Lawrence Route and Schedule Design for Coordinated Transportation

Final Report

-DRAFT-

City of Lawrence, KS
University of Kansas, Lawrence, KS

Prepared by
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March 1, 2010

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Chapter 1 Introduction and Previous Studies

Introduction

In January 2009, Olsson Associates (OA) and Bourne Transit (BT) were tasked with creating an implementation plan for the *Lawrence Route and Schedule Design for Coordinated Transportation Plan*, for the expressed purpose of increasing coordination between the transit operations of the University of Kansas (KU) KU On Wheels (KUOW) and the City of Lawrence (The T). Initial recommendations delivered in March of that year and implementing in August 2009 recommended consolidating hot line numbers, merging agency timetable brochures, and creating a joint route. This report compiles information gathered throughout the entire project, and presents the final recommendations. This chapter examines the initial situations of both systems, and examines the background information that was used for later recommendations.

Previous Studies

This implementation plan builds upon a history of moving towards coordinated transit efforts within Lawrence. This effort includes the following reports and studies:

- The University of Kansas "Ten-Year Parking Strategy Final Report," 2004
- K-10 Transportation Study, May 2005
- The University of Kansas "Transit Task Force Report to the Parking Commission and Provost," September 1, 2005
- Coordinated Public Transportation Development Plan, December 2006
- Lawrence-Douglas County MPO – Transportation 2030: Long-Range Transportation Plan, March 2008
- Lawrence-Douglas County MPO 2008-2012 Transportation Improvement Program

The University of Kansas "Ten-Year Parking Strategy Final Report," 2004

The "Ten-Year Parking Strategy Final Report" was commissioned to examine the amount of parking on campus, and suggest solutions. In addition to increasing parking rates, implementing access control and assigning parking spaces, the report suggested creating a campus shuttle or circulator that would provide a viable option for faculty, staff, and students to travel within the campus and between the main Campus and west campus. This report spoke to the main reason behind KUOW, which is to decrease parking demand on campus.

At the time of the report writing, it was suggested that KUOW and the then current service provider would be unable to provide a viable campus circulator. Two services were later established, each of which meets a portion of the need. The Park & Ride provides a connection between west campus and main campus every 5 minutes and the

Rec Center – JRP Circulator provides connections between the outlying parking lots and the main campus.

"K-10 Transportation Study," May 2005

The KDOT, MARC, and Lawrence-Douglas County MPO-sponsored *K-10 Transportation Study* examined future improvement needs on the K-10 highway corridor linking the two fastest growing counties in Kansas, Douglas and Johnson. In addition to discussions on widening the highway to six- and eight-lanes, and adding new interchanges, the study examined the possibility of a fixed transit route between the K-10/I-435 industrial area in Johnson County to the University of Kansas campus in Lawrence. The ridership estimates for this services was between 300 and 500 riders per day. The study recommended that a pilot project be implemented and that it be operated by one of the primary transit providers in the corridor, with funding provided through either KDOT or MARC.

The direct outcome of the K-10 Transportation Study is the K-10 Connector, which operates at peak hour 30 minute frequencies, and stops at the KU Park & Ride, 19th & Naismith, and 19th & Haskell. Current average daily ridership is nearing 500.

The University of Kansas "Transit Task Force Report to the Parking Commission and Provost," September 1, 2005

This report was generated in response to the "Ten-Year Parking Strategy Final Report" which challenged KU to rethink the way the campus addressed parking and transit issues. One of the first objectives identified by the task force was to consider possibilities for coordinating efforts between KU, KUOW, and The T.

The task force created an action plan composed of eight points:
1. In the Governance section three possible models were analyzed: a) The City will provide services to KU through a contract or memorandum of understanding, b) city-wide service would be provided through a new transit authority structure, c) the City would expand existing services as the provider of city-wide transit. The task force recognized that the issues of governance and funding for a new model of service were extremely complex and political, but critical for transit to move forward.
2. In the Funding portion it was noted that KU will encounter difficulty in expanding transit service without direct or indirect access to federal funding. Other points included identifying increasing the mill levy and student fees, coordinating parking permit rates with transit system plans, hiring transit consultants to obtain additional federal funding, and realizing that federal funding for bus acquisition may be limited on an annual basis.
3. The Student role section emphasized that students must be significantly represented in the decision making process meaning that their participation exceed that of an advisory capacity.
4. The Vision Statement realizes the need to continuously update information and work with consultants to address route and funding requirements according to the vision identified by KU.

5. Technical expertise is necessary to implement the system. This section highlights the need to:
a) Hire a consultant with expertise in FTA funding and regulations,
b) Hire legal counsel to implement a coordinated administrative system between KUOW and The T,
c) Hire a transportation consultant to help with design and implementation of transit routes,
d) Establish a transportation coordinator position to act as a single point of contact,
e) Have task force members continue to serve in transit related groups, and
f) Have a public relations campaign to inform both the KU community and the Lawrence community of service changes.
6. Coordination is necessary for implementation of the parking study recommendations. Those working on transit will need to coordinate closely with the parking commission and students.
7. Coordination needs to occur in phases. The logistical needs will require a phased approach to any coordinated system, due to limitations of federal funding, service provider contracts, and required lengths of time to set up a new administrative or transit authority.
8. An 18-month schedule for implementing the system will target completion in spring, 2006.

Coordinated Public Transportation Development Plan, December 2006

The *Coordinated Public Transportation Development Plan* evaluated the transit services available in the City and at the University. The plan evaluated each transit route, and identified overlapping service areas. A variety of recommendations on route changes, route mergers, and more substantive coordination strategies were recommended, including funding and governing structures. The culmination of the report was four packages, with each package increasing the amount of revenue hours used, with increases of 0%, 25%, 33%, and unconstrained increase over current levels. Few of the recommendations have been implemented.

Lawrence-Douglas County MPO – Transportation 2030: Long-Range Transportation Plan, March 2008

Transportation 2030 is a long range transportation plan for the urbanized area of Lawrence and the surrounding area of Douglas County. The plan attempts to identify future transportation investments for all modes of transportation, including transit. The plan recognizes that the region will continue to be dominated by the automobile, but other modes are becoming increasingly important. Interestingly, the plan identifies that a transit system should be “funded and supported similar to other public services”.

Transportation 2030 has a transit system plan in Chapter 7, and recognizes that desires for higher services levels, such as increased frequencies, longer service hours, more routes, will increase in the existing bus service areas.

The transit system plan in *Transportation 2030* includes the following ten action plans:

- Transit Action 1: Ongoing Monitoring of Transit Performance and Service
  - Including modifying transit service in response to changing development patterns, consider a north-south transit route in western portion of city that connects Bob Billings Parkway and Clinton Parkway
- Transit Action 2: Establish an off-street location for a regional transit hub
  - Plan for a regional transit hub that would provide improved facilities for local transit riders and a convenient connection to regional transit service.
- Transit Action 3: Develop Pedestrian and Land Development Standards to Promote Productive Transit Service
  - Include pedestrian access standards for new development and redevelopment projects that provide direct transit stop access, promote mixed-use and high density activity centers, develop transit orientated design standards for new developments and review on- and off-campus parking policies.
- Transit Action 4: Study Productivity and Coverage Issues
  - Review transit goals and objectives to determine an appropriate balance between coverage and productivity of transit service.
- Transit Action 5: Develop Transit-Friendly Roadway Design Standards
  - Develop transit-friendly roadway improvement standards that accommodate and promote far side intersection bus turnouts, efficient transit operations, and transit amenities. Require transit-friendly roadway design in construction of new roadways and reconstruction of existing roadways.
- Transit Action 6: Pursue Transit Consolidation Opportunities
  - Continue to pursue transit service coordination opportunities among The T, KUOW, and the local school bus system.
- Transit Action 7: Develop a Long-Term Transit Funding Strategy
  - Conduct a funding and subsidy study to determine the trade-off costs and benefits of various transit funding levels. Establish a long-term funding commitment for The T to provide for transit service to existing and future developments within the city.
- Transit Action 8: Develop a Long-Range Transit Plan
  - Develop a long-range transit plan that addresses future needs and opportunities, reviews the most appropriate fixed-route service types, establishes a framework for consolidation of transit services, and builds on recent transit services. Short-, medium-, and long-term actions should be included in the transit plan's implementation discussion.
- Transit Action 9: Develop a Long-Term Funding Strategy for Capital Improvements
  - Develop a long-term strategy to ensure regular replacement of transit vehicles on a regular schedule and ongoing construction of transit facilities.
- Transit Action 10: Investigate the Potential for Regional Transit Connections along I-70.
  - The Lawrence/Douglas County MPO should work with the Metropolitan Topeka Planning Organization and the Mid-American Regional Council to explore the potential for intercity transit service.

Only Transit Action 10 specifies a responsible party to achieve that action point. In the implementation chapter of the plan, a timeline for achieving each action point is specified. Transit Actions 2, 3, 5, 6, 7, 8, and 9 are specified to be completed in 0-5 years, Transit Action 10 in 0-10 years and completion of1 and 4 extends beyond the 10 years.

Various parts of the action plan have been completed or could be considered in progress since the completion of *Transportation 2030*. The *Lawrence Route and Schedule Design for Coordinated Transportation Plan* corresponds with Transit Action 6 to move towards increased transit coordination. Transit Actions 7 and 9 were aided by passage of a .20% and a .05% sales tax in November 2008 to fund the city transit service. This 10-year, dedicated sales tax replaced the property tax mill that was previously funding transit. The City of Lawrence bolstered transit Action 3 by adding a *Smart Code* section to its development code specifying that mixed-use districts have to be within ¼ mile of any transit route,

Transportation 2030 predicts revenues of approximately $96 million dollars available for transit over the life of *Transportation 2030*. The funding sources are approximately 44% local, 13% state, and 43% federal.

Lawrence-Douglas County MPO 2008-2012 Transportation Improvement Program

The Lawrence-Douglas County MPO created a Transportation Improvement Program (TIP) selected from the area's metropolitan transportation plan, the City and County's capital improvements programs, Lawrence's Five-Year plan, and KDOT's comprehensive transportation program. The TIP also included projects for The T that is a prioritized list of projects identified by The T and reviewed by FTA officials. TIP identified projects are fiscally constrained, meaning that there is a clear and realistic mechanism for funding them. The monetary amounts from the Lawrence-Douglas County MPO 2008-2012 TIP are identified in Figure 1-1 and Figure 1-2.

There are approximately 21 projects in the TIP that are identified as dealing with transit. These projects range from vehicle replacement programs for the city's fixed route fleet, Cottonwood Inc, and Independence Inc, KU's Park & Ride, to operating expenses, preventative maintenance, training, support staff, and security features.

Figure 1-1 TIP 2008-2012 Total Funds Programmed

TIP 2008-2012 Total Funds Programmed
(X $1,000)

Programmed Dollars

FY	Federal (STP & BR)	KDOT Funds	*Local Funds	**Federal Transit Funds	***Other Federal Funds	Total
2008	$ 3,040	$ 0	$ 5,866	$3,499	$1,480	$ 13,885
2009	$64,272	$25,758	$ 5,243	$3,355	$2,108	$100,736
2010	$12,146	$ 1,009	$21,298	$1,495	$ 0	$ 35,948
2011	$18,987	$ 4,497	$ 5,302	$ 0	$ 0	$ 28,786
2012	$22,582	$ 6,348	$ 4,113	$ 0	$ 0	$ 33,043
5-year total	$121,027	$37,612	$41,822	$8,349	$3,588	$212,398

Anticipated Dollars

FY	Federal (STP+BR)	KDOT Funds	Local Funds	Federal Transit Funds	Other Federal Funds	Total
2008	$ 3,040	$ 0	$ 5,866	$3,499	$1,480	$ 13,885
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2012	$22,582	$ 6,348	$ 4,113	$ 0	$ 0	$ 33,043
5-year Total	$121,027	$37,612	$41,822	$8,349	$3,588	$212,398
End Balance Remaining	$0	$0	$0	$0	$0	$0

* Includes regionally significant locally funded projects, match funding for federal aid road and bridge projects, and local match for federal transit funds.

** Includes Sections 5307, 5309, 5310, 5311, 5316-JARC, and 115 funds. Due to the uncertainty of federal and state transit funding after 2009 this TIP does not currently program any transit funds for 2010-2012.

*** Includes Transportation Enhancement-TE, Safe Routes To School-SRTS, High Risk Rural Roads-HRRR, and Federal Earmark funds.

Figure 1-2 Transit Projects for which Federal Funds Were Obligated to in FY 2008

Transit Projects for Which Federal Funds Were Obligated to in FY 2008

Sub-Grantee	CTD #	Federal Amount Obligated in FFY 2008	State Amount Obligated in FFY 2008	MPO	Fund
Independence, Inc.	1	$ 29,624		Lawrence	5310 Capital
Douglas County Senior Services	1	$ 40,442		Lawrence	5317 Operating
Bert Nash Community Mental Hospital	1		$ 4,000	Lawrence	State Operating Assistance
Cottonwood, Inc.	1		$ 4,000	Lawrence	State Operating Assistance
Douglas County Senior Services	1		$ 4,000	Lawrence	State Operating Assistance
Independence, Inc.	1		$ 4,000	Lawrence	State Operating Assistance
Lawrence Transit System	1	$1,496,307		Lawrence	5307 Operating and Capital
Lawrence Transit System	1	$ 400,000		Lawrence	Section 115 Funds - Capital
TOTALS		$1,966,373	$ 16,000		

Chapter 2 System and Route Profiles

System Profiles

System and route profiles are covered in this chapter, and include descriptions of system characteristics, ridership, productivity, and efficiency for all T and KUOW routes.

As Figure 2-1 shows, the core service span and square mileage of each system differs significantly. KUOW has a shorter service span and covers a smaller square area mileage, as defined by the quarter mile buffer around each route. KUOW can be defined as a performance system with an operating characteristic of delivering passengers from a relatively small radius to a strong central attraction point. The system has relatively low headways at six to thirty minutes, using a peak fleet of 28 buses.

The T is a coverage-based system. It encompasses three times the area of the KUOW system with only one additional route, and frequencies of forty minutes to eighty minutes, using a peak fleet of 10 buses. The T system is designed to get its diverse users to a wide variety of dispersed destinations throughout Lawrence.

Figure 2-1 System Characteristics

System Characteristics			
		The T	KU On Wheels
	Fixed Route Ridership*	387,938	1,190,641
	Paratransit Ridership	49,733	3,978
2	Core service span	6 am - 8 p.m., Mon-Sat	7 a.m. - 6 p.m., Mon-Fri
0	Expenditures	$ 3,687,986.00	$ 4,779,704.59
0	# of Routes	8	9
8	Peak Fixed Route Veh.	10	28
	Frequencies	40-80 minutes	6-30 minutes
	Sq Mileage	18.36	6.96

*KU ridership figures are Fiscal Year 08, City ridership figures are Calendar Year 08.

Efficiency is described with the following characteristics:

- Boarding's per revenue hour, separated by weekday and Saturday figures. The higher the ratio, the better utilized the service.
- Cost per rider – shows, by route and by system, the annual operating cost per rider carried on each route and the system as a whole. The lower the cost the better.

Efficiencies for each system are displayed in Figure 2-2.

Figure 2-2 System Efficiency by Route

System Effeciency by Route The T: February 2008-2009, KUOW: August 2008-February 2009				
	Boarding per Revenue Hour		Avg Cost Per Rider	
Route	Weekday	Saturday	Weekday	Saturday
The T 1/4	6.8	4.8	$ 7.10	$ 10.06
The T 2/3	6.9	4.1	$ 6.99	$ 11.80
The T 5	8.4	5.5	$ 5.81	$ 8.88
The T 6	12.1	8.8	$ 4.00	$ 5.51
The T 7	10.8	10.0	$ 4.49	$ 4.87
The T 8	14.4	14.4	$ 3.38	$ 3.38
T Lift	2.3	0.8	$ 20.00	$ 55.70
The T Fixed Route System Total	**9.4**	**7.1**	**$ 5.18**	**$ 6.87**
KUOW 21	79.9	--	$ 0.48	--
KUOW 23	32.4	--	$ 1.55	--
KUOW 24	47.0	--	$ 1.07	--
KUOW 25 & 26	46.3	--	$ 0.95	--
KUOW 27	55.1	--	$ 0.99	--
KUOW 28	29.9	--	$ 2.37	--
KUOW 29	38.5	--	$ 1.58	--
KUOW 41 P&R	37.6	--	$ 1.45	--
KUOW 42	17.6	--	$ 3.02	--
Jay Lift*	1.3		$ 137.61	
KUOW Fixed Route System Total	**46.9**	--	**$ 1.49**	--

* Jaylift average cost per rider excluding August was $54.77

Figure 2-2 highlights differences between The T and KUOW. When considering efficiencies such as boardings per hour and average cost per rider, KUOW measures better than The T. However, as previously mentioned, KUOW covers a much smaller geographical portion of Lawrence than does The T. KUOW has much more restricted hours, with limited service after 6:00 p.m. During the summer KUOW only operates when KU is in session but provides no weekend service. By all counts it is a classic example of a performance-based system. The T, by contrast, covers a much larger geographic area and more hours during the day, enabling riders to get to most places in Lawrence throughout the entire year. It utilizes only 1/3 of the number of vehicles as KUOW. Figure 2-3 shows the weekday boardings per revenue hour. Figure 2-4 displays the average daily boardings per route.

Figure 2-3 Weekday Boardings per Revenue Hour

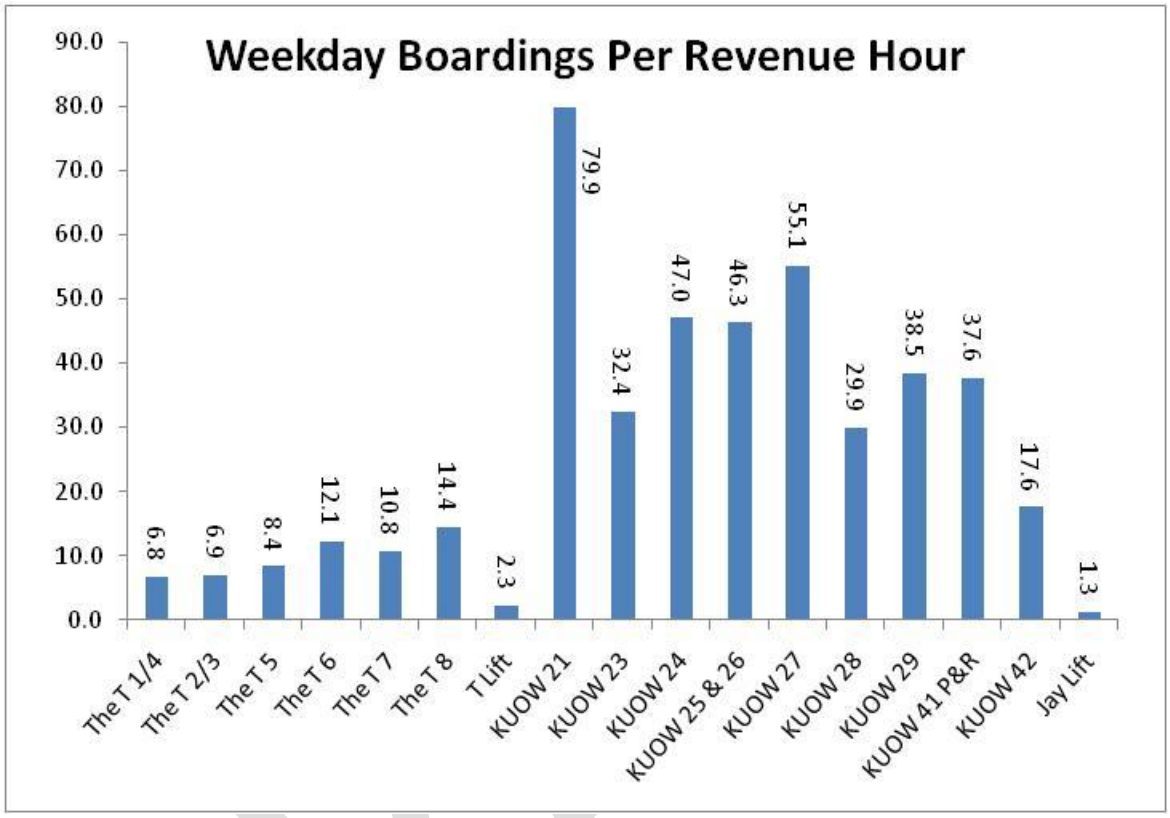
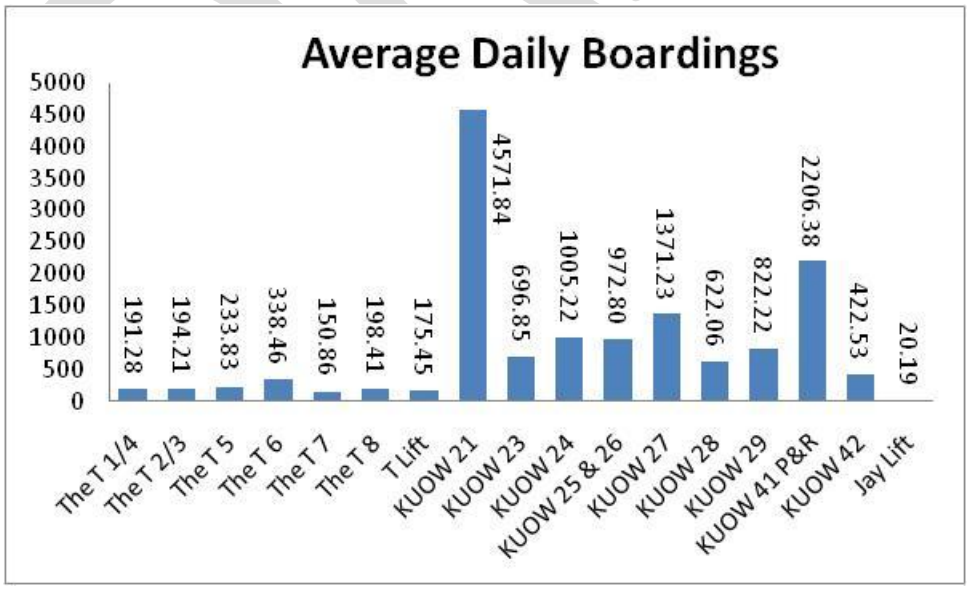


Figure 2-4 Average Daily Boardings



Fixed-Route Descriptions

The description for each route includes the general alignment, headway, service span, and efficiency measures. Routes are presented in numerical order, with the exception of interlined routes which are presented in their pairings.

Route 1 / 4, The Prairie Park Nature Center/Downtown, North Lawrence/Downtown

Operated by The T.

Route 1 and Route 4 are an interlined pair. Route 1 serves the south-east neighborhoods of Lawrence by connecting the Prairie Park neighborhood to downtown along Harper Street, 19th Street, Haskell Avenue, 11th Street, Delaware Street, and 9th Street.

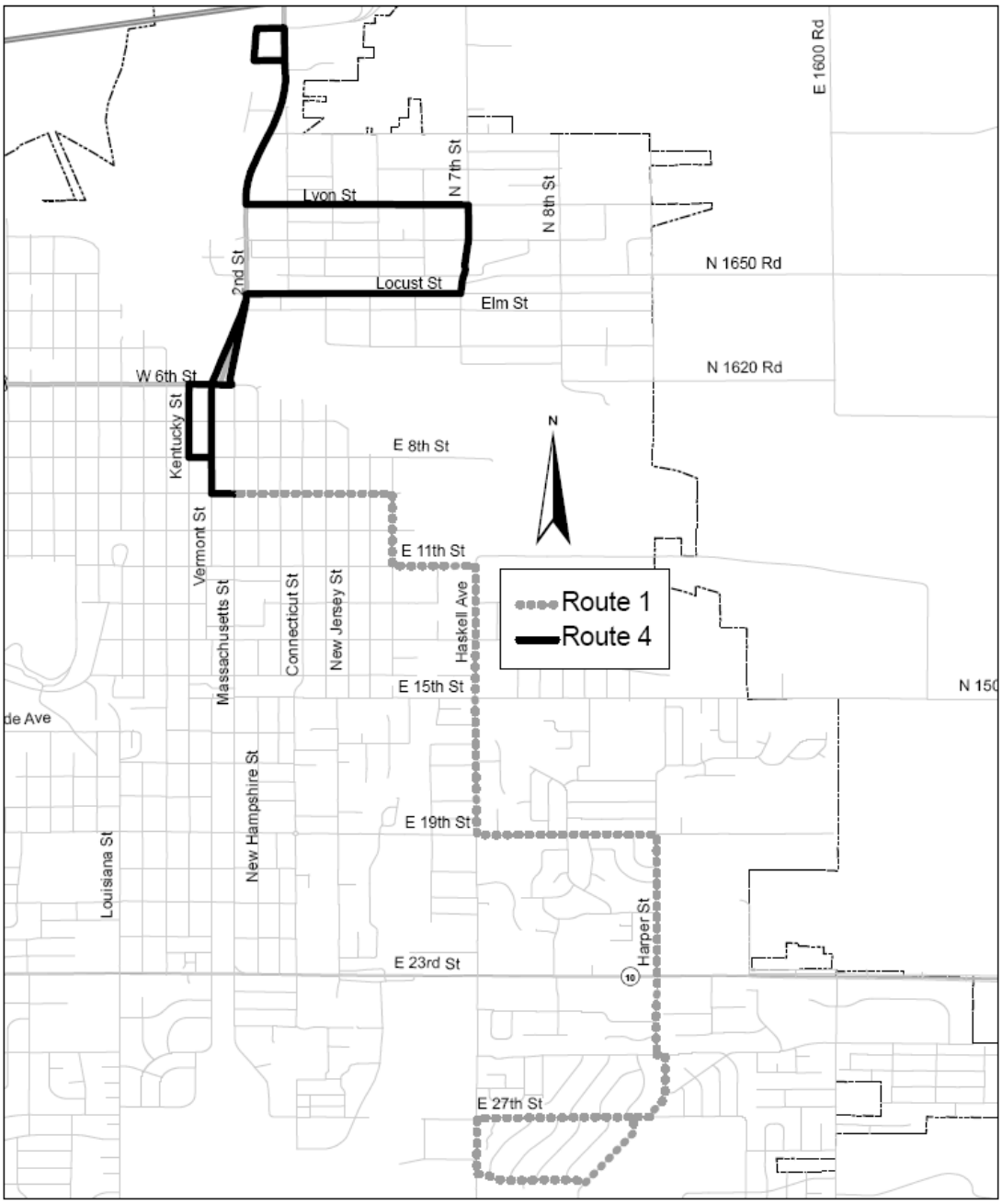
Route 4 is the sole route serving North Lawrence. It travels on Vermont and Kentucky Streets, N 2nd Street/US 40/59, Locust and Lyons Streets, and finishes at the I-70 Business Park near US 40/59.

Figure 2-5, Route 1 and Route 4 Characteristics

Route 1 and Route 4 Prairie Park Nature Center/Downtown North Lawrence/Downtown			
Frequency	40 minutes		
Service Span	6:02 a.m. to 8:00 p.m., Mon - Sat		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	6.8	4.8	9.4 / 7.1
Average Daily Boardings	191.3	135	217.8 / 164.3

Interlined Route 1 and Route 4 have The T's lowest productivity and financial measurements of all fixed routes

Figure 2-6, Route 1 - Prairie Park Nature Center/ Downtown and Route 4 - North Lawrence / Downtown



Route 2 / 3, HINU / Downtown, Iowa & Lakeview / Downtown Operated by The T

Route 2 and Route 3 are an interlined pair. Route 2 connects Haskell Indian Nations University and several community organizations including CLO Inc, and Independence Inc. to Downtown using 9th Street, Connecticut Street, 11th Street, New Jersey Street, 15th Street, Barker Avenue, 19th Street, Moodie Road, 20th Street, Haskell Avenue, 23rd Street, Massachusetts Street, Indian Avenue, and Barker Avenue.

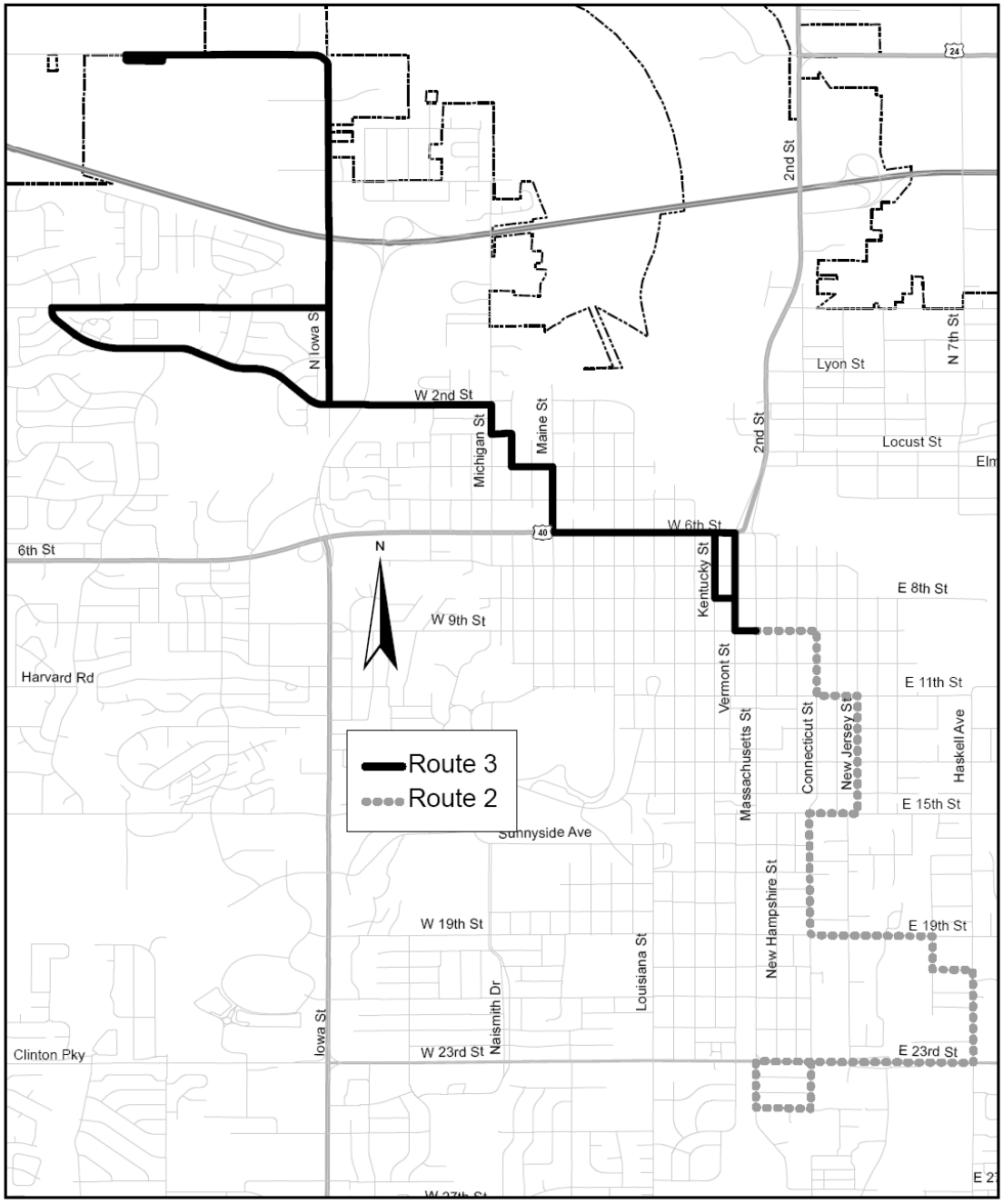
Route 3 serves north-west Lawrence, and connects the Lawrence Memorial Hospital and the North Iowa Industrial area to Downtown along Vermont and Kentucky Streets, 6th Street, Main Street, 4th Street, Arkansas Street, 3rd Street, Michigan Street, 2nd Street, N Iowa Street, Lakeview Road, Peterson Road, and Princeton Boulevard.

Figure 2-7, Route 2 and Route 3 Characteristics

Route 2 and Route 3 HINU / Downtown Iowa & Lakeview / Downtown			
Frequency	40 minutes		
Service Span	6:00 a.m. to 8:01 p.m., Mon - Sat		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	6.9	4.1	9.4 / 7.1
Average Daily Boardings	194.2	115	217.8 / 164.3

Interlined Route 2 and Route 3 have the second lowest weekday productivity and financial measures of The T's fixed route system.

Figure 2-8, Route 2 - HINU/Downtown, Route 3 - Iowa & Lakeview/Downtown



Route 5, 23rd / Clinton Crosstown – Wakarusa / South Iowa / K-10

Operated by The T

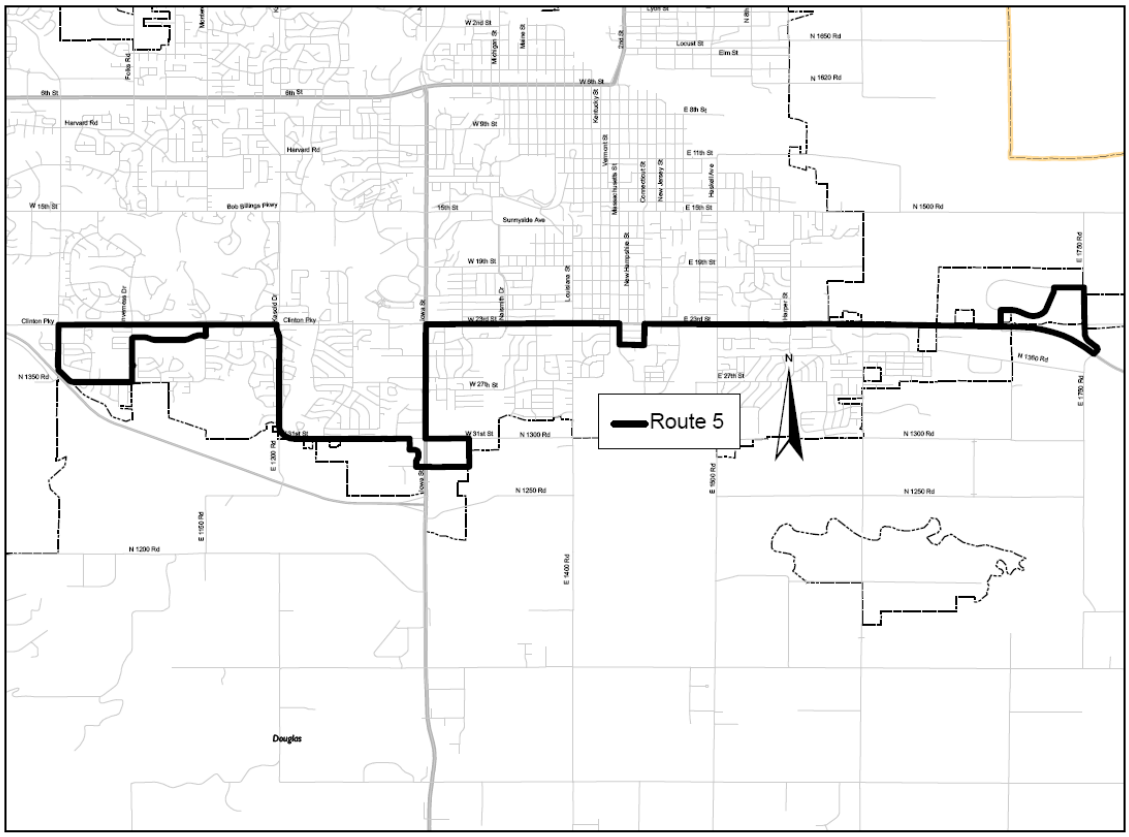
Route 5 is the only T route that does not serve Downtown. It does, however, access the East Hills Business Park, HINU, retail on south Iowa Street, Southwest Junior High, and retail along 23rd Street. The route serves as cross-town connector for the southern portion of Lawrence, and is scheduled to provide timed connections with Route 1, Route 2, Route 7, and Route 8. The alignment connects the East Hills Business park on Noria Road and Greenway Drive, and provides service along 23rd Street, HINU, Iowa Street, 31st Street, Ousdahl Road, 33rd Street, the southern portion of Kasold Drive, Clinton Parkway, Crossgate Drive, 24th Place, Inverness Drive, 27th Street, and the southern-most portion of Wakarusa Drive.

Figure 2-9, Route 5 Characteristics

Route 5 23rd / Clinton Crosstown - Wakaursa / South Iowa / K-10			
Frequency	40 minutes		
Service Span	6:00 a.m. to 8:00 p.m., Mon - Sat		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	8.4	5.5	9.4 / 7.1
Average Daily Boardings	233.8	153	217.8 / 164.3

Route 5 is the fourth-most productive route in The T system for both weekday and weekend productivity and financial measurements.

Figure 2-10, Route 5 - 23rd / Clinton Crosstown - Wakarusa / South Iowa / K-10



Route 6 Wakarusa via 6th Street / Downtown, Wakarusa via 9th Street / Downtown.

Operated by The T

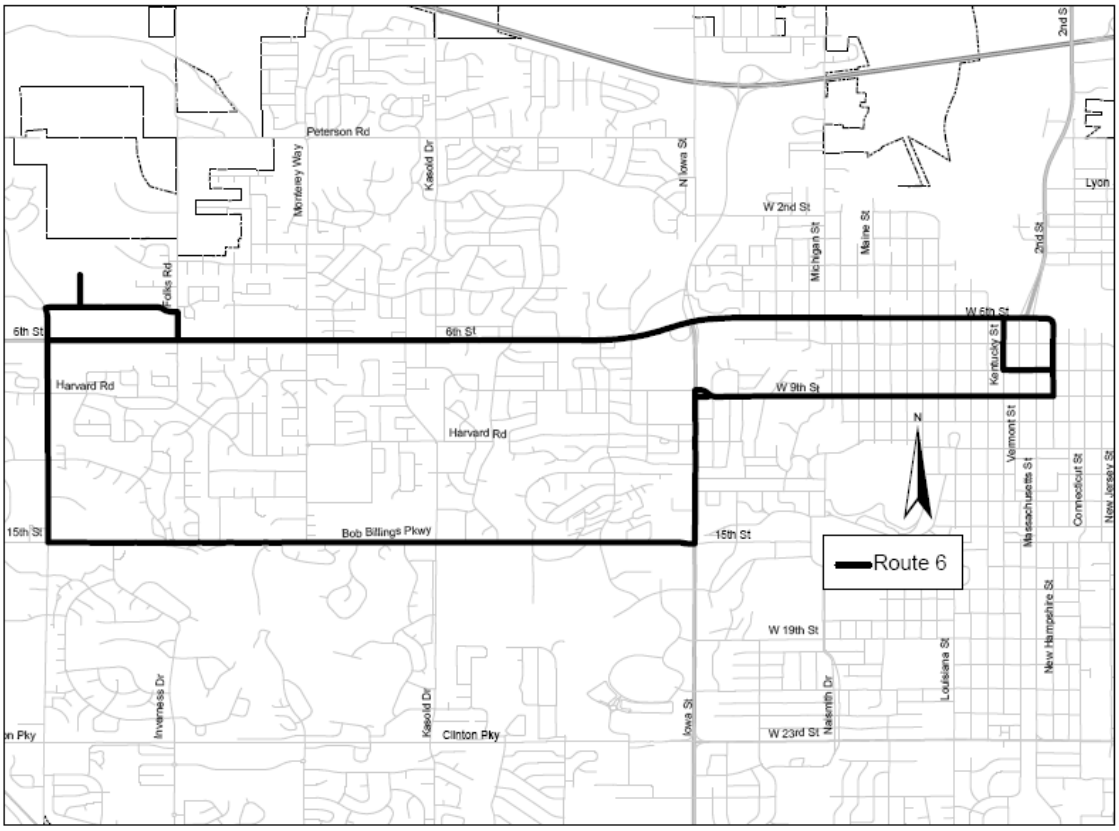
Route 6 is actually two routes that operate in bi-directional loops. It serves mainly west Lawrence along the arterial roads of 6th Street, Wakarusa Drive, Bob Billings Parkway, Iowa Street, and 9th Street. The route deviates to Free State High School / Lawrence Indoor Aquatic Center. In addition to these locations, the route accesses retail along 6th Street, the Social Security office, other government offices, and various medical offices along Wakarusa and Bob Billings Parkway. A Wal-Mart is scheduled to open April 29th just west of the route's current alignment at 6th Street and Wakarusa Drive.

Figure 2-11, Route 6 Characteristics

Route 6 Wakarusa Via 6th Street / Downtown Wakarusa Via 9th Street / Downtown			
Frequency	40 minutes		
Service Span	6:03 a.m. to 8:00 p.m., Mon - Sat		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	12.1	8.8	9.4 / 7.1
Average Daily Boardings	338.5	246	217.8 / 164.3

Route 6 is the second most productive weekday route in The T system for both boardings per revenue hour and fare box recovery ratio, and is the third most productive route on weekends.

Figure 2-12, Route 6 - Wakarusa / Downtown



Route 7 South Iowa / Downtown

Operated by The T

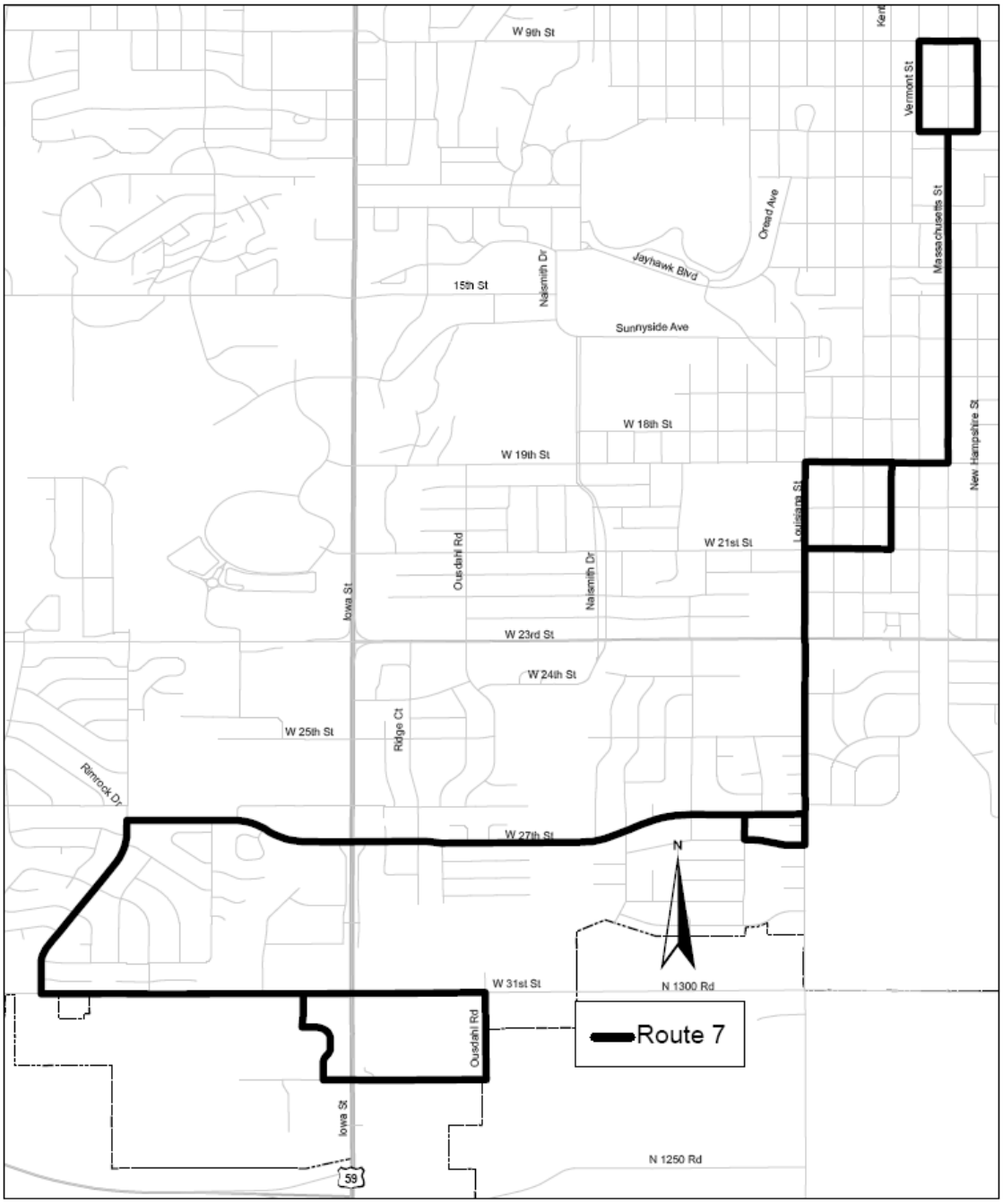
Route 7 connects Downtown with South Iowa retail through mainly residential areas. The route primarily uses Massachusetts, Louisiana and 27th Streets, Lawrence Avenue, 31st Street, and Ousdahl Road, 33rd Street, and Nieder Road around the South Iowa retail area. Route 7 passengers can access Central Junior High School, Lawrence High School, South Junior High, Holcom Park and Recreation Center, and retail at 23rd & Louisiana Street, 27th & Iowa Street, and at South Iowa Street.

Figure 2-13, Route 7 Characteristics

	Route 7 South Iowa / Downtown		
Frequency	80 minutes		
Service Span	6:04 a.m. to 8:01 p.m., Mon - Sat		
Peak Vehicles	1		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	10.8	10.0	9.4 / 7.1
Average Daily Boardings	150.9	139	217.8 / 164.3

Despite being on an 80 minute frequency, Route 7 is the third most productive weekday route, and the second most productive weekend route. This route serves numerous junior high schools and a high school, which are typical passenger generators for transit. It also connects several residential neighborhoods to Downtown and to retail on South Iowa Street.

Figure 2-14, Route 7 - South Iowa / Downtown



Route 8 KU / South Iowa / Downtown

Operated by The T

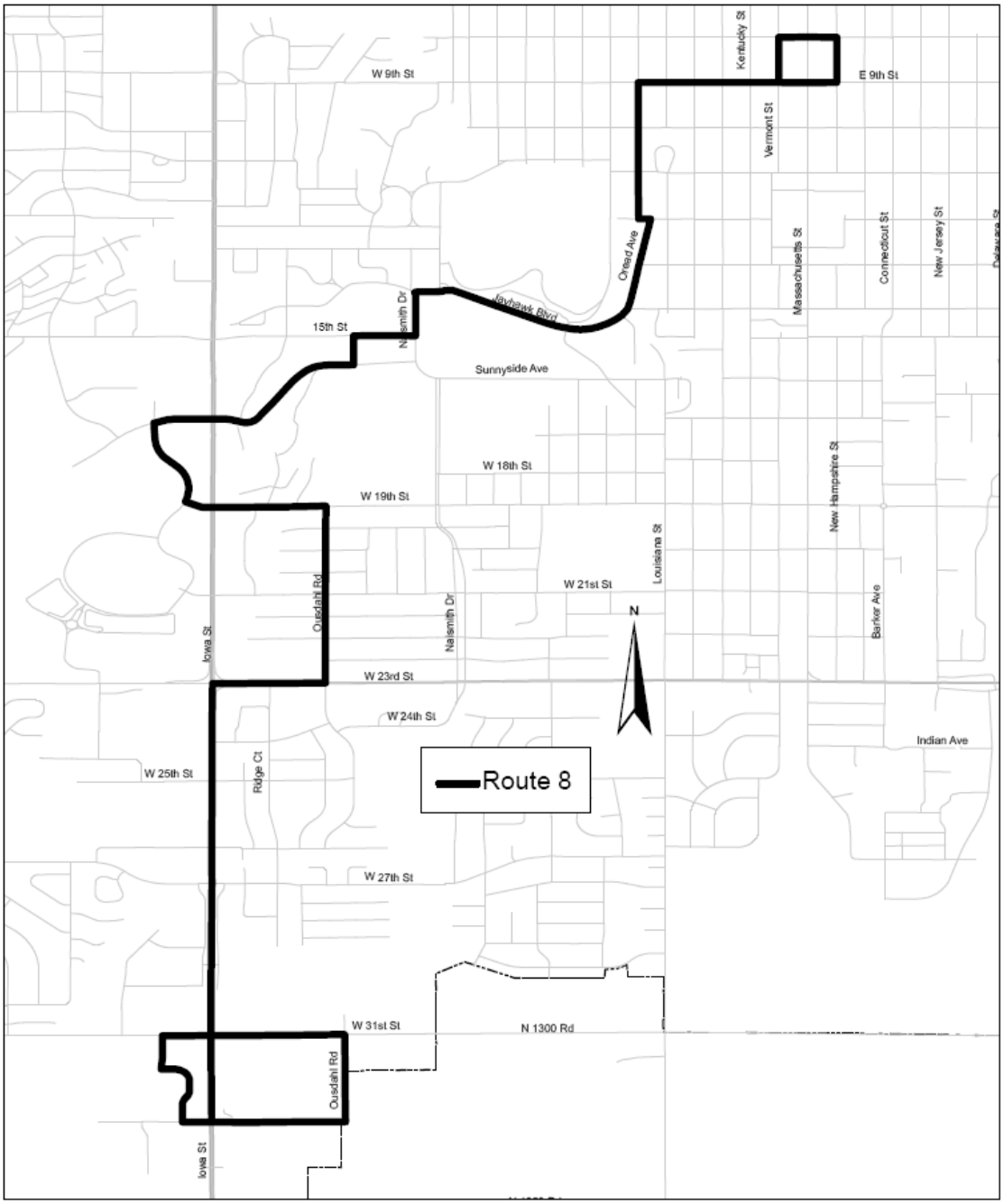
Route 8 connects Downtown to retail on South Iowa through the KU campus. The primary alignment of Route 8 is on 9th Street, Indiana Street, Jayhawk Boulevard, Irving Hill Road, 19th Street, Ousdahl Road, and Iowa Street, as well as 31st Street, Ousdahl Road, 33rd Street, and 31st Street.

Figure 2-15, Route 8 Characteristics

	Route 8 KU / South Iowa / Downtown		
Frequency	80 minutes		
Service Span	6:13 a.m. to 8:00 p.m., Mon - Sat		
Peak Vehicles	1		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	14.4	14.4	9.4 / 7.1
Average Daily Boardings	198.4	198	217.8 / 164.3

Route 8 is the most productive of The T routes despite having only 80 minute frequencies. It should be noted that the low frequency of the route uses fewer resources, and makes the route look more productive than it might otherwise appear if two buses served the route. It is also interesting to note that the productivity numbers are consistent for both the weekend and weekday service. Route 8 is the sole transit route serving KU dorms on the weekends, which might explain part of the high weekend ridership.

Figure 2-16, Route 8 - KU / South Iowa / Downtown



Route 21 Campus Express

Operated by KUOW

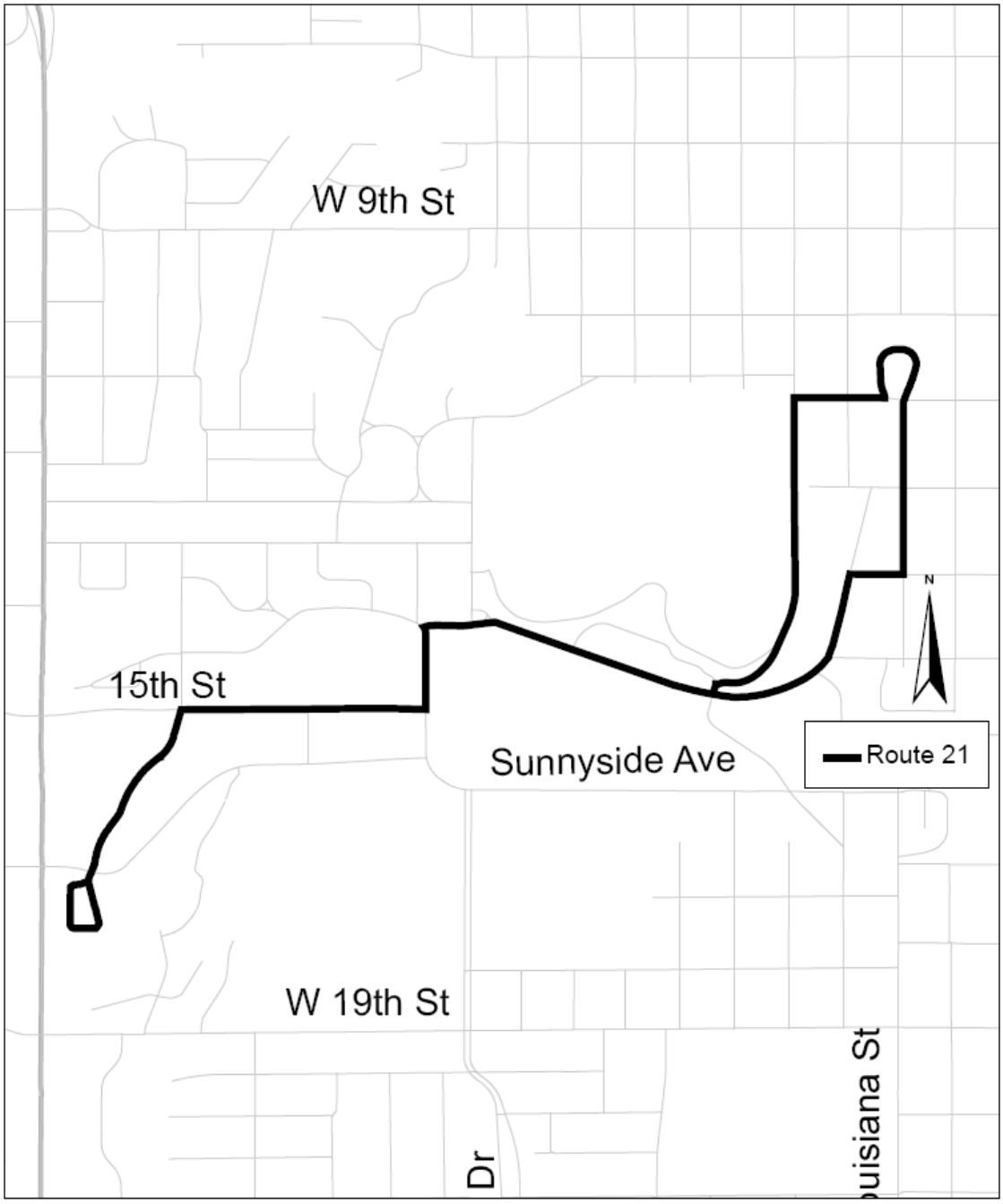
Route 21 Campus Express serves as an intra-campus shuttle connecting student dorms at both the west and east ends of campus with classrooms on Jayhawk Boulevard and 15th Street. The primary alignment is Engle Road, 15th Street, Jayhawk Boulevard and Oread Avenue.

Figure 2-17, Route 21 Characteristics

Route 21 Campus Express			
Frequency	6-10 minutes		
Service Span	7:20 a.m. - 5:40 p.m., Mon - Fri		
Peak Vehicles	7		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	79.9	--	46.9
Average Daily Boardings	4571.8	--	1410.1

Route 21 is the most productive of KUOW routes, and its alignment provides for extremely high concentration of both trip generation and trip origin. It is unsurprising that the route also accounts for 59% of all reported overloading incidents between November 24th and January 27th.

Figure 2-18, Route 21 - Campus Express



Route 23 Stewart / Louisiana

Operated by KUOW

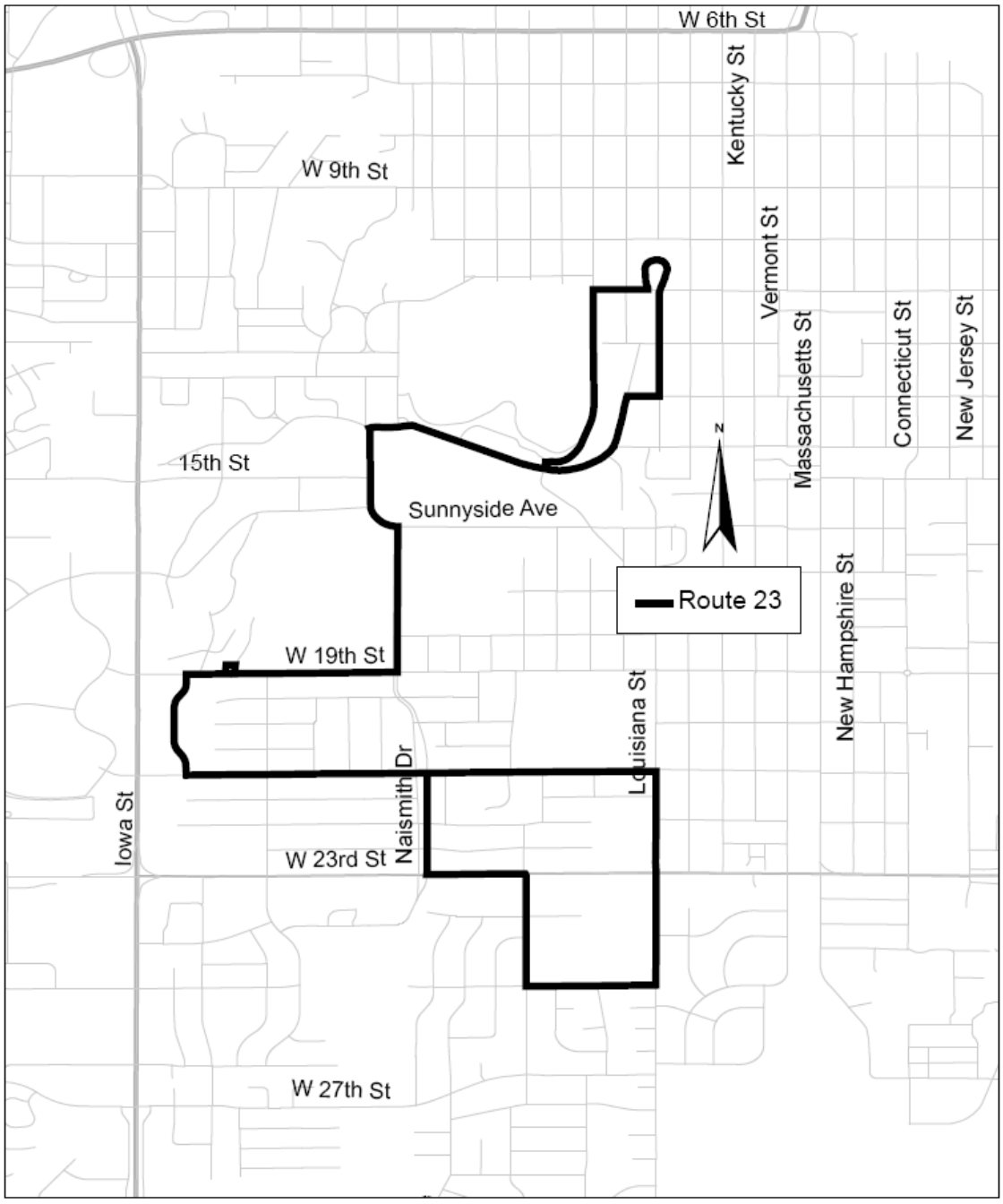
Route 23 connects KU with residential areas south and east of the campus. Its primary alignment after leaving campus on Naismith Drive is 19th Street, Stewart Avenue, 21st Street, a one-way loop along 21st Street, Louisiana Street, 25th Street, Alabama Street, 23rd Street and Naismith Drive. This route serves the Naismith Hall and Oliver Hall, and the apartment complexes located on Stewart Avenue and near Louisiana Street and 25th Street.

Figure 2-19, Route 23 Characteristics

	Route 23 Stewart / Louisiana		
Frequency	30 minutes		
Service Span	6:54 a.m. to 5:54 p.m., Mon - Fri		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	32.4	--	46.9
Average Daily Boardings	696.9	--	1410.1

Route 23 is, out of nine fixed routes, the seventh most productive at 32.4 boardings per hour.

Figure 2-20, Route 23 Stewart / Louisiana



Route 24 31st & Iowa

Operated by KUOW

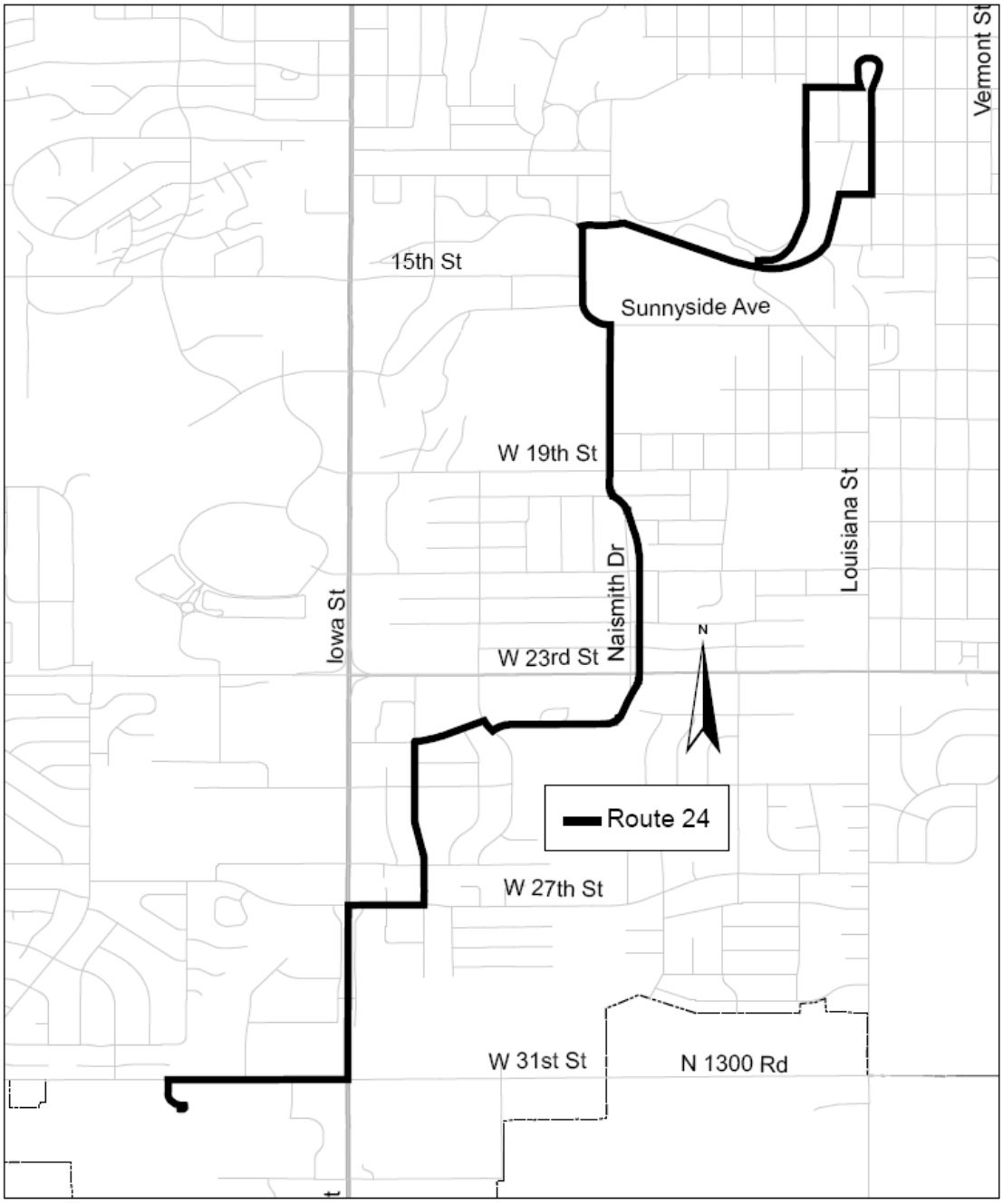
Route 24 connects the KU campus with apartment complexes at 24th Street & Ridge Court, 27th Street & Ridge Court, and The Reserves apartment complex near 31st and Iowa Street. Once the route exits campus, the primary alignment is Naismith Drive, 24th Street, Ridge Court, 27th Street, Iowa Street, and 31st Street. The route does not directly serve the retail on South Iowa street even though the alignment runs near the area.

Figure 2-21, Route 24 Characteristics

Route 24 31st & Iowa			
Frequency	30 minutes		
Service Span	7:00 a.m. to 6:00 p.m., Mon - Fri		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	47.0	--	46.9
Average Daily Boardings	1005.2	--	1410.1

Route 24 is the third most productive route in the KUOW system at 47.0 boardings per revenue hour.

Figure 2-22, Route 24 - 31st & Iowa



Route 25 and Route 26, Downtown / 25th & Melrose

Operated by KUOW

Route 25 and Route 26 are currently interlined together and connect the KU campus to residential areas around Downtown, and apartment areas at 24th Street & Naismith Drive, 24th Street & Ousdahl Road, and 25th Street & Melrose Lane. Route 25 is the only KUOW route serving east Lawrence. Leaving the campus at Louisiana Street, the primary alignment is 11th Street, New Jersey Street, 9th Street, Indiana Street (this route currently uses Mississippi Street due to construction).

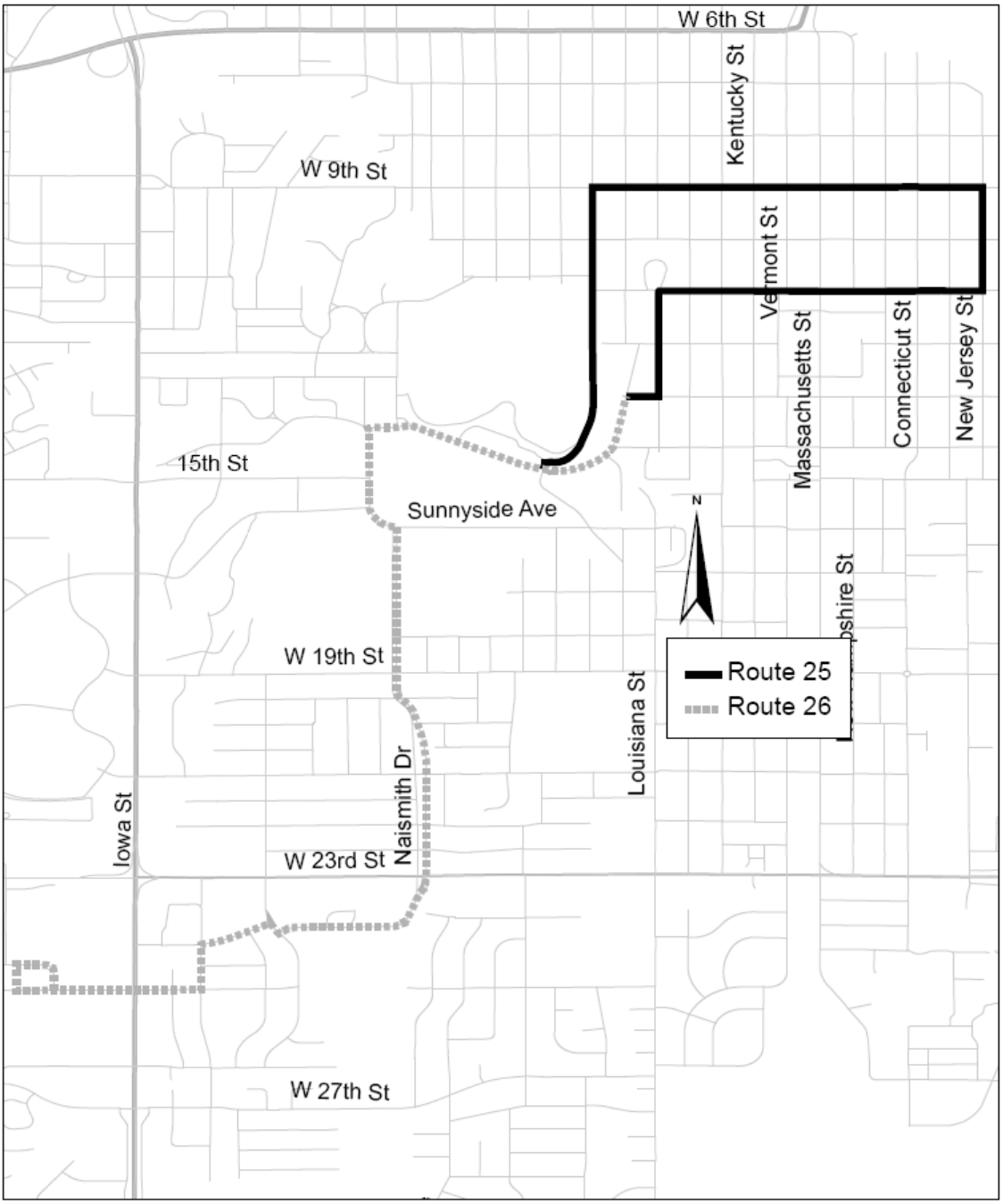
Route 26's primary alignment going towards campus follows 25th Street across Iowa to Ridge Court, 24th Street, and Naismith Drive.

Figure 2-23, Route 25 and Route 26 Characteristics

Route 25 and Route 26 Downtown / 25th & Melrose			
Frequency	30 minutes		
Service Span	7:25 a.m. to 5:55 p.m., Mon - Fri		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	46.3	--	46.9
Average Daily Boardings	972.8	--	1410.1

Interlined together, Route 25/26 is the fourth most productive route in the KU system with 46.3 boardings per revenue hour. This is just below the average 47.8 boardings per revenue hour.

Figure 2-24, Route 25 & Route 26 Downtown / 25th & Melrose



Route 27 Bob Billings & Kasold

Operated by KUOW

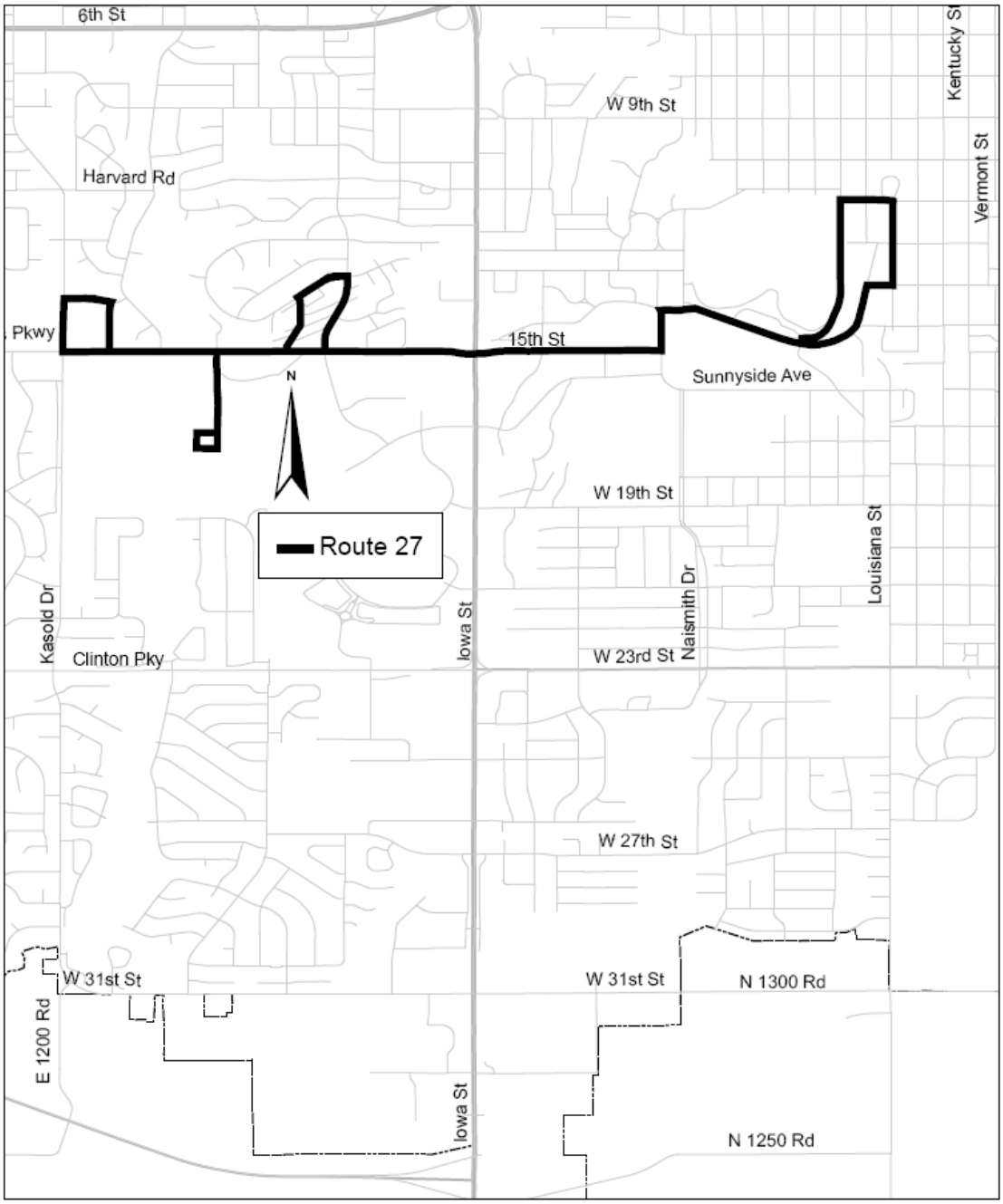
Route 27 connects the KU campus to apartment complexes on Bob Billings Parkway east of Kasold Drive. Exiting the campus on 15th Street, the route follows a primary alignment on Bob Billings Parkway with a deviation to access the Meadowbrook Apartments along Crestline Drive and Chelsea Place, before turning around at Orchards Corners apartments using Apple Lane, 14th Street, and Kasold Drive.

Figure 2-25, Route 27 Characteristics

Route 27 Bob Billings & Kasold			
Frequency	13 minutes at peak		
Service Span	7:10 a.m. - 5:55 p.m., Mon -Fri		
Peak Vehicles	3		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	55.1	--	46.9
Average Daily Boardings	1371.2	--	1410.1

Route 27 is the second most productive route in the KUOW system with 55.1 boardings per revenue hour.

Figure 2-26, Route 27 - Bob Billings & Kasold



Route 28 6th via Emery

Operated by KUOW

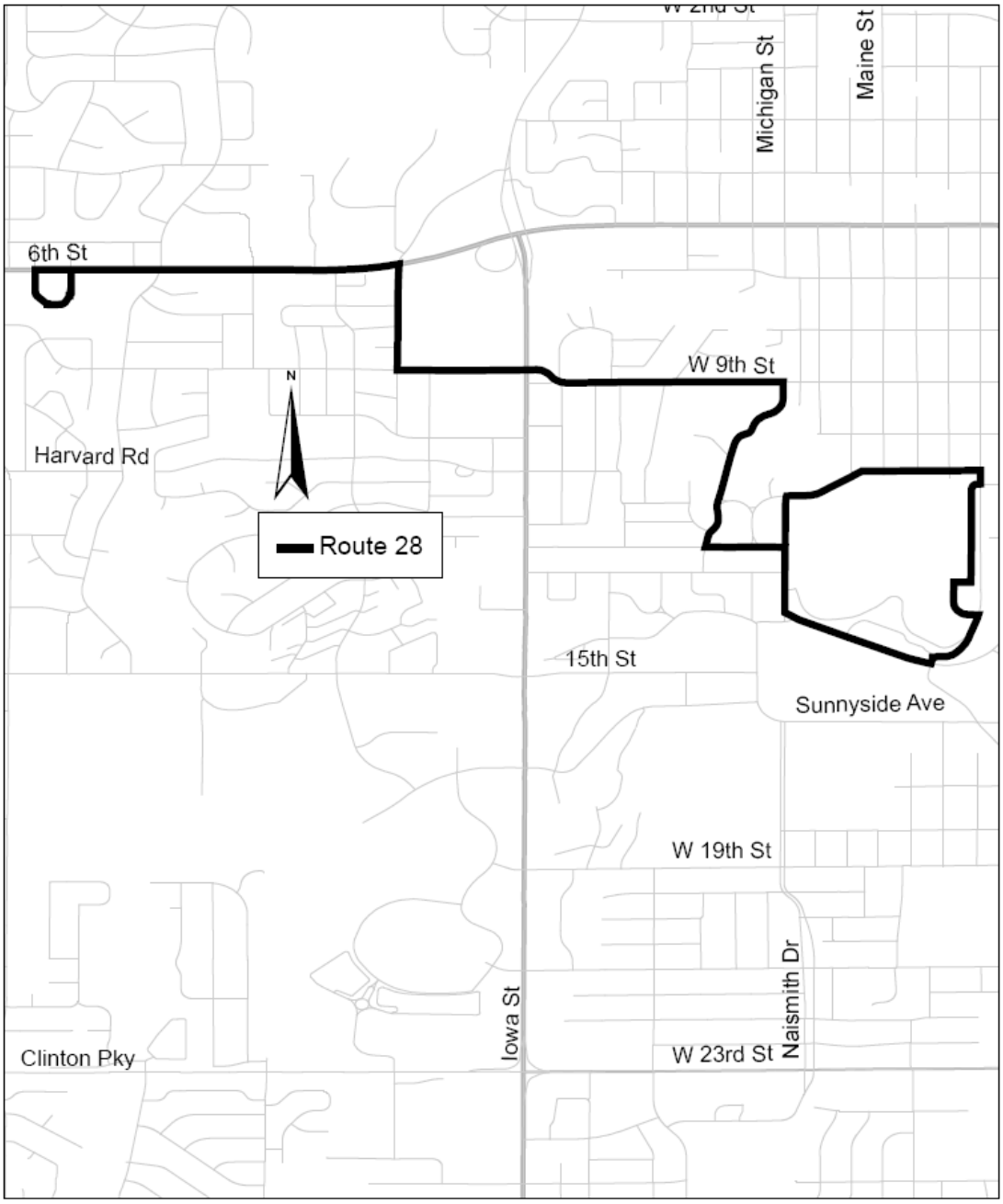
Route 28 connects the KU campus to apartment complexes on 6th Street and 9th Street, as well as Greek housing along Emery Rd and single family rental housing along Rockledge road. The general alignment exiting off of campus from West Campus Rd is Stratford and Emery Roads, 9th Street, Rockledge Road, and 6th Street, before turning around at the Sunrise Village apartments along Fireside Court.

Figure 2-27, Route 28 Characteristics

Route 28 6th Via Emery			
Frequency	20 minutes		
Service Span	7:05 a.m. - 5:50 p.m., Mon - Fri		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	29.9	--	46.9
Average Daily Boardings	622.1	--	1410.1

Route 28's productivity at 29.9 boardings per revenue hour is the second least productive route in the KU system, and the least productive off-campus route. This route, however, does have a higher frequency than most other off-campus KU routes at 20 minutes.

Figure 2-28, Route 28 - 6th Via Emery



Route 29 2nd & Michigan

Operated by KUOW

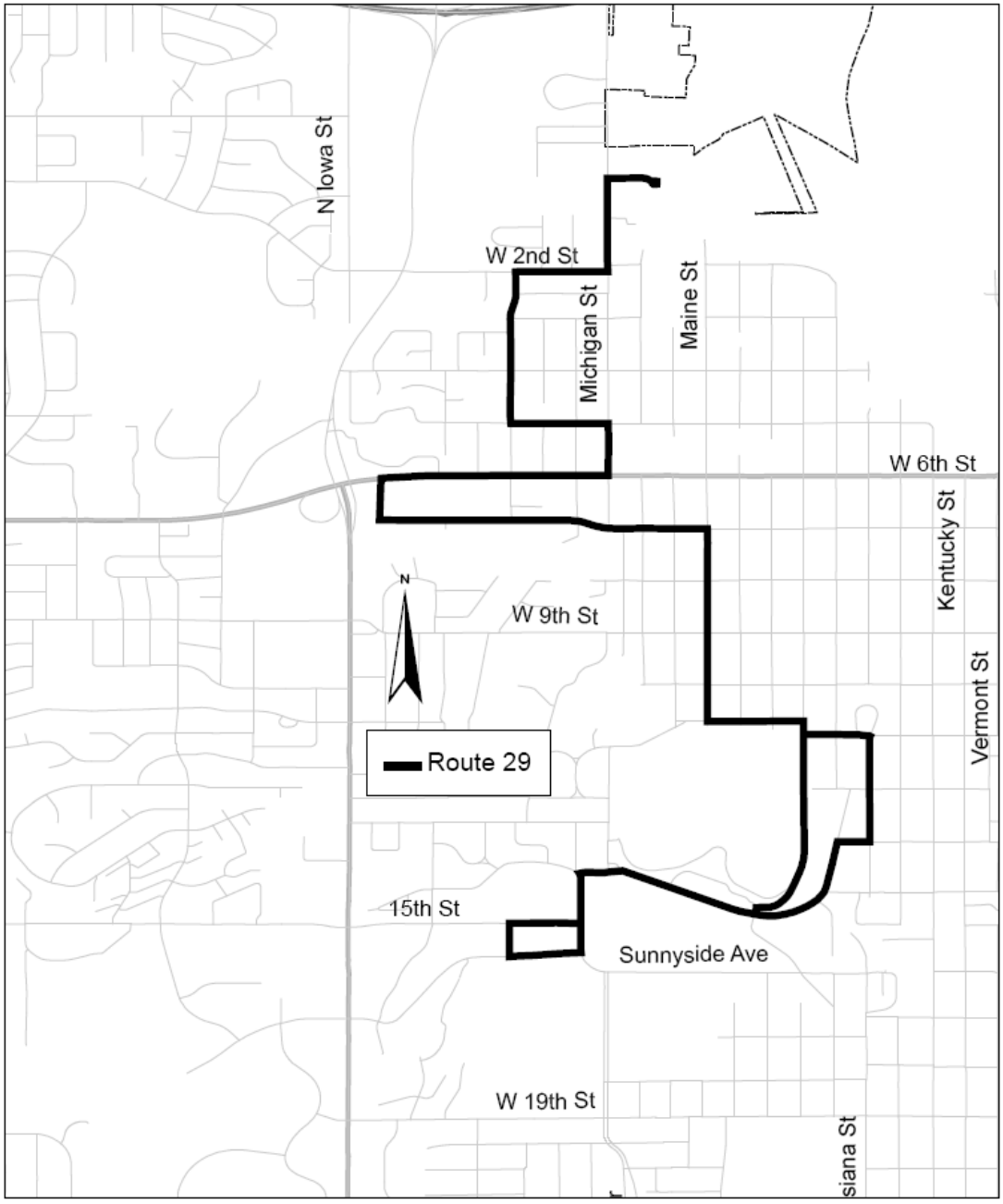
Route 29 connects the KU campus to living areas north of 9th Street, including apartment complexes near 7th Street & Michigan Street, Highpointe Apartment complex, and Michigan Street & George Court. The general alignment after exiting campus is Mississippi Street, Maine Street, 7th Street, 6th Street, Michigan Street, 5th Street, Wisconsin Street, and 2nd Street, before heading north on Michigan Street to George Court where the alignment turns around at Northwinds apartment.

Figure 2-29, Route 29 Characteristics

Route 29 2nd & Michigan			
Frequency	30 minutes		
Service Span	6:57 a.m. - 5:57 p.m., Mon - Fri		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	38.5	--	46.9
Average Daily Boardings	822.2	--	1410.1

Route 29 is the fifth most productive route of the KUOW system at 38.5 boardings per revenue hour, and is below the systems average.

Figure 2-30, Route 29 - 2nd & Michigan



Route 41 Park & Ride

Operated by KUOW, (with vehicles purchased through The T).

Route 41 is an intra-campus shuttle service between the KU Park & Ride located at 23rd & Iowa Street, and campus buildings along Sunnyside Avenue and Jayhawk Boulevard. The alignment generally follows Constant Avenue, Irving Hill Road, Naismith Drive, Sunnyside Avenue, Sunflower Road, Jayhawk Boulevard, Naismith Drive, 15th Street, and Burdick Drive back to Irving Hill Road.

Route 41 is the only KUOW route for which used the city acted as an intermediary to obtain capital funding. It is therefore classified as a public route.

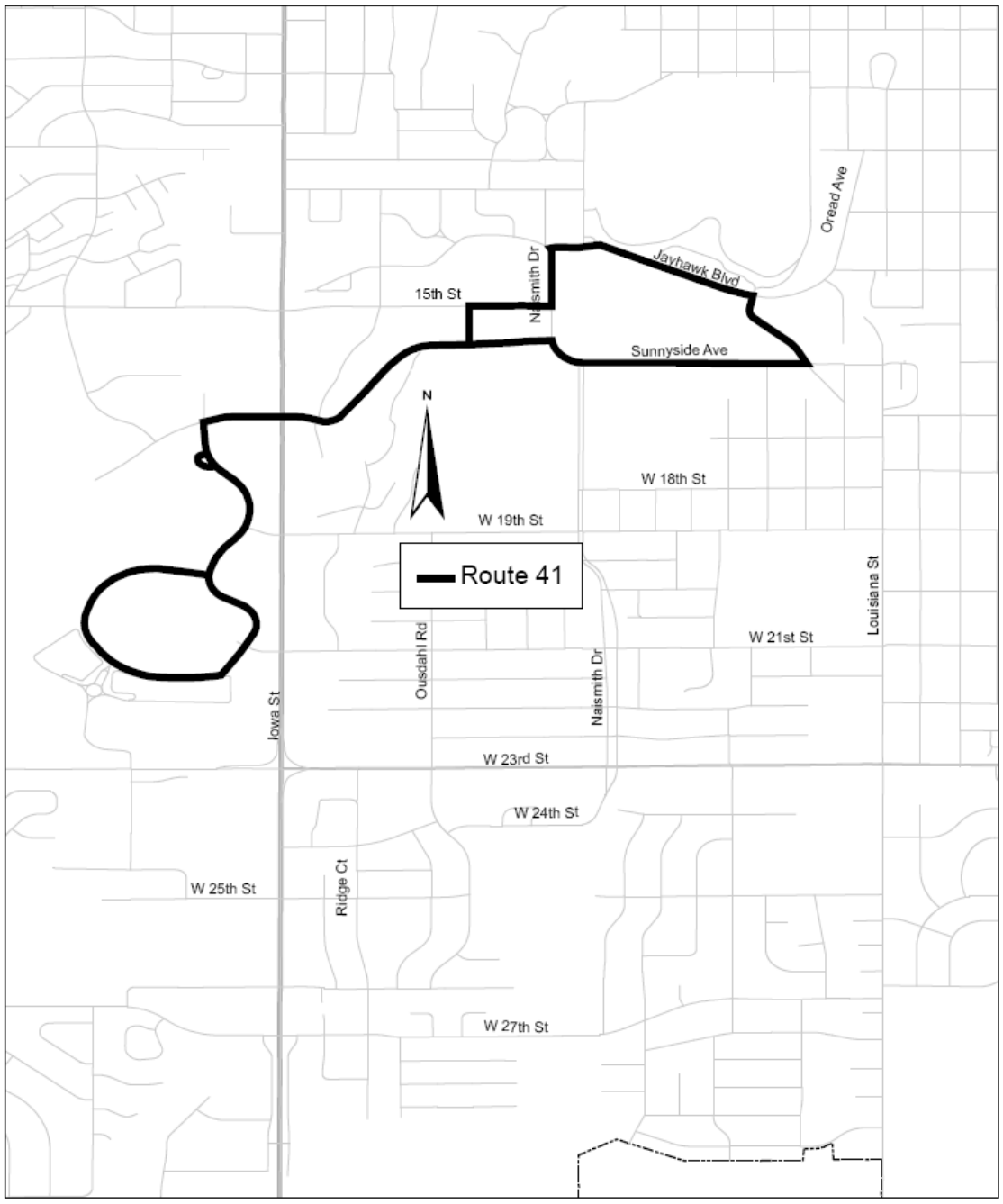
Figure 2-31, Route 41 Characteristics

Route 41 Park & Ride Express			
Frequency	5 minutes at peak		
Service Span	6:30 a.m. - 10:30 p.m., Mon - Fri*		
Peak Vehicles	6		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	37.6	--	46.9
Average Daily Boardings	2206.4	--	1410.1

* Friday service ends at 7:00 p.m.

Route 41 is the sixth most productive route on the KUOW system with 37.6 boardings per revenue hour. This is due to the relatively high number of resources it utilizes to maintain a 5 minute peak frequency. Route 41 has the second highest daily ridership.

Figure 2-32, Route 41 - Park & Ride Express



Route 42 Rec Ctr – JRP Circulator

Operated by KUOW

Route 42 is an intra-campus circulator that connects the on-campus parking lots at the recreation center on the southern campus edge and the parking lots near Memorial Stadium on the northern campus edge, with campus buildings along Sunnyside Avenue and Jayhawk Boulevard using a figure "eight" route. The general alignment is Naismith Drive, Sunnyside Ave, Sunflower Road, Jayhawk Boulevard, West Campus Road, 11th Street, and following Mississippi Street back to Jayhawk Boulevard and onto Naismith Drive.

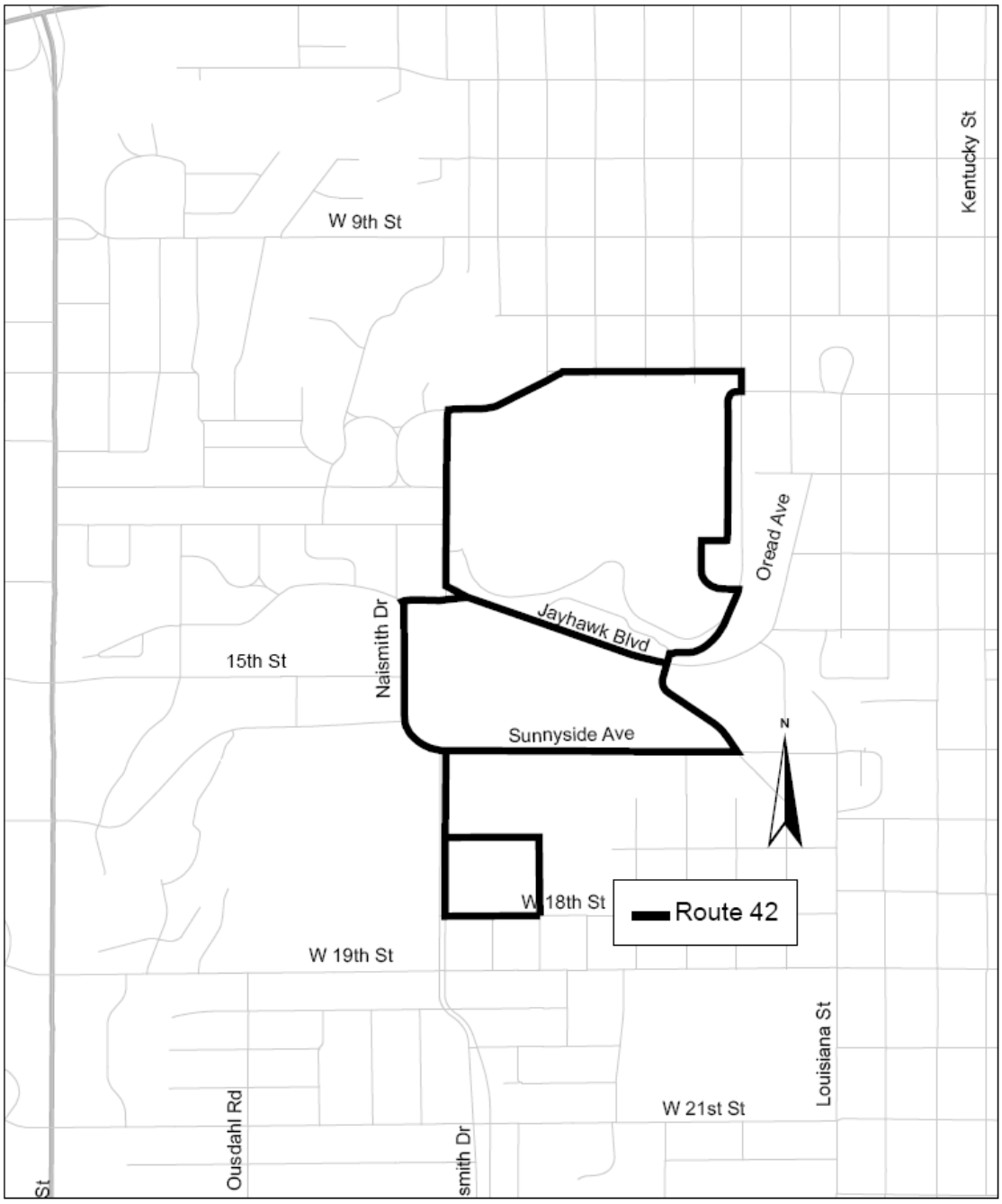
Figure 2-33, Route 42 Characteristics

Route 42 Rec Ctr - JRP Circulator			
Frequency	15 Minutes		
Service Span	7:00 a.m. - 10:30 p.m., Mon - Fri*		
Peak Vehicles	2		
	Weekday	Saturday	System Avg
Boardings per Revenue Hour	17.6	--	46.9
Average Daily Boardings	422.5	--	1410.1

*Friday service ends at 6:00 p.m.

Route 42 is the least productive of the KUOW routes at 17.6 boardings per revenue hour, and also has the lowest average daily boardings.

Figure 2-34, Route 42 - Rec Ctr JRP Circulator



Route Concerns

Two obvious route deficiencies appeared. The first is overloading issues on certain KUOW routes, notably Route 21 which accounts for 59% of measured overloading incidents. Secondly, in discussion with employer and employee groups, and school officials, The T's current schedule is not well coordinated with many shift or school times. KUOW, while having a greater frequency than The T, has a limited geographic scope making it unsuitable for many employees within the City of Lawrence. Figure 2-35 is a simple comparison of the start times of the Jr. High, High schools, and daytime shifts of large employers, with the nearest T or KUOW arrivals. Six out of twenty possible transit options have good connections at both the beginning and end of the school or business day.

Figure 2-35, School / Business Start / End Times and Transit Service Times

School / Business Day Time Start / End Times Compared with Transit Service Times

School / Business	AM Start	Route	Arrival	PM End	Route	Departure
Central Jr. High	8:08	7 NB	7:20 a.m.	3:10	7 NB	3:20 p.m.
		7 SB	7:24 a.m.		7 SB	3:24 p.m.
		2 NB	7:40 a.m.		2 NB	3:40 p.m.
		2 SB	7:44 a.m.		2 SB	3:44 p.m.
South Jr. High	8:08	7 NB	7:08 a.m.	3:10	7 NB	4:28 p.m.
		7 SB	7:35 a.m.		7 SB	3:35 p.m.
Southwest Jr. High	8:08	5 WB	8:00 a.m.	3:10	5 EB	3:20 p.m.
Lawrence Free State High	8:05	6 clockwise	7:42 a.m.	3:05	6 clockwise	3:45 p.m.
		6 counter	7:38 a.m.		6 counter	3:41 p.m.
Lawrence High School	8:05	7 NB	7:08 a.m.	3:05	7 NB	3:08 p.m.
		7 SB	7:35 a.m.		7 SB	3:35 p.m.
		23 OB	7:54 a.m.		23 OB	3:24 p.m.
Berry Plastics (North Iowa Industrial Area)	7:00	3 NB	6:40 a.m.	3:00	3 SB	3:20 p.m.
Kinedyne Corporation (East Hills Business Park)	6:30	5 EB	6:40 a.m.	3:00	5 WB	3:22 p.m.
KU Landscaping (Westbrooke St)	6:30	6 clockwise	6:32 a.m.	3:00	6 clockwise	3:00 p.m.
		6 counter	6:11 a.m.		6 counter	3:12 p.m.
KU Maintenance (Westbrooke St)	7:30	6 clockwise	7:31 a.m.	4:00	6 clockwise	4:11 p.m.
		6 counter	7:12 a.m.		6 counter	4:32 p.m.
		27 IB	7:15 a.m.		27 IB	4:15 p.m.
Vangent (East Hills Business Park)	7:30	5 WB	7:20 a.m.	3:00	5 EB	3:22 p.m.
Sauer Danfoss	7:00	5 WB	6:42 a.m.	3:00	5 EB	3:22 p.m.

Good Connection (less than 20 minute wait)
Bad Connection (more than 20 minute wait)

Paratransit Service Description

Lawrence Transit and KUOW each operate their own paratransit service ("T Lift" and "Jay Lift", respectively). Both services are currently being operated by the same service provider, but operations and policies differ.

T Lift is The T's ADA-paratransit service. It is required to follow FTA guidelines and therefore cannot restrict trip purpose. It has 30 minute windows to pick up, and drop off passengers. The Jay Lift is a non-ADA paratransit service and provides service for temporarily or permanently disabled students. Jay Lift does not have to follow FTA guidelines, and is able to restrict trip purpose to academic activities which can include class or campus-sponsored events. Jay Lift's self-imposed restrictions aim to deliver students to class on time.

Figure 2-36 compares the key characteristics of T Lift and Jay Lift. The figure shows that the Jay Lift cost per rider is $137.61. This includes August 2008 which had an abnormally high cost per rider due to the previous contract structure in which KUOW paid a monthly cost, regardless of how many days Jay Lift was in operation. The current contracts pays a variable amount according to hours used. Removing August 2008, the average cost per Jay Lift rider from September 2008 through February 2009 was $54.77. This cost is still above industry standards of around $20.00 a ride.

Figure 2-36, T Lift and Jay Lift Characteristics

T Lift and Jay Lift Characteristics		
	T Lift (Lawrence Transit)	Jay Lift (KU On Wheels)
Service Span	Mon-Sat, 6:00 a.m. - 8:00 p.m.	Mon-Fri, 7:00 a.m. - 10:00 p.m., other approved campus activities
Fares	$2.00	None
Eligibility	ADA-Certified, through medical professional	Temporary or permenent disability as reported by medical professional
Reservation Process	Up to 5 day advanced reservation, same-day as space available. Available subscription service.	Mostly subscription. Other campus event trips need 24 hour advanced notice.
Average Daily Ridership	175	20
Cancellation / No Shows Policies	Must be made more than 1 hr before pick-up. 6 no-shows/late cancellations within 90 day period results in 30-day suspension from service.	3 late / no shows result in a suspension for rest of the semester.
Vehicles	12 Vehicles Available	8 Vehicles Available
Eligible Trip Purposes	No Restrictions	Campus Events
Avg. Boardings Per Revenue Hour (Weekday/Saturday)	2.3 / 0.8	1.3 / --
Avg. Cost Per Rider	$20.00	$137.61

Paratransit Concerns

Several concerns about paratransit were observed. The high cost of Jay Lift immediately presents itself. However, the change to the current contract has appeared to bring costs down. January 2009 and February 2009 Jay Lift costs per rider were much lower at an average of $27.39, compared with the same month 2008 at $78.55. Discussions with Jay Lift users have identified concerns with policies. The strict cancellation procedure of 3 late/no shows resulting in a semester-long suspension from the service has imposed high academic and financial costs to some users. The T Lift

has a more relaxed policy of 6 no shows / late resulting in only a 30 days suspension. For the Jay Lift, there is also concern among past users about the definition of campus events (or "co-curricular activities"). For one user majoring in fine arts, class-mandated evening rehearsals and productions did not constitute as a campus event.

The lack of low-floor vehicles was problematic for several users, who found it necessary to use the vehicles' hydraulic lift features rather than navigate the high steps of the paratransit vehicles.

Stakeholders that work with senior citizens mentioned that The T Lift's application form itself seems unnecessarily long and complex. The T Lift application consists of two parts. The user desiring to use the system fills out part A, which consists of five pages of questions asking about the users physical abilities. The user's medical practitioner or social worker fills out part B, which is also five pages and covers mostly the same type of questions asked of the user in Part A. Stakeholders noted that the length and duplicative nature of the two parts, along with the relatively small print that makes it difficult for senior citizens or visually-impaired individuals to read, and the fact that medical practitioners may take several weeks to return part B, makes the process especially difficult. The entire application form for a Kansas disabled parking tag, by contrast, is one page with instructions on the back.

Funding

KUOW is internally funded through student fees and transfers from the parking department. Student fees include dedicated fees for bus acquisition and bus operations. Projected fare box revenue is minimal.

Beginning April 1, 2009, the local funding for The T system will be primarily through a .20% and a .05% sales tax. Future projections show nearly 70% of the funding will be locally provided, either through the sales tax or fare revenue, 25% will come from the federal government in the form of grants and the remainder, will come from state funding. Fare box revenue is projected to provide approximately 6% of the budget.

Chapter 3 Initial Public Meetings

Introduction

An intensive public involvement process was utilized during the week of February 9th, 2009. The study planning team identified 43 distinct groups. Olsson Associates and Bourne Transit met with these stakeholders in over 30 meetings.

Focus Groups with Stakeholders

Lawrence City Manager & Vice Provosts

Date / Time: Tuesday Feb 10, 2009 / 10:15 a.m.
Interviewees: Dave Corliss, Lawrence City Manager; Don Steeples, Vice Provost for Scholarly Support, Marlesa. Roney, Vice Provost of Student Success
Interviewers: Bob Bourne, Robert Bromberg, Mark Swope, Tom Worker-Braddock

- Currently students are sensitive to the prospect of consolidating systems because students still view KUOW as their system, but that institutional memory will gradually be lost.
- There was a recent mainstream press article about transit in Houston. Would it be possible to be more nimble in adjusting routes – regardless if it was KU route or City route? Election gave the city a 10 year budget and the current contract is for 5 years. Success is defined by ridership numbers.
- Safety is also important. Sometimes service, such as night service, needs to be provided even if ridership doesn't technically support it.
- There needs to be care in arguing what groups should fund what. City residents are supporting KU through state taxes, and students are paying property tax. It wouldn't be constructive to get into a tit-for-tat funding discussion as any sense of cooperation goes down when talking about money.
- It's recognized that any successful city transit service will need to serve students, and it could be argued that since the student pay more in student fees / property taxes, they get more service.
- KU last year decided not ask apartment complexes to subsidize the bus service.
- There was discussion about a transit hub at the current park & ride lot. There hasn't been much discussion about a transit hub at the stadium, but the throwing area at 11th and Mississippi will be up for redesign and there could be potential for integrating a transit hub in the redesign.
- City officials would probably be open to having a transit hub at the University.
- Any coordination will need to take into account that KUOW have alternate routes for heavy snowfall, which keeps the buses running on the contour lines instead of up and down the hills.

- Additional bus pull-outs would benefit the community and mitigate some of the negative feelings towards the buses.

KU Parking Commission

Date / Time: Tuesday Feb 10, 2009 / 1:30 p.m.
Interviewees: KU Parking Commission, Prof. Steve Schrock, Chair.
Interviewers: Bob Bourne, Robert Bromberg, Mark Swope, Tom Worker-Braddock

- The interviewers gave a briefing of the current project status. There were no comments, except that the Park & Ride service had ceased stopping on the outbound trip at Daisy Hill to mitigate capacity issues.

City Planning Staff

Date / Time: Tuesday Feb 10, 2009 / 11:30 a.m.
Interviewees: Sheila Stogsdill, Joe Rexwinkle, Dan Warner, David Guntert, Todd Girdler, Michelle Leininger
Interviewers: Bob Bourne, Robert Bromberg, Mark Swope, Tom Worker-Braddock

- Planning staff just finished adding a mixed-use district to the zoning regulations, which has to be within ¼ of any transit route that exists at the time zoning is applied. Mixed use district can reduced the parking requirements by 10-20%.
- Moving transit hub out of downtown would make sense as long as many routes continued to serve downtown.
- Current bus parking lot is in violation of city code.
- The small turning area on 17th Street makes the street difficult for buses. One solution might be eliminating parking on that side.
- There is no consistency in planning requirements for requiring bus pull outs. No policy requires builders to construct bus pull outs.
- Long range developments include further development of the southeast area, with residential and business going in just east of O'Connell Rd. Farmer's Turnpike will be a residential and business park. The *West of K10 Plan* on the City's northern edge is primarily expected to be residential. The southern area is expected to grow.
- Emphasizing that it is more important to get people on the bus instead of getting out to "suburban" areas, could focus on increasing service in core area, rather than area coverage.
- Core transit areas could experience lower parking demand with increased transit, and parking is currently an issue.
- Population growth for the past few years has been >1%.

- Implementing designated transit stops would help mixed-use districts, although there are some design concerns about stops and shelters in older neighborhoods.
- Public Works primarily deals with constructing bus stops. Since Public Works is currently looking at street standards there might be opportunity for further integrating transit elements.
- The Planning Department does not a position responsible for transit planning.

Downtown Lawrence Inc.

Date / Time: Thursday Feb 12, 2009 / 11:00 a.m.
Interviewees: Jane Pennington, Director, Downtown Lawrence Inc.
Interviewers: Tom Worker-Braddock

- Guesses that some employees use transit system to get downtown.
- Thinks it's good that hub is downtown.
- Hate to lose the hub location.
- There haven't been any concerns about physical / congestion issues with buses downtown.
- When transit system was started, the City moved the transit stop from in front of Weaver's department store to in front of a vacant lot, this way the stop location doesn't impinge on front door.
- There is some concern about the poor appearance of the wooden overhang on the north-side stop. There is no lighting and it is too inviting to transients. The overhang is dark at night, and people hang out under the wooden overhang throughout the night.
- The main issue Downtown is homeless, only indirectly related to transit.
- Lack of a designated transit facility is a concern.
- The football game day shuttle is appreciated. It lets people park Downtown, take the shuttle to the game, and then return to shop Downtown. The current alignment on New Hampshire is desirable to one on Massachusetts Street.
- Prefer having the hub Downtown. If riders did have to wait to transfer buses, they would have places at which to shop...
- Downtown Lawrence Inc. does have a weekly email that could be used for any transit-related issues.
- The only interaction Downtown Lawrence Inc. has with The T is for special events (i.e., when streets have to be closed for street fairs, etc.).

FTA / KDOT

Date / Time: Thursday Feb 12, 2009 / 2:00 p.m.
Interviewees: Mokhtee Ahmad FTA Region 7 Administrator; Lisa Koch, KDOT; Casey Toomay, Interim Lawrence Transit Director; Wendy Koerner, Lawrence Transit; Danny Kaiser, Assistant Director KU Parking and Transit
Interviewers: Bob Bourne, Mark Swope, Tom Worker-Braddock

- FTA will clarify if ridership counts on a public route can be used regardless if the vehicle is federally funded or not, or if only the ridership on the federally funded vehicle counts.
- Stimulus money should double the funding available through formula grants.
- This region did not receive any 5309 money.
- FTA doesn't care how local share money is split between two entities.
- If KU wants federal money, then they have to go through the MPO process.
- If there's federal share of either ridership or capital, then that route can count as a public route.
- Students pay student fee, so can have more service even if it's partially federally funded.
- Grantee is still city. Funding allocation is determined locally.
- Charter vehicles maintenance needs to be fully allocated if it takes place in a federally-funded maintenance facility. The storage yard would need to have some sort of physical delineation separating charter vehicles and federal vehicles.
- The reason P&R buses are only on one route is because KU's not doing any sampling.
- Need to clarify with Gary DeLorme about the NTD Small Urban Area rules.

Chamber of Commerce

Date / Time Friday Feb 13, 2009 / 3:30 p.m.
Interviewee: Tom Kern, President, Lawrence Chamber of Commerce
Interviewer: Tom Worker-Braddock

- Acknowledges that KUOW system works well for KU students.
- Existing transit system does not adequately serve the large employment centers of Lawrence, including East Hills and North Lawrence industrial area, mainly due to service not accommodating shift times.
- Chamber of Commerce supports ideals of city mass transit, but not necessarily for a town the size of Lawrence.
- Upcoming industrial developments include
  - Farmland will have 3 million sq' for development
  - Farmer's Turnpike will have 155 acres, and will probably be developed before Farmland.

  - Airport Industrial Park
- Upcoming other developments include
  - Bauer Farm is the largest upcoming commercial development
  - Remington Apt Complex, ~700 units
  - The Links Apt Complex
- The city transit system is not a selling point to new businesses. The availability of transit is seen as just an add-on factor that refers more to the general ideals of the Lawrence community, rather than solving transportation issues for new businesses. No potential business has asked specifically about the availability of a transit system.

Federation of the Blind

Date / Time Friday Feb 13, 2009 / 6:00 p.m.
Interviewee: Jim Canady, Lisa Canady, Susan Tabor, Rob Tabor
Interviewer: Tom Worker-Braddock

- Participants use both fixed route and paratransit, but when possible wants to use fixed route.
- Choice of fixed route is important for autonomy.
- Difficulties of riding fixed route are:
  - No designated stops
  - Flag down system doesn't work. The blind can't tell if approaching vehicle is a semi or a bus. Sometimes people get missed because waiting passenger isn't close enough to the street.
- Shelters and benches are best because blind and guide dogs can find it.
- Driver should call out the number of the route.
- In LA, drivers call out every single stop, and every single cross street.
- Is announcing stops mandated by ADA?
- Recommends a "crimson line" going north and south, and a blue line going east and west, to shorten the length of time it takes to get across town.
- It is less convenient for a blind person to consult a schedule than for a sighted person, and as a result 40 and 80 minute bus frequencies are especially problematic.
- Any efficiency savings should go into increasing route frequency.
- Of the group, KUOW has some usage, but overall is very light.
- One participant experienced issues using Jay Lift. A sudden appointment forced her to cancel a ride and consequently she was kicked off from the Jay Lift schedule. The service is extremely inflexible when canceling and there's no easy appeal. Participant had to take taxis for the rest of the semester because she was dropped from the Jay Lift service.

- Jay Lift didn't recognize music major's class-mandated rehearsals and events as valid events. Also, there are problems that Jay Lift ends at 5 pm, but there are often late rehearsals.
- Paratransit can become more efficient, the service software wanted to send two vehicles when a couple had the same pick-up and drop-off times and locations.
- A big issue is that the city's paratransit and fixed route service stops at 8 pm, and doesn't work with cultural events around town.
- Wants to find savings in paratransit costs to increase the span of service.
- Wants city to explore using taxi vouchers instead of paratransit. That raises questions about if the city would lose federal funding, and would it be possible for the city to get a waiver from losing federal funding.
- People with permanent disabilities have to get recertified every three years. There should be two levels of certificate, one temporary and one permanent.
- Difficult for wheelchair users to get from destination to bus stop (sidewalk issue).
- Paratransit buses have very high, difficult to use steps. Forces some users to use the lift mechanism.
- Key destinations include: Hospital, Downtown, Wal-Mart, grocery store, Target, Lied Center, Murphy Hall, Greyhound bus stop, DMV.
- There is a need for Haskell discussion. The general feeling was that Haskell is underserved. Recommends a Haskell express to Downtown. Also recommends serving Haskell Indian Health Services.
- The group would prefer improvements made, in this order, to 1) higher frequency, 2) later service hours, and 3) Sunday service.
- Sunday service could just be dial-a-ride.

Haskell Indian University

Date / Time Friday Feb 20, 2009 / 11:00 a.m.
Interviewee: Angelina Tah, Counselor; Debra Thompson, Facilities Management
Interviewer: Tom Worker-Braddock

- A lot of students do use it, but staff doesn't know where students go.
- South Iowa retail is a big attraction.
- 200 students live off campus.
- 700 registered vehicles.
- If it is beneficial to Haskell, would advertise it more.
- Use to advertise transit service, but not now (was advertised in the new student orientation program, "How to Survive Haskell").
- Haskell does have an academic exchange program with KU, used by a couple dozen students.

- HINU students also use KU library – parking problem on KU campus, so mostly use library at evenings and weekends.
- 700 students live on campus, no on-campus parking specifically reserved for dorm parking.
- Students spread out all over Lawrence.
- Haskell might be able to subsidize KU-HINU route.
- 90% of students are on Pell grants.
- If there was an incentive (i.e. discount), students would use bus pass.
- 75% of students have access to vehicles.
- Students often go to KU, Downtown, Wal-Mart.
- A good person to contact to gauge if students are interested in transit would be Mark Randolph, the off-campus counselor, and president of Off-Campus club.
- Majority of HINU students are full-time students.
- Off-campus work at Checkers, Dillons.
- Faculty and staff encourage first year students to stay on campus.

"Save the T"

Date / Time Friday Feb 20, 2009 / 3:30 p.m.
Interviewee: Lisa-Marie Wright, David and Laura Smith,
Interviewer: Tom Worker-Braddock

- City riders liked idea of multiple hubs.
- Transit leaders need to be careful about city accommodating KU too much. Needs to feel like there's a balance between KU and city needs.
- University doesn't always benefit the City.
- Ideas can't be presented as benefiting KU at the expense of City riders.
- Some of the transit hubs need to be clearly city-orientated.
- Really worried about how a hub near the KU stadium would be perceived (as totally university-centric).
- More open to the idea of a hub site at the KU Park & Ride.
    - Would benefit the east-west perception by tying campus (East Lawrence) to West Lawrence.
    - Would want coffee shops, restrooms, etc.
- Idea of hub at the Merc.
- Main concern is more frequent routes.
- Route 7 is often crowded.
- Want routes that wouldn't always bring people to out of the way transfers.
- People would love a joint paint scheme, or maybe so buses look similar.
    - Strong for symbolism
    - KU buses should look like city buses, not vice-versa.
- Evening service. Some un-allocated stimulus should be given towards transit.

- Early evening services ends at 8 p.m.
- Extended hours would help perception that city is benefiting from coordination.

Douglas County Senior Services

Date / Time Tuesday Feb 24, 2009 / 4:00 p.m.
Interviewee: Lucas Houk, Community Liaison, Midland Care; Sandra Kelly-Allen, Project LIVELY Coordinator, Lawrence-Douglas County Health Department; Kim Wittman, Senior Meals Manager, Douglas County Senior Services Inc; John Glassman, Director, Douglas County Senior Services Inc.; Judith Bellome, CEO, Douglas County Visiting Nurses; Rosemary Chapin, Director, Office of Aging and Long-Term Care at KU School of Social Welfare. Tine Roberts.
Interviewer: Tom Worker-Braddock

- Lawrence becoming a retirement place for those that have money.
- Transportation is always an issue, and the #1 reason why people have to go into long-term care.
- Dispatchers need to have patience in dealing with seniors. Many of them are suffering from dementia. Example of trying to schedule a ride to a doctor's appt, and client not being sure when the appt is.
- Douglas County Senior Services run a call-and-response program.
    - Safety is always top issue, which is why their drivers take the time to walk clients to the threshold and back, and acts as an extra set of eyes.
    - Doesn't enter house.
    - Douglas County Senior services are funded through county funds, and have some service in Baldwin.
    - Every city commission candidate listed transportation as in the top #3. Safety and timelines are the top issues with Douglas County Senior Services.
- Most of Douglas County Visiting Nurses Association clients are wholly depending on transportation.
    - 300 patients are either elderly or disabled.
    - Recommends setting up home visits so dispatchers can put a face to the people they're helping schedule.
    - Every 2 months, have 25-30 new people that can't drive, and are brand new to the transit system.
    - Visiting Nurses Association runs a small hospice program, may have family members who need transit.
- Midland Care is opening an adult day care program.
    - Contracting with DC Senior Services
    - Co-Chair of Douglas County Senior Services
    - Medical day care

- Program LIVELY
  - People need help scheduling
  - Application process is barrier. Unwieldy.
  - Would like eligibility process simplified to demographics and medical provider stating if the client is eligible or not for paratransit service.
  - Compared to disabled license plate placard, paratransit application is much more difficult.
  - Application doesn't clearly say what would make people eligible or not.
  - Older people need to be empowered, can't be empowered with overly complicated application.
  - Fixed route – bus stops are too far away in inclement weather
  - It's much easier for hot weather to be dangerous to older people than to relatively young people.
- Senior Wheels has no application process.
- Application process can take 2-3 weeks because professional has to sign it.
- Senior Wheels has $3 fair, w/simple scholarship process.
- Needs to be able to schedule further out than 5 days Right now, there is a limit of scheduling a ride 5 days out. If people wait until just 5 days before their appointment, there's sometimes no appointments available, doesn't have time to arrange another ride, and then have to reschedule Dr's appointment.
  - Can be very tough to reschedule Dr's appointments.
  - Paratransit dispatchers need training of working with ageing network.
  - Be aware of other transportation options.
  - Be told that they'll be dropped from service if they miss a ride.
- Riders are confident in drivers (Douglas County Senior Services) hands, makes riders feel comfortable.
- Scheduling a senior citizen is more complicated, takes more time and patience, than scheduling a KU student.
- Scheduling can be a 15-30 minute process.
  - Clients hate / won't use voicemail, hate automated systems ("Press 1 for English," etc.).
- Needs to be able to schedule clients further out, but then also needs reminder calls.
- Dispatchers need to be able to recommend other services.
- Current paratransit ridership criteria needs to be compared to other cities/agencies.
- Current city system is paid for 10 years. In 10 years, % of elderly population will increase. Currently it is 17%.
- Social workers would help people sign up if they could anticipate the needs.
  - Qualifying for meals on wheels could also qualify someone for paratransit service.

- It's not understood why the paratransit application consists of two parts.
- Seniors have trouble sitting for long periods. Don't like sitting for 30-40 minutes while picking up other passengers.
- Could more fixed route stops exist for specific areas?
- Questions how many seniors are currently using the fixed route service.
    - Have we looked at a blended system, is there an opportunity for a single dispatch?
- Currently, Douglas County Senior Services serving 4 days/week, M-Th, soon will serve Fridays. Service hours are 8:00 a.m. to 4:00 p.m.
- Fixed routes are not geared for typical senior-orientated trips such as medical trips, beauty/barber shops, and churches.
- Seniors are tax payers that spend more money if they are out of nursing homes.
    - Good transportation is only reason why seniors can live at home, and stay out of nursing homes.
- Transit brings customers to businesses.

KU Transit Commission

Date / Time Thursday Feb 12, 2009 / 3:00 p.m.
Interviewee: Transit Commission
Interviewer: Tom Worker-Braddock, Bob Bourne, Mark Swope

- A large amount of money for transit comes from student fees; smaller amount comes from parking fees.
- Should we have a series of 3-4 Park & Ride lots around the city?

KU Transit Commission (alternative meeting)

Date / Time Monday Feb 9, 2009 / 6:00 p.m.
Interviewee: Transit Commission members who couldn't attend the Thursday Feb 12 meeting. Rebecca Tolmen, Able Hawks representative, was the only interviewee.
Interviewer: Tom Worker-Braddock, Bob Bourne

- She feels trapped in her dorms on weekend; she wants to be able to live in Lawrence without a car.
- Doesn't know why they killed the night bus.
- The night bus wouldn't have to go to the dorms because Park & Ride goes to the dorms.
- Lives at Naismith Hall, has 3 buses that go by.
    - 2 buses are clumped together, Last bus comes through at :13. Only option is rec center bus and they stop for 5 minutes at the rec center.
- Buses on stop let passengers alight at a red light.

- Because of no weekend service, took 4 cabs in the past week. $8/ride for the uninsured cab, $10/ride for the insured cab.
- Of the T system, only uses the Route 8 bus.
- Steward / Louisiana Route, there's no outbound time point. Inbound, sometimes the bus is really full and sometimes it's not.
- Service provider is sending paratransit bus for saferide.
- Would mind KUOW changing to address city concerns, if the T would take student concerns in planning.

MV Transit

Date / Time Thursday Feb 12, 2009 / 1:00 p.m.
Interviewee: Mike Sweeten, Chad Hockman, Tom Kern, Julie, John
Interviewers: Bob Bourne, Mark Swope, Tom Worker-Braddock

- 10% change in revenue hours opens contract up again for negotiation.
- Revenue hours are measured annually.
- Moving hours between systems could trigger change.
- Drivers do have home divisions (home divisions are either KUOW or The T).
- 6-8 drivers train on both systems.
- Run time issues – Route #5 and Route #6.
- No infrastructure – bathrooms (city).
- City originally wanted 30 minute frequency.
- MV does route timings, but nothing changed since 2001.
- Surprised that #5 is keeping time.
- T goes to the Lawrence Aquatic center because it offers bathrooms for drivers, access to the high school, and was a new city facility at time of T's inception.
- #7 has the current alignment around Lawrence high school because the turn was too tight on previous alignment.
- Ridership not that high on 9th and Emery.
- Ridership can be counted by route, and by day.
- NW Lawrence not high on ridership.
- GPS tracking software – only KU staff can access. Uses Nextel geo-coded to certain timing points.
- City owns Trapeze, version 4.X. Upgraded in 2006.
- No contractual language shifting paratransit revenue hours to fixed route.
- No policy on conditional rider
    - (i.e. "You want to take paratransit, but you can take fixed route").
- No difference in ridership with increased eligibility requirements.
- Fare increase did affect ridership.
- Used to be peak of 200. Now peak swings because 170 and 215.
- Doesn't record trip purposes. Cottonwood uses a lot of paratransit.

- T Routes not set up for tracking.
- Have 10 buses at peak.
- 1 / 4, 2 / 3, already using paratransit.
- Routes #6, #7, #8 need a big bus.
- "City needs to get out of one size fits all" perception.
- Contract doesn't address providing deviated response service only in North Lawrence. Doesn't see any reason why they couldn't provide deviated response.
- Route #6, 7, 8 carry a lot of people.
- Southern portion of #6 isn't strong because it doesn't go through campus.
- City schedule works with high school and middle school schedule.
    - Freestate, Southwest Jr. High. Not many middle school students use it to go to school.
    - Lots of kids use the service on Wednesdays.
- KU right at 0 mark for revenue hours.
- Only wage differential is safebus.
- Dispatchers are at two different locations.
- Each entity has different uniform concepts.
- City owns their radio.
- KU bought theirs because previous KUOW bus owners were selling them.

City Transit Staff

Date / Time Wednesday Feb 11, 2009 / 8:00 a.m.
Interviewee: Wendy Koerner, Emily Lubliner, Casey Toomay
Interviewers: Bob Bourne, Mark Swope, Tom Worker-Braddock, Robert Bromberg

- Previous transit administrator felt 2006 report was biased towards university.
- Certain city leaders doesn't like idea of shared governance
    - 2006 report recommended splitting governance by ridership, not by money.
- Concern that city would be stuck with reporting agreements.
- Concern that University wanted to become the federal recipient agency.
- Receives conflicting signals from University administrative staff, and University student staff/representatives.
- MPO is composed of 1 city commissioner, 1 county commissioner, and representatives from all cities in Douglas County.
- What transit staff wants in a new transit administrator: transit planning, contract manager, skilled in grants administrating, NTD reporting.
- Bathrooms are both city and MV problem.
- MV has ridership sampling (random sampling for NTD report).

LMH

Date/ Time: Mon Feb. 9, 2009 / 8:30 am
Interviewee: Deborah Thompson, Human Resources Director, Lawrence Memorial Hospital (LMH)
Interviewers: Tom Worker-Braddock, Robert Bromberg

- LMH has 173 patient beds, 1250 employees (3rd largest employer in the city), 700 volunteers (several hundred of whom are KU students), 70% of services are outpatient.
- City owns LMH but it is administered by an appointed board of directors.
- Recent construction @ LMH has affected parking. To decrease demand for parking LMH has provided an incentive program since Sept. '08 that gives a $5 gift card every month to every employee who walks, bicycles, takes the bus or carpools to work. 100 employees per month receive gift cards but 2/3 of them were going to/from work in the same manner prior to the program's inception.
- The T provides limited service to LMH. Approx 45 persons ride The T to/from LMH daily. Most go to LMH for recurring appointments but some are employees and volunteers. For a majority of LMH employees who have access to autos, it takes far less time for them to drive to work than take The T.
- LMH might be open to: providing space for a bus transfer point on its campus, subsidizing bus passes for its employees and flexing shift hours to accommodate bus arrivals and departures.

HREO/AAAC

Date/Time: Mon Feb9, 2009 / 10 am
Interviewees: Mary Ann Rasnak, Director Academic Achievement and Access Center (AAAC), Melissa Manning, Assoc Director, Services for Students with Disabilities, (SSD)
Interviewers: Tom Worker- Braddock, Robert Bromberg

- AAAC accommodates students with disabilities and ensures that they have access to the same type of college life and experiences as able bodied students.
- Ms Rasnak serves on the KU Transit Committee.
- Ms Manning reviews documentation/applications from students with disabilities and injuries and determines the length of their eligibility to ride KU's paratransit service, Jay Lift. She also approves co-curricular (school/class-related) trips made on Jay Lift.
- Funding for Jay Lift transportation to/from classes (95% of total trips) comes from student fees. Funding for co-curricular trips comes from separate funding.
- Jay Lift is a "point to point" paratransit service.
- Jay Lift enrollment averages 15 (10 permanent, 5 temporary) and due to time constraints, Jay Lift enrollees can't use KUOW fixed transit to travel from class to class, even though such buses have lifts, because of time constraints.

- Blind enrollees have complained that Jay Lift drivers don't announce stops.
- T Lift enrollees have more restrictions than Jay Lift enrollees. T Lift's certification process is more rigorous than Jay Lift's and the latter's enrollees don't have to be recertified annually. T Lift trip window is 30 min on either side and Jay Lift's is 15 min.

USD 497

Date/Time: Mon Feb. 9, 2009 / 1 pm
Interviewees: Laura Baska, Lawrence Public Schools Vocational and Community Involvement, Rick Gammill, Lawrence Public Schools Director of Special Operations, Safety and Transportation
Interviewers: Tom Worker-Braddock, Robert Bromberg

- Career Development and Transition teaches vocational and community involvement skills to approx 100 special need students. Another program, C Tran, works with 15 more challenged students. One of those skills taught in both programs involves riding the T. Students in both programs find bus transfers to be especially challenging.
- Both programs are moving to abandoned Holcomb School and will need to connect from there into the T fixed route system.
- First Student (Laidlaw) is the district's transportation provider.
- All students in the district have early dismissal every Wed.
- Very few mainstream students use the T.
- District staff doesn't ride the T because they perceive and have experienced it to be undependable.
- State requires the district to transport secondary students who live 2.5 mi or further, junior high at 2.0 mi or further and grade school at 1.5 mi or further.
- The district is not looking to either the T or KUOW to assist in transporting students but encourages parents who don't meet distance requirements to check into the T for service possibilities.

MV Drivers Session 3

Date/Time: Tues. Feb. 10, 2009 / 9 am
Interviewees: John Wilson, KUOW Driver, Natalia Lowther and Larry Miller, T Drivers
Interviewers: Tom Worker-Braddock, Robert Bromberg

- Drivers for both systems are completely separate; no communication between the two groups. All three drivers think communication/interaction is needed.
- Natalia has been driving T Routes #2 & 3 for the past 2.5 yrs.
- At two points on her routes, Natalia encounters difficulty because KUOW and T buses are trying to make turns at the same time; 11th & New Jersey and 2nd & Michigan.

- The T's Holidome stop serves as a transfer for KU & Haskell students traveling to/from KCI on the Roadrunner service.
- Larry has driven the sole bus on T Route #8 for the past 5 yrs.
- Larry has also driven all T routes at one time or another and said there are timing issues on all routes.
- T drivers don't have time to use the bathroom and are continually behind schedule.
- T drivers encounter difficulty making transfer points; some have only 3 minute windows.
- Street cut outs are needed for transfer points because staying on the street disrupts traffic flow.
- The T needs a hub on the west side of town for north-south bus routes.
- The T needs to evolve from a flag-down system to a scheduled one.
- T bus stops need 2-sided signs and should provide schedule information.
- John drives the KU Campus Connector route.
- KUOW route timing depends on class schedules.
- KUOW should coordinate with the JO's K-10 Connector route stop @ 19th & Haskell.
- T drivers call in when they are running 10 min late, KUOW drivers call in when they are 5 min late.
- T routes by-pass campus at certain times on game days.

Social Service Agencies

Date/Time: Tues. Feb 10, 2009 / 3:30 pm
Interviewees: Shannon Murphy, Re-entry Director, Douglas County Sheriff's Dept, Jessica Clatterbuck, Intern, Douglas County Homeless Shelter, Bruce Messe, T Rider
Interviewers: Tom Worker-Braddock, Robert Bromberg

- County's 46-bed work release facility is on the east side of town near K-10 and is 1.1 mi from a T stop. A new road is opening near the facility will make it easier for inmates and staff to get to/from the one and only nearby bus stop.
- 15-20 of the residents of the facility are transit-dependent as are many of the 350 monthly visitors. They primarily need transportation M-F during business hours.
- T Routes #1 & 2 are used by homeless shelter residents to go to/from medical, employment and social service agencies. It is difficult for them to go to Westside destinations on the T.
- Unlike KUOW, T routes don't run north of 6th St.
- Social service clients don't ride KUOW because all its stops are residential.

- The areas that social service clients most need to access via transit are: 15th & Wakarusa, LMH, Clinton Pkwy & Kasold (medical), SRS 19th St., 19th & Haskell (parole office), and Wal-Mart.

Neighborhood Assoc & League of Women Voters

Date/Time: Wed. Feb 11, 2009 / 9 am
Interviewees: Carrie Lindsey, League of Women Voters, Richard Heckler, Neighborhood Activist
Interviewers: Tom Worker-Braddock, Bob Bromberg

- The 70/30 margin of victory for the transit sales tax is regarded as a mandate to do something positive about transit in Lawrence. Since this represents public support for transit the city and KU must seize the opportunity to capitalize on this project.
- "Everyone knows the T's route system needs to be revamped."
- Routes #3 & 4 need to be reconfigured and be made longer.
- Riders especially those who are transit-dependent, should be surveyed to determine how the system can best serve them. Will need to keep in mind that some riders can't read.
- Buses need to run to meet the schedules of transit-dependent population.
- 1,060 subsidized housing units in Lawrence. Two complexes are located at 17th & Mass and 23rd & Iowa.
- A luxury maintenance-free senior living complex is under construction at 15th & Wakarusa. The T needs to provide service to that location.
- The aging population in Lawrence is moving to the west side of the city.

KU Planners

Date/Time: Wed. Feb. 11, 2009 / 10:15 am
Interviewees: Peg Livingood, James Modig and Tom Waechter, KU Design, Construction, Management
Interviewers: Bob Bourne, Mark Swope, Tom Worker-Braddock, Robert Bromberg

- City needs to establish transit boundaries.
- Logical to establish a transit hub on campus because Lawrence is built around KU and transit should reflect that.
- Lied Center parking lot is a potential location for such a hub.
- KUOW could possibly run a circulator out of the campus hub.
- City is interested in establishing a Park & Ride on the outskirts of town; this could potentially be an opportunity for it to collaborate with KU.
- Rider incentives need to be built into both the city and KU transit systems.
- KUOW is comparatively a low-cost system.

- Despite the congestion, KUOW must operate on Jayhawk Blvd, to provide the convenience to riders of being dropped off on the top of the hill.
- Some neighborhoods near campus don't want/like KUOW buses running on their streets.
- 20% decrease in requests for on-campus parking followed establishment of Park & Ride lots.
- Consider providing incentives to KU staff to ride transit such as free T transit passes and designated parking in Park & Ride lots.
- Consideration should be given to designing a "spine" for transit service when talking about coordination between the T and KUOW.

Senate Presidents

Date/Time: Wed. Feb. 11, 2009 / 11 am
Interviewees: Paul Farran, President Unclassified Senate; Dennis Constance, President University Support Staff Senate; Jeannette Johnson, President-elect Unclassified Senate.
Interviewers: Tom Worker-Braddock, Robert Bromberg

- Students regard KUOW as their service so they need to be reassured that the service won't be diminished.
- Need to continue to provide free use of KUOW by KU staff.
- Somewhat difficult for KU support staff to use KUOW because they are spread out time-wise and at numerous work locations.
- KU support staff generally work 8-5. Many think KUOW doesn't fit their schedules.
- Might be helpful to survey KU support staff regarding how KUOW can better meet their needs.
- Many staff travel between main campus and west campus with regularity. Consider surveying them to find out if they can/would use KUOW.
- Consider providing incentives to KU staff to carpool such as providing rotating parking permits.
- Staff parking will be decreased by 50 spots this spring due to construction, therefore KUOW ridership should increase because more staff will use Park & Rides.
- KUOW doesn't always honor T stops due to safety issues. The two systems need to respect one another's stops.
- KUOW circulation on campus will improve greatly when Indiana St. project is completed.
- A public education effort regarding using KUOW is probably needed. This could be a project for the Sustainability office.

HR/DSH/FO

Date/Time: Wed. Feb. 11, 2009 / 3:30 pm
Interviewees: Diana Robertson, Director of Student Housing, Kip Grosshaus, Associate Director of Student Housing, Jim Scribner, Director of Campus Maintenance, Doug Riat, Director of Facilities Operations, Ola Faucher, Director of Human Resources and Equal Opportunity, Celeste Hoins, Recycling Program
Interviewers: Tom Worker-Braddock, Robert Bromberg

- KUOW Route 27 provides four daily trips between main and west campuses. 450 employees work in the west campus shops. Increased service is needed closer to shift times.
- Shift times may need to be adjusted to accommodate KUOW schedules.
- Maintenance employees no longer ride KUOW to/from work sites due to the significant down time employees encounter when waiting for buses. Impossible for workmen to carry tools on full buses.
- In one area on west campus there are 180 employees. Currently there's no efficient means of transporting them back and forth to main campus because of the length of time it takes on KUOW due to frequent stops, many buses are full and long waits for buses decreases productivity.
- Overall, KU staff use KUOW only on a spotty basis and very few use the T for work transportation.
- Need survey to ascertain staff use of KUOW.
- KUOW serves all student housing except for scholarship halls, due to their locations.
- Students complain frequently about KUOW buses being full especially between 8:30 – 9 am.
- Students want more buses to operate on Route 2 Daisy Hill.
- Lunch time waits for buses are excessively long.
- KUOW buses often get stacked up at bus loading zones because they can accommodate only 2-3 buses at a time.
- Need to build interest among employees for using KUOW to get around campus and for using the T.
- Kudos to KUOW for having the circulator bus go to GSP-Corbin.
- KUOW drivers need to announce stops for special needs students.
- Special needs students prefer side seat buses.
- No T routes currently serve KU Park & Ride lots. This should probably be reconsidered.

Employers

Date/Time: Thurs. Feb 12, 2009 / 8 am
Interviewee: Christy Campbell, Berry Plastics
Interviewers: Tom Worker-Braddock, Robert Bromberg

- Berry Plastics, 2330 Packer Rd., employs 700 and is growing.
- 50% of employees commute from outside of Lawrence e.g. Topeka, Perry, Eudora, Atchison, Baldwin.
- The remaining 50% live all over Lawrence with concentrations at Hawk Point and Meadowbrook apartment complexes near KU.
- Three shifts per day, 7-3, 3-11, 11-7.
- 45 employees work in distribution center in south Lawrence on Haskell.
- T Route #3 serves the main plant but only a few employees ride it.
- HR Dept encourages employees to ride T but has never offered any incentives such as free or subsidized bus passes but is willing to consider incentives.
- Parking is a problem at shift changes.

Property Managers

Date/Time: Thurs. Feb. 12, 2009 / 9:30 am
Interviewees: Gayle Sigurdson, Elderly Services Coordinator Lawrence Housing Authority; Connie Gore, Malls Olde English Village Apartments; Chris Baculy, Chase Court Apartments; Heather, Park 25 Apts
Interviewers: Tom Worker-Braddock, Robert Bromberg

- Lawrence Housing Authority has its own transit service which operates M-Th, 8 am – 5 pm. It serves as an alternative to T Lift.
- Residents of senior living centers located @ 17th & Mass, 29th & Peterson Rd and 23rd & Iowa utilize T for volunteer, employment, shopping and medical trips.
- Senior citizens are generally satisfied with T service but complain regularly about T Lift.
- T buses often slow/stop traffic especially at 27th & Iowa.
- KUOW stops are quicker than T stops so usually don't affect traffic flow.
- Access to T stops is often a challenge for riders. For example at 17th & Mass the wide boulevard impedes access to the one and only stop.
- 50% of residents at Old English are students, 10% are retirees and the remaining 40% are working class individuals and families.
- Students often choose where they live according to KUOW transit accessibility and rarely or never because of proximity to the T.
- Lack of coordination between T and KUOW routes.
- High school students can't ride the T to Free State because it arrives there 3 min after classes starts and 5 min after classes end.

- 90% of residents at Chase Ct. are students and many of them are international students. A high percentage of all students don't have cars so they rely on KUOW.
- 90% of Park 25 residents are students.
- KUOW needs to continue serving areas west of Iowa.
- There are capacity issues with many of the last KUOW buses leaving campus.

Chapter 4 : Part 1 Recommendations

Olsson Associates and Bourne Transit were tasked to create a coordinate transit implementation plan for the Lawrence Route and Schedule Design for Coordinated Transportation plan. The implementation plan is to be broken into 2 parts. Phase III part 1 will be implemented in August 2009, Phase III part 2 will be implemented in August 2010. Olsson Associates and Bourne Transit are making six initial recommendations for August 2009 implementation. These recommendations are:

- Produce one coordinated map and timetable brochure, with increased timepoints.
- Use one Information Hotline call number
- Create a new, coordinated route #11, replacing City Route #8 KU / South Iowa / Downtown, KUOW Route #24 31st & Iowa, and KUOW Route #25 Downtown
- Modify the alignment of KUOW Route #26 25th & Melrose
- Interline City Route #4 North Lawrence / Downtown and City Route #3 Iowa & Lakeview / Downtown, and assign smaller vehicles
- Interline City Route #1 Prairie Park Nature Center / Downtown and City Route #2 HINU / Downtown, and explore assigning smaller vehicles

While these recommendations may appear minor in nature, they were in fact created with an eye towards an August 2010 system plan, and as such significant route changes that might be changed again after only a year were avoided. The one major route alignment change is a new coordinated route that combines two university routes and one city route, and is envisioned to be a major spine for an August 2010 transit system. Implementation of these recommendations will increase coordination between the two transit entities, and enable further coordination to be successfully implemented in August 2010. The recommendations are described below.

Recommendation Overview

Produce a coordinated map and timetable brochure

The first recommendation is already being implemented. It was felt necessary to include this as a formal recommendation. The overall purpose of the study is to increase coordination and create a seamless user experience when moving between the two transit entities. Currently valid city bus passes or current KU Cards are accepted on both systems, and the two entities serve many of the same locations. Additionally both entities currently place map and timetable brochures at the same locations throughout the KU campus and Lawrence

locations (see Figure 4-1). However, the current lack of a joint map and timetable brochure presents difficulties to users wanting to access both systems, and increases the perception of two separate entities and services. A coordinated map and timetable brochure will ease customer's ability to transfer between the two systems by allowing them to see KU on Wheels routes and City of Lawrence routes on the same map, as well as the corresponding timetables. A coordinated map and timetable brochure will increase the public perception that the two agencies are increasing their coordination. In addition, it is recommended to include the K10 route and schedule on the coordinated map and timetable.

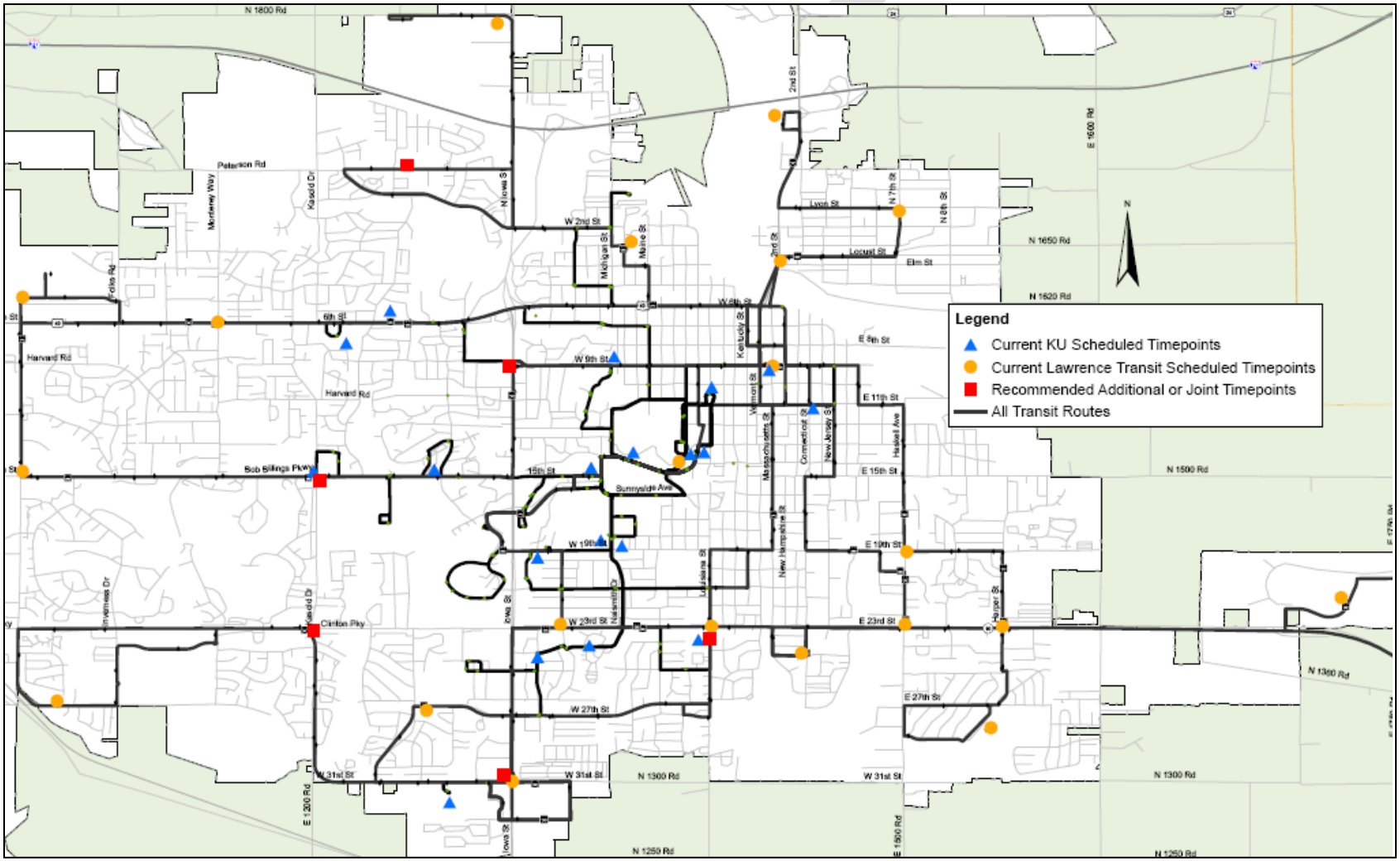
Figure 4-1 KU ON Wheels brochures and Lawrence Transit brochures distributed side-by-side

The coordinated map and timetable brochure should be the main reference for customers of both entities. It is not recommended that either entity produce separate maps and timetables, except for unique services such as KU On Wheel's late night "SafeBus" service, as separate maps will increase customer confusion and degrade the perception of a coordinated service. KU On Wheels typically updates its schedule and map brochures one to three times per year to reflect operational changes, and differences in summer service. Additionally, the heavy passenger loads experienced by implementation of universal access on KU On Wheel's routes in August 2008 necessitated schedule changes. Passenger loads typically increase in the 2nd year following a universal access policy, meaning that KU on Wheels might have to modify schedules again next

year to reflect operational challenges. Lawrence Transit has typically experienced longer timeframes between schedule and map brochure changes. When not experiencing significant operational changes, it is recommended to limit printing maps two times a year, with a KU On Wheels supplement inserted during summer service periods.

It is recommended to place additional timepoints on the coordinated map and timetable brochure than what is on each agency's current timetables. KU On Wheels current schedule generally only references inbound timepoints making it difficult for off-campus passengers to catch out-bound buses or make connections with Lawrence Transit routes. A comment in the winter 2008 survey recommended the route #5 schedules have a timetable reference for Clinton Parkway and Kasold Dr. In addition, there are several areas that would be better served by placing timepoints including Peterson Rd and Arrowhead Dr. Besides these opportunities for additional passenger information, an effort should be made to coordinate joint time point locations on the recommended joint schedule. The initial recommended joint timetable locations are 9th St. and Iowa St. for #6 and #28; Bob Billings Parkway and Kasold Dr. for #6 and #27; Checkers (replacing "The Malls" in the current #23 schedule) for #5, #7, and #23; and 31st St. and Iowa St. for #5, #7, and #5. It is realized that there are specific constraints for putting additional timepoints on a coordinated map and schedule brochure, however, the common vocabulary referencing the coordinated timetable locations will make it easier for passengers to transfer from one system to another, even if many of the route transfer opportunities between the two systems remain untimed. Figure 2 displays the current time point locations listed in the Lawrence Transit and KU On Wheels schedules. The red squares denote recommended additional / coordinated time point locations to be listed in the recommended coordinated map and schedule. These are recommended joint time point locations that are not listed on the current schedules.

Figure 4-2 Original KU and Lawrence Transit Scheduled Timepoint Locations, and Recommended / Joint Timepoint Locations



Use one informational hotline number

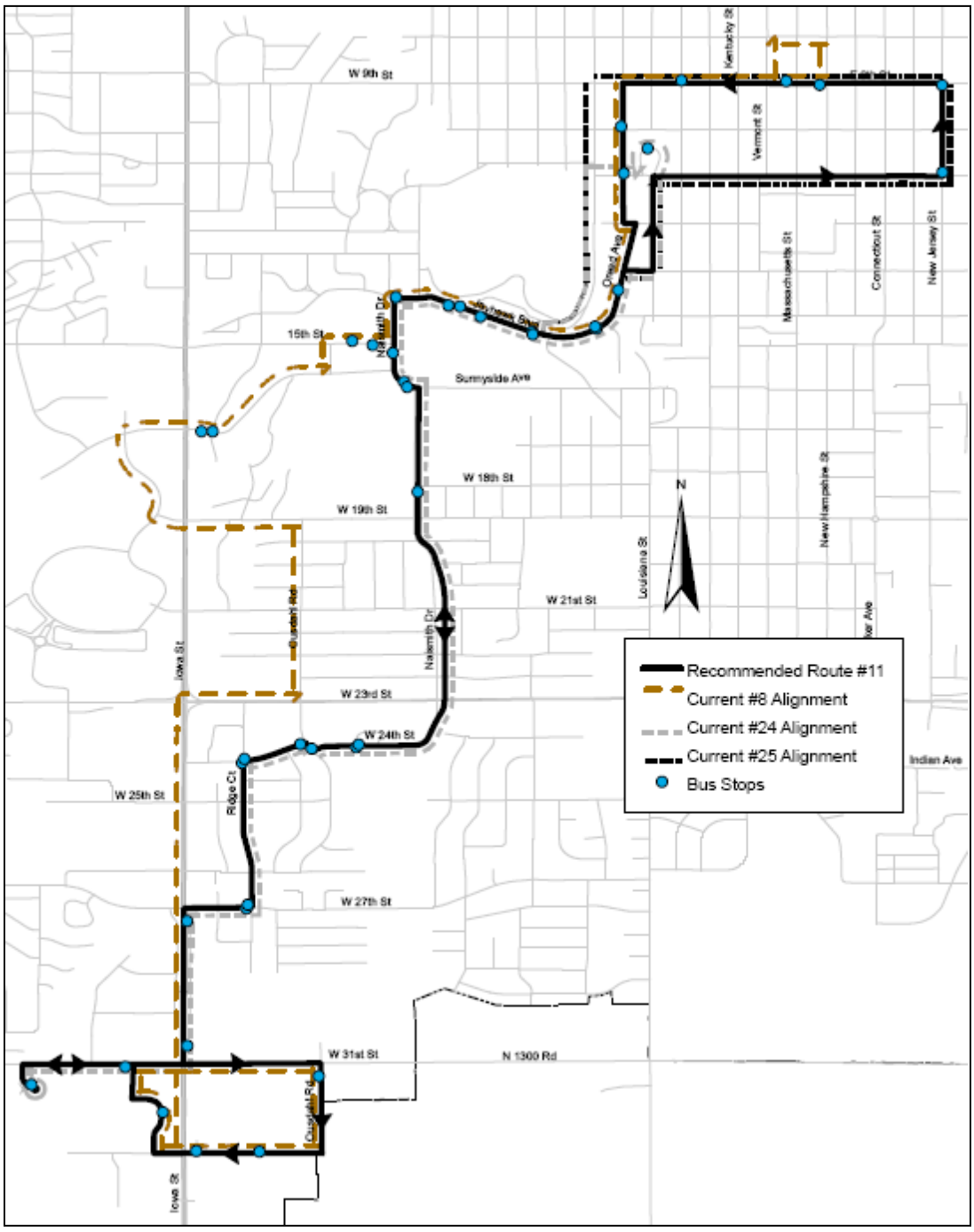
Currently, even though both services are maintained by one service provider, Lawrence Transit and KU On Wheels maintain separate information hotline numbers. The number listed on Lawrence Transit's current map and brochure is directed to the service provider. KU On Wheel's number is directed to the KU on Wheels office. Similar to separate schedules, maintaining separate informational hotline numbers increases the perception of inefficiency and two uncoordinated entities, while producing a varied customer service experience depending on which system is being accessed. The move should be made to begin publicizing only one number, with a future goal of phasing out the alternative number. Until that time, both entities should maintain and readily distribute current information, including route alignments and schedule information, on all transit alternatives in Lawrence allowing riders to easily obtain either system's information, regardless of what agency is called.

Create a new route #11, replacing route City Route #8 KU / South Iowa / Downtown, KUOW Route #24 31st & Iowa, KUOW Route #25 Downtown

Much of the public comment heard during the week of February 9th indicated frustrations in the downtown-KU-south Iowa connection. The City Route #8 KU / South Iowa / Downtown currently serves this area six days a week until approximately 8:00 p.m., but at only 80 minute intervals. KUOW Route #24 31st & Iowa currently provides a connection between The Reserves apartment on 31st St. to KU every 30 minutes, but doesn't run past 6:00 p.m. and does not run on weekends or KU breaks. Similarly KUOW Route #25 Downtown, which is interlined with KUOW Route #26 25th & Melrose, connects downtown Lawrence to KU every 30 minutes, but also does not operate past 6:00 p.m. or on weekends and KU breaks. While there are strong connections between downtown and KU, a trip between downtown and retail on south Iowa St. through the KU campus requires either an untimed transfer on campus within the KU service span, or experiencing 80 minute frequencies using the City Route #8 KU / South Iowa / Downtown. This arrangement prevented populations living near campus from relying on the transit system during KU break periods, and frustrated City riders in several comments in the winter 2008 survey.

A new route #11 is proposed that replaces the City Route #8 KU / South Iowa / Downtown, KUOW Route #24 31st & Iowa, and KUOW Route #25 Downtown. Route #11 would provide a strong connection between downtown Lawrence, the KU campus, high density apartment areas, and retail locations on south Iowa street. This service would generally follow year-round 30 minute service frequencies through the day, but would be 40 minute frequencies in off-peak hours. Figure 4-3 displays the alignment.

Figure 4-3: Recommended Route #11 replaces City Route #8 KU / South Iowa / Downtown, KUOW Route #24 31st & Iowa, and KUOW Route #25 Downtown



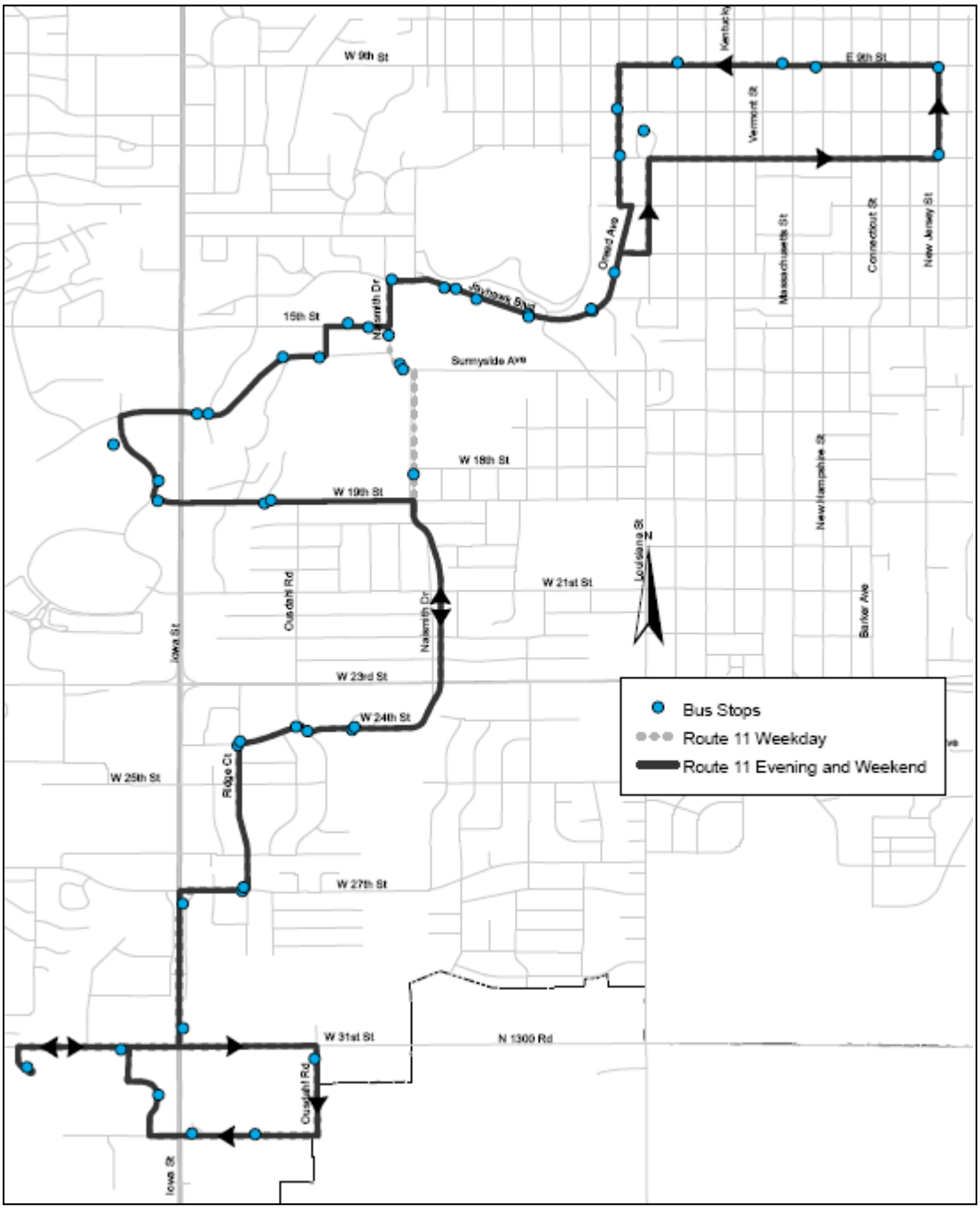
Serving downtown, the route follows the current KUOW Route #25 Downtown alignment serving population areas on 11th St, New Jersey St., 9th St., and Indiana St. to the KU campus. On campus the route begins to follow much of the KUOW Route #24 31st & Iowa route, provide service along Naismith Dr, 24th St, Ridge Ct, 27th St, and Iowa. At Iowa and 31st St., the route deviates from the current KUOW Route #24 31st & Iowa alignment and beings a one-way south Iowa St. retail loop, similar to the City Route #8 KU / South Iowa / Downtown alignment. The alignment turns left on 31st to Ousdahl where it turns right and proceeds to follow 33rd St. and Nieder providing a direct connection to Wal-Mart, Kohl's, JC Penny, and Target. At Nieder and 31st the route proceeds left to serve The Reserves apartment complex, after which, it makes an inbound trip bypassing the retail loop.

The retail loop in the route #11 alignment does serve the new student-orientated apartment complex, The Exchange, currently being built on 31st and Iowa. It is realized that the new student population accessing route #11 from The Exchange would cause capacity issues since the current KUOW Route #24 31st & Iowa already serves the dense population centers at The Reserves, Campus Court at Naismith, and Naismith/Oliver Hall. Serving this area was felt necessary though to maintain the connection that the Lawrence Transit currently provides from downtown to the retail surrounding 33rd St. and Iowa St. The alternative, bypass serving Ousdahl St. and running service only on Iowa St. and Nieder St adjacent to the Target store parking lot, creates a barrier by requiring shoppers to cross six-lanes of Iowa St. and navigating landscape berms and large parking lots to access shopping on the west side of Iowa St. The recommended retail loop, which by default serves The Exchange, is necessary for this route to truly serve both KU On Wheel purposes and Lawrence Transit purposes.

Route #11 would provide an opportunity for the Lawrence Transit and KU On Wheels to operate a single route for a year with truly coordinated service that successfully serves both entities missions while eliminating duplicated service between routes City Route #8 KU / South Iowa / Downtown, KUOW Route #24 31st & Iowa, and KUOW Route #25 Downtown. Successful implementation of this fully coordinated route would be a precursor test for a more fully coordinated transit system in August 2010. Costs would be allocated between KU On Wheels and Lawrence Transit based on each entity's' service span. KU On Wheels would pay for the route during the KU On Wheels service hours of approximately 7:00 a.m. to 5:00 p.m. while KU is in session, Lawrence Transit would pay for the route during evening and Saturday service, and on breaks when KU is not in session. This arrangement is the heart of coordinating transit service between the two agencies, as routes lose ownership by only one agency, and instead are "owned" by both agencies.

Route 11's alignment is recommended to change slightly on the weekend and evenings. Instead of following Naismith Dr. through the KU campus, the route will proceed on 15th, Burdick Dr., and Irving Hill Rd. to access the student dormitory on Daisy Hill. It follows 19th St. to Naismith Dr. and proceeds south matching the weekday alignment. This removes weekend service along Naismith Dr. from 15th St. to 19th St. The rest of the alignment is not changed. This slight alignment shift will provide an evening and weekend downtown – south Iowa connection for students living in the dormitories. Figure 4-4 displays the weekend and evening alignment.

Figure 4-4: Route #11 Evening and Weekend Alignment



A detailed comparison of revenue hours required for the current route #8 and the proposed route #11 is shown in Table 4-1.

Table 4-1: Revenue Hour Comparison

Route 8	Rev-hrs	Days	Year Rev Hrs
6:13 am to 8:00 pm	13.8	308	4250.4

Proposed Route 11	hdwy	Start	End	Rev-Hr/D	Days	Total Rev-hr
Service when KUOW does not operate						
Summer	40	7:00 AM	5:40 PM	21.33	67	1429.11
Winter Break	40	7:00 AM	5:40 PM	21.33	13	277.29
Spring Break	40	7:00 AM	5:40 PM	21.33	5	106.65
Saturdays	40	8:00 AM	7:40 PM	22.33	57	1272.8
Service at all times						
All wkdy early eve	80	5:40 PM	8:20 PM	2.67	255	680.85
All wkdys early AM	80	5:40 AM	7:00 AM	1.33	255	339.15
Total						4105.85

As shown in the Table, the proposed route #11 would require 144.55 fewer revenue hours than the current route City Route #8 KU / South Iowa / Downtown. This would equate to an annual savings of approximately $4,600.

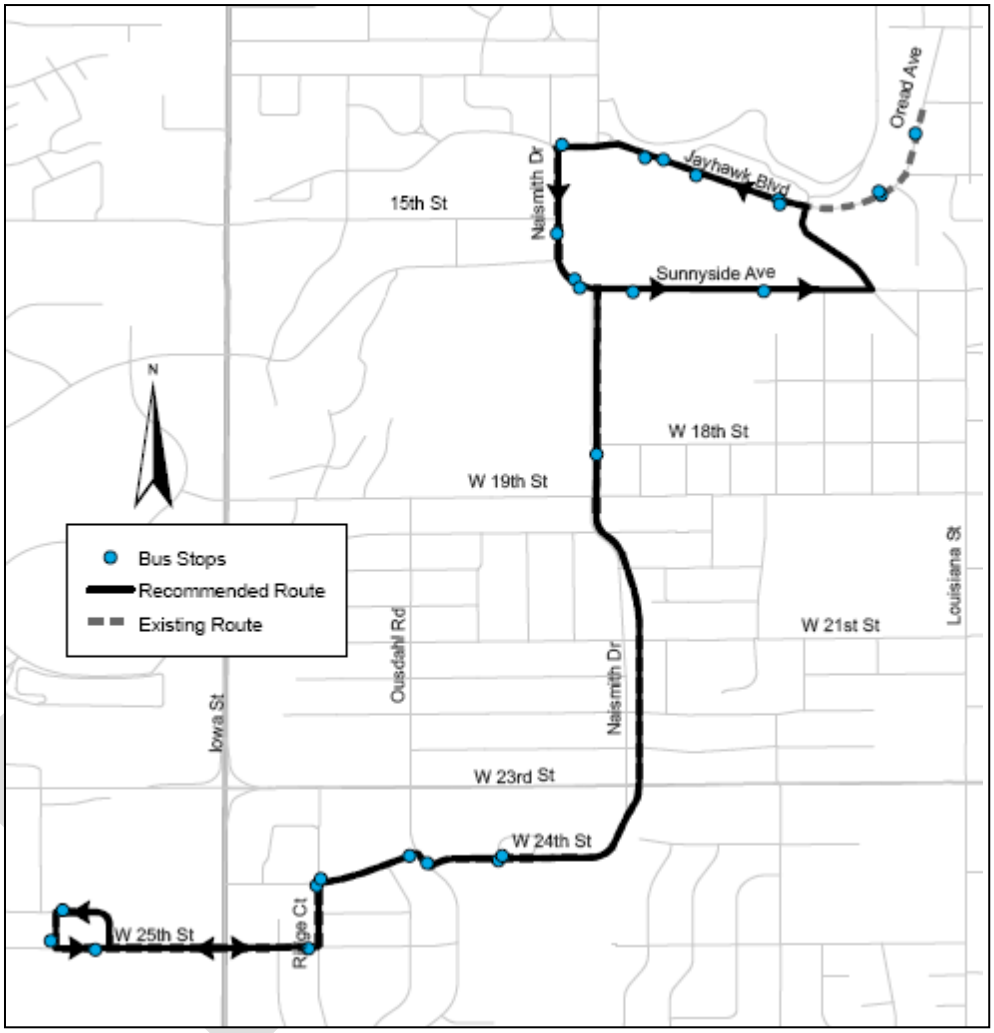
Finally, it should be acknowledged that capacity issues could arise at certain peak periods when University classes are in session. These could be addressed by adding 3 morning trippers and 3 afternoon trippers. This would require approximately 500 revenue hours annually.

Modify the alignment of route KUOW Route #26 25th & Melrose

The new route #11 would require alignment changes to KUOW Route #26 25th & Melrose for two reasons. First, route #26 is currently interlined with KUOW Route #25 Downtown. Route #25 currently serves downtown but is recommended to be replaced with route #11. Secondly, route #11 will require three buses to operate 30 minute frequencies on the route, an increase of one bus from the current route #24 alignment. To accomplish this, a bus will be reassigned from route #26 to route #11. 30 minute frequencies on route #26 will be maintained by shortening the alignment. Currently the route travels the entire length of Jayhawk Blvd and Oread Ave. to interline with KUOW Route #25 Downtown. The new alignment will create a one-way, counter-clockwise loop consisting of Sunnyside Ave, Sunflower Rd, Jayhawk Blvd, and Naismith Dr,

before continuing the outbound trip along Naismith Dr. The counterclockwise movement is important to maintain the north side of Jayhawk Blvd as the passenger waiting location for southbound travel. The southern portion of the current KUOW Route #26 25th & Melrose alignment will remain unchanged. Figure 4-5 displays the new alignment.

Figure 4-5: KUOW Route #26, 25th & Melrose New and Existing Alignment



Interline Route #3 and Route #4 together, and Interline Route# 1 and Route #2 together

Currently City Route #3 Iowa & Lakeview / Downtown and City Route #2 HINU / Downtown are interlined together, and City Route #1 Prairie Park Nature Center / Downtown and City Route #4 North Lawrence / Downtown are interlined together

(interlining occurs when a vehicles finishes the inbound trip of one route, and begins the outbound trip of a separate route). It is recommended to break the current connections and interline route #3 and route #4 instead. Ridership data is combined for each interlined route pair and cannot be assigned to a specific route within a pair, however conversations with Lawrence Transit staff and MV drivers have indicated that Route #3 Iowa & Lakeview / Downtown and Route #4 North Lawrence / Downtown have fewer passengers than Route #1 Prairie Park Nature Center / Downtown and Route #2 HINU / Downtown, suggesting that route #3 and route #4 are strong candidates for service changes in August 2010 when more specific ridership data has been collected. Interlining route #3 and route #4 will make it easier to make any service changes to these areas in 2010 without affecting the rest of the system. Revenue hours for the two new interlined pairs will remain unchanged in August 2009.

Minor route modifications will be required for the downtown portions of the new interlined pairs. Currently, route #3 and route #4 finish their inbound trips by proceeding east on 9th St from Vermont Street to the transit shelter on the south side of 9th Street between Massachusetts and New Hampshire Street. At this point they begin the outbound trips as their respective interlined partner. The new interlined pairing will require route #3 and route #4 to both exit the downtown area using northbound New Hampshire Street, westbound 8th Street, and northbound Kentucky Street, before proceeding on the designated route. This modification will also mean that only the transit shelter on the south side of 9th Street between Massachusetts and New Hampshire Street will be served by route #3 and route #4.

Likewise, currently route #1 and route #2 begin their outbound trips by proceeding east on 9th Street from the transit shelter on the south side of 9th Street between Massachusetts Street and New Hampshire Street. The new interlined pairing will require the two routes to begin their outbound trips by proceeding west on 9th Street from the transit shelter on the north side of 9th Street between Massachusetts Street and Vermont Street. Route #1 and Route #2 will exit the downtown area using westbound 9th Street, northbound Vermont Street, eastbound 8th Street, and southbound New Hampshire Street, before proceeding eastbound on 9th Street on their designated alignments. This modification of the downtown portion of the routes means that only the transit shelter on the north side of 9th Street between Massachusetts Street and Vermont Street will be served by route #1 and route #2.

The rearranging of interlined pairs will likely have little impact on ridership numbers for August 2009. Separated ridership numbers for each portion of interlined routes were unable to be collected in the short time of this phase, however current ridership numbers and conversations with bus drivers and Lawrence Transit administrative staff suggests with relative certainty that the new

interlined pair of #3 and #4 can be served by cutaway vehicles. Analysis of ridership numbers suggests that #1 and #2 routes would also be suited for the use of cutaway vehicles. More specific ridership data will need to be collected before the tentative recommendation regarding #1 and #2 could be more fully recommended, however several field observations noted that cutaway vehicles are currently being used for many of the trips on #2 and #3, and #1 and #4 interlined routes.

Implementation of Part 1 Recommendations

Several of the Part 1 recommendations were adopted by the City of Lawrence and KU On Wheels and were implemented in August 2009. The recommendations adopted included:

- Produce one coordinated map and timetable brochure, with increased timepoints.
- Use one Information Hotline call number
- Create a new, coordinated route #11, replacing City *Route #8 KU / South Iowa / Downtown*, KUOW *Route #24 31st & Iowa*, and KUOW *Route #25 Downtown*

Chapter 5 Service Standards

Background

One of the tasks of the *Lawrence Route and Schedule Design for Coordinated Transportation Plan* is to develop a set of standards that can be used to evaluate route performance. The mission statement developed by the planning committee is: **Together, the City of Lawrence and University of Kansas will provide safe, convenient, affordable, reliable, and responsive public transportation services to enhance the social, economic and environmental well being of the community.**

With this mission statement in mind, the consultant group offers a set of criteria for evaluation of the overall KU On Wheels (KUOW) system, the Lawrence 'T' system, and the coordinated routes (currently Route 11). Decision making for service changes on the KUOW system will continue to be made by KUOW. Decision making for the 'T' will be reviewed by Public Transit Advisory Committee (PTAC) and forwarded to the City Commission for final decision. Decision making for the coordinated route(s) will be made by KUOW and, through PTAC, the City Commission.

As specified in the RFP, the Olsson team worked with the Study Management Team to develop policies and standards in the following four areas that can be used as a basis for decision making:

- Fixed-route service design standards and policies
- Fixed-route service performance standards and policies
- Fixed-route service expansion/contraction standards and policies
- Fixed-route vehicle specifications

Route Design and Performance Criteria:

There are many indicators of performance that can be developed to evaluate bus service in small urban areas. Each indicator requires a varying level of data collection and analysis. With a contracted operation, it is recommended that data collection be as minimal as possible in order to keep costs low. Extensive data collection may require additional staff time from KU, or the City, or the contractor. These tasks will add costs to the administrative portion of the transit budget without a commensurate improvement in service. Therefore, data collection and analysis will be limited to information that is relatively simple to collect.

The Transit Cooperative Research Program (TCRP) is a branch of the Transportation Research Board (TRB) and part of the National Academy of Sciences. The TCRP Report #100 "Transit Capacity and Quality of Service Manual" uses a grading system, ranging from A to F, to define Transit Level of Service (LOS). The standards and policies presented in this document do not use this level of service concept, but use many of the same ranges for system design standards. This allows KUOW and the 'T' to benefit from industry knowledge, while avoiding the negative connotations that might occur with assigning a level of service ranging from A to F.

A "System Index" evaluation compares individual route performance to metrics from the entire system or a grouping of similar routes. This effectively indexes route performance standards to system and/or community changes such as, population growth or decline, system expansion or reduction, and energy prices, by comparing individual routes measurements to a factor of the median of the transit system as a whole. This performance measurement provides two primary benefits. First, the measurements are indexed to local conditions. Secondly, a system index measurement requires constant evaluation of each route against the system as a whole and forces continual monitoring and improvement. If system wide ridership increases for example, then ridership requirements for each route automatically increases.

For the tasks in this report, several criteria are used for fixed route service design. Expansion and contraction standards will be measured by compiling passengers per vehicle-hour and measuring it against system index. Area coverage will be measured by population density and income metrics. Measuring system and route design and performance through a variety of methods provides an ideal combination of industry standards and local customization.

- Fixed-route service design standards are:
  - Frequency of Service
  - Hours of Service
  - Area Coverage.
- Fixed-route service performance standards are:
  - Passenger Load Factors
  - On-time Performance
  - Transit/Auto Travel Time Comparison.
- Vehicle standards
  - Size
  - Accessibility
  - Fixed Route Equipment
- Fixed-route service expansion/contraction standards and policies will include:
  - Establish New Routes
  - Improving Frequency of Existing Routes
  - Increasing service
  - Decreasing Service

There is an extensive methodology available to numerically evaluate bus systems using a variety of factors. For Lawrence, the service measures will be limited to methods that accommodate easily collected data in order to minimize data collection costs.

Fixed Route Design Standards

Fixed route design standards evaluate route design using headway (also called frequency), service span and measurements of population density, income levels, and activity centers for area coverage. These design standards will be applied when routes are redesigned.

Frequency of Service

5-1 Frequency of Service

Avg. Headway (min)	veh/h	Comments
<10	>6	Passengers do not need schedules
10-14	5-6	Frequent service, passengers consult schedules
15-20	3-4	Maximum desirable time to wait if bus/train missed
21-30	2	Service unattractive to choice riders
31-60	1	Service available during the hour
>60	<1	Service unattractive to all riders

Source: TCRP Report #100, Transit Capacity and Quality of Service Manual

To increase ridership and meet the environmentally responsible aspect of the mission statement, it is necessary to attract "choice riders" who have other modes of transportation available to them. In order to attract "choice riders", the frequency should be 15 to 20 minutes or less. The KUOW system has varying headways between 6 minutes and 30 minutes. The 'T' operates at 40 or 80 minute headways. The Table below summarizes the frequency on each route.

Table 5-2 Frequency by Route

Frequency of Service					
KUOW	Frequency (min)	The 'T'	Frequency (min)	Coordinated	Frequency (min)
21	6-10	1/4	40	11	30-40
23	30	2/3	40		
24	30	5	40		
25/26	30	6	40		
27	14-20	7	80		
28	20				
29	30				
41	5-30				
42	15-30				
Range	**5-30**		**40-80**		**30-40**

Hours of Service

Characteristics of different hours of service are shown in the following table.

Table 5-3 Hours of Service

Hours of Service	Comments
19-24	Night or "owl" service provided
17-18	Late evening service provided
14-16	Early evening service provided
12-13	Daytime service provided
4-11	Peak hour service only or limited midday service
0-3	Very limited or no service

Source: TCRP Report #100, Transit Capacity and Quality of Service Manual

Service on the KUOW fixed route system and the 'T' are generally daytime services with the 'T' operating at slightly longer hours. KUOW only operates on KU schooldays with limited service during the summer and academic breaks. Safe Bus and Safe Ride provide evening service on portions of the KUOW network. Excepting on-campus routes of Park & Ride (Route 41) and the Rec Ctr – JRP Circulator service (Route 42), there is

little or no service continuity on KUOW between when regular fixed route service ends at 6:00 p.m. and Safe Ride begins at 10:30 p.m. or when Safe Bus begins Friday and Saturday at 9:00 p.m.

Late evening service would be achieved by operating additional routes until 10:00pm on weekdays and night service would be achieved by extending service to midnight. Saturday evening and Sunday service are not typically measured, but are part of a comprehensive service level.

Each route's hours of service is summarized below.

Table 5-4 Hours of Service

Hours of Service					
KUOW	Service Span	The 'T'	Service Span	Coordinated	Service Span
21	11	1/4	14	11	14
23	11	2/3	14		
24	11	5	14		
25/26	11	6	14		
27	11	7	14		
28	11				
29	11				
41	17				
42	16				
Range	**11-17**		**14**		**14**

Area Coverage

The 'T' was designed as a system that maximized area coverage as Lawrence existed in the design year of 2000. Since the initial fixed route system was established, there has been no significant expansion of area coverage although the incorporated area of Lawrence has grown.

Within areas that are eligible for transit service, route spacing guides the determination of route placement and service type. Criteria, that can be used to determine route spacing, are designed to identify areas with the largest transit dependent populations and then space transit service accordingly. These criteria include factors that have been shown to influence ridership, including income, population density, and vehicle ownership rates. Areas with the densest populations that overlap areas with the lowest incomes or low vehicle ownership rates will have the most closely spaced routes. The less dense and more affluent or with high vehicle ownership rates in an area, the farther

apart transit route service is spaced. Car ownership data mirrors income data, so using both variables does not necessarily give a better or more complete estimate of the transit dependent population.

Demographic analysis pertinent to route spacing is often performed by the Metropolitan Planning Organization (MPO) as part of their yearly transit analysis. While these tasks will prove useful and will provide a detailed analysis of transit traffic potential, it can be an expensive task and should be incorporated into the yearly transit review by the MPO. Alternatively, KUOW and the 'T' can perform their own analysis.

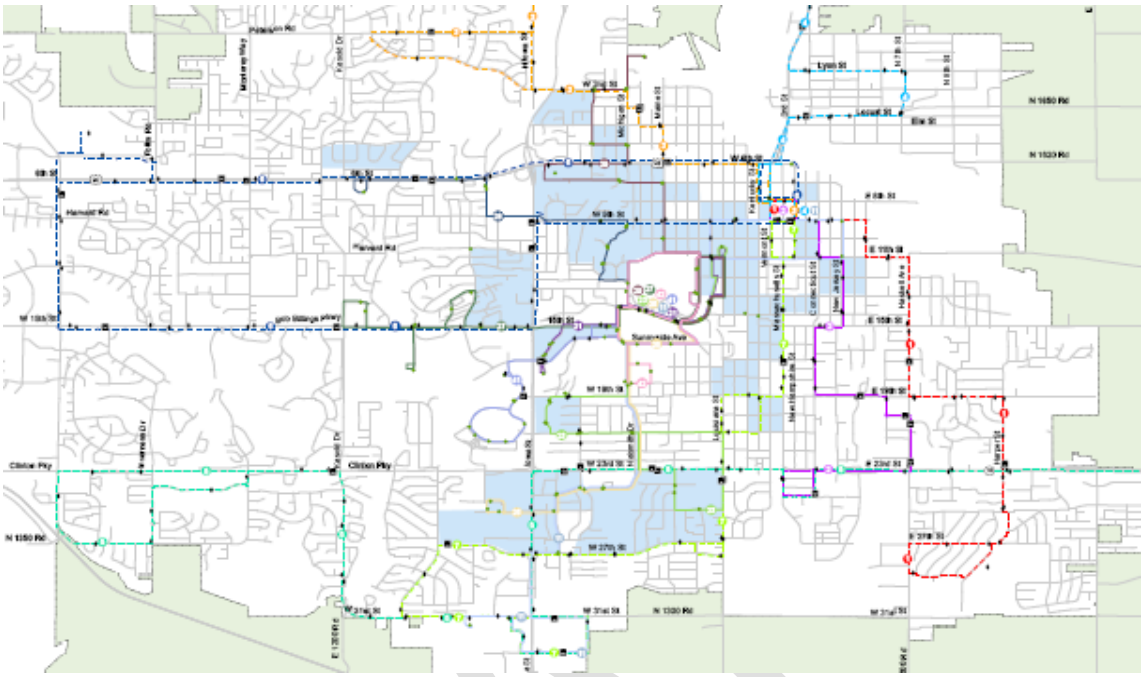
Route spacing guidelines are shown in Table 5-5.

Table 5-5 Route Spacing Guidelines

	Area Coverage			
Population/Acre	**Low Income and >50% with 1 or Fewer Vehicles**	**Moderate Income and 15% to 50% with 1 or Fewer Vehicles**	**Middle Income and 2.5% to 15% with 1 or Fewer Vehicles**	**Upper income and >2.5% with 1 or Fewer Vehicles**
Greater than 10	1/4 mile between routes	1/2 mile between routes	3/4 mile between routes	1 mile between routes
3 to 9	1/2 mile between routes	3/4 mile between routes	1 mile between routes	Spaced as needed
Less Than 3	3/4 mile between routes	1 mile between routes	Spaced as needed	Spaced as needed

As an example, the figure below displays Lawrence areas with a density greater than 10 persons per acre that are also low income areas or areas with the majority of households having access to one or fewer vehicles.

Figure 5-1 High Density Areas in Lawrence that are also low income or with the majority of households having access to one or fewer vehicles



A second criteria used for route spacing is applied to activity centers. Activity centers are places where one or more functions are concentrated. Functions in this case, mean large employers, medical facilities, retail centers, or educational institutions. Measurements can be taken from multiple functions to qualify as an activity center. These centers can be clustered around an intersection, within a dedicated area or along street corridors. To have an activity center cluster, functions should be no farther than ½ mile apart.

Table 5-6 Activity Center Guidelines

Activity Center Guidelines:
Employers with 500+ employees
Hospitals/nursing homes w/ 100+ beds
Educational Institutions w/ 1,000 students
Retail Centers w/ 100,000 sq ft of leased space
Social Service Agencies w/ 75 daily clients
Apartments w/ 300 units
Govt Agencies w/ 100 daily clients

Fixed Route Performance Standards:

The set of standards above measures the system design in terms of service provided by KUOW and the 'T'. The second set of factors measure system performance which reflects usage of the system by passengers. There are many variations of the criteria that can be incorporated into this analysis, but a simple approach is appropriate for KUOW and the 'T'.

Passenger Load Factor

Load factor characteristics are shown in the following table.

Table 5-7 Load Factors

(p/seat)	Standing Passenger Area (ft_2/p)	(m_2/p)	Comments
0.00-0.50	>10.8†	>1.00†	No passenger need sit next to another
0.51-0.75	8.2-10.8†	0.76-1.00†	Passengers can choose where to sit
0.76-1.00	5.5-8.1†	0.51-0.75†	All passengers can sit
1.01-1.25*	3.9-5.4	0.36-0.50	Comfortable standee load for design
1.26-1.50*	2.2-3.8	0.20-0.35	Maximum schedule load
>1.50*	<2.2	<0.20	Crush load

Source: TCRP Report #100, Transit Capacity and Quality of Service Manual

Load factors should be collected for all services provided by both systems, but the most likely services to have high load factors are KUOW routes and the coordinated route(s). The 'T' services' load factor will typically be between 0.00-0.50 passengers per seat to 0.76-1.00 passengers per seat.

Both organizations should develop an agreement on load factor standards for the current (Route 11) and future coordinated routes. The student population will probably be the controlling variable for load factors on the coordinated routes and a load factor standard could be the responsibility of KUOW on Route 11. KUOW is fortunate to have the overloading records for all trips (Code 7). The Code 7 documentation essentially shows when routes or specific trips are operating at crush loads.

An overloading problem on a route that operates at every 6-10 minutes, such as Route 21 and Route 41 is an annoyance for passengers who must wait for the next bus and may cause a person to be late for class. However, when buses that operate at every 30 minutes or worse, an overload situation will make a passenger up to 30 minutes late if another bus is not dispatched to the location before the next scheduled bus arrives.

A total of 348 passengers were unable to board buses on KUOW routes with 30 minute frequency between November 24, 2008 and May 1, 2009. While most of these were relatively close to campus, it requires passengers to adjust their travel pattern when this occurs and may affect future decisions about using transit service. Table 5-8 shows the number of passengers left after overloading incidents.

Table 5-8 Passengers Left After Overloading Incidents

Passengers Left After Overloading Incidents									
Route	21	23	24	25	27	28	41	42	EXT
Passengers Left	1008	87	96	123	33	9	140	10	45

Source: KUOW

By adopting a load factor standard of 1.01 – 1.25 to 1.26 - 1.50, the system will be designed to have adequate capacity to provide extra space when a higher than expected number of passengers attempt to use KUOW service. The same load factor standard should also apply to Safe Bus and extra buses should be added to that service when crowding occurs. It may be prudent to have a higher standard for Safe Bus to help minimize bad behaviors on the bus that can be exacerbated by crowded conditions.

While an immediate response is needed to pick up the passed passengers, KUOW has choices on how to solve a recurring problem. An extra bus (tripper) can be added when there are consistent overloads and it will improve the load factors on both buses. Trippers are the most cost effective method to improve the load factors. However, when trippers are needed four or more times per day, it is an indication that the route needs an improvement in the scheduled frequency of service. Improved headways generally increase ridership by inducing demand for service and allowing passengers to travel more easily on transit with a wider choice of travel times. Improved frequency also attracts passengers who have a lower tolerance for wider spaced headways. Adopting load factor standard of 1.01 – 1.25 to 1.26 - 1.50 will require extra service, either as trippers or as more frequent service on busy routes.

On Time Performance

On-time performance describes how often a transit vehicle adheres to the posted schedule and is an important component in measuring the usability and attractiveness of a transit system. Transfer opportunities and transit users will both be negatively affected by low on time performance. The below table describes on-time performance standards and is from the perspective of a single daily transit user. The transit user would experience 95% to 100% on time performance if their bus is late no more than once every two weeks. Likewise, the on-time performance would be below 75% if a transit user with a transfer experiences at least one late bus a day.

Table 5-9 On-Time Performance

On-Time Percentage	Comments*
95.0-100.0%	1 late transit vehicle every 2 weeks (no transfer)
90.0-94.9%	1 late transit vehicle every week (no transfer)
85.0-89.9%	3 late transit vehicles every 2 weeks (no transfer)
80.0-84.9%	2 late transit vehicles every week (no transfer)
75.0-79.9%	1 late transit vehicle every day (with a transfer)
<75.0%	1 late transit vehicle at least daily (with a transfer)

Source: TCRP Report #100, Transit Capacity and Quality of Service Manual

For this criterion to be effective, it is necessary to establish a standard for on time performance and it is necessary to collect data. GPS Technology is available to determine on time performance at terminals as well as intermediate timepoints. KUOW does currently utilize this technology, although the 'T' does not. Therefore, manual recording of performance for the 'T' is necessary to effectively use these criteria. Currently, some data is being collected and the effectiveness of these criteria is limited by the data available and the accuracy of the data.

Transit/Auto Travel Time

The table below shows Auto/Bus travel time characteristics.

Table 5-10 Auto/Bus Travel Time Characteristics

Travel Time Difference (min)	Comments
≤0	Faster by transit than by automobile
1-15	About as fast by transit as by automobile
16-30	Tolerable for choice riders
31-45	Round-trip at least an hour longer by transit
46-60	Tedious for all riders; may be best possible in small cities
>60	Unacceptable to most riders

Source: TCRP Report #100, Transit Capacity and Quality of Service Manual

Auto/Bus travel times measure the directness of a bus route compared with auto travel and are a good indication of the appeal of transit service. Data collection for Auto/Bus travel time comparisons can be costly if many origin-destination pairs are considered. The components of the transit/auto comparison are the trip components for each mode. To make it simple, it is assumed that the walk time from residence to auto parking is the same of the wait time for the bus.

The components for the auto trip are auto driving time and walk time from parking lot to final destination. For a comparable transit trip, it includes travel time by bus and walk time from bus stop to final destination.

KUOW and the 'T' can determine how many origin-destination pairs should be considered to determine the travel time standard for these criteria. Initially, it is recommended that 50 origin-destination pairs should be established. The MPO planning process can update the travel time differential as part of the transit planning process of updating the Metropolitan Transportation Plan and document how travel times change as the transit system improves. Additional origin-destination pairs can also be added as needed.

Summary of Current Level of Service:

Table 11 below summarizes the current service for KUOW, the 'T', and Route 11. The respective governing bodies should discuss the desired service standards for each criterion and then evaluate design and performance as part of the yearly planning process. With this summary table, KUOW and the 'T' can make changes to the system to make it conform to the desired service standards. Changes in performance (i.e. overloading) may require changes to system design (improved frequency). Similarly, changes in system design by improving the service standards will generally result in increased ridership.

Table 5-11 Current Levels of Service

Summary of Current Service			
Criteria	**KUOW**	**T**	**Route 11**
Frequency (min)	6-30	40-80	30-40
Hours of Service (wkdy hrs, KU in Session)	11-17	14	14
Load Factors (pass./seat)	0.51 - 1.50+	0.00 - 1.00	1.01 - 1.50
On Time Performance (%)	90% - 100%	90% - 100%	90% - 100%
Auto/Bus Travel Time (min)	+7:27 to -14:04	-4:07 to -52:08	-4:00 to -21:21

Vehicle Standards:

Vehicle standards are composed of:
Size
Accessibility
Fixed Route Equipment on body-chassis vehicles

Size

Appropriately sized vehicles are important for maintaining passenger safety, comfort, and perception of well-utilized resources. While a vehicle with limited capacity can affect route capacity, passenger comfort, and safety, a vehicle with consistent excessive capacity can lead to the perception that funding is not being well utilized. A balance must be reached.

Load factor is commonly used to determine appropriate vehicle size; however, the needed data collection can be burdensome. It is recommended that passengers per revenue hour instead be used for determining vehicle size. Unfortunately, passengers per hour might not accurately reflect load factors at peak time periods of the day, therefore overloading incidents will have to be reviewed and the number of passengers per revenue hour determining vehicle size may be modified. Certain routes may have specific characteristics that preclude certain vehicle types from using that route. These specific characteristics may include tight turning radii on a route, or specific runs that consistently experience overloading. Best judgment should be used in these instances. Table 5-12 displays the vehicle standards as measured by passengers per revenue hour. Routes that experience 7.5 passengers per hour and below would be assigned a body-on-chassis vehicle, routes experiencing 7.5 passengers per hour and above would be assigned at minimum a 30' vehicle, routes experience 30 passengers per hour and above would be assigned at minimum a 40' vehicle. The use of 60' articulated buses would be evaluated for routes experiencing above 60 passengers per hour. Higher initial purchasing costs, higher fuel costs, and higher maintenance costs should be taken into consideration when evaluating the purchase of articulated buses.

Table 5-12 Vehicle Standards

Vehicle Size Standards	
Pax/Hr	Vehicle Type
Below 7.5	Body-on-chassis
Greater than 7.5	Minimum 30'
Greater than 30	Minimum 40'
Greater than 60	Evaluate 60' articulated

Accessibility

Accessibility guidelines on public transportation is determined by the United States Access Board which was created to ensure access to federally funded facilities, including federally funded transit vehicles. The board developed the guidelines used in the Americans with Disabilities Act. Most University of Kansas vehicles are not currently federally funded. The University of Kansas is recommended to meet these requirements to match the ADA standards required by city transit vehicles and facilitate easier coordination. Currently, the guidelines on accessible buses and vans are being rewritten. It is not known when the final standards will be published.

The consultant group recommends fixed route vehicles be low-floor vehicles and the city and university should explore requiring all paratransit vehicles be low-floor. Low-floor vehicles lessen the time required for both boarding and alighting and lift operation. Discussions with the disabled-community in Lawrence revealed that the body-on-chassis vans, currently being used for paratransit operations and some fixed route vehicles, have very high stairwells and are accessible for many passengers with otherwise minor ambulatory-impairments only through the use of the hydraulic lift. There are an increasing number of vendors that are supplying Altoona-tested low-floor paratransit vehicles. Transit vehicles are required to be tested by the Altoona Bus Testing Program before they are eligible to be purchased using federal funds.

A minimum of 2 wheelchair spaces is recommended to be available in paratransit body-on-chassis vehicles and all fixed route vehicles. The paratransit recommendation is greater than the latest Access Board draft on Guidelines for Buses and Vans and requires one wheelchair space for vehicles under 22 feet in length and two wheelchair spaces for vehicles over 22 feet in length.

The Access Board draft revisions to the ADA Accessibility Guidelines for Buses and Vans initially required Automated Route Announcement Systems on vehicles more than 22 feet in length. However, public comment from the first draft expressed concern about the cost and complexity of installing the systems and the requirements are currently being further evaluated. The need for Automatic Route Announcement systems was brought up by discussion participants regarding both KUOW and the 'T' systems. This local participant concern, combined with the trend towards federal requirements, means that both KUOW and the City should evaluate Automatic Route Announcement systems for future vehicle procurement. Automatic Route Announcement systems are most effectively pared with a GPS system, which has other benefits including bus tracking for all passengers.

Fixed route equipment on body-on-chassis vehicles

Currently the 'T' is using body-on-chassis paratransit vehicles on certain fixed routes. While the vehicle capacity may match the load factors experienced on those vehicles, the vehicles themselves are not outfitted for fixed route operation. All fixed route vehicles, regardless of size, should be equipped with passenger signal systems and destination signs. The Access Board draft guidelines require stop request systems only on vehicles longer than 22 feet. However, the consulting group recommends that they be included on all fixed route vehicles.

Expansion/Contraction Standards:

The criteria in the Fixed Route Design Section include measured frequency, hours of service, and area coverage. When performance falls below the adopted standards in the Fixed Route Performance Standards, changes in design will address the performance issues. This section will provide an additional methodology for adding new routes, improving frequency, and adding hours of service.

Standards for expanding service can be used to:

- Establish new routes,
- Improve frequency on existing routes and
- Add hours of service to existing routes.

Political as well as financial considerations tend to drive decision making and this methodology will provide an unbiased assessment process for adding or reducing service based on passenger usage.

Establishing New Routes:

Assuming KUOW and the 'T' have adopted standards for area coverage, new traffic generators may not automatically qualify for additional service. When the area coverage approaches the minimum threshold for the desired level, it is appropriate to evaluate areas that are not served by transit. As an example, if the population or income characteristics for an area approaches a threshold in the area coverage standards, then the planning process should consider adding a route to maintain the service standard. The other option is to lower the service standard.

When routes are added, potential ridership should be calculated. The simplest methodology to determine transit ridership is to use data from the Institute of Transportation Engineers (ITE) on trip generation. Usual ITE trip generation rates are based on the number of housing units or square footage of commercial and institutional facilities. Each new development, residential, commercial, or institutional, generates traffic volumes which are calculated as part of the development's impact on local traffic. Using locally developed mode split models, the amount of transit traffic can be calculated.

It will be necessary to collect ridership numbers at existing facilities, such as commercial areas, apartment buildings, and single family residential areas. Comparing existing ridership to the square footage, or the number of residential units, or some other easily captured characteristic will allow KUOW and the 'T' to predict ridership and determine where new routes should be established.

Improving Frequency on Existing Routes:

In order to determine when to increase frequency on existing routes, the load factor standards adopted in the Fixed Route Performance section will require immediate action to maintain the appropriate load factors. However, improved frequency can also be done at other times to improve service and increase ridership by making transit service more convenient.

Measuring ridership using passengers per revenue hour is the best way to compare routes. It is not recommended to utilize fare box revenue per hour, as it does not differentiate between routes that may have a high proportion of reduced fares (elderly, disabled, K-12 students, KU students on city buses, City pass holders on KUOW busses), or systems like KUOW where students pay semester fees rather than bus passes or daily fare. Due to these characteristics in Lawrence, fare box revenue would not accurately measure transit ridership.

Evaluation Strategy:

Performance monitoring consists of evaluating which routes fall below the system performance and would initiate corrective action, and which routes are above the system average and initiate action to evaluate the route for the possibility of adding more service. Developing a strategy that is consistent with the mission statement of providing basic service and enhancing high ridership routes is relatively easy.

Increasing Service:

After KUOW adopts a desired load factor standard, it becomes necessary to add tripper buses to maintain the standard. If trippers are used consistently (four or more times per day), then it is logical to incorporate the trippers into the regular schedule and improve frequency. This may change the frequency standard. If a 30 minute headway is improved to 20 minute intervals, then both the frequency of service and the load factor will improve.

Some services do not have consistent overloading, but have the potential for improvement. This typically occurs on new routes because it takes two to three years for a route to establish its base ridership level. If a route is increasing its average passengers per hour and passes a set standard, such as 30 passengers/hour by the second year, then it should be examined to determine if additional service will generate additional riders. Land use changes, such as new apartment buildings, new job opportunities, new shopping facilities, or other traffic generators could justify added frequency on an existing route.

Decreasing Service:

Routes with decreasing ridership levels should also be reviewed. The system index approach provides a way to compare a specific route's ridership numbers with ridership numbers of a similar route. In this instance, the similar route groupings are city routes,

KUOW on-campus routes, and KUOW off-campus routes. This grouping is to prevent different route types from being compared to each other. The city does have routes that could be considered different route types (Routes 1 and 4 could be considered neighborhood bus service whereas Route 5 is a connector bus service). However, the relatively small number of routes, and multiple functions carried out by each route (route 7 could be considered both a neighborhood bus route and a connector route), made multiple groupings unfeasible. The coordinated route 11 has been included as a city route since the service span is longer than KUOW routes and it runs year-round.

Routes within each grouping are measured against a factor of the median passengers per revenue hour for that grouping. The standard used here is 110% of the median. Ridership changes within the grouping will modify the standard, while using the median figure, as opposed to the average, prevents outlying ridership numbers from disproportionately influencing the standards. Routes that fall within a range (here, 75%-125%) of the standard will be considered normal. Specific routes whose declining ridership falls below a set point of the standard will initiate a series of steps. Routes whose ridership per revenue hour falls between a range (here 50% to 75%) will have increased route marketing. Route realignments will be explored for routes below a lower range (here, 25% to 50%), and service reductions or an alternative transit mode will be explored for routes below the lowest level (below 25% of the standard). A service floor is provided by using passengers per revenue hour.

A deviated fixed route is different than a regular fixed route and would have a few timepoints along the route, but the drivers can deviate to locations to drop off or pick up passengers. This requires additional dispatching if all calls go through a dispatch center. Travel times may be faster and smaller vehicles are typically used for this service.

A general public demand response system is different than the deviated fixed route because the bus travels only when there is a call. With the deviated fixed route, the bus must pass the timepoints as required and there may be some trips that do not have any passengers. With a demand response route, the bus will only move when there is a passenger to pick up or drop off.

In both of these types of service, the bus would connect to a transfer location and passengers can transfer from other fixed route buses without the need to call the dispatcher or driver.

A minimum ridership standard of 6 passengers per revenue hour for the 'T' and 12 passengers per revenue hour for KUOW should be established for fixed route viability. Services with usage below this standard can have the fixed route service changed to a modified fixed route or a general public demand responsive service. Service on modified fixed route or demand response must average at least 4-6 passengers per hour for the service to continue. If there are time periods during the day when ridership each hour is consistently below this minimum, then the service would not operate.

A typical standards matrix would look like the following table with each route type measured by a standards index. Specific steps would be initiated by each range of the standard in an effort to increase ridership on a specific route before reducing service or

changing the transit mode. Service floors would be provided by measuring passengers per hour when changing the transit mode or eliminating service. At this time, the figures and ranges in the chart are for illustrative purposes only.

Table 4-13 Fixed Route Standards to Add or Delete Service

Fixed Route Standards to Add or Eliminate Service				
Day	**Add Service**	**No Change**	**Increase Route Marketing**	**Route Realignment**
T Weekdays	Greater than 125% of Standard	75% to125% of Standard	50% to 75% of Standard	25% to 50% of Standard
T Weekends	Greater than 125% of Standard	75% to 125% of Standard	50% to 75% of Standard	25% to 50% of Standard
KUOW On-Campus	Greater than 125% of Standard	75% to 125% of Standard	50% to 75% of Standard	25% to 50% of Standard
KUOW Off-Campus	Greater than 125% of Standard	75% to 125% of Standard	50% to 75% of Standard	25% to 50% of Standard
Day	**Reduce Service**	**Deviated Fixed Route**	**Public Demand Response**	**Eliminate Service**
T Weekdays	Less than 25% of Standard	4 - 6 pph	2 - 4 pph	less than 2 pph
T Weekends	Less than 25% of Standard	4 - 6 pph	2 - 4 pph	less than 2 pph
KUOW On-Campus	Less than 25% of Standard	N / A	N / A	less than 6 pph
KUOW Off-Campus	Less than 25% of Standard	N / A	N / A	less than 6 pph

Standard: 110% of Median Riders Per Hour Among Peer Group
pph: passengers per revenue hour

Review Process:

An informal review process is needed at the beginning of each semester by KUOW to determine if there are changes in ridership patterns. Extra trippers can be added as needed to capture the passengers before they seek alternative methods of transportation. Decisions on changing frequency in the middle of the school year can be based on the number of trippers that are added to meet passenger demand. An alternative to changing frequency in the middle of the year is to make a policy decision to run trippers as double-headers (an extra bus that immediately follows the schedule bus to accommodate excess demand). Increasing scheduled frequency could then be determined for the following year's schedule.

The formal process for review of coordinated services should occur in March of each year. Summer ridership should be separated from school year ridership. Decisions for additional service can be made in March which will allow for adequate time to publicize any changes for people who are making housing decisions in April for the next school year.

For any combined or coordinated routes, a methodology should be established in case KUOW or the 'T' faces a financial crisis that requires service reductions. The revenue hours that each entity contributes to the coordinated routes is defined by their original contribution. If one party reduces its contribution, the other party has the option to fund the reduction with no change in service to the public or it can reallocate hours from another route. If a service reduction is necessary, then each party can reduce the hours that it contributed to the service originally.

Similarly, it is appropriate to discuss how additional federal money, through FTA Section 5307 or Transit Intensive Cities will be allocated to KUOW, the 'T', and the coordinated routes.

Future Transit Development in Lawrence:

Previously KU On Wheels and the City of Lawrence transit system operated relatively separate of each other with relatively little systematic coordination. This level of cooperation is changing and is highlighted by the joint mission statement of KU and the City that states "Together, the City of Lawrence and University of Kansas will provide safe, convenient, affordable, reliable, and responsive public transportations services to enhance the social, economic, and environmental well being of the community." The joint standards and policies presented in this document provide goals and measurements to gauge progress, and present mechanisms on how to change service levels with changing resources and demand. These joint standards and policies also decrease the inconsistencies in standards between the two systems, while also recognizing the different transit role each system serves in Lawrence. Along with the joint mission statement, the new standards and policies can increase the level of cooperation and number of coordinated routes.

The existing transit system in Lawrence has evolved from two distinctly different philosophies. KUOW has been focused on transportation to and from class, but has broadened its mission to include safe evening transportation. The 'T' has been designed to provide broad area coverage but does so with wide headways which are typically not conducive to meeting a range of travel needs. The target markets are people with limited travel options due to disability or economic status. Consequently, the current service standards are relatively low for the 'T'. The next logical step would be to continue to coordinate resources for both KU and the 'T' in carrying students into the community and in accessing KU as a destination for the general public.

If the 'T' and KUOW change their mission in the future, then the standards can be addressed to the new mission. Additional standards would be needed to address evening, weekend, and specialty service.

Recommended Service Standards:

Funding from the City of Lawrence transit tax does not permit significant improvements in bus service in the near future and the mission statement desires continued operation of an area wide service. The KUOW standards reflect higher levels of service by focusing on trips that are most likely served by higher performing routes.

However, both the 'T' system, KUOW, and the coordinated routes can benefit from a blueprint that shows where to make future investments as funding become available.

The service standards can gradually be improved if more efficiency can be found that will allow a redistribution of service to the fixed routes, or if increased federal, state, and local funding become available.

The recommended service standards for the systems are shown below and are compared to the current service standards.

Table 4-14 Recommended Level of Service

Recommended Level of Service						
	KUOW		T		Rt. 11	Coordinated
Criteria	Current	Future	Current	Future	Current	Future
Frequency (min)	6 to 30	6 to 20	40 to 80	21 to 30	30 to 40	15 to 20
Hours of Service (wkdy hrs)	Generally 11	14 to 16	14	17 to 18	14	17 to 18
Load Factors (pass./seat)	0.51 to 1.50+	0.51 to 1.25	0.00 to 1.00	0.00 to 1.00	1.01 to 1.50	1.01 to 1.50
On Time Performance (%)	90% to 100%	95% to 100%	90% to 100%	95% to 100%	90% to 100%	95% to 100%
Auto/Bus Travel Time (min)	+7:27 to -14:04	<= -15:00	-4:07 to -52:08	<= - 45:00	-4:00 to -21:21	<=0 to -30:00

The standards in this document provide an unbiased assessment of current conditions and provide the framework for future decision making for service improvements and reductions. By adopting these standards, KUOW and the 'T' will have a plan to gradually improve service on the transit network in Lawrence.

Chapter 6 Final Route Recommendations

This chapter describes Part 2 route recommendations reflecting increased coordination between the City of Lawrence transit system (The T) and University of Kansas transit system (KU On Wheels, or KUOW), and is the result of discussion with bus drivers, City of Lawrence and KU On Wheels staff, and public discussion. The specific alignments and schedules discussed in this chapter review those routes where changes are recommended, and do not address existing routes whose alignment will be unchanged.

There are currently 16 routes in the system, not including variations in weekday or evening routes. Eight routes are changed in some way in these recommendations. In addition to these eight routes, Route 11 was created at the beginning of the coordination process and combined the previous City route 8 and previous KUOW Route

The base system operates on evenings, weekends, and days when KU is not in session and is displayed in Figure 6-11. The peak system would operate when KU is in session and is displayed in Figure 6-12. Revenue Hours are displayed in Table 6-1 and Table 6-2. Timetables and run guides for those routes recommended to be changed are included in Appendix B.

Merge Route 1 and Route 2 into a single route.
Route 1 is currently interlined with Route 4, and Route 2 is currently interlined with Route 3. The proposal would end the route interlining and merge Route 1 and Route 2 into a single route.

The new Route 1 would continue to provide a north-south connection in east Lawrence between downtown and 23rd Street, and would create a loop generally following 9th Street, Delaware Street, 13th Street, Haskell Avenue, 19th Street, 23rd Street to HINU where transfer opportunities would occur. The route would connect back to the downtown on 23rd Street, Haskell Avenue, 19th Street, 20th Street, Moodie Road, 19th Street, Barker Avenue, Connecticut Street, 11th Street, Vermont Street, and 9th Street. Route 1 is displayed in Figure 6-1

Modify Route 3 to include peak and off-peak alignments, and an off-peak flex zone.
Ridership data and discussions with bus drivers indicate that Route 3 has lower ridership than many other transit routes while providing key service to Lawrence Memorial Hospital. To more efficiently match supply with demand, Route 3 will continue its current alignment during the peak morning and afternoon periods. The fixed route alignment will be limited in the off-peak periods (9 a.m. to 3 p.m., and after 6 p.m.) to the portion connecting downtown to Lawrence Memorial Hospital. This will allow riders transferring from other routes to continue easy access to the hospital. The remainder of the route area will be served by a flex route. This demand response service will be operated with the Route 3 vehicle, and will pick passengers up in northwest Lawrence, delivering them to either the downtown transfer center or the a new transfer center at 6th Street and Wakarusa Drive. Passengers using the flex route service will be required to reserve rides 24 hours in advance. The fixed route would be at a 40 minute frequency. The new route and previous route are displayed in Figure 6-2.

Convert Route 4 into a flex route.
Ridership data and discussions with bus drivers indicate that Route 4 has the lightest ridership loads in the Lawrence transit system.

This proposal would convert the North Lawrence area currently being served by Route 4 into a flex area zone. A flex route is a general public demand response service offering curb-to-curb service within the zone, or delivering passengers between the flex zone and the downtown transfer point. Callers would reserve rides 24 hours in advance, and a subscription service would be available allowing riders to have a regular pick-up without making daily reservation calls. Fares within the flex zone would be the same as regular fixed route bus fare. Riders outside of the flex zone wanting to access the service would be required to meet the vehicle within the flex zone.

At public meetings there was general concern about implementing flex route operations in North Lawrence. Therefore, schedule and revenue hour calculations presented in this report maintained fixed route operations in North Lawrence while further community discussion takes place. This fixed route would maintain its current alignment, and is displayed in Figure 6-3.

Split Route 5 into two separate routes.
Currently Route 5 serves as a cross town connector at 40 minute frequencies. The new routes would serve separate areas east and west of Iowa Street at 60 minute frequencies. This change would be revenue hour neutral.

Route 5 East
Route 5 East would provide an east Lawrence connection following at 60 minute frequencies. The route would follow 23rd Street / K – 10 out to the east Hills Business park. The route would be at 60 minute frequency in the off-peak hour, and 30 minutes during peak hour, and is displayed in Figure 6-4.

Route 5 West
Route 5 West would serve southwest Lawrence and provide a north-south connection along Wakarusa Drive connecting 31st Street and Iowa Street to 6th Street and Wakarusa Drive through the 27th Street and Inverness Drive area. The route would be at 60 minute frequency. The new route and previous route are displayed in Figure 6-5.

Split Route 6 into two separate Routes.
Currently Route 6 is a bi-directional loop route. Creating two separate routes, Route 6 and Route 12, out of the service area would allow for more targeted route changes in the future.

Modify Route 6 to only serve along 6th Street.
The new route would maintain the strong connection between downtown and the 6th Street and Wakarusa Drive area. This route would deviate slightly onto Iowa Street to maintain service to the 9th Street and Iowa Street vicinity, before continuing on 6th Street. The route would serve Free State High School along Overland Drive on the westbound trip, and would extend into the West Lawrence neighborhood on Congressional Drive

and Harvard Drive before beginning the eastbound trip. The new route 6 would have a 40 minute frequency. The new route and previous route are displayed in Figure 6-6.

Create Route 12.
A new Route 12 would assume part of the southern portion of the current Route 6, and create a connection between the 6th Street and Wakarusa Drive area with the University of Kansas Campus using Wakarusa Drive and Bob Billings Parkway, before continuing onto downtown. From downtown, the route would proceed directly north on 9th Street to Iowa where it would resume the route westward at Bob Billings and Iowa. The new Route 12 would maintain a 60 minute frequency. The new route and previous route are displayed in Figure 6-9.

Modify Route 7 to create shorter frequency and access HINU.
Currently Route 7 is at an 80 minute frequency. Modifying this route by performing a loop around the 31st Street and Iowa Street area once per trip instead of the current twice per trip would allow Route 7 to improve the frequency from 80 minutes to 60 minutes. The new route is displayed in Figure 6-7.

Implement a peak-direction Route 11 express service.
Route 11 consistently experiences overloading incidents in the morning and afternoon when KU is in session. Creating a peak-directional express service, similar to the express service supporting the KU to Bob Billings Parkway route, would relieve some of the overcrowding pressure. The base system and peak system would maintain their current alignments, and an express service with two morning trips and two afternoon trips in peak directions would be created. Route 11 with the new express service is displayed in Figure 6-8.

Modify Route 26
Currently Route 26 serves several large apartment complexes and faces overcrowding issues. A slight route modification will decrease the pressure on Route 26. Instead of continuing from 24th Street and Ousdahl Road onto 24th Street, Naismith, and 21st Street, the route will continue from 24th Street and Ousdahl Road north on Ousdahl Road to 21st Street will it will resume its current alignment. The bypassed areas along 24th Street and Naismith Drive will continue to be served by Route 11. The new route is displayed in Figure 6-10.

Route 14
Clinton Parkway has an increasing concentration of multi-family housing with a high percentage presumably being KU students. Currently there is no direct transit service connecting multiple apartment complexes in this area with the KU campus. While current funding levels do not allow implementation, an additional transit route serving this connection should be explored. This route is displayed in Figure 6-13.

Table 6-1: Base System Revenue Hours

None Class Days and Saturdays - Lawrence Route and Schedule Summary

Route	None Class Days and Saturdays Intervals Peak	Off-Peak	Peak Bus Requirement	Off-Peak Requirement	Peak Service Span	Off-Peak Service Span	Peak Rev Hrs	Off-Peak Rev Hrs
Combined 1 and 2	40	40	1	1	6	8	6	8
3	40	40	1	1	6	8	6	8
4	40	40	1	1	6	8	6	8
5A (5 West)	60	60	1	1	6	8	6	8
5B (5 East)	30	60	2	1	6	8	12	8
6	60	60	1	1	6	8	6	8
7	60	60	1	1	6	8	6	8
11	40	40	2	2	6	8	12	16
11X	None							
12- Wakarusa	60	60	1	1	6	8	6	8
14	None							
22	None							
26	None							
27	None							
27X	None							
28	None							
41	No Change		6					58.66
42	None							
43	None							
Total			**17**	**10**			**66**	**138.66**

(Current vehicles are 17)

Proposed Base System Total: 204.66
2009-2010 Base System Total: 208.16

Updated: 2/27/2010

Table 6-2 Peak System Revenue Hours

When KU is in Session - Lawrence Route and Schedule Summary

Route	Peak	KU School Day Intervals Off-Peak	Peak Bus Requirement	Off-Peak Requirement	Peak Service Span	Off-Peak Service Span	Peak Rev Hrs	Off-Peak Rev Hrs
Combined 1 and 2	40	40	1	1	6	8	6	8
3	40	40	1	1	6	8	6	8
4	40	40	1	1	6	8	6	8
5A (5 West)	60	60	1	1	6	8	6	8
5B (5 East)	30	60	2	1	6	8	12	8
6	60	60	1	1	6	8	6	8
7	60	60	1	1	6	8	6	8
11	30	30	3	3	6	8	18	24
11X	2 AM Runs, 2 PM Runs		1		3		3	0
12- Wakarusa	60	60	1	1	6	8	6	8
14	30	30			6	4.5	0	0
22	19-28	19-28	3	3	6	4.5	18	13.5
26	30	30	2	2	6	4.5	12	9
27	20	20	2	2	6	4.5	12	9
27X	30	30	1		4.5	4.5	4.5	0
28	20	20	2	2	6	4.5	12	9
41	No Change		6				58.66	
42	No Change		2				24	
43	No Change		7				57.25	
Total:			**38**	**20**			**273.41**	**128.5**

(current vehicles are 37)

Proposed Peak Total:	401.91
Proposed Peak With Route 14:	422.91
2009-2010 Peak System Total:	401.78

Updated: 2/27/2010

Figure 6-1: Route 1

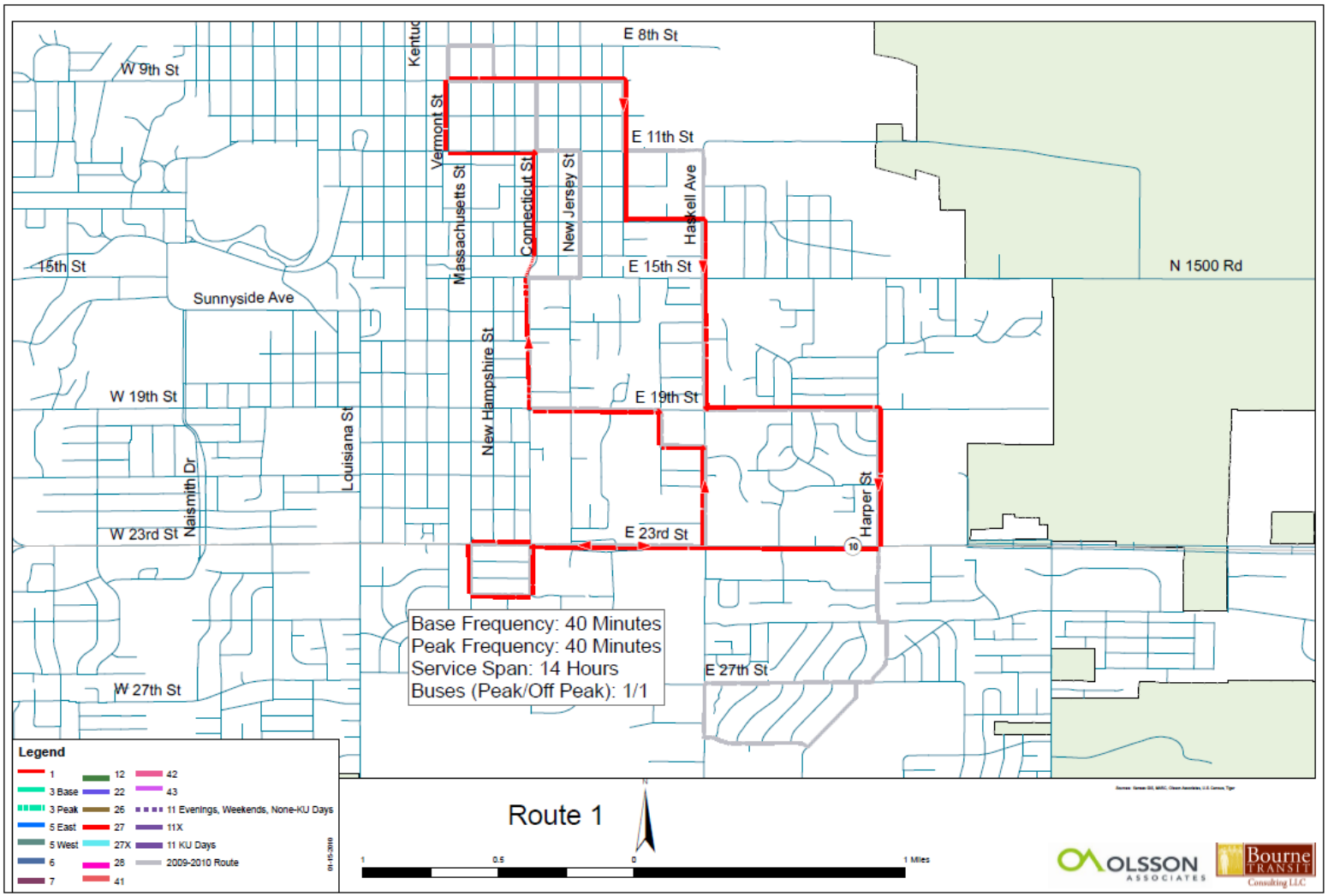


Figure 6-2: Route 3 Fixed Route and Flex Zone

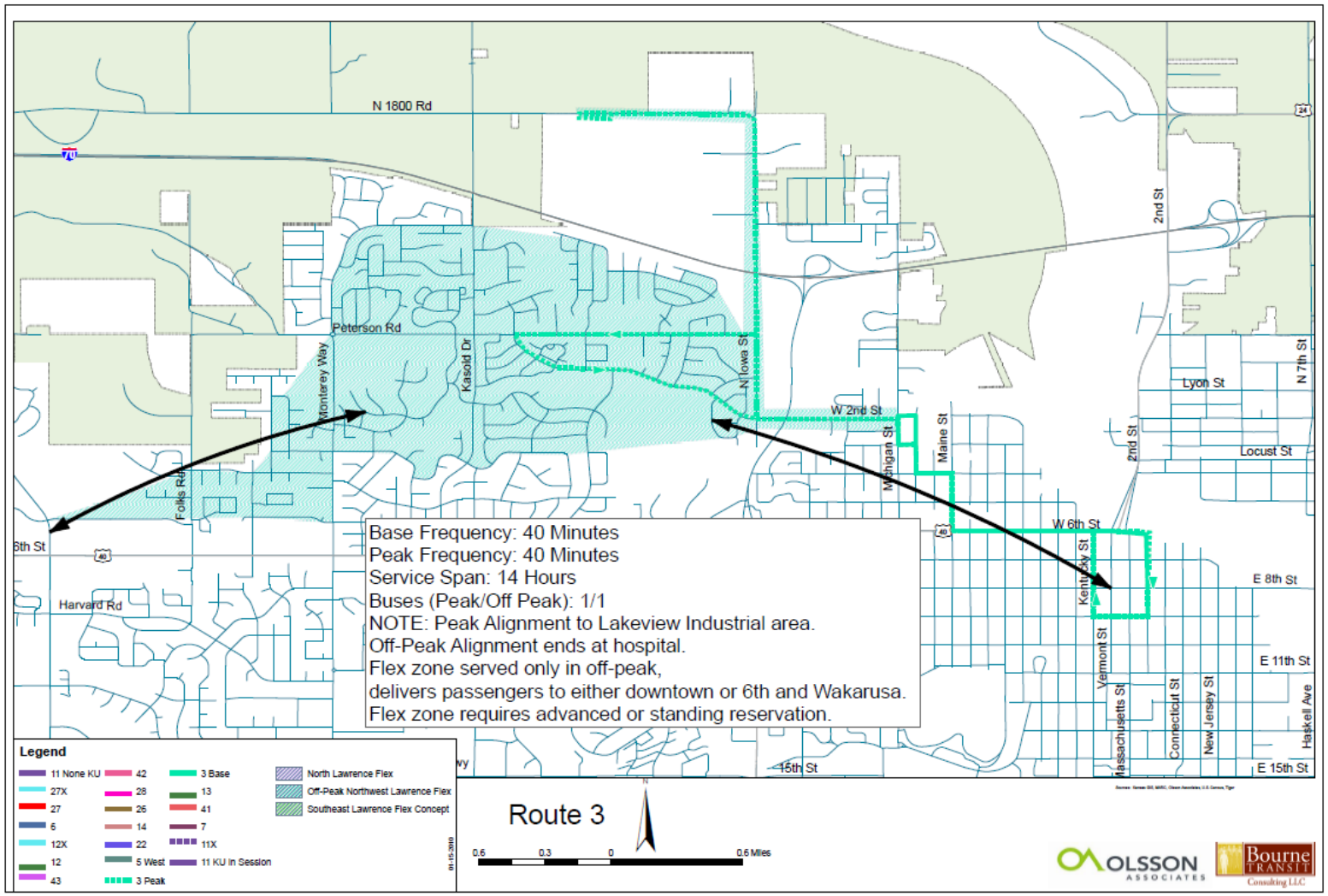


Figure 6-3: Route 4

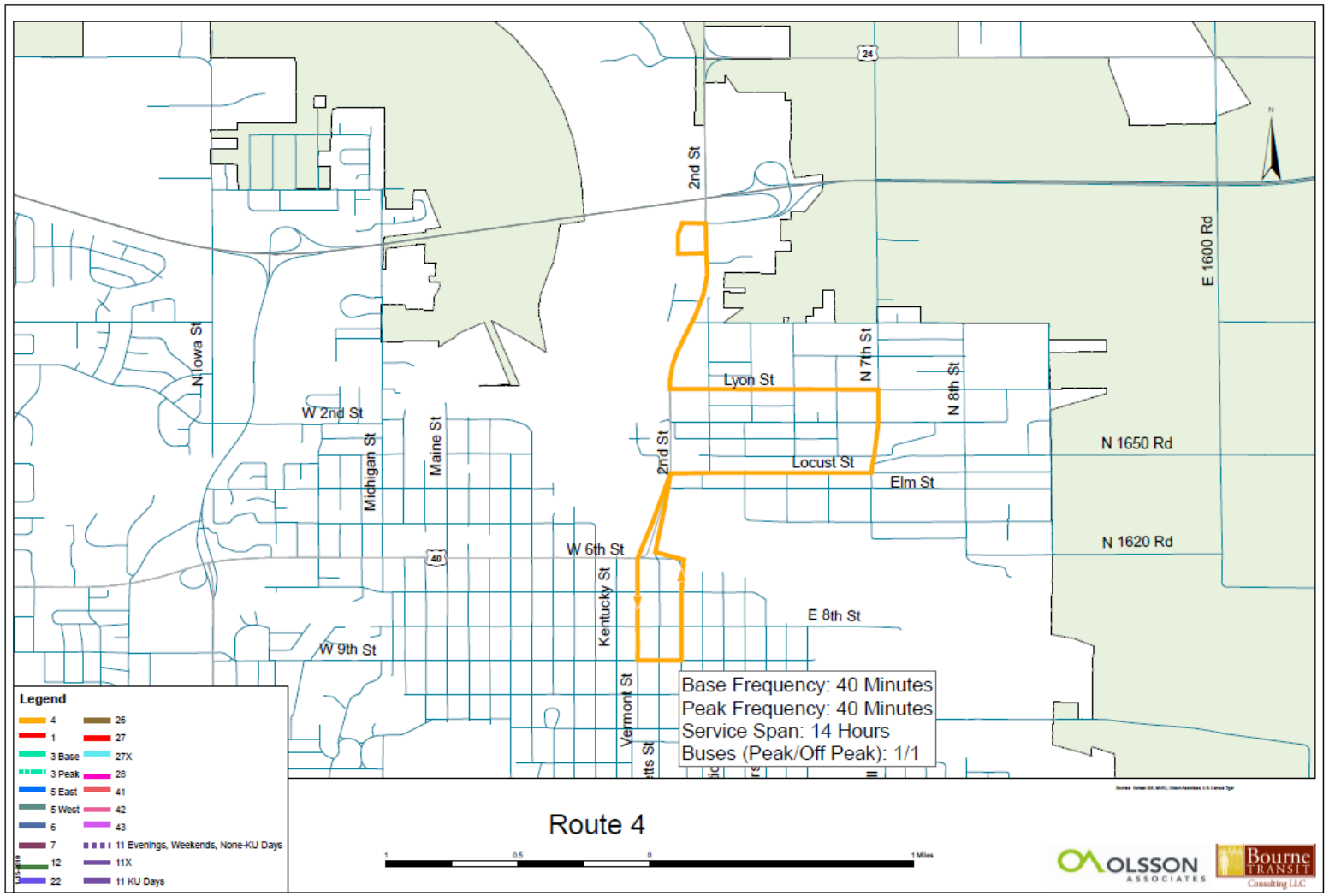


Figure 6-4: Route 5 East

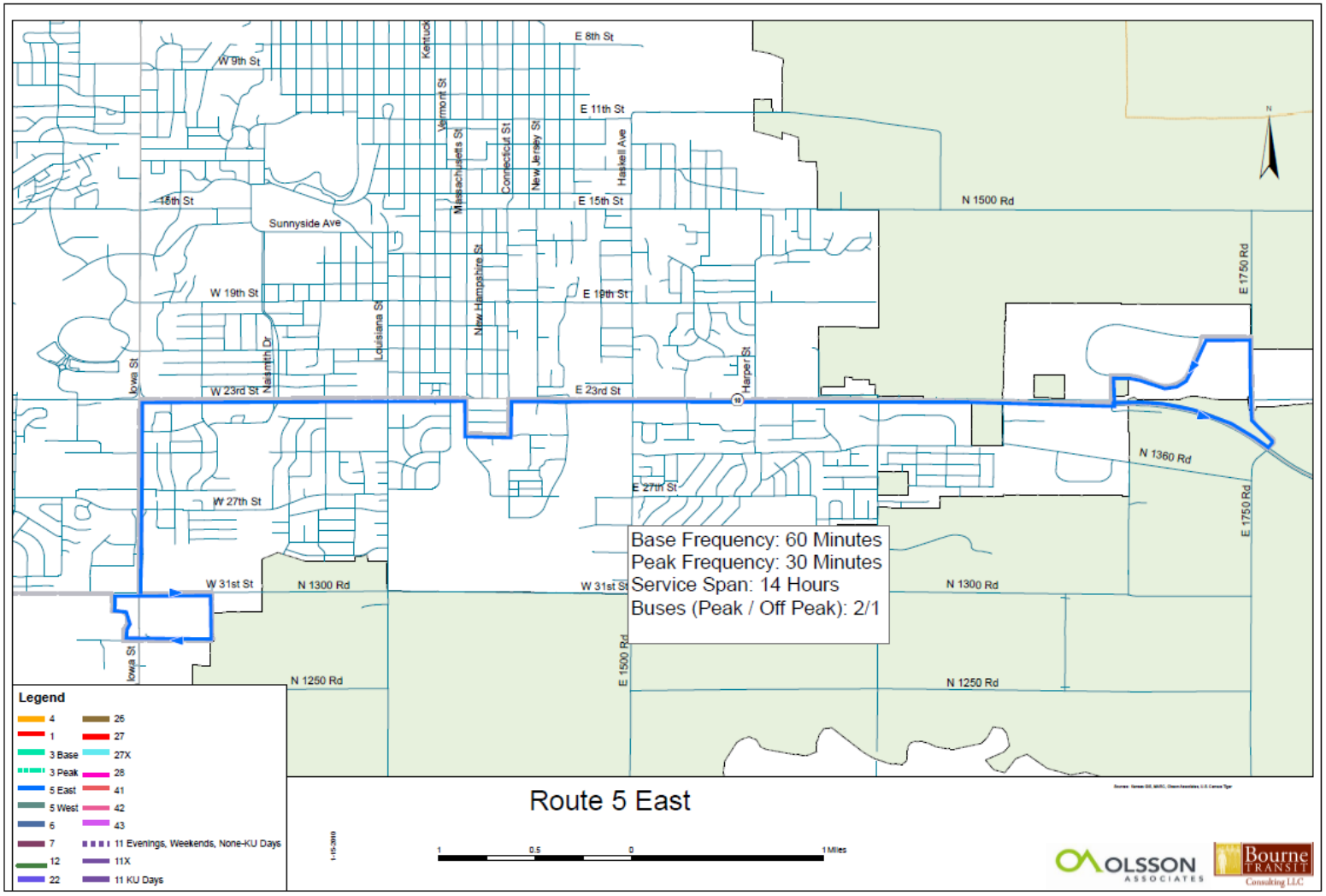


Figure 6-5: Route 5 West

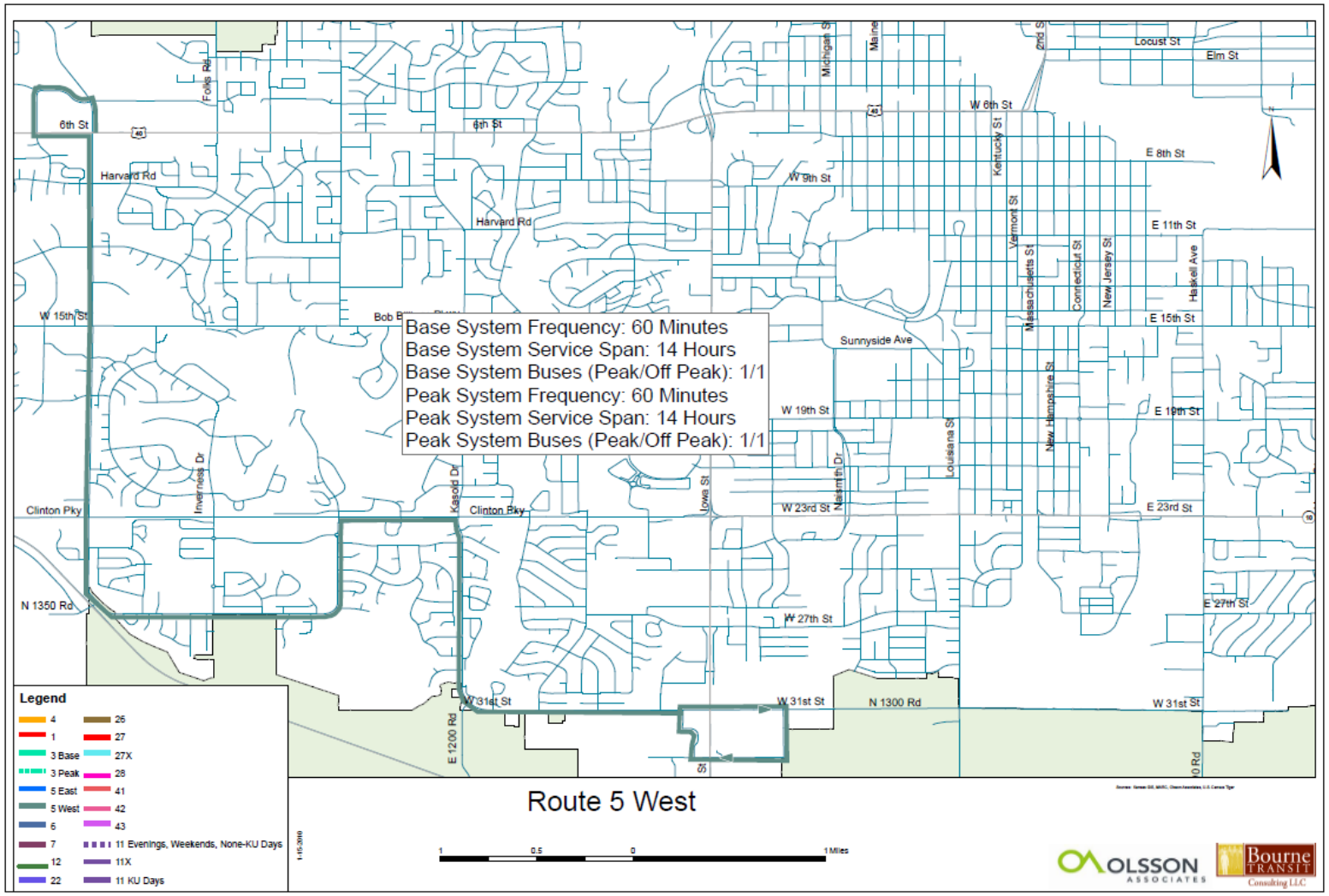


Figure 6-6 Route 6

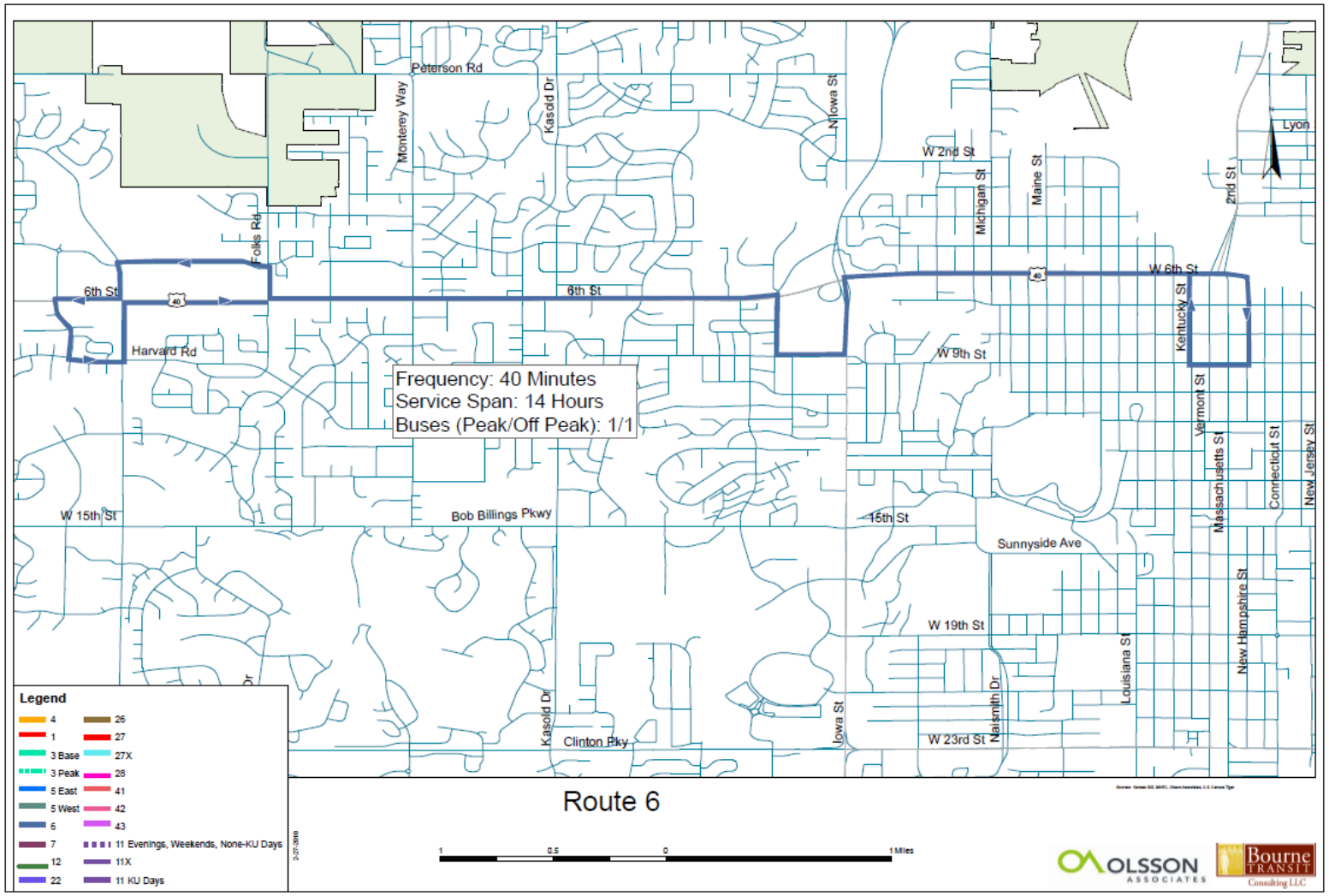


Figure 6-7: Route 7

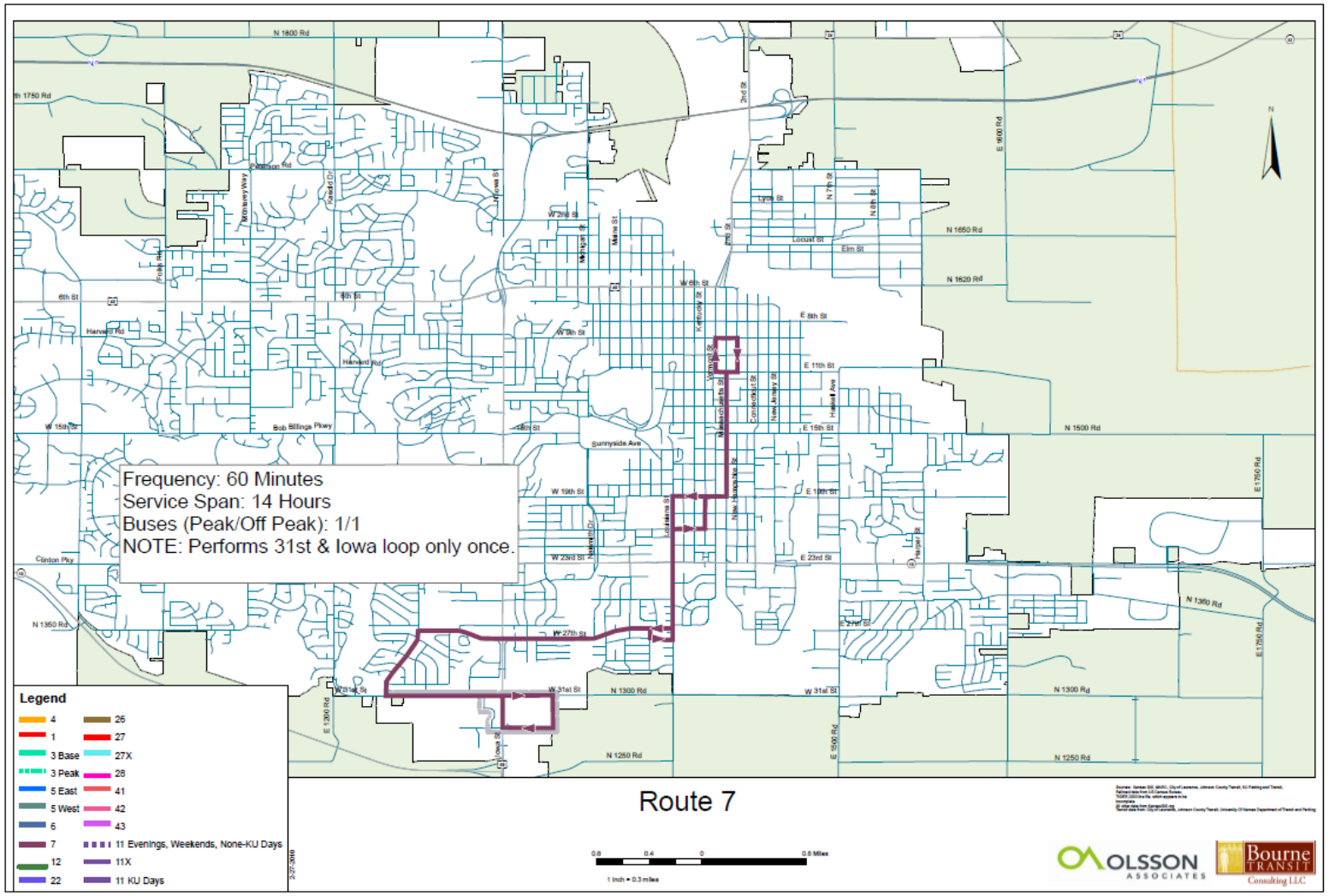


Figure 6-8: Route 11

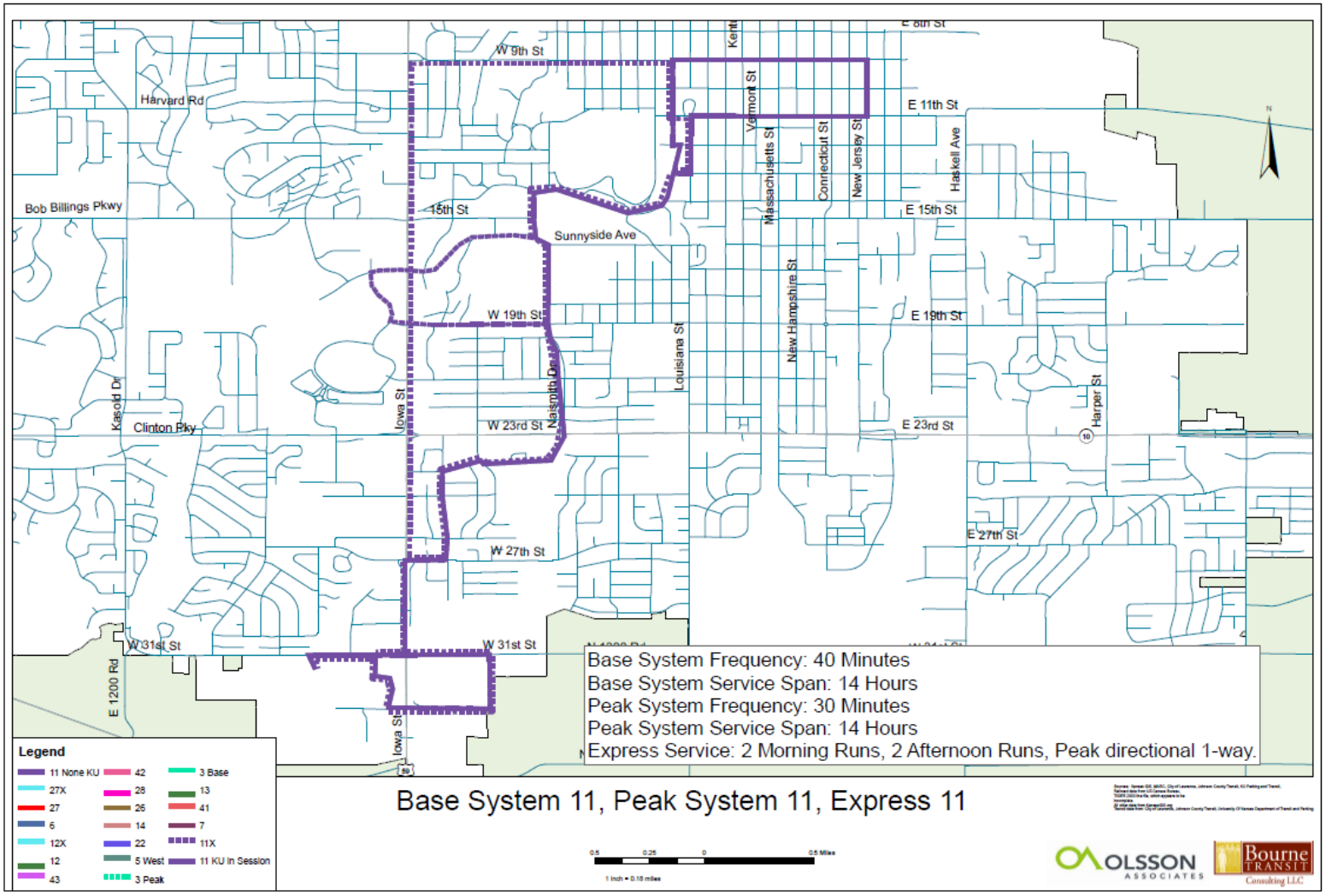


Figure 6-9: Route 12

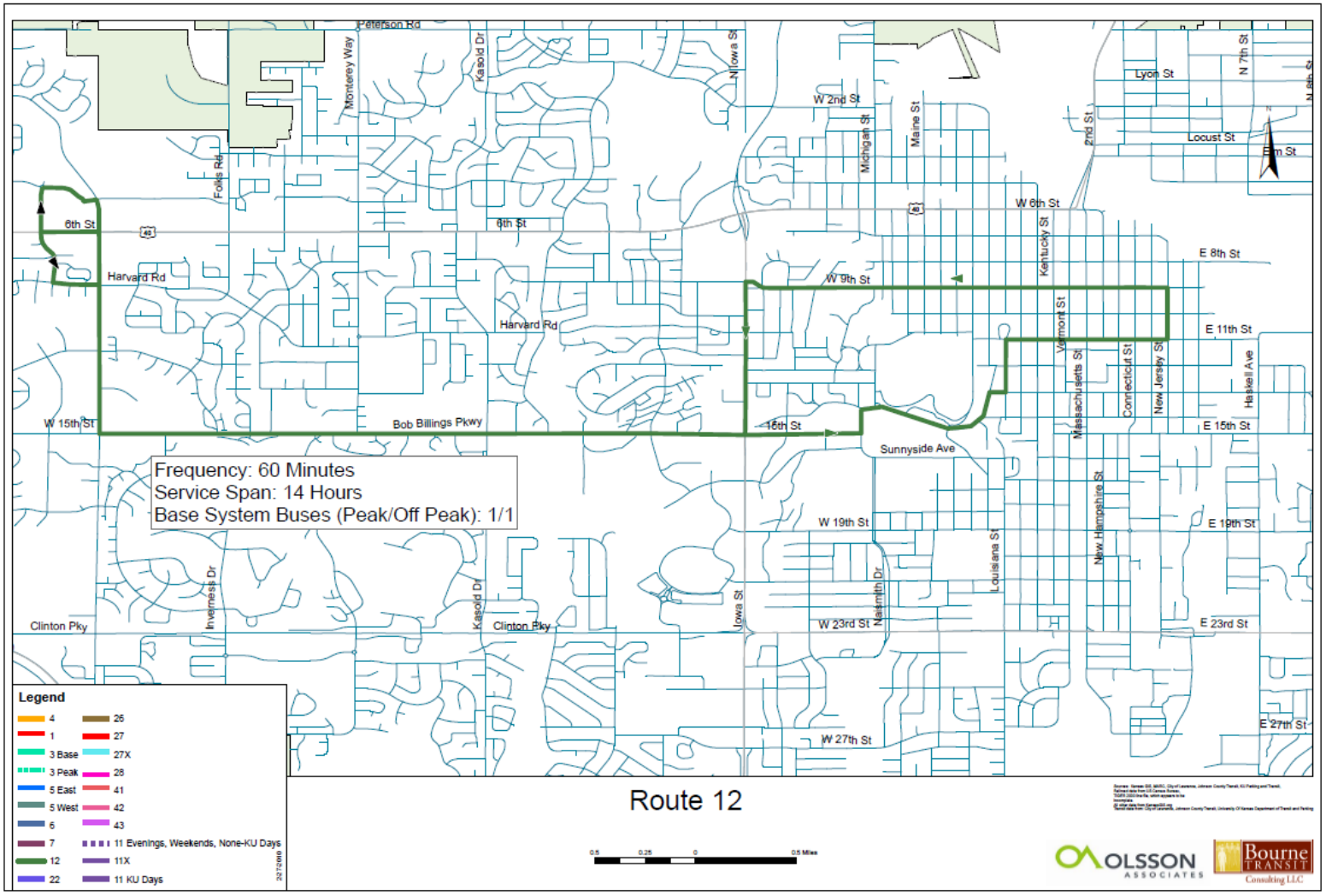


Figure 6-10: Route 26

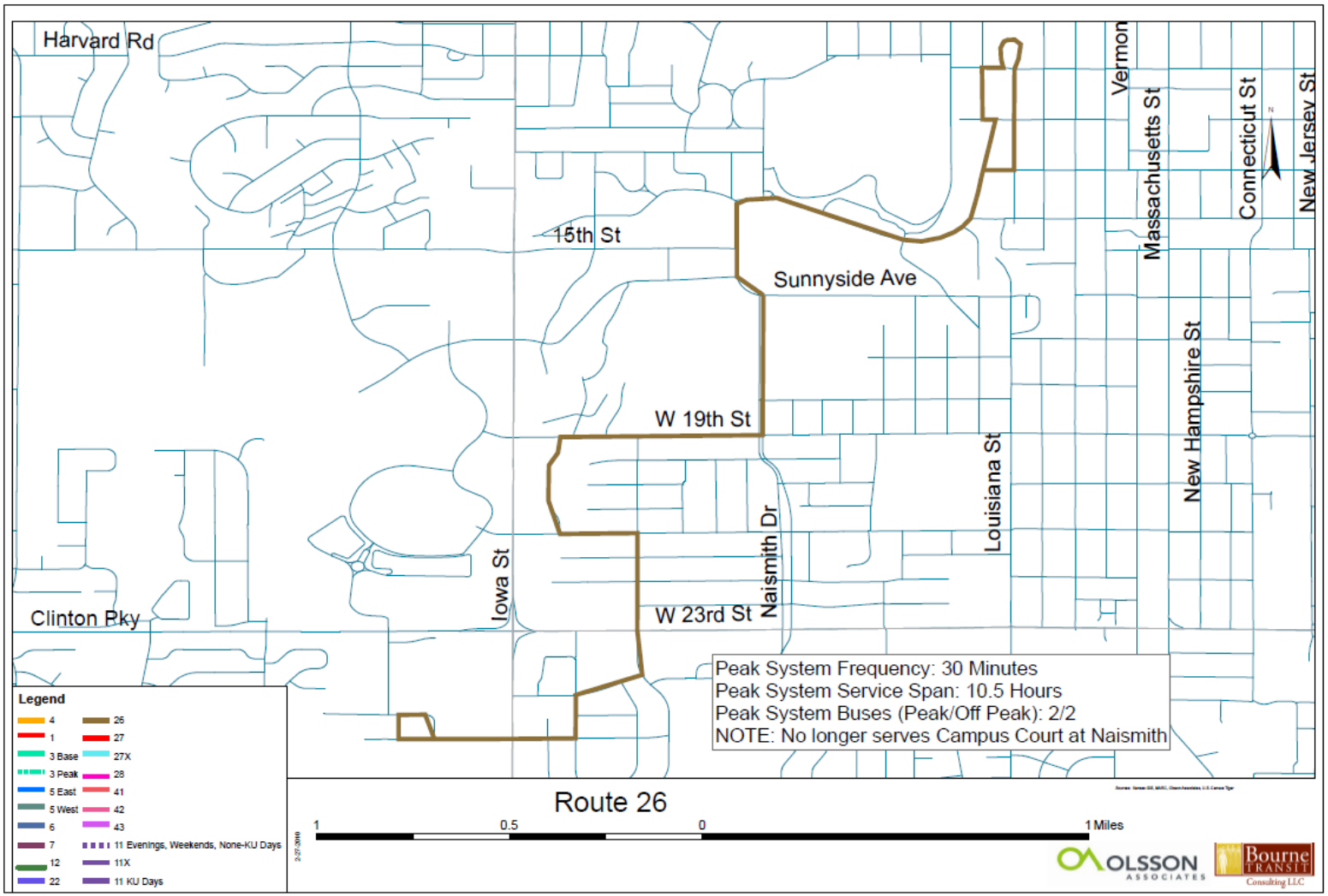


Figure 6-11: Base System Recommendations

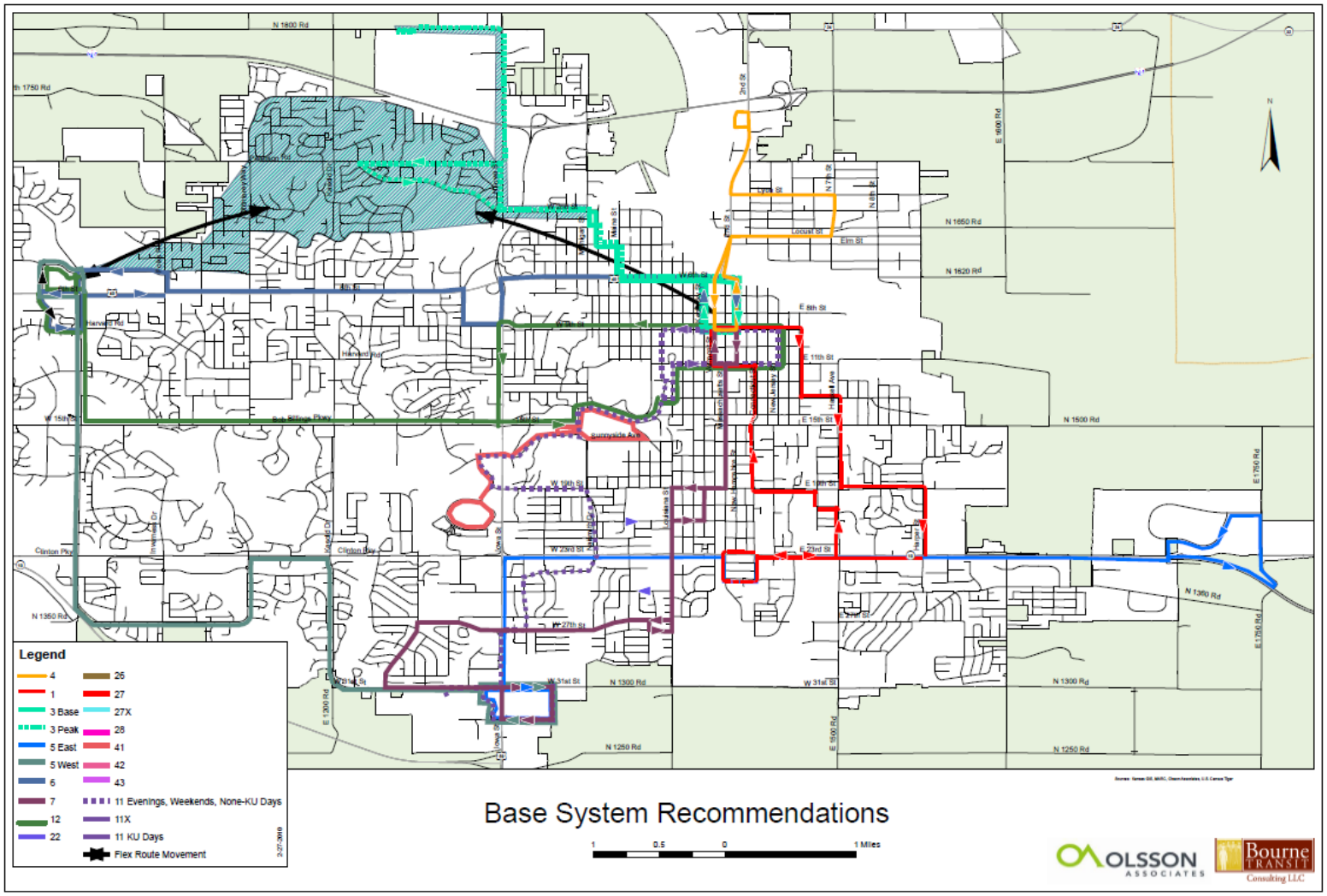


Figure 6-12: Peak System Recommendations

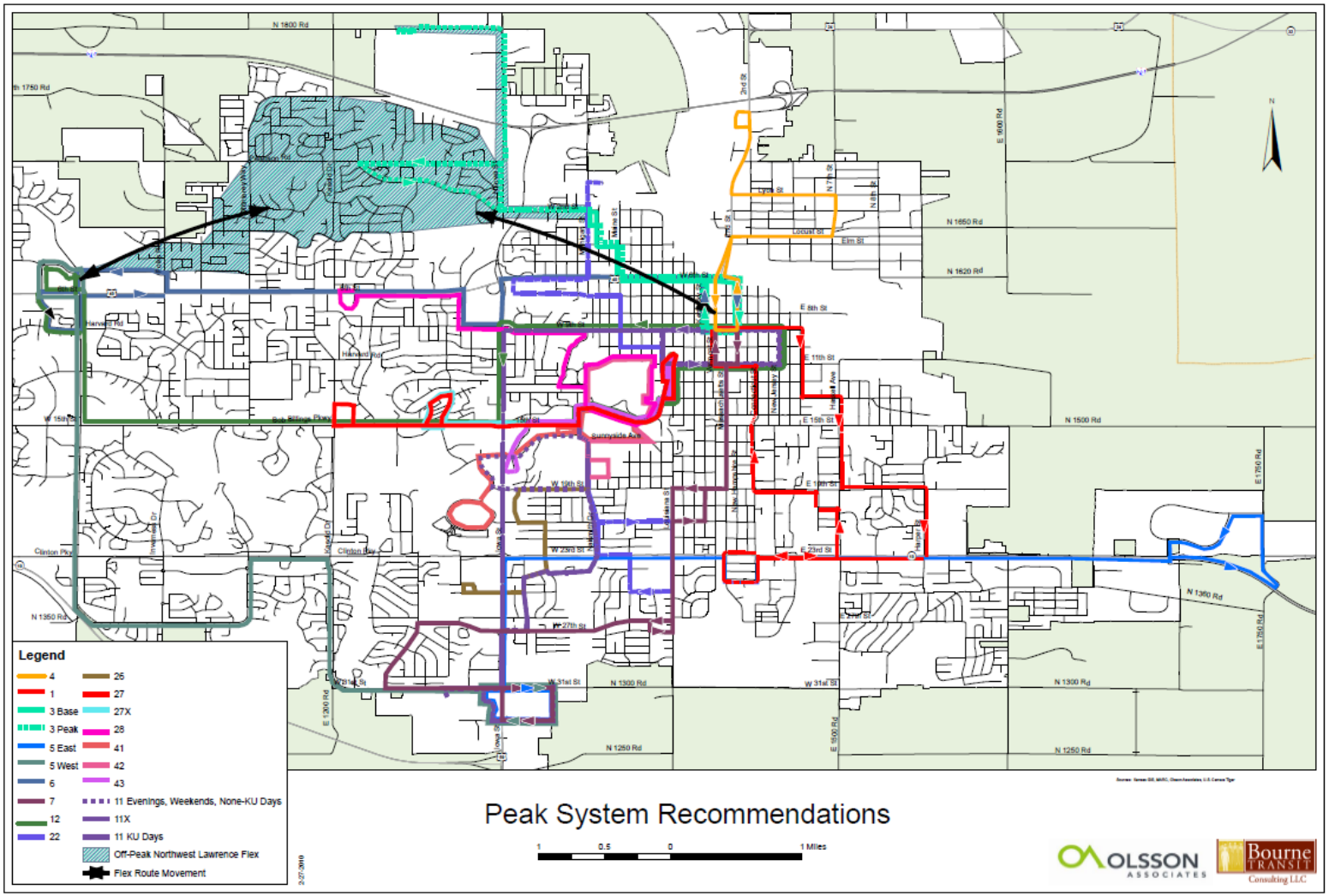
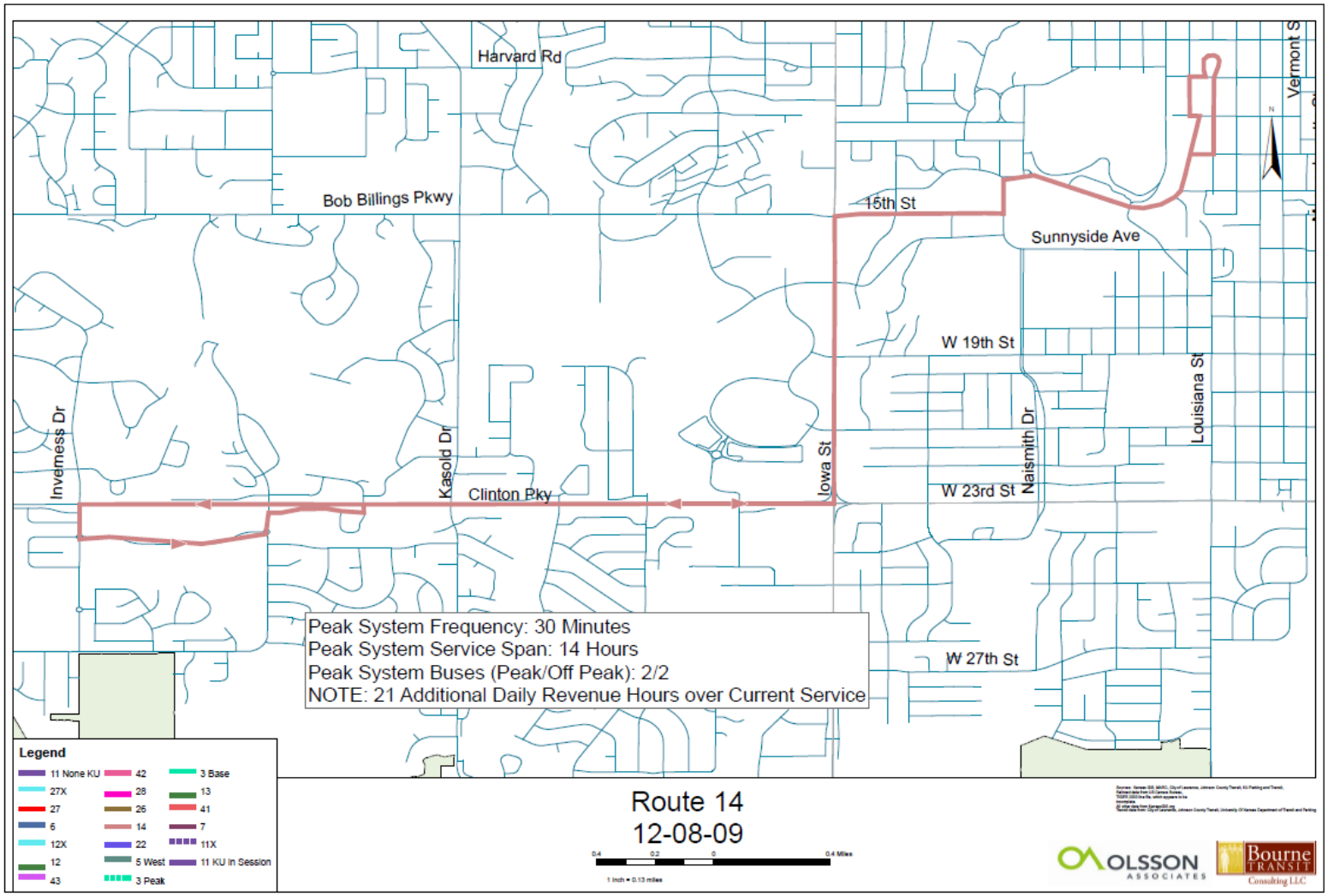


Figure 6-13: Route 14



Appendix A Calculations and Data Sources

Data analyses in the report were collected from The T, KU Parking and Transit, and MV transportation. Revenue hours for both systems were collected from MV Transit revenue mile reports for the week of January 24th, 2009 through January 30th, 2009. The T ridership and costing data from calendar year 2008 were analyzed. KUOW ridership and costing data for the months August 2008 through February 2009 were analyzed. While calendar year 2008 data could be gathered for KUOW, the implementation of universal access in August 2008 greatly changed ridership patterns, and analyzing calendar year 2008 data would not have presented an accurate data portrayal.

Lawrence Transit Data

Route productivity was calculated by dividing average daily route ridership from monthly aggregate data by one week's worth of average daily revenue hours. Daily route ridership data were separated by weekday and Saturdays.

Revenue hour cost was provided by The T, and is the average of monthly revenue hour costs. Daily operating costs for each route was taken by multiplying the average daily revenue hours per route by the average monthly revenue hour cost of $48.56 for fixed routes, and $46.99 for paratransit.

KUOW Data

Route productivity was calculated by dividing average daily route ridership from monthly aggregate data by one week's worth of average daily revenue hours. After discussion with KU Parking & Transit staff, revenue hours from a designated extra bus in the average daily revenue hours were added to Route 21 hours.

Cost per ride per month by route was provided by KU Parking & Transit. This data was averaged over the period from August 2008 to February 2009.

Appendix B Timetables and Run Guides of Recommended Changes.

ROUTE 1 - Downtown to HINU

AM Shift	Sign In: Leave Yard:	Route End:	Shuttle End: (Yard)
PM Shift	Shuttle Begin: (Yard)	Begin Route: (9th & Mass)	End Route: Arrive Yard: Sign Out:

19-Feb-10

Block	Route 1 HINU Southbound				Route 1 Downtown Northbound		
	Leave 9th & Mass	19th & Haskell	23rd& Harper	Arrive @ HINU	Leave HINU	23rd & Haskell	Arrive @ 9th & Mass
101					06:02 AM	06:05 AM	06:18 AM
101	06:21 AM	06:29 AM	06:33 AM	06:40 AM	06:42 AM	06:45 AM	06:58 AM
101	07:01 AM	07:09 AM	07:13 AM	07:20 AM	07:22 AM	07:25 AM	07:38 AM
101	07:41 AM	07:49 AM	07:53 AM	08:00 AM	08:02 AM	08:05 AM	08:18 AM
101	08:21 AM	08:29 AM	08:33 AM	08:40 AM	08:42 AM	08:45 AM	08:58 AM
101	09:01 AM	09:09 AM	09:13 AM	09:20 AM	09:22 AM	09:25 AM	09:38 AM
101	09:41 AM	09:49 AM	09:53 AM	10:00 AM	10:02 AM	10:05 AM	10:18 AM
101	10:21 AM	10:29 AM	10:33 AM	10:40 AM	10:42 AM	10:45 AM	10:58 AM
101	11:01 AM	11:09 AM	11:13 AM	11:20 AM	11:22 AM	11:25 AM	11:38 AM
101	11:41 AM	11:49 AM	11:53 AM	12:00 PM	12:02 PM	12:05 PM	12:18 PM
101	12:21 PM	12:29 PM	12:33 PM	12:40 PM	12:42 PM	12:45 PM	12:58 PM
101	01:01 PM	01:09 PM	01:13 PM	01:20 PM	01:22 PM	01:25 PM	01:38 PM
101	01:41 PM	01:49 PM	01:53 PM	02:00 PM	02:02 PM	02:05 PM	02:18 PM
101	02:21 PM	02:29 PM	02:33 PM	02:40 PM	02:42 PM	02:45 PM	02:58 PM
101	03:01 PM	03:09 PM	03:13 PM	03:20 PM	03:22 PM	03:25 PM	03:38 PM
101	03:41 PM	03:49 PM	03:53 PM	04:00 PM	04:02 PM	04:05 PM	04:18 PM
101	04:21 PM	04:29 PM	04:33 PM	04:40 PM	04:42 PM	04:45 PM	04:58 PM
101	05:01 PM	05:09 PM	05:13 PM	05:20 PM	05:22 PM	05:25 PM	05:38 PM
101	05:41 PM	05:49 PM	05:53 PM	06:00 PM	06:02 PM	06:05 PM	06:18 PM
101	06:21 PM	06:29 PM	06:33 PM	06:40 PM	06:42 PM	06:45 PM	06:58 PM
101	07:01 PM	07:09 PM	07:13 PM	07:20 PM	07:22 PM	07:25 PM	07:38 PM
	07:41 PM	07:49 PM	07:53 PM	08:00 PM			

Route 1: From SE corner 9th & Mass continue eastbound on 9th, right on Delaware, left on 13th, right on Haskell, left on 19th, right on Harper, right on 23rd Street, left on Mass, left on Indian Ave, left on Barker to HINU/Shelter. **Begin inbound trip:** North on Barker, right on 23rd, left on Haskell, left on 20th, right on Moodie, left on 19th, right on Barker, continue onto Connecticut, left on 11th, right on Vermont, right on Mass to SE corner of 9th & Mass.

Start Route Deadhead to 9th & Mass: Left on Haskell, left on 19th, right on Barker, continue north on Connecticut left on 11th, right on Vermont, right on Mass to Shelter. Begin outbound trip.

End Route Deadhead to fueling and yard from 9th & Mass: Continue east on Massachusetts to Connecticut, right on Connecticut, continue on Barker, left on 19th, right on Haskell, right on 29th into **Capital City Oil** - fuel vehicle, return to Haskell, right to yard.

Destination Sign Codes:

ROUTE 3 - Downtown - Hospital or Lakeview Road

AM Shift	Sign In: Leave Yard:	Route End:	Shuttle End: (Yard)
PM Shift	Shuttle Begin: (Yard)	Begin Route:	End Route: Arrive Yard: Sign Out:

2/19/2010

Block	Route 3 Downtown			Route 3 Hospital/Lakeview			
	Depart Iowa & Lakeview	Hospital	Arrive @ 9th & Mass	Depart 9th & Mass	Hospital/ Enter Flex	Hospital/ Exit Flex	Iowa & Lakeview
301	06:00 AM	06:13 AM	06:20 AM	06:22 AM	06:28 AM	--	06:38 AM
301	06:40 AM	06:53 AM	07:00 AM	07:02 AM	07:08 AM	--	07:18 AM
301	07:20 AM	07:33 AM	07:40 AM	07:42 AM	07:48 AM	--	07:58 AM
301	08:00 AM	08:13 AM	08:20 AM	08:22 AM	08:28 AM	--	08:38 AM
301	08:40 AM	08:53 AM	09:00 AM	09:02 AM	09:08 AM	09:31 AM	--
301	--	09:31 AM	09:38 AM	09:40 AM	09:46 AM	10:09 AM	--
301	--	10:09 AM	10:16 AM	10:18 AM	10:24 AM	10:47 AM	--
301	--	10:47 AM	10:54 AM	10:56 AM	11:02 AM	11:25 AM	--
301	--	11:25 AM	11:32 AM	11:34 AM	11:40 AM	12:03 PM	--
301	--	12:03 PM	12:10 PM	12:12 PM	12:18 PM	12:41 PM	--
301	--	12:41 PM	12:48 PM	12:50 PM	12:56 PM	01:19 PM	--
301	--	01:19 PM	01:26 PM	01:28 PM	01:34 PM	01:57 PM	--
301	--	01:57 PM	02:04 PM	02:06 PM	02:12 PM	--	02:22 PM
301	02:24 PM	02:37 PM	02:44 PM	02:46 PM	02:52 PM	--	03:02 PM
301	03:04 PM	03:17 PM	03:24 PM	03:26 PM	03:32 PM	--	03:42 PM
301	03:44 PM	03:57 PM	04:04 PM	04:06 PM	04:12 PM	--	04:22 PM
301	04:24 PM	04:37 PM	04:44 PM	04:46 PM	04:52 PM	--	05:02 PM
301	05:04 PM	05:17 PM	05:24 PM	05:26 PM	05:32 PM	--	05:42 PM
301	05:44 PM	05:57 PM	06:04 PM	06:06 PM	06:12 PM	06:35 PM	--
301	--	06:35 PM	06:42 PM	06:44 PM	06:50 PM	07:13 PM	--
301	--	07:13 PM	07:20 PM	07:22 PM	07:28 PM	07:51 PM	--
301	--	07:51 PM	07:58 PM				

Route 3 Fixed Route: From NW of 9th & Mass continue west on 9th to Vermont, right on Vermont, left on 8th, right on Kentucky, left on 6th, right on Maine, left on 4th, right on Arkansas, left on 3rd, right on Michigan, left on 2nd, continue on 2nd past McDonald Drive to Iowa, right on Iowa, continue on Lakeview to turnaround at 2801 Lakeview Rd., right to Lawrence Paper stop at 2901 Lakeview. **Begin Fixed Route inbound trip:** Continue on Lakeview onto Iowa southbound, right on Peterson Rd., left on Princeton to 2nd, continue east on 2nd to Michigan, right on Michigan, left on 3rd, right on Arkansas, left on 4th, right on Maine, left on 6th, right on Vermont, left on 9th to SE corner 9th & Mass (bank side).

Route 3 Flexed Route: From NW of 9th & Mass continue west on 9th to Vermont, right on Vermont, left on 8th, right on Kentucky, left on 6th, right on Maine, left on 4th, right on Arkansas, dwell at bus shelter until called into flex route operation, or begin flex inbound route. **Begin flex route inbound:** Continue north on Arkansas, left on 2nd, left on Michigan, left on 3rd, right on Maine, left on 6th, right on Vermont, left on 9th to SE corner 9th & Mass (bank side).

Start Route Deadhead to Iowa & Lakeview: Right on Haskell, right on 31st, right onto Iowa St., veer to right under 6th St., left and continue on McDonald Dr., left onto 2nd St., right onto N. Iowa St. to Lakeview Rd., turn left into Paper Company Parking lot to begin Route 3 inbound trip.

End Route Deadhead to fueling and yard from 9th & Mass: Continue east on Massachusetts to Connecticut, right on Connecticut, continue on Barker, left on 19th, right on Haskell, right on 29th into **Capital City Oil** - fuel vehicle, return to Haskell, right to yard.

Destination Sign Codes:

ROUTE 4 - Downtown to North Lawrence

AM Shift	**Sign In:**		**Route End:**	**Shuttle End:**
	Leave Yard:			**(Yard)**
PM Shift	**Shuttle Begin:**		**Begin Route:**	**End Route:**
	(Yard)		**(9th & Mass)**	**Arrive Yard:**
				Sign Out:

2/19/2010

Block	Route 4 North Lawrence				Route 4 Downtown			
	Depart 9th & Mass.	2nd & Locust	7th & Lyon	Arrive I70 Center	Depart I70 Center	7th & Lyon	2nd & Locust	Arrive @ 9th & Mass
401					06:02 AM	06:09 AM	06:13 AM	06:20 AM
401	06:24 AM	06:30 AM	06:34 AM	06:40 AM	06:42 AM	06:49 AM	06:53 AM	07:00 AM
401	07:04 AM	07:10 AM	07:14 AM	07:20 AM	07:22 AM	07:29 AM	07:33 AM	07:40 AM
401	07:44 AM	07:50 AM	07:54 AM	08:00 AM	08:02 AM	08:09 AM	08:13 AM	08:20 AM
401	08:24 AM	08:30 AM	08:34 AM	08:40 AM	08:42 AM	08:49 AM	08:53 AM	09:00 AM
401	09:04 AM	09:10 AM	09:14 AM	09:20 AM	09:22 AM	09:29 AM	09:33 AM	09:40 AM
401	09:44 AM	09:50 AM	09:54 AM	10:00 AM	10:02 AM	10:09 AM	10:13 AM	10:20 AM
401	10:24 AM	10:30 AM	10:34 AM	10:40 AM	10:42 AM	10:49 AM	10:53 AM	11:00 AM
401	11:04 AM	11:10 AM	11:14 AM	11:20 AM	11:22 AM	11:29 AM	11:33 AM	11:40 AM
401	11:44 AM	11:50 AM	11:54 AM	12:00 PM	12:02 PM	12:09 PM	12:13 PM	12:20 PM
401	12:24 PM	12:30 PM	12:34 PM	12:40 PM	12:42 PM	12:49 PM	12:53 PM	01:00 PM
401	01:04 PM	01:10 PM	01:14 PM	01:20 PM	01:22 PM	01:29 PM	01:33 PM	01:40 PM
401	01:44 PM	01:50 PM	01:54 PM	02:00 PM	02:02 PM	02:09 PM	02:13 PM	02:20 PM
401	02:24 PM	02:30 PM	02:34 PM	02:40 PM	02:42 PM	02:49 PM	02:53 PM	03:00 PM
401	03:04 PM	03:10 PM	03:14 PM	03:20 PM	03:22 PM	03:29 PM	03:33 PM	03:40 PM
401	03:44 PM	03:50 PM	03:54 PM	04:00 PM	04:02 PM	04:09 PM	04:13 PM	04:20 PM
401	04:24 PM	04:30 PM	04:34 PM	04:40 PM	04:42 PM	04:49 PM	04:53 PM	05:00 PM
401	05:04 PM	05:10 PM	05:14 PM	05:20 PM	05:22 PM	05:29 PM	05:33 PM	05:40 PM
401	05:44 PM	05:50 PM	05:54 PM	06:00 PM	06:02 PM	06:09 PM	06:13 PM	06:20 PM
401	06:24 PM	06:30 PM	06:34 PM	06:40 PM	06:42 PM	06:49 PM	06:53 PM	07:00 PM
401	07:04 PM	07:10 PM	07:14 PM	07:20 PM	07:22 PM	07:29 PM	07:33 PM	07:40 PM
401	07:44 PM	07:50 PM	07:54 PM	08:00 PM				

Route 4: Outbound: From SR corner 9th & Mass continue eastbound on 9th to New Hampshire, left on New Hampshire, right on 2nd St. bridge (Mass), right on Locust, left on 7th, left on Lyon, right on 2nd to I-70 Business Center north entrance, left into the Center. **Begin inbound trip:** Right on 3rd (continue on 2nd), left on Lyon, right on 7th, right on Locust, left on 2nd, continue on Vermont to 9th, left to SE corner 9th & Mass (bank side). Begin Outbound trip.

Start Route Deadhead to I70 Business Center: Left on Haskell, left on 19th, right on Connecticut, left on 7th, right on New Hampshire, right on 2nd St Bridge (Mass), north to I-70 Business Center, left into the Center to start Route 4.

End Route Deadhead to fueling and yard from I70 Business Center: Right on 3rd, continue on 2nd across bridge, left on 6th, continue right on New Hampshire, left on 7th, right on Connecticut, left on 19th, right on Haskell, right into **Capital City Oil** - fuel vehicle, return to Haskell, right to yard.

Destination Sign Codes:

ROUTE 5 East - 31st to East Hills

AM Shift	Sign In: / Leave Yard:			Route End:		Shuttle End: (Yard)	*PM Shift*	Shuttle Begin: (Yard)	Begin Route:		End Route: / Arrive Yard: / Sign Out:	
												2/19/2010
	Eastbound						Westbound					
	To/From 5W		*To/From 7 SB*							*To/From 7 NB*		*To/From 5W*
Block	Depart 31st Street Cutout	23rd & Ousdahl	23rd & Louisianna	HINU	23rd & Harper	NCS Arrive	NCS Depart	23rd & Harper	HINU	23rd & Louisianna	23rd & Ousdahl	Arrive 31st Street Cutout
501E	06:02 AM	06:11 AM	06:14 AM	06:17 AM	06:22 AM	06:26 AM	06:31 AM	06:36 AM	06:44 AM	06:47 AM	06:50 AM	06:58 AM
502E	06:32 AM	06:41 AM	06:44 AM	06:47 AM	06:52 AM	06:56 AM	07:01 AM	07:06 AM	07:14 AM	07:17 AM	07:20 AM	07:28 AM
501E	07:02 AM	07:11 AM	07:14 AM	07:17 AM	07:22 AM	07:26 AM	07:31 AM	07:36 AM	07:44 AM	07:47 AM	07:50 AM	07:58 AM
502E	07:32 AM	07:41 AM	07:44 AM	07:47 AM	07:52 AM	07:56 AM	08:01 AM	08:06 AM	08:14 AM	08:17 AM	08:20 AM	08:28 AM
501E	08:02 AM	08:11 AM	08:14 AM	08:17 AM	08:22 AM	08:26 AM	08:31 AM	08:36 AM	08:44 AM	08:47 AM	08:50 AM	08:58 AM
502E	08:32 AM	08:41 AM	08:44 AM	08:47 AM	08:52 AM	08:56 AM	09:01 AM	09:06 AM	09:14 AM	09:17 AM	09:20 AM	09:28 AM
501E	09:02 AM	09:11 AM	09:14 AM	09:17 AM	09:22 AM	09:26 AM	09:31 AM	09:36 AM	09:44 AM	09:47 AM	09:50 AM	09:58 AM
501E	10:02 AM	10:11 AM	10:14 AM	10:17 AM	10:22 AM	10:26 AM	10:31 AM	10:36 AM	10:44 AM	10:47 AM	10:50 AM	10:58 AM
501E	11:02 AM	11:11 AM	11:14 AM	11:17 AM	11:22 AM	11:26 AM	11:31 AM	11:36 AM	11:44 AM	11:47 AM	11:50 AM	11:58 AM
501E	12:02 PM	12:11 PM	12:14 PM	12:17 PM	12:22 PM	12:26 PM	12:31 PM	12:36 PM	12:44 PM	12:47 PM	12:50 PM	12:58 PM
501E	01:02 PM	01:11 PM	01:14 PM	01:17 PM	01:22 PM	01:26 PM	01:31 PM	01:36 PM	01:44 PM	01:47 PM	01:50 PM	01:58 PM
501E	02:02 PM	02:11 PM	02:14 PM	02:17 PM	02:22 PM	02:26 PM	02:31 PM	02:36 PM	02:44 PM	02:47 PM	02:50 PM	02:58 PM
501E	03:02 PM	03:11 PM	03:14 PM	03:17 PM	03:22 PM	03:26 PM	03:31 PM	03:36 PM	03:44 PM	03:47 PM	03:50 PM	03:58 PM
502E	03:32 PM	03:41 PM	03:44 PM	03:47 PM	03:52 PM	03:56 PM	04:01 PM	04:06 PM	04:14 PM	04:17 PM	04:20 PM	04:28 PM
501E	04:02 PM	04:11 PM	04:14 PM	04:17 PM	04:22 PM	04:26 PM	04:31 PM	04:36 PM	04:44 PM	04:47 PM	04:50 PM	04:58 PM
502E	04:32 PM	04:41 PM	04:44 PM	04:47 PM	04:52 PM	04:56 PM	05:01 PM	05:06 PM	05:14 PM	05:17 PM	05:20 PM	05:28 PM
501E	05:02 PM	05:11 PM	05:14 PM	05:17 PM	05:22 PM	05:26 PM	05:31 PM	05:36 PM	05:44 PM	05:47 PM	05:50 PM	05:58 PM
502E	05:32 PM	05:41 PM	05:44 PM	05:47 PM	05:52 PM	05:56 PM	06:01 PM	06:06 PM	06:14 PM	06:17 PM	06:20 PM	06:28 PM
501E	06:02 PM	06:11 PM	06:14 PM	06:17 PM	06:22 PM	06:26 PM	06:31 PM	06:36 PM	06:44 PM	06:47 PM	06:50 PM	06:58 PM
501E	07:02 PM	07:11 PM	07:14 PM	07:17 PM	07:22 PM	07:26 PM	07:31 PM	07:36 PM	07:44 PM	07:47 PM	07:50 PM	07:58 PM

Eastbound Route: Beginning at 31st & Iowa **layover point (cutout/shelter)**, continue eastbound on 31st, right on Ousdahl, continue right onto 33rd, right on Iowa, right on 23rd, right on Mass., left on Indian Ave., left on Barker to HINU/shelter, continue north on Barker to 23rd, right on 23rd to Noria Road, left on Noria Rd., left on Greenway Circle, left on Greenway Drive to layover/shelter in front of NCS, begin westbound route.

Westbound Route: Continue on Greenway Dr. to East Hills Dr., left on East Hills Dr., right on K-10, continue on 23rd to Barker, left on Barker, right on Indian Ave., right on Mass., left on 23rd, left on Iowa, left on 31st to layover point (cutout/shelter),begin eastbound.

Start Route Deadhead to 31st and Iowa: Right onto Haskell, right on 31st to Ousdahl, left on Ousdahl, right on 33rd, right on Iowa, right on 31st to cutout. Begin eastbound route.

End Route Deadhead to fueling & yard from 31st and Iowa: Continue east on Iowa, left on Haskell Avenue, left into **Capital City Oil**, fuel, right on Haskell Avenue, right into yard.

Destination Sign Codes:

ROUTE 5 West - 31st to Wakurasa

AM Shift	**Sign In:**			**Route End:**	**Shuttle End:**
	Leave Yard:				**(Yard)**
	PM Shift	**Shuttle Begin:**	**Begin Route:**	**End Route:**	
		(Yard)		**Arrive Yard:**	
				Sign Out:	

	Eastbound			Westbound		2/19/2010
	To/From 5E (peak)		*To/From 12*	*To/From 12*		*To/From 5E Peak*
Block	**Depart 31st Street Cutout**	**27th & Scottsdale**	**Arrive 6th & Wakaursa**	**Depart 6th & Wakarusa**	**27th & Scottsdale**	**Arrive 31st Street Cutout**
501W				06:02 AM	06:13 AM	06:25 AM
501W	06:32 AM	06:43 AM	06:54 AM	07:02 AM	07:13 AM	07:25 AM
501W	07:32 AM	07:43 AM	07:54 AM	08:02 AM	08:13 AM	08:25 AM
501W	08:32 AM	08:43 AM	08:54 AM	09:02 AM	09:13 AM	09:25 AM
501W	09:32 AM	09:43 AM	09:54 AM	10:02 AM	10:13 AM	10:25 AM
501W	10:32 AM	10:43 AM	10:54 AM	11:02 AM	11:13 AM	11:25 AM
501W	11:32 AM	11:43 AM	11:54 AM	12:02 PM	12:13 PM	12:25 PM
501W	12:32 PM	12:43 PM	12:54 PM	01:02 PM	01:13 PM	01:25 PM
501W	01:32 PM	01:43 PM	01:54 PM	02:02 PM	02:13 PM	02:25 PM
501W	02:32 PM	02:43 PM	02:54 PM	03:02 PM	03:13 PM	03:25 PM
501W	03:32 PM	03:43 PM	03:54 PM	04:02 PM	04:13 PM	04:25 PM
501W	04:32 PM	04:43 PM	04:54 PM	05:02 PM	05:13 PM	05:25 PM
501W	05:32 PM	05:43 PM	05:54 PM	06:02 PM	06:13 PM	06:25 PM
501W	06:32 PM	06:43 PM	06:54 PM	07:02 PM	07:13 PM	07:25 PM
501W	07:32 PM	07:43 PM	07:54 PM			

Eastbound Route: Beginning at 6th and Wakarusa, continue south on Wakarusa and continue onto 27th eastbound, left on Crossgate Drive, right on Kasold, continue onto eastbound 31st, continue across Iowa on 31st to layover point (cutout/shelter). Begin Westbound route.

Westbound Route: Begin at 31st & Iowa layover point (cutout/shelter), continue eastbound on 31st to Ousdahl, right on Ousdahl, continue right onto 33rd, continue across Iowa to Nieder Rd., right on Nieder to 31st, left on 31st, continue onto northbound Kasold to Clinton Pkwy., left on Clinton Pkwy to Crossgate, left on Crossgate, right on 27th Street, continue northbound onto Wakarusa Drive to 6th Street. Turn left on 6th Street to Congressional Drive, turn right onto Congressional Drive to Overland Drive, enter roundabout and turn right on Overland Drive to Wakarusa Drive. Turn right onto Wakarusa Drive to bus stop/layover point. Begin Eastbound trip.

Start Route Deadhead to 6th & Wakrusa: North on Haskell to 23rd, left on 23rd, continue to Wakarusa Drive, turn right on Wakarusa Drive to 6th Street. Turn left on 6th Street to Congressional Drive, turn right onto Congressional Drive to Overland Drive, enter roundabout and turn right on Overland Drive to Wakarusa Drive. Turn right onto Wakarusa Drive to bus stop/layover point. Begin Eastbound trip.

End Route Deadhead to fueling & Yard from 6th & Wakarusa: Continue south on Wakarusa, left onto Clinton Parkway, right onto Kasold, continue left onto 31st Street, continue past Iowa, left onto Haskell Avenue, left into Capital City Oil, fuel, right onto Haskel, enter yard.

Destination Sign Codes:

ROUTE 6 - Downtown to Wakarusa

AM Shift				*PM Shift*		
Sign In:		Route End:		Shuttle Begin:		End Route:
Leave Yard:		Shuttle End:		Start Route:		Arrive Yard:
						Sign Out:

Block	Depart 9th & Mass.	9th & Iowa	Arrive 6th & Wakarusa	Depart 6th & Wakarusa	9th & Iowa	Arrive 9th & Mass
601				06:00 AM	06:11 AM	06:19 AM
601	06:22 AM	06:27 AM	06:37 AM	06:40 AM	06:51 AM	06:59 AM
601	07:02 AM	07:07 AM	07:17 AM	07:20 AM	07:31 AM	07:39 AM
601	07:42 AM	07:47 AM	07:57 AM	08:00 AM	08:11 AM	08:19 AM
601	08:22 AM	08:27 AM	08:37 AM	08:40 AM	08:51 AM	08:59 AM
601	09:02 AM	09:07 AM	09:17 AM	09:20 AM	09:31 AM	09:39 AM
601	09:42 AM	09:47 AM	09:57 AM	10:00 AM	10:11 AM	10:19 AM
601	10:22 AM	10:27 AM	10:37 AM	10:40 AM	10:51 AM	10:59 AM
601	11:02 AM	11:07 AM	11:17 AM	11:20 AM	11:31 AM	11:39 AM
601	11:42 AM	11:47 AM	11:57 AM	12:00 PM	12:11 PM	12:19 PM
601	12:22 PM	12:27 PM	12:37 PM	12:40 PM	12:51 PM	12:59 PM
601	01:02 PM	01:07 PM	01:17 PM	01:20 PM	01:31 PM	01:39 PM
601	01:42 PM	01:47 PM	01:57 PM	02:00 PM	02:11 PM	02:19 PM
601	02:22 PM	02:27 PM	02:37 PM	02:40 PM	02:51 PM	02:59 PM
601	03:02 PM	03:07 PM	03:17 PM	03:20 PM	03:31 PM	03:39 PM
601	03:42 PM	03:47 PM	03:57 PM	04:00 PM	04:11 PM	04:19 PM
601	04:22 PM	04:27 PM	04:37 PM	04:40 PM	04:51 PM	04:59 PM
601	05:02 PM	05:07 PM	05:17 PM	05:20 PM	05:31 PM	05:39 PM
601	05:42 PM	05:47 PM	05:57 PM	06:00 PM	06:11 PM	06:19 PM
601	06:22 PM	06:27 PM	06:37 PM	06:40 PM	06:51 PM	06:59 PM
601	07:02 PM	07:07 PM	07:17 PM	07:20 PM	07:31 PM	07:39 PM
601	07:42 PM	07:47 PM	07:57 PM			

Route 6: West on 9th to Kentucky, right on Kentucky, left on 6th, left on Iowa Street, right on 9th Street, right on Rockledge Road, left on 6th Street, right on Folks Road, left on Overland Dr, left on Wakarusa to bus layover, **begin inbound trip**: Continue south on Wakarusa to 6th Street, right on 6th Street to Congressional Drive, left on Congressional Drive to Harvard Road, left on Harvard Road to Wakarusa Drive, left on Wakarusa Drive to 6th Street, right on 6th Street to Rockledge Road, right on Rockledge Road to 9th Street, left on 9th Street to Iowa, left on Iowa to 6th Street, right on 6th Street to New Hampshire, right on New Hampshire to 9th Street, right on 9th Street to bus layover (Penny Annie).

Start Route Deadhead to 6th & Wakarusa: North on Haskell to 23rd, left on 23rd, continue to Wakarusa Drive, turn right on Wakarusa Drive to 6th Street. Turn left on 6th Street to Congressional Drive, turn right onto Congressional Drive to Overland Drive, enter roundabout and turn right on Overland Drive to Wakarusa Drive. Turn right onto Wakarusa Drive to bus stop/layover point.

End Route Deadhead to fueling & Yard from 6th & Wakarusa: Continue south on Wakarusa, left onto Clinton Parkway, right onto Kasold, continue left onto 31st Street, continue past Iowa, left onto Haskell Avenue, left into **Capital City Oil,** fuel, right onto Haskel, enter yard.

Destination Sign Codes:

Route 7 - 31st and Iowa

AM Shift					***PM Shift***			End Route:
Sign In:			Route End: (9th & Mass)		Shuttle Begin: (Yard)			Arrive Yard:
Leave Yard:			Shuttle End: (Yard)		Begin Route: (9th & Mass)			Sign Out:
	Southbound				Northbound			2/19/2010
	Transfers:	*To/From 5E EB*					*To/From 5E WB*	
Block	Leave 9th & Mass.	23rd & Louisiana	Holcom Rec Center	Arrive 31st Street Cutout	Depart 31st Street Cutout	Holcom Rec Center	23rd & Louisianna	Arrive 9th & Mass.
701	06:03 AM	06:14 AM	06:21 AM	06:28 AM	06:31 AM	06:39 AM	06:47 AM	06:59 AM
701	07:03 AM	07:14 AM	07:21 AM	07:28 AM	07:31 AM	07:39 AM	07:47 AM	07:59 AM
701	08:03 AM	08:14 AM	08:21 AM	08:28 AM	08:31 AM	08:39 AM	08:47 AM	08:59 AM
701	09:03 AM	09:14 AM	09:21 AM	09:28 AM	09:31 AM	09:39 AM	09:47 AM	09:59 AM
701	10:03 AM	10:14 AM	10:21 AM	10:28 AM	10:31 AM	10:39 AM	10:47 AM	10:59 AM
701	11:03 AM	11:14 AM	11:21 AM	11:28 AM	11:31 AM	11:39 AM	11:47 AM	11:59 AM
701	12:03 PM	12:14 PM	12:21 PM	12:28 PM	12:31 PM	12:39 PM	12:47 PM	12:59 PM
701	01:03 PM	01:14 PM	01:21 PM	01:28 PM	01:31 PM	01:39 PM	01:47 PM	01:59 PM
701	02:03 PM	02:14 PM	02:21 PM	02:28 PM	02:31 PM	02:39 PM	02:47 PM	02:59 PM
701	03:03 PM	03:14 PM	03:21 PM	03:28 PM	03:31 PM	03:39 PM	03:47 PM	03:59 PM
701	04:03 PM	04:14 PM	04:21 PM	04:28 PM	04:31 PM	04:39 PM	04:47 PM	04:59 PM
701	05:03 PM	05:14 PM	05:21 PM	05:28 PM	05:31 PM	05:39 PM	05:47 PM	05:59 PM
701	06:03 PM	06:14 PM	06:21 PM	06:28 PM	06:31 PM	06:39 PM	06:47 PM	06:59 PM
701	07:03 PM	07:14 PM	07:21 PM	07:28 PM	07:31 PM	07:39 PM	07:47 PM	07:59 PM

Route 7 Southbound: From SE corner (bankside) of 9th & Mass - Right on New Hampshire, right on 11th, left on southbound Mass, right on 19th, left on Louisiana, right on 27th, left on Lawrence Ave, left on 31st, continue across Iowa to bus cutout/shelter.

Route 7 Northbound: Continue eastbound on 31st to Ousdahl, right on Ousdahl, continue right to 33rd to Iowa, right on Iowa to 31st, left on 31st, right on Lawrence Ave, right on 27th, east to Belle Haven, right on Belle Haven, left on 27th Terrace, left on Louisiana, right on 21st, left on Kentucky, right on 19th, left on Mass, left on 11th, right on Vermont, right on 9th, east to SE corner (bank side) 9th& Mass.

Start Route Deadhead to 9th & Mass: Left on Haskell, left on 23rd, right onto Mass St., left on 11th, right onto Vermont St., right onto 9th St. to 9th/Mass, bank side.

End Route Deadhead to fueling & yard from 9th & Mass: Continue east on Massachusetts to Connecticut, right on Connecticut, continue on Barker, left on 19th, right on Haskell, right on 29th into **Capital City Oil** - fuel vehicle, return to Haskell, right to yard.

Destination Sign Codes:

ROUTE 11 Express

AM Shift				*PM Shift*			
Sign In:		Route End:		Shuttle Begin:		End Route:	
Leave Yard:		Shuttle End:		Start Route:		Arrive Yard:	Sign Out:

Block	Depart Reserves	31st & Iowa	Campus Court at 24th Street	Union North	Deadhead to/from Reserves	Union South	Campus Court at 24th	31st & Iowa	Arrive Reserves
11X01	08:18 AM	08:23 AM	08:32 AM	08:46 AM					
11X01	09:06 AM	09:11 AM	09:20 AM	09:34 AM					
11X01						02:35 PM	02:47 PM	02:53 PM	02:57 PM
11X01						03:17 PM	03:29 PM	03:29 PM	03:39 PM

Route 11X01 Northbound: Start at the Reserves, Right onto 31st St., Right onto Ousdahl, Right onto 33rd, Right onto Iowa St., Right onto 27th St., Left onto Ridge Ct., Right onto 24th St., Right onto Ousdahl, immediate Left onto 24th St., continue on Naismith to Crescent (bookstore), Right onto Crescent, continue onto Jayhawk Blvd., **Begin deadhead back to Reserves:** Right onto 13th St., Left onto Louisiana St., left onto 11th St., right onto Mississipi Street, Left onto 9th St., left onto Iowa, right onto 31st, left into Reserves.

Route 11X01 Southbound: Start at Kansas Union. Continue across Jayhawk Blvd., Counter Clockwise around fountain, Left onto Naismith Dr., Right onto 24th St., Right onto Ousdahl, Immediate Left onto 24th St., Left onto Ridge Ct., Right onto 27th St., Left onto Iowa St., Left onto 31st St., Right onto Ousdahl, Right onto 33rd St., Right onto Nieder Rd., Left onto 31st St., Left into the Reserves. **Begin deadhead back to Kansas Union**: Right onto 31st St, left onto Iowa Street, right onto 9th Street, right onto Indiana Street, continue left onto 12th Street, right onto Oread Avenue. **Begin 11X01 Southbound trip**

Start 11X01 Northbound Deadhead to Reserves: Exit yard on 31st Street, continue to Iowa, continue past Iowa, left into the Reserves, start route.

Start 11X01 Southbound Deadhead to Kansas Union: Exit yard on 31st Street, continue to Iowa, left onto Iowa Street, right onto 9th Street, right onto Indiana Street, continue left onto 12th Street, right onto Oread Avenue. Begin 11X01 Southbound trip.

End Route Deadhead to fueling & yard from 31st and Iowa: Continue east on Iowa, left on Haskell Avenue, left into Capital City Oil, fuel, right on Haskell Avenue, right into yard.

End Route Deadhead to fueling & yard from Kansas Union: Right onto 13th St., Left onto Louisiana St., left onto 11th St., right onto Mississipi Street, Left onto 9th St., left onto Iowa, left onto 31st St, left onto Haskell Avenue, left into **Capital City Oil, fuel**, right onto Haskell Avenue, right into yard.

Destination Sign Codes:

ROUTE 12 - Wakarusa - KU (one-way) - downtown

AM Shift				*PM Shift*		
Sign In:		Route End:		Shuttle Begin:	End Route:	
Leave Yard:		Shuttle End:		Start Route:	Arrive Yard:	Sign Out:

Block	Depart 6th & Wakarusa	Bob Billings Pkwy & Iowa	Kansas Union	Arrive 9th & Mass	Depart 9th & Mass	Bob Billings Pkwy & Iowa	Arrive 6th & Wakarusa
1201	06:03 AM	06:14 AM	06:24 AM	06:36 AM	06:41 AM	06:48 AM	06:59 AM
1201	07:03 AM	07:14 AM	07:24 AM	07:36 AM	07:41 AM	07:48 AM	07:59 AM
1201	08:03 AM	08:14 AM	08:24 AM	08:36 AM	08:41 AM	08:48 AM	08:59 AM
1201	09:03 AM	09:14 AM	09:24 AM	09:36 AM	09:41 AM	09:48 AM	09:59 AM
1201	10:03 AM	10:14 AM	10:24 AM	10:36 AM	10:41 AM	10:48 AM	10:59 AM
1201	11:03 AM	11:14 AM	11:24 AM	11:36 AM	11:41 AM	11:48 AM	11:59 AM
1201	12:03 PM	12:14 PM	12:24 PM	12:36 PM	12:41 PM	12:48 PM	12:59 PM
1201	01:03 PM	01:14 PM	01:24 PM	01:36 PM	01:41 PM	01:48 PM	01:59 PM
1201	02:03 PM	02:14 PM	02:24 PM	02:36 PM	02:41 PM	02:48 PM	02:59 PM
1201	03:03 PM	03:14 PM	03:24 PM	03:36 PM	03:41 PM	03:48 PM	03:59 PM
1201	04:03 PM	04:14 PM	04:24 PM	04:36 PM	04:41 PM	04:48 PM	04:59 PM
1201	05:03 PM	05:14 PM	05:24 PM	05:36 PM	05:41 PM	05:48 PM	05:59 PM
1201	06:03 PM	06:14 PM	06:24 PM	06:36 PM	06:41 PM	06:48 PM	06:59 PM
1201	07:03 PM	07:14 PM	07:24 PM	07:36 PM	07:41 PM	07:48 PM	07:59 PM

Route 12 Inbound Trip: Eastbound from 6th and Wakarusa: Proceed south on Wakarusa. Left on Bob Billings Parkway, continue onto 15th Street, left on Naismith Drive, right on Jayhawk Boulevard, continue on Jayhawk Boulevard through Chi Omega Fountain, continue on Oread Ave, left on 12th St, right on Indiana St, right on 9th Street, arrive at 9th & Mass (bank side). **Begin Outbound trip:** Continue east on 9th Street, left on New Hampshire, left on 8th Street, left on Vermont, right on 9th Street, left on Iowa, right on Bob Billings Parkway, right on Wakarusa Drive, left on 6th Street, right on Congressional Drive, right on Overland Drive, right on Wakarusa Drive, end at layover point. **Begin Inbound Trip.**

Start Route Deadhead to 6th & Wakrusa: North on Haskell to 23rd, left on 23rd, continue to Wakarusa Drive, turn right on Wakarusa Drive to 6th Street. Turn left on 6th Street to Congressional Drive, turn right onto Congressional Drive to Overland Drive, enter roundabout and turn right on Overland Drive to Wakarusa Drive. Turn right onto Wakarusa Drive to bus stop/layover point. **Begin Inbound trip.**

End Route Deadhead to fueling & yard from 6th and Wakarusa: Continue south on Wakarusa, left on Clinton Parkway, right on Kasold, continue left on 31st Street, left on Haskell, left on 29th to fuel at Capital City Oil, exit left on Haskell to yard.

Destination Sign Codes:

Route 26 - 25th & Melrose - KU

AM Shift					***PM Shift***			End Route:
Sign In:			Route End: (9th & Mass)		Shuttle Begin: (Yard)			Arrive Yard:
Leave Yard:			Shuttle End: (Yard)		Begin Route: (9th & Mass)			Sign Out:
	Northbound				Southbound			2/19/2010
Block	Depart 25th & Melrose	24th St	Stewart Avenue	Arrive Union North	Leave Union South	Stewart Avenue	24th Street	Arrive 25th & Melrose
2601	06:55 AM	07:00 AM	07:05 AM	07:17 AM	07:30 AM	07:42 AM	07:47 AM	07:52 AM
2602	07:25 AM	07:30 AM	07:35 AM	07:47 AM	08:00 AM	08:12 AM	08:17 AM	08:22 AM
2601	07:55 AM	08:00 AM	08:05 AM	08:17 AM	08:30 AM	08:42 AM	08:47 AM	08:52 AM
2602	08:25 AM	08:30 AM	08:35 AM	08:47 AM	09:00 AM	09:12 AM	09:17 AM	09:22 AM
2601	08:55 AM	09:00 AM	09:05 AM	09:17 AM	09:30 AM	09:42 AM	09:47 AM	09:52 AM
2602	09:25 AM	09:30 AM	09:35 AM	09:47 AM	10:00 AM	10:12 AM	10:17 AM	10:22 AM
2601	09:55 AM	10:00 AM	10:05 AM	10:17 AM	10:30 AM	10:42 AM	10:47 AM	10:52 AM
2602	10:25 AM	10:30 AM	10:35 AM	10:47 AM	11:00 AM	11:12 AM	11:17 AM	11:22 AM
2601	10:55 AM	11:00 AM	11:05 AM	11:17 AM	11:30 AM	11:42 AM	11:47 AM	11:52 AM
2602	11:25 AM	11:30 AM	11:35 AM	11:47 AM	12:00 PM	12:12 PM	12:17 PM	12:22 PM
2601	11:55 AM	12:00 PM	12:05 PM	12:17 PM	12:30 PM	12:42 PM	12:47 PM	12:52 PM
2602	12:25 PM	12:30 PM	12:35 PM	12:47 PM	01:00 PM	01:12 PM	01:17 PM	01:22 PM
2601	12:55 PM	01:00 PM	01:05 PM	01:17 PM	01:30 PM	01:42 PM	01:47 PM	01:52 PM
2602	01:25 PM	01:30 PM	01:35 PM	01:47 PM	02:00 PM	02:12 PM	02:17 PM	02:22 PM
2601	01:55 PM	02:00 PM	02:05 PM	02:17 PM	02:30 PM	02:42 PM	02:47 PM	02:52 PM
2602	02:25 PM	02:30 PM	02:35 PM	02:47 PM	03:00 PM	03:12 PM	03:17 PM	03:22 PM
2601	02:55 PM	03:00 PM	03:05 PM	03:17 PM	03:30 PM	03:42 PM	03:47 PM	03:52 PM
2602	03:25 PM	03:30 PM	03:35 PM	03:47 PM	04:00 PM	04:12 PM	04:17 PM	04:22 PM
2601	03:55 PM	04:00 PM	04:05 PM	04:17 PM	04:30 PM	04:42 PM	04:47 PM	04:52 PM
2602	04:25 PM	04:30 PM	04:35 PM	04:47 PM	05:00 PM	05:12 PM	05:17 PM	05:22 PM
2601	04:55 PM	05:00 PM	05:05 PM	05:17 PM	05:30 PM	05:42 PM	05:47 PM	05:52 PM

Route 26 Northbound: Begin at 25th and Melrose Lane parking lot. Turn left on 25th Street and continue across Iowa Street. Left on Ridge Court, Right on 24th Street. Left on Ousdahl Road. Left on 21st Street. Right on Steward Avenue. Right on 19th Street. Left on Naismith Drive. Continue left on Naismith Drive. Right on Jayhawk Boulevard through Chi Omega fountain roundabout. Right on 13th Street. Left on Louisana Street. Continue across Enter GSP Hall / Corbin Hall turn-about. **Begin Southbound trip.** Exit GSP Hall Corbin hall turn-about. Left on 11th Street. Right on Indiana Street. Left on 12th Street. Right on Oread Road. Continue onto Jayhawk Boulevard. Continue through Chi Omega fountain roundabout. Left on Naismith Drive. Continue right on Naismith Drive. Right on 19th Street. Left on Stewart Avenue. Left on 21st Street. Right on Ousdahl Road. Right on 24th Street. Left on Ridge Court. Right on 25th Street, continue across Iowa Street. Right into Melrose Lane. Follow lane left. **Begin Northbound trip.**

Start Route Deadhead to 25th and Melrose Lane. Exit on 31st Street, continue onto Iowa, right on Iowa, left on 25th Street, right on Melrose Lane. Begin route.

End Route Deadhead to fueling & yard from 25th and Melrose: Exit Melrose, continue on 25th to Iowa, right on Iowa, left on 31st St, left onto Haskell Avenue, left into **Capital City Oil,** fuel, right onto Haskell Avenue, right into yard.

Destination Sign Codes: