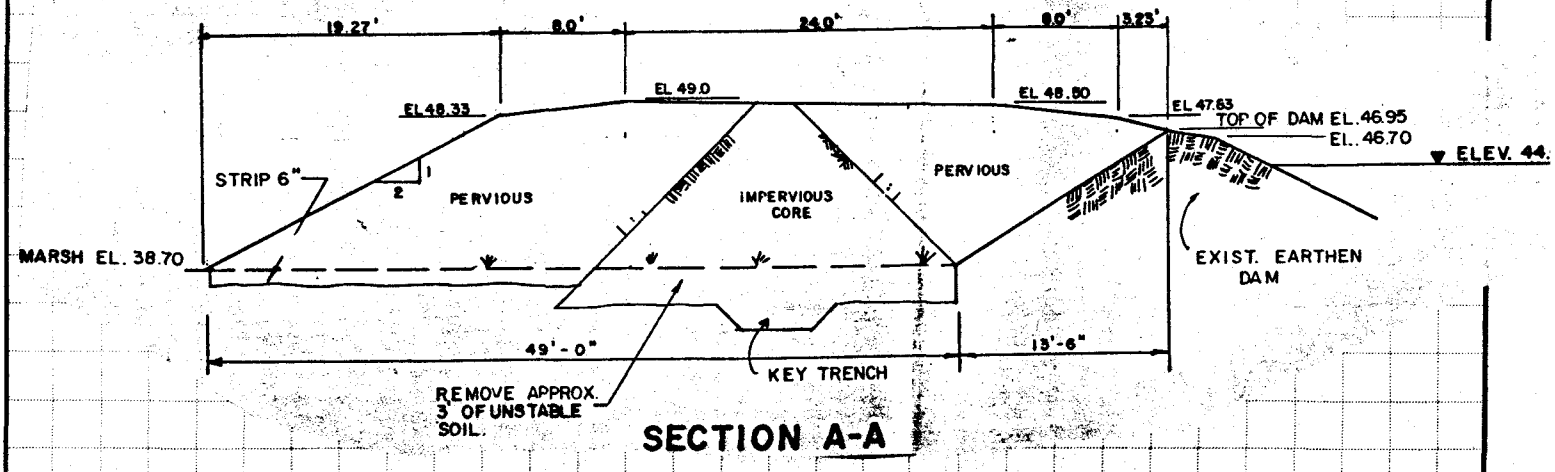
42"ϕ PIPE NETS 60CFS = 95.7cfs/pipe

Use 5 ~~8~~ 42" CMP with
total capacity of ~~287~~ 300 cfs OK
ref

$\frac{Q_{50}}{Q_{full}} = \frac{260}{287} = .91$

$r = \frac{9.62}{11.00} = (.87)(1.12) = .97$

$V = \frac{1.49}{.024}(.97)^{2/3}(.088)^{1/2} = 18.0 fps$



SECTION A-A

Rev 12/12/88 DCG

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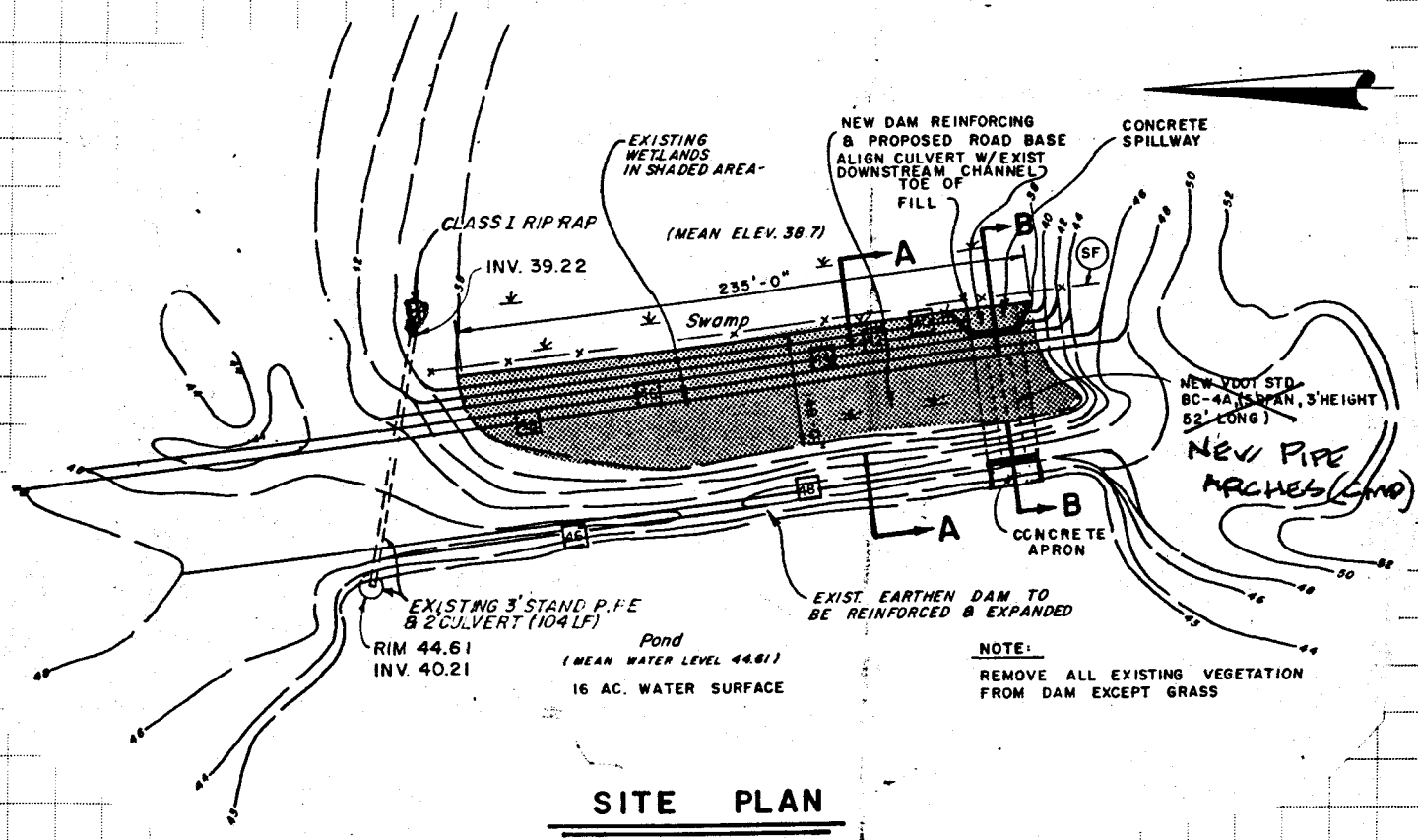

SITE PLAN

SCALE: NTS

Total flow to be passed by spillway = Q_{50} = 250 to 300 cfs (per Daryl Cook of JCC Code Compliance).

RVS'D 12/2/88

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$C_d = .62$
$H = 4'$

$$Q = C_d A_o \sqrt{2gH}$$
$$= .62(9.62)\sqrt{2(32.2)(4)}$$
$$= 95.7 cfs/pipe$$ – only 70 cfs/pipe

Use 3 - 42" CMP w/ivl.
total capacity of 287 cfs OK

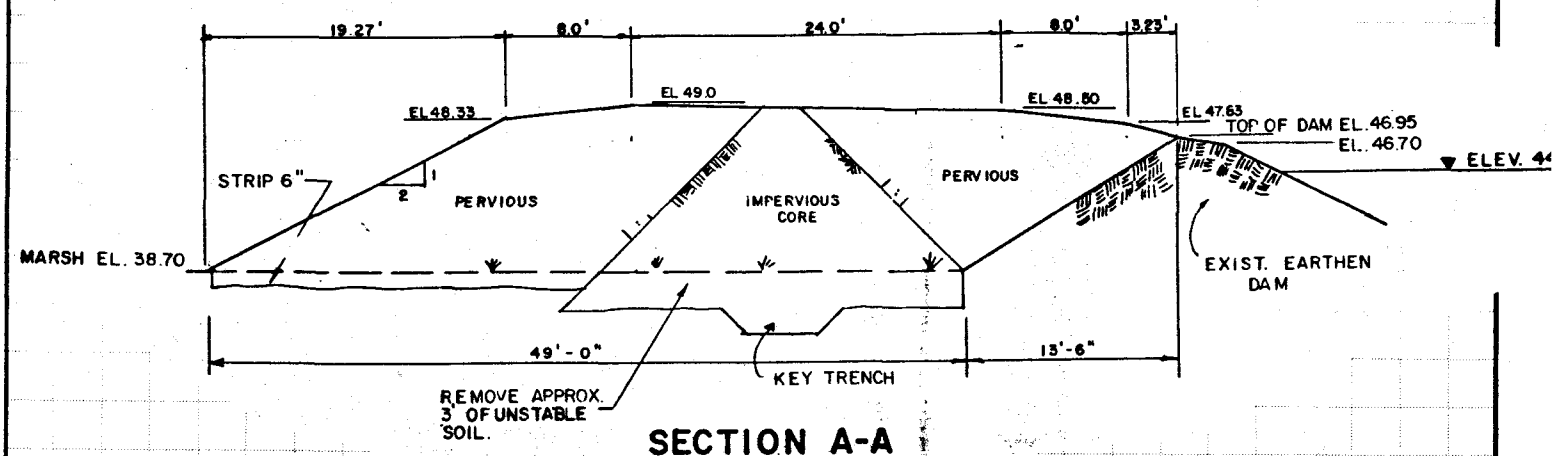
EXISTING WEIR = 20'
$Q = CLH^{3/2} = 2.7 \times 20 \times (4.5)^{3/2} = 515 cfs$

$$\frac{Q_{80}}{Q_{full}} = \frac{260}{287} = .91$$

Need $\frac{5}{\cancel{4}} \times 70 =$ ~~280 cfs~~ 350 cfs – computer runs.
25 Year Storm – Pond need to pass 440 cfs
need 24" Pipe = 40 cfs → 400 cfs thru emerg.
need 6 - 42" pipes

$$r = \frac{9.62}{11.00} = (.87)(1.12) = .97$$

$$V = \frac{1.49}{.024}(.97)^{2/3}(.088)^{1/2} = 18.0 fps$$



SECTION A-A

RICKMOND ENGINEERING INC.
1643C MERRIMAC TRAIL (804) 875-1785
WILLIAMSBURG, VA 23185
(804) 229-1776

LETTER OF TRANSMITTAL

TO James City County
Po Box JC
Williamsburg VA 23187

DATE 15 Dec 88 JOB NO 87169
ATTENTION Daryl Cook
RE: Beaver Lake Dam
Road
Warhill Tract

WE ARE SENDING YOU [✓]ATTACHED [ ]UNDER SEPARATE COVER VIA _____
THE FOLLOWING ITEMS:
[ ]SHOP DRAWINGS [ ]PRINTS [ ] PLANS [ ]SAMPLES
[ ]SPECIFICATIONS [ ]COPY OF LETTER [ ] CHANGE ORDER
[ ] _____

RECEIVED 12-15-88

COPIES	DATE	NO.	DESCRIPTION
3	RVSD 12/13/88	1	SHEET 3
3	RVSD 12/15/88	2	SPILLWAY CALCULATIONS

THESE ARE TRANSMITTED AS CHECKED BELOW:

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[ ]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 _____ 19___ [ ]PRINTS RETURNED AFTER LOAN TO US

REMARKS Daryl, Per our telecon on 12/13/88 I am sending you revised plans & calculations adding two more 42" ϕ cmpte spillway.

COPY TO _____ SIGNED Ralph C Simmons PE

RICKMOND ENGINEERING INC.
1643C MERRIMAC TRAIL (804) 875-1785
WILLIAMSBURG, VA 23185
(804) 229-1776

LETTER OF TRANSMITTAL

DATE 5 Dec 88 JOB NO 87169

TO James City County Code Compl.
Po Box JC
Williamsburg VA 23187

ATTENTION Mr Daryl Cook, P.E.

RE: Varhill E&S
Chg to Beaver Lake
Dam Spillway

WE ARE SENDING YOU [✓]ATTACHED [ ]UNDER SEPARATE COVER VIA _____
THE FOLLOWING ITEMS:
[ ]SHOP DRAWINGS [✓]PRINTS [ ] PLANS [ ]SAMPLES
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3	RVS'D 12/5/88	1	Sheet 8 only
3	RVS'D 12/2/88	2	Calculations

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[ ]FOR BIDS DUE _____ 19___ [ ]PRINTS RETURNED AFTER LOAN TO US

REMARKS Daryl, Sorry it's taken me this long to get you the revision. Let me know if you require add'l copies of plans and calculations. Thank you for your support.

COPY TO _____ SIGNED Ralph Simmons P.E.

P.S. Ref Toano Woods - requested contractor provide me chgs to plan again, ASAP.

WARHILL BEAVER POND 12/12/88

1. Ex. Watershed Conditions - w/ 6 - 42" Pipes
   - 25 Yr Storm MAX Q_{OUT} = 487.3 cfs Depth = 47.9'
   1097.23 - 100 Yr Storm MAX Q_{OUT} = 665.5 cfs Depth = 49.0'

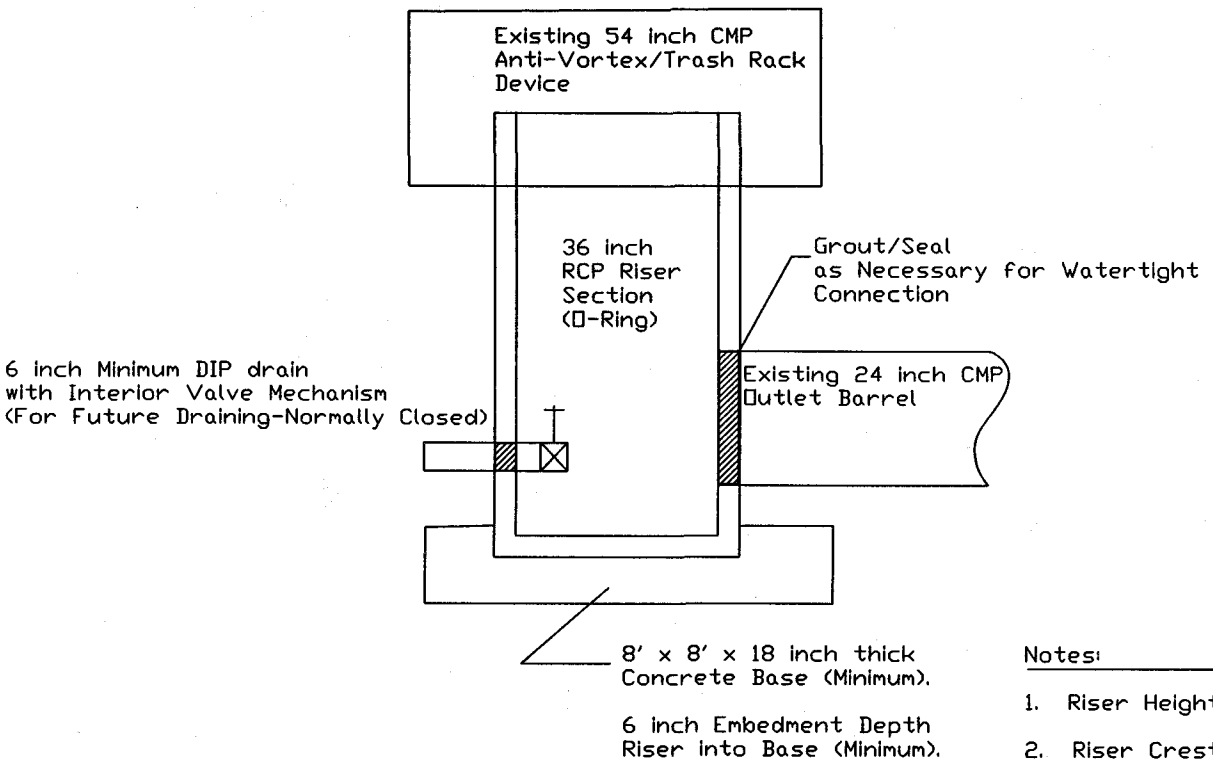
2. Scenario 3 - Watershed Conditions w/ 6 - 42" Pipes
   913 cfs - 25 Yr Storm Max Q_{OUT} = 510 cfs Depth = 48.0
   1239 * - 100 Yr Storm Max Q_{OUT} = 682 cfs Depth = 49.1
   * WHILBP.DAT & WHBPMOD.RTE

3. Scenario 3 - Watershed Cond. w/ 5 pipes - 42"
   913 - 25 yr Storm Max Q_{OUT} = 465.1 cfs Depth = 48.3

Need to provide 5 - 42" pipes.

PC 118 – RISER RETROFIT DURING JCSA SEWER WORK

INFO:
RIM EL. 44.6
INV EL. 40.21
NP 44.61
AREA POOL = 16 AC. ±
DA = 297 AC.



Notes:

1. Riser Height to Match Existing Height.
2. Riser Crest Elevation to Match Existing.
3. All Pipe Diameters and Invert Elevations to Match Existing.
4. Opening Area Between Anti-Vortex/Trash Rack Device and Riser to Match Exsiting to the Greatest Extent Possible.
5. Riprap Outlet Protection at Downstream End of Existing Barrel Must Be in Place Prior to Removal of Existing Riser Structure.
6. Clean and Paint Anti-Vortex/Trash Rack Device prior to Connection to Concrete Riser.
7. Securely Anchor Anti-Vortex/Trash Rack Device to Concrete Riser.
8. Install Erosion and Sediment Control prior to Work Activities.
9. Clean all woody debris within 15 ft. of Riser.

Watershed Services

Inspection Report

Warhill Trail Dam

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RECOMMENDATIONS **13**
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- Primary Spillway 13
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- Earthen Embankment 14
- Gate Valve 14

Background

Company

Representative: Cameron J. Smith
Watershed Services, Inc.
P.O. Box 2889
Mechanicsville, VA 23116
Phone: (804) 798-6995
Fax: (804) 798-7259
Toll Free: (888) 957-3036

Client

Representative: Mike Claud
Timmons Group, Inc.
1001 Boulders Pkwy, Suite 300
Richmond, Virginia 23225

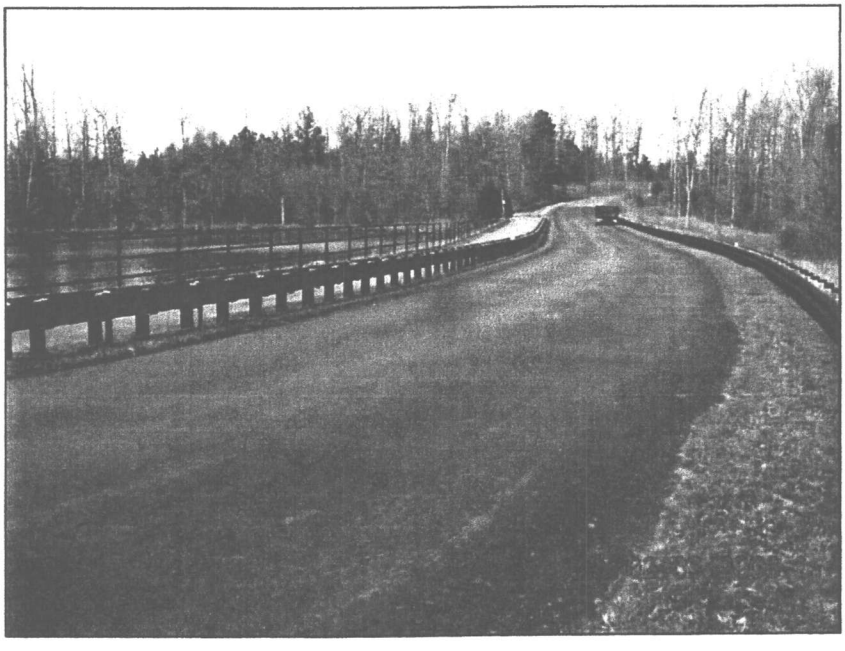


Figure 1 - Warhill Trail Dam- looking across dam towards left abutment

Site Conditions

Date of Dive Inspection:	Friday, February 3, 2006
Location:	Warhill Trail Dam, James City County
Weather:	65 degrees Fahrenheit, sunny, clear
Duration of Inspection:	3 hours, 30 minutes

Scope of Work

Watershed Services was contracted to perform an inspection on Warhill Trail Dam and its associated outlet works. A visual inspection was performed on the dam and spillway, and a video inspection was performed inside the low-level drain conduit. Crews visually inspected the riser structure by removing debris from around the structure and inspecting inside the riser. Video showing the condition of these structures is included as an attached DVD.

Several conditions known to the owner and engineer were noted, and they are included in the report for cataloging purposes.

All references to direction are made as if looking downstream unless noted otherwise.

Observations

Auxiliary Spillway

The emergency spillway, located near the right abutment, consists of four (4) concrete pipes. A large trash rack protects the entire entrance of the emergency spillway. The spillway emerges from the pipes and continues down the right abutment to the stream below. The spillway is armored with riprap and there is medium vegetation throughout.

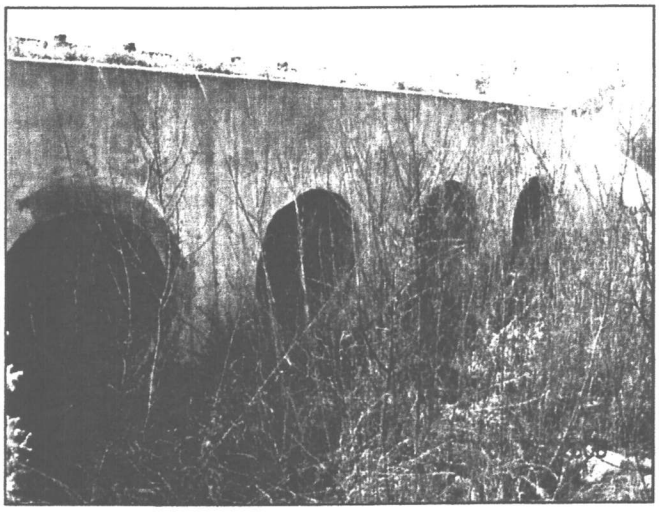


Figure 2- Outfall of emergency spillway and vegetation in spillway

The trash rack is in good condition. The concrete approach slab at the intake is in good condition. The concrete appears consistent with a structure of that age. There is no evidence to indicate water is undermining the structure.

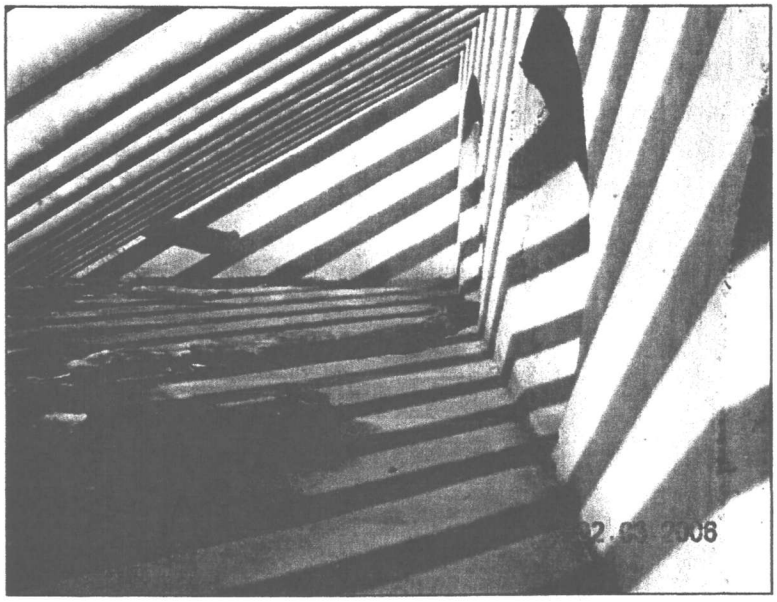


Figure 3 – Trash rack protecting intake of emergency spillway

The pipes are constructed of multiple pre-cast concrete sections. The emergency spillway was not activated at the time of inspection: however, there was water emerging along some of the joints. There was no evidence to indicate a port has formed and is emerging directly from the lake. We feel the water is probably phreatic emergence along the pipes and/or the natural emergence of water from the surrounding soils, not from the lake. Let it be known that the area received significant rainfall a day or two earlier.

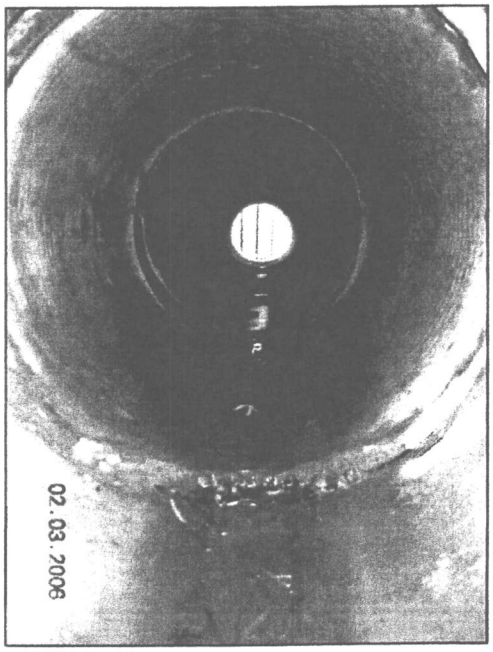


Figure 4 – Water emerging from a concrete pipe joint in emergency spillway

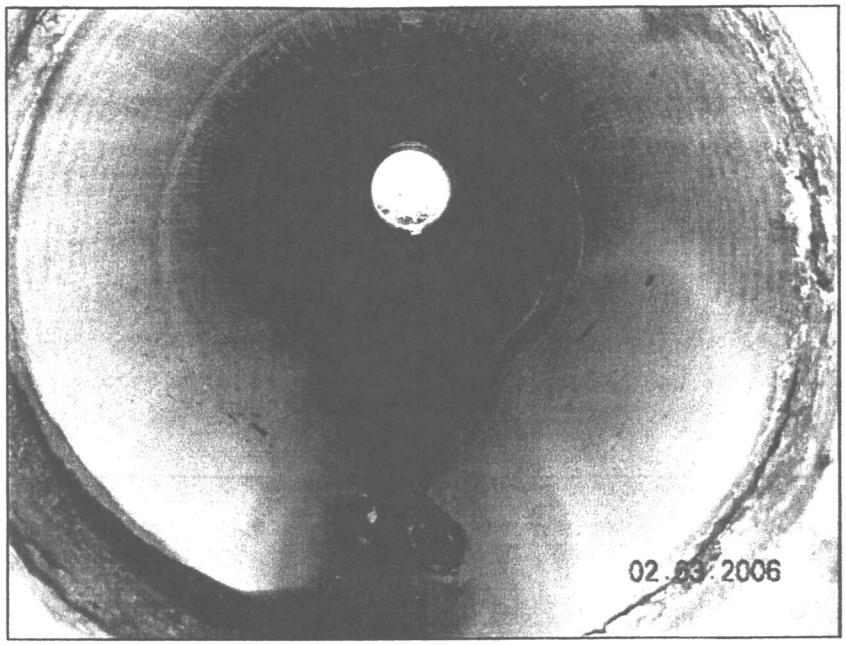


Figure 5 – Looking downstream through one of the four concrete pipes

A void was discovered beneath the first concrete pipe from the right abutment. The extent of the void is not known. There were no signs of voids beneath the other 3 pipes. Crews were able to reach back 5 inches underneath the pipe. The picture below shows the broken joint.

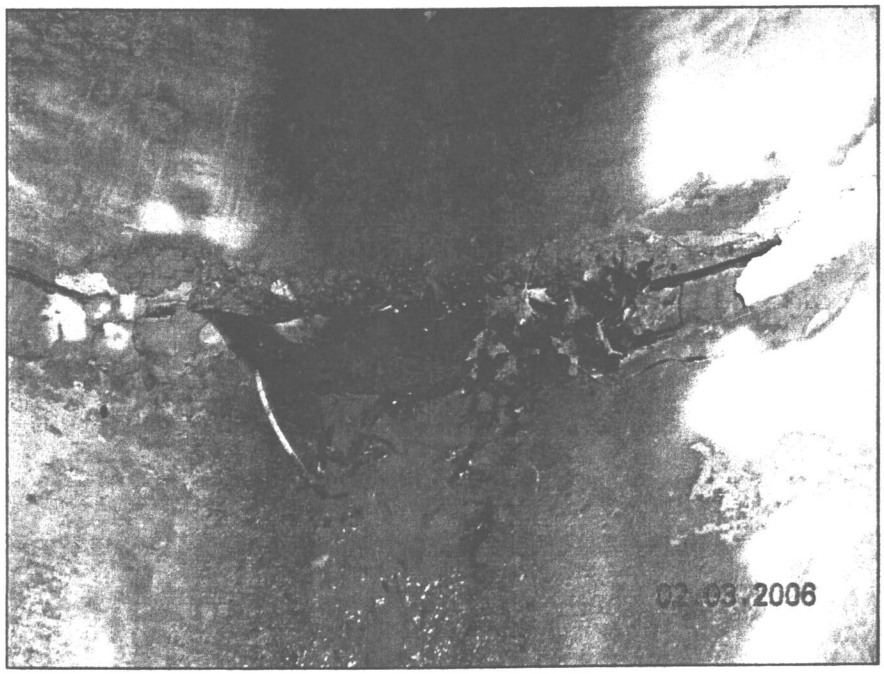


Figure 6 – Void beneath concrete pipe

Primary Spillway

The primary spillway consists of a riser structure located near the left abutment about 10 feet off the dam. The riser is a 3-foot diameter concrete structure, approximately 4 feet tall, with a 54" corrugated metal trash rack on top. The trash rack is approximately 2 feet in height.

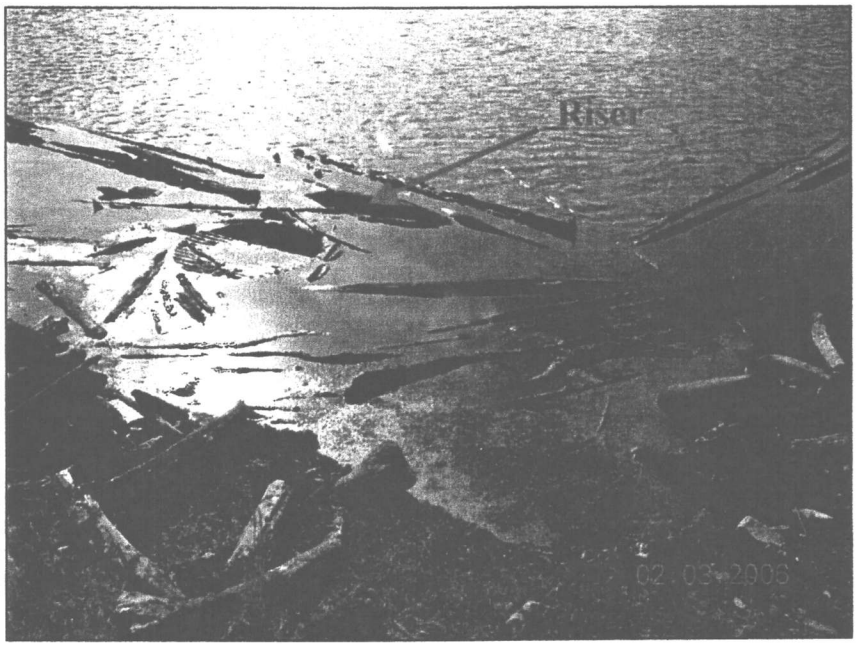


Figure 7 – Riser Inlet

At the time of inspection, the water level was equal with the top of the corrugated metal trash rack (notice the picture above). Its designed so water will spill into the riser between the corrugated pipe and the outside of the concrete riser, blocking most of the debris. This was not the case.

The outside of the trash rack is blocked with debris. This is preventing any significant amount of water to enter the riser at its designed elevation. Consequently, the lake level is approximately two feet higher then designed and the level is now controlled at the top of a trash rack. Dead and decaying trees at the head of the lake contribute to the extensive amount of debris. The large trash rack installed across the emergency spillway is necessary.

Outfall Conduit

The outfall conduit is a 24-inch corrugated metal pipe traveling 105 feet from the concrete riser. A utility installation was constructed after the dam was built. A 15-foot piece of steel pipe was added to the 24-inch corrugated metal pipe to bring the total outfall length to 120 feet. The steel pipe has an outside dimension of 25.5 inches. Please find the attached DVD, which shows the pipe inspection.

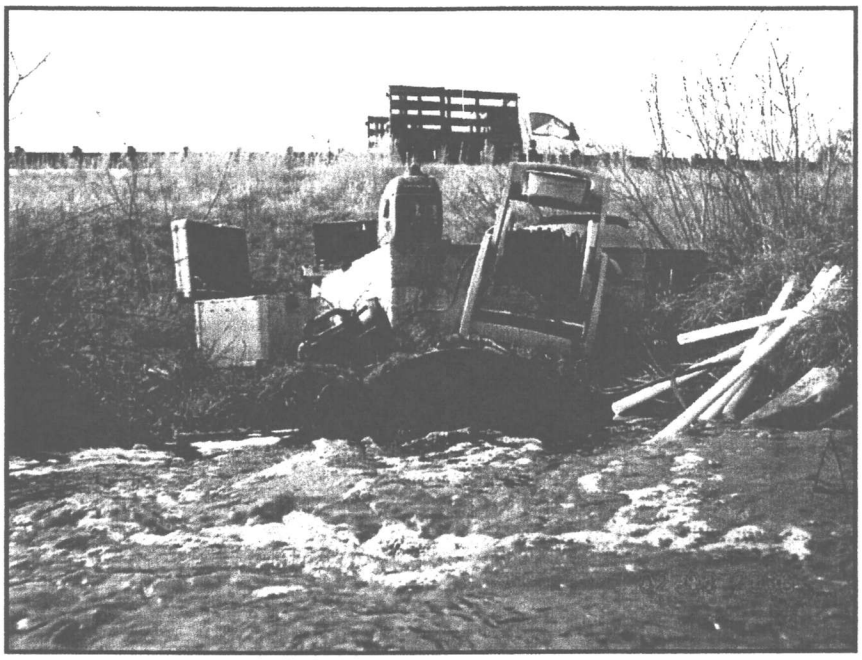


Figure 8 – Picture of outfall pipe at ¾ capacity

The steel pipe is in good condition. Approximately ½ of the outfall pipe is submerged in the plunge pool. At the time of inspection, heavy flows were encountered and the pipe was at ¾ capacity.

After traveling 15 feet in from the downstream side, the steel pipe connects to a corrugated metal pipe. The first 10 feet of the corrugated metal pipe inclines. The conduit returns to a consistent slope after 10 feet.

There were no signs of significant rust or deterioration inside the conduit.

Gate Valve

A gate valve exists at the bottom of the riser. The picture below shows the top of the stem for the valve. A "T" handle operator typically accompanies this installation and connects on top of the stem for operation.

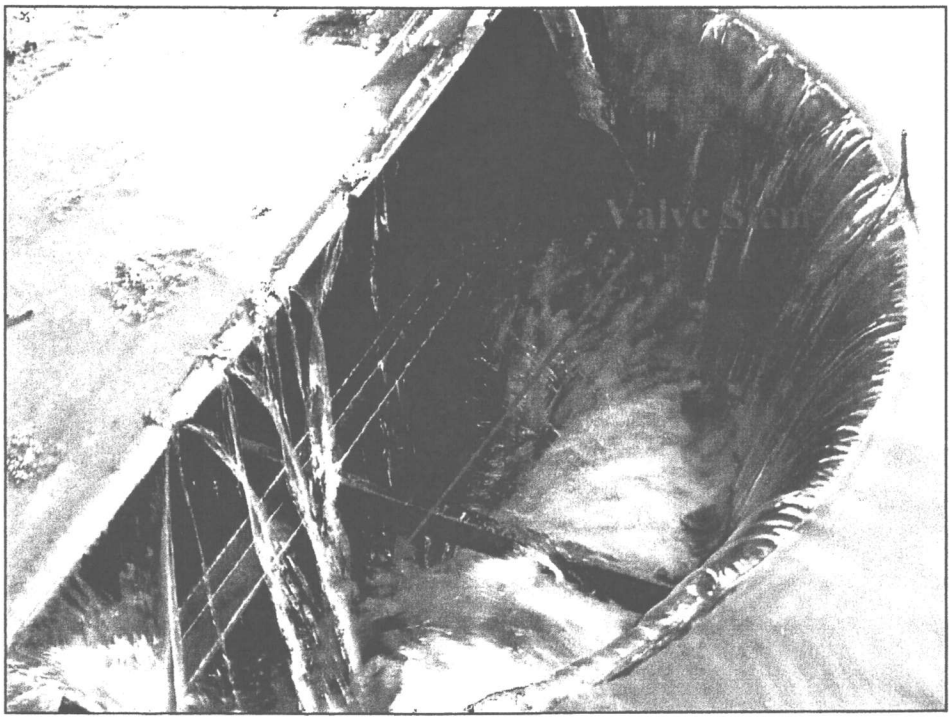


Figure 9 – Gate Valve

We believe the gate valve is a 12" non-rising stem slide gate. The intake for the low level drain could not be located. We believe it is buried in sediment.

The trash rack is not part of the original construction and was added much later. In its present condition, the "T" handle operator required to open and close the gate cannot be connected to the valve stem because the supports for the trash rack would block its operation. Consequently, we feel the gate valve has not been operated in many years.

Figure 10 – Close up of the valve stem

Toe of Dam

There is little vegetation along the slope of the dam. Medium vegetation exists along the toe of the dam as seen in the pictures below.

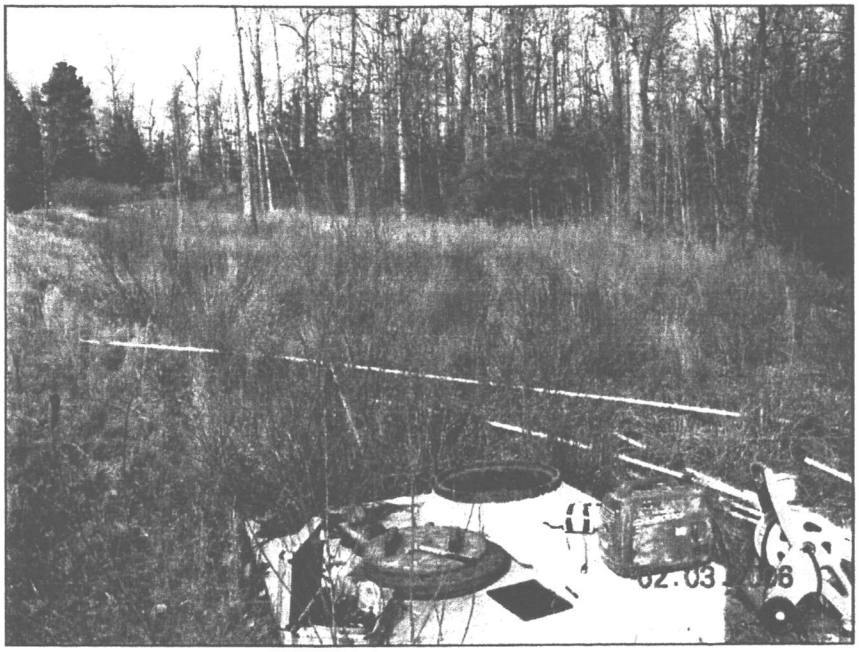


Figure 11 – toe of dam looking toward left abutment

Figure 12 – toe of dam looking toward left abutment

Recommendations

Auxiliary Spillway

The four concrete pipes that make up the emergency spillway should be injected with chemical grout. Many joints are leaking and a parallel port could develop.

We suggest using hydrophobic or hydrophilic foam grouts. They are inert after reaction and harmless to the environment. They react with water to form a flexible foam that acts as a barrier to water infiltrating the pipe. They also absorb into the soils and adhere to the outside of the pipe so that the void is filled and internal erosion is stopped.

If during repair, a large void is determined, amended Portland-based grouts should be used. The Portland grout is able to replace the structural support that was lost when the soils were eroded away, and is a better choice for large voids than chemical grout alone. Parallel porting is a concern on dams and can result in the sudden loss of the pool.

It is also a good idea to reseal the concrete pipe joints with an elastomeric sealant or repair mortar.

Primary Spillway

The lake bottom surrounding the riser needs to be dredged and the sediment and debris removed. At its present condition, the lake bottom is even with the top of the riser.

The existing trash rack needs to be replaced with a functional trash rack. The trash rack currently in place is not designed to handle the large amount of debris produced by this lake. We suggest a pyramidal stainless steel or aluminum trash rack with an anti-vortex device.

Outfall Pipe

The outfall should be re-inspected when the conduit has little to no flow.

The outfall conduit will need to be slip lined at some point because of the short useful life of corrugated metal pipes. The inspection did not note any serious porting or pending failure so we feel an immediate repair is not required at this time.

Earthen Embankment

The embankment should be kept clear of vegetation. The slope appears to be maintained regularly. It would be a good idea to have crews remove the vegetation a further down the slop along the toe of the dam so that larger vegetation does not begin to take root and crews could monitor seepage that may development.

Gate Valve

At its present condition the gate valve cannot be operated.

Once the area surrounding the riser tower is excavated, the condition of the gate valve can be determined and a decision on replacement or repair can be made at that time.

We anticipate replacing the gate valve with a hydraulically actuated gate that is operated from the shore. Because of the debris in the lake, a trash rack should be added to the low level drain as well.

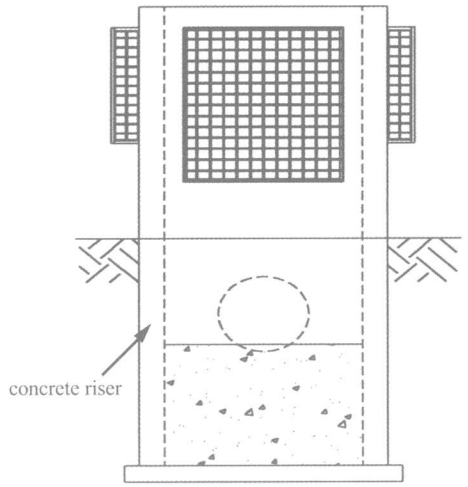
PLASTIC
SOLUTIONS
INC.

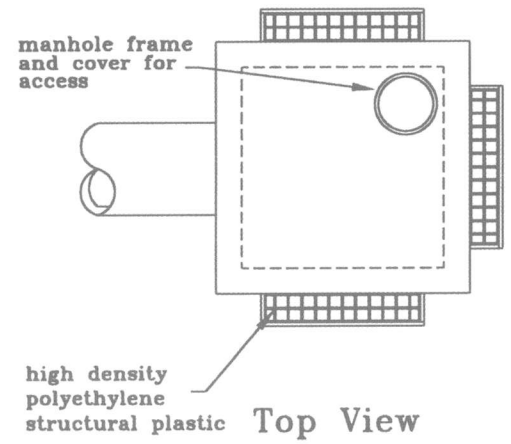
DAN REEVES
V.P. - Operations

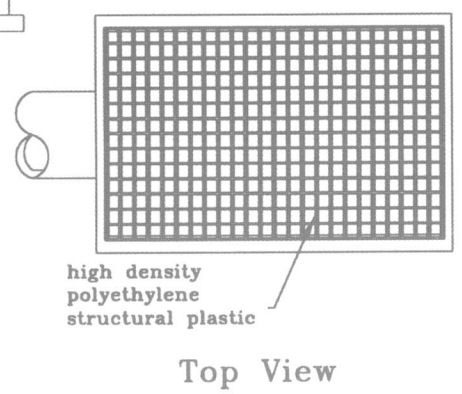
Plant
240 McGhee Road
P.O. Box 4386
Winchester, VA 22604

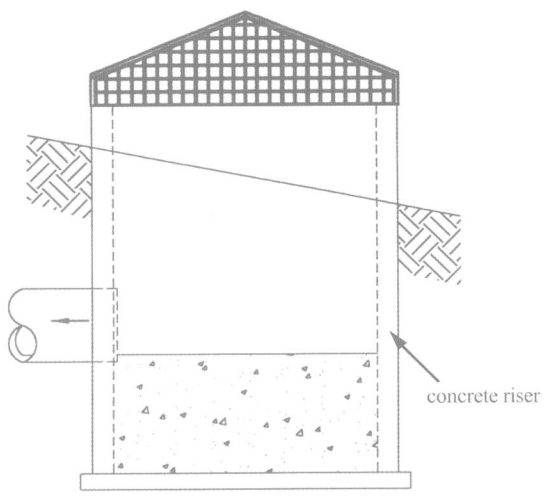
Office: 877-877-5727
540-722-4694
Fax: 540-722-2219
Email: d.reeves@plastic-solution.com
www.plastic-solution.com

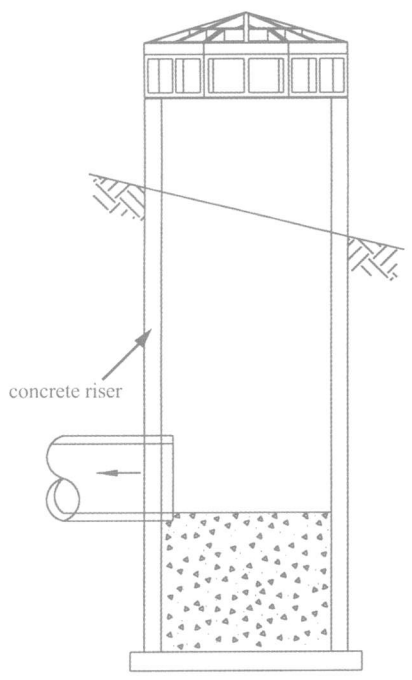
CAD drawings can be downloaded from our website.

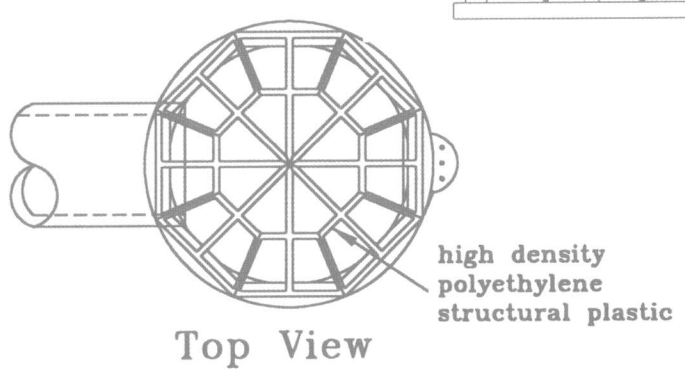












Pyramid racks are available with an anti-vortex device, but through empirical testing, the configuration of the grid pattern mitigates the need for a plated anti-vortex device.

Patent Pending

For more information, please contact
Plastic Solutions, Inc. at:
P.O. Box 4386 • Winchester, VA 22604
540-722-4694 • 877-877-5727 • Fax: 540-722-2219
Visit our website at http://www.plastic-solution.com

PLASTIC SOLUTIONS INC.

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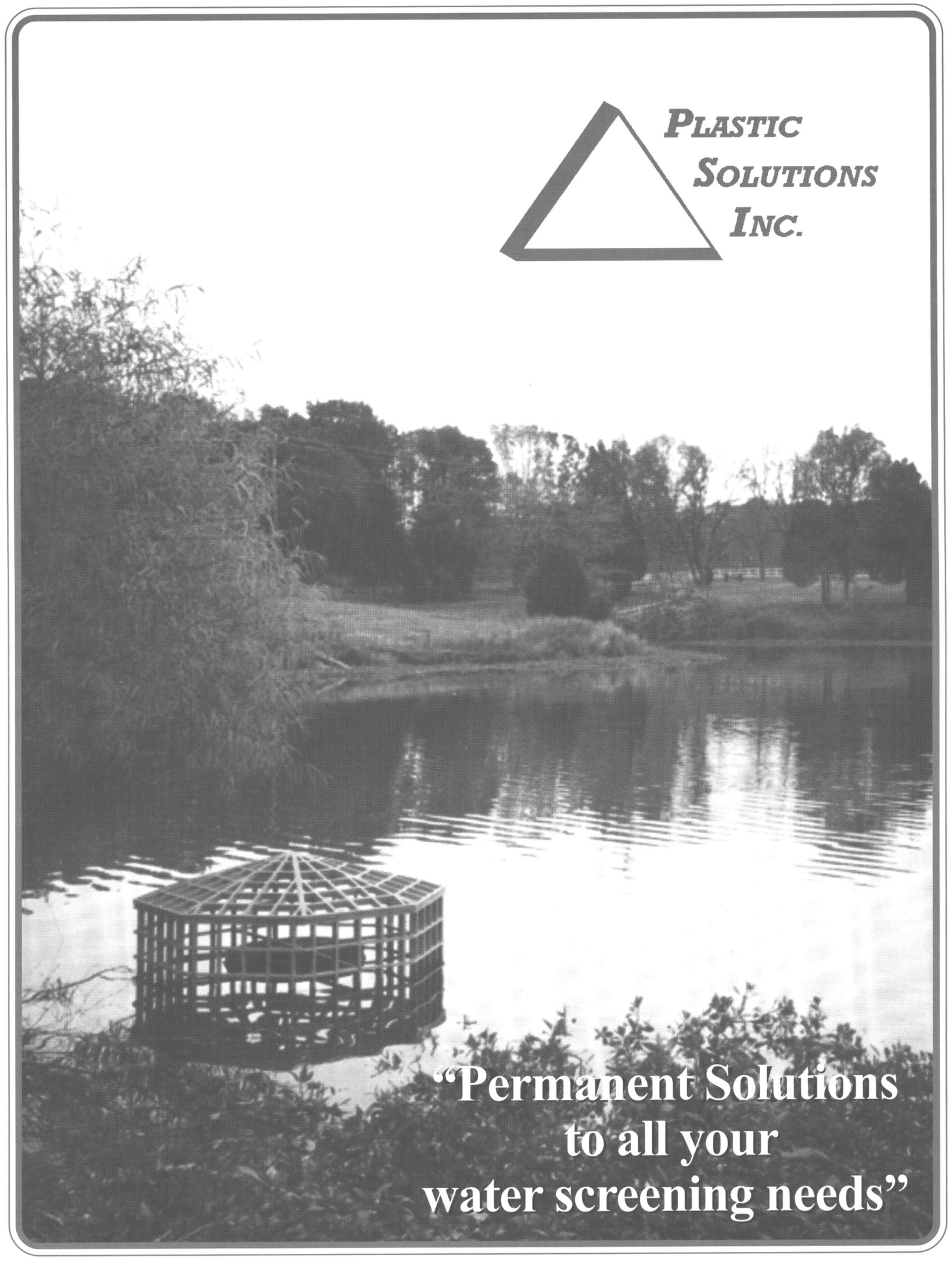


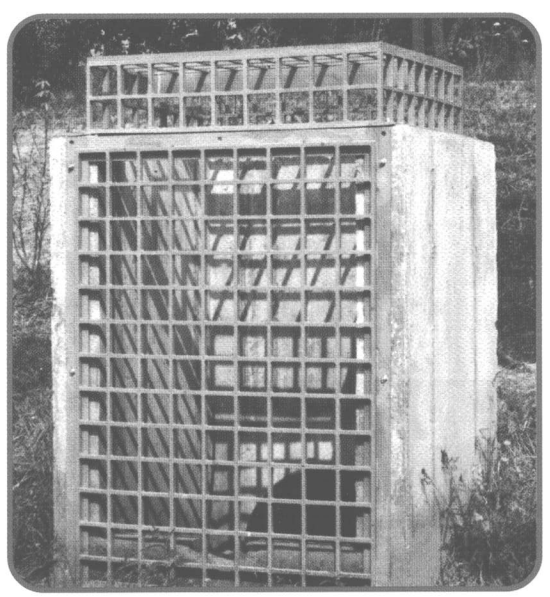
Plastic Solutions, Inc. is pleased to introduce its line of ***structural plastic*** trash racks and debris cages for storm water management basins and pond structures. Plastic Solutions offers a full line of standard sizes and can also customize to fit your specific requirements.
Available in concrete grey and black.

Patent Pending

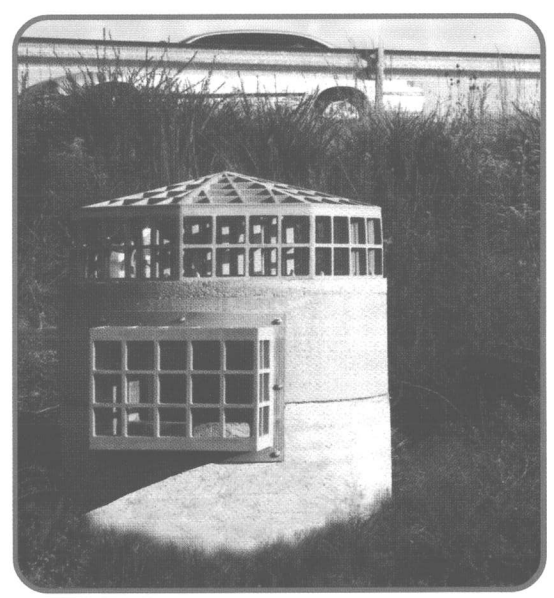
5000 lb. truck is supported by four 48" Pyramid structures.

Structural plastic has a cellular core surrounded by integral skins forming a totally integrated structure. Structural molded parts made from H.D.P.E. and fiberglass have a high strength-to-weight ratio and have 3 to 4 times greater rigidity than solid parts of the same material of equal weight.

Trash racks are available in numerous sizes and shapes to accommodate nearly every type of application.

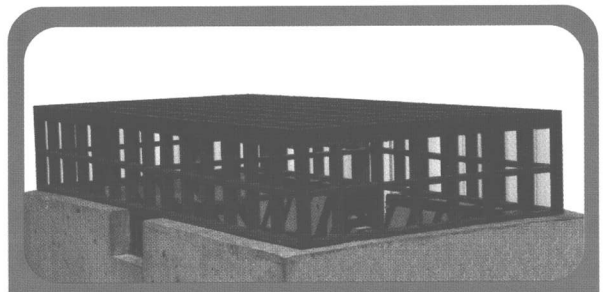


Trailside Residential Subdivision

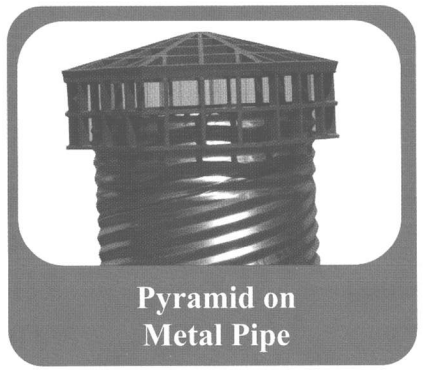


Dulles Toll Road

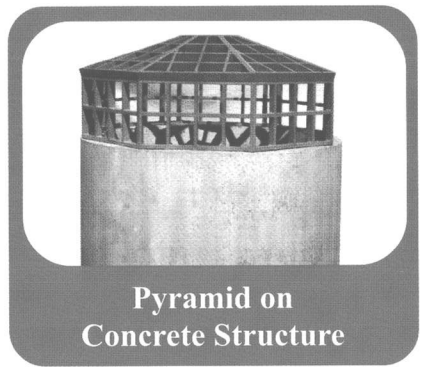
Racks can be mounted on concrete structures, plastic and metal pipe.



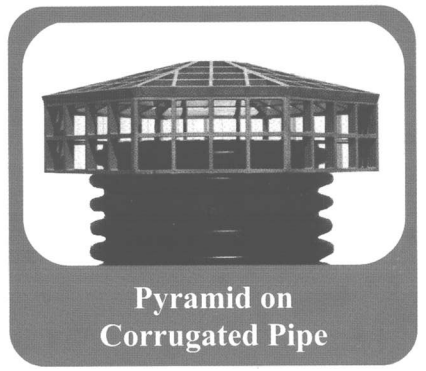
Flat Roof on Concrete Structure



Pyramid on Metal Pipe

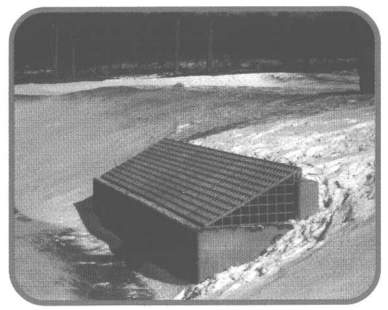


Pyramid on Concrete Structure

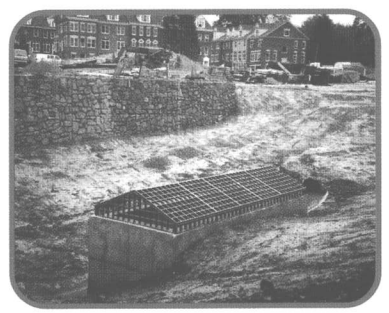


Pyramid on Corrugated Pipe

Racks are designed to withstand the conditions of pond structures - rough handling, high/low temperatures and long term weather exposure. ***Structural plastic*** has replaced wood, concrete, solid plastics and metals in a variety of applications. With ***structural plastic***, you can take advantage of the many benefits such as:



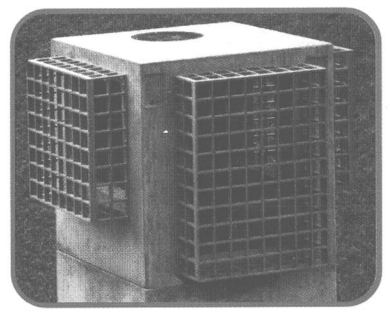
Belmont Green Recreation Area
(*Design Flexibility*)



Hunting Ridge Townhouses

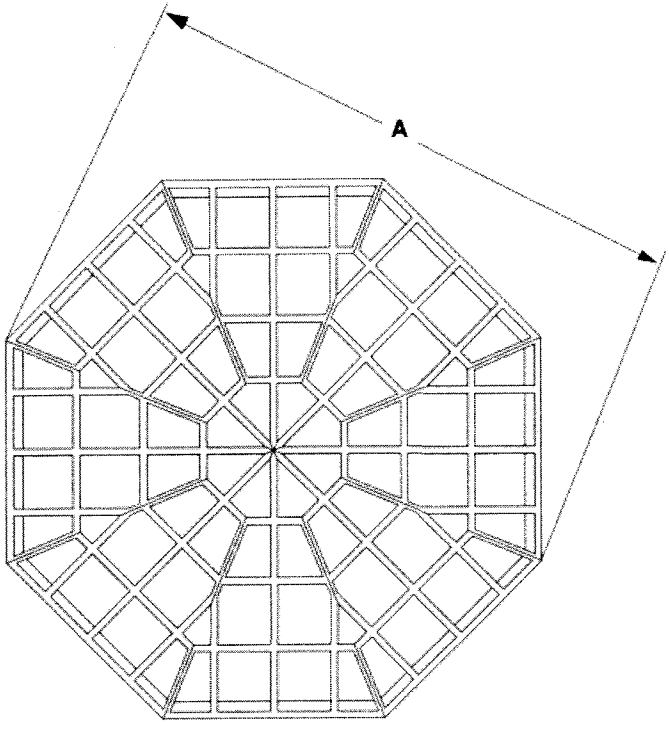
- **Lighter Weight**
- **Elimination of Corrosion**
- **Design Flexibility**
- **Greater Part Stiffness and Stability**
- **Chemical Resistance**
- **Installation Savings**

Installing Pyramid at Trex Manufacturing Facility
(*Installation Savings*)



Frederick County Landfill

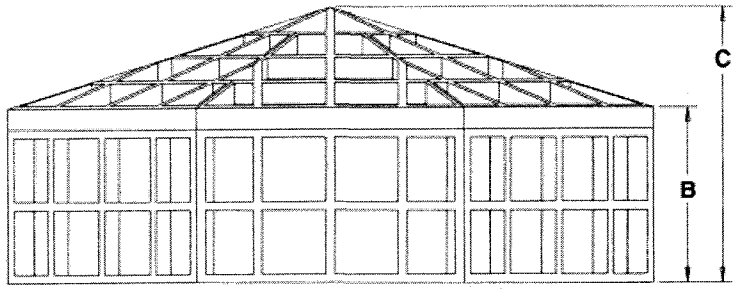
Structural plastic racks are a great alternative to painted and galvanized steel racks for use in storm water management ponds and general water screening. ***Structural plastic*** provides a structurally sound product with a long lasting quality appearance.



PYRAMID STRUCTURES

(STANDARD SIZES)

Dimensions in Inches to the Nearest 1/4″



Pyramid Racks for Concrete Pipe

|--- Pipe ---|

Part No.	I.D.	O.D.	A	B	C
PYD-24	24	30	30	7 1/2	11 3/4
PYD-36	36	44	44	13	19 1/4
PYD-48	48	58	58	13	21 1/4
PYD-60	60	72	71	17 3/4	28
PYD-72	72	86	84	23 1/2	31 3/4
PYD-84	84	100	94 1/2	25 1/2	39 1/2
PYD-96	96	114	114	22 3/4	39 1/2

Pyramid Racks for Plastic and Metal Pipe

(Includes Fastening Kit)

|----- Pipe -----|

Part No.	Corrugated	Plastic	A	B	C
PYDP-24	12,15,18	12,15,18	30	7 1/2	11 3/4
PYDP-36	21,24,27,30	24,30	44	13	19 1/4
PYDP-48	33,36,42	36,42	58	13	21 1/4
PYDP-60	48,54	48	71	17 3/4	28
PYDP-72	60,66	60	84	23 1/2	31 3/4
PYDP-84	72,78		94 1/2	25 1/2	39 1/2
PYDP-96	84,90,96		114	22 3/4	39 1/2

PLASTIC SOLUTIONS INC.

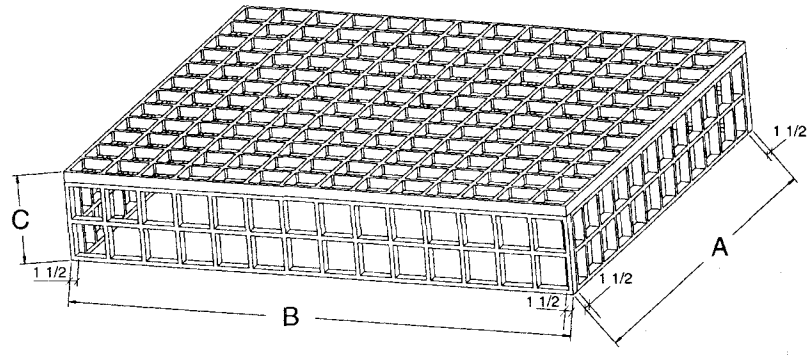
CAD Drawings Available from Our Website www.plastic-solution.com

P.O. Box 4386 • Winchester, VA 22604 • 540-722-4694 • 877-877-5727 • Fax: 540-722-2219

FLAT ROOF RECTANGULAR RACKS/WEIRS

(Standard Sizes)

Dimensions in Inches to the Nearest 1/4″



STANDARD WIDTHS

A	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	71 1/8	76 1/2	81 7/8	87 1/4
Width Code	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

STANDARD LENGTHS

B	11 3/8	16 3/4	22 1/8	27 1/2	32 7/8	38 1/4	43 5/8	49	54 3/8	59 3/4	65 1/8	70 1/2	75 7/8	81 7/8	87 1/4
Length Code	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

STANDARD HEIGHT

C	7 1/2	12 7/8
Height Code	01	02

PART CODE = FR _____ _____ _____ **(example: FR080802)**

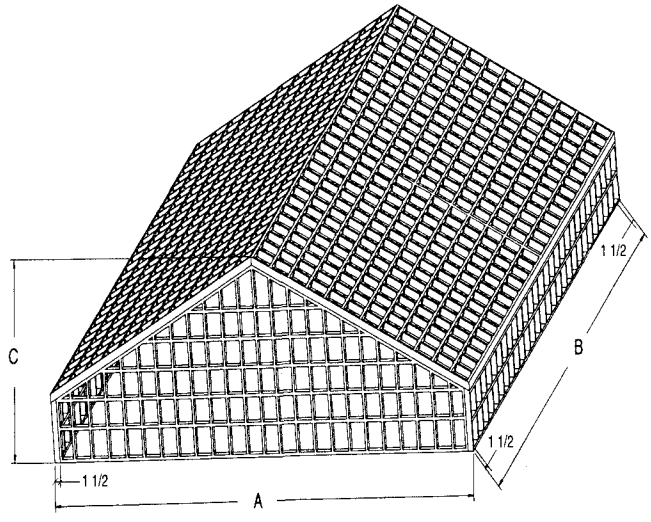
Width Code **Length Code** **Height Code**

******* CUSTOM SIZES AVAILABLE UPON REQUEST *******

PEAK ROOF STRUCTURE

(Standard Sizes)

Dimensions in Inches to the Nearest 1/4″



STANDARD WIDTHS AND HEIGHTS

A	49 3/4	59 3/4	69 1/2	79 1/2	89 1/2	99 1/2	109 1/4	120 1/2
Width Code	10	12	14	16	18	20	22	24
C	18	20	22	24	26	28	30	32

STANDARD LENGTHS

B	49	54 1/2	59 3/4	65 1/4	70 1/2	76	82	87 1/4	92 3/4	98	103 1/2	108 3/4
Length Code	09	10	11	12	13	14	15	16	17	18	19	20

PART CODE = PR _____ _____ _____ **(example: PR121201)**

Width Code **Length Code** **Height Code**

******* CUSTOM SIZES AVAILABLE UPON REQUEST *******

GERRY, FYI.
This was my sketch for the JCSA for Riser work at the JCC District Sports Complex (Large Pond @ Road). work should be generally following this sketch. Aud 2-8-01

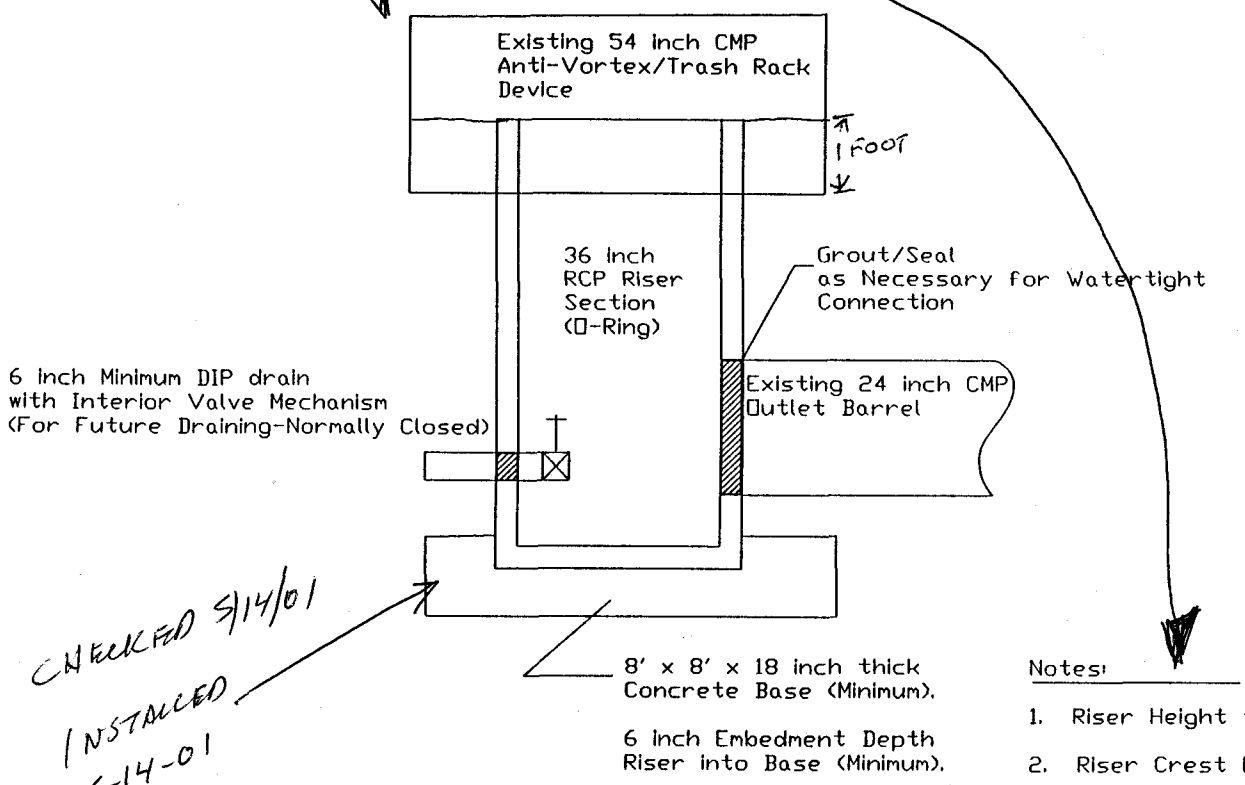
JCC District Sports Complex

Comments from Center for Watershed Protect

1. E+S getting offsite @ bridge.
2. work at Riser
3. Down-cut trees in WSEL?

TALKED TO GERRY LEWIS 2/08 2:15pm

1. Adequate perimeter control but unsightly due to mud tracking onto Road. was out there today.
2. watching work at riser.
3. Trees. Only trees within prop. sewer R/W were cut/removed. Not aware of cutting in pool area. We did not authorize.



CHECKED 5/14/01

INSTALLED 5-14-01

Notes:

1. Riser Height to Match Existing Height.
2. Riser Crest Elevation to Match Existing.
3. All Pipe Diameters and Invert Elevations to Match Existing.
4. Opening Area Between Anti-Vortex/Trash Rack Device and Riser to Match Exsiting to the Greatest Extent Possible.
5. Riprap Outlet Protection at Downstream End of Existing Barrel Must Be in Place Prior to Removal of Existing Riser Structure.
6. Clean and Paint Anti-Vortex/Trash Rack Device prior to Connection to Concrete Riser.
7. Securely Anchor Anti-Vortex/Trash Rack Device to Concrete Riser.
8. Install Erosion and Sediment Control prior to Work Activities.
9. Clean all woody debris within 15 ft. of Riser.

KEVIN 86 9-0468

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	RCP Riser
BMP ID NO	118	SITE AREA acre	521.7	CTRL STRUC SIZE inches	36
PLAN NO	SP-61-98	LAND USE	Public Park	OTLT BARRL DESC	CMP Barrel
TAX PARCEL	(32-01)(01-12)	old BMP TYP	Beaver Dam	OTLT BARRL SIZE inch	24
PIN NO	3210100012	JCC BMP CODE			
CONSTRUCTION DATE	12/1/2000	POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Warhill Tract-JCC Sports Complex			DESIGN HW ELEV	
FACILITY LOCATION	New Road BMP at Exist Lake			PERM POOL ELEV	44.61
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres	297	2-YR OUTFLOW cfs	0.00
CURRENT OWNER	James City County, Virginia			10-YR OUTFLOW cfs	0.00
OWNER ADDRESS	101 Mounts Bay Road			REC DRAWING	No
OWNER ADDRESS 2	P.O. Box 8784	SERVICE AREA DESCRI	Public Park, Roadway & Woods		
CITY-STATE-ZIP CODE	Williamsburg, Va. 23187	IMPERV AREA acres	0	CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Longhill Swamp		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	Yes	LAST INSP DATE	11/1/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		Exist Pond #1. Rebuilt after Hurr Floyd. 4-54" RCP Emerg Spillway. Sta. 35+00.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

TO: STORMWATER DIVISION

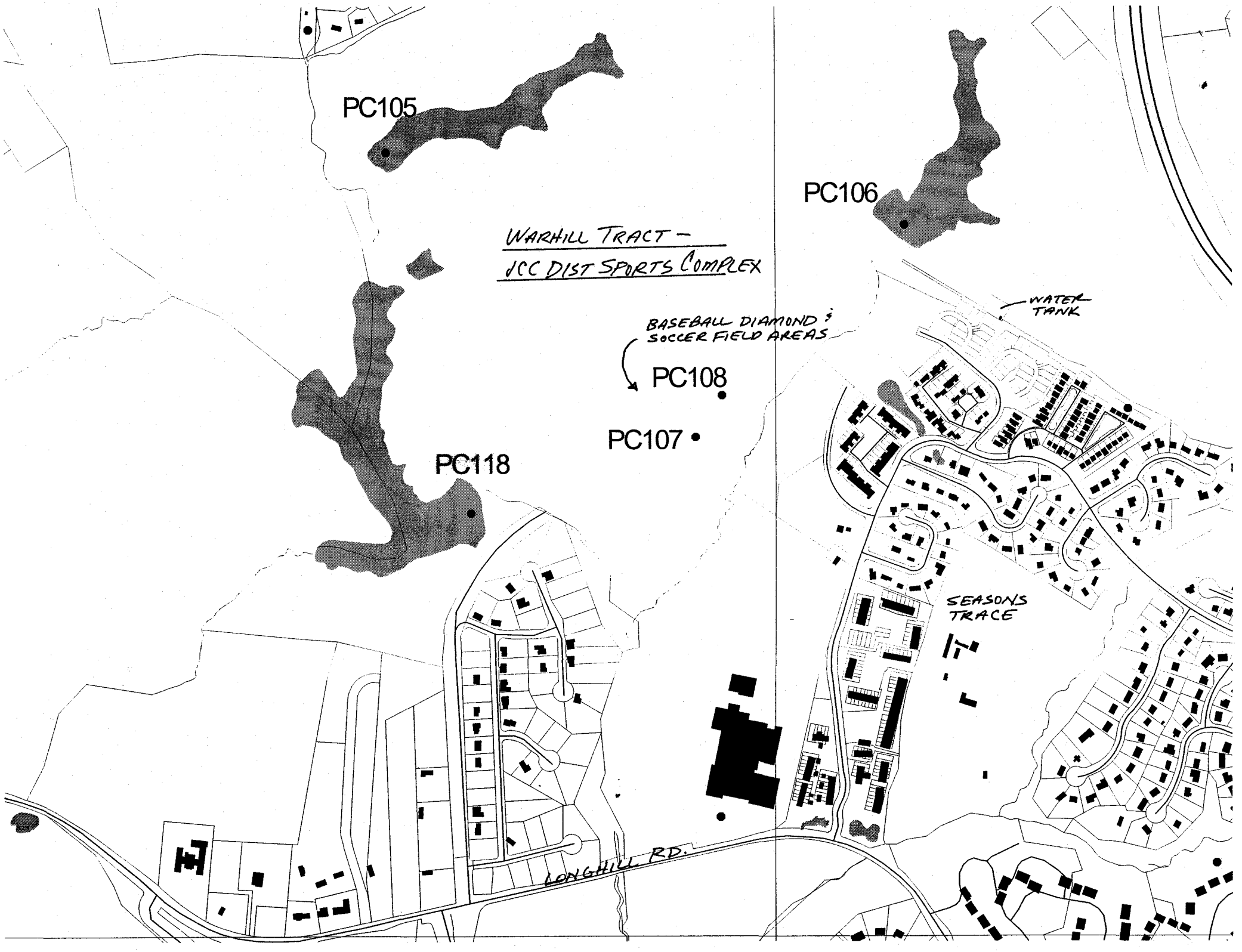
FROM: ENGINEERING AND RESOURCE PROTECTION

DIE
JMR
2-14-13

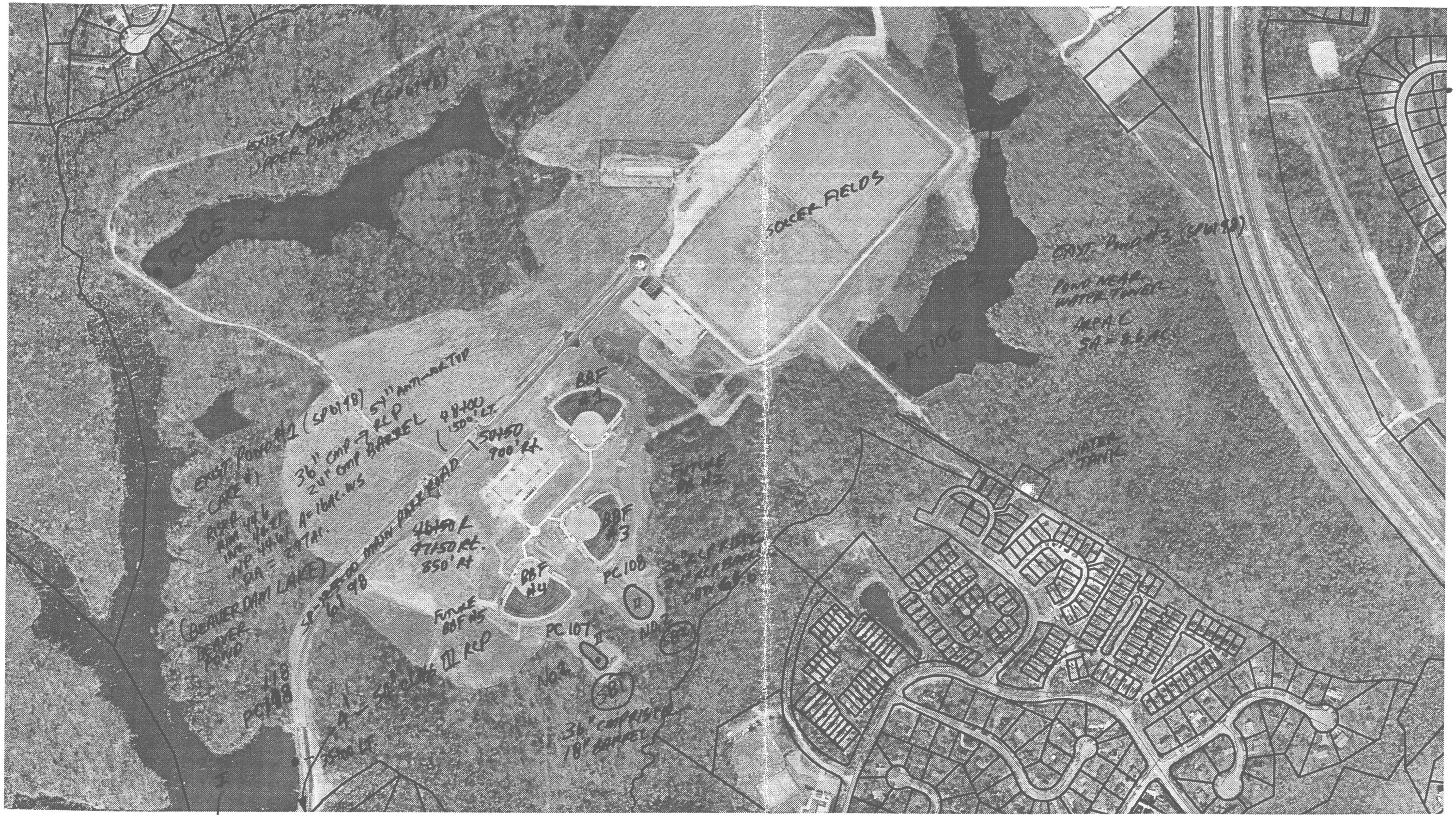
PROJECT: WARHILL TRAIL DAM REMOVAL

SP-26-11

RECEIVED ON
SEP 27 '12
Stormwater Division


PC105
PC106
WARHILL TRACT –
JCC DIST SPORTS COMPLEX
WATER TANK
BASEBALL DIAMOND & SOCCER FIELD AREAS
PC108
PC107
PC118
SEASONS TRACE
LONGHILL RD.

JCC - SPORTS COMPLEX
SP-61-98



Form PC 044

SP-61-98 2

GPIN 3210100012
5700 WARHILL TRAIL
JCC
POBox 8784
PARCEL-1 WH TRACT
RBMINO

WARHILL TRAIL DAM PC118

NEW TRASH RACK

James City County Stormwater Division - SWMF Inspection Report

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

BMP Score (3 or 4 requires attention): 1 ID Code: PC118 Date: 6/12/2008 District 2

Inspector: DG Location: 5700

☐ Bioretention ☐ Constructed SW Wetland ☐ General Infiltration ☐ Vegetated Filter Strip ☑ Retention

☐ Detention ☐ Extended Detention ☐ Gen Interm Sand Filter ☐ Manufactured BMP ☐ Grassed Swale

Criteria	Score	Comments: Check the letter that applies, more than one can be used. Write comments in the comment box below if needed.
1. Forebay Score: (50% filled with sediment = UNSAT and check ATTN required)	0	☐ a - Remove debris, trash and woody vegetation in foreba ☐ b - Repair breaches in the forbay structure. ☐ c - Remove sediment from pipes or channels into foreba ☐ d - Remove sediment from entire forebay.
2. Inlet(s): note signs of erosion, damage, obstructions	0	☐ a - Erosion at the inlet discharge point. ☐ b - Sediment, debris or woody vegetation at the outfall of inlet.
*3. Outlet: (note signs of erosion, damage, obstructions)	0	☐ a - Erosion at the outlet discharge point. ☐ b - Headwall/end section undermined or separated from barre ☐ c - Remove sediment, debris, or vegetation at outfall of pipe. ☐ d - Channel below outlet structure is blocked or eroded.
*4. Principal Spillway: (note signs of erosion, obstructions, seeping)	0	☐ a - Barrel pipe is blocked or damaged. ☐ b - Low flow orifice or weir is clogged. ☐ c - Leaks at pipe joints or piping along outside of barrel. ☐ d - Cracked, crushed, settled or otherwise damaged pipe.
5. Emergency Spillway: (note signs of erosion, obstructions)	0	☐ a - Woody vegetation growing in the spillway. ☐ b - Erosion in spillway channel or sidewalls. ☐ c - Trash or debris in spillway. ☐ d - Needs mowing, grass higher than 6-8 inches in spillway.
6. Basin Bottom and Side Slopes: (note erosion, ground cover, woody vegetation)	2	☐ a - Excessive accumulated sediment. ☐ b - Reestablish ground cover ☐ c - Erosion. ☑ d - Impaired access to inflow pipes or channels. ☐ e - Standing water in bottom of dry pond.
7. Safety Devices: (fences, gates, locks, etc.)	0	☐ a - Gate damaged, unable to open or key not available ☐ b - Fence damaged or needs repair.
*8. Embankments: (note adequate ground cover, signs of erosion, woody vegetation, low spots, cracking, animal burrows, signs of instability)	1	☐ a - Woody vegetation within 10 feet of embankment. ☐ b - Gound cover: too short/bare spots or ☐ c - too tall, >8" ☐ d - Erosion, settlement, or burrowing. ☐ e - Slippage or cracks along slope. ☐ f - Seepage or wet spots on exterior side of dam.
*9. Structural Components:(signs of settling, cracking, bulging, misalignment, or other deterioration)	1	☐ a - Settling, cracking, bulging, misalignment, or deterioration. ☐ b - Valves or drains are inoperable.

Requisition: James City County

Suggested Vendor:

W L PADDEN CONSTR
102 COUNTRY CLUB COURT

WILLIAMSBURG
VA 23185

Requisition: 3771
Date: 14-Sep-2009
Need By: 15-Sep-2009
Originator: joannar

Description:	Requisition Amt:
Warhill Dam Outlet Riser Repair	$4,900.00

Items Requisitioned

Seq	Quantity	Description	Units	Estimated PriceEach	Extended	Asset?
1	1	Temp construction entrance between road and bike path	EA	$700.00	$700.00	
				Bid Spec		
2	1	Excavation installation permanent construction entrance per VDOT specs	EA	$900.00	$900.00	
				Bid Spec		
3	1	Removal and disposal accumulated deadwood @ riser	EA	$900.00	$900.00	
				Bid Spec		
4	1	Removal disposal existing CM trash rack	EA	$500.00	$500.00	
				Bid Spec		
5	1	Excavation disposal of mud and debris around riser 3' deep x 3' wide	EA	$500.00	$500.00	
				Bid Spec		
6	1	Install 1 JCC Stormwater Division furnished CM Trash rack fasten to concrete riser	EA	$400.00	$400.00	
				Bid Spec		
7	1	Construction signage flagging and traffic	EA	$300.00	$300.00	
				Bid Spec		
8	1	Subgrade and pavement repair road and bike path	EA	$400.00	$400.00	
				Bid Spec		
9	1	topsil fertilizer and seed ec-2	EA	$300.00	$300.00	
				Bid Spec		
				Total	$4,900.00	

Requisition: James City County

Proposed Accounting

Accounting Ledger	Description	Avail Budget	Distrib Amt$
0130200300	WATER QUALITY IMPROVEME	$2,950,297.15	$4,900.00
Budget Control:		$0.00	
		Total	$4,900.00