I-95 Bridges BCA Revision – 10/29/26

NCDOT thanks FHWA for making staff available to provide comments on the Benefit Cost Analysis (BCA) for the I-95 Bridges Bridge Investment Program Grant Application. Based on their input, NCDOT is submitting a revised BCA. NCDOT has developed a website that includes references and other supplemental information: I-95 Bridges

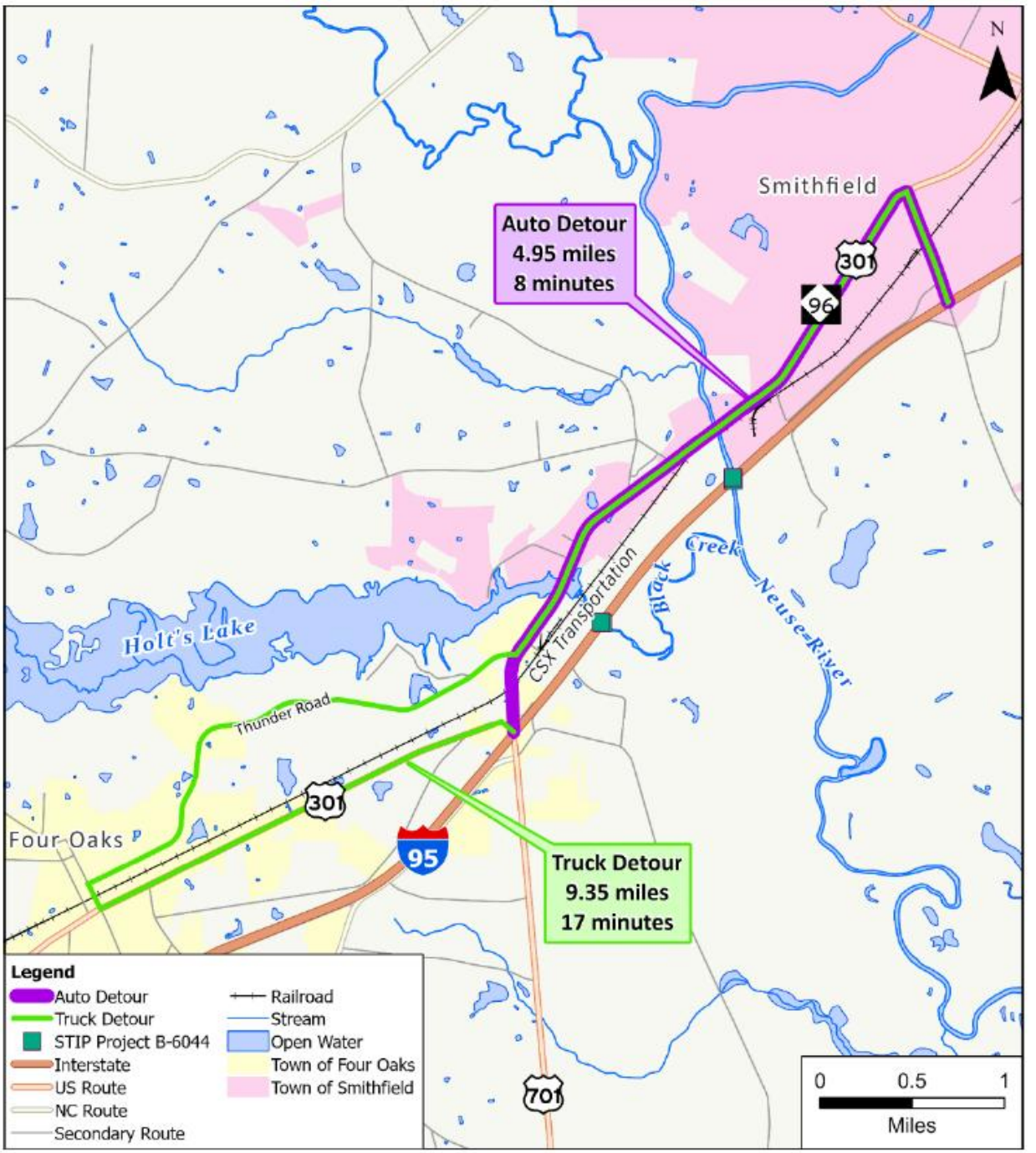
Changes made based on the debrief include:

- Annual growth rate changed from 2.0% to 2.5% (Table 3 of BCA sheet)
- Increased detour speed to 42 MPH (Table 4 of BCA sheet)
- Annual inflation rate decreased from 7% to 2% (Table 6 of BCA sheet)
- Asset life of a new facility was decreased from 100 years to 75 years (Table 10 of BCA sheet)
- Removed all Safety benefits based on FHWA debrief. No crash modification factors (CMFs) were applied. (Table 33 of BCA sheet)
- FHWA recalculated the detour but did not provide the updated route. For this reason, travel time savings were removed from the BCA Analysis (Table 36 of BCA sheet). The initial detour route previously used in shown in Figure 1 below.

In the debrief, FHWA revised the analysis from the four bridges currently in use in the project corridor (Bridges 000000001010082, 00000000010085, 000000001010101 and 000000001010100) to two bridges. To avoid changing the formulae used in the BCA template, NCDOT kept the analysis to the four existing structures. The construction costs and O&M remain split evenly between the four bridges.

The bridges on I-95 in this area are beyond their initial design life, Bridges 000000001010085 and 000000001010100 were constructed in 1955, Bridge 000000001010101 was constructed in 1957 and Bridge 000000001010082 was constructed in 1958. Based on the provided example in the BIP guidance, the BCA was calculated to account for a failure of the structures before the design year in the BCA guidance (2059). Based on the age of the structures, each bridge was assigned a specific closure date (range of 2049 to 2054). These years were automatically calculated in the BCA spreadsheet using FHWA's NBIAS software program (Tables 17 and 21 of BCA sheet). The closure was the driver for costs and benefits.

Figure 1. Proposed Detour Route



Note: The detour map provides separate tractor trailer truck and car detours. This is the case as that bridge 000000001010037, which carries US 301 and NC 96 over CSX railroad, is load-rated to 18 tons for single vehicles (SV) and 21 tons for tractor trailer trucks (TTS).

According to the NCDOT Average Annual Daily Travel (AADT) map, the average AADT on I-95 at the Neuse River Bridge was 50,000 vehicles per day in 2024, an increase of 22 percent over the past 10 years. The Truck Tractor Semi-Trailer (TTST) percentage of overall traffic was 12 percent, and the Dual Axel (Duals) were 4 percent. Based on the 50,000 vehicles/day at the Neuse River crossing, there is an estimated 85,000 vehicle-miles traveled per day within the 1.7-mile project limits. Using FHWA Highway Statistics (VM-1) to compute an all-vehicle average occupancy factor (2021 total person-miles divided by vehicle-miles ≈ 1.52 persons/vehicle), the corridor carries approximately 60,225,000 person-miles traveled per day across the same 3.3-mile segment.

The replacement structures proposed for the I-95 Bridge project have multiple improvements for safety and the environment. The project corrects documented geometric deficiencies by providing 14-foot paved shoulders, improving roadside recovery space and incident response capability, and increases superelevation to 0.025 to reduce ponding risk.

The revised BCA spreadsheet is included with this email and the results are summarized in Table 1. Based on the changes outlined above, the calculated Benefit Cost Ratio was 8.18.

Table 1. BCA Results

Category	1010100	1010085	1010101	1010082	Total	Percent of Total Benefits
Include in Analysis?	INCLUDE	INCLUDE	INCLUDE	INCLUDE	N/A	N/A
Safety	$ 23,631,824	$ 63,990,787	$ 41,652,023	$ 24,038,392	$153,313,027	38%
Travel Time	$ 18,322,960	$ 55,292,758	$ 34,829,903	$ 18,322,960	$126,768,581	32%
VOC	$ 16,980,721	$ 45,987,251	$ 29,932,081	$ 16,980,721	$109,880,774	27%
Resilience	$ -	$ -	$ -	$ -	$ -	0%
Health and Amenity	$ -	$ -	$ -	$ -	$ -	0%
-	$ -	$ -	$ -	$ -	$ -	0%
Emissions	$ 430,837	$ 1,166,424	$ 759,275	$ 430,837	$ 2,787,374	1%
Other Environmental	$ 19,419	$ 52,573	$ 34,222	$ 19,419	$ 125,632	0%
Maintenance	$ 1,432,569	$ 1,444,624	$ 1,444,624	$ 1,444,624	$ 5,766,439	1%
Other Benefits	$ -	$ -	$ -	$ -	$ -	0%
Residual Value	$ 787,007	$ 785,494	$ 786,640	$ 785,494	$ 3,144,635	1%
Total Benefits	$ 61,605,338	$ 168,719,911	$ 109,438,769	$ 62,022,446	$401,786,463	100%
Total Discounted Costs	$ 12,298,806	$ 12,265,806	$ 12,290,806	$ 12,265,806	$ 49,121,225	N/A
BCR	5.01	13.76	8.90	5.06	8.18	N/A
Net Present Value (NPV)	$ 49,306,531	$ 156,454,105	$ 97,147,962	$ 49,756,640	$352,665,238	N/A

NCDOT thanks FHWA for this opportunity to provide additional information and requests your strong consideration of this application.