Chapter 6:
Transportation Deficiencies Overview

List of Figures

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Overview

Developing a plan for improving any aspect of the community must start with identifying what elements of the community's system are deficient. For the 2040 Long Range Transportation Plan, MPO staff examined how the region's future transportation system would function if no future improvements were planned beyond projects included in the State's Six Year Improvement Program (SYIP) or proffered from local developers. Through this process, MPO staff, working with the MPO Committees, identified infrastructure that is expected to be incomplete or insufficient by 2040. All maps consider the 2040 community condition. That is, the analysis for each mode considers the population total and distribution for 2040; the employment total and distribution for 2040; and the road network for 2040 (i.e. projects that are not yet built, but will be by 2040). This analysis initiates the process of determining which projects need to be considered and analyzed as part of the LRTP update. Transportation deficiencies were divided into three categories:

- Roads and Freight
- Transit and Rail
- Bicycle and Pedestrian

Roads and Freight

Roads

The majority of the traffic in the MPO travels via the region's roadway system. Over time, as the Charlottesville-Albemarle region grows, an increasing number of people are expected to demand use of this system, constraining its capacity and resulting in congestion and delays. To ascertain how congested the road system would likely be in the year 2040, the MPO used its Travel Demand Model to forecast where demand on the system is expected to exceed system capacity.

The 2040 Travel Demand Model identifies these congested areas by calculating a Volume-to-Capacity ratio. The ratio indicates the volume of traffic expected on the road, compared with the capacity the roadway can accommodate. Roadways that are approaching capacity, or are over capacity are considered to be deficient. These roads are mapped in Figures 6-1, showing roads that are expected to experience "Minor Congestion" and 6-2, showing roads that are expected to be "Congested." The MPO used VDOT's volume to capacity ratio standards to define minor congestion and congestion.

» *Minor Congestion*

Roads approaching capacity are those with a Level of Service (LOS) E, which indicates that between 85% and 100% of the road's capacity is being used. These roads are expected to experience minor congestion. That is to say, they will be congested during rush hour travel and should operate at free flow conditions during other times of the day.

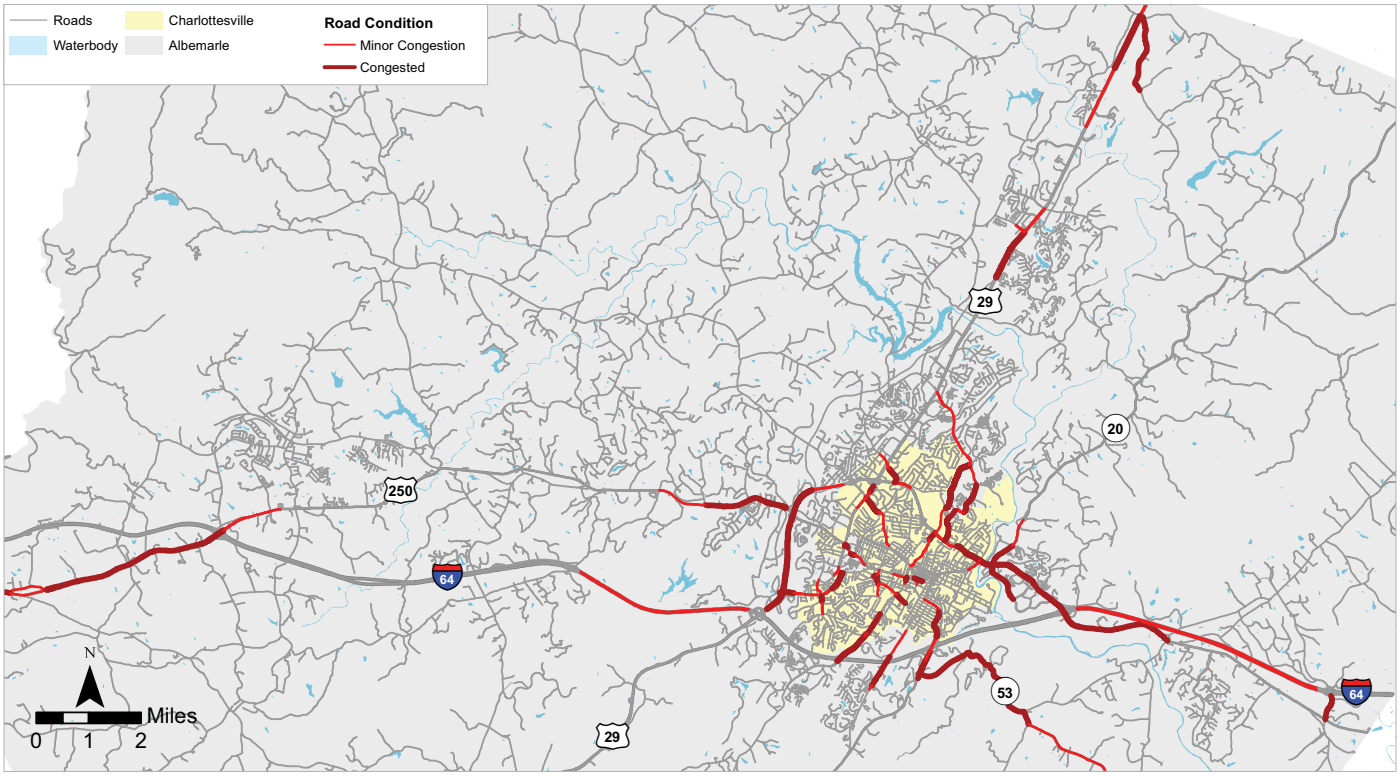
» *Congested*

Roads over capacity are those with a LOS F, which indicates that the roadway is expected to carry more volume than it was built to handle. These roads are expected to be congested throughout the day.

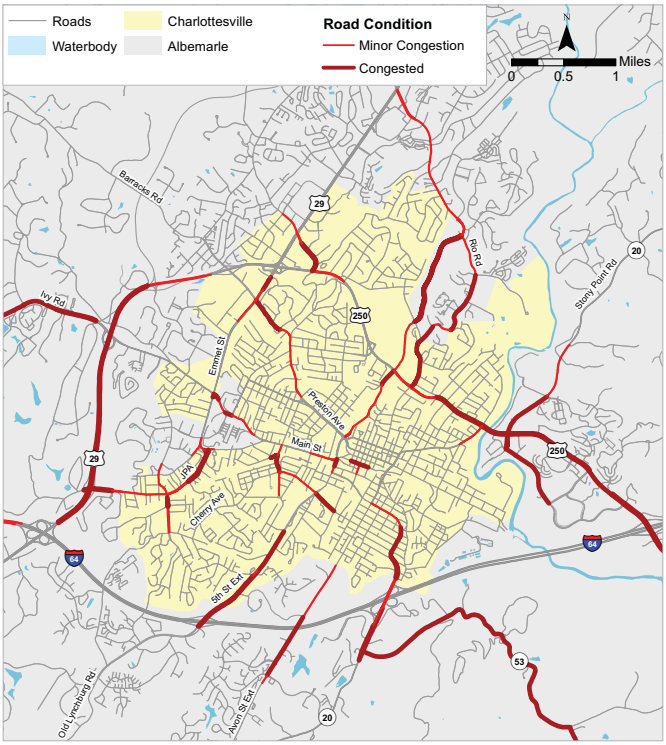
» *Significance of the Congestion Maps*

The level of congestion of the transportation system in the 2040 Base Scenario was mapped for two purposes. First, it was used to identify which areas would likely need improvements to reduce congestion and function more efficiently in the future. Secondly, it served as a base, against which each scenario could be compared as they were developed and analyzed. Congestion maps were prepared for each subsequent scenario, and compared to the 2040 Base congestion map to determine if the proposed projects were likely to improve or worsen the expected congestion levels on the system.

2040 Regional Congestion (Figure 6-1)



2040 Local Congestion (Figure 6-2)



Freight

The issue of freight movement throughout the region, while important, is not an overriding concern for regional mobility at this time. As mentioned in Chapter 2 (Existing Conditions), the key freight corridors in the region are Interstate 64 and US 29. Both routes are susceptible to congestion issues that affect general traffic mobility concurrent with any freight movements.

Freight movement along rail corridors is also not currently a prevalent regional traffic concern. At this time, rail freight movement in the region travels through the area to destinations outside the MPO's boundaries. While facilitating the movement of goods throughout the region is a priority discussed in Chapter 4, it is not as prominent in the Charlottesville-Albemarle MPO as it is for other MPOs.

Because the MPO does not attract substantial freight traffic at this time, and freight movement does not hinder general traffic movement, our travel demand model does not have a freight component, and congestion modeling is specific to general traffic mobility. As a result, data is not readily available to identify freight deficiencies beyond general congestion and demand issues associated with traffic movement.

Transit and Rail

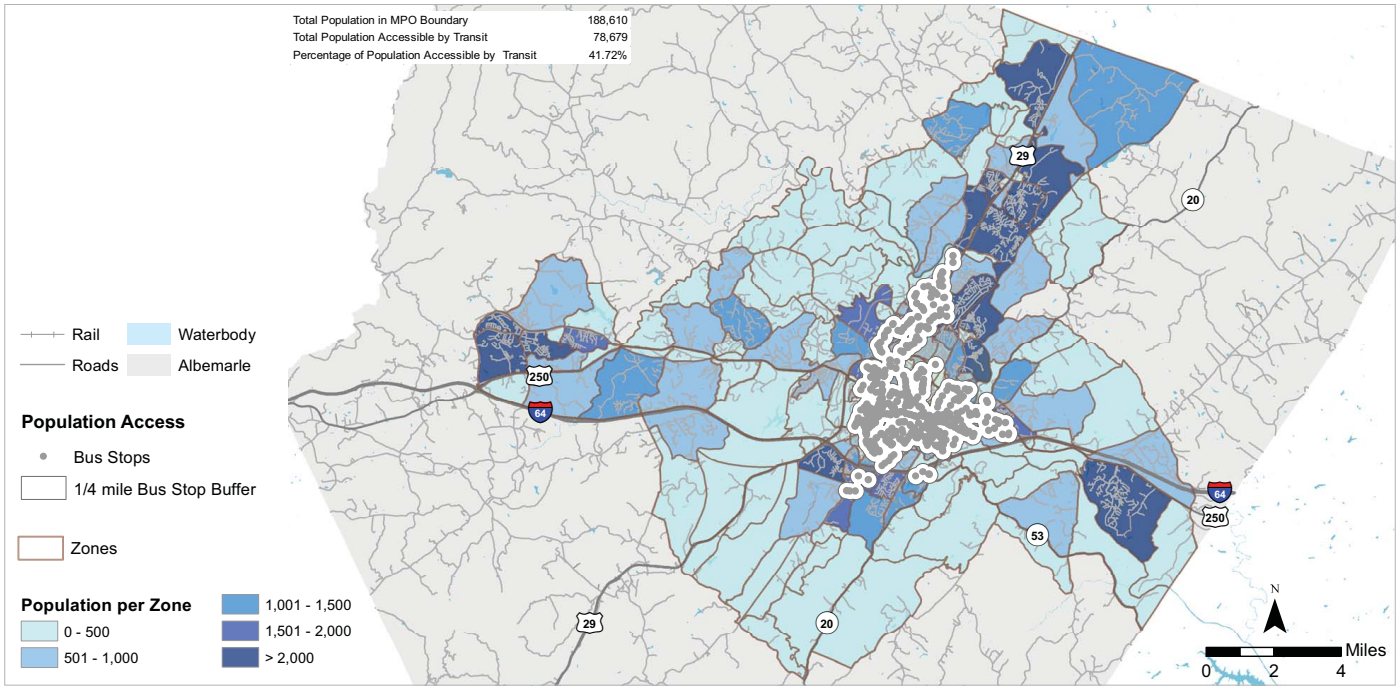
Transit

The MPO's transit system is one of the more robust small MPO transit systems in the state. As discussed in Chapter 2 (Existing Conditions), three transit entities serve the MPO: Charlottesville Area Transit (CAT), run by the City of Charlottesville with additional contributions coming from Albemarle County; University Transit Service (UTS), run by the University of Virginia; and JAUNT, a para-transit service provider for several contiguous counties in the region including the City of Charlottesville and Albemarle County. To determine transit deficiencies in the region, MPO staff was only able to consider transit services that had official bus stops: CAT and UTS.

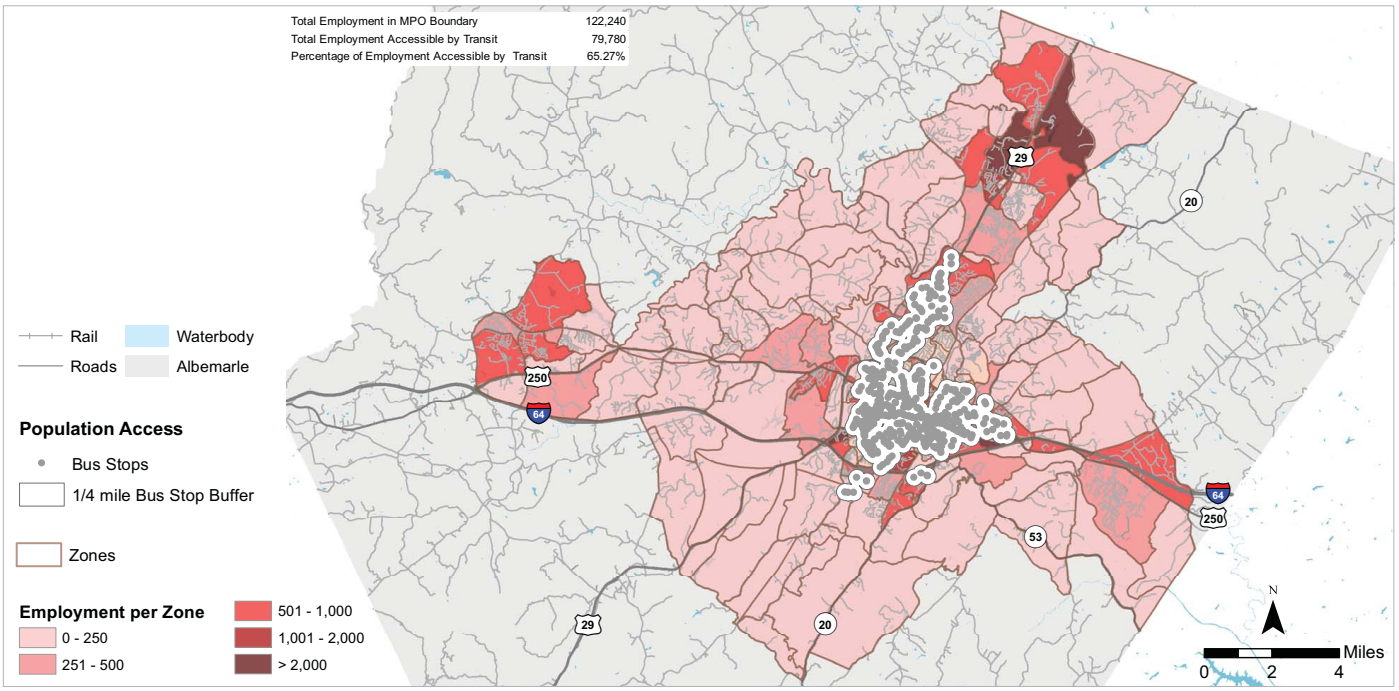
» *Transit Accessibility to Population and Employment Maps*

The travel demand model's 2040 population and employment data was used to map the population and employment densities forecast for each zone. Dark shades of blue indicate densely populated zones, while light shades of blue indicate sparsely populated zones. (Refer to Figure 6-3). Similarly, dark shades of red indicate zones with considerable employment opportunities, while light shades of red indicate zones with few employment opportunities. (Refer to Figure 6-4). The existing bus stop locations for UTS and CAT only were added to the maps, as JAUNT does not operate on a fixed service, and future bus stop locations for 2040 cannot be anticipated. The existing bus stops for UTS and CAT were buffered using a one-quarter mile radius, and the population or employment within a one-quarter mile buffer of transit stops was calculated to determine what percentage of the population or employment in 2040 would have access to transit. (Note, this study was completed prior to CAT's addition of Route 11.) Within the MPO, approximately 42% of the population and 65% of employment opportunities are located within a one-quarter mile radius of a bus stop. This means that driving is typically the only viable transportation option. These maps are useful for identifying the general areas that would benefit from additional transit service. Darker shaded areas without bus stops indicate areas where expanded service is expected to perform well due to the high concentration of residents or employment opportunities in these areas.

2040 Population Access to Transit (Figure 6-3)



2040 Employment Access to Transit (Figure 6-4)



Rail

In reviewing regional rail service, staff determined that additional service is important; particularly early morning service that supports business travel between the region and Washington D.C. and other areas in the northeast corridor. Nonetheless, passenger rail service, while important and growing in importance, is not a mode that can be fiscally-constrained within this process. This difficulty could and is likely to change in the future, but for now efforts are focused on other transportation needs.

Bicycle and Pedestrian

The MPO's bicycle and pedestrian network, while robust, is not a viable transportation option for most of the 2040 MPO's population and employment base. This analysis evaluated bicycle and pedestrian accessibility using the existing extent of this network.

Bicycle

The MPO's bicycle network includes bike lanes, multi-use paths, and shared roadway facilities. The analysis focuses on actual, designated bicycling facilities and does not focus on areas that do not have these facilities, but are in fact bikeable due to the nature of the roadway.

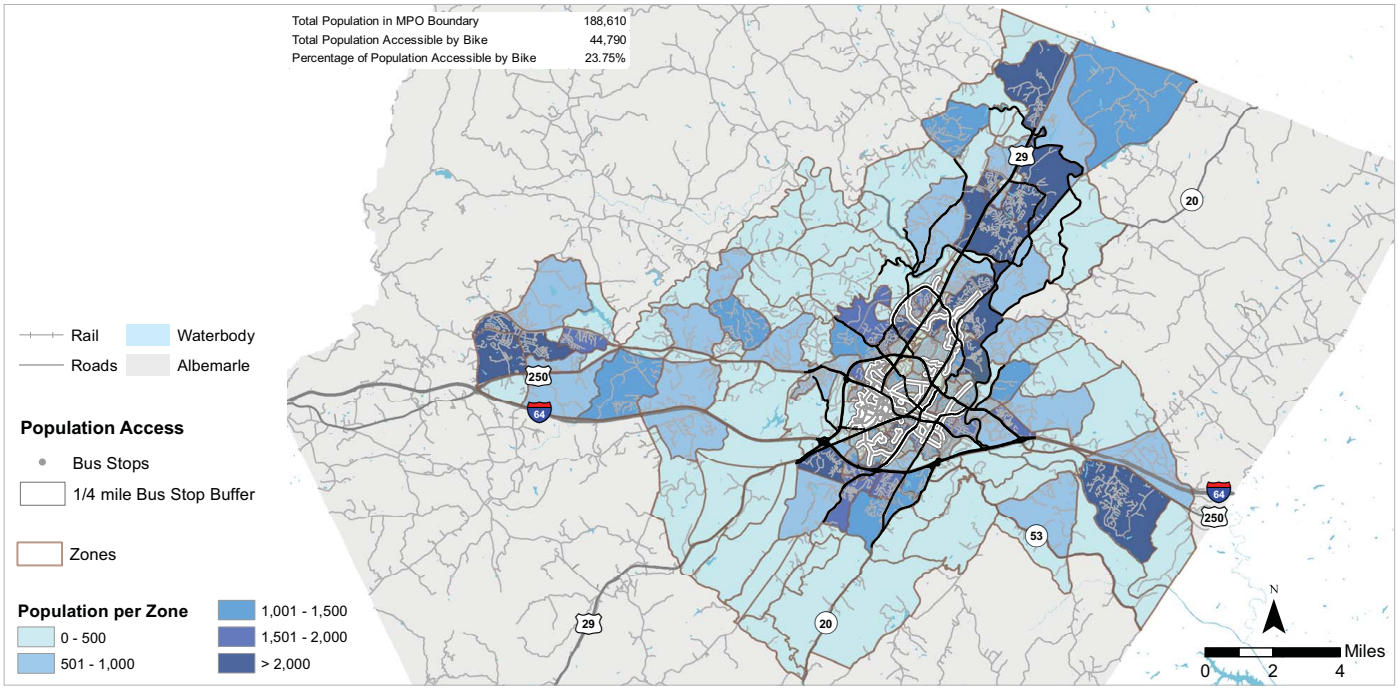
» *Bicycle Accessibility to Population and Employment Maps*

The travel demand model's 2040 data was used to map the population and employment densities forecast for each zone. Dark shades of blue indicate densely populated zones while light shades of blue indicate sparsely populated zones. (Refer to Figure 6-5). Similarly, dark shades of red indicate zones with considerable employment opportunities while light shades of red indicate zones with few employment opportunities. (Refer to Figure 6-6). Existing bicycle facilities were added to each map (thick grey lines), as were barriers to bicyclists (thick black lines).

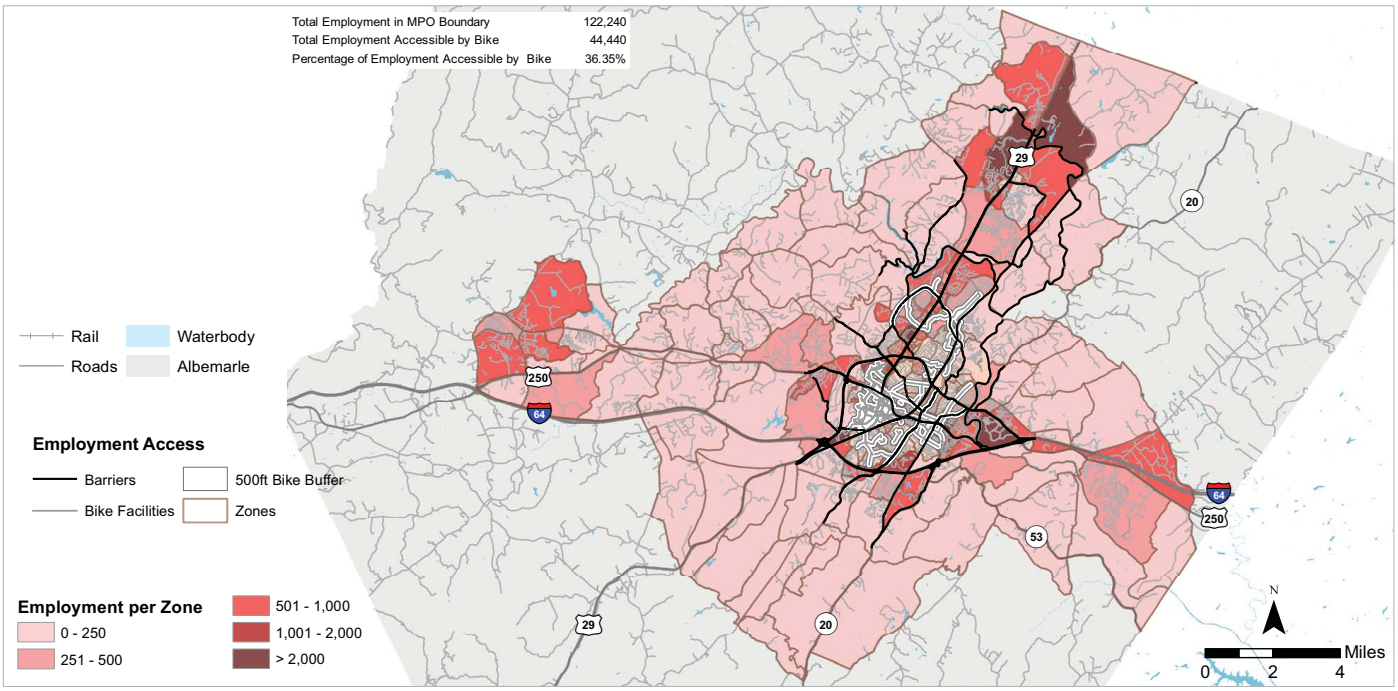
The bicycle facilities were then buffered using a distance of five hundred feet. The population or employment within five hundred feet of bicycle facilities was calculated to determine what percentage of the population or employment opportunities in 2040 would have bicycle access.

Within the MPO, approximately 24% of the population and 36% of employment opportunities are located within five hundred feet of a bicycle facility. However, regional biking tends to be limited to smaller zones due to barriers that prohibit bicycling beyond these areas. Figures 6-6 and 6-7 indicate that the existing barriers extensively inhibit bicycle access throughout the region. These maps are useful in identifying the general areas that would benefit from improved connectivity. Darker shaded zones that lack bicycle facilities or are segregated by barriers indicate areas where improvements to connectivity are expected to be valuable.

2040 Population Access to Bike Facilities (Figure 6-5)



2040 Employment Access to Bike Facilities (Figure 6-6)



Pedestrian

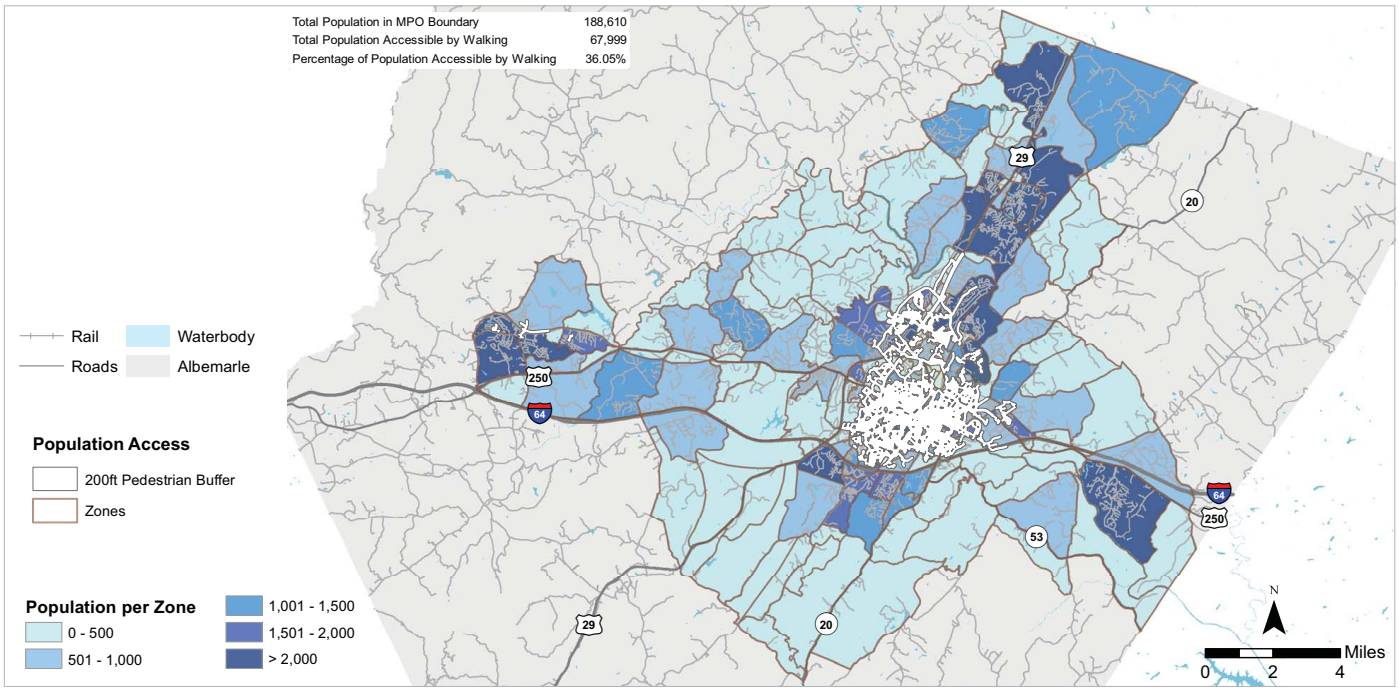
The MPO's pedestrian network includes sidewalks and walkable areas, such as the Downtown Pedestrian Mall. This analysis focused on access to this specific walkable network.

» *Pedestrian Accessibility to Population and Employment Maps*

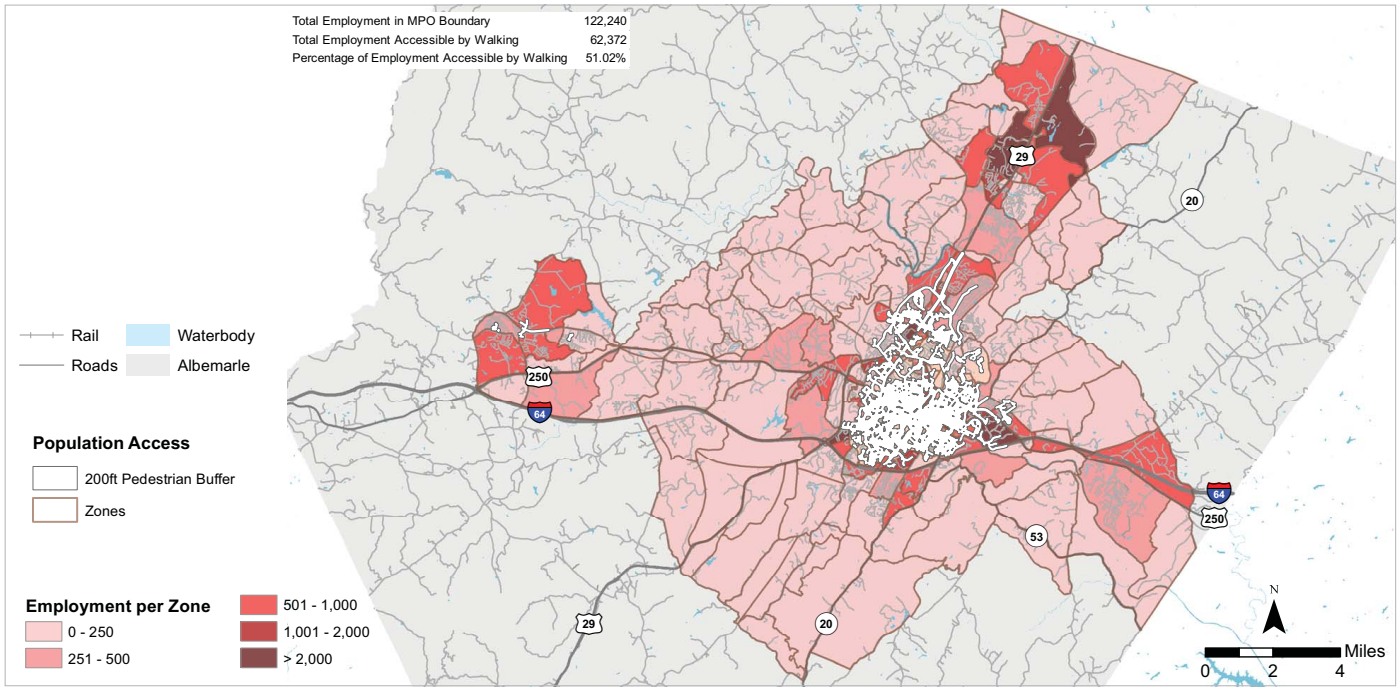
The travel demand model's 2040 population and employment data was used to map the population and employment densities forecast for each zone. Dark shades of blue indicate densely populated zones, while light shades of blue indicate sparsely populated zones. (Refer to Figure 6-7). Similarly, dark shades of red indicate zones with considerable employment opportunities, while light shades of red indicate zones with few employment opportunities. (Refer to Figure 6-8). The existing pedestrian facilities were added to the maps and then buffered using a distance of two hundred feet. The population or employment within two hundred feet of pedestrian facilities was calculated to determine what percentage of the population or employment opportunities in 2040 would have access to a sidewalk or walkable area.

Within the MPO, approximately 36% of the population and 51% of employment opportunities are located within two hundred feet of a pedestrian facility. The regional pedestrian network, while extensive, is missing links or extensions that would make the network more effective for the region. These maps are useful in identifying the general areas that would benefit from improved pedestrian connectivity. Darker shaded zones that lack pedestrian facilities indicate areas where an improvement to connectivity is expected to be valuable.

2040 Population Access to Pedestrian Facilities (Figure 6-7)



2040 Employment Access to Pedestrian Facilities (Figure 6-8)



Conclusion

The Transportation Deficiency Analysis provided the MPO with a starting point for considering the most vital and beneficial regional transportation improvements to be considered for the 2040 Long Range Transportation Plan. From this analysis, staff learned that roadway improvements need to be targeted at key locations throughout the region such as the US 29/US 250 Bypass or US 250 at Pantops and Shadwell. Regarding transit improvements, staff inferred that the transit access within the urban area is relatively robust; however, it would benefit from providing access to population clusters outside the urban ring. Staff determined that access via bike facilities is limited due to significant barriers prohibiting connectivity, despite reasonable access to facilities within the urban core. Finally, staff established that the pedestrian network is somewhat limited, and that there are key links missing from the network that could provide greater accessibility.

Staff used this information to develop an initial list of proposed roadway, transit, bicycle, and pedestrian projects targeted at improving these areas. Prospective capacity improvements, i.e. roadway and transit projects, were modeled to evaluate their potential impacts and benefits for the community. These projects are discussed further in Chapter 7. Potential non-capacity improvements, including bicycle and pedestrian projects, were drawn from this study, as well as bicycle and pedestrian improvements listed in existing regional planning documents. These projects are discussed further in Chapter 8.