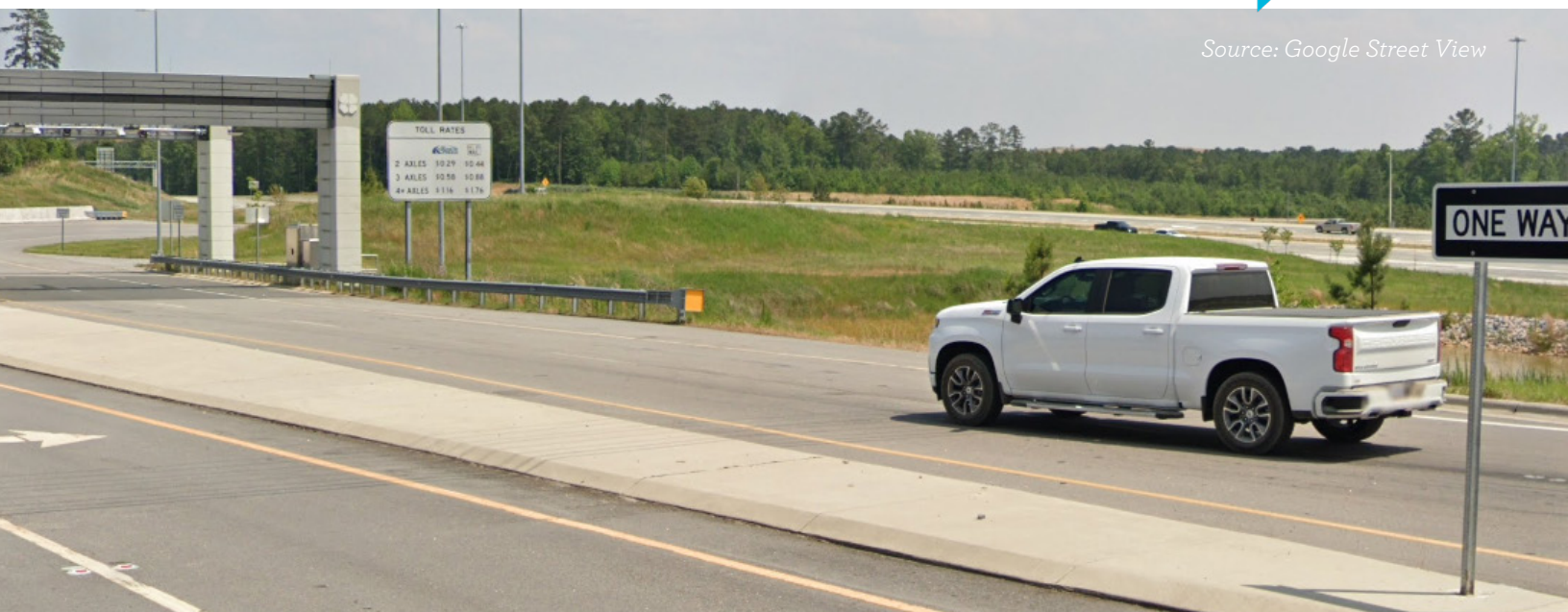




Source: Google Street View



Economic Case Studies

Introduction. Across the nation, studies have supported the assertion that transportation infrastructure investment generates economic activity. Economic research from the Federal Reserve Bank demonstrates that every \$1 invested in highway infrastructure gives rise to up to \$3.00 in economic output. Meanwhile, a Congressional Research Services study found that an incremental increase of 1 percent in transportation infrastructure increases private-sector economic output by 0.131 percent in the short term and 0.170 percent in the long term (Stupak, 2018). From providing access to jobs, education, and healthcare, to moving the goods and services relied on by residents and businesses, a high-functioning transportation system is needed to create opportunities that maintain and expand economic development.

In North Carolina, economic development is a component of its transportation funding process. The magnitude of a project's economic potential is a key determinant of whether a project will receive funding.

The recent establishment of the NC First commission has created a renewed focus on transportation investment. Ultimately, the commission is tasked to ensure the state's economic vitality and competitiveness

is upheld through transportation investment. As the state's leadership continues to evaluate the value of infrastructure investment, it has become increasingly important to be able to quantify the economic importance of individual transportation projects. As part of this research, case study projects were selected to study the economic impacts of transportation investment and provide context to how transportation projects support the North Carolina economy. These projects are discussed in detail in the sections that follow.



Economic Development Case Study R-2635D: Veridea Parkway

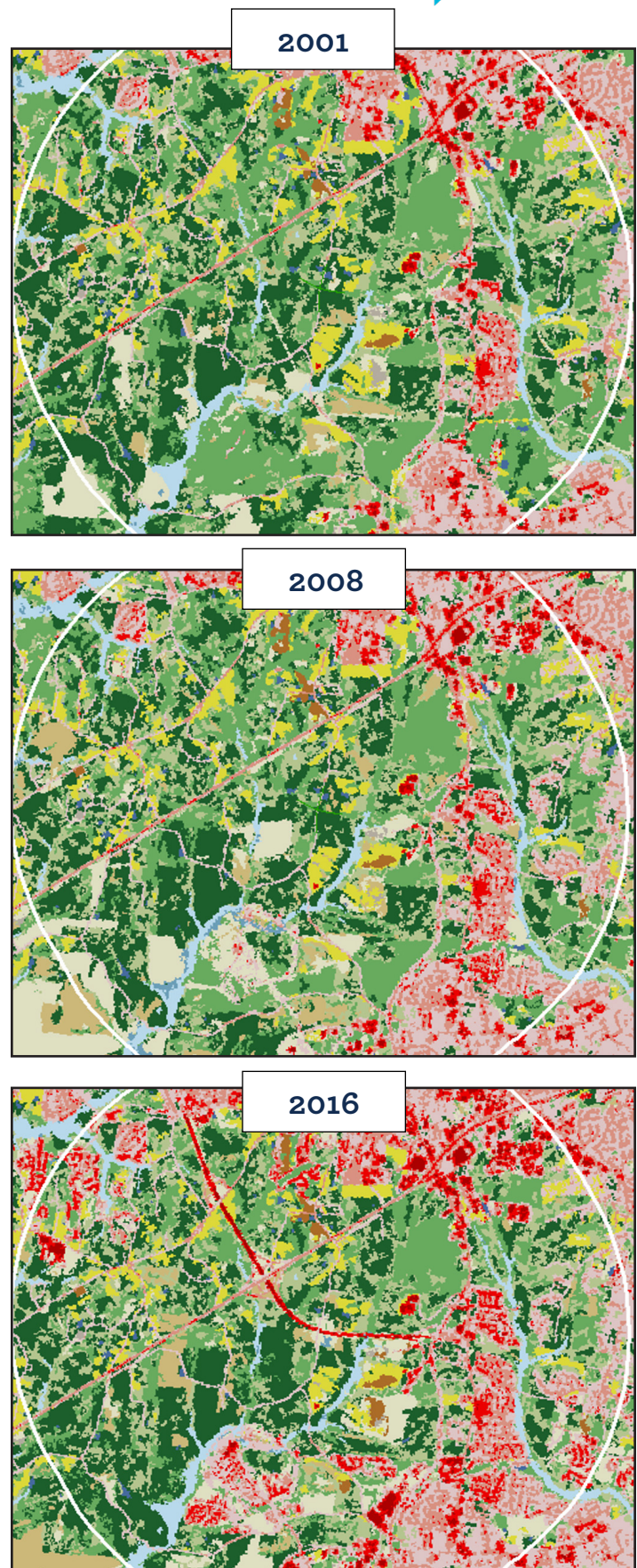
Economic Context. Programmed as part of the 2015 State Transportation Improvement Program (STIP), R-2635D was completed in April 2017. It offers an opportunity to evaluate the economic context of a recently completed infrastructure investment. R-2635D resulted in the addition of a new interchange located between US-1 and NC-55 at Veridea Parkway (formerly known as Old Holly Springs-Apex Road) as well as

another new interchange connecting to the Morrisville Parkway extension. The completed project now provides motorists with additional connectivity to the Western Wake Freeway (I-540) from Holly Springs and reduces travel time to the airport, among other destinations. According to NCDOT estimates, 1,900 vehicles per day traversed Veridea Parkway in 2010; however, that number is projected to increase more than 18 times to nearly 35,000 vehicles per day by 2035 (TBJ, 2017).

Economic Analysis. Economic activities within the R-2635D project area were studied. Economic conditions before-and-after the project was completed were reviewed to explore the economic effects that may be associated with the project. Geospatial and economic analyses were conducted using data from the 2015 NCDOT STIP, ESRI's Business Analyst dataset, and IMPLAN's input/output economic modeling platform. The results are shown in *Figure 7*.

Land Use. Using the National Land Cover Database (NLCD) from the Multi-Resolution Land Characteristics Consortium, the research team analyzed the changes in land use between 2001 and 2016 within a buffer area of 3 miles surrounding the R-2635D project. In 2001, 23.6 percent of the land within three miles of R-2635D was developed. In 2011, the land for I-540 and the Old Holly Springs-Apex Road interchange was cleared, and neighborhoods and developments began showing up in the buffer area, with the percentage of developed land reaching 31.1 percent. By 2016, months before the completion of the Old Holly Springs-Apex Road interchange, the percentage of developed land within the buffer area had reached 36.1 percent, an increase of 12.5 percent over a 15-year period.

Project Area Assessment. Using ESRI's Business Analyst dataset from Infographics USA, the research team analyzed changes in economic activity within proximity of the R-2635D interchange project. In 2014, there were approximately 1,170 firms employing 11,800 workers within three miles of the R-2635D build site. These firms directly supported \$1.8 billion in annual business sales at their companies.



Source: National Land Cover Database



Figure 7: Change in Direct Economic Activity Within Three Miles of R-2635D from 2014 to 2018

Year	Jobs	Employee Earnings	Economic Output
2014	11,800	\$578,300,000	\$1,806,400,000
2018	12,700	\$627,900,000	\$2,217,700,000
Net Difference	900	\$49,600,000	\$411,300,000
Percent Change	7.6%	8.6%	22.7%

Source: IMPLAN, ITRE Analysis

Figure 8: Economic Activity Facilitated by R-2635D Project Expenditures

Year	Project Construction Effects			
	Direct	Indirect	Induced	Total
Jobs	200	60	80	330
Employee Earnings	\$11,300,000	\$3,200,000	\$3,600,000	\$18,100,000
Economic Output	\$18,400,000	\$10,100,000	\$11,600,000	\$40,100,000
State and Local Tax Revenue				\$1,700,000

Source: IMPLAN, ITRE Analysis

Altogether, the direct economic activity originating in the project area, in 2014, supported a total of:

- 11,800 jobs
- \$578.3 million in employee earnings
- \$1.8 million in economic output

In 2018, there were approximately 1,200 firms employing 12,700 workers within three miles of the R-2635D build site. These firms directly supported \$2.2 billion in annual business sales for their organizations.

Altogether the direct economic activities originating in the project area contributed to a total of:

- 12,700 jobs
- \$627.9 million in employee earnings
- \$2.2 billion in economic output

From 2014 to 2018, direct employment grew 7.3 percent within the project area. Comparatively, employment grew in the state of North Carolina at a rate of 6.3 percent over this time period. It's important to note that project R-2635D has only been in operation for two years. The economic effects associated with highway interchange projects may take decades to fully materialize.

Construction Impacts. In addition to making the area within the R-2635D project vicinity more suitable for firm site-selection, the construction of R-2635 supports the improvement of North Carolina's capital stock and supports employment in engineering, construction, and planning firms. The transportation investment of \$18.4 million supports a total of 330 jobs, \$40.1 million in economic output, and generates \$1.7 million in local and state tax revenue, during the R-2635 project period. *Figure 8* provides a breakout of the direct, indirect, and induced effects associated with the construction of this project.



Source: AA Roads

Economic Development Case Study US-70: Goldsboro Bypass

Economic Context. United States Route 70 Bypass at Goldsboro, also known as the Goldsboro Bypass, was built from 2011 to 2016. The 21.7-mile route splits from US-70 just west of Goldsboro, forming a bypass around the city before it merges back into US-70 near La Grange, NC. This road offers an opportunity to evaluate the economic context of a recently completed infrastructure investment. According to NCDOT's annual average daily traffic maps, around 20,000 vehicles per day traversed the Goldsboro Bypass in 2018.

Economic Analysis. Economic activities within the US-70 Bypass area were studied. Economic conditions before-and-after the project was completed were reviewed to explore the economic effects that may be associated with the project. Geospatial and economic analyses were conducted using data from ESRI's Business Analyst dataset and IMPLAN's input/output economic modeling platform. The results are shown in *Figure 9*.

Land Use. Using the National Land Cover Database (NLCD) from the Multi-Resolution Land Characteristics Consortium, the research team analyzed the changes in land use between 2001 and 2016 within a buffer area of 3 miles surrounding the US-70 Bypass. In 2001, 15.9 percent of the land within three miles of the US-70 Bypass was developed. By 2016, the same year that the road was completed, the percentage of developed land within the buffer area had reached 18.8 percent, an increase of 2.9 percent over a 15-year period. This percentage is expected to continue to increase as it can take years for the full impact of road projects to materialize.

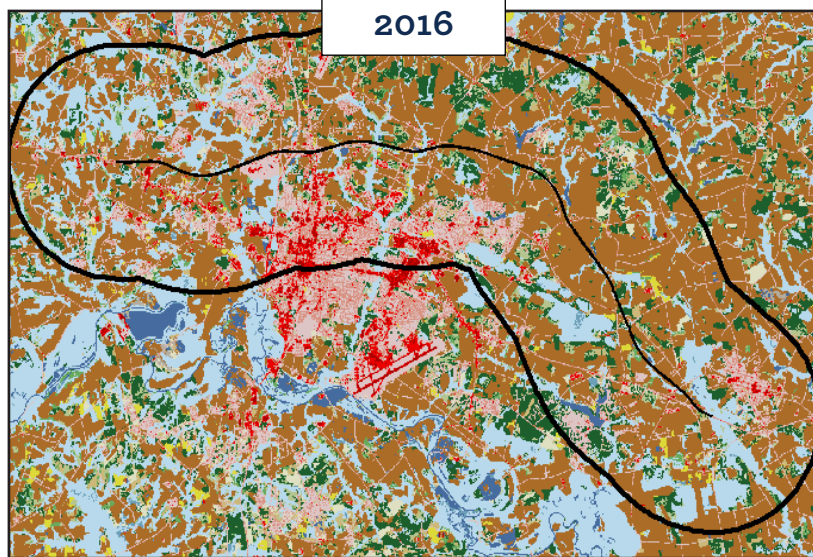
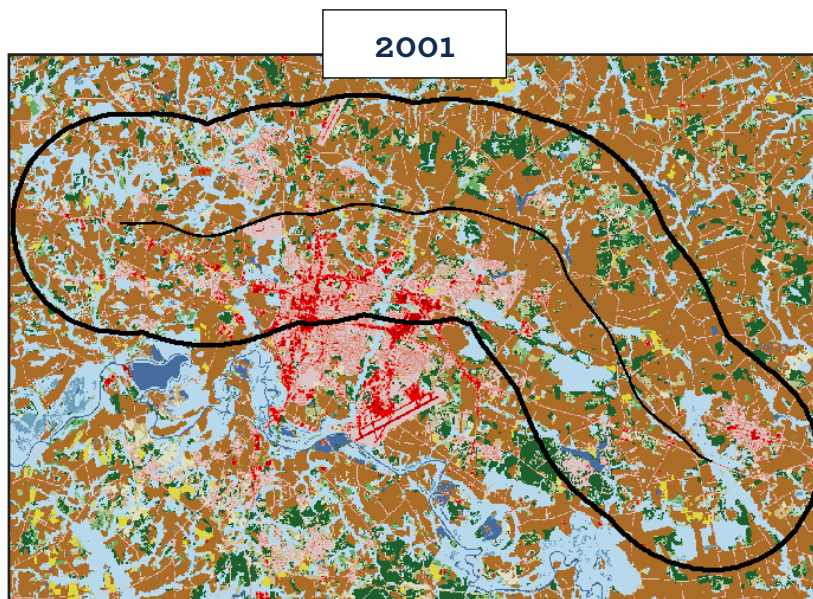
Project Area Assessment. Using ESRI's Business Analyst dataset from Infographics USA, the research team analyzed changes in economic activity within proximity of the US-70 Bypass interchange project. In 2008, a few years before the construction of the bypass had begun, there were approximately 2,233 firms employing 29,700 workers within three miles of the US-70 Bypass. These firms directly supported \$5.7 billion in annual business sales at their companies.



Figure 9: Change in Direct Economic Activity Within Three Miles of US-70 Bypass from 2008 to 2018

Year	Jobs	Employee Earnings	Economic Output
2008	29,700	\$1,666,300,000	\$5,761,100,000
2018	33,200	\$1,758,900,000	\$5,884,200,000
Net Difference	3,500	\$92,600,000	\$123,100,000
Percent Change	11.7%	5.6%	2.1%

Source: IMPLAN, ITRE Analysis



Altogether, the direct economic activity originating in the project area, in 2008, resulted in a total of:

- 29,700 jobs
- \$1.6 billion in employee earnings
- \$5.7 billion in economic output

In 2018, there were approximately 2,476 firms employing 33,200 workers within three miles of the US-70 Bypass. These firms directly supported \$5.8 billion in annual business sales for their organizations.

Altogether, the direct economic activity originating in the project area, in 2018, resulted in a total of:

- 33,200 jobs
- \$1.7 billion in employee earnings
- \$5.8 billion in economic output

From 2008 to 2018, direct employment grew 11.7 percent, direct employee earnings grew 5.6 percent, direct economic output grew 2.1%, and direct state and local tax revenue fell 5.9% within the project area. It's important to note that the US-70 Bypass has only been in operation for four years. The economic effects associated with road projects may take decades to fully materialize.

Source: National Land Cover Database



Source: Google Streetview



Economic Development Case Study NC-148: C.F. Harvey Parkway

Economic Context. North Carolina Highway 148, also known as C.F. Harvey Parkway, was built in stages starting in 2002 and finishing in 2014. The 8.7 mile route connects NC-58 to US-70 in Kinston North Carolina and provides access to both the North Carolina Global TransPark and the Kinston Regional Jetport while also creating a bypass around the town of Kinston to reach US-70. By linking the airport, Global TransPark, and the highway, NC-148 provides a valuable intermodal connection. This road offers an opportunity to evaluate the economic context of a recently completed infrastructure investment. According to NCDOT's annual average daily traffic maps, 5,800 vehicles per day traversed NC-148 in 2018. That number has more than doubled since 2009, when 1,860 vehicles per day traversed the road.

Economic Analysis. Economic activities within the NC-148 project area were studied. Economic conditions before-and-after the project was completed were reviewed to explore the economic effects that may be associated

with the project. Geospatial and economic analyses were conducted using data from ESRI's Business Analyst dataset and IMPLAN's input/output economic modeling platform. The results are shown in *Figure 10*.

Land Use. Using the National Land Cover Database (NLCD) from the Multi-Resolution Land Characteristics Consortium, the research team analyzed the changes in land use between 2001 and 2016 within a buffer area of 3 miles surrounding the NC-148. In 2001, 15.0 percent of the land within three miles of NC-148 was developed. By 2016, two years after the completion of NC-148, the percentage of developed land within the buffer area had reached 16.8 percent, an increase of 1.8 percent over a 15-year period.

Project Area Assessment. Using ESRI's Business Analyst dataset from Infographics USA, the research team analyzed changes in economic activity within proximity of NC-148. In 2001, there were approximately 882 firms employing 13,780 workers within three miles of where NC-148 would be built a few years in the future. These firms directly supported \$2.7 billion in annual business sales at their companies.



Altogether, the direct economic activity originating in the project area, in 2001, resulted in a total of:

- 13,780 jobs
- \$756.8 million in employee earnings
- \$2.7 billion in economic output

In 2018, there were approximately 1,060 firms employing 14,850 workers within three miles of NC-148. These firms directly supported \$2.9 billion in annual business sales for their organizations.

Altogether, the direct economic activity originating in the project area, in 2018, resulted in a total of:

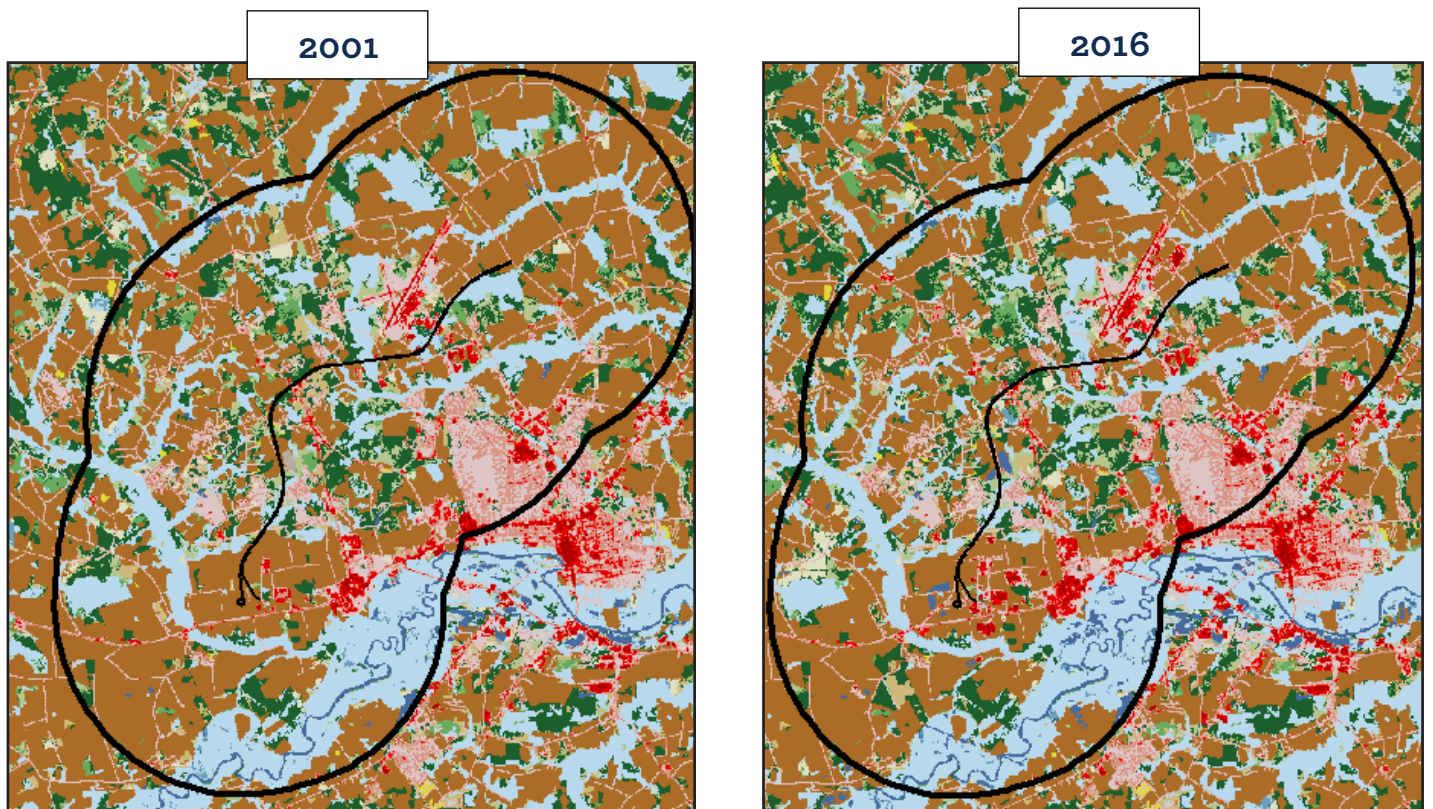
- 28,400 jobs
- \$883.3 million in employee earnings
- \$2.9 billion in economic output

From 2001 to 2018, direct employment grew 8.0 percent, direct employee earnings grew 16.8 percent, direct economic output grew 7.2%, and direct state and local tax revenue grew 105% within the project area. It's important to note that project NC-148 has only been in operation for six years. The economic effects associated with road projects may take decades to fully materialize.

Figure 10: Change in Direct Economic Activity Within Three Miles of NC-148 from 2001 to 2018

Year	Jobs	Employee Earnings	Economic Output
2001	13,700	\$756,400,000	\$2,750,300,000
2018	14,800	\$883,300,000	\$2,949,100,000
Net Difference	1,100	\$126,900,000	\$198,800,000
Percent Change	8.0%	16.8%	7.2%

Source: IMPLAN, ITRE Analysis



Source: National Land Cover Database



Source: Google Streetview



Economic Development Case Study NC-16: Lincoln County

Economic Context. North Carolina Route 16 in Lincoln County is a primary North/South corridor. It connects Denver and Lowesville to Charlotte, NC and I-85 in the South to I-40 in the North. In the mid to late 2000s, NC-16 in Lincoln County was rebuilt parallel to the historical route 16 and was constructed to be a limited access four-lane road. This new larger route has provided sufficient road capacity for new residential, commercial, and industrial development to occur in the region, providing quick, consistent access to both the large metro area of Charlotte as well as two major interstates. According to NCDOT's annual average daily traffic maps, 33,000 vehicles per day traversed NC-16 in Lincoln County in 2018. That number has almost doubled since 2012, shortly after the new route opened, when 17,000 vehicles per day traversed the road.

Economic Analysis. Economic activities within the NC-16 project area were studied. Economic conditions before-and-after the project was completed were reviewed to explore the economic effects that may be associated

with the project. Geospatial and economic analyses were conducted using data from ESRI's Business Analyst dataset and IMPLAN's input/output economic modeling platform. Results are shown in *Figure 11*.

Land Use. Using the National Land Cover Database (NLCD) from the Multi-Resolution Land Characteristics Consortium, the research team analyzed the changes in land use between 2001 and 2016 within a buffer area of 3 miles surrounding the NC-16 in Lincoln County. In 2001, 14.6 percent of the land within three miles of NC-16 was developed. By 2016, four years after the completion of NC-16 in Lincoln County, the percentage of developed land within the buffer area had reached 19.6 percent, an increase of 5 percent over a 15-year period.

Project Area Assessment. Using ESRI's Business Analyst dataset from Infographics USA, the research team analyzed changes in economic activity within proximity of NC-16. In 2001, there were approximately 795 firms employing 5,735 workers within three miles of where NC-16 would be built 11 years in the future. These firms directly supported \$1.1 billion in annual business sales at their companies.



Altogether, the direct economic activity originating in the project area, in 2001, resulted in a total of:

- 5,735 jobs
- \$329.4 million in employee earnings
- \$1.1 billion in economic output

In 2018, there were approximately 1,390 firms employing 10,618 workers within three miles of NC-16 in Lincoln County. These firms directly supported \$1.6 billion in annual business sales for their organizations.

Altogether, the direct economic activity originating in the project area, in 2018, resulted in a total of:

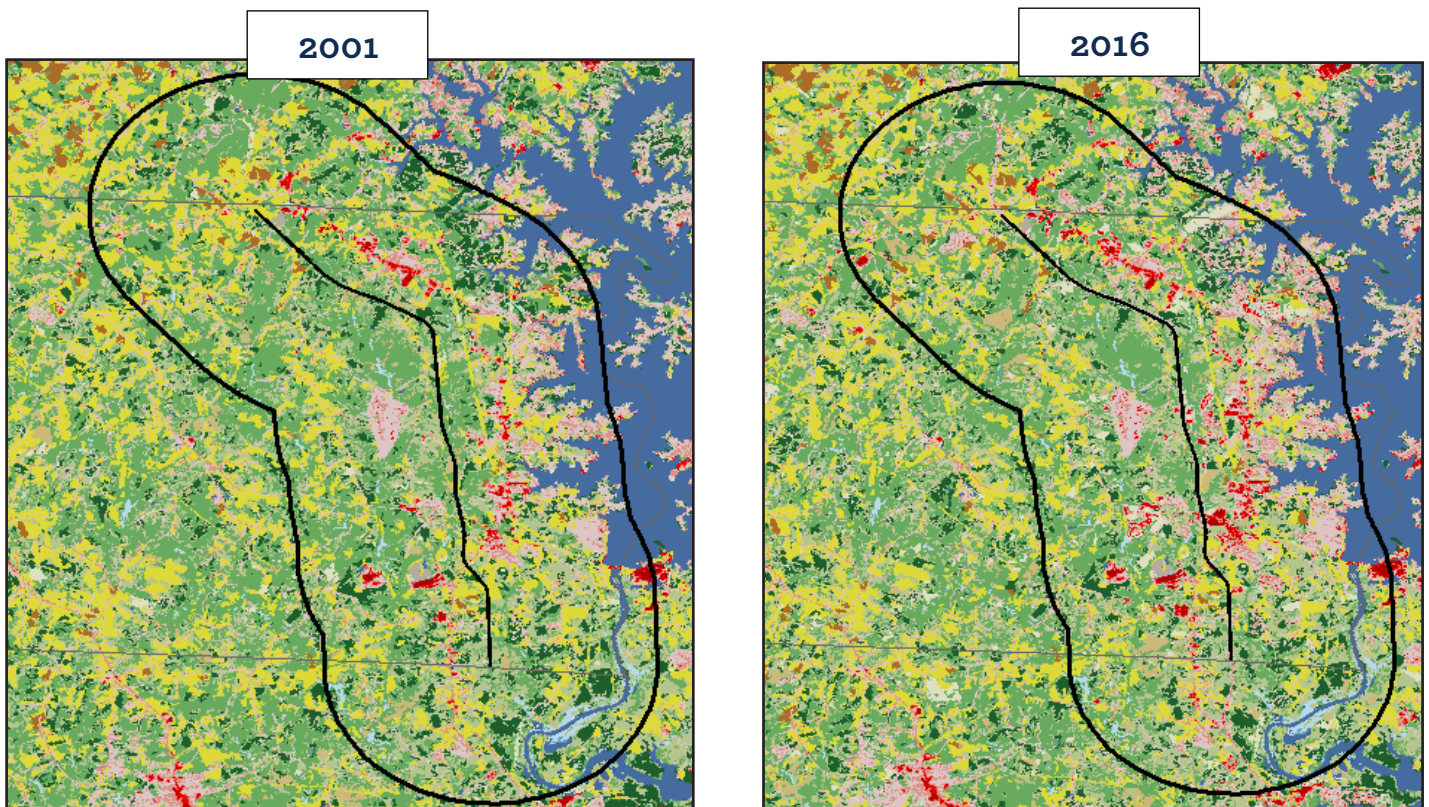
- 10,618 jobs
- \$660.5 million in employee earnings
- \$1.6 billion in economic output

From 2001 to 2018, direct employment grew 85.1 percent, direct employee earnings grew 100.5 percent, direct economic output grew 38.1%, and direct state and local tax revenue grew 46.9% within the project area. It's important to note that project NC-16 has only been in operation for eight years. The economic effects associated with road projects may take decades to fully materialize.

Figure 11: Change in Direct Economic Activity Within Three Miles of NC-16 from 2001 to 2018

Year	Jobs	Employee Earnings	Economic Output
2001	5,735	\$329,400,000	\$1,171,100,000
2018	10,618	\$660,500,000	\$1,617,600,000
Net Difference	4,883	\$331,100,000	\$446,500,000
Percent Change	85.1%	100.5%	38.1%

Source: IMPLAN, ITRE Analysis



Source: National Land Cover Database