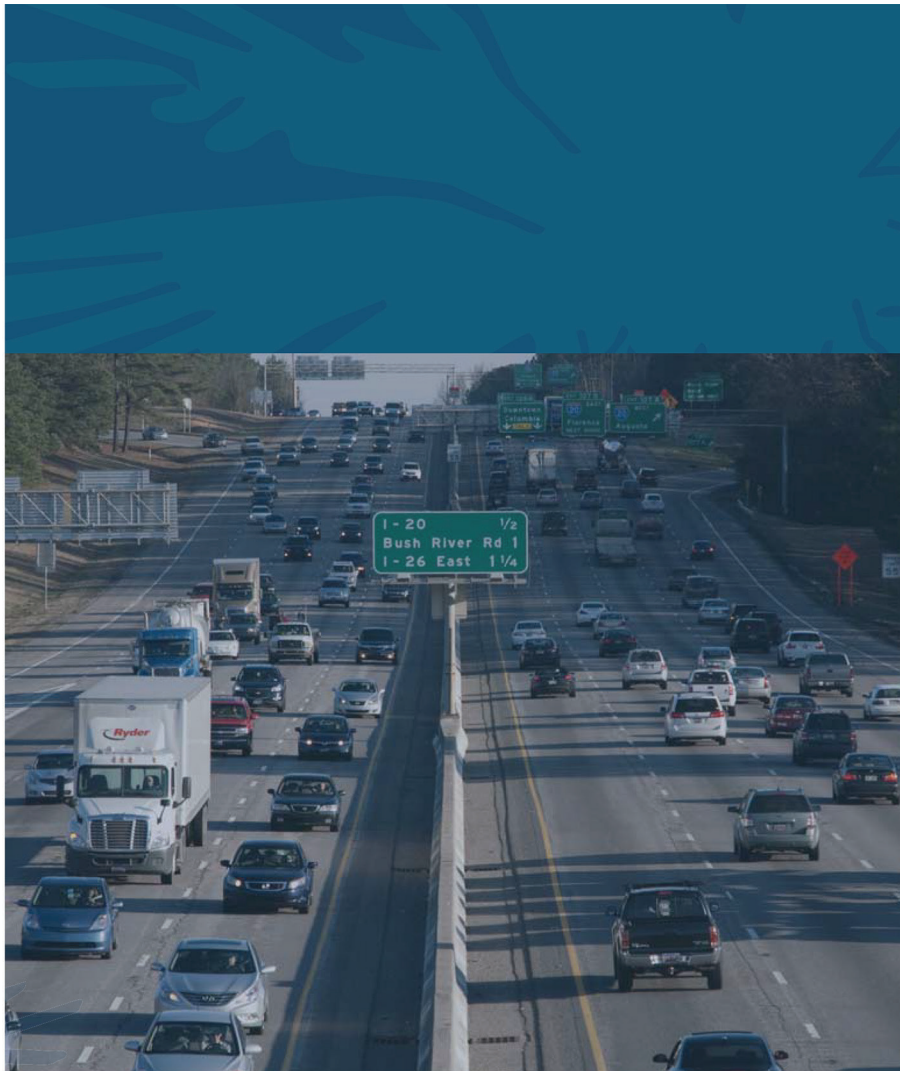


Appendix H—Economic Analysis Report



Economic Analysis in Support of Environmental Impact Statement

*Carolina Crossroads
I-20/26/126 Corridor Project
Lexington and Richland Counties, South Carolina*

FEIS May 2019



Prepared for South Carolina Department of Transportation
and the Federal Highway Administration

Economic Analysis in Support of Environmental Impact Statement

Carolina Crossroads

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Prepared by



Economic Analysis in Support of Environmental Impact Statement



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Economic Analysis in Support of Environmental Impact Statement



1 Introduction

Since the DEIS, minor adjustments have been made to refine RA1 based on public input and additional technical analysis, as discussed in Chapter 2 of the FEIS. The revised RA1 is now known as the Refined Recommended Preferred Alternative for the project. Though the changes to RA1 are not substantial and the termini, general alignment, and function remain the same, these refinements resulted in slightly higher cost estimates. Accordingly, the economic impacts increased over what was presented in the DEIS. The present document reflects these revisions.

2 Economic Impact Analysis

An analysis of the short-term (or temporary) economic impacts associated with capital expenses (preliminary design, construction, etc.) during the development phase of the project has been conducted in IMPLAN, an input-output based regional economic assessment modeling system developed and maintained by the IMPLAN Group LLC.

The economic impact analysis involves the estimation of three types of effect:

- Direct effect: change in economic activity occurring as a result of direct spending by businesses (e.g., expenses related to construction activities);
- Indirect effect: change in economic activity resulting from purchases by local firms who are the suppliers to the directly (first round) and otherwise indirectly affected (secondary rounds) affected businesses (e.g., spending by suppliers of the contractors responsible for construction activities and located in the study area); and
- Induced effect: change in economic activity associated with increased labor income that accrue to workers (of the contractors and all suppliers, in our example) and is spent on household goods and services purchased from businesses within the study area.

The indirect and induced effects are sometimes referred to as multiplier effects since they can make the total economic impact substantially larger than the direct effect alone. For the purpose of this analysis, the multiplier effects are derived from the 2015 IMPLAN data files for the State of South Carolina and the immediate study area (comprising Richland County and Lexington County).

In addition, the economic impacts are measured in terms of:

- Employment (i.e., full-time and part-time jobs combined);
- Labor income (i.e., employee compensation and proprietor income);
- Value added (i.e., contribution to regional gross domestic product [GDP]); and
- Tax revenue (at the federal and state/local levels).

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2.1 Assumptions

Capital expenses incurred during the development phase of the project can be roughly divided into three main categories: construction; right-of-way; and professional services (such as engineering). Right-of-way expenses are typically not included in economic impact analysis because they represent a transfer of asset from one entity to another and generate minimal economic impacts (e.g., direct impacts from real estate activity).

The development phase starts in 2017 with the DEIS and is currently scheduled to end in 2024 with the completion of construction works. Construction itself is assumed to last about five years. Capital cost estimates used in the economic impact analysis for the Refined Recommended Preferred Alternative and RA1 are summarized in Table 2.1 below.

Table 2.1 Capital Expenses

Major cost category	IMPLAN sector	RA1 (\$million)	Refined RPA (\$million)
Construction ¹	Construction of new highways and streets	\$957.3	\$1,040.5
Planning, engineering and design ²	Architectural, engineering, and related services	\$153.4	\$193.6
Environmental mitigation	Environmental and other technical consulting services	\$3.3	\$3.3

2.2 Economic Impact Analysis Results

Capital expenses incurred in the State of South Carolina are expected to generate about 11,700 job-years³ during the development phase (2017 – 2024) for the Refined Recommended Preferred Alternative. In other words, every \$105,000 in capital expenses would generate one job-year on average.⁴ Employees filling these jobs would earn a cumulative \$565.7 million in wages and benefits. Overall, the contribution to GDP is estimated at \$861.0 million and the contribution to taxes is estimated at \$179.8 million (including \$56.2 million in state and local taxes) statewide.

The results are slightly higher for RA1, but this is simply due to the fact that capital expenses are higher (see Table 2.1 above).

¹ Construction includes relocation of utilities. By default, construction employment occurs at the site of construction. So, it is assumed that 100 percent of construction expenses would be effectively incurred in the immediate study area (i.e., Richland County and Lexington County combined).

² It is assumed that 50 percent of planning, engineering, and design expenses would be spent outside of South Carolina and are thus excluded from the economic impact analysis.

³ A job-year can be simply defined as one person employed for one year, whether part-time or full-time.

⁴ By comparison, in 2011 the White House's Council of Economic Advisers estimated that the stimulus government spending needed to create 1 job-year was \$76,923 (Executive Office of the President, Council of Economic Advisers, "Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009," Washington, D.C., May 11, 2009; and September 2011 Update).

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Direct expenses associated with construction, engineering and environmental services account for more than half of total employment impact – conversely, the multiplier effects (i.e., indirect and induced effects) of capital expenses represent slightly less than half of total employment impact.

A summary of economic impacts at the state level is provided in Table 2.2 below.

Table 2.2 Summary of Cumulative Economic Impacts by Type of Effect – South Carolina (2017 – 2024)

Impact Metric	Direct	Indirect	Induced	Total
Refined RPA				
Employment (job-years)	6,427	2,558	2,748	11,732
Labor income	\$325.8	\$133.4	\$106.5	\$565.7
Value added	\$439.2	\$223.5	\$198.4	\$861.0
State and local taxes				\$56.2
Federal taxes				\$123.6
RA1				
Employment (job-years)	5,842	2,308	2,478	10,629
Labor income	\$293.6	\$120.6	\$96.0	\$510.2
Value added	\$397.8	\$202.7	\$178.9	\$779.5
State and local taxes				\$50.9
Federal taxes				\$111.7

Notes: All dollar amounts are expressed in millions of 2017 dollars. Employment impacts should not be interpreted as full-time equivalent (FTE) as they reflect the mix of full- and part-time jobs that is typical for each sector of the economy. State and local tax impacts are combined and cannot be separated within IMPLAN. Totals may not add due to rounding.

The economic impact results for the immediate study area (Richland County and Lexington County) are very similar. For instance, only 47 fewer jobs are expected to be generated for the Refined Recommended Preferred Alternative (46 fewer jobs for RA1), but the labor income impact and value added impact are slightly higher – which implies that, on average, jobs are slightly better paid in the immediate study area than the state as a whole. In other words, the multiplier effects are of the same magnitude at the state and local levels. This can be explained by the fact that Richland County and Lexington County are two of the most populous counties in the state (nearly 700,000 in total) and are located in an urban area with a well-diversified economy (they are part of the Columbia metropolitan statistical area).

Assuming that capital expenses are evenly spent over the period of analysis, more than 1,334 jobs would be sustained in Richland County and Lexington County from 2017 to 2024 as a result of the project (Refined Recommended Preferred Alternative). This represents 0.32 percent of the area’s current total employment.

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A summary of economic impacts for Richland County and Lexington County is provided in Table 2.3 below.

Table 2.3 Summary of Cumulative Economic Impacts – Richland Co. and Lexington Co. (2017 – 2024)

Impact metric	Direct	Indirect	Induced	Total
Refined RPA				
Employment (job-years)	6,329	2,494	2,862	11,685
Labor income	\$332.4	\$132.7	\$114.0	\$579.1
Value added	\$449.4	\$231.2	\$214.6	\$895.2
State and local taxes				\$58.5
Federal taxes				\$122.6
RA1				
Employment (job-years)	5,750	2,250	2,583	10,583
Labor income	\$299.8	\$120.0	\$103.0	\$522.7
Value added	\$407.3	\$209.9	\$193.8	\$811.0
State and local taxes				\$53.0
Federal taxes				\$110.9

Notes: All dollar amounts are expressed in millions of 2017 dollars. Employment impacts should not be interpreted as full-time equivalent (FTE) as they reflect the mix of full- and part-time jobs that is typical for each sector of the economy. State and local tax impacts are combined and cannot be separated within IMPLAN. Totals may not add due to rounding.

A breakdown of economic impacts by major cost category (construction, engineering, and environmental services) shows that construction related expenses account for at least 85 percent of economic impacts (e.g., 88.1 percent of total employment impact). Engineering related expenses are expected to generate 1,334 job-years for the Refined Recommended Preferred Alternative (or 11.4 percent of total employment impact). Prorating the results to the respective capital expenses shows that the construction job multiplier is greater (by a factor of 1.4) than the engineering job multiplier. This is due, in part, to the fact that the construction sector is more labor intensive than the architectural and engineering sector.

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The complete breakdown of impacts by major cost category is provided in Table 2.4 below.

Table 2.4 Summary of Economic Impact Analysis Results by Major Cost Category – South Carolina (2017 – 2024)

Impact metric	Construction	Engineering	Environmental Services
Refined RPA			
Employment (job-years)	10,337	1,334	61
Labor income	\$480.3	\$82.0	\$3.4
Value added	\$755.6	\$101.6	\$3.9
State and local taxes	\$49.8	\$6.1	\$0.2
Federal taxes	\$106.6	\$16.4	\$0.6
RA1			
Employment (job-years)	9,451	1,074	58
Labor income	\$454.2	\$65.1	\$3.5
Value added	\$724.8	\$82.2	\$4.0
State and local taxes	\$47.9	\$4.9	\$0.2
Federal taxes	\$98.1	\$12.2	\$0.6

Notes: All dollar amounts are expressed in millions of 2017 dollars. Employment impacts should not be interpreted as full-time equivalent (FTE) as they reflect the mix of full- and part-time jobs that is typical for each sector of the economy. State and local tax impacts are combined and cannot be separated within IMPLAN. Totals may not add due to rounding.

Appendix A— Additional Tables

Economic Analysis in Support of Environmental Impact Statement



Table A1 Cumulative Employment Impacts by Aggregate Industry, Refined Recommended Preferred Alternative – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	6,329	2,494	2,862	11,685
1	11 Ag, forestry, fish & hunting	0	4	6	11
20	21 Mining	0	115	2	117
41	22 Utilities	0	10	11	21
52	23 Construction	5,707	27	32	5,765
65	31-33 Manufacturing	0	177	14	192
395	42 Wholesale trade	0	279	77	356
396	44-45 Retail trade	0	235	499	734
408	48-49 Transportation & warehousing	0	212	68	280
417	51 Information	0	37	48	84
433	52 Finance & insurance	0	106	205	311
440	53 Real estate & rental	0	207	158	365
447	54 Professional- scientific & tech services	622	385	126	1,132
461	55 Management of companies	0	25	12	37
462	56 Administrative & waste services	0	363	187	551
472	61 Educational services	0	1	93	94
475	62 Health & social services	0	0	508	508
488	71 Arts- entertainment & recreation	0	28	82	110
499	72 Accommodation & food services	0	119	404	523
504	81 Other services	0	159	319	478
520	92 Government & non NAICs	0	6	11	16

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Table A2 Cumulative Employment Impacts by Aggregate Industry, RA1 – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	5,750	2,250	2,583	10,583
1	11 Ag, Forestry, Fish & Hunting	0	4	6	10
20	21 Mining	0	106	2	108
41	22 Utilities	0	9	10	19
52	23 Construction	5,250	24	29	5,303
65	31-33 Manufacturing	0	163	13	176
395	42 Wholesale Trade	0	256	69	326
396	44-45 Retail trade	0	216	450	666
408	48-49 Transportation & Warehousing	0	194	61	255
417	51 Information	0	33	43	76
433	52 Finance & insurance	0	95	185	280
440	53 Real estate & rental	0	188	143	331
447	54 Professional- scientific & tech services	500	339	113	952
461	55 Management of companies	0	23	11	34
462	56 Administrative & waste services	0	320	169	489
472	61 Educational services	0	1	84	85
475	62 Health & social services	0	0	459	459
488	71 Arts- entertainment & recreation	0	25	74	99
499	72 Accommodation & food services	0	104	364	469
504	81 Other services	0	145	288	433
520	92 Government & non NAICs	0	5	10	15

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Table A3 Cumulative Labor Income Impacts (\$Million) by Aggregate Industry, Refined Recommended Preferred Alternative – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	\$332.4	\$132.7	\$114.0	\$579.1
1	11 Ag, forestry, fish & hunting	\$0.0	\$0.0	\$0.0	\$0.1
20	21 Mining	\$0.0	\$5.3	\$0.0	\$5.3
41	22 Utilities	\$0.0	\$1.2	\$1.3	\$2.5
52	23 Construction	\$281.3	\$1.3	\$1.6	\$284.2
65	31-33 Manufacturing	\$0.0	\$10.5	\$0.9	\$11.4
395	42 Wholesale trade	\$0.0	\$24.1	\$6.6	\$30.8
396	44-45 Retail trade	\$0.0	\$7.5	\$15.0	\$22.6
408	48-49 Transportation & Warehousing	\$0.0	\$12.1	\$3.6	\$15.6
417	51 Information	\$0.0	\$2.7	\$3.4	\$6.1
433	52 Finance & insurance	\$0.0	\$6.9	\$11.3	\$18.2
440	53 Real estate & rental	\$0.0	\$7.9	\$4.0	\$11.9
447	54 Professional- scientific & tech services	\$51.2	\$28.0	\$8.4	\$87.6
461	55 Management of companies	\$0.0	\$2.0	\$0.9	\$3.0
462	56 Administrative & waste services	\$0.0	\$12.0	\$5.8	\$17.8
472	61 Educational services	\$0.0	\$0.0	\$3.2	\$3.2
475	62 Health & social services	\$0.0	\$0.0	\$28.6	\$28.6
488	71 Arts- entertainment & recreation	\$0.0	\$0.2	\$1.0	\$1.3
499	72 Accommodation & food services	\$0.0	\$2.4	\$8.1	\$10.5
504	81 Other services	\$0.0	\$8.1	\$9.6	\$17.8
520	92 Government & non NAICs	\$0.0	\$0.3	\$0.6	\$0.8

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Table A4 Cumulative Labor Income Impacts (\$Million) by Aggregate Industry, RA1 – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	\$299.8	\$119.9	\$102.9	\$522.7
1	11 Ag, Forestry, Fish & Hunting	\$0.0	\$0.0	\$0.0	\$0.1
20	21 Mining	\$0.0	\$4.9	\$0.0	\$4.9
41	22 Utilities	\$0.0	\$1.1	\$1.2	\$2.3
52	23 Construction	\$258.8	\$1.2	\$1.4	\$261.4
65	31-33 Manufacturing	\$0.0	\$9.7	\$0.8	\$10.4
395	42 Wholesale Trade	\$0.0	\$22.1	\$6.0	\$28.1
396	44-45 Retail trade	\$0.0	\$6.9	\$13.6	\$20.5
408	48-49 Transportation & Warehousing	\$0.0	\$11.1	\$3.2	\$14.3
417	51 Information	\$0.0	\$2.5	\$3.0	\$5.5
433	52 Finance & insurance	\$0.0	\$6.2	\$10.2	\$16.4
440	53 Real estate & rental	\$0.0	\$7.2	\$3.6	\$10.8
447	54 Professional- scientific & tech services	\$41.0	\$24.7	\$7.6	\$73.3
461	55 Management of companies	\$0.0	\$1.8	\$0.9	\$2.7
462	56 Administrative & waste services	\$0.0	\$10.6	\$5.2	\$15.8
472	61 Educational services	\$0.0	\$0.0	\$2.9	\$2.9
475	62 Health & social services	\$0.0	\$0.0	\$25.8	\$25.8
488	71 Arts- entertainment & recreation	\$0.0	\$0.2	\$0.9	\$1.1
499	72 Accommodation & food services	\$0.0	\$2.1	\$7.3	\$9.4
504	81 Other services	\$0.0	\$7.4	\$8.7	\$16.1
520	92 Government & non NAICs	\$0.0	\$0.2	\$0.5	\$0.8

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Table A5 Cumulative Value Added Impacts (\$Million) by Aggregate Industry, Refined Recommended Preferred Alternative – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	\$449.4	\$231.2	\$214.6	\$895.2
1	11 Ag, Forestry, Fish & Hunting	\$0.0	\$0.0	\$0.2	\$0.3
20	21 Mining	\$0.0	\$20.0	\$0.0	\$20.1
41	22 Utilities	\$0.0	\$3.8	\$4.4	\$8.1
52	23 Construction	\$398.0	\$1.9	\$2.3	\$402.2
65	31-33 Manufacturing	\$0.0	\$17.9	\$1.9	\$19.8
395	42 Wholesale Trade	\$0.0	\$46.2	\$12.7	\$58.8
396	44-45 Retail trade	\$0.0	\$11.4	\$25.0	\$36.4
408	48-49 Transportation & Warehousing	\$0.0	\$15.2	\$4.4	\$19.7
417	51 Information	\$0.0	\$5.0	\$7.3	\$12.3
433	52 Finance & insurance	\$0.0	\$10.0	\$17.7	\$27.7
440	53 Real estate & rental	\$0.0	\$36.3	\$56.8	\$93.0
447	54 Professional- scientific & tech services	\$51.4	\$31.4	\$10.5	\$93.2
461	55 Management of companies	\$0.0	\$2.5	\$1.2	\$3.7
462	56 Administrative & waste services	\$0.0	\$15.0	\$7.1	\$22.1
472	61 Educational services	\$0.0	\$0.0	\$3.4	\$3.4
475	62 Health & social services	\$0.0	\$0.0	\$33.5	\$33.5
488	71 Arts- entertainment & recreation	\$0.0	\$0.3	\$2.0	\$2.3
499	72 Accommodation & food services	\$0.0	\$3.4	\$12.2	\$15.6
504	81 Other services	\$0.0	\$10.8	\$11.5	\$22.3
520	92 Government & non NAICs	\$0.0	\$0.2	\$0.7	\$0.9

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Table A6 Cumulative Value Added Impacts (\$Million) by Aggregate Industry, RA1 – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	\$407.3	\$209.7	\$193.6	\$811.0
1	11 Ag, Forestry, Fish & Hunting	\$0.0	\$0.0	\$0.2	\$0.3
20	21 Mining	\$0.0	\$18.4	\$0.0	\$18.4
41	22 Utilities	\$0.0	\$3.4	\$3.9	\$7.4
52	23 Construction	\$366.2	\$1.7	\$2.1	\$370.0
65	31-33 Manufacturing	\$0.0	\$16.4	\$1.7	\$18.1
395	42 Wholesale Trade	\$0.0	\$42.4	\$11.4	\$53.8
396	44-45 Retail trade	\$0.0	\$10.5	\$22.5	\$33.0
408	48-49 Transportation & Warehousing	\$0.0	\$13.9	\$4.0	\$18.0
417	51 Information	\$0.0	\$4.5	\$6.6	\$11.0
433	52 Finance & insurance	\$0.0	\$9.0	\$16.0	\$24.9
440	53 Real estate & rental	\$0.0	\$32.9	\$51.2	\$84.2
447	54 Professional- scientific & tech services	\$41.1	\$27.8	\$9.4	\$78.4
461	55 Management of companies	\$0.0	\$2.3	\$1.1	\$3.3
462	56 Administrative & waste services	\$0.0	\$13.2	\$6.4	\$19.6
472	61 Educational services	\$0.0	\$0.0	\$3.0	\$3.1
475	62 Health & social services	\$0.0	\$0.0	\$30.2	\$30.2
488	71 Arts- entertainment & recreation	\$0.0	\$0.3	\$1.8	\$2.1
499	72 Accommodation & food services	\$0.0	\$3.0	\$11.0	\$14.0
504	81 Other services	\$0.0	\$9.8	\$10.4	\$20.2
520	92 Government & non NAICs	\$0.0	\$0.2	\$0.6	\$0.8