OFFICE ESTIMATE
1 @ 60' Bridge

Project# _____
TIP# _____
Let Date _____
WBS# 17BP.12.R.38

PREDESIGN-PRESURVEY REPORT

Bridge# 010246
Road# SR1111 (CARRIGAN RD)
Stream STREWALT CRK.

County ALEXANDER (Div. 12)

Type Of Request: POC Force Account TIP NCMA
Date 10/10/11 Name SMQ Assigned To RCH
Checked By WSH 5-29-13
Prior Survey Date NONE (attach copy of prior survey) BRN BK: NONE ✓ CO. FILE: NONE ✓
Study By Scour Section YES- ATTACHED
Flood Zone YES Detail Study LIMITED Date 12/18/07 Panel# 3758 ✓
B.M. Info N/A
Quad Map TAYLORSVILLE Drainage Area 1.5 SQ MI. From QUAD
Q25 650 CFS = 690 cfs Q50 850 CFS = 840 cfs Q100 1000 CFS = 990 cfs Method USGS URBAN EQN REG. 1 RURAL

EXISTING BRIDGE INFORMATION

Location 0.4 MI W JCT NC 16 ✓
Average Daily Traffic 1500 ✓ (2009) (6% TRK)
Length 26' ✓ Bed- To Crown 19' ✓ Water Depth 1' ✓
Type Structure STEEL PLANK DECK ON I-BEAMS
Type Spans 1 @ 26'3 ✓
Upstream Structure NO NUMBERED STR. (PIPE UNDER US 64)
Location N/A
Bed- To Crown — Prior Survey —
Downstream Structure FLOWS INTO LITTLE RIVER ✓
Location —
Bed- To Crown — Prior Survey —
SCS Watershed —

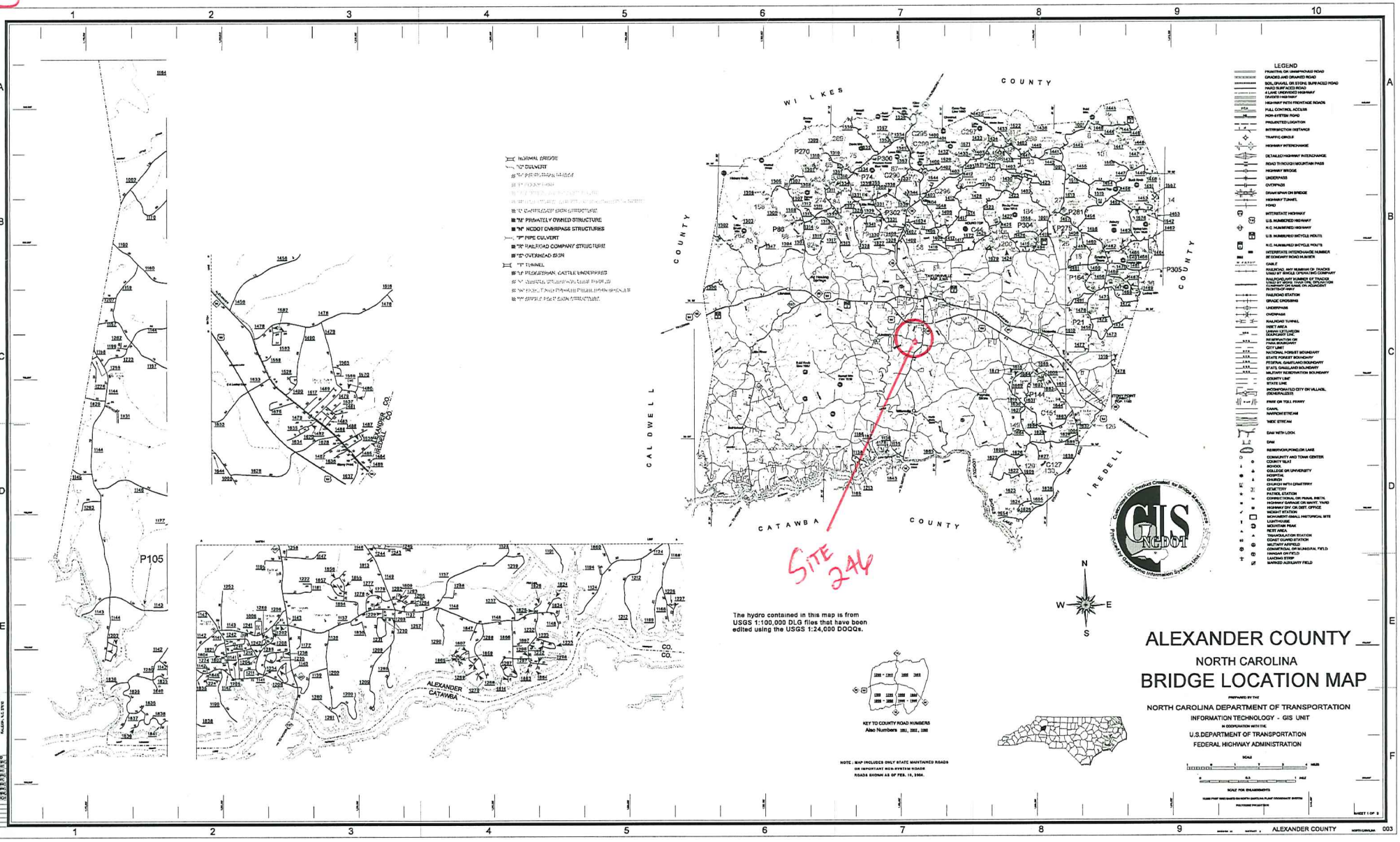
*NO TROUT IN ESM IN ALEXANDER CO.

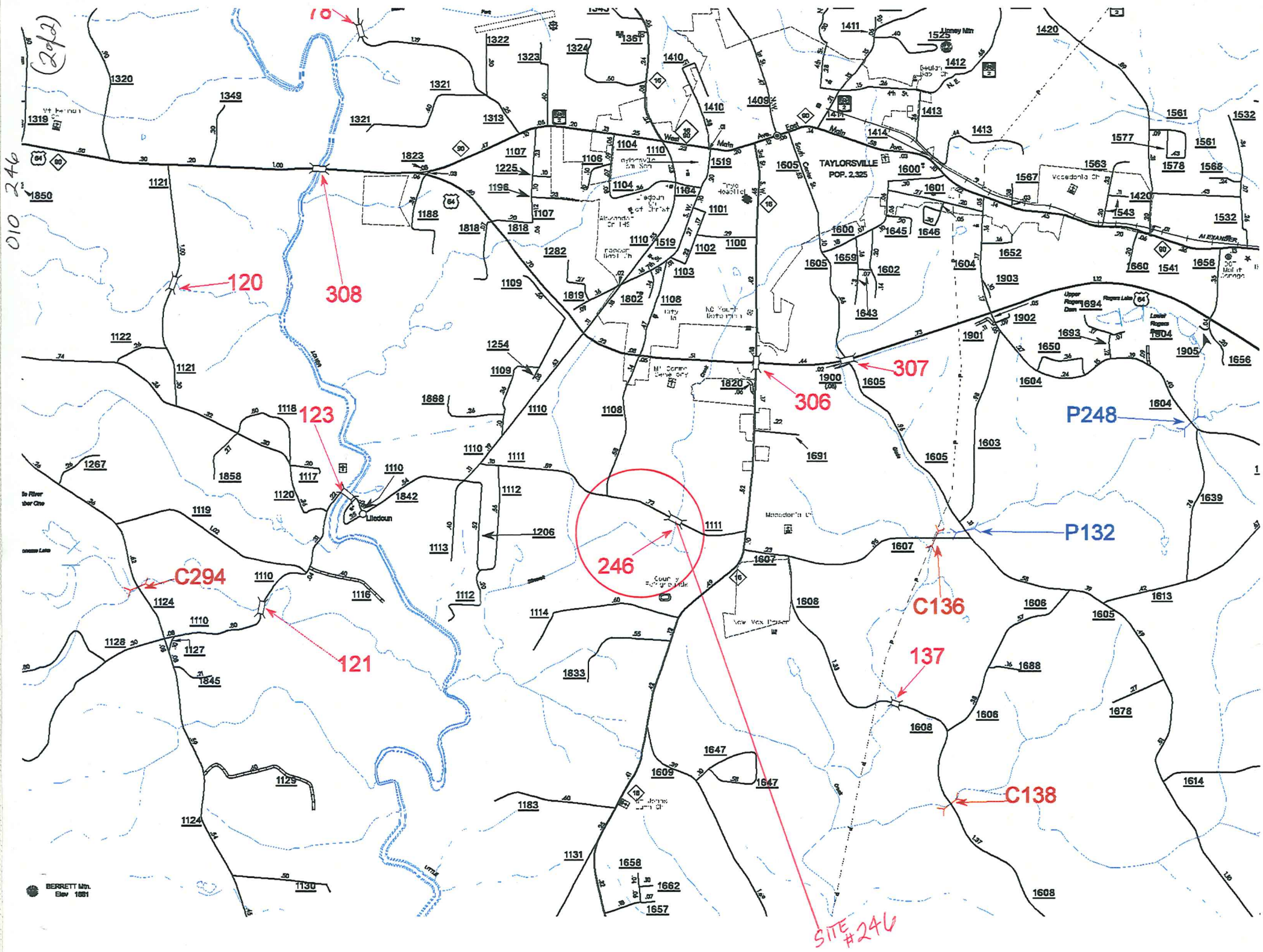
ENVIRONMENTAL TVA: NO ✓
Trout Stream UNKNOWN Anadromous Fish NO Primary Nursery Area NO ✓
High Quality Waters NO Nutrient Sensitive Waters NO ✓
Near Water Supply Intake NO ✓ CAMA County NO ✓
Stream Classification 11-69-6-(2) WS-IV ✓ # 11-69-6-(2) ✓
DENR River Basin Info. CATAWBA ✓ (FROM A PT. 0.2 M u/s OF SR 1111 TO LOWER LITTLE RIVER)

6/28/IN POR 2006
US 40

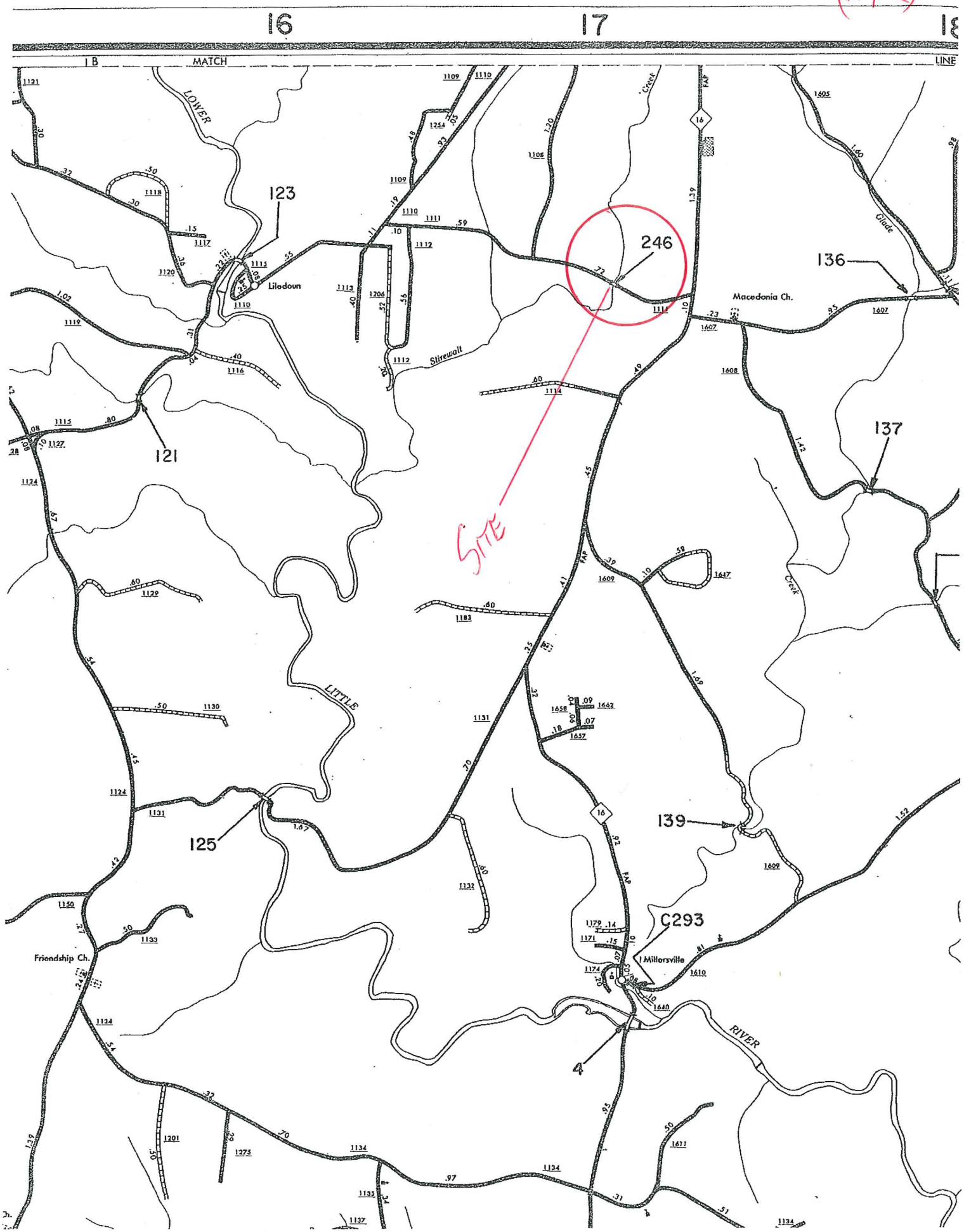
L

010246 (1 of 2)

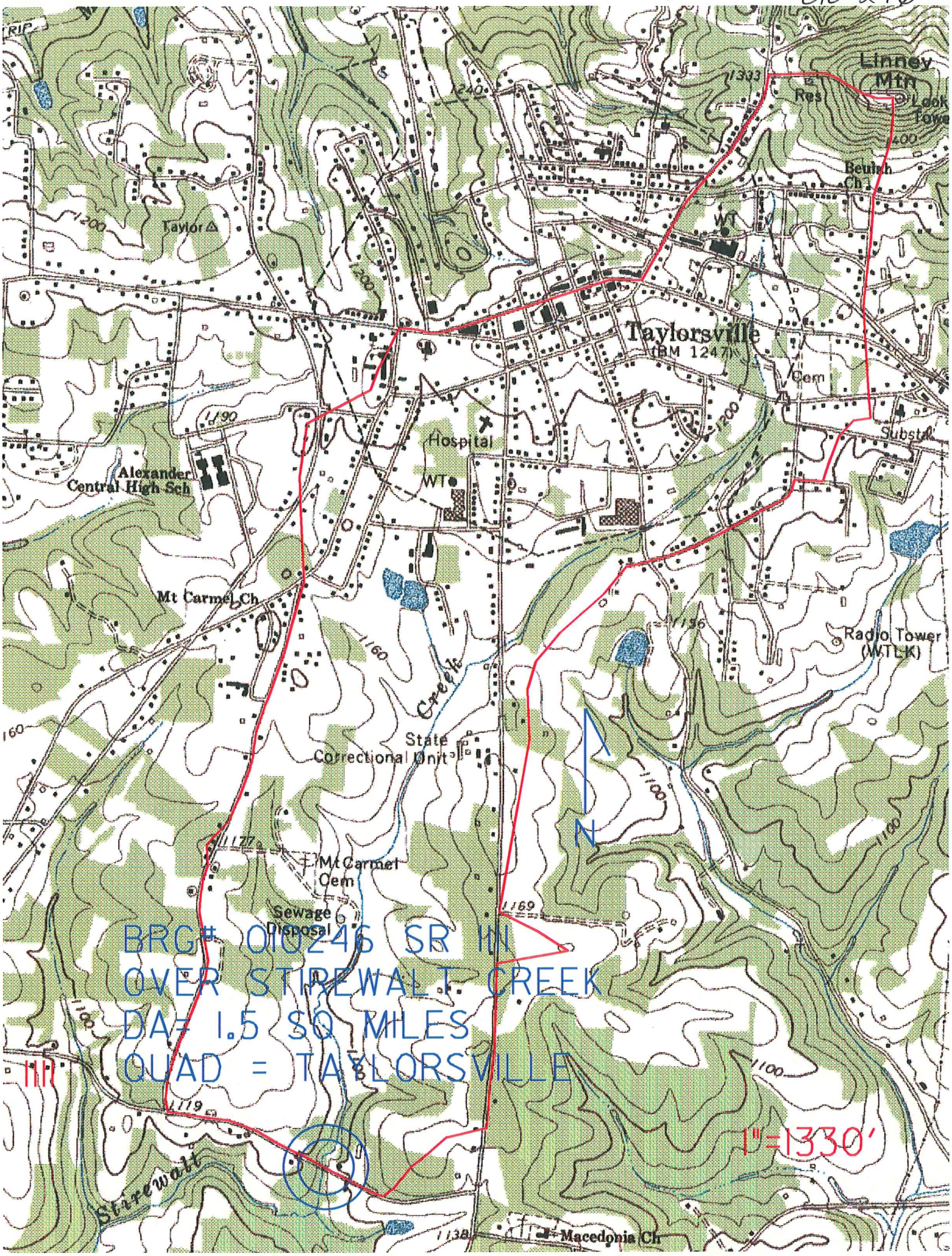

ALEXANDER COUNTY
NORTH CAROLINA
BRIDGE LOCATION MAP
PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
INFORMATION TECHNOLOGY - GIS UNIT
IN COOPERATION WITH THE
U.S.DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
LEGEND
NORMAL BRIDGE
"C" CULVERT
"P" PIPE CULVERT
"R" RAILROAD COMPANY STRUCTURE
"S" OVERHEAD SIGN
"T" TUNNEL
"U" PEDESTRIAN, CATTLE UNDERPASS
"V" PRIVATELY OWNED STRUCTURE
"W" NCDOT OVERPASS STRUCTURES
WILKES COUNTY
CALDWELL COUNTY
IREDELL COUNTY
CATAWBA COUNTY
ALEXANDER CO.
ALEXANDER
CATAWBA
SITE 246
The hydro contained in this map is from USGS 1:100,000 DLG files that have been edited using the USGS 1:24,000 DOQQs.
KEY TO COUNTY ROAD NUMBERS
Also Numbers 1261, 1262, 1265
NOTE: MAP INCLUDES ONLY STATE MAINTAINED ROADS OR IMPORTANT NON-SYSTEM ROADS
ROADS SHOWN AS OF FEB. 16, 2004.
SCALE FOR ENLARGEMENTS
SHEET 1 OF 3
ALEXANDER COUNTY
003


(2of2)
246
010
18
120
308
123
121
C294
246
306
307
P248
P132
C136
137
C138
SITE #246
TAYLORSVILLE
POP. 2,325
Lilledoun
BERRETT Mtn.
Elev 1651

010246
(2 of 2)

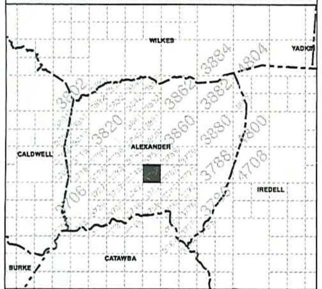

16
17
18
MATCH
LINE
LOWER
Lileduun
123
121
125
Stirewalt
246
SITE
Macedonia Ch.
136
137
Glade
Creek
LITTLE
139
C293
Millersville
Friendship Ch.
RIVER
4

010 246


Linney Mtn
Res
Look Tower
Beulah Ch
WT
Taylor
Taylorsville
(BM 1247)
Cem
Hospital
Substa
Alexander Central High Sch
WT
Mt Carmel Ch
Radio Tower (WTLK)
Creek
State Correctional Unit
N
Mt Carmel Cem
Sewage Disposal
BRG# 010246 SR 111
OVER STIREWALT CREEK
DA= 1.5 SQ MILES
QUAD = TAYLORSVILLE
111
1"=1330'
Stirewalt
Macedonia Ch

010246

STATE OF NORTH CAROLINA FIRM PANEL LOCATOR DIAGRAM



DATUM INFORMATION

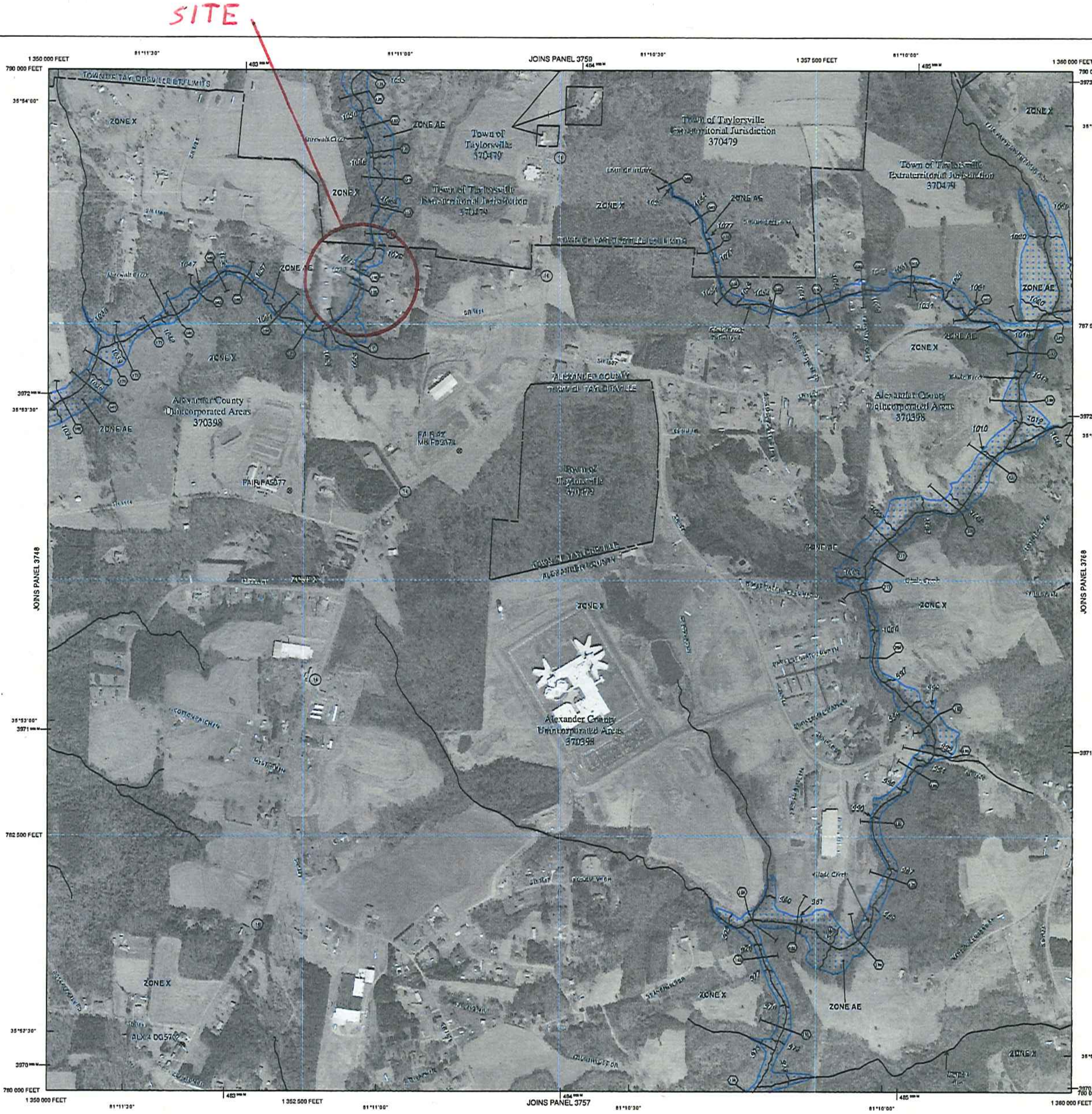
The projection used in the preparation of this map was the North Carolina State Plane (FIPSZONE 3200). The horizontal datum was the North American Datum of 1983, GRS80 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each North Carolina county. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this statewide format FIRM. The offsets for each county shown on this FIRM panel are shown in the vertical datum offset table below. Where a county boundary and a flooding source with unrevised NGVD 29 flood elevations are coincident, an individual offset has been calculated and applied during the creation of this statewide format FIRM. See Section 6.1 of the accompanying Flood Insurance Study report to obtain further information on the conversion of elevations between NAVD 88 and NGVD 29. To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the North Carolina Geodetic Survey at the address shown below. You may also contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov.

North Carolina Geodetic Survey
121 West Jones Street
Raleigh, NC 27601
(919) 733-3836
http://www.ncgs.state.nc.us

County Average Vertical Datum Offset Table

County	Vertical Datum Offset (ft)
Alexander	-0.81
Example: NAVD 88 = NGVD 29 + (-0.81)	



NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data, Limited Detailed Flood Hazard Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of **regulatory floodways** shown on the FIRM for flooding sources studied by detailed methods were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data for flooding sources studied by detailed methods as well as non-encroachment widths for flooding sources studied by limited detailed methods are provided in the Flood Insurance Study (FIS) report for this jurisdiction. The FIS report also provides instructions for determining a floodway using non-encroachment widths for flooding sources studied by limited detailed methods.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 4.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

FEMA recommends that a Flood Insurance Policy be purchased for structures in areas where levees are shown as providing protection from the 1% annual chance flood. Flooding is not covered by standard property/fire/dwelling insurance policies nor is it covered by Homeowners Insurance, Renters Insurance, Condominium Owners Insurance, or Commercial Property Insurance. Contact your insurance agent and local floodplain administrator for further information. Visit http://www.fema.gov/pdf/fhm/frm_gsah.pdf for information on levees and the risk of flooding in areas shown as being protected by levees.

Base map information and geospatial data used to develop this FIRM were obtained from various organizations, including the participating local community(ies), state and federal agencies, and/or other sources. The primary base for this FIRM is aerial imagery acquired by Alexander County. The time period of collection for the imagery is 2005. Information and geospatial data supplied by the local community(ies) that met FEMA base map specifications were considered the preferred source for development of the base map. See geospatial metadata for the associated digital FIRM for additional information about base map preparation.

Base map features shown on this map, such as **corporate limits**, are based on the most up-to-date data available at the time of publication. **Changes in the corporate limits may have occurred since this map was published.** Map users should consult the appropriate community official or website to verify current conditions of jurisdictional boundaries and base map features. This map may contain roads that were not considered in the hydraulic analysis of streams where no new hydraulic model was created during the production of this statewide format FIRM.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

If you have **questions about this map**, or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the North Carolina Floodplain Mapping Program website at http://www.ncfloodmaps.com, or contact the FEMA Map Service Center at 1-800-358-9616 for information on all related products associated with this FIRM. The FEMA **Map Service Center** may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov.

MAP REPOSITORY

Refer to listing of Map Repositories on Map Index or visit http://www.ncfloodmaps.com

EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL

DECEMBER 18, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to statewide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your insurance agent, the North Carolina Division of Emergency Management or the National Flood Insurance Program at the following phone numbers or websites:

NC Division of Emergency Management (919) 715-8000 http://www.nccrimecontrol.org/nfip
National Flood Insurance Program 1-800-638-6620 http://www.fema.gov/nfip

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

www.ncfloodmaps.com

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- ~ 513 ~ Base Flood Elevation line and value; elevation in feet*
- (EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276 mN 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 1 477 500 FEET 2500-foot grid values: North Carolina State Plane coordinate system (FIPSZONE 3200, State Plane NAD 83 feet)
- BM5510 × North Carolina Geodetic Survey bench mark (for more information visit http://www.ncgs.state.nc.us).
- BM5510 National Geodetic Survey bench mark (for more information visit http://www.ngs.noaa.gov).
- BM5510 NGS-58 GPS 2-5 cm Vertical Control Marks or Contractor-Established NCFMP Bench Marks (for more information visit http://www.ncgs.state.nc.us)
- ● M1.5 River Mile

GRID NORTH

MAP SCALE 1" = 500' (1 : 6,000)

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 3758J

FIRM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA

PANEL 3758

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	CID No.	PANEL	SUFFIX
ALEXANDER COUNTY	370398	3758	J
TAYLORSVILLE, TOWN OF	370479	3758	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE DECEMBER 18, 2007

MAP NUMBER 3710375800J

State of North Carolina
Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

010246

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION (PMN) ISSUED

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY ALEXANDER BRIDGE NUMBER 010246 INSPECTION CYCLE 2 YRS

ROUTE SR1111 ACROSS STIREWALT CREEK M.P. 0

LOCATION 0.4 MI. W. JCT. NC16

SUPERSTRUCTURE STEEL PLANK DECK ON I-BEAMS

SUBSTRUCTURE ABUTMENTS:MASS CONCRETE

SPANS 1@26'3

LONGITUDE 81° 11' 5.0" LATITUDE 35° 53' 43.5"

PRESENT CONDITION POOR INVENTORY RATING

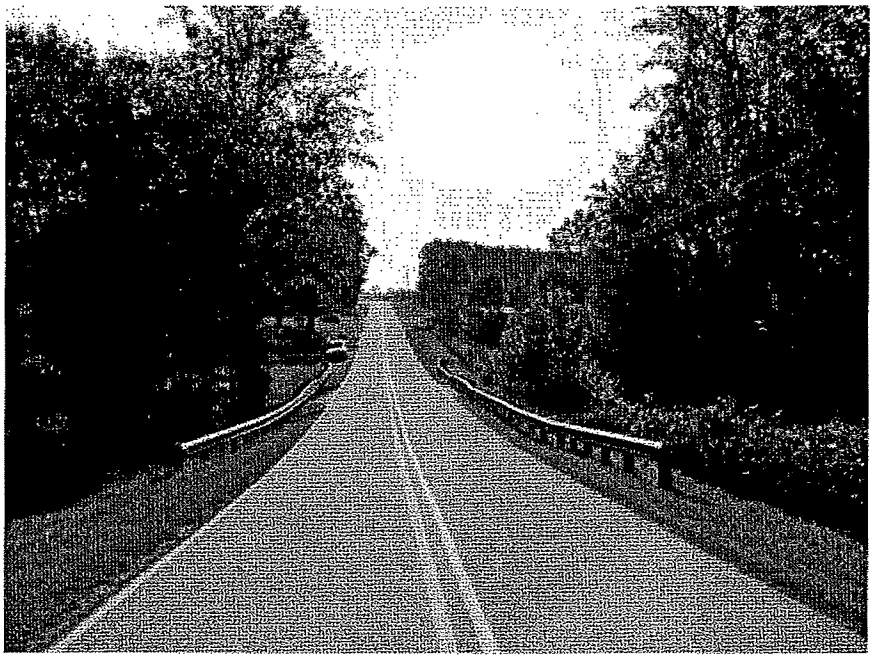
INSPECTION DATE 09/23/2010 OPERATING RATING

PRESENT POSTING Not Posted PROPOSED POSTING

COMPUTER UPDATE ANALYSIS DATE

POSTING LETTER DATE SUFFICIENCY RATING

OTHER SIGNS PRESENT NONE



WEST TO EAST

SIGN NOTICE ISSUED FOR		NUMBERED REQUIRED
No	WEIGHT LIMIT	
No	DELINEATORS	
No	NARROW BRIDGE	
No	ONE LANE BRIDGE	
No	LOW CLEARANCE	

010246

NATIONAL BRIDGE INVENTORY------ STRUCTURE INVENTORY AND APPRAISAL Run Date: 10/13/2010

IDENTIFICATION

(1) STATE NAME -NORTH CAROLINA BRIDGE 010246
(8) STRUCTURE NUMBER(FEDERAL) 000000000030246
INVENTORY ROUTE (ON/UNDER) - ON 131011110
(2) STATE HIGHWAY DEPARTMENT DISTRICT 12
(3) COUNTY CODE 3 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED - STIREWALT CREEK
(7) FACILITY CARRIED SR1111
(9) LOCATION 0.4 MI. W. JCT. NC16
(11)MILEPOINT 0
(16)LAT 35° 53' 43.5" (17)LONG 81° 11' 5.0"
(98)BORDER BRIDGE STATE CODE PCT SHARE
(99)BORDER BRIDGE STRUCTURE NO

STRUCTURE TYPE AND MATERIAL

(43) STRUCTURE TYPE MAIN: Steel
TYPE - Stringer Multibeam or Girder CODE 302
(44) STRUCTURE TYPE APPR :
TYPE - CODE 0
(45) NUMBER OF SPANS IN MAIN UNIT 1
(46) NUMBER OF APPROACH SPANS 0
(107)DECK STRUCTURE TYPE - Corrugated Steel CODE 6
(108)WEARING SURFACE / PROTECTIVE SYSTEM :
(A) TYPE OF WEARING SURFACE - Bituminous CODE 6
(B) TYPE OF MEMBRANE - None CODE 0
(C) TYPE OF DECK PROTECTION - None CODE 0

AGE AND SERVICE

(27) YEAR BUILT 1955
(106)YEAR RECONSTRUCTED 1989
(42) TYPE OF SERVICE : ON - Highway
UNDER - Waterway CODE 15
(28) LANES: ON STRUCTURE 2 UNDER STRUCTURE
(29) AVERAGE DAILY TRAFFIC 1500
(30) YEAR OF ADT 2009 (109) TRUCK ADT PCT 6 %
(19) BYPASS OR DETOUR LENGTH 3 MI

GEOMETRIC DATA

(48) LENGTH OF MAXIMUM SPAN 26 FT
(49) STRUCTURE LENGTH 26 FT
(50)CURB OR SIDEWALK: LEFT 0.0 FT RIGHT 0.0 FT
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 24.0 FT
(52) DECK WIDTH OUT TO OUT 25.0 FT
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 18.0 FT
(33) BRIDGE MEDIAN - No Median CODE 0
(34) SKEW 20° (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99 FT 99 IN
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 24.0 FT
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99 FT 99 IN
(54) MIN VERT UNDERCLEAR REF Not a Highway or Railroad
(55) MIN LAT UNDERCLEAR RT REF Not a Highway or Railroad 99.9 FT
(56) MIN LAT UNDERCLEAR LT REF - 0.0 FT

NAVIGATION DATA

(38) NAVIGATION CONTROL - No Navigational Control CODE 0
(111)PIER PROTECTION - Not Applicable CODE
(39) NAVIGATION VERTICAL CLEARANCE 0
(116)VERT - LIFT BRIDGE NAV MIN VERT CLEAR
(40) NAVIGATION HORIZONTAL CLEARANCE 0

SUFFICIENCY RATING = 55.3
STATUS = Structurally Deficient

CLASSIFICATION — CODE

(112)NBIS BRIDGE SYSTEM - YES
(104)HIGHWAY SYSTEM NON NHS Route 0
(26) FUNCTIONAL CLASS - Local 09
(100)STRAHNET HIGHWAY - Not a STRAHNET Route 0
(101)PARALLEL STRUCTURE - No Parallel Structure N
(102)DIRECTION OF TRAFFIC - 2-way Traffic 2
(103)TEMPORARY STRUCTURE - Not Temporary
(110)DESIGNATED NATIONAL NETWORK - Not Part of 0
(20) TOLL On Free Road 3
(31) MAINTAIN - State Highway Agency 01
(22) OWNER - State Highway Agency 01
(37) HISTORICAL SIGNIFICANCE - Not Eligible 5

CONDITION — CODE

(58) DECK 7
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 4
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

LOAD RATING AND POSTING — CODE

(31) DESIGN LOAD Other or Unknown 0
(64) OPERATING RATING - HS-42 175
(66) INVENTORY RATING - HS-25 145
(70) BRIDGE POSTING - No Posting Required 5
(41) STRUCTURE OPEN, POSTED ,OR CLOSED A
DESCRIPTION - Open, No Restriction

APPRAISAL — CODE

(67) STRUCTURAL EVALUATION 4
(68) DECK GEOMETRY 4
(69) UNDERCLEARANCES,VERTI & HORIZ N
(71) WATERWAY ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 7
(36) TRAFFIC SAFETY FEATURES 1111
(113)SCOUR CRITICAL BRIDGES U
SCOUR PLAN OF ACTION

PROPOSED IMPROVEMENTS

(75) TYPE OF WORK - CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT 0 FT
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE 20
(114)FUTURE ADT 3000 (115) YEAR FUTURE ADT 2025

INSPECTIONS

(90) INSPECTION DATE 09/23/2010
(92) CRITICAL FEATURE INSPECTION : (93) CFI DATE
A) FRACTURE CRIT DETAIL - NO A)
B) UNDERWATER INSP - NO B)
C) OTHER SPECIAL INSP NO C)
SCOUR

010246

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE Run Date: 10/13/2010

COUNTY :	DIV :	DIST :	STRUCTURE NUMBER :	LENGTH :
ALEXANDER	12	2	010246	26 FEET

ROUTE CARRIED : SR1111

FEATURE INTERSECTED : STIREWALT CREEK

LOCATED : 0.4 MI. W. JCT. NC16

BRIDGE NAME :

CITY :

FUNC. CLASS :	SYST.ON :	SYST.UNDER :	ADT & YR :	RAIL TYPE :
09	NFA	NFA	1500 2009	LT 323 RT 323

BUILT :	BY :	PROJ :	FED.AID PROJ :	DESIGN LOAD :
1955	BMU			Other or Unknown

REHAB :	BY :	PROJ :	ALIGNMENT :	SKEW :	LANES :
1989	BMU	5.7851	TAN	70	ON 2 UNDER

NAVIGATION :	HT. CRN. TO BED :	WATER DEPTH :
VC 0.0 FT HC 0.0 FT	19 FT	1 FT

SUPERSTRUCTURE : STEEL PLANK DECK ON I-BEAMS

SUBSTRUCTURE : ABUTMENTS:MASS CONCRETE

SPANS : 1@26'3"

BEAMS OR GIRDERS : 9 LINES OF W21X62 I-BEAMS @ 2'10" CENTERS

FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) :
STEEL.PLK, 6"AWS		25.0 FT

CLEAR ROADWAY :	BETWEEN RAILS :	SIDEWALK OR CURB :
24.0 FT	24.0 FT	LT 0.0 FT RT 0.0 FT

VERT.CL.OVER :	VERT.CL.UNDER :	HOR.CL.UNDER :
99 FT 99 IN	00 FT 00 IN	0.0 FT

INV.RTG. :	OPE.RTG. :	CONTR.MEMBER :	POSTED :
HS-25	HS-42	BEAM INT. #2&4	SV TTST DATE 07/21/1989

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

2ND OPENING :	3RD OPENING :	4TH OPENING :	5TH OPENING :

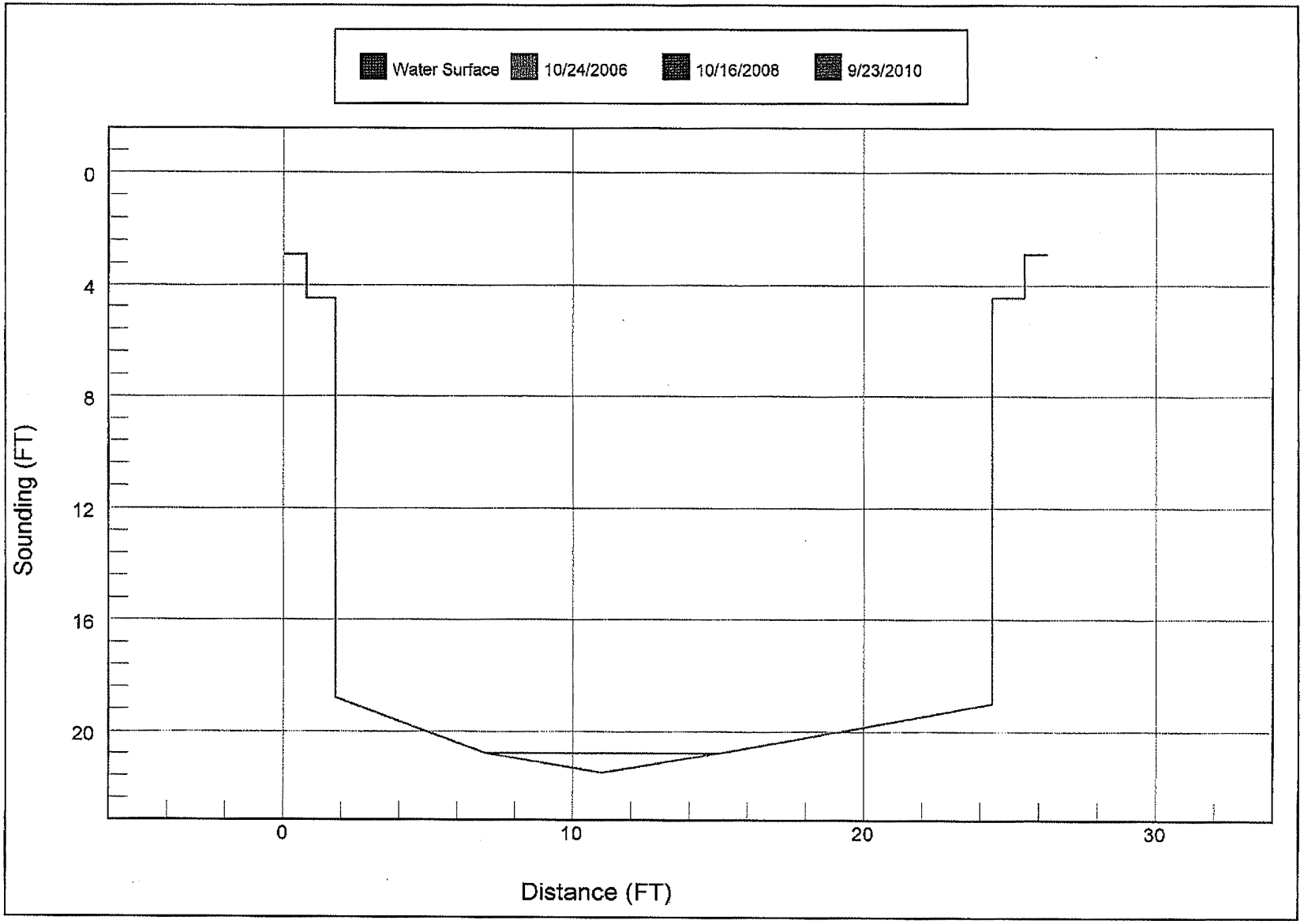
REMARKS :

010246

Bridge: 010246 County ALEXANDER Date: 09/23/2010

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



010246

rev. 8/2009

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NCDOT UNITS:
BRIDGE MAINTENANCE UNIT
HYDRAULIC DESIGN UNIT
GEOTECHNICAL UNIT
STRUCTURE DESIGN UNIT
SOILS AND FOUNDATION UNIT

BRIDGE SCOUR REPORT

COUNTY: ALEXANDER **BRIDGE:** 010246 **ROUTE:** SR 1111 **STREAM CROSSED:** STIREWALT CREEK

ASSESSMENT: YES **EVALUATION:** _____ **BY:** JJB **DATE:** 6/15/11

FHWA STRUCTURE INVENTORY & APPRAISAL CODES:

SUBSTRUCTURE CONDITION (ITEM 60)
CHANNEL AND CHANNEL PROTECTION (ITEM 61)
WATERWAY ADEQUACY (ITEM 71)
SCOUR CRITICAL BRIDGE (ITEM 113)

MONITORING:

PLAN REQUIRED? YES _____ **NO** ✓

- **FLOOD MONITORING EVENT (UPSTREAM FACE, FROM TOP OF RAIL):**

REQUIRED ACTION: _____

- **CRITICAL MONITORING DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):**

REQUIRED ACTION: _____

- **CRITICAL HIGH WATER DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):**

REQUIRED ACTION: _____

- **SCOUR CRITICAL DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):**

REQUIRED ACTION: _____

INCREASE UNDERWATER INSPECTION CYCLE? YES _____ **NO** ✓ **FREQUENCY** _____

COUNTER MEASURES:

PLAN REQUIRED? **YES** _____ **NO** ✓
SUMMARY OF PLAN:

CONSTRUCTION COMPLETE DATE: _____
FINAL CODING AFTER WORK IS COMPLETED (ITEM 113) _____ **DATE:** _____

BRIDGE MAINTENANCE COMMENTS:

010246

BRIDGE SCOUR EVALUATION ASSESSMENT

AND

DATA SUMMARY REPORT

ASSESSED:	6/15/11
BY:	JJB
CODE:	5
CLASSIFIED:	LOW RISK

SITE IDENTIFICATION:

COUNTY ALEXANDER CITY/TOWN _____ BRIDGE NO. 010246
ROUTE SR 1111 STREAM STIREWALT CREEK ROAD MILE _____
DUAL BRIDGE NO. ___ IS US/DS
ORIGINAL PROJECT NO. _____ YEAR BUILT 1955
REHAB PROJECT NO. _____ YEAR BUILT 1989
CURRENT ADT 1700 YEAR 2007 FUTURE ADT _____ YEAR _____

INFORMATION RESOURCES AVAILABLE:

HYDRAULIC STUDY REPORT (DATE): _____
AS-BUILT CONSTRUCTION PLANS (DATE): _____
FOUNDATION REPORT (DATE): _____
OTHER AGENCY STUDIES (DATE): _____
(FEMA, CORPS, T.V.A., SCS)
QUAD MAPS (NAME & DATE): _____
AERIAL PHOTOGRAPHY (DATE): _____
GAGE DATA (TYPE, NO., DRAINAGE AREA): _____
DISTANCE TO SITE (UP/DOWN STREAM): _____
BRIDGE INSPECTION REPORT (DATE): 10/16/08
UNDERWATER INSPECTION (DATE, CYCLE): _____
STRUCTURE DATA FILE (DATE): _____
OTHER _____ (DATE): _____

HYDRAULIC DATA:

DRAINAGE AREA _____ SQ. MILE SOURCE _____
100 YR. WATERWAY OPENING (NORMAL TO FLOW) _____

HISTORICAL FLOODS

DATE	ELEV. (FT BELOW TOP OF RAIL)	APPROX. FREQ. (YEARS)	APPROX. DISCH.	ADJUSTED TO SITE
	UNKNOWN			

SOURCE _____

FLOOD FREQUENCY (YRS)	Q___	Q___	Q___	Q___
ELEVATION (FT)				
DISCHARGE (CFS)				
AVG. VELOCITY (Q/A)				

SOURCE _____

COMMENTS: _____

rev. 8/2009

STRUCTURE DATA:

BRIDGE LENGTH: 26'
SUFFICIENCY RATING 82.5
NO. OF SPANS 1
BED TO CROWN _____

EST. REMAINING LIFE YRS: _____ **DATE:** _____
SPAN LENGTHS 1@26'3"
SIMPLE OR CONTINUOUS _____
TOP OF RAIL ELEVATION 0' **T HALWEG ELEVATION** 21.5'

BENT NO. (W-E, N-S)		EB1	EB2					
TYPE		MASS CONC.	MASS CONC.					
SKEW								
FTG./FOUNDATION TYPE								
FOOTING THICKNESS		3.8'						
TOP FTG. ELEV.	LT							
	CTR	18.9'						
	RT							
BOTTOM FTG. ELEV.	LT							
	CTR	22.7'	not tested					
	RT							
TOP SILL ELEV.	LT							
	CTR							
	RT							
BOTTOM SILL ELEV.	LT							
	CTR							
	RT							
CONC./ RIP RAP PROTECTION								
PILE TYPE								
PILE LENGTH (AVERAGE)								
PILE TIP ELEV. (AVERAGE)								
PILE EMBED BELOW THALWEG								
FTG. EMBED BELOW THALWEG		1.2'						

COMMENTS: EB1 FOOTING DEPTH FROM IMPACT ECHO (IE) TEST; SEE SCHNABEL REPORT DATED 9/27/11

610246

GEOMORPHIC DATA: (LOOKING DOWNSTREAM)

CHANNEL (NORMAL TO FLOW):

AVG. BASE WIDTH_____ AVG. TOP WIDTH_____ AVG. DEPTH_____

AT CROSSING:

STRAIGHT_✓_ MILD CURVE_____ SHARP BEND_____

FLOW ANGLE OF APPROACH:

LOW_✓_ MILD_____ HIGH_____

(0°-5°) (5°-20°) (20°+)

CROSSING WIDTH COMPARED TO:

UPSTREAM: WIDER_____ SAME_____ NARROWER_____

DOWNSTREAM: WIDER_____ SAME_____ NARROWER_____

BASED ON COMPARISON OF SECTIONS TAKEN AT DATES _____

CHANNEL HAS:

WIDENED _____ FT SAME_____ NARROWED _____ FT

AGGRADATED_____ FT SAME_____ DEGRADATED _____ FT

SHIFTED LT _____ FT SAME_____ SHIFTED RT. _____ FT

THALWEG HAS:

SHIFTED LT _____ FT SAME_____ SHIFTED RT. _____ FT

REPORTED SITE SCOUR PROBLEM:

	MINOR	MODERATE	SEVERE	UNKNOWN
LT. BANK	✓			
RT. BANK	✓			
LT. SPILL SLOPE				
RT. SPILL SLOPE				
PIER(S)	✓			
DEBRIS	✓			
CHANNEL BED	✓			
OTHER _____				

IS REPORTED PROBLEM CHANNEL FLOW ASSOCIATED? N/A

BASED ON THE AVAILABLE GEOMORPHIC DATA, THE CHANNEL STABILITY POTENTIAL OVER THE LIFETIME OF THE EXISTING STRUCTURE CAN BEST BE DESCRIBED AS:

1. **RELATIVELY STABLE WITH LITTLE EXPECTED CHANGE** N/A
2. **POTENTIAL FOR SLOW CHANGE OVER TIME. NOT PRONE TO A MAJOR ONE-EVENT CHANGE.** N/A
3. **UNSTABLE SUBJECT TO RAPID EVOLUTIONARY CHANGE** N/A

010246

ASSESSMENT CRITERIA:

1) SPREAD FOOTINGS WITHIN THE POTENTIAL CHANNEL SCOUR AREA ARE INDICATED BY FIELD INVESTIGATION OR BORING LOG ANALYSIS TO BE ON SCOUR RESISTANT MATERIAL.
GEOTECHNICAL CONCURRENCE BY:_____

2) AS-BUILT PLANS INDICATE THE SPREAD FOOTINGS WITHIN THE POTENTIAL CHANNEL SCOUR AREA TO BE KEYED AT LEAST 6" INTO ROCK. ____

3) STEEL PILE BENTS WITHIN THE POTENTIAL CHANNEL SCOUR AREA HAVE a) AVERAGE PILE TIPS THAT PENETRATE A MINIMUM OF 12 FEET BELOW STREAM BED OR b) HAVE LESS THAN 22 +/- FEET (LONGER IF BRACING CONSIDERED)OF TOTAL PILE LENGTH AND INDICATED BY: BORINGS LOGS, PILE DRIVE RECORDS, OR ROD SOUNDINGS TO BE TIPPED INTO POINT BEARING MATERIAL. a)____ b)____

4) CONCRETE OR TIMBER BENTS WITHIN THE POTENTIAL CHANNEL SCOUR AREA HAVE a) AVERAGE PILE TIPS THAT PENETRATE A MINIMUM OF 15 FEET BELOW THE STREAM BED OR b) HAVE LESS THAN 18 FEET +/- (LONGER IF BRACING CONSIDERED)OF TOTAL PILE LENGTH AND INDICATED BY BORING LOGS OR ROD SOUNDINGS TO BE TIPPED INTO POINT BEARING MATERIAL. a)____ b)____

5) ALL PIERS AND ABUTMENTS ARE OUTSIDE THE NORMAL CHANNEL SECTION. ____

6) THE BRIDGE HAS EXPERIENCED A FLOOD GREATER THAN A 50-YEAR MAGNITUDE WITH NO REPORTED OR APPARENT SCOUR PROBLEM. ____

7) THE BOTTOMS OF THE CHANNEL PIER SPREAD FOOTINGS ARE GREATER THAN 7 FEET BELOW THE STREAM BED. ____

8) THE APPROACH ROADWAY OR BRIDGE IS OVERTOPPED DURING MINOR FLOODS (<10-YEAR EVENT) REQUIRING CLOSURE AND INSPECTION BEFORE REOPENING. ____

9) DRILLED PIERS WITHIN THE POTENTIAL CHANNEL SCOUR AREA ARE INDICATED BY FIELD INVESTIGATION OR BORING LOG ANALYSIS TO BE IN SCOUR RESISTANT MATERIAL ____

THIS STRUCTURE MEETS WHICH OF THE ABOVE LISTED ITEMS FOR CLASSIFICATION AS A LOW RISK STRUCTURE? ____

BASED ON AN ENGINEERING EVALUATION OF THE AVAILABLE DATA AND REPORTS, THE LOW RISK CLASSIFICATION OF THIS STRUCTURE FOR THE REASON(S) LISTED ABOVE APPEARS REASONABLE. N/A

COMMENTS:
The rod drives encountered refusal (150 blows or more in one single foot) at 23.4 and 22.1 feet below top of rail at EB1 and EB2, respectively. (See Schnabel Report 9/27/11)

010246

ASSESSMENT DATA:

COUNTY: ALEXANDER
BRIDGE NO.: 010246

ASSESSMENT DATE: 6/15/11

	YES OR NO
INSPECTION REPORTS:	
DATE OF INSPECTION REPORT 10/16/08	
EXISTING SCOUR HOLES PRESENT	N/A
UNDERMINING OF FOOTINGS	N/A
72 FIELD SCOUR EVALUATION- SCOUR HAS OCCURRED	N/A
HYDRAULIC DATA:	
HIGH WATER- OVERTOP OF BRIDGE DECK	NO
CHANNEL SHIFTING OR DEGRADING	NO
BAD ANGLE OF ATTACK- STREAM CURVES AT BRIDGE	NO
DEBRIS PROBLEM AT BRIDGE- LEANING TREES ON BANK	NO
GEOTECHNICAL DATA:	
FOUNDATION MATERIAL IS SCOURABLE	N/A
STREAMBED IS SAND W/ NO ARMOR MATERIAL	N/A
STRUCTURAL DATA:	
SMALL ABUTMENTS (NOT MASSIVE)- EASY TO DAMAGE	N/A
WIDE WEBS- ADVERSE ANGLE- CREATES PIER SCOUR	N/A
ROTATION OR SETTLEMENT OF PIERS OR ABUTMENTS	N/A
ADDITIONAL CONSIDERATIONS:	
DAM-UPSTREAM/ DOWNSTREAM	N/A
PREVIOUS COUNTERMEASURES DAMAGED	N/A
RIP RAP ERODE	N/A
SAND OR GRAVEL MINING IN VICINITY OF BRIDGE	N/A

THIS ASSESSMENT WAS CONDUCTED BY AN INTERDISCIPLINARY TEAM OF HYDRAULIC, GEOTECHNICAL, STRUCTURAL, BRIDGE MAINTENANCE, AND FHWA ENGINEERS BASED UPON INFORMATION PROVIDED AND ENGINEERING JUDGMENT.

NOTE:
BRIDGE INSPECTORS TO NOTIFY THE HYDRAULICS UNIT IF ANY OF THE ABOVE CONDITIONS CHANGE ENOUGH TO WARRANT RECORDING OF ITEM 113.

010 246

DECISION:

CLASSIFIED AS:

- SCOUR CRITICAL _____
- UNKNOWN FOUNDATION _____
- LOW RISK ✓

RECOMMENDED SCOUR CODE: 5

ASSESSMENT COMMENTS:

EB1 Bottom of Footing 22.7' below Top of Rail with refusal material 22.1' below TOR.

EB2 depth not tested

SCHEDULE FOR DETAILED STUDY _____

SCHEDULE FOR FURTHER IN-HOUSE STUDY _____

ASSESSED BY: JJB
FIRM: NCDOT
DATE: 6/15/11
CHECKED BY: _____
DATE: _____
FIRM: _____

APPROVED BY: JLL
DATE: 6/15/11

FINAL COMMENTS:

SCOUR COMMITTEE RECOMMENDS CODE 5

SEE SCHNABEL REPORT DATED 9/27/11

010246

Schnabel ENGINEERING

Schnabel Engineering South, PC
Greensboro, NC
Phone: 336-274-9456
www.schnabel-eng.com

FINAL REPORT OF UNKNOWN BRIDGE FOUNDATION INVESTIGATION
BRIDGE NO. 010246
ALEXANDER COUNTY
SR 1111
STIREWALT CREEK

SUBMITTED TO:
Jerry Beard, P.E.
North Carolina Dept. of Transportation
Hydraulics Unit
1590 Mail Service Center
Raleigh, NC 27699-1590

AUTHORED BY:
Edward D. Billington, P.G.
and Gerald C. Robblee, P.E.
NC P.E. Registration No. 21395
Schnabel Project 09210013.16

NORTH CAROLINA PROFESSIONAL SEAL 021395 ENGINEER GERALD C. ROBBLEE

9/27/2011

1.0 INTRODUCTION

This report provides a summary of the results of field testing and records search for Bridge 010246 in Alexander County. The purpose of the work was to help determine the bridge foundation depth to allow the Scour Committee to assess the scour potential of the bridge.

Bridge 010246 is a one-span bridge built in 1955 and reconstructed in 1989. The present condition is Fair, according to the 10/16/08 Inspection Report. The superstructure is listed as STEEL PLANK DECK ON I-BEAMS. The substructure is listed as ABUTMENTS: MASS CONCRETE.

2.0 RECORDS SEARCH

The records search was performed by the Geotechnical Engineering Unit (GEU) and included reviewing the Raleigh Bridge Maintenance Unit records. The GEU also sent letters to the Division Bridge Maintenance Offices requesting pile records and other relevant information. Folders containing applicable information were provided for most bridges to Schnabel by the GEU.

Bridge Inspection Reports: 10/16/08
Soundings: 2002, 2004, 2006, 2008 (all four are the same)

3.0 BRIDGE INFORMATION

Latest Inspection Report	10/16/08	**Year Built**	1955
Substructure Condition	6	**Year Rehab**	1989
Channel & Channel Condition	7	**Current ADT**	1700
Scour Code	7	**Year**	2007
Waterway Adequacy	7		
Bridge Length	26	**EB1 Foundation**	MASS CONCRETE ABUTMENTS
Sufficiency Rating	82.5		
# of Spans	1	**EB2 Foundation**	
Span Lengths	1@26'3		

No additional information was found regarding the foundation. No plans are available.

4.0 HYDRAULIC DATA

Source of High Water Information	None
High Water*	Unknown
Date	Unknown
Q25	Unknown
Q50	Unknown
Q100	Unknown

*referenced to top of rail

5.0 FIELD OBSERVATIONS

Scour noted: No evidence of scour was observed during our field investigation.

Angle of Stream Attack: Straight

Debris: No debris noted.

Has Thalweg Shifted: The soundings show that the thalweg has not shifted and there has been very little change in channel depth since the 2002 sounding.

6.0 FIELD TESTING

We conducted an Impact Echo (IE) test on EB1 and calculated a footing thickness of 3.8 feet using a velocity of 12,500 feet per second. A data plot for this test is attached. Results of the testing are shown in the following table and on the attached cross-section.

PILE TIP OR BOTTOM OF FOUNDATION FROM TESTING			
Location	Computed Length (feet)	Top of Rail to Bottom of Foundation (feet)	Embedment Below Thalweg (feet)
EB1	3.8	22.7	1.2
EB2	Not Tested		

Thalweg: 21.5 feet below top of rail (10/16/08)

We drove half-inch diameter steel rods with a 16-pound hammer at EB1 and EB2, as shown in the following table.

Foundation Element and Reference Location (feet)	Depth Below Reference (feet)	Depth Below Top of Rail (feet)	Blows per Foot	Comment
EB1	1	21.2	7	
TOR to ref.	2	22.2	10	
20.2	3	23.2	31	
	3.2	23.4	150	Rock
EB2	1	21.2	9	
TOR to ref.	1.9	22.1	150	Rock
20.2	-	-	-	-

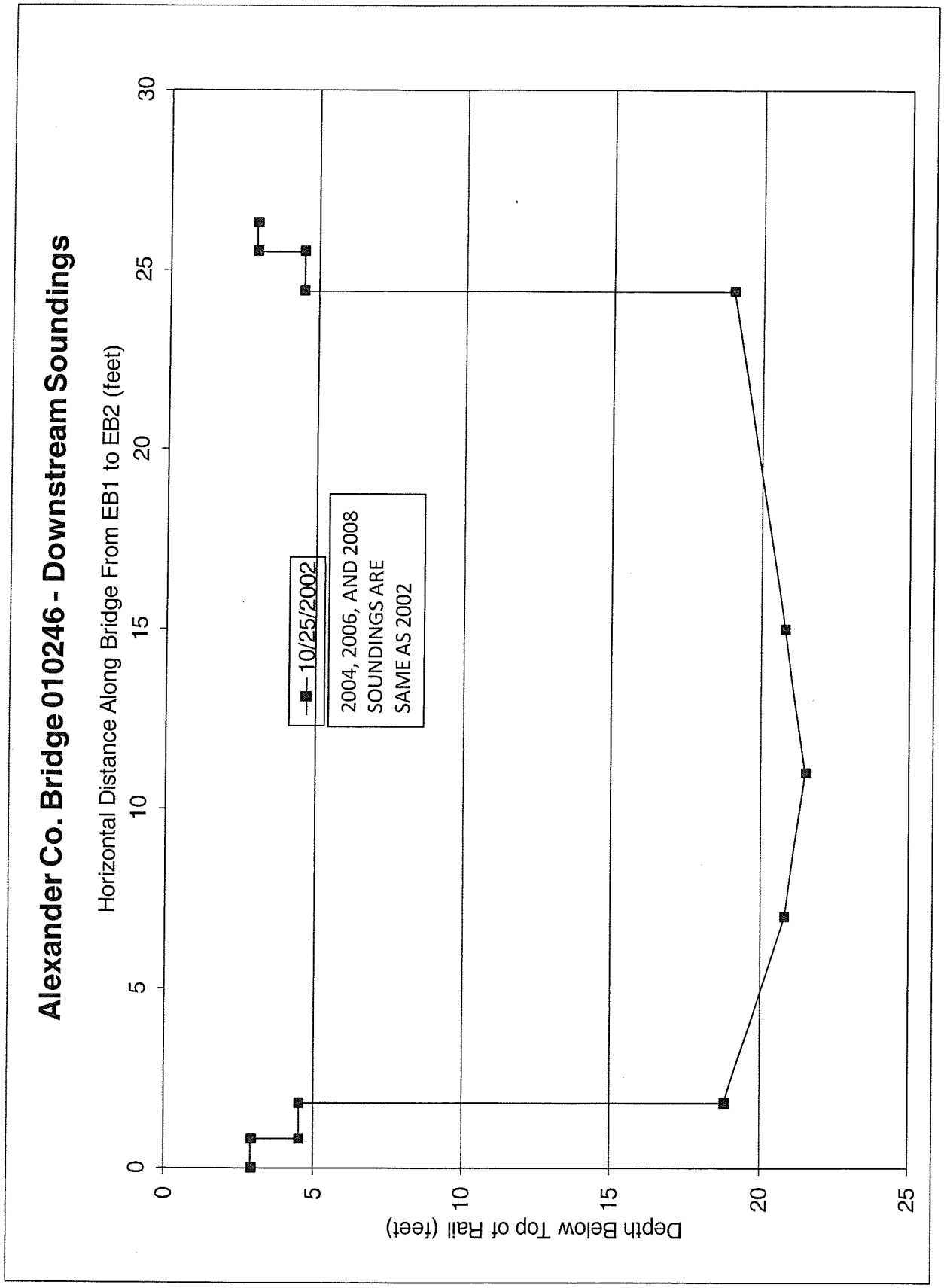
7.0 CONCLUSIONS

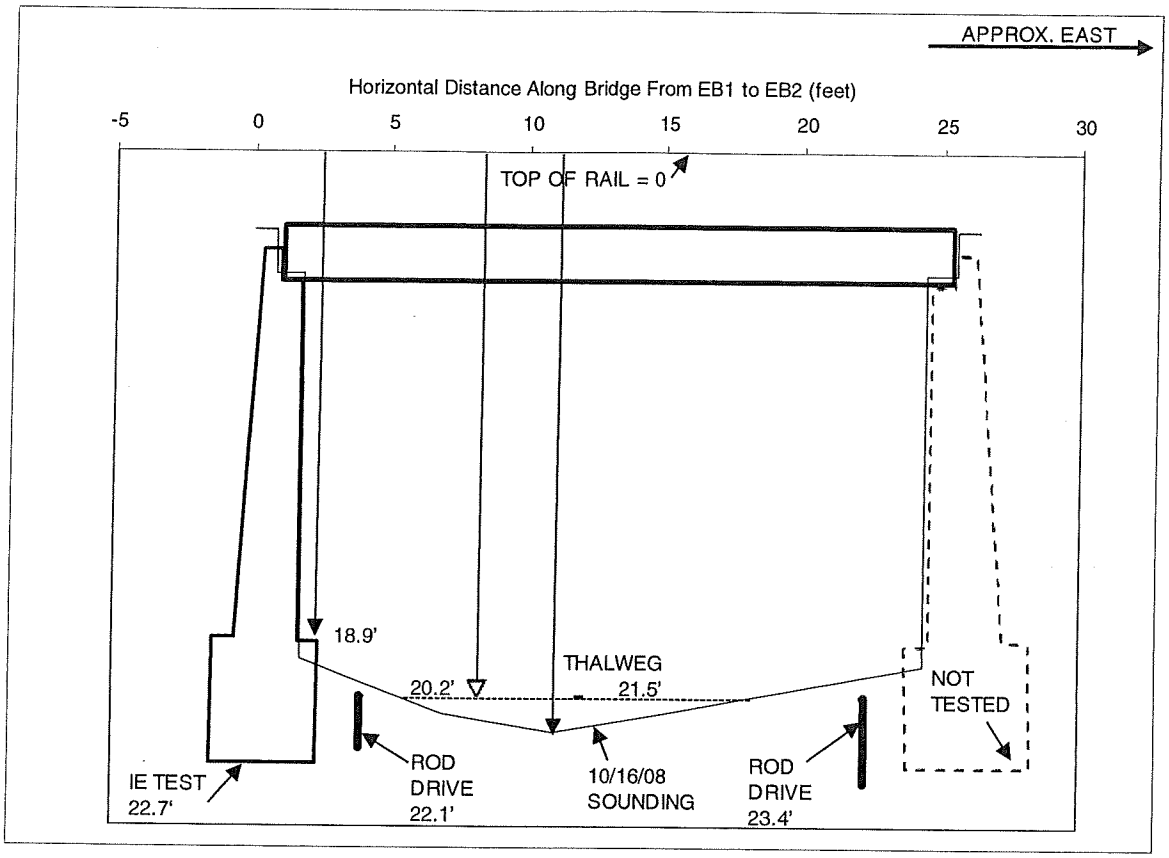
The results of the research, testing, and rod drives performed on Bridge 010246 in Alexander County indicate the following:

- There were no observations of scour during our field investigation.
- The soundings show that the thalweg has not shifted and there has been very little change in channel depth since the 2002 sounding.
- The rod drives encountered refusal (150 blows or more in one single foot) at 23.4 and 22.1 feet below top of rail at EB1 and EB2, respectively.
- We calculated a foundation tip elevation of 22.7 feet below top of rail from the IE test on EB1, which is 1.2 feet below thalweg.

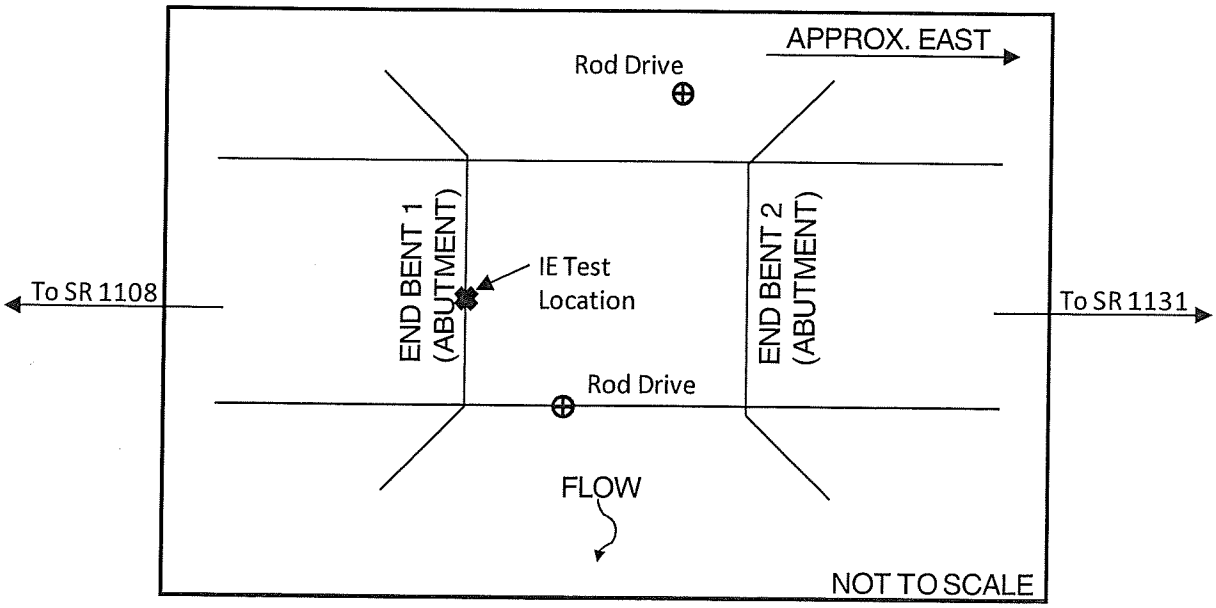
8.0 LIMITATIONS

The work presented herein is based on non-destructive evaluation techniques that require interpretation of the results. We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report, or any other instrument of service.


Alexander Co. Bridge 010246 - Downstream Soundings
Horizontal Distance Along Bridge From EB1 to EB2 (feet)
0
5
10
15
20
25
30
Depth Below Top of Rail (feet)
0
5
10
15
20
25
10/25/2002
2004, 2006, AND 2008
SOUNDINGS ARE
SAME AS 2002

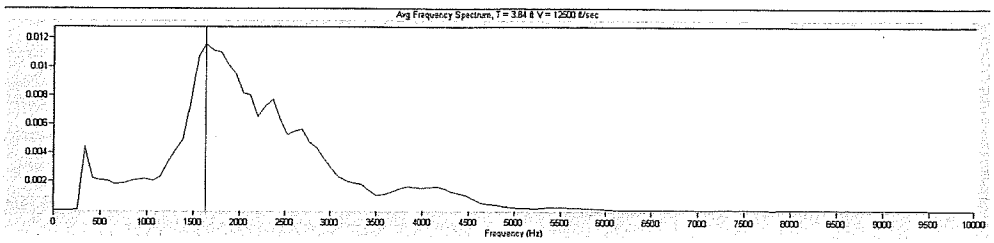


CROSS SECTION



PLAN VIEW

Impact Echo Test, EB1, Concrete Footing

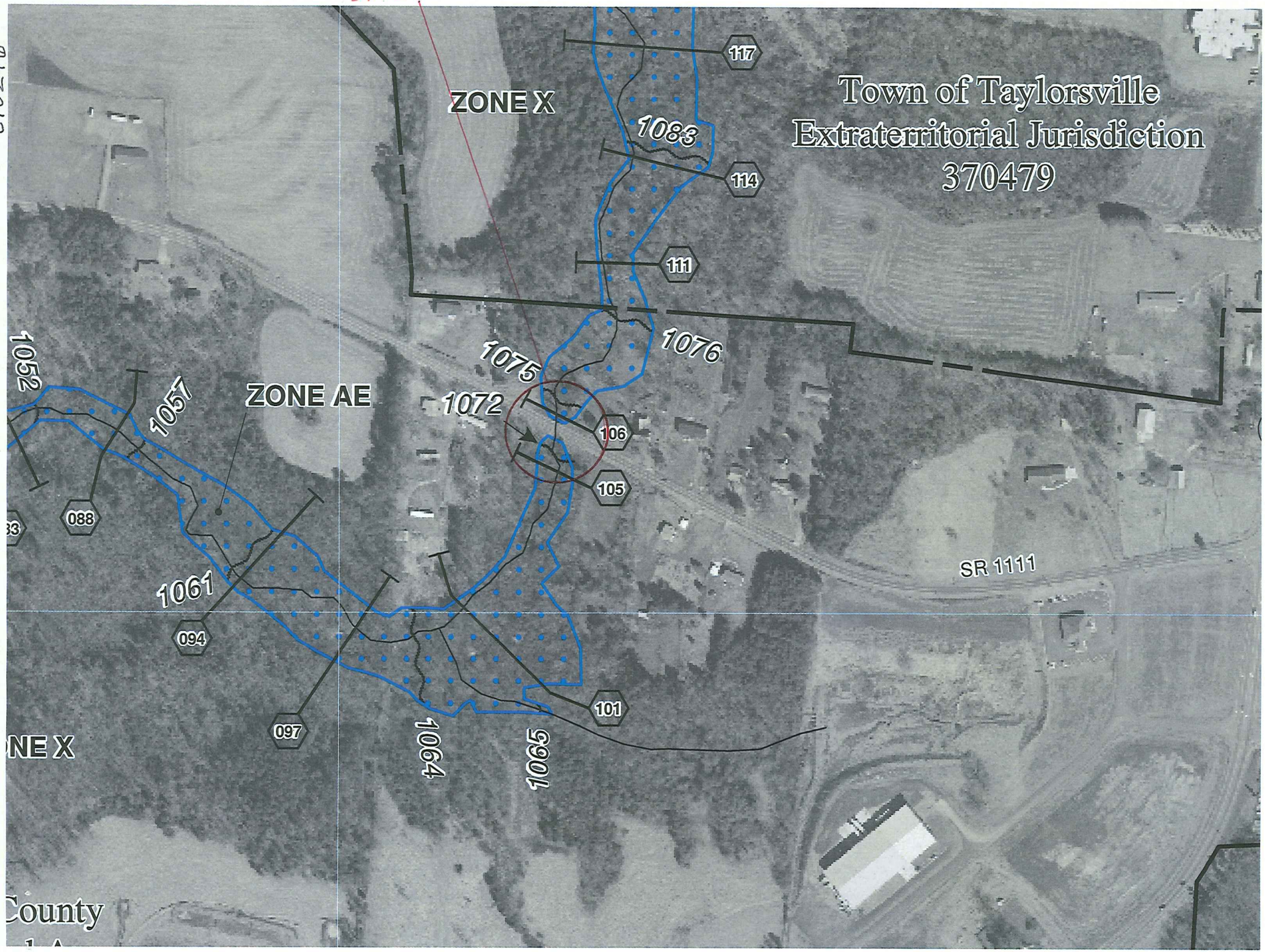


Footing length below test location = 3.8 feet
(using typical concrete velocity of 12,500 feet per second)

Top of footing is 18.9 feet below TOR,

Therefore, TOR to bottom of footing = 3.8 + 18.9 = 22.7 feet

010246

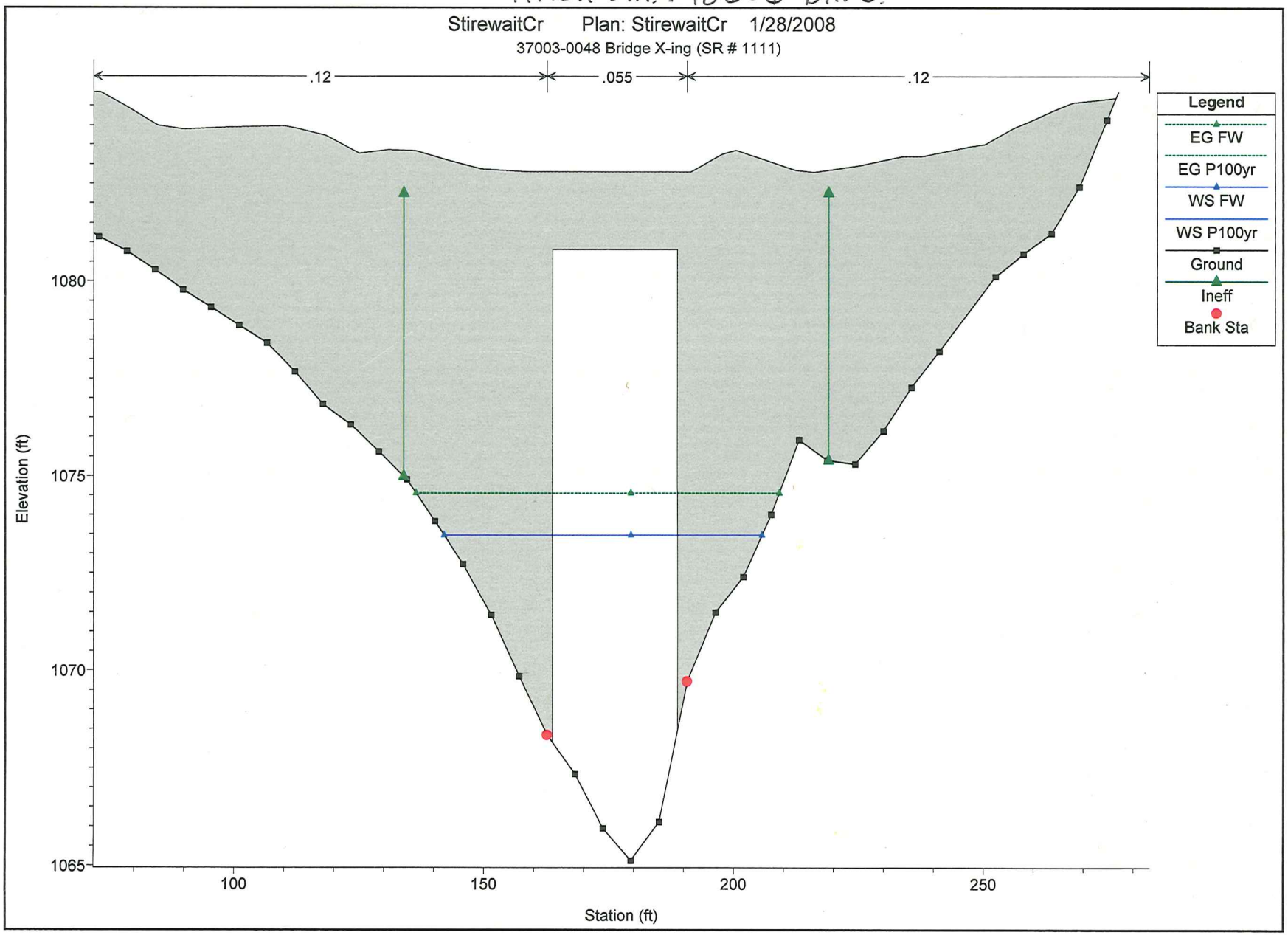

SITE
Town of Taylorsville
Extraterritorial Jurisdiction
370479
ZONE X
ZONE AE
ZONE X
1083
1076
1075
1072
1052
1057
1061
1064
1065
117
114
111
106
105
101
088
094
097
SR 1111
County

010246

Table 9—Limited Detailed Flood Hazard Data

Cross Section[1]	Stream Station[2]	Flood Discharge *(cfs)*	1% Annual Chance Water-Surface Elevation *(feet NAVD 88)*	Non-Encroachment Width *(feet)*[3]
STIREWALT CREEK				
043	4,347	2,130	1,026.4	41 / 89
045	4,499	2,130	1,026.7	86 / 54
046	4,647	2,130	1,026.9	84 / 61
049	4,863	2,130	1,027.3	87 / 53
053	5,273	2,130	1,029.1	55 / 65
055	5,509	2,130	1,029.9	79 / 51
058	5,818	2,130	1,031.3	68 / 62
061	6,053	2,130	1,032.6	16 / 116
065	6,454	2,130	1,034.5	80 / 50
067	6,745	2,130	1,035.4	35 / 37
070	7,023	2,130	1,037.0	82 / 26
073	7,315	1,650	1,039.0	68 / 30
077	7,650	1,650	1,039.8	18 / 16
080	7,951	1,650	1,044.2	19 / 47
083	8,284	1,650	1,046.4	20 / 29
085	8,549	1,650	1,050.5	17 / 15
088	8,846	1,650	1,056.4	53 / 40
094	9,401	1,650	1,061.2	23 / 32
097	9,745	1,650	1,062.4	38 / 32
101	10,058	1,650	1,065.4	94 / 26
103	10,333	1,470	1,069.3	51 / 28
105	10,488	1,470	1,070.6	44 / 44
106	10,571	1,470	1,071.6	23 / 21
106	10,641	1,470	1,074.4	37 / 31
107	10,711	1,470	1,075.0	70 / 46
108	10,780	1,470	1,075.0	66 / 54
111	11,109	1,470	1,076.6	68 / 14
114	11,404	1,470	1,083.0	116 / 11
117	11,712	1,470	1,084.6	49 / 61
120	11,998	1,470	1,086.3	114 / 21
123	12,258	1,470	1,088.7	64 / 19
126	12,618	1,470	1,091.3	64 / 29
129	12,930	1,470	1,095.0	61 / 134
133	13,336	1,470	1,100.1	88 / 20
138	13,837	1,290	1,103.1	57 / 38
141	14,072	1,290	1,103.9	30 / 18
143	14,321	1,290	1,106.6	37 / 19
147	14,671	1,290	1,109.6	30 / 55
150	14,977	1,290	1,112.3	54 / 171
152	15,231	1,290	1,112.9	15 / 21
153	15,301	1,290	1,114.8	43 / 32

STR. STA. 10606 BR.U.

010246

RIVER STA.: 10606 BR. U.