

MARKET ANALYSIS

Introduction

More than any other factor, density determines the effectiveness and efficiency of public transportation. Places with higher concentrations of people and/or jobs tend to have higher transit ridership. At the same time, most transit agencies have a mandate to provide comprehensive service in the communities they serve and to provide mobility for residents with no other means of transportation. The purpose of this Market Analysis is to both identify the strongest transit corridors in Butler County and to highlight areas with relatively high transit need. Thus, the Market Analysis consists of two key components: Transit Potential and Transit Need.

While Transit Potential is an analysis of population and employment density, Transit Need focuses on socio-economic characteristics such as income, automobile availability, age, and disability status that are indicative of a higher propensity to use transit. Transit use is also influenced by the built environment. Certain land uses—such as retail centers, civic buildings, multifamily housing, educational institutions, medical facilities, and major employment centers—tend to generate transit trips at a relatively higher rate. As such, these ridership generators are included in the maps describing Transit Potential and Transit Need. These ridership generators are included as points on each map due to the number of trip generators and scale of each map. Fixed-Route transit service is shown throughout as it was operated in January 2022.

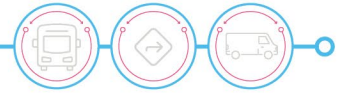
Transit Potential

Transit service is generally most effective in areas with high concentrations of residents and/or jobs. The following Transit Potential analysis uses American Community Survey (ACS) 2019 five-year datasets and Longitudinal Employer-Household Dynamics (LEHD) 2019 job employment data.

Population Density

Public transportation is most efficient when it connects population and employment centers where people can easily walk to and from bus stops. Transit's reach is generally limited to within one-quarter mile to one-half mile of the transit line, or a 10-minute walk. For this reason, the size of a transit travel market is directly related to an area's population density. Typically, a density greater than five people per acre¹ is needed to support base-level (hourly) fixed-route

¹ The TCRP Transit Capacity and Quality of Service Manual suggests 3 households per acre (approximately 6 people per acre) or 4 jobs per acre can support hourly transit service. Figure is based on these findings and the consultant's prior experience with transit service planning.



transit service. **Figures 1 through 4** show the population density of Butler County. Yellow areas indicate places where fixed-route service could be feasible; areas that are orange or red have the potential to support more frequent service.

Butler County at large has low population density unresponsive of traditional fixed-route transit; however, pockets of transit-supportive densities are prominent in the cities of Oxford, Hamilton, Trenton, and Middletown. There is also density outside of Butler County in Springdale where BCRTA currently provides service. Transit supportive densities are concentrated most heavily around:

- Community centers and hospitals in Oxford
- Miami University in Oxford and Hamilton
- Multi-family housing in Trenton and Middletown

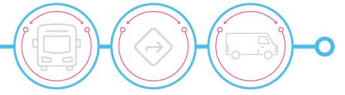
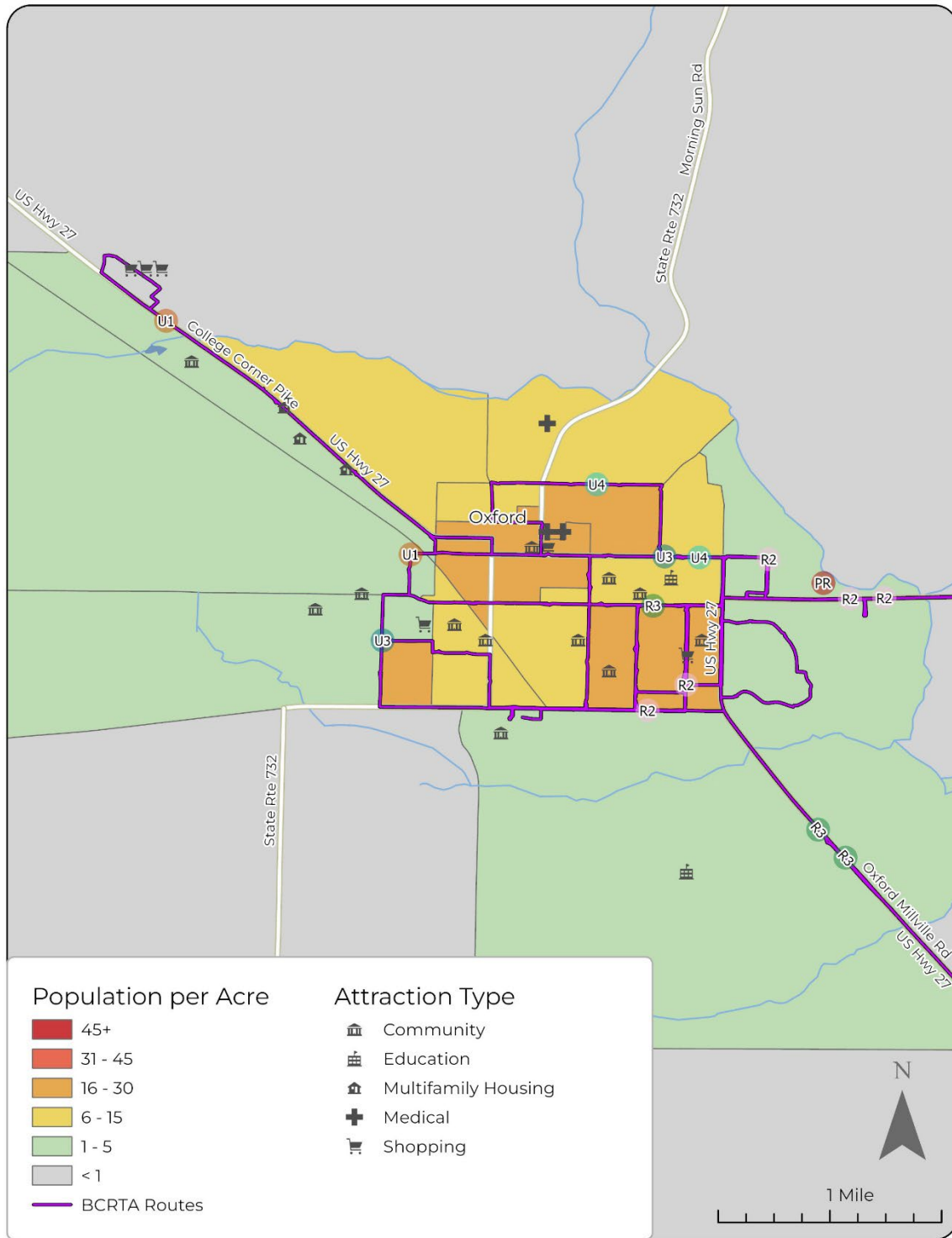


Figure 1 - Oxford Population per Acre



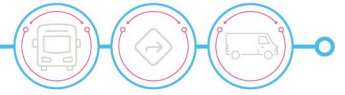
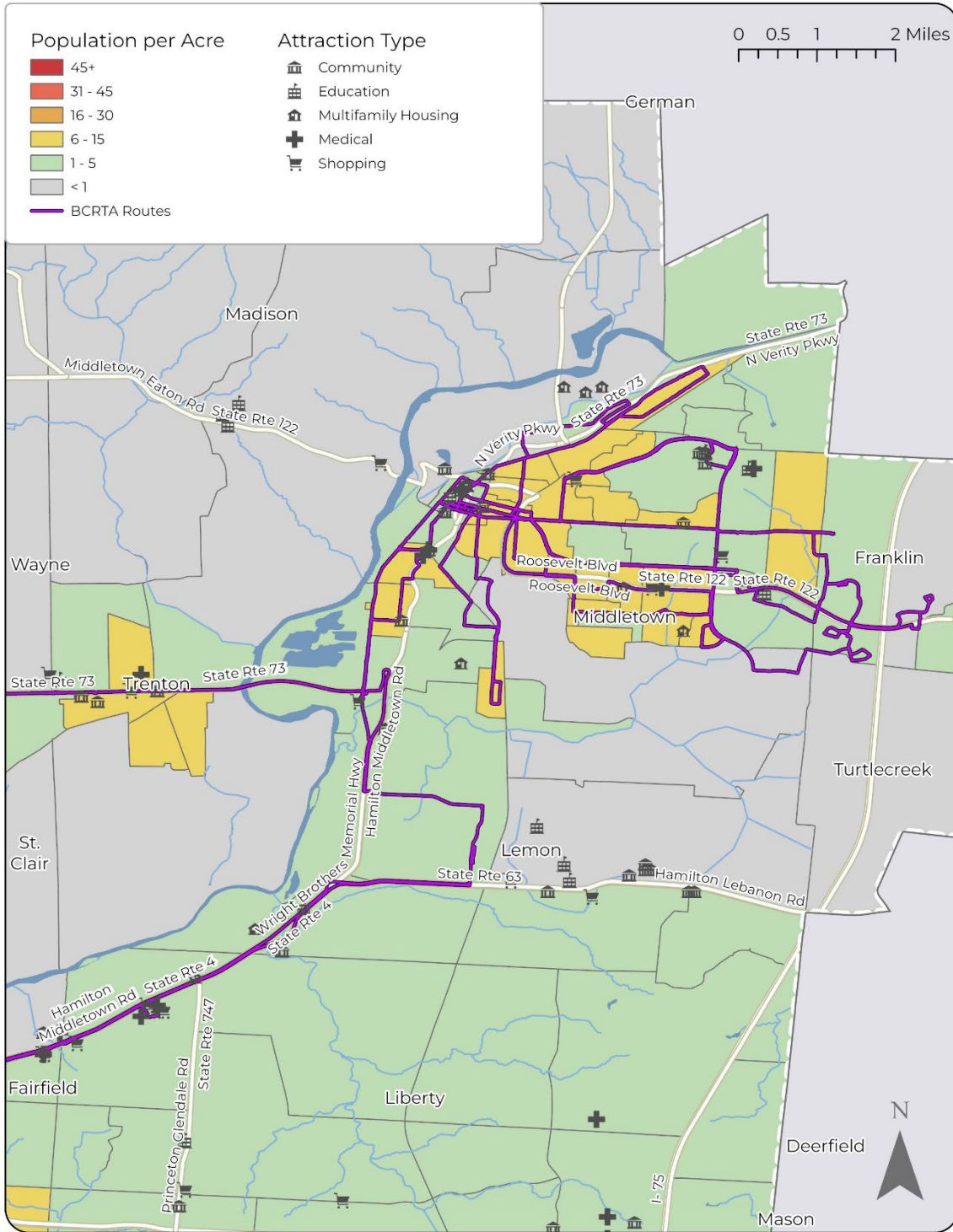


Figure 2 - Middletown Population per Acre



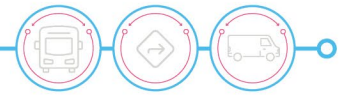
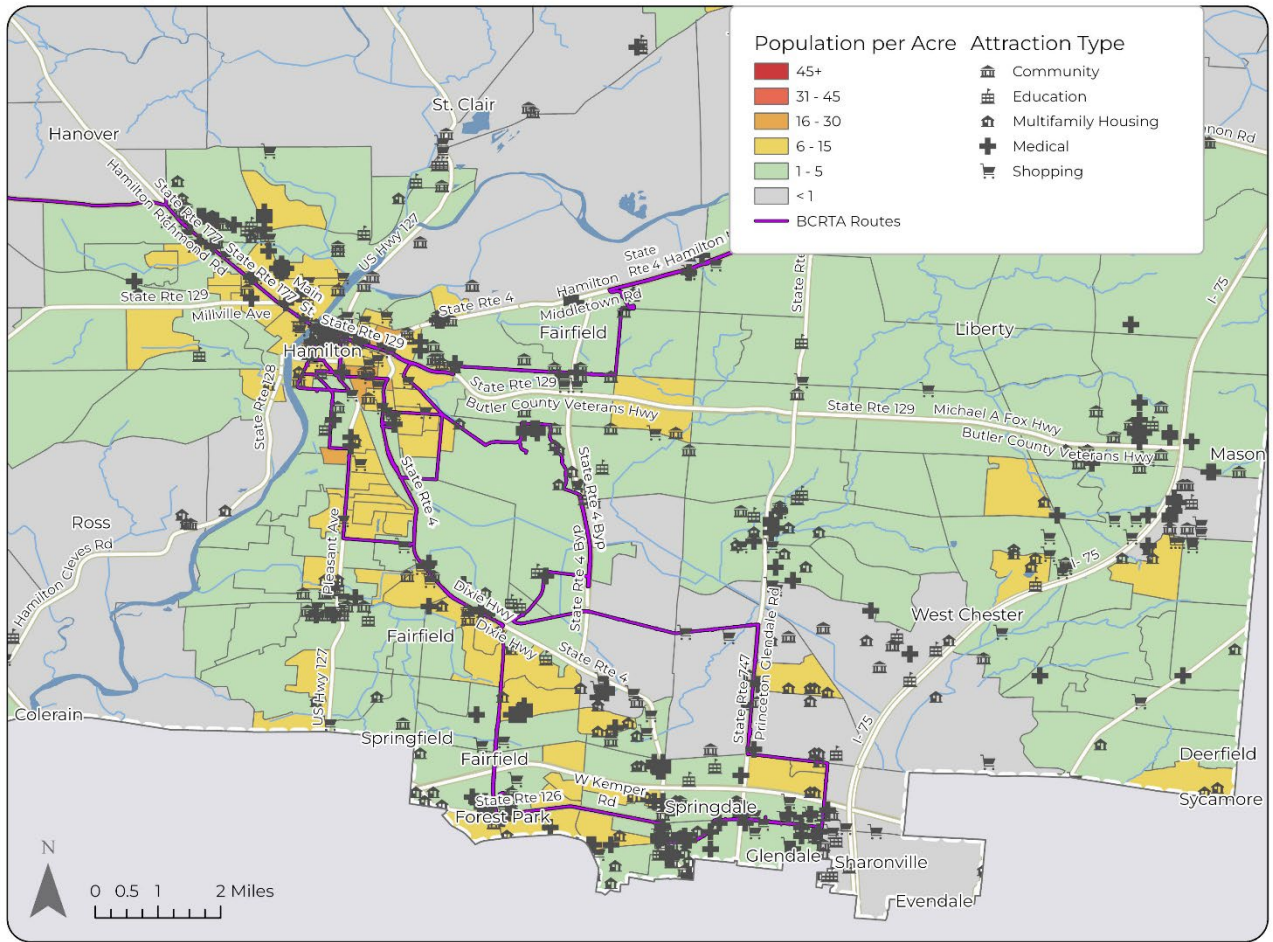


Figure 3 - Hamilton Population per Acre



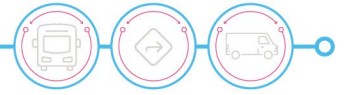
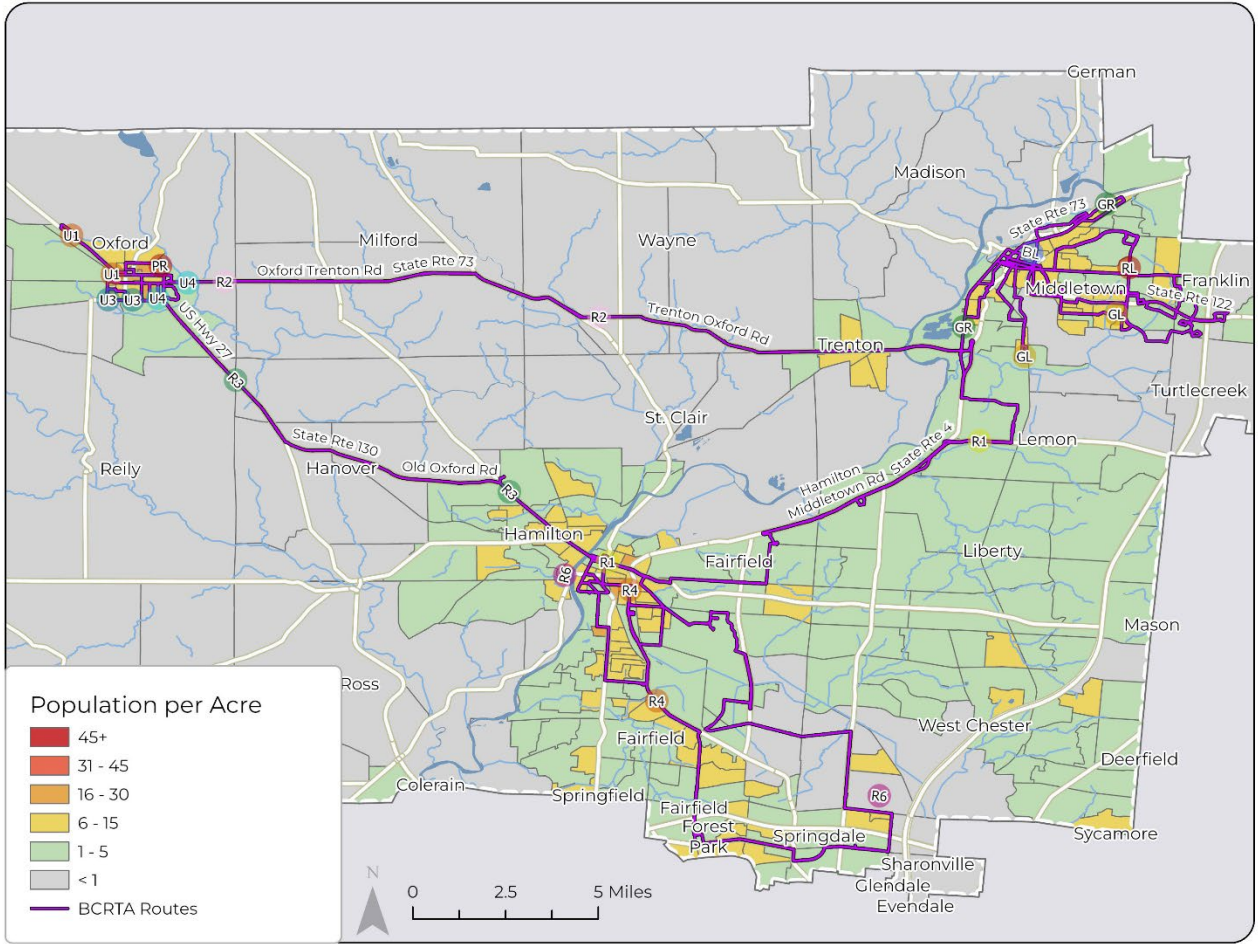
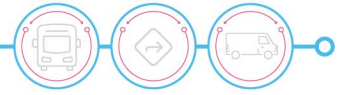


Figure 4 - Countywide Population per Acre





Employment Density

Given that traveling to and from work accounts for the largest single segment of transit trips in most markets, the location and number of jobs in a region are also strong indicators of transit demand. Transit that serves areas of high employment density also provides key connections to job opportunities. Like population density, an employment density greater than five jobs per acre can typically support base-level fixed-route service. This density corresponds with the yellow, orange, and red areas in **Figures 5 through 8**.

In Butler County, job concentration is highest in Oxford, with additional areas of moderate job density in the southeast. Per region concentrations are centered around:

- Miami University in Oxford
- West Chester west of I-75
- Hamilton on High Street near the Great Miami River
- The Tri-County Mall and surrounding shopping centers in Springdale

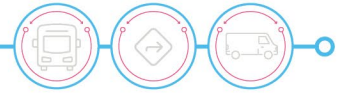
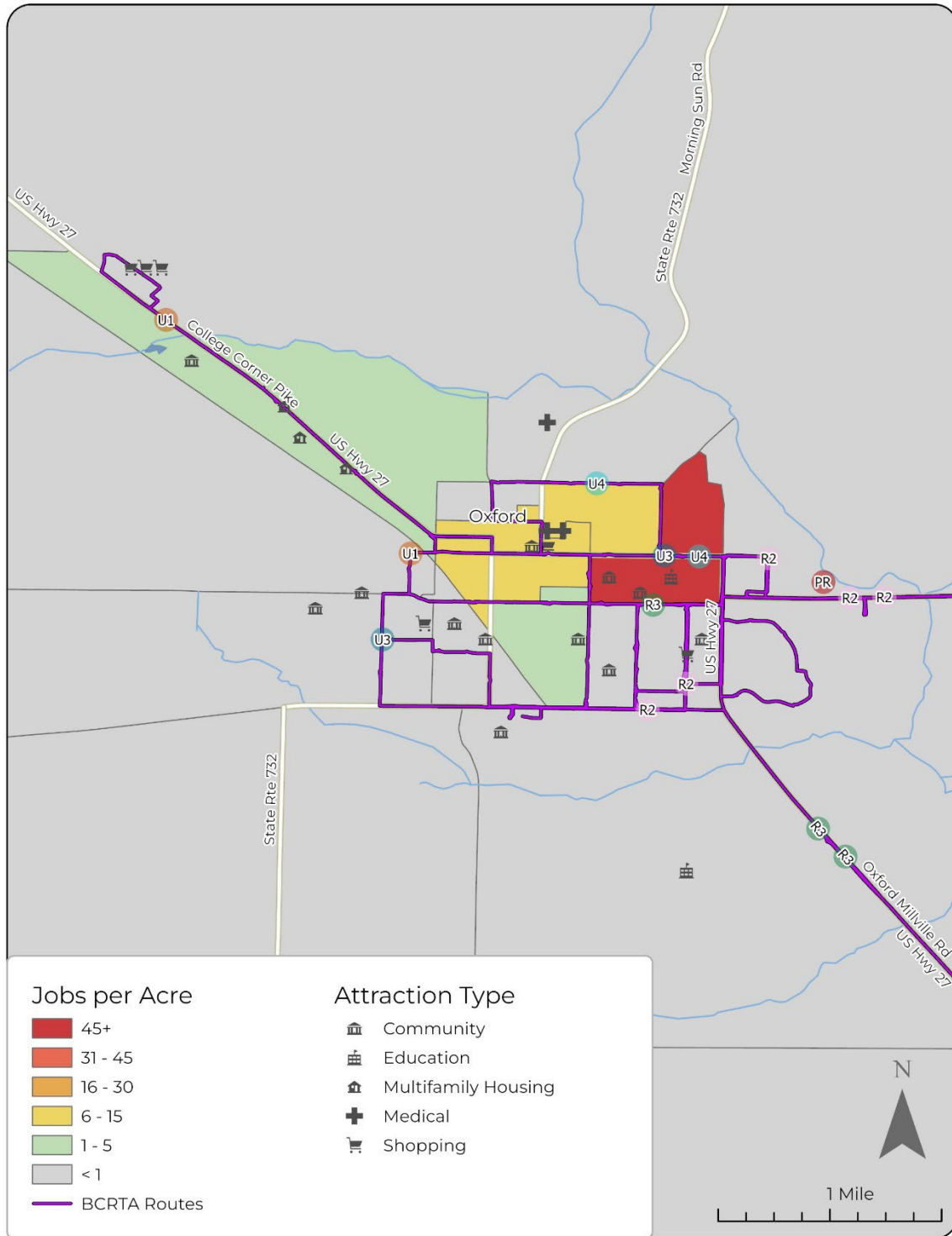


Figure 5 - Oxford Jobs per Acre



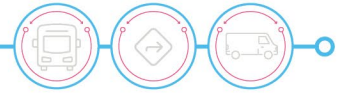
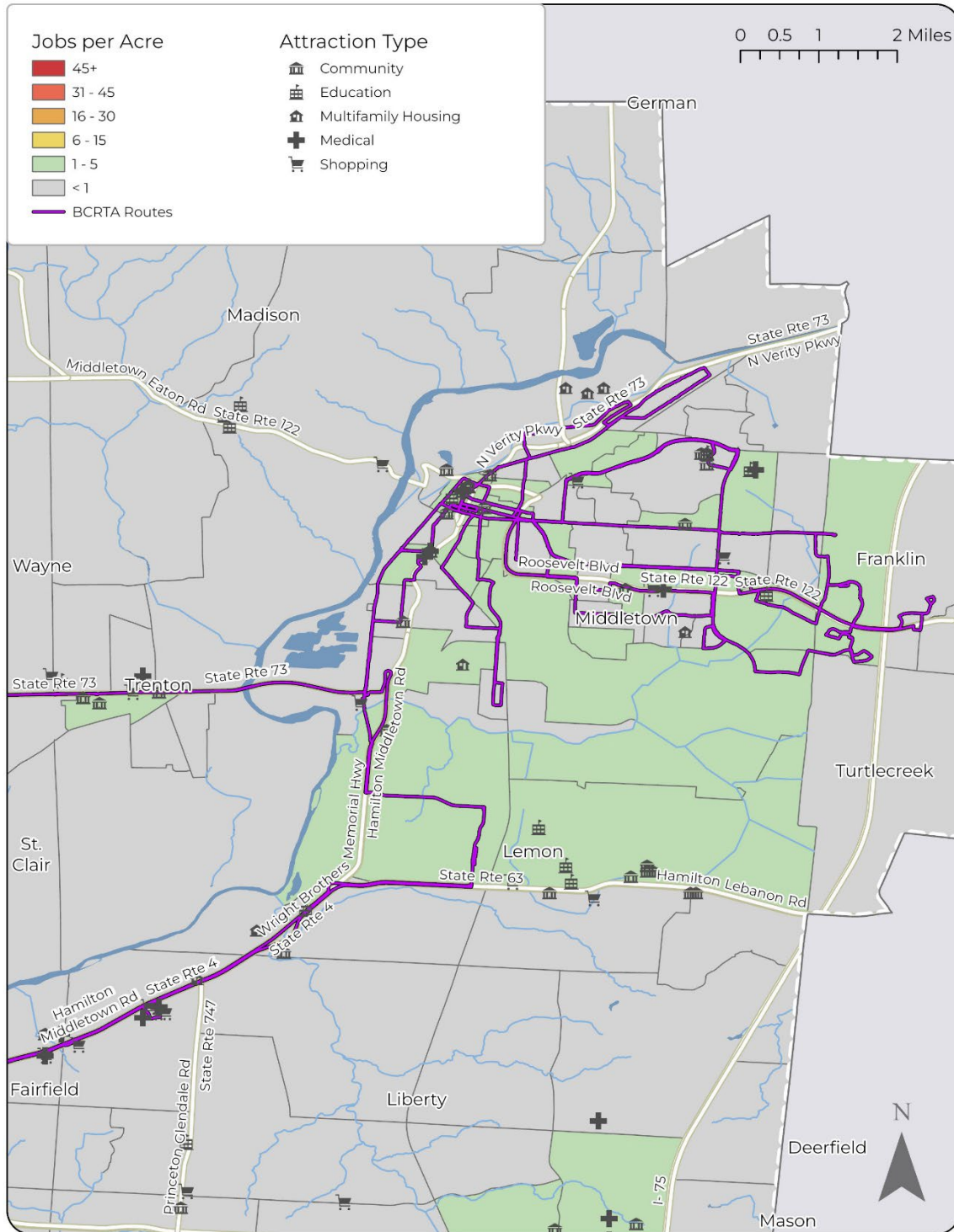


Figure 6 - Middletown Jobs per Acre



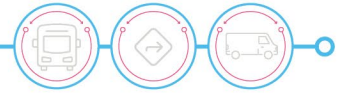
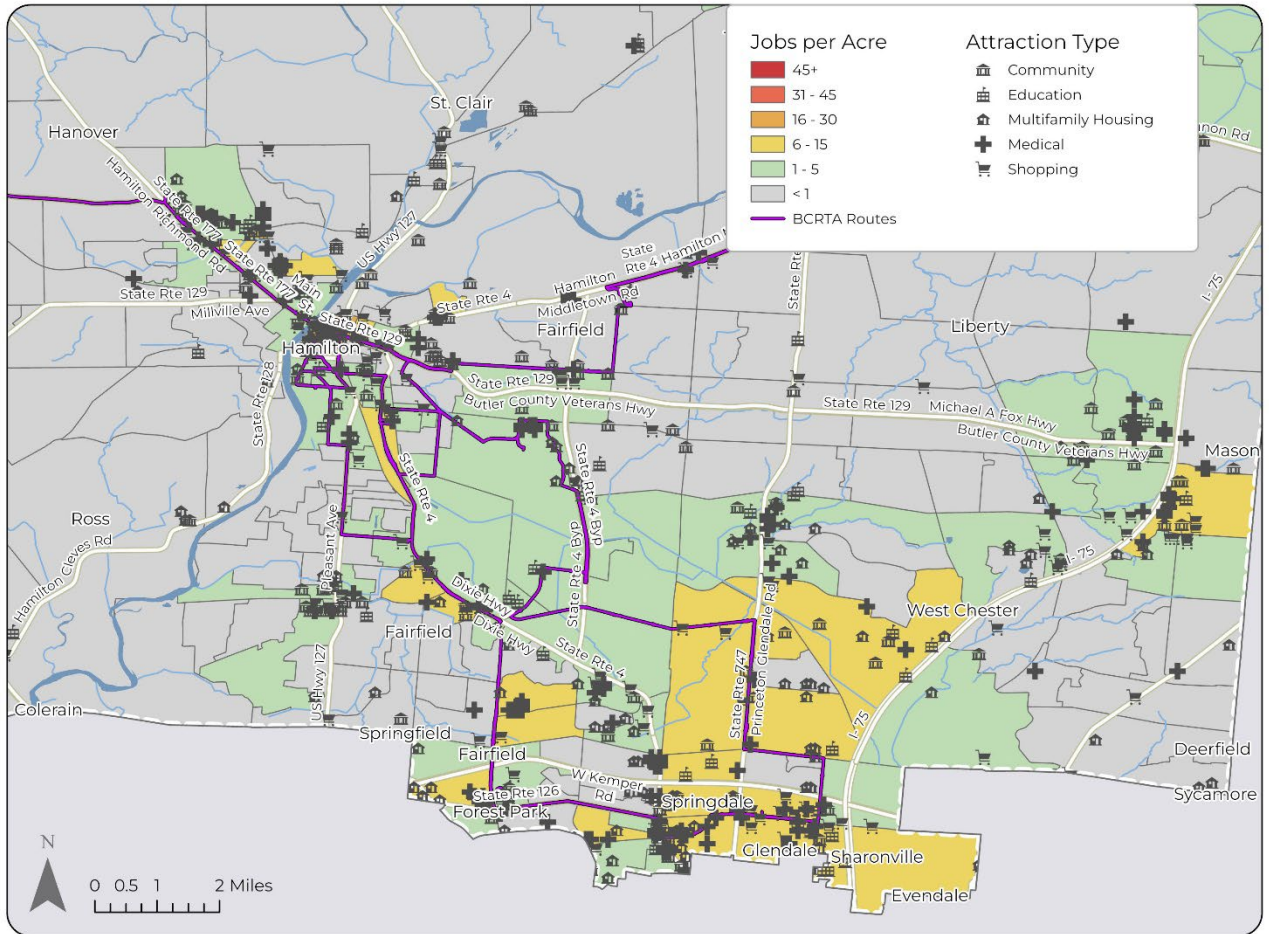


Figure 7 - Hamilton Jobs per Acre



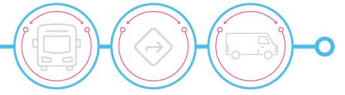
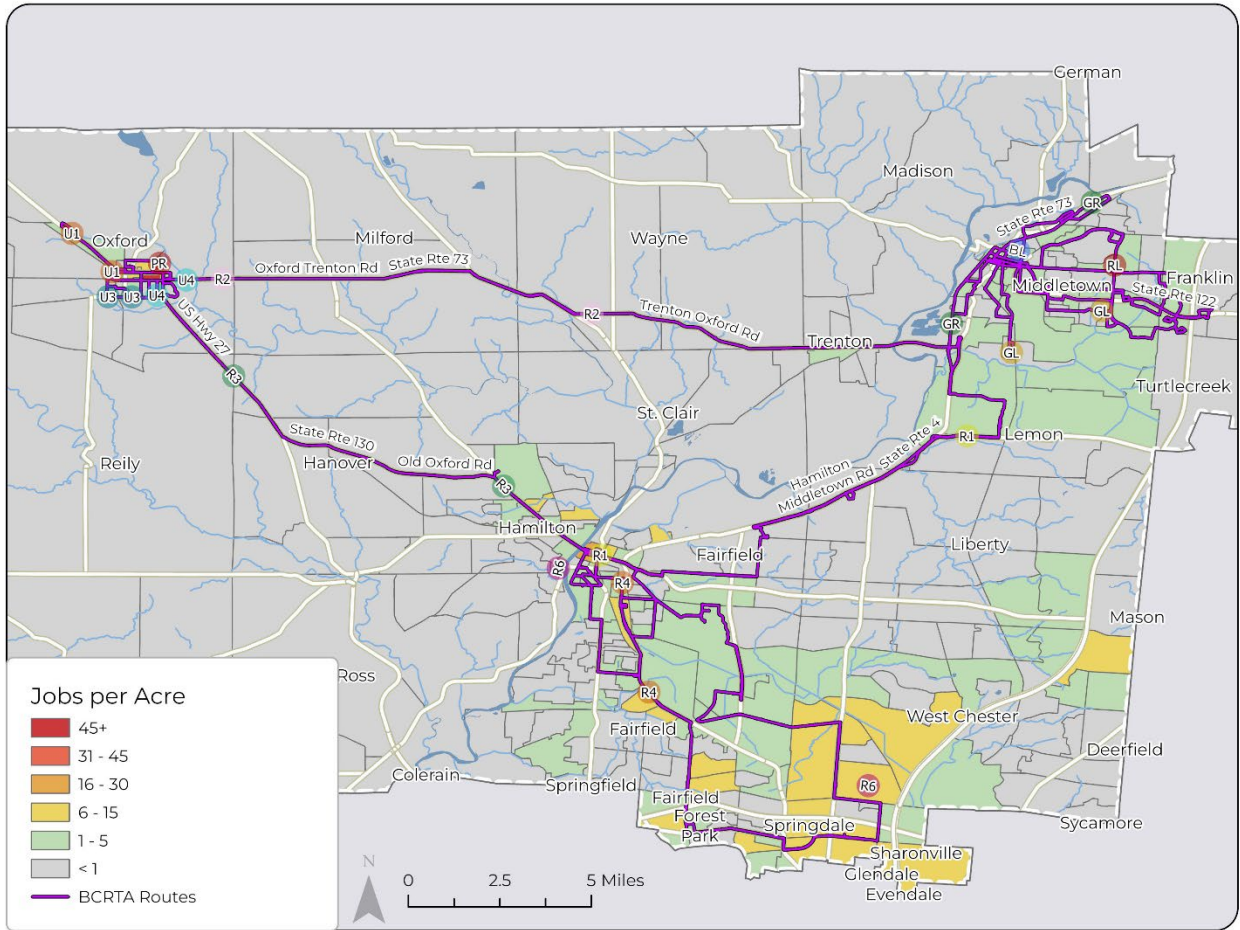
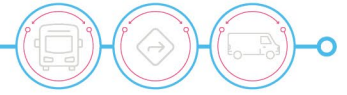


Figure 8 - Countywide Jobs per Acre





Transit Potential

Transit Potential, depicted in **Figures 9 through 12**, combines the population and employment densities for each block group shown previously to indicate fixed-route service viability in the study area.

In Butler County, the areas of highest transit potential are concentrated in Oxford. There are areas of moderate concentrations in Hamilton, and Middletown, and north of Springdale. These places also stood out as areas with high concentrations of jobs or population in the previous sections. When combining the two metrics, however, many more places appear to be potentially supportive of fixed-route transit services, most notably West Chester Township along US-75, where there are high concentrations of medical services, community services, and housing. While West Chester does not have a sufficiently high Transit Potential to accommodate high-frequency service, microtransit or limited trips to connect other regions in Butler County to this area can provide connectivity and increase mobility.

Additional factors, such as land use and intersection density, can impact the feasibility of fixed-route transit services. Many of the yellow areas on the maps in **Figures 9 through 12**, such as some neighborhoods in Middletown, have transit-supportive population and employment densities but may still be inefficient for fixed-route services. In areas like these, it is worth considering other interventions, such as on-demand microtransit, to provide efficient service.

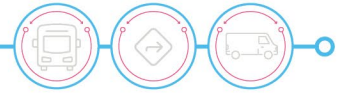
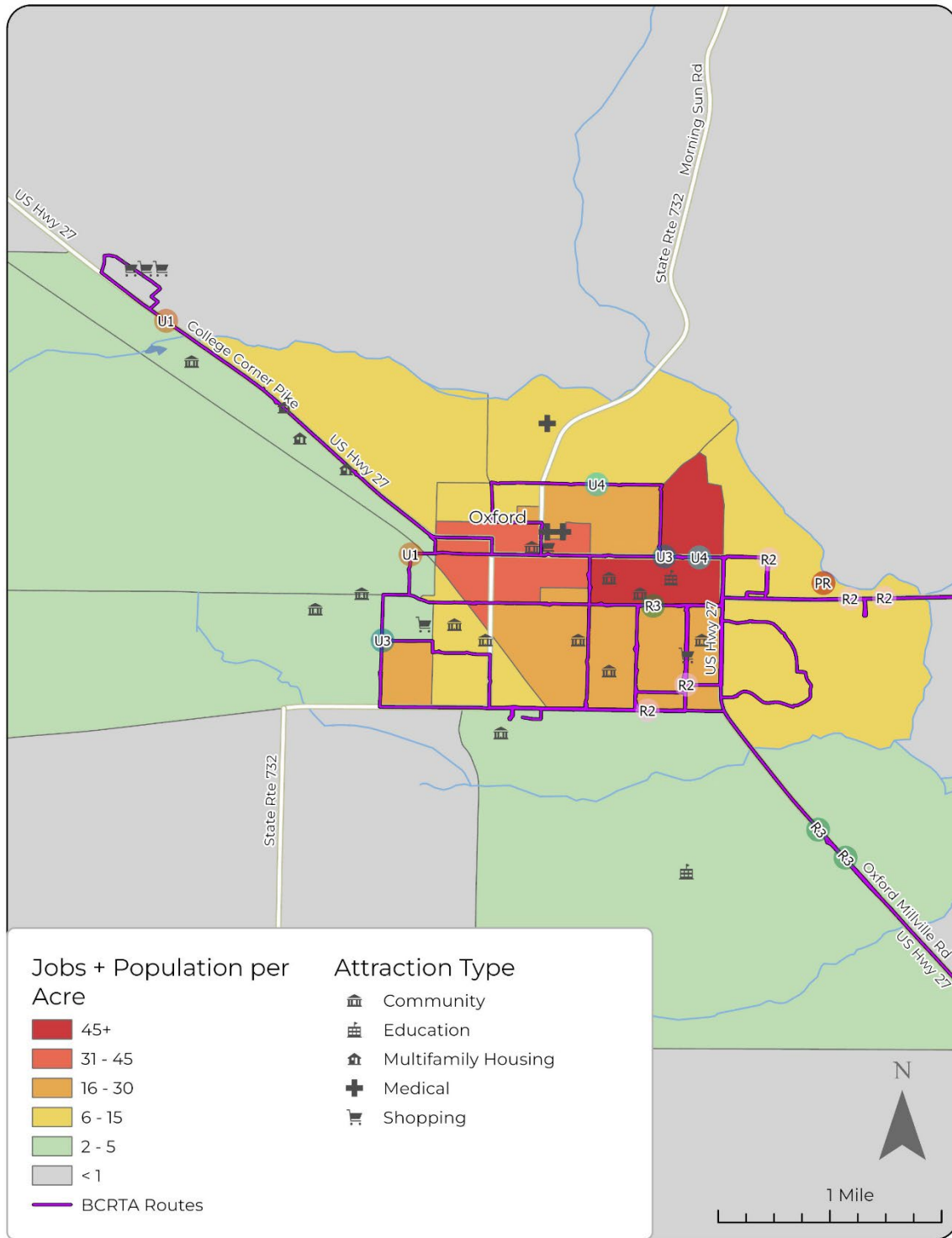


Figure 9 - Oxford Transit Potential



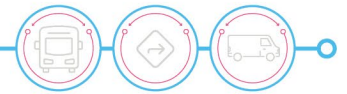
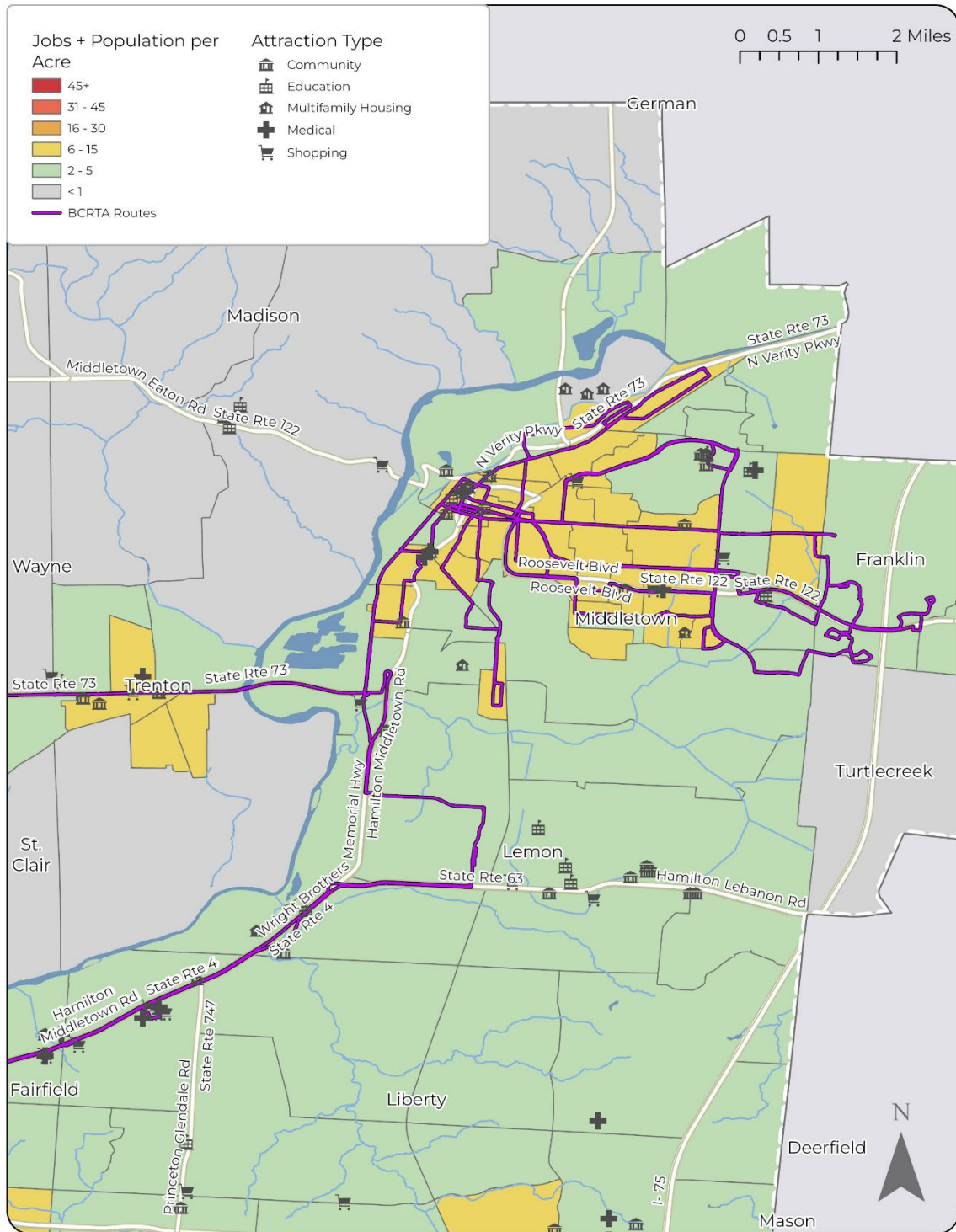


Figure 10 - Middletown Transit Potential



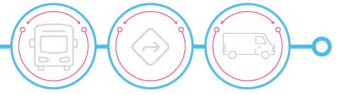
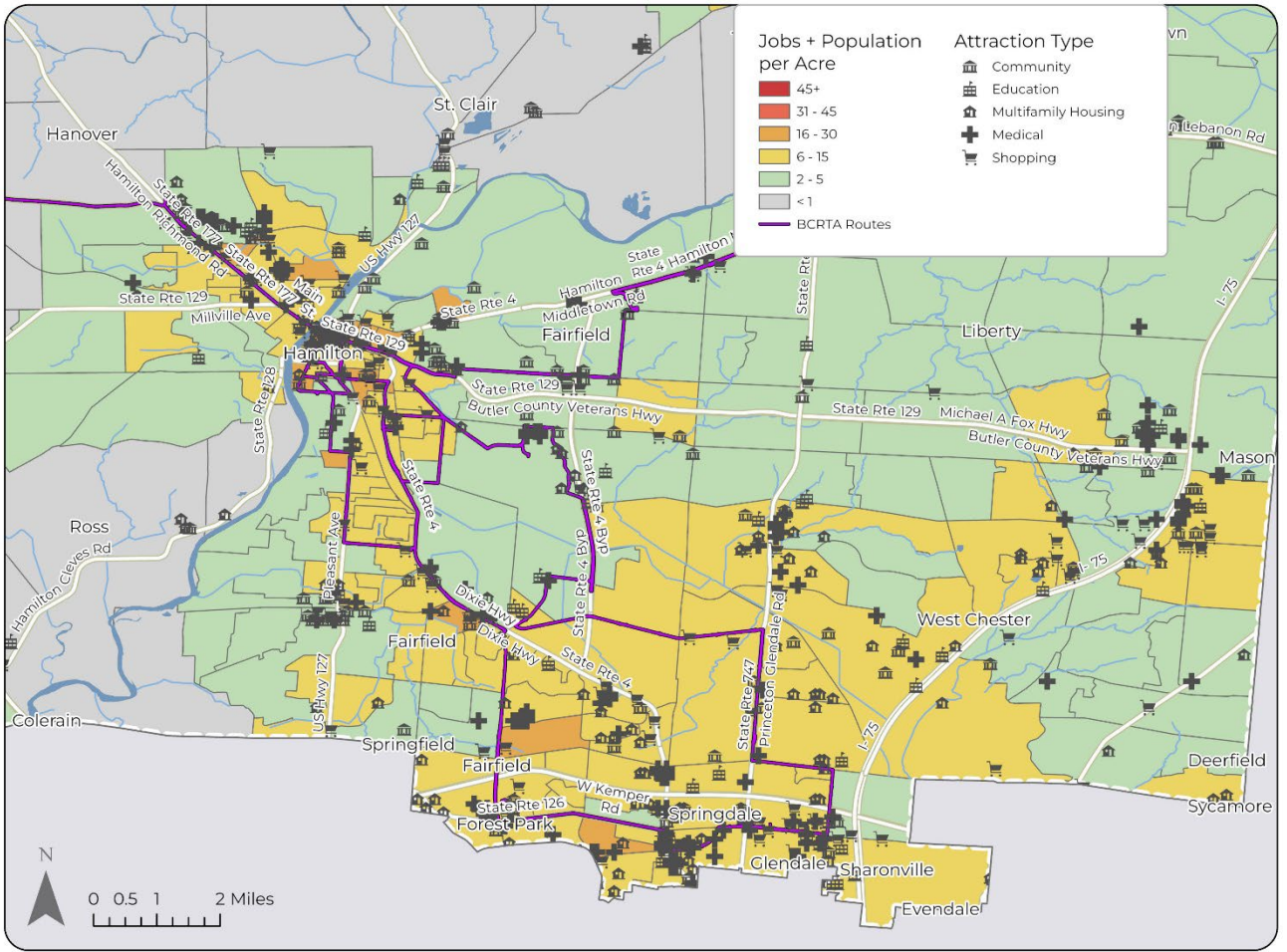


Figure 11 - Hamilton Transit Potential



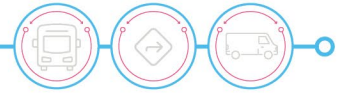
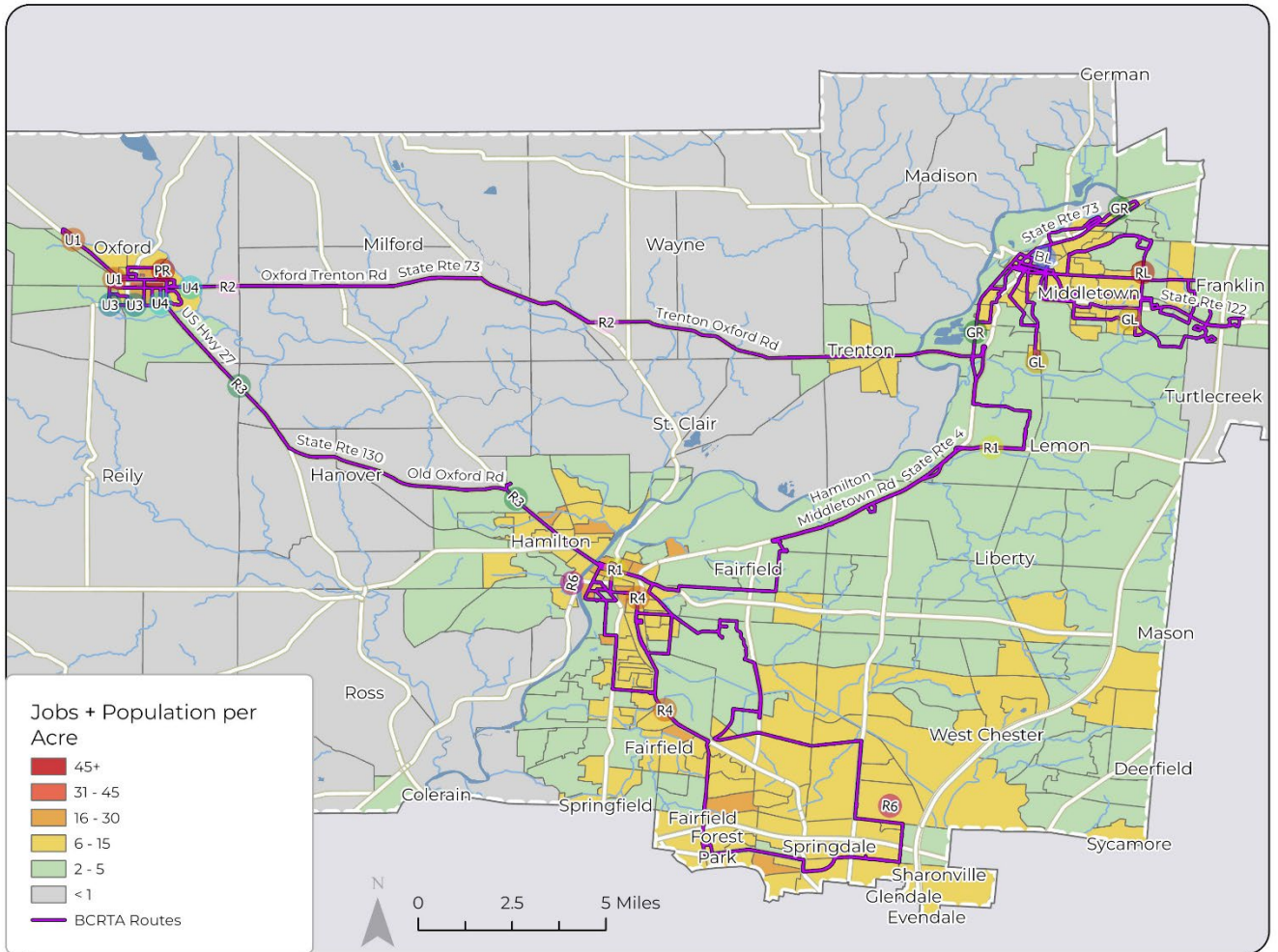
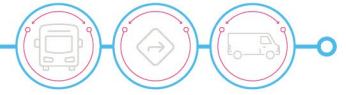


Figure 12 - Countywide Transit Potential





Transit Need

Above all, public transportation is a mobility tool. Certain population subgroups have a relatively higher propensity to use transit as their primary means of local and regional transportation. These groups include:

- People without access to an automobile, whether it be by choice or due to financial or legal reasons, often have no other transportation options besides using transit.
- Persons with disabilities, many of whom cannot drive and/or have difficulty driving.
- Low-income individuals, typically because transit is less expensive than owning and operating a car.
- Youth and Young adults is defined as persons from age 15 to 24. This group has in recent years shown a greater interest in transit, walking, and biking than in driving.
- Older adults, who as they age, often become less comfortable or less able to operate a vehicle.

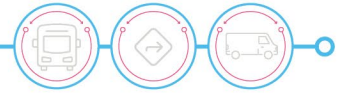
The maps in this section show the relative densities of each of these five high-transit-propensity population subgroups by Census block groups in Butler County to help determine where the need for transit service is greatest.

With density ranges differing for each demographic analysis, the maps utilize a Jenks Natural Breaks classification method to assign each block group to one of five density categories. For each analysis, depending on the natural break category into which it falls, a score from 1 (lowest density) to 5 (highest density) is assigned to each block group. Following the analysis of each individual factor, the Transit Need Index map (**Figure 15**) shows the composite Transit Need score for each block group based on the sum of its scores in each preceding analysis. For example, if a block group falls in the highest density category for each of the five demographic analyses, it will end up with a Transit Need Index value of 25 (5+5+5+5+5). The lowest possible Transit Need Index score is 5 (1+1+1+1+1).

While the Transit Potential analysis highlights areas of Butler County with actual densities to support fixed-route service, Transit Need is a relative measure that estimates the need for transit compared to other block groups. There is not, however, a specific Transit Need Index score or value that represents a threshold for supporting fixed-route service. Instead, Transit Need should be considered alongside Transit Potential. If two areas have similar and sufficient Transit Potential, the area with higher Transit Need should be prioritized for service. Conversely, in some locations, while the density of transit-dependent population groups may be relatively high, if the total population and/or employment density are still quite low, the potential to generate substantial fixed-route transit ridership will also remain low.

Zero-Vehicle Household Density

Figures 13 through 16 show zero-vehicle household density throughout Butler County.



Zero-vehicle households have concentrations in a few notable areas:

- Oxford along West Chestnut Street
- Hamilton on State Routes 128, 129, and 1277

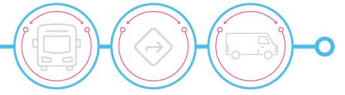
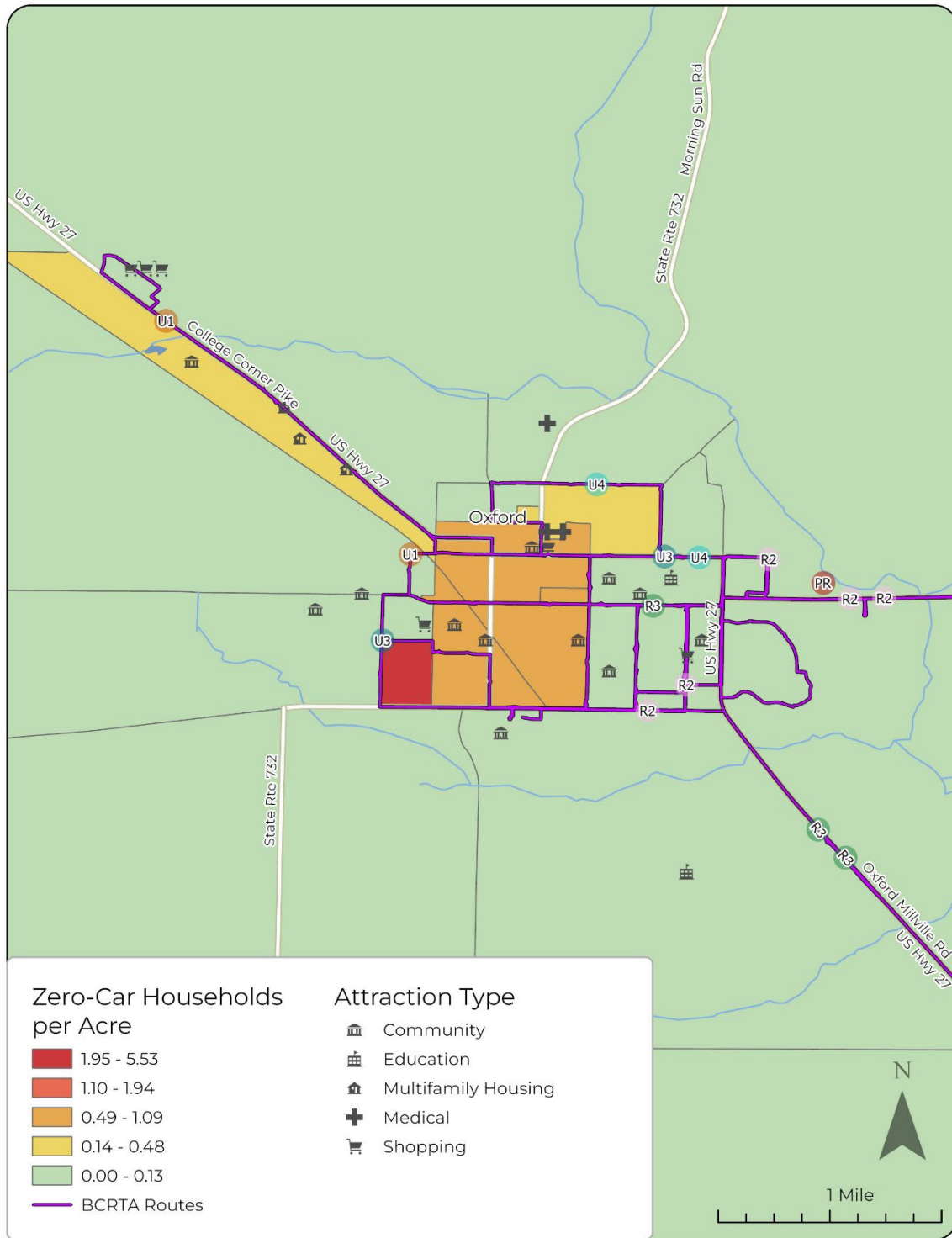


Figure 13 - Oxford Zero-Car Households



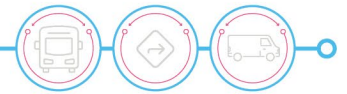
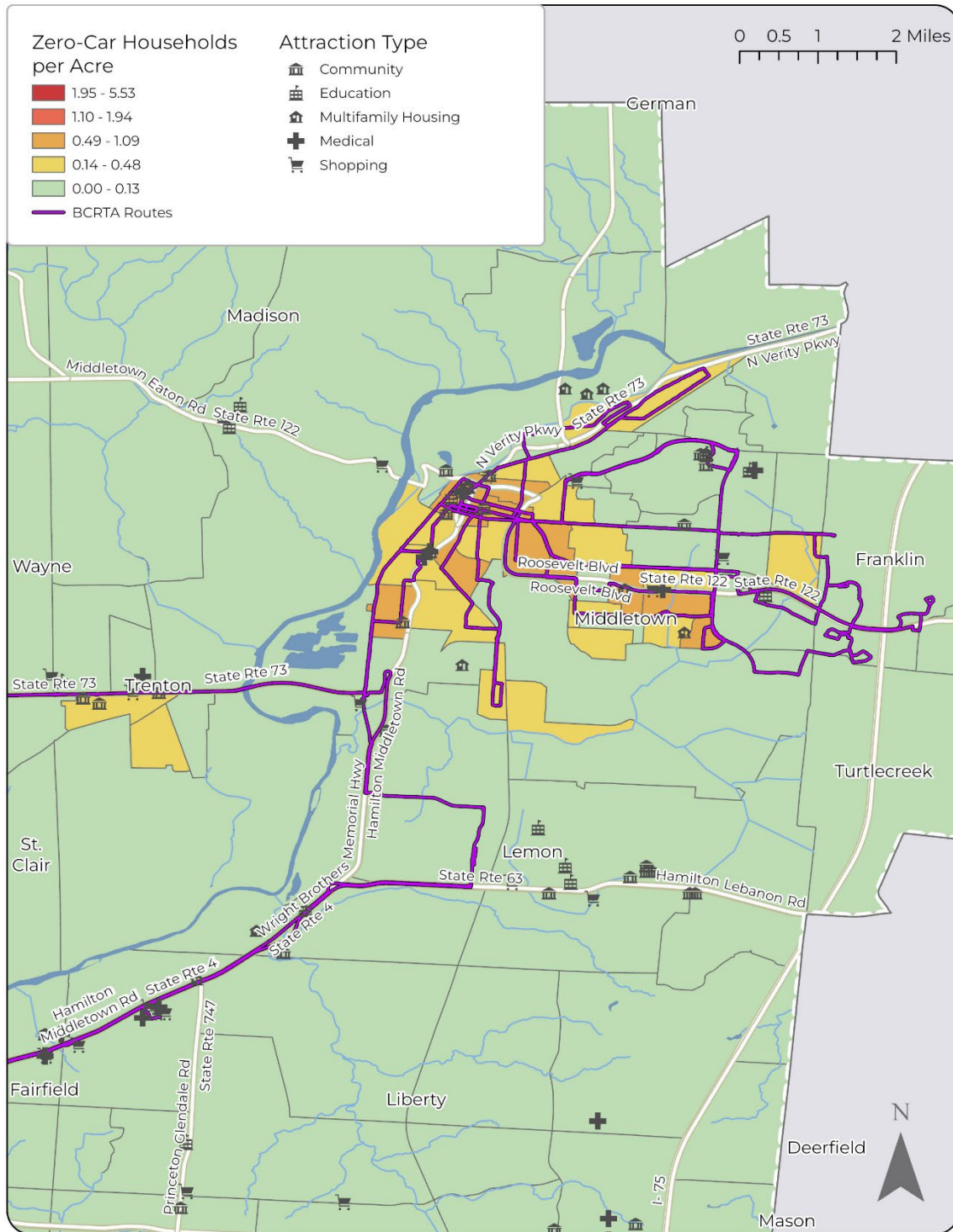


Figure 14 - Middletown Zero-Car Households



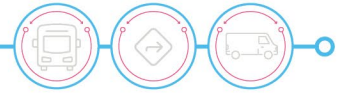
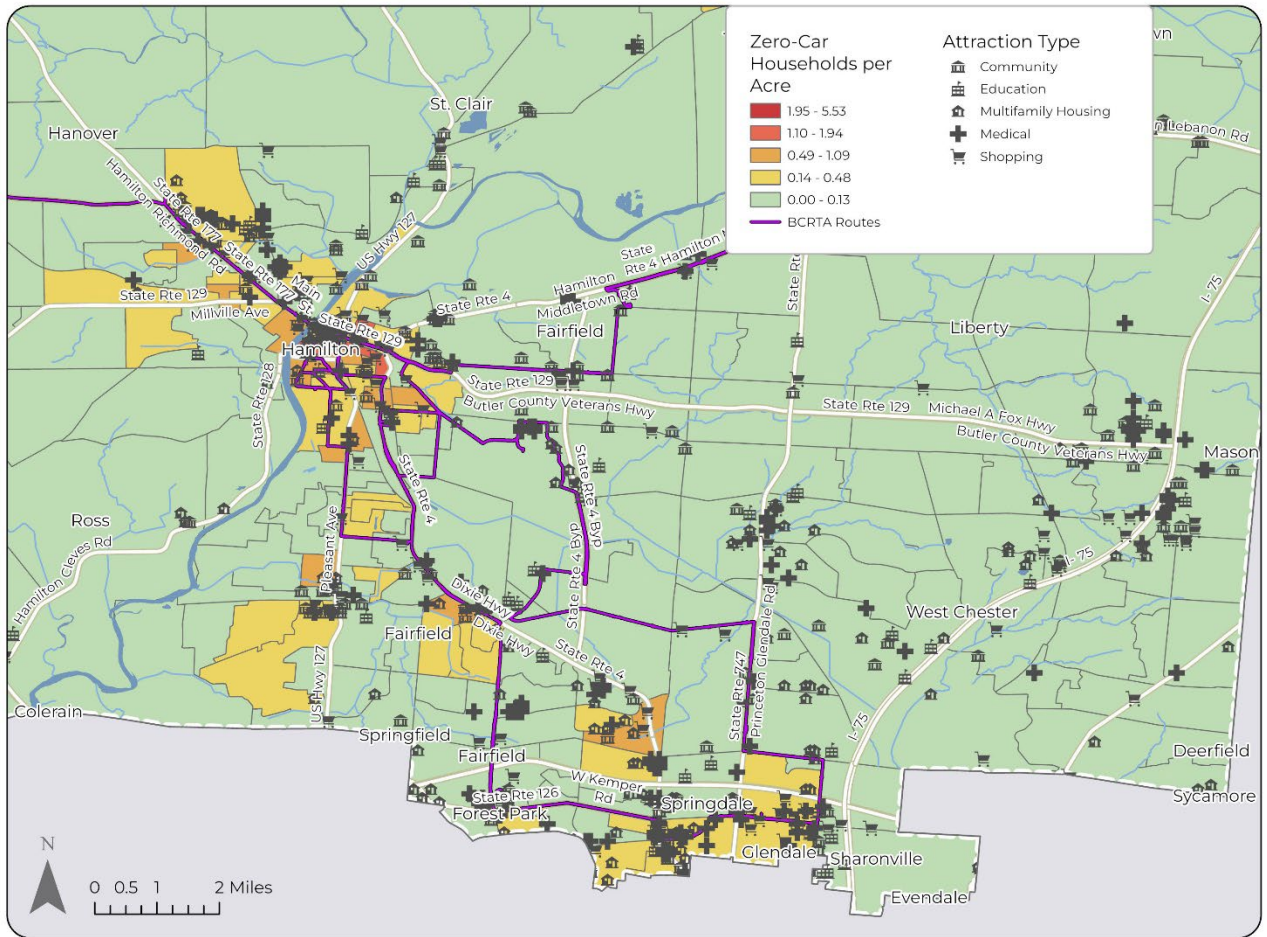


Figure 15 - Hamilton Zero-Car Households



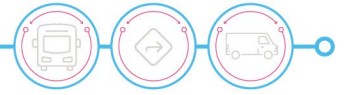
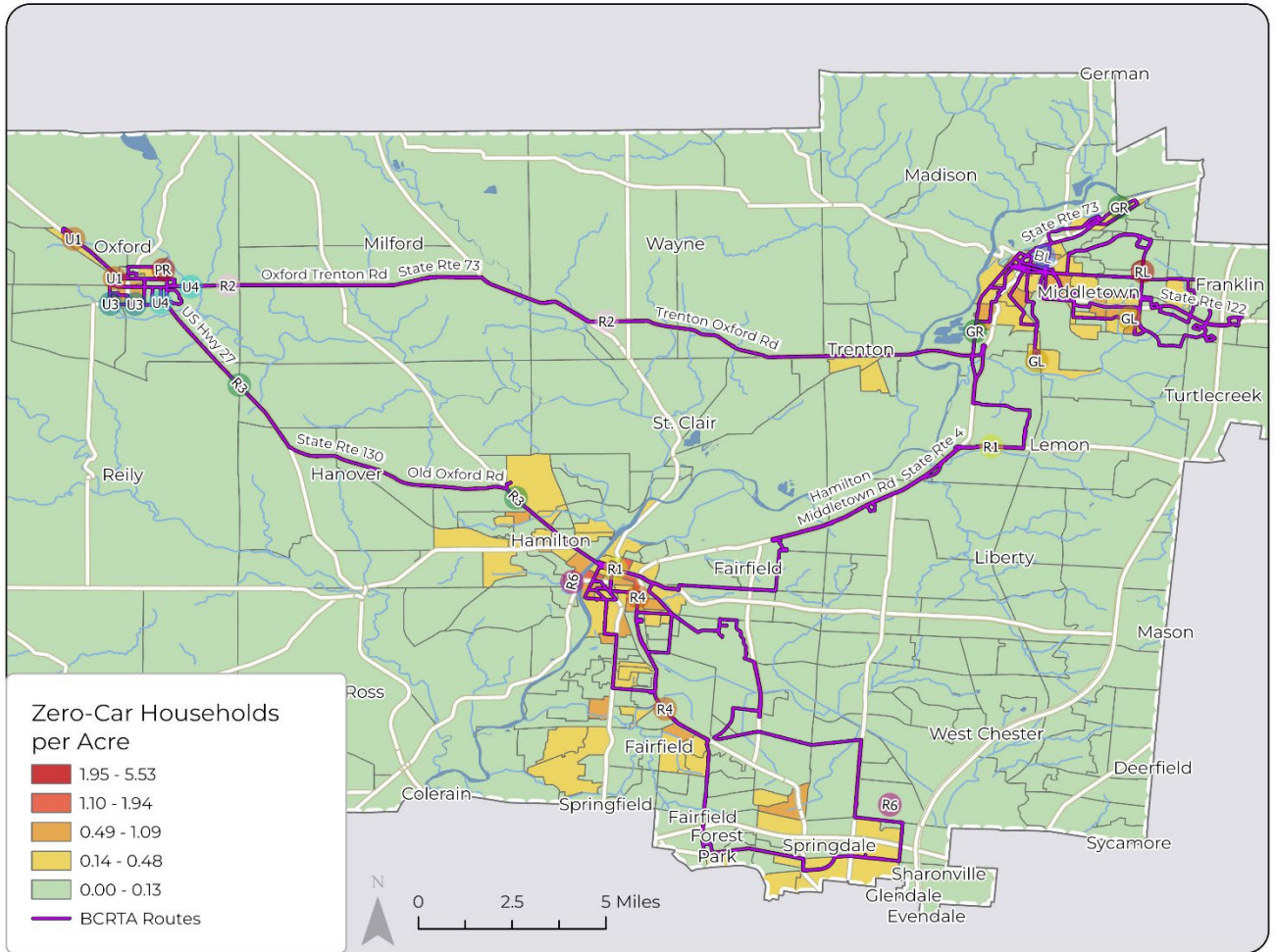
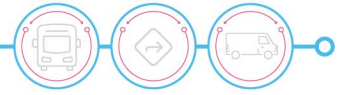


Figure 16 - Countywide Zero-Car Households





Population with Disabilities Density

Figures 17 through 20 show the density of people living with a disability. The highest concentrations of people with a disability are found in Middletown and Hamilton. There is also an area of moderate density in southwest West Chester. Of particular focus are:

- Hamilton on US Highway 127, and Hancock Ave
- Middletown along State Route 122

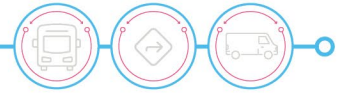
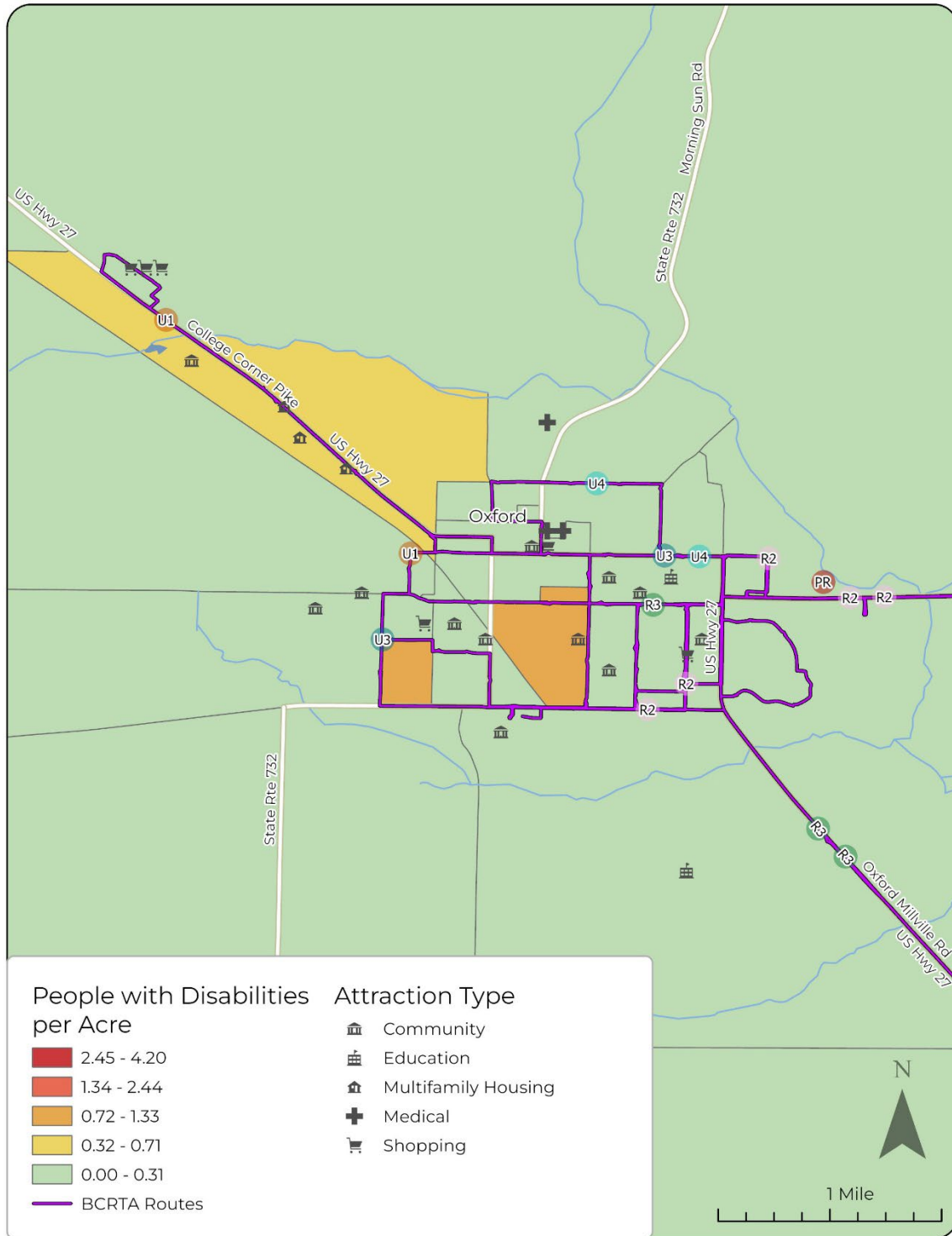


Figure 17 - Oxford People with Disabilities per Acre



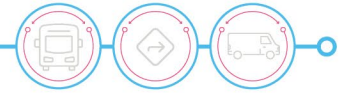
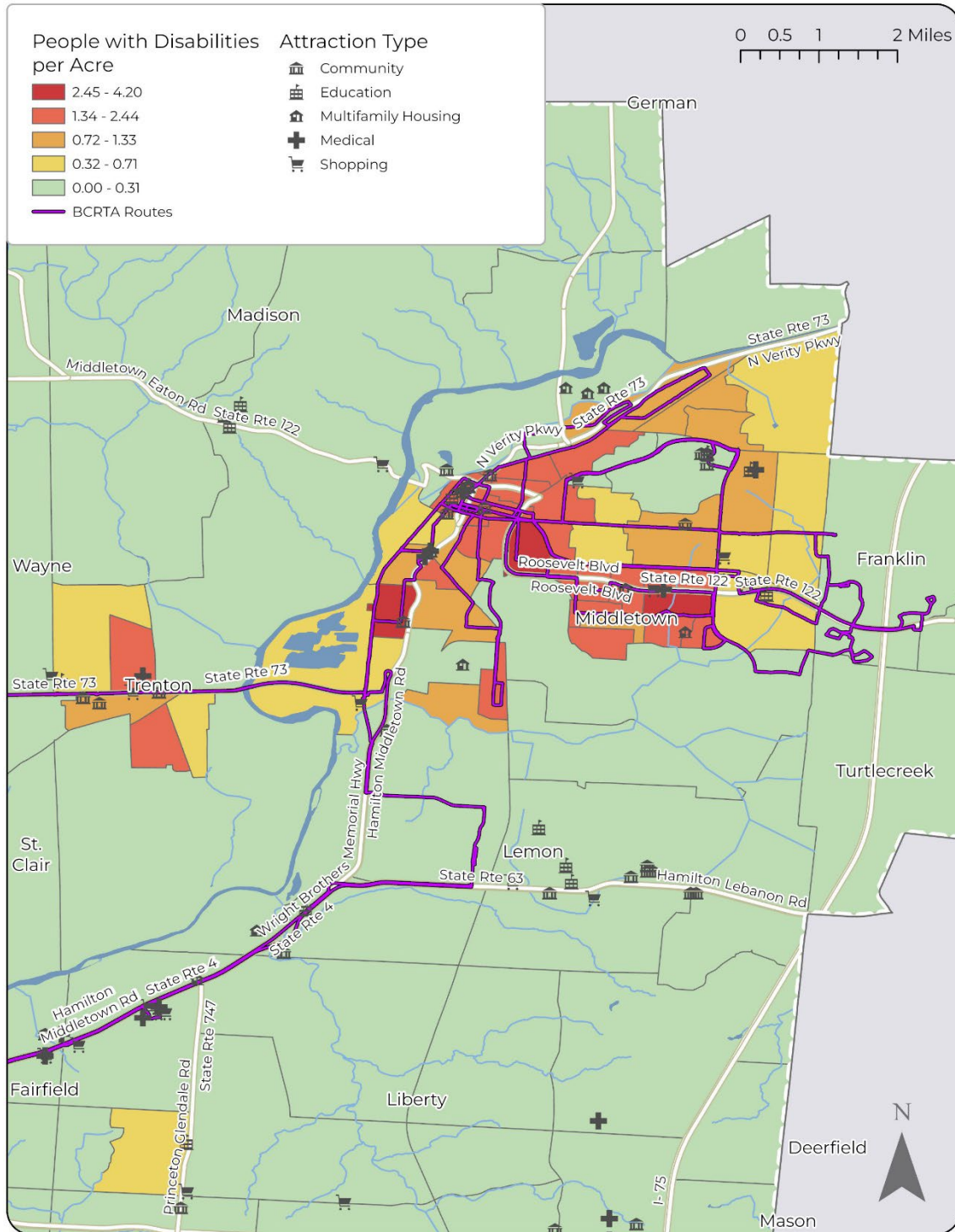


Figure 18 - Middletown People with Disabilities per Acre



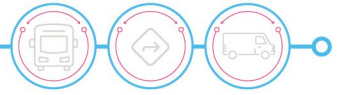
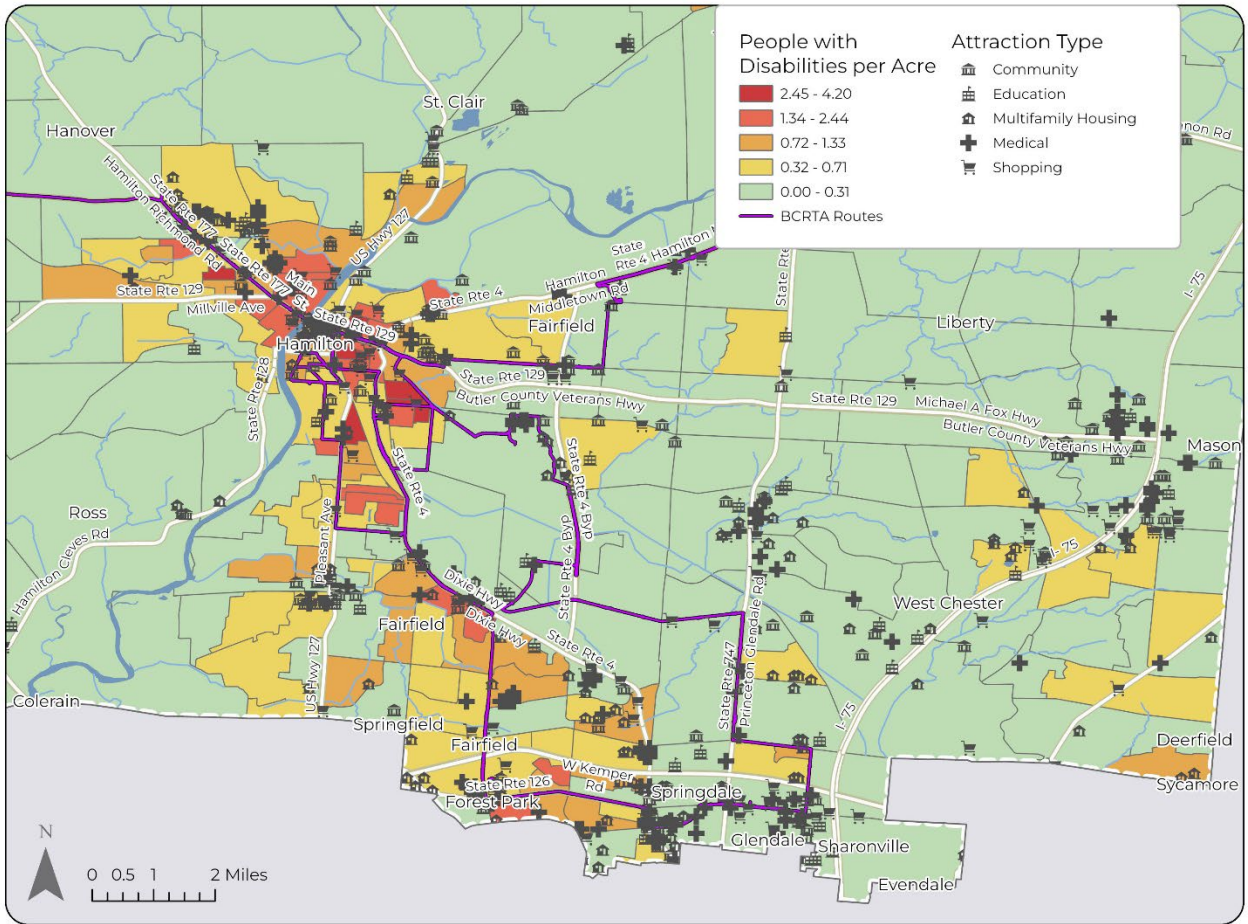
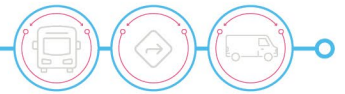


Figure 19 - Hamilton People with Disabilities per Acre





Low-Income Population Density

Figures 21 through 24 show the density of low-income households throughout Butler County. Low-income households are defined as those earning less than 150 percent of the federal poverty line.

Low-income was measured as a household income of less than 150% of the Federal poverty level. Low-income clusters were found in:

- Oxford, near State Route 732 and High Street
- Hamilton near High Street
- Middletown near State Routes 4 and 122

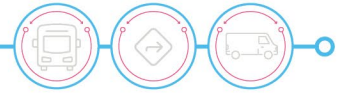
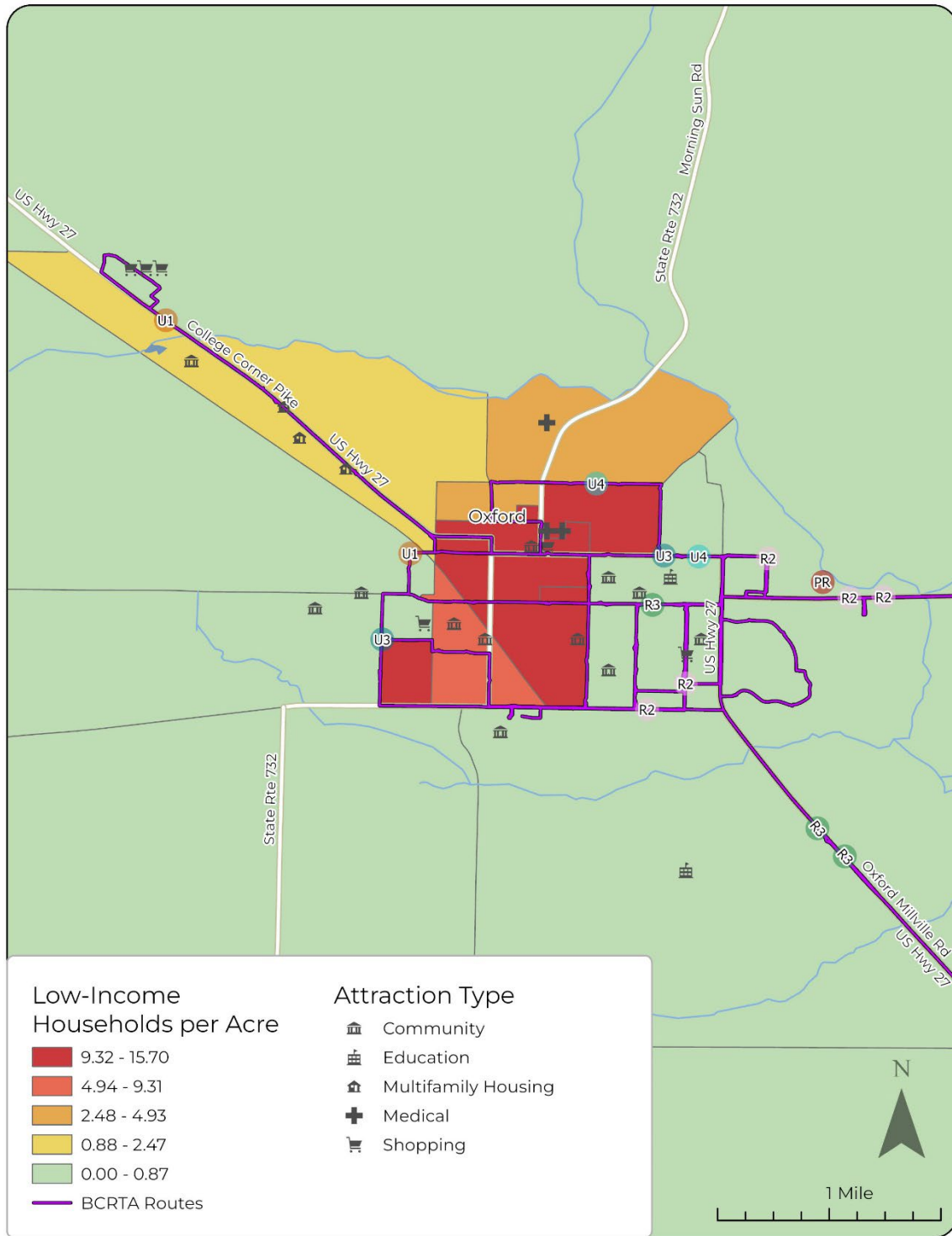


Figure 21 - Oxford Low-Income Households per Acre



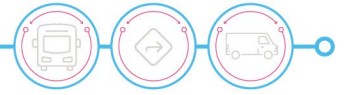
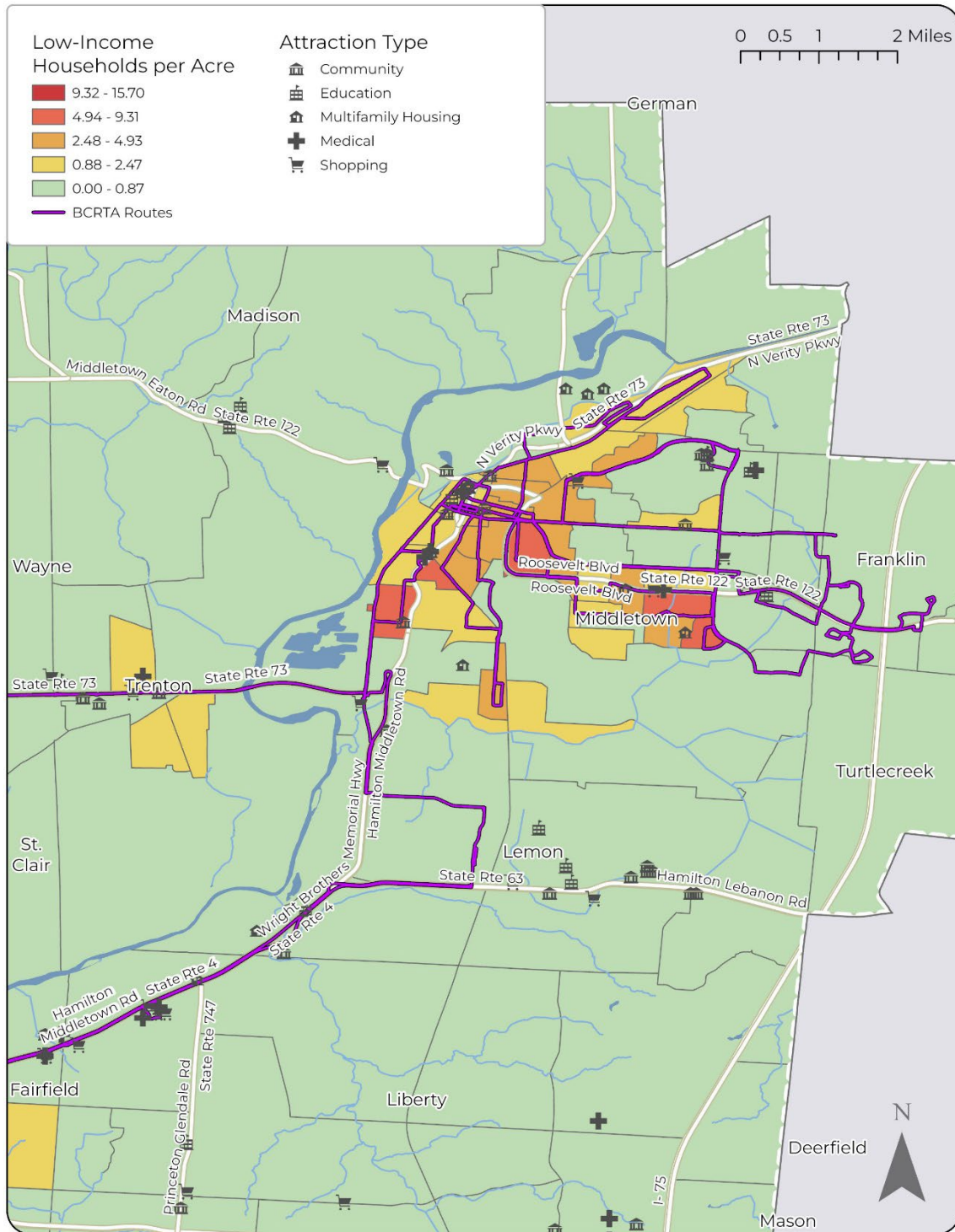


Figure 22 - Middletown Low-Income per Acre



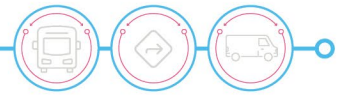
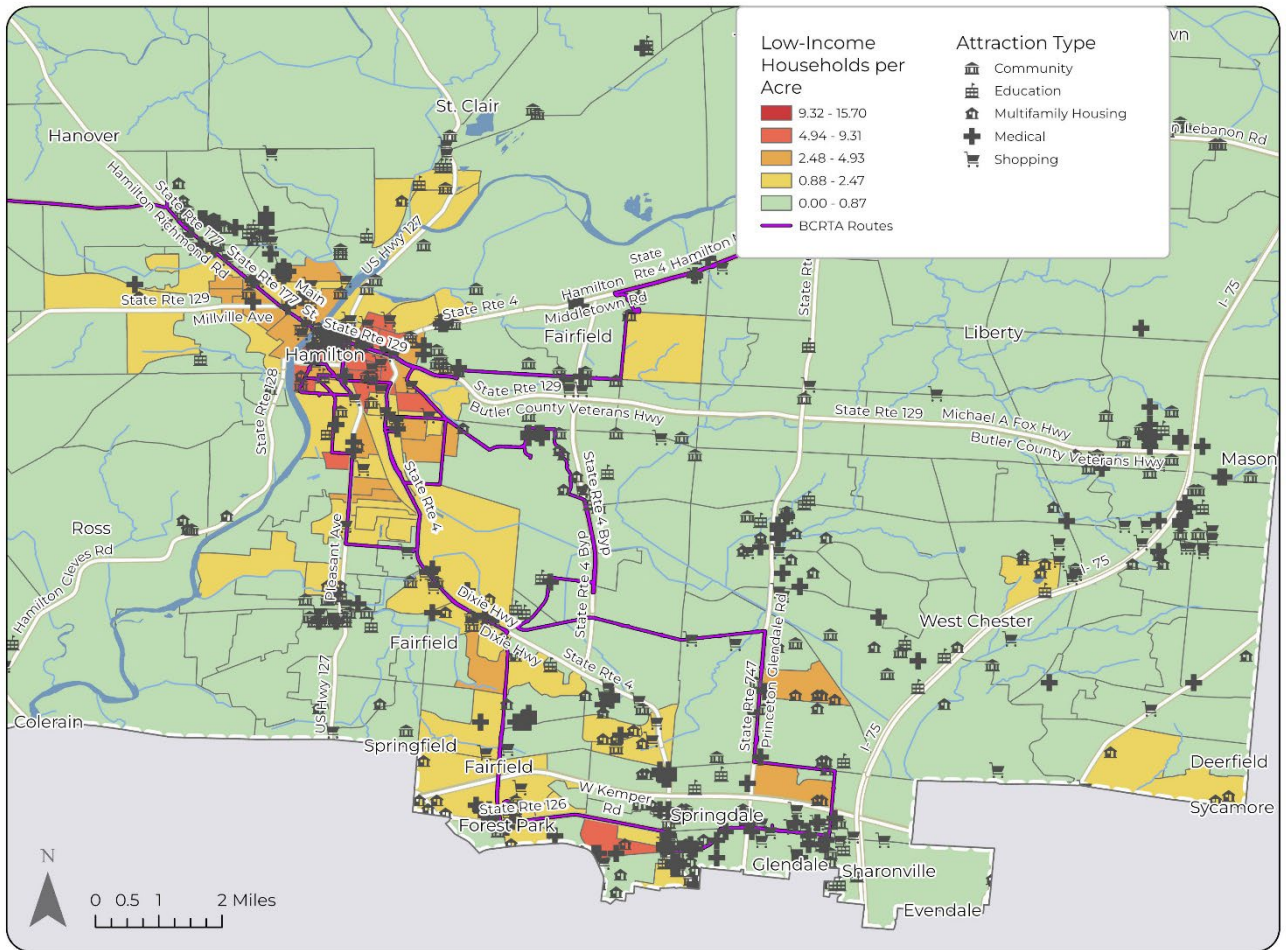


Figure 23 - Hamilton Low-Income per Acre



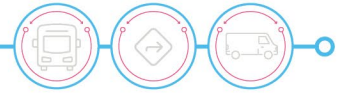
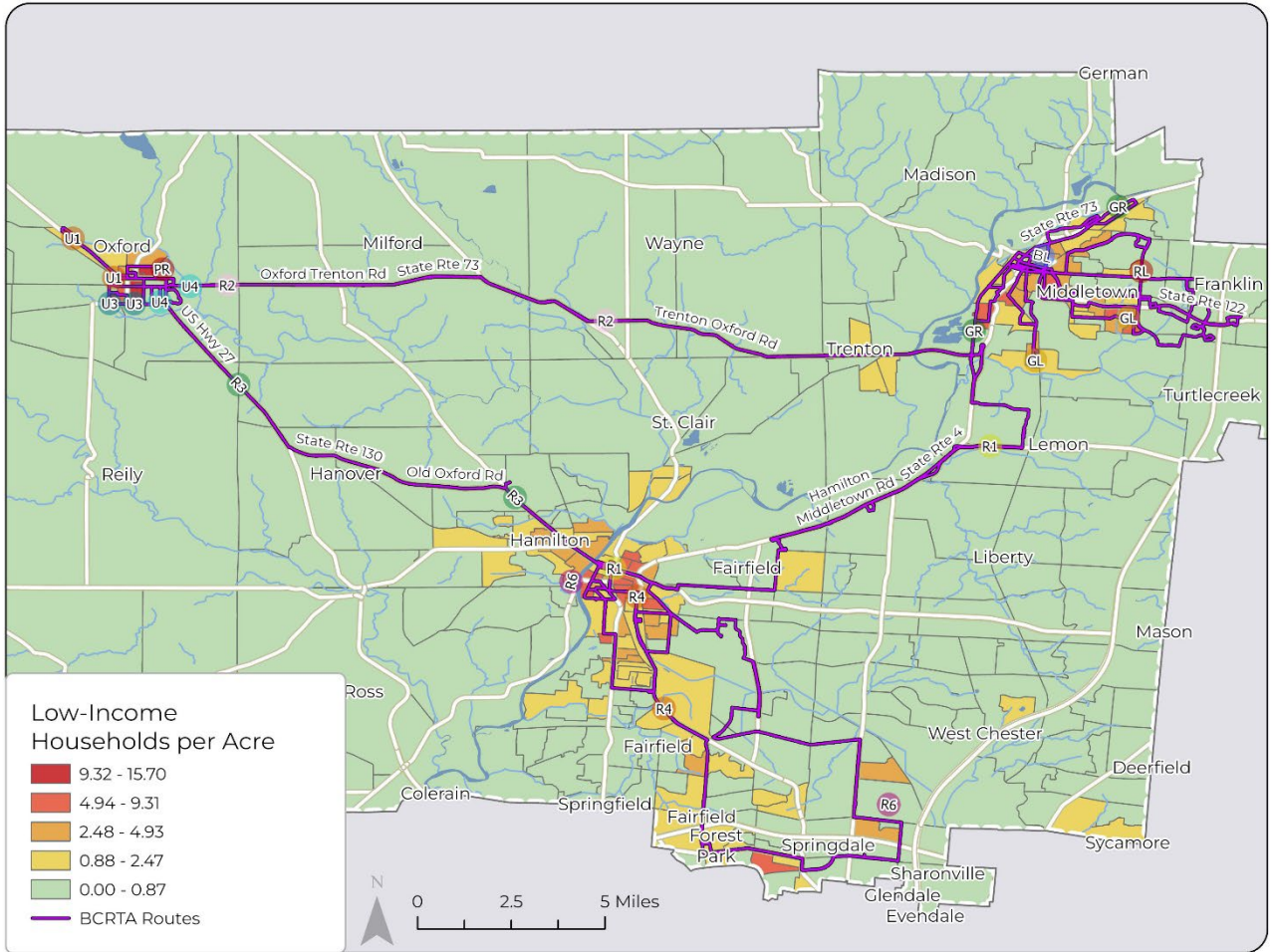
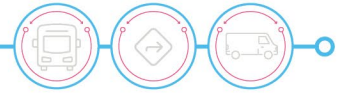


Figure 24 - Countywide Low-Income per Acre





Youth and Young Adult Population

Figures 25 through 28 show the concentrations of youth and young adult populations in Butler County. Youth and Young Adult was calculated as the population aged 15-24 years old. This age range has a growing demand for mobility due to employment, educational, and social activities, but limited access to transportation.

The city of Oxford has both the highest density of youth and young adults, as well as many high-density block groups clustered together. This is likely due to the presence of Miami University in Oxford. Additionally, there are moderate clusters in Hamilton and some in Middletown. There is a higher density block group in Hamilton near Miami University, with a cluster near Fairview Street and State Route 127.

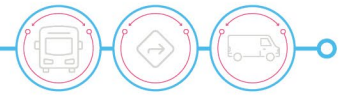
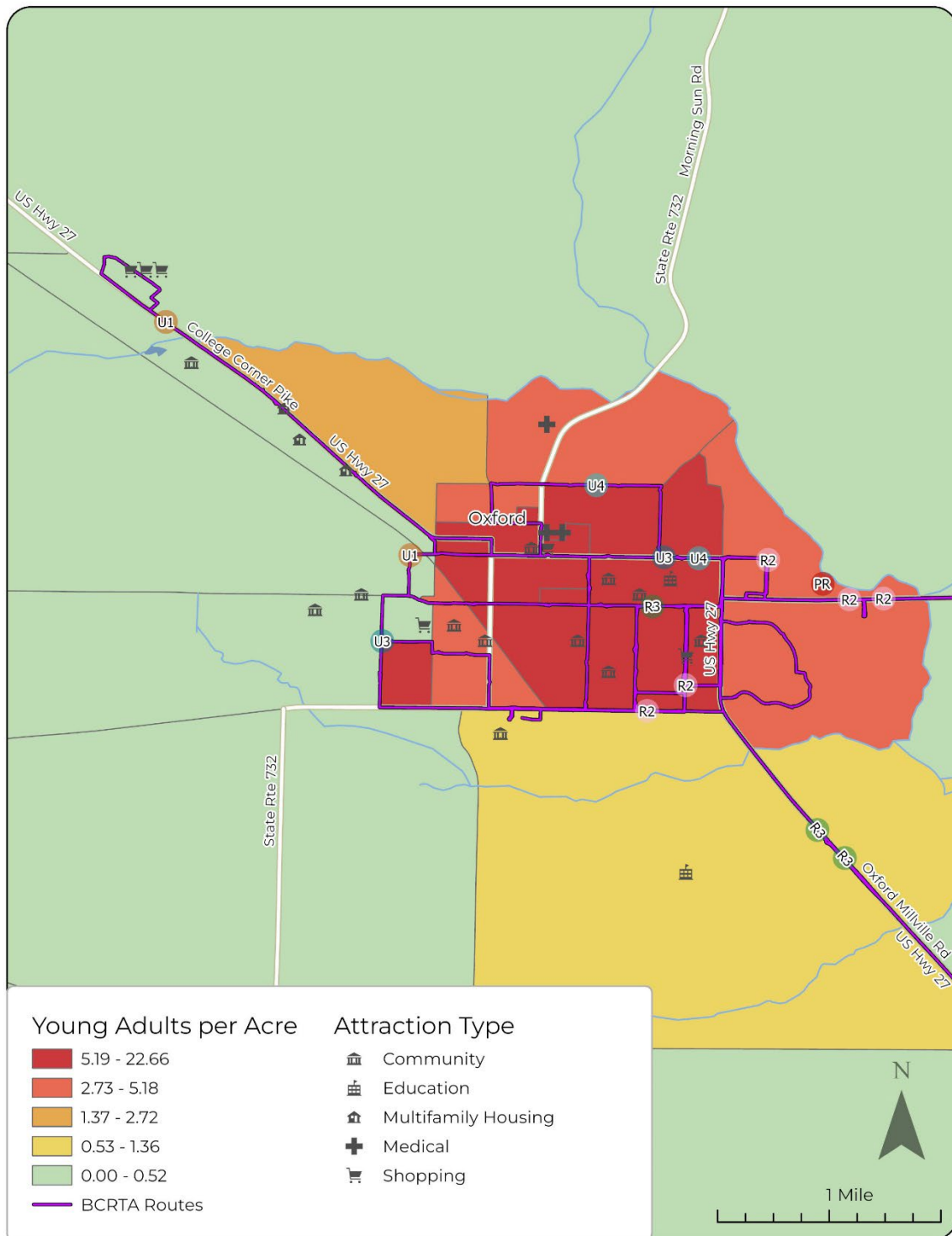


Figure 25 - Oxford Young Adults per Acre



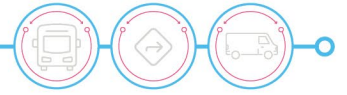
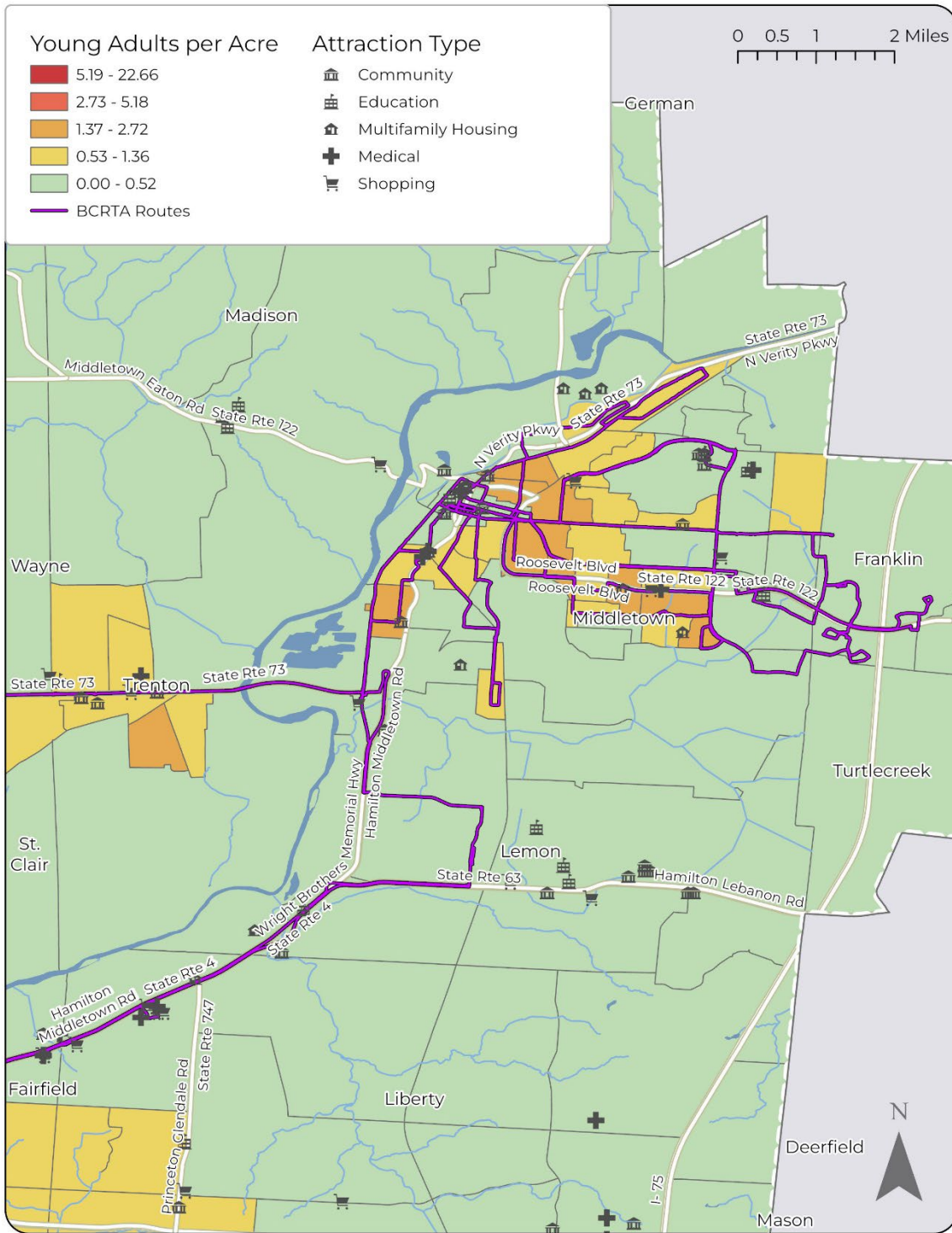


Figure 26 - Middletown Young Adults per Acre



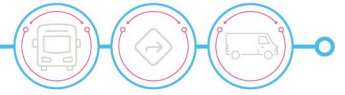
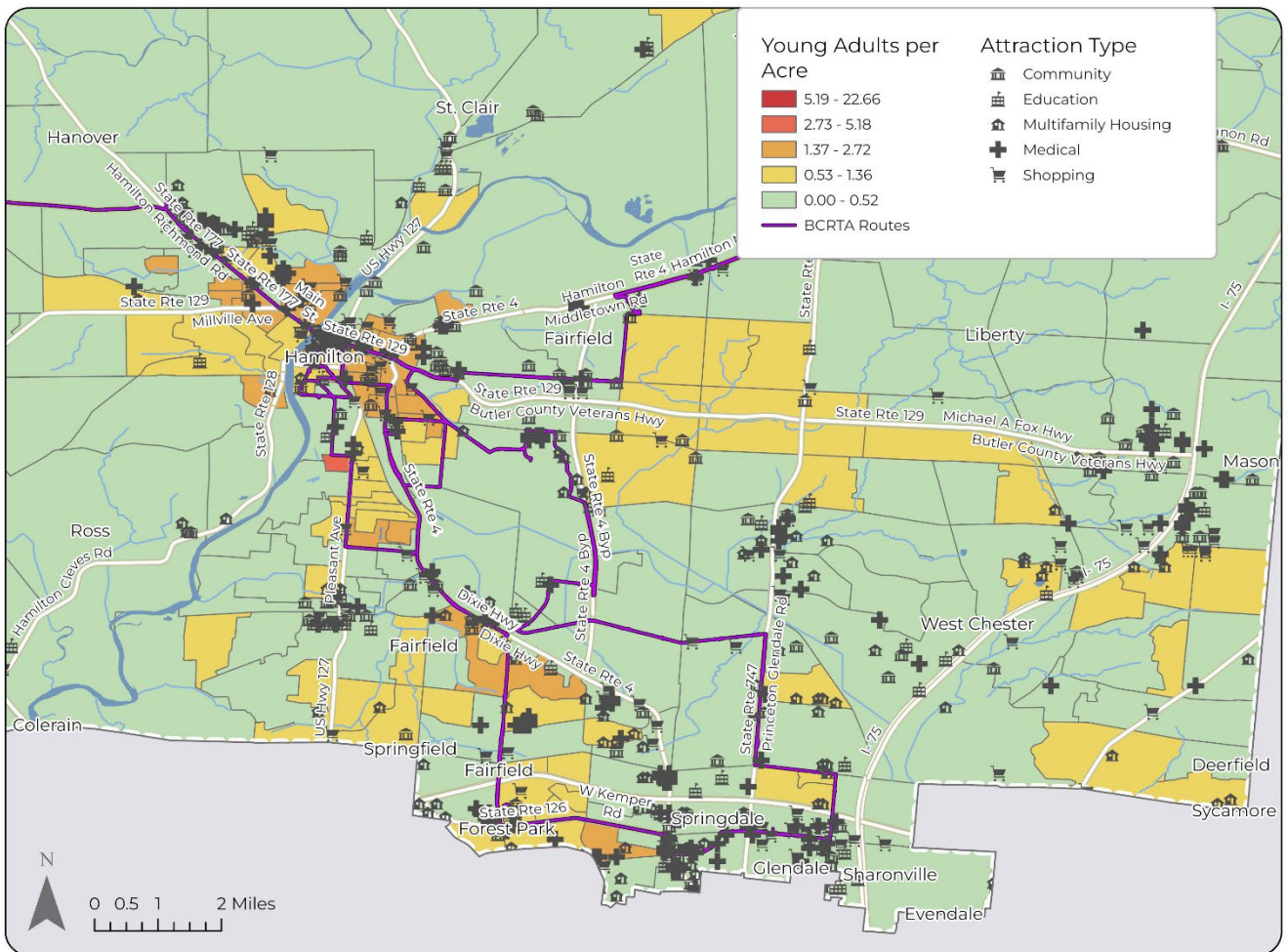


Figure 27 - Hamilton Young Adults per Acre



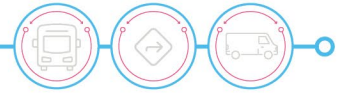
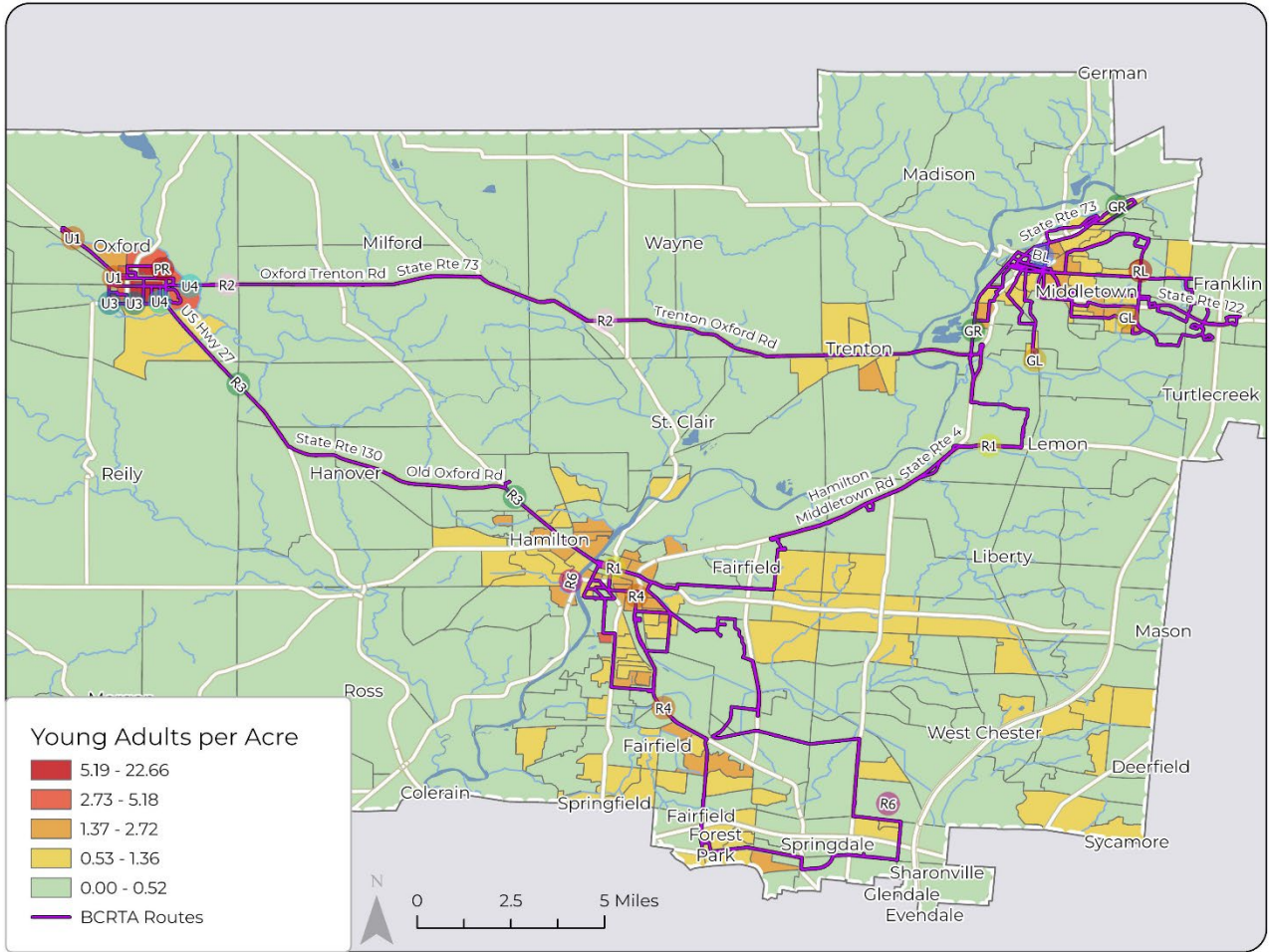
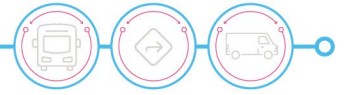


Figure 28 - Countywide Young Adults per Acre





Senior Population

Figures 29 through 32 show the population of adults aged 65 or older in Butler County. Middletown, Fairfield, Trenton, and Hamilton all have high senior-aged population density, relative to Butler County, so high concentrations of seniors appear prevalent throughout these cities. Additional pockets of high senior density can be found in Sharonville near the border of Hamilton County, which does not currently have fixed-route transit service. Transit services in most of these cities primarily serve arterial roads or travel along the edges of housing developments and require riders to walk to the nearest stop to access transit.

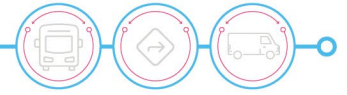
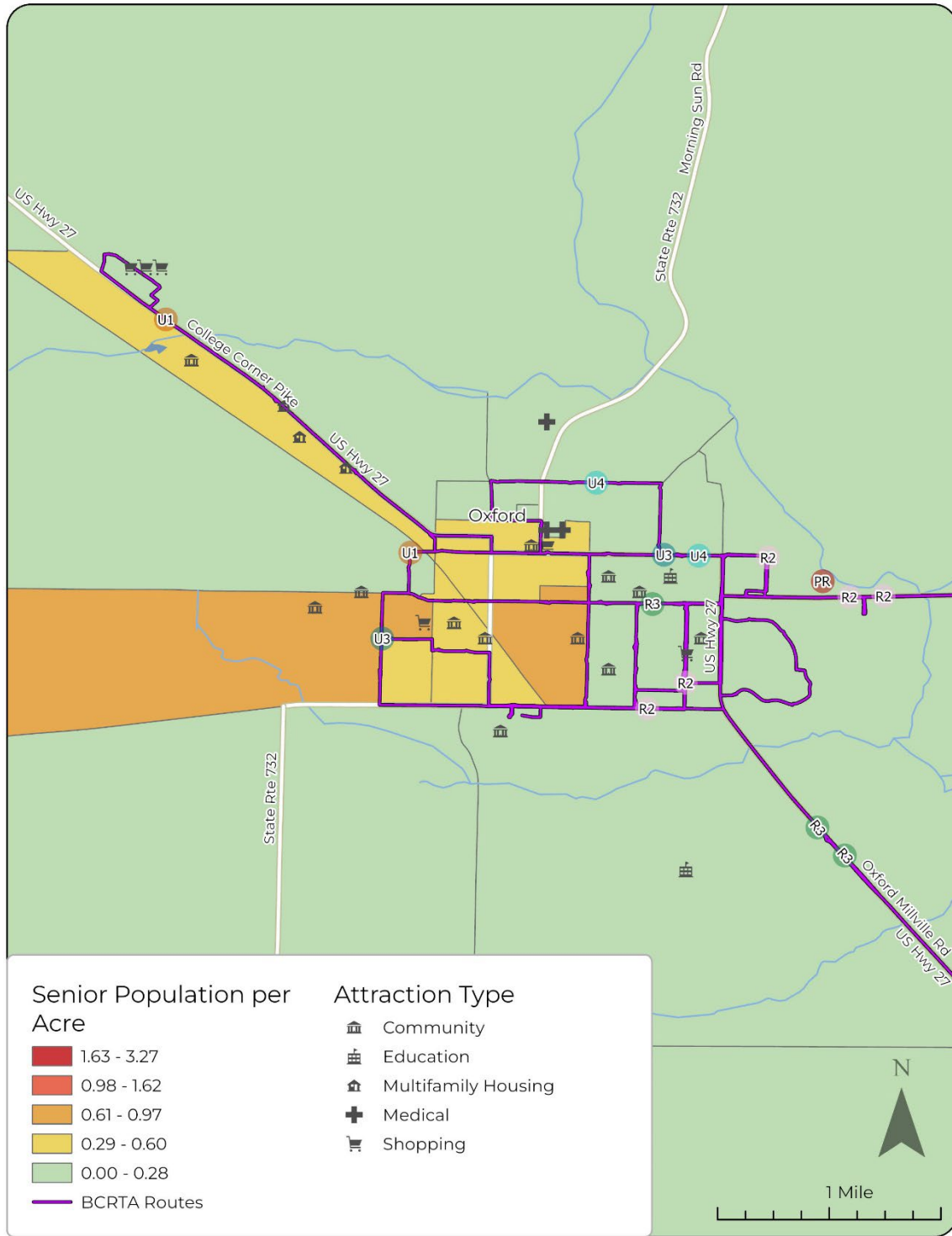


Figure 29 - Oxford Senior Population per Acre



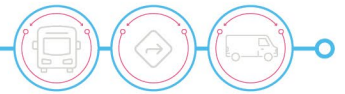
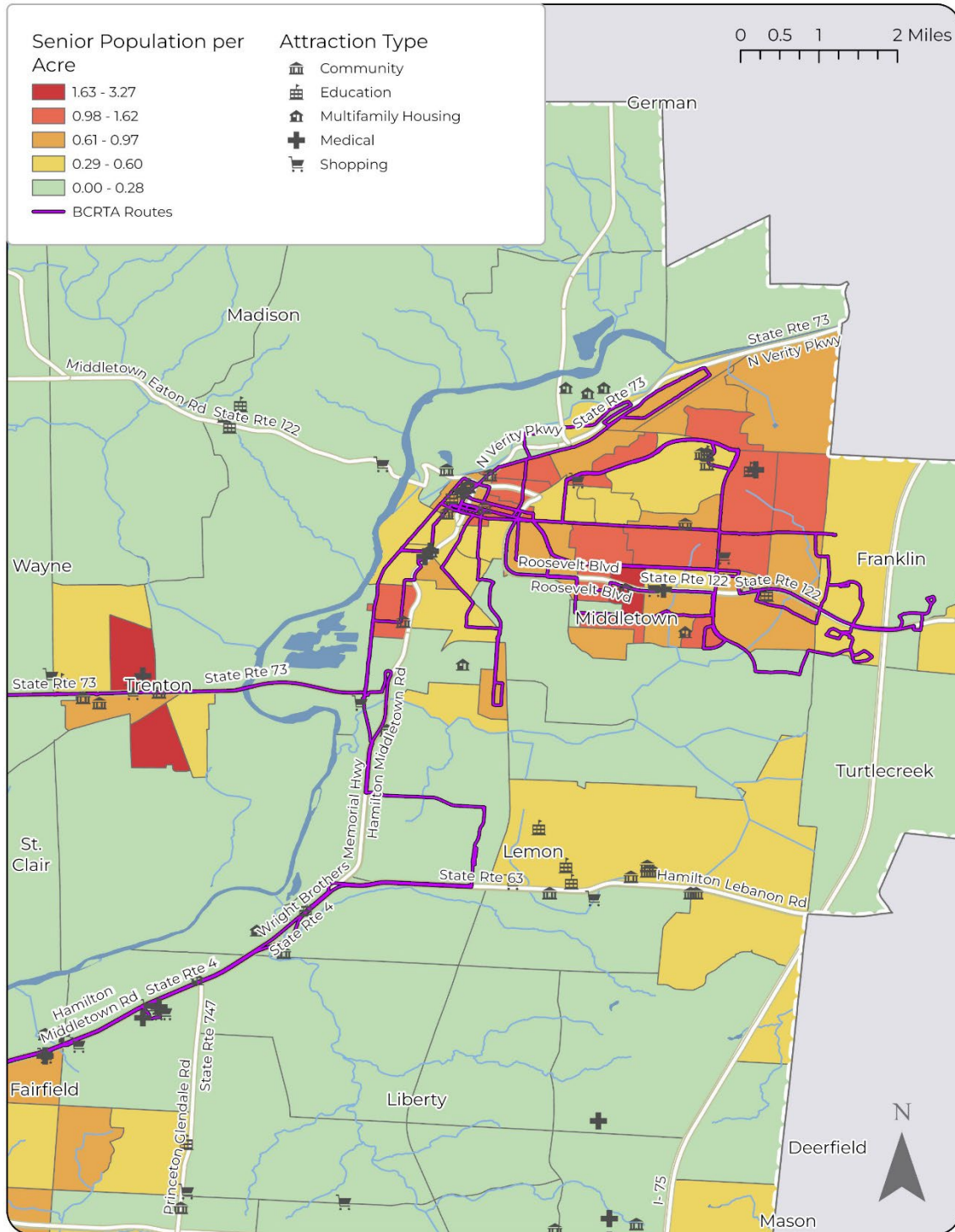


Figure 30 - Middletown Senior Population per Acre



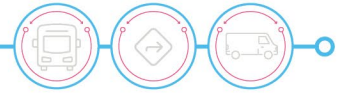
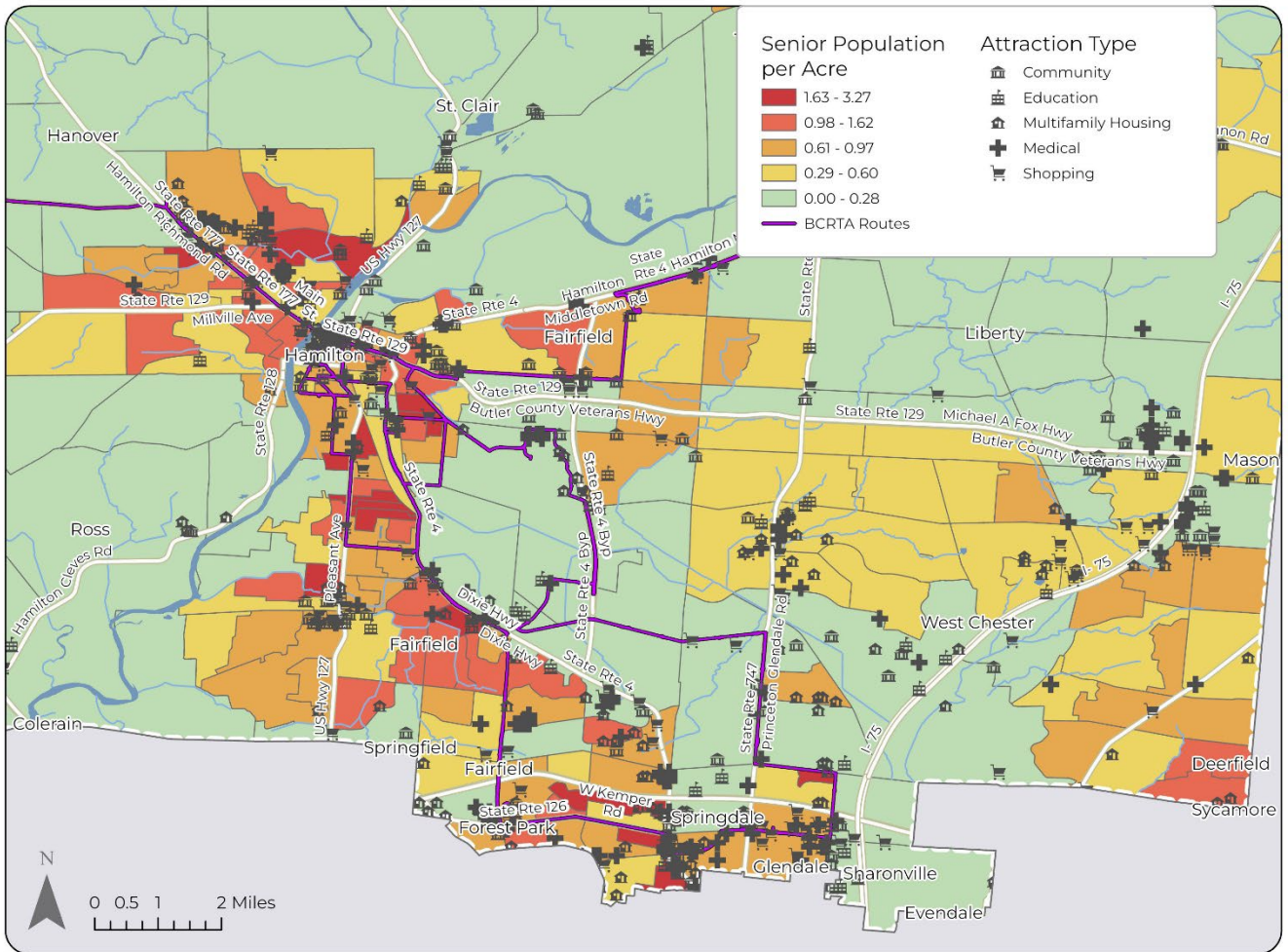


Figure 31 - Hamilton Senior Population per Acre



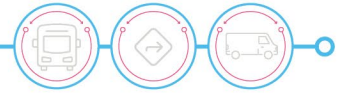
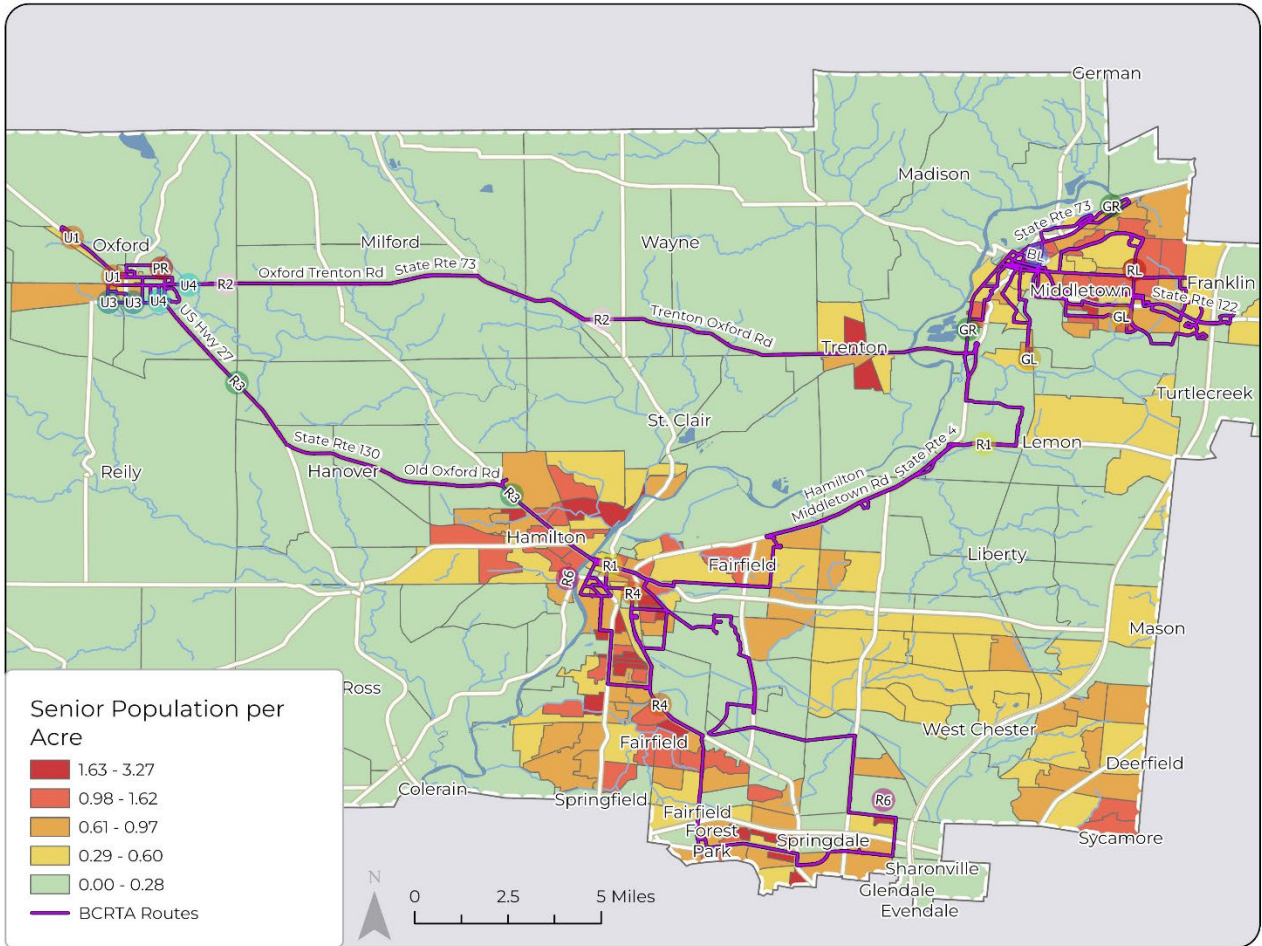
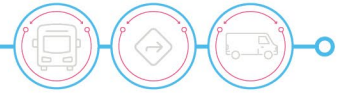


Figure 32 - Countywide Senior Population per Acre





Transit Need

Figures 33 through 36 combine the five-preceding demographic-density maps into one composite Transit Need map. The Transit Need Index reveals that the populations most likely to need transit services are most prevalent in

- Hamilton along Hancock Avenue, Hayes Avenue, State Route 129
- Oxford at West Chestnut St
- Trenton along State Route 73
- Middletown along State Route 4, State Route 122, Manchester Avenue
- Fairfield near State Route 4
- Low to moderate need in southeast corner of the county – maybe suitable for microtransit to connect to POI or transit, maybe connect to West Chester

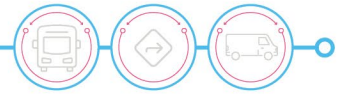
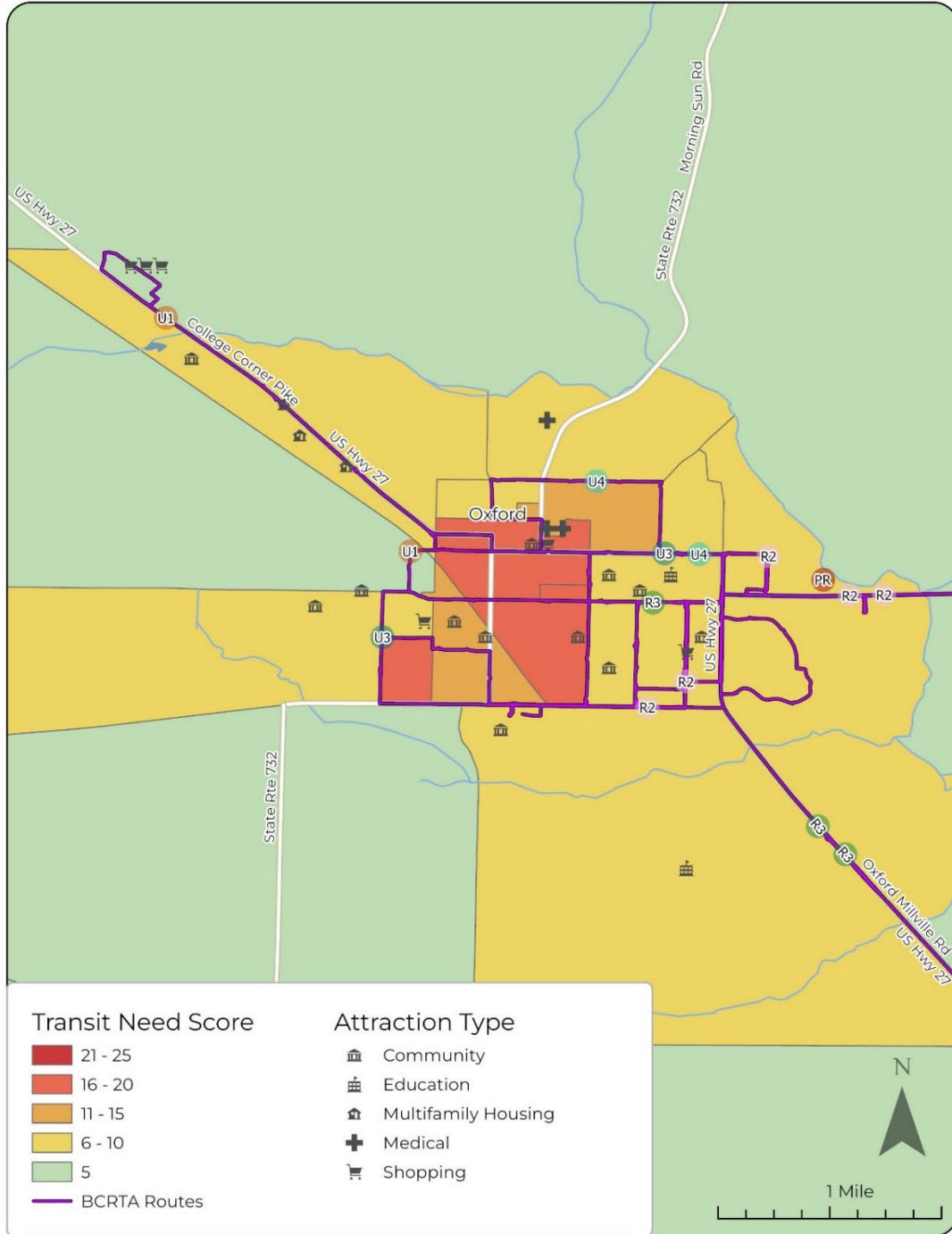


Figure 33 - Oxford Transit Need



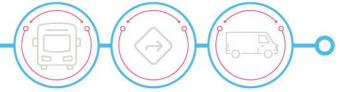
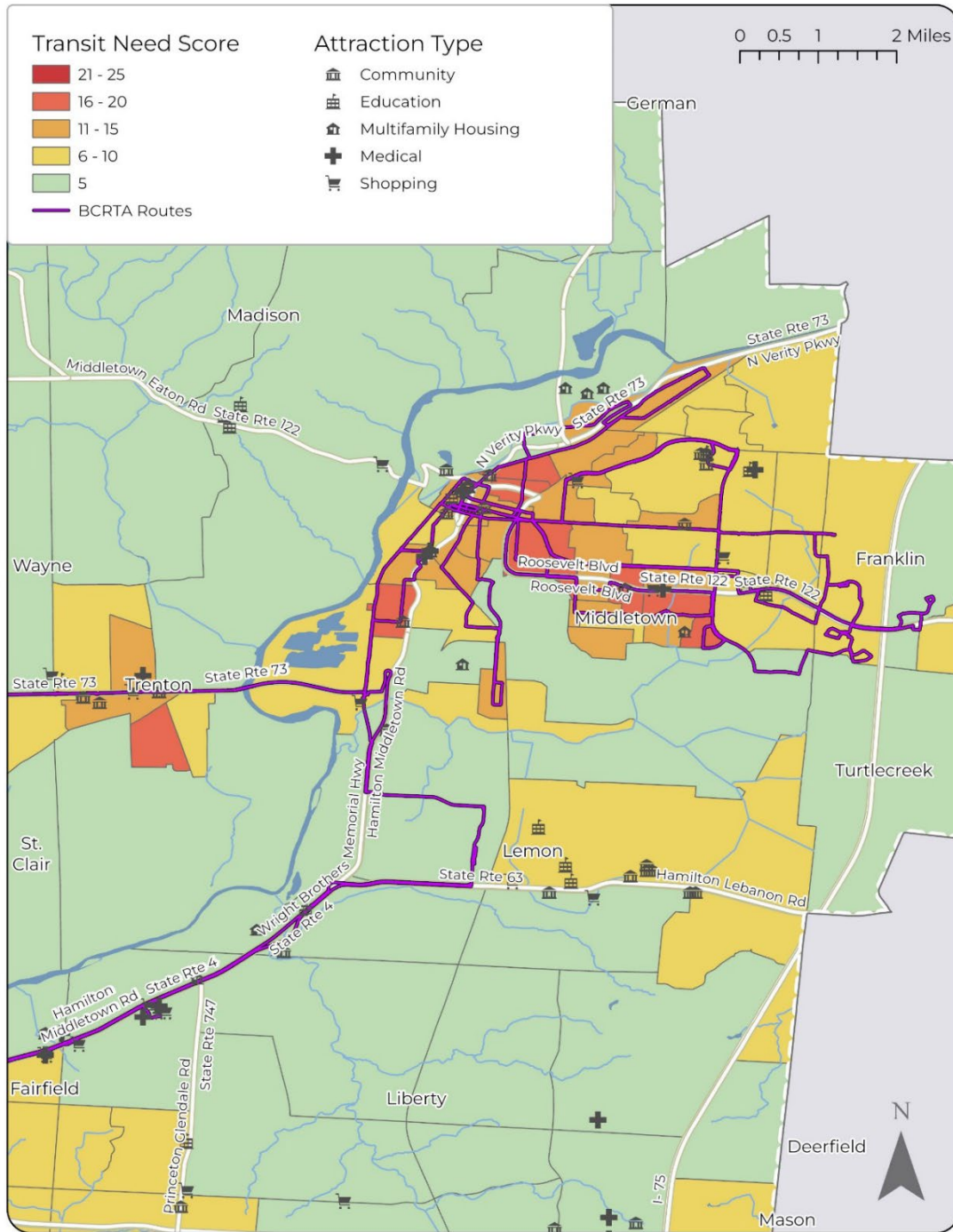


Figure 34 - Middletown Transit Need



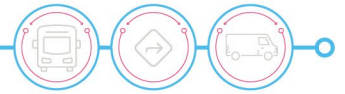
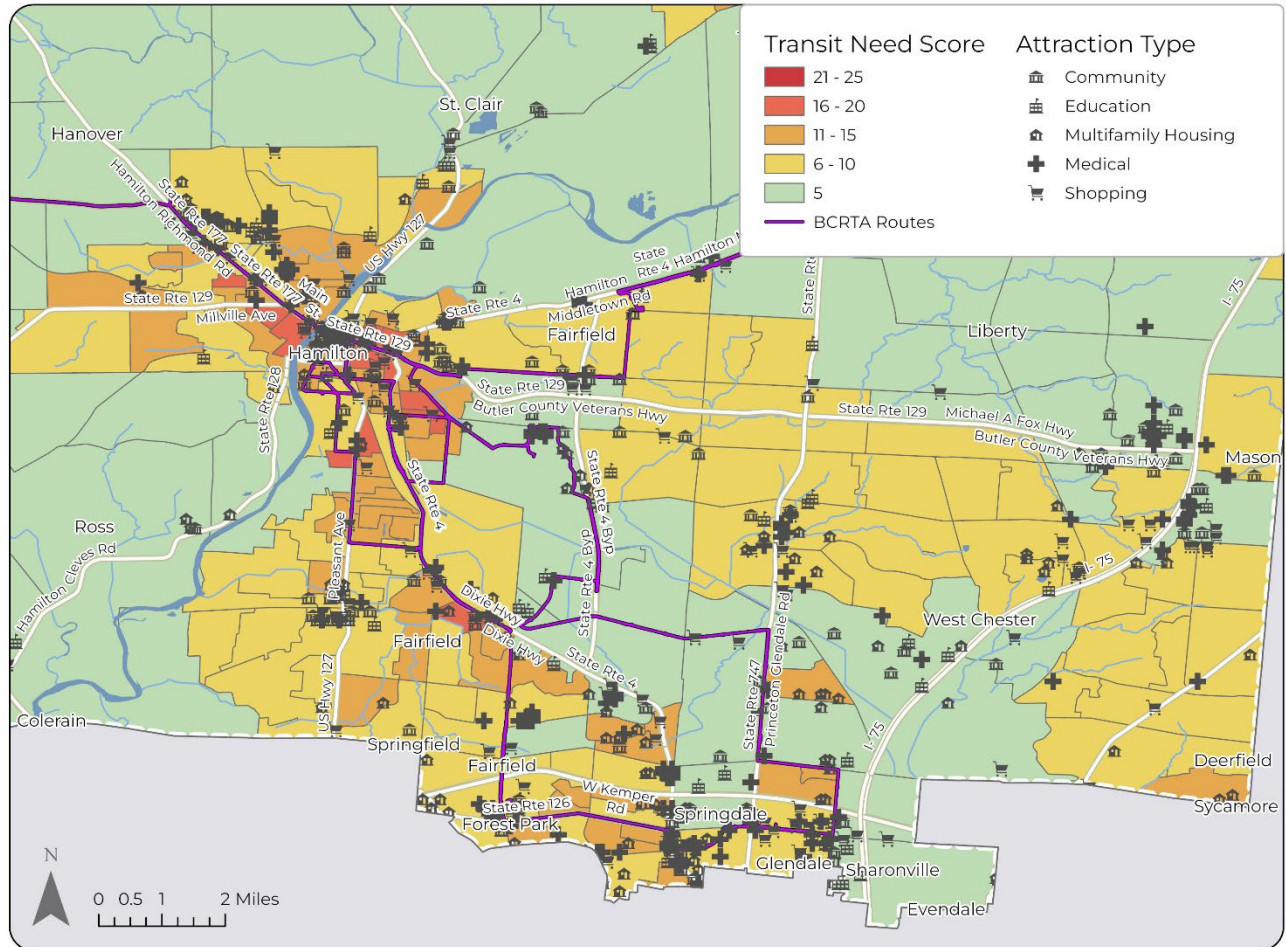


Figure 35 - Hamilton Transit Need



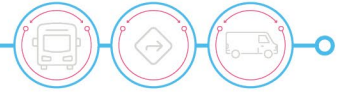
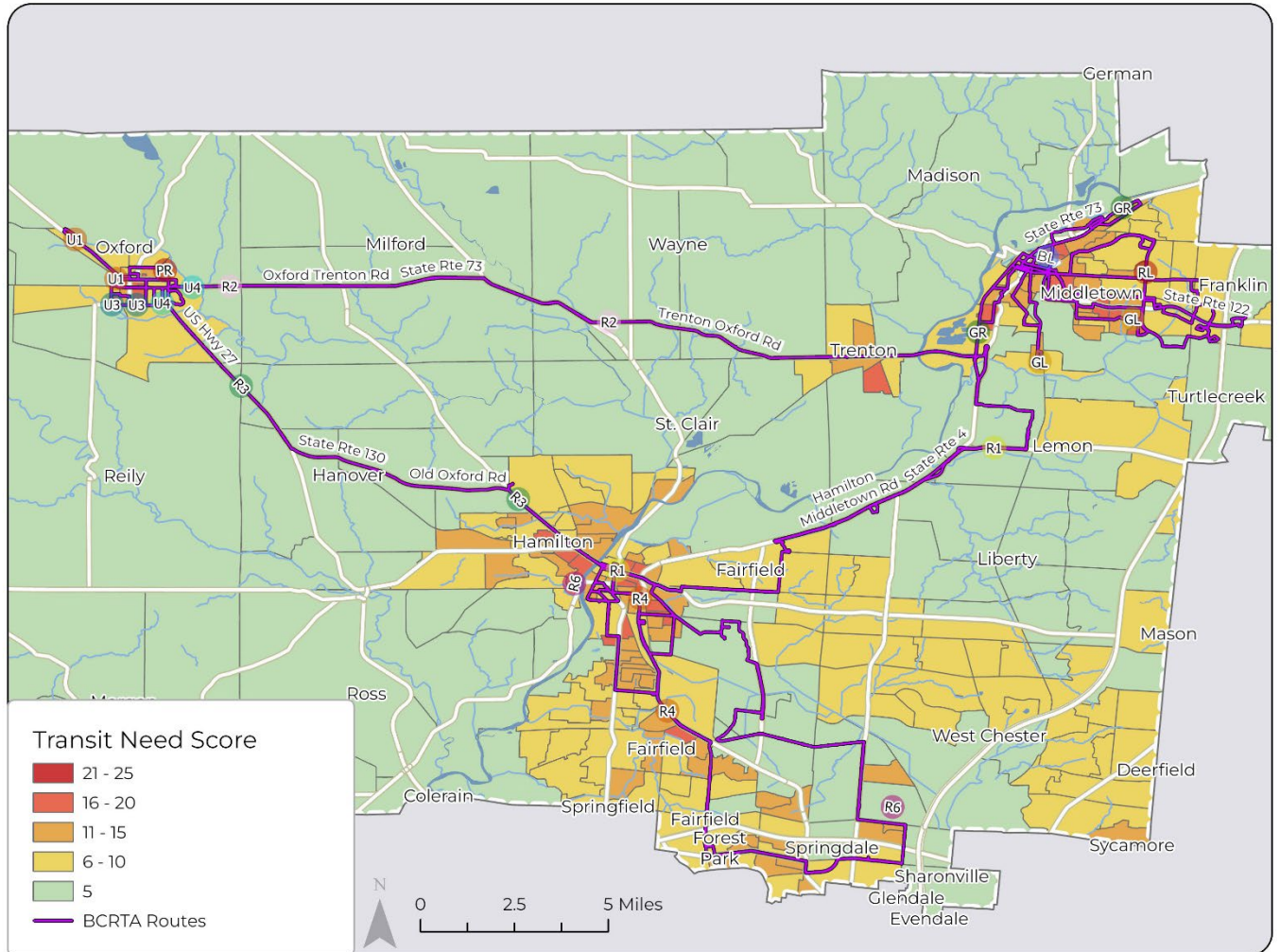
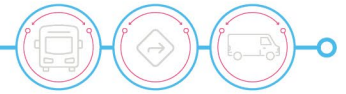


Figure 36 - Countywide Transit Need





Regional Travel Patterns

In general, transit users want to access the same regional destinations as travelers who use other modes of transportation. Thus, to understand the overall market for transit service, it is helpful to identify the most prevalent travel patterns in the region, regardless of mode.

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI) maintains a regional travel demand model which is used to simulate the travel patterns of all individual travelers in the region. The OKI model divides the region into traffic analysis zones (TAZ) and forecasts the expected travel volumes between each TAZ based on land-use, population, and socio-economic data. The following assessment of travel patterns in the Butler County study area relies on the 2019 regional travel demand model data provided by OKI.

Figures 37 through 40 show the significant TAZ-to-TAZ travel flows in the region. Significant travel flows are defined as 250 or more trips per day between any two TAZs. The majority of significant TAZ-to-TAZ travel is within the respective cities of Butler County, rather than between them.

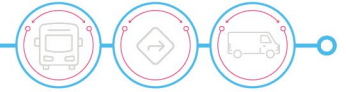
Oxford

The highest concentration of significant travel patterns in and around Oxford is focused on Miami University, with particularly high travel volumes between the university area and western Oxford, where there are several apartment complexes.

Oxford has some of the highest TAZ-to-TAZ travel volumes in Butler County.

Table 1. Top Travel Flows

Rank	TAZ 1	TAZ 2	Daily Trips (all modes)	Existing Transit Connection
1	1169 (West Oxford)	1170 (East Oxford)	2048	U1, U3
2	1166 (West Oxford – south of Fairfield Road)	1170 (East Oxford)	1709	U1, U3
3	1166 (West Oxford – south of Fairfield Road)	1169 (West Oxford)	1430	U3
4	1168 (Northwest Oxford – north of College Corner Pike)	1170 (East Oxford)	1251	U1
5	1169 (West Oxford)	1212 (Central Oxford)	1108	U1

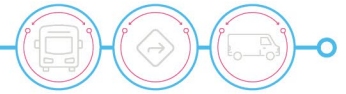


Middletown

There is a high volume of trips in Hamilton between Hamilton Middletown Road, near Lemon and Madison, and a TAZ south of Hamilton Middletown Road along Route R1. This TAZ has a shopping center, grocery store, and medical services. There are also high concentrations of significant travel patterns between Middletown and Franklin. Franklin is outside of Butler County but within an area served by existing BCRTA routes.

Table 2. Top Travel Flows

Rank	TAZ	TAZ 2	Daily Trips (all modes)	Existing Transit Connection
1	992 (Southeast Middletown)	1535 (West Franklin)	797	BL
2	992 (Southeast Middletown)	1460 (Turtlecreek)	676	BL
3	965 (West Middletown south of Roosevelt Blvd)	1535 (West Franklin)	628	BL
4	965 (West Middletown, south of Roosevelt Blvd)	1460 (Turtlecreek)	593	BL
5	965 (West Middletown south of Roosevelt Blvd)	992 (Southeast Middletown)	586	BL

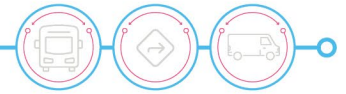


Hamilton

TAZ-to-TAZ travel volumes within Hamilton are generally lower than in Oxford and Middletown as trips are more dispersed. The most significant travel volumes in Hamilton are concentrated in clusters to the northwest, south, and near Fairfield.

Table 3. Top Travel Flows

Rank	TAZ	TAZ 2	Daily Trips (all modes)	Existing Transit Connection
1	909 (NW Hamilton north of Hamilton Richmond Road)	1101 (NW Hamilton north of Hamilton Richmond Road)	993	R3
2	1101 (NW Hamilton north of Hamilton Richmond Road)	1268 (West Hamilton, west of Hamilton Richmond Road)	795	R3
3	1098 (West Hamilton, west of Hamilton Richmond Road)	1101 (NW Hamilton north of Hamilton Richmond Road)	659	R3
4	1097 (West Hamilton, west of Hamilton Richmond Road)	1101 (NW Hamilton north of Hamilton Richmond Road)	628	R3
5	1101 (NW Hamilton, north of Hamilton Richmond Road)	1103 (North Hamilton south of Beissinger Road)	606	None



Countywide

In addition to the travel patterns noted above, there are also concentrations of significant TAZ-to-TAZ travel volumes north of Springdale, around West Chester, and between Oxford and Hamilton.

The travel patterns listed below are the top five TAZ-to-TAZ travel flows within Butler County, excluding those identified in previous sections.

Table 4. Top Travel Flows

Rank	TAZ	TAZ 2	Daily Trips (all modes)	Existing Transit Connection
1	997 (West Chester, south of Liberty Way)	998 (West Chester, south of Tylersville Road)	1557	None
2	1038 (Lemon, south of Hamilton Lebanon Road)	1065 (Lemon, north of Hamilton Lebanon Road)	1533	None
3	1460 (Middletown, south of SR 122, outside of Butler County)	1535 (Middletown, north of SR 122, outside of Butler County)	1459	BL
4	1038 (Lemon, south of Hamilton Lebanon Road)	1039 (Lemon, west of Hamilton Middletown Road)	1218	R1
5	1038 (Lemon, south of Hamilton Lebanon Road)	1064 (Lemon, north of SR 63)	1165	R1

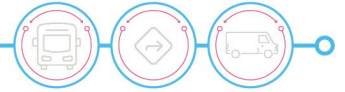
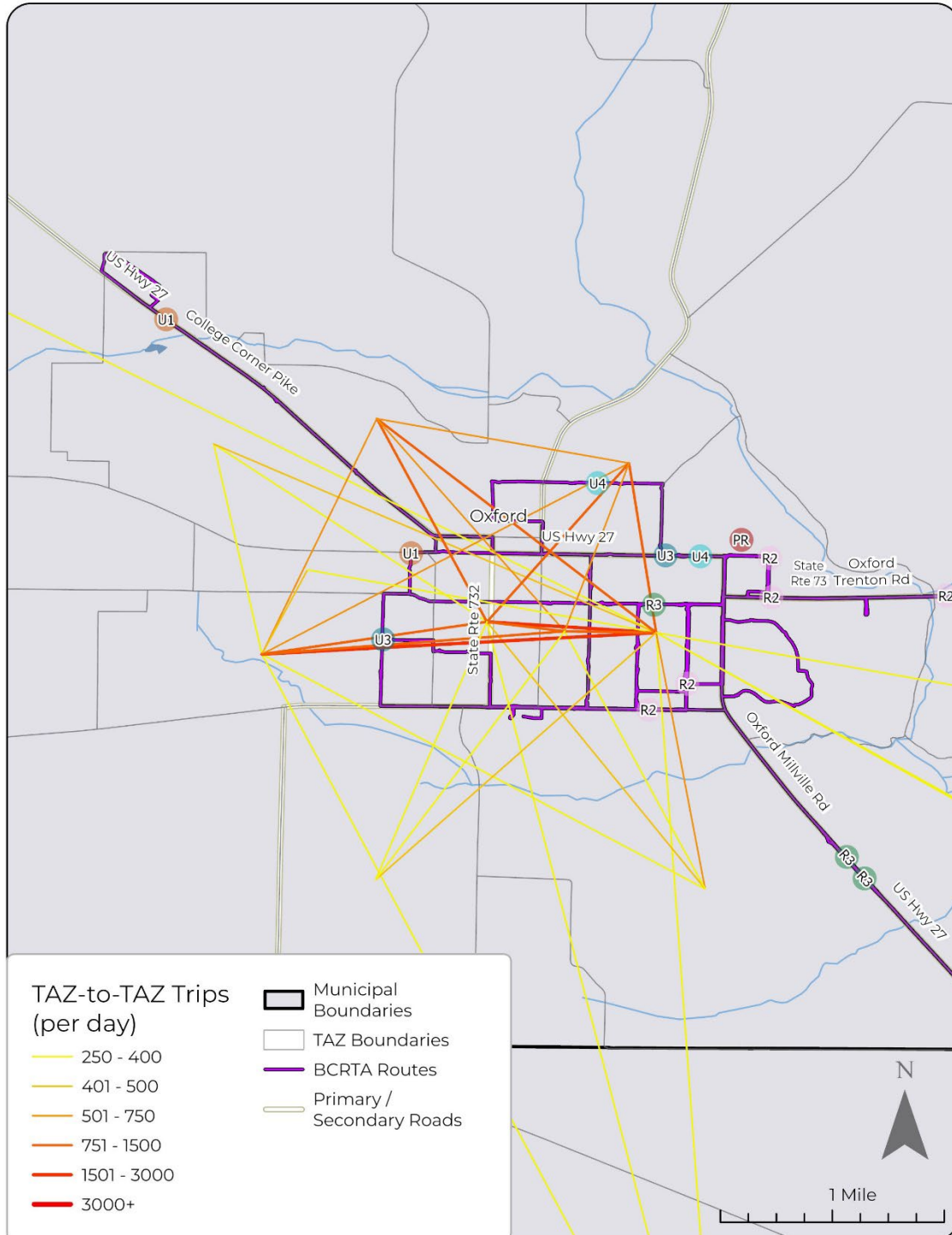


Figure 37 - Regional Travel Patterns in Oxford



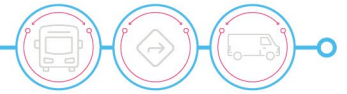
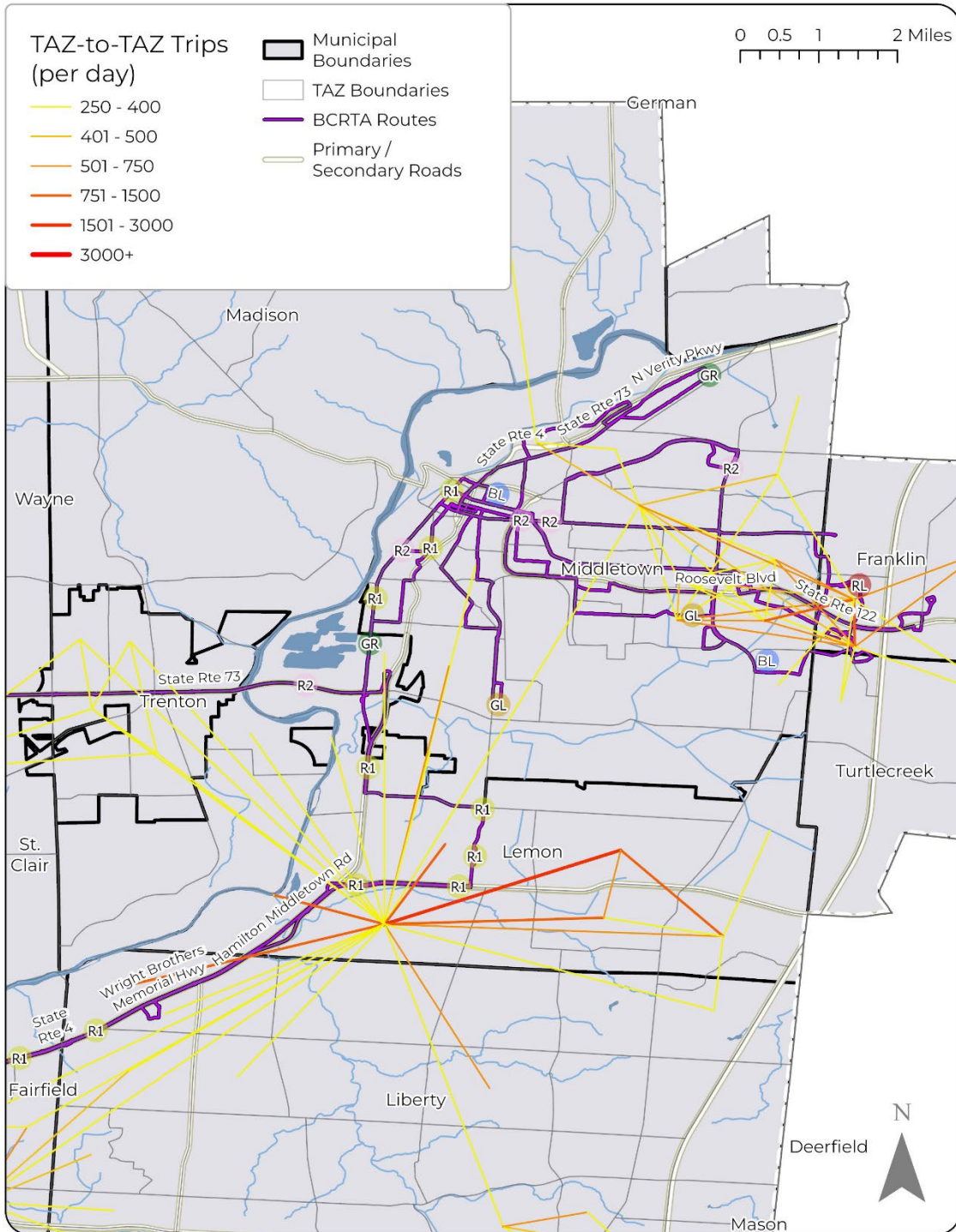


Figure 38 - Regional Travel Patterns in Middletown



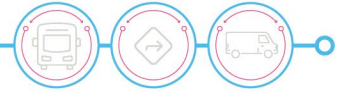
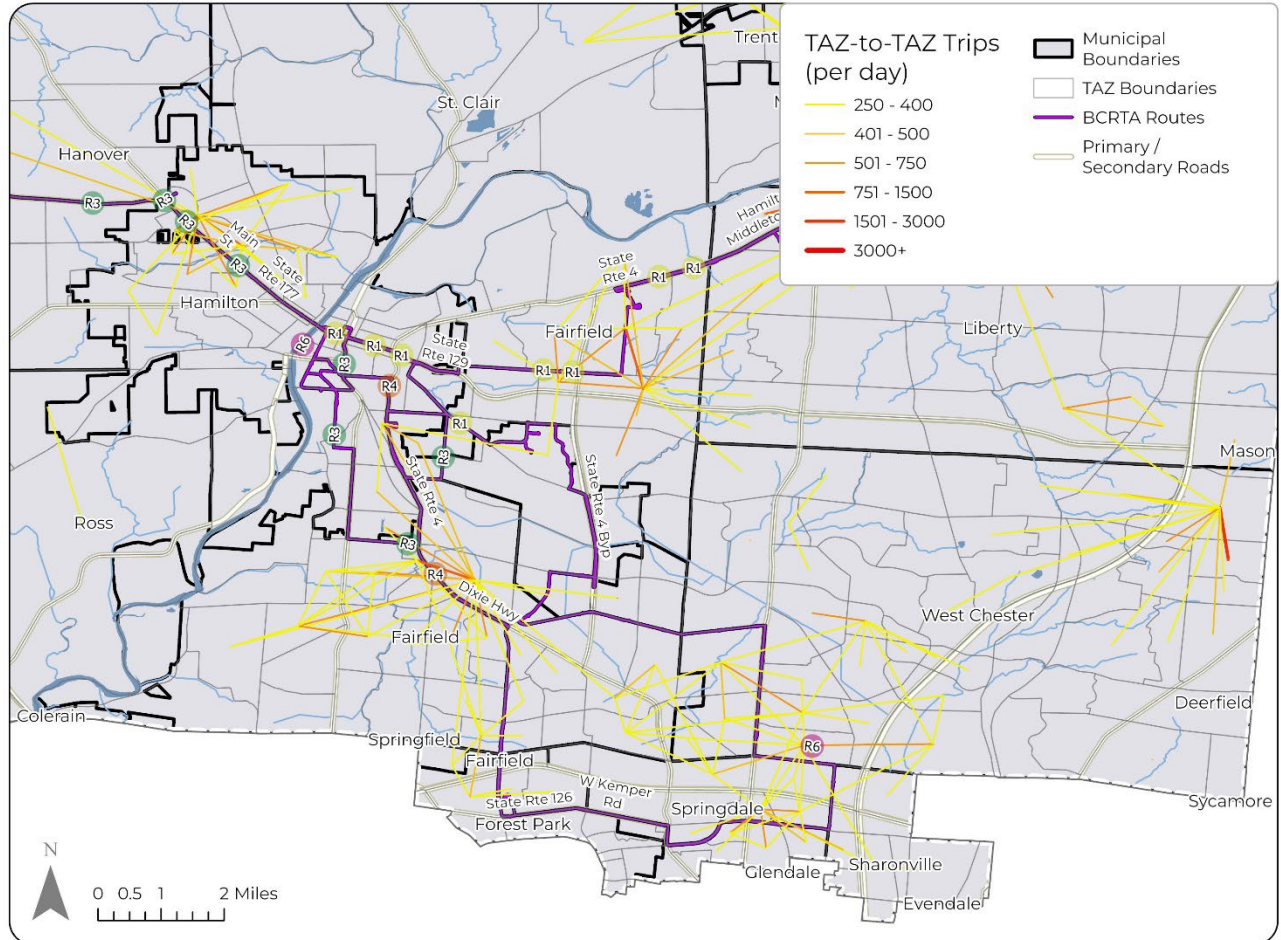


Figure 39 - Regional Travel Patterns in Hamilton



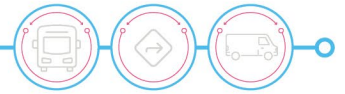
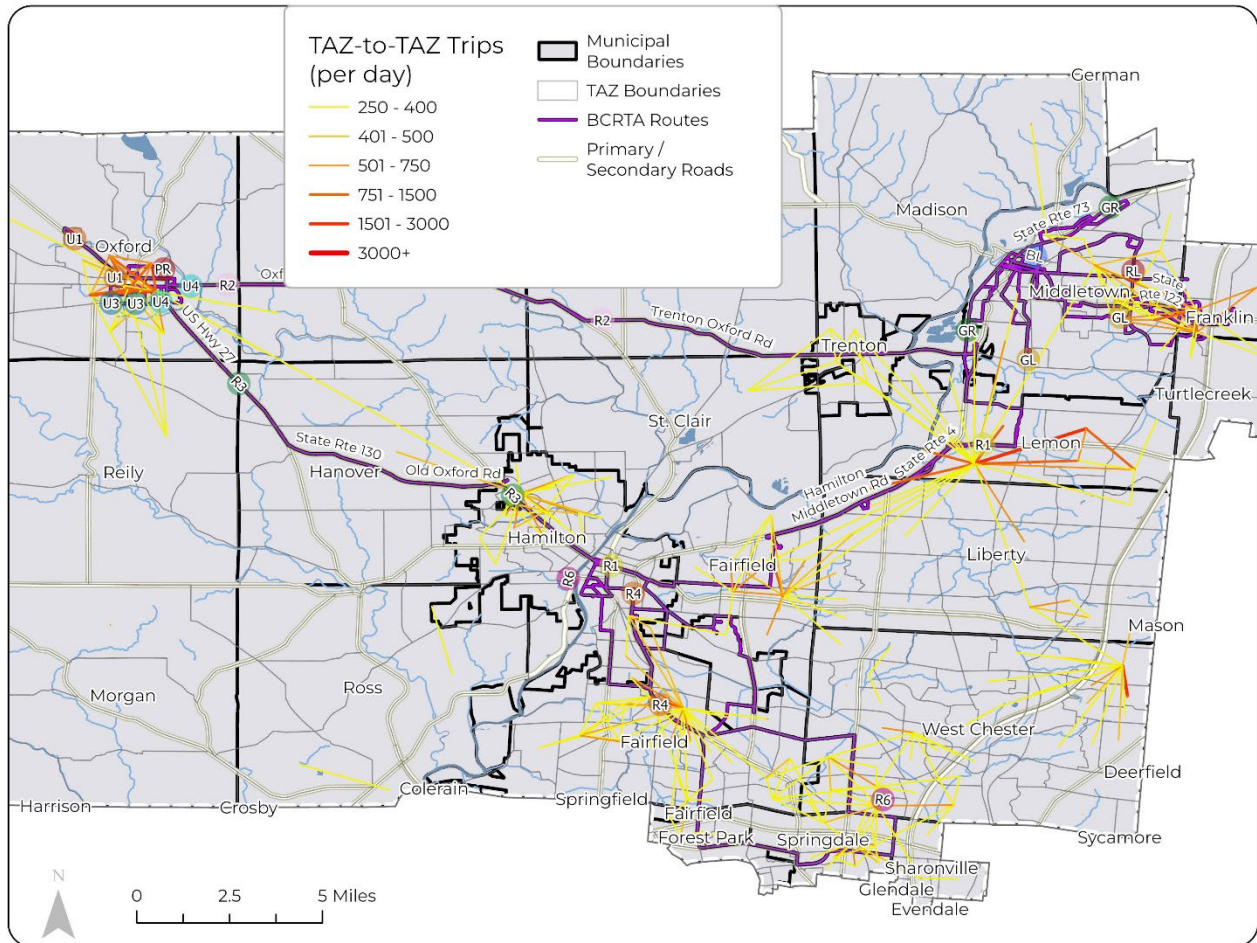
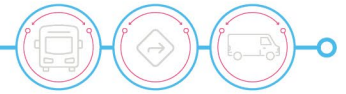


Figure 40 - Regional Travel Patterns Countywide





Butler County to Cincinnati Regional Travel Flows

BCRTA currently funds the operations of one route operated by the Southwest Ohio Regional Transit Authority (SORTA). Route 42X operates peak-period express service between the Meijer Park-and-Ride in West Chester and downtown Cincinnati.

Commuter services like the 42X generally attract riders from a wider area than local fixed-routes because riders congregate at a collection point like a park-and-ride, rather than walking to their nearest bus-stop. Given that riders often arrive at park-and-rides by car, they are usually willing to travel a greater distance to catch a commuter bus than local fixed-route riders are willing to travel to reach a bus stop.

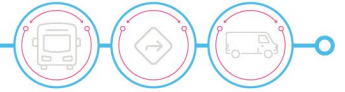
To assess how well the 42X route facilitates commuter trips to Cincinnati, the study team examined travel patterns between Butler County and three specific zones in the Cincinnati area: Downtown (central business district), Uptown (University of Cincinnati and University of Cincinnati Medical Center), and Cincinnati / Northern Kentucky International Airport (CVG). For this assessment, travel flows to and from these zones were aggregated by Butler County municipality, rather than by Butler County TAZs, to reflect the larger capture area of park-and-ride services.

The visualization in **Figure 41** shows travel flows that generate at least 500 trips per day (all travel modes and in both directions). This is a higher threshold than the 250 trips per day used in the TAZ-based analysis described previously and is meant to adjust for the larger geographic areas being analyzed in this assessment.

The results of this analysis reveal that the most significant travel flow is between West Chester and the Uptown zone, with more than 1,000 trips per day. This travel pattern is currently not served directly by the Route 42X, which instead provides express service between West Chester and Downtown Cincinnati, with connections available to Uptown and other destinations in Cincinnati.

Other major travel flows, generating at least 500 trips per day between Butler County and the three zones include the following:

- West Chester to Downtown and CVG
- Hamilton to CVG
- Fairfield to Uptown and Downtown
- Springdale to Uptown
- Sharonville to Uptown and Downtown
- Liberty to Uptown



The travel patterns in West Chester and Sharonville are like the routing of Route 42X, but the other travel patterns are not directly served by any transit service. These present potential opportunities for future coordination and collaboration with SORTA, including a potential re-route or variant of Route 42x to provide one-seat rides between West Chester and Uptown Cincinnati.

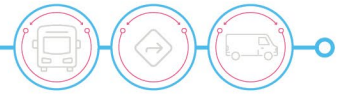
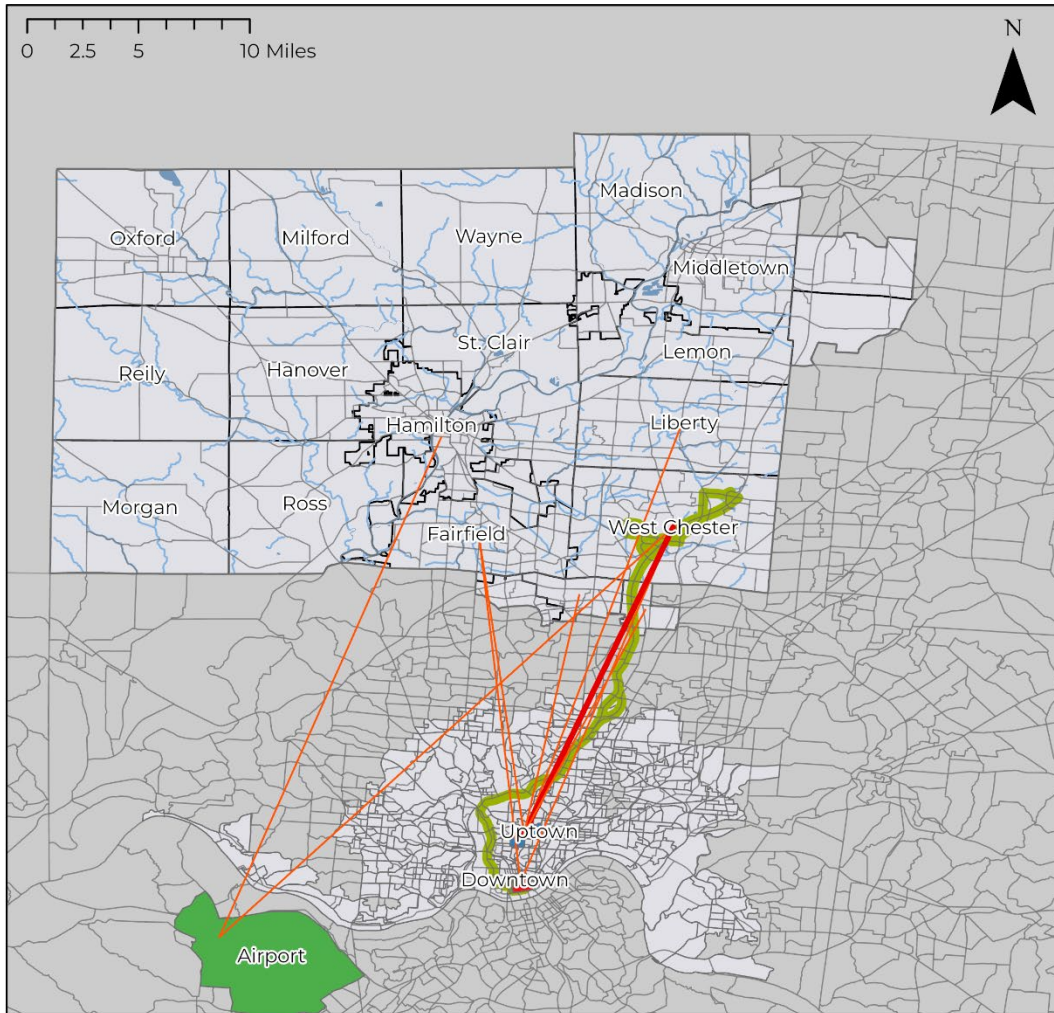


Figure 42 – Butler County to Cincinnati Travel Patterns



Consolidated TAZ

- Downtown
- Uptown
- Cincinnati/Northern Kentucky International Airport
- Route 42X - West Chester to Cincinnati

Average Daily Travel Flow

- > 500 Trips per Day
- > 1000 Trips per Day