SOUTH CENTRAL TRANSIT AUTHORITY

TRANSIT DEVELOPMENT PLAN UPDATE

APPENDIX A: COMMUNITY ASSESSMENT

FEBRUARY 2018

SCTA SOUTH CENTRAL TRANSIT AUTHORITY

BARTA

RRTA RED ROSE TRANSIT AUTHORITY

NELSON NYGAARD

TABLE OF CONTENTS

1 INTRODUCTION

Transit ridership is a function of the underlying demand for transit and the attractiveness of the service that is provided. These two elements go hand-in-hand, and SCTA's Transit Development Plan Update is designed to develop the strongest possible match between the two in order to enhance service within Berks and Lancaster Counties. As part of this process, this market analysis addresses two questions:

1. What is the underlying demand for transit services throughout SCTA's service area?
2. Where are people traveling from and where are they going?

The answers to these questions will provide the basis for improvements to enhance SCTA's ability to serve people, jobs, attractions and major destinations.

2 UNDERLYING TRANSIT DEMAND

The underlying demand for transit is driven by a number of factors, four of which are particularly important and are the focus of this market analysis:

- **Population and Employment Density:** Put simply, where larger numbers of people live and/or work in close proximity, transit demand is higher.
- **Major Activity Centers:** In all cities, there is a strong correlation between development patterns and transit ridership. A large proportion of transit trips are to and from activity centers such as downtown areas, office parks, shopping centers, and hospitals, as these places provide demand for many different types of trips (employees, patrons, etc.).
- **Demographic Characteristics:** Different people have different "propensities" to use transit, with differences related to socio-economic characteristics. For example, households with many cars are much less likely to use transit than those with one or none. Similarly, low-income residents use transit to a greater extent than high-income residents.
- **Travel Flows:** People use transit to get from one place to another. Different levels of density, socioeconomic characteristic, and land use all directly impact travel and require different modes of transit service to meet the market demand effectively and efficiently.

Population and Employment-Based Demand

More than any other factor, population and employment density will determine the underlying demand for transit. This is because:

- The reach of transit is generally limited to within one-quarter mile of the transit line or station. As a result, the size of the travel market is directly related to the density of development in that area.
- Transit service frequencies, in turn, are closely related to market size. Bigger markets support more frequent service, while smaller markets can support only less frequent service.
- To attract travelers who have other options, such as automobiles, transit must be relatively frequent—at least every 30 minutes, and preferably more frequently.

Population and Population Density

As described above, places with large numbers of people, jobs, and other activities produce the largest demands for transit service. The absolute numbers can be related to the demand for transit by converting them to densities, or the numbers of people and jobs per acre. The density figures, in turn, can be used to provide an indication of the type and frequency of service for which there would be demand (see Figure 1).

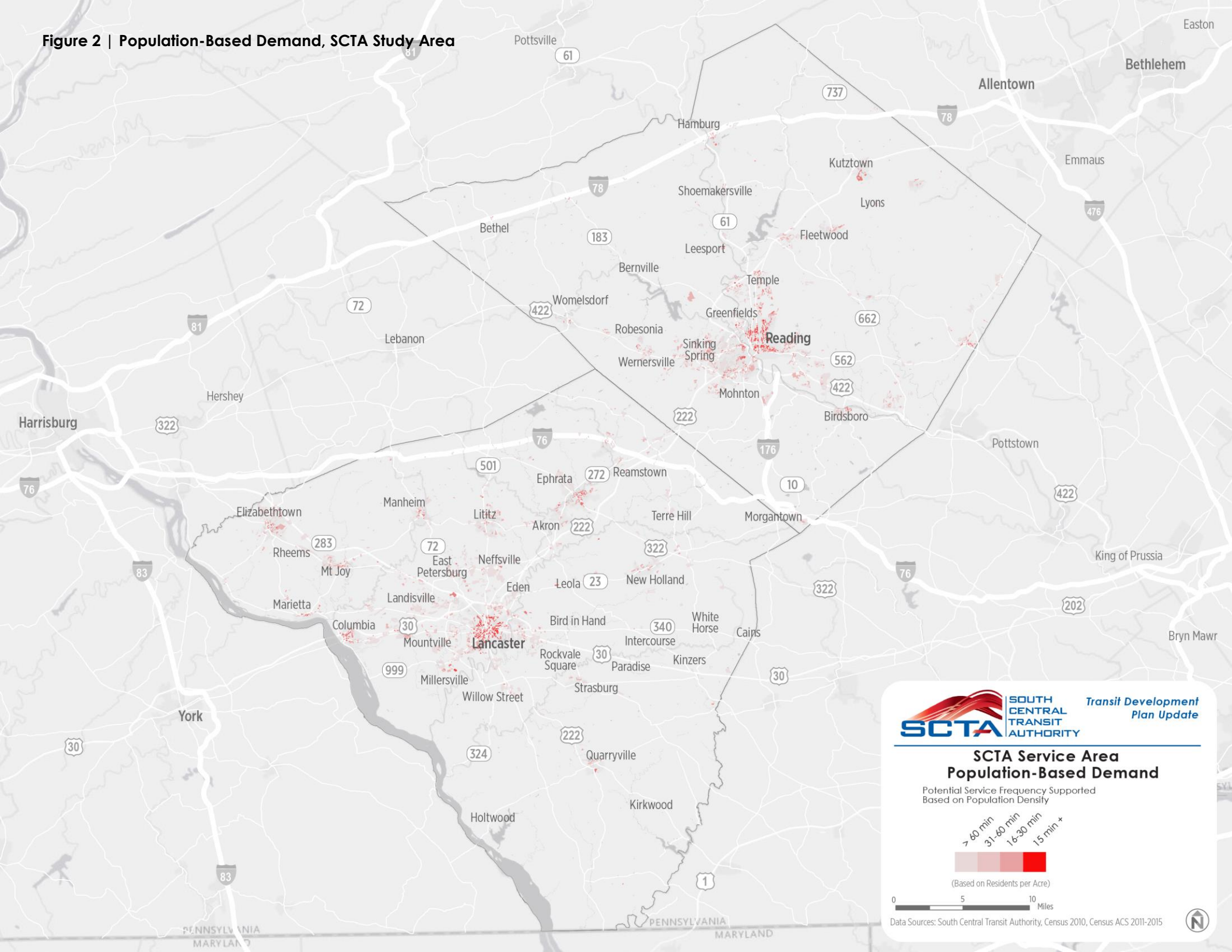
Figure 1 | Transit Supportive Population and Employment Densities

There generally must be 3 to 6 households per acre or 4 to 8 jobs per acre, or a combination thereof, to produce demand for hourly service, and 6 to 12 households per acre or 8 to 16 jobs per acre to support 30-minute service. For 15-minute service, there generally must be more than 12 households per acre or more than 16 jobs per acre or a combination thereof.

Note, however, that these density categories broadly indicate demand across contiguous and nearby areas, and are meant to be considered in this context. Clusters of density throughout an area or along a corridor are strong indicators of demand, while a dense but small block group in an isolated area would not produce sufficient demand in and by itself. Demand can also accumulate along corridors to produce demand for more frequent service than the densities alone would indicate. For example, long corridors where most blocks or block groups have the density to support 16 to 30 minute service will often produce accumulated demand for 15-minute service.

SCTA serves a large, diverse service area. As of 2015, the SCTA service area was home to nearly one million (approximately 944,181) residents, many of whom are concentrated in the urban areas of Reading (88,057) and Lancaster (59,344) and their surrounding municipalities (see Figure 2). Elsewhere, people live in much smaller population clusters such as the communities to the north and southwest of Reading, along Route 422 west of Reading, and communities north of Lancaster and to the west along Route 30 and Route 283. The town of Ephrata is notably the densest community in between the two major urban cores (see Figure 4).

Figure 2 | Population-Based Demand, SCTA Study Area



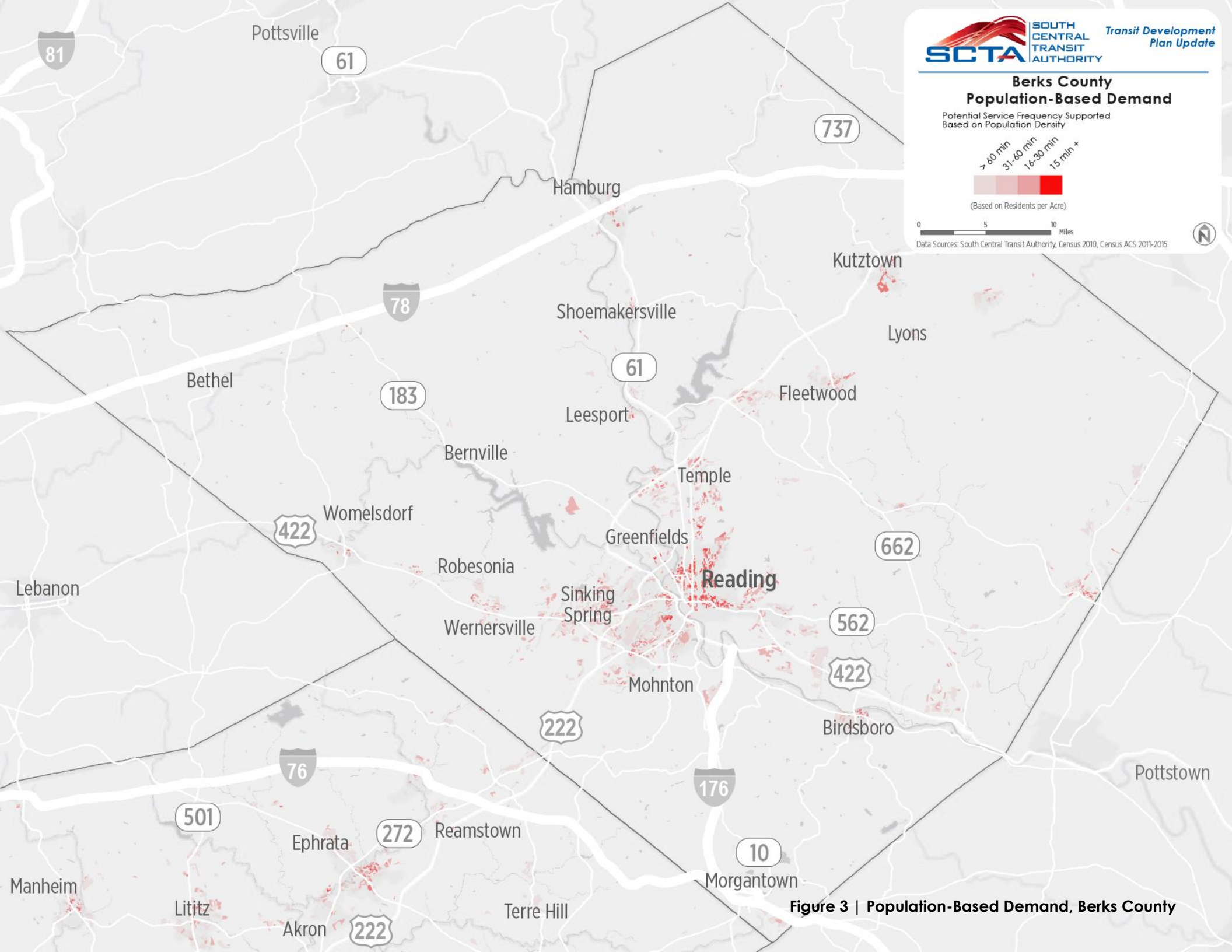


Figure 3 | Population-Based Demand, Berks County

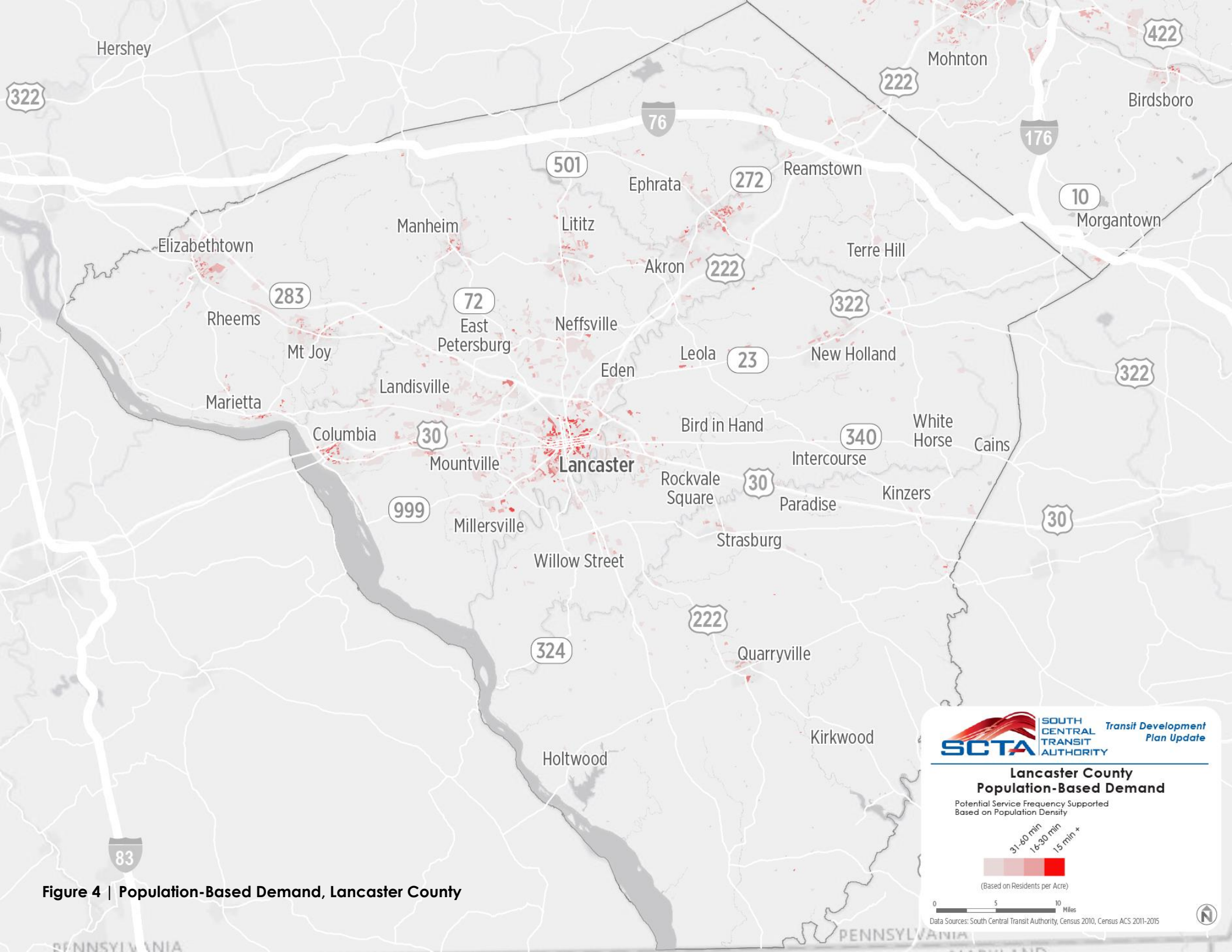


Figure 4 | Population-Based Demand, Lancaster County

Socioeconomic Characteristics and Transit Propensity

In addition to population density, socioeconomic characteristics[1] influence people's propensity to use transit. National research shows that many population groups have a higher propensity for transit use than the overall population. These include:

Low-income residents, who tend to use transit to a greater extent than those with higher incomes because transit provides significant cost savings over automobile ownership and use.

Approximately 68,358 or 19.6% of households in Berks and Lancaster Counties have low incomes (below $25,000 per year). A higher percentage occurs in the urban areas of Lancaster and Reading, with low-income households approximating 36.7% and 47.1% respectively.

Zero-vehicle households, where residents either do not have a vehicle by choice or for other reasons such as low income or because the members cannot or do not drive. In large or dense cities, many residents do not have an automobile by choice because transit is available, car ownership is a hassle, and there are plentiful additional options such as taxis, car sharing, and car rentals for the times when a car is desired or needed. However, in smaller urban areas and rural areas such as SCTA's service area that are more oriented toward automobile travel and where transit options are more limited, people without automobiles largely consist of those with lower incomes or those who do not drive.

Approximately 32,090 of the SCTA service areas households, or 9.2%, do not have a vehicle available. The urban areas are characterized by a larger percentage of zero-vehicle households: Lancaster with 22.8% and Reading with 27.7%. This may be partially due to self-selection, as households without a vehicle may choose to live closer to existing transit services, and partially due to the higher share of low-income households in these areas. Rural parts of eastern Lancaster County are also characterized by a large proportion of households with no vehicles, which may be representative of the Mennonite community residing in the region.

Minority residents, who are considered to be those who identify as a race other than White alone or ethnically as Hispanic/Latino. These populations tend to use transit more often than non-minorities because they tend to have more limited resources for transportation and live in denser neighborhoods closer to the urban core. This means that there is a large amount of overlap between minority populations and low-income households; however, the presence of high numbers of minority residents still provides an additional strong indicator of transit demand. The provision of effective transit service to minority populations is also particularly important to the Federal Transit Administration and is a requirement under Title VI of the Civil Rights Act of 1964.Table 1 shows the percentage of minority population in the SCTA service area.

[1] Population figures for socioeconomic characteristics are based on Census American Community Survey (ACS) Five-Year Estimates, 2011-2015.

The cities of Reading and Lancaster are characterized by very high proportions of minority residents, with 58.7% in Lancaster and 74.1% in Reading. Outside of these cities, and the adjacent towns, there are no major clusters of minority residents in the study area.

Table 1 | Race/Ethnicity in the SCTA Service Area

Race/Ethnicity	Population	Percent
White alone (not Hispanic or Latino)	751,538	78.5%
Black/African American alone (not Hispanic or Latino)	48,185	5.0%
Asian alone (not Hispanic or Latino)	16,424	1.7%
Other race or mixed race (not Hispanic or Latino)	14,572	1.5%
Hispanic/Latino (any race)	126,174	13.2%
Total Minority Population	205,355	21.5%

In a given location, groups of people from transit-supportive demographic groups may be too small individually to indicate significant demand for transit service, but their clustering may result in potentially high levels of transit use. Similarly, in a location where transit-supportive demographic groups have low representation, the level of potential transit demand may actually be lower than total population alone would indicate.

For Lancaster and Berks Counties, this was taken into account by considering relative differences in transit use between these groups and the population as a whole. The team developed a transit propensity index that measures the transit propensity of individual geographies, based on their demographic composition and the transit propensity of different socioeconomic groups. [2] This analysis consisted of three steps:

1. First, transit index factors were developed for each demographic characteristic. [3] These factors measure the likelihood of certain demographic groups to use transit relative to the study area's general population.
    - As shown in Table 2, the propensity of different demographic groups to use transit in the SCTA service area generally follows the trends discussed above. Annual income is inversely related to propensity to use transit, with propensity increasing as income declines. Minority residents were over three times as likely as the general population use transit. Residents without a vehicle were almost eight times as likely to use transit.

[2] This analysis was conducted using 2014 US Census Longitudinal Employer-Household Dynamics (LEHD). For confidentiality reasons, this data is not reported for small areas where data sizes are so small that individuals and households could be identifiable.

[3] Transit Index Factors were developed for each demographic group for the population aged 16 and over who are employed. Only work trips were considered, as comparable data is not available for non-work trips.

Table 2 | Transit Index Factors for SCTA Service Area by Demographic Group (Workers Age 16 and Older)

Demographic Group	Transit Propensity
Race and Ethnicity	
White Alone (Not Hispanic/Latino)	0.50
Minority (including Hispanic/Latino)	3.61
Vehicle Ownership	
No Car	7.82
One or More Cars	0.76
Annual Income	
Less than $15,000	2.09
$15,000-$25,000	1.35
$25,000-$35,000	0.69
$35,000-$50,000	0.52
$50,000 or Higher	0.47

Source: Calculations developed using 2010-2015 American Community Survey 5-Year Estimates

2. These factors were then applied to the population of each census block, calculating an overall Transit Propensity Adjustment Factor for each census block based on its demographic composition and their relative likelihood to use transit (see Figure 5, Figure 7, and Figure 9).
3. The Transit Propensity Adjustment Factors were then applied to each census block's underlying population as a multiplier, in order to "adjust" the population density of each census block to account for the population's relative transit propensity.
4. Finally, an updated map of adjusted population-based demand was produced based on the findings of this analysis. Adjusted population maps reflect both density of residents and density of populations likely to use transit. (See Figure 6, Figure 8, and Figure 10.)

The transit propensity factor developed in Step 2 is based on the demographic composition of each block group and the transit propensity of those demographic groups. Maps of the Transit Propensity Adjustment Factors indicate that residents of many parts Reading and Lancaster have a higher propensity to use transit (Figure 5). In Berks County (Figure 7), higher propensity populations are focused in Reading and just to the north. In Lancaster County (Figure 9), these groups are focused in and just around the city of Lancaster, as well as to the west in Columbia and in rural areas in the eastern part of the county. In both counties, most areas outside of the urban cores have an average or lower propensity to use transit.

The factor is used to adjust the actual population density of a block group based on the transit propensity of its residents (Step 3); this adjusted density, in turn, affects the underlying demand for transit. For example, a block group with a transit propensity factor of 1.5 effectively has a population density 1.5 times higher than it actually does, based on its demographic composition and the level of transit service it may support.

Adjusting the underlying population density to account for high transit propensity groups provides a clearer picture of where high-demand areas are located in the SCTA service area (see Figure 6). Within each county, the areas where population-based transit demand is highest include:

Berks County (see Figure 8)

- Most prominently in Reading, and the communities directly west of the Schuylkill River
- Just north of Reading and into Temple
- Communities west of Reading along Route 422
- Kutztown and Birdsboro

Lancaster County (see Figure 10)

- Most prominently within Lancaster and just southwest of the city
- Ephrata to the north
- Columbia and west along US Route 30
- Elizabethtown in western Lancaster County

Figure 5 | Transit Propensity Adjustment Factors, SCTA Study Area

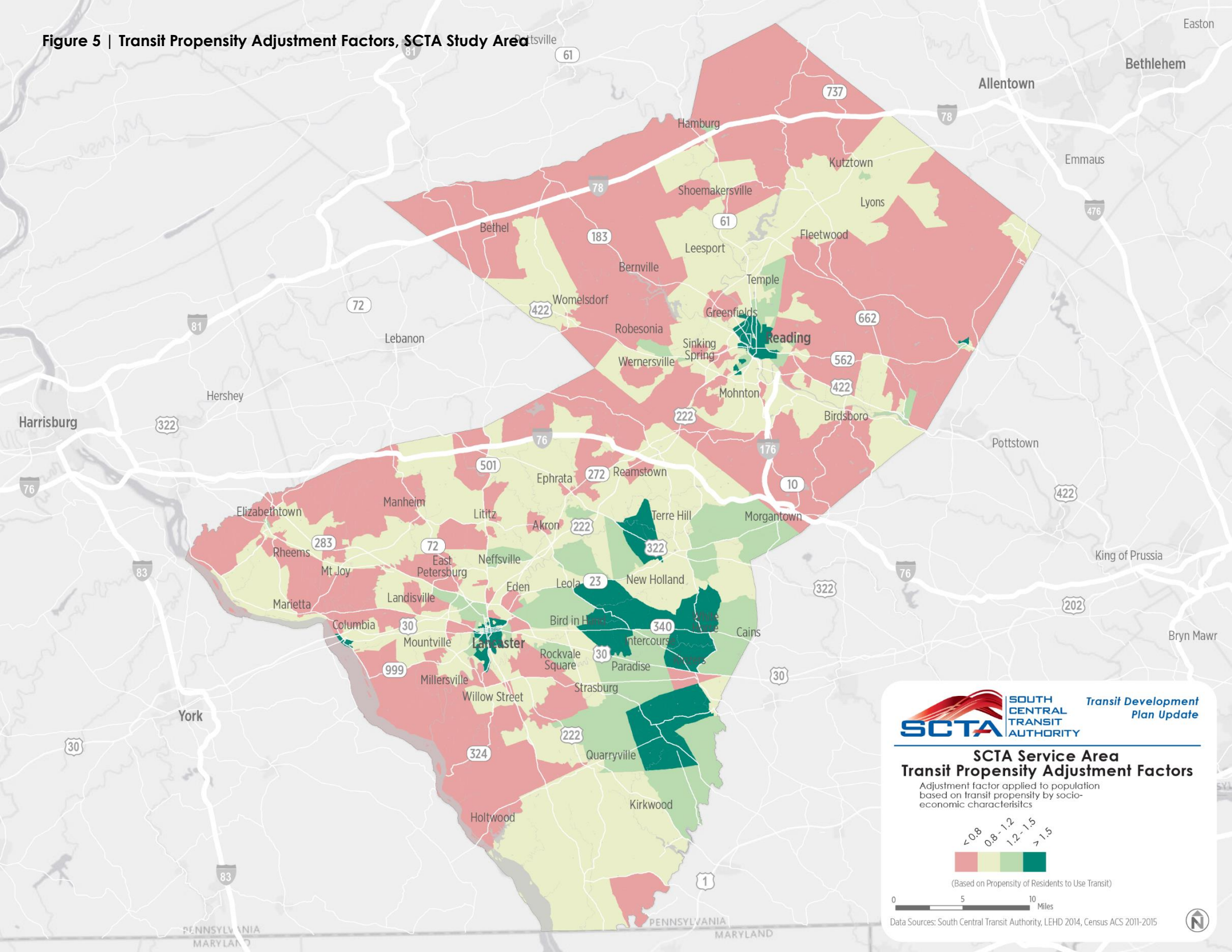
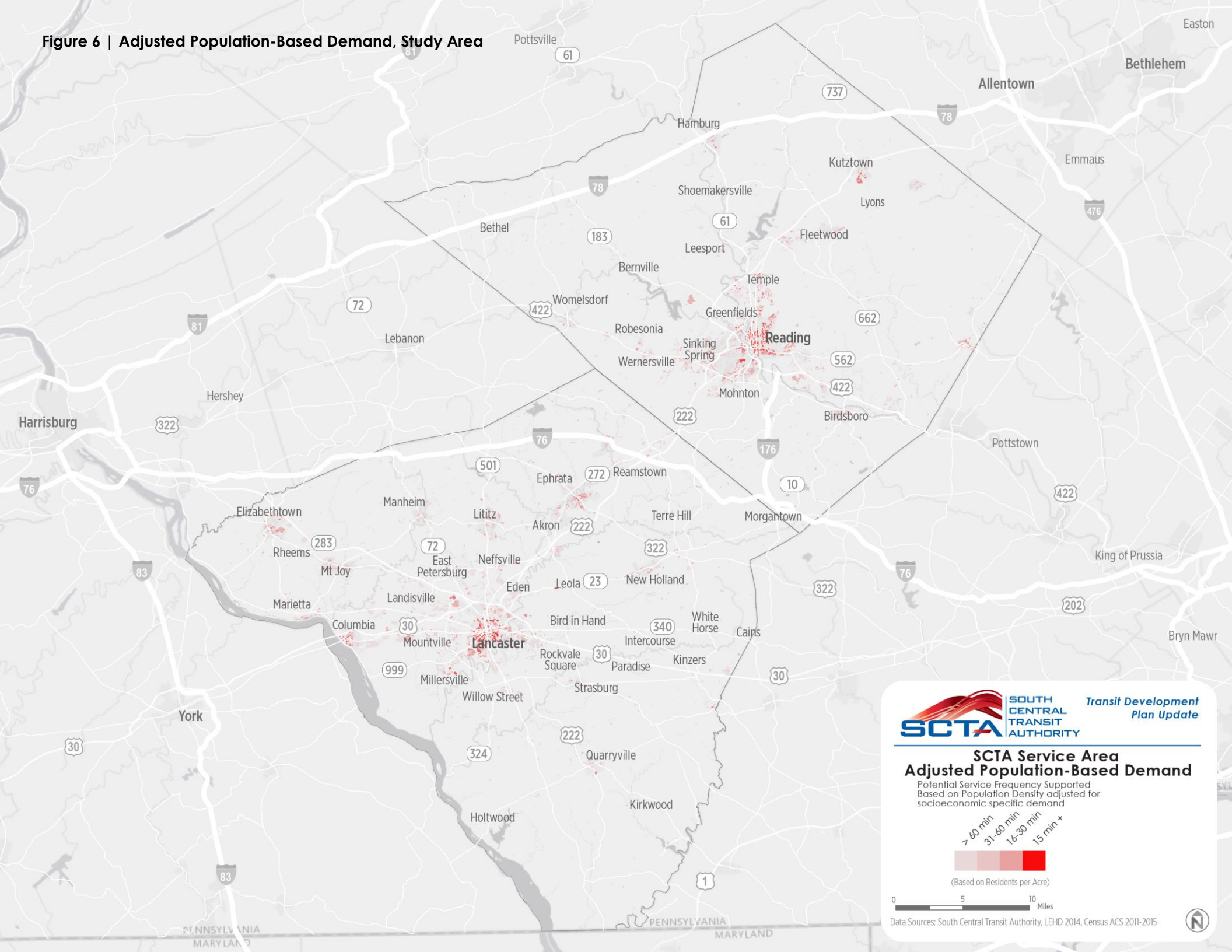


Figure 6 | Adjusted Population-Based Demand, Study Area



SCTA SOUTH CENTRAL TRANSIT AUTHORITY

Transit Development Plan Update

SCTA Service Area
Adjusted Population-Based Demand

Potential Service Frequency Supported Based on Population Density adjusted for socioeconomic specific demand

> 60 min
31-60 min
16-30 min
15 min +

(Based on Residents per Acre)

0 5 10 Miles

Data Sources: South Central Transit Authority, LEHD 2014, Census ACS 2011-2015

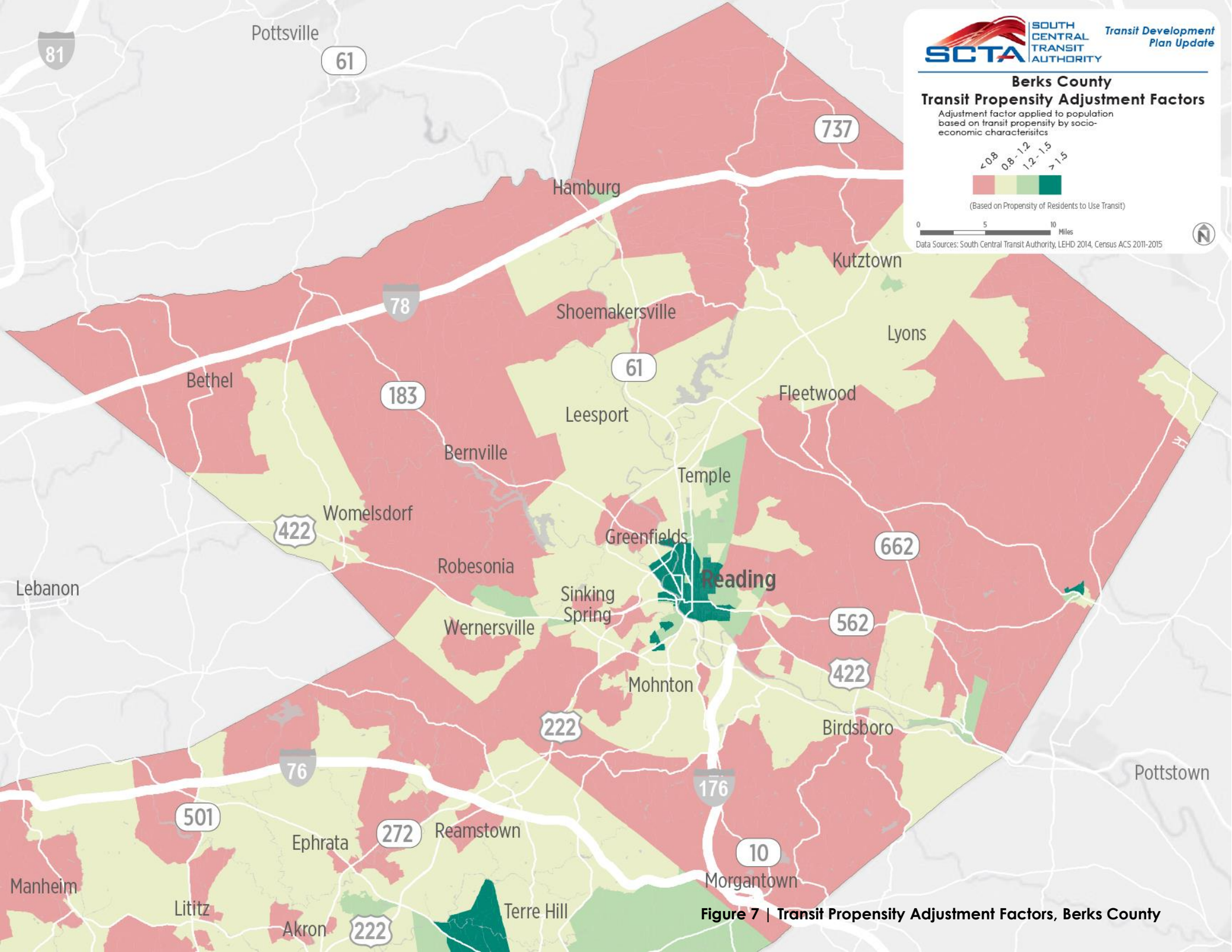


Figure 7 | Transit Propensity Adjustment Factors, Berks County

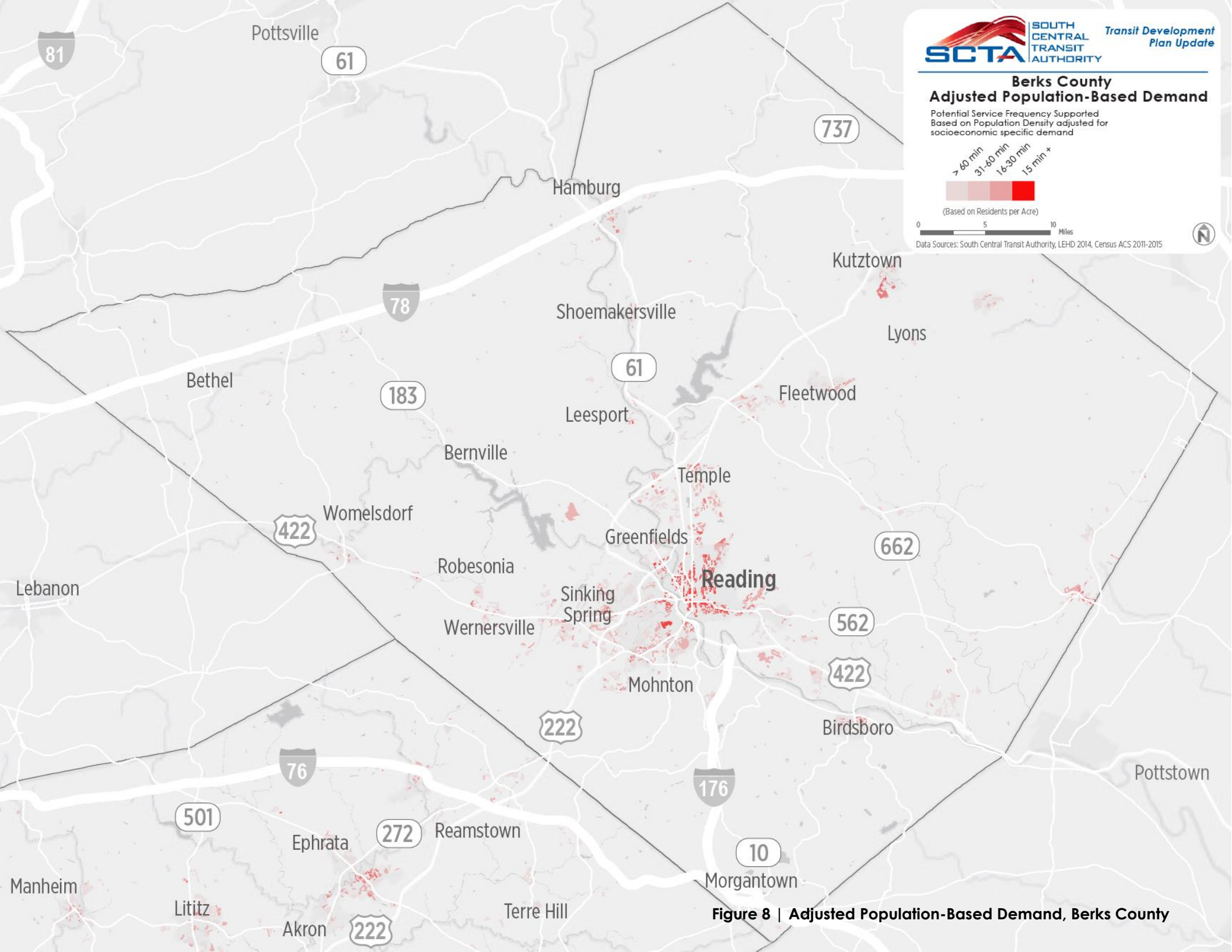


Figure 8 | Adjusted Population-Based Demand, Berks County

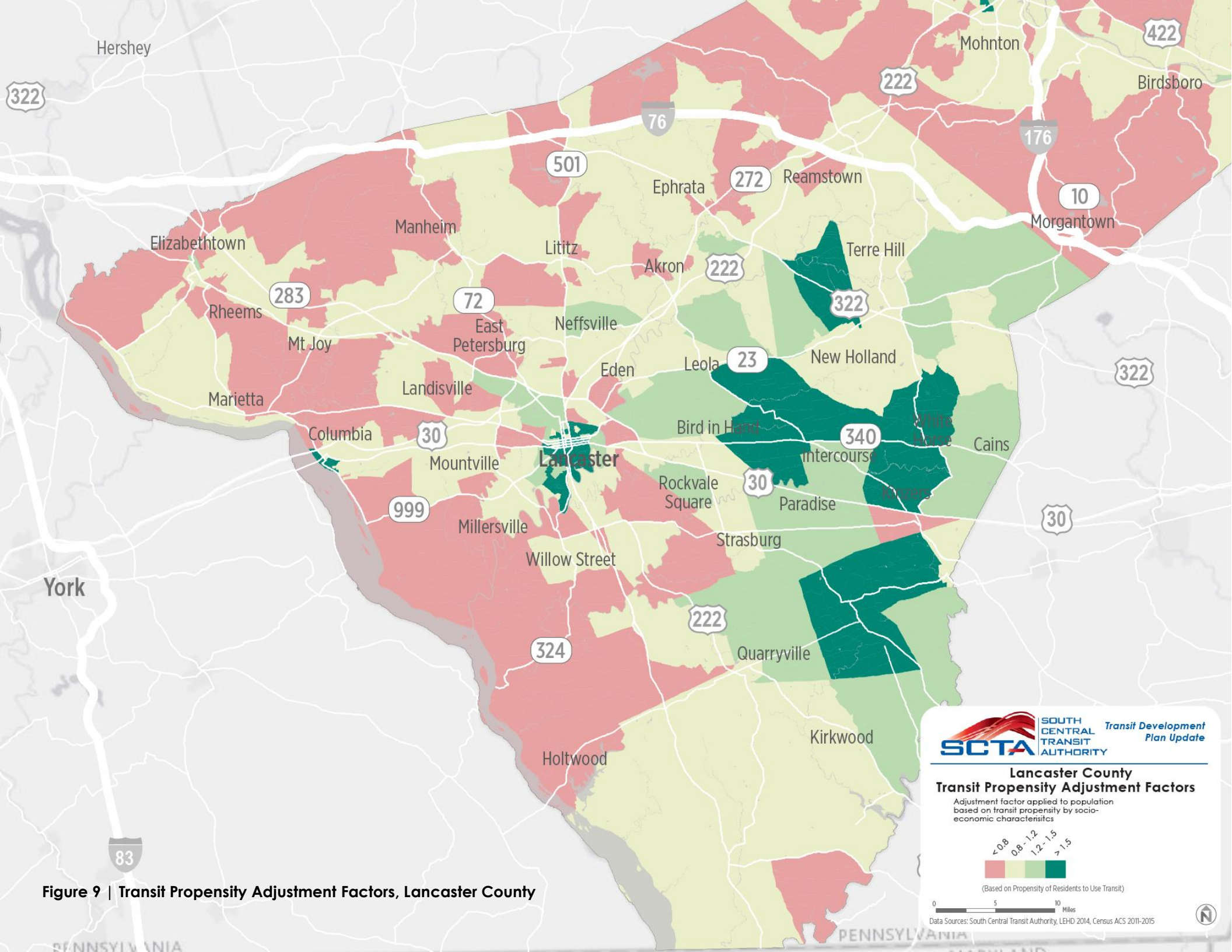


Figure 9 | Transit Propensity Adjustment Factors, Lancaster County

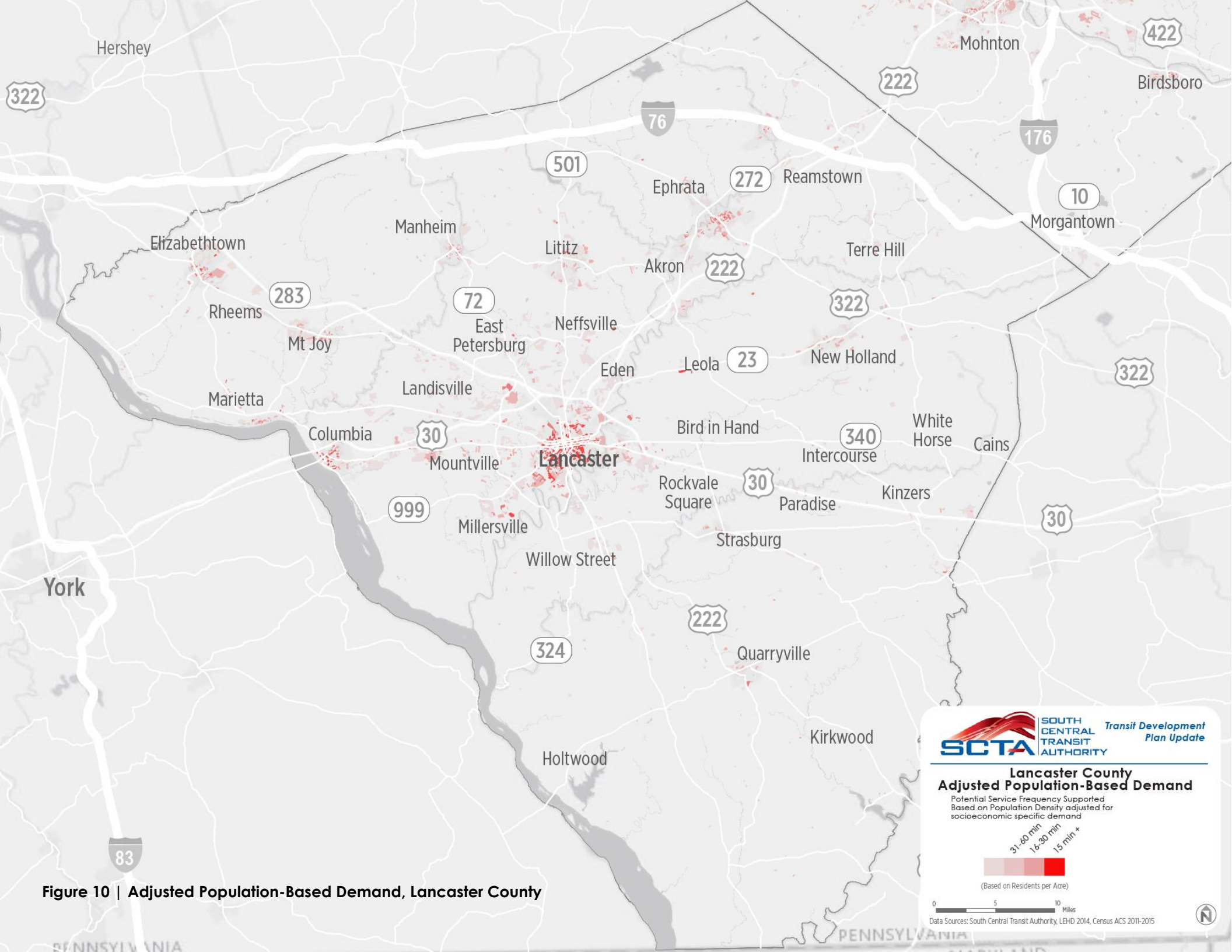


Figure 10 | Adjusted Population-Based Demand, Lancaster County

Employment and Employment Density

In the same manner as population densities, employment densities provide a second strong indication of underlying employment-based transit demand. In 2014, there were 406,260 jobs in the SCTA service area. Similar to population, jobs are highly concentrated around the urban areas of Reading and Lancaster, but with a higher concentration along major roadways (see Figure 11).

The highest employment densities in Berks County are located in downtown Reading and to the west into Wyomissing. Employment concentrations are also focused along US Route 222 north into Temple and southwest towards Mohnton, and west of Reading in Sinking Spring. In Lancaster County, the highest employment densities are located within the city of Lancaster and northwest along PA Route 72 towards East Petersburg. Additional concentrations are focused in Ephrata, Lititz, and west along US Route 30 to Columbia.

Table 3 | Largest Employers in Berks County (500+ Employees)

City	Employers	City	Employer
Reading	Reading Hospital	**Bethel**	Berks Park 78
	Carpenter Specialty Alloys	**Hamburg**	Cabela's
	St. Joseph's Medical Center	**Kutztown**	Kutztown University
	Wells Fargo	**Leesport**	Ashley Furniture Industry
	Sweet Street Desserts	**Lyons**	East Penn Manufacturing Co., Inc
	Penske Logistics	**Morgantown**	Morgan Corp
	Arrow International Inc.	**Sinking Spring**	Alcon Laboratories Inc.
	RM Palmer Co.	**Wernersville**	Caron Treatment Center
	Reading Area Community College		.
	CAN		
	First Energy Corp		
	Worley Parsons		

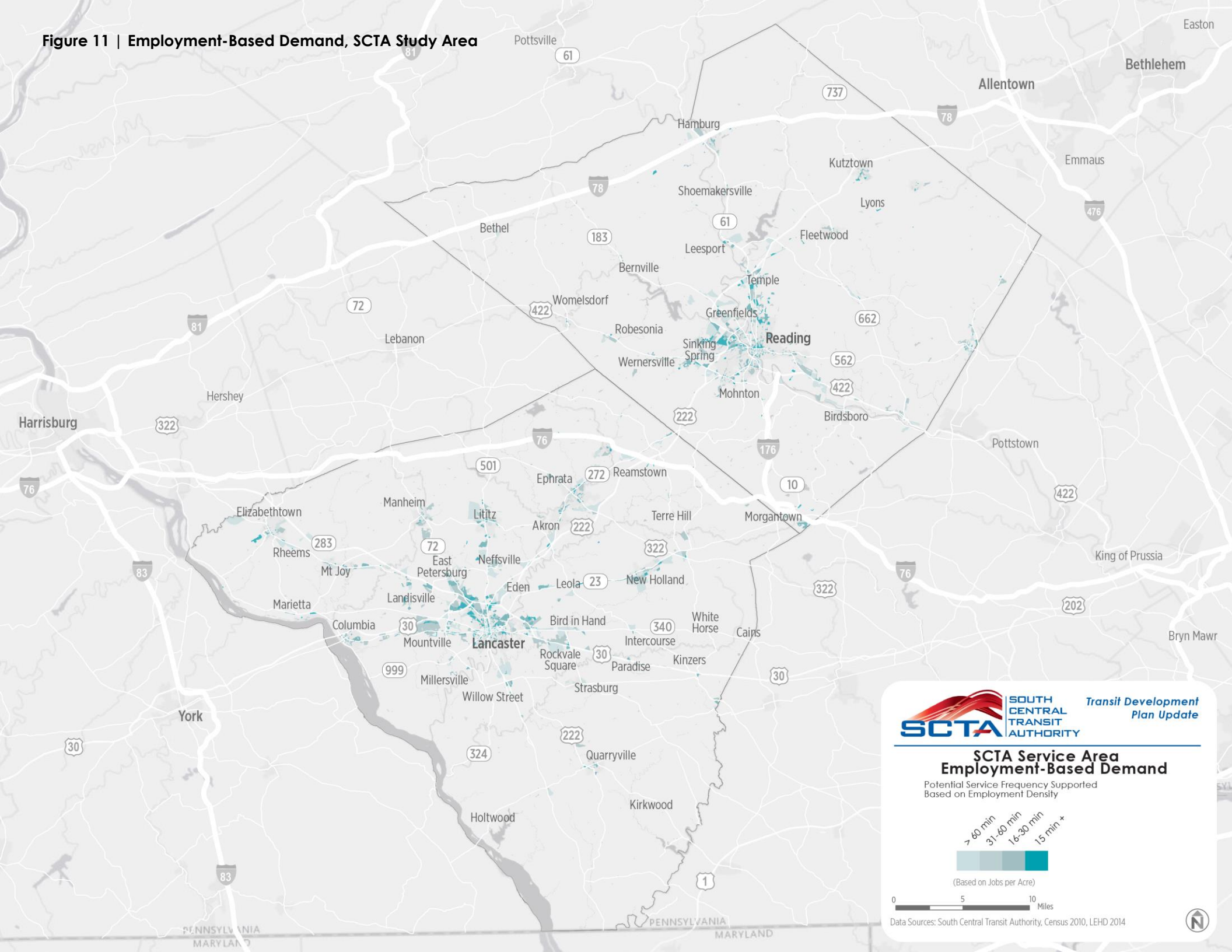
Source: Berks County Planning Commission

Table 4 | Largest Employers in Lancaster County (500+ Employees)

City	Employers	City	Employer
Lancaster	Doubletree Resort By Hilton	**Columbia**	Anvil International
	LNP Media Group Inc	**Conestoga**	Turkey Hill Dairy Inc
	Fulton Financial Corp	**Denver**	Supervalu Distribution Ctr
	HACC		Pepperidge Farm
	Armstrong World Industries	**East Earl**	Conestoga Wood Specialties
	Armstrong Holdings Inc	**Elizabethtown**	Masonic Village
	Lancaster County Court	**Ephrata**	Walmart Supercenter
	Conestoga View		Ephrata Community Hospital
	Lancaster Regional Medical		Northern Lancaster Medical
	High Steel Structures LLC		Four Seasons Produce Inc
	Lancaster General Family	**Gap**	Urban Outfitters Distribution
	Lancaster General Health	**Leola**	Dart Container Corp
	Y & S Candies	**Lititz**	Landis Homes Retirement
	LSC Communications		Warwick School District
	High Co		Johnson & Johnson
	Lancaster-Lebanon IU	**Manheim**	Manheim Auto Auction
	US Post Office	**Millersville**	Millersville University Of Pa
	R R Donnelley	**Mountville**	Clipper Magazine Inc
	QVC	**New Holland**	Tyson Foods Inc
	Alcoa Rolled Products	**New Providence**	Southern Lancaster County Farmer-Sportsmen's Assoc.
	Eurofins Lancaster Labs		
	Kellogg Co	**Willow Street**	Lakeside At Willow Valley
	Philhaven's Center For Autism		Willow Valley
	Doubletree Resort		

Source: Lancaster County Planning Commission

Figure 11 | Employment-Based Demand, SCTA Study Area



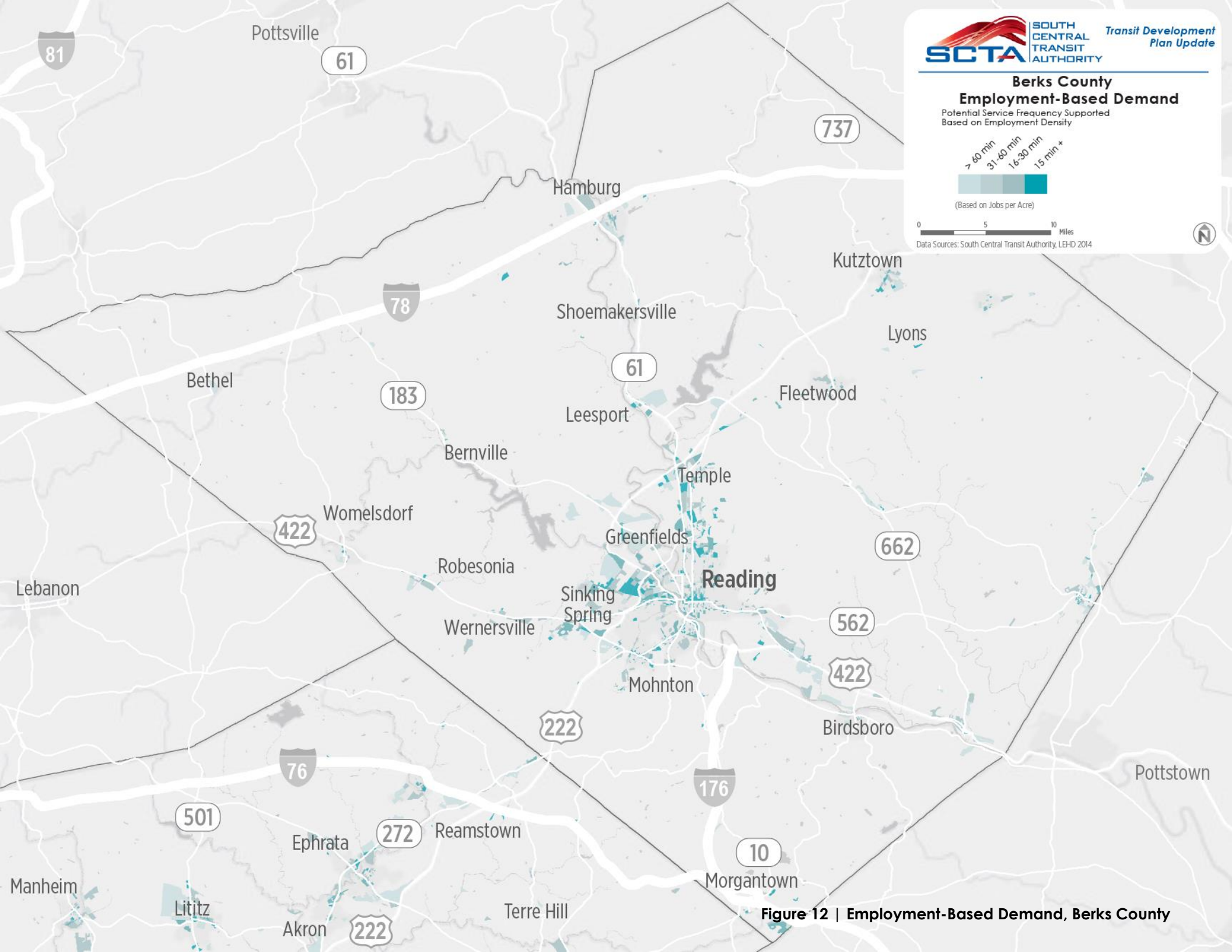


Figure 12 | Employment-Based Demand, Berks County

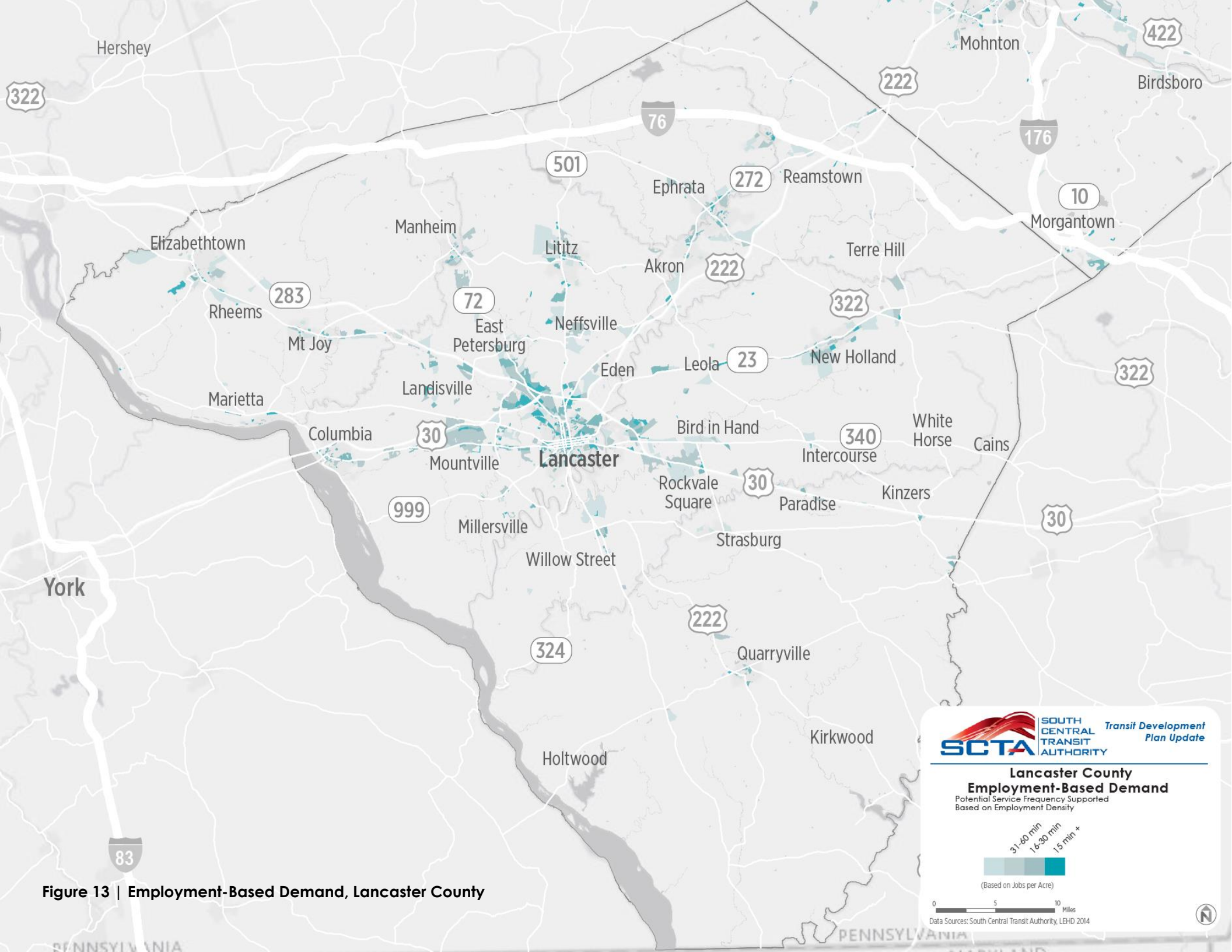
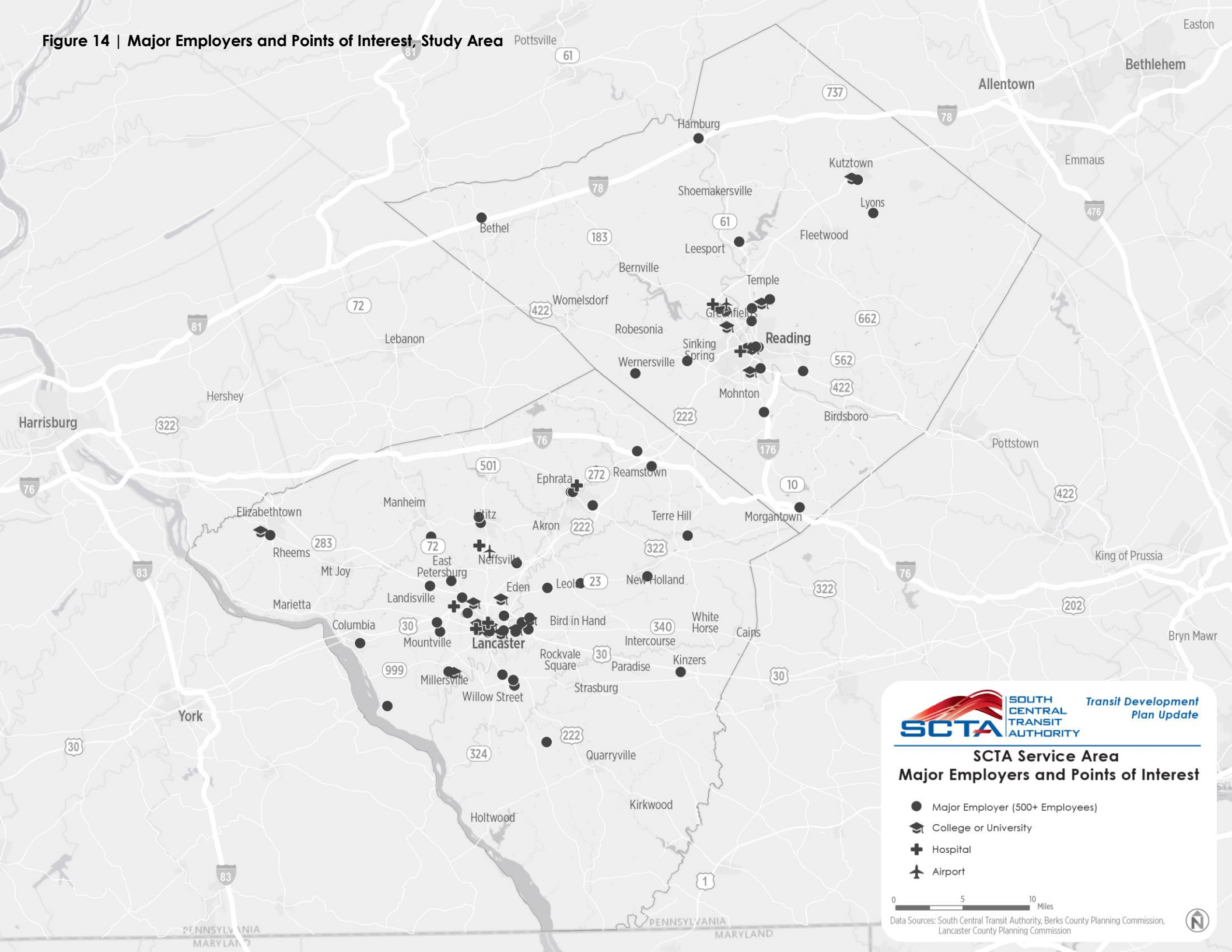


Figure 13 | Employment-Based Demand, Lancaster County

Figure 14 | Major Employers and Points of Interest, Study Area



SCTA SOUTH CENTRAL TRANSIT AUTHORITY

Transit Development Plan Update

SCTA Service Area
Major Employers and Points of Interest

- Major Employer (500+ Employees)
- College or University
- Hospital
- Airport

0 5 10 Miles

Data Sources: South Central Transit Authority, Berks County Planning Commission, Lancaster County Planning Commission

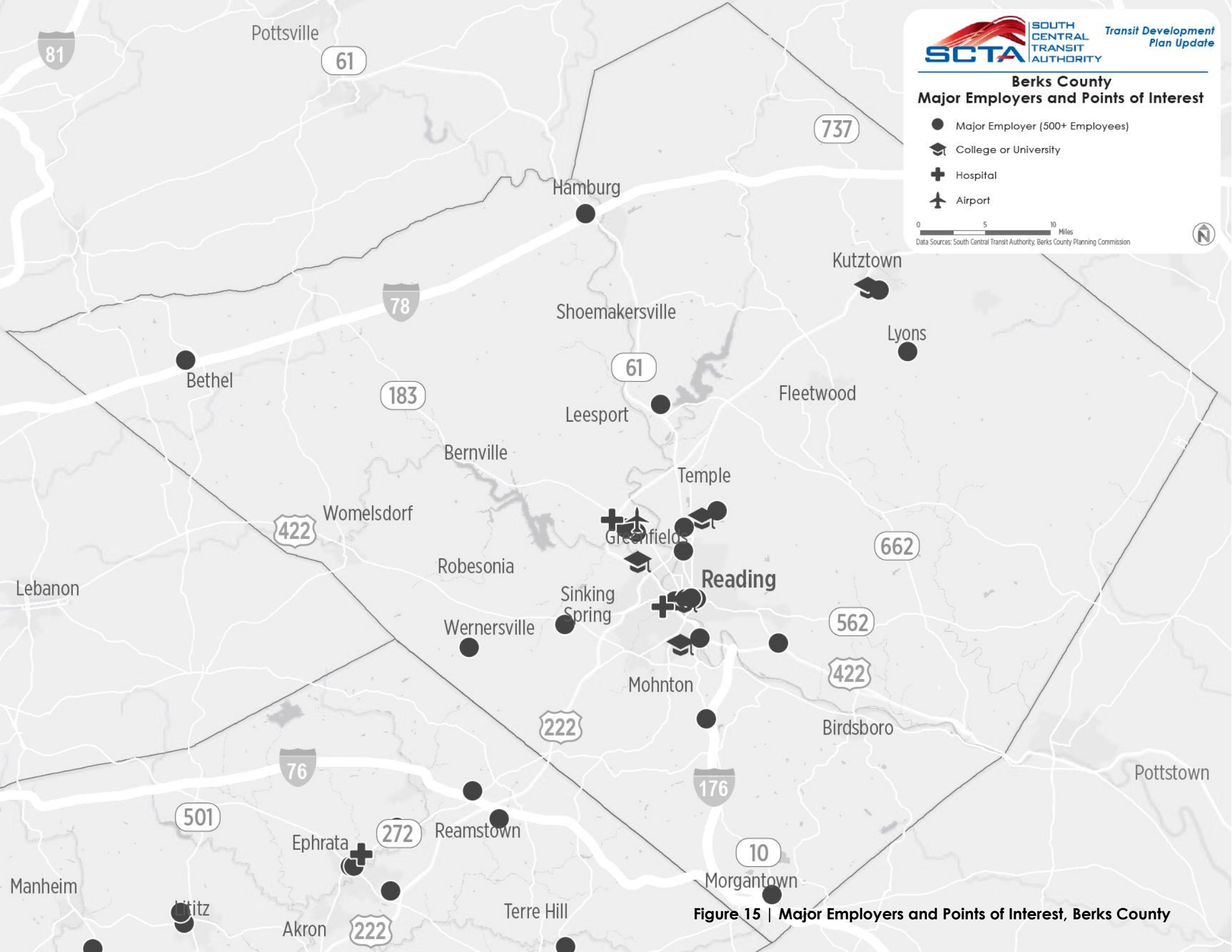


Figure 15 | Major Employers and Points of Interest, Berks County

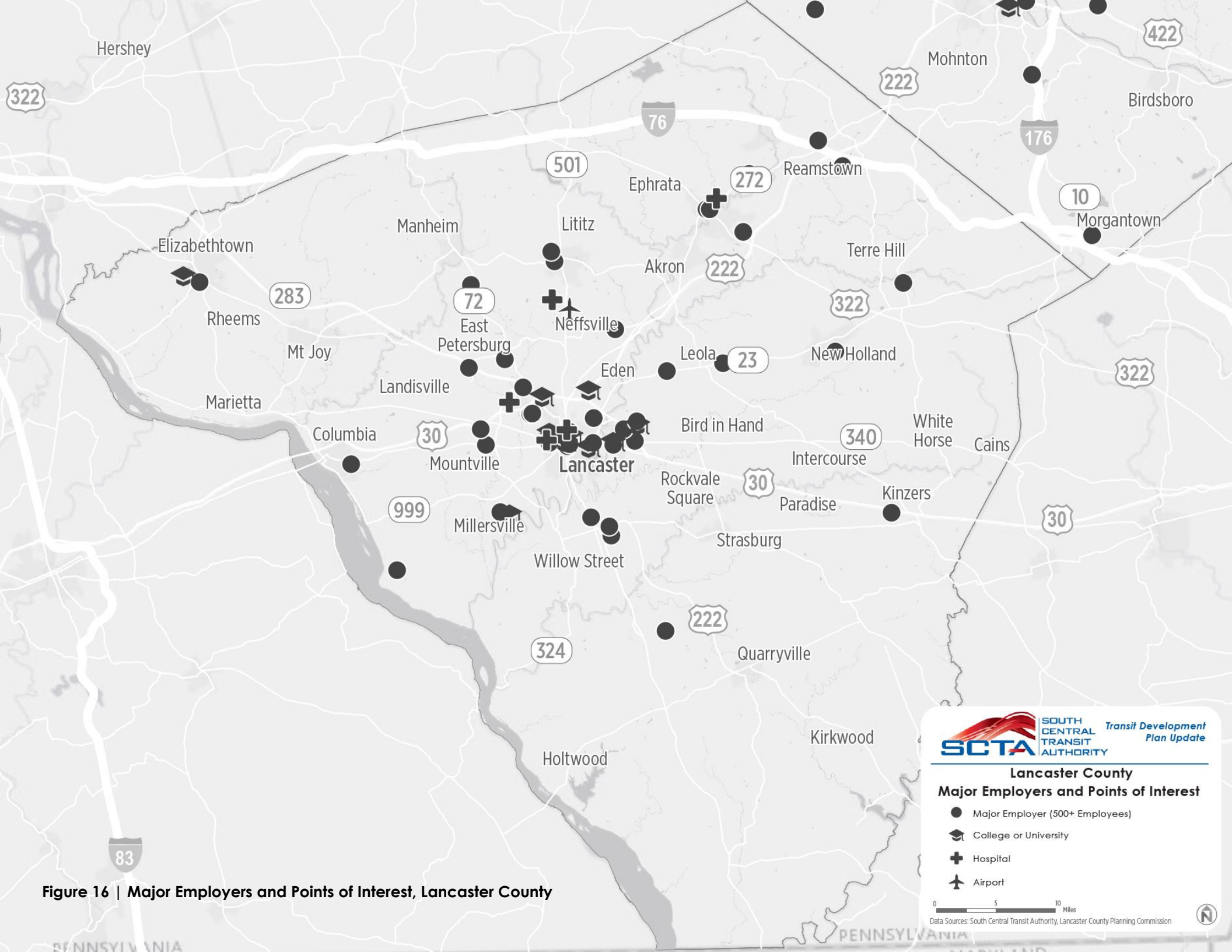


Figure 16 | Major Employers and Points of Interest, Lancaster County

Composite Transit Demand

The large majority of underlying transit demand can be explained by the combination of population and employment densities. While other factors, such as the location of major activity centers like universities, hospitals, and social service agencies, are also important demand generators, the combination of population and employment densities can be used to identify the large majority of underlying transit demand, typically driving 80% or more of year-round resident-based demand.

Combined population and employment densities indicate that the highest transit demands are focused in the core urban areas of Reading and Lancaster, with an underlying demand for frequent service throughout most of these core areas (see Figure 17). High-demand areas within each county are described below.

Berks County (see Figure 18)

Most of the city of Reading demonstrates underlying demand for 15-minute or better service. High demand is also focused:

- In Reading just southwest of the Schuylkill River and southwest towards Mohnton
- North towards Temple
- West of Reading into Wyomissing
- West along Route 422

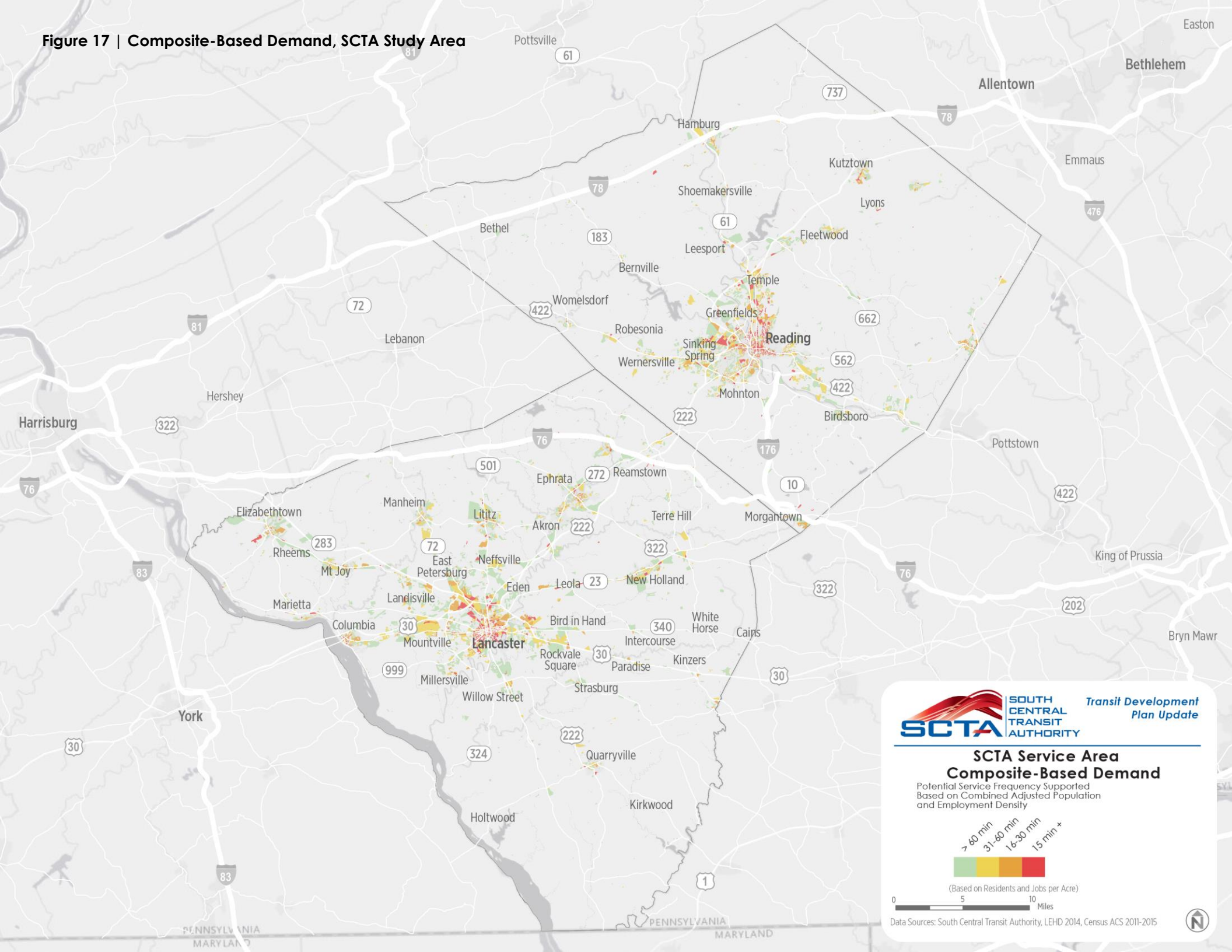
Lancaster County (see Figure 19)

Demand for frequent transit service is focused within Lancaster and just northwest of the city. Other areas with high demand for service include:

- Northwest along PA Route 72, through East Petersburg
- Just west along US Route 30
- Ephrata
- Columbia

There are also areas with some demand in the northern half of the county in Lititz, Manheim, Elizabethtown, and Mt. Joy, as well as New Holland.

Figure 17 | Composite-Based Demand, SCTA Study Area



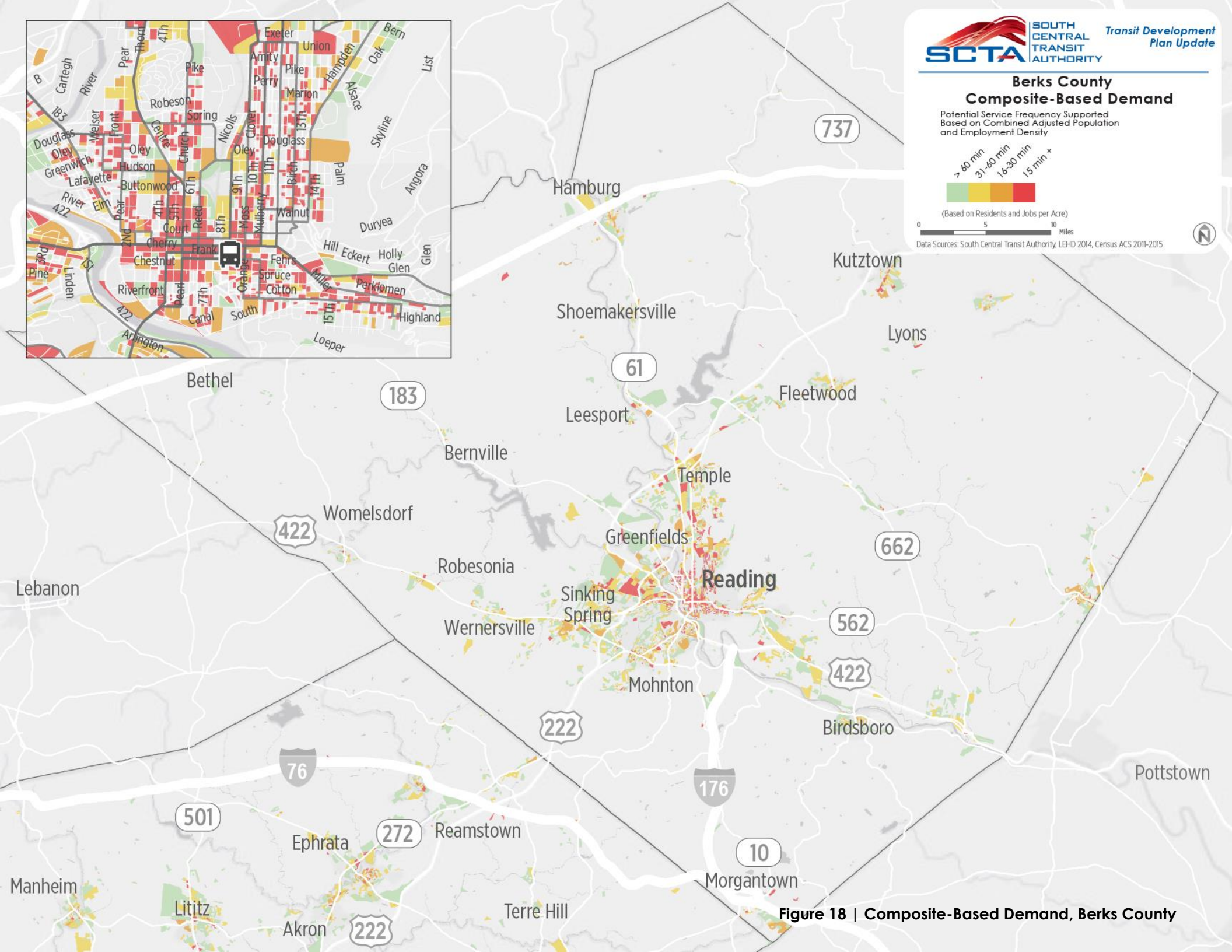
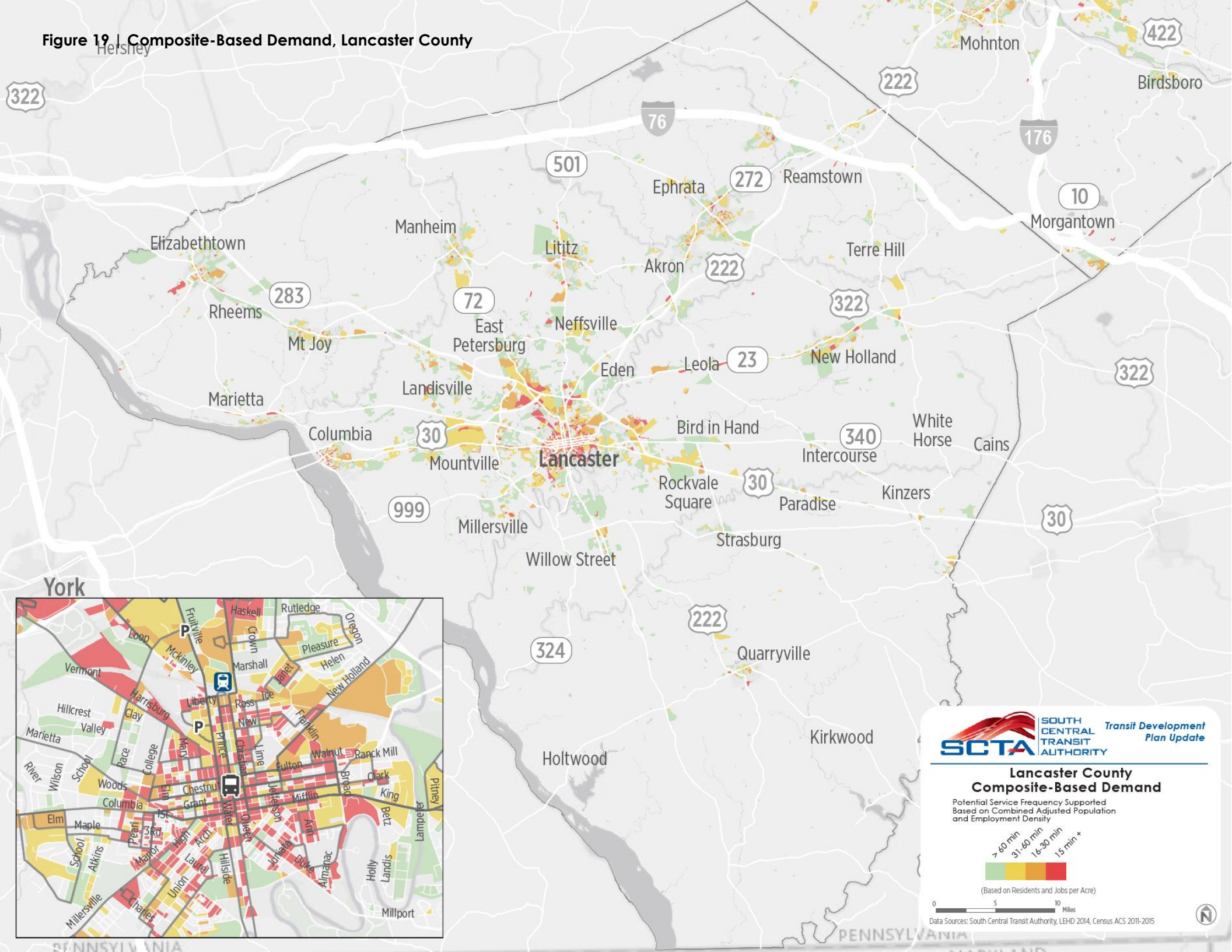


Figure 18 | Composite-Based Demand, Berks County

Figure 19 | Composite-Based Demand, Lancaster County



3 2014 TRAVEL FLOWS

For transit to be effective, it must take people from where they are to where they want to go. People also travel for many reasons, including to and from work and school, and for shopping, medical, recreation, social, and other purposes. Transit serves a wide verity of trips, but for all transit systems, work trips are particularly important. This is the case for a number of reasons, including public policy and because many work trips are concentrated around times and places that can be most effectively served by transit (for example, peak period trips to and from Lancaster and Reading). Work trips are also the most common trip type and the base for which other types of travel are scheduled. Transit serves work trips throughout the day, but the highest numbers of trips are generally made during the morning and late afternoon peak periods. Non-work trips typically comprise smaller volumes than work trips and typically occur during midday and evening hours, and these trips are generally made between more dispersed locations.

Home-Based Work Trips

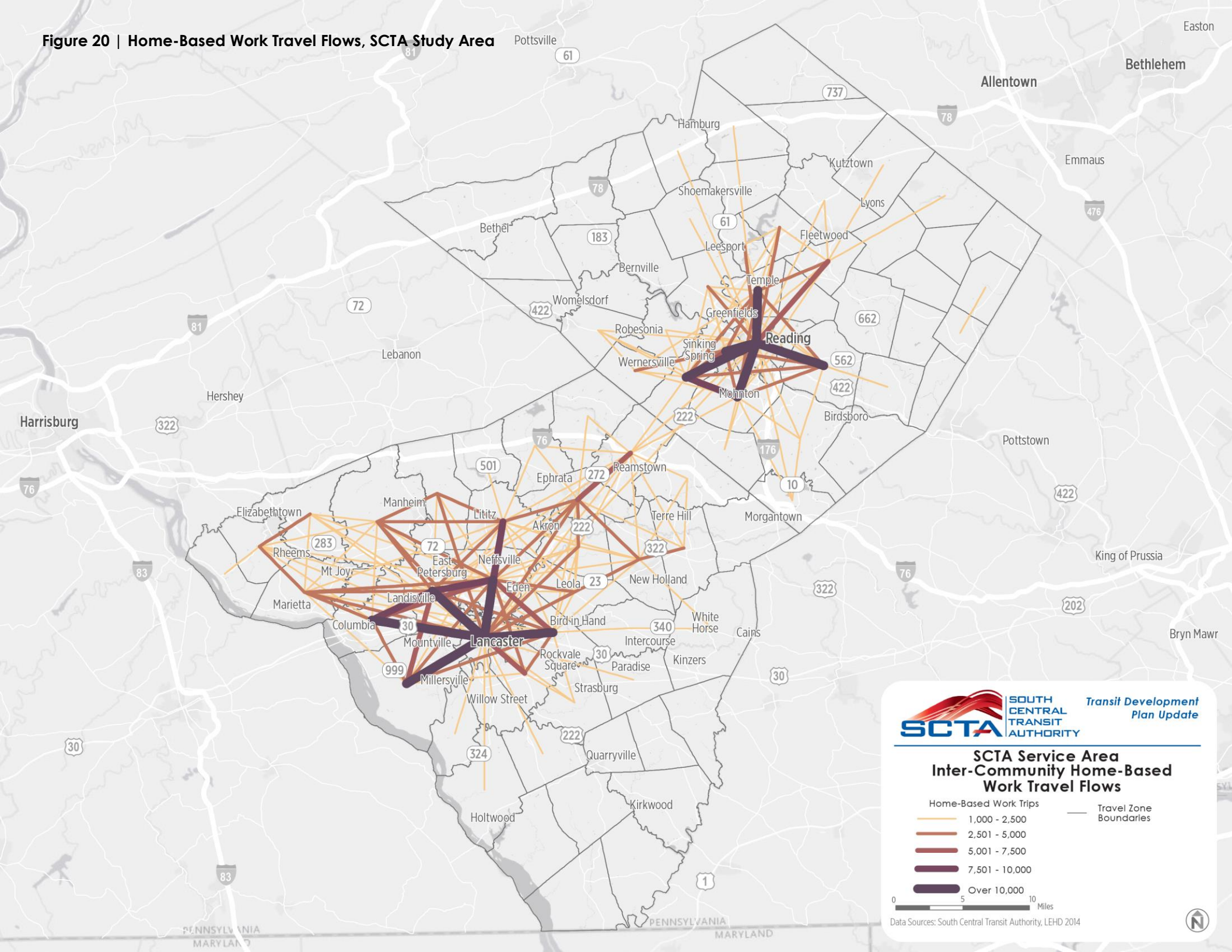
By far the highest travel volumes within each county are oriented to and from the cities of Lancaster and Reading, with few daily trips between the two counties and very few daily trips between the cities of Reading and Lancaster[4] (see Figure 20). Most trips between the two counties are between the northeastern portion of Lancaster County and travel zones in and just around Reading, mostly southwest of the city.

Within Berks County, the highest-volume trips are overwhelmingly focused to and from Reading, mostly from zones immediately north of the city and south, southwest, and southeast of the city. Other significant travel flows that are not downtown-focused are between zones southwest of Reading, and between the area just north of Reading (around Temple) and areas south of the city.

There are more high-volume travel flows in Lancaster County, with higher numbers of trips covering a larger portion of the county than in Berks County. The largest trip volumes are focused to and from the city of Lancaster, most from northern portions of the county. Beyond trips to and from the city of Lancaster, significant travel flows also emerge between zones to the north and northwest of Lancaster, spanning zones between Columbia and Neffsville, with the zone immediately north of Lancaster attracting trips from several areas, as well as trips across northeastern Lancaster County.

[4] This analysis was conducted using 2014 US Census Longitudinal Employer-Household Dynamics (LEHD).

Figure 20 | Home-Based Work Travel Flows, SCTA Study Area



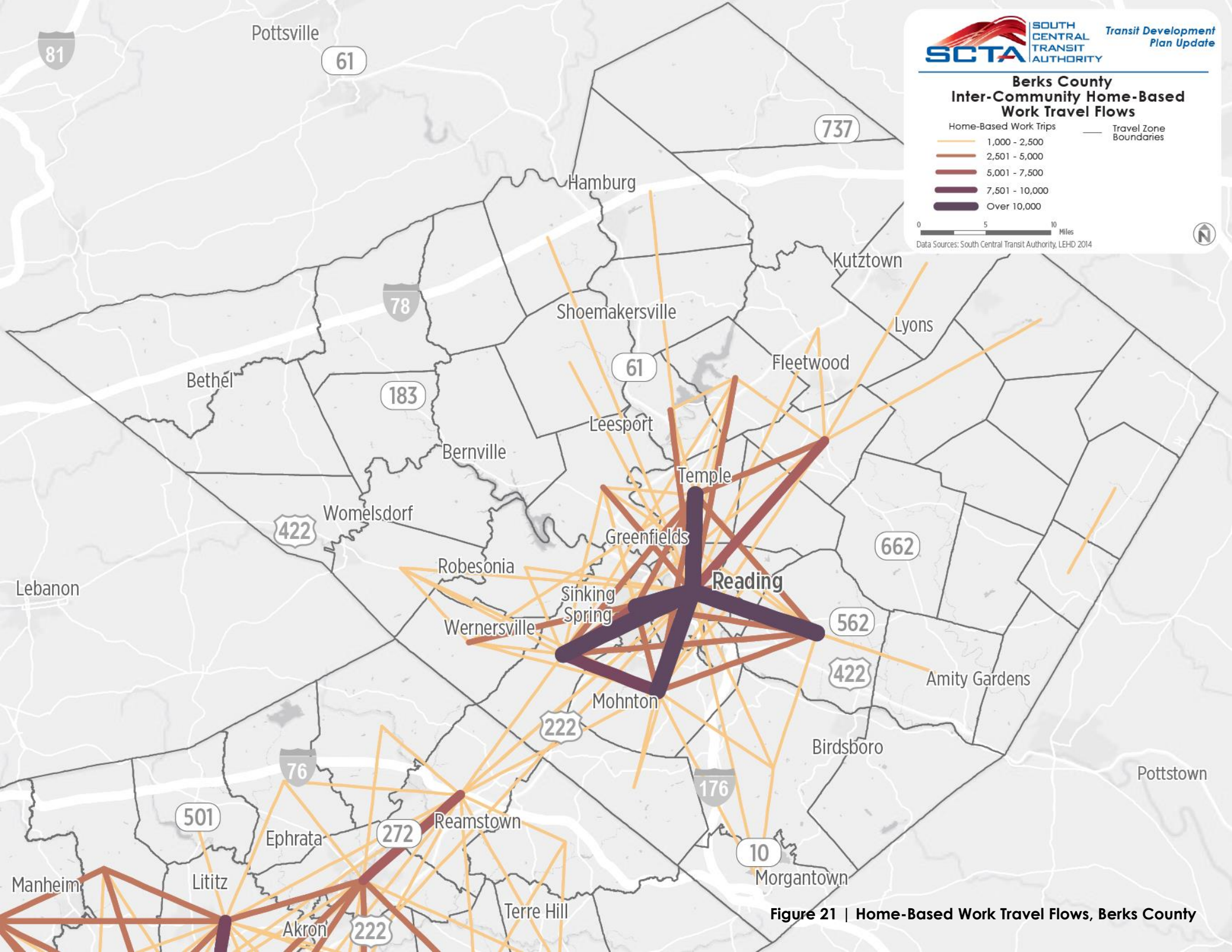


Figure 21 | Home-Based Work Travel Flows, Berks County

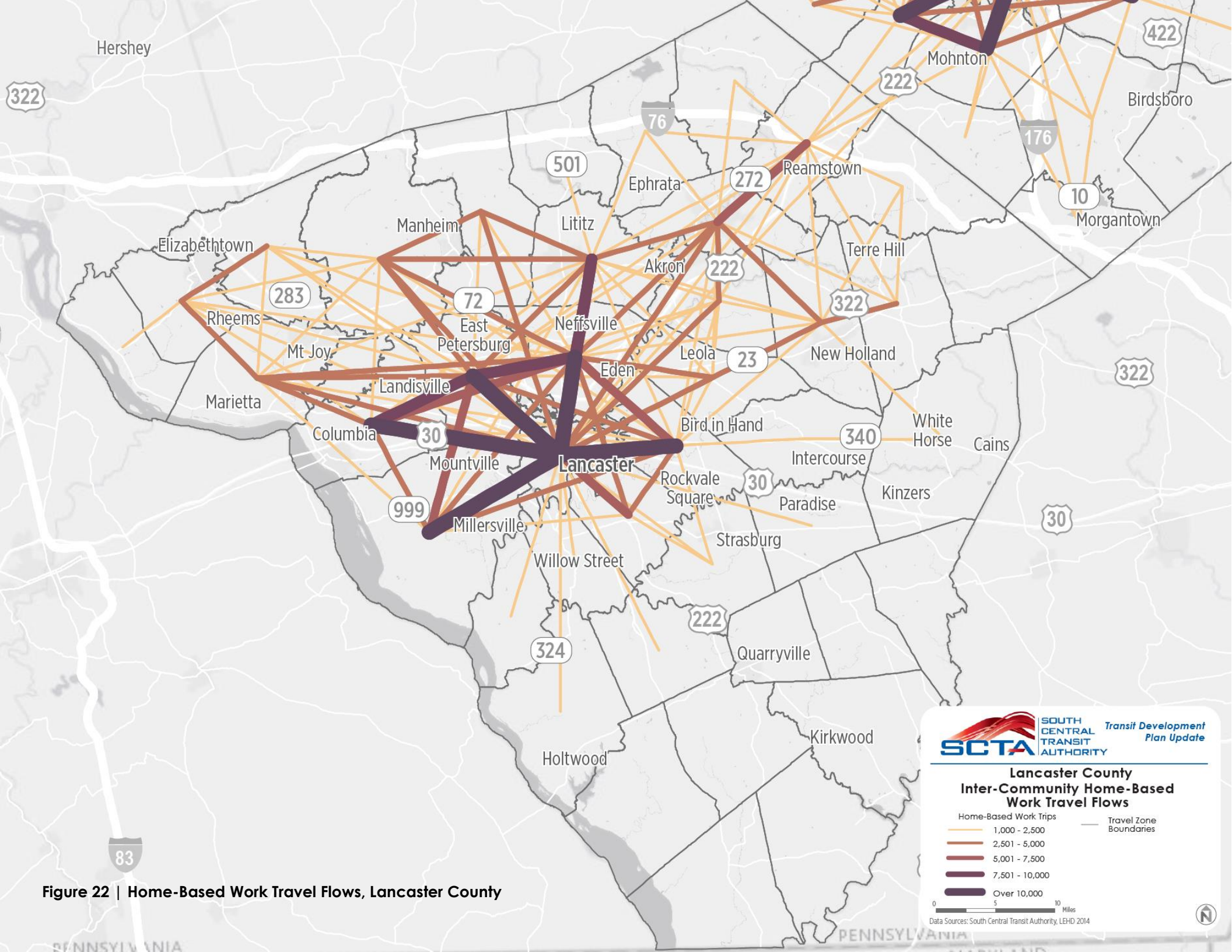


Figure 22 | Home-Based Work Travel Flows, Lancaster County

4 SUMMARY

SCTA encompasses a very large service area, with two differentiated systems, Berks Area Regional Transit Authority (BARTA) and Red Rose Transit Authority (RRTA) operating in two counties with two major urban areas. This combined service area includes nearly one million residents and over 400,000 jobs. The density of both people and jobs are fairly concentrated in the major urban areas of Reading and Lancaster, indicating a high underlying demand for transit service within these areas, while other areas of both counties are more rural with much lower densities that are more difficult to serve with transit.

In both counties, population-based transit demand is highly focused in the core urban areas of Reading and Lancaster, with few other concentrations of demand. This is based on both population density and the location of groups with high propensity to use transit. In Berks County, there are some areas just outside of Reading, especially to the north, west, and southwest of the city, that indicate moderate population-based demand for transit. In contrast, population-based demand in Lancaster County falls off sharply outside the city boundaries of Lancaster.

Similarly, employment-based transit demand is concentrated in the core areas of Reading and Lancaster. There are also concentrations of employment along major corridors such as US Route 30 west of Lancaster, PA Route 72 northwest of Lancaster, US Route 222 north and south of Reading, and US 422 west of Reading.

When population and employment are considered together, the highest transit demand emerges in the core urban areas of Reading and Lancaster, with an underlying demand for frequent service throughout most of these core areas. As many of these core areas already receive some service, this suggests that there are opportunities to improve levels of service in many areas, in addition to potential demand in areas that are not served today.

High transit demand is mostly focused:

- Within Reading and southwest of the Schuylkill River towards Mohnton
- Within the city of Lancaster
- North of Reading and in Temple
- West of Reading into Wyomissing and along Route 422
- Northwest of Lancaster along PA Route 72, through East Petersburg
- West of Lancaster along US Route 30
- Ephrata
- Columbia
- Lititz
- Manheim
- Elizabethtown

The highest travel volumes within each county are oriented to and from the cities of Lancaster and Reading, with few daily trips between the two counties and very few daily trips between the cities of Reading and Lancaster. Most trips between the two counties are between the northeastern portion of Lancaster County and travel zones in and just around Reading, mostly southwest of the city. Although travel flow volumes between Reading and Lancaster are relatively low, there may be potential opportunities for intercountry transit service by connecting major trip generators between the two cities or providing for a transfer point between the two transit systems in northeast Lancaster County or southwest Berks County.

Within Berks County, the highest-volume trips are overwhelmingly focused to and from Reading, mostly from zones immediately north of the city and south, southwest, and southeast of the city. Other large travel flows that are not downtown-focused are between zones southwest of Reading, and between the area just north of Reading (around Temple) and areas south of the city. The BARTA system currently operates as a "hub and spoke" system that requires riders to transfer downtown to complete a crosstown trip; these non-downtown travel flows may indicate potential demand for crosstown service or improved transfer opportunities.

In Lancaster County, the largest trip volumes are focused to and from the city of Lancaster, most from northern portions of the county. Beyond trips to and from the city of Lancaster, significant travel flows also emerge between zones to the north and northwest of Lancaster, with the zone immediately north of Lancaster attracting trips from several areas, as well as trips across northeastern Lancaster County. These non-Lancaster oriented travel flows may indicate potential demand for crosstown services or improved transfer opportunities, since all transit service currently operates to and from downtown Lancaster only.