Bustituted:
The Socioeconomic Impacts of Replacing Southwest Chief Service Over Raton Pass

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DEC 2018

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TRENT LOTT
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Executive Summary

Like all of the National Network trains Amtrak operates as part of our country's interstate passenger rail system, the Southwest Chief is an economic engine in the 32 communities it serves across eight U.S. states. Although elected and appointed officials for these communities understand this, until recently there was little data to quantify returns to the Amtrak served communities resulting from our continued investment in long-distance passenger rail service. Quantifying returns became even more crucial in 2018 as proposals were advanced to operate the Southwest Chief in two pieces joined with bus service between Dodge City, Kan., and Albuquerque, N.M.

The Rail Passengers Association commissioned this study to contribute to the debate over the bus-bridge proposal, because the Association believes it is crucial that local leaders understand the nature and magnitude of the socioeconomic losses to the region from truncating existing railway service.

This study estimates **direct economic impacts, indirect social impacts,** and the effects of replacing Southwest Chief (**SWC**) passenger rail service with Bus Bridge Service (**BBS**) in New Mexico, Colorado, and Kansas using numbers that Amtrak provided along with its proposal for BBS along Raton Pass. Further, the study also illustrates economic growth at the state and county levels for the eight states currently served by the Chief, including, from west to east, California, Arizona, New Mexico, Colorado, Kansas, Missouri, Iowa, and Illinois. Researchers from the University of Southern Mississippi (USM) and Rail Passenger Association (Rail Passengers) collaborated closely in collecting valid data and developing the methodologies employed.

First, a summary of potential impacts from passenger railway service and corresponding quantification methods were established, based on a comprehensive review of previous similar studies. Guided by this summary, **direct benefits** were estimated in terms of *employment*, *value-added*, *economic output*, and *tax* resulting from expenditures related to the following:

- Railway operations and maintenance (O&M)
- Bus service related station renovation
- Bus O&M
- PTC related construction and operating costs
- Visitor spending
- Saved travel cost for families.

In addition, **indirect impacts** were quantified in monetary values, including cost for, or value in:

- Pollution control
- Highway traffic fatalities
- Highway maintenance
- Forgone trips
- Residents' accessibility to higher education institutes, hospitals, and other Amtrak stations

- Residents with lower income, limited travel options, and travel options subject to adverse weather.

In order to compare current and proposed services, our study team analyzed three scenarios. The team quantified benefits under 1) current SWC service, 2) a bus-bridge service (BBS) from Albuquerque (ABQ) to Dodge City (DDG), and 3) a BBS from Albuquerque to La Junta (LAJ).

Overall Summary for New Mexico, Colorado, and Kansas

Replacing the Southwest Chief with a bus bridge would impose **significant direct damage** on the economies of New Mexico, Colorado, and Kansas. These changes include **permanent direct economic losses every year** (losses stemming from cancelled operating spending, fewer visitors and the loss of their spending, and higher travel costs for families along the route) and **temporary direct losses just during construction years** (including losses from PTC-related construction and bus-related station renovations). In addition, the three states would face **permanent indirect losses** in their communities, due to factors ranging from increased costs in pollution control, highway fatalities, highway maintenance, and forgone trips.

Replacing Chief service with a bus bridge between Albuquerque and Dodge City would produce permanent direct economic losses of **$116.4 million across the three states every year** -- $50 million in New Mexico, $49 million in Colorado and nearly $17 million in Kansas. The permanent indirect losses from shifting to such a bus bridge could take another $64 million out of the three states' economies. The reduction in visitor spending alone tops $5 million.

Outside of economic impact, 32 universities and 47 hospitals would no longer be served directly by train, and therefore be rendered inaccessible to the more than 30,000 passengers who would travel no other way. The 130,000 people that would drive if the Southwest Chief ceased would be doing so on mountainous roads that are estimated to be 4 times more dangerous than the national average. Furthermore, the counties on Raton Pass are home to the smallest median household incomes (lower than $35,000) on the entirety of the Southwest Chief route, meaning these already negative impacts will also be socially regressive.

See the details of permanent direct impacts, temporary direct impacts, and permanent indirect impacts in following tables:

Permanent direct economic loss

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
NM	Permanent loss	88.64	$ 6,380,774.00	$ 16,838,014.00	$ 26,551,113.00	$ 496,943.00
CO	Permanent loss	109.28	$ 8,355,007.00	$ 14,418,428.00	$ 25,790,376.00	$ 819,496.00
KS	Permanent loss	27.51	$ 2,384,489.00	$ 5,024,129.00	$ 8,644,591.00	$ 658,229.00

State	Category	Replace SWC with a BBS from ABQ to LAJ				
		Job	Labor income	Value added	Output	State/local tax
NM	Permanent loss	92.22	$ 6,502,647.00	$ 17,056,572.00	$ 26,944,350.00	$ 519,798.00
CO	Permanent loss	96.99	$ 7,958,801.00	$ 13,826,736.00	$ 24,684,984.00	$ 778,904.00
KS	Permanent loss	37.32	$ 2,666,329.00	$ 5,438,989.00	$ 9,449,128.00	$ 684,827.00

Temporary direct economic loss

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
NM	Temporary loss	340.5	$ 14,715,955.00	$ 22,114,226.00	$ 43,257,630.00	$ 954,022.00
CO	Temporary loss	322.87	$ 17,997,683.00	$ 26,592,504.00	$ 47,526,287.00	$ 1,596,202.00
KS	Temporary loss	-20.87	$ (971,347.00)	$ (1,496,554.00)	$ (3,655,992.00)	$ (118,809.00)

State	Category	Replace SWC with a BBS from ABQ to LAJ				
		Job	Labor income	Value added	Output	State/local tax
NM	Temporary loss	340.5	$ 14,715,955.00	$ 22,114,226.00	$ 43,257,630.00	$ 954,022.00
CO	Temporary loss	196.17	$ 11,081,118.00	$ 16,179,398.00	$ 27,944,291.00	$ 945,337.00
KS	Temporary loss	81.71	$ 4,165,071.00	$ 6,056,745.00	$ 11,330,448.00	$ 374,541.00

In addition, the three states also face indirect negative changes in their communities permanently, from increased pollution control, highway fatalities, highway maintenance, and forgone trips.

Permanent indirect economic loss

State	Replace SWC with a BBS from ABQ to DDG	Replace SWC with a BBS from ABQ to LAJ
NM	$ 26,247,559.33	$ 26,432,782.24
CO	$ 10,918,742.85	$ 10,939,942.65
KS	$ 26,558,519.96	$ 25,671,031.51

Detailed Summary

A summary of the economic inputs and outputs of direct impacts at the state level is listed below:

Lost Benefits in railway O&M from replacing current SWC with BBS

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
NM	OM Spending	59.73	$ 4,599,096.00	$ 12,388,164.00	$ 19,416,635.00	$ 268,364.00
CO	OM Spending	79.38	$ 6,160,329.00	$ 10,633,622.00	$ 19,026,561.00	$ 596,391.00
KS	OM Spending	26.58	$ 2,055,379.00	$ 4,234,085.00	$ 7,344,931.00	$ 541,024.00

State	Category	Replace SWC with a BBS from ABQ to LAJ				
		Job	Labor income	Value added	Output	State/local tax
NM	OM Spending	59.73	$ 4,599,096.00	$ 12,388,164.00	$ 19,416,635.00	$ 268,364.00
CO	OM Spending	58.32	$ 4,525,986.00	$ 7,812,509.00	$ 13,978,791.00	$ 438,167.00
KS	OM Spending	0	$ -	$ -	$ -	$ -

Increased Benefits from bus service related station renovation and operating expenses

		Replace SWC with a BBS from ABQ to DDG				
State	Category	Job	Labor income	Value added	Output	State/local tax
NM	Station renovation	50.4	$ 2,131,357.00	$ 3,226,700.00	$ 6,834,018.00	$ 237,082.00
NM	Bus operating	4.55	$ 127,319.00	$ 216,668.00	$ 395,710.00	$ 19,317.00
CO	Station renovation	0	$ -	$ -	$ -	$ -
CO	Bus operating	0	$ -	$ -	$ -	$ -
KS	Station renovation	102.58	$ 5,136,418.00	$ 7,553,299.00	$ 14,986,440.00	$ 493,350.00
KS	Bus operating	10.72	$ 314,243.00	$ 470,899.00	$ 904,391.00	$ 32,349.00

		Replace SWC with a BBS from ABQ to LAJ				
State	Category	Job	Labor income	Value added	Output	State/local tax
NM	Station renovation	50.4	$ 2,131,357.00	$ 3,226,700.00	$ 6,834,018.00	$ 237,082.00
NM	Bus operating	4.55	$ 127,319.00	$ 216,668.00	$ 395,710.00	$ 19,317.00
CO	Station renovation	126.7	$ 6,916,565.00	$ 10,413,106.00	$ 19,581,996.00	$ 650,865.00
CO	Bus operating	11.29	$ 356,319.00	$ 524,164.00	$ 986,879.00	$ 33,627.00
KS	Station renovation	0	$ -	$ -	$ -	$ -
KS	Bus operating	0	$ -	$ -	$ -	$ -

Lost Benefits in additional PTC related construction and operating from replacing current SWC with BBS

		Current SWC				
State	Category	Job	Labor income	Value added	Output	State/local tax
NM	PTC construction	390.9	$ 16,847,312.00	$ 25,340,926.00	$ 50,091,648.00	$ 1,191,104.00
NM	PTC operating	18.01	$ 1,386,759.00	$ 3,735,386.00	$ 5,854,672.00	$ 150,449.00
CO	PTC construction	322.87	$ 17,997,683.00	$ 26,592,504.00	$ 47,526,287.00	$ 1,596,202.00
CO	PTC operating	26.49	$ 2,055,997.00	$ 3,548,950.00	$ 6,350,076.00	$ 199,046.00
KS	PTC construction	81.71	$ 4,165,071.00	$ 6,056,745.00	$ 11,330,448.00	$ 374,541.00
KS	PTC operating	5.12	$ 395,632.00	$ 815,002.00	$ 1,413,797.00	$ 104,139.00

Lost Benefits in visitor spending from replacing current SWC with BBS

	Replace SWC with a BBS from ABQ to DDG					Replace SWC with a BBS from ABQ to LAJ				
State	Job	Labor income	Value added	Output	State/local tax	Job	Labor income	Value added	Output	State/local tax
CA	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
AZ	42%	42%	42%	42%	42%	41%	41%	41%	41%	41%
NM	31%	31%	31%	31%	32%	38%	38%	38%	38%	39%
CO	68%	68%	68%	68%	68%	46%	46%	46%	46%	46%
KS	34%	34%	35%	35%	34%	27%	27%	27%	27%	27%
MO	21%	21%	21%	22%	21%	20%	20%	20%	20%	20%
LA	29%	30%	30%	30%	30%	29%	29%	29%	29%	29%
IL	34%	34%	34%	34%	34%	33%	33%	33%	33%	33%

Lost Benefits in saved travel cost from replacing current SWC with BBS

	Replace SWC with a BBS from ABQ to DDG					Replace SWC with a BBS from ABQ to LAJ				
State	Job	Labor income	Value added	Output	State/local tax	Job	Labor income	Value added	Output	State/local tax
CA	66%	66%	66%	66%	66%	64%	64%	64%	64%	64%
AZ	71%	71%	71%	71%	71%	67%	67%	67%	67%	67%
NM	41%	41%	41%	41%	41%	51%	51%	51%	51%	51%
CO	71%	71%	71%	71%	71%	52%	52%	52%	52%	52%
KS	48%	48%	48%	48%	48%	43%	43%	43%	43%	43%
MO	40%	40%	40%	40%	40%	38%	38%	38%	38%	38%
LA	65%	66%	66%	66%	66%	64%	64%	64%	64%	64%
IL	71%	71%	71%	71%	71%	68%	68%	68%	68%	68%

A summary of the monetary values of indirect impacts at the state level is listed on the next page

Increased cost for pollution control from replacing current SWC with BBS

State	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% of increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% of increased cost (Scenario III)
CA	$107,543.05	$42,659.68	40%	$42,129.15	39%
AZ	$218,133.44	$116,101.86	53%	$114,188.23	52%
NM	$241,647.28	$174,815.56	72%	$175,389.64	73%
CO	$84,218.10	$73,708.65	88%	$73,957.41	88%
KS	$228,693.34	$178,109.77	78%	$172,073.15	75%
MO	$120,777.91	$66,002.50	55%	$63,409.61	53%
IA	$13,443.39	$5,716.88	43%	$5,537.50	41%
IL	$81,234.68	$29,970.04	37%	$29,033.19	36%

Increased cost for highway traffic fatalities from replacing current SWC with BBS

State	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% of increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% of increased cost (Scenario III)
CA	$345,620.26	$138,163.15	40%	$136,475.89	39%
AZ	$951,685.55	$624,912.65	66%	$618,962.15	65%
NM	$1,037,035.22	$820,233.16	79%	$822,491.04	79%
CO	$292,754.31	$259,022.65	88%	$259,848.68	89%
KS	$908,360.89	$750,239.75	83%	$731,381.30	81%
MO	$460,678.37	$285,584.88	62%	$277,558.71	60%
IA	$48,629.10	$23,696.02	49%	$23,151.57	48%
IL	$244,854.46	$80,124.11	33%	$77,283.85	32%

Increased cost for highway maintenance from replacing current SWC with BBS

State	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% of increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% of increased cost (Scenario III)
CA	$15,547,470.18	$6,215,166.34	40%	$6,139,266.51	39%

State					
AZ	$31,375,086.58	$16,675,451.14	53%	$16,407,772.25	52%
NM	$34,663,732.77	$24,911,053.56	72%	$25,012,622.57	72%
CO	$12,043,750.49	$10,526,356.98	87%	$10,563,515.17	88%
KS	$32,628,562.70	$25,515,601.07	78%	$24,667,267.78	76%
MO	$17,323,361.35	$9,446,911.25	55%	$9,085,859.95	52%
IA	$1,934,439.66	$812,843.76	42%	$788,351.66	41%
IL	$11,668,927.98	$4,258,655.79	36%	$4,130,888.80	35%

Lost value in forgone trips from replacing current SWC with BBS

State	Saved loss by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% of increased loss (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% of increased loss (Scenario III)
CA	$1,237,180.56	$714,921.09	58%	$699,777.67	57%
AZ	$438,756.36	$278,353.37	63%	$265,725.19	61%
NM	$814,450.53	$341,457.05	42%	$422,278.99	52%
CO	$85,923.26	$59,654.57	69%	$42,621.39	50%
KS	$243,442.18	$114,569.37	47%	$100,309.28	41%
MO	$436,292.68	$176,964.91	41%	$170,527.43	39%
IA	$52,716.15	$30,904.34	59%	$29,832.76	57%
IL	$1,381,403.93	$922,692.86	67%	$909,907.45	66%

Acknowledgement

1. Introduction

The Rail Passengers Association (*Rail Passengers*) commissioned The University of Southern Mississippi (USM) Trent Lott National Center for Economic Development and Entrepreneurship to assess the economic impacts of Southwest Chief (SWC) railway service in the regions it serves throughout eight states with input and advice from Rail Passengers staff. This assessment was undertaken in response to the potential of a bus bridge service (BBS) proposed by Amtrak to replace the SWC in the currently served areas in Kansas, Colorado, and New Mexico. In order to contribute to the debate over this proposal, the region will need to understand the nature and magnitude of socioeconomic gains to the region that will be lost from the existing railway service. This need is addressed by this study through a socioeconomic assessment of the impacts of Southwest Chief rail service with a comparison to the proposed bus-bridge service, abbreviated in the study as **BBS**.

1.1 Approach

The socioeconomic impacts were estimated based on rigorous and detailed data analysis. A summary of the SWC's potential impacts, quantification methods, and data needed was generated based on a thorough review of previous practices and research. Then, *Rail Passengers* assisted the team to select appropriate potential impacts suiting the study area and the corresponding methods for further analysis. In addition, *Rail Passengers* also kindly collected ridership related data from reliable data sources. Based on these efforts, the team analyzed the Southwest Chief's direct economic impacts and social benefits in comparison to a potential BBS for 29 counties where Amtrak stations are located and the eight states the Chief serves.

1.2 Organization of the report

The remainder of the report is organized as follows:

- Chapter 2 provides a high-level background to this study, outlining the main characteristics of the regions served by the SWC and details about proposed BBS;
- Chapter 3 presents the review of previous impact studies and research, with a summary of potential impacts of a passenger railway service;
- Chapter 4 summarizes the quantification methods used by previous studies reviewed in Chapter 3, especially data needed for the estimation and potential sources;
- Chapter 5 explains the ridership estimation process, which is the basis of the impact estimation;
- Chapter 6 details impact estimation of SWC comparing to the BBS, outlining key assumptions limitations and scenarios, and describing the impact analysis procedures.

2. Background

About the Southwest Chief Railway Service

The Southwest Chief is a full-service daily train between Chicago and Los Angeles. It traces the same route as the fabled Santa Fe *Super Chief* train, the latest iteration of continuous passenger rail service for over a century to its 33 stations located in 29 counties across eight states [Figure 1]. It reliably carries well over 350,000 passengers every year. [23]

Figure 1. Map of the Southwest Chief Routes and Stations
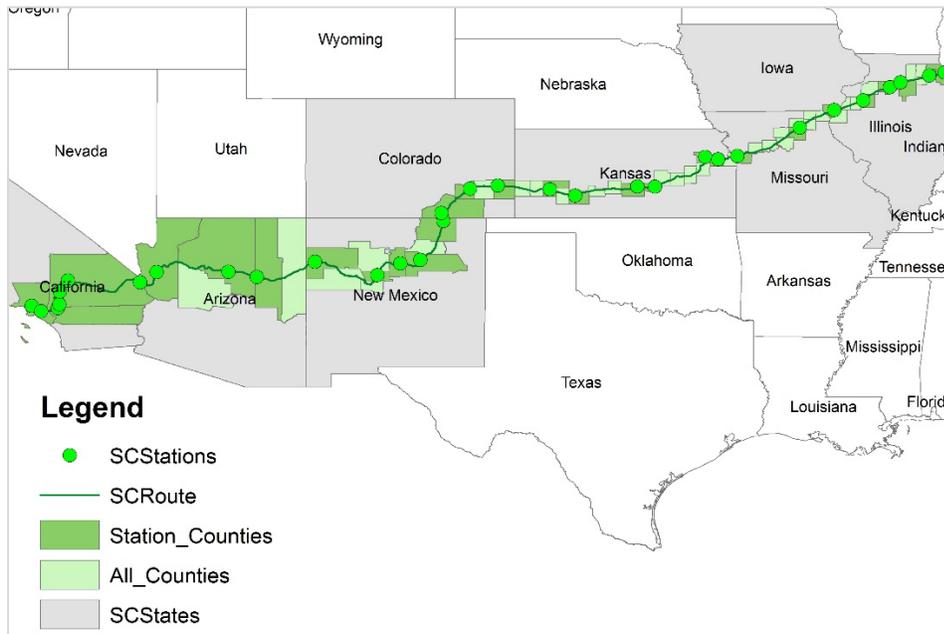
About the proposed bus bridge service (BBS)

Amtrak proposed to replace the SWC in New Mexico, Colorado, and Kansas with a BBS, in response to costs for maintenance and the installation of Positive Train Control along Raton Pass, the portion of the route in question. There were three BBS options in the proposal, shown in Table 1. For this study, the team focused only on options 1 and 2 when comparing the impacts from the current SWC to the impacts from BBS.

Table 1. Proposed Bus Bridge Service

Current SWC	BBS option #1	BBS option #2	BBS option #3
Railway service from Los Angeles to Chicago	Railway service from Los Angeles to Albuquerque + bus bridge service from Albuquerque to Dodge City + Railway service from Dodge City to Chicago	Railway service from Los Angeles to Albuquerque + bus bridge service from Albuquerque to La Junta + Railway service from La Junta to Chicago	New operating slots and schedules for options #1 and #2

3. Review of previous impact studies and research

Seven previous impact studies about passenger railway service were reviewed to build the list of potential impacts, summarized in Table 2. There are three types of impacts: direct investment related to the railway service, benefits to train passengers, and broader social benefits to the communities served. Impacts from changed congestion level and parking conditions are primarily confined to urban areas. Other impacts are rarely quantified, but are studied by researchers as agglomeration economics, quality of life issues, relocation cost savings, groundwater pollution cost savings, land conservation benefits, emergency preparedness, and recovery from adverse weather or events (routine snow storms along Raton Pass, for example). Based on the literature review, a list of potential impacts from a passenger railway service is also summarized in Table 2

Table 2. Summary of impacts discussed and quantified in previous passenger railway studies

	Impacts	Considered in	Quantified in	Commonly considered?
Direct Investments	Railway related construction	[1]; [2]; [3]	[1]; [2]; [3]	Only for new railways
	Railway operation & maintenance	[1]; [2]; [4]; [5]; [6]; [7]	[1]; [2]; [4]; [5]; [6]; [7]	Yes
	Nonresident passenger spending/Visitor spending (e.g., business travelers and tourists)	[1]; [4]; [5]; [6]	[1]; [4]; [5]; [6]	Yes
Passenger Benefits	Travel cost savings for resident passengers (business vs non-business)	[1]; [4]; [5]; [7]	[1]; [4]; [5]; [7]	Yes
	Travel time savings for resident passengers (business vs non-business)	[1]; [7]	[1]; [7]	For High-Speed-Rail
	Value of forgone trips	[7]; [20]	[7]; [20]	Yes, with Amtrak provided numbers; otherwise survey required
Social Benefits	Environment - Reduced pollution (greenhouse gas emission, air pollution and noise pollution) cost (compared to driving, flying, etc.)	[1]; [4]; [2]; [7]	[1]; [4]; [7]	Yes
	Safety - Reduction of traffic accidents	[1]; [4]; [7]	[1]; [4]; [7]	Yes
	Highway Maintenance - Reduced highway maintenance	[4]	[4]	No
	Tourism - Increased tourists	[1]; [2]; [6]	[1]; [2]	Tourism oriented development
	Congestion - Reduction in congestion in the study area	[1];		In urban area
	Accessibility - higher education, health service, recreational service, and other social services.	[1];		Context sensitive; Non-monetized
	Accessibility - transportation modes (e.g., average distance for the populations of a study region to the nearest Amtrak station and/or other modes of transport)	[1]; [6]	[1]	Context sensitive; Non-monetized
	Community development attributable to the railway (new construction, land use, property value, local business and industry, social inclusion, etc.)	[1]; [4]; [2]; [5]; [3]; [6]; [3]	[2]; [5]; [3]; [6]	Context sensitive; Only when data are available
	Special communities (disabled, senior, military, tribal, students, isolated remote area, etc.)	[1] [4] [6]		Context sensitive; Non-monetized; Very case sensitive
	Special add-on services provided by the train (mail and express service)	[4]		Context sensitive; Very case sensitive
	Increased use of other public transportation (airport, trains, buses, etc.)	[2]; [3]	[3]	Context sensitive; Require data on public transportation usage

4. Methodologies to Quantify Potential Impacts

According to a thorough review of previous studies, this section discusses formulas used to quantify potential impacts from passenger rail service. These formulas were employed by this study, the quantified results serving as inputs into the IMPLAN model; the direct impacts for further estimation of indirect economic benefits created by the SWC. The aim of this section is two-fold: One, that the methodologies employed in this study will be explained in detail. Two, that these methodologies can also serve as a guide for general American passenger rail service stakeholders to do similar work for "their" trains. This approach merited the inclusion of common assumptions and simplifications in the estimation for most of the discussed impacts.

4.1. One-time Impact from Construction

Construction cost can be considered a direct capital investment into the economy. However, such investment and its impacts are temporary, compared to the other continuous impacts. As a result, this impact is only considered in the study of proposed new railway service instead of existing railway service. It can be estimated by the below formula:

$$Cost\ for\ railway\ track\ construction + \ Cost\ for\ station\ buildings + \ Cost\ for\ train\ sets \\ + Cost\ of\ variable\ activities$$

The level of detail provided for construction costs on a given project are variable. In this case only general costs were known. General costs for a passenger railway service include cost for track and right of way construction, station building construction, and the purchase of train sets. Variable costs might include a unique signal control system for like the Positive Train Control system proposed here, which would then be considered a variable cost in the overall quantification of construction. All of these activities are modeled in IMPLAN as sector "58-construction of other new non-residential structures". Whenever the detailed costs are not available, it is recommended to use the total capital investment or total construction employment as the direct input into the economy, and use sector "58-construction of other new non-residential structures" to model its benefits in IMPLAN.

4.2. Direct Spending by Amtrak

The direct spending by Amtrak on a given route is composed of several parts listed below:

$$Amtrak\ Spending \\ = Spending\ on\ employee\ salaries + Spending\ on\ fuel + Spending\ on\ food \\ + Spending\ on\ Maintenance + Cost\ of\ variable\ activities$$

When a direct spending profile is not available, as in this case, total revenue or employment can be used as the input multiplier of direct impact from operating the railway service. Note that the total revenue for a passenger railway service should include not only the revenue from operations but also revenue from government subsidies. [25]

4.3. Nonresident passenger spending in the study area

Method

Nonresident passengers who arrive via the Southwest Chief to the study area will spend money to purchase food, lodging, and on other activities. These passengers include tourists, business travelers, and friends and families of residents in the area. Some of these passengers will visit regardless of access to

railway service. However, other visitors solely rely on the railway service, which means that without the service, they would not travel at all. The team refers to this portion of travelers as "induced passengers." These induced passengers are the group of people brought exclusively by the train and should be considered in this section.

In general, the spending by nonresident passengers can be estimated using the formula below:

$$Nonresident\ Passenger\ Spending\ =\ Number\ of\ visitors\ \times Spending\ per\ visitor$$

The number of visitors was conservatively estimated as the number of nonresident passengers brought by the railway service to the study area, and were induced to travel by train. If the service is stopped, these are the passengers who reliably won't visit and spend money in the area, resulting in a permanent loss. Other nonresident passengers will presumably spend money in the area regardless of the determination of the railway service, opting to use other modes of transport. Amtrak provides a percentage of its ridership nationally (at 8%) and per state that would only travel with railway service. [20] Otherwise, passenger surveys can illuminate nuances for particular regions. In a previous study for Amtrak's Downeaster passenger railway service, the percentage of induced passengers was 22%, based on a passenger survey [5]. In another projection study of a new High-Speed Rail service in the Hume region of Australia, this percentage was only 4% [1]. The percentage was calculated by the number of visitors or the number of induced passengers which can be estimated by the below formula:

$$Number\ of\ visitors\ =\ Number\ of\ passengers\ induced\ to\ travel\ to\ the\ area$$
$$=\ Number\ of\ passengers\ \textbf{alighting}\ in\ the\ area$$
$$\times\ Percentage\ of\ nonresident\ passengers\ \times\ Percentage\ of\ induced\ passengers$$

Spending per visitor is based on a generally calculated spending pattern of visitors in a given area, such as dollars spent per person per day or dollars spent per group per day. This spending includes costs like food, hotels, tourist destinations, shopping, sightseeing, etc. This data can be reliably obtained from tourism institutes in the given area. If spending was calculated per group, the average number of people within a group was provided by the tourism institute as well in addition to the average number of days spent by the visitors in the area. Depending on what raw data the tourism institute provides, the spending per visitor can be estimated by the following formulas:

$$Spending\ per\ visitor\ \ =\ spent\ per\ person\ per\ day \times average\ number\ of\ days\ visitors\ stay$$

Or

$$Spending\ per\ visitor$$
$$=\ (spent\ per\ group\ per\ day/average\ number\ of\ people\ in\ a\ group)$$
$$\times\ average\ number\ of\ days\ visitors\ stay$$

Commonly Used Assumptions

For the intent of this study, all visitors are assumed to have the same spending pattern. However, tourists and business travelers could have different spending profiles. If obtainable passenger data differentiates the categories of passengers alighting at a station, the spending should be estimated separately and then summed together. In cases where the categories of passengers have been collected through passenger surveys, average spending for each category should also be applied to the corresponding passengers to estimate spending of that passenger group.

Another assumption has to be made when the percentage of induced passengers is not available. Usually, without a designated survey of existing passengers, this type of data is only available on a limited basis by state from Amtrak and not collected by any tourism institute. This study used state-wide figures provided by Amtrak [20].

4.4. Saved Travel Fare by Resident Passengers

Method

Travel cost savings are had by residents who patronize the train over other transportation modes, such as bus, auto or airplane. These are passengers who would travel by other means where train service is unavailable. Accurate estimation is based on resident passenger alignments in the study area. Distance or fares by different means between these origin-destination pairs are also necessary for cost estimation. This impact is estimated by the below formula:

$$\sum_{i=1}^{n}\sum_{j=1}^{m}[No.\,of\ passengers\ between\ the\ area\ and\ station\ i\ shifted\ from\ mode\ j$$
$$\times\ (\ Cost\ by\ train\ between\ the\ area\ and\ station\ i$$
$$-\ Cost\ by\ mode\ j\ between\ the\ area\ and\ station\ i)]$$

where i is the ith station on the route outside of the study area, and j is the jth transportation mode other than passenger railway service.

$$No.\,of\ passengers\ between\ the\ area\ and\ station\ i\ shifted\ from\ mode\ j$$
$$=No.\,of\ passengers\ between\ the\ area\ and\ station\ i\times Resident\ passenger\ \%$$
$$\times\ (1-induced\ passenger\ \%)\times mode\ split\ \%\ for\ mode\ j$$

Travel cost for different transportation modes can be estimated based on average fare or cost per passenger mile, ridership, and travel distance between certain Origin and Destination pairs. The average fare or cost per passenger mile can be collected from the service websites, calculated based on operating fee, or estimated based on trackable national statistics for different modes, such as the estimation methods displayed in Appendix C. It is worthy to note that while using ticket price for different modes reflects the real expense at the study time, using national statistics can provide stable, comparable, and updated cost estimation. Based on this consideration, this study employed operating and performance statistics for various modes published in National Transportation Statistics from Bureau of Transportation Statistics. Travel distance in this study was calculated using and Origin and Destination matrix seen in section 5.

Further analysis breaks down the saved travel cost by resident passengers for business or non-business trips. This depends on the availability of data for purpose of travel. If available, it is worthy to note that some studies only consider savings for business resident trips as a direct impact to the local economy. The savings from residents' non-business train trips are usually consigned to household welfare gains, although this impact is usually much larger than business activity alone.

Commonly Used Assumptions

When the mode of transportation is split between the passengers who would have traveled regardless of train service, it is usually assumed that all of these passengers would use another mode, depending on the travel distance and fare. For example, in "Ananlysis of the economic benefits of the Amtrak Empire

Builder to Montana," by R & L Banks [4] , all passengers were assumed to drive private automobiles if train service was not available given the lack of air service on that corridor for equivalent average rail passenger trips on that route. This study used an Amtrak provided split of alternative choices [20].

If the precise number and distance of round trips taken using the train are unavailable, an average trip length for the passengers residing in the study area should be adopted. It can be estimated by

$$Average\ trip\ length \times Total\ number\ of\ trips\ from\ the\ area \times\ Cost\ per\ passenger\ mile$$

The cost per passenger mile by different means can be collected from U.S. Department of Transportation Bureau of Transportation Statistics by different modes (See Appendix C for detailed estimation).

4.5. Saved Travel Time by Resident Passengers

Method

Travel time is often saved by residents who chose to shift modes, for example, from driving a private car to riding a train. Since time has value in economic activities, the saved hours for resident passengers can be considered as a type of productivity input in the local economy. This impact can be estimated by the following formula:

$$
\begin{aligned}
Time\ &Value\ per\ hour \\
&\times \sum_{i}^{n} \sum_{j}^{m} [No.\ of\ passengers\ from\ the\ area\ to\ station\ \boldsymbol{i}\ shifted\ from\ mode\ \boldsymbol{j} \\
&\times (Travel\ time\ by\ train\ from\ the\ study\ area\ to\ station\ \boldsymbol{i} \\
&- Travel\ time\ by\ mode\ \boldsymbol{j}\ from\ the\ study\ area\ to\ station\ \boldsymbol{i})]
\end{aligned}
$$

Travel time by each mode should include:

- Access time - derived using GIS or Google Maps from the community center to the nearest station on a typical work day.
- Wait time - obtained from local stations or communities.
- In-vehicle time - derived using GIS or Google Maps from the origin to destination stations. For trains, buses, and airplanes, this information could also be collected online.
- Egress time- derived using GIS or Google Maps from the destination station to the destination community center.

Where $\boldsymbol{i}$ is the ith station on the railway line and $\boldsymbol{j}$ is the jth transportation mode that the passengers would have used if the railway was not available.

$$
\begin{aligned}
No.\ of\ &passengers\ from\ the\ area\ to\ station\ \boldsymbol{i}\ shifted\ from\ mode\ \boldsymbol{j} \\
&= No.\ of\ passengers\ from\ the\ area\ to\ station\ \boldsymbol{i} \times Resident\ passenger\ \% \\
&\times (1 - induced\ passenger\ \%) \times mode\ split\ \%\ for\ mode\ \boldsymbol{j}
\end{aligned}
$$

Like the impact of saved travel cost, if broken down into saved time by business and non-business trips, it is good practice to simply consider the saved time and its value for business trips by resident passengers as the direct impact on the economy.

Commonly Used Assumptions

The estimation requires the passenger flows between the study area and other stations. Whenever this data is not available, travel distance for each mode can be estimated by average trip length for the passengers residing in the study area [4].

4.6. Reduced Pollution in the study area

Method

When evaluating emissions on a per-user basis, trains are often a low emitter of air pollution relative to other modes [1] [4] [5] [7]. If the railway service was not available, many passengers would shift back to buses, airplanes, and automobiles. The added transportation vehicles (cars, buses, and airplanes, etc.) will increase emissions in the study area. Ideally, this impact should be estimated based on modal split if the railway service were to cease operations, by the following formulas:

$$
\begin{aligned}
&Cost\ of\ pollution\ from\ driving \times No.of\ automobiles\ added \times Avg.travel\ distance \\
&\qquad \times (1 - Cost\ ratio\ between\ train\ and\ auto) \\
&\qquad + Cost\ of\ pollution\ from\ flying \times No.of\ airplane\ added \times Avg.travel\ distance \\
&\qquad \times (1 - Cost\ ratio\ between\ train\ and\ airplane) \\
&\qquad + Cost\ of\ pollution\ from\ busing \times No.of\ buses\ added \times Avg.travel\ distance \\
&\qquad \times (1 - Cost\ ratio\ between\ train\ and\ bus) + \cdots
\end{aligned}
$$

$$
\begin{aligned}
No.of\ automobiles\ added \\
= No.of\ passengers \times (1 - induced\ \%) \times automobile\ mode\ share\ \% \\
\div No.of\ passengers\ in\ an\ automobile
\end{aligned}
$$

$$
\begin{aligned}
No.of\ airplanes\ added \\
= No.of\ passengers \times (1 - induced\ \%) \times airplane\ mode\ share\ \% \\
\div No.of\ passegners\ in\ an\ airplane
\end{aligned}
$$

$$
\begin{aligned}
No.of\ buses\ added \\
= No.of\ passengers \times (1 - induced\ \%) \times bus\ mode\ share\ \% \\
\div No.of\ passegners\ in\ a\ bus
\end{aligned}
$$

$$
Avg.travel\ distance = \frac{1}{2} \times railway\ route\ length\ in\ the\ study\ area
$$

Commonly Used Assumptions

Ideally, the transportation mode split for shifted passengers should be estimated based on a passenger survey, or given Amtrak state level data. [20] A simplification is to assume that the mode split of the passengers is the same as the average mode split in the area. For other cases where this mode split data is not available, it is usually assumed that all passengers would have driven automobiles if no train was available. So, the reduced pollution in the area can be simplified using the following formula:

$$Cost\ of\ pollution\ from\ driving \times No.of\ automobiles\ added \times Avg.travel\ distance$$
$$\times\ (1 - Cost\ ratio\ between\ train\ and\ auto)$$

$$No.of\ automobiles\ added$$
$$= No.of\ passengers \times (1 - induced\ \%) \times 100\%$$
$$\div No.of\ passengers\ in\ an\ automobile$$

4.7. Reduction of Traffic Crashes in the study area

Method

Passenger rail is also associated with improved safety from a reduction of traffic crashes (as measured by the cost associated with fatalities and serious injuries). It provides crash avoidance cost savings for railway users. The cost savings are derived by comparing the crash costs of passenger rail to the crash costs of other transportation modes that would be utilized in the absence of rail. It is estimated by the following formulas:

$$Saved\ crash\ cost\ by\ shifting\ from\ bus\ to\ passenger\ rail$$
$$+ Saved\ crash\ cost\ by\ shifting\ from\ airplane\ to\ passenger\ rail$$
$$+ Saved\ crash\ cost\ by\ shifting\ from\ automobile\ to\ passenger\ rail$$
$$+ Saved\ crash\ cost\ by\ shifting\ from\ another\ mode\ to\ passenger\ rail$$
$$+ Cost\ of\ variable\ activities$$

$$Saved\ crash\ cost\ by\ shifting\ from\ automobile\ to\ passenger\ rail$$
$$= No.of\ passengers\ shifted\ from\ automobile \times Avg.travel\ distance$$
$$\times Fatalities\ per\ passenger\ mile\ by\ automobile \times Value\ of\ statistical\ life$$

$$No.of\ passengers\ shifted\ from\ automobile$$
$$= No.of\ passengers \times (1 - induced\ \%) \times automobile\ mode\ share\ \%$$

$$Avg.travel\ distance = \frac{1}{2} \times railway\ route\ length\ in\ the\ study\ area$$

Commonly Used Assumptions

Same as the reduced pollution cost, usually a study tends to focus on trips made by car in the absence of passenger rail, by reducing the number of passengers to account for passengers who would travel by automobile if the railway service is not available. Doing this requires mode split for passengers as was used for this study [20]. Another way to further simplify the estimation is to assume that all the shifted passengers would choose to drive automobiles if passenger rail is not available. In this case, the estimation can be simplified in the following formula:

$$No.passengers \times (1 - induced\ \%) \times Avg.travel\ distance \times Fatalities\ per\ passenger\ mile$$
$$\times Value\ of\ statistical\ life$$

4.8. Saved Maintenance Cost on the Highways in the study area

Method

This impact expresses the cost avoided, with regard to maintenance work and other services on highways in the study area, as a result of passengers shifting from driving automobiles to the train. Shifting residents and nonresidents of the study area from driving benefits the study area from wear and tear on local roads. It is estimated by the following formula:

$$No. of\ passengers \times (1 - induced\ \%)$$
$$\times Trips\ made\ by\ automobile\ in\ the\ absence\ of\ passenger\ rail\ \%$$
$$\times Avg. trip\ length \times \frac{1}{No. of\ people\ per\ vehicle}$$
$$\times Maintenance\ cost\ per\ vehicle\ mile$$

$$Avg. travel\ distance = \frac{1}{2} \times railway\ route\ length\ in\ the\ study\ area$$

4.9. Broad Impacts on Tourism

Method

A successful passenger railway can have significant impacts on tourism in local communities, given the unique accessibility and visibility granted by the service. These impacts can be estimated by the following formula:

$$No. of\ increased\ tourists \times Spending\ per\ tourist$$

$$No. of\ increased\ tourists = No. of\ total\ tourists \times Increase\ \%$$

The percentage increase is the increase in tourism attributable to the railway service. The spending per tourist can be obtained from the local tourism department or institute.

Commonly Used Assumptions

The increase percentage in tourism attributable to the railway service is not easily determined without comprehensive regional surveys. A commonly used surrogate is the induced passenger percentage of the railway [1]. Another is to assume scenarios using low, medium, and high increase rates [8] [2], such as 1%, 5%, and 10% to illustrate the significance of the impact in tourism.

4.10 Recommendations for Further Study

In order to track the needed data and information for future economic impact study, several actions are recommended below.

- Routine data collection from stakeholders in local communities on a railway route. Data to be collected above and beyond what was highlighted already should include jobs and revenues related to railway related business and transit-oriented development, rental price or house price of residential buildings in the vicinity of railway stations.
- Economic impact workshops should be held with local stakeholders along passenger railway corridors to gather feedback on methodologies being used for economic assessment. Participants will review the proposed economic impact analysis methods and results, and comment on validity of methods, missing factors, and special impacts. Such discussions are key to help fine-tune the analysis and develop a more context-specific final estimation of impacts. Participants would include but are not limited to local governments, economic development corporations, transit agencies, legislative staff, universities, healthcare centers, and recreational services. Information to be collected includes but is not limited to feedback on the methodology, available data, critical issues for consideration, and available local studies that would improve the impact analysis.
- Passenger intercept surveys would ideally be conducted routinely to capture information about occupation of passengers (students, business owners, farm land owners, commuters, etc.), trip purposes (business, non-business, tourism, family visit, friends visit, education, recreation, etc.), residency, mode choice with and without the railway service, value of time, productivity cost, and attitude toward the service. Surveys can be completed on trains using printed questionnaires on weekdays, weekends, and holidays. Electronic surveys could also be used by sending questionnaires to passengers through emails with ticket confirmation.

A summary of quantification methods for selected potential impacts and data needs are shown in Table 3.

Table 3. Summary of the Quantification Methodologies for each Impact Component to the Study Area (I)

Impacts	Formulas	Data	Data source
Direct spending by nonresident passengers	$Nonresident\ Passenger\ Spending = Visitor\ spending\ \times No.of\ visitors$ $No.of\ visitors = No.of\ passengers\ induced\ to\ travel\ to\ the\ area$ $= Number\ of\ passengers\ deboarding\ in\ the\ area$ $\times Nonresident\ passengers\ \% \times Induced\ passengers\ \%$ $Spending\ per\ visitor$ $= spent\ per\ person\ per\ day$ $\times Avg.number\ of\ days\ visitors\ stay$ OR $Spending\ per\ visitor$ $= \left(\dfrac{amount\ spent\ per\ group\ per\ day}{Avg\ number\ of\ people\ in\ a\ group}\right)$ $\times Avg\ number\ of\ days\ visitors\ stay$	Spending per person per day (or, spent per group per day Avg number of persons in a group) Avg number of days visitors stay in the area	Tourism institute
		No. of passengers deboarding in the area Nonresident passengers %	Amtrak [20]
		Induced passengers %	Survey, Amtrak [20]
Direct spending by Amtrak on operation	$on\ salaries + on\ fuel + on\ food + on\ maintenance + \cdots$ Simplified estimation: Total revenue or number of employees for operation	on salaries on fuel on food on maintenance on other services	Amtrak
Direct spending by Amtrak on construction	$Cost\ for\ railway\ track\ construction + Cost\ for\ station\ buildings$ $+ Cost\ for\ train\ sets + \cdots$ Simplified estimation: Total capital investment or number of temporary employees for construction	Capital investment No. of temporary employment for construction	Amtrak

Table 4. Summary of the Quantification Methodologies for each Impact Component to the Study Area (II)

Impacts	Formulas	Data	Data source
Reduced travel fare for resident passengers	$$\sum_{i=1}^{n}\sum_{j=1}^{m} No.\,of\ passengers\ from\ the\ area\ to\ station\ \boldsymbol{i}\ shifted\ from\ mode\ \boldsymbol{j}$$ $$\times\,(\,Cost\ by\ train\ from\ the\ area\ to\ station\ \boldsymbol{i}$$ $$-\,Cost\ by\ mode\ \boldsymbol{j}\ from\ the\ area\ to\ station\ \boldsymbol{i})$$ $\boldsymbol{i}$ - ith station other than the study area; $\boldsymbol{j}$ – jth transportation mode available between the study area and destination station, e.g., by air, private car, rental car, bus, etc. $$No.\,of\ passengers\ from\ the\ area\ to\ station\ \boldsymbol{i}\ shifted\ from\ mode\ \boldsymbol{j}$$ $$= No.\,of\ passengers\ from\ the\ area\ to\ station\ \boldsymbol{i}$$ $$\times\,Resident\ passenger\ \%\times(1-induced\ passenger\ \%)$$ $$\times\,Mode\ split\ \%\ for\ mode\ \boldsymbol{j}$$ by train, air, rental car, or bus can be searched through online fare calculator by private car can be estimated by using fuel cost and distance	No. of passengers boarding in the area to each station; Resident passenger %	Amtrak
		Induced passengers %	Amtrak
		By train, bus, air, private car, or rental car from the study area to each station	Survey; Manual collection
Reduced travel fare for resident passengers (Simplified estimation)	Simplified estimation $$Avg.\,trip\ length\ of\ the\ residents\ in\ the\ area$$ $$\times\,Total\ number\ of\ trips\ from\ the\ area$$ $$\times\,Cost\ difference\ per\ passenger\ mile$$ $$Cost\ difference\ per\ passenger\ mile$$ $$= Cost\ by\ train\ per\ passenger\ mile$$ $$-\,Cost\ by\ another\ dominant\ mode$$	Avg. trip length of the residents in the study area; Cost by different means per passenger mile	U.S. Department of Transportation Bureau of Transportation Statistics
Reduced highway maintenance cost	$$Cost\ of\ maintenance\times No.\,of\ vehicles\ added\times Avg.\,travel\ distance$$	Cost of maintenance per vehicle mile	Research reports; USDOT Government reports

Table 5. Summary of the Quantification Methodologies for each Impact Component to the Study Area (III)

Impacts	Formulas	Data	Data source
Reduced cost for accidents on highways	$Cost\ of\ accident \times No.of\ vehicles\ added \times Avg.travel\ distance$ $Average\ travel\ distance = \frac{1}{2} \times Route\ mileage\ in\ the\ area$	Cost per fatality in traffic crashes	USDOT Government reports
Reduced pollution cost (compared to driving)	$Cost\ of\ pollution\ from\ driving \times No.of\ vehicles\ added \times$ $Avg.travel\ distance \times (1 - Cost\ ratio\ between\ train\ and\ auto)$	Cost of pollution control per ton of CO2 emission; CO2 emission in the unit of gram per passenger mile	Research reports; Government reports
Reduced travel time for resident passengers	$Time\ Value\ per\ hour$ $\times \sum_{i}^{n} \sum_{j}^{m} \begin{array}{c} Travel\ time\ difference\ from\ the\ study\ area\ to\ station\ \boldsymbol{i} \\ by\ train\ vs\ mode\ \boldsymbol{j} \times \\ No.of\ trips\ from\ the\ study\ area\ to\ station\ \boldsymbol{i} \end{array}$ Travel time should consider access time, egress time, wait time, and in vehicle time,	Time value per hour	Passenger survey; Research reports
Reduced travel time for resident passengers (simplified estimation)	Simplified estimation $Value\ of\ time\ per\ hour$ $\times (Travel\ time\ by\ train - Travel\ time\ by\ mode\ \boldsymbol{j})$ Travel time can be estimated based on travel speed of mode j and average trip length of the residents in the area.		

5. Scenario Analysis

There are three scenarios considered in this study:

- Scenario I – Keeping the passenger railway service in place unchanged
- Scenario II – Adopting Bus Bridge Service between Albuquerque and Dodge City
- Scenario III – Adopting Bus Bridge Service between Albuquerque and La Junta

The ridership at each station to/from each station on the route, known as the "Origin-Destination (OD) Matrix," is the most important data set required to quantify impact. The OD data for Scenario 1 is derived from the ridership reports from Amtrak for fiscal year 2017. Unfortunately, there is no detailed-station level ridership data for Scenario II and III, except a total ridership estimate for each scenario for the entire service, shown below in Table 4.

Table 6. Three study scenarios

Category	Scenario I	Scenario II	Scenario III
Revenue	$53,023.00	$24,167.00	$23,277.00
Ridership	$363,269.00	$238,900.00	$240,500.00
5-year O&M Cost	$394,295.00	$324,145.00	$335,745.00

Ridership Adjustments

In order to adjust the ridership for Scenario II and III, ridership data was divided among multiple areas. For example, ridership between stations in western part of the route (between Los Angeles and Albuquerque) is in area A in the OD matrix. Details of the division are shown in Figure 2 and 3.

O\D	LAX	FUL	RIV	SNB	VRV	BAR	NDL	KNG	WMJ	FLG	WLO	GLP	ABQ	LMY	LSV	RAT	TRI	LAJ	LMR	GCK	DDG	HUT	NEW	TOP	LRC	KCY	LAP	FMD	GBB	PCT	MDT	NPV	CHI
LAX	0	9	1266	649	1232	367	1361	649	1739	4658	409	1730	11351	1489	361	1027	218	238	64	456	333	169	1080	274	91	2408	95	145	480	24	51	155	12733
FUL	7	0	233	252	353	79	869	312	2203	198	889		4310	352	122	328	95	69	15	98	53	37	142	69	17	523	101	90	162	14	42	78	1817
RIV	728	76	0	20	138	27	374	151	68	804	93	213	1464	110	47	122	25	21	6	66	36	20	82	40	10	171	18	29	46	3	15	21	699
SNB	442	42	16	0	66	163	890	166	72	535	63	257	1602	145	67	121	47	27	10	62	45	31	116	67	6	212	16	33	60	1	3	18	702
VRV	792	144	33	26	0	10	251	70	25	201	24	56	546	36	22	41	6	14	2	8	16	10	55	16	7	101	3	7	34	1	7	12	254
BAR	242	24	16	49	1	0	31	21	2	120	11	41	494	21	7	21	6		2	11	3	6	14	18	9	53	4	9	8	4	4	3	105
NDL	1527	656	409	632	212	93	0	22	3	72	173	62	131	7	8	13	5		4	16	1	14	20	4	10	36	5	10	16	2	3	3	125
KNG	774	227	147	169	70	21	15	0	40	123	18	84	488	40	25	52	36	35	18	16	17	16	87	74	18	236	25	56	72	19	33	57	1749
WMJ	1886	176	74	78	29	6	2	60	0	58	0	7	168	37	11	19	15	16	0	1	22	10	55	19	7	163	41	27	47	5	8	11	1426
FLG	6514	1974	860	551	211	109	74	202	158	0	74	275	1451	234	50	233	95	115	26	78	57	88	208	158	71	872	90	182	361	45	60	185	3691
WLO	431	197	78	63	28	16	50	24	7	84	0	56	410	70	44	18	11	10	6	4	12	8	45	14	21	57	23	9	31	0	29	10	206
GLP	1950	796	205	217	51	43	71	96	6	344	63	0	3049	9	20	40	23	7	3	9	12	14	63	18	89	161	5	18	31	2	4	19	267
ABQ	11954	3425	1406	1544	530	466	98	562	247	1738	359	3315	0	196	651	556	236	208	75	187	101	145	596	321	202	1620	93	230	717	74	126	266	5321
LMY	1526	282	109	141	38	21	8	39	206	264	73	17	97	0	46	91	42	43	12	32	32	48	144	99	106	455	28	63	140	28	23	81	994
LSV	380	80	67	57	19	12	12	29	5	64	40	15	559	73	0	98	86	37	4	22	14	9	48	25	25	104	7	9	30	14	8	29	217
RAT	1179	273	130	175	31	20		66	30	268	16	43	846	128	103	0	34	9	14	15		42	177	72	114	1313	49	117	289	16	93	226	1386
TRI	235	72	32	49	10	5	12	28	37	96	14	18	216	39	75	97	0		22	14	5	61	147	47	53	406	115	29	96	4	39	32	631
LAJ	253	44	19	26	14	7		35	10	117	14	5	218	39	39	120	15	0	18	40	383	47	233	148	124	629	139	58	149	23	39	37	652
LMR	74	16	8	11	3	2	2	16	0	22	3	7	66	12	5	13	27	75	0	9	5	4	24	33	32	212	4	24	22	8	21	18	96
GCK	529	65	55	51	11	10	9	10	2	95	4	12	169	40	20	15	13	39	22	0	29	35	98	199	344	769	37	20	102	20	19	83	609
DDG	425	25	33	51	8	4	5	12	27	70	9	10	96	36	14	17	9	29	4	11	0	34	75	159	243	423	25	41	94	6	20	55	392
HUT	157	16	19	21	8	1	8	12	7	64	6	13	128	48	9	33	63	49	3	49	16	0	30	39	73	231	28	55	87	21	17	54	635
NEW	1089	69	65	99	34	21	10	80	74	212	37	58	538	128	59	194	148	210	27	92	65	30	0	114	116	684	78	136	374	37	79	152	2426
TOP	330	52	33	69	19	12	4	70	21	156	23	15	315	91	32	84	49	128	30	166	150	47	137	0	41	440	24	54	255	37	38	141	1996
LRC	114	12	10	7	6	3	7	28	7	91	22	83	231	106	18	110	40	113	38	334	247	94	141	32	0	395	26	36	198	33	38	293	1985
KCY	2714	271	174	220	89	34	29	284	264	1095	56	188	1637	470	133	1508	350	684	211	766	436	358	1165	533	484	0	569	650	2345	241	488	2025	20109
LAP	145	82	14	13	3	4	2	24	31	98	24	7	84	24	8	46	94	114	5	37	27	28	92	21	32	624	0	71	290	26	80	340	3367
FMD	179	85	35	25	7	8	6	46	34	186	14	15	222	75	9	120	30	71	23	25	32	57	157	46	41	699	49	0	113	3	15	106	828
GBB	404	101	51	44	30	3	11	71	48	373	32	36	618	146	16	341	77	117	26	93	78	74	359	220	172	2091	273	68	0	74	80	752	6145
PCT	29	9	2	1	1	4	3	22	2	45	0	1	61	23	15	22	5	24	6	21	9	21	47	32	32	260	30	4	38	0	17	138	2775
MDT	62	38	9	9	2	2	5	28	5	83	29	2	130	22	7	95	42	30	15	12	17	24	88	27	36	498	92	13	67	3	0	161	1486
NPV	206	52	30	17	8	4	2	67	18	203	10	11	293	91	35	266	32	54	15	90	56	31	162	165	325	2220	400	92	747	152	156	0	0
CHI	13330	1269	648	596	200	66	120	1790	1767	5083	204	235	4740	1103	211	1942	692	620	78	592	422	682	2406	1922	1985	19530	3257	918	4290	2677	2403	0	0

(Regions labeled A–I are overlaid on the matrix to indicate the area divisions described in the text.)

Figure 2. Station level ridership OD data for Scenario I (Southwest Chief) and ridership segmentation according to Scenario II

O/D	LAX	FUL	RIV	SNB	VRV	BAR	NDL	KNG	WMJ	FLG	WLO	GLP	ABQ	LMY	LSV	RAT	TRI	LAJ	LMR	GCK	DDG	HUT	NEW	TOP	LRC	KCY	LAP	FMD	GBB	PCT	MDT	NPV	CHI
LAX	0	9	1266	649	1232	367	1361	649	1739	4658	409	1730	11351	1489	361	1027	218	238	64	456	333	169	1080	274	91	2408	95	145	480	24	51	155	12733
FUL	7	0	233	252	353	79	869	312	226	2203	198	889	4310	352	122	328	95	69	15	98	53	37	142	69	17	523	101	90	162	14	42	78	1817
RIV	728	76	0	20	138	27	374	151	68	804	93	213	1464	110	47	122	25	21	6	66	36	20	82	40	10	171	18	29	46	3	15	21	699
SNB	442	42	16	0	66	163	890	166	72	535	63	257	1602	145	67	121	47	27	10	62	45	31	116	67	6	212	16	33	60	1	3	18	702
VRV	792	144	33	26	0	10	251	70	25	201	24	56	546	36	22	41	6	14	2	8	16	10	55	16	7	51	3	7	34	1	7	12	254
BAR	242	24	16	49	1	0	31	21	2	120	11	41	494	21	7	6	6	2	11	3	6	14	18	9	53	4	9	8	4	4	3	105
NDL	1527	656	409	632	212	93	0	22	3	72	173	62	131	7	8	5	12	4	16	1	14	20	4	10	36	5	10	16	2	3	3	125
KNG	774	227	147	169	70	21	15	0	40	123	18	84	488	40	25	52	36	36	18	16	17	16	87	74	18	236	25	50	72	19	33	57	1749
WMJ	1886	176	74	78	29	6	2	60	0	58	0	7	168	37	11	19	15	16	0	1	22	10	55	19	7	163	41	27	47	5	8	11	1426
FLG	6514	1974	860	551	211	109	74	202	158	0	74	275	1451	234	50	233	95	115	26	78	57	88	208	158	71	872	90	182	361	45	60	185	3691
WLO	431	197	78	63	28	16	50	24	7	84	0	56	410	70	44	18	11	10	6	4	12	8	45	14	21	57	23	9	31	0	29	10	206
GLP	1950	796	205	217	51	43	71	96	6	344	63	0	3049	9	20	40	23	7	3	9	12	14	63	18	89	161	5	18	31	2	4	19	267
ABQ	11954	3425	1406	1544	530	466	98	562	247	1738	359	3315	0	196	651	556	236	208	75	187	101	145	596	321	202	1620	93	230	717	74	126	266	5321
LMY	1526	282	109	141	38	21	8	39	206	264	73	17	97	0	46	91	42	43	12	32	32	48	144	99	106	455	28	63	140	28	23	81	994
LSV	380	80	67	57	19	12	12	29	5	64	40	15	559	73	0	86	37	4	22	14	9	48	25	25	104	7	9	30	14	8	29	217	
RAT	1179	273	130	175	31	20	5	66	30	268	16	43	846	128	103	0	34	32	9	14	15	42	177	72	114	113	49	117	289	16	93	226	1386
TRI	235	72	32	49	10	5	1	28	37	96	14	18	216	39	75	39	0	13	22	14	5	61	147	47	53	406	115	29	96	4	39	32	631
LAJ	253	44	19	26	14	7	13	35	10	117	14	5	218	39	39	120	15	0	18	40	383	47	233	148	124	629	139	58	149	23	39	37	652
LMR	74	16	8	11	3	2	2	16	0	22	3	7	66	12	5	13	27	75	0	9	5	4	24	33	32	212	4	24	22	8	21	18	96
GCK	529	65	55	51	11	10	9	10	2	95	4	12	169	40	20	15	13	39	22	0	29	35	98	199	344	769	37	20	102	20	19	83	609
DDG	425	25	33	51	8	4	5	12	27	70	9	10	96	36	14	17	9	29	4	11	0	34	75	159	243	423	25	41	94	6	20	55	392
HUT	157	16	19	21	8	1	8	12	7	64	6	13	128	48	9	33	63	49	3	49	16	0	30	39	73	231	28	55	87	21	17	54	635
NEW	1089	69	65	99	34	21	10	80	74	212	37	58	538	128	59	194	148	210	27	92	65	30	0	114	116	684	78	136	374	37	79	152	2426
TOP	330	52	33	69	19	12	4	70	21	156	23	15	315	91	32	84	49	128	30	166	150	47	137	0	47	440	24	54	255	37	38	141	1996
LRC	114	12	10	7	6	3	7	28	7	91	22	83	231	106	18	110	40	113	38	334	247	94	141	32	0	95	26	36	198	33	38	293	1985
KCY	2714	271	174	220	89	34	20	284	264	1095	56	188	1637	470	133	509		350	684	211	766	436	358	1165	533	484	0	569	650	2345	241	488	2025	20109
LAP	145	82	14	13	3	4		24	31	98	24	7	84	24	8	46	94	155	5	37	27	28	92	21	32	624	0	71	290	26	80	340	3367
FMD	179	85	35	25	7	8	9	46	34	186	14	15	222	75	9	120	30	71	23	25	32	57	157	46	41	699	49	0	113	3	15	106	828
GBB	404	101	51	44	30	3	11	71	48	373	32	36	618	146	16	341	77	117	26	93	78	74	359	220	172	2091	273	68	0	74	80	752	6145
PCT	29	9	2	1	1	4	3	22	2	45	0	1	61	23	15	22	5	24	6	21	9	21	47	32	32	260	30	4	38	0	17	138	2775
MDT	62	38	9	9	2	2	5	28	5	83	29	2	130	22	7	95	42	30	15	12	17	24	88	27	36	498	92	13	67	3	0	161	1486
NPV	206	52	30	17	8	4	2	67	18	203	10	11	293	91	35	266	32	54	15	90	56	31	162	165	325	2220	400	92	747	152	156	0	0
CHI	13330	1269	648	596	200	66	120	1790	1767	5083	204	235	4740	1103	211	1942	692	620	78	592	422	682	2406	1922	1985	19530	3257	918	4290	2677	2403	0	0

A- Ridership between western stations (LAX-ABQ)
B- Ridership from western stations to middle stations (LAX-LAJ)
C- Ridership from western stations to eastern stations (LAX-CHI)
D- Ridership from middle stations to western stations (LAJ-LAX)
E- Ridership between middle stations (ABQ-LAJ)
F- Ridership from middle stations to eastern stations (ABQ-CHI)
G- Ridership from eastern stations to western stations (CHI-LAX)
H- Ridership from eastern stations to middle stations (CHI-ABQ)
I- Ridership between eastern stations (LAJ-CHI)

High ridership
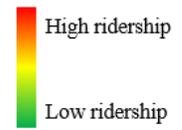
Low ridership

Figure 3. Station level ridership OD data for Scenario I (Southwest Chief) and ridership segmentation according to Scenario III

In order to derive the same OD data for Scenario II and III, several assumptions are required. First, since the bus bridge service only occurs in the middle part of the route (area E in Figure 3), ridership in area A or I will stay the same. Second, ridership in area B, C, D, E, F, G, and H will decrease because of additional transfers occurring between bus and railway services. Third, the rate ridership loss in area E will be assumed to be half of the rate in the other areas. This assumption is made based on the consideration of additional transfer between train and bus in areas B, C, D, E, F, G, and H.

According to the assumptions discussed above, the OD data for Scenario II and III were derived from the data in Figure 3 to make sure that the total ridership for Scenario II is 238,900 and for Scenario III 240,500 (Figure 4 and 5) as projected by Amtrak.

O\D	LAX	FUL	RIV	SNB	VRV	BAR	NDL	KNG	WMJ	FLG	WLO	GLP	ABQ	LMY	LSV	RAT	TRI	LAJ	LMR	GCK	DDG	HUT	NEW	TOP	LRC	KCY	LAP	FMD	GBB	PCT	MDT	NPV	CHI
LAX	0	9	1266	649	1232	367	1361	649	1739	4658	409	1730	11351	223.4	54.16	154.1	32.71	35.71	9.602	68.41	49.96	25.35	162	41.11	13.65	361.3	14.25	21.75	72.01	3.601	7.651	23.25	1910
FUL	7	0	233	252	353	79	869	312	226	2203	198	889	4310	52.81	18.3	49.21	14.25	10.35	2.25	14.7	7.951	5.551	213	10.35	2.55	78.46	15.15	13.5	24.3	2.1	6.301	11.7	272.6
RIV	728	76	0	20	138	27	374	151	68	804	93	213	1464	16.5	7.051	18.3	3.751	3.151	0.9	9.902	5.401	3	12.3	6.001	1.5	25.65	2.7	4.351	6.901	0.45	2.25	3.151	104.9
SNB	442	42	16	0	66	163	890	166	72	535	63	257	1602	21.75	10.05	18.15	7.051	4.051	1.5	9.302	6.751	4.651	17.4	10.05	0.9	31.81	2.4	4.951	9.001	0.15	0.45	2.7	105.3
VRV	792	144	33	26	0	10	251	70	25	201	24	56	546	5.401	3.301	6.151	0.9	2.1	0.3	1.2	2.4	1.5	8.251	2.4	1.05	15.15	0.45	1.05	5.101	0.15	1.05	1.8	38.11
BAR	242	24	16	49	1	0	531	21	2	120	11	41	494	3.151	1.05	3.151	0.9	0.9	0.3	1.65	0.45	0.9	2.1	2.7	1.35	7.951	0.6	1.35	1.2	0.6	0.6	0.45	15.75
NDL	1527	656	409	632	212	93	0	22	3	72	173	62	131	1.05	0.75	1.8	0.6	2.4	0.15	2.1	3	0.6	1.5	5.401	0.75	1.5	2.4	0.3	0.45	0.45	18.75
KNG	774	227	147	169	70	21	15	0	40	123	18	84	488	6.001	3.751	7.801	5.401	5.401	2.7	2.4	2.55	2.4	13.05	11.1	2.7	35.41	3.751	7.501	10.8	2.85	4.951	8.551	262.4
WMJ	1886	176	74	78	29	6	2	60	0	58	0	7	168	5.551	1.65	2.85	2.25	2.4	0	0.15	3.301	1.5	8.251	2.85	1.05	24.45	6.151	4.051	7.051	0.75	1.2	1.65	213.9
FLG	6514	1974	860	551	211	109	74	202	158	0	74	275	1451	35.11	7.501	34.96	14.25	17.25	3.901	11.7	8.551	13.2	31.21	23.7	10.65	130.8	13.5	27.3	54.16	6.751	9.001	27.75	553.7
WLO	431	197	78	63	28	16	50	24	7	84	0	56	410	10.5	6.601	2.7	1.65	1.5	0.9	0.6	1.8	1.2	6.751	2.1	3.151	8.551	3.451	1.35	4.651	0	4.351	1.5	30.91
GLP	1950	796	205	217	51	43	71	96	6	344	63	0	3049	1.35	3	6.001	3.451	1.05	0.45	1.35	1.8	2.1	9.452	2.7	13.35	24.15	0.75	2.7	4.651	0.3	0.6	2.85	40.06
ABQ	1954	3425	1406	1544	530	466	98	562	247	1738	359	3315	0	112.7	374.3	319.7	135.7	119.6	43.13	107.5	58.08	21.75	89.41	48.16	30.31	243	13.95	34.51	107.6	11.1	18.9	39.91	798.3
LMY	228.9	42.31	16.35	21.15	5.701	24.73	1.2	5.851	30.91	39.61	10.95	2.55	55.78	0	26.45	52.33	24.15	24.73	6.9	18.4	18.4	7.201	21.6	14.85	15.9	68.26	4.201	9.452	21	4.201	3.451	12.15	149.1
LSV	57.01	12	10.05	8.551	2.85	1.8	1.8	4.351	0.75	9.602	6.001	2.25	321.4	41.98	0	56.35	49.45	21.28	2.3	12.65	8.05	1.35	7.201	3.751	3.751	15.6	1.05	1.35	4.501	2.1	1.2	4.351	32.56
RAT	176.9	40.96	19.5	26.25	4.651	3	1.95	9.902	4.501	40.21	2.4	6.451	486.5	73.6	59.23	0	19.55	18.4	5.175	8.05	8.625	6.301	26.55	10.8	17.1	197	7.351	17.55	43.36	2.4	13.95	33.91	207.9
TRI	35.26	10.8	4.801	7.351	1.5	0.75	1.8	4.201	5.551	14.4	2.1	2.7	124.2	22.43	43.13	55.78	0	7.475	12.65	8.05	2.875	9.152	22.05	7.051	7.951	60.91	17.25	4.351	14.4	0.6	5.851	4.801	94.67
LAJ	37.96	6.601	2.85	3.901	2.1	1.05	1.95	5.251	1.5	17.55	2.1	0.75	125.4	22.43	22.43	69	8.625	0	10.35	23	220.2	7.051	34.96	22.2	18.6	94.37	20.85	8.701	22.35	3.451	5.851	5.551	97.82
LMR	11.1	2.4	1.2	1.65	0.45	0.3	0.3	2.4	0	3.301	0.45	1.05	37.95	6.9	2.875	7.475	15.53	43.13	0	5.175	2.875	0.6	3.601	4.951	4.801	31.81	0.6	3.601	3.301	1.2	3.151	2.7	14.4
GCK	79.36	9.752	8.251	7.651	1.65	1.5	1.35	1.5	0.3	14.25	0.6	1.8	97.18	23	11.5	8.625	7.475	22.43	12.65	0	16.68	5.251	14.7	29.85	51.61	115.4	5.551	3	15.3	3	2.85	12.45	91.37
DDG	63.76	3.751	4.951	7.651	1.2	0.6	0.75	1.8	4.051	10.5	1.35	1.5	55.2	20.7	8.05	9.775	5.175	16.68	2.3	6.325	0	34	75	159	243	423	25	41	94	6	20	55	392
HUT	23.55	2.4	2.85	3.151	1.2	0.15	1.2	1.8	1.05	9.602	0.9	1.95	19.2	7.201	1.35	4.951	9.452	7.351	0.45	7.351	16	0	30	39	73	231	28	55	87	21	17	54	635
NEW	163.4	10.35	9.752	14.85	5.101	3.151	1.5	12	11.1	31.81	5.551	8.701	80.71	19.2	8.851	29.1	22.2	31.51	4.051	13.8	65	30	0	114	116	684	78	136	374	37	79	152	2426
TOP	49.51	7.801	4.951	10.35	2.85	1.8	0.6	10.5	3.151	23.4	3.451	2.25	47.26	13.65	4.801	12.6	7.351	19.2	4.501	24.9	150	47	137	0	41	440	24	54	255	37	38	141	1996
LRC	17.1	1.8	1.5	1.05	0.9	0.45	1.05	4.201	1.05	13.65	3.301	12.45	34.66	15.9	2.7	16.5	6.001	16.95	5.701	50.11	247	94	141	32	0	395	26	36	198	33	38	293	1985
KCY	407.2	40.66	26.1	33.01	13.35	5.101	4.351	42.61	39.61	164.3	8.401	28.2	245.6	70.51	19.95	226.2	52.51	102.6	31.66	114.9	436	358	1165	533	484	0	569	650	2345	241	488	2025	20109
LAP	21.75	12.3	2.1	1.95	0.45	0.6	0.3	3.601	4.651	14.7	3.601	1.05	12.6	3.601	1.2	6.901	14.1	23.25	0.75	5.551	27	28	92	21	32	624	0	71	290	26	80	340	3367
FMD	26.85	12.75	5.251	3.751	1.05	1.2	1.35	6.901	5.101	27.9	2.1	2.25	33.31	11.25	1.35	18	4.501	10.65	3.451	3.751	32	57	157	46	41	699	49	0	113	3	15	106	828
GBB	60.61	15.15	7.651	6.601	4.501	0.45	1.65	10.65	7.201	55.96	4.801	5.401	92.72	21.9	2.4	51.16	11.55	17.55	3.901	13.95	78	74	359	220	172	2091	273	68	0	74	80	752	6145
PCT	4.351	1.35	0.3	0.15	0.15	0.6	0.45	3.301	0.3	6.751	0	0.15	9.152	3.451	2.25	3.301	0.75	3.601	0.9	3.151	9	21	47	32	32	260	30	4	38	0	17	138	2775
MDT	9.302	5.701	1.35	1.35	0.3	0.3	0.75	4.201	0.75	12.45	4.351	0.3	19.5	3.301	1.05	14.25	6.301	4.501	2.25	1.8	17	24	88	27	36	498	92	13	67	3	0	161	1486
NPV	30.91	7.801	4.501	2.55	1.2	0.6	0.3	10.05	2.7	30.46	1.5	1.65	43.96	13.65	5.251	39.91	4.801	8.101	2.25	13.5	56	31	162	165	325	2220	400	92	747	152	156	0	0
CHI	2000	190.4	97.22	89.41	30	9.902	18	268.5	265.1	762.6	30.61	35.26	711.1	165.5	31.66	291.3	103.8	93.02	11.7	88.81	422	682	2406	1922	1985	19530	3257	918	4290	2677	2403	0	0

Figure 4. Station level ridership OD data for Scenario II (Bus Bridge Service from ABQ to DDG)

O\D	LAX	FUL	RIV	SNB	VRV	BAR	NDL	KNG	WMJ	FLG	WLO	GLP	ABQ	LMY	LSV	RAT	TRI	LAJ	LMR	GCK	DDG	HUT	NEW	TOP	LRC	KCY	LAP	FMD	GBB	PCT	MDT	NPV	CHI
LAX	0	9	1266	649	1232	367	1361	649	1739	4658	409	1730	11351	145.1	35.19	100.1	21.25	23.2	6.238	44.45	32.46	16.47	105.3	26.71	8.87	234.7	9.26	14.13	46.79	2.339	4.971	15.11	1241
FUL	7	0	233	252	353	79	869	312	226	2203	198	889	4310	34.31	11.89	31.97	9.26	6.726	1.462	9.553	5.166	3.607	13.84	6.726	1.657	50.98	9.845	8.773	15.79	1.365	4.094	7.603	177.1
RIV	728	76	0	20	138	27	374	151	68	804	93	213	1464	10.72	4.581	11.89	2.437	2.047	0.585	6.433	3.509	1.95	7.993	3.899	0.975	16.67	1.755	2.827	4.484	0.292	1.462	2.047	68.14
SNB	442	42	16	0	66	163	890	166	72	535	63	257	1602	14.13	6.531	11.79	4.581	2.632	0.975	6.044	4.386	3.022	11.31	6.531	0.585	20.66	1.56	3.217	5.849	0.097	0.292	1.755	68.43
VRV	792	144	33	26	0	10	251	70	25	201	24	56	546	3.509	2.144	3.997	0.585	1.365	0.195	0.78	1.56	0.975	5.361	1.56	0.682	9.845	0.292	0.682	3.314	0.097	0.682	1.17	24.76
BAR	242	24	16	49	1	0	531	21	2	120	11	41	494	2.047	0.682	2.047	0.585	0.585	0.195	1.072	0.292	0.585	1.365	1.365	1.365	5.166	0.39	0.877	0.78	0.39	0.39	0.292	10.24
NDL	1527	656	409	632	212	93	0	22	3	72	173	62	131	0.682	0.78	1.267	0.487	1.17	0.39	1.56	0.097	1.365	1.95	0.39	0.975	3.509	0.487	0.975	1.56	0.195	0.292	0.292	12.18
KNG	774	227	147	169	70	21	15	0	40	123	18	84	488	3.899	2.437	5.069	3.509	3.509	1.755	1.56	1.657	1.56	8.48	7.213	1.755	23	2.437	4.874	7.018	1.852	3.217	5.556	170.5
WMJ	1886	176	74	78	29	6	2	60	0	58	0	7	168	3.607	1.072	1.852	1.462	1.56	0	0.097	2.144	0.975	5.361	1.852	0.682	15.89	3.997	2.632	4.581	0.487	0.78	1.072	139
FLG	6514	1974	860	551	211	109	74	202	158	0	74	275	1451	22.81	4.874	22.71	9.26	11.21	2.534	7.603	5.556	8.578	20.28	15.4	6.921	85	8.773	17.74	35.19	4.386	5.849	18.03	359.8
WLO	431	197	78	63	28	16	50	24	7	84	0	56	410	6.823	4.289	1.755	1.072	0.975	0.585	0.39	1.17	0.78	4.386	1.365	2.047	5.556	2.242	0.877	3.022	0	2.827	0.975	26.03
GLP	1950	796	205	217	51	43	71	96	6	344	63	0	3049	0.877	1.95	3.899	2.242	0.682	0.292	0.877	1.17	1.365	6.141	1.755	8.675	15.69	0.487	1.755	3.022	0.195	0.39	1.852	26.03
ABQ	11954	3425	1406	1544	530	466	98	562	247	1738	359	3315	0	107.6	357.2	305.1	129.5	114.1	7.311	18.23	9.845	14.3	5.81	31.29	19.69	155.8	9.065	22.49	69.89	7.213	12.28	25.93	518.7
LMY	148.7	27.49	10.62	13.74	3.704	2.047	0.78	3.802	20.08	25.73	7.116	1.657	53.23	0	25.24	49.94	23.05	23.6	1.17	3.119	3.119	4.679	14.04	9.65	10.33	44.35	2.729	6.141	13.65	2.729	2.242	7.896	96.89
LSV	37.04	7.798	6.531	5.556	1.852	1.17	1.17	2.827	0.487	6.238	3.899	1.462	306.7	40.06	0	53.78	47.19	20.3	0.39	2.144	1.365	0.877	4.679	2.437	2.437	10.14	0.682	0.877	2.924	1.365	0.78	2.827	21.15
RAT	114.9	26.61	12.67	17.06	3.022	1.95	1.267	6.433	2.924	26.12	1.56	4.191	464.2	70.24	56.52	0	18.66	17.56	0.877	1.365	1.462	4.094	17.25	7.018	11.11	128	4.776	11.4	28.17	1.56	9.065	22.03	135.1
TRI	22.91	7.018	3.119	4.776	0.975	0.487	1.17	2.729	3.607	9.358	1.365	1.755	118.5	21.4	41.16	53.23	0	7.134	2.144	1.365	0.487	5.946	14.33	4.581	5.166	39.58	11.21	2.827	9.358	0.39	3.802	3.119	61.51
LAJ	24.66	4.289	1.852	2.534	1.365	0.682	1.267	3.412	0.975	11.4	1.365	0.487	115	21.4	21.4	65.85	8.231	0	18	40	383	47	233	148	124	629	139	58	149	23	39	37	652
LMR	7.213	1.56	0.78	1.072	0.292	0.195	0.195	1.56	0	2.144	0.292	0.682	6.433	1.17	0.487	1.267	2.632	75	0	9	5	4	24	33	32	212	4	24	22	8	21	18	96
GCK	51.57	6.336	5.361	4.971	1.072	0.975	0.877	0.975	0.195	9.26	0.39	1.17	3.899	1.95	1.462	1.267	2.632	75	22	0	29	35	98	199	344	769	37	20	102	20	19	83	609
DDG	41.43	2.437	3.217	4.971	0.78	0.39	0.487	1.17	2.632	6.823	0.877	0.975	9.358	3.509	1.365	1.657	0.877	29	4	11	0	34	75	159	243	423	25	41	94	6	20	55	392
HUT	15.3	1.56	1.852	2.047	0.78	0.097	0.78	1.17	0.682	6.238	0.585	1.267	12.48	4.679	0.877	3.217	6.141	49	3	49	16	0	30	39	73	231	28	55	87	21	17	54	635
NEW	106.2	6.726	6.336	9.65	3.314	2.047	0.975	7.798	7.213	20.66	3.607	5.654	52.44	12.48	5.751	18.91	14.43	210	27	92	65	30	0	114	116	684	78	136	374	37	79	152	2426
TOP	32.17	5.069	3.217	6.726	1.852	1.17	0.39	6.823	2.047	15.21	2.242	1.462	30.71	8.87	3.119	8.188	4.776	128	30	166	150	47	137	0	41	440	24	54	255	37	38	141	1996
LRC	11.11	1.17	0.975	0.682	0.585	0.292	0.682	2.729	0.682	8.87	2.144	8.091	22.52	10.33	1.755	10.72	3.899	113	38	334	247	94	141	32	0	395	26	36	198	33	38	293	1985
KCY	264.6	26.42	16.96	21.44	8.675	3.314	2.827	27.68	25.73	106.7	5.459	18.33	159.6	45.81	12.96	147	34.12	684	211	766	436	358	1165	533	484	0	569	650	2345	241	488	2025	20109
LAP	14.13	7.993	1.365	1.267	0.292	0.39	0.195	2.339	3.022	9.553	2.339	0.682	8.188	2.339	0.78	4.191	9.163	155	5	37	27	28	92	21	32	624	0	71	290	26	80	340	3367
FMD	17.45	8.285	3.412	2.437	0.682	0.78	0.877	4.484	3.314	18.13	1.365	1.462	21.64	7.311	0.877	11.7	2.924	71	23	25	32	57	157	46	41	699	49	0	113	3	15	106	828
GBB	39.38	9.845	4.971	4.289	2.924	0.292	1.072	6.921	4.679	36.36	3.119	3.509	60.24	14.23	1.56	33.24	7.506	117	26	93	78	74	359	220	172	2091	273	68	0	74	80	752	6145
PCT	2.827	0.877	0.195	0.097	0.097	0.39	0.292	2.144	0.195	4.386	0	0.877	9.546	2.242	1.462	2.144	0.487	24	6	21	9	21	47	32	32	260	30	4	38	0	17	138	2775
MDT	6.044	3.704	0.877	0.877	0.195	0.195	0.487	2.729	0.487	8.091	2.827	0.195	12.67	2.144	0.682	9.26	4.094	30	15	12	17	24	88	27	36	498	92	13	67	3	0	161	1486
NPV	20.08	5.069	2.924	1.657	0.78	0.39	0.195	6.531	1.755	19.79	0.975	1.072	28.56	8.87	3.412	25.93	3.119	54	15	90	56	31	162	165	325	2220	400	92	747	152	156	0	0
CHI	1299	123.7	63.16	58.1	19.5	6.433	11.7	174.5	172.2	495.5	19.89	22.91	462	107.5	20.57	189.3	67.45	620	78	592	422	682	2406	1922	1985	19530	3257	918	4290	2677	2403	0	0

Figure 5. Station level ridership OD data for Scenario III (Bus Bridge Service from ABQ to LAJ)

Although total ridership in Scenario III is higher than Scenario II, the ridership rate of loss for areas B through H are higher in Scenario III. This counterintuitive observation is owed to the decrease in the number of OD pairs over the shorter BBS length, making the loss more punitive at each newly minted bus stop. As a result, adjusted ridership in areas B to H in Scenario III is lower than in Scenario II. This adjustment is based entirely on the ridership estimate from Amtrak for the bus bridge service. Additional information about how Amtrak estimated the ridership data would be required to confirm the relationship between travel time and transfer decision making, which is beyond the scope of work for this study.

6. Impact Quantification for the Southwest Chief Service

Not all impacts listed in Table 2 needed to be estimated for the purpose of this study. A selection of impacts had to be determined based on the socio-economic characteristics of the counties and states served by the SWC. Following this rule, the analyzed impacts are from:

- Direct economic impacts
  - Lost benefits from railway operating & maintenance cost
  - Benefits from bus operating & maintenance cost
  - Lost benefits from additional construction cost for improving the service, such as PTC installation, etc.
  - Lost benefits from visitor spending
  - Lost benefits from travel cost savings for resident passengers
- Indirect social impacts
  - Increased cost for pollution control
  - Increased cost for traffic fatalities
  - Increased cost for highway maintenance
  - Lost value of forgone trips
  - Lost accessibility to higher education institutions, hospitals, and Amtrak services
  - Inconvenience for adolescents, seniors, lower income families, and residents who live in adverse weather affected areas

In order to focus on the potential changes in benefits, the tables in this section only include the loss or increase in benefits. Details about impacts estimated by IMPLAN for each scenario are summarized in the appendix.

Lost benefits from railway operations and maintenance (O&M)

Amtrak's exact spending profile for the Southwest Chief's O&M is not available. Therefore, the total O&M cost was estimated by summing up total core revenue from ticket sales and total subsidy from the government. Based on the data provided in Amtrak's annual report for 2018 [25], the total core revenue and subsidies are $49,912,421 and $54,083,333 respectively. So, the total O&M cost in 2017 is estimated to be $103,995,754. This total cost is further fragmented down to each state and county for further analysis. An assumption is that the amount of spending will be proportional to the mileage of the route in each study area. Under this assumption, the O&M cost in each state was estimated (see Table 7). While the profile is assumed, the impacts nevertheless are real: the money has been spent.

Table 7. Estimated Amtrak O&M spending in each state

State Name	Spending
ARIZONA	$21,441,557.04
CALIFORNIA	$24,704,990.73
COLORADO	$10,159,749.98
ILLINOIS	$8,910,197.01
IOWA	$1,396,114.35

Table 7. Estimated Amtrak O&M spending in each state (II)

KANSAS	$13,492,475.23
MISSOURI	$3,851,620.88
NEW MEXICO	$20,039,048.78
Total	$103,995,754.00

Passenger railway operations and maintenance generate jobs, salaries, and additional value in local economies. If the current SWC services were cancelled in New Mexico, Colorado, and Kansas, it is assumed that no railway O&M spending will be needed in affected counties. Thus, what was spent currently in those communities will be cancelled in the BBS scenarios. The lost benefits at the county level and state level are shown in Table 8, and Table 9. It is assumed that in the other states and counties where the railway service will remain the O&M spending for railway won't change. However, in reality this spending will likely decrease due to lower ridership.

Table 8. Lost economic impacts from Amtrak O&M spending, county level

County	Replace SWC with a BBS from ABQ to DDG				
	Job	Labor income	Value added	Output	County tax
Bernalillo	8.9	$ 756,399.00	$ 1,831,312.00	$ 2,756,977.00	$ 6,160.00
Santa Fe	11.87	$ 911,137.00	$ 2,467,719.00	$ 3,804,030.00	$ 13,502.00
San Miguel	51.69	$ 4,956,489.00	$ 5,481,409.00	$ 1,809,705.00	$ 12,479.00
Colfax	13.41	$ 1,086,493.00	$ 3,234,713.00	$ 4,896,662.00	$ 10,740.00
Las Animas	20.61	$ 1,606,235.00	$ 2,993,097.00	$ 5,439,609.00	$ 13,452.00
Otero	15.48	$ 1,198,015.00	$ 2,213,589.00	$ 4,088,800.00	$ 10,426.00
Prowers	14.21	$ 1,010,453.00	$ 1,883,197.00	$ 3,560,224.00	$ 13,573.00
Finney	8	$ 664,619.00	$ 1,445,965.00	$ 2,394,695.00	$ 32,822.00
Ford	12.04	$ 955,608.00	$ 2,124,746.00	$ 3,566,131.00	$ 50,713.00

County	Replace SWC with a BBS from ABQ to LAJ				
	Job	Labor income	Value added	Output	County tax
Bernalillo	8.9	$ 756,399.00	$ 1,831,312.00	$ 2,756,977.00	$ 6,160.00
Santa Fe	11.87	$ 911,137.00	$ 2,467,719.00	$ 3,804,030.00	$ 13,502.00
San Miguel	51.69	$ 4,956,489.00	$ 5,481,409.00	$ 1,809,705.00	$ 12,479.00
Colfax	13.41	$ 1,086,493.00	$ 3,234,713.00	$ 4,896,662.00	$ 10,740.00
Las Animas	20.61	$ 1,606,235.00	$ 2,993,097.00	$ 5,439,609.00	$ 13,452.00
Otero	15.48	$ 1,198,015.00	$ 2,213,589.00	$ 4,088,800.00	$ 10,426.00

Table 9. Lost economic impacts from Amtrak O&M spending, state level

State	Category		Replace SWC with a BBS from ABQ to DDG			
		Job	Labor income	Value added	Output	State/local tax
NM	OM Spending	59.73	$ 4,599,096.00	$ 12,388,164.00	$ 19,416,635.00	$ 268,364.00
CO	OM Spending	79.38	$ 6,160,329.00	$ 10,633,622.00	$ 19,026,561.00	$ 596,391.00
KS	OM Spending	26.58	$ 2,055,379.00	$ 4,234,085.00	$ 7,344,931.00	$ 541,024.00

State	Category		Replace SWC with a BBS from ABQ to LAJ			
		Job	Labor income	Value added	Output	State/local tax
NM	OM Spending	59.73	$ 4,599,096.00	$ 12,388,164.00	$ 19,416,635.00	$ 268,364.00
CO	OM Spending	58.32	$ 4,525,986.00	$ 7,812,509.00	$ 13,978,791.00	$ 438,167.00
KS	OM Spending	0	$ -	$ -	$ -	$ -

Table 9. Lost economic impacts from Amtrak O&M spending, in percentage of current SWC impacts, state level

Staet	Replace SWC with a BBS from ABQ to DDG					Replace SWC with a BBS from ABQ to LAJ				
	Job	Labor income	Value added	Output	State/local tax	Job	Labor income	Value added	Output	State/local tax
NM	68%	68%	68%	68%	54%	68%	68%	68%	68%	54%
CO	100%	100%	100%	100%	100%	73%	73%	73%	73%	73%
KS	33%	33%	33%	33%	33%	0%	0%	0%	0%	0%

Benefits from construction and operating related to the proposed bridge bus service

If current railway service across the three states in question were replaced by the proposed bus bridge service, regular railway O&M spending would be cancelled. However, other O&M spending for bus services will be implemented in the related segment. In counties benefitting from train to bus transfer terminals, there would be a certain level of positive impact from replacing the SWC with BBS. These gained benefits at county and state levels are shown in Table 10 and Table 11 It is crucially important to note that while station renovations can generate a significant number of jobs and corresponding economic impact, these benefits are only temporary.

Table 10. Benefits from BBS related construction and operating, county level

County	Category		Replace SWC with a BBS from ABQ to DDG			
		Job	Labor income	Value added	Output	County tax
Bernalillo	Station renovation	49.78	$ 2,318,812.00	$ 3,515,268.00	$ 6,990,736.00	$ 22,658.00
Bernalillo	Bus operating	4.25	$ 135,156.00	$ 230,298.00	$ 394,616.00	$ 1,806.00
Otero	Station renovation	0	$ -	$ -	$ -	$ -
Otero	Bus operating	0	$ -	$ -	$ -	$ -
Ford	Station renovation	84.16	$ 4,370,860.00	$ 6,303,968.00	$ 12,178,795.00	$ 59,825.00
Ford	Bus operating	16.84	$ 122,610.00	$ 201,593.00	$ 796,479.00	$ 5,321.00

County	Category		Replace SWC with a BBS from ABQ to LAJ			
		Job	Labor income	Value added	Output	County tax
Bernalillo	Station renovation	49.78	$ 2,318,812.00	$ 3,515,268.00	$ 6,990,736.00	$ 22,658.00
Bernalillo	Bus operating	4.25	$ 135,156.00	$ 230,298.00	$ 394,616.00	$ 1,806.00
Otero	Station renovation	119.99	$ 4,149,007.00	$ 5,853,222.00	$ 14,271,830.00	$ 45,299.00
Otero	Bus operating	16.43	$ 113,993.00	$ 159,621.00	$ 740,084.00	$ 2,441.00
Ford	Station renovation	0	$ -	$ -	$ -	$ -
Ford	Bus operating	0	$ -	$ -	$ -	$ -

Table 11. Benefits from BBS related construction and operating, state level

State	Category	Job	Labor income	Value added	Output	State/local tax
			Replace SWC with a BBS from ABQ to DDG			
NM	Station renovation	50.4	$ 2,131,357.00	$ 3,226,700.00	$ 6,834,018.00	$ 237,082.00
NM	Bus operating	4.55	$ 127,319.00	$ 216,668.00	$ 395,710.00	$ 19,317.00
CO	Station renovation	0	$ -	$ -	$ -	$ -
CO	Bus operating	0	$ -	$ -	$ -	$ -
KS	Station renovation	102.58	$ 5,136,418.00	$ 7,553,299.00	$ 14,986,440.00	$ 493,350.00
KS	Bus operating	10.72	$ 314,243.00	$ 470,899.00	$ 904,391.00	$ 32,349.00

State	Category	Job	Labor income	Value added	Output	State/local tax
			Replace SWC with a BBS from ABQ to LAJ			
NM	Station renovation	50.4	$ 2,131,357.00	$ 3,226,700.00	$ 6,834,018.00	$ 237,082.00
NM	Bus operating	4.55	$ 127,319.00	$ 216,668.00	$ 395,710.00	$ 19,317.00
CO	Station renovation	126.7	$ 6,916,565.00	$ 10,413,106.00	$ 19,581,996.00	$ 650,865.00
CO	Bus operating	11.29	$ 356,319.00	$ 524,164.00	$ 986,879.00	$ 33,627.00
KS	Station renovation	0	$ -	$ -	$ -	$ -
KS	Bus operating	0	$ -	$ -	$ -	$ -

Lost benefits from additional Positive Train Control (PTC) related construction and operating spending

If the current railway service remains, Amtrak has insisted upon additional installation and operating spending related to PTC. This investment is the alternative to BBS, and is therefore confined exclusively to Raton Pass . The investment in construction will generate temporary jobs and economic impacts, while the spending in operating the system would create continuous economic impacts. By replacing the current SWC with BBS, the benefits related to PTC will be lost. Details about this loss at the county and state levels are shown in Table 12 and Table 13.

Table 12. Lost economic impacts from additional PTC related construction and operating, county level

County	Category	Employment	Labor income	Value added	Output	County tax
				Current SWC		
Bernalillo	PTC construction	19.03	$ 901,387.00	$ 1,352,034.00	$ 2,525,439.00	$ 8,206.00
Bernalillo	PTC operating	0.94	$ 79,011.00	$ 191,161.00	$ 290,435.00	$ 646.00
Santa Fe	PTC construction	89.56	$ 3,428,746.00	$ 4,990,023.00	$ 10,406,772.00	$ 56,392.00
Santa Fe	PTC operating	3.96	$ 303,945.00	$ 823,204.00	$ 1,268,982.00	$ 4,504.00
San Miguel	PTC construction	154.56	$ 3,972,006.00	$ 5,791,734.00	$ 15,123,760.00	$ 46,027.00
San Miguel	PTC operating	10.63	$ 1,019,248.00	$ 1,127,192.00	$ 372,146.00	$ 2,566.00
Colfax	PTC construction	126.74	$ 4,508,281.00	$ 6,302,302.00	$ 13,913,659.00	$ 55,566.00
Colfax	PTC operating	4.48	$ 362,655.00	$ 1,079,700.00	$ 1,634,434.00	$ 3,585.00
Las Animas	PTC construction	128.38	$ 4,631,488.00	$ 6,548,327.00	$ 14,212,472.00	$ 41,162.00
Las Animas	PTC operating	6.88	$ 536,048.00	$ 998,885.00	$ 1,815,359.00	$ 4,489.00
Otero	PTC construction	93.92	$ 3,538,755.00	$ 4,973,673.00	$ 10,645,995.00	$ 32,682.00
Otero	PTC operating	5.17	$ 399,865.00	$ 738,836.00	$ 1,364,732.00	$ 3,479.00
Prowers	PTC construction	86.14	$ 2,789,471.00	$ 3,744,734.00	$ 8,940,079.00	$ 42,816.00
Prowers	PTC operating	4.74	$ 337,237.00	$ 628,513.00	$ 1,188,217.00	$ 4,530.00
Finney	PTC construction	48.38	$ 2,519,046.00	$ 3,569,953.00	$ 6,461,587.00	$ 29,299.00
Finney	PTC operating	2.67	$ 221,815.00	$ 482,588.00	$ 799,224.00	$ 10,954.00
Ford	PTC construction	20.48	$ 1,077,386.00	$ 1,533,657.00	$ 2,769,994.00	$ 13,250.00
Ford	PTC operating	1.17	$ 93,284.00	$ 207,412.00	$ 348,117.00	$ 4,950.00

Table 13. Lost economic impacts from additional PTC related construction and operating, state level

State	Category	Job	Labor income	Value added	Output	State/local tax
				Current SWC		
NM	PTC construction	390.9	$ 16,847,312.00	$ 25,340,926.00	$ 50,091,648.00	$ 1,191,104.00
NM	PTC operating	18.01	$ 1,386,759.00	$ 3,735,386.00	$ 5,854,672.00	$ 150,449.00
CO	PTC construction	322.87	$ 17,997,683.00	$ 26,592,504.00	$ 47,526,287.00	$ 1,596,202.00
CO	PTC operating	26.49	$ 2,055,997.00	$ 3,548,950.00	$ 6,350,076.00	$ 199,046.00
KS	PTC construction	81.71	$ 4,165,071.00	$ 6,056,745.00	$ 11,330,448.00	$ 374,541.00
KS	PTC operating	5.12	$ 395,632.00	$ 815,002.00	$ 1,413,797.00	$ 104,139.00

Lost benefits from visitor spending

Visitors induced by the SWC spend money in the communities for lodging, ground transportation, food, entertainment, and shopping. This spending can be considered as a direct impact on the local community and will generate jobs and taxes continuously. This benefit will be negatively affected by replacing the current SWC with BBS, corresponding to the significant resulting loss in ridership. The loss at the county and state levels are shown in Table 14, Table 15, Table 16 and Table 18.

Table 14. Lost economic impacts from visitor spending, county level

County	Employment	Labor income	Value added	Output	County tax
			Replace SWC with a BBS from ABQ to DDG		
Los Angeles	9.87	$ 421,804.00	$ 637,888.00	$ 1,019,420.00	$ 7,312.00
Orange	1.23	$ 49,925.00	$ 76,735.00	$ 122,257.00	$ 471.00
Riverside	0.69	$ 22,863.00	$ 34,237.00	$ 58,734.00	$ 446.00
San Bernardino	1.25	$ 38,327.00	$ 56,673.00	$ 99,898.00	$ 648.00
Mohave	0.37	$ 9,804.00	$ 13,125.00	$ 23,799.00	$ 195.00
Coconino	1.65	$ 51,381.00	$ 67,320.00	$ 114,433.00	$ 695.00
Navajo	0.1	$ 2,507.00	$ 3,744.00	$ 7,094.00	$ 44.00
McKinley	0.24	$ 5,130.00	$ 7,231.00	$ 14,578.00	$ 148.00
Bernalillo	2.53	$ 71,455.00	$ 106,019.00	$ 189,044.00	$ 1,080.00
Santa Fe	1.13	$ 36,541.00	$ 51,601.00	$ 88,269.00	$ 796.00
San Miguel	0.51	$ 8,470.00	$ 12,105.00	$ 26,633.00	$ 196.00
Colfax	1.79	$ 39,828.00	$ 56,429.00	$ 112,398.00	$ 888.00
Las Animas	0.78	$ 10,394.00	$ 17,921.00	$ 45,991.00	$ 517.00
Otero	0.98	$ 13,094.00	$ 22,493.00	$ 58,615.00	$ 712.00
Prowers	0.24	$ 3,165.00	$ 5,659.00	$ 14,777.00	$ 261.00
Finney	0.48	$ 10,562.00	$ 14,319.00	$ 28,844.00	$ 300.00
Ford	0.15	$ 2,707.00	$ 3,885.00	$ 8,560.00	$ 99.00
Reno	0.15	$ 2,793.00	$ 3,931.00	$ 8,916.00	$ 88.00
Harvey	0.59	$ 11,516.00	$ 15,923.00	$ 33,154.00	$ 370.00
Shawnee	0.28	$ 7,814.00	$ 11,089.00	$ 19,782.00	$ 160.00
Douglas	2.17	$ 63,926.00	$ 95,691.00	$ 172,644.00	$ 928.00
Jackson	4.01	$ 115,354.00	$ 165,428.00	$ 298,014.00	$ 1,101.00
Macon	0.35	$ 6,724.00	$ 8,863.00	$ 19,337.00	$ 87.00
Lee	0.37	$ 7,004.00	$ 9,640.00	$ 20,563.00	$ 170.00
Knox	0.26	$ 6,325.00	$ 8,588.00	$ 16,545.00	$ 66.00
Bureau	0.03	$ 580.00	$ 777.00	$ 1,567.00	$ 8.00
LaSalle	0.06	$ 1,311.00	$ 1,870.00	$ 3,456.00	$ 21.00
DuPage	0.11	$ 3,973.00	$ 5,552.00	$ 9,002.00	$ 21.00
Cook	2.89	$ 114,773.00	$ 159,031.00	$ 253,148.00	$ 904.00

County	Job	Labor income	Value added	Output	County tax
			Replace SWC with a BBS from ABQ to LAJ		
Los Angeles	9.78	$ 417,822.00	$ 631,866.00	$ 1,009,796.00	$ 7,244.00
Orange	1.25	$ 50,752.00	$ 78,005.00	$ 124,280.00	$ 480.00
Riverside	0.7	$ 23,238.00	$ 34,798.00	$ 59,697.00	$ 453.00
San Bernardino	1.27	$ 39,118.00	$ 57,844.00	$ 101,961.00	$ 661.00
Mohave	0.35	$ 9,434.00	$ 12,631.00	$ 22,901.00	$ 188.00
Coconino	1.6	$ 49,840.00	$ 65,302.00	$ 111,002.00	$ 673.00
Navajo	0.1	$ 2,535.00	$ 3,786.00	$ 7,173.00	$ 44.00
McKinley	0.24	$ 5,033.00	$ 7,095.00	$ 14,304.00	$ 145.00
Bernalillo	3.12	$ 88,667.00	$ 131,213.00	$ 233,056.00	$ 1,337.00
Santa Fe	1.41	$ 45,450.00	$ 64,182.00	$ 109,789.00	$ 991.00
San Miguel	0.6	$ 9,885.00	$ 14,127.00	$ 31,079.00	$ 229.00
Colfax	2.21	$ 49,039.00	$ 69,480.00	$ 138,392.00	$ 1,095.00
Las Animas	0.96	$ 12,780.00	$ 22,034.00	$ 56,545.00	$ 634.00
Otero	0.29	$ 3,858.00	$ 6,627.00	$ 17,269.00	$ 210.00
Prowers	0.11	$ 1,485.00	$ 2,656.00	$ 6,936.00	$ 123.00
Finney	0.2	$ 4,368.00	$ 5,922.00	$ 11,930.00	$ 124.00
Ford	0.01	$ 558.00	$ 953.00	$ 7,411.00	$ 14.00
Reno	0.15	$ 2,673.00	$ 3,762.00	$ 8,535.00	$ 85.00
Harvey	0.56	$ 10,887.00	$ 15,054.00	$ 31,343.00	$ 350.00
Shawnee	0.24	$ 6,642.00	$ 9,426.00	$ 16,816.00	$ 136.00
Douglas	2.11	$ 62,599.00	$ 93,797.00	$ 169,128.00	$ 892.00
Jackson	3.68	$ 105,864.00	$ 151,819.00	$ 273,497.00	$ 1,010.00
Macon	0.3	$ 5,829.00	$ 7,683.00	$ 16,764.00	$ 75.00
Lee	0.36	$ 6,825.00	$ 9,394.00	$ 20,039.00	$ 166.00
Knox	0.25	$ 6,226.00	$ 8,453.00	$ 16,286.00	$ 65.00
Bureau	0.03	$ 536.00	$ 719.00	$ 1,450.00	$ 7.00
LaSalle	0.06	$ 1,263.00	$ 1,801.00	$ 3,328.00	$ 19.00
DuPage	0.11	$ 3,920.00	$ 5,479.00	$ 8,883.00	$ 20.00
Cook	2.82	$ 111,969.00	$ 155,146.00	$ 246,964.00	$ 882.00

Table 15. Lost economic impacts from visitor spending, in percentage, county level

County	Replace SWC with a BBS from ABQ to DDG					Replace SWC with a BBS from ABQ to LAJ				
	Job	Labor income	Value added	Output	County tax	Job	Labor income	Value added	Output	County tax
Los Angeles	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%
Orange	24%	24%	24%	24%	24%	25%	25%	25%	25%	25%
Riverside	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
San Bernardino	15%	15%	15%	15%	15%	16%	16%	16%	16%	16%
Mohave	51%	51%	51%	51%	51%	49%	49%	49%	49%	49%
Coconino	42%	42%	42%	42%	42%	41%	41%	41%	41%	41%
Navajo	28%	27%	27%	27%	27%	28%	27%	27%	27%	27%
McKinley	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Bernalillo	21%	20%	20%	21%	20%	25%	25%	25%	25%	25%
Santa Fe	69%	69%	69%	69%	69%	87%	86%	86%	86%	86%
San Miguel	61%	62%	62%	62%	62%	72%	72%	72%	72%	72%
Colfax	69%	69%	69%	69%	69%	85%	85%	85%	85%	85%
Las Animas	68%	68%	68%	68%	68%	83%	83%	83%	83%	83%
Otero	68%	68%	68%	68%	68%	20%	20%	20%	20%	20%
Prowers	67%	67%	67%	67%	67%	31%	31%	31%	31%	32%
Finney	70%	70%	70%	70%	69%	29%	29%	29%	29%	29%
Ford	26%	26%	26%	26%	26%	2%	5%	6%	23%	4%
Reno	29%	30%	30%	30%	30%	29%	29%	29%	29%	29%
Harvey	36%	35%	35%	35%	35%	34%	34%	34%	34%	34%
Shawnee	28%	28%	28%	28%	28%	24%	24%	24%	24%	24%
Douglas	75%	78%	79%	78%	65%	73%	76%	77%	77%	63%
Jackson	23%	23%	23%	23%	23%	21%	21%	21%	21%	21%
Macon	13%	13%	13%	13%	13%	11%	11%	11%	11%	11%
Lee	30%	30%	30%	30%	30%	29%	29%	29%	29%	29%
Knox	21%	20%	20%	20%	21%	20%	20%	20%	20%	21%
Bureau	7%	7%	7%	7%	7%	7%	6%	6%	6%	7%
LaSalle	14%	13%	13%	13%	13%	14%	12%	12%	12%	12%
DuPage	20%	20%	20%	20%	20%	20%	20%	20%	20%	19%
Cook	39%	39%	39%	39%	39%	38%	38%	38%	38%	38%

Table 16. Lost economic impacts from visitor spending, state level

State	Category	Current SWC				
		Job	Labor income	Value added	Output	State/local tax
CA	Visitor spending	41.23	$ 1,799,581.00	$ 2,747,358.00	$ 4,481,549.00	$ 275,891.00
AZ	Visitor spending	5.87	$ 193,437.00	$ 266,978.00	$ 464,019.00	$ 27,366.00
NM	Visitor spending	19.64	$ 553,129.00	$ 804,190.00	$ 1,455,618.00	$ 85,720.00
CO	Visitor spending	2.48	$ 85,756.00	$ 137,236.00	$ 242,263.00	$ 16,171.00
KS	Visitor spending	5.19	$ 149,140.00	$ 214,260.00	$ 391,745.00	$ 23,007.00
MO	Visitor spending	20.74	$ 597,085.00	$ 850,949.00	$ 1,564,307.00	$ 88,604.00
LA	Visitor spending	1.17	$ 31,818.00	$ 46,677.00	$ 86,353.00	$ 5,533.00
IL	Visitor spending	10.81	$ 389,950.00	$ 558,782.00	$ 937,955.00	$ 60,830.00

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
CA	Visitor spending	27.6	$ 1,204,445.00	$ 1,836,592.00	$ 2,995,774.00	$ 184,502.00
AZ	Visitor spending	3.39	$ 111,704.00	$ 154,328.00	$ 268,248.00	$ 15,836.00
NM	Visitor spending	13.5	$ 380,167.00	$ 551,839.00	$ 998,519.00	$ 58,627.00
CO	Visitor spending	0.79	$ 27,472.00	$ 43,964.00	$ 77,609.00	$ 5,180.00
KS	Visitor spending	3.4	$ 97,769.00	$ 140,319.00	$ 256,463.00	$ 15,088.00
MO	Visitor spending	16.29	$ 468,929.00	$ 668,166.00	$ 1,225,819.00	$ 69,595.00
LA	Visitor spending	0.83	$ 22,371.00	$ 32,818.00	$ 60,713.00	$ 3,891.00
IL	Visitor spending	7.15	$ 257,828.00	$ 369,457.00	$ 620,160.00	$ 40,220.00

Table 17. Lost economic impacts from visitor spending, state level (II)

State	Category	Replace SWC with a BBS from ABQ to LAJ				
		Job	Labor income	Value added	Output	State/local tax
CA	Visitor spending	27.65	$ 1,206,243.00	$ 1,839,404.00	$ 3,000,370.00	$ 184,781.00
AZ	Visitor spending	3.46	$ 114,099.00	$ 157,614.00	$ 273,958.00	$ 16,171.00
NM	Visitor spending	12.16	$ 342,300.00	$ 496,539.00	$ 898,330.00	$ 52,694.00
CO	Visitor spending	1.33	$ 46,011.00	$ 73,632.00	$ 129,982.00	$ 8,675.00
KS	Visitor spending	3.81	$ 109,543.00	$ 157,275.00	$ 287,503.00	$ 16,899.00
MO	Visitor spending	16.68	$ 480,314.00	$ 684,531.00	$ 1,258,378.00	$ 71,275.00
LA	Visitor spending	0.83	$ 22,612.00	$ 33,171.00	$ 61,367.00	$ 3,933.00
IL	Visitor spending	7.24	$ 260,980.00	$ 373,967.00	$ 627,657.00	$ 40,712.00

Table 18. Lost economic impacts from visitor spending, in percentage, state level

State	Replace SWC with a BBS from ABQ to DDG					Replace SWC with a BBS from ABQ to LAJ				
	Job	Labor income	Value added	Output	State/local tax	Job	Labor income	Value added	Output	State/local tax
CA	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
AZ	42%	42%	42%	42%	42%	41%	41%	41%	41%	41%
NM	31%	31%	31%	31%	32%	38%	38%	38%	38%	39%
CO	68%	68%	68%	68%	68%	46%	46%	46%	46%	46%
KS	34%	34%	35%	35%	34%	27%	27%	27%	27%	27%
MO	21%	21%	21%	22%	21%	20%	20%	20%	20%	20%
LA	29%	30%	30%	30%	30%	29%	29%	29%	29%	29%
IL	34%	34%	34%	34%	34%	33%	33%	33%	33%	33%

Lost benefits from saved travel cost for resident passengers

Passengers can save a significant amount of money by utilizing cheaper transportation modes, taking a train if available as opposed to owning and driving a private car or taking a flight. Travel costs for different transportation modes are estimated based on information from average fares, ridership, and passenger miles from the "National Transportation Statistics 2018" [9]. The 2017 cost per mile by Amtrak train, air, car, and intercity bus are estimated to be $0.3226/passenger-mile, $0.4059/passenger-mile, $0.3449/passenger-mile, and $1.72/passenger-mile, respectively (See detailed data source and calculation in Appendix C). The saved travel cost can be spent in the local economy on housing, shopping, education, etc. By replacing the current SWC with BBS, more passengers will be pushed to other, more expensive transportation modes. This leads to a loss in family savings versus utilizing the less expensive railway service. This type of loss at county and state levels is shown in Table 19, Table 21, Table 22, and Table 24.

Table 19. Lost economic impacts from saved travel cost for families, county level

County	Jobs	Labor income	Value added	Output	County tax
			Replace SWC with a BBS from ABQ to DDG		
Los Angeles	21.05	$ 1,145,896.00	$ 2,042,548.00	$ 3,256,206.00	$ 26,987.00
Orange	3.33	$ 176,907.00	$ 321,405.00	$ 504,456.00	$ 2,205.00
Riverside	1.34	$ 51,435.00	$ 99,251.00	$ 170,526.00	$ 1,524.00
San Bernardino	2.08	$ 84,093.00	$ 153,466.00	$ 255,925.00	$ 1,898.00
Mohave	2.56	$ 90,295.00	$ 162,930.00	$ 297,961.00	$ 2,233.00
Coconino	9.38	$ 358,893.00	$ 652,224.00	$ 1,137,111.00	$ 6,683.00
Navajo	0.34	$ 11,123.00	$ 21,391.00	$ 42,514.00	$ 206.00
McKinley	0.33	$ 9,826.00	$ 19,992.00	$ 37,014.00	$ 390.00
Bernalillo	14.82	$ 194,811.00	$ 379,268.00	$ 660,581.00	$ 3,801.00
Santa Fe	1.65	$ 65,726.00	$ 125,780.00	$ 214,640.00	$ 1,948.00
San Miguel	0.31	$ 7,571.00	$ 16,248.00	$ 31,545.00	$ 201.00
Colfax	1.8	$ 48,303.00	$ 108,891.00	$ 198,437.00	$ 1,599.00
Las Animas	0.41	$ 12,026.00	$ 23,075.00	$ 43,663.00	$ 350.00
Otero	0.52	$ 14,904.00	$ 26,853.00	$ 54,413.00	$ 401.00
Prowers	0.11	$ 2,935.00	$ 6,046.00	$ 12,344.00	$ 161.00
Finney	0.73	$ 27,723.00	$ 54,170.00	$ 92,333.00	$ 1,036.00
Ford	0.28	$ 8,781.00	$ 18,251.00	$ 33,116.00	$ 414.00
Reno	0.29	$ 9,925.00	$ 18,413.00	$ 33,659.00	$ 363.00
Harvey	1.23	$ 33,354.00	$ 67,852.00	$ 129,662.00	$ 1,580.00
Shawnee	0.73	$ 30,182.00	$ 58,196.00	$ 97,585.00	$ 798.00
Douglas	0.38	$ 11,454.00	$ 25,072.00	$ 44,012.00	$ 500.00
Jackson	6.4	$ 299,785.00	$ 552,850.00	$ 917,671.00	$ 2,727.00
Macon	0.4	$ 9,196.00	$ 19,342.00	$ 40,606.00	$ 162.00
Lee	0.47	$ 14,605.00	$ 29,202.00	$ 52,830.00	$ 366.00
Knox	1.94	$ 67,117.00	$ 117,640.00	$ 216,900.00	$ 649.00
Bureau	0.14	$ 4,415.00	$ 8,601.00	$ 15,905.00	$ 60.00
LaSalle	0.37	$ 12,621.00	$ 25,900.00	$ 46,019.00	$ 237.00
DuPage	1.25	$ 64,789.00	$ 116,378.00	$ 187,809.00	$ 356.00
Cook	38.61	$ 2,122,936.00	$ 3,751,604.00	$ 5,869,427.00	$ 18,814.00

Table 20. Lost economic impacts from saved travel cost for families, county level

County	Jobs	Labor income	Value added	Output	County tax
			Replace SWC with a BBS from ABQ to LAJ		
Los Angeles	20.23	$ 1,101,382.00	$ 1,963,202.00	$ 3,129,715.00	$ 25,937.00
Orange	3.24	$ 172,115.00	$ 312,700.00	$ 490,793.00	$ 2,146.00
Riverside	1.31	$ 50,061.00	$ 96,601.00	$ 165,973.00	$ 1,484.00
San Bernardino	2.02	$ 81,923.00	$ 149,506.00	$ 249,321.00	$ 1,849.00
Mohave	2.43	$ 85,655.00	$ 154,557.00	$ 282,649.00	$ 2,119.00
Coconino	13.24	$ 506,520.00	$ 920,509.00	$ 1,604,850.00	$ 9,432.00
Navajo	0.33	$ 10,703.00	$ 20,583.00	$ 40,908.00	$ 199.00
McKinley	0.31	$ 9,354.00	$ 19,034.00	$ 35,239.00	$ 371.00
Bernalillo	6.05	$ 244,700.00	$ 476,396.00	$ 829,750.00	$ 4,774.00
Santa Fe	2.07	$ 82,612.00	$ 158,093.00	$ 269,781.00	$ 2,448.00
San Miguel	0.39	$ 9,441.00	$ 20,261.00	$ 39,336.00	$ 251.00
Colfax	2.26	$ 60,449.00	$ 136,273.00	$ 248,338.00	$ 2,003.00
Las Animas	0.51	$ 15,051.00	$ 28,878.00	$ 54,645.00	$ 438.00
Otero	0.17	$ 4,726.00	$ 8,515.00	$ 17,254.00	$ 127.00
Prowers	0.05	$ 1,406.00	$ 2,895.00	$ 5,911.00	$ 77.00
Finney	0.42	$ 16,081.00	$ 31,422.00	$ 53,560.00	$ 600.00
Ford	0.35	$ 11,166.00	$ 23,207.00	$ 42,109.00	$ 526.00
Reno	0.28	$ 9,632.00	$ 17,870.00	$ 32,666.00	$ 353.00
Harvey	1.18	$ 32,166.00	$ 65,434.00	$ 125,042.00	$ 1,523.00
Shawnee	0.69	$ 28,506.00	$ 54,963.00	$ 92,165.00	$ 753.00
Douglas	0.34	$ 10,180.00	$ 22,284.00	$ 39,118.00	$ 444.00
Jackson	6.13	$ 286,823.00	$ 528,947.00	$ 877,995.00	$ 2,609.00
Macon	0.37	$ 8,467.00	$ 17,808.00	$ 37,385.00	$ 150.00
Lee	0.46	$ 14,225.00	$ 28,442.00	$ 51,455.00	$ 356.00
Knox	1.92	$ 66,395.00	$ 116,374.00	$ 214,567.00	$ 642.00
Bureau	0.13	$ 4,234.00	$ 8,248.00	$ 15,252.00	$ 58.00
LaSalle	0.37	$ 12,494.00	$ 25,640.00	$ 45,557.00	$ 235.00
DuPage	1.24	$ 64,016.00	$ 114,990.00	$ 185,570.00	$ 351.00
Cook	37.32	$ 2,052,265.00	$ 3,626,717.00	$ 5,674,039.00	$ 18,188.00

Table 21. Lost economic impacts from saved travel cost for families, in percentage, county level

County	Replace SWC with a BBS from ABQ to DDG					Replace SWC with a BBS from ABQ to LAJ				
	Jobs	Labor income	Value added	Output	County tax	Jobs	Labor income	Value added	Output	County tax
Los Angeles	72%	72%	72%	72%	72%	69%	69%	69%	69%	69%
Orange	53%	53%	53%	53%	53%	52%	52%	52%	52%	52%
Riverside	57%	57%	57%	57%	57%	56%	56%	56%	56%	56%
San Bernardino	50%	50%	50%	50%	50%	49%	49%	49%	49%	49%
Mohave	83%	83%	83%	83%	83%	79%	79%	79%	79%	79%
Coconino	68%	68%	68%	68%	68%	97%	97%	97%	97%	97%
Navajo	53%	54%	54%	54%	54%	52%	52%	52%	52%	52%
McKinley	26%	25%	25%	25%	25%	24%	24%	24%	24%	24%
Bernalillo	94%	30%	30%	30%	30%	38%	38%	38%	38%	38%
Santa Fe	72%	72%	72%	72%	72%	90%	90%	90%	90%	90%
San Miguel	70%	70%	70%	70%	70%	89%	88%	88%	88%	88%
Colfax	71%	71%	71%	71%	71%	89%	89%	89%	89%	89%
Las Animas	72%	71%	71%	71%	71%	89%	89%	89%	89%	89%
Otero	70%	71%	71%	71%	71%	23%	22%	22%	22%	22%
Prowers	69%	71%	71%	71%	70%	31%	34%	34%	34%	34%
Finney	71%	71%	71%	71%	71%	41%	41%	41%	41%	41%
Ford	37%	36%	36%	36%	36%	46%	46%	46%	46%	46%
Reno	41%	41%	41%	41%	41%	39%	40%	40%	40%	40%
Harvey	51%	51%	51%	51%	51%	49%	49%	49%	49%	49%
Shawnee	46%	46%	46%	46%	46%	43%	43%	43%	43%	43%
Douglas	32%	32%	32%	32%	32%	28%	28%	28%	28%	28%
Jackson	41%	41%	41%	41%	41%	39%	39%	39%	39%	39%
Macon	35%	35%	35%	35%	35%	33%	32%	32%	32%	32%
Lee	66%	66%	66%	66%	66%	65%	64%	64%	64%	64%
Knox	55%	55%	55%	55%	55%	54%	54%	54%	54%	54%
Bureau	38%	37%	37%	37%	38%	35%	36%	36%	36%	37%
LaSalle	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%
DuPage	50%	50%	50%	50%	50%	49%	49%	49%	49%	49%
Cook	74%	74%	74%	74%	74%	71%	71%	71%	71%	71%

Table 22. Lost economic impacts from saved travel cost for families, state level

State	Category	Current SWC				
		Job	Labor income	Value added	Output	State/local tax
CA	Family saving	50.25	$ 2,825,545.00	$ 5,083,592.00	$ 8,320,230.00	$ 537,875.00
AZ	Family saving	25.56	$ 1,149,443.00	$ 2,064,254.00	$ 3,626,982.00	$ 195,213.00
NM	Family saving	22.51	$ 844,521.00	$ 1,641,239.00	$ 2,946,035.00	$ 170,112.00
CO	Family saving	2.42	$ 113,234.00	$ 200,822.00	$ 350,822.00	$ 18,405.00
KS	Family saving	9.95	$ 412,467.00	$ 781,451.00	$ 1,375,883.00	$ 78,768.00
MO	Family saving	18.11	$ 778,081.00	$ 1,416,577.00	$ 2,480,612.00	$ 120,897.00
LA	Family saving	1.1	$ 43,459.00	$ 81,868.00	$ 144,605.00	$ 8,100.00
IL	Family saving	73.07	$ 3,725,088.00	$ 6,714,122.00	$ 11,127,305.00	$ 648,749.00

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
CA	Family saving	16.96	$ 953,615.00	$ 1,715,700.00	$ 2,808,058.00	$ 181,531.00
AZ	Family saving	7.53	$ 338,430.00	$ 607,777.00	$ 1,067,891.00	$ 57,477.00
NM	Family saving	13.2	$ 495,245.00	$ 962,458.00	$ 1,727,618.00	$ 99,758.00
CO	Family saving	0.7	$ 32,837.00	$ 58,238.00	$ 101,737.00	$ 5,337.00
KS	Family saving	5.21	$ 216,117.00	$ 409,451.00	$ 720,911.00	$ 41,272.00
MO	Family saving	10.85	$ 466,106.00	$ 848,595.00	$ 1,486,000.00	$ 72,423.00
LA	Family saving	0.38	$ 14,840.00	$ 27,954.00	$ 49,377.00	$ 2,766.00
IL	Family saving	21.4	$ 1,091,148.00	$ 1,966,692.00	$ 3,259,396.00	$ 190,030.00

Table 23. Lost economic impacts from saved travel cost for families, state level

State	Category		Replace SWC with a BBS from ABQ to LAJ							
		Job	Labor income		Value added		Output		State/local tax	
CA	Family saving	18.16	$	1,021,069.00	$	1,837,060.00	$	3,006,686.00	$	194,372.00
AZ	Family saving	8.43	$	379,203.00	$	681,000.00	$	1,196,546.00	$	64,401.00
NM	Family saving	10.96	$	411,239.00	$	799,200.00	$	1,434,570.00	$	82,836.00
CO	Family saving	1.16	$	54,185.00	$	96,098.00	$	167,877.00	$	8,807.00
KS	Family saving	5.71	$	236,746.00	$	448,534.00	$	789,725.00	$	45,212.00
MO	Family saving	11.19	$	480,525.00	$	874,846.00	$	1,531,969.00	$	74,663.00
LA	Family saving	0.4	$	15,585.00	$	29,358.00	$	51,857.00	$	2,904.00
IL	Family saving	23.02	$	1,173,636.00	$	2,115,369.00	$	3,505,798.00	$	204,398.00

Table 24. Lost economic impacts from saved travel cost for families, in percentage, state level

State	Replace SWC with a BBS from ABQ to DDG					Replace SWC with a BBS from ABQ to LAJ				
	Job	Labor income	Value added	Output	State/local tax	Job	Labor income	Value added	Output	State/local tax
CA	66%	66%	66%	66%	66%	64%	64%	64%	64%	64%
AZ	71%	71%	71%	71%	71%	67%	67%	67%	67%	67%
NM	41%	41%	41%	41%	41%	51%	51%	51%	51%	51%
CO	71%	71%	71%	71%	71%	52%	52%	52%	52%	52%
KS	48%	48%	48%	48%	48%	43%	43%	43%	43%	43%
MO	40%	40%	40%	40%	40%	38%	38%	38%	38%	38%
LA	65%	66%	66%	66%	66%	64%	64%	64%	64%	64%
IL	71%	71%	71%	71%	71%	68%	68%	68%	68%	68%

Increased cost for pollution control

Modifying current railway service with a bus bridge service means that ridership will decrease by a certain percentage in each county and state. A portion of the lost trips are forgone trips resulting from the loss of induced ridership. The remainder will be made by other major transportation modes, all of which are dirtier than passenger trains. These added trips on the transportation network in each county and state will increase CO_2 emissions, which in turn increases the cost of pollution control. According to "Transportation Cost and Benefit Analysis II – Air Pollution Cost" published by Victoria Transport Policy Institute [10], control cost in 2007 for CO2 was estimated to be $35 per gram. This value is estimated to be $42.7 in 2018 [11]. According to "Comparison of Energy Use & CO_2 Emissions From Different Transportation Modes" [12], CO_2 generated by train, air, car, and bus was estimated to be 177 gram per passenger miles traveled, 243 gram per passenger miles traveled, 371 gram per passenger miles traveled, and 299 gram per passenger miles traveled, respectively. Table 25 and Table 26 summarize the increased pollution control cost in each county and state.

Table 25. Increased cost for pollution control, county level

County	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% of increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% of increased cost (Scenario III)
Los Angeles	$5,261.84	$2,379.00	45%	$2,336.41	44%
Orange	$17,619.17	$7,620.88	43%	$7,495.84	43%
Riverside	$64,199.65	$26,758.22	42%	$26,367.70	41%
San Bernardino	$30,570.39	$13,034.75	43%	$12,862.28	42%
Mohave	$8,623.87	$3,953.29	46%	$3,899.37	45%
Coconino	$14,547.79	$7,859.01	54%	$7,721.70	53%
Navajo	$9,800.05	$6,025.60	61%	$5,908.47	60%
McKinley	$13,848.26	$15,401.28	111%	$15,361.27	111%
Bernalillo	$18,808.85	$20,266.64	108%	$20,139.53	107%
Santa Fe	$15,105.50	$15,587.46	103%	$15,417.89	102%
San Miguel	$12,394.93	$12,777.60	103%	$12,640.69	102%
Colfax	$11,545.80	$11,877.97	103%	$11,744.92	102%
Las Animas	$27,822.54	$28,580.78	103%	$28,240.33	102%
Otero	$11,910.88	$12,232.03	103%	$12,120.32	102%
Prowers	$9,390.75	$9,643.34	103%	$8,104.59	86%
Finney	$9,588.77	$9,842.83	103%	$8,081.00	84%
Ford	$12,993.43	$13,346.92	103%	$10,604.97	82%
Reno	$44,563.00	$37,533.42	84%	$35,536.42	80%
Harvey	$59,957.36	$48,081.60	80%	$45,537.07	76%
Shawnee	$28,090.81	$21,179.59	75%	$20,090.01	72%
Douglas	$10,380.74	$7,483.69	72%	$7,126.05	69%
Jackson	$26,791.74	$15,142.17	57%	$14,531.56	54%
Macon	$25,639.57	$11,274.09	44%	$10,904.73	43%
Lee	$29,957.89	$12,739.77	43%	$12,340.02	41%
Knox	$16,322.82	$6,679.63	41%	$6,469.23	40%
Bureau	$196,589.71	$76,400.67	39%	$73,991.12	38%
LaSalle	$47,863.40	$18,061.74	38%	$14,340.64	37%
DuPage	$26,696.51	$10,141.28	38%	$8,051.15	37%
Cook	$7,100.04	$2,813.56	40%	$2,233.51	38%

Table 26. Increased cost for pollution control, state level

State	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% of increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% of increased cost (Scenario III)
CA	$107,543.05	$42,659.68	40%	$42,129.15	39%
AZ	$218,133.44	$116,101.86	53%	$114,188.23	52%
NM	$241,647.28	$174,815.56	72%	$175,389.64	73%
CO	$84,218.10	$73,708.65	88%	$73,957.41	88%
KS	$228,693.34	$178,109.77	78%	$172,073.15	75%
MO	$120,777.91	$66,002.50	55%	$63,409.61	53%
IA	$13,443.39	$5,716.88	43%	$5,537.50	41%
IL	$81,234.68	$29,970.04	37%	$29,033.19	36%

Increased cost for highway traffic fatalities

As explained in the environmental cost section, the replacement of the service will decrease ridership, thus increasing car traffic on highways in each county and state. These added highway trips will increase the possibility of traffic fatalities. According to "Transportation Cost and Benefit Analysis II-Safety and Health Costs" conducted by Victoria Transport Policy Institute [13], FHWA reported that in 1994 the crash cost per fatality was estimated to be $2,600,000. This value is $4,446,000 in 2018, adjusting for inflation. Based on the passenger miles traveled within a county or a state, vehicle miles traveled is estimated by using 1.64 passengers per vehicle. Fatality rates by state in 2016 can be obtained from the "2016 Traffic , Safety Facts" published by NHTSA [14]. Table 27 and Table 29 summarize the increased traffic fatality cost in each county.

Table 27. Increased traffic fatality cost, county level

County	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
Los Angeles	$16,886.59	$7,696.04	46%	$7,559.47	45%
Orange	$56,572.51	$24,666.69	44%	$24,266.51	43%
Riverside	$206,153.47	$86,651.57	42%	$85,404.90	41%
San Bernardino	$98,071.41	$42,213.97	43%	$41,664.56	42%
Mohave	$37,646.19	$22,812.93	61%	$22,642.94	60%
Coconino	$63,408.78	$41,980.18	66%	$41,554.89	66%
Navajo	$42,716.06	$30,464.86	71%	$30,104.39	70%
McKinley	$59,533.56	$42,692.36	72%	$42,175.74	71%
Bernalillo	$80,650.92	$65,059.49	81%	$65,052.07	81%
Santa Fe	$64,551.93	$58,684.89	91%	$59,351.83	92%
San Miguel	$52,951.36	$48,179.91	91%	$48,717.48	92%

Table 28. Increased traffic fatality cost, county level (II)

County	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
Colfax	$49,334.33	$44,878.08	91%	$45,509.72	92%
Las Animas	$96,647.80	$85,727.09	89%	$87,718.40	91%
Otero	$41,407.50	$36,628.32	88%	$36,949.18	89%
Prowers	$32,666.77	$28,833.67	88%	$28,527.17	87%
Finney	$38,178.51	$34,233.24	90%	$33,362.16	87%
Ford	$51,675.26	$45,927.00	89%	$44,127.79	85%
Reno	$177,113.53	$154,889.94	87%	$148,744.19	84%
Harvey	$238,215.58	$200,958.18	84%	$193,118.35	81%
Shawnee	$111,578.94	$90,018.73	81%	$86,652.37	78%
Douglas	$41,228.75	$32,211.82	78%	$31,099.43	75%
Jackson	$102,104.66	$64,948.24	64%	$63,053.13	62%
Macon	$98,109.47	$51,768.89	53%	$50,641.31	52%
Lee	$108,367.38	$52,805.34	49%	$51,592.04	48%
Knox	$49,244.48	$18,174.08	37%	$17,535.57	36%
Bureau	$592,717.47	$206,125.39	35%	$198,806.65	34%
LaSalle	$144,265.41	$48,486.11	34%	$46,766.83	32%
DuPage	$80,447.42	$27,259.71	34%	$26,289.93	33%
Cook	$21,397.55	$7,618.26	36%	$7,348.14	34%

Table 29. Increased traffic fatality cost, state level

State	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
CA	$345,620.26	$138,163.15	40%	$136,475.89	39%
AZ	$951,685.55	$624,912.65	66%	$618,962.15	65%
NM	$1,037,035.22	$820,233.16	79%	$822,491.04	79%
CO	$292,754.31	$259,022.65	88%	$259,848.68	89%
KS	$908,360.89	$750,239.75	83%	$731,381.30	81%
MO	$460,678.37	$285,584.88	62%	$277,558.71	60%
IA	$48,629.10	$23,696.02	49%	$23,151.57	48%
IL	$244,854.46	$80,124.11	33%	$77,283.85	32%

Increased cost for highway maintenance

Similar to environmental and safety costs, more highway traffic will materialize along with the replacement of the service. These added highway trips will worsen traffic congestion and pavement quality. There will be increased costs to maintain acceptable level of service through roadway expansion

and maintenance. According to "Transportation Cost and Benefit Analysis II-Roadway Costs" conducted by Victoria Transport Policy Institute [15], AASHTO reported that the 2015 cost related to congestion and road maintenance was estimated to be $2 per vehicle mile, $2.14 in 2018, adjusting for inflation. Based on passenger miles traveled with a county or a state, the vehicle miles traveled is estimated by using 1.64 passengers per vehicle. Table 30 and Table 31 summarize the increased congestion and maintenance cost in each county.

Table 30. Increased congestion and maintenance cost, county level

County	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
Los Angeles	$759,630.61	$346,200.47	46%	$340,057.07	45%
Orange	$2,544,872.15	$1,109,612.56	44%	$1,091,610.69	43%
Riverside	$9,273,660.57	$3,897,956.48	42%	$3,841,876.05	41%
San Bernardino	$4,411,669.20	$1,898,964.11	43%	$1,874,249.31	42%
Mohave	$1,241,116.32	$573,853.21	46%	$566,206.49	46%
Coconino	$2,090,455.19	$1,126,505.51	54%	$1,107,374.00	53%
Navajo	$1,408,259.34	$857,148.48	61%	$840,932.68	60%
McKinley	$1,989,957.07	$1,232,368.11	62%	$1,209,128.41	61%
Bernalillo	$2,695,821.69	$1,994,452.55	74%	$1,994,118.97	74%
Santa Fe	$2,157,699.88	$1,893,775.73	88%	$1,923,777.36	89%
San Miguel	$1,769,941.65	$1,555,301.35	88%	$1,579,483.46	89%
Colfax	$1,649,039.60	$1,448,578.48	88%	$1,476,992.26	90%
Las Animas	$3,976,036.99	$3,484,777.02	88%	$3,574,354.52	90%
Otero	$1,703,481.83	$1,488,494.02	87%	$1,502,927.42	88%
Prowers	$1,343,892.94	$1,171,463.91	87%	$1,157,675.81	86%
Finney	$1,371,381.97	$1,193,907.35	87%	$1,154,722.16	84%
Ford	$1,856,189.06	$1,597,607.53	86%	$1,516,671.61	82%
Reno	$6,361,964.87	$5,362,253.23	84%	$5,085,791.02	80%
Harvey	$8,556,766.64	$6,880,769.81	80%	$6,528,100.91	76%
Shawnee	$4,007,944.93	$3,038,074.77	76%	$2,886,641.91	72%
Douglas	$1,480,947.63	$1,075,327.69	73%	$1,025,287.60	69%
Jackson	$3,839,546.24	$2,168,092.60	56%	$2,082,842.31	54%
Macon	$3,689,310.99	$1,604,714.41	43%	$1,553,991.34	42%
Lee	$4,310,796.42	$1,811,379.30	42%	$1,756,799.97	41%
Knox	$2,346,823.73	$949,145.07	40%	$920,421.95	39%
Bureau	$28,246,892.07	$10,856,335.27	38%	$10,527,107.11	37%
LaSalle	$6,875,196.96	$2,566,636.57	37%	$2,489,296.15	36%
DuPage	$3,833,849.29	$1,441,240.16	38%	$1,397,615.15	36%
Cook	$1,019,734.01	$399,883.02	39%	$387,732.08	38%

Table 31. Increased congestion and maintenance cost, state level

State	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
CA	$15,547,470.18	$6,215,166.34	40%	$6,139,266.51	39%
AZ	$31,375,086.58	$16,675,451.14	53%	$16,407,772.25	52%
NM	$34,663,732.77	$24,911,053.56	72%	$25,012,622.57	72%
CO	$12,043,750.49	$10,526,356.98	87%	$10,563,515.17	88%
KS	$32,628,562.70	$25,515,601.07	78%	$24,667,267.78	76%
MO	$17,323,361.35	$9,446,911.25	55%	$9,085,859.95	52%
IA	$1,934,439.66	$812,843.76	42%	$788,351.66	41%
IL	$11,668,927.98	$4,258,655.79	36%	$4,130,888.80	35%

Lost value derived from forgone trips

According to "Benefits of Passenger Rail in North Carolina" [7], "affordable mobility benefits passengers who would not have made the trips in the absence of passenger rail." When trips are induced by train service, it can be assumed that the value of the trip can be derived from the travel purpose, such as access to education and healthcare institutions, business trips, attending cultural events, etc. Thus, passengers who forgo making trips would lose the value they derive from these trips. The value of each forgone trip is conservatively estimated to be the train ticket price. Based on the number of forgone trips made by resident passengers in each county and state, the lost value made by the replacement of the service is summarized in Table 32 and Table 34.

Table 32. Lost value derived from forgone trips, county level

County	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
Los Angeles	$873,919.02	$552,670.04	63%	$538,745.54	62%
Orange	$165,636.57	$79,624.62	48%	$78,758.98	48%
Riverside	$61,383.07	$28,939.35	47%	$28,780.49	47%
San Bernardino	$136,241.89	$53,687.09	39%	$53,492.64	39%
Mohave	$70,902.72	$52,652.65	74%	$50,243.36	71%
Coconino	$347,233.98	$216,546.96	62%	$206,538.67	59%
Navajo	$20,619.66	$9,153.77	44%	$8,943.16	43%
McKinley	$70,187.45	$14,489.30	21%	$13,934.04	20%
Bernalillo	$509,496.05	$161,480.99	32%	$202,028.95	40%
Santa Fe	$99,273.51	$70,726.10	71%	$88,741.72	89%
San Miguel	$25,302.77	$17,204.37	68%	$21,107.49	83%
Colfax	$110,190.74	$77,556.29	70%	$96,466.79	88%
Las Animas	$34,218.30	$24,013.41	70%	$29,886.03	87%
Otero	$41,119.72	$28,295.28	69%	$9,135.47	22%
Prowers	$10,585.24	$7,345.88	69%	$3,599.89	34%

Table 33. Lost value derived from forgone trips, county level (II)

County	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
Finney	$34,103.63	$23,916.27	70%	$12,450.58	37%
Ford	$26,414.94	$8,627.43	33%	$9,860.43	37%
Reno	$18,234.05	$7,833.18	43%	$7,719.56	42%
Harvey	$82,323.73	$40,227.84	49%	$39,126.11	48%
Shawnee	$43,556.33	$19,778.73	45%	$18,522.47	43%
Douglas	$38,809.51	$14,185.92	37%	$12,630.13	33%
Jackson	$391,933.02	$164,653.21	42%	$159,369.22	41%
Macon	$44,359.65	$12,311.70	28%	$11,158.21	25%
Lee	$52,716.15	$30,904.34	59%	$29,832.76	57%
Knox	$99,265.77	$50,101.99	50%	$50,543.12	51%
Bureau	$14,879.38	$5,448.51	37%	$5,314.75	36%
LaSalle	$21,556.00	$10,314.50	48%	$10,505.31	49%
DuPage	$60,399.35	$28,782.24	48%	$28,960.22	48%
Cook	$1,185,303.44	$828,045.63	70%	$814,584.04	69%

Table 34. Lost value derived from forgone trips, state level

State	Saved cost by using current service (Scenario I)	Replace the current service by bus bridge ABQ-DDG (Scenario II)	% increased cost (Scenario II)	Replace the current service by bus bridge ABQ-LAJ (Scenario III)	% increased cost (Scenario III)
CA	$1,237,180.56	$714,921.09	58%	$699,777.67	57%
AZ	$438,756.36	$278,353.37	63%	$265,725.19	61%
NM	$814,450.53	$341,457.05	42%	$422,278.99	52%
CO	$85,923.26	$59,654.57	69%	$42,621.39	50%
KS	$243,442.18	$114,569.37	47%	$100,309.28	41%
MO	$436,292.68	$176,964.91	41%	$170,527.43	39%
IA	$52,716.15	$30,904.34	59%	$29,832.76	57%
IL	$1,381,403.93	$922,692.86	67%	$909,907.45	66%

Lost rail accessibility to key civic resources

If Amtrak cuts SWC service in New Mexico, Colorado, and Kansas, key services such as higher education institutions and hospitals will not have the distinction of accessibility directly by train. In Scenario II, with bus bridge service from Albuquerque to Dodge City were implemented, 32 universities and 47 hospitals would no longer be served directly by train. Scenario III cuts 29 higher education institutions and 30 hospitals from direct train service. In order to analyze the accessibility, a 50-mile radius around the current SWC stations in the three states was used to represent the service area by SWC, the same assumption used in *Rail Passengers* Amtrak service reports [16] as the largest catchment area from a single station. In Figure 6 and Figure 7, green dots represent locations of higher education institutions or hospitals, red dots representing institutions standing to lose direct train service if the SWC was replaced by BBS from ABQ to DDG. Similar information can be seen in Figure 8 and Figure 9.
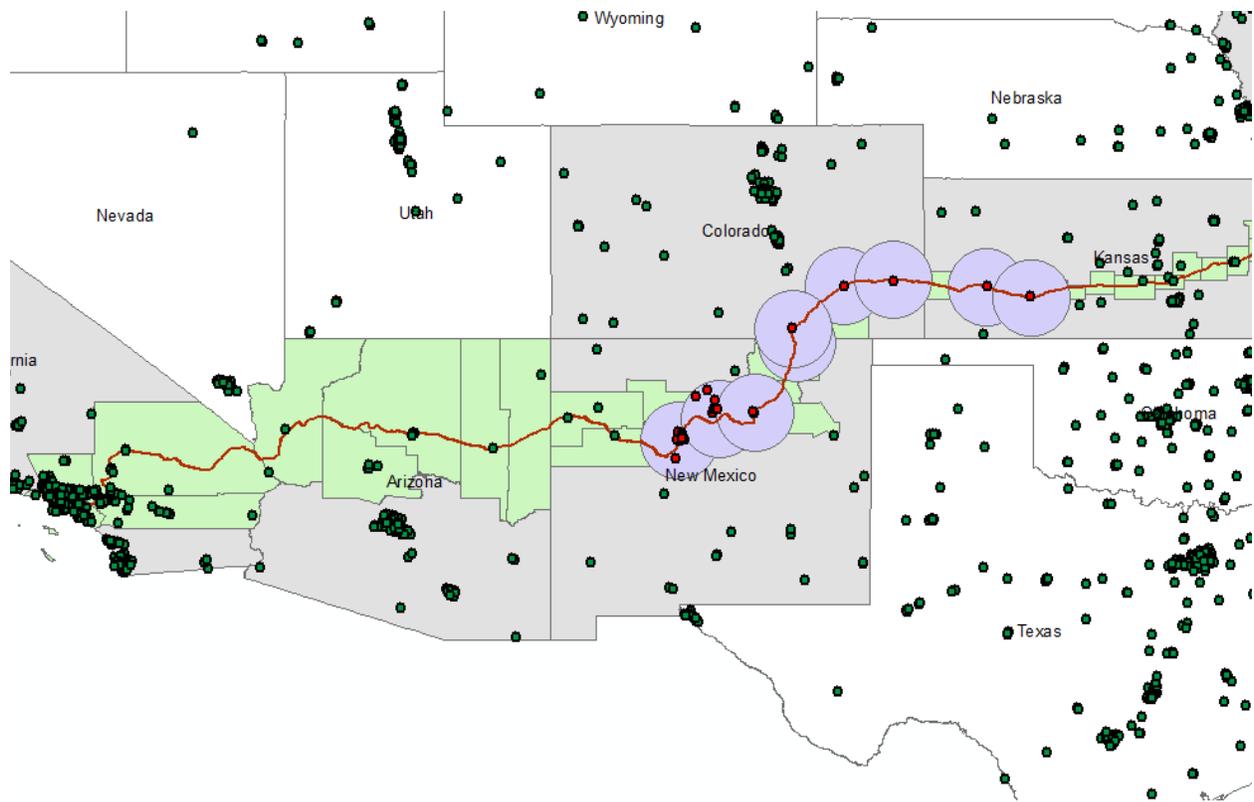
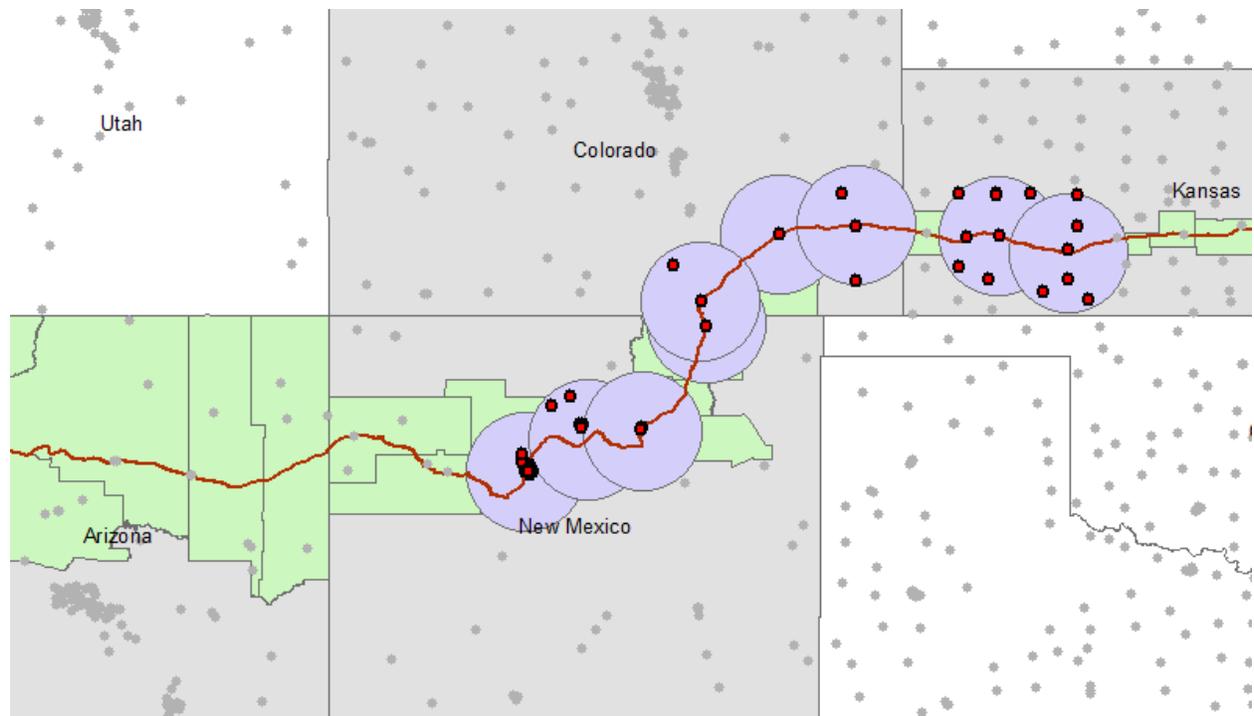*Figure 6. Higher education institutions inaccessible by rail if using BBS from ABQ-DDG*

Figure 7. Hospitals inaccessible by rail if using BBS from ABQ-DDG
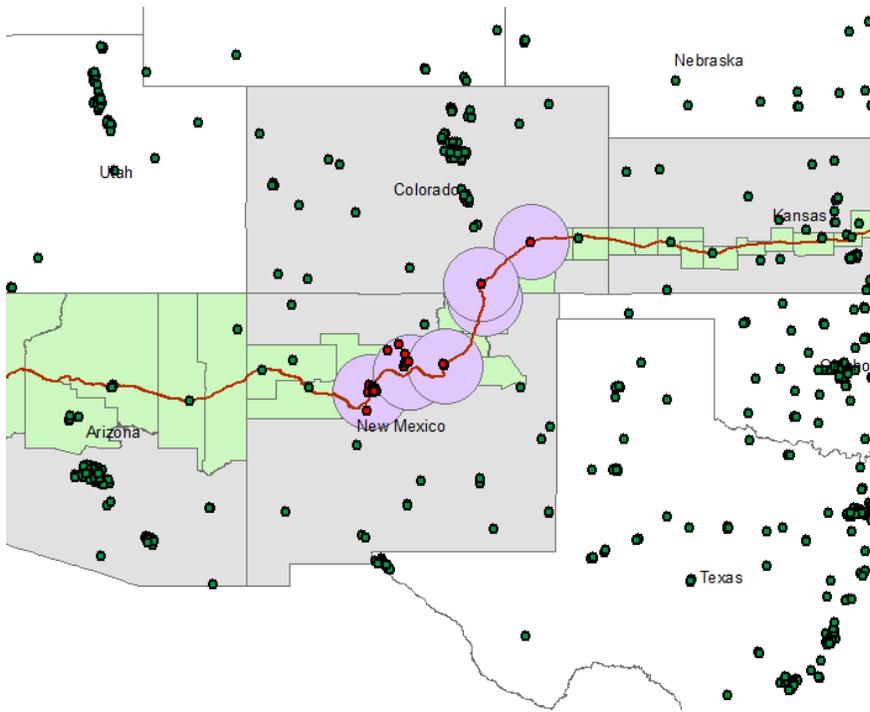
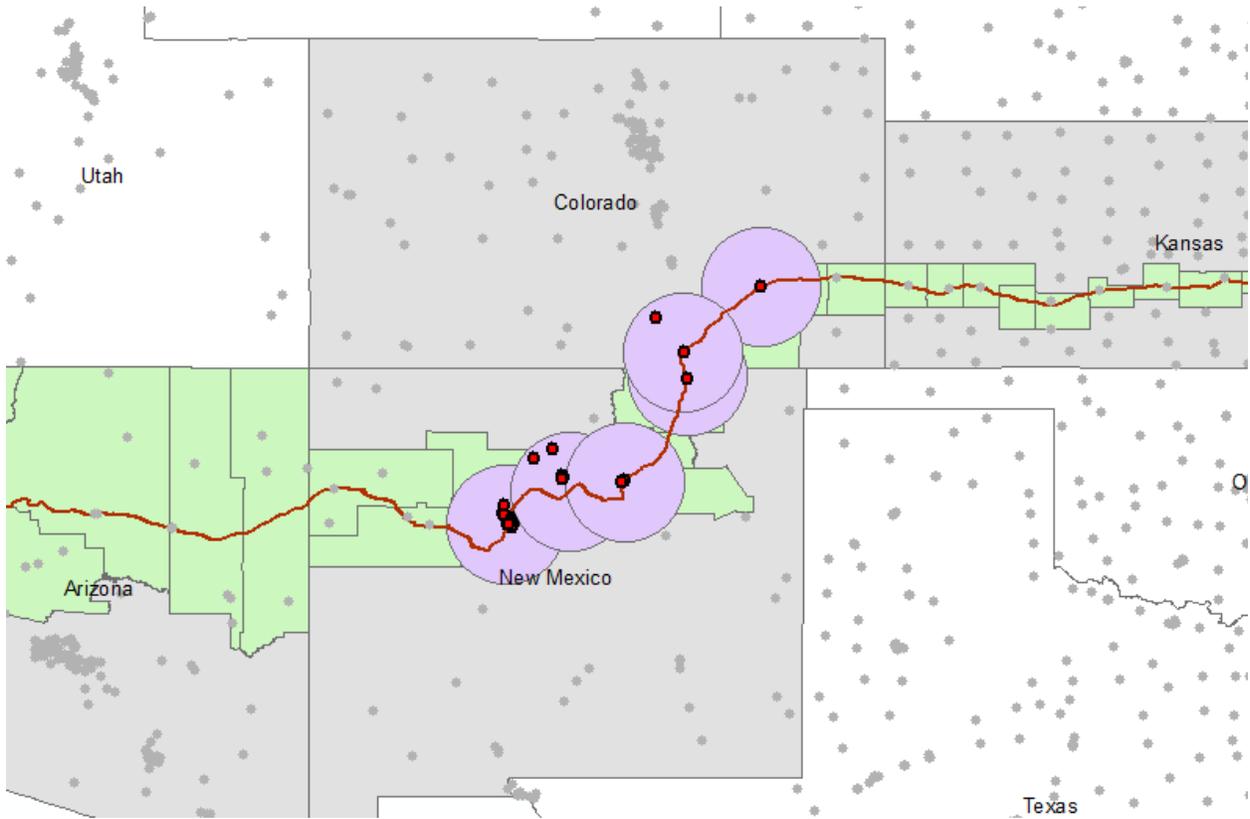*Figure 8. Higher education institutions inaccessible by rail if using BBS from ABQ-LAJ*

Figure 9. Hospitals inaccessible by rail if using BBS from ABQ-LAJ

Other negative impacts on residents in New Mexico, Colorado, and Kansas

Demographic information from New Mexico, Colorado, and Kansas indicates a larger than average percentage of people under 18 and over 65 years of age, the ends of the bell curve who are more vulnerable to the cancellation of railway service (see Table 29). The 100 million Americans who can't drive [17] usually fall into this category. Another observation is that most areas within the three states are rural areas, where transportation environments and conditions, such as highway miles per capita, are on average poorer than urban areas. As a result, a passenger railway service is often a life-line given the absence of alternative transportation services. Furthermore, the counties on the SWC route with the smallest median household income (lower than $35,000) are located in Colorado and New Mexico, on the part of the route in question, meaning the impact will be socially regressive.

Table 35. Socio-Economic characteristics of counties served by SWC

State	County	Population	Median Household Income	Urban/Rural	% of population under 18 or over 65
Arizona	Navajo	107449	$ 39,774.00	Rural	45%
	Coconino	134421	$ 49,510.00	Urban	33%
	Mohave	200186	$ 39,785.00	Urban	48%
California	San Bernardino	2078586	$ 54,100.00	Urban	38%
	Riverside	2266899	$ 56,592.00	Urban	39%
	Orange	3086331	$ 75,998.00	Urban	36%
	Los Angeles	9974203	$ 55,870.00	Urban	35%
Colorado	Prowers	12551	$ 33,969.00	Rural	43%
	Otero	18831	$ 34,142.00	Rural	44%
Illinois	Cook	5194675	$ 53,942.00	Urban	36%
	DuPage	916924	$ 76,581.00	Urban	38%
	LaSalle	113924	$ 51,705.00	Rural	41%
	Bureau	34978	$ 45,692.00	Rural	43%
	Knox	52919	$ 39,545.00	Rural	41%
Iowa	Lee	35862	$ 42,444.00	Rural	39%
Kansas	Douglas	110826	$ 45,831.00	Urban	31%
	Shawnee	177934	$ 47,464.00	Urban	42%
	Harvey	34684	$ 46,604.00	Urban	44%
	Reno	64511	$ 41,431.00	Rural	42%
	Ford	33848	$ 46,621.00	Rural	41%
	Finney	36776	$ 50,454.00	Rural	42%
Missouri	Macon	15566	$ 36,429.00	Rural	45%
	Jackson	674158	$ 46,252.00	Urban	39%
New Mexico	Colfax	13750	$ 39,216.00	Rural	45%
	San Miguel	29393	$ 32,213.00	Rural	40%
	Santa Fe	144170	$ 52,696.00	Urban	41%
	Bernalillo	662564	$ 47,481.00	Urban	38%
	McKinley	71492	$ 31,335.00	Rural	41%

Note: Darker color in the table highlights greater value.

Figure 10 highlights the level of snowfall in each state, shown in different colors. North New Mexico, Colorado, and Kansas have an average of one or more inches of snow for more than 10 days in a year. The part of Colorado served by the SWC can see as many as 75 per year. Snow on roads is widely identified as hazard to highway traffic safety. Railway service is the most reliable form of ground transportation in winter storms, being able to operate at speed in conditions that highway traffic can't safely handle [19] a fact advertised by some transit agencies [18]. Thus, the cancellation of the SWC in these areas will force some passengers to drive in unsafe conditions.

Figure 10. Level of snow fall in the US [24]
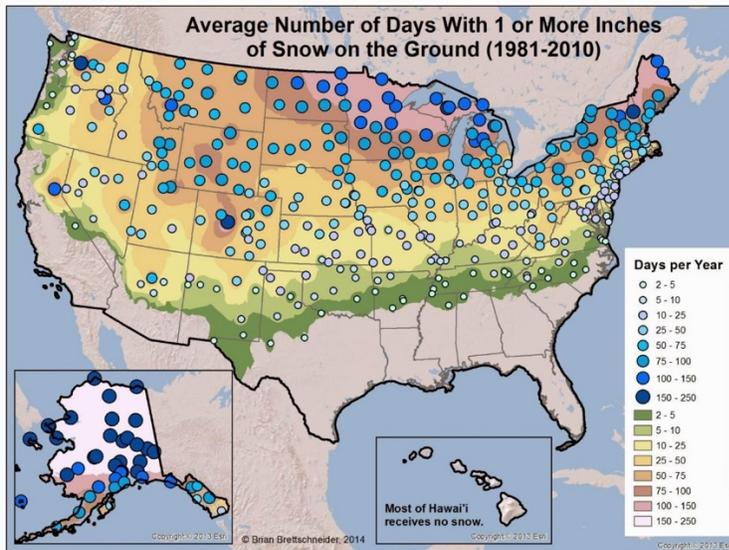
Another risk factor related to highway traffic crashes is the mountainous terrain of the region, which leads to more curves, sharp turns, and steep slopes on roads [21,22]. Previous studies about traffic safety in mountainous areas found that the odds ratio of "out of control" crashes and the crash involvement due to speeding are respectively about 4.2 times and 2.8 times higher on mountainous than non-mountainous roads [22]. **Figure 11** shows that most of New Mexico, Colorado and western area of Kansas are located in the mountains, and Raton Pass is paralleled only by rural state roads. Thus, the cancellation of the SWC in these areas will place more passengers driving in these conditions every day.

Figure 11. Terrain cartography of USA

Limitations

This study was initiated on October 1, 2018 and was directed to be completed by December 4, 2018. Thus, no time was allowed to develop an intercept survey or collect new data. Where accurate data or methods were not available, the estimation was conducted conservatively. As a result, in general, the quantitative benefits calculated in this study tend to be underestimated and understated. Whenever quantitative methods were not supported by data, qualitative discussions were provided with references.

All local purchase coefficients are assumed to be 100% for all study areas and all industries. This should be adjusted to accommodate local industry structure. However, this was not a significant problem since this study focused on replacing the current service with the bus bridge services. The estimation of the change itself was unaffected by the selection of local purchase coefficients.

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Appendix

A State level benefits estimated by IMPLAN

Railway O&M spending

State	Category	Current SWC				
		Job	Labor income	Value added	Output	State/local tax
NM	OM Spending	87.58	$ 6,743,658.00	$ 18,164,773.00	$ 28,470,624.00	$ 501,027.00
CO	OM Spending	79.38	$ 6,160,329.00	$ 10,633,622.00	$ 19,026,561.00	$ 596,391.00
KS	OM Spending	79.39	$ 6,138,975.00	$ 12,646,301.00	$ 21,937,728.00	$ 1,615,922.00

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
NM	OM Spending	27.85	$ 2,144,562.00	$ 5,776,609.00	$ 9,053,989.00	$ 232,663.00
CO	OM Spending	0	$ -	$ -	$ -	$ -
KS	OM Spending	52.81	$ 4,083,596.00	$ 8,412,216.00	$ 14,592,797.00	$ 1,074,898.00

State	Category	Replace SWC with a BBS from ABQ to LAJ				
		Job	Labor income	Value added	Output	State/local tax
NM	OM Spending	27.85	$ 2,144,562.00	$ 5,776,609.00	$ 9,053,989.00	$ 232,663.00
CO	OM Spending	21.06	$ 1,634,343.00	$ 2,821,113.00	$ 5,047,770.00	$ 158,224.00
KS	OM Spending	79.39	$ 6,138,975.00	$ 12,646,301.00	$ 21,937,728.00	$ 1,615,922.00

Visitor spending

State	Category	Current SWC				
		Job	Labor income	Value added	Output	State/local tax
CA	Visitor spending	41.23	$ 1,799,581.00	$ 2,747,358.00	$ 4,481,549.00	$ 275,891.00
AZ	Visitor spending	5.87	$ 193,437.00	$ 266,978.00	$ 464,019.00	$ 27,366.00
NM	Visitor spending	19.64	$ 553,129.00	$ 804,190.00	$ 1,455,618.00	$ 85,720.00
CO	Visitor spending	2.48	$ 85,756.00	$ 137,236.00	$ 242,263.00	$ 16,171.00
KS	Visitor spending	5.19	$ 149,140.00	$ 214,260.00	$ 391,745.00	$ 23,007.00
MO	Visitor spending	20.74	$ 597,085.00	$ 850,949.00	$ 1,564,307.00	$ 88,604.00
LA	Visitor spending	1.17	$ 31,818.00	$ 46,677.00	$ 86,353.00	$ 5,533.00
IL	Visitor spending	10.81	$ 389,950.00	$ 558,782.00	$ 937,955.00	$ 60,830.00

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
CA	Visitor spending	27.6	$ 1,204,445.00	$ 1,836,592.00	$ 2,995,774.00	$ 184,502.00
AZ	Visitor spending	3.39	$ 111,704.00	$ 154,328.00	$ 268,248.00	$ 15,836.00
NM	Visitor spending	13.5	$ 380,167.00	$ 551,839.00	$ 998,519.00	$ 58,627.00
CO	Visitor spending	0.79	$ 27,472.00	$ 43,964.00	$ 77,609.00	$ 5,180.00
KS	Visitor spending	3.4	$ 97,769.00	$ 140,319.00	$ 256,463.00	$ 15,088.00
MO	Visitor spending	16.29	$ 468,929.00	$ 668,166.00	$ 1,225,819.00	$ 69,595.00
LA	Visitor spending	0.83	$ 22,371.00	$ 32,818.00	$ 60,713.00	$ 3,891.00
IL	Visitor spending	7.15	$ 257,828.00	$ 369,457.00	$ 620,160.00	$ 40,220.00

State	Category	Replace SWC with a BBS from ABQ to LAJ				
		Job	Labor income	Value added	Output	State/local tax
CA	Visitor spending	27.65	$ 1,206,243.00	$ 1,839,404.00	$ 3,000,370.00	$ 184,781.00
AZ	Visitor spending	3.46	$ 114,099.00	$ 157,614.00	$ 273,958.00	$ 16,171.00
NM	Visitor spending	12.16	$ 342,300.00	$ 496,539.00	$ 898,330.00	$ 52,694.00
CO	Visitor spending	1.33	$ 46,011.00	$ 73,632.00	$ 129,982.00	$ 8,675.00
KS	Visitor spending	3.81	$ 109,543.00	$ 157,275.00	$ 287,503.00	$ 16,899.00
MO	Visitor spending	16.68	$ 480,314.00	$ 684,531.00	$ 1,258,378.00	$ 71,275.00
LA	Visitor spending	0.83	$ 22,612.00	$ 33,171.00	$ 61,367.00	$ 3,933.00
IL	Visitor spending	7.24	$ 260,980.00	$ 373,967.00	$ 627,657.00	$ 40,712.00

Saved travel cost

State	Category	Current SWC				
		Job	Labor income	Value added	Output	State/local tax
CA	Family saving	50.25	$ 2,825,545.00	$ 5,083,592.00	$ 8,320,230.00	$ 537,875.00
AZ	Family saving	25.56	$ 1,149,443.00	$ 2,064,254.00	$ 3,626,982.00	$ 195,213.00
NM	Family saving	22.51	$ 844,521.00	$ 1,641,239.00	$ 2,946,035.00	$ 170,112.00
CO	Family saving	2.42	$ 113,234.00	$ 200,822.00	$ 350,822.00	$ 18,405.00
KS	Family saving	9.95	$ 412,467.00	$ 781,451.00	$ 1,375,883.00	$ 78,768.00
MO	Family saving	18.11	$ 778,081.00	$ 1,416,577.00	$ 2,480,612.00	$ 120,897.00
LA	Family saving	1.1	$ 43,459.00	$ 81,868.00	$ 144,605.00	$ 8,100.00
IL	Family saving	73.07	$ 3,725,088.00	$ 6,714,122.00	$ 11,127,305.00	$ 648,749.00

State	Category	Replace SWC with a BBS from ABQ to DDG				
		Job	Labor income	Value added	Output	State/local tax
CA	Family saving	16.96	$ 953,615.00	$ 1,715,700.00	$ 2,808,058.00	$ 181,531.00
AZ	Family saving	7.53	$ 338,430.00	$ 607,777.00	$ 1,067,891.00	$ 57,477.00
NM	Family saving	13.2	$ 495,245.00	$ 962,458.00	$ 1,727,618.00	$ 99,758.00
CO	Family saving	0.7	$ 32,837.00	$ 58,238.00	$ 101,737.00	$ 5,337.00
KS	Family saving	5.21	$ 216,117.00	$ 409,451.00	$ 720,911.00	$ 41,272.00
MO	Family saving	10.85	$ 466,106.00	$ 848,595.00	$ 1,486,000.00	$ 72,423.00
LA	Family saving	0.38	$ 14,840.00	$ 27,954.00	$ 49,377.00	$ 2,766.00
IL	Family saving	21.4	$ 1,091,148.00	$ 1,966,692.00	$ 3,259,396.00	$ 190,030.00

State	Category	Replace SWC with a BBS from ABQ to LAJ				
		Job	Labor income	Value added	Output	State/local tax
CA	Family saving	18.16	$ 1,021,069.00	$ 1,837,060.00	$ 3,006,686.00	$ 194,372.00
AZ	Family saving	8.43	$ 379,203.00	$ 681,000.00	$ 1,196,546.00	$ 64,401.00
NM	Family saving	10.96	$ 411,239.00	$ 799,200.00	$ 1,434,570.00	$ 82,836.00
CO	Family saving	1.16	$ 54,185.00	$ 96,098.00	$ 167,877.00	$ 8,807.00
KS	Family saving	5.71	$ 236,746.00	$ 448,534.00	$ 789,725.00	$ 45,212.00
MO	Family saving	11.19	$ 480,525.00	$ 874,846.00	$ 1,531,969.00	$ 74,663.00
LA	Family saving	0.4	$ 15,585.00	$ 29,358.00	$ 51,857.00	$ 2,904.00
IL	Family saving	23.02	$ 1,173,636.00	$ 2,115,369.00	$ 3,505,798.00	$ 204,398.00

B County level benefits estimated by IMPLAN

Railway O&M spending

County	Jobs	Labor income	Value added	Output	County tax
			Current SWC		
Los Angeles	11.09	$ 956,846.00	$ 1,342,121.00	$ 2,694,638.00	$ (5,097.00)
Orange	11.5	$ 982,014.00	$ 1,361,830.00	$ 2,620,292.00	$ (2,569.00)
Riverside	12.83	$ 934,940.00	$ 1,277,505.00	$ 2,699,638.00	$ (5,797.00)
San Bernardino	136.14	$ 10,754,400.00	$ 14,255,873.00	$ 29,957,779.00	$ (93,528.00)
Mohave	35.96	$ 2,887,237.00	$ 6,319,438.00	$ 10,678,013.00	$ 30,499.00
Coconino	41.3	$ 3,320,563.00	$ 7,175,994.00	$ 11,983,542.00	$ 30,016.00
Navajo	15.51	$ 1,273,684.00	$ 2,834,839.00	$ 4,830,923.00	$ 9,845.00
McKinley	23.94	$ 1,806,356.00	$ 5,241,849.00	$ 8,433,573.00	$ 28,160.00
Bernalillo	8.9	$ 756,399.00	$ 1,831,312.00	$ 2,756,977.00	$ 6,160.00
Santa Fe	11.87	$ 911,137.00	$ 2,467,719.00	$ 3,804,030.00	$ 13,502.00
San Miguel	51.69	$ 4,956,489.00	$ 5,481,409.00	$ 1,809,705.00	$ 12,479.00
Colfax	13.41	$ 1,086,493.00	$ 3,234,713.00	$ 4,896,662.00	$ 10,740.00
Las Animas	20.61	$ 1,606,235.00	$ 2,993,097.00	$ 5,439,609.00	$ 13,452.00
Otero	15.48	$ 1,198,015.00	$ 2,213,589.00	$ 4,088,800.00	$ 10,426.00
Prowers	14.21	$ 1,010,453.00	$ 1,883,197.00	$ 3,560,224.00	$ 13,573.00
Finney	8	$ 664,619.00	$ 1,445,965.00	$ 2,394,695.00	$ 32,822.00
Ford	12.04	$ 955,608.00	$ 2,124,746.00	$ 3,566,131.00	$ 50,713.00
Reno	16.01	$ 1,128,620.00	$ 2,480,191.00	$ 4,273,510.00	$ 55,441.00
Harvey	10.23	$ 793,813.00	$ 1,785,338.00	$ 3,014,786.00	$ 41,901.00
Shawnee	8.4	$ 657,888.00	$ 1,397,021.00	$ 2,317,936.00	$ 24,797.00
Douglas	9.45	$ 693,743.00	$ 1,537,504.00	$ 2,583,188.00	$ 34,287.00
Jackson	12.61	$ 997,790.00	$ 1,826,237.00	$ 3,208,637.00	$ 4,638.00
Macon	9.89	$ 663,790.00	$ 1,309,229.00	$ 2,498,247.00	$ 3,666.00
Lee	5.07	$ 429,253.00	$ 1,035,810.00	$ 1,687,700.00	$ 3,684.00
Knox	9.9	$ 793,257.00	$ 1,273,002.00	$ 2,454,168.00	$ 2,223.00
Bureau	14.98	$ 1,229,401.00	$ 1,968,898.00	$ 3,823,090.00	$ 3,328.00
LaSalle	10.03	$ 802,453.00	$ 1,305,879.00	$ 2,496,937.00	$ 4,788.00
DuPage	8.96	$ 773,257.00	$ 1,231,882.00	$ 2,212,309.00	$ 2,719.00
Cook	7.98	$ 727,341.00	$ 1,154,621.00	$ 2,035,557.00	$ 2,579.00

County	Jobs	Labor income	Value added	Output	County tax
			Replace SWC with a BBS from ABQ to DDG		
Los Angeles	11.09	$ 956,846.00	$ 1,342,121.00	$ 2,694,638.00	$ (5,097.00)
Orange	11.5	$ 982,014.00	$ 1,361,830.00	$ 2,620,292.00	$ (2,569.00)
Riverside	12.83	$ 934,940.00	$ 1,277,505.00	$ 2,699,638.00	$ (5,797.00)
San Bernardino	136.14	$ 10,754,400.00	$ 14,255,873.00	$ 29,957,779.00	$ (93,528.00)
Mohave	35.96	$ 2,887,237.00	$ 6,319,438.00	$ 10,678,013.00	$ 30,499.00
Coconino	41.3	$ 3,320,563.00	$ 7,175,994.00	$ 11,983,542.00	$ 30,016.00
Navajo	15.51	$ 1,273,684.00	$ 2,834,839.00	$ 4,830,923.00	$ 9,845.00
McKinley	23.94	$ 1,806,356.00	$ 5,241,849.00	$ 8,433,573.00	$ 28,160.00
Bernalillo	0	$ -	$ -	$ -	$ -
Santa Fe	0	$ -	$ -	$ -	$ -
San Miguel	0	$ -	$ -	$ -	$ -
Colfax	0	$ -	$ -	$ -	$ -
Las Animas	0	$ -	$ -	$ -	$ -
Otero	0	$ -	$ -	$ -	$ -
Prowers	0	$ -	$ -	$ -	$ -
Finney	0	$ -	$ -	$ -	$ -
Ford	0	$ -	$ -	$ -	$ -
Reno	16.01	$ 1,128,620.00	$ 2,480,191.00	$ 4,273,510.00	$ 55,441.00
Harvey	10.23	$ 793,813.00	$ 1,785,338.00	$ 3,014,786.00	$ 41,901.00
Shawnee	8.4	$ 657,888.00	$ 1,397,021.00	$ 2,317,936.00	$ 24,797.00
Douglas	9.45	$ 693,743.00	$ 1,537,504.00	$ 2,583,188.00	$ 34,287.00
Jackson	12.61	$ 997,790.00	$ 1,826,237.00	$ 3,208,637.00	$ 4,638.00
Macon	9.89	$ 663,790.00	$ 1,309,229.00	$ 2,498,247.00	$ 3,666.00
Lee	5.07	$ 429,253.00	$ 1,035,810.00	$ 1,687,700.00	$ 3,684.00
Knox	9.9	$ 793,257.00	$ 1,273,002.00	$ 2,454,168.00	$ 2,223.00
Bureau	14.98	$ 1,229,401.00	$ 1,968,898.00	$ 3,823,090.00	$ 3,328.00
LaSalle	10.03	$ 802,453.00	$ 1,305,879.00	$ 2,496,937.00	$ 4,788.00
DuPage	8.96	$ 773,257.00	$ 1,231,882.00	$ 2,212,309.00	$ 2,719.00
Cook	7.98	$ 727,341.00	$ 1,154,621.00	$ 2,035,557.00	$ 2,579.00

County	Jobs	Labor income	Value added	Output	County tax
			Replace SWC with a BBS from ABQ to LAJ		
Los Angeles	11.09	$ 956,846.00	$ 1,342,121.00	$ 2,694,638.00	$ (5,097.00)
Orange	11.5	$ 982,014.00	$ 1,361,830.00	$ 2,620,292.00	$ (2,569.00)
Riverside	12.83	$ 934,940.00	$ 1,277,505.00	$ 2,699,638.00	$ (5,797.00)
San Bernardino	136.14	$ 10,754,400.00	$ 14,255,873.00	$ 29,957,779.00	$ (93,528.00)
Mohave	35.96	$ 2,887,237.00	$ 6,319,438.00	$ 10,678,013.00	$ 30,499.00
Coconino	41.3	$ 3,320,563.00	$ 7,175,994.00	$ 11,983,542.00	$ 30,016.00
Navajo	15.51	$ 1,273,684.00	$ 2,834,839.00	$ 4,830,923.00	$ 9,845.00
McKinley	23.94	$ 1,806,356.00	$ 5,241,849.00	$ 8,433,573.00	$ 28,160.00
Bernalillo	0	$ -	$ -	$ -	$ -
Santa Fe	0	$ -	$ -	$ -	$ -
San Miguel	0	$ -	$ -	$ -	$ -
Colfax	0	$ -	$ -	$ -	$ -
Las Animas	0	$ -	$ -	$ -	$ -
Otero	0	$ -	$ -	$ -	$ -
Prowers	14.21	$ 1,010,453.00	$ 1,883,197.00	$ 3,560,224.00	$ 13,573.00
Finney	8	$ 664,619.00	$ 1,445,965.00	$ 2,394,695.00	$ 32,822.00
Ford	12.04	$ 955,608.00	$ 2,124,746.00	$ 3,566,131.00	$ 50,713.00
Reno	16.01	$ 1,128,620.00	$ 2,480,191.00	$ 4,273,510.00	$ 55,441.00
Harvey	10.23	$ 793,813.00	$ 1,785,338.00	$ 3,014,786.00	$ 41,901.00
Shawnee	8.4	$ 657,888.00	$ 1,397,021.00	$ 2,317,936.00	$ 24,797.00
Douglas	9.45	$ 693,743.00	$ 1,537,504.00	$ 2,583,188.00	$ 34,287.00
Jackson	12.61	$ 997,790.00	$ 1,826,237.00	$ 3,208,637.00	$ 4,638.00
Macon	9.89	$ 663,790.00	$ 1,309,229.00	$ 2,498,247.00	$ 3,666.00
Lee	5.07	$ 429,253.00	$ 1,035,810.00	$ 1,687,700.00	$ 3,684.00
Knox	9.9	$ 793,257.00	$ 1,273,002.00	$ 2,454,168.00	$ 2,223.00
Bureau	14.98	$ 1,229,401.00	$ 1,968,898.00	$ 3,823,090.00	$ 3,328.00
LaSalle	10.03	$ 802,453.00	$ 1,305,879.00	$ 2,496,937.00	$ 4,788.00
DuPage	8.96	$ 773,257.00	$ 1,231,882.00	$ 2,212,309.00	$ 2,719.00
Cook	7.98	$ 727,341.00	$ 1,154,621.00	$ 2,035,557.00	$ 2,579.00

Visitor spending

County	Employment	Labor income	Value added	Output	County tax
			Current SWC		
Los Angeles	23.47	$ 1,002,929.00	$ 1,516,716.00	$ 2,423,890.00	$ 17,389.00
Orange	5.07	$ 205,765.00	$ 316,257.00	$ 503,871.00	$ 1,944.00
Riverside	3.18	$ 104,891.00	$ 157,074.00	$ 269,462.00	$ 2,045.00
San Bernardino	8.19	$ 250,714.00	$ 370,727.00	$ 653,479.00	$ 4,240.00
Mohave	0.72	$ 19,306.00	$ 25,847.00	$ 46,865.00	$ 385.00
Coconino	3.9	$ 121,476.00	$ 159,161.00	$ 270,548.00	$ 1,643.00
Navajo	0.36	$ 9,429.00	$ 14,083.00	$ 26,683.00	$ 164.00
McKinley	2.6	$ 54,821.00	$ 77,275.00	$ 155,804.00	$ 1,587.00
Bernalillo	12.33	$ 350,456.00	$ 518,618.00	$ 921,150.00	$ 5,288.00
Santa Fe	1.63	$ 52,658.00	$ 74,360.00	$ 127,200.00	$ 1,148.00
San Miguel	0.83	$ 13,684.00	$ 19,557.00	$ 43,026.00	$ 316.00
Colfax	2.61	$ 57,905.00	$ 82,041.00	$ 163,412.00	$ 1,292.00
Las Animas	1.15	$ 15,349.00	$ 26,463.00	$ 67,912.00	$ 762.00
Otero	1.44	$ 19,137.00	$ 32,875.00	$ 85,670.00	$ 1,040.00
Prowers	0.36	$ 4,731.00	$ 8,459.00	$ 22,090.00	$ 390.00
Finney	0.69	$ 15,180.00	$ 20,580.00	$ 41,457.00	$ 432.00
Ford	0.58	$ 10,379.00	$ 14,898.00	$ 32,826.00	$ 381.00
Reno	0.52	$ 9,343.00	$ 13,150.00	$ 29,804.00	$ 297.00
Harvey	1.66	$ 32,491.00	$ 44,926.00	$ 93,537.00	$ 1,044.00
Shawnee	0.99	$ 27,702.00	$ 39,313.00	$ 70,134.00	$ 568.00
Douglas	2.91	$ 81,843.00	$ 121,256.00	$ 220,086.00	$ 1,419.00
Jackson	17.68	$ 509,191.00	$ 730,228.00	$ 1,315,486.00	$ 4,860.00
Macon	2.65	$ 51,719.00	$ 68,162.00	$ 148,718.00	$ 671.00
Lee	1.24	$ 23,590.00	$ 32,468.00	$ 69,255.00	$ 575.00
Knox	1.26	$ 31,047.00	$ 42,152.00	$ 81,211.00	$ 317.00
Bureau	0.41	$ 8,402.00	$ 11,276.00	$ 22,718.00	$ 107.00
LaSalle	0.44	$ 10,359.00	$ 14,770.00	$ 27,304.00	$ 163.00
DuPage	0.55	$ 20,030.00	$ 27,989.00	$ 45,387.00	$ 104.00
Cook	7.33	$ 291,029.00	$ 403,254.00	$ 641,904.00	$ 2,293.00

County	Employment	Labor income	Value added	Output	County tax
		Replace SWC with a BBS from ABQ to DDG			
Los Angeles	13.6	$ 581,125.00	$ 878,828.00	$ 1,404,470.00	$ 10,077.00
Orange	3.84	$ 155,840.00	$ 239,522.00	$ 381,614.00	$ 1,473.00
Riverside	2.49	$ 82,028.00	$ 122,837.00	$ 210,728.00	$ 1,599.00
San Bernardino	6.94	$ 212,387.00	$ 314,054.00	$ 553,581.00	$ 3,592.00
Mohave	0.35	$ 9,502.00	$ 12,722.00	$ 23,066.00	$ 190.00
Coconino	2.25	$ 70,095.00	$ 91,841.00	$ 156,115.00	$ 948.00
Navajo	0.26	$ 6,922.00	$ 10,339.00	$ 19,589.00	$ 120.00
McKinley	2.36	$ 49,691.00	$ 70,044.00	$ 141,226.00	$ 1,439.00
Bernalillo	9.8	$ 279,001.00	$ 412,599.00	$ 732,106.00	$ 4,208.00
Santa Fe	0.5	$ 16,117.00	$ 22,759.00	$ 38,931.00	$ 352.00
San Miguel	0.32	$ 5,214.00	$ 7,452.00	$ 16,393.00	$ 120.00
Colfax	0.82	$ 18,077.00	$ 25,612.00	$ 51,014.00	$ 404.00
Las Animas	0.37	$ 4,955.00	$ 8,542.00	$ 21,921.00	$ 245.00
Otero	0.46	$ 6,043.00	$ 10,382.00	$ 27,055.00	$ 328.00
Prowers	0.12	$ 1,566.00	$ 2,800.00	$ 7,313.00	$ 129.00
Finney	0.21	$ 4,618.00	$ 6,261.00	$ 12,613.00	$ 132.00
Ford	0.43	$ 7,672.00	$ 11,013.00	$ 24,266.00	$ 282.00
Reno	0.37	$ 6,550.00	$ 9,219.00	$ 20,888.00	$ 209.00
Harvey	1.07	$ 20,975.00	$ 29,003.00	$ 60,383.00	$ 674.00
Shawnee	0.71	$ 19,888.00	$ 28,224.00	$ 50,352.00	$ 408.00
Douglas	0.74	$ 17,917.00	$ 25,565.00	$ 47,442.00	$ 491.00
Jackson	13.67	$ 393,837.00	$ 564,800.00	$ 1,017,472.00	$ 3,759.00
Macon	2.3	$ 44,995.00	$ 59,299.00	$ 129,381.00	$ 584.00
Lee	0.87	$ 16,586.00	$ 22,828.00	$ 48,692.00	$ 405.00
Knox	1	$ 24,722.00	$ 33,564.00	$ 64,666.00	$ 251.00
Bureau	0.38	$ 7,822.00	$ 10,499.00	$ 21,151.00	$ 99.00
LaSalle	0.38	$ 9,048.00	$ 12,900.00	$ 23,848.00	$ 142.00
DuPage	0.44	$ 16,057.00	$ 22,437.00	$ 36,385.00	$ 83.00
Cook	4.44	$ 176,256.00	$ 244,223.00	$ 388,756.00	$ 1,389.00

County	Replace SWC with a BBS from ABQ to LAJ				
	Job	Labor income	Value added	Output	County tax
Los Angeles	13.69	$ 585,107.00	$ 884,850.00	$ 1,414,094.00	$ 10,145.00
Orange	3.82	$ 155,013.00	$ 238,252.00	$ 379,591.00	$ 1,464.00
Riverside	2.48	$ 81,653.00	$ 122,276.00	$ 209,765.00	$ 1,592.00
San Bernardino	6.92	$ 211,596.00	$ 312,883.00	$ 551,518.00	$ 3,579.00
Mohave	0.37	$ 9,872.00	$ 13,216.00	$ 23,964.00	$ 197.00
Coconino	2.3	$ 71,636.00	$ 93,859.00	$ 159,546.00	$ 970.00
Navajo	0.26	$ 6,894.00	$ 10,297.00	$ 19,510.00	$ 120.00
McKinley	2.36	$ 49,788.00	$ 70,180.00	$ 141,500.00	$ 1,442.00
Bernalillo	9.21	$ 261,789.00	$ 387,405.00	$ 688,094.00	$ 3,951.00
Santa Fe	0.22	$ 7,208.00	$ 10,178.00	$ 17,411.00	$ 157.00
San Miguel	0.23	$ 3,799.00	$ 5,430.00	$ 11,947.00	$ 87.00
Colfax	0.4	$ 8,866.00	$ 12,561.00	$ 25,020.00	$ 197.00
Las Animas	0.19	$ 2,569.00	$ 4,429.00	$ 11,367.00	$ 128.00
Otero	1.15	$ 15,279.00	$ 26,248.00	$ 68,401.00	$ 830.00
Prowers	0.25	$ 3,246.00	$ 5,803.00	$ 15,154.00	$ 267.00
Finney	0.49	$ 10,812.00	$ 14,658.00	$ 29,527.00	$ 308.00
Ford	0.57	$ 9,821.00	$ 13,945.00	$ 25,415.00	$ 367.00
Reno	0.37	$ 6,670.00	$ 9,388.00	$ 21,269.00	$ 212.00
Harvey	1.1	$ 21,604.00	$ 29,872.00	$ 62,194.00	$ 694.00
Shawnee	0.75	$ 21,060.00	$ 29,887.00	$ 53,318.00	$ 432.00
Douglas	0.8	$ 19,244.00	$ 27,459.00	$ 50,958.00	$ 527.00
Jackson	14	$ 403,327.00	$ 578,409.00	$ 1,041,989.00	$ 3,850.00
Macon	2.35	$ 45,890.00	$ 60,479.00	$ 131,954.00	$ 596.00
Lee	0.88	$ 16,765.00	$ 23,074.00	$ 49,216.00	$ 409.00
Knox	1.01	$ 24,821.00	$ 33,699.00	$ 64,925.00	$ 252.00
Bureau	0.38	$ 7,866.00	$ 10,557.00	$ 21,268.00	$ 100.00
LaSalle	0.38	$ 9,096.00	$ 12,969.00	$ 23,976.00	$ 144.00
DuPage	0.44	$ 16,110.00	$ 22,510.00	$ 36,504.00	$ 84.00
Cook	4.51	$ 179,060.00	$ 248,108.00	$ 394,940.00	$ 1,411.00

Saved travel costs

County	Jobs	Labor income	Value added	Output	County tax
			Current SWC		
Los Angeles	29.39	$ 1,599,999.00	$ 2,851,983.00	$ 4,546,598.00	$ 37,681.00
Orange	6.26	$ 333,015.00	$ 605,024.00	$ 949,606.00	$ 4,152.00
Riverside	2.35	$ 90,042.00	$ 173,750.00	$ 298,525.00	$ 2,670.00
San Bernardino	4.12	$ 166,743.00	$ 304,299.00	$ 507,457.00	$ 3,763.00
Mohave	3.09	$ 108,869.00	$ 196,445.00	$ 359,252.00	$ 2,693.00
Coconino	13.72	$ 524,862.00	$ 953,843.00	$ 1,662,965.00	$ 9,774.00
Navajo	0.64	$ 20,610.00	$ 39,636.00	$ 78,774.00	$ 382.00
McKinley	1.29	$ 39,027.00	$ 79,409.00	$ 147,018.00	$ 1,550.00
Bernalillo	15.84	$ 640,791.00	$ 1,247,530.00	$ 2,172,852.00	$ 12,504.00
Santa Fe	2.3	$ 91,860.00	$ 175,792.00	$ 299,983.00	$ 2,722.00
San Miguel	0.44	$ 10,784.00	$ 23,142.00	$ 44,929.00	$ 286.00
Colfax	2.53	$ 67,748.00	$ 152,727.00	$ 278,322.00	$ 2,244.00
Las Animas	0.57	$ 16,892.00	$ 32,411.00	$ 61,330.00	$ 492.00
Otero	0.74	$ 21,014.00	$ 37,861.00	$ 76,719.00	$ 567.00
Prowers	0.16	$ 4,162.00	$ 8,572.00	$ 17,503.00	$ 229.00
Finney	1.03	$ 39,089.00	$ 76,379.00	$ 130,188.00	$ 1,460.00
Ford	0.76	$ 24,400.00	$ 50,712.00	$ 92,017.00	$ 1,149.00
Reno	0.71	$ 24,230.00	$ 44,953.00	$ 82,174.00	$ 886.00
Harvey	2.42	$ 65,906.00	$ 134,072.00	$ 256,205.00	$ 3,121.00
Shawnee	1.6	$ 65,837.00	$ 126,942.00	$ 212,862.00	$ 1,739.00
Douglas	1.2	$ 35,996.00	$ 78,793.00	$ 138,316.00	$ 1,569.00
Jackson	15.77	$ 738,217.00	$ 1,361,388.00	$ 2,259,755.00	$ 6,713.00
Macon	1.13	$ 26,159.00	$ 55,020.00	$ 115,508.00	$ 462.00
Lee	0.71	$ 22,178.00	$ 44,344.00	$ 80,223.00	$ 556.00
Knox	3.55	$ 122,894.00	$ 215,403.00	$ 397,153.00	$ 1,188.00
Bureau	0.37	$ 11,879.00	$ 23,141.00	$ 42,792.00	$ 158.00
LaSalle	0.69	$ 23,256.00	$ 47,725.00	$ 84,797.00	$ 439.00
DuPage	2.51	$ 130,269.00	$ 233,997.00	$ 377,621.00	$ 715.00
Cook	52.48	$ 2,885,611.00	$ 5,099,387.00	$ 7,978,048.00	$ 25,573.00

County	Jobs	Labor income	Value added	Output	County tax
		Replace SWC with a BBS from ABQ to DDG			
Los Angeles	8.34	$ 454,103.00	$ 809,435.00	$ 1,290,392.00	$ 10,694.00
Orange	2.93	$ 156,108.00	$ 283,619.00	$ 445,150.00	$ 1,947.00
Riverside	1.01	$ 38,607.00	$ 74,499.00	$ 127,999.00	$ 1,146.00
San Bernardino	2.04	$ 82,650.00	$ 150,833.00	$ 251,532.00	$ 1,865.00
Mohave	0.53	$ 18,574.00	$ 33,515.00	$ 61,291.00	$ 460.00
Coconino	4.34	$ 165,969.00	$ 301,619.00	$ 525,854.00	$ 3,091.00
Navajo	0.3	$ 9,487.00	$ 18,245.00	$ 36,260.00	$ 176.00
McKinley	0.96	$ 29,201.00	$ 59,417.00	$ 110,004.00	$ 1,160.00
Bernalillo	1.02	$ 445,980.00	$ 868,262.00	$ 1,512,271.00	$ 8,703.00
Santa Fe	0.65	$ 26,134.00	$ 50,012.00	$ 85,343.00	$ 774.00
San Miguel	0.13	$ 3,213.00	$ 6,894.00	$ 13,384.00	$ 85.00
Colfax	0.73	$ 19,445.00	$ 43,836.00	$ 79,885.00	$ 645.00
Las Animas	0.16	$ 4,866.00	$ 9,336.00	$ 17,667.00	$ 142.00
Otero	0.22	$ 6,110.00	$ 11,008.00	$ 22,306.00	$ 166.00
Prowers	0.05	$ 1,227.00	$ 2,526.00	$ 5,159.00	$ 68.00
Finney	0.3	$ 11,366.00	$ 22,209.00	$ 37,855.00	$ 424.00
Ford	0.48	$ 15,619.00	$ 32,461.00	$ 58,901.00	$ 735.00
Reno	0.42	$ 14,305.00	$ 26,540.00	$ 48,515.00	$ 523.00
Harvey	1.19	$ 32,552.00	$ 66,220.00	$ 126,543.00	$ 1,541.00
Shawnee	0.87	$ 35,655.00	$ 68,746.00	$ 115,277.00	$ 941.00
Douglas	0.82	$ 24,542.00	$ 53,721.00	$ 94,304.00	$ 1,069.00
Jackson	9.37	$ 438,432.00	$ 808,538.00	$ 1,342,084.00	$ 3,986.00
Macon	0.73	$ 16,963.00	$ 35,678.00	$ 74,902.00	$ 300.00
Lee	0.24	$ 7,573.00	$ 15,142.00	$ 27,393.00	$ 190.00
Knox	1.61	$ 55,777.00	$ 97,763.00	$ 180,253.00	$ 539.00
Bureau	0.23	$ 7,464.00	$ 14,540.00	$ 26,887.00	$ 98.00
LaSalle	0.32	$ 10,635.00	$ 21,825.00	$ 38,778.00	$ 202.00
DuPage	1.26	$ 65,480.00	$ 117,619.00	$ 189,812.00	$ 359.00
Cook	13.87	$ 762,675.00	$ 1,347,783.00	$ 2,108,621.00	$ 6,759.00

County	Jobs	Labor income	Value added	Output	County tax
Los Angeles	9.16	$ 498,617.00	$ 888,781.00	$ 1,416,883.00	$ 11,744.00
Orange	3.02	$ 160,900.00	$ 292,324.00	$ 458,813.00	$ 2,006.00
Riverside	1.04	$ 39,981.00	$ 77,149.00	$ 132,552.00	$ 1,186.00
San Bernardino	2.1	$ 84,820.00	$ 154,793.00	$ 258,136.00	$ 1,914.00
Mohave	0.66	$ 23,214.00	$ 41,888.00	$ 76,603.00	$ 574.00
Coconino	0.48	$ 18,342.00	$ 33,334.00	$ 58,115.00	$ 342.00
Navajo	0.31	$ 9,907.00	$ 19,053.00	$ 37,866.00	$ 183.00
McKinley	0.98	$ 29,673.00	$ 60,375.00	$ 111,779.00	$ 1,179.00
Bernalillo	9.79	$ 396,091.00	$ 771,134.00	$ 1,343,102.00	$ 7,730.00
Santa Fe	0.23	$ 9,248.00	$ 17,699.00	$ 30,202.00	$ 274.00
San Miguel	0.05	$ 1,343.00	$ 2,881.00	$ 5,593.00	$ 35.00
Colfax	0.27	$ 7,299.00	$ 16,454.00	$ 29,984.00	$ 241.00
Las Animas	0.06	$ 1,841.00	$ 3,533.00	$ 6,685.00	$ 54.00
Otero	0.57	$ 16,288.00	$ 29,346.00	$ 59,465.00	$ 440.00
Prowers	0.11	$ 2,756.00	$ 5,677.00	$ 11,592.00	$ 152.00
Finney	0.61	$ 23,008.00	$ 44,957.00	$ 76,628.00	$ 860.00
Ford	0.41	$ 13,234.00	$ 27,505.00	$ 49,908.00	$ 623.00
Reno	0.43	$ 14,598.00	$ 27,083.00	$ 49,508.00	$ 533.00
Harvey	1.24	$ 33,740.00	$ 68,638.00	$ 131,163.00	$ 1,598.00
Shawnee	0.91	$ 37,331.00	$ 71,979.00	$ 120,697.00	$ 986.00
Douglas	0.86	$ 25,816.00	$ 56,509.00	$ 99,198.00	$ 1,125.00
Jackson	9.64	$ 451,394.00	$ 832,441.00	$ 1,381,760.00	$ 4,104.00
Macon	0.76	$ 17,692.00	$ 37,212.00	$ 78,123.00	$ 312.00
Lee	0.25	$ 7,953.00	$ 15,902.00	$ 28,768.00	$ 200.00
Knox	1.63	$ 56,499.00	$ 99,029.00	$ 182,586.00	$ 546.00
Bureau	0.24	$ 7,645.00	$ 14,893.00	$ 27,540.00	$ 100.00
LaSalle	0.32	$ 10,762.00	$ 22,085.00	$ 39,240.00	$ 204.00
DuPage	1.27	$ 66,253.00	$ 119,007.00	$ 192,051.00	$ 364.00
Cook	15.16	$ 833,346.00	$ 1,472,670.00	$ 2,304,009.00	$ 7,385.00

Replace SWC with a BBS from ABQ to LAJ

State	Category	Current SWC				
		Job	Labor income	Value added	Output	State/local tax
CA	OM Spending	229.49	$ 19,275,520.00	$ 27,459,776.00	$ 54,276,489.00	$ 464,941.00
	Visitor spending	41.23	$ 1,799,581.00	$ 2,747,358.00	$ 4,481,549.00	$ 275,891.00
	Family saving	50.25	$ 2,825,545.00	$ 5,083,592.00	$ 8,320,230.00	$ 537,875.00
AZ	OM Spending	144.61	$ 10,645,082.00	$ 21,382,233.00	$ 36,224,373.00	$ 1,147,833.00
	Visitor spending	5.87	$ 193,437.00	$ 266,978.00	$ 464,019.00	$ 27,366.00
	Family saving	25.56	$ 1,149,443.00	$ 2,064,254.00	$ 3,626,982.00	$ 195,213.00
NM	OM Spending	87.58	$ 6,743,658.00	$ 18,164,773.00	$ 28,470,624.00	$ 501,027.00
	PTC construction	390.9	$ 16,847,312.00	$ 25,340,926.00	$ 50,091,648.00	$ 1,191,104.00
	PTC operating	18.01	$ 1,386,759.00	$ 3,735,386.00	$ 5,854,672.00	$ 150,449.00
	Station renovation	0	$ -	$ -	$ -	$ -
	Bus operating	0	$ -	$ -	$ -	$ -
	Visitor spending	19.64	$ 553,129.00	$ 804,190.00	$ 1,455,618.00	$ 85,720.00
	Family saving	22.51	$ 844,521.00	$ 1,641,239.00	$ 2,946,035.00	$ 170,112.00
CO	OM Spending	79.38	$ 6,160,329.00	$ 10,633,622.00	$ 19,026,561.00	$ 596,391.00
	PTC construction	322.87	$ 17,997,683.00	$ 26,592,504.00	$ 47,526,287.00	$ 1,596,202.00
	PTC operating	26.49	$ 2,055,997.00	$ 3,548,950.00	$ 6,350,076.00	$ 199,046.00
	Station renovation	0	$ -	$ -	$ -	$ -
	Bus operating	0	$ -	$ -	$ -	$ -
	Visitor spending	2.48	$ 85,756.00	$ 137,236.00	$ 242,263.00	$ 16,171.00
	Family saving	2.42	$ 113,234.00	$ 200,822.00	$ 350,822.00	$ 18,405.00
KS	OM Spending	79.39	$ 6,138,975.00	$ 12,646,301.00	$ 21,937,728.00	$ 1,615,922.00
	PTC construction	81.71	$ 4,165,071.00	$ 6,056,745.00	$ 11,330,448.00	$ 374,541.00
	PTC operating	5.12	$ 395,632.00	$ 815,002.00	$ 1,413,797.00	$ 104,139.00
	Station renovation	0	$ -	$ -	$ -	$ -
	Bus operating	0	$ -	$ -	$ -	$ -
	Visitor spending	5.19	$ 149,140.00	$ 214,260.00	$ 391,745.00	$ 23,007.00
	Family saving	9.95	$ 412,467.00	$ 781,451.00	$ 1,375,883.00	$ 78,768.00
MO	OM Spending	27.24	$ 1,929,661.00	$ 3,594,198.00	$ 6,515,485.00	$ 180,090.00
	Visitor spending	20.74	$ 597,085.00	$ 850,949.00	$ 1,564,307.00	$ 88,604.00
	Family saving	18.11	$ 778,081.00	$ 1,416,577.00	$ 2,480,612.00	$ 120,897.00
LA	OM Spending	7.2	$ 547,776.00	$ 1,224,316.00	$ 2,027,739.00	$ 60,601.00
	Visitor spending	1.17	$ 31,818.00	$ 46,677.00	$ 86,353.00	$ 5,533.00
	Family saving	1.1	$ 43,459.00	$ 81,868.00	$ 144,605.00	$ 8,100.00
IL	OM Spending	71.26	$ 5,855,412.00	$ 9,520,851.00	$ 17,353,614.00	$ 537,877.00
	Visitor spending	10.81	$ 389,950.00	$ 558,782.00	$ 937,955.00	$ 60,830.00
	Family saving	73.07	$ 3,725,088.00	$ 6,714,122.00	$ 11,127,305.00	$ 648,749.00

State	Category	Job	Labor income	Value added	Output	State/local tax
				Replace SWC with a BBS from ABQ to DDG		
CA	OM Spending	229.49	$ 19,275,520.00	$ 27,459,776.00	$ 54,276,489.00	$ 464,941.00
	Visitor spending	27.6	$ 1,204,445.00	$ 1,836,592.00	$ 2,995,774.00	$ 184,502.00
	Family saving	16.96	$ 953,615.00	$ 1,715,700.00	$ 2,808,058.00	$ 181,531.00
AZ	OM Spending	144.61	$ 10,645,082.00	$ 21,382,233.00	$ 36,224,373.00	$ 1,147,833.00
	Visitor spending	3.39	$ 111,704.00	$ 154,328.00	$ 268,248.00	$ 15,836.00
	Family saving	7.53	$ 338,430.00	$ 607,777.00	$ 1,067,891.00	$ 57,477.00
NM	OM Spending	27.85	$ 2,144,562.00	$ 5,776,609.00	$ 9,053,989.00	$ 232,663.00
	PTC construction	0	$ -	$ -	$ -	$ -
	PTC operating	0	$ -	$ -	$ -	$ -
	Station renovation	50.4	$ 2,131,357.00	$ 3,226,700.00	$ 6,834,018.00	$ 237,082.00
	Bus operating	4.55	$ 127,319.00	$ 216,668.00	$ 395,710.00	$ 19,317.00
	Visitor spending	13.5	$ 380,167.00	$ 551,839.00	$ 998,519.00	$ 58,627.00
	Family saving	13.2	$ 495,245.00	$ 962,458.00	$ 1,727,618.00	$ 99,758.00
CO	OM Spending	0	$ -	$ -	$ -	$ -
	PTC construction	0	$ -	$ -	$ -	$ -
	PTC operating	0	$ -	$ -	$ -	$ -
	Station renovation	0	$ -	$ -	$ -	$ -
	Bus operating	0	$ -	$ -	$ -	$ -
	Visitor spending	0.79	$ 27,472.00	$ 43,964.00	$ 77,609.00	$ 5,180.00
	Family saving	0.7	$ 32,837.00	$ 58,238.00	$ 101,737.00	$ 5,337.00
KS	OM Spending	52.81	$ 4,083,596.00	$ 8,412,216.00	$ 14,592,797.00	$ 1,074,898.00
	PTC construction	0	$ -	$ -	$ -	$ -
	PTC operating	0	$ -	$ -	$ -	$ -
	Station renovation	102.58	$ 5,136,418.00	$ 7,553,299.00	$ 14,986,440.00	$ 493,350.00
	Bus operating	10.72	$ 314,243.00	$ 470,899.00	$ 904,391.00	$ 32,349.00
	Visitor spending	3.4	$ 97,769.00	$ 140,319.00	$ 256,463.00	$ 15,088.00
	Family saving	5.21	$ 216,117.00	$ 409,451.00	$ 720,911.00	$ 41,272.00
MO	OM Spending	27.24	$ 1,929,661.00	$ 3,594,198.00	$ 6,515,485.00	$ 180,090.00
	Visitor spending	16.29	$ 468,929.00	$ 668,166.00	$ 1,225,819.00	$ 69,595.00
	Family saving	10.85	$ 466,106.00	$ 848,595.00	$ 1,486,000.00	$ 72,423.00
LA	OM Spending	7.2	$ 547,776.00	$ 1,224,316.00	$ 2,027,739.00	$ 60,601.00
	Visitor spending	0.83	$ 22,371.00	$ 32,818.00	$ 60,713.00	$ 3,891.00
	Family saving	0.38	$ 14,840.00	$ 27,954.00	$ 49,377.00	$ 2,766.00
IL	OM Spending	71.26	$ 5,855,412.00	$ 9,520,851.00	$ 17,353,614.00	$ 537,877.00
	Visitor spending	7.15	$ 257,828.00	$ 369,457.00	$ 620,160.00	$ 40,220.00
	Family saving	21.4	$ 1,091,148.00	$ 1,966,692.00	$ 3,259,396.00	$ 190,030.00

State	Category	Job	Labor income	Value added	Output	State/local tax
			Replace SWC with a BBS from ABQ to LAJ			
CA	OM Spending	229.49	$ 19,275,520.00	$ 27,459,776.00	$ 54,276,489.00	$ 464,941.00
	Visitor spending	27.65	$ 1,206,243.00	$ 1,839,404.00	$ 3,000,370.00	$ 184,781.00
	Family saving	18.16	$ 1,021,069.00	$ 1,837,060.00	$ 3,006,686.00	$ 194,372.00
AZ	OM Spending	144.61	$ 10,645,082.00	$ 21,382,233.00	$ 36,224,373.00	$ 1,147,833.00
	Visitor spending	3.46	$ 114,099.00	$ 157,614.00	$ 273,958.00	$ 16,171.00
	Family saving	8.43	$ 379,203.00	$ 681,000.00	$ 1,196,546.00	$ 64,401.00
NM	OM Spending	27.85	$ 2,144,562.00	$ 5,776,609.00	$ 9,053,989.00	$ 232,663.00
	PTC construction	0	$ -	$ -	$ -	$ -
	PTC operating	0	$ -	$ -	$ -	$ -
	Station renovation	50.4	$ 2,131,357.00	$ 3,226,700.00	$ 6,834,018.00	$ 237,082.00
	Bus operating	4.55	$ 127,319.00	$ 216,668.00	$ 395,710.00	$ 19,317.00
	Visitor spending	12.16	$ 342,300.00	$ 496,539.00	$ 898,330.00	$ 52,694.00
	Family saving	10.96	$ 411,239.00	$ 799,200.00	$ 1,434,570.00	$ 82,836.00
CO	OM Spending	21.06	$ 1,634,343.00	$ 2,821,113.00	$ 5,047,770.00	$ 158,224.00
	PTC construction	0	$ -	$ -	$ -	$ -
	PTC operating	0	$ -	$ -	$ -	$ -
	Station renovation	126.7	$ 6,916,565.00	$ 10,413,106.00	$ 19,581,996.00	$ 650,865.00
	Bus operating	11.29	$ 356,319.00	$ 524,164.00	$ 986,879.00	$ 33,627.00
	Visitor spending	1.33	$ 46,011.00	$ 73,632.00	$ 129,982.00	$ 8,675.00
	Family saving	1.16	$ 54,185.00	$ 96,098.00	$ 167,877.00	$ 8,807.00
KS	OM Spending	79.39	$ 6,138,975.00	$ 12,646,301.00	$ 21,937,728.00	$ 1,615,922.00
	PTC construction	0	$ -	$ -	$ -	$ -
	PTC operating	0	$ -	$ -	$ -	$ -
	Station renovation	0	$ -	$ -	$ -	$ -
	Bus operating	0	$ -	$ -	$ -	$ -
	Visitor spending	3.81	$ 109,543.00	$ 157,275.00	$ 287,503.00	$ 16,899.00
	Family saving	5.71	$ 236,746.00	$ 448,534.00	$ 789,725.00	$ 45,212.00
MO	OM Spending	27.24	$ 1,929,661.00	$ 3,594,198.00	$ 6,515,485.00	$ 180,090.00
	Visitor spending	16.68	$ 480,314.00	$ 684,531.00	$ 1,258,378.00	$ 71,275.00
	Family saving	11.19	$ 480,525.00	$ 874,846.00	$ 1,531,969.00	$ 74,663.00
LA	OM Spending	7.2	$ 547,776.00	$ 1,224,316.00	$ 2,027,739.00	$ 60,601.00
	Visitor spending	0.83	$ 22,612.00	$ 33,171.00	$ 61,367.00	$ 3,933.00
	Family saving	0.4	$ 15,585.00	$ 29,358.00	$ 51,857.00	$ 2,904.00
IL	OM Spending	71.26	$ 5,855,412.00	$ 9,520,851.00	$ 17,353,614.00	$ 537,877.00
	Visitor spending	7.24	$ 260,980.00	$ 373,967.00	$ 627,657.00	$ 40,712.00
	Family saving	23.02	$ 1,173,636.00	$ 2,115,369.00	$ 3,505,798.00	$ 204,398.00

C Travel cost per passenger mile for each transportation mode

Raw data from BTS 2018 Annual Report necessary for travel cost per passenger mile estimation

Data Name	Value	Unit	Year	Page Number (Adobe Reader Page Number)
Amtrak				
Ave. passenger trip length	220.4	Miles	2006	Rail Profile, page 393
Fare	65.43	$ per passenger	2006	Rail Profile, page 393
Air				
Revenue passenger-miles	1.17916E+12 (total of all domestic services)	Passenger-miles	2006	Air Carrier Profile, page 376
Average passenger fare	329	$ per passenger	2006	Table 3-18, page 210
Revenue passenger enplanements	1338870000 (total of Domestic services)	Passenger	2006	Air Carrier Profile, page 377
Car				
Ave. cost of owning and operating an automobile	0.522	$ per veh-mile	2006	Table 3-17, page 209
Passenger miles by car	4,562,368,000,000	Passenger-mile	2006	Automobile Profile, page 384
Vehicle miles by car	2,785,074,000,000	Vehicle-mile	2006	Automobile Profile, page 384
Intercity Bus				
Number of revenue passengers	585,600,000	Passengers	2002	Bus Profile, page 388
Operating revenues	1,120,422,000	$	2002	Bus Profile, page 388
Ave. revenue per passenger-mile	0.0972	$ per passenger-mile	2002	Bus Profile, page 388
Fare per passenger	30.11	$ per passenger	2002	Table 3-18, page 210

Amtrak (2006)

Fare per passenger mile in 2006 = Fare per passenger / Ave. passenger trip = 65.43 / 220.4 = $0.296869328 per passenger-mile

Air (2006)

Fare per passenger mile in 2006 = (Ave. passenger fare × Revenue passenger enplanements)/Revenue passenger miles = (329 × 1338870000) / 1.17916E+12 = $0.373561091 per passenger-mile

Car (2006)

Number of Passenger per vehicle = Passenger miles / Vehicle miles = 4,562,368,000,000 / 2,785,074,000,000 = $1.638149651 passengers per vehicle

Fare per passenger-mile in 2006 = Ave. cost per vehicle-mile / Number of passengers per vehicle = 0.522 / 1.638149651 = $0.317431316 per passenger-mile

Intercity Bus (2002)

Passenger-mile by intercity bus = Operating revenues / Ave. revenue per passenger-mile = 1,120,422,000 / 0.0972 = 11526975309 Passenger-mile

Miles per passenger = Passenger mile / Number of revenue passengers = 11526975309 / 585,600,000 = 19.68404254 miles per passenger

Fare per passenger mile = Fare per passenger / miles per passenger = 30.11 / 19.68404254 = $1.529665461 per passenger mile

Convert travel cost numbers to 2017 value

Since the only 2017 data known is for car owning and operating cost per vehicle mile, we use the ratio between its 2017 data and 2006 data to convert 2006 travel cost numbers. Then, we use the ratio between car cost data in 2017 and 2002 to convert 2002 travel cost numbers to 2017.

- Ave. cost per vehicle-mile in 2002 was $0.502 per veh mile
- Ave. cost per vehicle-mile in 2006 was $0.522 per veh mile
- Ave. cost per vehicle-mile in 2017 was $0.565 per veh mile

After conversion, the travel costs for each transportation mode are

- Travel cost by Amtrak train is estimated to be $0.3226/passenger-mile
- Travel cost by air is estimated to be $0.4059/passenger-mile
- Travel cost by car is estimated to be $0.3449/passenger-mile
- Travel cost by intercity bus is estimated to be $1.72/passenger-mile

On a final note, it is significant that the travel cost data are estimated based on trackable and comparable data from the same data source – "National Transportation Statistics", which is an improved estimation than previous studies that used data from various data sources.