

OFFICE ESTIMATE
1@ 40, 1@ 60, 1@ 40' Bridge

PREDESIGN-PRESURVEY REPORT

County SURRY (DIV. II)

Type Of Request: POC Force Account TIP NCMA

Date 7/01/13 Name MTJ

Checked By WSH 7-17-13

Assigned To RLH

Prior Survey Date 2e60" (attach copy of prior survey) BRN BK: 2e60" CD. FILE NONE

Study By Scour Section YES (attached)

Flood Zone AE Detail Study LIMITED Date 8/18/09 Panel# 5031

B.M. Info

Quad Map MOUNT AIRY NORTH Drainage Area 18.6 Sq. Mi. From DASS: STA: 211358701

Q25 3200 cfs Q50 3800 cfs Q100 4400 cfs Method REG. ERNS/REG. 1

EXISTING BRIDGE INFORMATION

Location 0.1 MI. N. JLT. SR 1722

Average Daily Traffic 3100 6% TRK (2010)

Length 120' Bed- To Crown 19' Water Depth 1'

Type Structure RL FLOOR ON I-BEAMS; RL CAPS/H-PILES, RL POST & BEAM

Type Spans 3@ 40'

Upstream Structure N.A. - UPSTREAM STRUCTURE IS IN VIRGINIA ON JOHNSON CRK RD.

Location

Bed- To Crown Prior Survey

Downstream Structure NA. - MERGES INTO ARARAT RIVER

Location

Bed- To Crown Prior Survey

SCS Watershed

ENVIRONMENTAL TVA NO

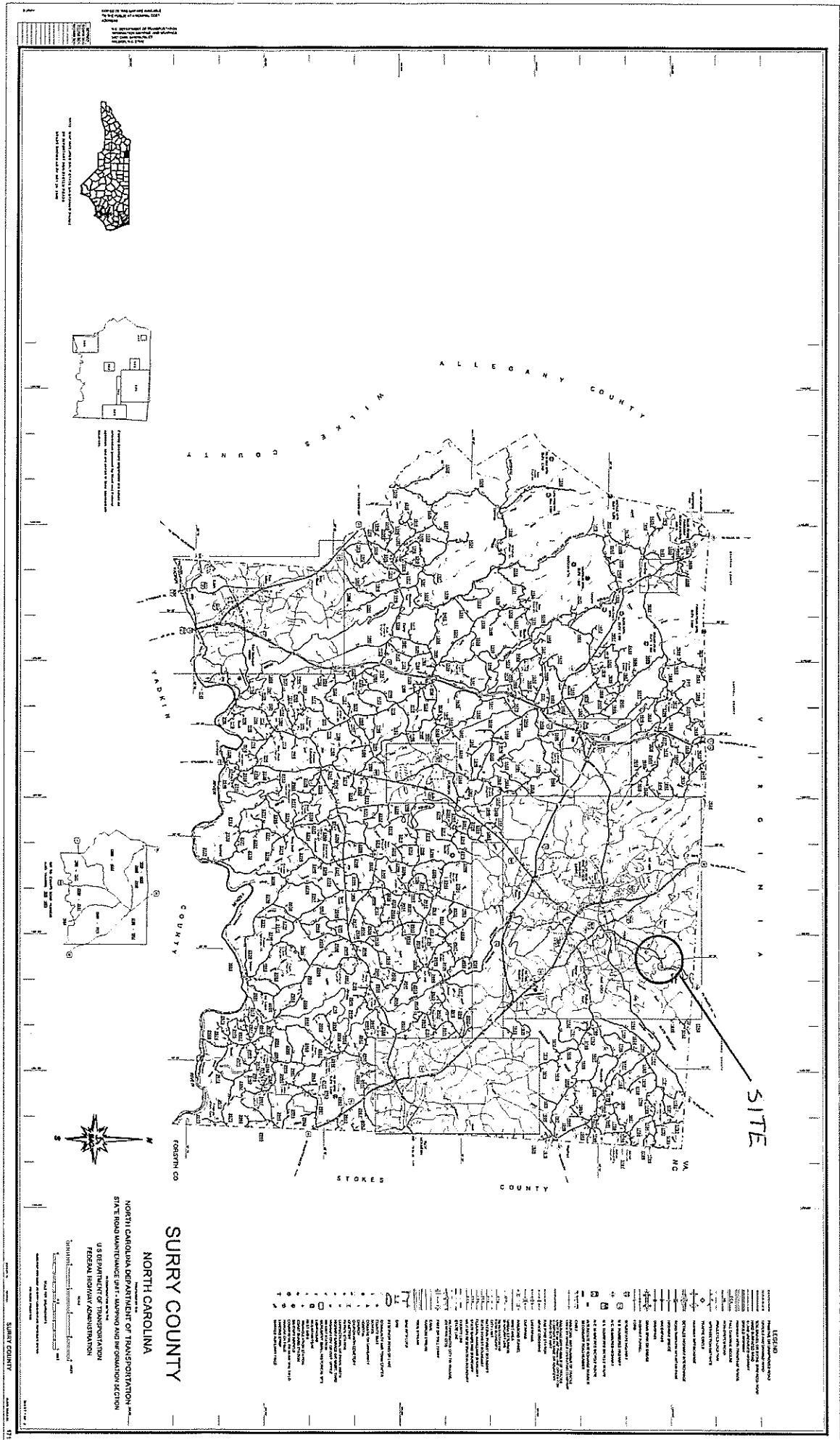
Trout Stream YES Anadromous Fish NO Primary Nursery Area NO

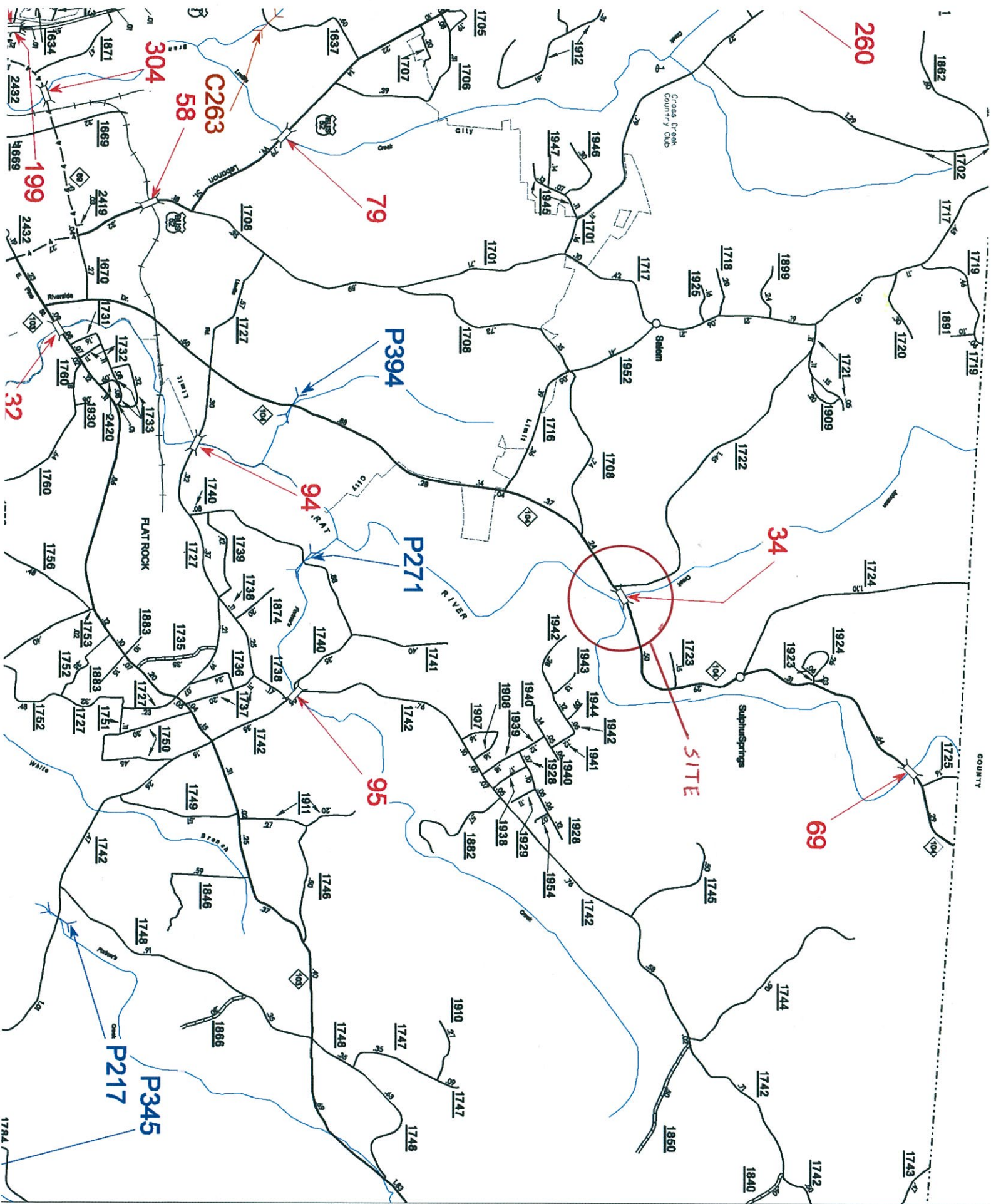
High Quality Waters NO Nutrient Sensitive Waters NO

Near Water Supply Intake YES CAMA County NO

Stream Classification WS-IV-Tr # 12-72-3 (From

DENR River Basin Info. YADKIN STATE LN TO ARARAT RIVER)





This topographic map depicts the Fort Johnson area, which is highlighted in pink. The map shows the confluence of several waterways, including the Potomac River, the Shenandoah River, and the North Branch of the Shenandoah River. The Fort Johnson area is situated on the western bank of the Potomac River. The map also shows the surrounding terrain, including the Ridge and the Fort Johnson area. The map is oriented with North at the top.

- 7/1/2013 1:51:07 PM



North Carolina StreamStats

Streamstats Ungaged Site Report

Date: Mon Jul 1 2013 13:50:38 Mountain Daylight Time

Site Location: North_Carolina

NAD27 Latitude: 36.5362 (36 32 10)

NAD27 Longitude: -80.5815 (-80 34 53)

NAD83 Latitude: 36.5364 (36 32 11)

NAD83 Longitude: -80.5812 (-80 34 52)

Drainage Area: 18.5 mi²

Percent Urban: 5.3 %

Percent Impervious: 0.3 %

Peak Flows Region Grid Basin Characteristics			
100% Peak Southeast US 2009 5158 (18.5 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	18.5	1	9000
Percent Area in Region 1 (percent)	77.336	0	100
Percent Area in Region 2 (percent)	22.664	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 (18.5 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	18.5	0.04	41
Area of Impervious Surfaces (percent)	0.33 (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	1060	35		609	1830
PK5	1840	34		1070	3170
PK10	2420	35		1380	4240
PK25	3180	38		1750	5760
PK50	3820	40		2040	7150
PK100	4440	42		2300	8590
PK200	5030	44		2510	10100
PK500	5940	48		2830	12500

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	134				
PK5U	305				
PK10U	466				
PK25U	836				
PK50U	1110				
PK100U	1420				

850034



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

TEMPORARY REPAIRS (ALL BEAM ENDS AT PIERS)

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY SURRYBRIDGE NUMBER 850034INSPECTION CYCLE 2 YRSROUTE NC104ACROSS JOHNSON CREEKM.P. 0LOCATION 0.1 MI.N.JCT.SR1722SUPERSTRUCTURE REINFORCED CONCRETE FLOOR ON I-BEAMSSUBSTRUCTURE E.BTS:RC CAPS/H-PILES;INT.BTS:RC POST&BEAMSPANS 3 @ 40'LONGITUDE 80° 34' 55.7"LATITUDE 36° 32' 7.5"PRESENT CONDITION FAIR

INVENTORY RATING _____

INSPECTION DATE 09/08/2011

OPERATING RATING _____

PRESENT POSTING Not Posted **NOT POSTED**

PROPOSED POSTING _____

COMPUTER UPDATE _____

ANALYSIS DATE _____

POSTING LETTER DATE _____

SUFFICIENCY RATING _____

OTHER SIGNS PRESENT NONESOUTH TO NORTHSIGN NOTICE
ISSUED FORNUMBERED
REQUIREDNo

WEIGHT LIMIT _____

No

DELINEATORS _____

No

NARROW BRIDGE _____

No

ONE LANE BRIDGE _____

No

LOW CLEARANCE _____

850034

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 01/31/2012

COUNTY : SURRY	DIVISION : 11	DISTRICT : 1	STRUCTURE NUMBER : 850034	LENGTH : 120 FEET
ROUTE CARRIED : NC104		FEATURE INTERSECTED : JOHNSON CREEK		
LOCATED : 0.1 MI.N.JCT.SR1722		BRIDGE NAME :		CITY :
FUNC. CLASS : 16	SYST.ON : FA	SYST.UNDER : NFA	ADT & YR : 3100 2010	RAIL TYPE : LT 111 RT 111
BUILT : 1955	BY : SHPWC	PROJ : 11674192	FED.AID PROJ :	DESIGN LOAD : HS 15
REHAB :	BY :	PROJ :	ALIGNMENT : TAN	SKEW : 120
			LANES : ON 2 UNDER	
NAVIGATION : VC 0 FT	HC 0 FT	HT. CRN. TO BED : 19 FT	WATER DEPTH : 1 FT	
SUPERSTRUCTURE : REINFORCED CONCRETE FLOOR ON I-BEAMS				
SUBSTRUCTURE : E.BTS:RC CAPS/H-PILES;INT.BTS:RC POST&BEAM				
SPANS : 3 @ 40'				
BEAMS OR GIRDERS : 4 LINES 30 I-BEAMS @ 7'-6 CENTERS				
FLOOR :	ENCROACHMENT :	DECK (OUT TO OUT) : 29.4 FT		
CLEAR ROADWAY : 26 FT	BETWEEN RAILS : 29.3 FT	SIDEWALK OR CURB : LT 1.6 FT RT 1.6 FT		
VERT.CL.OVER : 999.9 FT				
INV.RTG. : HS-1	OPER.RTG. : HS-1	CONTR.MEMBER : int bm	POSTED : SV	TTST DATE
SYSTEM : Primary N.C. Route		GREEN LINE ROUTE : N		
UNDER ROUTES AND CLEARANCES				

REMARKS :

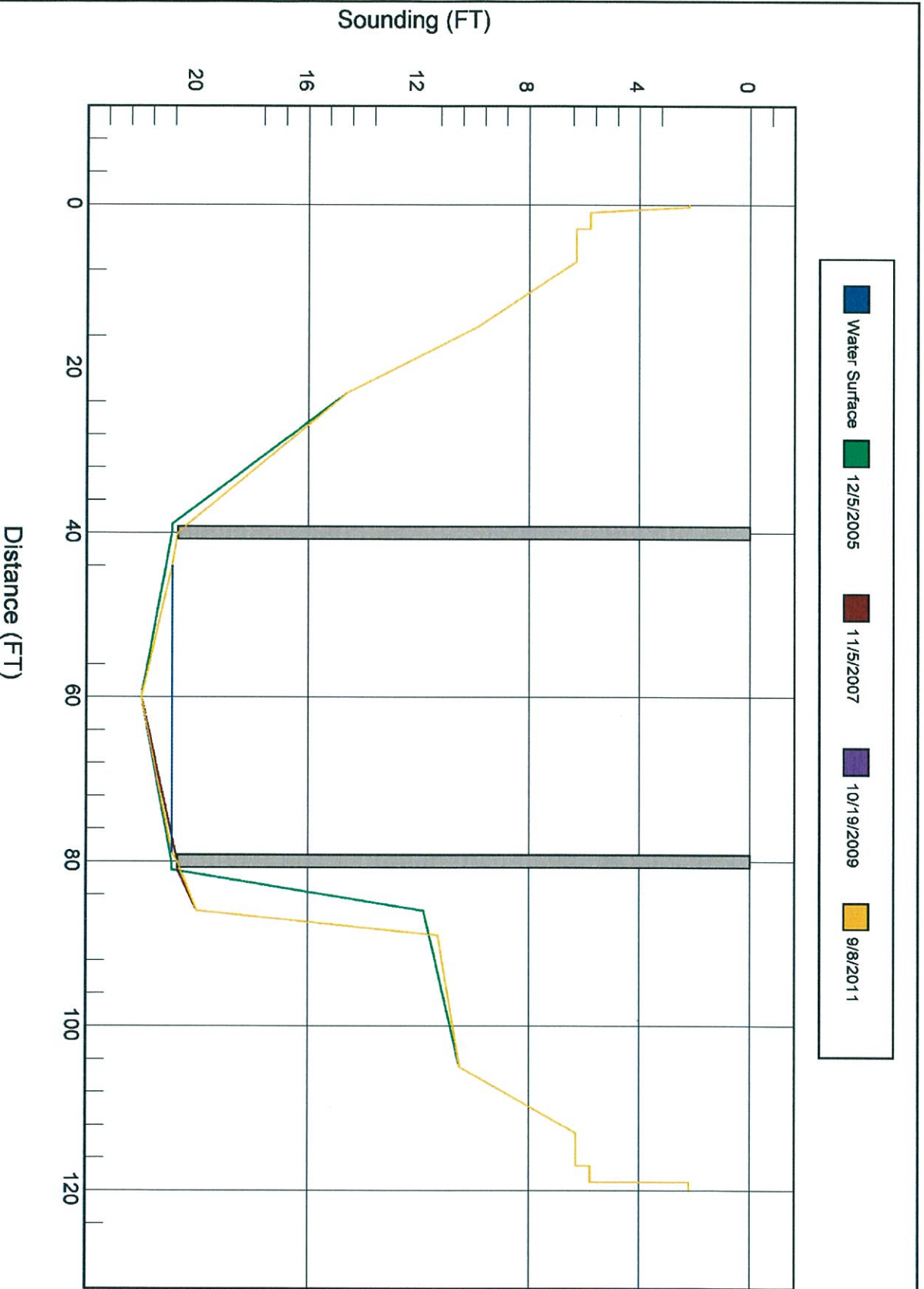
Bridge: 850034

County SURRY

Date: 09/08/2011

Top of Rail = 0 FT (Sounding)

STREAMBED PROFILE (Downstream)



Structure 850034

County SURRY

Date: 09/08/2011

Structure Photos



ABUT. (A)



WEST PROFILE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



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

X
 THIS IS A
 PARTIAL COPY OF
 SCOUR FILE LOCATED
 IN HYDRO FILES

BRIDGE SCOUR REPORT

COUNTY: Sway BRIDGE: 34 ROUTE: NC 104 STREAM CROSSED: JOHNSON CREEK

ASSESSMENT ☒ EVALUATION ☐ BY: ASmm DATE 7/24/97

FHWA STRUCTURE INVENTORY & APPRAISAL CODES:

SUBSTRUCTURE CONDITION (ITEM 60) _____
 CHANNEL AND CHANNEL PROTECTION (ITEM 61) _____
 WATERWAY ADEQUACY (ITEM 71) _____
 SCOUR CRITICAL BRIDGES ((ITEM 113) 8

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 DEPTHS(UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: _____

INCREASE UNDERWATER INSPECTION CYCLE? YES _____ NO ☒ FREQUENCY _____

COUNTERMEASURES:

PLAN REQUIRED? YES _____ NO ☒

SUMMARY OF PLAN:

CONSTRUCTION COMPLETED DATE _____

FINAL CODING AFTER WORK IS COMPLETED (ITEM 113) _____ DATE _____

BRIDGE MAINTENANCE COMMENTS:

BRIDGE SCOUR EVALUATION ASSESSMENT AND DATA SUMMARY REPORT



850034

ASSESSED	11 - 13 - 96
BY:	HSMM
CODE	8-600
CLASSIFIED	Low Risk

SITE IDENTIFICATION:

COUNTY SURRY CITY/TOWN _____ BRIDGE NO. 34
 ROUTE NC 104 STREAM JOHNSON CREEK ROAD MILE _____
 DUAL BRIDGE NO. _____ IS US/DS _____
 ORIG. PROJECT NO. 11674192 YEAR BUILT 1955
 REHAB. PROJECT NO. _____ YEAR REHAB. _____
 CURRENT ADT _____ YEAR _____ FUTURE ADT _____ YEAR _____

INFORMATION RESOURCES AVAILABLE:

HYDRAULIC STUDY REPORT (DATE)	—
AS-BUILT CONSTRUCTION PLANS (DATE)	<u>SEPT 1954</u>
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/DN STREAM)	—
BRIDGE INSPECTION REPORT (DATE)	<u>11/13/95</u>
UNDERWATER INSPECTION (DATE, CYCLE)	—
STRUCTURE DATA FILE (DATE)	<u>11/13/95</u>

HYDRAULIC DATA:

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

HISTORICAL FLOODS

DATE	ELEV. (FT.)	APPROX. FREQ. (YRS.)	APPROX. DISCH.	ADJUSTED TO SITE

SOURCE _____

FLOOD FREQUENCY (YRS.)

ELEVATION (FT.)

DISCHARGE (CFS)

AVG. VELOCITY (Q/A)

SOURCE: _____

Q	Q	Q	Q

COMMENTS: _____

$$TOR = 1068,0 - \frac{1,5}{12} + \frac{30,5}{12} = 1070,4$$

2

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? _____

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. _____

ASSESSMENT

1) PIER AND/OR ABUTMENT SPREAD FOOTINGS WITHIN POTENTIAL CHANNEL SCOUR AREA ARE INDICATED ON THE Plans TO BE ON SCOUR RESISTANT MATERIAL. THIS FINDING HAS BEEN REVIEWED AND CONCURRED WITH BY MD Moore 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 ? _____

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 ? _____

4) ARE ALL PIERS AND ABUTMENTS OUTSIDE THE NORMAL CHANNEL SECTION ? _____

5) HAS THE CROSSING EXPERIENCED A FLOOD OF 50 OR MORE YEARS ESTIMATED MAGNITUDE WITH NO REPORTED OR INDICATED SCOUR PROBLEM ? _____

6) ARE THE BOTTOMS OF THE CHANNEL PIER SPREAD FOOTINGS MORE THAN 7 FEET BELOW BED ? _____

7) IS THE AVERAGE VELOCITY IN BRIDGE OPENING (SIMPLE ANALYSIS $V=Q/A$) FOR THE ESTIMATED 100 YR. EVENT LESS THAN 4 FT./SEC ? _____

8) IS THE APPROACH ROADWAY OR BRIDGE OVERTOPPED DURING MINOR FLOODS (≤ 10 YR.) REQUIRING CLOSURE AND INSPECTION BEFORE REOPENING ? _____

THIS STRUCTURE MEETS CRITERIA DESCRIBED IN WHICH OF THE ABOVE LISTED ITEMS FOR CLASSIFICATION AS A LOW RISK STRUCTURE? 1

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. YES

COMMENTS: _____

DECISION:

CLASSIFIED AS: SCOUR CRITICAL
UNKNOWN FOUNDATION
LOW RISK

_____✓

RECOMMENDED SCOUR CODE 8

ASSESSMENT COMMENTS: THIS BRIDGE IS CLASSIFIED AS LOW RISK
BECAUSE THE SPREAD FOOTINGS WERE TO BE CARRIED 6" INTO
ROCK. THE PLANS ARE NOT MARKED AS AS-BUILTS BUT EXCAVATION
QUANTITIES INDICATE BOTTOM OF FOOTING ELEVATIONS. THE
STREAMBED ELEVATION HAS NOT CHANGED SINCE 1954 BUT THE
BANKS HAVE WIDENED SIGNIFICANTLY. THE RIGHT FOOTING ON
BENT 2 IS EXPOSED. SLOPE PROTECTION IS BEING UNDERMINED.
RECOMMEND PROBE BE DRIVEN AT BENTS 1 AND 2.

SCHEDULE FOR DETAILED STUDY

SCHEDULE FOR FURTHER IN-HOUSE STUDY

ASSESSED BY: HRC
FIRM: HSM
DATE: 11/15/96

APPROVED BY: P. FISHER
DATE: 7/24/97

CHECKED BY: C. Bush
FIRM: D+D
DATE: 1-3-97

FINAL COMMENTS :

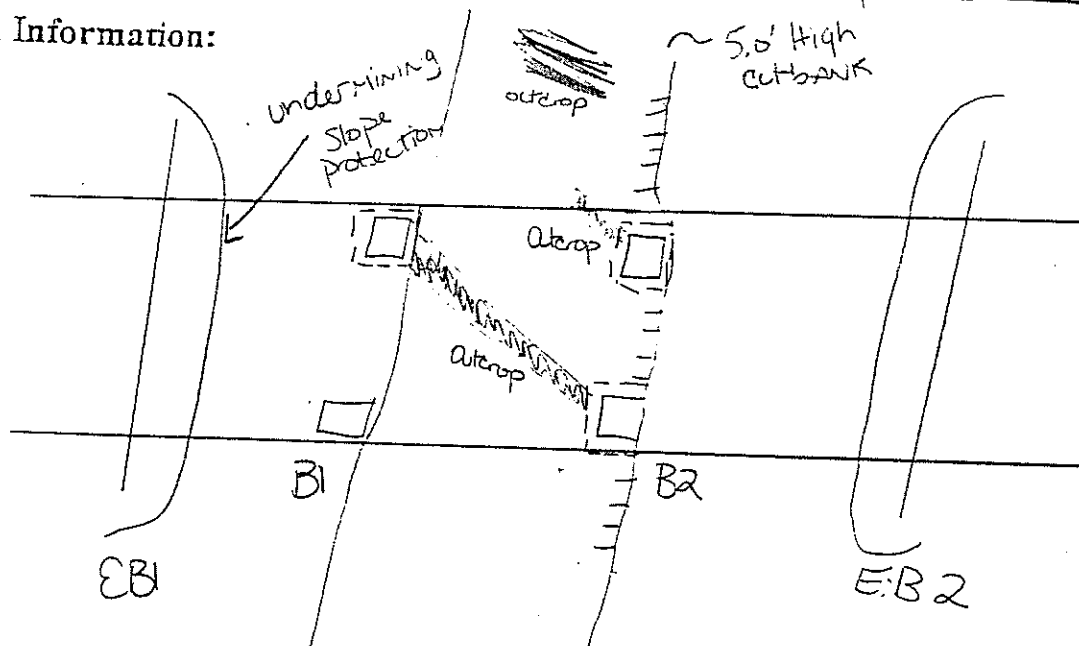
Geotech should confirm that the footings are founded
on scour resistant material.

850034

Scour Evaluation Studies Geotechnical Field Investigation

County: Surry Route No.: NC104 Stream: Johnson Creek
 Bridge No.: 34 Date: 6-18-97 By: Colin Mallor, Sue Eore

Sketch Information:



Bridge Data:

T.O.R. = 1070.4 H₂O elev. = 1049.65

End Bent Protection Type: Concrete slope

Bent Type: post + beam

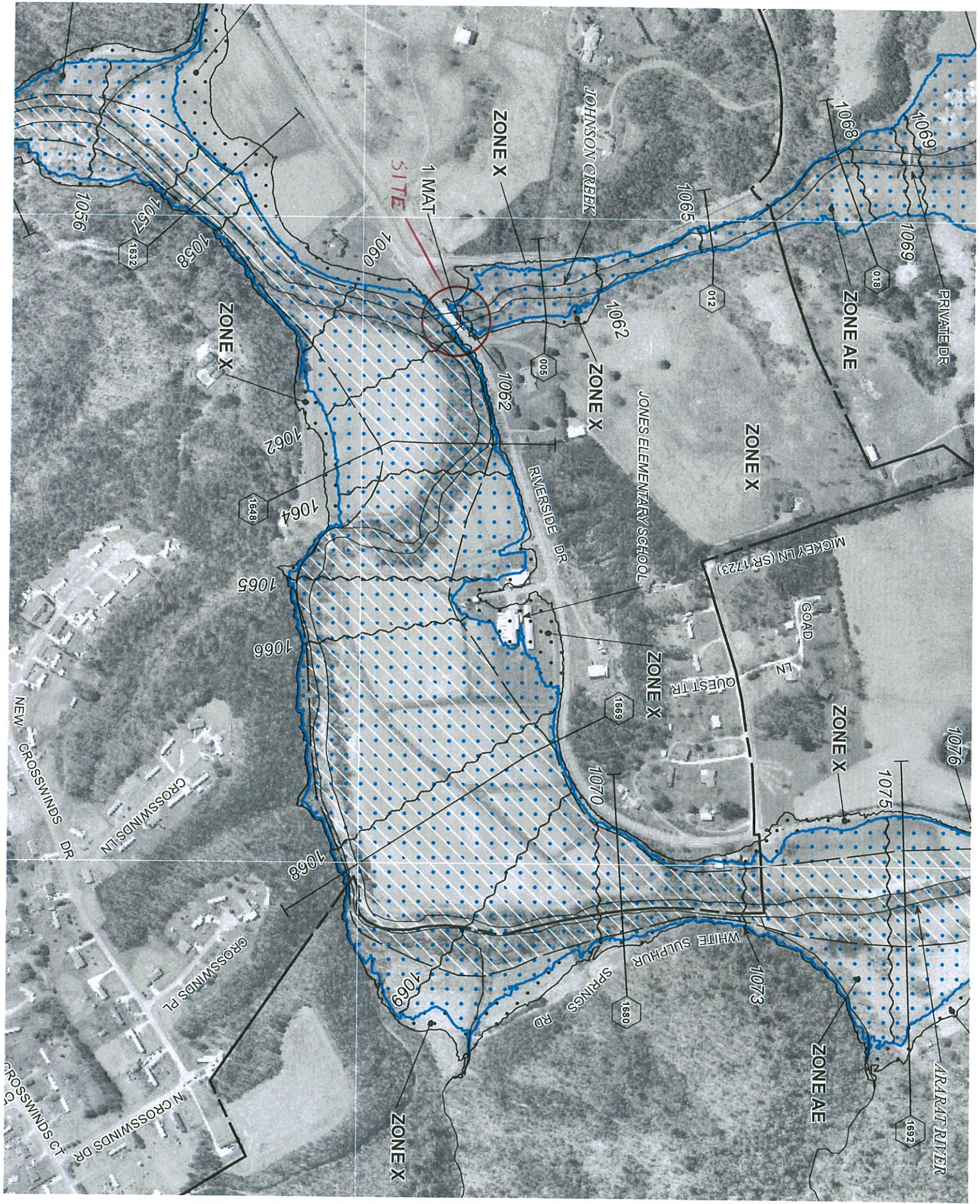
High Water Mark: Low steel ± 15'

Channel Bed Material: outcrop + stream

Noted Scour: N/A

Resident Interview: N/A

Recommendation(s): Bill M to sign.



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)
HORN CREEK TRIBUTARY 1A				
008	765	268	842.6	8 / 2
008	832	268	843.5	16 / 4
009	932	268	844.3	12 / 4
010	986	268	845.3	7 / 4
011	1,056	268	847.5	10 / 4
011	1,136	268	849.2	4 / 4
013	1,278	268	852.8	8 / 4
014	1,402	268	854.7	13 / 4
JACKSON CREEK				
001	53	1,760	1,025.4 ⁴	25 / 25
005	466	1,760	1,025.8	9 / 76
010	972	1,604	1,029.1	19 / 77
015	1,485	1,162	1,031.7	10 / 144
020	2,017	1,162	1,034.4	5 / 153
025	2,506	1,162	1,037.7	6 / 84
030	2,999	1,162	1,040.9	30 / 8
035	3,505	1,162	1,044.0	56 / 10
040	3,950	1,162	1,046.7	16 / 28
045	4,480	1,162	1,049.7	22 / 12
050	4,988	1,106	1,054.3	16 / 10
055	5,475	1,106	1,058.4	15 / 10
059	5,935	1,106	1,061.6	10 / 79
JACKSON CREEK TRIBUTARY 1				
001	83	505	1,028.4	10 / 11
006	626	505	1,034.4	8 / 13
011	1,064	462	1,040.5	20 / 7
015	1,484	462	1,054.9	3 / 6
JACKSON CREEK TRIBUTARY 2				
001	87	906	1,030.0 ⁴	44 / 10
006	587	906	1,035.5	9 / 13
011	1,050	906	1,041.2	25 / 7
017	1,672	906	1,048.8	89 / 8
021	2,075	906	1,055.6	24 / 9
026	2,567	906	1,063.6	43 / 7
029	2,877	906	1,066.6	39 / 7
JOHNSON CREEK				
001	53	4,599	1,061.7 ⁴	35 / 35
003	261	4,599	1,061.7 ⁴	42 / 18
005	498	4,599	1,061.7 ⁴	50 / 65
009	891	4,599	1,063.4	33 / 27
012	1,186	4,599	1,065.3	25 / 35
014	1,414	4,589	1,066.2	30 / 30
018	1,790	4,589	1,067.9	70 / 38
024	2,439	4,589	1,070.5	76 / 115
030	3,007	4,589	1,072.1	176 / 117
035	3,491	4,589	1,073.9	25 / 134
040	3,995	4,589	1,077.0	119 / 23
042	4,221	4,589	1,077.9	96 / 23

RIVER STA.: 119 BR U

Johnson Creek Limited Detail Study Plan: Floodway Run 8/20/2009
Riverside Dr (John) TORStructure ID: LDS_JC_01Approximate Surv

