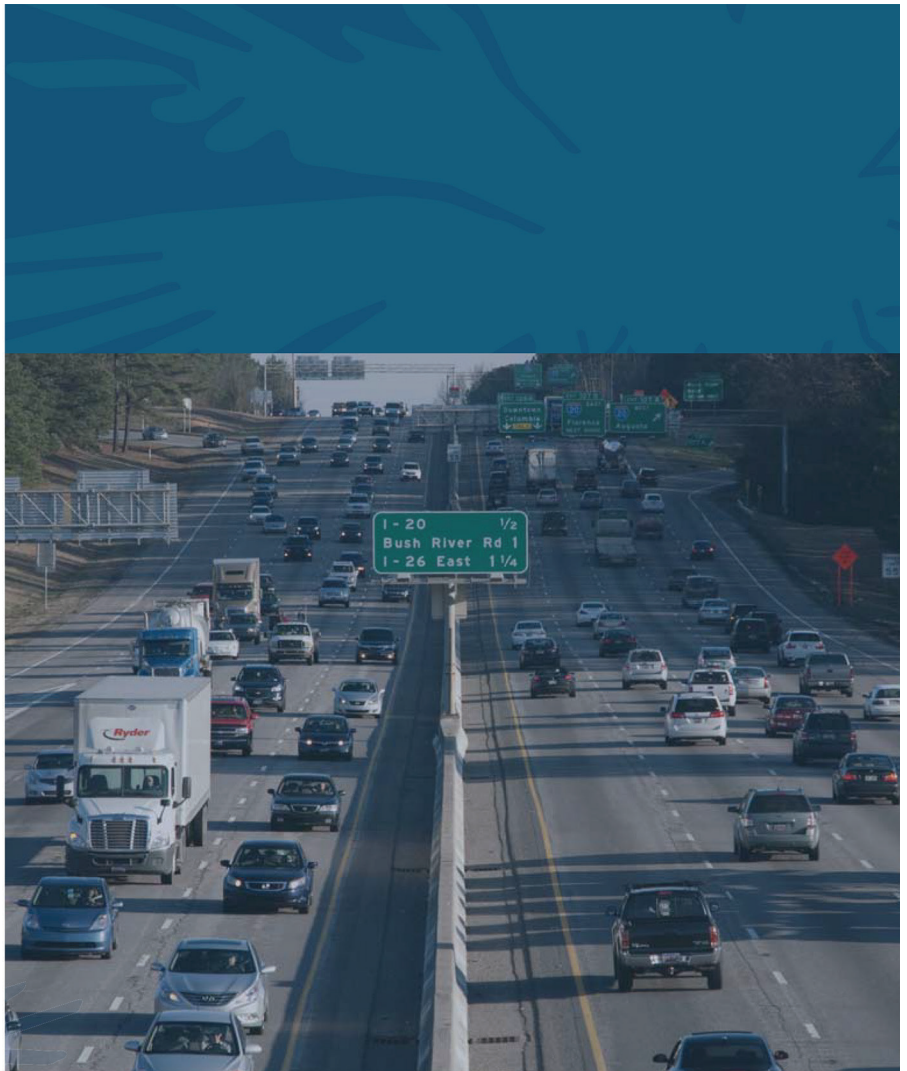


Appendix G—Economic Analysis Report



Economic Analyses in Support of Environmental Impact Statement

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

DEIS July 23, 2018



Economic Analyses in Support of Environmental Impact Statement

Carolina Crossroads

I-20/26/126 Corridor Improvement Project

Lexington and Richland Counties, South Carolina

DEIS July 23, 2018

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

Prepared by



Economic Analyses in Support of Environmental Impact Statement



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Economic Analyses in Support of Environmental Impact Statement



1 Economic Analyses in Support of Environmental Impact Statement

As a part of the draft environmental impact statement (DEIS) for the Carolina Crossroads I-20/26/126 Corridor Improvement Project (Carolina Crossroads), HDR has conducted two distinct economic analyses: benefit-cost analysis (BCA) and economic impact analysis (EIA). While the latter estimates the macro-economic impacts (in terms of sales, jobs, tax collections, etc.) of individuals' decisions and activities – typically on the local or regional level – the former focuses on an investment project's ability to generate a net increase in society's welfare. The results of these analyses are summarized below.

1.1 Benefit-Cost Analysis

The BCA has been performed in accordance with United States Department of Transportation (USDOT) guidelines. In particular, the most recent monetized values and methodologies recommended for grant applications have been applied. The following economic benefits have been measured, monetized, and discounted on an annual basis throughout the lifecycle of the project (40 years)¹ for reasonable alternatives RA1 and RA5 Modified:

- **Travel time savings** – Reductions in travel time from reduced congestion (e.g., adding capacity) or shorter trips / improved accessibility (e.g., new connector or new interchange configuration).
- **Vehicle operating cost savings** – Reductions in the costs of owning (i.e., depreciation) and operating (i.e., fuel, oil, tires, and maintenance) a vehicle resulting from reduced congestion, shorter trips, or diversion of trips to more affordable transportation modes (e.g., public transit).
- **Accident cost savings** – Reductions in the cost of 1) crash fatalities and injuries and 2) property damage only (PDO) crashes as a result of congestion management and interchange reconfiguration.
- **Emissions cost savings** – Reductions in the cost of vehicular emissions of air pollutants (nitrogen oxides, sulfur dioxide, volatile organic compound, and fine particulate matter) and greenhouse gases (carbon dioxide) as a result of less congestion (i.e., improved speed) or reduced vehicle miles traveled (VMT).
- **Reliability benefits** – Reductions in travel time variability and uncertainty from less congestion translate into supply chain logistics benefits (e.g., reductions in freight inventory cost savings) and labor productivity benefits (i.e., fewer employees being late for work).
- **Residual value** – Value of remaining useful service life of the project assets (which excludes the value of right-of-way or professional support).

Note that some benefits accrue to motor vehicle users only (e.g., vehicle operating cost savings), while other benefits accrue to society as a whole (e.g., emissions cost savings) or the agency operating the facility, namely SCDOT (e.g., pavement cost savings).

¹ USDOT recommends a minimum of 20 years.

Economic Analyses in Support of Environmental Impact Statement

1.1.1 SUMMARY OF RESULTS

Table 1.1 summarizes the BCA findings for RA1 and RA5 Modified. Annual costs and benefits are computed over the useful life of the project (40 years of operation). Benefits accrue during the operation of the project from 2025 to 2064. While the benefit-cost ratio, net present value, and internal rate of return help determine *whether* to invest, the payback period helps determine *when* to invest:

- **Benefit-cost ratio (B/C)** – present-discounted value of benefits over present-discounted value of costs – estimated at 0.92 for RA5 Modified (in other words, each dollar invested will generate \$0.92 in benefits) and at 1.28 for RA1;
- **Net present value (NPV)** – present-discounted value of benefits minus present-discounted value of costs – estimated at -\$93.4 million for RA5 Modified and at \$300.8 million for RA1;
- **Internal rate of return (IRR)** – discount rate at which the net present value is zero to show the rate of return of investment relative to a risk-free bond – estimated at 3.3 percent for RA5 Modified and at 5.4 percent for RA1;
- **Payback period** – number of years until the cumulative cost is recuperated, where both benefits and costs are discounted – estimated at 18 years for RA5 Modified and 13 years for RA1.

Table 1.1 Summary of Benefit-Cost Analysis Results, Cumulative Over 2025-2064 (40 Years of Operation)

Project evaluation metric	Reasonable alternative RA1	RA5 Modified
Total discounted benefits (millions of 2017 dollars)	\$1,365.0	\$1,023.5
Total discounted costs (millions of 2017 dollars)	\$1,064.2	\$1,116.9
Net present value (millions of 2017 dollars)	\$300.8	-\$93.4
Benefit / cost ratio	1.28	0.92
Internal rate of return (%)	5.4	3.3
Payback period (years)	13	18

1.1.2 ANALYSIS OVERVIEW

For the purpose of this analysis, the build scenarios (RA1 and RA5 Modified) assume full completion of the roadway and interchange improvements. They are compared to the no-build scenario to measure the incremental benefits of the investment. The methodology makes several important assumptions and seeks to avoid overestimation of benefits and underestimation of costs. Specifically:

- Input prices are expressed in 2017 dollars;
- Construction starts in 2020 and ends in 2024; for the purpose of the BCA, the project lifecycle is 40 years (2025-2064);
- A constant four (4) percent real discount rate is assumed throughout the period of analysis;
- Opening year demand is an input to the BCA and is assumed to be fully realized in the first year (2025) without a ramp-up period.

Economic Analyses in Support of Environmental Impact Statement



The BCA builds upon the improvements in congestion management, which depends on changes in travel demand. For this analysis, changes are derived from 2015 and 2040 peak-hour trips, travel time, and distance between proposed project segments (including arterials). Key data points related to travel demand are provided in Table 1.2.

Table 1.2 Travel Demand Estimates (2025 and 2040)

Variable	Opening year (2025)	2040	RA1	RA5 Modified
		No-Build		
AADT	417,981	433,168	458,951	469,138
Vehicle miles traveled	2,065,610	2,132,263	2,216,679	2,289,708
Vehicle hours traveled	50,144	51,808	50,698	53,839

The existing and future travel demand profiles also rely on a number of reports and surveys. Key data files and assumptions include:

- 2012-2014 corridor accident data;²
- FHWA Crash Modification Factors Clearinghouse (factors for adding lanes and interchange improvements);
- Traffic volumes by type of vehicle and by hour used in the noise analysis technical study;
- U.S. Energy Information Administration fuel prices;
- USDOT BCA Guidance 2017 (for values of travel time, vehicle operating costs, accident costs by severity, and environmental pollutant costs);³
- Roadway pavement operating and maintenance (O&M) costs (assumed \$12,000 per lane-mile for roadway for about 45 miles and \$35,200 per lane-mile of bridge deck/surface for 20 miles);⁴ and
- Project (roadway and bridges) has a 50-year useful life duration and a linear depreciation rate over the 40-year study period.

1.1.3 BENEFIT-COST ANALYSIS RESULTS

Benefits and costs by category are reported in Table 1.3 and Table 1.4 respectively. For both RA1 and RA5 Modified, the most significant benefit category is accident cost reduction, accounting for about half of the total benefits. It also doubles the estimated travel time savings for RA5 Modified.

Note that cost savings for vehicle operating, emission, and reliability are (for the most part) negative because of the additional travel demand that exceeds thresholds of beneficial use. In particular, travel time reliability for RA5 Modified is relatively costly because of higher volume to capacity. Since reliability measures the spread or variance in travel time, the differences in trip characteristics (volume, distance and speed) are compounded

² SCDOT Crash Analysis; Carolina Crossroads I-20/26/126 Corridor Project. Draft 01 February 2016.

³ <https://www.transportation.gov/sites/dot.gov/files/docs/mission/office-policy/transportation-policy/284031/benefit-cost-analysis-guidance-2017.pdf>

⁴ O&M costs were not available given the level of design at the time of the analysis. The assumptions applied in the BCA are based on HDR's research on O&M costs of similar projects. Sensitivity analysis includes variations on such assumptions.

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exponentially (instead of computed linearly as in other benefit categories), resulting in dramatically different reliability costs between RA1 and RA5 Modified. In general, more vehicles means more fuel consumption and more user-based and environmental costs.

Table 1.3 Total Benefits, Cumulative Over 2025-2064 (40 Years of Operation)

Benefit category	Value, millions of discounted dollars	
	RA1	RA5 Modified
Travel time savings	\$550.4	\$354.7
Vehicle operating cost savings	-\$9.1	-\$9.9
Accident cost savings	\$651.8	\$696.1
Residual value	\$29.1	\$30.6
Reliability cost savings	\$145.6	-\$44.3
Emission cost savings	-\$2.9	-\$3.7
Total discounted benefits	\$1,365.0	\$1,023.5

On a per-user (for automobile and truck) basis, the net savings (from reduction in travel time, vehicle operating cost, accident reduction, and reliability cost) amount to about \$0.20 per trip for RA1 and \$0.14 for RA5 Modified. Accident and travel time cost savings are estimated at \$0.10 and \$0.08 per user per trip respectively for RA1. For RA5 Modified, the savings are \$0.10 and \$0.05 per user per trip respectively.

Table 1.4 Total Costs, Cumulative Over 2025-2064 (40 Years of Operation)

Cost category	Value, millions of discounted dollars	
	RA1	RA5 Modified
Capital	\$1,033.6	\$1,086.2
O&M	\$30.5	\$30.6
Total discounted costs	\$1,064.2	\$1,116.9

1.1.4 SENSITIVITY ANALYSIS

The BCA for the Carolina Crossroads project shows that the investment is indeed economically worthwhile and socially viable. A sensitivity analysis has been conducted to account for uncertainty surrounding some of the model inputs/parameters and to inform on the key drivers of the BCA. The list of parameters tested individually includes:

- Discount rate: to account for different risk-free investments, from 3 percent to 7 percent;
- Roadway and bridge O&M costs: to address the cost of shoulders, with doubling or tripling roadway miles needing maintenance; and
- Total cost: to reflect the impact of cost and schedule risks, with a 10 percent to 25 percent contingency.

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The sensitivity analysis shows that the project investment may not be as favorable when compared to alternative investments that can yield at least 5.4 percent in return for RA1 and 3.3 percent in return for RA5 Modified. Also, the economic feasibility of the project varies dramatically with respect to changes in investment cost (mainly capital cost and not so much O&M cost). Note, however, that the B/C ratio remains above one in all cases for RA1.

Table 1.5 Sensitivity Analysis, Selected Results

Input	New B/C ratio & percent change in NPV			
	RA1		RA5 Modified	
Discount rate – 7%	0.84	-150.2%	0.62	-296.6%
Discount rate – 3%	1.51	89.2%	1.06	179.0%
Total cost – increase of 10%	1.17	-35.4%	0.83	-119.6%
Total cost – increase of 25%	1.03	-88.4%	0.73	-298.9%
Roadway and bridge O&M – increase of 100%	1.25	-10.1%	0.89	-32.8%
Roadway and bridge O&M – increase of 200%	1.21	-20.3%	0.87	-65.6%

1.2 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 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).

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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).

1.2.1 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 each build scenario are summarized in Table 1.6 below.

Table 1.6 Capital Expenses

Major cost category	IMPLAN sector	RA1 (\$million)	RA5 Modified (\$million)
Construction ⁶	Construction of new highways and streets	\$957.3	\$1,004.4
Planning, engineering and design ⁷	Architectural, engineering, and related services	\$153.4	\$161.2
Environmental mitigation	Environmental and other technical consulting services	\$3.3	\$3.3

1.2.2 ECONOMIC IMPACT ANALYSIS RESULTS

RA1 capital expenses incurred in the State of South Carolina are expected to generate nearly 8,600 job-years⁸ during the development phase (2017 – 2024). In other words, every \$110,000 in capital expenses will generate one job-year on average.⁹ Employees filling these jobs will earn a cumulative \$510.2 million in wages and benefits. Overall, the contribution to GDP is estimated at \$779.5 million and the contribution to taxes is estimated at \$162.6 million (including \$111.7 million in state and local taxes) statewide.

The results are slightly higher for RA5 Modified, but this is simply due to the fact that capital expenses are higher (see Table 1.6 above).

⁶ 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 will be effectively incurred in the immediate study area (i.e., Richland County and Lexington County combined).

⁷ It is assumed that 50 percent of planning, engineering, and design expenses will be spent outside of South Carolina and are thus excluded from the economic impact analysis.

⁸ A job-year can be simply defined as one person employed for one year, whether part-time or full-time.

⁹ 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 1.7.

Table 1.7 Summary of Cumulative Economic Impacts by Type of Effect – South Carolina (2017 – 2024)

Impact metric	Direct	Indirect	Induced	Total
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
Federal taxes				\$50.9
State and local taxes				\$111.7
RA5 Modified				
Employment (job-years)	6,128	2,422	2,600	11,151
Labor income	\$308.0	\$126.5	\$100.7	\$535.3
Value added	\$417.4	\$212.7	\$187.7	\$817.8
Federal taxes				\$53.4
State and local taxes				\$117.1

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 46 fewer jobs are expected to be generated 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 1,220 jobs will be sustained in Richland County and Lexington County from 2017 to 2024 as a result of the project. This represents 0.32 percent of the area’s current total employment.

A summary of economic impacts for Richland County and Lexington County is provided in Table 1.8.

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Table 1.8 Summary of Cumulative Economic Impacts – Richland Co. and Lexington Co. (2017 – 2024)

Impact metric	Direct	Indirect	Induced	Total
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
Federal taxes				\$53.0
State and local taxes				\$110.9
RA5 Modified				
Employment (job-years)	6,028	2,360	2,708	11,095
Labor income	\$314.2	\$125.8	\$107.9	\$548.0
Value added	\$427.1	\$220.1	\$203.1	\$850.3
Federal taxes				\$55.6
State and local taxes				\$116.2

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., nearly 89 percent of total employment impact). Engineering related expenses are expected to generate 1,074 job-years for RA1 (or 10.1 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 1.5) 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.

The complete breakdown of impacts by major cost category is provided in Table 1.9.

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Table 1.9 Summary of Economic Impact Analysis Results by Major Cost Category – South Carolina (2017 – 2024)

Impact Metric	Construction	Engineering	Environmental Services
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
Federal taxes	\$47.9	\$4.9	\$0.2
State and local taxes	\$98.1	\$12.2	\$0.6
RA5 Modified			
Employment (job-years)	9,916	1,129	51
Labor income	\$476.6	\$68.4	\$3.0
Value added	\$760.5	\$86.4	\$3.5
Federal taxes	\$50.3	\$5.2	\$0.2
State and local taxes	\$102.9	\$12.8	\$0.5

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 Analyses in Support of Environmental Impact Statement



Table A1 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 A2 Cumulative Employment Impacts by Aggregate Industry, RA5 Modified – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	6,028	2,359	2,707	11,095
1	11 Ag, Forestry, Fish & Hunting	0	4	6	10
20	21 Mining	0	111	2	113
41	22 Utilities	0	9	10	20
52	23 Construction	5,509	25	31	5,564
65	31-33 Manufacturing	0	171	14	184
395	42 Wholesale Trade	0	269	72	341
396	44-45 Retail trade	0	226	472	699
408	48-49 Transportation & Warehousing	0	204	64	268
417	51 Information	0	34	45	80
433	52 Finance & insurance	0	100	194	294
440	53 Real estate & rental	0	197	150	347
447	54 Professional- scientific & tech services	519	356	119	994
461	55 Management of companies	0	24	11	35
462	56 Administrative & waste services	0	335	177	512
472	61 Educational services	0	1	88	89
475	62 Health & social services	0	0	481	481
488	71 Arts- entertainment & recreation	0	26	78	103
499	72 Accommodation & food services	0	109	382	491
504	81 Other services	0	152	302	454
520	92 Government & non NAICs	0	5	10	16

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Table A3 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 A4 Cumulative Labor Income Impacts (\$Million) by Aggregate Industry, RA5 Modified – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	\$314.2	\$125.8	\$107.9	\$548.0
1	11 Ag, Forestry, Fish & Hunting	\$0.0	\$0.0	\$0.0	\$0.1
20	21 Mining	\$0.0	\$5.1	\$0.0	\$5.1
41	22 Utilities	\$0.0	\$1.1	\$1.3	\$2.4
52	23 Construction	\$271.5	\$1.2	\$1.5	\$274.2
65	31-33 Manufacturing	\$0.0	\$10.1	\$0.8	\$11.0
395	42 Wholesale Trade	\$0.0	\$23.2	\$6.3	\$29.5
396	44-45 Retail trade	\$0.0	\$7.3	\$14.2	\$21.5
408	48-49 Transportation & Warehousing	\$0.0	\$11.6	\$3.4	\$15.0
417	51 Information	\$0.0	\$2.6	\$3.2	\$5.7
433	52 Finance & insurance	\$0.0	\$6.5	\$10.7	\$17.2
440	53 Real estate & rental	\$0.0	\$7.6	\$3.8	\$11.4
447	54 Professional- scientific & tech services	\$42.7	\$25.9	\$7.9	\$76.6
461	55 Management of companies	\$0.0	\$1.9	\$0.9	\$2.8
462	56 Administrative & waste services	\$0.0	\$11.1	\$5.5	\$16.6
472	61 Educational services	\$0.0	\$0.0	\$3.0	\$3.0
475	62 Health & social services	\$0.0	\$0.0	\$27.0	\$27.0
488	71 Arts- entertainment & recreation	\$0.0	\$0.2	\$1.0	\$1.2
499	72 Accommodation & food services	\$0.0	\$2.2	\$7.7	\$9.9
504	81 Other services	\$0.0	\$7.8	\$9.1	\$16.9
520	92 Government & non NAICs	\$0.0	\$0.2	\$0.6	\$0.8

Economic Analyses in Support of Environmental Impact Statement



Table A5 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

Economic Analyses in Support of Environmental Impact Statement



Table A6 Cumulative Value Added Impacts (\$Million) by Aggregate Industry, RA5 Modified – Richland Co. and Lexington Co. (2017 – 2024)

Sector	Description	Direct	Indirect	Induced	Total
0	Total	\$427.1	\$220.0	\$203.0	\$850.3
1	11 Ag, Forestry, Fish & Hunting	\$0.0	\$0.0	\$0.2	\$0.3
20	21 Mining	\$0.0	\$19.3	\$0.0	\$19.4
41	22 Utilities	\$0.0	\$3.6	\$4.1	\$7.7
52	23 Construction	\$384.2	\$1.8	\$2.2	\$388.2
65	31-33 Manufacturing	\$0.0	\$17.2	\$1.8	\$19.0
395	42 Wholesale Trade	\$0.0	\$44.5	\$12.0	\$56.4
396	44-45 Retail trade	\$0.0	\$11.0	\$23.6	\$34.6
408	48-49 Transportation & Warehousing	\$0.0	\$14.6	\$4.2	\$18.8
417	51 Information	\$0.0	\$4.7	\$6.9	\$11.6
433	52 Finance & insurance	\$0.0	\$9.4	\$16.7	\$26.1
440	53 Real estate & rental	\$0.0	\$34.6	\$53.7	\$88.2
447	54 Professional- scientific & tech services	\$42.8	\$29.2	\$9.9	\$81.9
461	55 Management of companies	\$0.0	\$2.4	\$1.1	\$3.5
462	56 Administrative & waste services	\$0.0	\$13.8	\$6.7	\$20.5
472	61 Educational services	\$0.0	\$0.0	\$3.2	\$3.2
475	62 Health & social services	\$0.0	\$0.0	\$31.7	\$31.7
488	71 Arts- entertainment & recreation	\$0.0	\$0.3	\$1.9	\$2.2
499	72 Accommodation & food services	\$0.0	\$3.1	\$11.5	\$14.6
504	81 Other services	\$0.0	\$10.3	\$10.9	\$21.2
520	92 Government & non NAICs	\$0.0	\$0.2	\$0.6	\$0.8

Appendix B—RA1 BCA Tables

Economic Analyses in Support of Environmental Impact Statement



Table B1 Annual Estimates of Project Benefits (Millions of 2017 Dollars)

Year	Project year	Total benefits	Travel time cost savings	Reliability cost savings	Vehicle operating cost savings	Accident cost savings	Emissions cost savings	Residual value
2017	Development Year 1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2018	Development Year 2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2019	Development Year 3	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2020	Development Year 4	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2021	Development Year 5	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2022	Development Year 6	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2023	Development Year 7	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2024	Development Year 8	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2025	Operations Year 1	\$78.4	\$26.4	\$14.3	\$0.1	\$37.7	<\$0.0	\$0.0
2026	Operations Year 2	\$74.5	\$25.4	\$13.3	\$0.0	\$35.8	<\$0.0	\$0.0
2027	Operations Year 3	\$70.9	\$24.4	\$12.3	\$0.1	\$34.1	<\$0.0	\$0.0
2028	Operations Year 4	\$67.4	\$23.5	\$11.4	\$0.1	\$32.4	<\$0.0	\$0.0
2029	Operations Year 5	\$64.0	\$22.6	\$10.5	\$0.1	\$30.8	<\$0.0	\$0.0
2030	Operations Year 6	\$60.8	\$21.8	\$9.7	\$0.0	\$29.3	<\$0.0	\$0.0
2031	Operations Year 7	\$57.7	\$20.9	\$8.9	\$0.0	\$27.8	<\$0.0	\$0.0
2032	Operations Year 8	\$54.7	\$20.1	\$8.2	\$0.0	\$26.4	-\$0.1	\$0.0
2033	Operations Year 9	\$51.9	\$19.4	\$7.5	-\$0.1	\$25.1	-\$0.1	\$0.0
2034	Operations Year 10	\$49.2	\$18.7	\$6.9	-\$0.1	\$23.8	-\$0.1	\$0.0
2035	Operations Year 11	\$46.7	\$18.0	\$6.3	-\$0.1	\$22.6	-\$0.1	\$0.0
2036	Operations Year 12	\$44.3	\$17.3	\$5.7	-\$0.1	\$21.5	-\$0.1	\$0.0
2037	Operations Year 13	\$42.0	\$16.6	\$5.2	-\$0.2	\$20.4	-\$0.1	\$0.0
2038	Operations Year 14	\$39.7	\$16.0	\$4.7	-\$0.3	\$19.4	-\$0.1	\$0.0
2039	Operations Year 15	\$37.6	\$15.4	\$4.2	-\$0.3	\$18.4	-\$0.1	\$0.0
2040	Operations Year 16	\$35.7	\$14.8	\$3.8	-\$0.3	\$17.5	-\$0.1	\$0.0
2041	Operations Year 17	\$33.8	\$14.3	\$3.4	-\$0.3	\$16.6	-\$0.1	\$0.0
2042	Operations Year 18	\$32.0	\$13.7	\$3.0	-\$0.3	\$15.7	-\$0.1	\$0.0

Economic Analyses in Support of Environmental Impact Statement



Year	Project year	Total benefits	Travel time cost savings	Reliability cost savings	Vehicle operating cost savings	Accident cost savings	Emissions cost savings	Residual value
2043	Operations Year 19	\$30.3	\$13.2	\$2.6	-\$0.3	\$14.9	-\$0.1	\$0.0
2044	Operations Year 20	\$28.8	\$12.7	\$2.3	-\$0.3	\$14.1	-\$0.1	\$0.0
2045	Operations Year 21	\$27.2	\$12.3	\$2.0	-\$0.3	\$13.4	-\$0.1	\$0.0
2046	Operations Year 22	\$25.8	\$11.8	\$1.7	-\$0.3	\$12.7	-\$0.1	\$0.0
2047	Operations Year 23	\$24.4	\$11.4	\$1.4	-\$0.3	\$12.0	-\$0.1	\$0.0
2048	Operations Year 24	\$23.1	\$10.9	\$1.1	-\$0.3	\$11.4	-\$0.1	\$0.0
2049	Operations Year 25	\$21.8	\$10.5	\$0.9	-\$0.3	\$10.8	-\$0.1	\$0.0
2050	Operations Year 26	\$20.6	\$10.1	\$0.7	-\$0.3	\$10.2	-\$0.1	\$0.0
2051	Operations Year 27	\$19.5	\$9.8	\$0.5	-\$0.3	\$9.7	-\$0.1	\$0.0
2052	Operations Year 28	\$18.4	\$9.4	\$0.3	-\$0.3	\$9.2	-\$0.1	\$0.0
2053	Operations Year 29	\$17.4	\$9.0	\$0.1	-\$0.3	\$8.7	-\$0.1	\$0.0
2054	Operations Year 30	\$16.5	\$8.7	-\$0.1	-\$0.3	\$8.2	-\$0.1	\$0.0
2055	Operations Year 31	\$15.5	\$8.4	-\$0.2	-\$0.3	\$7.8	-\$0.1	\$0.0
2056	Operations Year 32	\$14.7	\$8.1	-\$0.3	-\$0.3	\$7.4	-\$0.1	\$0.0
2057	Operations Year 33	\$13.8	\$7.8	-\$0.5	-\$0.3	\$7.0	-\$0.1	\$0.0
2058	Operations Year 34	\$13.1	\$7.5	-\$0.6	-\$0.3	\$6.6	-\$0.1	\$0.0
2059	Operations Year 35	\$12.3	\$7.2	-\$0.7	-\$0.3	\$6.2	-\$0.1	\$0.0
2060	Operations Year 36	\$11.6	\$6.9	-\$0.8	-\$0.3	\$5.9	-\$0.1	\$0.0
2061	Operations Year 37	\$10.9	\$6.7	-\$0.9	-\$0.3	\$5.5	-\$0.1	\$0.0
2062	Operations Year 38	\$10.3	\$6.4	-\$1.0	-\$0.3	\$5.2	-\$0.1	\$0.0
2063	Operations Year 39	\$9.7	\$6.2	-\$1.1	-\$0.3	\$4.9	-\$0.1	\$0.0
2064	Operations Year 40	\$38.3	\$6.0	-\$1.1	-\$0.3	\$4.7	-\$0.1	\$29.1
Total		\$1,365.0	\$550.4	\$145.6	-\$9.1	\$651.8	-\$2.9	\$29.1

Economic Analyses in Support of Environmental Impact Statement



Table B2 Annual Estimates of Project Costs (Millions of 2017 Dollars, Discounted at 4 Percent)

Year	Project year	Capital costs	O&M costs	Total costs	Total costs discounted at 4%
2017	Development Year 1	\$92.3	\$0.0	\$92.3	\$87.7
2018	Development Year 2	\$92.3	\$0.0	\$92.3	\$88.7
2019	Development Year 3	\$92.3	\$0.0	\$92.3	\$85.3
2020	Development Year 4	\$191.5	\$0.0	\$191.5	\$170.2
2021	Development Year 5	\$191.5	\$0.0	\$191.5	\$163.7
2022	Development Year 6	\$191.5	\$0.0	\$191.5	\$157.4
2023	Development Year 7	\$191.5	\$0.0	\$191.5	\$151.3
2024	Development Year 8	\$191.5	\$0.0	\$191.5	\$129.3
2025	Operations Year 1	\$0.0	\$2.0	\$2.0	\$1.5
2026	Operations Year 2	\$0.0	\$2.0	\$2.0	\$1.4
2027	Operations Year 3	\$0.0	\$2.0	\$2.0	\$1.4
2028	Operations Year 4	\$0.0	\$2.0	\$2.0	\$1.3
2029	Operations Year 5	\$0.0	\$2.0	\$2.0	\$1.3
2030	Operations Year 6	\$0.0	\$2.0	\$2.0	\$1.2
2031	Operations Year 7	\$0.0	\$2.0	\$2.0	\$1.2
2032	Operations Year 8	\$0.0	\$2.0	\$2.0	\$1.1
2033	Operations Year 9	\$0.0	\$2.0	\$2.0	\$1.1
2034	Operations Year 10	\$0.0	\$2.0	\$2.0	\$1.0
2035	Operations Year 11	\$0.0	\$2.0	\$2.0	\$1.0
2036	Operations Year 12	\$0.0	\$2.0	\$2.0	\$1.0
2037	Operations Year 13	\$0.0	\$2.0	\$2.0	\$0.9
2038	Operations Year 14	\$0.0	\$2.0	\$2.0	\$0.9
2039	Operations Year 15	\$0.0	\$2.0	\$2.0	\$0.9
2040	Operations Year 16	\$0.0	\$2.0	\$2.0	\$0.8
2041	Operations Year 17	\$0.0	\$2.0	\$2.0	\$0.8
2042	Operations Year 18	\$0.0	\$2.0	\$2.0	\$0.8
2043	Operations Year 19	\$0.0	\$2.0	\$2.0	\$0.7
2044	Operations Year 20	\$0.0	\$2.0	\$2.0	\$0.7
2045	Operations Year 21	\$0.0	\$2.0	\$2.0	\$0.7
2046	Operations Year 22	\$0.0	\$2.0	\$2.0	\$0.7
2047	Operations Year 23	\$0.0	\$2.0	\$2.0	\$0.6
2048	Operations Year 24	\$0.0	\$2.0	\$2.0	\$0.6
2049	Operations Year 25	\$0.0	\$2.0	\$2.0	\$0.6
2050	Operations Year 26	\$0.0	\$2.0	\$2.0	\$0.6
2051	Operations Year 27	\$0.0	\$2.0	\$2.0	\$0.5
2052	Operations Year 28	\$0.0	\$2.0	\$2.0	\$0.5
2053	Operations Year 29	\$0.0	\$2.0	\$2.0	\$0.5
2054	Operations Year 30	\$0.0	\$2.0	\$2.0	\$0.5

Economic Analyses in Support of Environmental Impact Statement



Year	Project year	Capital costs	O&M costs	Total costs	Total costs discounted at 4%
2055	Operations Year 31	\$0.0	\$2.0	\$2.0	\$0.5
2056	Operations Year 32	\$0.0	\$2.0	\$2.0	\$0.4
2057	Operations Year 33	\$0.0	\$2.0	\$2.0	\$0.4
2058	Operations Year 34	\$0.0	\$2.0	\$2.0	\$0.4
2059	Operations Year 35	\$0.0	\$2.0	\$2.0	\$0.4
2060	Operations Year 36	\$0.0	\$2.0	\$2.0	\$0.4
2061	Operations Year 37	\$0.0	\$2.0	\$2.0	\$0.4
2062	Operations Year 38	\$0.0	\$2.0	\$2.0	\$0.3
2063	Operations Year 39	\$0.0	\$2.0	\$2.0	\$0.3
2064	Operations Year 40	\$0.0	\$2.0	\$2.0	\$0.3
Total		\$1,234.1	\$81.1	\$1,315.2	\$1,064.2

Appendix C—RA5 Modified BCA Tables

Economic Analyses in Support of Environmental Impact Statement



Table C1 Annual Estimates of Project Benefits (Millions of 2017 Dollars)

Year	Project year	Total benefits	Travel time cost savings	Reliability cost savings	Vehicle operating cost savings	Accident cost savings	Emissions cost savings	Residual value
2017	Development Year 1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2018	Development Year 2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2019	Development Year 3	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2020	Development Year 4	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2021	Development Year 5	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2022	Development Year 6	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2023	Development Year 7	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2024	Development Year 8	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
2025	Operations Year 1	\$68.6	\$19.6	\$10.5	\$0.0	\$38.5	<\$0.0	\$0.0
2026	Operations Year 2	\$64.6	\$18.7	\$9.3	\$0.0	\$36.7	<\$0.0	\$0.0
2027	Operations Year 3	\$60.9	\$17.8	\$8.1	\$0.0	\$35.0	<\$0.0	\$0.0
2028	Operations Year 4	\$57.3	\$16.9	\$7.0	\$0.1	\$33.4	-\$0.1	\$0.0
2029	Operations Year 5	\$53.9	\$16.1	\$6.0	\$0.0	\$31.8	-\$0.1	\$0.0
2030	Operations Year 6	\$50.6	\$15.3	\$5.0	\$0.0	\$30.3	-\$0.1	\$0.0
2031	Operations Year 7	\$47.6	\$14.6	\$4.2	\$0.0	\$28.9	-\$0.1	\$0.0
2032	Operations Year 8	\$44.6	\$13.9	\$3.3	-\$0.1	\$27.5	-\$0.1	\$0.0
2033	Operations Year 9	\$41.9	\$13.3	\$2.6	-\$0.1	\$26.2	-\$0.1	\$0.0
2034	Operations Year 10	\$39.3	\$12.6	\$1.9	-\$0.1	\$25.0	-\$0.1	\$0.0
2035	Operations Year 11	\$36.8	\$12.0	\$1.2	-\$0.1	\$23.8	-\$0.1	\$0.0
2036	Operations Year 12	\$34.5	\$11.5	\$0.6	-\$0.2	\$22.7	-\$0.1	\$0.0
2037	Operations Year 13	\$32.3	\$10.9	\$0.0	-\$0.2	\$21.6	-\$0.1	\$0.0
2038	Operations Year 14	\$30.2	\$10.4	-\$0.5	-\$0.2	\$20.6	-\$0.1	\$0.0
2039	Operations Year 15	\$28.2	\$9.9	-\$1.0	-\$0.2	\$19.6	-\$0.1	\$0.0
2040	Operations Year 16	\$26.3	\$9.4	-\$1.4	-\$0.2	\$18.7	-\$0.1	\$0.0
2041	Operations Year 17	\$24.6	\$9.0	-\$1.9	-\$0.2	\$17.8	-\$0.1	\$0.0
2042	Operations Year 18	\$22.9	\$8.6	-\$2.2	-\$0.2	\$16.9	-\$0.1	\$0.0

Economic Analyses in Support of Environmental Impact Statement



Year	Project year	Total benefits	Travel time cost savings	Reliability cost savings	Vehicle operating cost savings	Accident cost savings	Emissions cost savings	Residual value
2043	Operations Year 19	\$21.3	\$8.2	-\$2.6	-\$0.4	\$16.1	-\$0.1	\$0.0
2044	Operations Year 20	\$19.8	\$7.8	-\$2.9	-\$0.3	\$15.4	-\$0.1	\$0.0
2045	Operations Year 21	\$18.4	\$7.4	-\$3.2	-\$0.3	\$14.6	-\$0.1	\$0.0
2046	Operations Year 22	\$17.1	\$7.1	-\$3.4	-\$0.3	\$13.9	-\$0.1	\$0.0
2047	Operations Year 23	\$15.9	\$6.7	-\$3.7	-\$0.3	\$13.2	-\$0.1	\$0.0
2048	Operations Year 24	\$14.7	\$6.4	-\$3.9	-\$0.3	\$12.6	-\$0.1	\$0.0
2049	Operations Year 25	\$13.6	\$6.1	-\$4.1	-\$0.3	\$12.0	-\$0.1	\$0.0
2050	Operations Year 26	\$12.5	\$5.8	-\$4.3	-\$0.3	\$11.4	-\$0.1	\$0.0
2051	Operations Year 27	\$11.5	\$5.6	-\$4.4	-\$0.4	\$10.9	-\$0.1	\$0.0
2052	Operations Year 28	\$10.6	\$5.3	-\$4.5	-\$0.4	\$10.3	-\$0.1	\$0.0
2053	Operations Year 29	\$9.7	\$5.1	-\$4.7	-\$0.4	\$9.8	-\$0.1	\$0.0
2054	Operations Year 30	\$8.9	\$4.8	-\$4.8	-\$0.4	\$9.3	-\$0.1	\$0.0
2055	Operations Year 31	\$8.2	\$4.6	-\$4.9	-\$0.4	\$8.9	-\$0.1	\$0.0
2056	Operations Year 32	\$7.4	\$4.4	-\$4.9	-\$0.4	\$8.4	-\$0.1	\$0.0
2057	Operations Year 33	\$6.8	\$4.2	-\$5.0	-\$0.4	\$8.0	-\$0.1	\$0.0
2058	Operations Year 34	\$6.1	\$4.0	-\$5.0	-\$0.4	\$7.6	-\$0.1	\$0.0
2059	Operations Year 35	\$5.5	\$3.8	-\$5.1	-\$0.4	\$7.3	-\$0.1	\$0.0
2060	Operations Year 36	\$4.9	\$3.6	-\$5.1	-\$0.4	\$6.9	-\$0.1	\$0.0
2061	Operations Year 37	\$4.4	\$3.5	-\$5.1	-\$0.4	\$6.5	-\$0.1	\$0.0
2062	Operations Year 38	\$3.9	\$3.3	-\$5.1	-\$0.4	\$6.2	-\$0.1	\$0.0
2063	Operations Year 39	\$3.5	\$3.2	-\$5.1	-\$0.4	\$5.9	-\$0.1	\$0.0
2064	Operations Year 40	\$33.7	\$3.0	-\$5.1	-\$0.3	\$5.6	-\$0.1	\$30.6
Total		\$1,023.5	\$354.7	-\$44.3	-\$9.9	\$696.1	-\$3.7	\$30.6

Economic Analyses in Support of Environmental Impact Statement



Table C2 Annual Estimates of Project Costs (Millions of 2017 Dollars, Discounted at 4 Percent)

Year	Project year	Capital costs	O&M costs	Total costs	Total costs discounted at 4%
2017	Development Year 1	\$97.5	\$0.0	\$97.5	\$92.4
2018	Development Year 2	\$97.5	\$0.0	\$97.5	\$93.8
2019	Development Year 3	\$97.5	\$0.0	\$97.5	\$90.2
2020	Development Year 4	\$200.9	\$0.0	\$200.9	\$178.6
2021	Development Year 5	\$200.9	\$0.0	\$200.9	\$171.7
2022	Development Year 6	\$200.9	\$0.0	\$200.9	\$165.1
2023	Development Year 7	\$200.9	\$0.0	\$200.9	\$158.8
2024	Development Year 8	\$200.9	\$0.0	\$200.9	\$135.7
2025	Operations Year 1	\$0.0	\$2.0	\$2.0	\$1.5
2026	Operations Year 2	\$0.0	\$2.0	\$2.0	\$1.4
2027	Operations Year 3	\$0.0	\$2.0	\$2.0	\$1.4
2028	Operations Year 4	\$0.0	\$2.0	\$2.0	\$1.3
2029	Operations Year 5	\$0.0	\$2.0	\$2.0	\$1.3
2030	Operations Year 6	\$0.0	\$2.0	\$2.0	\$1.2
2031	Operations Year 7	\$0.0	\$2.0	\$2.0	\$1.2
2032	Operations Year 8	\$0.0	\$2.0	\$2.0	\$1.1
2033	Operations Year 9	\$0.0	\$2.0	\$2.0	\$1.1
2034	Operations Year 10	\$0.0	\$2.0	\$2.0	\$1.0
2035	Operations Year 11	\$0.0	\$2.0	\$2.0	\$1.0
2036	Operations Year 12	\$0.0	\$2.0	\$2.0	\$1.0
2037	Operations Year 13	\$0.0	\$2.0	\$2.0	\$0.9
2038	Operations Year 14	\$0.0	\$2.0	\$2.0	\$0.9
2039	Operations Year 15	\$0.0	\$2.0	\$2.0	\$0.9
2040	Operations Year 16	\$0.0	\$2.0	\$2.0	\$0.8
2041	Operations Year 17	\$0.0	\$2.0	\$2.0	\$0.8
2042	Operations Year 18	\$0.0	\$2.0	\$2.0	\$0.8
2043	Operations Year 19	\$0.0	\$2.0	\$2.0	\$0.7
2044	Operations Year 20	\$0.0	\$2.0	\$2.0	\$0.7
2045	Operations Year 21	\$0.0	\$2.0	\$2.0	\$0.7
2046	Operations Year 22	\$0.0	\$2.0	\$2.0	\$0.7
2047	Operations Year 23	\$0.0	\$2.0	\$2.0	\$0.6
2048	Operations Year 24	\$0.0	\$2.0	\$2.0	\$0.6
2049	Operations Year 25	\$0.0	\$2.0	\$2.0	\$0.6
2050	Operations Year 26	\$0.0	\$2.0	\$2.0	\$0.6
2051	Operations Year 27	\$0.0	\$2.0	\$2.0	\$0.5
2052	Operations Year 28	\$0.0	\$2.0	\$2.0	\$0.5
2053	Operations Year 29	\$0.0	\$2.0	\$2.0	\$0.5
2054	Operations Year 30	\$0.0	\$2.0	\$2.0	\$0.5

Economic Analyses in Support of Environmental Impact Statement



Year	Project year	Capital costs	O&M costs	Total costs	Total costs discounted at 4%
2055	Operations Year 31	\$0.0	\$2.0	\$2.0	\$0.5
2056	Operations Year 32	\$0.0	\$2.0	\$2.0	\$0.4
2057	Operations Year 33	\$0.0	\$2.0	\$2.0	\$0.4
2058	Operations Year 34	\$0.0	\$2.0	\$2.0	\$0.4
2059	Operations Year 35	\$0.0	\$2.0	\$2.0	\$0.4
2060	Operations Year 36	\$0.0	\$2.0	\$2.0	\$0.4
2061	Operations Year 37	\$0.0	\$2.0	\$2.0	\$0.4
2062	Operations Year 38	\$0.0	\$2.0	\$2.0	\$0.3
2063	Operations Year 39	\$0.0	\$2.0	\$2.0	\$0.3
2064	Operations Year 40	\$0.0	\$2.0	\$2.0	\$0.3
Total		\$1,297.0	\$81.5	\$1,378.5	\$1,116.9