

ROADWAY DRAINAGE DESIGN CALCULATIONS & LAND DISTURBANCE PERMIT APPLICATION

FOR

S-83 OVER BUFFALO CREEK

CHEROKEE COUNTY, SOUTH CAROLINA



PREPARED BY:

THE LPA GROUP INCORPORATED

Columbia, South Carolina

SEPTEMBER 2011

S-83 OVER BUFFALO CREEK

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DRAINAGE CALCULATIONS
&
NOTICE OF INTENT – NPDES GENERAL PERMIT**

CHEROKEE COUNTY, SOUTH CAROLINA

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Shanna D. Niswonger
9/2/11



SCDOT NOTICE OF INTENT (NOI)
For Stormwater Discharges from SCDOT Activities
Covered Under South Carolina NPDES Construction
General Permit SCR160000
 (Maintain As Part of On-Site SWPPP)



For Official DHEC Use Only

DHEC File Number: _____

Permit Number: SCR16 _____

Submittal Package Complete: _____

Public Notice Start Date (OCRM only): _____

For official SCDOT use only

SCDOT File Number: 0040188

Submission of this Notice of Intent constitutes notice that the SCDOT intends to be authorized as a Primary Permittee under NPDES General Permit SCR160000.

For Official Use Only

Submission Date: 08/04/2014 Proposed Start Date: 01/05/2014 Proposed Completion Date: 01/05/2019

Project/Site Name: S-83 over Buffalo Creek Bridge Replacement County: Cherokee

(Modification or Change of Information Only): Prior Approved NPDES Permit or File Number: _____

Do you want this project to be considered for the Expedited Review Program (ERP)? Yes No (see Instructions)

Notice of Intent (NOI) Application Type(s)

- Project (Application/Review) Type(s) (Select **ALL** that apply): New Project (Initial Notification) Ongoing Project:
- Permitted Un-Permitted
- Late Notification
- Major Modification: (attach modifications)
- Ocean and Coastal Resource Management (OCRM) Review
- Change of Information/Other (Specify): _____

II. Owner and Operator Information

A. Project Owner: South Carolina Department of Transportation SCDOT EIN: 57-6000954

Phone: 803-737-1308 Fax: 803-737-2389 Email Address: HarringtKG@scdot.org

Mailing Address: 955 Park St. City: Columbia State: SC Zip: 29202

B. Project Operator: South Carolina Department of Transportation Resident Engineer

Name: Shane Parris Phone: 864-489-5760 Email Address: ParrisSL@scdot.org

Mailing Address: 1868 Old Georgia Highway City: Gaffney State: SC Zip: 29340

III. Site Information

A. Type of Activity (check one): Industrial Linear Site Preparation (No new impervious) Other: _____

B. Site Location (nearest intersection, etc.): near intersection of S-83 (Blacksburg Hwy) & I-85

City/Town: _____ Disturbed Area (Nearest tenth of an acre): 3.4

Beginning Latitude: 35 ° 07 ' 27 " N Beginning Longitude: 81 ° 32 ' 55 " W

Ending Latitude: 35 ° 07 ' 42 " N Ending Longitude: 81 ° 33 ' 05 " W

(Source): GPS Website: Google

- C. Is the proposed site located on Indian Land? Yes No (If yes, name the reservation: _____)
- D. Are there State and Federal Environmental Permits or Approvals (other than USACOE 404 permit and 401 certification) applied for or obtained for this site? Yes No
- If "Yes", list all obtained: _____

IV. Stormwater Pollution Prevention Plan (SWPPP) Information

- A. General SWPPP Information: Is the SWPPP prepared in accordance with the SCDOT CGP? Yes No
- B. SWPPP Preparer: Shanna Niswonger S.C. Registration #: 28678
- C. Company /Firm: Michael Baker Inc. S.C. COA #: 00448
- Mailing Address: 700 Huger St City: Columbia State: SC Zip: 29201
- Phone: 803-231-3996 Fax: 803-779-8749 Email: SNiswonger@mbakerintl.com

V. Water Body Information:

A. Receiving Waterbody(s) (RWB) Information: List the nearest and next nearest receiving waterbodies to which the sites stormwater discharges will drain. If stormwater discharges drain to multiple waterbodies, then list all such waterbodies. (Attach additional sheet(s) as needed)

1. Name of Receiving Waterbodies (RWB)	2. Distance to RWB (feet)	3. Classification of RWB
a. Nearest: <u>Buffalo Creek</u>	<u>0</u>	<u>FW</u>
b. Next Nearest: <u>Broad River</u>	<u>10000</u>	<u>FW</u>
c. Other Waterbodies: _____		

B. Waters of the U.S. / State Information: Attach additional sheet(s) as needed

Waters of the U.S./ State	1. On the Site?	2. Delineated/ Identified?	3. Impacts?	4. Amount of impacts
a. Jurisdictional wetlands	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>0.009</u> Ac
b. Non-jurisdictional wetlands	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>N/A</u> Ac
c. Other Water(s): <u>stream clearing</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>40 If</u> Ac
d. Coastal Zone ONLY: <u>Direct Critical Area</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____ Ac
e. If yes for impacts, describe each impact and activity, and list all permits (e.g. USACOE Nationwide Permit, DHEC General Permit) and Certifications (e.g. CHZ certification number) that have been applied for or obtained: <u>GP #SAC 2010 - 01346</u> <u>0.005 ac fill, 0.004 ac clearing, SC GP-95-002 DHEC Navigable Waters GP SAC# 2011-00218-DS</u>				

C. S.C. Navigable Waterways (SCNW) Information: Attach additional sheet(s) as needed.

1. Are S. C. Navigable Waters (SCNW) on the site: Yes No
- a. If no, do not complete this question. Proceed to Section D (Impaired Waterbodies).
- b. If yes, provide the name of S.C. Navigable Waters (SCNW) on the site: Buffalo Creek
2. If yes for C.1, will construction activities cross over or occur in, under, or thru the SCNW? Yes No
- If yes, describe SCNW activities (e.g., road crossing, sub-aqueous utility line, temp./perm. structures, etc.) and proceed to Section C.3: Bridge replacement over Buffalo Creek

3. Identify permits providing coverage of SCNW activities proposed for your site. If NONE, list "none".

Permits/Certifications	Permit or Certification No.	Corresponding Covered SCNW Activities
a. DHEC General/ Other DHEC Permit	None	
b. USACOE 404 Permit or 401 Cert.	SAC 2012-01346	fill and clearing of wetlands
c. SCNW Permit if applied for list: Date: _____ if issued list: Date: 10/09/2012	SC GP-95-002	<input checked="" type="checkbox"/> All Activities or <input type="checkbox"/> Some Activities (Describe):

d. If a SCNW Permit has **NOT** been applied for provide an additional plan sheet that shows plan and profile views (drawn to scale) of the SCNW and associated activities. Include a description of all proposed activities on this plan.

D. Impaired Waterbodies Information: Attach additional sheet(s) as needed.

D1. 303(d) Listed Impaired Waterbodies

a. Name the nearest DHEC Water Quality Monitoring Station(s) (WQMS) that receives stormwater from your construction site and/or thru an MS4, as well as the Name of the Corresponding Waterbody?

Nearest DHEC WQMS(s): B-057
 Corresponding Waterbody: Buffalo Creek

b. Is this WQMS(s) listed on most current 303(d) List? Yes No

Name of impaired WQMS: _____

c. If yes for "b", list the impairment(s): _____

d. Will any pollutants contributing to the impairment be present in the site's construction stormwater discharges? Yes No

e. If yes for "d" above, will the use of the BMPs proposed for your project ensure that the site's discharges will **NOT** contribute to or cause further WQS violations for the impairment(s) listed in "c"? Yes No

(NOTE: If no for "e", this site is NOT eligible for coverage under the SCDOT CGP)

D2. TMDL Impaired Waterbodies

a. Name of Nearest DHEC Water Quality Monitoring Stations (WQMS)(s) that receives stormwater from your construction site and/or through an MS4?: B-057

b. Has a TMDL(s) been developed for this WQMS(s)? Yes No

If Yes, Identify the TMDL: The Upper Broad River Watershed

c. If yes for "b", list the impairment(s) : FC

d. If yes for "b", has the standard been "ATTAINED" or "FULLY SUPPORTED" for the impairment(s)? Yes No

e. If no for "d" (Not Attained), Determine whether or not the stormwater discharge from the Project may contain pollutants that contribute to a sediment or a sediment-related impairment. Yes No

List the Pollutants: _____

f. If yes for "e" above, Have you carefully evaluated selected BMPs and their performance to minimize pollutants in the stormwater discharge to not cause or contribute to a violation of water quality standards? Yes No

(NOTE: If no for "f", this site is NOT eligible for coverage under the CGP).

VI. Signatures and Certifications: DO NOT SIGN IN BLACK INK!

A. "One copy of the SWPPP, all required specifications and supporting calculations, forms, and reports are herewith submitted and made a part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of Title 48, Chapter 14 of the Code of Laws of SC, 1976 as amended, pursuant to Regulation 72-400 et seq., and in accordance with the terms and conditions of SCR160000." (This should be person identified in Section IV.)

Check one: Engineer Tier B Surveyor Landscape Architect

Shanna Niswonger
Printed name of SWPPP Preparer

Shanna Niswonger
Signature of SWPPP Preparer

28678
S.C. Registration #

B. "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also hereby certify that all land-disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans and SCR160000. I also certify that a responsible person will be assigned to the project for day-to-day control. I hereby grant authorization to S.C. Department of Health and Environmental Control (DHEC) and/or the local implementing agency the right of access to the site at all times for the purpose of on-site inspections during the course of construction and to perform maintenance inspections following the completion of the land-disturbing activity. (See Section 122.22 of S.C. Reg. 61-9 for signatory authority information.) Having understood the above information, I am signing this certification as Project Owner to the aforementioned NPDES general permit."

Printed Name of Project Owner

Title/Position

Signature of Project Owner

Date Signed

NPDES SCDOT CGP Fee Schedule

DO NOT MAIL CASH. DHEC will notify the Project Owner if the submitted check or credit card payment cannot be processed. The review clock will start when acceptable payment is received.

1. Will this project ultimately disturb 1 acre or more state wide, or 1/2 acre or more if located within 1/2 mile of a RWB in one of the eight coastal counties (Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties)? Yes No

If yes, enter \$125 in right-hand column and proceed to item 2.

If no, coverage under SCR160000 is not required.

\$ 125.00

Note: For projects greater than 2 acres SCDHEC may require additional review fees at \$100/disturbed acre, but not to exceed \$2000.

4. **Payment Method:**

Payment by Check:

Attach a signed and dated check payable to S.C.DHEC to the front of the Fee Schedule. Please note that all checks must be less than 30 days old and must be for the entire required fees.

Payment by Credit Card: (Check here if you wish to pay via credit card using the on-line payment system).

The Department will contact you to provide instructions and the invoice number necessary for online payment. Please provide an email address where the invoice number may be sent:

Email Address: _____

Payment by Credit Card: (Check here if this is an auto-draft to the SCDOT debit card account.)

For official use only: Invoice Number: _____

Instructions

If you are uncertain whether you need to obtain coverage under the NPDES Stormwater SCDOT Construction General Permit, 160000 (SCDOT-CGP), if you cannot access the websites listed on the NOI and instructions, or if you have any other questions, contact the Bureau of Water Stormwater Permitting Section (BOW-SWP) at (803) 898-4300 or Coastal Stormwater Permitting Section (CSWP) at (843) 953-0200 for projects located in the SC Coastal Zone (SCCZ) (Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties. Please see the Bureau of Water, Stormwater Permitting website (BOW-SWPS): <http://www.scdhec.gov/environment/water/swater/> for guidance and additional information regarding the SCDOT-CGP..

Who Must File an NOI:

- The Owner of a single project that will ultimately disturb 1 acre or more (all counties).
- In the SCCZ, the Owner of a single project that is within ½ mile of a receiving waterbody (RWB—see item V.A of the instructions) and will ultimately disturb more than 0.5 acre.
- See the BOW-SWPS for "Small Project Requirements in Non-Coastal Counties" and for "Small Project Requirements in Coastal Counties".

Where to File:

For projects in the SCCZ:	All other areas:
S.C. DHEC—Bureau of Water Coastal Stormwater Permitting Section 1362 McMillan Ave., Suite 400 Charleston, S.C. 29405	S.C. DHEC—Bureau of Water Stormwater Permitting Section 2600 Bull Street Columbia, SC 29201-1708

Submittal Package for SWP and CSWP:

1. For projects in the non-coastal counties disturbing greater than or equal to 1 acre include the original, signed NOI form with required fees, three (3) copies of the Stormwater Pollution Prevention Plan (SWPPP), and one (1) copy of all other supporting documentation, when requested, with the initial submittal.
2. For projects in the coastal counties greater than ½ acre and within ½ mile of a receiving water body an application for Coastal Zone Consistency certification is required along with the NOI form, required fees, three (3) copies of the SWPPP, and (1) copy of all other supporting documentation when required with the initial submittal.
3. For projects reviewed by SWP, the 20-day review period does not begin until a complete NOI has been received by DHEC. For projects reviewed by CSWP, the 20-day review period does not begin until a complete NOI has been received by DHEC and the project has been deemed consistent with the S.C. Coastal Zone Management Plan.

S.C. Coastal Zone (SCCZ) Requirements:

For all projects impacting Geographical Areas of Particular Concern (GAPC—see definition in the Critical Area Permitting Regulations: http://scdhec.gov/environment/ocrm/regs/docs/CARegs_0606.pdf) that are located within ½ mile of a RWB, a registered engineer, landscape architect, or Tier B surveyor must prepare the SWPPP. For other projects that are located within ½ mile of a RWB and will ultimately disturb more than 0.5 acre but less than or equal to 2 acres, a licensed professional is not required to prepare the SWPPP.

Project/Site Name: The Project/Site Name should be a unique or distinguishing name (e.g., not Proposed Highway). DHEC should be notified in writing if the Project/Site Name changes.

County: If the project is in multiple counties, list the county in which the majority of the site is located. If part of the project is in the SCCZ, then list the coastal county in which the majority of the site is located and submit the project to the appropriate OCRM office; see the "Where to File" section. List the other counties in which the site is located in the narrative.

Start and Completion Dates: List the estimated start and completion dates of the construction activity.

Expedited Review Program (ERP): For additional information about ERP, see the ERP website (<http://www.scdhec.gov/environment/water/swerfexpedite.htm>). DHEC will notify the Project Owner if the project is selected for review in the ERP. There are additional required fees for participation in this program; these ERP fees should not be submitted until DHEC has notified the Project Owner that the project was selected for participation in the ERP. In the SCCZ, please note that projects impacting GAPCs are not eligible for participation in the ERP.

I. Notice of Intent (NOI) Application Types(s):

Select all that apply.

II. Owner Operator Information:

A. Project Owner

- "Project Owner" in the context of stormwater associated with construction activity is SCDOT. The Owner has operational or design control over construction plans and specifications, including the ability to make modifications to those plans and specifications. The SCDOT Director of Construction or an appointed designee must complete and submit, if required, the appropriate NOI form.

- List the complete, legal name of the Project Owner. NPDES coverage under SCR160000 will be issued to the Owner.
- The SCDOT EIN is the Employer Identification Number as established by the U.S. Revenue Service; the EIN is commonly referred to as the taxpayer ID.
- Enter the complete mailing address of the Owner. If an email address is entered, DHEC may contact the Owner via email. The Owner is responsible for all portions of the site until a Notice of Termination (NOT) is submitted.

B. Project Operator

- "Project Operator" in the context of stormwater associated with construction activity, means any person who has day-to-day operational control of activities at a Project, which are necessary to ensure compliance with the SWPPP for the Project or other Permit conditions. This person is typically the SCDOT Resident Construction Engineer.
- The Permit Operator should be listed. This can be someone other than the person that has signatory authority for the SCDOT. Also, enter the complete mailing address for the Permit Operator. This can be different from the mailing address entered for the Owner.

III. Site Information:

- Select ONE activity type that most nearly describes the proposed development of the site. "Site Preparation" includes clearing, grubbing, and grading only; no new impervious areas should be proposed if this activity type is selected. If none of the activity types describe the development, then select "Other" and list the activity.
- List the site address. If the site address is unknown, list the road name(s) on which the site is located, the nearest intersection, or other detailed description of the site location. List a city/town only if the site is within the city/town limits. See the following website for assistance in obtaining latitude/longitude coordinates: http://www.epa.gov/tri/report/sitting_tool/index.htm. Latitude (from 32° to 35°) and longitude (-78° to -83°) should be for the center of the site. Minutes (') and seconds (") should be from 0 to 59. Enter the disturbed area for the project. The total disturbed area must be rounded to the nearest tenth of an acre. DHEC must be notified in writing if the actual disturbed area exceeds the disturbed area on the NOI.
- Is the proposed site is located on Indian Land? If yes, name the reservation.
- List all State and Federal Environmental Permits or Approvals (other than USACOE 404 permit and 401 certification) applied for or obtained for this site (e.g., RCRA, USACOE, Nationwide, etc.). If None, list None.

IV. SWPPP Information:

A. SWPPP

SWPPP is the Stormwater Pollution Prevention Plan.

B. SWPPP Preparer

- Enter N/A for the S.C. Registration # if the SWPPP preparer is not a registered professional in S.C. (Engineer, Tier B Surveyor, or Landscape Architect)
- For projects disturbing more than 2 acres, or projects that are located within ½ mile of a RWB and disturbing less than 2 acres, the SWPPP preparer must be one of the listed professionals or federal government employee as described in Title 40, Chapter 22.
- S.C. COA is S.C. Certificate of Authorization. See the following websites for information about COA requirements for Landscape Architecture firms (<http://www.dnr.sc.gov/land/LandscArch/LALicense.html>) and Engineering and Surveying firms (<http://www.lir.state.sc.us/POL/Engineers/>) Enter N/A for S.C. COA if the firm is not required to have a COA. Enter the complete mailing address for the SWPPP Preparer. If an email address is listed, DHEC may contact the SWPPP Preparer via email.

C. Company/Firm

Enter the SWPPP Preparer's legal Company/firm name, address, phones number, and email address.

V. Waterbody Information:

A. Receiving Waterbody(s) (RWB) Information

- The nearest receiving waterbody (RWB) is the nearest Waters of the State (WoS—see definition in § 122.2 of S.C. Regulation 61-9 <http://www.scdhec.gov/environment/water/regs/r61-9.pdf>) to which the site's stormwater discharges will drain. The nearest RWB must be listed in reference to a named waterbody if the RWB is unnamed. For example, if the site's stormwater discharges drain to a stream on the site, then the nearest RWB would be the stream. If the stream is not named, then determine the nearest named waterbody (e.g., Grove Creek) into which the stream will flow and list the nearest RWB as a tributary to the name waterbody (e.g., Tributary to Grove Creek). Then, the next/nearest named RWB would be Grove Creek. If the site's stormwater discharges drain to multiple waterbodies, then list all such waterbodies; attach additional sheets, if necessary.
- Provide the distance, in feet to each receiving waterbody.
- Provide the classification for each named receiving waterbody. See S.C. Regulation 61-9 for a list of classifications of waterbodies within South Carolina. If the nearest RWB is unnamed, then search the document for the nearest name RWB. If the nearest, named RWB is not listed, then continue searching the document for the next, named waterbody, proceeding downstream from the site. For example, a site in Anderson County drains to a tributary of Hornbuckle Creek, then to Hornbuckle Creek, then to Middle Branch, and then to Brushy Creek/Big Brushy Creek. First, search the document for Hornbuckle Creek, then Middle Branch, then Brushy Creek. Because there are 3 listings for Brushy Creek, the next, named waterbody (Saluda River) must be determined. Note that the county for this record for Brushy Creek is listed as Pickens because the headwaters of Brushy Creek are in Pickens County. Therefore, the classification of the tributary to Hornbuckle Creek is "FW—Freshwaters".

B. Waters of the U. S. /State Information

1. Complete the "On the Site?" column for items a-c. If yes is selected for that column, then the next 3 columns must be completed. If there are other Waters of the U.S./State (WoS) on the site not listed in items a and b (e.g., stream, river, lake, pond), then list those in item c.
2. **Delineated** means identification by U.S. Army Corps of Engineers (USACOE) or wetlands consultant. In the SCCZ, WoS must be verified by USACOE. If there are WoS within 100' for the disturbed area that were not delineated/identified, then explain this in the narrative; this include WoS that are not on the project site but are within 100' for the disturbed area. For Direct Critical Area in the SCCZ, delineation means identification by OCRM or wetlands consultant. OCRM staff may require identification of Direct Critical Area by OCRM staff as part of its Coastal Zone Consistency review.
3. **Impacts:** If land disturbing activities will occur in and/or will impact WoS, then select yes for "Impacts?"
4. **Amount of Impacts:** If "yes" for impacts, list the amount of impacts to WoS. Provide an additional, separate plan sheet that shows all WoS on the site and the impacted areas. If there are proposed impacts to WoS, please contact USACOE (866-329-8187) and S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section (803-898-4300) to determine additional requirements before submitting this NOI. In the SCCZ, also contact S.C. DHEC-OCRMs Wetlands Section (843-953-0200). Please note that it is the Project Owner's responsibility to ensure that all WoS are shown and identified in the SWPPP.
5. If there are not impacts to Waters of the U.S./State (listed in item V.B.3), then no USACOE permit is needed, therefore indicate that and proceed to item V.C. If there are impacts to WoS (listed in item V.B.3), then list each impact in section V.B.e. Indicate which permits are needed for the impacts listed in item V.B.3, and list the permit/application numbers and their statuses. In the Critical Area of the SCCZ, a USACOE permit and a DHEC-OCRMs Critical Area permit may both be required. If only a DHEC-OCRMs Critical Area permit is needed, then indicate that, list the Critical Area permit number, and proceed to item V.C.

C. S. C. Navigable Waters (SCNW) Information

See <http://www.scdhec.gov/environment/water/navwater.htm> for the definition of SCNW and other information related to SCNW. Or, contact S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section at (803) 898-4300 for assistance determining the navigability of the waters on your site or with questions related to SCNW. For projects in the Critical Area of the SCCZ, contact the DHEC-OCRMs Wetlands Section Coordinator at (843) 953-0200 with questions related to SCNW.

1. List the name of the SCNW. If the SCNW is not named, then provide a description that references the nearest, named waterbody (e.g., tributary to Grove Creek).
2. Indicate whether any construction activities or structures will cross over or under or otherwise affect SCNW. This includes temporary and permanent crossings with roads, utility lines, etc.
3. Identify permits providing SCNW Activity(ies) coverage(s) for the project

Impaired Waterbodies Information:

Maps showing WQMS locations are available at the following website for each watershed:

<http://www.scdhec.gov/environment/water/tmdl/index.htm#303d>. In the SCCZ, list the nearest upstream and downstream DHEC WQMS(s) and corresponding waterbody(ies).

D.1. See the following website for the most current 303(d) List for Impaired Waters and related information:

<http://www.scdhec.gov/environment/water/tmdl/index.htm#303d>.

1. List the nearest SCDHEC Water Quality Monitoring Station(s) to which the site's construction stormwater discharges will drain and its corresponding waterbody.
2. Identify whether this WQMS is listed on the most current 303(d) List? The 303(d) list is available in Microsoft Excel and Adobe Reader formats. Maps showing WQMS locations are available for each watershed at this website as well. To search the 303(d) list to determine whether a WQMS is listed, select "Edit" from the top toolbar of your web browser. Then, select "Find". Enter the WQMS exactly as listed on the map and hit enter. If none of the WQMS(s) are found, then select "No" and proceed to item V.D.2 (TMDL Impaired Waterbodies). If any of the WQMS(s) are found, then select "Yes" and proceed to item "c".
3. If yes for "b", list the impairment(s) for the WQMS(s) and proceed to item "d".
4. Will any pollutants contributing to the impairment be present in your site's construction stormwater discharges?
5. If yes for "d", will use of the BMPs proposed for your project ensure the site's discharge will NOT contribute to or cause further water quality standard violations for the impairment(s) listed in "c"? NOTE: If your answer to item "e" is NO, this site is NOT eligible for coverage under the CGP. You may contact the Department to determine if an individual permit application is necessary or you may revise your project to include appropriate Best Management Practices, controls, and procedures to bring your discharge into compliance

D.2. See the following website for a list of all WQMS with Approved S.C. Total Maximum Daily Loads (TMDLs):

http://www.scdhec.gov/environment/water/tmdl/docs/tmdl_2008sites.pdf.

1. List the nearest SCDHEC water quality monitoring station(s) to which the site's construction stormwater discharges will drain. List WQMS identified in part D.1.a of this table.
2. Identify whether a TMDL is listed for this WQMS. NOTE: Select "Edit" from the top toolbar. Then, select "Find". Enter the WQMS exactly as listed and hit enter. If a WQMS is NOT found, then select "No," Stop and proceed to Section VII. If a WQMS is found, then select "Yes" and proceed to item c.
3. If yes for "b", list the impairment(s) for the WQMS(s) and proceed to item d. If the WQMS(s) is impaired for more than one parameter, then the WQMS will be listed multiple times on successive rows.
4. If yes for "c", identify whether the standard has been ATTAINED for the impairment(s). NOTE: See "USE SUPPORT" to determine if the standard has been attained for each impairment for each WQMS. "FULLY SUPPORTED" means the standard has been attained for the impairment. "NOT SUPPORTED" means that the standard has NOT been attained for

that impairment. If no for "d" (the standard has NOT been attained (NOT SUPPORTED) for all impairments for all WQMS(s)), proceed to item e. If yes for "d" (the standard has been attained for all impairments for all WQMS(s)), proceed to Section VII.

5. Determine whether or not the stormwater discharge from the Project may contain pollutants that contribute to a sediment or a sediment-related impairment. If no for "e", proceed to Section VII. If yes for "e", proceed to "f".
6. If yes for e, Have you carefully evaluated selected BMPs and their performance to minimize pollutants in the stormwater discharge to not cause or contribute to a violation of water quality standards?? NOTE: If your answer to item "f" is No, this site is NOT eligible for coverage under the CGP. You may contact the Department to confirm that adherence to a SWPPP that meets the requirements of the CGP will be consistent with the TMDL.

VI. Signatures and Certifications:

DO NOT SIGN IN BLACK INK! The NOI submitted to DHEC must have original signatures for VI.A. and VI.B.

- A. The same registered professional must sign and seal the NOI form, SWPPP, calculations, and supporting documentation.
- B. Print the name of the person who is signing the NOI for the Project Owner. A person with signatory authority for the Project Owner must sign the application. The SWPPP Preparer cannot sign the application for the Project Owner. The SWPPP, all reports, and any information requested by DHEC must be signed by a person with signatory authority for the Project Owner or a duly authorized representative. See § 122.22 of S.C. Reg. 61-9 for complete information about signatory authority requirements.

Fee Schedules:

Make sure to answer all applicable questions on the appropriate Fee Schedule. SCDHEC will provide notification if additional review fees are required.

Office Mechanics and Filing:

This form and supporting documentation will be kept in the Central Office files (hard copy or digitized copy) in accordance with the Retention Schedule.

Additional Sheets may be used for any section and attached to this form as is needed.

Stormwater Management and Sediment and Erosion Control Plan Review Checklist For Design Professionals

Please indicate the location and page number(s) where each item below can be found in your SWPPP or supporting calculations. If an item is not applicable, put N/A. The Department reserves the right to modify this checklist at any time. The Coastal Zone consists of the following counties: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper.

Checklist Completed by:

Printed name: Shanna Niswonger

Signature: Shanna Niswonger

Date: 9-2-11

1. CURRENT COMPLETED APPLICATION FORM

- Original signatures
- Signatory authority
- All items completed and answered
- Fee Schedule
- Note: State and local government projects are not exempt from the plan review fee of \$100 per disturbed acre.

ATTACHED

2. COPIES OF PLANS AND CALCULATIONS

- Plans stapled together!
- For projects that disturb more than 2 acres, less than or equal to 2 acres but are part of a larger common plan of development or sale (LCP), or more than 0.5 acre and within ½ mile of a receiving waterbody (RWB) in the Coastal Zone, ONE set of plans and supporting documentation (report, calculations, maps, etc.)
- For projects that disturb less than or equal to 2 acres (not part of LCP and not within ½ mile of RWB in the Coastal Zone), THREE sets of plans and one set of supporting documentation [Note: You may submit up to 2 additional sets of plans to be stamped for approval.]
- Supporting documentation tabbed (e.g., Maps, Pre-Development calculations) and pages numbered [no loose pages]

ATTACHED

3. LOCATION MAP

- North arrow and scale
- Outlined project location
- Labeled road names

TAB 2

4. PROJECT NARRATIVE

- Scope of project outlined, including a brief description of pre- and post-development conditions
- Summary table of pre- and post-development flows (at least 2- and 10-year, 24-hour storm events)
- Existing flooding problems in the surrounding area described
- Disturbed area calculations included for subdivision projects or LCP disturbing 1 or more acres
 - For subdivisions if the site is not to be mass-graded, the following formula should be used to determine the amount of disturbance:

Amount of Disturbance = 2[Max Restricted Building Size][Number of Lots] + Right of Way (ROW) areas {ROW areas include clearing for roads, utilities, easements etc.}

- If this equation is used, include a note on the **plans** stating: "The site is not to be mass-graded. Only 2 times the footprint is to be cleared as the lots are developed. The assumed disturbance on each lot is ____ sq. ft."

TAB 1

5. USGS TOPOGRAPHIC MAP

- Project boundary outlined
- Route of runoff from site to nearest waterbody shown
- Road names adjacent to site labeled

TAB 2

6. SOILS INFORMATION

- Project boundary outlined
- Predominate soil types found at the site identified on the plans or on a separate map
- *Note: Soils information is available from the Natural Resource Conservation Service through their website: <http://websoilsurvey.nrcs.usda.gov/app/>*

TAB 2

7. FLOODWAY MAPS/FEMA FLOOD INSURANCE MAP

- Project boundary outlined, if in close proximity to floodplain/ floodway
- *Note: The Department does not regulate the placement of fill in floodplains. Please see your local city or county official.*

TAB 2

8. WATERS OF THE STATE, INCLUDING WETLANDS

- Delineation of all waters of the State (WoS), including wetlands, shown and labeled on plans (delineation not required if a 100-ft undisturbed buffer can be maintained between the WoS and all land-disturbing activities)
- Additional, separate plan sheet that shows all WoS on the site and the impacted areas with a description of the activity(s), whether it is permanent or temporary, and any other relevant information.
- If impacts to WoS, outlined areas of impacts and labeled that no work can begin in this area until all necessary USACOE permits and SCDHEC 401 certifications have been obtained.
- Double row of silt fence provided in all areas where a 50' undisturbed buffer cannot be maintained between the disturbed area and the WoS
- Minimum 10' maintenance buffer provided between last row of silt fence and WoS; or, if buffer not provided, then statement from P.E. on plans indicating how silt fence will be installed and maintained without impacts to WoS
- *Note: If there are proposed impacts to WoS, then it is advised that you contact USACOE (866-329-8187) and/ or S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section (803-898-4300) to determine additional requirements before submitting the Notice of Intent (NOI).*
- *Note: If WoS are to be impacted, work cannot be performed in these designated areas until all necessary permits have been acquired*
- *Note: If a USACOE permit is required for construction of or access to a temporary or permanent stormwater management structure, NPDES permit coverage cannot be granted until the USACOE permits and S.C. DHEC 401 Section certifications are obtained.*
- *Note: The Department recommends a minimum 20-foot buffer between a sediment trap/basin and WoS.*

TAB 2

9. HYDROLOGIC ANALYSIS

- Pre- and post-developed hydrologic analysis calculations for the 2- and 10-year, 24-hour storm events at each outfall point
- Drainage area maps that clearly correspond to the calculations (pre- and post-development)
- Analysis points for comparing runoff rates and the total drainage area analyzed do not change from pre- to post-development, although the immediate drainage areas contributing to each analysis point might shift.
- Post-development discharges less than pre-development discharges for each outfall point (if not, then see "Detention Waiver" section below)
- Analysis performed using SCS 24-hour storm (Rational method is not acceptable)
- Rainfall data from South Carolina DHEC Storm Water Management BMP Handbook (BMP Handbook) used in all calculations
- *Note: The curve number for open water, marshes, etc. should be 98 to 100.*

TAB 1

10. DETENTION ANALYSIS/DESIGN

- **Analysis**
 - Pond routing using a volume-based hydrograph for the 2- and 10-year, SCS 24-hour storm event (Drain:Edge, ICPR, HEC-1, SedCAD, HYDRAFLOW, etc. perform full pond routings; TR55 does not perform a full pond routing; rational method cannot be used)
 - Hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications of the proposed land-disturbing activity, with and without the detention structure (results of

analysis will determine the need to modify the detention design or eliminate the detention requirement—see note 2 below)

- Inputs and outputs from analysis program
- Summary table of the peak inflows, peak outflows, discharge velocities, and maximum water surface elevations (WSE) for the 2- and 10-year, 24-hour storm events for each detention structure
- Stage-storage-discharge relationship for the outlet structure of each detention structure
- If a rating curve for the outlet structure must be generated externally from the analysis program (Drain:Edge, HEC-1, etc.), data and equations used to rate the outlet structure
- As-built of existing detention pond if the site drains to an existing detention pond (see below)
- *Note: SedCAD users please refer to the [memo regarding the input of outlet structures](#).*
- *Note: The Department recommends using the 10% rule in performing analysis. The hydrologic analysis should be conducted for the larger drainage area, where the site in question encompasses 10% of the total drainage area. For example, if your site is 10 acres, then the hydrologic analysis should be performed at the point downstream where the contributing drainage area, including your 10-acre site, is approximately 100 acres.*

• Design

- Detail of outlet structure and cross-section of the dam/ berm or pond bank, including elevations and dimensions that correspond to the calculations
- Orifice constructability considered (do not specify orifice diameters with increments of less than ¼")
- Maximum WSE for the 10-year storm event below the emergency spillway with 0.5-ft of freeboard between maximum WSE for the 10-year storm and the emergency spillway
- Maximum WSE for the 100-year storm event below the embankment with 0.5-ft of freeboard between maximum WSE for the 100-year storm and the embankment
- Dewatering time calculations for the 10-year storm event (dry ponds must drain completely within 72 hours)
- Bottom of all detention and retention ponds graded to have a slope of not less than 0.5%
- If the pond is to be used for sediment control during construction, temporary horseshoe-shaped riprap berm in front of any low level outlets provided during construction and shown on the pond detail
- Permanent maintenance access to all permanent detention structures (easements may be needed for structures surrounded by lots)
- Infiltration systems designed in accordance with S.C. Reg. 72-307.C(11) [specify how items a-j have been addressed]
- *Note: Emergency spillways should not be built on fill slopes.*
- *Note: The Department recommends installation of a trash rack or other debris-screening device on all pond risers.*
- *Note: The Department recommends a maximum slope of 3:1 on pond embankments to allow for ease of maintenance.*
- *Note: The Department recommends installation of sediment forebays at each outfall into the detention/ sediment basin.*

TAB 1.

11. AS-BUILTS

- Provided for all previously approved detention ponds that will receive flows from new drainage areas
- Prepared by a South Carolina Licensed Land Surveyor
- Grades/ contours/ depths for pond
- Elevations and dimensions of all outlet structures, including:
 - Pipe and orifice inverts and diameters
 - Weir elevations and dimensions
 - Riser dimensions and elevations
 - Emergency spillway dimensions and elevations
 - Locations and inverts for all pipes discharging into the pond
- If the elevations or dimensions of the structures listed above do not match those used in the approved plans, certification statement signed by the project's Registered Engineer indicating that the pond, as built, will function within all applicable standards provided [new analysis of the pond (routing) may be necessary]
- For projects located in the eight coastal counties: For any construction project permitted after September 1, 2006, as-built/record drawings will be required by DHEC-OCRM prior to stormwater permit closeout. Prior to the contractor requesting a final site inspection, one as-built drawing hard copy and 1 digital (scanned plan sheets as .tif or .pdf document) copy must be provided to OCRM staff.
- *Note: As-built survey and /or analysis must be submitted and accepted by the Department before Notice of Termination (NOT) is submitted.*

N/A

12. PERMANENT STORMWATER MANAGEMENT STRUCTURE MAINTENANCE

- Signed agreement from the responsible party accepting ownership and maintenance of the structure
- Description of maintenance plan to be used
- Schedule of maintenance procedures (e.g., every 6 months)
- Detailed or manufacturer-specific maintenance items for proprietary control devices (oil-water separators, etc.), underground detention structures, exfiltration systems and non-traditional stormwater controls (constructed wetlands, bioretention, etc.)
- Typical maintenance items to be addressed
 - Grass to be mowed
 - Trees to be removed from within the pond and on the embankment
 - Trash and sediment to be removed from inside of and around the pond outlet structure
 - Orifices to be cleaned and unclogged
 - Outlet pipe to be cleaned, inspected, and repaired
 - Sediment accumulation to be removed from pond
 - Pond bottom to be regraded to provide proper drainage towards the outlet discharge point
 - Energy dissipator to be cleaned and repaired
 - Emergency spillway, if applicable, to be inspected and repaired
 - Erosion on side slopes, if present, to be addressed
 - The Department must be notified in writing of any changes in maintenance responsibility for the stormwater devices at the site (include this statement in agreement).
- *Note: The Department recommends that the county, city, or other governing utility, which has the authority to accept the ownership and maintenance of a storm drainage system also accept the permanent stormwater management structure.*
- *Note: If the entity or person with maintenance responsibility changes, then a new maintenance agreement, signed by the new person responsible for maintenance, must be provided to the Department. If a new, signed maintenance agreement is not provided to the Department, then the entity/ person who signed the most recent maintenance agreement on file with the Department will be considered the responsible entity.*

N/A

13. DISCHARGE POINTS

- Storm drainage or pond outfalls carried to an existing drainage outfall such as a pipe, ditch, etc.
- No new point discharges onto adjacent property where there was not a point discharge previously, unless written permission from the adjacent property owner is provided
- Level spreaders, plunge pools, etc. provided when the proposed outlet is near the property line and not directed to an existing outfall, such as a creek or ditch
- Twenty (20)-foot minimum buffer is provided between the property line and the discharge point
- Outlets shall not discharge on fill slopes

DISCHARGE WILL BE TO BUFFALO CREEK.

14. DETENTION WAIVER

- *Note: If the 2- and 10-year, 24-hour post-developed flow rates exceed the pre-developed rates, [waivers](#) from detention may be granted in accordance with regulation 72-302(B) on a case-by-case basis*
- Justification and a written request, including the following statement: "*the increased flows will not have a significant adverse impact on the downstream/adjacent properties*"
- A project may be eligible for a waiver or variance of stormwater management for water quantity control if the applicant can demonstrate that:
 - The proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties; or
 - The imposition of peak control requirements for rates of stormwater runoff would aggravate downstream flooding
- Waiver signed by the project's Professional Engineer
- *Note: See note in checklist item 10 regarding the 10% rule.*

TAB 1. Any increase is negligible when compared to size of Buffalo Creek watershed.

15. PERMANENT WATER QUALITY REQUIREMENTS

- Permanent water quality addressed (all projects or LCP that disturb 5 or more acres)
 - Wet ponds designed to catch the first ½" of runoff from the entire area draining to the pond and release it over at least a 24-hour period

- Dry ponds designed to catch the first 1" of runoff from the entire area draining to the pond and release it over at least a 24-hour period
- For areas not draining to a pond, show how permanent water quality requirements were addressed
- Projects disturbing less than five (5) acres but within one-half (1/2) mile of a receiving water body in the Coastal Zone must meet Section III.C.3.XIII.A of the Coastal Zone Management Program Refinements. Designs must show that the first ½ inch of runoff from the entire site or the first one (1) inch of runoff from the built upon area, whichever is greater, can be stored onsite.
- Waters of the U.S./State are not used for permanent water quality control (alternative means of treatment must be used if an existing pond is to be used for water quantity control).
- *Note: Other non-traditional stormwater controls such as Bioretention areas, constructed wetlands, etc. may be used. Consult the [BMP Handbook](#) for information on the design of these devices.*
- *Note: Pre-fabricated or proprietary treatment devices are approved on a case-by-case basis if adequate removal efficiency can be demonstrated. Provide pollutant removal efficiency data, preferably from a third-party testing company. Type of system selected should be based on the ability to remove the pollutants of concern in that area/situation (bacteria, hydrocarbons, etc.).*

N/A.

16. SEDIMENTOLOGY

- Trapping efficiency calculations showing that all sediment basins/ traps are capable of achieving a sediment trapping efficiency of at least 80% for the 10-year, 24-hour storm event, if more than 10 disturbed acres drain to a common point (stream, lake, etc.)
- Sediment basins provide storage for the 10-year, 24-hour storm event for disturbed conditions or 3600 ft³/ acre draining to the basin, if more than 10 disturbed acres drain to a common point (stream, lake, property line, etc.)
- Sediment traps only used for drainage areas of less than 5 acres
- Sediment trap storage calculations, showing that 1800 ft³/ total acre draining to each trap is provided below the spillway
- If trapping efficiency calculations are required for sediment traps, then provide peak outflow, q_{po} , calculations; the 10-year, 24-hour storm event for construction conditions cannot overtop the trap's spillway
- Sediment basins and traps designed for total area draining to them
- Drainage area map outlining the area draining to each basin/ trap
- Copies of figures used to determine V_{15} (SV-1) and trapping efficiency (ST-1, SB-1, SB-2), if Design Aids from BMP manual are used to determine trapping efficiencies
- Silt fence only used in areas with drainage areas of less than ¼ acre per 100 LF of fence and not used in areas with concentrated flows
- Clean-out stake, marked at ½ the designed sediment storage depth, provided in all sediment basins/ sediment traps
- *Note: Consult the [BMP Handbook](#) for information on the design of these and other devices.*
- *Note: The Design Aids in the [BMP Handbook](#) cannot be used to determine trapping efficiencies for structures in series. If the flow for the 10-year, 24-hour storm for construction conditions overtops the structure or the structure's spillway, then the Design Aids cannot be used. If multiple soil types are in the area draining to the structure, then the soil type with the smallest D_{15} for the appropriate depth should be used to determine the settling velocity, V_{15} ; an average D_{15} should not be used.*
- *Note: SedCAD users please refer to the [memo regarding the input of outlet structures](#).*

TAB 4

17. STABLE CHANNEL CALCULATIONS

- All channels and diversion ditches able to handle the 10-year storm event with non-erosive velocities of less than 5 feet per second during construction (use appropriate CN for disturbed areas) and post-construction (if velocity exceeds 5 ft/s, then permanent measures to reduce the velocity to a non-erosive rate must be provided)
- Rock check dams provided in temporary diversions
- Installation detail for erosion control blanket (ECB) or turf reinforcement matting (TRM) if ECBs or TRMs to be used

TAB 4

18. INLET PROTECTION

- Provided at all inlets
- Hay bales not used

Updated 10/3/06

- Steel posts and buried fabric shown for filter fabric inlet protection
- Inlet protection details provided for pre-paving and after roadways have been paved
- *Note: The Department recommends that an inlet not have more than one (1) acre draining to it.*

SEE PLANS

19. ENERGY DISSIPATORS/ OUTLET PROTECTION

- All outlets stabilized
- Riprap aprons sized appropriately
- Riprap detail shows apron dimensions and stone sizes for each pad or each pipe diameter
- Filter fabric installed beneath all riprap

SEE PLANS

20. FILL SLOPES AND/ OR EMBANKMENTS

- All slopes stabilized
- Slope drains designed in accordance with the [BMP Handbook](#)
- Slope drains provided where concentrated flows discharge onto a fill slope
- For all slopes steeper than 1.5:1, identification of stabilization practice (e.g., ECB, TRM)
- *Note: Measures, in addition to grassing or hydroseeding, include synthetic or vegetative matting, diversion berms, temporary slope drains, etc.*
- *Note: If retaining walls or fill slopes are to be constructed at the downstream property line, the Department recommends a 10' buffer to allow for construction and maintenance. If a 10' buffer is not provided, then provide permission from the adjacent property owner for possible land-disturbing activities on his property.*

SEE PLANS.

21. UTILITY LINES

- Limits of disturbance include areas disturbed for water and sewer line installation
- Inlet protection provided at all existing inlets that receive flows from the disturbed areas; also add this as a note on the plans
- For all utility lines crossing WoS, narrative and detail showing sediment and erosion control measures provided on plans
- Note for construction entrances to be provided at all locations where construction traffic accesses a paved roadway

SEE PLANS.

22. TMDL/ 303d IMPAIRED WATERBODIES

- List the nearest S.C.DHEC Water Quality Monitoring Station (WQMS) that the site's stormwater discharges drain to and the waterbody on which it is located: [B-057, BUFFALO CREEK](#)
- Qualitative and quantitative assessment (described in Section 3.4C of SCR100000), if nearest WQMS listed on the [2004 303\(d\) List of Impaired Waters](#) **and** if site's stormwater construction discharges contain the pollutant of impairment **and** if site disturbs 25 or more acres
- Evaluation of selected BMPs if nearest WQMS listed on the [2004 303\(d\) List of Impaired Waters](#) **and** if site's stormwater construction discharges contain the pollutant of impairment **and** if site disturbs less than 25 acres
- If [Approved TMDL](#) developed for nearest WQMS **and** if site's stormwater construction discharges contain the pollutant of impairment, showed that measures and controls on SWPPP met assumptions and requirements of TMDL (may need to contact [Watershed Manager](#) for assistance)
- *Note: Contact Department staff for guidance on selection of BMPs based on pollutant of impairment.*

TAB 2.

23. NAVIGABLE WATERS

- Extra plan sheet showing impacts to navigable water and description of activity included if S.C. Navigable Waters (SCNW) crossing and separate SCNW permit has not been obtained for all activities
- *Note: For NOIs initially submitted to delegated entities, if project has SCNW crossing and if separate SCNW permit has not been obtained for this crossing, then this item will be reviewed by S.C. DHEC before NPDES coverage will be granted.*

TAB 2.

24. OCRM REQUIREMENTS

- *Note: The following items only apply to those projects in the eight coastal counties.*
- If a project is within a half-mile of a receiving water body (RWB) or is one (1) or more acre in size, a digital project boundary must be submitted and approved by the OCRM GIS department. If OCRM's review of the project location indicates potential impacts to Coastal Resources on projects disturbing less than or equal to 0.5 acre but within ½ mile of a RWB, then OCRM staff will notify the applicant to submit an NOI. For projects which will disturb more than 0.5 acre and are located within ½ mile of a RWB, the NOI and other pertinent information must be submitted with the digital boundary. Please include the completed digital submittal form along with the electronic boundary. Go to <http://www.scdhec.gov/environment/ocrm/permit/stormwater.htm> for instructions.
- Any freshwater wetlands on the site must be identified and verified by the US Army Corps of Engineers (USACOE). A Corps wetland verification letter and corresponding signed, sealed and dated wetland plat must accompany the application package. The dates on the plat and verification letter must correspond. The Corp verification letter must reference the plat as an "accurate depiction" and not preliminary or approximation. The plat needs to identify whether or not the wetlands are jurisdictional or non-jurisdictional. Include USACOE permit number on the permit application if applicable.

If non-jurisdictional wetlands are being impacted, a wetland impact statement as shown below must be completed along with an 8.5 x 11 inch map indicating the wetland acreages, amount and type of impacts. A USGS topographic map should also be submitted indicating the location of the project.

"This project is proposed to impact ___ acres of Federally non-jurisdictional freshwater wetlands. These proposed impacts require approval under the SCCZM program. This plan will (fill, excavate, otherwise impact) (give individual wetland size by acres) for a total impact of (total acreage). Mitigation will be provided for these proposed impacts by (describe mitigation, giving acreages of preserved wetlands and/or buffers/credits)." If no mitigation is proposed, the notice needs to state as such.

- If saltwater/critical areas are located on the site, an OCRM approved delineation and plat must be included with the submittal package.
- If the proposed project is adjacent to saltwater/critical areas then a dock master plan will need to be submitted (if applicable) with the permit application package.
- Water and Sewer Certification requests if applicable.
- See item #15, 4th bullet of this checklist for additional water quality requirements in the Coastal Zone.

25. SITE PLANS CHECKLIST:

- *Note: The Department may require phased sediment and erosion control plans for large or complicated projects.*
- Location map with site outlined on first plan sheet (map should have enough detail to identify Surface Waters of the State within 1 mile of the site)
- North arrow and scale
- Property lines and adjacent landowners' names
- Legend
- Registered engineer's signed and dated seal
- Engineering Firm's Certificate of Authorization seal
- Existing and proposed contours for entire disturbed area
- Limits of disturbed area
- Locations of off-site material, waste, borrow, or construction equipment storage areas, excluding roll-off containers (*Note: Some off-site disturbed areas may require a separate application for NPDES coverage*)
- Location and identification of any stormwater discharges associated with industrial activity (not construction)
- Delineation of WoS, including wetlands (see checklist item 8)
- Easements
- Road profiles with existing and proposed ground elevations (if no contours are shown on the plans)
- Grassing and stabilization specifications (temporary and permanent)
- Construction sequence (implementation of all stormwater and sediment controls in the first phase of construction; ensure that basins, traps, ponds, etc. can be installed before the area draining to them is cleared and grubbed)
- Standard notes (see following page)

- Temporary and permanent control measures (provide details of all sediment and erosion control measures used; make sure the label or legend on the plans matches the name on the detail)
Note: Maintenance requirements for each BMP should be listed on the detail.
Note: If details from the [BMP Handbook](#) are used, then the inspection frequency must be changed to be in accordance with the new CGP (see Standard note 3).

Standard Notes

1. If necessary, slopes, which exceed eight (8) vertical feet should be stabilized with synthetic or vegetative mats, in addition to hydroseeding. It may be necessary to install temporary slope drains during construction. Temporary berms may be needed until the slope is brought to grade.
2. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after work has ceased, except as stated below.
 - Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions stabilization measures must be initiated as soon as practicable.
 - Where construction activity on a portion of the Site is temporarily ceased, and earth-disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on that portion of the Site.
3. All sediment and erosion control devices shall be inspected every seven (7) days. If site inspections identify BMPs that are damaged or are not operating effectively, maintenance must be performed as soon as practical or as reasonably possible and before the next storm event whenever practicable.

OR

All sediment and erosion control devices shall be inspected at least once every fourteen (14) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. If site inspections identify BMPs that are damaged or are not operating effectively, maintenance must be performed as soon as practical or as reasonably possible and before the next storm event whenever practicable.

4. Provide silt fence and/or other control devices, as may be required, to control soil erosion during utility construction. All disturbed areas shall be cleaned, graded, and stabilized with grassing immediately after the utility installation. Fill, cover, and temporary seeding at the end of each day are recommended. If water is encountered while trenching, the water should be filtered to remove any sediments before being pumped back into any waters of the State.
5. All erosion control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control devices may be required during construction in order to control erosion and/or offsite sedimentation. All temporary control devices shall be removed once construction is complete and the site is stabilized.
6. The contractor must take necessary action to minimize the tracking of mud onto paved roadway(s) from construction areas and the generation of dust. The contractor shall daily remove mud/soil from pavement, as may be required.
7. Residential subdivisions require erosion control features for infrastructure as well as for individual lot construction. Individual property owners shall follow these plans during construction or obtain approval of an individual plan in accordance with S.C Reg. 72-300 et seq. and SCR100000.
8. Temporary diversion berms and/or ditches will be provided as needed during construction to protect work areas from upslope runoff and/or to divert sediment-laden water to appropriate traps or stable outlets.
9. All waters of the State (WoS), including wetlands, are to be flagged or otherwise clearly marked in the field. A double row of silt fence is to be installed in all areas where a 50-foot buffer can't be maintained between the disturbed area and all WoS. A 10-foot buffer should be maintained between the last row of silt fence and all WoS.
10. Litter, construction debris, oils, fuels, and building products with significant potential for impact (such as stockpiles of freshly treated lumber) and construction chemicals that could be exposed to storm water must be prevented from becoming a pollutant source in storm water discharges.

S-83 (Blacksburg Highway) Bridge Replacement over Buffalo Creek Roadway Drainage Summary Report

I. INTRODUCTION

This project is a bridge replacement along S-83, Blacksburg Highway, in Cherokee County. Improvements include replacement of the bridge over Buffalo Creek and improvements to the associated roadway approaches. All total the project is 0.327 miles long. The land use for this section is primarily wooded and rural development. This report covers the drainage calculations for the roadway portion of the improvements.

II. SITE VISITS

An in-depth field visit was performed by the design team in March 2011. The purpose of this visit was to inventory existing drainage and flow patterns and to verify boundaries of watersheds draining through the project. Photos from the site visit can be found in this report.

A Design Field Review was conducted with SCDOT on June 8, 2011.

III. HYDROLOGY & STORMWATER MANAGEMENT

The calculations in this notebook are for all aspects of the drainage design required for construction. The Rainfall intensity values were taken from the "Gaffney" area of the Rainfall Intensity Values table utilized by the South Carolina Department of Transportation. The 10-year storm was used to design the open drainage system. The 25-year storm was used for design on all crossline pipes and the 100-year storm was used as a check for overtopping.

The storm water management design of this project, including the sediment and erosion control design, complies with the South Carolina Department of Transportation Requirements for Hydraulic Design Studies dated May 26, 2009.

IV. PRE-CONSTRUCTION VS. POST-CONSTRUCTION ANALYSIS

The entire project drains to Buffalo Creek. Due to the large watershed to Buffalo Creek, any increase in runoff from this project will not have a significant adverse impact on the downstream/adjacent properties.

V. CROSS LINE PIPE

The existing 36" CMP cross line at station 119+50 was analyzed using HY8 software. The pipe was designed for the 25 year storm with a HW/d < 1.2 and it was verified that the 100-year storm does not overtop the roadway.

SCDOT's Resident Maintenance Engineer in Cherokee County inspected the existing CMP and determined that it is in poor condition. Therefore, the pipe will have to be either replaced or lined as well as extended.

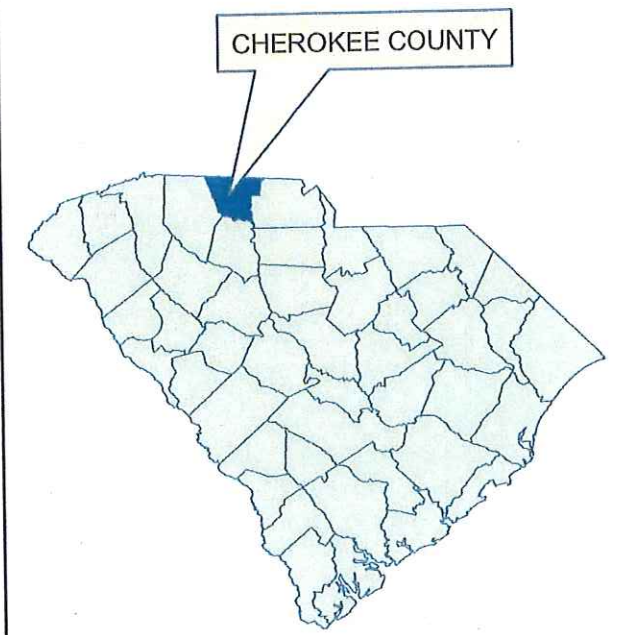
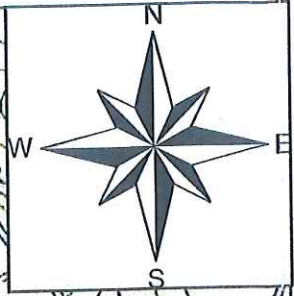
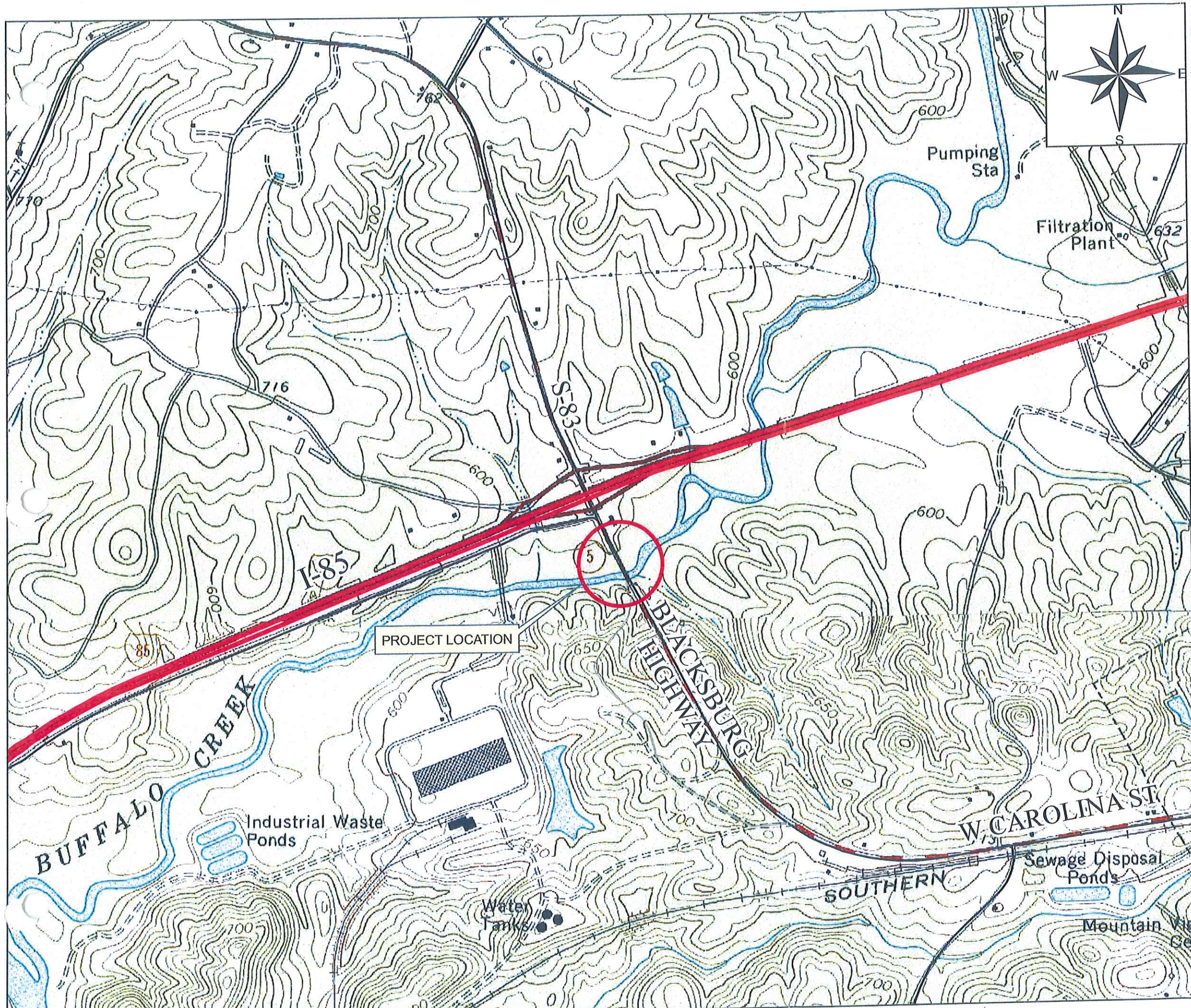


VI. ROADSIDE DITCHES

Calculations for the roadside ditches are included in this notebook. Channel capacity and stability was checked using the HEC-15 methodology for Vegetative Class "C". Due to the steep slopes in the area, a portion of the roadside ditch requires permanent erosion control matting in order to prevent erosion. This area has been designated on the plans in the Erosion Control Data Sheet.

VII. DESIGN SOFTWARE

- Microstation V8i
- HEC-15 LPA, Inc.
- Hydraflow Hydrographs by Intelisolve, version 9.26
- HY-8 (for Windows), version 7.1.0



PROJECT LOCATION MAP

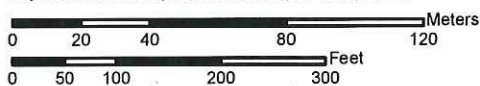
S-83 over Buffalo Creek



Soil Map—Cherokee County, South Carolina



Map Scale: 1:2,180 if printed on A size (8.5" x 11") sheet.



MAP LEGEND

 Area of Interest (AOI)	 Very Stony Spot
 Soils	 Wet Spot
 Soil Map Units	 Other
Special Point Features	Special Line Features
 Blowout	 Gully
 Borrow Pit	 Short Steep Slope
 Clay Spot	 Other
 Closed Depression	Political Features
 Gravel Pit	 Cities
 Gravelly Spot	Water Features
 Landfill	 Oceans
 Lava Flow	 Streams and Canals
 Marsh or swamp	Transportation
 Mine or Quarry	 Rails
 Miscellaneous Water	 Interstate Highways
 Perennial Water	 US Routes
 Rock Outcrop	 Major Roads
 Saline Spot	 Local Roads
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	
 Spoil Area	
 Stony Spot	

MAP INFORMATION

Map Scale: 1:2,180 if printed on A size (8.5" x 11") sheet.
 The soil surveys that comprise your AOI were mapped at 1:20,000. Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cherokee County, South Carolina
 Survey Area Data: Version 8, Jan 8, 2009
 Date(s) aerial images were photographed: 6/16/2006; 6/17/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Cherokee County, South Carolina (SC021)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Mv	Mixed alluvial land	1.2	26.6%
NaC2	Nason very fine sandy loam, 6 to 10 percent slopes, eroded	1.2	28.3%
TaF3	Tatum silty clay loam, 15 to 35 percent slopes, severely eroded	1.5	34.0%
TmB2	Tatum very fine sandy loam, 2 to 6 percent slopes, eroded	0.0	0.8%
TmE2	Tatum very fine sandy loam, 15 to 25 percent slopes, eroded	0.2	5.3%
W	Water	0.2	5.0%
Totals for Area of Interest		4.3	100.0%



APPROXIMATE SCALE



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CHEROKEE COUNTY,
SOUTH CAROLINA
(UNINCORPORATED AREAS)

PANEL 61 OF 175

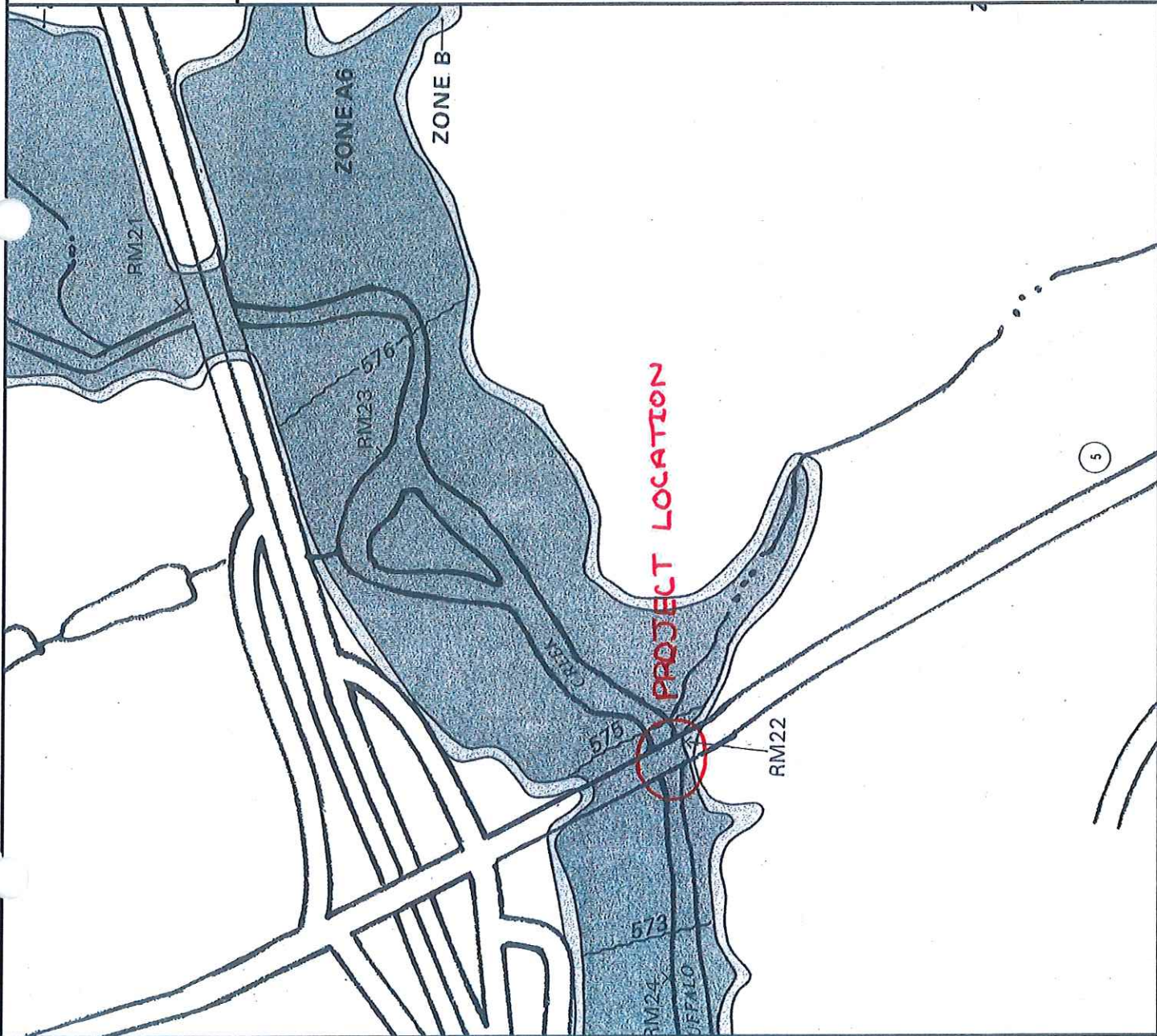
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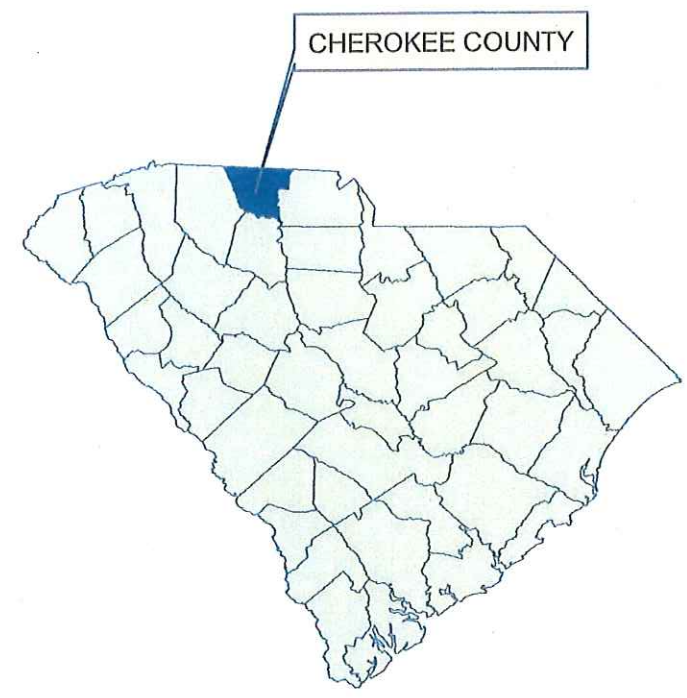
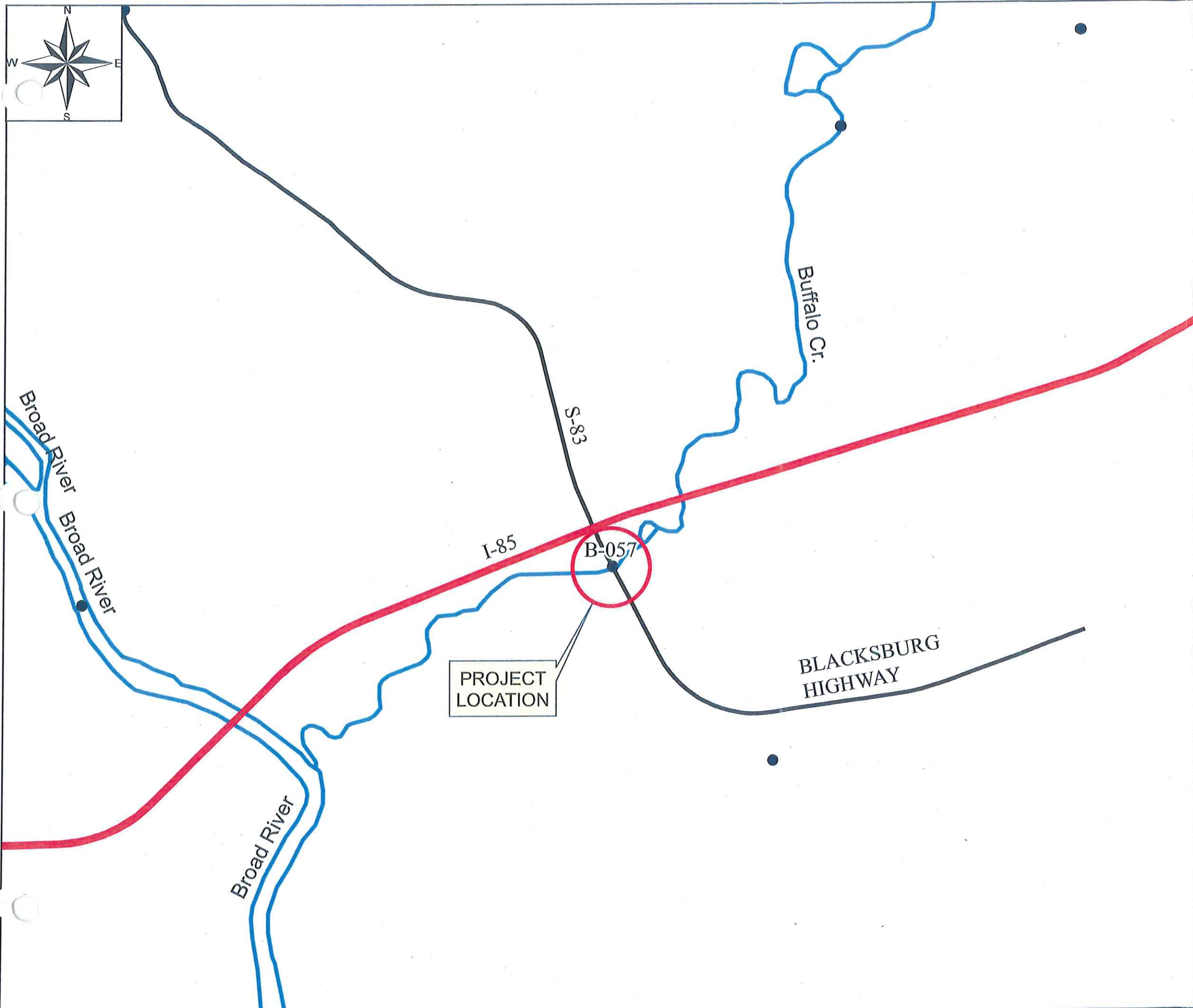
EFFECTIVE DATE:
JULY 2, 1981



federal emergency management agency
federal insurance administration

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov





Legend

- SC Navigable Streams
- WQMS

**WATERS OF THE STATE
WQMS/303D LIST
S-83 over Buffalo Creek**



Appendix B: SC Waters' 1 Approved TMDL

NOTE	BA	12-DIGIT HUC	DESCRIPTION	STATION	COUNTY	USE	CAUSE	USE SUPPORT	TMDL	DHEC_TECH REPORT	REVAL DATE
	BROAD	030501050506	SUCK CK AT S-11-60 5 MI ENE OF CHESNEE	RS-07038	CHEROKEE	REC	FC	Not Supported	WnTMDL	022-04	04/22/10
	BROAD	030501050805	BUFFALO CK AT SC 5 1 MI W OF BLACKSBURG	B-057	CHEROKEE	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501050805	BUFFALO CREEK AT S-11-213, 2.2 MI NNW OF BLACKSBURG	B-119	CHEROKEE	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501050902	KINGS CREEK AT S-11-209, 3 MI W OF SMYRNA	B-333	CHEROKEE	REC	FC	Not Supported	WnTMDL	022-04	09/30/04
	BROAD	030501051001	LIMESTONE CK AT S-11-301	B-128	CHEROKEE	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051002	IRENE CK AT S-11-307 2.5 MI W OF GAFFNEY	B-059	CHEROKEE	REC	FC	Fully Supported	InTMDL	022-04	09/30/04
	BROAD	030501051002	THICKETTY CREEK AT S-11-164	B-095	CHEROKEE	REC	FC	Fully Supported	InTMDL	022-04	09/30/04
	BROAD	030501051002	LITTLE THICKETTY CREEK AT S-42-307 1.2 MI NE OF COWPENS	RS-04376	SPARTANBURG	REC	FC	Not Supported	WnTMDL	022-04	09/30/04
	BROAD	030501051003	GILKEY CK AT S-11-231, 9 MI SE OF GAFFNEY	B-334	CHEROKEE	REC	FC	Fully Supported	InTMDL	022-04	09/30/04
	BROAD	030501051004	THICKETTY CK AT SC 211 2 MI AB JCT WITH BROAD RVR	B-062	CHEROKEE	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051004	THICKETTY CK AT SC 18 8.3 MI S OF GAFFNEY	B-133	CHEROKEE	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051101	CLARK FORK INTO CRAWFORD LK ON UN# RD NEAR SC 161 & 705-KINGS MT	B-325	YORK	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051101	LONG BRANCH ON SC 216 BL KINGS MTN PK REC AREA	B-326	YORK	REC	FC	Fully Supported	InTMDL	022-04	09/30/04
	BROAD	030501051103	BULLOCK CK AT SC 97 4.8 MI S OF HICKORY GROVE	B-159	YORK	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051103	BULLOCK CREEK AT SC 211 8.43 MI WSW OF YORK	RS-05394	YORK	REC	FC	Not Supported	WnTMDL	022-04	09/30/04
	BROAD	030501051202	PAGE CK AT S-42-1258 1.7 MI SE LANDRUM	B-301	SPARTANBURG	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051203	N PACOLET RVR AT S-42-956 6.5 MI E LANDRUM	B-026	SPARTANBURG	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051203	N PACOLET RVR AT S-42-978, 1 MI SE OF FINGERVILLE	B-126	SPARTANBURG	REC	FC	Not Supported	InTMDL	022-04	09/30/04
	BROAD	030501051203	OBEED CREEK AT UNNUMBERED CHRISTOPHER ROAD OFF SC 11	RS-03514	SPARTANBURG	REC	FC	Not Supported	WnTMDL	022-04	09/30/04

THE LPA GROUP INCORPORATED

P.O. Box 5805 Columbia, South Carolina 29250
 700 Huger St. Columbia, South Carolina 29201
 (803) 254-2211

JOB S-83 over Buffalo Creek

SHEET NO. 3 OF _____

CALCULATED BY SDN DATE 5-11-11

CHECKED BY _____ DATE _____

SCALE _____

Cross line @ 119+50

DA = 35 Ac. Offsite	0.25	8.75	
0.37 Ac. Rdway	0.90	0.333	C = 0.26
35.37		9.083	

$T_c = 33 \text{ min.} \rightarrow I_{10} = 3.828 \text{ in/hr}$
 $I_{25} = 4.363 \text{ in/hr}$
 $I_{100} = 5.180 \text{ in/hr}$

$Q_{10} = (0.26)(3.828)(35.37) = 35.20 \text{ cfs}$
 $Q_{25} = (0.26)(4.363)(35.37) = 40.12 \text{ cfs} \rightarrow \text{Design Storm}$
 $Q_{100} = (0.26)(5.180)(35.37) = 47.64 \text{ cfs} \rightarrow \text{check for overtopping}$

Roadway Elev. = 606.49
 Width = 50

36" CMP
 $\frac{(588.00 - 571.96)}{110} (132) \rightarrow \text{New US Inv.} = 591.20$

Per HY8: 36" CMP OK if extended w/ HW

$\frac{HW}{d}$ for 25-yr is < 1.2

100-yr does not overtop

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project S-83 over Buffalo Creek By _____ Date _____
 Location 119+50 Checked _____ Date _____

Circle one: Present Developed
 Circle one: T_c T_t through subarea _____

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

Sheet Flow (Applicable to T_c only)

1 Surface Description (table 3-1) -----				
2 Manning's roughness coeff., n (table 3-1) -----				
3 Flow length, L (total L < or = 100) -----	ft	100		
4 Two-yr 24-hr rainfall, P ₂ -----	in	3.50		
5 Land slope, s -----	ft/ft	0.0660		
6 T _t = 0.007 (nL) ^{0.8} / (P ₂ ^{0.5} s ^{0.4}) Compute T _t -----	hr	0.370	+	0.000 = 0.370

Shallow Concentrated Flow

7 Surface Description (paved or unpaved) -----				
8 Flow length, L -----	ft	250		
9 Watercourse slope, s -----	ft/ft	0.0660		
10 Average velocity, V (figure 3-1) -----	ft/s	4.15		0.00
11 T _t = L / (3600 V) Compute T _t -----	hr	0.017	+	0.000 = 0.017

Channel Flow

Front Slope, (_ : 1) -----		12		
Back Slope, (_ : 1) -----		12		
Bottom Width -----	ft	4		
Flow Depth -----	ft	1		
12 Cross sectional flow area, a -----	ft ²	16.00		0.00
13 Wetted perimeter, p _w -----	ft	28.08		0.00
14 Hydraulic radius, r = a / p _w Compute r -----	ft	0.57		#DIV/0!
15 Channel Slope, s -----	ft/ft	0.0775		
16 Manning's roughness coeff., n -----		0.10		
17 V = 1.49 r ^{2/3} s ^{1/2} / n Compute V -----	ft/s	2.85		#DIV/0!
18 Flow length, L -----	ft	1708		
19 T _t = L / (3600 V) Compute T _t -----	hr	0.166	+	0.000 = 0.166
20 Watershed or subarea T _c or T _t (add T _t in steps 6, 11, and 19)				hr 0.553
				min 33.17

The LPA Group Incorporated
700 Huger Street
Columbia, South Carolina 29201

Job: S 83 over Buffalo Creek
Sheet : _____
Calculated By: SDN Date: 5/11/2011
Checked By: _____ Date: _____

LPA - Intensity Calculator (S.C. Version)

Design Input

County/Area : Gaffney
Storm Event : 10-year
Time to Concentration : 33.000

Computed Data

Intensity : 3.828

The LPA Group Incorporated
700 Huger Street
Columbia, South Carolina 29201

Job: S 83 over Buffalo Creek
Sheet : _____
Calculated By: SDN Date: 5/11/2011
Checked By: _____ Date: _____

LPA - Intensity Calculator (S.C. Version)

Design Input

County/Area : Gaffney
Storm Event : 25-year
Time to Concentration : 33.000

Computed Data

Intensity : 4.363

The LPA Group Incorporated
700 Huger Street
Columbia, South Carolina 29201

Job: S 83 over Buffalo Creek
Sheet : _____
Calculated By: SDN Date: 5/11/2011
Checked By: _____ Date: _____

LPA - Intensity Calculator (S.C. Version)

Design Input

County/Area : Gaffney
Storm Event : 50-year
Time to Concentration : 33.000

Computed Data

Intensity : 4.777

The LPA Group Incorporated
700 Huger Street
Columbia, South Carolina 29201

Job: S 83 over Buffalo Creek
Sheet : _____
Calculated By: SDN Date: 5/11/2011
Checked By: _____ Date: _____

LPA - Intensity Calculator (S.C. Version)

Design Input

County/Area : Gaffney
Storm Event : 100-year
Time to Concentration : 33.000

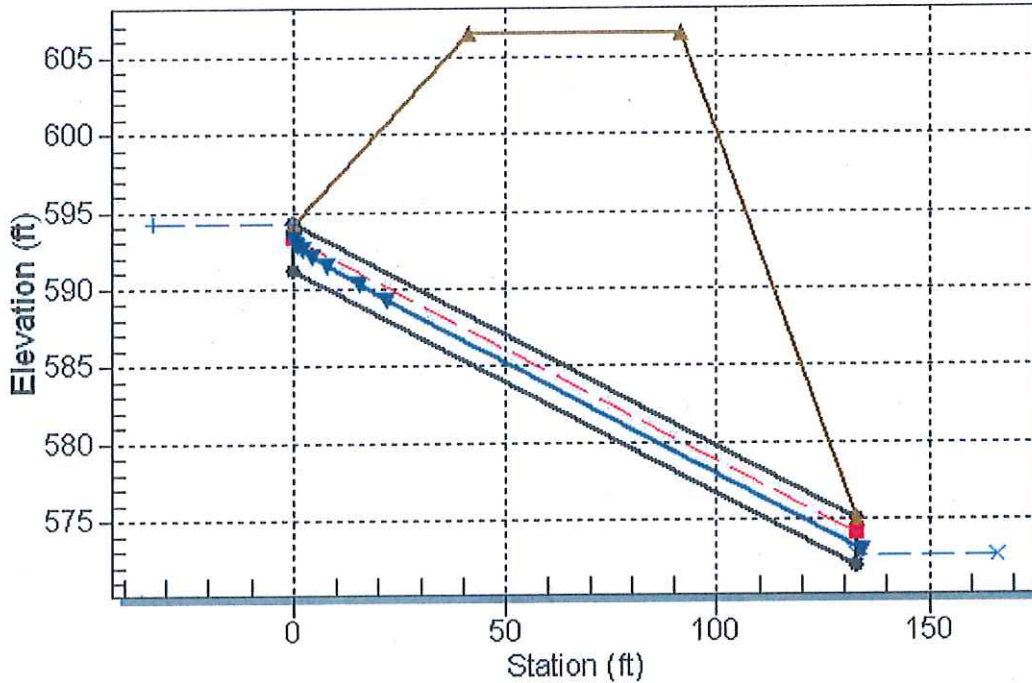
Computed Data

Intensity : 5.180

HY-8 Culvert Analysis Report

Water Surface Profile Plot for Culvert: Culvert 1

Crossing - Crossing 1, Design Discharge - 40.1 cfs
Culvert - Culvert 1, Culvert Discharge - 40.1 cfs



Site Data - Culvert 1

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 591.20 ft
Outlet Station: 133.00 ft
Outlet Elevation: 571.96 ft
Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular
Barrel Diameter: 3.00 ft
Barrel Material: Corrugated Aluminum
Barrel Manning's n: 0.0310
Inlet Type: Conventional
Inlet Edge Condition: Square Edge with Headwall
Inlet Depression: None

Table 1 - Downstream Channel Rating Curve (Crossing: Crossing 1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
35.20	572.65	0.69	4.13	0.98	1.13
36.44	572.66	0.70	4.16	1.00	1.13
37.69	572.67	0.71	4.20	1.01	1.14
38.93	572.68	0.72	4.25	1.02	1.14
40.12	572.69	0.73	4.27	1.04	1.14
41.42	572.70	0.74	4.30	1.05	1.14
42.66	572.71	0.75	4.34	1.07	1.15
43.91	572.72	0.76	4.38	1.08	1.15
45.15	572.73	0.77	4.40	1.09	1.15
46.40	572.74	0.78	4.43	1.11	1.15
47.64	572.75	0.79	4.47	1.12	1.16

Tailwater Channel Data - Crossing 1

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 4.00 ft

Side Slope (H:V): 12.00 (1:1)

Channel Slope: 0.0227

Channel Manning's n: 0.0300

Channel Invert Elevation: 571.96 ft

Roadway Data for Crossing: Crossing 1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 606.49 ft

Roadway Surface: Paved

Roadway Top Width: 50.00 ft

Table 1 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
35.20	35.20	593.95	2.754	0.000	1-S2n	1.186	1.922	1.187	0.693	13.525	4.126
36.44	36.44	594.03	2.830	0.000	1-S2n	1.209	1.957	1.210	0.704	13.662	4.163
37.69	37.69	594.11	2.909	0.000	1-S2n	1.230	1.991	1.231	0.714	13.808	4.198
38.93	38.93	594.19	2.988	0.000	1-S2n	1.252	2.026	1.255	0.723	13.883	4.247
40.12	40.12	594.26	3.065	0.000	5-S2n	1.272	2.059	1.278	0.734	13.962	4.269
41.42	41.42	594.35	3.150	0.000	5-S2n	1.295	2.096	1.295	0.744	14.162	4.301
42.66	42.66	594.43	3.233	0.000	5-S2n	1.316	2.125	1.324	0.753	14.177	4.342
43.91	43.91	594.52	3.318	0.000	5-S2n	1.338	2.153	1.343	0.762	14.314	4.381
45.15	45.15	594.60	3.405	0.000	5-S2n	1.359	2.182	1.372	0.773	14.323	4.400
46.40	46.40	594.69	3.493	0.000	5-S2n	1.381	2.210	1.389	0.782	14.478	4.434
47.64	47.64	594.78	3.583	0.000	5-S2n	1.402	2.239	1.408	0.791	14.614	4.466

Inlet Elevation (invert): 591.20 ft, Outlet Elevation (invert): 571.96 ft

Culvert Length: 134.38 ft, Culvert Slope: 0.1447

JOB 583 over Buffalo Creek

THE LPA GROUP INCORPORATED
 P.O. Box 5805 Columbia, South Carolina 29250
 700 Huger St. Columbia, South Carolina 29201
 (803) 254-2211

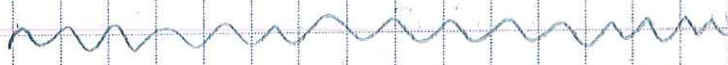
SHEET NO. 1 OF _____

CALCULATED BY SDN DATE 5-11-11

CHECKED BY _____ DATE _____

SCALE _____

Stable Channel Calculations



(*) Ditch from 115125 to 116158 RT

HPV @ 108100 per USGS Quad
 L = 858 ft

DA: 858 x 14 = 0.28 Ac.	Paved	0.90	0.252	C = 0.49
858 x 30 = 0.59 Ac.	Gross/Woods	0.30	0.177	
			0.429	
		0.87 Ac		

SCDOT I values for Gullfry:

T_e = 5 min, I₁₀ = 6.77 in/hr

$$Q_{10} = (0.49)(6.77)(0.87) = 2.89 \text{ cfs}$$

2:1 SS, 2' FB

$$\text{Slope} = \frac{624.77 - 616}{100} = 8.77\%$$

Per HEC 15 → Unstable w/ veg. → Line w/ Mat or Concrete to match existing.

(*) Ditch from 116158 to 118129 RT

Not being touched w/ new construction

DA: 1029 x 14 = 0.33 Ac.	Paved	0.90	0.297
(858 x 30) + (171 x 40) = 0.75 Ac.	Gross/Woods	0.30	0.225
			1.08
			0.522

c = 0.48

$$Q_{10} = (0.48)(6.77)(1.08) = 3.51 \text{ cfs}$$

$$\frac{606}{11500} \frac{604}{11650} = \frac{12}{150} = 8\%$$

→ Per HEC 15 → Unstable w/ veg. but not currently lined & not modified w/ construction

THE LPA GROUP INCORPORATED

P.O. Box 5805 Columbia, South Carolina 29250
 700 Huger St. Columbia, South Carolina 29201
 (803) 254-2211

JOB S-83 over Buffalo Creek
 SHEET NO. 2 OF _____
 CALCULATED BY SDN DATE 5-11-11
 CHECKED BY _____ DATE _____
 SCALE _____

⊛ Ditch from Beg. to Milliken Rd. - LT

$L = 117+00 - 108+00 = 900 \text{ ft}$

DA = 15 Ac. offsite

T_c line = 650 ft., wooded, heavy underbrush

$T_c = 26 \text{ min} \rightarrow I_{10} = 4.296 \text{ in/hr}$

15 Ac.	0.25	3.75	
0.29 Ac.	0.90	0.261	$C = 0.26$
15.29		4.011	

$Q_{10} = (0.26)(4.296)(15.29) = 17.08 \text{ cfs}$

$\frac{626.00 - 621.05}{100} = 4.95\%$

⊛ Ditch from 120+50 to 122+50 LT

$L = 12250 - 12050 = 200 \text{ ft.}$

DA =	0.016 Ac.	0.90	0.054	$C = 0.39$
	0.32 Ac.	0.30	0.096	
	0.38 Ac.		0.15	

$Q_{10} = (0.39)(4.296)(0.38) = 0.64 \text{ cfs}$

$\frac{600.08 - 595.08}{200} = 2.5\% \text{ slope}$

<* 1 Print Profile S83

Beginning profile S83 description:

```

=====
          STATION      ELEV      GRADE      TOTAL L      BACK L      AHEAD L
VPI      1      115+32.00    627.6729
VPC      119+35.00    607.5229    -5.0000    K = 86.1
VPI      2      121+10.00    598.7729    350.0000    175.0000    175.0000
VPT      122+85.00    597.1402    -0.9330
VPC      127+25.00    593.0350    -0.9330    K = 65.5
Low Point 127+86.13    592.7499
VPI      3      129+15.00    591.2624    380.0000    190.0000    190.0000
VPT      131+05.00    600.5097    4.8670
VPC      131+30.00    601.7265    4.8670    K = 59.5    SSD = 445.3
VPI      4      131+80.00    604.1600    100.0000    50.0000    50.0000
VPT      132+30.00    605.7531    3.1862
VPI      5      132+47.00    606.2947    3.1862
=====
  
```

Ending profile S83 description

The LPA Group Incorporated
700 Huger Street
Columbia, South Carolina 29201

Job: S 83 over Buffalo Creek
Sheet : _____
Calculated By: SDN Date: 5/11/2011
Checked By: _____ Date: _____

LPA - Intensity Calculator (S.C. Version)

Design Input

County/Area : Gaffney
Storm Event : 10-year
Time to Concentration : 5.000

Computed Data

Intensity : 6.770

The LPA Group Incorporated
 2530 Devine Street
 Columbia, South Carolina 29205

Job: S-83 over Buffalo Creek
 Sheet : _____
 Calculated By: SDN Date: 5/11/2011
 Checked By: _____ Date: _____

LPA - Visual HEC 15

Roadside Channels with Flexible Linings

Design Input

Channel Discharge = 2.89 cfs
 Channel Grade = 0.087700 ft/ft
 Side Slope - Left = 2.00:1
 Side Slope - Right = 2.00:1
 Channel Bottom Width = 2.00 feet

HP to 116+58 RT

Lining Type	Flow Depth (ft)	Velocity (fps)	n	Permissible Stress (psf)	Computed Stress (psf)	Status
Woven paper net	0.16	7.80	0.015	0.15	0.87	Unstable
Jute net	0.20	6.04	0.022	0.45	1.09	Unstable
Fiberglass roving: single	0.19	6.23	0.021	0.60	1.06	Unstable
Fiberglass roving: double	0.19	6.23	0.021	0.85	1.06	Unstable
Straw with net	0.25	4.59	0.033	1.45	1.38	Stable
Curled wood mat	0.26	4.41	0.035	1.55	1.42	Stable
Synthetic mat	0.21	5.55	0.025	6.00	1.17	Stable
Vegetative: Class A	1.04	0.68	0.483	3.70	5.71	Unstable
Class B	0.65	1.34	0.191	2.10	3.58	Unstable
Class C	0.46	2.14	0.099	1.00	2.53	Unstable
Class D	0.39	2.65	0.073	0.60	2.14	Unstable
Class E	0.35	3.02	0.061	0.35	1.93	Unstable

The LPA Group Incorporated
 2530 Devine Street
 Columbia, South Carolina 29205

Job: S-83 over Buffalo Creek
 Sheet : _____
 Calculated By: SDN Date: 5/11/2011
 Checked By: _____ Date: _____

LPA - Visual HEC 15

Roadside Channels with Flexible Linings

Design Input

Channel Discharge = 3.51 cfs
 Channel Grade = 0.080000 ft/ft
 Side Slope - Left = 2.00:1
 Side Slope - Right = 2.00:1
 Channel Bottom Width = 2.00 feet

116158-118429 RT

Lining Type	Flow Depth (ft)	Velocity (fps)	n	Permissible Stress (psf)	Computed Stress (psf)	Status
Woven paper net	0.18	8.07	0.015	0.15	0.92	Unstable
Jute net	0.23	6.24	0.022	0.45	1.14	Unstable
Fiberglass roving: single	0.22	6.44	0.021	0.60	1.11	Unstable
Fiberglass roving: double	0.22	6.44	0.021	0.85	1.11	Unstable
Straw with net	0.29	4.73	0.033	1.45	1.44	Stable
Curled wood mat	0.30	4.54	0.035	1.55	1.49	Stable
Synthetic mat	0.25	5.72	0.025	6.00	1.23	Stable
Vegetative: Class A	1.11	0.75	0.428	3.70	5.52	Unstable
Class B	0.71	1.45	0.175	2.10	3.54	Unstable
Class C	0.51	2.28	0.093	1.00	2.54	Unstable
Class D	0.43	2.81	0.070	0.60	2.17	Unstable
Class E	0.39	3.19	0.058	0.35	1.97	Unstable

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project S-83 over Buffalo Creek By _____ Date _____
 Location Begin to Milliken Rd - LT Checked _____ Date _____

Circle one: Present Developed
 Circle one: T_c T_t through subarea _____

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

Sheet Flow (Applicable to T_c only) Segment ID

- 1 Surface Description (table 3-1) -----
- 2 Manning's roughness coeff., n (table 3-1) -----
- 3 Flow length, L (total L < or = 100) -----
- 4 Two-yr 24-hr rainfall, P₂ -----
- 5 Land slope, s -----
- 6 $T_t = 0.007 (nL)^{0.8} / (P_2^{0.5} s^{0.4})$ Compute T_t -----

woods/kudzu	
0.800	
ft	100
in	3.50
ft/ft	0.0538
hr	0.401 + 0.000 = 0.401

Shallow Concentrated Flow Segment ID

- 7 Surface Description (paved or unpaved) -----
- 8 Flow length, L -----
- 9 Watercourse slope, s -----
- 10 Average velocity, V (figure 3-1) -----
- 11 $T_t = L / (3600 V)$ Compute T_t -----

unpaved	
ft	550
ft/ft	0.0538
ft/s	3.74 0.00
hr	0.041 + 0.000 = 0.041

Channel Flow Segment ID

- Front Slope, (_ : 1) -----
- Back Slope, (_ : 1) -----
- Bottom Width -----
- Flow Depth -----
- 12 Cross sectional flow area, a -----
- 13 Wetted perimeter, p_w -----
- 14 Hydraulic radius, $r = a / p_w$ Compute r -----
- 15 Channel Slope, s -----
- 16 Manning's roughness coeff., n -----
- 17 $V = 1.49 r^{2/3} s^{1/2} / n$ Compute V -----
- 18 Flow length, L -----
- 19 $T_t = L / (3600 V)$ Compute T_t -----
- 20 Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)

ft	
ft	
ft ²	0.00 0.00
ft	0.00 0.00
ft	#DIV/0! #DIV/0!
ft/ft	
ft/s	#DIV/0! #DIV/0!
ft	
hr	#DIV/0! + #DIV/0! = 0.000
	hr 0.442
	min 26.51

The LPA Group Incorporated
700 Huger Street
Columbia, South Carolina 29201

Job: S 83 over Buffalo Creek
Sheet : _____
Calculated By: SDN Date: 5/11/2011
Checked By: _____ Date: _____

LPA - Intensity Calculator (S.C. Version)

Design Input

County/Area : Gaffney
Storm Event : 10-year
Time to Concentration : 26.000

Computed Data

Intensity : 4.296

The LPA Group Incorporated
 2530 Devine Street
 Columbia, South Carolina 29205

Job: S-83 over Buffalo Creek 12050-12250 L
 Sheet : _____
 Calculated By: SDN Date: 8/4/2011
 Checked By: _____ Date: _____

LPA - Visual HEC 15

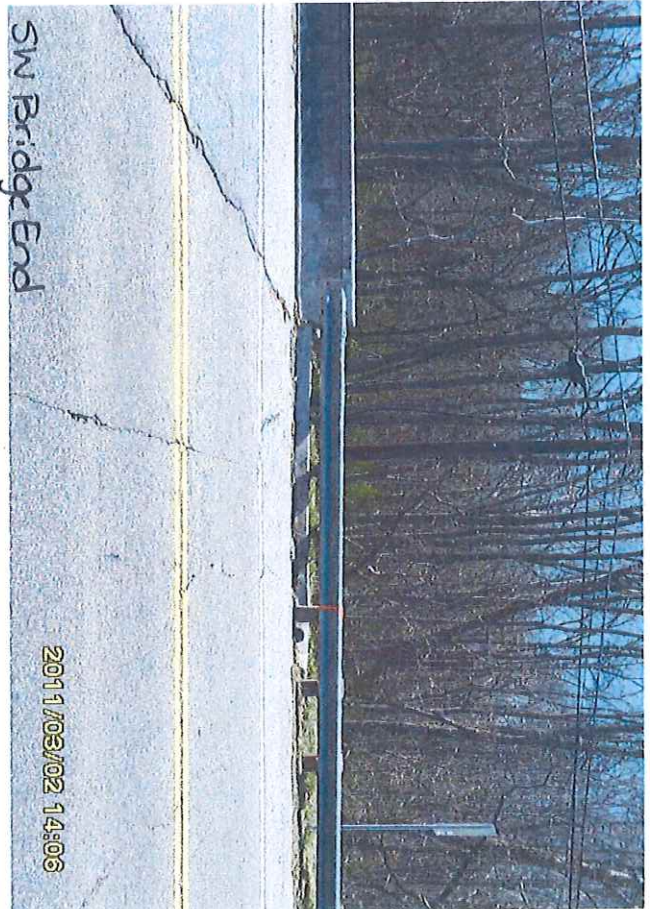
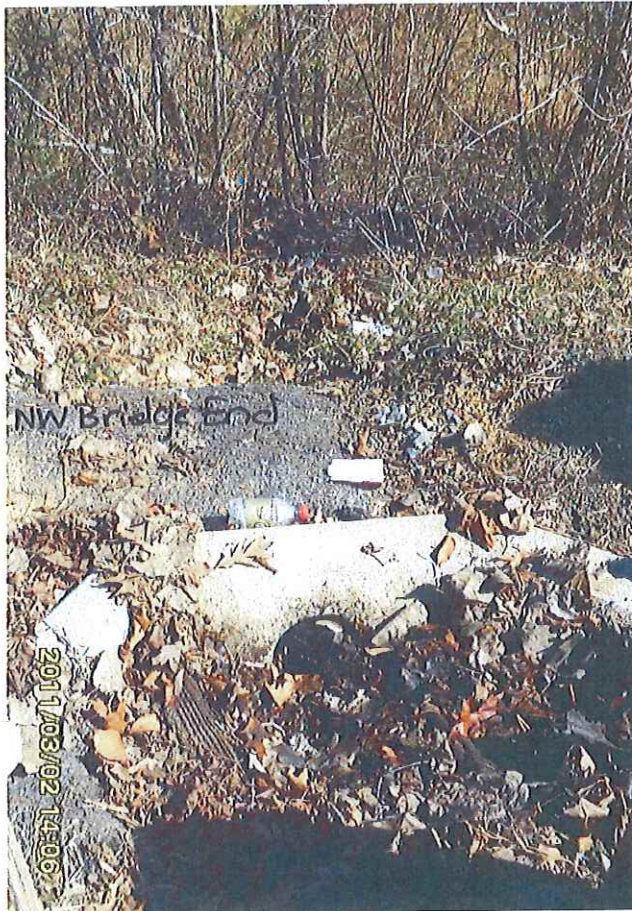
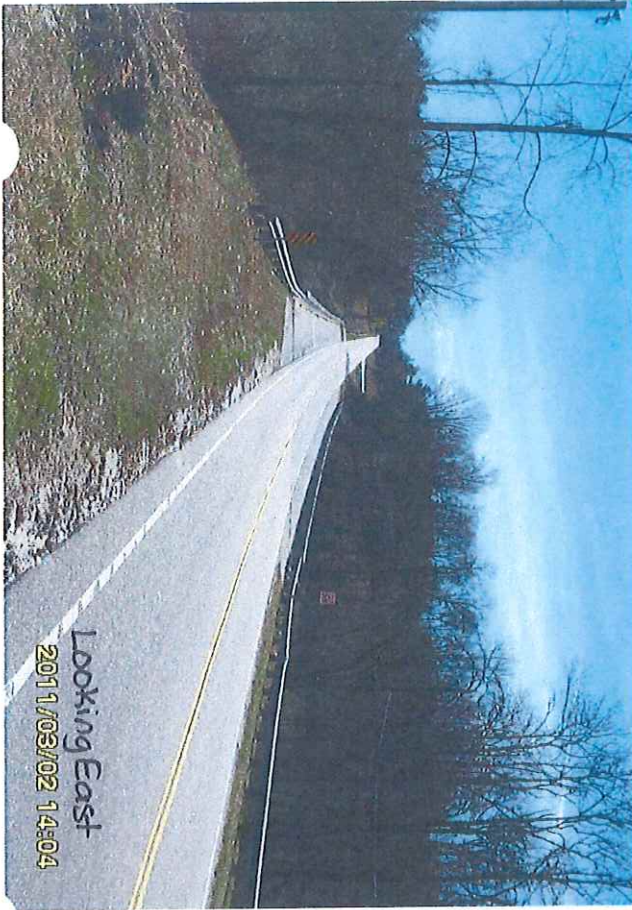
Roadside Channels with Flexible Linings

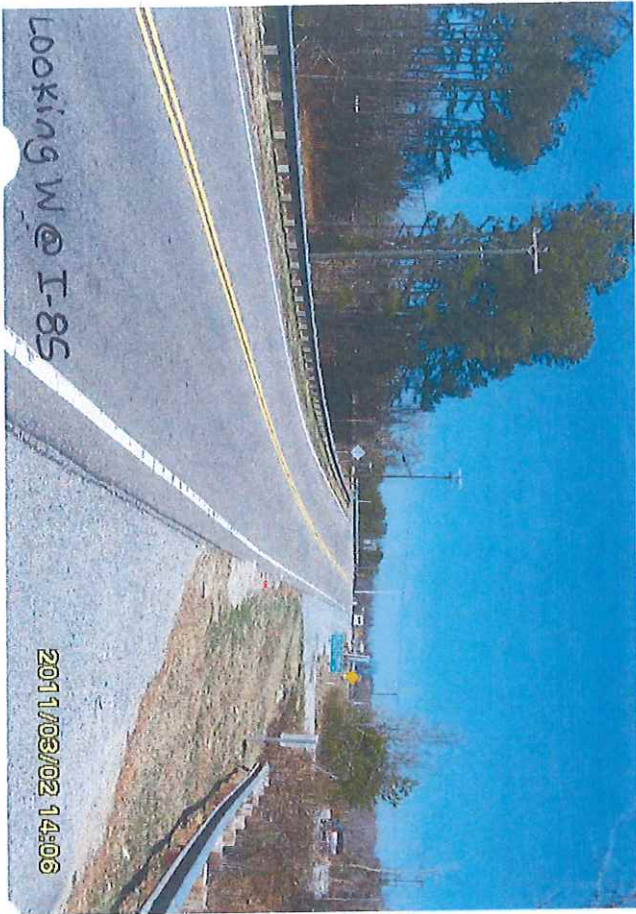
Design Input

Channel Discharge = .64 cfs
 Channel Grade = 0.025000 ft/ft
 Side Slope - Left = 6.00:1
 Side Slope - Right = 2.00:1
 Channel Bottom Width = 0.00 feet

Lining Type	Flow		n	Permissible Stress (psf)	Computed Stress (psf)	Status
	Depth (ft)	Velocity (fps)				
Woven paper net	0.22	3.46	0.015	0.15	0.34	Unstable
Jute net	0.25	2.60	0.022	0.45	0.39	Stable
Fiberglass roving: single	0.24	2.69	0.021	0.60	0.38	Stable
Fiberglass roving: double	0.24	2.69	0.021	0.85	0.38	Stable
Straw with net	0.29	1.92	0.033	1.45	0.45	Stable
Curled wood mat	0.30	1.83	0.035	1.55	0.46	Stable
Synthetic mat	0.26	2.36	0.025	6.00	0.41	Stable
Vegetative: Class A	1.66	0.06	3.498	3.70	2.59	Stable
Class B	0.98	0.17	0.851	2.10	1.53	Stable
Class C	0.64	0.39	0.271	1.00	0.99	Stable
Class D	0.52	0.59	0.159	0.60	0.81	Unstable
Class E	0.46	0.74	0.117	0.35	0.72	Unstable

March 2, 2011 - Site Visit





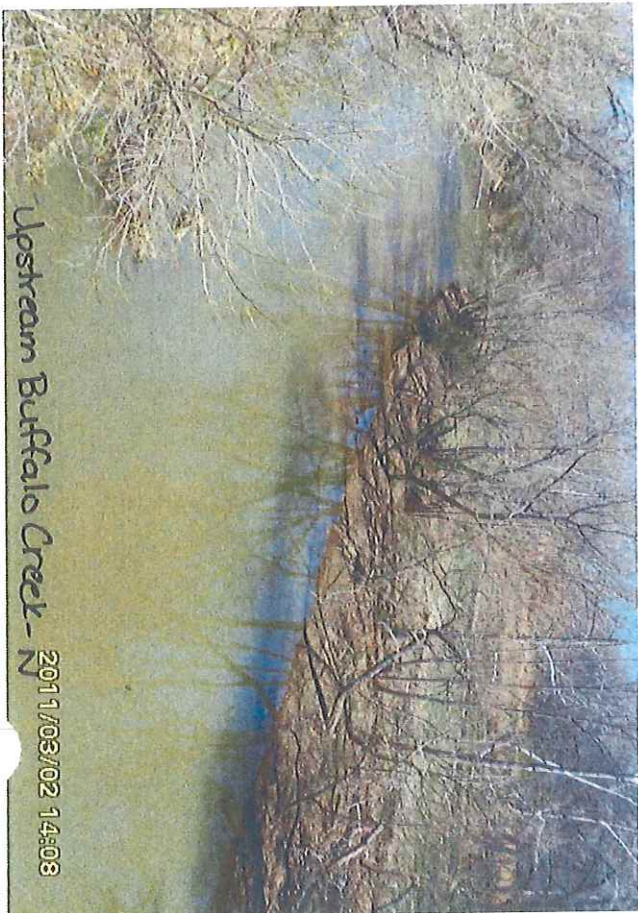
Looking W @ I-85

2011/03/02 14:06



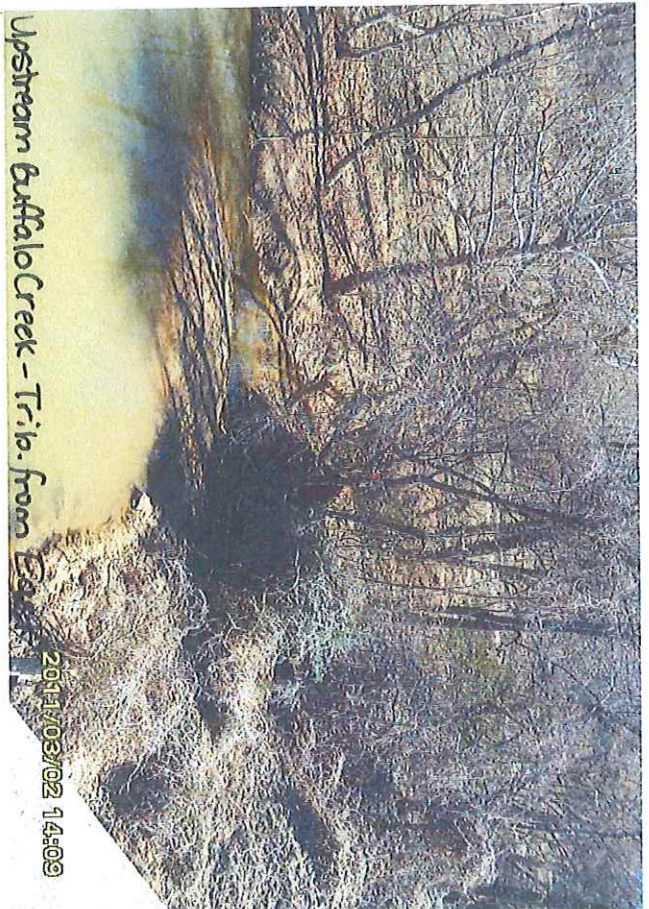
2011/03/02 14:07

Scuppers on N side of bridge



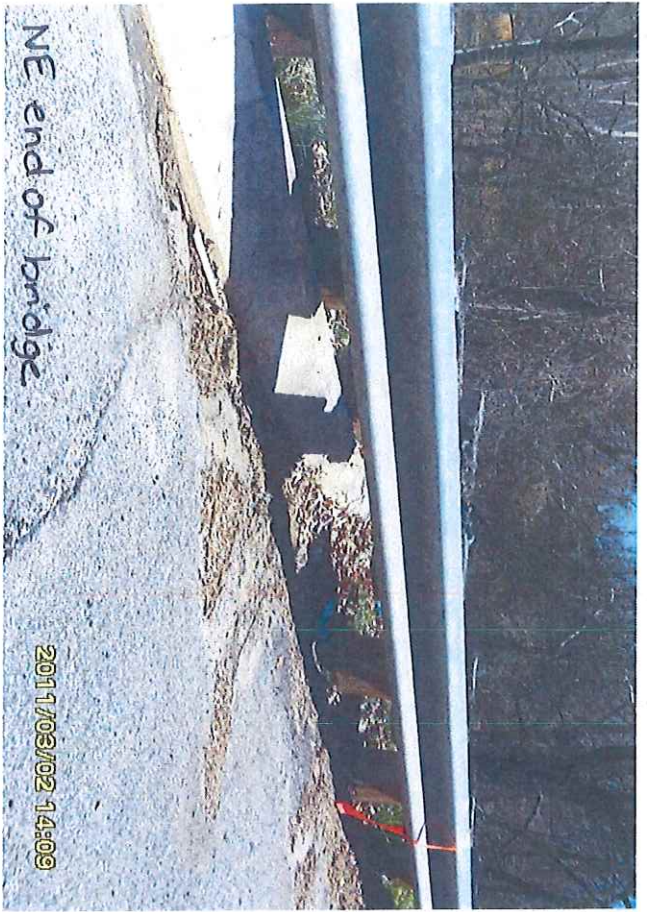
Upstream Buffalo Creek

2011/03/02 14:08



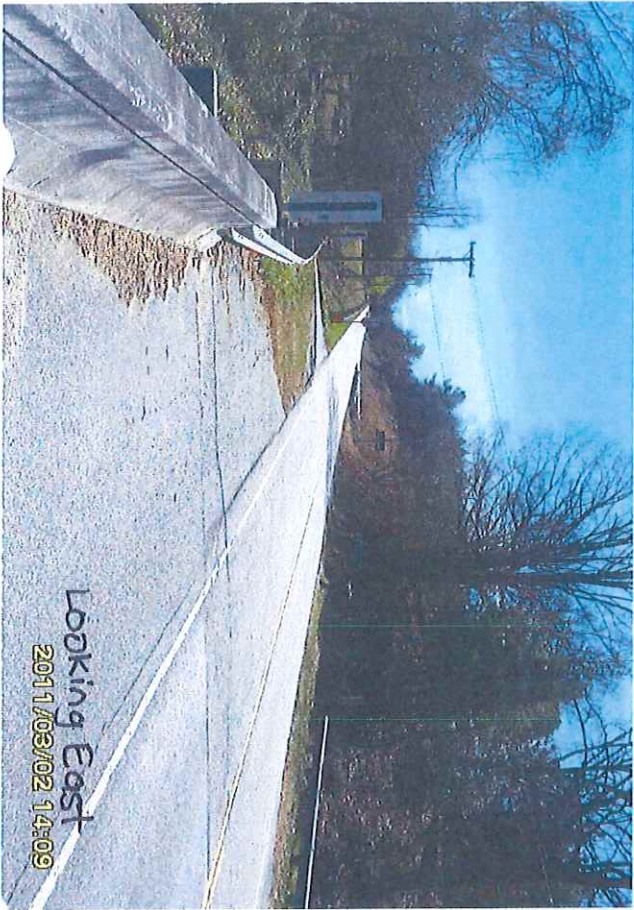
Upstream Buffalo Creek - Trib. from East

2011/03/02 14:09



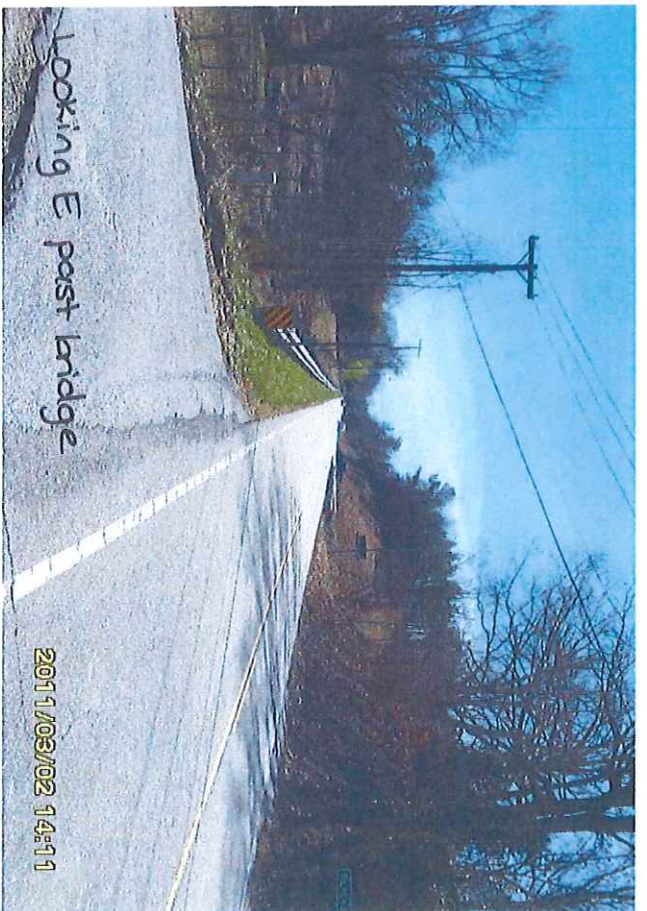
NE end of bridge

2011/03/02 14:09



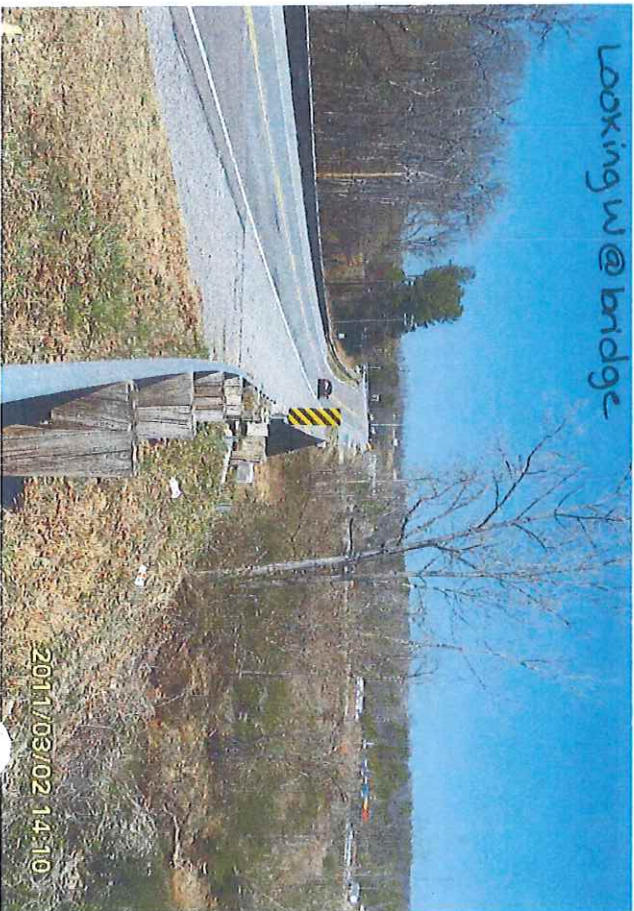
Looking East

2011/03/02 14:09



Looking E past bridge

2011/03/02 14:11



Looking W @ bridge

2011/03/02 14:10

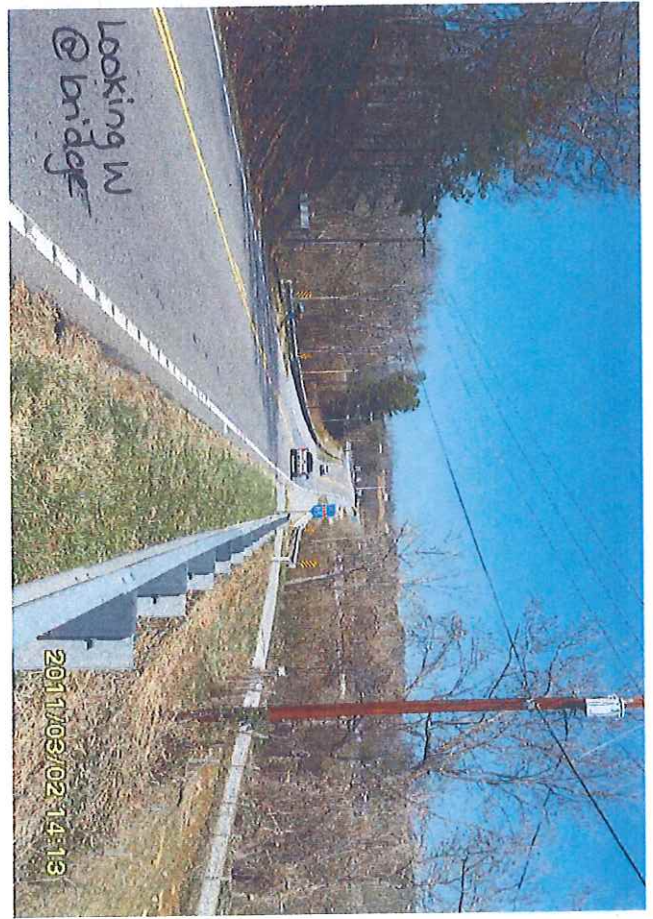
Looking E @ N side of roadway



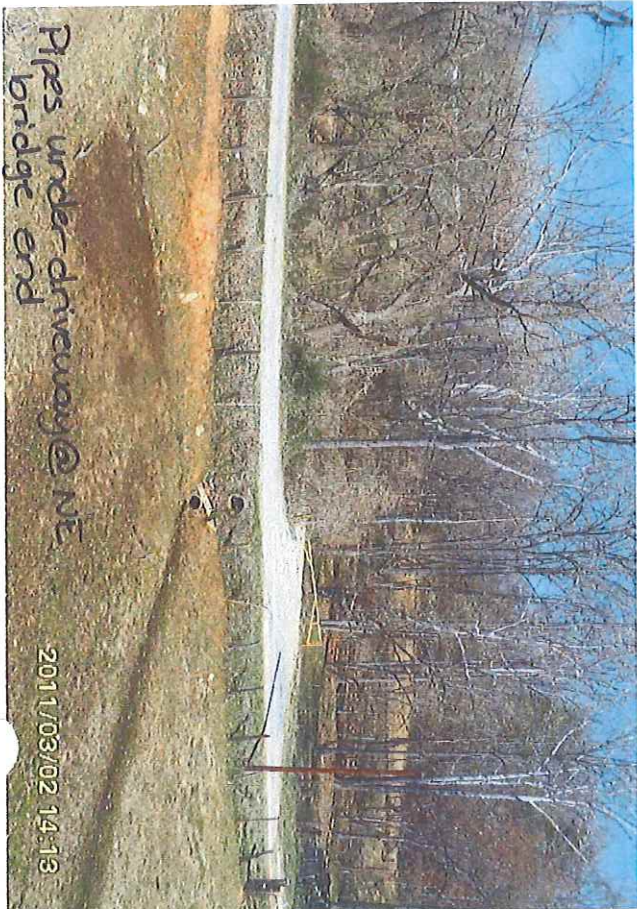
Looking @ NE bridge end



Looking W @ bridge



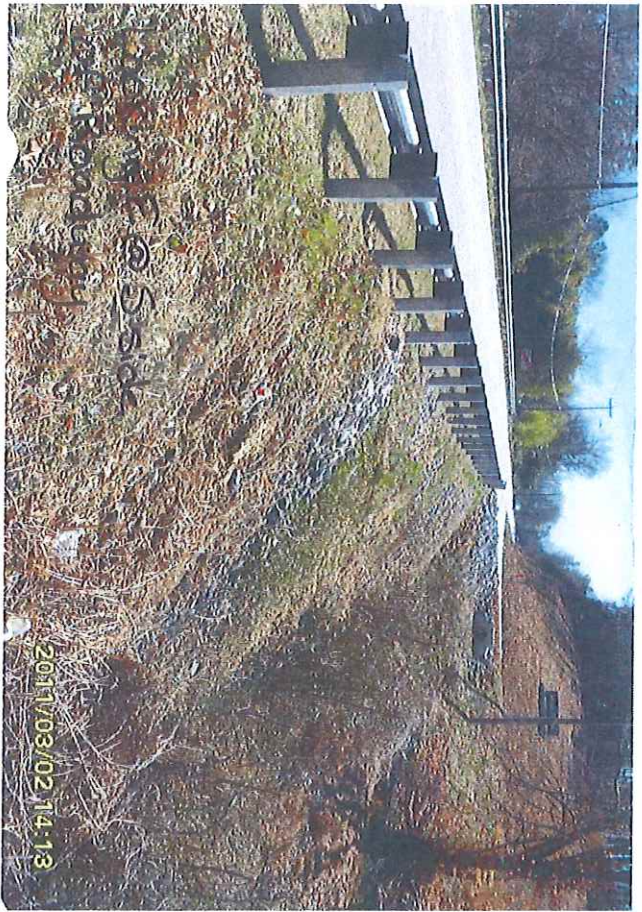
Pipes under driveway @ NE





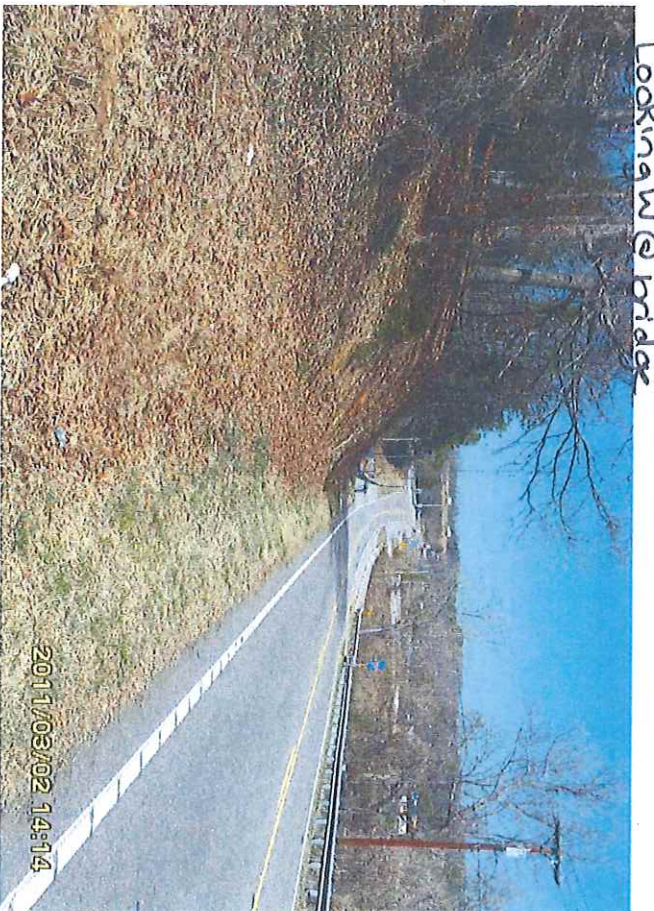
Looking @
S side of
Foodway

2011/03/02 14:14



Looking @
S side
Foodway

2011/03/02 14:13



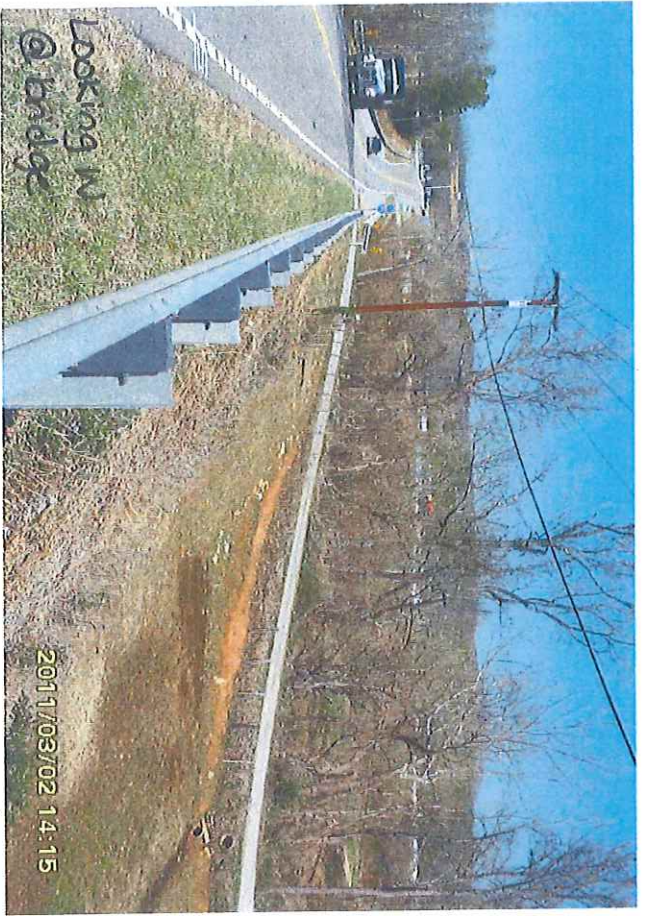
Looking W @ bridge

2011/03/02 14:14



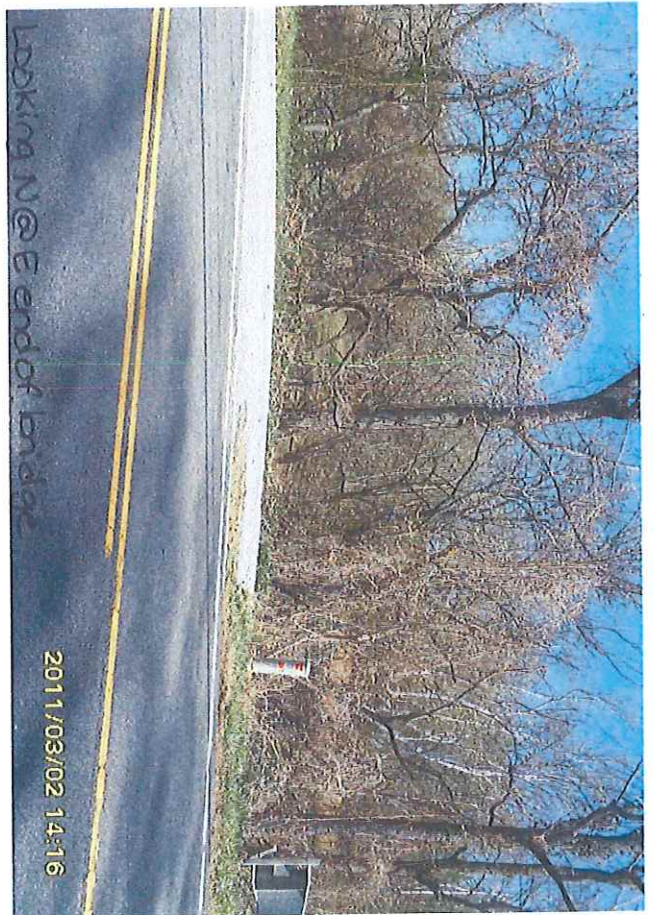
Looking S @ End of bridge

2011/03/02 14:14



Looking W @ bridge

2011/03/02 14:15



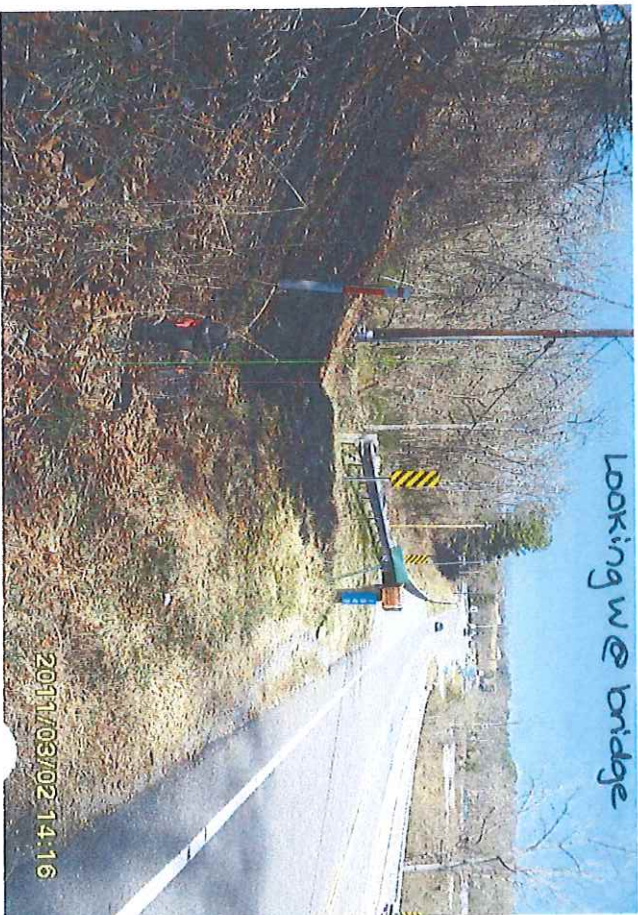
Looking N @ E end of bridge

2011/03/02 14:16



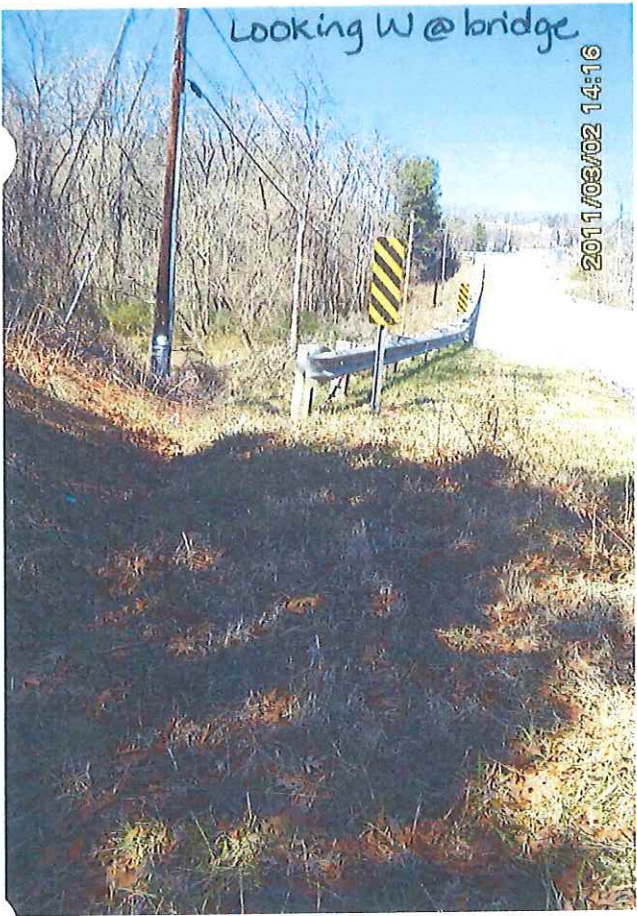
Looking N @ End of bridge

2011/03/02 14:15



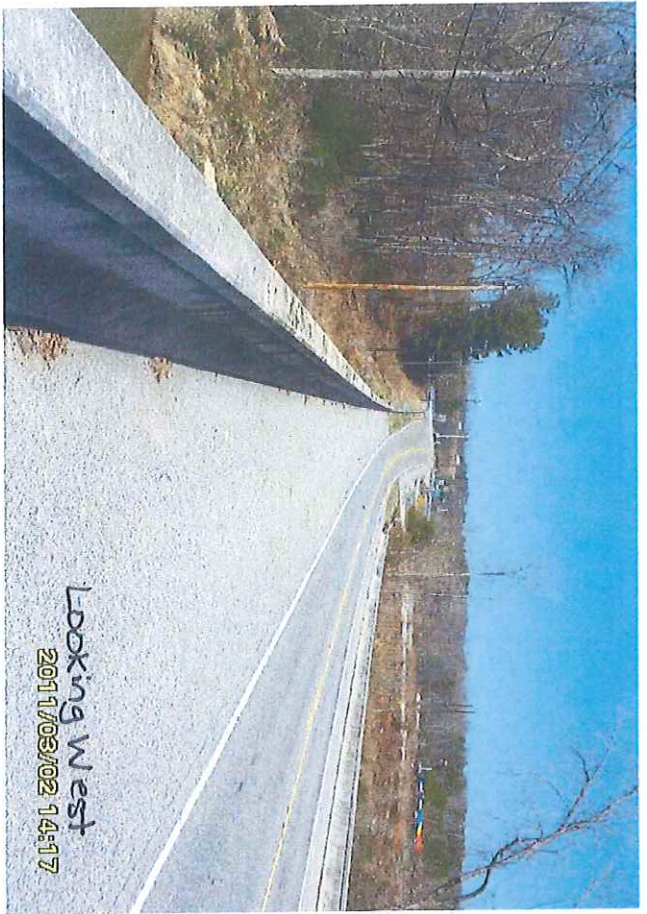
Looking W @ bridge

2011/03/02 14:16



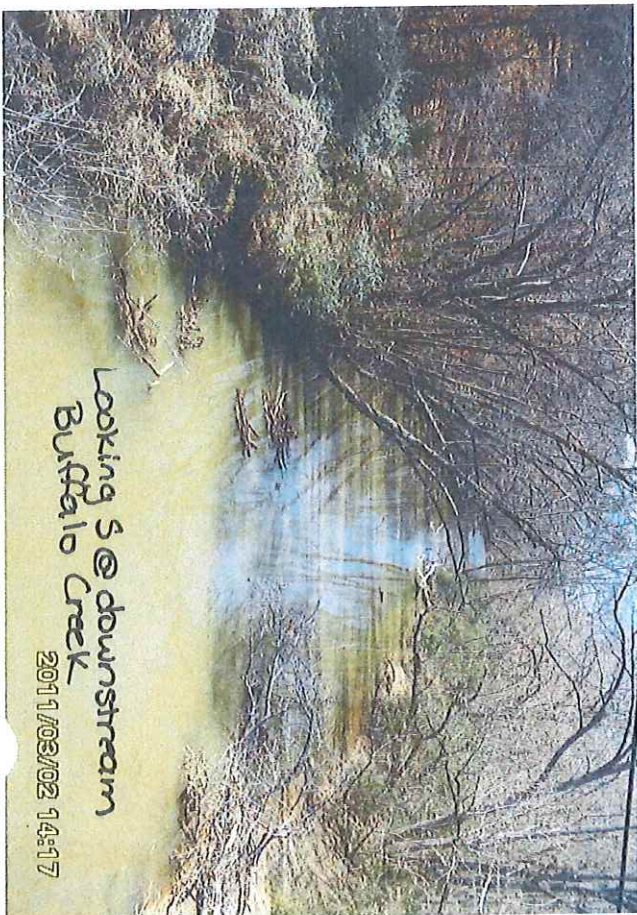
Looking W @ bridge

2011/03/02 14:16



Looking West

2011/03/02 14:17



Looking S @ downstream Buffalo Creek

2011/03/02 14:17



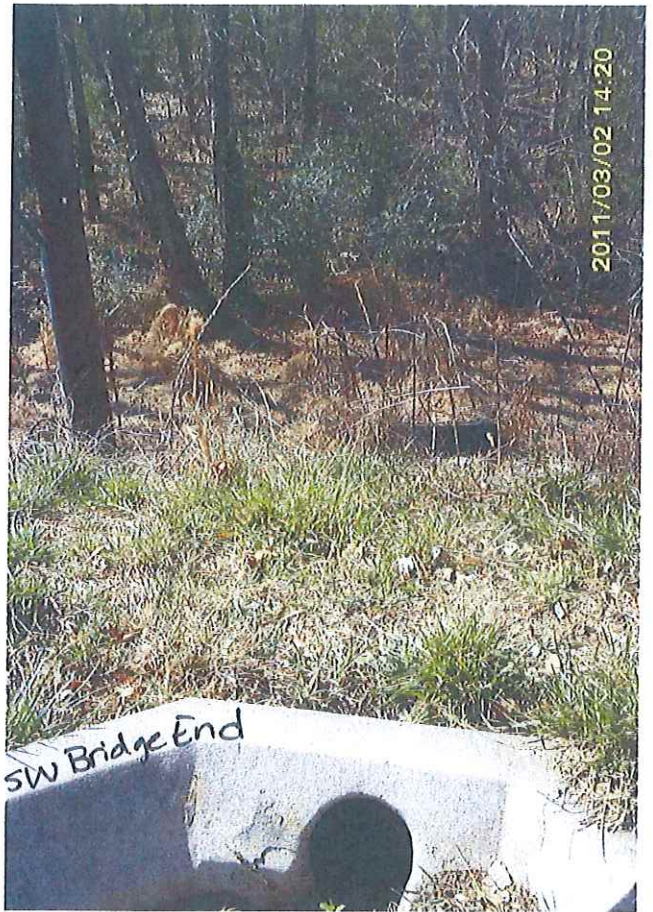
View on N side of bridge

2011/03/02 14:19



SW bridge end

2011/03/02 14:20



SW Bridge End

2011/03/02 14:20



Looking E @ S side of bridge

2011/03/02 14:20



NE barrier wall

2011/03/02 14:24