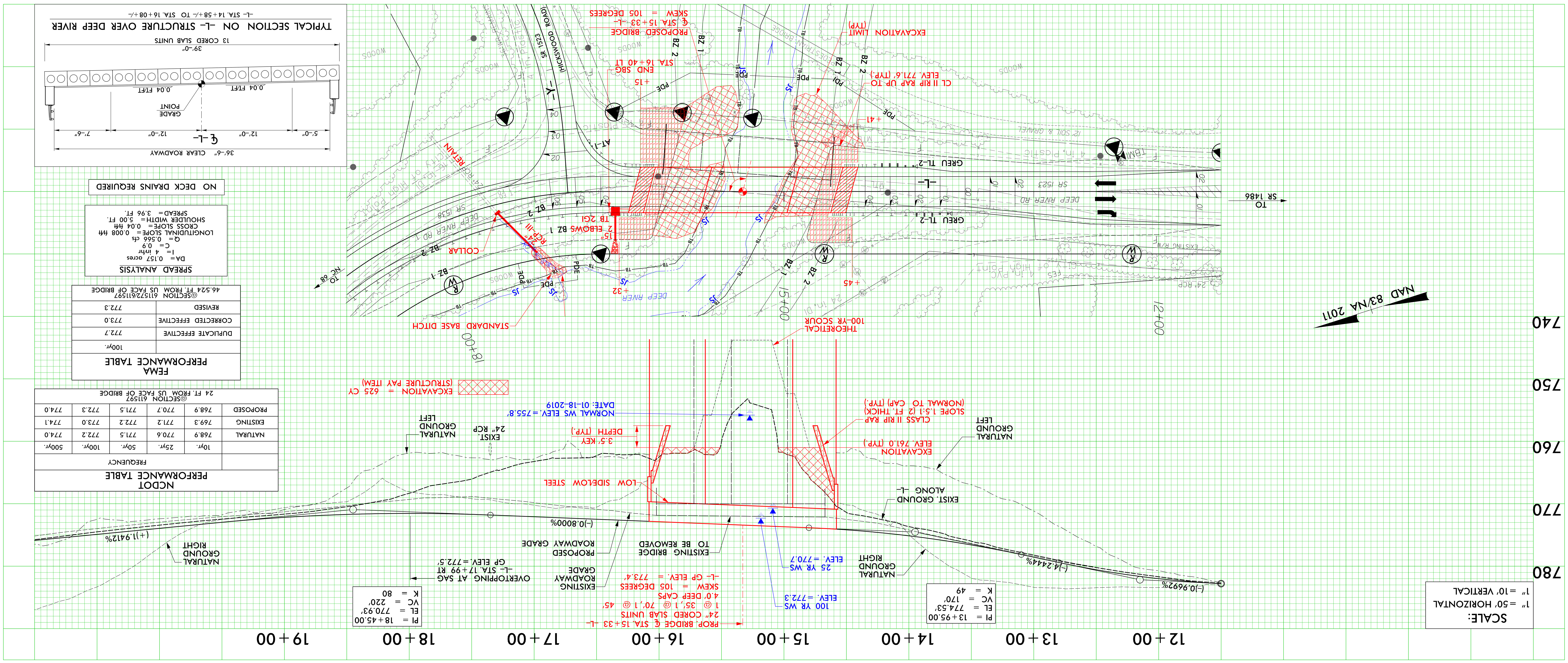

NCDOT PERFORMANCE TABLE

	FREQUENCY				
	10yr.	25yr.	50yr.	100yr.	500yr.
NATURAL	768.9	770.6	771.5	772.2	774.0
EXISTING	769.3	771.2	772.2	773.0	774.1
PROPOSED	768.9	770.7	771.5	772.3	774.0

@SECTION 611597
24 FT. FROM US FACE OF BRIDGE

FEMA PERFORMANCE TABLE

	100yr.
DUPLICATE EFFECTIVE	772.7
CORRECTED EFFECTIVE	773.0
REVISED	772.3

@SECTION 611572/611597
46.524 FT. FROM US FACE OF BRIDGE

INFORMATION TO BE SHOWN ON PLANS

WS EL. Taken @ River Station 611597

Design: Discharge 5,435 c.f.s. Frequency 25 yr. Elev. 770.7 ft.

Base Flood: Discharge 6,930 c.f.s. Frequency 100 yr. Elev. 772.3 ft.

Overtopping: Discharge 8,500 c.f.s. Frequency 500 +/- yr. Elev. *772.5 ft.

*OT OCCURS AT SAG AT –L– STA. 17+99 RT

ADDITIONAL INFORMATION AND COMPUTATIONS

USGS RURAL REGRESSION EQUATIONS FROM SCIENTIFIC INVESTIGATIONS REPORT 2014–5030

DA = 32.8 SQ. MI.

IMPERVIOUS AREA % = 14% (FUTURE IMPERVIOUS FROM GUILFORD COUNTY ZONING DATA)

REGION 1 – PIEDMONT

RURAL RIDGE and VALLEY–PIEDMONT (SIR 2014–5030)	SAY	PRELIMINARY HEC–RAS DISCHARGE
$Q_{10} = 484\ (32.8)^{0.5539}\ 10^{0.0060(14)} = 4{,}060$ cfs	4,100 cfs	4,102 cfs
$Q_{25} = 657\ (32.8)^{0.5470}\ 10^{0.0046(14)} = 5{,}142$ cfs	5,100 cfs	5,435 cfs
$Q_{50} = 794\ (32.8)^{0.5428}\ 10^{0.0037(14)} = 5{,}949$ cfs	5,900 cfs	6,206 cfs
$Q_{100} = 941\ (32.8)^{0.5386}\ 10^{0.0028(14)} = 6{,}749$ cfs	6,700 cfs	6,930 cfs
$Q_{500} = 1{,}319\ (32.8)^{0.5305}\ 10^{0.0011(14)} = 8{,}706$ cfs	8,700 cfs	8,934 cfs

AFTER COMPARISON, THE DISCHARGES FROM THE PRELIMINARY HEC–RAS MODEL SHOULD BE USED TO DESIGN THE PROPOSED BRIDGE.

LIVE–BED CONTRACTION SCOUR:

(HEC–18, 5TH ED., APRIL 2012)

$Y_2 = Y_1 [Q_2/Q_1]^{6/7} [W_1/W_2]^{K1}$; $Ys = Y_2 - Yo$ Yo = 13.52

LIVE–BED CONTRACTION (CHANNEL)

RS 611974: $W_1 = 49.20$ $Q_1 = 2563.03$ $Y_1 = 13.28$ K1 = 0.64

RS 611510 BR: $W_2 = 40.66$ $Q_2 = 4202.92$

$Y_2 = 13.28[4202.92/2563.03]^{6/7} [49.20/40.66]^{0.64} = 22.92$

$Ys_{100\text{-}YR} = 22.92 - 13.52 =$ 9.4 FT

LOCAL SCOUR (CSU EQUATION)

$Ys_{100} = 2.0(K1)(K2)(K3)(a)^{0.65} (Y1)^{0.35} (FR)^{0.43} = 2.0(1.0)(1.0)(1.1)(3)^{0.65}\ 11.32^{0.35}\ 0.08^{0.43} =$ 3.5 FT

INTERIOR BENTS HAVE THE SAME SCOUR DEPTH

NOTES:

1. NO UPSTREAM OR DOWNSTREAM STRUCTURES THAT WERE IN PLACE AT THE TIME THIS PROJECT WAS DESIGNED WILL BE ADVERSELY AFFECTED BY THE PROPOSED BRIDGE.
2. STREAM BED MATERIAL IS SAND WITH SMALL COBBLES.
3. JEFFREY BROWN, THE NCDOT DIVISION 7 TRANSPORTATION SUPERVISOR, STATED THAT HE HAS NOT SEEN THE WATER OVERTOP THE ROADWAY AT THE PROJECT LOCATION.

SITE DATA

Drainage Area 32.8 SQ MI Source USGS STREAM STATS/USGS QUAD MAP

River Basin CAPE FEAR Character REGION 1–PIEDMONT

Stream Classification (Such as Trout, High Quality Water, etc.) WS IV

Data on Existing Structure 4 SPANS, 1@30'–0", 1@45'–0" AND 2@30'–0" PRECAST PRESTRESSED CONCRETE CORED SLAB, 30'–3" OUT TO OUT WIDTH, 16' CROWN TO BED Total Waterway Opening 917.4 s.f.

Waterway Opening Below 100yr. WS EL. 917.4 s.f.

Debris Potential: Low ...... Moderate X High ......

Data on Structures Up and Down Stream UPSTREAM STR. NO. 400028 ON NC 68, 1.2 MILES UPSTREAM; 3 SPANS 1@42'–10"; 1@42'–6"; 1@42'–9"; RC DECK GIRDER; 22.5' BED TO CROWN. DOWNSTREAM STR. NO. 400070 ON SR 1537 .15 MILES DOWN STREAM; 2 SPANS @83'–6" RC DECK/I BEAMS; 30.1' BED TO CROWN.

Design Control Elev. 773.0 ft. (CORRECTED EFFECTIVE @ RS 611597 – FEMA 100–YR)

Gage Station No. N/A Period of Records N/A yrs.

Max. Discharge N/A c.f.s. Date N/A Frequency N/A

Historical Flood Information: SEE NOTE 3 IN ADDITIONAL INFORMATION

Date ...... Elev. NO OT ft. Est. Freq. ...... yr. Source JEFFREY BROWN (NCDOT DIV. 7 TRANSPORTATION SUPERVISOR) Period of Knowledge N/A yrs.

Date 1/2019 Elev. 761.8 ft. Est. Freq. <10 yr. Source RECENT HIGH WATER (SURVEYED ON 1/18/2019) Period of Knowledge N/A yrs.

Date ...... Elev. ...... ft. Est. Freq. ...... yr. Source ...... Period of Knowledge ...... yrs.

Historical Scour Info. : General N/A ft. Contraction 4–8 FT ft. Local N/A ft.

Channel Slope 0.0018 ft/ft Source FIELD SURVEY Normal Water Surface Elev. 755.8 ft.

Manning's n: Left O.B. 0.015–0.14 Channel 0.042 Right O.B. 0.08–0.14 Source FIELD SURVEY

Flood Study /Status FEMA PRELIMINARY DETAILED STUDY – ZONE AE, PANEL #7812 Floodway Established? YES

Flood Study 100yr. Discharge 6,930 c.f.s. WS Elev.: With Floodway 773.4 ft. Without Floodway 772.6 ft. @ River Station 611572

DESIGN DATA

Hydrological Method FEMA PRELIMINARY DISCHARGES COMPARED WITH USGS URBAN REGRESSION EQUATIONS

Hydraulic Design Method HEC–RAS 5.0.6 FILENAME: West Fork Deep River.prj

Floods Evaluated: @ River Station 611597

Freq. (yr.)	Q (c.f.s)	Elev. (ft.)	Backwater (ft.)	Bridge Opening Velocity (f.p.s.)
10–YR	4,102	768.9	0.0	3.7
25–YR	5,435	770.7	0.1	4.1
50–YR	6,206	771.5	0.0	4.7
100–YR	6,930	772.3	0.1	5.2
500–YR	8,934	774.0	0.0	5.7

Waterway Opening Provided Below:Design W.S. Elev. 1324.7 s.f.,100yr W.S. Elev. 1324.7 s.f.,Total 1324.7 s.f.,

Average Channel Velocity (Design) 2.8 f.p.s. Average Overbank Velocity (Design) LT = 0.5 RT = 1.0 f.p.s.

Computed Scour : General N/A ft. Contraction 9.4 ft. Local 3.5 ft.

Is a Floodway Revision Required? MOA TYPE 2G (MAXIMUM INCREASE = 0.3' WITHIN NCDOT ROW)

Stream DEEP RIVER Struc. Inv. No. 0067 I.D. No. SF–400067 Project No. 17BP.7.R.127 PDF File 40 0067 2019 SF–400067 DEEP RIVER SR 1523.PDF

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

DS GC

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

I.D. No. SF–400067 Project No. 17BP.7.R.127 Proj. Station 15+33.0 –L–

County GUILFORD Bridge Over DEEP RIVER Bridge Inv. No. 0067

On Highway SR 1523/1538 (DEEP RIVER ROAD) Between SR 1486 (GREENSBORO ROAD) and NC 68

Recommended Structure 3 SPAN, 24" PCCS, 1@35', 1@70', 1@45' w/4' DEEP CAPS

Recommended Width of Roadway 36'–6" CLEAR ROADWAY Skew 105°

Recommended Location is (Up, ~~At, Down) Stream from Existing Crossing.~~ 30' UPSTREAM

Latitude 36.00068 Longitude –79.97353

Statewide Tier ☐ Regional Tier ☐ Sub–Regional Tier ☒

Bench Mark is B5714–2, –L– STA. 11+10.95, 28.76' RT, NCDOT GPS MONUMENT

Northing 820159.49 Easting 1711913.19 Elev. 783.67 ft. Datum: NAVD 88

Temporary Crossing NOT REQUIRED, OFFSITE DETOUR PROVIDED

MOTT MACDONALD
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(919) 552–2254 (Fax)
www.mottmac.com
NC LICENSE NO. F–0669

Designed by: MOTT MACDONALD

Assisted by: EMR

Project Engineer : TRENTON J. CORMIER, PE

Reviewed by: DocuSigned by: Erik Seiler 914DF6C33CF245D...

Date 4/1/2019

NORTH CAROLINA PROFESSIONAL SEAL 34364 ENGINEER TRENTON J. CORMIER
DocuSigned by: Trenton J. Cormier 5EE0563E8675416...