driving95
what's your view?

North Carolina I-95 Economic Assessment

prepared for

North Carolina Department of Transportation

prepared by

Cambridge Systematics, Inc.

June 2013

CAMBRIDGE SYSTEMATICS

final report

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prepared for

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prepared by

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Table of Contents

List of Tables

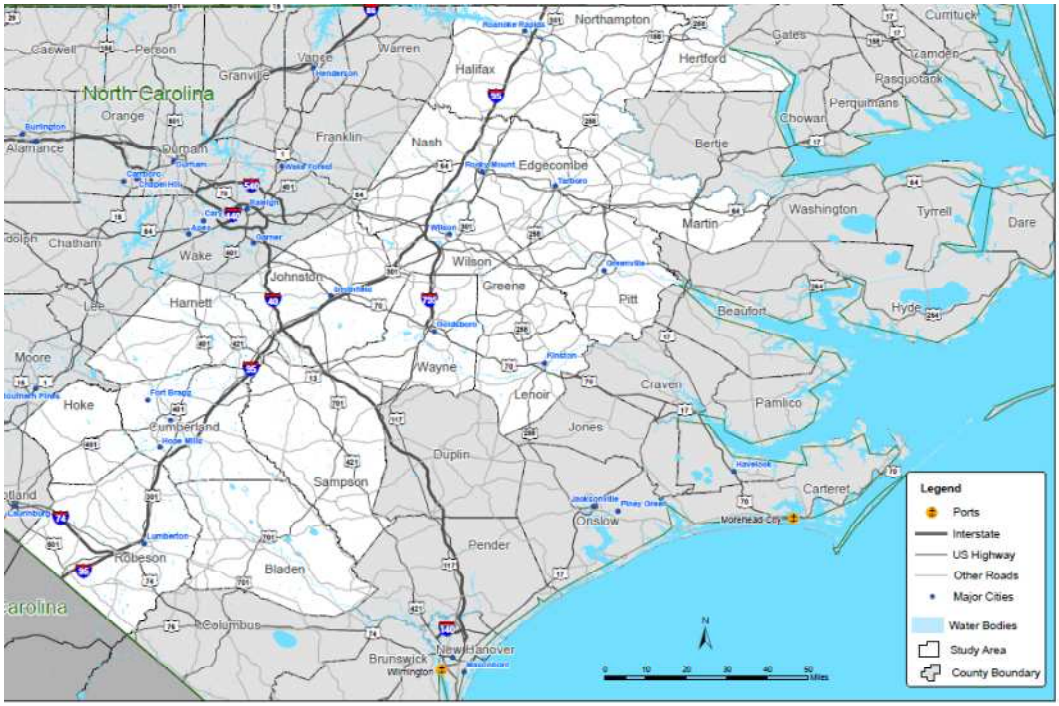
List of Figures

1.0 Introduction and Key Findings

1.1 PROJECT BACKGROUND

Interstate 95 (I-95) in North Carolina is an important part of the local, regional, state, and national transportation system. I-95 traverses 182 miles through eight counties (Robeson, Cumberland, Harnett, Johnston, Wilson, Nash, Halifax, and Northampton) from the Virginia border to the South Carolina border. These eight counties comprise the I-95 corridor region for the purpose of the current study and report. I-95 in North Carolina was first built between 1956 and 1980, and with a few exceptions, it is basically the same four-lane highway today as when it was first built. Thus, it does not meet the most current interstate design standards.

Figure 1.1 The I-95 Corridor in North Carolina



Source: Cambridge Systematics, Inc.

The North Carolina Department of Transportation (NCDOT) recently completed an evaluation of safety, connectivity and efficiency improvements needed to upgrade the 182-mile stretch of I-95 in NC. This work, the I-95 Corridor Planning and Finance Environmental Assessment (EA) recommended widening the interstate to a combination of six and eight lanes, repairing pavement

deficiencies, raising and rebuilding bridges, improving interchanges, and bringing I-95 up to current safety standards. The total cost for making these improvements is approximately $4.4 billion; however, current funding levels do not adequately cover these improvement needs. About $455 million (roughly 10 percent of the funding need) in existing funding (programmed and anticipated funding) has been identified through the Statewide Transportation Improvement Program (STIP). In the EA, NCDOT identified tolling as the most feasible financing option to fund the proposed improvements within a reasonable timeframe.

1.2 STUDY PURPOSE AND OVERVIEW

At the conclusion of the I-95 Corridor Planning & Finance Study, many North Carolina constituents raised questions about the economic impact of tolling I-95. In response to these concerns, the NC General Assembly instructed NCDOT to conduct an economic assessment of the proposed improvements and alternative funding options for I-95. The I-95 Economic Assessment answers the following questions:

- What are the impacts on traffic and the economy if the improvements are not made?
- What are the impacts on traffic and the economy if tolls are used to pay for the improvements?
- Are there other ways to pay for the improvements and what are the economic impacts of those options?

The study examined both positive and negative impacts of making the investment and paying for that investment using various taxes and fees. This includes, but is not limited to:

- The impact on the cost of doing business for current businesses along the corridor;
- The impact on the cost of residents that use the corridor on a regular basis;
- The impact on the cost of travel for tourists;
- The impact on future economic development opportunities; and
- The impact of the diversion of traffic from I-95 to other roads.

The approach to the study, designed to ***promote more informed decision-making***, is built on four guiding principles:

1. Employ a ***data-driven, stakeholder-led process*** to build support for findings by ensuring the study process is:
   - Transparent;
   - Objective; and
   - Defensible

2. Use ***existing data and tools*** to the extent possible, while maintaining objectivity and defensibility;
3. Define a ***few good metrics*** that reflect what stakeholders care about; and
4. Address uncertainty by ***incorporating risk analysis tools*** to assess key assumptions.

Key components of the study included stakeholder engagement, data collection and validation, freight and trucking analysis, tourism analysis, funding and finance screening, traffic forecasting, and economic development assessment. Findings from these areas were used to develop the inputs necessary for the economic modeling of the I-95 investment alternatives.

1.3 STAKEHOLDER INPUT PROCESS

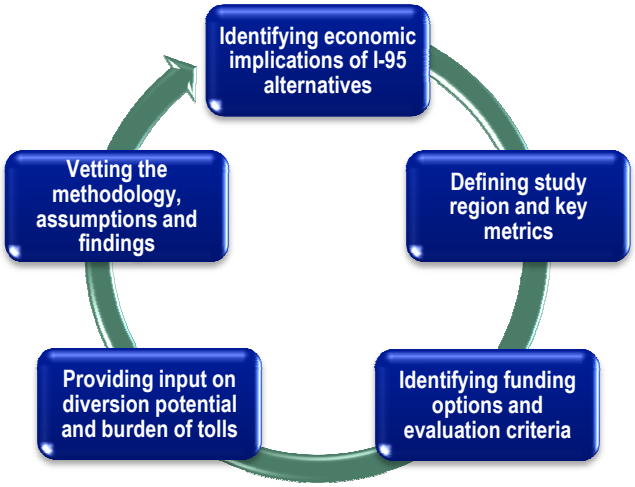
The I-95 Economic Assessment was conceived in response to citizens' questions and concerns about the potential economic impact of tolling I-95 in North Carolina. Therefore, extensive public and stakeholder outreach, utilizing a variety of methods, was conducted throughout the study.

The first step in getting the study underway was the appointment of an Advisory Council, which consisted of representatives of key stakeholder groups that voiced concerns over the potential of utilizing tolling to fund I-95 improvements. Members represented:

- NC Retail Merchants Association;
- NC Chamber of Commerce;
- NC Trucking Association;
- NC Farm Bureau;
- NC Travel and Tourism Coalition;
- NC Travel Industry Association;
- NC State University (Agriculture and Resource Economics); and
- No Tolls I-95 Coalition.

Five meetings with the Advisory Council were conducted over the course of the study in October & December of 2012 and February, March and April of 2013. In addition, each Advisory Council member was interviewed individually at the beginning of the study and many members participated in various focus groups held throughout the corridor. The Advisory Council provided input on key aspects of the study as shown in Figure 1.2.

Figure 1.2 Role of the Advisory Council



In addition to the Advisory Council, the study team conducted various outreach activities across all the stakeholder groups. A summary of these activities is provided in Figure 1.3.

Figure 1.3 Summary of Outreach Activities Conducted

Advisory Council	Surveys	Interviews
• Interviews • Meetings • Electronic updates	• Trucking industry • General public	• Shippers/Agriculture • Trucking industry • Economic developers • Site selection consultants • County engineers • Tourism officials • NCDOT management
Website	**Meetings**	**Focus Groups**
• Study updates • Fact sheets • Meeting notices • Comments • Public survey link	• No Tolls I-95 board • Advisory Council • NCDOT mgmt • Public	• Shippers • Trucking Industry • Economic developers • Tourism stakeholders • General public • Agricultural businesses • Roadway contractors

While there are many mixed feelings about the proposed I-95 project and ways of funding it, there were some common viewpoints across all the stakeholder groups:

- Consensus that good roads are vital to the economic well-being and the future of both the region and state.
- Transportation funding needs to be addressed at the federal & state levels, not at the corridor level.
- The first priority should be to end all transfers from the Highway Fund & Highway Trust Fund.
- I-95 needs improving in the future and the emphasis should be on outdated interchanges, medians, shoulders, and bridges.
- While traffic growth is expected, stakeholders feel a significant portion of that growth will be generated from sources outside the state.
- If tolls are implemented on I-95, there needs to be a way for local businesses and residents to pay reduced rates or not have to pay at all.
- With the exception of motor carriers, user fees such as tolls are viewed as a good way to fund transportation, as long as they are applied equitably to all interstates.
- No one wants to pay more, but I-95 is important, so necessary improvements must be made.

1.4 ORGANIZATION OF REPORT AND SUPPORTING MATERIAL

Following the introduction, the remainder of the report is organized as follows:

- Section 2: The Economic Role of I-95. This section provides an economic profile of the corridor, an examination of key industries along the corridor, the linkage between highways and economic development, and an overview of important trends impacting future traffic on I-95.
- Section 3: Economic Assessment of I-95. This section lays out the technical analysis including methodology, data collection, and the economic modeling process. In addition, the screening of funding options and modeling of future traffic and diversion impacts are discussed. Finally, the results of the economic assessment are presented.
- Section 4: Conclusions. This section reviews the findings and presents key conclusions.

The material presented in this report is drawn from a series of technical reports developed throughout the study. The technical reports provide an in-depth analysis of various critical elements of the overall economic assessment and include:

- Public and Stakeholder Outreach
- Freight, Logistics, and Trucking Analysis
- Economic Base Analysis and Profile

- Tourism Profile
- Travel Demand Modeling and Diversion Analysis
- Funding and Financing Options
- Economic Analysis

1.5 KEY STUDY TAKEAWAYS

- I-95 needs improvement, primarily to improve safety in the short-term and to mitigate congestion in the long term.
- Only about $455 million (roughly 10 percent of the funding need) in existing funding (programmed and anticipated funding) has been identified through the Statewide Transportation Improvement Program (STIP).
- Simply maintaining the facility as it is today with some spot improvements will lead to significant economic losses for the corridor counties, eastern North Carolina, and the state as a whole. It is estimated that Business as Usual will cost the state an average of over 16,000 jobs annually compared to the baseline economic forecast.
- Developing the full set of improvements recommended in the I-95 Corridor Planning and Finance EA will lead to significant economic benefits for North Carolina relative to the Business as Usual scenario. Depending on the funding option used, this benefit will be an additional $48 to $85 billion in economic output and an average of about 12,000 to 19,000 jobs annually between 2014 and 2050.
- The economic loss to the region and state arising from maintaining I-95 under business-as-usual is far greater than the loss arising from increases in state and local taxes and/or fees (including tolls) necessary to pay for the proposed improvements.
- The economic impact of tolls is no better or worse than other funding alternatives examined and implementing the proposed improvements regardless of how it is funded results in a net positive economic impact for the I-95 corridor region and the state as a whole.
- The eight I-95 corridor counties bear the greatest burden of the cost in the Business as Usual and tolling scenarios. However, they also reap the largest share of benefits from improving I-95.

2.0 The Economic Role of I-95

2.1 REGIONAL ECONOMIC PROFILE

The I-95 Corridor traverses through the eastern, more rural, region of the state by way of eight counties between Virginia and South Carolina. Private employment in eastern North Carolina is dominated by agricultural and manufacturing industry sectors. In Cumberland County, where Fort Bragg is located, the military and supporting industries comprise the most important economic sector. Given the concentration of agricultural, manufacturing, and military industries in this area, I-95 is the primary freight corridor in eastern North Carolina. Not only do intrastate freight movements depend on I-95, but regional trade utilizes I-95 to access markets in the northeast and Florida, while also providing access to major east coast ports. Regionally, the I-95 corridor serves as a significant route for commuters as it connects to highways leading to the Raleigh-Durham and Fayetteville metropolitan areas.

Population

Population in the eight counties I-95 passes through was 1,007,222[1] in July 2011, approximately 10 percent of total North Carolina state population. Between 2001 and 2010, Harnett and Johnston Counties exhibited significant change in population and density, with almost 3 percent annual growth and density in Johnston County alone (see Table 2.1).

Population in both the I-95 Corridor and the state of North Carolina is expected to undergo continued growth from 2010 to 2032 at rates of nearly 16 and 24 percent, respectively. However, as shown in Table 2.2, when examined individually, several counties are projected to see a decrease in population between 2010 and 2032. Northampton County is projected to experience the most notable decline, with a loss in population, approximately 13 percent between 2010 and 2030.

[1] Certified 2011 County Population Estimates, North Carolina Office of State Budget and Management

Table 2.1 I-95 Corridor Population Growth, 2001-2010

	2001-2010 Compound Annual Growth Rate
Northampton	-0.01%
Halifax	-0.44%
Nash	0.85%
Wilson	0.88%
Johnston	2.86%
Harnett	2.06%
Cumberland	0.55%
Robeson	0.77%

Source: NC State Data Center (http://linc.state.nc.us/).

Table 2.2 Population Projections for I-95 Counties

	Population Projections						Percent Change
	2010	2015	2020	2025	2030	2032	2010-2032
Northampton	22,063	21,361	20,756	20,152	19,490	19,241	-13%
Halifax	54,565	53,691	52,806	51,920	51,035	50,682	-7%
Nash	95,878	97,680	99,557	101,433	103,307	104,057	9%
Wilson	81,373	84,376	88,118	91,864	95,607	97,104	19%
Johnston	169,669	184,158	198,644	213,127	227,614	233,407	38%
Harnett	115,792	130,123	144,503	158,885	173,266	179,020	55%
Cumberland	327,348	336,378	340,797	342,553	343,253	343,394	5%
Robeson	134,489	135,356	136,237	137,116	137,994	138,348	3%
I-95 Corridor	1,001,177	1,043,123	1,081,418	1,117,050	1,151,566	1,165,253	16%
North Carolina	9,575,665	10,097,304	10,616,077	11,126,321	11,631,895	11,832,968	24%

Source: North Carolina Office of State Budget and Management.

The eastern U.S. is also expecting population growth similar to that of the North Carolina. Table 2.3 highlights the state population projections for those states located along the entire length of I-95. With the exception of the District of Columbia, the national I-95 Corridor states have a projected population growth between 4 and 79 percent, with the southern states expecting the most significant growth in population.

Table 2.3 I-95 Corridor States Population Projections
2000 to 2030

State	Miles	Percent of Corridor	Projections July 1, 2030	Percent Change (2000-2030)

FL	382.17	19.9%	28,685,769	79%
GA	112.03	5.8%	12,017,838	47%
SC	198.76	10.3%	5,148,569	28%
NC	181.71	9.4%	12,227,739	52%
VA	178.73	9.3%	9,825,019	39%
DC	0.07	0.0%	433,414	-24%
MD	109.05	5.7%	7,022,251	33%
DE	23.43	1.2%	1,012,658	29%
PA	51.08	2.7%	12,768,184	4%
NJ	97.76	5.1%	9,802,440	16%
NY	23.5	1.2%	19,477,429	3%
CT	111.57	5.8%	3,688,630	8%
RI	43.3	2.2%	1,152,941	10%
MA	91.95	4.8%	7,012,009	10%
NH	16.2	0.8%	1,646,471	33%
ME	303.2	15.8%	1,411,097	11%
Total	**1924.51**	**100.0%**	**133,332,458**	**23.7%**

Source: U.S. Census Bureau, Population Division, Interim State Population Projections, 2005.

Employment

In 2011, there were over 490,000 jobs in the eight I-95 Corridor counties, accounting for 10 percent of the state's total employment. Table 2.4 presents employment by industry for the I-95 counties, eastern North Carolina, and the remainder of the state. Tourism-based industries, including accommodations, food services, and retail trade, along with healthcare services, the military, educational services, and manufacturing, represent key industries in the Corridor.

Table 2.4 Employment by Industry
2011

Industry Employment by Region	I-95 Corridor Regio	Eastern North Carolina	Rest of NC	North Carolina
Accommodation and food services	32,824	60,342	269,894	363,060
Administrative and waste management services	29,229	44,802	279,060	353,091
Arts, entertainment, and recreation	5,107	13,118	87,780	106,005
Construction	28,520	46,475	211,177	286,172
Educational services	8,923	8,871	94,977	112,771
Federal, civilian	15,646	18,646	35,407	69,699
Finance and insurance	14,338	25,016	196,224	235,578
Forestry, fishing, and related activities	1,104	4,077	4,728	9,909
Health care and social assistance	42,578	62,150	386,245	490,973
Information	4,631	8,461	68,347	81,439
Management of companies and enterprises	3,932	3,611	59,127	66,670
Manufacturing	39,064	60,769	352,760	452,593
Military	55,248	70,558	19,130	144,936
Mining	227	728	3,473	4,428
Other services, except public administration	27,308	44,314	211,879	283,501
Professional, scientific, and technical services	17,722	29,293	236,987	284,002
Real estate and rental and leasing	16,735	40,187	167,143	224,065
Retail trade	51,398	89,117	393,819	534,334
State and local government	64,398	125,434	456,614	646,446
Transportation and warehousing	8,153	8,121	72,959	89,233
Utilities	450	930	5,320	6,700
Wholesale trade	11,859	20,322	141,009	173,190
Farm employment	10,880	14,001	17,374	41,743
Total Industry Employment	490,274	785,342	3,754,059	5,018,795

Source: U.S. Bureau of Economic Analysis, 2011

Generally, total employment in those counties located directly along the I-95 Corridor had modest annual growth in employment between 2000 and 2010, with only Halifax experiencing a slight retraction in employment (see Table 2.5). Cumberland and Harnett, however, experienced the highest growth rates. The most significant growth in annual employment in this region can be attributed to service-related industries, including management of companies and enterprises and administrative and waste management services, which are among the two fastest growing industries in the Corridor counties, followed closely by educational services and health care and social assistance. In contrast, a decline in farm and manufacturing employment across all counties mirrors the overall statewide trend in North Carolina.

Table 2.5 I-95 Corridor Employment 2001-2010 Compound Annual Growth Rate (CAGR)

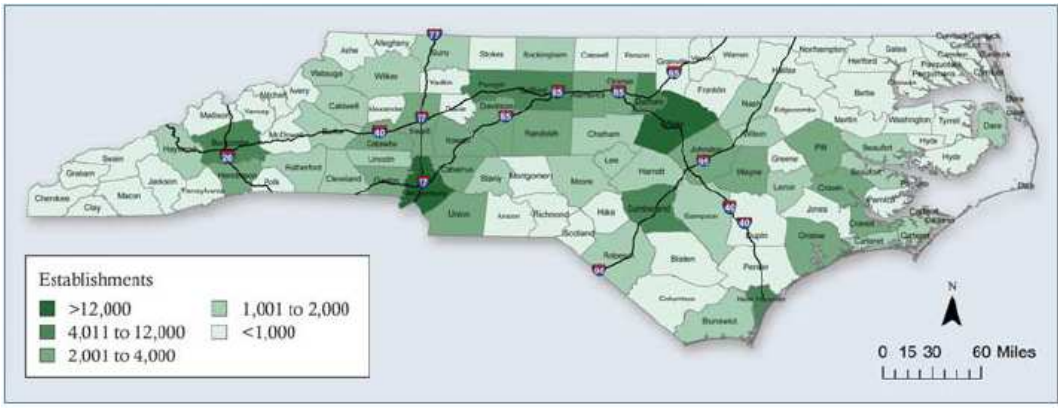
Employment 2001-2010 CAGR	Northampton	Halifax	Nash	Johnston	Wilson	Harnett	Cumberland	Robeson	North Carolina
Total employment	0.98	-0.12	0.28	2.33	0.15	1.86	1.83	0.87	0.8
Farm employment	-4.88	-5.38	-3.02	-2.27	1.08	-3.04	-1.99	-3.24	-2.9
Forestry, fishing, and related activities	(NM)	4.23	(NM)	(NM)	(NM)	(NM)	(NM)	-3.15	0.42
Mining	(NM)	(NM)	(NM)	(NM)	(NM)	(NM)	(NM)	(NM)	1.39
Utilities	(NM)	(NM)	(NM)	0.85	(NM)	(NM)	2.84	(NM)	(NM)
Construction	-1.73	-0.88	0.10	-0.11	-0.85	0.01	0.93	-1.35	-1.38
Manufacturing	-5.24	-4.37	-3.03	-2.01	-1.58	-7.64	-4.54	-3.66	-4.99
Wholesale trade	2.21	(NM)	-2.51	2.77	-0.38	(NM)	-0.46	0.22	0.43
Retail trade	8.77	-0.50	-0.66	1.51	-1.09	2.44	-0.16	-0.15	-0.09
Transportation and warehousing	(NM)	6.27	(NM)	1.98	(NM)	1.60	-0.71	(NM)	-0.97
Information	(NM)	-3.48	6.55	-1.04	-3.83	0.99	-3.90	-0.74	(NM)
Finance and insurance	(NM)	1.49	-0.33	6.13	9.66	7.45	1.32	2.44	3.3
Real estate and rental and leasing	(NM)	5.76	2.74	6.07	5.51	3.29	4.83	6.95	4.56
Professional, scientific, and technical services	-3.35	0.87	5.65	(NM)	(NM)	4.05	5.70	1.36	2.74
Management of companies and enterprises	(NM)	5.81	-1.53	(NM)	(NM)	6.80	2.29	12.68	2.15
Administrative and waste management services	10.21	0.59	1.90	5.39	-0.99	5.80	4.24	7.27	2.48
Educational services	(NM)	(NM)	7.10	9.33	4.27	(NM)	8.77	9.24	6.37
Health care and social assistance	(NM)	(NM)	2.39	5.30	1.45	(NM)	4.99	4.58	3.55

Employment 2001-2010 CAGR	Northampton	Halifax	Nash	Johnston	Wilson	Harnett	Cumberland	Robeson	North Carolina
Arts, entertainment, and recreation	(NM)	2.40	2.32	4.09	2.95	5.79	1.92	0.88	3.49
Accommodation and food services	(NM)	2.18	2.45	2.90	0.36	4.12	2.82	2.18	2.21
Other services, except public administration	1.40	0.56	0.89	2.89	1.44	2.91	1.28	0.55	1.41
Government and government enterprises	-1.52	-1.35	0.83	4.06	0.60	1.34	2.14	1.15	1.62
Federal, civilian	2.19	0.62	8.01	2.42	-0.32	1.97	3.20	2.09	2
Military	-1.35	-1.88	-0.46	1.80	-0.33	0.93	2.29	-0.58	2.42
State and local	-1.68	-1.40	0.75	4.22	0.67	1.35	1.26	1.19	1.41
State government	-6.64	-1.87	1.87	3.29	0.69	-0.73	1.52	3.29	1.8
Local government	0.13	-1.24	0.51	4.39	0.66	1.81	1.20	0.37	1.23

Source: U.S. Bureau of Economic Analysis.

There are over 15,000 business establishments located in the I-95 Corridor supporting the local, state, and regional economy. Figure 2.1 displays the number of establishments by county. Most notably, retail trade and health care and social assistance industries constitute the largest number of establishments along the I-95 Corridor. Cumberland and Johnston Counties contain the largest number of establishments, totaling over 5,100 and 1,900, respectively. The large number of establishments in Cumberland County may be attributed to Fort Bragg, one of the 10 largest military bases in the U.S., covering over 251 square miles. Johnston County borders Wake County, the home of North Carolina's state capital (Raleigh), and not only serves as a throughway for I-95, but I-40 as well, which is a contributing factor to the large number of establishments in the county. Additionally, the largest outlet shopping center in eastern North Carolina is located in Johnston County, which helps to attract several supporting businesses, such as hotels and food establishments.

Figure 2.1 Business Establishments in North Carolina

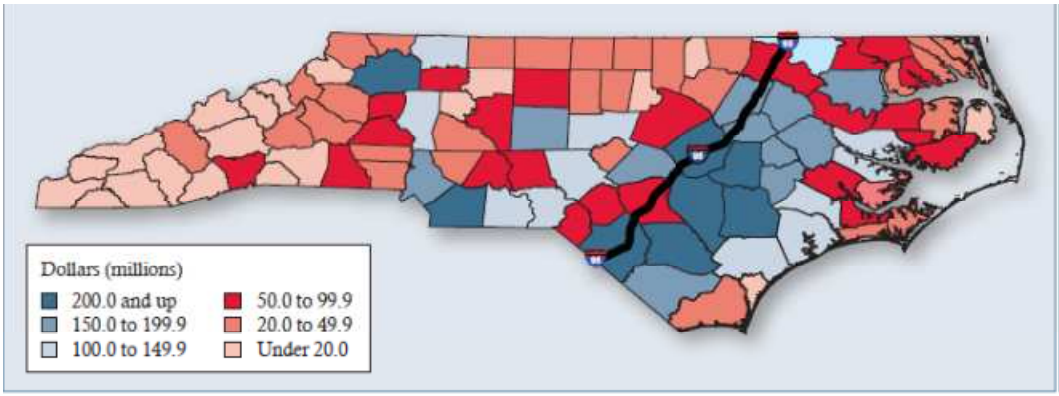


Source: North Carolina Department of Commerce, Labor, and Economic Analysis Division.

Agriculture and Farming

At $77 billion a year and employing close to one of every five North Carolinians, agribusiness is the state's largest industry. Animal agriculture (swine, poultry, cattle, and dairy) comprises six of North Carolina's top twelve commodity groups. As seen in Figure 2.2, the counties along I-95 are among the top counties in the state in terms of farming revenue and sales.

Figure 2.2 County Farm Cash Receipts
2011



Source: North Carolina Department of Commerce.

Table 2.6 displays the top five cash receipts from farming (by commodity) in North Carolina and Table 2.7 displays the State's top ten counties in farm receipts.

Table 2.6 NC Top 5 Cash Receipts from Farming by Commodity
2010

	2010	2010 % of Total Sales
Commodities	**Thousand Dollars**	**Percent**
Broilers (chickens)	2,612,054	27.0
Hogs	2,242,773	23.2
Greenhouse, Nursery, Floriculture & Christmas Trees	764,670	7.9
Tobacco	589,198	6.1
Turkeys	587,430	6.1

Source: North Carolina Department of Agriculture.

Livestock comprises over 50 percent of total farm cash receipts by commodity and is dominated by the broiler and hog production sectors, which brought in over $2.6 billion and $2.2 billion, respectively, in 2010.

Table 2.7 NC Top 10 Counties in Farm Receipts

TOP 10 COUNTIES IN FARM CASH RECEIPTS					
Livestock		Crops		Total	
County	Thousand Dollars	County	Thousand Dollars	County	Thousand Dollars
Duplin	908,941	Sampson	177,045	Duplin	1,002,513
Sampson	720,895	Mecklenburg	157,270	Sampson	921,268
Union	339,450	**Johnston**	**120,892**	Union	409,874
Bladen	276,335	**Wilson**	**115,637**	Wayne	353,118
Wilkes	269,468	Wayne	87,293	**Robeson**	**339,581**
Wayne	248,653	Henderson	85,811	Bladen	330,616
Robeson	**241,885**	**Nash**	**85,389**	Wilkes	280,115
Randolph	179,091	Duplin	76,518	**Johnston**	**235,960**
Richmond	123,652	**Robeson**	**76,453**	Randolph	196,972
Anson	122,817	Pitt	76,396	**Nash**	**189,407**

Source: North Carolina Department of Agriculture. I-95 Corridor counties shown in bold.

Those counties along the I-95 Corridor are significant crop producers, as noted by the dominance of the corridor counties in the top ten counties in farm crop cash receipts. Robeson County is one of the top five counties in cash receipts for soybeans, corn, and wheat. Wilson County is a major producer of greenhouse and nursery products, tobacco, and vegetables, followed by Johnston and Nash Counties, which also produce tobacco and greenhouse & nursery products. Halifax County ranks ninth in the state for peanut production, but number one in cotton, while Northampton County produces primarily cotton.

For those counties east of the I-95 Corridor, agricultural production is concentrated in the southeastern region of North Carolina, where a significant amount of livestock and crop production operations are located. Table 2.8 presents the number of crop and animal production establishments, as well as the associated employment for the primary Corridor counties. The counties most dependent on I-95 include eight out of the top ten counties in crop production. With regards to livestock, half of the top ten counties are represented as key contributors to total farm cash receipts.

Table 2.8 Agricultural Establishments and Employment for Selected Counties along the I-95 Corridor
2011

County	NAICS[a] Title	Establishments	Estimated Employment
Johnston	Crop Production	62	643
Nash	Crop Production	44	908
Wilson	Crop Production	39	732
Halifax	Crop Production	26	165
Harnett	Crop Production	24	170
Robeson	Crop Production	21	106
Cumberland	Crop Production	15	105
Northampton	Crop Production	15	89
Northampton	Animal Production and Aquaculture	17	132
Johnston	Animal Production and Aquaculture	16	118
Robeson	Animal Production and Aquaculture	15	90
Halifax	Animal Production and Aquaculture	14	124
Cumberland	Animal Production and Aquaculture	10	62
Nash	Animal Production and Aquaculture	8	61
Wilson	Animal Production and Aquaculture	6	51
Harnett	Animal Production and Aquaculture	4	39

Source: North Carolina Department of Commerce, Division of Employment Security, Quarterly Census of Employment and Wages (QCEW)

[a] North American Industry Classification System.

Tourism Activities and Related Industries

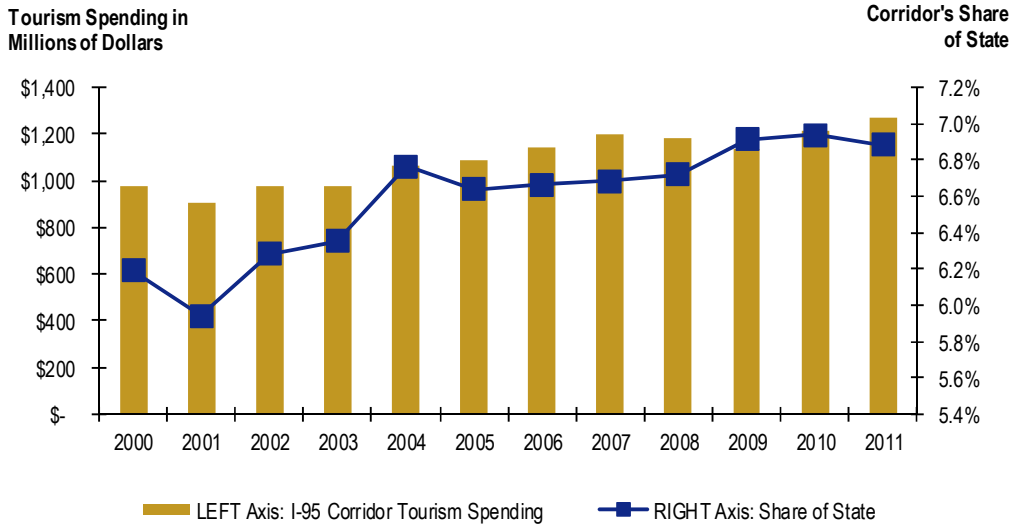
The I-95 Corridor's tourism industry is a key contributor to the region's economy, and has helped the region weather the recent recession by staying relatively stable compared to other industries. The Corridor includes many, generally small- to medium-sized attractions that draw visitors from elsewhere in North Carolina, as well as from other, mainly East Coast, states. While thousands of travelers visit destinations along the Corridor on an annual basis, and spend money in the region's shops, recreational areas, museums, and restaurants, a large portion of the travel expenditures coming into the region are from "pass-through" travelers on their way to and from places outside of the I-95 Corridor. This includes people traveling for leisure, business, or other personal reasons between the Northeast and the Southeast, as well as travelers destined for other locations in North Carolina. I-95 is not only a conduit for north-south travelers, but is also a jumping-off point for the major tourist attractions on the North Carolina coast that attract millions annually. The large

volumes of pass-through travelers on I-95 are key to supporting the hotels along the Corridor that have largely located adjacent to I-95 interchanges in order to serve this clientele. Similarly, these travelers also patronize local restaurants and retail establishments before moving on to more distant destinations.

Visitors to the I-95 Corridor spend on a variety of goods, including lodging, food, retail, transportation, and amusement/recreation. On an annual basis, the North Carolina Department of Commerce's Division of Tourism releases estimates of expenditures, jobs, and tax revenues associated with travel for the state and by county. For the purposes of these detailed estimates, the tabulations are based on travel activities associated with all overnight and day trips to places 50 miles or more away, one way, from the traveler's origin, and any overnight trips away from home in paid accommodations. These data would include both visitors to the I-95 region, as well as people who are stopping along the Corridor and continuing their trips to other destinations.

In 2011, travel expenditures approached $1.3 billion, representing an increase of 30 percent compared to 2000 (see Figure 2.3). Tourism spending is cyclical with the economy, with expenditures in the I-95 Corridor showing drops during both the 2001 and 2009 recessions. During the 2000s, the I-95 Corridor's share of total tourism expenditures in North Carolina grew from approximately six percent early in the decade to about seven percent in 2009 and 2010.

Figure 2.3 Tourism Spending in the I-95 Corridor and Corridor's Share of State Tourism
2000 to 2011



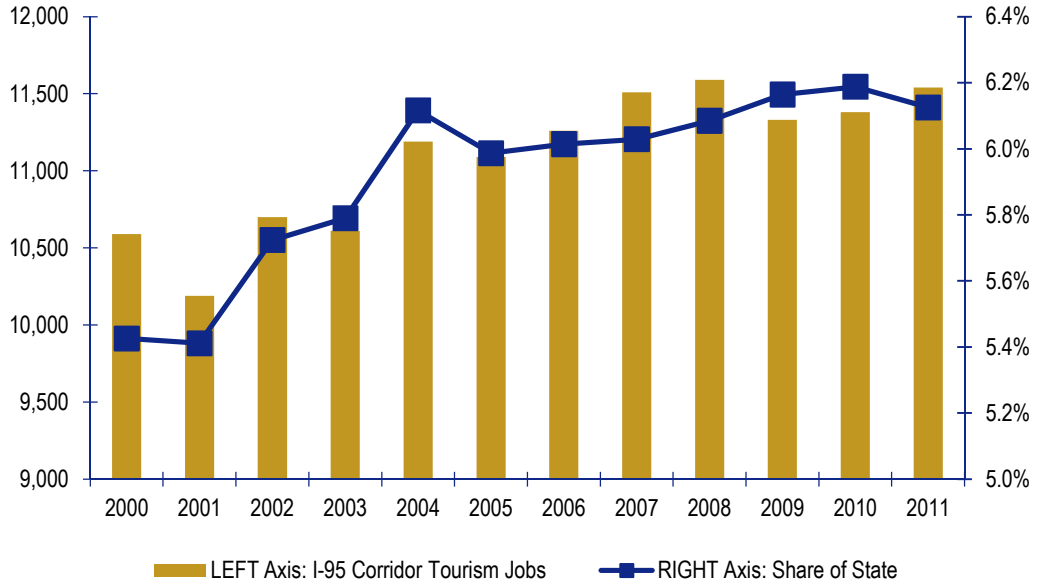
Source: North Carolina Department of Commerce, calculated by CS; tourism spending is in 2011 dollars.

Cumberland and Johnston Counties posted the largest gains, with 44 and 128 percent, respectively. The Fort Bragg expansion stimulated travel spending in Cumberland County, while the development of a large retail outlet mall in

Johnston County, the Carolina Premium Outlets, also created a tourist draw. The Carolina Premium Outlets are located in Smithfield, directly on the I-95 frontage road.

Similar to the I-95 Corridor's travel expenditures over the 2000-2011 period, tourism-related employment has been rising as well. In 2011, the industry directly employed over 11,500 people in the Corridor region, an increase of about 1,000 jobs as compared to 2000 (see Figure 2.4). Over the same period, the region's share of total North Carolina employment related to travel also increased.

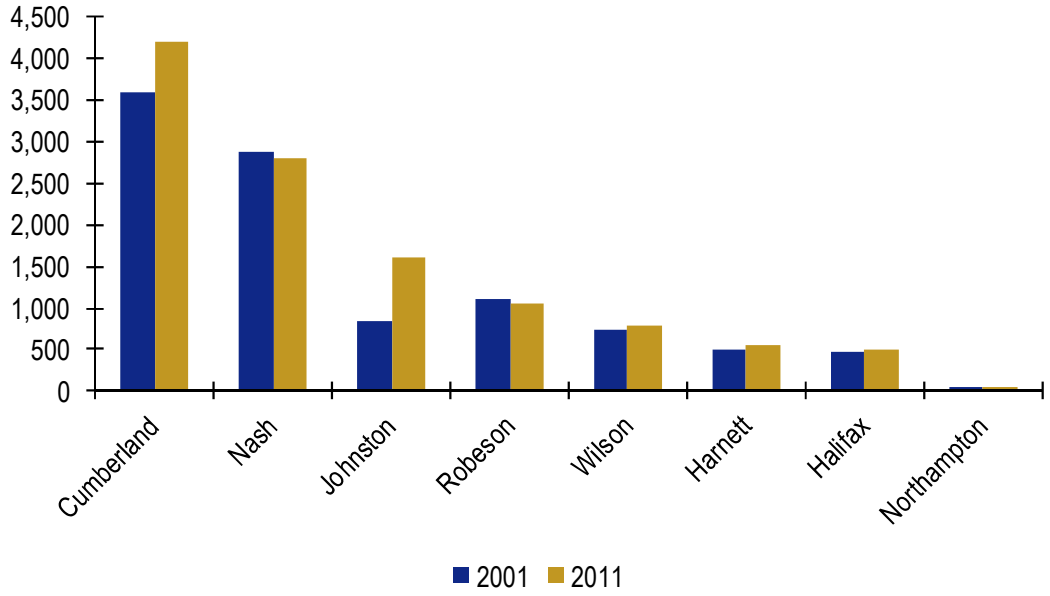
Figure 2.4 Tourism Jobs in the I-95 Corridor and Corridor's Share of State Tourism Employment
2000 to 2011



Source: North Carolina Department of Commerce, calculated by CS.

Most Corridor counties posted jobs increases over the period, but growth was led by Johnston and Cumberland Counties. The two counties, which also led in travel industry expenditures growth, experienced employment increases of 760 and 600 jobs, respectively (see Figure 2.5).

Figure 2.5 Tourism Jobs in the I-95 Corridor by County
2001 and 2011



Source: North Carolina Department of Commerce, calculated by Cambridge Systematics

Since 2000, the travel industry's share of all Corridor jobs has held steady at just under three percent. The industry accounts for about five percent of jobs in the rest of North Carolina and has seen its share tick-up slightly during and since the 2009 recession. As mentioned earlier, the "rest of North Carolina" includes the state's large cities and top coastal and mountain destinations, thus explaining the higher share of jobs within the travel industry as compared to the I-95 Corridor. The share of tourism jobs in North Carolina's non-coastal Eastern region is consistently a percentage point lower than in the I-95 Corridor region, and the industry's share of jobs within this region is very slowly eroding. As with the greater per capita expenditures, the higher share of tourism jobs on the I-95 Corridor may be attributable to interstate proximity, among other factors.

The I-95 Corridor region is a destination for business, family, and leisure-related travel. These types of travelers, as well as pass-through travelers (people only spending an evening on their way to other parts of North Carolina or the United States) bring in jobs and spending for the corridor area. Some of the primary generators of tourism are attractions along the Corridor that draw people mostly from around North Carolina and the East Coast.

Compared to major attractions elsewhere in North Carolina, those located on the I-95 Corridor tend to be smaller, attracting fewer than 150,000 visitors per year (see Table 2.9). The Airborne and Special Operations Museum in Fayetteville brings in close to 150,000 visitors per year and ranks among the top 30 tourist destinations in the state based on attendance. The I-95 Corridor is also a jumping-off point for travelers to the North Carolina coast, which attracts much

higher visitor volumes. There are eleven destinations on or near the beach that draw 200,000 or more visitors per year, including close to two million to Cape Hatteras National Seashore. While these attendance figures certainly include visitors going to multiple destinations on the same trip, they do underscore a significant difference in magnitude between the I-95 Corridor destinations and North Carolina's more heavily visited coastal attractions. It also suggests that the I-95 Corridor's tourism industry is relatively more dependent on pass-through travelers, including those destined for the Outer Banks, as opposed to tourists with primary destinations along the Corridor.

Table 2.9 Selected Major Attractions on the I-95 Corridor in North Carolina
Annual Visitation

Attraction	City	County	Annual Visitors
Airborne and Special Operations Museum	Fayetteville	Cumberland	144,289
Medoc Mountain State Park	Brinkleyville	Halifax	102,580
Rocky Mount Sports Complex	Rocky Mount	Nash	74,332
Clemmons Educational State Forest	Clayton	Johnston	50,000
Historic Halifax	Halifax	Halifax	32,074
Vollis Simpson Windmill Farm	Lucama	Wilson	27,500
Sylan Heights Bird Park	Scotland Neck	Halifax	23,000
North Carolina Coastal Plains Museum	Wilson	Wilson	20,000
Nestus Freeman Roundhouse Museum	Wilson	Wilson	20,000
Imagination Station Science Museum	Wilson	Wilson	20,000
North Carolina Baseball Museum	Wilson	Wilson	12,000
Ava Gardner Museum	Smithfield	Johnston	12,000
Tobacco Farm Life Museum	Kenly	Johnston	10,000
Bentonville Battlefield State Historic Site	Four Oaks	Johnston	-
Lake Gaston	N/A	Halifax, Northampton	-
Royal Palace Theatre	Roanoke Rapids	Halifax	-
Averasboro Battlefield Museum	Dunn	Harnett	-
Imperial Centre for the Arts and Sciences	Rocky Mount	Nash	-

Sources: Triangle Business Journal (American City Business Journals), March 22, 2012 and various local sources, including interviews with convention and visitors bureaus. This list aims to represent the major attractions in the region and the relative magnitude of annual attendance. However, it should not be viewed as a comprehensive capture of all significant tourism venues in the region.

In total, there are over 14,000 hotel rooms in the eight counties located on the Corridor. Average occupancy generally ranges from 60 to 70 percent, for a corridor-wide average of approximately 64 percent. Based on occupancies and average rates, the Corridor's hotels generate an estimated $227 million in revenue per year (these data correspond to late 2011 - late 2012) from 3.3 million annual room nights.

During stakeholder interviews, tourism and convention and visitors bureau (CVB) directors were asked to estimate the share of room nights represented by travelers passing through on I-95. The results are displayed in Table 2.10. Most counties estimated that these types of guests account for between 80 - 90 percent

of room nights, with about 60 percent being drop-ins without a reservation. In Johnston County, the estimate was lower (66 percent), because a number of hotels serve the I-40 corridor as well. Cumberland County had the lowest share of hotel nights associated with pass-through guests, 30 percent, because a smaller portion of its rooms are located along the highway, and many instead serve the Fort Bragg market ten miles to the west. Based on the data made available from the interviews and CVB director estimates, approximately 57 percent of room nights in the I-95 Corridor region can be attributed to pass-through travelers. These travelers generate an estimated $130 million per year in direct lodging revenue.

Table 2.10 Hotel Room Inventory, Rates, and Occupancy on I-95

	Rooms	Occupancy	Occupied Rooms per night	Annual Room Nights	Rate	Annual Revenue	Pass-through Share of Guests	Pass-through Lodging Revenue
Northampton	100	60%	60	21,900	$51.00	$1,116,900	90%	$1,005,210
Halifax	1,040	57%	593	216,372	$64.00	$13,847,808	90%	$12,463,027
Nash	2,600	60%	1,560	569,400	$70.00	$39,858,000	80%	$31,886,400
Harnett	N/A	N/A	N/A	N/A	$60.00	N/A	N/A	N/A
Wilson	1,400	71%	994	362,810	$70.00	$25,396,700	80%	$20,317,360
Johnston	1,700	60%	1,020	372,300	$60.00	$22,338,000	66%	$14,743,080
Cumberland	5,900	66%	3,894	1,421,310	$73.00	$103,755,630	30%	$31,126,689
Robeson	1,450	65%	943	344,013	$60.00	$20,640,780	90%	$18,576,702
Total	14,190	63%	9,063	3,308,105	$63.50	$210,064,668	57%	$130,118,468

Sources: Data provided by tourism authorities and convention and visitors bureaus through interviews and other documentation, December 3-6, 2012. Not all CVBs have detailed hotel data available. Figures shown in red are estimates. Calculations are by Cambridge Systematics.

Warehousing and Distribution, Wholesale Trade and Trucking

Warehousing and distribution, wholesale trade and trucking are key industries sector along the Corridor, given the interstate access to northern cities and international trading ports. Wal-mart and Food Lion are among the two largest employers along the I-95 Corridor, each employing over 1,000 individuals. Wal-mart's distribution center in the region is located in Hope Mills located in Cumberland County and located right off I-95. Food Lion maintains three large distribution centers along I-95, one in Dunn and two in Fayetteville.[2] 9.99 Stockroom located in Johnston County and Intercall Inc. located in Nash County

[2] Based on Google map searches, 2012.

are the next largest employers along the corridor employing between 500 and 999 individuals in 2011. In 2011, there were 39 warehousing and distribution facilities along I-95(see Table 2.11).

Table 2.11 2011 Warehousing & Distribution, Wholesale Trade and Trucking Establishments and Employment

County	Establishments	Estimated Employment
Cumberland	283	7,563
Johnston	191	2.188
Nash	152	2,141
Robeson	125	1,364
Wilson	93	2,907
Harnett	90	1.591
Halifax	49	1,414
Northampton	29	814

Source: North Carolina Department of Commerce, Division of Employment Security, Quarterly Census of Employment and Wages (QCEW) and US Bureau of Economic Analysis

Manufacturing

Table 2.12 summarizes the number of manufacturing establishments and employment in the primary Corridor counties. Goodyear Tire and Rubber, Hospira Inc., Bridgestone Americas Tire Operation, Talecris Biotherapeutics Inc., Consolidated Diesel Co., and Merck & Co are the top manufacturing employers along the Corridor, employing over 1,000 individuals each. These manufacturing facilities are located in five (Cumberland, Nash, Robeson, Wilson, and Johnston) of the eight counties along I-95, primarily along the middle to southern portion of the corridor. Access to I-95 is clearly a consideration and necessity for the larger manufactures to located in a specific region. This was supported through interviews with local and regional economic developers and site selection consultants. In addition to locating near I-95, many of the establishments are clustered around the central region of the corridor, defined as Johnston, Nash, and Wilson. Not only are these counties near the major population center of Raleigh, but the area is accessible to US 64 and US 264, both newer east-west roads with access to major population centers to the east.

Table 2.12 2011 Manufacturing Establishments and Employment

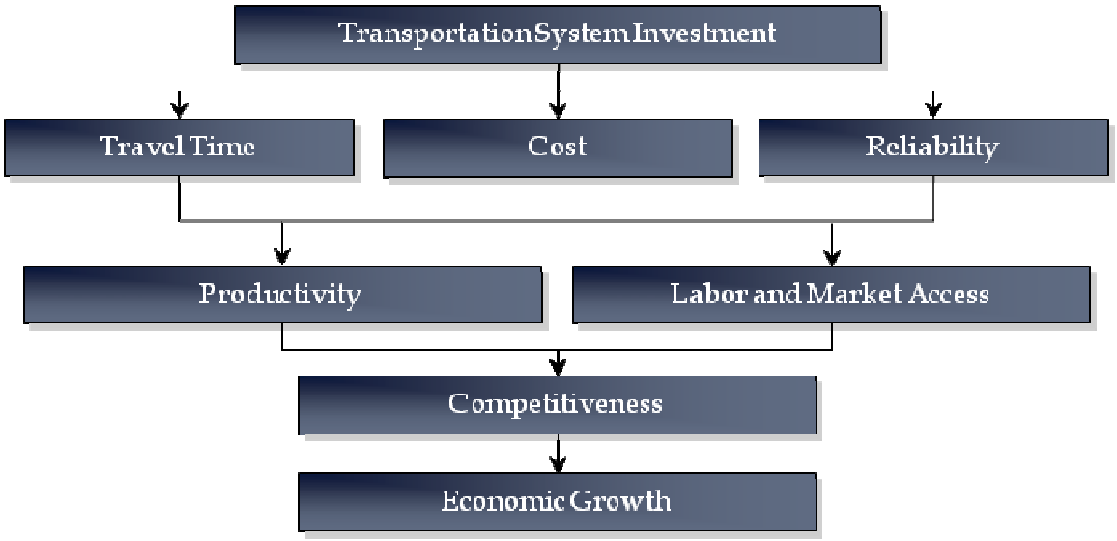
Area Name	Establishments	Estimated Employment
Johnston	121	6,207
Cumberland	117	7,095
Nash	99	7,006
Wilson	94	8,139
Harnett	65	1,137
Robeson	61	5,837
Halifax	33	1,843
Northampton	12	359

Source: North Carolina Department of Commerce, Division of Employment Security, Quarterly Census of Employment and Wages (QCEW).

2.2 THE LINKAGE BETWEEN HIGHWAY CONDITIONS AND ECONOMIC DEVELOPMENT

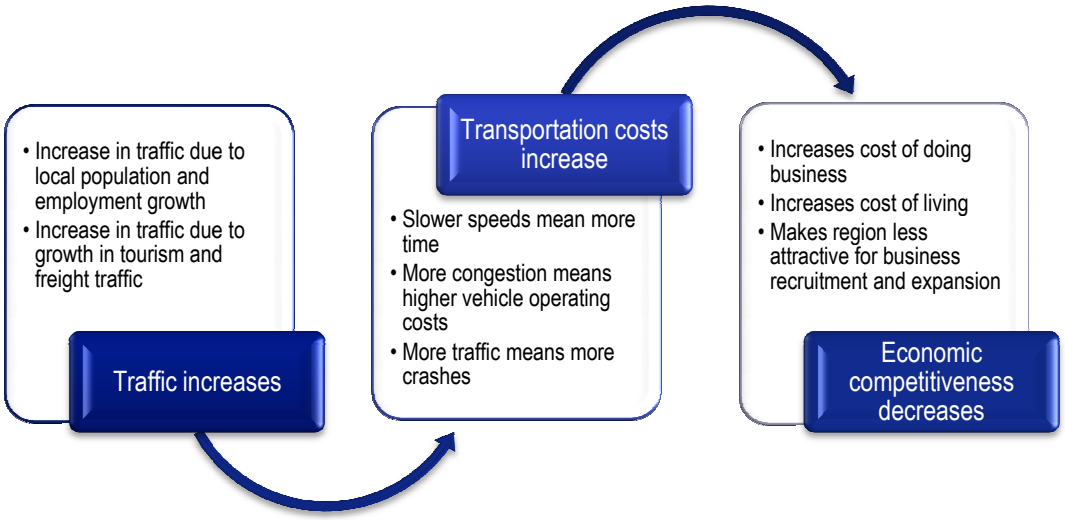
The I-95 Corridor serves key industries and economic development assets in the state, provides for emergency routing, serves as a local commuter route for urban areas along the corridor, and is the gateway into the state for millions of visitors each year. As shown in Figure 2.6, good roads are vital to the economy because the quality of transportation impacts the cost of doing business through travel times, reliability of travel times, and overall transportation costs. These factors directly impact productivity, as well as access to markets and labor, which impact the region's and state's economic competitiveness and overall growth.

Figure 2.6 Linkage between Transportation and Economic Development



Likewise, failure to maintain the transportation system's ability to provide safe, efficient mobility of goods and people can lead to lost economic activity and opportunities. As shown in Figure 2.7, lack of investment can lead to worsening conditions, including increased traffic levels and congestion and increases in crashes. In turn, this leads to increases in travel times and overall transportation costs for residents and business. As transportation costs increase, the region may become less attractive in terms of business expansion, retention and recruitment.

Figure 2.7 Impact of Deteriorating Transportation Infrastructure



2.3 TRENDS IMPACTING FUTURE TRAFFIC ON I-95 IN NORTH CAROLINA

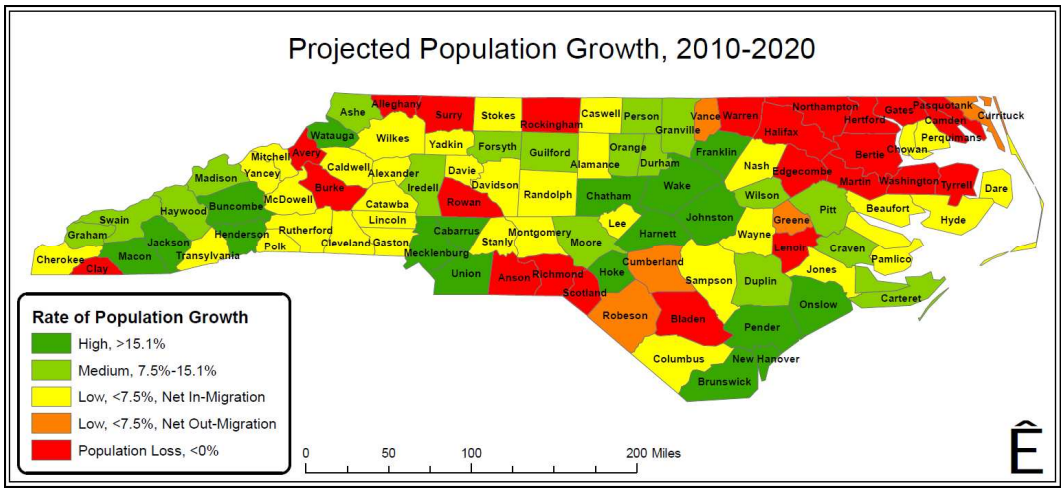
Two primary trends will drive future traffic levels on I-95 in North Carolina - population and freight growth. Because I-95 is a major corridor connecting the eastern seaboard, traffic levels in North Carolina will be impacted by growth in both local and broader regional population and freight levels.

Over the next several decades, population is projected to increase most significantly in those counties along the middle portion of the corridor, specifically in Johnston and Harnett Counties. The northeast region in North Carolina is expected to exhibit a stagnant or declining population over the same time period. The population increase in Johnston and Harnett Counties could be attributed to the proximity of Wake County. Raleigh, located in Wake County, is a major employment center attracting people to move closer to where the jobs are located.

The overall trend for North Carolina's counties between 2010 and 2032, shown in Figures 2.8 to 2.10, indicates a general movement of people towards

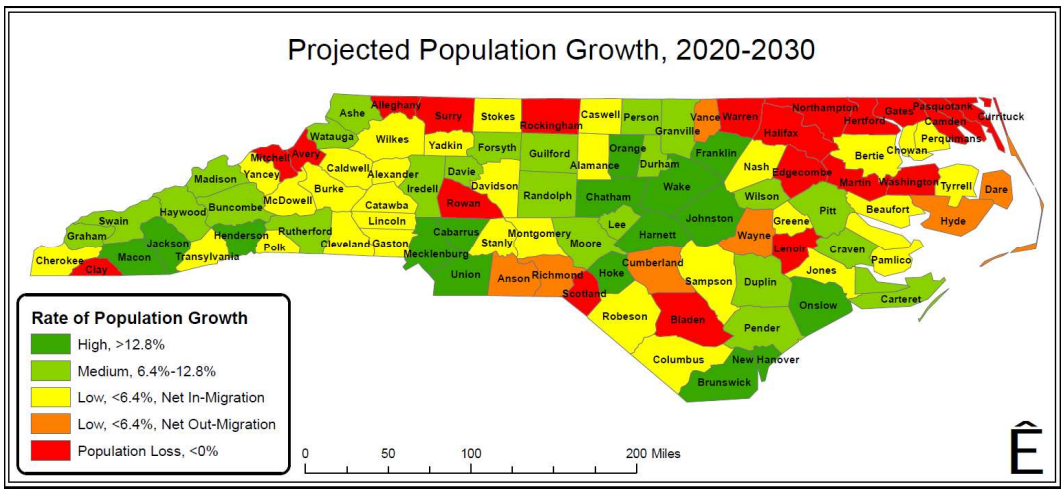
population centers, which are mostly located in the central region of the state. The Triad, Research Triangle, and Charlotte regions are located in counties with high population growth with the immediate surrounding counties also following a similar trend. Examining growth over intermediate periods of time is important to understand how traffic growth, and thus resulting benefits and costs, may change over the study period for the economic assessment.

Figure 2.8 Projected Population Growth
2010 to 2020



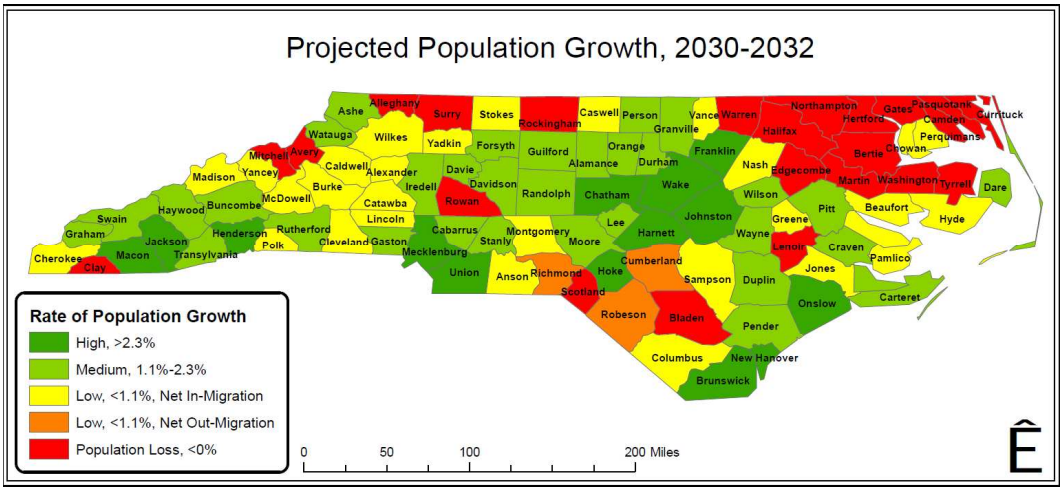
Source: North Carolina Office of State Budget and Management

Figure 2.9 Projected Population Growth
2020 to 2030



Source: North Carolina Office of State Budget and Management

Figure 2.10 Projected Population Growth
2030 to 2032



Source: North Carolina Office of State Budget and Management

The eastern U.S. is also expecting population growth similar to that of North Carolina (see Table 2.2 above).

3.0 Economic Assessment of I-95

The purpose of the North Carolina I-95 Economic Assessment study was to examine the economic trade-offs of alternative approaches to improving and funding the proposed improvements to I-95, including making the proposed investment using alternative funding sources and only making those improvements that can be funded using existing revenue sources. The economic analysis framework and process was vetted with the Advisory Council and revised based on their input. Direct economic impacts were developed from the analysis of construction activity, existing and future traffic forecasts, funding options, and broader economic development data collected from various sources including stakeholders along the Corridor. These direct impacts were used to estimate total impacts, comprised of direct, indirect, and induced impacts using a customized economic model developed by Regional Economic Models, Inc. (REMI). This methodological approach is designed to capture the economic impacts of I-95 transportation performance changes and reactions associated with the alternative investment and funding scenarios.

3.1 SCENARIOS MODELED

The I-95 Economic Assessment evaluates the economic implications for the alternatives included in the EA and additional scenarios defined with input from NCDOT, the Advisory Council, and other stakeholders.

Scenarios evaluated include:

- **Business As Usual (BAU)**: Defined as ongoing maintenance and operations with no capacity expansion, this scenario would result in worsening traffic conditions leading to increased transportation costs on I-95. Traditionally, a base case scenario is compared to an improved network scenario, but in this study, an examination of how transportation costs are likely to change with limited improvements was needed. Thus, the team developed a BAU scenario to estimate the potential of foregone economic activity if improvements are not made to I-95.
- **Build - No Specific Funding**: Defined as the implementation of the proposed improvements based on the EA, including rebuilding and expanding the entire corridor, without assuming any increase in any state or local taxes or fees. This focuses on the positive impacts of improved traffic conditions and the influx of construction activity, while ignoring potential negative impacts associated with increasing taxes or fees to pay for the investment. While this scenario is unrealistic, it was necessary to be able to separate the impacts of the improvements from the impacts of funding options.

- **Build - Fund via Tolls:** This is the same improvements as in the Build – No Specific Funding scenario, but it also includes modeling the impacts of tolling.
- **Build - Fund via Mitigated Tolls**: This scenario modifies the previous scenario by including a fifty percent reduction in the toll rates for local residents and businesses.
- **Build - Fund via Alternative Funding:** This scenario includes improving, rebuild and expand entire corridor as outlined above, and raising various state and local taxes and fees to pay for it.

3.2 SCREENING OF FUNDING OPTIONS FOR I-95

Transportation in North Carolina is funded primarily from three sources: federal funds and two different state funds (the North Carolina Highway Fund and the North Carolina Highway Trust Fund). Federal funds account for approximately 25 percent of North Carolina's annual transportation funding, while the remaining 75 percent comes from state revenues through taxes and fees that are deposited into both highway funds.

North Carolina Highway Fund

The Highway Fund dates back to 1921, when the North Carolina General Assembly first imposed the gasoline tax of 1.0 cents per gallon (cpg) on all motor vehicle fuels sold or distributed in the state. Highway Fund revenues are used to maintain the state roadway network and to fund the administrative operations of the Department of Transportation. The Highway Fund also supports multimodal programs, such as air, rail, ferries, and bicycle and pedestrian programs, and provides funding for secondary road construction and maintenance.

The Highway Fund receives support from a variety of dedicated revenue sources, including state motor fuel taxes and vehicle registration and license fees (Table 3.1). Seventy-five percent of state motor fuel tax revenues are allocated to the Highway Fund, and these revenues account for nearly 70 percent of total annual fund revenues. Highway Fund revenues have increased from $904 million in Fiscal Year (FY) 1990 to $1,732 million in FY 2010; however, revenues have been declining since 2007.

Table 3.1 Dedicated Revenue Sources for the Highway Fund and the Highway Trust Fund

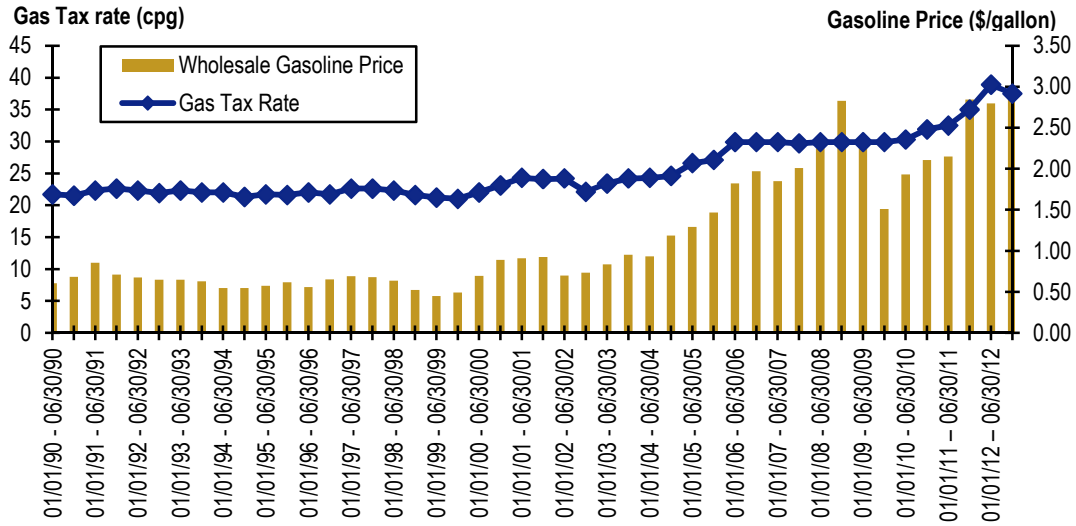
	Highway Fund	Highway Trust Fund
Motor Fuels Excise Tax	●	●
Highway Use Tax		●
Title and Registration Fees	●	●
Lien Recording Fees		●
Driver's License Fees	●	
Dealer and Manufacturer License Fees	●	
Financial Security Restoration Fees	●	
International Registration Tax	●	
Overweight/Oversize permits	●	
Penalties	●	
Safety Equipment Process Fees	●	
Vehicle Registration Fees	●	
Truck License Plate Fees	●	
Interest earned on cash balances	●	●

Motor Fuel Tax

Similar to the federal motor fuel tax, most states collect motor fuel taxes on a fixed rate (for example, per gallon), and revenues are therefore dependent on consumption, rather than changes in price. As a result, inflationary effects have significantly eroded and will continue to erode the purchasing power of this funding source. The introduction of more fuel efficient vehicles also affects the revenue yield, as consumption declines on a per-mile-traveled basis.

North Carolina is one of a few states adjusting the motor fuel tax rate based on price. The current excise motor fuel tax rate in North Carolina is 37.5 cents per gallon (cpg), and consists of two components: 1) a fixed tax rate of 17.5 cpg; and 2) a variable rate based on the average wholesale price of fuel, adjusted every six months. The variable wholesale component is either 3.5 cpg or 7 percent of the average wholesale price of motor fuel during the preceding six-month base period, whichever is greater. In July 2012, the North Carolina General Assembly adopted legislation to cap the motor fuel tax rate at 37.5 cpg through June 2013. The motor fuel tax rate has ranged between 21.3 cpg and 38.9 cpg over the last 20 years, with rates exceeding 30 cpg since January 2010 (Figure 3.1).

Figure 3.1 North Carolina Motor Fuel Tax Rate and Wholesale Gas Price
1990 to 2012



Source: EIA, North Carolina Total Gasoline Wholesale/Resale Price by Refiners (Dollars per Gallon); Tax rate from North Carolina Department of Revenue.

Note: Wholesale gas price lagged by six months. The motor fuel tax rate was capped at 29.9 cpg for two years (2008 and 2009).

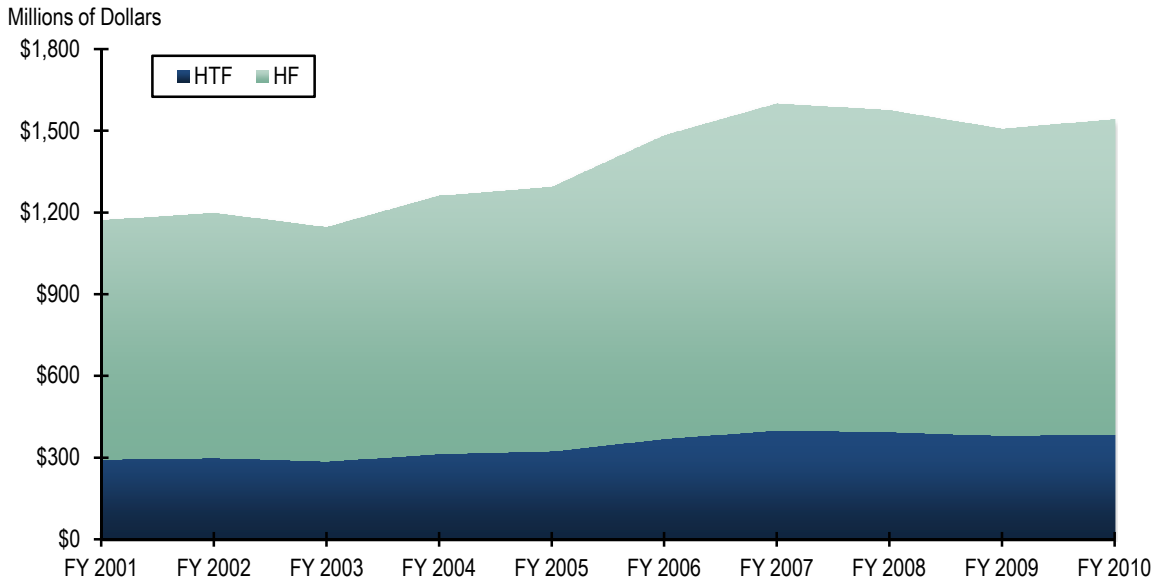
The revenue collected from the excise tax from all motor fuels sold, distributed, and used to power motor vehicles operating on public roads is split between the state Highway Fund and Highway Trust Fund. The Highway Fund portion is 75 percent of collections and the Highway Trust Fund receives the remaining 25 percent. Receipts from the motor fuel tax have increased from $1,170.2 million in FY 2001 to $1,541.5 million in FY 2010, growing at an average annual rate of 3.1 percent (Figure 3.2). The yield per penny of motor fuel taxes has declined from $56.0 million in FY 2007 to $53.7 million in FY 2011.

Over the long term, motor fuel tax revenues are susceptible to fuel efficiency improvements and higher penetration of alternative fuels into the market, leading to lower revenue yields. Since FY 2006, state gas tax receipts have remained stagnant due in part to the economic downturn, which resulted in less driving, and the introduction of more fuel efficient vehicles, which means more miles are driven on less gas. As shown in Figure 3.3, gasoline consumption has gradually increased since 2000, while diesel consumption grew significantly during the first half of the past decade, but declined significantly after 2007. It is anticipated that fuel consumption will decrease in the future as new federal fuel efficiency standards are being implemented. In 2009, a new national policy and set stringent Corporate Average Fuel Economy (CAFE) standards to increase fuel efficiency and reduce greenhouse gas emissions for all new cars and trucks sold in the United States beginning in 2012 through 2016 was implemented. This

year, a new rule to further reduce greenhouse gas emissions and improve fuel economy for light-duty vehicles for Model Years (MY) 2017-2025 was approved. The new rule increases average fuel economy requirements for cars and light-duty trucks from 36.1 miles per gallon in 2017 to 54.5 miles per gallon by 2025.[3]

The 2040 North Carolina Statewide Transportation Plan estimates that motor fuel tax revenues will decrease from $1,750 million (2011 dollars) in 2011 to nearly $700 million (2011 dollars) by 2040 due to the implementation of new federal fuel efficiency standards (Figure 3.4).

Figure 3.2 Motor Fuel Tax Revenue Allocations

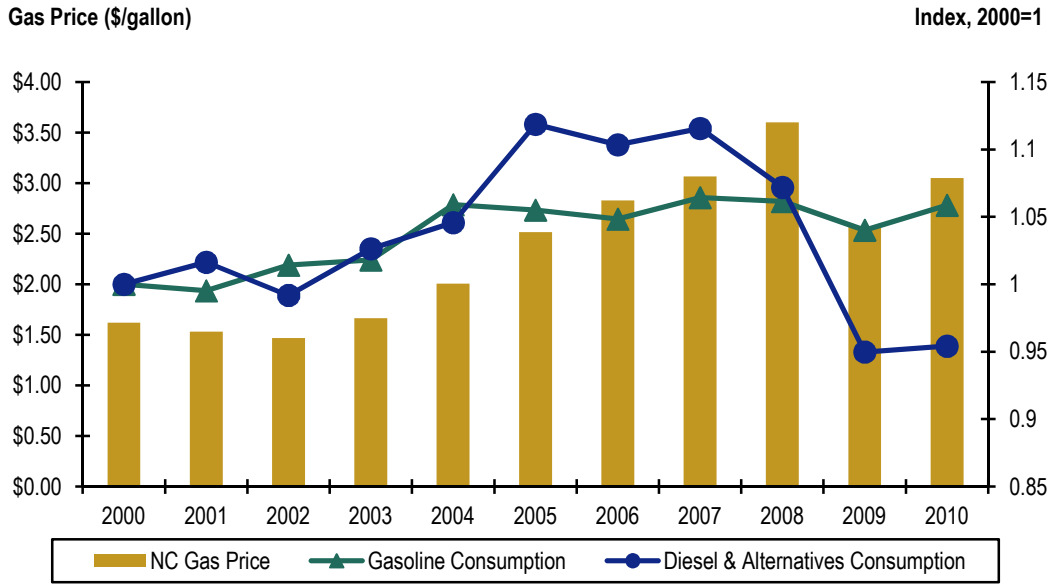


Source: Office of State Budget and Management, North Carolina Tax Guide 2010.

[3] The White House, Obama Administration Finalizes Historic 54.5 MPG Fuel Efficiency Standards, http://www.whitehouse.gov/the-press-office/2012/08/28/obama-administration-finalizes-historic-545-mpg-fuel-efficiency-standard.

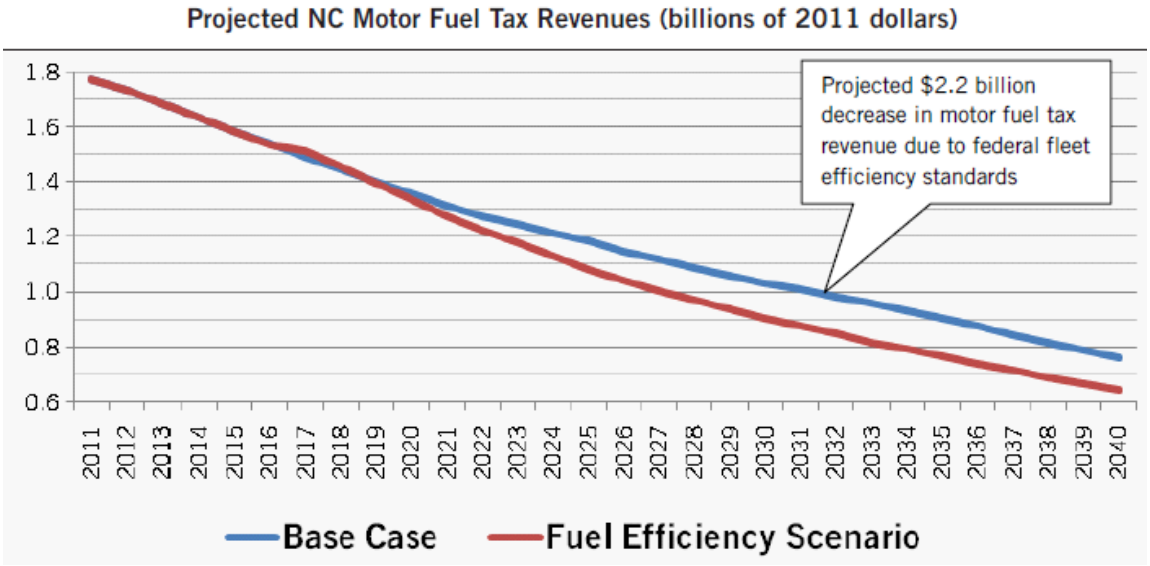
Figure 3.3 North Carolina Fuel Consumption (Gas and Diesel) and Gas Prices

2000 to 2010



Source: Gas Price from EIA; Gasoline and Diesel consumption from N.C. Department of Revenue.

Figure 3.4 Forecast Motor Fuel Tax Revenues



Source: 2040 Plan.

Note: The State's motor fuel tax rate is set at an average of 35 cpg throughout the study period.

Public Road Ownership and Spending

North Carolina is tied with Texas for the nation's largest state-maintained highway systems. NCDOT is responsible for maintaining about 76 percent of public road miles in the state (see Figures 3.5 and 3.6). Local governments are responsible for 21 percent of the roads, while the federal government is responsible for 3 percent. Among neighboring states, the Virginia DOT also is responsible for the maintenance of a significant share of its roadway network, whereas in Tennessee and Georgia, most of the responsibility falls to the counties and local governments. The DOTs of these two states are responsible for maintaining only 15 percent of public roads.

Figure 3.5 Miles of Public Roads by Ownership
2009

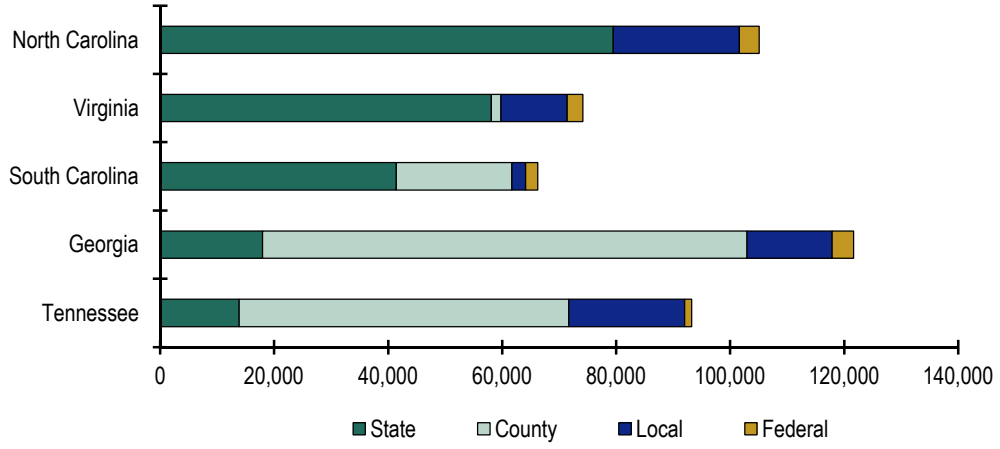
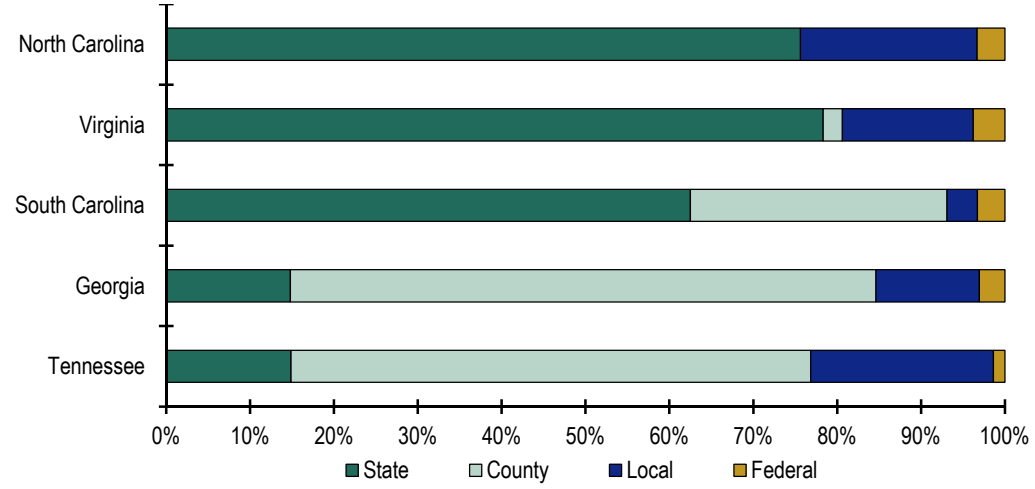


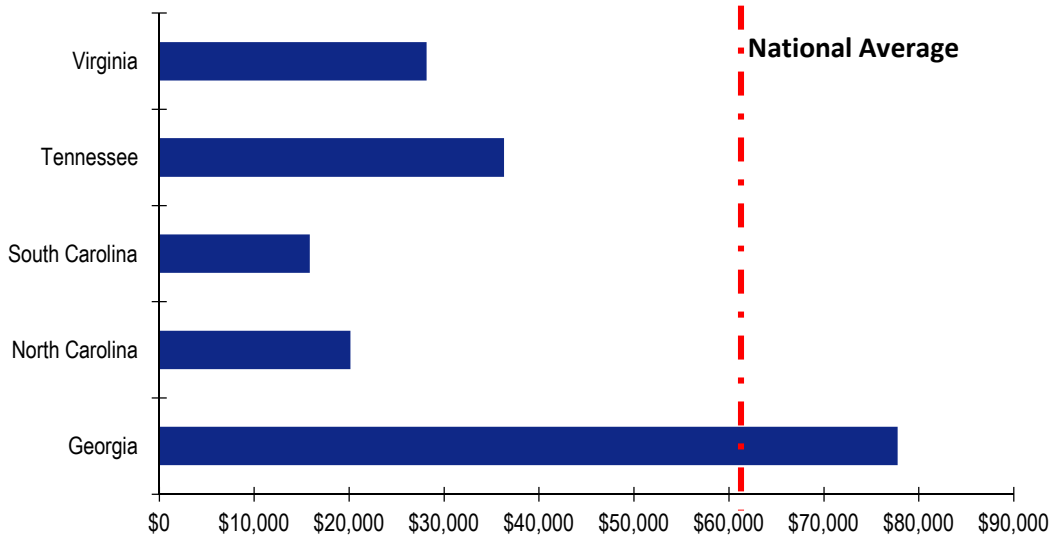
Figure 3.6 Share of Public Roads
2009



Source: U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, 2009.

In terms of state funding spending on transportation, North Carolina ranks 48th in the nation and fourth among its neighboring states, as shown in Figure 3.7. In 2009, North Carolina spent approximately $20,100 per lane-mile on state-maintained roadways, compared to a national average of $63,700 per lane-mile.

Figure 3.7 State Investment in State-Maintained Highways
$ per lane-mile, 2009



Source: NCDOT analysis of FHWA Highway Statistics, Tables HM-81 and SF-4 (2008)

The North Carolina Department of Transportation (NCDOT) has estimated the cost of the I-95 Corridor improvements at $4.543 billion (2011 dollars). The proposed improvements on this corridor include reconstruction of the existing roadway, adding additional capacity, and reconstruction of interchanges to improve traffic operation and safety. The Environmental Assessment (January 2012) included a tolled option, which would require investment in toll collection infrastructure. About $455 million (roughly 10 percent of the funding need) in existing funding (programmed and anticipated funding) has been identified through the Statewide Transportation Improvement Program (STIP). The Environmental Assessment (EA) included the evaluation of five funding scenarios for the I-95 Corridor improvements.

A list of potential funding options was developed for this study. The potential funding options are divided in three main groups:

1. Funding options proposed in the EA, including tolling
2. Increases to existing taxes and fees dedicated to transportation; and
3. New funding options at the state and local levels, including (but not limited to) those considered by NCDOT during the EA process and the 2040 Plan, and further divided in three sub-categories:

a. User fees;

b. Special taxes; and

c. Value capture.

Funding Options Proposed in the Environmental Assessment

NCDOT evaluated five funding scenarios as part of the Environmental Assessment (EA):

- **Continued Project Programming through the STIP (Status Quo**) – Under this option, only 10 percent of the necessary funding has been identified through 2020. NCDOT has estimated that with funding allocations of approximately $46 million per year, it would take over 100 years to address the corridor needs.
- **Increased Appropriation of Current State Funds to I-95 –** This option would require the transfer of existing NCDOT funding away from other programs to the I-95 Corridor. There are three factors affecting the feasibility of this option:
  - **Project Prioritization –** NCDOT's "From Policy to Projects" process is aimed at creating a transparent and strategic process to define the agency's investment policy based on long-term goals of safety, mobility and infrastructure health. The process uses data regarding pavement condition, traffic congestion and road safety, as well as input from local governments and NCDOT staff to determine transportation priorities. The process begins with the development of a 30-year Statewide Long-Range Transportation Plan (2040 Plan),[4] followed by the 10-year Program and Resource Plan,[5] and concluding with the 5-year STIP. Regional (NCDOT's Highway Divisions 4 and 6) needs for the 2018-2022 period have been estimated at $6,258 million, inclusive of I-95 needs over that period. Limited resources are distributed among competing priorities to achieve NCDOT's long-term goals.
  - **Current Funding Gap –** Based on the funding analysis of the 2040 Plan, NCDOT has estimated its needs over the next 30 years at $114.1 billion (2011 dollars), but existing funding sources are anticipated to cover only 47 percent of those needs. The 5-year STIP has programmed $8.3 billion in transportation projects through 2017, and draft STIP allocations for 2018-2022 are estimated at $8.7 billion. At that level of investment, only 14 percent of total needs over the 5-year period are funded. Funding available for Highway Divisions 4 and 6 would cover less than 11 percent of the region's needs (including projects beyond the I-95 Corridor) for the 2018-2022 period.

[4] The 2040 Plan was adopted in August 2012.

[5] Draft Policy to Projects Plan, September 2012.

  - **Equity Formula[6] –** Another factor affecting increased appropriations is the equity formula, which requires that STIP funds be distributed equitably among regions of the State. STIP funds are distributed based on population (50 percent), on the number of miles of intrastate highways left to complete in a region (25 percent), and the remaining 25 percent is distributed equally among the regions. The funding distribution restrictions would limit additional funding allocations to the proposed I-95 Corridor improvements.

- **Special Federal Funding** – This option would rely on successfully obtaining special federal appropriations through earmarks or discretionary grant programs. The new transportation bill signed into law in July 2012, Moving Ahead for Progress in the 21st Century (MAP-21), does not provide earmarks or special federal funding to meet the funding needs for the I-95 Corridor.
- **Increased Local Funding** – This option would require local governments to fund portions of the improvement program from either existing revenue streams (e.g., property taxes) or from special assessments or new sales taxes. As noted earlier, most roadways in North Carolina are state-maintained; therefore, the role of local governments in transportation funding is limited, with most local option transportation taxes allowed by legislation targeted to public transportation (e.g., local options sales tax, vehicle rental tax, and vehicle registration fees). Property taxes and local sales taxes are levied locally and used for education, public health, public safety, and other general services. The counties in the corridor generated $779 million in FY 2009 from both property and local sales taxes. Reallocating a portion of existing local revenues to the I-95 project needs would not be feasible without impacting other local needs. Furthermore, I-95 is a corridor of national and state significance, and placing this financial burden on local governments is likely to meet with opposition. NCDOT found that an additional 1 percent sales tax in the counties along the corridor may provide about $40 million annually to match STIP funding apportionments for the I-95 Corridor.[7]
- **Tolling** – This option would impose direct fees to users of the corridor. NCDOT's analysis of tolling in the I-95 Corridor estimated gross toll revenues of $250 million in the first year (2020) and $928 million in 2040, assuming phased implementation of tolling. Assuming all electronic tolling (AET) and the implementation of toll zones at 10-mile spacing on the mainline, the proposed I-95 Corridor improvements could be fully funded with toll revenues and debt financing. Toll revenues are anticipated to cover debt financing cost (principal and interest, and reserve requirements),

[6] At the time this report was being completed, changes were being proposed to move away from the equity formula to a State Mobility Fund where state funds would be allocated to projects of statewide, regional and local priority.

[7] I-95 Planning and Finance Study, Draft Financial Plan. October 2012.

operations and maintenance costs (O&M), and renewal and replacement costs (R&R).

Of the funding options considered by NCDOT, only tolling is anticipated to generate the necessary amount of revenue that could be leveraged to finance the corridor needs. In February 2012, the Federal Highway Administration (FHWA) granted NCDOT a conditional provisional reservation under the Interstate System Reconstruction and Rehabilitation Pilot Program to investigate the implementation of tolls on this corridor. For the purpose of the economic impact analysis, all funding options (in addition to tolling) will be considered and evaluated.

Increase Existing Transportation Funding

Under current state regulations, only funding from the Highway Fund can be used for the I-95 Corridor. The Highway Trust Fund is restricted to the completion of projects specified by legislation. If Highway Trust Fund allocations cannot be used for these projects, the funding may be used for projects on other routes or corridors, including the I-95 Corridor from South Carolina to Virginia. The most recent map for North Carolina's intrastate system shows uncompleted intrastate highway projects within Regions A and C. Only after completion of these projects could Highway Trust Fund allocations be diverted to other corridor needs in the region, including the I-95 Corridor.

It should be noted that any future increases to existing transportation fees would be distributed as specified by legislation and subject to state funding allocation requirements. Furthermore, the I-95 Corridor improvements will compete with other regional needs for any potential increase in funding allocations to Highway Divisions 4 and 6.

Motor Fuel Tax

As indicated earlier, North Carolina has one of the highest fuel tax rates in the nation today, mainly as a result of higher fuel prices in recent years, which determine the variable portion of the motor fuel tax rate. Although the excise tax rate has not been adjusted since 1992, an increase to the excise tax rate may not be politically acceptable, given the current tax rate resulting from higher fuel prices. Even at these rates, motor fuel tax revenues fall well short of addressing North Carolina's transportation needs.

Changes in fuel prices affect the stability of the fuel tax rate in North Carolina, as shown in Figure 3.1. Other options include adjusting the fixed portion of the motor fuel tax rate to some measure of inflation, such as the consumer price index (CPI) or to an inflation index gauging changes in highway construction and maintenance costs or state revenue needs.

NCDOT's 2040 Plan proposed eliminating current transfers from the Highway Fund for non-transportation uses, including the General Fund. The FY 2011/2012 budget included 7 percent in transfers to other state agencies/

programs. The STIP estimates $1.9 billion in transfers over the 2013-2017 period, with General Fund transfers estimated at $112 million per year.

The net yield of 1 cpg in FY 2011 is estimated at $52.4 million.[8] Based on STIP data, about 7 percent of the available STIP funding for capital will be allocated to Highway Divisions 4 and 6 over the 2018-2022 period. Assuming that any increase in revenue will be dedicated to capital, an additional $3.7 million per year could be available for the region by increasing the motor fuel tax rate by 1 cpg.

Motor Vehicle Registration and Title Fees

The 2040 Plan proposed adjusting vehicle registration fees by inflation every five years, starting in 2016. Assuming a 3 percent inflation rate, revenues from adjusting current vehicle registration fees could generate $6.1 billion (2011 dollars) over 25 years, per NCDOT's estimates for the 2040 Plan. Again, only a small portion of the additional revenues would be available for projects in Highway Divisions 4 and 6.

Highway Use Tax

Another proposal to raise additional revenues from the 2040 Plan consists of increasing the Highway Use Tax rate from 3 to 4 percent. The 2040 Plan estimated additional revenues at $3.25 billion (2011 dollars) over 25 years. Revenues from the Highway Use Tax are currently deposited into the Highway Trust Fund; therefore, additional revenues would have to be allocated outside the Highway Trust Fund in able to be used on the I-95 Corridor project.

Another option to generate additional revenues through the Highway Use Tax is to increase the $1,000 cap on commercial vehicles. The cap could be adjusted periodically based on inflation.

Eliminate Transfers to the General Fund

There are a number of annual transfers from NCDOT funds to other state agencies and into the General Fund. In 2012, a total of $390 million were transferred out of NCDOT funds. Some of the major transfers are for the State Highway Patrol ($199 million) out of the Highway Fund, and for reimbursing the General Fund for the revenue lost with the creation of the Highway Trust Fund and for the North Carolina Turnpike Authority ($77 million). The 2013-2017 STIP estimates total transfers from $380 million in 2014 to $408 million in 2017.

Table 3.2 summarizes the estimated 5-year transfers from NCDOT funds to other agencies and into the General Fund for fiscal years 2013 through 2017. The 2040 Plan forecast transfers $3.3 billion out of the Highway Fund over 28 years (2013-2040).

[8] North Carolina Department of Revenue, Motor Fuels Tax Collection data through FY 2011 (Table 53).

Table 3.2 NCDOT Funding Transfers
FY 2013 to 2017

	5-Year Total (Millions)
Department of Crime Control and Public Safety – Highway Patrol	$1,064
Department of Agriculture	$26
Department of Revenue	$26
State Treasurer	$129
Office of the State Controller – Best Shared Services	$2
Department of Public Instruction – Driver Education	$144
Department of Public Instruction – Civil Penalties	<$1
Leaking Underground Storage Tank Trust Fund (LUST)	<$1
Department of Health and Human Services – Chemical Test	$3
NC Global TransPark	$5
Transfer to General Fund and North Carolina Turnpike Authority (NCTA)	$525
Transfer Total	$1,924

Source: NCDOT Statewide Transportation Improvement Program (STIP), 2013-2017.

New Revenue Options

The potential to fully finance the proposed I-95 corridor improvements through increases in existing transportation funding sources is limited, given several factors, including restrictions in funding allocations and competing transportation investment needs. Based on funding strategies used in other states for transportation projects and input provided through stakeholder interviews, several new funding options will be explored. The new funding options were divided into three groups:

1. User fees;
2. Special taxes; and
3. Value capture

The funding options described in this section represent a range of options to support transportation investment that may be implemented by governing bodies at the local and state levels. Together, these approaches are intended to present a broad financial picture for North Carolina when considering potential funding sources, financial techniques, and tools to supplement existing revenue and financing tools in order to advance the I-95 Corridor improvements. The ability to fully finance the project cost will require a combination of funding sources and financing tools, and none of the revenue options presented here should be considered in isolation, but rather as part of a larger financial package.

New revenue options include taxes and fees that could be implemented statewide, as well as taxes and fees that could be implemented at the local level. Local option taxes have been widely adopted by local governments in most states (including North Carolina) to support transportation investments. They

include mechanisms such as sales, income, property, and vehicle taxes and fees. The application and level of local option taxes could be at the local or regional level; revenues are often dedicated to specific transportation projects or programs. For example, transit agencies in North Carolina currently rely on local sales and vehicle rental taxes and local vehicle registration fees to support transit capital and operating needs. The application of local funding to support highway needs is more limited, since most highways are state-maintained, with local funding responsibilities limited to some local roads and streets. FHWA Highway Statistics show that most local funding for roads comes from General Fund appropriations (local sales and property taxes). The application of local option taxes to pay for improvements on the I-95 Corridor will require support from the counties where these new funding sources would be levied. The public acceptability of local funding dedicated to the I-95 Corridor is likely to be low given the national and regional significance of the corridor. Revenue sources such as local sales, income, and property taxes would generate more revenues compared to other local revenue sources, given their broader tax base.

Therefore, not all of the transportation funding approaches described in this section may be appropriate for use in North Carolina on the I-95 Corridor. The implementation of some of the proposed revenue sources and financing tools may require legislative action, or the implementation of policies to ensure the use of these new sources for transportation needs. At the local level, some of the local option revenue sources that are already in place are used to support other local public services, and dedicating or allocating a higher share of existing resources to transportation needs means that their availability for other important public services (which may also have a growing need for funding) will be reduced.

User Fees

Express Toll Lanes In addition to traditional tolling, another funding option related to direct user charges is the application of pricing options, such as managed lanes or tolls on new capacity only. For the most part, managed lane projects are built for their traffic management characteristics – the ability to maintain a free-flowing, reliable path at all times – rather than their ability to fund project construction. Most yield enough revenue to cover operating expenses, and some also contribute funds to corridor transit operations or to repay capital expenses. Drivers' willingness to pay tolls is one of the most important factors when forecasting traffic and revenue for managed lanes. In addition, the feasibility of managed lanes in the corridor will depend on existing or anticipated congestion and the potential for significant travel time savings and improved travel reliability. To the extent that portions of the I-95 Corridor exhibit these conditions, the implementation of high-occupancy toll (HOT) lanes or express toll lanes (ETL) on new capacity could be considered as potential revenue sources.

The implementation of tolling and pricing on existing roads generally faces both public and political opposition, largely based on considerations of double taxation. Also, some of the concerns expressed by different stakeholder groups[9] interviewed for this study include:

- Equity across the state regarding similar corridors remaining toll-free; a tolling policy should be addressed statewide; and
- Financial burden on corridor residents.

Vehicle-Miles Traveled (VMT) Fees The long-term sustainability of motor fuel taxes as the main source for transportation funding is a concern, given the anticipated erosion of revenue yield with long-term improvements in fuel efficiency and the introduction of alternative fuels. VMT fees have been identified as an alternative or supplement to fuel-based taxes. The fees would help states cope with declining revenues from state motor fuel taxes, which as described throughout this report have historically provided a substantial portion of state transportation funding. Presumably, fees could vary based on time of travel, the roadways traveled, and vehicle type. VMT fees are typically seen as a longer-term solution for transportation funding. The fees have a high-potential revenue yield, but currently are not being utilized by any state.

VMT fees have been the subject of several national studies, including the National Surface Transportation Infrastructure Financing Commission. While VMT fees have great potential to both efficiently manage the transportation system and generate significant revenues, there are a number of technical and transition challenges, as well as substantial public and political acceptance issues that will need to be overcome in order to replace motor fuel taxes with VMT fees as the foundation of the U.S. transportation financing system.

VMT on all functional classes of highway in North Carolina was estimated at 102.4 billion[10] in 2010, a slight decline from 2009 (0.2 percent). Based on this statistic, the annual yield of a 1-cent fee per VMT is close to $1.0 billion, compared to $1.4 billion[11] generated by motor fuel taxes in 2010.[12] The 2040 plan estimated the revenue potential of a 2-cent per VMT fee at $26.6 billion (2011 dollars) over 20 years.[13]

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[9] The Public Outreach process for the North Carolina I-95 Economic Assessment is documented in the I-95 Environmental Assessment report available at www.driving95.com.

[10] 2010 FHWA Highway Statistics, Table VM-2.

[11] 2010 FHWA Highway Statistics, Table SF-1.

[12] MFT rates at 30.3 cpg (January-June 2010) and 31.9 cpg (July-December 2010).

[13] The 2040 Plan assumes implementation by 2020, and 30 percent reduction of gross revenues to account for the cost of collection and evasion.

A disadvantage of VMT fees is that they also are susceptible to increases in fuel prices, as experienced nationwide in 2008 when VMT levels declined as fuel prices rose; however, VMT fees would fare better compared to motor fuel taxes, since improvements in fuel efficiency (a long-term effect of high fuel prices) would not erode their yield. In addition, VMT fees should be indexed over the long term to ensure that their purchasing power keeps pace with inflation and the growth in the cost of delivering transportation projects. In addition, VMT fees are likely to be implemented to replace motor fuel taxes. As such, current policy issues associated with funding allocation and restrictions on use would impact their potential use for the I-95 Corridor improvements.

Short-Term Vehicle Lease Rental car taxes are in place in 30 states, and in some, the rental car tax is levied in lieu of a sales tax. Seven states dedicate all or a portion of vehicle rental taxes for roadways, including Florida, Hawaii, Iowa, Nevada, Oklahoma, South Dakota, and Utah. In North Carolina, revenues from an 8 percent tax on short-term vehicle leases go into the General Fund.

The 2040 Plan proposed redirecting revenues raised by the short-term vehicle lease tax from the General Fund to NCDOT. The plan assumed that revenues would remain flat over the 2040 Plan period. Assuming this revenue source was redirected to NCDOT in 2016, total projected revenues are estimated at $630 million (2011 dollars) over 25 years.

The yield of this potential revenue source is low, and redirecting the revenues to NCDOT implies the same allocation restrictions noted to funds deposited into the Highway Fund and the Highway Trust Fund.

Local Vehicle Registration Fees In North Carolina, Regional Transit Authorities (RTA) and counties are authorized to implement local vehicle registration fees for transit. Similar to local sales taxes, local vehicle registration fees would require legislative action providing counties with the ability to set their own investment priorities.

Local Motor Fuel Tax According to the AASHTO Center for Excellence in Project Finance, 15 states authorize local option motor fuel taxes, with widespread use in 5 states (Alabama, Florida, Hawaii, Illinois, and Nevada). For example, Florida has made extensive use of local option fuel taxes for transportation purposes, where counties can impose up to 12 cpg. In North Carolina, however, legislation prohibits the implementation of local motor fuel taxes.

Vehicle Property Tax. The 2040 Plan included increasing the vehicle property tax as a potential option to fund statewide transportation needs. This option assumes that a 5 percent increase in existing local property tax collections on motor vehicles would be dedicated for local road projects, assuming an average local tax rate of $0.07 per $100 of assessed valuation. If implemented in 2016, the 2040 Plan estimated revenues from this source at $500 million (2011 dollars).

At the corridor level, vehicle property taxes will not generate significant revenues, based on the statewide estimates from the 2040 Plan.

Special Taxes and Fees

Sales Tax Counties in North Carolina have the authority to levy up to 2.25 percent in local sales taxes for general use. Most counties levy 2 percent; among the counties in the I-95 Corridor, Cumberland, Halifax, and Robeson counties currently levy 2.25 percent.

Local option sales taxes for transportation are authorized in North Carolina for public transportation only. Currently, Mecklenburg County levies an additional 0.5 percent dedicated to transit. The counties of Durham, Forsyth, Guilford, Orange, and Wake may enact a 0.5 percent local sales tax to fund transit investments, upon voters' approval; other counties could implement a 0.25 percent local sales tax, subject to voters' approval. Both Durham and Orange Counties approved a 0.5 percent sales tax for transit that will be collected starting in 2014.

New local option sales taxes for transportation would require legislative action providing counties the ability to set their investment priorities (e.g., roads, transit).

Property Tax In North Carolina, property taxes are supervised by the state, while tax assessment and collection is administered by the counties and municipalities. Revenues from property taxes fund many local government services. Current county tax rates in the corridor range between $0.67 and $0.92 per $100 valuation. County property tax rates statewide range between $0.279 and $1.03 per $100 valuation. Some municipalities also levy property taxes.

Increasing current tax rates and dedicating a portion of new or existing property tax revenues levied in the counties served by the I-95 Corridor is a potential option for funding the proposed I-95 Corridor improvements.

Payroll Taxes and Income Local governments in North Carolina do not have legislative authority to collect income or payroll taxes. In the United States, about 20 states authorize local income or payroll taxes, although only a few are dedicated to transportation, specifically to transit, including Indiana, Kentucky, Ohio, and Oregon. In Virginia, some counties[14] are authorized to levy, local income taxes for transportation, if approved by voters, but such taxes have not been adopted anywhere in the state.

Income taxes are considered equitable in that people with higher income generally pay more than those with lower income. When applied at the local level, however, geographic equity concerns arise, and it may encourage people to settle where local income taxes are lower or not collected. In the case of payroll taxes, it may encourage businesses to relocate outside the taxation locality/region.

[14] Arlington, Fairfax, Loudoun, and Prince William, and the Cities of Alexandria, Fairfax, Falls Church, Manassas, Manassas Park, Norfolk, and Virginia Beach.

Hotel/Room Occupancy Taxes Hotel/room occupancy taxes are common revenue generating mechanisms employed by municipal and county governments. These are applied either as a sales tax on the cost per room or as a daily fee per room, and revenues are often dedicated to tourism or to the development of tourism-related facilities. Its application to transportation is very limited, although some local governments have enacted this type of tax to support transportation investments where infrastructure improvements or transportation services are needed to enhance visitor experience, accessibility and mobility.

In North Carolina, counties and municipalities may collect occupancy taxes up to 6 percent, which must be used to promote tourism and travel (two-thirds of revenues) and tourism-related purposes (one-third). Two counties in the I-95 Corridor (Cumberland and Harnett) already levy the maximum tax rate. Any I-95 Corridor improvements funded with occupancy taxes must demonstrate tourism-related benefits, and revenues may not be sufficient to support a significant portion of the needs.

Billboard Fees (outdoor advertising), Logo Signs and Tourist-Oriented Directional Sign (TODS) Program By legislation, NCDOT may levy an initial fee not to exceed $120, and an annual renewal fee of $60 per billboard[15], with revenues going into the Highway Beautification Fund. The application fee for directional signs is $60, with a renewal fee of $30 annually. With over 7,000 billboards reported in the state[16], billboard fees generate about $420,000 annually statewide (assuming a renewal fee of $60). Some stakeholders have suggested increasing billboard fees as a funding option for the I-95 Corridor improvements. Outdoor advertising generated $488,770 in FY 2010.

Logo and Tourist-Oriented Directional Signs provide information about services and tourist attractions along North Carolina roadways. The Logo signs (also known as the "blue signs") are installed on access-controlled facilities (such as I-95) where space is available. The annual fee is $300 per mainline, ramp and trailblazer panel. The fee is set by the Board of Transportation based on the cost of installing and maintaining the logo signs. The TODS program provides signage for tourist attractions on state roads (non-freeway) in rural areas or cities and towns with a population of less than 40,000. The annual fee for TODS is $200 per panel. The fee is set by NCDOT to cover the cost of installing and maintaining the sign, and administration of the program. The logo signs and the TODS program are revenue neutral. Logo signs generated $3.8 million in FY2010; revenues for TODS in FY2010 were $34,400.

[15]OUTDOOR ADVERTISING CONTROL ACT OF 1967, Article 11, Chapter 136 of the General Statutes of North Carolina

[16]http://www.carolinapublicpress.org/2829/nc-electronic-billboard-bill-revised (last accessed on January 16, 2013).

The revenue yield of these funding sources is low compared to funding needs on the I-95 Corridor, and dedicating revenues to the project may require legislation dictating the uses of new revenues levied in the corridor.

Screening Criteria

When considering potential revenue sources for transportation, there are common criteria that are employed to evaluate advantages and disadvantages of each source. These criteria, which were vetted with the Advisory Council, may be used as a guide when determining the feasibility of these sources for application to the I-95 Corridor improvements in North Carolina:

- **Adequacy and Predictability –** This criterion refers to both the overall magnitude of funds a funding source is capable of generating and how reliable this yield is predicted to be over time.
  - **Adequacy –** Strategies are given a "high" rating if they are capable of producing large amounts of revenue. In particular, fuel taxes have been the mainstay of transportation revenues for decades, receiving generally a "high" rating related to yield. Sources or strategies are given a "low" rating if the strategies are inherently short-term or low-yield. For example, a revenue source like an impact fee would rank "low" in adequacy, given its narrow tax base and the fact that it is a onetime charge.
  - **Predictability –** A funding strategy with a "high" rating produces revenues that are predictably sustained over time, whereas a "low" rating refers to funding sources whose revenue generation potential over time is more uncertain. For example, motor fuel taxes may not be reliable over time because, if not indexed, the revenue degrades with both inflation and lower consumption as vehicles become more fuel efficient. If they are indexed, the inflation impact is removed, and revenues are only impacted by lower demand.
- **Economic Efficiency –** This criterion refers to the extent that a strategy provides clear pricing signals that encourage users and providers to minimize unproductive travel and maximize economic growth. Therefore, strategies with "high" economic efficiency are those that help to make the marginal prices of goods and services reflect their true costs. Strategies with "low" economic efficiency are those that distort the market by collecting fees that are unrelated to the services they help fund. For example, sales taxes would be considered "low" in economic efficiency, as these are not directly related to transportation and would not send direct signals of efficient use of the transportation network. A robust measure of economic efficiency includes the full network effects that are gained from completing a single segment of roadway.
- **Equity –** This criterion refers to the extent that each strategy places inequitable burdens on different groups of people financially, or unfairly

restricts access to basic transportation services. Excise and sales taxes and user fees are all regressive, since they require those with lower incomes to expend a disproportionately higher share of their incomes to pay the tax or fee. The only funding strategies that are likely to receive a "high" rating are those that levy different fees *based on income levels*, including income or payroll taxes, property taxes, and vehicle personal property.

- **Administrative Effectiveness –** This criterion refers to the cost and ease of administering each fee or tax system; that is, minimizing evasion and the logistical difficulties imposed on the public in the process of paying the fee or tax in a cost-effective way. The easiest fee-collection systems, designated as having "high" administrative effectiveness are those that piggyback on other payments at the point of sale, including fuel taxes and sales taxes. Strategies are designated as "medium" if they require the user to make a unique payment solely for the purpose of paying fees or taxes, but where this process has been reasonably streamlined. New funding sources or those with high administrative costs are designated as "low."
- **Political Feasibility/Public Acceptance –** Because all of the funding sources require **t**he public to pay more, it is likely that they will all be generally unpopular. Funding sources that are somewhat removed from the transportation project or service they are supporting tend to be particularly unpopular, such as sales, property, and income taxes and general revenue.
- **Leverage Potential** – Most (if not all) large-scale projects require financing, since revenue streams are generally not sufficient to meet annual cash flow needs to pay-as-you-go. The predictability of a revenue source plays a key role in determining a revenue source's leverage potential. Even some low-yield sources could have a "medium" leverage potential, if pledged in combination with other revenue sources. Ideally, the financial plan will include a combination of revenue streams that reduces risk and achieves good bond ratings, which in turn lowers financing costs.
- **Share of tax paid by in-state vs. out-of-state residents/businesses** – I-95 is a corridor of national, regional and statewide significance, serving both interstate and intrastate travel. This criterion considers the potential to share the tax burden with out-of-state users, or if the tax burden would be carried mainly by North Carolina residents and businesses. Tolling would be rated "high" because out-of-state travelers would pay their share for using the corridor, whereas property taxes would be rated "low" since the tax is paid by residents and businesses where the additional property tax is imposed to pay for the project.

Revenue mechanisms with high adequacy and high stability/predictability are generally appropriate for capital spending and could potentially be leveraged through bonding or used as a repayment source for other financing tools. Revenue sources with lower yields and high to medium predictability that can be collected annually may be used to support ongoing expenses such as operations and maintenance, or can be combined with other revenues to be leveraged. Revenue sources with sunset provisions or one time payments (e.g., impact fees)

are not appropriate for ongoing operating and maintenances expenses, but can provide funding for capital improvements. Note that financing tools (e.g., debt instruments and loans) will not be evaluated against these criteria, and that the key to financing is to have viable revenue sources in place for repayment. Table 3.3 defines the rating ranges for the evaluation criteria.

Initial Screening of Funding Options

Alternative revenue options were evaluated based on the criteria described above. The ratings (from low to high) are intended to provide a qualitative assessment of the revenue options to inform decision-makers about the pros and cons of implementation. The ratings are subjective, and not intended to support or dismiss any of the revenue options, but should help in narrowing down the universe of potential funding options.

The study team assigned ratings by criteria for all the revenue options based on existing research, professional judgment, and input from the stakeholders' surveys conducted for this study.

The study team ranked the potential revenue options based on these criteria. . None of the revenue alternatives considered for the I-95 project ranked high in all criteria; therefore, the shortlist of potential revenue options focused on choosing alternatives that could be leveraged to support a major investment.

All revenue options and the ranking analysis were presented to the Advisory Council, and a shortlist of funding options was developed after consultation with the Council and NCDOT. The shortlist of potential funding options was further evaluated in the economic assessment analysis.

Table 3.3 Rating Definition for Revenue Evaluation Criteria

Criterion	Low	Medium	High
Adequacy	Revenue streams are low and may not provide sufficient funding to support a project or program, or can only be implemented over the short term.	Revenue streams are close to or comparable to existing revenue options. Levies may partially support a project or program, and could be leveraged through finance.	Revenue streams are higher than existing revenue options. Levies can support a project or program over the long term.
Predictability	Revenue fluctuations are uncertain and highly volatile, making it difficult to predict future revenue streams. Fluctuations in revenues are highly variable year to year, and specific factors affecting stability cannot be identified.	Revenue fluctuations are generally consistent over time or more predictable, and the factors affecting stability are generally known, such as economic downturns.	Revenue streams are highly predictable, with a long history of receipts for which trends can be easily identified. Fluctuations in revenues are low or nonexistent.
Economic Efficiency	The revenue source and the use of the system are unrelated, thus it does not provide clear pricing signals, leading to inefficient use of the system.	The revenue source and the use of the system are indirectly related (e.g., motor fuel taxes), yet pricing signals are not clear and users are not encouraged to make efficient use of the system.	There is a strong relationship between the revenue source and the use of the system, sending clear pricing signals, and encouraging the efficient use of the system. The revenue option reflects the true cost of using the system.
Equity	Low-income populations have to spend a higher share of their income to pay the tax or fee compared to other groups, or are unfairly restricted from using basic transportation services.	The burden on low-income populations is lower, but they still spend a higher share of their income to pay the tax/fee compared to other groups.	The tax or fee is based on income levels.
Administrative Effectiveness	Administrative and compliance costs account for a significant share (e.g., over 50%) of total revenues, or require new collection systems and/or technologies.	Administrative and compliance costs account for a reasonable share (e.g., about 10 to 20%) of total revenues. The collection system is streamlined, reducing the administrative costs.	Administrative and compliance costs are low (e.g., less than 10% of total revenues), and collection and monitoring can be piggy-backed under existing collection systems.
Political Feasibility/ Public Acceptance	Highly unpopular and low support from public and decision-makers.	Moderate support from public and decision-makers.	High support from public and decision-makers.
Leverage Potential	Revenue streams are not appropriate for long-term debt due to factors such as low yield, high volatility and uncertainty.	Revenue streams are generally predictable over time and could be leveraged in combination with other sources of revenue.	Revenue yields are sufficient to support financing, and rating agencies would generally consider the revenue source low-risk.
Share of tax paid by in-state vs. out-of-state residents and businesses	Tax paid primarily in-state.	A portion of the tax burden is transferred out-of-state.	The tax burden is shared among in-state and out-of-state based on use (e.g., tolls) or significant share of the tax burden is transferred out-of-state.

Funding Alternatives Advanced to the Economic Analysis

After presenting the preliminary evaluation of funding sources to the Advisory Council and NCDOT, a shortlist of potential revenue sources was developed to be advanced as part of the economic impact assessment of the I-95 corridor improvements. The revenue options evaluated include:

- Tolling
  - Build Toll: As evaluated in the Environmental Assessment (EA)
  - Build Toll with local mitigation (local trips get a 50 percent toll rate discount)
- Sales tax increase over 10-years to support transportation investments (including the I-95 corridor improvements)
- State motor fuel tax rate increase
- Federal motor fuel tax increase
- Statewide personal income tax rate increase
- A funding package aimed at dividing the sources of revenues and not relying in a single source of funding (assuming 10-year and 30-year revenue streams) was also developed. This funding package revenue consisted of:
  - Highway use tax
  - Motor vehicle registration fees
  - Sales tax

For the tolling options, the team used the toll revenue forecast[17] developed for the EA. The local mitigation strategy was tested with the travel demand modeling and economic impact analysis efforts. Based on travel demand modeling estimates of local and through traffic on I-95, the revenue impact of the toll mitigation strategy was analyzed. For the remaining revenue options, the team estimated annual revenue streams and the required tax rate increases for each funding source to finance the I-95 corridor improvements. Table 3.4 summarizes the annual revenues generated by each funding option in 2015 and 2040.

[17] North Carolina Department of Transportation, I-95 Planning and Finance Study – Draft 2 Financial Plan (January 2013).

Table 3.4 Summary of Revenues Estimates for the I-95 Project by Funding Option

Millions, YOE$

Funding Options	Rate	Share to I-95	2015	2024	2040	10-year revenues (2015-2024)	30-year revenues (2015-2044)
Build with Tolls	$0.0975 per mile (rural) $0.195 per mile (urban)	100%	N/A	$428	$928	$1,745	$16,607
Build with Tolls – local mitigation	50% discount toll for local trips	100%	N/A	$286	$619	$1,164	$11,071
Increase State motor fuel tax	$0.071 per gallon	100%	$368	$361	$354	$3,691	$10,771
Increase Federal motor fuel tax	$0.138 per gallon	33%	$243	$238	$234	$2,437	$7,111
Increase Statewide Sales Tax[b]	1.0%	33%	$1,162	$1,714	N/A	$14,227	$14,227
Increase Statewide Personal Income Tax	0.039%	100%	$164	$264	$536	$2,108	$10,814
Funding Package of Multiple Sources (30 years)							
Statewide Sales Tax	*1%*	*15%*	*$176*	*$266*	*$518*	*$2,183*	*$10,688*
Vehicle Registration Fees	*5% fee increase*	*100%*	*$13*	*$14*	*$17*	*$138*	*$455*
Highway Use Tax	*1%*	*5%*	*$9*	*$10*	*$14*	*$93*	*$345*
Total (Combined)			$198	$291	$548	$2,415	$11,488
Funding Package of Multiple Sources (10 years)							
Statewide Sales Tax	*1%*	*60%*	*$703*	*$1,065*	*N/A*	*$8,731*	*$8,731*
Vehicle Registration Fees	*50% fee increase*	*100%*	*$132*	*$144*	*N/A*	*$1,384*	*$1,384*
Highway Use Tax	*1%*	*50%*	*$90*	*$103*	*N/A*	*$934*	*$934*
Total (Combined)			$925.6	$1,312	$0	$11,049	$11,049

[a] Total revenues for the local mitigation scenario are about 2/3 lower as compared to the base tolling scenario.

[b] Total revenues from new sales tax dedicated to I-95 and other transportation projects, over 10 years (2015-2024)

Revenue Forecast of Funding Options

The study team developed revenue forecasts for the non-toll options based on the following assumptions:

- Collection of dedicated revenues for the I-95 project will begin in 2015, and will continue over 30 years, with a few exceptions where revenues are assumed to be dedicated to the project for only 10 years.
- Tax rates were set based on preliminary assumptions of project financing and the calculation of 30-year principal and interest requirements, assuming a 5 percent interest rate on financing for project costs. No O&M or rehabilitation and renewal expenses are included for the non-toll options, only capital investment. The rates should provide an idea of the magnitude of potential tax rate increases required to implement the project, and they will be applied to assess their economic impact. Detailed financial modeling would be required to determine revenue stream requirements of the financial structure to deliver the project.

A summary of the screening of each of the funding alternatives advanced to through the screening process for the economic assessment follows.

Tolling on I-95

Adequacy	Predictability	Economic Efficiency	Equity	Administrative Effectiveness	Political Feasibility/ Public Acceptance	Leverage Potential	Fair Share of Tax Payment
High	Medium	High	Medium	Med-High	Low	High	Medium

NCDOT estimated toll revenues assuming a toll rate of $0.0975 per mile (2020 dollars) in the rural segments of the corridor, and $0.195 per mile (2020 dollars) in the urban areas. NCDOT assumed that tolls would be adjusted annually at an assumed rate of 2.5 percent to match inflation, and the revenue model accounts for a leakage rate of 5 percent and traffic ramp-up between 2020 and 2023. NCDOT estimated revenues starting at $250 million in 2020, increasing to $928 million by 2040 in year of expenditure dollars. The NCDOT financial plan indicates that toll revenues would be sufficient to finance 100 percent of the I-95 corridor improvements, in addition to the necessary O&M expenses and rehabilitation and renewal costs.

The I-95 corridor is an existing corridor with a proven traffic stream. However, adding tolls will result in some traffic diversion, the magnitude of which is uncertain. The travel demand model analysis conducted for the economic analysis shows that vehicle miles traveled (VMT) on I-95 will decline 28 percent by 2020 under the "toll build" scenario, whereas VMT on I-95 is forecast to

increase 13 percent by 2020 under the "no toll build" scenario (see Table 3.5). Understanding the potential for traffic diversion and other risks associated with tolling allows for the development of robust toll revenue forecasts.

Table 3.5 I-95 Vehicle Miles Traveled (VMT)

Scenario	I-95 VMT 2011	I-95 VMT 2020	I-95 VMT 2040	VMT % Change 2011-2020	VMT % Change 2011-2040	VMT % Change 2020 No Build	VMT % Change 2040 No Build
BAU	7,274,284	8,148,403	10,227,700	12%	41%		
Build, no funding specified	N/A	8,188,883	10,553,714	13%	45%	1%	3%
Build with tolls	N/A	5,218,202	7,018,845	-28%	-4%	-36%	-31%
Build with Mitigated Tolls	N/A	6,857,715	8,723,697	-6%	20%	-16%	-15%

Tolling on I-95 with Local Mitigation

The local mitigation scenario assumed that local travelers would get a 50 percent discount on their tolls, which is estimated to result in 16 percent of I-95 VMT diverting away in 2020, compared to 36 percent diverting away in the Toll Build scenario with no discounts (see Table 3.5). Compared to the base (2011) VMT, the Build with mitigated tolls would result in a VMT reduction of 6 percent by 2020, compared to a VMT decline of 28 percent for the Build with tolls scenario. The discounted toll scenario would reduce expected toll revenue by almost 33 percent below that expected from the non-discounted scenario, since local trips are significant share of the I-95 traffic.

Statewide Sales Tax

Adequacy	Predictability	Economic Efficiency	Equity	Administrative Effectiveness	Political Feasibility/ Public Acceptance	Leverage Potential	Fair Share of Tax Payment
High	Medium	Low-Med	Medium	High	Medium	High	Low-Med

The statewide sales tax increase was modeled after the recently approved sales tax for transportation in Arkansas, and similar efforts in other states. This scenario assumed that a statewide sales tax increase of 1.0 percent will be in place for 10 years and that those revenues will be dedicated to transportation, including the I-95 Corridor improvements.

The REMI economic model was used to forecast growth of annual tax revenues based on adjusted growth in taxable consumer expenditure used for the economic impact analysis. If sales tax collection began in 2015, it would generate about $14.2 billion over 10 years.

State Motor Fuel Tax Increase

Adequacy	Predictability	Economic Efficiency	Equity	Administrative Effectiveness	Political Feasibility/ Public Acceptance	Leverage Potential	Fair Share of Tax Payment
Low[a]	Med-High	Medium	Low-Med	High	Low	High	Low-Med

[a] Based on current funding allocations through equity formula.

The team estimated revenue streams from a motor fuel tax (MFT) increase based on NCDOT's 2040 Plan revenue forecasts. The initial analysis estimated the MFT rate increase required to finance the I-95 corridor improvements. However, under current legislation, motor fuel tax receipts are distributed among the Highway Fund and the Highway Trust Fund. NCDOT estimates that from an increase in MFT of $0.01/gallon, only $0.00016/gallon (or 1.6%) could be used for the I-95 project.

NCDOT's forecast of motor fuel consumption was applied to estimate the revenue yield of $0.01/gallon in additional MFT. NCDOT's revenue model applied two fuel consumption scenarios from the Department of Energy (DOE): a reference case (based on the Annual Energy Outlook 2012), and the CAFE case, which assumed new CAFÉ standards of 54.5 mpg for cars and light duty trucks by 2025. For the purpose of this analysis, the CAFÉ case was applied to account for this recently-adopted federal policy on fuel efficiency standards for light duty vehicles, which would impact long-term fuel consumption and revenue yield.

The net revenue yield of 1-cpg was estimated at $51.8 million in 2015, declining to $49.8 million by 2040. These values imply that an additional 7.1 cpg would be needed to finance the I-95 Corridor improvements if all of the new revenue could be devoted to the project. However, assuming that current MFT revenue distribution to the Highway Trust Fund and the Highway Fund does not change, NCDOT would have to levy a motor fuel tax rate of over $4.40 per gallon to fund the project over 30 years with Highway Trust Fund allocations to Divisions 4 and 6.

Federal Motor Fuel Tax Increase

Adequacy	Predictability	Economic Efficiency	Equity	Administrative Effectiveness	Political Feasibility/ Public Acceptance	Leverage Potential	Fair Share of Tax Payment
High	Med-High	Medium	Low-Med	High	Low	High	Low-Med

Based on input from the Advisory Council, the team developed an estimate of how much the Federal government should increase the federal motor fuel tax rate (currently at 18.4 cpg for gasoline and 24.4 cpg for diesel) to fund the I-95 corridor improvements. The following assumptions were applied to estimate the federal MFT rate increase:

- North Carolina is a donor state, with a 96 percent return of the payments into the Federal Highway Trust Fund (HTF) since 1956.[18] It should be noted, however, that NCDOT's funding apportionment and allocations of Federal HTF funds over the last few years have exceeded North Carolina's payments into the fund.
- NCDOT should provide 10 percent match to additional federal funds, assuming the standard federal share of 90 percent for project on the Interstate system.
- 1/3 of the additional federal funding to NCDOT over 30 years will be dedicated to the I-95 Corridor improvements.
- Motor fuel tax yield is based on fuel consumption assumptions that account for recently-adopted CAFÉ standards for light duty vehicles.

Based on this assumption, the Federal government should raise the motor fuel tax rate by 13.8-cpg to generate sufficient funds to finance the I-95 corridor improvements.

Statewide Personal Income

Adequacy	Predictability	Economic Efficiency	Equity	Administrative Effectiveness	Political Feasibility/ Public Acceptance	Leverage Potential	Fair Share of Tax Payment
High	Medium	Low	Med-High	High	Low	High	Low

[18] U.S. DOT, Federal Highway Administration, Highway Statistics 2011, Table FE-221b.

For this revenue option, it was assumed that the additional revenues generated by the statewide personal income tax rates would be dedicated to the I-95 project. We also assumed that as a new revenue source for transportation, it would not be subject to the distribution formulas of the Highway Fund and the Highway Trust Fund. The income tax rate increase required to finance the I-95 corridor was estimated at 0.039 percentage points on the current personal income tax rate. If the income tax is raised and revenues are dedicated to transportation, it is likely that those revenues will not be fully dedicated to the I-95 corridor project, but rather, used to fund other transportation needs. Assuming that 1/3 of the revenues are dedicated to the I-95 Corridor improvements, the income tax rate increase is estimated at 0.12 percentage points.

Personal income data for North Carolina was extracted from the REMI economic model to estimate the total revenues generated by the additional 0.039% income tax rate.

Table 3.6 summarizes the percent change on personal income tax rates from the additional tax. The statewide personal income tax rate would increase between 0.5 and 0.65 percent by adding the 0.039% rate across all income brackets. The 0.039% income tax would generate about $10.8 billion over 30 years.

Table 3.6 Personal Income Rates and Percent Change for I-95 Corridor Improvements
Statewide

Additional Income Tax Rate for I-95	Personal Income Tax Bracket	Additional Tax (0.039%)	Percent change in tax rate
Earnings up to:	6%	6.039%	0.65%
$12,750 (single)/			
$21,250 (couple)			
Earnings between:	7%	7.039%	0.56%
$12,750 to $60,000 (single)/			
$21,250 to $100,000 (couple)			
Earnings over $60,000 (single)/	7.75%	7.789%	0.50%
$100,000 (couple)			

Source: North Carolina Department of Revenue and Cambridge Systematics analysis

Table 3.7 illustrates the tax impact for selected incomes within the three brackets for the assumed statewide tax rate increases.

Table 3.7 Illustrative Tax Impact for Selected Incomes (Statewide Tax)

Taxable Income (single)	Current Income Tax	Income Tax @ +0.039% Statewide (I-95 only)	Additional Income Tax @ +0.039%	Percent Change @ +0.039	Income Tax @ +0.12% Statewide	Additional Income Tax @ +0.12%	Percent Change @ +0.12%
$10,000	$600	$604	$4	0.65%	$612	$12	2.0%
$30,000	$1,973	$1,984	$12	0.59%	$2,008	$35	1.8%
$80,000	$5,623	$5,654	$31	0.55%	$5,716	$94	1.7%

Source: Cambridge Systematics

Funding Package (Sales Tax, Highway Use Tax and Vehicle Registration Fees)

Adequacy	Predictability	Economic Efficiency	Equity	Administrative Effectiveness	Political Feasibility/ Public Acceptance	Leverage Potential	Fair Share of Tax Payment
Medium	Medium	Low	Medium	Med-High	Low-Med	Med-High	Low-Med

This funding package combines:

- Increases to existing transportation revenues:
  - Highway Use Tax; and
  - Vehicle registration fees
- Adoption of a new dedicated sales tax for transportation.

It should be noted that both the Highway Use Tax and vehicle registration fees are restricted by the equity distribution formula, which would allow only about 1.8% of any tax increase to be dedicated to the I-95 corridor. We assumed that a portion of both the increase to existing vehicle-related taxes and the new sales tax would be dedicated to the I-95 to cover the funding needs for the project, albeit this share was not restricted by the equity formula. In reality, without changes in current legislation, the tax rates presented here would have to be much higher in order to satisfy both the equity formula requirements **and** fully funding the I-95 project.

Two periods for collection of new revenues were assumed: 10 and 30 years. We assumed revenue collection would begin in 2015. Figures 3.8 and 3.9 illustrate the assumptions applied to calculate 10- and 30-year revenue streams for the project, respectively.

Figure 3.8 Funding Package
10 years, YOE dollars

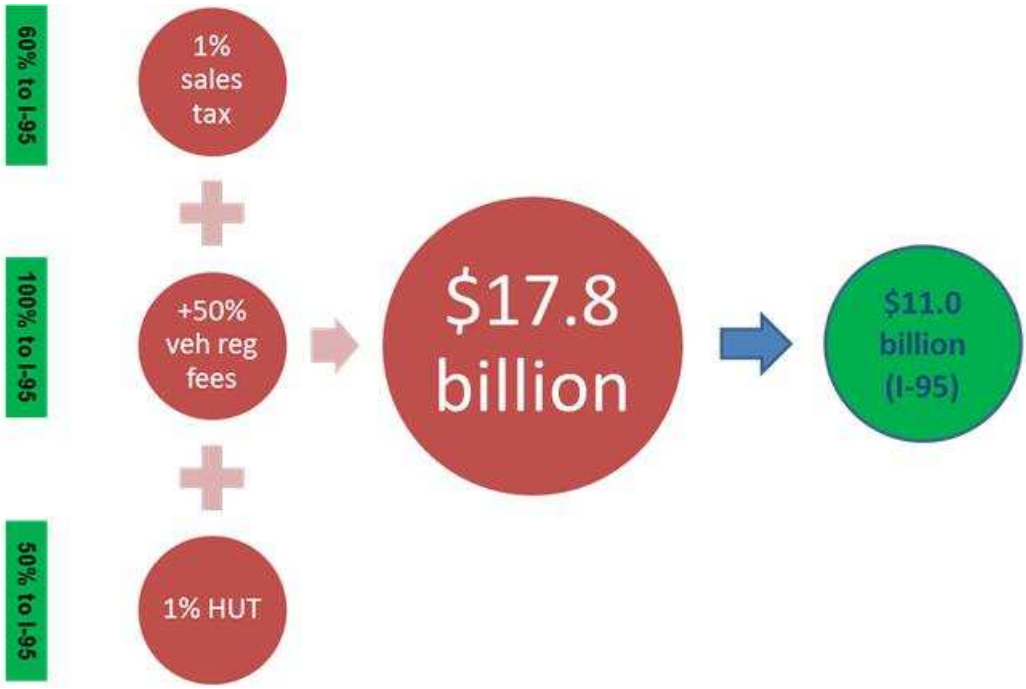
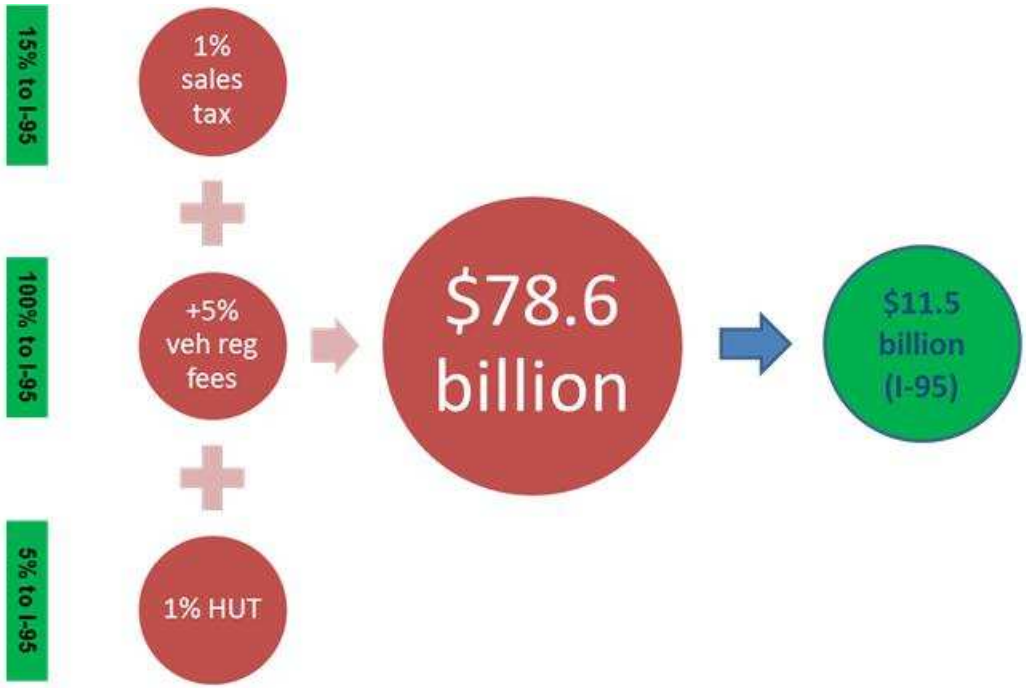


Figure 3.9 Funding Package
30 years, YOE dollars



Revenue forecasts from existing revenues sources were obtained from NCDOT 2040 Plan. Increases to existing revenue sources are assumed to leverage revenues from the new sales tax, such that surplus revenues (i.e., funds not dedicated to the I-95 Corridor) can support other major transportation needs. The following assumptions were applied to estimate revenue streams for the 10- and 30-year scenarios.

- 10-year revenue streams
  - New 1% sales tax – 60 percent of the revenues to I-95,
  - 50% increase in vehicle registration fees – all revenues to I-95,
  - Additional 1% highway use tax – 50 percent of the revenues to I-95.
- 30-year revenue streams
  - New 1% sales tax – 15 percent of the revenues to I-95,
  - 50% increase in vehicle registration fees – all revenues to I-95,
  - Additional 1% highway use tax – 5 percent of the revenues to I-95.

3.3 CURRENT AND FUTURE TRAFFIC VOLUMES ON I-95

A key component of the North Carolina I-95 Economic Assessment was to understand existing passenger and truck travel within the I-95 Corridor, future traffic growth, and sensitivity of travelers to tolls. Travel demand forecasts were developed using a customized version of the Corridor Travel Demand Model (CTDM) originally developed by the Martin/Alexiou/Bryson (MAB) and Michael Baker Corporation team as part of the I-95 Corridor Planning and Finance Study.

The existing travel demand model (CTDM) underwent an extensive peer review to determine if it should be used on the NC I-95 Economic Assessment. The evaluation primarily focused on how well the model replicated observed data, the model structure, growth projections and methodology, and how well the model responded to tolls. Another point of evaluation was the ability of the model to forecast vehicle miles and vehicle hours traveled, which is more in line with what a regional model would produce, as opposed to a corridor model. Model networks were reviewed to check for consistency with other available data; appropriateness of parameters for reasonableness with respect to acceptable standards; and validation of model results against counts, travel times, and trip distribution patterns, where data was available. In addition, the post-processing and growth methods used to develop the model were reviewed. Finally, the model's sensitivity was analyzed by running two future year tolled scenarios.

Based on the model evaluation findings, it was recommended that the model be refined to better suit the needs of the I-95 Economic Assessment. The evaluation identified three areas to focus on during model refinement including:

a. Less reliance on "preloads";

b. Improved geographic and modal validation; and

c. Enhancement of the model structure

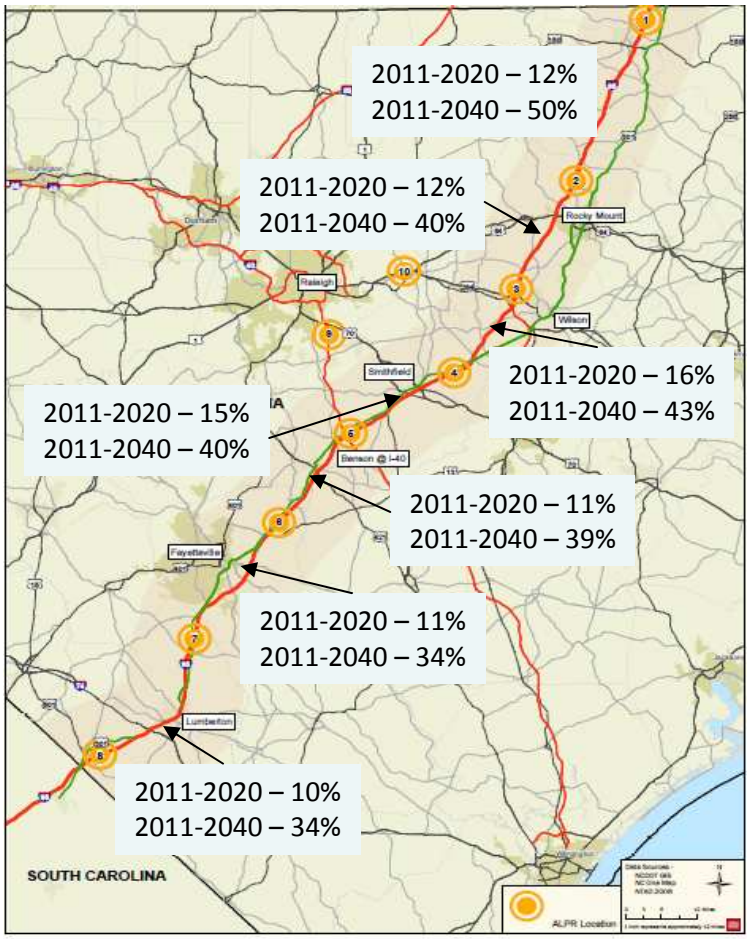
The model refinement entailed the addition of network detail to the CTDM network, re-estimation of the origin-destination trip table by mode to include traffic counts over the entire model region, altering the model structure to capture sensitivity of the model to tolling, and eliminate the dependence on the process of adding traffic manually (or preloads). The refined model was validated to within industry acceptable standards, and tested for sensitivity to tolling. Once found to be satisfactory, the project alternatives were modeled. Results from the travel demand model, which included traffic growth, vehicle miles and hours traveled, and traffic diversions due to tolls, were fed into the economic analysis and the traffic impact analysis.

Growth Assumptions

An additional tool use in forecasting traffic volumes was the Integrated Corridor Analysis Tool (ICAT) developed and maintained by the I-95 Corridor Coalition. Future year growth for each vehicle type (autos and trucks) was estimated within the ICAT regional model based on forecasted land use. To capture this growth, the ICAT model was applied to produce future year traffic forecasts and the trips within the corridor were extracted from this assignment and disaggregated to the 532 zone system that underlies the I-95 Corridor Model consistent with the base year subarea extraction. Growth factors were then calculated for each of the 532 zones based on the difference between the raw base and future year subarea trip tables. These growth factors were applied to the calibrated base year trip table to produce the future year trips.

The projected growth in traffic on I-95, between the base year 2011 and the two horizon years, 2020 and 2040 are illustrated in Figure 3.10. The growth by 2020 ranges between 10 and 16 percent, and by 2040, ranges between 34 and 50 percent.

Figure 3.10 Projected Growth in Traffic on I-95



Source: Cambridge Systematic Analysis using the CTDM and ICAT models

After completing validation and ensuring that the results were within industry accepted standards, the model was applied to several project alternatives listed below.

The alternatives modeled were:

1. 2011 Base year
2. 2020 and 2040 scenarios
   - Business as Usual (includes committed projects);
   - Build with no specified funding (includes committed projects and applicable I-95 projects as described in Section 2.7);
   - Build with Tolls – 10 Mile Gantry Spacing; and

- Build with Mitigated Tolls – 10 Mile Gantry Spacing and 50 percent toll discount for "internal" or non-through traffic.

Table 3.8 lists the toll amounts used for each scenario at each gantry.

Table 3.8 Proposed Toll Rates for All Alternatives

	10 Mile Spacing (No Mitigation)		10 Mile Spacing with Mitigation (Through Trip Tolls)		10 Mile Spacing with Mitigation (Local Trip Tolls)	
Toll Gantry	Auto Toll $	Truck Toll $	Auto Toll $	Truck Toll $	Auto Toll $	Truck Toll $
1	1.02	2.86	1.02	2.86	0.51	1.43
2	1.02	2.86	1.02	2.86	0.51	1.43
3	1.02	2.86	1.02	2.86	0.51	1.43
4	1.02	2.86	1.02	2.86	0.51	1.43
5	1.02	2.86	1.02	2.86	0.51	1.43
6	1.02	2.86	1.02	2.86	0.51	1.43
7	1.02	2.86	1.02	2.86	0.51	1.43
8	1.02	2.86	1.02	2.86	0.51	1.43
9	1.02	2.86	1.02	2.86	0.51	1.43
10	1.02	2.86	1.02	2.86	0.51	1.43
11	1.87	5.24	1.87	5.24	0.94	2.62
12	1.87	5.24	1.87	5.24	0.94	2.62
13	1.87	5.24	1.87	5.24	0.94	2.62
14	1.87	5.24	1.87	5.24	0.94	2.62
15	1.87	5.24	1.87	5.24	0.94	2.62
16	1.87	5.24	1.87	5.24	0.94	2.62
17	1.87	5.24	1.87	5.24	0.94	2.62
18	1.02	2.86	1.02	2.86	0.51	1.43

Source: NCDOT I-95 Financial Plan, Draft

Traffic Analysis Results

This section presents the results comparing the aforementioned alternatives. A comparison of vehicle miles of travel (VMT) and vehicle hours of travel (VHT) across alternatives, compared against the base year (2011), is presented in Table 3.9. The table presents results aggregated for all I-95 sections, as well as a primary study area, which is approximately 10 miles on either side of I-95. Both miles and hours traveled in the BAU and Build with no funding specified alternatives increase relative to the base year. The impact of tolled scenarios is that traffic is diverted away from I-95, predominantly to roadways in the

immediate vicinity of I-95. Build with mitigated tolls leads to a lower level of diversion compared with the regular toll scenario, given the lower tolls that "local" users would pay. Further, the analysis suggests that the diversion impacts of tolls will reduce as time passes as users become more accustomed to tolls along the facility, and realize the positive impact of completing the entire I-95 Corridor.

Table 3.9 Comparison of VMT and VHT across Alternatives for the Eight Corridor Counties

			VMT (thousands)	VMT Growth over 2011	VHT (thousands)	VHT Growth over 2011
I-95	2011	Base Case	12,719		179	
	2020	Business as Usual (BAU)	14,106	11%	202	13%
		Build – No Funding Specified	14,147	11%	199	11%
		Build – with Toll	10,876	-15%	152	-15%
		Build – Mitigated Toll	12,738	0%	179	0%
	2040	BAU	17,494	38%	270	51%
		Build – No Funding Specified	17,847	40%	255	43%
		Build – with Toll	13,843	9%	196	10%
		Build – with Mitigated Toll	15,871	25%	226	26%
			VMT (thousands)	VMT Growth over 2011	VHT (thousands)	VHT Growth over 2011
Primary (10 Mile Envelope around I-95)	2011	Base Run	22,580		374	
	2020	BAU	24,924	10%	416	11%
		Build – No Funding Specified	24,952	11%	413	11%
		Build – with Toll	23,421	4%	413	11%
		Build – with Mitigated Toll	24,428	8%	415	11%
	2040	BAU	30,515	35%	537	44%
		Build – No Funding Specified	30,740	36%	520	39%
		Build – with Toll	28,638	27%	518	39%
		Build – with Mitigated Toll	29,882	32%	521	39%

Source: Cambridge Systematics analysis using the enhance Corridor travel Demand Model

Tables 3.10 and 3.11 show forecast volumes along I-95 in the 2020 and 2040 alternatives, respectively. The forecast growth between the base year (2011) and 2020 is between 10 - 16 percent depending on the location. Forecast growth to 2040 from the base year is 34-50 percent. These growth rates are around one percent per year and are within a reasonable range given the projected population and employment increases along the eastern seaboard.

Tolling I-95 is expected to divert traffic away from I-95, with the amount depending on the magnitude of the toll and convenience of diversion routes. Since the proposed project only has toll collection points on the mainline, and not on the ramps, drivers can use I-95, skirt the toll plazas and return to I-95 one interchange later. Figures 3.11 illustrates the extent of these diversions to other roads in 2040 for the non-mitigated toll scenario, with the thicker green lines indicating the locations with the highest amount of diversion. Figure 3.12 shows the same information for the mitigated toll scenario. The highest diversion amounts are generally expected on roads immediately parallel to the proposed toll locations, but diversions further away from I-95 are also expected. Since proposed toll rates would be higher south of I-40, diversion away from the toll locations on that portion of I-95 are expected to be considerably higher.

Table 3.10 Comparison of Forecast 2020 Traffic Volumes at Proposed Toll Collection Locations

			Year 2020 Build, No Funding Specified		Year 2020 Build, With Tolls		Year 2020 Build with Mitigated Tolls	
Location	Year 2020 BAU volume	Year 2020 BAU Growth (versus 2011)	Volume	Change compared to BAU	Volume	Change compared to Build, with No Tolls	Volume	Change compared to Build with No Tolls
Station 1	45,007	12%	44,995	0.0%	38,418	-15%	43,302	-4%
Station 2	43,919	12%	43,908	0.0%	31,211	-29%	40,123	-9%
Station 3	44,695	12%	44,725	0.1%	32,459	-27%	40,806	-9%
Station 4	42,998	16%	43,127	0.3%	20,045	-54%	27,534	-36%
Station 5	49,162	11%	49,360	0.4%	38,654	-22%	45,692	-7%
Station 6	55,408	15%	56,237	1.5%	44,937	-20%	50,831	-10%
Station 7	51,093	11%	51,211	0.2%	23,513	-54%	34,970	-32%
Station 8	31,597	10%	31,638	0.1%	17,556	-45%	27,885	-12%

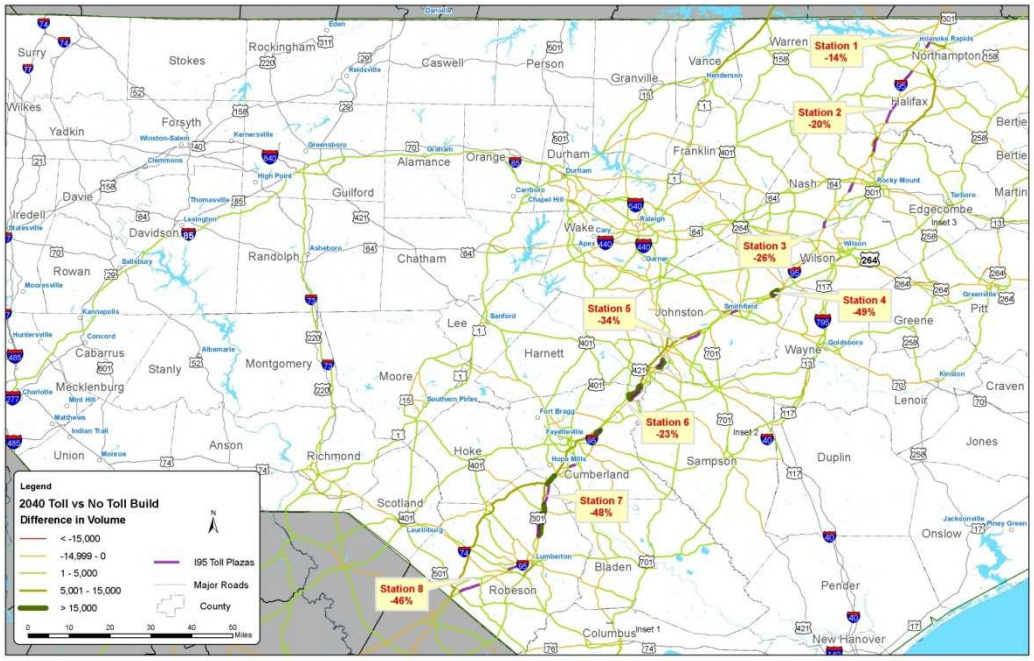
Source: Cambridge Systematics analysis using the enhanced corridor travel demand model

Table 3.11 Comparison of Forecast 2040 Traffic Volumes at Proposed Toll Collection Locations

			Year 2040 Build, No Funding Specified		Year 2040 Build with Tolls		Year 2040 Build with Mitigated Tolls	
Location	Year 2020 BAU volume	Year 2040 BAU Growth (versus 2011)	Volume	Change compared to BAU	Volume	Change compared to Build, with No Tolls	Volume	Change compared to Build with No Tolls
Station 1	59,879	49%	60,480	1%	52,110	-14%	57,242	-4%
Station 2	58,820	50%	59,392	1%	47,711	-20%	55,115	-6%
Station 3	55,697	40%	57,827	4%	42,791	-26%	50,757	-9%
Station 4	52,883	43%	54,719	3%	27,766	-49%	36,166	-32%
Station 5	61,285	39%	64,712	6%	42,867	-34%	56,264	-8%
Station 6	67,227	40%	71,157	6%	55,109	-23%	63,764	-5%
Station 7	62,017	34%	63,137	2%	33,085	-48%	42,771	-31%
Station 8	38,418	34%	38,651	1%	20,949	-46%	28,988	-25%

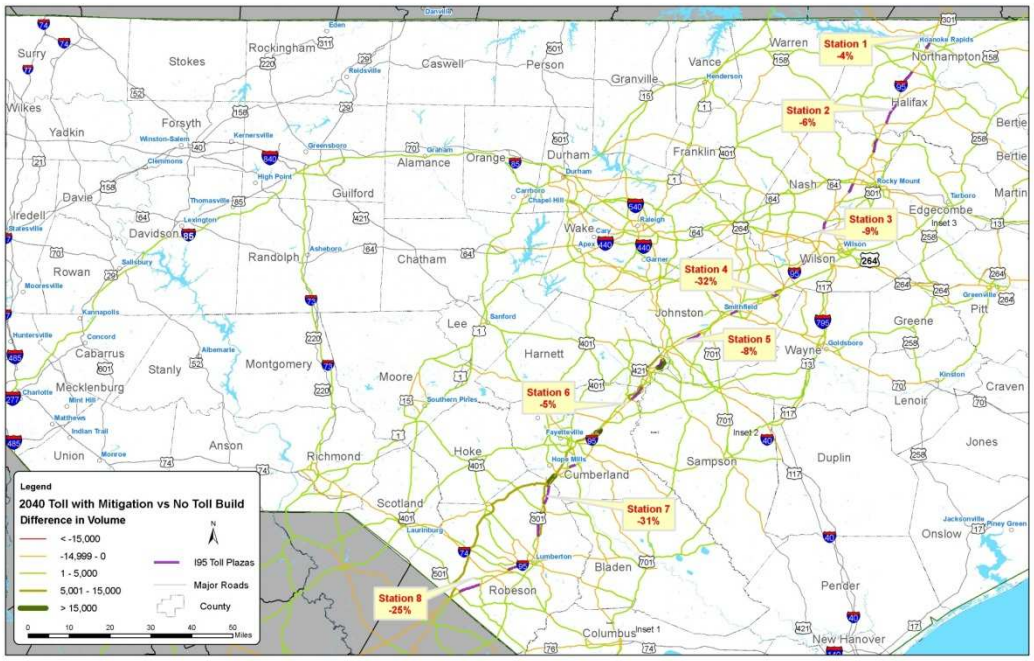
Source: Cambridge Systematics analysis using the enhanced corridor travel demand model

Figure 3.11 Comparison of Forecast Build with Toll versus Build with No Funding Specified Scenario Volumes—2040



Source: Cambridge Systematics analysis using the enhanced CTDM.

Figure 3.12 Comparison of Forecast Build with Mitigated Tolls versus Build with No Funding Specified Scenario Volumes—2040



Source: Cambridge Systematics analysis using the enhanced CTDM.

3.4 ECONOMIC IMPACT ANALYSIS

To ensure consistent understanding of the terms used in describing the analysis framework, a few definitions and concepts are defined in Table 3.12.

Table 3.12 Variable Definition

Variable	Definition	Data Source
Vehicle miles traveled (VMT)	Measure of distance traveled (miles)	I-95 Travel demand model (TDM)
Vehicle hours traveled (VHT)	Measure of time spent traveling (hours)	I-95 TDM
Vehicle operating costs (VOC)	Measure of fuel and non-fuel vehicle maintenance costs of driving	AAA and ATRI
Buffer time	Amount of extra time allotted to ensure on-time arrival	Stakeholder input
Occupancy rates	Average number of people in vehicle	North Carolina Statewide TDM
Level of service (LOS)	Measure of congestion based on travel volumes compared to highway capacity levels	I-95 TDM
Delay	Measure of extra travel time incurred as result of travel below speed limits	I-95 TDM and ATRI
User impact	Impact to those directly driving on I-95 or any of the diversion routes	Calculated by project team

Economic impact analysis focuses on three types of impacts:

Direct User Impacts - These can include travel efficiency and logistics improvements in terms of change to

- travel times,
- vehicle operating costs,
- safety costs,
- reliability or more efficient transfers of goods, and
- changing traffic volumes leading to changes in business activities.

Business Competitiveness – Changes in business conditions that lead to more widespread economic impacts including:

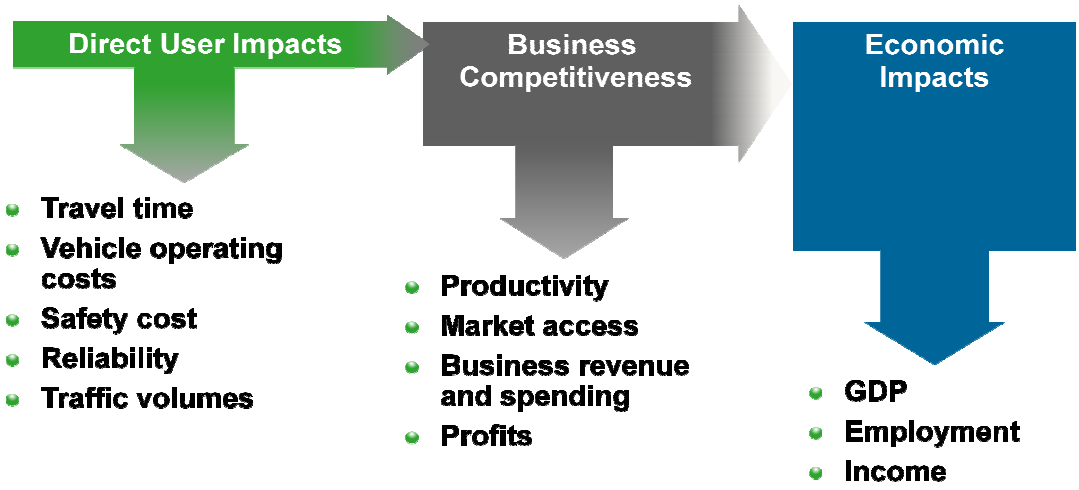
- productivity,
- market accessibility,
- business revenue or spending,
- tax incentives,
- profits, or
- a combination of factors.

Economic Impacts – The direct expenditures by the public and private sectors on any project have economic implications on the local and regional economies. These are exemplified by changes in gross regional product (GRP), employment, and income, to name a few.

Economic Modeling Methodology

The most important aspect of any impact analysis is understanding and accurately estimating the direct effects from investments, policies, and programs. Once quantified, the direct impacts are used in conjunction with economic impact models like REMI. REMI is a model that estimates the full economic impacts on local, regional, and state economies. These impacts are measured in terms of multiplier effects from indirect and induced effects on employment by industry, Gross Domestic Product (GDP) (or Gross Regional Product if discussing sub-national output), personal income, and business sales. Figure 3.13 provides an overview of the metrics included in the economic analysis methodology, which is explained in the section below.

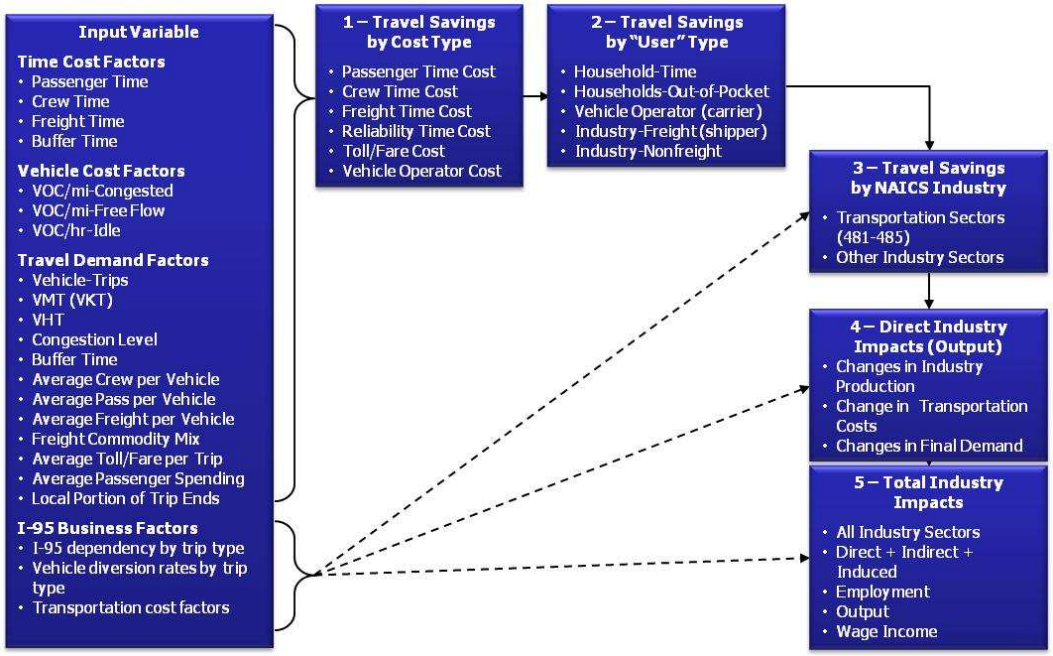
Figure 3.13 Impact Metrics for I-95 Funding Alternatives



Step-by-step approach

The direct inputs for the economic modeling of changes in travel efficiencies are derived in part from the results of the traffic demand model, including: time costs, vehicle costs, travel demand factors, and I-95 business factors. Figure 3.14 depicts the process for estimating the economic impacts of the I-95 alternatives. The steps involved are summarized below.

Figure 3.14 General Analytical Framework



Step 1 – The travel savings are defined by category and then by stakeholder cost type to include cost type and user type. Costs associated with travel savings include passenger or crew time, freight time, reliability, toll, and vehicle operating costs. These travel costs are influenced by changes in travel time and distance as well as I-95 business factors, which contribute to the magnitude of changes in transportation costs.

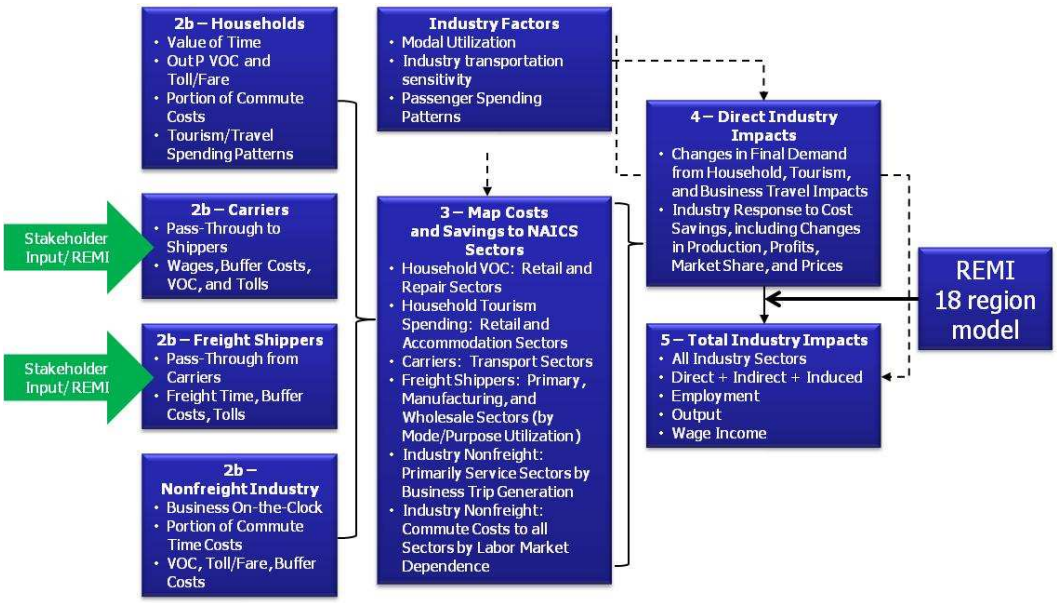
Step 2 – The monetized costs are then assigned to specific users incurring these costs, which include households, carriers, freight shippers, and non-freight industries.

Household travel activity is divided into business and leisure travel to capture the different values of time associated with each activity, which impacts the economy differently. Business-related auto travel costs are borne by the employer, whereas non-business travel costs, including commute time, are borne by the individual as a personal expense or foregone benefits. In the case of the freight and freight-related industries, vehicle operators (carriers), shippers, and other industries and businesses bear the burden of the cost (or reap the benefit).

Each user travel savings (or cost) is estimated and assigned to the appropriate industry, including private households. Stakeholder input is critical to the analysis in providing insights to understanding specific nuances in the local economy, such as carrier and freight shipper operating details. For example, the amount of buffer time applied to local trucking industries was provided by interviewees during the outreach activities.

Steps 3 and 4, depicted in Figure 3.15, drill down on the process of converting estimated transportation costs into inputs for the economic model and finally, total economic impacts.

Figure 3.15 Modeling Changes in Transportation Costs



Step 3 – Following the monetization by cost and user type, the travel savings (or costs) are then assigned to the appropriate industry sectors incurring the costs.

Step 4 – Once the users are identified and costs assigned, the corresponding increase or decrease in costs are prepared as inputs to the economic model by way of production cost, consumer spending, and personal tax variables for each study region.

Step 5 - When mapped to the North American Industrial Classification System (NAICS), the economic model produces results such as, but not limited to, employment, Gross Regional Product (GRP) or total level of economic activity, and disposable personal income. All results are provided for each of the counties along I-95 and each of the study regions.

Valuation of Economic Impact from Transportation Changes

The analysis of economic impacts from transportation changes are based on changes to:

- Freight/crew or passenger time costs;
- Vehicle operating costs;
- Reliability costs; and
- Diversion of traffic.

Auto and freight movements along I-95, as well as any changes to these movements, affect the vehicle cost, travel time, and travel demand factors of industries dependent upon the interstate in North Carolina. These changes are measured by the changes in vehicle miles traveled (VMT) or distance, and vehicle hours traveled (VHT) or total travel time. Both of these metrics are generated from the travel demand forecast discussed above.

Reliability costs are assumed to be insignificant for auto users in this study given the current and short term congestion levels revealed in the travel demand model (TDM) outputs and stakeholder input. On the other hand, trucks are estimated to incur some reliability costs based on future congestion projections and concerns voiced by stakeholders during the outreach process. It was assumed that only local truck trip reliability is impacted if improvements are not made on I-95. Thus, the additional truck trip costs are included only in the BAU scenario.

User travel cost impacts are estimated as follows:

- Value of time (VOT)

$$VOT_{auto} = VHT_{auto} \times avg\ number\ of\ passengers \times \frac{\frac{\$}{hour}}{passenger}$$

$$VOT_{truck} = VHT_{truck} \times avg\ number\ of\ crew \times \frac{\frac{\$}{hour}}{crewmember}$$

- Vehicle operating cost (VOC)

$$VOC_{auto} = VMT_{auto} \times (\frac{\$}{mile_{fuel\ auto}} + \frac{\$}{mile_{non-fuel\ auto}})$$

$$VOC_{truck} = VMT_{truck} \times (\frac{\$}{mile_{fuel\ truck}} + \frac{\$}{mile_{non-fuel\ truck}})$$

- Reliability cost (RC) = Freight cost

$$RC = Freigh\ tons \times (\frac{\frac{\$}{hour}}{ton})$$

- Delay

$$Delay\ Cost_{auto} = delay\ hours_{auto} \times VOT_{passenger}$$

$$Delay\ Cost_{truck} = delay\ hours_{truck} \times VOT_{crew}$$

- Toll/fare cost = trips * $/trip

$$Toll_{auto} = trips_{auto} \times \frac{\$_{auto}}{trip_{auto}}$$

$$Toll_{truck} = trips_{truck} \times \frac{\$_{truck}}{trip_{truck}}$$

- Total transportation costs

$$Total\ Transportation\ Cost_{auto} = VOT_{auto} + VOC_{auto} + Toll_{auto}$$

$$Total\ Transportation\ Cost_{truck} = VOT_{truck} + VOC_{truck} + RC_{truck} + Toll_{truck}$$

Table 3.14 provides the source and value of each variable.

Table 3.13 Travel Cost Variable, Values, and Sources

Variable	Value (2012$)	Source
Passenger Trip Purpose	Business – 21.4%	TDM (Statewide)
	Commute – 17.6%	
	Leisure – 61.0%	
Passenger VOT	Business – $15.26 per hour	Statewide Hourly Median Value (All Occupations) – BLS
	Commute – $15.26 per hour	
	Leisure – $10.95 per hour	Hourly Median Household Income – U.S. Census
Passenger VOC	Fuel – $0.18 per mile	AAA Driving Cost for NC, 2012
	Non-Fuel – $0.06 per mile	
Freight crew VOT	$0.60 per mile	ATRI
Freight non-labor costs (Buffer time)	$1.04 per mile	ATRI and Stakeholder input
Toll/user fee (per mile)	$0.0975 to $0.195 (urban project limits)	I-95 Environmental Assessment and Project Team
	$2.10 – $2.80 per mile for trucks	
Vehicle operating costs	Auto- $0.19 per mile	AAA, 2012
	Truck – $1.07 per mile	ATRI
Occupancy rate (passenger)	Average number adult passenger	TDM (Statewide)

The VOT encompasses the labor and non-labor costs associated with transporting goods along the I-95 Corridor. Consisting of crew and freight costs, the VOT fluctuations are dependent upon changes to VHT. As congestion leads to delays, VHT increase, thereby increasing the VOT above the base year levels. These changes are translated into increases in production costs by industry.

Reliability costs take into account the buffer time attributed to reliability issues associated with traveling along I-95 and the longer travel times associated with congestion. As such, businesses are expected to build in additional time or add additional vehicles and drivers as more trucks are delayed. This additional cost may lead to changes in inventory levels and operating costs, leading to an overall increase in production costs.

Any changes in travel miles constitute fuel and non-fuel operation costs, which are identified as VOC. For example, as congestion increases on I-95 resulting in delays, the VOC would most likely increase as a result of less fuel efficient speeds and increases in congestion-related idling.

When addressing the impacts of tolls, the appropriate percentage of the toll burden borne by user type is estimated. This process was informed by stakeholder input including motor carriers, shippers and business owners and managers.

Key Assumptions

When conducting any economic analysis, assumptions regarding certain aspects of the analysis are required. A summary of the most important assumptions employed in the current study are as follows:

From the CTDM, it is assumed that businesses and households in the county of origin would bear the burden of the costs associated with each scenario modeled. To obtain this information, the trip table from the CTDM is used to determine the percentage of I-95 trips originating from each study region.

Key auto and truck assumptions and methodology are provided below.

- Buffer Time
    - Auto – As discussed previously, auto buffer time is not modeled given the current and short-term congestion levels. Additionally, it is assumed that non-business, leisure travel is less sensitive to changes in travel time as there is a lower sense of 'urgency'.
    - Trucks – Changes in costs are only estimated for the BAU scenario and did not include impacts until 2020, given the lack of congestion currently and in the nearer term. Based on data collected as part of the EA, it is estimated that 60% of all truck trips are local or short distance trips. These shorter trips are most likely to be impacted by reliability concerns. Most longer haul trucks traveling through the state via I-95 are not expected to increase buffer time, as it is assumed the lost time will be made up on another portion of the trip. The shorter local truck trips averaging approximately 30 miles a day, however, are more susceptible to changes in reliability. Based on stakeholder interviews, many shippers and carriers attempt to get two or three trips per day per truck. They indicated that if there is, on average, 45 minutes of delay on the first trip or second trip, they would not be able to make their final trip. This is not the case for all short trips. Therefore, it is assumed that a conservative 5 percent increase in number of short truck trips beginning in 2020, rising to 20 percent by 2040 will be required to deliver the same amount of goods. The increased costs associated with these additional trips are applied to truck operating costs under the BAU scenario.

$$Buffer\ Time_{trucks} = Annual\ Trips_{trucks} \times 60\% \times Assumed\ Trip\ Increase \times 30\ miles \times (VOC_{trucks} + VOT_{trucks})$$

- Lost Sales Due to Diversion

    - The potential diversion due to increases in time and/or mileage caused by congestion or a toll is estimated to manifest in the form of lost sales for local businesses along the corridor. In other words, it is assumed that increases in diversion would lead to a loss in "drop-in" business, which averages approximately 60 (percent based on stakeholder interview input) along the corridor. It is assumed that accommodation, eating, and drinking establishments and retail businesses in a 2-mile zone of the corridor (one mile is each directions) would be impacted by a loss of traffic on I-95. It is also assumed that the monies that would have been spent at these establishments will not be spent at other establishments in the same county. This assumption likely leads to over-estimating the countywide impact. The total loss is estimated at approximately $1.1 billion in sales/revenue from 2014 to 2050 for business along a 2-mile buffer of I-95.

$$Lost\ Sales = \%\ Diversion_{\ thru} \times 60\%$$

- Crash Delay

    - Crash delay impacts are calculated using 2012 INRIX data provided by the I-95 Corridor Coalition and supplemented with NCDOT crash data. INRIX data is collected via GPS devices, including phones. The project team used historical crash delay data for the BAU scenario and monetized the impacts using the previously-agreed upon VOT parameters. The crash analysis for the Build scenarios indicated a 3.6% reduction in the number of crashes if the improvements are made. Stakeholder interviews and comparison to clearance times on other interstate facilities suggested that a 50% delay reduction in incident clearance times is a reasonable estimate given the proposed highway improvements. Table 3.14 provides the estimated delay for autos and trucks caused by incidences for both the BAU and the Build scenarios.

Table 3.14 Estimation of Crash Delay

Build Improvements				
Crash reduction	3.60%			
Percent of incidents that cause delay	16%			
Delay reduction	50%			
		BAU		**Build**
Average number of annual incidents	1,435	incidences	1,383	incidences
Percent of incidents that cause delay	16%		16%	
Annual number of incidents that cause delay	234	incidences	221	incidences
Average incident impact time	66	minutes	66	minutes
Average speed during incident impact time	31	Mph	31	mph
Average delay per vehicle impacted	31.9	minutes	15.95	minutes
Average number of autos impacted by incident	1594	Auto	1,537	auto
Average number of trucks impacted by incident	337	Trucks	325	trucks
Total auto delay per incident that causes delay	50,859	minutes	24,509	minutes
Total truck delay per incident that causes delay	10,746	minutes	5182	minutes
Total annual auto delay from incidents	11,897,194	minutes	5,733,275	minutes
Total annual truck delay from incidents	2,513,853	minutes	1,212,162	minutes
Total annual auto delay from incidents	198,287	Hours	95,555	hours
Total annual truck delay from incidents	41,898	Hours	20,203	hours

Source: 2012 INRIX, NCDOT Crash Data, and CS calculations

- Construction
  - To avoid over or under estimating the construction spending impacts along the corridor, the construction spending dollars are divided into wage and non-wage components. The wage components are allocated based upon historical construction employment throughout all study regions in North Carolina. It is assumed that construction spending from wages is spent in those counties in which the construction employees are located. For those non-wage related spending, it is assumed that supporting construction materials and activities required are spent along the corridor where construction activity occurs. Construction spending is assumed to begin in 2014.

3.5 ECONOMIC ASSESSMENTS RESULTS

The following section presents results from the REMI economic model for each scenario. All results are for the study period 2014 to 2050, in constant 2012 dollars. For comparison purposes, three tiers of regional impact analysis are presented:

- Impacts to the I-95 corridor;
- Impacts to Eastern North Carolina (defined as east of I-95); and,
- Impacts to the rest of the state of North Carolina.

The BAU scenario assumes ongoing maintenance and operations without any of the proposed improvements stated in the EA. Table 3.15 summarizes the economic impacts of Business as Usual over the period 2014 to 2050. . The forecasted increase in population and subsequent economic activity is expected to lead to worsening traffic conditions along I-95, which is expected to increase business transportation costs for all regions. These costs increase to as much as $6.0 billion in eastern North Carolina up to $51.7 billion in the I-95 Corridor, over what costs would be if the current level of travel efficiencies is maintained between 2015 and 2050. These increases in business transportation costs would be expected to lead to a weakening in economic activity as evidenced by decreases in GRP, personal income, and jobs over the study period for all regions.

The BAU scenario presents a significantly negative economic impact to North Carolina. It is important to note the decreases in the economic metrics are not negative levels of economic activity; rather, all results are presented in relation to an economic baseline forecast based on status quo activities. In other words, the economy is growing, but at a slower or reduced rate that is currently projected.

Table 3.15 Economic Impacts of Business as Usual Compared to the Baseline Economic Forecast

2014 to 2050

Metric	Constr.	%	Long-term	%	Total	%
I-95 Counties						
Business Transportation Costs ($billions 2012)					**$51.70**	
Gross Regional Product ($billions 2012)	$0.23	0.0214	($41.10)	(2.57)	**($40.80)**	(2.550)
Personal Income ($billions 2012)	$0.22	0.0179	($44.30)	(2.33)	**($44.10)**	(2.314)
Jobs (average annual full-time)	132	0.0345	(9,858)	(2.26)	**(9,727)**	(2.222)
Eastern NC						
Business Transportation Costs ($billions 2012)					**$6.00**	
Gross Regional Product ($billions 2012)	$0.04	0.0012	($7.30)	(0.305)	**($7.20)**	(0.304)
Personal Income ($billions 2012)	$0.04	0.0019	($6.90)	(0.306)	**($6.80)**	(0.304)
Jobs (average annual full-time)	10.00	0.0013	(1,620)	(0.274)	**(1,610)**	(0.272)
Rest of State						
Business Transportation Costs ($billions 2012)					**$9.20**	
Gross Regional Product ($billions 2012)	$0.15	0.0012	($30.50)	(0.206)	**($30.40)**	(0.205)
Personal Income ($billions 2012)	$0.11	0.0014	($21.80)	(0.182)	**($21.70)**	(0.181)
Jobs (average annual full-time)	34	0.0013	(5,048)	(0.177)	**(5,014)**	(0.176)

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative values

In the Build scenario where funding is not specified and all improvements are made with no cost burden on North Carolinians, the results clearly present a different picture from the BAU scenario (see Table 3.16). In this case, efficiencies are gained from the improvements on I-95, which lead to a decrease in business transportation costs with no additional cost associated with funding. Thus, all regions are more economically competitive, with production cost decreases that lead to increases in GRP, personal income, and jobs. In this Build scenario, all of the foregone economic activity seen in the BAU scenario is recovered with a forecast increase in GRP of $44.2 billion over the baseline economic forecast for the I-95 Corridor counties and $7.9 billion in eastern North Carolina across the study period. In addition to the recovery of the foregone economic activity from the BAU scenario, added economic activity is expected to be generated from the travel efficiencies gained from the improved Corridor as represented in the net difference between the BAU and the Build No Funding Specified scenario. For

example, in the I-95 Corridor, the net increase in GRP across the study period is $3.4 billion. This Build scenario also highlights the significant benefit that the I-95 Corridor region gains from improvements to the Corridor as they retain the largest share of dollar and job benefits as compared to the other two regional tiers. However, this scenario does ignore the real effects of the costs that would be imposed in order to fund the project.

Table 3.16 Economic Impacts of Build, No Funding Specified Compared to Business as Usual
2014 to 2050

Metric	Constr.	%	Long-term	%	Total	%
I-95 Counties						
Business Transportation Costs ($billions 2012)					**($51.90)**	
Gross Regional Product ($billions 2012)	$2.80	0.244	$41.40	2.586	**$44.20**	2.831
Personal Income ($billions 2012)	$2.80	0.216	$44.70	2.354	**$47.50**	2.570
Jobs (average annual full-time)	1,706	0.431	9,927	2.271	**11,633**	2.702
Eastern NC						
Business Transportation Costs ($billions 2012)					**($6.10)**	
Gross Regional Product ($billions 2012)	$0.38	0.014	$7.50	0.306	**$7.90**	0.320
Personal Income ($billions 2012)	$0.45	0.021	$7.30	0.308	**$7.80**	0.329
Jobs (average annual full-time)	120	0.014	1,689	0.275	**1,809**	0.289
Rest of State						
Business Transportation Costs ($billions 2012)					**($9.30)**	
Gross Regional Product ($billions 2012)	$2.20	0.014	$30.70	0.207	**$32.90**	0.221
Personal Income ($billions 2012)	$1.80	0.020	$22.00	0.183	**$23.80**	0.203
Jobs (average annual full-time)	589	0.015	5,074	0.178	**5,663**	0.193

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative values

The Build with Toll scenario, summarized in Table 3.17, takes into account the improvements to the Corridor, but also incorporates the proposed tolls paid by North Carolinians. Even with the imposition of tolls, the travel efficiencies gained from the improvement lead to a net gain in economic activity in North Carolina. The business cost benefits, denoted as negatives, are larger than in the Build No Funding Specific scenario. The benefits from the Build with Toll

scenarios also recoup most of the foregone economic activity if no improvements were made, as in the case of the BAU scenario.

Table 3.17 Economic Impact of Build with Tolls Compared to Business with Usual
2014 to 2050

Metric	Constr.	%	Long-term	%	Total	%
I-95 Counties						
Business Transportation Costs ($billions 2012)					**($50.6)**	
Toll cost ($billions 2012)					**$7.90**	
Gross Regional Product ($billions 2012)	$2.80	0.244	$39.40	2.570	**$42.20**	2.814
Personal Income ($billions 2012)	$2.80	0.216	$38.60	2.546	**$41.40**	2.762
Jobs (average annual full-time)	1,706	0.431	9,066	2.322	**10,772**	2.753
Eastern NC						
Business Transportation Costs ($billions 2012)					**($3.20)**	
Toll cost ($billions 2012)					**$0.73**	
Gross Regional Product ($billions 2012)	$0.38	0.014	$4.70	0.426	**$5.10**	0.439
Personal Income ($billions 2012)	$0.45	0.021	$3.80	0.503	**$4.30**	0.524
Jobs (average annual full-time)	120	0.014	910	0.397	**1,030**	0.412
Rest of State						
Business Transportation Costs ($billions 2012)					**($8.60)**	
Toll cost ($billions 2012)					**$0.94**	
Gross Regional Product ($billions 2012)	$2.20	0.014	$28.30	0.218	**$30.50**	0.232
Personal Income ($billions 2012)	$1.80	0.020	$20.10	0.201	**$21.90**	0.221
Jobs (average annual full-time)	589	0.015	4,601	0.189	**5,190**	0.204

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative value

The Build with Mitigated Tolls results in impacts similar to that of the Build with Tolls. The mitigated tolls are based on a 50% discount for locals paying tolls to use I-95. This discount is based upon typical transponder discounts provided to consumers on toll roads in Texas and Florida. The discounts ranged from 33% to over 60% if the driver was using a transponder device. Given these local

discounts, a net decrease in business transportation costs in all regions is expected to lead to increases in economy activity in the long-term GRP between $45.4 billion in the I-95 counties, $4.5 billion in eastern North Carolina, and $9.2 billion in the rest of the state (see Table 3.18). Again, as seen in the previous two Build scenarios, the eight I-95 Corridor counties benefit more than the other regions from the improvements on I-95. The Corridor counties are also projected to experience the greatest foregone economic activity in the BAU scenario. It is important to note as well that the region will pay most of the tolls associated with the two proposed tolling scenarios, even with the mitigated toll pricing scheme.

Table 3.18 Economic Impact of Build with Mitigated Tolls Compared to Business as Usual
2014 to 2050

Metric	Constr.	%	Long-term	%	Total	%
I-95 Counties						
Business Transportation Costs ($billions 2012)					**($49.3)**	
Toll cost ($billions 2012)					**$4.20**	
Gross Regional Product ($billions 2012)	$2.80	0.244	$42.50	2.573	**$45.30**	2.818
Personal Income ($billions 2012)	$2.80	0.216	$47.20	2.420	**$50.00**	2.636
Jobs (average annual full-time)	1,706	0.431	9,297	2.300	**11,003**	2.731
Eastern NC						
Business Transportation Costs ($billions 2012)					**($4.20)**	
Toll cost ($billions 2012)					**$0.37**	
Gross Regional Product ($billions 2012)	$0.38	0.014	$5.50	0.392	**$5.80**	0.406
Personal Income ($billions 2012)	$0.45	0.021	$4.60	0.462	**$5.00**	0.483
Jobs (average annual full-time)	120	0.014	1,140	0.365	**1,234**	0.379
Rest of State						
Business Transportation Costs ($billions 2012)					**($8.80)**	
Toll cost ($billions 2012)					**$0.48**	
Gross Regional Product ($billions 2012)	$2.20	0.014	$29.30	0.212	**$31.50**	0.226
Personal Income ($billions 2012)	$1.80	0.020	$20.80	0.193	**$22.60**	0.213
Jobs (average annual full-time)	589	0.015	4,782	0.183	**5,371**	0.199

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative value

Table 3.19 presents the results of these toll scenarios. The net total GRP for the Build with Toll scenario is $77.8 billion, personal income is $67.6 billion, and average annual job impact is 16,872 over the study period (2014 to 2050). The Build with Mitigated Toll yields higher levels of GRP, income and average annual jobs relative to the Build with Tolls scenario. This is an expected result given the reduced burden of tolls for local residents and businesses. The increase in GRP is approximately $4.8 billion more than the Build with Toll, for a net impact of $82.6 billion more than Business as Usual across the study period. As to be expected, a corresponding net increase in personal income and jobs are revealed.

Table 3.19 Comparison of Economic Impact of Toll Scenarios, 2014 to 2050

Metric	Capture foregone impacts from BAU	Construction	New impacts arising from travel efficiencies	Net Total
Build with Toll				
Gross Regional Product ($billions 2012)	$78.4	$5.4	($6.0)	$77.8
Personal Income ($billions 2012)	$72.6	$5.1	($10.1)	$67.6
Jobs (average annual full-time)	16,352	2,415	(1,885)	16,872
Build with Mitigated Toll				
Gross Regional Product ($billions 2012)	$78.4	$5.4	($1.2)	$82.6
Personal Income ($billions 2012)	$72.6	$5.1	($0.1)	$77.6
Jobs (average annual full-time)	16,352	2,415	(1,842)	16,925

Source: Cambridge Systematics analysis using the REMI economic model. ( ) denotes negative values

In addition to the four scenarios discussed above, the Advisory Council and NCDOT identified four additional funding alternatives for analysis. Each funding alternative is modeled in combination with the Build No Specified Funding economic impact results. This method is used to understand the net economic impact of funding the proposed transportation improvements by each of the funding alternatives, while benefiting from the travel efficiency gains from the proposed improvements.

Table 3.20 summarizes the findings. Overall, across the multiple funding scenarios, making the investment to improve I-95 and raising fees or taxes to pay for it is better than not making the investment, given that each scenario produces economic benefits. This is evidenced by the increase in GRP ranging from $66 to $78 billion across the scenarios. This translates into a corresponding increase in jobs ranging from 12,000 to 19,000 annually across the study period.

Table 3.20 Economic Impacts of Investing in I-95 via Alternative Funding Options

Metric	10-Year Dedicated Sales Tax	Revenue Pkg Sales, HUT, VR	Personal Income Tax	Motor Fuel Tax
Gross Regional Product ($billions 2012)	$66.3	$74.7	$76.4	$77.7
Personal Income ($billions 2012)	$46.4	$58.2	$61.4	$64.2
Jobs (average annual full-time)	12,673	16,072	16,616	16,845

Source: Cambridge Systematics analysis using the REMI economic model.

The differences in economic impacts across funding options are relatively small and in some cases, insignificant. The most notable difference is that a 10-year dedicated sales tax leads to the lowest boost in economic output and job creation, implying that the sales tax is more burdensome on the economy than the other options including the motor fuel tax. This supports the fact that user fees such as the motor fuel tax or tolls are generally the most economically efficient means of raising revenue.

4.0 Conclusion

4.1 STUDY SUMMARY

The study was conducted in response to a proposed plan for improving I-95 and paying for those improvements with tolls. The economic assessment addressed the following questions:

- What are the impacts on traffic and the economy if the improvements are not made?
- What are the impacts on traffic and the economy if tolls are used to pay for the improvements?
- Are there other ways to pay for the improvements and what are the economic impacts of those options?

The study estimated both positive and negative impacts of making the investment and paying for that investment using various taxes and fees. This included, but was not limited to:

- The impact of the diversion of traffic from I-95 to other roads
- The impact on the cost of doing business for existing businesses along the Corridor
- The impact on the cost of residents that use the Corridor on a regular basis
- The impact on the cost of travel for tourists
- The impact on future economic development opportunities

4.2 KEY FINDINGS

For each scenario and study region, summary impacts provided include:

- Business transportation costs – Travel time cost plus vehicle operating costs without tolls;
- Tolls – Amount of tolls estimated to be paid by people and businesses based on the origin of trips using I-95;
- Gross Regional Product (GRP) – Total value of economic output and general measure of the size of a region's economy;
- Personal Income – Value of wages, salaries and proprietor's income; and

- Jobs – Measured in average annual full-time equivalent jobs.

Summary findings are presented in Table 4.1.

Table 4.1 Summary of Economic Impacts of I-95 Alternatives , 2014 to 2050

Metric	BAU	Build, No Funding	Build, Tolls	Build, Mitigated Tolls
Business Transportation Costs ($ Billions)	$66.9	($67.3)	($62.4)	($62.3)
Toll Cost ($ Billions)			$9.6	$5.1
Gross Regional Product ($ Billions)	($78.4)	$85.0	$77.8	$82.6
Personal Income($ Billions)	($72.6)	$79.1	$67.6	$77.6
Jobs (average annual full-time)	(16,352)	19,105	16,872	16,925

Source: Cambridge Systematics analysis using a REMI economic model

The key takeaways from these findings include:

- Business as Usual on I-95 will cost the state an average of more than 16,000 jobs annually compared to baseline economic forecast
- Making the full set of improvements recommended in the I-95 Corridor Planning and Finance EA leads to a significant net increase in statewide economic benefits over Business as Usual regardless of the funding option used to pay for the improvements
- Counties along the I-95 corridor bear the greatest burden in terms of economic losses arising from tolls, but they also benefit the most from the improvements.
- The economic loss to the region and state arising from maintaining I-95 under business-as-usual is far greater than the loss arising from increases in state and local taxes and/or fees (including tolls) necessary to pay for the proposed improvements.
- The economic impact of tolls is no better or worse than other funding alternatives examined and implementing the proposed improvements regardless of how it is funded results in a net positive economic impact for the I-95 corridor region and the state as a whole.

The I-95 Economic Assessment provides an analysis of the economic implication of alternative ways of funding investments on I-95 in North Carolina. The study, while it does not make any recommendations, provides valuable information to inform decisions on future funding for improving and expanding I-95.