

OFFICE ESTIMATE

1@50, 1@60, 1@40 Bridge

complete

PREDESIGN-PRESURVEY REPORT

Project# _____
 TIP# _____
 Let Date _____
 WBS# 17 BP, 11, R, 59

County Yadkin

Bridge# 980109
 Road# SR 1502 (Country Club Rd.)
 Stream North Deep Creek

Type Of Request: POC Force Account TIP NCMA

Date 7/8/13 Name M. G. S

Assigned To _____

Checked By SRB 7-16-13

3@40' ✓

Prior Survey Date NONE (attach copy of prior survey) BRN BK: Yes CD. FILE NONEStudy By Scour Section YES - ATTACHEDFlood Zone Yes Detail Study limited Date 5/18/09 Panel# 5817B.M. Info AJE 19520 ALQuad Map Yadkinville Drainage Area 30.5 sq mi. From USGS / Stream StatsQ25 4260 cfs Q50 5140 cfs Q100 5910 cfs Method Regression

DASS ~~STA~~ **STA. 211560755**
DA = 30.5 SQMI.

EXISTING BRIDGE INFORMATION

Location 0.7 mi. Jct. SR 1134Average Daily Traffic 2400 YR 2003Length 120 feet Bed-To Crown 23 ft Water Depth 3 ft.Type Structure Reinforced conc. floor on T-beamsType Spans 3 @ 40'-0"Upstream Structure 980071 + Prestressed conc. Corrod slab N/ALocation 0.2 mi. N. Jct SR 1134Bed-To Crown 13 ft. WD = 2 ft. Prior Survey _____Downstream Structure 980154 DA = 35.2 mi.²

Location _____

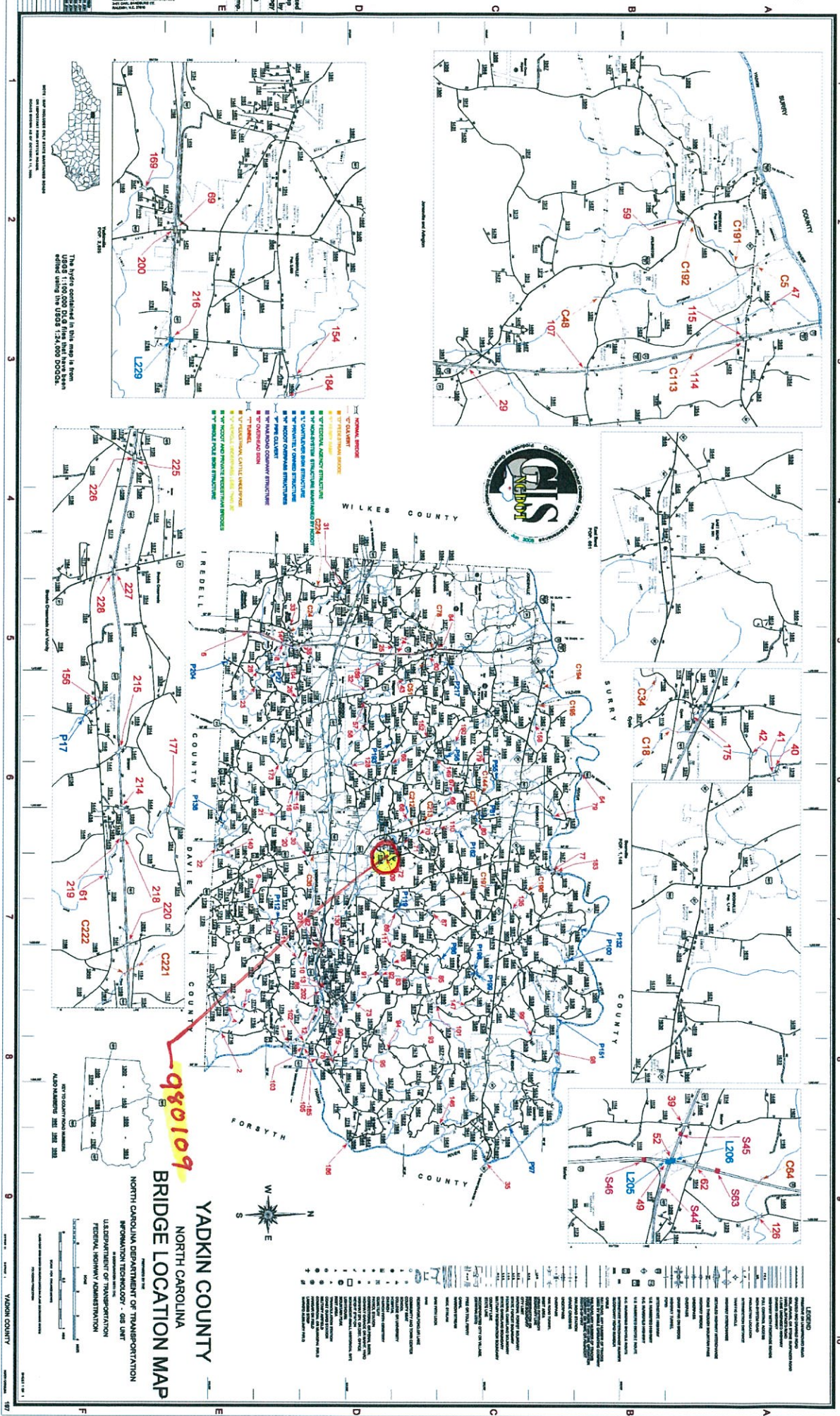
Bed-To Crown _____ Prior Survey _____

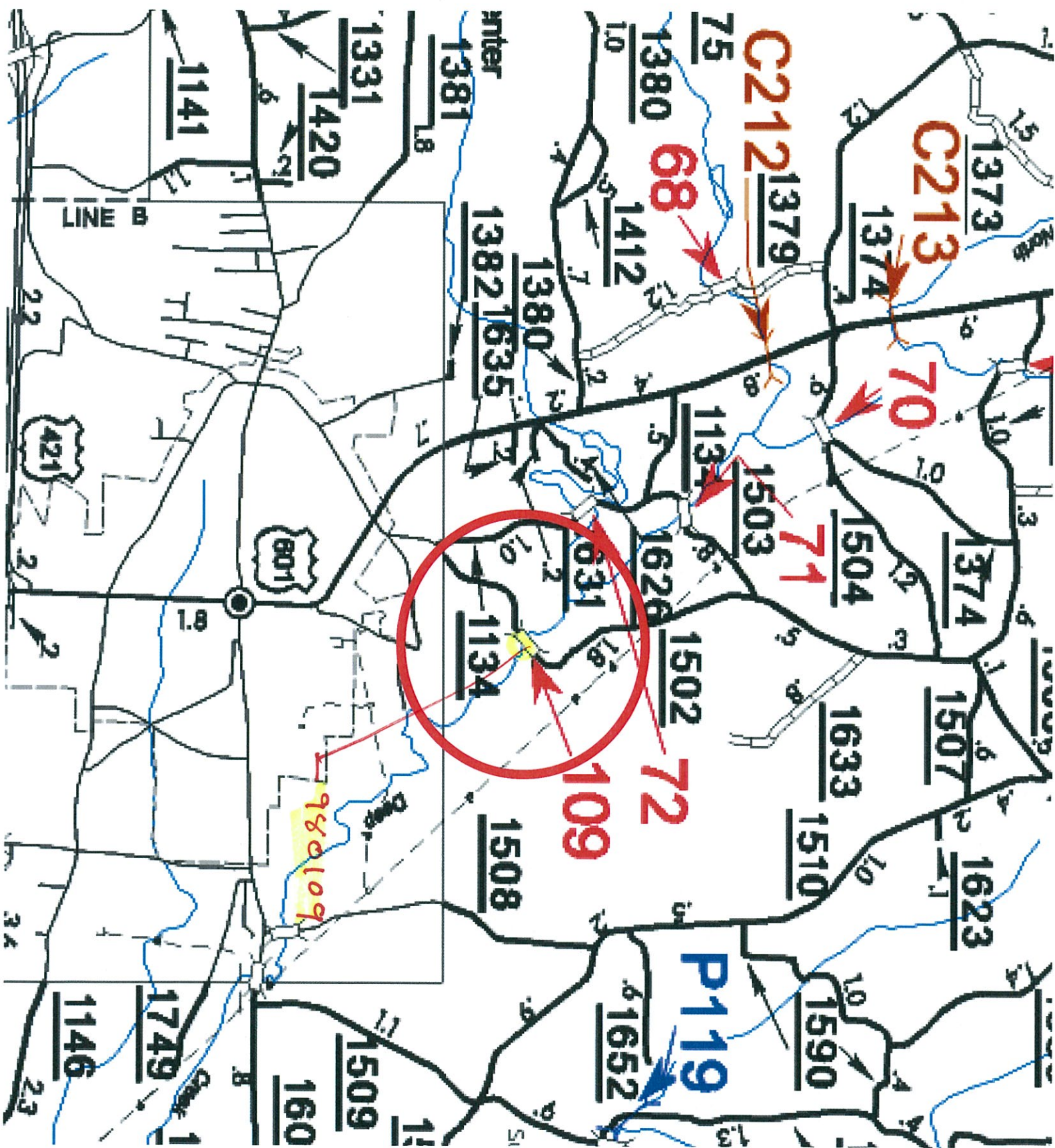
SCS Watershed _____

ENVIRONMENTAL

TVA NoTrout Stream NoAnadromous Fish No Primary Nursery Area NoHigh Quality Waters No Nutrient Sensitive Waters NoNear Water Supply Intake No CAMA County NoStream Classification C 12-84-1-(0.5)DENR River Basin Info. Yadkin

At the confluence
with deep creek





12



North Carolina StreamStats

Streamstats Ungaged Site Report

Date: Mon Jul 8 2013 08:24:08 Mountain Daylight Time

Site Location: North_Carolina

NAD27 Latitude: 36.1530 (36 09 11)

NAD27 Longitude: -80.6570 (-80 39 25)

NAD83 Latitude: 36.1531 (36 09 11)

NAD83 Longitude: -80.6567 (-80 39 24)

Drainage Area: 30.5 mi² 19520 AC

Percent Urban: 8.7 %

Percent Impervious: 1.1 %

Peak Flows Region Grid Basin Characteristics			
100% Peak Southeast US 2009 5158 (30.5 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	30.5	1	9000
Percent Area in Region 1 (percent)	100.000	0	100
Percent Area in Region 2 (percent)	0.000	0	100
Percent Area in Region 3 (percent)	0.000	0	100
Percent Area in Region 4 (percent)	0.000	0	100
Percent Area in Region 5 (percent)	0.000	0	100

Urban Flows Region Grid Basin Characteristics			
100% Peak urban Blue Ridge-Piedmont FS007-00 (30.5 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	30.5	0.04	41
Area of Impervious Surfaces (percent)	1.15 (below min value 2)	2	54.6

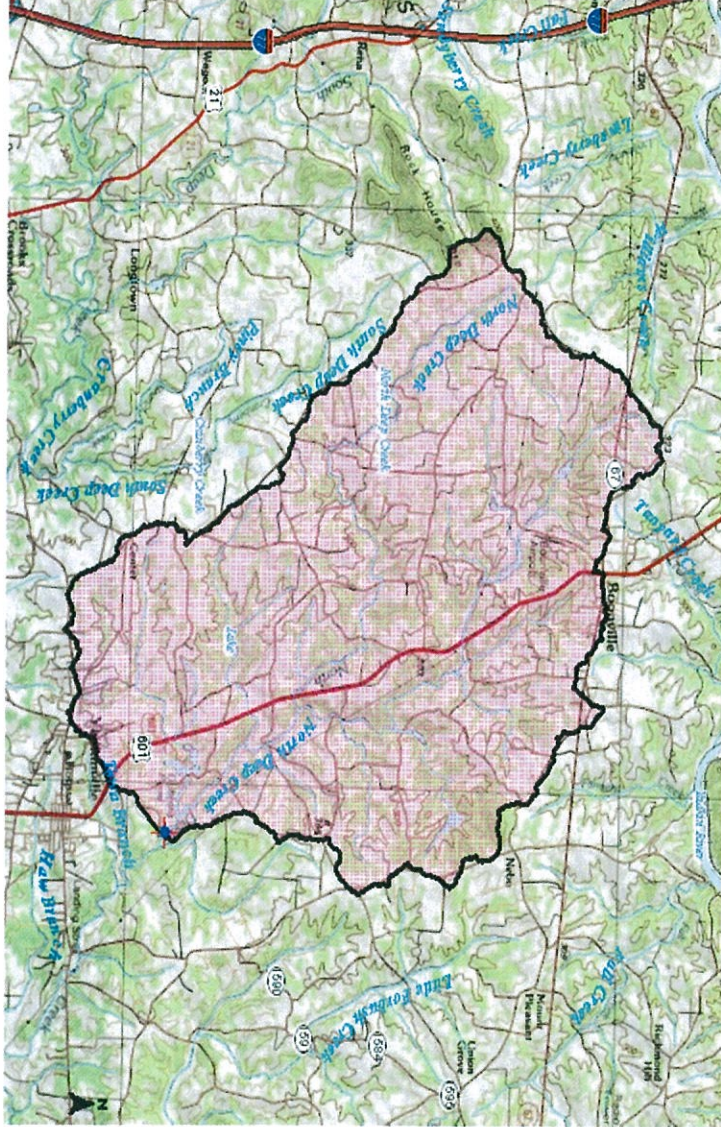
Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Peak Flows Region Grid Streamflow Statistics					
Statistic	Flow (ft ³ /s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK2	1460	35		840	2530
PK5	2520	34		1460	4330
PK10	3280	35		1870	5740
PK25	4260	38		2350	7720
PK50	5140	40		2750	9600
PK100	5910	42		3060	11400
PK200	6670	44		3330	13400
PK500	7860	48		3740	16500

Urban Flows Region Grid Streamflow Statistics					
Statistic	Flow (ft ³ /s)	Standard Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK2U	458				
PK5U	876				
PK10U	1230				
PK25U	1960				
PK50U	2450				
PK100U	2980				



StreamStats Print Page



7/8/2013 8:26:27 AM

- Explanation**
- ★ Global Watershed Point
 - SPT08SPoint
 - NCDOT Point
 - ▲ Local Ags
 - ▲ Gauging Station, Continuous Record
 - ▲ Low Flow, Partial Record
 - ▲ Peak Flow, Partial Record
 - ▲ Peak and Low Flow, Partial Record
 - ▲ Stage Only
 - ▲ Low Flow, Partial Record, Stage
 - ▲ Miscellaneous Record
 - ▲ Unknown
 - Local H2
 - Longest Flow Path
 - Stream Grid
 - Global Watershed
 - Pilot Study Area
 - Inupoly



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

TEMPORARY REPAIRS

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY YADKIN BRIDGE NUMBER 980109 INSPECTION CYCLE 2 YRS

ROUTE SR1502 ACROSS NORTH DEEP CREEK M.P. 0

LOCATION .7 MI.N.JCT.SR1134

SUPERSTRUCTURE REINFORCED CONCRETE FLOOR ON I-BEAMS

SUBSTRUCTURE E.BTS:RC CAPS/H-PILES;INT.BTS:RC CAPS/H-PILES ENC.IN CONC.

SPANS 3 @ 40'

LONGITUDE 80° 39' 24.0"

LATITUDE 36° 9' 12.0"

PRESENT CONDITION FAIR

INVENTORY RATING

INSPECTION DATE 05/25/2011

OPERATING RATING

PRESENT POSTING SV 25 TTST 32

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT 4 DELINEATORS



SOUTH TO NORTH

SIGN NOTICE
ISSUED FOR

NUMBERED
REQUIRED

No WEIGHT LIMIT

No DELINEATORS

No NARROW BRIDGE

No ONE LANE BRIDGE

No LOW CLEARANCE

BRIDGE MANAGEMENT UNIT
DATA ON EXISTING STRUCTURE

Run Date: 07/01/2011

COUNTY : YADKIN		DIV : 11		DIST : 1		STRUCTURE NUMBER : 980109		LENGTH : 120 FEET	
ROUTE CARRIED : SR1502				FEATURE INTERSECTED : NORTH DEEP CREEK					
LOCATED : .7 MI.N.JCT.SR1134				BRIDGE NAME :				CITY :	
FUNC. CLASS : 07		SYST.ON : FA		SYST.UNDER : NFA		ADT & YR : 2400 2003		RAIL TYPE : LT 071 RT 071	
BUILT : 1963		BY : SHC		PROJ : 8.28559		FED.AID PROJ : S-1073(2)		DESIGN LOAD : H 15	
REHAB :		BY :		PROJ :		ALIGNMENT : TAN		SKEW : 90	
						LANES : ON 2 UNDER			
NAVIGATION : VC 0.0 FT HC 0.0 FT				HT. CRN. TO BED : 23 FT				WATER DEPTH : 3 FT	
SUPERSTRUCTURE : REINFORCED CONCRETE FLOOR ON I-BEAMS									
SUBSTRUCTURE : E.BTS:RC CAPS/H-PILES;INT.BTS:RC CAPS/H-PILES ENC.IN CONC.									
SPANS : 3 @ 40'									
BEAMS OR GIRDERS : 4 LINES 27 I-BEAMS @ 7'CENTERS									
FLOOR : 7 RC/NO AWS		ENCROACHMENT :				DECK (OUT TO OUT) : 28.2 FT			
CLEAR ROADWAY : 24.0 FT		BETWEEN RAILS : 26.3 FT				SIDEWALK OR CURB : LT 1.1 FT RT 1.1 FT			
VERT.CL.OVER : 99 FT 99 IN		VERT.CL.UNDER : 00 FT 00 IN				HOR.CL.UNDER : 0.0 FT			
INV.RTG. : HS-1		OPE.RTG. : HS-1		CONTR.MEMBER : Ext. Beam		POSTED : SV 25 TTST 32		DATE 09/24/2008	
SYSTEM : Secondary S.R. Route						GREEN LINE ROUTE : N			
2ND OPENING :		3RD OPENING :		4TH OPENING :		5TH OPENING :			
REMARKS :									

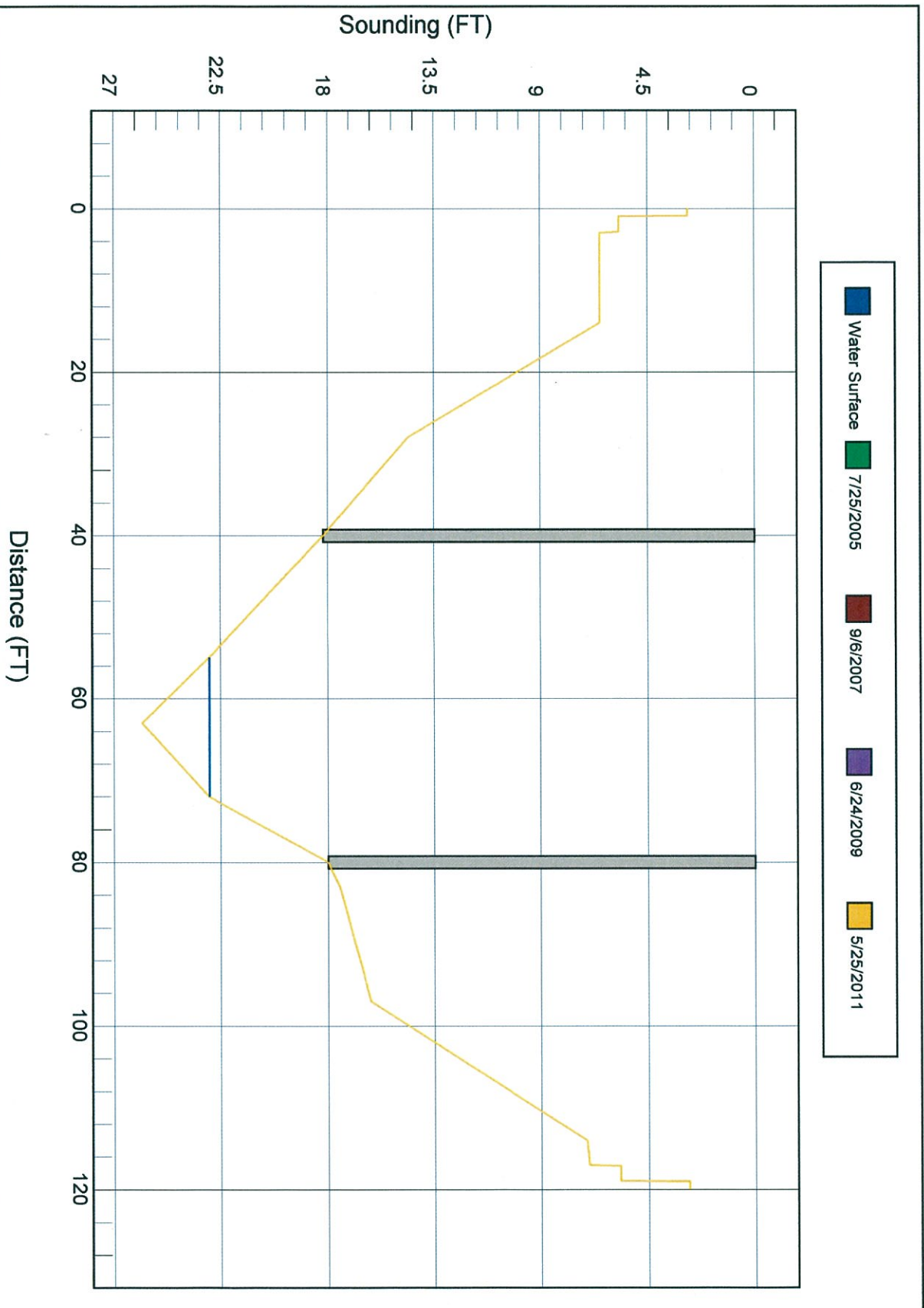
Bridge: 980109

County YADKIN

Date: 05/25/2011

Top of Rail = 0 FT (Sounding)

STREAMBED PROFILE (Downstream)





NORTH FACE PIER (1)



EAST PROFILE



WEST PROFILE



ABUT. (A)

WITH ATTACHMENTS Phases I, II, and IV

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MAINTENANCE UNIT
HYDRAULICS UNIT
GEOTECHNICAL UNIT
STRUCTURE DESIGN UNIT
SOILS AND FOUNDATIONS SECTION

THIS IS A PARTIAL
COPY OF THE SCOUR
REPORT IN HYDRAULICS
FILE, 7/19/97

RECEIVED

JUL 11 1997

DIVISION OF HIGHWAYS
HYDRAULICS UNIT

SCOUR EVALUATION REPORT

COUNTY YADKIN BRIDGE # 109

ROUTE SR 1502 ACROSS NORTH DEEP CREEK

SCOUR CRITICAL:	YES <u>X</u>	NO <u> </u>	DATE <u>11/92</u>
ITEM 113-SCOUR CRITICAL BRIDGES			CODE <u>3</u>

COUNTERMEASURES REQUIRED:	YES <u>X</u>	NO <u> </u>
COUNTERMEASURE DESIGN COMPLETED		DATE <u>3/94</u>
MONITORING PLAN COMPLETED		DATE <u> </u>
UNDERWATER INSPECTION REQUIRED:	YES <u> </u>	NO <u> </u>
COUNTERMEASURE CONSTRUCTION COMPLETED		DATE <u>6/5/97</u>

STRUCTURE NO LONGER SCOUR CRITICAL	DATE <u>6/5/97</u>
ITEM 113-SCOUR CRITICAL BRIDGES	CODE <u>7</u>

DD
7/7/97

CRITICAL SCOUR ELEVATION:

MONITORING OF SCOUR COUNTERMEASURES

- NCDOT Bridge Maintenance should inspect the pier riprap condition, for settlement or losses, after each flood flow that equals or exceeds a Q_{50} WSEL of 172.0 ft (11.6 ft from the top of the downstream rail at Bent 2). This water surface will be 4.0 to 5.0 ft over the top of the pier riprap mat.
- The NCDOT Hydraulics Unit shall be notified if the riprap mat shows signs of settlement (more than 2 ft) or shows significant rock loss around the edges of the mat (more than 3 ft of horizontal loss). NCDOT Hydraulics should also be notified if any tilting or settlement of the bridge structure is observed.

APR 30 1997

LE
PA

BRIDGE MAINTENANCE UNIT

N.C. DEPT. OF TRANSPORTATION
BRIDGE MAINTENANCE UNITDEPARTMENT 3446 WORK ORDER 57751 FUNCTION SBS FILE 14654BRIDGE NUMBER 109 LOCATION SC 1502ADT _____ ESTIMATED COST 15,000.- COUNTY YADKIN

DESCRIPTION OF PROPOSED BRIDGE OR WORK REQUIRED

(1) Span Lengths _____ SKEW _____

Roadway Width _____ Type Floor _____

Beam Size and Spacing _____

Abutment or End Bent _____

Type and size cap _____

Number, type and spacing of piles _____

Encasement of footing _____

Bents _____

Type and size cap _____

Number, type and spacing of piles _____

Encasement of footings _____

(2) Pipe (Number, size and type) _____

End treatment _____

(3) General maintenance (work required) PLACE 400' CLASS II RIPRAP
AT INTERIOR BENTSMaterials STONE FROM OPEN P.O.'SRemarks PER CONSULTANT SCOUR REPORTHead of Bridge Maintenance Jim D. Co Date 5-1-97Superintendent J. J. Holderman Date 4/25/97Supervisor S. B. HENDSPETH Date 4/25/97Date Completed 6/5/97 Initial SBH

JUN 11 1997

IN HOUSE REVIEW NOTES

file: IHRNOTES

COUNTY: YADKIN BRIDGE NO.: 109 DUAL NO.:
YEAR BUILT: 1963 SR 1502 / N. Deep Creek

DETAIL STUDY REPORT

PHASE I&II REPORT REVIEWED

SCOUR COMPUTATIONS CHECKED

COUNTERMEASURE DESIGN CHECKED

REPORT CHECKED FOR FINAL SUBMITTAL

FINAL REPORT TRANSMITTED

JLR, WSE

* JLR

Geotechnical Site Visit

Borings

Structural Comps Ck'ed

- * 11-23-93 - IN COMPUTATION FOR CONTRACTION SCOUR NEEDED TO USE
APPROACH CONSTRICTED AND WSE FOR LOCAL SCOUR
AS HP-2 CARD NEEDS HO ADDED. - JLR

From The Initial Assessment:

- Piling is exposed
- PILES HAVE $\sim 20'$ OF EMBEDMENT
- POSSIBLE MIGRATION OF STREAM
- $\sim 23'$ OF MATERIAL HAS BEEN LOST FROM THE EAST BANK
AROUND Bent #2.

EBASCO Detail Study:

- PHASE I & II REPORT LOOKS GOOD

① Review With Geotech, Structural and Soils

② Review All Comments With EBASCO.

HAVE EBASCO COMPUTE CONTRACTION SCOUR USING THE APPROACH "CONSTRICTED"
SECTION IN THE COMPUTATION FOR Q_{NC}. ALSO, HAVE EBASCO CHECK
THE DRAINAGE AREA.

11-24-93 PHONED KEAR CATO WITH PHASE I & II REVISIONS TO BE MADE.
HE WILL LET ME KNOW WHAT AFFECT USING THE CONSTRICTED
(VS THE UNCONSTRICTED) APPROACH SECTION HAS ON THE
CONTRACTION SCOUR DEPTH. THEN, REVIEW WITH GEOTECH ETC.

12-13-93 KEAR REVISOR HIS USPRO MODEL. CONTRACTION SCOUR INCREASED
BY $0.1'$. HYDRO WILL NEED TO LET EBASCO KNOW HOW TO PROCEED.

1-26-94 ① Review with Geotech - See what Reduction, if any, can be made
TO THE THEORETICAL SCOUR DEPTHS. BRIDGE HAS SURVIVED A HIGH
EVENT AS WELL AS A MAJOR EVENT RECENTLY (4' ABOVE BANKS)

- MONITORING SEEMS TO BE A VIABLE PLAN OF ACTION FOR BENT 1 AND
RIP RAP AT BENT 2 TO DETECT LATERAL MIGRATION
TOWARDS EB 2.

② Get Scour Critical Elev. From Jose/ADAR

2-2-94 Meeting With P. Fisher, ADAR, Jose R. and BZ.

Bent #2 - Rip Rap Around Bent & Bank

Bent #1 - Rip Rap Around Pile

4-14-94 Phoned Kear Cato with Final A...

CONTRACTION SCOUR INPUT SHEET

County: YADKIN
Reviewer: JLR

Bridge No.: 109
Date: 11-22-93

FREQUENCY: 100-YEAR
DISCHARGE: 6473

WSEL @ FULLVALLEY: 173.0
WSEL @ APPROACH (unconstricted): 173.2
WSEL @ BRIDGE: 172.9
WSEL @ APPROACH (constricted): 175.1

$Y_s = Y_1 * [(Q_{bc}/Q_{nc})^{6/7} * (W_{nc}/W_{bc})^{k_1 - 1}]$
 $k_1 = 0.59, 0.64, \text{ or } 0.69 \quad k_1 = \underline{0.64}$

Determine Q_{bc} : (Bridge Section)

$Q_t = \underline{6473} \quad W_{bc} = \underline{55}$
 $K_c = \underline{113501} \quad Q_{bc} = \underline{6088} \quad (K_c/K_t) * Q_t$
 $K_t = \underline{120680}$

Determine Q_{nc} : (SECTION-Fullvalley)

$Q_t = \underline{6473} \quad W_{nc} = \underline{60}$
 $K_c = \underline{117861} \quad Q_{nc} = \underline{3656} \quad (K_c/K_t) * Q_t$
 $K_t = \underline{208653}$
 $Y_1 = \underline{11.3} \quad Y_s = \underline{7.2}$

Determine Q_{nc} : (SECTION-Approach constricted)

$Q_t = \underline{\quad\quad\quad} \quad W_{nc} = \underline{\quad\quad\quad}$
 $K_c = \underline{\quad\quad\quad} \quad Q_{nc} = \underline{\quad\quad\quad} \quad (K_c/K_t) * Q_t$
 $K_t = \underline{\quad\quad\quad}$
 $Y_1 = \underline{\quad\quad\quad} \quad Y_s = \underline{\quad\quad\quad}$

Determine Q_{nc} : (SECTION-Approach unconstricted)

$Q_t = \underline{6473} \quad W_{nc} = \underline{45}$
 $K_c = \underline{84369} \quad Q_{nc} = \underline{2843} \quad (K_c/K_t) * Q_t$
 $K_t = \underline{192084}$
 $Y_1 = \underline{11.7} \quad Y_s = \underline{8.1}$

Contraction Scour (ft) --- $Y_s = \underline{\quad\quad\quad}$

NOTES: _____

* per Dr. Everette Richardson (Colorado State) 303-223-5556

CONSERV
NO FORM
CONSERV
F

FILENAME:
DATE:

CONTRACTION SCOUR INPUT SHEET

County: YADKIN
Reviewer: JLR

Bridge No.: 109
Date: 11-22-93

FREQUENCY: 500-YR
DISCHARGE: 9637

WSEL @ FULLVALLEY: 174.9
WSEL @ APPROACH (unconstricted): 175.1
WSEL @ BRIDGE: 174.4
WSEL @ APPROACH (constricted): 177.3

$Y_s = Y_1 * [(Q_{bc}/Q_{nc}) ^ {6/7} * (W_{nc}/W_{bc}) ^ {k_1 - 1}]$
 $k_1 = 0.59, 0.64, \text{ or } 0.69$ $k_1 =$ 0.64

Determine Q_{bc} : (Bridge Section)

$Q_t =$ <u>9637</u>	$W_{bc} =$ <u>55</u>	
$K_c =$ <u>138982</u>	$Q_{bc} =$ <u>8931</u>	$(K_c/K_t) * Q_t$
$K_t =$ <u>149968</u>		

Determine Q_{nc} : (SECTION-Fullvalley)

$Q_t =$ <u>9637</u>	$W_{nc} =$ <u>60</u>	
$K_c =$ <u>152624</u>	$Q_{nc} =$ <u>4902</u>	$(K_c/K_t) * Q_t$
$K_t =$ <u>300043</u>		
$Y_1 =$ <u>13.2</u>	$Y_s =$ <u>10.2</u>	

HP-1
CALC

Determine Q_{nc} : (SECTION-Approach constricted)

$Q_t =$ _____	$W_{nc} =$ _____	
$K_c =$ _____	$Q_{nc} =$ _____	$(K_c/K_t) * Q_t$
$K_t =$ _____		
$Y_1 =$ _____	$Y_s =$ _____	

Determine Q_{nc} : (SECTION-Approach unconstricted)

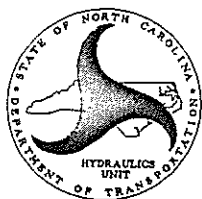
$Q_t =$ <u>9637</u>	$W_{nc} =$ <u>45</u>	
$K_c =$ <u>108438</u>	$Q_{nc} =$ <u>3633</u>	$(K_c/K_t) * Q_t$
$K_t =$ <u>287663</u>		
$Y_1 =$ <u>13.6</u>	$Y_s =$ <u>12.3</u>	

Contraction Scour (ft) --- $Y_s =$

NOTES: _____

* per Dr. Everette Richardson (Colorado State) 303-223-5556

BRIDGE SCOUR EVALUATION ASSESSMENT



.AND DATA SUMMARY REPORT

ASSESSED 11-25-92
BY: J. Reid M.J.N.
CODE 2
CLASSIFIED Scour Critical

SITE IDENTIFICATION:

COUNTY YADKIN CITY/TOWN YADKINVILLE BRIDGE NO. 109
ROUTE SR 1502 STREAM NORTH DEEP CR ROAD MILE _____
DUAL BRIDGE NO. _____ IS US/DS
ORIG. PROJECT NO. 8.28559 YEAR BUILT 1963 SKW90
REHAB. PROJECT NO. _____ YEAR REHAB. _____ 3040

INFORMATION RESOURCES AVAILABLE:

HYDRAULIC STUDY REPORT (DATE) JAN - 1963
AS-BUILT CONSTRUCTION PLANS (DATE) MARCH - 1963
FOUNDATION REPORT (DATE) NONE
OTHER AGENCY STUDIES (DATE) _____
(FEMA, CORPS, T.V.A., SCS)
QUAD MAPS (NAME & DATE) YADKINVILLE - 1964
AERIAL PHOTOGRAPHY (DATE) _____
GAGE DATA (TYPE, NO., DRAINAGE AREA) 20 / 0211560755 / 30.5 S.M.
DISTANCE TO SITE (UP/DN STREAM) AT SITE
BRIDGE INSPECTION REPORT (DATE) MAY - 1991
UNDERWATER INSPECTION REPORT (DATE) NONE
STRUCTURE DATA FILE (DATE) MAY - 1991

HYDRAULIC DATA:

DRAINAGE AREA 30.5 SQ. MI. SOURCE USGS - SELECTED SITES
100 YR. WATERWAY OPENING (NORMAL TO FLOW) _____ SQ. FT.

HISTORICAL FLOODS

BSR

DATE	ELEV.(FT.)	APPROX. FREQ. (YRS.)	APPROX. DISCH.	ADJUSTED TO SITE
<u>—</u>	<u>176.1</u>			

FLOOD FREQUENCY (YRS.)

ELEVATION (FT.)

DISCHARGE (CFS)

AVG. VELOCITY (Q/A)

SOURCE: _____

<u>Q 10</u>	<u>Q 50</u>	<u>Q 100</u>	<u>Q 500</u>
<u>3242</u>	<u>5358</u>	<u>6474</u>	<u>9637</u>

COMMENTS: NO FEMA DATA AVAILABLE

GEOMORPHIC DATA:

CHANNEL (NORMAL TO FLOW):

AVG. BASE WIDTH 44 AVG. TOP WIDTH 52 AVG. DEPTH 5AT 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 5' SAME _____ NARROWER _____BASED ON COMPARISON OF SECTIONS TAKEN AT DATES 3-1963 / 5-1991CHANNEL IS: WIDER 20 FT. SAME _____ NARROWER _____ FT.
SHALLOWER _____ FT. SAME ✓ DEEPER _____ FT.
SHIFTED LT. 20 FT. SAME _____ SHIFTED RT. _____ FT.
THALWEG HAS: SHIFTED LT. 12 FT. SAME _____ SHIFTED RT. _____ FT.

REPORTED SITE SCOUR PROBLEM: (LOOKING DOWNSTREAM)

	MINOR	MODERATE	SEVERE	UNKNOWN
LT. BANK		✓		
RT. BANK		✓		
LT. SPILL SLOPE				
RT. SPILL SLOPE				
PIER (S)			✓	
DEBRIS		✓		
CHANNEL BED	✓ ①			
OTHER _____				

IS REPORTED PROBLEM CHANNEL FLOW ASSOCIATED? YES

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. _____
- 2) POTENTIAL FOR SLOW CHANGE OVER TIME. NOT PRONE TO A MAJOR ONE-EVENT CHANGE. _____
- 3) UNSTABLE. SUBJECT TO RAPID EVOLUTIONARY CHANGE. ✓

① THALWEG STILL SAME BUT MEANDERING

STRUCTURE DATA:

BRIDGE LENGTH 120
 SUFFICIENCY RATING _____
 NO. OF SPANS 3 SPAN LENGTHS 40' EST. REMAINING LIFE (YRS.) 25
 UNDERCLEARANCE (BED TO LOW BEAM) 22

THALWEG ELEV. $\pm$ 160.0

BENT NO. (W-E), (S-N)	EB #1 SPILL THRU	B #1 Post 1 Beam	B #2 Post 1 Beam	EB #2 SPILL THRU	THALWEG ELEV. $\pm$ 160.0
TYPE	90				
SKEW	PILE				
FTG. / FOUNDATION TYPE					
COLUMN WIDTH		1'-8"	1'-8"		
COLUMN / BENT SHAPE		SQUARE	SQUARE		
FOOTING THICKNESS					
TOP FTG. ELEV.					
LT.					
CTR.					
RT.					
BOTTOM FTG. ELEV.					
LT.					
CTR.					
RT.					
TOP SILL ELEV. CAP	178.87	178.20	177.77	177.57	
LT.					
CTR.	178.98	178.31	177.87	177.68	
RT.	178.87	178.20	177.77	177.57	
BOTTOM SHEE ELEV. CAP	176.37	175.70	175.27	175.07	
LT.					
CTR.					
RT.					
CONC. / RIP RAP PROTECTION				RIE RAP	
PILE LENGTHS (AVERAGE)	6 @ 10.4'	6 @ 29'	6 @ 23.4'	6 @ 24.2'	
PILE TIP ELEV. (AVERAGE)	167.0	147.7	152.9	151.9	
PILE EMBEDMENT (23) *	9	16.3	9.1	24.1	
SPREAD FOOTING					
EMBEDMENT (6) *					

COMMENTS:

* SEE QUESTIONS 2, 3, & 6 ON PAGE 4

ASSESSMENT

4

- PILES
- 1) PIER AND/OR ABUTMENT ~~SPREAD FOOTINGS~~ PILES WITHIN POTENTIAL CHANNEL SCOUR AREA ARE INDICATED ON THE CONST. DRAWINGS TO BE ON SCOUR RESISTANT MATERIAL. THIS FINDING HAS BEEN REVIEWED AND CONCURRED WITH BY _____ YES
(GEOTECHNICAL UNIT)
 - 2) DO THE PILE BENTS OR PILE FOOTINGS (IN THE PIEDMONT AND MOUNTAIN PROVINCE) WITHIN THE POTENTIAL CHANNEL SCOUR AREA, HAVE PILES THAT PENETRATE 20 OR MORE FEET BELOW THE STREAM BED ? NO
 - 3) DO THE PILE BENTS OR PILE FOOTINGS (IN THE COASTAL PLAIN) WITHIN THE POTENTIAL CHANNEL SCOUR AREA, HAVE PILES THAT PENETRATE 30 OR MORE FEET BELOW THE STREAM BED ? N/A
 - 4) ARE ALL PIERS AND ABUTMENTS OUTSIDE THE NORMAL CHANNEL SECTION ? NO
 - 5) HAS THE CROSSING EXPERIENCED A FLOOD OF 50 OR MORE YEARS ESTIMATED MAGNITUDE WITH NO REPORTED OR INDICATED SCOUR PROBLEM ? UNKNOWN
 - 6) ARE THE BOTTOMS OF THE CHANNEL PIER SPREAD FOOTINGS MORE THAN 7 FEET BELOW BED ? N/A
 - 7) IS THE AVERAGE VELOCITY IN BRIDGE OPENING (SIMPLE ANALYSIS $V=Q/A$) FOR THE ESTIMATED 100 YR. EVENT LESS THAN 4 FT./SEC ? UNKNOWN
 - 8) IS THE APPROACH ROADWAY OR BRIDGE OVERTOPPED DURING MINOR FLOODS (≤ 10 YR.) REQUIRING CLOSURE AND INSPECTION BEFORE REOPENING ? UNKNOWN

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

BASED ON AN EVALUATION OF THE AVAILABLE DATA AND REPORTS THE CLASSIFICATION OF THIS STRUCTURE AS LOW RISK FOR THE REASON(S) LISTED ABOVE APPEARS REASONABLE AND PRUDENT.

COMMENTS:

DECISION:

CLASSIFIED AS: SCOUR CRITICAL
UNKNOWN FOUNDATION
LOW RISK

RECOMMENDED CODE 2 23 YHCOMMENTS: CODE 2 RECOMMENDED SINCE PILING IS EXPOSED

SCHEDULE FOR DETAILED STUDY
SCHEDULE FOR FURTHER IN-HOUSE STUDY

SCREENING BY: J. Reid
FIRM: MOFFATT & NICHOL
DATE: 11-25-92
CHECKED BY: K. TREFFLER, DED
DATE: 12-10-92

APPROVED BY: Y. Moman
DATE: 28 JAN 93

COMMENTS: CLASSIFIED AS SCOUR CRITICAL DUE TO (1) SEE
BRIDGE INSP. REPORT AND PHOTOS, H PILES EXPOSED, CORROSION OF
PILES LIKELY. (2) SHALLOW PILE DEPTH IS SHOWN TO BE IN
ROCK, COULD BE A PROBLEM @ BENT # 2 (3) RECOMMEND GEOTECH
CONFIRM ROCK LOCATIONS & STABILITY (4) IF ROCK IS WHERE
ITS SHOWN, EXPOSED PILES SHOULD BE INSPECTED AND ENCASED
(5) RECOMMEND DETAILED STUDY TO DETERMINE IF MIGRATION OF SLOPES
WILL CONTINUE.

NEED DETAILED STUDY TO GIVE ESTIMATED SCOUR. GEOTECH
CAN THEN GIVE REDUCED SCOUR. A BORING MAY BE NECESSARY
TO ESTABLISH SCOUR RESISTANCE.

REVISED TO CODE 3: STREAM IS MIGRATING BUT
NOT DEEPPING. WITH ADDITIONAL AREA, VELOCITY IS
REDUCING.

YH

CBASCO 18 MAR 93

YADKIN LOG

120' BRIDGE BUILT IN 1963, 3 SPANS @ 40'

SR 1502 OVER NORTH DEEP CREEK

NOT IN FEMA STUDY AREA; DA = 30 1/2 SM

ALL PILE FOUNDATIONS, END BENTS & INTERIOR BENT.

SCOUR SCOUR REPORTED @ BENTS! CHECK B-2

IN CROSS SECTION

VELOCITY CALCULATES - UNKNOWN

CODE 2 WAS INITIALLY RECOMMENDED BECAUSE

PILING IS EXPOSED.

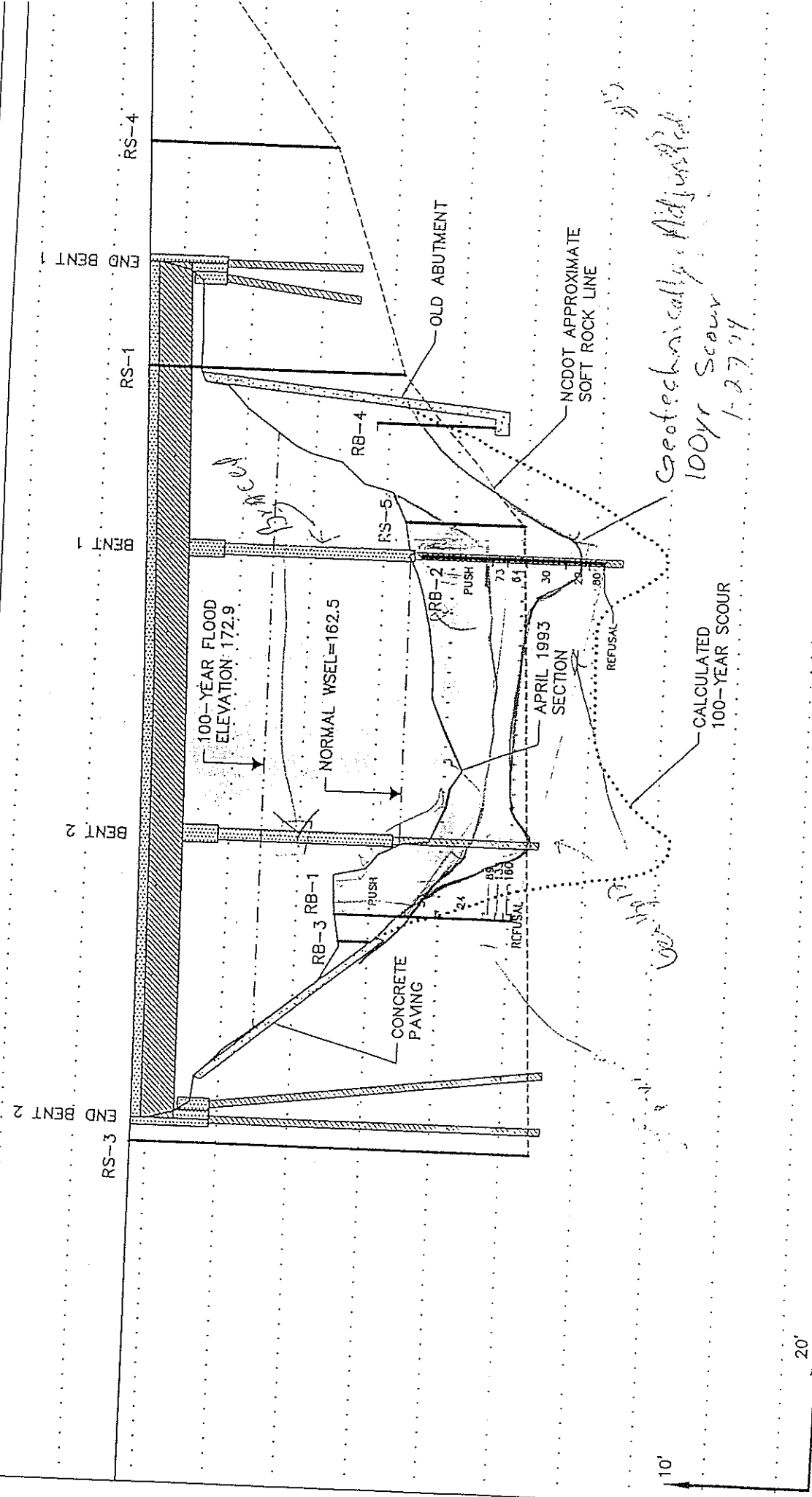
BENT 2 EMBEDMENT IS 9' NOTE SOFT ROCK UN

BENT 1 EMBEDMENT IS 12 1/2'



YADKIN 109

1:1 CROSS SECT



Geotechnically Adjusted
100yr Scour
1-27-94

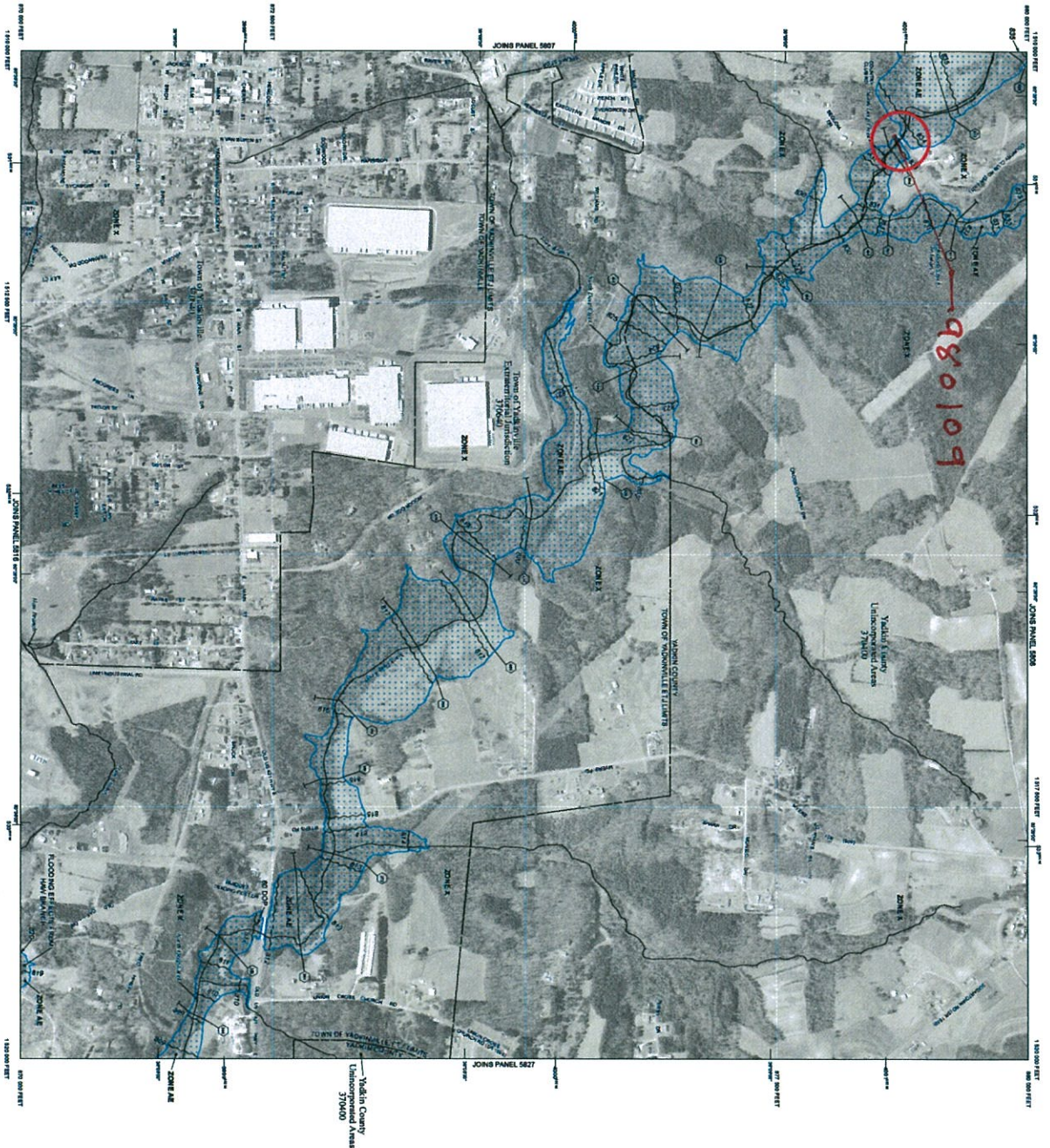
ENHANCED CROSS SEC



At stations listed in the Flood Hazard Data Table below were studied by described methods using field surveys. Other flood hazard data shown on this map may have been derived using a coastal analysis or limited detailed hydraulic analysis. More information on the flooding sources studied by these analyses is contained in the Flood Insurance Study report.



The official Food Insurance Plan Map (FIPMA) 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 foodshare management to decrease the impact of food shortages on the food bank level. As a part of this effort, the State of North Carolina has joined in a Cooperative "Memorandum" that agreement with FEMA to produce and maintain the official FIPMA.



NOTES TO USERS

[illegible]

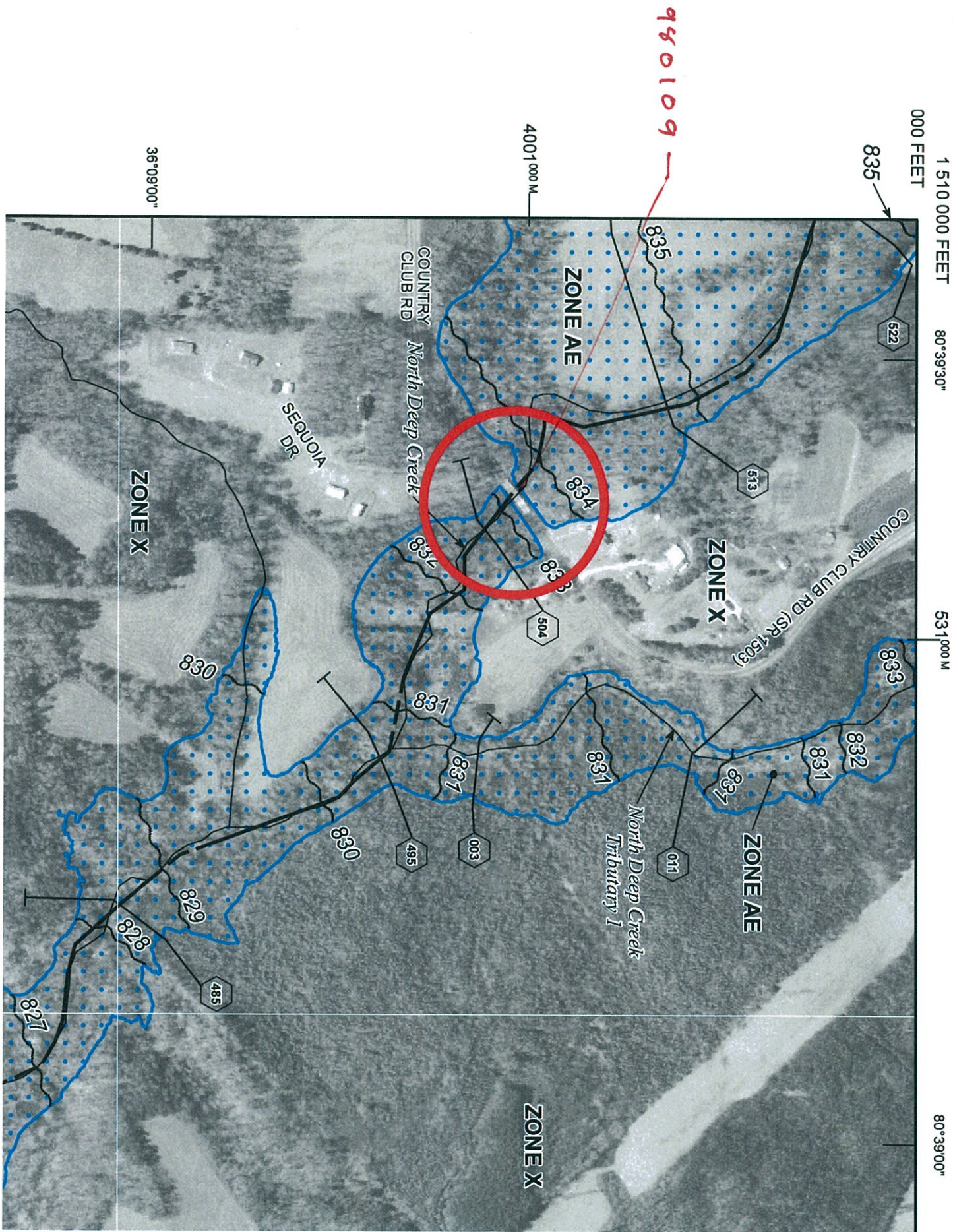
completing various projects in a 6-month period. However, these studies have not been able to identify the specific factors that influence the productivity of knowledge workers. For example, a study by the Center for Human Resources Research at the University of Michigan found that the productivity of knowledge workers is influenced by a number of factors, including the quality of the work environment, the quality of the work itself, and the quality of the work life. The study also found that the productivity of knowledge workers is influenced by the quality of the work environment, the quality of the work itself, and the quality of the work life. The study also found that the productivity of knowledge workers is influenced by the quality of the work environment, the quality of the work itself, and the quality of the work life.

[illegible]

NEW RESEARCH
Make it Easy to Make Improvements on Flood Hazard or Low-Reliability Residential Areas
EFFECTIVE DATE OF FLOOD INCREASE RATE MAY VARY
MAY 15, 2009
EFFECTIVE DATES OF INCREASES TO THIS RATE.

LEGEND

[illegible]



Section 4.0 – Area Studied

**Table 6—Flooding Sources Studied by
Detailed Methods: Limited Detailed**

Source	Riverine Sources		Affected Communities
	From	To	
Long Branch North	The confluence with North Little Hunting Creek	The Yadkin/Wilkes County boundary	Yadkin County (Unincorporated Area)
Mill Branch	The confluence with Logan Creek	Approximately 1.2 miles upstream of Bloomtown Road (SR 1569)	Yadkin County (Unincorporated Area)
Miller Creek	The confluence with Yadkin River	Approximately 1.2 miles upstream of the confluence with Yadkin River	Yadkin County (Unincorporated Area)
North Deep Creek	The confluence with Deep Creek and South Deep Creek	Approximately 1.2 miles upstream of Spencer Road (SR 1385)	Town of Yadkinville, Yadkin County (Unincorporated Area)
North Deep Creek Tributary 1	The confluence with North Deep Creek	Approximately 1.5 miles upstream of the confluence with North Deep Creek	Yadkin County (Unincorporated Area)
North Deep Creek Tributary 2	The confluence with North Deep Creek	Approximately 1.1 miles upstream of US Highway 601	Town of Yadkinville, Yadkin County (Unincorporated Area)
North Deep Creek Tributary 2A	The confluence with North Deep Creek Tributary 2	Approximately 0.7 mile upstream of the confluence with North Deep Creek Tributary 2	Town of Yadkinville, Yadkin County (Unincorporated Area)
North Deep Creek Tributary 3	The confluence North Deep Creek	Approximately 0.4 mile upstream of Shugarts Mill Road (SR 1379)	Yadkin County (Unincorporated Area)
North Deep Creek Tributary 4	The confluence North Deep Creek	Approximately 1.0 mile upstream of Baptist Church Road	Town of Boonville, Yadkin County (Unincorporated Area)
North Deep Creek Tributary 4A	The confluence North Deep Creek Tributary 4	Approximately 0.6 mile upstream of the confluence with North Deep Creek Tributary 4	Yadkin County (Unincorporated Area)
North Deep Creek Tributary 4B	The confluence North Deep Creek Tributary 4	Approximately 0.4 mile upstream of Abraham Road (SR 1512)	Yadkin County (Unincorporated Area)
North Little Hunting Creek	The Yadkin/Iredell County boundary	The Yadkin/Wilkes County boundary	Yadkin County (Unincorporated Area)
North Little Hunting Creek Tributary 1	The confluence with North Little Hunting Creek	Approximately 0.5 mile upstream of the confluence with North Little Hunting Creek	Yadkin County (Unincorporated Area)

Section 5.0 – Engineering Methods

Table 8—Summary of Discharges

Flooding Source	Location	Drainage Area (square miles)	Discharges (cfs)			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Miller Creek	Approximately 0.9 mile upstream of the confluence with Yadkin River	3.5	*	*	1,622	*
	Approximately 1.1 miles upstream of the confluence with Yadkin River	3.4	*	*	1,587	*
North Deep Creek	At the confluence with Deep Creek/South Deep Creek	44.6	*	*	8,002	*
	Approximately 0.9 mile upstream of US Highway 421	43.3	*	*	7,857	*
	Approximately 1.1 miles downstream of Styers Mill Road (SR 1510)	42.2	*	*	7,729	*
	Approximately 0.6 mile downstream of Styers Mill Road (SR 1510)	40.8	*	*	7,569	*
	Approximately 1.1 miles upstream of Styers Mill Road (SR 1510)	39.7	*	*	7,441	*
	Approximately 1.5 miles downstream of Old US Highway 421 East	36.9	*	*	7,106	*
	Approximately 1,815 feet downstream of Old US Highway 421 East	36.3	*	*	7,034	*
	Approximately 250 feet downstream of Myers Road	35.2	*	*	6,895	*
	Approximately 1.1 miles upstream of Myers Road	33.7	*	*	6,717	*
	Approximately 0.6 mile downstream of Country Club Road (SR 1503)	33.1	*	*	6,644	*
	Approximately 960 feet downstream of Country Club Road (SR 1503)	30.5	*	*	6,311	*

Section 5.0 – Engineering Methods

Table 10—Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Cobb Creek	0.050 – 0.070	0.060 – 0.250
Cranberry Creek	0.035 – 0.055	0.070 – 0.150
Deep Creek	0.047 – 0.052	0.070 – 0.290
Dobbins Creek	0.045	0.080 – 0.140
Dobbins Creek Tributary	0.045	0.080 – 0.140
Fall Creek	0.045 – 0.050	0.010 – 0.150
Fisher Creek	0.050	0.080 – 0.150
Flat Rock Branch	0.045	0.110 – 0.120
Forbush Creek	0.050	0.080 – 0.140
Forbush Creek Tributary 1	0.050	0.080 – 0.140
Forbush Creek Tributary 2	0.050	0.080 – 0.140
Forbush Creek Tributary 3	0.050	0.080 – 0.140
Forbush Creek Tributary 4	0.050	0.080 – 0.140
Forbush Creek Tributary 5	0.055	0.080 – 0.140
Hall Creek	0.045	0.045 – 0.140
Hall Creek Tributary 1	0.045	0.060 – 0.140
Hall Creek Tributary 2	0.045	0.060 – 0.140
Harmon Creek	0.048	0.060 – 0.120
Hauser Creek	0.050 – 0.055	0.090 – 0.150
Haw Branch	0.050	0.070 – 0.150
Jonesville Creek	0.050	0.080 – 0.140
Lineberry Creek	0.050	0.080 – 0.140
Little Forbush Creek	0.048	0.080 – 0.150
Little Forbush Creek Tributary 1	0.035 – 0.048	0.080 – 0.150
Logan Creek	0.048	0.080 – 0.120
Logan Creek Tributary 1	0.048 – 0.050	0.080 – 0.150
Logan Creek Tributary 2	0.048	0.080 – 0.150
Logan Creek Tributary 3	0.048	0.080 – 0.150
Loney Creek	0.052	0.060 – 0.120
Long Branch	0.040	0.080 – 0.120
Long Branch North	0.045 – 0.050	0.080 – 0.120
Mill Branch	0.052	0.060 – 0.120
Miller Creek	0.055	0.080 – 0.150
North Deep Creek	0.035 – 0.050	0.070 – 0.150
North Deep Creek Tributary 1	0.045	0.070 – 0.140
North Deep Creek Tributary 2	0.035 – 0.045	0.070 – 0.140
North Deep Creek Tributary 2A	0.035 – 0.050	0.080 – 0.120
North Deep Creek Tributary 3	0.045 – 0.050	0.070 – 0.140
North Deep Creek Tributary 4	0.035 – 0.050	0.080 – 0.140
North Deep Creek Tributary 4A	0.045	0.080 – 0.140
North Deep Creek Tributary 4B	0.035 – 0.045	0.080 – 0.140

Section 5.0 – Engineering Methods

Table 11—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 ³ (feet)
NORTH DEEP CREEK				
349	34,925	7,034	811.0	144 / 33
352	35,223	7,034	811.3	144 / 27
354	35,409	7,034	811.6	113 / 119
361	36,113	7,034	812.7	105 / 377
364	36,422	7,034	812.8	50 / 375
369	36,864	7,034	813.1	200 / 175
372	37,222	7,034	813.4	330 / 110
380	38,007	6,895	815.0	125 / 28
386	38,552	6,895	815.5	86 / 29
388	38,827	6,895	816.3	194 / 26
392	39,191	6,895	816.7	313 / 56
398	39,815	6,895	817.0	237 / 300
405	40,491	6,895	817.2	121 / 350
408	40,848	6,895	817.3	18 / 275
412	41,225	6,895	818.3	190 / 26
416	41,574	6,895	818.9	321 / 28
418	41,825	6,895	819.1	251 / 128
423	42,252	6,895	819.4	244 / 35
426	42,578	6,895	820.0	246 / 181
429	42,904	6,895	820.3	218 / 25
433	43,279	6,895	820.7	150 / 165
436	43,644	6,717	821.1	207 / 72
440	43,998	6,717	821.3	32 / 108
442	44,190	6,717	821.8	29 / 195
444	44,428	6,717	822.4	24 / 335
447	44,653	6,717	822.6	43 / 225
451	45,114	6,717	823.4	401 / 23
454	45,420	6,717	823.6	175 / 86
458	45,759	6,717	824.4	400 / 18
460	45,968	6,717	824.7	289 / 49
465	46,492	6,717	825.4	357 / 23
471	47,087	6,717	826.1	67 / 297
474	47,374	6,717	826.5	30 / 433
478	47,762	6,644	826.9	120 / 202
481	48,102	6,644	827.2	79 / 93
485	48,534	6,644	828.2	121 / 37
488	48,849	6,644	829.4	171 / 98
492	49,180	6,644	829.6	32 / 98
495	49,545	6,644	830.7	53 / 106
497	49,724	6,311	831.0	93 / 65
501	50,092	6,311	831.9	79 / 120
504	50,420	6,311	832.3	125 / 40
507	50,737	6,311	834.4	175 / 26
509	50,940	6,311	834.5	250 / 117
513	51,322	6,311	834.6	27 / 287
519	51,916	6,311	834.7	152 / 148
522	52,197	6,311	834.8	241 / 20
525	52,528	5,746	835.1	25 / 334

North Deep Creek Limited Detail Study Plan: Floodway Run 9/20/2007
 Country Club Rd (NDC) for Structure ID: LDS_NDC_10 Approximate S

