HYDRAULIC ANALYSIS REPORT

FOR
ADMINISTRATIVE ACTION
STATE ENVIRONMENTAL IMPACT STATEMENT

US 70 KINSTON BYPASS
LENOIR, JONES, AND CRAVEN COUNTIES
NORTH CAROLINA

STIP PROJECT R-2553
WBS No. 34460

ADDENDUM

Prepared For:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND HYDRAULICS UNIT

OCTOBER 2017

ADDENDUM: HYDRAULIC ANALYSIS REPORT US 70 KINSTON BYPASS

This addendum addresses roadway design changes due to interchange revisions of the roadway functional designs completed since the original Hydraulic Analysis Report dated March 2014. Northern alternatives were removed at the Merger meeting held on January 16, 2014. The decision to remove the northern alternatives from future consideration was based on the updated Traffic Forecast performed in 2012, which showed that the northern routes no longer met purpose and need because they would not draw enough traffic from the existing US 70. Roadway interchange design modifications were made to alternatives, 1_UE, 1_UE_SB, 11, 12, 31, 32, 35, 36, 51, 52, 63, 65. The interchange design changes were made based on human and environmental impacts and the proposed interchange configurations were revised accordingly. It was determined that stream and wetland impacts were the most critical factor and residential/business impacts were closely followed.

Just as in the original Hydraulic Analysis Report, this updated hydraulic analysis utilized the same available GIS and CAD data to identify any additional major hydraulic crossing locations. Minor crossings were not evaluated with this addendum. Only one additional major hydraulic crossing, crossing 417, was identified and applies to alternatives 11, 31, 36, 51, and 65. Crossing 417 is just upstream of previously identified crossing 416 therefore; crossing 417 utilizes the same sizing as crossing 416, a double 5' x 6' box culvert. Table 1 is updated below.

Table 1. Hydraulic Crossing Categories

Category[1]	Structure Type	Q Capacity (cfs)	Maximum Drainage Area (ac.)	Maximum Drainage Area (sq. mi.)	No. of Crossings
Box Culvert [2, 3]	Single 6'x6' RCBC	330	< 714	< 1.1	35
	Double 6'x6' RCBC	660	< 2267	< 3.5	
	Triple 6'x6' RCBC	990	< 4480	< 7.0	
Bridge	Bridge	N/A	> 4480	>7.0	14

Notes:

1. Drainage areas estimated to require a structure less than or equal to a 72" pipe are not included in the hydraulic analysis unless located within a FEMA regulated floodway.
2. Crossing locations with drainage areas estimated to require conveyance larger than a 72" pipe but less than the capacity of a triple box culvert will be evaluated for an approximate box culvert opening size based on inlet control hydraulics unless located in a FEMA regulated floodway.
3. Culvert crossing locations within FEMA regulated floodway boundaries utilize a HW/D = 1 for the 100-year storm for sizing.

Table 2, Major Hydraulic Crossings, is updated below. Also updated and attached are the figures showing the culvert and bridge locations.

Table 2. Major Hydraulic Crossings

Alternatives	Crossing No.	Structure Type	Structure Size [1]	Surface Water
1, 1(SB), 11, 12, 31, 32, 35, 36, 51, 52, 63, 65	2	Culvert	Single 6' x 6' Box	UT to Whitelace Creek
1, 1 (SB), 11, 12	6	Culvert [2]	Double 9' x 6' Box	UT to Falling Creek
1, 1 (SB), 11, 12, 31, 32, 63	12	Culvert [2]	Triple 12' x 10' Box	UT to Falling Creek
1, 1 (SB), 12, 32, 35, 52, 63	48	Culvert [2]	Triple 7' x 7' Box	Tracey Swamp
1	104	Culvert [2]	Single 5' x 6' Box	UT to Falling Creek
1	105	Culvert [2]	Single 12' x 8' Box	UT to Neuse River
1, 1 (SB), 12, 32, 35, 52, 63	112	Culvert [2]	Double 6' x 6' Box	Mill Branch
35, 36	116	Culvert	Double 6' x 6' Box	Whitelace Creek
35, 36	118	Culvert	Single 6' x 6' Box	UT to Neuse River
35, 36	132	Culvert	Double 6' x 6' Box	Strawberry Branch
11, 31, 36, 51, 65	136	Culvert	Double 5' x 6' Box	Tracey Swamp
11, 12, 31, 32, 51, 52, 63, 65	150	Culvert	Single 8' x 6' Box	Mott Swamp
12, 32, 52, 63	154	Culvert	Double 6' x 6' Box	Strawberry Branch
12, 32, 35, 52, 63	157	Culvert	Single 8' x 6' Box	UT to Mill Branch
51, 52	172	Culvert	Double 8' x 6' Box	Whitelace Creek
51, 52	176	Culvert	Single 8' x 6' Box	Whitley's Creek
51, 52	177	Culvert	Single 6' x 6' Box	UT to Whitley's Creek
11, 31, 51, 65	180	Culvert	Double 6' x 6' Box	Strawberry Branch
35, 36, 51, 52	201	Culvert	Double 5' x 6' Box	UT to Whitelace Creek
51, 52	202	Culvert	Double 6' x 6' Box	Whitley's Creek
1 (SB)	303	Culvert	Single 8' X 6' Box	UT to Falling Creek
1 (SB)	304	Culvert	Single 8' x 6' Box	UT to Falling Creek
1 (SB)	307	Culvert	Double 5' x 6' Box	UT to Neuse River
1 (SB)	308	Culvert	Single 8' x 6' Box	UT to Neuse River
1 (SB)	311	Culvert	Single 7' x 6' Box	UT to Neuse River
1 (SB)	312	Culvert	Single 7' x 6' Box	UT to Neuse River
1 (SB)	313	Culvert	Single 7' x 6' Box	UT to Neuse River
1	326	Culvert [3]	Double 6' x 7' Box	Rivermont Tributary
11 ,31, 36, 51, 65	339	Culvert	Single 8' x 6' Box	Gum Swamp
1, 1 (SB), 11, 12	406	Culvert	Single 6' x 6' Box	UT to Whitelace Creek
1, 1 (SB), 11, 12	407	Culvert	Single 6' x 6' Box	UT to Whitelace Creek
1, 1 (SB), 11, 12	408	Culvert	Single 6' x 6' Box	UT to Whitelace Creek

Table 2. Major Hydraulic Crossings (cont.)

Alternatives	Crossing No.	Structure Type	Structure Size [1]	Surface Water
1, 1 (SB), 12, 32, 35, 52, 63	415	Culvert	Double 5' x 6' Box	Gum Swamp
All Alts.	416	Culvert	Double 5' x 6' Box	Gum Swamp
11, 31, 36, 51, 65	417	Culvert	Double 5' x 6' Box	Gum Swamp
1, 1 (SB), 11, 12	4	Bridge [4]	121' (N. Service Rd.) 121' (WBL) [4] 121' (EBL) [4] 121' (S. Service Rd.)	Falling Creek
11, 12, 31, 32, 63, 65	16	Bridge [4]	470' (SBL) [4] 427' (NBL) [4]	UT to Falling Creek
1	106A	Bridge [4]	405' (WBL) [4] 405' (EBL) [4]	Neuse River
1	106B	Bridge [4]	315' (WBL) [4] 316' (EBL) [4]	UT to Neuse River
1, 1 (SB)	110	Bridge [4]	158' (WBL) [4] 167' (EBL) [4] 167' (S. Service Rd.)	Southwest Creek
35, 36	119	Bridge	3,800'	Neuse River
35, 36	121	Bridge	945'	Southwest Creek
63, 65	139	Bridge	85'	Whitelace Creek
63, 65	140	Bridge	5,480' (N. Ramp) 5,590' (WBL) 5,760' (EBL) 2,140' (S. Ramp)	Neuse River & UT to Neuse River
11, 12, 31, 32, 51, 52, 63, 65	149	Bridge	1,025'	Southwest Creek
11, 12, 31, 32	163	Bridge	3,691'	Neuse River
11, 12, 31, 32, 63, 65	167	Bridge	390'	Falling Creek
51, 52	175	Bridge	3,480'	Neuse River & UT to Neuse
1 (SB)	305	Bridge	7,115'	Neuse River

Notes:

1. All dimensions in feet. Culvert size shown as width x height. Bridge size refers to overall length of structure.
2. Major hydraulic crossing with existing culvert structure. Existing structure meets or exceeds minimum hydraulic opening size determined based on contributing drainage area. Existing culverts are assumed to be retained and lengthened, if necessary.
3. Crossing located within a FEMA regulated floodway, therefore the box culvert size estimated based on Q100 (rather than Q50), assuming a Q/B of 55 cfs/ft and 7' culvert height. Single, double, and triple barrel considered.
4. Major hydraulic crossing with existing bridge structure(s). Minimum hydraulic size recommendations for proposed ramp or service road structures adjacent to existing bridge structures are based on existing bridge lengths. Existing bridge structures assumed to be maintained and widened, if necessary. Plan and profile sheets not produced for bridge crossing 16. Note that crossing 16 is a minor crossing based on contributing drainage area; however, crossing contains an existing bridge structure.

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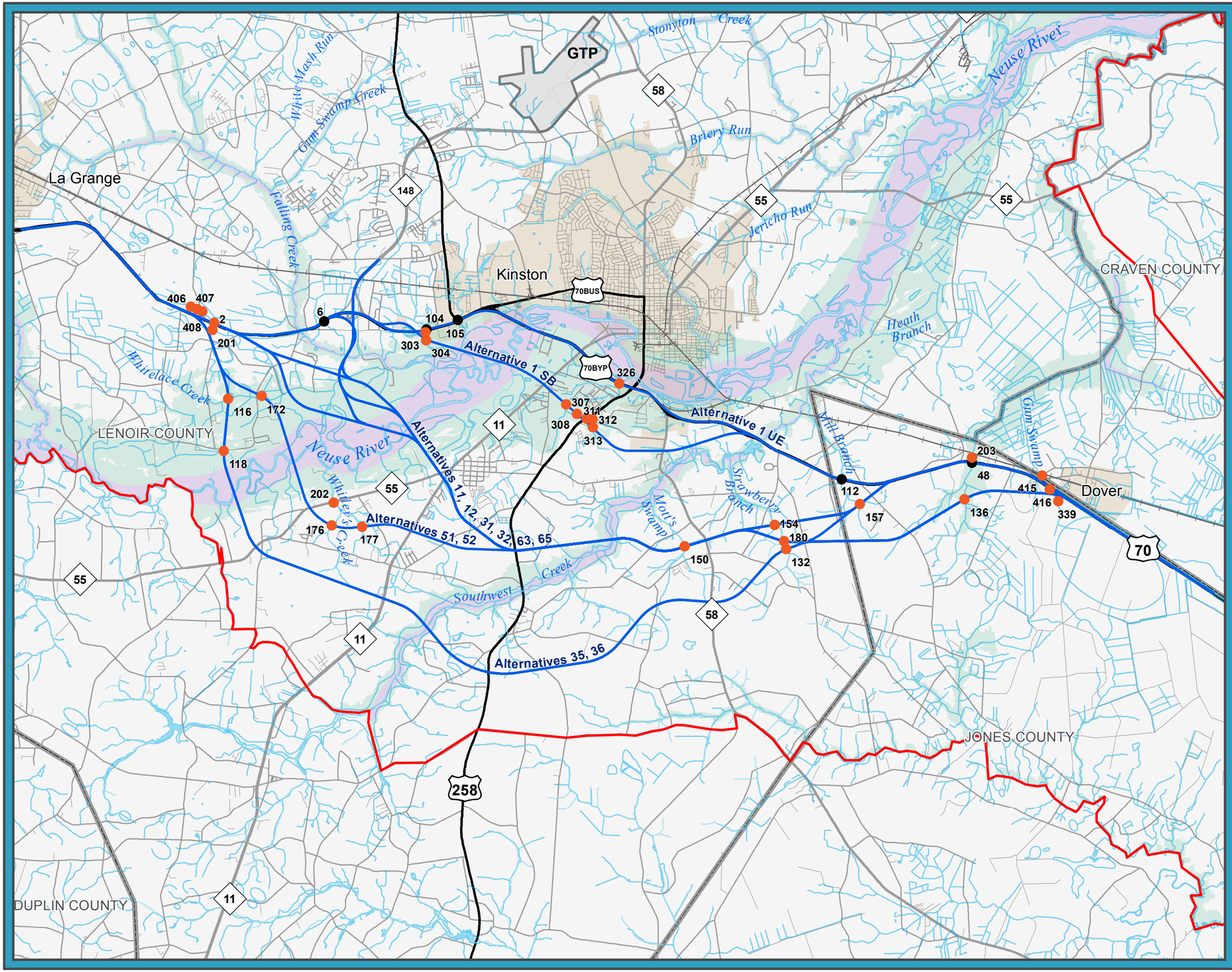
Addendum

Culvert Locations

October 2017



Legend

- Proposed Box Culvert Crossing
- Retain Existing Culvert (Extend as Needed)
- Study
- Alternative
- Stream
- Railroad
- Local Road
- County
- Global TransPark (GTP)
- Waterbody
- Floodplain
- Floodway
- Municipal

0 12,000 Feet

N

This map is for reference only.
Sources: CGIA, NCDOT, NCDENR, NCFPM, Craven County, NCDCM, NCEM, Lenoir County, Pitt County, Kinston Planning Department, NCOneMap, NCWRC, NCSHPO,EPA, USFWS, USDA, NRCS, DWQ, ESRI and URS.

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Bridge Locations

October 2017

Legend

- Proposed Bridge Crossing
- Maintain Existing Bridge (with Potential Widening and/or Proposed Ramp/Service Rd. Bridge)
- Study Area
- Alternative Alignment
- Stream
- Railroad
- Global TransPark (GTP)
- County
- Waterbody
- Floodplain
- Floodway
- Municipal Area

0 12,000 Feet

N

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