



**ADDITIONAL INFORMATION AND COMPUTATIONS**

DRAINAGE AREA = .595 ACRES (0.93 SQ. MI.)  
 IMPERVIOUS AREA % = .30% (100% EMPLOYMENT MIXED USE FROM HARNETT FUTURE LAND USE MAP)  
 24-HR, 50-YR MAX. PRECIPITATION = 7.8

USGS SIR 2014-5030

REGION 4, 0.10 SQ. MI. ≤ DA ≤ 53.5 SQ. MI.

FREQUENCY	NATURAL	50yr	100yr	500yr
10yr	228.5	228.9	229.0	229.2
25yr	234.6	234.6	234.6	234.6
50yr	234.6	234.6	234.6	234.6
100yr	234.6	234.6	234.6	234.6
500yr	234.6	234.6	234.6	234.6

FEMA PERFORMANCE TABLE

SECTION	REVISION	DATE	DESCRIPTION
10284.8	1	231.2	DUPLICATE EFFECTIVE @ SECTION 10284.8
234.6	1	234.6	DUPLICATE EFFECTIVE @ SECTION 234.6
234.6	1	234.6	DUPLICATE EFFECTIVE @ SECTION 234.6

**SITE DATA**

Drainage Area . . . . . 595 AC (0.93 SQ. MI) . . . . . Source . . . . . QUAD MAP AND QL2 LIDAR  
 River Basin . . . . . CAPE FEAR . . . . . Character . . . . . AGRICULTURAL AND RURAL RESIDENTIAL  
 Stream Classification (Such as Trout, High Quality Water, etc.) . . . . . C; NSW\_INDEX #18-68-12-2  
 Data on Existing Structure . . . . . 2 @ 48" RCP WITH GROOVE END PROJECTING  
 Total Waterway Opening . . . . . 24.5 . . . s.f. . . . . Waterway Opening Below 100yr. WS EL. . . . . 24.5 . . . s.f.  
 Debris Potential: Low  Moderate  High   
 Data on Structures Up and Down Stream . . . . . UPSTREAM: 1 @ 72" CMP ON SR 1709 (HODGES CHAPEL RD)  
 . . . . . DOWNSTREAM: 2 @ 72" CMP ON SR 1808 (JONESBORO RD)  
 Gage Station No. . . . . NONE . . . . . Period of Records . . . . . N/A . . . . . yrs.  
 Max. Discharge . . . . . N/A . . . c.f.s . . . Date . . . . . N/A . . . Frequency . . . . .  
**Historical Flood Information:** DID NOT OVERTOP DURING HURRICANES MATTHEW AND FLORENCE, PER DIVISION  
 Date . . . . . Elev. . . . . ft. Est. Freq. . . . . yr. Source . . . . . Period of Knowledge . . . . . yrs.  
 Date . . . . . Elev. . . . . ft. Est. Freq. . . . . yr. Source . . . . . Period of Knowledge . . . . . yrs.  
 Allowable HW Elev. . . . . EFFECTIVE 100 YR EL = 234.6' . . . ft. Normal Water Surface Elev. . . . . 225.0' . . . ft.  
 Manning's n : Left O.B. . . . . 0.13 . . . Channel, 0.043 . . . Right O.B. . . . . 0.13 . . . Obtained From . . . . . RECON.  
 Flood Study / Status . . . . . LIMITED DETAILED (REV 7-17-2007) . . . Non-Encroachment Established? . . . . . YES  
 Flood Study 100 yr. Discharge . . . . . 527 . . . c.f.s.; WS Elev.: Non-Encroachment 234.8' . . . Without Non-encroachment 234.3' . . . ft.  
 . . . . . @ River Station 10284.8

**DESIGN DATA**

Hydrological Method . . . . . USGS SIR 2014-5030 (30% IMPERVIOUS)  
 Hydraulic Design Method . . . . . HEC-RAS VER 4.1.0 (I-5986B\_MingoSwampTribl\_195.pri)  
 Design Tailwater : Q<sub>10</sub> . . . . . 4.2 . . . ft.; Q<sub>25</sub> . . . . . N/A . . . ft.; Q<sub>50</sub> . . . . . 4.5 . . . ft.; Q<sub>100</sub> . . . . . 4.6 . . . ft.; Q<sub>500</sub> . . . . . 4.8 . . . ft.  
 INV. IN EL = 223.3, INV. OUT EL = 222.8; BED AT INLET EL = 224.3, BED AT OUTLET EL = 223.8  
**SIZE & TYPE: 2@7'X6' RCBC @ RS 10357, APPROX. 25.0 FT. UPSTREAM OF CULVERT.**

FREQUENCY	Q (cfs)	Inlet Control		Outlet Control		Remarks	
		HW/D	H.W.	WSEL	H.W.		WSEL
10 YR	330	0.78	3.9	228.2	5.0	229.3	OUTLET CONTROL
50 YR	420	0.92	4.6	228.9	5.7	230.0	OUTLET CONTROL
100 YR	460	0.98	4.9	229.2	6.1	230.4	OUTLET CONTROL
500 YR	530	1.08	5.4	229.7	7.0	231.3	OUTLET CONTROL

Is a Floodway Revision Required? . . . . . MOA TYPE 2B . . . . . Total Proposed Waterway Opening . . . . . 70 . . . . . s.f.  
 . . . . . 3.4' DECREASE  
 Outlet Velocity (V<sub>o</sub>) . . . . . 5.6 . . . . . f.p.s. Natural Channel Velocity (V<sub>n</sub>) . . . . . 3.8 . . . . . f.p.s.  
 Required Outlet Protection . . . . . CL T RIP RAP BANK STABILIZATION

**INFORMATION TO BE SHOWN ON PLANS**

Design: Discharge . . . . . 420 . . . c.f.s. Frequency . . . . . 50 . . . yr. Elev. . . . . 230.0 . . . ft.  
 Base Flood: Discharge . . . . . 460 . . . c.f.s. Frequency . . . . . 100 . . . yr. Elev. . . . . 230.4 . . . ft.  
 Overtopping: Discharge . . . . . 1070 . . . c.f.s. Frequency . . . . . >500 . . . yr. Elev. . . . . 234.2 . . . ft.  
 . . . . . OVERTOPS ROADWAY @ STA -L- 1220 + 87.0

**CULVERT SURVEY & HYDRAULIC DESIGN REPORT**

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

I.D. No. . . . . I-5986B . . . . . Project No. . . . . 47532.1.3 . . . . . Proj. Station . . . . . 1220+34 -L-  
 County . . . . . HARNETT . . . . . Stream . . . . . MINGO SWAMP TRIB 1 . . . . . Stru. No. . . . . N/A  
 . . . . . SR 1709 . . . . . NC 50 (JOHNSTON CTY)  
 On Highway . . . . . I-95 . . . . . Between (HODGES CHAPEL RD) and . . . . . (MAIN ST)  
 Recommended Structure . . . . . 2 @ 7' X 6' RCBC W/ 6' BEVELED HEADWALL . . . . .  
 . . . . . (BURY INVERT 1 BELOW STREAM BED)  
 Recommended Width of Roadway . . . . . 251.0' SP-SP (NORMAL) . . . . . Skew . . . . . 87 DEG  
 Recommended Location is (Up/At/Down) Stream from Existing Crossing . . . . . AT  
 Latitude . . . . . 35.34631 . . . . . Longitude . . . . . -078.556639  
 Statewide Tier  Regional Tier  Sub-Regional Tier   
 Bench Mark is . . . . . BM #58: RR SPIKE IN 30' PINE, STA. 1211+97 -L-, 184 FT LT  
 . . . . . N 580527 E 2131768 . . . . . Elev. . . . . 240.86 . . . ft. Datum: . . . . . NAVD 88  
 Temporary Crossing . . . . . NOT REQUIRED. STAGED CONSTRUCTION.



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 Project Engineer: . . . . . JOSHUA G. DALTON, P.E.  
 Reviewed by: . . . . . Matthew S. York, PE  
 Date: 6/2/2019

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