

# Lebanon, MO Rural Public Transportation Feasibility Study:



by

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## EXECUTIVE SUMMARY

The Western Transportation Institute (WTI) at Montana State University provided technical assistance to the City of Lebanon, Missouri to facilitate development of a Rural Public Transportation Feasibility Study. This project is part of a larger contract with the National Association of Development Organizations (NADO) Research Foundation, *Technical Assistance for Rural Transportation Systems: Connecting Rural Transportation with Economic Opportunity*.

The City of Lebanon, Missouri is conducting a Rural Public Transportation Feasibility Study, which will investigate the possibility of developing a public transportation system within the City of Lebanon.

In particular, the City of Lebanon is looking for assistance with:

- Education,
- Needs assessment,
- Service area and plan,
- Asset acquisition needs,
- Cost analysis,
- Alternative options,
- Funding opportunities,
- Communication and marketing strategies,
- Sustainability and evaluation process, and
- Other recommendations that may assist with the implementation of a public transportation system.

The following sections provide summaries of the background information, literature review, survey results, route analysis, next steps, answers to misconceptions about public transportation systems that every employee should know, and the concluding information.

### Background

A review of the demographics of the City of Lebanon suggest that there is a need for public transportation within the community. The data suggests that 25.6% of households are below the poverty level, 9.6% of households do not have access to a vehicle (and more only have access to one), 28.4% of households have a person 65 years of age or older, and 35.1% of households have a person with a disability. In particular, the Census tract that is northwest of MO 32 and southwest of Jefferson Avenue (officially named Census Block Group 3, Census Tract 9609 Laclede County, MO) has many demographics that would suggest a need, including: 5-10% of households without a vehicle and 60-69.06% of households with only one vehicle; 90-93.12% of individuals age 16 and older are living below the poverty line, 40-43.3% of households living in poverty, and median household incomes ranging from \$17,031 to \$20,00 annually; 15-15.2% of individuals age 16 and older are unemployed; 30-40% of individuals 18 and older report a disability; and 40-50% of households reporting at least one child under the age of 18. If service provisions (e.g. cost, accessible to individuals with disabilities) appeal to these demographics, these populations will likely use the service. Furthermore, if the service is well-marketed, City of Lebanon residents who do not fall within the above categories, but who see value in having additional mobility, may be enticed to use the service as well.

## Literature Review

A review of relevant literature confirmed that public transportation has the opportunity to provide, particularly for those without access to a reliable vehicle, vital connections within the community. Public transportation can help to reduce barriers to access employment, education, medical care, and other services, in turn providing economic benefits to a community. Rural communities with a public transportation system were found to have higher net earnings than those counties without one. Federal money spent on rural public transportation was found to benefit a rural community by an economic multiplier of more than **three times** the money spent on the system. The impacts of a public transportation system on health and employment access were identified in literature. In particular, public transportation systems need to work with healthcare providers to try to coordinate public transportation system schedules with appointment times. Furthermore, healthcare providers can provide information about the public transportation system to their patients. Literature reported that in rural areas, not owning a vehicle has a **significant impact** on obtaining and keeping a job. Similar to healthcare, public transportation systems should work with employers, particularly entities with shift schedules, to coordinate schedules. Owning and maintaining a vehicle was reported as being associated with an annual cost of \$9,000; this cost would increase with older vehicles. Older vehicles are often what low-income individuals can afford.

## Survey Results

The results of the surveys collected for the study indicate that there is broad support for a public transportation system; survey respondents who reported that they or someone in their household would use a public transportation system along with those who said they would not use such a system but saw value represented 86.5% of all survey respondents. As cost of travel was reported as being important to low-income residents, the City of Lebanon should carefully consider the cost requested of system users. Almost thirty-five percent of all survey respondents reported missing work as a result of transportation problems. Missing work impacts the productivity of an employer. Collectively, a community's economy is impacted if employees cannot get to work, as it may prove difficult for them to maintain employment. Providing an additional mobility source could address those missing work because of transportation problems. The youngest of the City of Lebanon residents (ages 18 to 35) face an uphill battle, with an overrepresentation of less-than-high school education and low annual incomes. A public transportation system could allow younger residents of the City of Lebanon to reduce the portion of their household budget that goes towards transportation, and potentially connect them to higher education opportunities and additional employment opportunities. Providing opportunities for the younger generation to improve their economic well-being directly benefits the local economy. Survey respondents who reported providing rides to others reported doing so most often only *periodically*; this is not a sustainable source of mobility to those lacking transportation options. Current mobility options, OATS and taxi services, were found to not address the mobility needs of residents, as limited service, high costs and safety concerns were reported.

## Route Analysis

The research team identified several route concepts and information regarding cost and populations served for each potential route. The researchers recommend the concept of the *Shortened Purple Route* as a starting point, with opportunities for expansion identified as well. The researchers do not recommend a meandering service throughout the community; while many stops

would be addressed, the service characteristics of such a service would not allow users to efficiently travel to where they want to go. The potential routes described provide the foundation for further public transportation system planning and development. If a transportation system is implemented, additional planning should be done, such as considering how the bus type may impact routing, the speed traveled, and rider capacity. In addition, the researchers recommend a full-time equivalent position be dedicated to overseeing the system, including making adjustments as needed and implementing a travel training program.

### Next Steps

As noted above, public transportation systems in rural areas are becoming more commonplace, and feedback from surveys of those who use services within the City of Lebanon suggest that there is a need for a system, particularly to access health care and other day-to-day services (e.g. the bank). The City of Lebanon should schedule a meeting with the Missouri Department of Transportation staff to discuss funding and other options associated with moving forward with implementing a public transportation system in the City. Furthermore, to allow staff to better understand the opportunities and challenges with implementing a public transportation system, City of Lebanon staff should attend the Missouri Public Transit Association (MPTA) Annual Meeting. In addition, City of Lebanon staff should follow-up with employers to identify concepts provided in the report that would potentially fill the gap regarding their need for job candidates by supporting the public transportation system; it could be an agreement that would allow additional cooperation as employers see the value on making these connections. City of Lebanon staff could also talk with Mercy Hospital representatives, Missouri State University representatives, Ozarks Technical Community College representatives, and other major destinations on the proposed route for potential partnerships.

### Public Transportation System Misconceptions

It is expected that some community members may be unsupportive of a public transportation system if they do not see the value to themselves brought by a stronger local economy because their fellow community members can get to where they need to go (e.g. job interviews, non-emergency healthcare). Therefore, Appendix E provides answers to common critiques of public transportation systems. This information should be communicated to all City of Lebanon staff, so they can understand why the system is being implemented and articulate it to others. The following are questions for which answers are provided in Appendix E:

1. Why should I pay for public transportation? I won't be using a bus.
2. Why are we paying for buses to run empty?
3. Won't autonomous vehicles eliminate the need for public transportation?
4. Everyone **owns** a vehicle in Lebanon.
5. Everyone can **afford** a vehicle in Lebanon.
6. Having public transportation will make Lebanon an unaffordable place to live.
7. A public transportation system will make Lebanon too congested.

### Conclusions

Based on the findings, the researchers recommend that the City of Lebanon move forward with more detailed planning of a public transportation system. The researchers recommend that the City of Lebanon hire a full-time, term employee whose *only focus* is the success of the system. A very important task for this employee would be the continuous **engagement of partners**. A **travel**

**training** program should be implemented, to support use by seniors, people with disabilities, youth, and anyone else who desires to use the public transportation system but is unfamiliar with such a mode of transportation. *The City of Lebanon should not strive to implement the minimum level of service, as this will result in poor use and perception. Rather, the City of Lebanon should work to find a balance between an enticing, desirable level of service at funding levels which can be sustained.* The City of Lebanon should plan on modifying the system over the course of the 5-year pilot, as lessons learned from implementation of a system will likely identify necessary modifications.

## 1. INTRODUCTION

The primary objective of the technical assistance to Lebanon, Missouri was to develop a Rural Public Transportation Feasibility Study, which will investigate the possibility of developing a public transportation system within the City of Lebanon (LEBANON). This project is part of a larger contract with the National Association of Development Organizations (NADO) Research Foundation, *Technical Assistance for Rural Transportation Systems: Connecting Rural Transportation with Economic Opportunity*.

In particular, LEBANON is looking for assistance with:

- Education,
- Needs assessment,
- Service area and plan,
- Asset acquisition needs,
- Cost analysis,
- Alternative options,
- Funding opportunities,
- Communication and marketing strategies,
- Sustainability and evaluation process, and
- Other recommendations that may assist with the implementation of a public transportation system.

## 2. BACKGROUND INFORMATION

LEBANON is located in south central Missouri within Laclede County (Figure 2-1). In 2016, LEBANON reported 14,652 people (US Census Bureau, 2016).

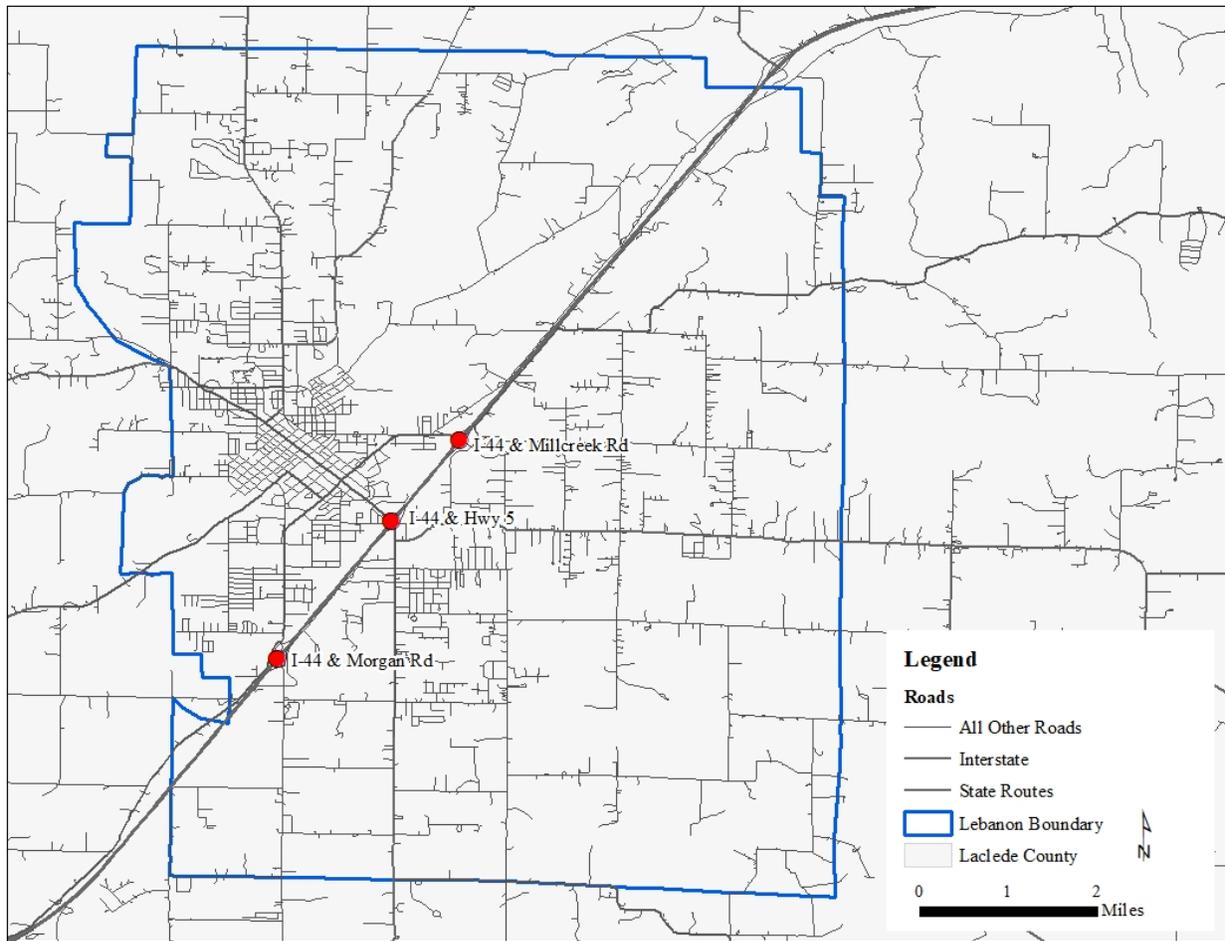


Figure 2-1: LEBANON within Laclede County, in the State of Missouri

The following sections discuss: 1) Community Characteristics, 2) Key Demographics, 3) Employment & Commuter Characteristics, 4) Existing Transportation Resources, and 5) a Summary of Background Information.

### 2.1. Community Characteristics

Although a relatively small community from a population perspective, LEBANON is not a “compact” community. LEBANON spans approximately 5 miles north to south and 3 miles east to west. Another complicating issue is that Interstate 44 (I-44) splits the community, with only three main crossings of the interstate to allow travel from the west (northwest) to the east (southeast) part of the community. While much of the original residential segment of the community is in the west, residential areas are also present on the east (southeast) side of the interstate. Further, key businesses/destinations such as the hospital and clinics, grocery stores, big box stores, and several large employers are on the east and southeast side of I-44. Therefore, the community and transportation systems need to deal with the “barrier” that I-44 creates (see Figure 2-2).



**Figure 2-2: I-44 Crossings**

However, the interstate also provides access to LEBANON from surrounding communities. During initial project meetings, staff noted that LEBANON has a regional draw.

## 2.2. Key Demographics

The primary source of information for the key demographics section was the US Census Bureau's *2012-2016 American Community Survey (ACS) Five Year Estimates* (US Census Bureau, 2016). Key demographic information about LEBANON was compared with peer communities in the State of Missouri that currently have public transportation systems, thereby providing information regarding who within LEBANON would be most likely to use the system.

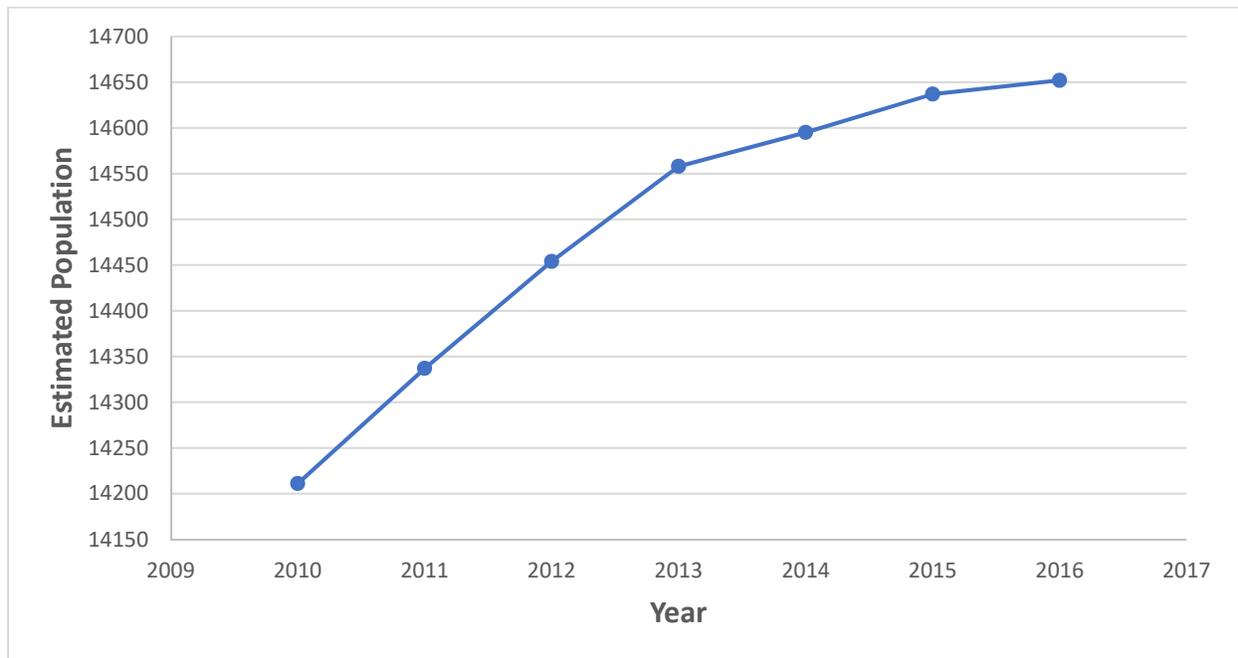
Specific populations including senior citizens, people with disabilities, and low-income households are more likely to benefit from a public transportation system (Chaudhari, Lonsdale, & Kack, 2016). Understanding where these specific populations live within LEBANON helped to determine locations that may need transportation alternatives. It also allowed the researchers to compare outcomes of survey questions with this demographic information.

The 2012-2016 ACS data for census block groups was obtained for Laclede County, Missouri and mapped using ArcMap in order to gain an understanding of where specific population subgroups reside within LEBANON.

The following sections discuss LEBANON's population growth rate, gender split, population density, race, age, people with disabilities, individuals living in poverty, and household characteristics.

### 2.2.1. Population

LEBANON has continued to see population growth, though it has plateaued since 2013 (see Figure 2-3). Overall, from 2010 to 2016, LEBANON has seen a population growth rate of 3.1 percent. The population is fairly evenly split between male (48%) and female (52%).



**Figure 2-3: Population of LEBANON 2010-2016 (Based on data retrieved from (US Census Bureau, 2016))**

The densest census block group in LEBANON is concentrated along Jefferson Ave (see Figure 2-4).

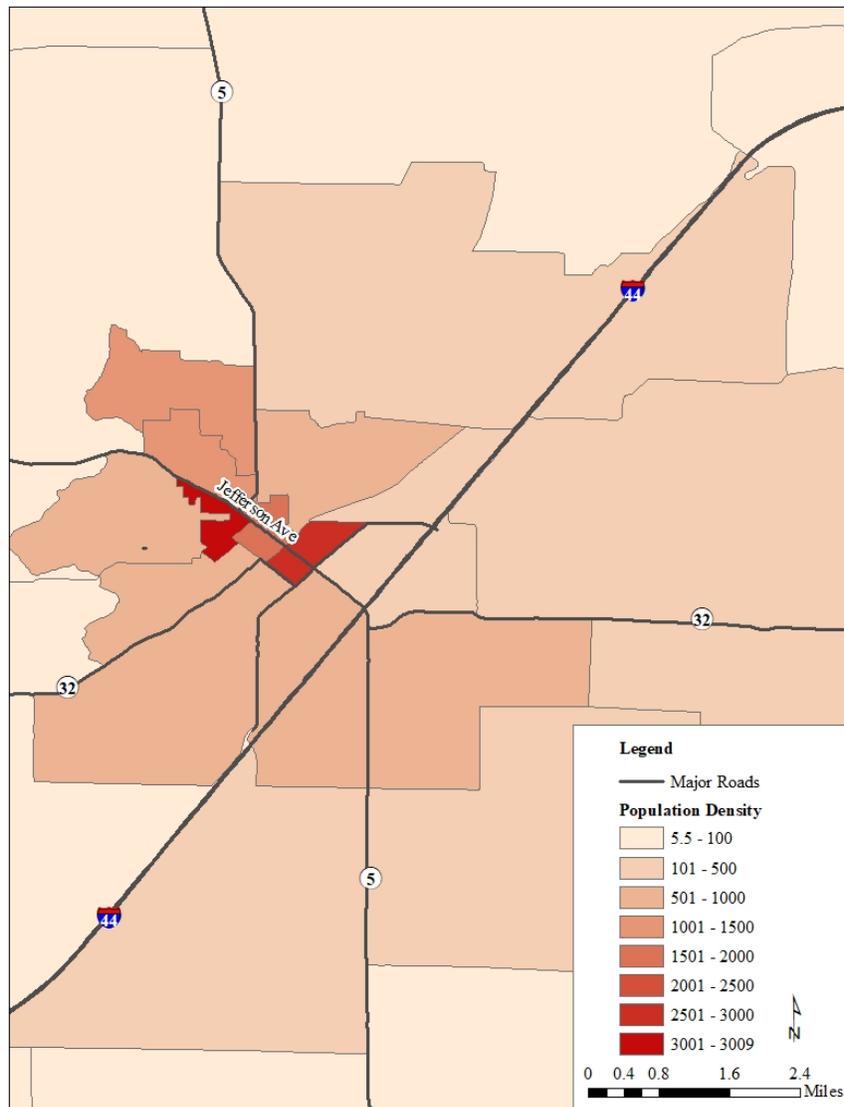


Figure 2-4: Population Density (2016 ACS Census Block Groups)

### 2.2.2. Race

The racial makeup of LEBANON is predominately White (94%) (Figure 2-5).

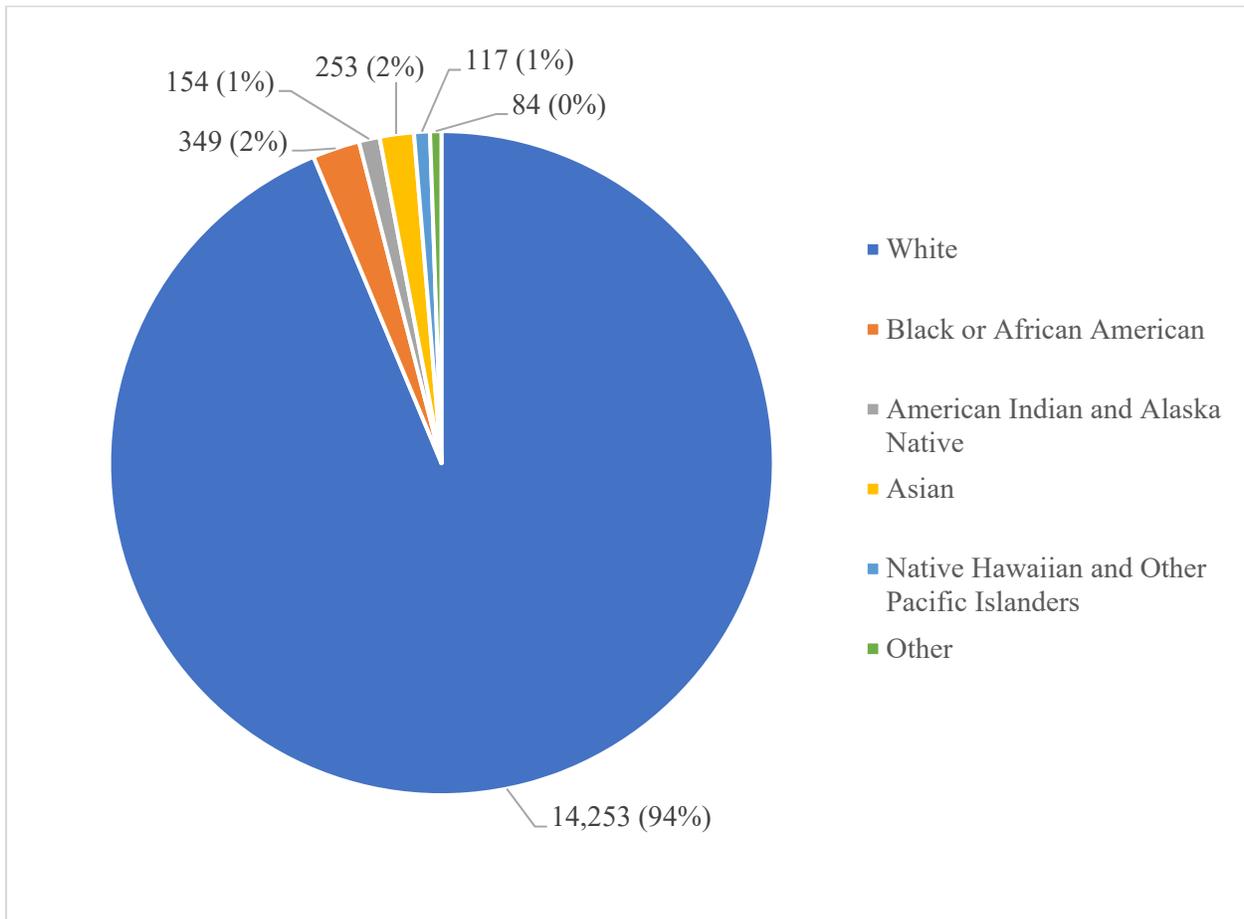


Figure 2-5: Racial Makeup of LEBANON

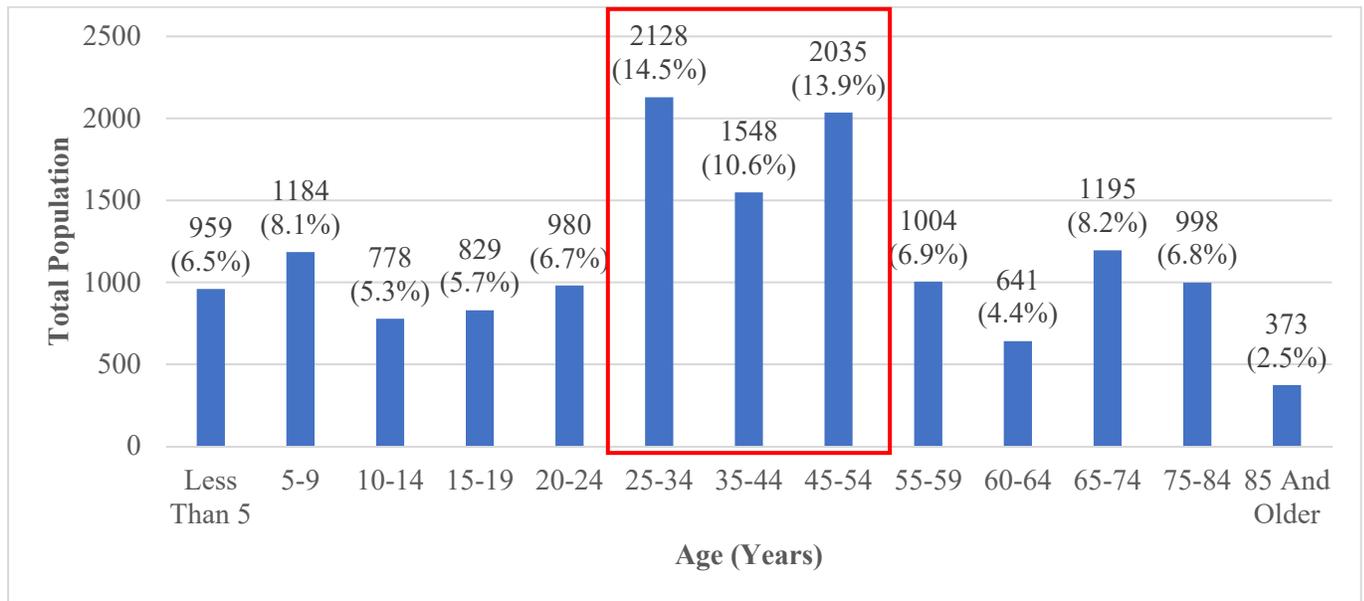
### 2.2.3. Age

The median age in LEBANON is 37.7 years. Compared to other communities (both cities and counties) in Missouri that have a public transportation system, with an average of 38.1 years for these communities, LEBANON has a slightly younger population (Table 2-1).

**Table 2-1: Population & Age of Peer Communities with Public Transportation Systems**

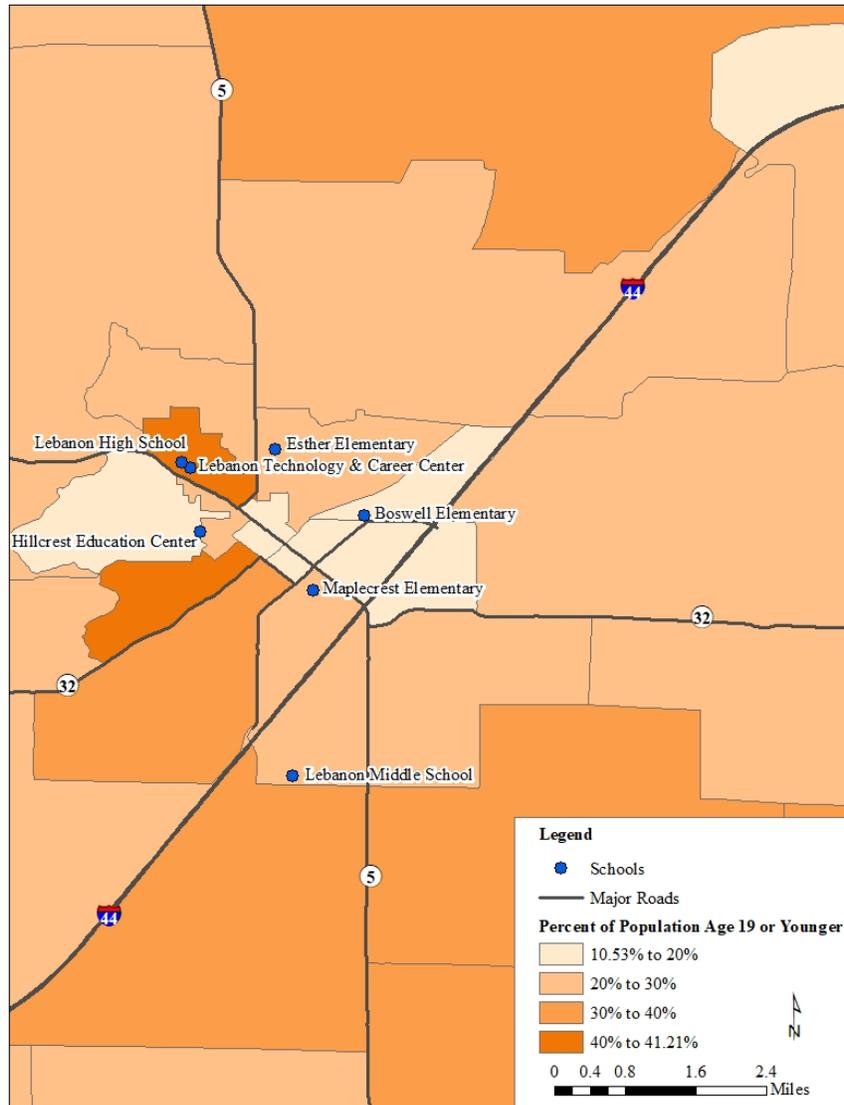
Public Transportation System	Population	Median Age
<b>City of Lebanon</b>	<b>14,709</b>	<b>37.7</b>
Cape Girardeau County Transit Authority	78,913	36.2
City of Bloomfield Transportation System	2,020	43.1
City of Carthage	14,309	34.9
City of Clinton	8,844	38.7
City of Columbia	120,612	27.4
City of El Dorado Springs	3,577	34.6
City of Excelsior Springs	11,522	33
City of Houston	2,093	37.9
City of Lamar	4,420	41.5
City of Mt. Vernon	4,553	46.3
City of Nevada	8,224	36.6
City of New Madrid	3,005	39.8
City of St. Joseph	76,472	35.7
City of West Plains	12,320	34.6
Direct Transit (Ray County Transportation)	22,754	41.6
Dunklin County Transportation	30,535	39.6
Franklin County Transportation Council	102,838	40.6
Mississippi County Transit System	13,799	38.5
Ripley County Transit, Inc.	13,817	42.2
Scott County Transportation Systems	38,745	39.6

About 40% of LEBANON’S population is between the ages of 25 to 54 (Figure 2-6).



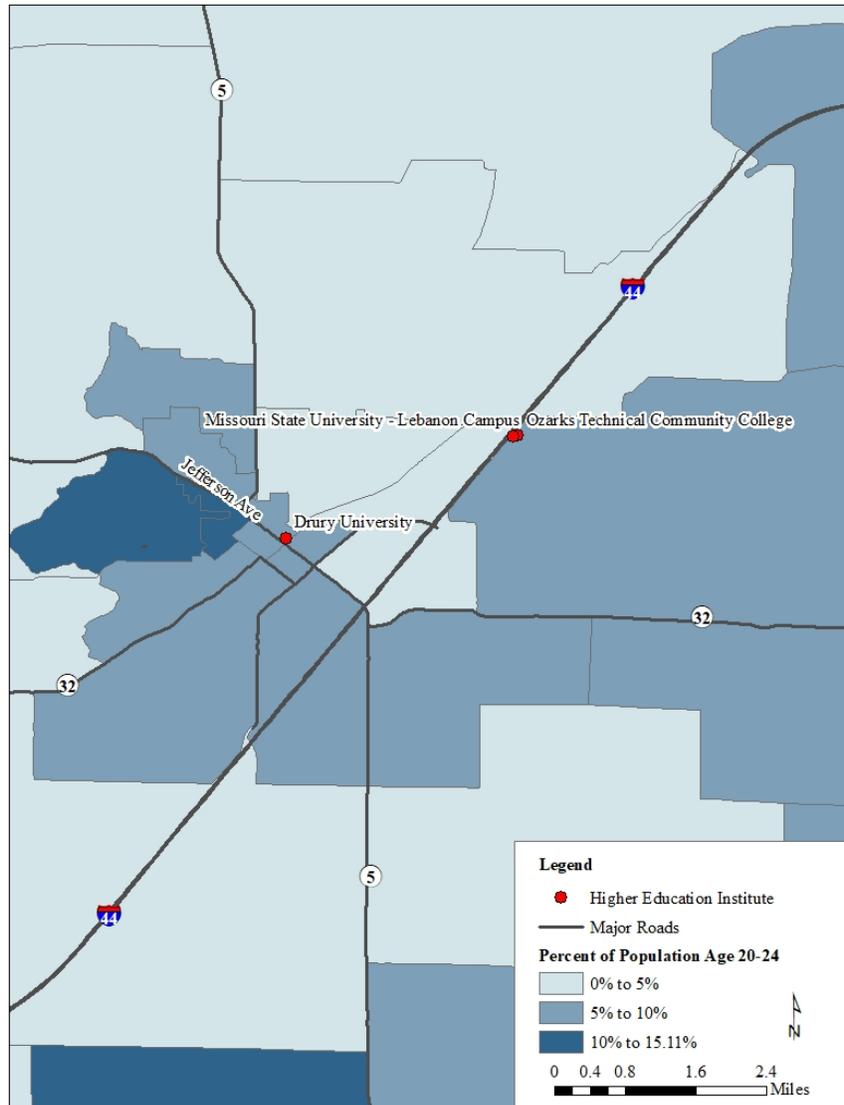
**Figure 2-6: Age Distribution in LEBANON**

Youth, including children who have not obtained a driver’s license and college-aged young adults, may use a public transportation system for travel (Chaudhari, Lonsdale, & Kack, 2016). LEBANON has 3,750 people (25.6%) under the age of 19. Census block groups with larger proportions of children are located near Jefferson Ave. and Highway 32 and just North of the town center (Figure 2-7).



**Figure 2-7: Percent of Census Block Group Population Age 19 and Younger (2016 ACS Census Block Groups)**

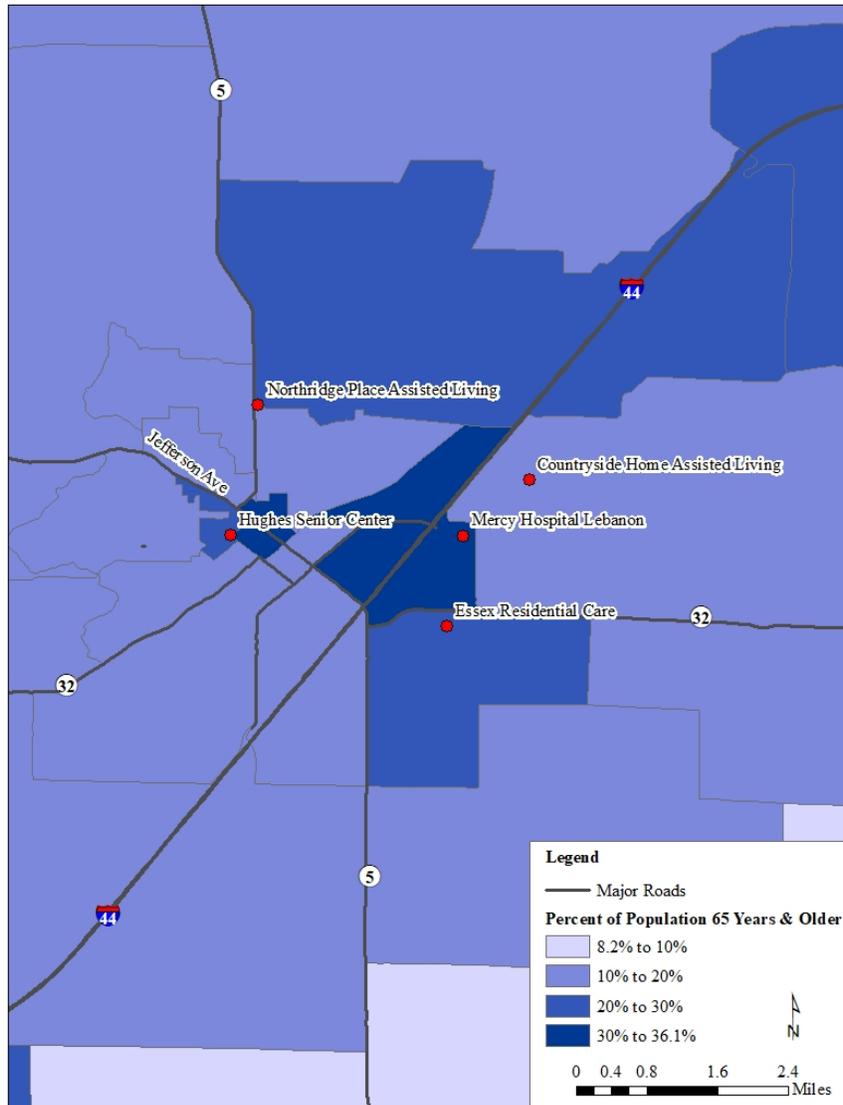
The Census block with those with the lowest household income also has the largest percentage of individuals 19 and younger (Figure 2-7 and Figure 2-8). Only 6.7 percent of LEBANON’s population is age 20 to 24. It is possible that some portion of this age group may be attending an institution of higher education, although there is no definitive data to suggest that this explains why this age group has a smaller percentage when compared with other age groups. All census block groups have a fairly low proportion (0 to 15.11 percent) of residents within this age range (Figure 2-8).



**Figure 2-8: Percent of Census Block Group Population Age 20 to 24 (2016 ACS Census Block Groups)**

As individuals age, slower motor skills may make senior citizens (age 65 years or older) feel more comfortable using transportation alternatives that do not require them to drive a vehicle (Chaudhari, Lonsdale, & Kack, 2016; Zhao & Gustafson, 2013); operating a vehicle requires a complex cognitive and in many cases physical capabilities (e.g. getting in and out of a vehicle, turning one’s head to check a blind spot). There are 2,566 senior citizens in LEBANON, who account for about 17.5% of the total population. As the population continues to age, LEBANON can expect to see the number of senior citizens grow.

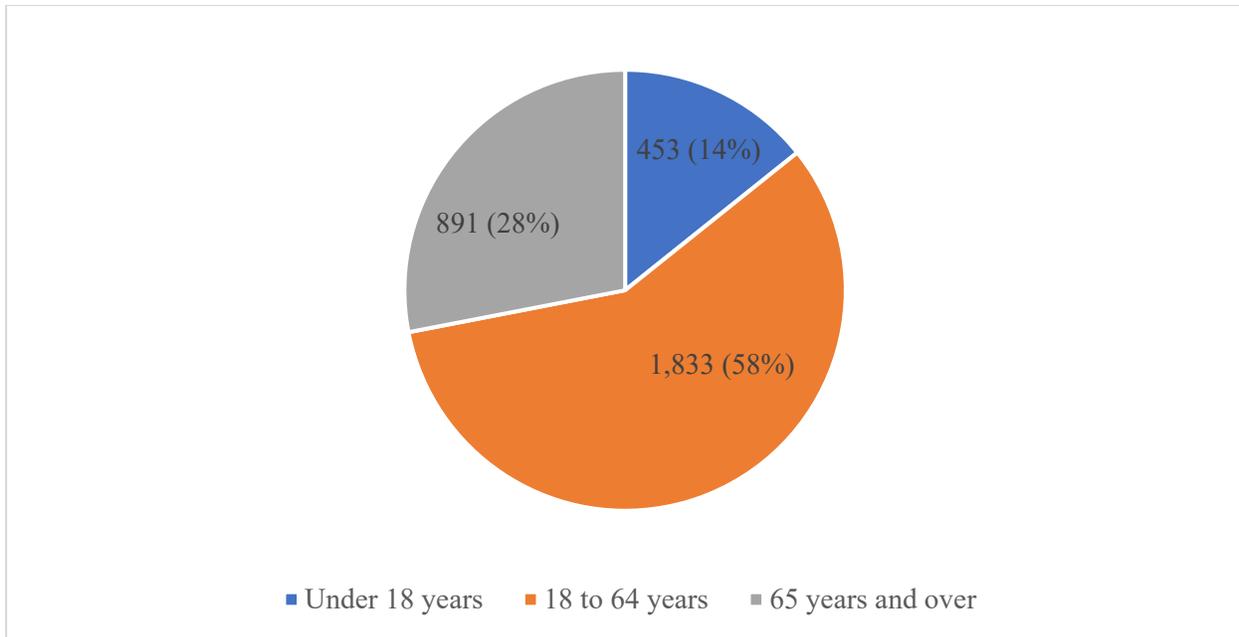
Senior citizens are fairly dispersed throughout the city, but there are a few census block groups with a large percentage of senior citizens (36% or more) who are age 65 or older (see Figure 2-9). These higher concentrations of senior citizens are located along I-44 and along Jefferson Ave. Figure 2-9 also shows some assisted living facilities, the hospital and associated medical services and the senior center – all likely origins and destinations relevant to seniors.



**Figure 2-9. Percent of Census Block Groups that are Age 65 or Older (2016 ACS Census Block Groups)**

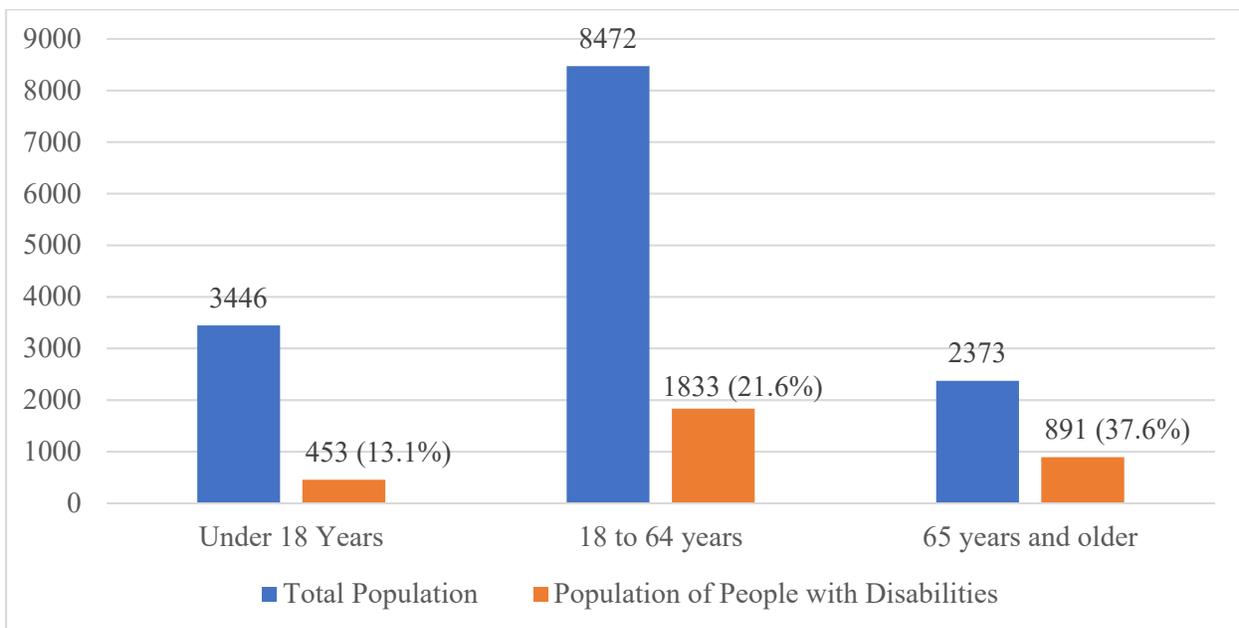
### 2.2.4. People with Disabilities

As previously noted, the total population of LEBANON in 2016 was 14,652 people. To identify people with disabilities, the Census Bureau uses the total civilian non-institutional population, which excludes those on active duty and institutionalized adults (mental health facility, retirement facility, or jail). The total civilian non-institutional population in LEBANON is 14,296 (US Census Bureau, 2016). Within this population count, 22.2% or 3,177 are people with a disability. Of the 3,177 people with a disability, Figure 2-10 shows the number and percentage divided into three age groups: school-age children (under 18), working age adults (18 to 64), and senior citizens (over 65). Nearly 60% of the people with disabilities in LEBANON are working age adults.



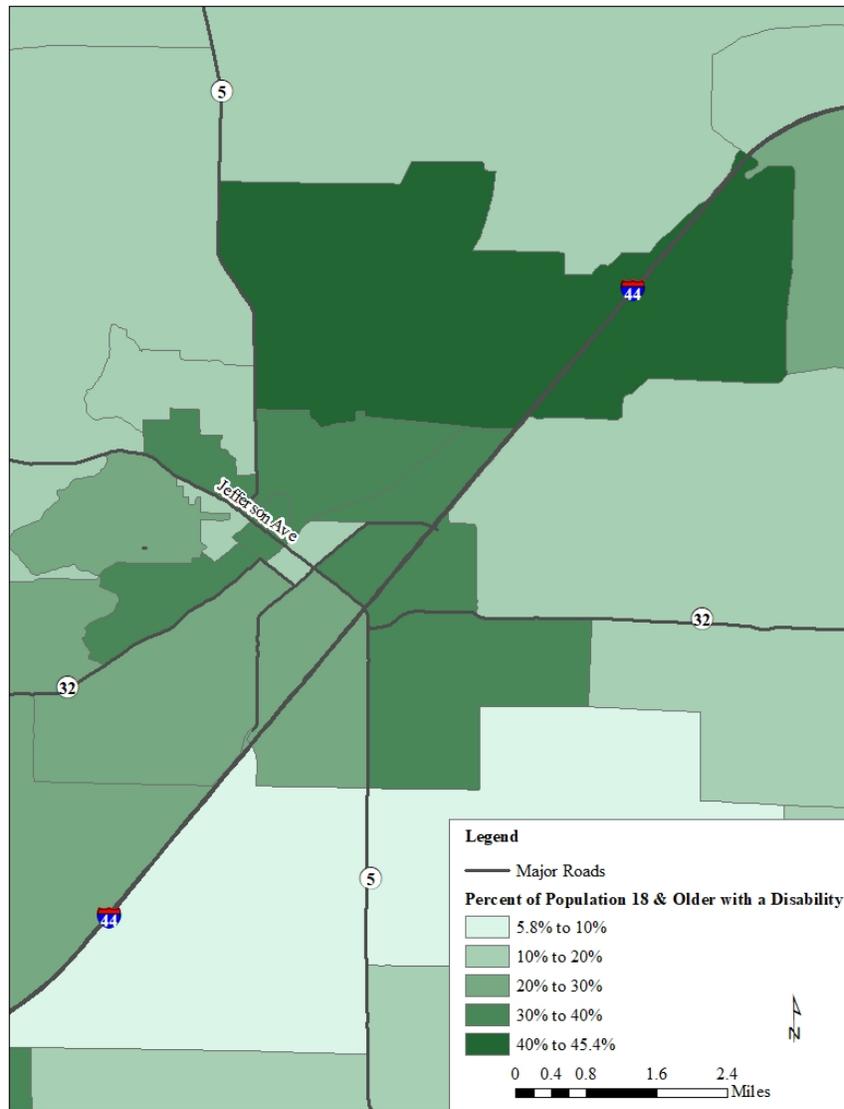
**Figure 2-10: Age Distribution of Non-institutionalized People with a Disability in LEBANON (total count 3,177)**

Figure 2-11 looks at the age distribution of people with disabilities relative to the entire population of LEBANON. It shows the percentage of individuals with disabilities within each age group of the total population. For example, of all the seniors (age 65+) in LEBANON, more than 37% have a disability. Compared to other age groups, seniors tend to have a larger proportion of people with disabilities (Figure 2-11).



**Figure 2-11: Percent of each age group in LEBANON’S Total Population (14,652) with a Disability**

There are larger proportions of people with a disability in census block groups North of Jefferson Ave and I-44, with one block group having upwards of 45.4% of its citizens aged 18 and older having at least one disability (Figure 2-12).



**Figure 2-12: Percent of Census Block Group Population 18 and Older that has a Disability (2016 ACS Census Block Groups)**

### 2.2.5. Individuals Living in Poverty

A total of 3,823 or about 26.9% of LEBANON’S population is estimated to have an income below the poverty level, which was determined to be \$12,228 per single person in 2016 (US Census Bureau, 2016). Note that this measure is specific to the *individual*. A later discussion involves looking at whether a household lives at or below the poverty level. One census block group near Highway 32 and Jefferson Ave has 93.12% of its population age 16 and older that are below the poverty line (Figure 2-13).

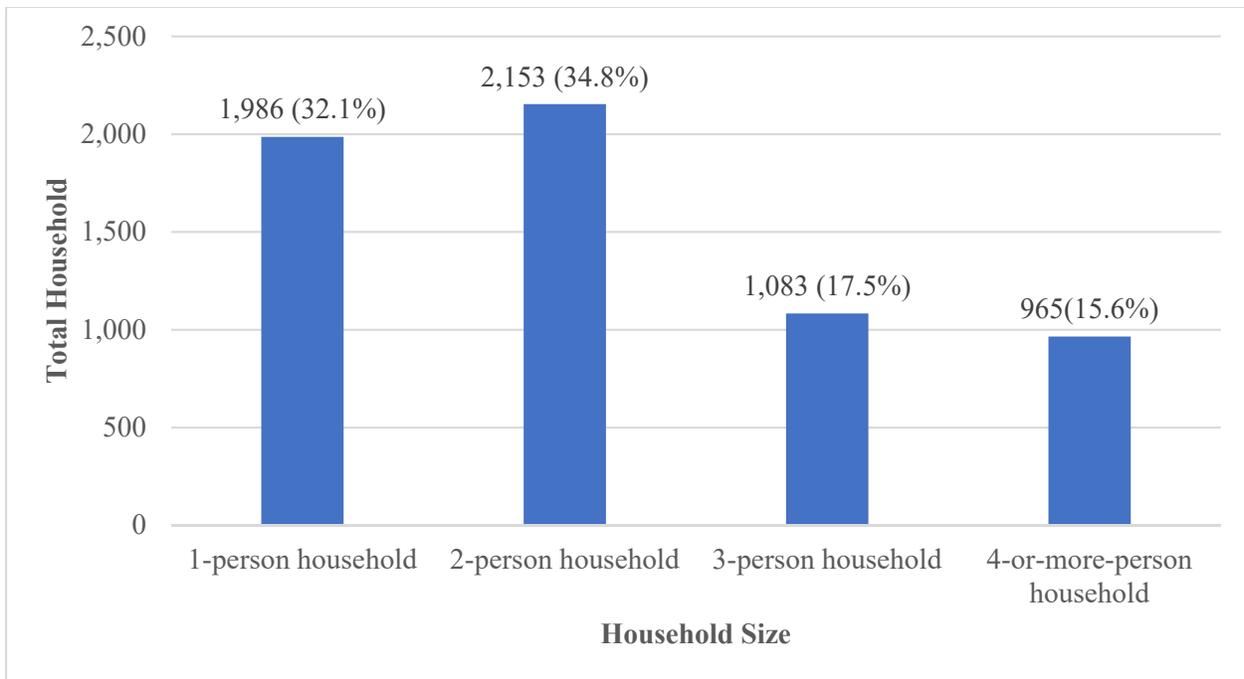


**Figure 2-13: Percent of the Census Block Group Population that is Age 16 and Older and Below the Poverty Line (2016 ACS Census Block Groups)**

### 2.2.6. Household Characteristics

This section considers previously discussed topics but from the household perspective: household size, the number of children in a household, household income, households living below the poverty line, and the number of vehicles in a household.

There are 6,187 occupied housing units in LEBANON. The average household size is 2.36 people. The most common household sizes are one and two-person households, which account for 32.1% and 34.8%, respectively of occupied housing units (Figure 2-14).



**Figure 2-14: Household Size in LEBANON**

Family households or households that “have at least one member of the household related to the householder by birth, marriage, or adoption” total 63% of all occupied housing units. Non-family households (37%) include people living alone or with people who are not related by birth, marriage, or adoption (e.g. roommates) (Figure 2-15).

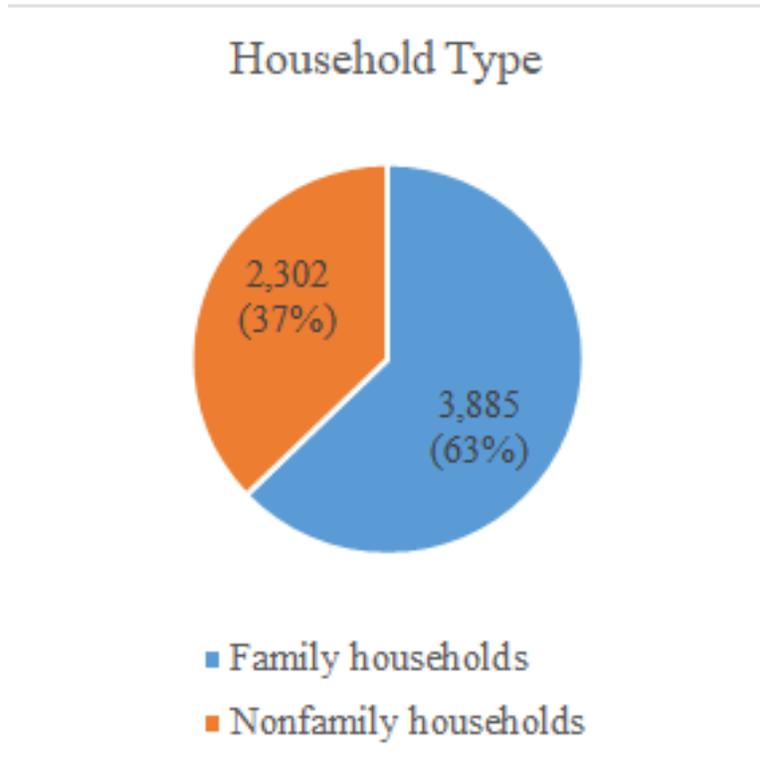


Figure 2-15: Family or Non-Family Households

For family households, these were primarily married-couple households (67%). For non-family households, these consisted primarily of people living alone (86%) (Figure 2-16).

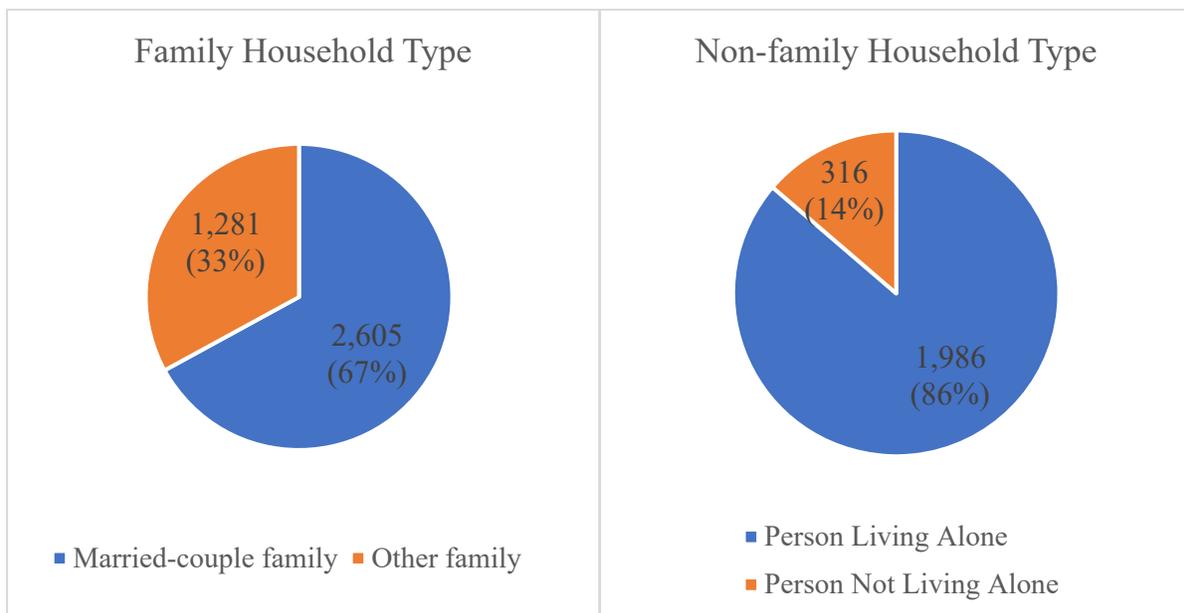
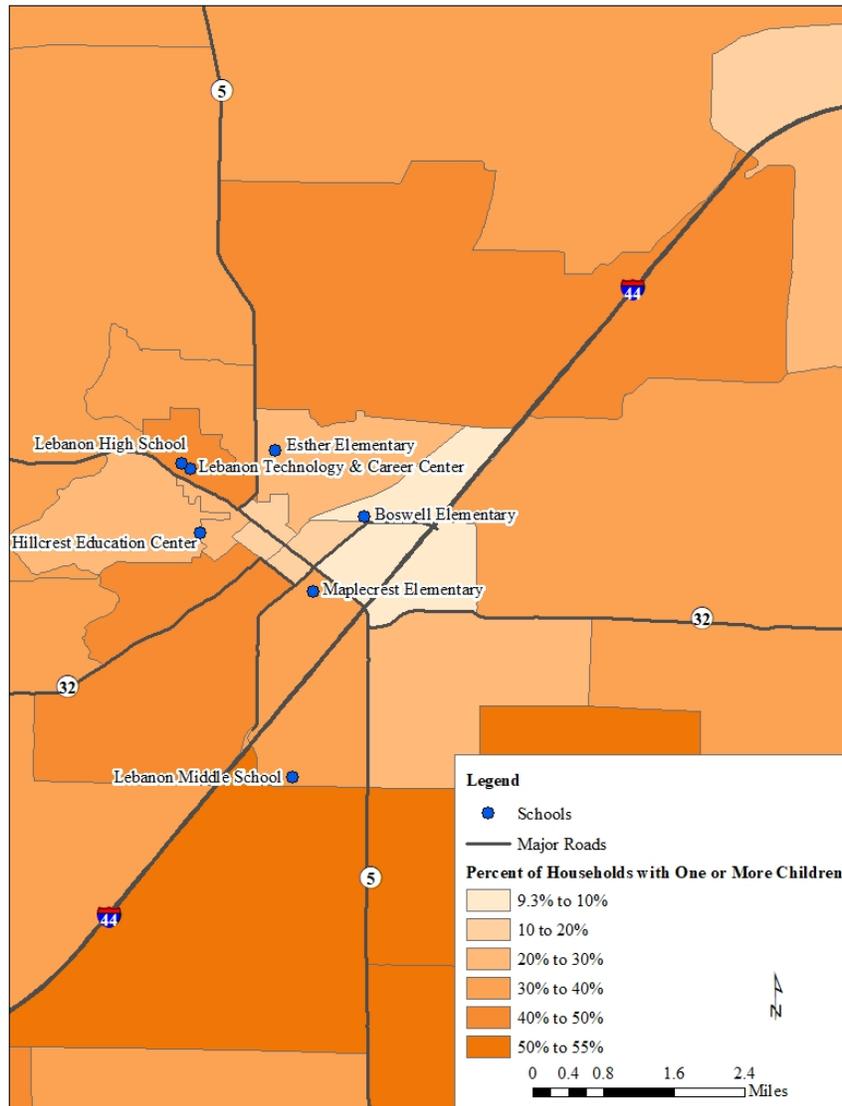


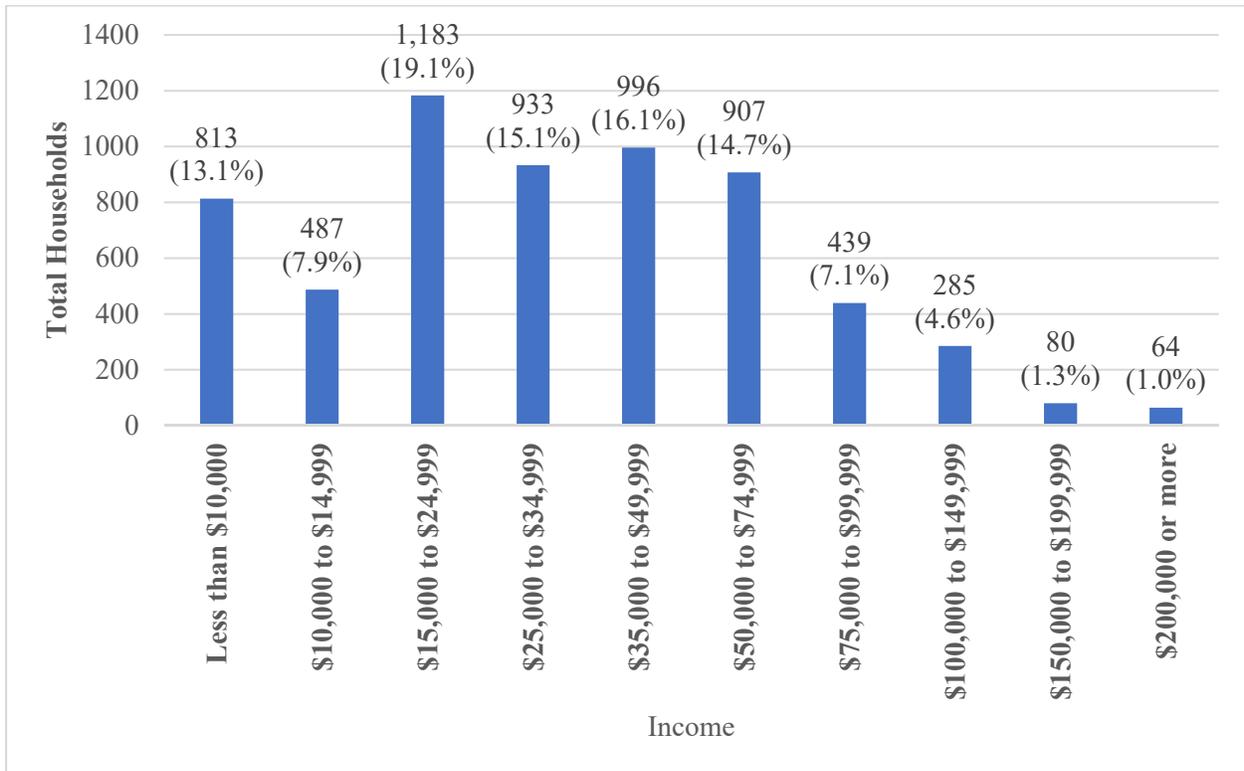
Figure 2-16: Family & Non-Family Household Types

Of the occupied households, 1,969 (31.8%) have one or more children aged 18 or younger. Just over half of the households with a child present are married-couple households (52.7%). An additional 46.4% of households with a child present consist of a single family-member taking care of the child. There are larger percentages of households with a child present away from the downtown corridor (Jefferson Ave) (Figure 2-17). South of I-44 there are a few census block groups where over half of the households have a child.



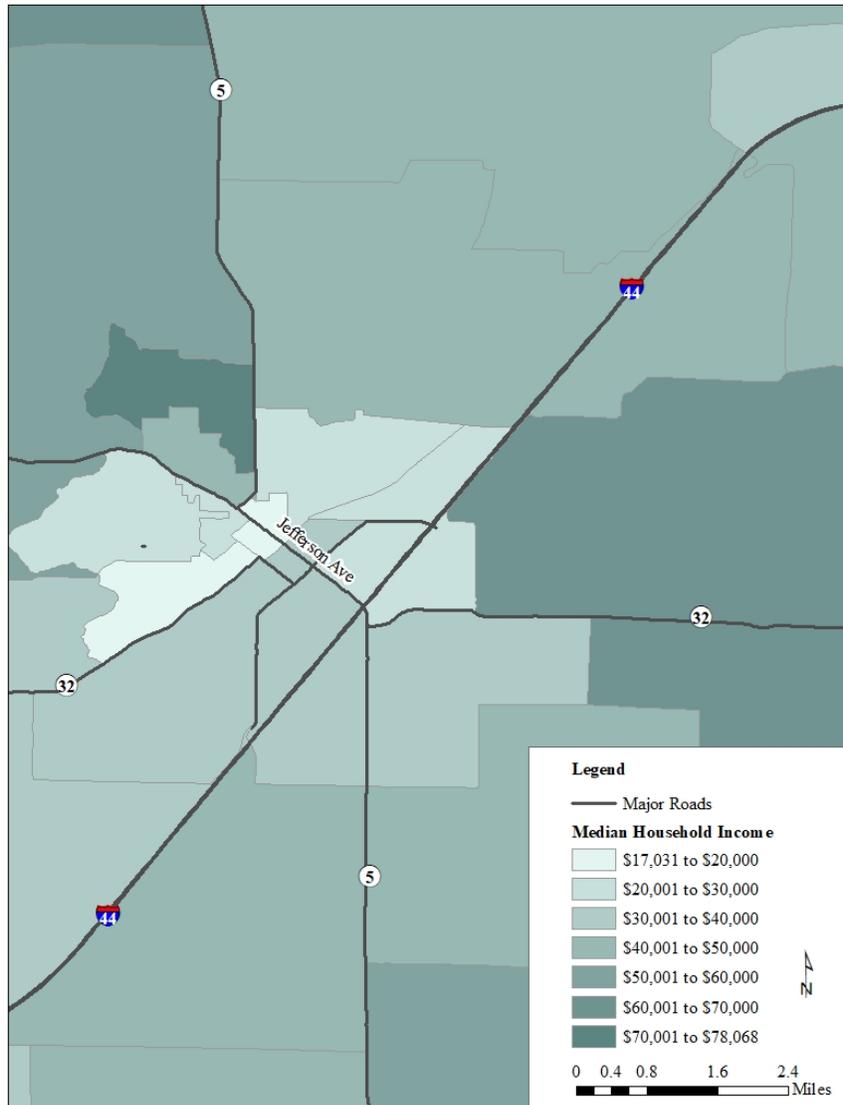
**Figure 2-17: Percent of Households in the Census Block Group that have a Child Age 18 or Younger (2016 ACS Census Block Groups)**

The most frequent income category is \$15,000 to \$24,999 (Figure 2-18). The median household income is \$31,425.



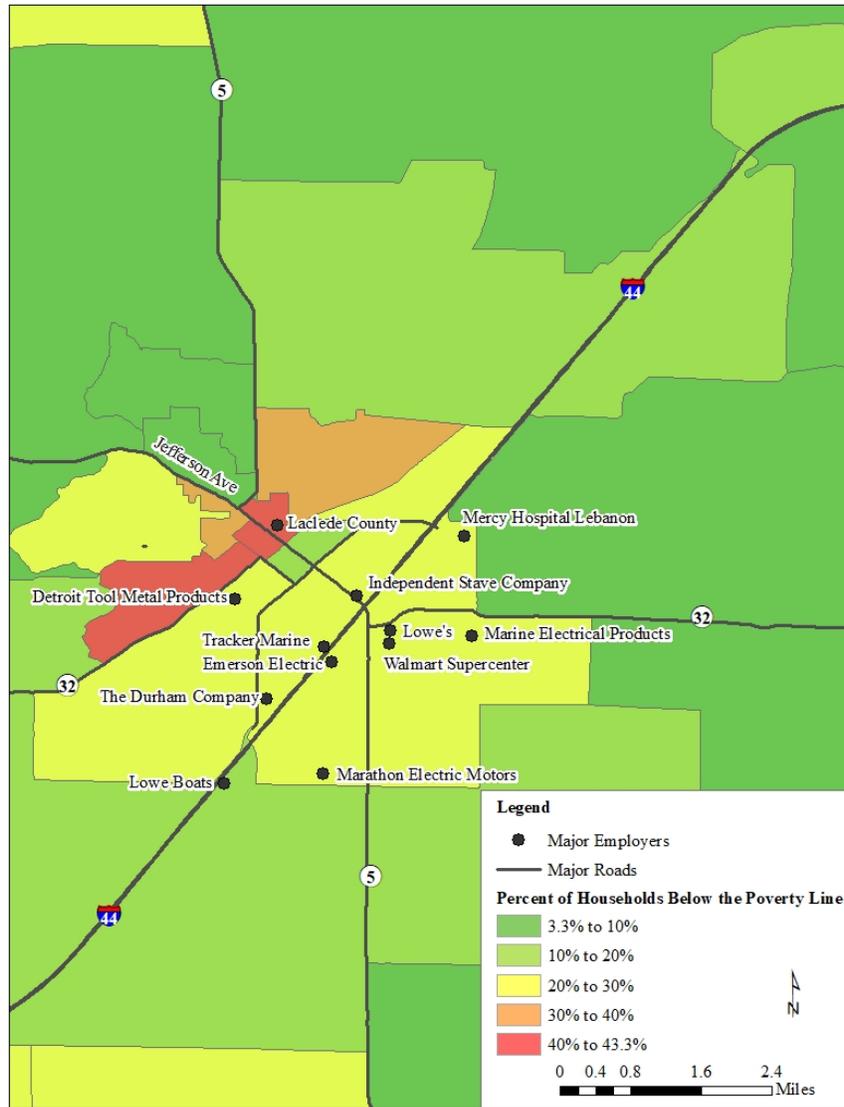
**Figure 2-18: Household Income**

The census block median household income tends to be lower along Jefferson Ave; it increases as you move away from the central core of LEBANON (Figure 2-19) except for the census block northwest of Highway 5 and Jefferson Ave.



**Figure 2-19: Median Household Income Per Census Block Group (2016 ACS Census Block Groups)**

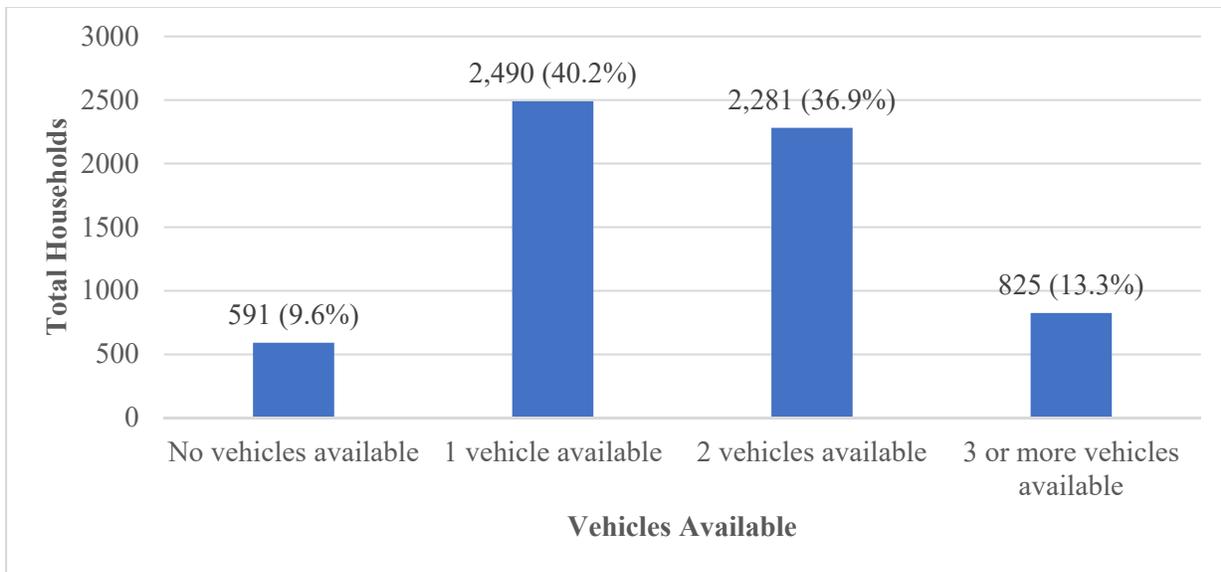
Of the 6,187 occupied households in LEBANON, 1,586 (25.6%) of these households are below the poverty level, which is currently \$12,228 for a single individual or \$24,339 for a family of four (two adults, two children under 18). (Note: Recall from above that this discussion is specific to the household, rather than to an individual.) Census block groups with larger percentages of households below the poverty line are located near Jefferson Ave and North of Highway 32 (Figure 2-20).



**Figure 2-20: Percent of Households in the Census Block Group that are Below the Poverty Line (2016 ACS Census Block Groups)**

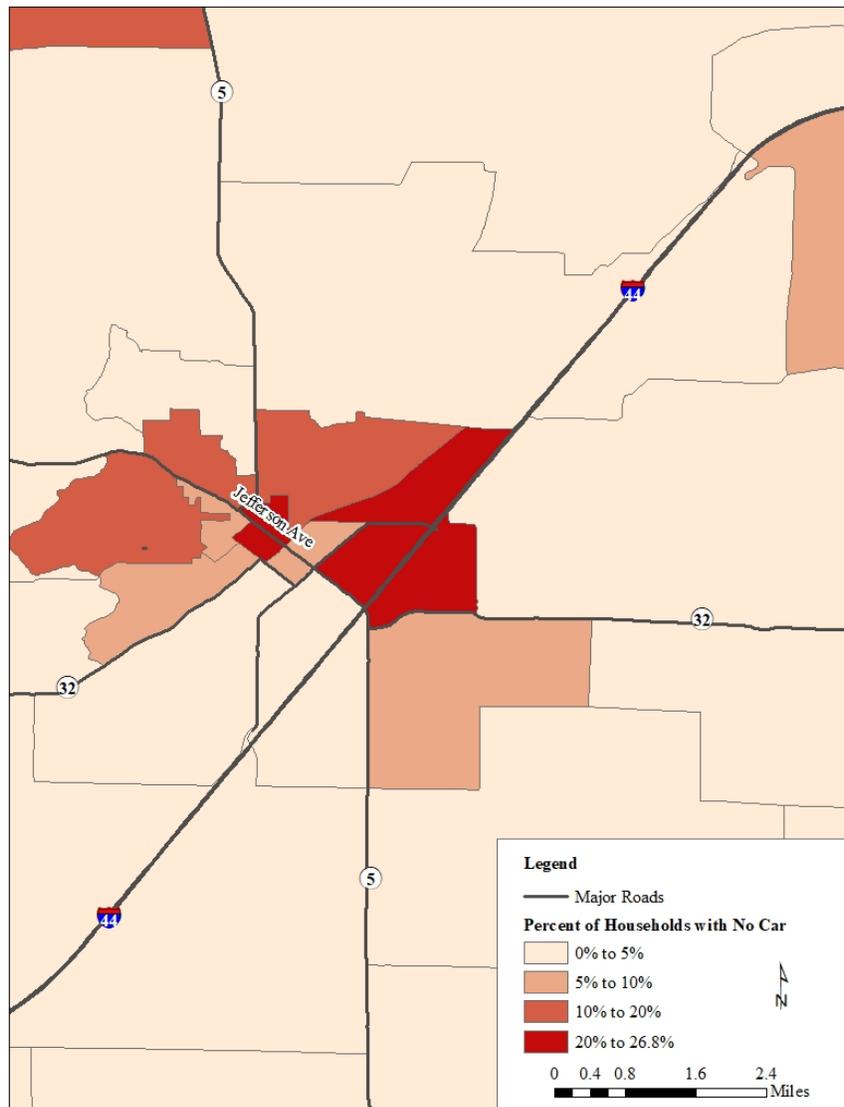
Notice that the census block northwest of Detroit Tool (officially named Census Block Group 3, Census Tract 9609 Laclede County, MO) has more than 90% of the population (individuals) living in poverty (Figure 2-13), and more than 40% of households are living below the poverty line (Figure 2-20). If the skillset of individuals within the census block could match the needs of Detroit Tool, individuals in this census block would have access to a good paying job.

Most households in LEBANON have access to one (40.2%) or two (36.9%) vehicles (Figure 2-21).



**Figure 2-21: Total Vehicles Available Per Household**

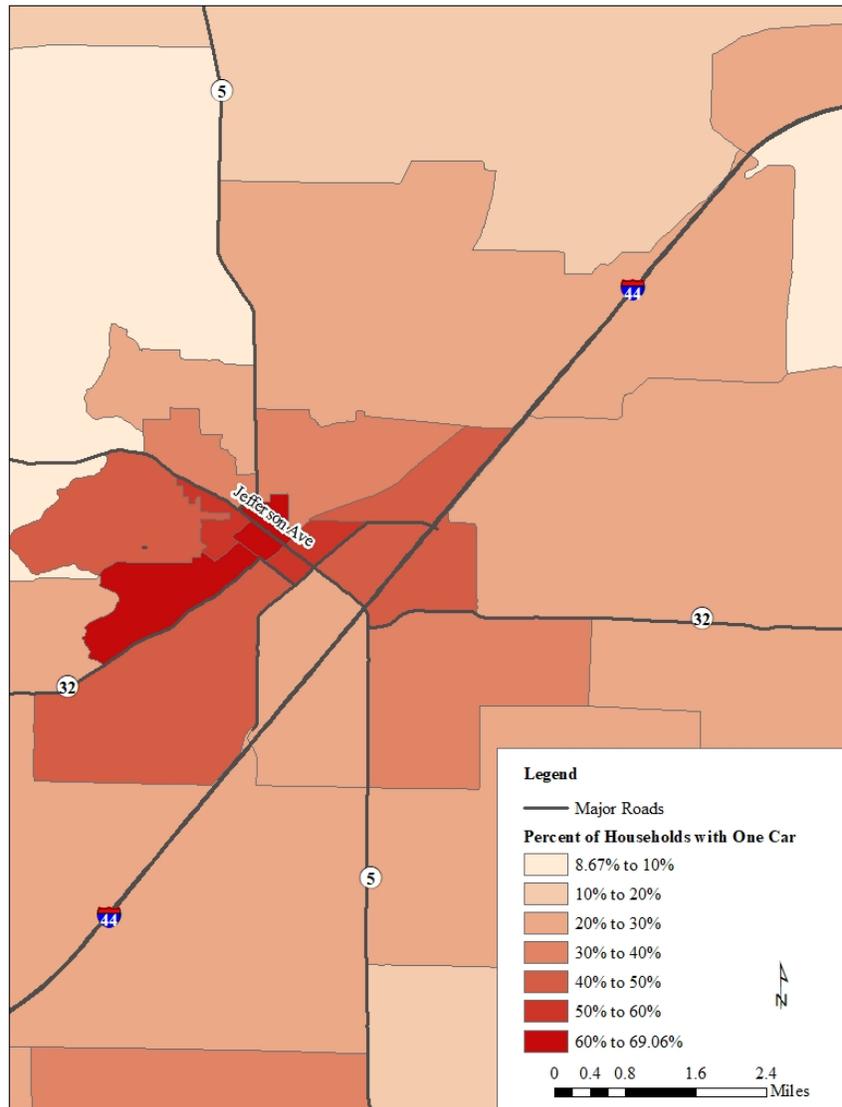
However, almost ten percent of households do *not* have access to a vehicle (Figure 2-21). Most households without access to a vehicle are located within central LEBANON, with some census blocks having upwards of 26.8% of households without access (Figure 2-22).



**Figure 2-22. Percent of Households within Census Block that Do Not Own a Vehicle (2016 ACS Census Block Groups)**

Interestingly, the census blocks that reported not owning a vehicle do not correspond to the census block that reported the highest percentage of individuals living in poverty and the highest percentage of households living below the poverty line (e.g. the census block to the northwest of Detroit Tool (officially named Census Block Group 3, Census Tract 9609 Laclede County, MO) see Figure 2-13 and Figure 2-20); rather, these census blocks seem to correspond more closely with people with disabilities and those who are 65 and older (see Figure 2-9 and Figure 2-12). Note that this information does not specify whether or not the reported vehicle within the household is operable.

Households with two or more people but with only one vehicle may also have difficulty in accessing employment. Therefore, it is also of interest to identify households that report only one vehicle (Figure 2-23).



**Figure 2-23: Percent of Households within Census Block that Own One Vehicle (2016 ACS Census Block Groups)**

Notice that the census block (officially named Census Block Group 3, Census Tract 9609 Laclede County, MO) that has the greatest number of individuals living in poverty and the greatest percentage of households living below the poverty line has one of the greatest percentages of households with *one* car. It is plausible to assume that these households rely on the income of the one person who can use the vehicle. If employment opportunities were more accessible via another form of reliable, affordable transportation, there is the potential that the economic opportunity for this household would increase. Furthermore, with many of the households that own one vehicle reporting annual household incomes of \$20,000 or less, and knowing that the approximate annual cost to own and operate a vehicle when driving around 15,000 miles annually is \$9,000 (American Automobile Association (AAA), 2018), one can assume that a large percentage of the household income earned must go toward the cost of maintaining that one vehicle. Only a small amount of

the household income earned can be put towards housing and food costs, with little, if any, left over to address other needs and/or desires (e.g. clothing, enrolling in college courses).

### 2.2.7. Walking & Bicycling

During the site visit to LEBANON in January of 2018, multiple people were observed walking and biking. According to the U.S. Census, 1.1% of workers over the age of 16 reported walking to work and 0.0% reported bicycling to work (US Census Bureau, 2016).

For the sixty-five LEBANON residents who indicated that they walked to work on a daily basis, Table 2-2 shows the duration of their daily walking trip (US Census Bureau, 2016).

**Table 2-2: Number and Duration of Walking Commuters**

Duration (Time) of Trip	Number of Walking Commuters
15-19 minutes	26
20-24 minutes	7
30-34 minutes	32
TOTAL	65

An example of a bicyclist observed during a site visit to LEBANON is provided in Figure 2-24; other examples of people walking and biking are shown in Appendix B – Walkers and Bicyclists in Lebanon. Furthermore, other bicyclists were observed in LEBANON, though photos were not taken. It is unknown whether the bicyclist in Figure 2-24 or others that were observed were commuting to work. If this individual is commuting to work, however, it would appear as if there were some changes in transportation modes since the last census (in which no bicycle commuters were recorded) or that this mode was not represented in the data.

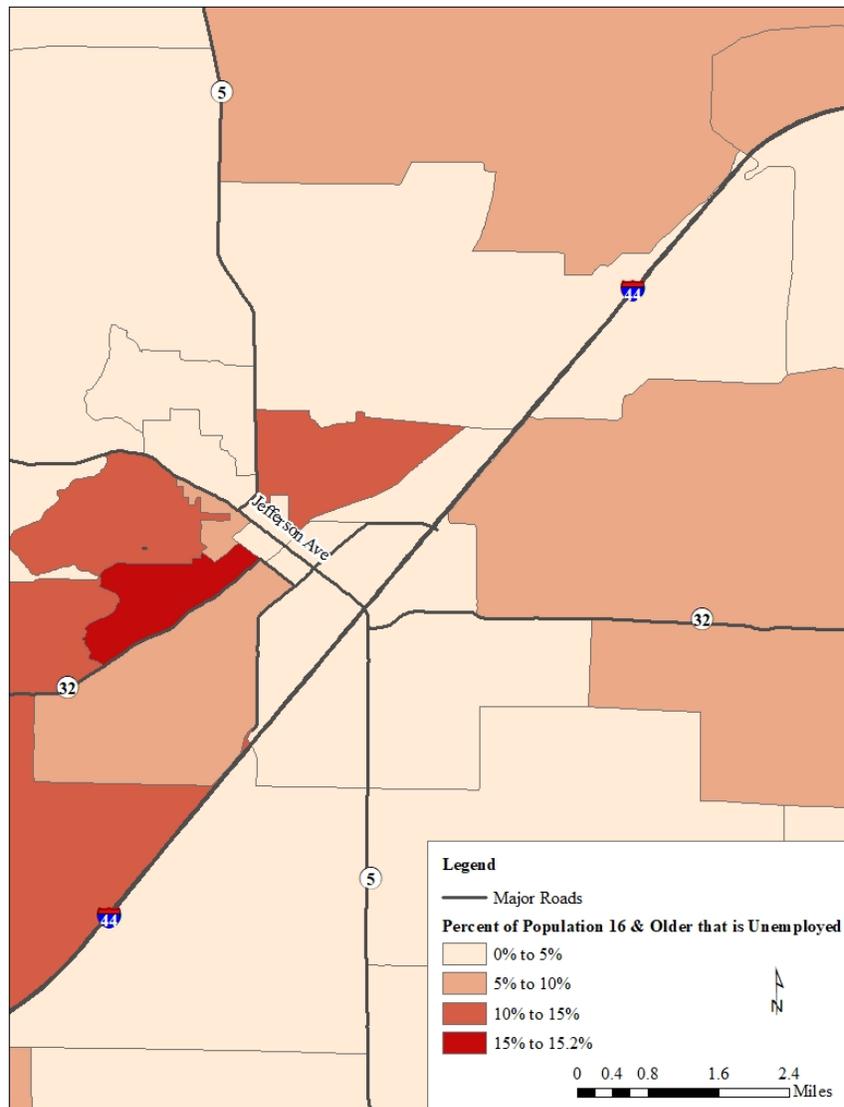


Figure 2-24. A Bicyclist in LEBANON

### 2.3. Employment & Commuter Characteristics

There are 11,645 residents of LEBANON over the age of 16. Of these, 5,804 are employed (49.8%), 548 are unemployed (4.7%), and 14 are in the armed forces (0.1%). The remaining 5,279 people are not in the labor force, and they include students, retirees, institutionalized people, and people who are not looking for work. Of the 6,352 people in the civilian labor force, with 548 people unemployed, the unemployment rate for LEBANON is 8.6%. (Note: This measure of unemployment considers only those who are in the labor force, not the population of the community that are 16 and older.)

Census block groups with 10 to 15 percent of their population aged 16 and older that are unemployed are located northwest of I-44 and south of Jefferson Ave (Figure 2-25).



**Figure 2-25: Percent of Census Block Group Age 16 or Older that are Unemployed (2016 ACS Census Block Groups)**

Again, the census block (officially named Census Block Group 3, Census Tract 9609 Laclede County, MO) with the greatest percentage of unemployment corresponds with: 1) the greatest percentage of individuals living below the poverty level, 2) the greatest percentage of households living below the poverty line, and 3) households with only one vehicle.

Employment in LEBANON is primarily in the manufacturing industry (25.7%) and the educational, health and social services industry (19.6%) (Figure 2-26). From the 2012 Economic Census, thirty-three manufacturing establishments were identified as being within LEBANON (U.S. Census Bureau, 2012). The agriculture, forestry, fishing/hunting, and mining industries employ the fewest people (1.3%).

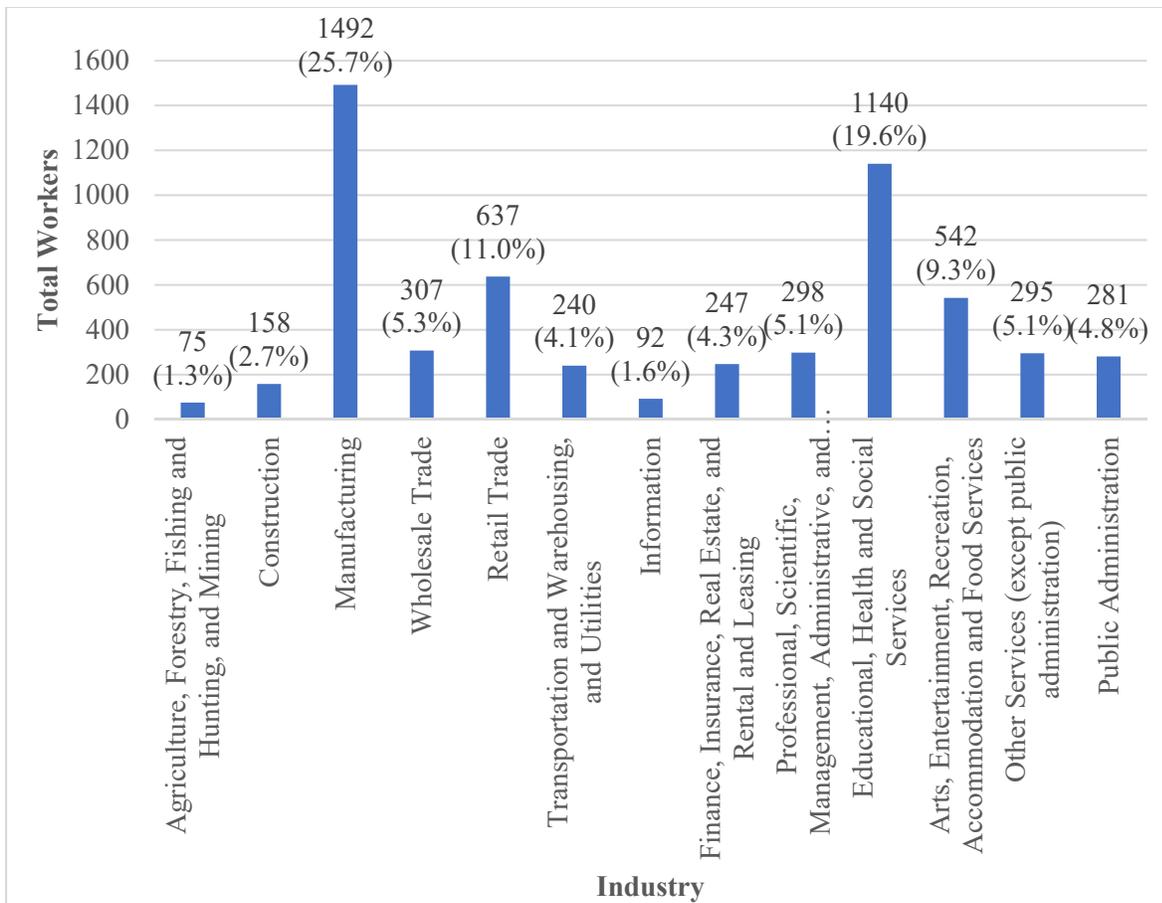


Figure 2-26: Number & Percent of Employees By Industry

The Lake of the Ozarks Council of Local Governments (LOCLG) provided a list of the top twelve employers in Laclede County (Lake of the Ozarks Council of Local Governments, 2018).

- 1) Independent Stave Company
- 2) Tracker Marine
- 3) Emerson Electric
- 4) Mercy Hospital
- 5) Marathon Electric Motors
- 6) Lowe Boats
- 7) Marine Electrical Products
- 8) Detroit Tool Metal Products
- 9) Walmart
- 10) Lowe’s Home Improvement
- 11) The Durham Company
- 12) Laclede County

All employers are within a 1.5-mile distance from I-44 (Figure 2-27). Furthermore, they are all within one to five miles from each other, which is essentially indicating that they are within LEBANON (see earlier discussion in Community Characteristics regarding the size of LEBANON).

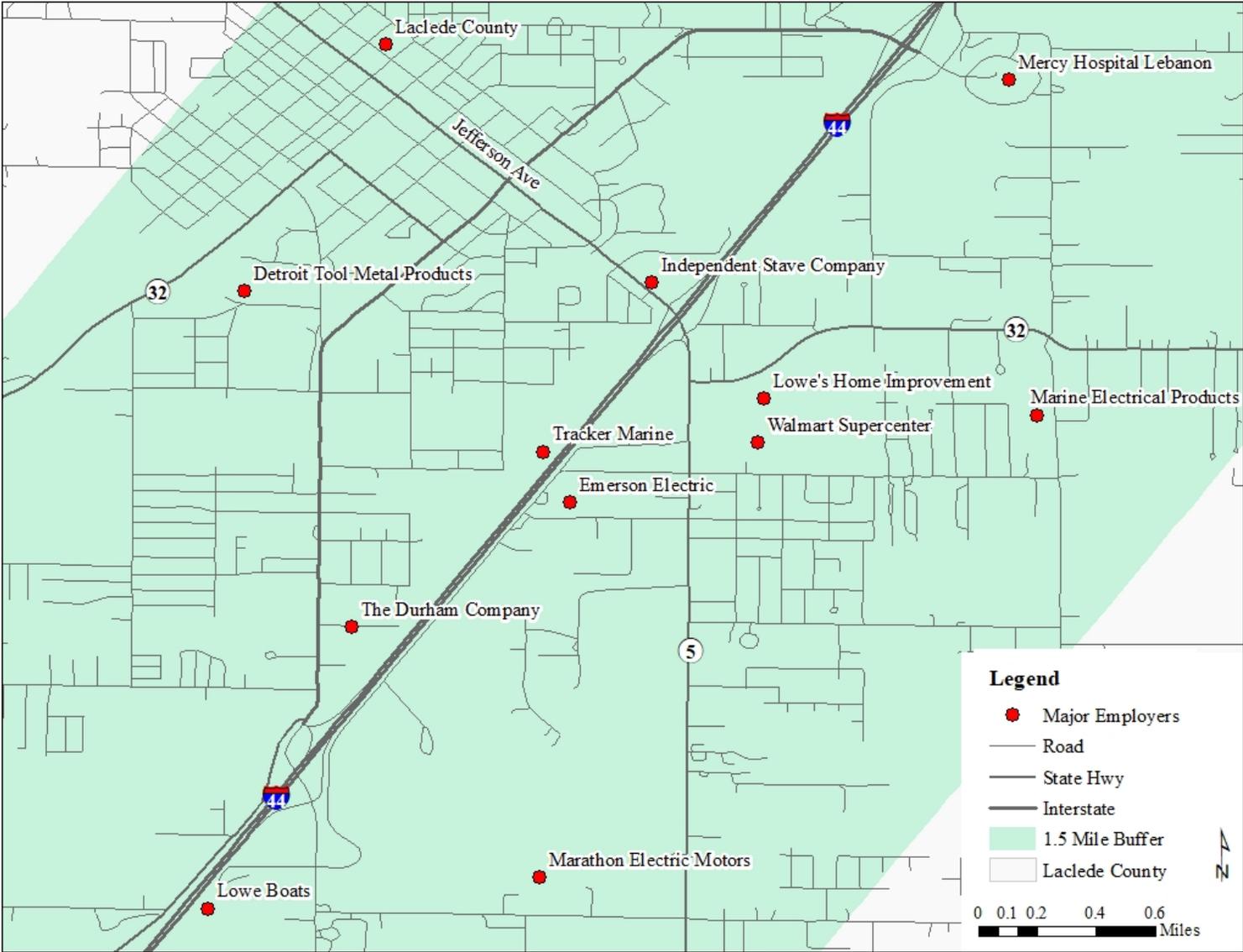
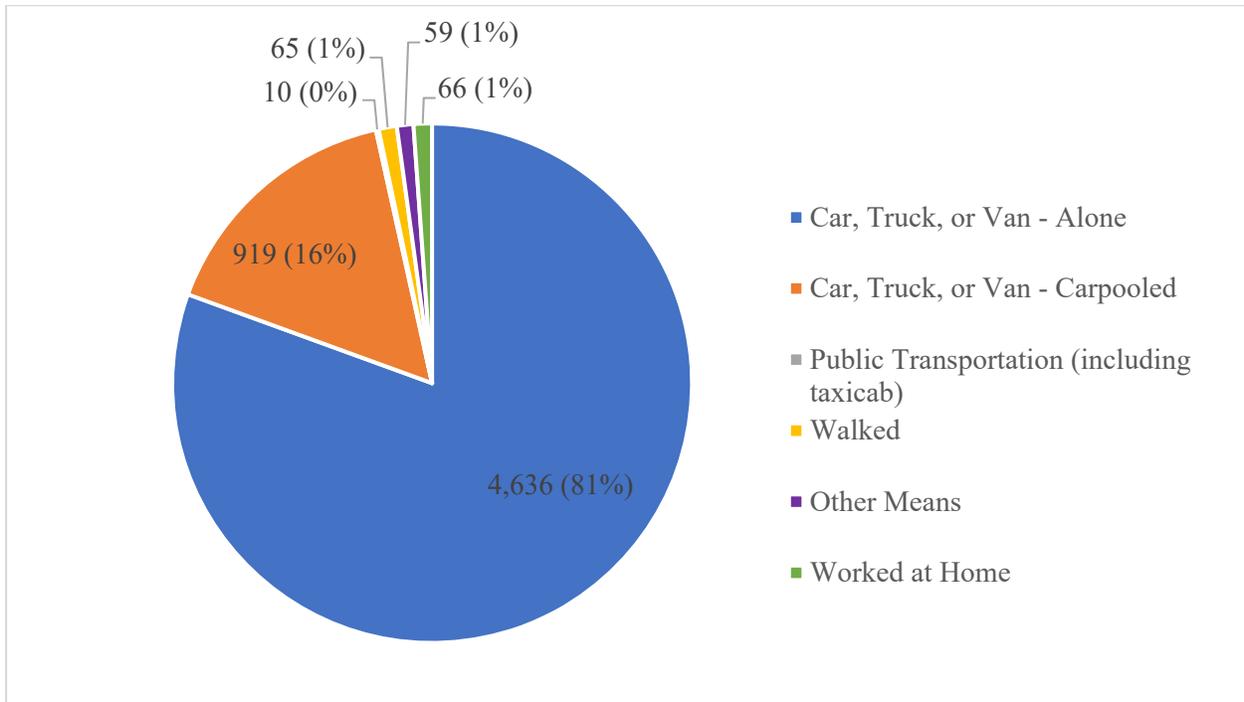


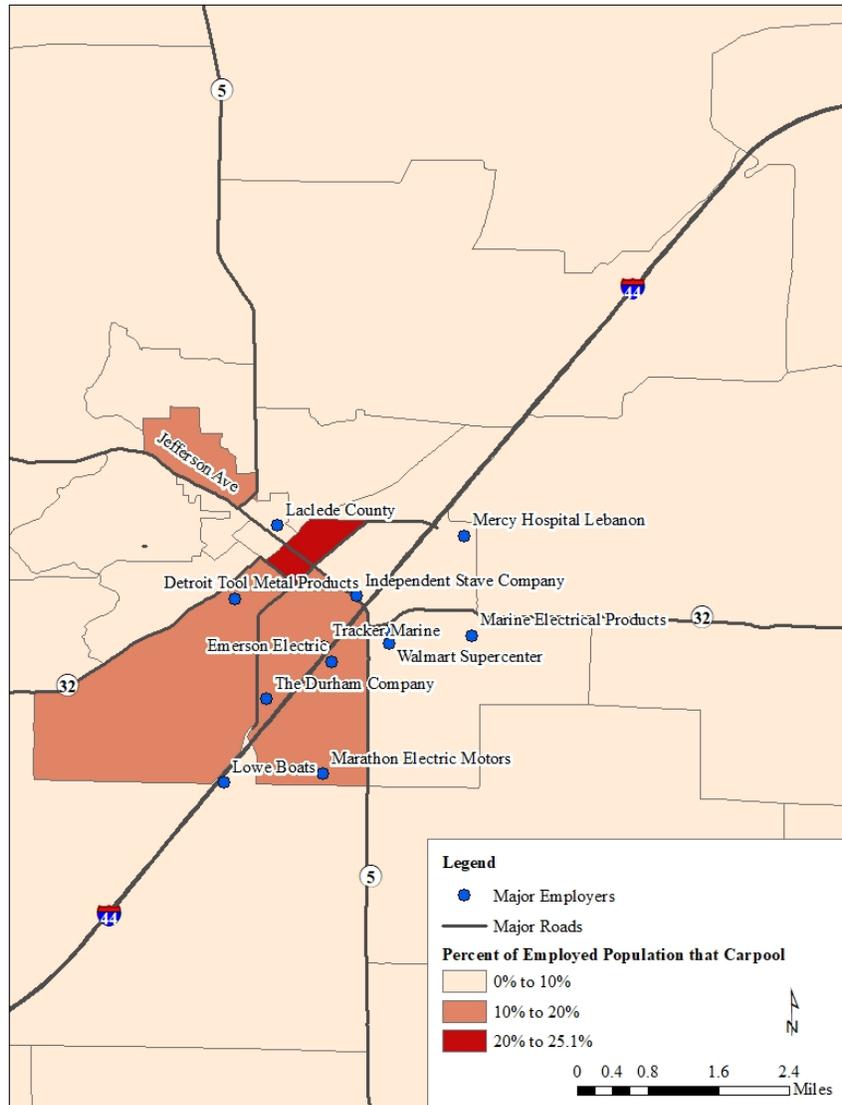
Figure 2-27: Primary Employers in the LEBANON Area

For the employed population, travel to work is dominated by the automobile (Figure 2-28), with ninety-seven percent reporting that they travel in a car, truck or van whether alone or as a carpool. Most workers (81%) travel to work via a single occupancy vehicle. An additional 16% of workers travel via carpool. The mean travel time to work is 17.2 minutes.



**Figure 2-28: Worker Commute Transportation Mode**

For the people who carpool, they primarily travel in two-person carpools. There are a few census block groups that have 10 to 25 percent of their employed population (age 16 and older) that commute to work via carpool (Figure 2-29), which does not include the census block with the largest percentage of households living below the poverty level (officially named Census Block Group 3, Census Tract 9609 Laclede County, MO).



**Figure 2-29: Percent of Census Block Group Employed Population that Commute to Work Via Carpool (2016 ACS Census Block Groups)**

The median income per worker is \$22,406. However, there is a disparity of about 25% between the income earnings when comparing men and women workers. The median income for a full-time, year-round male worker is \$36,746 compared with \$27,427 for females. For households of single mothers trying to support a child or children, this disparity can be problematic.

### 2.4. Existing Transportation Resources

This section discusses services provided by: 1) OATS, 2) Greyhound, 3) taxis, 4) Lebanon Industries, and 6) faith-affiliated transportation.

### 2.4.1. OATS

Currently, public transportation options are extremely limited in LEBANON. OATS is the primary demand-response transportation provider for LEBANON. OATS operates within LEBANON Monday through Friday from 7:30 AM to 2:00 PM. Once a month OATS provides service to Springfield, MO. OATS is available to everyone (e.g. there is no age requirement) but requests a rider to schedule a ride at least 7 to 10 days in advance. The limited hours of operation and ride scheduling requirements would make impromptu trips (e.g. trips for medical care) difficult for potential riders. Furthermore, LEBANON staff have received reports of last-minute cancellations of previously scheduled trips.

OATS has recently reduced its hours of services in LEBANON due to a loss of local funding from LEBANON and the Lebanon Area Foundation's "Community Cares Program" (Heusted, 2017). The loss of this funding also has an impact on OATS' ability to receive Section 5311 funding from the Missouri Department of Transportation (MoDOT).

### 2.4.2. Greyhound

Greyhound operates a bus stop for intercity bus services in LEBANON. Greyhound operates daily, and four routes provide service to LEBANON including (Greyhound, 2018):

1. St. Louis, MO to Los Angeles, CA
2. Phoenix, AZ to St. Louis, MO
3. Chicago, IL to Phoenix, AZ
4. Los Angeles, CA to Chicago, IL

These routes provide service to numerous locations within Missouri including Fort Leonard Wood, Springfield, Rolla, Joplin, and St. Louis.

### 2.4.3. Taxi Services in Lebanon

Three taxi services were identified in LEBANON: Away We Go Cab Company, Gray's Taxi Cab Company, and I Need a Cab Company. While these services do provide a mobility option for residents, these are very small operations that often require advance notice; also, they have had issues with cancelling trips at the last minute, which means these taxi services are not a viable option for people trying to get to work. In addition, most of these services charge around \$5 per person, per trip, which can be a barrier for lower income residents, particularly those with children (the services reportedly charge the same rate for children as well, so a parent traveling with a child would pay \$10/trip, one-way).

### 2.4.4. Laclede Industries Transportation

Laclede Industries currently provides transportation to and from work for employees who have a disability. Laclede Industries provides service within LEBANON city limits Monday through Thursday from 6:00 AM to 7:30 AM and 2:30 PM to 4:30 PM using three vehicles (a 15-passenger van, and two 12-passenger vehicles). The transportation service does not have a specific route, but

instead operates based upon the needs of the riders. In addition, a single, 7-passenger van provides service seven days a week to a worksite in Conway, Missouri (Kimrey, 2018).

#### 2.4.5. Faith-Affiliated Transportation

There were many shuttles seen in the parking lots of churches during site visits to LEBANON. Faith-affiliated organizations could be a potential untapped source to provide transportation services to people living in rural areas. An estimated 10 percent of Federal Transit Administration (FTA) Section 5310 – Enhanced Mobility for Seniors and Individuals with Disabilities funds are available to faith-affiliated organizations (Seekins, Bridges, Santa Annesa, Denis, & Hartsell, 2007). A national survey of 288 rural faith-affiliated organizations in the United States found that around one-third of the responding agencies owned one or more vehicles (Seekins, Bridges, Santa Annesa, Denis, & Hartsell, 2007). When asked to rate their willingness to provide transportation to the general public or to people with disabilities in their communities, the most common response is that these organizations are neither willing nor unwilling to provide transportation. While 32 percent of the respondents stated that they were willing or very willing to provide transportation to people with disabilities, only 19 percent were willing to provide transportation services to the general public (Seekins, Bridges, Santa Annesa, Denis, & Hartsell, 2007). Though some faith-affiliated organizations may be willing to provide transportation for residents in their local communities, many face barriers in doing so. These include lack of funding and staff, liability issues, and lack of the necessary knowledge or skills to provide transportation to people with disabilities (Seekins, Bridges, Santa Annesa, Denis, & Hartsell, 2007). In LEBANON, the Community Baptist Church provides transportation as a part of its “Overcomers” programs, which helps those addicted to drugs or alcohol (Community Baptist Church, 2018).

### 2.5. Summary of Background Information

This section discussed community characteristics, key demographics, employment and commuter characteristics, and the existing transportation resources found within LEBANON. Understanding that: 1) low income households, 2) households without a private vehicle or with only one, 3) households with people aged 65 and older and 4) households with a person with a disability are all households that would be more likely to take advantage of a public transportation system if one were available, the 2016 ACS data was used to estimate the number of households in each of these categories. For LEBANON, there are 6,187 occupied households; of these, 1,586 (25.6%) are below the poverty level, 594 (9.6%) do not have access to a vehicle, 1,756 (28.4%) have a person aged 65 or older, and 2,171 (35.1%) have a person with a disability. All of these groups within LEBANON may be enticed to use a public transportation system should the service provisions (e.g. frequency of service and cost) appeal to them.

Currently, residents of LEBANON have few options for public transportation services. OATS provides service to any location within LEBANON and service to Springfield, MO once a month but requires 7 days advance notice for a ride, which makes it difficult for a person to make a spontaneous trip. (Note: Individuals also reported having last-minute cancellations of scheduled trips.) Greyhound provides intercity bus services which could allow residents to access nearby Fort Leonard Wood and Springfield, MO, but is a scheduled service with no “local services” available; first-mile and last-mile connectivity is often an issue with intercity bus transportation. Taxi services, while potentially providing more flexibility, have been reported as costly and sometimes undependable to LEBANON staff.

Reviewing demographic information suggests that there is a need for public transportation in LEBANON, which existing services cannot provide.

### 3. LITERATURE REVIEW

This section presents literature on topic areas that LEBANON wanted to learn more about and on topic areas that are useful when considering a public transportation system as part of a larger transportation network:

- 1) Park County Transit Feasibility Study,
- 2) Cost & Benefits of Public Transportation,
- 3) Changes to a Public Transportation System,
- 4) Public Transportation's Impact on Health,
- 5) Public Transportation's Impact on Employment,
- 6) The First & Last Mile,
- 7) Funding Public Transportation, and
- 8) Marketing Public Transportation.

For all topic areas, resources were selected that addressed the rural viewpoint if available, although when limited information existed, urban examples were identified. At the end of this section of the report, a summary of important points is provided.

#### 3.1. Park County Transit Feasibility Study

In May of 2016, a Park County Transit Feasibility Study was completed (Chaudhari, Lonsdale, & Kack, 2016). The study investigated the feasibility of implementing a public transportation system within Park County, Wyoming; therefore, the focus and results tend to be more regional as compared with local in nature. Just over eighteen percent (18.3%) of the county's population is aged 65 years and older. Sixty-seven percent of all residents eligible for the labor force are working in it; the unemployment rate for the county was reported as 2.6%. Finally, while 2.5% of county residents do not have a vehicle in the household, only 0.7% of survey respondents captured in the study reported that they did not own a vehicle. The researchers collected 437 survey responses using Survey Monkey via a snowball sampling method to better understand the public's view of a public transportation system within the county. The majority of responses (70%) were from women, with the greatest percentage (36.7%) ranging in age from 51-65 years old. More than half (54%) of survey respondents reported household incomes from \$50,001 to \$110,000. Almost eighty percent (78%) indicated that they were employed full-time; just under two percent (1.6%) of survey respondents identified themselves as students. From 2010 to 2014, the population growth of Park County was 2.8%. Only one taxi service was identified as operating within the county. The top four employment sectors are: 1) Education Services, Health Care and Social Assistance, 2) Retail Trade, 3) Arts, Entertainment, Recreation, Accommodation and Food Services, and 4) Agriculture, Forestry, Fishing and Hunting, and Mining. Park County's median household income is \$53,951, with 18% of household incomes below \$25,000 and 17% of household incomes above \$100,000. Park County and all of the communities within it reported over 75% of commuters as driving alone, 11% as carpooling and the rest walking, biking, working from home or traveling by another means. Those in the 25 to 44 age group reported the highest number of commuters carpooling.

The report highlighted the importance of the quality of service provided, reporting that, "The City of Cody [within Park County] previously operated a shuttle/transit service. Ridership was limited, and opinions were that the shuttle was considered unreliable, as it was often late." The authors

also reported that the Meeteetse Recreation District provided transportation for community members, charging \$5 per ride, although senior citizens and the general public can purchase an annual pass for \$100 and \$200, respectively. The majority of survey respondents reported being unlikely or very unlikely to use public transportation. Even so, 74% of survey respondents reported that “providing public transportation options is important for Park County.” Private ride providers reported that they felt that the mobility needs of the county were being met with their services. Stakeholders suggested that, in order of most frequent user, 1) commuters (between communities within the county), 2) college students, 3) people with disabilities and 4) seniors would be the biggest users of a public transportation system within the county.

A healthcare entity indicated that nurses have a 7am to 7pm schedule and other employees work from 8am-4:30pm; furthermore, respondents from this entity reported that if employees found the service useful, they would consider paying for the cost on behalf of the employee. A discussion with college administrators at Northwest College suggested that they had little interest in providing support to a public transportation system, because most commuters are faculty members with irregular schedules and students who drive large vehicles (e.g. to accommodate horse trailers); this would leave only staff who are on the “lower end of the pay scale” and work from 8am to 5pm as potential riders. There was a suggestion that they viewed an increase to student fees as the way in which contribution to a public transportation system would be financed.

Sixty percent of survey respondents reported that fixed route transit would be the most useful service-type for someone in their household. Two examples of situations that seemed to be minimally captured by the data are: 1) two students who are married and have two children do not have access to a vehicle; they cannot travel outside of the community in which they reside without a ride from a friend, and 2) an individual reported losing a job due to unreliable transportation options. The authors reported that the top three household expenses among respondents were: 1) housing (33%), 2) transportation (17%), and 3) food (13%). Within the report, the authors highlighted the trade-offs between affordable housing on the outskirts of a community with an increase in costs for transportation (cost for additional gas, etc.). They also suggested that if the cost of transportation can be reduced, residents could either invest in purchasing a property or make repairs (e.g. replacing a roof) or upgrades to their property.

### **3.2. Costs & Benefits of Public Transportation**

This section discusses costs and benefits of public transportation. First, a tool that can be used to evaluate public transportation is discussed. Then after, a report discusses the benefits and costs of public transportation at the state level. Next, misconceptions regarding the funding of transportation through general taxes and capacity of transit vehicles and parking lots are discussed. Then after, latent demand and unreliability of rides from friends and family are discussed. Subsequently the higher transportation costs for rural as compared with urban residents are described. Finally, the benefits from addressing transportation needs of the young and old with crash reductions, the reduction in needed parking spaces by an employer, and the higher net earnings of counties with public transportation system are highlighted.

When considering an investment in public transportation an agency must consider all of the impacts on everyone over time. These impacts are not just the impacts on transportation itself but on the quality of life, environmental quality, equity, and more. The *Transportation Cooperative Research Program Report 78: Estimating the Benefits and Costs of Public Transit Projects: A Guidebook for Practitioners* provides information and methods to estimate the benefits and costs

of public transportation to help local and regional agencies conduct benefit-cost analysis in order to evaluate investments in public transportation (Transportation Research Board, 2002). These include factors like facilities, vehicles, operations and maintenance, fares, travel time, safety, environmental concerns (air, water, and noise pollution), and more. The guidebook provides in-depth analysis of the theory behind the various factors that should be considered when conducting a benefit-cost analysis. The final chapter of the guidebook directs the reader through a benefit-cost analysis of an example metropolitan area with a population of 1,000,000 people that is considering express bus services. While the calculation of costs and benefits for a public transportation system will differ depending on the community type (i.e. rural vs. urban) it is an important step in the planning process when considering a large investment like public transportation.

A study investigated the costs and benefits associated with transit in the State of Wisconsin (HDR/HLB Decision Economics, Inc., 2006). Transit systems were grouped according to the number of annual riders: 1) more than 50,000; 2) 10,000 to 50,000; and 3) less than 10,000. Transit benefits to the state were found to be \$9.7 billion in present value; therefore, the authors concluded that investing in public transportation is “economically worthwhile” to the State of Wisconsin. However, only 0.11 percent of the benefits were attributed to small systems (e.g. those with less than 10,000 annual riders). Other key points from the report are that, 1) transit users in Wisconsin do **not have access to other transportation**, and 2) **the level of service is a key predictor of ridership**. Furthermore, the authors reported that ridership for **small services** (those with less than 10,000 annual riders) was **particularly sensitive to changes in the service provisions**. The authors also reported that if transit was unavailable for a trip, potential riders will often just forgo the trip, which if the trip was for a medical purpose, can potentially result in a subsequent costly emergency trip.

Two common critiques associated with public transportation are funding and empty buses (American Public Transportation Association (APTA), 2017). City and county roads were identified as primarily being funded through general taxes. Therefore, there is a disparity in who is able to access a transportation system that is solely designed for the private vehicle if some residents cannot afford a private vehicle even though the network for the private vehicle is being funded through general taxes paid by everyone. The second common critique of public transportation systems is empty buses. Yet, empty buses are not unlike empty parking lots in that bus sizes are designed to accommodate capacity, much like parking lots are designed to accommodate peak use by private vehicles.

Hosen and Powell reported that, “Rural transit service is a **lifeline** for many people residing in rural areas” (Hosen & Powell, 2011). As an example, Sanders County, Montana reportedly implemented a public transportation system when a community member died as a result of her inability to access cancer treatments due to transportation limitations (APTA, 2017).

One source suggested that there is “*considerable latent demand*” for a public transportation system in rural areas (APTA, 2017). For example, while some may suggest that informal transportation provided by relatives and friends may be a solution to transportation needs from the viewpoint of those receiving transportation, such mobility is *unreliable* and can be *uncomfortable* (APTA, 2017). Non-drivers report preferring to pay for public transportation as compared with being dependent upon others for their mobility needs.

One source estimated that rural residents spend approximately forty-two percent of their total annual incomes on transportation (APTA, n.d.). This supports reports that, “rural households

spend a much greater portion of their budgets on transportation than urban households” (APTA, 2017). As a result of a significant portion of a household’s budget being spent on transportation, these households reportedly forego paying for utilities, medicine and healthy food (i.e. junk food is often cheaper than fruits, etc.) (APTA, 2017).

The youngest of drivers (16 to 19 years old) and the oldest drivers have some of the worst crash records (APTA, 2017). The youngest drivers reportedly have **three times** the crash rate of drivers 20 years and older. Furthermore, older Americans have the **second highest** crash rate per mile. Therefore, providing drivers in these age groups with an alternative mobility option can bring a safety benefit to a community.

Public transportation can benefit companies by reducing their parking costs, as public transportation users do not need parking (APTA, 2017). While on-site, the researchers noticed many employees from one manufacturer parking beyond the extent of the parking lots, into the grass. It appeared that this parking may be intruding on the grass of a nearby park. In addition, another manufacturer was in the process of enlarging its parking lot.

An **eleven percent difference** in average net earnings has been reported when comparing rural counties with and without a public transportation system (APTA, 2017). Furthermore, an economic multiplier of **3.35** was reported for every dollar of federal money spent on rural public transportation (APTA, 2017).

### 3.3. Changes to a Public Transportation System

Even with the best possible knowledge, as a community continues to evolve, the needs that a public transportation system is designed to address can be expected to evolve. The literature discussed incremental changes, the need to redesign a system when faced with termination, and innovative ways of engaging with the public to ensure that all users’ needs are addressed. Shoup and Homa (2010) reported that Litchfield County, Connecticut has a public transportation system that has evolved with “incremental changes.” Hosen and Powell (2011) reported that innovative agencies were those with a willingness and ability to change and/or reinvent themselves, typically when the only other option was a termination of the service. They also reported that a service in northeastern Texas created a ‘Meeting on a Bus’ program in order to engage public transportation system users who may otherwise be unable to attend a traditional public meeting.

### 3.4. Public Transportation’s Impact on Health

In America, 3.6 million people miss or delay medical care annually due to transportation barriers. (Hughes-Cromwick, Wallace, Mull, & Bologna, 2005). These people tend to be transportation disadvantaged populations including the elderly, low-income, minority, or mobility-impaired. The National Health Interview Survey found that the transportation disadvantaged noted the following conditions: depression, hypertension, heart disease, asthma, and chronic obstructive pulmonary disease (COPD) (Hughes-Cromwick, Wallace, Mull, & Bologna, 2005). When people delay or miss routine medical appointments, they are more likely to rely on emergency care which is costlier to the **individual** and to the **healthcare facility** and are likely to exacerbate any chronic conditions (Syed, Gerber, & Sharp , 2013). Non-emergency medical transportation (NEMT) benefits

everyone by providing transportation to routine medical care, which increases a person's quality of life while reducing the frequency of appointment **no-shows and emergency room trips which are costly to medical facilities**. Medicaid and Medicare pay \$3.5 million annually to provide NEMT for low-income and senior beneficiaries. In 2000, the average cost per Medicaid trip was \$16 compared to ambulance trips which can cost more than \$500 per trip (APTA, 2003).

Hughes-Cromwick et al. (2005) studied data on 800,000 paratransit trips across twenty locations in 2004 to gain an understanding of the costs for providing NEMT. For rural areas, the average cost for a one-way trip for an ambulatory person was \$20.95, for a wheelchair-bound person was \$33.02, and for a stretcher-bound person \$86.20. Comparing these costs to the cost of a fixed-route transit trip (\$2.86), Hughes-Cromwick et al. concluded that fixed-route transit could be a cost-effective way to provide transportation to medical facilities.

Arcury et al. conducted a survey of 1,059 rural Appalachians in North Carolina to explore the relationship between transportation and healthcare access (Arcury, Preisser, Gesler, & Powers, 2005). The authors focused on data for chronic care and routine checkup medical appointments. Most respondents accessed medical care via their own vehicle, 201 respondents (18.9%) received a ride from a family member or friend, and only 48 respondents (4.5%) used public transportation to reach medical appointments (Arcury, Preisser, Gesler, & Powers, 2005). Distance to medical care was not found to be statistically significant to the number of chronic care or routine care medical appointments. **Having a driver's license or a family member or friend who is willing to provide transportation were significantly associated with the number of health care appointments a respondent attended.** Respondents with a driver's license had **2.29 times** more health care visits for chronic care and **1.92 times** more visits for regular checkup care than those who did not have a driver's license (Arcury, Preisser, Gesler, & Powers, 2005). Respondents who used public transportation to access health care appointments had an average of **four more** chronic care medical appointments per year than those who did not use public transportation (Arcury, Preisser, Gesler, & Powers, 2005).

MacLeod et al. (2015) examined data on over 125,000 Medicaid trips for over 2,913 patients in Delaware to examine reasons for canceling NEMT appointments. Most NEMT appointments (75%) were for pre-scheduled dialysis appointments (MacLeod, et al., 2015). Most regularly scheduled trips were less likely to be canceled. Six percent of all NEMT trips were canceled; over half of these were no-shows. Approximately a quarter of all trips were not pre-scheduled; of these trips 13% were canceled (MacLeod, et al., 2015). This study shows that regularly scheduled appointments were less likely to be canceled. NEMT providers could work together with healthcare providers to reduce the number or missed appointments through creating efficient scheduling for patients by coordinating medical appointments along with NEMT to that appointment (Rural Health Information Hub, 2016).

Health Outreach Partners conducted a survey of 188 health centers nationally. A majority (87.1%) of health centers stated that the rate of missed appointments was a **moderate or serious problem** (Health Outreach Partners, 2017). The average rate of missed appointments ranged from 11-30% for 64% of respondents. Most respondents (69%) believe that **transportation** was one of the **primary reasons** for missed appointments. Respondents were asked how patients travel to medical appointments. Only 40% stated that public transportation was used frequently, but these were primarily in urban areas (Rural Health Information Hub, 2016). For rural areas, patients were more likely to access medical appointments via a private automobile. (Note: These results do not take into account whether or not public transportation is available in rural areas.) Most medical centers

keep data on the number of missed appointments, but few track the reasons why an appointment was missed. Further information on the reasons why patients miss an appointment could clarify the issues surrounding insufficient transportation to medical facilities.

Unfortunately, people who do rely on public transportation for access to medical care can face issues of their own. Sipe et al. (2004) conducted a study of hospital-based patients. A total of 82 patients responded to the survey. It was found that people who used public transportation to access medical care (27% of the 82 respondents) faced long trip times (upwards of 81 minutes), had missed a medical appointment (86%), and had been late for a medical appointment (95%) (Sipe, et al., 2004). For situations like this, the Rural Health Information Hub suggests five strategies to improve transportation services: (1) simplify transportation trip scheduling, (2) centralize staff for trip eligibility determinations and reservation requests, (3) create regular trip schedules to specialty care facilities, (4) provide reminder calls to riders, and (5) communicate information about the availability of public transportation services for medical care.

Working with local health care clinics can be beneficial to overcoming transportation barriers to health care access. A strong relationship between public transportation and health care clinics can allow information exchange, the clinic can share information with a transit partner on peak appointment times so transit can better coordinate a fixed-schedule, and the clinic can share information on existing transit services with its patients. In addition, transit buses can use bus wraps to advertise for health care clinics on their routes (Figure 3-1). This relationship benefits both entities: public transit gains more riders because the health care facility can make its patients aware of the available public transportation and health care clinics reduce their no-show appointments.



**Figure 3-1. Bozeman Health Bus Wrap Example**

Mattson found that people who use public transportation to access medical appointments encountered three challenges: (1) inconvenient schedules, (2) need to match medical and transit schedules, and (3) infrequent transit service (Mattson, 2010). Services that make scheduling easier

for patients may reduce a barrier to health care. In 2013, the Missouri Rural Health Association in coordination with the Missouri Public Transportation Association, Community Health Builders LLC, and the Missouri Foundation for Health conducted focus groups with patients, health care providers, and transit partners to examine barriers to health care in rural areas. As a result of these focus groups, the Missouri Foundation for Health funded a pilot program, HealthTran, which partnered with existing transportation providers to coordinate transportation for individuals within a 10-county region in South-Central Missouri. HealthTran employed coordinators who would work with individuals to identify their transportation needs, schedule rides with public or private transportation systems, and provide the individual with education on how to use these services. In 2016, this program handled 2,012 referrals; 76% of these referrals resulted in a trip with an average cost of \$34 per trip leg (Health Outreach Partners, 2017). The current status of the program is unclear; however, it appears that the grant funding for the program ended in 2016.

Ride Connection in Portland, Oregon is a non-profit organization that coordinates and provides transportation services for chronic care (dialysis) and other NEMT for seniors and people with disabilities. Ride Connection has a network of more than 30 service partners and 700 drivers (Health Outreach Partners, 2017). From 2015 to 2016, Ride Connection provided over 569,000 rides to medical care. In addition, Ride Connection trained (e.g. travel training) over 2,000 people on how to use available transportation services (Rural Health Information Hub, 2016). Previously, dialysis patients would completely miss or cut appointments short due to transportation issues. Ride Connection has provided patients with a reliable transportation service to reach necessary medical appointments.

The Rural Health Information Hub hosted a webinar in February 2018 that discussed, “*Improving Access to Transportation in Rural Communities*.” This webinar presented information on the Rural Transportation Toolkit (available: <https://www.ruralhealthinfo.org/toolkits/transportation>), which provides resources and model transportation programs in rural communities. The resources provide information for communities on planning, implementing, or evaluating transportation programs in their community. In addition to the Rural Transportation Toolkit, two model transportation programs provided information on their services: ITNAmerica which coordinates rideshare type service for seniors across the United States and HealthTran which coordinates existing transportation services to improve access to healthcare. The presentation slides and link to the recording are available in Appendix D – Additional Resources.

It is clear that providing public transportation can have a positive impact on access to medical care, particularly for disadvantaged populations. However, these services need to be easy to use and reliable for individuals to consider these services as a viable method to access health care facilities.

### **3.5. Public Transportation’s Impact on Employment**

This section discusses information found in the literature regarding public transportation’s impact on employment.

A quote from Debbie C. of Nixa, Missouri [a suburb of Springfield, Missouri] noted (APTA, 2017):

*“I think if you talk to the local food pantries and non-profits you will find that much of the food and energy assistance needed in Nixa is due to the fact that **quality employment is unreachable if you can’t afford a vehicle, or its maintenance costs.**”*

One news brief indicated that, “*The U.S. Department of Health and Human Services acknowledges the importance of public transportation for job access in small urban and rural areas*” (APTA, n.d.). An example from Alabama was provided where the community used school buses to provide access to jobs. A second example from Winchester, Virginia was provided, where the intent was to implement a job-access transit program, which reportedly resulted in “*expanded access to thousands of manufacturing jobs in the area...tailored to...specific work shifts.*”

Residents in rural communities tend to have longer distances to travel for employment, education, or childcare. These areas also tend to have higher rates of poverty, unemployment, and lower incomes (Fletcher, Garasky, Jensen, & Nielsen, 2010). Fletcher et al. conducted a study related to rural welfare recipients in Iowa (Fletcher, Garasky, Jensen, & Nielsen, 2010). Thirty-five families were interviewed to gain an understanding of their daily routines, **employment**, housing, **transportation**, and well-being. Many themes emerged from these interviews, primarily that barriers to owning a vehicle resulted in **significant challenges in obtaining and maintaining employment** (Fletcher, Garasky, Jensen, & Nielsen, 2010). Forty percent of these families did not have access to a vehicle and for those that did, the vehicle tended to be older and unreliable, thereby requiring more maintenance (Fletcher, Garasky, Jensen, & Nielsen, 2010). Among those who did not have access to a vehicle, they either obtained a ride from a friend or family member or would limit their employment search to jobs within walking distance.

In addition, Fletcher et al. studied data from the 2001 Iowa Transportation and Employment Survey (ITES). For this survey, researchers conducted random phone calls to the general public and to welfare recipients in a five-county region of Iowa. The final dataset included data from 768 respondents (Fletcher, Garasky, Jensen, & Nielsen, 2010). These survey respondents were then screened to select respondents who were between the ages of 19 and 64 and had an income below the poverty level, resulting in a dataset of 290 respondents (Fletcher, Garasky, Jensen, & Nielsen, 2010). More than half (62%) of the respondents were employed. In addition, 63 percent of respondents had access to a vehicle, but **almost half (48%) had experienced transportation barriers due to financial hardships within the last year** (Fletcher, Garasky, Jensen, & Nielsen, 2010). Results of this survey showed that **having access to a vehicle had the largest impact on the probability of employment**. Lack of a reliable vehicle was related to a 10 percent decrease in the likelihood of employment (Fletcher, Garasky, Jensen, & Nielsen, 2010). The Fletcher et al. study highlighted the importance of reliable transportation on employment.

Two common policy recommendations to reduce transportation barriers to employment include improving public transportation, especially providing such an option if it is currently unavailable and making vehicle ownership easier (Gao, Shengyi, & Johnston, 2009). For small urban and rural communities, public transportation has the opportunity to provide a necessary link to connect isolated residents to employment and services. However, approximately 40 percent of rural communities have no public transportation options (Criden, 2008).

Increasing public transportation can increase access to employment, particularly to more distant employment opportunities. This is particularly true for zero-vehicle households that may have had to limit their employment options to those that were within walking and bicycling distance. Public transportation can also open up employment opportunities for adults living in single-vehicle households where one adult may have the vehicle during working hours, making employment difficult for the other person. In addition, public transportation can reduce a household's transportation budget. **Car ownership is estimated to cost around \$9,000 annually** (American

Automobile Association (AAA), 2018). For lower-income families with older vehicles, this estimate can be higher due to the need for additional maintenance of an older vehicle.

For communities that do have access to public transportation, there are concerns that the services may not be reliable or frequent enough for employment trips. Ipsen conducted a study of 82 vocational rehab services in rural locations. Seventeen respondents stated that **bus schedules in their service areas were too limited to meet their clients' needs** (Ipsen, 2012). This can be a problem for many lower-income (e.g. employment at a fast food restaurant) or shift jobs that have schedules that require work hours during evenings and weekends, when public transportation is less likely to be in operation. In addition, employers may not be located near public transportation routes, making this model not viable for many employees.

Public transportation has been shown to assist people with overcoming transportation barriers to employment. A study of welfare recipients in urban Los Angeles County, California found that 26 percent of employment-related trips were made via public transportation and that welfare recipients without access to a vehicle significantly benefit from public transportation options (Gao, Shengyi, & Johnston, 2009). A study of 912 Londoners (England) found that over 60 percent felt that public transportation significantly improved their chance of finding a job (Urban Transport Group, 2015). Approximately **60 percent of trips** on the Skyline Bus which operates from rural Big Sky, Montana to Bozeman, Montana, are **work related trips**. Skyline operates seven days a week during peak season (Summer and Winter) and weekdays only during the off-season (Skyline Bus, 2018). For Streamline Transit which operates within Bozeman, Montana and to nearby communities of Belgrade, Four Corners, and Livingston, approximately 25 to 33 percent of all trips are work related trips. Streamline Transit operates within the City of Bozeman Monday through Friday from 6:30 AM to 7:15 PM and on Saturdays from 7:30 AM to 6:15 PM (Streamline Transit, 2018).

Some areas have partnered with community action agencies to provide public transportation services to low-income residents, seniors, and people with disabilities. In Maine, the York County Community Action Agency established a transit system to provide employment and service access to youth, seniors, and low-income residents (Criden, 2008). This system not only provided transportation to local shops and medical facilities, but also offered discounted transportation to job training, higher education, and employment (Criden, 2008). The Little Dixie Community Action Agency used USDOT funding to establish Little Dixie Transit, which provides rides for low-income residents and seniors in rural areas for all trip purposes. Little Dixie Transit started with one driver in one van in 1983 and grew to 70 employees and a fleet of 90 vehicles (Criden, 2008). (Note: No additional information was provided regarding strategies that were used by Little Dixie Transit to grow the service.) In London, the non-profit Work Wise helped low-income Londoners overcome transportation barriers by providing free or discounted public transit passes for interviews or during the first few weeks at a new job, in addition to trip planning (a.k.a. travel training) to help people understand how to use public transportation to get to work. The Work Wise program has worked with over 14,000 people in ten years (Urban Transport Group, 2015). Trip planning is a useful strategy for vocational rehabilitation and for moving people from welfare to work. Trip planning helps participants understand what transportation options are available and teaches them how to use public transportation to travel to employment. For more information, see the travel training resources in Appendix D – Additional Resources.

### 3.6. The First & Last Mile

A fixed public transportation system cannot provide access and egress to every potential attraction and destination. Therefore, users will have to often have to travel from home to a stop to access public transportation and then get off at a stop nearby their destination, often again traveling by either walking or biking. These access and egress trips are called “the first and last mile.” Communities should seek to make these trips as pleasant and seamless as possible.

Shoup and Homa (2010) noted that wider, larger roads encourage speeding and may make it difficult for pedestrians to travel within a community. In particular, they cited the concerns for having elderly, people with disabilities, and youth traveling “*on unsafe infrastructure and alongside highways with excessive travel speeds.*” Shoup and Homa discuss complete streets, including crossing treatments like rapid-flashing rectangular beacons (RRFBs) that can better accommodate multiple modes as a potential solution to sprawling roadways (e.g. those with multiple lanes). Similarly, the APTA reported the need to consider complete street policies in cooperation with a public transportation service (APTA, 2017).

### 3.7. Funding Public Transportation

The FTA provides multiple funding sources for public transportation services. FTA discusses grant programs, capital investment grant programs, and provides additional funding and finance resources on its website: <https://www.transit.dot.gov/funding>. The following are some funding sources that may be of interest to LEBANON:

1. Access and Mobility Partnership Grants
2. Better Utilizing Investments to Leverage Development (BUILD) Transportation Grants Program (formerly TIGER)
3. Bus & Bus Facilities Infrastructure Investment Program
4. Enhanced Mobility of Seniors & Individuals with Disabilities – Section 5310
5. Flexible Funding Programs – Congestion Mitigation and Air Quality Program – 23 USC 149
6. Flexible Funding Programs – Surface Transportation Block Grant Program – 23 USC 133
7. Formula Grants for Rural Areas – 5311
8. Grants for Buses and Bus Facilities Formula Program – 5339(a)
9. Human Resources & Training – 5314(b)

What follows is a brief discussion of the aforementioned funding sources.

Access and Mobility Partnership Grants provides funding for the coordination of projects that improve access to healthcare.

Better Utilizing Investments to Leverage Development (BUILD) Transportation Grants Program (formerly TIGER) more generally funds infrastructure investments, but the funds can also be used for transit. FTA reportedly provides technical assistance associated with these grants.

Bus & Bus Facilities Investment Program enables an entity to purchase buses and related equipment.

Enhanced Mobility of Seniors & Individuals with Disabilities – Section 5310 provides financial assistance to private nonprofit groups to address the transportation needs of older adults and people with disabilities if the current transportation service is “unavailable, insufficient, or inappropriate.”

Flexible Funding Programs – Congestion Mitigation and Air Quality Program – 23 USC 149 provides funding to address nonattainment or maintenance for ozone, carbon monoxide, and/or particulate matter. While it does not appear that Laclede County is a nonattainment area (United States Environmental Protection Agency (EPA), 2018), the funding may also be used for capital expenditures related to transit if there is an air quality benefit.

Flexible Funding Programs – Surface Transportation Block Grant Program – 23 USC 133 provides funding to assist a community to “preserve and improve the conditions and performance of surface transportation, including highway, transit, intercity bus, bicycle and pedestrian projects.”

Formula Grants for Rural Areas – 5311 “provides capital, planning, and operating assistance to states to support public transportation in rural areas with populations of less than 50,000, where many residents often rely on public transit to reach their destinations.” Technical assistance through the Rural Transportation Assistance Program (RTAP) (<https://www.nationalrtap.org/>) is also provided through this funding source.

Grants for Buses and Bus Facilities Formula Program – 5339(a) provides funding to either a state or transit agency to “replace, rehabilitate and purchases buses and related equipment and to construct bus-related facilities.”

Human Resources & Training – 5314(b) funding relevant to LEBANON includes: 1) employment training, and 2) an outreach program to encourage participation by minority and female candidates in public transportation.

Several sources discussed innovative ideas for funding a public transportation system. Shoup and Homa (2010) identified an example from Washington State where local match was obtained through capital investments by Greyhound via FTA 5311 (f) Private Match. Hosen and Powell (2011) identified a **diversity of funding sources** as an innovation. Examples of such funding sources include: a hotel bed tax, local option sales tax (Idaho), ‘big box’ and grocery store advertising on bus shelters, and a match from Greyhound. Communities should always consider what partnerships (e.g. other public and private entities that might find value in working with a public transportation system) could contribute to funding a public transportation system, as available sources may change over time.

### 3.8. Marketing Public Transportation

A large part of marketing is understanding the audience. The following are examples of some considerations for marketing a public transportation system.

APTA noted that “*improving public transit service requires broad community support*” (APTA, 2017). Therefore, engaging the community and partners is imperative to the success of a public transportation system.

One public transportation system provider in Georgia described itself as a “*mobility enterprise*” (APTA, n.d.). Marketing a provider in this manner may help overcome the stigma that is often associated with public transportation.

An example provided by Shoup and Homa (2010) from Vermont described “*mobility management planning*” which allowed a “*family of transportation services*” to reach a wide range of users.

Again, this approach characterizes public transportation not as one source of transportation, but as a transportation piece that is part of a larger network.

An innovation described by Hosen and Powell (2011), as reported by an interviewed agency, was communicating information about the public transportation service by showing “*up at every local function, parade, county fair, community, and Chamber of Commerce meeting.*” A community could specify that the **job responsibilities of a public transportation system manager include promoting the service at a certain number of events.**

Hosen and Powell (2011) also noted that providing the information about the service in Google Transit (e.g. general transit feed specification (GTFS)), is a good way to promote the system. If someone looks for directions using a smartphone, the user will be shown directions for public transportation if selected.

Hosen and Powell (2011) also reported that some public transportation systems provided incentives for use. As an example, one system offered **free rides on a 90-day introductory period.** That same system also put users in a **drawing for a free trip** to Las Vegas, Nevada. Another system reported offering a **guaranteed ride home program.**

### 3.9. Summary of Literature Review

This section discussed literature reviewed on the costs and benefits of public transportation, changes to a public transportation system, the impacts of a public transportation system on health and employment, definitions and issues related to the first and last mile, funding ideas, and examples of innovative marketing ideas for a public transportation system.

When considering access to healthcare, two findings from the literature seemed relevant: ensuring that public transportation can meet regularly occurring appointment times and the need to work with medical providers to notify their patients of the availability of public transportation to and from the facility. LEBANON should work with Mercy and other health care providers in the community to try to achieve these recommendations. For example, Mercy staff could provide input regarding the times during which appointments are scheduled to try to coordinate with the public transportation service or Mercy could consider coordinating appointments with a public transportation schedule. The patients, community and health care providers would all benefit.

The literature concluded that in rural areas, not owning a vehicle has a significant impact on obtaining and keeping a job. In fact, this was found to be the most significant factor. Therefore, low-income individuals often had to limit their job search to those within walking distance. However, even with public transportation, coordinating its schedule with shift hours can be a barrier to employment for those without a vehicle. Due to the significant number of manufacturers in LEBANON, LEBANON should coordinate with these employers to better understand shift schedules (e.g. a late bus run to pick-up those on second shift), which would inform the development of effective schedules for public transportation in LEBANON.

The literature reported that the estimated annual cost of owning and maintaining a vehicle is approximately \$9,000. Even if an individual with a low-income is able to afford a vehicle, the cost to maintain that vehicle is often greater due to the age of the vehicle. Therefore, public transportation can potentially provide an alternative for mobility if such a vehicle breaks down, while also providing an option for more regular transportation to and from a place of employment.

Public transportation has the opportunity to provide, particularly for those without access to a reliable vehicle, vital connections within a community. Public transportation not only helps reduce barriers to access employment, education, medical care, and other services, but also provides economic benefits to a community. Rural counties with a public transportation system were found to have higher net earnings than those counties without one. Finally, federal money spent on rural public transportation was found to benefit a community by an economic multiplier of more than three times the money spent on the system.

In closing, the literature shows that the benefits to health and employment as a result of a public transportation system are real and significant. However, a community needs to consider how to incrementally change the system over time as community characteristics or user needs evolve. The community should also be aware of the impact of access and egress trips on the use of the system. Finally, the community should leverage a multitude of funding sources, implement innovative marketing techniques that entice community members to use the system, and incorporate input from all potential public transportation system users into planning efforts and updates.

## 4. CITY OF LEBANON SURVEY

This section provides details and analysis of the survey conducted of the residents and those who make use of the services within LEBANON. Survey data was collected using a multi-modal distribution, where survey respondents were allowed to respond online or using a hard copy. The survey instrument can be found in Appendix F – City of Lebanon Survey Instrument. First, more details regarding the data itself are provided. Then after, each individual survey question is discussed, showing the results from the online, hard copy and overall survey data. At the end of this section are the results of several cross-question analyses. Finally, a summary is provided.

### 4.1. Data

This section discusses specific aspects of each mode: online and hard copy surveys.

#### 4.1.1. Online

A total of one hundred seventy-five impressions were captured; however, only one hundred and fifty online surveys were retained for analysis. Twenty-five were removed because of incomplete data and because the impressions were the result of stakeholders testing the survey. Sixteen entries had IP Addresses captured; however, these survey respondents did not provide any information. Rather, they simply entered the survey, but did not answer any questions. In addition, nine of the one hundred seventy-five were from the testing phase. The online survey, available through Qualtrics, was made available to LEBANON residents starting on May 11, 2018; it was closed on June 11, 2018. The link and a QR code were distributed in utility bills that are sent out to residents.

A total of twenty-eight (18.7%) of the online survey responses accessed the survey using the provided QR code. This would imply that the survey respondent used a smartphone to access the survey.

The latitude and longitude of a survey respondent's location was provided; however, these did not match well with the nearest cross streets identified by a survey respondent. Qualtrics captures the location of each respondent. If the respondent used a GPS-enabled device like a smartphone to complete the survey, Qualtrics captures the location of that device. Otherwise, Qualtrics captures a location based on a computer IP address. If this is the case, the location captured is only accurate to the city-level and the accuracy of that location cannot be determined. Ultimately, due to many errors identified in the IP Addresses, only cross-streets identified by survey respondents were used to create spatial graphics.

The identified IP Address was consistent across several of the responses; however, it would appear that the majority either represented two responses from a couple or potentially multiple responses from a public location (e.g. a library). To remain consistent regarding retaining data for both the online and hard copy data, the data was reviewed for uniqueness. The researchers did not observe consistent responses to all questions in the data; rather, responses from multiple IP Addresses often appeared to be from a couple or the like. In addition, while there may be commonalities among two respondents from a household, there may also be many differences between, for example, the viewpoints of a couple. Therefore, unless there was some clear indication that the survey response was erroneous, the surveys were not removed.

#### 4.1.1. Hard Copy

Three hundred seventy-five hard copy surveys were collected. Hard copy surveys were made available from May 11, 2018 through June 22, 2018. The researchers provided the electronic version of the hard copy survey to LEBANON who distributed it to partner organizations throughout the community.

## 4.2. Surveys Question Results

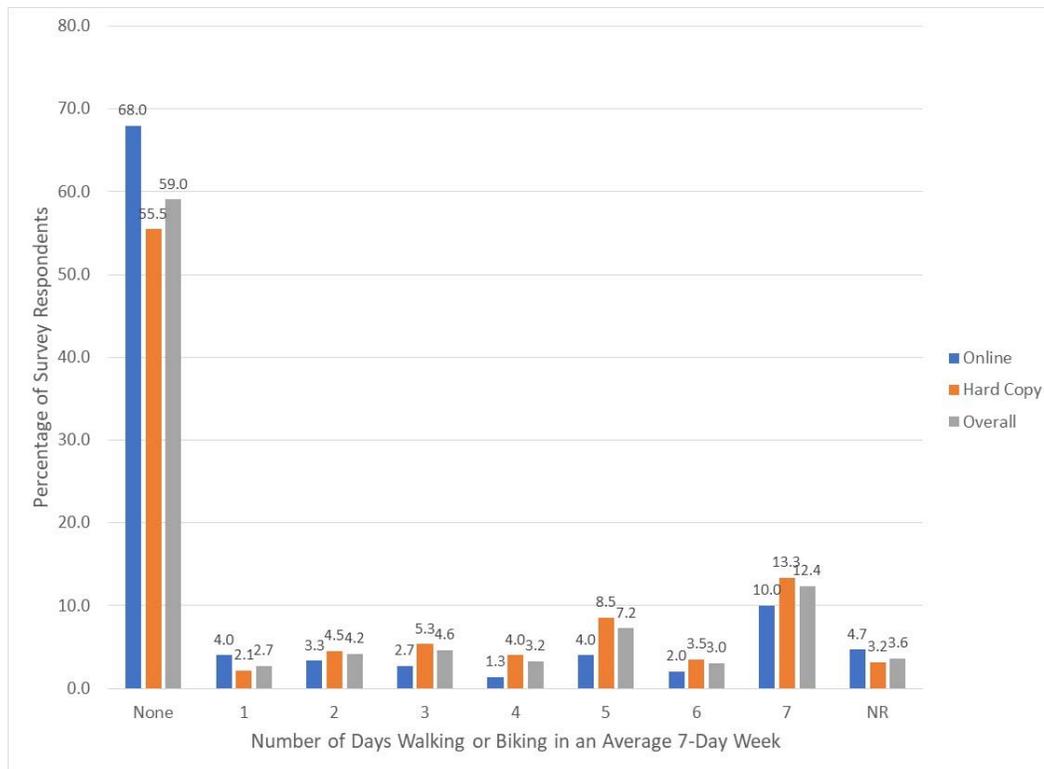
The results of the online and hard copy surveys and the overall results are discussed in the following sections:

- 1) Reported Walking and Biking in LEBANON
- 2) Possession of a Driver's License
- 3) Vehicle Ownership
- 4) Rely on Others for Transportation
- 5) Provided Transportation for Others & Frequency
- 6) Transportation Financial Hardships
- 7) Statements of Agreement – Variety of Options, Cost, Distance, Connected, Walkable
- 8) Missed/Arrived Late to Work Due to Unreliable Vehicle
- 9) Limit a Job Search
- 10) Missed a Medical Appointment
- 11) Reported Use of a Public Transportation System
- 12) Cost to Ride a Bus
- 13) Acceptable Wait Time
- 14) Statements of Agreement – Value to the Community, Improves Respondent's Quality of Life
- 15) Use & Description of OATS
- 16) Use & Description of Taxis
- 17) Approximate Location of Survey Respondent
- 18) Internet
- 19) Enrollment in Higher Education
- 20) Gender
- 21) Age
- 22) Number of People in Household
- 23) Number of Children in Household
- 24) Education
- 25) Household Income
- 26) Race
- 27) Ethnicity
- 28) Comments
- 29) Additional Analyses

#### 4.2.1. Reported Walking and Biking in LEBANON

The first question asked, **“How many days in a week do you walk or bike for transportation (e.g. to get to work, school or the store) in a typical seven-day week?”** Respondents were provided with: None, 1, 2, 3, 4, 5, 6, or 7 as possible answers. Figure 4-1 shows the percentage of

survey respondents who reported walking or biking zero, 1, 2, 3, 4, 5, 6 or 7 days a week by online, hard copy and overall data.

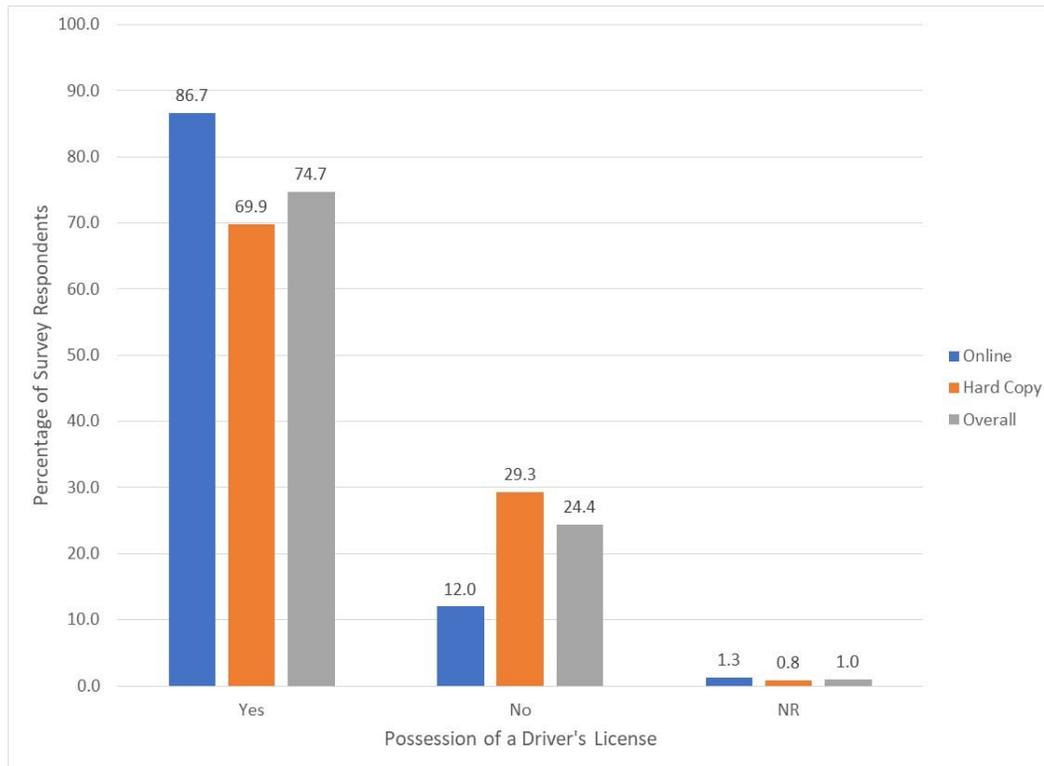


**Figure 4-1: Reported Walking/Biking in a 7-day Week**

Online survey respondents reported less biking and walking in a typical week as compared with that reported by hard copy survey respondents. By far, the most commonly reported response was that the survey respondent did not walk or bike in a typical week (68.0% and 55.5% for online and hard copy survey respondents, respectively). However, 37.4% of the combined data reported walking and biking anywhere from one to seven days a week. More interestingly, with 12.4% of the overall sample (also the second most commonly chosen frequency) reporting that they walk or bike 7 days a week, this suggests that this percentage of the population does not have access to a vehicle for transportation. As shown in Figure 2-21, 9.6% of LEBANON residents do not have a vehicle in their household. Therefore, if we assume that the survey respondents who report walking 7 days a week are representative of those without a vehicle, the information from the survey would seem to represent views from vehicle-less households. Of course, there could be some noise in the data if a survey respondent reported walking or bicycling for this question even though it was done for exercise.

### 4.2.2. Possession of a Driver’s License

The second question asked, **“Do you have a driver’s license?”** Survey respondents were allowed to answer yes or no. About three quarters of the entire sample reported possessing a driver’s license (Figure 4-2).



**Figure 4-2: Possession of a Driver’s License**

The results show that possessing a driver’s license is more common for online survey respondents as compared with hard copy survey respondents. The larger question, however, is how do the 25% of the survey respondents who reported not possessing a driver’s license get around? They either are: 1) driving without a license, 2) are dependent upon someone else to provide them with transportation, or 3) use another mode of transportation (i.e. walking, biking, OATS, or taxi).

### 4.2.3. Vehicle Ownership

The third question asked, **“Which of the following best describes your vehicle ownership status or plans?”** Survey respondents were provided with the following possible responses:

- 1) I currently own or lease a vehicle,
- 2) I have regular access to a vehicle that someone else in my household owns or leases, or
- 3) I do not currently own or lease a vehicle.

Most survey respondents reported owning or leasing a vehicle (Figure 4-3).

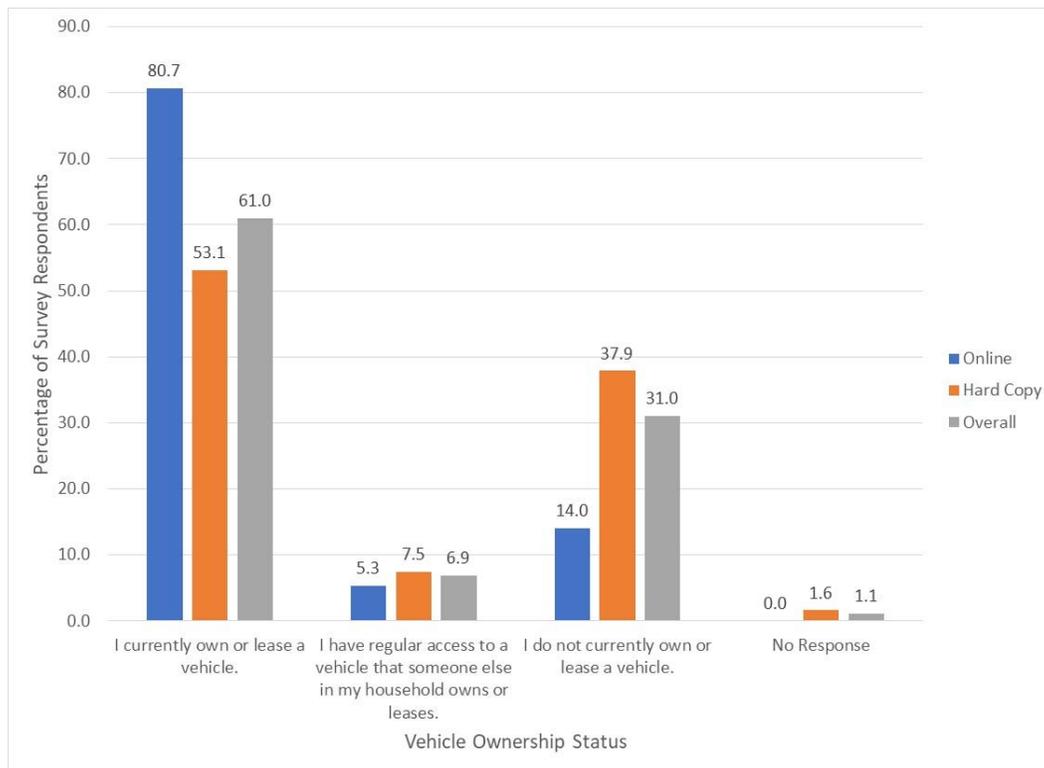
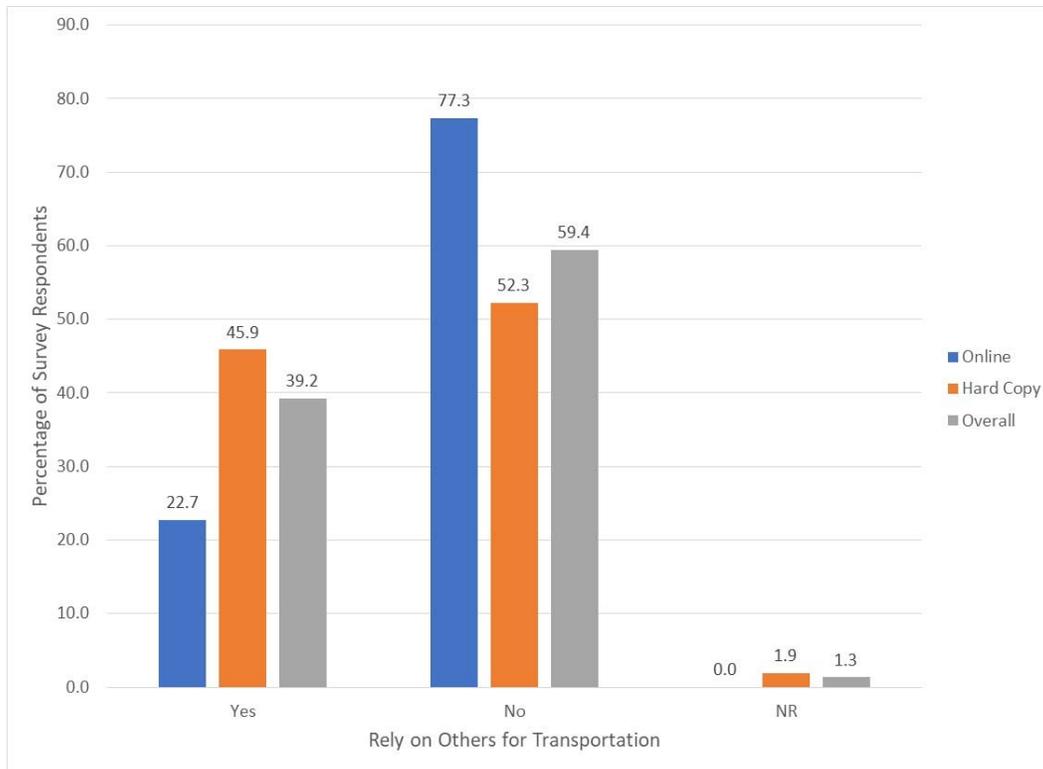


Figure 4-3: Vehicle Ownership Status

Note the large difference between the reported percentage of vehicle ownership/lease when comparing online with hard copy survey data (80.7% vs. 53.1%).

#### 4.2.4. Rely on Others for Transportation

The fourth question asked, **“Do you often have to rely on transportation from a friend/family member or co-workers?”** Survey respondents were allowed to answer yes or no. This question was asked as low-income individuals may be more dependent on others for transportation. Furthermore, people with disabilities and the elderly may elect or have to be entirely dependent upon someone else for transportation. Similarly, youth without driver’s licenses may be entirely dependent upon parents, relatives or friends for transportation until they can obtain their driver’s license. All of these populations (low-income, elderly, those with disabilities, youth) would benefit from a public transportation system. Overall, just under forty percent of the survey respondents (39.2%) indicated that they rely on others for transportation (Figure 4-4).

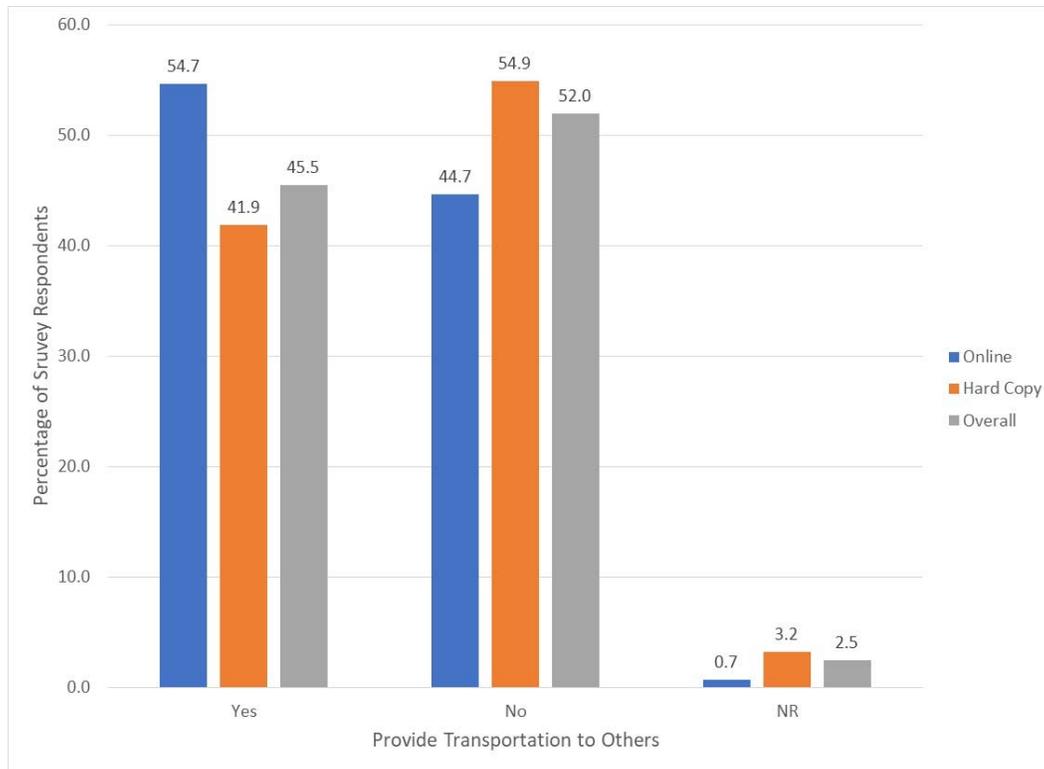


**Figure 4-4: Rely on Others for Transportation**

There is an obvious difference between the reliance on others for transportation by the hard copy survey respondents as compared with the online survey respondents. Note that due to the sample representing almost only those above the age of 18, youth that depend upon someone else for transportation are not represented in these percentages. Therefore, if youth were included in the sample, the percentage of survey respondents answering “yes” would likely increase.

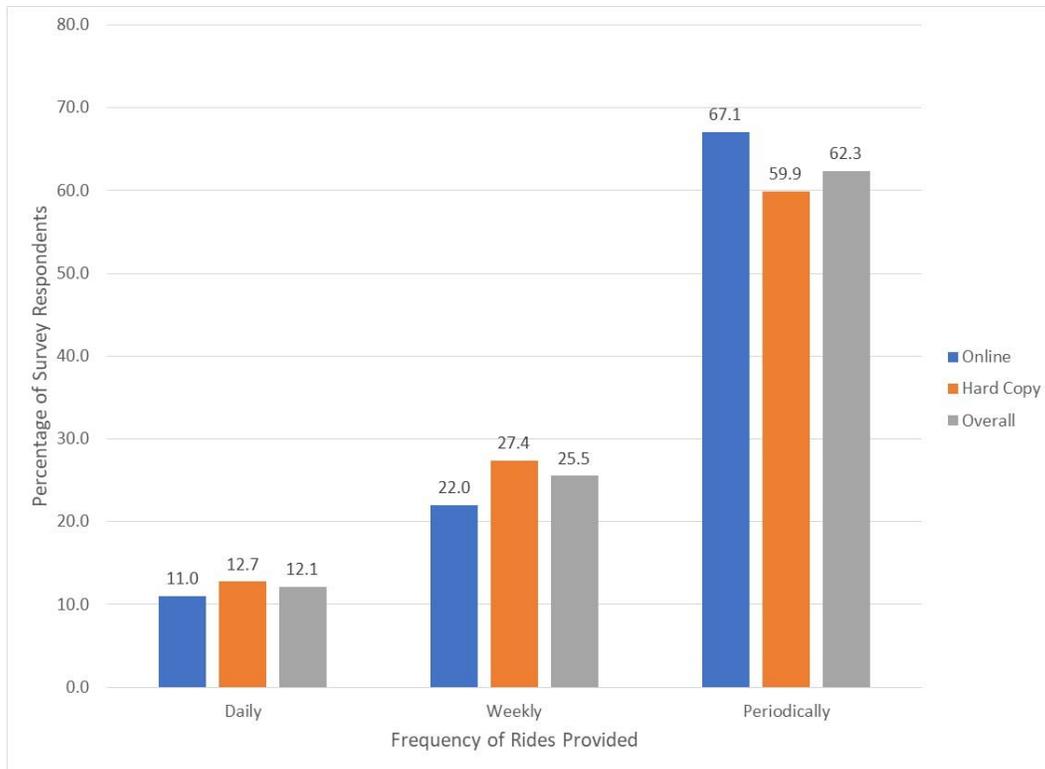
#### 4.2.5. Provided Transportation for Others & Frequency

The fifth question asked, **“Have you provided a ride to a friend/family member or co-worker?”** A follow-up question asked about the frequency with which rides were provided, **“How often do you provide a ride to a family/friend member or co-worker?”** Survey respondents were provided with: 1) daily, 2) weekly, or 3) periodically as potential responses. For the online survey, if survey respondents did not indicate yes, the follow-up question was not shown to them. Hard copy survey respondents were directed to skip the follow-up question, but they did not always follow the instructions. Just under half of the survey respondents (45.5%) indicated that they had provided a ride to a friend, family member or co-worker (Figure 4-5).



**Figure 4-5: Provide Transportation to Others**

For those survey respondents (239 survey respondents) who indicated that they provided a ride to others, they were asked how frequently they provided these rides, whether daily, weekly, or periodically. Twenty-nine, sixty-one, and one hundred forty-nine survey respondents chose daily, weekly, and periodically, respectively. Overall, *periodically* was the most frequently chosen qualitative descriptor (Figure 4-6).



**Figure 4-6: Frequency of Provided Transportation**

Therefore, of the survey respondents who reported providing transportation, the majority provided it only on occasion. Only twenty-nine survey respondents (12.1% of the 239 survey respondents who reported providing a ride) reported providing daily transportation for someone else. In other words, *obtaining a ride from someone else cannot be viewed as a consistent source of mobility*. If you do not have a vehicle, and you were trying to get to work, only obtaining a ride periodically to work would likely result in your termination from employment. Similarly, only periodically having access to a ride to a source of higher education would likely result in poor grades if not other more negative consequences (i.e. withdrawing from school). *Both of these mobility limitations have economic implications.*

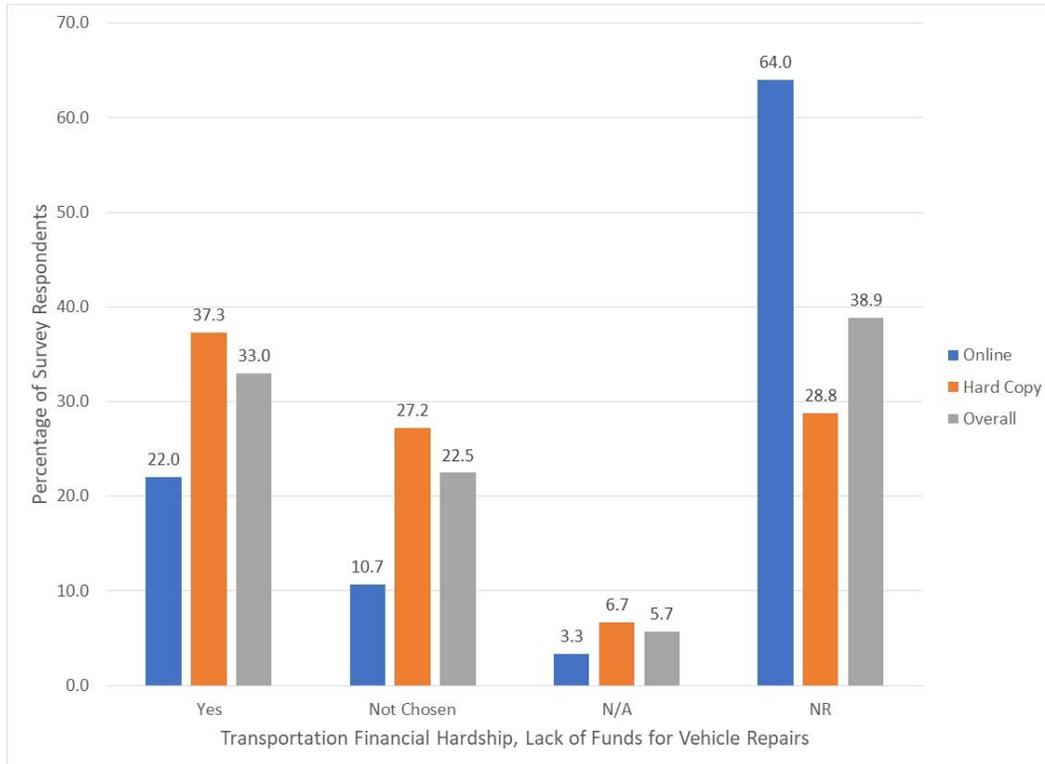
#### 4.2.6. Transportation Financial Hardships

The sixth question asked, **“In the past year, have you experienced any of the following financial hardships related to transportation? (Please check ALL that apply.)”** Survey respondents were provided with the following options: 1) lack of funding for repairs to a vehicle, 2) could not afford gas, 3) insurance lapsed, 4) vehicle was repossessed, and 5) other (please specify).

When survey respondents indicated that they had “none” by either entering it in the other category (online) or scratching out the question (hard copy) they were categorized as Not Applicable (N/A) as compared with No Response (NR). However, it can be expected that a large proportion of those who did not provide a response viewed this question as not applying to them.

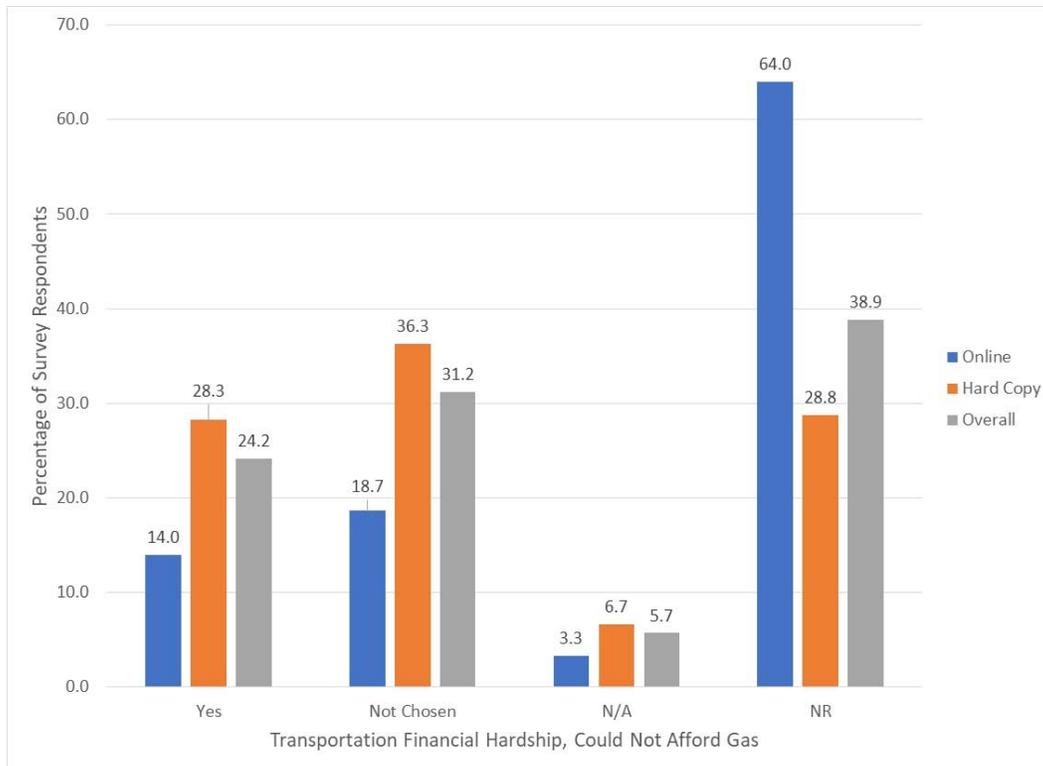
Figure 4-7 through Figure 4-10 compare the responses from online, hard copy and the overall responses for each question regarding transportation financial hardships: vehicle repair, gas, insurance lapse and vehicle repossessed. Then after, the overall dataset was used to compare the magnitude of each transportation financial hardship against one another in Figure 4-11.

A larger percentage of hard copy survey respondents reported that the lack of funding for repairs to a vehicle was a transportation financial hardship when compared with the responses from online survey respondents (Figure 4-7).



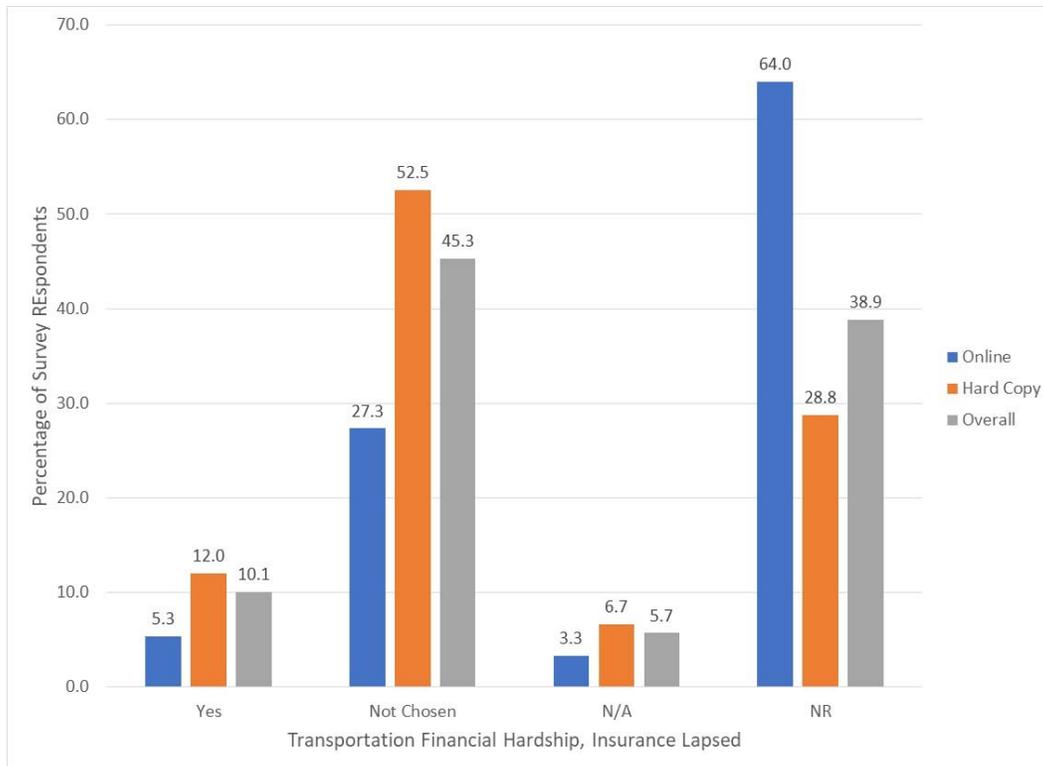
**Figure 4-7: Lack of Funds for a Vehicle Repair**

A larger percentage of hard copy survey respondents reported that the cost of gas was a transportation financial hardship when compared with the responses from online survey respondents (Figure 4-8).



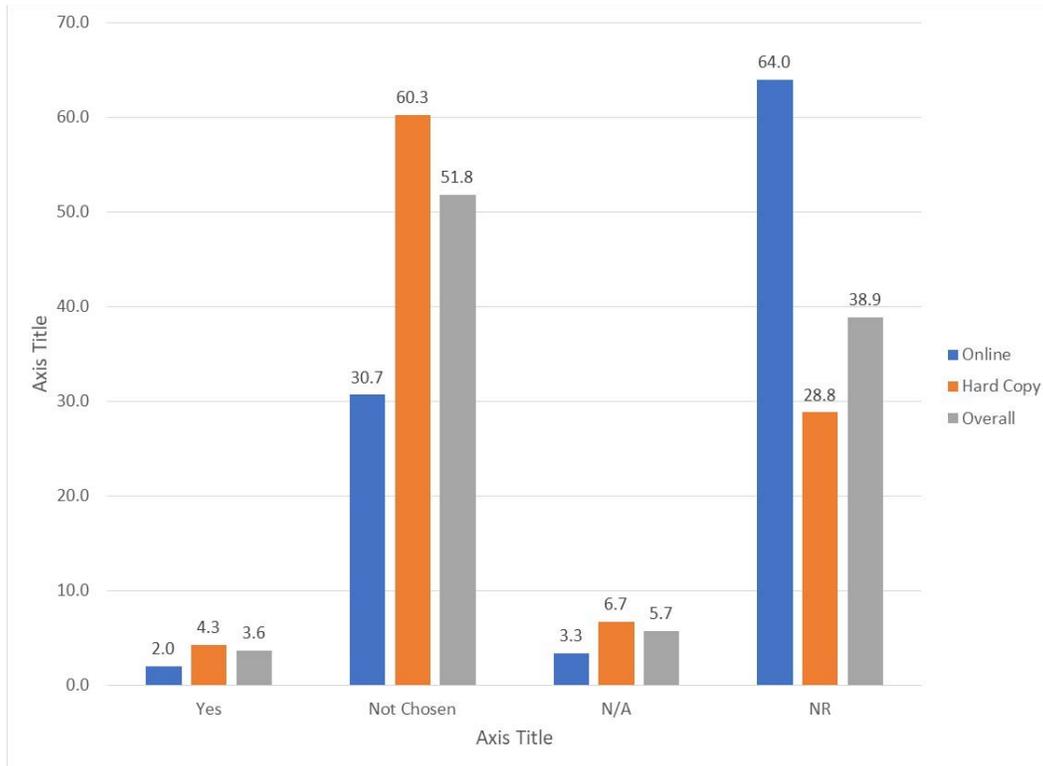
**Figure 4-8: Could Not Afford Gas**

A larger percentage of hard copy survey respondents reported that their insurance lapsing was a transportation financial hardship when compared with the responses from online survey respondents (Figure 4-9), although overall, the percentages are relatively small.



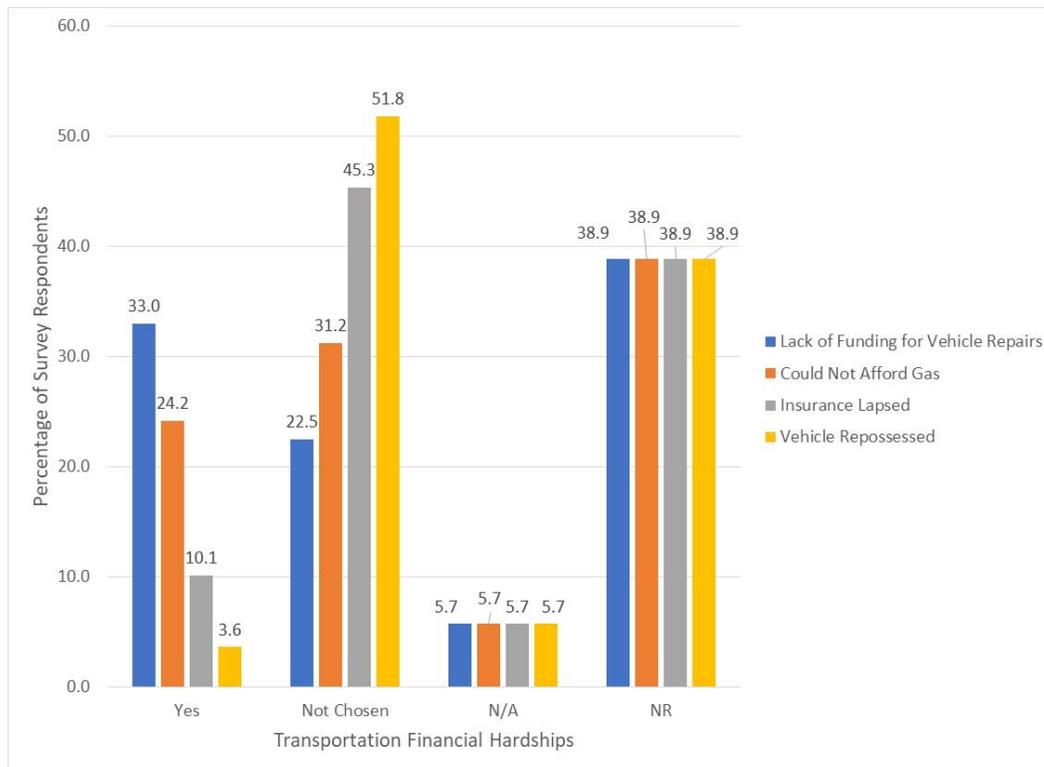
**Figure 4-9: Insurance Lapsed**

A larger percentage of hard copy survey respondents reported that a vehicle being repossessed was a transportation financial hardship when compared with the responses from online survey respondents (Figure 4-10). However, the difference was very small, even smaller than that reported for insurance lapsed.



**Figure 4-10: Vehicle Repossessed**

The researchers compared the reported percentages for each of the transportation financial hardships (Figure 4-11).



**Figure 4-11: Comparison of Overall Transportation Financial Hardships**

Figure 4-11 shows that the lack of funding for vehicle repairs is one of the most reported transportation financial hardships, followed by could not afford gas; responses then drop off for insurance lapsed with very few reporting “vehicle repossessed.” As identified in the literature, lower-income households tend to have vehicles that require more maintenance; therefore, it would be of interest to compare the relationship between lack of funding for vehicle repairs and reported annual household income (Fletcher, Garasky, Jensen, & Nielsen, 2010). This discussion can be found in the Additional Analyses section.

Some additional examples of obstacles or hardships offered by online survey respondents are as follows: 1) not able to drive, 2) could not afford a car, 3) health and weather issues keep me from driving at times, 4) don’t have a car, 5) illnesses prevented me from driving, 6) have never owned a vehicle, 7) no driver’s license, 8) no vehicle, 9) transmission went out, 10) purchasing price too high for another vehicle, 11) someday I will not be able to drive because of wheelchair use, 12) cab fare, and 13) don’t have a vehicle.

Numerous additional examples offered by hard copy survey respondents, several of which are duplicative, are as follows: 1) being broke because the government sucks, 2) no transportation, 3) \$ to ride or must give 3 day notice, 4) recycle car no longer want one, 5) no license, 6) no license, 7) no vehicle, 8) don’t have license, 9) taxi cab, 10) had to sell car, 11) purchased car 2 months ago, 12) don’t have license, 13) have no vehicle, 14) no car, 15) don’t drive, 16) not able to afford

cabs sometimes, 17) doesn't drive, 18) don't have a car, 19) couldn't afford a cab, 20) depend on family – no longer drive, 21) sold car, 22) auto, 23) not always in working order, 24) can't afford a car, 25) no car, 26) disabled, 27) could not get a ride when needed, 28) taxi cab, 29) I don't drive, 30) can't drive, 31) no money for car, 32) no license, 33) no car or driver [permit] or [license], 34) entire engine/transmission blew up, 35) vehicle's engine blew up, 36) accident that [temporarily] disabled vehicle, 37) my car is currently not running, 38) car repairs (had to walk), 39) someone borrowed car, totaled it, wrecked, 40) no income, no license, food stamps only (live with mom who is 78 she does NOT drive), 41) can't afford a car and insurance along with maintenance, gas, etc., 42) incarcerated, 43) no license, 44) license revoked, 45) no license, 46) DWI's – license revoked, 47) costs, 48) no vehicle, 49) can't afford car, 50) licensing, 51) no vehicle, 52) limited on mileage, 53) do not own car, 54) pay taxi, 55) no car, 56) not enough money for a cab, 57) no car, 58) no vehicle, 59) no auto, 60) wreck – had to [borrow] vehicle from friend to get to work because other person fighting it was not their fault, etc., 61) don't have vehicle, 62) maintenance (i.e. brakes oil changes), 63) I had seizures and couldn't drive, 64) Every week!!!, 65) having to pay for gas for rides or cabs, 66) no license, 67) help others, 68) incarcerated, 69) doesn't run – needs expensive repairs, 70) not a good driver, 71) can't drive at all, 72) couldn't afford to get the tags [renewed], and 73) never had a car.

Overall, regarding other transportation financial hardships, **access to a vehicle** and the **lack of a driver's license** was reported as a problem by both hard copy and online survey respondents, as was **no longer feeling comfortable driving**. Viable alternatives should be made available to those who acknowledge that they should not be driving or do not feel comfortable driving in order to enhance safety for all, particularly as the number of adults 65 and older is anticipated to double in the U.S. between 2011 and 2031 (Farber, Shinkle, Lynott, Fox-Grage, & Harrell, 2011).

#### 4.2.7. Statements of Agreement – Variety of Options, Cost, Distance, Connected, Walkable

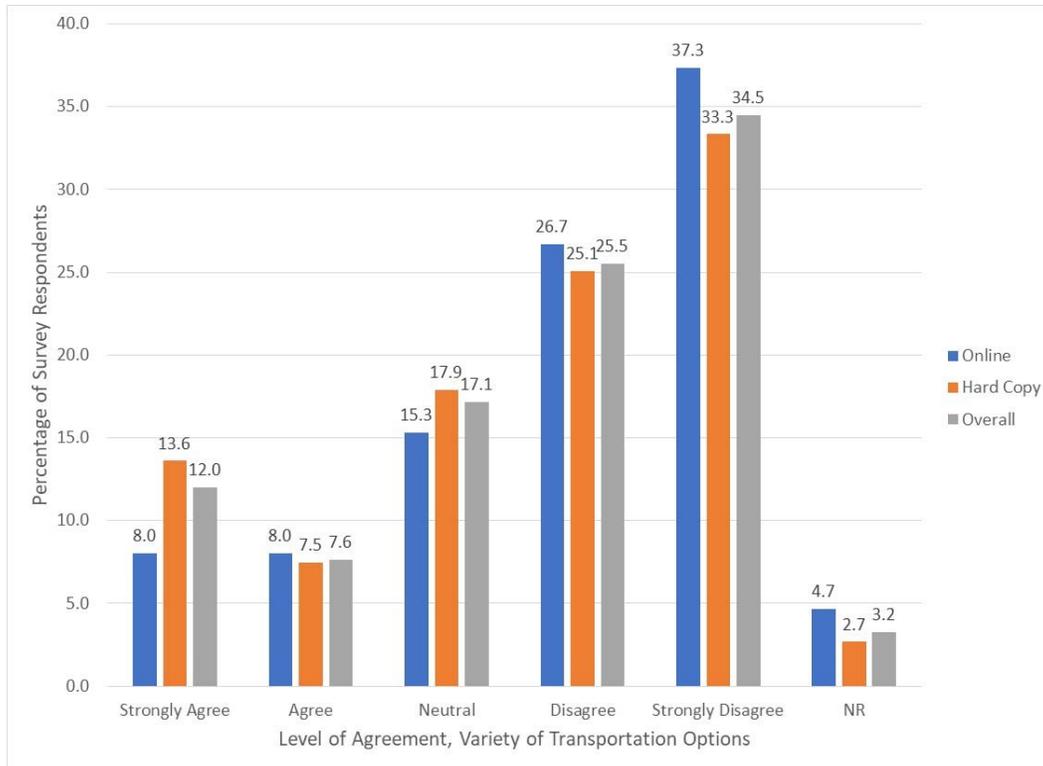
The seventh question asked, “**Please indicate how strongly you agree or disagree with the following statements.**” Survey respondents were provided with five qualitative categories: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree. The following statements were presented:

- I feel that I have a variety of transportation options in the City of Lebanon that allow me to get around.
- Cost influences how I travel.
- Distance to work influences how I travel.
- Distance to *shopping* influences how I travel.
- Distance to **recreational** activities influences how I travel.
- It is important for me to stay connected to the internet/phone while traveling on a daily basis.
- The area where I live is walkable (retail stores and restaurants within a comfortable walking distance).

The following subsections will present the results for each of the statements.

**4.2.7.1.1. Variety of Transportation Options**

Overall, both online and hard copy survey respondents reported that they did not feel that LEBANON has a variety of transportation options to enable them to get around (Figure 4-12).

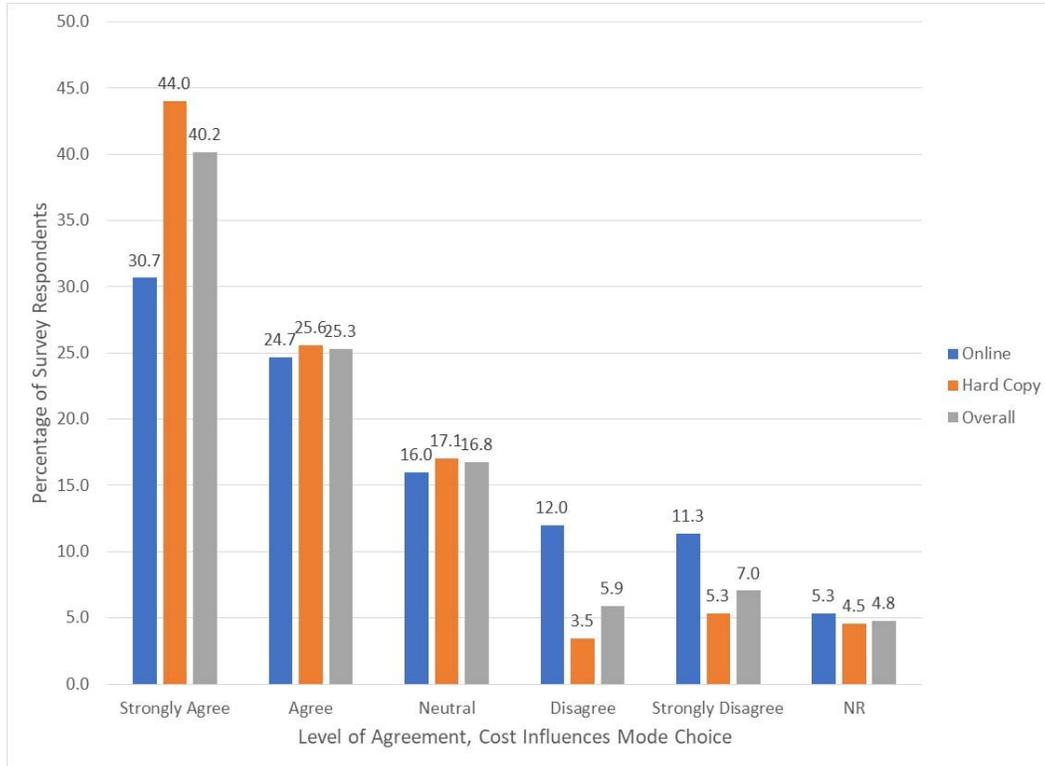


**Figure 4-12: Variety of Transportation Options**

However, it is interesting that online survey respondents seem to be in more disagreement than hard copy survey respondents. This is particularly notable for the Strongly Agree category, where the percentage of hard copy survey respondents who reported that they “Strongly Agreed” was 1.7 times larger than the percentage for online survey respondents.

**4.2.7.1.2. The Influence of Cost on Travel Choice**

Survey respondents reported overwhelmingly that cost influenced their travel choice (Figure 4-13), with the influence more notable for hard copy survey respondents.

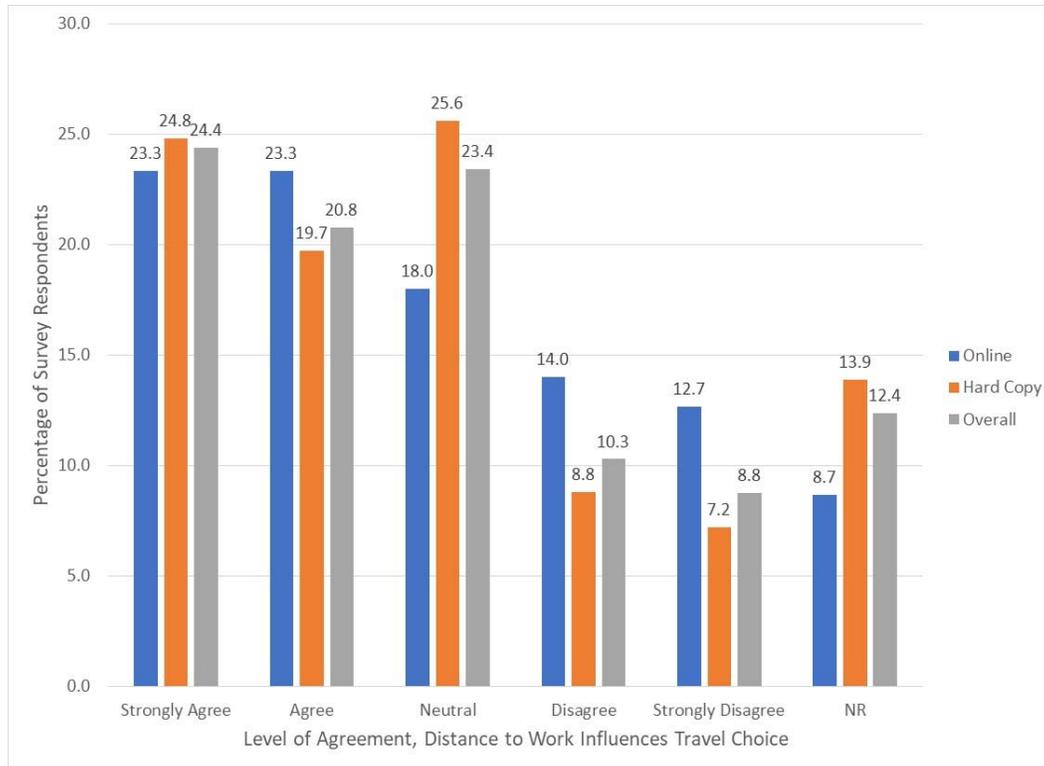


**Figure 4-13: Cost Influence on Travel Choice**

Therefore, if LEBANON were to implement a public transportation system, **administrators should carefully consider how cost will influence ridership**. Public transportation is often seen in a poor light and charging a substantial fee will influence whether or not potential users will even consider the mode. LEBANON should seek partnerships with entities that would benefit from the service to keep the user fee to a minimum.

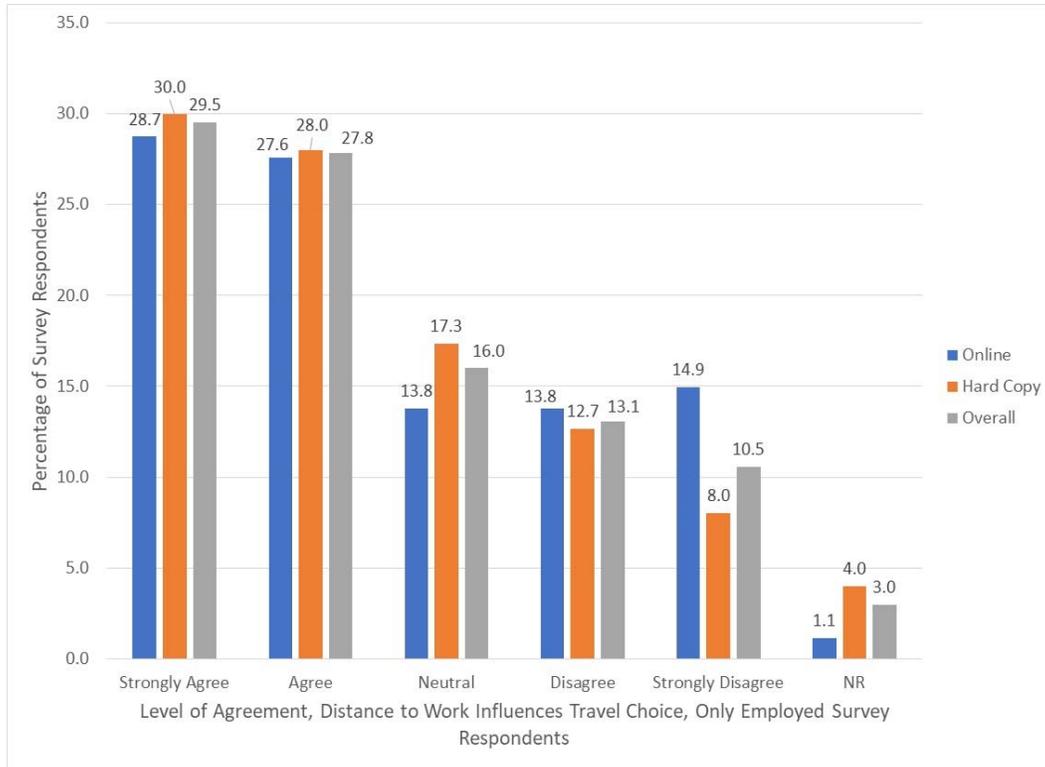
**4.2.7.1.3. The Influence of Distance to Work on Travel Choice**

Generally speaking, survey respondents agreed that the distance to work influences how they travel (Figure 4-14).



**Figure 4-14: Distance to Work Influence on Travel Choice**

The researchers were concerned that the data was being influenced by non-employed survey respondents. Therefore, the result was analyzed again by including any survey respondents who indicated that they were employed full-time or part-time (Figure 4-15).

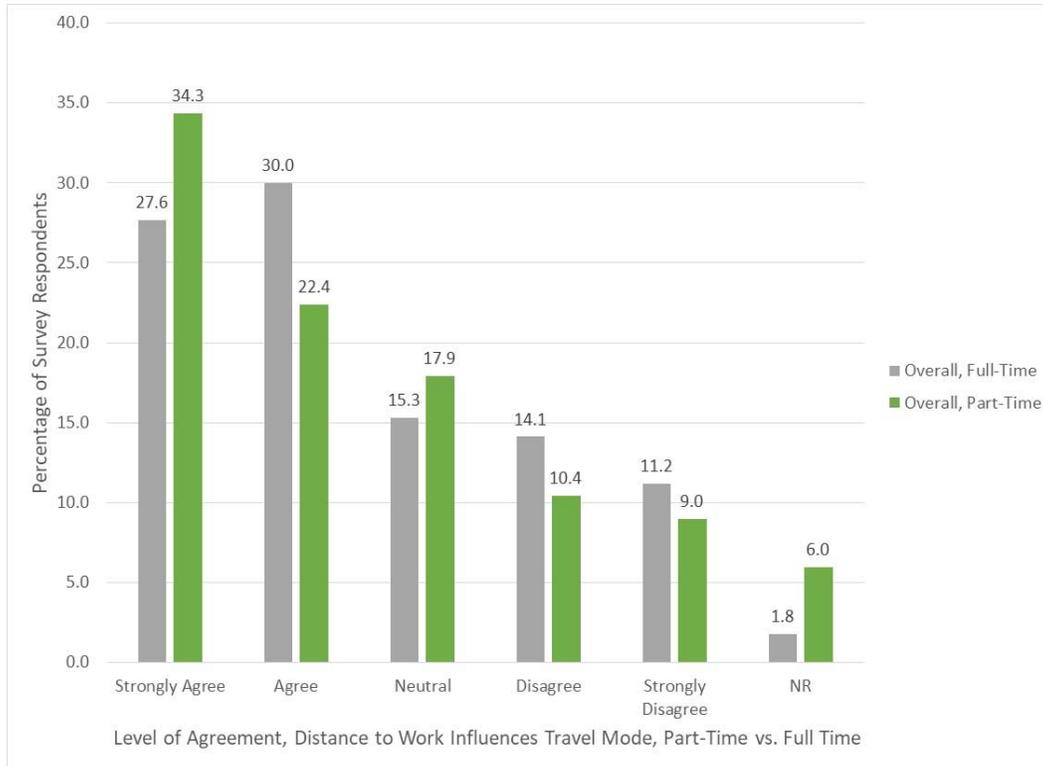


**Figure 4-15: Distance to Work Influence on Travel Choice, Only Employed**

The results suggest that survey respondents who were identified with a category other than full-time or part-time employed typically either selected Neutral or did not provide a response (note the changes in these categories).

When looking at the data from both samples, the results look relatively consistent, which implies that the influence of distance to work is approximately equivalent for online and hard copy survey respondents. There is only a little variability within the Neutral, Strongly Disagree and No Response categories, where online survey respondents reported less of an impact on the travel mode chosen based on the distance to work. This likely suggests more common expected use of one’s private vehicle.

The researchers compared the overall data between full-time and part-time survey respondents regarding their level of agreement that the distance to their place of work influenced their travel choice (Figure 4-16).



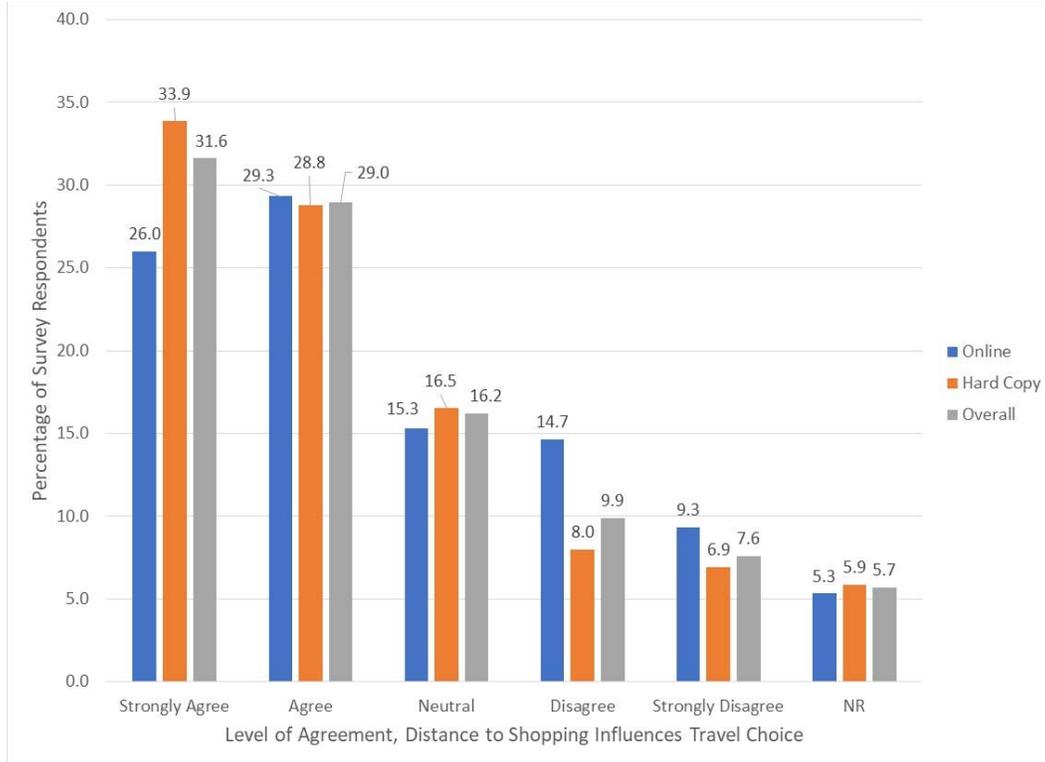
**Figure 4-16: Distance to Work Influence on Travel Choice, Part-Time vs. Full-Time**

There seems to be a hint that distance has more of an impact on part-time employees than full-time employees. This would be expected because if one is working a shorter shift, one would not want to spend the same or potentially even more time commuting than working. This should be considered when evaluating a bus headway, and when designing a public transportation system with a goal of enabling residents to access additional employment opportunities.

Further analyses that look at the reported distances to work as compared with the level of agreement may provide more insight regarding this question (see Additional Analyses section).

**4.2.7.1.4. The Influence of Distance to Shopping on Travel Choice**

Survey respondents generally seemed to agree that the distance to shopping influences how they travel (Figure 4-17).

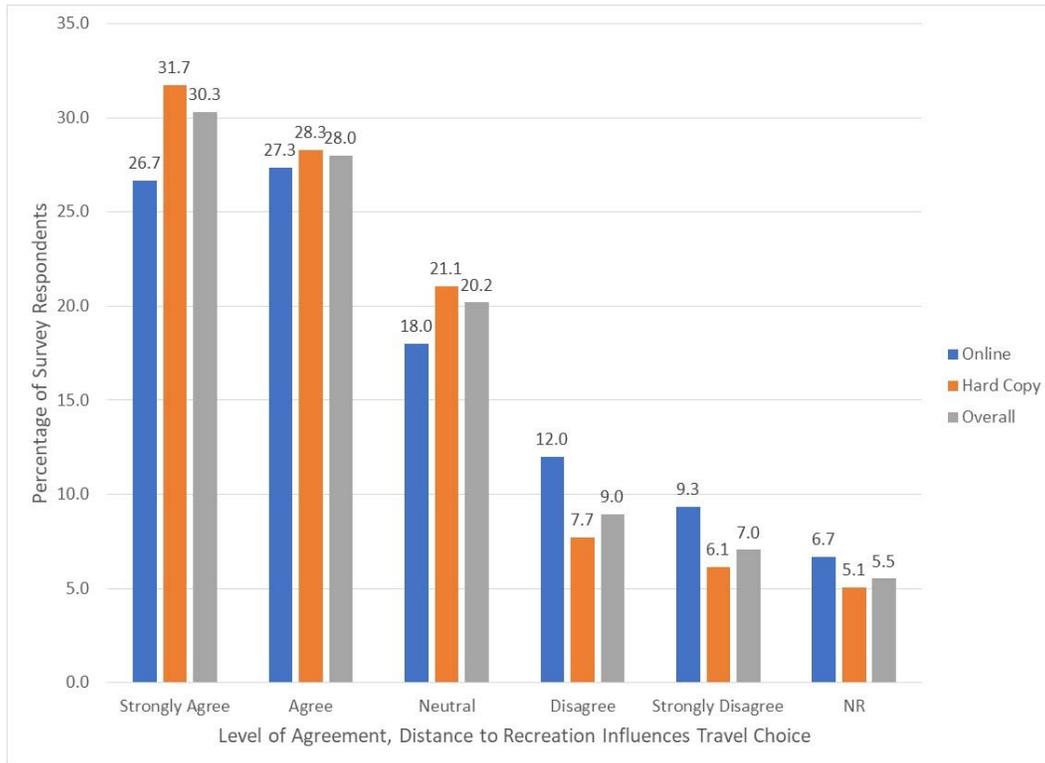


**Figure 4-17: Distance to Shopping Influence on Travel Choice**

It is interesting that hard copy survey respondents reported about 7% more agreement in the Strongly Agree category when compared with online survey respondents. This could potentially reflect the expected more mono-modal travel choice of most online survey respondents (i.e. private vehicle), where the distance is irrelevant. In contrast, as noted by one of the hard copy survey respondents who reported taking a taxi while the spouse rode a bike, the mode choice would be reflective of the need to transport groceries. (Note: Having one person bike while the other uses a vehicle saves them \$5, as taxis charge a per rider fee.)

**4.2.7.1.5. The Influence of Distance to Recreational Activities on Travel Choice**

Similar to the results for distance to shopping, most survey respondents indicated agreement that distance to recreational activities influences their travel choice (Figure 4-18).

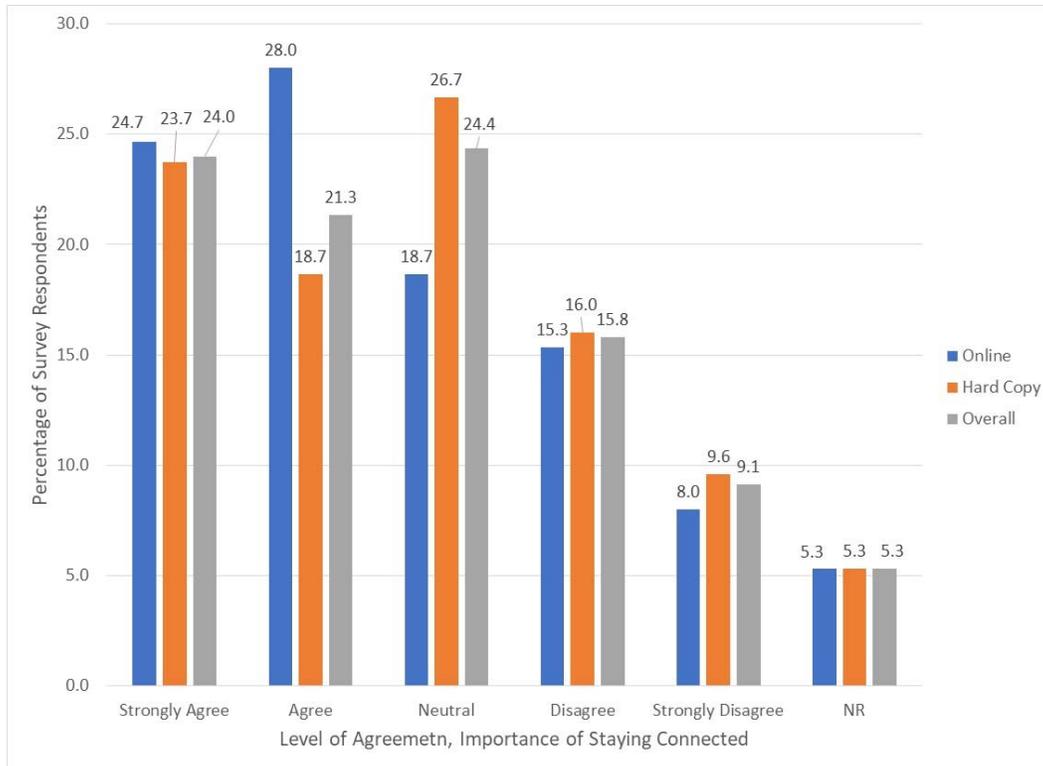


**Figure 4-18: Distance to Recreational Activities Influence on Travel Choice**

Again, more hard copy survey respondents chose Strongly Agree than online survey respondents, although the difference (5%) was less. In addition, a few more people did not respond to this question as compared with the question regarding shopping (i.e. No Response category has a slightly greater percentage); otherwise, the result is similar to that for shopping. This could potentially reflect the limited ability of some to engage in recreational activities.

**4.2.7.1.6. Staying Connected While Traveling**

Survey respondents were asked how important they felt it was to stay connected while they traveled (Figure 4-19).

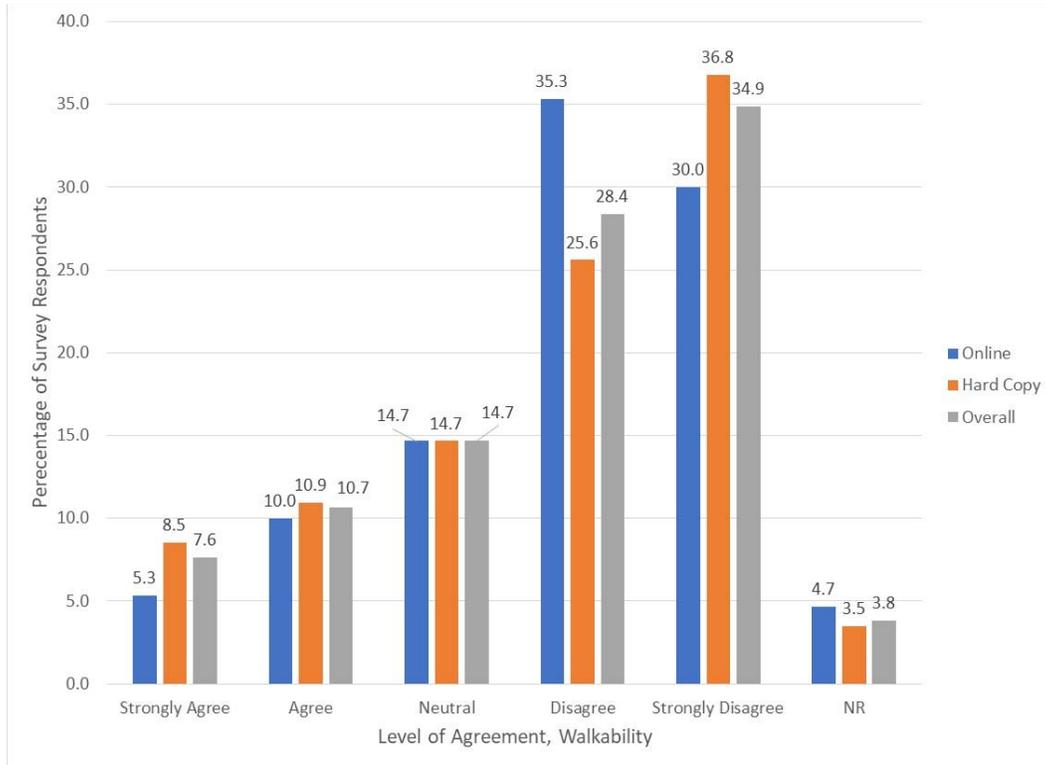


**Figure 4-19: Staying Connected While Traveling**

Generally speaking, survey respondents are in agreement. It is also interesting to note that staying connected while traveling seems to be more important for online survey respondents. The topic is further discussed in the Additional Analyses section.

**4.2.7.1.7. Walkability**

Survey respondents were asked whether the area where they live is walkable, which was specified as including walking access to retail stores and restaurants (Figure 4-20).

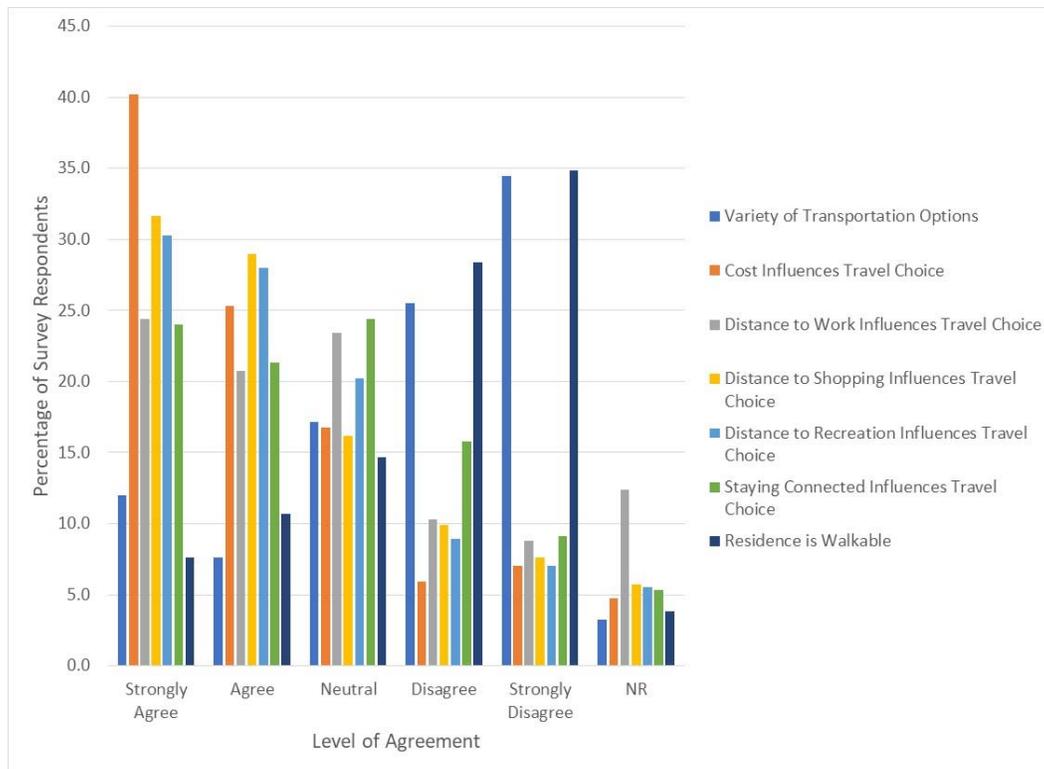


**Figure 4-20: Walkability**

Overall, the majority of survey respondents expressed disagreement, with hard copy survey respondents reporting larger percentages for “Strongly Disagree,” whereas online survey respondents reported larger percentages for “Disagree.”

It will be interesting to better understand the correlation between level of agreement and the reported location of the survey respondent, a discussion of which can be found in Additional Analyses.

The overall results of the level of agreement statements can be compared to see if survey respondents tended to agree with one statement more than others (Figure 4-21).



**Figure 4-21: Level of Agreement, Comparison of Results**

Overall, walkability and variety of transportation options seem to relate more towards disagreement whereas cost, distance to work, shopping, recreation, and staying connected generally relate more towards agreement.

Table 4-1 summarizes whether hard copy or online survey respondents were more in agreement or if the two sample modes reported consistent findings, whether in agreement or disagreement.

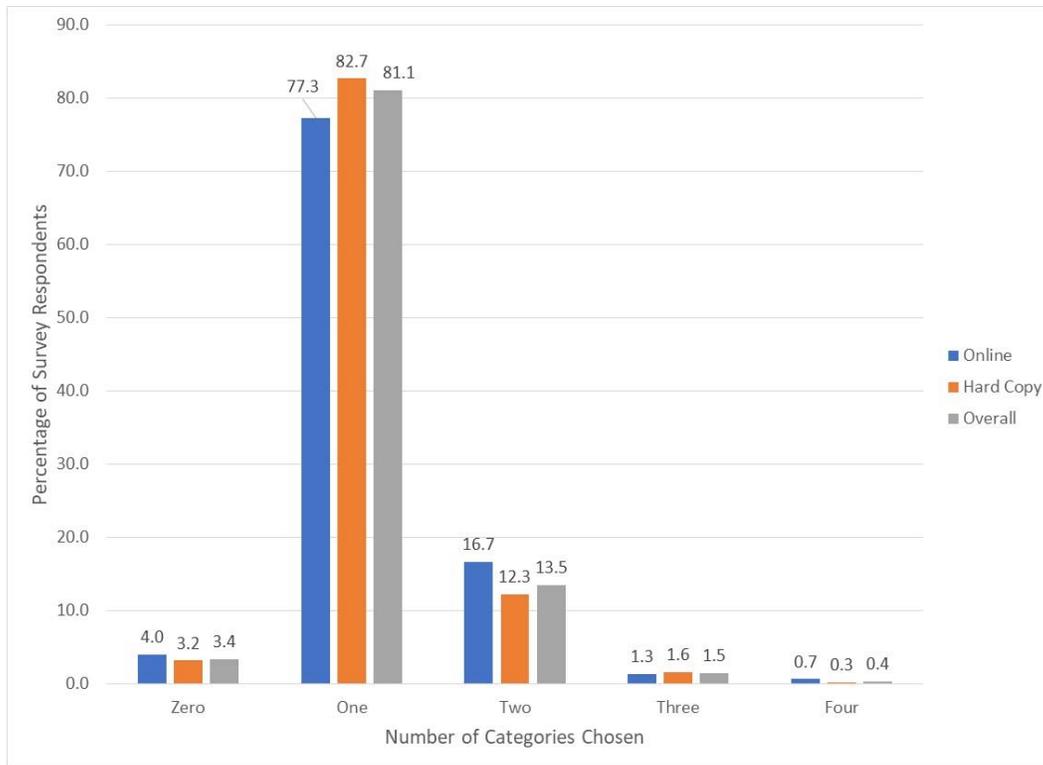
**Table 4-1: Level of Agreement, Online vs. Hard Copy Samples**

Question Topic	ONLINE, More in Agreement	Similar Levels of Agreement	HARD COPY, More In Agreement
<b>Transportation Options</b>		Both in Disagreement	
<b>Cost Influences Travel</b>			14% more
<b>Distance to Work</b>		Both in Agreement	
<b>Distance to Shopping</b>			8% more
<b>Distance to Recreation</b>			5% more
<b>Staying Connected</b>	10% more		
<b>Walkability</b>		Both in Disagreement, although ONLINE reporting Disagree with HARD COPY reporting <u>Strongly</u> Disagree	

#### 4.2.8. Employment Categories

The eighth question asked, “**Which of the following category/categories applies to you? (Please check ALL that apply.)**” Survey respondents were provided with the following options: 1) Employed, full-time, 2) Employed, part-time, 3) Unable to work due to a disability, 4) Retired, 5) Homemaker, 6) Stay-at-home parent, 7) Unemployed, 8) Self-employed, 9) Student, and 10) Other (please specify).

Most survey respondents only selected one category (Figure 4-22).



**Figure 4-22: Number of Categories Chosen**

The category chosen by the majority of survey respondents was employed, full-time, particularly for the online survey respondents, who reported almost twice the percentage of employed, full-time when compared with the hard copy survey respondents (Figure 4-23).

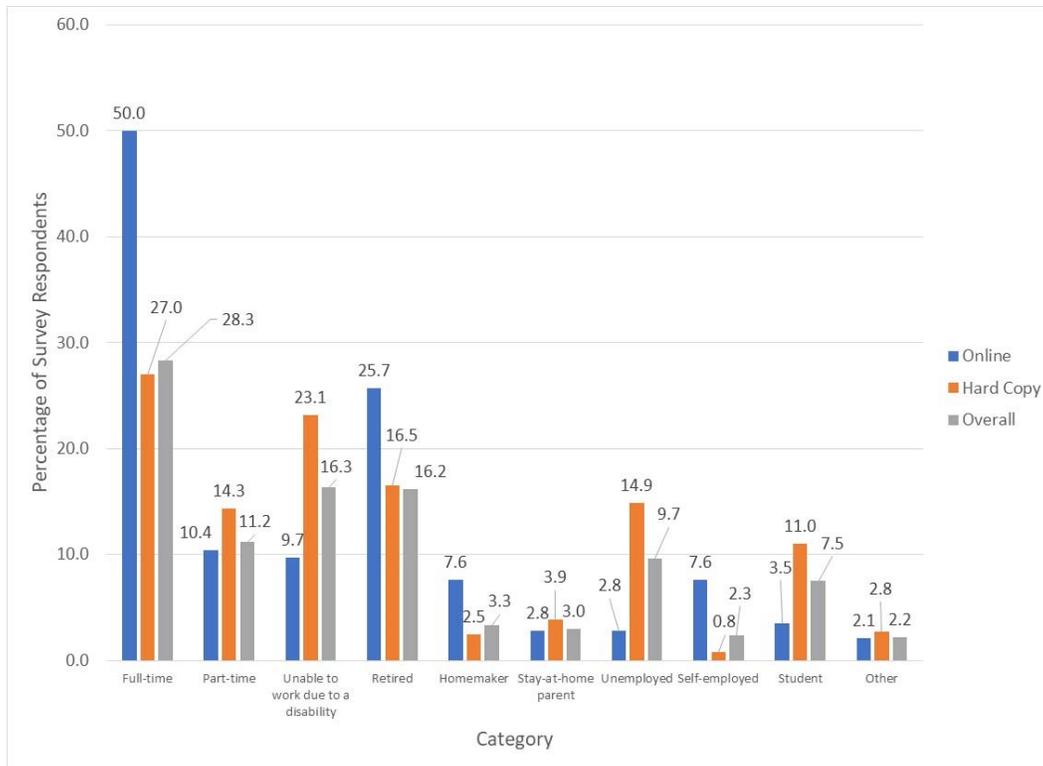
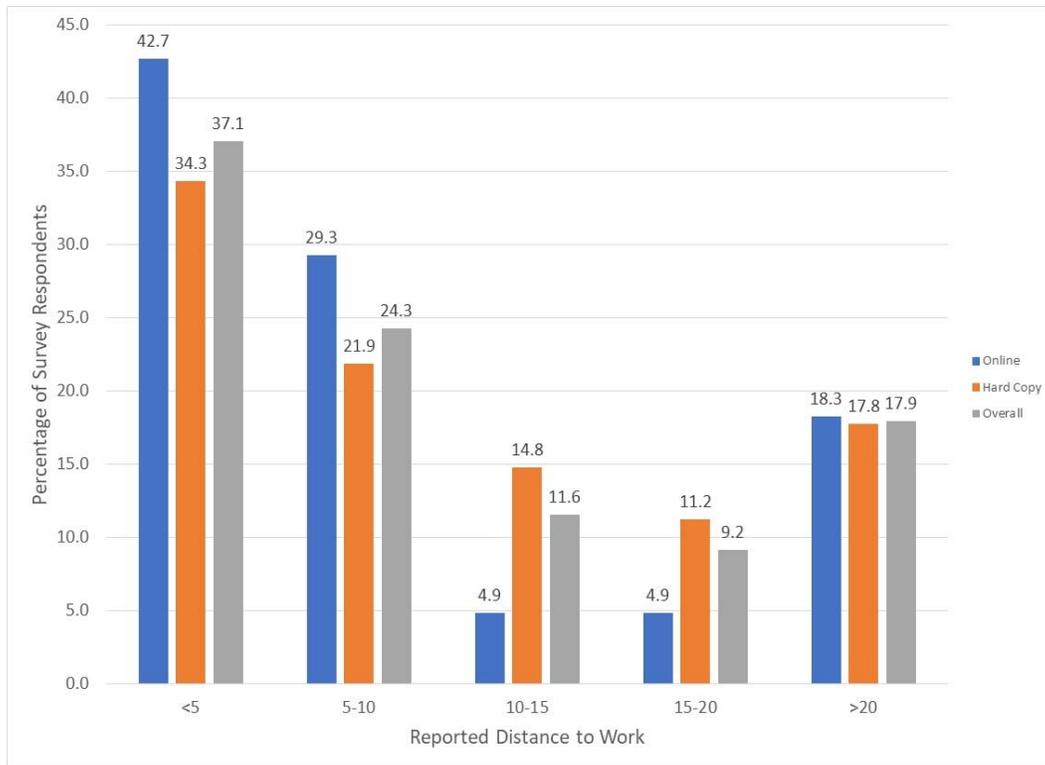


Figure 4-23: Category

Retired and unable to work due to a disability were the second and third most frequently reported categories, although the second and third place category switches for online versus hard copy survey respondents showing that **different modes of data collection capture different sub-samples of the population of LEBANON**. Compared to the U.S. Census, the hard copy data more closely mimics that of the percentage of survey respondents who are disabled (23.1% vs. 22.2%, see Key Demographics) (US Census Bureau, 2016). The researchers mapped the reported cross-streets of survey respondents who identified as being unemployed; the results can be found in the Additional Analyses section.

Of the two hundred fifty-one survey respondents who provided their distance to work, just under forty percent indicated that they lived within five miles of their job, which is consistent across survey modes, although the percentage for online survey respondents was greater (Figure 4-24).

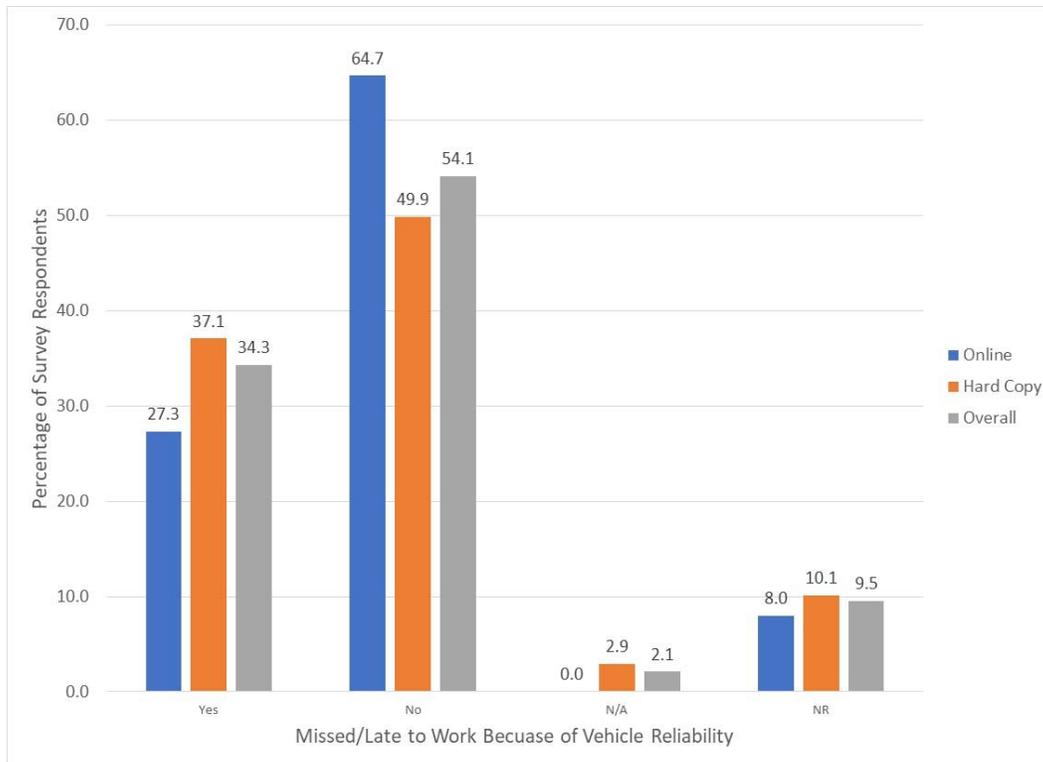


**Figure 4-24: Reported Distance to Work**

The greater percentage of online survey respondents when compared with hard copy survey respondents who reported working in closer proximity to their place of employment could in part reflect the greater representation of out-of-town residents in the hard copy sample (discussed in Approximate Location of Survey Respondent). It could also reflect the fact that many of the hard copy survey respondents, who reported lower annual household incomes, live in the part of the community with higher poverty rates, which tends to be further away from the employers in LEBANON.

### 4.2.9. Missed/Arrived Late to Work Due to Unreliable Vehicle

The ninth question asked, “**Have you ever missed or arrived late to work as a result of reliability of your vehicle (i.e. needed repairs, could not afford gas, etc.)?**” Survey respondents were allowed to answer yes or no. Just over half of the survey respondents indicated that they did not arrive late or miss work as a result of the reliability of their vehicle; this was reported almost fifteen percent more by online survey respondents as compared with hard copy survey respondents (Figure 4-25).

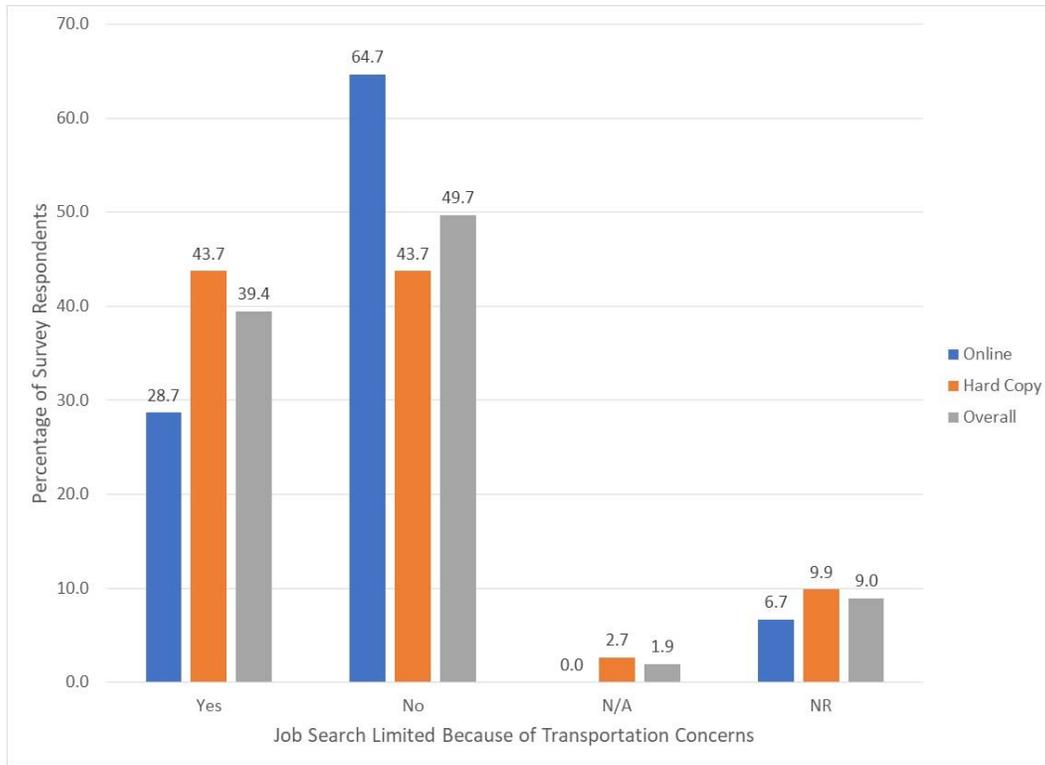


**Figure 4-25: Missed Work Due to Reliability of Vehicle**

Yet, even though more than half of the survey respondents reported not missing work due to the reliability of a vehicle, overall, 34.3% of survey respondents reported this as a problem, with a greater representation, by about 10%, reported by hard copy survey respondents. These results suggest that there is a good portion of the population that may have challenges in obtaining and maintaining employment as a result of an unreliable vehicle, challenges discussed in the literature (Fletcher, Garasky, Jensen, & Nielsen, 2010), which can have *negative economic impacts to a community*. This implies that even if a household does own or have access to a vehicle, the cost of maintaining that vehicle can be problematic. *This suggests the need for another transportation option.*

### 4.2.10. Limit a Job Search

The tenth question asked, “**Have you ever had to limit a job search due to transportation concerns?**” Survey respondents were allowed to answer yes or no. Overall, just under half of the survey respondents indicated that transportation concerns did not restrict where they searched for jobs, although the difference between online and hard copy survey respondents was about twenty percent, therefore, significantly more pronounced (Figure 4-26).



**Figure 4-26: Limited Job Search Due to Transportation Options**

Yet, more interesting is the percentage that did report an impact of transportation options on restricting their employment prospects: just under forty-percent of survey respondents indicated that transportation restricted where they could work. Considering that LEBANON has many companies competing for employees (Figure 4-27), *this result would suggest that there are additional potential candidates to fill vacancies, that may in part be addressed if there were more transportation options.*

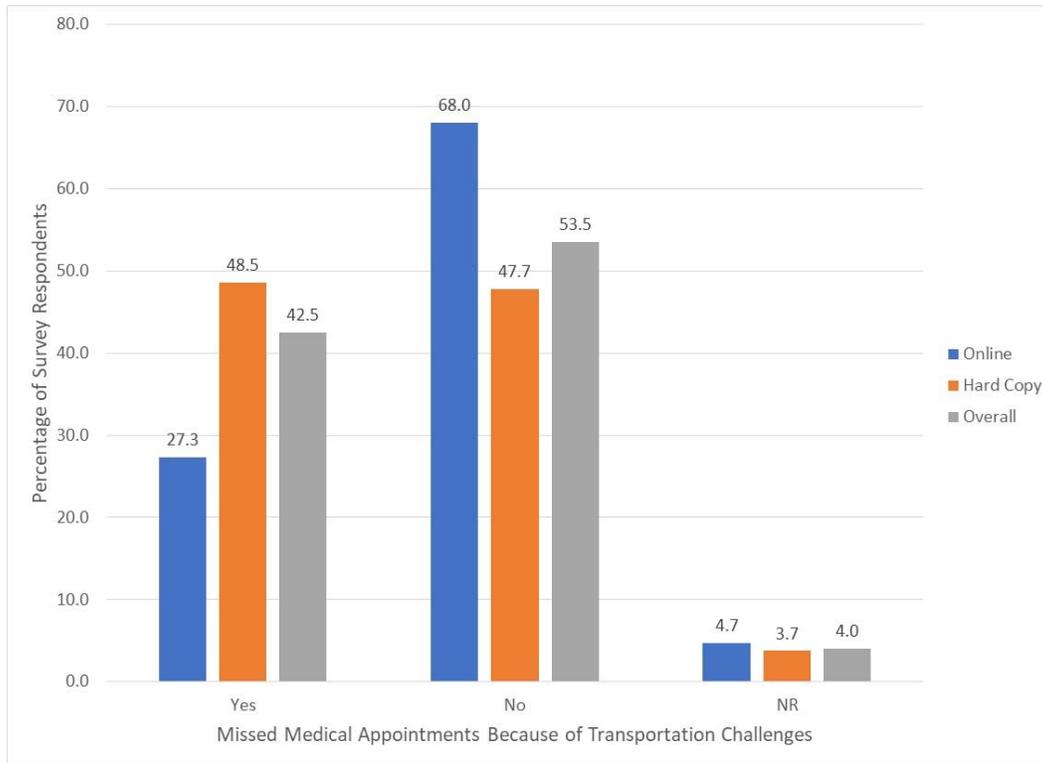


**Figure 4-27: Now Hiring Sign in LEBANON**

LEBANON should further discuss how transportation may impact the potential employee pool with employers, realizing that, as reported during some stakeholder sessions, residents may not want to identify themselves as having to limit their job search as a result of the reliability of transportation. Furthermore, when considering survey respondents who reported being unemployed, LEBANON should work with the local colleges and employers to determine if and how a gap exists between skills needed by employers and current knowledge of potential employees.

### 4.2.11. Missed a Medical Appointment

The eleventh question asked, **“Have you ever missed or arrived late to a medical appointment because of transportation issues (e.g., could not find transportation, vehicle did not work)?”** Survey respondents were allowed to answer yes or no. Just over fifty percent of all survey respondents indicated no (Figure 4-28).



**Figure 4-28: Missed Medical Appointments Because of Transportation**

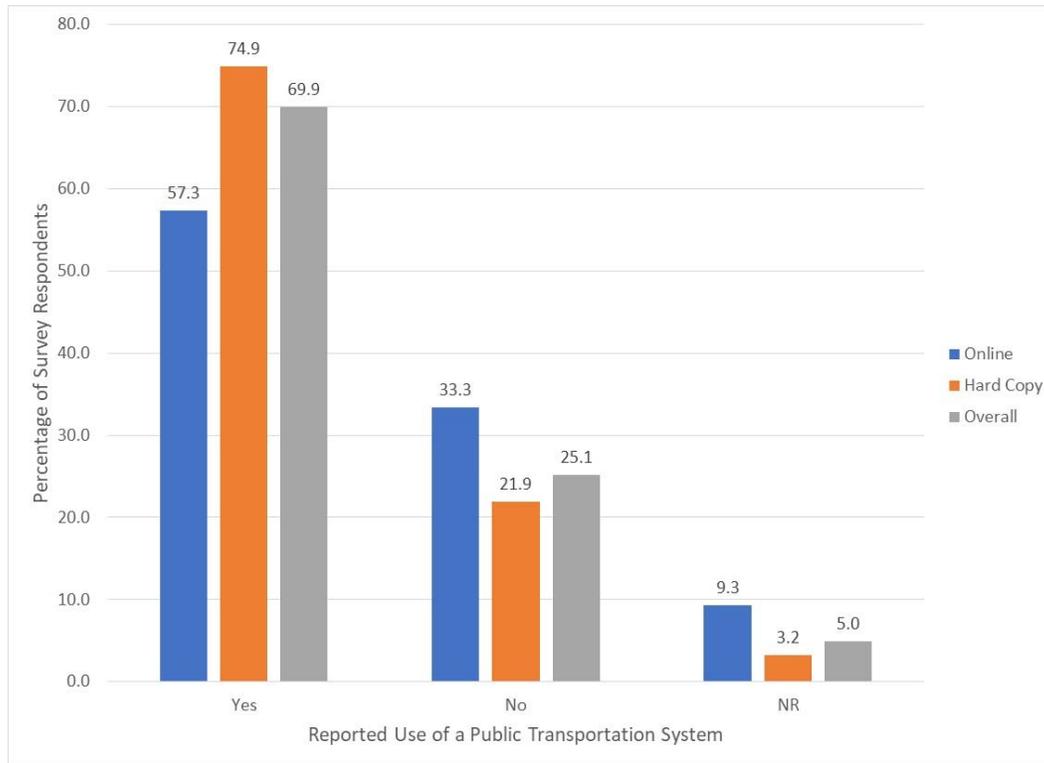
More than 40 percent of all survey respondents, larger when considering only the hard copy data, reported that they missed medical appointments because of transportation. The impact of the lack of transportation on missed medical appointments seems to have a greater impact than the lack of transportation on job access, as a larger percentage of all survey respondents reported missing medical appointments than missing work (39.4% vs. 42.5%). (Note: No survey respondents clearly indicated that this question was not applicable to them as was done for the questions related to work, which is why a N/A category does not appear for this question.) As discussed in the Literature Review, no-shows and emergency room trips are costly to medical facilities and can negatively impact a person’s overall health (APTA, 2003).

LEBANON should work with the local health care providers to identify how public transportation could be coordinated with appointments and be routed to connect those who reported missing appointments with the health care facilities.

An additional analysis that shows the location of survey respondents who reported missing medical appointments can be found in the Additional Analyses section.

### 4.2.12. Reported Use of a Public Transportation System

The twelfth question asked, “Would you or someone in your household use a public transportation system if one were available in your community?” Survey respondents were allowed to answer yes or no. Overall, just under seventy percent of the survey respondents indicated yes (Figure 4-29).



**Figure 4-29: Reported Use of Public Transportation by a Household Member**

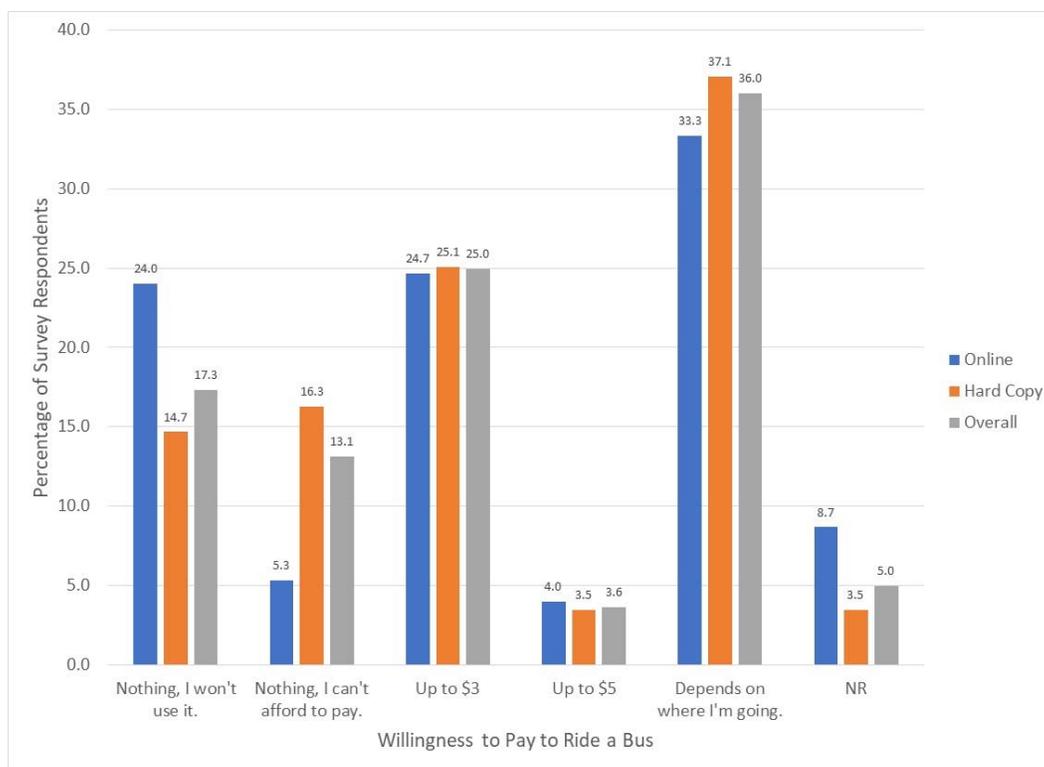
Overall, it is notable that almost seventy percent of survey respondents reported that they or someone in their household would be willing to use a public transportation system. Compare these results with those of Chaudhari et al. (2016), where the majority of survey respondents reported being unlikely or very unlikely to use a public transportation system.

It should be noted that because of how the question is phrased, there may be a slightly higher percentage of reported use as compared with actual use. For example, in a household of three, where there is an older adult living with a middle-aged couple, if both the couple answered and reported that someone in the household would use a shuttle, they both could be referring to the older adult. This example would likely be relatively limited; nonetheless, the difference between stated preference and actual behavior should be considered. (Note: While respondents may say that they will do something, it does not necessarily mean that they will act on it. This is the difference between “stated” and “actual” behavior.)

Compared to the previous yes/no questions, there is a larger percentage of non-respondents. It is unclear if this is because these individuals are undecided as to whether or not someone would use a public transportation system if it were provided.

#### 4.2.13. Cost to Ride a Bus

The thirteenth question asked, “**How much would you be willing to pay to ride a bus?**” Survey respondents were provided with the five following answers: 1) Nothing; I wouldn’t use it, 2) Nothing; I can’t afford to pay for it; 3) Up to \$3 per ride, 4) Up to \$5 per ride, 5) Depends on where I’m going. Most survey respondents reported that the amount they are willing to pay is tied to where they are going (Figure 4-30).



**Figure 4-30: Amount Willing to Pay to Ride a Bus**

The question did not ask if this was one-way, round trip, or for the entire day, and interpretations should be careful to understand this. This finding suggests that more specific information needs to be provided to the public, and then the public should be asked to provide feedback. The public needs to understand potential routes and whether or not they would ride as a result of several route scenarios. Some hard copy survey respondents provided additional insight, noting that they might be willing to pay more to ride a bus to another community. It is clear that charging \$5 would be very unpopular (reported acceptable by 3.6% of the survey respondents) and would make use of the bus almost obsolete; this also makes sense when considering the result to an earlier question where survey respondents clearly reported that cost influences how

they travel (see The Influence of Cost on Travel Choice). In addition, charging \$5 for a ride on public transportation would be similar to the cost of the taxi, with questions regarding whether or not a potential user would value the service model of a taxi more or less than a public transportation system. A public transportation system, while anticipated as being more reliable, does not provide door-to-door service. While almost a quarter of survey respondents reported being willing to pay almost up to \$3, some hard copy survey respondents reported that the most they were willing or able to pay was \$1. An aspect that should be considered regarding collecting a user fee is the amount of time required by a bus driver to collect the fee. Collecting fees can be considered as a potential distraction to the bus driver. Not providing change for a fare, which is often necessary to ensure the safety of the driver by providing a fare box, can be a deterrent to use. However, whatever fare is identified would likely be very negatively received if it were to be increased at a later time.

#### 4.2.14. Acceptable Wait Time

The fourteenth question asked, **“In your opinion, what is an acceptable wait time for a bus?”** Survey respondents were asked to choose from the following four responses: 1) The wait time doesn’t matter to me, I would use a bus if it was offered, 2) Less than 20 minutes, 3) Less than 30 minutes, or 4) There is no acceptable wait time, I wouldn’t use a bus. The largest percentage of survey respondents reported that an acceptable wait time is less than 20 minutes (Figure 4-31).

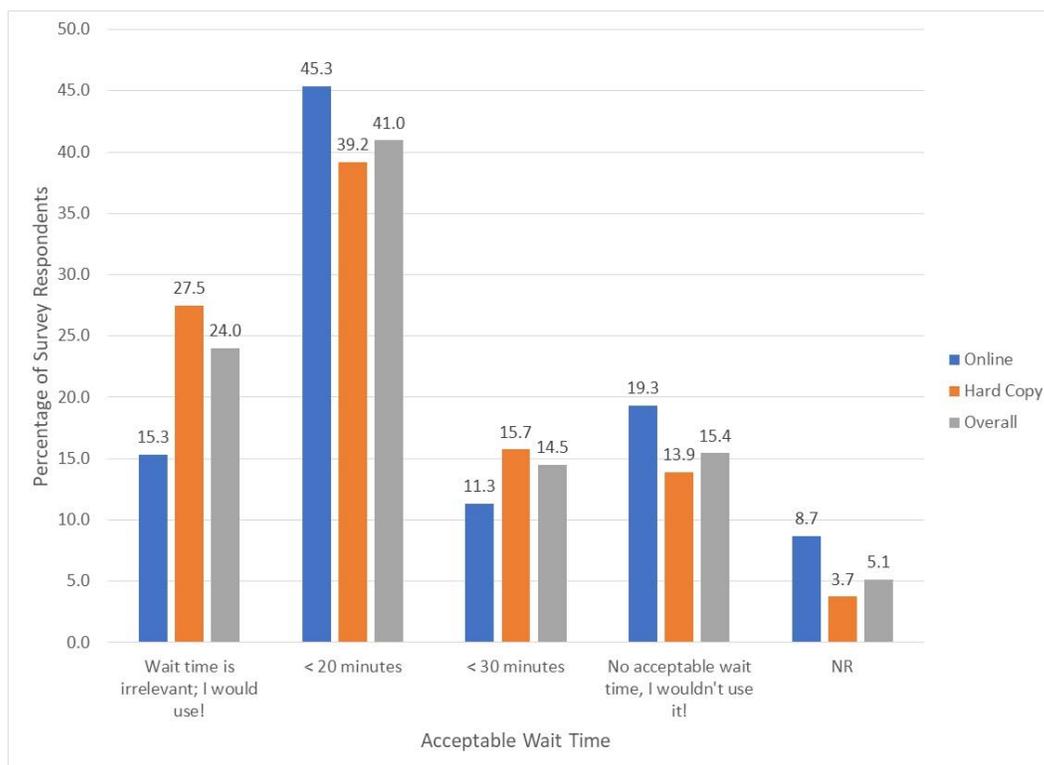


Figure 4-31: Acceptable Wait Time

While 20 minutes would likely be a good choice for a headway, in a rural environment, where distances between stops can be long, achieving a 20-minute headway may be challenging. While not specifically addressed in this survey, in addition to the headway of a bus, the reliability of a bus to be “on time” holds significant value, as was found by the bus service that is no longer in operation in Cody, Wyoming (Chaudhari, Lonsdale, & Kack, 2016). More specifically, it was reported that: *“The City of Cody previously operated a shuttle/transit service. Ridership was limited, and opinions were that the shuttle was considered unreliable, as it was often late”* (Chaudhari, Lonsdale, & Kack, 2016).

There are likely a few individuals who chose the response indicating that the wait time is irrelevant and that they would use a bus regardless, when they should have instead chosen the fourth option, no acceptable wait time and they would not use, as it is expected that the 24% who indicated that they would not use a shuttle should have chosen this option. Therefore, there is likely only about 10% of the online survey respondents who would use the shuttle regardless of the amount of wait time.

A more in-depth analysis of those who indicated that they would use the shuttle regardless of the wait time will be provided in Additional Analyses.

#### 4.2.15. Statements of Agreement – Value to the Community, Improves Respondent’s & Other’s Quality of Life

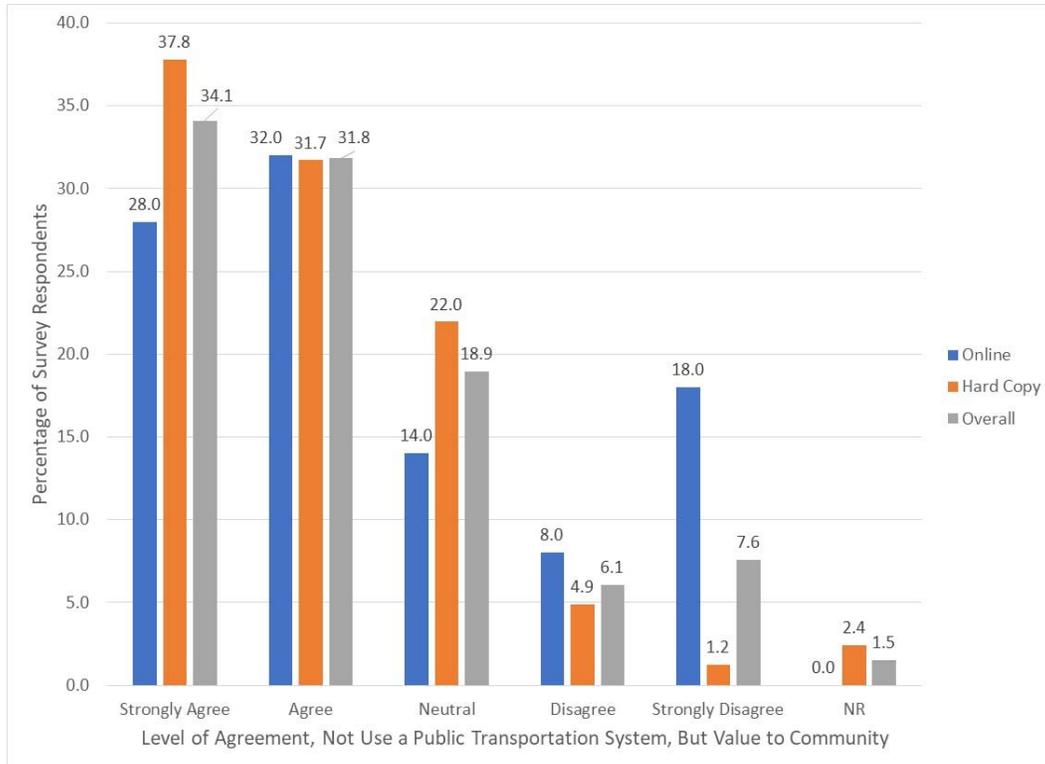
The seventh question asked, **“Please indicate how strongly you agree or disagree with the following statements.”** Survey respondents were provided with five qualitative categories: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree. The following three statements were presented:

- While I do not envision using a public transportation system, if one were offered in the City of Lebanon, I would see value in our community having it.
- It would improve my quality of life to have a public transportation system in the City of Lebanon.
- It would improve the quality of life for others in the City of Lebanon if we have a public transportation system.

The following subsections will present the results for each of the statements.

**4.2.15.1.1. Will Not Use, But Brings Value to Community**

This question proved to be a bit confusing to those who indicated that they intended to use a public transportation system. Therefore, to provide more informative results, the individuals who indicated that they would not use the public transportation system (n=132), were specifically evaluated to look at the levels of agreement. The results show that almost sixty-six percent of individuals who report that they will *not* use the system *reported seeing value* in having a public transportation system in the community (Figure 4-32).

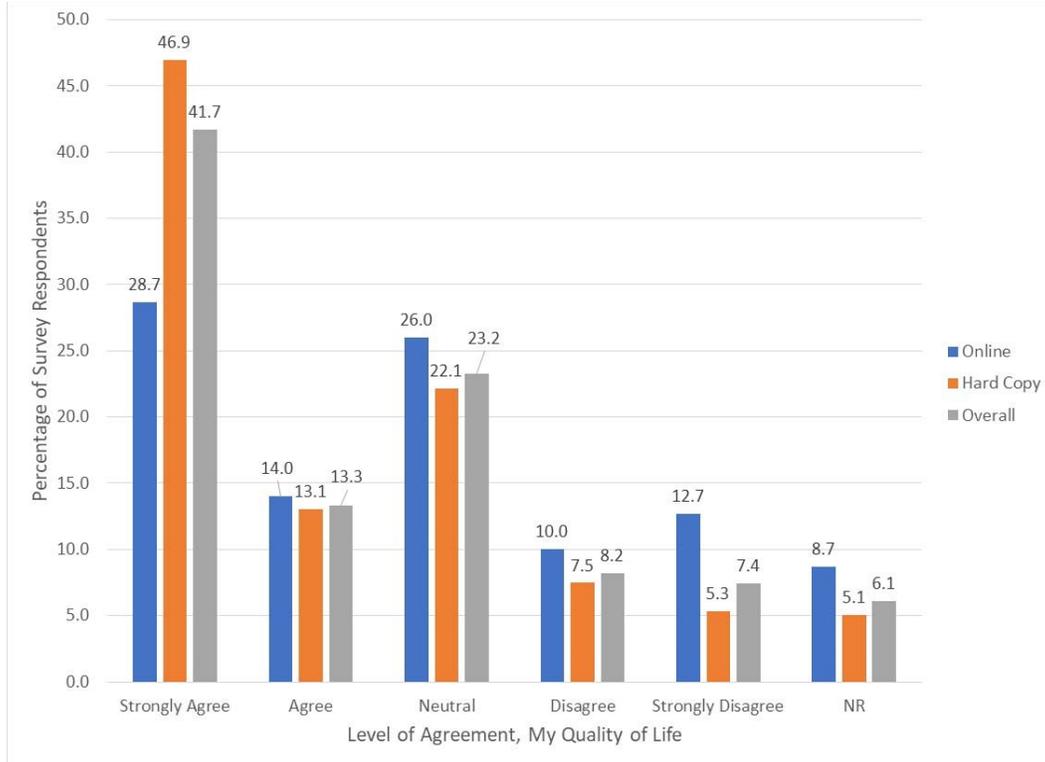


**Figure 4-32: Won’t Use, But See Value to Community**

As such, if you combine the results of this question with those reporting that they or someone in their household would use a public transportation system, 86.5% of survey respondents see value in the system either for themselves or a household member using it or as a valuable service to the community. (Note: overall, 69.9% of survey respondents reported they or someone in their household would use it (see Figure 4-29); of the 25.1% of the entire sample that reported that they or someone in their household would not use a public transportation system, 16.6% reported that they Strongly Agreed or Agreed that they saw value for a public transportation system in the community.)

**4.2.15.1.2. My Quality of Life**

The reported impact on the survey respondent’s quality of life should a public transportation system be offered in LEBANON was substantially greater (almost 18% more) for hard copy as compared with online survey respondents (Figure 4-33).

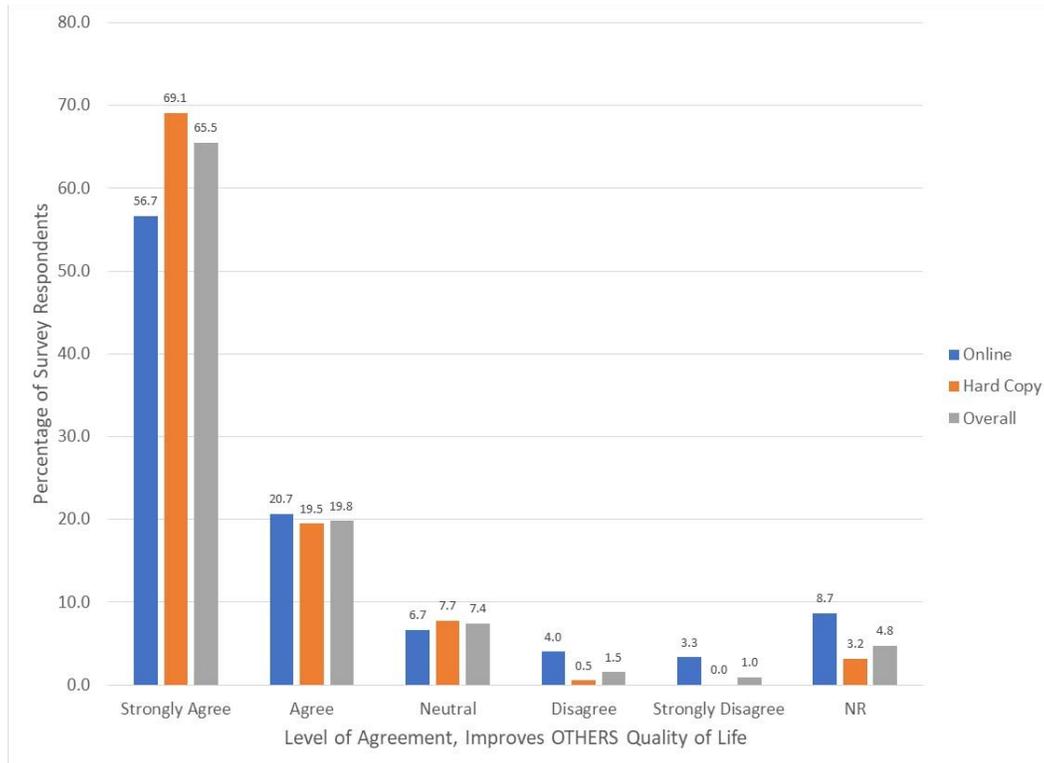


**Figure 4-33: Public Transportation System to Improve Respondent’s Quality of Life**

The results are interesting in that survey respondents either strongly agreed or were more neutral in their level of agreement with this question. It would be of interest to investigate the demographics of survey respondents who reported that they strongly agreed that a public transportation system would strongly improve their quality of life to those that reported neutral agreement; further discussion can be found in Additional Analyses.

### 4.2.15.1.3. Others' Quality of Life

Overall, just over sixty-five percent of survey respondents indicated that they Strongly Agreed that a public transportation system in LEBANON would improve the quality of life for others (Figure 4-34).



**Figure 4-34: Public Transportation System to Improve Quality of Life for Others**

Again, there was a stronger sentiment of agreement reported by hard copy survey respondents when compared with online survey respondents.

More importantly, a *very small percentage of survey respondents (less than 6 percent overall)* suggested that they disagreed with the relationship between improving others' quality of life and providing a public transportation system.

In summary, overall, the hard copy survey respondents reported a greater level of agreement for the value of a public transportation system to the community and for the relationship between improving their own and others’ quality of life as compared with online survey respondents (Table 4-2).

**Table 4-2: Level of Agreement, Online vs. Hard Copy Samples: Community Value & Quality of Life**

Question Topic	ONLINE, More in Agreement	Similar Levels of Agreement	HARD COPY, More In Agreement
Value to the Community			9.8% more
“My” Quality of Life (QOL)			18.2% more
“Others” QOL			12.4% more

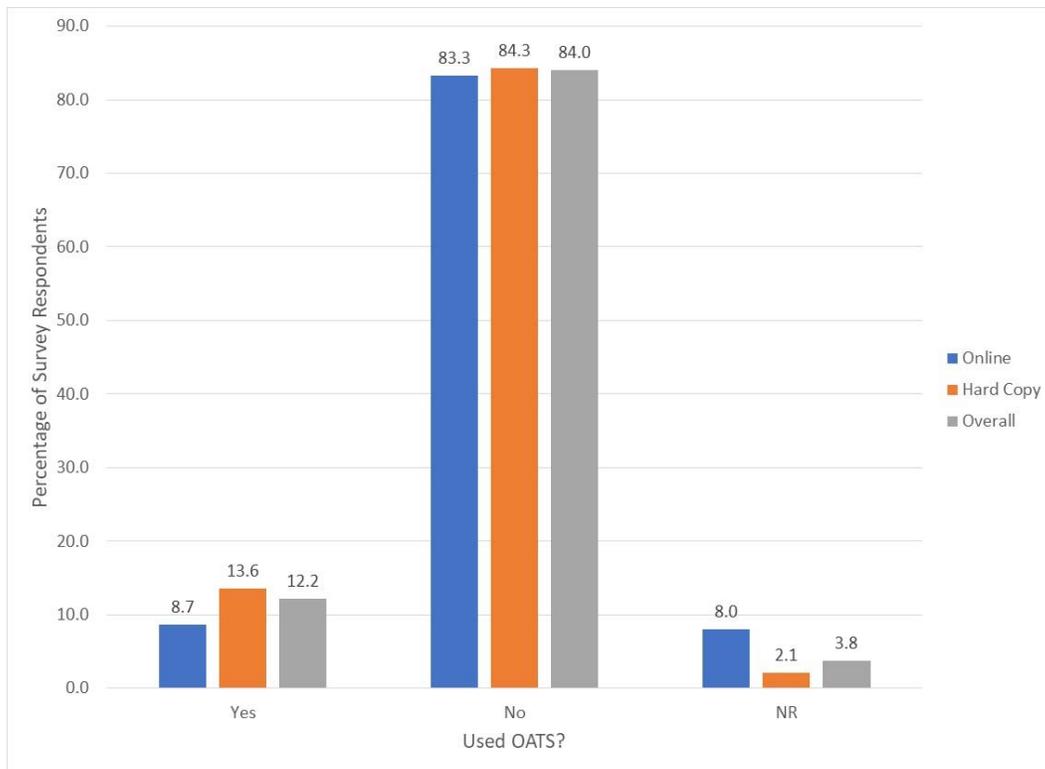
#### 4.2.16. Use & Description of OATS

The sixteenth question asked, “**Have you used OATS in Lebanon?**” A photo of the OATS bus in LEBANON is shown in Figure 4-35.



**Figure 4-35: OATS Bus**

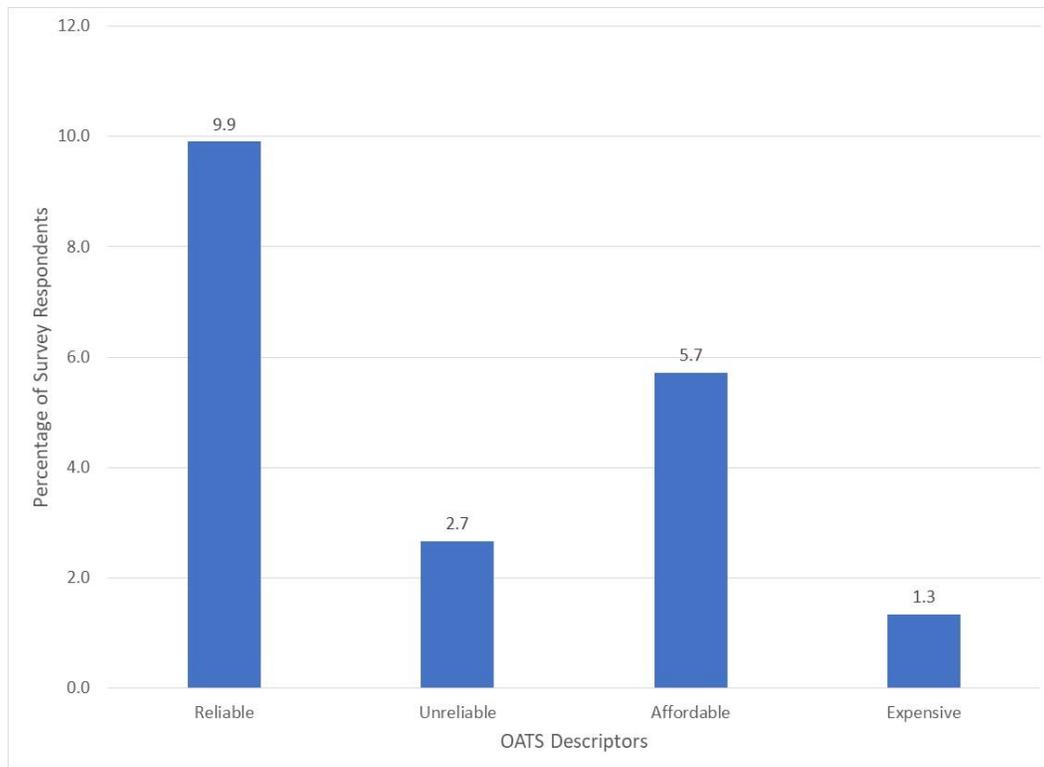
Survey respondents were allowed to answer yes or no. Most survey respondents (84.0%) reported that they had not used OATS (Figure 4-36).



**Figure 4-36: Use of OATS**

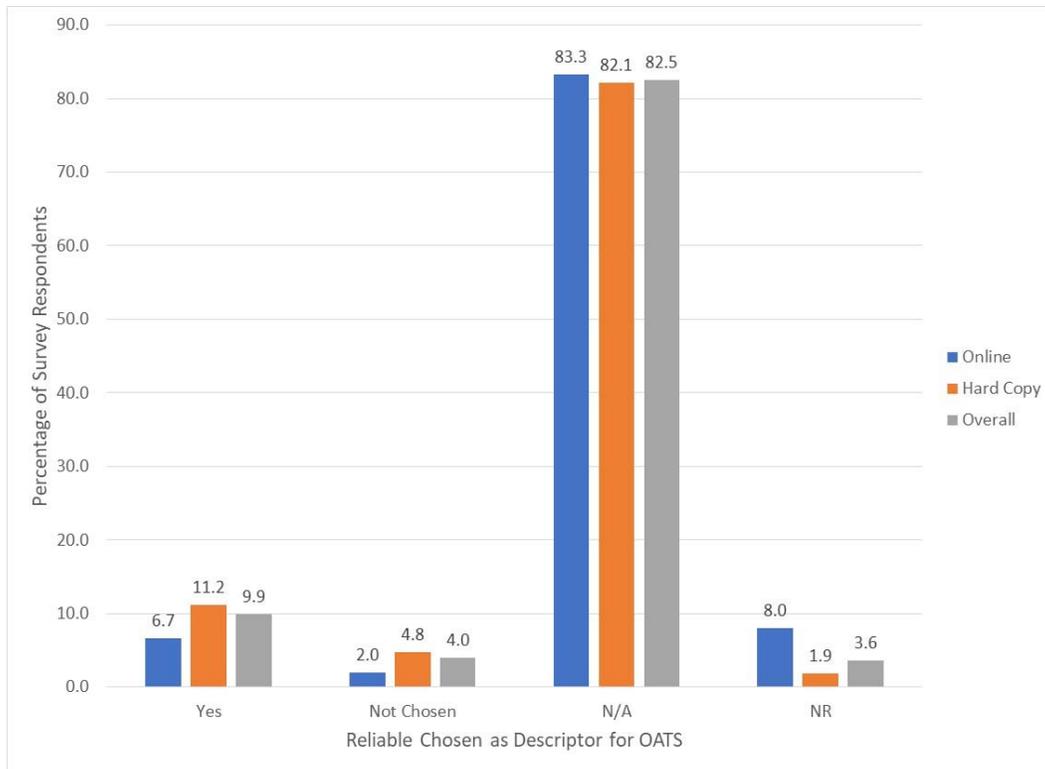
It is surprising how few survey respondents reported using OATS. It would be of value to understand if those who have not used OATS understood that it is a service available to all, not just the elderly and people with disabilities, as is often common perception. Or, it may be that the limited service dissuades people from using the service.

Of the 72 (n=73 for the first descriptor, affordable) overall survey respondents who indicated that they had used OATS, the most commonly cited descriptor was *reliable* (Figure 4-37).

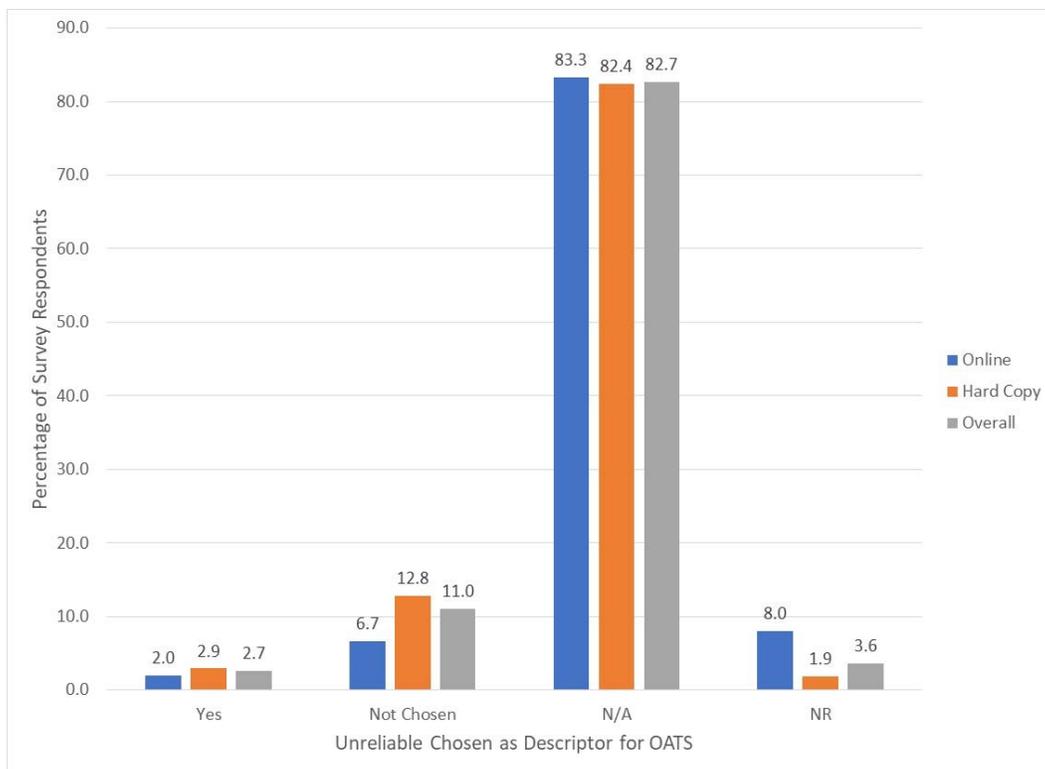


**Figure 4-37: Comparison of Percentages Selecting Qualities of OATS**

The following figures (Figure 4-38 through Figure 4-41) compare the online and hard copy survey respondents' selections for each descriptor (e.g., reliable, unreliable, affordable, expensive).



**Figure 4-38: Reliable as a Descriptor for OATS (n=73)**



**Figure 4-39: Unreliable as a Descriptor for OATS (n=72)**

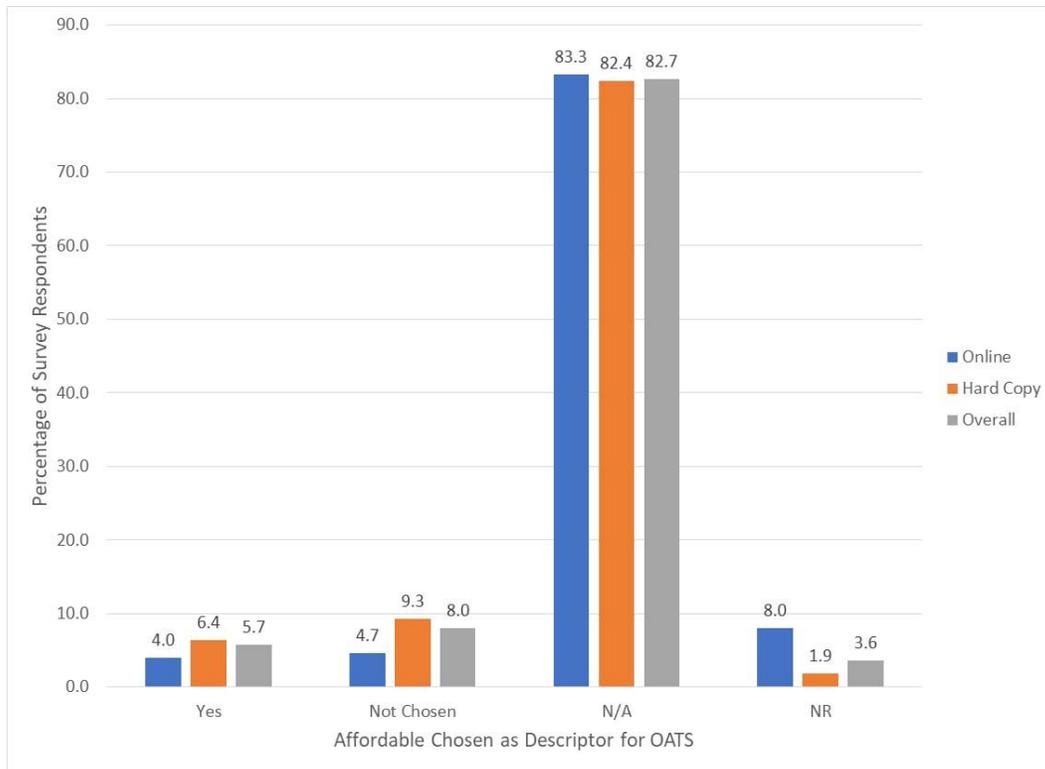


Figure 4-40: Affordable as a Descriptor for OATS (n=72)

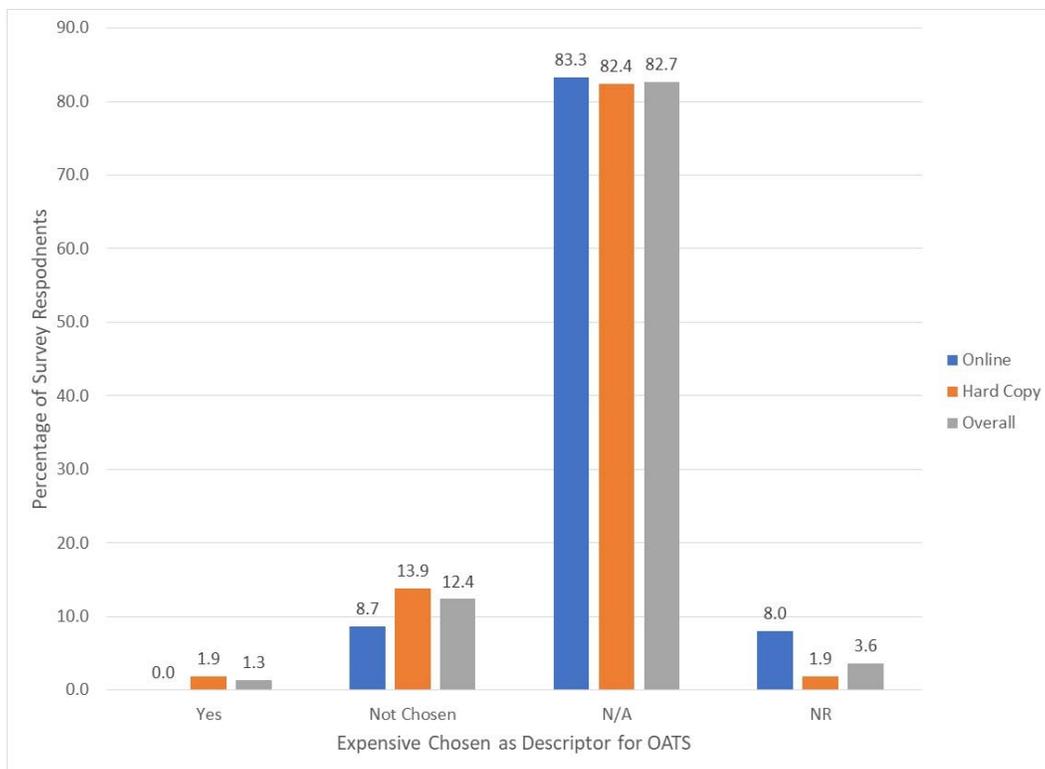


Figure 4-41: Expensive as a Descriptor for OATS (n=72)

Generally speaking, the largest difference in responses between online and hard copy survey respondents' selection was for the descriptor "affordable." However, keep in mind that the sample size of reported OATS users is small; therefore, if additional OATS users were asked to provide input, it is likely that the value of one descriptor as compared with another could easily change.

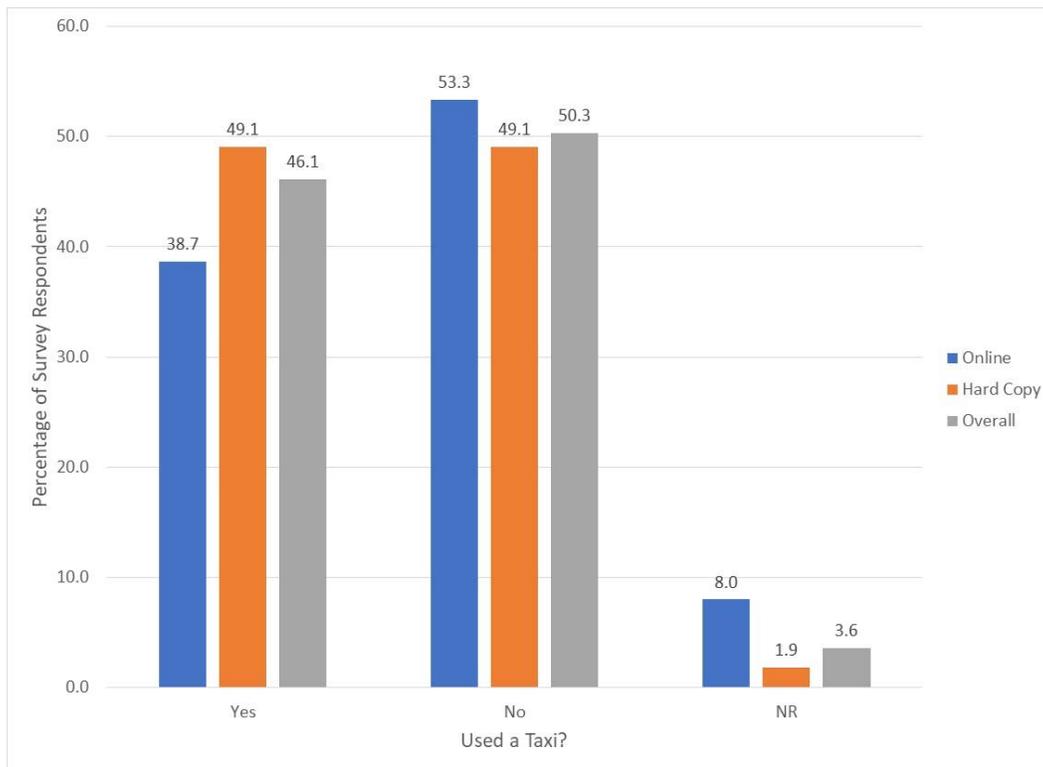
Only one online survey respondent chose other and indicated that OATS was "too limited." The following descriptors were suggested by hard copy survey respondents: 1) friendly, 2) takes too long to wait, 3) don't like having to call days in advance to go to Wal-Mart, 4) three day notice is too much, 5) not enough stops, 6) the only bad thing about riding the OATS bus is that you have to schedule about 2 weeks ahead of time, 7) can't change scheduled appt/re-route – don't know where/when they will be, 8) crowded at times, 9) difficult to coordinate with other elderly patrons, 10) doesn't go where I need, and 11) limited to 2 stops have to give advance reservation. The majority of the other descriptors offered were negative, with frustrations with the requirement for advanced reservation to use the system the most commonly cited irritation. It is also interesting to note that the reported advance notice differs by survey respondent (3 days vs. 2 weeks).

When thinking about how the critiques could be translated to a public transportation system, the benefit would be significant in terms of the service always operating on a set schedule on a weekly basis, which would address the advanced reservation requirement. Users would also know when/where the buses will be. However, there may be crowding on the buses at times, as the objective of a public transportation system is not to provide an entire bus for one person. Stops may be perceived by some as "limited;" however, the number of stops that a fixed route has impacts the headway. A public transportation system would eliminate the need to coordinate with others, although a buddy system approach with a public transportation system would not be a bad concept, as it would encourage socialization, use, and allow passengers to look after one another. A public transportation system would allow for more flexibility in accommodating rescheduled doctor appointments, as it would operate over a period of time during the day, not just to provide the limited service for which a reservation(s) was made. LEBANON officials have already noted that whereas Mercy offers same day appointments on Friday, as a result of the seven-day advanced scheduling requirement by OATS, if patients became sick during the week they would be unable to access Mercy, meaning that these appointments do not help the mobility-constrained. There is no limit on the number of times a user can hop on and off a bus, and different types of passes (daily, weekly, monthly) could allow one to hop on and off a bus multiple times in one day. A route that allows for deviation could also allow for some flexibility in addressing additional stops as compared with just a pure fixed route system.

Due to the limited use of this public transportation system at present, it would appear that *OATS does not address the mobility needs of LEBANON residents.*

### 4.2.17. Use & Description of Taxis

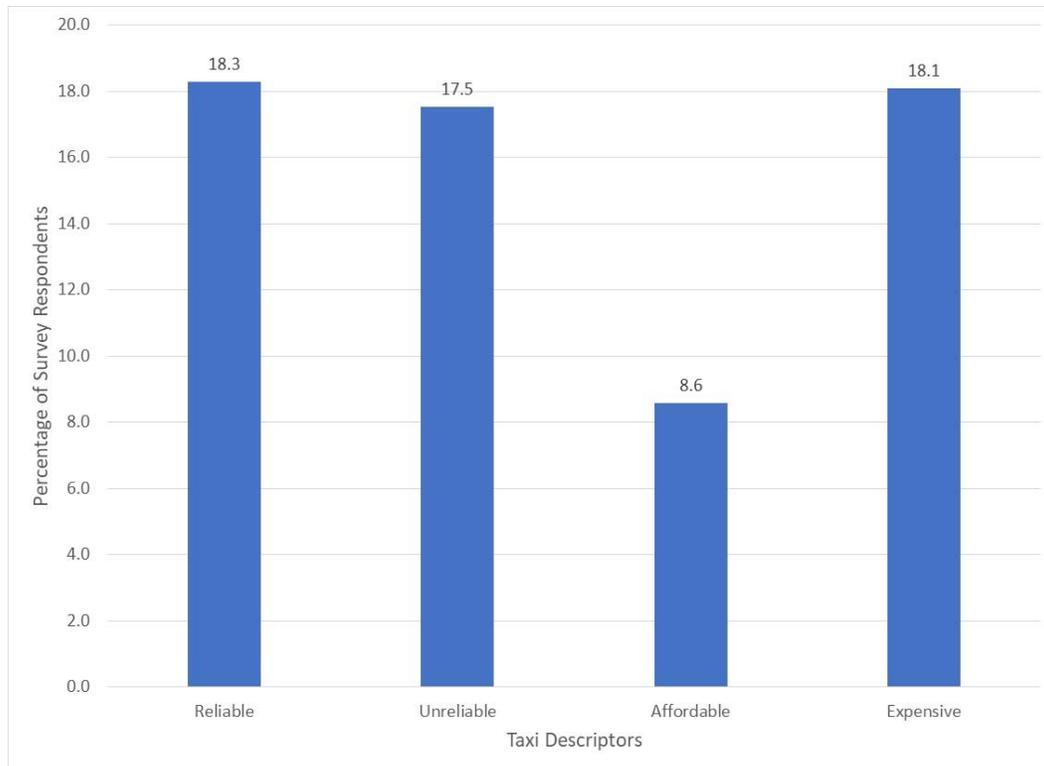
The seventeenth question asked, **“Have you ever used a taxi service in Lebanon?”** Survey respondents were allowed to answer yes or no. Overall, 46.1% of all survey respondents reported using a taxi service in LEBANON, substantially more than the percentage reporting the use of OATS (Figure 4-42).



**Figure 4-42: Use of Taxis**

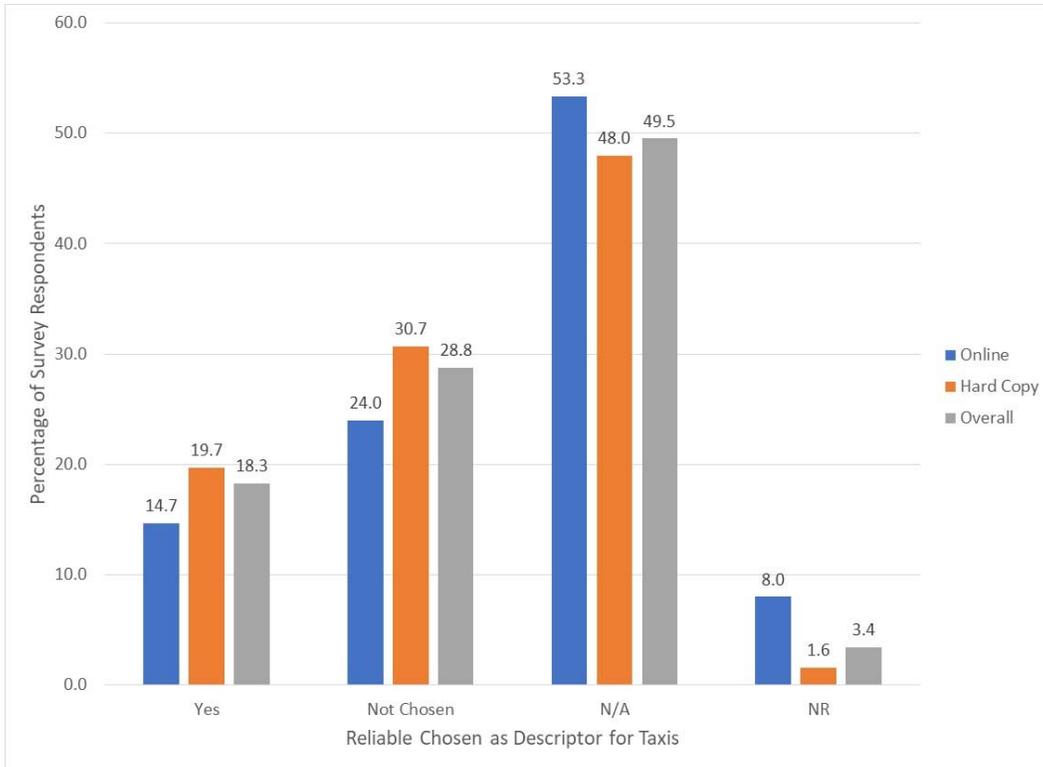
There was a similar percentage of non-respondents for the taxi question as there was for the OATS question from online survey respondents.

Of the 247 overall survey respondents who indicated that they had used a taxi, similar percentages of respondents selected *reliable*, *unreliable* and *expensive* as descriptors of this service (Figure 4-43).

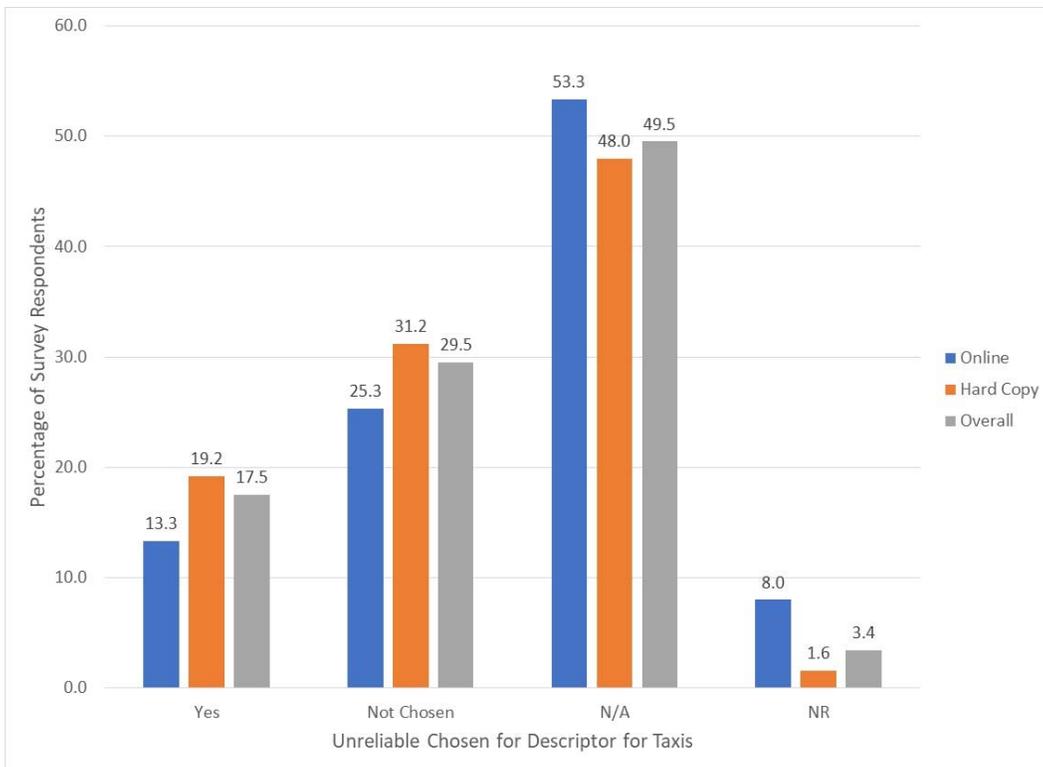


**Figure 4-43: Comparison of Percentage Selecting Qualities of Taxis**

The following figures (Figure 4-44 through Figure 4-47) compare the online and hard copy survey respondents' selections for each descriptor (e.g., reliable, unreliable, affordable, expensive). In contrast, it is clear that there was general agreement that taxi services were not affordable.



**Figure 4-44: Reliable as a Descriptor for Taxis (n=247)**



**Figure 4-45: Unreliable as a Descriptor for Taxis (n=247)**

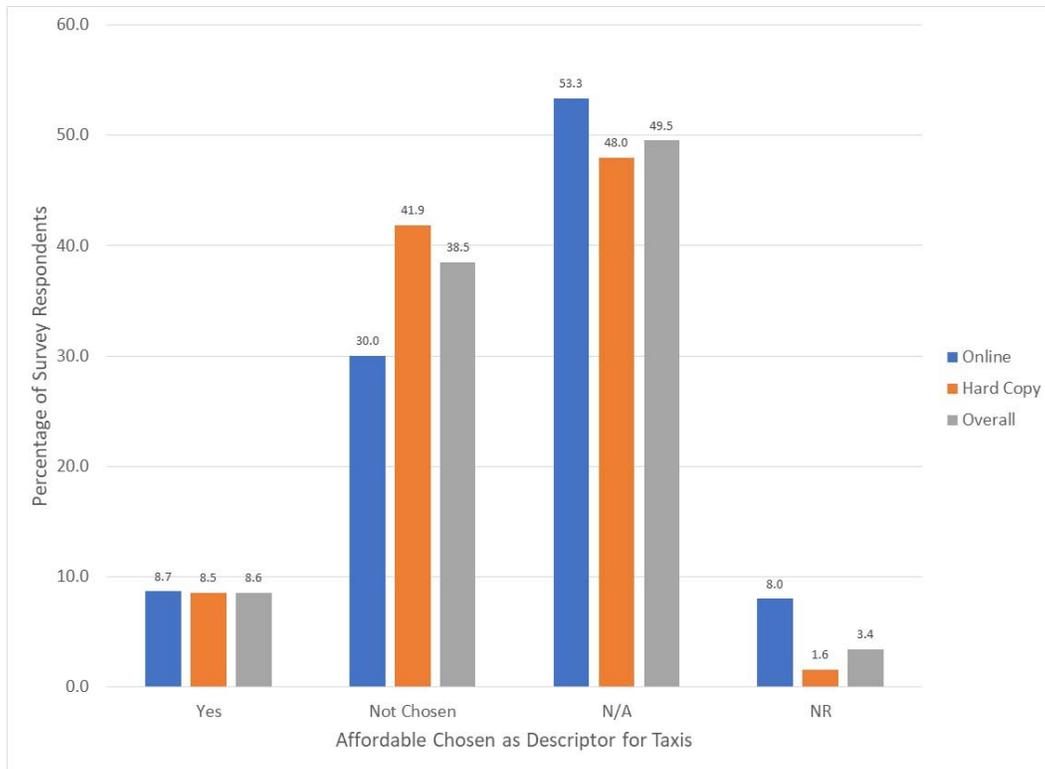


Figure 4-46: Affordable as a Descriptor for Taxis (n=247)

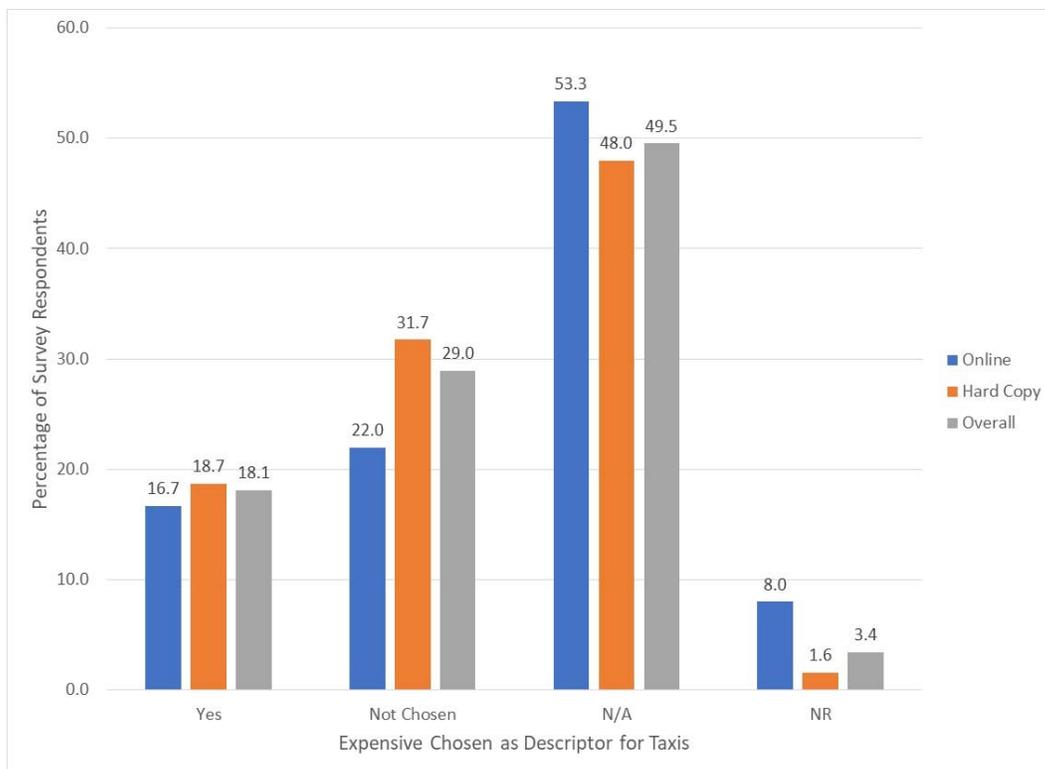


Figure 4-47: Expensive as a Descriptor for Taxis (n=247)

Comparing online and hard copy survey responses, the most consistent answer is for the descriptor “affordable,” although less than ten percent of all users chose this descriptor. There was more difference between the descriptors “unreliable” and “reliable” when comparing the online and hard copy survey respondents.

Ten online survey respondents chose other and indicated that taxis in LEBANON were:

- 1) convenient (+);
- 2) unsafe (-);
- 3) I was just glad it was available (+);
- 4) low quality (-);
- 5) long wait times (-);
- 6) vehicles are broken down (-),
- 7) service may not come (-);
- 8) only used once (-);
- 9) inconvenient and nasty (-); and
- 10) cab was dirty (-).

Twenty-four hard copy survey respondents chose other and indicated that taxis in LEBANON were:

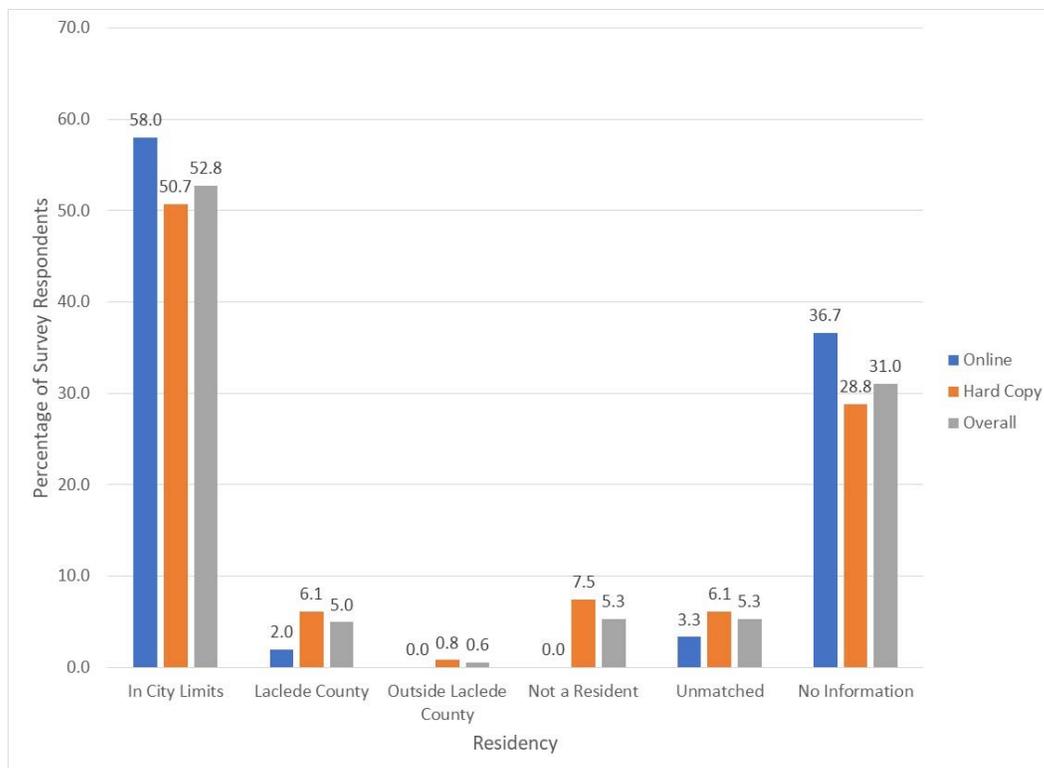
- 1) long wait (-)
- 2) could be less than \$5 per person (-)
- 3) slow (-)
- 4) hit and miss (-)
- 5) sketchy (-)
- 6) some drivers are scary – smelly, [smoky] vehicles (-)
- 7) 5 dollar[s] to go and 5 dollar back home it cost to the store 10 dollar (-)
- 8) call & [wait] (-)
- 9) don’t care for taxi (-)
- 10) disgusting (-)
- 11) someone got it for us (-)
- 12) nasty (-)
- 13) long wait time for taxi to arrive (-)
- 14) took a long time for them to pick me up. I guess they were really busy. (-)
- 15) been a while, once stuck in cab for 1.5 hr while they picked up & dropped off other [fares].  
Also several times when I used cab, spouse took cab home w/groceries while I rode bike and beat cab home. Also, several times no cab available. (-)
- 16) In Lebanon – it is \$5 anywhere in the city – but that is \$10 to go one place and back home and sometimes the wait is up to an hour (-)
- 17) mixed reliability (-)
- 18) hard to get a taxi when it’s raining (when I need one) because everybody else is trying to get a taxi as well (-)
- 19) very high cab [fare] (-)
- 20) depends on which cab company (-)
- 21) takes way too long when I rode the last one (-)
- 22) all the cabs are nasty unreliable and [disgusting] (-)
- 23) The wait time is long. The last experience I had, the driver wasn’t friendly. (-)
- 24) unclean unsafe (-)

Not one of the other offered descriptors from hard copy survey respondents was positive. Implications are that many of these individuals are the most frequent users and therefore are most familiar with the quality of service. At best, one person indicated that he/she likely would not have used the cab had it not been provided by someone else.

Considering both online and hard copy survey respondents, overwhelmingly, the other descriptors were highly negative, suggesting that *the services provided by the taxis are not addressing the needs of LEBANON residents*. One of the only two positive comments seems to come from someone desperate for transportation, even in the face of others suggesting that safety concerns were present.

#### 4.2.18. Approximate Location of Survey Respondent

The eighteenth question asked, **“What are the nearest cross-streets to your house?”** Survey respondents were provided with a blank space to identify the cross-streets nearest their house. While many survey respondents did not provide information (31.0%), the majority of those who did identified a location within the city limits (Figure 4-48).



**Figure 4-48: Within or Outside of the City Limits**

The researchers also mapped the locations provided by survey respondents, both a view with all survey respondents including those outside of the Laclede County (Figure 4-49) and one with just those within Laclede County (Figure 4-50).

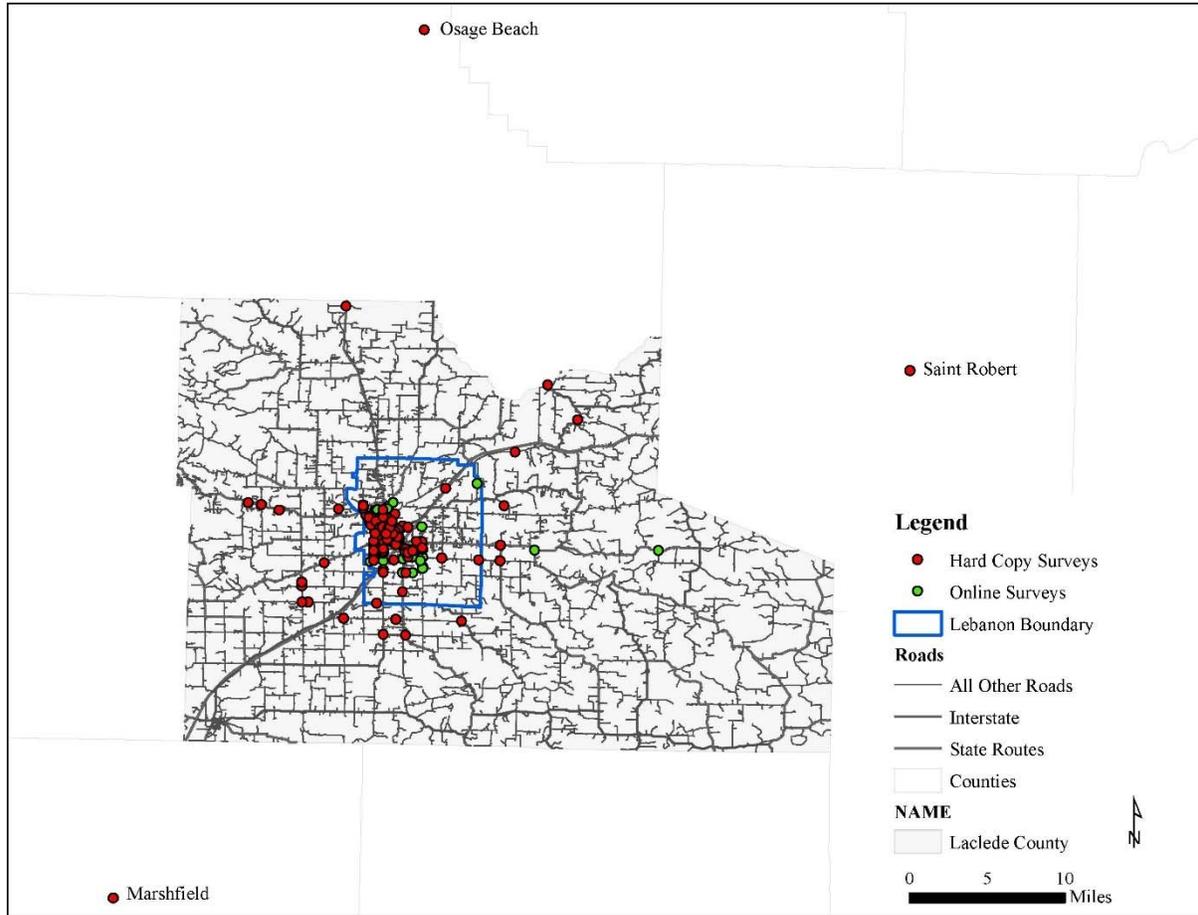
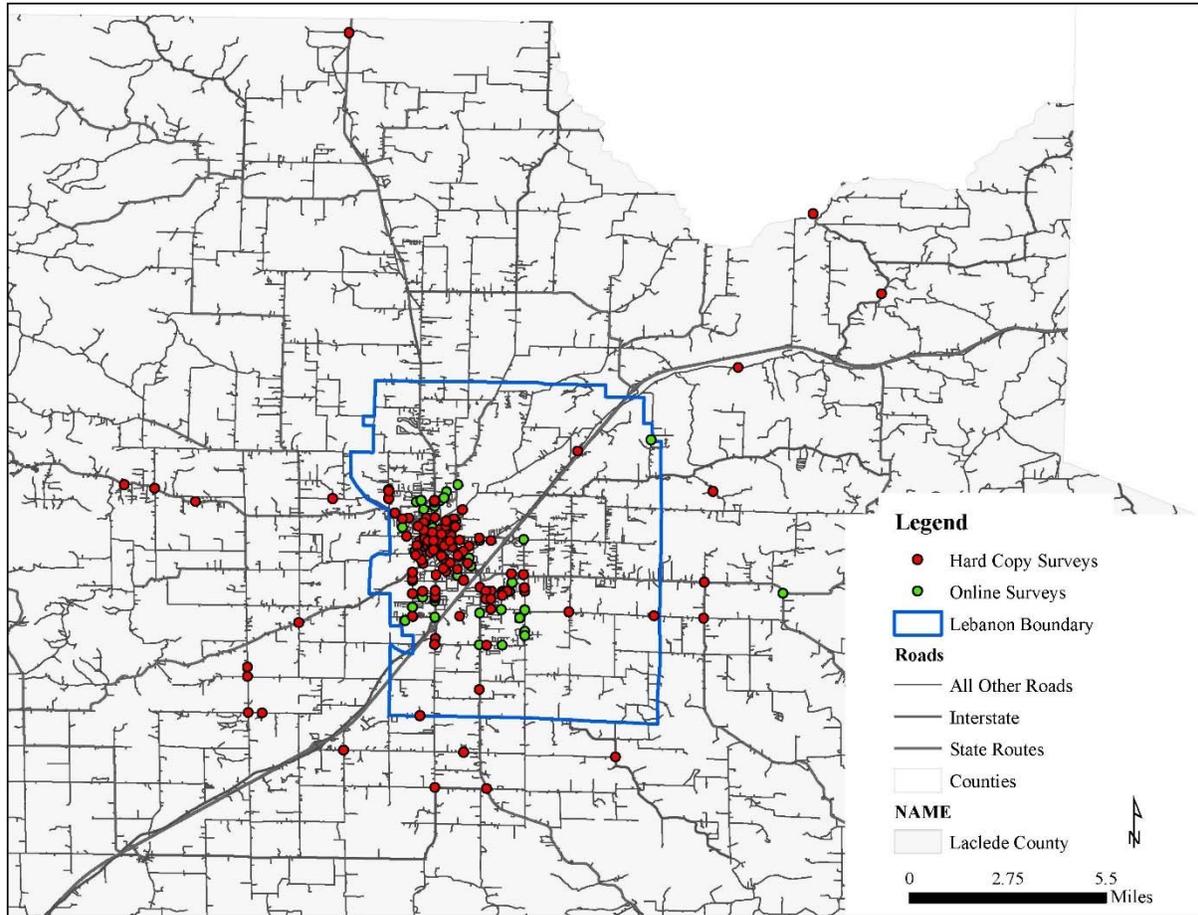


Figure 4-49: Graphical Location of Survey Respondents, All



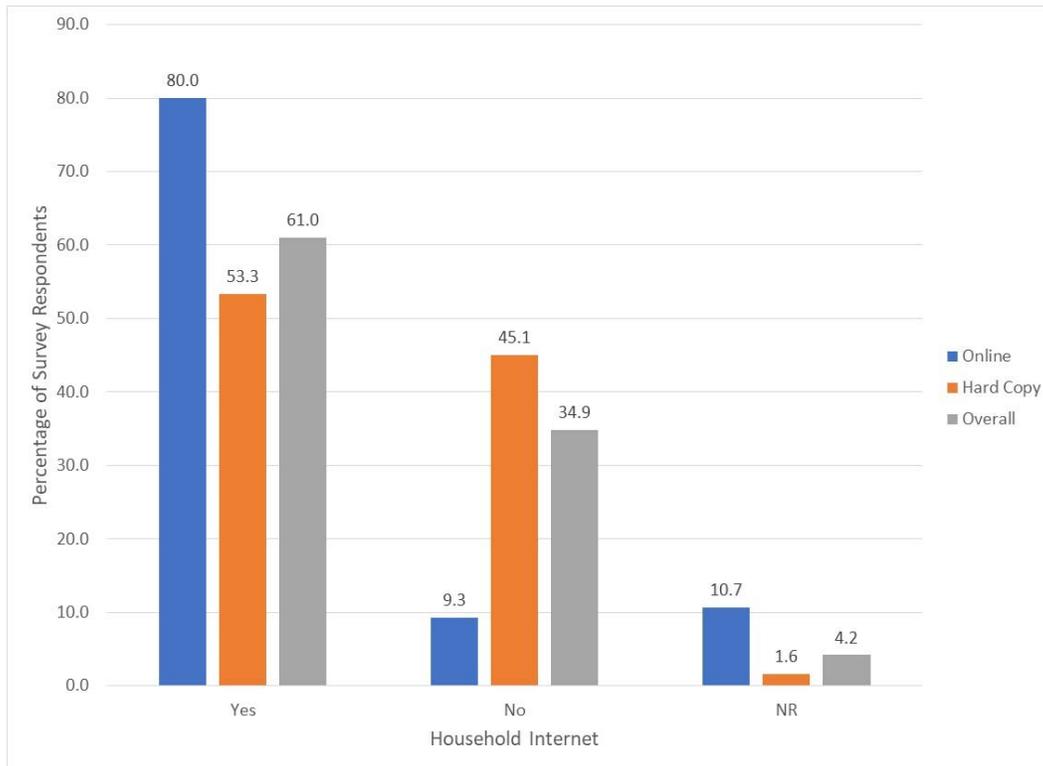
**Figure 4-50: Graphical Location of Survey Respondents, Within Laclede County**

The results show that, as indicated by LEBANON staff, LEBANON has a regional draw.

As shown by Figure 4-50, most survey respondents were from the northwest side of the city, west of the interstate. However, this tends to be the densest part of the community (see Figure 2-4 for population density).

### 4.2.19. Internet

The nineteenth question asked, **“Do you have internet in your household?”** Survey respondents were allowed to answer yes or no. Overall, just over sixty percent of survey respondents indicated that they had household internet (Figure 4-51).



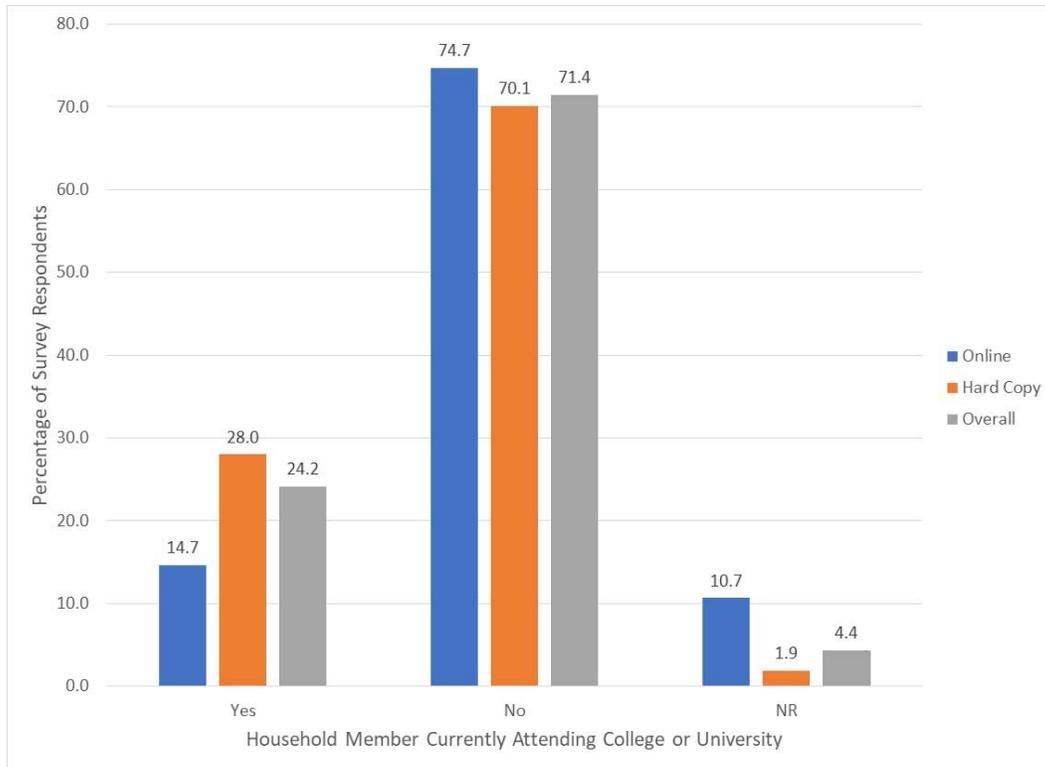
**Figure 4-51: Household Internet**

However, there is a significant difference between access to household internet when comparing the online sample to the hard copy sample. It is clear that the online sample’s access to household internet made it substantially easier for that sample to access the survey and provide input. Clearly there is a relationship between survey mode (online vs. hard copy) and the presence of internet in a household. Keep in mind, however, that while a survey respondent may not have household internet, the survey respondent may have access to the internet via a smartphone, which can provide some additional access, although the cost to use data to answer a survey can negatively impact one’s ability to respond. A smartphone could be used without requiring the use of one’s data where free wireless internet could be found (e.g. a coffee shop).

### 4.2.20. Enrollment in Higher Education

The twentieth question asked, **“Are you, or is a member of your household, a student at a college or university?”** Survey respondents were allowed to answer yes or no. Most survey

respondents (71.4%) indicated that they were not nor was a member of their household enrolled at a college or university (Figure 4-52).



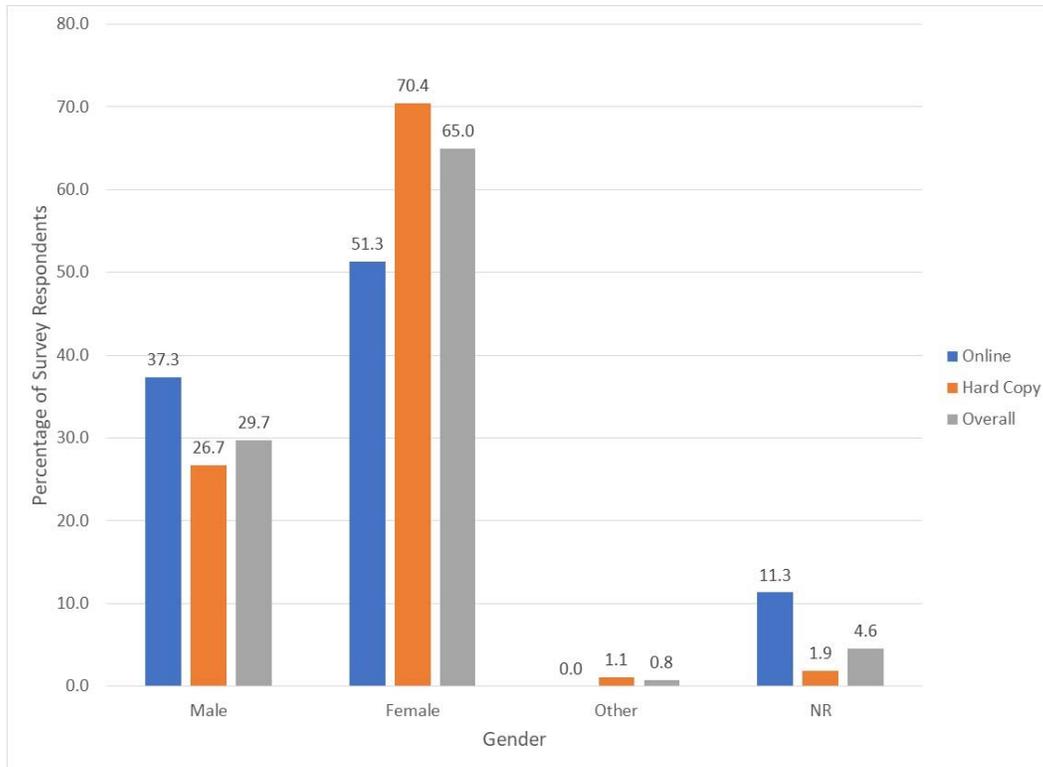
**Figure 4-52: Enrolled at a College or University**

It is not surprising that there is a greater percentage of hard copy survey respondents who reported being enrolled at a college/university or having someone from within the household enrolled, as Ozarks Technical Community College (OTC) provided several large batches of completed surveys. Therefore, it would be expected that these individuals would be represented for this question.

It is unclear why there is such a high percentage of non-response from this question for the online survey respondents.

### 4.2.21. Gender

The twenty-first question asked, **“What is your gender?”** Survey respondents were provided with three potential responses: 1) male, 2) female, or 3) other (please specify). Most survey respondents (65.0%) reported being female (Figure 4-53). Although slightly lower, it is in line with the reported gender distribution for the survey in Wyoming (70% of respondents were women) (Chaudhari, Lonsdale, & Kack, 2016).

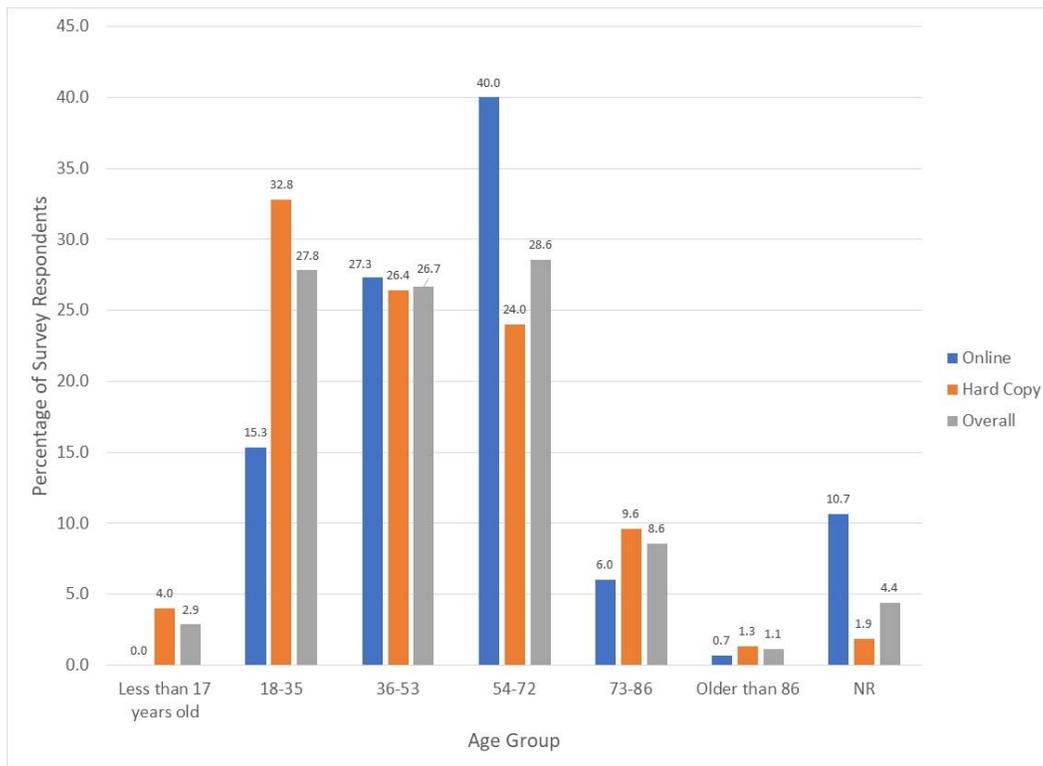


**Figure 4-53: Gender**

Typically, women tend to complete surveys more often than men, so the higher percentage of survey respondents identifying as women is not unexpected. When compared with the U.S. Census data, where the split between male and female is approximately equal (48% male, 52% female), however, the data overrepresents viewpoints from women in the community (see Community Characteristics). However, it is interesting that more men completed the survey online than in a hard copy format. This phenomena could be explained by factors such as: 1) online survey respondents feel more anonymity, 2) it could reflect the ease of completing the survey online with a full-time position, 3) it could reflect more familiarity with a computer, 4) none of these suggestions, or 5) a combination. More online survey respondents when compared with hard copy survey respondents did not identify their gender; therefore, if all of these survey respondents were male, it would pull down the proportion that was female to be more representative of what was reported by the U.S. Census.

### 4.2.22. Age

The twenty-second question asked, **“Which of the following age categories do you fall within?”** Survey respondents were provided with six potential categories in which to group themselves: 1) 17 and younger, 2) 18 to 35, 3) 36 to 53, 4) 54 to 72, 5) 73 to 86, or 6) older than 86. Typically, providing a survey respondent with a category rather than asking for a specific age will allow for more survey respondents to answer the question. In addition, these categories were grouped with the intention that they would correlate with the generations as discussed in *Mobility Mindset of Millennials in Small Urban and Rural Areas* (i.e., 18-35 = Millennials; 36-53 = Generation X; 54-72 = Baby Boomers, etc.), although the oldest category (86 or older) did not directly correlate. The majority of survey respondents were between the ages of 18 and 72, although this was in large part because the overrepresentation of those in the 54-72 age group in the online sample was balanced out by the overrepresentation of those in the 18-35 age group in the hard copy sample (Figure 4-54).



**Figure 4-54: Age Groups**

The age categories identified for survey respondents did not directly match those discussed in Figure 2-6; however, grouping 20-34, 35-54, and 55-74 roughly matches 18-35, 36-53, and 54-72. The former percentages from Figure 2-6 added up to 21.2%, 24.5%, and 19.5%; therefore, the 36-53 category should have the largest representation of survey respondents to be representative of the LEBANON population. Yet, the 54-72 age group seems to be slightly overrepresented in the

survey sample when compared with the population of the community. As Figure 4-54 shows, if surveys had not been made available via hard copy, this group would have been significantly overrepresented.

Very few survey respondents were represented in the older than 86 age group and the intent of the survey was not to collect data from those younger than 17 years of age, although some of the groups that distributed the hard copy survey did provide surveys to this age group.

There was a relatively large percentage of online survey respondents (10.7%) who did not identify the age group that best applied to them.

#### 4.2.23. Number of People in the Household

The twenty-third question asked, “**Including yourself, how many people currently live in your household?**” Survey respondents were provided with the following seven possible responses: a) 1, b) 2, c) 3, d) 4, e) 5, f) 6, and g) Other (please specify). Average reported household sizes ranged between 2 to 3 people, with hard copy survey respondents reporting more variable household sizes (Table 4-3).

**Table 4-3: Household Size: Online, Hard Copy, and Overall**

Data Collection Method	Minimum	Average	Maximum	Standard Deviation
<b>Online</b>	1	2.6	9	1.3
<b>Hard Copy</b>	1	2.9	50	3.1
<b>Overall</b>	1	2.8	50	2.8

The average of 2.8 people per household is greater than that reported from the U.S. Census (see Key Demographics), which reported 2.36 (US Census Bureau, 2016). (Note: While the survey respondent who indicated that there were 50 people in the household did not provide additional information, a survey respondent who identified a household size of 12 reported residing in a “residential home.” Therefore, it is likely that the person identifying 50 people in the household lives in some type of group home.) As a whole, the larger standard deviation for hard copy survey respondents suggests a more varied sample whereas the small standard deviation for the online survey respondents suggests a sample of households with similar characteristics.

#### 4.2.24. Number of Children in the Household

The twenty-fourth question asked, “**How many children under the age of 18 currently live in your household?**” Survey respondents were provided with the following seven possible

responses: a) 0, b) 1, c) 2, d) 3, e) 4, f) 5, and g) Other (please specify). The number of children in households ranged from 0 to 60 children, with hard copy survey respondents reporting more variable counts of children within a household, similar to the result for household size (Table 4-4).

**Table 4-4: Number of Children in Household, Online, Hard Copy, and Overall**

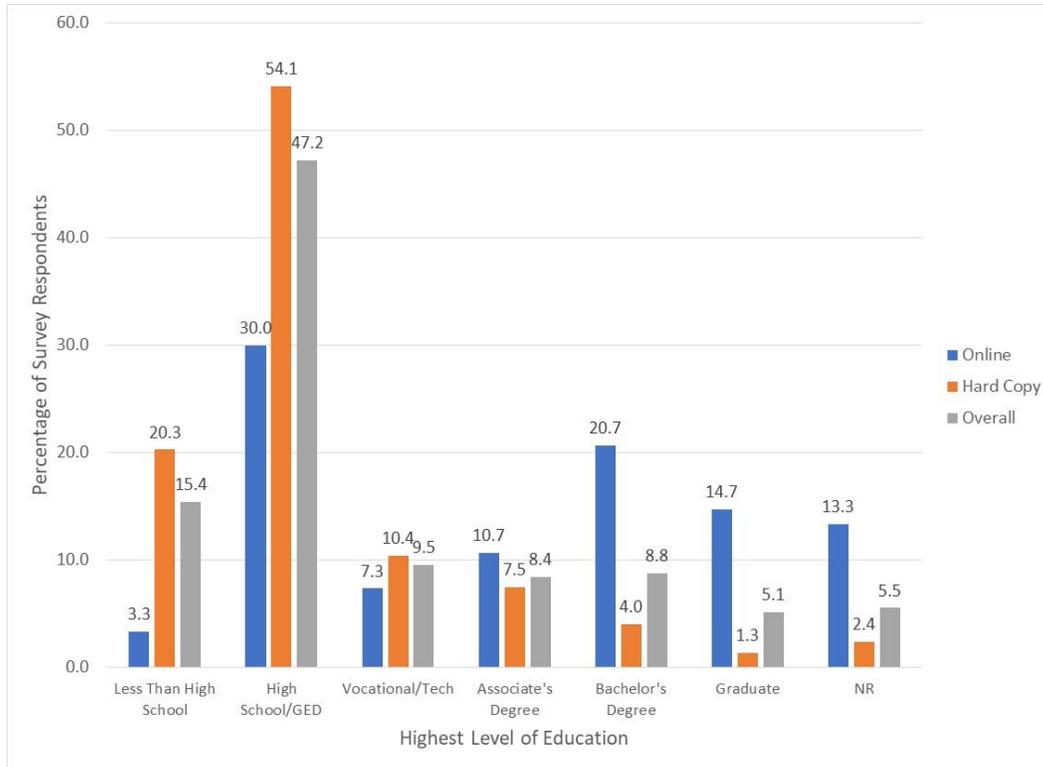
Data Collection Method	Minimum	Average	Maximum	Standard Deviation
<b>Online</b>	0	0.5	6	1.0
<b>Hard Copy</b>	0	1.0	60	3.3
<b>Overall</b>	0	0.8	60	2.9

Note that the maximum number of children is greater than the largest household size because the survey respondent who indicated that 60 individuals under the age of 18 were living in the house did not provide a household size.

A large portion of survey respondents, 217 of the 375 hard copy survey respondents (57.9%) and 96 of the 150 online survey respondents (64.0%), reported not having a child under the age of 18 living in their household. Both samples have fewer zero children households than that reported by the U.S. Census, 68.2% (see Key Demographics), although this could be somewhat representative of the changes since the last U.S. Census was conducted.

#### 4.2.25. Education

The twenty-fifth question asked, “**Please indicate the highest level of education that you have completed.**” Survey respondents were provided the following six categories: 1) Less than high school, 2) High school graduate/GED, 3) Vocational or technical school certificate, 4) Associate’s degree, 5) Bachelor’s degree, or 6) Graduate degree or professional degree (MA, MS, PhD, JD, MBA, etc.). The largest number of survey respondents reported having a high school education or the equivalent (Figure 4-55), with 62.6% of the overall sample reporting an education level of high school or less.

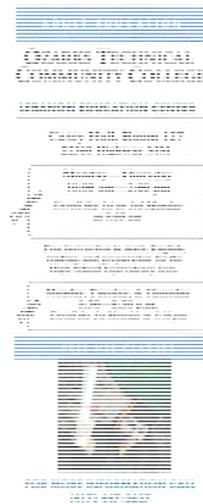


**Figure 4-55: Level of Education of Survey Respondents**

Compared with the results of a study that collected data from the rural areas of Minnesota, Montana, Washington State and Wisconsin, the dataset at hand is considerably biased towards a high school education, as compared with a greater representation of the rural population reporting at least some college education and a larger percentage reporting obtaining bachelor’s degrees (Villwock-Witte & Clouser, 2016). For the current study, only the online survey data more closely mimics the data from the aforementioned study. While the other study does not include observations from Missouri in its dataset, it is of value to look at inconsistencies and consistencies of the results from a rural viewpoint. This would suggest that creating a public transportation system that would allow connectivity to institutions of higher education for both post-secondary degrees (Figure 4-56) and for opportunities to complete a General Equivalency Diploma (GED) for those without a high school degree (Figure 4-57) would be an economic benefit to LEBANON.



**Figure 4-56: Example of a Post-Secondary Degree Offered in LEBANON**

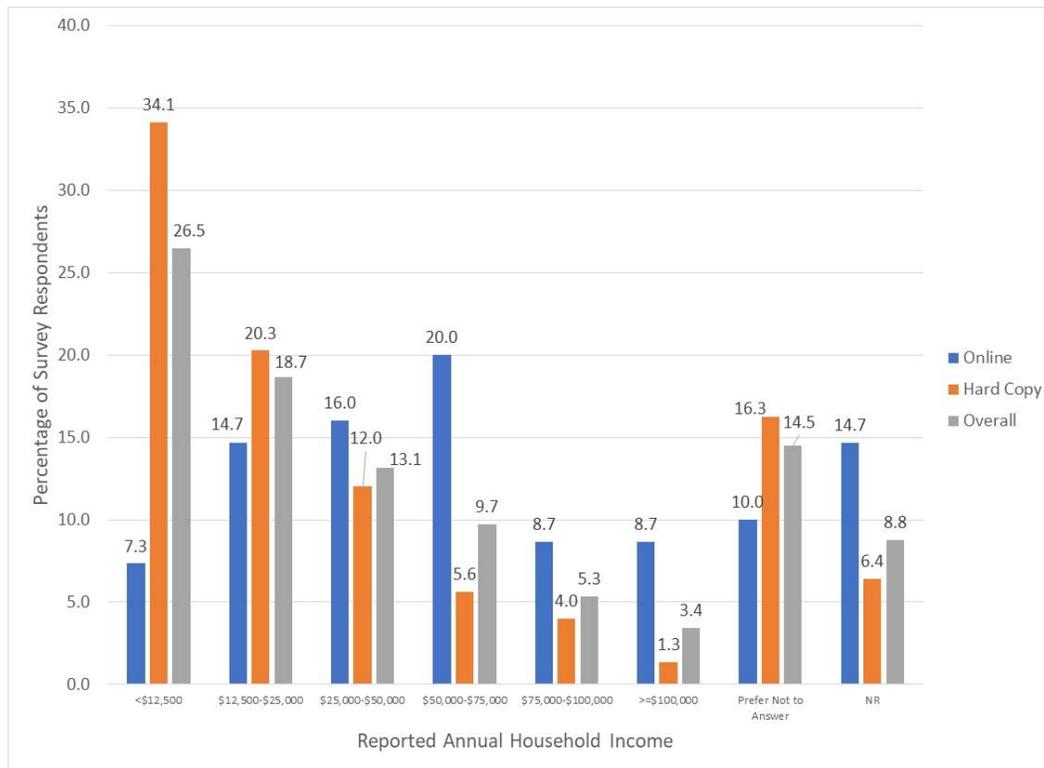


**Figure 4-57: Example of HSE/GSE Programs in LEBANON**

The other notable outcome from the level of education question is that the hard copy survey respondents have a substantially larger percentage reporting they have less than a high school education (more than 6 times) when compared with online survey respondents. This could, in part, be a result of the fact that more younger people were captured via the hard copy surveys (see Figure 4-54); however, this will not account for all of the percentage difference in this category. The differences between the hard copy survey respondents and the online survey respondents in percentages for bachelor's degrees and graduate degrees are also notable. Online respondents reported bachelor's degrees 5 times more often than hard copy respondents, and graduate degrees 11 times more often. Again, while the online survey respondents' average category was older than that for the hard copy surveys, this does not entirely explain the differences in the level of education. Further, from a community perspective, ensuring that there is opportunity within each group benefits everyone in the community.

### 4.2.26. Household Income

The twenty-sixth question asked, **“What was your household income before taxes in 2017?”** Survey respondents were provided the following seven categories: 1) Less than \$12,500, 2) \$12,500 to less than \$25,000, 3) \$25,000 to less than \$50,000, 4) \$50,000 to less than \$75,000, 5) \$75,000 to less than \$100,000, 6) \$100,000 or more, or 7) Prefer not to answer. The most frequently reported category was less than \$12,500 (26.5%) (Figure 4-58), which is considered at or below the poverty level. This correlates well with the U.S. Census, which reports that 26.9% of LEBANON is living at the poverty level (see Key Demographics).



**Figure 4-58: 2017 Reported Annual Household Income**

Note that compared with the rural study conducted in Park County, Wyoming (Chaudhari, Lonsdale, & Kack, 2016), where more than half of the survey respondents reported an annual income of \$50,001 to \$110,000, only 18.4% of LEBANON survey respondents fall approximately within this category. This would suggest that while a public transportation system was not implemented for Park County, Wyoming, due to the low reported annual household income in LEBANON, *the value to LEBANON residents in reducing the portion of their budget that has to pay for transportation could bring significant economic benefits to households and thereby the community.*

Again, there is a notable difference between the reported annual household income of online survey respondents when compared with hard copy survey respondents, with the former more frequently reporting higher annual household income categories. As noted earlier, the median

household income is \$31,425 (see Key Demographics). Almost sixty percent (58.3%) of the overall survey sample falls within the \$0 to \$50,000 category (with 13.1% of the sample in the \$25,000 to \$50,000 category). Therefore, the median household income identified in the U.S. Census would fall within the median of the data collected for the survey sample.

Consider again, the imbalance between the reported ages of the two samples, with the hard copy survey respondents tending to fall within the 18-35 age groups and the online survey respondents falling within the 54-72 age group. Considering the significant overrepresentation of hard copy survey respondents in the less than \$12,500 annual household income category and the likely greater number of children in these households, **the economic opportunity for the youngest of residents within LEBANON is harsh.** Knowing that transportation is the second largest part of a household’s budget at 17%, surpassed only by housing (33%), and trailed by the cost of food (13%), providing a cheaper alternative than an approximately annual maintenance cost of \$9,000 for a private vehicle can be expected to bring substantial economic opportunity to the youngest of families and consequently the community of LEBANON.

#### 4.2.27. Race

The twenty-seventh question asked, **“With which racial group(s) do you most closely identify? (Please check ALL that apply.)”** Survey respondents were provided the following six categories: 1) American Indian/or Alaska Native, 2) Asian, 3) Black or/African American, 4) Native Hawaiian or other Pacific Islander, 5) White, and 6) Prefer not to answer. Most survey respondents (85.1%) identified as being White (Figure 4-59).

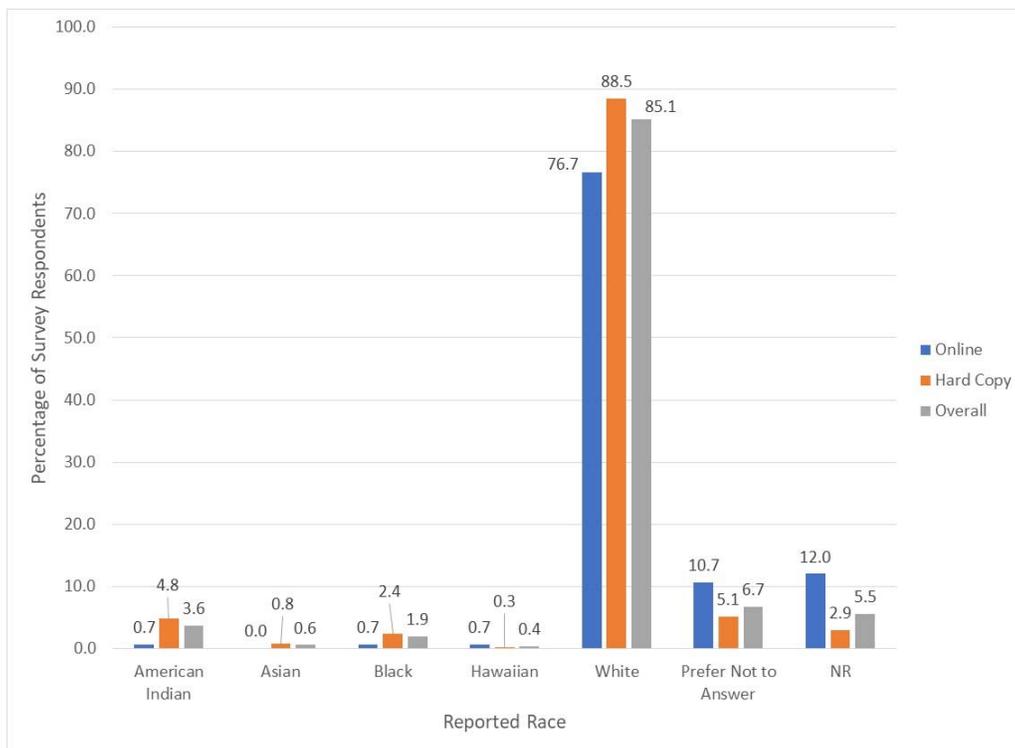


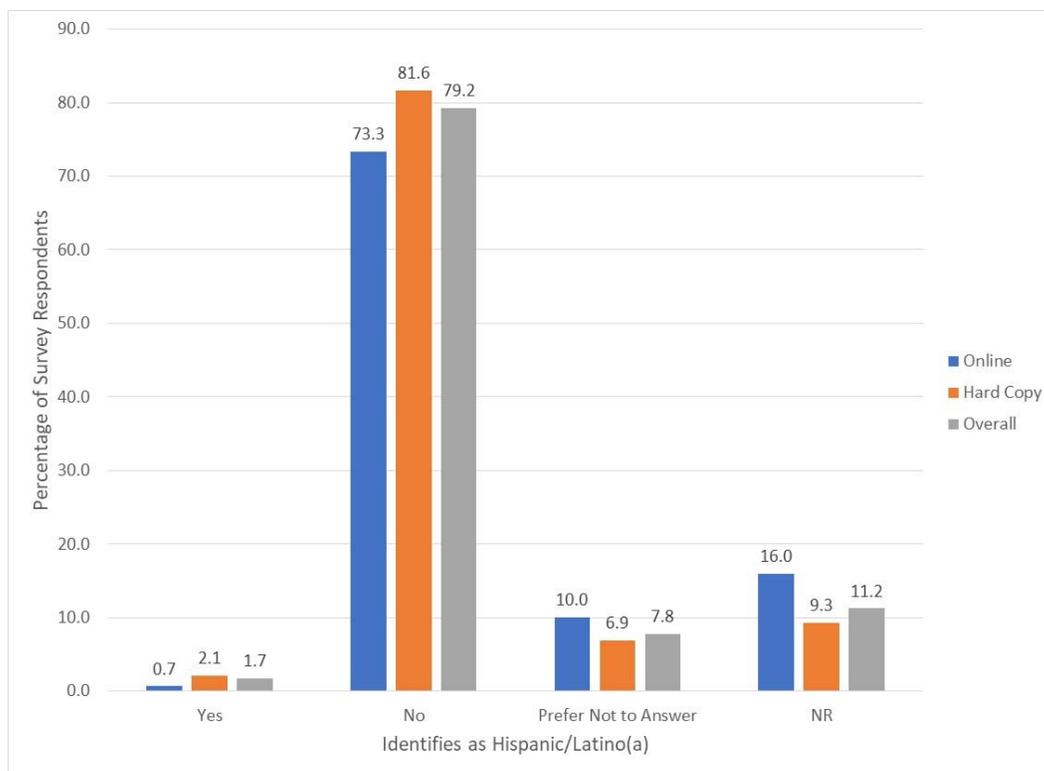
Figure 4-59: Reported Race

Hard copy survey respondents essentially accounted for all of the racial diversity in the sample for survey respondents who provided input. A decent percentage of online survey respondents (22.7%) provided no information about their race by either indicating that they prefer not to answer or by not responding to the question. Based on the U.S. Census data (see Figure 2-5 where 94% of the population identified as White), most of these survey respondents would likely be categorized as White, and as such, the overall percentage would likely exceed ninety percent. Instead of pulling the overall percentage down, these respondents would increase the overall percentage of survey respondents who would be identified as White.

Most survey respondents identified as being mono-racial; only two online survey respondents (1.3%) and fourteen hard copy survey respondents (3.7%) identified with more than one race.

#### 4.2.28. Ethnicity

The twenty-eighth question asked, “**Are you of Hispanic or Latino origin or descent.**” Survey respondents were provided the following three categories: 1) Yes, Hispanic or Latino, 2) No, not Hispanic or Latino, or 3) Prefer not to answer. Most survey respondents (79.2%) indicated that they were not Hispanic or Latino (Figure 4-60).



**Figure 4-60: Reported Hispanic/Latino(a) Descent**

Similar to the question regarding race, a large percentage of online survey respondents (26.0%) did not provide information regarding whether or not they identified as Hispanic/Latino(a). However, again, hard copy survey respondents reported a greater ethnic diversity.

#### 4.2.29. Comments

The twenty-ninth question asked, “**Please share with us any additional comments about transportation in Lebanon.**” Survey respondents were provided with an open box with which to provide feedback. Sixty-three online respondents and one hundred twenty-six hard copy survey respondents provided feedback. The comments were grouped into the following ten categories:

- 1) Design of a public transportation system,
- 2) Fiscal concerns,
- 3) Comments related to biking and walking challenges,
- 4) Pleas for assistance by implementing a public transportation system,
- 5) Traffic congestion/safety concerns,
- 6) Support for a public transportation system,
- 7) Acknowledgement of others’ challenges,
- 8) Benefit to employment,
- 9) OATS/Taxi specific comments, and
- 10) Miscellaneous.

##### 4.2.29.1.1. Design of a Public Transportation System

Some survey respondents provided feedback regarding what they would desire from a public transportation system, such as design considerations for wheelchair access and use of payment options like monthly passes. One interesting requirement identified by a survey respondent was that the service be managed by LEBANON.

- *Wheelchair access* (online)
- *Work a deal with school bus system on alternate demand times and personal pay for use.* (online)
- *This would help our community, especially the elderly. Which I believe they should get a discount.* (online)
- *Would love to have it handicap accessible.* (online)
- *Just make the price reasonable enough for seniors. We worked & paid in our [w]hole life. We shouldn’t have to not eat to get a ride to the [doctor]or store.* (hard copy)
- *Bus passes cost effective* (hard copy)
- *Would be great if we get city bus routes that we could get a monthly pass* (hard copy)
- *Wait time on bus transportation & cost needs to be low. People would use to get to work, dr. appt and such* (hard copy)
- *This service is needed in our city. However, it must be affordable to low income and must be managed by the City in order to meet standards and expectations of the public.* (hard copy)

##### 4.2.29.1.2. Fiscal Concerns

Several survey respondents expressed passionate concerns regarding the cost of a public transportation system; however, the majority of survey respondents providing such input were online survey respondents. Recall that while this group reported significantly higher annual household incomes, they seem to overlook the cost that even non-users are paying through general taxes (APTA, 2017) for the maintenance of systems (e.g. roadway networks) that those without private vehicles are infrequently, and possibly never, using. It is also interesting to note that even

with almost 15,000 residents, a survey respondent called LEBANON “very rural.” Yet, with just under 800 cities, LEBANON is the 59<sup>th</sup> largest (Cubit, 2018) in the state.

- *Lebanon is not big enough or have a large enough need for such a service. It would cost way to[o] much for the taxpayers and very few people would benefit. Sure people say they would use it, but when it comes down to it, you won't see them standing on the street corner waiting for 30 min in the heat/cold. This would be a huge waste of money. (online)*
- *I work 5 job[s] because I don[ 't] live off government like 90% of who this service is for and my hard earn[ed] money will pay for this. And make even more unaffordable to live in the [City] of Lebanon. The electric rate increase and all the taxes that the city is doing. Will be moving out of Lebanon soon because of it. (online)*
- *Public transportation is not economically viable...would require large taxpayer subsidy. (online)*
- *The city is continually looking for new ways to raise taxes and currently has a higher tax rate than large metro areas. Try maintaining the streets you currently have instead of looking for new ways to spend money. Public transportation will only benefit the unemployed people in this town. Being very rural, the majority of citizens have transportation. (online)*
- *The top negative view would be how much would be spent on management of the system. (online)*
- *If busing could be kept reasonable, I'm sure it would be an asset to Lebanon (hard copy)*
- *Make it cheap! (hard copy)*
- *Too expensive to the taxpayer to [shoulder] (hard copy)*

#### 4.2.29.1.3. Comments Related to Biking & Walking Challenges

While the request for comments did not specifically mention biking and walking, several comments related to these modes were provided. Of them, only one survey respondent reported little interest in additional facilities for bicycles and pedestrians. Note that while this survey respondent suggested that sidewalks get little use, during the two visits the researchers made to LEBANON, multiple observations of bicyclists and walkers were made (see Appendix B – Walkers and Bicyclists in Lebanon). Many respondents requested additional bicycle and pedestrian infrastructure, in one case identifying their concern with traveling with motorized vehicles. Furthermore, at least two survey respondents noted the challenges of these modes as a result of extreme temperatures. An important point made by one survey respondent is that “*basic tasks are a chore*” if you do not have a private vehicle. One survey respondent suggested that sidewalks are underutilized; however, many **walkers and bicyclists** may use corridors that motor vehicles do not use, so they **may not be seen** by those who view walking and bicycling as underutilized modes. Limited connectivity of sidewalks and bike trails may also limit utilization.

- *It would really help if there was a way to get around here[.] I have to walk to most places [be]cause I can't afford a cab. [I] have to walk in the hot heat. (online)*
- *No available sidewalks in our area. [Note: The survey respondent identified as being located near Mountrose & Tower, within city limits.] (online)*
- *Walking is near impossible due to the lack of functional sidewalks and crosswalks. Taxi services appear to be unreliable. Without a car, the most basic tasks are a chore. (online)*

- *I would like more sidewalks and bicycle alleys and even a bicycle sharing system. I am [not] comfortable to ride my [bike] on the same roads with cars!* (online)
- *There are a lot of people on foot in this town and weather fluctuates from one extreme to the other (hot, then freezing). I have had to stop in the roadway to wait for pedestrians and people on bicycles that are forced to walk in the roadway (lack of sidewalks)* (hard copy)
- *You can't even ride a bicycle in this stupid town because there are no bike lanes and only ¾ of the streets even have sidewalks (which you aren't supposed to ride a bike on) and the roadway goes right to the curb* (hard copy)
- *It is not safe to walk.* (hard copy)
- *It would help others that have to walk everywhere. You can't trust walking in town anymore.* (hard copy)
- *Sidewalks are starting to be built everywhere which is nice but they are not used as often as you'd think* (hard copy)

#### **4.2.29.1.4. Pleas for Assistance by Implementing a Public Transportation System**

One respondent suggested that lack of transportation may have been a factor in the death of a resident. The researchers performed an internet search to try to identify the particular situation that was referenced without success. However, the quote suggests that extreme situations exist in which the lack of transportation can impact of a person's life. A similar example was provided by Sanders County, Montana (APTA, 2017), where the lack of transportation resulted in a fatality.

- *I believe many in our community cannot afford to own a private vehicle, and must rely on alternative transportation. Last winter, a woman was standing in front of the post office asking for anyone to take her to an address on the south side of town. That same woman was found frozen to death behind a local mall a day or two later. May have saved a life if there was a low cost public transportation option.* (online)

#### **4.2.29.1.5. Traffic Congestion/Safety Concerns**

The vast majority of online survey respondents expressed their lack of satisfaction with traffic congestion, suggesting that they tend to use the motor vehicle network and on a fairly frequent basis. Several expanded on their view of how a bus may impact their commute; some commented on a desire to ensure that a bypass was not constructed.

- *The traffic and not having a quicker route to get to the other side of town is what is bothering most people.* (online)
- *Not sure how much would help. Traffic congestion seems to be a problem in certain areas though.* (online)
- *As long as traffic does not get anymore dense it is fine* (online)
- *Jefferson Ave can be quite crowded.* (online)
- *Would be nice if there was a way to ease traffic on Jefferson maybe another byway* (online)
- *Not enough lanes/roads for the number of vehicles. When traffic is stopped past two green lights, there is a problem needing to be addressed.* (online)
- *Synchronizing the lights and turn signals in town would help a lot especially at the I-44 overpass where they are always out of sync and traffic backs up. You can sit at a green*

*light because no one can move forward due to a red light ahead. Put a left turn lane from Washington onto 5. Don't allow the escort vehicles for windmill parts to prevent people from passing them where it's 2 lane. They will drive on the line so people can't get around. (online)*

- *Getting across town is difficult half the time. (online)*
- *Do not allow a Highway 5 bypass to be built. It would hurt too many businesses. (online)*
- *Traffic is so heavy, speeding on main streets (hard copy)*
- *I think having a bus route through Lebanon would play a very high traffic hazard. The traffic light within the city on the main stre[e]ts are not [synced] enough to allow a timely movement through the city during peak hours of travel. If there are any MVA's on any of the [main] routes, you can easily triple your travel time through the city. (hard copy)*
- *Lebanon needs a new bypass to keep big trucks/boats, etc. off area streets. Traffic congestion on Jefferson St. is horrible. The signal lights in Lebanon are terrible, timing not coordinated with traffic flow. (hard copy)*
- *Drive in Lebanon is unsafe (hard copy)*
- *I feel a bus would be helpful to those who need it. I however also think it would cause more traffic congestion. (hard copy)*

#### 4.2.29.1.6. Support for a Public Transportation System

While some comments specifically mentioned a bus, other comments were more general, but the implications are that the feedback was regarding a potential bus. Note, however, that the question asked more generally about the overall transportation system in LEBANON, as compared with a public transportation system, suggesting that there is likely some bias in responses which focused on public transportation.

- *I believe there is a need for mass transportation in Lebanon. I live 30 minutes outside of Lebanon and would also be interested in seeing a light rail system down the Hwy 5 corridor from Camdenton to Lebanon. (online)*
- *Buses would be VERY beneficial for our town! (online)*
- *Lebanon needs different...transportation [choices]! (online)*
- *Our family would benefit from this sort of transportation as I have anxiety that leaves me unable to drive most places. (online)*
- *Great idea! (online)*
- *I strongly support the idea of public transportation in Lebanon. There is a strong need for it. It would help to improve many lives and the economy in Lebanon. (online)*
- *Please give us a public bus (online)*
- *We are in desperate need of public transportation. The towns['] residents would benefit from bus systems because not all of the town is accessible by walking and the weather doesn't always permit it. Especially for elderly and people with kids needing to go to dr. appts. (online)*
- *I strongly believe we need some type of public transportation. There are many in the community with children and a cab ride is \$5 for each person. So, if you have a parent with a couple of children that need to go to the store or doctor, it would be \$30 for a round trip. Ridiculous. (online)*
- *There is a need for public transportation in the city limits of Lebanon. (online)*

- *Lebanon needs affordable, reliable transportation system for people without transportation that provides service 7 days per week.* (online)
- *A bus system would be amazing. I am from St. Louis and feel the community could benefit a great deal as well as I with stores like Walmart and deals being to[o] far to walk to and cab wait times sometimes are ridiculous.* (online)
- *We need a bus line* (hard copy)
- *It would be great to have public transportation in Lebanon. I would use it at least three times a week.* (hard copy)
- *I think a bus might be a good thing.* (hard copy)
- *Would love to see a bus service & cheaper taxis....* (hard copy)
- *I think it would be good for Lebanon to have another form of transportation.* (hard copy)
- *Would love a bus route!* (hard copy)
- *Would love a bus route!* (hard copy)
- *It is very needed.* (hard copy)
- *We really need a bus we can depend on* (hard copy)
- *We need public transportation* (hard copy)
- *I think it would be a great benefit to the city and citizens of Lebanon* (hard copy)
- *We really need a bus service!!!* (hard copy)
- *I feel transportation would greatly improve lives in Lebanon I think it would be great to have affordable transportation everyone could afford to get around I'm homebound and have a hard time getting from one place to another & I[']m very glad to hear that someone wants to help those who don't drive or can't depend on someone else to take them where they need to go. I hope that Lebanon gets the transportation we sorely need thank you in advance & I hope we get it a very concerned citizen.* (hard copy)
- *Please, we need something like a bus that we could count on. I am 75 and have a very difficult time finding rides to medical appointments to let alone anything just for fun like the library or out to eat. I am alone so it would be great to get out more.* (hard copy)
- *Would be wonderful – senior w/o a vehicle!* (hard copy)
- *I think this would be a great asset to the community.* (hard copy)
- *We need a bus* (hard copy)
- *I recommend this service in Lebanon it is much needed. Taxis are too high their cars are nasty, smoky, and unreliable* (hard copy)
- *I visit other cities often and enjoy getting around by city bus. I travel around Mercy Hosp. campus in Springfield by their complimentary bus service. I really do appreciate the rides.* (hard copy)
- *Lebanon could use affordable bus service. There are teens working at local businesses walking to work and elderly who have quit driving or who didn't drive wanting to do their own shopping taxi service is slow and expensive.* (hard copy)
- *I feel Lebanon is in desp[e]rate need of public transportation besides the cab service & OATS bus.* (hard copy)
- *I do think public transportation would greatly benefit Lebanon* (hard copy)
- *I think it's a great idea. We have several friends with children who currently walk where needed now that it[']s summer & so hot. A transportation system would benefit them greatly.* (hard copy)
- *Need a bus* (hard copy)

- *Lebanon need[s] a bus system somewhat like Springfield that runs at least 6 days a week – that has scheduled stops and one can ride when they want or need to without having to make an appointment. Lebanon also needs a bus or buses that will go to other counties. I heard that Greyhound does not even run through here anymore!* (hard copy)
- *I think it would be [great] if Lebanon had public transportation.* (hard copy)
- *Public transportation (bus) could be useful lived in KC & used the metro regularly* (hard copy)
- *Public transportation would be beneficial to the community helps keep people out of the extreme weather* (hard copy)
- *I believe a bus would be very helpful or useful* (hard copy)
- *We need busses!* (hard copy)
- *Lebanon is growing and needs a regular fixed bus route* (hard copy)
- *Senior need a bus* (hard copy)
- *It would be nice to have public transportation for many people in Lebanon, especially the elderly in town.* (hard copy)
- *A bus would be beneficial & a cheaper options for those who would walk if they had a way to get there.* (hard copy)
- *I don't use in Lebanon, but think public transportation is great.* (hard copy)
- *I like public transportation.* (hard copy)
- *Public transportation is needed in Lebanon!!!!* (hard copy)

#### 4.2.29.1.7.

#### Acknowledgement of Other's Challenges

An interesting thread was identified among the comments; there were a number of responses that seemed to identify how a bus could improve another person's daily life. These comments correlated well with the question that asked whether or not a public transportation system may improve someone else's quality of life.

- *Having a bus system or public transportation of some kind could benefit so many people in this community.* (online)
- *I am aware of many people in Lebanon who would greatly benefit from public transportation, and as I get older, with my disabilities, I may need to rely on it in the near future.* (online)
- *I think that Transportation if the city of Lebanon had public transportation it would help a lot with people that a[re] wheelchair-bound or other disabilities.* (online)
- *Although I wouldn't use public transportation in the city[,] I feel there is a need.* (online)
- *I know many who would benefit from public transportation. I myself have been transportation when friend[s] need a ride due to they have lost their license or vehicle[s] breakdown.* (online)
- *Because of the high percentage of people living in generational poverty in the area, I feel there is a very high need for public transportation.* (online)
- *I know several of the people I serve in my job could benefit from a bus especially one that is affordable. The people who need this service the most cannot afford to pay \$5 each way in a cab. Example: A trip to the bank to get a money order to pay me rent costs \$10 round trip, you take that from someone who's income is less than \$800 a month, after rent and*

*necessities that is a huge amount. These folks cannot afford cars and the upkeep of a car. The OATS bus is not an option because of the long length of time they have to be on the bus, health issues do not work with OATS bus. Besides you have to set up a ride a week in advance to ride the OATS bus, who can predict a week ahead they are going to get sick. Some of my residents who work, have a hard time getting a cab to arrive on time to get them to and from work. Their employers do not appreciate them being late. I have residents who cannot walk even to a grocery store a few blocks away. A city bus would help so many of our low income residents. I also feel many of the people who would be served most, probably will not respond to this survey because of their lack of access to a computer. Some of the residents in the poorer neighborhoods voices will not be heard, yet I believe they would cherish the opportunity to ride a city bus. (online)*

- *Transportation is very hard to obtain here and the available options do not allow for things like paying bills. (online)*
- *As I do not take alternate sources of transportation at this time, as my husband and I are aging, we would like to have the option to use one. And it would greatly benefit this town for many others. (online)*
- *Not quite old enough to give up driving but when I do I would like to ride a city bus. Many seniors would benefit from a City Transportation System. (online)*
- *I work with a large number of clients who could truly use public transportation in Lebanon. Taxis are overwhelmingly expensive, and many people are without vehicles. Since we work with many pregnant women, they can't necessarily use bikes or other "less safe" transportation, so I believe public transportation would be extremely valuable in our area. (online)*
- *I work with a lot of people who don't have transportation and their options are limited. The taxis are expensive and not always reliable. (online)*
- *I work at the Pregnancy Support Center, and many of our clients have a lot of trouble finding affordable, reliable transportation. It would help them so much if good public transportation were available! (online)*
- *We have our own car but think it might [be a challenge] to many people here (hard copy)*
- *Hope you get a bus for those who don't have a car. (hard copy)*
- *There are a lot of people that are unable to have a car as they depend on [friends/family] to take them, or too old to drive anymore. Disabled, or no cars. (hard copy)*
- *It would help the older community. (hard copy)*
- *It would help the older community. (hard copy)*
- *We Senior Citizens Needs Transportation! (hard copy)*
- *As an employee of Laclede Co. Health Dept., I constantly see the need in our community for a public transportation service. (hard copy)*
- *I work with many clients that would benefit greatly with more options. (hard copy)*
- *It would be wonderful for those who need it. (hard copy)*
- *I think if we had transportation it would help people like elderly or disabled people. I think it would help the community and the town of Lebanon! (hard copy)*
- *My daughter is low income & doesn't drive. Public transportation would help her out tremendously! (hard copy)*

- *I have worked for non for profit agencies in the last 20 years. Transportation is the number one barrier for hard to serve Lebanon area. A punch card or something related to that would be a good source. (hard copy)*
- *I think more affordable transportation is very much needed in Lebanon I see it where I work. (hard copy)*
- *Will help the homeless get around (hard copy)*
- *Since I live in Conway, it probably wouldn't affect me, but I think it would help a lot of people in Lebanon. (hard copy)*
- *Would be great to have transportation. Will help so much with people that can't [afford] a vehicle. We (some of us) know how that feels with having to walk all over in the heat or cold. So we need this. Please and thank you. (hard copy)*
- *I think it would be a great thing because some of the people in the community can't afford transportation (hard copy)*

#### 4.2.29.1.8. Benefit to Employment

Several comments were specifically directed at the relationship between transportation and employment. Many of them addressed how inconsistent transportation did not enable someone to reliably show up for work; this supported survey findings related to the question that asked how frequently respondents provided a ride to someone else. It was also notable that one survey respondent identified as an employer and suggested that there is value in a public transportation system.

- *As an employer[,] I feel we could bring people into the workforce who do not currently work because they do not have con[s]istant transportation. (online)*
- *I believe that it would improve a lot of lives in our community. Plus employers that are on the other side of town could hire more employees. I personally know several people that do not drive but need to get to work on time due to late pick up from taxi services. If the bus route stops by Emerson and G3 and Lowe boats. Plus Marine electric on that side of town it would boost the economy. (online)*
- *We need transportation. A lot of local youth have a hard time getting back and forth to work, making them leave [their] job. (hard copy)*
- *Great need for public transport for low income to access employment opportunities. No money = no transport = no job! Lebanon needs this desperately. (hard copy)*
- *It's really difficult with harsh weather conditions to not own a vehicle here. It's kept me from finding better work for myself. It's dangerous in certain neighborhoods. I've love to have public transportation in Lebanon! (hard copy)*
- *We need a bus service More would be able to go to work (hard copy)*
- *It would help elders in our community or those lacking transportation and it would also be helpful to those seeking jobs driving or assisting others in the community. Very beneficial (hard copy)*

#### 4.2.29.1.9. OATS/Taxi-specific Comments

The following comments were provided regarding OATS and taxi services.

- *[OATS] transit is good transportation because it's cheap and reliable. (online)*

- *There are 2 taxi companies operating in this town, plus OATS (online)*
- *I have used the oats bus but I think they need to run both buses each day instead of just one because they fill up fast and it[']s hard to try to get on. You also have to have 5 days in advance to ride the oats. (online)*
- *It desperately needs public transportation like a bus that doesn't smell like liquor or vomit or smoke. Or cabs that don't smell that way. (online)*
- *It is needed...to ride the OATS bus requires scheduling the day before and I never know in advance just how I will feel the next day, also to ride w/OATS, it is necessary to go where everyone else is going and for returning home. (online)*
- *I know of people who use a taxi service every day and my neighbor uses oats. (online)*
- *A few cab svc's are in town but none are reliable. Even scheduling a week early, it may or may not show up. (online)*
- *Not sure needed since I have seen more taxi cabs in Lebanon area. (online)*
- *Be nice to have a city bus in town; sometimes taxis are very busy and have a wait; there's only 3 taxis in Lebanon some so busy can't get to you (hard copy)*
- *We can't depend on our cab service one company are out of business most of the time The[y] are the only one that give senior citizens a discount (hard copy)*
- *I would like to see this service happen The taxis are too costly & unreliable. (hard copy)*
- *I could not take the Oats Bus I get sick in it. (hard copy)*
- *I know numerous people that have no transportation. Taxis are too expensive and filthy (a major concern for bed bugs). (hard copy)*
- *It is hard to get around Lebanon, you cannot always, get a cab. And they cost a lot. I know this, when my truck was broke, they can't, you[']r[e] stuck. Just in my area, I know of 10 people who could use transportation. Please help. (hard copy)*
- *I don't use a cab anymore unless I broke down or when my husband was in hospital to pick up his vehicle, but when I was in town and use to use cab I often wondered why bus service was not used here. So many elderly could benefit as if something comes up they have no transportation. OATS bus you have to call 5 days in advance and there is no way to predict an urgent needs (hard copy)*
- *Many businesses including restaurants are very widespread. My mother and I use taxi but it's not very affordable and it's a long wait. (hard copy)*
- *Sometimes hard to get a taxi when you need one (hard copy)*
- *I think there needs to be something new. I also believe that if we don't get new transportation the taxi's and cabs need to be inspected and held to a cleaner higher expectation/standards. (hard copy)*

**4.2.29.1.10.****Miscellaneous**

Some comments did not fit well in any of the above categories and were placed into the miscellaneous category.

- *Right now we are both in decent health and able to drive. In the future it may be different* (online)
- *There is a lack of* (online)
- *We need visions of cities without automobiles/trucks.* (online)
- *The transportation here isn't as bad as many would have one believe.* (online)
- *I own a business in Lebanon and live 5 miles outside of town.* (online)
- *Lebanon is behind on everything* (hard copy)
- *I think we should have a better light system in place throughout town* (hard copy)
- *Needed* (hard copy)
- *We need one* (hard copy)
- *Sounds like a good [?]* (hard copy)
- *It would be a big plus to Lebanon* (hard copy)
- *We need this!* (hard copy)
- *There does seem to be a large need in our community for more transportation.* (hard copy)
- *I would like to use Lebanon transportation because I will be able to have more fun.* (hard copy)
- *Desperately needed – I feel it would greatly improve the community* (hard copy)
- *We need it badly!!!* (hard copy)
- *Pray to god this happens in Lebanon* (hard copy)
- *I think a reliable way to get across town should be offered in every town larger than 15,000* (hard copy)
- *I feel it would be a great addition to Lebanon.* (hard copy)
- *I think it's a great idea.* (hard copy)
- *This would be a great addition to our growing city!* (hard copy)
- *I was glad to have it!* (hard copy)
- *Please come to Lebanon, ma & Conway – Phillipsburg area please. It would be a ton of help. Thank you.* (hard copy)
- *Retired Springfield City Bus Driver.* (hard copy)
- *Not enough* (hard copy)
- *Not many options to rely on* (hard copy)
- *I think it be good* (hard copy)
- *I don't live in Lebanon so it doesn't apply to me.* (hard copy)
- *It will allow value* (hard copy)
- *I live in Osage Beach, MO* (hard copy)
- *I do not live in Lebanon, but in St. Robert 25 miles away. (Close to Army Post). I feel it would be great.* (hard copy)
- *Only that it would be a great benefit, but as with myself, I believe the majority of citizens could not afford it.* (hard copy)
- *I think it would be wonderful to have more transportation services provided to the community other than the OATS bus and taxi service* (hard copy)

- *I do not live in Lebanon* (hard copy)
- *Very needed* (hard copy)
- *[Transportation] is greatly needed* (hard copy)
- *Need more & affordable* (hard copy)
- *This would be a great need in Lebanon* (hard copy)
- *It would greatly help C-star people* (hard copy)
- *It be [really] good [wonderful] to have* (hard copy)
- *Need better transportation in Lebanon* (hard copy)

#### 4.2.29.1. Summary of Comments

Several conclusions can be derived from the comments.

First, survey respondents do not seem to understand that OATS buses operate when volunteer drivers are available. Therefore, while in some cases it may be ideal to operate both buses, as one survey respondent noted, there may not be a second bus driver available. This suggests that the demand for OATS is outstripped by the service model.

Several comments throughout the survey suggested that there are concerns about the safety and cleanliness of the current available taxi services (see comments under Use & Description of Taxis). A public transportation system operated by LEBANON should select vehicles that can and should be maintained to a high level of cleanliness and safety.

One survey respondent suggested that “most people” just want to get from one side of the community to the other, as fast as possible in their private vehicles. Yet, few except for this person reported this concern. First, as a recent report from the National Transportation Safety Board (NTSB) report has indicated, speed is most directly related to safety concerns (National Transportation Safety Board (NTSB), 2017). So, for those who are also suggesting that safety is a concern, there is a need to educate the public on the impact of speeds on the frequency and severity of crashes. There also seems to be a need to educate folks that interstate facilities are designed to accommodate speed, but that there should be different expectations when traveling within a community.

One survey respondent suggested that a public transportation system make use of school buses. The problem with this arrangement is that school buses are needed during the same time period that most people would need to get to work. Therefore, the public transportation system would not be able to address this need, which would likely be one of the most significant benefits to the community. Furthermore, using school buses for a public transportation system would add extra wear and tear on the buses. Buses are not cheap. Using the buses for a public transportation system would require more frequent replacement of the buses and likely impact expectations of life span that the school made when purchasing the school buses for service. Finally, school buses would not be able to accommodate most mobility impaired riders and might be hard for senior users as a result of the stairs and the size of the seats. However, it would be worth investigating coordinating the maintenance of buses used for a public transportation system with that done by the school system (Figure 4-61). Could the same facilities be used? Would it allow for someone to increase hours toward a full-time equivalent position or another person to be hired on specifically to address the needs of the public transportation system, thereby bringing additional full-time jobs to the city? It could potentially allow such employees more flexibility for their

vacations and other time off. If LEBANON moves forward with implementing a public transportation system, administrators should *obtain input from the staff that maintains the buses for the school to help them provide insight and recommendations regarding maintenance considerations.*



**Figure 4-61: School Maintenance Facility**

One individual indicated plans to relocate outside of LEBANON because of rate increases or if a public transportation system was implemented. The cross-streets for this person's residence were assigned to a location outside of the city, so it is unclear as to whether this individual actually lives in the city and gave erroneous information or lives outside of the city and incorrectly believes that tax increases and electric rate increases that were made in the county are related to the city. It was not verified whether or not LEBANON recently made some electric rate increases.

Two survey respondents provided illustrative examples of how public transportation can address the "big picture" issue of alternatives for people who can no longer drive safely. One saw the benefit from the mobility that would be provided to her family due to her issues with anxiety. This also brings a benefit to the community, as this person may otherwise feel pressure to drive and could cause a crash. The second individual understood that while she may not use the system immediately, she would likely use it in the future due to physical limitations brought on by aging. While these are only two comments that provide this viewpoint, they are likely a representation of a larger percentage of people who also share (or will share) such challenges. Providing alternative options that would allow for mobility would bring a safety benefit for these users and those who the road with them.

One survey respondent noted that the OATS bus requires everyone to go where everyone else is going. Again, there is a need for some education about what a public transportation system can and cannot provide. For example, it will not provide door-to-door service. However, it will operate on a fixed schedule and route (although it could diverge for requested pick-ups if designed as such). It may only be able to provide service 5 days or possibly 6 days a week. It will likely

only operate between AM hours that may accommodate trips to work and PM hours that may accommodate trips from work and a bit after. Therefore, it will not operate into the late hours of the night. Depending on where users are coming from and going to, they may not be traveling on a direct route, and it may be a bit circuitous to address multiple needs. Therefore, there is a need to engage and educate the public more regarding reasonable expectations. Furthermore, LEBANON can make use of travel training (See Appendix D – Additional Resources) to help familiarize the public with the system; this will involve outreach and time to conduct travel training, but it can be expected to bring a significant return. An employee should be tasked with creating a travel training program should a public transportation system in LEBANON be implemented.

While many people acknowledged how a public transportation system may benefit others in the community, there were other survey respondents who do not seem to understand the struggle by some of their fellow residents, as demonstrated by comments like, “*Not sure how much would help...*” Part of the education related to moving forward with a public transportation system may be to educate some people who do not understand the needs of others. Representatives of organizations who address needs of those in LEBANON who are struggling could speak on behalf of their constituents at public forums.

Several survey respondents noted traffic concerns. From the researchers’ viewpoints, S. Jefferson Ave. (MO-5/MO-64), in particular where it met up with W. Elm St. (MO-32), seemed to be a choke point. LEBANON should consider the number of access and egress points along the Jefferson Ave. corridor and how these may impact both safety and traffic congestion. Furthermore, LEBANON should consider looking at the corridor’s signal lights in cooperation with MoDOT to determine if improvements in safety and congestion can be made. This would likely benefit all; however, the impacts to any potential use of the corridor by a future public transportation system (i.e. balancing green times for the main road with those for the side-streets that the bus may access) should be considered.

The survey respondent who suggested that public transportation is not economically viable may not understand the interplay of all the current factors in the current transportation environment. The current roadway model is designed to support the individual vehicle, which is also not economically viable when considering the cost to purchase and maintain a vehicle, the operational costs, the environmental costs associated with the emitted pollutants from the vehicle into the air and onto the road, the costs of life and repair associated with crashes, and the annual costs to maintain roadways (often one of the largest portions of the budget of a community) (see Cost of Mobility in Appendix D – Additional Resources). Those that are currently mobility limited (i.e. no vehicle) are paying taxes to maintain a roadway that others are using. Therefore, **the most economically vulnerable are supporting the most economically independent in a community.**

One respondent addressed needs related to specific local employers. LEBANON should take the comments related to 1) Emerson, 2) G3, 3) Lowe boats, and 4) Marine electric to these employers to obtain their thoughts regarding whether or not they would like to see a public transportation system assist with providing candidate employees with access to their job locations.

One respondent reported using a taxi system on a daily basis. This suggests that there may be a need for this person to get from one location to another on a regular basis. However, what needs to be understood is whether or not this person would make use of a bus if it does not provide door-to-door service like a taxi would. Furthermore, if the cost of a taxi is \$5 in each direction, a bus

would have to significantly improve on the cost (i.e. less than \$10 roundtrip) to compete with a taxi service unless the reliability of having a dependable bus service is more valuable to the person than the current taxi service.

For those respondents who are already concerned with traffic density, they will likely perceive an implemented bus as negatively impacting the traffic regardless of what any collected data could suggest. More than likely, traffic will grow regardless of whether or not a bus is implemented. Therefore, there would be more traffic regardless of whether or not one exists. Traffic could potentially be reduced because those who were previously providing rides may suggest that their riders try to use the public transportation system. However, providing a public transportation system may provide mobility to those who would otherwise not have it, thereby increasing the traffic. Yet, this could also provide some with the opportunity to pursue employment, which may result in a more vibrant economy, potentially resulting in more traffic. Therefore, determining if a public transportation system would impact traffic is extremely difficult. It is likely more realistic to focus on the impact to mobility and connecting potential employees with employers. In conclusion, reducing traffic density is an unrealistic demand that would be very difficult to truly measure, one way or another.

Another comment showed a potential lack of understanding of average tax rates: *“The city is continually looking for new ways to raise taxes and currently has a higher tax rate than large metro areas. Try maintaining the streets you currently have instead of looking for new ways to spend money. Public transportation will only benefit the unemployed people in this town. Being very rural, the majority of citizens have transportation.”* According to Avalara, LEBANON’S combined sales tax rate is 7.413% (Avalara Tax Rates, n.d.). This is far below the 10% combined sales tax reported for Birmingham as well as 24 other large metro areas, including New York City (theirs is 8.875%) (Summers, 2010). It is well below the total tax rate for St. Louis, Missouri (9.491%), and only slightly below that reported for Kansas City, Missouri (7.725%) (Summers, 2010). Again, maintaining the streets creates a bias to providing transportation for those who own a vehicle(s). Furthermore, many elderly individuals indicated that they would benefit from public transportation, which would therefore make such a system extend beyond the “unemployed” unless the elderly are grouped within this survey respondent’s generalization. While most households (i.e. about 90%, see Figure 2-21) report having one or two vehicles, it seems to be a poor idea to suggest that the remaining 10% of the households should just lack mobility; limiting the mobility of ten percent of the population can be expected to result in negative economic impacts to a community. It also overlooks the limitations on the households that have only one vehicle (40.2%), which is a pretty large percentage, as they would be restricted in their ability to get a second job to provide better economic opportunities for their family. This viewpoint also overlooks the impacts that a crash or other catastrophic maintenance would have on the vehicle and subsequently on a family’s economic well-being. As is true for structural design, redundancy in the system (i.e. providing a multitude of modal options) provides a measure of safety, in this case to ensure that families can continue to access employment, shopping and other basic daily needs even if something happens to their vehicle (e.g. crash, costly repair).

A comment was provided regarding the cost of management. Cost control must be balanced with the value of good management. If someone cannot oversee the drivers, the maintenance of the buses, the service levels of the buses, and so forth, the system will be critiqued as much as the taxi service (which seems to lack the needed capacity) and OATS (which has limited availability of drivers). Not only could a public transportation system provide access to employment for those

who currently have limited to no employment options, it would create additional employment opportunities based on the need for drivers, mechanics, and oversight.

### 4.3. Additional Analyses

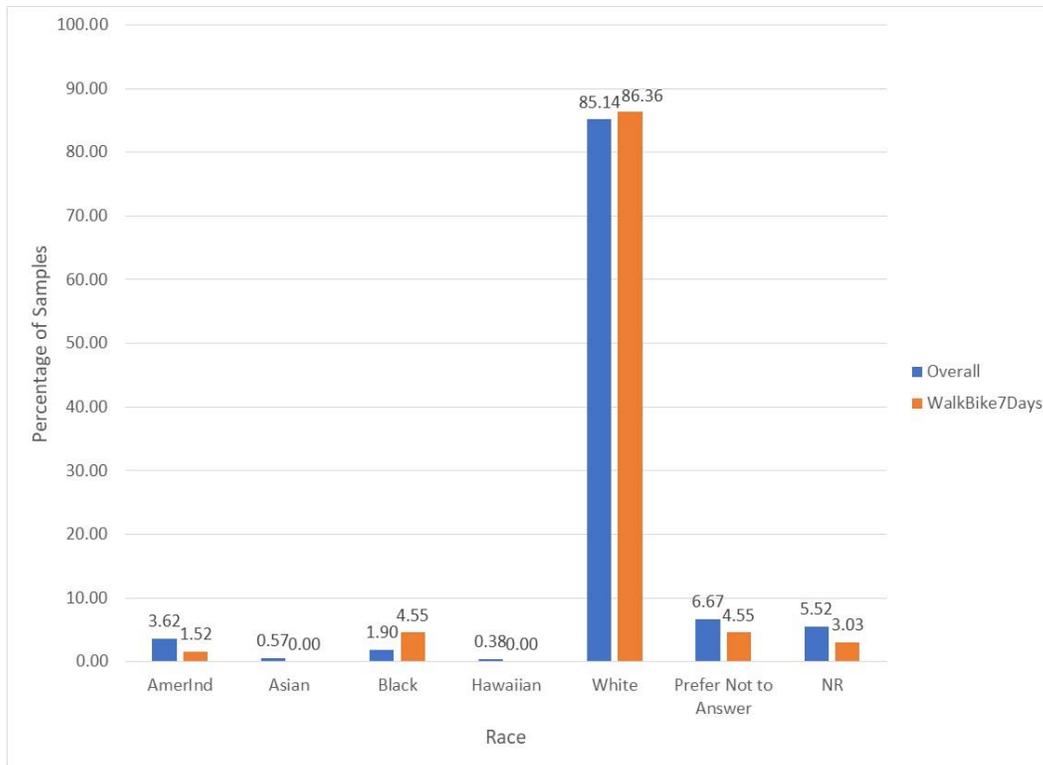
The following sections investigate further results of the survey by considering multiple questions:

- 1) Characteristics of Those Walking or Biking in a Typical Week,
- 2) No Driver's License and Providing Rides,
- 3) Car-less and Level of Agreement with a Variety of Transportation Options in LEBANON,
- 4) Low Income Earners and Impact of Cost on Travel,
- 5) Location of Unemployed Survey Respondents
- 6) Relationship Between Distance to Work and Level of Agreement on Distance to Work's Influence on Mode Choice,
- 7) Location of Survey Respondents Who Reported Missing Medical Appointments
- 8) Importance of Staying Connected and Age Group,
- 9) Spatial Analysis and Walkability,
- 10) Describing Individuals Who Reported Limited Work Options,
- 11) Describing Individuals Who Reported Missing Work,
- 12) Describing Reported Users of a Public Transportation System,
- 13) Respondents Reported Using a Public Transportation System No Matter What,
- 14) "My" Quality of Life Improves as a Result of a Public Transportation System,
- 15) Characteristics of Those Missing Medical Appointments,
- 16) No Household Internet & Age Group,
- 17) Characteristics of OATS users,
- 18) Characteristics of Taxi Users,
- 19) Location of Survey Respondents with Less Than a High School Degree, and
- 20) Lack of Funding for Vehicle Repairs & Reported Annual Household Income.

#### 4.3.1. Characteristics of Those Walking or Biking in a Typical Week

Fifteen online and fifty hard copy survey respondents reported walking or biking seven days a week in a typical week. Therefore, the sixty-five survey respondents who reported biking or walking seven days a week represent a little over twelve percent (12.4%) of the entire sample.

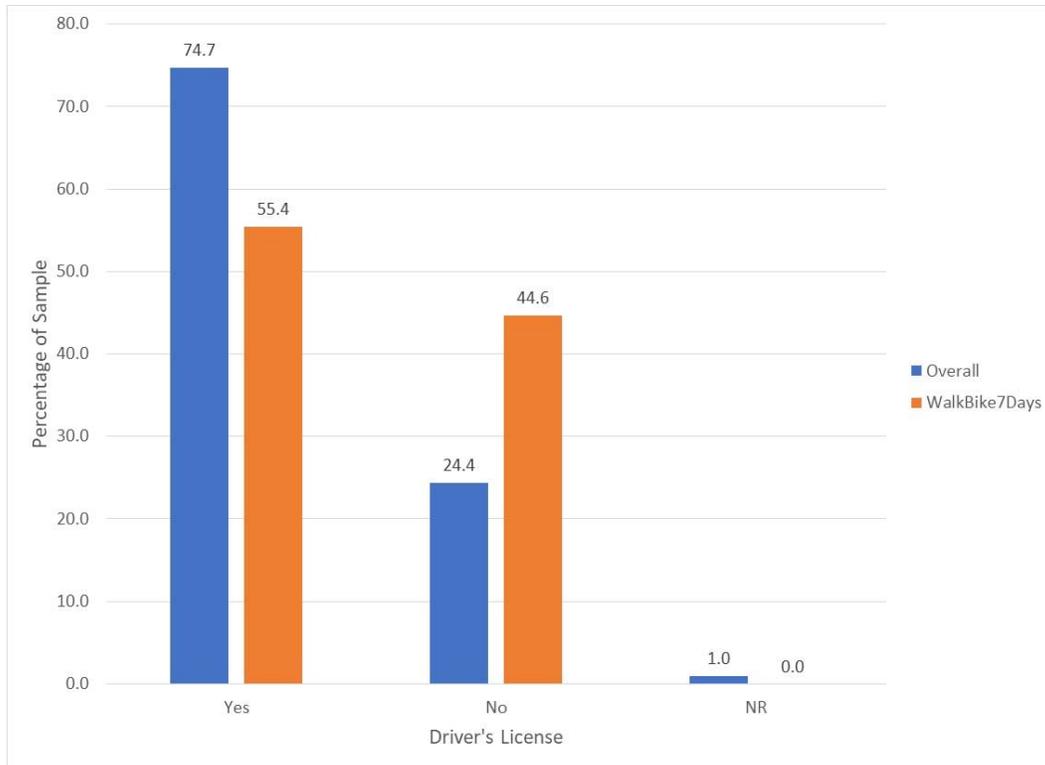
Several characteristics of this sample are notable, including racial demographics and vehicle ownership. Overall, few survey respondents identified as Black. However, of the ten survey respondents in the entire sample, three of these survey respondents reported walking or biking seven days a week; therefore, Black survey respondents were overrepresented (Figure 4-62).



**Figure 4-62: Race of Those Walking/Biking 7 Days a Week**

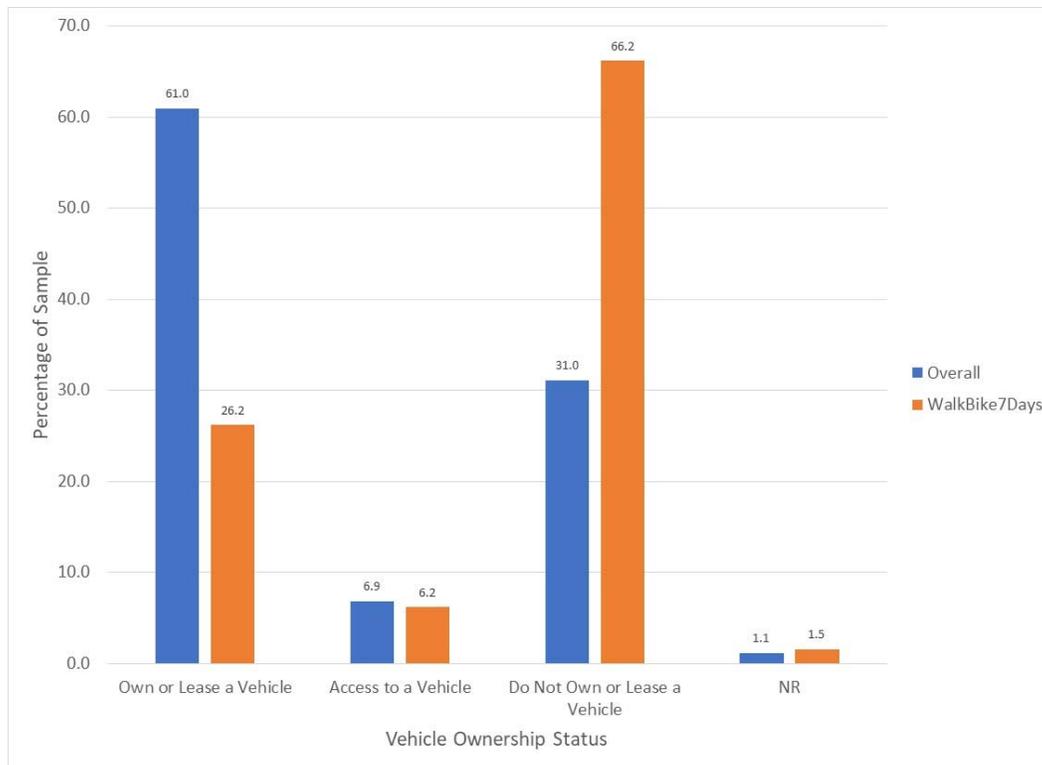
However, because the total number of survey respondents who identified with this category is small overall, a larger sample of this particular racial group would be needed to consider further if those identifying as Black report walking and biking seven days a week more often. Furthermore, those identifying as White were slightly overrepresented in this category. Again, because this particular race dominated the sample, one would have to oversample individuals reporting a non-white race to better understand the relationship.

While less than the overall sample, those survey respondents who reported that they walked or biked seven days a week still reported some level of possessing a driver’s license (Figure 4-63).



**Figure 4-63: Driver's License, Walk/Bike 7 Days a Week**

The most notable outcome, which is expected, is that those who reported walking or biking seven days a week, in large part, do not own a vehicle (Figure 4-64).

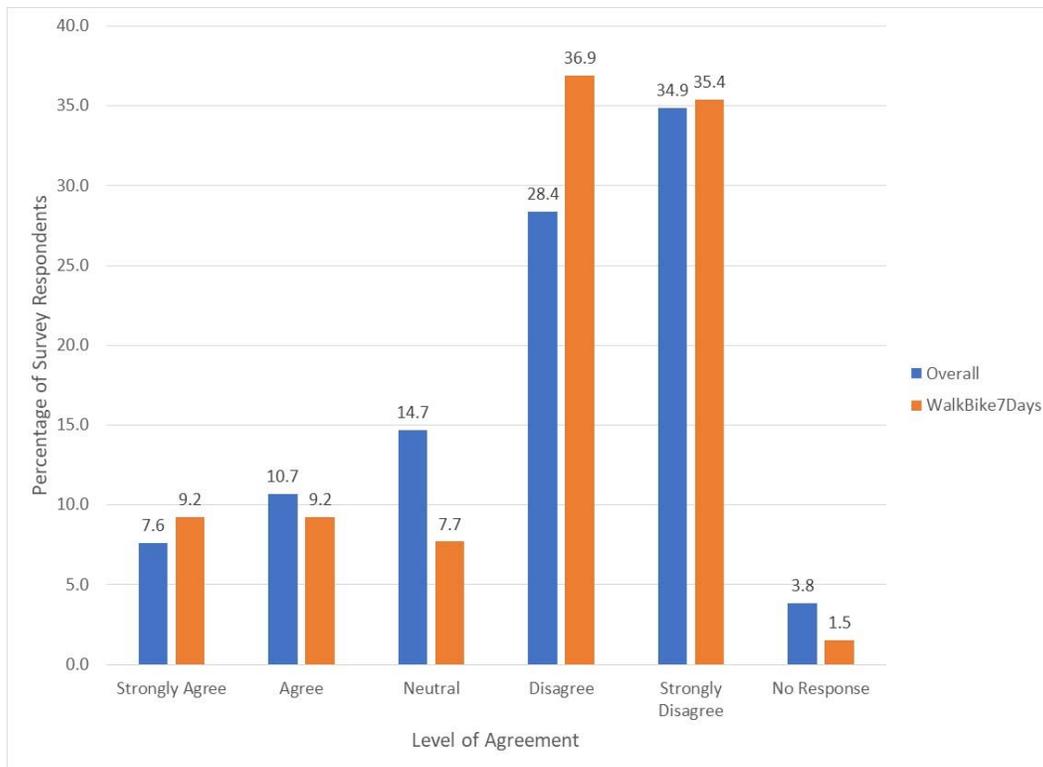


**Figure 4-64: Vehicle Ownership Status, 7 Days a Week Walking or Biking**

In fact, the percentage of survey respondents who reported owning a vehicle when considering the entire sample is almost equal to the percentage of survey respondents within the sub-sample who reported not owning or having access to a vehicle. Notice also how the percentage of survey respondents who reported having access to a vehicle stayed almost the same. **These results suggest that those who are walking or biking seven days a week have no other choice in order to get to where they need to go.**

The researchers also considered the number of survey respondents who reported not owning a vehicle but possessing a driver's license. Of the eighteen survey respondents who fell into this category, there does not seem to be a relationship between younger individuals who possess a driver's license, but do not own a vehicle, as a total of 0, 6, 6, 6, 0, 0, and 0 survey respondents identified with the categories of younger than 17, 18-35, 36-53, 54-72, 73-86, greater than 87 and no response, respectively.

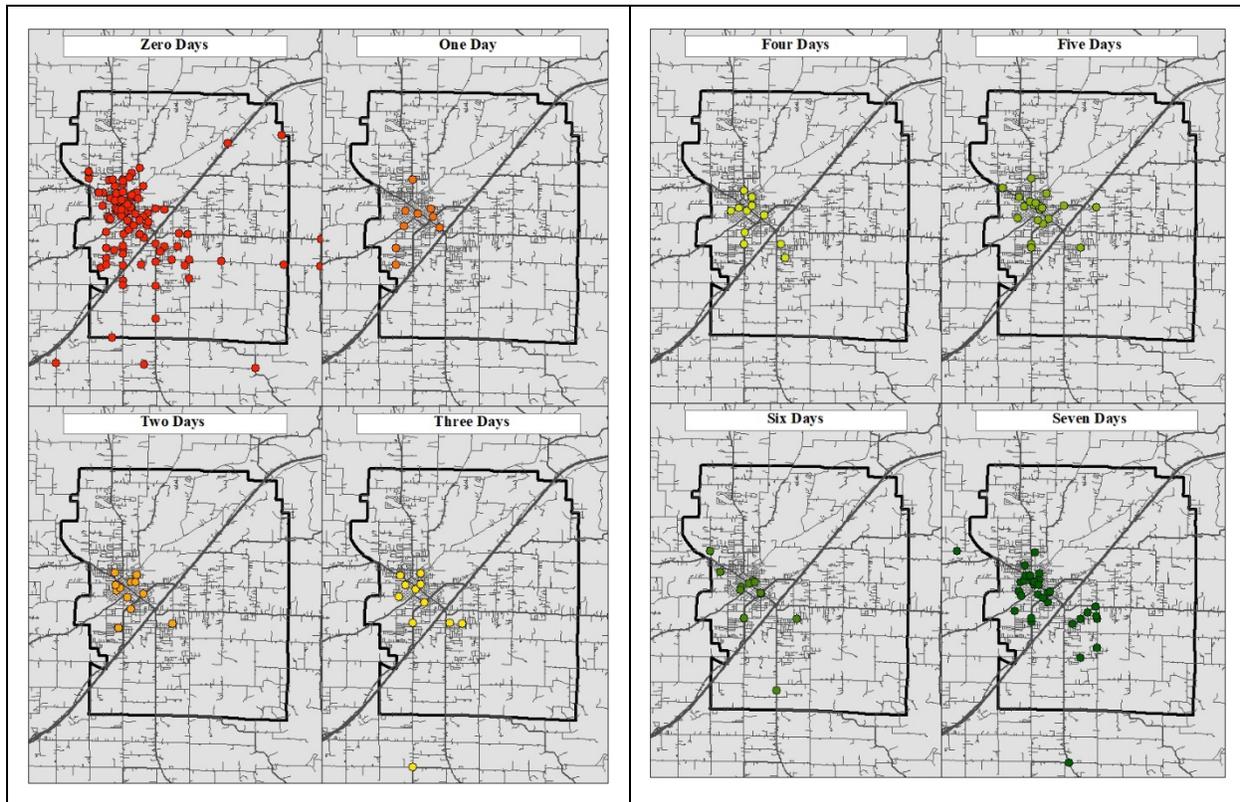
The researchers also considered how those who reported walking/biking seven days a week viewed walkability as compared with the overall sample (Figure 4-65).



**Figure 4-65: Walkability, Walk/Bike 7 Days a Week**

The major difference was between the “Neutral” and “Disagree” category. It seemed that generally speaking, those who reported walking/biking 7 days a week felt more strongly regarding whether or not their community was walkable (i.e. the Neutral category was reported half as often as for the overall sample). Furthermore, generally speaking, consistent with the overall sample, it seems that there is also disagreement among this sub-sample.

The researchers also considered the spatial reporting of those who indicated that they walked or biked to work. After looking at the initial results, the researchers created a series of figures to show how the spatial representation of survey respondents may change by the number of days in a week in which the survey respondent reported walking and biking. Figure 4-66 shows the results.

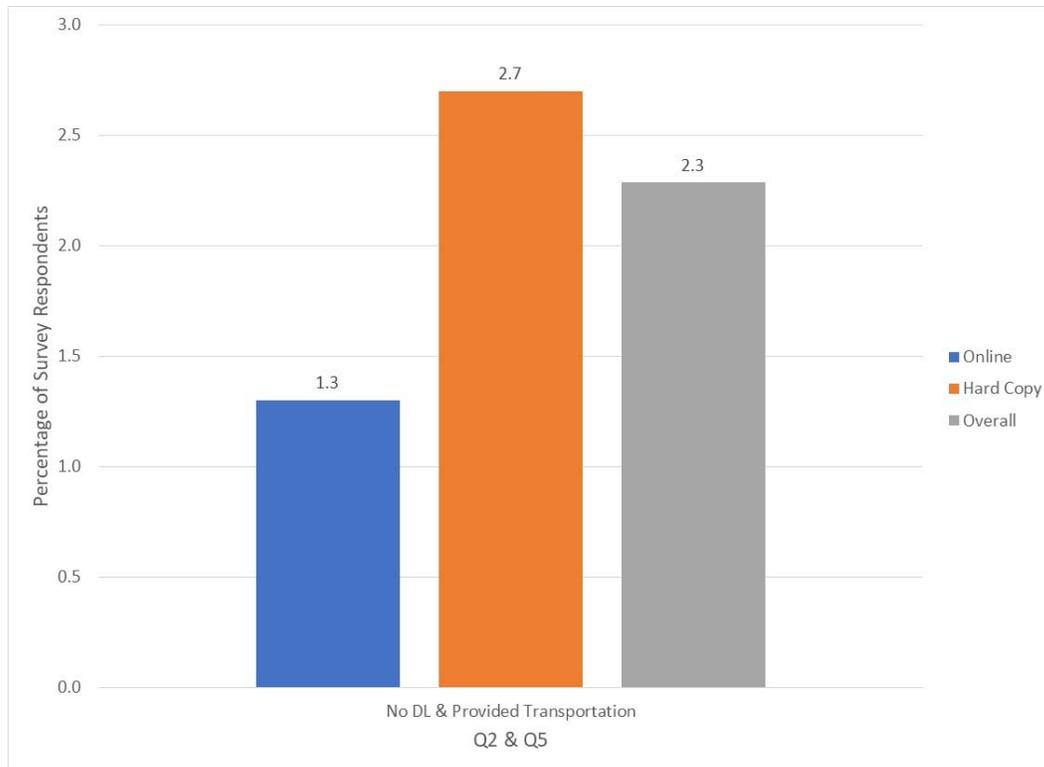


**Figure 4-66: 0 to 7 Days of Walking and Biking in a Typical Week**

The most notable difference is that those in the far outlying areas were in large part removed when zero days of walking and biking were removed. Also interesting to note is that those reporting walking or biking 1, 2, 3, 4, and 5 days a week ( $n=14, 22, 24, 17,$  and  $38$ ) generally lived more central to the population density of LEBANON, close to the Jefferson Ave. corridor. Those in the 6 and 7 days a week categories ( $n=16$  and  $65$ ) were more dispersed.

#### 4.3.2. No Driver's License & Providing Rides

Two online and ten hard copy survey respondents reported not possessing a driver's license but still indicated that they were providing rides. Therefore, the twelve survey respondents who reported not having a driver's license and providing rides represent a little over two percent (2.29%) of the entire sample.

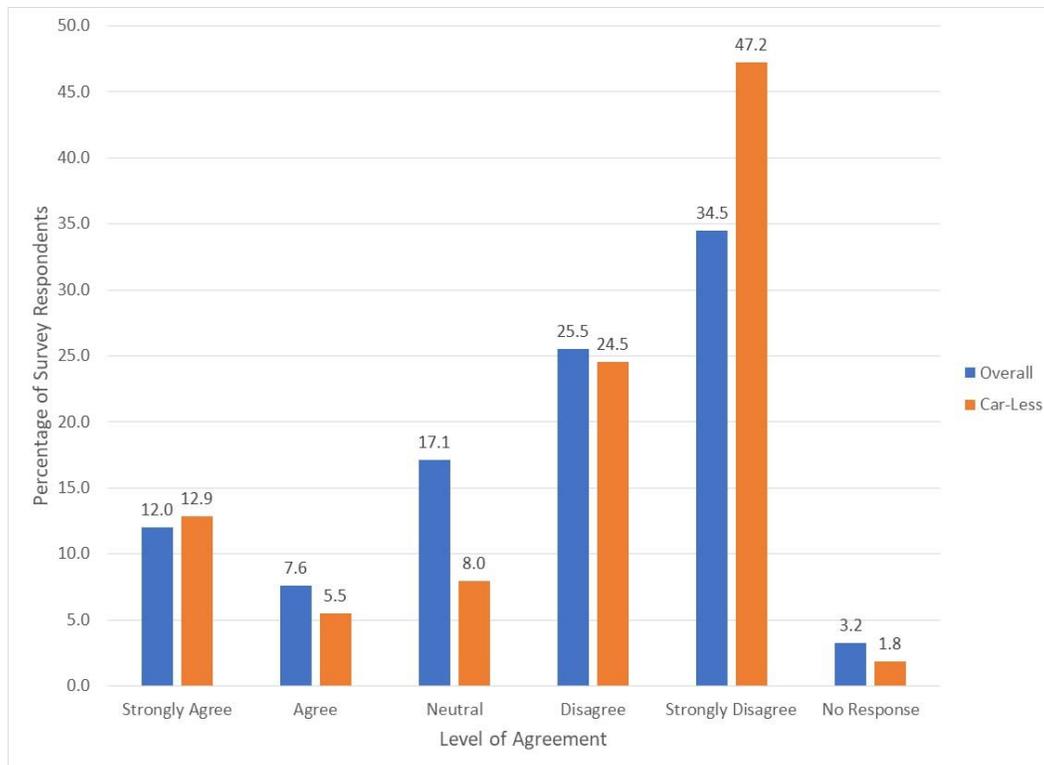


**Figure 4-67: No DL & Provided Transportation**

It may be that while these individuals lost their driver's license for a valid reason (i.e. DWI), they feel obligated to provide a family member or friend with a ride. Providing a public transportation system within LEBANON would therefore provide two benefits: 1) enabling people who are depending upon others for transportation to have transportation options (i.e. an elderly mother) and 2) improving the safety of the drivers on the road by encouraging drivers without licenses to use these other modes or encourage those who need rides to use these modes.

#### 4.3.3. Car-Less and Level of Agreement with a Variety of Transportation Options in LEBANON

There was a notable difference in the responses regarding the level of agreement with the statement about whether there are a variety of transportation options in LEBANON. When comparing the level of agreement for the entire sample to that of the sample of survey respondents who reported not owning or leasing a vehicle (n=163), the main difference in the reported level of agreement occurred between the "Neutral" and "Strongly Disagree" categories.



**Figure 4-68: Car-less vs. Overall Sample and Level of Agreement with Variety of Transportation Options in LEBANON**

While not surprising, this result suggests that **if you do not have access to a vehicle, you feel constrained** from a mobility perspective because of limited transportation options.

#### 4.3.4. Low-Income Earners and Impact of Cost on Travel

The researchers wanted to better understand the percentage of survey respondents who reported earning incomes of less than \$12,500 annually who also reported, “Strongly Agree,” for the statement on whether cost influenced how they traveled. 77.0% of survey respondents who reported earning less than \$12,500 annually also reported that they “Strongly Agree” or “Agree” that cost influences how they travel (Table 4-5).

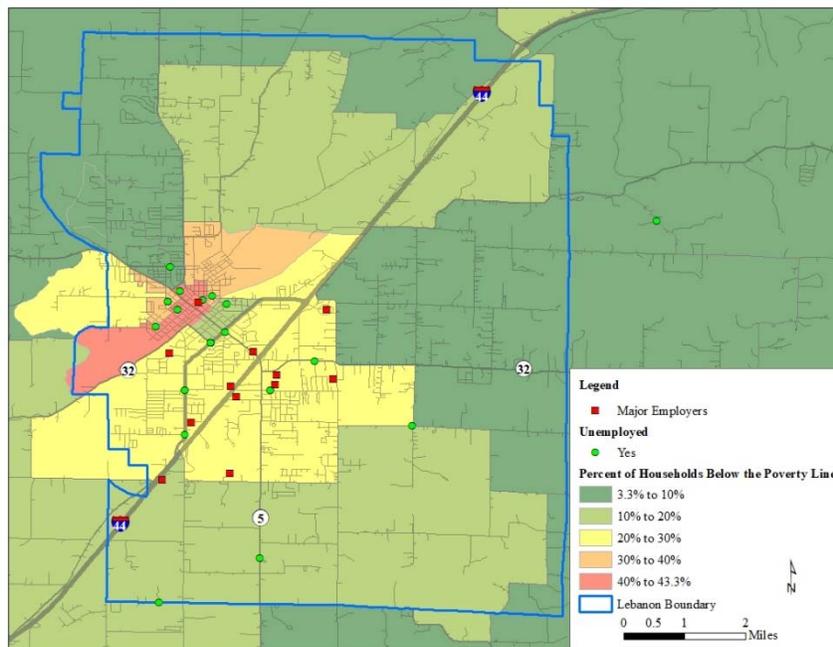
**Table 4-5: Number of Low-Income Individuals Who Reported Strong Agreement or Agreement with Cost Influencing Travel**

Data Collection Method	Number of Low-Income Survey Respondents	Number of Sub-Sample Reporting for Cost		Percentage
		“Strongly Agree”	“Agree”	
Online	128	69	28	75.8%
Hard Copy	11	8	2	90.9%
Overall	139	77	30	77.0%

Therefore, **low-income earners can be expected to be very sensitive to the absolute price and any changes in price for any mode of transportation.** This needs to be considered if low-income individuals are anticipated users of a public transportation system.

#### 4.3.5. Location of Unemployed Survey Respondents

The researchers wanted to better understand if there were clusters of survey respondents within the community who reported being unemployed (Figure 4-69). In addition, the researchers considered their location in relationship to major employers and poverty lines.



**Figure 4-69: Location of Unemployed**

While not all survey respondents who reported being unemployed were grouped within one part of the community, there appears to be a cluster near one of the blocks that has the highest percentage of households below the poverty line (block in red), which also tends to have the greatest separation from most of the major employers. Therefore, a public transportation system should consider whether a pick-up location near this block could be connected to the major employers. However, it should be noted that merely providing the transportation may not result in instant success as **the skill sets of potential employees must match the needs of the employers**. Nonetheless, there is the potential that on-the-job training or connection to additional educational opportunities, which may require an investment of at least four years (typical time to obtain a degree), could work to bridge these gaps. Therefore, it should be understood that **the ability to see the true value of providing public transportation on filling job vacancies should be considered at several points in time** (e.g. within 6 months, 1 year, 3 years, 5 years, 10 years, etc.).

#### 4.3.6. Relationship Between Distance to Work and Level of Agreement on Distance to Work's Influence on Mode Choice

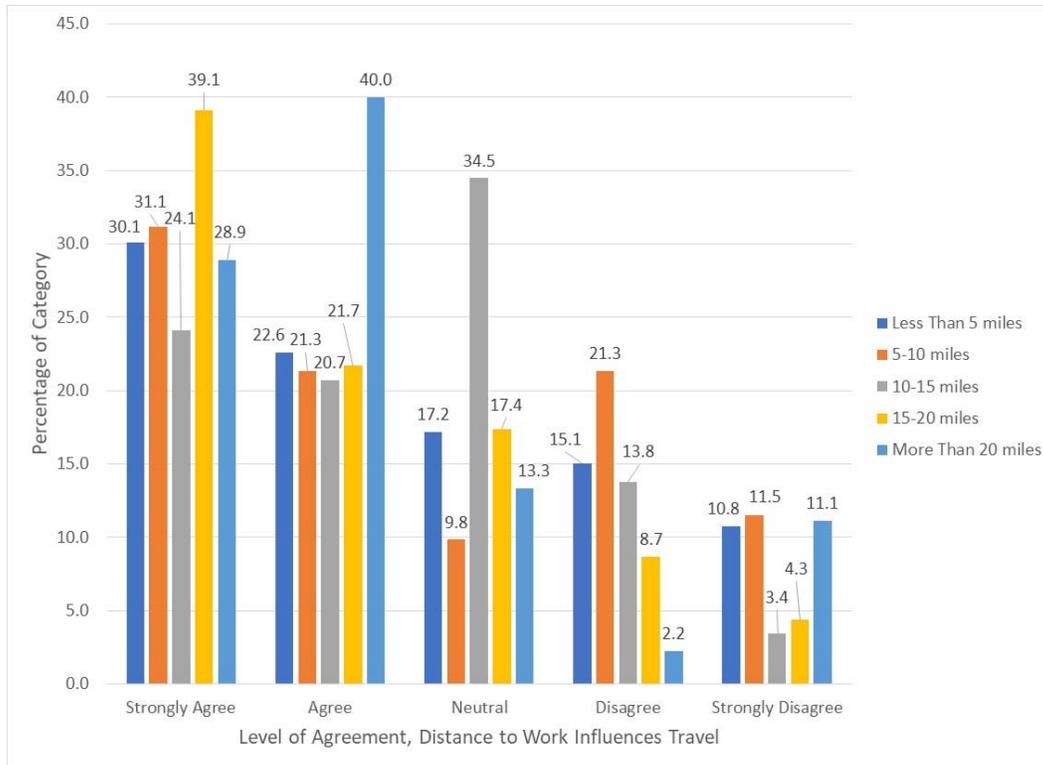
This analysis sought to investigate the cross-section of responses for two questions: “Please indicate how strongly you agree or disagree with the following statements: 1) Distance to work influences how I travel.” and “For your primary place of employment, what is the approximate distance you travel one-way from your home to work?” where a) Less than 5 miles, b) 5 miles to less than 10 miles, c) 10 miles to less than 15 miles, d) 15 miles to less than 20 miles and e) 20 miles or more were provided as potential responses.

Table 4-6 shows the number of survey respondents who chose each category regarding distance to work. Recall that Not Applicable potentially means that the survey respondent is retired or may be disabled and unable to work.

**Table 4-6: Employed Survey Respondents, Reported Distance to Work**

<b>Distance to Work (miles)</b>	<b>Number of Survey Respondents</b>	<b>Percentage of Sample</b>
<b>Less Than 5</b>	93	17.7%
<b>5-10</b>	61	11.6%
<b>10-15</b>	29	5.5%
<b>15-20</b>	23	4.4%
<b>More Than 20</b>	45	8.6%
<b>Not Applicable</b>	246	46.9%
<b>No Response</b>	28	5.3%
<b>TOTAL</b>	525	100

Therefore, since there were not a consistent number of respondents for each category, it is of interest to consider what percentage of each group (e.g. less than 5 miles to work) chose what level of agreement category. Figure 4-70 presents these results.



**Figure 4-70: Distance to Work Influences Mode Choice & Reported Distance to Work**

While overall, most survey respondents seemed to report agreement that distance to work influences how they travel, survey respondents reporting in the greatest two categories (e.g., 15-20 miles and more than 20 miles) had substantially larger percentages for the “Strongly Agree” and “Agree” categories. This may suggest that public transportation would likely hold little interest for these individuals and they should not be the anticipated users of the service; these individuals also likely live outside of the community. It is interesting that the middle category of distance to work (10-15 miles) reported a significantly Neutral viewpoint; it is unclear as to why.

#### 4.3.7. Location of Survey Respondents Who Missed Medical Appointments

The researchers mapped the locations of survey respondents who reported missing medical appointments with the percent of households below the poverty line (Figure 4-71).

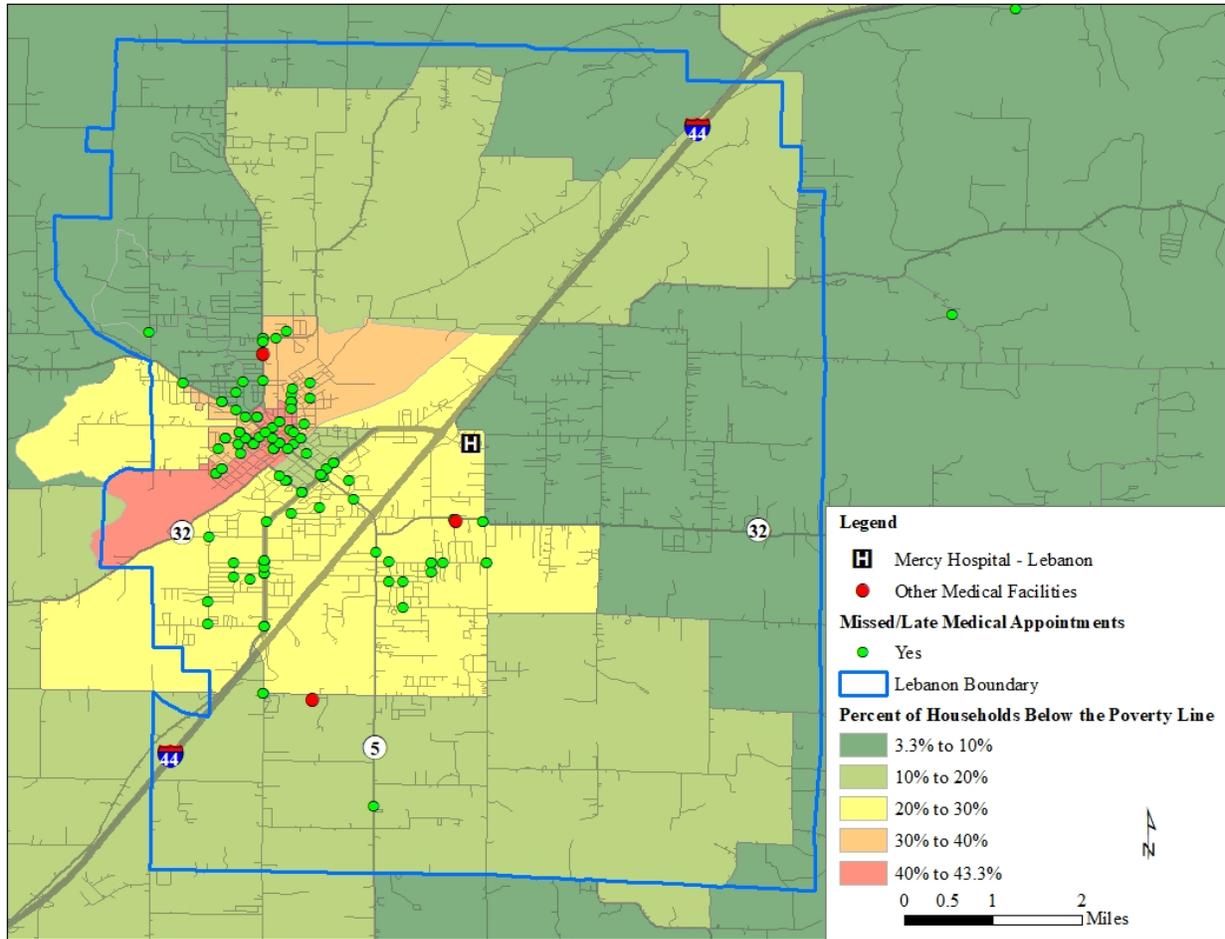


Figure 4-71: Missed Medical Appointments, Location, Below Poverty Line

There is clearly a cluster of survey respondents who reported yes in the blocks with the largest percent of households below the poverty line (see those grouped in the red shape). While there are a few survey respondents who reported yes in the blocks that reported the lowest percent of households below the poverty line (dark green), the number of survey respondents is significantly less dense. A connection between the densest reporting of “yes” and medical facilities could help to reduce no-show or late appointments. This would likely bring value to the medical facility, and consequently the community. Notice how many of the survey respondents who reported yes are on the opposite side of the interstate from the hospital (identified with an H), which also has other medical services on-site. The Jordan Valley Community Health Center (red dot to the north of the green cluster) is the nearest medical facility. Unfortunately, a sidewalk does not continue along the length of Lynn Rd, which has many heavy vehicles traveling at or above the posted speed limit of 45 mph. It seems that the Jordan Valley Community Health Center realizes the transportation problems of some clients, offering on its website, “*Our pharmacy also offers FREE delivery within the Lebanon city limits. This service is at no extra cost to our patients. Just simply request delivery when filling your prescriptions*” (Jordan Valley Community Health Center, n.d.).

### 4.3.8. Importance of Staying Connected and Age Group

The researchers compared how strongly each of the generations (i.e. groupings of the age groups) indicated that staying connected was important to them (Figure 4-72).

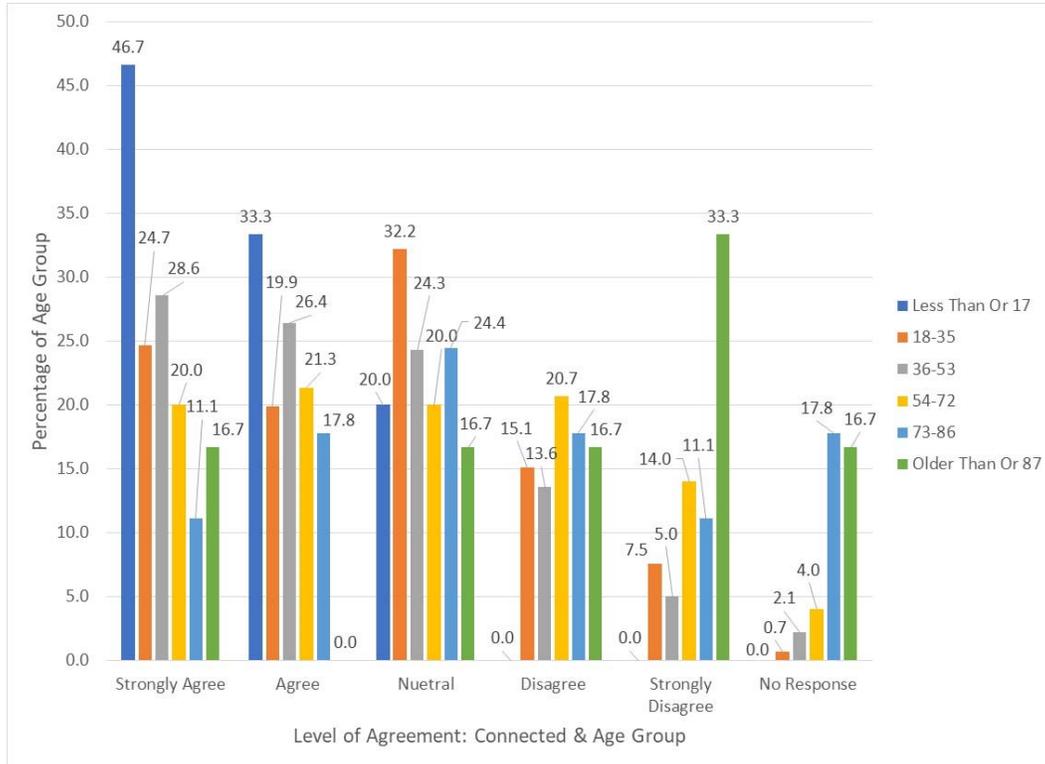
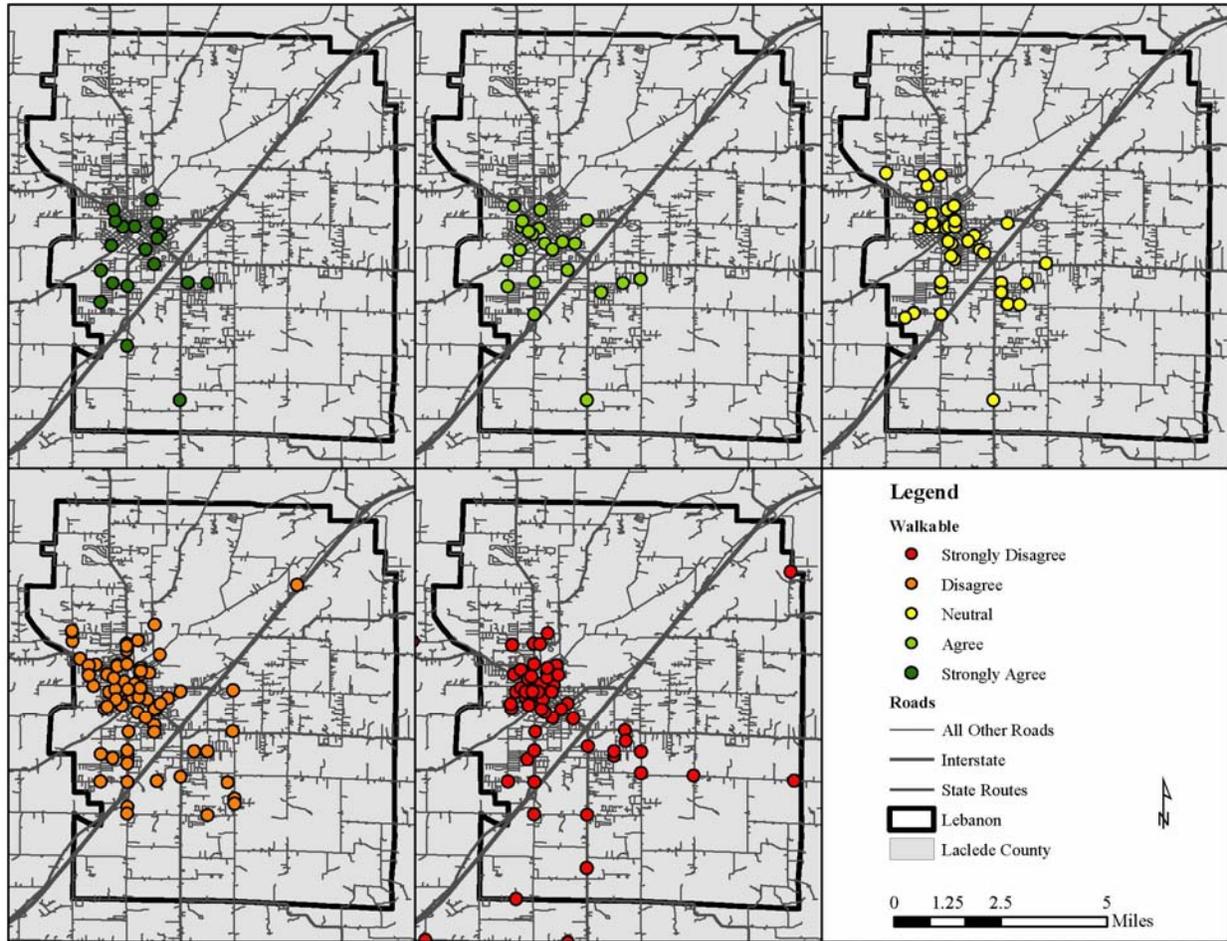


Figure 4-72: Staying Connected While Traveling & Age Groups

The figure shows that the **younger generations were more in agreement with the desire to stay connected while traveling** whereas the older generations were less in agreement. Providing amenities like on-board wi-fi could entice the younger community members to use the public transportation system. (Note: n = 15, 146, 140, 150, 45, 6, and 23 for Less Than or 17, 18-35, 36-53, 54-72, 73-86, and Older Than Or 87, respectively.)

### 4.3.9. Spatial Analysis of Walkability

The researchers were interested in investigating the relationship between reported level of walkability and where the survey respondent lived. While there may be hints that those on the outskirts of the community reported lower levels of walkability, overall, there does not appear to be a clear pattern (Figure 4-73).



**Figure 4-73: Reported Level of Agreement with Walkability of Where Survey Respondent Lives**

Notice in particular, for the “Strongly Disagree” map (bottom right), dots on the bottom and to the far right part of the map exist, which are not found in the “Strongly Agree” map (top left). Therefore, spatial impact regarding a survey respondent’s view of walkability seems to be inconclusive. This could potentially be influenced by one’s understanding of what’s implied by the term “walkability.” It may have several interpretations.

#### 4.3.10. Describing Individuals Who Reported Limited Work Options

The researchers wanted to understand the correlation between survey respondents who reported limiting their job search because of transportation challenges and where they resided. First, the researchers looked at the spatial representation of survey respondents who reported “yes” and “no” (Figure 4-74).

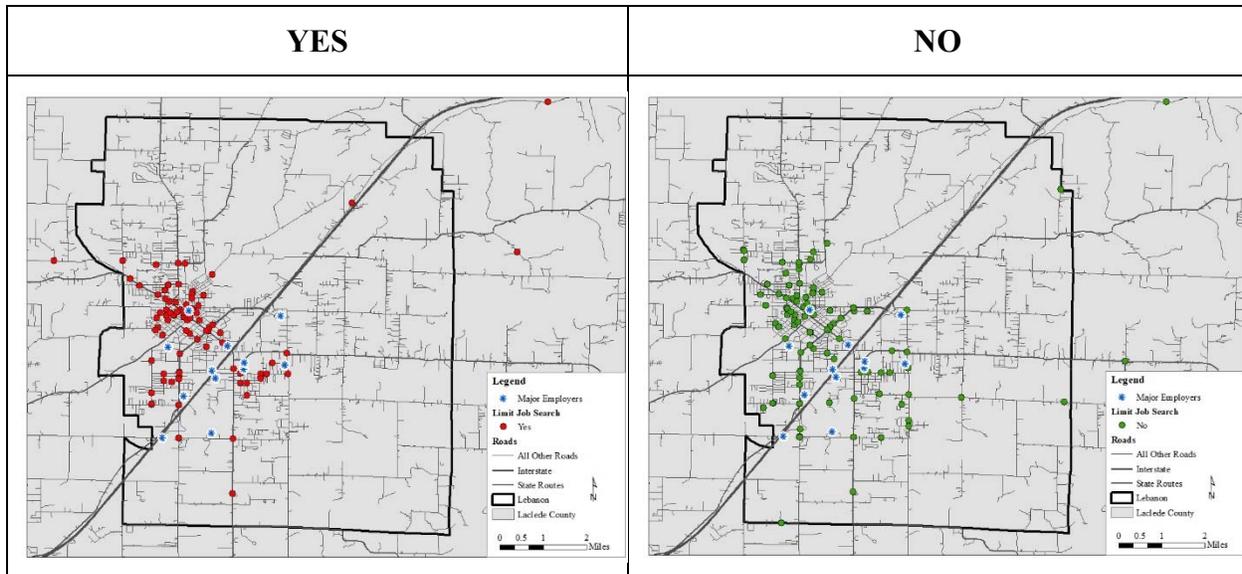
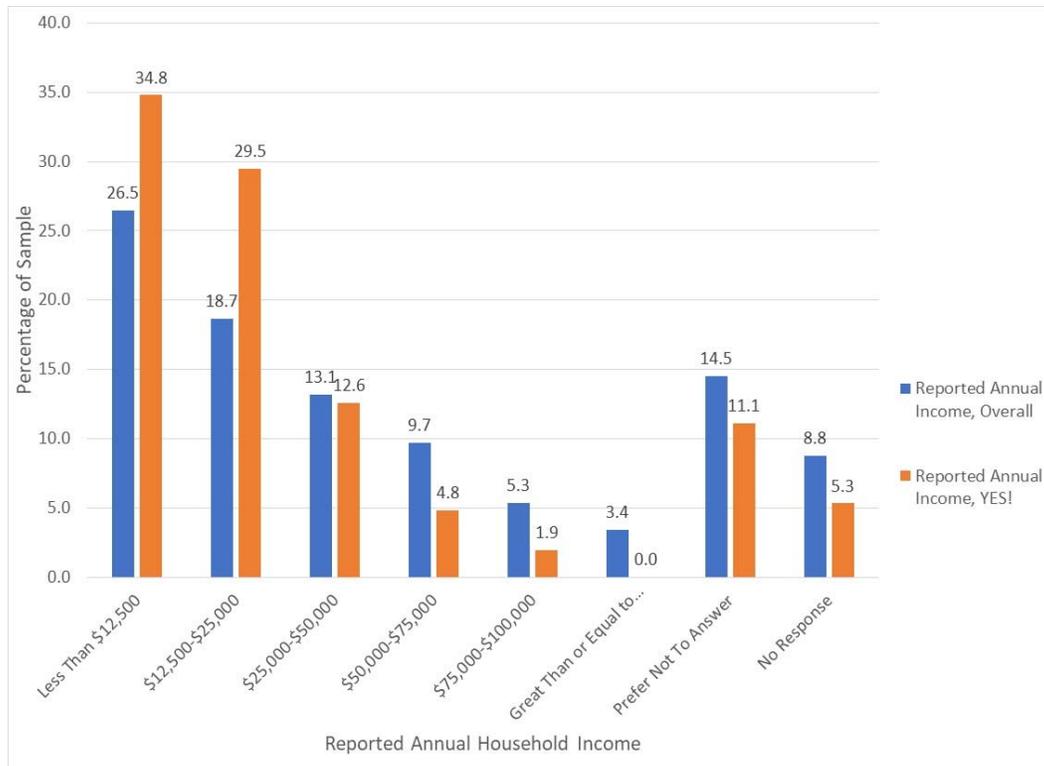


Figure 4-74: Limited Job Search Due to Transportation, “Yes” and “No”

Generally speaking, there seems to be a denser congregation of survey respondents who reported “yes” in the densest part of the community (Figure 2-4), near the Jefferson Ave. corridor. This tends to be the lower income part of the city (Figure 2-19), suggesting that these responses may be more related to the ability to pay for transportation options. However, as noted earlier, the majority of employment opportunities tend to be southeast of this core. Notice that this part of the map (that area southeast of the interstate) tends to have more “no’s”

The researchers also wanted to investigate how reported annual household income may relate to whether someone reported limiting their job search as a result of transportation challenges (Figure 4-75).



**Figure 4-75: Limited Job Search Due to Transportation & Reported Annual Household Income**

As expected, when compared with the distribution of reported annual household income of the entire sample, the subsample had a larger percentage of survey respondents from the lower income earning categories that reported this to be a problem. To some degree, earning a lower annual household income and reporting that one limited their job search is a feedback loop. It is interesting to note that there was a small number of survey respondents in higher annual income categories (\$50,000-\$75,000 = 10 and \$75,000-\$100,000 = 4) who reported transportation challenges, which was somewhat unexpected.

#### 4.3.11. Describing Individuals Who Reported Missing Work

The researchers wanted to better understand the age category and reported 2017 annual household income of survey respondents who reported that they missed or were late to work because of transportation challenges.

First, the researchers considered the spatial location of where survey respondents who reported missing work lived (Figure 4-76).

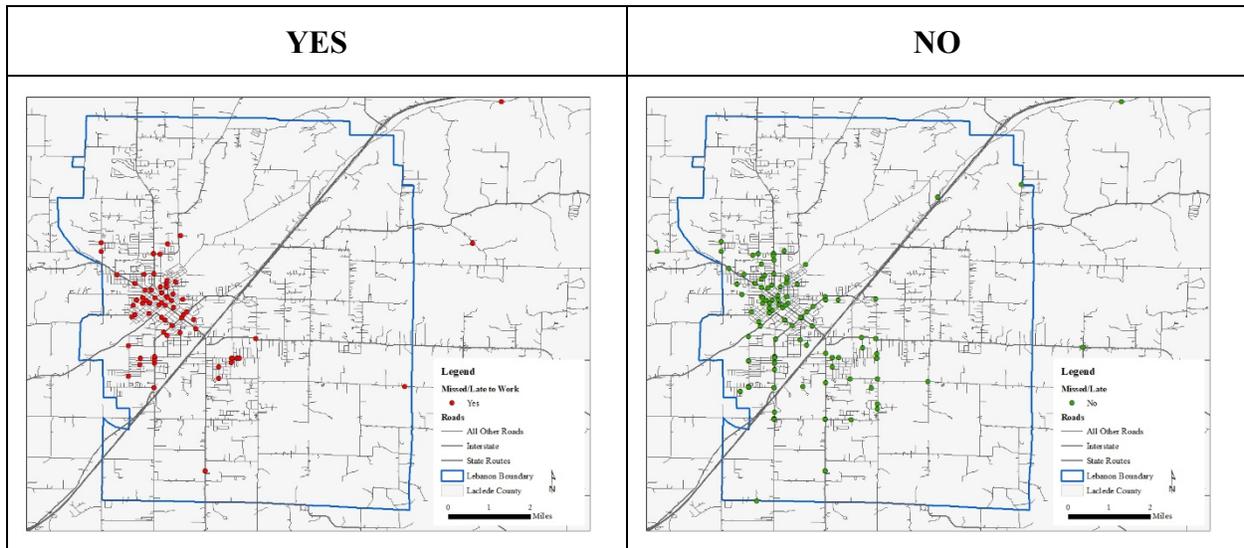


Figure 4-76: Missed/Late to Work & Nearest Cross-Street, Yes vs. No

The results are not conclusive in that it is not entirely clear that those who reported yes were more centrally located as compared with those who reported no. However, considering again the earlier discussion regarding households living at or below the poverty level, those who reported yes seemed to better represent these areas. To test this out, the researchers plotted the “yeses” and “no’s” on top of the census block percentage of households below the poverty level (Figure 4-77).

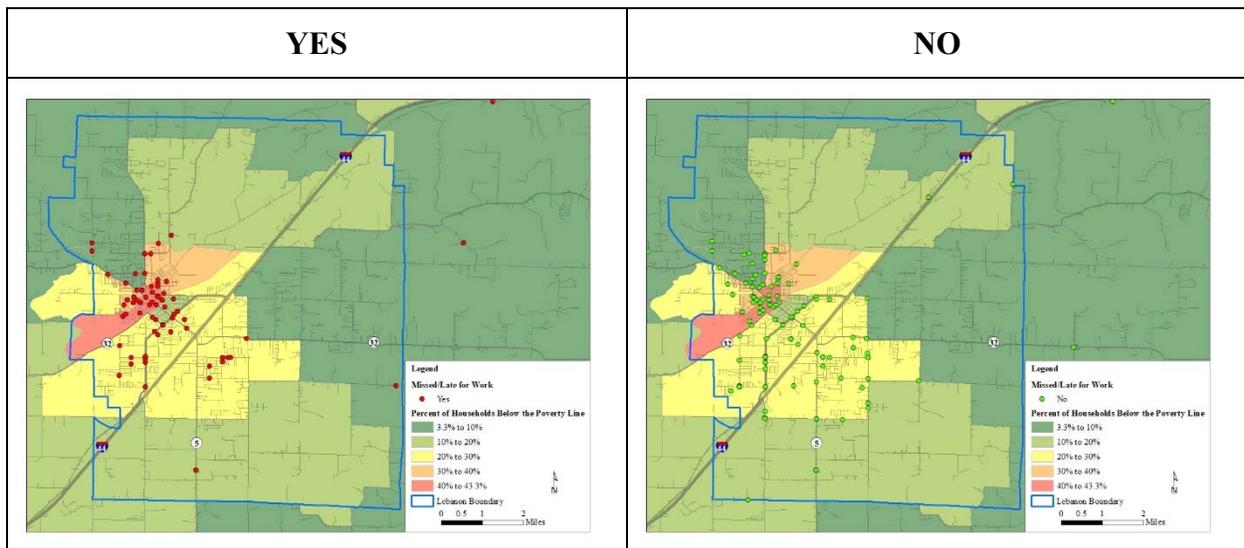
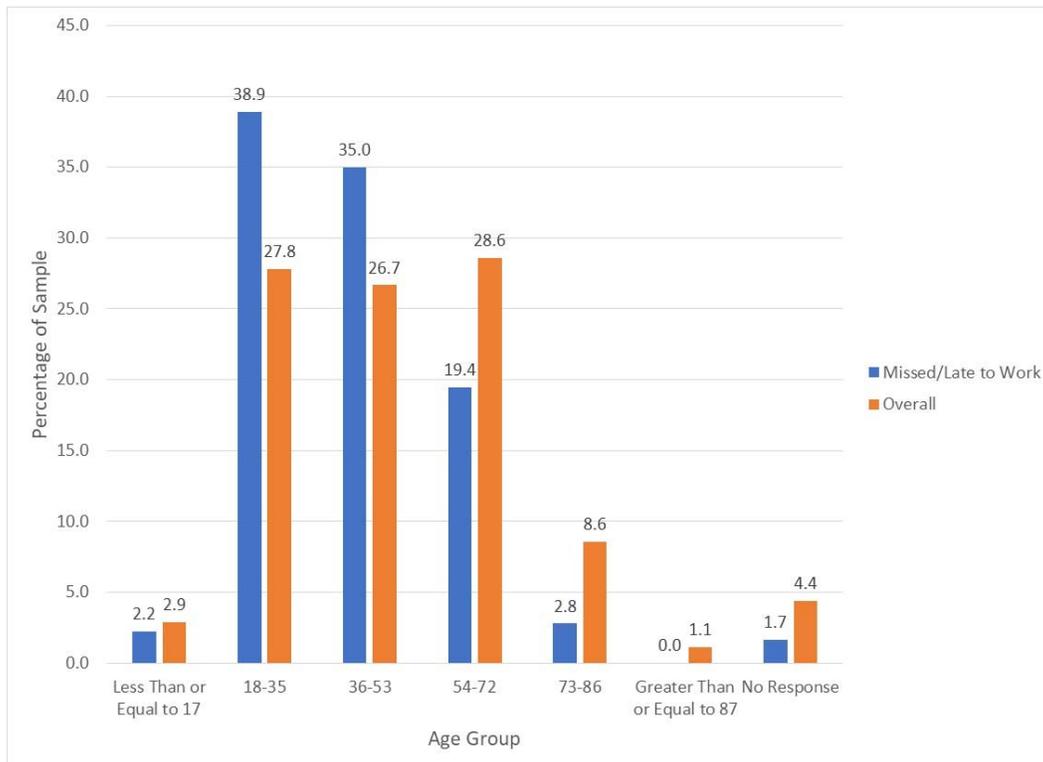


Figure 4-77: Missed/Late to Work & Nearest Cross-Street, Yes vs. No By Poverty Line

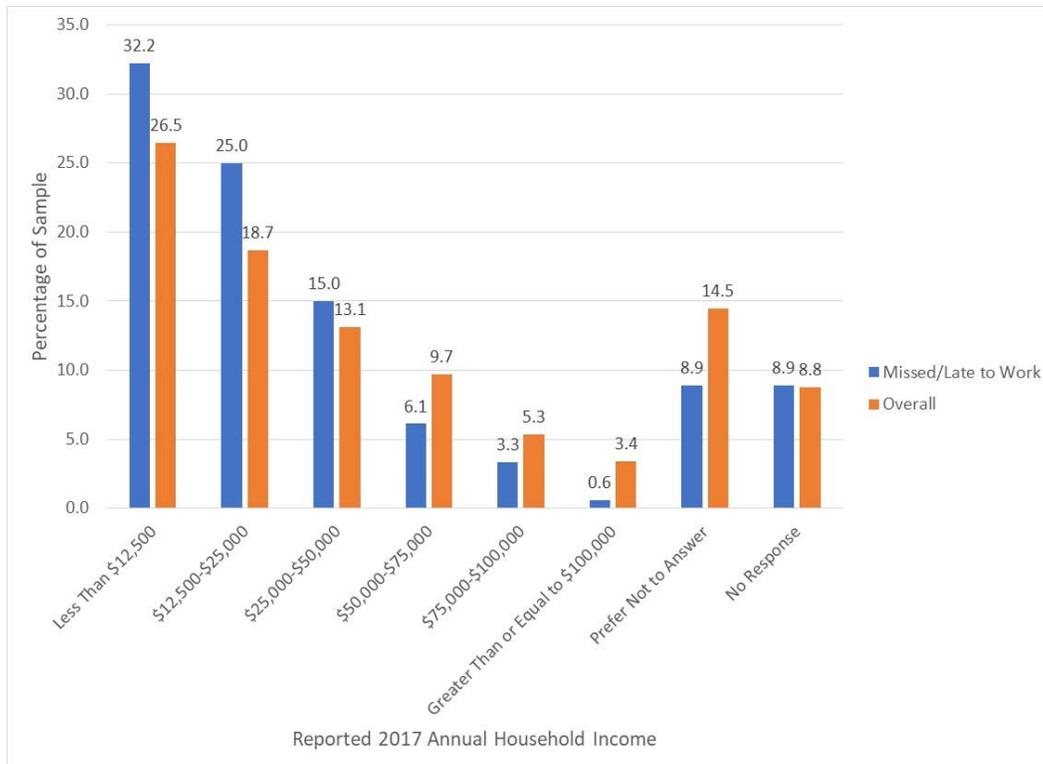
Generally speaking, it appears that the red cluster, almost parallel to I-44, fits well into areas where there are 30% or more households below the poverty level (orange and red). A most notable contrast is that the green block just to the northwest has almost no “yesses,” but a significant number of “nos.”

The researchers investigated the age group reported by those who reported being late or missing work due to transportation issues as compared with the overall sample. The results suggest that **missing or arriving to work late as a result of transportation problems is reported more often by younger survey respondents**, as they are overrepresented when compared with the overall sample (Figure 4-78).



**Figure 4-78: Missed/Late to Work Due to Transportation Problems & Age Group**

Typically, those who are younger tend to have lower annual household incomes. Therefore, in part, it is not unexpected that the survey respondents from this sub-sample reported lower household incomes (Figure 4-79).



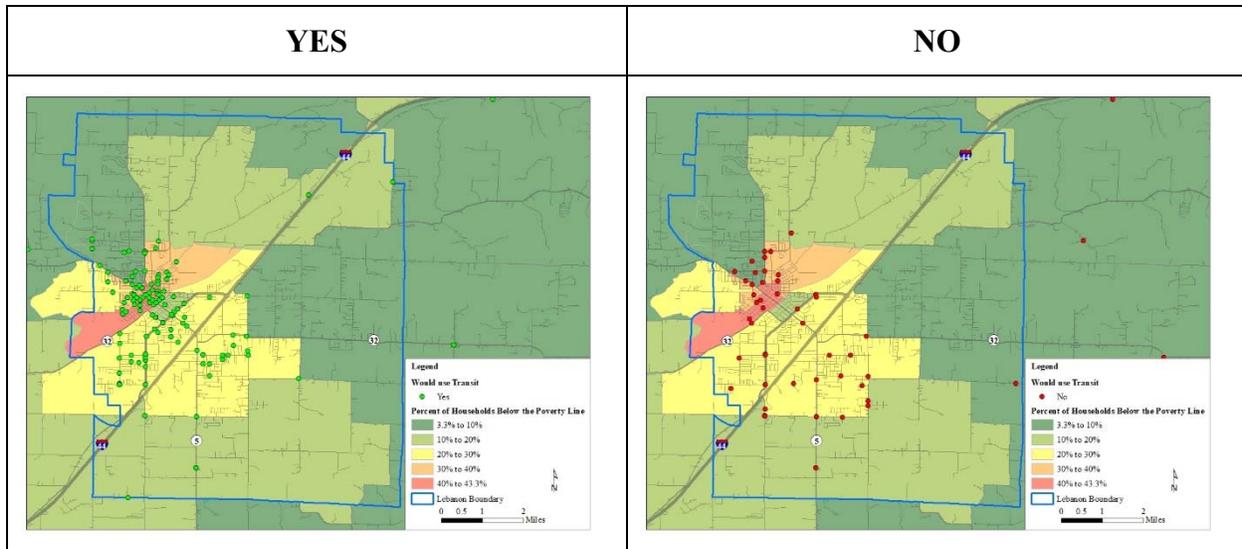
**Figure 4-79: Missed/Late to Work Due to Transportation Problems & Reported Annual Household Income**

It is a bit surprising to see that some survey respondents within the \$75,000 to \$100,000 category reported missing or arriving late to work as a result of transportation problems.

#### 4.3.12. Describing Reported Users of a Public Transportation System

The research team wished to compare the demographics of those reporting an interest in using a public transportation system to those who do not report an interest in using it. How do these compare with those who did not provide a response (those removed because they did not provide a response to the two prior questions)? What about the information regarding their places of residence (are the majority of those who report an interest in using within LEBANON; is there inconclusive information)?

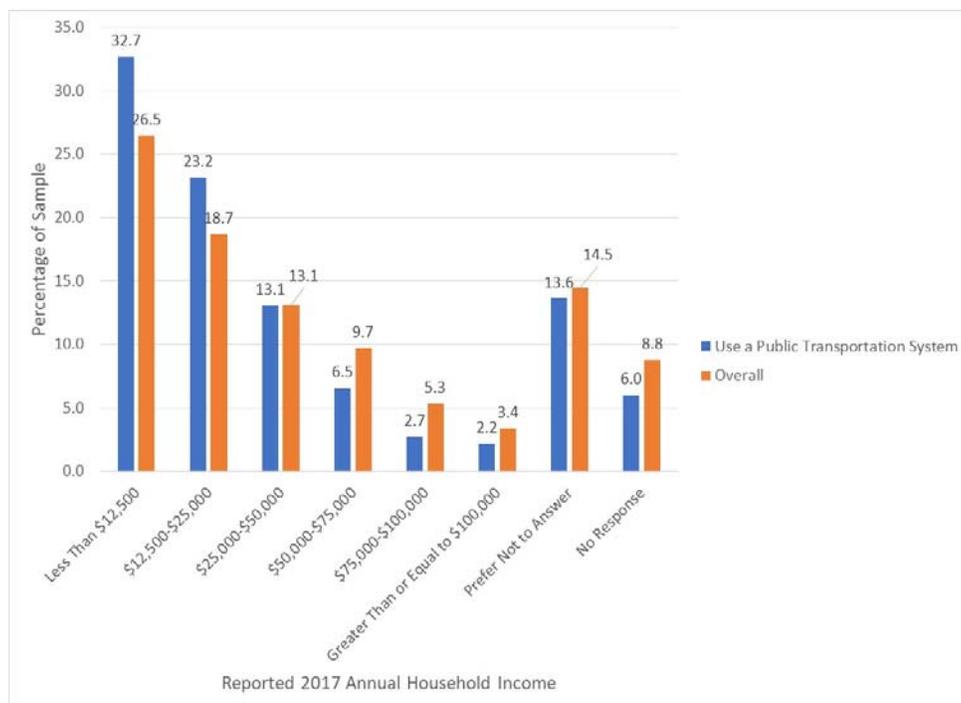
First the researchers considered the location of the survey respondents who reported that they or someone in their household would use a public transportation system as compared with those who would not (Figure 4-80) overlaid on top of the census blocks displaying percentage of households below the poverty level.



**Figure 4-80: Spatial Distribution of Those Who Would Use a Public Transportation System**

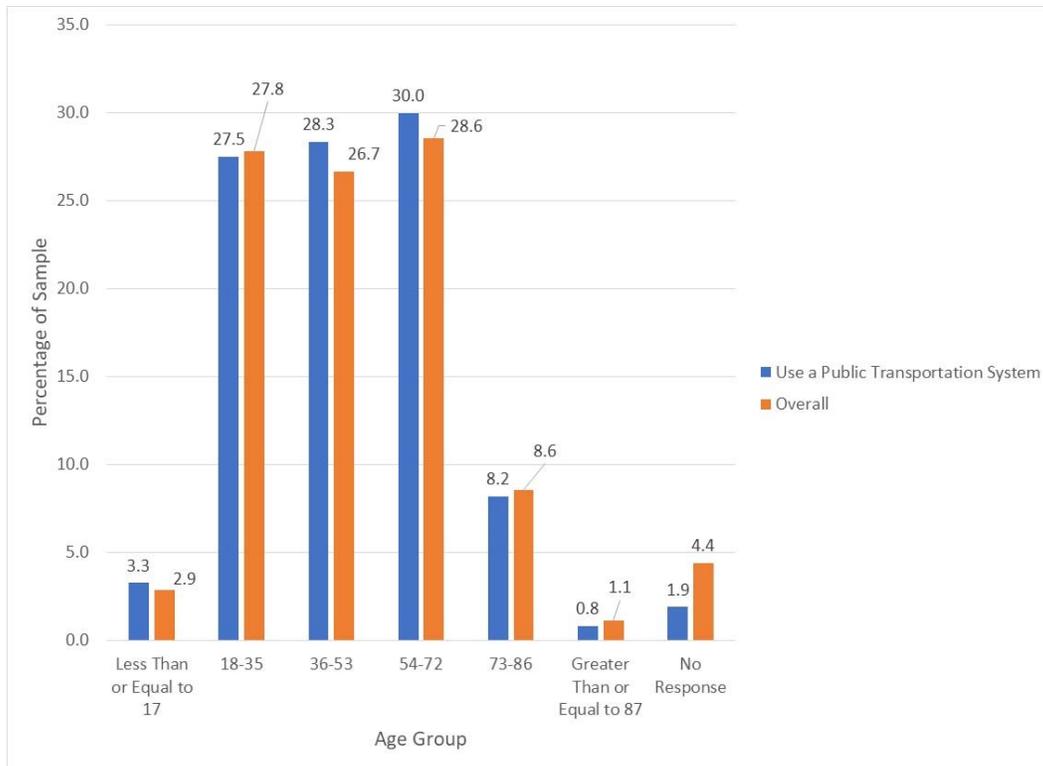
The results show that those who reported using the public transportation system tend to be more clustered into the center of LEBANON and generally tend to report a cross-street more commonly associated with census blocks (i.e. Census Block Group 3, Census Tract 9609 Laclede County, MO) where there are larger percentages of LEBANON households below the poverty level.

Survey respondents with lower household incomes reported more often that they or someone in their household would use a public transportation system (Figure 4-81).



**Figure 4-81: Would Use a Public Transportation System & Reported 2017 Annual Household Income**

Interestingly enough, the age group of the sub-sample of those who reported that they or someone in their household would use a public transportation system generally corresponds with the overall sample.



**Figure 4-82: Would Use Public Transportation System & Age Group of Respondent**

This result supports the common belief that only the younger age groups would report using a public transportation system, albeit one must consider the potential influence that it could reflect the fact that survey respondents were asked not only to identify if they, but also someone in their household would use a bus.

#### 4.3.13. Respondents Who Reported Using a Public Transportation System No Matter What

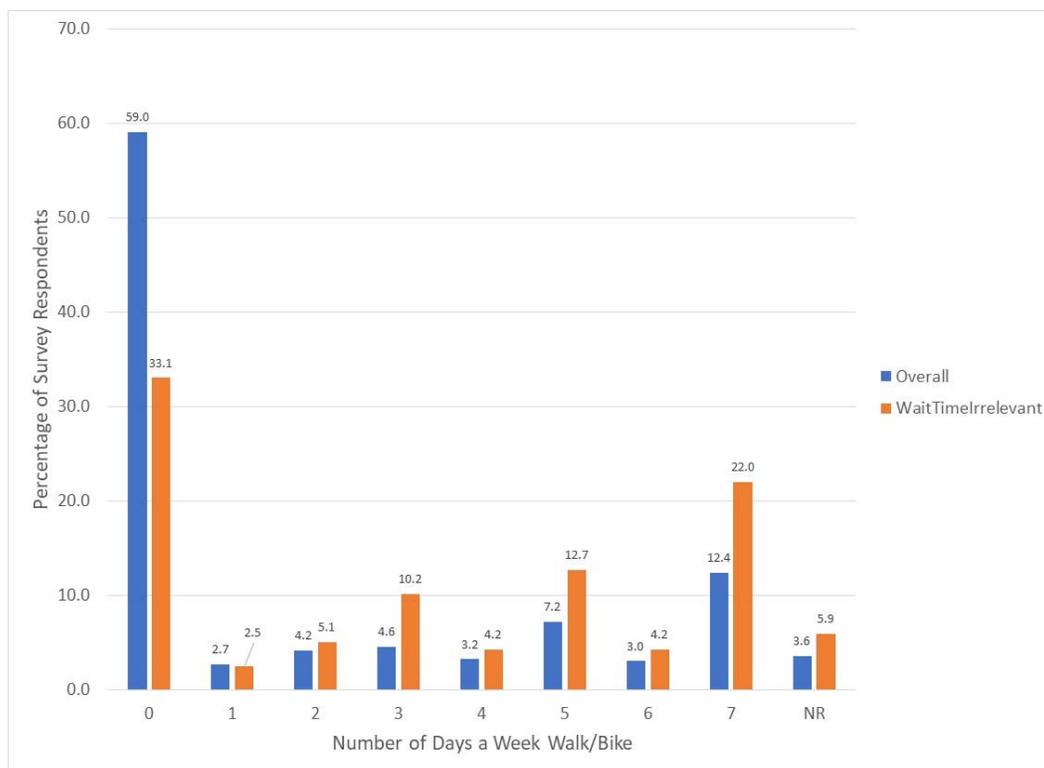
One hundred three hard copy respondents and twenty-three online survey respondents reported that they would use a bus regardless of the wait time. However, six hard copy and two online survey respondents appeared to mistakenly choose this result, as they reported that they would never use a bus. (Note: The two responses, “The wait time doesn’t matter to me, I would use a bus if it was offered,” and “There is no acceptable wait time, I wouldn’t use a bus,” might appear similar to one that did not read the statements carefully.) Therefore, these survey respondents were removed, and a total of ninety-seven and twenty-one hard copy and online survey respondents, respectively, remained.

The researchers compared the overall sample with the sub-sample of survey respondents who reported using the shuttle regardless of wait time with respect to:

- 1) The number of days they reported walking and biking in a week
- 2) Possession of a driver’s license
- 3) Vehicle ownership
- 4) Rely on others for transportation
- 5) Reported category
- 6) Willingness-to-pay for a bus ride
- 7) Gender
- 8) Age
- 9) Annual Household Income

### 4.3.13.1. Walking/Biking, Typical Week

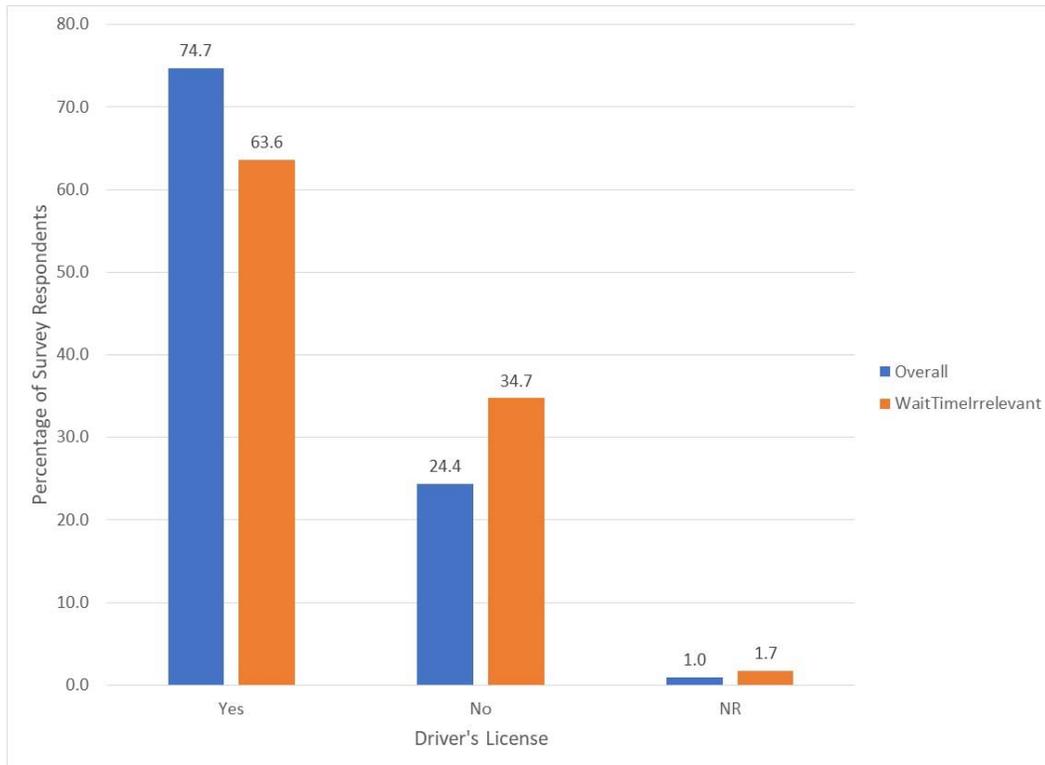
Not surprisingly, survey respondents who reported that they would use a bus regardless of the wait time also reported walking and biking more in a typical week as compared with the overall sample (Figure 4-83). [Note: Both of the removed online survey respondents reported 0; 4, 1, and 1 of the hard copy survey respondents reported walking/biking 0, 1 and 6 days a week, respectively.)



**Figure 4-83: Wait Time Irrelevant & Number of Days in a Typical Week Walking/Biking**

### 4.3.13.2. Possession of a Driver’s License

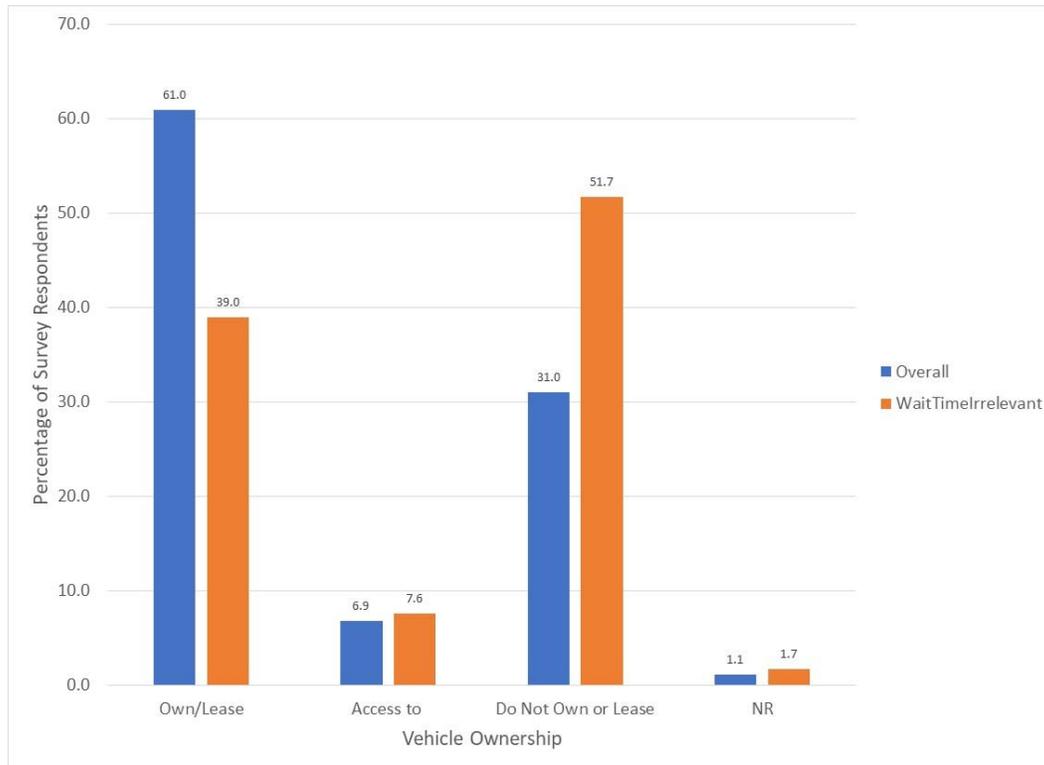
The sub-sample has more survey respondents who reported not possessing a driver’s license as compared with the overall sample (Figure 4-84). [Note: Five of the six and both of the hard copy and online survey respondents, respectively, which were removed had reported possession of a driver’s license.]



**Figure 4-84: Wait Time Irrelevant & Possession of Driver’s License**

### 4.3.13.3. Vehicle Ownership

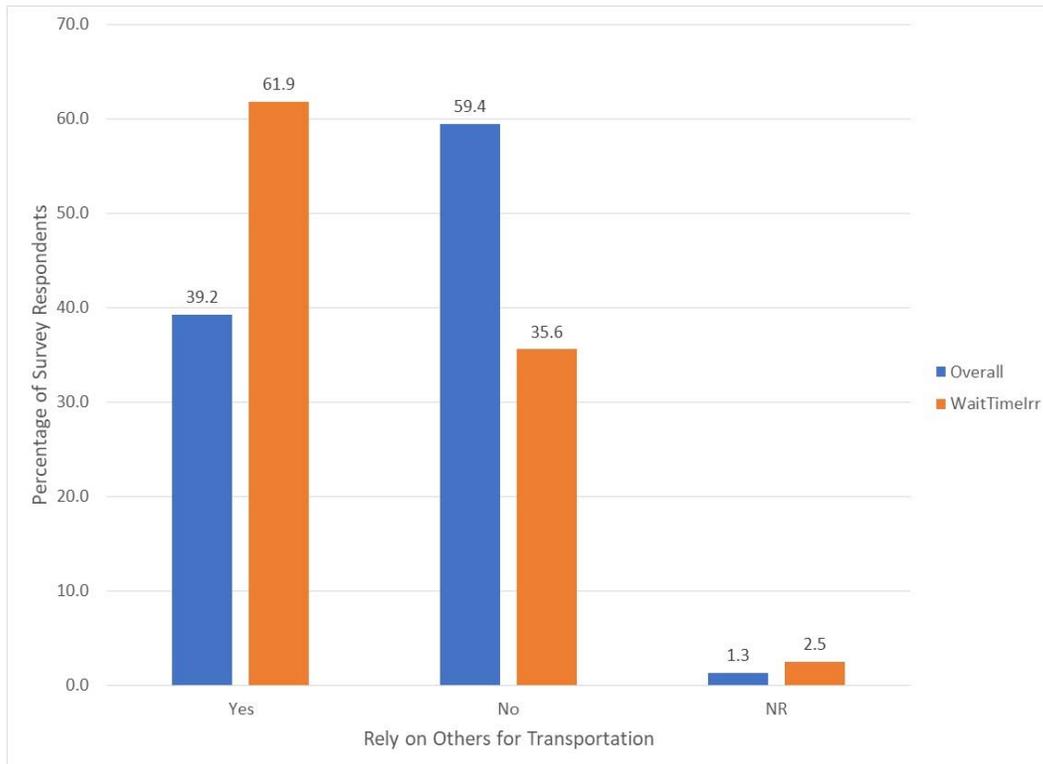
The sub-sample of survey respondents who reported that they would use a bus regardless of the wait time also reported owning a vehicle less often than the overall sample (Figure 4-85). [Note: Four, 1, and 1 hard copy survey respondents represented the own/lease, access to, and do not own or lease categories, respectively. Both online survey respondents were in the own/lease category.]



**Figure 4-85: Wait Time Irrelevant & Vehicle Ownership**

### 4.3.13.4. Reliance on Others for Transportation

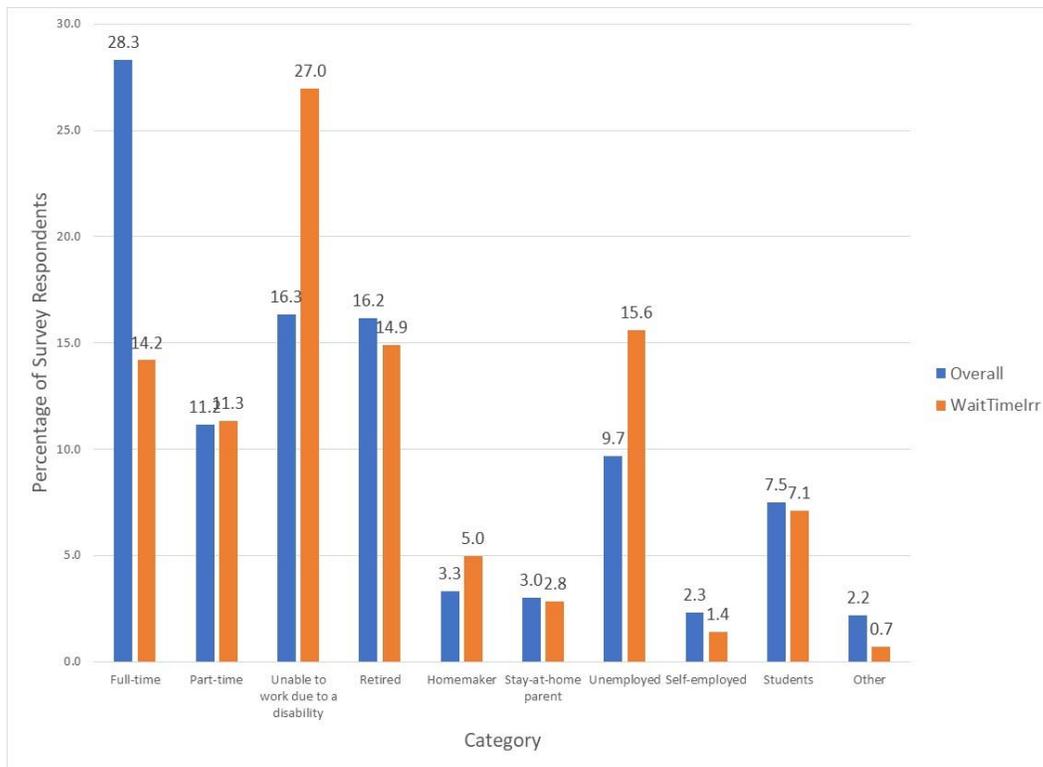
The sub-sample also reports relying on others for transportation to a greater degree (Figure 4-86). [Note: All but *one* of the hard copy survey respondents and none of the online respondents whose observations were removed for this question reported relying on others for transportation.]



**Figure 4-86: Wait Time Irrelevant & Rely on Others for Transportation**

### 4.3.13.5. Employment Categories

The researchers wanted to better understand the employment status of respondents who reported that they would use a bus regardless of the wait time (Figure 4-87). [Note: For online survey respondents, one was from the full-time employed category, the other from retired. For hard copy survey respondents, 1, 1, 3, and 1 reported part-time, unable to work due to a disability, retired, and no response, respectively.]

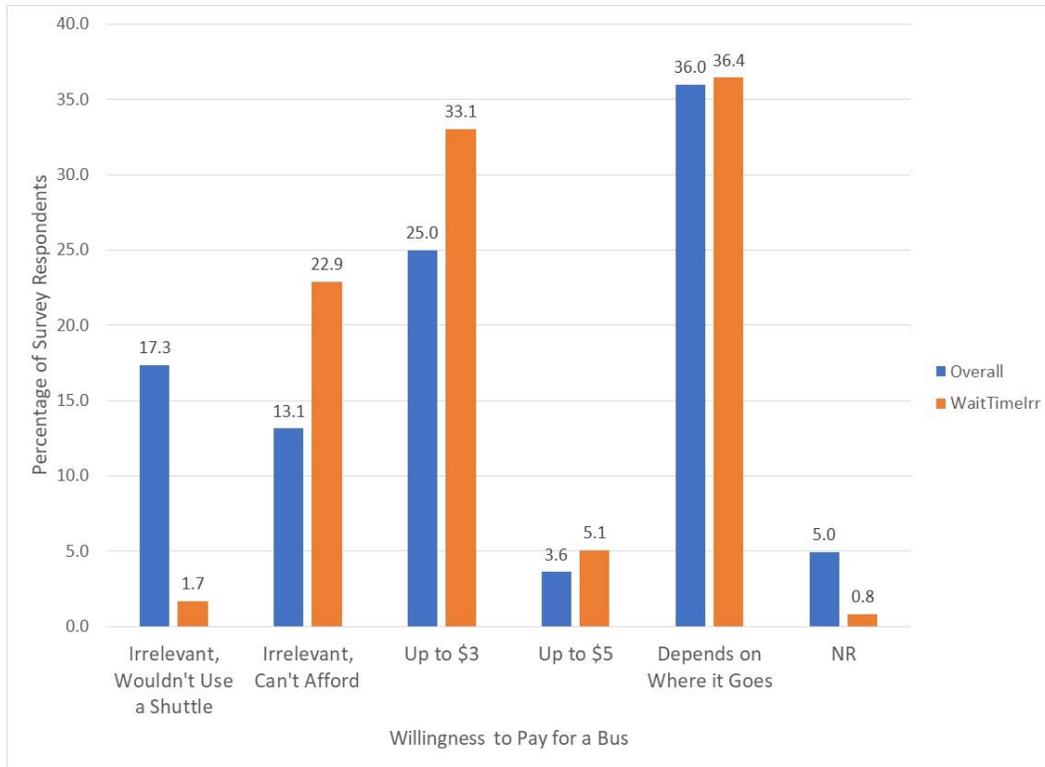


**Figure 4-87: Wait Time Irrelevant & Category**

It is not surprising that those who reported working full-time were underrepresented by this sample, as it can be expected that they may have more limited time and therefore value a frequent headway. Those who reported not working as a result of a disability are overrepresented in the sub-sample, which is expected, and it also suggests that there will be a need to ensure that the bus can accommodate those with disabilities (e.g. buses that can kneel to make it easier to board and alight). Another interesting result came as a result of reviewing the category. Retirees are underrepresented. This suggests that **retirees value their time**, even though many may assume that they would be more flexible and that the wait time would be irrelevant. If planning for a public transportation system moves forward, LEBANON should be sure to engage retirees within the community to, as best as possible, incorporate characteristics that would make the bus appealing (e.g. use peer travel trainers that are retired).

### 4.3.13.6. Acceptable Price for a Bus

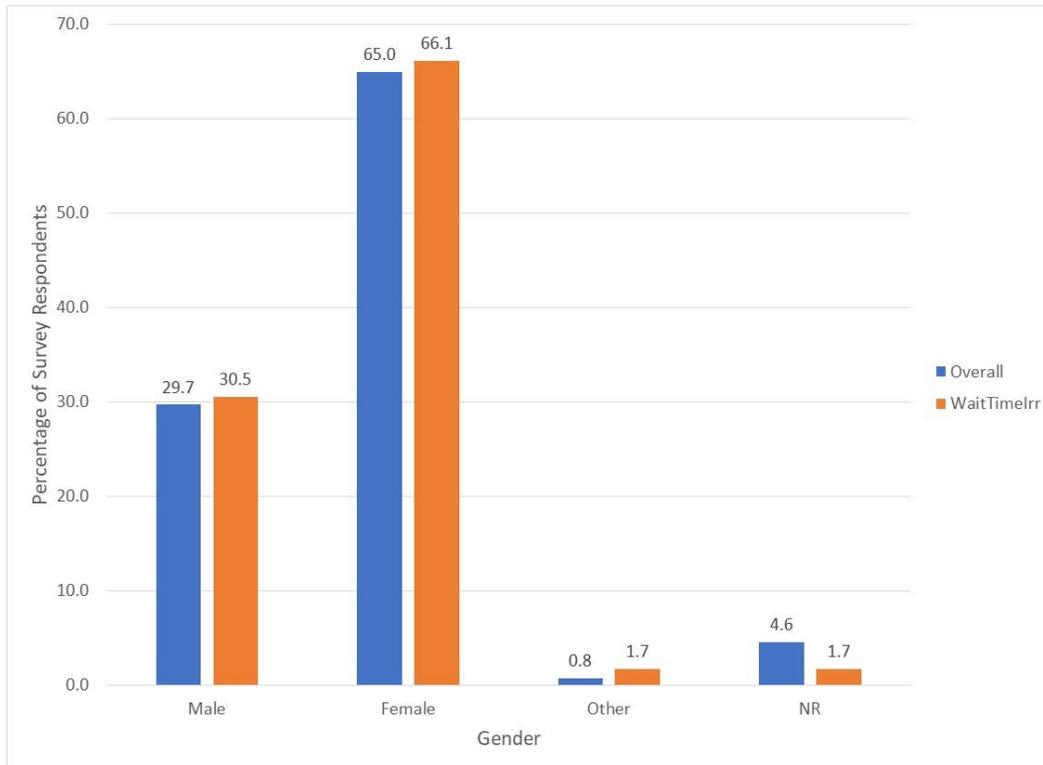
The researchers wanted to better understand how the price of a potential bus ride would impact those who reported that they would use a bus no matter what (Figure 4-88). [Note: Both online survey respondents who were removed selected “Irrelevant, Wouldn’t Use a Shuttle.” Four, 1 and 1 hard copy survey respondents who were removed had selected “Irrelevant, Wouldn’t Use a Shuttle,” “Up to \$3,” and “Depends on Where it Goes.”]



**Figure 4-88: Wait Time Irrelevant & Acceptable Price for a Bus**

### 4.3.13.7. Gender

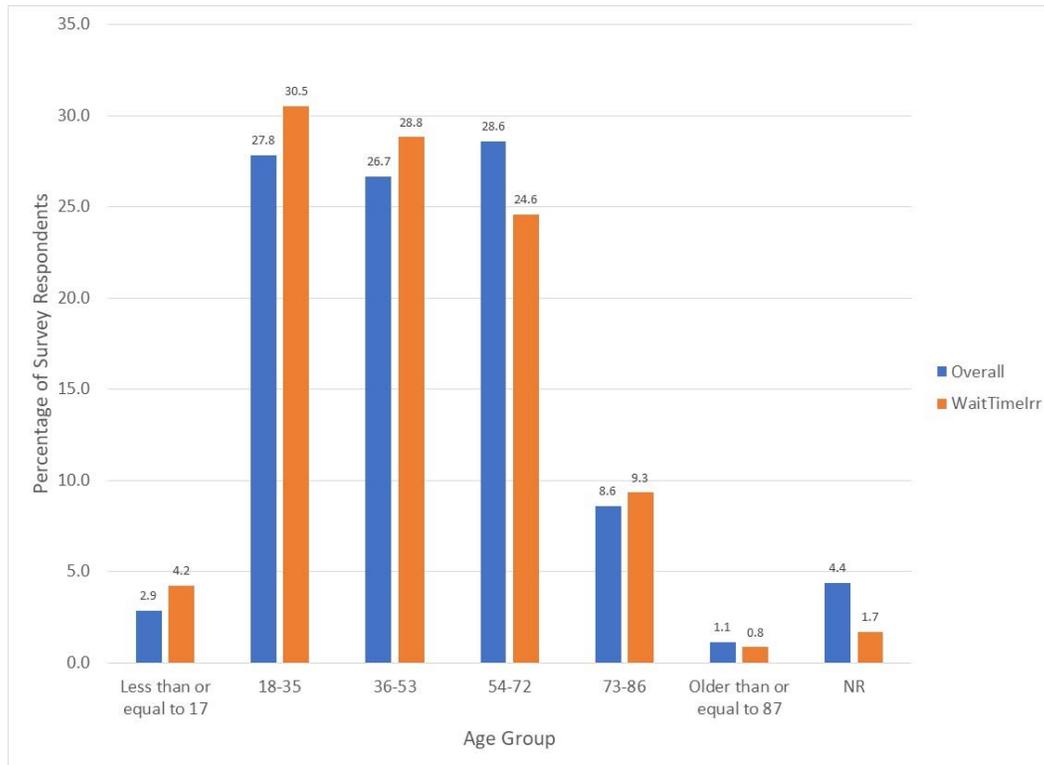
Somewhat unexpectedly, **more men than the entire sample reported that they would use the bus regardless of wait time** (Figure 4-89). [Note: Both of the online survey respondents were male; two and four of the hard copy survey respondents identified as male and female, respectively.]



**Figure 4-89: Wait Time Irrelevant & Gender**

### 4.3.13.8. Age

The researchers also investigated whether age had an impact on a survey respondent reporting willingness to wait regardless of the amount of time to use a bus (Figure 4-90). [Note: Both online survey respondents reported ages of 36-53; one, 2, 2, and 1 hard copy survey respondents reported less than 17, 18-35, 36-53 and 73-86, respectively.]



**Figure 4-90: Wait Time Irrelevant & Age Group**

Generally speaking, with the exception of the 73-86 age group, **the younger the survey respondent, the more likely a survey respondent reported that the wait time is irrelevant to the choice to use a bus.** The 54-72 age group was underrepresented as reporting that wait time for a bus would be irrelevant. **Residents within this age group (54-72) may also be very unlikely to use a bus if implemented.**

### 4.3.13.9. Household Income

The final aspect that the researchers wanted to investigate relative to wait time was the reported 2017 annual income of the sub-group as compared with the overall sample (Figure 4-91). [Note: The two removed online survey respondents reported \$50,000-\$75,000 and more than \$100,000. The 3, 2, and 1 removed hard copy survey respondents reported less than \$12,500, prefer not to answer and no response, respectively.]

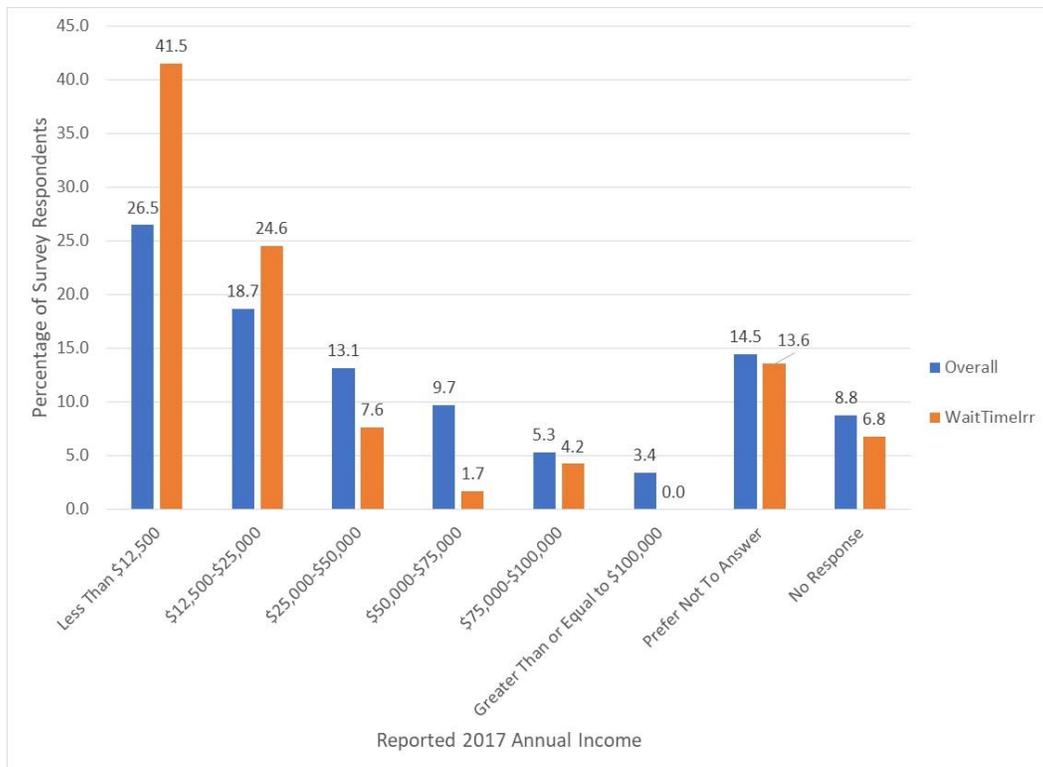


Figure 4-91: Wait Time Irrelevant & Reported 2017 Annual Income

While the researchers expected that this group would be represented more within the lower income groups, the overrepresentation in the two lowest categories (41.3% vs. 26.5% and 23.0% vs. 18.7%) is telling.

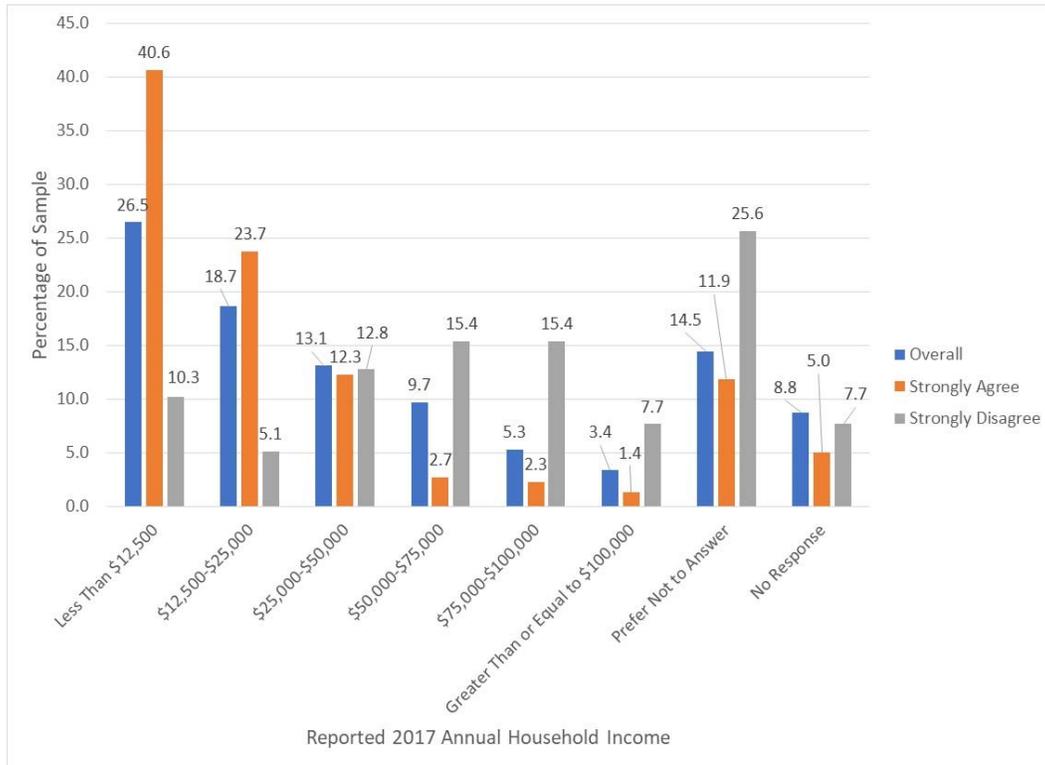
Considering all of the above, the responses of those who reported that they would use a bus regardless of wait time suggest that **these individuals are desperate for mobility.**

### 4.3.14. “My” Quality of Life Improves as a Result of a Public Transportation System

The researchers anticipated that there could be two potential groups of individuals whose quality of life would improve if a public transportation system were implemented in LEBANON: those who would make use of it, and those who would have a reduced load in providing transportation

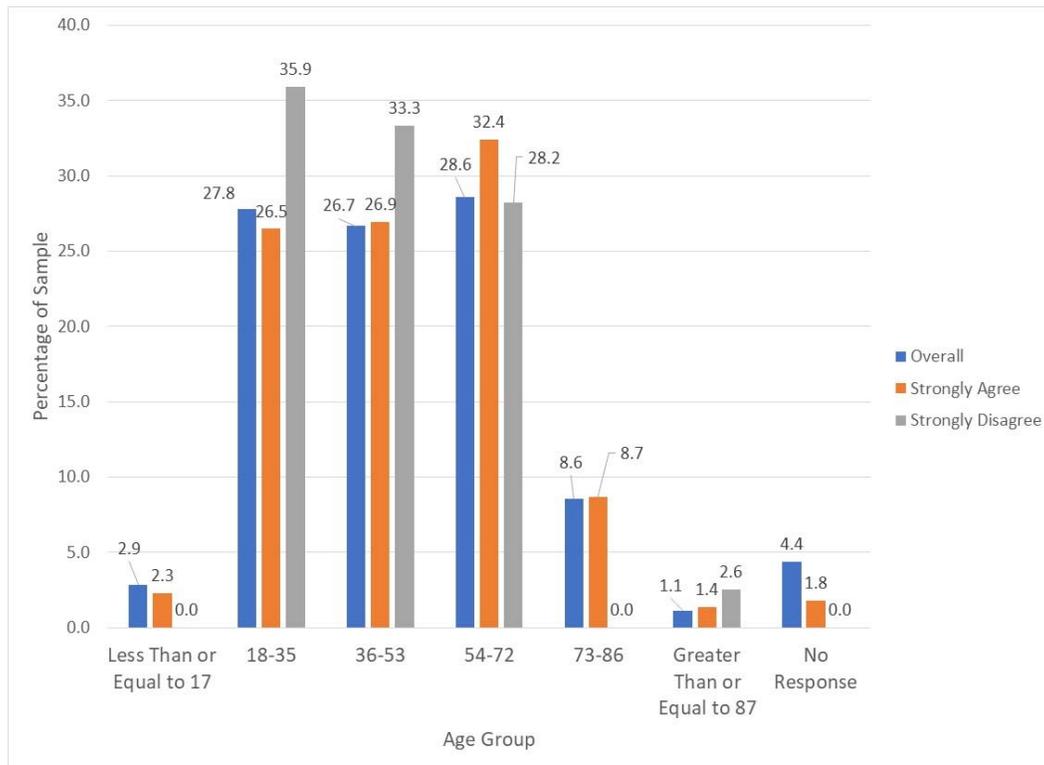
to the transportation-dependent (e.g. young adult children, older adults). Therefore, the researchers investigated the reported income and age group for survey respondents who reported both “Strongly Agree” and “Strongly Disagree” in response to this statement.

It is very clear that survey respondents who reported the lowest income categories feel that a public transportation system will improve their quality of life (Figure 4-92).



**Figure 4-92: Affirmative or Negative, Public Transportation System Improves Quality of Life, Annual Household Income**

The researchers also wanted to better understand the reported impact by age group (Figure 4-93).

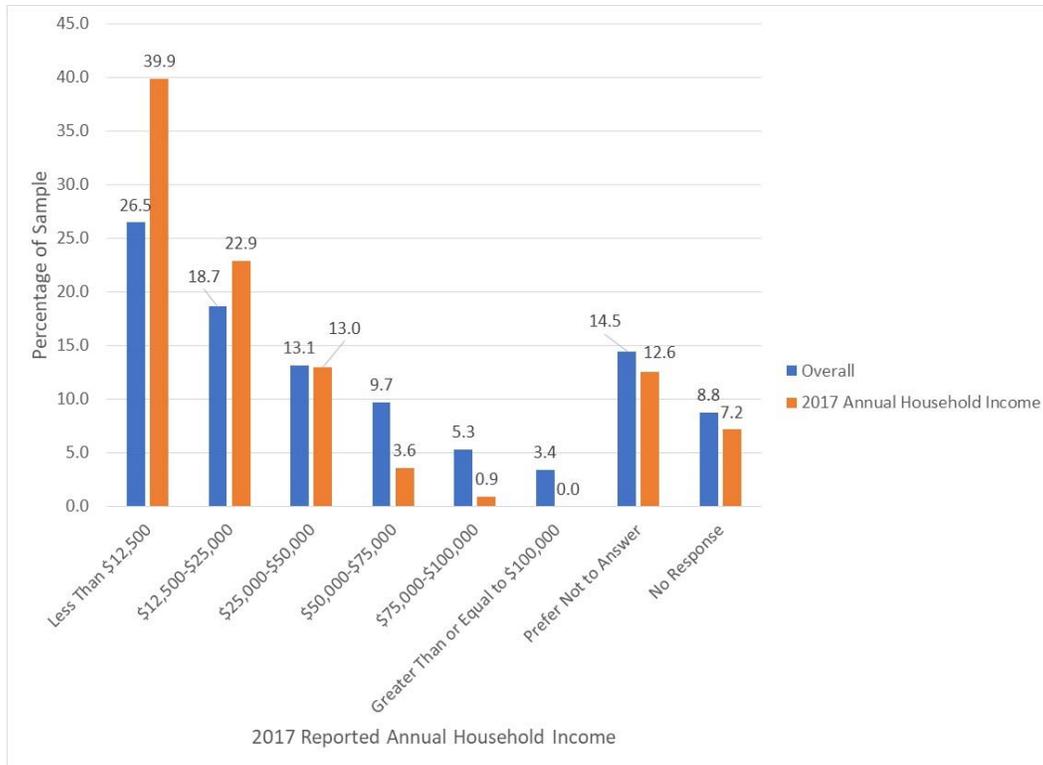


**Figure 4-93: Affirmative or Negative, Public Transportation System Improves Quality of Life, Age Group**

This result is somewhat unexpected, as it was assumed that those in the younger age groups, who reported lower annual household incomes, would report an improvement in their quality of life. These results suggest that those in the 54 to 72 age group who reported annual household incomes of \$25,000 or less were most likely to feel that a public transportation system would improve their quality of life.

#### 4.3.15. Characteristics of Those Missing Medical Appointments

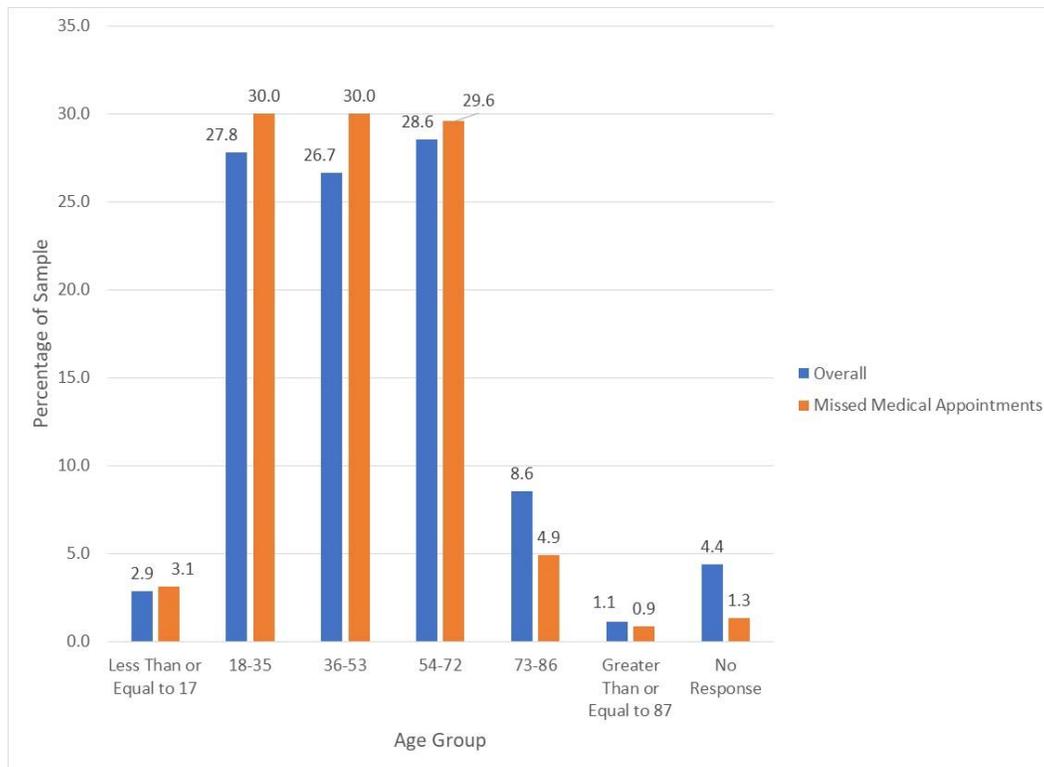
The researchers wanted to better understand the characteristics of survey respondents who reported that they missed medical appointments as a result of transportation challenges. Therefore, they compared the sub-sample of survey respondents who reported that they had missed medical appointments with the overall sample. First, the researchers considered the 2017 reported annual household income (Figure 4-94).



**Figure 4-94: Missed Medical Appointments & 2017 Reported Annual Household Income**

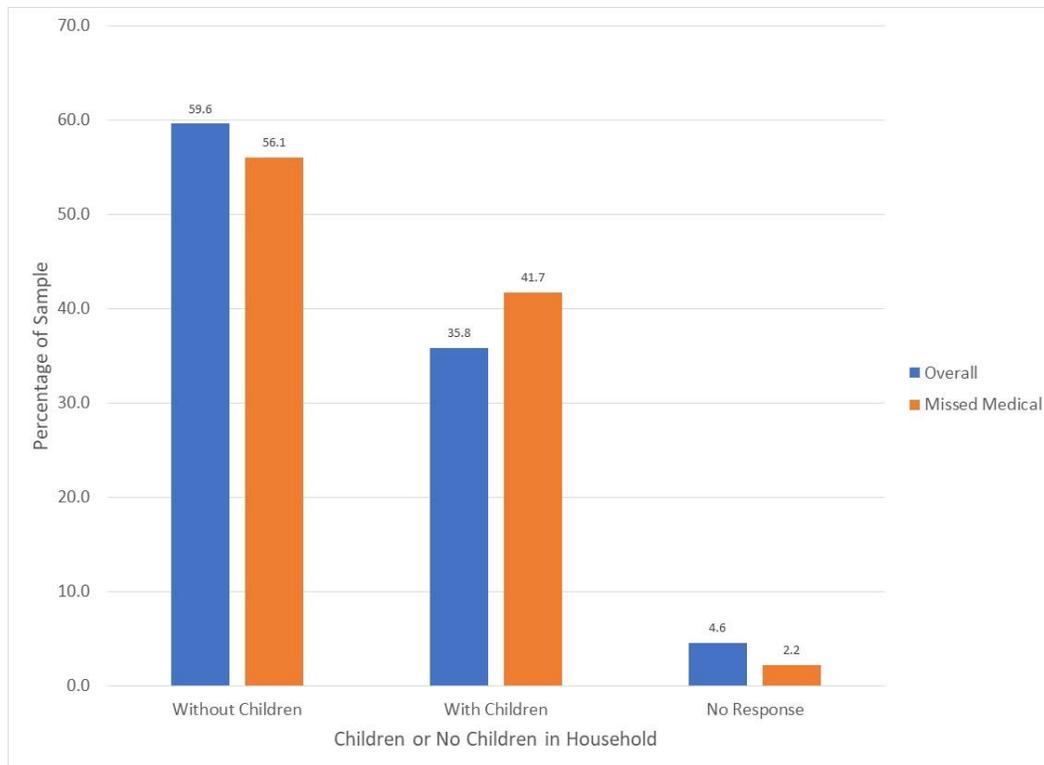
As expected, the higher annual household income categories reported fewer issues with transportation challenges requiring them to miss medical appointments. It is possible that for those individuals in the higher income categories who reported missing medical appointments, they may have physical limitations, not monetary limitations, that make it difficult for them to access medical appointments.

The researchers then considered the age of those who reported difficulties with missing medical appointments as a result of transportation (Figure 4-95).



**Figure 4-95: Missed Medical Appointments & Age Group**

The results are somewhat unexpected in that it appears that younger survey respondents, not the anticipated older survey respondents, reported missing medical appointments more often. Therefore, the researchers wanted to better understand if households with children were overrepresented in those who reported missing medical appointments (Figure 4-96).



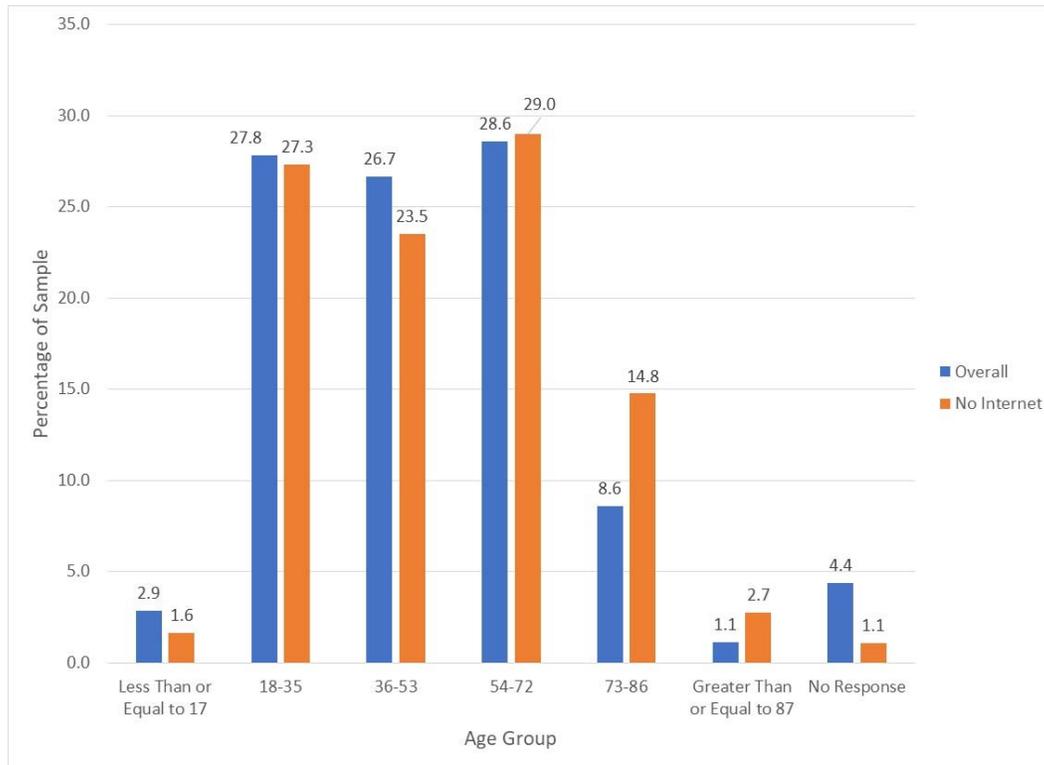
**Figure 4-96: Missed Medical Appointments & Children in Household**

It appears that those with at least one child living in the household are slightly overrepresented in the data, suggesting that there is the *potential that children may be missing medical appointments*. This was suggested by one survey respondent who noted:

*“I strongly believe we need some type of public transportation. There are many in the community with children and a cab ride is \$5 for each person. So, if you have a parent with a couple of children that need to go to the store or doctor, it would be \$30 for a round trip. Ridiculous.”*

### 4.3.16. No Household Internet & Age Group

The researchers wanted to better understand the age groups of online survey respondents who indicated that they did not have household internet. Overall, as expected, a greater percentage of the 73-86 and 87 and older age groups reported not having household internet as compared with their representation in the overall sample (Figure 4-97).

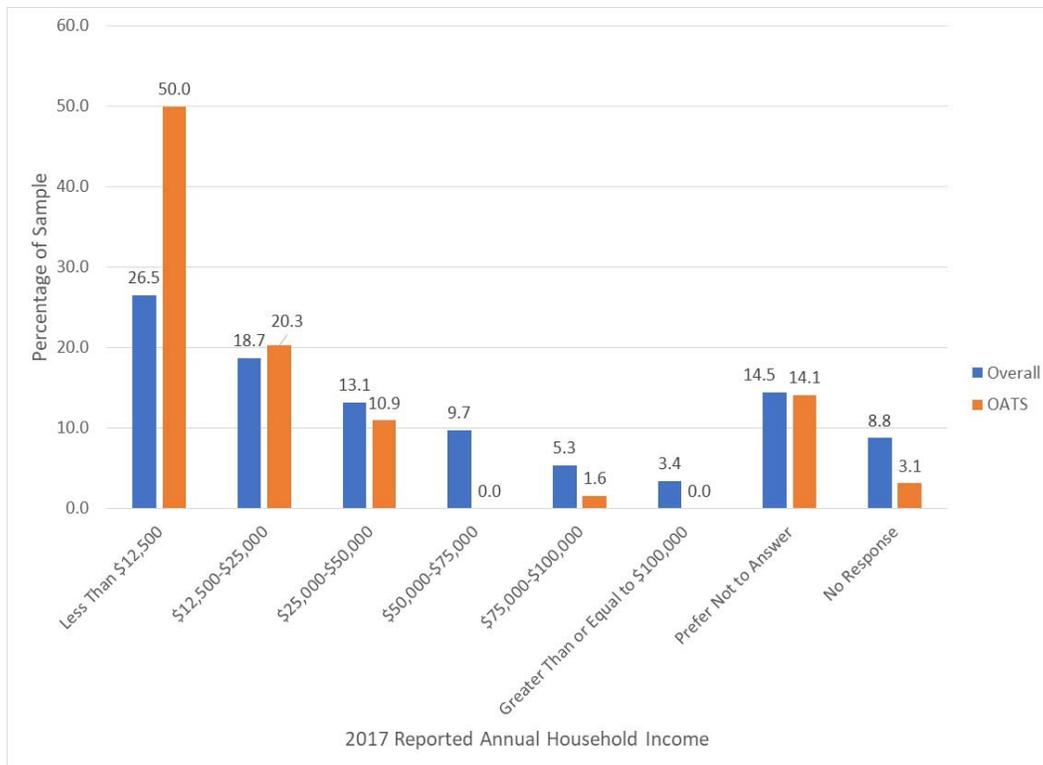


**Figure 4-97: Age Group & No Household Internet**

The 36-53 age group was underrepresented in the sub-sample that reported no household internet, suggesting that this group has greater access to the internet. Considering that the mobility concerns (being able to have transportation and potentially having special needs as mobility decreases) for older Americans (e.g. 73 and older) are different than younger individuals, there is a need to ensure that information gathered for planning purposes uses methods other than internet dissemination, as the gathered information would miss input from these age groups.

### 4.3.17. Characteristics of OATS Users

The following data pertains to people who responded that they have used OATS, regardless of frequency. Therefore, those represented in the following figures may have only used the service once. First, the researchers considered the 2017 reported annual household income of survey respondents who reported using OATS (Figure 4-98).



**Figure 4-98: OATS Users & Annual Household Income**

It is not surprising that the lowest annual income earners reported using OATS the most. From the descriptors that survey respondents provided regarding OATS’ service, it would likely be an undesirable service for those who report higher annual household incomes.

Next, the researchers considered the ages of survey respondents who reported using OATS (Figure 4-99).

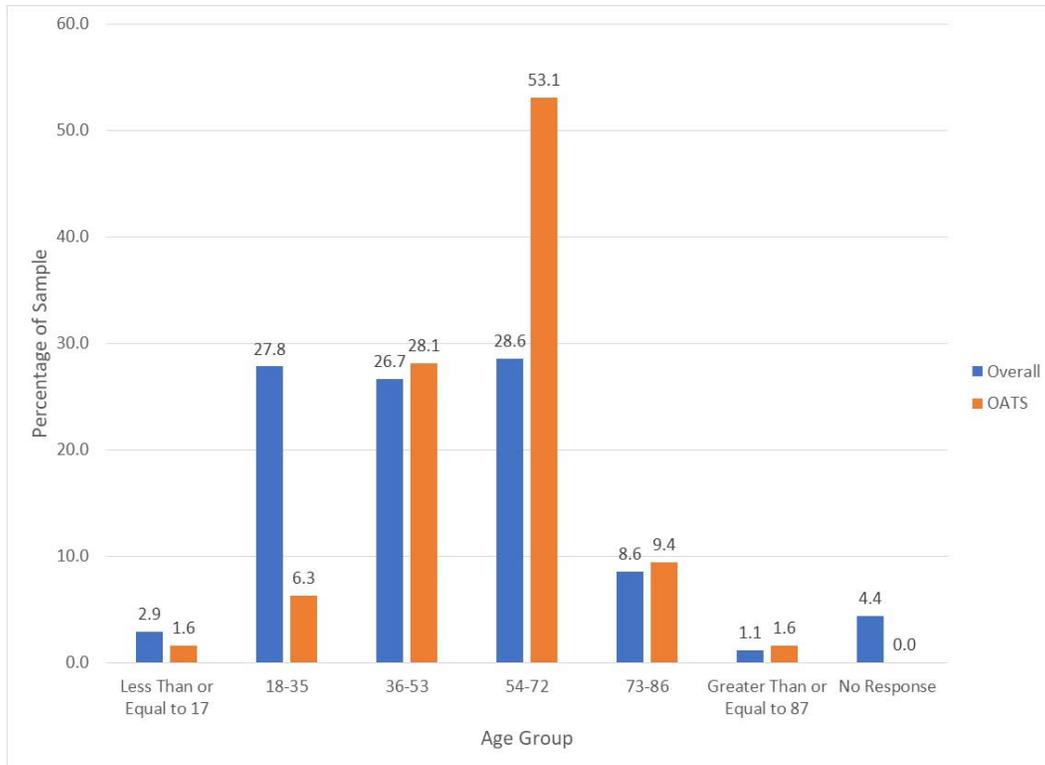
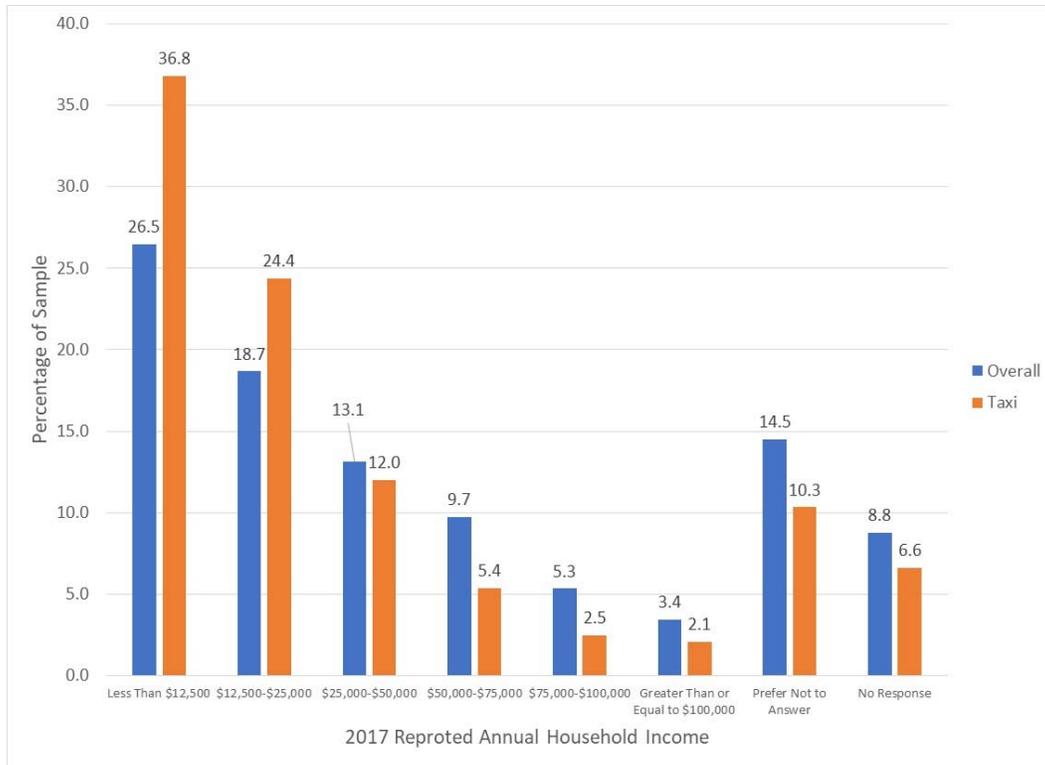


Figure 4-99: OATS Users & Age Group

As expected, the 54-72 age group is significantly overrepresented as users of OATS. Therefore, for the younger age groups, for example, the 18-35 age group, it is unclear if the service design of OATS detracts from the interest in use, or if individuals in the youngest age group do not understand that they could use the service. If planning efforts move forward, or even as an interim solution to provide mobility to residents, **LEBANON should work with OATS to provide awareness of this public transportation option that exists.**

#### 4.3.18. Characteristics of Taxi Users

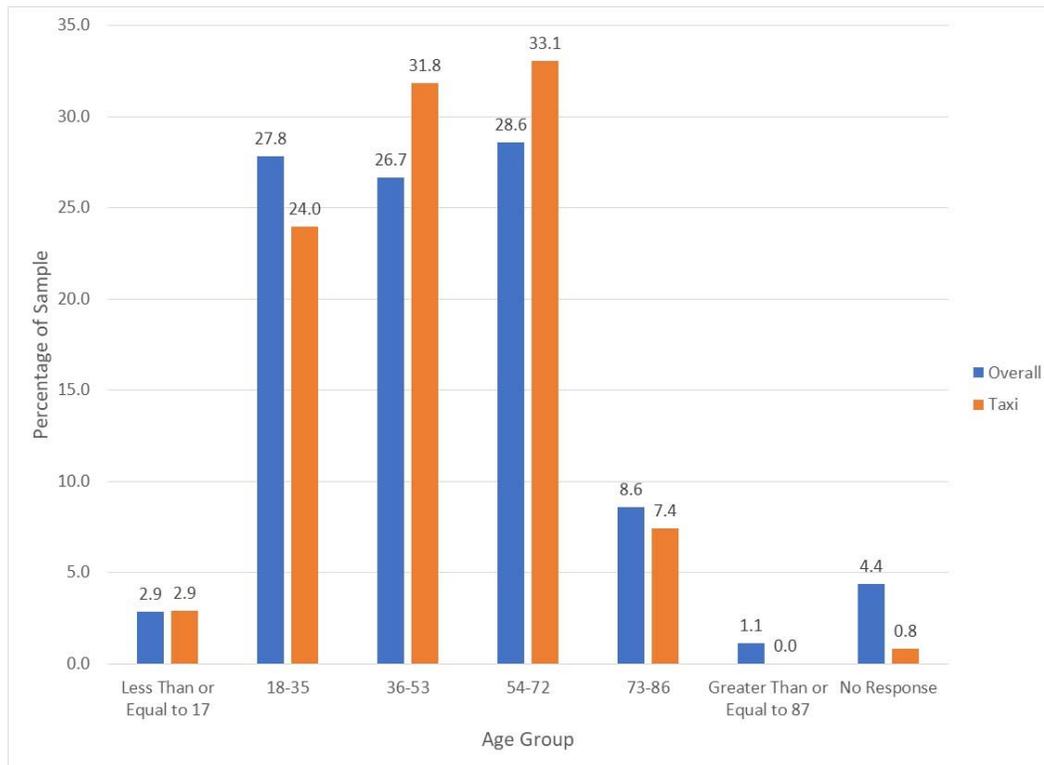
The following data on taxi usage pertains to respondents who have ever used the taxi services within LEBANON. Therefore, those represented in the following figures may have only used the service once. First, the researchers considered the 2017 reported annual household income of survey respondents who reported using a taxi (Figure 4-100).



**Figure 4-100: Taxi Users & 2017 Reported Annual Household Income**

Again, as expected, the transportation-dependent (those earning less than \$25,000 annually) are overrepresented as taxi users when compared with the entire sample.

The researchers also considered the reported age of taxi users (Figure 4-101).

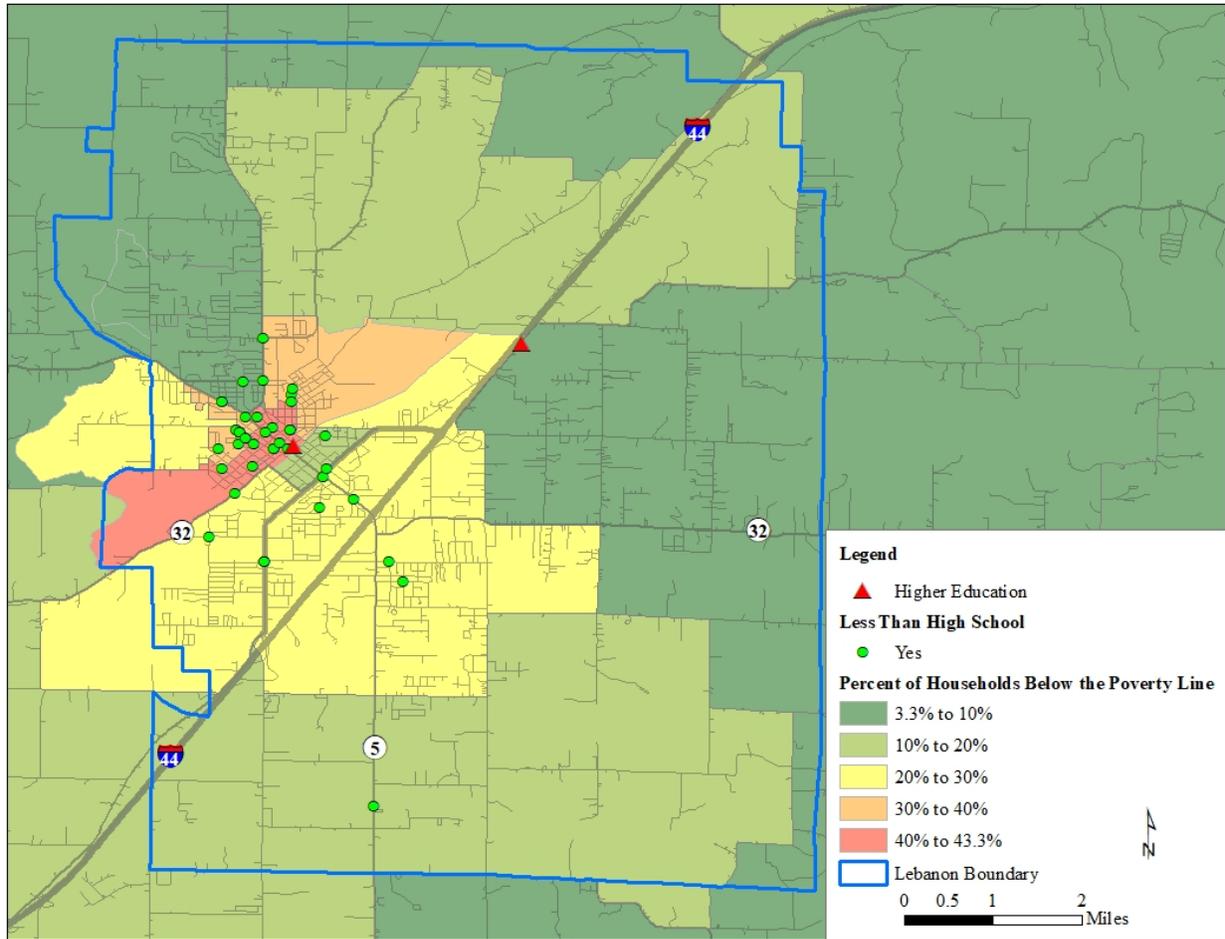


**Figure 4-101: Taxi Users & Age Group**

For the OATS service, the users were largely represented by the 54-72 category. By contrast, for taxi services, users from the 36-53 age category have nearly equal usage to that of the 54-72 category. Interestingly, those in the oldest categories (e.g. 73-86 and greater than 87) were underrepresented in this category, suggesting that individuals in these age groups do not prefer to use the taxi. Similarly, while those in the 18-35 age group have a lower representation as compared with the overall sample represented by this age group, the difference is significantly closer than that reported for use of the OATS service (e.g. a difference of 3.8% as compared with a difference of 21.5%).

#### 4.3.19. Location of Less Than a High School Education

The researchers wanted to understand the location of survey respondents who reported not having a high school education to consider how a public transportation system could provide them with connectivity to a GED program (see Figure 4-57). Figure 4-102 shows the location of survey respondents who reported less than a high school degree.

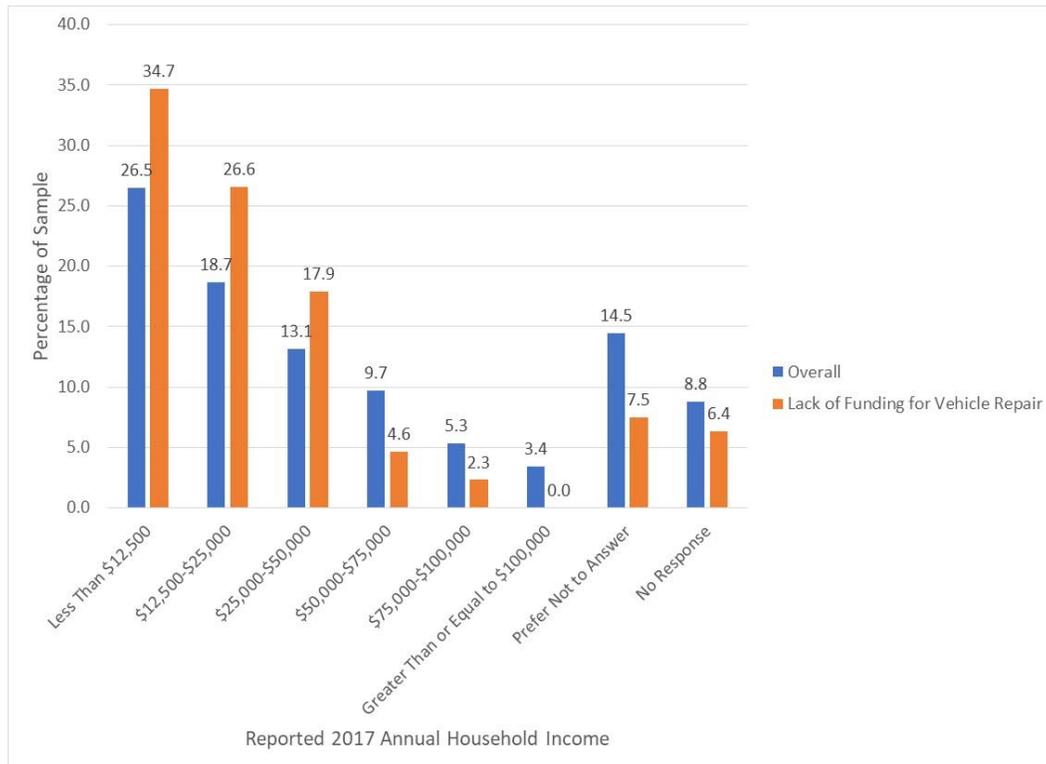


**Figure 4-102: Level of Education, Less Than High School**

The triangle that is closest to the cluster of green survey respondents is Drury, a private school. The triangle that is near I-44, represents OTC and MSU. There is clearly a substantial distance between where the density of survey respondents with less than a high school degree live and the OTC/MSU campus, which likely provides the best option for these individuals to pursue at least a GED equivalent. Furthermore, the road that students would have to travel on with a bike or walking, if they did not have a private vehicle, has a high posted speed limit and no shoulders. Therefore, someone who would want to access the campus would either have to get a ride from someone else or not make the trip without having a vehicle. Recall from earlier discussions that those in the orange polygon had one of the highest percentages of households without a vehicle (see Figure 2-22), and those in the red polygon (Census Block Group 3, Census Tract 9609 Laclede County, MO) had the highest percentage of households that reported one vehicle, with 60-69.9% (see Figure 2-23).

### 4.3.20. Lack of Funding for Vehicle Repairs & Reported Annual Household Income

The researchers wanted to better understand the relationship between survey respondents reporting that they did not have enough funding to repair their vehicle (Figure 4-103) and their incomes.



**Figure 4-103: Lack of Funding for Vehicle Repairs & Reported 2017 Annual Household Income**

As expected, compared with the overall sample, the survey respondents who reported that they did not have sufficient funds to repair their vehicle were also overrepresented in the lower income categories. Note that there is a small number of survey respondents in the higher reported annual household income categories that reported a lack of funding for vehicle repairs.

### 4.4. Summary of Survey Data

The following summary describes some notable findings from the survey data collected:

Cost of travel was reported as being more important by hard copy survey respondents, who tended to report lower annual household incomes. As it is expected that low-income individuals may represent some of the most frequent users of a public transportation system, LEBANON should carefully consider what fee will be charged for a bus, as high fees may result in underuse by the anticipated largest user category.

Just under thirty-five percent of all survey respondents reported missing work as a result of transportation problems, which the literature shows can impact one’s ability to access and maintain

employment. In addition to negatively impacting a person, the impacts of missed work can impact the productivity of an employer. Both of these impacts can negatively impact a community's economy.

With limited education (overrepresented in less-than-high school education) and low annual incomes (overrepresented in annual incomes less than \$12,500), **the youngest of LEBANON residents (18-35) face an uphill battle** to achieve economic stability when an estimated 17% of their household budget is for transportation. A public transportation option that allows members of this age group to access desirable places of employment and/or educational opportunities to advance their credentials would bring an economic benefit to the community.

Survey respondents who identified as providing rides to others most often reported doing so periodically, which is **not a reliable form of mobility**. This supports findings by APTA that obtaining a ride from someone else is an unreliable form of transportation. Furthermore, as noted by APTA (APTA, 2017), many individuals who rely on others for rides feel *uncomfortable* and would instead prefer to have a transportation alternative that would not require them to obtain a ride from someone else.

When considering the number of survey respondents who reported that they or someone in their house would use public transportation added to the number of survey respondents who reported that neither they or someone in their house would use public transportation but that they see value in public transportation being provided in the community, **86.5% of all survey respondents reported support for a public transportation system for LEBANON**. Furthermore, less than six percent of all survey respondents reported that they did not believe that a public transportation system would improve the lives of others.

OATS and taxi services in LEBANON do not address the mobility needs of residents, the former because of limited service and the latter because of cost and concerns with safety.

LEBANON staff should discuss with the school district the possibility of combining maintenance activities for school buses and public transportation system buses.

A notable observation when comparing the online surveys to the hard copy survey is the average age of the respondents for each dataset and their corresponding education and income levels. The online surveys tend to be responses from older individuals in LEBANON who are wealthier. The hard copy surveys have more observations from younger individuals and those with children. Many are extremely poor. While there can be an expectation that income levels and potentially education levels will increase with age, there are many individuals in the hard copy surveys who are beyond the college years (i.e. 18 to 22) possessing less than a high school education. It is unlikely that these individuals will have much opportunity to better themselves without support. They will likely be unable to leave the community as low-income earners have little opportunity to relocate. Therefore, providing these individuals with opportunity to access education or a steady, skills appropriate job via a public transportation system would benefit the individual and the community. In some cases, desperate individuals may resort to crime in search of food or from depression.

*"...the teenager in North Carolina who walked for hours each day until a kind police officer brought him a bike; Stacey Calvin who spent more time commuting by bus and train than she spent at her part time job in Atlanta; and James Baker, pedaling in snow for an hour in Frederick, Maryland, because bus service wasn't a viable option. When you can't afford a car and lack access*

*to good public transit it creates a chain reaction. Not only does commuting become unbearable but quality of life drops and access to jobs diminishes, reducing economic opportunities to provide stability for your family”* (Kaufman, 2017). LEBANON should keep these observations in mind when considering what kind of service provisions to implement with a public transportation system. Would they make the effort to walk to a bus if it is only going to come every hour? What if you are five minutes late, or what if the bus is running early and you miss it? If you are working part-time, does it make sense to go in for the hour by the time you wait for the next bus?

As stated very well, *“Access to transit alone will not pull even the most determined people out of poverty, but it is an important part of the solution”* (Kaufman, 2017). LEBANON has many resources and support for a large portion of the public that will likely work in conjunction with a public transportation system to help alleviate poverty and expand economic opportunity for many residents.

Overall, while there was a decent level of support for a public transportation system in LEBANON, there were also several negative viewpoints. To provide LEBANON with some ideas on how to address these negative viewpoints, the authors have developed a table that shows some common viewpoints against public transportation with potential ideas for a response in the LEBANON context. This table can be found in Appendix E – Potential Responses to Common Critiques.

## 5. MISSOURI PUBLIC TRANSIT SYSTEMS SURVEY

### 5.1. Survey Introduction

As a part of the feasibility study, WTI solicited feedback from twenty-one public transportation agencies across the State of Missouri that had similar demographics to LEBANON. The survey intended to gain information on peer transit system operations, ridership, funding, and lessons learned. The full survey instrument is available in Appendix G – Missouri Public Transportation Systems Survey Instrument.

A total of thirty questions were asked; the questions are summarized in the following topic areas:

- System Starting Year
- Reason for Starting the System
- System Details
  - Type of Public Transportation System
  - Route Changes
  - Ownership and Operations
  - Service Area Size
  - Service Hours and Days
  - Annual Miles Traveled
  - Bicycle Racks
  - Bus Stop Infrastructure
  - Information Dissemination
  - Notable Changes
- Budget and Funding
  - Budget – Facilities, Management, Service
  - Capital Costs
  - Fare
  - Funding
- Ridership
  - Annual Rides
  - Ride Purpose
  - Rider Information
  - Number and Type of Buses
- Lessons Learned and Recommendations
  - System Changes Over Time
  - Recommendations for LEBANON

Twenty-one peer public transportation agencies were sent the survey. These peer systems were chosen based on having similar demographic information (population or population density) with LEBANON (Table 5-1). The systems with an asterisk next to their name have responded to the survey.

**Table 5-1: Demographic Information for Peer Public Transportation Systems**

Public Transportation System	Population	Density (People/SqMile)
<b>City of Lebanon</b>	<b>14,709</b>	<b>1,005.40</b>
Cape Girardeau County Transit Authority	78,913	136.40
City of Bloomfield Transportation System	2,020	1,496.30
City of Carthage	14,309	1,228.24
City of Clinton*	8,844	967.61
City of Columbia	120,612	1,912.05
City of El Dorado Springs	3,577	1,161.36
City of Excelsior Springs	11,522	1,104.70
City of Houston	2,093	575.00
City of Lamar*	4,420	863.28
City of Mt. Vernon*	4,553	1,176.49
City of Nevada	8,224	915.81
City of New Madrid	3,005	669.27
City of St. Joseph	76,472	1,738.40
City of West Plains	12,320	925.62
Direct Transit (Ray County Transportation)*	22,754	40.00
Dunklin County Transportation*	30,535	56.43
Franklin County Transportation Council	102,838	111.46
Mississippi County Transit System*	13,799	33.53
Ripley County Transit, Inc.	13,817	21.95
Scott County Transportation Systems*	38,745	92.25

Twenty-one peer public transportation agencies were sent an invitation to complete the Missouri Public Transportation Survey either online or by telephone, followed by at least three reminders either through phone and/or email. By May 4, 2018, nine public transportation agencies (42.9%) had responded to the survey. This includes eight from the targeted list of twenty-one public transportation agencies and one from OATS Transit (which provided service for the targeted agency). All of the respondents elected to complete the survey online through Qualtrics.

The following public transportation agencies have responded to the survey:

- 1) City of Clinton
- 2) City of Lamar
- 3) City of Mount Vernon
- 4) Direct Transit (Ray County Transportation)
- 5) Dunklin County Transportation
- 6) Mississippi County Transit System
- 7) OATS Transit (*removed*)
- 8) Scott County Transit System
- 9) Unknown Respondent

The representative from OATS responded to the survey because OATS transit provides service in Franklin County, Missouri. However, the OATS representative provided information on their services in Laclede County, Missouri instead. Since this agency was not on the list of public transportation agencies targeted for this survey, the OATS responses have been removed from the following analysis. The researchers did however confirm through online queries that OATS provides all transit service for this county. One respondent chose to not give the name of the corresponding transit agency, this response is listed as “Unknown Respondent” in this section.

One respondent only completed approximately half of the survey; as a result, the total number of respondents will be noted for each question.

## 5.2. Survey Responses

The following sections discuss the results of the survey.

### 5.2.1. System Starting Year

Respondents were asked, “**When did you start your system?**” All eight respondents completed this question. Most of the respondents’ public transportation systems were started between the 1960s and 1980s. All of the respondents’ public transportation systems have been operating for at least 24 years (see Table 5-2).

**Table 5-2: System Starting Year**

Respondent	Text Response
City of Clinton	Late 1970s
City of Lamar	1994
City of Mount Vernon	1983
Direct Transit (Ray County Transportation)	1989
Dunklin County Transit	Dunklin County Transit was started in 1982
Mississippi County Transit System	Our program started in 1985
Scott County Transit System	April 1981
Unknown Respondent	1965

### 5.2.2. Reason for Starting System

Respondents were asked, “**Why did you start your system?**” All eight respondents completed this question (Table 5-3). Five respondents (62.5%) stated that their public transportation system was started to support transportation disadvantaged populations, primarily seniors. Two respondents (25.0%) stated that the system was started to provide good transportation to the general public. One respondent (12.5%) stated that the system was started out of public demand and that the City took over a privately-operated system that was going out of business.

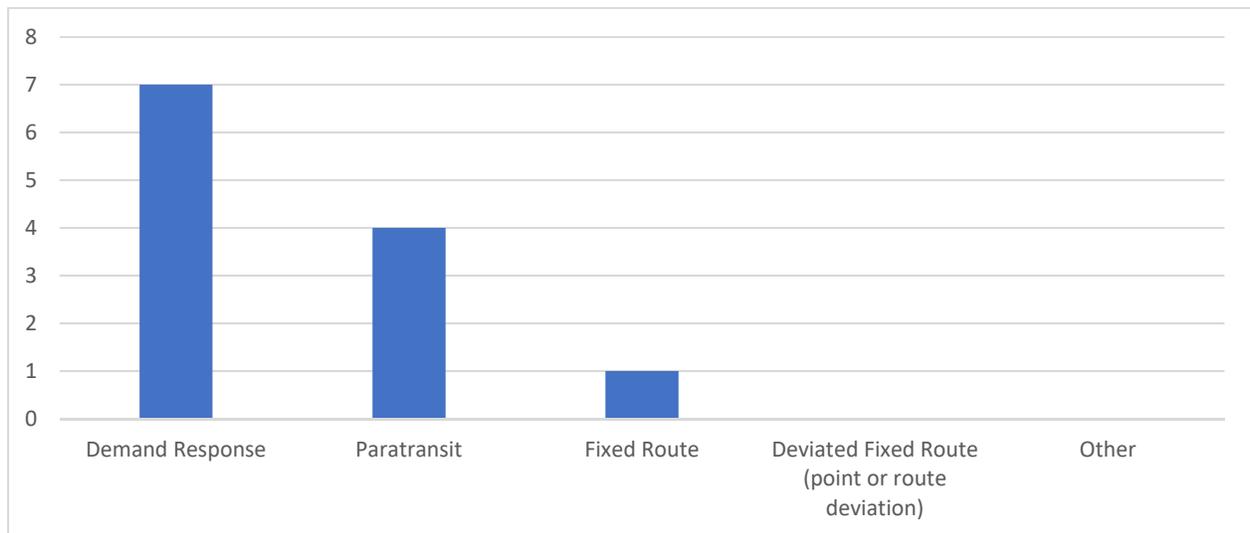
**Table 5-3: Motivation for System Start**

Respondent	Elderly	People with Disabilities	Low-income	Everyone	Private Entity Going-out-of-Business
<b>City of Clinton</b>	X	X	X		
<b>City of Lamar</b>	X	X		X	
<b>City of Mount Vernon</b>	X	X			
<b>Direct Transit (Ray County Transportation)</b>	X				
<b>Dunklin County Transit</b>				X	
<b>Mississippi County Transit System</b>				X	
<b>Scott County Transit System</b>	X				
<b>Unknown Respondent</b>					X

Full text responses are listed in Appendix H – Full Text Responses to Missouri Public Transportation Systems Survey.

### 5.2.3. Type of Transportation System

Respondents were asked what type of public transportation services their system provides. All eight respondents answered this question. Four respondents (50.0%) stated that they only provide demand response public transportation (see Figure 5-1). Three respondents (37.5%) offer paratransit and demand response public transportation. One respondent (whose agency is unknown) (12.5%) offers fixed route and paratransit.



**Figure 5-1: Public Transportation System Structure**

**Table 5-4: Public Transportation System Structure**

Respondent	Demand Response	Paratransit	Fixed Route	Deviated Fixed Route	Other
City of Clinton	X				
City of Lamar	X	X			
City of Mount Vernon	X				
Direct Transit (Ray County Transportation)	X	X			
Dunklin County Transit	X				
Mississippi County Transit System	X				
Scott County Transit System	X	X			
Unknown Respondent		X	X		

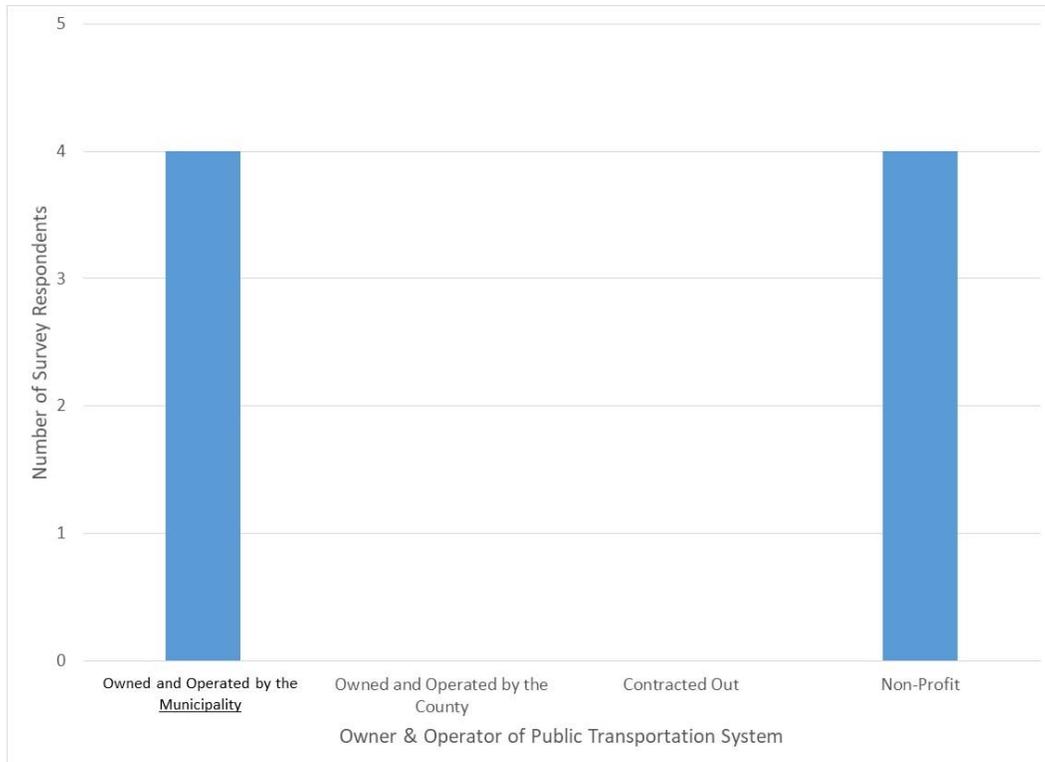
#### 5.2.4. Route Changes

Respondents were then asked, “**Have you changed the system’s route over time?**” and “**What were the route changes made?**” None of the respondents answered these questions.

#### 5.2.5. Ownership & Operation

Respondents were asked who owned and operated the public transportation system. All eight respondents answered this question. Half indicated that they were non-profits, and half were owned and operated by a municipality (the OATS observation was removed). Half the respondents (50.0%) including Dunklin County Transit, Direct Transit, Mississippi County Transit System, and Scott County Transit System selected "other" and all stated that that they are **non-profit** public transportation systems (Figure 5-2). The remaining respondents (50.0%) including City of Clinton,

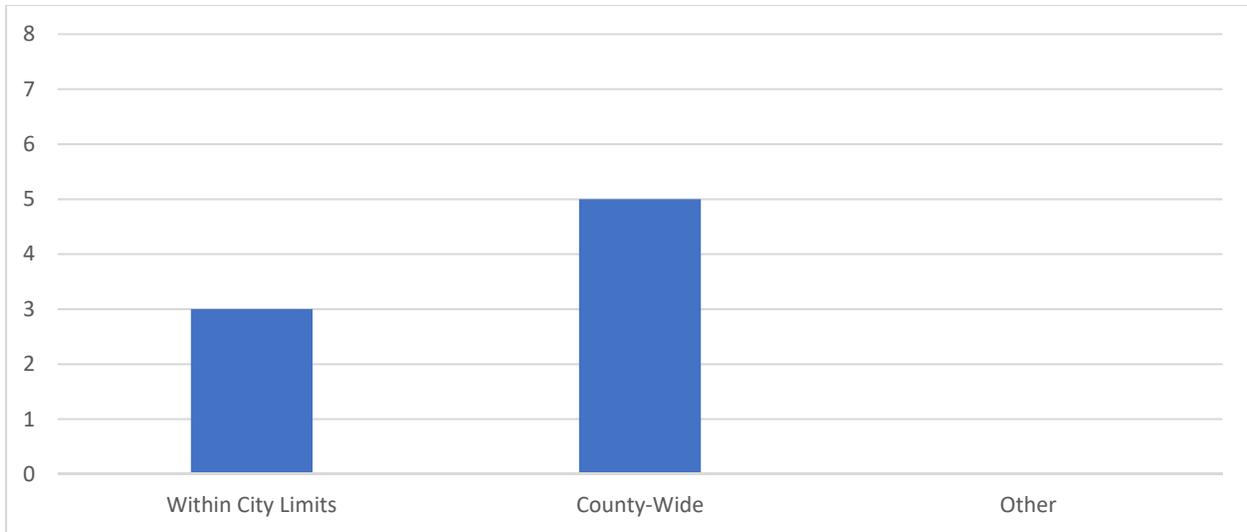
City of Lamar, City of Mount Vernon, and the Unknown Respondent have systems that are **owned and operated by the municipality**.



**Figure 5-2: Type of Agency that Operates the Public Transportation System**

### 5.2.6. Service Area Size

Respondents were asked about the size of the service area for their public transportation system. All eight respondents answered this question. One respondent (12.5%) selected “other” and stated that the system is operated county-wide in the comments, so this response will be included in the total number of respondents that operate county-wide. Five respondents (62.5%) have a county-wide service area (Figure 5-3). The remaining respondents (37.5%) operate within city limits.



**Figure 5-3: System Service Area**

**Table 5-5: System Service Area**

Respondent	Within City Limits	County-Wide	Other
City of Clinton	X		
City of Lamar			X
City of Mount Vernon	X		
Direct Transit (Ray County Transportation)		X	
Dunklin County Transit		X	
Mississippi County Transit System		X	
Scott County Transit System		X	
Unknown Respondent	X		

### 5.2.7. Service Hours and Days

Respondents were asked, “**How many 1) hours per day, and 2) days per week does the public transportation system operate?**” All eight respondents answered this question. *All respondents operate at least Monday through Friday.* Three of the respondents (37.5%) stated that their system operates on Saturday, and one respondent (12.5%) operates on Sunday. Two respondents (25.0%) stated that they provide specific *weekend service for dialysis patients.*

**Table 5-6: Days of Operation**

Respondent	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL
<b>City of Clinton</b>	X	X	X	X	X			5
<b>City of Lamar</b>	X	X	X	X	X			5
<b>City of Mount Vernon</b>	X	X	X	X	X			5
<b>Direct Transit (Ray County Transportation)</b>	X	X	X	X	X	X	X	7
<b>Dunklin County Transit</b>	X	X	X	X	X	X		6
<b>Mississippi County Transit System</b>	X	X	X	X	X			5
<b>Scott County Transit System</b>	X	X	X	X	X			5
<b>Unknown Respondent*</b>	X	X	X	X	X	X		6
<b>TOTAL</b>	8	8	8	8	8	3	1	-

\*The assumption was made that the sixth day was on Saturday, although the response did not clearly state the six days of service.

The text responses are listed in Appendix H – Full Text Responses to Missouri Public Transportation Systems Survey.

### 5.2.8. Annual Miles Traveled

Respondents were asked, “**How many miles does your service travel annually?**” All eight respondents answered this question. Answers ranged from 33,000 miles annually (City of Mount Vernon) to 1,161,138 miles annually (Unknown Respondent). The text responses are provided in Table 5-7.

**Table 5-7: Annual Miles Traveled**

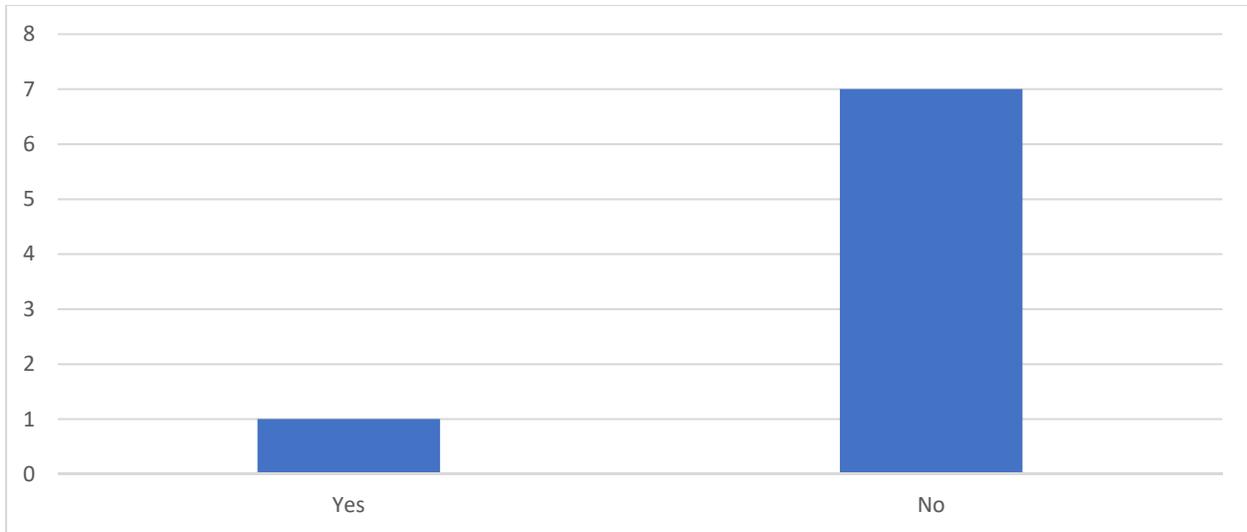
Respondent	Text Answer
City of Clinton	40,000
City of Lamar	50,000
City of Mount Vernon	33,000
Direct Transit (Ray County)	382,587 last year
Dunklin County Transit	Last FY we traveled 337,605 miles.
Mississippi County Transit System	Close to 200,000
Scott County Transit System	121,000
Unknown Respondent	1161138 <sup>1</sup>

### 5.2.9. Bicycle Racks

Respondents were asked, “**Do your buses have bicycle racks?**” All eight respondents answered this question. Overall, this does not seem to be a consideration for the respondent systems. Seven respondents (87.5%) stated that their buses do not have bicycle racks (Figure 5-4). The eighth respondent indicated that there was a bicycle rack; unfortunately, the agency providing this information is unknown.

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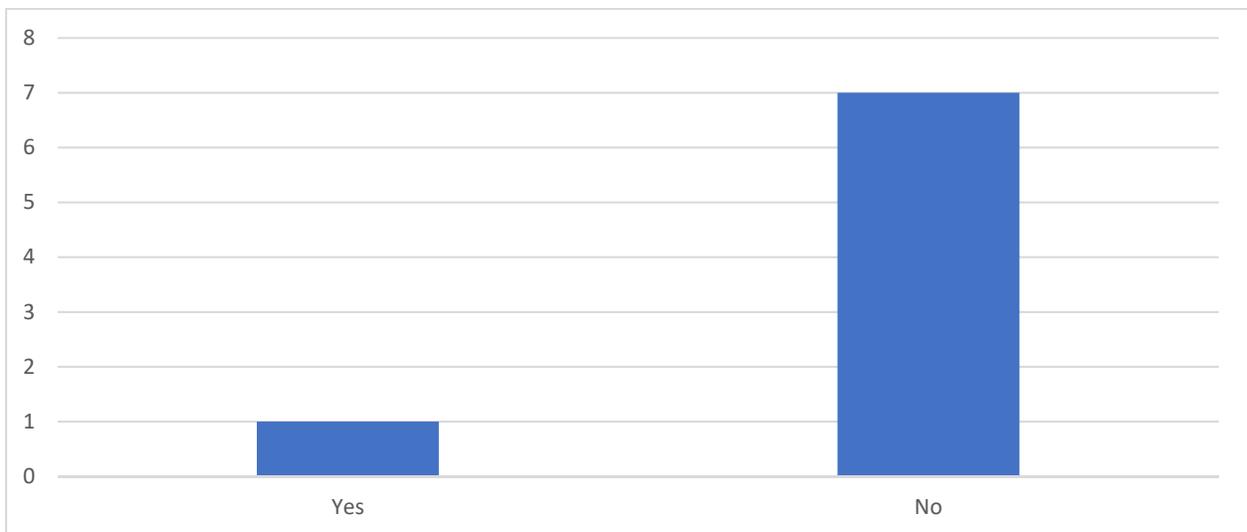
<sup>1</sup> The respondent did not provide the answer with a comma; it was left as entered because it is unclear if there was an extra number, or if the service did in fact provide more than 1 million miles of service.



**Figure 5-4: Bicycle Racks**

### 5.2.10. Bus Stop Infrastructure

Respondents were then asked, **“Do you have bus stop infrastructure?”** LEBANON had specifically requested that this question be included. All eight respondents answered this question. Only one respondent (12.5%) has a system with bus stop infrastructure (Unknown Respondent) (Figure 5-5). This respondent answered a follow-up question, “Do you have bus stops located on private property, public property, or other?” This respondent stated that the bus stops are located on public property. Again, because the survey respondent did not provide information regarding agency affiliation, additional information could not be obtained.



**Figure 5-5: Bus Stop Infrastructure**

### 5.2.11. Information Dissemination

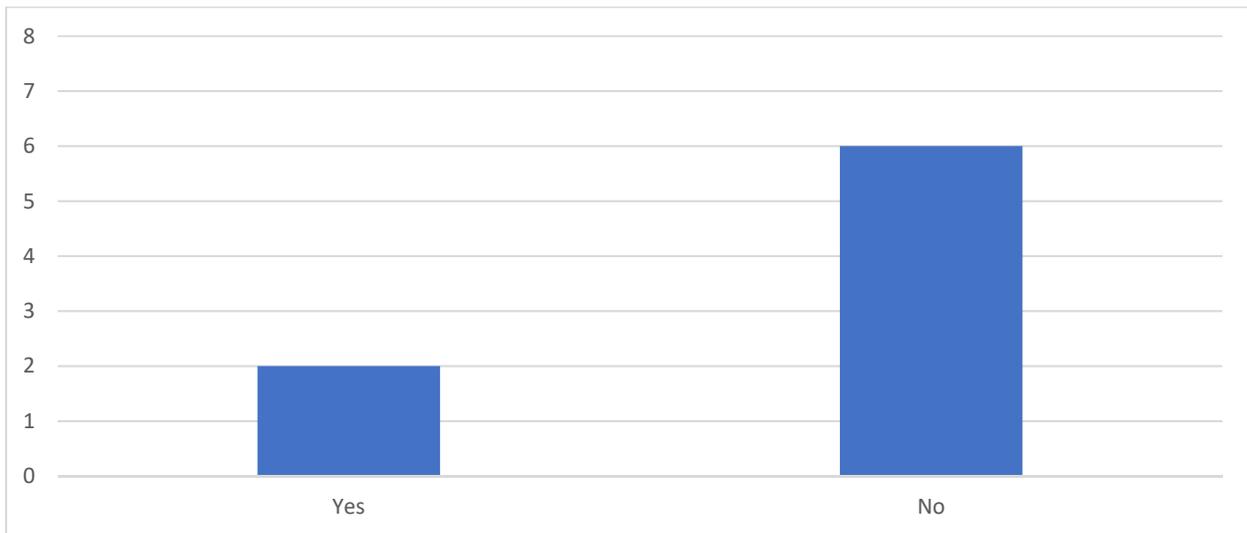
Respondents were asked, “**How do you provide information about the service to the public (e.g. Facebook/social media, pamphlet, radio, other)?**” All eight respondents answered this question. While social media, local newspapers, printed materials (pamphlets, flyers), and the transportation system website were common answers, printed materials were still the most popular (Table 5-8). One respondent (12.5%), Scott County Transit, stated that the agency provides information to *doctors’ offices*. The text answers are provided in Appendix H – Full Text Responses to Missouri Public Transportation Systems Survey.

**Table 5-8: Summary of Information Dissemination Used by Missouri Public Transportation Systems**

Respondent	Social Media	Printed Materials (pamphlets, flyers)	Newspaper	Posters at Local Businesses/Medical Facilities	Local Media (radio, television)	Website	Word of Mouth	Apps
City of Clinton	X	X	X					
City of Lamar		X	X		X	X		
City of Mount Vernon			X				X	
Direct Transit (Ray County Transportation)								
Dunklin County Transit	X				X	X		
Mississippi County Transit System		X			X		X	
Scott County Transit System		X		X				
Unknown Respondent	X	X				X		X
<b>TOTAL</b>	<b>3</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>

### 5.2.12. Notable Changes

Respondents were asked, “**Have there been any notable changes to the system within the past 5 years?**” Two respondents (25.0%) stated that there was a notable change (Scott County Transit System and the Unknown Respondent) (Figure 5-6). Scott County Transit System stated that its system *extended the hours of service* from 4:00 pm to 5:00 pm due to public demand. The Unknown Respondent stated that the system changed from an “orbital pulse system to a networked system.” An orbital pulse transit system allows for something called a “*timed transfer*” or scheduled times when buses will wait for each other so that passengers may transfer between routes in one location (Vuchic, Clarke, & Molinero, 1981). These work well in areas where transit headways are longer so that passengers do not need to wait long periods of time between transferring bus routes. A networked public transportation system will not have “timed transfers.” A networked system tends to have buses running frequently on routes, so the passengers can easily transfer between buses without having a lengthy wait time.



**Figure 5-6: Have there been any notable changes to the system within the past 5 years?**

### 5.2.13. Budget – Facilities, Management, Service

Respondents were asked about their annual budget for facilities, management, and service costs. Additionally, they were asked what their annual maintenance costs are for the transit system. Five respondents (62.5%) answered this question (Table 5-9). Dunklin County Transit provided the most specific budget information out of all of the respondents. Dunklin County Transit had an annual budget of \$517,047 for the previous fiscal year. The annual maintenance costs for Dunklin County Transit were \$20,323 for vehicles and \$4,423 for facility maintenance.

**Table 5-9: Annual Budget and Annual Maintenance Costs**

Respondent	Annual Budget (facilities, management, service costs)	Annual Maintenance Costs
City of Clinton	Did not respond.	Did not respond.
City of Lamar	130,000	5,000
City of Mount Vernon	170,305.40	6,000
Direct Transit (Ray County)	Did not respond.	Did not respond.
Dunklin County Transit	For last fy, \$517,047.00	\$20,323.00-vehicles \$4,423.00-facility
Mississippi County Transit System	350,000	50,000
Scott County Transit System	\$300,000.00	\$6,000.00
Unknown Respondent	Did not respond.	Did not respond.

In general, the annual budget and maintenance costs seem to increase as the service area increases. Dunklin County Transit, Mississippi County Transit System, and Scott County Transit System all provide countywide services which would require longer travel distances resulting in higher service and maintenance costs.

#### 5.2.14. Capital Costs

Respondents were asked, “**What sum have you spent on capital investments (e.g. purchase of vehicles or other system improvement items) over the past five years?**” Five respondents answered this question (Table 5-10).

**Table 5-10: Capital Investments Over Last Five Years**

Respondent	Sum of Capital Investments
City of Clinton	Did not respond.
City of Lamar	10,000
City of Mount Vernon	111,000 80% is paid with federal grants
Direct Transit (Ray County)	Did not respond.
Dunklin County Transit	\$66,975.00 has been spent by our transit, 20% match on vehicles over past 5 years.
Mississippi County Transit System	100,000
Scott County Transit System	\$20,000.00
Unknown Respondent	Did not respond.

### 5.2.15. Fare

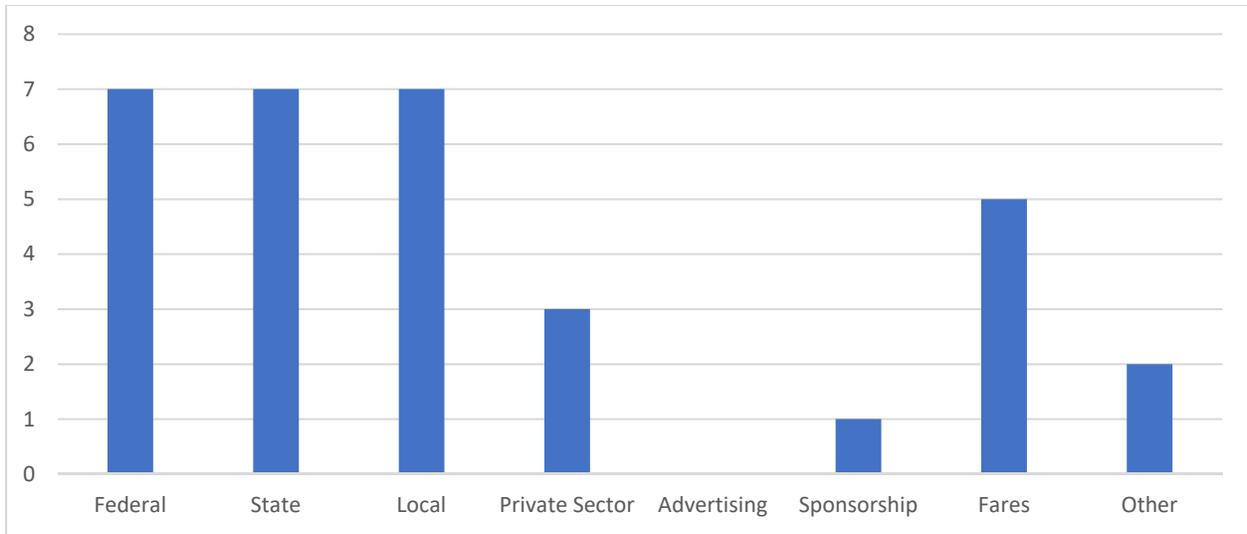
Respondents were asked, “**What fare do you charge, and does it vary by rider type?**” Seven respondents answered this question. Fares range from \$0.50 (City of Mount Vernon) to \$150.00 (Mississippi County). *Fares tend to increase as the service area increases from city-level to county-wide.* The \$150 fare for Mississippi County is for a roundtrip ride from Mississippi County to St. Louis, Missouri which is over 300 miles (Jones, 2018). Only one respondent (Direct Transit (a.k.a. Ray County Transportation)) stated that some riders (e.g. seniors, people with disabilities, and Medicare rides) receive free fares based on contracts and grant programs. The text answers are provided in Table 5-11.

**Table 5-11: Fares of Other Missouri Transit Systems**

Public Transportation System	Text Response
City of Clinton	1 dollar per one way trip.
City of Lamar	1.00 senior and disabled, 3.00 regular fare per stop.
City of Mount Vernon	\$.50 cents elderly and handicap \$1.00 all other rides per stop
Direct Transit (Ray County)	varies from \$2.25 to \$5 each way depending on where they live in the county, some riders are free based on contracts and grant programs
Dunklin County Transit	We have suggested donations In-town-\$6.00 In-county-\$10.00 Adjacent county-\$15.00 Outside Adjoining County/Long Distance Medical-\$35.00.
Mississippi County Transit System	Fares are based on age and how far they travel. \$5-\$150
Scott County Transit System	The suggested contribution varies by rider type and destination.
Unknown Respondent	Did not respond.

### 5.2.16. Funding

Respondents were asked, “**What are the sources of funding for your system (check all that apply)?**” Seven respondents answered this question. All respondents stated that they receive Federal, State, and Local funding (Figure 5-7). Five respondents (62.5%) stated that they receive funding from fares. Three respondents (37.5%) stated that they receive additional funding from the private sector. These respondents include: City of Lamar, Direct Transit (Ray County Transportation), and Scott County. *The City of Lamar stated that private funds are received from a number of sources including local banks, businesses, civil clubs, Walmart “Community Giving” grants, and private donors (Keatts, 2018); the diversity of sources was highlighted as an innovation by Hosen and Powell in the Literature Review (Hosen & Powell, 2011).* The City of Lamar specifically mentioned that it has a trust fund that was set up by a previous rider to ensure that the City of Lamar received funding from his estate each year. The City of Lamar has another donor who sends memorial donations to the transit service instead of purchasing funeral flowers when someone passes away. Two respondents (Dunklin County Transit and the Scott County Transit System) stated that they receive funding from other sources. Dunklin County receives suggested donations and Scott County Transit System receives rider contributions.



**Figure 5-7: Funding Sources**

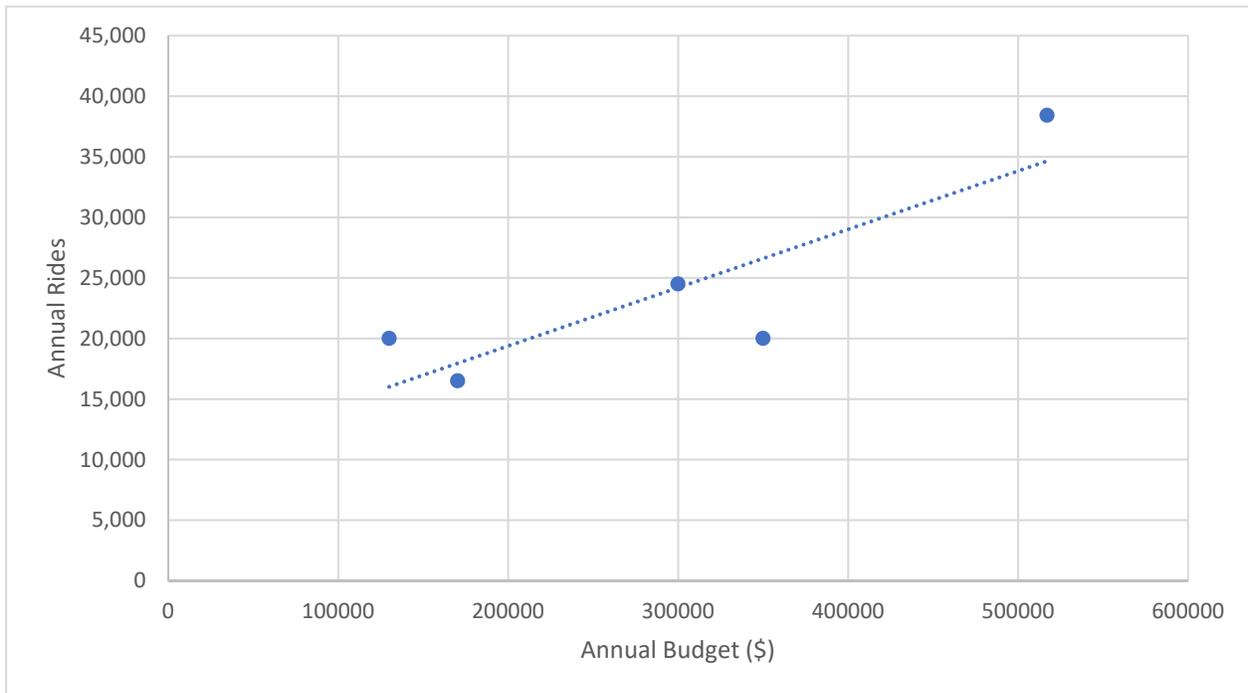
### 5.2.17. Annual Rides

Respondents were asked, “**How many rides do you provide annually?**” Seven respondents answered this question. Answers ranged from 15,000 rides to 63,232 rides annually. The average number of rides is 28,879 rides annually. The exact text responses as provided by the survey respondents are shown in Table 5-12.

**Table 5-12: Annual Rides Given**

Respondent	Text Answer
City of Clinton	20,000
City of Lamar	20,000+
City of Mount Vernon	15,000 to 18,000
Direct Transit (Ray County)	63,232 last year
Dunklin County Transit	38,422
Mississippi County Transit System	20,000+
Scott County Transit System	24,500
Unknown Respondent	Did not respond.

As the budget increased, the annual ridership increased (Figure 5-8).



**Figure 5-8: Annual Budget vs. Annual Rides**

### 5.2.18. Ride Purpose

Respondents were asked if they had a general idea of what percentage of rides were used for 1) Medical trips, 2) Shopping, 3) Employment, and 4) School. LEBANON was specifically interested in better understanding ride purposes in other Missouri communities. Seven respondents answered this question. The majority of those who responded indicated that rides were primarily used for medical purposes followed by shopping. Please recall, however, that the majority of the transportation systems were initiated in order to transport seniors. Four of the respondents stated that they did not provide a response to this question (Table 5-13).

**Table 5-13: Percentage of Rides Used for Various Purposes**

Respondent	Medical Purposes	Shopping	Employment	School
City of Clinton	Did not respond.			
City of Lamar	12	41	17	1
City of Mount Vernon	Did not respond.			
Direct Transit (Ray County Transportation)	40	51	11	
Dunklin County Transit	Did not respond.			
Mississippi County Transit System	80	20		
Scott County Transit System <sup>2</sup>	70	25	3	
Unknown Respondent	Did not respond.			

### 5.2.19. Rider Information

Respondents were asked if they knew detailed information about their riders including age, income level, or other. Seven respondents answered this question, but *only one* respondent (12.5%) had detailed information on riders. The City of Lamar stated that 45 percent of its riders were senior citizens, 41 percent were people with disabilities, and *14 percent were regular fare riders*.

### 5.2.20. Number and Types of Buses

Respondents were asked about the number and types of buses they used to operate their system. Seven respondents answered this question. Answers ranged from 3 vehicles to 22 vehicles. The exact text responses provided by survey respondents are shown in

Table 5-14. In general, the responses show that as a system's service area became larger (city limits vs. county-wide), the number of vehicles tends to be larger.

<sup>2</sup> Note: The numbers provided by the survey respondent did not add up to 100%.

**Table 5-14: Number and Types of Buses**

Respondent	How many buses do you use to operate the service?	What types of buses do you use to provide your service
City of Clinton	3	Two 20 passenger mini buses with lifts, and one 14 passenger mini bus.
City of Lamar	none	2 minivans, 1 wheelchair lift large van, 1 car
City of Mount Vernon	3	1 mini van and 2 larger van style
Direct Transit (Ray County)	22 total vehicles; mini-buses, 15 passenger vans, mini-vans, sedans	21 passengers and 17 passengers that hold 2 wheelchairs--we purchase whatever is in the state contract
Dunklin County Transit	We currently have 15 vehicles in our fleet	Car, min-vans, lowered floor mini-vans, narrow cut-away buses and wide cut-away buses
Mississippi County Transit System	9	We have 1 car, 3 lower floor wheelchair vans, 4 regular vans and one cutaway bus with a wheelchair lift.
Scott County Transit System	7	mini vans, cutaways, straight vans
Unknown Respondent	Did not respond.	Did not respond.

### 5.2.21. System Changes Over Time

Respondents were asked, “**What have you learned that you wish you knew when you started your system?**” Only three respondents (37.5%) answered this question. Only one of the three provided specific recommendations, the City of Lamar. However, Dunklin County Transit provided insight by highlighting the need for change over time. The text responses are provided in Table 5-15.

**Table 5-15: Useful Knowledge for Starting a System**

Respondent	Text Response
City of Clinton	Did not respond.
City of Lamar	pricing structure, funding sources, proof of disability
City of Mount Vernon	Did not respond.
Direct Transit (Ray County)	Did not respond.
Dunklin County Transit	I started with the transit in 1985 so I have seen many changes in 32 years.
Mississippi County Transit System	I have only been in this business for 6 years.
Scott County Transit System	Did not respond.
Unknown Respondent	Did not respond.

### 5.2.22. Recommendations for Lebanon

Finally, respondents were asked, “**What recommendations would you give to LEBANON as city officials consider whether or not to implement a system?**” Five respondents (62.5%) answered this question. While small, the most consistent response was that two respondents (25.0%) suggested *contacting the MoDOT transit division to discuss funding options*. Therefore, there is a clear need to work collaboratively with the state if a system were to be implemented. The text responses are provided in Table 5-16.

**Table 5-16: Recommendations for LEBANON**

Public Transportation System	Text Answer
<b>City of Clinton</b>	Contact MoDOT transit division about a 5310/5311 grant to assist with funding.
<b>City of Lamar</b>	make sure you are ready to b[u]y into providing funding to cover los[s]es, <b>consider the positive economic impact</b> (tax dollars etc)
<b>City of Mount Vernon</b>	Did not respond.
<b>Direct Transit (Ray County)</b>	talk to MoDOT about grant funding for operating and capital for vehicle purchases
<b>Dunklin County Transit</b>	Make sure that you have <b>a lot of community support!</b>
<b>Mississippi County Transit System</b>	Make sure you network with people who have started from the beginning.
<b>Scott County Transit System</b>	Did not respond.
<b>Unknown Respondent</b>	Did not respond.

Two important points made by survey respondents were: 1) consider the positive economic impact and 2) enlist a lot of community support. For the former, they did note that there is a need to consider how “losses” may be accounted for.

### 5.3. Summary of Missouri Public Transportation System Survey

A total of eight responses were received from the Missouri Public Transportation System Survey. All of the respondents’ public transportation systems have been operating for at least 24 years, which suggests that **these long-standing systems have brought value to their respective communities**. These systems were started out of public demand or to provide mobility options to transportation disadvantaged populations; in particular, **senior citizens** were identified most frequently. Five respondents, including the City of Clinton, City of Lamar, City of Mount Vernon, Direct Transit (Ray County Transportation), and Scott County Transit System, specifically mentioned that their systems were started to provide transportation to seniors. The percentage of the population that is aged 65 or older in these areas is similar to that of LEBANON (17.5%):

- City of Clinton, MO (18.9%)
- City of Lamar (20.1%)
- City of Mount Vernon (23.5%)
- Direct Transit (Ray County Transportation) (16.9%)
- Scott County Transit System (16.6%)

All of the respondents have public transportation systems that offer some form of demand response or paratransit services. These systems are either owned and operated by the municipality or are private, non-profits. All of these systems provide service at least Monday through Friday. Three of the respondents (75.0%) stated that their system operates on Saturday, and one respondent (25.0%) operates on Sunday. Two respondents (Direct Transit and Dunklin County Transit) stated that they provide specific weekend service for dialysis patients. In addition, Direct Transit mentioned that weekend services were provided for employment access.

Fares range from \$0.50 (City of Mount Vernon) to \$150 (Mississippi County Transit). As expected, fares for in-town trips tend to be smaller than fares for out-of-town or county-wide trips. A majority of the respondents stated that their system does not have bicycle racks on their buses and they do not have bus stop infrastructure. The City of Clinton and City of Mount Vernon have the smallest systems; both are in-town services operating three buses. Dunklin County Transit and Direct Transit (Ray County Transportation) both have county-wide systems and operate between 15 and 22 vehicles.

Printed materials (e.g. flyers and pamphlets) were the most popular marketing method. Social media and local media including newspapers and television along with the transit system website were also identified as popular ways to disseminate information about the transit systems to the public.

The systems have an annual ridership ranging from 15,000 riders (City of Mount Vernon) to 63,232 riders (Direct Transit). In general, as the number of rides increased, the annual budget increased.

Half of the respondents were able to provide information about trip purposes; for these respondents, most trips were for shopping or medical purposes. Two systems, Direct Transit (Ray County) and Dunklin County Transit specifically mentioned that they provided weekend service specifically for dialysis patients. Direct Transit also noted that it provided service on the weekend for job access. Only one of the respondents (City of Lamar) was able to provide detailed demographic information on its riders (age, income, etc.), stating that 45 percent of riders are senior citizens, 41 percent are people with disabilities, and 14 percent are regular fare riders. Interestingly enough, this system was somewhat unique when compared with other responses in that medical appointments were not the most often reported trip purpose – shopping was. The low response rate on this question may mean that a majority of the respondents either do not have a method for collecting this data, or they are not keeping detailed records of ridership information for their transportation system beyond the number of rides provided.

All of the respondents stated that their system receives funding from federal, state, and local funds. Three systems including City of Lamar, Direct Transit (Ray County), and Scott Count receive private sector funding. Potential sources to consider for private sector funding include local banks, businesses, and civic clubs. Further, two respondents recommend that LEBANON contact MoDOT in order to obtain further information on grant funding for capital, operation and maintenance costs.

## 6. PROPOSED PUBLIC TRANSPORTATION SYSTEM ROUTES

This section discusses fixed route scenarios that were developed to provide LEBANON with initial ideas on how a public transportation system could provide connections from residential areas to places of employment, the hospital, the college campus, and other locations. The primary goal of the public transportation system is to provide access to employment, higher education, and medical care. Routes were developed with efficiency and safety in mind.

Public transportation (transit) service is typically considered to be either fixed-route service, with set stops and routes, or demand-response service, which is based on specific calls for service. However, some communities use deviated fixed route service to cover major stops (origins or destinations of riders), while addressing the Americans with Disabilities Act (ADA) requirements that come with providing fixed route service.

Deviated fixed route service can be in the form of either route-deviation or point-deviation service. With route-deviation service, a bus (bus driver) can deviate between any set stops as needed to accommodate scheduled pick-ups to meet ADA requirements. With point-deviation service, a bus (or driver) will use set streets for the routes and will deviate from those streets only to get a scheduled ride but will return to the “set street” as quickly as possible. See <https://www.nationalrtap.org/adatoolkit/Service-Type-Requirements/Deviated-Route-Requirements> for additional information. The main reason for using deviated fixed-route service is to combine the benefits of fixed-route service (having set stops and schedules), without having to add a separate paratransit service. The service is typically configured so that two to three deviations can be made each hour of service. This service requires a dispatcher to have a good understanding of how long it may take the driver to deviate to the requested stop and get back on the fixed route.

Three route scenarios, including a list of potential stops and estimated travel times, are discussed herein. Travel times were estimated in two ways: 1) using the travel times generated by Google Maps – which provides an estimated travel time based on the speed limit and the number of stop lights along a route, and 2) using the widely accepted “rule-of-thumb” speed for transit planning of 12 miles per hour, which accounts for slower travel speeds as well as stopping for passengers to get on and off a bus. In reality, the travel time along the proposed routes will most likely fall somewhere in between these two travel time estimations depending on speed, vehicular traffic, number of passengers (e.g. time it takes to board and alight the bus), and other factors.

Travel times are important because they affect the headway of the bus (how frequently the bus returns to each stop, e.g. every hour). The headway of a system will affect the number of vehicles required along a route, as well as the public’s willingness to use the service. In other words, the shorter the headway, the more desirable the service becomes (see reported results from City of Lebanon Survey, Acceptable Wait Time). **With these considerations in mind, LEBANON should strive to provide services with an hour headway or less.**

The potential routes described in this section provide the **foundation** for further public transportation system planning and development. The discussion herein provides a conceptual example of potential routes. Additional planning should be done, such as considering how the bus type may impact routing, the speed traveled, and rider capacity.

In addition, while these routes may provide LEBANON with ideas as they move towards implementation, these routes should be expected to evolve over time. After implementation,

LEBANON should consider surveying both riders and non-riders, to understand how the public transportation system is being used (or why it is not used). Survey results can guide future efforts to modify routes in a manner that will continue to meet the needs of all residents in LEBANON. Changes to the system should be made typically on an annual basis, to balance the need for consistency with the need to remain relevant.

## 6.1. Potential Bus Stops

After discussions with LEBANON officials and a site visit, the following destinations were chosen as potential bus stops:

- Laclede County Library
  - This stop will serve as the start and end point for each route.
  - This stop will serve as a rest area for the driver and as a transfer point between bus routes for riders.
  - This stop provides access to the Library and the Route 66 Museum and Gift Shop, the movie theater, and Independent Stave Company (major employer of 575 people (Myers, 2018)). In addition, public restrooms are available at this location.
- Ozarks Technical Community College/Missouri State University – Lebanon (see Figure 6-1)



**Figure 6-1: Parking Lot at Ozarks Technical Community College/Missouri State University - Lebanon**

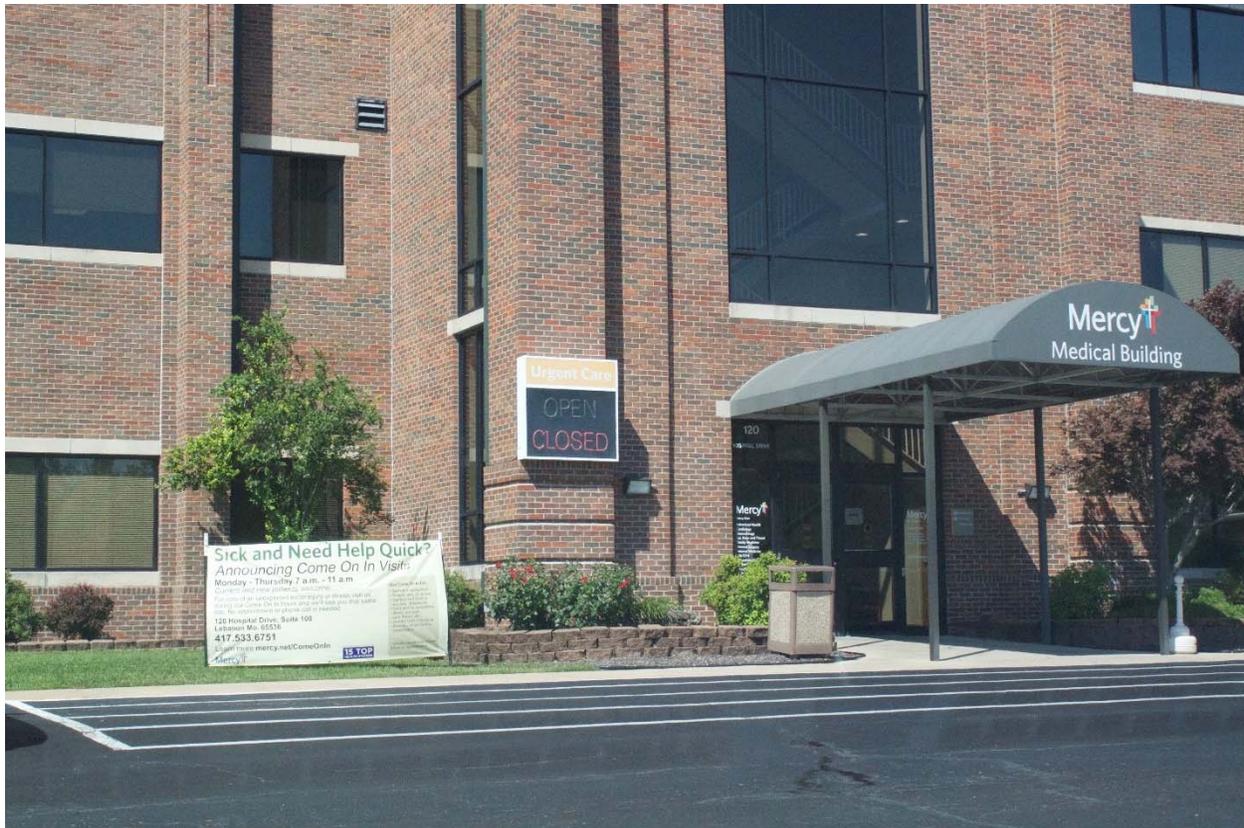
- This stop would provide access to higher education opportunities.
- Consideration should be made as to whether this route is only needed during the academic year when classes are in session, or if there is year-round, all-day demand to reach the campus (e.g. by staff, potential students, visitors, and study groups). LEBANON should work with Ozarks Technical Community College/Missouri State University – Lebanon to discuss variation in use of the

campus throughout the year to determine when a public transportation system would be necessary to serve this location.

- LEBANON should explore partnership opportunities with both the Ozarks Technical Community College and Missouri State University – Lebanon.
- Mercy Hospital (see Figure 6-2 and Figure 6-3)



**Figure 6-2: Mercy Hospital Main Entrance**



**Figure 6-3: Mercy Hospital (walk-in clinic location)**

- This stop would provide access to the hospital for residents to obtain medical care. In addition, the hospital is the fifth largest employer in the city (total employment numbers unknown).
- LEBANON should explore a potential partnership with Mercy Hospital.
- Tower Road & Copeland Drive
  - This stop would provide access to Emerson/Copeland (major employer of 859 people (Myers, 2018)).
- Bland Road (near Whispering Pines)
  - This stop would serve Whispering Pines Mobile Homes, a low-income community.
- Social Security Administration (SSA) Office
  - This stop would serve clients and staff of the SSA Office.
  - This stop could also serve the Laclede County Family Support Office, but due to traffic conditions along South Jefferson Avenue, the researchers recommend that LEBANON investigate the possibility of providing a pedestrian crossing (e.g. pedestrian hybrid beacon; for more information, see (U.S. Department of Transportation, Federal Highway Administration, 2014)).
  - This stop could be skipped when the SSA Office is not open. Current hours for the SSA Office are:
    - Monday, Tuesday, Thursday, Friday: 9 AM to 4 PM, and

- Wednesday: 9 AM to 12 PM.
  - LEBANON should work with the SSA Office to determine if an alternative location for the SSA Office (e.g. downtown) closer to users is possible. This would reduce the cost of a bus (i.e. fewer stops means shorter round-trip times which means more frequent, less costly service) while still providing resources to its residents.
- Buzz Pride Road
  - This stop provides access to Lebanon Middle School, the Freemont Village Apartments, and Christian Healthcare of Lebanon.
  - The Lebanon School District is a major employer in the city (total employment numbers unknown).
- Ivey Lane (near hotels)
  - This stop provides access to several hotels, restaurants, and other places of employment. In addition, this stop serves Penmac (a staffing agency serving manufacturers in LEBANON) and the Sundance Apartments.
    - Sundance Apartments has 40 units and approximately 180 residents (Myers, 2018).
    - **Penmac participated in the initial site visit and expressed a need for public transportation for many of its temporary workers.**
- Laclede Industries
  - This stop serves Laclede Industries, which provides employment and job services for individuals with disabilities.
  - Laclede Industries currently provides transportation to its clients and reported during the initial site visit an interest in having its clients use a public transportation system within LEBANON; representatives noted that they would prefer not to be a provider of transportation. Therefore, **possible partnerships may exist.**
- Bland Road near Tracker Marine (see Figure 6-4)



**Figure 6-4: Bland Road (near Tracker Marine)**

- This stop serves Tracker Marine (major employer of 1,100 people (Myers, 2018)), as well as a multi-family housing complex along Kent Drive.
- Lebanon City Hall
  - This stop provides access to Lebanon City Hall, which provides riders with access to utility offices (e.g. to pay bills), a USPS mail box, the Police Department, and the Municipal Court (see survey respondent comment that access to services is a problem for its residents, Acknowledgement of Other’s Challenges).
  - In addition, this stop would serve multiple businesses along Jefferson Avenue (a major thoroughfare), including the Lebanon Publishing Company and the Lebanon Field Apartments.
- Lebanon High School
  - This stop provides access to the high school, the Lebanon Technical and Career Center, and The Timbers Apartments.
  - The Timbers Apartments has 46 housing units and 140 residents (Myers, 2018).
  - Lebanon High School already has a good spot for a bus to pull over on the side of the road (see Figure 6-5).



**Figure 6-5. Lebanon High School Bus Pull-Over**

- Harwood Manor
  - This stop serves Harwood Manor, the Health Department, the Public Defender's Office, as well as a daycare.
  - Harwood Manor has 52 units and 104 residents (Myers, 2018).
- Commercial Street & Washington Drive
  - This stop would serve LEBANON'S's historic downtown corridor.
- Washington Avenue & Oak Street
  - This stop would serve the Kenneth E. Cowan Civic Center, without requiring the bus to loop through the Civic Center's parking lot.
- Jordan Valley Community Health Center
  - This stop would serve the Jordan Valley Community Health Center, a clinic that provides health services to low-income residents.
- Brice Street & Lee Street
  - This stop would provide access to nearby residential areas.
- The Timbers Apartments
  - This stop would provide access for The Timbers Apartments.
  - The Timbers Apartments has 46 housing units and 140 residents (Myers, 2018).
- 4<sup>th</sup> Street & Madison Avenue
  - This stop would serve the Heritage Apartments and Monroe Estates.

- Heritage Apartments has 20 housing units and 48 residents (Myers, 2018).
- Monroe Estates has 74 housing units and 220 residents (Myers, 2018).
- Hughes Senior Center
  - This stop would directly serve the Hughes Senior Center while also providing access to nearby Gasconade Park.
  - Many survey respondents were seniors who expressed a desire to use a public transportation system.
  - The majority of survey respondents operating other public transportation systems within Missouri indicated that they had started their systems to serve their seniors.
  - This stop was observed as being served by the OATS bus, but it would be worthwhile to further explore providing service to the Hughes Senior Center.
- Monroe Street & Commercial Street
  - This stop would serve the downtown corridor while providing service to the Lebanon Publishing Company, Madison Manor Senior Citizens, and the Lebanon Field Apartments (total resident numbers unknown).
  - Madison Manor Senior Citizens has 33 housing units and 66 residents (Myers, 2018).
- Britli Estates (see Figure 6-6)



**Figure 6-6: Britli Estates**

- This stop would serve the Britli Estates Apartment Complex. Britli Estates has a good parking lot for a public transportation system vehicle to loop in and back

out, but LEBANON would need to get approval (e.g. an agreement) from Britli Estates prior to using this as a bus stop.

- Britli Estates has 65 housing units and 358 residents (Myers, 2018).
- Boswell City Park (see Figure 6-7)



**Figure 6-7: Boswell City Park**

- This stop would serve the Boswell City Park and Aquatic Center as well as nearby residential areas.
- Regal Beloit
  - This stop would serve Regal Beloit (a major employer of 170 people (Myers, 2018)), the US National Guard, and Christian Health Care of Lebanon.
- Hwy MM Park-N-Ride (see Figure 6-8)



**Figure 6-8: Commuter Park-N-Ride on Highway MM**

- This stop will serve the Hwy MM Park-n-Ride which provides service to nearby Fort Leonard Wood.
- The park-n-ride lot is an easy place for the public transportation system vehicles to loop in and out, providing a reprieve to any vehicles that may have ended up behind the slower moving bus while making the trip out to the colleges (i.e. preventing traffic back-ups).
- LEBANON would need to obtain approval from MoDOT to locate a stop in the park-and-ride lot.
- Kenneth E Cowan Civic Center
  - This stop would loop through the parking lot of the Civic Center to provide access not only to the Civic Center but also to the Greyhound Bus Stop and the YMCA.
- Fourth Street & Madison Avenue
  - This stop would provide service to nearby residential areas.

## 6.2. Bus Route Scenarios – Overview

To provide LEBANON with several route options to compare and consider, researchers developed proposed routes within three overarching scenarios. **Scenario 1** proposes to serve the entire city with a single route; LEBANON had requested that the researchers provide such an example. **Scenario 2** would divide the service into two routes (and within Scenario Two, two different route

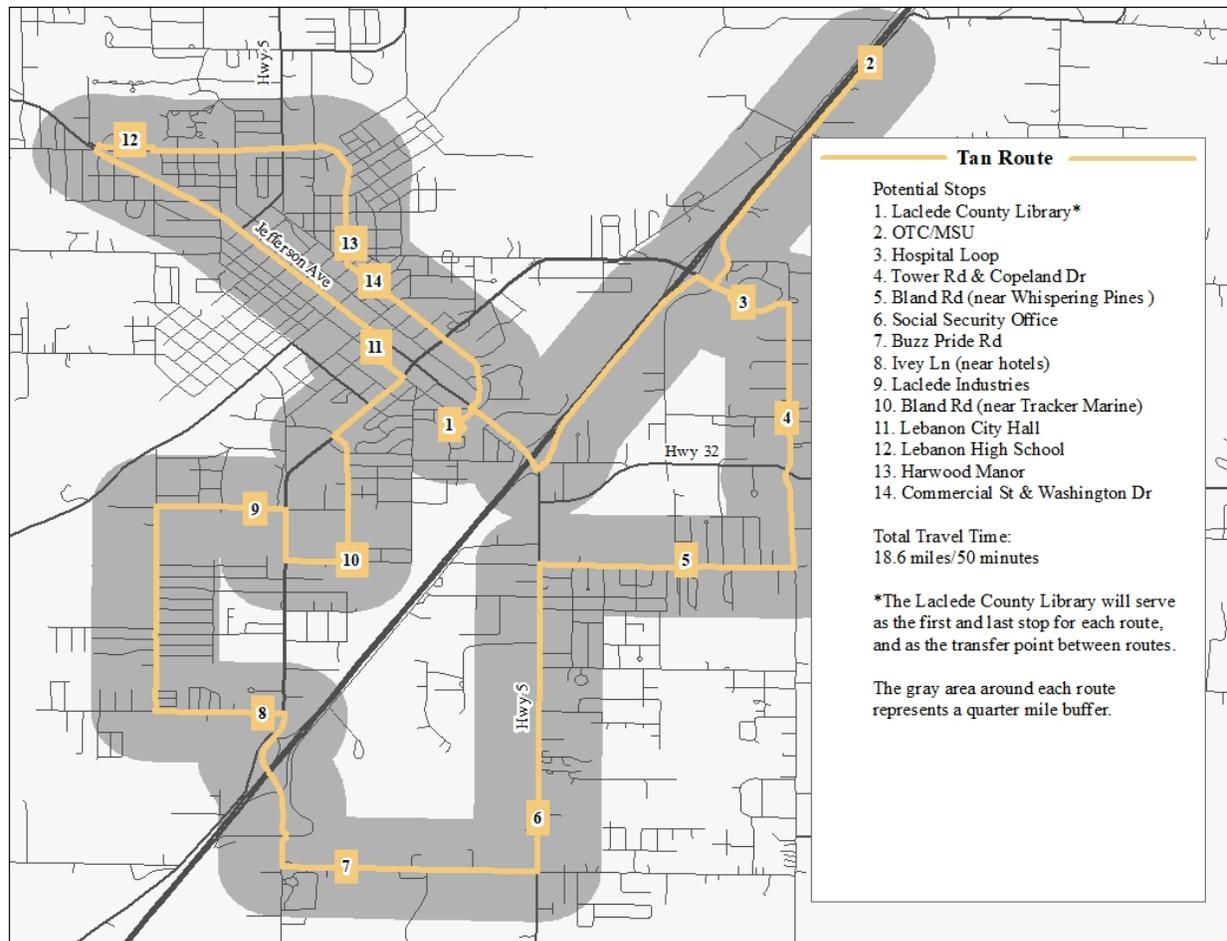
patterns were created as options). Finally, **Scenario 3** proposes a three-route system. Scenarios and route names are introduced in Table 6-1 and described in the sections that follow.

**Table 6-1: Bus Route Scenario Overview**

SCENARIO	PROPOSED ROUTES
<b>Scenario 1 – One Loop</b>	Tan Route
	Purple Route (this route was developed for Scenario 2B below, but is offered here as a shorter single route alternative if needed)
<b>Scenario 2 – Two Loops</b>	
<i>Scenario 2A (West/East routes)</i>	Red Route
	Green Route
<i>Scenario 2B (North/South routes)</i>	Purple Route
	Orange Route
<b>Scenario 3 – Three Loops</b>	Yellow Route
	Blue Route
	Black Route

### 6.3. Scenario 1 – One Loop

Scenario 1 consists of a single loop, which can be addressed with the longer Tan Route or the shorter Purple Route. The Tan Route is the longest of the proposed routes, traveling a total of 18.6 miles (Figure 6-9).



**Figure 6-9: Scenario 1, Tan Route**

The researchers were asked by LEBANON to provide information on the distance and timing for how a single loop addressing all destinations within the community would look. The Tan Route encompasses all of LEBANON, while continuing to provide access to the college campus and several major employers. Using the industry standard of a quarter mile walk to a bus stop as the catchment area, the proposed bus stops for this route serve a total of 23 destinations (see Figure 6-10). The Tan Route would provide service to six major employers with more than 2,886 employees and seven multi-family housing complexes with at least 414 residents (Myers, 2018). (Note: The number of employees or residents were not available for all businesses and facilities.)

- 6 major employers
  - 1) Emerson/Copeland (859 employees)
  - 2) Independent Stave Company (575 employees)
  - 3) Lebanon Publishing Company
  - 4) Mercy Hospital
  - 5) The Durham Company (352 employees)
  - 6) Tracker Marine (1,100 employees)
- 7 Apartments/Senior Living Facilities
  - 1) Freemont Village Apartments

- 2) Harwood Manor (104 residents)
- 3) Lebanon Field Apartments
- 4) Lebanon Sundance Apartments (180 residents)
- 5) Madison Manor Senior Citizens (66 residents)
- 6) Vernon Heights Senior Living (64 residents)
- 7) Whispering Pines Mobile Homes
- 10 Other Destinations
  - 1) Christian Health Care of Lebanon
  - 2) Kenneth E. Cowan Civic Center
  - 3) Laclede County Library
  - 4) Laclede Industries
  - 5) Lebanon City Hall
  - 6) Lebanon High School
  - 7) Lebanon Technical and Career Center
  - 8) Ozarks Technical Community College/Missouri State University – Lebanon
  - 9) Penmac
  - 10) SSA Office

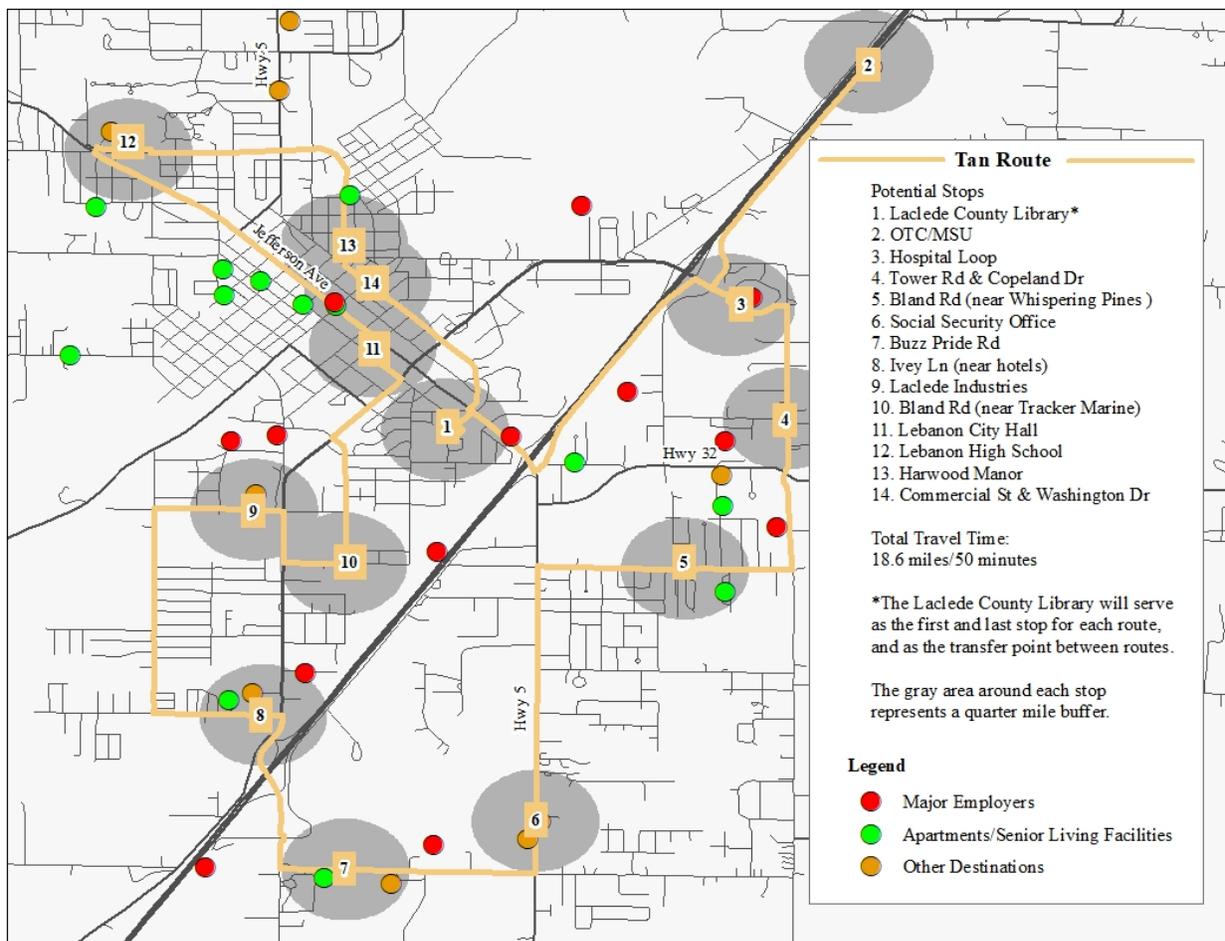


Figure 6-10: Scenario 1, Tan Route, Destinations Served

According to the Google Maps travel time estimate, it would take approximately 50 minutes to travel the entire loop (Google Maps, 2018). Assuming a travel speed of 12 miles per hour, it would take 91 minutes to travel the route (see Table 6-2). Keeping these estimates in mind, in order to maintain a one-hour headway, this route would likely require two buses.

**Table 6-2: Scenario 1, Tan Route, Potential Stops & Travel Times**

<b>Tan Route</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	OTC/MSU	3.1	15
3	Mercy Hospital	1.5	7
4	Tower Rd & Copeland Dr	0.8	4
5	Bland Rd	1.2	6
6	SSA Office	1.8	9
7	Buzz Pride Dr	1.0	5
8	Ivey Ln	1.2	6
9	Laclede Industries	1.8	9
10	Bland Rd	0.6	3
11	Lebanon City Hall	1.5	7
12	Lebanon High School	1.7	8
13	Harwood Manor	1.3	6
14	Commercial St & Washington Dr	0.2	1
15	Laclede County Library	1.0	5
<b>Total Distance (mi)</b>		<b>18.6</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>91</b>
<b>Total Travel Time (Google Estimate)</b>			<b>50</b>

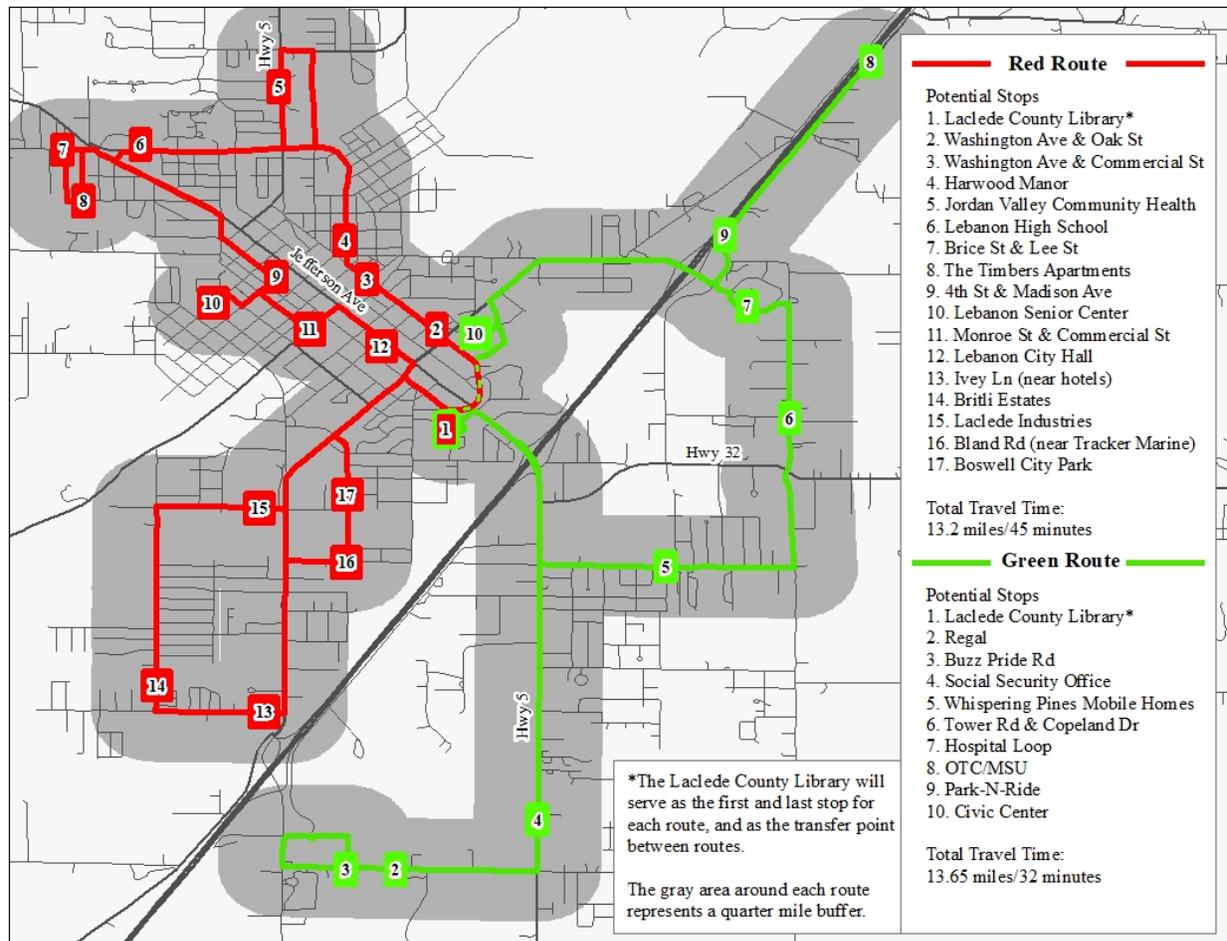
The Tan Route would provide access and means to travel across LEBANON. However, considering the travel time necessary for this route, **the researchers strongly advise against further development of this scenario**. Even with two buses, it would take a rider a tremendous amount of time to cross the city. If LEBANON decides to implement a single bus loop, the researchers suggest considering the *Shortened Purple Route* described in a later section (see Scenario 2B: Purple Route & Orange Route (North/South Orientation)). The *Shortened Purple Route* would provide a good starting point to provide access from dense residential areas to places of employment, the hospital, and the college campus. The *Shortened Purple Route* would provide a foundation that LEBANON could add to with further funding.

## **6.4. Scenario 2 – Two Loops**

Scenario 2 proposes the development of two bus loops to provide a better level of service to the residents of LEBANON. Scenario 2A and Scenario 2B each have two loops served by two routes. Scenario 2A has the Red and Green Routes; Scenario 2B has the Purple and Orange Routes. Each set of routes serves the same overall list of stop locations. However, Scenario 2A routes travel West and East, while Scenario 2B routes travel North and South. So, the routes within the first set combine stops in a different way than the routes in the second set. The two scenarios were created to demonstrate different options for meeting the same level of service. The Library will serve as the transfer point between the routes and as a place for a driver to take a break.

### **6.4.1. Scenario 2A: Red Route & Green Route (West/East Orientation)**

The first set of routes, the Red Route and Green Route, travel West/East of Interstate 44 (see Figure 6-11). The Red Route would serve the denser residential areas of LEBANON and provide a means to directly travel from North of Jefferson Ave to South along Elm Street. While this route serves many residential areas and employment facilities including Penmac, Laclede Industries, and the Lebanon Technical and Career Center, it would require travelers to transfer from one bus to another to access Mercy Hospital and the colleges. The Green Route provides access for residents to major employers including Emerson/Copeland, Mercy Hospital, and Regal Beloit, but misses the denser residential areas served by the Red Route.

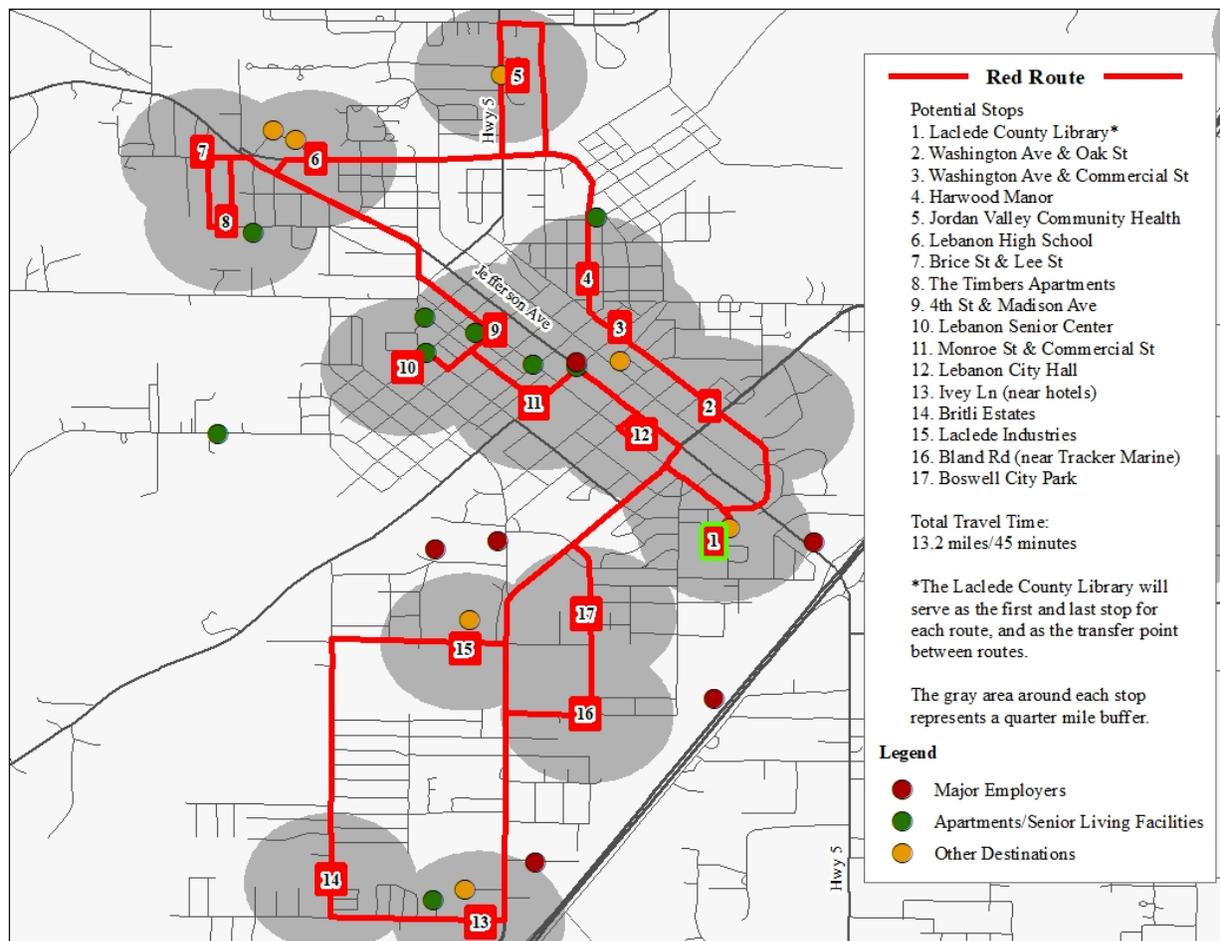


**Figure 6-11: Scenario 2A, the Red and Green Routes, West/East Orientation**

The Red Route would provide service to four major employers with more than 2,027 employees and ten multi-family housing complexes with more than 1,180 residents (Myers, 2018). Again, keeping in mind that most people are willing to walk a quarter mile to a bus stop, the following 23 major destinations are served by the Red Route in this scenario (see Figure 6-12):

- 4 Major Employers
  - 1) Independent Stave Company (575 employees)
  - 2) Lebanon Publishing Company (no data available)
  - 3) The Durham Company (352 employees)
  - 4) Tracker Marine (1,100 employees)
- 9 Apartments/Senior Living Facilities
  - 1) Britli Estates (358 residents)
  - 2) Harwood Manor (104 residents)
  - 3) Heritage Apartments (48 residents)
  - 4) Lebanon Field Apartments (no data available)
  - 5) Lebanon Sundance Apartments (180 residents)
  - 6) Madison Manor Senior Citizens (66 residents)
  - 7) Monroe Estates (220 residents)

- 8) The Timbers Apartments (140 residents)
- 9) Vernon Heights Senior Citizens (64 residents)
- 10 Other Destinations
  - 1) Hughes Senior Center
  - 2) Jordan Valley Community Health Center
  - 3) Kenneth E. Cowan Civic Center
  - 4) Laclede County Library
  - 5) Laclede Industries
  - 6) Lebanon City Hall
  - 7) Lebanon High School
  - 8) Lebanon Technical and Career Center
  - 9) Penmac
  - 10) The Sound House



**Figure 6-12: Scenario 2A, Red Route Destinations Served**

For the Red Route, Google Maps estimates the travel time at 45 minutes (Google Maps, 2018). Using the 12 miles per hour estimate, this route may take closer to 68 minutes to travel (see

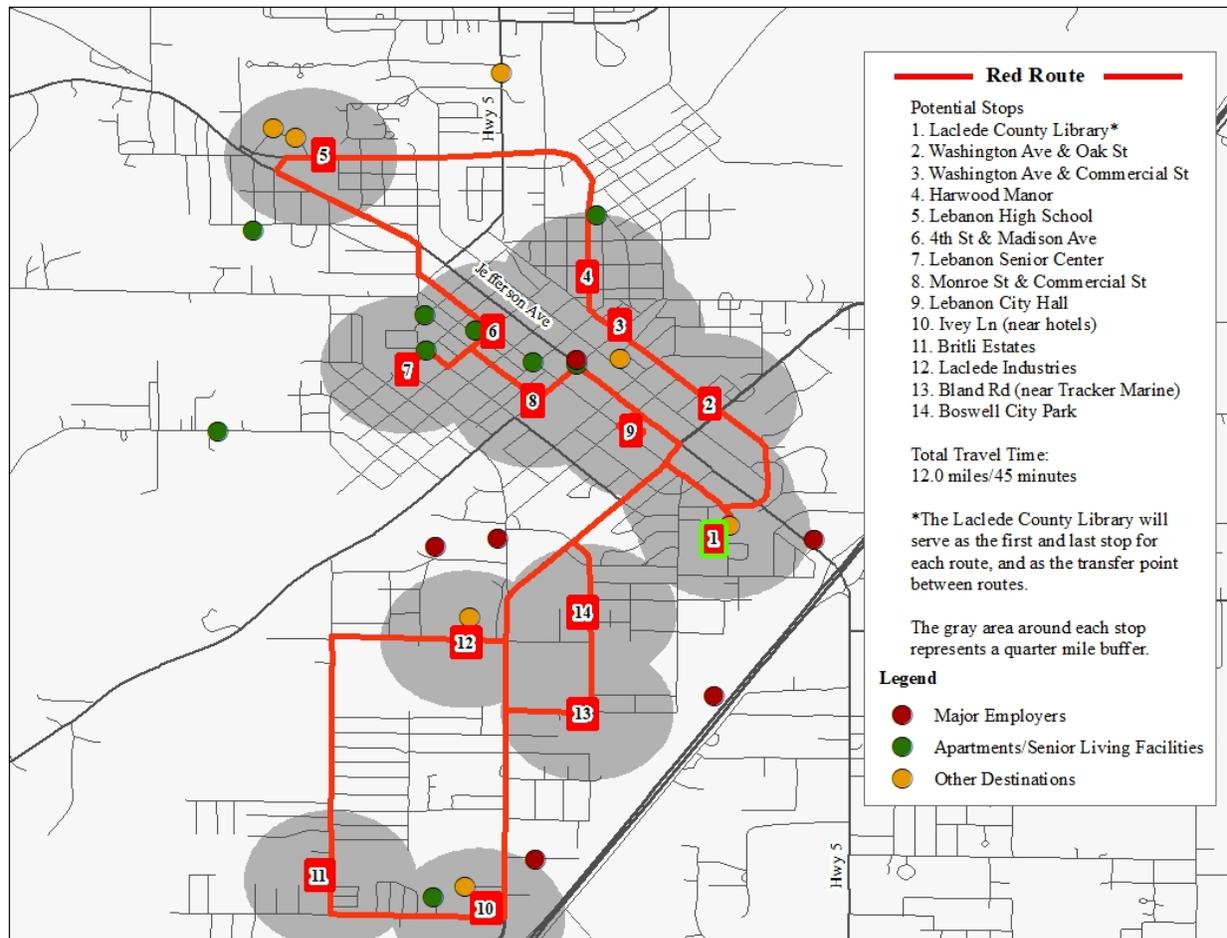
Table 6-3). Again, to meet a one-hour headway this route would either likely need to have two buses or remove potential stops.

**Table 6-3: Scenario 2A - Red Route, Potential Stops & Travel Times**

<b>Red Route</b>			
Stop #	Potential Stops	Distance (mi)	Time (min)
1	Laclede County Library	-	-
2	Washington Ave & Oak St	0.67	3
3	Washington Ave & Commercial St	0.37	2
4	Harwood Manor	0.22	1
5	Jordan Valley Community Health	0.98	5
6	Lebanon High School	1.5	8
7	Brice St & Lee St	0.3	2
8	The Timbers Apartments	0.32	2
9	4th St & Madison Ave	1.3	7
10	Lebanon Senior Center	0.35	2
11	Monroe St & Commercial St	0.52	3
12	Lebanon City Hall	0.48	2
13	Ivey Ln	2.37	12
14	Britli Estates	0.56	3
15	Laclede Industries	1.27	6
16	Bland Rd	0.6	3
17	Boswell City Park	0.37	2
18	Laclede County Library	1.02	5
<b>Total Distance (mi)</b>		<b>13.2</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>68</b>
<b>Total Travel Time (Google Estimate)</b>			<b>45</b>

Possible stops that could be removed to get the Red Route closer to one hour, renamed Red Route *Shortened*, include (see Figure 6-13):

- Washington Ave & Oak St – this stop can be served by Washington Ave & Commercial St
- Jordan Valley Community Health Center – this stop deviates far from the main loop of the route to serve one location; this stop could potentially be added in the future with further funding
- Brice St & Lee St – this stop can be served by the stop at The Timbers Apartments



**Figure 6-13: Scenario 2A, Red Route *Shortened***

The removal of these three stops would reduce the overall travel time, assuming a speed of 12 miles per hour, to 61 minutes (see Table 6-4).

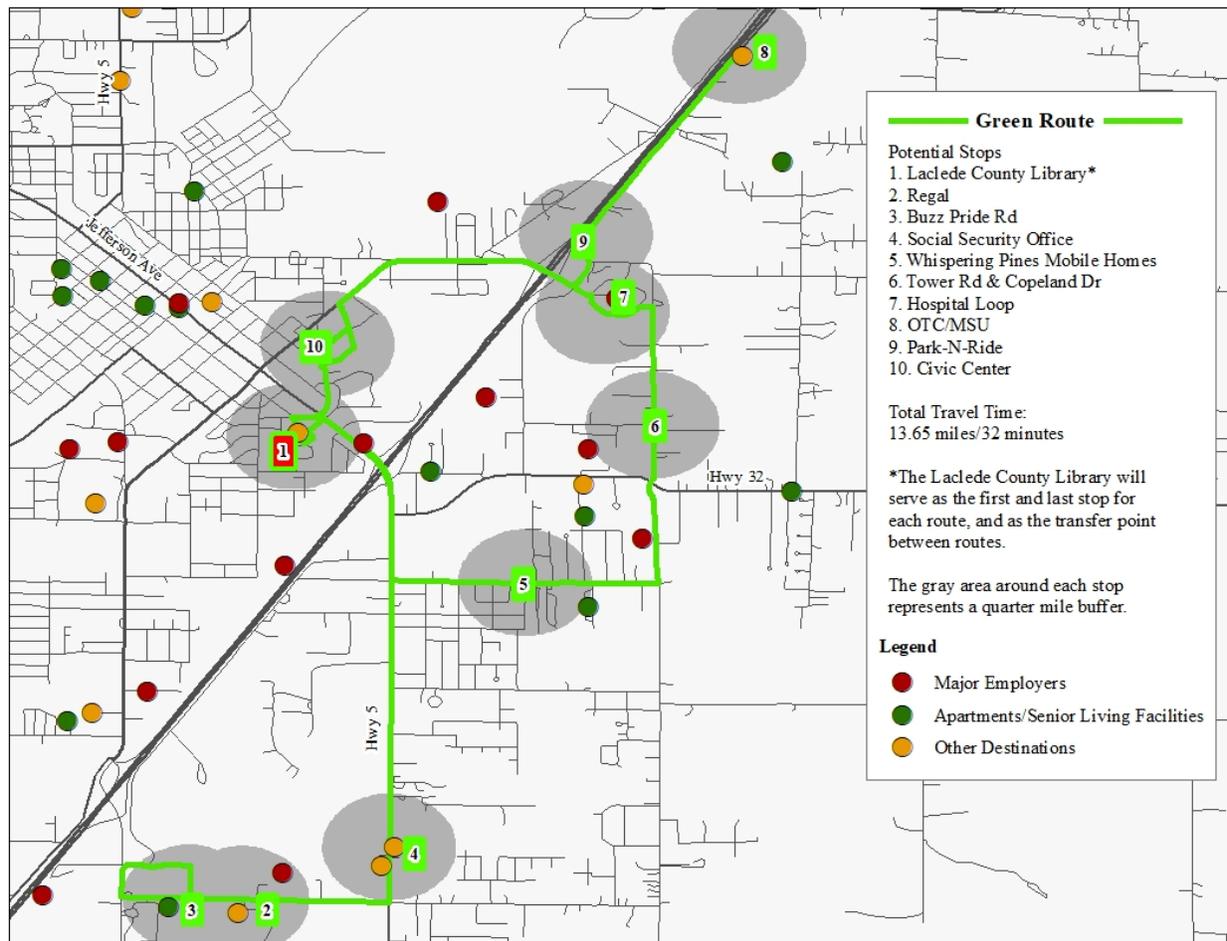
**Table 6-4: Scenario 2A - Red Route Shortened, Potential Stops & Travel Times**

<b>Red Route - Shortened</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	Washington Ave & Oak St	0.67	3
3	Harwood Manor	0.6	3
4	Lebanon High School	1.3	7
5	The Timbers Apartments	0.6	3
6	4th St & Madison Ave	1.3	7
7	Lebanon Senior Center	0.35	2
8	Monroe St & Commercial St	0.52	3
9	Lebanon City Hall	0.48	2
10	Ivey Ln	2.37	12
11	Britli Estates	0.56	3
12	Laclede Industries	1.27	6
13	Bland Rd	0.6	3
14	Boswell City Park	0.37	2
15	Laclede County Library	1.02	5
<b>Total Distance (mi)</b>		<b>12.01</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>61</b>
<b>Total Travel Time (Google Estimate)</b>			<b>45</b>

The Green Route in Scenario 2A travels along the East side of I-44. This route would provide service to four major employers with more than 1,604 employees (Myers, 2018). The potential stops along the Green Route serve 14 destinations (see Figure 6-14):

- 4 Major Employers
  - 1) Emerson/Copeland (859 employees)
  - 2) Independent Stave Company (575 employees)
  - 3) Mercy Hospital (no data available)
  - 4) Regal-Beloit (170 employees)
- 3 Apartments/Senior Living Facilities
  - 1) Fremont Village Apartments (no data available)

- 2) Timber Creek Estates (no data available)
- 3) Whispering Pines Mobile Homes (no data available)
- 7 Other Destinations
  - 1) Christian Health Care of Lebanon
  - 2) Kenneth E. Cowan Civic Center
  - 3) Laclede County Family Support
  - 4) Laclede County Library
  - 5) Ozarks Technical Community College/Missouri State University – Lebanon
  - 6) Park-N-Ride
  - 7) SSA Office



**Figure 6-14: Scenario 2A, Green Route Destinations Served**

For the Green Route, Google Maps estimates the travel time at 32 minutes (Google Maps, 2018). Using the 12 miles per hour estimate, this route will take closer to an estimated 68 minutes (see Table 6-5). Assuming the actual travel time falls between the two time estimates, this route could meet a one-hour headway. To make up for time constraints, this route could potentially skip the Ozarks Technical Community College (OTC)/Missouri State University (MSU) – Lebanon campus when classes are not in session, as well as the SSA Office when the office is closed. Currently the SSA Office is open the following hours:

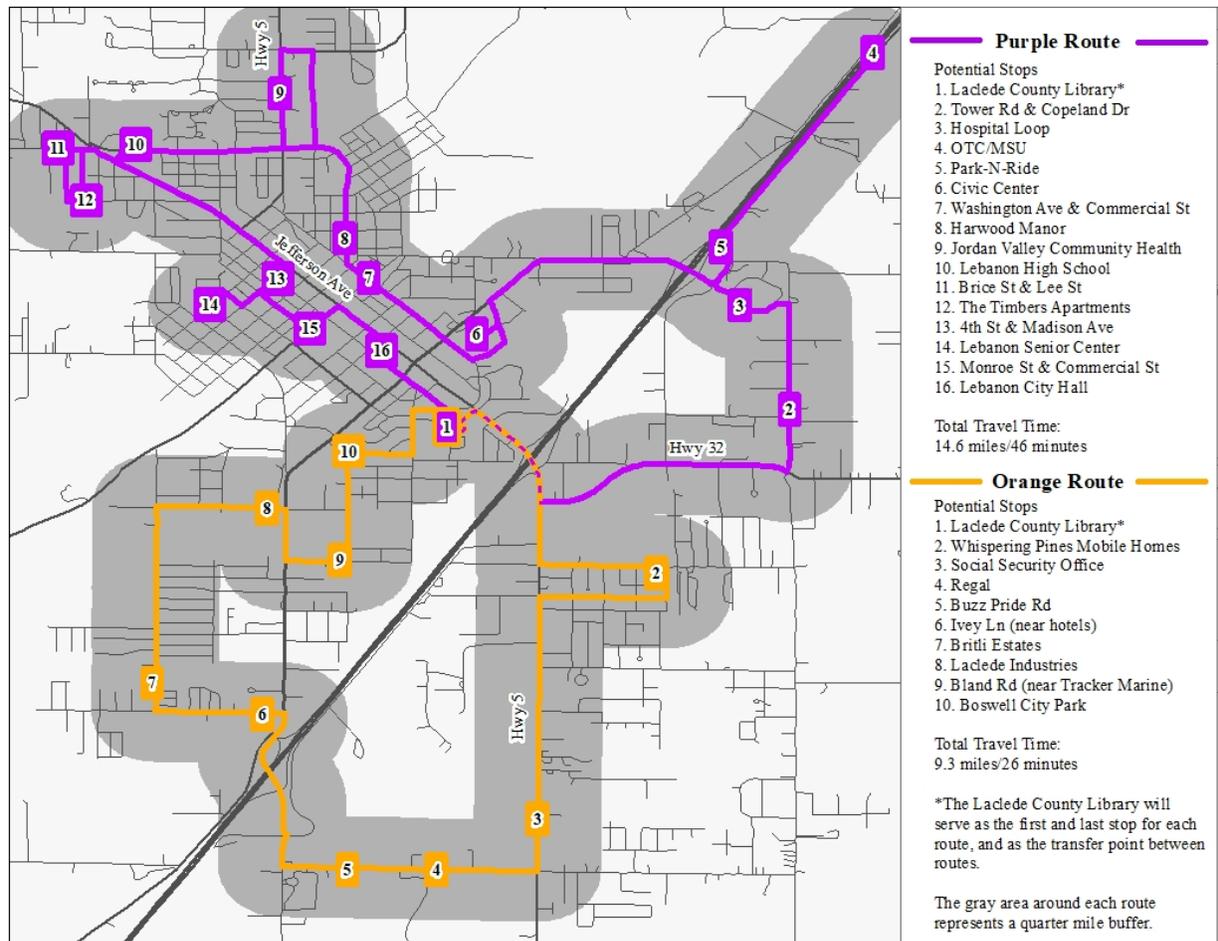
- Monday, Tuesday, Thursday, Friday from 9 AM to 4 PM
- Wednesday from 9 AM to 12 PM

**Table 6-5: Scenario 2A – Green Route, Potential Stops & Travel Times**

<b>Green Route</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	Regal Beloit	2.91	15
3	Buzz Pride Rd	0.41	2
4	SSA Office	1.8	9
5	Whispering Pines Mobile Homes	1.83	9
6	Tower Rd & Copeland Dr	1.17	6
7	Mercy Hospital	0.79	4
8	OTC/MSU	1.44	7
9	Park-N-Ride	1.09	5
10	Civic Center	1.41	7
11	Laclede County Library	0.8	4
<b>Total Distance (mi)</b>		<b>13.65</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>68</b>
<b>Total Travel Time (Google Estimate)</b>			<b>32</b>

While Scenario 2A would provide a higher level of service in comparison to Scenario 1, the set of routes (e.g. the Red Route and Green Route) is fairly disjointed when trying to allow for travel from the dense residential areas to the colleges or the hospital. Scenario 2B helps with this problem; this set of routes has a more North and South oriented loop, which would allow riders to utilize one bus to travel from residential areas to East of I-44 and in particular to Mercy Hospital and the college campuses (see Figure 6-15).

#### 6.4.2. Scenario 2B: Purple Route & Orange Route (North/South Orientation)

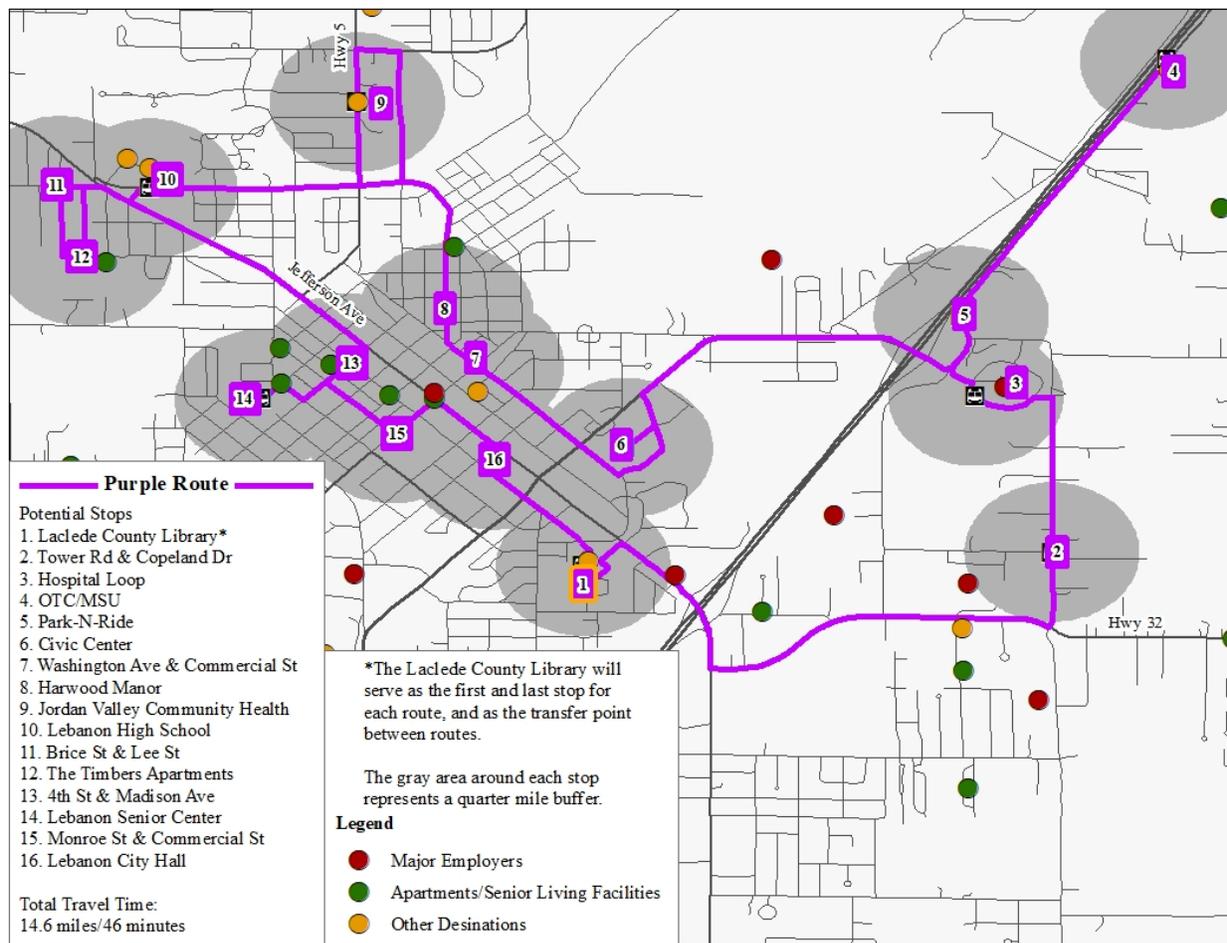


**Figure 6-15: Scenario 2B, Purple Route & Orange Routes - North/South Orientation**

The Purple Route provides direct connections from the densest residential areas of Lebanon to the Library, Mercy Hospital, and the college campuses (see Figure 6-16). This route would provide public transportation service to four major employers with more than 1,434 employees and eight multifamily housing complexes with more than 642 residents (Myers, 2018). Potential stops along the Purple Route serve 21 destinations:

- 4 Major Employers
  - 1) Emerson Copeland (859 employees)
  - 2) Independent Stave Company (575 employees)
  - 3) Lebanon Publishing Company (no data available)
  - 4) Mercy Hospital (no data available)
- 7 Apartments/Senior Living Facilities
  - 1) Harwood Manor (104 residents)
  - 2) Heritage Apartments (48 residents)
  - 3) Lebanon Field Apartments (no data available)
  - 4) Madison Manor Senior Citizens (66 residents)
  - 5) Monroe Estates (220 residents)
  - 6) The Timbers Apartments (140 residents)

- 7) Vernon Heights Senior Citizens (64 residents)
- 10 Other Destinations
  - 1) Hughes Senior Center
  - 2) Jordan Valley Community Health Center
  - 3) Kenneth E. Cowan Civic Center
  - 4) Laclede County Library
  - 5) Lebanon City Hall
  - 6) Lebanon High School
  - 7) Lebanon Technical and Career Center
  - 8) Ozarks Technical Community College (OTC)/Missouri State University (MSU) – Lebanon
  - 9) Park-N-Ride
  - 10) The Sound House



**Figure 6-16: Scenario 2B, Purple Route Destinations Served**

The number of destinations served by the Purple Route is similar to Scenario 1, while providing better access from East to West of I-44. This route is 14.54 miles long and according to Google Maps it would take approximately 46 minutes (Google Maps, 2018). Using the 12 miles per hour

speed estimate, this route would take approximately 76 minutes (see Table 6-6). In order to meet the one hour headway, this route may require two buses or the removal of stops.

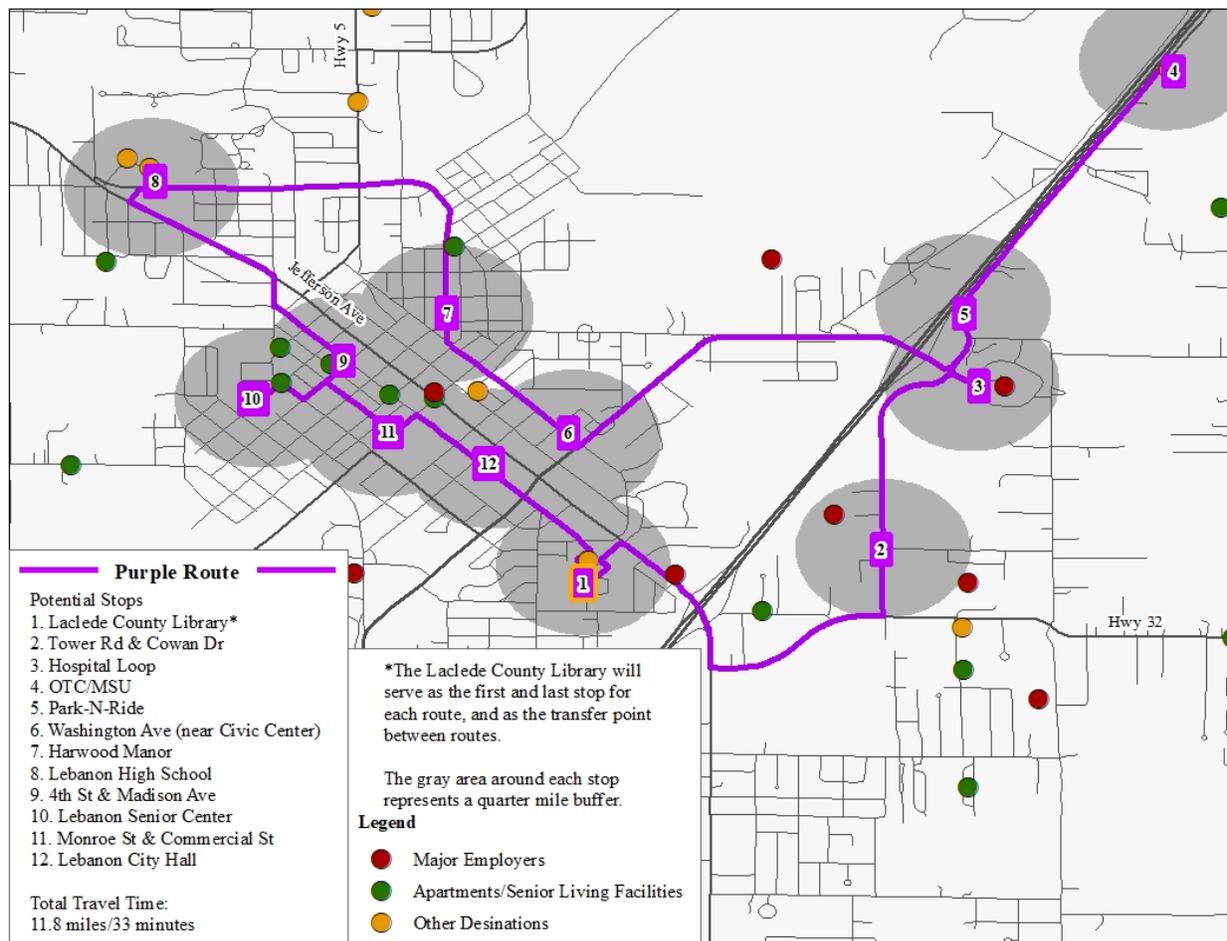
**Table 6-6: Scenario 2B – Purple Route, Potential Stops & Travel Times**

<b>Purple Route</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	Tower Rd & Copeland Dr	2.06	10
3	Mercy Hospital	0.79	4
4	OTC/MSU	1.44	7
5	Park-N-Ride	1.09	5
6	Civic Center	1.41	7
7	Washington Ave & Commercial St	0.87	4
8	Harwood Manor	0.22	1
9	Jordan Valley Community Health	0.98	5
10	Lebanon High School	1.5	8
11	Brice St & Lee St	0.3	2
12	The Timbers Apartments	0.32	2
13	4th St & Madison Ave	1.3	7
14	Lebanon Senior Center	0.35	2
15	Monroe St & Commercial St	0.52	3
16	Lebanon City Hall	0.48	4
17	Laclede County Library	0.91	5
<b>Total Distance (mi)</b>		<b>14.54</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>76</b>
<b>Total Travel Time (Google Estimate)</b>			<b>46</b>

Some suggested changes to the Purple Route, renamed the *Shortened Purple Route*, include the removal or relocation of the following stops (see Figure 6-17):

- Move Stop 2 (Tower Rd & Copeland Dr) to Cowan Dr & Copeland Dr in order to save on travel time.

- Move Stop 6 (Civic Center) to Washington Ave & Oak Street – this stop would still serve the Kenneth E. Cowan Civic Center but would not require the bus to travel through the parking lot.
- Remove Stop 9 (Jordan Valley Community Health Center) – this stop deviates far from the main loop of the route to serve one location. This stop could potentially be added in the future with further funding.
- Remove Stops 11 and 12 (Brice St & Lee St and The Timbers Apartments), again these stops require diverging from the main route in order to serve a single apartment complex and surrounding residential area.



**Figure 6-17: Scenario 2B, Shortened Purple Route Destinations Served**

The removal of these stops would remove service to the Jordan Valley Community Health Center and The Timbers Apartments. In addition, changes to this route would remove direct access to the Civic Center; instead riders would have to cross Elm St from the Washington Avenue stop. With additional funding, LEBANON could consider adding back service to these stops. The changes to this route would reduce the overall length of this route to 11.82 miles and the estimated travel time to 61 minutes when assuming 12 miles per hour travel speed (see Table 6-7).

**Table 6-7: Scenario 2B – Shortened Purple Route, Potential Stops & Travel Times**

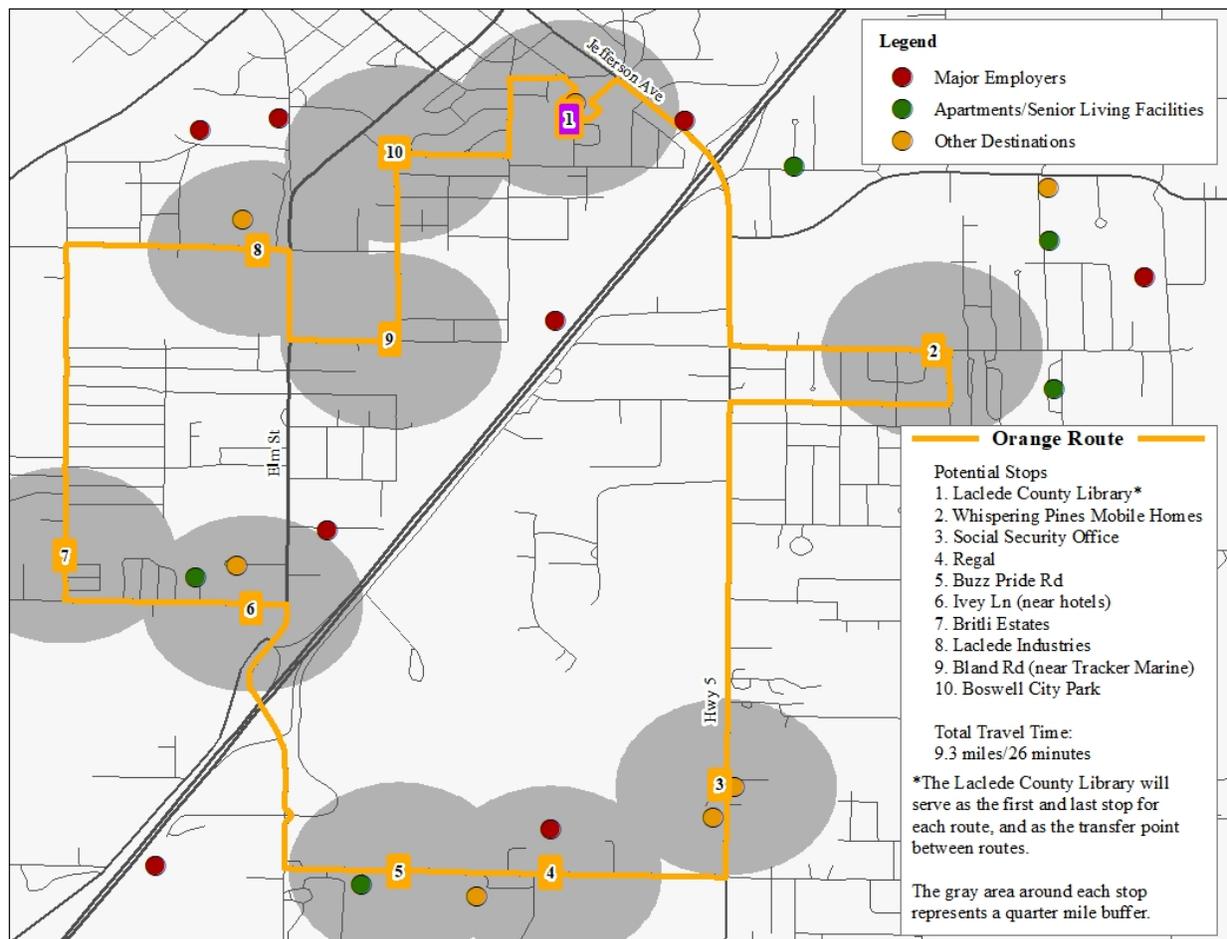
<b>Shortened Purple Route</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	Copeland Dr & Cowan Dr	1.55	8
3	Mercy Hospital	0.87	4
4	OTC/MSU	1.44	7
5	Park-N-Ride	1.09	5
6	Washington Ave (near Civic Center)	1.5	7
7	Harwood Manor	0.59	3
8	Lebanon High School	1.54	8
9	4th St & Madison Ave	0.98	5
10	Lebanon Senior Center	0.35	2
11	Monroe St & Commercial St	0.52	3
12	Lebanon City Hall	0.48	4
13	Laclede County Library	0.91	5
<b>Total Distance (mi)</b>		<b>11.82</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>61</b>
<b>Total Travel Time (Google Estimate)</b>			<b>33</b>

Due to the destinations served by the *Shortened Purple Route*, the researchers believe that the *Shortened Purple Route* would serve as a better Scenario 1 than the originally developed Tan Route described in the previous section (Scenario 1 – One Loop). If LEBANON decides to implement a one route scenario, the *Shortened Purple Route* could serve as a starting point which could be expanded upon with further funding.

The Orange Route, part of Scenario 2B, begins at the Laclede County Library and travels South along Highway 5 to Fremont Road, then North up Elm Street. This route would provide service to four major employers with more than 2,197 employees and four multi-family housing complexes with more than 538 residents (Myers, 2018). The Orange Route would provide service to 14 destinations (see Figure 6-18):

- 4 Major Employers
  - 1) Independent Stave Company (575 employees)
  - 2) Regal-Beloit (170 employees)

- 3) The Durham Company (352 employees)
- 4) Tracker Marine (1,100 employees)
- 4 Apartments/Senior Living Facilities
  - 1) Britli Estates (358 residents)
  - 2) Freemont Village Apartments (no data available)
  - 3) Lebanon Sundance Apartments (180 residents)
  - 4) Whispering Pines Mobile Homes (no data available)
- 6 Other Destinations
  - 1) Christian Health Care of Lebanon
  - 2) Laclede County Family Support
  - 3) Laclede County Library
  - 4) Laclede Industries
  - 5) Penmac
  - 6) SSA Office



**Figure 6-18: Scenario 2B, Orange Route Destinations Served**

The Orange Route is 9.33 miles long and takes about 26 minutes to travel according to Google Maps (Google Maps, 2018). Assuming the 12 miles per hour travel speed, this route would take about 47 minutes to travel (see Table 6-8).

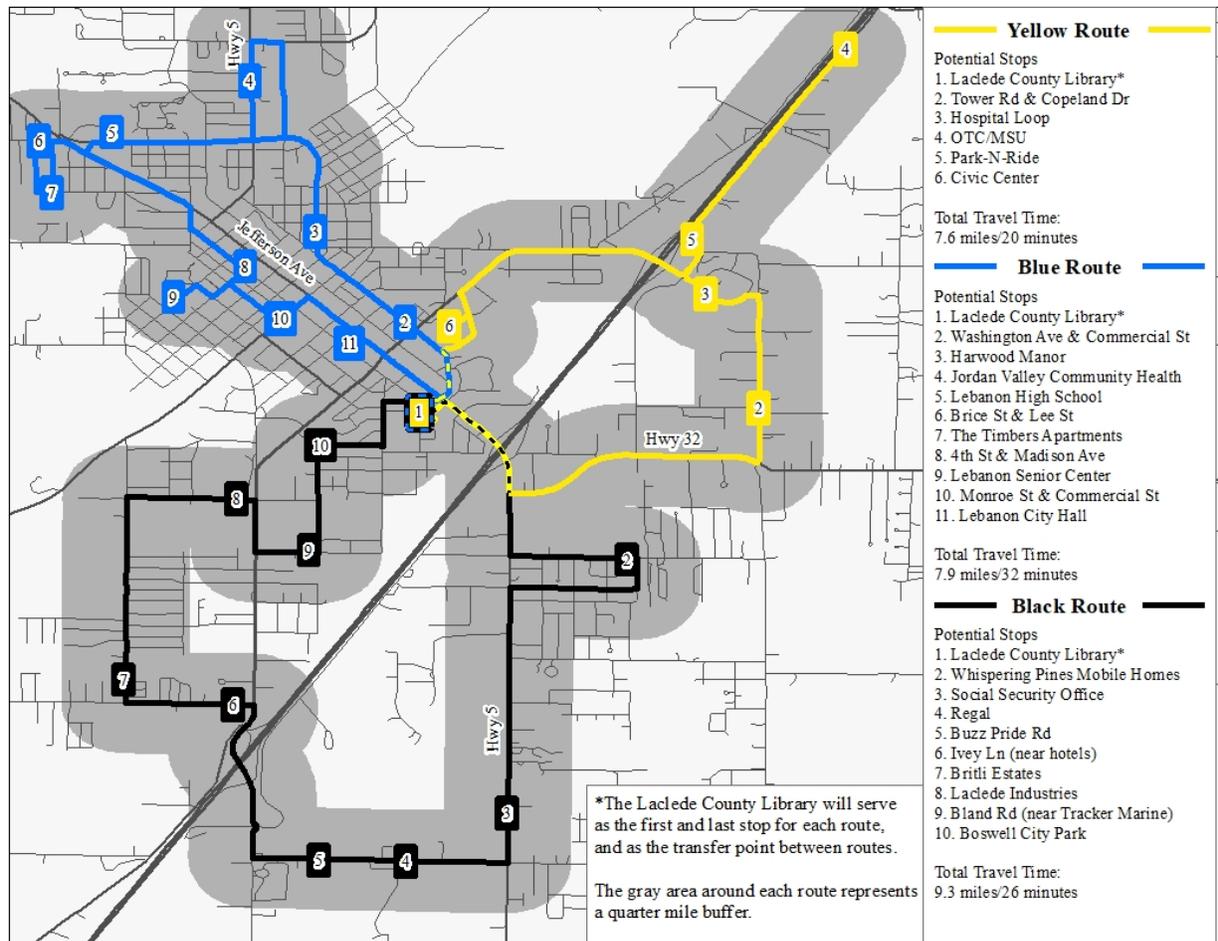
**Table 6-8: Scenario 2B – Orange Route, Potential Stops & Travel Times**

<b>Orange Route</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	Whispering Pines Mobile Homes	1.64	8
3	SSA Office	1.74	9
4	Regal Beloit	0.59	3
5	Buzz Pride Rd	0.41	2
6	Ivey Ln	1.13	6
7	Britli Estates	0.56	3
8	Laclede Industries	1.27	6
9	Bland Rd	0.6	3
10	Boswell City Park	0.37	2
11	Laclede County Library	1.02	5
<b>Total Distance (mi)</b>		<b>9.33</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>47</b>
<b>Total Travel Time (Google Estimate)</b>			<b>26</b>

Considering Scenario 2A and Scenario 2B, the second set of routes (the Purple and Orange Routes) would provide a good level of service with direct connections from residential areas to Mercy Hospital and the Ozarks Technical Community College (OTC)/Missouri State University (MSU) – Lebanon Campus.

### **6.5. Scenario 3 – Three Loops**

Scenario 3 involves three bus routes that would serve the same destinations as Scenario 2 but at a more frequent service level (see Figure 6-19).



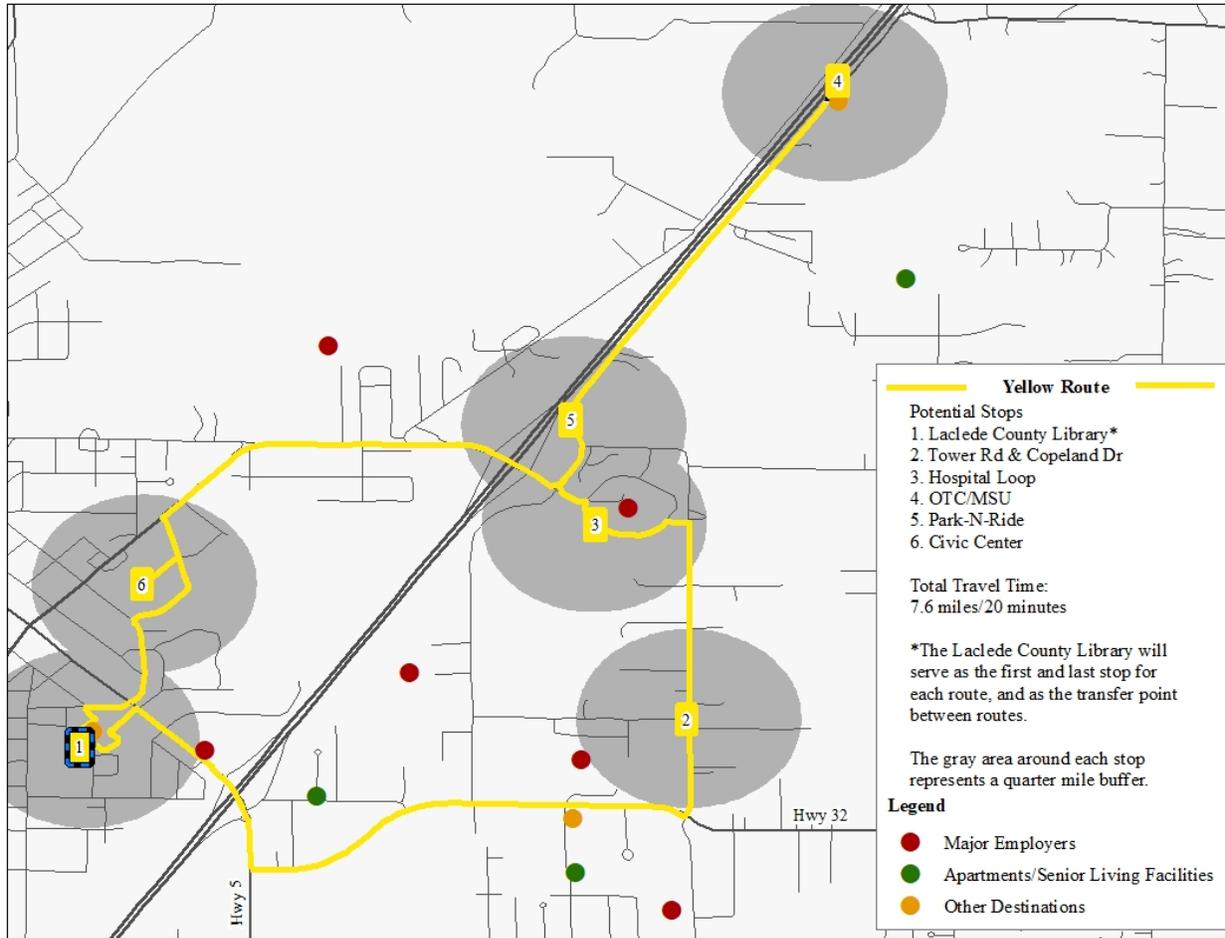
**Figure 6-19: Scenario 3: Yellow Route, Blue Route, & Black Route**

The Yellow Route would travel from the Laclède County Library across I-44 to Emerson/Copeland, Mercy Hospital, and the Ozarks Technical Community College (OTC)/Missouri State University (MSU) campuses, then back across I-44 to the Kenneth E Cowan Civic Center and the Library. The Yellow Route could run frequently to provide quick service to Mercy Hospital. In addition, this route could save further time by skipping the stop at the college campuses when class is not in session. LEBANON should discuss with the colleges how the use of the campus varies throughout the year.

The Yellow Route would provide service to three major employers with more than 1,434 employees (Myers, 2018). This route does not serve any apartment complexes or senior living facilities, but this is expected as most residences are to the West of I-44. Potential stops along the Yellow Route would serve a total of 6 destinations (see Figure 6-20):

- 3 Major Employers
  - 1) Emerson/Copeland (859 employees)
  - 2) Independent Stave Company (575 employees)
  - 3) Mercy Hospital (no data available)
- 0 Apartments/Senior Living Facilities
- 3 Other Destinations

- 1) Kenneth E Cowan Civic Center
- 2) Laclede County Library
- 3) Ozarks Technical Community College (OTC)/Missouri State University (MSU) - Lebanon



**Figure 6-20: Scenario 3, Yellow Route Destinations Served**

The Yellow Route is 7.6 miles long and takes approximately 20 minutes to travel according to Google Maps (Google Maps, 2018). Assuming a 12 miles per hour travel speed, it would take approximately 37 minutes to travel (see Table 6-9).

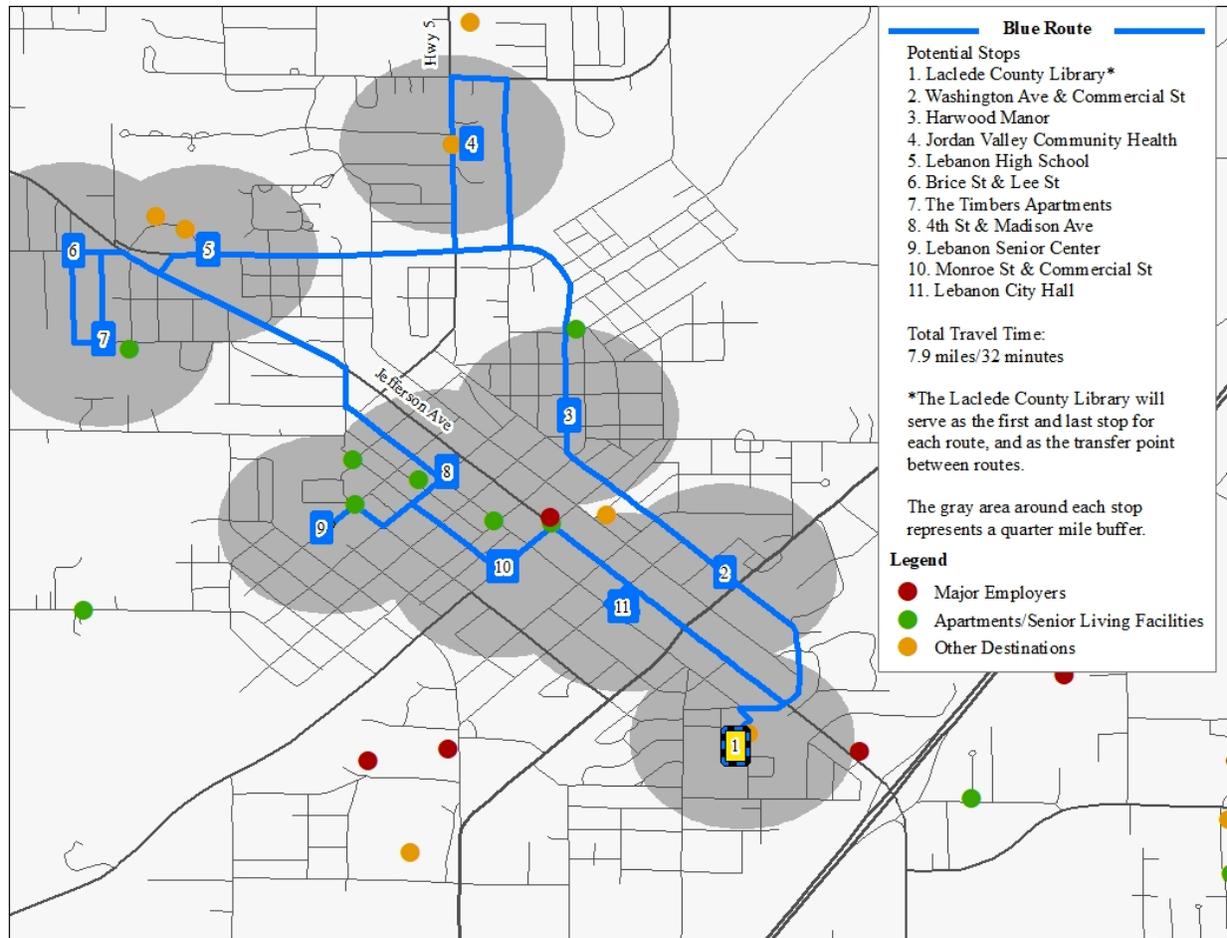
**Table 6-9: Scenario 3 – Yellow Route, Potential Stops & Travel Times**

<b>Yellow Route</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	Tower Rd & Copeland Dr	2.06	10
3	Mercy Hospital	0.79	4
4	OTC/MSU	1.44	7
5	Park-N-Ride	1.09	5
6	Civic Center	1.41	7
7	Laclede County Library	0.8	4
<b>Total Distance (mi)</b>		<b>7.59</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>37</b>
<b>Total Travel Time (Google Estimate)</b>			<b>20</b>

The Blue Route travels from the Laclede County Library to Lebanon High School and back. This route would provide service to two major employers with more than 575 employees and eight multi-family housing complexes with more than 642 residents (Myers, 2018). Potential stops along the Blue Route would provide service to 17 destinations (see Figure 6-21):

- 2 Major Employers
  - 1) Independent Stave Company (575 employees)
  - 2) Lebanon Publishing Company (no data available)
- 7 Apartments/Senior Living Facilities
  - 1) Harwood Manor (104 residents)
  - 2) Heritage Apartments (48 residents)
  - 3) Lebanon Field Apartments (no data available)
  - 4) Madison Manor Senior Citizens (66 residents)
  - 5) Monroe Estates (220 residents)
  - 6) The Timbers Apartments (140 residents)
  - 7) Vernon Heights Senior Citizens (64 residents)
- 8 Other Destinations
  - 1) Hughes Senior Center
  - 2) Jordan Valley Community Health Center
  - 3) Kenneth E Cowan Civic Center
  - 4) Laclede County Library
  - 5) Lebanon City Hall

- 6) Lebanon High School
- 7) Lebanon Technical and Career Center
- 8) The Sound House



**Figure 6-21: Scenario 3, Blue Route Destinations Served**

The Blue Route is 7.9 miles long and takes approximately 32 minutes to travel according to Google Maps (Google Maps, 2018). Using the 12 miles per hour travel speed, the Blue Route may take closer to 44 minutes to travel (see Table 6-10).

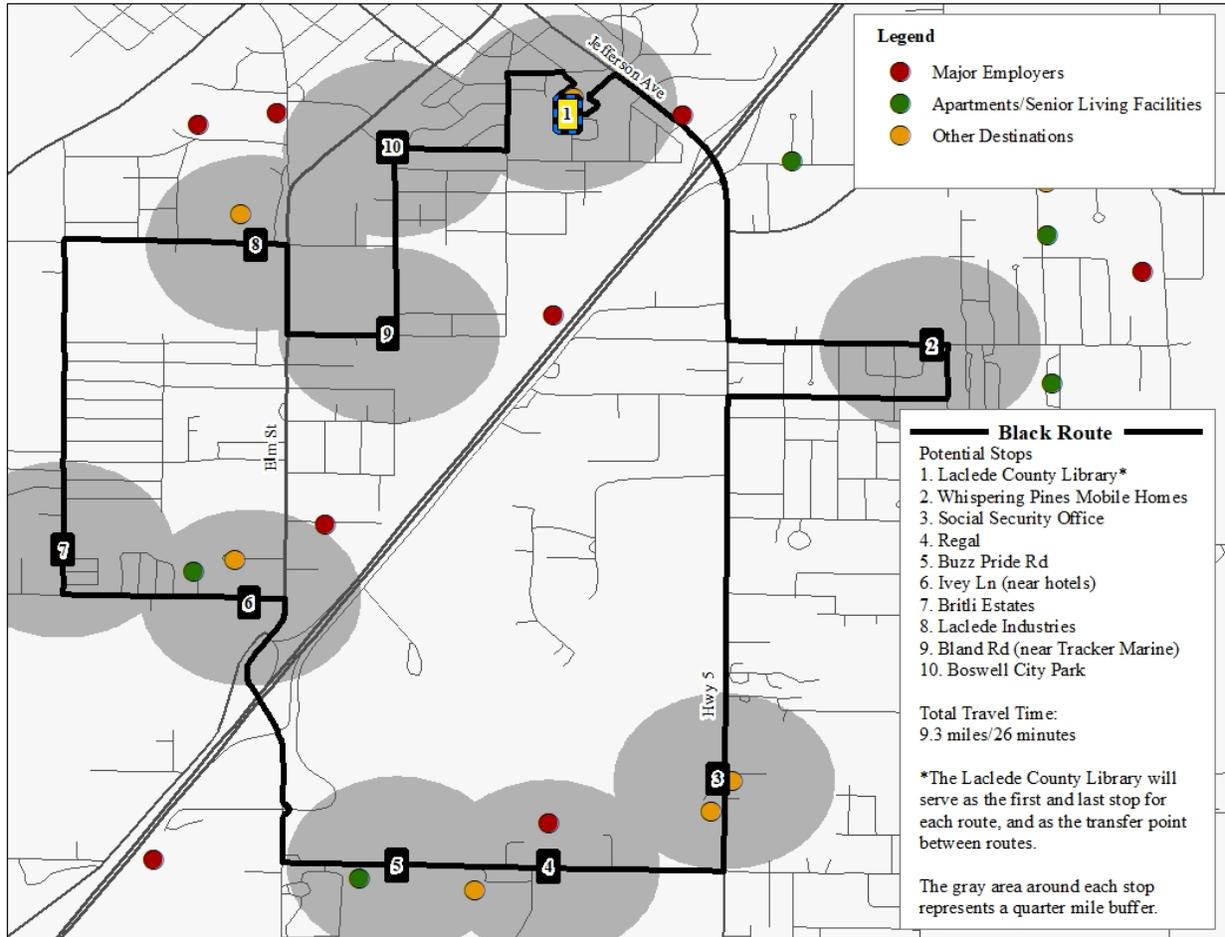
**Table 6-10: Scenario 3, Blue Route, Potential Stops & Travel Times**

<b>Blue Route</b>			
Stop #	Potential Stops	Distance (mi)	Time (min)
1	Laclede County Library	-	-
2	Washington Ave & Commercial St	1.04	5
3	Harwood Manor	0.22	1
4	Jordan Valley Community Health	0.98	5
5	Lebanon High School	1.5	8
6	Brice St & Lee St	0.3	2
7	The Timbers Apartments	0.32	2
8	4th St & Madison Ave	1.3	7
9	Lebanon Senior Center	0.35	2
10	Monroe St & Commercial St	0.52	3
11	Lebanon City Hall	0.48	4
12	Laclede County Library	0.91	5
<b>Total Distance (mi)</b>		<b>7.92</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>44</b>
<b>Total Travel Time (Google Estimate)</b>			<b>32</b>

The Black Route within Scenario 3 begins at the Laclede County Library and travels South along Highway 5 to Fremont Road then back to the library. The Black route would provide service to four major employers with more than 2,197 employees and four multi-family housing complexes with more than 538 residents (Myers, 2018). The Black route provides service to 14 destinations (see Figure 6-22):

- 4 Major Employers
  - 1) Independent Stave Company (575 employees)
  - 2) Regal-Beloit (170 employees)
  - 3) The Durham Company (352 employees)
  - 4) Tracker Marine (1,100 employees)
- 4 Apartments/Senior Living Facilities
  - 1) Britli Estates (358 residents)
  - 2) Fremont Village Apartments (no data available)
  - 3) Lebanon Sundance Apartments (180 residents)
  - 4) Whispering Pines Mobile Homes (no data available)
- 6 Other Destinations

- 1) Christian Health Care of Lebanon
- 2) Laclede County Family Support
- 3) Laclede County Library
- 4) Laclede Industries
- 5) Penmac
- 6) SSA Office



**Figure 6-22: Scenario 3, Black Route Destinations Served**

The Black Route is 9.33 miles long and takes approximately 26 minutes to travel according to Google Maps (Google Maps, 2018). Assuming the 12 miles per hour travel speed, this route will take about 47 minutes to travel (see Table 6-11).

**Table 6-11: Scenario 3 – Black Route, Potential Stops & Travel Times**

<b>Black Route</b>			
<b>Stop #</b>	<b>Potential Stops</b>	<b>Distance (mi)</b>	<b>Time (min)</b>
1	Laclede County Library	-	-
2	Whispering Pines Mobile Homes	1.64	8
3	SSA Office	1.74	9
4	Regal Beloit	0.59	3
5	Buzz Pride Rd	0.41	2
6	Ivey Ln	1.13	6
7	Britli Estates	0.56	3
8	Laclede Industries	1.27	6
9	Bland Rd	0.6	3
10	Boswell City Park	0.37	2
11	Laclede County Library	1.02	5
<b>Total Distance (mi)</b>		<b>9.33</b>	
<b>Total Travel Time (12 mi/hr)</b>			<b>47</b>
<b>Total Travel Time (Google Estimate)</b>			<b>26</b>

Scenario 3 would provide LEBANON with a high frequency level of service. LEBANON could further refine the destinations annually to maximize the service while minimizing expenditures.

## 6.6. Estimated Public Transportation System Costs

Public transportation system costs will largely depend on the: 1) number of vehicles, 2) type of vehicles, 3) hours of service, and 4) number of days in a week on which the service is provided. Costs associated with a public transportation system include: 1) operating costs, 2) capital costs, and 3) maintenance costs as described in more detail below. This section will discuss estimated costs to operate a public transportation system in LEBANON.

The goal of the public transportation system is to connect LEBANON residents to places of employment, higher education, and medical care. Most major employers in LEBANON are open Monday through Friday. In addition, classes at Ozarks Technical Community College (OTC) and Missouri State University (MSU) – Lebanon are in session Monday through Friday. According to the Small Urban and Rural Transit Center's *2017 Rural Transit Fact Book*, approximately 72 percent of rural public transportation systems provide service five days a week (Mattson, 2017). Furthermore, from the survey of other peer Missouri public transportation systems, a minimum of

five days a week of service are provided. Keeping this in mind, operating five days a week would be a good place to start for LEBANON. Additional days or hours of service could be added once the system is in operation, if feedback from riders suggests this may be necessary and additional funding is available.

### 6.6.1. Operating Costs

Operating costs cover expenses related to running the bus service, including fuel and labor. For the purposes of this report, the hours of service will be estimated assuming bus services will operate Monday through Friday from 7:00 AM to 7:00 PM which will allow the residents of LEBANON to travel to and from work. (Note: This does not address employers that may have second shifts, but LEBANON could potentially partner with employers if such service is desired.) This service would operate 255 days per year, accounting for major holidays (e.g. Thanksgiving) when the bus will not be in service. The costs are estimated using a one hour headway – meaning the bus will travel the route once per hour. With this assumption, the proposed *shortened* routes for the Red Route and the Purple Route described in the previous sections are necessary to estimate costs.

Per hour operating costs are estimated using two different statistics to provide a range of likely costs.

1. According to the *2017 Rural Transit Facts* report, the median operating cost per mile for transit in Federal Transit Association (FTA) Region 7 (which includes Missouri) was **\$2.30** in 2015 (Mattson, 2017).
2. According to *Cost-Benefit Analysis of Rural and Small Urban Transit*, the average operating cost per mile for fixed-route transit was **\$5.73** in 2014.

#### 6.6.1.1.1. Scenario 1, Estimated Operating Costs

For Scenario 1, costs were estimated for both the originally proposed Tan Route which travels across all of LEBANON, and for the *Shortened* Purple Route (from Scenario 2B) which provides service from the dense residential areas to the hospital and the college campus. The estimated costs to operate a single route range from \$83,189.16 to \$326,128.68 per year (see Table 6-12). The operating costs are much higher for the Tan Route due to the longer travel distance and the likely need for a second vehicle.

**Table 6-12: Scenario 1, Operating Costs**

	<b>Scenario 1</b>	
	<b>Tan Route</b>	<i>Shortened Purple Route</i>
<b>Total Distance Traveled (mi)</b>	18.6	11.82
<b>Number of Vehicles</b>	2	1
<b>Total Distance Traveled Per Day</b>	223.20	141.84
<b>Total Cost Per Day (Low)</b>	\$513.36	\$326.23
<b>Total Cost Per Day (High)</b>	\$1,278.94	\$812.74
<b>Total Distance Traveled Per Year (mi)</b>	56,916.00	36,169.20
<b>Total Cost Per Year (Low)</b>	\$130,906.80	\$83,189.16
<b>Total Cost Per Year (High)</b>	\$326,128.68	\$207,249.52
<b>Total Cost Per Year for Route Scenario</b>	<b>\$130,906.80 to \$326,128.68</b>	<b>\$83,189.16 to \$207,249.52</b>

Both the Tan Route and the *Shortened Purple Route* serve a total of 14 stops. The Tan Route would provide services across all of LEBANON but would require two vehicles to keep the frequency within one hour. The *Shortened Purple Route* would require only one vehicle. This route would provide service from the residential areas of LEBANON to the hospital and the college. However, the *Shortened Purple Route* does not provide service to the Southern portion of LEBANON. While each route has its benefits, the researchers believe that the *Shortened Purple Route* would serve as a good starting point for LEBANON, should the minimum level of service be provided.

### 6.6.1.1. Scenario 2, Estimated Operating Costs

For Scenario 2, annual operating costs ranged from \$155,399.04 to \$449,917.31 (see Table 6-13).

**Table 6-13: Scenario 2, Operating Costs**

	Scenario 2			
	Scenario 2A		Scenario 2B	
	Red Route <i>Shortened</i>	Green Route	<i>Shortened</i> Purple Route	Orange Route
<b>Total Distance Traveled (mi)</b>	12.01	13.65	11.82	10.26
<b>Number of Vehicles</b>	1	1	1	1
<b>Total Distance Traveled Per Day</b>	144.12	163.80	141.84	123.12
<b>Total Cost Per Day (Low)</b>	\$331.48	\$376.74	\$326.23	\$283.18
<b>Total Cost Per Day (High)</b>	\$825.81	\$938.57	\$812.74	\$705.48
<b>Total Distance Traveled Per Year</b>	36,750.60	41,769.00	36,169.20	31,395.60
<b>Total Cost Per Year (Low)</b>	\$84,526.38	\$96,068.70	\$83,189.16	\$72,209.88
<b>Total Cost Per Year (High)</b>	\$210,580.94	\$239,336.37	\$207,249.52	\$179,896.79
<b>Total Cost Per Year for Route Scenario</b>	<b>\$180,595.08 to \$449,917.31</b>		<b>\$155,399.04 to \$387,146.30</b>	

Both Scenario 2A and 2B travel to similar destinations, but the orientation of the routes is different. For Scenario 2A, the Red Route *Shortened* and the Green Route travel West/East of Interstate 44. The Red Route *Shortened* would serve the denser residential areas of LEBANON and provide a means to directly travel from North of Jefferson Ave to South along Elm Street. The Green Route provides access for residents to major employers including Emerson/Copeland, Mercy Hospital, and Regal Beloit, but misses the denser residential areas served by the Red Route *Shortened*. Due to the way these routes travel, the costs for Scenario 2A are higher due to the longer distances between destinations for both the Red Route *Shortened* and the Green Route. Scenario 2B helps with this problem; the *Shortened* Purple Route and the Orange Route have more North and South oriented loops, which help to reduce the overall travel distance and thus the overall cost per route.

### 6.6.1.1. Scenario 3, Estimated Operating Costs

For Scenario 3, costs ranged from \$181,369.26 to \$451,846.03 per year (see Table 6-14).

**Table 6-14: Scenario 3, Operating Costs**

	Scenario 3		
	Yellow Route	Blue Route	Black Route
<b>Total Distance Traveled (mi)</b>	7.59	7.92	10.26
<b>Number of Vehicles</b>	1	1	1
<b>Total Distance Traveled Per Day</b>	91.08	95.04	123.12
<b>Total Cost Per Day (Low)</b>	\$209.48	\$218.59	\$283.18
<b>Total Cost Per Day (High)</b>	\$521.89	\$544.58	\$705.48
<b>Total Distance Traveled Per Year</b>	23,225.40	24,235.20	31,395.60
<b>Total Cost Per Year (Low)</b>	\$53,418.42	\$55,740.96	\$72,209.88
<b>Total Cost Per Year (High)</b>	\$133,081.54	\$138,867.70	\$179,896.79
<b>Total Cost Per Year for Route Scenario</b>	<b>\$181,369.26 to \$451,846.03</b>		

Scenario 3 would provide the highest level of service to LEBANON residents, but Scenario 3 would require three vehicles to be in operation, which is why it has the highest estimated cost.

### 6.6.2. Capital Costs

Capital costs will include the purchase of any vehicles and infrastructure required to operate a public transportation system, such as signs and bus stop benches.

The main purpose of a public transportation system is to provide a form of mobility that gets people from where they are (origins) to where they want to go (destinations). Typically, these origins and destinations have infrastructure (sidewalks, streets, buildings) that allow passengers to easily use the system. Often, all the public transportation system needs to do is add a “bus stop sign” along the street/road where vehicles stop. Typically, public transportation systems try and use existing infrastructure, so they do not have to spend funding on bus shelters, etc. Often, public transportation systems stop at areas such as shopping centers, stores, or medical facilities that already have areas where people (including bus riders) can sit and be out of any weather (rain, cold, etc.). If, however, there are stops in areas without such infrastructure, public transportation systems can install benches or bus shelters where needed.

Brasco (<https://brasco.com/>) and Tolar Manufacturing (<http://www.tolarmfg.com/>) are two companies that provide bus shelters. Public transportation systems may use capital funds to purchase shelters or have local companies or organizations “sponsor” the shelters or have advertising on the shelters to pay for installation and maintenance. **A public transportation system should be established for a few years before shelters and or benches are added, as it is expensive to move these items.** A public transportation system would want to avoid changing routes frequently and having to move benches and/or shelters.

The purchase price of multiple vehicles that would be appropriate for LEBANON is provided in Table 6-15.

**Table 6-15: Vehicle Costs (Nations Bus Sales, 2018; Northwest Bus Sales, Inc., 2018)**

Model	Starcraft Allstar	VIP 2200	Challenger 270	Defender 330
<b>Manufacturer</b>	Ford	Diamond	Champion	Champion
<b>Estimated Price</b>	\$61,380 <sup>3</sup>	\$69,900 <sup>4</sup>	\$77,800 <sup>2</sup>	\$109,800
<b>Capacity</b>	14	21	25	29
<b>Wheel Chair Accessible</b>	X	X		
<b>Length</b>	22'	22'8"	25'	25'
<b>Fuel Type</b>	Gasoline	Gasoline	Gasoline	Diesel

The decision on which bus (or buses) maybe be best for the potential service will depend on many factors, including how much funding may be available through FTA and MoDOT. A couple of other factors to consider are that the operational costs (insurance, maintenance, fuel) differ little between running a 15-passenger or 25-passenger bus. However, if a smaller bus is constantly full, and the decision is made to add another bus for capacity reasons, this is an expensive solution, as the driver (drivers) are typically the highest expense for a transit system. Therefore, it is usually better to err on the side of having a slightly larger bus with a few open seats, as opposed to a smaller vehicle with all the seats full. In addition, customers typically prefer to have an open seat next to them on their trip, at least for some of the way. A smaller bus/vehicle would likely be used for the paratransit service, however. One consideration regarding a larger bus is the turning radius in some locations.

LEBANON can receive funding from the FTA Section 5311 or Section 5339 to fund up to 80 percent of the purchase of a vehicle (FTA, Formula Grants for Rural Areas – 5311, 2018) and (FTA, Grants for Buses and Bus Facilities Formula Program, 2018). Formula Grants for Rural Areas (FTA Section 5311) provides funding for capital, planning, and operating costs related to public transportation systems in areas with a population less than 50,000 people (FTA, Formula Grants for Rural Areas – 5311, 2018). The Grants for Buses and Bus Facilities Formula Program (FTA Section 5339) provides funding to states and public transportation agencies to replace, rehabilitate, and purchase buses and bus related facilities (FTA, Grants for Buses and Bus Facilities Formula Program, 2018).

<sup>3</sup> Price based on list price on Northwest Bus Sales, Inc.: <http://www.nwbus.com/>

<sup>4</sup> Price based on list price on Nations Bus Sales: <https://nationsbus.com/>

If the decision is to continue moving toward implementation of a transit system, LEBANON will want to meet with staff from MoDOT to discuss how much funding (both capital and operating funding) may be available for the community. The outcome of meetings with MoDOT will likely have an impact on both the service (routes, etc.) to be implemented, as well as the number and types of buses to procure. More information on funding from MoDOT can be found at <https://www.modot.org/transit-applications-and-reporting>. Finally, both the capital and operational funding require “local match.” LEBANON should consider its ability/capability to raise the necessary local match for operating the system. Conversations with other transit providers in Missouri would help to identify the sources of local match that other communities have identified, and the Missouri Public Transit Association (MPTA) (<https://mopublictransit.org/>) would be an excellent source of information.

At the onset of implementation, permanent bus stop infrastructure will likely not be necessary as LEBANON can expect changes to the routes during the pilot phase for the public transportation system. To begin, LEBANON will want to install signs at each bus stop. As the public transportation system moves from the pilot phase, LEBANON could begin to build up the bus stop infrastructure with benches or covered seating. Bus stop infrastructure like a bench could be used to obtain advertisement funds from local businesses, lawyers, realtors, and other sponsors.

### 6.6.3. Maintenance Costs

Maintenance costs include the costs to maintain the vehicles and infrastructure (bus stops – signs, benches, etc.) associated with the public transportation system. Maintenance costs will vary depending on vehicle type, vehicle age, number of miles traveled, road conditions, and other factors. LEBANON should consider the expected life span of vehicles and a replacement plan. Carpenter Bus estimates that annual maintenance costs of a mini bus (or bus that carries around 8 to 16 passengers) range from \$1,310 for a gas engine vehicle to \$1,700 for a diesel engine (Carpenter Bus Sales, 2018). These costs include regular vehicle maintenance for a vehicle traveling up to 15,000 miles per year, but all the proposed routes would travel well beyond this mileage so annual maintenance costs should be expected to be higher. In general, as a vehicle ages the operations and maintenance costs will increase (Figliozzi & Feng, 2013).

## 6.7. Route Summary

Each proposed route has various benefits (see Table 6-16). This section discusses each proposed Scenario and how they would meet the needs of the transportation disadvantaged in LEBANON as this group is more likely to use a public transportation system. Scenario 1 (Tan Route) has been removed from this analysis because the researchers believe that this scenario would not meet the minimum level of service to encourage ridership. Instead of considering the Tan Route for a one loop scenario, the researchers suggest the use of the *Shortened* Purple Route as this one would meet the minimum level of service while providing service from the dense residential core of LEBANON to Mercy Hospital and OTC/MSU. When considering implementation, these route scenarios can be used by LEBANON during public scoping efforts to gain feedback from the public to ensure that the proposed public transportation system would meet the needs of all LEBANON residents.

When implementing a public transportation system, LEBANON will want to consider creating a travel training program to educate residents on how to use a fixed route system (see Appendix D – Additional Resources for more information on this topic). Travel training typically covers the

basics of using a public transportation system, for example how to pay fares, how to plan a trip, or how to read and understand the system timetable and route maps. Travel training can be focused towards the general public or towards targeted populations like seniors or people with a disability. In addition, travel training can be completed on an individual level, where the travel trainer will help a single person plan and prepare to use the public transportation system, or it can be done in a classroom setting where the travel trainer teaches how to use the public transportation system on a more general level. Travel training improves mobility and can lead to an increase in ridership because it reduces confusion or anxiety related to using a public transportation system for the first time (National Academies of Sciences, Engineering, and Medicine, 2014).

**Table 6-16: Route Comparison**

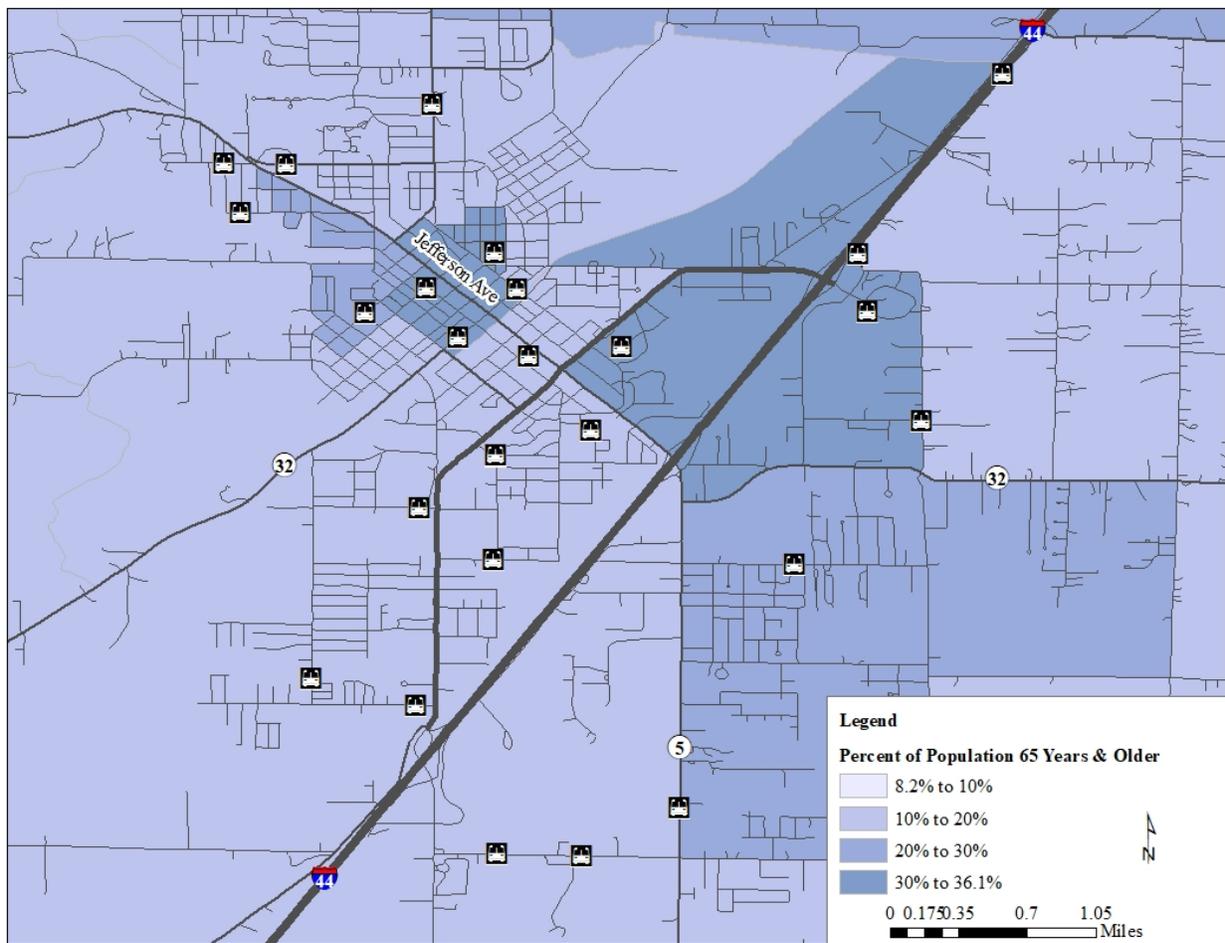
	Scenario 2										
	Scenario 1	Scenario 2A			Scenario 2B			Scenario 3			
	Purple Route – shortened*	Red Route – shortened*	Green Route*	Scenario 2A	Purple Route – shortened*	Orange Route*	Scenario 2B	Yellow Route*	Blue Route	Black Route*	Scenario 3
<b>Total Distance Traveled (miles)</b>	11.8	12.0	13.7	15.7	11.8	10.3	22.1	7.59	7.92	10.26	25.83
<b>Total Travel Time (min) ~ assuming 12mph speed</b>	61	61	68	-	61	51	-	37	44	51	-
<b>Total Travel Time (min) ~ assuming Google Estimate</b>	33	45	32	-	33	26	-	20	32	26	-
<b>Total Stops</b>	12	14	10	24	12	10	22	6	11	10	27
<b>Total Destinations Served</b>	21	21	14	35	21	12	33	6	17	14	37
<b>Total Employment Locations Served</b>	4	4	4	8	4	4	8	3	2	4	9
<b>Employees Served</b>	1,434	2,027	1,604	3,631	1,434	2,197	3,631	1,434	575	2,197	4,206
<b>Total Apts/Senior Living Facilities Served</b>	8	9	3	12	8	3	11	0	8	4	12
<b>Residents Served</b>	642	1,180	Unknown	1,180	642	538	1,180	None	642	538	1,180
<b>Total Other Destinations Served</b>	9	8	7	15	9	5	14	3	7	6	16
<b>Total Vehicles Required</b>	1	1	1	2	1	1	2	1	1	1	3
<b>Average Annual Cost</b>	\$145,219	\$147,554	\$167,703	\$315,256	\$145,219	\$126,053	\$217,273	\$93,250	\$97,304	\$126,053	\$316,608
<b>Cost Effective (cost/stop)</b>	\$3.95	\$3.44	\$5.48	-	\$3.95	\$4.12	-	\$5.08	\$2.89	\$4.12	-
<b>Shortest Travel Distance</b>				-			-	X			-

<b>Shortest Travel Time</b>				-			-	X			-
<b>Most Destinations Served (within quarter mile)</b>				-			-				X
<b>Most Major Employers Served</b>				-			-				X
<b>Most Apartments/Senior Living Facilities Served</b>				X			-				X
<b>Most Other Destinations Served</b>				-			-				X
<b>Provides Best Access to Health Care and Higher Education</b>				-	X		-				-

Considering the more transportation disadvantaged populations discussed in the Key Demographics section of this report including seniors, people with disabilities, and lower-income individuals, each route would provide service in various ways.

### 6.7.1. Service Provided to Seniors

While senior citizens tend to be fairly spread throughout LEBANON, there are higher concentrations of senior citizens living off of Jefferson Avenue near the Hughes Senior Center, who would be served by the bus stop at the Hughes Senior Center and by the bus stop at 4<sup>th</sup> Street and Madison Avenue (see Figure 6-23). In addition, there are higher concentrations of senior citizens living near Mercy Hospital and along Route 66 near the Kenneth E Cowan Civic Center. These would be served by stops at Mercy Hospital, Kenneth E Cowan Civic Center, and at Washington Avenue and Oak Street near the Civic Center.



**Figure 6-23. Proposed Bus Stops in Relation to the Senior Population**

The *Shortened Purple Route* has five stops within census blocks where the population is 30 to 36.1 percent senior citizens: Mercy Hospital, Cowan Drive & Copeland Drive, Harwood Manor, 4<sup>th</sup> Street & Madison Avenue, and Monroe Street & Commercial Street (see Figure 6-24). In addition, the *Shortened Purple Route* would provide service directly to the Hughes Senior

Center. This route would provide service from the dense residential core of LEBANON where there is a higher concentration of senior citizens to places like Mercy Hospital, the Kenneth E Cowan Civic Center, Town Hall, the Library, and the Hughes Senior Center – all without having to transfer between buses.

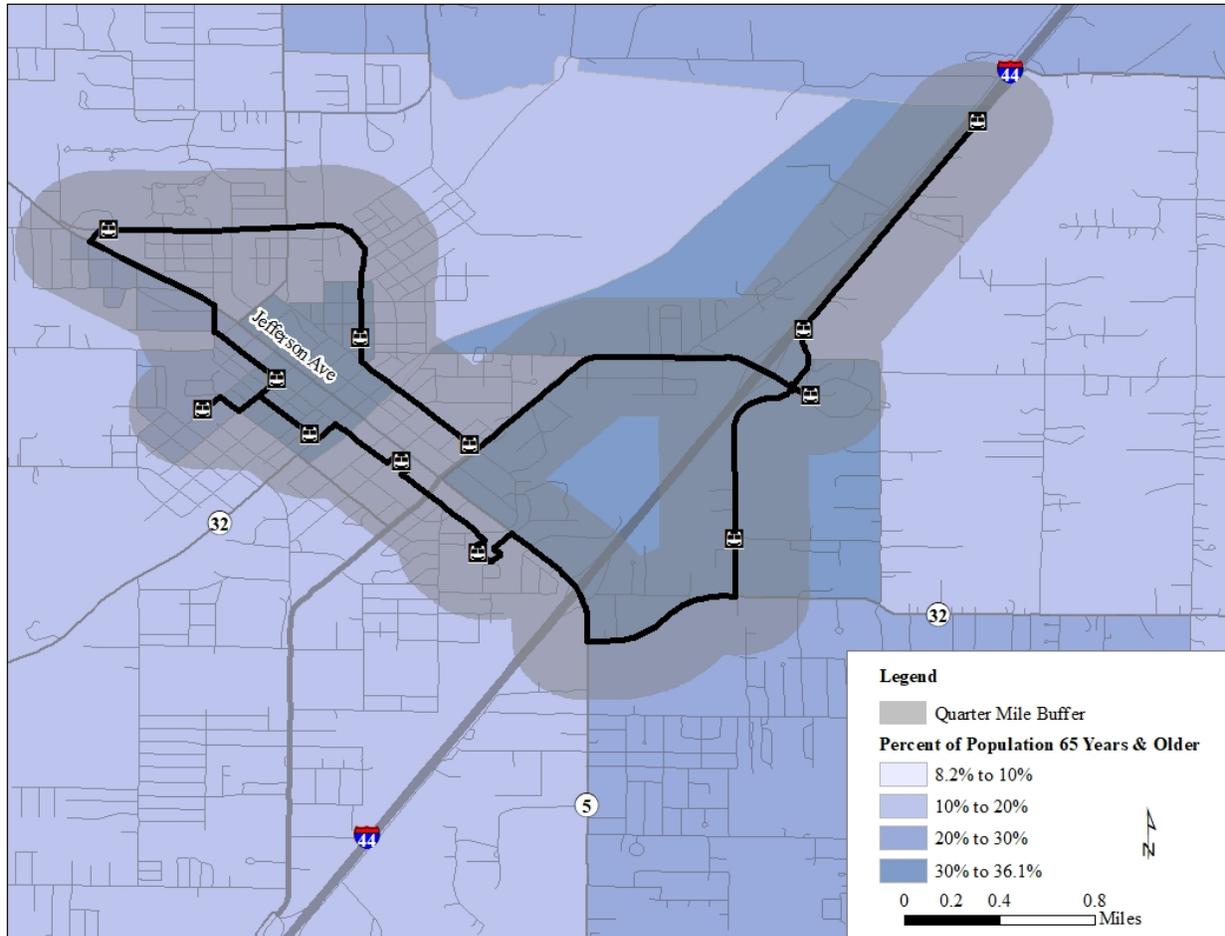
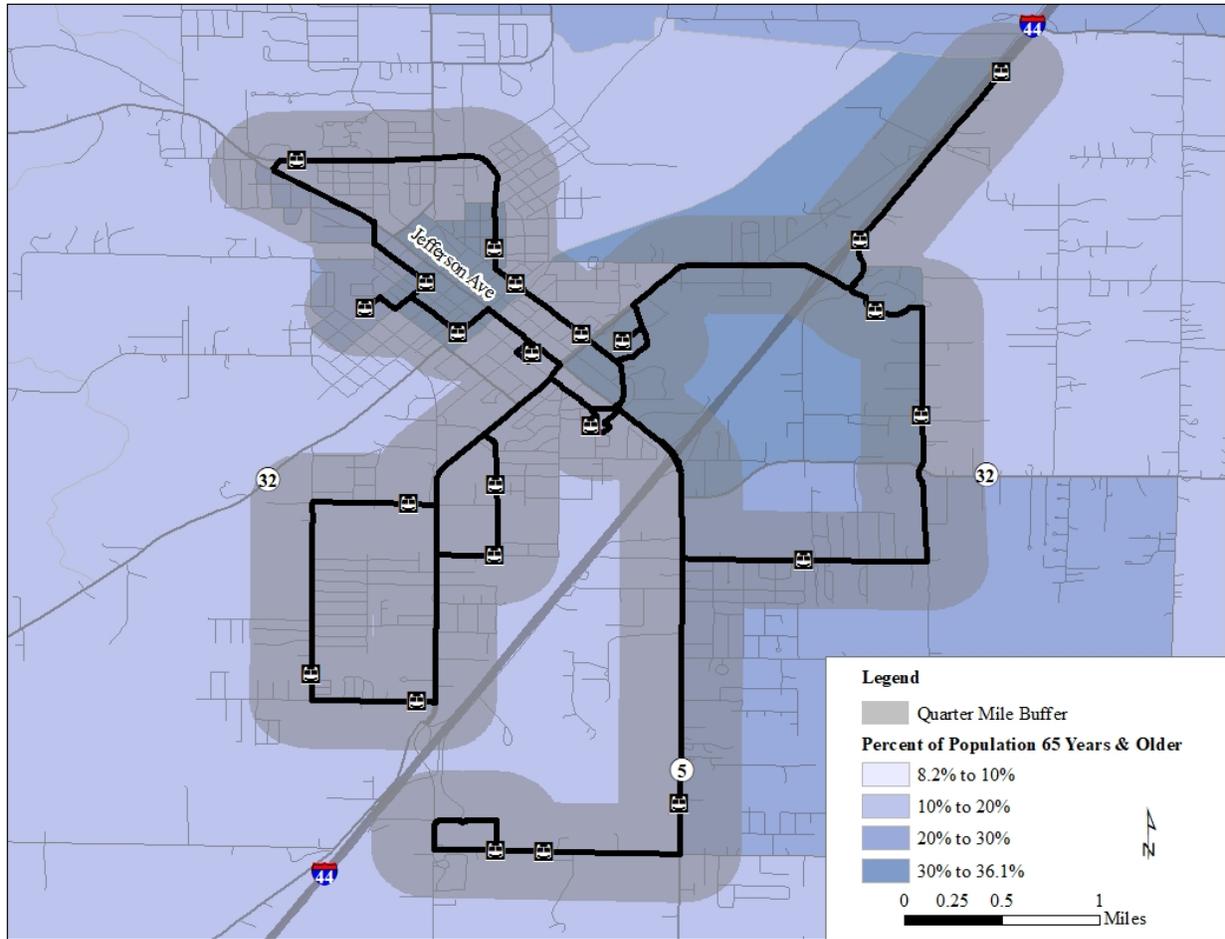


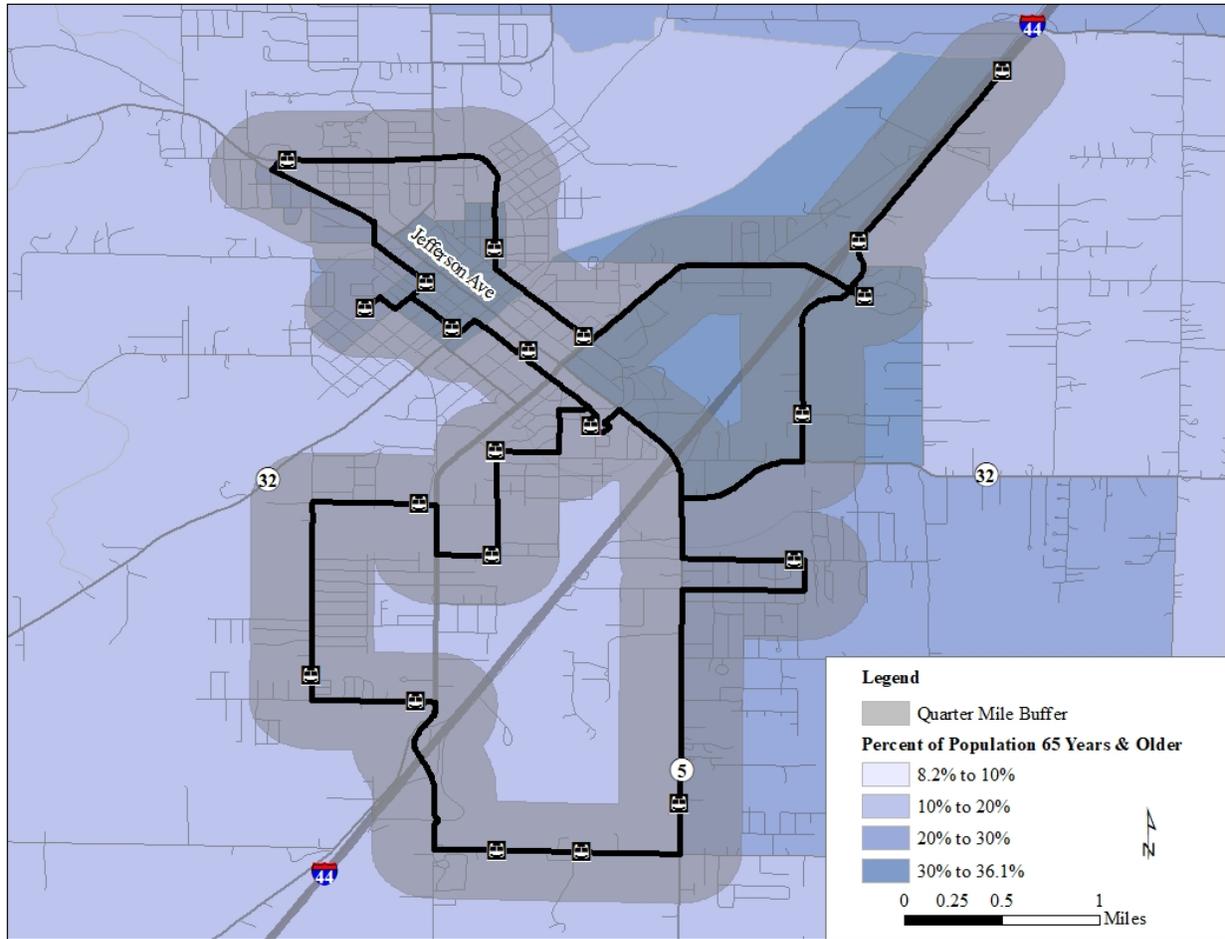
Figure 6-24: Shorted Purple Route in Relation to the Senior Population

Scenario 2A directly provides access to senior citizens at seven stops: Mercy Hospital, Tower Road & Copeland Drive, Washington Avenue & Oak Street, Harwood Manor, Hughes Senior Center, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, Whispering Pines Mobile Homes, and the Kenneth E Cowan Civic Center (see Figure 6-25). These stops are located near LEBANON’s main core, meaning Scenario 2A does not require a rider to walk long distances to get to a bus stop. In addition, Scenario 2A has a stop at the Hughes Senior Center. However, for seniors who need direct access to Mercy Hospital, Scenario 2A would require transferring between buses at the Library.



**Figure 6-25: Scenario 2A in Relation to the Senior Population**

Scenario 2B provides access to seniors at nine stop locations: Mercy Hospital, Cowan Drive & Copeland Drive, Washington Avenue & Oak Street, Harwood Manor, Hughes Senior Center, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, Whispering Pines Mobile Homes, and the Kenneth E Cowan Civic Center (see Figure 6-26). Similar to Scenario 2A, Scenario 2B provides direct access to the Hughes Senior Center which in turn has direct access to Mercy Hospital.



**Figure 6-26: Scenario 2B in Relation to the Senior Population**

Scenario 3 provides service to seniors at nine stop locations: Mercy Hospital, Cowan Drive & Copeland Drive, Washington Avenue & Oak Street, Harwood Manor, Hughes Senior Center, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, Whispering Pines Mobile Homes, and the Kenneth E Cowan Civic Center (see Figure 6-27). While Scenario 3 would require seniors to transfer between routes, this scenario has the benefit of more frequent service.

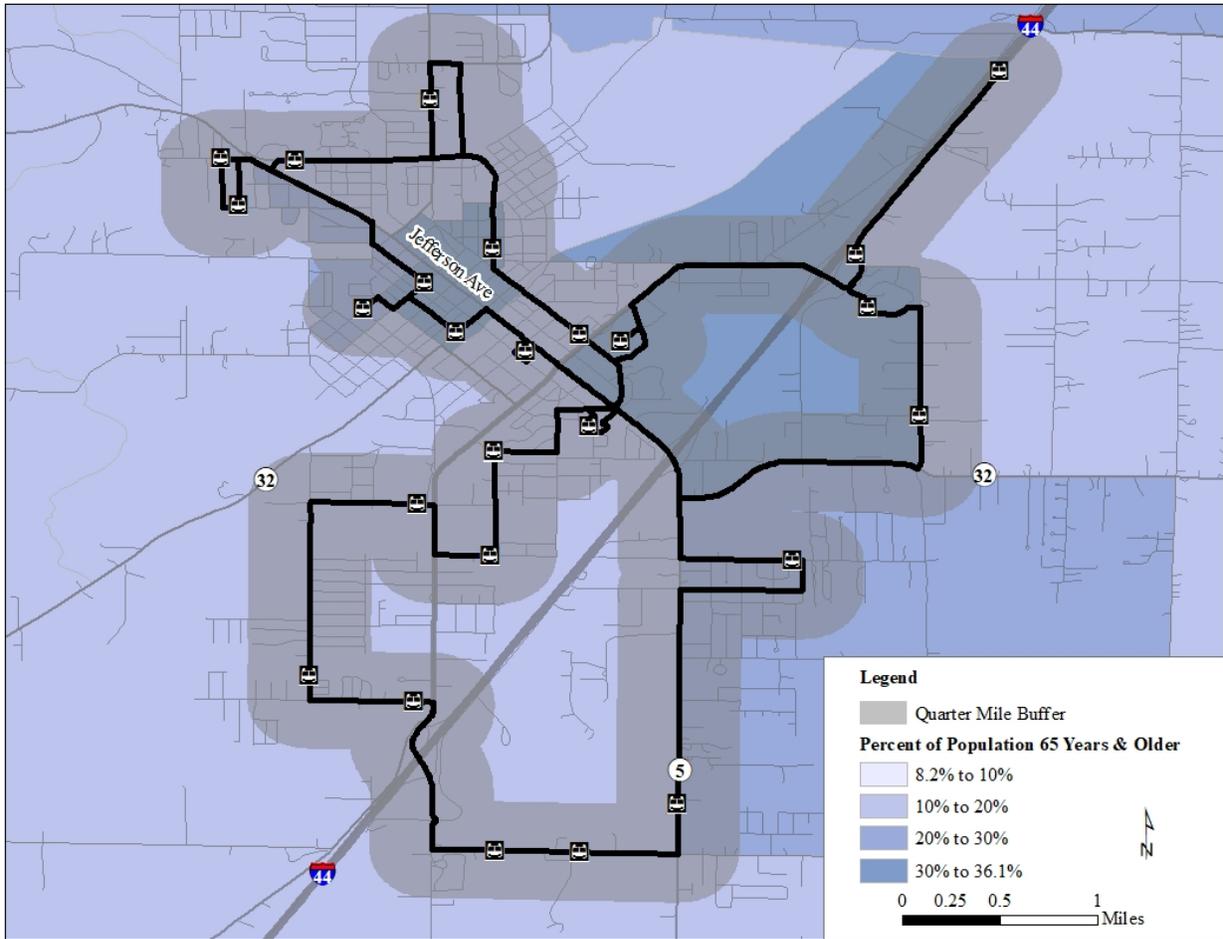


Figure 6-27: Scenario 3 in Relation to the Senior Population

### 6.7.2. Service Provided to People with Disabilities

There are higher concentrations of people with a disability located near Walmart who could be served by the stop along Bland Road near Whispering Pines Mobile Homes, near the Kenneth E Cowan Civic Center where there is a potential bus stop, along Jefferson Avenue which could be served by the stop at City Hall or by the stop at Washington Avenue & Commercial Street, and along Elm Street close to downtown which is served by the stop at Boswell Park (see Figure 6-28). In addition, there is a proposed bus stop at Laclede Industries which provides career services to people with disabilities. There are census blocks with higher concentrations of people with a disability located North of LEBANON that are currently not being served by any proposed bus route, service to this area should be considered as the system is expanded in the future with additional funding.

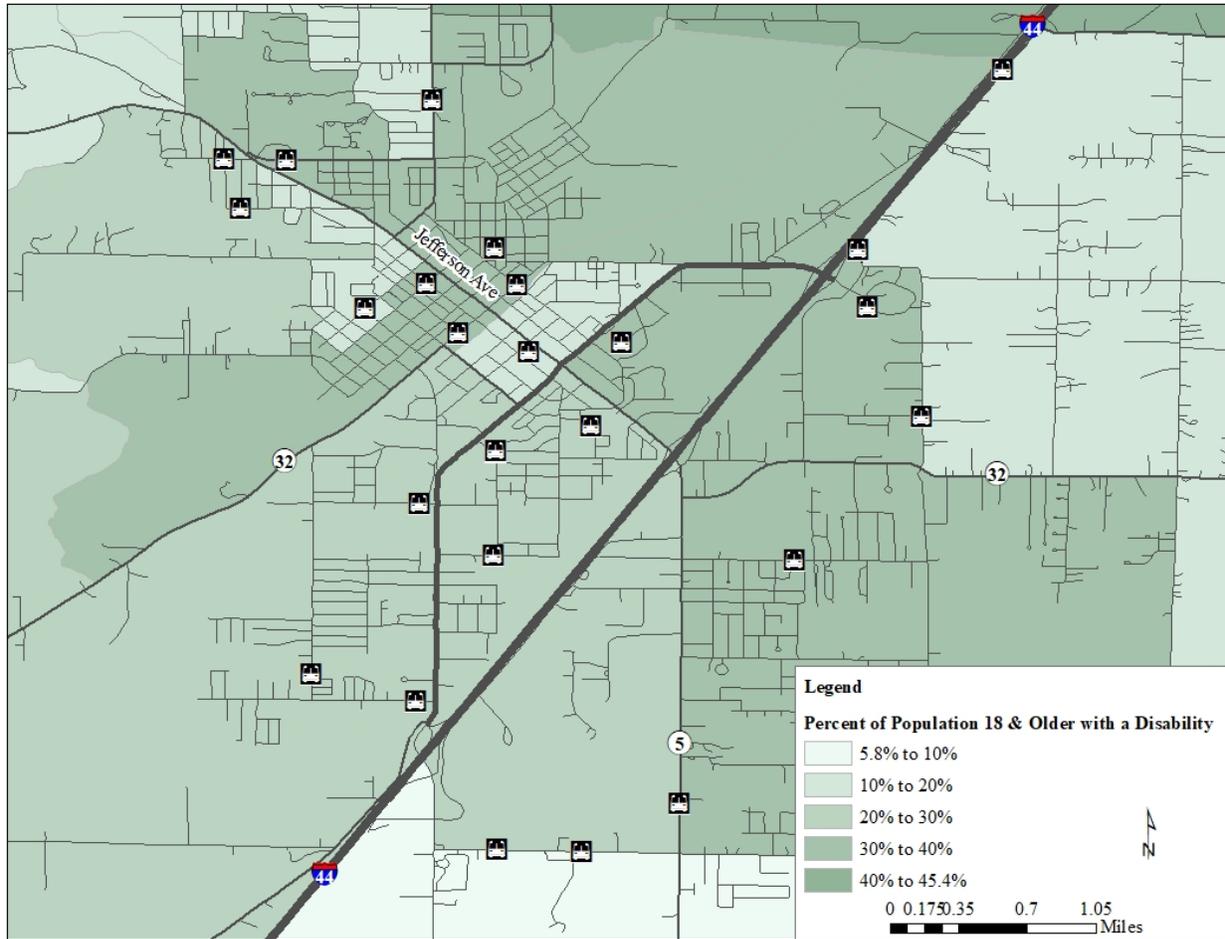
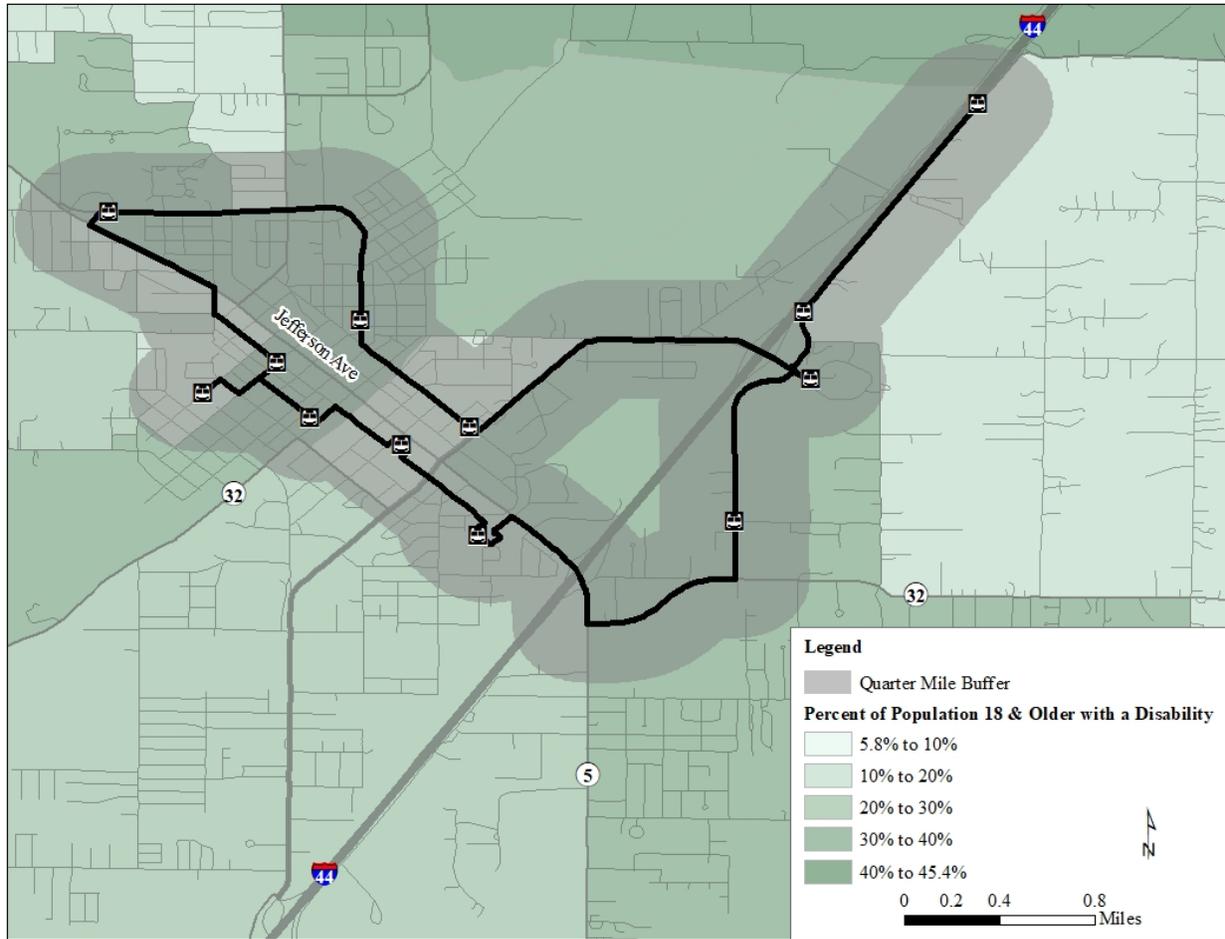


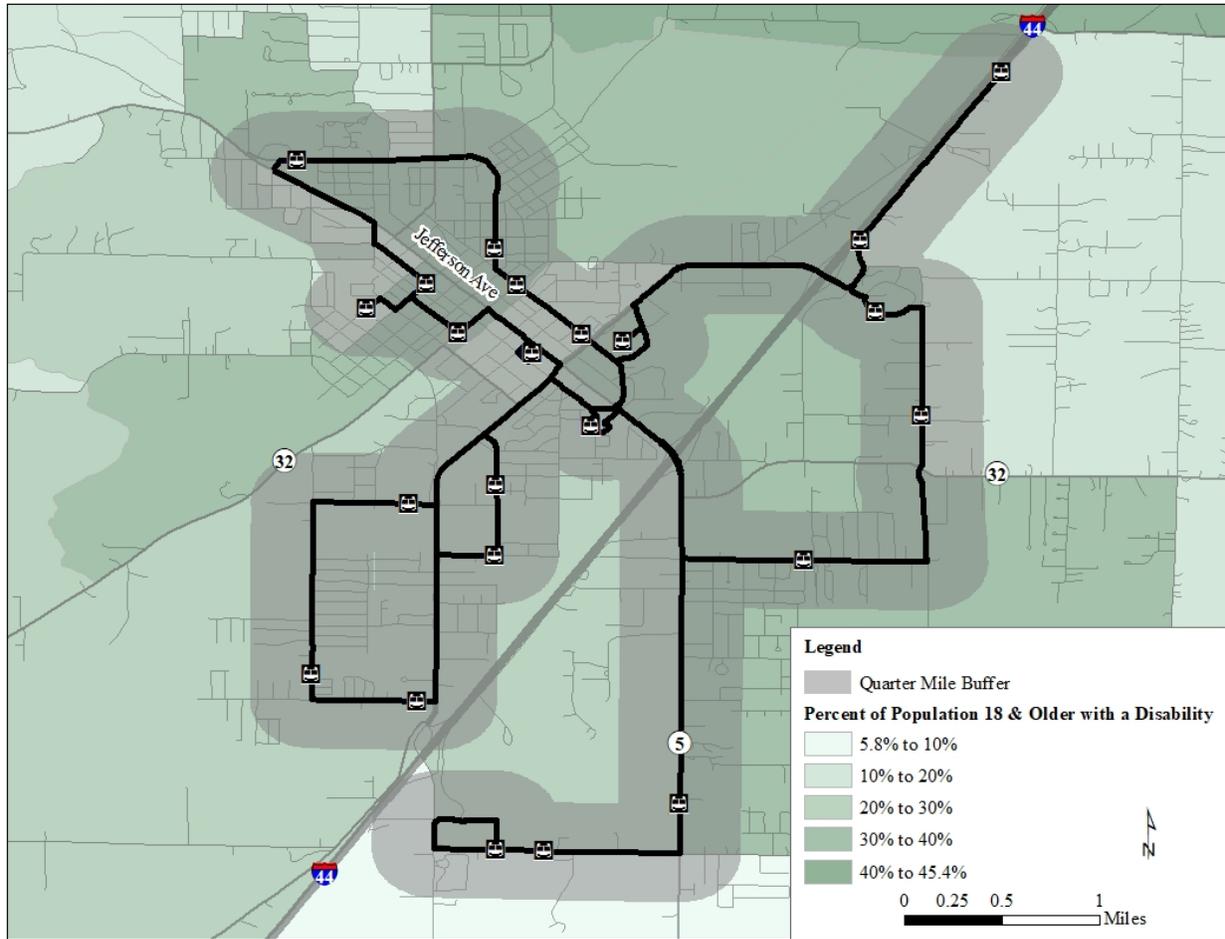
Figure 6-28: Proposed Bus Stops in Relation to People with Disabilities

The *Shortened Purple Route* provides service to census blocks where the population consists of 30 to 40 percent of people with a disability at six stops: Harwood Manor, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, Mercy Hospital, Cowan Drive & Copeland Drive, and Lebanon High School (see Figure 6-29). This route would provide access to medical care, education, and to the main core of LEBANON along Jefferson Avenue where riders can access commercial businesses.



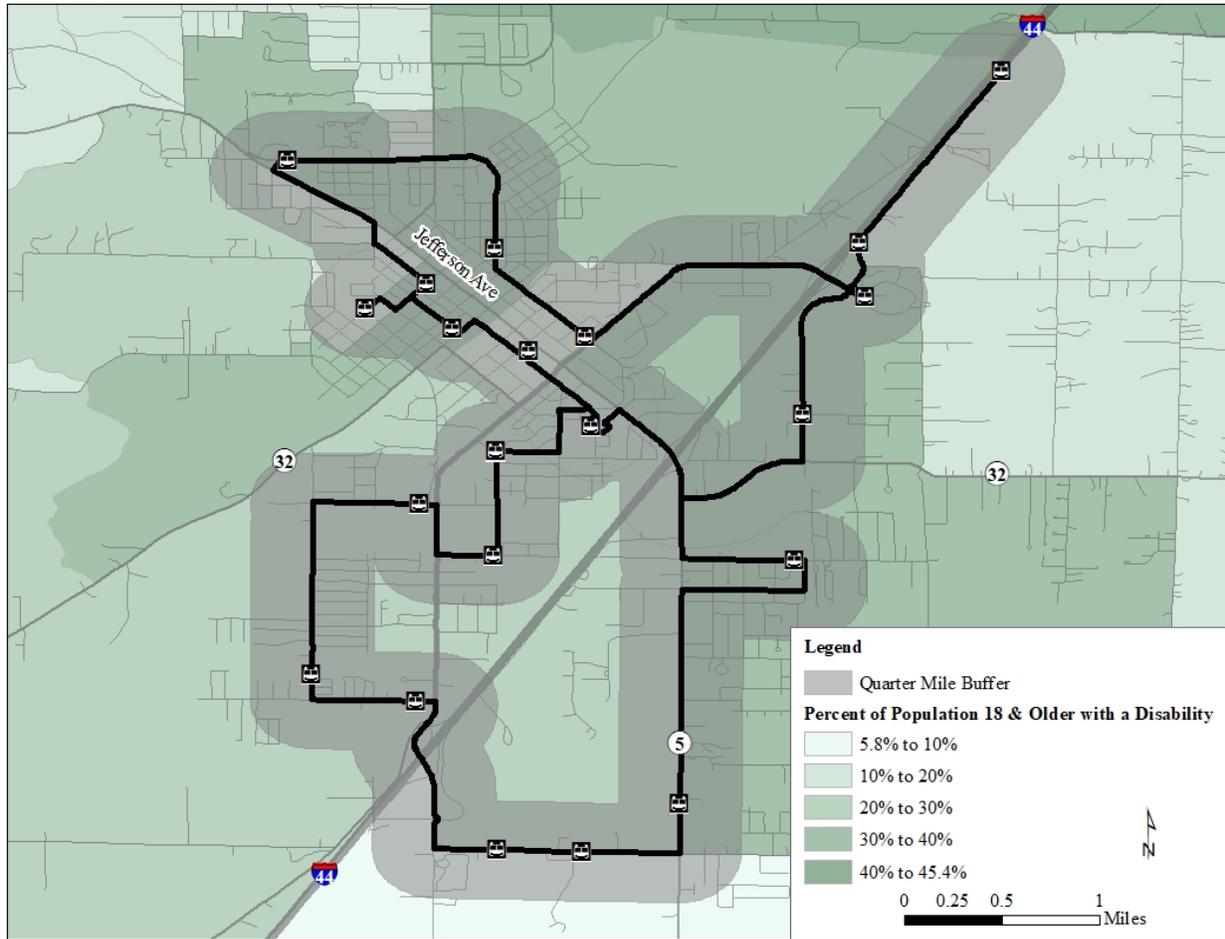
**Figure 6-29: Purple Route in Relation to People with a Disability**

Scenario 2A would provide service to areas with a larger percentage of people with disabilities at nine stops: Washington Avenue & Oak Street, Harwood Manor, 4<sup>th</sup> Street and Madison Avenue, Monroe Street & Commercial Street, Mercy Hospital, Tower Road & Copeland Drive, Whispering Pines Mobile Homes, Kenneth E Cowan Civic Center, and Laclede Industries (see Figure 6-30). Scenario 2A would provide access to the denser residential areas of LEBANON to places like Laclede Industries, the Lebanon Career and Technical Center, and the Library without requiring a rider to transfer between buses.



**Figure 6-30. Scenario 2A in Relation to People with Disabilities**

Scenario 2B would provide service to areas with a larger percentage of people with disabilities at nine stops: Washington Avenue & Oak Street, Harwood Manor, 4<sup>th</sup> Street and Madison Avenue, Monroe Street & Commercial Street, Mercy Hospital, Tower Road & Copeland Drive, Whispering Pines Mobile Homes, Kenneth E Cowan Civic Center, and Laclede Industries (see Figure 6-31). The *Shortened Purple Route* (the Northern loop) from Scenario 2B provides service to six of these stops alone. Scenario 2B would provide more direct service from the dense residential areas to Mercy Hospital and the OTC/MSU campus but may require transferring buses to access Laclede Industries.



**Figure 6-31: Scenario 2B in Relation to People with Disabilities**

Scenario 3 would provide service to areas with a larger percentage of people with disabilities (30 to 40 percent) at eight stops: Harwood Manor, 4<sup>th</sup> Street and Madison Avenue, Monroe Street & Commercial Street, Mercy Hospital, Tower Road & Copeland Drive, Whispering Pines Mobile Homes, Kenneth E Cowan Civic Center, and Laclede Industries (see Figure 6-32). Scenario 3 would provide similar service to Scenario 2A or 2B but at a higher frequency, though with shorter routes riders will most likely need to transfer between buses.

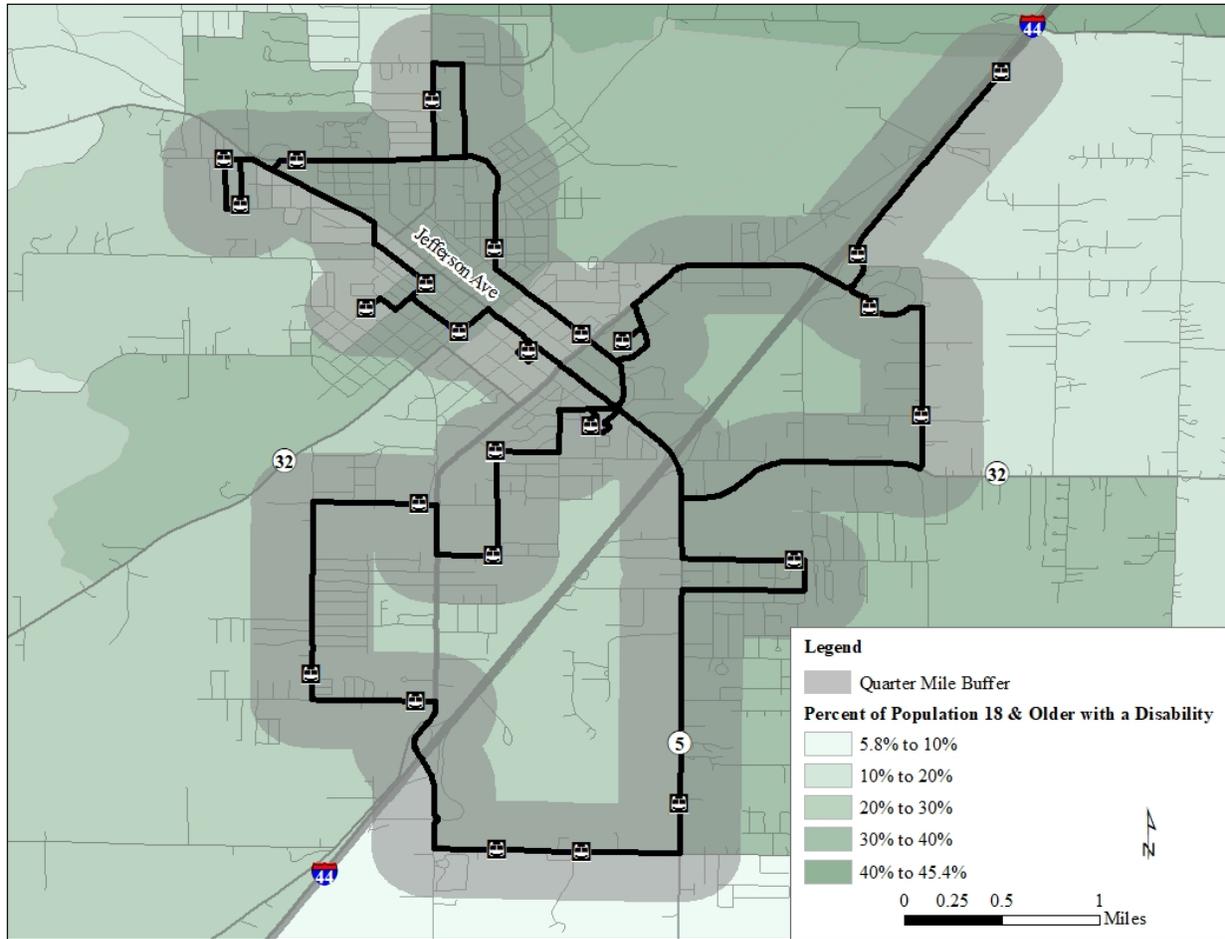


Figure 6-32: Scenario 3 in Relation to People with Disabilities

### 6.7.3. Service to Households Below the Poverty Line

There are households living below the poverty line throughout the city, but the highest concentration of households living below the poverty line are along Commercial Street and near Highway 5 in the northern part of LEBANON. The stop at Monroe Street & Commercial Street and the stop at Washington Avenue & Commercial Street would provide service to this area (see Figure 6-33). Considering these stops, the *Shortened Red Route*, *Shortened Purple Route*, and Blue Route would provide services to these areas.

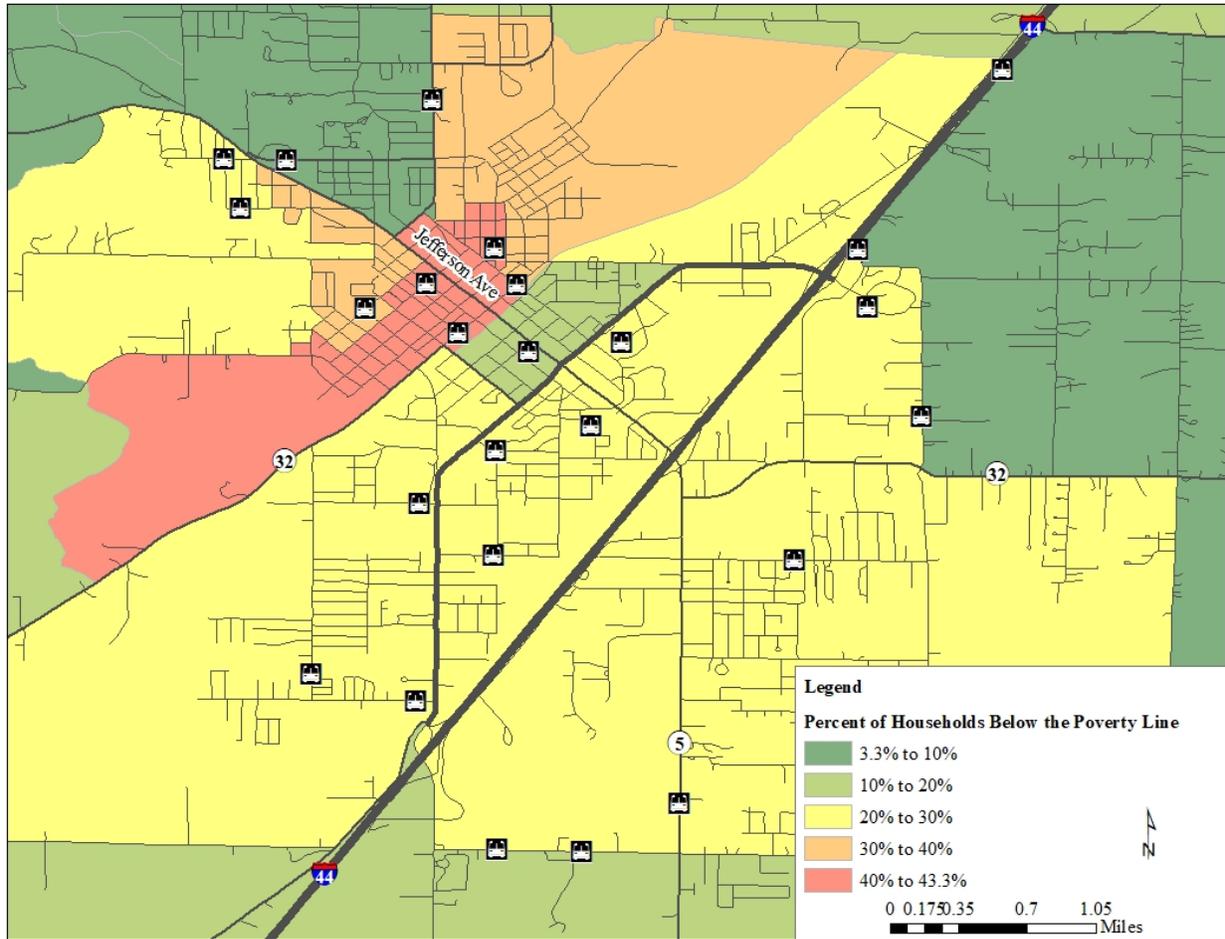
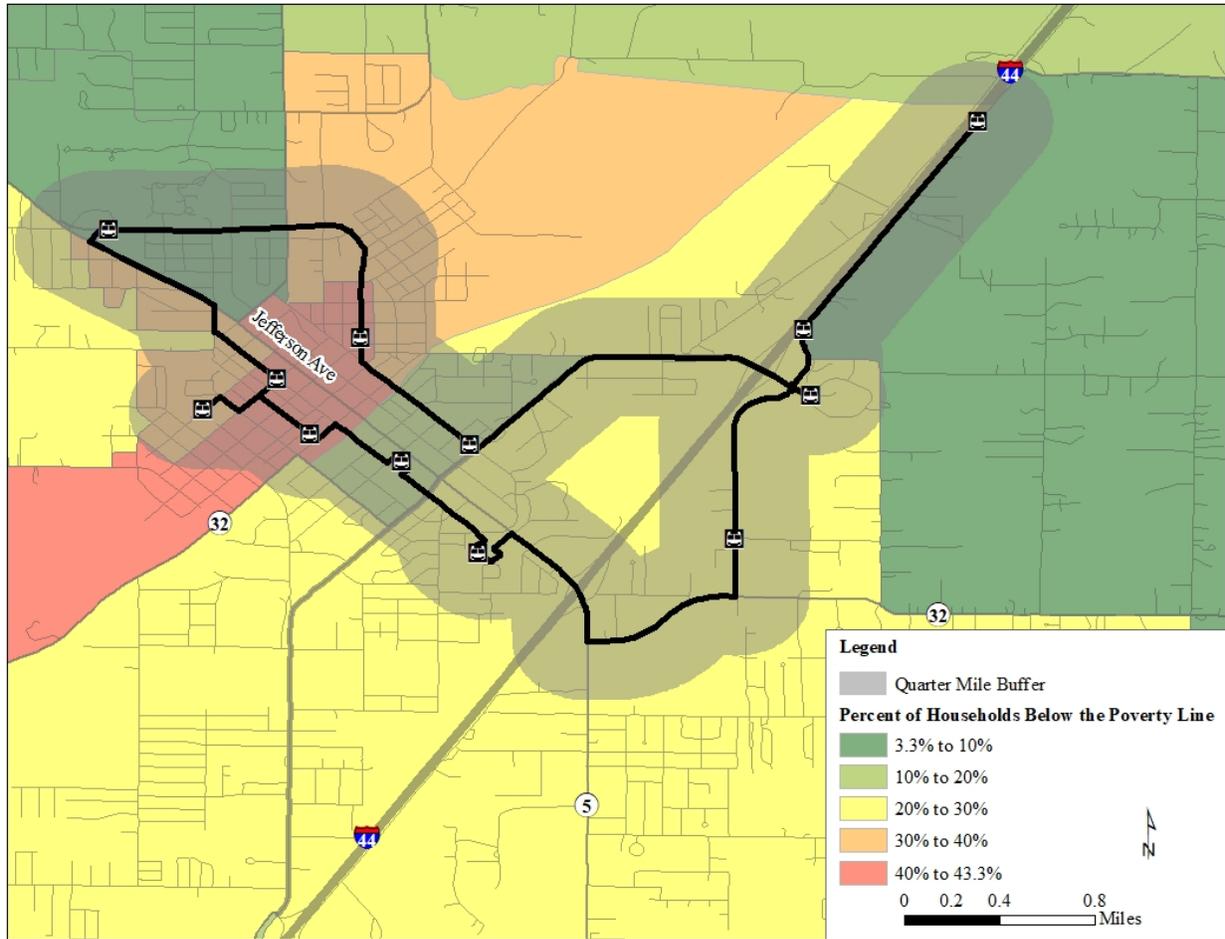


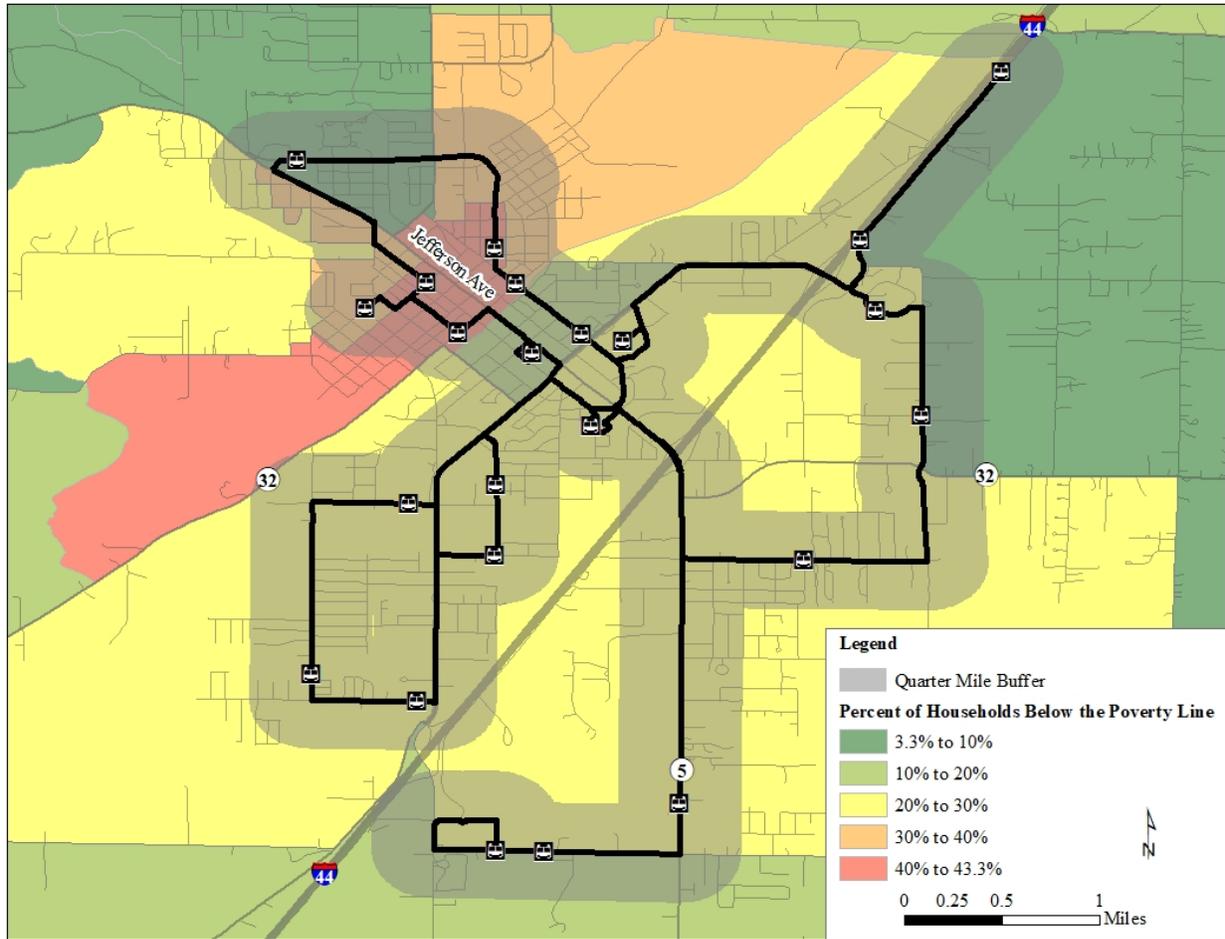
Figure 6-33: Proposed Bus Stops in Relation to Households Below the Poverty Line

The *Shortened Purple Route* provides access to four locations where there are 30 to 43.3 percent of households below the poverty level: Harwood Manor, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, and the Hughes Senior Center (see Figure 6-34). In addition to these stops, many of the other stops along the *Shortened Purple Route* are within census blocks where 20 to 30 percent of households are below the poverty level. The *Shortened Purple Route* would provide this area with access to the Library, Mercy Hospital, and OTC/MSU. In addition, the *Shortened Purple Route* provides access to places like the Lebanon Town Hall where residents pay bills. Stops at Lebanon Town Hall and the Library would provide access to commercial businesses along Jefferson Avenue including a grocery store, a pharmacy, and restaurants.



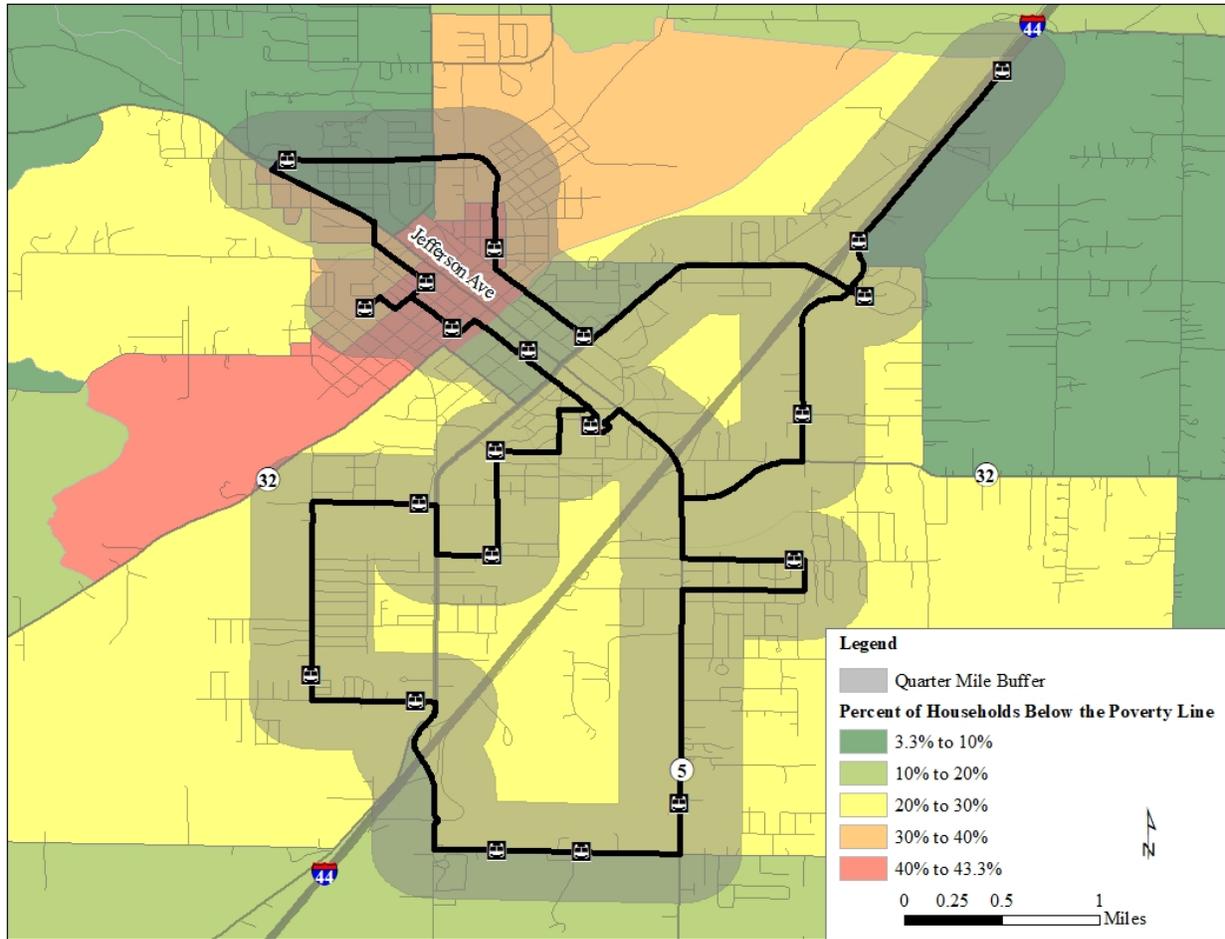
**Figure 6-34: The Shortened Purple Route in Relation to Households Below the Poverty Level**

Scenario 2A provides service to five locations within census blocks where there are 30 to 43.3 percent of households below the poverty level: Washington Avenue & Commercial Street, Harwood Manor, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, and the Hughes Senior Center (see Figure 6-35). Many of the remaining stops in Scenario 2A are within census blocks where 20 to 30 percent of households are below the poverty level. Scenario 2A would provide access from the higher concentration of residential areas to employment along Jefferson Avenue, near Ivey Lane, and to Tracker Marine. For residents that would need to travel from the core of LEBANON to Mercy Hospital, OTC/MSU, or to employment on the eastern side of I-44, Scenario 2A would require transferring between bus routes.



**Figure 6-35: Scenario 2A in Relation to Households Below the Poverty Line**

Similar to Scenario 2A, Scenario 2B provides service to five locations within census blocks where 30 to 43.3 percent of households are below the poverty level: Washington Avenue & Commercial Street, Harwood Manor, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, and the Hughes Senior Center (see Figure 6-36). Many of the remaining stops in Scenario 2B are within census blocks where 20 to 30 percent of households are below the poverty level. Scenario 2B would provide service to Mercy Hospital and OTC/MSU as well as Emerson/Copeland (a major employer) without requiring riders to transfer between buses. The benefit of this route scenario is that it may improve access to OTC/MSU, which would allow residents to gain a higher level of education and possibly work towards a better career.



**Figure 6-36: Scenario 2B in Relation to Households Below the Poverty Line**

Scenario 3 provides frequent service to the main core of LEBANON at five locations within census blocks where 30 to 43.3 percent of households are below the poverty level: Washington Avenue & Commercial Street, Harwood Manor, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, and the Hughes Senior Center (see Figure 6-37). Scenario 3 travels primarily through census blocks where 20 to 30 percent of households are below the poverty level. The benefit of Scenario 3 is that the higher level of service may make accessing employment using a public transportation system a more viable option for residents.

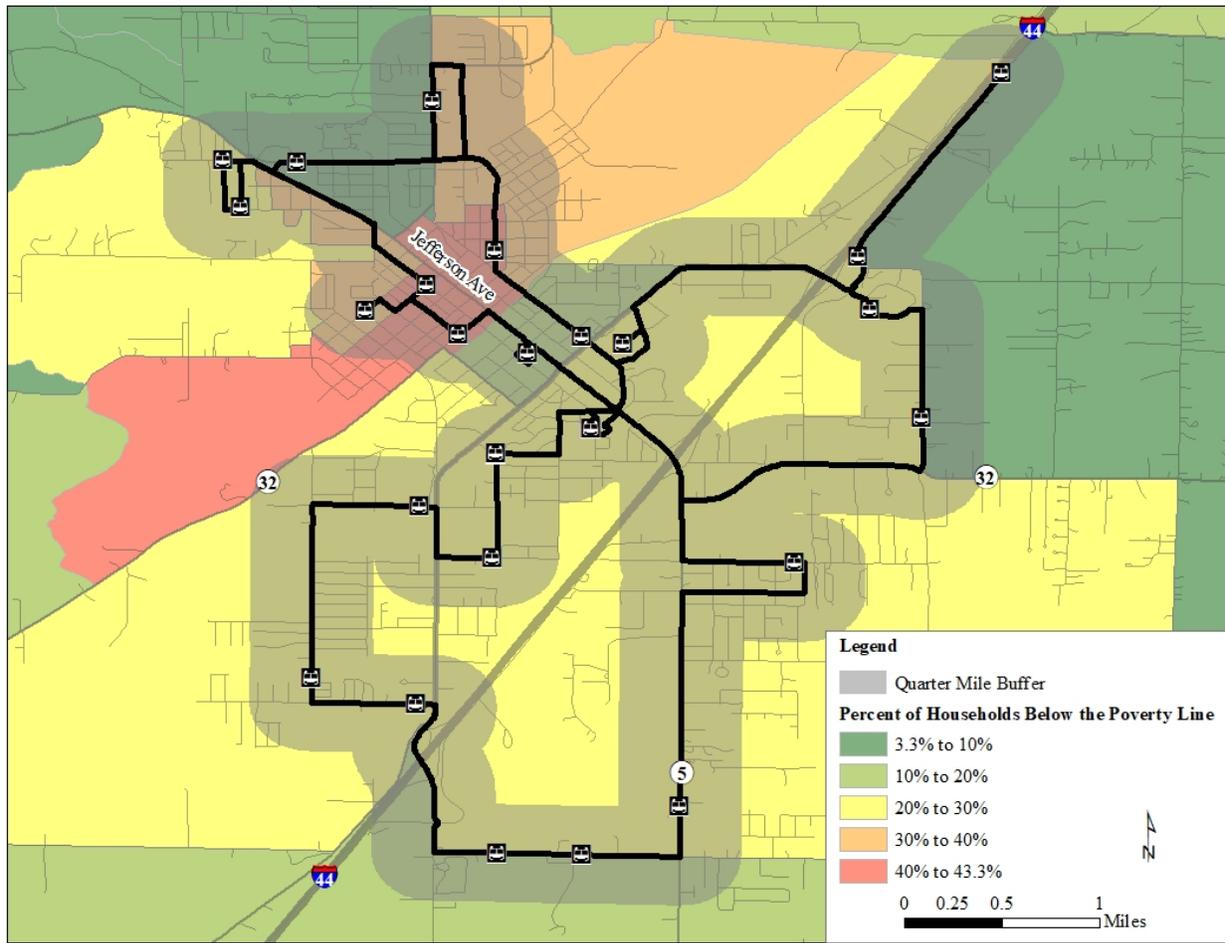
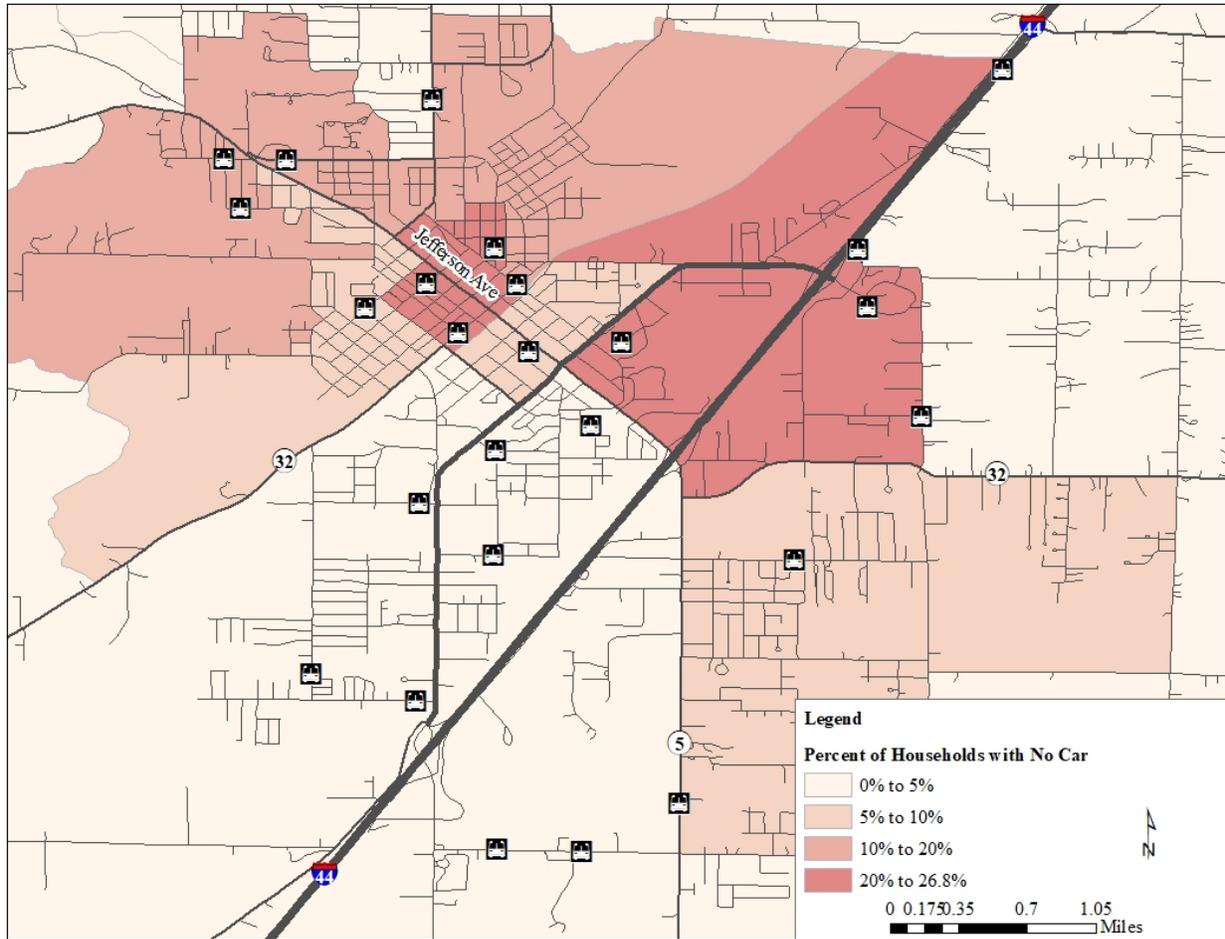


Figure 6-37: Scenario 3 in Relation to Households Below the Poverty Line

#### 6.7.4. Vehicle-Less Households

There are higher proportions of households without a vehicle along I-44 which would be served by bus stops at Mercy Hospital, the Park-N-Ride, Tower Road & Copeland Drive, and the Kenneth E Cowan Civic Center (see Figure 6-38). At the core of LEBANON near Jefferson Avenue there is another high concentration of households without a vehicle. This may suggest that people without a vehicle are choosing to reside near the main core of LEBANON because they understand that they need to access commercial areas and services via walking or bicycling. Households without a vehicle may rely on friends or family for rides or must walk or bicycle everywhere; this can make accessing employment, education, or medical services a struggle, as discussed in the Literature Review. Multiple bus stops would serve these households including: Harwood Manor, Washington Avenue & Commercial Street, Monroe Street & Commercial Street, and 4<sup>th</sup> Street & Madison Avenue.



**Figure 6-38: Proposed Bus Stops in Relation to Households without a Car**

The *Shortened Purple Route* provides service to six locations where 20 to 26.6 percent of households lack access to a vehicle: Harwood Manor, 4<sup>th</sup> Street & Madison Avenue, Monroe Street & Commercial Street, Mercy Hospital, Cowan Drive & Copeland Drive, and the Park-N-Ride (see Figure 6-39). These households may currently rely on rides from friends or family which can be inconvenient or they may currently be walking or bicycling to access necessities. The *Shortened Purple Route* would provide these households with the ability to access employment, higher education, and medical care in a reliable manner.

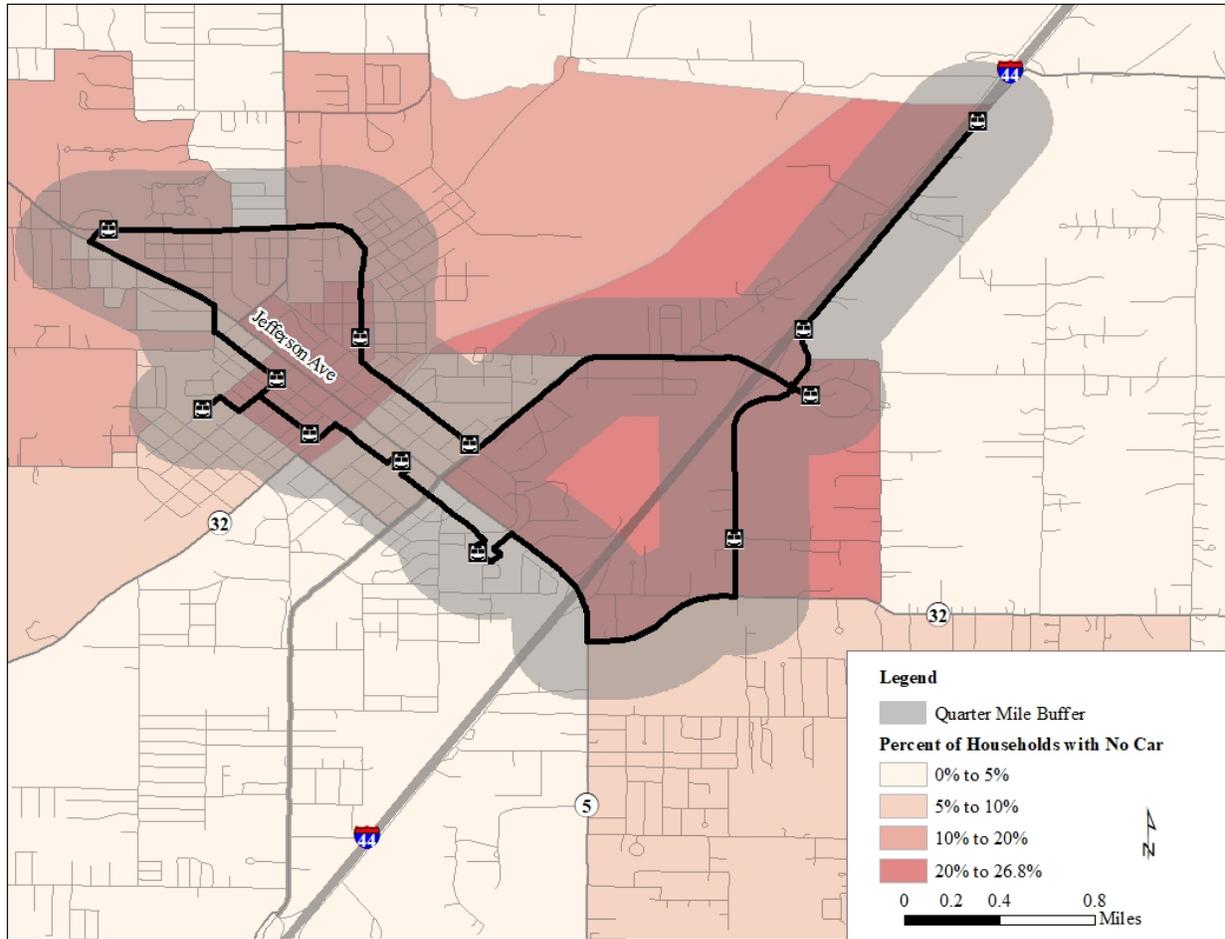
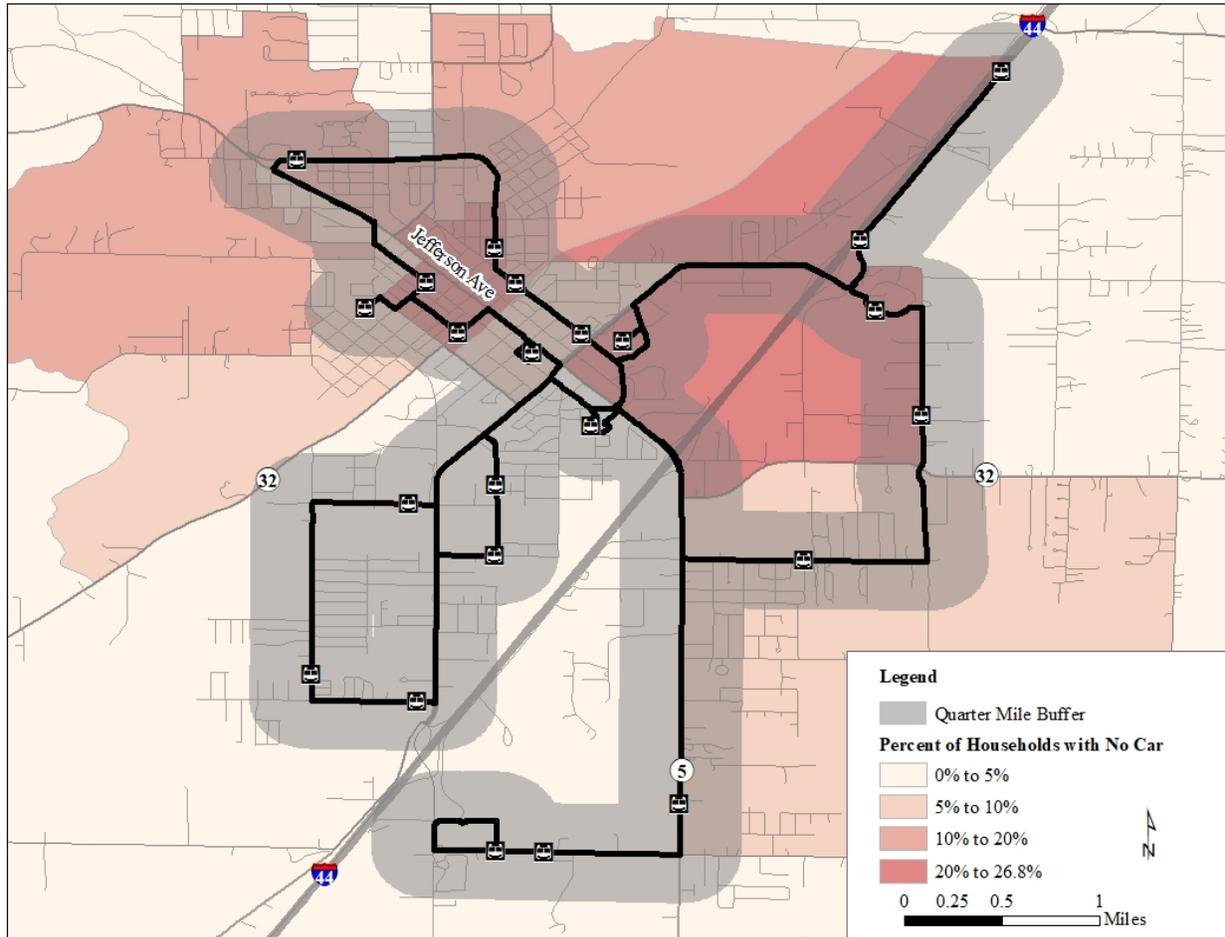


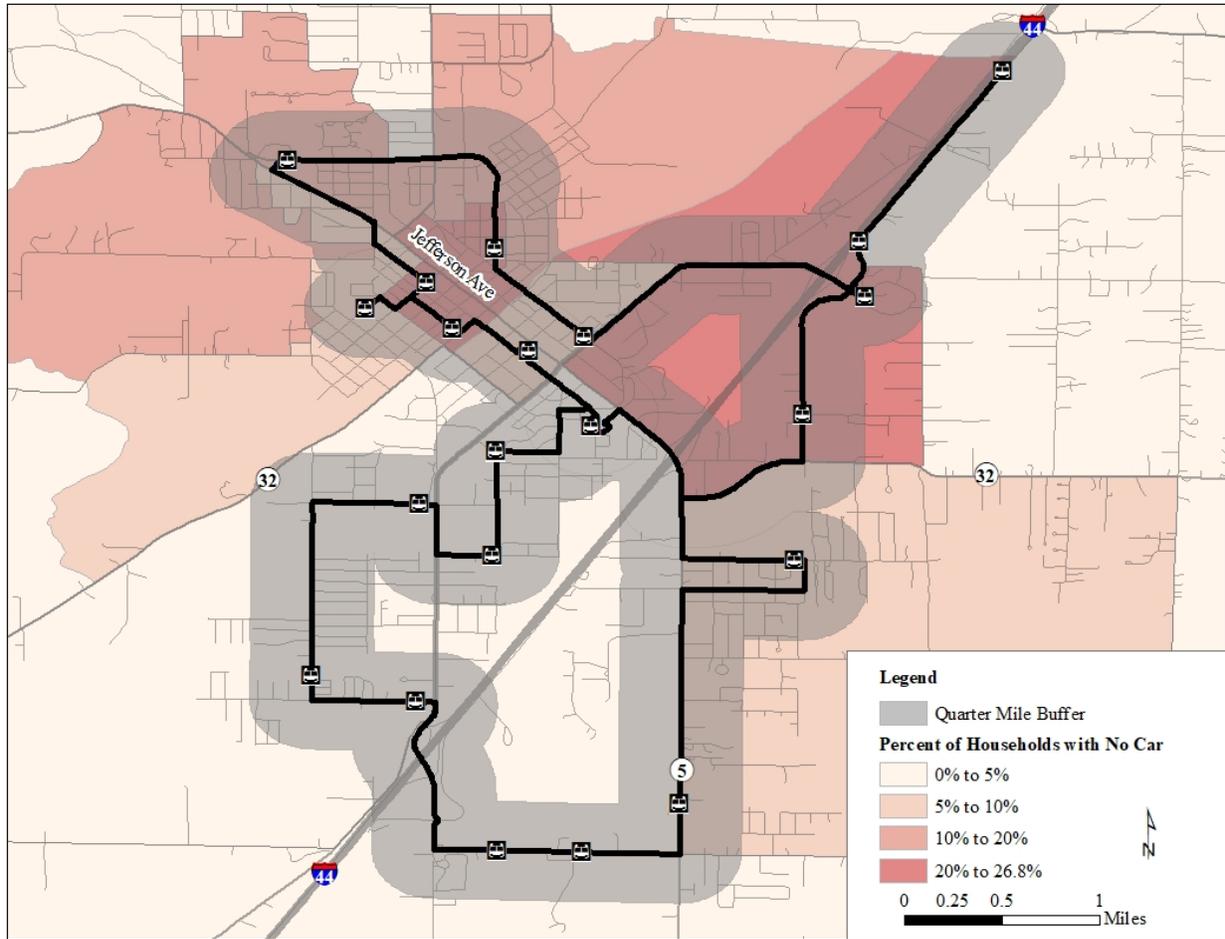
Figure 6-39: Shortened Purple Route in Relation to Households without a Car

Scenario 2A provides service to eight locations within a census block where 20 to 26.8 percent of households lack a vehicle: Washington Ave & Oak St, Harwood Manor, Monroe Street & Commercial Street, 4<sup>th</sup> Street & Madison Avenue, Mercy Hospital, the Park-N-Ride, and Tower Road & Copeland Drive (see Figure 6-40). Scenario 2A would require riders from the dense residential areas of LEBANON to transfer between buses to access healthcare, higher education, or the commercial area near Bland Road on the eastern side of I-44.



**Figure 6-40: Scenario 2A in Relation to Households without a Car**

Scenario 2B provides service to eight locations within a census block where 20 to 26.8 percent of households lack a vehicle: Washington Ave & Oak St, Harwood Manor, Monroe Street & Commercial Street, 4<sup>th</sup> Street & Madison Avenue, Mercy Hospital, the Park-N-Ride, and Cowan Drive & Copeland Drive (see Figure 6-41). All of these stops are along the *Shortened Purple Route* in this scenario. Scenario 2B would provide service from the dense residential areas to Mercy Hospital and the OTC/MSU campus.



**Figure 6-41: Scenario 2B in Relation to Households without a Car**

Scenario 3 provides service to eight locations within a census block where 20 to 26.8 percent of households lack a vehicle: Washington Ave & Oak St, Harwood Manor, Monroe Street & Commercial Street, 4<sup>th</sup> Street & Madison Avenue, Mercy Hospital, the Park-N-Ride, and Cowan Drive & Copeland Drive (see Figure 6-42). Scenario 3 would provide frequent service making the public transportation system a more desirable and viable option for residents to access employment, education, and/or healthcare.

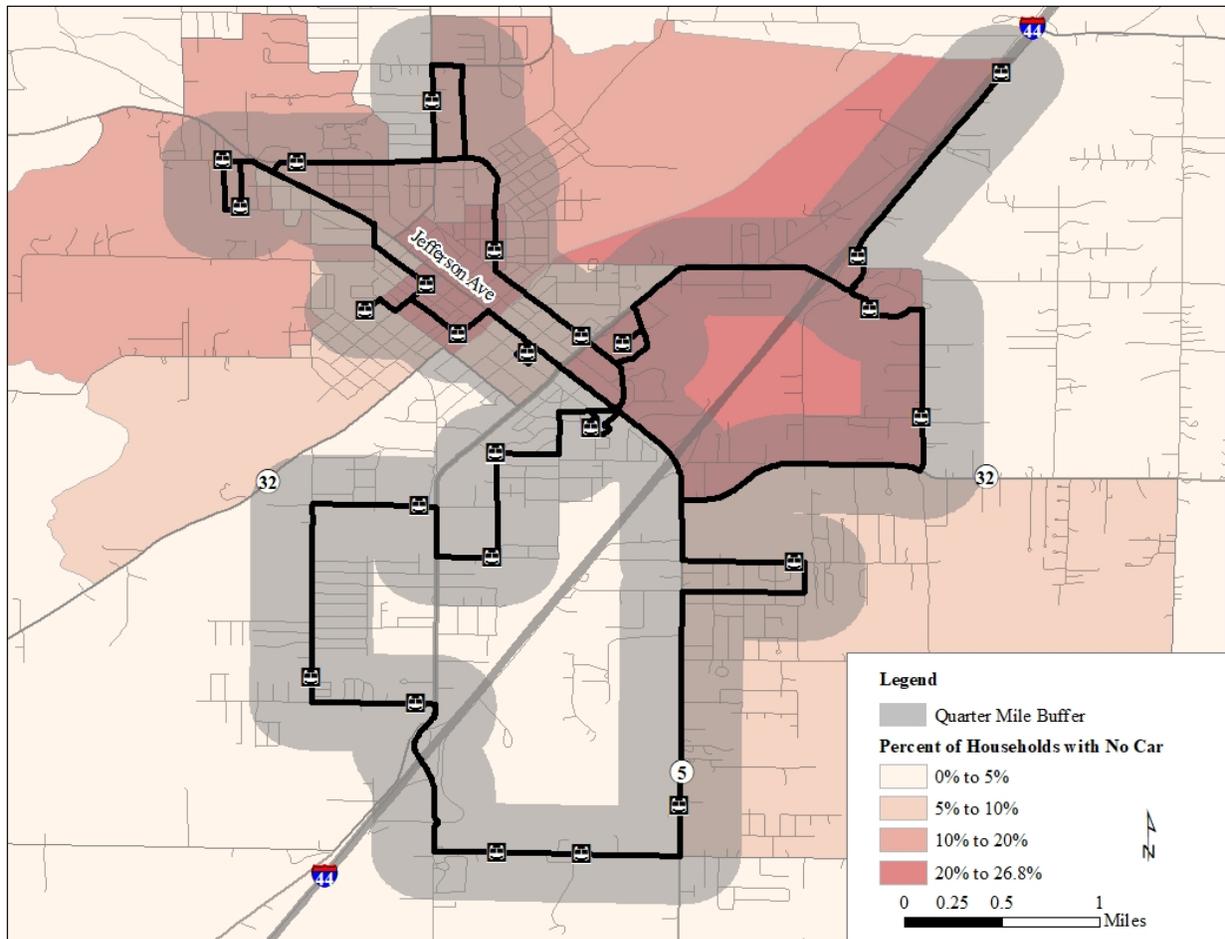


Figure 6-42: Scenario 3 in Relation to Households without a Car

Considering a one route scenario, the *Shortened Purple Route* has an estimated annual cost that is lower than the Tan Route (\$145,219.34 vs. \$22,517.74) and is also more cost effective when considering cost per stop (\$3.95 per stop vs. \$5.33). In addition, while the *Shortened Purple Route* does not provide service to the Southern portion of LEBANON, it does provide good access and frequent service from dense residential areas to Mercy Hospital and to the Ozarks Technical Community College/Missouri State University – Lebanon. In addition, the *Shortened Purple Route* has many stops that would provide service to the transportation disadvantaged populations in LEBANON.

**The researchers believe that the *Shortened Purple Route* would be a good starting point for LEBANON to implement a public transportation system.** With additional funding, LEBANON can begin to consider the addition of multiple routes or begin to add vehicles to the *Shortened Purple Route* to provide more frequent service.

While the discussion herein referred to the routes by a color, LEBANON should investigate the potential impact on system use as a result of how the system is marketed, as was discussed in a presentation at the 2018 National Conference on Rural Public & Intercity Transportation conference, during the presentation, *Banish the Bland! The Secrets to Successful Transit Branding*.

## 6.8. Paratransit Requirements

A public transportation system that provides fixed route service must also provide complementary paratransit service for anyone who is unable to use the fixed route service under Section 223 of the Americans with Disabilities Act (National Aging and Disability Transportation Center, 2014). Paratransit service typically operates on a demand response basis and provides origin to destination service, either door-to-door or curb-to-curb service, which may require additional drivers or vehicles.

The FTA requires that paratransit service be provided to origins and destinations within three-fourths of a mile on either side of a fixed route system (Federal Transit Administration, 2018). Figure 6-43 shows an example of the paratransit service area that would be required (shown in dark gray) for the recommended *Shortened Purple Route* scenario.



**Figure 6-43: Shortened Purple Route Paratransit Service Area**

Paratransit service must be provided to all individuals who are unable to use the fixed route service due to a disability. FTA defines three types of eligibility categories (Federal Transit Administration, 2018):

1. A person with a disability who cannot navigate that transit system without assistance.
2. A person with a disability who requires an accessible vehicle when one is not available.
3. A person with a disability who is unable to reach the transit stop.

Eligibility is typically determined through an application process. The eligibility determination process can also include an in-person interview or in-person assessment to determine an applicant's eligibility. The determination process should be clear and straightforward. Eligibility determination helps to manage demand for paratransit service by ensuring that only those who truly need paratransit service can use it. Information about paratransit and the eligibility determination process can be found in Appendix D – Additional Resources. Since **a paratransit service is required when fixed-route service is provided**, it is important to remember to include this cost when calculating the overall cost of the potential service. As an example, assuming a cost of \$75/hr for an additional vehicle to operate and be maintained during the same time period as the fixed route (e.g. Monday through Friday from 7am to 7pm), an additional cost of \$4500 will be necessary to offer paratransit; note, however, that the cost could be more if demand is more. As such, identifying strategies to minimize the cost of providing paratransit will assist in keeping overall costs low, as discussed in *Travel Training for Older Adults Part II: Research Report and Case Studies* (Burkhardt, et al., 2014).

## 7. CONNECTIONS TO ECONOMIC DEVELOPMENT

Outcomes of the project identified several economic implications including lack of mobility impacting employment, an observed shortage of labor to fill positions advertised by businesses in the community, lack of access to higher education, and a need to address missed medical appointments. Furthermore, providing a public transportation system in LEBANON would work to reduce monthly household costs for residents who use, and potentially create jobs in LEBANON directly by adding full or part-time positions for drivers and maintenance workers.

Of the survey respondents who reported providing rides to others, the most commonly reported frequency was periodically. Periodically obtaining a ride from someone else restricts the rider's ability to access educational and employment opportunity, which in turn has economic implications.

Many "help wanted" signs (Figure 4-27) were observed in front of major employers in LEBANON, and almost forty percent of overall survey respondents reported that they had to limit their job searches as a result of transportation challenges. There is a possibility that some of the needed employees could be found among those who reported limiting their searches if another form of transportation was provided in LEBANON.

The results suggest that creating a public transportation system that would allow connectivity to institutions of higher education for both post-secondary degrees and for opportunities to complete a General Equivalency Diploma (GED) for those without a high school degree; both would bring economic benefits to LEBANON.

With more than a quarter of LEBANON survey respondents reporting earnings of less than \$12,500 annually, a number which roughly represents the poverty level, providing a public transportation system could reduce the household costs allocated for transportation, which could bring economic benefits to these households and thereby to the community. As an example, reducing household transportation costs could free up a household's budget for spending on other necessities and potentially increase spending at local businesses.

The researchers suggested that LEBANON discuss with school district staff the possibility of coordinating maintenance of public transportation system buses with school buses, should LEBANON implement a system. Dependent upon the work load of current school bus employees for maintaining the buses, this could either increase a full-time equivalency (FTE) of a current employee or require the hiring of a new employee to address maintenance needs, thereby bringing economic benefits to LEBANON.

More than forty percent of survey respondents reported missing medical appointments due to transportation challenges. Missed medical appointments are costly to medical providers and consequently the community. Therefore, providing a public transportation system that offers another mobility option may help to address missed appointments.

In closing, implementing a public transportation system in LEBANON could connect potential employees to businesses, fill position openings, provide access to higher education, and reduce monthly household costs all while providing additional mobility to the community.

## 8. CONCLUSIONS

Investigating the demographics of LEBANON suggests that there is a need for a public transportation system in LEBANON, as mobility needs of low-income, seniors, and/or people with disabilities are not being met with the existing public transportation system options.

The survey data collected resulted in different sub-sets of the larger LEBANON population being captured dependent upon the mode. Online survey respondents tended to be older (54-72 age range), more educated and wealthier. In contrast, hard copy survey respondents tended to be younger (18-35), less educated and poorer, suggesting a concerning economic outlook for LEBANON.

The survey results highlighted the need for transportation by many community members to employment opportunities (30% missed work) and to access health care (40% missed an appointment), which have economic implications for the community.

Overwhelmingly, survey respondents reported that there are limited transportation options within LEBANON. The survey of individuals living in and using the services within LEBANON showed that the rides provided by family members and/or friends are not consistent sources of mobility. Similarly, OATS and taxis are not providing sufficient, affordable mobility to those who need it. Furthermore, taxis are used by a relatively large percentage of this rural community, suggesting that there are unmet mobility needs. Descriptions of taxi service characteristics (e.g. safety issues, dirty) are concerning.

It can be anticipated that the primary users of a public transportation system in LEBANON, if implemented, will be lower income, older, and/or transportation disadvantaged (e.g. no access to a private vehicle). LEBANON should work to ensure that the system is not stigmatized, as it will help facilitate a broader use by the entire LEBANON population. LEBANON staff, particularly a manager of the system, should be incentivized to use the system.

A lot of useful information was gained from the survey of other public transportation systems in Missouri. First, most of the systems are long-standing, suggesting that there is significant value of these systems to these communities. Second, senior citizens were often the primary group identified as the focus of the service. Third, most noted that they had a minimum of Monday through Friday service, with additional service on the weekend to address health needs (e.g. dialysis) and employment access needs. The most commonly identified trip purposes, from the only respondent who was able to provide this information, was for medical and shopping purposes. (Note: Shopping and medical can be directly correlated, as access to healthy food and pharmacy needs are often accessed through shopping trips.) Finally, an increase in ridership and costs were often correlated, as were additional vehicles and a model of service that moved from a local community to regional service.

The researchers recommend that LEBANON moves forward with designing and implementing a public transportation system. 86.5% of survey respondents reported that they or someone in their household would use the system, or that they saw value in a system for others in the community. There is a need and there is public support, both from those who need it the most and from the

community as a whole. The researchers developed and analyzed multiple route options and recommended one potential option that should be investigated further, the *Shortened Purple Route*. This route represents a good starting point for introducing a system within LEBANON.

There is a need for additional planning to better understand how service characteristics of a public transportation system (e.g. hours of service, cost of use, frequency of service, detailed location of stops) will be received by a broad section of LEBANON residents. However, LEBANON needs to understand that after an initial system is designed and implemented, service tweaks will be needed annually as more is learned. In order to better understand what tweaks will be needed, LEBANON should institute, at a minimum, annual surveys. Examples of such surveys that are conducted to adjust service can be found for the transit systems within Bar Harbor, Maine and Acadia National Park (<http://www.exploreacadia.com/comments.htm>). LEBANON may want to consider select, in-depth interviews with riders and non-riders to better understand service considerations. LEBANON should hire a full-time, term employee whose primary responsibilities are system evaluation and engaging partners and the public in order to maintain the success of the system. Staff for LEBANON should use the service to understand first hand opportunities and issues. **LEBANON should not strive to implement the minimum level of service, as this will result in poor use and perception. Rather, LEBANON should work to find a balance between an enticing, desirable level of service at funding levels which can be sustained.** LEBANON should work collaboratively with employers and key destinations (e.g. universities and hospitals) to create partnerships that address transportation gaps (e.g. getting potential students to campus). LEBANON should also implement a travel training program, to encourage seniors and those who are unfamiliar with public transportation systems to learn how to use the new services.

What follows are recommended next steps for LEBANON:

1. Ask the MoDOT Transit Section to review the report.
2. Meet with MoDOT Transit and MoDOT Planning together with the Lake of the Ozarks Council of Local Governments (LOCLG) to discuss opportunities to access FTA funding, in particular to determine if planning dollars might be available to plan the detailed preferred option and if planning for a public transportation system can be identified as a priority in MoDOT's planning partnership process.
3. Attend an MPTA Annual Conference.
4. Collaborate with employers and other key destinations (e.g. Mercy Hospital) on partnerships and understand their interest in partnering and if and what resources they might offer.
5. Add a full-time equivalent (FTE) position to oversee the public transportation system, if LEBANON decides to move forward with implementing one.
6. Consider forming a formal stakeholder committee if LEBANON decides to move forward.
7. Use the detailed information in Appendix E to answer questions from the public and move forward on recommendations such as implementing a travel training program.

## 9. APPENDIX A – ACTIVITIES CONDUCTED

The following are an overview of activities conducted as a part of the project;

1. Approximately Monthly Check-In Calls (12/15/17, 1/16/18, 2/21/18, 3/21/18, 4/18/18, 5/16/18, 7/27/18, 9/13/18)
2. First Site Visit – Kick Off Meeting: 1/23/18 to 1/26/18
3. Second Site Visit - Route Feasibility Testing & Presentation of Draft Survey Results: 6/27/18 to 6/29/18
4. Demographic Analysis of the City of Lebanon
5. Literature Review Related to the Impact of Public Transportation and Access to Medical Care and Employment
6. City of Lebanon Survey Instrument Development, Dissemination and Analysis
7. Missouri Transit System Survey Instrument Development, Dissemination and Analysis
8. Development of Possible Public Transportation System Routes with the City of Lebanon
9. Transportation Research Board (TRB) Meeting Paper Submission

## 10.APPENDIX B – WALKERS AND BICYCLISTS IN LEBANON

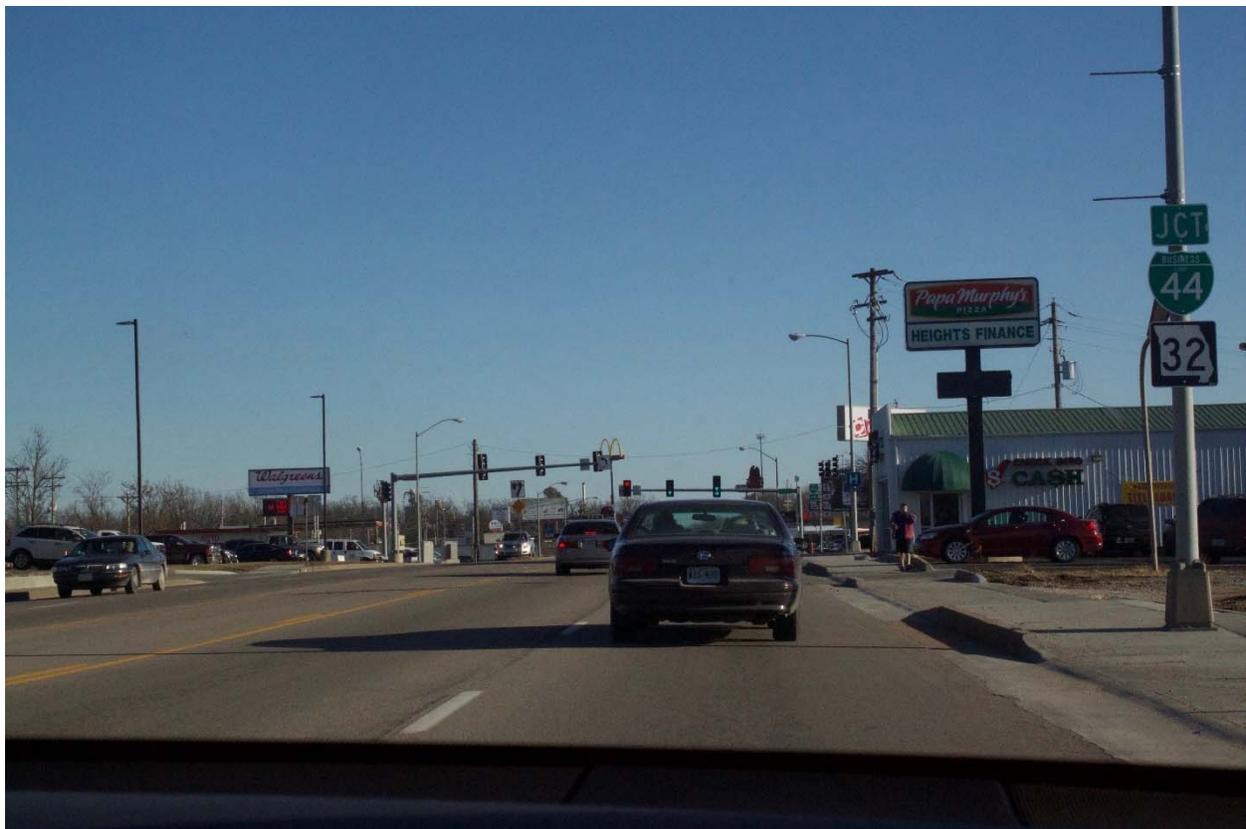
The following are examples of walkers and bikers or evidence of walking or biking within LEBANON observed during site visits.













### 11.APPENDIX C – BUS WRAP EXAMPLES

The cost of wrapping a bus is directly related to how much of the bus is wrapped. Small wraps on small buses can be estimated at approximately \$1500. Most wraps will last five to seven years.

Bozeman, MT Skyline Bus Wrap Examples



The cost for the Bozeman Health Wrap was approximately \$6,500. The Medical Center paid for the wrapping of the bus and also paid an additional approximately \$6,500 annually to “rent” the exterior of the bus for their advertising.





The cost to wrap two shuttles at Valley Forge National Historical Park was \$1,200 for the wrap design and approximately \$15,500 to put the design on both shuttles. Furthermore, because the shuttles could not be used by the concessionaire when the service was not operating at the park, there was an additional \$340 fee. These costs were from 2009.



## 12.APPENDIX D – ADDITIONAL RESOURCES

January 2018 Kick-Off Meeting Presentation by David Kack and Natalie Villwock-Witte

# Lebanon, MO Transit Feasibility Study

David Kack, Director  
Small Urban, Rural and Tribal Center on Mobility

Natalie Villwock-Witte, PhD, PE  
Assistant Research Professor/Research Engineer



## Agenda

- General Concepts/Terms
- Overview of Public Transportation (Transit/Mobility)
- Mobility/Mode Options
- Discussion



## Questions

Imagine a transit/public transportation system in Lebanon.

What does that look like?

Who does it serve?



## Mobility: A Means To An End



## Scope of Work

- Collect & analyze data & information
- Provide examples of public transportation in other communities
- Provide a “decision tree”



## Defining Terms

- Feasibility – “capable of being done or carried out”
- Need – “a strong feeling that you must have or do something”
- Necessary – “so important that you must do it or have it”

Source: Merriam-Webster Online Dictionary



## Cost of Mobility



Source: 2016 Consumer Expenditures. Bureau of Labor Statistics, U.S. Department of Labor

Note: In 1917 transportation was 2% of the budget, or the 6<sup>th</sup> highest expense



## Cost of Mobility

Mileage	Small Sedan	Medium Sedan	Large Sedan	Small SUV	Medium SUV	Minivan	Pickup	Avg.
10,000	\$5,508	\$7,163	\$8,222	\$6,573	\$8,208	\$8,023	\$8,664	\$7,480
15,000	\$6,354	\$8,171	\$9,399	\$7,606	\$9,451	\$9,146	\$10,054	\$8,597

Note: 10,000 miles equals 40 miles per working day (250 working days)

**If you commute to work by car, figure about \$56.46 in total vehicle expenses per 100 miles. If that seems like a lot, driving a more fuel-efficient model or using public or alternative transportation options could save you money.**

Source: AAA Your Driving Costs 2017 Edition



## Are You A One Percenter?

$$\begin{aligned} 1/24 &= 4.2\% \\ &\times 25\% \\ &= 1.05\% \end{aligned}$$



## Transportation/Mobility Options

- Demand Response
- Fixed Route
- Van Pool
- Volunteer Driver Programs



## Demand Response

- Call day before to schedule a ride
- Works in rural/frontier areas with low populations densities
- Typically used only by those who have no other choice
- Cost per Ride can be two to three times as much as a fixed route ride



## Fixed Route

- Set route and schedule (although point-deviation and route-deviation options)
- Viewed as most “true form” of public transportation
- Most likely option to be used by choice riders
- Frequency key to “usefulness” of system



## Fixed Route Options

- Details
  - Governance & Operational Entities
  - Service Levels
  - Funding



## Cost Estimates

Service (12 hrs/day)	@\$50/hour	@\$75/hour	@\$100/hour
Monday-Friday (255 service days/yr)	\$153,000	\$229,500	\$306,000
Monday-Saturday (307 service days/yr)	\$184,200	\$276,300	\$368,400

Note: FTA Section 5311 funds cover 50% of operating costs. Other Federal funds cover 80% of capital costs. Some state funding available, as well.



## Federal & State Requirements

- FTA Master Agreement
- “Biggies”
  - Drug & Alcohol Testing Program
  - ADA (very relevant with fixed route system)
  - Charter (limited exemptions/exceptions)
  - Title VI (do not discriminate)



## Van Pool

- Used for work related commute
- Capital paid for through grant
- Operating costs covered by monthly ridership fees
- Flexibility for routing, timing
- Not “true” public transportation



## Van Pool Options

- Discuss support from major employers
- Determine costs based on expenses and in-kind donations
- Survey employees at major employers in regard to joining a van pool



## Volunteer Driver Programs

- Used by “transportation dependent” population
- Volunteers drive own vehicles, or agency/organization vehicles
- Depends upon ability to recruit and retain volunteer drivers



## Additional Resources

- Federal Transit Administration
  - [www.transit.dot.gov](http://www.transit.dot.gov) (circulars, regulations)
- MoDOT
  - Transit Section
- Missouri Public Transit Association
  - <https://mopublictransit.org/>
- National Rural Transit Assistance Program
  - [www.nationalrtap.org/](http://www.nationalrtap.org/)



## Moving Ahead

- What caught your attention?
- What concerns you?
- What appears to be the central issue?
- What action does this trigger for you?



## Other Questions



Western Transportation Institute

## **General Resources**

**Improving Access to Transportation in Rural Communities**, hosted by the Rural Health Information Hub in February 2018.

Presentation Slides: <https://www.ruralhealthinfo.org/assets/957-3157/transportation-toolkit-021218.pdf>

Presentation Recording: <https://www.ruralhealthinfo.org/webinars/transportation>

Rural Transportation Toolkit: <https://www.ruralhealthinfo.org/toolkits/transportation>

Missouri Public Transit Association (MPTA) Educational Series: TDD Financing of Transit: March 2, 2018

<https://mopublictransit.org/2017/12/04/2355/>

Presentation Slides: [https://mopublictransit.org/app/uploads/2016/06/Social-Media-and-Transit\\_MPTA2016\\_Final.pdf](https://mopublictransit.org/app/uploads/2016/06/Social-Media-and-Transit_MPTA2016_Final.pdf)

**2018 MPTA Annual Conference**, hosted by MPTA on September 19-21, 2018 in Columbia, MO.

Conference Link: <https://mopublictransit.org/event/2018-mpta-annual-conference/>

**CEO Bootcamp**, hosted by Southwest Transit Association

<https://www.swta.org/>

### **Travel Training Resources**

#### **Travel Training for Older Adults: Part I: A Handbook**

Citation: National Academies of Sciences, Engineering, and Medicine. 2014. *Travel Training for Older Adults Part I: A Handbook*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/22299>.

Link: <http://www.nap.edu/catalog/22299/travel-training-for-older-adults-part-i-a-handbook>

#### **Travel Training for Older Adults: Part II: Research Report and Case Studies**

Citation: National Academies of Sciences, Engineering, and Medicine. 2014. *Travel Training for Older Adults Part II: Research Report and Case Studies*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/22298>.

Link: <http://www.nap.edu/catalog/22298/travel-training-for-older-adults-part-ii-research-report-and-case-studies>

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### **2017 Transportation Trends Topic Spotlight: Rural Travel Training**

Citation: National Aging and Disability Transportation Center. 2018. *2017 Transportation Trends Topic Spotlight: Rural Travel Training*. Washington, DC.

Link: <https://www.nadtc.org/wp-content/uploads/NADTC-2017-Trends-Report-Topic-Spotlight-Rural-Travel-Training.pdf>

### **A Guide to Travel Training**

Citation: Ride Connection. 2009. *A Guide to Travel Training*. Ride Connection, Inc. Portland, OR.

Link: <http://milestones.org/wp-content/uploads/2016/04/Ride-Wise.A-Guide-to-Travel-Training-12-7-09.pdf>

### **Achieving Mobility Access for Older Adults Through Group Travel Instruction**

Citation: Lubin, Andrea, Karen Alexander, & Elizabeth Harvey. 2017. *Achieving mobility access for older adults through group travel instruction*. Transportation Research Record: Journal of the Transportation Research Board, (2650), pp.18-24.

Link: <https://trrjournalonline.trb.org/doi/10.3141/2650-03>

**Growing Your New Travel Training Program Webinar**, hosted by the South West Transit Association (SWTA) on March 21, 2018.

Link: <https://www.mtm-inc.net/swta-webinar-growing-your-new-travel-training-program/>

## **Paratransit**

### **Determining ADA Paratransit Eligibility: An Approach, Recommendations, and Training Materials**

Citation: National Aging and Disability Transportation Center. 2014. *Determining ADA Paratransit Eligibility: An Approach, Recommendations, and Training Materials*. Easter Seals Project ACTION.

Link: <http://www.nadtc.org/wp-content/uploads/NADTC-Determining-ADA-Paratransit-Eligibility.pdf>

### **Practices for Establishing ADA Paratransit Eligibility Assessment Facilities**

Citation: National Academies of Sciences, Engineering, and Medicine. 2015. *Practices for Establishing ADA Paratransit Eligibility Assessment Facilities*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/22184>.

Link: <https://www.nap.edu/catalog/22184/practices-for-establishing-ada-paratransit-eligibility-assessment-facilities>

**Topic Guides on ADA Transportation**

Citation: Disability Rights Education and Defense Fund & TransSystems Corporation. 2010. *Topic Guides on ADA Transportation*. Accessed: August 30, 2018. Accessed: <https://dredf.org/ADAtg/index.shtml>

Link: <https://dredf.org/ADAtg/index.shtml>

**Americans with Disabilities Act (ADA): Guidance**

Citation: Federal Transit Administration. 2015. *FTA Circular – FTA C 4710.1. Americans with Disabilities Act (ADA): Guidance*. U.S. Department of Transportation, Washington, DC.

Link:

[https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Final\\_FTA\\_ADA\\_Circular\\_C\\_4710.1.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Final_FTA_ADA_Circular_C_4710.1.pdf)

**Federal Transit Administration – Civil Rights/ADA Website**

Citation: Federal Transit Administration. 2018. *Civil Rights/ADA*. U.S. Department of Transportation, Washington, DC. Accessed On: September 2018. Accessed: <https://www.transit.dot.gov/regulations-and-guidance/civil-rights-ada/civil-rightsada>

Link: <https://www.transit.dot.gov/regulations-and-guidance/civil-rights-ada/civil-rightsada>

**Social Media and Transit**, hosted by the MPTA in November 2016



- Cris Swaters
  - City of Springfield, City Utilities: Social Media/Digital Content
  - Cris.Swaters@cityutilities.net
  - 417.831.8479
- Bridget Moss
  - Kansas City Area Transportation Authority: Public Affairs Manager
  - bmoss@kcata.org
  - 816.346.0339

## City Utilities - Springfield

- 12 weekday routes, 7 night and Saturday routes, 4 Sunday routes
- 4,600 rides per weekday

### Platforms

- @CUTransit on Twitter
- City Utilities on Springfield is on Twitter, Facebook, Instagram

## RideKC

- Bus: 50,000+ rides/day
- 4 transit providers in Kansas and Missouri, urban, suburban, express, on-demand
- 90+ routes

### Platforms: RideKCTransit

- Twitter
- Facebook
- Instagram, Pinterest, YouTube, LinkedIn



## Why

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- Building ridership
  - Customer Satisfaction
    - Notice of events affecting their ride
    - Addressing complaints
  - Where the bus goes
  - Supporting outreach
- Image management
- Media relations

## Platform use

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Facebook - **71%** of internet users - **58%** of adult population  
Twitter **23%** - 19%  
Instagram **26%** - 21%  
Pinterest **28%** - 22%  
LinkedIn **28%** - 23%

## Who is on Social Media

- 65% of adults now use social networking sites – 10x jump in the past decade
- Young adults (18 to 29): 90%
- 65 and older: 35%
  - Just 2% in 2005
- By gender:
  - 68% of women
  - 62% of all men
- By ethnic group: 65% of whites, 65% of Hispanics and 56% of African-Americans
- By location: 58% of rural residents, 68% of suburban residents and 64% of urban residents

## Selecting platforms

- Demographics + Reach + Ease of use + Results



## Not my target audience

- If you aren't reaching customers directly, what about:
  - ▣ Media
  - ▣ Voters
  - ▣ Stakeholders
  - ▣ Community Service Organizations
  - ▣ Industry: Healthcare

## What are the benefits for transit

- Inform
- Motivate
- Engage
- Monitoring





### Case Study: Transit Center Opening

- Goal: Promote the new Transit Center & get attendees to the First Friday Art Walk event at the grand opening
- Facebook
- Twitter
- Instagram

Facebook



Facebook



### Facebook



### Facebook



## Facebook



## Facebook

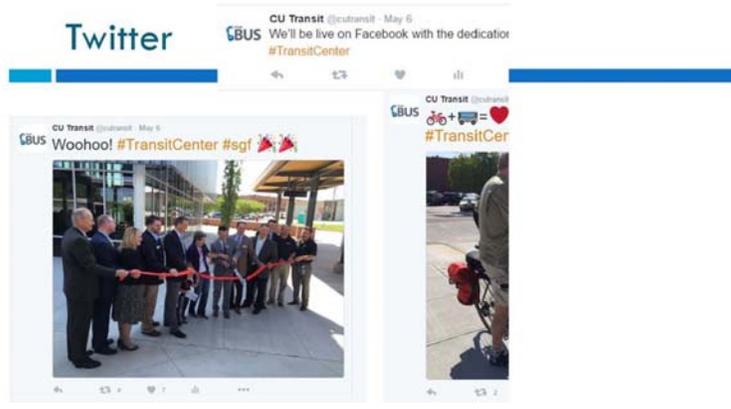


### Twitter



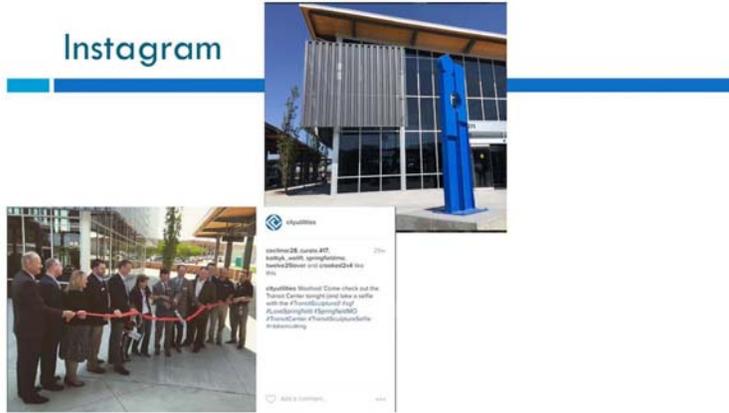
### Twitter







## Instagram



## Crisis Communication

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- Severe Winter Weather
- Royals World Series Parade

## Crisis Communication

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Anticipate a crisis.

Types:

- Deliberate Agency Action
- Smoldering issue
- Local, national or international risk
- Operational crisis
- Social media

## Build Equity In Your Brand

---

- Build equity / reputation ahead of a crisis
  - Positive news
  - Engage
  - Respond to questions and complaints
- People will remember that you react, and how you react in a crisis

## During the crisis

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- Multi-channel response
- Be prepared
- Transparency and authenticity
- Fast response times are vital

## Crisis Plan Best Practices

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What should it include?

- Make it a written plan
- Involve communication leaders
- Do scenario planning
- Determine roles
- Define key stakeholders
- Know what channels to reach key stakeholders
- Train for it



WINTER WEATHER

## Focus attention on Twitter, Media

- Kansas City
  - Infrequent severe winter storms
- Skeleton communication crew during storms
  - Media updates
  - Twitter



## Work plan

- Goal: Informed customers, informed community
- Twitter
  - “KCATA is preparing...”
  - Current conditions, more frequently
  - Bus service and facilities
  - Customer service



## Be Prepared

- Messages
  - Prepare for the storm
  - Current conditions
  - Real-time bus information
- Visuals
  - Add interest to your social media
- The media and twitter
  - A twitter list, in our case
  - News cycles
  - Event hashtags: #kcwx #kssnow #mowx



## Be Prepared, part 2

- Your tools
- Yourself



## Be Consistent

- Keep your core values in mind
  - Safety
  - Transit is an integral part of the community



## Visuals leverage the message

- Use expected and unexpected visuals
  - Buses in snow
  - People: Drivers, customers
  - Facilities crews
  - Represent extreme conditions
- Behind the scenes
  - Pusher buses
  - Tow trucks
  - Command center
  - Call center



## Monitor and scan for information

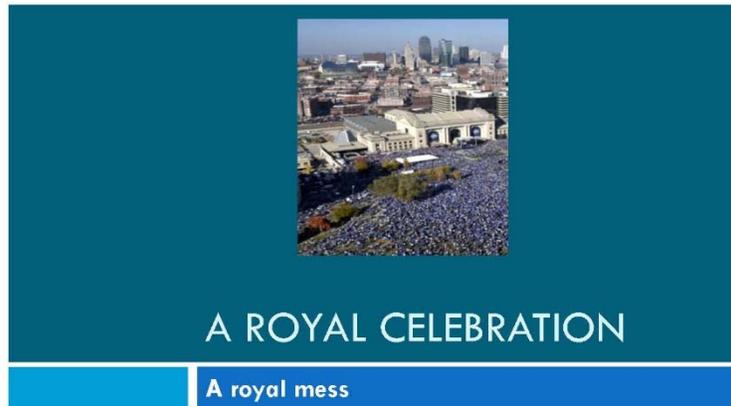
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- Hashtags - #kcwx #ksweather #mowx #SnOMG
- Searches – bus + geography
  
- Hashtags were...
  - “Born to address the need to organize and make sense of the overwhelming social media buzz.”
    - Ann Smarty, The YouMoz Blog

## Lessons from the storms

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- Social media requires that you be on and respond
  - Figure out how to divvy up responsibilities
  - Real-time information
- Use retweet liberally
- Be real
- Thank your customers, media friends

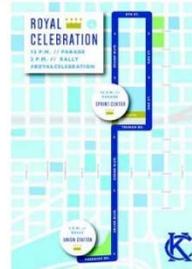


Royals - Party Like It's 1985



## Parade Route

- Parade route and rally location
- Shuttle service throughout region



## Early Communications

- Maintain secrecy while preparing employees
- Comprehensive plan, with other parties in lead
  - Time table
  - Materials
  - Messaging



## KC Is Ready To Celebrate



## Tuesday morning: Crisis Management





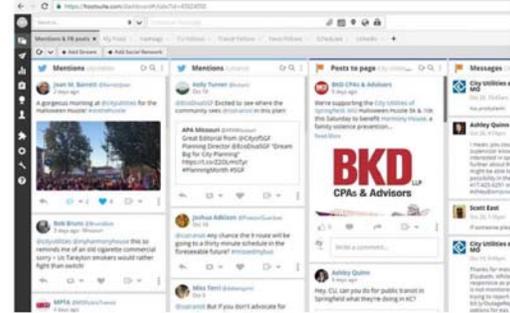
## The Party's Over, But We're Not Done

- Addressing complaints and compliments
- Celebrating employees
- Lessons learned and debriefs

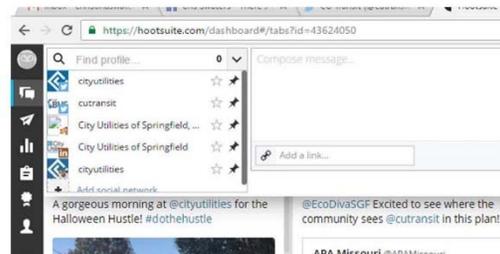


MANAGEMENT TOOLS

### Management: Hootsuite



### Management: Hootsuite



## Management: Scheduled Posts



## Management: Content Calendar

- Year-at-a-glance
- List by month
- Helps you keep track of important dates
- Allows you more easily schedule if you're short on time
- Holiday/days closed/altered transit schedules column, 'public' column, 'employees' column

## Sprout Social

- Task manager
- Search / discovery
- Reports



## Planning your messaging

- Scheduling
  - With caveats
- Post something everyday
- Mix it up

	M	T	W	T	F	M	T	W	T	F	M
EMAILS		✓	✓	✓	✓		✓	✓			
TWITTER		✓	✓	✓	✓		✓	✓			
FACEBOOK		✓	✓	✓	✓		✓	✓			
INSTAGRAM				✓	✓		✓	✓			
PINTEREST		✓	✓				✓				
MEDIA CLIPS				✓	✓		✓				
OLD WEB BULL		✓					✓				
CLEAN EMAIL		✓		✓	✓		✓				



**13. APPENDIX E – POTENTIAL RESPONSES TO COMMON CRITIQUES**

	<b>Common Critiques of Public Transportation</b>	<b>Potential Response for LEBANON</b>
1	Why should I pay for public transportation? I won't be using a bus.	<p>City and county roads are financed primarily through <b>general taxes</b>. Therefore, all residents pay, even if they do not have a vehicle to use on the roadway network.</p> <p>Just because you may not use the bus, doesn't mean you won't see the benefits of having a public transportation system in your community. Public transportation will provide better access for all community members – which may mean getting more people to work, getting more people through the door of your business, and fewer vehicles on the road causing congestion.</p>
2	Why are we paying for buses to run empty?	Much like parking lots or roadways that are often designed for a capacity greater than the average, buses may be more crowded at popular times of the day (e.g. travel to and from work or medical appointments) and less crowded outside of peak periods of use (e.g. mid-day)
3	Won't autonomous vehicles eliminate the need for public transportation?	More is still being learned about autonomous vehicles, and they cannot operate in all weather conditions (e.g. heavy rain, snow). Furthermore, the costs of an autonomous vehicle are anticipated to be substantially more than current vehicle prices, which many low-income households cannot currently afford.
4	Everyone <b>owns</b> a vehicle in Lebanon.	9.6% of households in Lebanon do not own a vehicle. While some households do so by choice, others are without vehicles simply due to the economics of a situation. Being homebound or having limited mobility options from an individual viewpoint can negatively impact a person's mental state,

		<p>and from a community viewpoint, could reduce that individual’s economic contribution to the community.</p> <p>In addition, while most households may own one vehicle, there is a potential that there is lost income for the household because of challenges caused by coordinating work schedules among people who share a vehicle.</p> <p>Furthermore, lower income individuals are likely to own older vehicles which may require more frequent maintenance which can be a financial burden. Having an alternative mode of transportation for everyone will reduce financial strain and ensure that these individuals are able to access employment, medical care, and other necessary services.</p>
5	Everyone can <b>afford</b> a vehicle in Lebanon.	<p>More than 25% of households are <b>below</b> the poverty level (\$12,228 for an individual or \$24,339 for a family of 4). After paying an estimated \$9,000 in annual costs to own and operate a vehicle, there is little money left for the individual for food, housing and other daily necessities.</p>
6	Having public transportation will make Lebanon an unaffordable place to live.	<p>Providing another form of mobility for LEBANON will likely make the community more affordable for many, including the 25.6% of households living <b>below</b> the poverty level.</p>
7	A public transportation system will make Lebanon too congested.	<p>The exact transportation impacts of adding a public transportation system are very complex. There is a potential that traffic congestion may be reduced because a public transportation can take private vehicles off the road, particularly trips that were otherwise provided to a child or elderly adult. However, providing mobility to those who previously had none can bring economic benefits which are often associated with an increase in travel.</p>

## 14.APPENDIX F – CITY OF LEBANON SURVEY INSTRUMENT



The City of Lebanon and the Lake of the Ozarks Council of Local Governments (LOCLG) are working with the Western Transportation Institute at Montana State University to conduct a study to better understand preferences related to transportation for the City of Lebanon. Participation is voluntary. You can skip any question you want, and you can stop at any time.

The information you provide by taking the survey will be used solely for research purposes and to understand local transportation needs. Personal information about respondents will remain strictly confidential and will not be sold or shared. Survey results will be summarized to exclude any personally-identifiable information. Your participation is important for planning future transportation improvements that meet your preferences and needs.

Thank you for taking the time to provide information for this valuable study. We anticipate that it will take no more than 8 minutes to complete. If you have any questions about the survey or study, please contact Natalie Villwock-Witte, PhD, PE at [505-340-3570](tel:505-340-3570) or [n.villwockwitte@montana.edu](mailto:n.villwockwitte@montana.edu).



How many days in a week do you walk or bike for transportation (e.g., to get to work, school or the store) in a typical seven-day week?

Do you have a driver's license?

Yes

No

Which of the following best describes your vehicle ownership status or plans?

- I currently own or lease a vehicle.
- I have regular access to a vehicle that someone else in my household owns or leases.
- I do not currently own or lease a vehicle.

Do you often have to rely on transportation from a friend/family member or co-worker?

- Yes
- No

Have you provided a ride to a friend/family member or co-worker?

- Yes
- No



How often do you provide a ride to a friend/family member or co-worker?

- Daily
- Weekly
- Periodically

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In the past year, have you experienced any of the following financial hardships related to transportation (check all that apply)?

- Lack of funding for repairs to a vehicle
- Could not afford gas
- Insurance lapsed
- Vehicle was repossessed
- Other (please specify)

Please indicate how strongly you agree or disagree with the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I feel that I have a variety of transportation options in the City of Lebanon that allow me to get around.	<input type="radio"/>				
Cost influences how I travel.	<input type="radio"/>				
Distance to <u>work</u> influences how I travel.	<input type="radio"/>				
Distance to <u>shopping</u> influences how I travel.	<input type="radio"/>				
Distance to <u>recreational</u> activities influences how I travel.	<input type="radio"/>				
It is important for me to stay connected to the internet/phone while traveling on a daily basis.	<input type="radio"/>				
The area where I live is <u>walkable</u> (retail stores and restaurants are within a comfortable walking distance).	<input type="radio"/>				



Which of the following category/categories applies to you (check all that apply):

- Employed, full-time
- Employed, part-time
- Unable to work due to a disability
- Retired
- Homemaker
- Stay-at-home parent
- Unemployed
- Self-employed
- Student
- Other (please specify)



For your primary place of employment, what is the approximate distance you travel one-way from your home to work?

- Less than 5 miles
- 5 miles to less than 10 miles
- 10 miles to less than 15 miles
- 15 miles to less than 20 miles
- 20 miles or more

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Have you ever missed or arrived late to work as a result of reliability of your vehicle (i.e., needed repairs, could not afford gas, etc.)?

Yes  
 No

Have you ever had to limit a job search due to transportation concerns?

Yes  
 No

← →



Have you ever missed or arrived late to a medical appointment because of transportation issues (e.g., could not find transportation, vehicle did not work)?

Yes  
 No

← →

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Would you or someone in your household use a public transportation system if one were available in your community?

- Yes
- No

How much would you be willing to pay to ride a bus?

- Nothing; I wouldn't use it.
- Nothing; I can't afford to pay for it.
- Up to \$3 per ride.
- Up to \$5 per ride.
- Depends on where I'm going.

In your opinion, what is an acceptable wait time for a bus?

- The wait time doesn't matter to me, I would use a bus if it was offered.
- Less than 20 minutes.
- Less than 30 minutes.
- There is no acceptable wait time, I wouldn't use a bus.

Please indicate how strongly you agree with the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
While I do not envision using a public transportation system if one were offered in the City of Lebanon, I see value in our community having it.	<input type="radio"/>				
It would improve <u>my</u> quality of life to have a public transportation system in the City of Lebanon.	<input type="radio"/>				
It would improve the quality of life for <u>others</u> in the City of Lebanon if we had a public transportation system.	<input type="radio"/>				

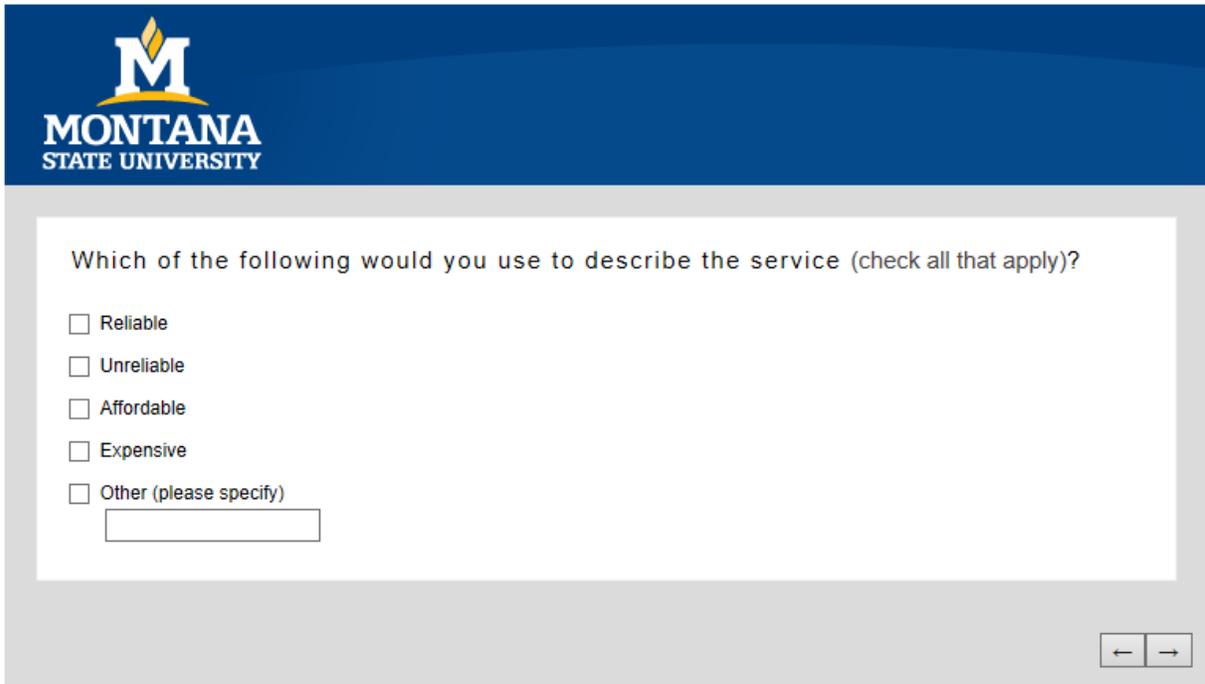


Have you used OATS in Lebanon?

- Yes
- No



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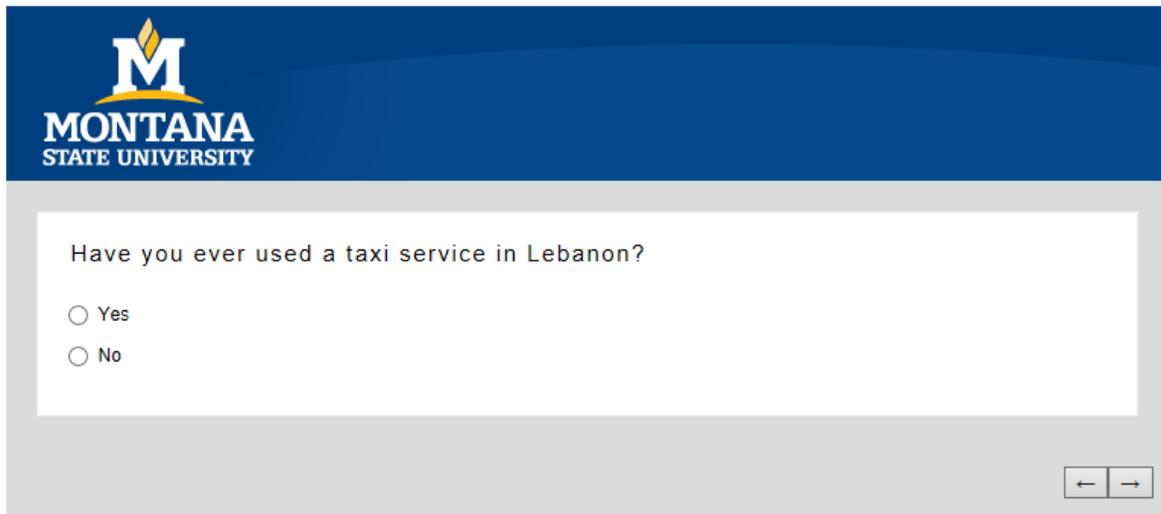


**MONTANA**  
STATE UNIVERSITY

Which of the following would you use to describe the service (check all that apply)?

- Reliable
- Unreliable
- Affordable
- Expensive
- Other (please specify)

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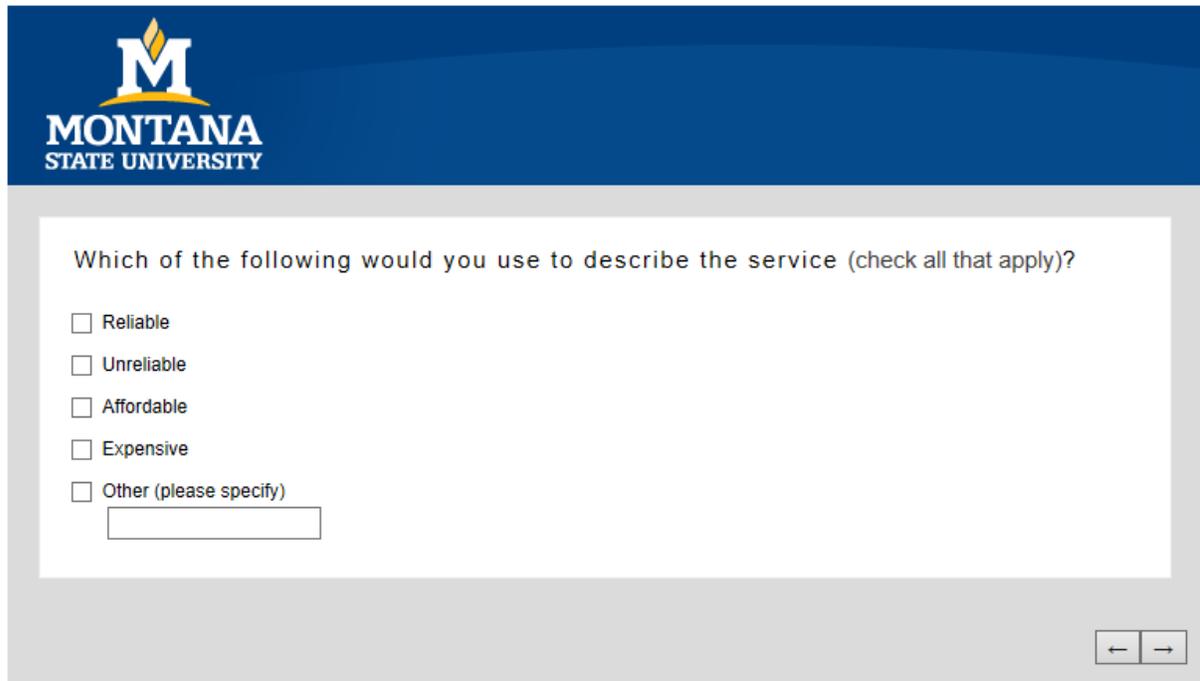


**MONTANA**  
STATE UNIVERSITY

Have you ever used a taxi service in Lebanon?

- Yes
- No

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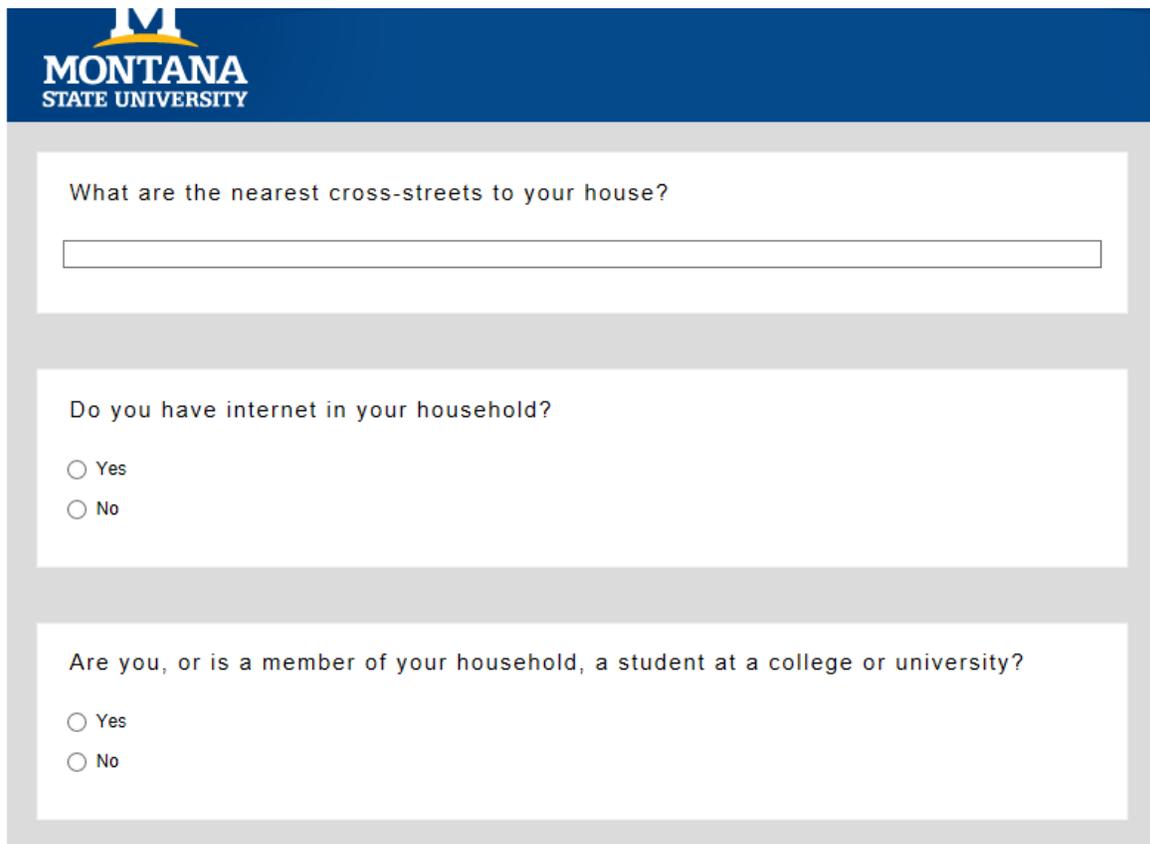


**MONTANA**  
STATE UNIVERSITY

Which of the following would you use to describe the service (check all that apply)?

- Reliable
- Unreliable
- Affordable
- Expensive
- Other (please specify)

Survey Powered By [Qualtrics](#)



**MONTANA**  
STATE UNIVERSITY

What are the nearest cross-streets to your house?

Do you have internet in your household?

- Yes
- No

Are you, or is a member of your household, a student at a college or university?

- Yes
- No

**MONTANA**  
STATE UNIVERSITY

What is your gender?

Male

Female

Other (please specify)

Which of the following age categories do you fall within?

17 and younger

18 to 35

36 to 53

54 to 72

73 to 86

89 and older

**MONTANA**  
STATE UNIVERSITY

Including yourself, how many people currently live in your household?

1

2

3

4

5

6

Other (please specify)

How many children under the age of 18 currently live in your household?

- 0
- 1
- 2
- 3
- 4
- 5
- Other (please specify)

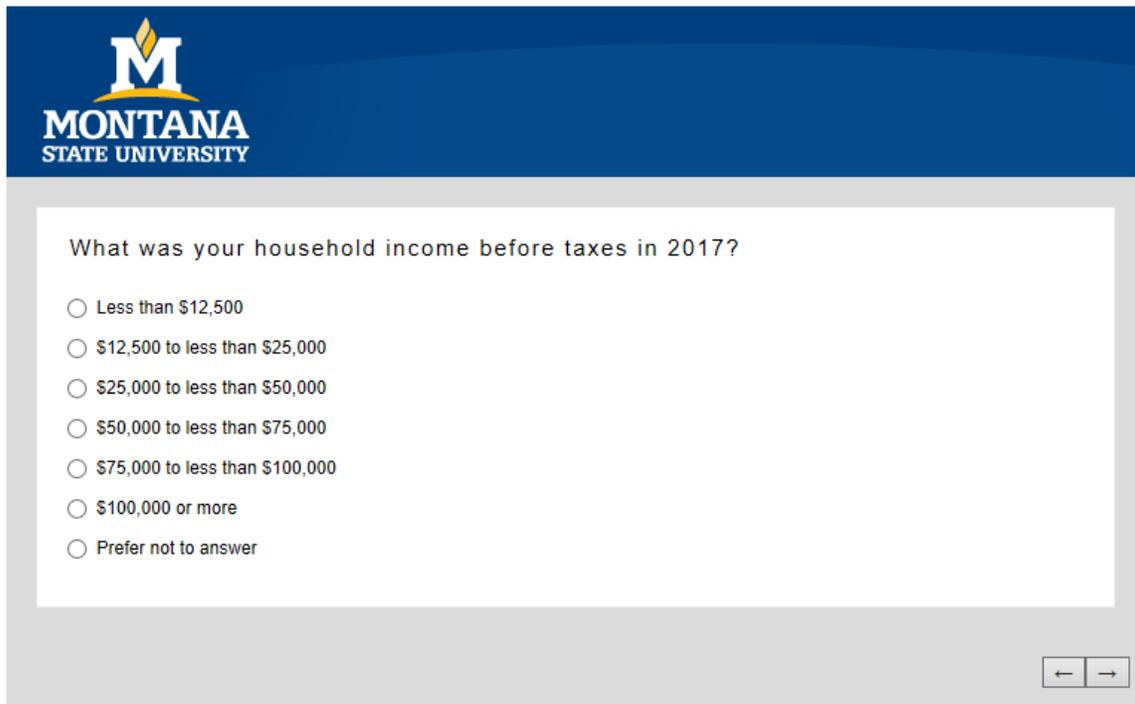
Survey Powered By [Qualtrics](#)



Please indicate the highest level of education that you have completed.

- Less than high school
- High school graduate/GED
- Vocational or technical school certificate
- Associate's degree
- Bachelor's degree
- Graduate degree or professional degree (MA, MS, PhD, JD, MBA, etc.)

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MONTANA  
STATE UNIVERSITY

What was your household income before taxes in 2017?

- Less than \$12,500
- \$12,500 to less than \$25,000
- \$25,000 to less than \$50,000
- \$50,000 to less than \$75,000
- \$75,000 to less than \$100,000
- \$100,000 or more
- Prefer not to answer

← →

Survey Powered By [Qualtrics](#)

With which racial group(s) do you most closely identify (check all that apply)?

- American Indian/or Alaska Native
- Asian
- Black or/African American
- Native Hawaiian or other Pacific Islander
- White
- Prefer not to answer

Are you of Hispanic or Latino origin or descent?

- Yes, Hispanic or Latino
- No, not Hispanic or Latino
- Prefer not to answer



Please share with us any additional comments about transportation in Lebanon.

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## 15.APPENDIX G – MISSOURI PUBLIC TRANSPORTATION SYSTEMS SURVEY INSTRUMENT

**MONTANA**  
STATE UNIVERSITY

The Western Transportation Institute at Montana State University is working with the City of Lebanon, Missouri to investigate the feasibility of establishing a public transportation system. The City would very much appreciate your feedback to the following survey regarding the system that your community operates. Participation is voluntary, and you can choose to not respond to a question you do not wish to answer or you can conclude the survey at any time. If you have any questions or comments regarding the survey, please contact Natalie Villwock-Witte, [n.villwockwitte@montana.edu](mailto:n.villwockwitte@montana.edu) or 505-340-3570. Thank you for your willingness to provide us with this very valuable information.

What is the name of the organization that you represent (e.g. City of Lebanon)?

When did you start your system?

Why did you start your system?

The following questions are intended to provide the City of Lebanon with more details regarding your community's system.

Do you provide:

- Fixed route
- Deviated fixed route (point or route deviation)
- Paratransit
- Demand response
- Other (please specify)

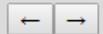


Have you changed the system's route over time?

- Yes
- No



Why were the route changes made?



Is the system:

- Owned and operated by the municipality?
- Owned and operated by the county?
- Contracted out?
- Other (please specify)

Is the system's service area:

- Within city limits
- County-wide
- Other (please specify)



How many 1) hours per day and 2) days per week does the public transportation system operate?

How many miles does your service travel annually?



Do your buses have bicycle racks?

- Yes
- No
- Other (please specify)

Do you have bus stop infrastructure (i.e. benches, shelters)?

- Yes
- No



Do you have bus stops located on:

- Private property
- Public property
- Other (please specify)



How do you provide information about the service to the public (i.e. Facebook/social media, pamphlet, radio, other)?

Have there been any notable changes to the system within the past 5 years?

Yes

No



Please tell us 1) what changes were made to your system and 2) why.



The following questions ask about budget and funding for your community's system.

What is your annual budget for facilities, management, and service costs?

What is your annual maintenance costs for the transit system?

What sum have you spent on capital investments (e.g. purchase of vehicles or other system improvement items) over the past 5 years?

What fare do you charge, and does it vary by rider type?



What are the sources of funding for your system (check all that apply)?

- Federal
- State
- Local
- Private Sector
- Advertising
- Sponsorship
- Fares
- Other (please specify)

The following questions are intended to provide the City of Lebanon with a better understanding of the riders that are using your system.

How many rides do you provide annually?

Do you have a general idea of what percentage of rides are used for: 1) medical purposes, 2) shopping, 3) employment, and 4) school?

- Yes
- No

What percentage of rides are used for:

0      10      20      30      40      50      60      70      80      90      100

Medical purposes

Shopping

Employment

School

Do you know more detailed information about your riders, like their age, income level, other?

Yes

No

Please provide additional detailed rider information (i.e. breakdown by age, breakdown by income level, number of rides per unique rider, etc.) as applicable.

The following questions are in relationship to the number and types of buses your system uses.

How many buses do you use to operate the service?

What types of buses (i.e. vehicle size and/or make) do you use to provide your service?



The following questions are asking for lessons learned and recommendations for the City of Lebanon based on your community's experience.

What have you learned that you wish you knew when you started your system?

What recommendations would you give to the City of Lebanon as city officials consider whether or not to implement a system?





We thank you for your time spent taking this survey.  
Your response has been recorded.

## 16. APPENDIX H – FULL TEXT RESPONSES TO MISSOURI PUBLIC TRANSPORTATION SYSTEMS SURVEY

### Why did you start your system?

Respondent	Text Response
City of Clinton	There was a need for local transport of the elderly, disabled, and impoverished.
City of Lamar	To serve the needs of elderly and disabled citizens. We also provide general transportation for everyone.
City of Mount Vernon	Seen the need for the Elderly and handicap citizens of Mount Vernon
Direct Transit (Ray County Transportation)	Originally to transport seniors
Dunklin County Transit	I did not start our system, director before myself did. She wanted good transportation available for Dunklin County residents.
Mississippi County Transit System	To provide transportation for general public of Mississippi County
Scott County Transit System	In response to elderly individuals needing transportation to doctor appointments.
Unknown Respondent	Due to public demand, the City took over a privately-operated bus system that was going out of business.

**Hours per Day and Days per Week of Service**

<b>Respondent</b>	<b>Text Answer</b>
City of Clinton	8 hours per day, Monday through Friday
City of Lamar	11 hrs Monday-Friday
City of Mount Vernon	Monday thru Friday 8:30 am to 4:00 pm
Direct Transit (Ray County Transportation)	Approximately 5:30 AM to 5:00 PM Monday-Friday, Approximately 7 AM-4:00 PM Saturday and approximately 7:00-12:00 on Sunday (we only transport dialysis patients and job transportation on weekends).
Dunklin County Transit	Our office is open 7:00am to 4:00pm, Monday through Friday. Drivers are out on routes early morning to late afternoon and Saturdays for one dialysis route.
Mississippi County Transit System	Normal driving hours are from 5am-5pm Monday - Friday
Scott County Transit System	Monday through Friday 8:00 am to 5:00 pm
Unknown Respondent	13 hours a day, 6 days a week

**Information Dissemination Tools**

Respondent	Text Answer
City of Clinton	Social media, pamphlets, flyers, newspaper.
City of Lamar	Website, Television, Newspaper, pamphlets
City of Mount Vernon	newspaper, word of mouth
Direct Transit (Ray County)	Yes
Dunklin County Transit	Website, Facebook, pamphlet, radio
Mississippi County Transit System	Pamphlet, radio, word of mouth
Scott County Transit System	Local newspaper, posters at businesses and doctors' offices
Unknown Respondent	Social Media, website, printed materials, Apps

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