

Project Number 45612.1.1
TIP Number B-5657
Let Date _____

PREDESIGN-PRESURVEY REPORT

County Halifax

Bridge Number 410015
Road Number SR1001 Justice Branch Rd
Stream Beaverdam Swamp

Type Of Request: POC Force Account TIP
Date 1/29/15 Name EAKpuogu Assigned To PAT
Checked By _____

Prior Survey Date _____ (attach copy of prior survey)

Study By Scour Section _____

Flood Zone AE Detail Study Limited Date 7/3/2007 (attach copy of flood map)

B.M. Info _____

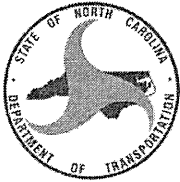
Quad Map Enfield Drainage Area 30 Smi From Stream stat
Q25 1925 Q50 2380 Q100 2870 Method USGS-Lural-Regression eqn
(USGS SI Report 2004-5158)

EXISTING BRIDGE INFORMATION

Location 0.8 mi N Jct SR 1206
Average Daily Traffic 450 (2013)
Length 52 Bed- To Crown 9 Water Depth 4
Type Structure Tim Deck / Trm Joist
Type Spans 1 @ 17.5', 1 @ 17', 1 @ 17.5'
Upstream Structure (NC561) Brg # 76, Brg # 82
Location 0.5 mi E Jct SR1001, 0.6 mi E Jct SR1001
Bed- To Crown 12, 14 Prior Survey _____
Downstream Structure (US301) Brg # 62
Location 1.3 mi N Jct SR 1003
Bed- To Crown 20 Prior Survey _____
SCS Watershed _____

ENVIRONMENTAL

Trout Stream No Anadromous Fish No Primary Nursery Area No
High Quality Waters No Nutrient Sensitive Waters Yes
Near Water Supply Intake No CAMA County No
Stream Classification WS-IV, NSW
DENR River Basin Info. Tar pam



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STRUCTURE MANAGEMENT UNIT

ATTENTION: PRIORITY MAINTENANCE ISSUED (BENT 1 CAP)
TEMPORARY REPAIR (ENCASED PILE)

Structure Safety Report

Routine Element Inspection

COUNTY: HALIFAX STRUCTURE NUMBER: 410015 FREQUENCY: 24 MONTHS

FACILITY CARRIED: SR1001 MILE POST:

LOCATION: 0.8 MI N JCT SR1206

FEATURE INTERSECTED: BEAVERDAM SWAMP

LATITUDE: 36° 12' 52.34" LONGITUDE: 77° 40' 24.48"

SUPERSTRUCTURE: TIMBER DECK/TIMBER JOIST

SUBSTRUCTURE: E.BTS&INT.BTS:TIMBER CAPS/TIMBER PILES

SPANS: 1@17.5';1@17';1@17.5'

☐ FRACTURE CRITICAL ☐ TEMPORARY SHORING ☐ SCOUR CRITICAL ☒ SCOUR PLAN OF ACTION

PRESENT CONDITION: Fair INSPECTION DATE: 08/19/2015

POSTED SV: 24 POSTED TTST: 39

OTHER SIGNS PRESENT: 4 DELINEATORS



LOOKING NORTH

Sign noticed issued for		Number Required
<u>NO</u>	WEIGHT LIMIT	<u>0</u>
<u>NO</u>	DELINEATORS	<u>0</u>
<u>NO</u>	NARROW BRIDGE	<u>0</u>
<u>NO</u>	ONE LANE BRIDGE	<u>0</u>
<u>NO</u>	LOW CLEARANCE	<u>0</u>

INSPECTED BY Z.S DUNLOW	SIGNATURE 	ASSISTED BY G.L. HARRINGTON
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BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 01/05/2016

COUNTY : DIVISION : DISTRICT: STRUCTURE NUMBER : LENGTH :
HALIFAX 4 1 410015 52 FEET

ROUTE CARRIED : SR1001 FEATURE INTERSECTED : BEAVERDAM SWAMP

LOCATED : 0.8 MI N JCT SR1206 BRIDGE NAME : CITY :

FUNC. CLASS : SYST.ON : SYST.UNDER : ADT & YR : RAIL TYPE :
08 NFA NFA 450 2013 LT 233 RT 233

BUILT : BY : PROJ : FED.AID PROJ : DESIGN LOAD :
1952 BMU 5.3051 Unknown

REHAB : BY : PROJ : ALIGNMENT : SKEW : LANES :
BMU 5.3051 TAN 90 ON 2 UNDER 0

NAVIGATION : VC 0 FT HC 0 FT HT. CRN. TO BED : 9 FT WATER DEPTH : 4 FT

SUPERSTRUCTURE : TIMBER DECK/TIMBER JOIST

SUBSTRUCTURE : E.BTS&INT.BTS:TIMBER CAPS/TIMBER PILES

SPANS : 1@17.5'; 1@17'; 1@17.5'

BEAMS OR GIRDERS : SPAN 1&3:23LINES;SPAN2:22LINES 6X12 TIMBER JOIST

FLOOR : ENCROACHMENT : DECK (OUT TO OUT) :
4X8TIM/4.5" AWS 24.083 FT

CLEAR ROADWAY : BETWEEN RAILS : SIDEWALK OR CURB :
23.083 FT 23.5 FT LT .2085 FT RT .2085 FT

VERT.CL.OVER :
999.9 FT

INV.RTG. : OPE.RTG. : CONTR.MEMBER : POSTED :
HS-12 HS-17 Joist Sp2 SV 19 TTST 27 DATE 01/05/2016

SYSTEM : GREEN LINE ROUTE :
Secondary S.R. Route N

UNDER ROUTES AND CLEARANCES

REMARKS :

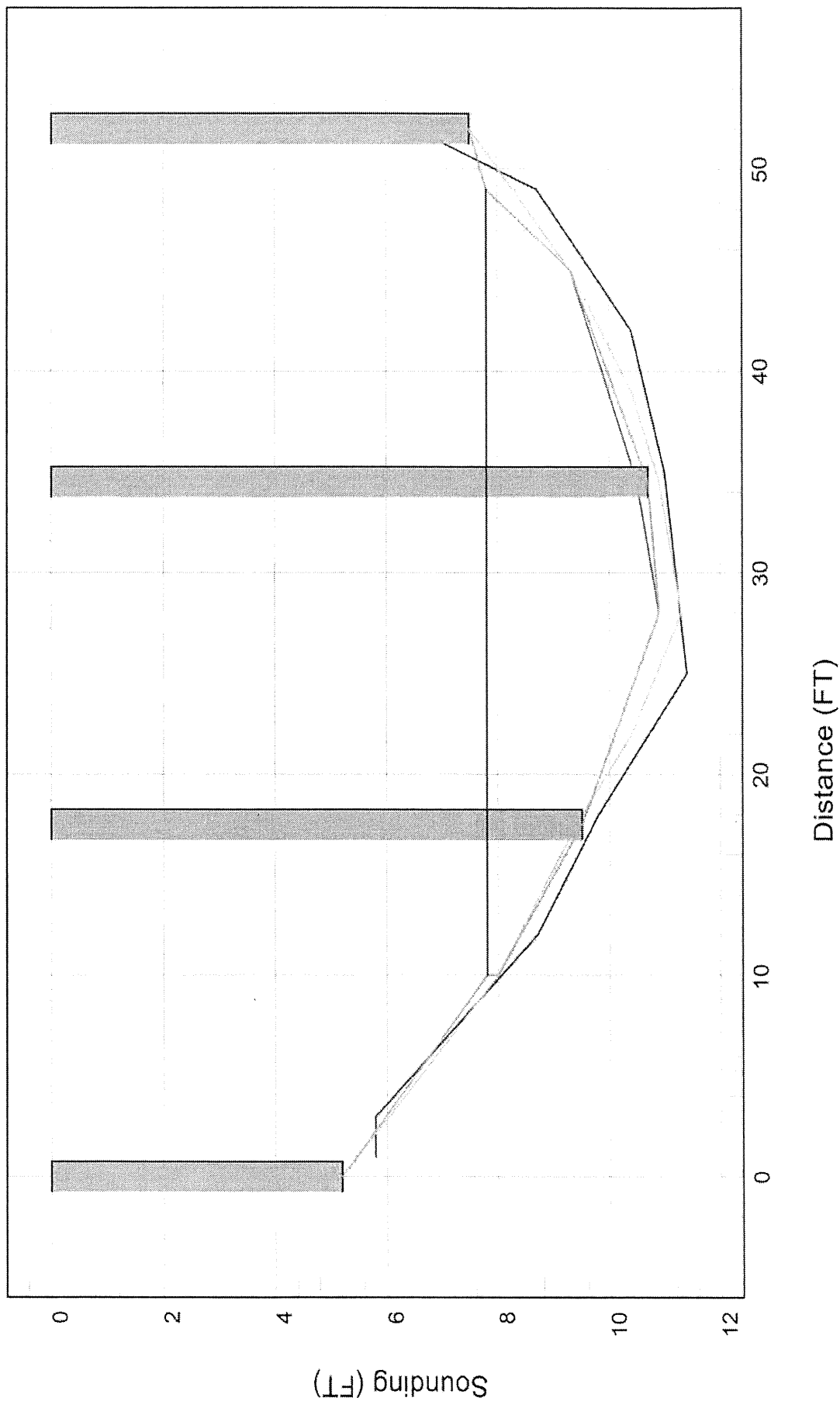
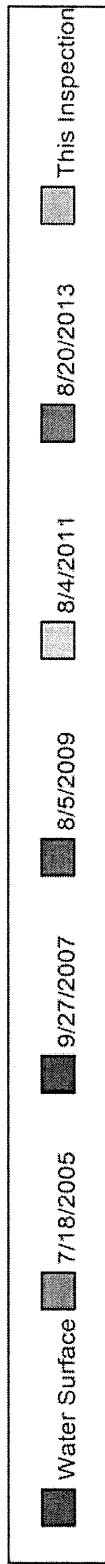
Bridge: 410015

County HALIFAX

Date:

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 12/07/2015

COUNTY :	DIVISION :	DISTRICT :	STRUCTURE NUMBER :	LENGTH :
HALIFAX	4	1	410076	91 FEET

ROUTE CARRIED :	FEATURE INTERSECTED :
NC561	MARSH SWAMP

LOCATED :	BRIDGE NAME :	CITY :
0.5 MI E. OF JCT SR1001		

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
06	FA	NFA	760 2012	LT 233 RT 233

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
1975	DOH			HS 15

REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :	LANES :
			TAN	90	ON 2 UNDER 0

NAVIGATION :	HT. CRN. TO BED :	WATER DEPTH :
VC 0 FT HC 0 FT 12 FT		10 FT

SUPERSTRUCTURE : PRESTRESSED CONCRETE CORED SLAB

SUBSTRUCTURE : E.BTS.&INT.BTS:PPC CAP/H-PILES

SPANS : 1@30.5' ,1@30' ,1@30.5'

BEAMS OR GIRDERS : 11 LINES 33" PPC CORED SLAB SECTIONS

FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
PPCCS/3.5 AWS		30.25 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
29.25 FT	29.75 FT	LT .25 FT RT .25 FT

VERT.CL.OVER :
999.9 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :	DATE
HS-24	HS-41	cored slab	SV TTST	01/01/0001

SYSTEM :	GREEN LINE ROUTE :
Primary N.C. Route	Y

UNDER ROUTES AND CLEARANCES

Upstream Structure

REMARKS :

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 12/07/2015

COUNTY :	DIVISION :	DISTRICT :	STRUCTURE NUMBER :	LENGTH :
HALIFAX	4	1	410082	180 FEET

ROUTE CARRIED :	FEATURE INTERSECTED :
NC561	MARSH SWAMP

LOCATED :	BRIDGE NAME :	CITY :
0.6 MI.E.JCT.SR1001		

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
06	FA	NFA	760 2012	LT 41 RT 41

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
2008	DOH	8.1301901	BRSTP-561(14)	HS 25 or greater

REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :	LANES :
			TAN.	90	ON 2 UNDER 0

NAVIGATION :	HT. CRN. TO BED :	WATER DEPTH :
VC 0 FT HC 0 FT 14 FT		7 FT

SUPERSTRUCTURE : PRECAST PRESTRESSED CONC. BOX BEAM

SUBSTRUCTURE : EBTS:RC CAPS/H-PILES IBTS:RC CAPS/DRILLED SHAFT PIERS

SPANS : 3@60'

BEAMS OR GIRDERS : 14 LNS. PPC CONC. BOX BEAM UNITS.

FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
PPC BB/4 AWS		42 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
38.666 FT	38.666 FT	LT 0 FT RT 0 FT

VERT.CL.OVER :
999.9 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :	TTST	DATE
HS-55	HS-55	Box Beam	SV		07/09/2008

SYSTEM :	GREEN LINE ROUTE :
Primary N.C. Route	N

UNDER ROUTES AND CLEARANCES

Upstream structure 1

REMARKS :

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 01/26/2016

COUNTY :	DIVISION :	DISTRICT :	STRUCTURE NUMBER :	LENGTH :
HALIFAX	4	1	410062	380 FEET

ROUTE CARRIED :	FEATURE INTERSECTED :
US301,NC481	BEECH SWAMP

LOCATED :	BRIDGE NAME :	CITY :
1.3 MI. N. OF JCT. SR1003		

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
06	FA	NFA	3300 2013	LT 41 RT 41

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
2005	DOH	8.1301701	BRSTP-301(15)	HS 20 + MOD

REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :	LANES :	UNDER :
			TAN	90	ON 2	0

NAVIGATION :	HT. CRN. TO BED :	WATER DEPTH :
VC 0 FT HC 0 FT 20 FT		8 FT

SUPERSTRUCTURE : PRECAST PRESTRESSED CONC. CORED SLAB

SUBSTRUCTURE : EBT:RC CAPS/H-PILES;IBTS:RC CAPS/PPC PILES

SPANS : 1@35', 1@50', 4@40.2', 2@50', 1@35'

BEAMS OR GIRDERS : 15 LINES 36" PPC CONC.CORED SLAB SECTIONS

FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
PPC CS/1 AWS		45 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
42 FT	42 FT	LT 0 FT RT 0 FT

VERT.CL.OVER :
999.9 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :	TTST	DATE
HS-32	HS-53	CSlab - B	SV		

SYSTEM :	GREEN LINE ROUTE :
Primary U.S. Route	Y

UNDER ROUTES AND CLEARANCES

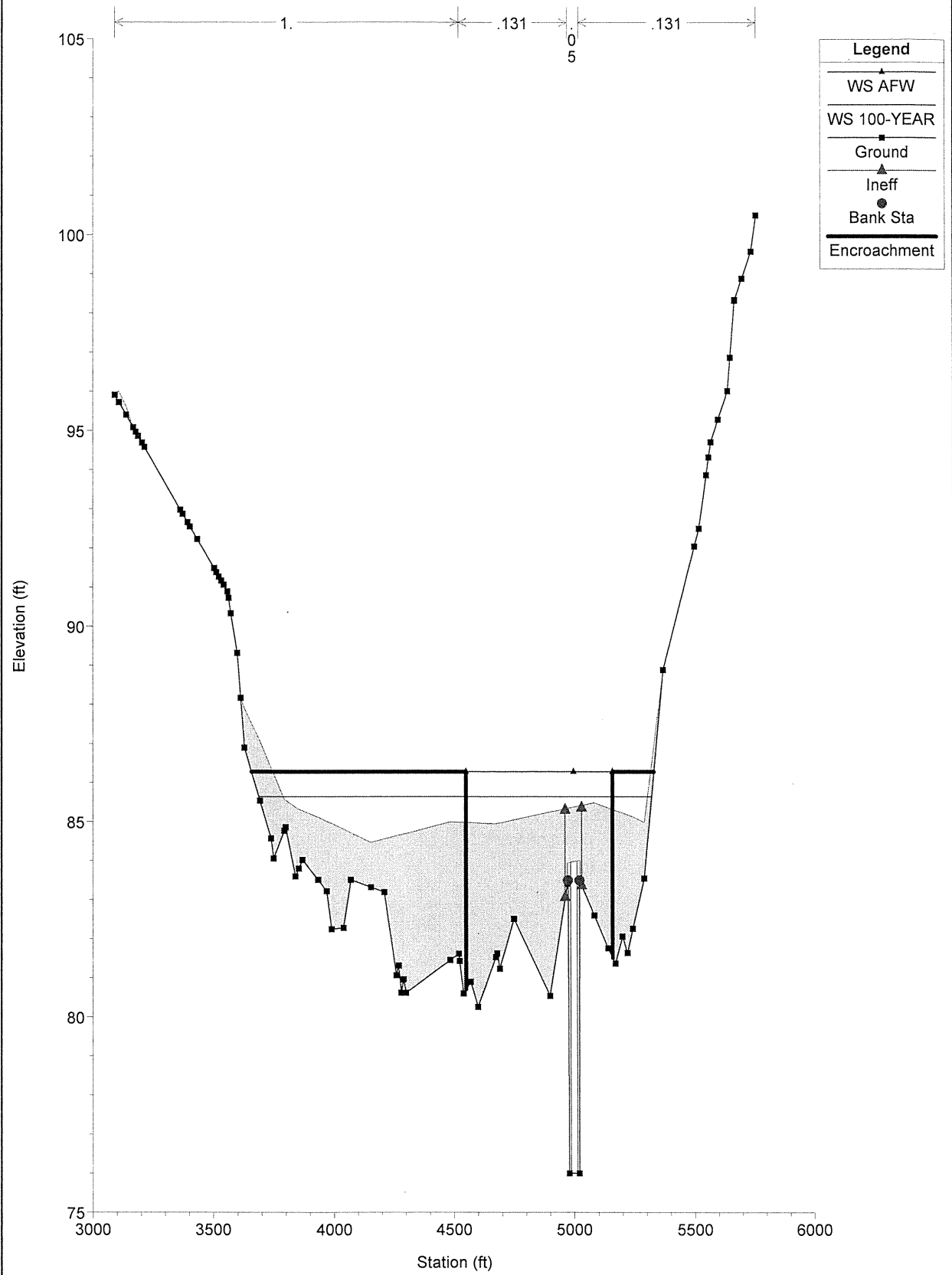
Downstream Structure

REMARKS :

Beaverdam Swamp

Plan: Beaverdam Swamp
Justice Branch Road

1/29/2016



HEC-RAS Plan: Base Plan River: Main Stem Reach: Reach - 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach - 1	10500.0	3280.00	78.12	86.78		86.80	0.000349	2.20	7666.31	1960.14	0.13
Reach - 1	10500.0	3280.00	78.12	87.44		87.47	0.000355	2.33	3820.37	629.50	0.14
Reach - 1	10000.0	3280.00	77.86	86.65		86.66	0.000243	1.85	7876.60	2128.20	0.11
Reach - 1	10000.0	3280.00	77.86	87.30		87.32	0.000247	1.96	4693.33	766.54	0.11
Reach - 1	9500.0	3280.00	77.42	86.52		86.53	0.000241	1.89	8010.02	1928.92	0.11
Reach - 1	9500.0	3280.00	77.42	87.18		87.20	0.000244	1.99	4534.87	705.04	0.11
Reach - 1	9000.0	3280.00	77.40	86.36		86.39	0.000354	2.27	7736.57	1956.35	0.13
Reach - 1	9000.0	3280.00	77.40	87.02		87.05	0.000360	2.40	3789.43	639.99	0.14
Reach - 1	8500.0	3280.00	77.08	86.10		86.16	0.000607	2.99	6455.20	1783.11	0.18
Reach - 1	8500.0	3280.00	77.08	86.75		86.81	0.000616	3.15	2801.59	516.85	0.18
Reach - 1	7717.1	3280.00	76.02	85.64	81.65	85.68	0.000588	2.77	5647.35	1631.95	0.16
Reach - 1	7717.1	3280.00	76.02	86.28	81.66	86.34	0.000586	2.90	3027.30	609.29	0.16
Reach - 1	7695.1	Bridge									
Reach - 1	7673.1	3280.00	75.78	85.42	81.42	85.46	0.000582	2.76	5673.09	1632.93	0.16
Reach - 1	7673.1	3280.00	75.78	86.01	81.40	86.07	0.000598	2.92	3005.16	609.29	0.16
Reach - 1	7500.0	3280.00	76.24	85.34		85.37	0.000427	2.52	6945.35	1830.35	0.15
Reach - 1	7500.0	3280.00	76.24	85.93		85.97	0.000439	2.66	3482.76	632.79	0.15
Reach - 1	7063.9	3280.00	76.56	85.13		85.16	0.000522	2.67	7232.42	2017.28	0.16
Reach - 1	7063.9	3280.00	76.56	85.71		85.76	0.000536	2.83	3169.16	578.29	0.17
Reach - 1	6500.0	3280.00	76.41	84.73		84.79	0.000806	3.25	7127.10	2084.26	0.20
Reach - 1	6500.0	3280.00	76.41	85.30		85.38	0.000819	3.43	2641.46	554.33	0.20
Reach - 1	5904.4	3280.00	76.23	84.30		84.35	0.000675	2.92	8191.70	2650.00	0.18
Reach - 1	5904.4	3280.00	76.23	84.88		84.94	0.000662	3.03	3189.99	704.70	0.18
Reach - 1	4990.2	3280.00	74.48	83.69		83.75	0.000630	3.08	4422.33	1144.67	0.18
Reach - 1	4990.2	3280.00	74.48	84.28		84.35	0.000623	3.19	2614.40	435.50	0.18
Reach - 1	4494.3	3280.00	74.30	83.30		83.38	0.000833	3.49	5133.22	1219.19	0.21

StreamStats

Delineation Results

Be sure to thoroughly check the delineated basin for accuracy before using the tools below.



StreamStats Basin Characteristics Report - Google Chrome

streamstatsags.cr.usgs.gov/v3_beta/BCreport.htm?rcode=N

US StreamStats Version 3.0

Basin Characteristics Ungaged Site Report

Date: Fri Jan 29, 2016 4:13:00 PM GMT-5

Study Area: North Carolina

NAD 1983 Latitude: 36.2139 (36 12 50)

NAD 1983 Longitude: -77.6738 (-77 40 26)

Label	Value	Units	Definition
DRNAREA	30	square miles	Area that drains to a point on a stream
LC11IMP	0.52	percent	Percentage of impervious area determined from NLCD 2011 impervious dataset

Accessibility Notices FOIA Privacy Policies and Notices

36:21454, -77.67347

USGS The National Map: National Boundaries Dataset, 3D Elevation Program, Geographic Names Information System, Nation...



Who Am I: General Public

Effective

Flood Information

Click the map to view information.

?

Map Location

Flood Zone: AE

Flood Source:

Base Flood Elevation: 85.5 ft

County: Halifax

Political Area: Halifax County

CID: 370327

Panel: 3899 Download

Map Number: 3720389900J

Panel Effective Date: 7/3/2007

Latitude: 36.2139

Longitude: -77.6738

Risk Information

Financial Vulnerability

FIS Reports

Map Export

Data Export

FRIS

Map Theme ▼

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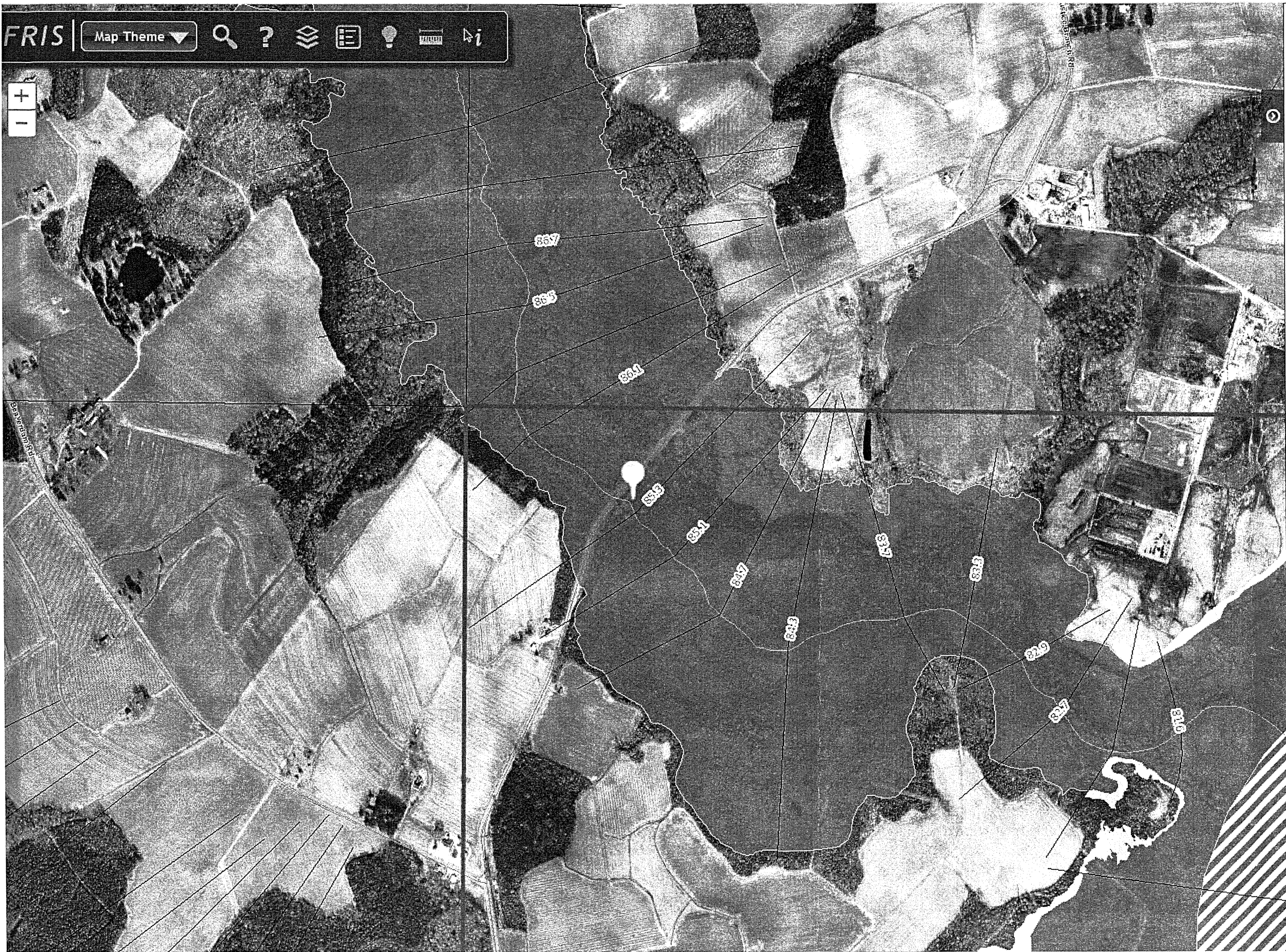
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Who Am I : Advanced ▼ Effective ▼

▸ Flood Information

▸ Risk Information

▸ Financial Vulnerability

▸ FIS Reports

▸ Flood Risk Management Plan

▾ Engineering Models

📌 Click a stream to view models. ?

Model Information

Stream: Beaverdam Swamp

Model: Beaverdam Swamp Model

Study: Limited Detailed Study

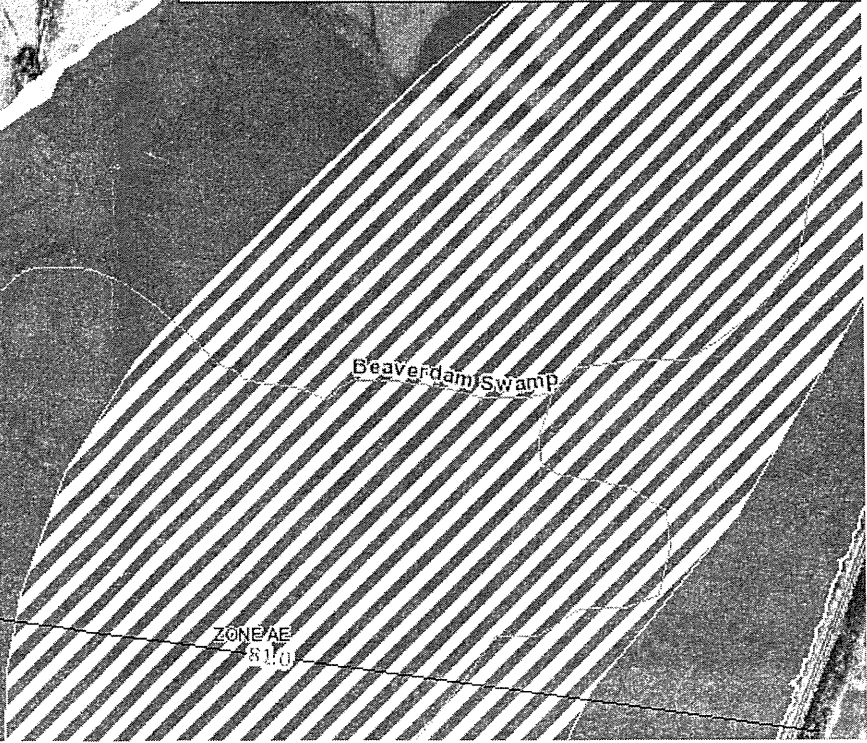
Start: The confluence with Marsh Swamp

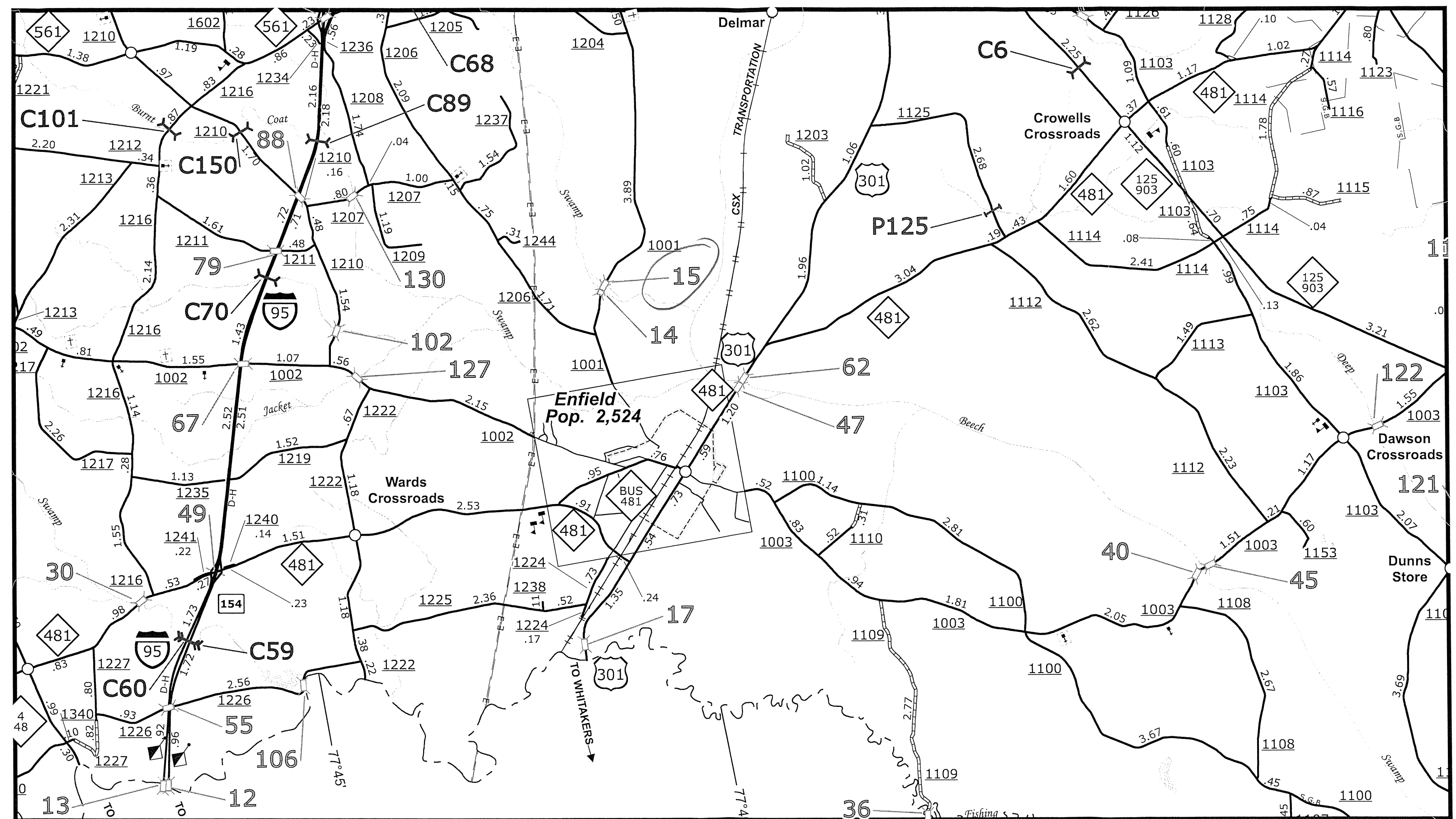
End: Approximately 1.4 miles upstream of the Highway 95

[Download Model](#)

▸ Map Export

▸ Data Export

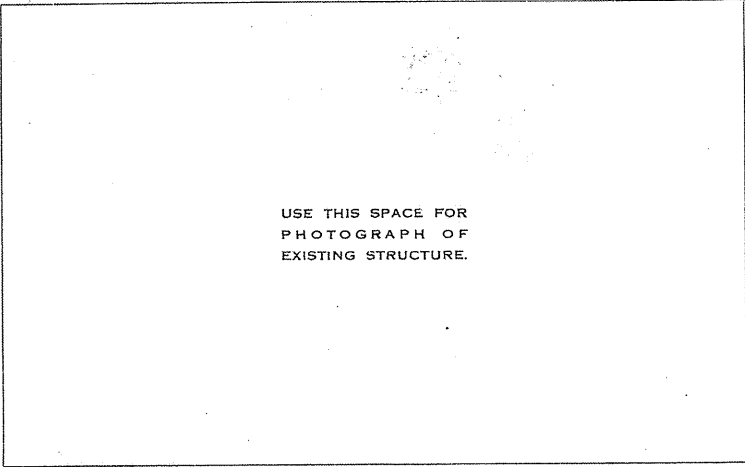




Drainage Area 31 Sq. Mi. Obtained from Soil Map
Character of Drainage Area Swampy - rolling - partially cultivated - Sandy
Waterway Required by Formula 568 sq. ft. Formula Used Talbot's C = 0.35
Waterway Required by Discharge Computations _____ sq. ft.
Maximum High Water Elevation 122.8 Year 1929
Next Highest High Water Elevation _____ Year _____
Ordinary High Water Elevation 119.5 ±
High Water Information Determined from whom, and by what marks Mr. Neville - local resident

DATA ON EXISTING STRUCTURES							
BRIDGE ON	DISTANCE UP OR DOWN STR.	DATE BUILT	TYPE	SPAN	TOTAL WATERWAY	WATERWAY UNDER H. W.	ACTION AT MAX. H. W. OVERFLOW, SCOUR, ETC.
Pres Route	50' down	?	I-Beam	2 @ 21'-0" 4 @ 20'-0" 1 @ 18'-0"	505' ±	505' ±	Flows Full

Based On All Available Data, Waterway Area Considered Necessary 600 sq. ft.
Waterway Area Provided by Recommended Structure, 600 sq. ft.
Other Information: _____



USE THIS SPACE FOR PHOTOGRAPH OF EXISTING STRUCTURE.

New Location is 50' ± Up, Down stream From Crossing on Present Route
Nearest Shipping Point Halifax On Atlantic Coast Line R. R.
Distance From Shipping Point to Bridge Site is 4.0 ± miles.
Observed Velocity at Time of Survey _____ ft. per sec.
Estimated Velocity at high Water Periods _____ ft. per sec.
Character of Water in Stream Fresh
Are Marine Borers Evident at any Structures in Vicinity? No
Method Used in Determining Foundation Material 1/2" φ Iron Rods
Do you Consider This Information Reliable? Yes

Additional Foundation Information Obtained by _____ Date _____
Method Used _____ Is This Satisfactory? _____
Description of Foundation Material _____

Remarks: _____

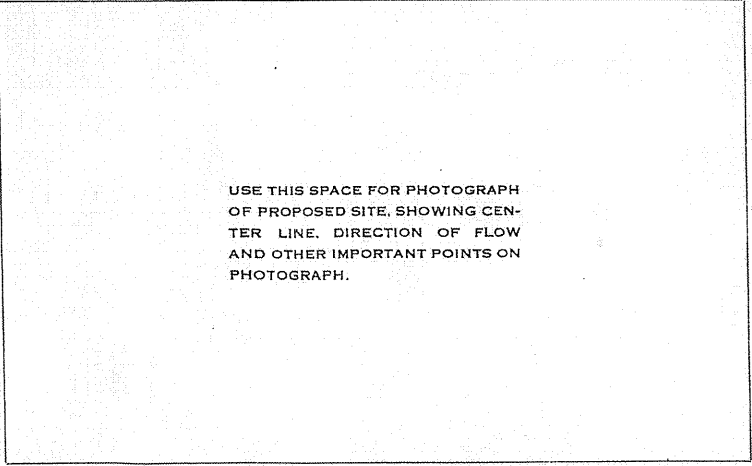
Brg #s 76 & 82
upstream structure

BRIDGE DEPARTMENT
NORTH CAROLINA STATE HIGHWAY COMMISSION
RALEIGH, N. C.

BRIDGE INSPECTION REPORT

BRIDGE OVER MARSH SWAMP
Known as Mar. Bridge & Overflow
On Route No. #561 between Brinkleyville and Halifax
The Stream is not Navigable (War Dept. Definition)
Piles are Required Creosoted
Temporary Crossing is not req'd Maintain Present Bridges
Present Structure Shall be removed
Riprap is not Required
Channel is not to be Cleared, Excavated
Elevations From B. M. #52 Nail in root 10' Elm 40' Lt. Sta. 629+50 Elev. 121.28

Structure Shall be Standard, with Standard Width of Roadway, No Sidewalks, No Illuminating Standards, etc., unless Noted Here: 22' Roadway



USE THIS SPACE FOR PHOTOGRAPH OF PROPOSED SITE, SHOWING CENTER LINE, DIRECTION OF FLOW AND OTHER IMPORTANT POINTS ON PHOTOGRAPH.

Surveyed by J. L. Harris Date 9-16-35
Assisted by G. B. Lockhart

INFORMATION TO BE SHOWN ON PLANS

Design: Discharge 5980 c.f.s. Frequency 50 YR. Elev. 80.77
Base Flood: Discharge 7340 c.f.s. Frequency 100 YR. Elev. 81.19
Overtopping: Discharge 12000 + c.f.s. Frequency 500 YR. + Elev. 83.0

ADDITIONAL INFORMATION AND COMPUTATIONS

DRAINAGE AREA = 130 mi². DISCHARGES WERE CALCULATED USING COASTAL PLAIN HYDROLOGIC FORMULAS.
THE COASTAL PLAIN DISCHARGES WERE HIGHER THAN FEMA VALUES, HOWEVER THE COASTAL PLAIN DISCHARGES
WERE MORE REPRESENTATIVE OF FIELD CONDITIONS AND HISTORICAL FLOOD DATA GATHERED FROM PERSONS
WITH KNOWLEDGE OF THE LOCAL AREA.

(COASTAL PLAIN HYDROLOGIC AREA)

$$Q_2 = 69.4(130)^{.622} = 1505 \text{ CFS}$$

$$Q_5 = 149(130)^{.582} = 2535 \text{ CFS} \quad \text{FEMA} = 1760 \text{ CFS}$$

$$Q_{10} = 225(130)^{.559} = 3420 \text{ CFS} \quad \text{FEMA} = 2380 \text{ CFS}$$

$$Q_{25} = 362(130)^{.532} = 4825 \text{ CFS}$$

$$Q_{50} = 490(130)^{.514} = 5980 \text{ CFS} \quad \text{FEMA} = 4480 \text{ CFS}$$

$$Q_{100} = 653(130)^{.497} = 7340 \text{ CFS} \quad \text{FEMA} = 5600 \text{ CFS}$$

$$Q_{500} = 1090(130)^{.485} = 12015 \text{ CFS} \quad \text{FEMA} = 9100 \text{ CFS}$$

CLEAR-WATER CONTRACTION SCOUR PREDICTIONS

$$Y_s = [(0.4^2)/(120(D_m)^{.23} W^2)]^{1/2} Y; \text{ where } D_m = 1.25(D_{50}) = 1.25(0.015)$$

$$Q_{100} \quad Y_s = [(4906^2)/(120(0.0188)^{.23} 285^2)]^{1/2} \cdot 5.68 = -1.09 \text{ FT}; \text{ therefore, } Y_s = 0.0 \text{ FT}$$

$$Q_{500} \quad Y_s = [(8144^2)/(120(0.0188)^{.23} 285^2)]^{1/2} \cdot 7.39 = -0.31 \text{ FT}; \text{ therefore, } Y_s = 0.0 \text{ FT}$$

LOCAL SCOUR PREDICTIONS

$$Y_s = Y_1 [(2.0)(K_1)(K_2)(K_3)(K_4)(a/Y)^{.65} (FR_1)^{.43}]$$

$$\text{PIER 1: } Q_{100} \quad Y_s = 7.12 [(2.0)(1.0)(1.0)(1.1)(1.0)(3/7.12)^{.65} (0.37)^{.43}] = 5.83 \text{ FT}$$

$$Q_{500} \quad Y_s = 8.70 [(2.0)(1.0)(1.0)(1.1)(1.0)(3/8.70)^{.65} (0.43)^{.43}] = 6.68 \text{ FT}$$

$$\text{PIERS 2 - 7: } Q_{100} \quad Y_s = 5.16 [(2.0)(1.0)(1.0)(1.1)(1.0)(3/5.16)^{.65} (0.12)^{.43}] = 3.18 \text{ FT}$$

$$Q_{500} \quad Y_s = 6.74 [(2.0)(1.0)(1.0)(1.1)(1.0)(3/6.74)^{.65} (0.14)^{.43}] = 3.80 \text{ FT}$$

$$\text{PIER 8: } Q_{100} \quad Y_s = 5.55 [(2.0)(1.0)(1.0)(1.1)(1.0)(3/5.55)^{.65} (0.13)^{.43}] = 3.43 \text{ FT}$$

$$Q_{500} \quad Y_s = 7.13 [(2.0)(1.0)(1.0)(1.1)(1.0)(3/7.13)^{.65} (0.16)^{.43}] = 4.04 \text{ FT}$$

SITE DATA

Drainage Area 130 SM Source USGS QUAD SHEETS Character RURAL
Stream Classification (Such as Trout, High Quality Water, etc.) CLASS C SW NSW
Data on Existing Structure MAIN STRUCTURE IS 8 SPAN CONCRETE GIRDER WITH ASPHALT OVERLAY
ON CONCRETE DECK. LENGTH = 299 FEET Waterway Opening 1525 SF
Data on Structures Up and Down Stream UPSTREAM CSX RR BRIDGE
DOWNSTREAM 151 FT. 5 SPAN TIMBER PILES WITH CONCRETE DECK AND 121 FT. 3 SPAN TIMBER PILES
WITH STEEL PLANK FLOOR.

Design Control Elev. 81.73 (NATURAL $Q_{100} + 1.0'$)

Gage Station No. N/A Period of Records N/A
Max. Discharge N/A c.f.s. Date N/A Frequency N/A

Historical Flood Information:

NO
Date Elev. OVERTOP Est. Freq. Source ANN PARTIN (USPS) Period of Knowledge 10 YRS.
100
Date 10/98 Elev. 81 +/- Est. Freq. YR. + Source WINFORD BOBBIT (RESIDENT) Period of Knowledge 40 YRS.
Date Elev. Est. Freq. Source Period of Knowledge

Historical Scour Info.: General Contraction Local 1.0 +/-
Channel Slope 0.04 % Source USGS QUAD SHEETS Normal Water Surface Elev. 74.0 +/-
Manning's n: Left 0.14 Channel 0.06 Right 0.14 Source HEC-II RUN
Flood Study / Status FEMA FIRM ZONE AE Floodway Established? YES
Flood Study 100 yr. Discharge 5600 c.f.s.; W.S. Elev.: With Floodway 81.4 Without Floodway 80.8

DESIGN DATA

Hydrological Method USGS REGRESSION EQUATIONS
Hydraulic Design Method HEC-RAS USING USGS DISCHARGES
Floods Evaluated: Freq. Q (CFS) Natural * Elev. (FT) Existing * Elev. (FT) Proposed * Elev. (FT) Backwater Velocity Bridge Opening
5 YR. 2535 78.47 78.70 78.70 0.23 1.93 FT/S
10 YR. 3420 79.23 79.47 79.47 0.24 2.13 FT/S
50 YR. 5980 80.42 80.78 80.77 0.35 2.89 FT/S
100 YR. 7340 80.73 81.21 81.19 0.46 3.35 FT/S
500 YR. 12015 82.23 82.94 82.88 0.65 4.38 FT/S
Waterway Opening Provided Below: Design W.S. Elev. 1664 SF, 100yr W.S. Elev. 1770 SF
Average Channel Velocity (Design) 0.68 FPS Average Overbank Velocity (Design) 0.55 FPS (PIER 1)
Computed Scour: General NONE Contraction $Q_{100} = 0.0 \text{ FT}$ Local $Q_{100} = 5.8 \text{ FT}$
 $Q_{500} = 0.0 \text{ FT}$ $Q_{500} = 6.7 \text{ FT}$
Is a Floodway Revision Required? NO
* Elevations From Section 67480

Down stream structure

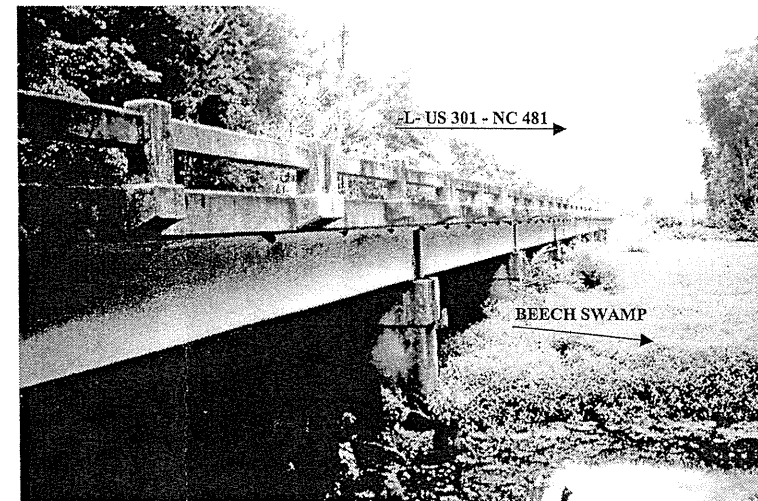
Bridge 1 of 1

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

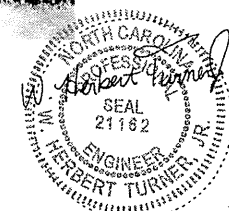
N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

FEMA DETAILED STUDY
TAR-PAMLICO RIVER BASIN

Project No. B-2980 Project No. 8.1301701 Proj. Station -L- 22+34.00
County HALIFAX Bridge Over BEECH SWAMP Bridge Inv. No. 62
Highway US301-NC481 Between ENFIELD and HALIFAX
Recommended Structure PROPOSED 9 SPAN - PRESTRESSED CONCRETE CORED SLAB
9 SPANS: 1@35.1@50.2@40.1@50.1@35 = 380 FT.
Recommended Width of Roadway 42 FT. CLEAR ROADWAY Skew 90°
Recommended Location Is (Up, At) Down Stream from Existing Crossing.
Nearest Shipping Point ENFIELD On CSX R.R., 1.0 Miles From Bridge
Bench Mark Is RR SPIKE IN BASE OF 9" GUM 93.89' RT. OF -BL- STATION 10+64.73.
Elev. 78.84' Datum NGVD 29
Temporary Crossing PROPOSED DETOUR



KD & ASSOCIATES, PC
1011 SCHAUB DRIVE, SUITE 202
RALEIGH, NORTH CAROLINA 27606
Designed by: Date
Assisted by: MSA, SRW, WHT & TPH
Project Engineer: W. HERBERT TURNER, JR. PE
Reviewed by: Susan Locklear 6-19-02



81-22

6-18-2002

