



Kansas City Area Transportation Authority



SOUTHTOWN - TROOST CORRIDOR

PLANNING STUDY

10 August 2007

Prepared By:



With:



SOUTHTOWN--TROOST CORRIDOR PLANNING REPORT

10 August 2007

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SOUTHTOWN--TROOST CORRIDOR

Planning Report

INTRODUCTION

The Kansas City Area Transportation Authority (KCATA) in cooperation with the City of Kansas City, Missouri, has studied transportation improvement options in the southtown area of Kansas City, Missouri (from the downtown CBD south to I-435) for many years. In 2001, KCATA and the City completed the *Central Business Corridor (CBC)* plan which focused on fixed guideway alternatives. The CBC study leading to the final CBC plan was an Alternatives Analysis effort that identified transportation options in both the Main Street and Troost Avenue Corridors. The preferred mode identified in the CBC plan for both corridors was light rail transit. BRT was the preferred mode if light rail transit was found to be financially infeasible. A ballot initiative to establish a sales tax for light rail in both the Main Street and Troost Corridors was defeated by the voters in 2001. Following that vote, the KCATA shifted the transportation focus in keeping with the CBC plan to reviewing options for BRT in the Main Street and Troost corridors. This resulted in planning and implementation of the Main Street BRT project (MAX) in 2005.

At the same time, planning continued on transit improvements for the Troost and other regional transit corridors. The result being the development of a regional transit plan in 2004, identified as Smart Moves but the Mid America Regional Council (MARC). The Smart Moves Regional Transit Plan (see Figure 1) includes several Bus Rapid Transit corridors including both the Main Street MAX BRT line and the Troost BRT line. The Smart Moves Plan which includes these BRT lines was officially adopted as the region's transit plan in 2005. The Troost BRT line is part of this plan and was incorporated as the preferred alternative for the Troost corridor in the Region's 2030 Long-Range Transportation Plan in 2005.

TROOST AVENUE CORRIDOR

The location of the Troost Corridor within the Kansas City area is shown in Figure 2. The corridor is centered on Troost Avenue and extends from the Kansas City, Missouri Central Business District (CBD) southward for approximately 10 miles to Bannister Road / 95th Street. The corridor extends east-west from approximately Main Street (west) to US-71 (Bruce Watkins Freeway) and I-435 on the east. Today, local bus service traverses Troost Avenue and provides a connection to the Bannister Mall area, a regional retail center. The Troost Corridor and the Bannister connection are part of the Troost Study Corridor.

PLANNING SUMMARY

This document summarizes the planning elements studies along the Troost Corridor. This report is supplemented with the following documents:

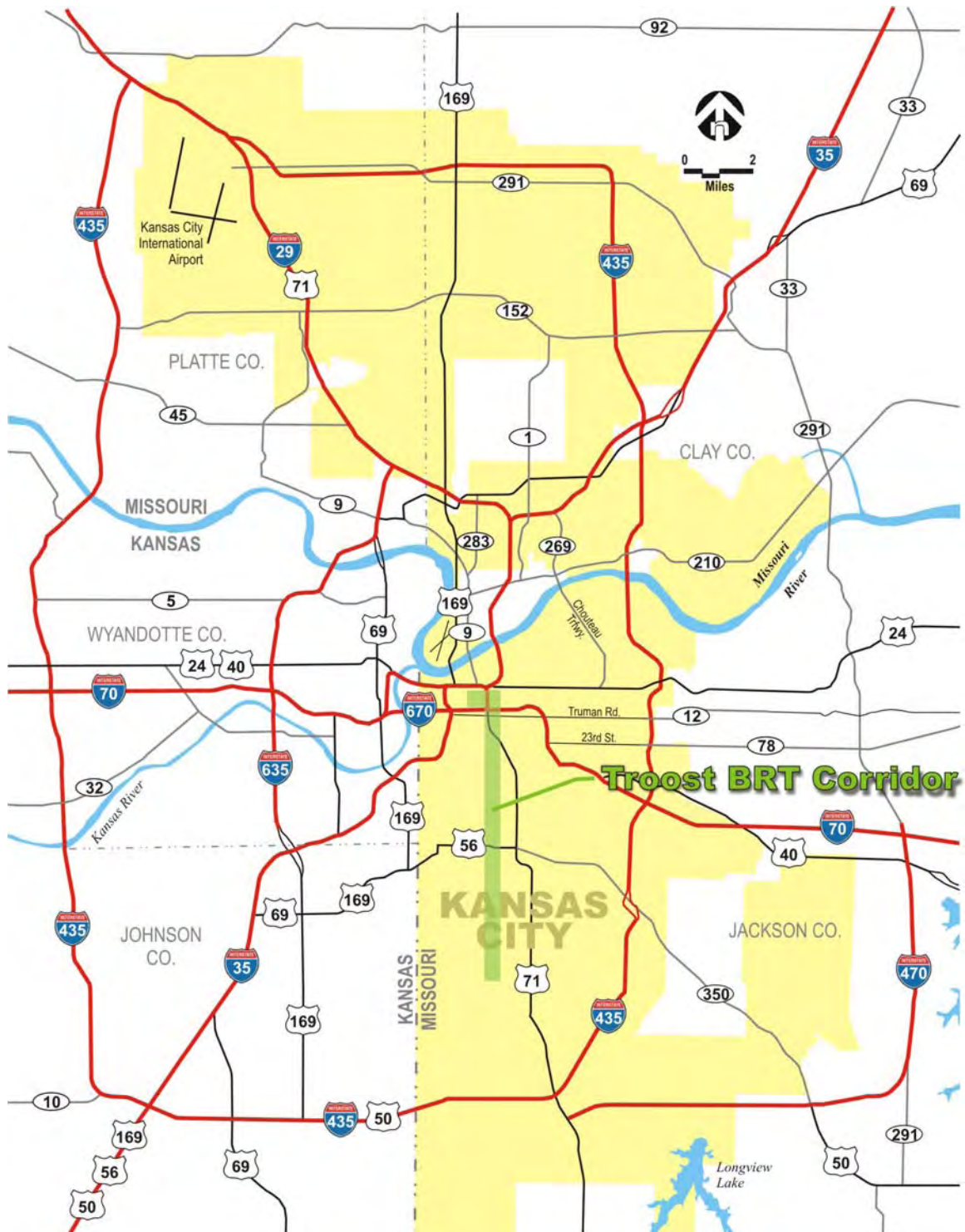
- Public Involvement Plan
- Construction Cost Estimate
- Operations and Financial Plans

Figure 1 – Smart Moves Regional Transit Plan



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Figure 2 – Regional Context



GOALS

The goals for improved services along the Troost Corridor include:

- Expand success of MAX service. MAX has been in service since July of 2005. At the time service began the corridor MAX replaced the 56 Country Club local bus service. Ridership in the corridor was approximately 3300 riders per day. As of May 2007, ridership in the MAX corridor has increased by over 50% and is at 5,300 riders per day. In a survey of MAX customers in 2006, users gave MAX the highest satisfaction ratings ever for the KCATA. The KCATA also conducted a ridership survey of Troost 25 uses in February, 2007. Questions about MAX were included as part of the survey. The results included the following findings:
 - 57% of Troost Riders have used MAX
 - 77% of Troost Riders have a good impression of MAX
 - 68% believe that MAX service on Troost would be successful
- Attract new riders
- Evaluate service and operation needs along Bannister corridor
- Provide benefit to existing riders
- Provide travel time savings for riders (at least 20% reduction in travel time)

The development of the operating plan for MAX service on Troost included the creation of route schedules for both the new MAX service and the remaining local service in the corridor. The travel times for the new MAX service were based on the operating speeds of the existing Main Street MAX service along with the characteristics of the streets and stops for the new corridor. The results of this analysis are that the travel time between the 85th Street station and the central business district will be reduced from 43 minutes to 33 minutes in the morning peak period (and 23% reduction in travel time) and from 48 minutes to 38 minutes during the afternoon peak period (a 21% reduction in travel time).
- Increase transit service reliability
- Enhanced passenger amenities, including real time arrival information at all BRT stations
- Provide safe and secure transit stations
- Strengthen a positive identity of transit
- Increase system capacity and service levels
- Provide a service level that will encourage transit supportive land development. Increased frequencies and reduced travel times will support land development along the corridor, such as connecting the Volker and Hospital Hill campuses of the University of Missouri Kansas City give the University flexibility to meet needs at either location. Another example is the Downtown Council partnership with Truman Medical Center to provide health care services to downtown employees. The new MAX service will provide a direct and frequent connection.
- Provide high quality transit access to major employment centers, medical centers and entertainment/events destinations.

The effectiveness of bus rapid transit service in the Troost Corridor was assessed by analyzing the likelihood of the project achieving the goals. This report documents the improved level of service that can be provided to transit riders in the corridor and estimating the expected increase in ridership. Level of service will be improved through

reductions in waiting time at BRT stations, reduced in-vehicle travel time and increased reliability. Ridership increase estimates have been developed based on increases experienced on the existing MAX line with adjustment for differences in the corridors.

PUBLIC ENGAGEMENT

Opportunities for public engagement were provided in lots of ways during the planning process. Citizens had the following ways to engage in the process:

- Advisory Committee
- Zone Committees
- Public Meetings
- Briefings

The Advisory Committee included community and public agency representation. This Committee met seven times during the planning process including a tour of the study area aboard the Troost 25 local bus. Three zone committees were organized based on the geography of the Troost Corridor and the different needs along the corridor. There are 23 neighborhoods along the Troost Avenue BRT study area, and six (6) more along Bannister Road to Bannister Mall. Most of these neighborhoods are active, organized and well-informed about current redevelopment projects and planning efforts in the area, and expected to be included in planning for BRT. Due to the length of the corridor and the familiarity of so many residents with planning issues, the public involvement activities were designed around three geographic zones. These neighborhood Zone Committees consisted of residents and businesses on both sides of Troost.

A general public meeting was held at the during the final recommendation review portion of the planning process. Public briefings were also given to the KCATA Board of Commissioners. Other briefings were also provided during the planning process to public agencies and stakeholder groups.

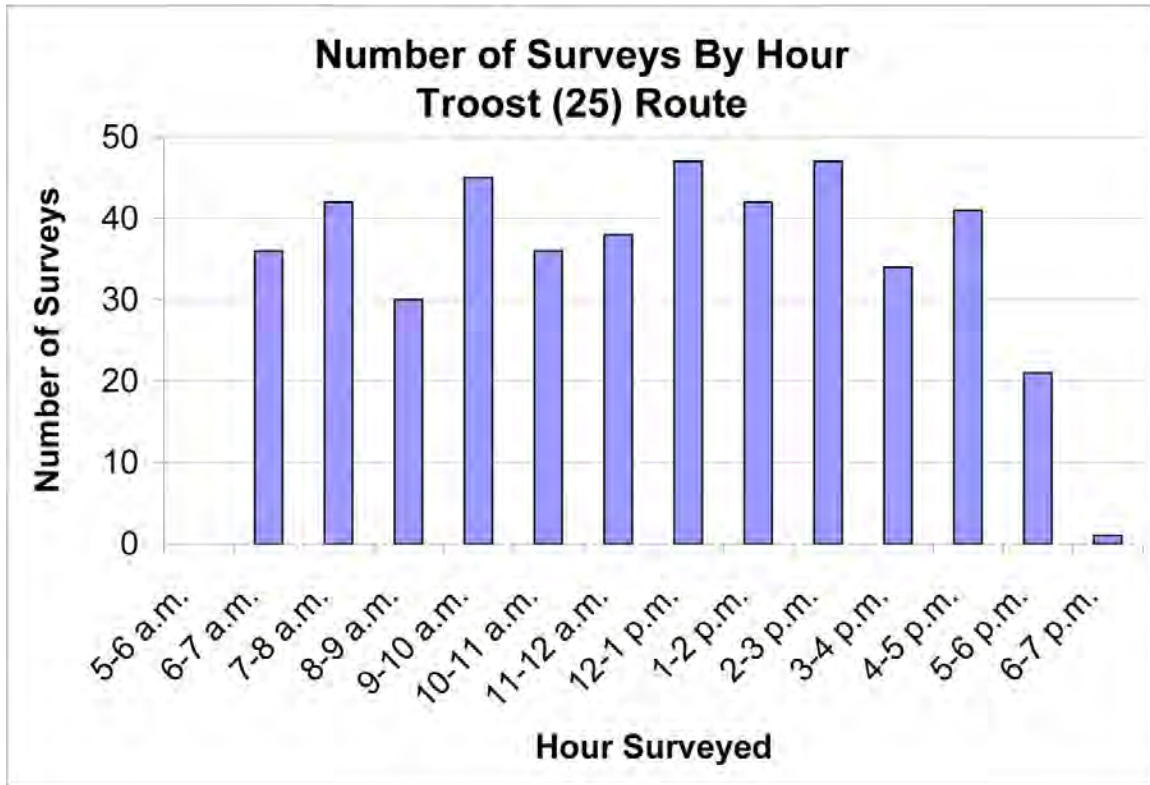
More detailed information about the public engagement process is contained in a supplementary report.

ON-BOARD SURVEY

An on-board survey of Troost #25 riders took place on February 20, 2007. Surveys were distributed and collected on board. Participants were also allowed to submit to the driver as well. The number of surveys collected during the day are illustrated in Figure 3. Three major categories of questions were asked:

- Where are you coming from or going to?
- Trip Characteristics
- Questions about MAX

Figure 3—Number of Surveys



Where are you coming from or going to?

One of the significant results from the first series of questions was that the fact that many riders were using the Troost #25 as a transfer opportunity. In fact, transferring to the Troost route or transferring after the ride was identified by 68.3% of the riders. In addition, 19.2% of all riders were transferring from another route to the Troost Route and then transferred again at the end of their ride.

The survey also documented that 33.7% of riders were traveling to Downtown and 12.1% were traveling to Hospital Hill. These were the two most popular destinations.

Figure 4—Transit Trip Destinations

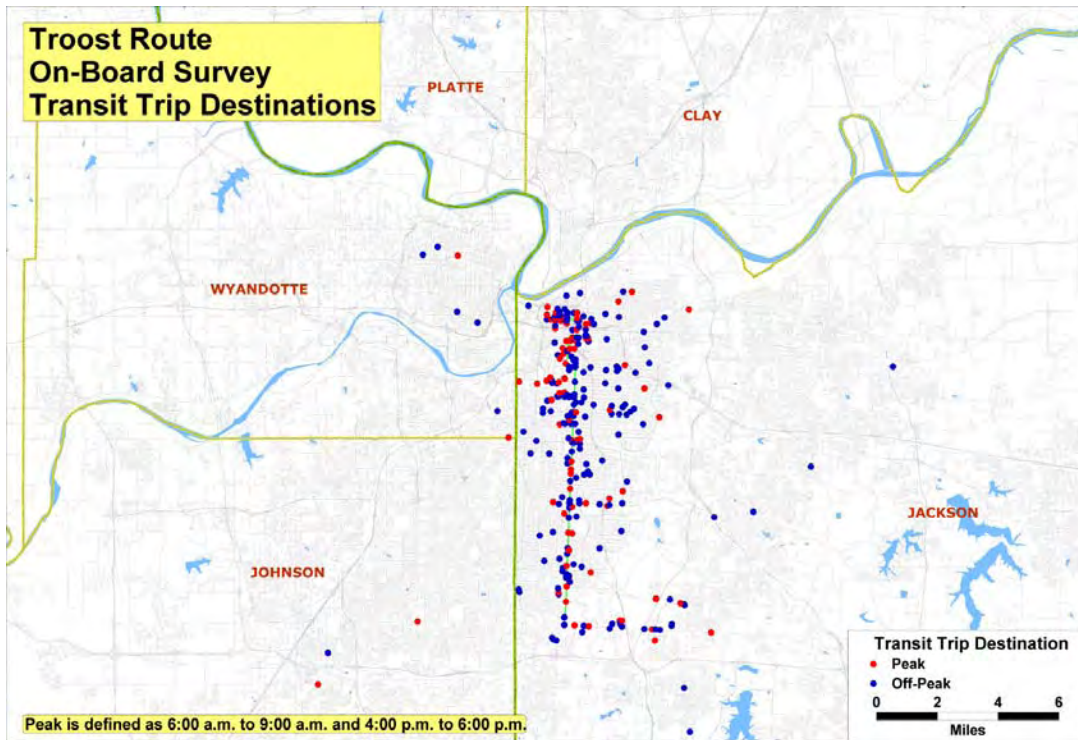
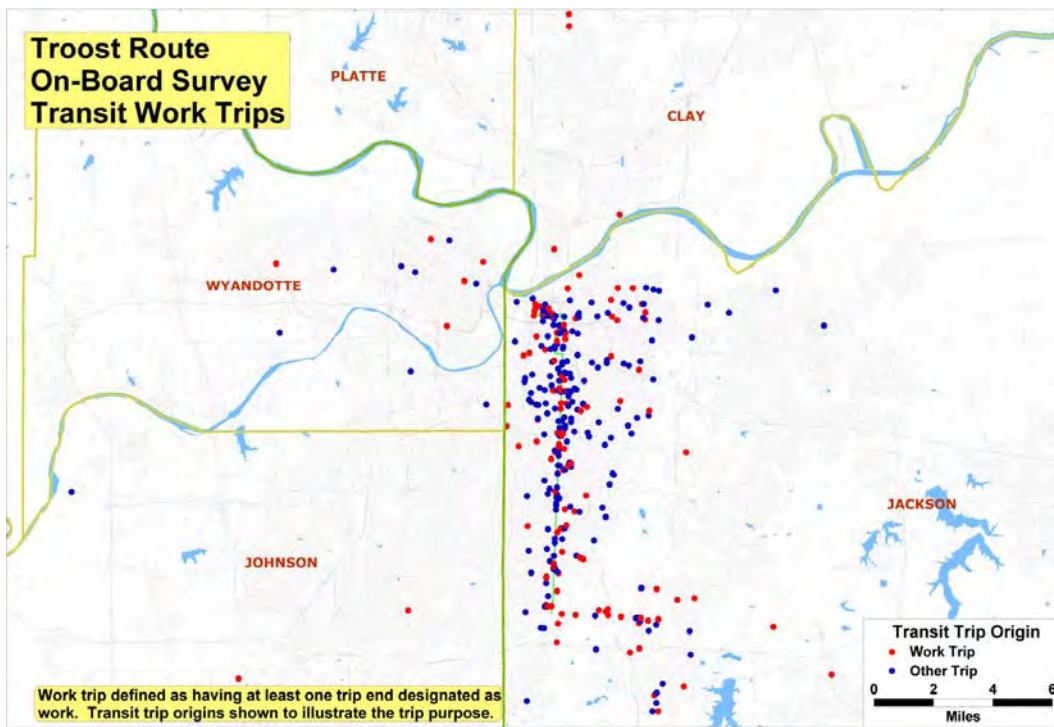


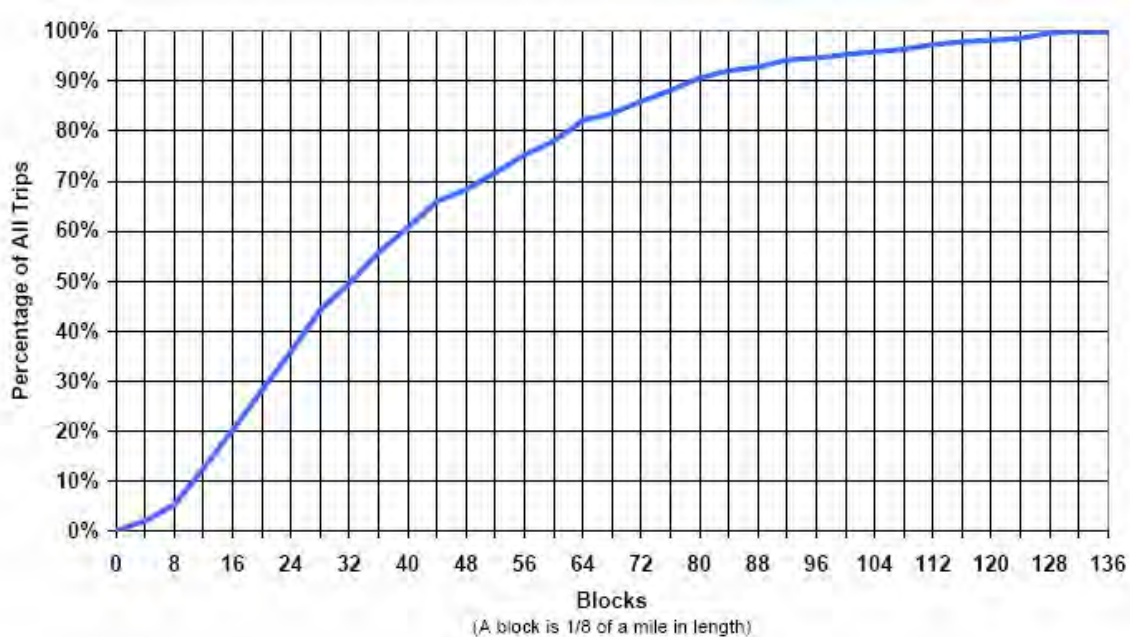
Figure 5—Transit Work Trips



Trip Characteristics

Most riders were using the Troost route to travel between 8 to 28 blocks. While overall, over 80% of all riders were traveling more than two miles. The highest purpose for using the Troost #25 was to go to work as indicated by 36% of all respondents.

Figure 6—Length of Trips



Questions about MAX

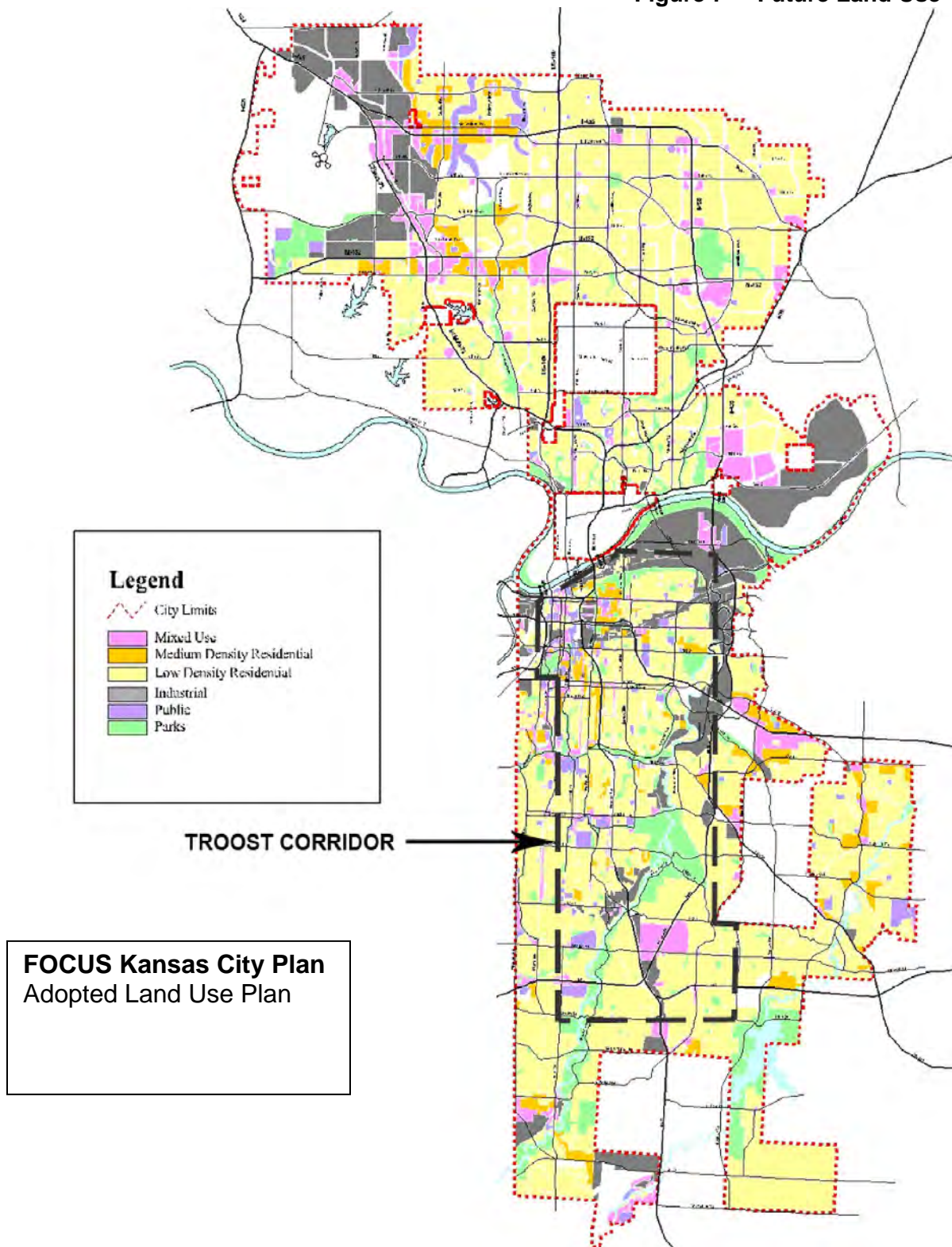
Many respondents had good impressions of the MAX service and had used MAX. Of those surveyed 57% of Troost riders had used MAX. In addition, 77% of Troost riders have a good impression of MAX and 68% believed that MAX service on Troost would be successful.

LAND USE AND ACTIVITY CENTERS

The corridor is in the urban core of Kansas City, Missouri. Population within the Corridor decreased during the 1970s and 1980s as the metropolitan area experienced a high level of suburbanization. Within the past two decades, some corridor districts and neighborhoods have stabilized as reinvestment has occurred. Significant reinvestment is now taking place within the Downtown CBD and adjacent neighborhoods along the Troost Corridor. However, areas within the corridor south of the CBD continue to need substantial revitalization.

Land Uses within the Study Corridor vary greatly in terms of uses and densities. See Figure 7.

Figure 7 – Future Land Use



Corridor Section 1. Downtown/CBD: Land uses within the CBD are characterized by a mix of high-rise and mid-rise office buildings, restaurants and urban residences. The CBD is currently the Metropolitan Area's largest office center; is the Center of City and County government; home to the City's convention center and many of the Metro Area's important existing cultural institutions including the future Performing Arts Center; is the location of a major future retail and entertainment district; and a growing residential community.

Activity Centers include:

- Major office headquarters
- Entertainment District (under construction, to be completed in late 2007)
- City Hall
- County Courthouse
- Residential loft districts
- Sprint Arena (under construction, opening in October 2007)
- Performing Arts – theatre and music hall
- Municipal Auditorium
- Convention Center
- Crown Center mixed use retail entertainment center
- Arts District

Troost Corridor Section 2. CBD to 75th Street: Land uses east and south of the CBD are characterized to include a mix of urban land uses including residential, small commercial establishments, medical, social service and medical.

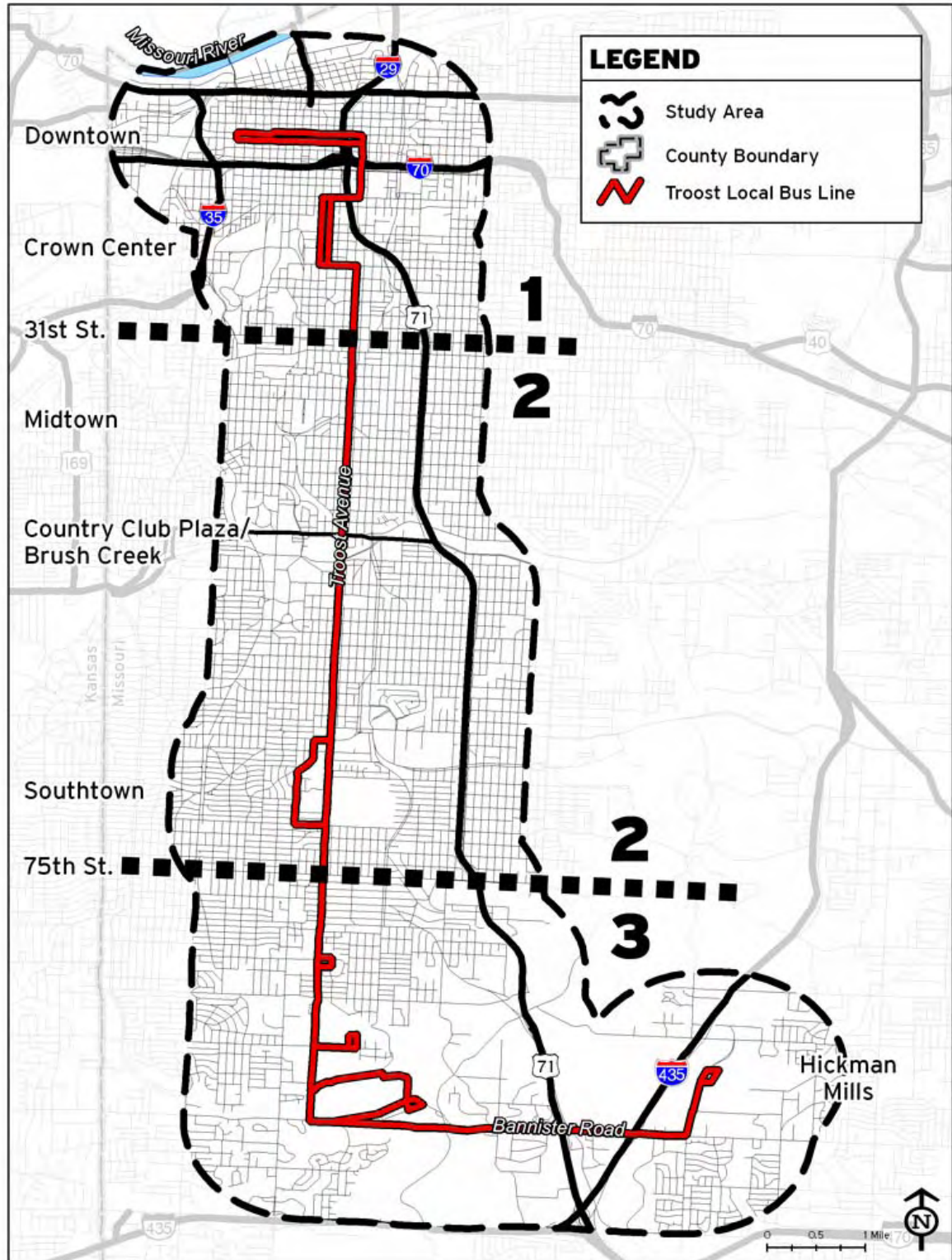
Activity centers include:

- Hospital Hill/Truman Medical Center
- 39th Street MetroCenter
- Brush Creek Corridor Institutions including the Discovery Center, Kauffmann Foundation, and the Stowers Institute for Medical Research
- UMKC
- Rockhurst University
- The Landing Shopping Center and immediate vicinity
- Medical offices around former Baptist Hospital
- Emanuel Cleaver II YMCA

Troost Corridor Section 3. 75th Street to Bannister Mall: This area is primarily residential. It does include major employment and retail centers located along the Bannister Road portion of this study corridor. However, this area has undergone significant change in recent years and much of the retail has closed and numerous businesses have relocated.

Activity centers located in this section of the Troost Corridor includes:

- President Gardens Residential Development
- National Archives and Records
- Hillcrest Transfer Center
- Mazuma Credit Union



SOCIO-ECONOMIC CHARACTERISTICS OF THE TROOST CORRIDOR

Population Characteristics – The population characteristics of the Troost Corridor are presented in Table 1 and 2 and are shown graphically in Figures 8 and 9. The corridor is shown to have a greater density than the City of Kansas City and the region as a whole. As shown in Table 2, the Troost Corridor has a higher percentage of non-Caucasian population than the city or the region.

Table 1 – Population and Population Density

Corridor Section	Area (Acres)	Population					
		2000		2010		Change	
		Number	Pop./Acre	Number	Pop./Acre	Number	%
1	6,618	34,324	5.2	35,393	5.3	1,069	3.1%
2	13,687	98,961	7.2	88,610	6.5	-10,351	-10.5%
3	14,202	45,399	3.2	41,749	2.9	-3,650	-8.0%
Corridor Total	34,507	178,684	5.2	165,753	4.8	-12,931	-7.2%
Kansas City, MO	200,960	441,545	2.2	NA	NA	NA	NA
Kansas City MSA	2,419,200	1,695,764	0.7	1,905,522	0.8	209,758	12.4%

Source: MARC

Table 2 – Racial Characteristics

Corridor Section	Population				
	Total	Caucasian		Non-Caucasian	
		Number	%	Number	%
1	34,324	8,988	26.2%	25,336	73.8%
2	98,961	39,749	40.2%	59,212	59.8%
3	45,399	23,986	52.8%	21,413	47.2%
Corridor Total	178,684	72,723	40.7%	105,961	59.3%
Kansas City, MO	441,269	268,449	60.8%	172,820	39.2%
Kansas City MSA	1,776,062	1,434,512	80.8%	341,550	19.2%

Source: US Census, 2000

Figure 8 – Population Density

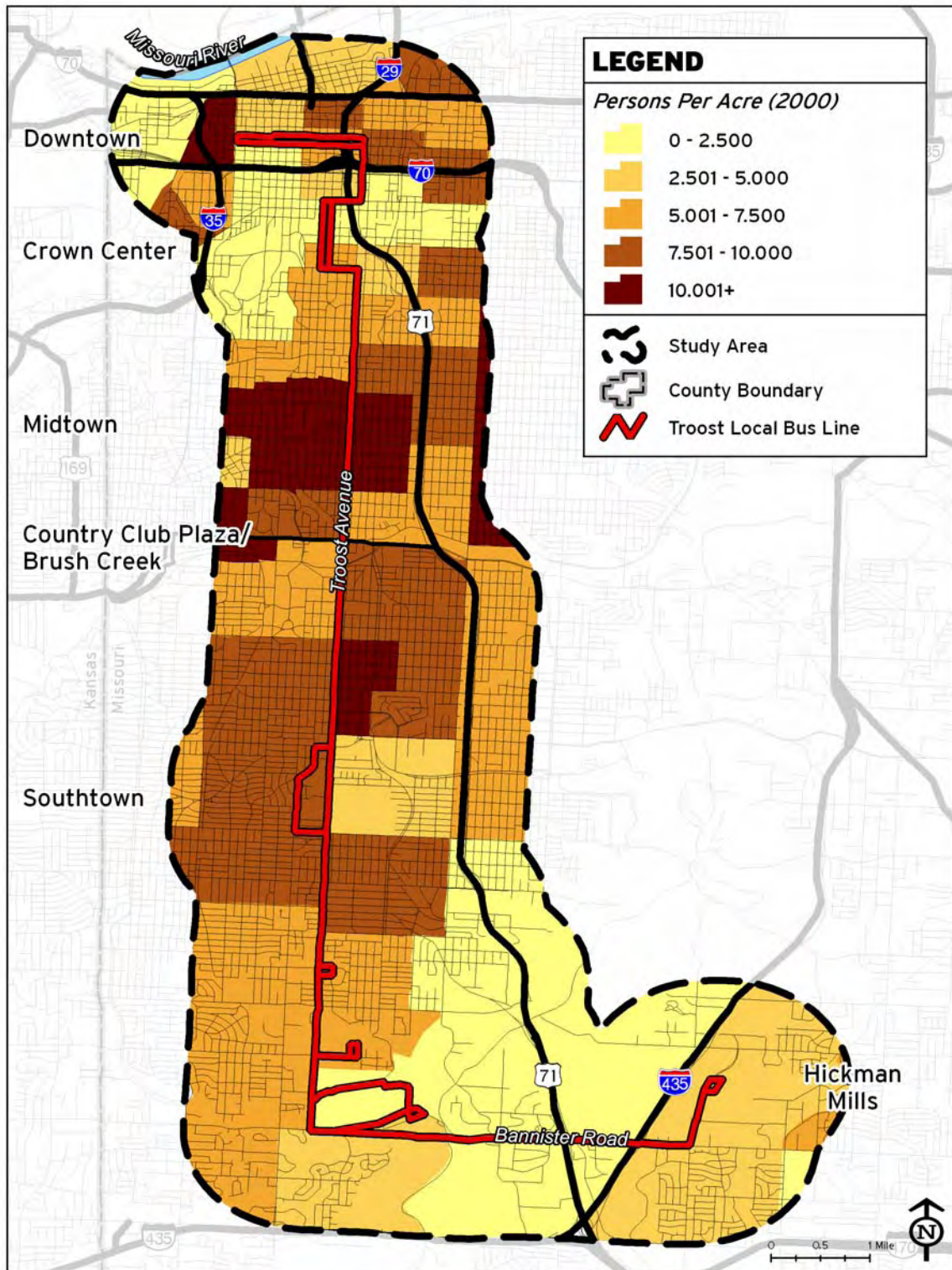
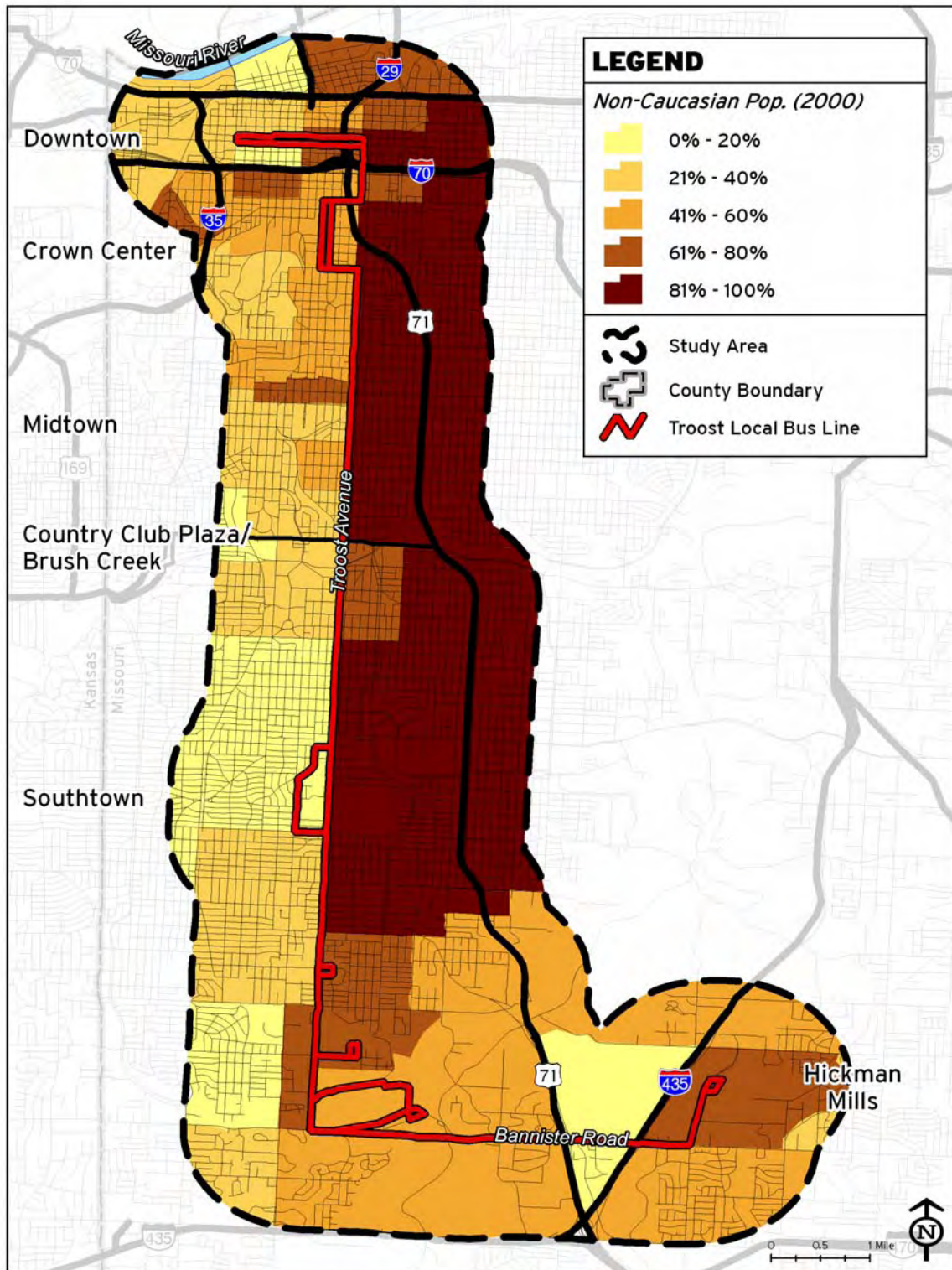


Figure 9 – Racial Characteristics



Household Characteristics – additional characteristics of the Troost Corridor are presented in Table 3 and are shown graphically in Figures 10, 11, 12 and 13. The information shows that households in the corridor on average have lower incomes and own fewer vehicles as compared to the City and regional averages.

Table 3 – Household Characteristics

Corridor Section	Households	Median Income	Low & Medium-Low Income*	Owner-Occupancy	Auto-Ownership		
					0 Cars	1 Car	2+ Cars
1	14,074	\$21,780	83.8%	28.5%	28.6%	47.9%	23.5%
2	43,805	\$28,582	67.6%	52.3%	19.3%	43.6%	37.1%
3	19,829	\$35,703	19.6%	52.6%	8.6%	47.5%	43.8%
Corridor Total	77,708	\$29,167	58.3%	48.1%	18.3%	45.4%	36.3%
Kansas City, MO	184,028	\$37,198	43.4%	57.7%	12.9%	40.8%	46.3%
Kansas City MSA	694,971	\$46,193	33.4%	67.9%	7.3%	33.5%	59.2%

*Calculated in relation \$32,547.50, the household income (1999) separating medium-low income households from medium income households as determined by the U.S. Census Bureau

Employment Characteristics – the level of employment is presented in Table 4 and employment is shown graphically in Figure 14.

Table 4 – Employment Density

Corridor Section	Employment					
	2000		2010 (Projected)		Change	
	Number	Jobs/Acre	Number	Jobs/Acre	Number	%
1	150,573	22.8	167,151	25.3	16,578	11.0%
2	79,263	5.8	90,968	6.6	11,705	14.8%
3	39,893	2.8	43,946	3.1	4,054	10.2%
Corridor Total	269,729	7.8	302,065	8.8	32,337	12.0%
Kansas City, MO	NA	NA	NA	NA	NA	NA
Kansas City MSA	1,166,709	0.5	1,426,048	0.6	259,339	22.2%

Source: MARC

Figure 10 – Household Density

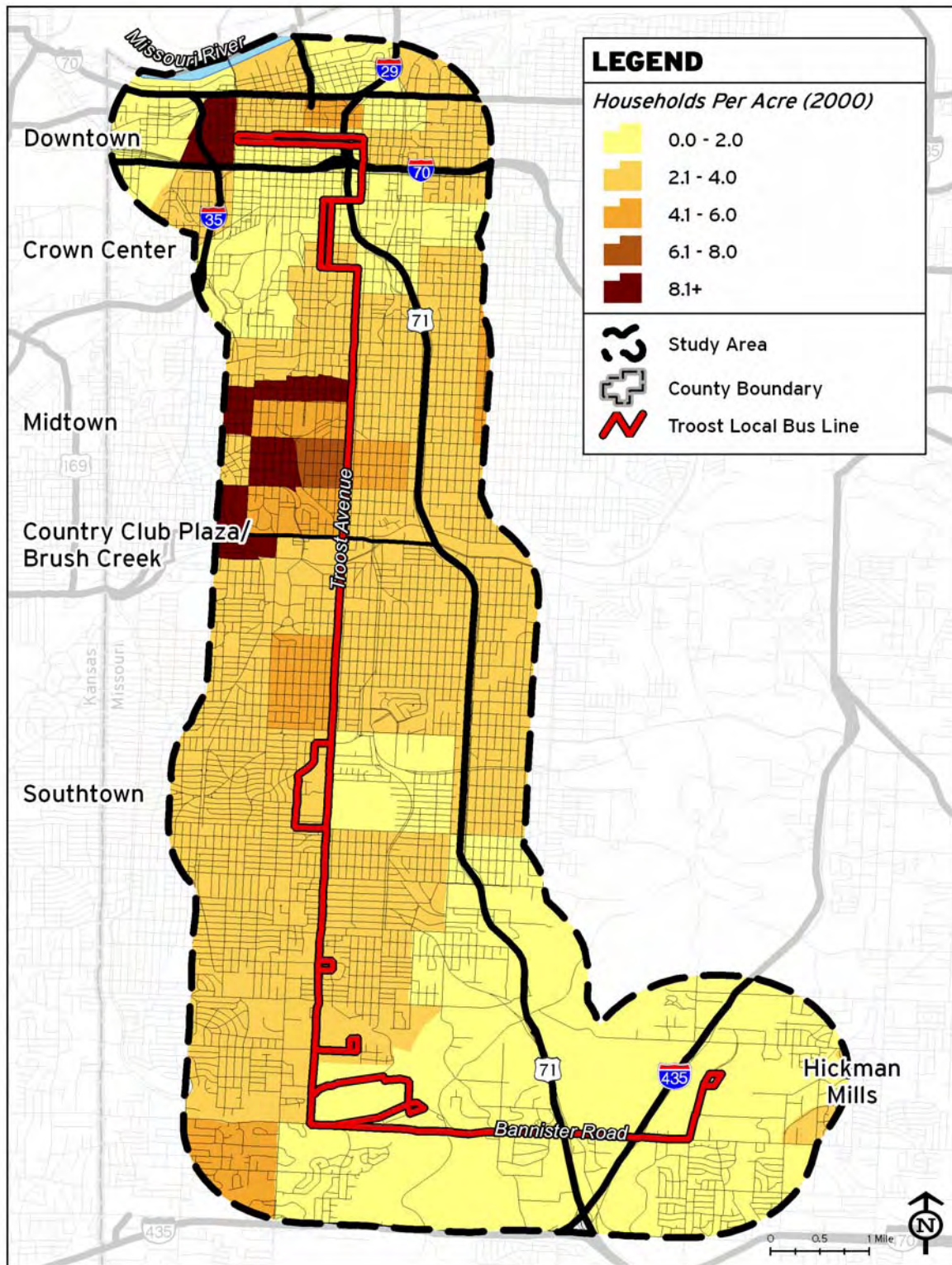


Figure 11 – Household Median Income

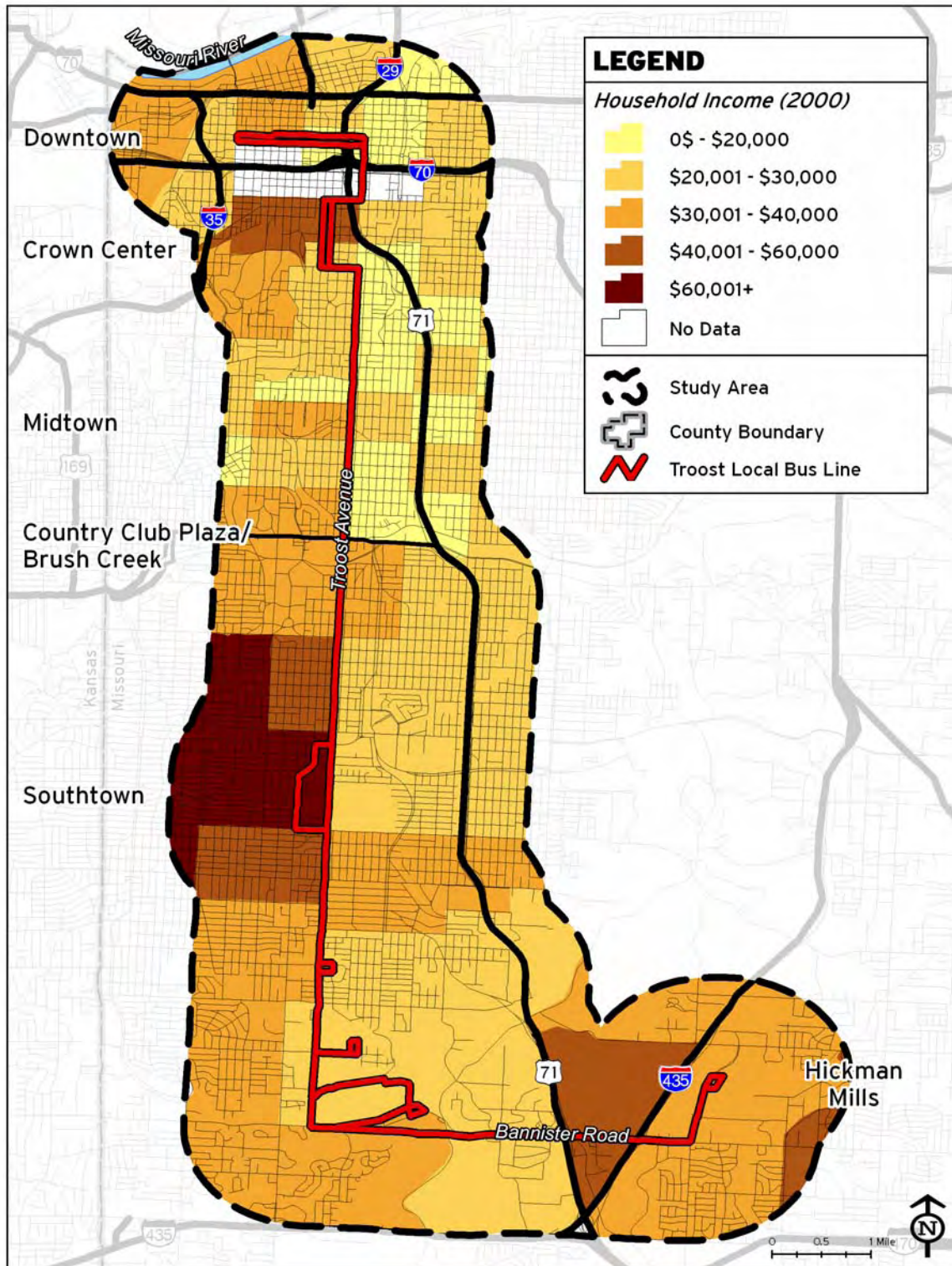


Figure 12 – Owner Occupied Housing

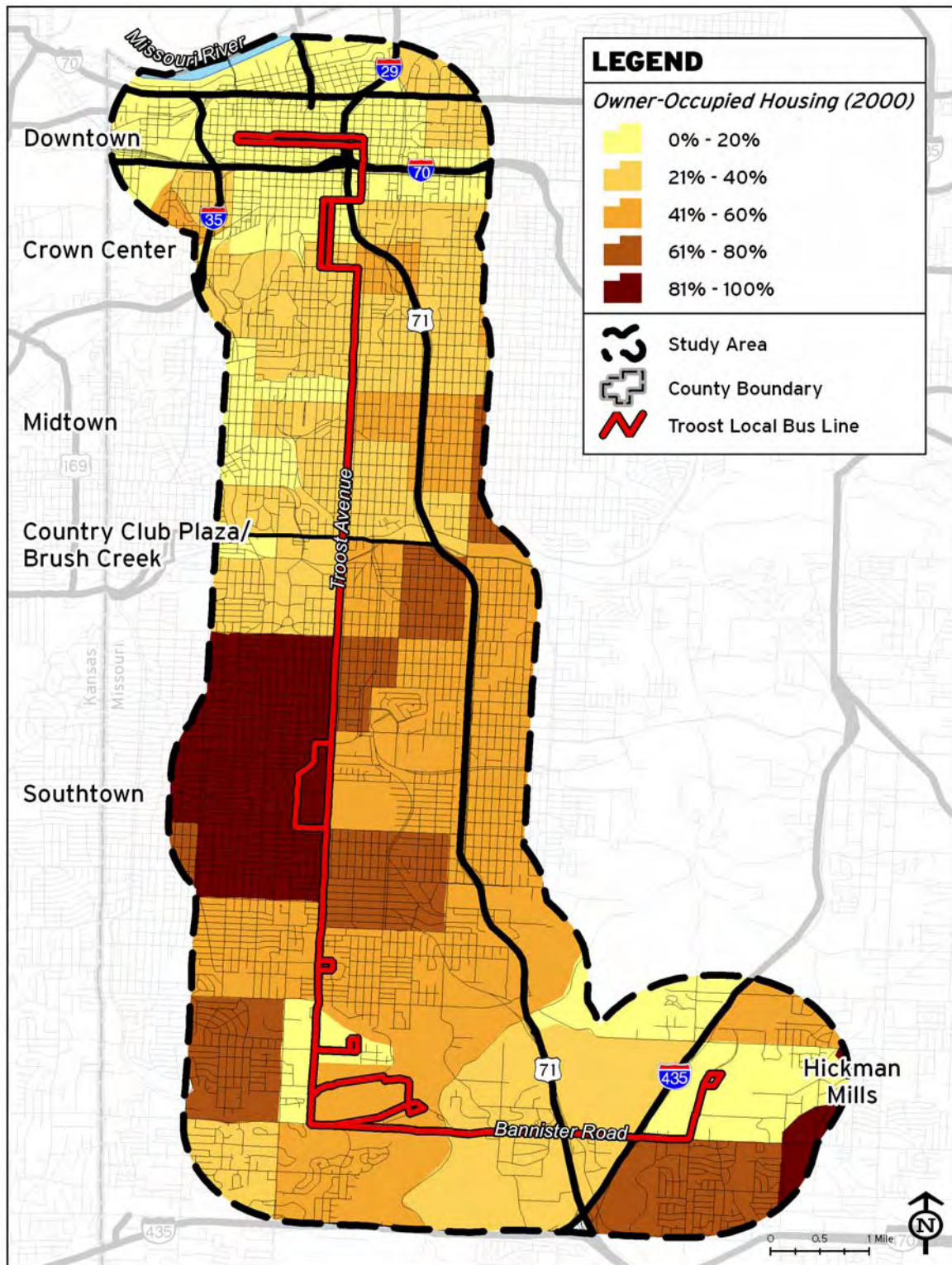


Figure 13 – Auto Ownership

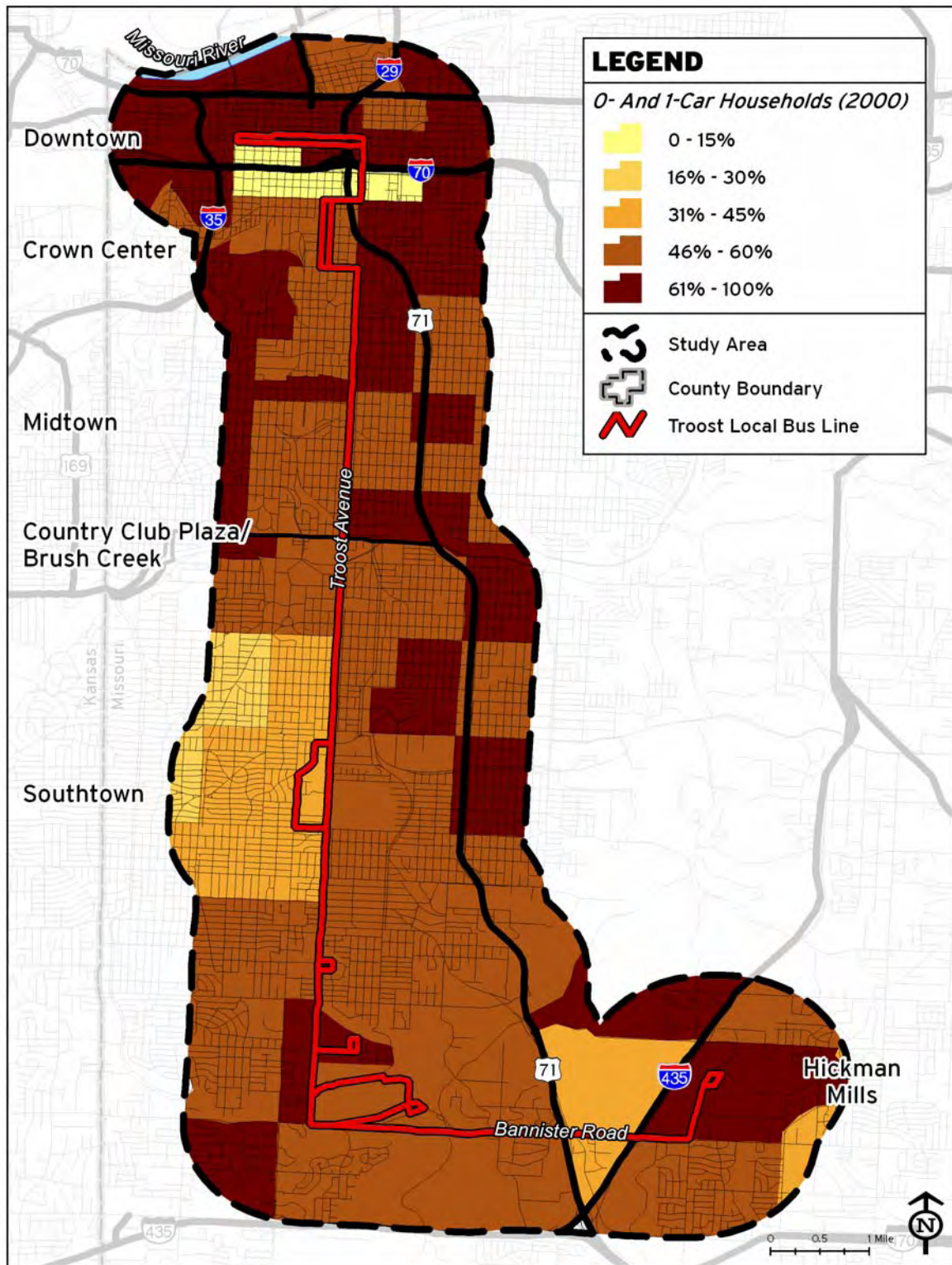
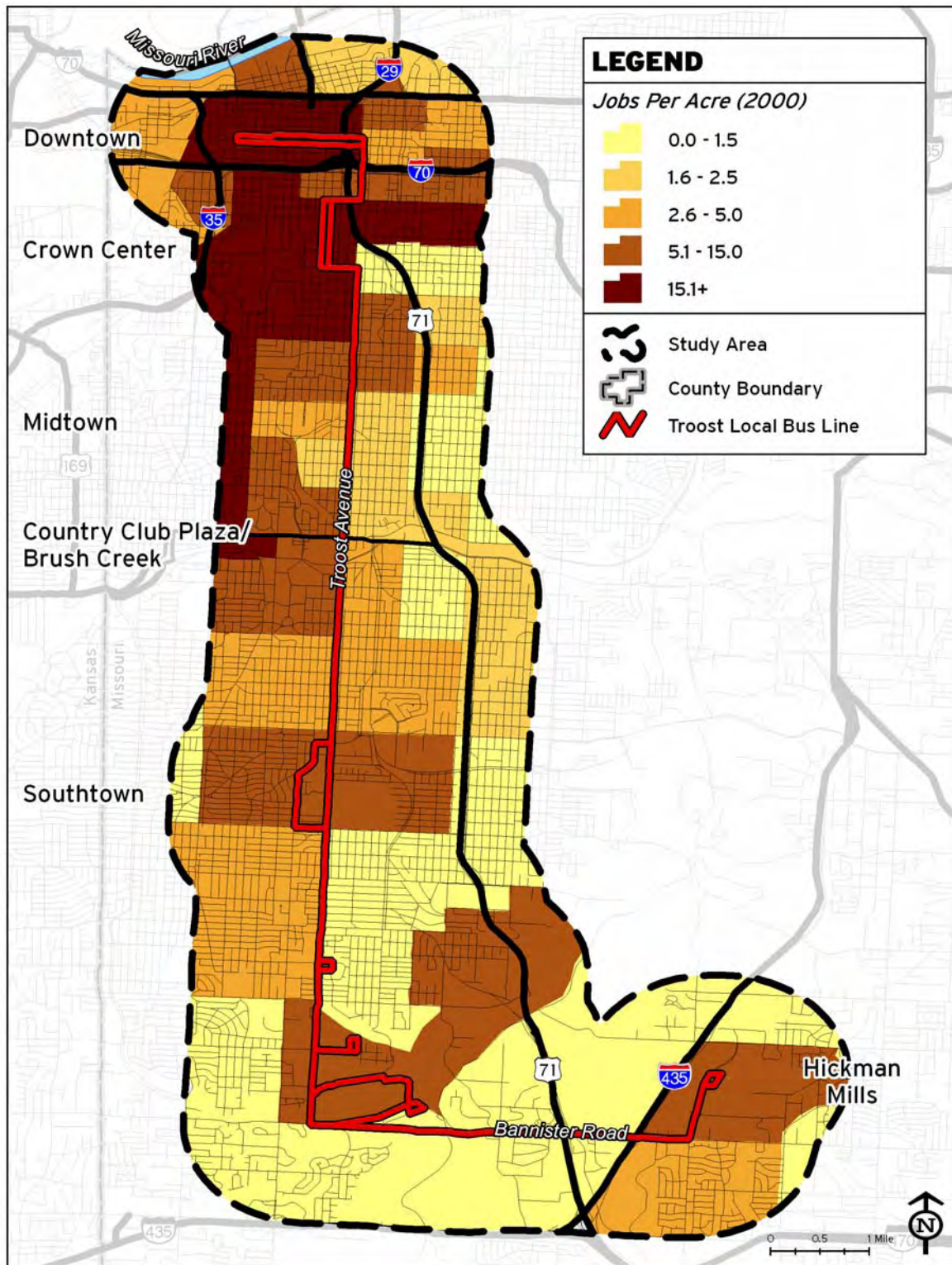


Figure 14 – Employment Density



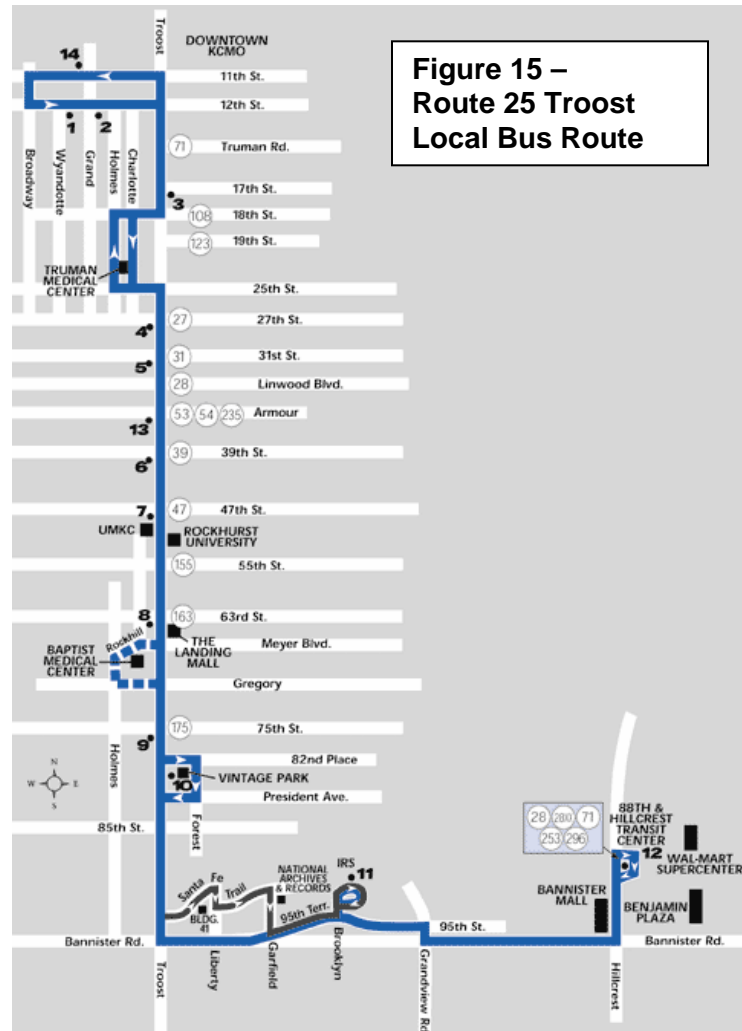
Employment Characteristics – the level of employment is presented in Table 4 and employment is shown graphically in Figure 10.

Existing Service – Troost Route 25 Description

The existing Troost local bus route serves the Troost Corridor. The Troost route is shown in Figure 11. The route circulates through the CBD on 11th and 12th Streets. It operates north-south on Troost Ave. between 11th and Bannister Road. The route then operates east-west between Troost and Hillcrest, terminating at the Hillcrest Transit Center. This local bus route operates at a 10 to 12 minute frequencies between 4:00 a.m. and 6:00 p.m. and 30-minute frequency from 6:00 p.m. to midnight. On Saturday, the frequency is 15 minutes during the day and 30 minutes in the evening. Sunday service frequency is 30 minutes for both day and evening.

Today, the local route 25 Troost runs between the downtown and Bannister Transit Center in Kansas City, Missouri. Starting on 12th Street at Wyandotte Street the route is primarily on either 12th Street or 11th Street through the downtown, north and southbound on Troost Avenue and through Santa Fe Trail to terminate at the Bannister (IRS) Federal Complex. There is a slight deviation from this route to pass the Truman Medical Center on Charlotte Street as well as a number of deviations depending on the time of day. Thirty percent of the daytime service buses run along Bannister Road and extend past the Federal Complex to the Bannister Transit Center. A map of the route is shown in Figure 15.

One deviation has the route terminating at 89th Street and Flora/Wayne prior to 9 a.m. and after 6:30 p.m. on Sundays. Another deviation is a pass-by of President Gardens by thirty-five percent of trips during the week and between the hours of 4:00 a.m. and 6:00 p.m.



The total length of the base route to Bannister Road is approximately 10 miles, and with the extended route to Hillcrest and the Bannister Mall, the length is approximately 15 miles. The base route average operating speed is about 14 miles/hour and 13 miles/hour in the southbound and northbound directions respectively during the day although average speeds on several sections are even lower. With the extended route, this increases to 16 miles/hour and 15 miles/hour during the day. The average operating speeds are similar at night.

Troost Hours and Frequency

Route 25 runs southbound from 4:00 a.m. to 11:30 p.m. and northbound from 4:30 a.m. to 12:30 p.m. The base route from downtown to the Federal Complex is approximately 50 minutes in duration and the extended trip takes about 10 additional minutes making the total trip 1 hour. The route has a 10-12 minute frequency throughout the day starting at 5:30 a.m. until approximately 6:00 p.m. when the frequency changes to 30 minutes. Prior to 5:30 a.m., the frequency is transitions from every thirty minutes to every 12 minutes.

Troost Vehicle Requirements

The number of buses scheduled on the 25 Troost route at different times throughout the week is summarized below in Table 5.

Table 5 – Troost Vehicle Requirements

Day	Time Period			
	AM (peak)	11 a.m. (off-peak)	PM (peak)	Night
Monday to Friday	12	11	14	5
Saturday	8	8	8	5
Sunday	5	5	5	4

Troost Ridership

In March of 2007, approximately 7,700 people board Route 25 each weekday. This is the busiest KCATA bus route. The areas where there are the highest number of boardings and alightings are at the main cross streets where there are transfer points with crossing routes. Figures 12 and 13 show the average weekday ons and offs at each of the stops, with labels at the busiest stops. The ridership data comes from the KCATA automated passenger counting (APC) system.

Ridership has slightly decreased due to the closing of the Wal-mart Supercenter, Bannister Mall and the relocation of the IRS headquarters.

Figure 16 – Route 25 Southbound boardings (ons) and alightings (offs)

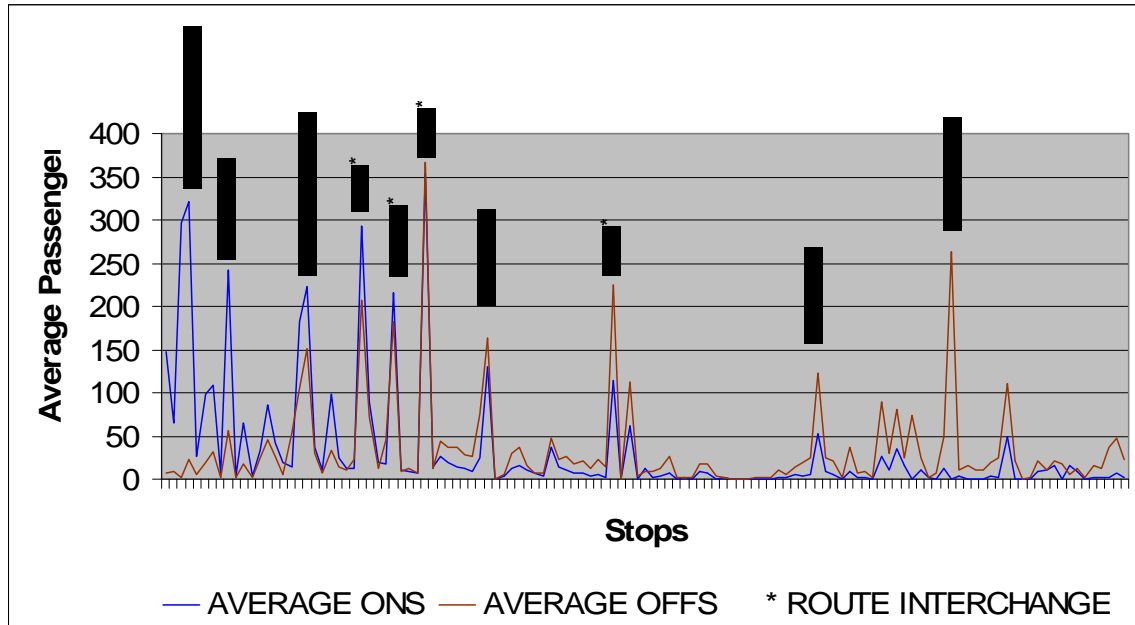
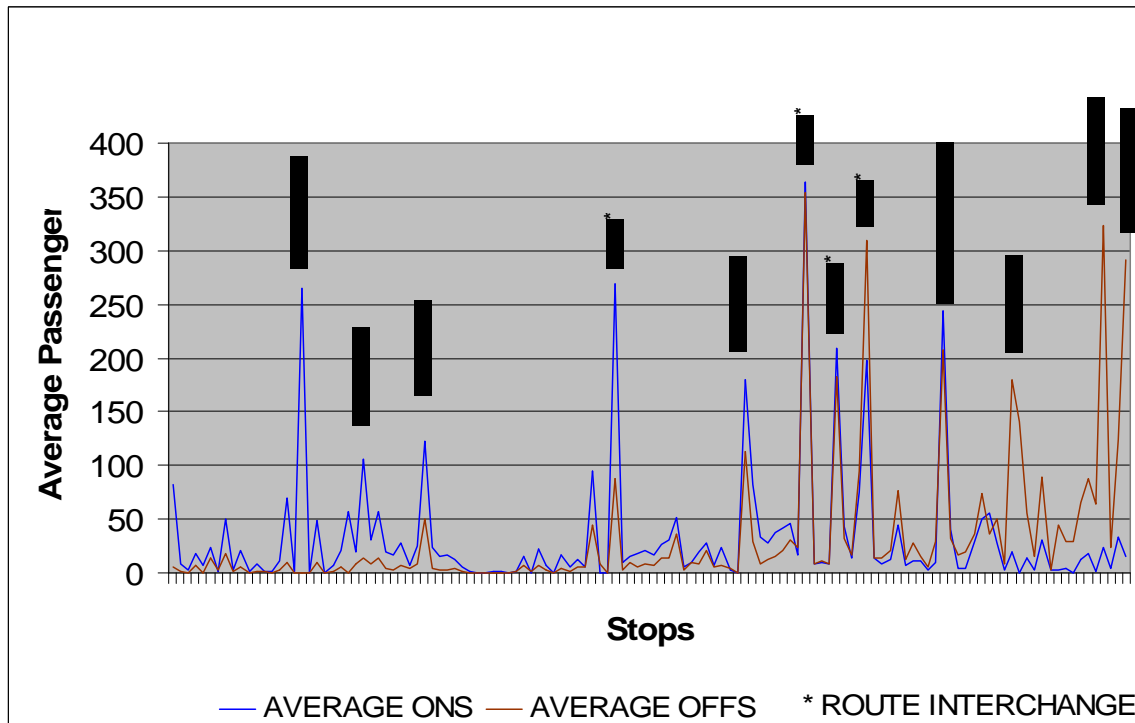


Figure 17 – Route 25 Northbound boardings (ons) and alightings (offs)



Crossing Transit Routes

There are a number of local bus routes in the Troost Corridor that intersect and exchange passengers with the 25 Troost local. The KCATA APC system was also used to collect data from these routes.

Route 71 meets route 25 at Truman Road and at the Bannister Transit Center and essentially runs parallel to route 25 east of Troost, on Prospect Avenue. At the Troost transfer point there are approximately 150 boardings and 160 alightings and the key directions of travel are from/to the east and south. This is one of the busier transfer points along route 71. Route 71 runs from 5:00 a.m. to midnight with a frequency of 10 minutes in the peak periods and 30 minutes in the evenings and on week-ends. Key stops along route 71 include Bannister Mall, Downtown KCMO, Linwood Shopping Center, Lucile Bluford Library, Pioneer Campus of Penn Valley and 10th & Main Transit Plaza.

Route 25 is crossed by route 108 at 18th Street. The main stops along this route include the 10th and Main Transit Plaza, Downtown KCMO, Parade Park, Benton Park and the Bruce R. Watkins Cultural Center. The route runs Monday through Sunday from about 5:00 a.m. to midnight. On weekdays during the day the route frequency varies from 15 to 35 minutes, Saturdays the daytime frequency is 35 minutes and at night and on Sundays there is hourly frequency. At Troost, there are approximately 170 boardings and 160 alightings daily at this crossing point.

Route 27 crosses route 25 at 27th Street and runs between the hours of 5:00 a.m. and 11:30 p.m. with a frequency of 20 minutes in the peak periods and 30 minutes off peak. Main stops along the route include Children's Mercy Hospital, Truman Medical Center and Union Station. The average daily boardings and alightings at this transfer point are 285 and 300 respectively with the most movements from/to the east and south. The transfer point at Troost Avenue is the second busiest along route 27.

Route 25 is crossed by route 31 at 31st Street. The main stops along route 31 include the VA Medical Center in the east, Lucile Bluford Library / Linwood Shopping Center and Penn Valley Community College in the west. The transfer point at route 25 has the second highest number of boardings and alightings just behind the stop at the Linwood Shopping Center. Route 31 runs Monday to Sunday between the hours of about 5:00 a.m. and midnight with a frequency of about 15 minutes throughout the daytime and 30 minutes in the evenings and week-ends. The boardings and alightings are relatively balanced at the transfer point at route 25 with a daily average of 920 and 885 respectively. The main directions are traveled from/to the east and south.

Route 28 from the downtown to south of Bannister Road. It crosses route 25 at Linwood Boulevard and at the Bannister Transit Center. The main stops along this route include the Downtown KCMO, Bannister Mall and Longview Square. The route runs Monday through Saturday from about 5:00 a.m. to 7:00 pm and the frequency varies during the week from 10 minutes to 40 minutes. The frequency on Saturdays is 30 minutes. There are also two express routes 28 Blue Ridge Express and I-435 South Express that run between 6:00 a.m. and 7:30 a.m. and 3:40 to 5:15 p.m. with a frequency of approximately 15 minutes. At Troost there are approximately 180 boardings and 190 alightings daily at the Linwood crossing point. The number of passengers traveling north

and south is relatively balanced. In the east and west directions there are more passengers traveling east.

Routes 53 and 54 cross Troost at Armour Street / 35th Street. Routes 53 and 54 are on the same path west of Troost Avenue through the downtown. Both routes stop at 10th and the Main Transit Plaza at Crown Center. Route 53 stops at Swope Park on weekends and otherwise terminates at Jackson and 68th Street. Route 54 passes the Landing Mall and Terminates at 80th Street and Hickman Mills. The route runs from 5:30 a.m. to about midnight and the frequency varies from 7 to 15 minutes in the peak periods to 35 minutes in the off peak periods and 30 minutes on week-ends. There are on average 470 route 53 boardings and 400 route 53 alightings as well as 470 route 54 boardings and 410 route 54 alightings at this transfer point per day and the key traveling directions are from/to the east and south.

At Armour Road, route 235 crosses route 25 Monday to Sunday with a frequency of 25 minutes during peak periods, 50 minutes in off peak periods and 60 minutes on Saturdays and Sundays. The bus runs from about 5:00 a.m. to midnight during the week and 6:00 a.m. to 7:00 p.m. on week-ends. On average there are 460 boardings and 410 alightings daily at this transfer point which is the busiest transfer point along route 235. The main directions are from/to the east and south. The main stops along this route are at Van Brunt, Dunbar Apartments, KC Life Insurance and V.A. Hospital.

The base local route 39 travels between Broadway and Cleveland along 39th Street with deviations to 39th at Adams, Nichols Road at Jefferson, 45th at Kensington and 39th at Topping throughout the day Monday to Saturday between 5:00 a.m. and midnight. Sunday the route runs from KU Medical Center to 39th and Van Brunt with a loop to 45th and Kensington. The route has a 10 minute frequency in the peak periods, a 15-20 minute frequency in the off peak periods and a 30 minute frequency in the evenings. There are on average 1435 boardings and 1385 alightings per day at the transfer point with route 25 which makes it the busiest transfer point along route 39 and on route 25. The main directions traveled are to/from the north and west although all directions are relatively equal. Key stops along the route include the Troost MetroCenter, Country Club Plaza, KU Medical Center and St. Luke's Hospital.

Route 47 runs from about 5:00 a.m. to 7:00 p.m. Monday to Saturday and crosses Troost Avenue and route 25 at 47th Street. The frequency of the route varies from 15 minutes to 40 minutes throughout the day and hourly on Saturday. The average daily boardings and alightings at the transfer point with route 25 are 360 and 320 respectively.

At 63rd Street, route 163 also crosses route 25. Key stops for Route 163 include Brookside Plaza, The Landing, Metro Plaza, Southeast Library, Kansas City Zoo and Brywood Shopping Centre. The route runs seven days a week from about 6:00 a.m. to 10 p.m. and has a frequency that varies from 30 to 40 minutes throughout the day during the week and every 30 minutes on week-ends. The Troost transfer point has the largest number of boardings and alightings of any other transfer point along this route with an average of 530 boardings and 430 alightings daily. The key directions of travel are northbound and eastbound.

Route 175 along 75th Street has a 30 minute frequency Monday through Sunday between 6:00 a.m. and 10 p.m. Key stops include the Ward Parkway Shopping Center, Waldo, East Hills Village, Victoria Estates Nursing Home, Southeast High School and

the zoo. There is a daily average of 310 boardings and 310 alightings at the Troost transfer point. When looking at travel north and south, the northbound direction is more prominent and ridership is relatively balanced between east and west travel.

ELEMENTS OF THE PLANNING STUDY

The planning study evaluated five components of transit service for the Southtown-Troost Corridor. Each of these elements include:

- Service Options
- Route
- Stations
- Design
- Operations

Service

Based on the results of the on-board survey that was conducted on February 20, 2007, and existing ridership data, many current customers would benefit from a limited stop service. In addition, current ridership patterns suggest that a local service is needed in the Troost corridor to serve riders whose trips are generally less than two miles in length.

The transit service recommendations for the Southtown-Troost Corridor are:

- Provide BRT Service
A bus rapid transit service from Downtown to a location between 75th and Bannister would benefit 70% to 80% of the riders in the corridor who are traveling more than two miles for their trip. In addition, these users are typically boarding the current Troost #25 service within two blocks of the recommended station locations.
- Maintain Local Service
Local service is an integral service component to the Southtown-Troost Corridor.
 - Downtown to Bannister Transit Center
 - Provide direct service along the entire Troost Corridor

Figure 18—BRT Rider Benefits

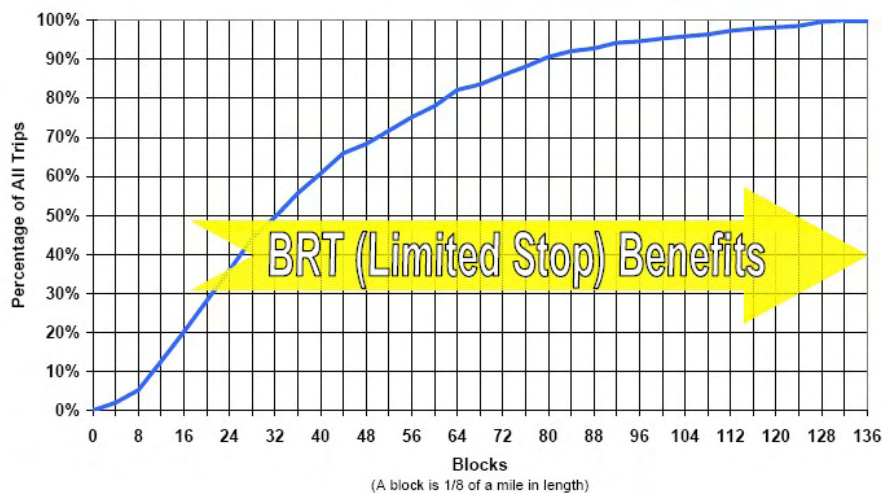
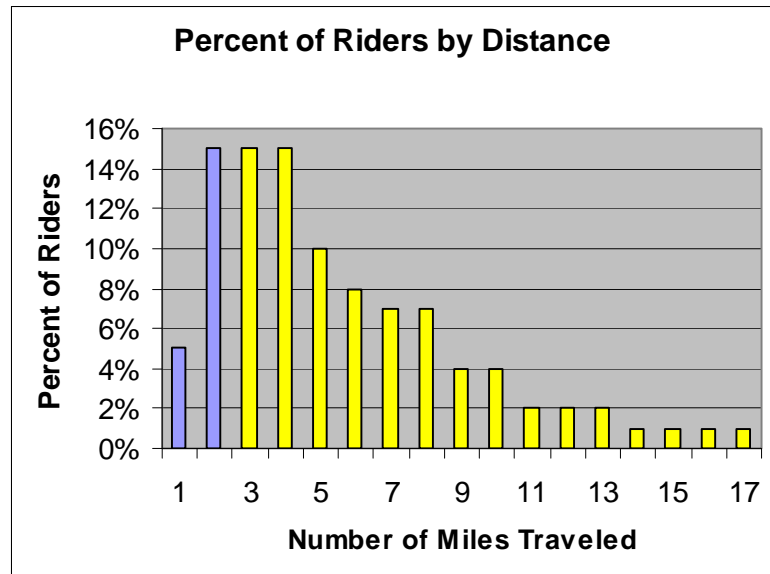


Figure 19—Riders by Distance



BRT Route Options

Many options were identified and evaluated to determine the route that would best serve customers along the Troost Corridor. Existing travel patterns, transfers, boardings and alightings, development potential and land use were all factors in determining a final route recommendation. The Corridor was analyzed in three sections. There were:

- Northern options into Downtown
- Central options between 27th Street and 75th Street
- Southern terminus options

Northern Options into Downtown

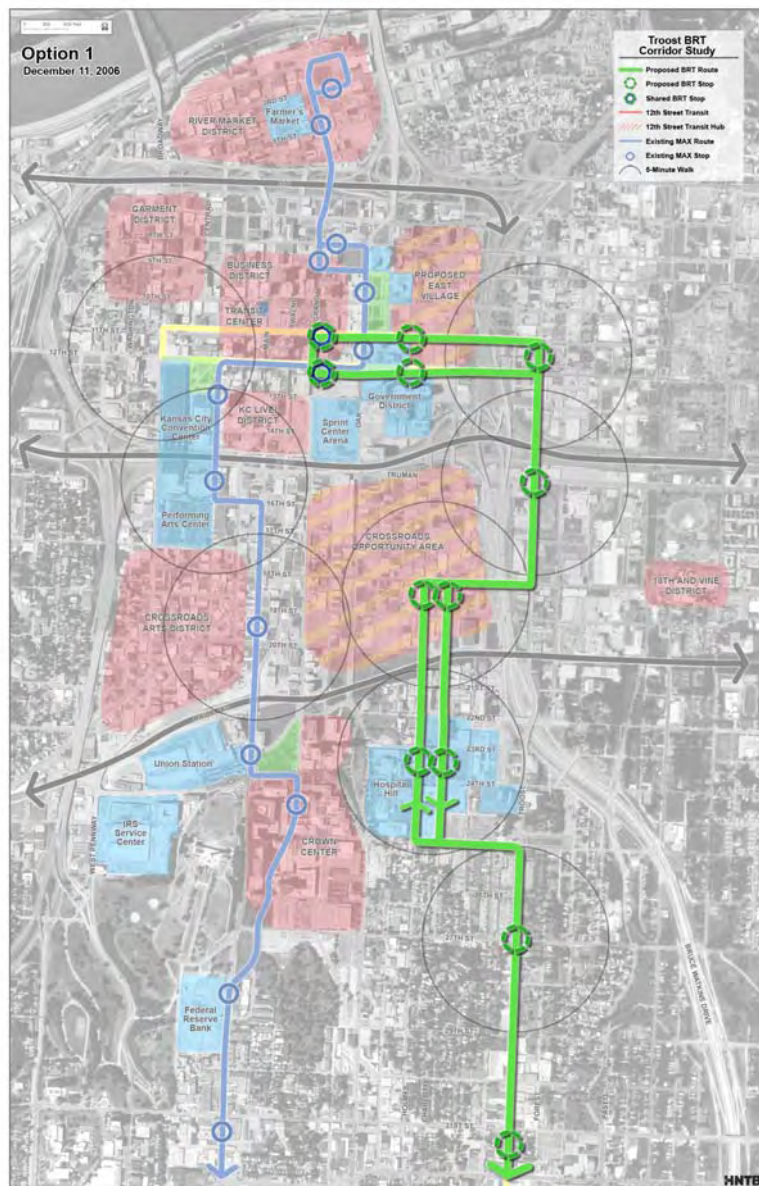
Multiple alternatives north of 27th Street were considered to connect a rapid transit service from Troost Avenue into Downtown. These options included using the following north-south streets:

- Troost
- Holmes/Charlotte
- Oak
- Grand

Downtown Connection Option 1

This option north of 27th Street turns west onto 25th Street and uses the Holmes and Charlotte one-way pair to travel through Hospital Hill. The inbound and outbound stations would be located near the Truman Medical Center entrances. The route would continue to 18th Street and then turn east bound to Troost Avenue. Service would continue north on Troost with a station near 17th and Troost to the 11th and 12th Streets one-way pair. A station would be located near the Greyhound bus terminal. The route would use the 11th and 12th Street pair with stations near Holmes, Oak and Grand. The turnaround would be at Main Street to allow riders to access the 10th and Main Transit Center. This option uses the same route that the Troost #25 uses to enter downtown and Hospital Hill.

Figure 20—Downtown Option 1

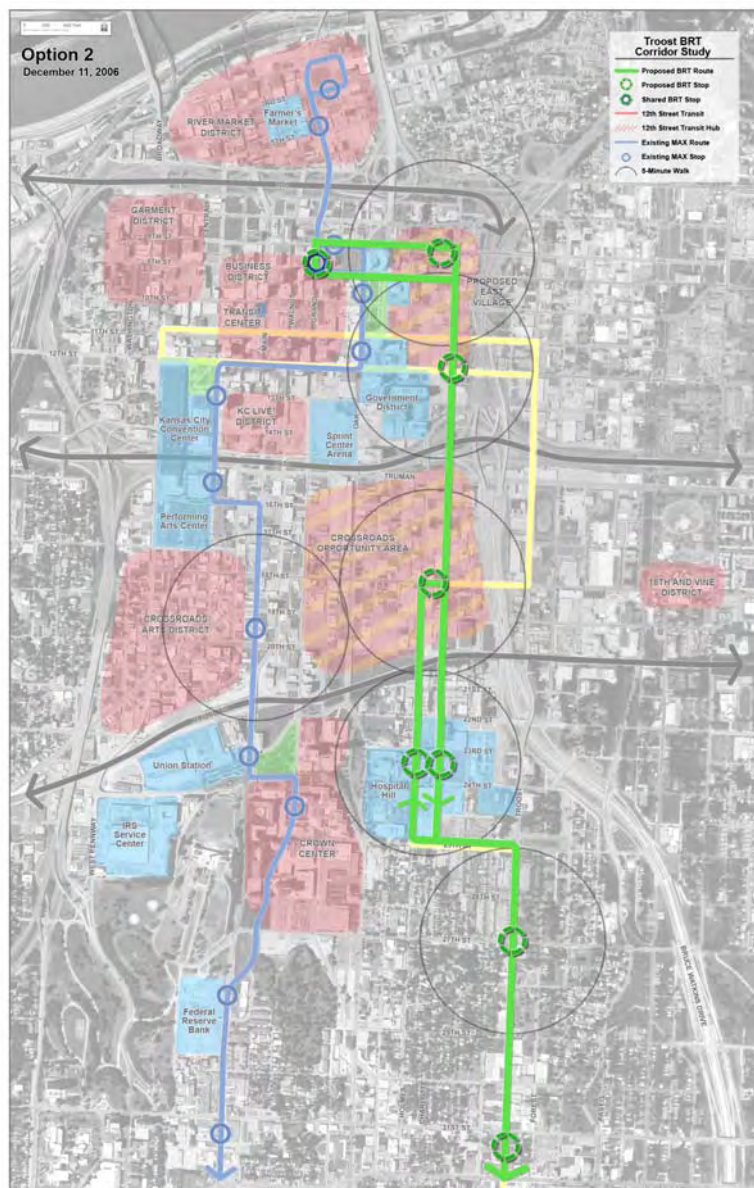


Downtown Connection Option 2

This option north of 27th Street turns west onto 25th Street and uses the Holmes and Charlotte one-way pair to travel through Hospital Hill. The inbound and outbound stations would be located near the Truman Medical Center entrances as identified in Option 1. The route would continue service on the Homes and Charlotte pair. The route would then use the 8th and 9th Streets one-way pair. This would provide direct service to the proposed East Village mixed use development and the north side of downtown. Stations would be located near Holmes, Oak and Grand. The turnaround would be near Main Street to allow riders to access the 10th and Main Transit Center.

An alternative for this option is to convert one of the travel lanes on Charlotte to a northbound transit lane that would keep the BRT service on one street.

Figure 21—Downtown Option 2

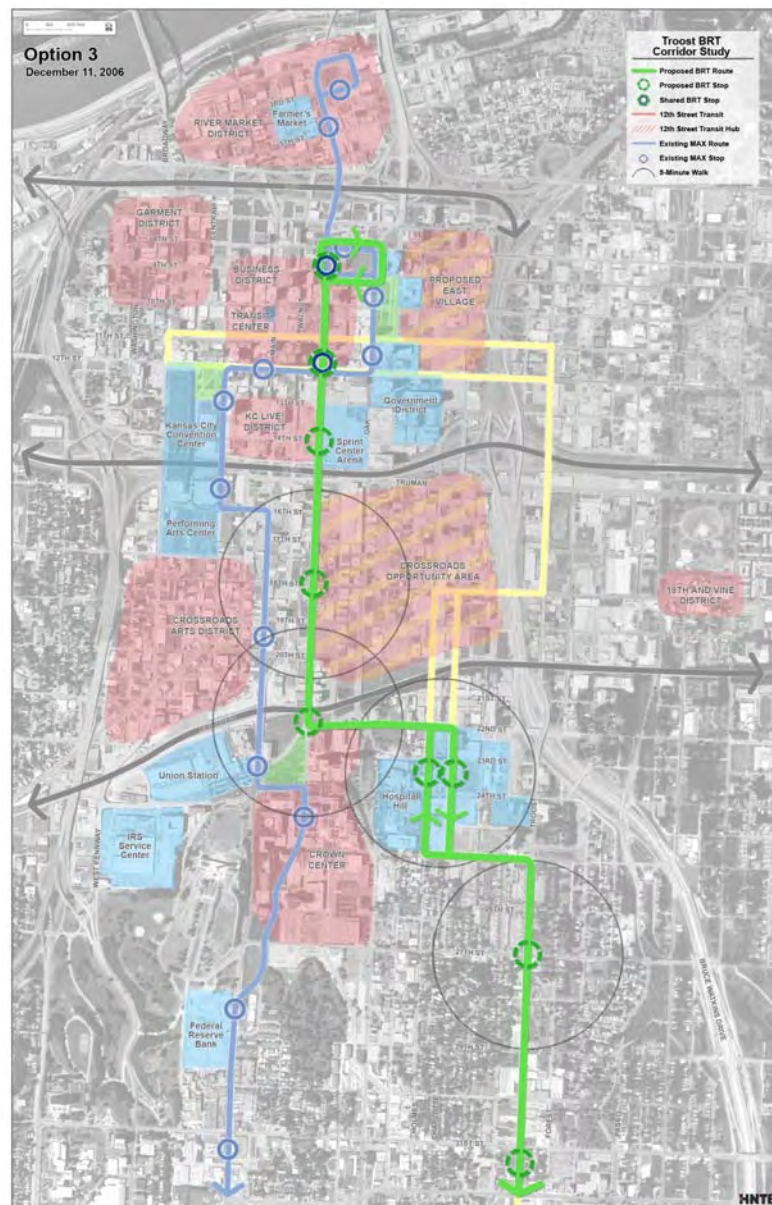


Downtown Connection Option 3

This option north of 27th Street turns west onto 25th Street and uses the Holmes and Charlotte one-way pair to travel through Hospital Hill. The inbound and outbound stations would be located near the Truman Medical Center entrances. The route would continue to 22nd Street and then turn west bound to Grand Boulevard. This route would provide service to the north end of Crown Center.

Service would continue north on Grand with a station near 18th and Grand to serve the Crossroads area. The route would continue on Grand to serve the new Sprint Arena and KC Live district and use the 8th and 9th Street pair to create a turnaround and connection to the existing MAX service.

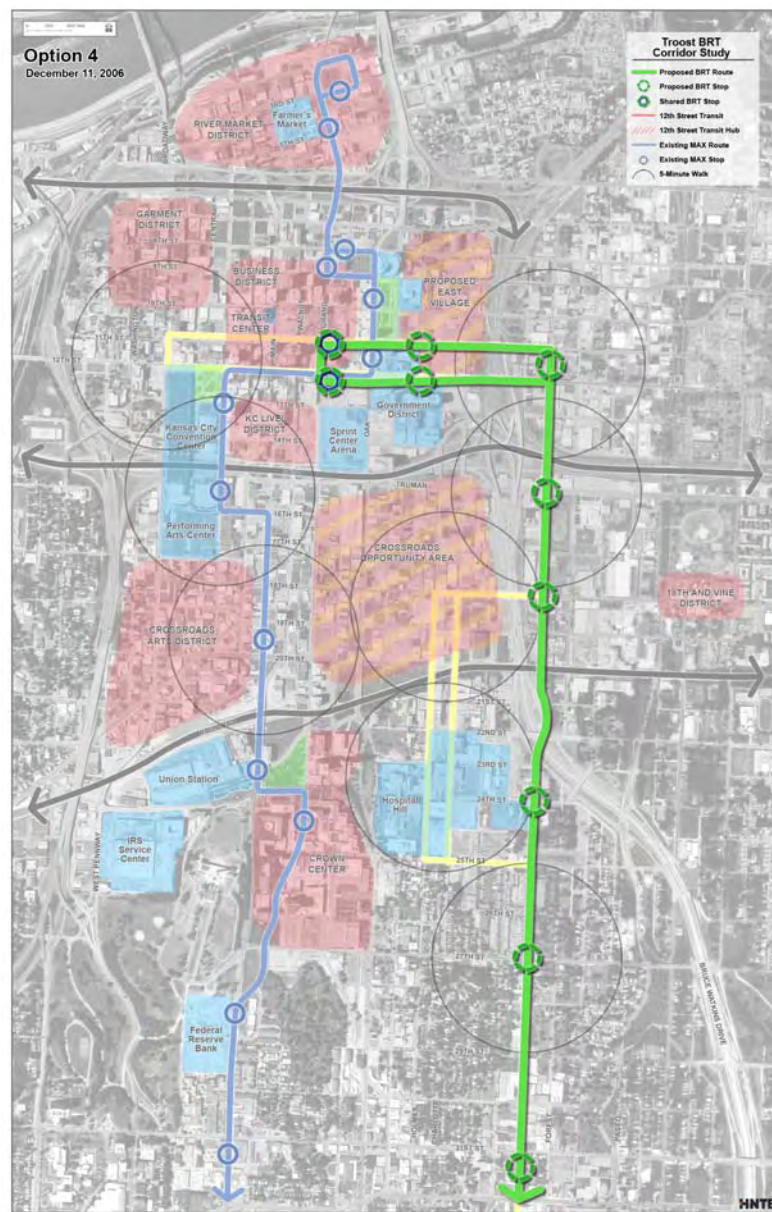
Figure 22—Downtown Option 3



Downtown Connection Option 4

This option north of 27th Street remains on Troost Avenue. A station would be located at 24th Street to serve Hospital Hill, the Health Department on the west side and the Beacon Hill neighborhood on the east side. Service would continue north on Troost with the next stations near 18th Street, Truman Boulevard and the Greyhound Terminal at 11th Street. The route would use the 11th and 12th Street pair with stations near Holmes, Oak and Grand. The turnaround would be at Main Street to allow riders to access the 10th and Main Transit Center. This option uses the same route that the Troost #25 uses except for the direct access to Hospital Hill.

Figure 23—Downtown Option 4



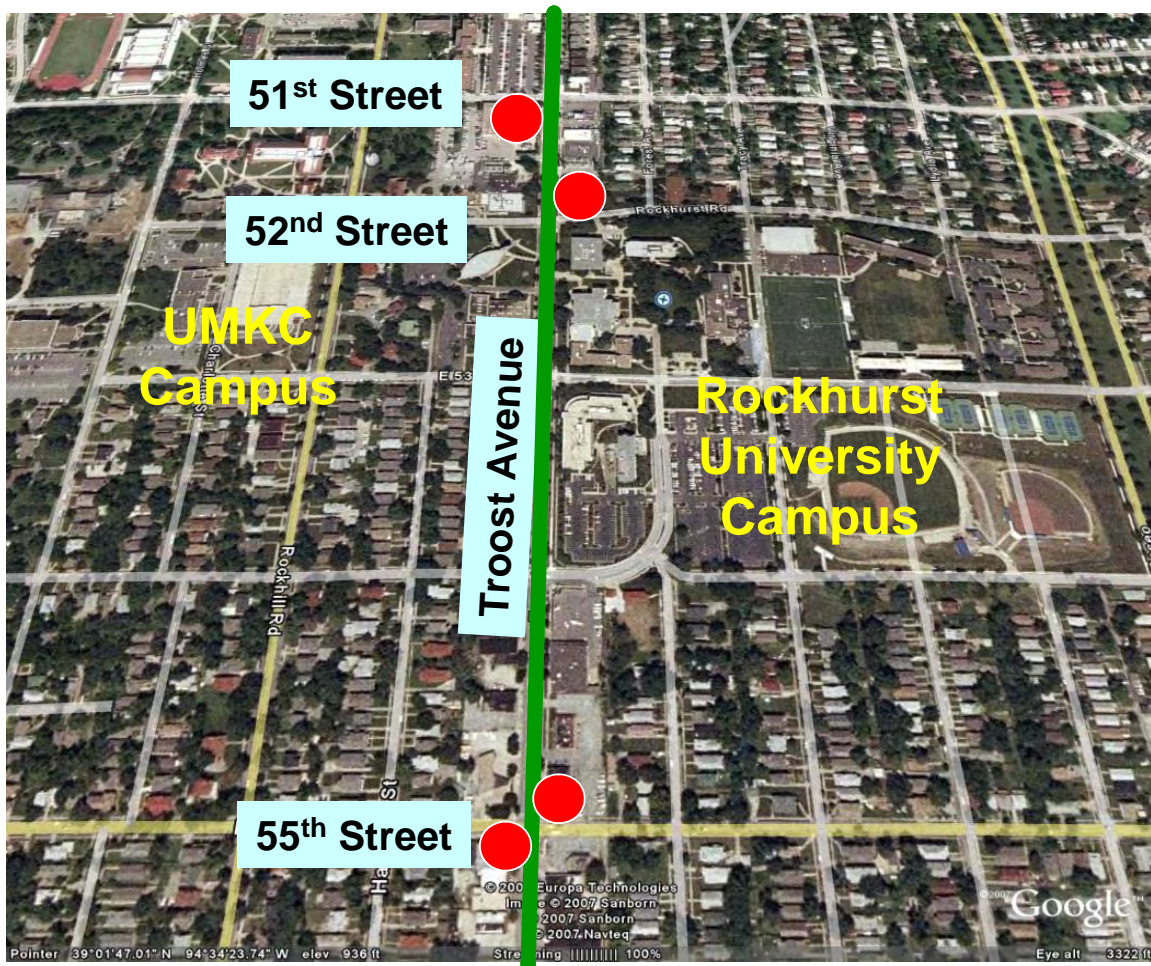
Central route alignment

Generally, the planning study evaluated station locations between 27th to 75th streets. The planning studied also identified all of the cross town routes in an effort to ensure that the ability to transfer to the bus rapid transit line would be convenient and easy.

UMKC and Rockhurst University

Opportunities to attract new riders was an important consideration in this highly active transit corridor. Boardings and alightings on the current Troost 25 at the two university campuses, UMKC and Rockhurst University, are very low. The study team met with university representatives from both campuses to identify a station location that was convenient to both campuses. UMKC has identified 51st Street as their main east-west campus street and have plans to improve the streetscape and enhance the pedestrian experience from Oak Street to Troost Avenue. This project is known as University Way. A portion of University Way has been completed between Oak and Cherry. Rockhurst has established 53rd Street as a central pedestrian spine for their campus. Collectively, the instructions have agreed that locating the bus rapid transit station between 51st and 52nd Streets would be beneficial to both campuses.

Figure 24—Universities Stations



Southern Terminus

The Kansas City Area Transportation Authority (KCATA) and HNTB Corporation have studied several sites for a southern terminus for the Troost BRT route. The terminus is multi-functional and provides not only a necessary layover location but also includes a driver comfort station and park-and-ride opportunity. These study sites included four separate locations around 85th Street ranging in size from 1 to 9 acres. These sites were located on both side of Troost between 82nd and 85th street. Three additional turnaround locations were considered around the Bannister Road and Troost intersection. The 75th Street vicinity was also considered for the southern terminus.

The program for these sites included the following:

Preferred Program Elements for Southern Terminus

- Parking for 30 cars (all concrete paving assumed at 10" - concrete walks at 4"
- Bicycle parking
- 1 BRT shelter (w/ platform ready for additional shelters)
- 1 BRT marker
- Site lighting
- Landscaping
- Layover space for 2-4 buses
- Driver comfort station

Figure 25—Southern Terminus Options



Service to Bannister Transit Center

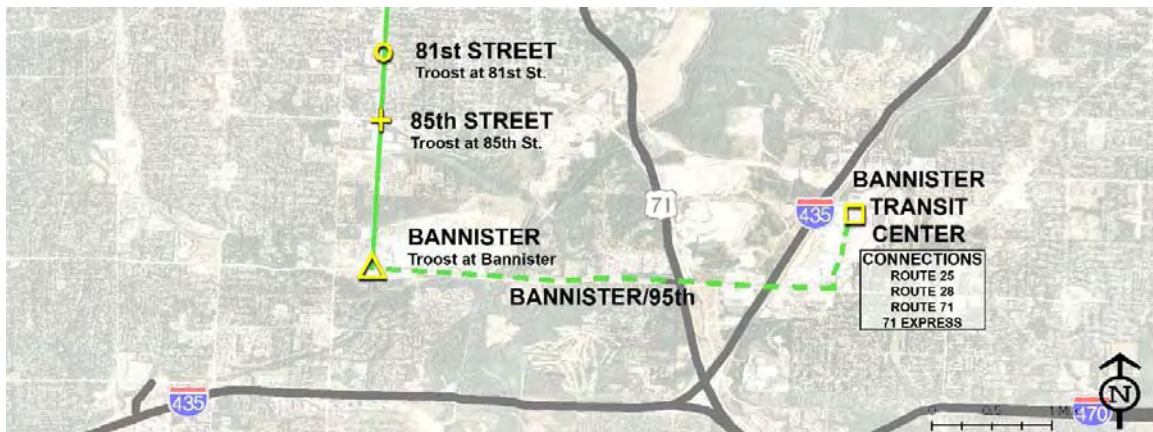
The Bannister Mall area has experienced significant disinvestment over the past few years. So far in 2007, the Wal-mart Supercenter and Bannister Mall have closed. In addition, the IRS has relocated from the Bendix complex to its new headquarters in the Downtown / Crown Center area.

Service to the Bannister area remains important to serve the residents and businesses in southeast Kansas City. A transit center to connect the following routes remains important:

- Route 25
- Route 28
- Route 71
- Route 175

A transit center near Bannister Road and Drury Road may be more convenient to interstate and highway access to other part of the Kansas City community.

Figure 26—Service to Bannister Transit Center



Evaluation Criteria

In order to evaluate the route and station alternatives a number of criteria were used to review each option. Some of the detail criteria applied to just stations or routes. Collectively this criteria allowed for evaluation of route and station options. The criteria and elements are as follows:

Safety and Security (Activity on the Street)

- Lighting
- Visibility
- Pedestrian Refuge
- Traffic Safety
- Bus operations
- Crosswalks, signal control
- Location of stop

Transportation

- Signal Priority
- Traffic Capacity
- Travel Lanes
- Travel Time
- Exclusive Lane Options
- Traffic Circulation
- On-Street Parking
- Turning Movements
- Transit Route Integrity
- Park and Ride Opportunities

Pedestrian Accessibility

- Street Grades
- Proximity to Major Generators
- Amenities
- Streetscape / Urban Design
- Sidewalk Width and Condition
- Costs to Remedy
- Signage

Directness

- Number of Turns
- Distance
- Out of Direction Travel
- Signals and Stops

Development Opportunities

- Development Potential
- Integrate Station Opportunities
- Land Use
- Joint Development Opportunities

Connectivity

- New Ridership
- Key Destinations / Employment Nodes
- Network System
- Transit Hubs
- Existing MAX
- Smart Moves

Cost

- Capital
- Operations

Route Recommendation

The recommended route begins at the turnaround on Main Street between 11th and 12th Streets and uses the 11th and 12th Street pair to the Holmes and Charlotte pair on the east side of downtown. The route continues southbound using the Holmes and Charlotte pair to 25th Street where it continues eastbound to Troost Avenue. The bus rapid transit route then stays on Troost Avenue for the entire length until it terminates at a park and ride lot near Bannister Road. The route and potential stations are identified on Figure 29.

Downtown Loop

The preferred route recommendation is to use the 11th and 12th Street pair to cross downtown from Holmes and Charlotte to Main Street. The Main Street turnaround allows for a close connection to the 10th and Main Transit Center where a significant number of current Troost #25 riders make a transfer to another route.

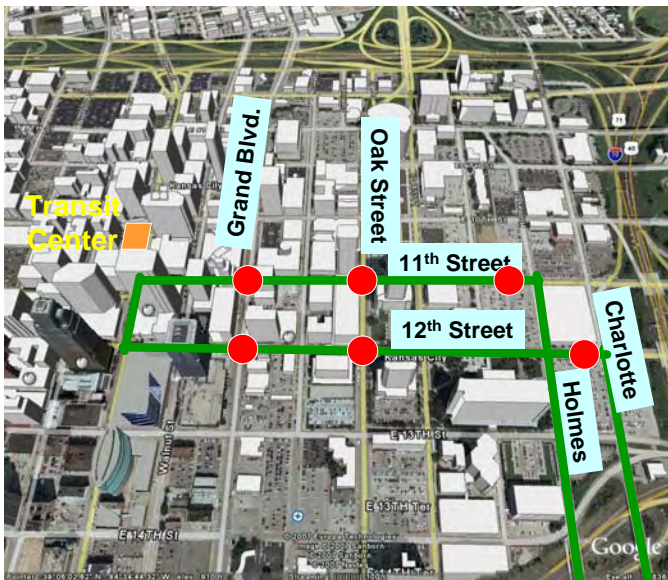
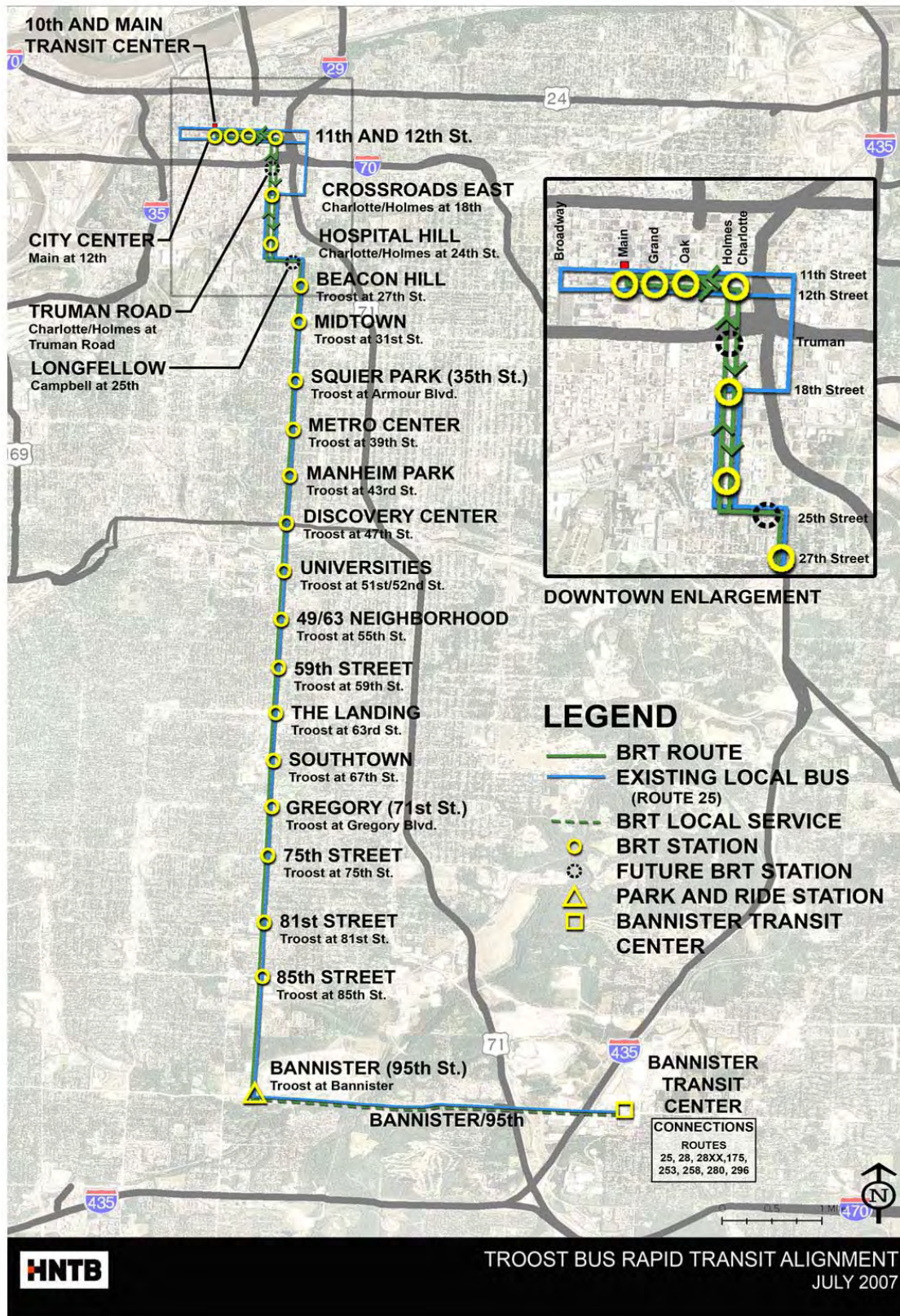


Figure 27—Downtown Route and Stations

Figure 29—Proposed Troost BRT Route



Station Locations

The following stations are recommended along the Troost Bus Rapid Transit Route

Northern Stations

- 11th/12th at Grand
- 11th/12th at Oak
- 11th/12th at Holmes / Charlotte
- 18th and Holmes / Charlotte
- 24th and Holmes / Charlotte
- 25th and Campbell (future)
- 27th and Troost

Central Stations

- 31st
- Armour
- 39th
- 43rd
- 47th to 48th
- 51st -- 52nd
- 55th
- 63rd
- 67th
- Gregory
- 75th

Southern Stations

- 82nd
- 85th
- 89th (may serve as local stop)
- Bannister

Station Design

The station design for the bus rapid transit service would be similar to the station design for the current MAX line on Main Street. The stations would have the following components:

Platform

The station platform would be concrete and could include a distinguishing pattern. The platform would be a minimum of 55 feet in length. In areas with special streetscape treatment, the station will be integrated into the streetscape design.

Marker

The station will include the unique marker used on the Main Street MAX line. The distinguishing marker includes the system identification logo—MAX; the name of the station, real time information, route and transfer information and

local area of interest information. The marker is the one constant element at every station.

Shelter

A shelter that is approximately 15 feet in length will be provided at most stations. The shelter is intended to be transparent to provide views to local shops. In addition, the shelter includes night lighting.

Litter Receptacle

Each station will include a litter receptacle for the use of patrons.

Landscape

Where possible based on individual site conditions and rights-of-way availability, landscape will be provided.

Other Elements and Features

Based on comments received from the community and public input process, representatives suggested several additional station elements be included. Additional elements include pedestrian and local site lighting, additional landscape features such as trees, wider unobstructed sidewalk area which may require a narrow shelter profile, neighborhood names for stations and larger stations because of the volume of riders.

Figure 29—Proposed Station Site Plan

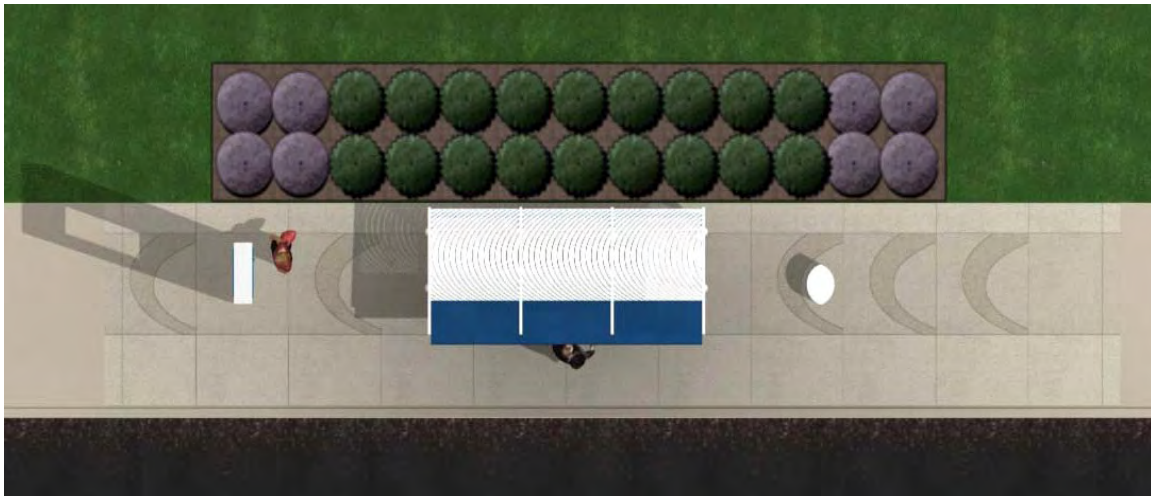


Figure 29—Proposed Station Perspective along Troost



Figure 30—Proposed Station near 31st and Troost



Operations Summary

Figure 31—Existing MAX Station

BRT Service

- Peak Weekday Service
- 10 minute headways
- Reduce Travel Time by 20%
- Differentiate from Local Bus
- Operate and Promote like Rail
- Passenger Amenities and ITS

Local Bus Service

- Provide service to all stops on route
- Continue service to Bannister Transit Center
- Evaluate frequencies
- Weekdays
- Weekends
- Incorporate local bus service information at BRT Stations

ITS Technology

- ATA Radio System, GPS & AVL
- Real-Time Arrival Information
- Signs at Every MAX Station
- Automated Traffic Signal Priority
- Automatic Station Enunciator
- Automatic Passenger Counters



• SCHEDULE RECOMMENDATION

HNTB Corporation

IMPLEMENTATION SCHEDULE

Troost BRT
July 2007

ID	Task Name	2007								2008												2009												
		May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan
1	Final Engineering and Design																																	
2	Traffic Signal Design and Pavement Design																																	
3	Station and Park and Ride Design																																	
4	Vehicle Acquisition																																	
5	Station and Streetscape Construction																																	
6	Streetscape Construction																																	
7	Station Site Work																																	
8	Shelter and Marker Fabrication																																	
9	Traffic Signal Upgrades / Installations																																	
10	Pavement Construction																																	
11	Real Time Sign Acquisition and Installation																																	
12	Program and Contract Management																																	

SUMMARY OF TROOST CORRIDOR BRT RECOMMENDATION

The proposed BRT service in the Troost Corridor is to provide a second BRT line in the Kansas City rapid transit system as described in the Regional Transit Plan entitled *Smart Moves*. This service will be called MAX. The branding of the corridor could be referred to as “Troost” or by a color or a number. The system would be a street running BRT and includes transit stations with enhanced amenities. These amenities include real-time passenger information, lights and better protection from the weather. Traffic signal priority will be provided for BRT when the vehicle is behind schedule. The Troost MAX may have some lanes dedicated to transit. Similar to MAX, Troost MAX service will use a unique low-floor BRT vehicle, and provide unique and easy to understand transit service.

Service will be provided seven days a week. Headways during the peak periods will be no greater than 10 minutes. Off-peak headways will be approximately 15 minutes and potentially 30 minutes on Sunday.

The MAX BRT service will operate between the Kansas City, Missouri CBD along Troost to approximately Bannister Road. South of that point, transit service will be provided as local transit service. Further study will determine whether the MAX vehicles will operate this southern portion of the route in local service or whether different vehicles will be used and will then provide transfer at the transit station located between 85th Street and Bannister Road.

The Troost BRT service will generally consist of:

- BRT vehicles operating entirely on existing city streets the length of the route;
- BRT will operate seven days a week, during the regular hours of the rest of the KCATA bus system (generally 5 a.m. to 1 a.m.);
- Fares will be collected via front door boarding using an electronic farebox;
- No significant property acquisition is required to implement BRT and no business or residential relocation is anticipated;
- BRT buses will stop at stations at major intersections on the route, generally every 1/4 to 1/2 mile;
- The BRT stations will generally be farside of intersections on existing Kansas City right-of-way;
- Shelters and related transit infrastructure will be distinctive in design and color compared with the existing bus shelters, fully ADA compliant and similar to the MAX BRT line implemented on Main Street (but distinguished by color);
- Adjacent to BRT stations, curb lanes will be reconstructed for a minimum of approximately 60 feet;
- Sidewalks, curb inlets and other such infrastructure improvements will be made as part of station and streetscape implementation;
- BRT is expected to increase commuter ridership along the corridor, because of more frequent and faster service than currently provided;
- BRT is expected to increase ridership for recreational and entertainment trips along the corridor, because of its linkage to major activity centers, its frequent and faster service, and the ease of understanding for potential customers because of its distinctive vehicle and station features.

IMPLEMENTATION AND OPERATIONS PLAN

A draft plan for implementing and operating the Troost BRT service has been prepared. A separate summary is provided as a separate report.

CONCLUSIONS

Bus Rapid Transit in the Troost Corridor is an excellent opportunity to provide significant transit benefits at a relatively low cost. The corridor demographics offer opportunities to provide transit benefits to segments of the population that will greatly benefit from the enhanced connections and amenities that BRT offers. The improvements will benefit a large number of existing transit riders while also providing a service that will be attractive to those new to transit and new to the corridor. By providing these enhanced services, the project will have the indirect benefit of enhancing the corridor's connectivity and supporting economic reinvestment in a portion of the urban core that continues to need economic rejuvenation. As shown in figure 1 the Troost BRT project corresponds with the region's Smart Moves plan by increasing mobility in the corridor, reduce dependency on automobiles. For more information on Smart Moves in Kansas City see <http://www.marc.org/kcsmartmoves>. The plan is also consistent with the MPO's long-range transportation plan, previous corridor studies and the overall goals of KCATA and FTA.