

PREDESIGN/PRESURVEY REPORT

County: Orange

Project No.:

TIP No.:

Let Date:

WBS No.:

Bridge No.: 670173

Road No.: SR 1353 (Compton Rd.)

Stream: Prong Eno River (East Fork Eno River)

Type of Request:

Date: 5/21/2013

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.: 9858

BM Info:

Quad Map: Cedar Grove
(Cedrgr)

Drainage Area: 3.88 sq. mi

From: Quad/Stream Stats

Q25: 1200cfs

Q50: 1500cfs

Q100: 1700cfs

Method: USGS Rural Regression: Region 1

EXISTING BRIDGE INFORMATION

Location: 0.6 Miles West of JCT NC 86

Average Daily Traffic: 2000 - 60

Length: 41'

Bed-to-Crown: 8'

Water Depth: 1'

Type of Structure: Timber Deck on I-Beams; End Bents: Timber Caps & Piles, Timber Bulkheads

Type of Span(s): 1@40'7

Upstream Structure: 670253 – Triple 8'X6' RCBC, 33'10" Along Centerline of Culvert

Location: 0.2 Miles North of JCT SR 1508 (Hawkins Rd.)

Bed-to-Crown: 10'

Prior Survey:

Downstream Structure: 670014 – Triple 9'X10' RC Box Culvert, 160' Along Centerline Culvert; Ext. & Int. Walls

Location: 0.2 Mile East of JCT. SR1353 (Compton Rd.)

Bed-to-Crown: 21'

Prior Survey: 09/1989

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:

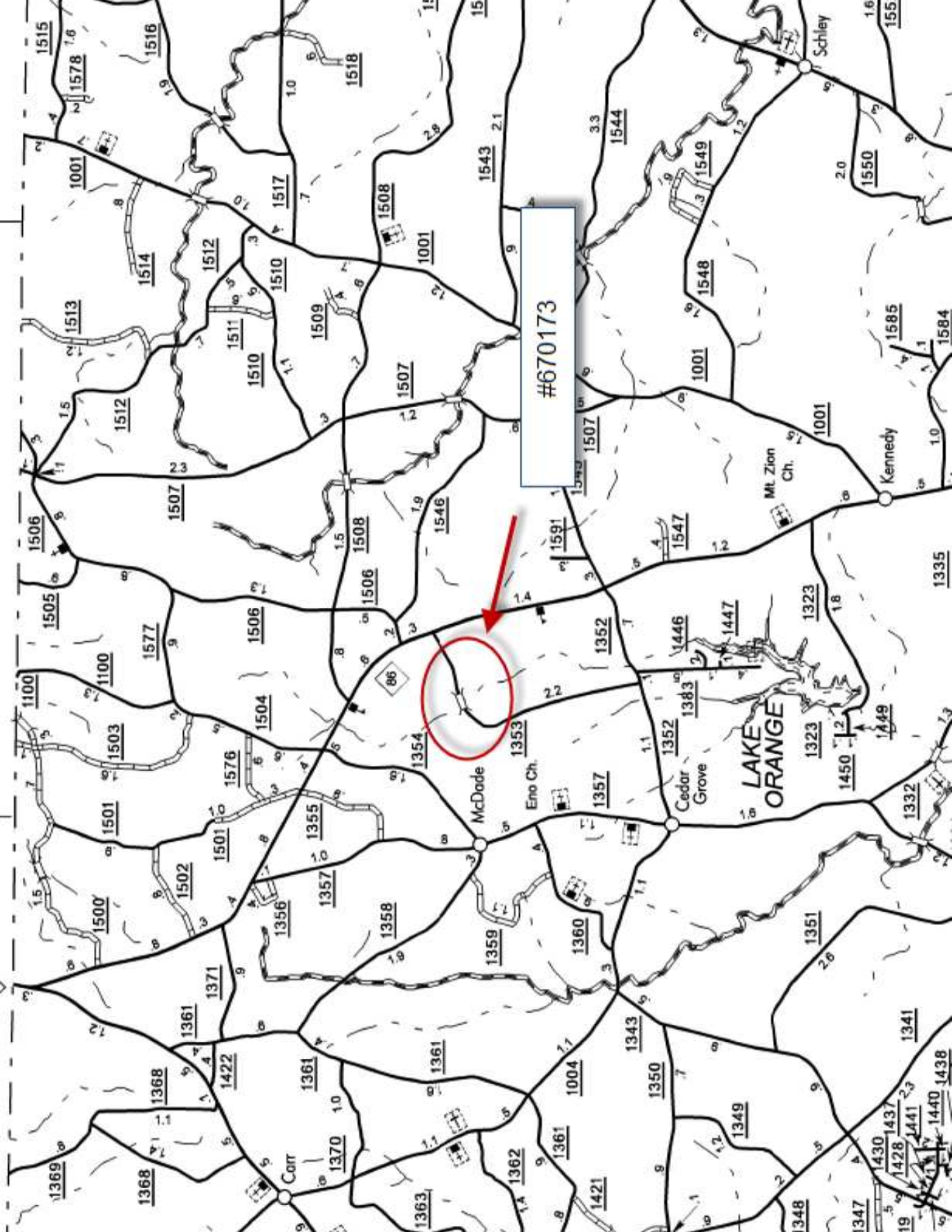
Initiated as:Date Initiated:

Man-days Estimated:

Date Surveyed:Date Completed:

PersonnelHoursPay Period

Comments:



#670173

LAKE
ORANGE

McDade

Cedar
Grove

Mt Zion
Ch.

Kennedy

Schley

Corr



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION

SCOUR CRITICAL

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection - Contract

COUNTY ORANGE BRIDGE NUMBER 670173 INSPECTION CYCLE 0 YRS

ROUTE SR1353 ACROSS PRONG ENO RIVER M.P. 0

0.6 MILES WEST OF JUNCTION WITH NC86

LOCATION 0.6 MI. W. JCT. NC86

SUPERSTRUCTURE TIMBER DECK ON I-BEAMS

SUBSTRUCTURE END BENTS:TIMBER CAPS & PILES,TIMBER BULKHEADS

1@40'-6"

SPANS 1@40'7

LONGITUDE 79° 8' 53.8" 79° 9' 1.5" LATITUDE 36° 11' 34.2" 36° 11' 29.3"

PRESENT CONDITION POOR

INVENTORY RATING

INSPECTION DATE 09/13/2011

OPERATING RATING

PRESENT POSTING SV 14 TTST 17 SV 14 TTST 17

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT (4) DELINEATORS, (2) NARROW BRIDGE



LOOKING SOUTH

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: 11/04/2011

IDENTIFICATION							
(1) STATE NAME -NORTH CAROLINA	BRIDGE	670173		SUFFICIENCY RATING =		55.3	
(8) STRUCTURE NUMBER(FEDERAL)		000000001350173		STATUS =	Structurally Deficient		
INVENTORY ROUTE (ON/UNDER) - ON		131013530					
(2) STATE HIGHWAY DEPARTMENT DISTRICT		7					
(3) COUNTY CODE	135	(4) PLACE CODE	00000				
(6) FEATURE INTERSECTED - PRONG ENO RIVER							
(7) FACILITY CARRIED SR1353							
(9) LOCATION	0.6 MI. W. JCT. NC86						
(11)MILEPOINT		0					
(16)LAT	36° 11' 34.2"	(17)LONG	79° 8' 53.8"				
(98)BORDER BRIDGE STATE CODE		PCT SHARE					
(99)BORDER BRIDGE STRUCTURE NO							
STRUCTURE TYPE AND MATERIAL				CLASSIFICATION			
(43) STRUCTURE TYPE MAIN: Steel				(112)NBIS BRIDGE SYSTEM -		YES	
TYPE - Stringer Multibeam or Girder		CODE	302	(104)HIGHWAY SYSTEM	NON NHS Route	0	
(44) STRUCTURE TYPE APPR :				(26) FUNCTIONAL CLASS -	Local	09	
TYPE -		CODE		(100)STRAHNET HIGHWAY -	Not a STRAHNET Route	0	
(45) NUMBER OF SPANS IN MAIN UNIT		1		(101)PARALLEL STRUCTURE -	No Parallel Structure	N	
(46) NUMBER OF APPROACH SPANS				(102)DIRECTION OF TRAFFIC -	2-way Traffic	2	
(107)DECK STRUCTURE TYPE - Timber		CODE	8	(103)TEMPORARY STRUCTURE -	Not Temporary		
(108)WEARING SURFACE / PROTECTIVE SYSTEM :				(110)DESIGNATED NATIONAL NETWORK -	Not Part of	0	
(A) TYPE OF WEARING SURFACE - Bituminous		CODE	6	(20) TOLL	On Free Road	3	
(B) TYPE OF MEMBRANE - None		CODE	0	(31) MAINTAIN -	State Highway Agency	01	
(C) TYPE OF DECK PROTECTION - None		CODE	0	(22) OWNER -	State Highway Agency	01	
				(37) HISTORICAL SIGNIFICANCE -	Not Eligible	5	
AGE AND SERVICE				CONDITION			
(27) YEAR BUILT		1962		(58) DECK		4	
(106)YEAR RECONSTRUCTED				(59) SUPERSTRUCTURE		6	
(42) TYPE OF SERVICE : ON - Highway				(60) SUBSTRUCTURE		6	
UNDER - Waterway		CODE	15	(61) CHANNEL & CHANNEL PROTECTION		7	
(28) LANES: ON STRUCTURE	2	UNDER STRUCTURE		(62) CULVERTS		N	
(29) AVERAGE DAILY TRAFFIC		60					
(30) YEAR OF ADT	2000	(109) TRUCK ADT PCT	%				
(19) BYPASS OR DETOUR LENGTH		0 MI					
GEOMETRIC DATA				LOAD RATING AND POSTING			
(48) LENGTH OF MAXIMUM SPAN		41 FT		(31) DESIGN LOAD	Other or Unknown	0	
(49) STRUCTURE LENGTH		41 FT		(64) OPERATING RATING -	HS-11	120	
(50)CURB OR SIDEWALK: LEFT	0.4 FT	RIGHT	0.4 FT	(66) INVENTORY RATING -	HS-7	112	
(51) BRIDGE ROADWAY WIDTH CURB TO CURB		19.0 FT		(70) BRIDGE POSTING -	Posting Required	0	
(52) DECK WIDTH OUT TO OUT		20.0 FT		(41) STRUCTURE OPEN, POSTED ,OR CLOSED		P	
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS)		20.0 FT		DESCRIPTION -	Posted for Load		
(33) BRIDGE MEDIAN - No Median		CODE	0				
(34) SKEW	0°	(35) STRUCTURE FLARED	NO				
(10) INVENTORY ROUTE MIN VERT CLEAR		99 FT 99 IN					
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR		19.0 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				APPRAISAL			
(38) NAVIGATION CONTROL - No Navigational Control		CODE	0	(67) STRUCTURAL EVALUATION		4	
(111)PIER PROTECTION - Not Applicable		CODE		(68) DECK GEOMETRY		4	
(39) NAVIGATION VERTICAL CLEARANCE		0		(69) UNDERCLEARANCES,VERTI & HORIZ		N	
(116)VERT - LIFT BRIDGE NAV MIN VERT CLEAR				(71) WATERWAY ADEQUACY		4	
(40) NAVIGATION HORIZONTAL CLEARANCE		0		(72) APPROACH ROADWAY ALIGNMENT		8	
				(36) TRAFFIC SAFETY FEATURES		0000	
				(113)SCOUR CRITICAL BRIDGES		U	
				SCOUR PLAN OF ACTION	Z		
				PROPOSED IMPROVEMENTS			
				(75) TYPE OF WORK -		CODE	311
				(76) LENGTH OF STRUCTURE IMPROVEMENT		64 FT	
				(94) BRIDGE IMPROVEMENT COST		\$136,000	
				(95) ROADWAY IMPROVEMENT COST		\$34,000	
				(96) TOTAL PROJECT COST		\$204,000	
				(97) YEAR OF IMPROVEMENT COST ESTIMATE		2007	
				(114)FUTURE ADT	120	(115) YEAR FUTURE ADT	2025
				INSPECTIONS			
(38) NAVIGATION CONTROL - No Navigational Control		CODE	0	(90) INSPECTION DATE		09/13/2011	
(111)PIER PROTECTION - Not Applicable		CODE		(92) CRITICAL FEATURE INSPECTION :		(93) CFI DATE	
(39) NAVIGATION VERTICAL CLEARANCE		0		A) FRACTURE CRIT DETAIL -	NO	A)	
(116)VERT - LIFT BRIDGE NAV MIN VERT CLEAR				B) UNDERWATER INSP -	NO	B)	
(40) NAVIGATION HORIZONTAL CLEARANCE		0		C) OTHER SPECIAL INSP	NO	C)	
				SCOUR			

BRIDGE MANAGEMENT UNIT
DATA ON EXISTING STRUCTURE

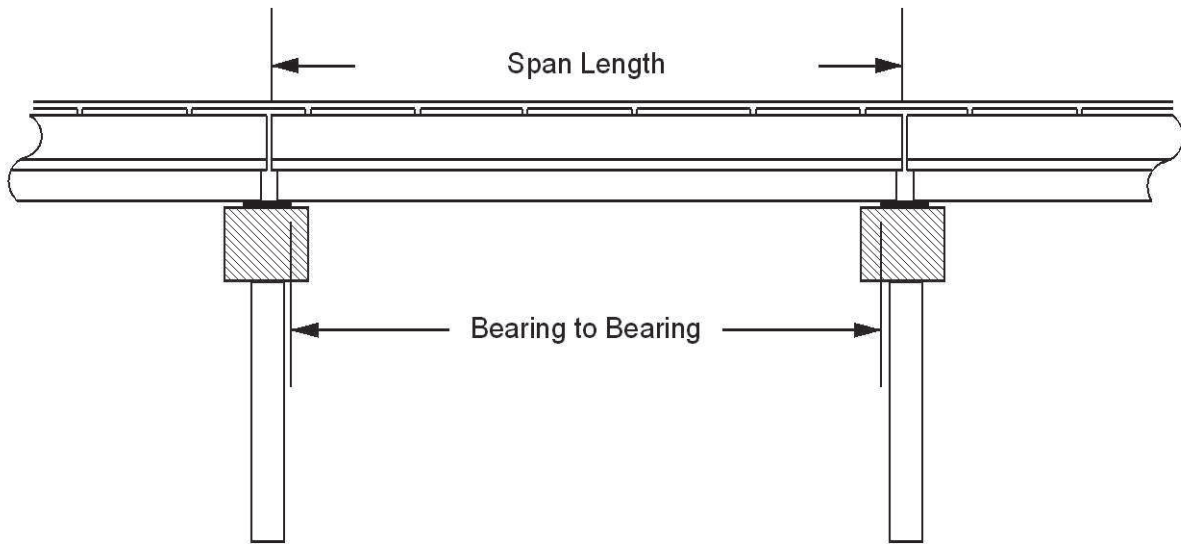
Run Date: 11/04/2011

COUNTY : ORANGE	DIV : 7	DIST : 1	STRUCTURE NUMBER : 670173	LENGTH : 41 FEET
ROUTE CARRIED : SR1353		FEATURE INTERSECTED : PRONG ENO RIVER		
LOCATED : 0.6 MI. W. JCT. NC86		BRIDGE NAME :		CITY :
FUNC. CLASS : 09	SYST.ON : NFA	SYST.UNDER : NFA	ADT & YR : 60 2000	RAIL TYPE : LT 227 RT 227
BUILT : 1962	BY : BMU	PROJ :	FED.AID PROJ :	DESIGN LOAD : Other or Unknown
REHAB :	BY : BMU	PROJ : 5.5051	ALIGNMENT : TAN	SKEW : 90
				LANES : ON 2 UNDER
NAVIGATION : VC 0.0 FT HC 0.0 FT		HT. CRN. TO BED : 8 FT		WATER DEPTH : 1 FT
SUPERSTRUCTURE : TIMBER DECK ON I-BEAMS				
SUBSTRUCTURE : END BENTS;TIMBER CAPS & PILES,TIMBER BULKHEADS				
SPANS : 1@40'7				
BEAMS OR GIRDERS : 8 LINES OF W16X40 I-BEAMS @ 2'7 CENTERS				
FLOOR : 4X8 TIM,3.0"AWS	ENCROACHMENT :		DECK (OUT TO OUT) : 20.0 FT	
CLEAR ROADWAY : 19.0 FT	BETWEEN RAILS : 19.8 FT		SIDEWALK OR CURB : LT 0.4 FT RT 0.4 FT	
VERT.CL.OVER : 99 FT 99 IN	VERT.CL.UNDER : 00 FT 00 IN		HOR.CL.UNDER : 0.0 FT	
INV.RTG. : HS-7	OPE.RTG. : HS-11	CONTR.MEMBER : int.bm	POSTED : SV 14 TTST 17 DATE 10/13/1983	
SYSTEM : Secondary S.R. Route		GREEN LINE ROUTE : N		
2ND OPENING :		3RD OPENING :	4TH OPENING :	5TH OPENING :
REMARKS :				

Structure Data Worksheet

Spans

County: ORANGE Structure No: 670173 Date: 09/13/2011 Inspected By: FER



Span No	Span Length	Bearing to Bearing	Comments
1	40.5	39.833	NBIS BRIDGE LENGTH = 38.333'
	1.0000		

Stream Bed Soundings

(See next sheet for profile sketch)

Bridge No: 670173 County: ORANGE Date: 09/13/2011 By: FER

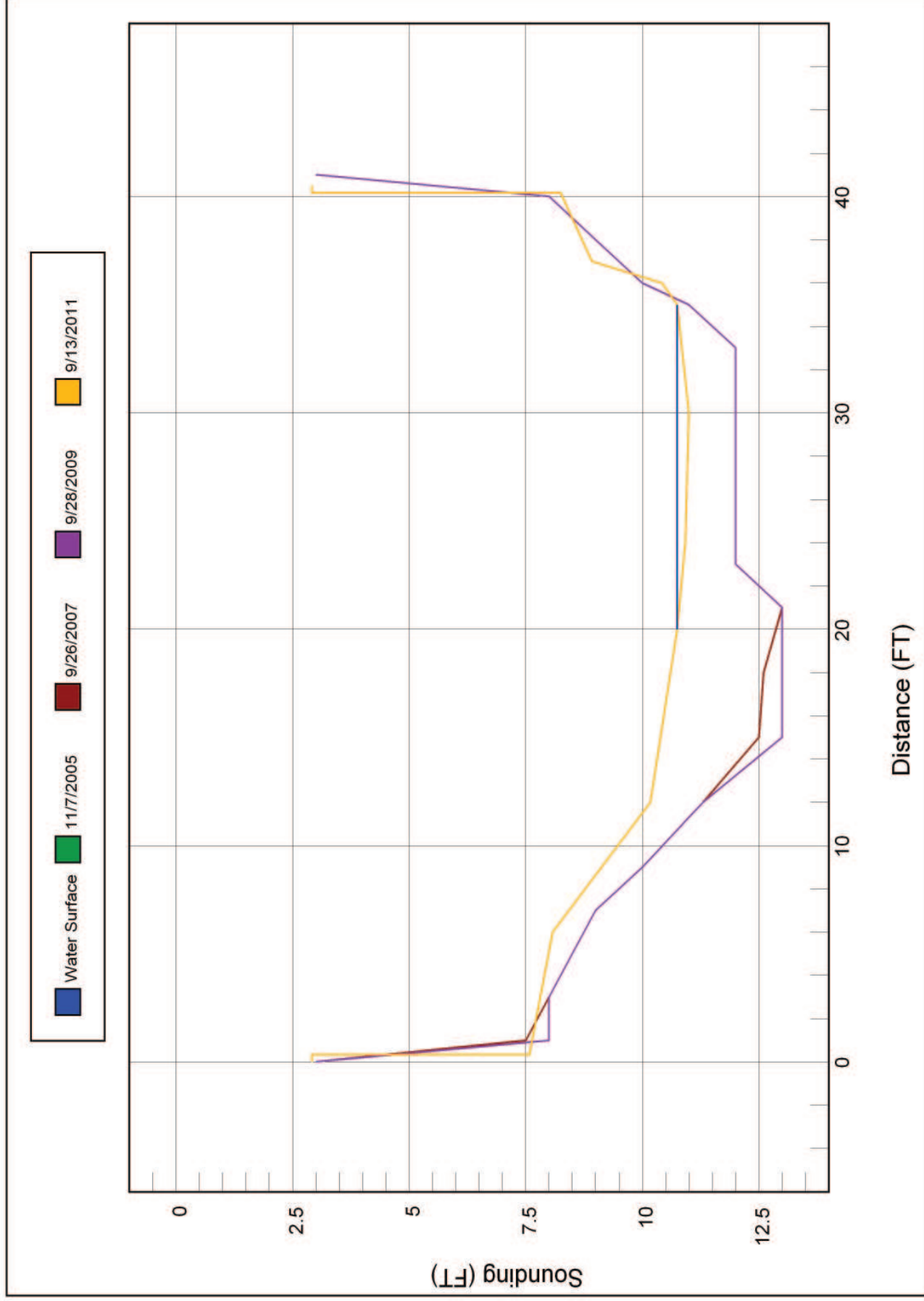
Record sounding from top of rail. Other location if needed: TOP OF RAIL

Distance from Highwater Mark to top of rail: 5 Location of Highwater Mark: DEBRIS ON CAPS

DOWNSTREAM			UPSTREAM		
Distance (Station) (ft)	Sounding (ft)	Description	Distance (Station) (ft)	Sounding (ft)	Description
0	2.92	F/F			
0.33	2.92				
0.34	7.58		0.34	8.75	
6	8.08				
12	10.17				
20	10.75	Water Surface/Water Edge (WSWE)			
24	10.92				
30	11				
35	10.75	Water Surface/Water Edge (WSWE)			
36	10.42				
37	8.92				
40.17	8.25		40.17	9.25	
40.18	2.92				
40.5	2.92	F/F			

STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)



Bridge Inspection Field Sketch



Roadway	20ft Wide	2 Paved Lanes	Looking North
Left Shoulder	4ft Wide		4ft Unpaved
Right Shoulder	4ft Wide		4ft Unpaved
Left Guardrail			
Right Guardrail			

Title

APPROACH ROADWAY

Description

SOUTH APPROACH, LOOKING NORTH

Bridge No: 670173

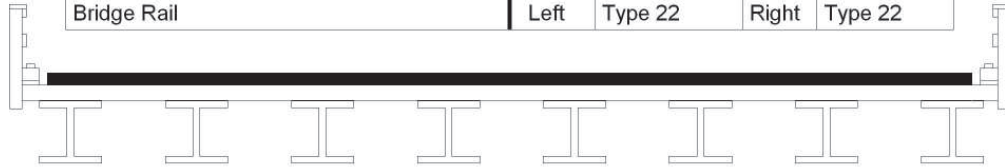
Drawn By: DMR

Date: 09/21/2011

File Name: S0066000687

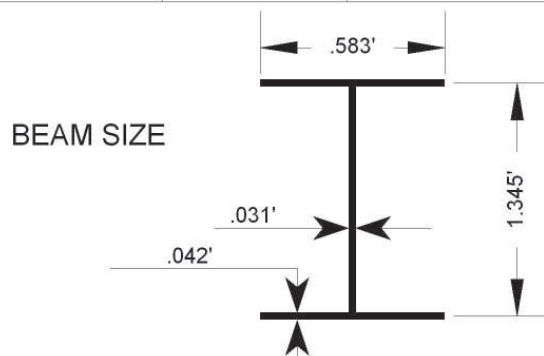
Bridge Inspection Field Sketch

Deck Width/Out to Out	20ft	Between Rails				19.75ft
Clear Roadway	19ft	Wearing Surface				0.25ft
Median Width		Median Height				
Curb Height		Left	0.58ft	Right	0.58ft	
Sidewalk Width		Left		Right		
Clear Roadway (Rail to Median)		Left		Right		
Guardrail Width		Left	0.5ft	Right	0.5ft	
Top of Rail to Deck/Wearing Surface		Left	2.67ft	Right	2.67ft	
Bridge Rail		Left	Type 22	Right	Type 22	



Measurements for Span #	1		
Deck Thickness	0.313	Left Overhang	1
Top of Rail to Bottom of Beam	4.83	Right Overhang	1

Beam Number	Beam Type	Spacing	Comments
1	Steel I Beam	2.583ft	
2	Steel I Beam	2.583ft	
3	Steel I Beam	2.583ft	
4	Steel I Beam	2.583ft	
5	Steel I Beam	2.583ft	
6	Steel I Beam	2.583ft	
7	Steel I Beam	2.583ft	
8	Steel I Beam		



.333' X .667' NAILER ON TOP OF BEAMS

DIAPHRAMS: INTERIOR DIAPHRAMS @ 1/3 POINTS

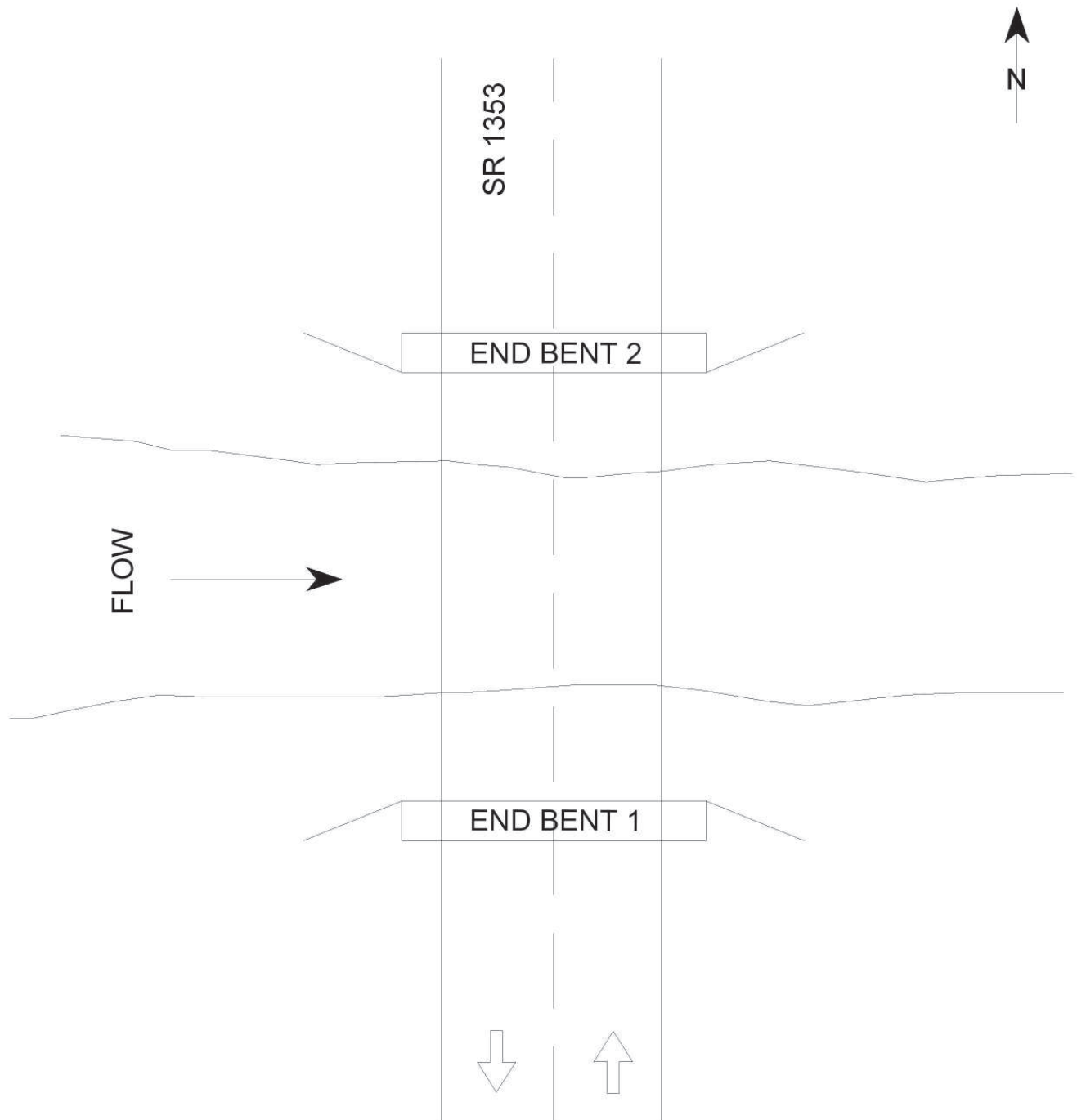
Title		Description	
TYPICAL SECTION		SPAN 1, LOOKING NORTH	
Bridge No: 670173	Drawn By: DMR	Date: 09/21/2011	File Name: S0066000688

Bridge Inspection Field Sketch

Cap Information			Material Timber								
Length	Width	Height	Left Overhang	Right Overhang	Left Beam to End of Cap.	Right Beam to End of Cap.					
20.000 ft.	.833 ft.	.959 ft.	1.417 ft.	1.750 ft.	1.000 ft.	.917 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	4 ft.	1 ft.			Vertical	No	No	No	No	
2	Timber	4.833 ft.	1 ft.			Vertical	No	No	No	No	
3	Timber	4.167 ft.	1 ft.			Vertical	No	No	No	No	
4	Timber	4.333 ft.	1 ft.			Vertical	No	No	No	No	
5	Timber		1 ft.			Vertical	No	No	No	No	
Bent/Abutment #:			1		Similar Bents:			2			

Title			Description		
SUBSTRUCTURE ELEVATION			END BENT 1, LOOKING NORTH		
Bridge No:	670173	Drawn By:	DMR	Date:	09/21/2011
				File Name:	S0066000689

Bridge Inspection Field Sketch

**Title**

PLAN SKETCH

Description

PLAN VIEW

Bridge No: 670173

Drawn By: DMR

Date: 9/22/2011

File Name: S0342000151



LOOKING SOUTH



SOUTH APPROACH, LOOKING NORTH



UPSTREAM VIEW FROM BRIDGE, LOOKING WEST



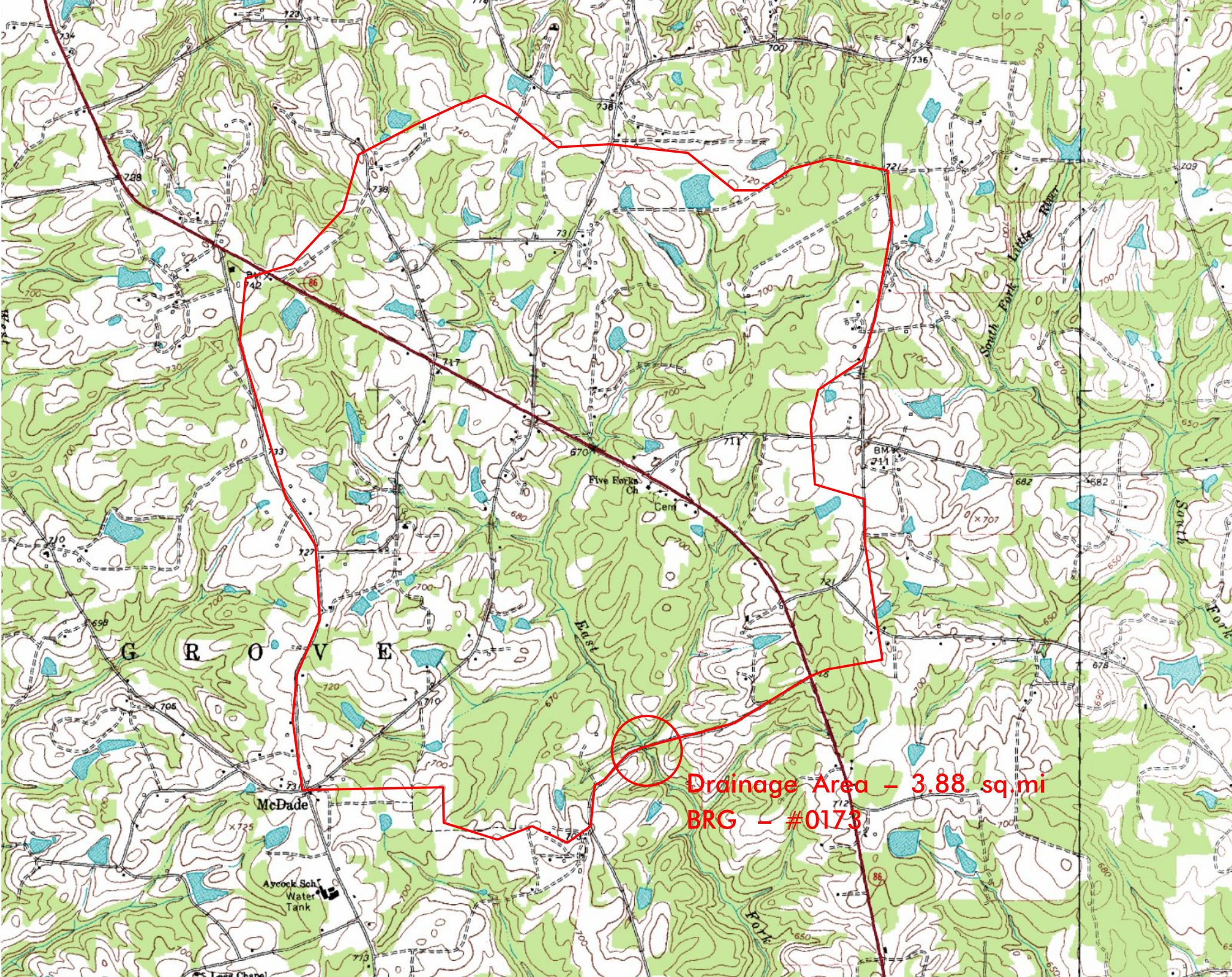
DOWNSTREAM VIEW FROM BRIDGE, LOOKING EAST



UPSTREAM PROFILE FROM CREEK, LOOKING EAST



DOWNSTREAM PROFILE FROM CREEK, LOOKING WEST



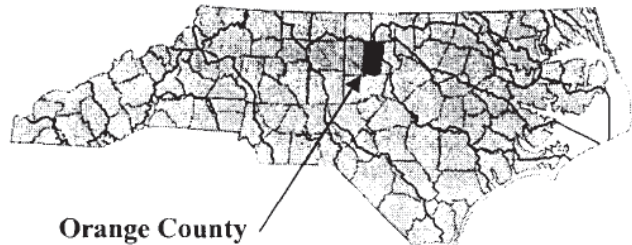
Drainage Area - 3.88 sq.mi
BRG - #0173

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



Table 5—Flooding Sources Studied by Detailed Methods: Revised or Newly Studied

Source	Riverine Sources		Affected Communities
	From	To	
New Hope Creek Tributary 1	Approximately 400 feet downstream of Orange County/Durham County boundary	Approximately 1,800 feet upstream of confluence of Dry Branch	Orange County (Unincorporated Areas) Town of Chapel Hill
Strouds Creek	The confluence with Eno River	Approximately 0.6 mile upstream State Highway 57	Orange County (Unincorporated Areas)

Table 6, “Flooding Sources Studied by Detailed Methods: Redelineated,” contains a list of flooding sources that were studied by detailed methods for previous FISs, but were only partially revised in the current study. Their effective analyses remain valid; however, their floodplain delineations have been revised on the current FIRM.

Table 6—Flooding Sources Studied by Detailed Methods: Redelineated

Source	Riverine Sources		Affected Communities
	From	To	
Bolin Creek Tributary	The confluence with Bolin Creek	Approximately 0.6 mile upstream of confluence with Bolin Creek	Orange County (Unincorporated Areas) Town of Carrboro
Buckwater Creek	The confluence with Eno River	Approximately 0.2 mile upstream of the confluence of Buckwater Creek Tributary 2	Orange County (Unincorporated Areas)
Buckwater Creek Tributary 1	The confluence with Buckwater Creek	Approximately 150 feet upstream of St. Marys Road	Orange County (Unincorporated Areas)
Buckwater Creek Tributary 2	The confluence with Buckwater Creek	Approximately 170 feet upstream of St. Marys Road	Orange County (Unincorporated Areas)
East Fork Eno River	The confluence of West Fork Eno River	Approximately 150 feet upstream of Carr Store Road	Orange County (Unincorporated Areas)
East Price Creek	The confluence with Price Creek and West Price Creek	The Orange County/Chatham County boundary	Orange County (Unincorporated Areas)

Section 4.0 – Area Studied

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

Source	Riverine Sources		Affected Communities
	From	To	
Bolin Creek	Approximately 200 feet upstream of Old NC 86	Approximately 0.2 mile upstream of Talbryn Way	Orange County (Unincorporated Areas)
Buckhorn Branch	The confluence with Jones Creek	Approximately 500 feet upstream of Unnamed Road	Orange County (Unincorporated Areas)
Cane Creek (North)	The Orange/Alamance County Boundary	Approximately 500 feet upstream of Borland Road	Orange County (Unincorporated Areas)
Cane Creek (North) Tributary 5	The confluence with Cane Creek	Approximately 0.2 mile upstream of Orange Grove Road	Orange County (Unincorporated Areas)
Cedar Fork	Approximately 600 feet upstream of Cedar Hills Drive	Approximately 0.1 mile upstream of Kingston Drive	Town of Chapel Hill
Chapel Creek	Approximately 0.23 mile downstream of South Fordham Boulevard	Approximately 0.3 mile upstream of Purt Near Lane	Town of Chapel Hill
Collins Creek	The Orange/Chatham County Boundary	Approximately 0.8 mile upstream of Orange Grove Road	Orange County (Unincorporated Areas)
Collins Creek Tributary 1	The confluence with Collins Creek	Approximately 2.1 miles upstream of NC 54 W	Orange County (Unincorporated Areas)
Crabtree Creek	The confluence with Sevenmile Creek	Approximately 1.8 miles upstream of confluence with Sevenmile Creek	Orange County (Unincorporated Areas)
Crow Branch	The confluence with Booker Creek	Approximately 1.1 miles upstream of Airport Road	Town of Chapel Hill
Cub Creek	Approximately 0.5 mile upstream of Nature Trail Road	Approximately 0.9 mile upstream of Nature Trail Road	Orange County (Unincorporated Areas)
Dry Creek	The confluence with Eno River	Approximately 0.3 mile upstream of Altman Road	Orange County (Unincorporated Areas)
East Fork Eno River	Approximately 150 feet upstream of Carr Store Road	Approximately 100 feet downstream of State Highway 86	Orange County (Unincorporated Areas)
East Fork Eno River Tributary 1	The confluence with East Fork Eno River	Approximately 1.1 miles upstream of confluence of East Fork Eno River	Orange County (Unincorporated Areas)
East Fork Eno River Tributary 2	Approximately 0.3 mile upstream of the confluence of East Fork Eno River	Approximately 0.5 mile upstream of Carr Store Road	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
East Fork Eno River	At Mouth	12.3	1,220	2,700	3,050	5,100
	At North Carolina Secondary Road 1332	11.5	1,075	2,130	2,700	4,700
	Below Lake Orange Dam	9.1	740	1,550	2,000	3,540
	Above Lake Orange Dam	9.1	1,575	2,900	3,660	6,020
	Above Fork in Lake	6.6	1,270	2,350	2,965	4,910
	At Carr Store Road	5.1	1,070	1,995	2,525	4,195
	Approximately 0.42 mile downstream of Compton Road	5.14	*	*	2,072	*
	Approximately 90 feet upstream of Compton Road	4.14	*	*	1,811	*
	Approximately 0.54 mile upstream of Compton Road	3.26	*	*	1,560	*
	Approximately 1.29 miles upstream of Compton Road	2.48	*	*	1,315	*
East Fork Eno River Tributary 1	Approximately 1.18 miles upstream of confluence with East Fork Eno River	1.64	*	*	1,014	*
	Approximately 0.98 mile upstream of confluence with East Fork Eno River	1.28	*	*	870	*
East Fork Eno River Tributary 2	Approximately 0.60 mile downstream of Carr Store Road	1.08	*	*	783	*
	Approximately 0.56 mile upstream of Carr Store Road	1.01	*	*	747	*
East Price Creek	At Mouth	2.2	812	1,507	1,683	2,509
	Below Tributary at Station 1700	1.9	707	1,256	1,516	2,317
	Above Tributary at Station 1700	1.6	538	997	1,245	1,971
	At Orange County boundary	1.2	378	741	932	1,602
Eno River	At Durham County Limits	121.4	9,150	12,770	13,700	17,750
	Above confluence of Rhodes Creek	115.6	8,600	12,100	13,500	17,370
	Above confluence of Stony Creek	104.2	7,800	11,500	12,900	17,200
	Above confluence of Buckwater Creek	90.1	6,700	10,300	11,900	16,500

Section 5.0 – Engineering Methods

The stillwater elevations have been determined for the 1% annual chance flood for the flooding sources studied by detailed methods and are summarized in Table 11, “Summary of Stillwater Elevations.”

Table 11—Summary of Stillwater Elevations

Flooding Source	FIRM Panel Number(s)	Elevations (feet NAVD)			
		10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Cane Creek (North) Reservoir	3710982000, 3710984100	*	*	501.2	*

*Data not available

Table 12, “Gage Information,” lists the stream gages located in Orange County, including the drainage area of the flooding source at the gage and the period of record available at the time of the publication of this FIS Report.

Table 12—Gage Information

Gage Number or Identifier	Flooding Source	Site Name	Drainage Area (square miles)	Period of Record	
				From	To
02085000	Eno River	Town of Hillsborough	66.5	1928	1971
02085020	Stony Creek Tributary	Near the Town of Hillsborough	0.8	1953	1971
02085070	Eno River	Near the City of Durham	141.0	1964	1978
02085190	North Fork Little River	Near the Town of Rougemont	1.0	1954	1978
0208521324	Little River	At SR 1461 near Orange Factory, NC	78.2	1988	2005
02085220	Little River	Near Orange Factory	80.4	1962	1987
02097500	Morgan Creek	Near the Town of Chapel Hill	29.1	1923	1932
02096846	Cane Creek	Near Orange Grove	7.54	1989	2005
02097000	Haw River	Near the Town of Pittsboro	1,310.0	1908	1973
02097517	Morgan Creek	Near Chapel Hill	41.0	1983	2005

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)
CROW BRANCH (continued)				
071	7,122	446	481.7	15 / 20
077	7,714	255	489.9	15 / 5
083	8,317	255	499.8	14 / 21
CUB CREEK				
214	21,443	2,228	259.3	263 / 13
218	21,809	2,228	260.6	15 / 100
224	22,432	2,026	263.4	31 / 161
229	22,855	2,026	265.0	18 / 229
DRY CREEK				
001	75	1,052	552.1 ⁴	20 / 10
003	257	1,052	552.1 ⁴	92 / 37
005	500	1,052	552.1 ⁴	34 / 53
008	846	1,052	556.4	21 / 12
013	1,319	1,052	560.7	20 / 71
018	1,796	1,052	562.7	9 / 79
023	2,251	1,052	565.7	11 / 17
028	2,798	1,052	570.5	21 / 26
039	3,910	1,052	578.2	81 / 5
044	4,362	1,052	583.2	65 / 12
050	5,000	1,052	588.7	17 / 23
EAST FORK ENO RIVER				
216	21,561	2,072	627.7	75 / 75
219	21,893	2,072	628.0	207 / 107
226	22,561	2,072	628.2	90 / 20
230	22,991	2,072	629.7	95 / 30
235	23,451	2,072	631.1	140 / 27
246	24,643	2,072	651.7	280 / 300
252	25,178	2,072	651.7	200 / 300
256	25,597	2,072	651.7	200 / 200
262	26,174	2,072	651.7	224 / 144
268	26,760	2,072	651.7	200 / 277
272	27,242	2,072	651.8	315 / 123
276	27,600	2,072	651.8	287 / 148
284	28,359	1,811	651.8	173 / 255
290	29,042	1,811	651.9	166 / 310
296	29,589	1,811	651.8	98 / 55
310	30,951	1,560	652.6	39 / 108
314	31,440	1,560	653.0	30 / 93
323	32,313	1,560	654.5	90 / 20
331	33,096	1,560	657.3	105 / 20
336	33,598	1,315	658.6	125 / 20
341	34,098	1,315	660.0	83 / 99
346	34,624	1,315	661.3	152 / 85

Section 5.0 – Engineering Methods

Table 14—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)
EAST FORK ENO RIVER (continued)				
351	35,111	1,315	662.8	19 / 61
356	35,561	1,315	664.8	102 / 59
361	36,101	1,315	666.4	10 / 140
365	36,527	1,315	667.4	82 / 174
369	36,937	1,315	668.2	43 / 79
EAST FORK ENO RIVER TRIBUTARY 1				
003	274	1,014	588.6 ⁴	31 / 20
006	621	1,014	588.6 ⁴	27 / 17
010	1,043	1,014	592.2	85 / 10
014	1,445	1,014	594.6	16 / 38
017	1,719	1,014	596.4	114 / 6
022	2,188	1,014	599.5	14 / 24
028	2,777	1,014	603.6	76 / 11
032	3,203	1,014	605.7	54 / 20
039	3,947	1,014	611.1	16 / 55
044	4,426	1,014	614.2	108 / 36
049	4,949	1,014	617.2	25 / 45
055	5,463	870	622.4	84 / 7
061	6,070	870	627.2	17 / 60
EAST FORK ENO RIVER TRIBUTARY 2				
031	3,141	783	617.9	75 / 2
035	3,500	783	619.7	60 / 67
039	3,947	783	621.8	59 / 15
045	4,494	747	624.4	41 / 17
050	4,952	747	626.3	15 / 46
054	5,393	721	628.6	20 / 8
060	6,000	721	631.8	32 / 10
064	6,432	721	633.6	20 / 20
078	7,842	655	641.2	15 / 25
084	8,352	655	646.2	30 / 25
090	8,954	582	649.1	35 / 50
095	9,473	582	650.5	10 / 60
100	10,000	582	654.3	10 / 10
FORREST CREEK				
314	31,401	1,758	594.8	165 / 165
320	32,000	1,758	594.9	119 / 108
325	32,500	1,758	595.2	118 / 13
330	33,000	1,758	596.4	36 / 112
335	33,500	1,758	597.3	133 / 18
339	33,892	1,758	597.9	183 / 85
346	34,589	1,475	598.6	45 / 292
350	35,000	1,475	599.2	30 / 110
360	36,000	1,475	603.7	16 / 69

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 3200). The **horizontal datum** was the North American Datum of 1983, NAD83 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.

County	Vertical Datum Offset (ft)
Orange	- 0.79
Example: NAVD 88 = NGVD 29 + (-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.

FLOOD HAZARD DATA TABLE					Floodway Width (feet) Left/Right Distance From the Center of Stream to Encroachment Boundary (Looking Downstream) or Total Floodway Width
Cross Section	Stream Station	Flood Discharge (cfs)	1% Annual Chance (100-year) Water-Surface Elevation (feet NAVD 88)		
EAST FORK ENO RIVER					
203	20.330	NA	627.7		150
*Feet above mouth					



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.

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 equalled 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. Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AH** 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

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



GRID NORTH

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

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 9858J

FIRM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA

PANEL 9858

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

CONTAINS:

COMMUNITY ORANGE COUNTY

OID No. 370342

PANEL 9858

SUFFIX 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
FEBRUARY 2, 2007

MAP NUMBER
370958600J



State of North Carolina
Federal Emergency Management Agency



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



