
Case Study Report

The Master Trails Plan

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Abstract

*Greene County, Ohio, adopted a master trails plan in 2020, intending to develop a safe and connected trail network system in the county. It is a long-range vision for connected trails within the region while considering locally developed plans. The development of these trails provides many community benefits beyond personal mobility, such as public health, economic development, quality of life, and environmental quality. In a car-dominated society, the development of a safe and proper trail system aims to encourage the community to use the trail in order to promote a healthy living style. Comfortable and accessible bicycling and walking provide a host of quality of life benefits. It not only encourages inclusivity by providing a sense of independence in seniors, young people, and those who cannot or choose not to drive but also has been reported the highest level of "commute – wellbeing" by bicyclists and pedestrian commuters. These are based on stress, confidence in arrival time, pleasure, and ease of trip. One of the main goals of the Greene County Master Trails Plan is to develop the **connectivity network between the local, regional, state, and nationwide connections**. It aims to tie the existing trail to the network into on-road bicycle facility infrastructure from the neighborhood to the downtown commercial area. It also aims to create a trail network that is **accessible for all ages and abilities**, encouraging them to use the trail **to promote health and exercise**.*

Keywords

Bicycle path, pedestrian pathway, healthy community, accessibility

1. Introduction

1.1. Expanding the trail system

Greene County already has an established system of trails with four major trails converging at Xenia Station, which is centrally located in the county. The trails that cross Greene County are part of the nation's largest network of paved trails. Regional trails include Creekside, Xenia-Jamestown Connector, along with the Little Miami Scenic and Prairie Grass, which are both parts of the statewide Ohio-to-Erie Trail. These major trails, as well as local bikeways and sidewalks, help connect residents and visitors to everyday and major destinations such as downtowns, neighborhoods, schools, work, and open spaces. The existing network builds a solid foundation for the expansion of the network, especially between some cities and villages that are not currently connected via bicycle facilities. Greene County sees thousands of bicyclists every year on its trails, with a daily average of up to 281 bicyclists on its busiest trail. More people are walking and biking for everyday needs and there is increased recognition of the benefits of active transportation. In addition to the existing high ridership in Greene County, there has been an increased interest in biking and walking during the COVID-19 pandemic. Expanding the trail network will have both health and economic benefits.

1.2. Benefit

Active transportation can provide many community benefits, even beyond personal mobility, such as public health, economic development, quality of life, and environmental quality. The Greene County Master Trails Plan addresses the following benefit to the community.

- **Quality of life:** Comfortable and accessible bicycling and walking increase the number of travel options for everyone and can lead to a sense of independence in seniors, young people, and others who cannot or choose not to drive. Bicyclists often report greater satisfaction with their commute than people who drive to work (Willis, 2013). In communities that have invested in bicycling and walking infrastructure, bicyclists and pedestrian commuters report the highest levels of “commute well-being,” which is a measure of commute-based stress, confidence in arrival time, boredom or enthusiasm, excitement, pleasure, and ease of trip.
- **Physical Health:** According to the U.S. Health and Human Services Department’s (USHHS) Physical Activity Guidelines for Americans, 150 minutes of moderate-intensity aerobic activity (for example, brisk walking) each week reduces the risk of many chronic diseases and other adverse health outcomes (DOH, 2008)¹. For young people ages 6–17 the USHHS recommends participating in at least 60 minutes of physical activity every day. Engaging in physical activity beyond these amounts can impart additional health benefits. Being overweight increases an individual’s risk for many chronic diseases, including hypertension, diabetes, and cardiovascular disease (Kearns, 2014). Increased opportunities for recreation and destination-oriented trips using active modes of travel are key to reducing obesity and, by extension, the risk of developing chronic diseases.
- **Mental Health:** Physical activity reduces depression, can improve the quality of sleep, and has been shown to improve cognitive function for older adults (UDH, 2008). While there may be many reasons people feel socially isolated, land use and transportation systems designed around the automobile can exacerbate these feelings. Car dependence reinforces solitary lifestyles and reduces opportunities for positive social interaction in public spaces.
- **Environmental Quality:** Support for bicycling and walking comes in part from concerns about greenhouse gas emissions, stormwater runoff from highway facilities, and other environmental implications of widespread personal vehicle use (NCHRP Report) Shifting to bicycling and walking trips and concentrating development on dense, walkable, and bikeable communities can reduce transportation-based emissions and sprawling land use that impacts the natural environment (FHANBWS, 1993)

2. Project timeline

2.1. Timeline

Developing the Plan began in early 2020 with an assessment of existing conditions and a review of other relevant plans and studies. Public input and technical analysis provided a foundation for recommendations and prioritization of those recommendations. Finally, guidance for implementation was developed.



Figure 1 Project Timeline. Source: Author

3. Vision and Goals

3.1. Connectivity

Connect the existing and proposed trails network to multiple jurisdictions and downtown commercial centers within each jurisdiction. Develop a network that has local (neighborhoods), regional (parks, multiple jurisdictions), state (Ohio-to-Erie trail, State Bike Routes 1, 20, and 23), and nationwide (US Bike Routes 21 and 50, Great American Rail Trail) connections.

3.2. Safety and Accessibility

Create a trail network that is accessible for all ages and abilities, such as off-road trails, separated/protected bike lanes, and bicycle boulevards. Support Complete Streets by encouraging jurisdictions to adopt Complete Streets Policies or consider a complete streets approach in roadway projects

3.3. Programming and Awareness

Build momentum and advertise Greene County Trails as being part of the Nation's largest paved trail network as well as being part of major statewide and nationwide trail networks. Emphasize the trail system as a destination.

3.3. Economic Benefit

Engage local business owners to help build support for on-road protected bicycle facilities to connect trails to downtown commercial centers.

3.4. Wayfinding

Use wayfinding to encourage trail users to visit various city and town centers as well as major parks and other destinations.

3.5. Funding

Explore multiple funding sources to support expanding the trail network as well as programming and advertising trails, including local, regional, statewide, and federal sources. Develop partnerships between the individual jurisdictions, county, and MPO to help leverage funding and expand the trail network.

3.6. Maintenance

Support the creation of cohesive maintenance plan for all Greene County Trails.

4. Existing Condition

Greene County is located east of Dayton, OH has an overall population just over 168,900 with Beavercreek being the largest city (46,942), followed by Fairborn (33,462), and Xenia (26,534). Other cities and villages include: Bellbrook (7,212), Cedarville (4,075), Yellow Springs (3,872), Spring Valley (543), Bowersville (350), and Clifton (116). The median household income of Greene County is \$67,394, approximately 20 percent higher than the state median household income. On average residents spend 20.7 minutes traveling to and from work with 83 percent driving alone, 6 percent carpooling, 5 percent working from home, and 3 percent walking. One percent take public transit and less than one percent bicycle to work. The majority of the population is white (86 percent) followed by black (7 percent), and two or more races (4 percent). 94 percent of residents speak English with the second most spoken language being Spanish (4 percent).

Various plans were reviewed to understand the needs and conditions of each jurisdiction of the county and to incorporate those goals and future network plans into the Master Trails Plan. The plans for the following jurisdictions/regions were reviewed:

- Miami Valley Regional Planning Commission (MVRPC)- Bike Plan Update
- Perspective 2020 – Greene County’s Future Land Use Plan
- City of Beavercreek – Beavercreek Thoroughfare Plan
- City of Bellbrook – City of Bellbrook Comprehensive Plan
- City of Fairborn – Fairborn Comprehensive Land Use Plan Update 2016, Fairborn Thoroughfare Plan
- Sugarcreek Township- Sugarcreek Township 2013 Long Range Land Use Plan
- City of Xenia- Xenia Comprehensive Plan, Plan Xenia Recreation Needs Assessment and Action Plan 2015
- Village of Yellow Springs- Yellow Springs Active Transportation Plan 2019

4. Existing Infrastructure

Greene County has an established system of trails. The statewide Ohio-to-Erie Trail runs from Northeast to Southwest through the county connecting major cities, Columbus and Cincinnati, as well as Cedarville, Xenia, and Spring Valley in Greene County. Beaver Creek and Xenia are connected via the Creekside Trail while the Little Miami Scenic Trail connects Yellow Springs to Xenia. Xenia and Jamestown are connected via the Xenia to Jamestown Connector. Individual cities and villages have networks of trails, on-road bicycle facilities, and sidewalks for pedestrians (Figure 12). This planning process builds on the foundation of the proposed routes by evaluating them further, considering alternatives, and gaining public input.

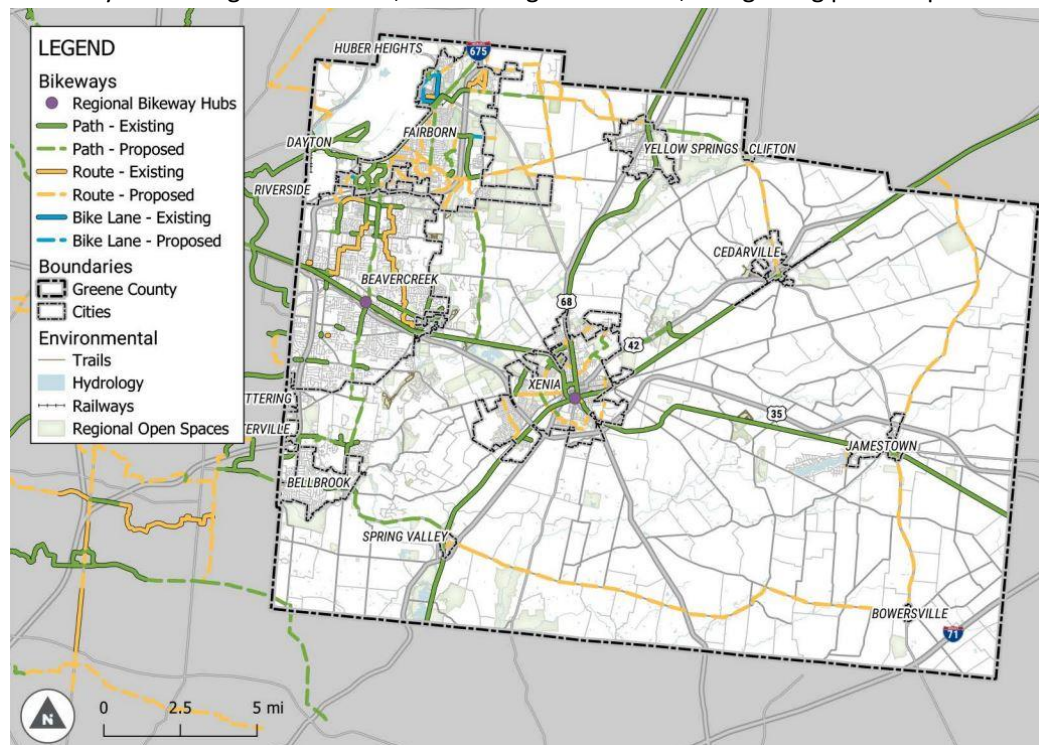


Figure 2 Existing Condition. Source: Author

3.1. Needs Analysis

Lower-income and communities of color are typically the most dependent on active transportation and transit. As part of the statewide active transportation plan, Walk.Bike.Ohio, the Ohio Department of Transportation (ODOT) did a needs and demand analysis for walking and biking at the census tract level. Areas of high need and high demand should be prioritized for bicycle and pedestrian improvements because it is likely that the residents in these areas rely more heavily on active transportation options for having their needs met. Several indicators were taken into account in ODOT's analyses to define Needs including: Minority Groups, Youth, Older Adults, Poverty, No High School Diploma, Limited English Proficiency, and No Access to a Motor Vehicle.

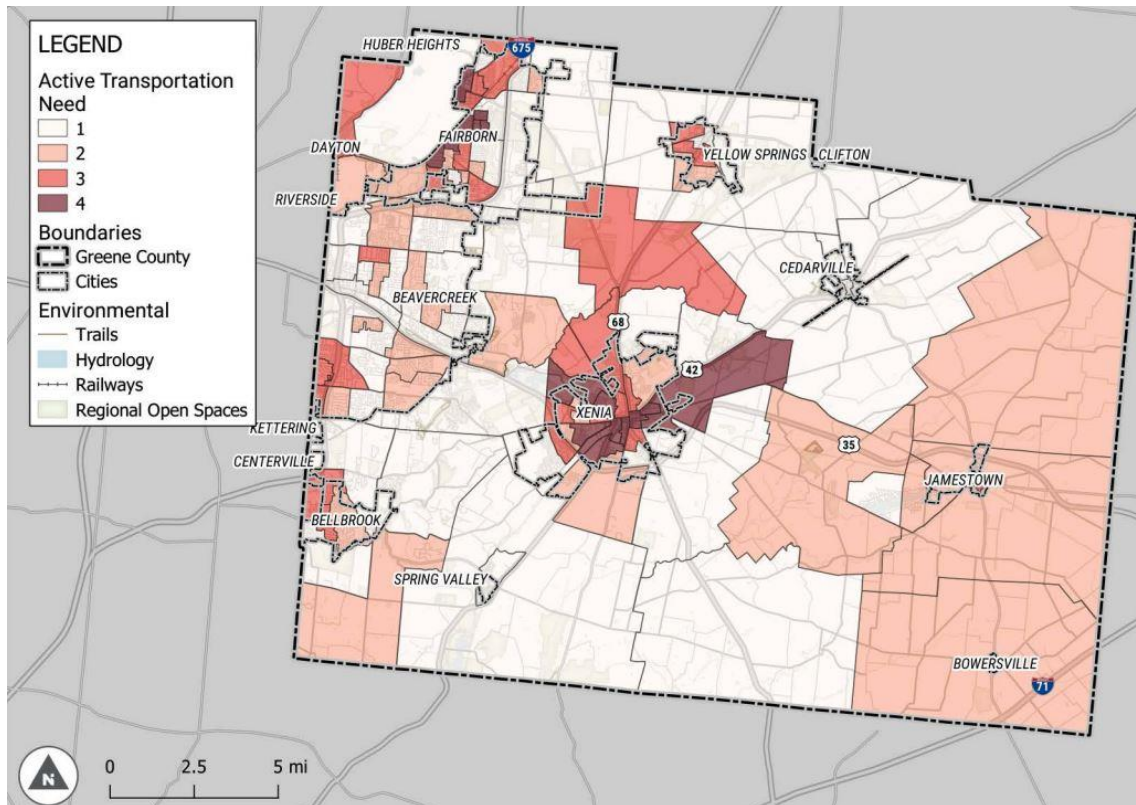


Figure 3 Needs Analysis. Source: Author

3.2. Demand Analysis

Several indicators were taken into account in ODOT's analyses to define Demand including Demand Indicators: Employment Density, Population Density, Walk/Bike Commute Mode, Park Density, Presence of Colleges/Universities, Retail Employment Density, and People at or Below 200% of the Federal Poverty Line.

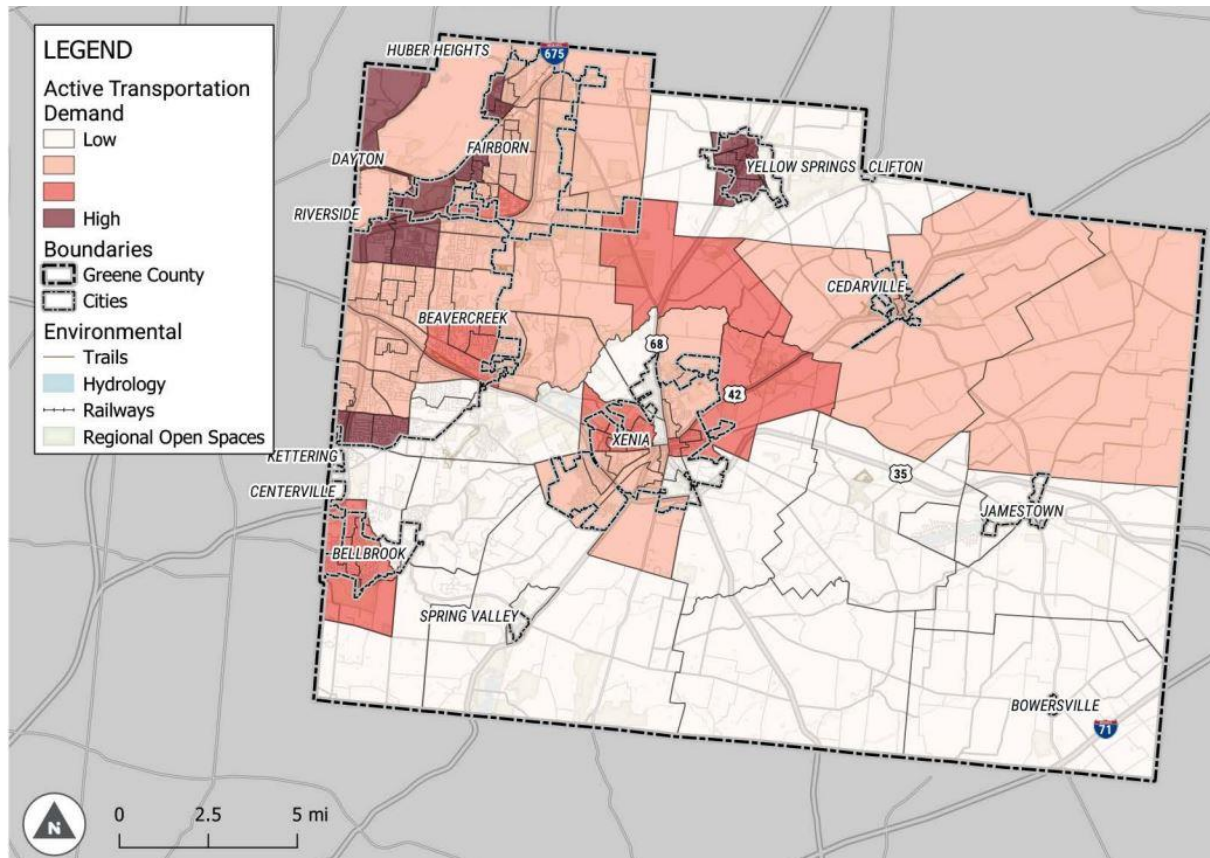


Figure 4 Demand Analysis. Source: Author

3.3. Volume Average Annual Daily Traffic (AADT)

AADT information was available for the major roadways in Greene County. The yellow and green highlighted roads have higher volumes, while the blue and purple highlighted roads have lower volumes (>5,000 AADT). In general lower volume/speed roads are more comfortable to bike on and therefore conducive to mixed facilities (shared lanes or bicycle boulevards), while higher volume/speed roads are less comfortable to bike on and need more separation to accommodate bicyclists of all ages and abilities.

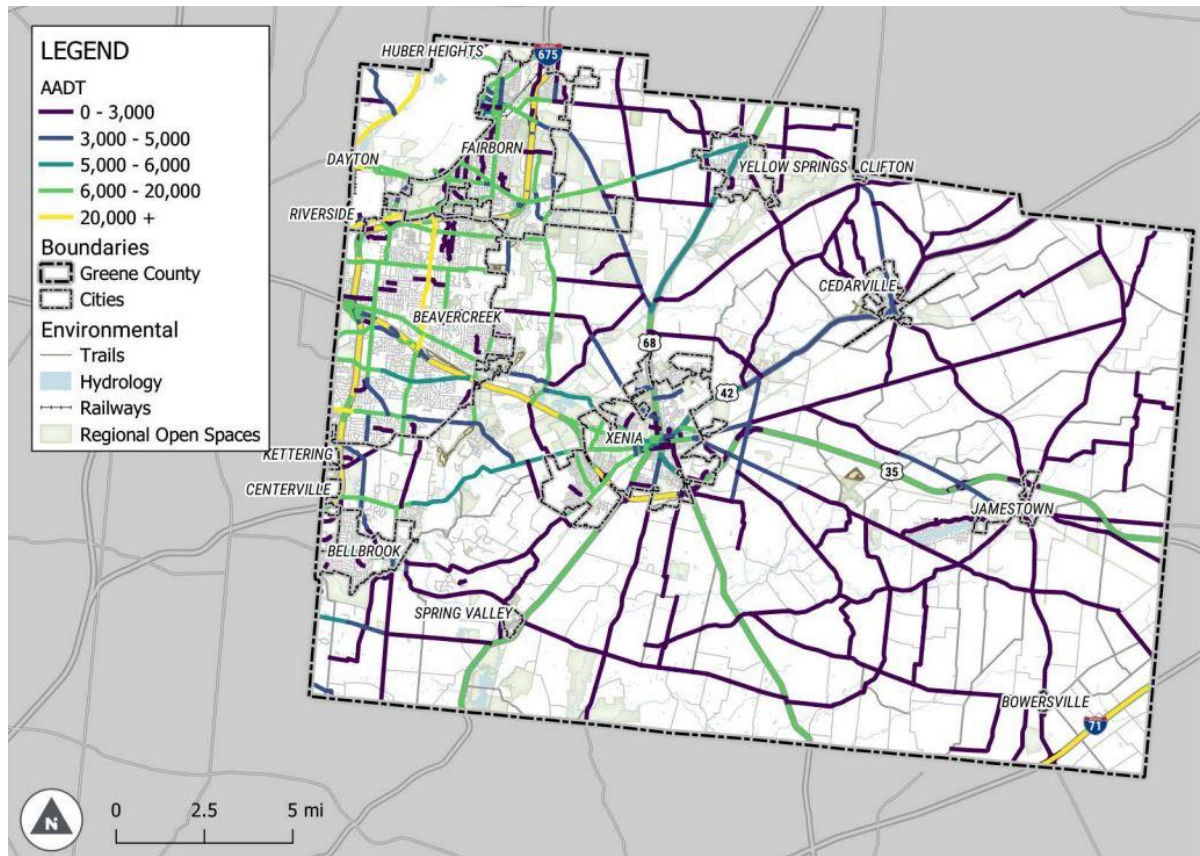


Figure 5 County Traffic Volume. Source: Author

3.4. Speed Limit

Speed data were available for most major roads in Greene County. The darker the line, the higher the speed. Many of the roadways between cities and villages have speeds of 45mph to 55mph. Higher speed and higher volume roadways are not conducive to on-street bicycle facilities, especially if trying to accommodate all ages and abilities. Separated facilities, such as sidepaths are more appropriate for higher-speed roadways.

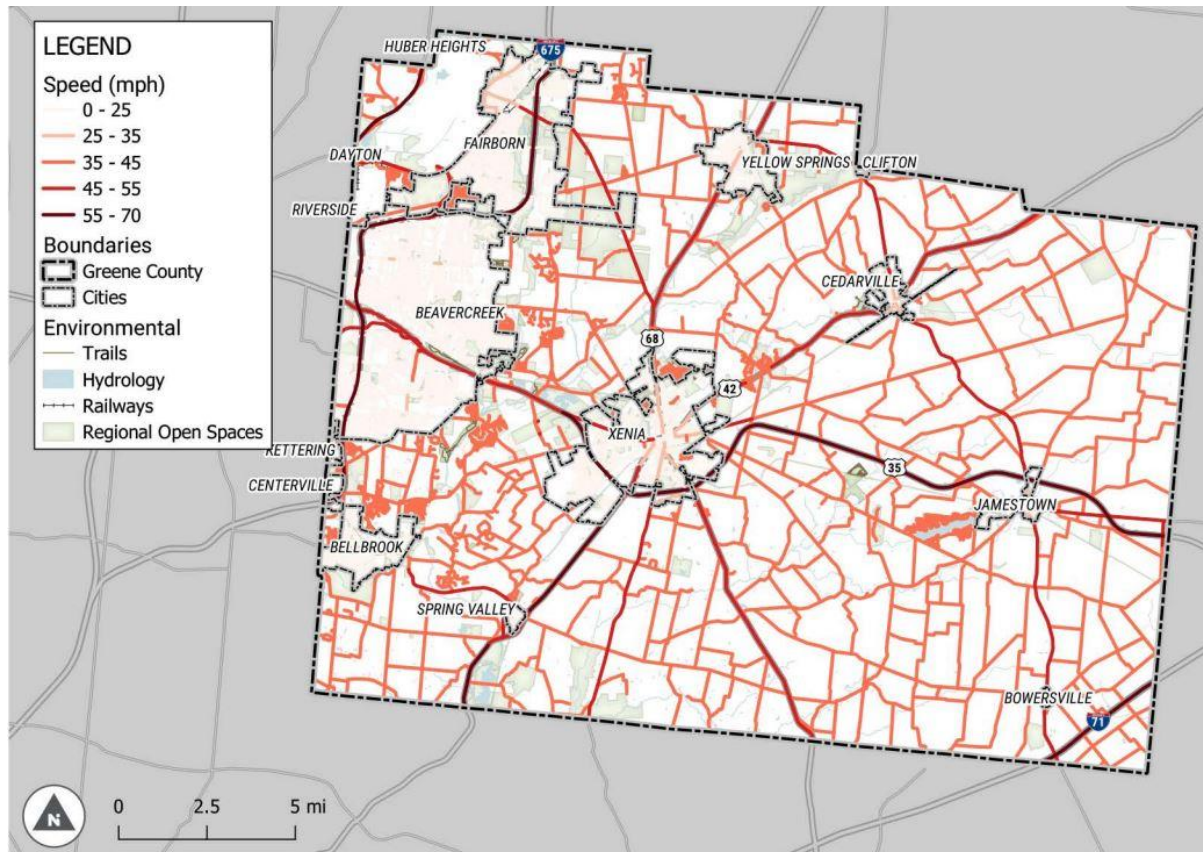


Figure 6 Speed Limit. Source: Author

3.5. Crash Analysis

Bicycle and pedestrian crashes from 2014-2018 are shown in Figure 7. Most crashes are concentrated in individual cities and villages, such as Fairborn, Xenia, and Beavercreek. There are fewer crashes on roadways between cities and villages. As shown in the Volume (Figure 5) and Speed Limit Figure 6, roadways between villages and cities have higher posted speeds and higher volumes, so they likely have much lower bicyclists and pedestrians using them to travel. As mentioned previously, higher speed, higher volume roads are not conducive to mixed traffic and separated facilities should be considered for bicyclists and pedestrians.

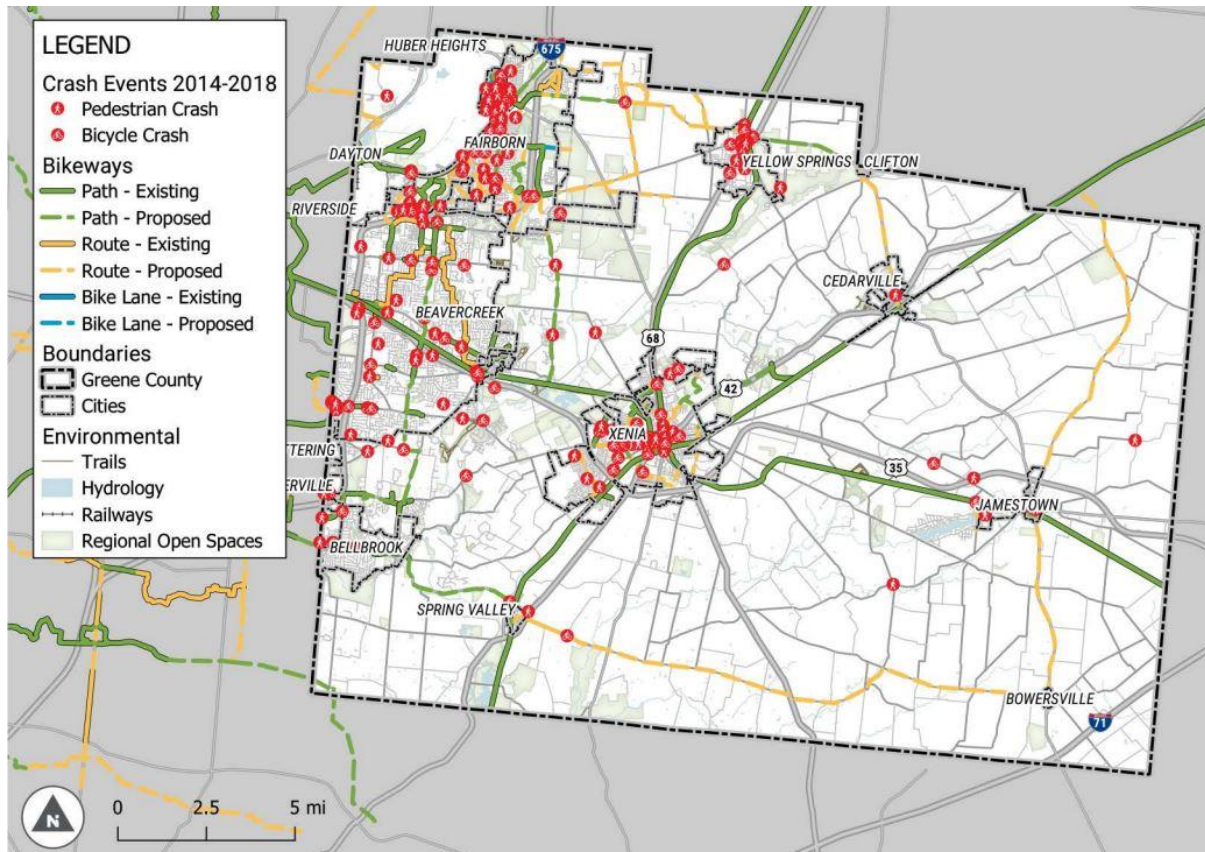


Figure 7 Crash Analysis. Source: Author

5. Community Engagement

Community engagement was an essential tool in the plan development process. Involving the public helped build trust in the Plan and improved the overall quality of the findings. Public input was collected through several methods including Oversight Committee meetings, online maps, and surveys. The public surveys

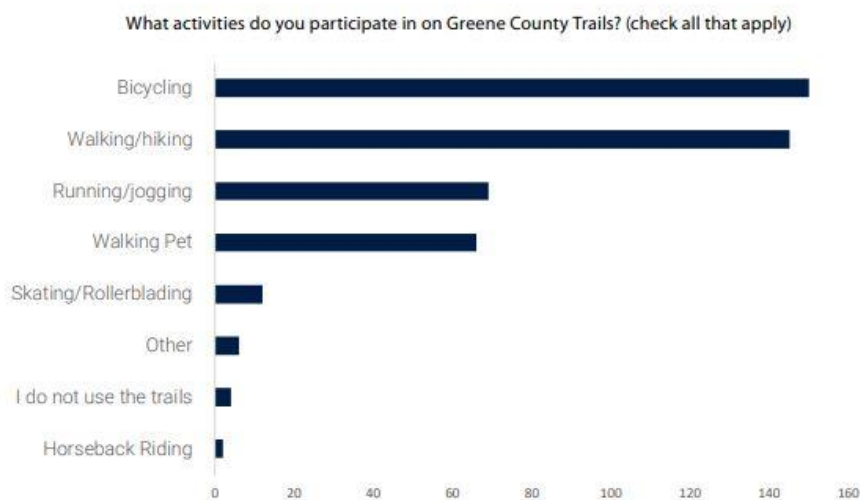


Figure 8 What activities do you participate in on Greene County Trails?

requested background information from each participant to monitor feedback and ensure that results were demographically balanced and targeted marketing could take place when necessary.

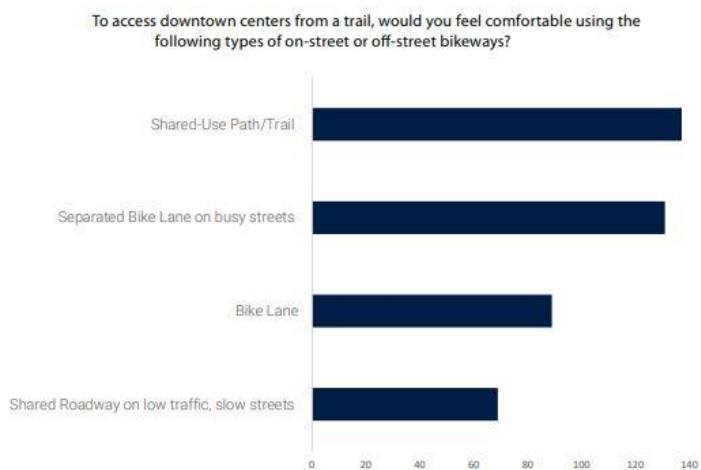


Figure 10 Access to Downtown



Figure 9 Uses of Bicycle

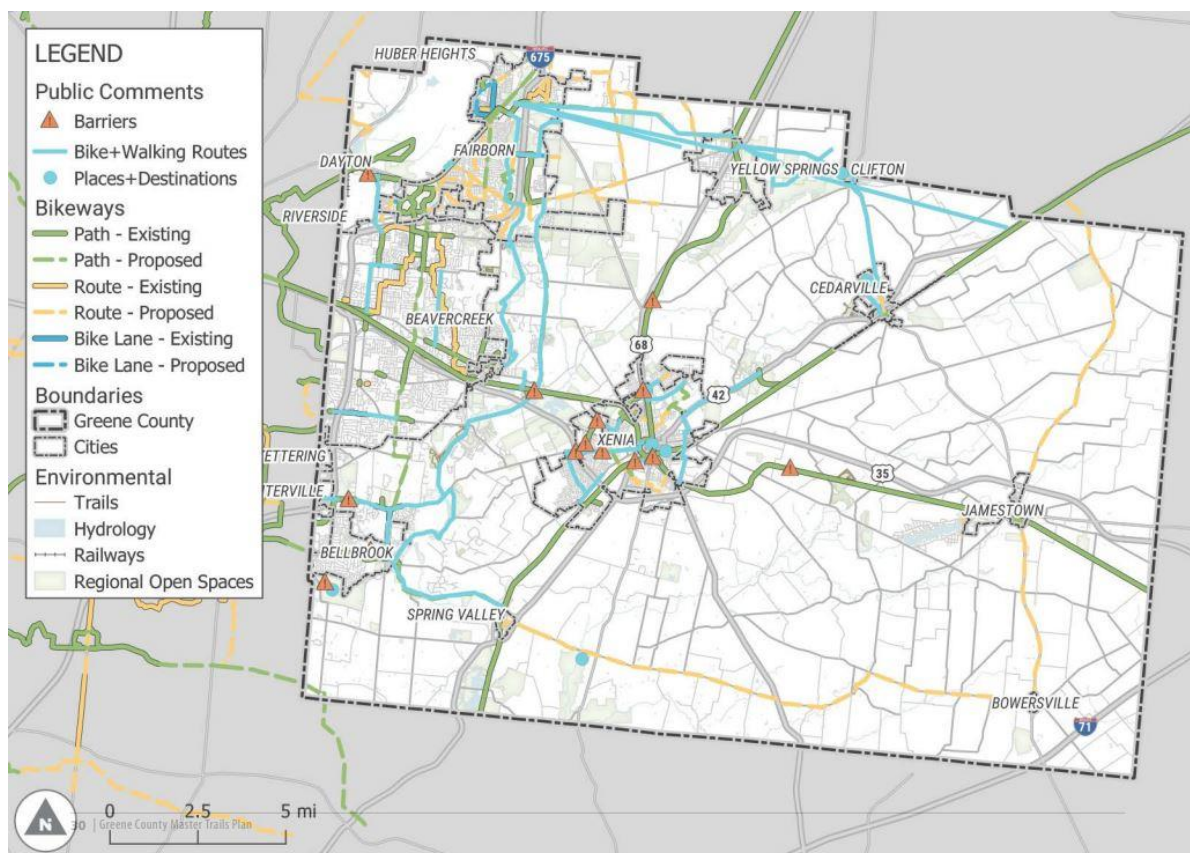


Figure 11 Public Input Result

The above graph illustrates that people prefer shared pathways with trails to bike rather than shared roadway even on low traffic slow streets. The shared bike pathway with trails is safer than the low-traffic

roads. Figure 8 shows that the trails are dominantly used for bicycling and walking and hiking. It is also significantly used for running, jogging, and walking pets. This directly impacts the health of the people using the trails. Bicycling is a form of physical exercise that helps to promote the health of people. The provision of a safe trail network encourages residents to use it more often resulting in more physical exercise and spending time in natural environments. There are many benefits of spending time in nature. It not only provides the opportunity to breathe fresh air but also helps to relax and be mentally peaceful.

6. Recommendation

This plan makes recommendations that will promote and support active transportation through a combination of infrastructure projects, policies, and programs. Recommendations are divided into linear and spot improvements (Figure 12). Linear recommendations include infrastructure on roads (bike lanes), adjacent to roads (sidepaths), or off-road (shared use paths, trails). Spot improvements include recommendations such as crossing and intersection enhancements. Infrastructure recommendations refer to physical, built projects that will change how roadways are configured to provide space for all roadway users. Policy and program recommendations aim to re-prioritize walking and bicycling and change the culture around active transportation while increasing its use through engagement, education, encouragement, and evaluation.

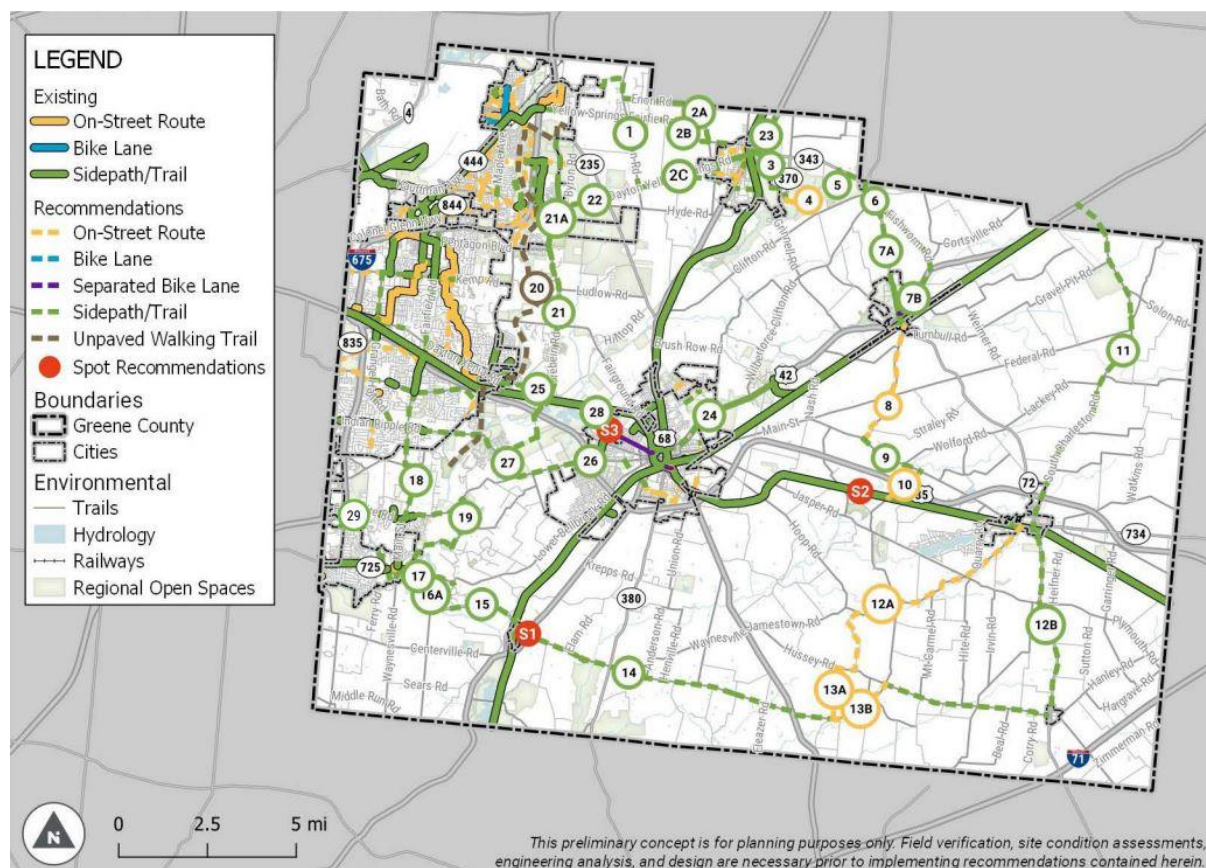


Figure 12 Network Recommendations

6. Implementation

According to the University of Wisconsin Population Health Institute, Greene County ranks 8th out of 88 Ohio counties in terms of health. The benefit of trails and their direct impact on physical health is evident. Since the adoption of the Master Trails Plan in 2021 several routes have been constructed. The Master Trails Plan is taken into high consideration during the review of any new development project. Proposed projects that are situated on a recommended trail route are required to comply with the Master Trails Plan. Many local governments use resolutions to require new developments to build or pay for active transportation infrastructure including trails or shared use paths as part of the approval process. At Greene County Regional Planning, the approval of subdivision and land development applications is conditional based on their compliance with a recommended route. The county has received positive feedback on the trails and their usage. It has helped residents of varying ages travel independently. The trail has also been the attraction factor for developers as well as potential homeowners. Since the adoption of this plan, every new subdivision that has developed along the corridor has not only complied with the plan, but incorporated internal trail systems to provide residents with off-street options to access the trail network.

Phase 1 of the Spotted Turtle Trail, 4 miles (number 20 in the Master Trails Plan) is completed in Beavercreek. The entirety of the trail aims to be completed in approximately 5 years. The parks and reserves within the wetland corridor will have a variety of enhancements and facilities that will attract local tourists for outdoor activities and protect the ecosystems along the river corridor and adjacent wetlands. The trail along number 21 in Figure 12 will be starting soon. The trail between Yellow Springs and Clifton numbered 3, 4, and 5 have applied for funding with intentions to begin construction as soon as funding is secured. Similarly, jurisdictions and local partners along trail numbers 15, 16 A, and 17 have also applied for funding to begin engineering.

The continuous implementation of the Master Trails Plan gives positive encouragement to the residents of Greene County. Ohio participates in events and identifies October of each year as Walk and Bike to School Month, and many cities and villages designate every May as Bike Month. When a majority of the school participates in a special event, it creates a snapshot of what life could look like if every day was a "Walk and Bike to School Day." Furthermore, Greene County trails are part of the largest paved trail network in the nation. It was identified early on in stakeholder engagement that maximizing on this fact and the economic benefits that can come from Greene County as a bicycle hub is key to this plan.

4. References

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