



Using Census Data for Transit Planning



ABSTRACT

Smart Moves is metropolitan Kansas City's vision for expanded and enhanced public transportation services. It is a regional plan, providing service in seven metro area counties, and represents the first detailed service plan cooperatively developed by the Mid-America Regional Council (MARC), Kansas City Area Transportation Authority (KCATA), Johnson County Transit and United Government Transit. A key part of the planning process has been the utilization of Census data to determine those areas most appropriate for transit, based upon current and forecast population and employment densities, automobile ownership, and trip patterns. GIS maps created in Arc/View provided the opportunity to overlay proposed transit lines on layers of Census data to help determine those areas most suited to flexible service, fixed route service, or commuter express service. Journey-to-Work data provided needed information about trip patterns in the region, and allowed for more informed decisions to be made regarding services needed to connect counties to counties. The final plan represents a structure of service based both upon public input regarding perceived needs, as well as these Census data based evaluations.

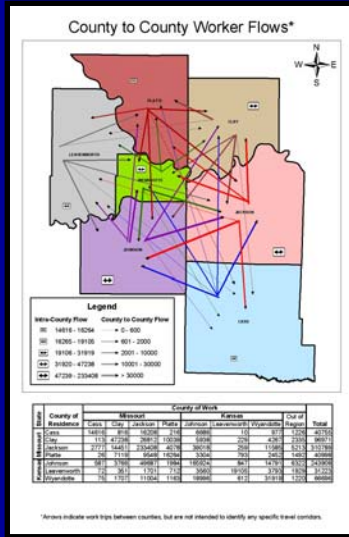
INTRODUCTION

Spanning over portions of two states, eight counties, and over 100 incorporated areas, the Kansas City metropolitan area is a perfect candidate for coordinated regional transit. Unfortunately, relatively uncoordinated roadways and a lack of financial or political support have left the region's transit system mired in separate operating agencies with limited hours and insufficient services to address the needs of the region's population. In recognition of the deficiencies of the Kansas City area's public transit system, in 1988 the Greater Kansas City Chamber of Commerce and the Mid-America Regional Council (MARC - the area MPO) joined together in cooperation with area transit providers and local governments to conduct the Metropolitan Transit Initiative - Demand Assessment (MTI). The MTI documented transit demands in the region and established a conceptual service plan. The MTI was followed in 1993 by the Creating Quality Places (CQP) initiative, which has provided ongoing support for transit due to its emphasis on transit-supportive development. Finally, the 2001 Transit Investment Strategy provided a general funding approach for the development of a wide-reaching transit plan.

The plan that resulted from the above studies is *Smart Moves* - a regional transit plan for the Kansas City metropolitan area. A joint effort of MARC, the Kansas City Area Transportation Authority (KCATA), Johnson County Transit (JCT), and United Government Transit, *Smart Moves* attempts to increase mobility options throughout the Kansas City region through an expansion of fixed-route and flexible transit options linked by local and regional transit centers located to provide support and connectors to community facilities. A mixture of case was used to develop the *Smart Moves* vision, including community surveys, research on current routes, and Census data related to current population, employment, automobile availability, and Journey-to-Work trips. Additionally, conversations with local planners indicated the need to project future employment and population trends as the plan is implemented.

SERVICE TYPES

- Proposed Smart Moves service types:**
- Blue Rapid Rider:** Bus Rapid Transit or limited stop style service designed to move customers quickly across the region in primary travel corridors. May include all or some of the following characteristics:
 - Limited stop service
 - Dedicated lanes
 - Enhanced vehicles
 - Traffic signal priority
 - Pre-paid fares
 - Green Rapid Rider:** Bus or commuter rail express services designed to provide high-speed service across the region. Will typically run on interstates or major arterial roads connecting the suburbs with other suburbs and the Central Business District.
 - Yellow Rapid Rider:** Bus or commuter rail express services that provide the most local neighborhood service to transit users. These routes generally connect with a single transit center.
 - Regional Connectors:** Fixed routes that provide a high degree of regional connectivity to the transit system. These routes operate between regional transit centers or higher-level local transit centers located at both ends of the route.
 - Local Connectors:** Connectors provide a high degree of local access to commercial, retail and residential development along the route. Usually, most local link connector routes are anchored at both ends of the route by local transit centers or primary destinations.
 - Circulators:** Fixed route or dial-a-ride style services that provide the most local neighborhood service to transit users. These routes generally connect with a single transit center.



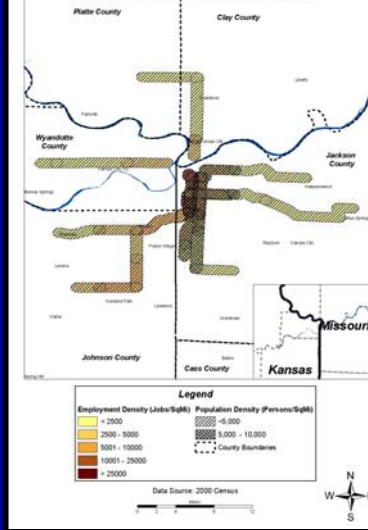
SERVICE SPAN AND FREQUENCY

The determination of a route's level of suitability for transit service will help in establishing both service span and service frequency. The following chart outlines the general levels of service to be expected at each level of suitability.

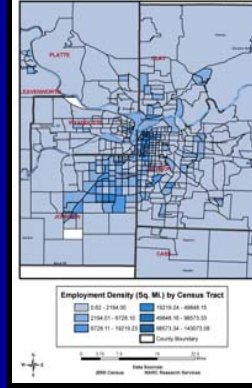
Suitability Level	Peak	Mid-Day	Night	Sat	Sun	Hours of Service/Day
Low	10-30 Minutes	7	Some	Some		6-12
Medium	10-30 Minutes	7	7	Some	7	10-16
High	10-30 Minutes	7	7	7	7	14-18

At lower levels of suitability, some routes may be limited to commuter express services during peak periods only. The mix of services that may be accessed along a route may also affect right and weekend services.

Population & Employment Densities Along Proposed Bus Rapid Transit Corridors



SMART MOVES FORECAST EMPLOYMENT DENSITIES (2030)



CONCLUSIONS

Current transit ridership in the Kansas City metropolitan area hovers at around 50,000 daily, less than 2% of travel for the MSA. The *Smart Moves* plan is designed to double both services and ridership, in large part by supplying transit to areas where there is latent demand, as shown by population demographics, travel patterns, and community input. Data obtained from the decennial Census has proven invaluable in the planning process, as it provides the opportunity to look more objectively at areas in the region where transit is currently working well, and look for similar characteristics in areas that are currently underserved by transit.

As the metropolitan area continues to expand, Census data will remain an important tool in the transit planning process, providing information on changes in the region's population and employment characteristics. It is hoped that by continuing to coordinate transit services with needs reflected by area demographics, transit will become an increasingly used method of travel in the Kansas City region.

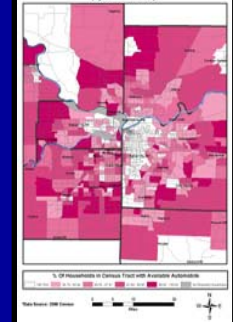
OTHER FACTORS FOR CONSIDERATION

While the analysis of Census data has played an important role in the development of the *Smart Moves* service plan, other factors have also been taken into consideration, including:

- Current transit ridership
- Presence of traffic generators, including:
 - Transit centers
 - Retail commercial areas
 - Institutions (such as schools, hospitals, and other social service agencies)
- Current travel conditions, including:
 - Congestion
 - Speed
 - Trip patterns
 - Trip lengths

By looking at all these characteristics within the framework of the metropolitan area, a comprehensive and efficient transit system may be developed in order to best serve the needs of the region's population.

Percent of Households with Available Automobile (by Census Tract)



RECOMMENDED SERVICE STANDARDS

Rapid Rider:

Residential Density	People per square mile
High	> 10,000
Medium	5,000 - 10,000
Low	< 5,000

Employment Density	Employment per Square Mile
High	> 25,000
Medium	10,000 - 25,000
Low	< 10,000

Auto Ownership	Autos per Household
High	> 1.5
Medium	1 - 1.5
Low	< 1

Freeway Flyer/Commuter Express Route:

Employment Density	CBD square feet of commercial office space
High	> 30M
Medium	15 - 30M
Low	< 15M

Local Link (Regional Connectors):

Residential Density	People per square mile
High	> 10,000
Medium	3,000 - 10,000
Low	< 5,000

Auto Ownership Warrant	Autos per Household
High	> 1.5
Medium	1.5 - 2.0
Low	> 2.0

Local Links (Local Connectors & Circulators):

Residential Density	People per square mile
High	> 10,000
Medium	3,000 - 10,000
Low	< 5,000

Auto Ownership Warrant	Autos per Household
High	> 1.0
Medium	1.0 - 1.5
Low	> 1.5

ENSURING EQUITY

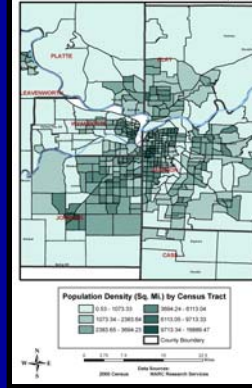
Implementing the *Smart Moves* plan will require an increase in transit funding in the Kansas City region, most likely through the levying of a region-wide sales tax. In order to best promote passage of such a tax, it is critical to ensure that the majority of those who will be asked to pay receive the benefits of transit expansion. Census information was used to determine the population residing in areas within one mile of a fixed route or flexible service area, resulting in the following table:

Characteristics of Areas with Transit Service

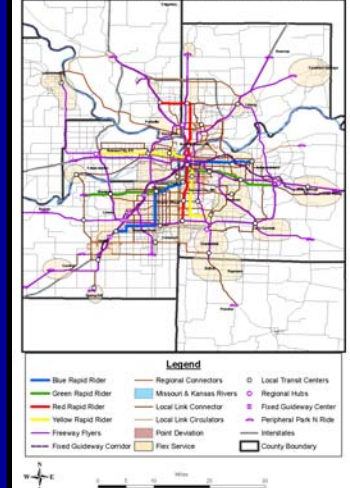
Service Area	Persons	Square Miles	% of Persons	% of Area	Average Population/Sq Mile
Population in areas served by transit (route + 1/2 mile buffer area)	1272514	653	76.09%	16.98%	2301.16
Population in border areas (within 1/2 to 1 mile of service area)	137641	445	8.23%	13.65%	309.31
Population in areas not served by transit	262233	2282	15.68%	69.37%	119.53
Total or Average	1672418	3394	100.00%	100.00%	499.48

These figures indicate that the majority of the region's population live within an area that will have convenient access to transit services once *Smart Moves* is implemented, thus increasing the likelihood of obtaining adequate funding.

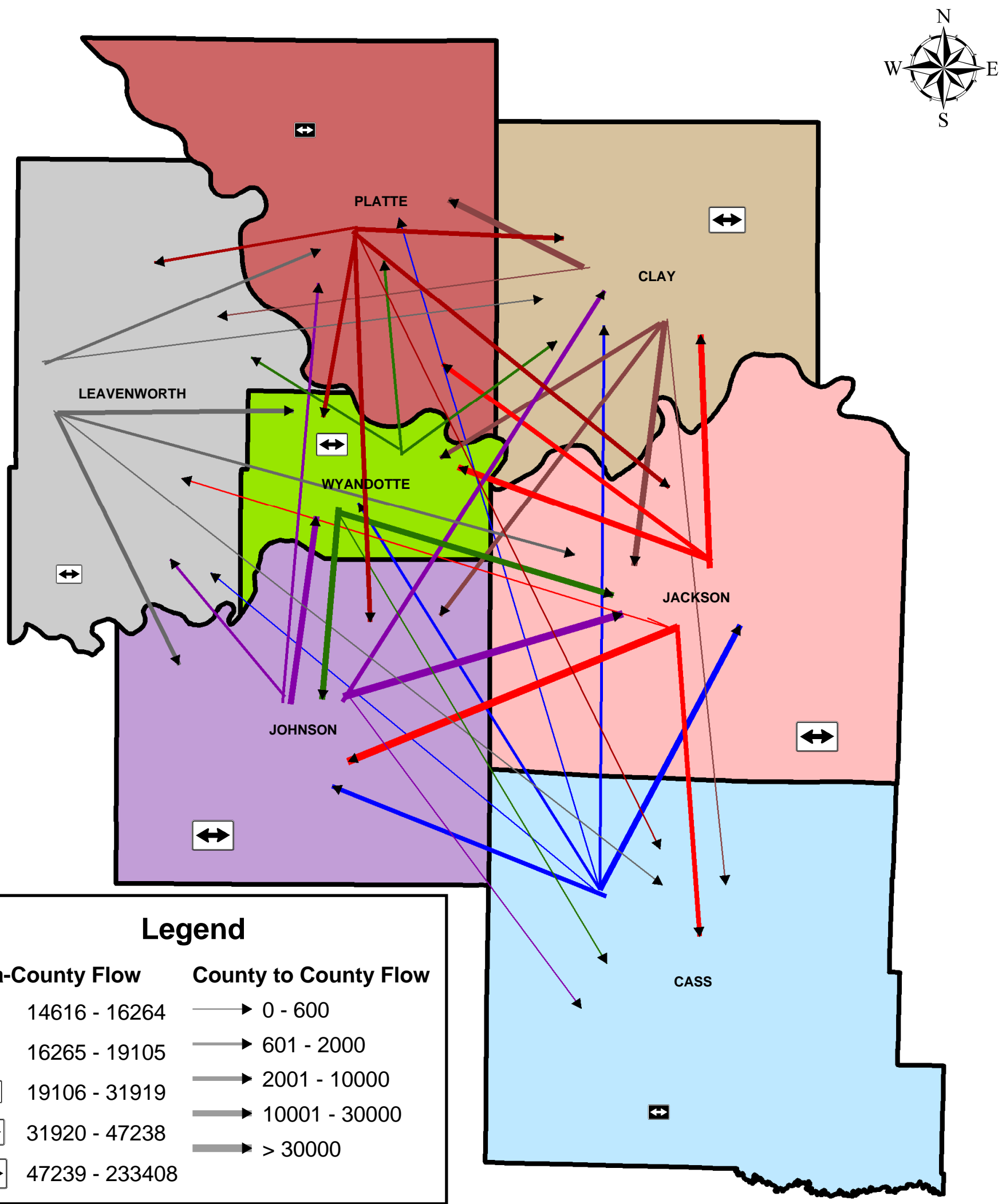
SMART MOVES FORECAST POPULATION DENSITIES (2030)



PROPOSED REGIONAL SMART MOVES SYSTEM



County to County Worker Flows*

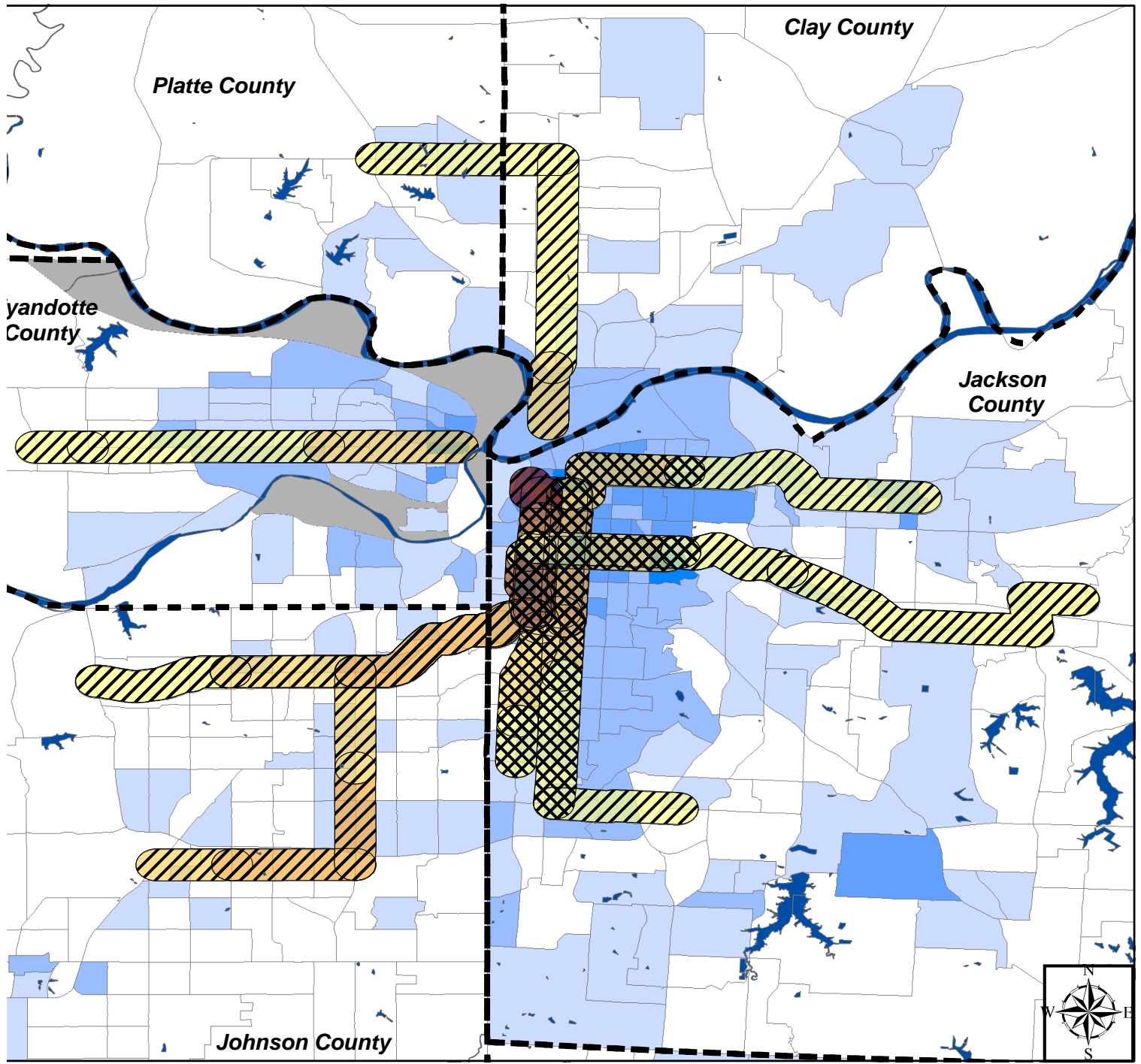


State	County of Residence	County of Work							Out of Region	Total
		Missouri				Kansas				
Kansas Missouri	Cass	14616	816	16208	216	6686	10	977	1226	40755
	Clay	113	47238	26812	10039	5938	229	4267	2335	96971
	Jackson	2777	14451	233408	4078	39018	259	11585	5213	310789
	Platte	26	7119	9548	16264	3304	793	2452	1492	40998
	Johnson	587	3766	49687	1984	165924	847	14791	6322	243908
	Leavenworth	72	351	1701	712	3560	19105	3793	1929	31223
	Wyandotte	75	1707	11004	1163	18996	612	31919	1220	66696

Data Source: Journey to Work, Census 2000, County to County Worker Flow

*Arrows indicate work trips between counties, but are not intended to identify any specific travel corridors.

Automobile Availability and Population & Employment Densities Along Proposed Rapid Rider Arterial Transit Routes



Legend

Employment Density (Jobs/SqMi)	% of Households with Vehicle Available	Population Density (Persons/SqMi)
 < 2500	 23.05 - 56.52	 <5,000
 2500 - 5000	 56.53 - 74.85	 5,000 - 10,000
 5001 - 10000	 74.86 - 87.27	 No Reported Households
 10001 - 25000	 87.28 - 95.38	 County Boundaries
 > 25000	 95.39 - 100.00	

ata Source: US Census Bureau American Community Survey, 2000

