

Ozarks Transportation Organization

Fixed Route Transit Operations & Regional Service Analysis

Joe Kern, SRF Consulting Group

Bob Bourne, Bourne Transit Consulting

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Study Purpose

- Determine how well current fixed route services meet local needs
- Identify opportunities for improvement
- Test forward-looking scenarios to gauge impacts
- Design and evaluate regional service concepts

Current City Utilities Transit System

- 14 daytime routes, 4 night routes
 - Operate 6:00 a.m. – 11:00 p.m.
- Weekend service also available
- 1.1 million service miles per year
- 1.5 million passengers per year
- \$7.2 million annual operating cost
- \$1.0 million annual passenger revenue
- ACCESS service for disabled passengers








Current Users

- 22% < 25 years old
- 6% > 65 years old
- 53% Male
- 60% Earn less than \$15,000 per year
- 68% Ride every day
- 29% Have been riding < 1 year
- 37% Going to/from work
- 72% Have no car available/can't drive
- 82% Have their travel needs met via CU Transit
- 87% Satisfied with service

Performance Measures


Performance Measures	Rating	Note
Service Coverage	B/C	79% coverage
Service Frequency	D/E	30 minute peak 60 minute off-peak
Transit vs. Auto Travel Time	C	18 minute difference
Service Span	B	17 hours per day
On-Time Performance	B	94% on-time

Comparison to Peers

Category	Performance Measure	Peer Average	CU Transit
Cost Effectiveness	Operating Expense per Passenger	\$4.12	\$4.70 
Service Efficiency	Operating Expense per Revenue Hour	\$72.00	\$89.57 
Service Effectiveness	Passengers per Revenue Hour	19	19 
Market Penetration	Passengers per Capita	13.4	9.4 
	Revenue Hours per Capita	0.7	0.5 
Passenger Revenue	Passenger Revenue per Passenger	\$0.64	\$0.59 
Effectiveness	Passenger Revenue per Operating Expense	18%	13% 

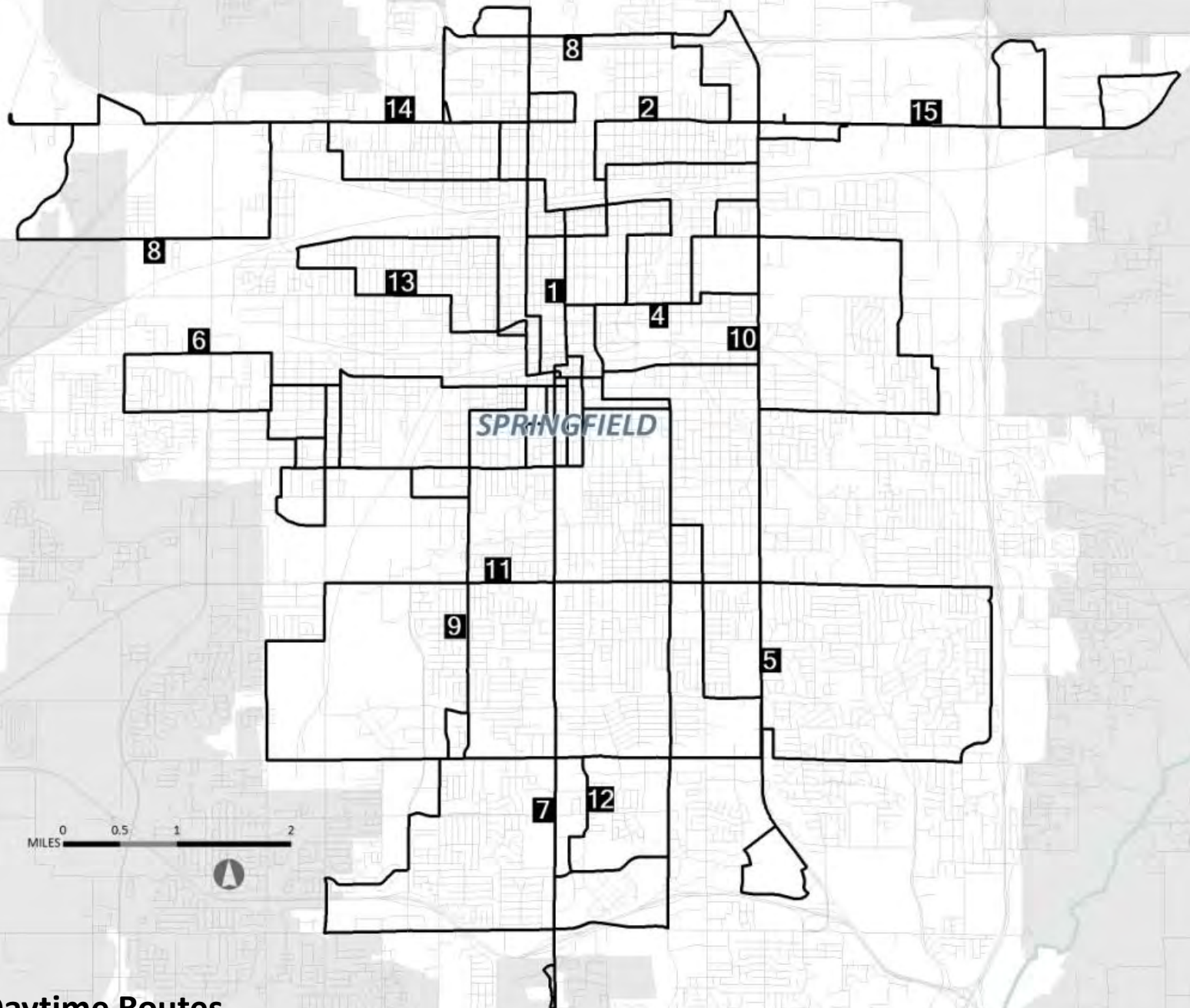
 = Better than peer average

 = Worse than peer average, but within acceptable range

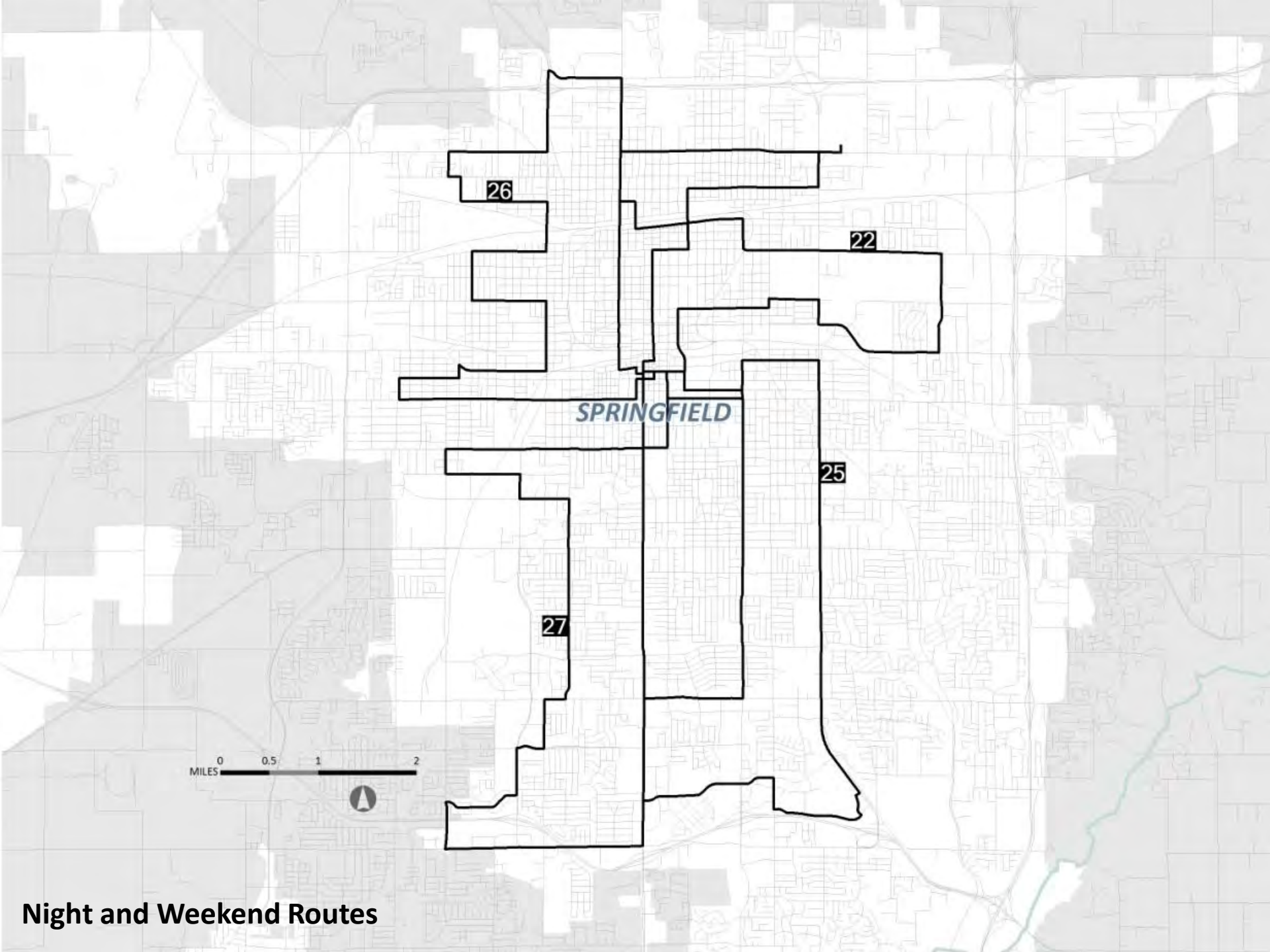
 = Worse than peer average and outside of acceptable range

Existing System Review

- System generally works well
- CU management & drivers work together to fine-tune routes
- 3 pulse points used
- Reasonable level of route coverage
- Adequate operational policies in place
- Different shape north & south
- 60% of current customers transfer between routes



Weekday Daytime Routes



Night and Weekend Routes

North Side Routes

Strengths

- Good residential coverage
- Use low-volume streets
- Good sidewalk infrastructure
- High transit dependent population

Weaknesses

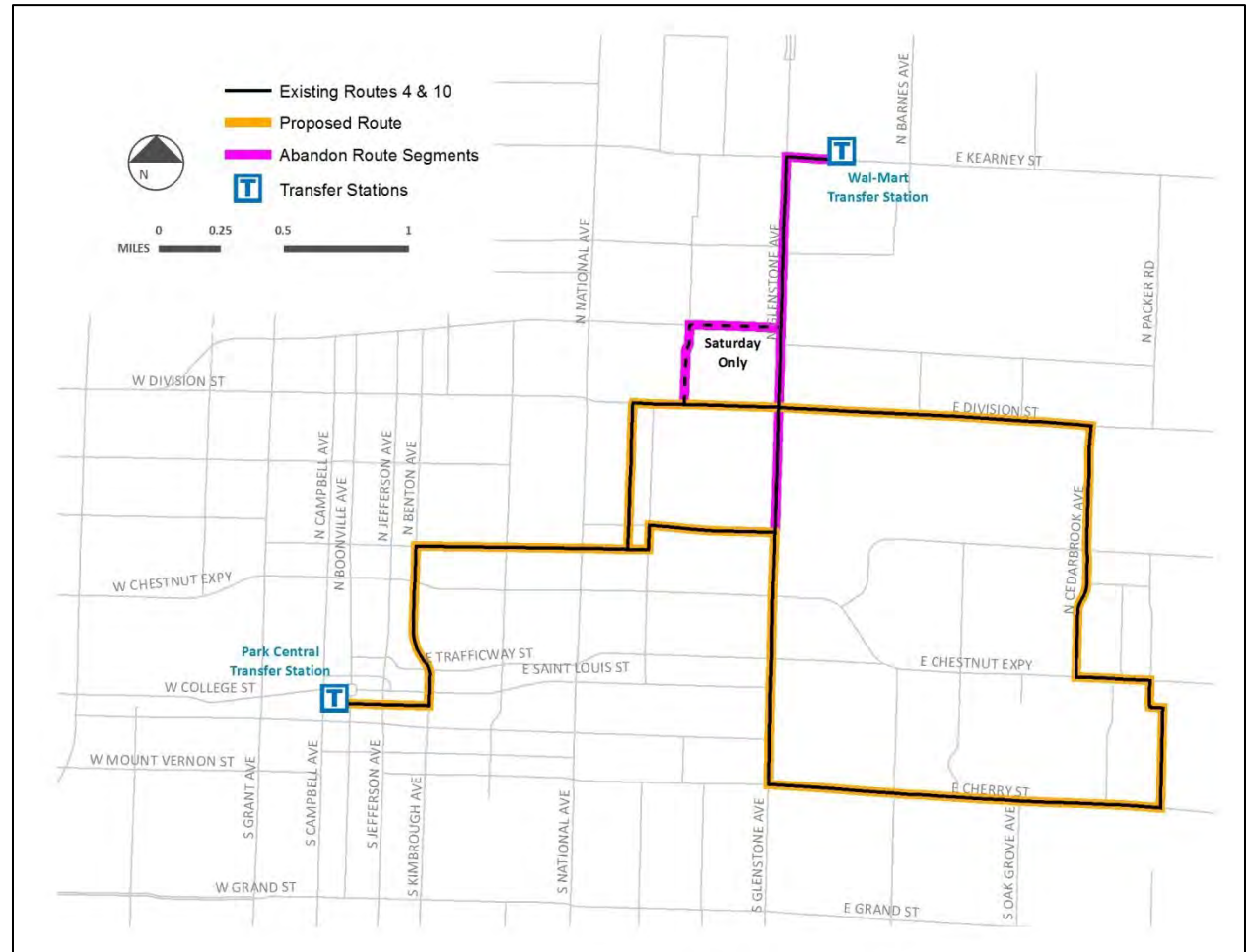
- Long travel time on some routes
- Lack of bi-directional travel
- 60 minute intervals
- 4, 8, 10, & 15 are weakest routes

North Side Recommendations:

(1) Combine Routes 4 & 10

Advantages:

Combines 2
weak routes
and offers
convenient
access to
transfer center

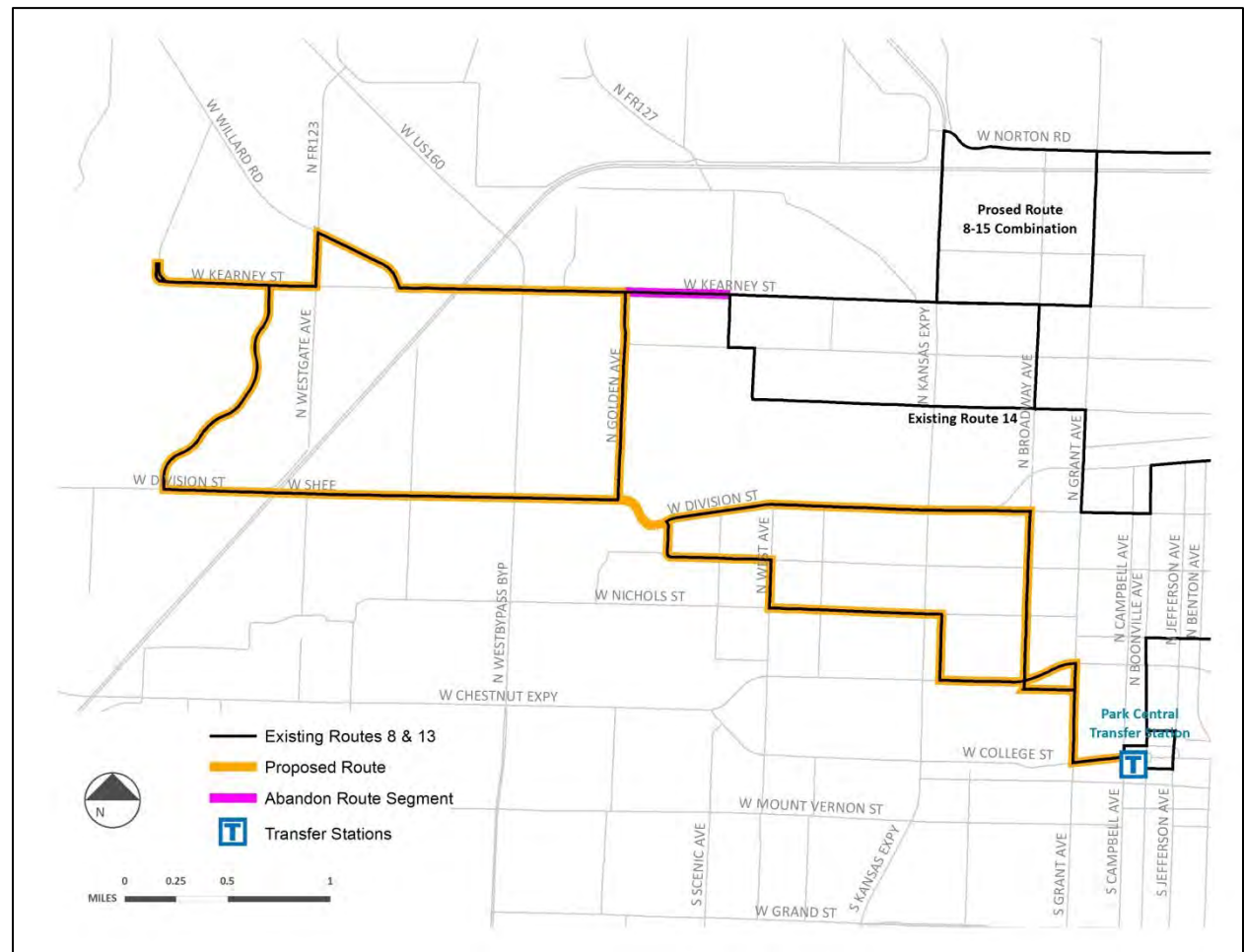


North Side Recommendations:

(2) Combine Routes 13 & 8 (West Half)

Advantages:

Combines 2 weak routes and offers convenient access to transfer center

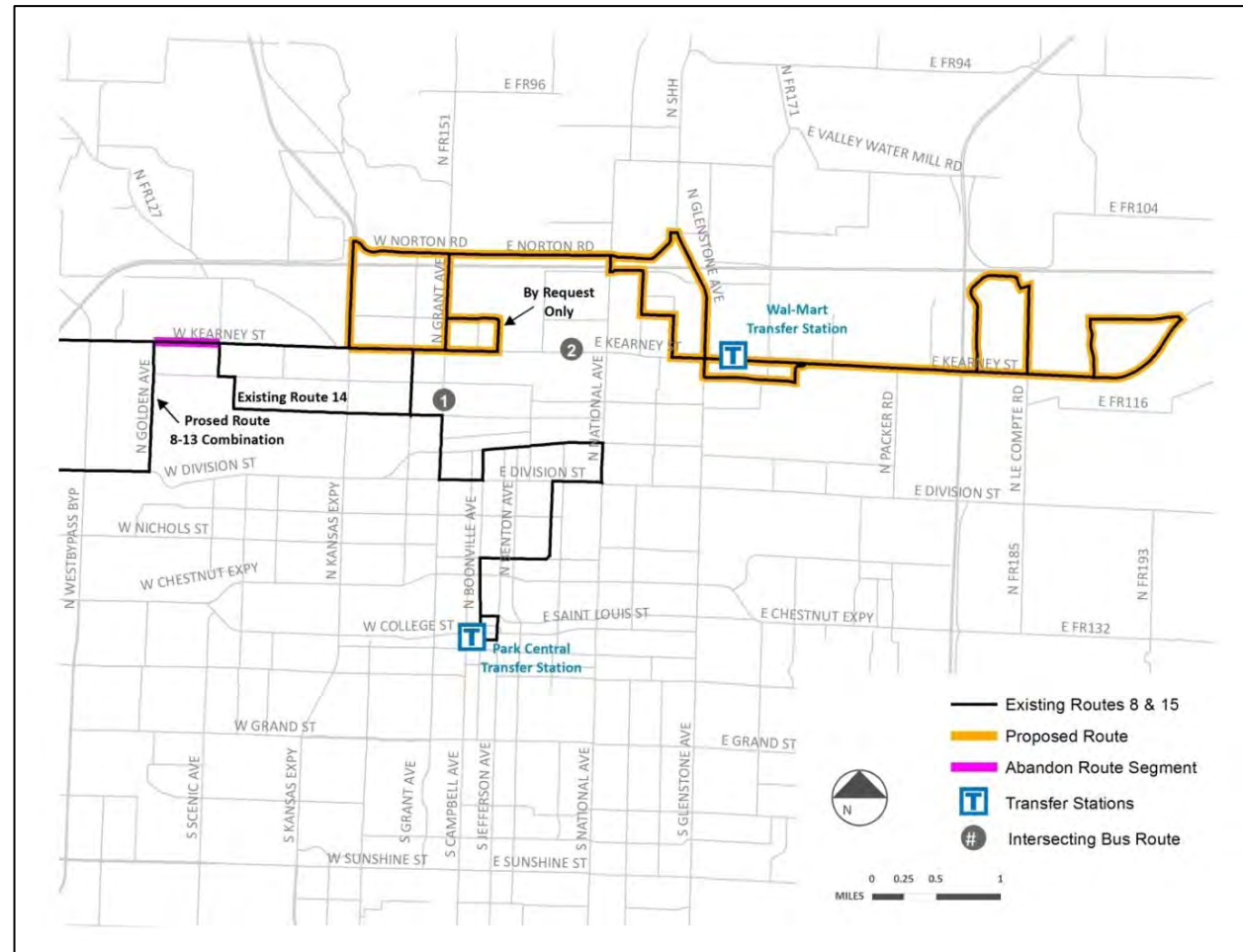


North Side Recommendations:

(3) Combine Routes 15 & 8 (East Half)

Advantages:

Provides
crosstown
east-west
route on north
end



South Side Routes

Strengths

- Fast travel times
- Routes aligned with high-use travel corridors
- High job densities
- Good shelter & bench density

Weaknesses

- Schedule adherence problems in p.m.
- Weak sidewalk infrastructure far south
- Turnouts can delay bus flow
- Dangerous pedestrian crossings

Bus Stops

- 877 stops in system
 - Most stops marked
 - Spacing on some routes exceeds standards
 - “Trapped” by traffic at some locations
 - Some stops not optimally located
- 88 shelters in system
 - 10% shelter deployment higher than peers
 - Bench & shelter maintenance program should be reviewed

Vehicles

- Uses 30-foot bus as main fleet
- 20 peak, 5 spares
- High average age (11.8 years)
- Future buses should be 35-foot
 - Wheelchair ramps at both doors
 - Rear roof-mounted flashers
 - AVL & APC
- Advertising wrap restrictions
 - 50-60% limit
- Transit Signal Priority (TSP) - Study

Marketing

- Print media difficult to use
- Electronic media pretty good
- Future markets
 - Workers
 - 65 and over
 - College students
 - Unlimited Access Program

Service Improvement Scenarios

- Level I: Improve reliability
- Level II: Improve frequency (step 1)
- Level III: Expand east-west options on far south side
- Level IV: Additional frequency improvements
Limited Stop Service
- Level V: 15 minute frequency
½ mile spacing

Level I Changes

- Focus on improving reliability of existing system
- Add “shared” bus on Route 7 & 12 during p.m.
- Add bus to Route 5
- Extend cycle time on 1/7 & 2/12 to 120 minutes
- Sunday/evenings: Split route 25 into 2 routes
- Add garage supervisor to cover hours
- Add mobile supervisor to deal with late buses

Level I Outcomes

- No change in service area coverage (79%)
 - 10% increase in service hours
 - 2% increase in passengers
 - 10% increase in O&M costs
 - \$800,000 capital cost
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- ❑ Corrects current reliability issues and positions system for growth

Level II Changes

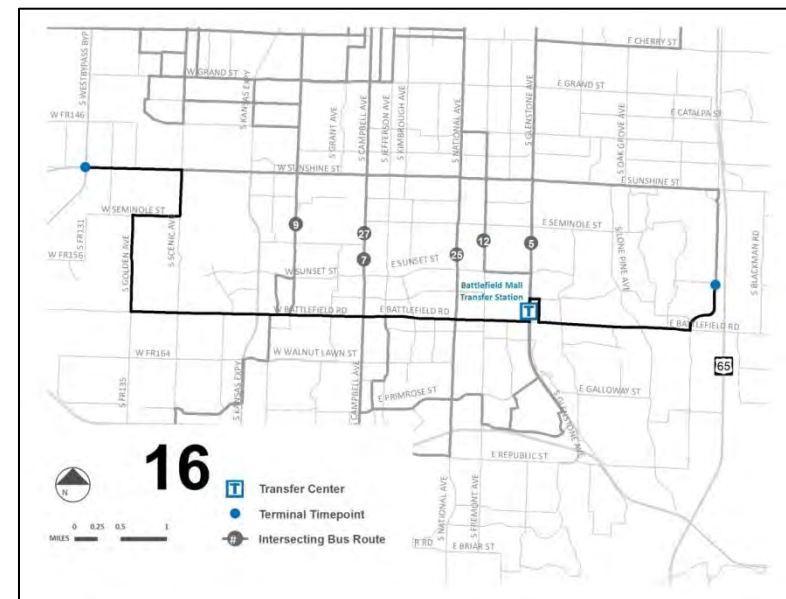
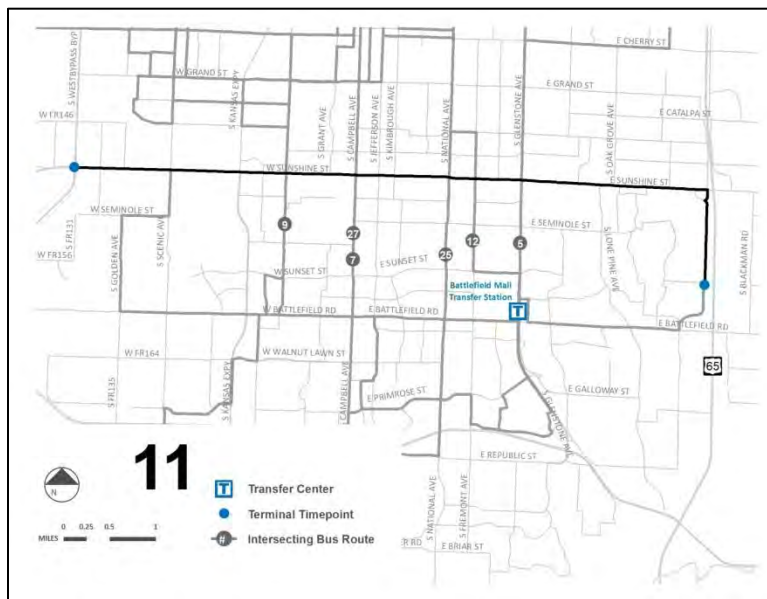
- Change to 20 minute peak / 30 minute off-peak frequency on best routes: 1/7, 2/12, 5, 6, 14
- Change to 30 minute all day frequency on 9, 4/10
- Change to 30 minute Saturday service on best routes
- 8 buses required (7 operation, 1 spare)

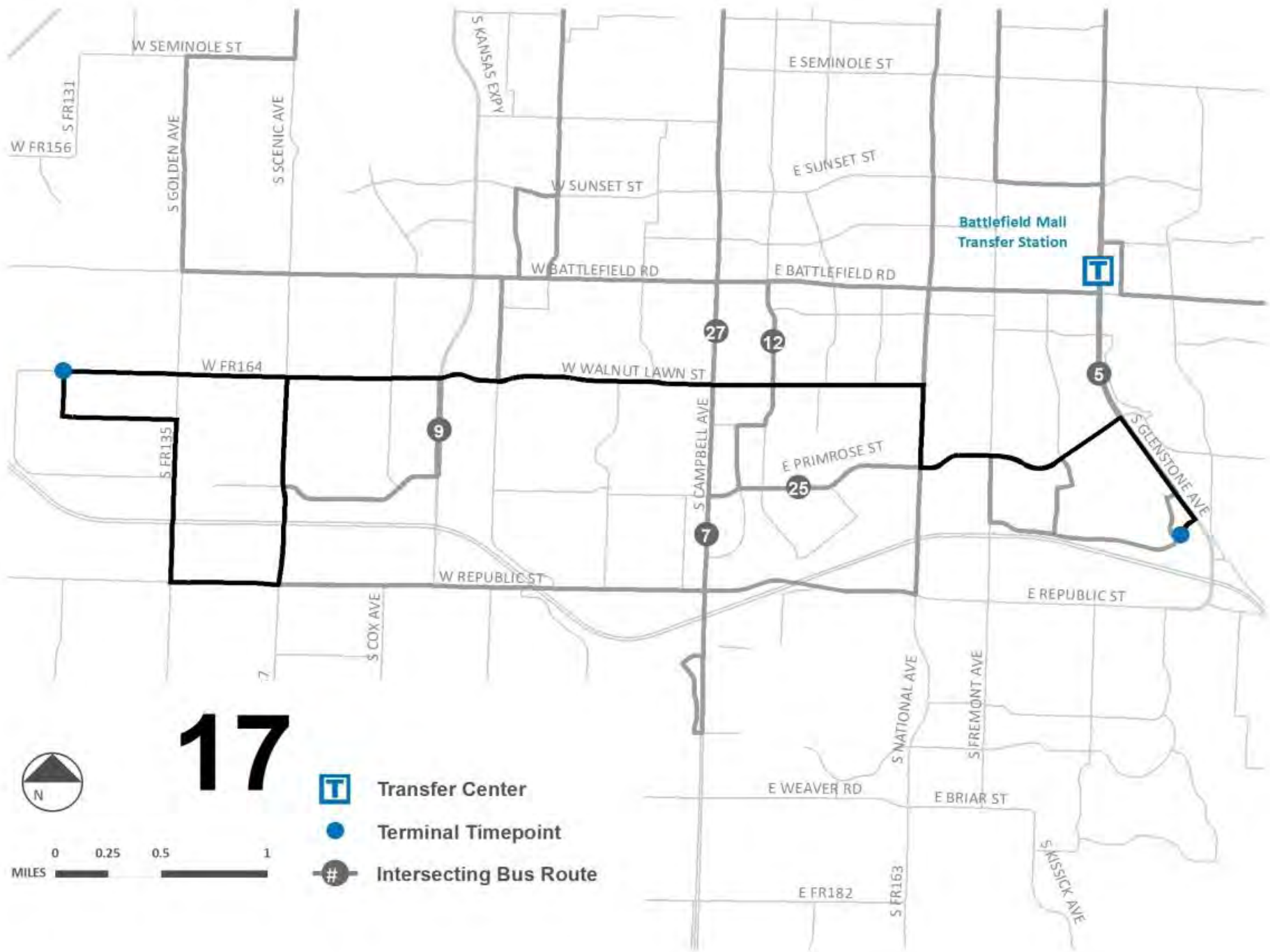
Level II Outcomes

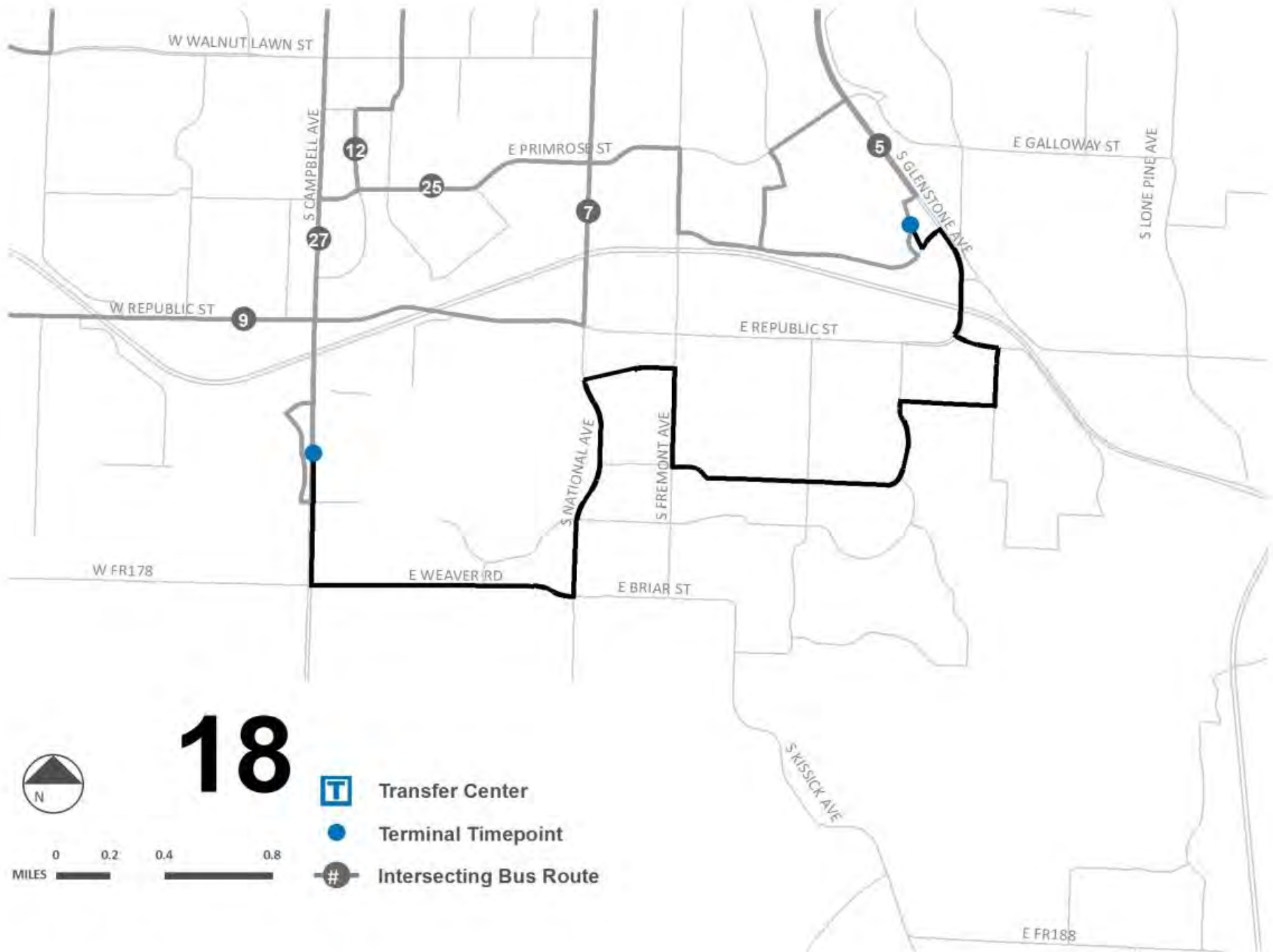
- No change in service area coverage (79%)
 - 34% increase in service hours (over base)
 - 13% increase in passengers (much greater potential)
 - 34% increase in O&M costs
 - \$3.2 million capital cost
-
- ❑ Outstanding prospects for ridership growth; other communities have responded favorably to frequency changes

Level III Changes

- Expand coverage to 82%
- Split Route 11 into 11 and new 16; operate both at 30 minute frequency
- Add Route 17 – Walnut Lawn
- Add Route 18 – Far South





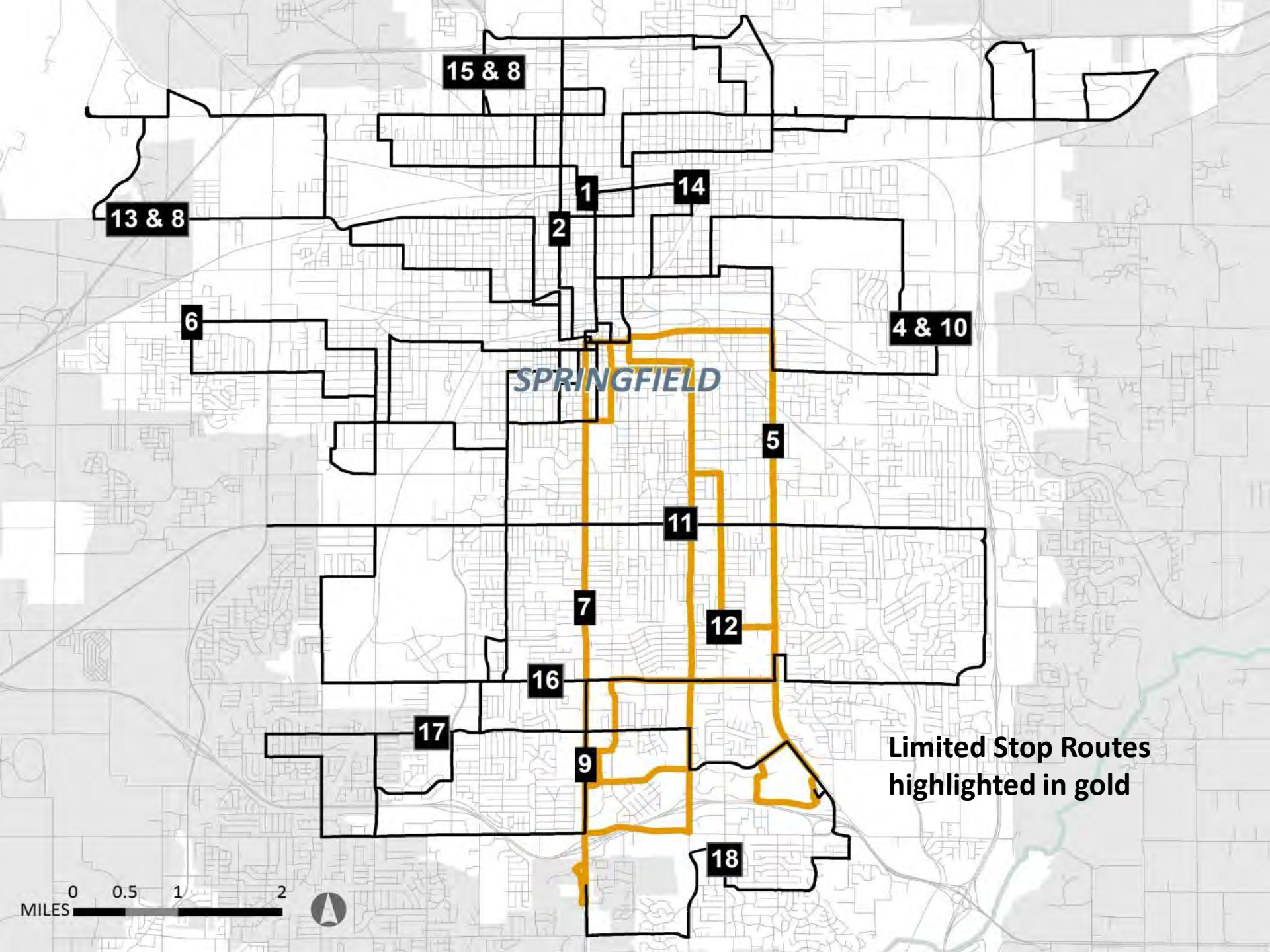


Level III Outcomes

- 10 new buses required (8 operation, 2 spare)
 - 6 large, 4 mini
 - 70% increase in service hours (over base)
 - 33% increase in passengers (conservative estimate)
 - 70% increase in O&M costs
 - \$2.3 million capital cost
- ❑ Establishes new level of neighborhood circulators, strengthens east-west network

Level IV Changes

- Change to 30 minute frequency on remaining system
 - Weekdays on Routes 8/13, 8/15
 - Evenings and Sundays on Routes 5, 12, 22, 26, 27
- Add Limited Stop service as overlay on Routes 5, 7, 12 at 30 minute frequency
- No change in area coverage



15 & 8

13 & 8

6

1

14

2

4 & 10

SPRINGFIELD

5

11

7

12

16

17

9

18

Limited Stop Routes
highlighted in gold

0 0.5 1 2
MILES

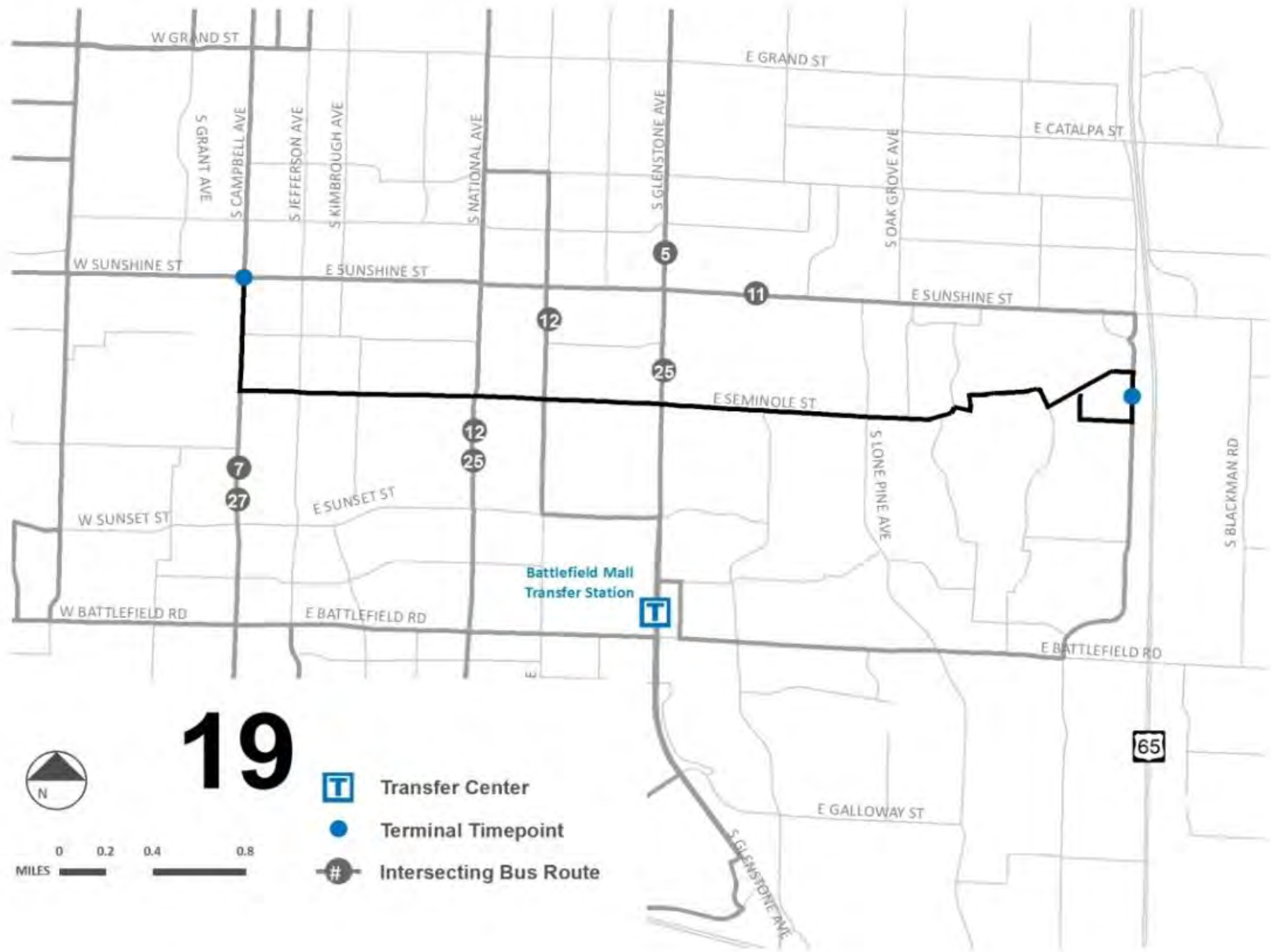


Level IV Outcomes

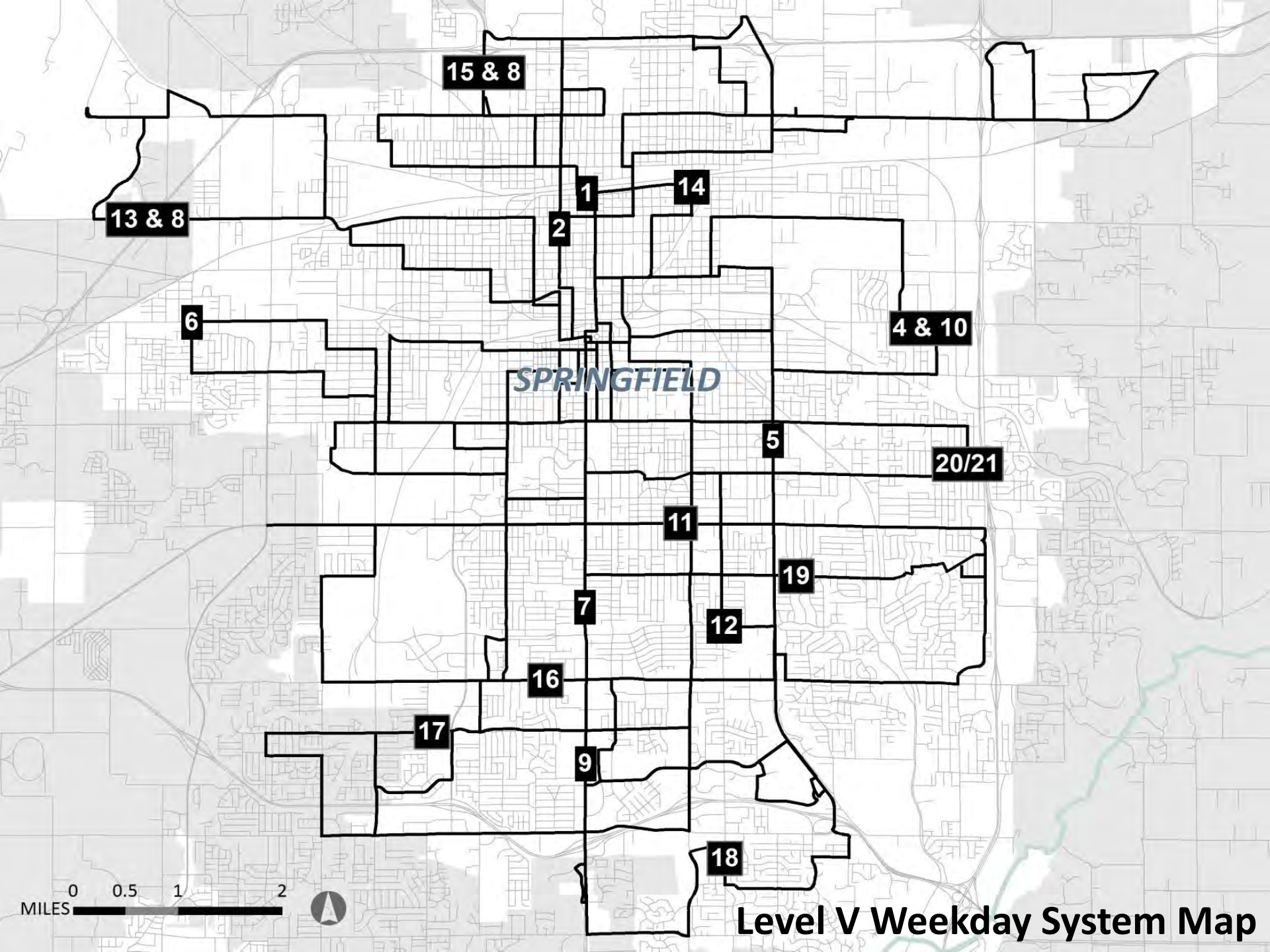
- 12 new buses required (10 operation, 2 spare)
 - Facility capacity reached – Study
 - 106% increase in service hours (over base)
 - 62% increase in passengers (conservative estimate)
 - 106% increase in O&M cost
 - \$4.8 million capital cost
-
- Total system operating at upgraded frequency, good cross-community service pattern, new limited-stop concept introduced

Level V Changes

- Change all route frequencies to 15 minutes during peak, 30 minutes during off-peak
- Fill in any remaining gaps in network to provide approximately ½-mile spacing between routes
 - Add Route 19 – Seminole
 - Add Route 20/21 – Bennett/Grand







Level V Outcomes

- 41 new buses required (if Level IV Limited Stop not implemented)
 - 188% increase in service hours (over base)
 - 100% increase in passengers (very conservative)
 - 188% increase in O&M cost
 - \$9.7 million capital cost
- ☐ This grid-like network and frequency would be a model service level for this size community

Service Improvement Summary

Statistics and Measures

	Existing	Level I	Level II	Level III	Level IV	Level V
Peak Buses	20	22	29	37	47	76
Spare Buses	5	5	6	8	10	15
Total Buses	25	27	35	45	57	91
Service Hours	72,644	79,983	97,397	123,722	149,287	220,494
Operational Cost	\$6,537,915	\$7,406,470	\$8,765,685	\$11,134,935	\$13,435,785	\$19,844,460
Capital Cost	-	\$920,000	\$3,200,000	\$2,320,000	\$4,800,000	\$9,680,000
Annual Ridership	1,480,769	1,505,460	1,676,520	1,969,015	2,391,761	2,963,146

* Model estimate for measuring baseline service.

Performance Measure	Existing	Level I	Level II	Level III	Level IV	Level V
Op. Expense per Passenger	\$4.70	\$4.78	\$5.23	\$5.66	\$5.62	\$6.70
Op. Expense per Service Hour	\$89.57	\$90.00*	\$90.00*	\$90.00*	\$90.00*	\$90.00*
Passengers per Service Hour	19.0	18.8	17.2	15.9	16.0	13.4
Passengers per Capita	9.4	9.4	10.5	12.3	15.0	18.6
Service Hours per Capita	0.5	0.5	0.6	0.8	0.9	1.4
Pass. Rev. per Passenger	\$0.59	\$0.59*	\$0.59*	\$0.59*	\$0.59*	\$0.59*
Pass. Rev. per Op. Expense	13.0%	12.3%	11.3%	10.4%	10.5%	8.8%

= Better than peer average

= Worse than peer average, but within acceptable range

= Worse than peer average and outside of acceptable range

* = Assumed Value based on existing conditions

Ozarks Transportation Organization

Regional Service Analysis



Regional Service Analysis

Candidate Communities

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

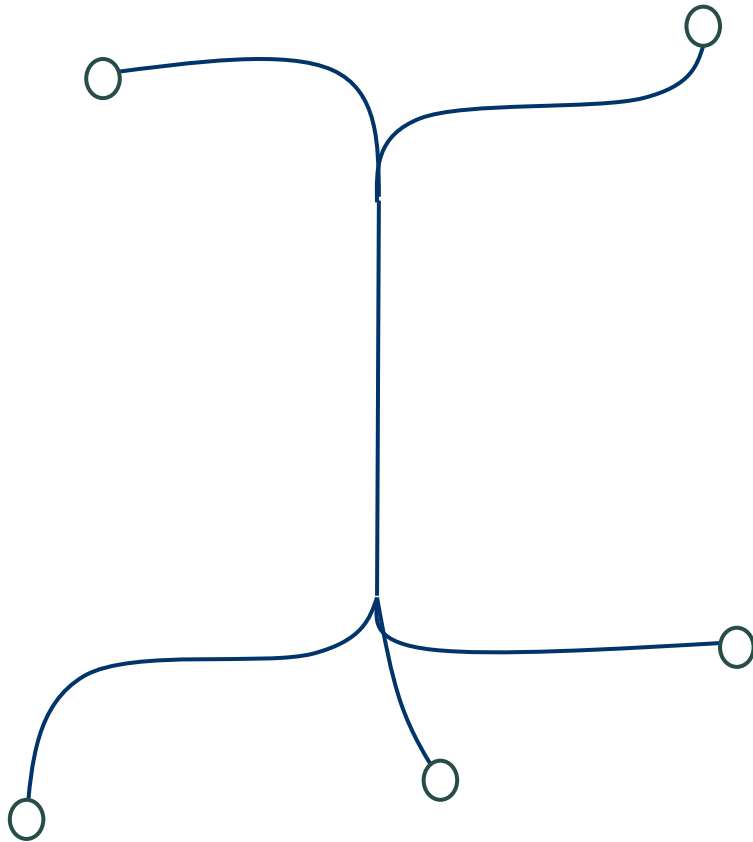
¹ US Decennial Census, 2010

² LEHD, 2009

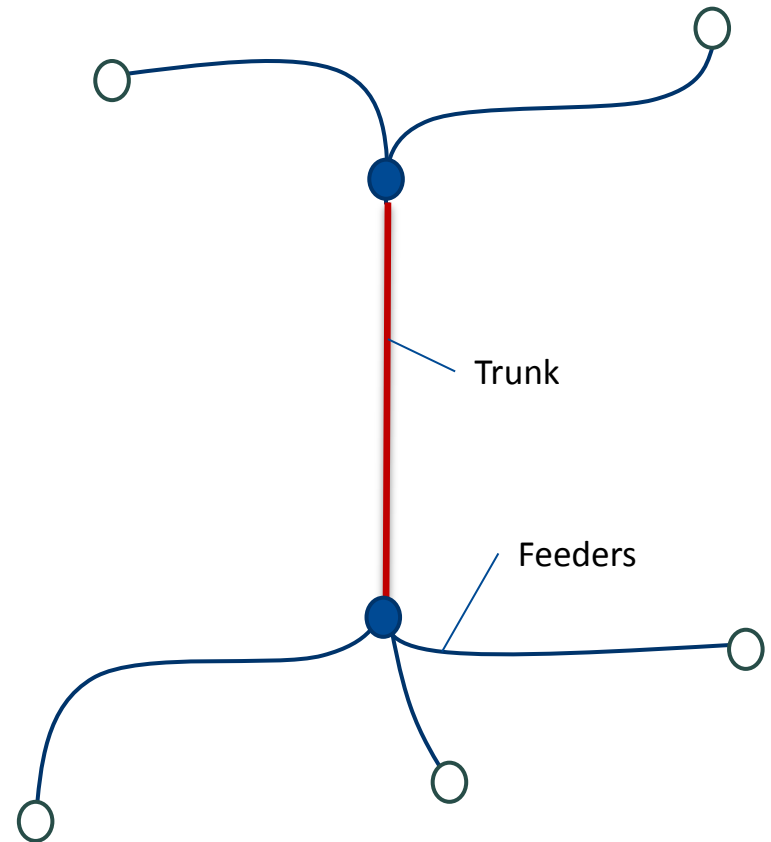
³ Generated using Google Maps route planner

Service Design

Run-Through



Feeder to Trunk



Service Parameters

- Utilize Limited Stop distribution service along National Avenue
- Feed regional services to Cox South and Park Central Station
- Inbound – morning peak; Outbound – afternoon peak
- “Time” regional arrivals to Park Central pulse – may not be ideal for all shift times at major employers
- Estimate ridership at 2-3% of workers commuting
- Assess sensitivity to fuel price
- Estimate costs for years 1, 5, and 10
- Passenger revenue set at \$0.10 per mile

Year 1 Estimates

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

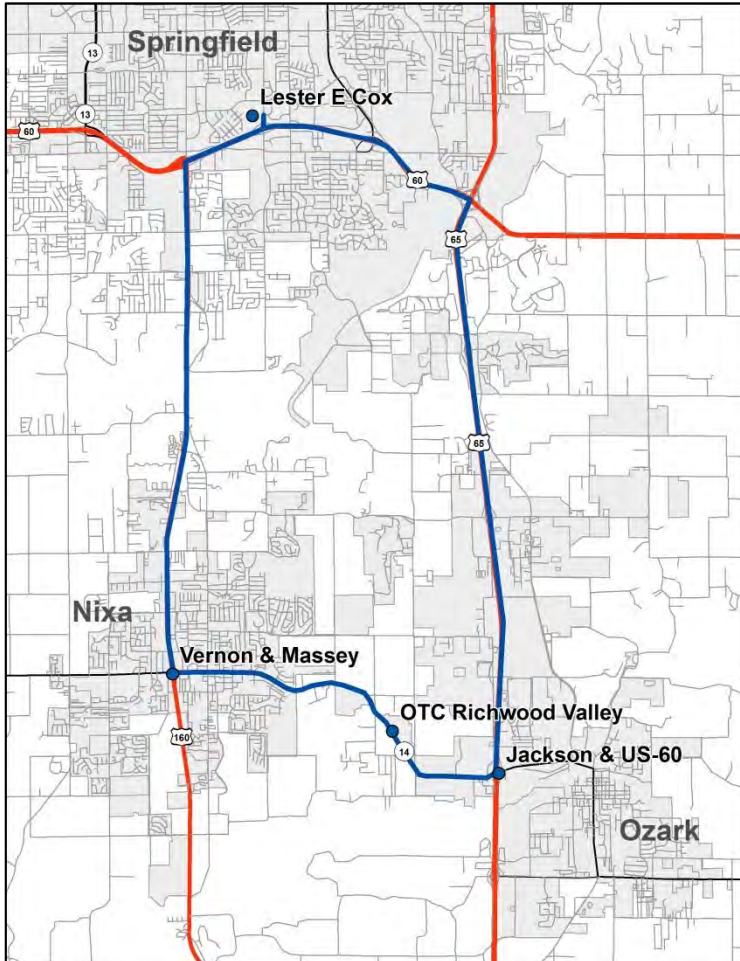
Year 5 Estimates

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

Year 10 Estimates

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

Nixa – Ozark Concept



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

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

Nixa – Ozark Results

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

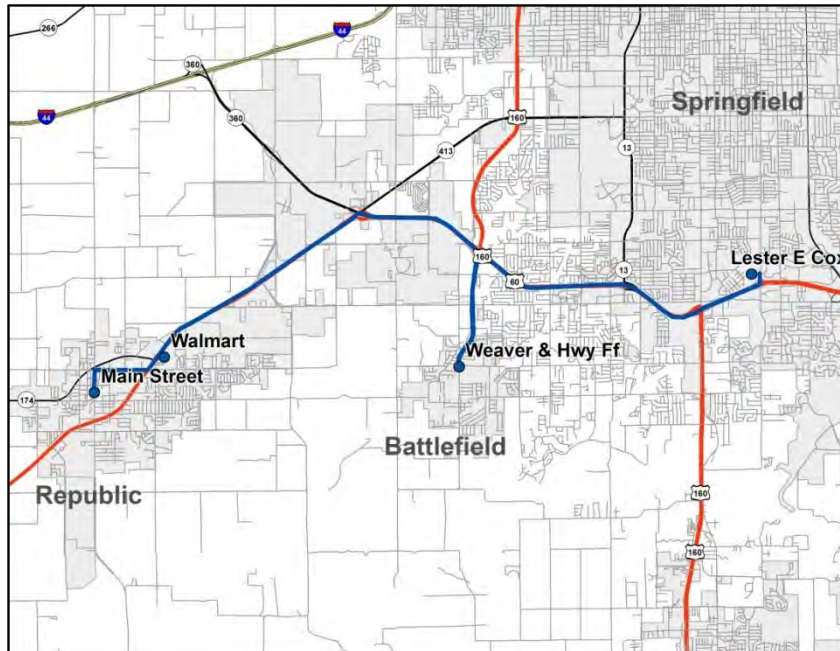
Operating Year	Annual Service Hours	Cost per Service Hour	Operations and Maintenance	Fare Revenue		Net Cost	
				Low	High	Low	High
1	901	\$90.00	\$81,090	\$20,196	\$30,294	\$50,796	\$60,894
5	1,505*	\$104.33	\$156,972	\$40,392	\$60,588	\$96,384	\$116,580
10	2,703**	\$120.95	\$326,935	\$81,166	\$121,749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

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

Repubilc – Battlefield Concept



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

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

Republic – Battlefield Results

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

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

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