

PREDESIGN/PRESURVEY REPORT

County: Orange

Project No.:
TIP No.:
Let Date:
WBS No.: 17BP.7.R.80

Bridge No.: 670023
Road No.: SR 1508 (Hawkins Rd)
Stream: South Fork Little River

Type of Request:

Date: 5/28/2013

Name:

Assigned to: EMT/CJL

Checked by:

Prior Survey Date (attach copy of prior survey):

Study by Scour Section:

Flood Zone: AE

Detail Study: LDS

Date: 02/02/07

Panel No.: 9868

BM Info:

Quad Map: Caldwell (Caldwl)

Drainage Area: 1.8 sq.mi

From: Quad/Stream Stats

Q25: 800cfs

Q50: 950cfs

Q100: 1100cfs

Method: USGS Rural Regression: Region 1

EXISTING BRIDGE INFORMATION

Location: 0.5 Miles West of JCT SR1507 (Wilkerson Rd)

Average Daily Traffic: 2010 - 200

Length: 36'

Bed-to-Crown: 8'

Water Depth: 1'

Type of Structure: Tim Deck on Tim Joists; End/Int Bents: Tim Caps&Piles

Type of Span(s): 1@17'9", 1@17'10'

Upstream Structure: N/A

Location:

Bed-to-Crown:

Prior Survey:

Downstream Structure: 670027 – 1@4'4", 1@15'3", 1@17'6", 1@3'2" Tim Deck on I-Beams; Ebts:Tim Caps/Piles, Conc. Encased, Tim. Blkhds, Stl. Crutch Cap

Location: 0.3 Miles North JCT SR1546 (Olin Rd)

Bed-to-Crown: 10'

Prior Survey:

SCS Watershed:

ENVIRONMENTAL

Trout Stream: No

Anadromous Fish: No

Primary Nursery Area: No

High Quality Waters: Yes

Nutrient Sensitive Waters: Yes

Near Water Supply Intake:

CAMA County: No

Stream Classification: WS-II: Water Supply II - Undeveloped

Notes: None

DENR River Basin Info: Neuse

MAINTENANCE COORDINATION

Bridge Maintenance – Contact Superintendent and Supervisor.

High Water:

Relocation: New Alignment Staked: BM Information:

Road Maintenance – Contact District Engineer and County Maintenance Engineer.

High Water:

Road to be Paved: Relocation of Vicinity of Bridge:

New Alignment Staked: BM Information:

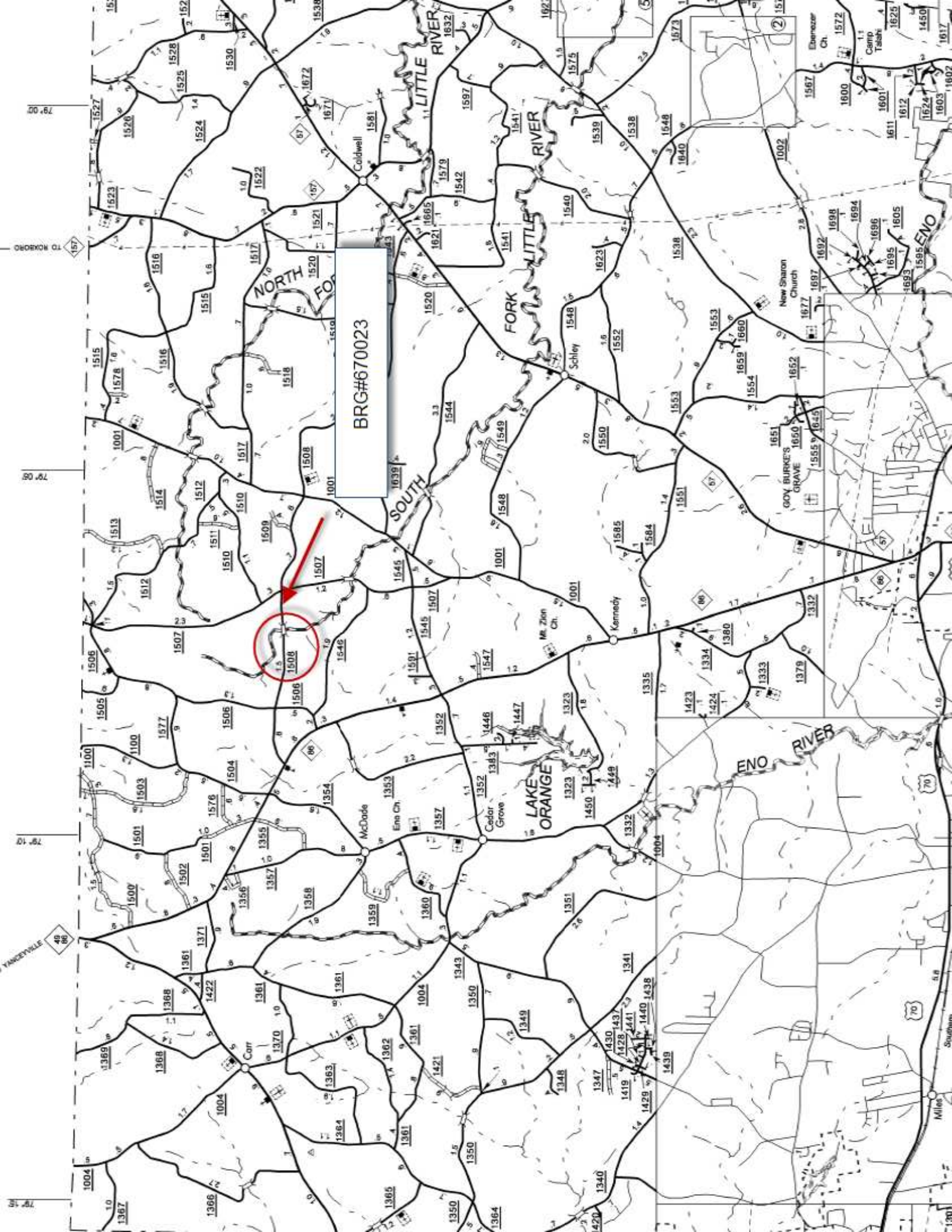
Initiated as: Date Initiated:

Man-days Estimated:

Date Surveyed: Date Completed:

Personnel Hours Pay Period

Comments:





NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY ORANGE BRIDGE NUMBER 670023 INSPECTION CYCLE 2 YRS
SR1508 HAWKINS RD.
ROUTE SR1508 ACROSS SOUTH FORK LITTLE RIVER M.P. 0

LOCATION 0.5 MI. W. JCT. SR1507

SUPERSTRUCTURE TIMBER DECK ON TIMBER JOISTS

SUBSTRUCTURE END & INTERIOR BENTS: TIMBER CAPS & PILES

SPANS 1@17'9", 1@17'10"

LONGITUDE 79° 7' 5.9"

LATITUDE 36° 12' 21.6"

PRESENT CONDITION FAIR

INVENTORY RATING

INSPECTION DATE 05/01/2012

OPERATING RATING

PRESENT POSTING SV 17 TTST 24 SV 17 TTST 24

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT 2 NARROW BRIDGE, 4 DELINEATORS



LOOKING EAST

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

NATIONAL BRIDGE INVENTORY----- STRUCTURE INVENTORY AND APPRAISAL

Run Date: 05/09/2012

IDENTIFICATION			
(1) STATE NAME -NORTH CAROLINA	BRIDGE	670023	SUFFICIENCY RATING = 58.47
(8) STRUCTURE NUMBER(FEDERAL)	000000001350023		STATUS = Functionally Obsolete
(5) INVENTORY ROUTE (ON/UNDER) - ON	31015080		
(2) STATE HIGHWAY DEPARTMENT DISTRICT	1		
(3) COUNTY CODE 135	(4) PLACE CODE 00000		
(6) FEATURE INTERSECTED - SOUTH FORK LITTLE RIVER			
(7) FACILITY CARRIED SR1508			
(9) LOCATION 0.5 MI. W. JCT. SR1507			
(11) MILEPOINT 0			
(16) LAT 36° 12' 16.6"	(17) LONG 79° 7' 11.1"		
(98) BORDER BRIDGE STATE CODE	PCT SHARE		
(99) BORDER BRIDGE STRUCTURE NO			
STRUCTURE TYPE AND MATERIAL			
(43) STRUCTURE TYPE MAIN: Wood or Timber			
TYPE - Stringer Multibeam or Girder	CODE 702		
(44) STRUCTURE TYPE APPR :			
TYPE -	CODE 0		
(45) NUMBER OF SPANS IN MAIN UNIT 2			
(46) NUMBER OF APPROACH SPANS 0			
(107) DECK STRUCTURE TYPE - 8	CODE		
(108) WEARING SURFACE / PROTECTIVE SYSTEM :			
(A) TYPE OF WEARING SURFACE -	CODE		
(B) TYPE OF MEMBRANE -	CODE		
(C) TYPE OF DECK PROTECTION -	CODE		
AGE AND SERVICE			
(27) YEAR BUILT 1955			
(106) YEAR RECONSTRUCTED			
(42) TYPE OF SERVICE : ON - Highway			
UNDER - Waterway	CODE 15		
(28) LANES: ON STRUCTURE 2 UNDER STRUCTURE			
(29) AVERAGE DAILY TRAFFIC 200			
(30) YEAR OF ADT 2010	(109) TRUCK ADT PCT 6%		
(19) BYPASS OR DETOUR LENGTH 2 MI			
GEOMETRIC DATA			
(48) LENGTH OF MAXIMUM SPAN 18 FT			
(49) STRUCTURE LENGTH 36 FT			
(50) CURB OR SIDEWALK: LEFT .3 FT RIGHT .3 FT			
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 19.2 FT			
(52) DECK WIDTH OUT TO OUT 20.2 FT			
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 18 FT			
(33) BRIDGE MEDIAN - No Median	CODE 0		
(34) SKEW 0°	(35) STRUCTURE FLARED 0		
(10) INVENTORY ROUTE MIN VERT CLEAR 999.9 FT			
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 19.2 FT			
(53) MIN VERT CLEAR OVER BRIDGE RDWY 999.9 FT			
(54) MIN VERT UNDERCLEAR REF Not a Highway or Railroad 0 FT			
(55) MIN LAT UNDERCLEAR RT REF Not a Highway or Railroad 000 FT			
(56) MIN LAT UNDERCLEAR LT REF - 000 FT			
NAVIGATION DATA			
(38) NAVIGATION CONTROL - No Navigational Control	CODE 0		
(111) PIER PROTECTION -	CODE		
(39) NAVIGATION VERTICAL CLEARANCE 0			
(116) VERT - LIFT BRIDGE NAV MIN VERT CLEAR FT			
(40) NAVIGATION HORIZONTAL CLEARANCE 0 FT			
CLASSIFICATION			
(112) NBIS BRIDGE SYSTEM -			YES
(104) HIGHWAY SYSTEM Is not on NHS			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 -			
(110) DESIGNATED NATIONAL NETWORK - Not on the National Network			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			
(58) DECK			5
(59) SUPERSTRUCTURE			7
(60) SUBSTRUCTURE			5
(61) CHANNEL & CHANNEL PROTECTION			7
(62) CULVERTS			N
LOAD RATING AND POSTING			
(31) DESIGN LOAD Other or Unknown			0
(63) OPERATING RATING METHOD - Allowable Stress			
(64) OPERATING RATING - HS-15			227
(65) INVENTORY RATING METHOD - Allowable Stress			
(66) INVENTORY RATING - HS-11			219
(70) BRIDGE POSTING - Posting Required			0
(41) STRUCTURE OPEN, POSTED, OR CLOSED DESCRIPTION - Posted for Load			P
APPRAISAL			
(67) STRUCTURAL EVALUATION			5
(68) DECK GEOMETRY			3
(69) UNDERCLEARANCES, VERTI & HORIZ			N
(71) WATERWAY ADEQUACY			7
(72) APPROACH ROADWAY ALIGNMENT			7
(36) TRAFFIC SAFETY FEATURES			0000
(113) SCOUR CRITICAL BRIDGES			U
PROPOSED IMPROVEMENTS			
(75) TYPE OF WORK -			CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT			
(94) BRIDGE IMPROVEMENT COST			
(95) ROADWAY IMPROVEMENT COST			
(96) TOTAL PROJECT COST			
(97) YEAR OF IMPROVEMENT COST ESTIMATE			
(114) FUTURE ADT 600	(115) YEAR FUTURE ADT 2025		
INSPECTIONS			
(90) INSPECTION DATE			05/01/2012
(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			

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 05/09/2012

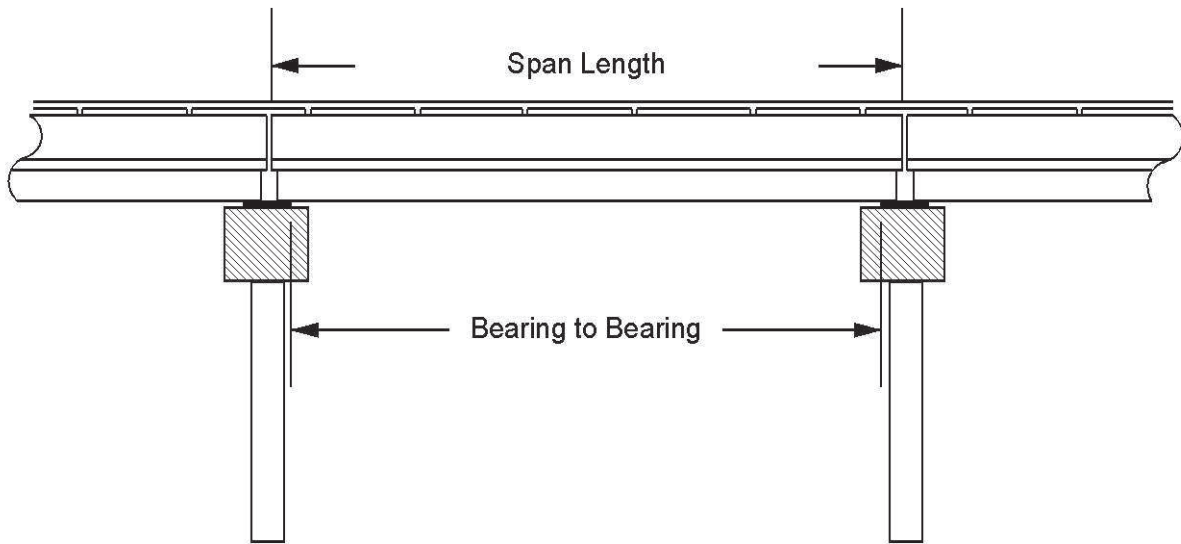
COUNTY : ORANGE	DIVISION : 7	DISTRICT : 1	STRUCTURE NUMBER : 670023	LENGTH : 36	FEET
ROUTE CARRIED : SR1508		FEATURE INTERSECTED : SOUTH FORK LITTLE RIVER			
LOCATED : 0.5 MI. W. JCT. SR1507		BRIDGE NAME :		CITY :	
FUNC. CLASS : 09	SYST.ON : NFA	SYST.UNDER : NFA	ADT & YR : 200 2010	RAIL TYPE : LT 227 RT 227	
BUILT : 1955	BY : BMU	PROJ :	FED.AID PROJ :	DESIGN LOAD : Other or Unknown	
REHAB :	BY : BMU	PROJ :	ALIGNMENT : TAN	SKEW : 90	LANES : ON 2 UNDER
NAVIGATION : VC 0 FT	HC 0 FT	HT. CRN. TO BED : 8 FT	WATER DEPTH : 1 FT		
SUPERSTRUCTURE : TIMBER DECK ON TIMBER JOISTS					
SUBSTRUCTURE : END & INTERIOR BENTS: TIMBER CAPS & PILES					
SPANS : 1@17'9", 1@17'10"					
BEAMS OR GIRDERS : SP#1:13 LINES,SP#2:14 LINES 6"X12" TIMBER JOISTS @ 1'6" CTS.					
FLOOR : 4X8"TIM,1. 5"AWS	ENCROACHMENT :		DECK (OUT TO OUT) : 20.2 FT		
CLEAR ROADWAY : 19.2 FT	BETWEEN RAILS : 19.8 FT		SIDEWALK OR CURB : LT .3 FT RT .3 FT		
VERT.CL.OVER : 999.9 FT					
INV.RTG. : HS-11	OPE.RTG. : HS-15	CONTR.MEMBER : JOIST INT.	POSTED : SV 17	TTST 24	DATE 09/19/2008
SYSTEM : Secondary S.R. Route			GREEN LINE ROUTE : N		
UNDER ROUTES AND CLEARANCES					

REMARKS :

Structure Data Worksheet

Spans

County: ORANGE Structure No: 670023 Date: 05/01/2012 Inspected By: TFM



Span No	Span Length	Bearing to Bearing	Comments
1	17.833	17.083	NBIS BL 33.667
2	17.833	17.083	

Stream Bed Soundings

(See next sheet for profile sketch)

Bridge No: 670023 County: ORANGE Date: 05/01/2012 By: TFM

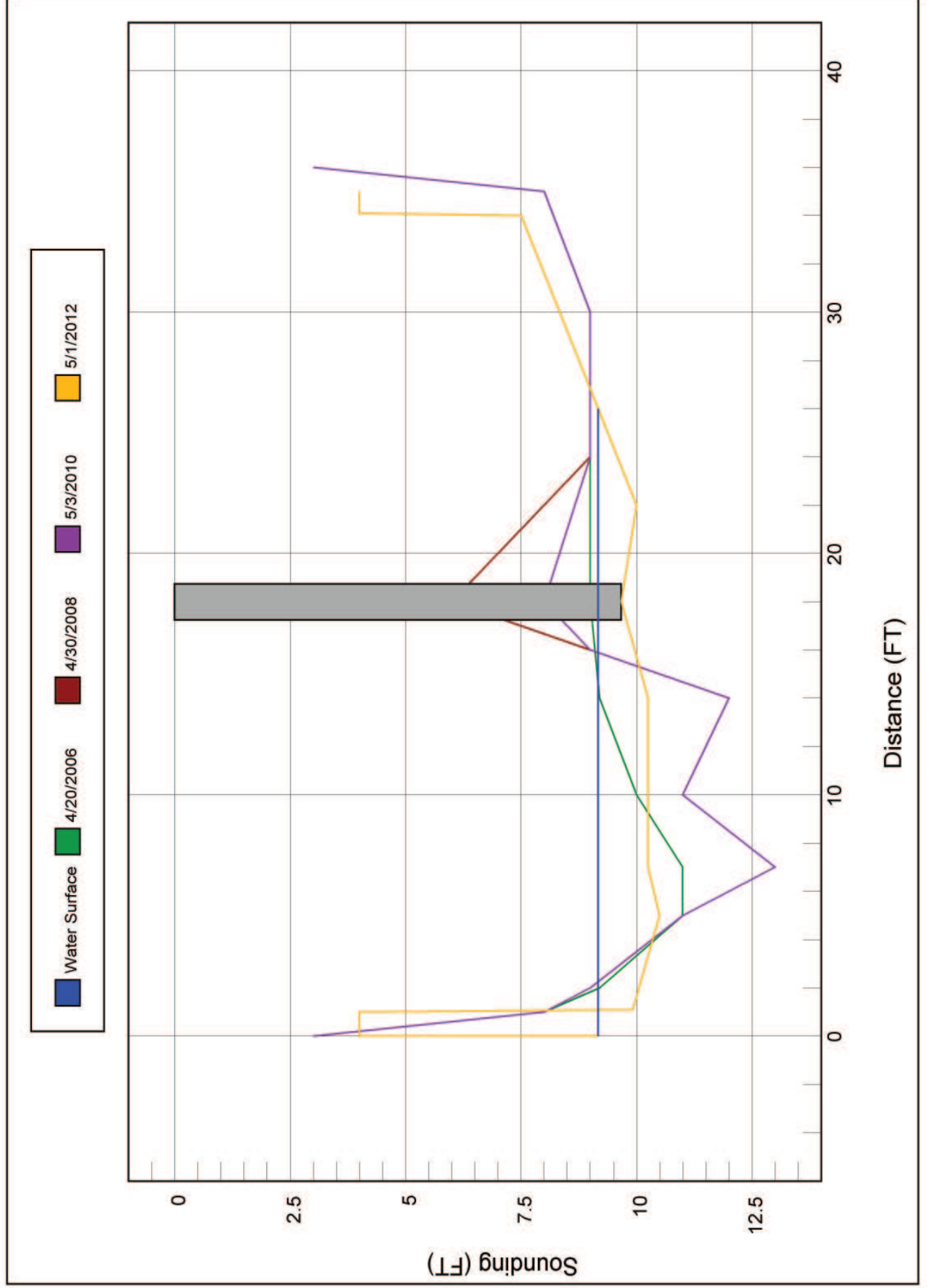
Record sounding from top of rail. Other location if needed: _____

Distance from Highwater Mark to top of rail: _____ Location of Highwater Mark: _____

DOWNSTREAM			UPSTREAM		
Distance (Station) (ft)	Sounding (ft)	Description	Distance (Station) (ft)	Sounding (ft)	Description
0	9.17	Water Surface/Water Edge (WSWE)			
0.01	4	Top of Cap			
1	4	Top of Cap	1	8	END BENT 1
1.1	9.92				
5	10.5				
7	10.25				
10	10.25				
14	10.25				
18	9.67	PIER	18	10.92	PIER
22	10				
26	9.17	Water Surface/Water Edge (WSWE)			
34	7.5				
34.1	4				
35	4		35	8	END BENT 2

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



Bridge Inspection Field Sketch



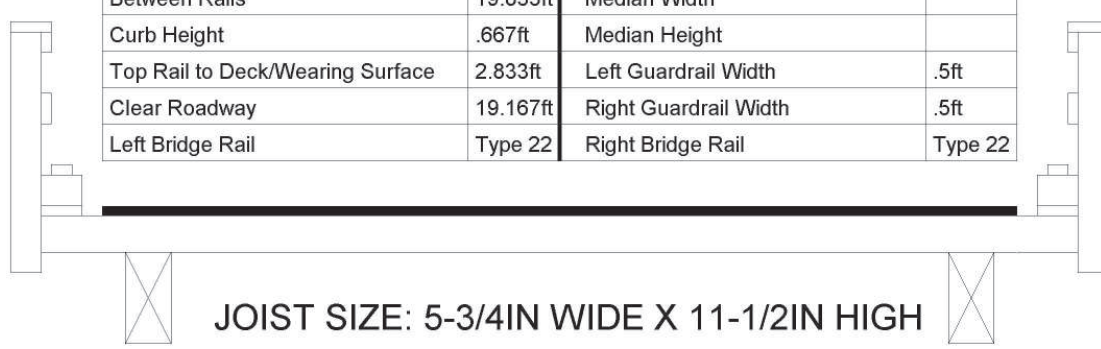
Roadway	18ft Wide	2 Paved Lanes	Looking East
Left Shoulder	6ft Wide		6ft Unpaved
Right Shoulder	6ft Wide		6ft Unpaved

MEASUREMENTS VERIFIED BY DH 5/1/2012

Title		Description	
APPROACH ROADWAY SKETCH		APPROACH ROADWAY SKETCH	
Bridge No: 670023	Drawn By: GDP	Date: 04/30/08	File Name: S0066001230

Bridge Inspection Field Sketch

Deck Width/Out to Out	20.167ft	Wearing Surface	.123ft
Between Rails	19.833ft	Median Width	
Curb Height	.667ft	Median Height	
Top Rail to Deck/Wearing Surface	2.833ft	Left Guardrail Width	.5ft
Clear Roadway	19.167ft	Right Guardrail Width	.5ft
Left Bridge Rail	Type 22	Right Bridge Rail	Type 22



JOIST SIZE: 5-3/4IN WIDE X 11-1/2IN HIGH

Measurements for Span #	2		
Deck Thickness	.313	Left Overhang	1.083
Top of Rail to Bottom of Beam	4.25	Right Overhang	1.083

Beam No	Beam Type	Spacing	Comments
1	Timber (Rectangular)	1ft	OTHER SPAN SIMILAR
2	Timber (Rectangular)	1.5ft	
3	Timber (Rectangular)	1.5ft	
4	Timber (Rectangular)	1.5ft	
5	Timber (Rectangular)	1.5ft	
6	Timber (Rectangular)	1.5ft	
7	Timber (Rectangular)	1ft	
8	Timber (Rectangular)	1.5ft	
9	Timber (Rectangular)	1.5ft	
10	Timber (Rectangular)	1.5ft	
11	Timber (Rectangular)	1.5ft	
12	Timber (Rectangular)	1.5ft	
13	Timber (Rectangular)	1ft	
14	Timber (Rectangular)		

MEASUREMENTS VERIFIED BY DH 5/1/2012

Title		Description	
STRUCTURE DATA SKETCH		STRUCTURE DATA SKETCH	
Bridge No: 670023	Drawn By: GDP	Date: 04/30/08	File Name: S0066001231

Bridge Inspection Field Sketch

Cap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.		Right Beam to End of Cap.			
21.920 ft.	.959 ft.	.959 ft.	2.500 ft.	2.420 ft.	2.000 ft.		2.000 ft.			
Subcap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Pile to Splice.					
Sill Information			Material							
Length	Width	Height								
Pile #	Material	Spacing	Width/Dia.	Height	Length	Orientation	Driven?	Replacement?	Removed?	Collar?
1	Timber	6.5 ft.	1 ft.				No	No	No	No
2	Timber	4.08 ft.	1 ft.				No	No	No	No
3	Timber	6.42 ft.	1 ft.				No	No	No	No
4	Timber		1 ft.				No	No	No	No
Bent/Abutment #: 1 Similar Bents:										

Title		Description	
END BENT 1		PILE DIAGRAM END BENTS	
Bridge No: 670023	Drawn By: DH	Date: 5/1/2012	File Name: S0066001232

Bridge Inspection Field Sketch

Cap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.			Right Beam to End of Cap.		
22.080 ft.	.959 ft.	.959 ft.	2.250 ft.	2.250 ft.	2.000 ft.			2.000 ft.		
Subcap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Pile to Splice.					
Sill Information			Material							
Length	Width	Height								
Pile #	Material	Spacing	Width/Dia.	Height	Length	Orientation	Driven?	Replacement?	Removed?	Collar?
1	Timber	6 ft.	1 ft.				No	No	No	No
2	Timber	5.58 ft.	1 ft.				No	No	No	No
3	Timber	6 ft.	1 ft.				No	No	No	No
4	Timber		1 ft.				No	No	No	No
PIER 1 Similar Bents:										

Title		Description	
PILE DIAGRAM PIER		PILE DIAGRAM PIER	
Bridge No: 670023	Drawn By: DH	Date: 5/1/2012	File Name: S0066001233

Bridge Inspection Field Sketch

A diagram consisting of a single horizontal bar at the top, which is solid gray. From the bottom edge of this horizontal bar, four vertical bars hang down. These vertical bars are shaded with a cross-hatch pattern, while the spaces between them are white. The vertical bars are of equal width and are spaced evenly across the horizontal bar.

Cap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.			Right Beam to End of Cap.		
22.080 ft.	.959 ft.	.959 ft.	2.580 ft.	2.500 ft.	1.920 ft.			1.920 ft.		
Subcap Information			Material							
Length	Width	Height	Left Overhang	Right Overhang	Left Pile to Splice.					
Sill Information			Material							
Length	Width	Height								
Pile #	Material	Spacing	Width/Dia.	Height	Length	Orientation	Driven?	Replacement?	Removed?	Collar?
1	Timber	6.67 ft.	1 ft.				No	No	No	No
2	Timber	3.83 ft.	1 ft.				No	No	No	No
3	Timber	6.5 ft.	1 ft.				No	No	No	No
4	Timber		1 ft.				No	No	No	No
Bent/Abutment #: 2 Similar Bents:										

Title END BENT 2		Description END BENT 2	
Bridge No: 670023	Drawn By: DH	Date: 5/1/2012	File Name: S0066074539



NARROW BRIDGE SIGN



LOOKING EAST



EAST END APPROACH



LOOKING WEST



LOOKING DOWNSTREAM



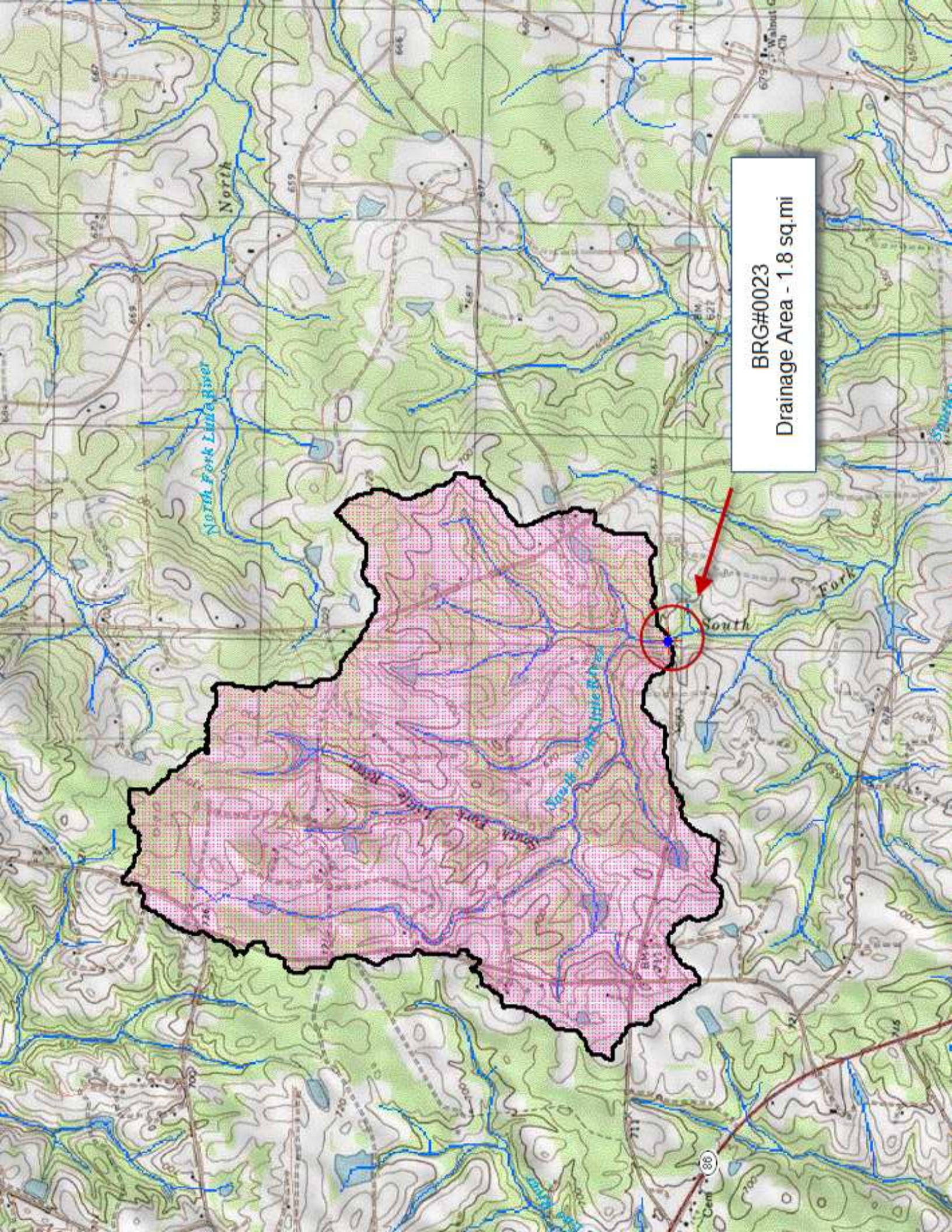
LOOKING UPSTREAM



LOOKING AT SOUTH SIDE



LOOKING AT NORTH SIDE



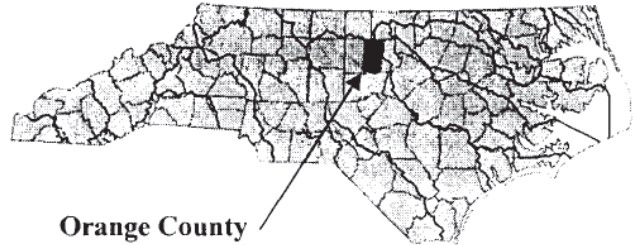
BRG#0023
Drainage Area - 1.8 sq.mi

FLOOD INSURANCE STUDY

A Report of Flood Hazards in

ORANGE COUNTY, NORTH CAROLINA

AND INCORPORATED AREAS



Community Name	Community Number	River Basins
Carrboro, Town of	370275	Cape Fear
Chapel Hill, Town of	370180	Cape Fear
Hillsborough, Town of	370343	Neuse
Orange County (Unincorporated Areas)	370342	Cape Fear/ Neuse/Roanoke

VOLUME 1 OF 3



Revised: May 16, 2008

**Federal Emergency Management Agency
State of North Carolina**

**Flood Insurance Study Number
37135CV001B**

www.fema.gov and www.ncfloodmaps.com



Section 4.0 – Area Studied

Table 7—Flooding Sources Studied by Detailed Methods: Limited Detailed

Source	Riverine Sources		Affected Communities
	From	To	
Forrest Creek	Approximately 200 feet upstream of State Highway 57	Approximately 130 feet upstream of Phelps Road	Orange County (Unincorporated Areas)
High Rock Creek	The confluence with Eno River	Approximately 0.3 mile upstream of Efland-Cedar Grove Road	Orange County (Unincorporated Areas)
Jones Creek	Approximately 0.4 mile upstream of confluence with Bolin Creek	Approximately 0.2 mile upstream of Lucy Lane	Orange County (Unincorporated Areas)
Lick Creek	The Orange/Person County Boundary	Approximately 0.3 mile upstream of Holly Ridge Road	Orange County (Unincorporated Areas)
Little Creek (Chapel Hill)	The Town of Chapel Hill Boundary	Approximately 0.3 mile downstream of the Pinehurst Drive	Town of Chapel Hill
Little Creek Tributary 3 (Chapel Hill)	The confluence with Little Creek (Chapel Hill)	Approximately 0.5 mile upstream of Ephesus Church Road	Town of Chapel Hill
Little River North Fork	Approximately 280 feet upstream of State Highway 57	Approximately 0.3 mile upstream of Hester Road	Orange County (Unincorporated Areas)
Little River North Fork Tributary 2	The confluence with Little River North Fork	Approximately 1.3 miles upstream of Gates Road	Orange County (Unincorporated Areas)
Little River North Fork Tributary 3	The confluence with Little River North Fork	Approximately 0.7 mile upstream of Sneed Road	Orange County (Unincorporated Areas)
Little River South Fork	Approximately 230 feet upstream of State Highway 57	Approximately 100 feet upstream of Hawkins Road	Orange County (Unincorporated Areas)
Meeting of the Waters Creek	The confluence with Morgan Creek	Approximately 0.7 mile upstream of Fordham Boulevard South	Town of Chapel Hill
Mill Creek Tributary	The confluence with Mill Creek	Approximately 0.5 mile upstream of Lee Street	Orange County (Unincorporated Areas)
Morgan Creek	Approximately 1,500 feet upstream of Farrington Mill Road	The Orange/Durham County boundary	Town of Chapel Hill Orange County (Unincorporated Areas)
Morgan Creek-University Lake	The University Lake Dam	Approximately 0.3 mile upstream of Jones Ferry Road	Orange County (Unincorporated Areas)
Mountain Creek	The confluence with New Hope Creek	Approximately 1.9 miles upstream of confluence with New Hope Creek	Orange County (Unincorporated Areas)

Section 5.0 – Engineering Methods

Table 10—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
Little River North Fork Tributary 2	Approximately 0.15 mile upstream of confluence with Little River North Fork	2.97	*	*	1,471	*
	Approximately 1.13 miles upstream of Gates Road	2.87	*	*	1,441	*
Little River North Fork Tributary 3	Approximately 0.10 mile upstream of Sneed Road	3.22	*	*	1,547	*
	Approximately 0.58 mile upstream of Sneed Road	2.99	*	*	1,478	*
	Approximately 0.69 mile upstream of Sneed Road	1.97	*	*	1,139	*
Little River South Fork	At Durham County Limits	38.7	5,350	7,600	8,500	11,100
	At North Carolina Secondary Road 1538	33.5	4,470	6,850	7,950	11,050
	Below confluence of Forrest Creek	30.8	4,030	6,400	7,670	10,950
	Above confluence of Forrest Creek	22.5	2,850	5,170	6,485	10,550
	Approximately 2.5 miles below North Carolina Highway 57	19.8	2,620	4,760	5,975	9,740
	At North Carolina Highway 57	16.0	2,270	4,150	5,215	8,520
	Approximately 0.86 mile upstream of Brock Drive	15.67	*	*	4,159	*
	Approximately 0.03 mile downstream of Pearson Road	14.79	*	*	4,012	*
	Approximately 0.30 mile upstream of Pearson Road	6.8	*	*	2,487	*
	Approximately 0.23 mile downstream of Wilkerson Road	6.05	*	*	2,296	*
	Approximately 0.63 mile upstream of Wilkerson Road	3.70	*	*	1,688	*
	Approximately 55 feet downstream of Hawkins Road	2.78	*	*	1,410	*
	Approximately 0.02 mile upstream of Hawkins Road	1.80	*	*	1,075	*

Section 5.0 – Engineering Methods

Table 14—Limited Detailed Flood Hazard Data

Cross Section¹	Stream Station²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)	Non-Encroachment Width³ (feet)
LITTLE RIVER NORTH FORK TRIBUTARY 2 (continued)				
061	6,053	1,441	605.6	30 / 260
066	6,620	1,441	607.2	39 / 164
LITTLE RIVER NORTH FORK TRIBUTARY 3				
001	145	1,547	543.7 ⁴	10 / 95
005	500	1,547	543.7 ⁴	7 / 95
010	1,000	1,547	545.0	100 / 8
015	1,504	1,547	546.5	25 / 32
020	1,979	1,547	548.9	68 / 12
029	2,882	1,547	551.4	62 / 19
035	3,533	1,478	554.6	11 / 53
041	4,095	1,478	557.8	46 / 28
046	4,628	1,478	559.6	53 / 67
054	5,419	1,478	561.7	51 / 77
060	5,979	1,139	563.9	42 / 95
LITTLE RIVER SOUTH FORK				
560	55,966	4,282	553.0	17 / 61
574	57,380	4,159	555.5	24 / 31
580	58,000	4,159	557.8	32 / 36
585	58,500	4,159	559.2	46 / 39
590	59,033	4,159	560.1	19 / 87
595	59,500	4,159	561.0	89 / 26
600	60,000	4,159	562.4	42 / 36
605	60,500	4,159	563.7	57 / 24
609	60,934	4,159	564.7	24 / 250
615	61,500	4,012	565.1	14 / 72
620	62,000	4,012	565.2	20 / 30
624	62,447	4,012	568.9	35 / 40
630	62,959	4,012	572.1	17 / 24
634	63,396	4,012	574.5	73 / 19
640	63,955	4,012	576.2	164 / 27
644	64,372	4,012	577.0	88 / 27
650	65,000	4,012	578.5	123 / 31
654	65,393	4,012	578.5	34 / 17
660	66,000	4,012	581.6	69 / 29
667	66,668	4,012	584.1	251 / 31
674	67,427	4,012	585.0	504 / 39
680	68,000	4,012	585.3	265 / 30
686	68,558	4,012	586.2	323 / 30
694	69,369	4,012	587.3	30 / 135
700	70,000	4,012	588.3	18 / 89
705	70,500	4,012	589.4	19 / 91
709	70,855	4,012	590.2	25 / 67
713	71,319	4,012	591.3	64 / 37

Section 5.0 – Engineering Methods

Table 14—Limited Detailed Flood Hazard Data

Cross Section¹	Stream Station²	Flood Discharge (cfs)	1% Annual Chance Water- Surface Elevation (feet NAVD 88)	Non- Encroachment Width³ (feet)
LITTLE RIVER SOUTH FORK (continued)				
724	72,408	2,487	593.2	180 / 50
729	72,925	2,487	593.6	201 / 173
734	73,433	2,296	593.8	233 / 15
740	74,000	2,296	594.3	294 / 30
744	74,399	2,296	594.6	401 / 16
751	75,097	2,296	595.4	342 / 84
755	75,500	2,296	596.1	230 / 83
761	76,117	2,296	598.1	19 / 391
770	77,000	2,296	600.5	13 / 263
775	77,500	2,296	601.7	65 / 70
780	78,000	2,296	603.3	39 / 132
785	78,500	2,296	604.0	18 / 257
791	79,079	2,296	604.8	158 / 153
794	79,449	2,296	605.2	161 / 168
803	80,303	2,296	606.5	101 / 38
810	81,000	1,688	609.1	85 / 87
815	81,500	1,688	610.0	185 / 8
825	82,500	1,688	612.4	183 / 32
831	83,112	1,688	613.2	29 / 184
835	83,500	1,688	613.8	58 / 11
841	84,105	1,688	616.9	16 / 27
846	84,552	1,688	619.8	10 / 16
850	85,041	1,688	624.0	50 / 45
856	85,568	1,410	625.8	38 / 28
860	86,000	1,410	627.0	30 / 25
866	86,554	1,410	628.9	5 / 58
872	87,155	1,410	631.9	42 / 68
875	87,500	1,410	632.6	145 / 15
880	88,000	1,410	633.5	101 / 54
885	88,500	1,410	634.4	147 / 49
891	89,107	1,410	635.6	121 / 24
898	89,760	1,075	637.4	20 / 41
MEETING OF THE WATERS CREEK				
006	622	1,350	262.0 ⁴	13 / 37
012	1,152	1,350	265.9	10 / 147
017	1,690	1,350	269.8	2 / 82
023	2,311	1,350	274.0	220 / 5
032	3,151	1,350	278.5	41 / 74
040	4,040	1,290	299.1	60 / 70
045	4,500	1,290	299.3	32 / 55
050	5,000	1,290	306.4	20 / 15
056	5,637	838	313.8	20 / 40
060	6,007	838	316.5	30 / 8

FLOODING SOURCE		FLOODWAY				BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)		
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little River South Fork	100	180	1,792	4.7	467.6	467.6	468.6	1.0
	131	200	1,804	4.7	478.2	478.2	478.6	0.4
	159	350	3,615	2.4	483.7	483.7	484.4	0.7
	184	190	1,932	4.4	489.2	489.2	489.9	0.7
	213	315	3,220	2.5	494.7	494.7	495.5	0.8
	247	400	3,924	2.1	497.9	497.9	498.7	0.8
	269	265	2,620	3.0	500.5	500.5	501.3	0.8
	281	105	1,399	5.5	502.7	502.7	503.5	0.8
	308	200	1,909	3.4	505.7	505.7	506.6	0.9
	323	130	1,573	4.1	510.6	510.6	511.5	0.9
	342	230	1,993	3.3	514.4	514.4	515.4	1.0
	395	290	2,313	2.8	524.2	524.2	525.2	1.0
	413	255	2,273	2.6	527.6	527.6	528.5	0.9
	439	110	1,109	5.1	532.3	532.3	533.3	1.0
	476	160	1,700	3.3	540.3	540.3	541.3	1.0
	504	175	1,827	3.1	545.0	545.0	545.7	0.7
	556	470	3,642	1.4	549.7	549.7	550.7	1.0
569	95	854	6.1	551.8	551.8	552.4	0.6	

¹Feet above mouth

FEDERAL EMERGENCY MANAGEMENT AGENCY

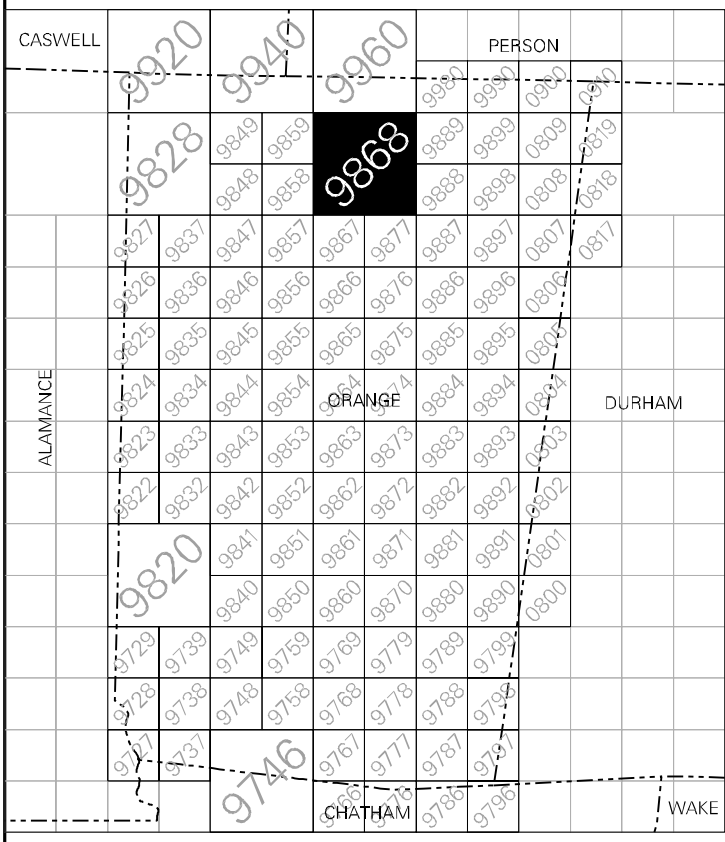
TABLE 16

FLOODWAY DATA

ORANGE COUNTY, NC
AND INCORPORATED AREAS

LITTLE RIVER SOUTH FORK

STATE OF NORTH CAROLINA FIRM PANEL LOCATOR DIAGRAM



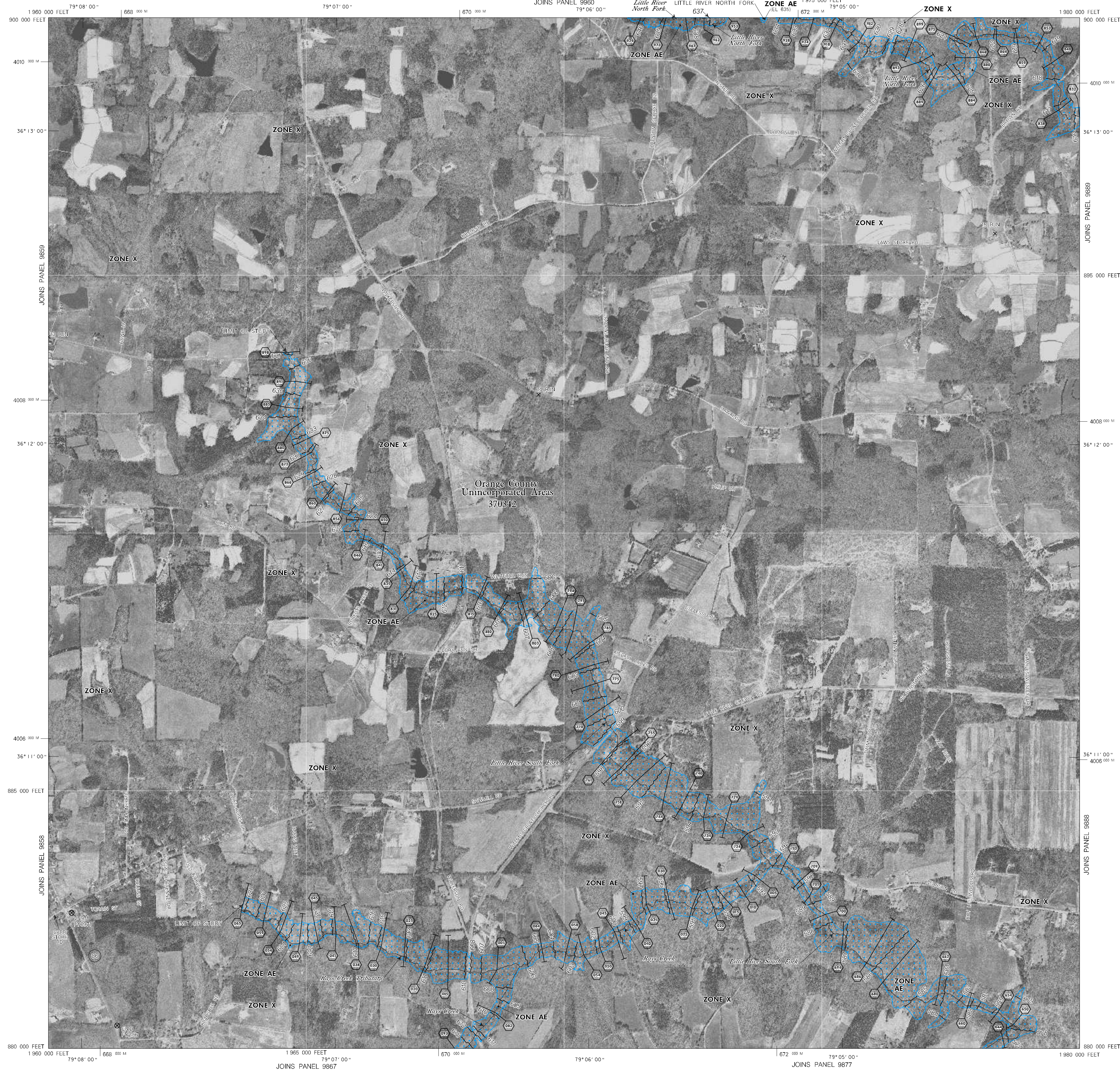
DATUM INFORMATION

The **projection** used in the preparation of this map was the North Carolina State Plane (NAD83/ZONE 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 their website at www.ngs.noaa.gov.

North Carolina Geodetic Survey 121 West Jones Street Raleigh, NC 27601 (919) 733-3636 www.ncgs.state.nc.us	County Average Vertical Datum Offset Table <table> <tr> <th>County</th><th>Vertical Datum Offset (ft)</th></tr> <tr> <td>Orange</td><td>- 0.79</td></tr> </table> Example: NAVD 88 = NGVD 29 + (-0.88)	County	Vertical Datum Offset (ft)	Orange	- 0.79
County	Vertical Datum Offset (ft)				
Orange	- 0.79				

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



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 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 identified. 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 future conditions 1% 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 and future conditions 1% 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 and future conditions 1% 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.
 - Base Flood Elevation line and value; elevation in feet*
 - 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

4276000 M

1477 500 FEET

BM5510 x

BM5510

M1.5

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

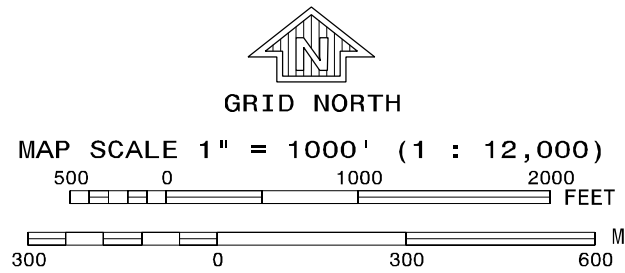
1000-meter Universal Transverse Mercator grid ticks, zone 17

2500-foot grid values; North Carolina State Plane coordinate system: (FIPS)ZONE 3200, State Plane NAD 83 feet

North Carolina Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).

National Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).

River Mile



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 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 the jurisdictions.

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 as part of the National Digital Orthophoto Program. The time period of collection for the imagery is 1998-1999. 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 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 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 www.msc.fema.gov.

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index or visit www.ncfloodmaps.com.

EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL
FEBRUARY 2, 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 this 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
www.ncdcmcontrol.org/nfip

National Flood Insurance Program
1-800-638-6620
www.fema.gov/nfip

Cooperating Technical State

FEMA'S COOPERATING TECHNICAL PARTNER

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

PANEL 9868J

FIRM

FLOOD INSURANCE RATE MAP

NORTH CAROLINA

PANEL 9868

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

CONTAINS:

COMMUNITY ORANGE COUNTY **OID No.** 370342 **PANEL** 9868 **SUFFIX** J

Effective Date
FEBRUARY 2, 2007

Map Number
370986800J

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.

State of North Carolina
Federal Emergency Management Agency



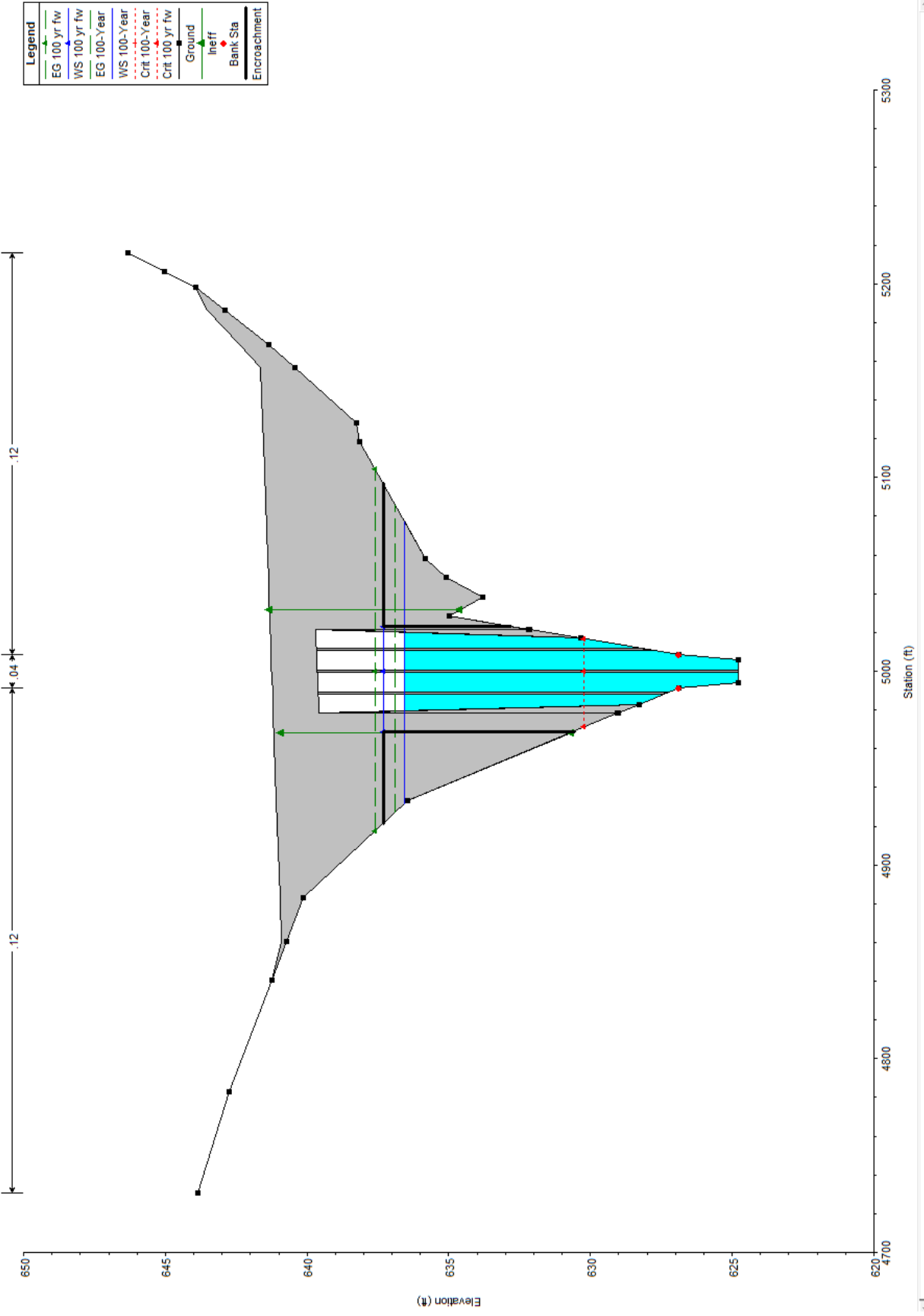
Cross Section

File Options Help

River:
Reach:

Reload Data

South Fork Little River Plan: 100 Year Single 7/30/2003
Hawkins Road-TOR



River:
Reach: River Sta.:

Reload Data

South Fork Little River Plan: 100 Year Single 7/30/2003
Hawkins Road-TOR

