Ozarks Transportation Organization
Regional Service Analysis

Phase III: Regional Transit Service

April 2012

SRF Consulting Group Team

Contents

Introduction

Ozarks Transportation Organization (OTO) is conducting a Fixed Route Operations Analysis on the City Utilities (CU) transit system in Springfield, Missouri. One component of this analysis involves an evaluation and recommendation of route structure, timing, and location for potential regional commuter service. The cities within the Springfield region noted for having commuter service potential include Ash Grove, Battlefield, Fair Grove, Nixa, Ozark, Republic, Rogersville, Strafford, Walnut Grove, and Willard. Additionally, the City of Branson will be evaluated due to its distinction as a regional entertainment and tourist destination.

The locations of the cities in relation to Springfield are shown in Figure 1. Basic characteristics of each city including population, the number of workers commuting from each city to Springfield, and the average travel time to Springfield, are summarized in Table 1.

The largest of these cities is Nixa with a population of 19,022. This is followed closely by Ozark with a population of 17,820, and Republic with a population of 14,751. Branson has a population of 10,510, while the remaining cities have populations ranging from 665 to 5,590. As with population, the number of workers living in each city and commuting to Springfield is highest in the Cities of Nixa, Ozark, and Republic. However, the highest number for Springfield commuters as a proportion of total population is seen in Battlefield at 33 percent. This is likely due to Battlefield having the closest proximity to Springfield. These proportions for Nixa, Ozark, and Republic are between 22 and 26 percent. With the exception of Branson, all cities are within a 22 to 36 minute drive by automobile. The auto travel time to Branson is nearly double this at 54 minutes.

Table 1: Regional City Characteristics

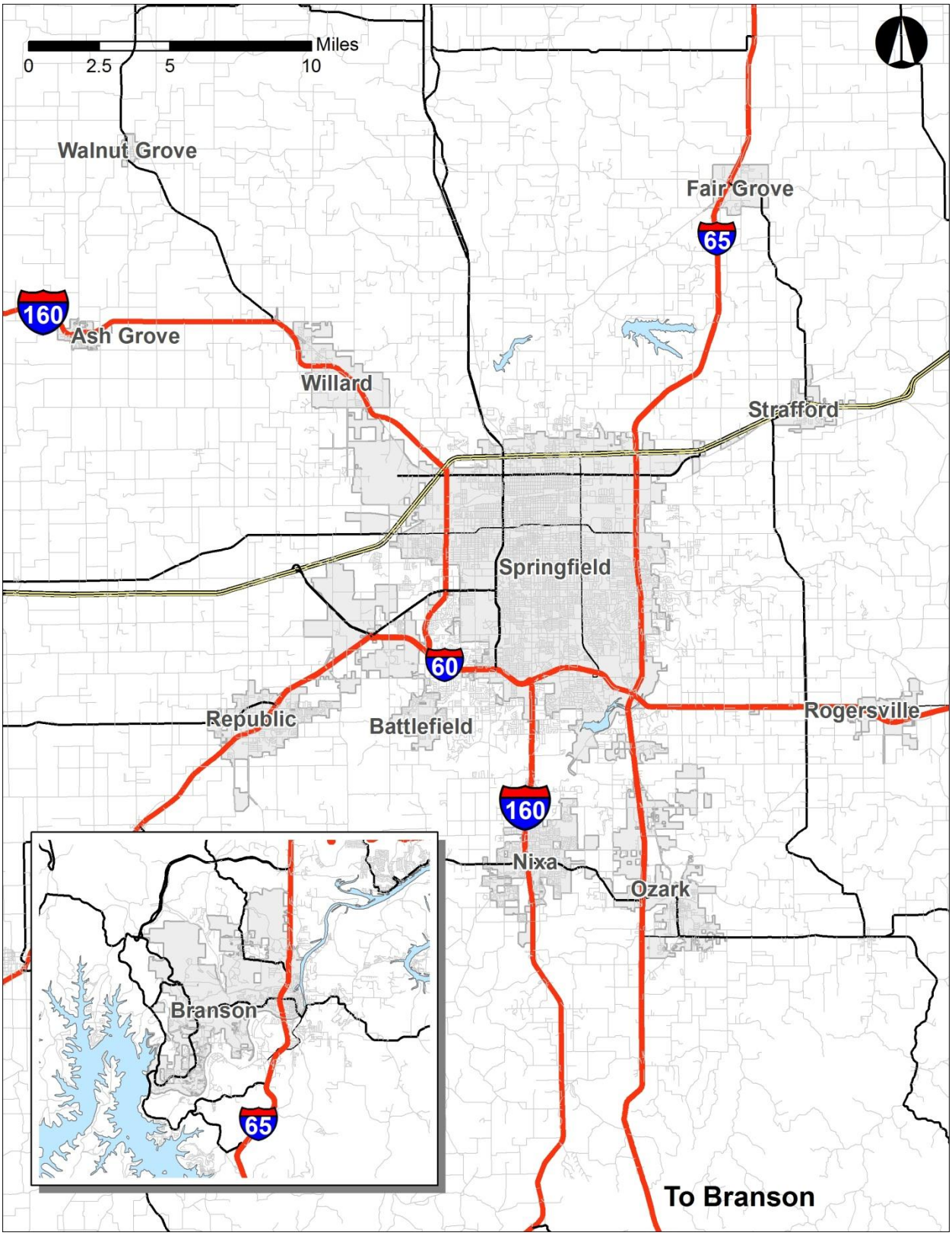
City	Population[1]	Workers Commuting to Springfield[2]	% of Population Commuting to Springfield	Travel Time (min)[3]
Ash Grove	1,472	235	16%	34
Battlefield	5,590	1,849	33%	22
Branson	10,520	357	3%	54
Fair Grove	1,393	238	17%	28
Nixa	19,022	4,934	26%	24
Ozark	17,820	3,939	22%	28
Republic	14,751	3,486	24%	27
Rogersville	3,073	108	4%	30
Strafford	2,358	385	16%	23
Walnut Grove	665	86	13%	36
Willard	5,288	1,151	22%	24

[1] *US Decennial Census, 2010*

[2] *LEHD, 2009*

[3] *Generated using Google Maps route planner*

Figure 1: Location of Cities with Potential for Regional Transit Service



Preliminary Evaluation

Before commencing with detailed service planning, a preliminary evaluation was made of the overall viability of commuter service to each regional city. Many of the guiding principles for this evaluation were taken from a report by the Transit Cooperative Research Program (TCRP). *TCRP Report 116: Guidebook for Evaluating, Selecting, and Implementing Suburban Transit Services* provides a detailed analysis of suburban transit case studies. Most important to this evaluation is the TCRP analysis of the case study system performance measures as they compare to typical land use and demographic characteristics of the regions they serve. The report found meaningful correlations between route productivity (passengers per revenue hour) and factors such as population density, job density, and the number of zero- and single-car households. The factors used for this preliminary evaluation are summarized below. Information for population density is from the 2010 US Decennial Census, Summary File #1, aggregated to the level of census designated place. Information for the number of commuters is from 2009 Longitudinal Household-Employer Dynamic data. Information for the percent of zero- and single-car households is from the 2009 American Community Survey 5-year estimate database.

- ***Population / Square Mile:*** Greater concentrations of population allow routes to operate more productively by serving a larger population with fewer resources.
- ***Jobs / Square Mile:*** As with population density, a higher concentration of jobs allows transit routes to provide service more productively. In this case the job density of each city is an indicator of the potential for reverse commute service.
- ***Percent of Zero-Car Households:*** The percent of zero-car households in an area represents the segment of the population that is dependent on other means of transportation such as carpooling or transit. This is another measure that correlates to transit market share and route productivity.
- ***Percent of Single-Car Households:*** The TCRP report found that single-car households were also correlated with route productivity. A potential reason for this correlation is that a single car does not meet all the mobility needs of a multiple person household.
- ***Commuters (City to Springfield):*** The number of commuters travelling from each city to Springfield represents one of the potential markets for commuter transit service.
- ***Commuters (Springfield to City):*** Commuters travelling in the opposite direction (reverse commuters) provide commuter routes the ability to be productive in both directions of travel.
- ***Total Commuters:*** The combined total of regular and reverse commuters.

Due to the unique circumstances of the City of Branson's more distant location and commuting behavior characterized by a predominantly outward travel flow, this analysis was limited to the original ten regional cities identified in the introduction. The land use and demographic factors described above are summarized for each city in Table 2. In addition to this information, a transit service score was calculated for each factor by comparing each city's value with the average value of all ten cities. The transit service score is calculated as the number of standard deviations away from the average. For example, in the population density category Ash Grove's transit service score is -0.08 because it's density of 1,211 mile is only slightly lower than the average of 1,260. However, Battlefield scores a 1.65

in this category because it's density of 2,240 is much higher than the average. All factors in this evaluation are positively correlated to route productivity.

Once transit service scores were calculated for each factor, a combined final score was calculated for each city. The final score represents a weighted average of the individual factor components. The largest proportion (50 percent) of the final score was allotted to the total number of commuters travelling between each city and Springfield. This factor was given the highest priority because it is one of the highest indicators of commuter service potential. While the others factors are also important, they are less indicative of commuter service potential and would be weighed more highly in an evaluation of alternative suburban service such as fixed or deviated-fixed route service. The transit scores for population and job density were each allotted 15 percent of the final score. Transit scores for the percent zero- and single-car households were each allotted 10 percent. The individual and final weighted transit service scores are summarized in Table 2. The scores are also formatted with a shaded scale as a visual aid. Lighter shading indicates a lower score while darker shading indicates a higher score.

Table 2: Regional Transit Service Scores

City	Population/ SqMi[1]		Jobs/ SqMi[2]		% Zero-Car HHs[3]		% Single-Car HHs[3]		Commuters (Springfield to City)[2]		Commuters (City to Springfield)[2]		Total Commuters[2]		Final Weighted Score
Final Score Weight	***15%***		***15%***		***10%***		***10%***		***0%***		***0%***		***50%***		***100%***
Ash Grove	1,211	-0.08	390	0.32	3.5%	2.00	31.8%	2.26	77	-0.75	235	-0.77	311	-0.77	0.07
Battlefield	2,240	1.65	139	-0.79	1.5%	0.04	11.6%	-1.42	101	-0.69	1,849	0.11	1,949	-0.04	-0.03
Fair Grove	438	-1.38	608	1.28	0.9%	-0.54	20.2%	0.16	131	-0.62	238	-0.77	368	-0.75	-0.43
Nixa	2,244	1.65	689	1.64	1.7%	0.25	14.1%	-0.96	1,117	1.64	4,934	1.80	6,053	1.79	1.32
Ozark	1,606	0.58	559	1.06	1.3%	-0.15	18.4%	-0.17	1,192	1.81	3,939	1.26	5,133	1.38	0.91
Republic	1,109	-0.25	252	-0.29	1.9%	0.45	17.6%	-0.32	614	0.48	3,486	1.01	4,100	0.92	0.39
Rogersville	893	-0.62	102	-0.95	2.3%	0.78	23.8%	0.81	91	-0.71	108	-0.84	198	-0.83	-0.49
Strafford	897	-0.61	442	0.55	1.4%	-0.07	20.0%	0.11	300	-0.23	385	-0.69	685	-0.61	-0.31
Walnut Grove	1,071	-0.32	40	-1.22	0.0%	-1.38	18.0%	-0.25	4	-0.91	86	-0.85	89	-0.87	-0.83
Willard	893	-0.62	222	-0.42	0.0%	-1.38	18.2%	-0.22	396	-0.01	1,151	-0.27	1,547	-0.22	-0.43
Average	**1,260**		**318**		**1.4%**		**19.4%**		**402**		**1,641**		**2,043**		

[1] *US Decennial Census, 2010*

[2] *LEHD, 2009*

[3] *ACS 5-year Estimate, 2009*

Overall Service Design and Estimation

The original concept considered for overall service design was to route regional services from the outlying communities through Springfield while stopping at key locations primarily along National Ave. Based on feedback from OTO, this concept was determined to result in excessive bus volumes and underutilized capacity along this main Springfield artery. As a result, a second alternative was developed that consists of feeder service from the outlying areas to a trunk-line limited stop/express service operating along National Ave.

Under this proposed regional service plan, each route would carry passengers to one of two Springfield terminals. The south terminal would be located at or near Lester E Cox Medical Center South on National Ave. The north terminal would be located at the Park Central Transfer Station. Upon reaching these terminals, passengers would then board the Springfield Limited Stop Circulator to transport them to their final destination. The initial service design would provide only inbound service in the a.m. peak and outbound service in the p.m. peak.

In designing the bus route schedules, consideration was given to meeting the shift start and end times for the major employers along the Limited Stop Circulator route. Unfortunately, this proved difficult due to a large degree of variation in the shift start and end times for adjacent employers. Instead, it was determined that the best initial scheduling plan would be to coordinate the regional service routes with the pulse times of routes serving the Park Central Transfer Station. Buses were timed to arrive five minutes before service pulses in the a.m. and p.m. peak.

Ridership Estimation

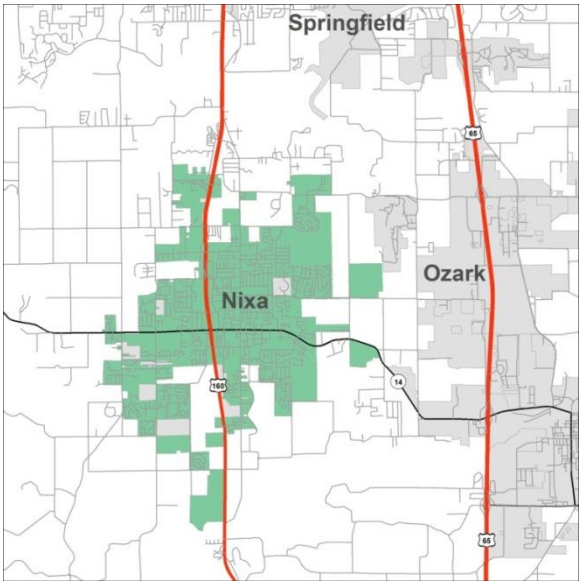
The primary purpose of commuter transit service is to provide convenient transportation between home and the place of employment for transit customers. As such, the chief component of ridership estimation for these services is longitudinal employer-household dynamic (LEHD) data. This data is generated by the US Census Bureau and is created using a combination of federal and state administrative data on employers and employees, while maintaining the confidentiality of people and firms which provide the data. Using modern statistical and computing techniques, the US Census Bureau is able to produce a database of commuting behavior detailing the origins and destinations of workers throughout the country at the census block level.

By identifying the census blocks within an origin area, and the census blocks within a destination area, a database query can be created to summarize the number of commuters that live in the origin area and work in the destination area. In the case of Springfield regional service the origins selected for analysis included all census blocks within the US Census Designated Places for each city in the region. An example of the boundaries of the Census Designated Place for Nixa is shown in Figure 2.

For the destination areas, all census blocks within ¼-mile of the six Limited Stop Circulator bus stop locations were analyzed. A listing of the origin and destination census block IDs used in this analysis is provided in

Appendix A: LEHD . To account for additional commuters that may work in Springfield outside of the ¼-mile buffer bus stop buffer, it was assumed that one quarter of the commuters working in Springfield as a whole (less commuters working within the ¼-mile buffers) would also be able to use this new service to reach their place of employment. This total number was then used to apply a mode share value as described below.

Figure 2: Census Designated Place Example, Nixa



Mode Share

Transit ridership is often measured in terms of a mode share, or the percentage of trips that are made via transit service relative to other modes such as automobile, walking, and biking. Currently, the overall transit mode share for transportation to work in Springfield, MO is roughly 1 percent[1]. However, this figure represents the proportion of all commute trips, regardless of whether transit service is available for the commuter. In areas where transit service is available, the transit mode share will typically be higher than the overall average. For the purposes of this service plan, a range of ridership estimation is presented with a low estimate of 2 percent and a high estimate of 3 percent. These mode share proportions were applied to the number of commuters estimated between the origin areas and the destination areas as described above.

1, 5, and 10 Year Estimates

Ridership was estimated for years 1, 5, and 10 of operation. It was assumed that ridership will rise gradually and will not reach its full potential until year 5 of operation. Ridership in year 1 was assumed to be half of the full mode share potential. Ridership in year 10 was assumed to grow at a rate equal to current population growth trends. For Nixa and Ozark, the annual population growth rates were calculated using data provided in the 2009 Christian County Comprehensive Plan. For Branson, the annual growth rate was calculated using data provided on the City of Branson website. For the remaining regional cities, the growth rates were taken from the 2007 Greene County Comprehensive Plan. The most recent growth rates for Springfield and Walnut Grove have been slightly negative. For these cities, ridership was assumed to grow at a 0.5 percent annual growth rate.

[1] http://transportation-modes-city.findthedata.org/l/1272/Springfield-Missouri-Commuting-Stats

Impact of Fuel Cost Increases

Additional analysis was conducted to estimate the effects of increased fuel prices on transit ridership. The cross price elasticity of transit ridership with respect to fuel prices was assumed to be 0.33. That is, for every 1 percent increase in fuel prices, transit ridership can be expected to rise 0.33 percent. This is a generally accepted elasticity level within the transit industry[2]. Current fuel prices were assumed to be approximately 3 dollars per gallon. The impacts on ridership were analyzed for an increase in fuel prices from 3 to 4 dollars per gallon and an increase from 3 to 5 dollars per gallon.

Cost Estimation

To estimate the total cost of providing regional service, the following cost assumptions were used:

- Operating and Maintenance Cost: $90 per hour (year 1)
- Capital Cost (Large Bus): $400,000 per bus
- Capital Cost (Minibus): $120,000 per bus
- Year 1 Startup Cost: $10,000 per route
- Customer Fare: $0.10 per mile
- Annual Inflation Rate: 3.0 percent

Annual operating and maintenance costs were estimated for each route in years 1, 5, and 10 of operation. Operating and maintenance costs in years 5 and 10 were estimated to rise at an annual inflation rate of 3.0 percent. Fare revenue was calculated by applying each route's trip fare to the range of ridership estimates as described in the Ridership Estimation section. Initial capital costs for each route include a $10,000 year 1 startup cost and a cost for required new buses based on the requirements of the route. The costs of both bus options (large and minibus) are assumed to include AVL and APC equipment.

Regional Service Routes

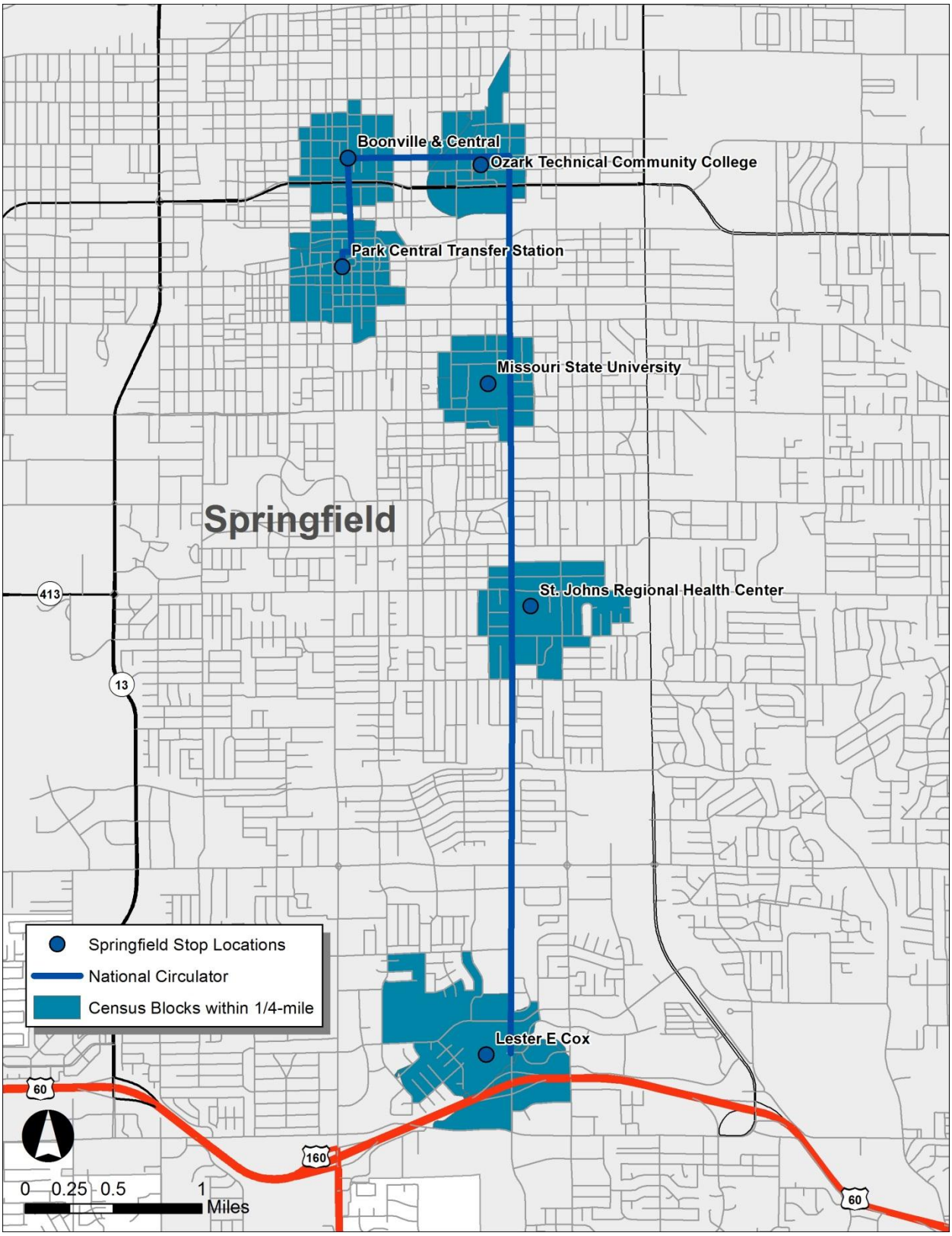
In the following section, the routing, scheduling, ridership estimation, and cost estimation of each route is described. Unless noted otherwise, the segment mileages were measured using Geographical Information (GIS) software and the travel time between stops was estimated using the route finder function in Google Maps.

Springfield Limited Stop Circulator

The Limited Stop Circulator route would provide service between the two terminal points while making stops at St. John's Regional health Center, Missouri State University, Ozark Technical Community College, and the intersection of Boonville Ave & Central St. These stop locations were chosen due to the high number and concentration of jobs located nearby. According to the LEHD data analyzed, roughly 20 percent of all commuters travelling from a regional city to Springfield work in census blocks within ¼ mile of these six bus stop locations. As shown in Figure 3, the Limited Stop Circulator would operate primarily on National Ave, Central St, and Boonville Ave.

[2] http://www.vtpi.org/tranelas.pdf [Table 15: Recommended Transit Elasticity Values; Transit Ridership WRT Auto Operating Costs (Long Term)

Figure 3: Limited Stop Circulator



The mileage and run-times between each stop location are shown in Table 3. Because this route will stop at only six locations throughout its route, it will be able to travel faster than a typical local service route. An average speed of 15 mph was assumed when calculating the run-times. The segment mileages and run-times are shown for the southbound direction, but are assumed to be identical for the northbound direction. Buses will be able to make a full round trip within one hour, allowing this service to be provided using only two buses.

Table 3: Limited Stop Circulator Segment Mileage and Run-Times

Stop/Location	Segment Mileage	Total Mileage	Speed (mph)	Segment Time (min)
Park Central Transfer Station	-	0	-	-
Boonville & Central	0.67	0.67	15	3
Ozark Technical Community College	0.75	1.42	15	3
Missouri State University	1.44	2.86	15	6
St. Johns Regional Health Center	1.30	4.16	15	5
Lester E Cox Medical Center South	2.50	6.66	15	10

All regional service routes would be scheduled to arrive at their respective Springfield terminal locations on the hour and half-hour during the a.m. peak. In order to facilitate a bus-to-bus transfer, the Limited Stop Circulator would be scheduled to leave at 5 and 35 minutes past the hour during the a.m. peak, matching the pulsed schedules of local service. Regional service routes would also be scheduled to depart the two terminal locations 10 and 40 minutes past the hour during the p.m. peak. To facilitate these transfers in the reverse direction, the Limited Stop Circulator would be scheduled to arrive at 5 and 35 minutes past the hour during the p.m. peak, also matching the pulsed schedule of the local service. The proposed schedules for the Limited Stop Circulator route are shown in Table 4 and Table 5.

Table 4: Limited Stop Circulator Northbound Schedule

NB Schedule	*Lester E Cox Medical Center South*	*St. Johns Regional Health Center*	*Missouri State University*	*Ozark Technical Community College*	*Boonville & Central*	*Park Central Transfer Station*
Trip 1 - AM	7:05 AM	7:15 AM	7:20 AM	7:26 AM	7:29 AM	7:32 AM
Trip 2 - AM	7:35 AM	7:45 AM	7:50 AM	7:56 AM	7:59 AM	8:02 AM
Trip 3 - PM	4:38 PM	4:41 PM	4:44 PM	4:50 PM	4:55 PM	5:05 PM
Trip 4 - PM	5:08 PM	5:11 PM	5:14 PM	5:20 PM	5:25 PM	5:35 PM

Table 5: Limited Stop Circulator Southbound Schedule

SB Schedule	*Park Central Transfer Station*	*Boonville & Central*	*Ozark Technical Community College*	*Missouri State University*	*St. Johns Regional Health Center*	*Lester E Cox Medical Center South*
Trip 1 - AM	7:05 AM	7:08 AM	7:11 AM	7:17 AM	7:22 AM	7:32 AM
Trip 2 - AM	7:35 AM	7:38 AM	7:41 AM	7:47 AM	7:52 AM	8:02 AM
Trip 3 - PM	4:38 PM	4:48 PM	4:53 PM	4:59 PM	5:02 PM	5:05 PM
Trip 4 - PM	5:08 PM	5:18 PM	5:23 PM	5:29 PM	5:32 PM	5:35 PM

Ridership and Cost Estimation

Assuming all regional service will transfer passengers at one of the two terminal locations, ridership estimates for the Limited Stop Circulator route will be reliant on (and equal to the sum of) estimates of the regional commuter routes. The combined ridership estimates for all regional routes being implemented at one time is shown in Table 6.

Table 6: Limited Stop Circulator Ridership Estimates

	Daily Ridership Estimate	
Operating Year	**Low**	**High**
1	148	220
5	296	440
10	528	786

The operating and maintenance costs for the Limited Stop Circulator route are shown in Table 7. The fleet for the Limited Stop Circulator is assumed to be comprised of two standard transit vehicles similar to others operated by CU Transit. These 35-foot buses are assumed to have a seating capacity of 32 with a standing load capacity (125% of seated capacity) of 40. The initial capital costs would be $810,000 for this route.

Table 7: Limited Stop Circulator Costs

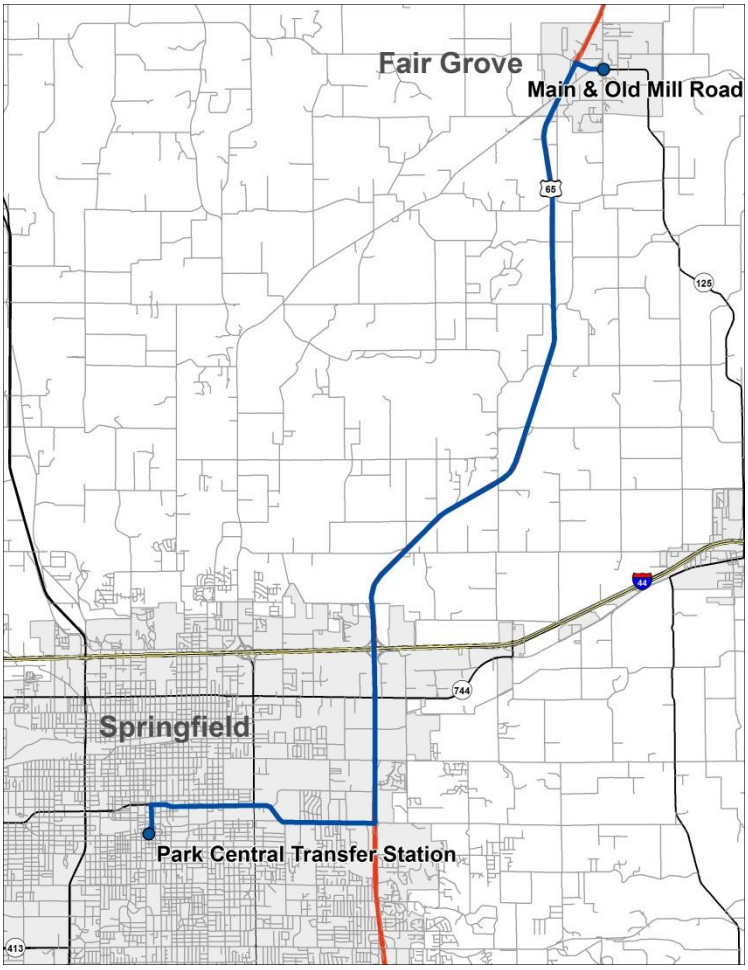
Operating Year	Annual Service Hours	Cost per Service Hour	Service Costs
1	1,020	$90.00	$101,800
5	1,020	$104.33	$106,421
10	1,020	$120.95	$123,372

The summarized costs assume the use of two buses providing eight trips per day as described above. However, given the effects of the combined ridership from all regional commuter routes, eight trips will not provide sufficient capacity for the number of transferring passengers. This issue is discussed in more detail in the Summary section. Fare revenue was not calculated for this route as it was assumed that the regional commuter route fares will allow a free transfer to this circulator route.

Fair Grove

Service from Fair Grove would operate from Main St and Old Mill Rd to the Park Central Transfer Station via Old Mill, US-65, E Chestnut, Boonville, Olive, and Patton as shown in Figure 4. Service from Springfield to Fair Grove would follow this routing in reverse.

Figure 4: Fair Grove Routing



Service would be operated with no intermediate stops and would take 28 minutes for a one-way trip. Two inbound trips would be provided in the a.m. peak and two outbound trips would be provided in the p.m. peak. No reverse commute service would be provided. To provide these two trips with 30-minute headway, two buses would be required. The proposed schedules for Fair Grove service are shown in Table 8 and Table 9.

Table 8: Fair Grove Inbound Schedule

Inbound Schedule	*Main & Old Mill*	*Park Central Transfer Station*
Trip 1 - AM	6:32 AM	7:00 AM
Trip 2 - AM	7:02 AM	7:30 AM

Table 9: Fair Grove Outbound Schedule

Outbound Schedule	*Park Central Transfer Station*	*Main & Old Mill*
Trip 1 - PM	5:10 PM	5:38 PM
Trip 2 - PM	5:40 PM	6:08 PM

Ridership and Cost Estimation

Ridership on the Fair Grove service is projected to be extremely low. Analysis of the LEHD data shows only 238 commuters travelling from Fair Grove to Springfield. Of these, only 41 work within ¼ mile of the proposed Limited Stop Circulator bus stops. The high end estimate of ridership in year 5 is 6 riders per day. Based on route mileage between Fair Grove and the Park Central Transfer Station, the one-way fare would be $1.80. The ridership estimates and resulting fare revenue are summarized in Table 10.

Table 10: Fair Grove Ridership Estimates

Operating Year	Fare	Daily Ridership Estimate		Annual Ridership Estimate		Annual Fare Revenue	
		Low	High	Low	High	Low	High
1	$1.80	<5	<5	510	765	$918	$1,377
5	$1.80	<5	6	1,020	1,530	$1,836	$2,754
10	$1.80	5	8	1,398	2,096	$2,516	$3,774

Opening year operating costs are projected to be $79,560. The impact to the net cost due to fare revenue and inflation is summarized in Table 11.

Table 11: Fair Grove Operating Costs and Revenues

Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	884	$90.00	$79,560	$918	$1,377	$78,183	$78,642
5	884	$104.33	$92,232	$1,836	$2,754	$89,478	$90,396
10	884	$120.95	$106,922	$2,516	$3,774	$103,148	$104,406

In order to operate the proposed schedule, two regional service buses would be required. Given the estimated ridership levels, these were assumed to be body on chassis minibuses at an estimated unit cost of $120,000 per vehicle. Combined with the initial year 1 startup cost of $10,000, this brings the total capital costs to $250,000.

Because the initial ridership estimates are so low, the effects of increased fuel prices are minimal. The adjusted ridership estimates due to fuel price increases are shown in Table 13.

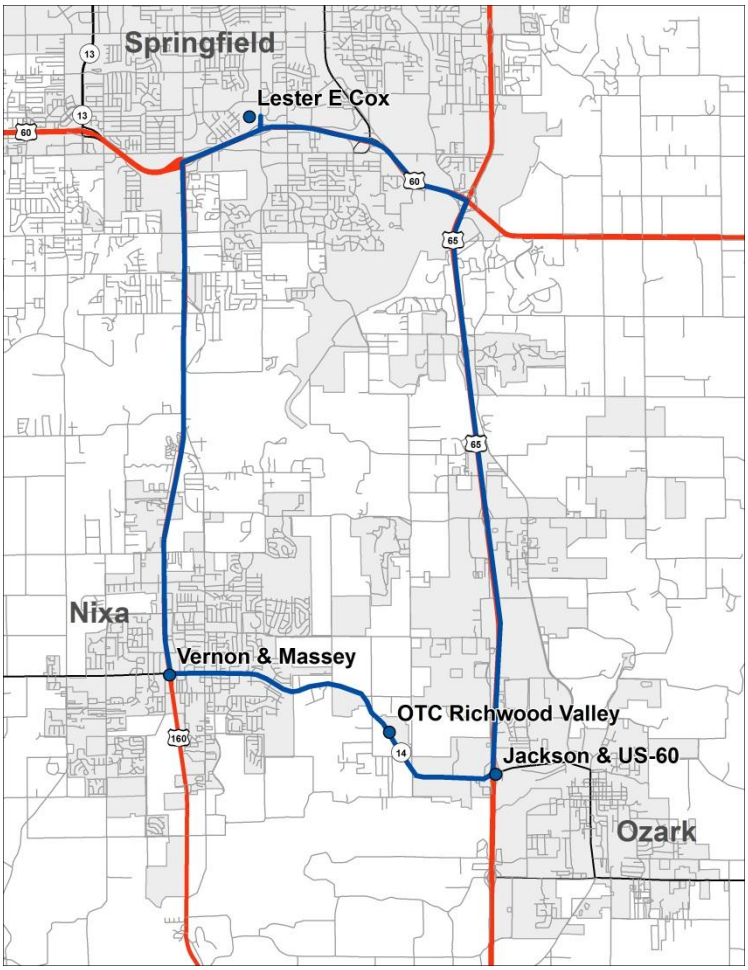
Table 12: Fair Grove Fuel Price Increase Ridership Impacts

Operating Year	Daily Ridership Estimate @ $4 per Gallon		Daily Ridership Estimate @ $5 per Gallon	
	Low	High	Low	High
1	<5	<5	<5	<5
5	<5	6	5	7
10	6	9	6	10

Nixa – Ozark

Service from Nixa and Ozark would operate in a loop starting and ending at Lester E Cox Medical Center South and Service Nixa, Ozark, and the OTC Richwood Valley campus via US-60, US-160, Jackson, and US-65 as shown in Figure 5. Service in the AM period would traverse the loop in a counterclockwise direction and service in the PM period would traverse the loop in a clockwise direction.

Figure 5: Nixa – Ozark Routing



Service would be operated with no intermediate stops and would take 35 minutes to complete the loop. In year 1, two inbound trips would be provided in the a.m. peak and two outbound trips would be provided in the p.m. peak. No reverse commute service would be provided. To provide these two trips with 30-minute headway would require 2 buses. However, by slightly adjusting the trip scheduling, the service could be operated with only 1 bus. To allow this change, the first a.m. trip would be shifted five minutes earlier and the second p.m. trip would be shifted five minutes later. This would result in a 10 minute transfer time between the Nixa-Ozark route and the Limited Stop Circulator for each of these trips, but it would allow both morning and afternoon trips to be operated by a single bus. The proposed schedules for Nixa service are shown in Table 13 and Table 14.

Table 13: Nixa-Ozark Inbound Schedule

Inbound Schedule	*Lester E Cox Medical Center South*	*Vernon & Massey*	*OTC Richwood Valley*	*Jackson & US-60*	*Lester E Cox Medical Center South*
Trip 1 - AM	6:20 AM	6:32 AM	6:39 AM	6:43 AM	6:55 AM
Trip 2 - AM	6:55 AM	7:07 AM	7:14 AM	7:18 AM	7:30 AM

Table 14: Nixa=Ozark Outbound Schedule

Outbound Schedule	*Lester E Cox Medical Center South*	*Jackson & US-60*	*OTC Richwood Valley*	*Vernon & Massey*	*Lester E Cox Medical Center South*
Trip 1 - PM	5:10 PM	5:22 PM	5:26 PM	5:33 PM	5:45 PM
Trip 2 - PM	5:45 PM	5:57 PM	6:01 PM	6:08 PM	6:20 PM

Ridership and Cost Estimation

Ridership on the Nixa – Ozark service is projected to be the highest out of the regional service routes. Analysis of the LEHD data shows 8,873 commuters travelling from Nixa and Ozark to Springfield. Of these, 1,833 work within ¼ mile of the proposed Limited Stop Circulator bus stops. Daily ridership estimates range from 72 to 108 for year 1 service. Due to strong population growth, the daily ridership estimates for year 10 service range from 289 to 434.

The fare was calculated based on the mileage between OTC Richwood Valley and Lester E Cox Medical Center South. This mileage would result in a one-way fare of $1.10. The ridership estimates and resulting fare revenue are summarized in Table 15.

Table 15: Nixa-Ozark Ridership Estimates

Operating Year	Fare	Daily Ridership Estimate		Annual Ridership Estimate		Annual Fare Revenue	
		Low	High	Low	High	Low	High
1	$1.10	72	108	18,360	27,540	$20,196	$30,294
5	$1.10	144	216	36,720	55,080	$40,392	$60,588
10	$1.10	289	434	73,787	110,681	$81,166	$121,749

Opening year operating costs are projected to be $40,545. The impact to the net cost due to fare revenue and inflation is summarized in Table 16.

Table 16: Nixa-Ozark Operating Costs and Revenues

Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	901	$90.00	$81,090	$20,196	$30,294	$50,796	$60,894
5	1,505*	$104.33	$156,972	$40,392	$60,588	$96,384	$116,580
10	2,703**	$120.95	$326,935	$81,166	$121,749	$205,186	$245,769

** Assumes the use of 2 peak buses operating 3 trips per peak period*

*** Assumes the use of 3 peak buses operating 6 trips per peak period*

In order to operate the proposed schedule, only one regional service bus would be required during year 1 service. The significant increases in estimated ridership would necessitate the use of additional peak buses if the service proved successful. Using the average ridership estimates, two peak buses operating

three trips each peak period would be required to sufficiently serve the estimated passenger loads by year 5 and three peak buses operating six trips each peak period would be required to provide sufficient service by year 10. These operational considerations are accounted for in the operating costs and revenues table above. However, they should viewed only as rough estimates as much more detailed analysis would need to be undertaken to determine the appropriate level of service if ridership indeed grew at the estimated rates.

The vehicles were assumed to be standard large buses at an estimated unit cost of $400,000 per vehicle. Combined with the initial year 1 startup cost of $10,000, this brings the total capital costs to $410,000 for year 1 service, and potentially as high as $1,210,000 for year 10 service.

Ridership is projected to increase substantially as a result of increased fuel prices. High-end estimates of ridership in year 10 of operation are over 500 trips per day for each fuel increase analyzed. The adjusted ridership estimates due to fuel price increases are shown in Table 17.

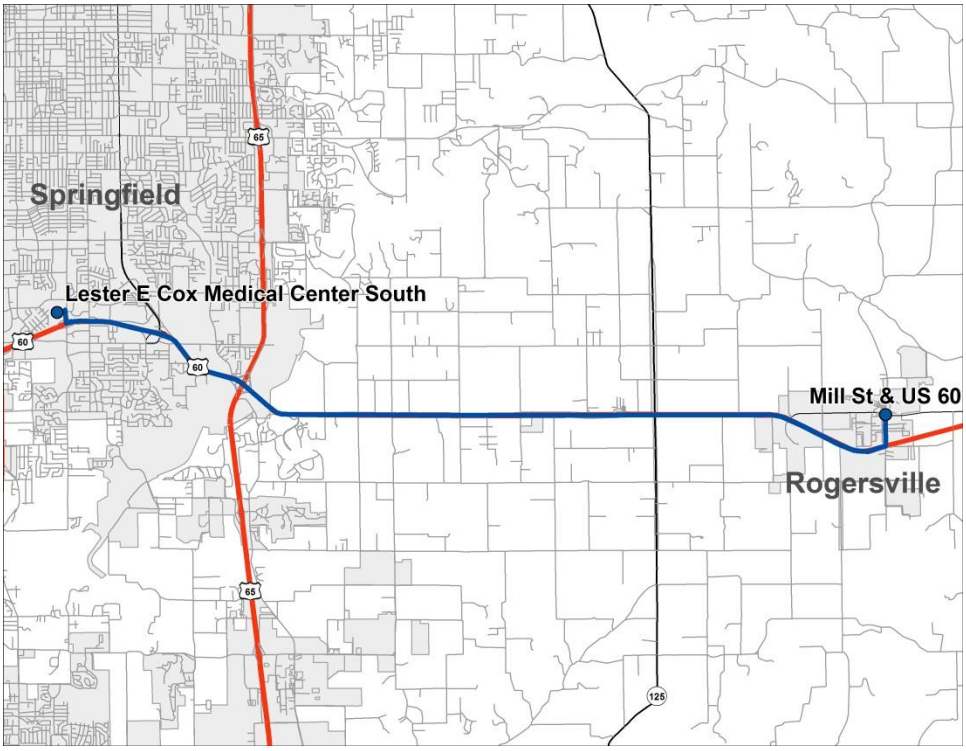
Table 17: Nixa-Ozark Fuel Price Increase Ridership Impacts

	Daily Ridership Estimate @ $4 per Gallon		Daily Ridership Estimate @ $5 per Gallon	
Operating Year	**Low**	**High**	**Low**	**High**
1	80	120	88	132
5	160	240	176	264
10	321	482	353	530

Rogersville

Service from Rogersville would operate from Mill St & US-60 to Lester E Cox Medical Center South via Mill St, US-60, and National as shown in Figure 6. Service from Springfield to Rogersville would follow this routing in reverse.

Figure 6: Rogersville Routing



Service would be operated with no intermediate stops and would take 17 minutes for a one-way trip. Two inbound trips would be provided in the a.m. peak and two outbound trips would be provided in the p.m. peak. No reverse commute service would be provided. To provide these two trips with a 30-minute headway, two buses would be required. The proposed schedules for Rogersville service are shown in Table 18 and Table 19.

Table 18: Rogersville Inbound Schedule

Inbound Schedule	*Mill & US-60*	*Lester E Cox Medical Center South*
Trip 1 - AM	6:43 AM	7:00 AM
Trip 2 - AM	7:13 AM	7:30 AM

Table 19: Rogersville Outbound Schedule

Outbound Schedule	*Lester E Cox Medical Center South*	*Mill & US-60*
Trip 1 - PM	5:10 PM	5:27 PM
Trip 2 - PM	5:40 PM	5:57 PM

Ridership and Cost Estimation

Ridership on the Rogersville service is projected to be very low. Analysis of the LEHD data shows only 108 commuters travelling from Rogersville to Springfield. However, 71 (approximately 65 percent) of these commuters work within ¼ mile of the proposed Limited Stop Circulator bus stops. The year 1 ridership estimates are less than 5 per day, but as a result of significant projected population growth, the year 10 ridership estimates rise to between 8 and 12 riders per day.

Based on route mileage between Rogersville and the Lester E Cox Medical Center South, the one-way fare would be $1.40. The ridership estimates and resulting fare revenue are summarized in Table 20.

Table 20: Rogersville Ridership Estimates

Operating		Daily Ridership Estimate		Annual Ridership Estimate		Annual Fare Revenue	
Year	Fare	Low	High	Low	High	Low	High
1	$1.40	<5	<5	409	614	$573	$859
5	$1.40	<5	5	819	1,228	$1,146	$1,719
10	$1.40	8	12	2,066	3,099	$2,892	$4,338

Opening year operating costs are projected to be $70,380. The impact to the net cost due to fare revenue and inflation is summarized in Table 21.

Table 21: Rogersville Operating Costs and Revenues

Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	782	$90.00	$70,380	$573	$859	$69,521	$69,807
5	782	$104.33	$81,590	$1,146	$1,719	$79,871	$80,444
10	782	$120.95	$94,585	$2,892	$4,338	$90,246	$91,693

In order to operate the proposed schedule, two regional service buses would be required. Given the estimated ridership levels, these were assumed to be body on chassis minibuses at an estimated unit cost of $120,000 per vehicle. Combined with the initial year 1 startup cost of $10,000, this brings the total capital costs to $250,000.

Because the initial ridership estimates are so low, the effects of increased fuel prices are minimal. The impact of fuel price increases on ridership are summarized in Table 22.

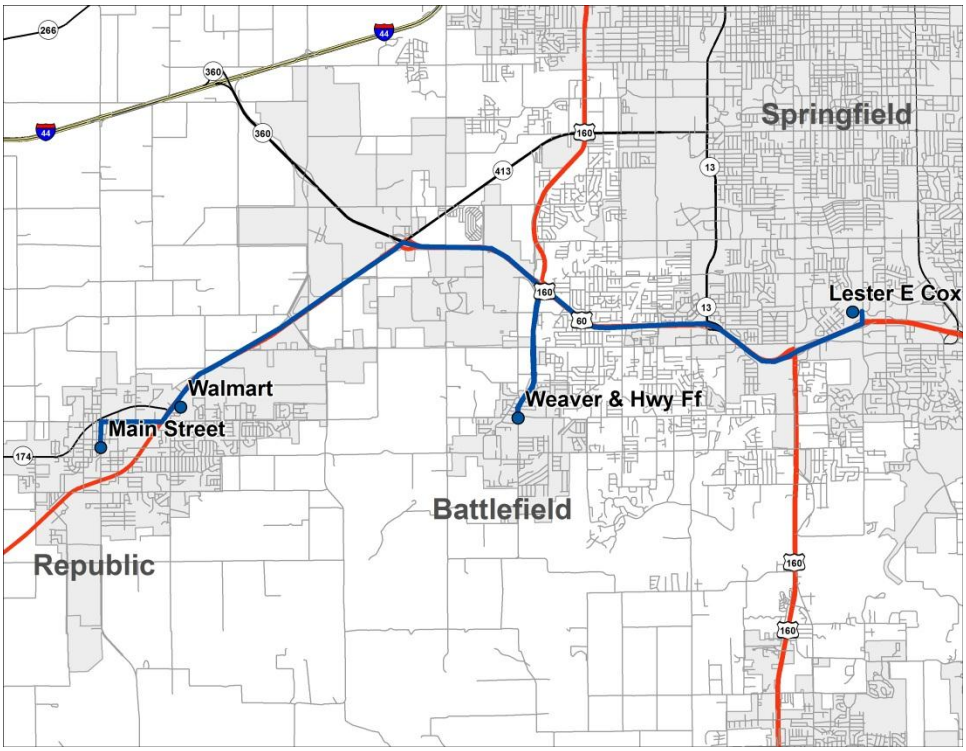
Table 22: Rogersville Fuel Price Increase Ridership Impacts

	Daily Ridership Estimate @ $4 per Gallon		Daily Ridership Estimate @ $5 per Gallon	
Operating Year	Low	High	Low	High
1	<5	<5	<5	<5
5	<5	5	<5	6
10	9	13	10	15

Republic – Battlefield

Service from Republic and Battlefield would operate from Main St & Grant Street in Republic to Weaver Road & Highway Ff in Battlefield to the Lester E Cox Medical Center South via Main, Hines, US-60, State Highway M, State Highway F, James River Freeway, and National as shown in Figure 7. Service from Springfield to Republic-Battlefield would follow this routing in reverse.

Figure 7: Republic - Battlefield Routing



Service would be operated with no intermediate stops and would take 33 minutes for a one-way trip. Two inbound trips would be provided in the a.m. peak and two outbound trips would be provided in the p.m. peak. No reverse commute service would be provided. To provide these two trips with a 30-minute headway, two buses would be required. The proposed schedules for Republic - Battlefield service are shown in Table 24 and Table 25.

Table 23: Republic - Battlefield Inbound Schedule

Inbound Schedule	*Republic*	*Battlefield*	*Lester E Cox Medical Center South*
Trip 1 - AM	6:27 AM	6:46 AM	7:00 AM
Trip 2 - AM	6:57 AM	7:16 AM	7:30 AM

Table 24: Republic - Battlefield Outbound Schedule

Outbound Schedule	*Lester E Cox Medical Center South*	*Battlefield*	*Republic*
Trip 1 - PM	5:10 PM	5:24 PM	5:43 PM
Trip 2 - PM	5:40 PM	5:54 PM	6:13 PM

Ridership and Cost Estimation

Ridership on the Republic - Battlefield service is projected to be the highest among the regional service routes. Analysis of the LEHD data shows 5,335 commuters (Battlefield: 1,849; Republic: 3,486) travelling from Republic - Battlefield to Springfield. Of these, 1,095 (Battlefield: 356; Republic: 739) work within ¼ mile of the proposed Limited Stop Circulator bus stops. Ridership estimates for year 1 service are 43 to 65 trips inbound and outbound per day.

Based on route mileage between Republic - Battlefield and the Lester E Cox Medical Center South, the one-way fare would be $1.70 from Republic and $0.80 from Battlefield. The ridership estimates and resulting fare revenue are summarized in Table 25. Based on projected ridership levels, a weighted average fare of $1.40 was used for fare revenue estimates.

Table 25: Republic-Battlefield Ridership Estimates

Operating Year	Fare	Daily Ridership Estimate		Annual Ridership Estimate		Annual Fare Revenue	
		Low	High	Low	High	Low	High
1	$1.40	43	65	10,965	16,575	$15,351	$23,205
5	$1.40	86	130	21,930	33,150	$30,702	$46,410
10	$1.40	163	246	41,560	62,823	$58,184	$87,952

Opening year operating costs are projected to be $88,740. The impact to the net cost due to fare revenue and inflation is summarized in Table 26

Table 26: Republic-Battlefield Operating Costs and Revenues

Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	1,292	$90.00	$116,280	$15,351	$23,205	$93,075	$100,929
5	1,292	$104.33	$134,800	$30,702	$46,410	$88,390	$104,098
10	1,938*	$120.95	$234,406	$58,184	$87,952	$146,454	$176,222

** Assumes the use of 3 peak buses operating 3 trips per peak period*

In order to operate the proposed schedule, two regional service buses would be required. Given the estimated ridership levels, this was assumed to be two standard large buses at an estimated unit cost of $400,000 per vehicle. Combined with the initial year 1 startup cost of $10,000, this brings the total capital costs to $810,000. By year 10, if ridership levels perform as estimated, an additional bus will be required to provide sufficient service. This need is reflected in the cost and revenue estimates shown in the tables above.

The adjusted ridership estimates due to fuel price increases are shown in Table 27

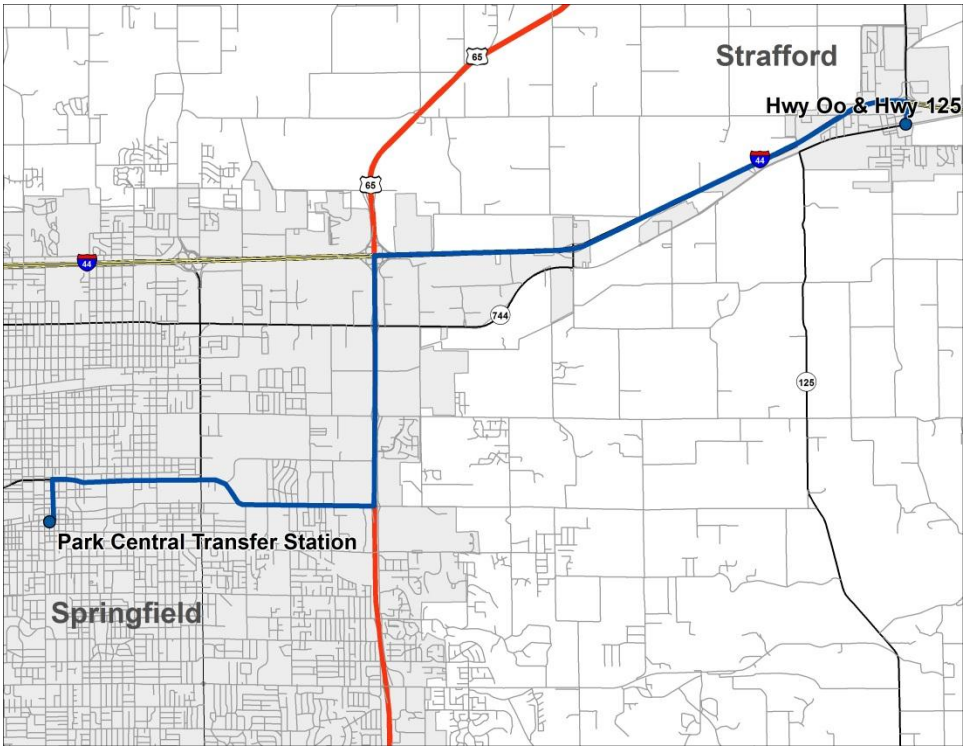
Table 27: Republic-Battlefield Fuel Price Increase Ridership Impacts

Operating Year	Daily Ridership Estimate @ $4 per Gallon		Daily Ridership Estimate @ $5 per Gallon	
	Low	High	Low	High
1	47	70	50	76
5	93	141	100	152
10	177	267	190	287

Strafford

Service from Strafford would operate from Highway Oo and Highway 125 to the Park Central Transfer Station via I-44, US-65, E Chestnut, and Boonville as shown in Figure 8. Service from Springfield to Strafford would follow this routing in reverse.

Figure 8: Strafford Routing



Service would be operated with no intermediate stops and would take 23 minutes for a one-way trip. Two inbound trips would be provided in the a.m. peak and two outbound trips would be provided in the p.m. peak. No reverse commute service would be provided. To provide these two trips with a 30-minute headway, two buses would be required. The proposed schedules for Strafford service are shown in Table 28 and Table 29.

Table 28: Strafford Inbound Schedule

Inbound Schedule	*Strafford*	*Park Central transfer Station*
Trip 1 - AM	6:37 AM	7:00 AM
Trip 2 - AM	7:07 AM	7:30 AM

Table 29: Strafford Outbound Schedule

Outbound Schedule	Park Central transfer Station	Strafford
Trip 1 - PM	5:10 PM	5:33 PM
Trip 2 - PM	5:40 PM	6:03 PM

Ridership and Cost Estimation

Ridership on the Strafford service is projected to be extremely low. Analysis of the LEHD data shows only 385 commuters travelling from Strafford to Springfield. Of these, only 64 work within ¼ mile of the proposed Limited Stop Circulator bus stops. The ridership projections for year 1 range from 3 to 4 trips per day. In part due to low projected population growth, the ridership projections for year 10 only range from 6 to 9 trips per day.

Based on route mileage between Strafford and the Park Central Transfer Station, the one-way fare would be $1.40. The ridership estimates and resulting fare revenue are summarized in Table 30.

Table 30: Strafford Ridership Estimates

Operating		Daily Ridership Estimate		Annual Ridership Estimate		Annual Fare Revenue	
Year	Fare	Low	High	Low	High	Low	High
1	$1.40	<5	<5	765	1,020	$1,071	$1,428
5	$1.40	6	8	1,530	2,040	$2,142	$2,856
10	$1.40	6	9	1,641	2,187	$2,297	$3,062

Opening year operating costs are projected to be $62,730. The impact to the net cost due to fare revenue and inflation is summarized in Table 31.

Table 31: Strafford Operating Costs and Revenues

Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	697	$90.00	$62,730	$1,071	$1,428	$61,302	$61,659
5	697	$104.33	$72,721	$2,142	$2,856	$69,865	$70,579
10	697	$120.95	$84,304	$2,297	$3,062	$81,242	$82,007

In order to operate the proposed schedule, two regional service buses would be required. Given the estimated ridership levels, these were assumed to be body on chassis minibuses at an estimated unit cost of $120,000 per vehicle. Combined with the initial year 1 startup cost of $10,000, this brings the total capital costs to $250,000.

Because the initial ridership estimates are so low, the effects of increased fuel prices are minimal. At most, ridership is project to increase by 1 to 2 trips per day. The adjusted ridership estimates due to fuel price increases are shown in Table 32.

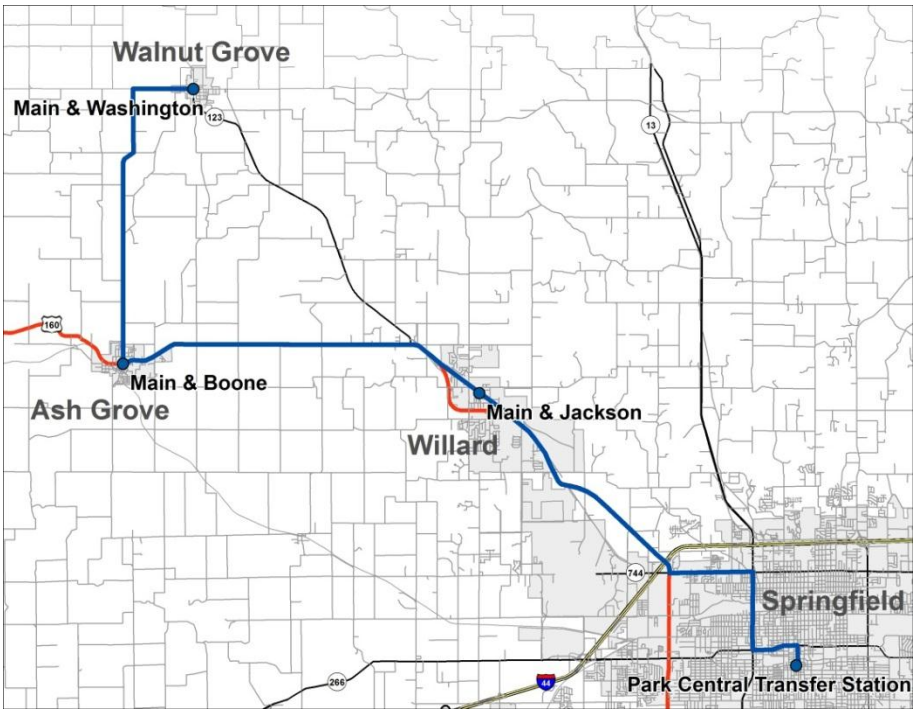
Table 32: Strafford Fuel Price Increase Ridership Impacts

	Daily Ridership Estimate @ $4 per Gallon		Daily Ridership Estimate @ $5 per Gallon	
Operating Year	Low	High	Low	High
1	<5	<5	<5	5
5	6	9	7	9
10	7	9	8	10

Walnut Grove – Ash Grove – Willard

Service from Walnut Grove – Ash Grove – Willard would operate from Main St and Washington St to the Park Central Transfer Station via Main, Missouri, Boone, US-160, Jackson, US-160, Kearney, Kansas, E Chestnut, and Boonville as shown in Figure 9. Service from Springfield to Walnut Grove – Ash Grove – Willard would follow this routing in reverse.

Figure 9: Walnut Grove - Ash Grove - Willard Routing



Service would be operated with no intermediate stops and would take 50 minutes for a one-way trip. Two inbound trips would be provided in the a.m. peak and two outbound trips would be provided in the p.m. peak. No reverse commute service would be provided. To provide these two trips with a 30-minute headway, two buses would be required. The proposed schedules for Walnut Grove – Ash Grove – Willard service are shown in Table 33 and Table 34.

Table 33: Walnut Grove - Ash Grove - Willard Inbound Schedule

Inbound Schedule	*Walnut Grove*	*Ash Grove*	*Willard*	*Park Central Transfer Station*
Trip 1 - AM	6:10 AM	6:22 AM	6:35 AM	7:00 AM
Trip 2 - AM	6:40 AM	6:52 AM	7:05 AM	7:30 AM

Table 34: Walnut Grove - Ash Grove - Willard Outbound Schedule

Outbound Schedule	*Park Central Transfer Station*	*Willard*	*Ash Grove*	*Walnut Grove*
Trip 1 - PM	5:10 PM	5:22 PM	5:35 PM	6:00 PM
Trip 2 - PM	5:40 PM	5:52 PM	6:05 PM	6:30 PM

Ridership and Cost Estimation

Ridership on the Walnut Grove - Ash Grove - Willard service is projected to be fairly low. Analysis of the LEHD data shows 1,472 commuters travelling from Walnut Grove - Ash Grove - Willard to Springfield (Walnut Grove: 86; Ash Grove: 235; Willard: 1,151). Of these, only 223 (15 percent) work within ¼ mile of the proposed Limited Stop Circulator bus stops. The ridership projections for year 1 range from 11 to 16 trips per day. In part due to low projected population growth, the ridership projections for year 10 only range from 24 to 35 trips per day.

Based on route mileage between Walnut Grove - Ash Grove - Willard and the Park Central Transfer Station, the one-way fare would be range from $1.20 from Willard to $3.00 from Ash Grove. Based on projected ridership levels, weighted average fare of $1.45 was used. The ridership estimates and resulting fare revenue are summarized in Table 35.

Table 35: Walnut Grove – Ash Grove – Willard Ridership Estimates

Operating Year	Fare	Daily Ridership Estimate		Annual Ridership Estimate		Annual Fare Revenue	
		Low	High	Low	High	Low	High
1	$1.45	11	16	2,805	4,080	$4,067	$5,916
5	$1.45	22	32	5,610	8,160	$8,135	$11,832
10	$1.45	24	35	6,114	8,893	$8,865	$12,895

Opening year operating costs are projected to be $123,930. The impact to the net cost due to fare revenue and inflation is summarized in Table 36.

Table 36: Walnut Grove – Ash Grove – Willard Operating Costs and Revenues

Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	1,377	$90.00	$123,930	$4,067	$5,916	$118,014	$119,863
5	1,377	$104.33	$143,669	$8,135	$11,832	$131,837	$135,534
10	1,377	$120.95	$166,552	$8,865	$12,895	$153,656	$157,686

In order to operate the proposed schedule, two regional service buses would be required. Given the estimated ridership levels, these were assumed to be body on chassis minibuses at an estimated unit cost of $120,000 per vehicle. Combined with the initial year 1 startup cost of $10,000, this brings the total capital costs to $250,000.

Ridership is expected to see a moderate increase due to increase fuel prices. Year 10 ridership is projected to be 2 to 6 trips per day higher than projections with constant fuel prices. The adjusted ridership estimates due to fuel price increases are shown in Table 37.

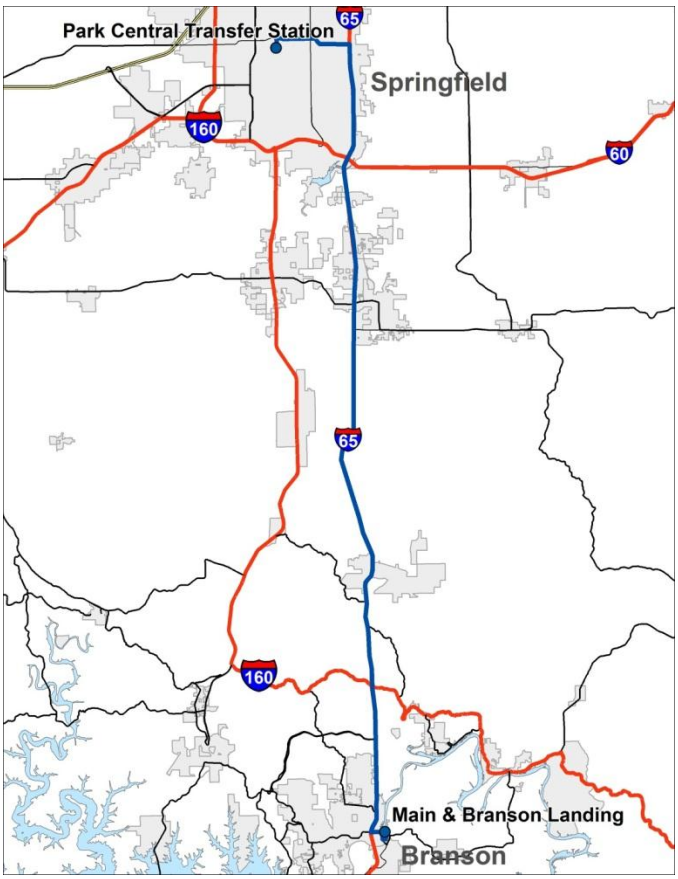
Table 37: Walnut Grove – Ash Grove – Willard Fuel Price Increase Ridership Impacts

Operating Year	Daily Ridership Estimate @ $4 per Gallon		Daily Ridership Estimate @ $5 per Gallon	
	Low	High	Low	High
1	12	17	13	19
5	24	35	26	37
10	26	38	28	41

Branson

Unlike the previous regional service routes, the LEHD data show that the predominant commute direction for Branson service would be a reverse commute from Springfield to Branson in the a.m. peak and from Branson to Springfield in the p.m. peak. Service to Branson would operate from the Park Central Transfer Station to Main & Branson Landing via Boonville, E Chestnut, US-65, and Main as shown in Figure 10. Service from Branson to Springfield would follow this routing in reverse. This service would connect at Park Central Transfer Station rather than Lester E Cox Medical Center South in order to allow better connections with Springfield local service.

Figure 10: Branson Routing



Service would be operated with no intermediate stops and would take 54 minutes for a one-way trip. Two outbound and two inbound trips would be provided in the a.m. peak and two outbound and two inbound trips would be provided in the p.m. peak. To provide these two four with a 30-minute headway, two buses would be required. The proposed schedules are shown in Table 38 and Table 39.

Table 38: Branson Outbound Schedule

Outbound Schedule	*Springfield*	*Branson*
Trip 1 - AM	7:10 AM	8:04 AM
Trip 2 - AM	7:40 AM	8:34 AM
Trip 3 - PM	4:10 PM	5:04 PM
Trip 4 - PM	4:40 PM	5:34 PM

Table 39: Branson Inbound Schedule

Inbound Schedule	*Branson*	*Springfield*
Trip 1 - AM	8:10 AM	9:04 AM
Trip 2 - AM	8:40 AM	9:34 AM
Trip 3 - PM	5:10 PM	6:04 PM
Trip 4 - PM	5:40 PM	6:34 PM

Ridership and Cost Estimation

Analysis of the LEHD data shows 813 commuters travelling from Springfield to Branson. The data also show 357 commuters travelling from Branson to Springfield. Because the service is scheduled with a focus on the reverse commute direction, it was assumed that only half of the Branson to Springfield riders would be able to use the service. The ridership projections for year 1 range from 15 to 22 trips per day, rising to 32 to 46 trips per day by year 10. Based on route mileage between Branson and the Park Central Transfer Station, the one-way fare would be $4.60. The ridership estimates and resulting fare revenue are summarized in Table 42

Table 40: Branson Ridership Estimates

Operating		Daily Ridership Estimate		Annual Ridership Estimate		Annual Fare Revenue	
Year	Fare	Low	High	Low	High	Low	High
1	$4.60	15	22	3,825	5,610	$17,595	$25,806
5	$4.60	30	44	7,650	11,220	$35,190	$51,612
10	$4.60	32	46	8,041	11,794	$36,990	$54,251

Opening year operating costs are projected to be $165,240. The impact to the net cost due to fare revenue and inflation is summarized in Table 41.

Table 41: Branson Operating Costs and Revenues

Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	1,836	$90.00	$165,240	$17,595	$25,806	$139,434	$147,645
5	1,836	$104.33	$191,558	$35,190	$51,612	$139,946	$156,368
10	1,836	$120.95	$222,069	$36,990	$54,251	$167,817	$185,079

In order to operate the proposed schedule, two regional service buses would be required. Given the estimated ridership levels, these were assumed to be body on chassis minibuses at an estimated unit cost of $120,000 per vehicle. Combined with the initial year 1 startup cost of $10,000, this brings the total capital costs to $250,000.

The adjusted ridership estimates due to fuel price increases are shown in Table 42.

Table 42: Branson Fuel Price Increase Ridership Impacts

	Daily Ridership Estimate @ $4 per Gallon		Daily Ridership Estimate @ $5 per Gallon	
Operating Year	Low	High	Low	High
1	17	24	18	27
5	33	49	37	54
10	35	51	38	56

Summary

Summaries of the operations and capital costs for all regional service routes are shown in the tables below. These summaries assume average daily ridership that is an average of the low and high estimates calculated in the previous sections. Annual net costs (after accounting for passenger fare revenue) for year 1 service range from $55,845 per year for Nixa-Ozark service to $143,540 per year for Branson service. In total, the year 1 regional service as described would cost $818,550 per year to operate and generate $74,328 per year in fare revenue for an annual total net cost of $744,222. By year 10, the combined operational cost of the regional service routes would be $1,396,154 with fare revenues of $240,466 per year and a net cost of $1,115,689.

Table 43: Regional Service Year 1 Cost Summary

Route	Initial Startup and Capital Cost	Annual Service Cost	Fare	Average Annual Ridership	Annual Fare Revenue	Annual Net Cost
Fair Grove	$250,000	$79,560	$1.80	638	$1,148	$78,413
Nixa – Ozark	$410,000	$81,090	$1.10	22,950	$25,245	$55,845
Rogersville	$250,000	$97,920	$1.40	512	$716	$97,204
Republic - Battlefield	$810,000	$116,280	$1.40	13,770	$19,278	$97,002
Strafford	$250,000	$62,730	$1.40	893	$1,250	$61,481
Walnut Grove - Ash Grove - Willard	$250,000	$123,930	$1.45	3,443	$4,992	$118,938
Branson	$250,000	$165,240	$4.60	4,718	$21,701	$143,540
Limited Stop Circulator	$810,000	$91,800	-	-	-	$91,800
TOTAL	**$3,280,000**	**$818,550**	**-**	**46,922**	**$74,328**	**$744,222**

Table 44: Regional Service Year 5 Cost Summary

Route	Annual Service Cost	Fare	Average Annual Ridership	Annual Fare Revenue	Annual Net Cost
Fair Grove	$92,232	$1.80	1,275	$2,295	$89,937
Nixa - Ozark	$156,972	$1.10	45,900	$50,490	$106,482
Rogersville	$113,516	$1.40	1,023	$1,432	$112,084
Republic - Battlefield	$134,800	$1.40	27,540	$38,556	$96,244
Strafford	$72,721	$1.40	1,785	$2,499	$70,222
Walnut Grove - Ash Grove - Willard	$143,669	$1.45	6,885	$9,983	$133,686
Branson	$191,558	$4.60	9,435	$43,401	$148,157
Limited Stop Circulator	$106,421	-	-	-	$106,421
TOTAL	**$1,011,890**	**-**	**93,843**	**$148,657**	**$863,233**

Table 45: Regional Service Year 10 Cost Summary

Route	Annual Service Cost	Fare	Average Annual Ridership	Annual Fare Revenue	Annual Net Cost
Fair Grove	$106,922	$1.80	1,747	$3,145	$103,777
Nixa - Ozark	$326,935	$1.10	92,234	$101,457	$225,477
Rogersville	$131,596	$1.40	2,582	$3,615	$127,981
Republic - Battlefield	$234,406	$1.40	52,191	$73,068	$161,338
Strafford	$84,304	$1.40	1,914	$2,680	$81,624
Walnut Grove - Ash Grove - Willard	$166,552	$1.45	7,504	$10,880	$155,671
Branson	$222,069	$4.60	9,918	$45,621	$176,448
Limited Stop Circulator	$123,372	-	-	-	$123,372
TOTAL	**$1,396,154**	**-**	**168,090**	**$240,466**	**$1,155,689**

Two common measures of transit performance are the average cost of service per passenger, and the number of passengers per service hour. A summary of each of these measures in provided in the tables below. By far the highest performing regional service routes are Nixa – Ozark, and Republic – Battlefield with average costs per passenger of $3.53 and $8.44 respectively. This per passenger cost does not include the costs for operating the Limited Stop Circulator. The remaining routes have an average cost per passenger of over $35. These same routes also show the highest productivity levels at 25.5 and 10.7 passengers per service hour respectively. The remaining regional service routes result in productivity levels of less than 3 passengers per service hour. Due to ridership increases, the average cost per passenger would fall from $17.45 in year 1 to $8.31 in year 10.

Table 46: Regional Service Year 1 Performance Measures

Route	Average Annual Ridership	Annual Net Cost	Annual Service Hours	Average Cost per Passenger	Passengers per Service Hour
Fair Grove	638	$78,413	884	$124.80	0.7
Nixa - Ozark	22,950	$55,845	901	$3.53	25.5
Rogersville	512	$97,204	1,088	$191.40	0.5
Republic - Battlefield	13,770	$97,002	1,292	$8.44	10.7
Strafford	893	$61,481	697	$70.29	1.3
Walnut Grove - Ash Grove - Willard	3,443	$118,938	1,377	$36.00	2.5
Branson	4,718	$143,540	1,836	$35.03	2.6
Limited Stop Circulator	-	$91,800	1,020	-	-
TOTAL	**46,922**	**$744,222**	**9,095**	**$17.45**	**5.2**

Table 47: Regional Service Year 5 Performance Measures

Route	Average Annual Ridership	Annual Net Cost	Annual Service Hours	Average Cost per Passenger	Passengers per Service Hour
Fair Grove	1,275	$89,937	884	$72.34	1.4
Nixa - Ozark	45,900	$106,482	1,505	$3.42	30.5
Rogersville	1,023	$112,084	1,088	$110.94	0.9
Republic - Battlefield	27,540	$96,244	1,292	$4.89	21.3
Strafford	1,785	$70,222	697	$40.74	2.6
Walnut Grove - Ash Grove - Willard	6,885	$133,686	1,377	$20.87	5.0
Branson	9,435	$148,157	1,836	$20.30	5.1
Limited Stop Circulator	-	$106,421	1,020	-	-
TOTAL	**93,843**	**$863,233**	**9,699**	**$10.78**	**9.7**

Table 48: Regional Service Year 10 Performance Measures

Route	Average Annual Ridership	Annual Net Cost	Annual Service Hours	Average Cost per Passenger	Passengers per Service Hour
Fair Grove	1,747	$103,777	884	$61.20	2.0
Nixa - Ozark	92,234	$225,477	2,703	$3.54	34.1
Rogersville	2,582	$127,981	1,088	$50.96	2.4
Republic - Battlefield	52,191	$161,338	1,938	$4.49	26.9
Strafford	1,914	$81,624	697	$44.05	2.7
Walnut Grove - Ash Grove - Willard	7,504	$155,671	1,377	$22.20	5.4
Branson	9,918	$176,448	1,836	$22.39	5.4
Limited Stop Circulator	-	$123,372	1,020	-	-
TOTAL	**168,090**	**$1,155,689**	**11,543**	**$8.31**	**14.6**

Vehicle Requirements

As mentioned in the Limited Stop Circulator service planning section, the combined ridership for all regional commuter routes being implemented at one time would result in ridership levels on the Circulator route in excess of capacity for a two-bus operation. This situation is further complicated by the uneven distribution of passenger transfers between the north and south terminals.

Routes using the north terminal include Fair Grove, Strafford, and Walnut Grove – Ash Grove – Willard. These result in one-way ridership levels between 16 and 23 per day for year 5 estimates[3]. Assuming 40 as the maximum standing load bus capacity[4] for planning purposes, the proposed service would be sufficient. However, the route using the south terminal, which include Nixa, Ozark, Rogersville, and Republic – Battlefield, would result in one-way ridership levels of 117 to 175 per day. This would either require two to three additional 35-foot buses operating in tandem on the northbound portion of the Circulator, or the use of much higher capacity buses.

[3] One-way ridership levels cited assume a worst-case scenario where all regional route passengers transfer to the Limited Stop Circulator rather than transferring to other routes or walking to a final destination.
[4] 125% x 32 (Gillig 35-ft bus seating capacity) = 40

Alternatively, select routes providing service to the southern regional cities could be designed such that there is no forced transfer for passengers at the south terminal. Instead, buses arriving at the Lester E Cox Medical Center South would operate by following the routing and stop locations of the Limited Stop Circulator route. Because routes connecting to the southern terminal are already scheduled to deadhead to the CU Transit garage after completing their runs, there would be only marginal increases to the service hours and operating costs. In addition, operating in this manner would provide a faster and more comfortable trip for CU Transit customers by eliminating the 5-minute transfer at the southern terminal. This would also allow more flexibility in route scheduling.

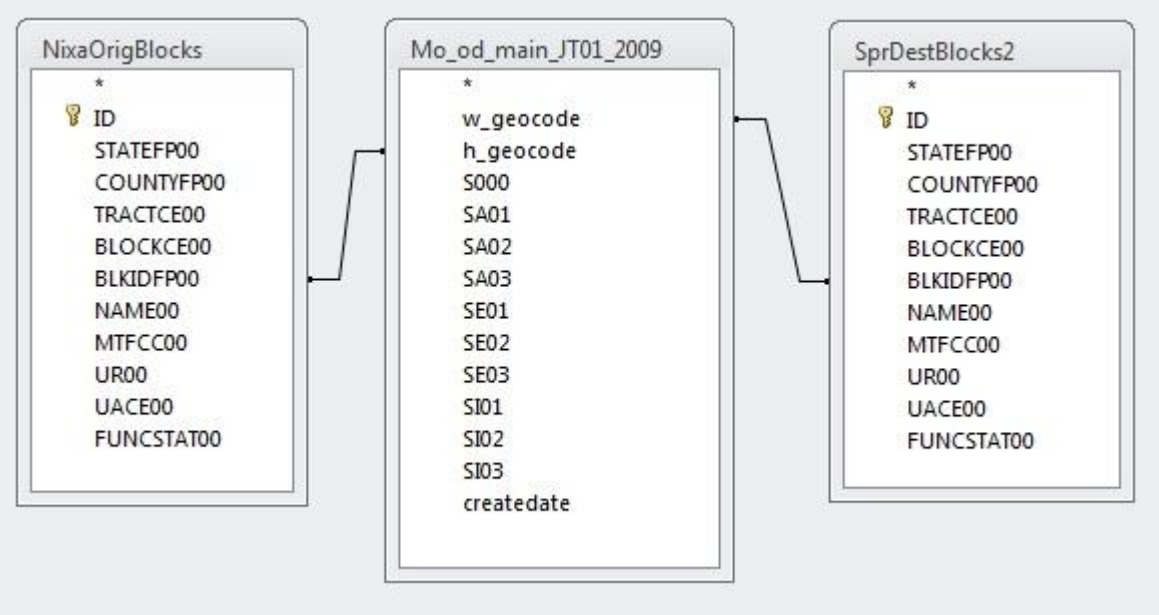
Regional services to Nixa, Ozark, and Republic – Battlefield are projected to have the highest numbers of passenger ridership. Operating only two of these services under this alternative plan would result in manageable ridership levels for the Limited Stop Circulator route.

Appendix A: LEHD Analysis

As discussed in the Ridership Estimation section, Longitudinal Employer-Household Dynamic (LEHD) data is generated by the US Census Bureau and contains information on the origins and destinations of commuters. The most recent dataset available is for 2009 LEHD data available at: http://lehd.did.census.gov/led/onthemap/mo/od/. The data table used for this analysis was titled: "mo_od_main_JT01_2009.csv.gz". The represents data for the origins and destinations of primary job commuters who both live and work within the Missouri state boundaries.

To conduct the analysis, this origin-destination table was downloaded and imported into Microsoft Access. The origin and destination census blocks used for this analysis were selected as described in the Ridership Estimation section and also imported into Microsoft Access. A query was then created to return the sum of commuters who live in one of the census blocks listed in the origin table and work in one of the census blocks listed in the destination table. An example of this is shown in Figure 11, which shows the query setup for finding the number of commuters living in Nixa and working in Springfield within ¼ mile of the bus stop locations.

Figure 11: Microsoft Access LEHD Query Example



The remainder of this Appendix lists the census blocks used for each origin and destination location.

Table 49: Ash Grove Origin Census Blocks

290770050012039	290770050012060	290770050012093	290770050012116	290770050012133
290770050012040	290770050012061	290770050012094	290770050012117	290770050012134
290770050012043	290770050012063	290770050012103	290770050012118	290770050012135
290770050012044	290770050012064	290770050012104	290770050012119	290770050012136
290770050012047	290770050012065	290770050012105	290770050012120	290770050012137
290770050012048	290770050012066	290770050012106	290770050012121	290770050012138
290770050012050	290770050012067	290770050012107	290770050012122	290770050012139
290770050012052	290770050012085	290770050012108	290770050012123	290770050012170

290770050012053	290770050012086	290770050012109	290770050012124	290770050012171
290770050012054	290770050012087	290770050012110	290770050012127	290770050012172
290770050012055	290770050012088	290770050012111	290770050012128	290770050012173
290770050012056	290770050012089	290770050012112	290770050012129	
290770050012057	290770050012090	290770050012113	290770050012130	
290770050012058	290770050012091	290770050012114	290770050012131	
290770050012059	290770050012092	290770050012115	290770050012132	

Table 50: Battlefield Origin Census Blocks

290770041011012	290770041011036	290770041012002	290770041012020	290770041012032
290770041011013	290770041011037	290770041012004	290770041012021	290770041012033
290770041011014	290770041011038	290770041012005	290770041012022	290770041012034
290770041011027	290770041011039	290770041012006	290770041012023	290770041012035
290770041011028	290770041011040	290770041012007	290770041012024	290770041012036
290770041011029	290770041011041	290770041012008	290770041012025	290770041012037
290770041011030	290770041011042	290770041012012	290770041012026	290770041012038
290770041011031	290770041011043	290770041012013	290770041012027	290770041012039
290770041011032	290770041011044	290770041012014	290770041012028	290770041012040
290770041011033	290770041011045	290770041012015	290770041012029	290770041022011
290770041011034	290770041012000	290770041012017	290770041012030	290770042022016
290770041011035	290770041012001	290770041012019	290770041012031	290770042022017

Table 51: Branson Destination Census Blocks

292139801009014	292139801008032	292139801009029	292139801008049	292139801009041
292139801008016	292139801008043	292139801008021	292139801008044	292139801008031
292139801009022	292139801009013	292139801009039	292139801009035	292139801009036
292139801009047	292139801008007	292139801009026	292139801009016	292139801008003
292139801008029	292139801008018	292139801009037	292139801008019	292139801009025
292139801009051	292139801009021	292139801008052	292139801009024	292139801008027
292139801009050	292139801008009	292139801009031	292139801009042	292139801008030
292139801009032	292139801009015	292139801009054	292139801009043	292139801009033
292139801008037	292139801008010	292139801008050	292139801009044	292139801008036
292139801008026	292139801008013	292139801009052	292139801008028	292139801008048
292139801009009	292139801008014	292139801008047	292139801008999	
292139801009056	292139801008008	292139801008046	292139801009046	
292139801009017	292139801009011	292139801009027	292139801008033	
292139801009040	292139801009055	292139801008011	292139801009038	
292139801009045	292139801008017	292139801008015	292139801009010	
292139801009049	292139801009019	292139801008024	292139801009028	
292139801008035	292139801008022	292139801009048	292139801008012	
292139801008034	292139801009012	292139801009030	292139801009018	

292139801008045	292139801008020	292139801009034	292139801009020	
292139801008051	292139801009023	292139801009053	292139801008025	

Table 52: Fair Grove Origin Census Blocks

290770046004019	290770046004029	290770046005005	290770046005025	290770046005036
290770046004020	290770046004030	290770046005006	290770046005026	290770046005126
290770046004024	290770046004031	290770046005007	290770046005028	290770046005127
290770046004025	290770046004032	290770046005008	290770046005029	290770046005128
290770046004026	290770046004033	290770046005009	290770046005031	290770046005129
290770046004027	290770046005003	290770046005010	290770046005034	
290770046004028	290770046005004	290770046005011	290770046005035	

Table 53: Nixa Origin Census Blocks

290430202012000	290430202021077	290430202031036	290430202041012	290430202051004
290430202012001	290430202021078	290430202031037	290430202041013	290430202051005
290430202012003	290430202021079	290430202031038	290430202041014	290430202051006
290430202012004	290430202021080	290430202031039	290430202041015	290430202051007
290430202012006	290430202021081	290430202031040	290430202041016	290430202051008
290430202012007	290430202021082	290430202031041	290430202041017	290430202051009
290430202012008	290430202021083	290430202031042	290430202041018	290430202051010
290430202012009	290430202021084	290430202031043	290430202041019	290430202051011
290430202021009	290430202021085	290430202031044	290430202041020	290430202051012
290430202021010	290430202021086	290430202031045	290430202041021	290430202051013
290430202021025	290430202022002	290430202031046	290430202041022	290430202051014
290430202021026	290430202022003	290430202031047	290430202041023	290430202051015
290430202021027	290430202022004	290430202031048	290430202041024	290430202051016
290430202021028	290430202022005	290430202031049	290430202041025	290430202051017
290430202021029	290430202022006	290430202031050	290430202041026	290430202051019
290430202021030	290430202022007	290430202031051	290430202041027	290430202051020
290430202021031	290430202022010	290430202031052	290430202041028	290430202051021
290430202021032	290430202022011	290430202031053	290430202041029	290430202051022
290430202021033	290430202022012	290430202032000	290430202041030	290430202051023
290430202021034	290430202022013	290430202032001	290430202041031	290430202051024
290430202021035	290430202022014	290430202032002	290430202041032	290430202051025
290430202021036	290430202022015	290430202032003	290430202041033	290430202051026
290430202021037	290430202022016	290430202032004	290430202041034	290430202051027
290430202021038	290430202022017	290430202032005	290430202041035	290430202051028
290430202021039	290430202022018	290430202032006	290430202041036	290430202051029
290430202021045	290430202022019	290430202032007	290430202041037	290430202051030
290430202021046	290430202022020	290430202032008	290430202041038	290430202051031
290430202021047	290430202022021	290430202032009	290430202041039	290430202051032
290430202021048	290430202022022	290430202032013	290430202041040	290430202051033

290430202021051	290430202022023	290430202032014	290430202041041	290430202051034
290430202021052	290430202022024	290430202032015	290430202041042	290430202051035
290430202021053	290430202022025	290430202032016	290430202041043	290430202051036
290430202021054	290430202022026	290430202032017	290430202041044	290430202051037
290430202021055	290430202022027	290430202032018	290430202041048	290430202051038
290430202021056	290430202022028	290430202032019	290430202041049	290430202051039
290430202021057	290430202022029	290430202032020	290430202041050	290430202051041
290430202021058	290430202022030	290430202032021	290430202041051	290430203011118
290430202021059	290430202022031	290430202032022	290430202041052	290430203011119
290430202021060	290430202022032	290430202032023	290430202041053	
290430202021061	290430202022033	290430202032024	290430202041054	
290430202021062	290430202022034	290430202032025	290430202041055	
290430202021063	290430202022035	290430202032026	290430202041056	
290430202021064	290430202022036	290430202032027	290430202041058	
290430202021065	290430202022037	290430202032028	290430202041059	
290430202021066	290430202031015	290430202032029	290430202041060	
290430202021067	290430202031016	290430202032030	290430202041061	
290430202021068	290430202031024	290430202032031	290430202041062	
290430202021069	290430202031025	290430202041004	290430202041066	
290430202021070	290430202031026	290430202041005	290430202041071	
290430202021071	290430202031027	290430202041006	290430202041072	
290430202021072	290430202031028	290430202041007	290430202041073	
290430202021073	290430202031029	290430202041008	290430202051000	
290430202021074	290430202031030	290430202041009	290430202051001	
290430202021075	290430202031034	290430202041010	290430202051002	
290430202021076	290430202031035	290430202041011	290430202051003	

Table 54: Ozark Origin Census Blocks

290430203011001	290430203011159	290430203012117	290430203022092	290430203032076
290430203011012	290430203011160	290430203012118	290430203022093	290430203032077
290430203011013	290430203011161	290430203012119	290430203022094	290430203032081
290430203011014	290430203011162	290430203012120	290430203022095	290430203032087
290430203011015	290430203011163	290430203012121	290430203022096	290430203032099
290430203011017	290430203011166	290430203012991	290430203022098	290430203032100
290430203011018	290430203011171	290430203012992	290430203022099	290430203032121
290430203011019	290430203011172	290430203012993	290430203022100	290430203032122
290430203011020	290430203011174	290430203012994	290430203022101	290430203041000
290430203011021	290430203011175	290430203021020	290430203022102	290430203041001
290430203011022	290430203011176	290430203021021	290430203022103	290430203041002
290430203011023	290430203011177	290430203021022	290430203022104	290430203041003
290430203011024	290430203011178	290430203021023	290430203022105	290430203041004
290430203011025	290430203011179	290430203021024	290430203022106	290430203041005

290430203011026	290430203011180	290430203021025	290430203022107	290430203041006
290430203011027	290430203011181	290430203021026	290430203022108	290430203041007
290430203011028	290430203011182	290430203021027	290430203022109	290430203041008
290430203011029	290430203011183	290430203021028	290430203022110	290430203041009
290430203011030	290430203011184	290430203021029	290430203022111	290430203041010
290430203011031	290430203011185	290430203021030	290430203022112	290430203041011
290430203011032	290430203011186	290430203021031	290430203022113	290430203041012
290430203011053	290430203011187	290430203021032	290430203022114	290430203041014
290430203011054	290430203011188	290430203021033	290430203023000	290430203041036
290430203011055	290430203011189	290430203021034	290430203023001	290430203041998
290430203011056	290430203011190	290430203021035	290430203023002	290430203041999
290430203011057	290430203011191	290430203021036	290430203023003	290430203042000
290430203011058	290430203011192	290430203022001	290430203023004	290430203042001
290430203011059	290430203011193	290430203022002	290430203023005	290430203042002
290430203011060	290430203011194	290430203022004	290430203023006	290430203042003
290430203011061	290430203011195	290430203022005	290430203023007	290430203042004
290430203011062	290430203011196	290430203022006	290430203023008	290430203042005
290430203011063	290430203011197	290430203022007	290430203023009	290430203042006
290430203011064	290430203011198	290430203022008	290430203023010	290430203042007
290430203011065	290430203011199	290430203022009	290430203023011	290430203042008
290430203011066	290430203012003	290430203022010	290430203023012	290430203042009
290430203011067	290430203012007	290430203022011	290430203023013	290430203042010
290430203011068	290430203012009	290430203022012	290430203023014	290430203042011
290430203011069	290430203012010	290430203022013	290430203023015	290430203042012
290430203011070	290430203012011	290430203022014	290430203023016	290430203042013
290430203011071	290430203012012	290430203022015	290430203023017	290430203042014
290430203011072	290430203012013	290430203022016	290430203023018	290430203042016
290430203011073	290430203012014	290430203022017	290430203023019	290430203042017
290430203011074	290430203012015	290430203022018	290430203023020	290430203042018
290430203011075	290430203012017	290430203022019	290430203023021	290430203042019
290430203011076	290430203012018	290430203022020	290430203023022	290430203042020
290430203011077	290430203012020	290430203022021	290430203031000	290430203042021
290430203011078	290430203012021	290430203022022	290430203031014	290430203042022
290430203011079	290430203012022	290430203022023	290430203031015	290430203042023
290430203011080	290430203012023	290430203022024	290430203032000	290430203042024
290430203011081	290430203012024	290430203022025	290430203032001	290430203042025
290430203011082	290430203012025	290430203022026	290430203032002	290430203042026
290430203011083	290430203012026	290430203022027	290430203032003	290430203042027
290430203011084	290430203012027	290430203022028	290430203032004	290430203042028
290430203011086	290430203012028	290430203022029	290430203032005	290430203042029
290430203011087	290430203012029	290430203022030	290430203032006	290430203042030
290430203011089	290430203012030	290430203022031	290430203032007	290430203042031
290430203011090	290430203012031	290430203022032	290430203032008	290430203042032

290430203011091	290430203012032	290430203022033	290430203032009	290430203042033
290430203011092	290430203012033	290430203022034	290430203032010	290430203042034
290430203011093	290430203012034	290430203022035	290430203032011	290430203042035
290430203011094	290430203012035	290430203022036	290430203032012	290430203042036
290430203011095	290430203012036	290430203022037	290430203032013	290430203042037
290430203011096	290430203012037	290430203022038	290430203032014	290430203042038
290430203011097	290430203012038	290430203022039	290430203032015	290430203042039
290430203011098	290430203012039	290430203022040	290430203032016	290430203042040
290430203011099	290430203012040	290430203022041	290430203032017	290430203042041
290430203011100	290430203012041	290430203022042	290430203032018	290430203042042
290430203011101	290430203012042	290430203022043	290430203032019	290430203042043
290430203011102	290430203012043	290430203022044	290430203032020	290430203042044
290430203011103	290430203012044	290430203022045	290430203032021	290430203042045
290430203011104	290430203012045	290430203022046	290430203032022	290430203042046
290430203011105	290430203012046	290430203022047	290430203032023	290430203042047
290430203011106	290430203012047	290430203022048	290430203032024	290430203042048
290430203011107	290430203012048	290430203022049	290430203032025	290430203042049
290430203011108	290430203012049	290430203022050	290430203032026	290430203042050
290430203011109	290430203012050	290430203022051	290430203032027	290430203042051
290430203011110	290430203012051	290430203022052	290430203032028	290430203042054
290430203011111	290430203012052	290430203022053	290430203032029	290430203042057
290430203011112	290430203012053	290430203022054	290430203032030	290430203042058
290430203011113	290430203012054	290430203022055	290430203032032	290430203042060
290430203011114	290430203012055	290430203022056	290430203032035	290430203042061
290430203011115	290430203012056	290430203022057	290430203032036	290430203042062
290430203011116	290430203012057	290430203022058	290430203032039	290430203042063
290430203011124	290430203012058	290430203022059	290430203032040	290430203042064
290430203011125	290430203012059	290430203022060	290430203032041	290430203042065
290430203011126	290430203012060	290430203022061	290430203032042	290430203042066
290430203011127	290430203012061	290430203022062	290430203032043	290430203042067
290430203011128	290430203012062	290430203022063	290430203032044	290430203042068
290430203011129	290430203012063	290430203022064	290430203032045	290430203042069
290430203011130	290430203012064	290430203022065	290430203032046	290430203042070
290430203011131	290430203012065	290430203022066	290430203032047	290430203042071
290430203011132	290430203012066	290430203022067	290430203032048	290430203042072
290430203011133	290430203012067	290430203022068	290430203032049	290430203042073
290430203011135	290430203012068	290430203022069	290430203032053	290430203042074
290430203011136	290430203012069	290430203022070	290430203032054	290430203042075
290430203011137	290430203012070	290430203022071	290430203032055	290430203042076
290430203011138	290430203012071	290430203022072	290430203032056	290430203042077
290430203011139	290430203012072	290430203022073	290430203032057	290430203042078
290430203011140	290430203012073	290430203022074	290430203032058	290430203042079
290430203011141	290430203012074	290430203022075	290430203032059	290430203042080

290430203011142	290430203012075	290430203022076	290430203032060	290430203042998
290430203011143	290430203012076	290430203022077	290430203032062	290430203042999
290430203011144	290430203012077	290430203022078	290430203032063	290430205003036
290430203011145	290430203012078	290430203022079	290430203032064	
290430203011146	290430203012079	290430203022080	290430203032065	
290430203011147	290430203012080	290430203022081	290430203032066	
290430203011148	290430203012081	290430203022082	290430203032067	
290430203011150	290430203012083	290430203022083	290430203032068	
290430203011151	290430203012084	290430203022084	290430203032069	
290430203011152	290430203012110	290430203022085	290430203032070	
290430203011153	290430203012112	290430203022086	290430203032071	
290430203011154	290430203012113	290430203022087	290430203032072	
290430203011156	290430203012114	290430203022088	290430203032073	
290430203011157	290430203012115	290430203022089	290430203032074	
290430203011158	290430203012116	290430203022091	290430203032075	

Table 55: Republic Origin Blocks

290430201022003	290770048013006	290770048021047	290770048031015	290770048032017
290430201022004	290770048013007	290770048021048	290770048031016	290770048032018
290430201022005	290770048013008	290770048021049	290770048031017	290770048032019
290430201022008	290770048013009	290770048021050	290770048031018	290770048032020
290430201022035	290770048013010	290770048022001	290770048031019	290770048032021
290770043012058	290770048013011	290770048022002	290770048031020	290770048032022
290770048011014	290770048013023	290770048022003	290770048031022	290770048032023
290770048011015	290770048013024	290770048022004	290770048031024	290770048032024
290770048011016	290770048013025	290770048022005	290770048031025	290770048032025
290770048011017	290770048013026	290770048022006	290770048031026	290770048032026
290770048011018	290770048013027	290770048022007	290770048031027	290770048032027
290770048011020	290770048013028	290770048022008	290770048031028	290770048032028
290770048011021	290770048013031	290770048022009	290770048031029	290770048032029
290770048011022	290770048013032	290770048022010	290770048031030	290770048032030
290770048011023	290770048013033	290770048022011	290770048031031	290770048032031
290770048011052	290770048013049	290770048022012	290770048031032	290770048032032
290770048011053	290770048013050	290770048022013	290770048031033	290770048032033
290770048011054	290770048013052	290770048022014	290770048031034	290770048032034
290770048011055	290770048021000	290770048022015	290770048031035	290770048032035
290770048011056	290770048021001	290770048022016	290770048031036	290770048032036
290770048011057	290770048021002	290770048022017	290770048031039	290770048032037
290770048011058	290770048021003	290770048022018	290770048031040	290770048032038
290770048011059	290770048021004	290770048022019	290770048031042	290770048032039
290770048012006	290770048021005	290770048022020	290770048031043	290770048032040
290770048012007	290770048021006	290770048022021	290770048031044	290770048032041

290770048012008	290770048021007	290770048022022	290770048031045	290770048032042
290770048012009	290770048021008	290770048022023	290770048031046	290770048032043
290770048012012	290770048021009	290770048022024	290770048031047	290770048032044
290770048012013	290770048021010	290770048022025	290770048031048	290770048032045
290770048012016	290770048021011	290770048022026	290770048031049	290770048032046
290770048012017	290770048021012	290770048022027	290770048031050	290770048032047
290770048012018	290770048021013	290770048022028	290770048031051	290770048032048
290770048012019	290770048021014	290770048022029	290770048031052	290770048032049
290770048012020	290770048021015	290770048022030	290770048031053	290770048032050
290770048012021	290770048021016	290770048022031	290770048031054	290770048032051
290770048012022	290770048021017	290770048022032	290770048031055	290770048032052
290770048012024	290770048021018	290770048022033	290770048031057	290770048032053
290770048012029	290770048021019	290770048022034	290770048031060	290770048032054
290770048012036	290770048021020	290770048022035	290770048031061	290770048032055
290770048012037	290770048021021	290770048022036	290770048031062	290770048032056
290770048012038	290770048021022	290770048022037	290770048031063	290770048032057
290770048012039	290770048021023	290770048022038	290770048031064	290770048032058
290770048012040	290770048021024	290770048022039	290770048031065	290770048032059
290770048012041	290770048021025	290770048022040	290770048031066	290770048032060
290770048012042	290770048021026	290770048022041	290770048031067	290770048032061
290770048012043	290770048021027	290770048022042	290770048031068	290770048032062
290770048012044	290770048021028	290770048022043	290770048031069	290770048032063
290770048012045	290770048021029	290770048022044	290770048031070	290770048032064
290770048012046	290770048021030	290770048022045	290770048032000	290770048032065
290770048012047	290770048021031	290770048022046	290770048032001	290770048032066
290770048012048	290770048021032	290770048022047	290770048032002	290770048032067
290770048012049	290770048021033	290770048022048	290770048032003	290770048032068
290770048012050	290770048021034	290770048022050	290770048032004	290770048032069
290770048012051	290770048021035	290770048022051	290770048032005	290770048032070
290770048012052	290770048021036	290770048022052	290770048032006	290770048032071
290770048012053	290770048021037	290770048022053	290770048032007	290770048032072
290770048012054	290770048021038	290770048022054	290770048032008	290770048032073
290770048012055	290770048021039	290770048022055	290770048032009	290770048032074
290770048012075	290770048021040	290770048022056	290770048032010	290770048032075
290770048013000	290770048021041	290770048022057	290770048032011	290770048032076
290770048013001	290770048021042	290770048022058	290770048032012	
290770048013002	290770048021043	290770048022059	290770048032013	
290770048013003	290770048021044	290770048031011	290770048032014	
290770048013004	290770048021045	290770048031012	290770048032015	
290770048013005	290770048021046	290770048031014	290770048032016	

Table 56: Rogersville Origin Census Blocks

290770047003022	292259703005010	292259703005026	292259703005041	292259703005056
290770047003023	292259703005011	292259703005027	292259703005042	292259703005057
290770047003024	292259703005012	292259703005028	292259703005043	292259703005058
290770047003025	292259703005013	292259703005029	292259703005044	292259703005059
290770047003026	292259703005014	292259703005030	292259703005045	292259703005060
290770047003028	292259703005015	292259703005031	292259703005046	292259703005062
290770047003029	292259703005016	292259703005032	292259703005047	292259703005063
290770047003031	292259703005017	292259703005033	292259703005048	292259703005064
290770047003039	292259703005018	292259703005034	292259703005049	292259703005068
290770047004060	292259703005020	292259703005035	292259703005050	292259703005070
290770047004061	292259703005021	292259703005036	292259703005051	292259703005071
290770047004062	292259703005022	292259703005037	292259703005052	
290770047004064	292259703005023	292259703005038	292259703005053	
292259703004045	292259703005024	292259703005039	292259703005054	
292259703005001	292259703005025	292259703005040	292259703005055	

Table 57: Springfield Destination Census Blocks (1/4-mile from bus stops)

290770001001002	290770001001041	290770006003016	290770007003021	290770009003016
290770001001003	290770001001042	290770006003017	290770007003022	290770010001006
290770001001004	290770001001043	290770006003023	290770007003023	290770010002015
290770001001005	290770001001044	290770006003024	290770007003024	290770010002016
290770001001006	290770001001045	290770006003025	290770007003025	290770010002017
290770001001007	290770001002001	290770006003026	290770007003026	290770010002018
290770001001008	290770001002002	290770006003027	290770007003027	290770011001001
290770001001009	290770001002003	290770006003028	290770007003028	290770011001003
290770001001010	290770001002004	290770006003059	290770007003029	290770011001004
290770001001011	290770001002007	290770006003061	290770007003034	290770011003000
290770001001012	290770001002008	290770006003062	290770007003035	290770011003001
290770001001013	290770002001003	290770006003069	290770007003036	290770012001000
290770001001018	290770002001004	290770006003070	290770007003037	290770012001001
290770001001019	290770002001005	290770006003071	290770007003038	290770012001007
290770001001020	290770002001006	290770006003072	290770007003039	290770012001008
290770001001021	290770002001007	290770006003073	290770007003045	290770012001009
290770001001022	290770002002000	290770006003074	290770007003046	290770027002020
290770001001023	290770002002001	290770007002019	290770007003060	290770027002021
290770001001024	290770003001000	290770007002020	290770007003062	290770027002026
290770001001025	290770003001001	290770007002021	290770007003063	290770027002027
290770001001026	290770003001002	290770007003000	290770007004015	290770028001002
290770001001027	290770003003018	290770007003001	290770007004016	290770028001015
290770001001028	290770003003019	290770007003002	290770007004017	290770028001016
290770001001029	290770006002024	290770007003003	290770007004019	290770028001017

290770001001030	290770006002025	290770007003004	290770007004020	290770028001018
290770001001031	290770006002026	290770007003005	290770008001039	290770040011000
290770001001032	290770006003000	290770007003006	290770008003007	290770040011001
290770001001033	290770006003001	290770007003009	290770008003008	
290770001001034	290770006003002	290770007003010	290770008003019	
290770001001035	290770006003003	290770007003013	290770008003020	
290770001001036	290770006003011	290770007003014	290770009003004	
290770001001037	290770006003012	290770007003015	290770009003005	
290770001001038	290770006003013	290770007003016	290770009003013	
290770001001039	290770006003014	290770007003017	290770009003014	
290770001001040	290770006003015	290770007003018	290770009003015	

Table 58: Strafford Origin Census Blocks

290770046001000	290770046001022	290770046001040	290770046001090	290770046002029
290770046001002	290770046001023	290770046001045	290770046001091	290770046002030
290770046001003	290770046001024	290770046001047	290770046001093	290770046002031
290770046001004	290770046001025	290770046001048	290770046002009	290770046002032
290770046001005	290770046001026	290770046001050	290770046002010	290770046002033
290770046001009	290770046001027	290770046001051	290770046002013	290770046002037
290770046001010	290770046001028	290770046001052	290770046002015	290770046002038
290770046001011	290770046001029	290770046001066	290770046002016	290770046002039
290770046001012	290770046001030	290770046001068	290770046002017	290770046002047
290770046001013	290770046001031	290770046001072	290770046002018	290770046002048
290770046001014	290770046001032	290770046001073	290770046002019	290770046002049
290770046001015	290770046001033	290770046001074	290770046002022	290770046002050
290770046001016	290770046001034	290770046001075	290770046002023	290770046002065
290770046001017	290770046001035	290770046001085	290770046002024	290770046002066
290770046001018	290770046001036	290770046001086	290770046002025	290770046003031
290770046001019	290770046001037	290770046001087	290770046002026	
290770046001020	290770046001038	290770046001088	290770046002027	
290770046001021	290770046001039	290770046001089	290770046002028	

Table 59: Walnut Grove Origin Census Blocks

290770050011032	290770050011036	290770050011028	290770050011040	290770050011027
290770050011046	290770050011047	290770050011018	290770050011039	290770050011029
290770050011031	290770050011042	290770050011045	290770050011026	290770050011043
290770050011023	290770050011024	290770050011044	290770050011025	290770050011037
290770050011049	290770050011030	290770050011054	290770050011019	
290770050011033	290770050011020	290770050011048	290770050011038	
290770050011034	290770050011041	290770050011035	290770050011050	

Table 60: Willard Origin Census Blocks

290770050021105	290770050022005	290770050023003	290770050023016	290770050023029
290770050021106	290770050022006	290770050023004	290770050023017	290770050023030
290770050021108	290770050022007	290770050023005	290770050023018	290770050023031
290770050021109	290770050022008	290770050023006	290770050023019	290770050023032
290770050021110	290770050022009	290770050023007	290770050023020	290770050023033
290770050021111	290770050022010	290770050023008	290770050023021	290770050023034
290770050021112	290770050022011	290770050023009	290770050023022	290770050023035
290770050021113	290770050022014	290770050023010	290770050023023	290770050023036
290770050021114	290770050022017	290770050023011	290770050023024	290770050023037
290770050021115	290770050022018	290770050023012	290770050023025	290770051002015
290770050022000	290770050023000	290770050023013	290770050023026	290770051002016
290770050022001	290770050023001	290770050023014	290770050023027	290770051002017
290770050022004	290770050023002	290770050023015	290770050023028	290770051002018