



ADDITIONAL INFORMATION AND COMPUTATIONS

HYDROLOGY DRAINAGE AREA = .150 ACRES (0.23 SQ. MILES)

44% IMPERVIOUS (BASED SMITHFIELD AND JOHNSTON COUNTY ZONING MAPS)

HEC-HMS v4.3 MODEL USE

U ₁₀	= .183 cfs	180 cfs
U ₂₅	= .201 cfs	200 cfs
U ₅₀	= .235 cfs	230 cfs
U ₁₀₀	= .258 cfs	260 cfs
U ₅₀₀	= .310 cfs	310 cfs

EXISTING CHANNEL DESCRIPTION

US OF PROPOSED CROSSING: 7' WIDE AND 3.6' DEEP CHANNEL, 13.1' WIDE FROM TOB TO TOB WITH 0.8:1 BANK SLOPES.

DS OF PROPOSED CROSSING: 7' WIDE AND 3.0' DEEP CHANNEL, 10.4' WIDE FROM TOB TO TOB WITH 0.6:1 BANK SLOPES.

BED MATERIAL: SILT AND SAND

FLOODPLAIN: WOODED W MEDIUM UNDERBRUSH AT STREAM, SOME AGRICULTURAL FIELDS FURTHER AWAY

OUTLET SHEAR STRESS CALCULATION (10-yr)

SHEAR STRESS=UNIT WEIGHT OF WATER x DEPTH x CHANNEL SLOPE

SHEAR STRESS=62.4 lb/ft x 3.8 ft x 0.0038 ft/ft = 0.90 lb/ft

SITE DATA

Drainage Area . . . 150 ACRES (0.23 SQ. MILES) . . . Source . . . USGS STREAM STATS /QUAD MAP - FOUR OAKS NE

River Basin . . . NEUSE RIVER . . . Character . . . REGION 1: PIEDMONT (URBAN)

Stream Classification (Such as Trout, High Quality Water, etc.) . . . C, NSW

Data on Existing Structure . . . NA

Total Waterway Opening . . . N/A . . . s.f. . . . Waterway Opening Below 100yr. WS EL. . . NA . . . s.f.

Debris Potential: Low Moderate High

Data on Structures Up and Down Stream . . . UPSTREAM: NA; . . . DOWNSTREAM: CONFLUENCE WITH POLECAT BRANCH

Gage Station No. . . NA . . . Period of Records . . . NA . . . yrs.

Max. Discharge . . . NA . . . c.f.s . . . Date . . . NA . . . Frequency . . . NA

Historical Flood Information:

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

Allowable HW Elev. 145.7 SMITHFIELD BEST VALUE INN LAG/ft. Normal Water Surface Elev. 142.3 . . . ft.

Manning's n : Left O.B. . . 0.15 . . . Channel 0.035 . . . Right O.B. . . 0.05 . . . Obtained From FIELD . . . (9/2018) (TREES/BRUSH) (STRAIGHTFULL) (AG. FIELDS)

Flood Study /Status . . . PANEL 2602: NOT IN FLOOD STUDY . . . Floodway Established? . . . NA . . . (EFF. FIS REPORT-1/5/2007 PRELIM. FIS REPORT-3/31/2015) Without

Flood Study 100 yr. Discharge . . . NA . . . c.f.s.; WS Elev.: Floodway . . . NA . . . ft. Floodway . . . NA . . . ft. @River Station NA

DESIGN DATA

Hydrological Method . . . HEC-HMS 4.3 (I5972_UTPolecatBranch_SR2507.hms)

Hydraulic Design Method . . . HY8 7.5 (I5972_UTPolecatBranch_SR2507.hy8)

Design Tailwater : Q₁₀ . . . 3.8 . . . ft.; Q₂₅ . . . 3.9 . . . ft.; Q₅₀ . . . 4.0 . . . ft.; Q₁₀₀ . . . 4.1 . . . ft.; Q₅₀₀ . . . 4.2 . . . ft.

INV. IN EL.=140.7, INV. OUT EL.=140.4							
SIZE & TYPE: (1) 7' X 5' RCBC (BURY 1') @ INLET OF CULVERT.							
FREQUENCY	Q (cfs)	Inlet Control			Outlet Control		Remarks
		HWD	H.W.	WSEL	H.W.	WSEL	
10 YR	180	0.66	2.3	143.7	3.7	145.1	
25 YR	200	0.71	2.5	143.9	3.9	145.3	
50 YR	230	0.77	2.7	144.1	4.0	145.4	
100 YR	260	0.83	2.9	144.3	4.3	145.7	
500 YR	310	0.91	3.2	144.6	4.6	146.0	

Is a Floodway Revision Required? . . . NO . . . Total Proposed Waterway Opening . . . 35 . . . s.f.

Outlet Velocity (V_o) . . . 3.4 . . . f.p.s. Natural Channel Velocity (V_n) . . . 1.8 . . . f.p.s.

Required Outlet Protection . . . CLASS I RIP RAP W/GEOTEXTILE FABRIC

INFORMATION TO BE SHOWN ON PLANS

Design: WS EL Taken @ River Station NA - US FACE OF CULVERT

Discharge . . . 200 . . . c.f.s. Frequency . . . 25 . . . yr. Elev. . . 145.2 . . . ft.

Base Flood: Discharge . . . 260 . . . c.f.s. Frequency . . . 100 . . . yr. Elev. . . 145.7 . . . ft.

Overtopping: Discharge . . . 632 . . . c.f.s. Frequency . . . 500+ . . . yr. Elev. . . 149.2 . . . ft.

* OVERTOPPING ELEVATION IS 149.64' ON SAG AT -L- STA. 17+05

CULVERT SURVEY & HYDRAULIC DESIGN REPORT

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

I.D. No. . . I-5972 . . . Project No. . . 44989.1.1 . . . Proj. Station . . . STA. 17+35.5 -Y2- . . .

County . . . JOHNSTON . . . Stream . . . UNNAMED TRIBUTARY TO POLECAT BRANCH . . . Stru. No. . . NA . . .

On Highway . . . SR 2507 . . . Between . . . SR 2507 . . . and . . . US 70 BUSINESS . . . (MALLARD RD) . . . (MALLARD RD)

Recommended Structure . . . (1) = 7' X 5' RCBC (BURY 1') + . . . (2) = 36" RCP-IV WITH . . . CONCRETE HEADWALLS AND WING WALLS

Recommended Width of Roadway . . . 36' SHOULDER PT. TO SHOULDER PT. . . Skew . . . 67.2'

Recommended Location is (Up, At, Down) Stream from Existing Crossing . . . NEW LOCATION

Latitude . . . 35.49944 . . . Longitude . . . -78.31959

Statewide Tier Regional Tier Sub-Regional Tier

Bench Mark is . . . BM #8 ON -Y3- STA. 7+84.7, 31.6' RT, NAIL IN 29" PINE . . .

Temporary Crossing . . . NOT REQUIRED-NEW LOCATION



RK&K RK&K ENGINEERS, LLP
900 RIDGEFIELD DRIVE, STE. 350
RALEIGH, NC 27609, LICENSE NO. F-0112

Designed by: . . . COREY CAVALIER, PE . . . Date . . .

Assisted by: . . . CHRIS PIPER . . .

Project Engineer : . . . COREY CAVALIER, PE . . .

Reviewed by: . . .

