DELAWARE - MUNCIE

BICYCLE AND PEDESTRIAN PLAN

DELAWARE - MUNCIE METROPOLITAN PLAN COMMISSION

BICYCLE AND PEDESTRIAN PLAN

August 2019

Prepared By:

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URBAN DESIGN + LANDSCAPE ARCHITECTURE | www.reasite.com

FLR
FLATLAND RESOURCES

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Acknowledgements

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Introduction

Below: Cyclists participate in a community ride through Downtown Muncie during the annual Cardinal Greenway Bike Fest

PROJECT OVERVIEW

The Delaware-Muncie Bicycle and Pedestrian Plan provides infrastructure and policy recommendations for Delaware County, Indiana and it's incorporated cities and towns to improve the safety and quality of life for those who live, walk, or bicycle in the county. According to the United States Census Bureau[1], 116,852 people lived the county as of 2015. The largest city in Delaware County is Muncie, Indiana, which consists of 69,010 people, or 59% of the county population. The second largest incorporated area in the county is town of Yorktown, which has a population of 11,210 people, or 9.5% of the county population. Smaller incorporated areas throughout the county include the following:

Albany: 2,107 (1.8%)

Daleville: 1,598 (1.4%)

Eaton: 1,737 (1.5%)

Gaston: 863 (0.7%)

Selma: 839 (0.7%)

The remaining 29,488 (25.2%) residents of Delaware County do not live within an incorporated area.

PROJECT IMPORTANCE

Bicycle and Pedestrian plans are important because they form the working document of future infrastructure and policy improvements for bicycles and pedestrians. Future sidewalks, bike lanes, shared-use paths, and other facilities will enhance transportation, health, environmental, and economical improvements in the county, which will contribute to an overall higher quality of life for residents and visitors.

TRANSPORTATION IMPROVEMENTS

Improvements to local infrastructure for bicycles and pedestrians will allow for more trips or activities to be made by alternate transportation modes. Fewer cars using public streets will relieve some on-going maintenance concerns, if enough people are walking and bicycling rather than driving. The benefits of these efforts are most likely to be realized on local and neighborhood streets.

HEALTH IMPROVEMENTS

The use of alternate transportation modes directly benefits the health of the user. Currently, Indiana ranks poorly compared to the rest of the country, ranking as the 7th highest rate for obesity. Additionally, Hoosiers paid $3.5 billion in obesity-related medial costs in 2012. More concerning, 30% of Indiana youth are considered overweight or obese which would indicate that future obesity related healthcare cost will continue to increase[2]. It is imperative that public infrastructure, both for cyclists and pedestrians, be provided and be intuitive to use so that they are a part of a daily routine.

ENVIRONMENTAL IMPROVEMENTS

Alternate transportation results in the use of less automobile traffic and thus, less greenhouse gas emissions in the environment. Nearly two-thirds of all vehicle trips (63%) have a total travel distance of less than 5 miles. Unfortunately, less than 2% of these trips are

made on bicycle. If infrastructure and policy improvements can be made, a majority of local trips can be car-less and as a result provide for a higher quality environment[3].

Additionally, trees and landscape improvements provided with new sidewalks or shared-use paths improve the quality of the environment as well.

ECONOMIC IMPROVEMENTS

The average cost to own a car rose to $8,469 per year in 2017 according to Experian, AAA, and the Bureau of Labor Statistics. For many residents of Delaware County, the cost to own, insure, and maintain a car is not financially feasible. If properly planned, bicycle and pedestrian infrastructure can link neighborhoods, employers, and destinations; local residents will see a direct financial improvement.

Neighborhoods and business districts with improved public infrastructure such as sidewalks and shared-use paths will have higher land values, as these properties will be considered better connected and more easily accessible.

Investment in public infrastructure is important as a economic driver as well. Cities and towns that have new sidewalks, shared-use paths, and bike lanes may be viewed more favorably by private-sector businesses looking to locate their headquarters.

SUMMARY

A report published by the League of American Bicyclists and the Alliance for Biking and Walking[4], summarizes the importance of alternate transportation modes:

Muncie BikeFest2016 - Photo by Cardinal Greenway Bike Fest

> Bicycling [and walking] is popular across America among all types of people. Communities that have fostered that popularity by providing bicycle infrastructure for transportation and recreation have seen considerable economic benefits by attracting businesses, tourism, and active residents.
>
> Neighborhoods become more desirable when traffic slows down and residents have more transportation choices. Business can encourage shopping among loyal, local customers by making getting there by bike more appealing. Individuals benefit from increased levels of fitness and heath that result in real cost savings and employers have healthier employees who miss fewer days of work.

PLANNING PROCESS

In order to achieve the benefits of Transportation, Health, Environmental, and Economic improvements listed, the planning process was organized into three stages, or phases, of work which included Discovery, Visioning, and the final Master Plan.

During the Discovery phase, numerous reports, plans, GIS data and relevant policies were collected. Public input was collected through surveys, a project website and a WikiMap. On-going meetings with project stakeholders were also held. This phase ended with a public meeting to present the discoveries and to collect public comments.

In the second phase, the draft network recommendations were developed. Public input was reviewed from the previous phase, and summarized. The steering committee reviewed the draft recommendations with the design team and provided feedback. After adjustments, a second public meeting was held to present the periodic results and to collect additional comments.

The last phase of work was the Final Plan, during which the plan was completed, as well as the policy recommendations. Multiple meetings with the steering committee were held to review the project details and to finalize the plan. The research collected during the project phases were organized into the updated plan.

Existing Facilities& Plans

Below: Cyclists ride the Cardinal Greenway during BikeFest 2018 - photo by John Disher

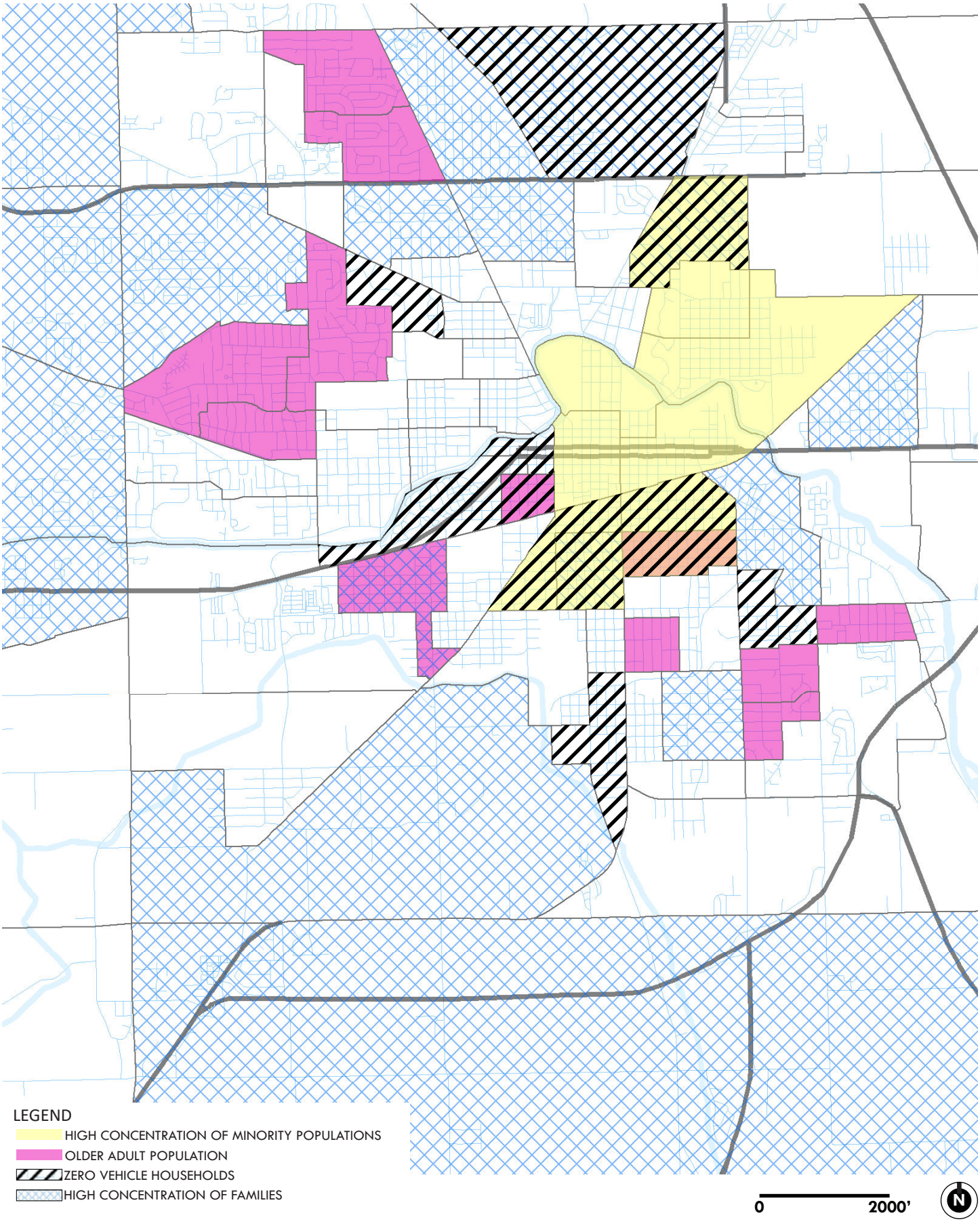
OVERVIEW

Various plans, reports, and studies related to transportation and bicycle and pedestrian connectivity were studied to best understand what currently exists and what is planned for the future in Delaware County and the City of Muncie.

Existing information that was collected include the following:

- Existing Shared-Use Trails and Sidewalks in Muncie and Yorktown
- Safe Routes to School
- Existing Sidepaths
- Average Daily Traffic Figures
- Existing On-Street Bicycle Routes in Delaware County
- Existing On-Street Bike Lanes in Muncie and Yorktown
- Existing MITS Routes
- Proposed Muncie Art and Culture Trail Plan and Phasing
- Delaware County and the City of Muncie Strava Data
- 2013-2040 Delaware-Muncie Transportation Plan
- Residential Density
- Employment Density
- Ball State University Bicycle Master Plan
- Low-Income and Poverty Analysis
- Demographic Analysis

Demographic Analysis



DELAWARE COUNTY POPULATIONS

According to the 2010 census, Delaware County's population is 117,700. Nearly half of the population in Delaware County is between the age 25-64, with the 0-17 year old cohort at 25.1%, the 18-24 cohort at 15%, and the 65+ cohort at 15%, respectively. Delaware County has a higher percentage of population aged 18-24, when compared to other mid-sized communities, due to the presence of Ball State University.

A CHANGING LANDSCAPE FOR FAMILIES TYPE

Delaware County population has declined approximately 10% since 1970. This population decrease is driven largely by a decline in family size. During the 1970s, there were 42,700 "children" in Delaware County ages 0-17 while in 2010, there were 23,600. This is a significant drop in the cohort population and it is a drop that is actually larger than net population decline. This is because there has been growth in the 18-24 cohort (+175 persons) and the 25-65 cohort (+575 persons) and because there has been a significant increase in the 65+ cohort (+6,800). Both reduction in family size and an extended life expectancy is consistent with national trends.

The changes in age distribution has had some impact on geographical cohort concentrations throughout the residential landscape. These distributions have resulted in a shifting demand/need for bike and pedestrian infrastructure.

While the average household size has declined in Muncie, there are areas of the community that have higher levels of family density. These "high concentration" areas of families are distributed throughout the community.

NO VEHICLE POPULATIONS

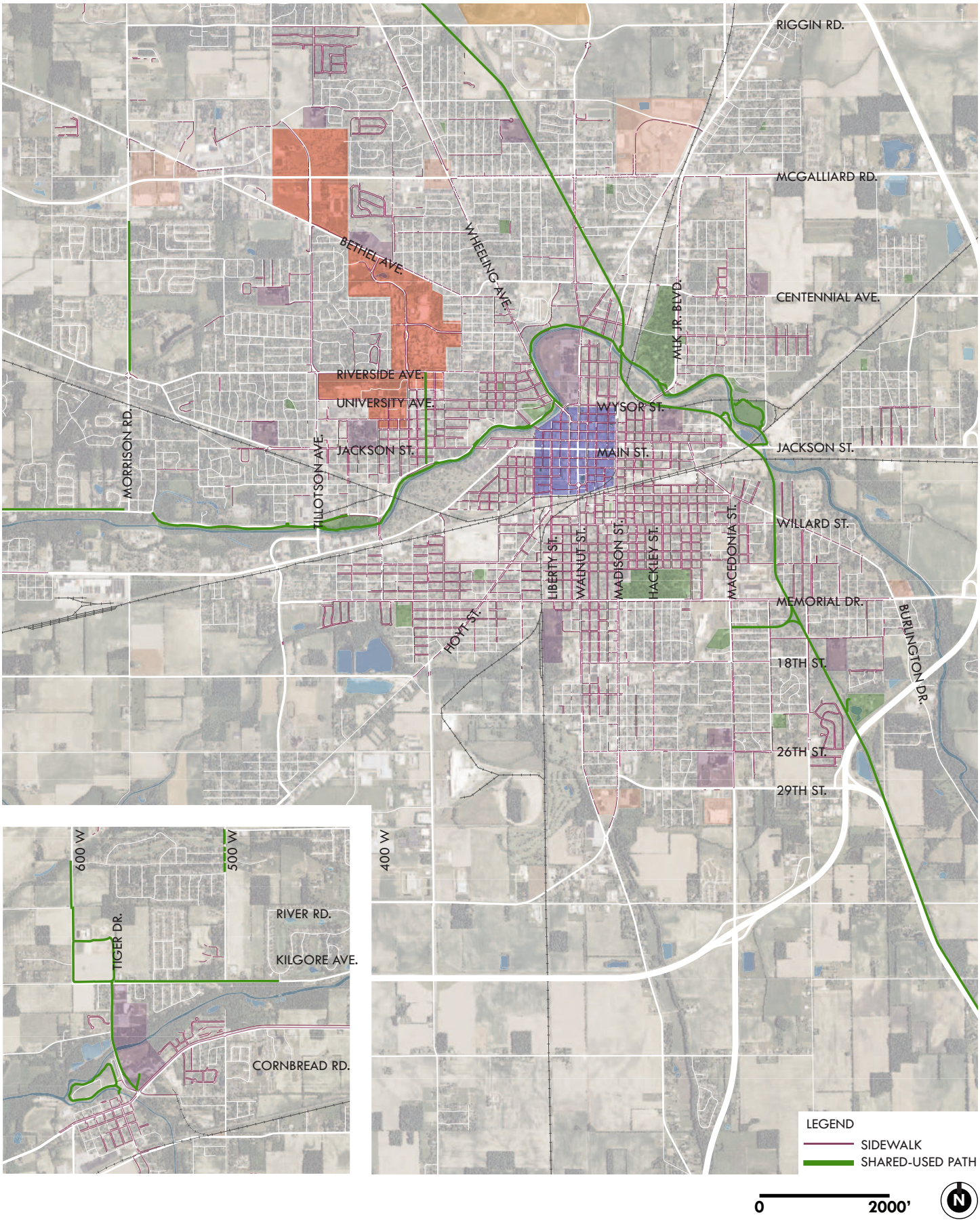
The geospatial isolation from commercial centers is a challenge that is exacerbated for Muncie residents who have no available vehicle or who intentionally limit vehicular travel for social and environmental reasons. This problem is irrespective of age, family size, or minority status. The block groups with the highest percentage of housing units with no available vehicles are also located primarily in historic pre-automobile neighborhoods within Muncie proper. Over 30% of households within these block groups have no personal form of vehicular transportation.

LEVEL OF SERVICE

The commercialized areas of Muncie and Delaware County are generally the largest employment centers. This creates bike and pedestrian safety barriers for all residents, but especially for those that may rely on or choose bike, pedestrian, and/or public transit systems as their primary means of transportation. Conversely, historic/lower density areas of the community have lower volume streets when compared to other areas of the community. Therefore, dedicated facilities may better serve all Muncie residents (regardless of age, family size, and minority status) in high volume commercial areas while on-street facilities may be adequate for the low-volume streets that dominate low-density neighborhoods.

An equitable geospatial distribution of dedicated bike and pedestrian facilities may not maximize the safety and security benefits for all populations.

Existing Shared-Use Trails & Sidewalks - Muncie & Yorktown



SHARED-USE TRAILS AND SIDEWALKS

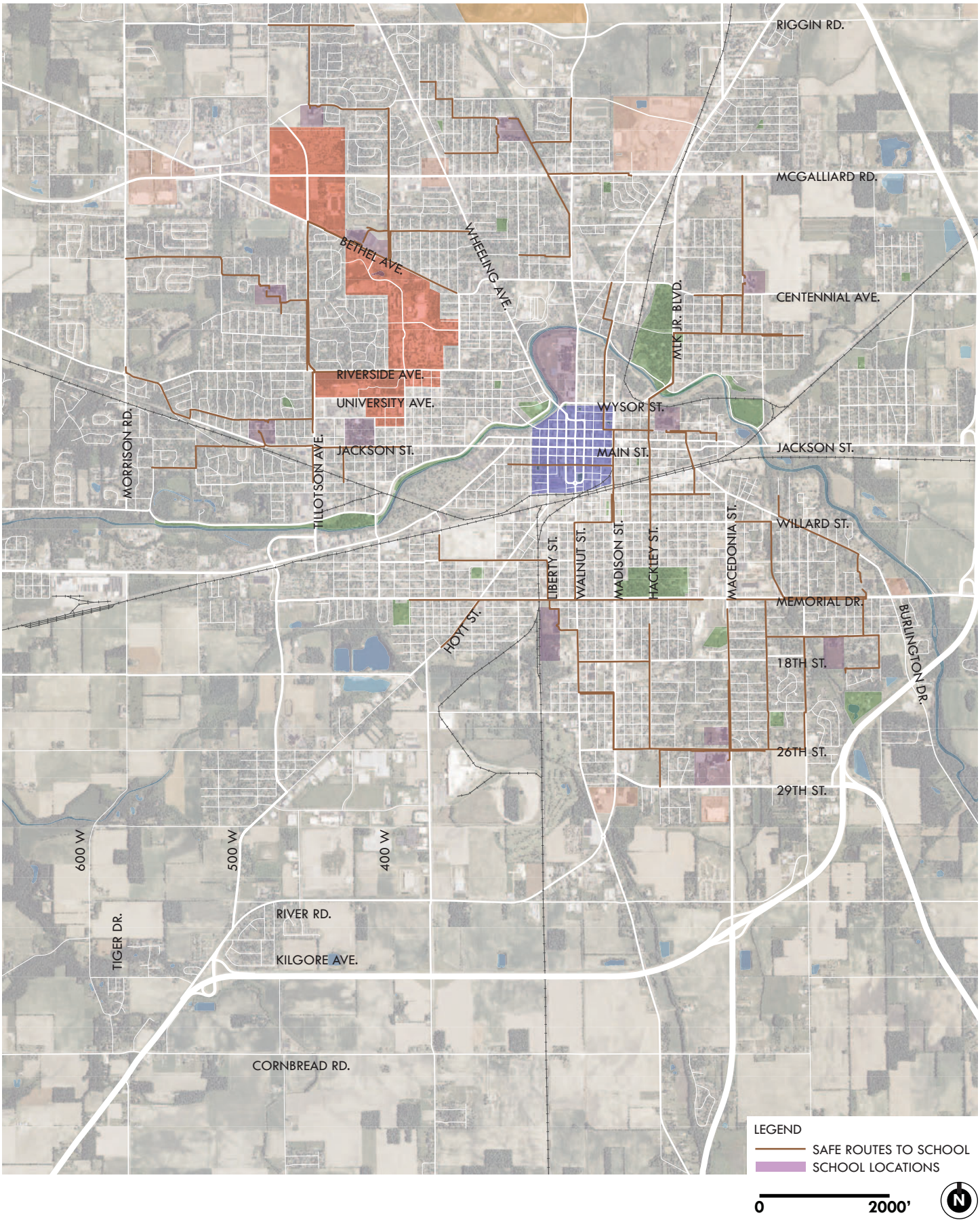
Shared-use paths are intended for cyclists and pedestrians. They should be a minimum of 10' wide, however 8' wide trails may be required depending upon the existing conditions. Shared-use paths also must be a minimum distance from adjacent vehicle travel lanes. This distance varies depending upon is a curb is present, on-street parking, and vehicle travel speeds.

The major shared-use trails in the Muncie and Yorktown area are the Cardinal Greenway and the White River Greenway. These trails have regional connections but also provide important access to local destinations.

Sidewalks are intended for pedestrian traffic only. If located adjacent to the back-of-curb, they must be a minimum of 6' wide. Sidewalks located more than 2' away from back of curb must be at least 5' wide.

Sidewalks also provide the needed infrastructure for pedestrian transportation to local destinations. They are also a very effective means of identifying the edge of right-of-way, or where private property begins. The highest and most dense concentrations of sidewalks is located near downtown Muncie, south of the White River. However, sidewalks are less common and more sporadic the further one travels from downtown Muncie. Similarly, sidewalks are located in downtown Yorktown, but few are located in the surrounding neighborhoods.

Existing Safe Routes to School - Muncie & Yorktown



SAFE ROUTES TO SCHOOL

Safe Routes to School (SRTS) is a nationwide organization and program designed to provide safe routes for children who are walking and bicycling to school. Funding is available for communities and school districts to construct new or improved sidewalk and shared-use path infrastructure.

The location of these routes was considered when developing a Bike and Pedestrian Master Plan for the City of Muncie. If existing SRTS can be further developed as part of a comprehensive trail system, the City could benefit from Federal funding that can be used to develop a proposed network of routes.

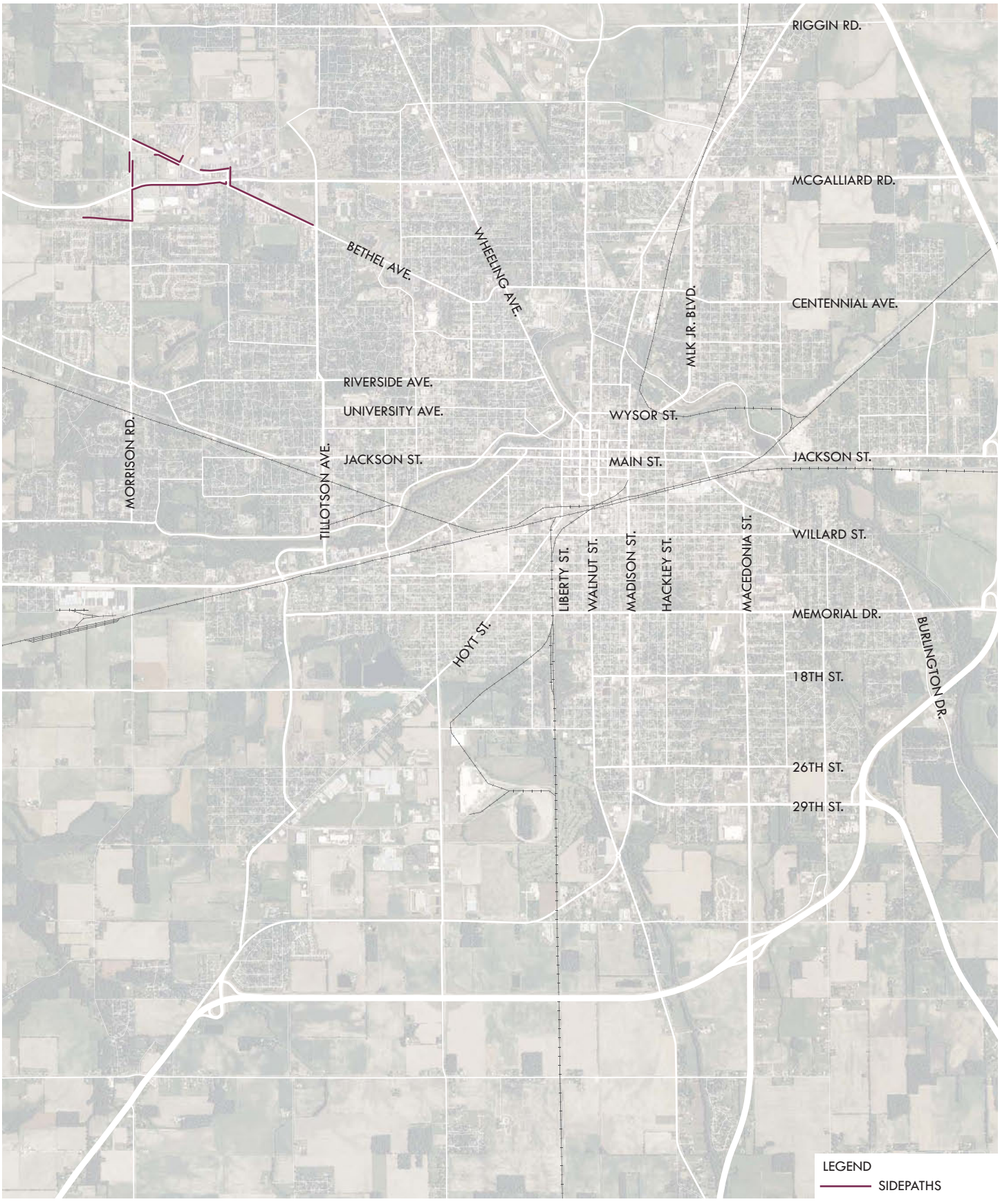
Providing safe dedicated routes for children to get to school has positive health impacts as well. According to the 2016 Indiana Safe Routes to School Guidebook[5]:

> "Walking and biking to school helps children feel more connected to their community and increases their confidence that school is a safe place for learning. Studies have shown kids who walk and bike to school arrive more alert and ready to learn. Bicycling and walking to school helps establish a healthy active lifestyle from an early age. Generally, increased physical activity among school-aged children contributes to their improved health. Furthermore, cities and towns with established SRTS programs report a stronger sense of community identity and increased social skills among the children."

"If the number of kids who walk and bike to school was restored to 1969 levels, our nation would cut 3.2 billion vehicle miles, 1.5 million tons of CO2, and 89,000 tons of other pollutants annually. This is the equivalent of keeping more than 250,000 cars off the road for a year."

- Margo Pedroso,
2008 Safe Routes to School National Partnership

Existing Sidepaths - Muncie & Yorktown



SIDEPATHS

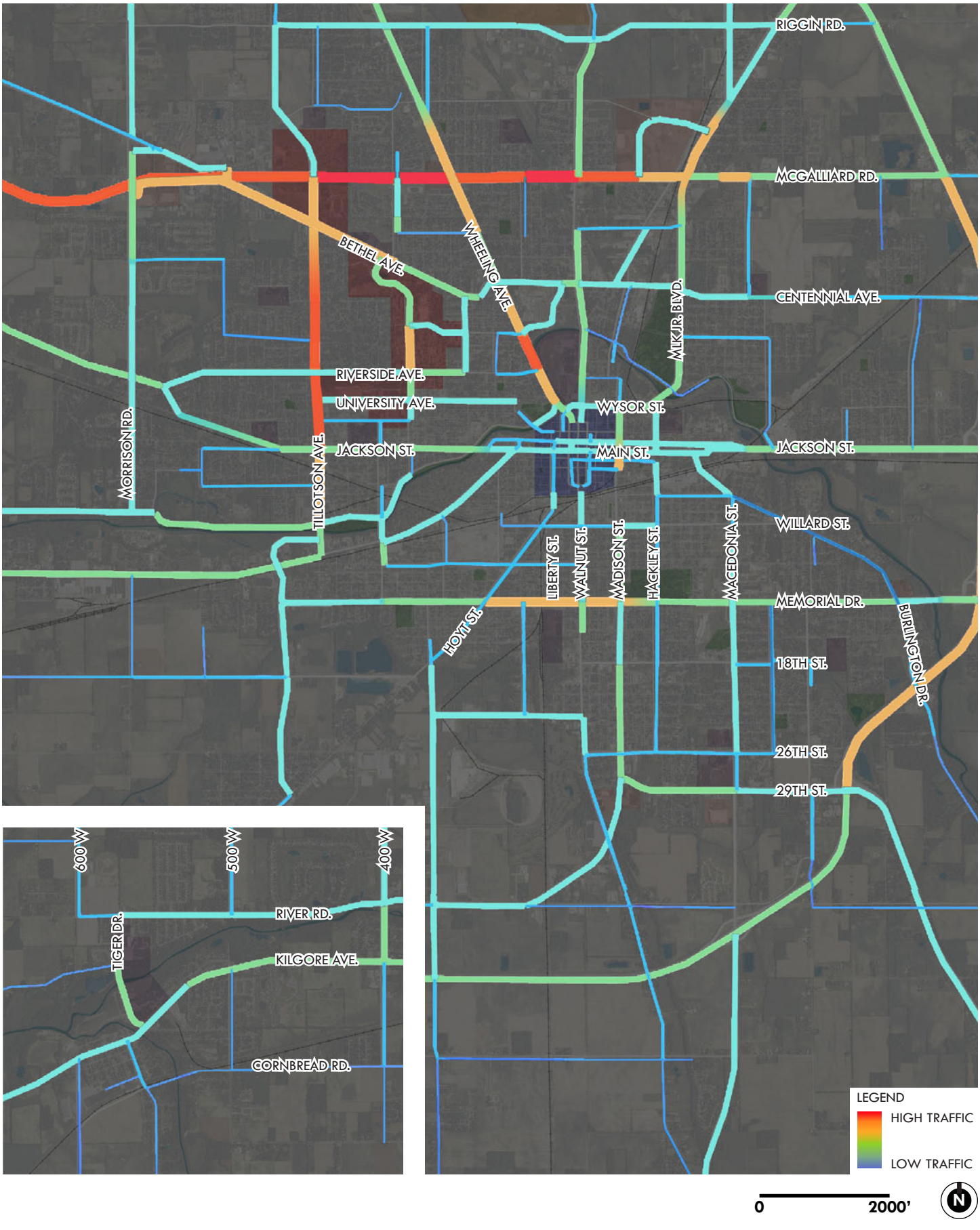
There are various types of paths types that are currently used throughout the City of Muncie. Though generally similar, sidepaths, sidewalks and shared-use paths are unique from one another.

“Sidepaths” have been determined by the City of Muncie and allow for cyclist and pedestrian use, although they may not meet the requirements of a shared-use path. Oftentimes, these paths are adequate width to be considered a shared-use path, but are located closer to the back-of-curb because existing site conditions or right-of-way did not permit or allow for additional setback from the roadway.

The existing sidepaths in Muncie were recently completed with the Morrison-TIF sidewalk plan, near the intersection of Bethel and State Road 332.

However, shared-use paths should be considered the minimum implementation technique for any facility that allows bicycle-use.

Existing Average Daily Traffic Figures - Muncie & Yorktown



TRAFFIC DATA

Existing traffic figures provide a valuable understanding regarding how current roadways function. Wider, faster moving traffic on busy roadways are likely not suitable for bicycle or pedestrian facilities. However, some roadways are much wider than the total amount of traffic they carry.

The thresholds below have been identified by Federal Highway Administration (FHWA) as an initial checkpoint to determine if a road diet may or may not be appropriate.

> **Less than 10,000 ADT**: A great candidate for Road Diets in most instances. Capacity will most likely not be affected.
>
> **10,000-15,000 ADT**: A good candidate for Road Diets in many instances. Agencies should conduct intersection analyses and consider signal retiming in conjunction with implementation.
>
> **15,000-20,000 ADT**: A good candidate for Road Diets in some instances; however, capacity may be affected depending on conditions. Agencies should conduct a corridor analysis.
>
> **Greater than 20,000 ADT**: Agencies should complete a feasibility study to determine whether the location is a good candidate. Some agencies have had success with Road Diets at higher traffic volumes.

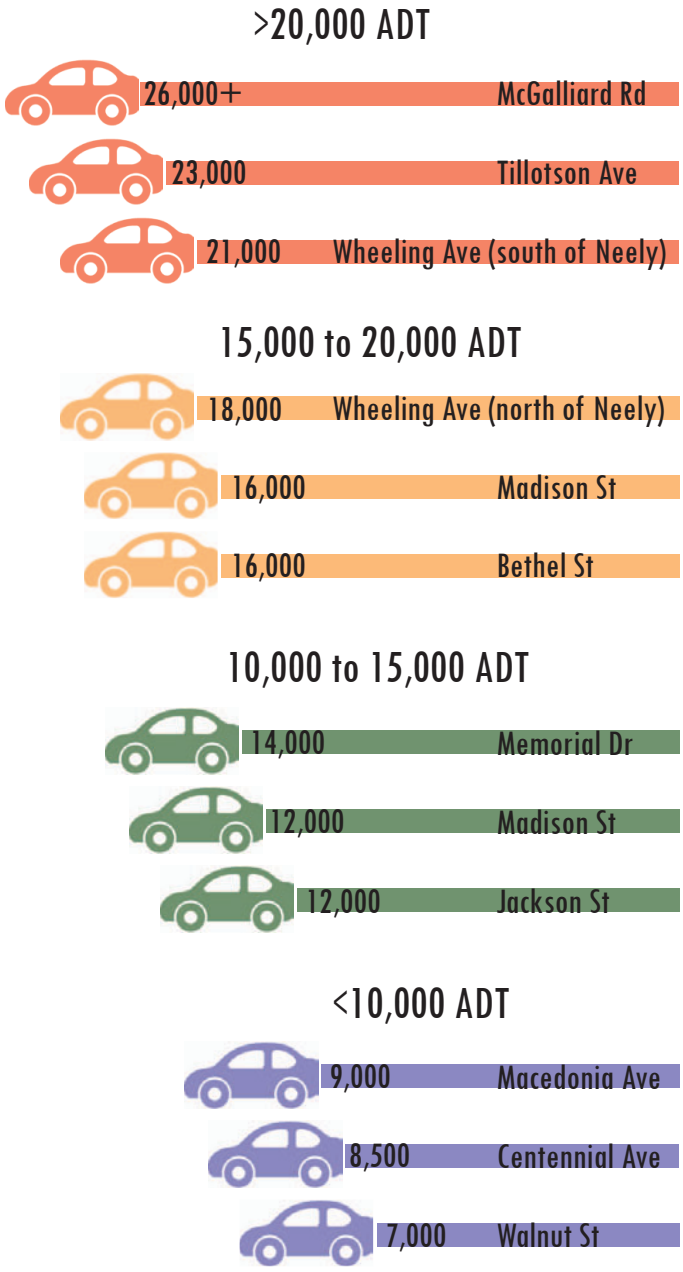
According to FHWA, conversion from four lane to three lane road diets have reduced the number of crashes by 19 to 47 percent.

Road Diets studies may be for specific streets, or supplements to a city's existing plans for best practices. However, some cities have incorporated more detailed road diet information into their own Complete Street policies[6].

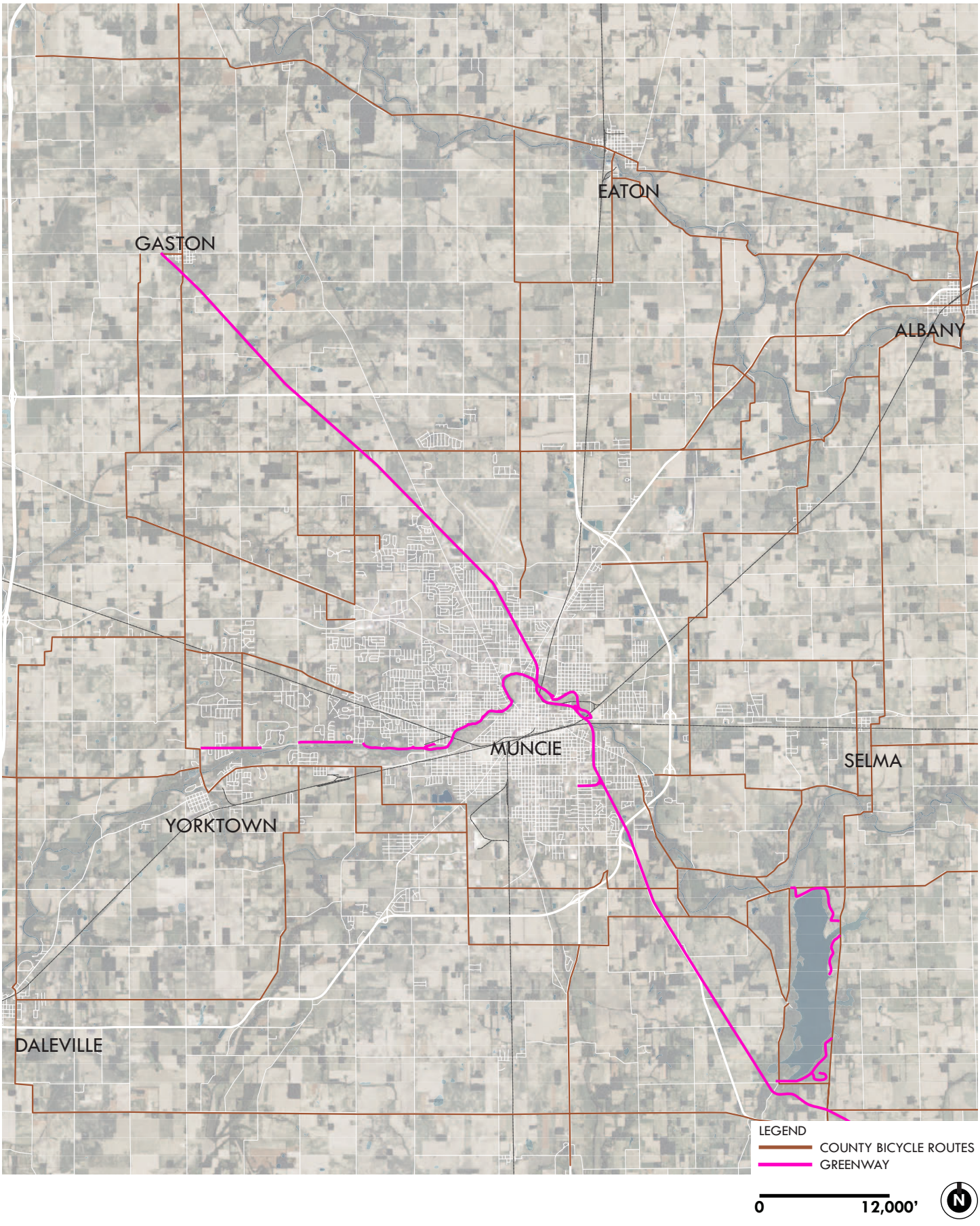
Pavement Resurfacing Schedule

Existing traffic figures can also be used to determine when and how existing streets are maintained. Oftentimes, new pavement markings can be scheduled to occur at the same time as street resurfacing (mill and resurface) projects. Cities with organized resurfacing plans are better able to plan for future routes and implementation strategies.

It is recommended that the City of Muncie determine a schedule for future street resurfacing. A resurfacing plan would allow resurfacing projects to potentially qualify for Federal Funding, especially those streets that include road diet projects.



Existing County-wide Bicycle Routes - Delaware County



COUNTY ROUTES

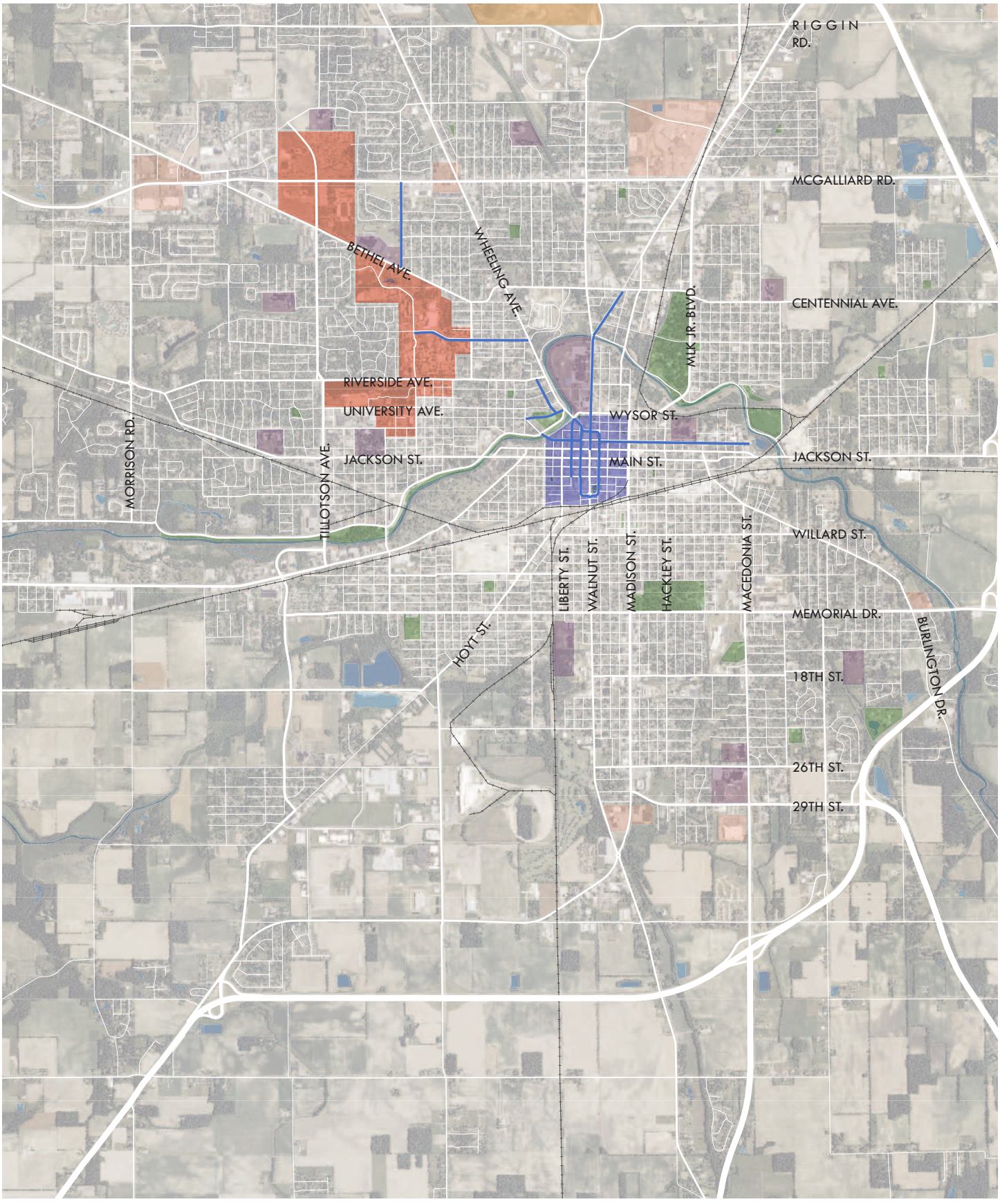
County bicycle routes are on-street routes that utilize existing county roads in Delaware County. These routes are considered preferred as existing traffic counts are low or provide direct access to preferred destinations.

The importance of adopting a plan of county bicycle routes are the connections that are made to rural residents and towns throughout Delaware County. While dedicated bicycle facilities such as the Cardinal Greenway and White River Greenway are valuable off-street routes, it is not financially realistic to provide off-street routes to every neighborhood and town in the county. A plan of county bike routes would provide connections from Muncie and Yorktown to Gaston, Eaton, Albany, and Selma.

The City of Muncie and Delaware County should continue to monitor preferred bicycle routes on county roads to determine if signage or pavement markings should be provided to make these routes safer.

A resource that the County-City can continue to refer to is Bicycle Indiana[7], which promotes, safe bicycling and education of roadway bicycle users in regard to Indiana's bicycling law, and advocates for the rights of all bicyclists in Indiana.

Existing On-Street Bicycle Lanes - Muncie



BIKE LANES

The City of Muncie currently utilizes bike lanes near downtown Muncie and Ball State University. Bike lanes are beneficial to the community as they provide safer routes connecting to local destinations and have also been shown to make vehicle travel safer, as they reduce travel lane width and reduce vehicle speeds as they remind motorists that cyclists may be present[8].

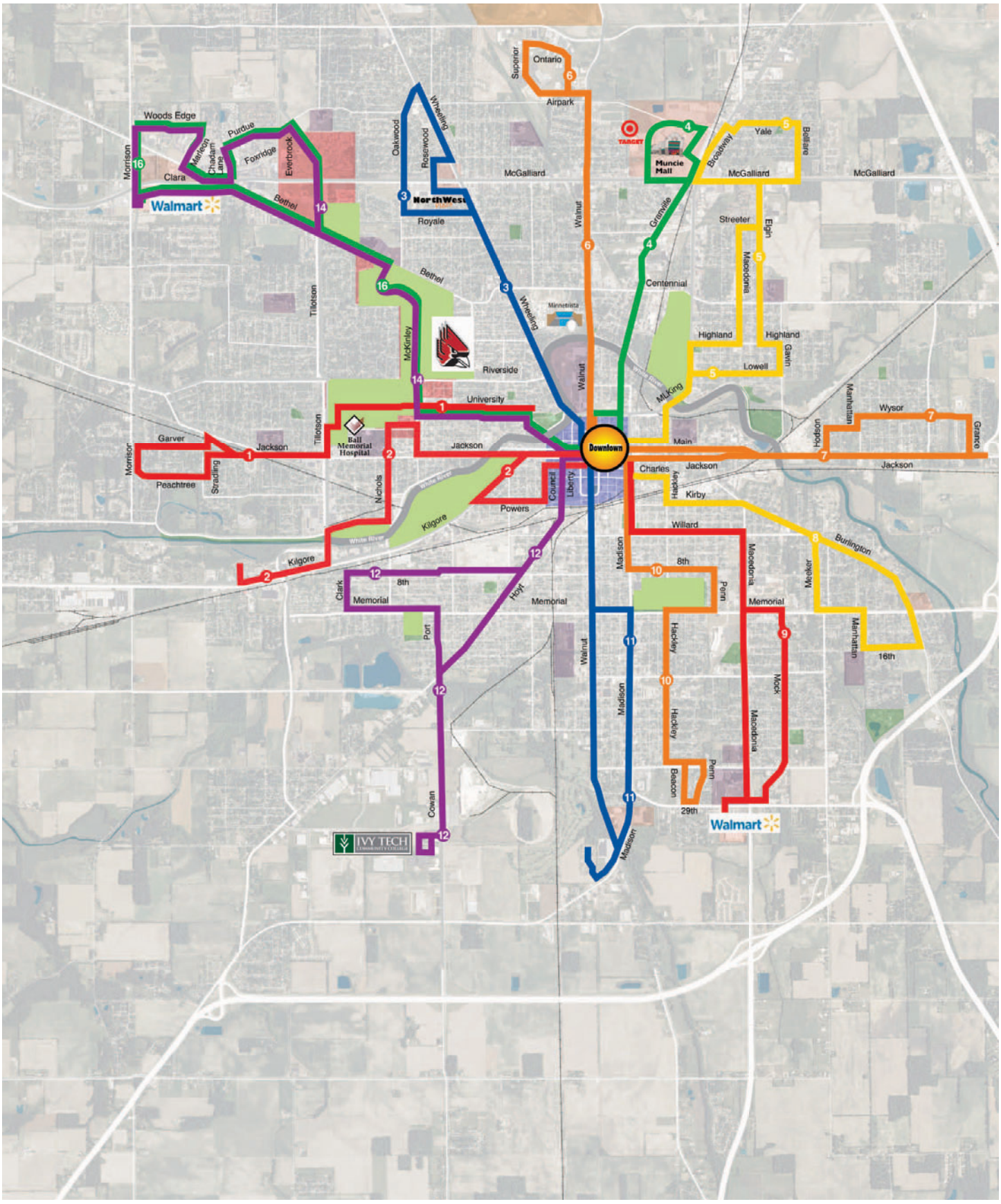
Bike lane pavement markings also provide dedicated space where cyclists can feel safe. By removing cyclists from vehicle travel lanes, motorists and cyclists each feel safer knowing they each have dedicated space for travel.

Current trends have typically pushed for protected or separated bike lanes, as they provide enhanced levels of safety. Depending upon the traffic counts and type of existing roadways, bike lanes may be more than adequate as a safe means of bicycling.

Bike lanes are located on the following streets:

- N. Granville Ave
- N. Walnut St
- High St (one-way south)
- Mulberry St (one-way north)
- Oakwood St
- Neely Ave
- North St (one-way west)
- Alameda Ave (one-way south)

Existing MITS Bus Routes and Amenities - Muncie

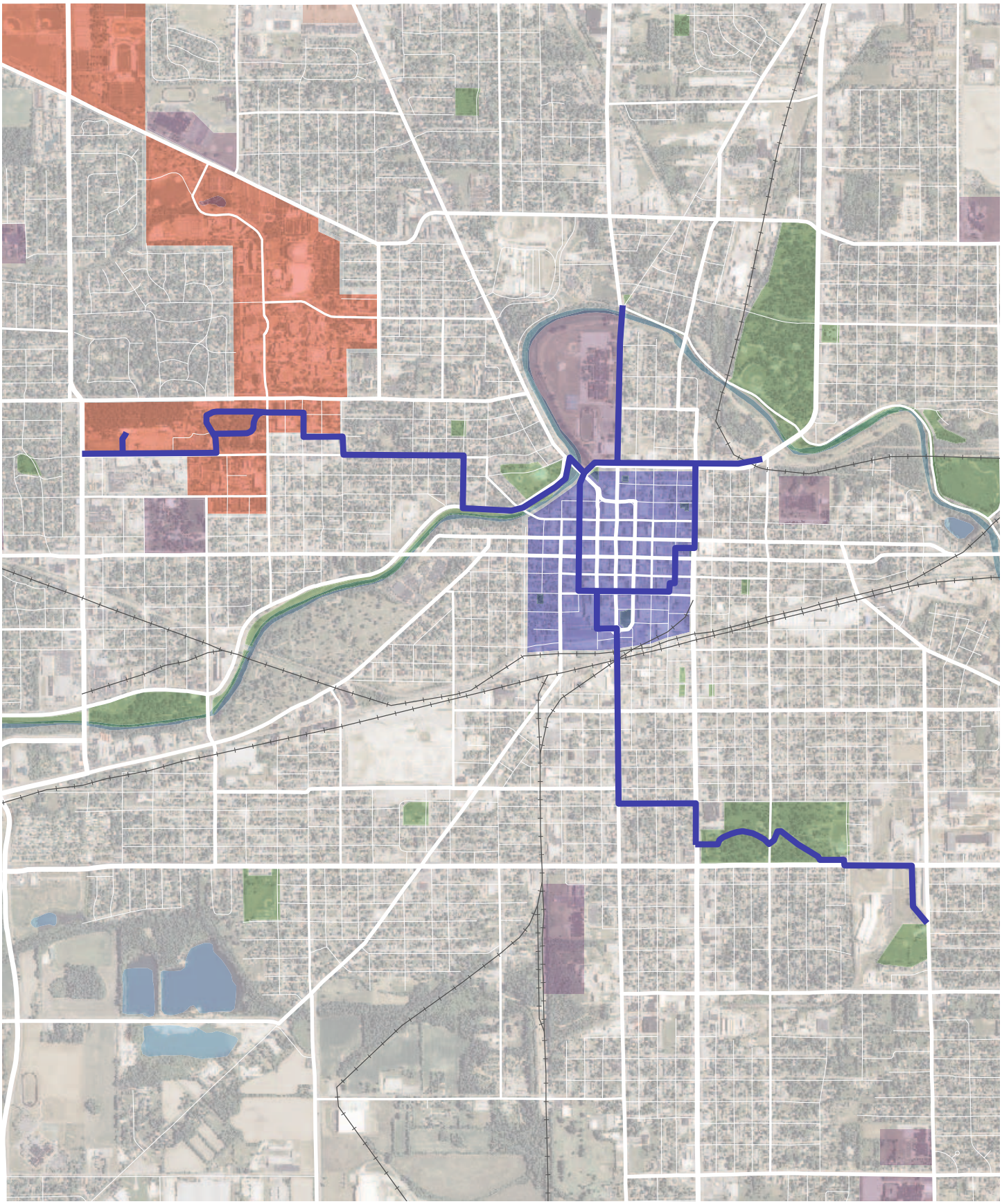


PUBLIC TRANSPORTATION

The Muncie Indiana Transit System (MITS) provides 16 different city bus routes, which connect to a variety of areas and destinations in Muncie. MITSPlus offers door-to-door service for those with disabilities. The following MITS routes connect to a wide range of destinations in Muncie:

1. Ball State University
2. Ball State University and Jackson St.
3. Northwest Plaza
4. Muncie Mall
5. Whitely Morningside
6. North Walnut
7. East Jackson
8. Burlington
9. Industry Willard
10. Heekin Park
11. Southwest Centre
12. Ivy Tech
14. Rural King/Wal-Mart
16. Wal-Mart/Rural King

Muncie Art and Culture Trail Plan



PROPOSED ROUTING AND IMPLEMENTATION

The Muncie Art and Culture Trail (MACT) is a separated cycle track and pedestrian sidewalk system proposed by the city of Muncie. The trail utilizes public right-of-way to connect Ball State University and IU Health Ball Memorial Hospital; downtown Muncie; and the south Muncie neighborhoods and Heekin Park.

The following text is an overview of the project, as noted on page five of the report:

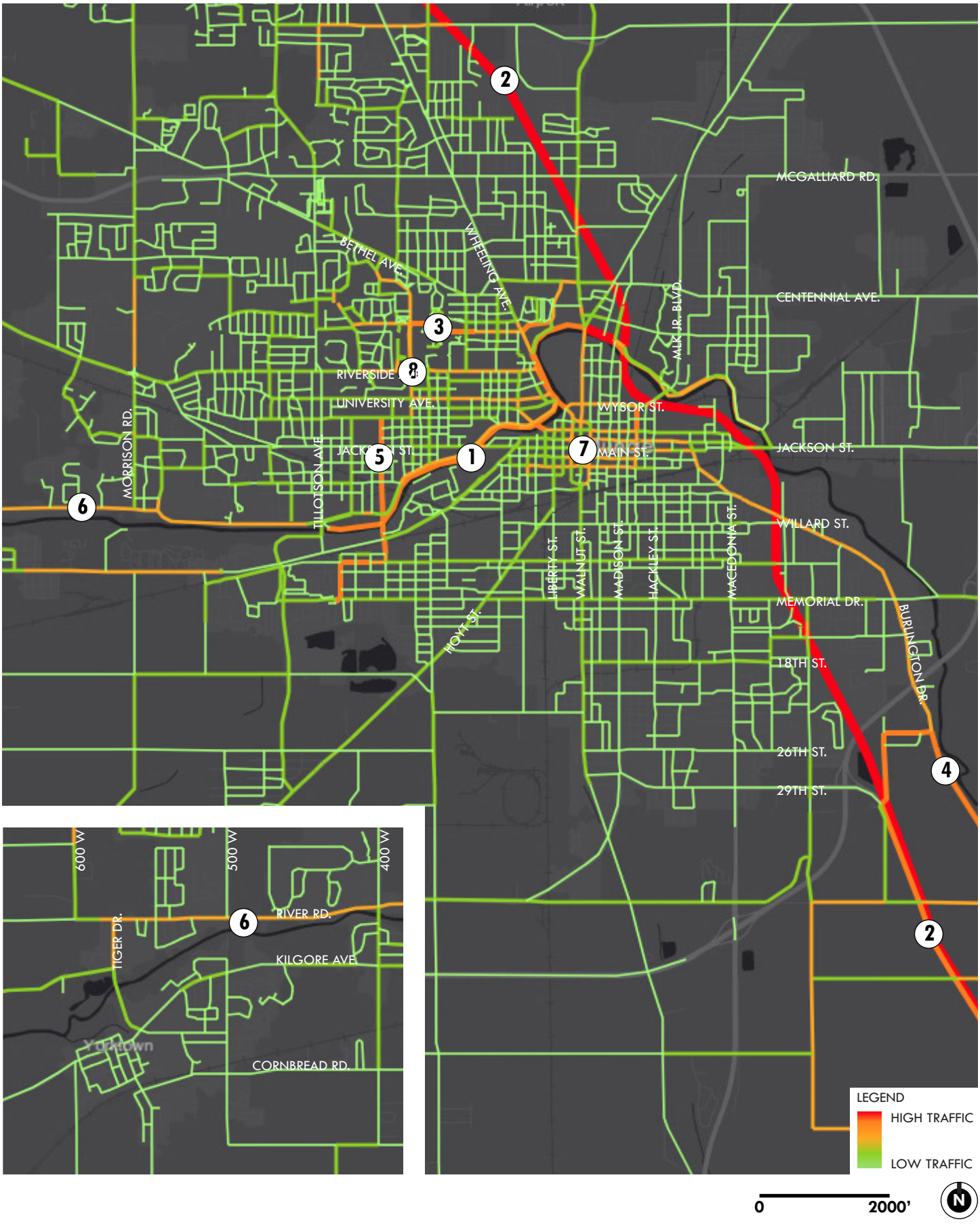
> "Known as the Muncie Arts & Culture Trail (MACT), this facility is intended to be more than a greenway or bicycle lane. The Muncie Arts & Culture Trail is a multi-use path and urban amenity that will become a branding tool and destination facility for the City of Muncie. Designed for use by individuals, children, and families alike, this facility will be separated from the vehicular roadway and will provide opportunities for walkers, joggers, runners, bicyclists, roller bladers, and others to safely access the City's existing bicycle facilities, parks, public art, schools, historic neighborhoods, and business districts."

The White River Greenway and the Cardinal Greenway also connect to the proposed MACT. The recommendations as part of this study also look to connect to the proposed MACT, leveraging the value of the proposed infrastructure.

According to the MACT planning documents, the project is proposed to occur in three phases, but an implementation timeline has yet to be established:

- Connection to Ball State University and IU Health Ball Memorial Hospital
- Downtown Loop
- Heekin Park connection

Existing Bicycle and Pedestrian Routes - Strava Data Yorktown & Muncie



STRAVA DATA - YORKTOWN AND MUNCIE

Strava is crowdsourced data that is provided from users' smartphones or GPS devices. Large numbers of routes have been uploaded reflecting bicycle, running, and walking routes. This information, which can be used to help improve bicycle and pedestrian infrastructure, is available to local city and county transportation and planning officials. The Delaware-Muncie Metropolitan Planning Commission made their information available for this planning study, which is shown on the previous page.

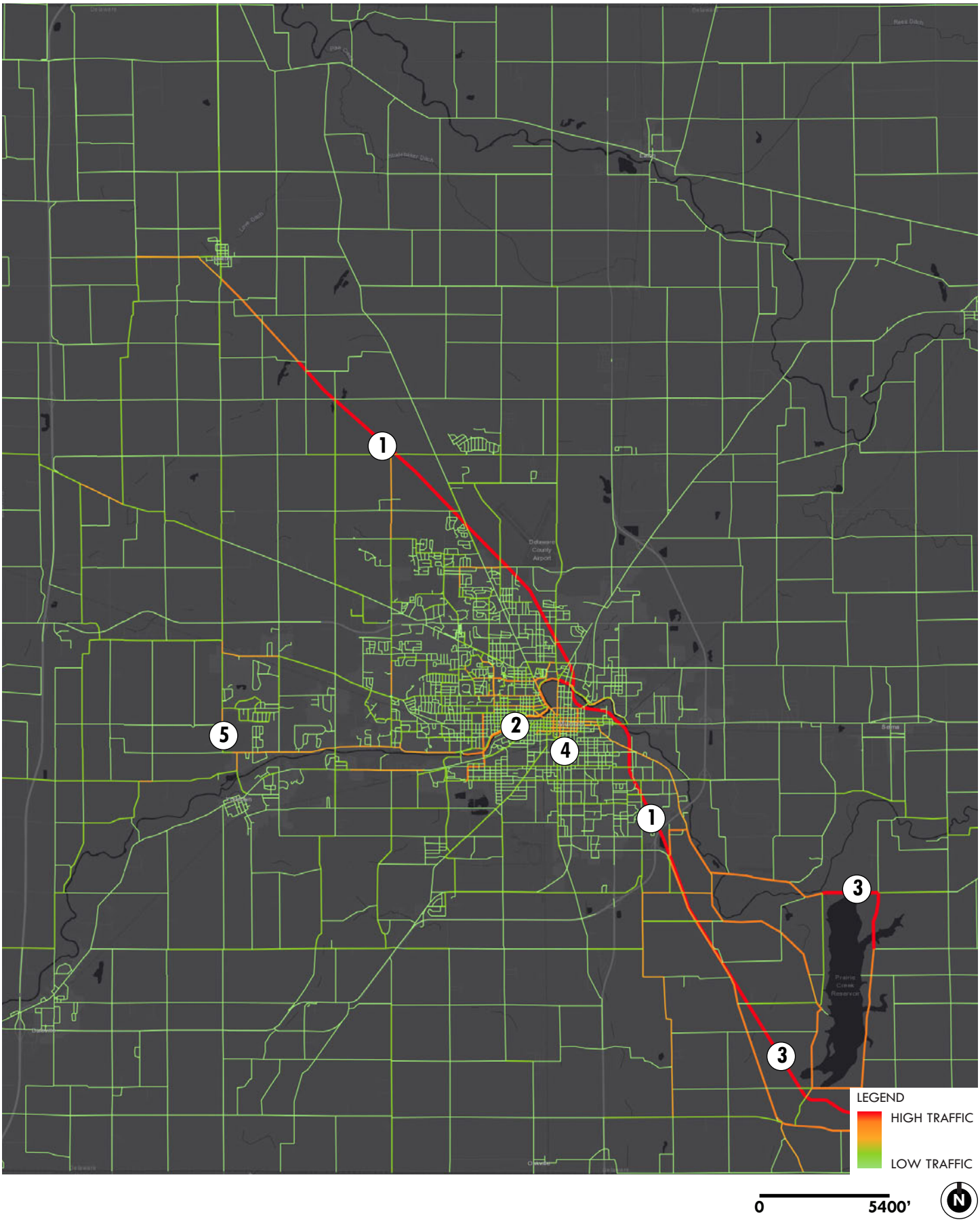
Similar to information that was collected during the public meetings as part of this study, the Strava data is reviewed and analyzed to help determine which routes should be considered for future improvements.

Frequently used routes were identified in dark red, while lesser used routes were identified in light green. It is important to note that route data is only identified if it has been collected by a smartphone or GPS device, meaning that low-income areas or areas of the County that may not have access to these devices, could show less use. Similarly, the routes identified through the Strava data represent only a single data set of information. As such, certain users may be able to skew the data to particular areas of Muncie or Delaware County.

The heaviest routes identified through the Strava data include:

1. White River Greenway
2. Cardinal Greenway
3. W. Neely Avenue
4. S. Burlington Drive
5. S. Nichols Avenue
6. W. River Road (Yorktown & Muncie)
7. Downtown Muncie
8. Ball State University; including McKinley Avenue

Existing County Bicycle and Pedestrian Routes - Strava Data



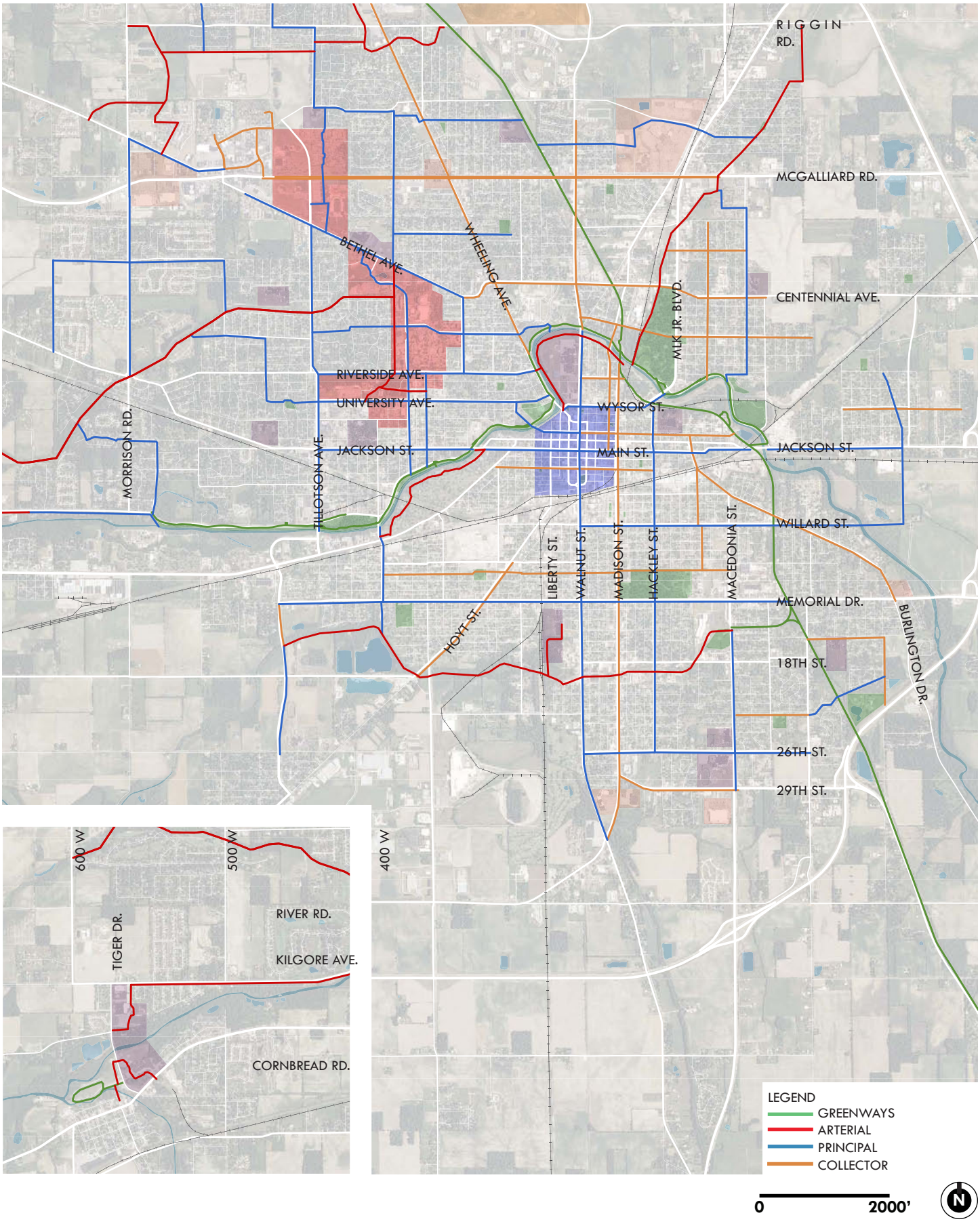
STRAVA DATA - DELAWARE COUNTY

The county plan shows the more regional connections that are made throughout Delaware County. The heaviest routes include:

1. Cardinal Greenway
    - Including the county road route of the Cardinal Greenway between Gaston and the town of Matthews, in Grant County
2. White River Greenway
3. Routes connecting to the Prairie Creek Reservoir
4. downtown Muncie
5. County roads around Yorktown

Strava data should continue to be collected to determine if the county road routes identified in this plan continue to remain the preferred bicycle and running/walking routes.

2013-2040 Delaware-Muncie Transportation Plan Update



SUMMARY OF THE TRANSPORTATION PLAN

The purpose of the 2013-2040 Delaware-Muncie Transportation Plan was to provide long-range guidance toward developing and maintaining the transportation systems within Delaware County. While there was a great deal of information related to all transportation types within the Plan, the most pertinent information reviewed was the "Bike and Ped Plan Vision." An exert from this section describes the goals and objectives of this portion of the document:

BIKE/PED PLAN VISION

The long range vision guiding the Delaware-Muncie Bicycle and Pedestrian Plan is to provide a changing transportation system which allows true modal choice for walkers and cyclists in the conduct of their everyday lives for the widest range of trip purposes possible - recreation, health, consumption and commuting.

GOALS AND OBJECTIVES

Improve the efficiency of the transportation system: potential increase in transit, pedestrian and bicycle travel; reduction of modal conflict; projected areas of congestion developed with consideration of bicycle and pedestrian traffic and circulation patterns.

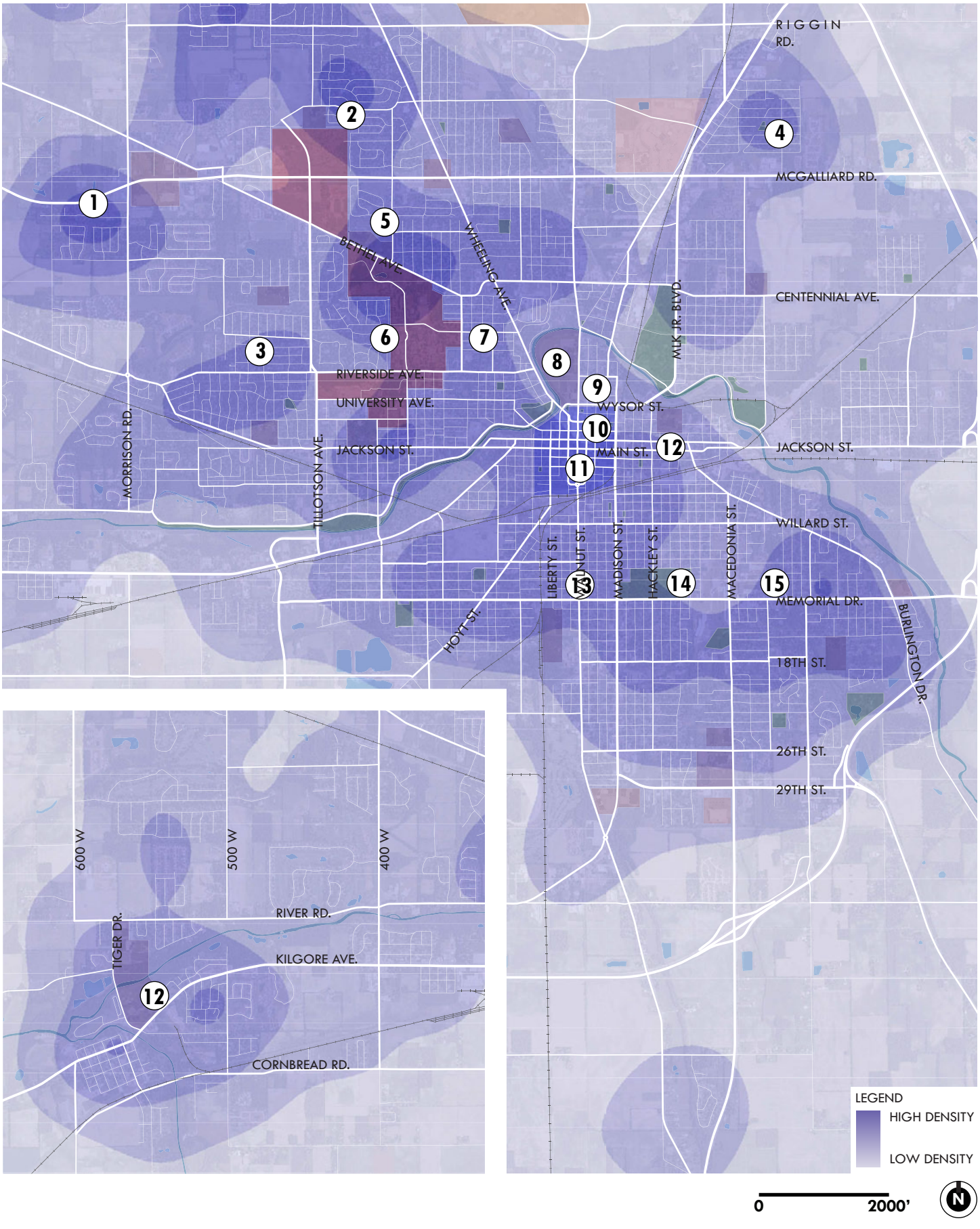
Reduce impacts of transportation on the environment: design standards scaled to the surrounding environment; land use patterns, development and infrastructure improvements guided by preservation practices rather than mitigation; amenities installed complementing the natural environment.

Reduce the need for costly future investments in public infrastructure: retrofitting kept to a minimum; developers charged with installing a coordinated system of infrastructure improvements; right-of-way dedications based on system-wide planning; planned acquisitions at current value preventing inflationary increases.

Ensure efficient access to jobs, services and centers of trade: alternatives modes offered at logical and desired locations; maintenance of low travel times; conflicts decreased at access points.

Examine development patterns and identify strategies to encourage private sector development patterns which achieve goals of the TCSP: comprehensive plan coordinated with thoroughfare planning; personal preference survey results produced in report format for public distribution identifying supply/demand issues; reliance on planned infrastructure improvements built in conjunction with private development.

Residential Density - Yorktown and Muncie



RESIDENTIAL DENSITY

Neighborhood or residential density was measured to identify where concentrations of people live. The most dense neighborhoods are near Ball State University, downtown Muncie, and Heekin Park. Specific neighborhoods in these areas would include:

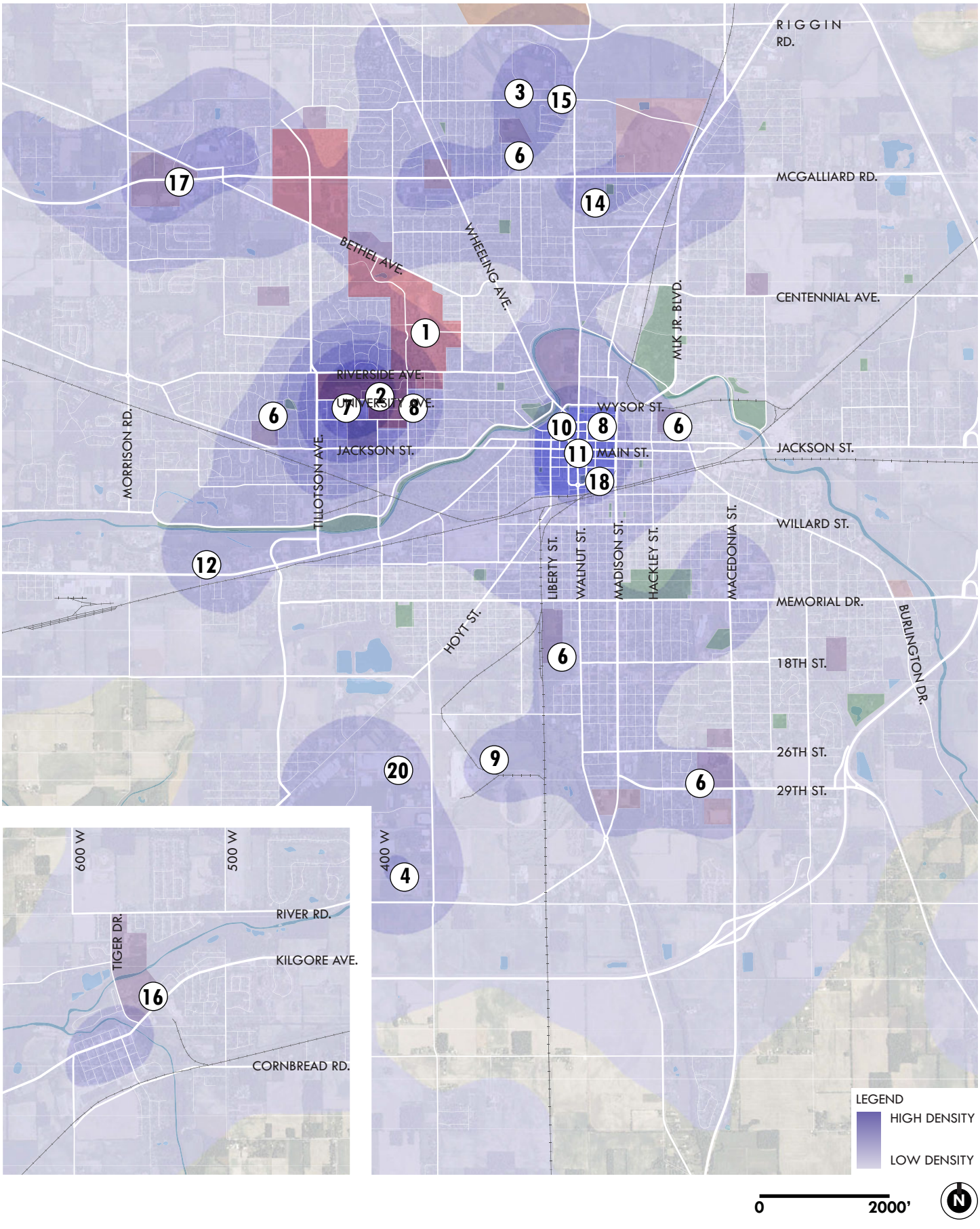
1. Westbridge
2. Norwood
3. Kenmore
4. Morningside
5. Anthony
6. Ball State
7. Riverside/Normal City
8. Central High School
9. McKinley
10. Gilbert
11. Downtown
12. East Central
13. South Central
14. Industry
15. Blaine

The downtown Yorktown area is another dense neighborhood that should also be connected to bicycle and pedestrians facilities.

16. Yorktown

Proposed bicycle and pedestrian improvements recommended by this plan and future improvements should look to connect to as many neighborhoods as possible. These connections will provide safer alternate transportation routes to local destinations.

Job Density - Yorktown and Muncie



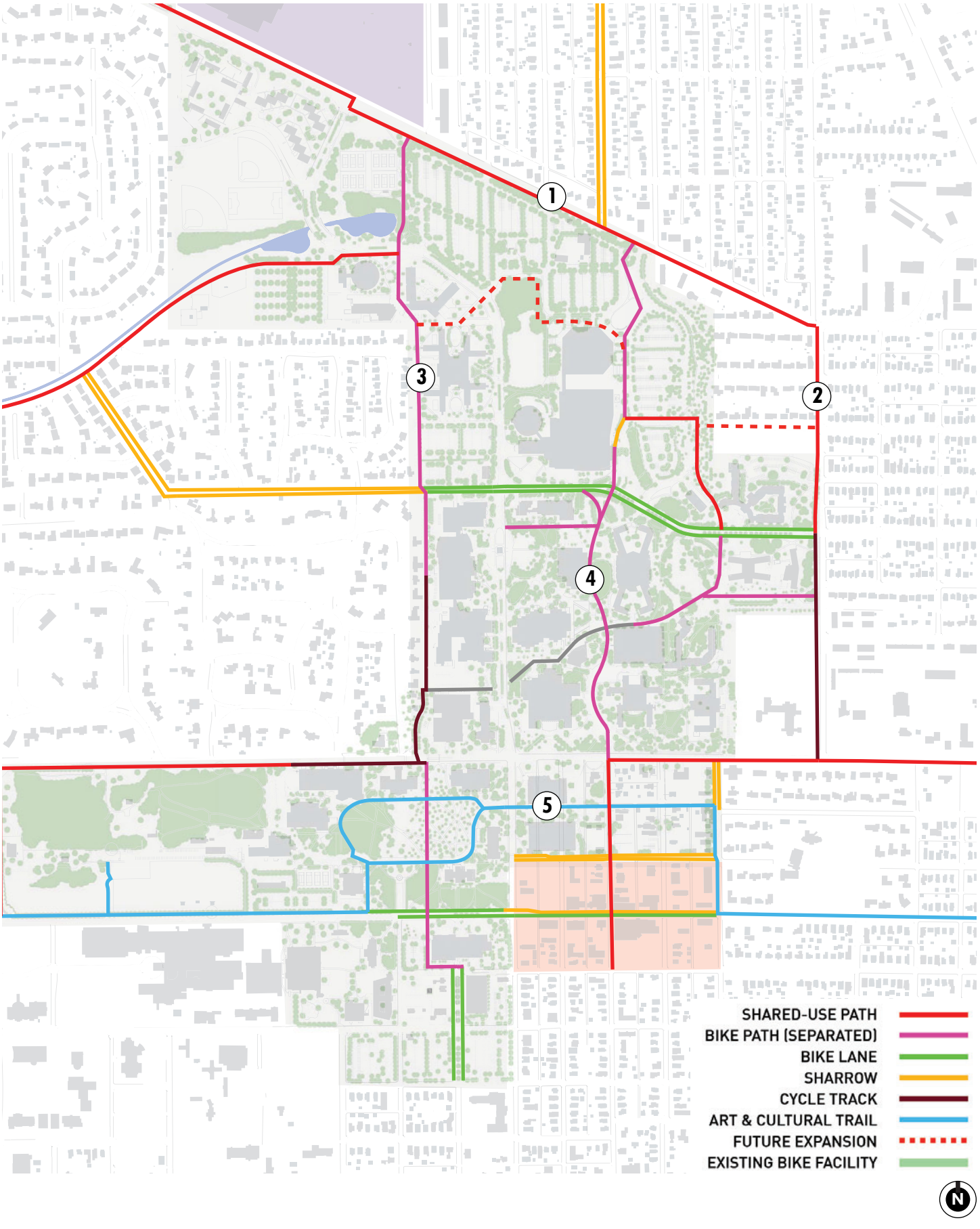
JOB DENSITY

To determine the best system of routes within Muncie and Yorktown, existing employment centers were mapped. According to the Muncie-Delaware County Economic Development Alliance[9], the following are the largest employers in the area, and the number of people they employ:

1.	3,229	Ball State University
2.	2,931	IU Health Ball Memorial Hospital
3.	650	Navient
4.	585	MPT Muncie/Magna Powertrain
5.	550	Concentrix (not on map)
6.	518	Muncie Community Schools
7.	517	Meridian Health Services
8.	516	First Merchants Corporation
9.	500	Progress Rail
10.	465	City of Muncie
11.	452	Delaware County Government Offices
12.	400	Youth Opportunity Center
13.	392	Delaware Community Schools (not on map)
14.	380	Hillcroft Services
15.	362	Lifetouch
16.	349	Yorktown Community Schools
17.	323	Wal-Mart North
18.	300	Ivy Tech Community College
19.	300	Mursix Corporation (not on map)
20.	295	DIY Group, Inc

Proposed bicycle and pedestrian routes should connect to the major local employers, which would give local employees the opportunity to walk and bicycle to work. The highest density of employers occurs near Ball State University and the IU Health Ball Memorial Hospital, and in downtown Muncie. Providing bicycle and pedestrian connections to these two employment centers should be the priority implementation areas.

Ball State University Bicycle Master Plan



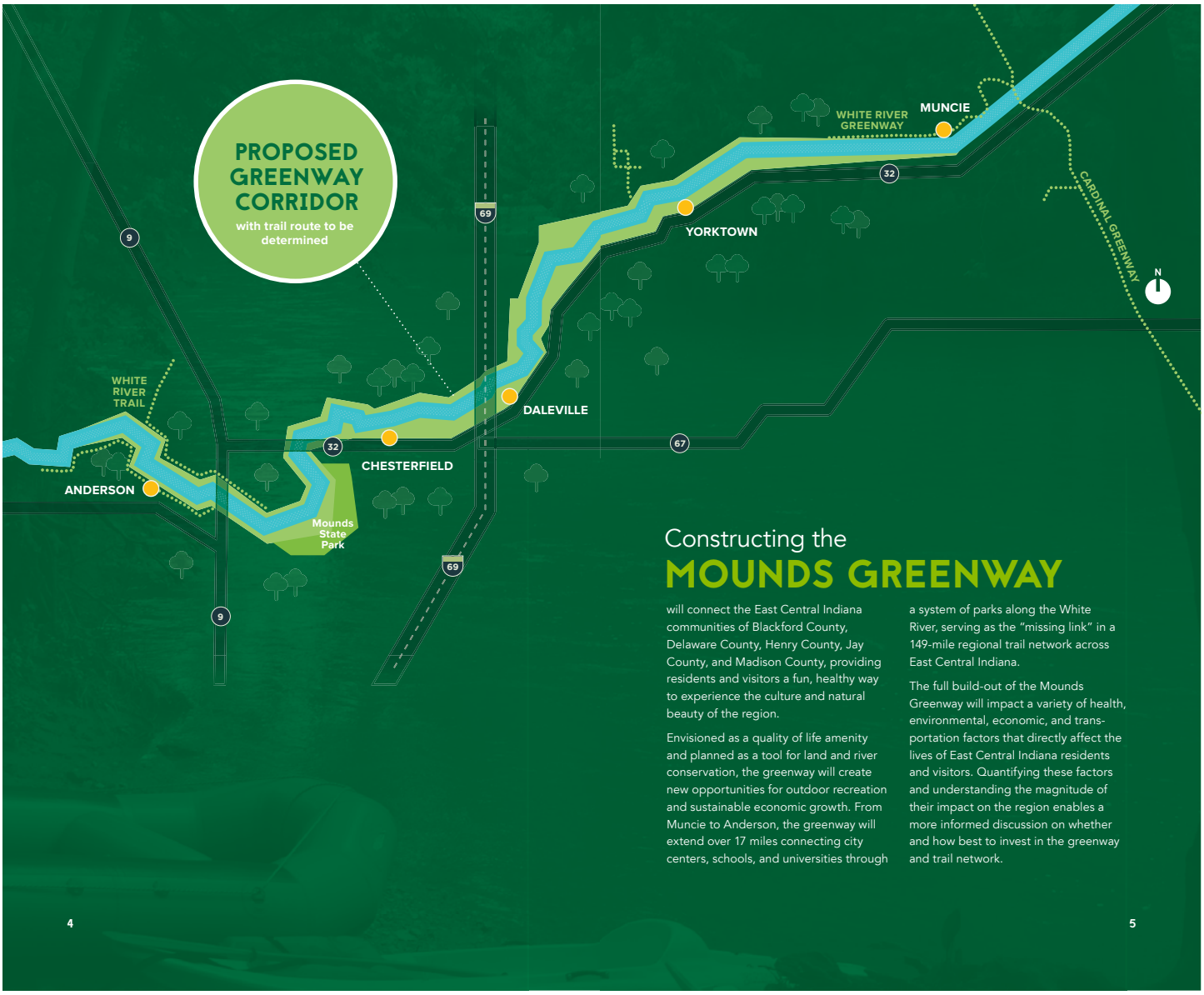
BALL STATE UNIVERSITY BICYCLE MASTER PLAN

Completed in 2017, the Ball State Bicycle Master Plan recommends routes within and around the campus. These routes were utilized within the larger Delaware-Muncie Bicycle and Pedestrian Master Plan. Important routes that will require coordination between the University and the City of Muncie include the following:

1. Adjust Bethel to provide for a shared-use path
2. On New York Avenue, provide a shared-use north of Neely and a cycle track south of Neely.
3. Enhance the cow-path bike path to connect from Bethel to the Student Center
4. Provide a separated bike path as the "East Mall," which connects from Bethel to Martin Street. The recently completed improvements on Martin Street connect to the White River Greenway.
5. Implement the Muncie Art and Cultural Trail through campus

These five improvements represent important connections between campus and the surrounding city. These improvements are considered part of the Ball State University Master Plan, but are fully supported by the recommendations of the Delaware-Muncie Bike and Pedestrian Master Plan. Furthermore, the recommendations of the Ball State University Bicycle Master Plan have been incorporated into this planning document. Refer to specific recommendations in the Implementation Section of this report for additional information and cross sections.

Mounds Greenway Planning Efforts



Constructing the MOUNDS GREENWAY

will connect the East Central Indiana communities of Blackford County, Delaware County, Henry County, Jay County, and Madison County, providing residents and visitors a fun, healthy way to experience the culture and natural beauty of the region.

Envisioned as a quality of life amenity and planned as a tool for land and river conservation, the greenway will create new opportunities for outdoor recreation and sustainable economic growth. From Muncie to Anderson, the greenway will extend over 17 miles connecting city centers, schools, and universities through a system of parks along the White River, serving as the "missing link" in a 149-mile regional trail network across East Central Indiana.

The full build-out of the Mounds Greenway will impact a variety of health, environmental, economic, and transportation factors that directly affect the lives of East Central Indiana residents and visitors. Quantifying these factors and understanding the magnitude of their impact on the region enables a more informed discussion on whether and how best to invest in the greenway and trail network.

The illustration above was included as part of the report, *Meet at the Mounds, An Economic, Health, and Environmental Benefits Analysis*, which was produced by Alta Planning and Design for the Hoosier Environmental Council.

OVERVIEW OF THE MOUNDS GREENWAY

Establishing regional connections to Delaware County and it's cities and town is important. A potential future connect is the Mounds Greenway. Reports have been completed and are still under study to determine the opportunities and constraints with implementing such a project. Multiple municipalities, including representation from Muncie, have supported the efforts to plan and construct such a trail.

The following exert was described in the report from the Hoosier Environmental Council's (HEC), The Case for the Mounds Greenway. Additional information regarding the HEC report can be acquired by contacting Bob Weaver, Mounds Greenway Campaign Manager for the HEC.

> The Mounds Greenway will be a linear park and trail connecting the trails and parks of Muncie to the trails and parks of Anderson and the communities in between. The Greenway and Conservation Area will protect the West Fork White River as a free-flowing natural river and also conserve bottomland hardwood forest, wetlands, and riparian habitats in the river's floodplain – an area roughly 2,300 acres in size.
>
> Ownership and management of the Mounds Greenway is to be determined, but it could be a state project or a partnership of state and local governments and private organizations.
>
> The Greenway will provide a variety of quality outdoor recreational opportunities – trails for hiking and bike riding, river access points for canoeing, kayaking and fishing, picnic and camping areas, and wildlife observation.
>
> Cultural and historic features will be noted and protected. An Interpretive Center at Rangeline Preserve will offer displays and other learning opportunities about the West Fork White River valley. Once completed, the Mounds Greenway's trails will allow a hiker or bicyclist to travel from the Cardinal Greenway in Muncie to Mounds State Park to the Anderson city trail system.
>
> Along the way, Greenway visitors and local residents can enjoy the variety of restaurants, brewpubs, coffee shops and retailers which will be attracted to the riverside "villages" in the communities along the river.
>
> The greenway will complement and be compatible with existing public outdoor lands and cultural sites, including Mounds State Park, Rangeline Preserve, Walbridge Acres Park, Camp Chesterfield and other facilities[10].

Public Input

Below: Community members participate in a mapping exercise at the July 2017 public meeting.

OVERVIEW

In order to understand the current experiences and future expectations of local users, both online surveys and public meetings were conducted to collect data:

PUBLIC MEETINGS AND EVENTS

Timeline and events:

- Public Meeting, July 2017

  The local community members were invited to give preliminary input for the plan. The meeting collected preferred walking/ running and biking routes and destinations

- Cardinal Greenway Bike Fest, July 2017

  Input was collected in regard to existing routes that cyclists currently use.

- Delaware County Fair, July 2017

  The project website was provided on business cards and provided to fair attendees in order to gather as much county and regional input as possible.

- Public Meeting, February 2018

  First version of the plan was presented in the meeting to collect public opinions. Additional input was solicited on existing and proposed routes

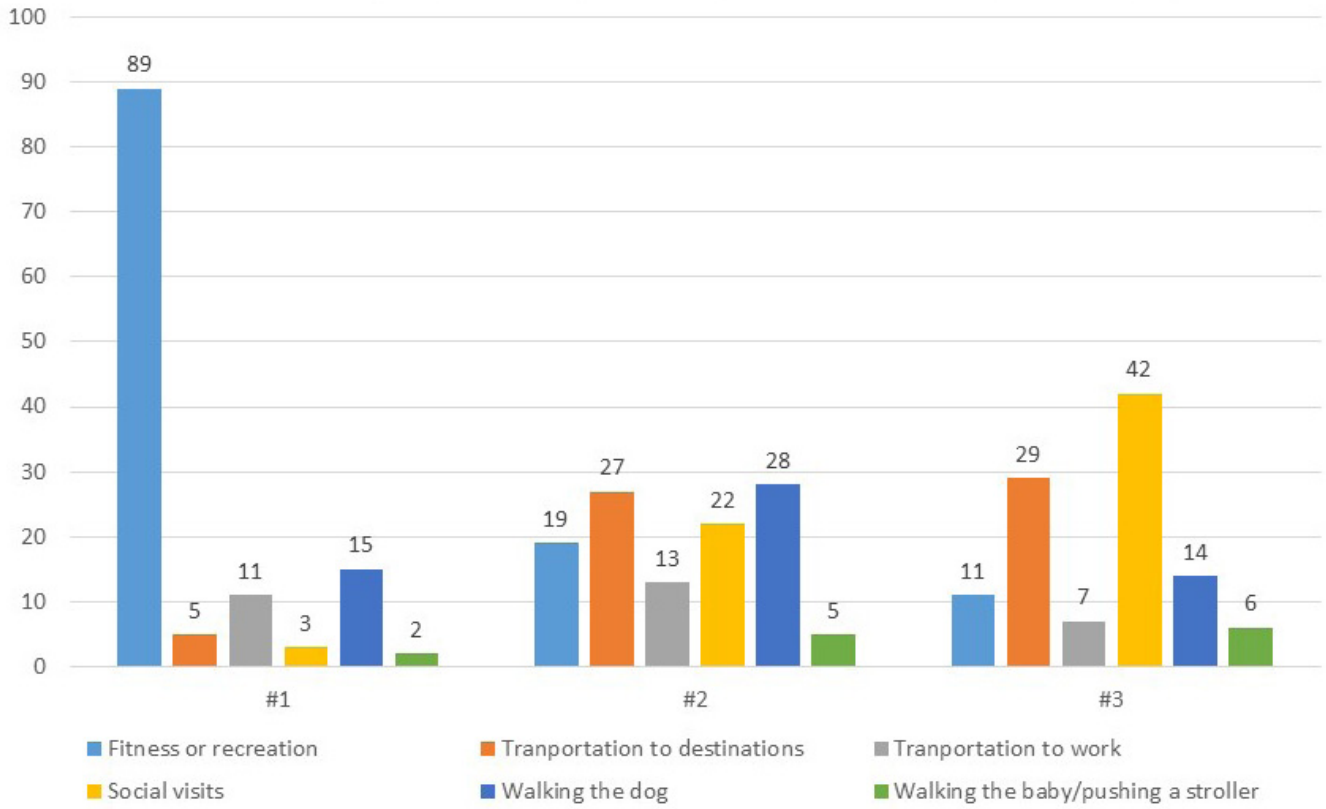
PUBLIC SURVEY DATA

An online survey consisted of 18 questions and was conducted from for the entire length of the study. The survey helps to identify the critical issues for the local pedestrian network. 133 respondents participated in the online survey.

WIKI MAP DATA

WIKI MAP is a crowdsourced data collection map that allows users to graphically input their thoughts and opinions. The Map reveals the major interests, conflicts and future expectations for the pedestrian network. 210 respondents participated in the online exercise.

For what purposes do you walk/bike most now? (Rank Top 3)



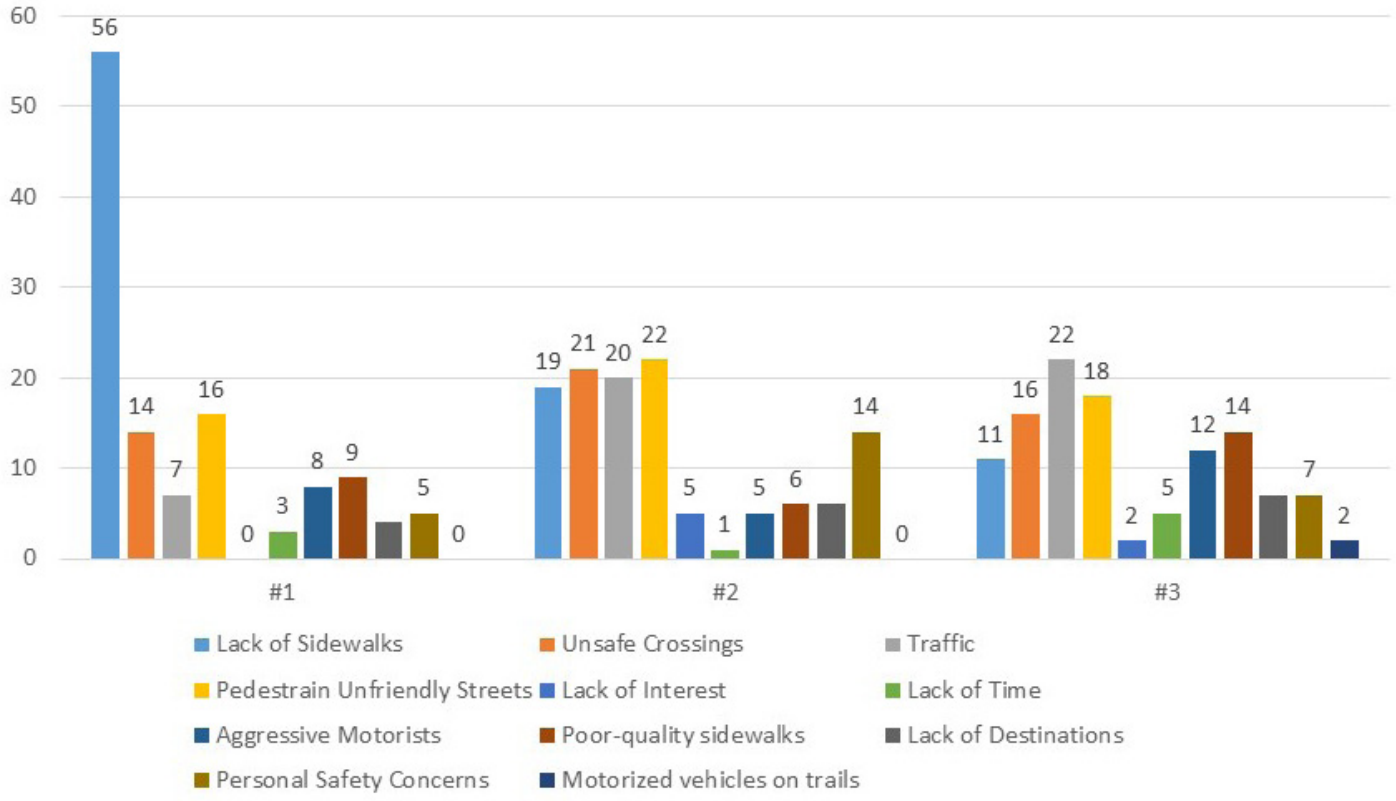
SURVEY FIGURE A

Respondents were asked to choose their top three most preferred answers.

According to respondents of the online survey, the most popular reason to walk and bike was for "Fitness or Recreation"; 94% of respondents chose this reason. The least common reasons for biking and walking was related to activity with an infant. This is expected as this applies to a smaller group of people. The second most common reason for walking and biking was for "Social Visits" (53% ranked this top three) and for "Transportation to Destinations" (48%)

There is room to for improvements to be made for people to walk and bike to work more frequently. Only 25% of respondents ranked this as a top reason. With a number of large employers local to Muncie, it is realistic to expect this number to increase with improved or additional bicycle and pedestrian infrastructure.

What do you think are the biggest factors that discourage trail, sidewalk or bicycle facility use? (Rank Top 3)



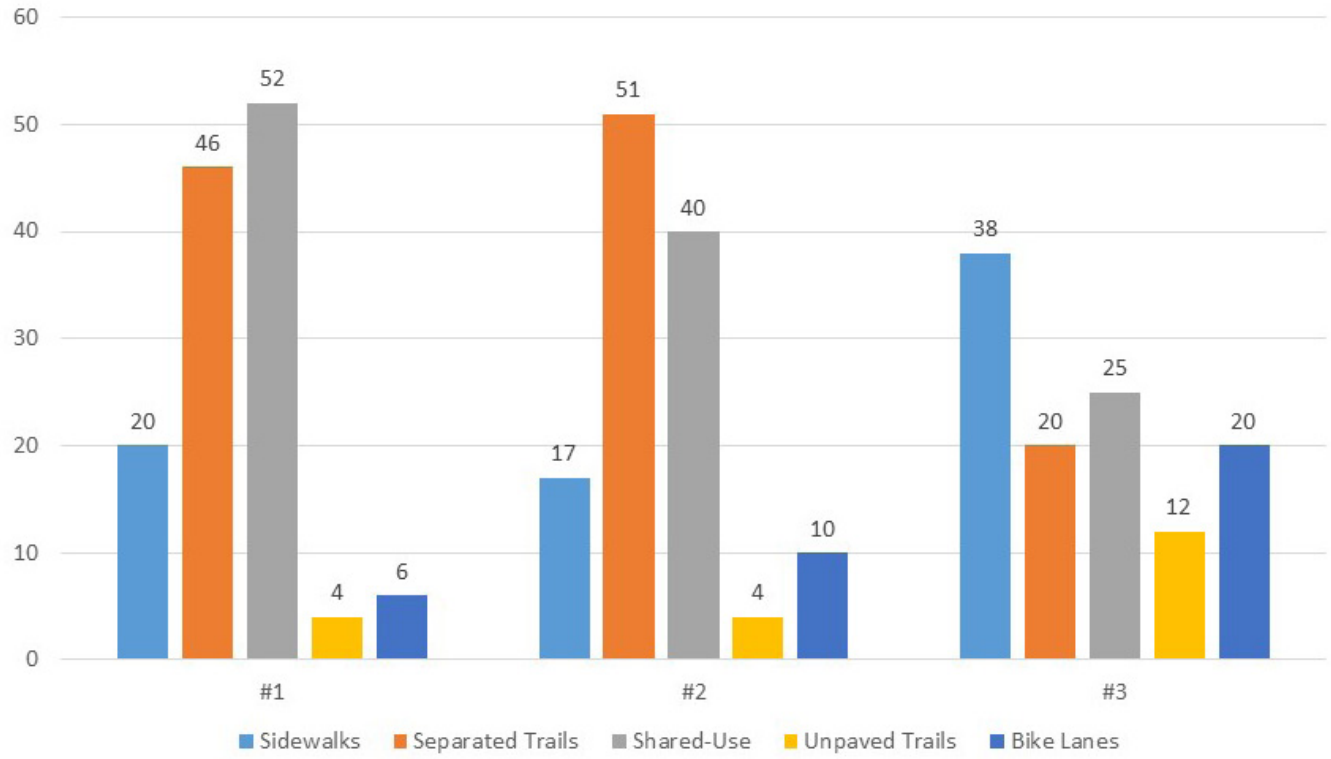
SURVEY FIGURE B

Respondents were asked to choose their top three most preferred answers.

The most common factor (91%) to discourage walking and bicycling was a simple lack of facilities, or "Lack of Sidewalks." This is critical information because if more trails or sidewalks existed, people would use them according to the survey. One of the least common factors (17%) for discouraging walking and bicycling was "Lack of Destinations." Comparing the most common and one of the least common factors that could discourage trail or sidewalk use, respondents noted that there are places they wish to go by use of trails, but not always a way to get there.

The other similar factors that were selected as deterrents for trail and sidewalk use include "Unsafe Crossings" (63%), "Traffic" (67%), and "Pedestrian Unfriendly Streets (70%). The design of local streets and the speed of vehicles on these streets are acting as a deterrent for walking and cycling. Streets should be designed as "Complete Streets" and be appropriately designed to reduce vehicle speed to make it safer for pedestrians and cyclists to use them.

What are your most desired bicycle and pedestrian route types? (Rank Top 3)



Above: Photograph answers were provided in lieu of written answers, to give a better understanding of the different types of facilities. Shown above are the "answers" for Separated Trails, Shared-Use Trails, and Bike Lanes respectively.

SURVEY FIGURE C

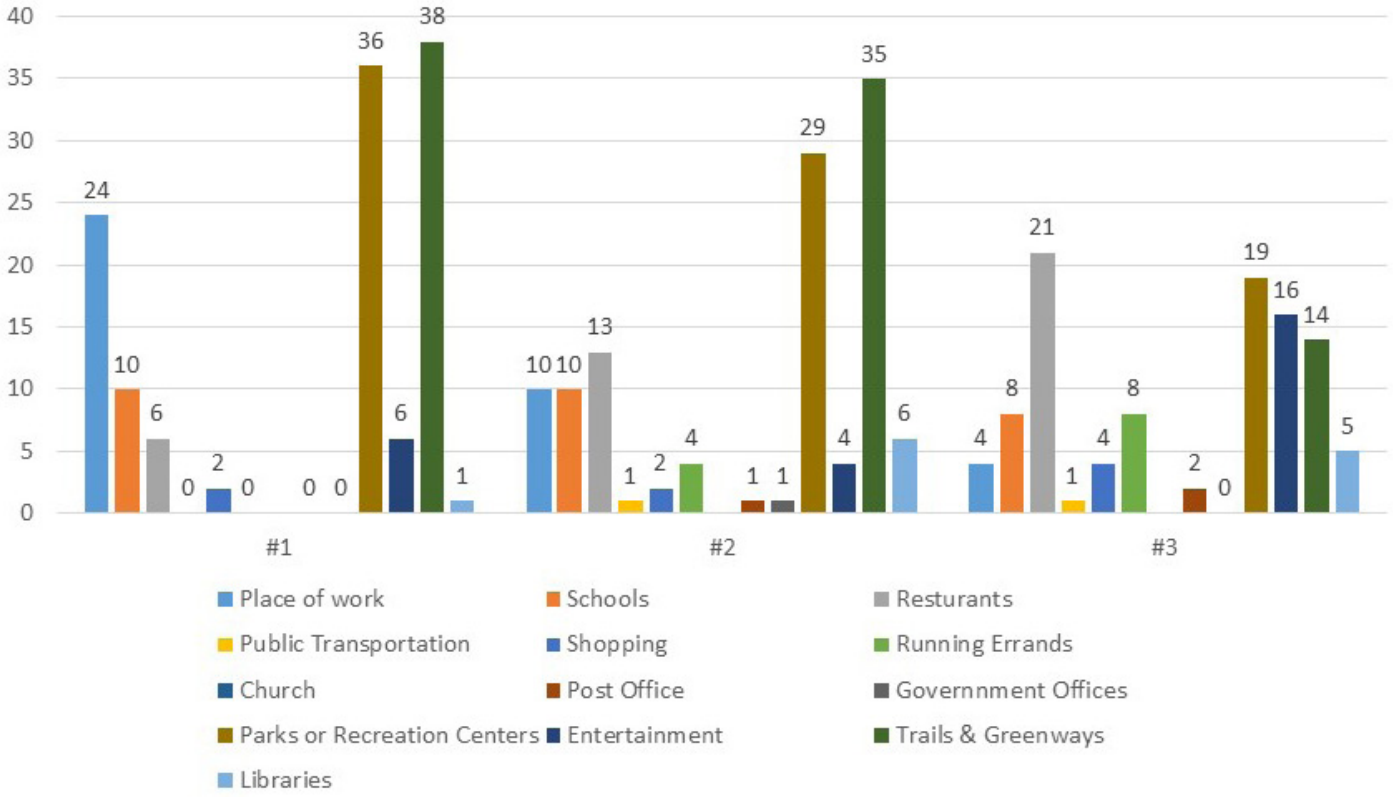
Respondents were asked to choose their top three most preferred answers.

There is a preference for bicycle and pedestrian routes to be off-street and away from vehicle traffic. "Separated Trails" and "Shared-Use Trails" were the most preferred options selected by survey respondents (both were in the respondents top three in 99% of the surveys). "Bike lanes" was much less preferred, accounting for the top three in just 31% of respondents surveys.

While unpaved trails are appropriate for natural spaces and other unique areas, it was the least popular selection in the survey (17%).

This particular set of data is important to consider when determining the type of facilities to implement for cyclists and pedestrians. People feel safer with physical separation from vehicle travel lanes. In the engineering recommendations, or implementation section of this report, many shared-use trails are proposed within the City of Muncie and Yorktown, which is to reflect the preference identified from the survey.

What destinations would you most like to get to by trail? (Rank Top 3)



SURVEY FIGURE D

Respondents were asked to choose their top three most preferred answers.

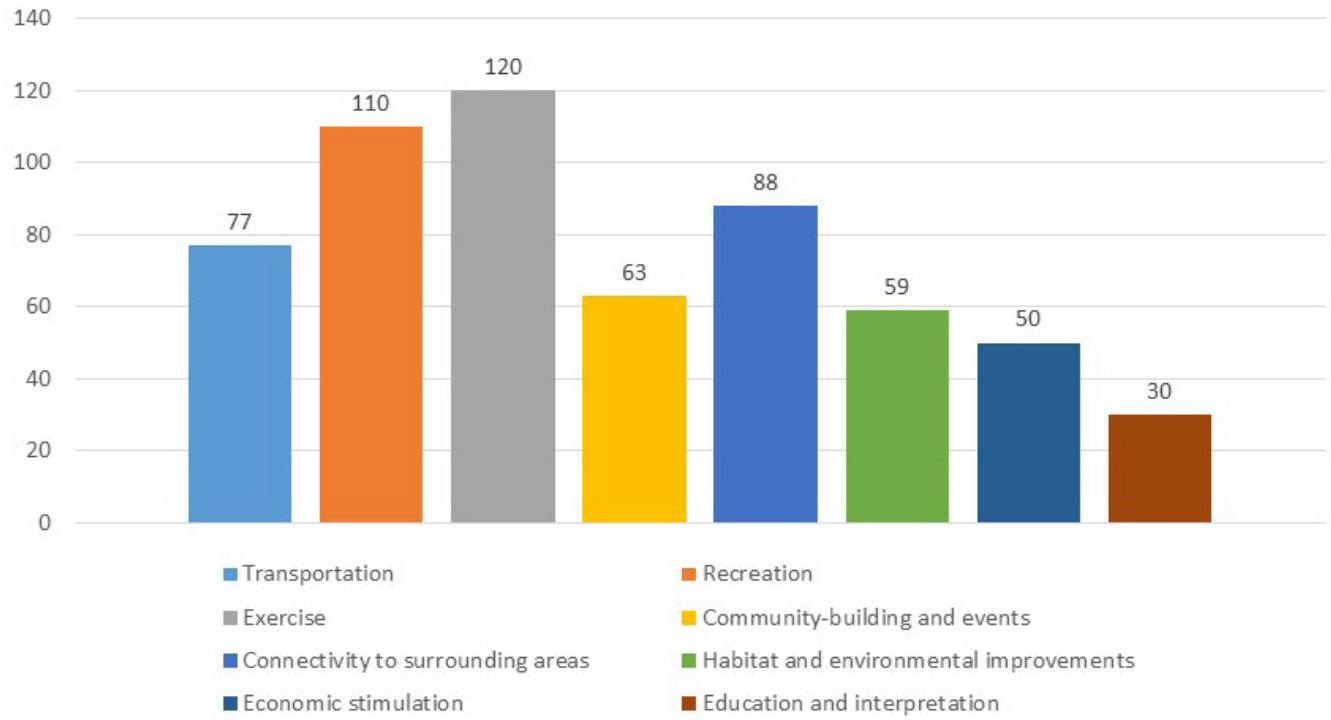
Destinations are important to consider when determining how and where bicycle and pedestrian facilities should go. Routes should connect people to their most preferred destinations. The most preferred destinations that respondents would like to reach by trail was "Other Trails & Greenways" (100%) and "Park or Recreation Centers" (96%). This data supports the information that was collected in Survey Figure A, which identified that 94% of respondents main use for trails was for "Fitness or Recreation."

Using trails to get to work destinations was selected in the top three in 38% of the surveys, and using trails to get to school was a preferred transportation option in 28% of the surveys. There are opportunities for improvement for both of these categories.

According to the Muncie-Delaware County Economic Development Alliance, the "average commute time to work in Muncie is 17 minutes. That is 53% below the United States average." With commute times much lower than the national average, both the City of Muncie and Delaware County has the opportunity to have a major share of their citizens and workforce commute to work by bike, if programs and physical improvements can be implemented.

Other destination results includes cycling and walking to "restaurants" (40%), "entertainment" (26%), "libraries" (12%), and "running errands" (12%).

What would be the most important benefits and uses of a complete system of shared-use trails, sidewalks and bike lanes? (Select all that apply)



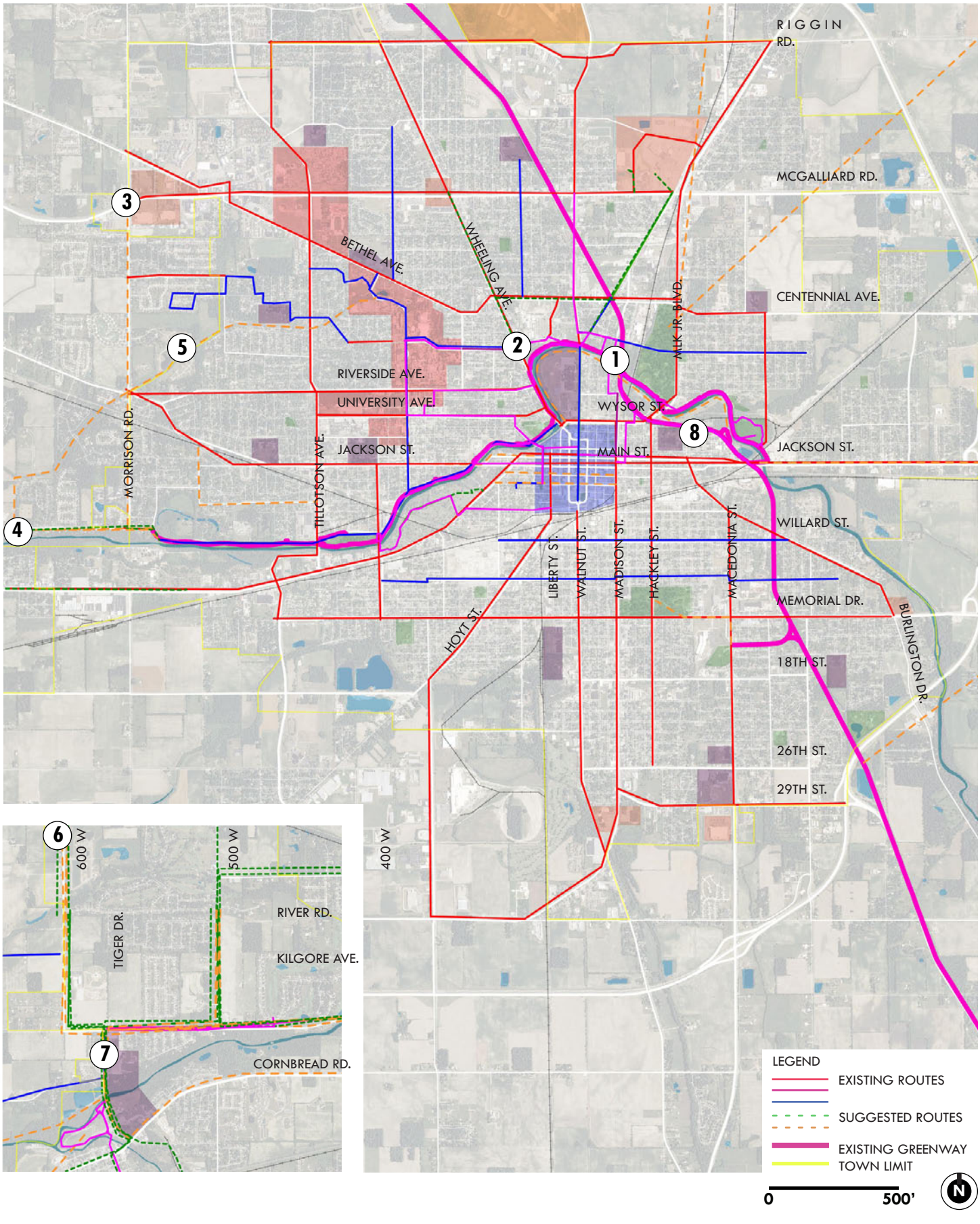
SURVEY FIGURE E

Similar to results found in other survey questions, “Exercise” (93%) and “Recreation” (86%) was identified as the most important benefit of a more complete system of alternative transportation routes.

“Connectivity to surrounding areas” (70%) and “Transportation” (61%) were also frequently selected.

The least common benefit identified was “Education and interpretation” (24%).

WIKI Map - Yorktown and Muncie



WIKI MAP

WikiMap data is a crowdsourced online public input map, which collected input from more than 200 participants during the study. Users are able to provide comments and routes on a digital map. The solid lines represent where people currently are walking/cycling; the dash lines show where they would like to be walking/cycling.

The current usage is concentrated on the greenways and major streets in Muncie and Yorktown. The suggested new routes include connections from Muncie to other towns, particularly to Yorktown; and new routes connecting downtown Yorktown to the surrounding neighborhoods.

The WikiMap also allows users to provide comments about routes they walk or bike, and how certain intersections or areas could be improved. The following are a sample of anonymous comments received through WikiMap:

1. This intersection is very dangerous! Hard to see over bridge, cars drive far too fast. Better stripping, lighted signs, etc needed here.

2. No pedestrian or bike crossing signals, signs or painted crosswalks. This is a high bicycle and pedestrian traffic intersection connecting campus to Minnetrista/WR Greenway.

3. Close the gap between the trail on River Road and the White River Greenway!

4. I often see people trying to walk across this dangerous intersection. It's a real problem!

5. Crosswalk lights needed---very difficult to walk/bike across this intersection. Safety hazard

6. Having a new shared-use path from Ball State's duck pond along York Prairie Creek past Tillotson Ave, past the intersection of Jackson and Morrison, and all the way to River Road, would tie together the new shared-use trail along Morrison Rd and the new shared-use trail along River Rd with the University, several neighborhoods, a couple schools (Northside, former Storer building, Heritage Christian), churches, and some senior living (e.g. condos on Morrison). It would also provide access for all those people living near any of those trails to shops on parts of McGalliard (e.g. Walmart via Morrison trail) without having to have or use a car (e.g. teenagers, seniors, students, disabled). It also would not be along roadways which would make it safer for young children on bikes/scooters and family recreation.

7. I live at Jackson and 725 and would love for my kids and I to be able to SAFELY bike to the Y, Morrow's Meadows, Downtown Yorktown, etc.!

8. The bridge across the White River is very narrow and walking my dog is hard to pass others especially if they have another dog or are riding a bike. (Improvements to this bridge in Yorktown are currently in progress.)

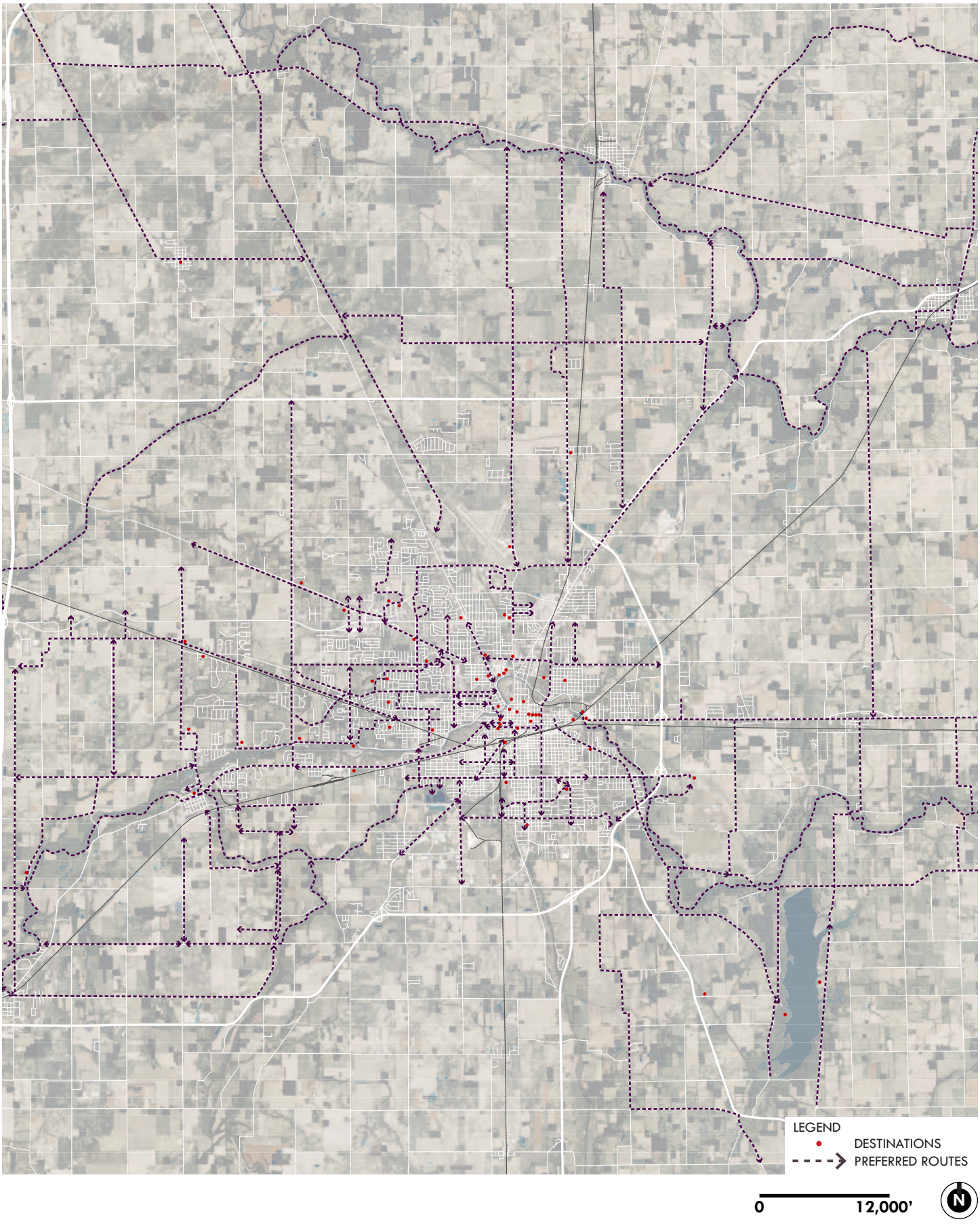
9. I like the idea of an additional shared-use path on the south side of the river around Central High School. And continue it further along the south side of the river all the way to the Hughes Nature Preserve to meet up with the Cardinal Greenway again. This would provide several options for different size running and biking loops (especially once the pedestrian bridge near Jackson and Bunch Blvd is complete).

General comments received regarding more regional connections include:

- Would be nice to have a trail that connects Muncie with Hyde Park, Selma, Parker Clty, Farmland, Winchester, and eventually Greenville, OH

- Love to do loops around the reservoir.

Public Comments

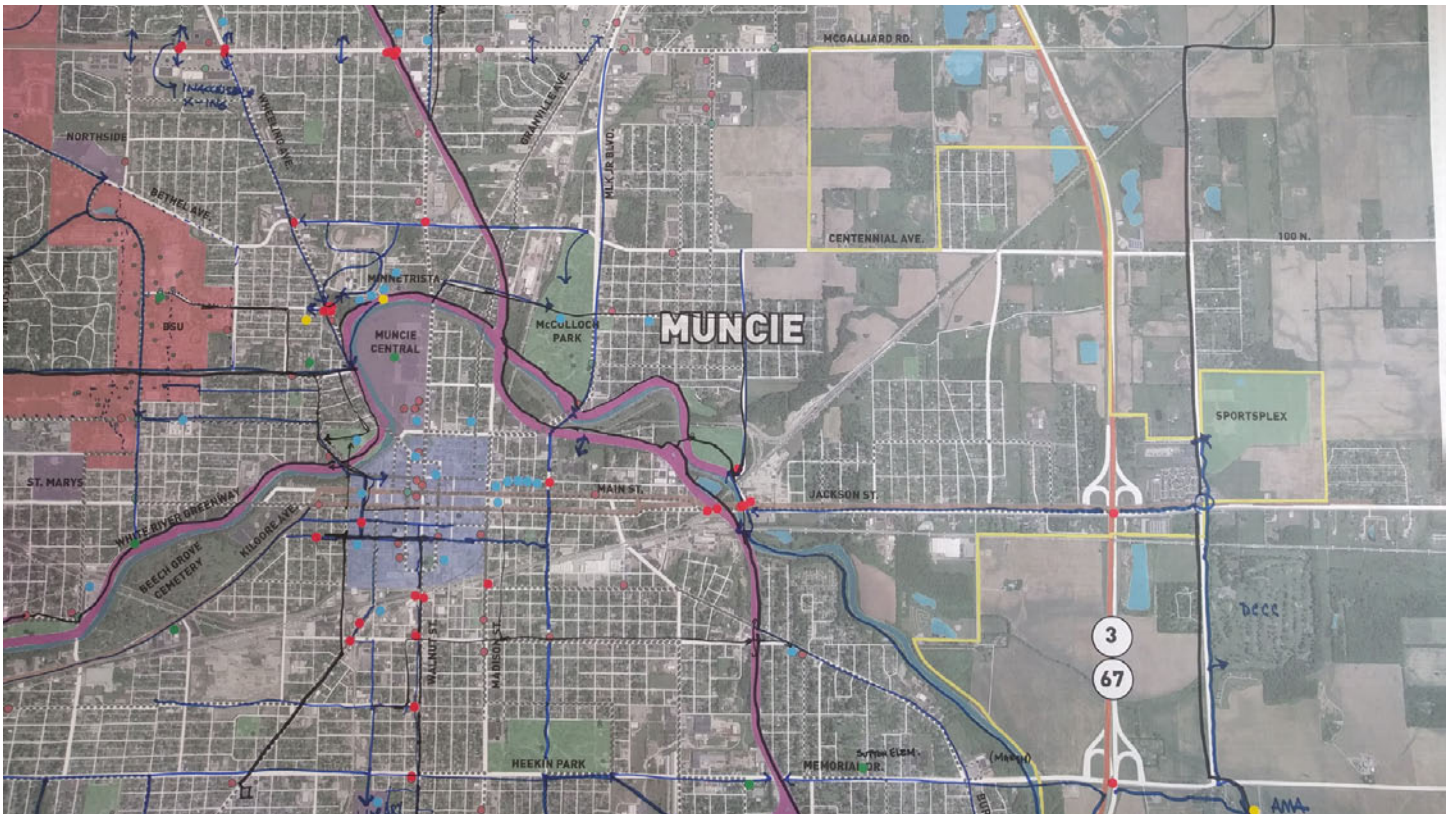


PUBLIC MEETING - MAPPED COMMENTS

Multiple public meetings were held and multiple existing public events were leveraged in order to gather public input. In summary, the most common thoughts amongst respondents included:

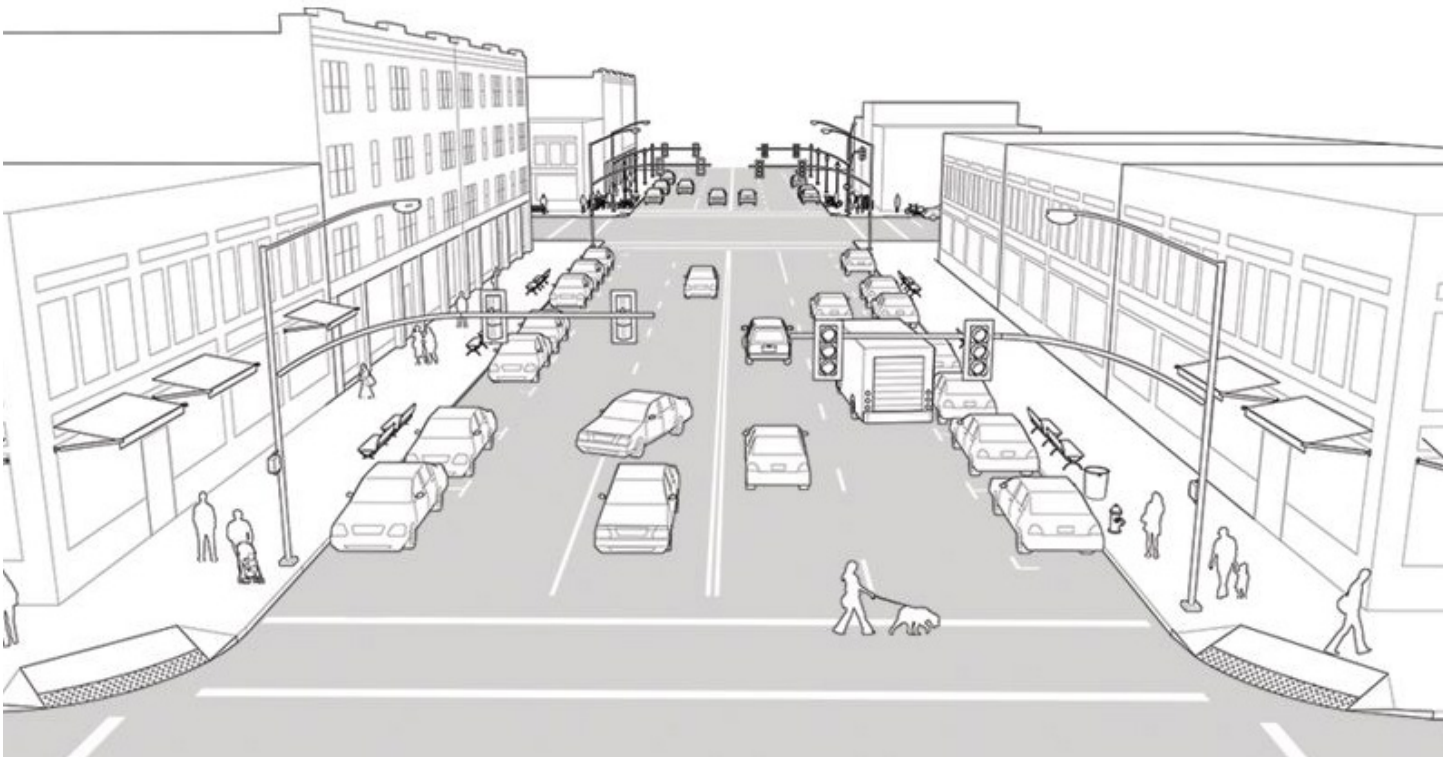
1. Improve connections from downtown Muncie to south Muncie, or the neighborhoods that surround Heekin Park.
2. Improve connections from downtown Muncie to Ball State.
3. Fill in trail gaps between Yorktown and downtown Muncie.
4. Provide additional connections throughout the county to the Cardinal Greeway, through signage or designated preferred routes.
5. Use existing natural features to locate future trails.

Important destinations throughout the county were identified with orange dots. These destinations were reviewed to ensure that the future proposed bicycle and pedestrian facilities were providing connections to the proper areas of the county.



Design Guidance & Facility Types

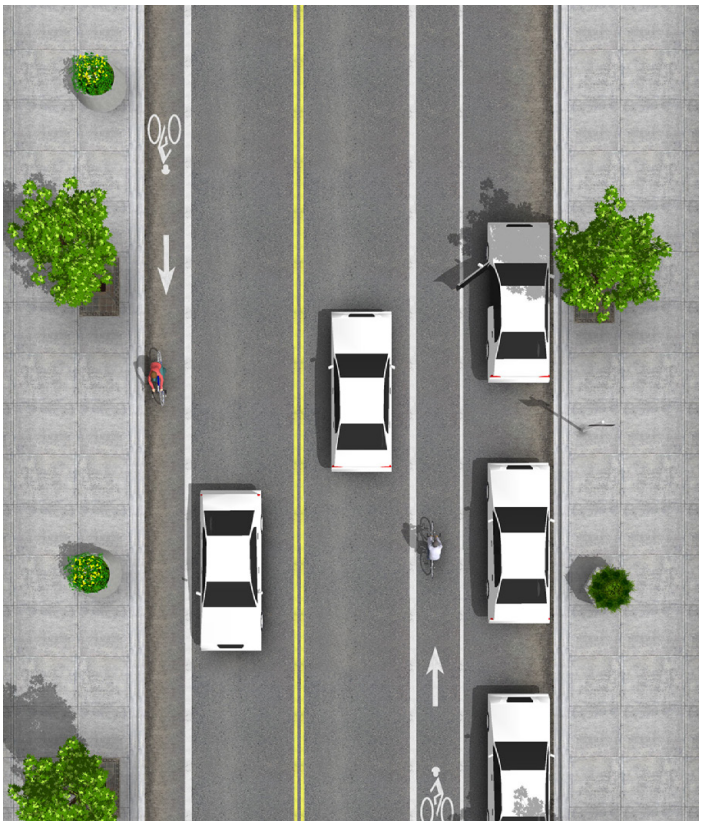
Below: Before and after renderings of a typical urban street. Urban Street Design Guide, NACTO



OVERVIEW

Guidelines provided by the National Association of City Transportation Officials (NACTO) include requirements, recommendations, and optional features of typical right-of-way bicycle facilities. For shared-use trails, a common reference material is produced by the American Association of State Highway and Transportation Officials (AASHTO). These recommendations provided specific notes regarding shared-use paths.

Bike Lanes



Traditional one-way bike lanes. © NACTO

BIKE LANES

Bike lanes are on-street pavement markings that identify dedicated space for cyclists. All widths and engineering requirements shall conform to NACTO and all symbols shall meet MUTCD standards, which include the following recommendations[12]:

- 6' wide preferred, 5' wide minimum when adjacent to a raised curb
- Ensure all adjacent utilities are flush and safe to cyclists to cross
- Use 6" to 8" solid white line adjacent to vehicle traffic
- Use 4" solid white line adjacent to on-street parking
- Use MUTCD Figure 9C-3 symbols to indicate bike lanes

Contraflow Bike Lanes

Contraflow bike lane and bike lane combination. © NACTO

CONTRAFLOW BIKE LANES

Contraflow bike lanes are less common in the Midwest and are only used on one-way vehicle streets. While it is easy for vehicles to circumnavigate one-way streets, asking cyclists to do so is not always safe or practical. When street widths prohibit alternate solutions, a contraflow bike lane may be used. Contraflow lanes add a bike lane in the opposite direction of vehicle travel. The following are recommendations from NACTO for implementing a contraflow bike lane[13]:

- Provide a 6' wide bike lane adjacent to the curb, for cyclists traveling the opposite direction of vehicle traffic, with a solid double line indicate the edge of the both vehicle and bicycle travel lane.
- If possible, provide a buffered centerline to further separate cyclists from vehicles.

Typically, contraflow bike lanes are used in combination with sharrow pavement markings to provide bicycle travel in the opposite direction. However, contraflow bike lanes that are provided in combination with a bike lane in the opposite direction is typically a less than desirable solution. It is recommended that these two facilities be combined into a two-way protected bike lane, which could be implemented during future street resurfacing projects. See additional recommendations for two-way protected bike lanes on the following page.

Protected Bike Lanes

One-way protected bike lane, NACTO

ONE-WAY PROTECTED BIKE LANES

One-way protected bike lanes are positioned near the edge of the street and provide one-way directional travel for cyclists. The benefits of one-way protected bike lanes are that they are similar to traditional bike lanes, and may be more comfortable and predictable for motorists. To implement a one-way protected bike lane, consider the following requirements[14]:

- 18" minimum buffer between adjacent vehicle travel lanes and on-street parking lanes
- The combined space for both the bicycle lane and buffer must be at least 7'.
- Follow recommendations for pavement markings and signage as identified under bike lanes.

Two-way protected bike lane - How to Build A Great Menlo Park Bike Network, Oct. 2016

TWO-WAY PROTECTED BIKE LANES

When protected bike lanes are preferred, but existing streets are one-way, a two-way protected bike lane should be considered. The benefit of a two-way protected bike lane on an existing one-way street is consolidating bike traffic to one area, and providing a safer space for contraflow bicycle traffic. While contraflow bike lanes can be used, they are often intimidating for novice and recreational cyclists and they are immediately adjacent to on-coming traffic. The following are NACTO requirements for implementing a two-way protected bike lane:

- Provide a minimum 3' buffer between the bike lane and vehicle travel lane. Knock-down vertical bollards may be added as well to increase awareness of the buffer separation
- Each bike lane shall be a minimum of 4' wide, creating a total 8' wide two-way bike lane
- Refer to intersection design recommendations for additional requirements for protected bike lanes at intersections

Two-way protected bike lanes may also be implemented on streets with two-way vehicular traffic, which could make cyclists feel safer, as they are separated from vehicle traffic by a buffer and consolidated to one specific part of the street.

Cycle Tracks

Indianapolis Cultural Trail, Two-Way Cycle Track

ONE-WAY AND TWO-WAY CYCLE TRACKS

A cycle track may be a one-way or two-way bicycle facility, that is raised and physically separated from the adjacent street. One-way cycle tracks are located on both sides of the street, and will follow the same direction as vehicular traffic. For most users, cycle tracks offer the safest bicycle facility because of the elevation and physical separation that cycle tracks offer. However, oftentimes cycle tracks are more expensive to implement then bicycle lanes and protected bike lanes, which for the most part can be accomplished by roadway restriping.

If a cycle track is desired, the following requirements are noted by NACTO[15]:

- The cycle track shall be protected from adjacent vehicle travel lanes. Protection strategies include a raised or mountable curb, street furnishings, low vegetation, or on-street parking.
- The cycle track should be vertically separated from the roadway.
- One-way cycle tracks shall be a minimum of 5' wide, excluding buffers. Two-way cycle tracks shall be a minimum of 8' wide, excluding buffers.
- Approaching intersections, the cycle track may "Bend-in" to promote greater visibility of cyclists.

Vassar Street Cycle Track, One-Way Cycle Track, NACTO

- At intersections, provide a dedicated signal phasing for cyclists to eliminate conflicts with turning automobiles.
- Provide signage and pavement markings that follow MUTCD standards

The proposed Muncie Art and Culture Trail is a two-way cycle track that connects Ball State University, downtown Muncie, and the neighborhoods of south Muncie.

Intersection Treatments for Bicycle Planning

BIKE BOXES

Bike Boxes are queuing zones for cyclists at intersections. They benefit cyclists for the following reasons[16]:

- Provides a visible space for cyclists to stop near the intersection. Cars are to stop behind the bike box, allowing cyclist to be at the front of the intersection. Also, multiple cyclist are able to group together at a visible location in the front of the intersection
- Provides space to allow cyclist to make a left-hand turn at an intersection.
- The bike box should be a minimum of 10' long and maximum of 16' long.
- A "No turn on red sign" shall be installed to prevent vehicles from entering the bike box during a red light, and turning right.

INTERSECTION CROSSING MARKINGS

Much like traditional bike lanes on a street, pavement markings through the intersection identify dedicated space for cyclists. These pavement markings remind motorists that cyclists may be continuing through an intersection[16].

- Follow MUTCD for all pavement markings symbols and signage
- Provide a minimum 6" wide dashed line adjacent to the vehicle travel lanes, and a minimum 4" dash line elsewhere.
- Intersection crossing markings may be dotted line extensions, shared lane markings, colored conflict areas, or "elephant's feet." Potential pavement marking options were recommended by the NACTO Design Guide.

THROUGH BIKE LANES

A common conflict area between cyclist and vehicles occurs at intersections. Oftentimes, a cyclist will continue through an intersection while motorists wish to turn right. Cyclist should always be positioned on the left side of any right-turning vehicles. To accommodate for cyclists at intersections, a dedicated bike lane may be provided on the left side of a vehicle right turn lane, or the vehicle right turn lane may be marked as a "Shared-Lane" with a space for cyclists identified on the left side of the shared lane[16].

PROTECTED INTERSECTIONS

Protected intersections, or Dutch intersections, provide a protected bike lane through an intersection and allows cyclists to more safely make left hand turns without having to cross multiple lanes of traffic. The City of Muncie has recently started to install a form of a protected intersection at Wheeling Avenue and Neely Avenue.

As bike lanes approach intersections, conflicts typically occur when motorists wish to make right-hand turns. In an effort to remove the conflict between through-movement cyclists and turning motorists, a protected intersection maintains cyclists on the right side of the right turn lane and provides space for vehicles to queue while waiting for cyclists to continue through the intersection. This concept keeps cyclists in the field of vision throughout the intersection. A cyclist wishing to make a left-hand turn will continue through the intersection, and then wait until parallel vehicle traffic receives a green light[17].

Plan Recommendations and Implementation

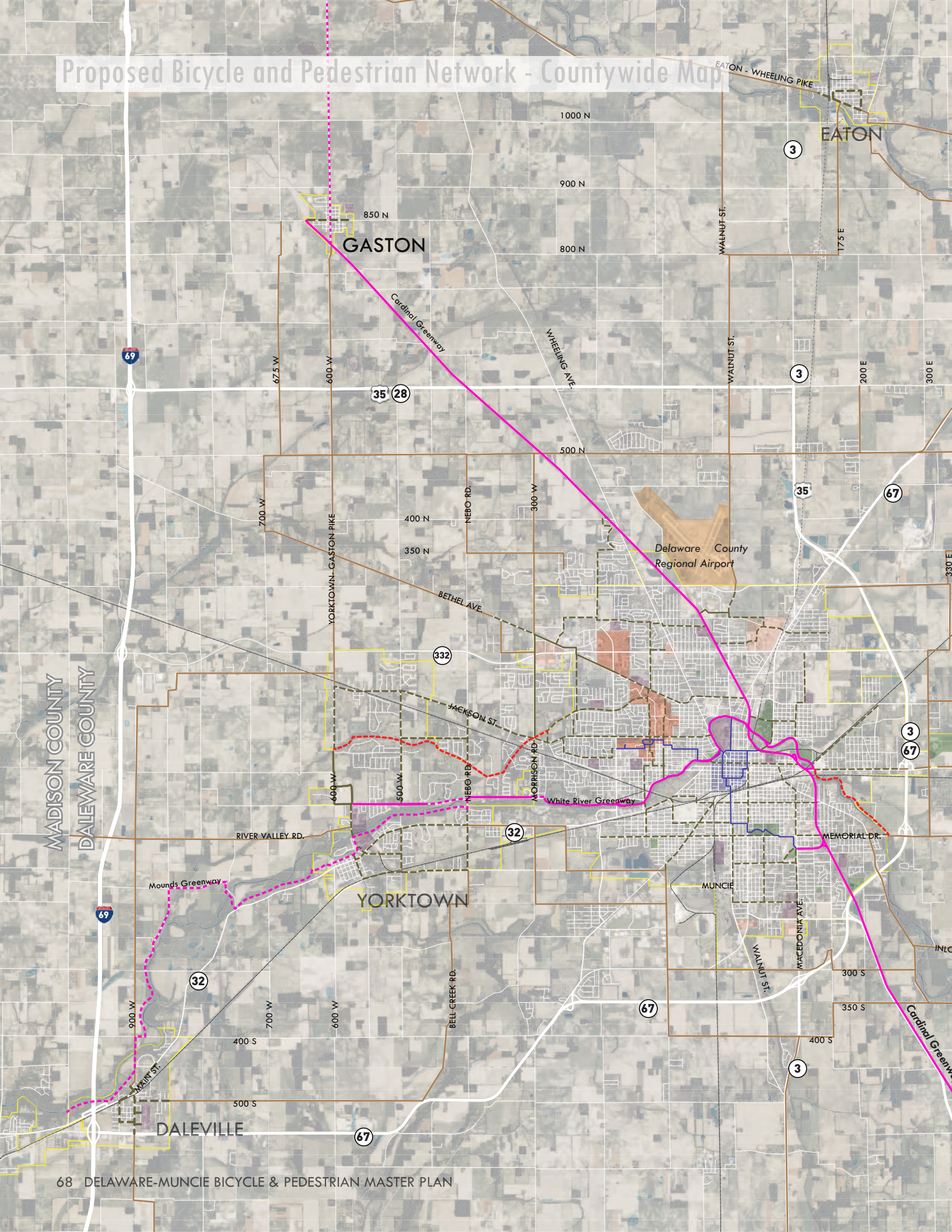
Photo: Cardinal Greenway Wysor St. Trail Head, Cardinal Bike Fest 2017

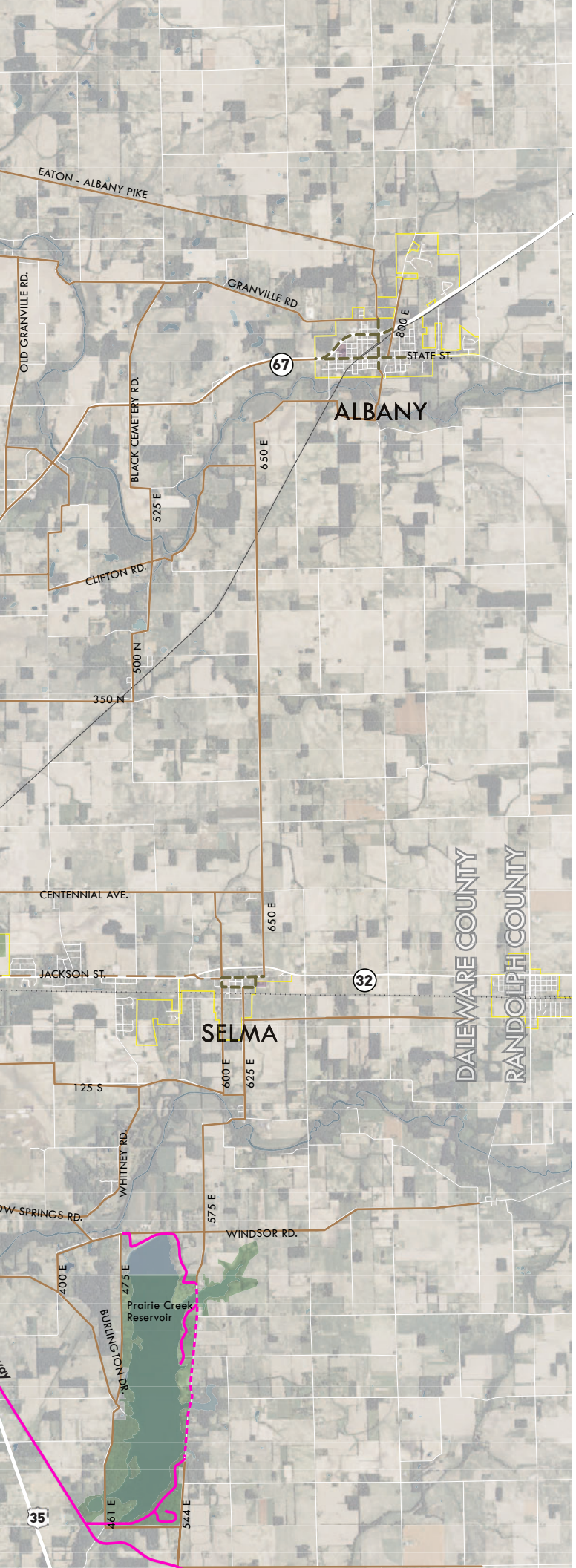
OVERVIEW

In order to provide convenient, safe, and efficient bicycle and pedestrian travel throughout Delaware County, a collection of physical facility improvements are recommended. Some of these improvements will likely occur over a long period of time, while more critical routes or more affordable routes could be accomplished in the short term. Included within the Plan and Implementation recommendations include the following:

1. County-wide bicycle and pedestrian recommendations
2. Muncie and Yorktown sidewalk improvement plan
3. City and town bicycle and pedestrian recommendations
    - South Muncie
    - North Muncie
    - The recommendations from the Ball State University Bicycle Master Plan are noted within the North Muncie study area.
    - Yorktown
    - Gaston
    - Albany
    - Eaton
    - Selma
    - Daleville
4. Trail Implementation Plan and Planning Level Costs

Proposed Bicycle and Pedestrian Network - Countywide Map





THE NETWORK

The Bicycle and Pedestrian Master Plan proposes enhancements routes for future bicycle and pedestrian.

The routes developed in this plan are based on previous studies, inventory of existing facilities, online and public meeting survey results, residential and job density data, traffic counts and right-of-way opportunities.

The recommended routes will provide connections to local and regional greenway systems. The routes also provide safe and accessible experiences through out the community. Along with on-street facilities, extensions of existing greenway system have been proposed.

In order to provide safe and most user-friendly routes, shared-use facility were often recommended.

The proposed network is intended to be the arterials and connectors of the base bicycle and pedestrian system. Local connections and expansions are encouraged to continue to build a completely interconnected bike/pedestrian network serving all neighborhoods with ties into the base system. The plan also encourages neighborhoods adjacent to the White River and Cardinal Greenways to create connections in coordination with the Cardinal Greenway organization.

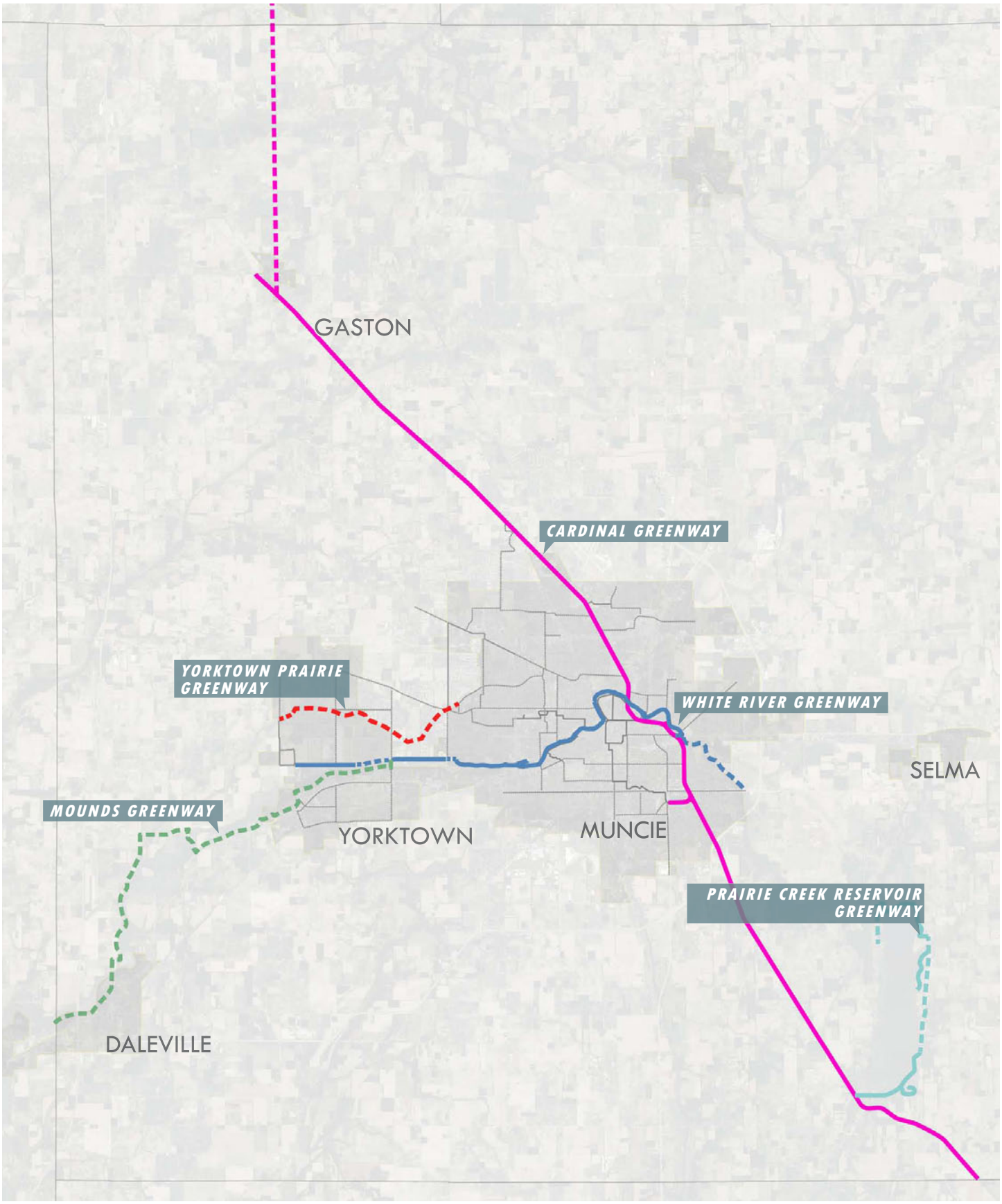
LEGEND

- EXISTING ROUTES
- PROPOSED ROUTES
- COUNTY BIKE ROUTES
- PROPOSED COUNTY BIKE ROUTES
- EXISTING GREENWAY
- PROPOSED GREENWAY
- MACT

N

0 9,000'

County-Wide Greenway System



CARDINAL GREENWAY

The rail-trail greenway spans through a wide area in East Central Indiana - starting from Marion and ending in Richmond. Within the study area, the trail passes through Gaston and Muncie, and connects to the White River Greenway, Prairie Creek Reservoir and local parks.

The Greenway is a shared-use path for walking, running and cycling. After reaching Gaston, the trail uses local county roads until reaching Gas City.

MOUNDS GREENWAY

Focusing on the West Fork of the White River, the Mounds Greenway is an ongoing project that stretches from Anderson to Muncie.

Starting at Rangeline Preservation in Anderson, the greenway connects to Shellabarger Park in Daleville, Lion's Club Park in Yorktown, and the White River Greenway in Muncie. Along the White River, over 13 miles of shared-use path for hiking and bicycling are proposed. There are also other opportunities for tourism and hospitality developments along the corridor.

In Delaware County, the Mounds Greenway will become the second regional greenway after the Cardinal Greenway.

WHITE RIVER GREENWAY

Managed by Cardinal Greenway, the White River Greenway is a 6-mile trail along the White River. The proposed east extension continues for 1.5 miles along the river, ending at Memorial Rd/100 South.

PRAIRIE CREEK RESERVOIR GREENWAY

Located southeast of Muncie, the Prairie Creek Reservoir provides a variety of recreational opportunities. This plan proposes a 2-mile trail on the east side of reservoir, which will connect to other existing recreational destinations and trails, and to Cardinal Greenway.

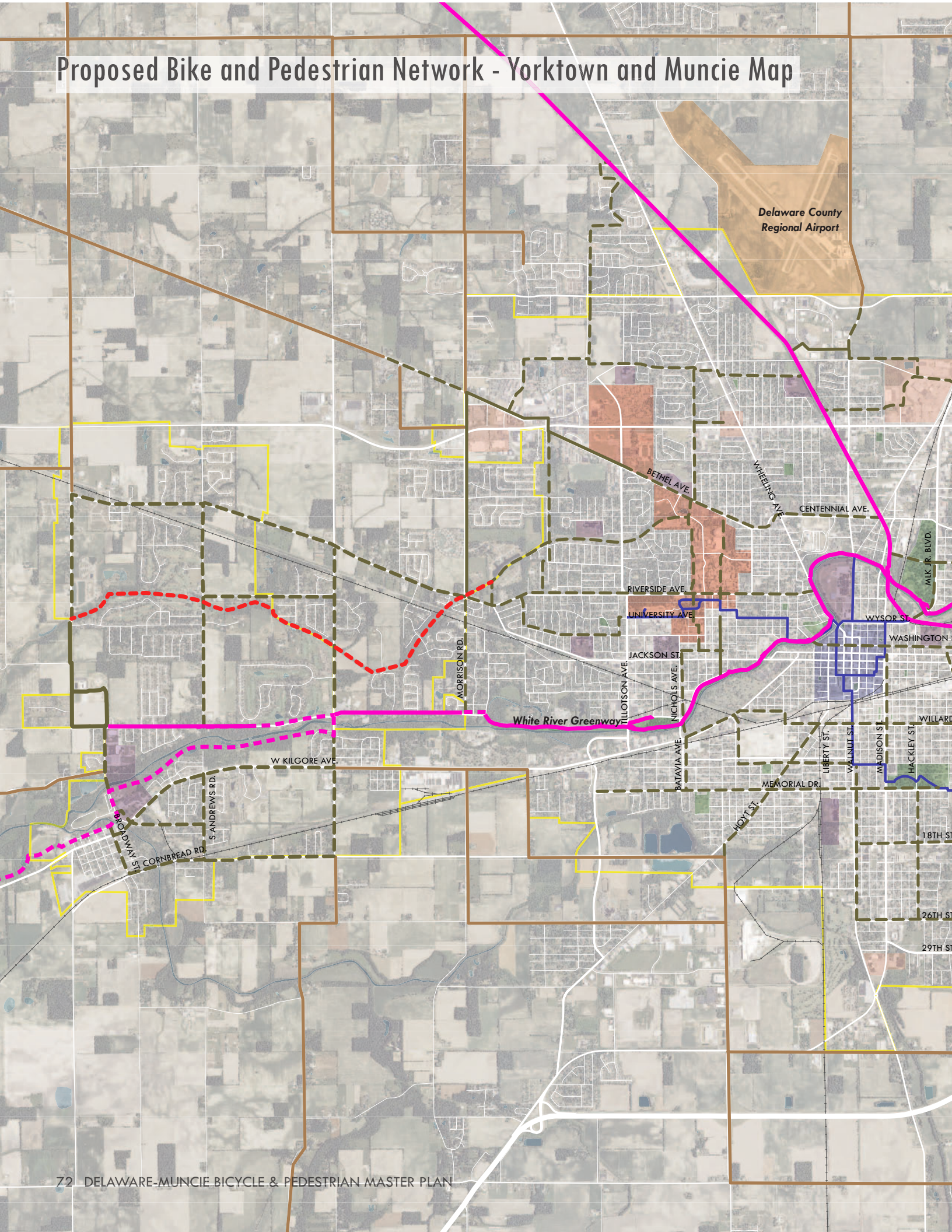
YORKTOWN PRAIRIE GREENWAY

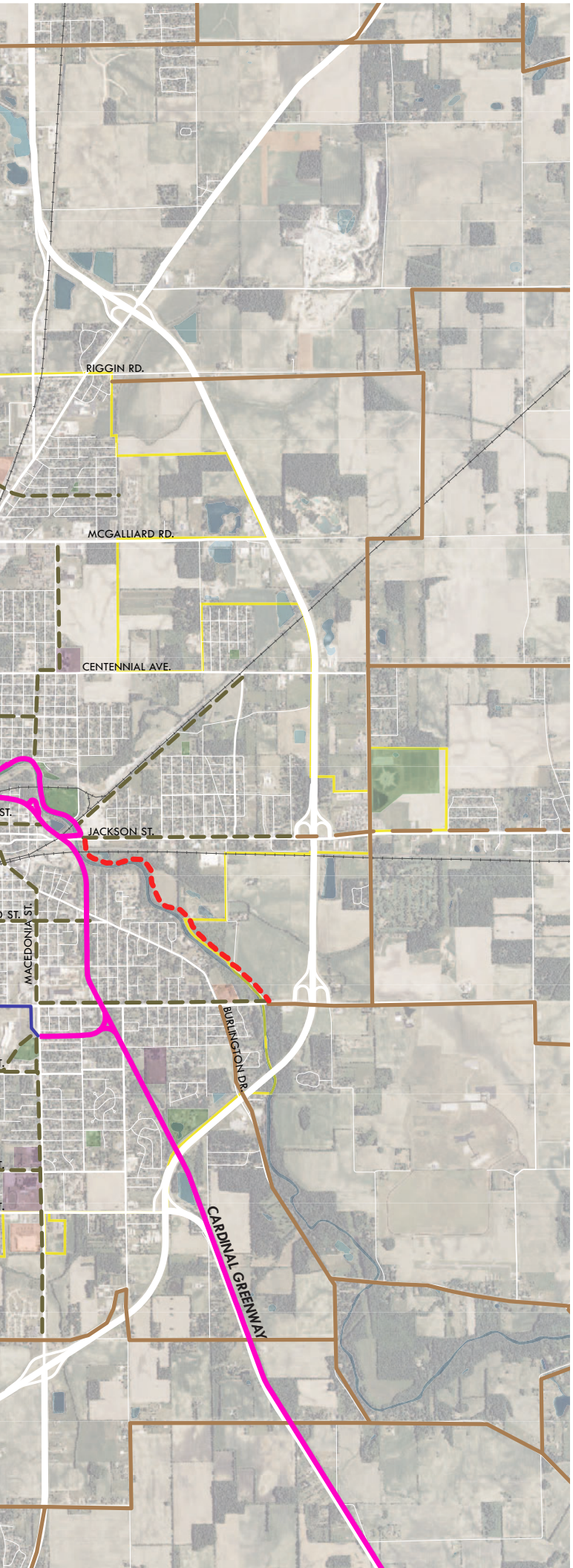
The Yorktown Prairie Greenway is proposed along a local stream. Beginning at S 600 W Rd, it would connect to the roundabout at Jackson St. and Morrison Rd. The 2.8-mile addition to the local greenway system will provide more attractions for outdoor recreations and more biking and hiking options for the community.

Cardinal Greenway

Cardinal Bike Fest 2017

Proposed Bike and Pedestrian Network - Yorktown and Muncie Map





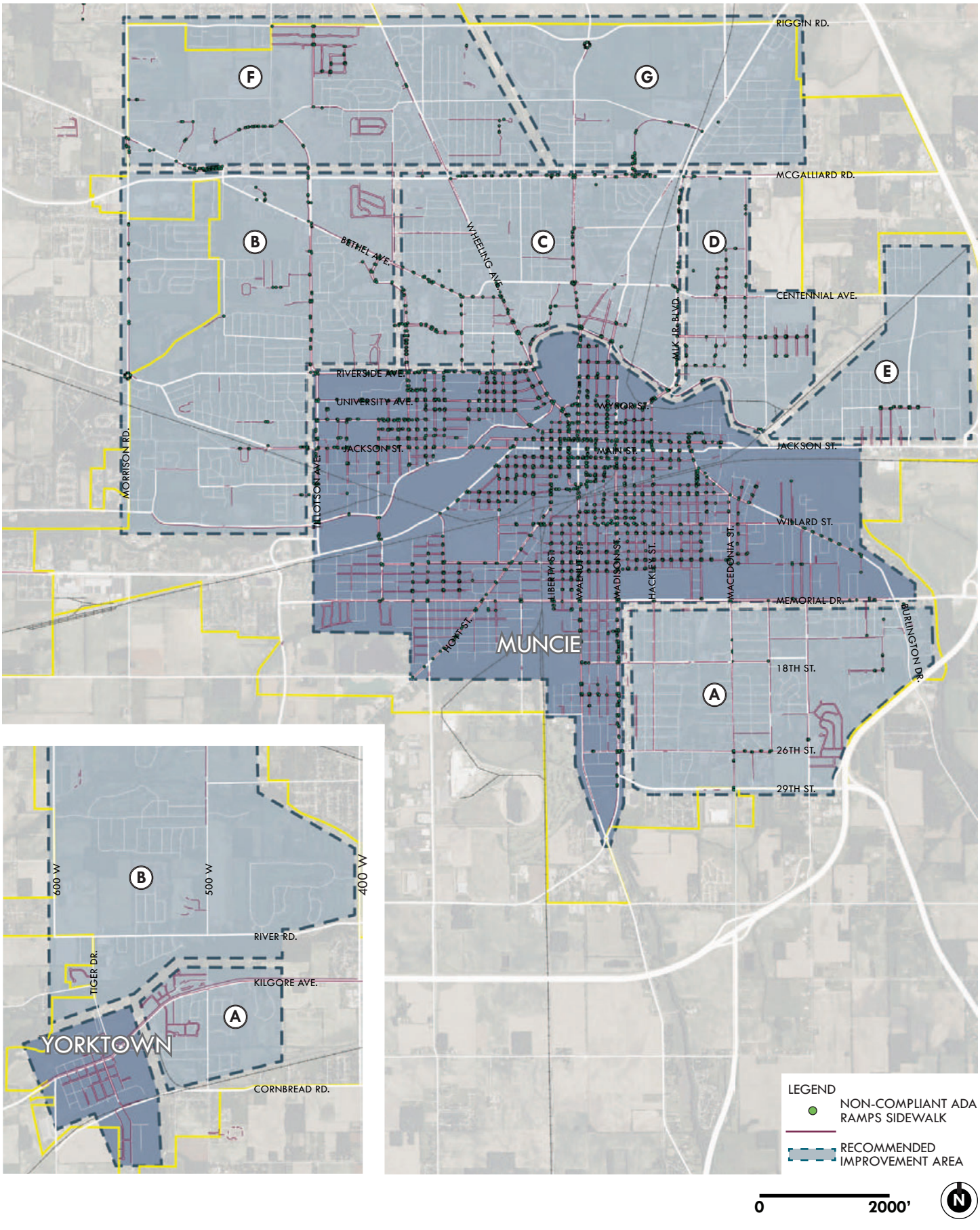
LEGEND

- EXISTING ROUTES
- PROPOSED ROUTES
- EXISTING COUNTY BIKE ROUTES
- PROPOSED COUNTY BIKE ROUTES
- EXISTING GREENWAY
- PROPOSED GREENWAY
- CITY&TOWN LIMIT
- MACT
- SCHOOLS
- AIRPORT
- BALL STATE UNIVERSITY
- RETAIL AREA
- DOWNTOWN MUNCIE

N

0 4,500'

Sidewalk Improvement Plan - Muncie & Yorktown



OVERVIEW

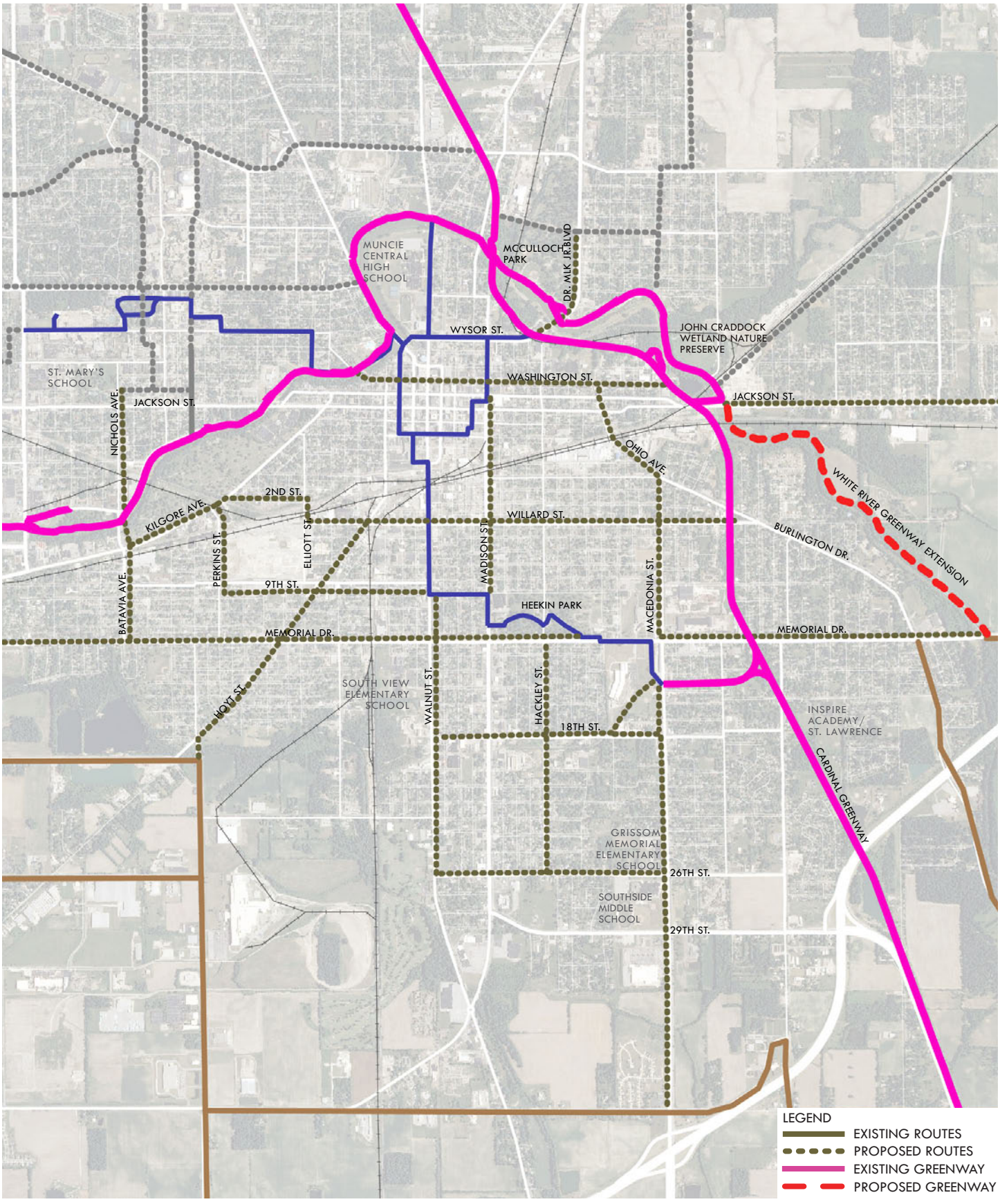
Sidewalk systems are critical for short-distance transportation and creating more connected neighborhoods. The sidewalk improvement plan identifies areas of Muncie for focused sidewalk improvement. The graphic to the left identifies area of sidewalks improvement locations in Muncie, but does not provide data on sidewalk quality. However, curb ramps that are not ADA compliant have been marked with a dot indicating their location.

Downtown Muncie has the most be connected system of sidewalks., but as a result of having more sidewalks, most of the non-compliant ADA ramps are located near downtown Muncie as well. The city should focus on replacing curb ramps to be ADA compliant within this area of the city. A connected system of sidewalks that is not available to people of all abilities is not inclusive and serving their intended purpose.

Moving outward from the downtown core, sidewalks are provided in fewer areas compared to around downtown Muncie. Muncie Subareas A, C, and D should be the first focus locations for new sidewalks. These subareas have a below-average (50%) coverage of existing sidewalks with fewer non-compliant ADA ramps. Providing new sidewalks in these areas would better connect fairly dense neighborhoods to surrounding amenities, including local businesses, employers, and Ball State University. Similarly, sidewalk improvement should focus on Yorktown subarea A. More sidewalks in this area would better connect residents to downtown Yorktown and events that may be occurring at Yorktown schools.

Muncie subareas B, F, E, and G and Yorktown subarea B have the fewest sidewalks as compared to other areas. New sidewalks should be provided in these areas, but implementation will more than likely occur over a longer period of time since a significant amount of new sidewalks are needed.

South Muncie



EXISTING

The existing pedestrian network provides coverage to many of the neighborhoods that surround downtown Muncie. In addition to the White River Greenway and Cardinal Greenway, the future Muncie Art and Culture Trail (MACT) will loop around downtown, connect to Ball State University, and connect to Heekin Park in south Muncie.

RECOMMENDATIONS

Aimed to improve bike and pedestrian access through the entire city and county, the proposed trail system will be able to connect popular destinations and local neighborhoods.

The proposed bicycle and pedestrian network recommends the following routes:

- Memorial Dr.
- Willard St. - 2nd st. - Kilgore Ave. corridor
- Washington St.
- Wysor St.
- Walnut St.
- Madison St.
- Macedonia Ave. - Ohio Ave.
- Nichols/Batavia Ave.
- Washington St (pending 2-way road conversion)

The sections on the following pages will demonstrate details of the potential routes.

Bike Fest in 2017

Heekin Park

Washington Street

EXISTING

- 6’ or 8’ sidewalk on each side of the street
- Two 12’ lane traffic with 8’ wide on-street parking

RECOMMENDATION A

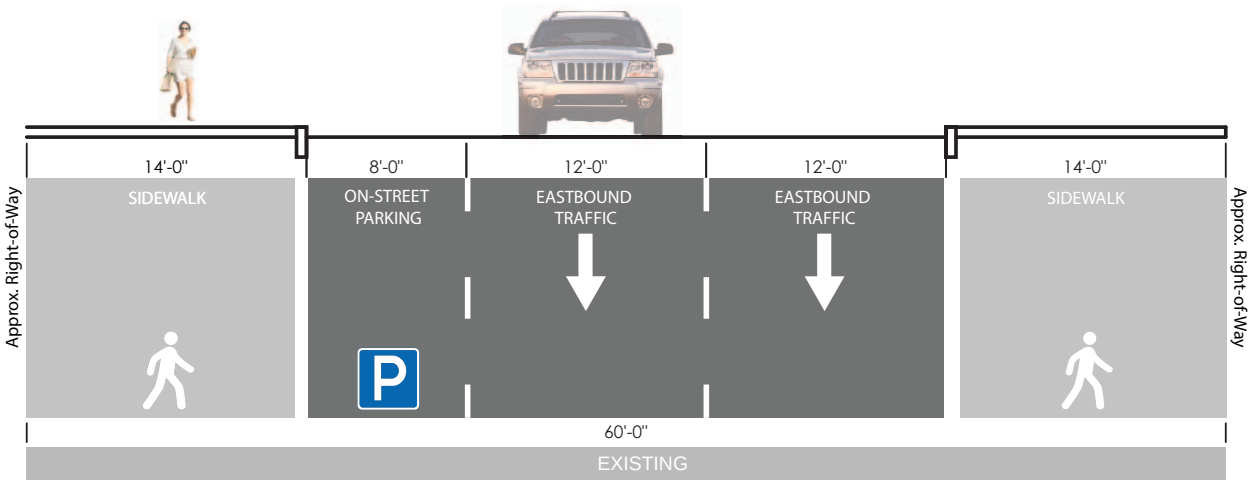
- Convert the street to two-way traffic with one 12’ wide lane on each direction
- Turn both lane to sharrow

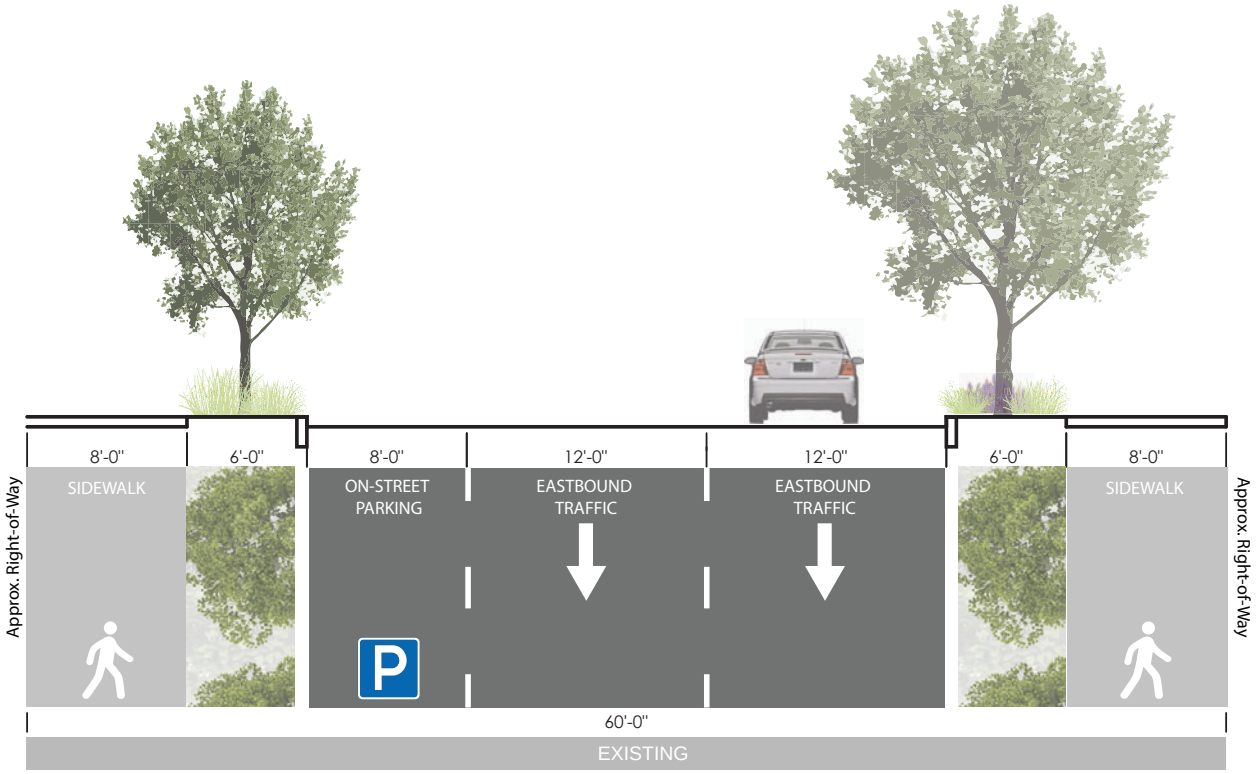
RECOMMENDATION B

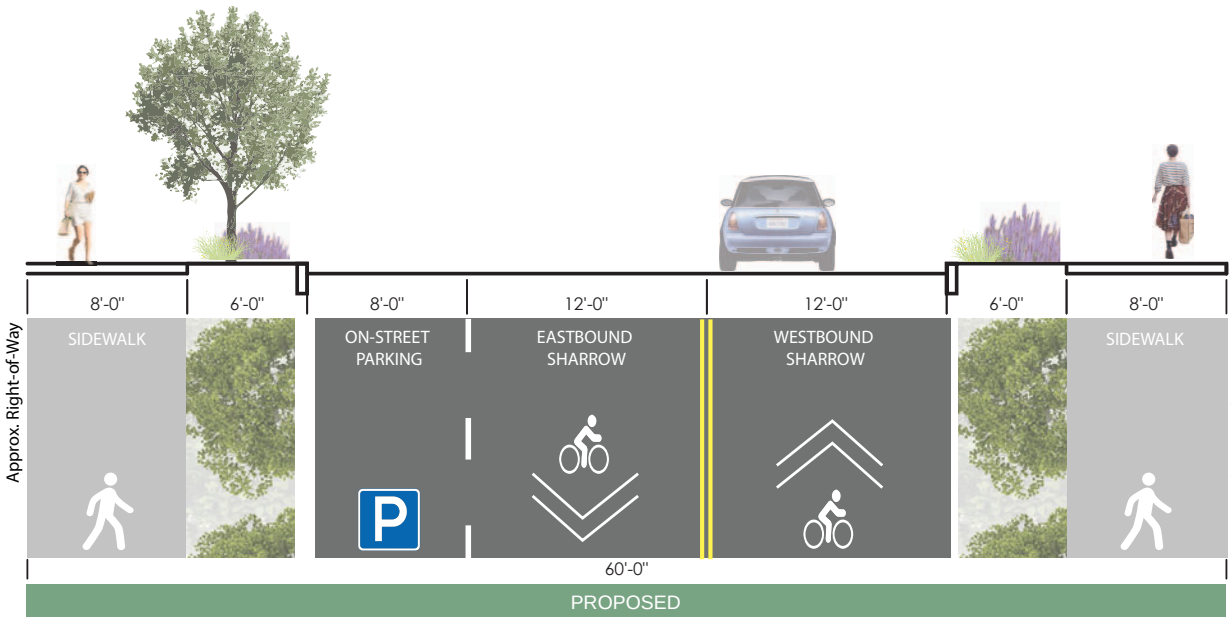
- Convert the street to two-way traffic with one 11’ wide lane on each direction
- Provide a 5’ wide bike lane on each direction

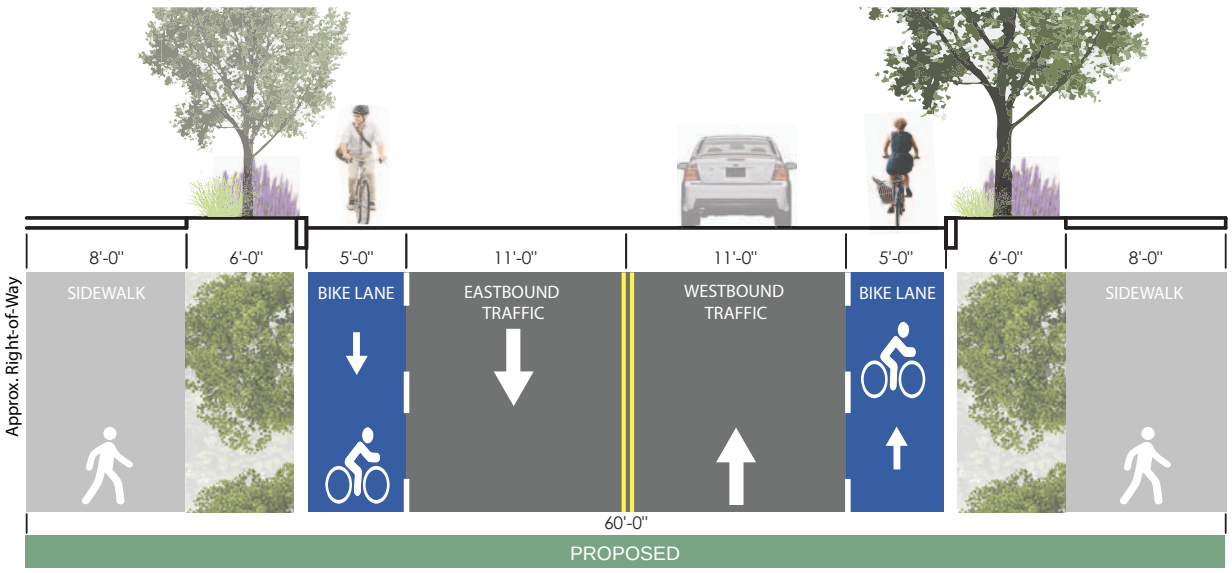
RECOMMENDATION C

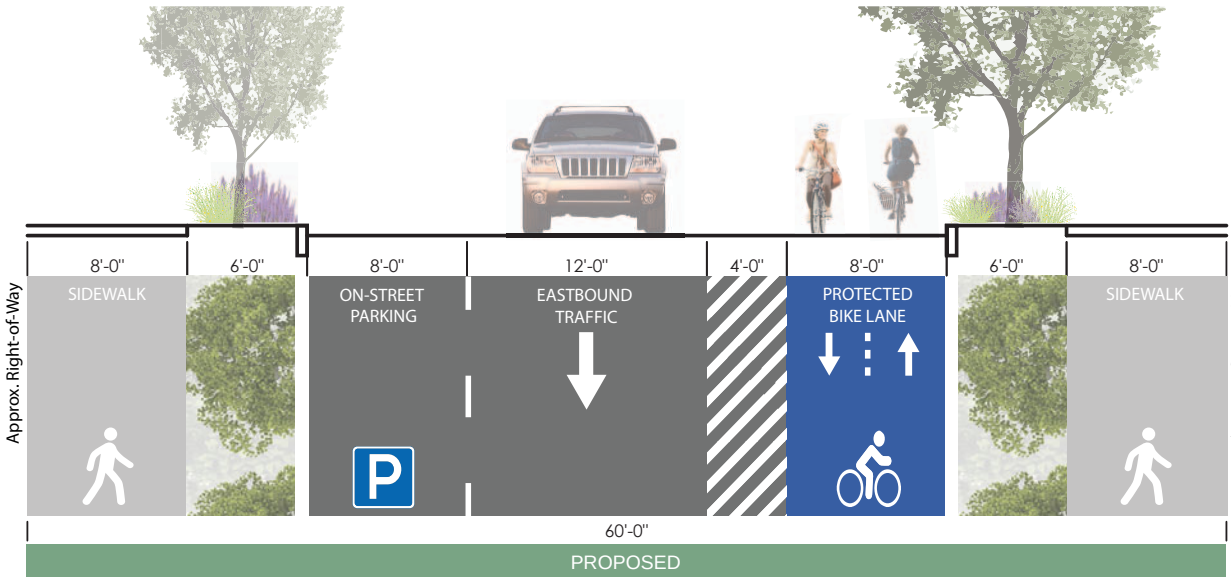
- Provide one eastbound travel lane
- Provide a 8’ wide two-way bike lane with 4’ buffer from vehicular traffic
- Maintain on-street parking on south side of the street






Approx. Right-of-Way
8'-0"
6'-0"
8'-0"
12'-0"
12'-0"
6'-0"
8'-0"
SIDEWALK
ON-STREET PARKING
EASTBOUND SHARROW
WESTBOUND SHARROW
SIDEWALK
60'-0"
PROPOSED


Approx. Right-of-Way
8'-0"
6'-0"
5'-0"
11'-0"
11'-0"
5'-0"
6'-0"
8'-0"
SIDEWALK
BIKE LANE
EASTBOUND TRAFFIC
WESTBOUND TRAFFIC
BIKE LANE
SIDEWALK
60'-0"
PROPOSED


Approx. Right-of-Way
8'-0"
6'-0"
8'-0"
12'-0"
4'-0"
8'-0"
6'-0"
8'-0"
SIDEWALK
ON-STREET PARKING
EASTBOUND TRAFFIC
PROTECTED BIKE LANE
SIDEWALK
60'-0"
PROPOSED

Memorial Drive

EXISTING

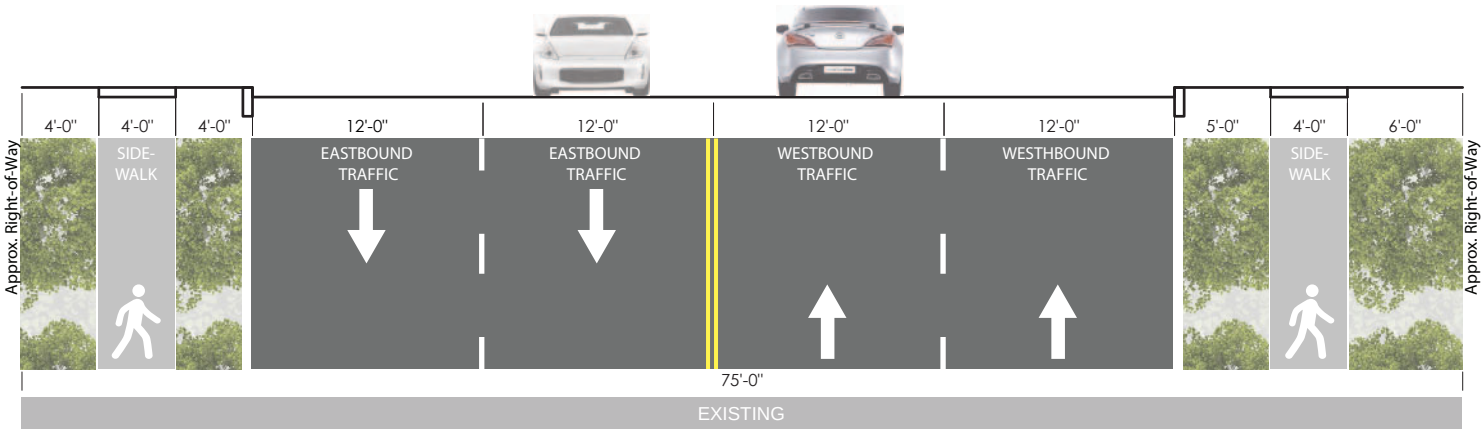
- 4 12’ lanes for vehicle traffic, 2 in each direction
- 4’ sidewalk separated by buffer on both side
- Average Daily Traffic Counts (ADT) below 14,000

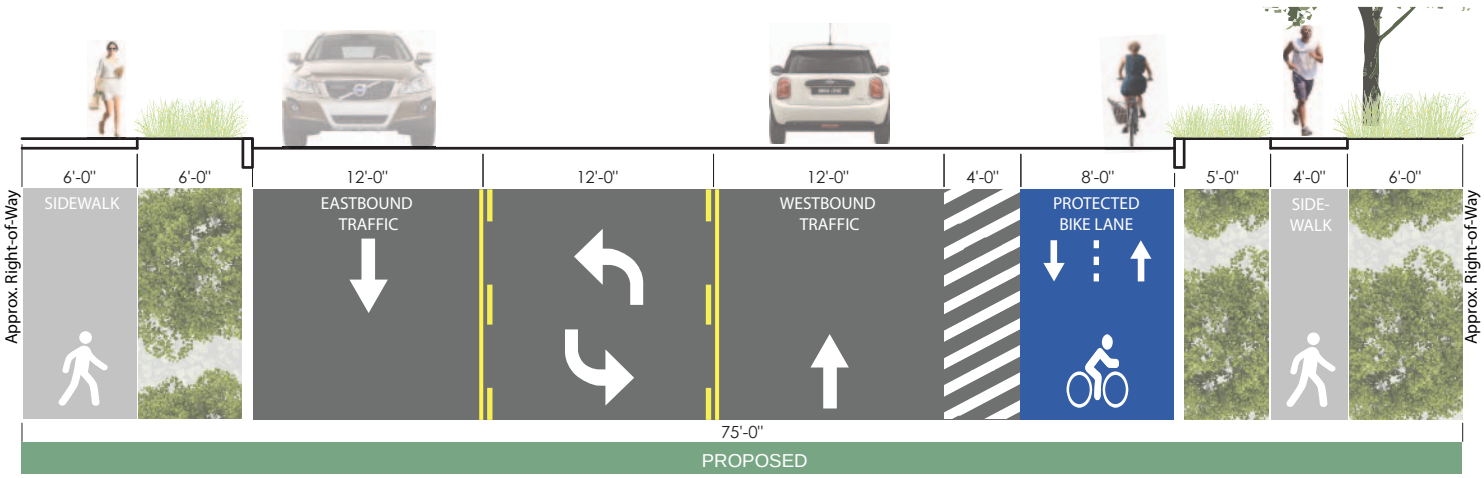
RECOMMENDATION A

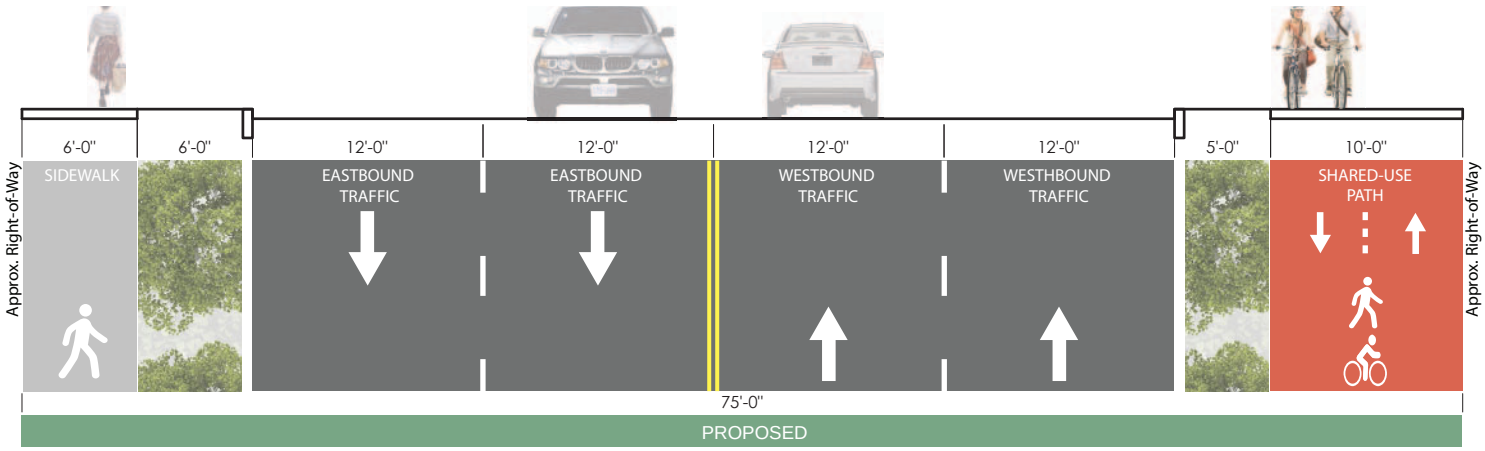
- Convert the street to 3 lanes, with a center turn lane
- Provide separated trail on north side, expand the sidewalk and plant buffer on south side. Separated trail is preferred for high volume traffic.

RECOMMENDATION B

- Maintain existing curb lines
- Provide 10’ wide shared-use path on north side of street







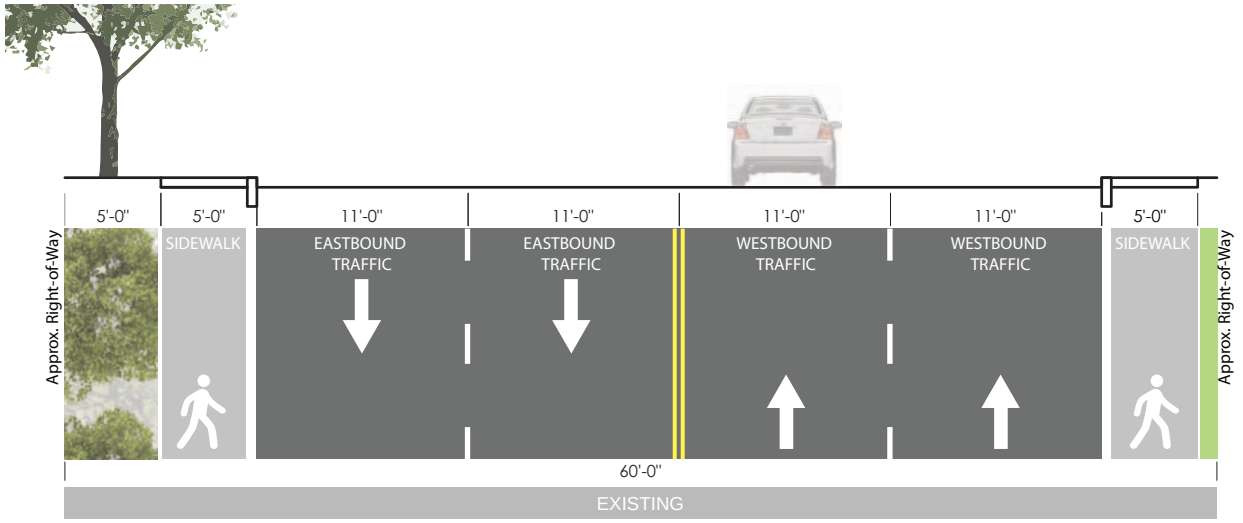
Madison Street

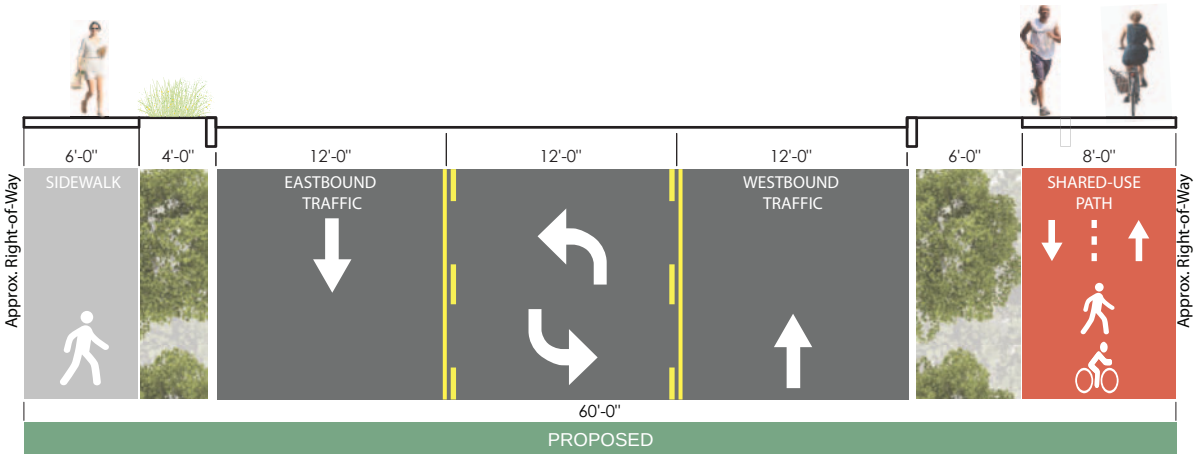
EXISTING

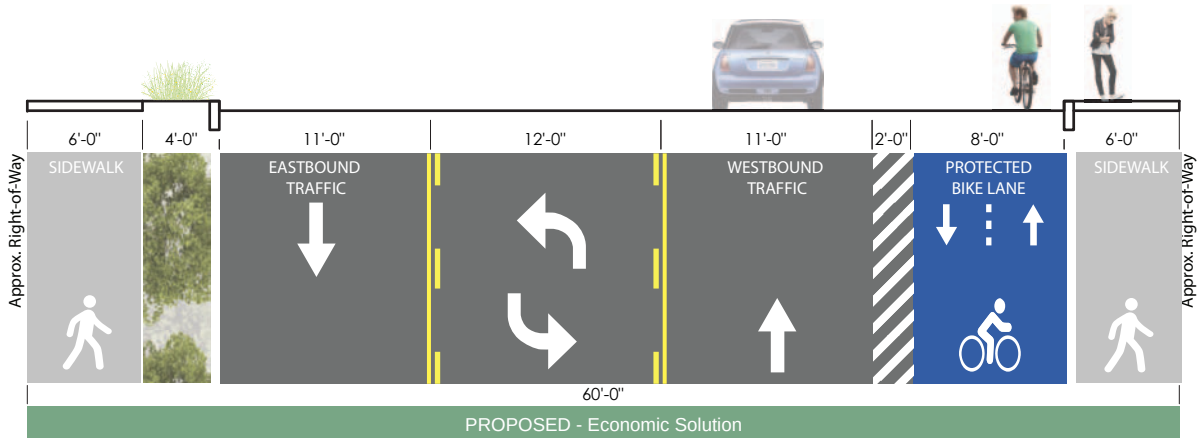
- 4, 11’ vehicle lanes, 2 on each direction
- 5’ sidewalk on both sides
- ADT below 12,000

RECOMMENDATION

- Remove one traffic lane in each direction. Provide center -shared-left turn lane
- Provide bicycle/pedestrian facilities on each side of street, see sections







Walnut Street

EXISTING

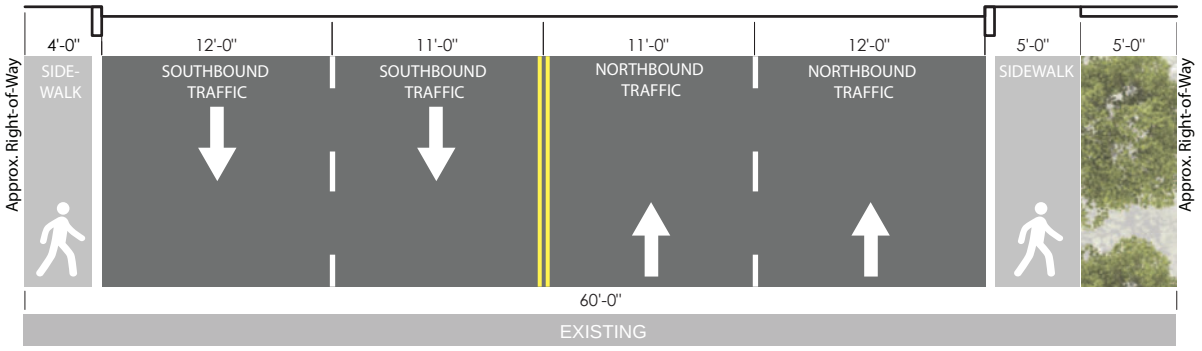
- South extension of MACT
- 4’ sidewalk adjacent to both sides of street
- ADT below 12,000

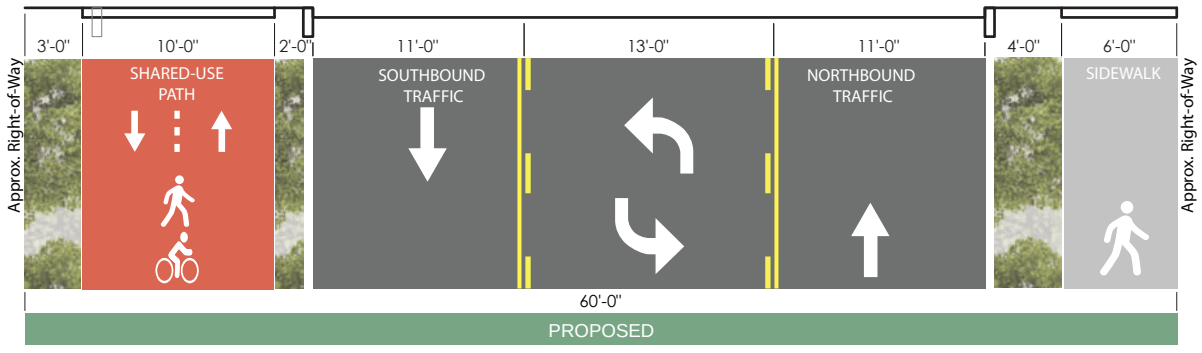
RECOMMENDATION A

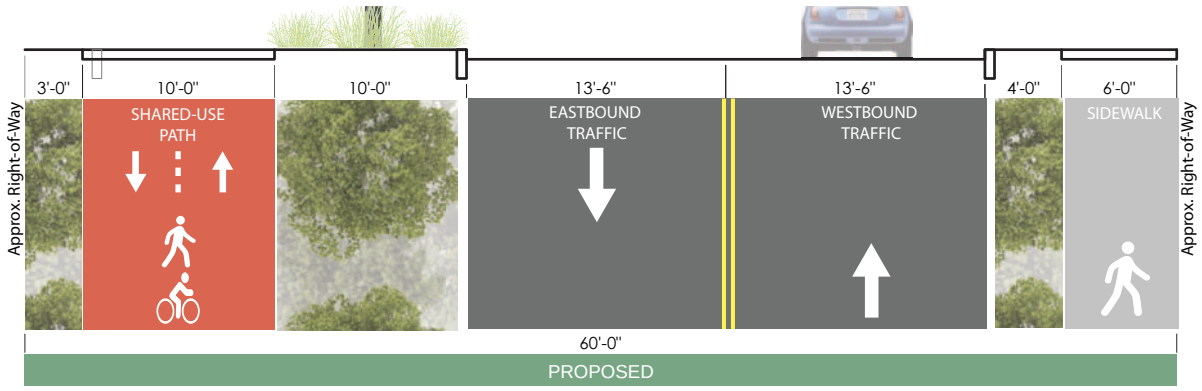
- Remove one traffic lane in each direction. Provide center -shared-left turn lane
- Provide a 10’ wide shared-use path on the west side

RECOMMENDATION B

- Remove one traffic lane in each direction,
- Provide a 10’ wide shared-use path on the west side







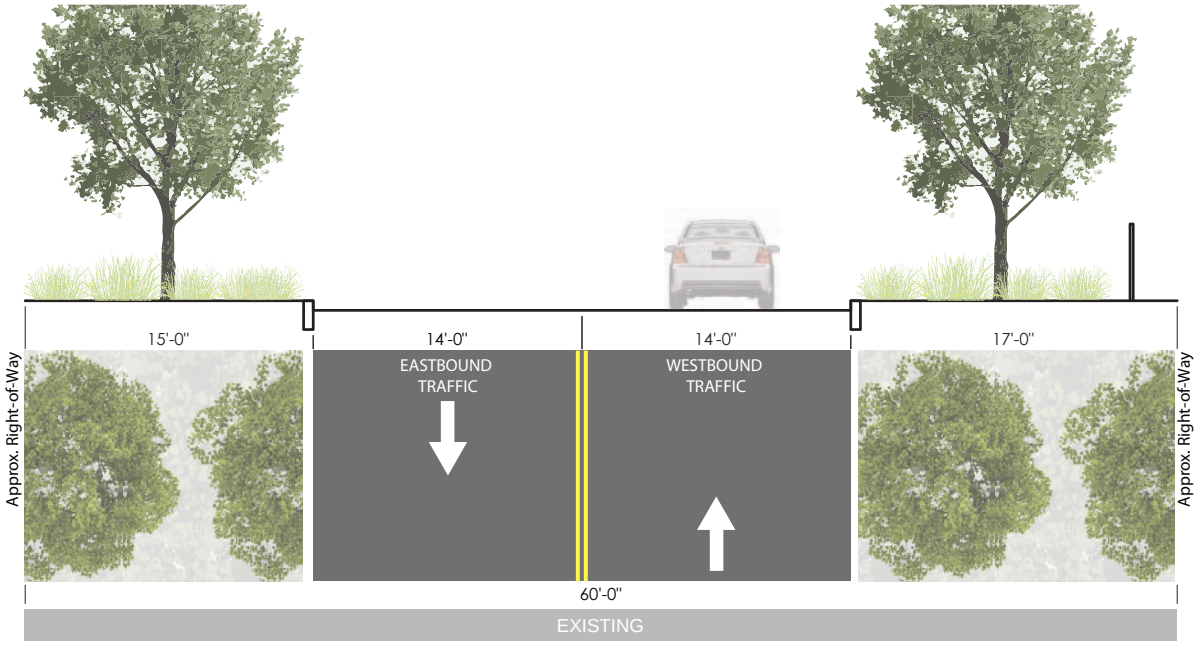
Kilgore Avenue

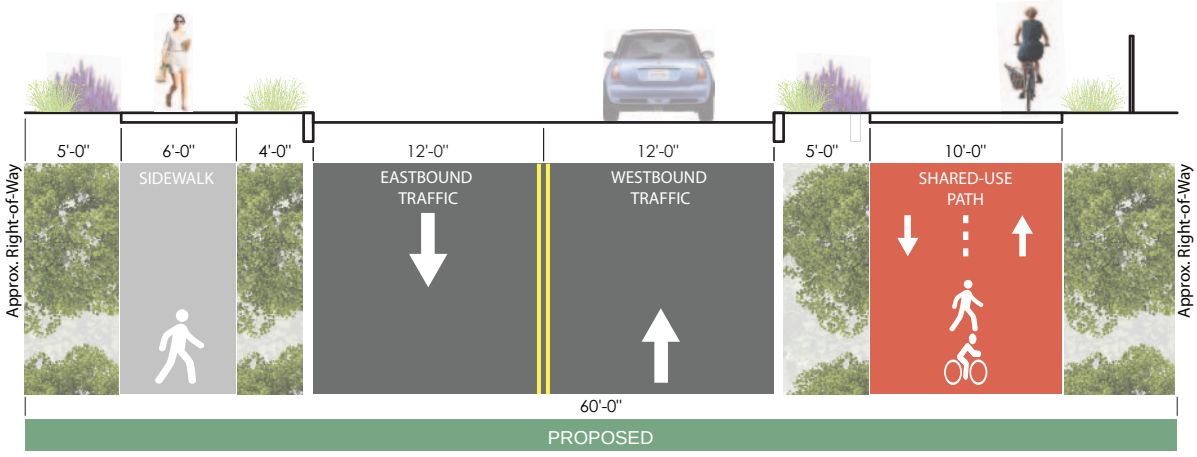
EXISTING

- Two 14’ wide travel lanes, one in each direction

RECOMMENDATION

- Reduce vehicle travel lane width from 14’ to 12’
- Provide a 10’ wide shared-use path on the north side of the street
- If desired, Provide a 6’ wide sidewalk on the south side of the street
- Existing curb lines to be maintained





Willard Street

CONDITION A

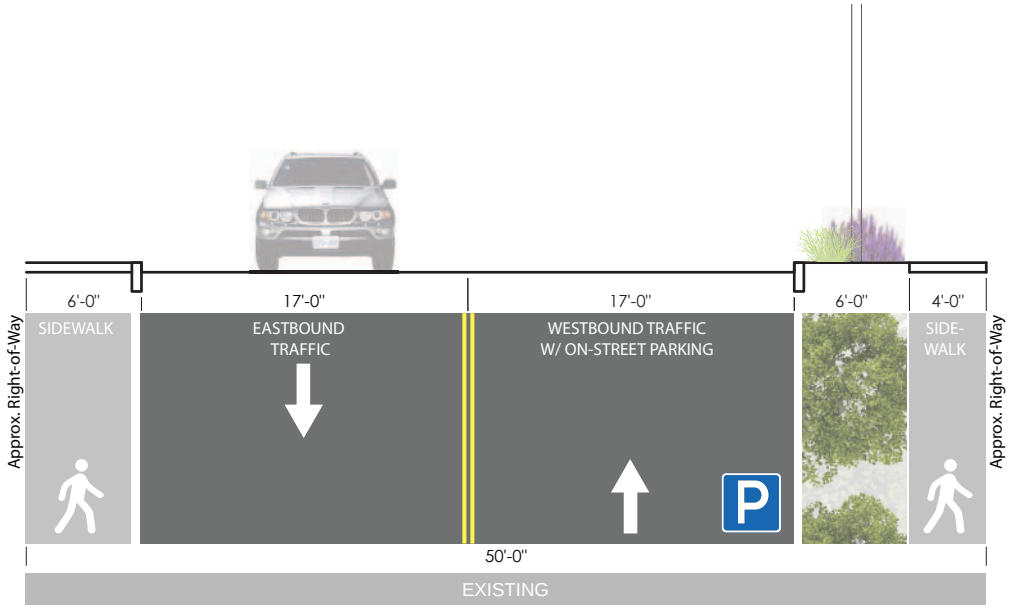
EXISTING

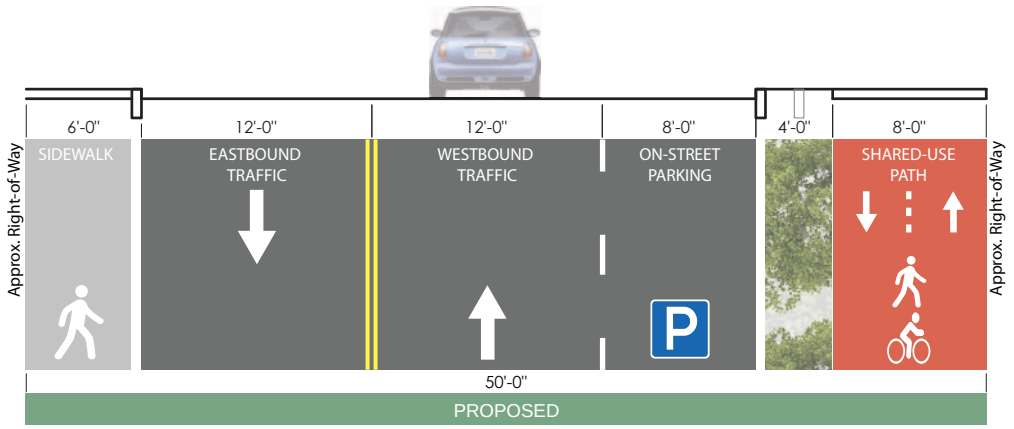
- 34’ wide, with 17’ travel lanes in each direction
- On-street parking along the north side
- 6’ wide sidewalks, adjacent to each side of the street
- Determine how existing utility conflicts can be mitigate or avoided

RECOMMENDATION

- Re-stripping existing street to provide two-lane traffic and 8’ wide on-street parking. Move the north curbline 2’ to the south
- Provide 8’ wide shared-use path with 4’ buffer on north side of the street
- Maintain the 6’ wide sidewalk on the south, rebuild sections as needed

CONDITION A





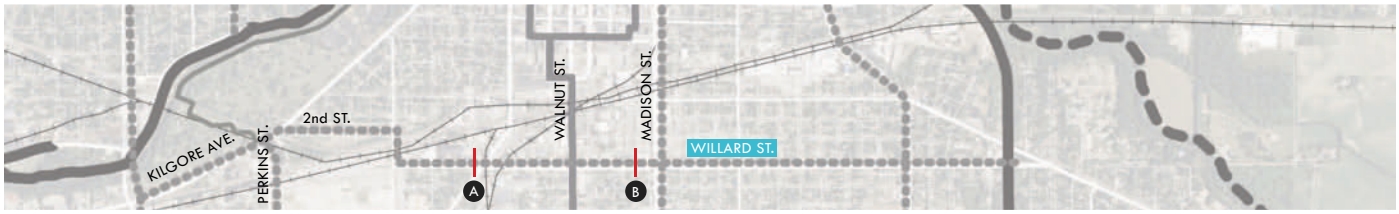
CONDITION B

EXISTING

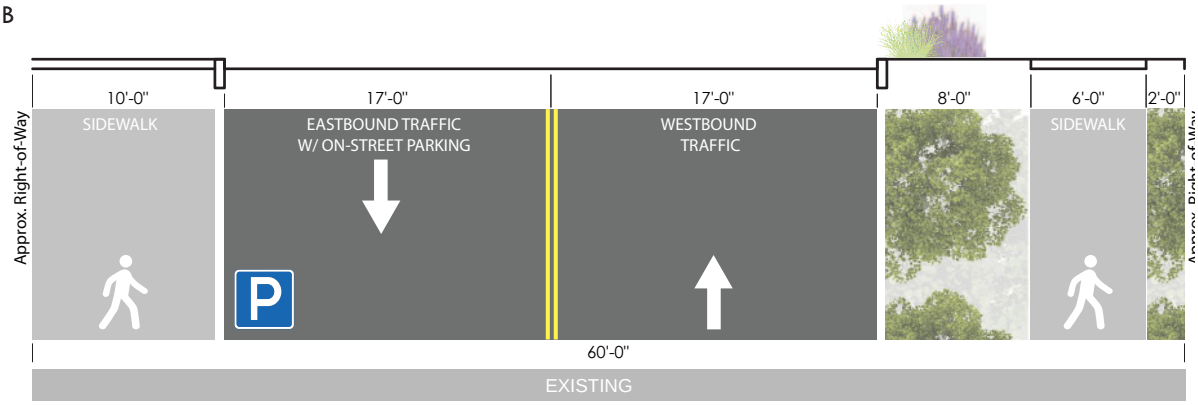
- 60’ right-of-way on Willard St. turns into 60’ from TK of Walnut St.
- 10’ wide sidewalk on one or both sides of the street. Business frontage typically 10’ wide, sidewalk, residential typically 6’ wide

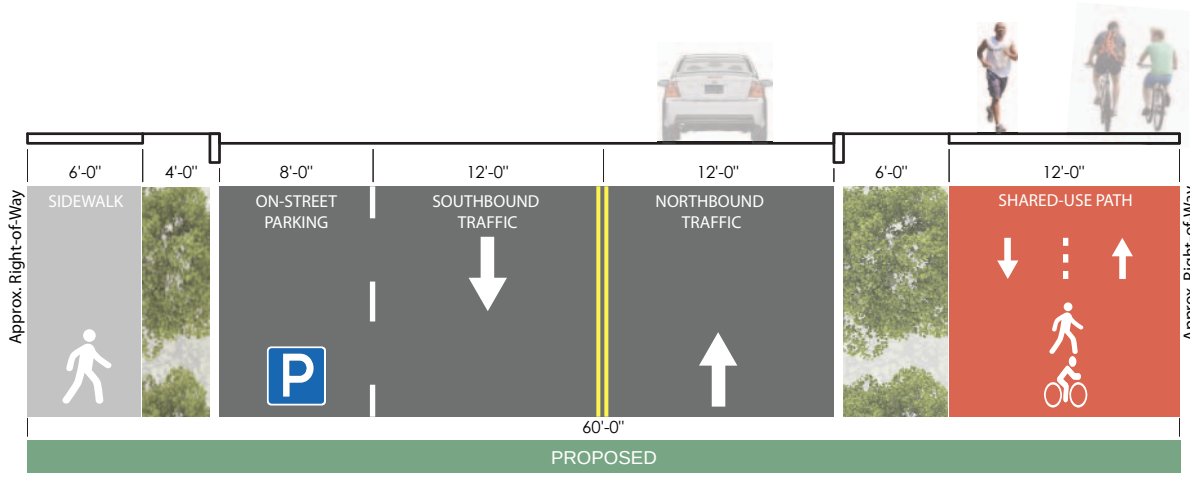
RECOMMENDATION

- Replace existing sidewalk with a 12’ shared-use path on the north side of the street
- Provide a 6’ wide sidewalk on the south side with 4’ plant buffer
- Maintain existing curb lines



CONDITION B





Perkins Avenue

EXISTING

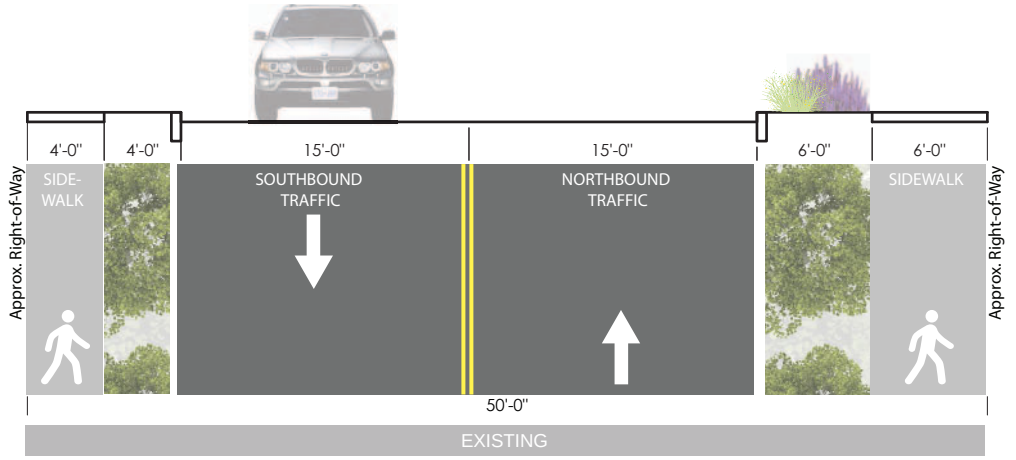
- 30’ wide from curb to curb for two-lane traffic.
- Existing sidewalks on both sides of the street

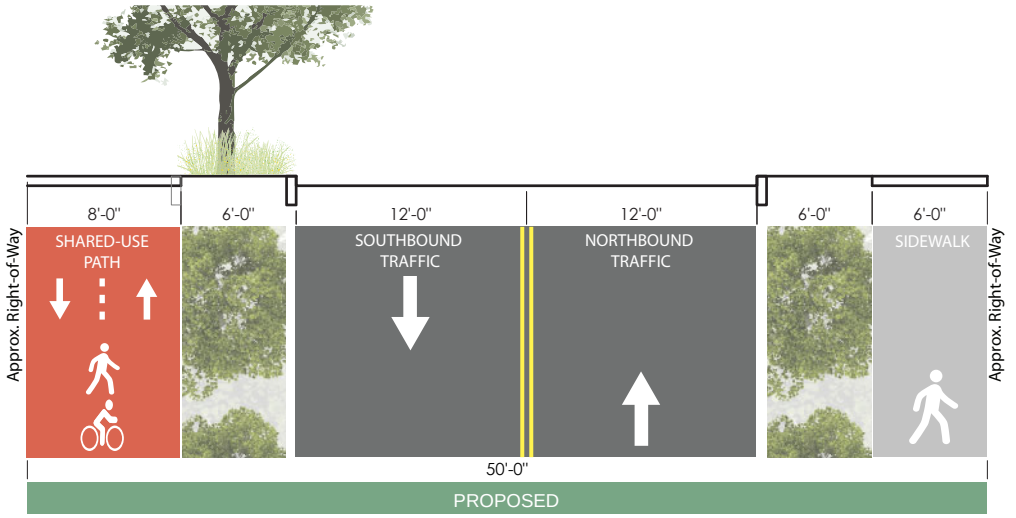
RECOMMENDATION 1

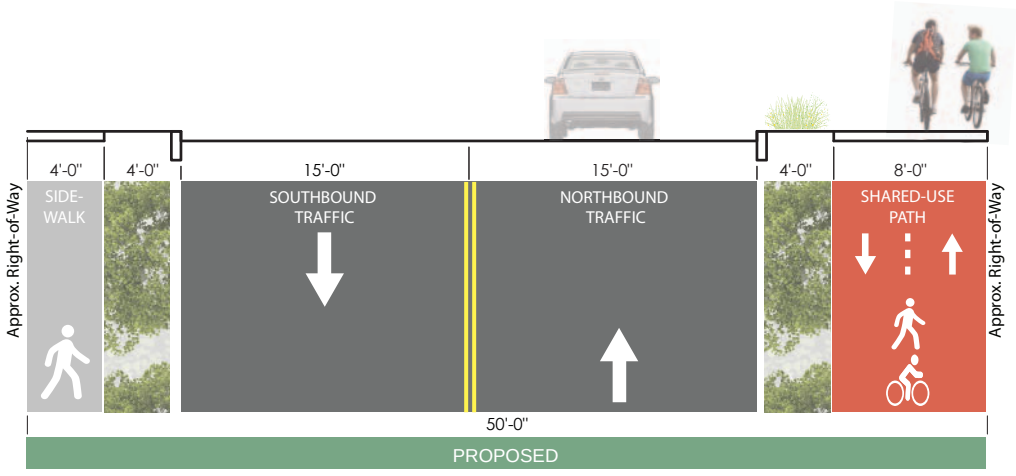
- Move the west curb line 6’ to the east, Provide a 8’ wide shared-use path with plant buffer
- Maintain the existing sidewalk on the east side. Reconstruct if in poor condition

RECOMMENDATION 2

- Provide 8’ wide shared-use path with 4’ buffer on the east side of the street
- Maintain existing curb lines







Nicholes Avenue/Batavia Avenue

CONDITION A

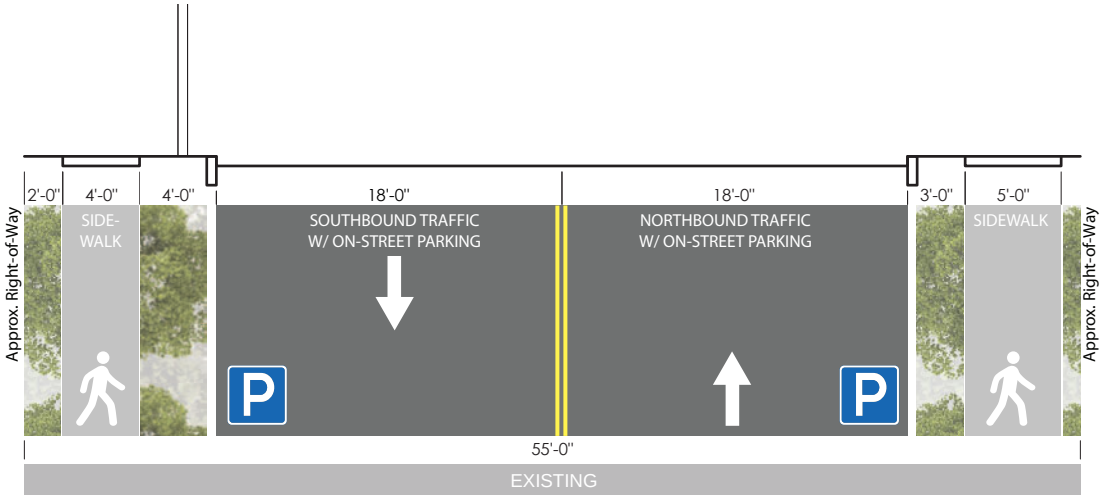
EXISTING

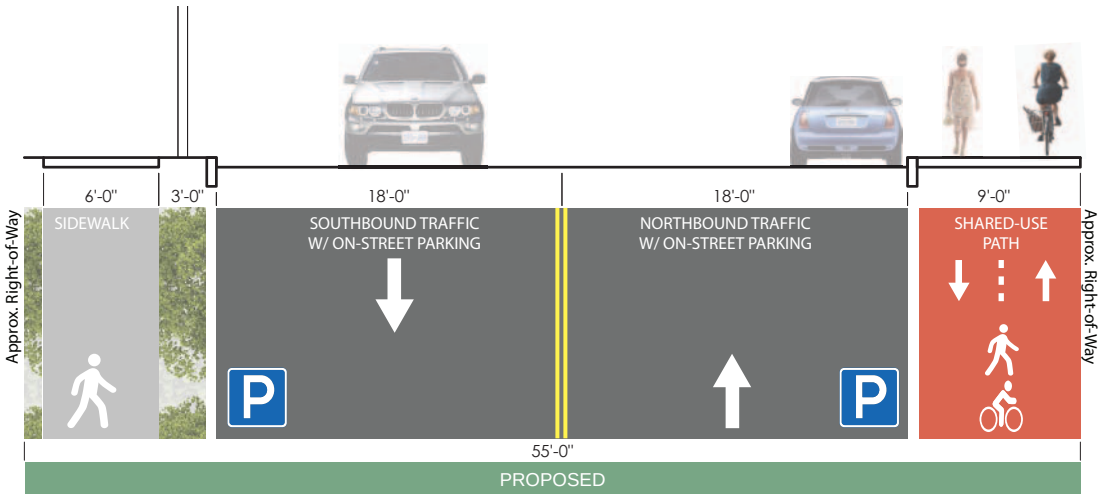
- Two 18' wide travel/parking lane in each direction
- Sidewalk with plant buffer on both sides of the street

RECOMMENDATION

- Maintain the existing curb-to-curb distance
- Provide 8' wide shared-use path on east side of the street
- Provide 6' wide sidewalk on west side of the street

CONDITION A





CONDITION B

EXISTING

- Three 12’ lanes on the bridge
- 6’ sidewalk on both sides of the bridge

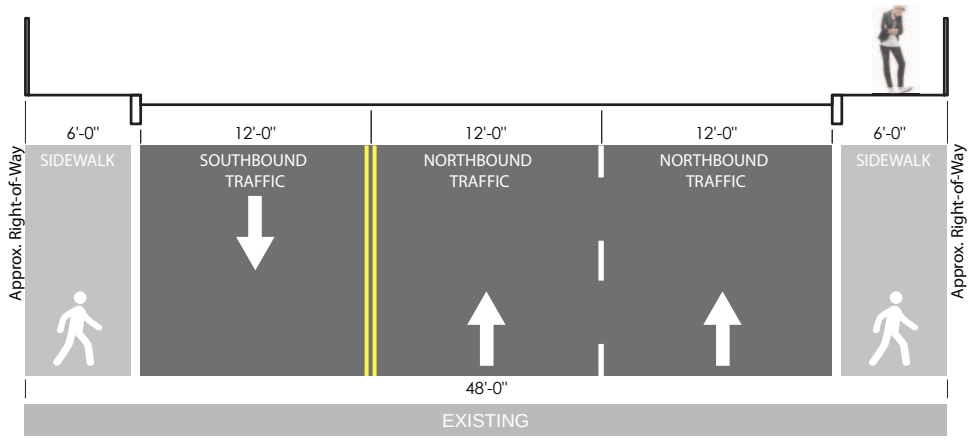
RECOMMENDATION 1

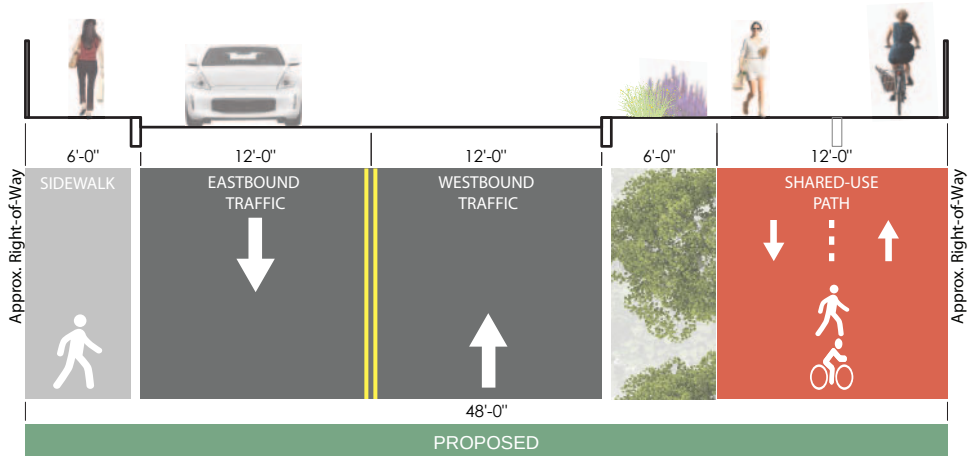
- Reduce one northbound traffic lane
- Provide 12’ Shared-used path with 6’ buffer on east side of bridge

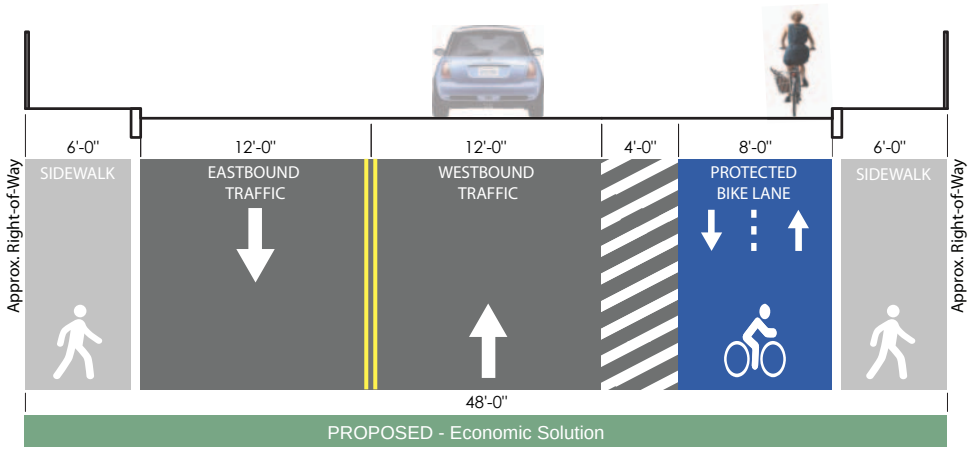
RECOMMENDATION 2

- Keep the existing curb line and sidewalk, Provide 8’ wide bike lane with 4’ buffer from vehicular traffic

CONDITION B







CONDITION C

EXISTING

- Two, 16’ travel lanes are in each direction
- 4’ sidewalk with 5’ wide buffer on east side of the street

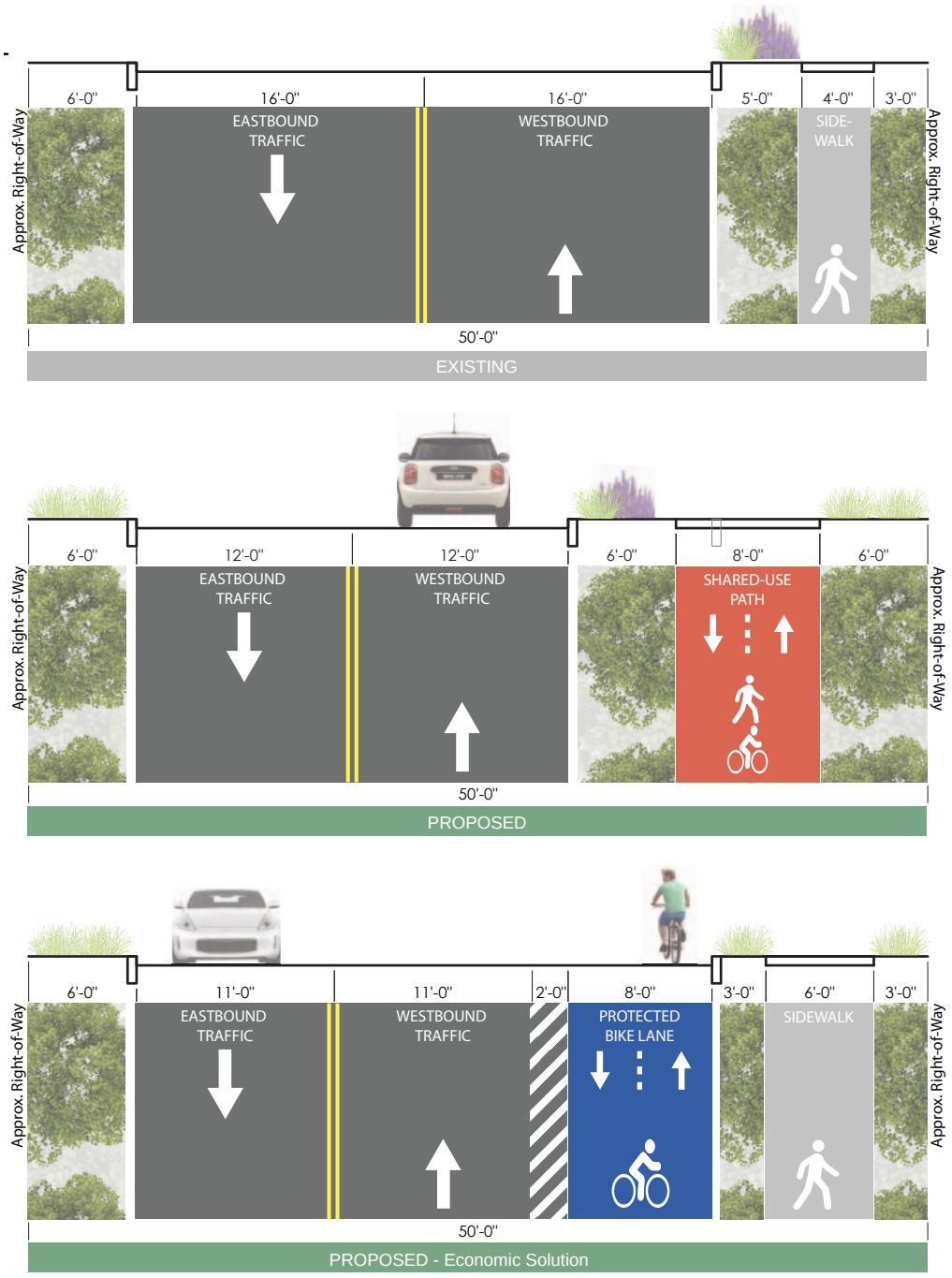
RECOMMENDATION 1

- Reduce vehicle traffic lanes to 12’
- Provide 8’ wide shared-used path with 6’ buffer on east side of street

RECOMMENDATION 2

- Maintain existing curb line and Provide 8’ wide protected bike lane with 4’ wide buffer
- Expand the existing sidewalk to 6’ and maintain a 3’ buffer from the bike lane

CONDITION C



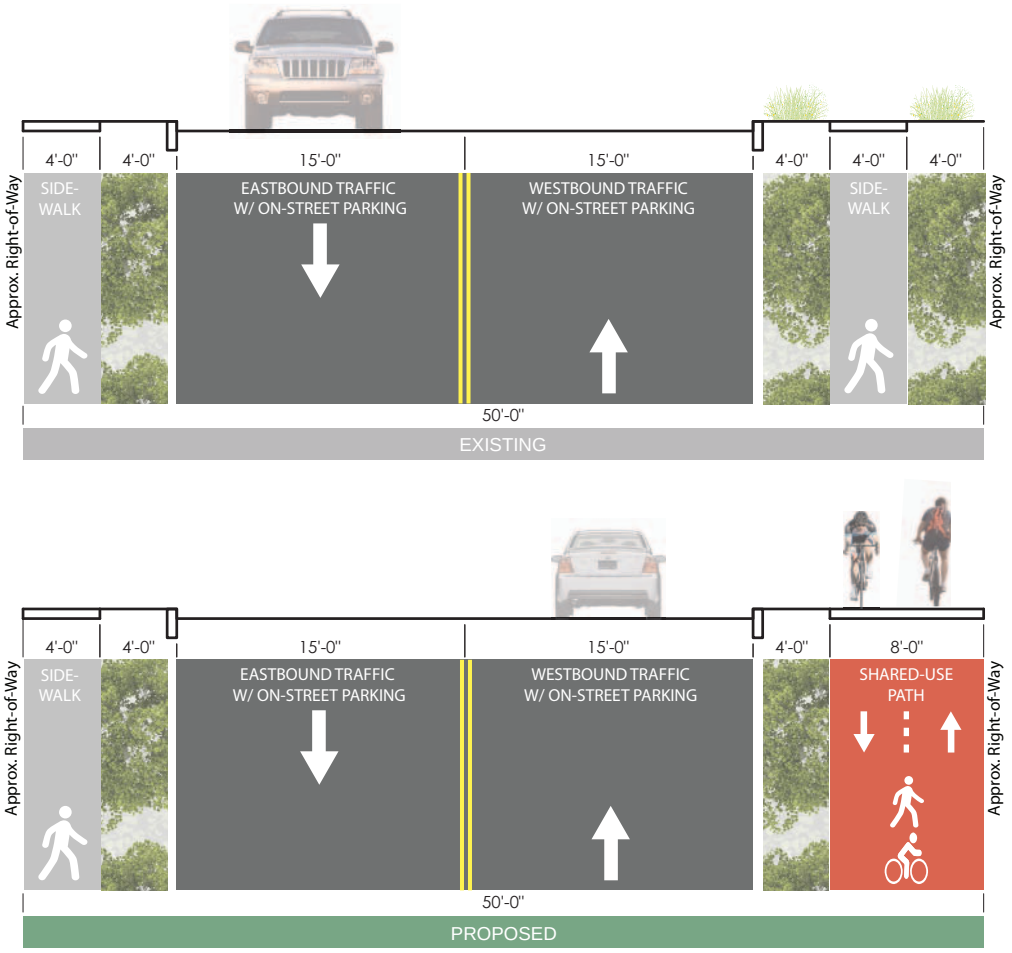
9th Street

EXISTING

- Between Perkins St. and Walnut St., two way street with on-street parking on both sides.
- 4’ wide sidewalk on both sides

RECOMMENDATION

- Replace the existing sidewalk with an 8’ wide shared-use path on the north side of the street



Macedonia Avenue

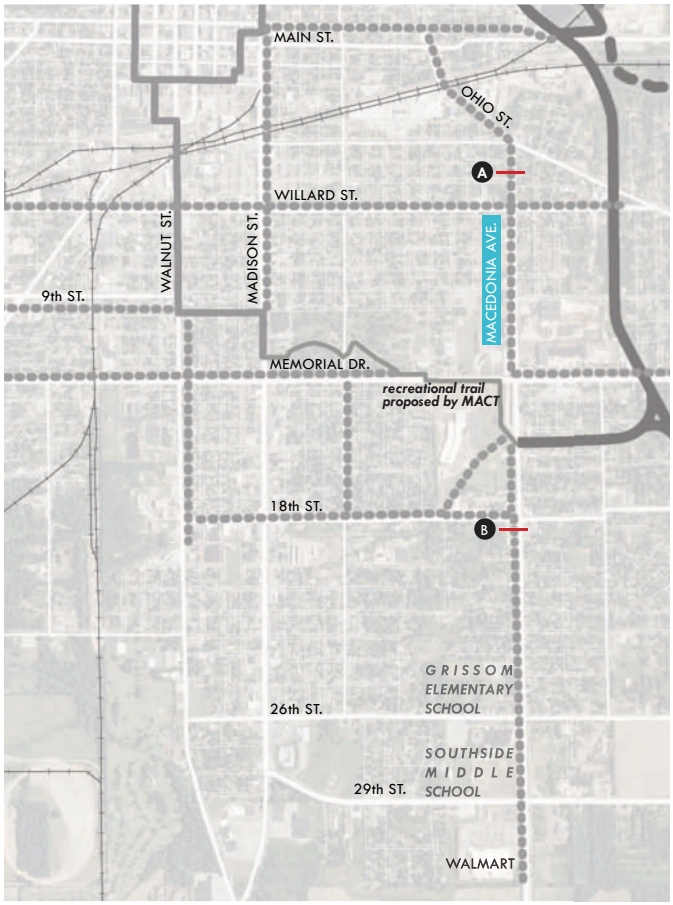
CONDITION A

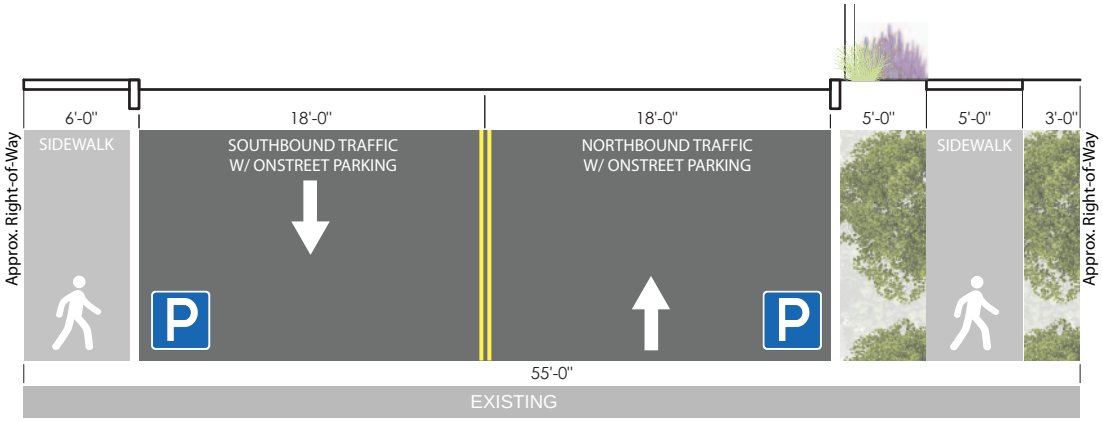
EXISTING

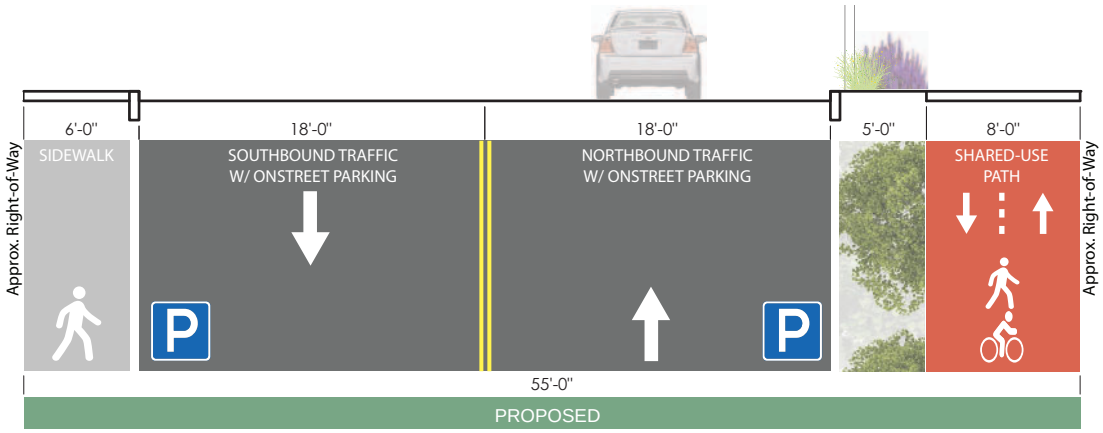
- Two 18’ wide travel/parking lanes in each direction
- 6’ wide sidewalk on west side of the street
- 5’ wide sidewalk with buffer on the east side of the street

RECOMMENDATION

- Provide 8’ wide shared-use path on the north side
- Maintain existing curb-to-curb distance







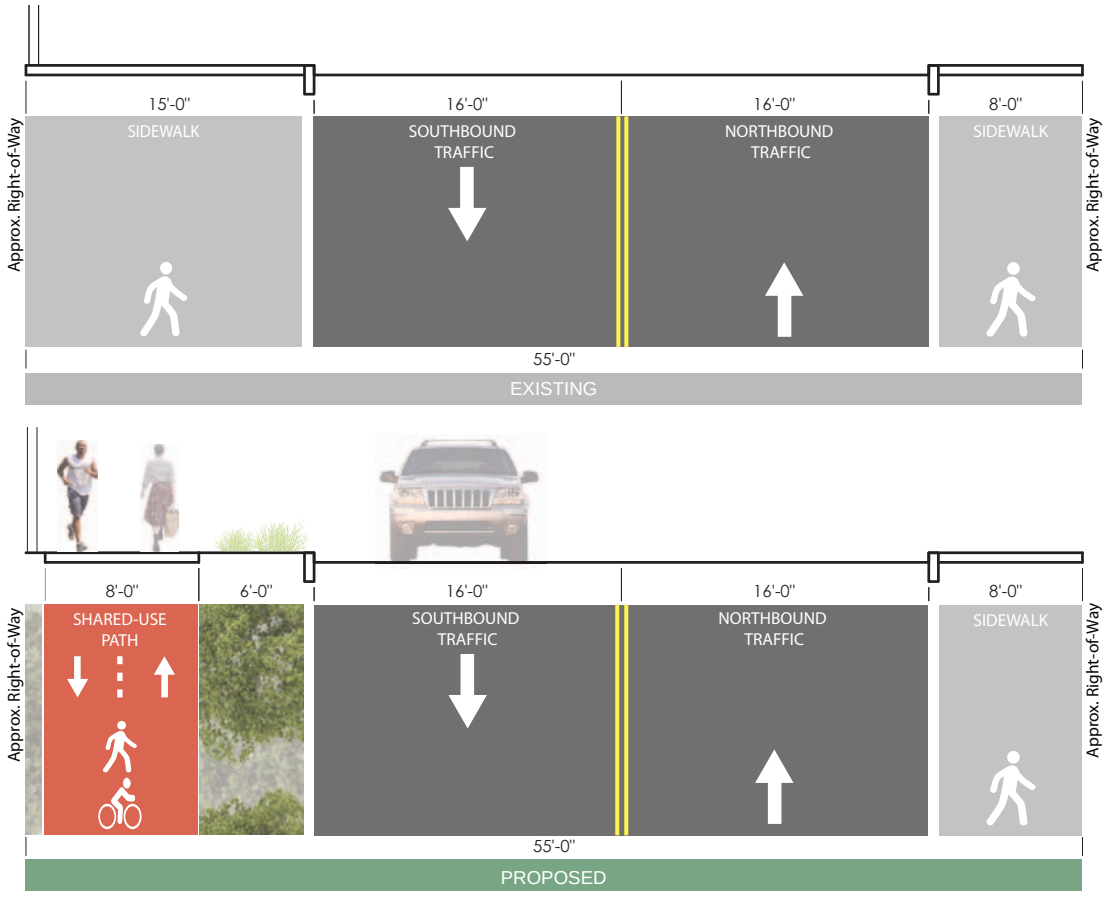
CONDITION B

EXISTING

- 30’ to 32’ wide roadway with one lane in each direction
- There are sidewalk on both sides of the street. Business frontage 8’ or 15’ wide side walk residential typically 6’ wide

RECOMMENDATION

- Provide 8’ wide shared-use on the west side of the street
- Maintain existing sidewalk on the east side of the street



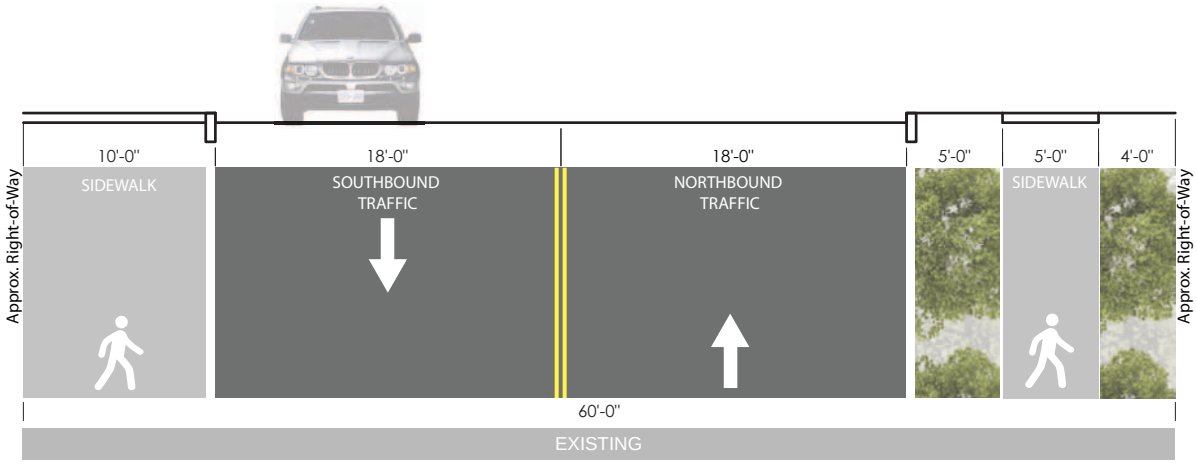
S. Ohio Avenue

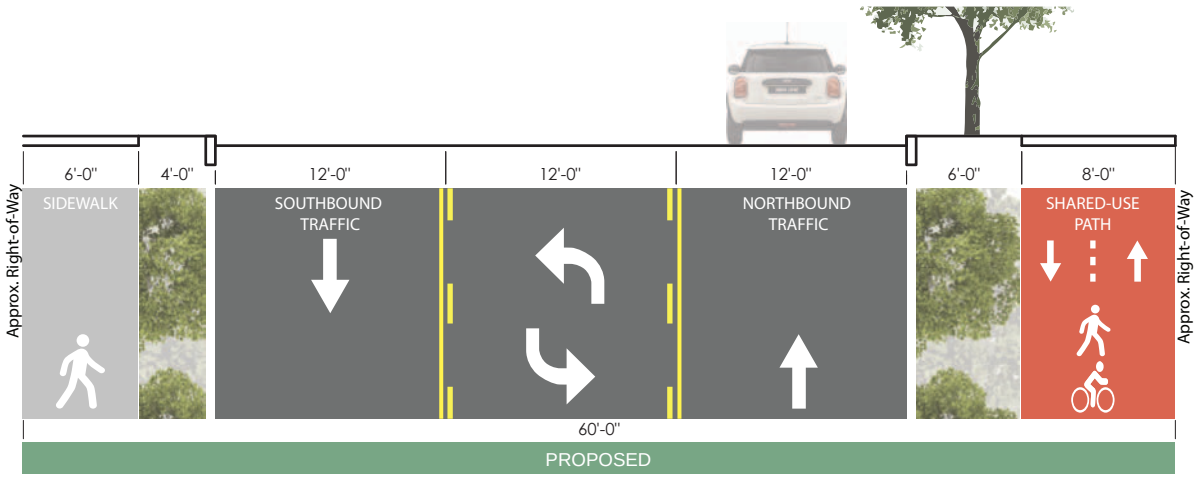
EXISTING

- 36’ wide with one lane on each side
- Current sidewalks on both sides of street are in poor condition.

RECOMMENDATION

- Reduce travel lanes from 18’ to 12’, provide 12’ wide shared-left-turn lane
- Provide 8’ wide shared-use path on the east side of the street
- Reconstruct the sidewalks on both sides of the street





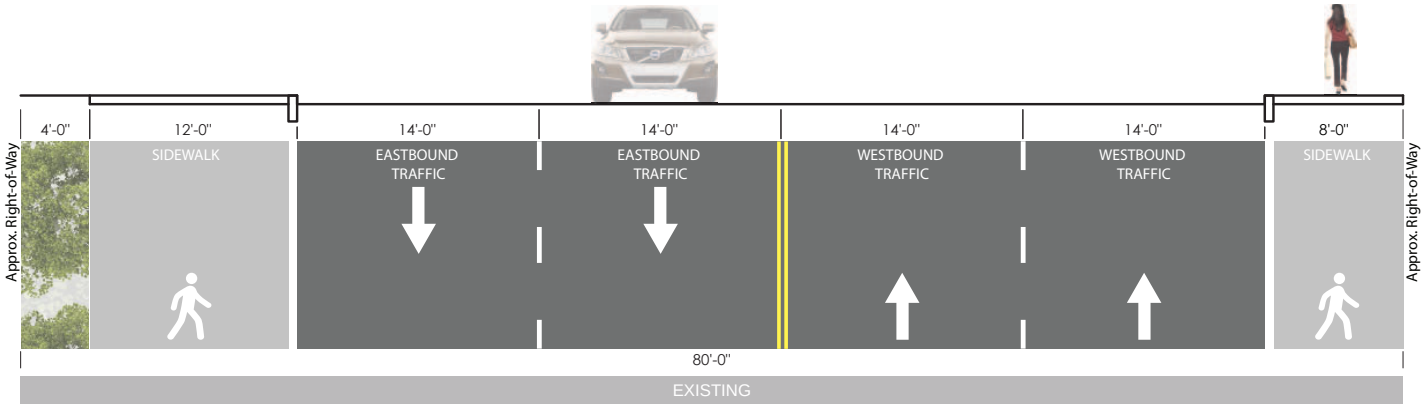
Wysor Street

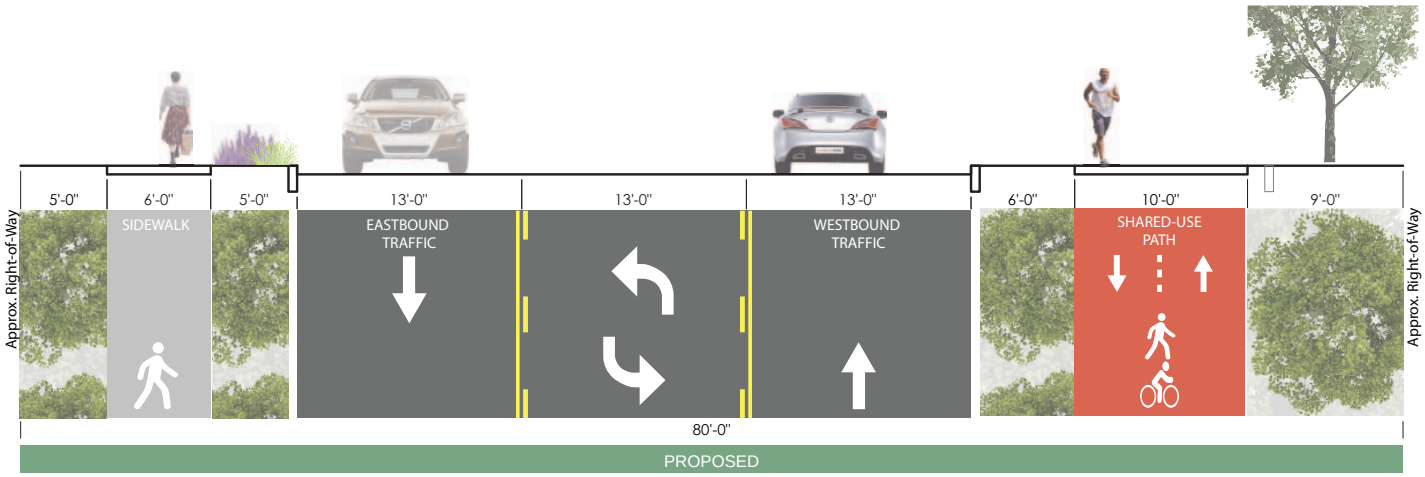
EXISTING

- Connect to future MACT
- Four 14’ travel lanes with two lanes in each direction
- Sidewalks adjacent on both sides of the street

RECOMMENDATION

- Reduce one travel lane in each direction and provide a 13’ wide shared-left-turn lane.
- Reduce remaining travel lanes to 13’ wide
- Provide a 10’ wide shared-use path with 6’ wide buffer on the north side of street
- Provide a 6’ wide sidewalk on the south side with 4’ plant buffer





Dr. MLK Jr. Boulevard

EXISTING

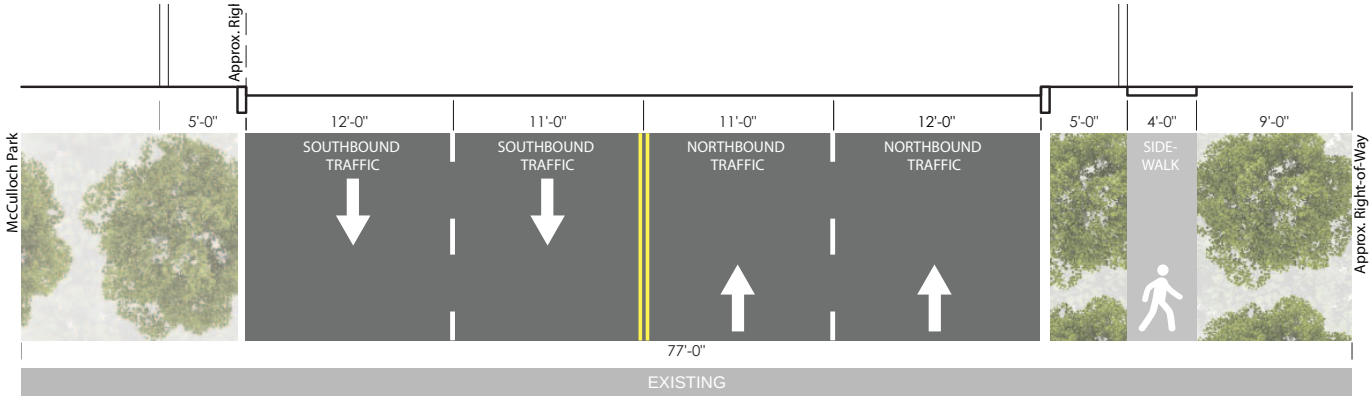
- 4 vehicle travel lanes with one 11’ and one 12’ in each direction

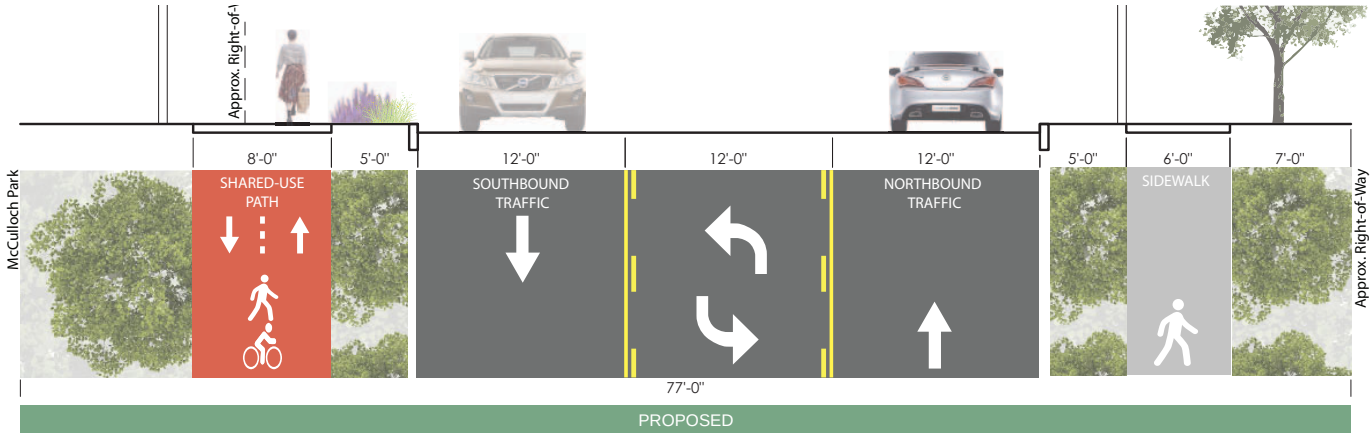
RECOMMENDATION 1

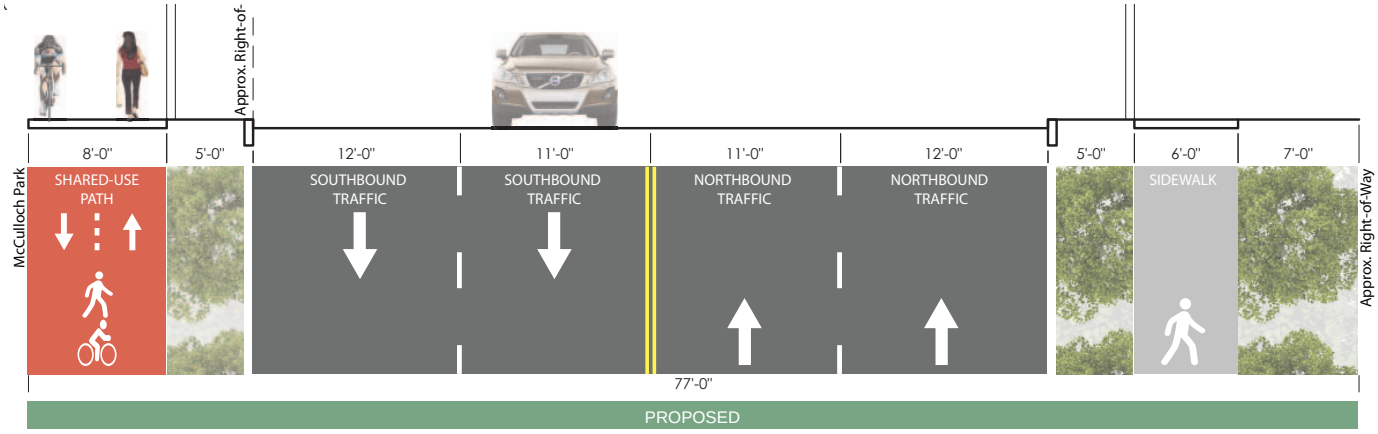
- Remove two lanes of traffic, one in each direction
- Provide 12’ wide shared-left-turn lane
- Provide 8’ wide shared-use path on the east side of the street
- If desired, provide 6’ wide min. sidewalk on east side of the street

RECOMMENDATION 2

- Provide 8’ wide shared-use path on the west side. The path will take up to 13’ wide land in the McCulloch Park property
- Upgrade the sidewalk on east side to six feet wide
- Curb lines to be maintained







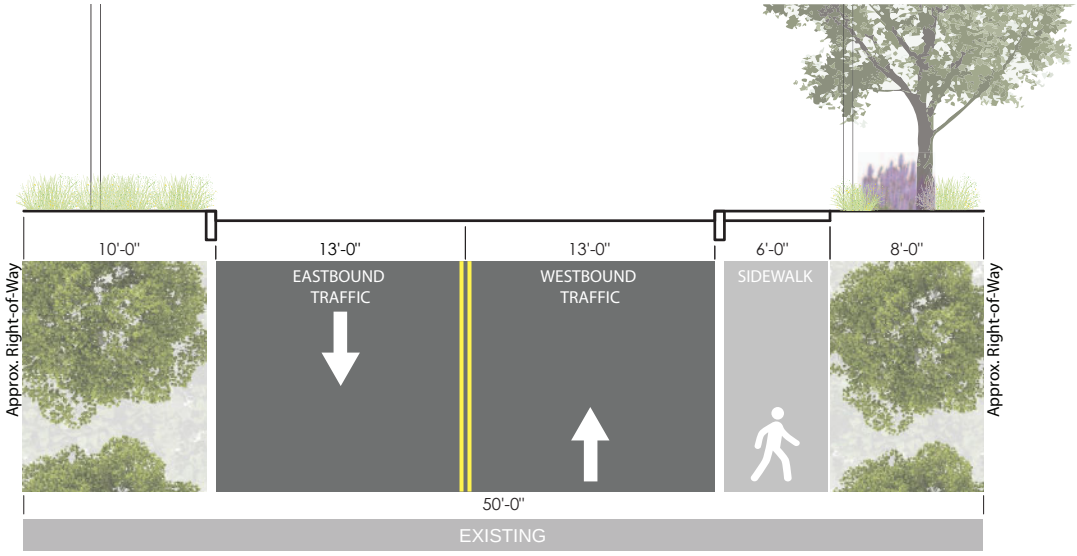
18th Street

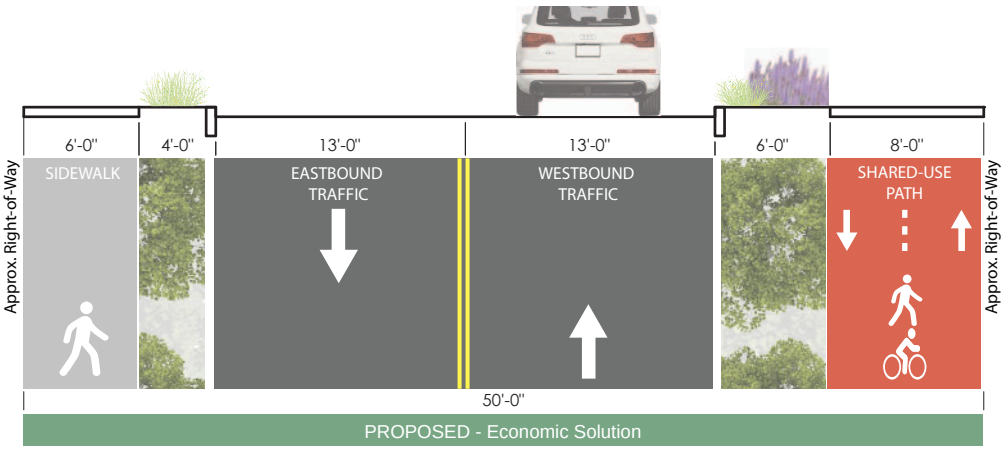
EXISTING

- Between Walnut St. and Macedonia Ave., one 13' wide travel lane in each direction
- Six feet sidewalk is presented on the north side of the street
- Along the corridor are mainly residences, with small businesses in between

RECOMMENDATION

- Provide 8' wide shared-use path on north side of the street
- Provide 6' wide sidewalk on the south side





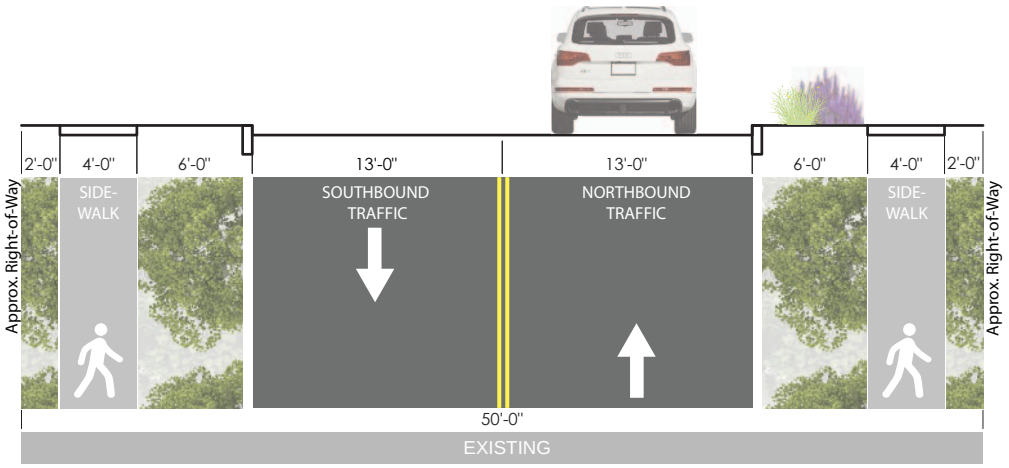
Hackley Street

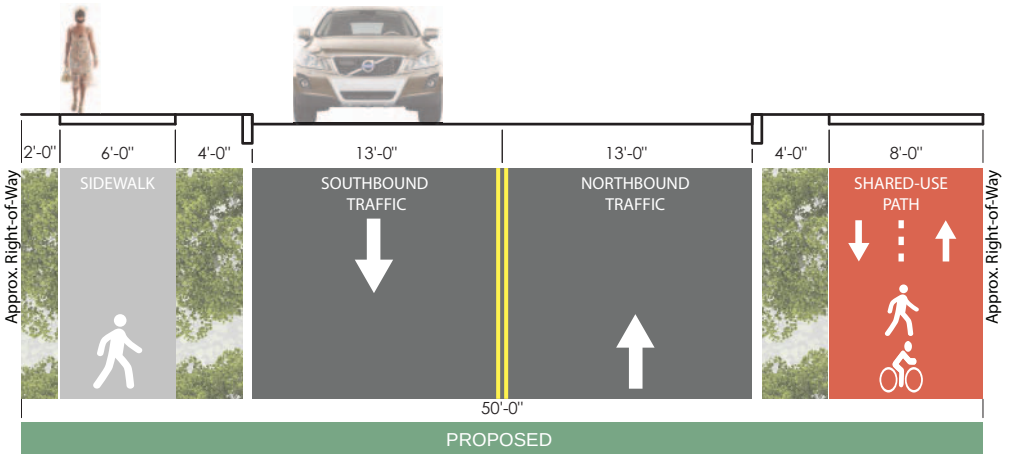
EXISTING

- One 13’ wide travel lane in each direction
- 4’ wide sidewalks and 6’ wide buffer on both sides of the street

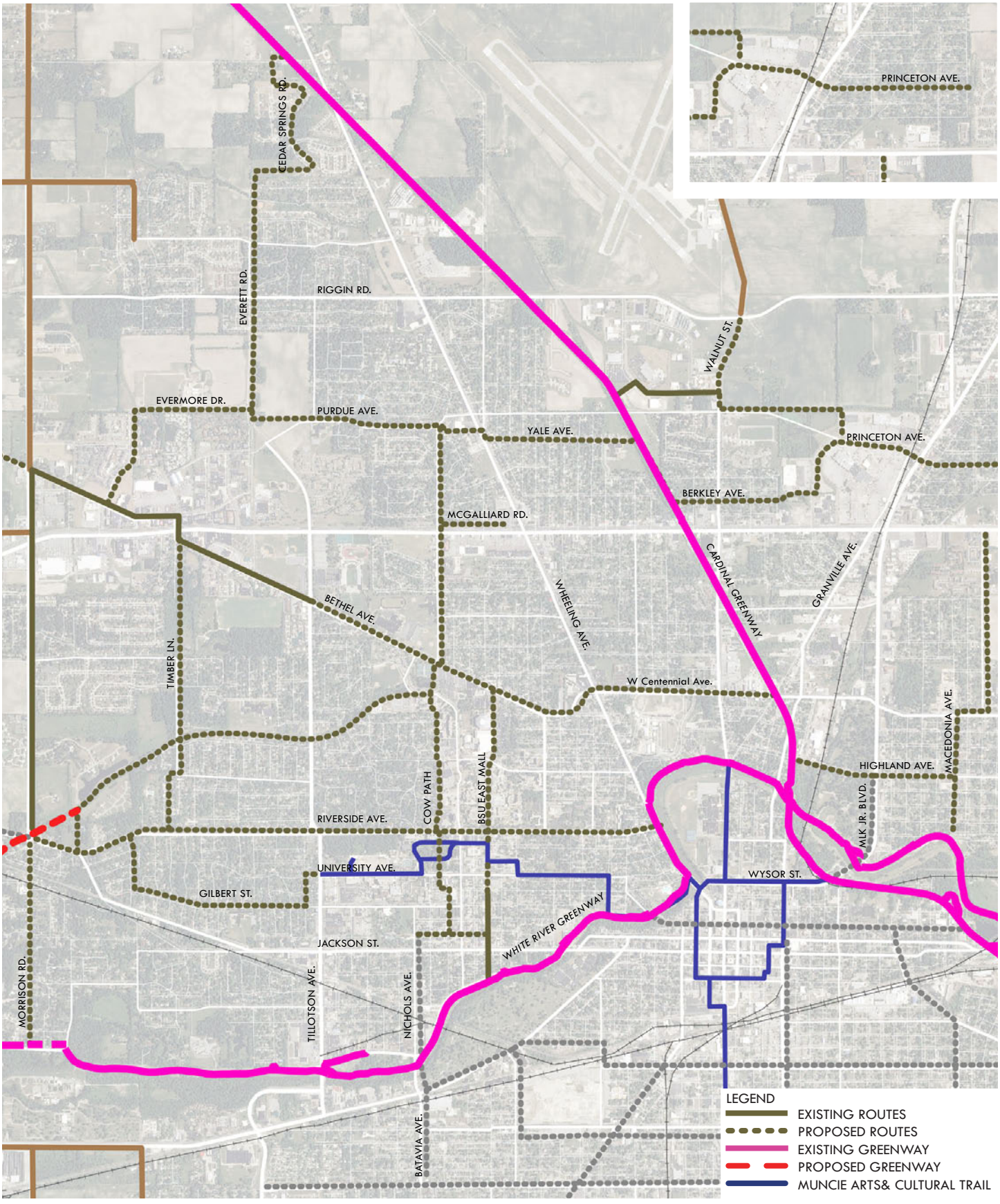
RECOMMENDATION

- Provide a 8’ wide shared-use path with 4’ wide buffer on the east side of the street
- If desired, remove the existing 4’ wide sidewalk on west side of street and replace with a 6’ wide sidewalk





North Muncie



EXISTING

The Muncie North area southern boundary is the White River Greenway. It extends north to the Delaware County Airport.

There are multiple trails in this area, which include the Cardinal Greenway and the White River Greenway. The Ball State University Bicycle Master Plan provides future connections through and around the university's campus and the proposed MACT provides connections to downtown.

This area presents a higher number of educational institutions, especially on the west side of the Cardinal Greenway. Six schools and the Ball State University are located very close to one another.

This area of Muncie has six schools that trail connections should be made too. Dense neighborhoods located in this study area include the following:

- Lantern-Pearwood-Keller
- Halteman
- Norwood
- Anthony
- Riverside/Normal City
- Westside
- Morningside

Retail businesses are highly concentrated along McGalliard Rd. which is also one of the busiest roads in the city. Trail connections are proposed to improve connectivity to these businesses.

Wysor St. Trail Head - Bike Fest 2017

Cyclists on Muncie's street, Bike Fest 2016

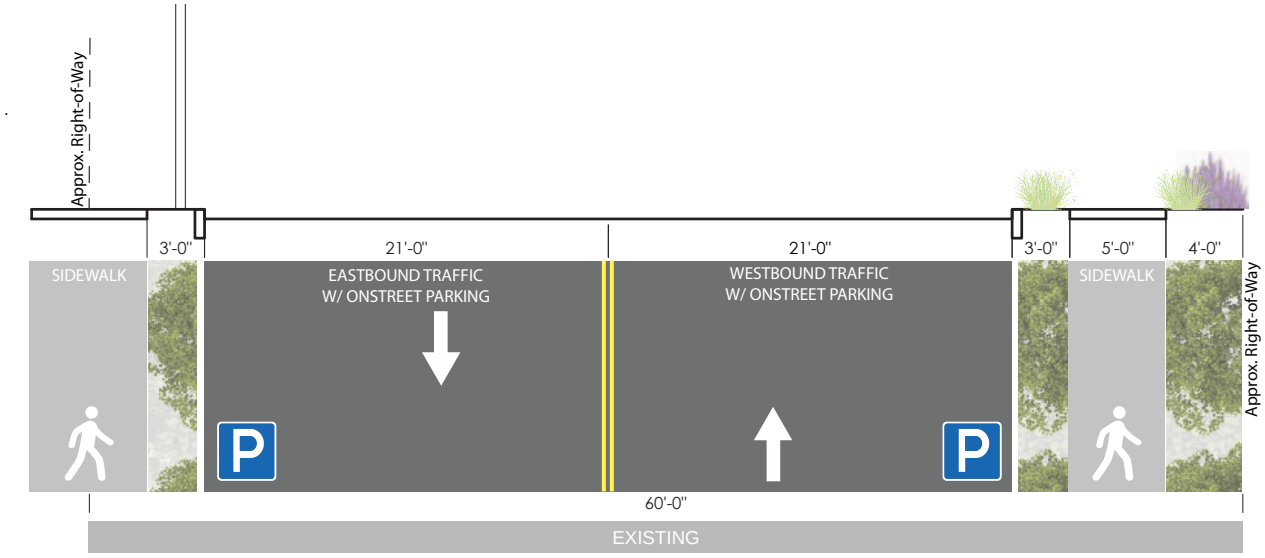
Highland Avenue

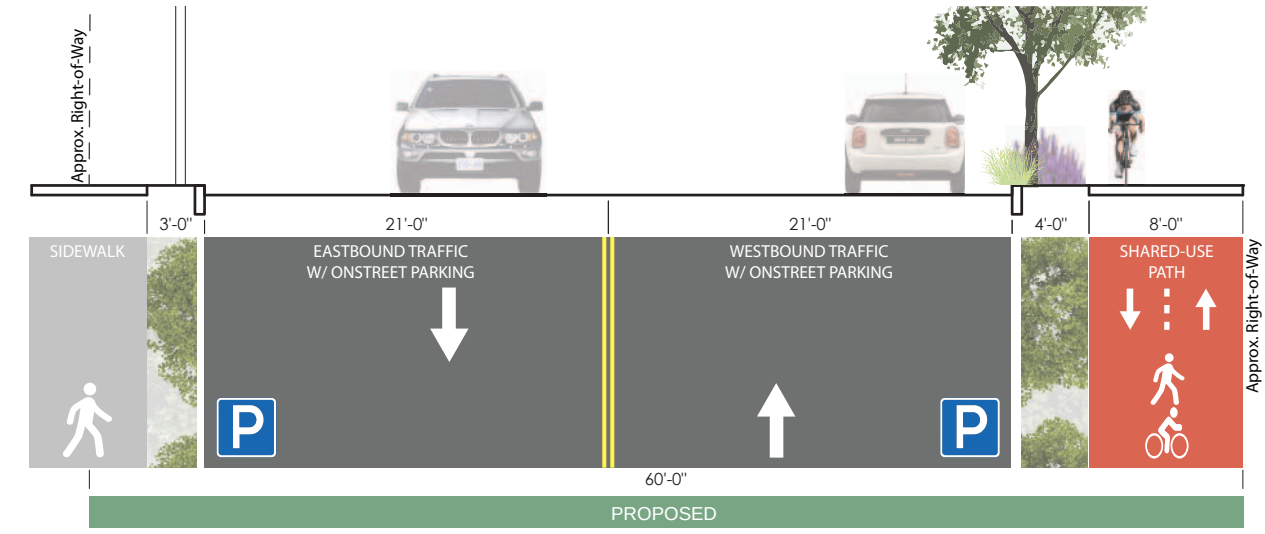
EXISTING

- One, 21' wide travel/parking lane in each direction
- Sidewalk w/ buffer on both sides of the street

RECOMMENDATION

- Provide an 8' wide shared-use path on the north side of the street with a 4' buffer
- Maintain location of existing curbs





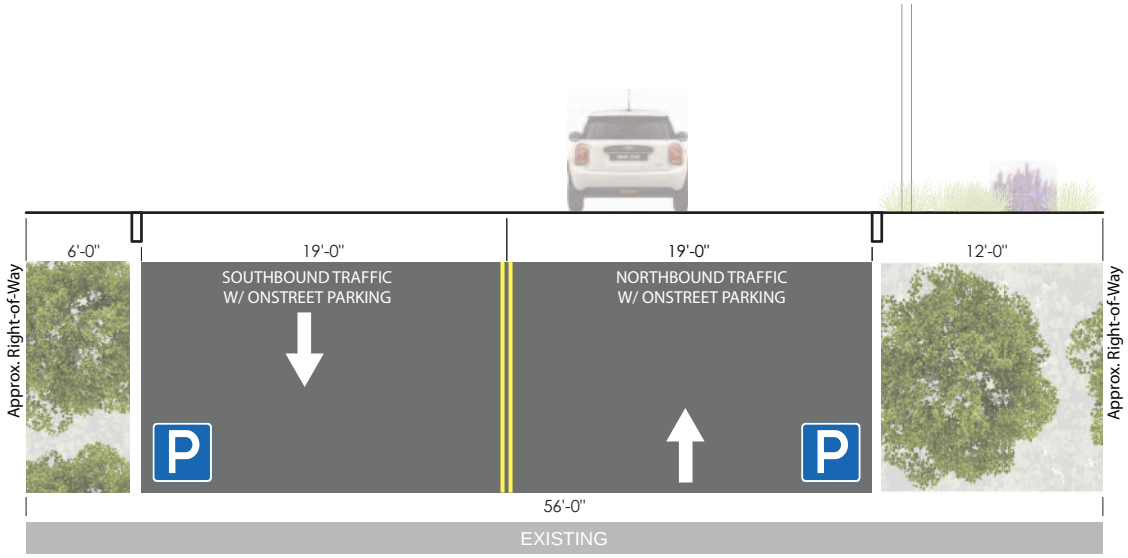
Macedonia Ave.

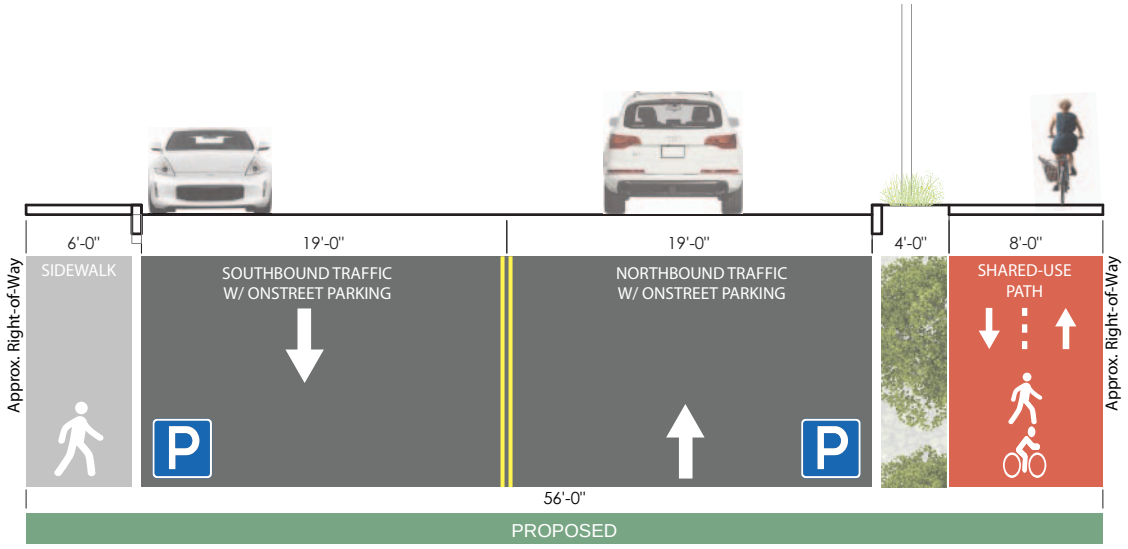
EXISTING

- One 19’ wide travel/parking lane in each direction
- Only a portion of the west side of the street has existing sidewalks

RECOMMENDATION

- Maintain existing curb-to-curb distance
- Provide 8’ wide shared-use path with 4’ wide buffer on the east side of the street





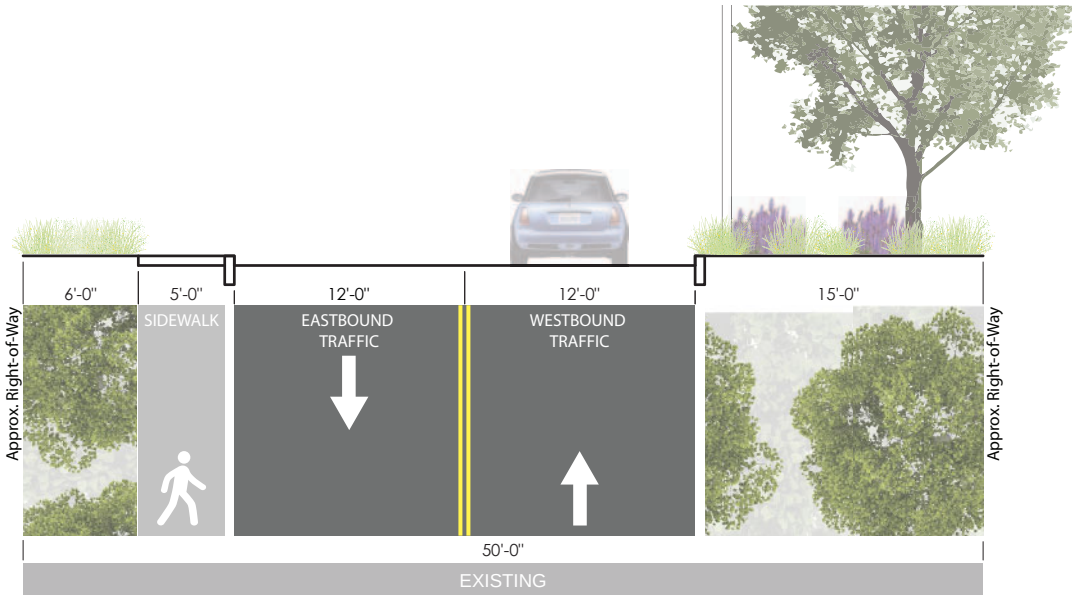
Centennial Avenue

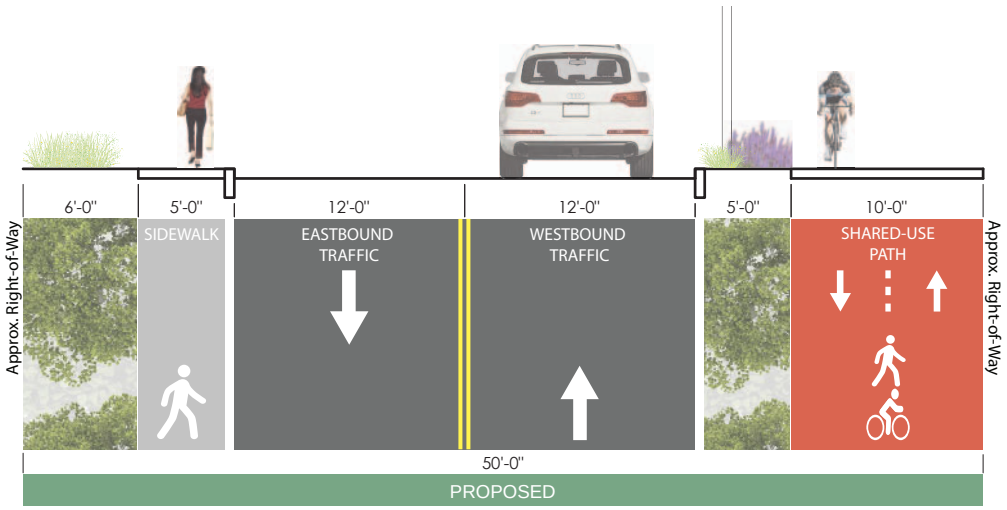
EXISTING

- One 12’ wide travel lane in each direction
- 5’ wide sidewalk adjacent to the south side of the street

RECOMMENDATION

- Provide a 10’ wide shared-use path on the north side





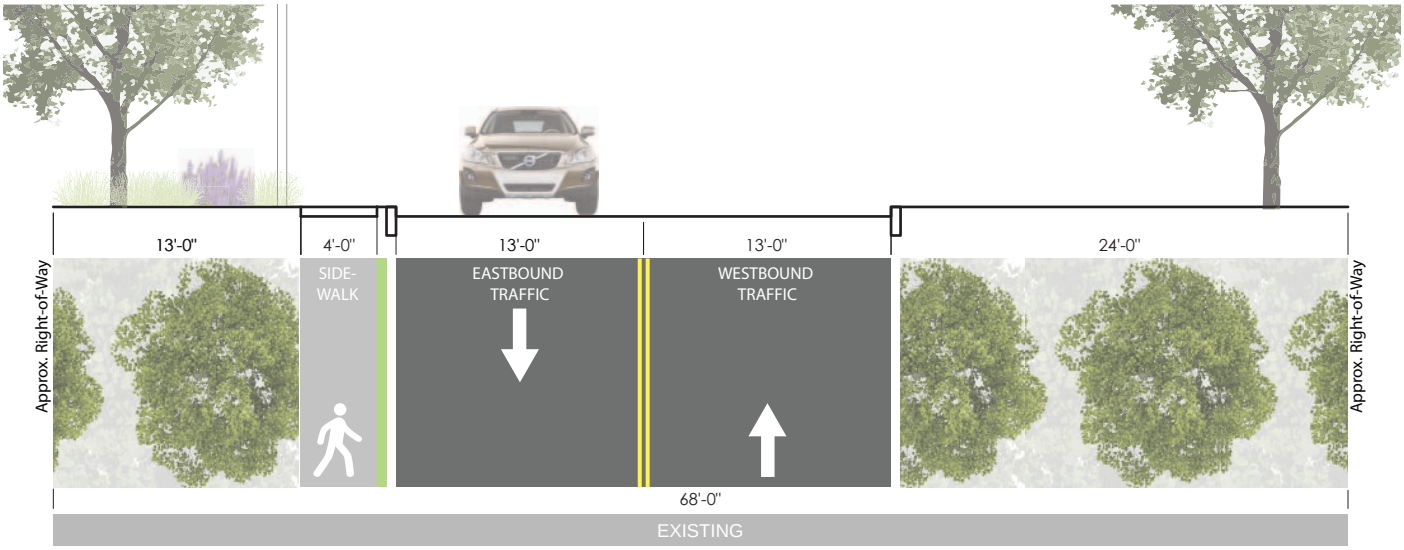
Purdue Avenue

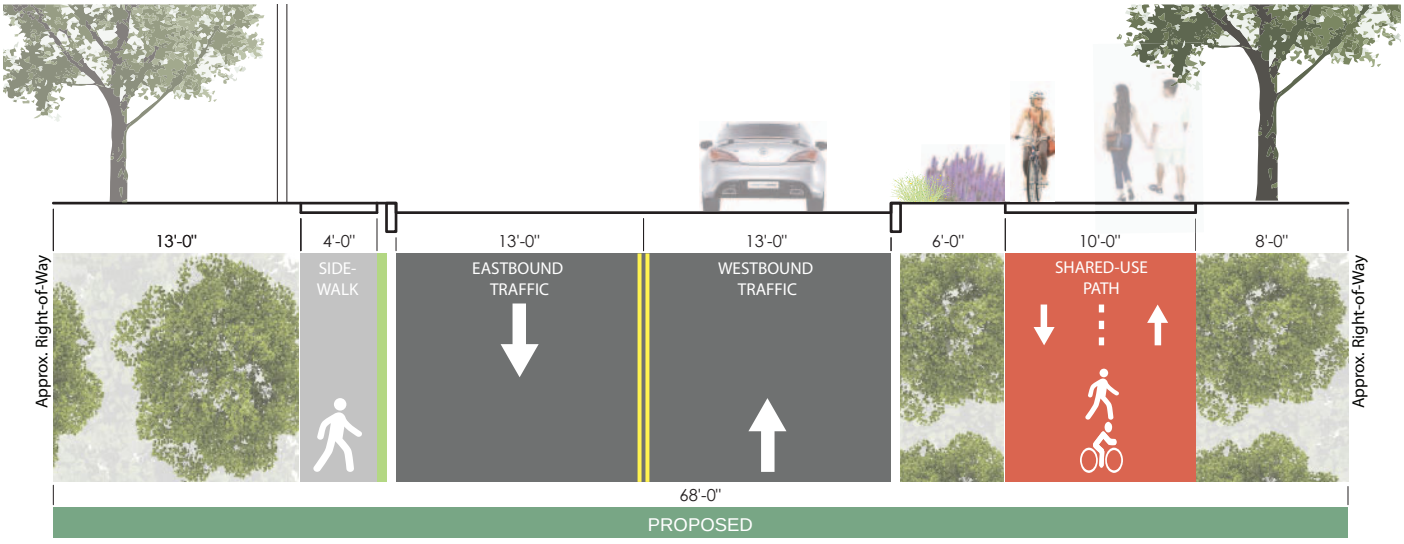
EXISTING

- One 13’ wide travel lane in each direction
- 4’ wide sidewalk adjacent to the south side of the street

RECOMMENDATION

- Provide 10’ wide shared-use path with 6’ wide buffer on the north side





Oakwood Street

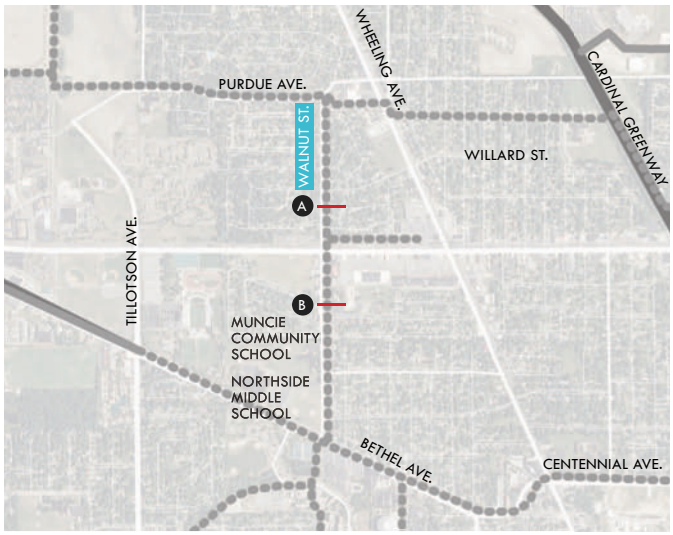
CONDITION A

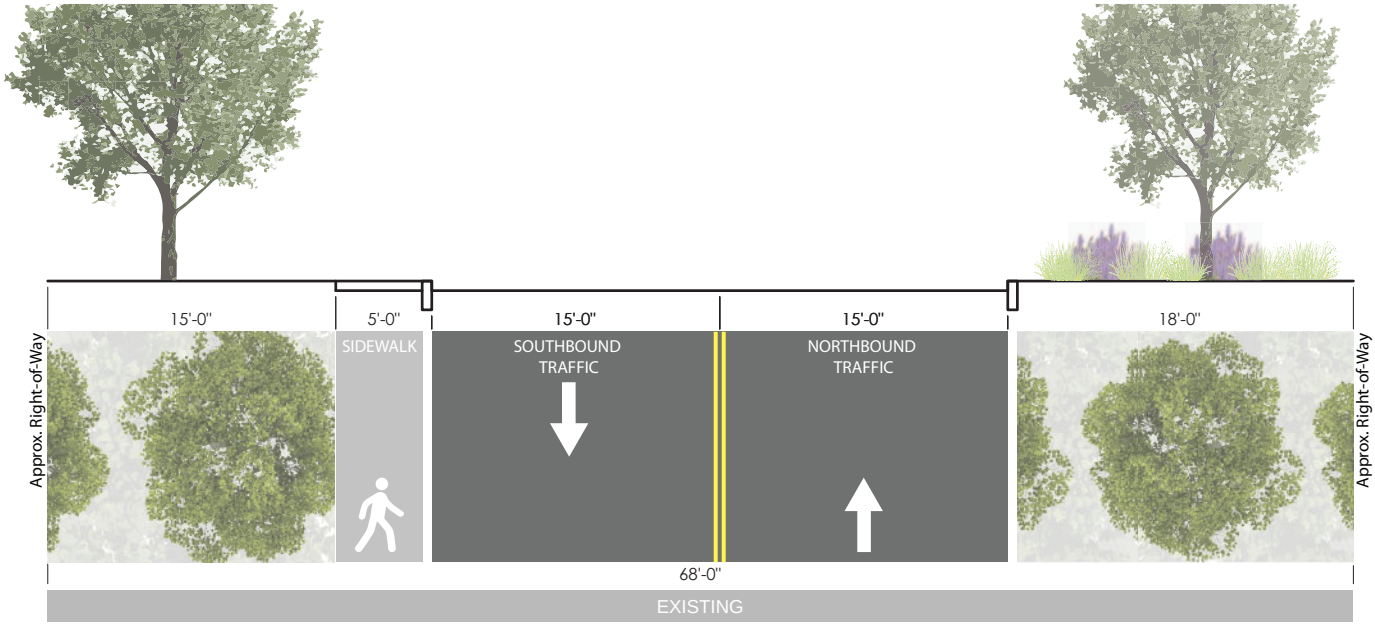
EXISTING

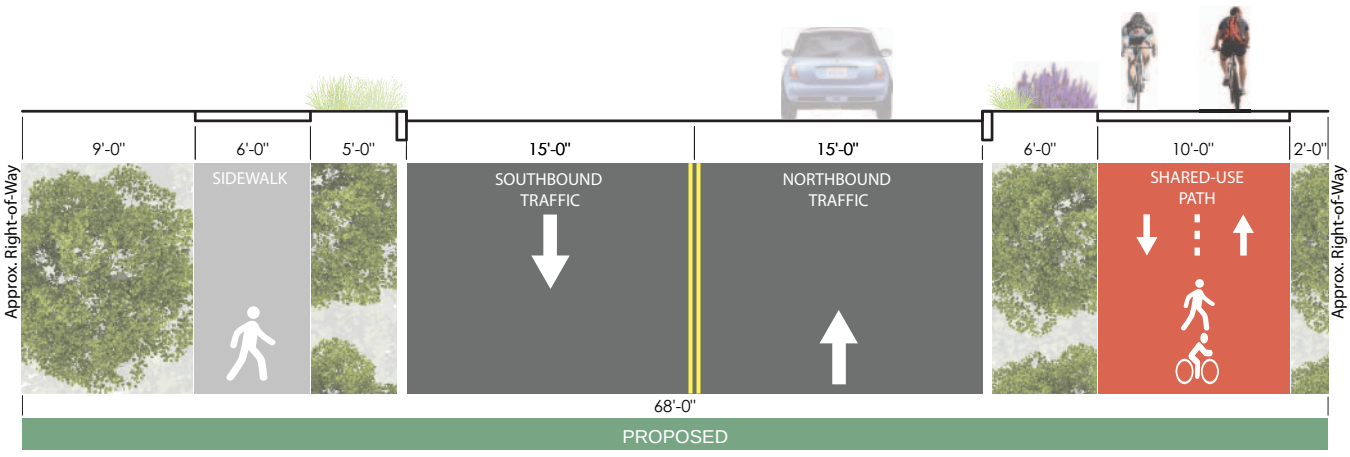
- One 15’ wide travel lane in each direction
- 5’ wide sidewalk adjacent to the west side of the street

RECOMMENDATION

- Maintain existing curb-to-curb distance
- Provide a 10’ wide shared-use path with 6’ wide buffer on the east side of the street
- Provide 6’ sidewalk with 5’ plant buffer on the west side.







CONDITION B

EXISTING

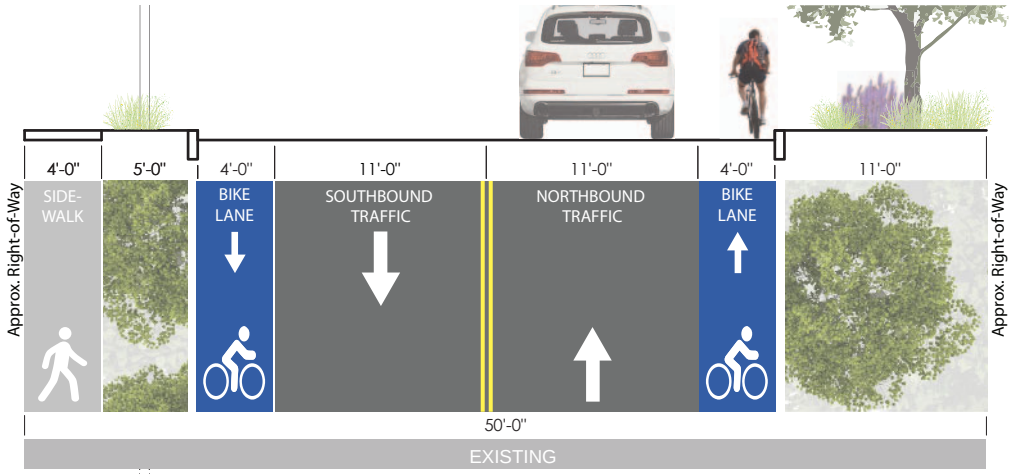
- One 11’ wide travel lane and one 4’ wide bike lane in each direction
- A portion of the both sides of the street has existing sidewalks

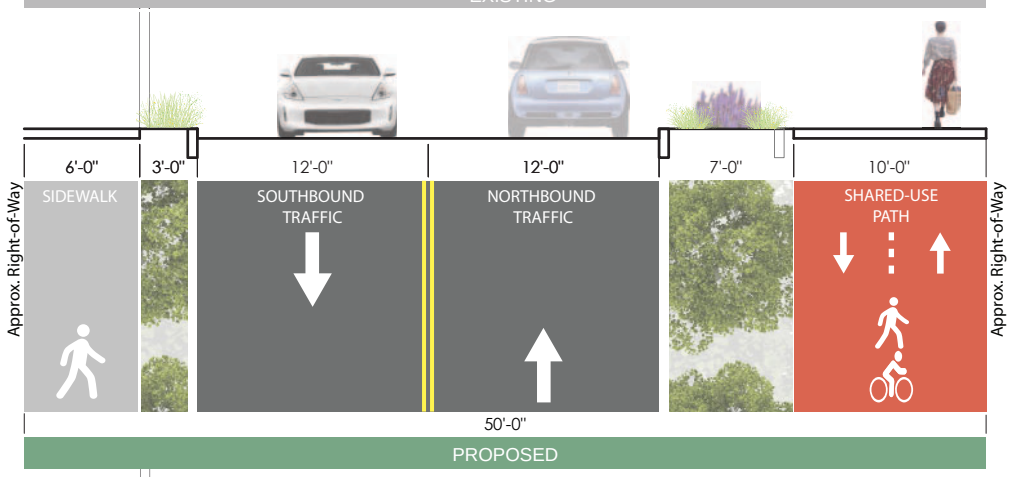
RECOMMENDATION 1

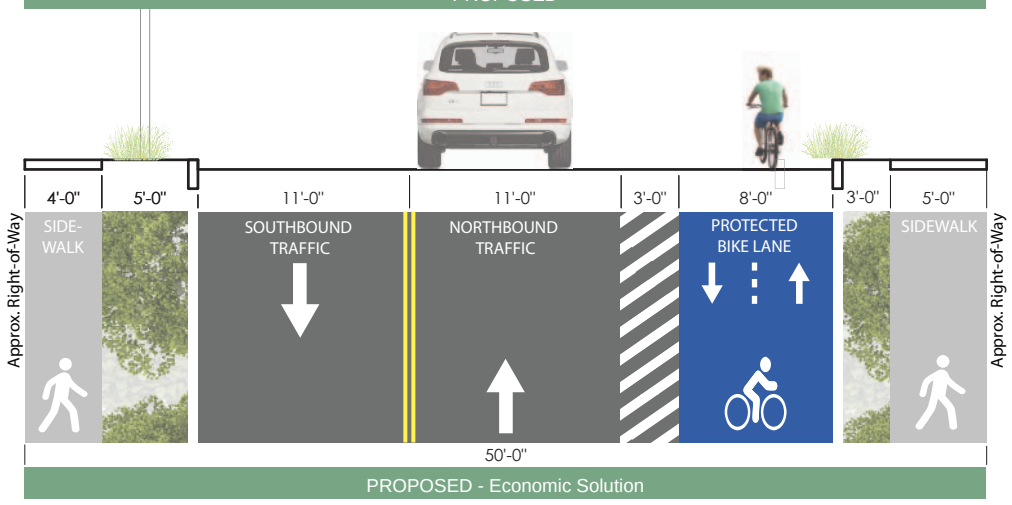
- Provide 6’ wide sidewalk on the west side of the street
- Provide 10’ shared-use path on the east side of the street

RECOMMENDATION 2

- Eliminate existing bike lanes and provide 8’ wide protected bike lanes with 2’ wide painted buffer on the east side of the street







Gilbert Street

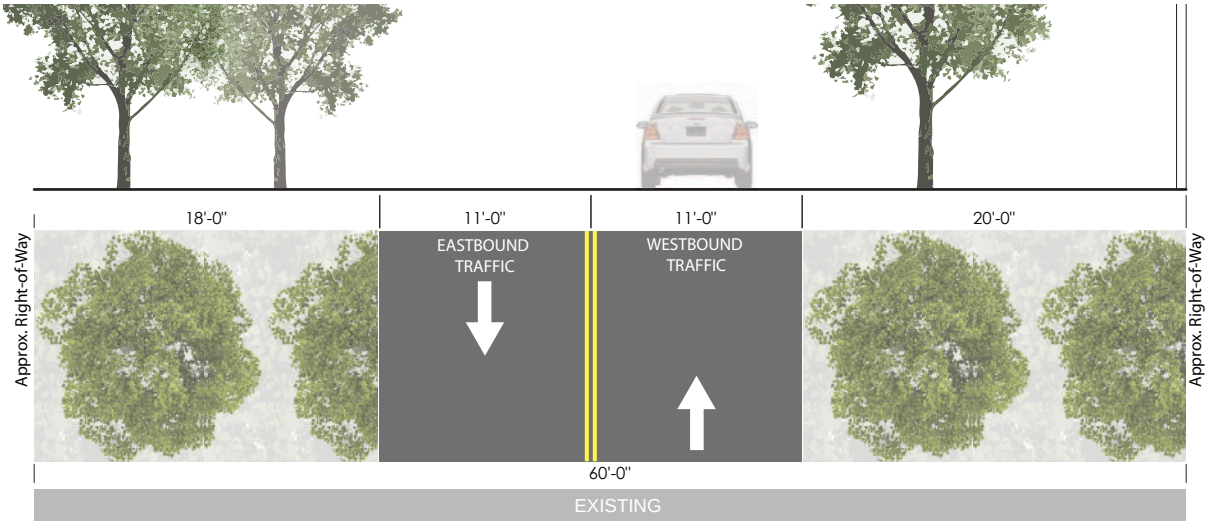
CONDITION A

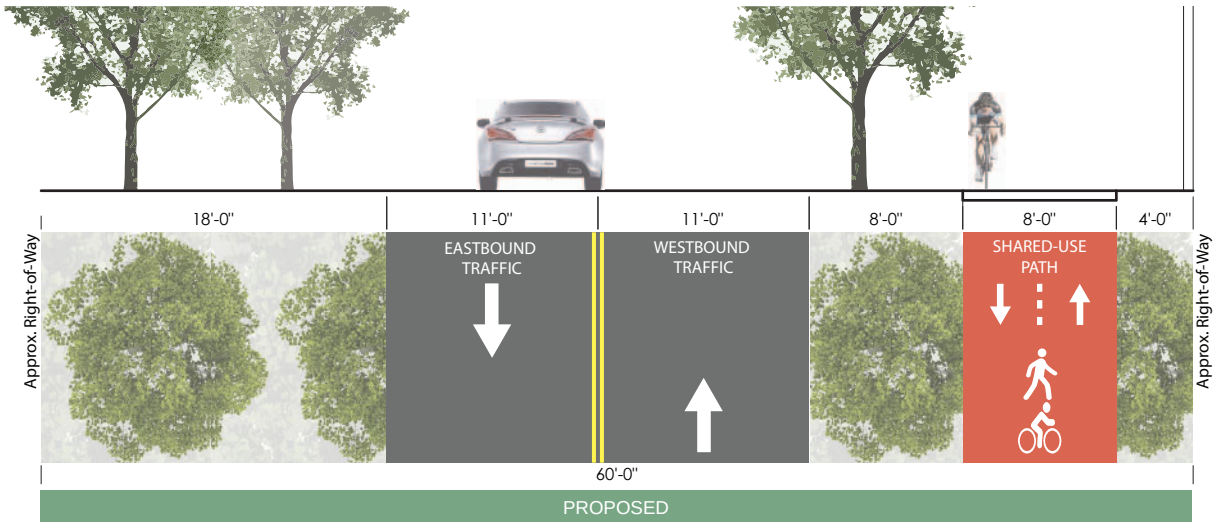
EXISTING

- Two 11' travel lanes, one on each direction
- Curbs are not existing on this portion of Gilbert

RECOMMENDATION

- Provide a 8' wide shared-use path on the north side of the street





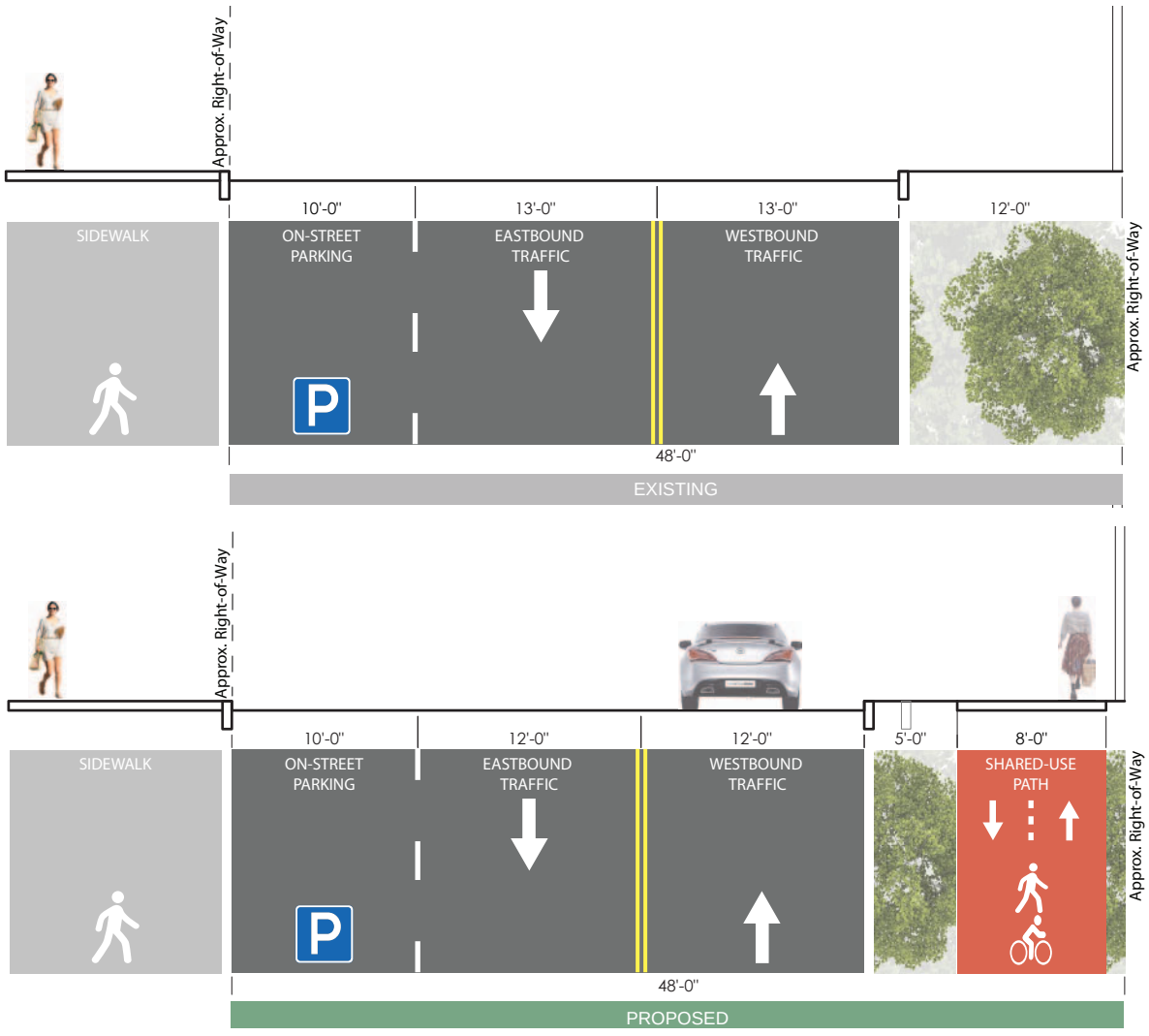
CONDITION B

EXISTING

- This condition is in front of the West View Elementary School
- There are two 13’ wide travel lanes, one on each direction
- On-street parking on the south side of the street

RECOMMENDATION

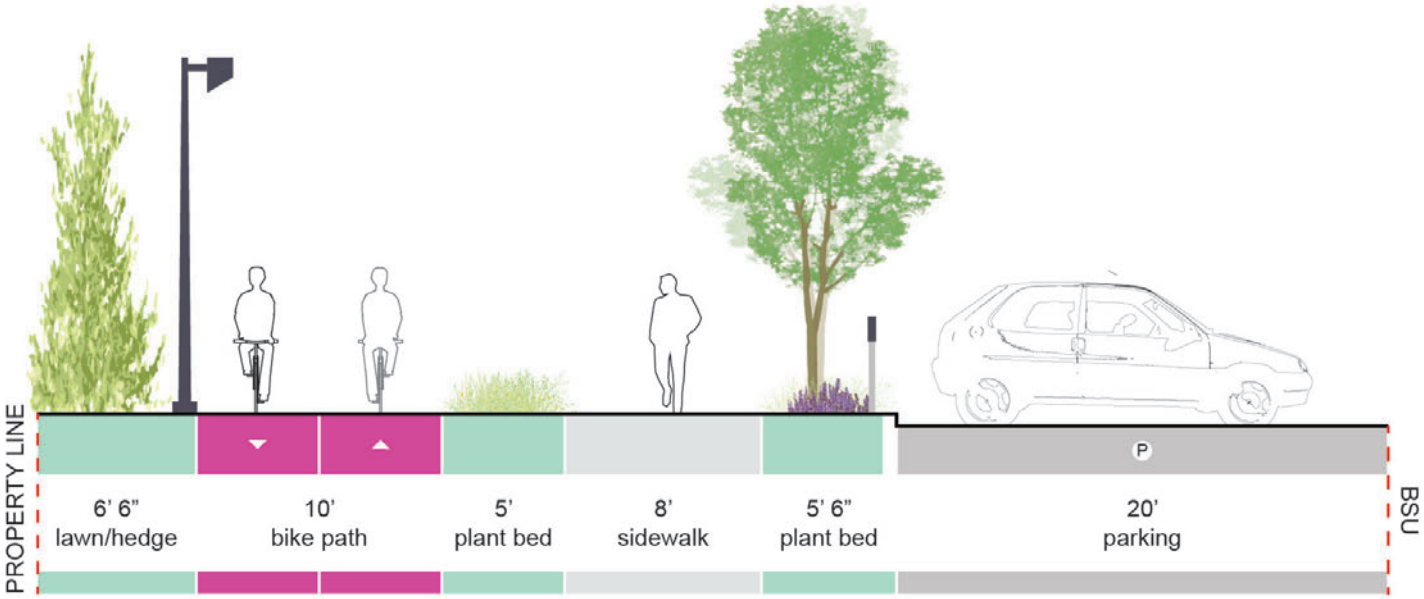
- Provide 8’ wide shared-use path on the north side



Cow Path - Ball State University

EXISTING

The Cow Path is a major route proposed by Ball State University Bike Master Plan. The corridor provides separate pathways for pedestrian and cyclists. It's located between Bethel Ave. and University Ave., west of McKinley Avenue.

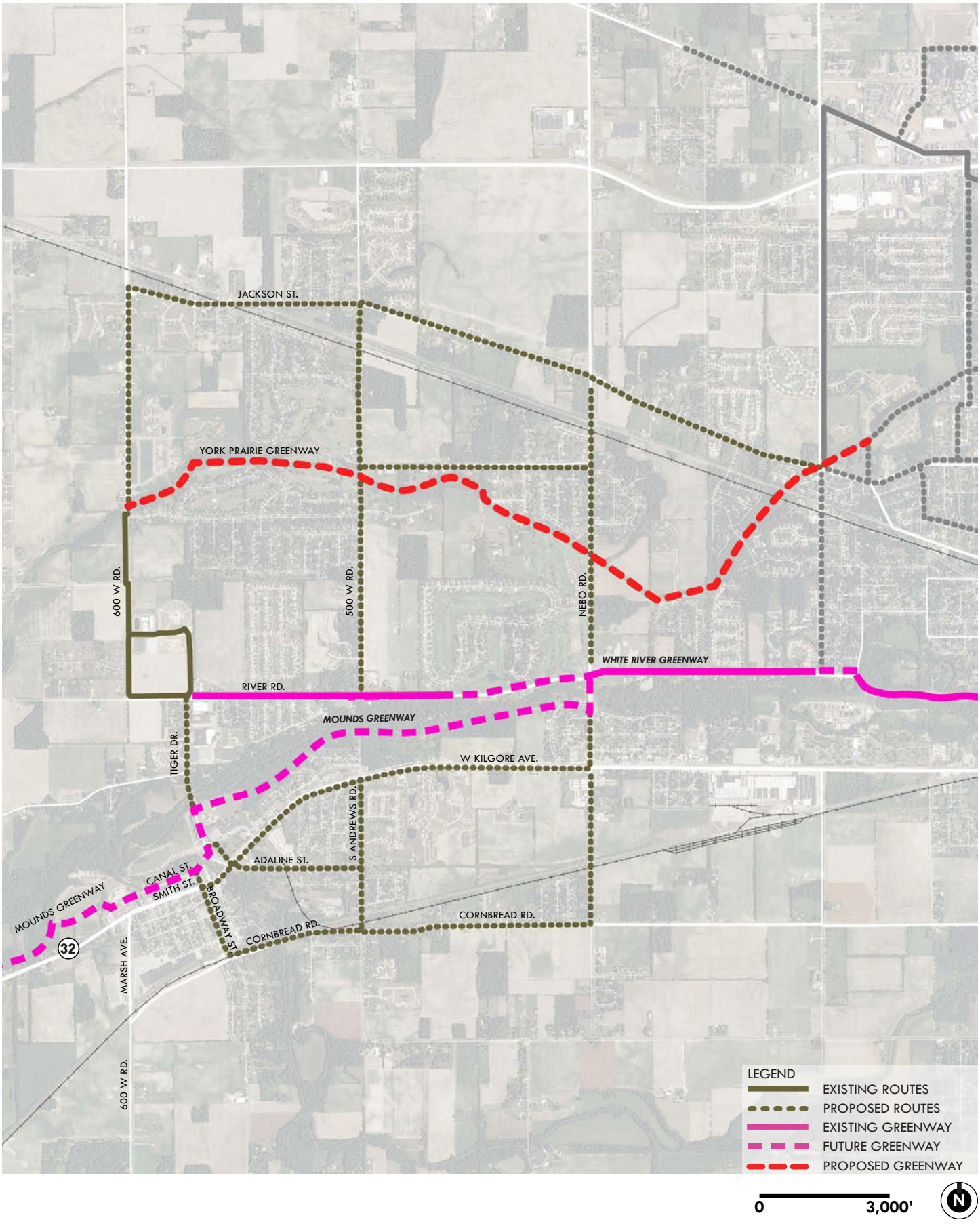


East Mall Path - Ball State University

EXISTING

The East Mall is a bicycle and pedestrian corridor east of McKinley Ave. It's located between Bethel Ave. and University Ave.

Yorktown


JACKSON ST.
YORK PRAIRIE GREENWAY
600 W RD.
500 W RD.
NEBO RD.
WHITE RIVER GREENWAY
RIVER RD.
MOUNDS GREENWAY
TIGER DR.
W KILGORE AVE.
S ANDREWS RD.
ADALINE ST.
CANAL ST.
SMITH ST.
BROADWAY ST.
CORNBREAD RD.
MOUNDS GREENWAY
32
MARSH AVE.
600 W RD.
LEGEND
EXISTING ROUTES
PROPOSED ROUTES
EXISTING GREENWAY
FUTURE GREENWAY
PROPOSED GREENWAY
0
3,000'
N

EXISTING

Bicycle and pedestrian routes in Yorktown begin west of Morrison Rd.

The White River Greenway and the proposed Mounds Greenway connect Yorktown to Muncie and other potential regional destinations. The proposed York Prairie Greenway will provide an additional inter-neighborhood connection.

The densest residential areas are near Smith Street and S. Andrews Rd., which should have trail connection.

Trails are proposed to connect the businesses in downtown Muncie with the surrounding neighborhoods.

SR 32 / Smith St.

Broadway St.

Broadway Street

CONDITION A

EXISTING

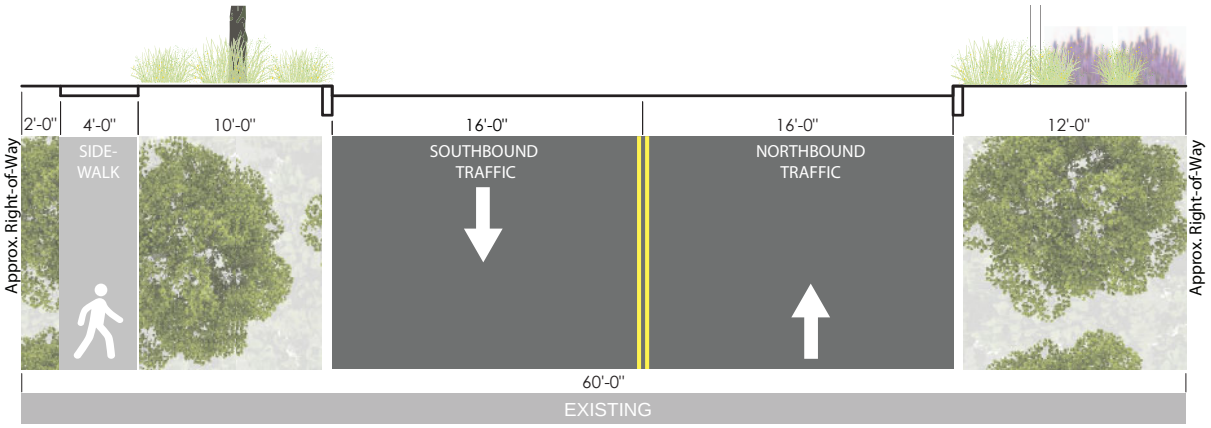
- One 16’ wide travel lane on each direction

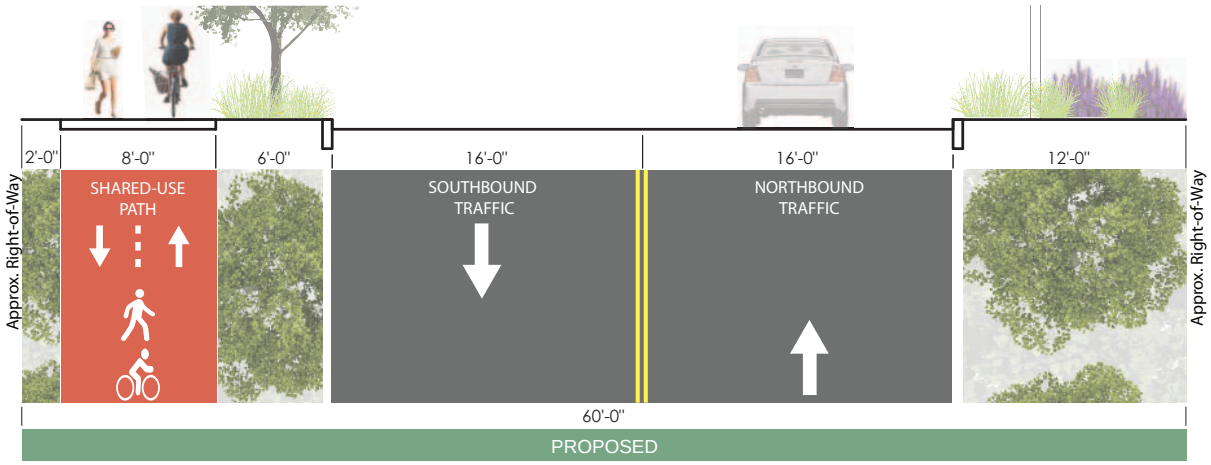
RECOMMENDATION 1

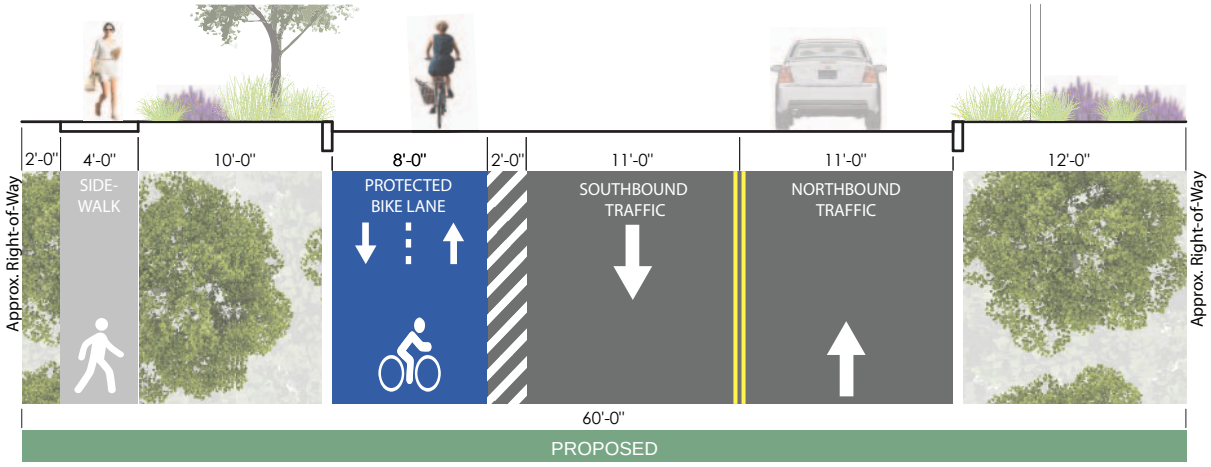
- Provide an 8’ wide shared-use path on the west side of the street

RECOMMENDATION 2

- Provide an 8’ wide protected bike lane on the west of the street







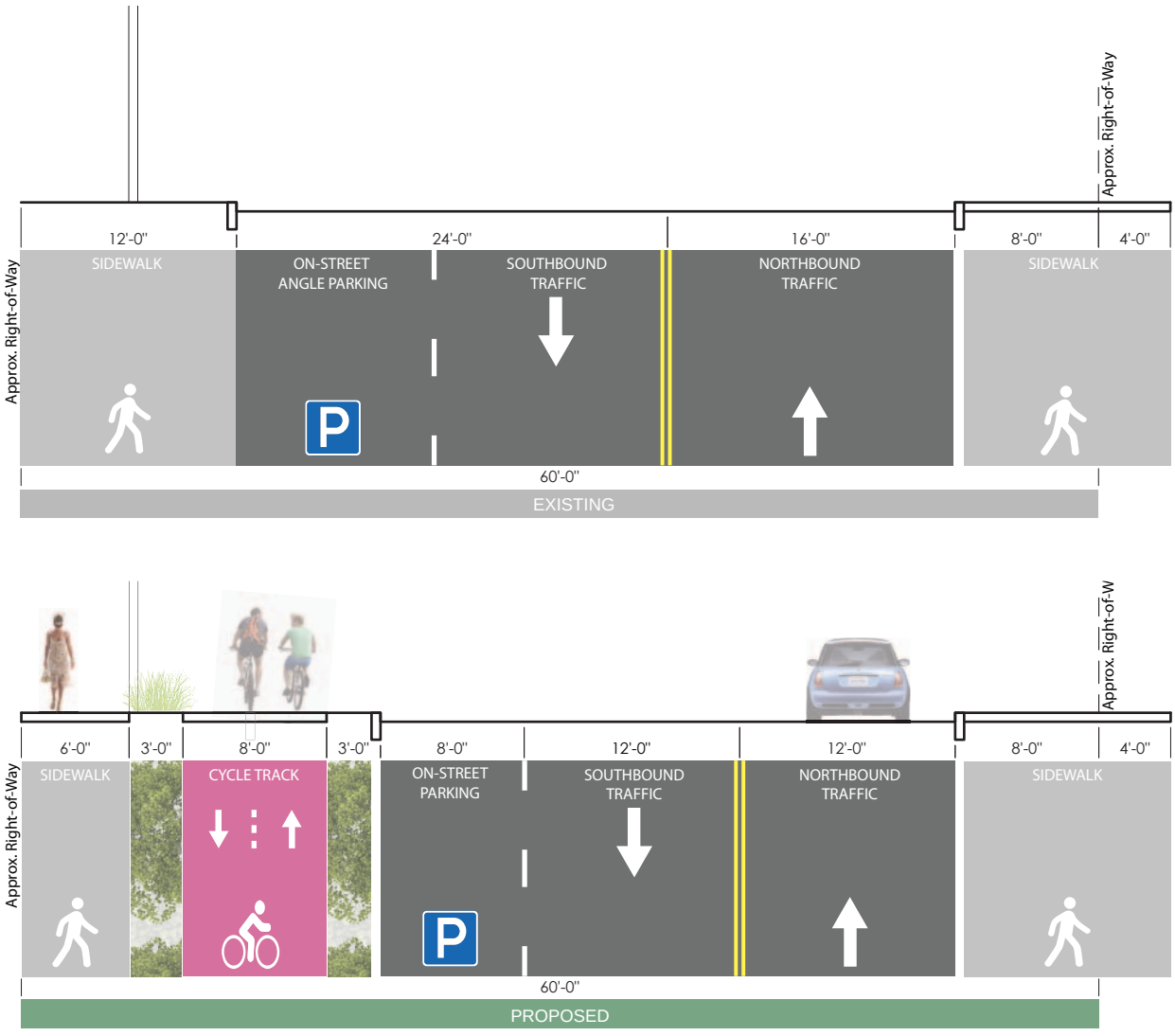
CONDITION B

EXISTING

- This condition refer to the block north of High St.
- One lane on each direction
- On-street parking are on the west side of street

RECOMMENDATION

- Replace the angle-parking with parallel parking
- Provide separated trail on the west



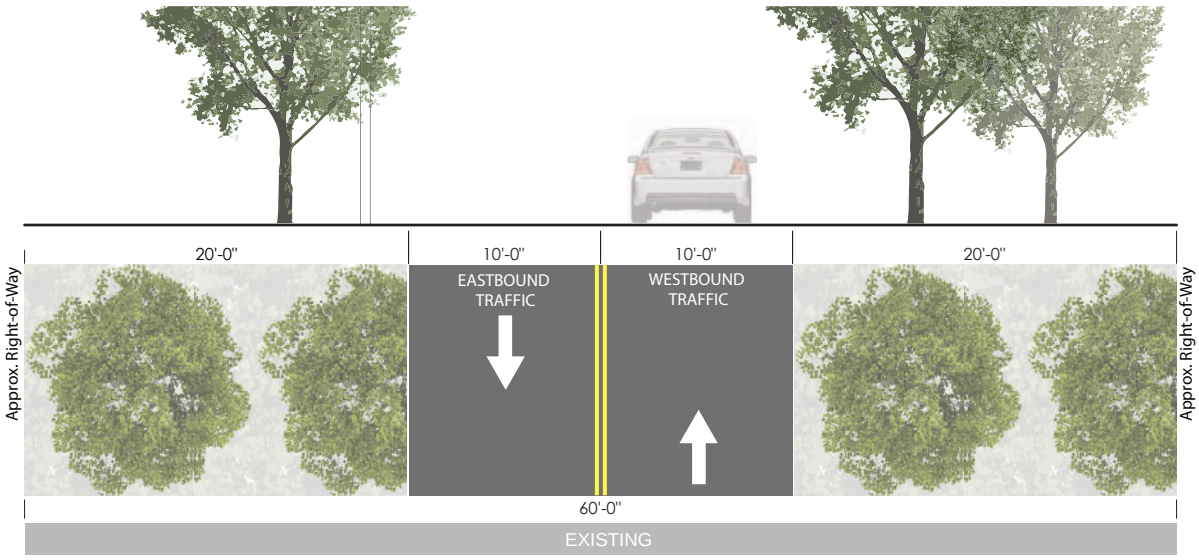
Cornbread Road

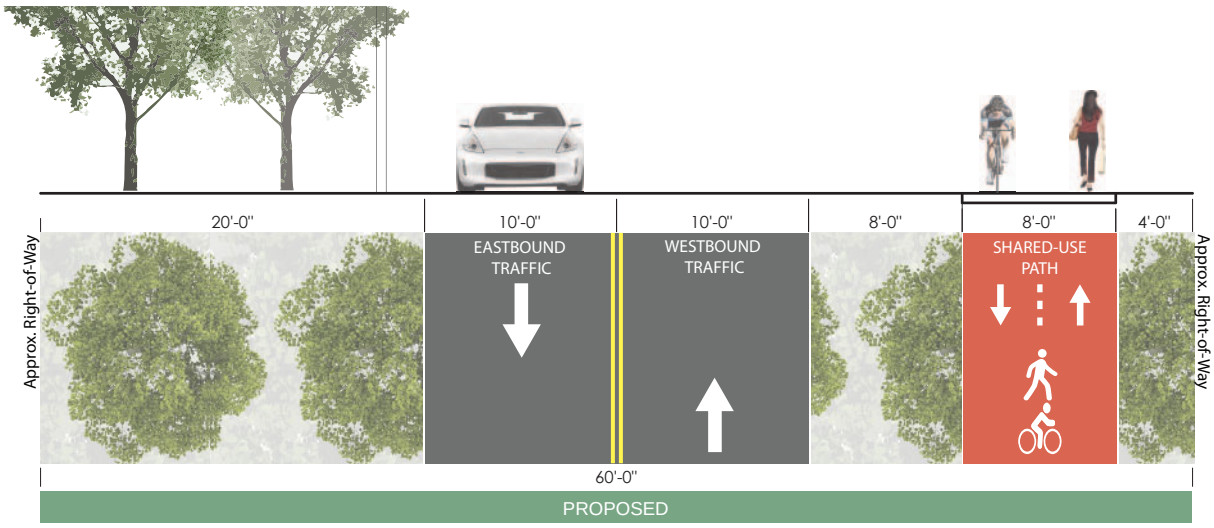
EXISTING

- One, 10’ wide travel lane in each direction

RECOMMENDATION

- Provide an 8’ wide shared-use path on the north side of the street, with an 8’ wide buffer





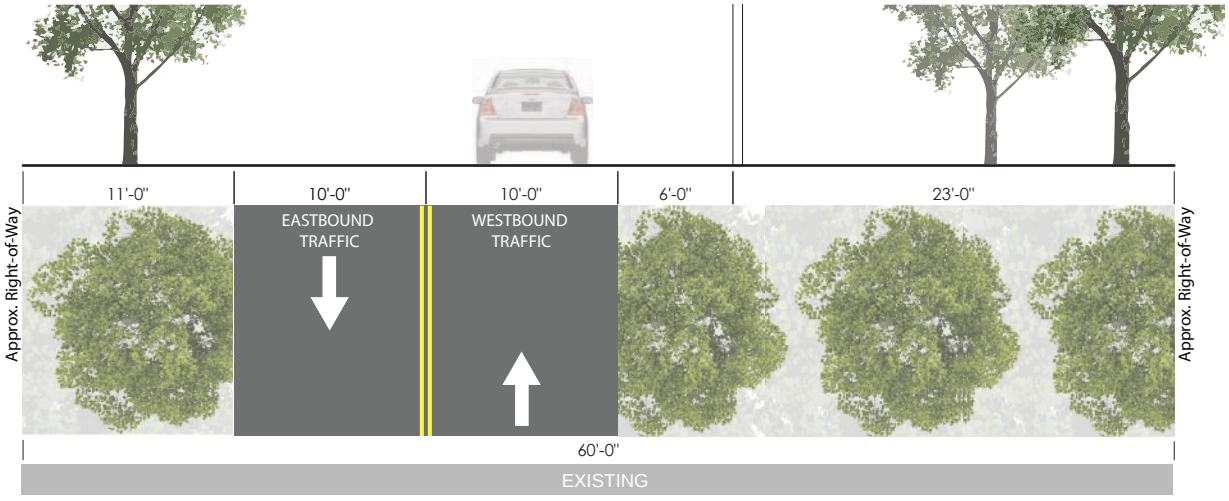
Jackson Street

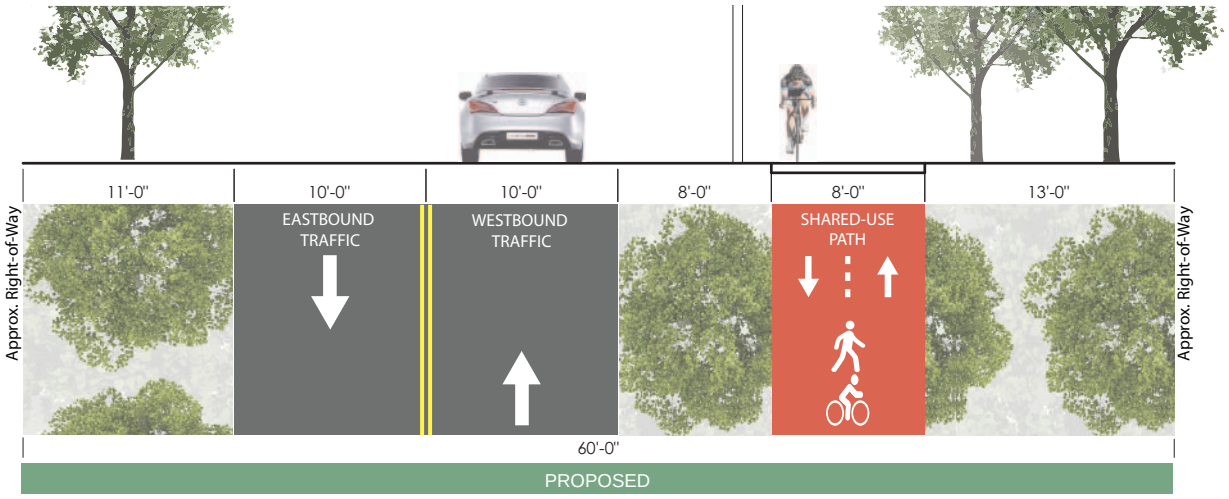
EXISTING

- One 10’ wide travel lane in each direction

RECOMMENDATION

- Provide an 8’ wide shared-use path on the north side of the street, with a 10’ wide buffer





Nebo Road

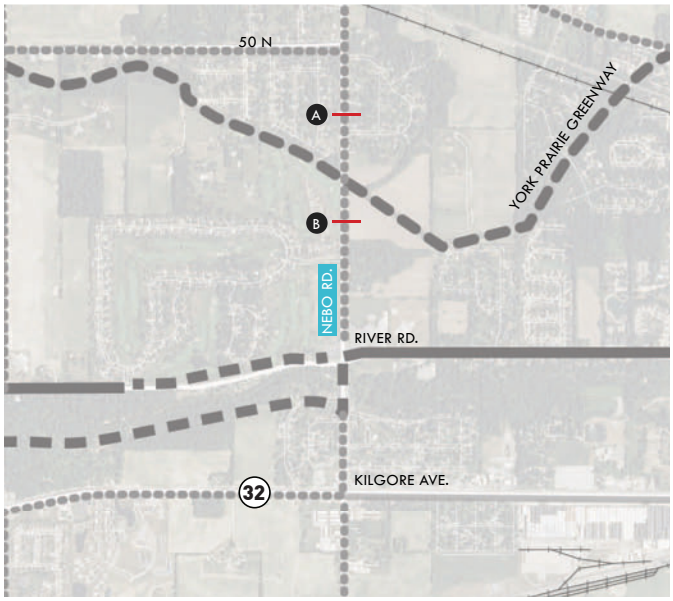
CONDITION A

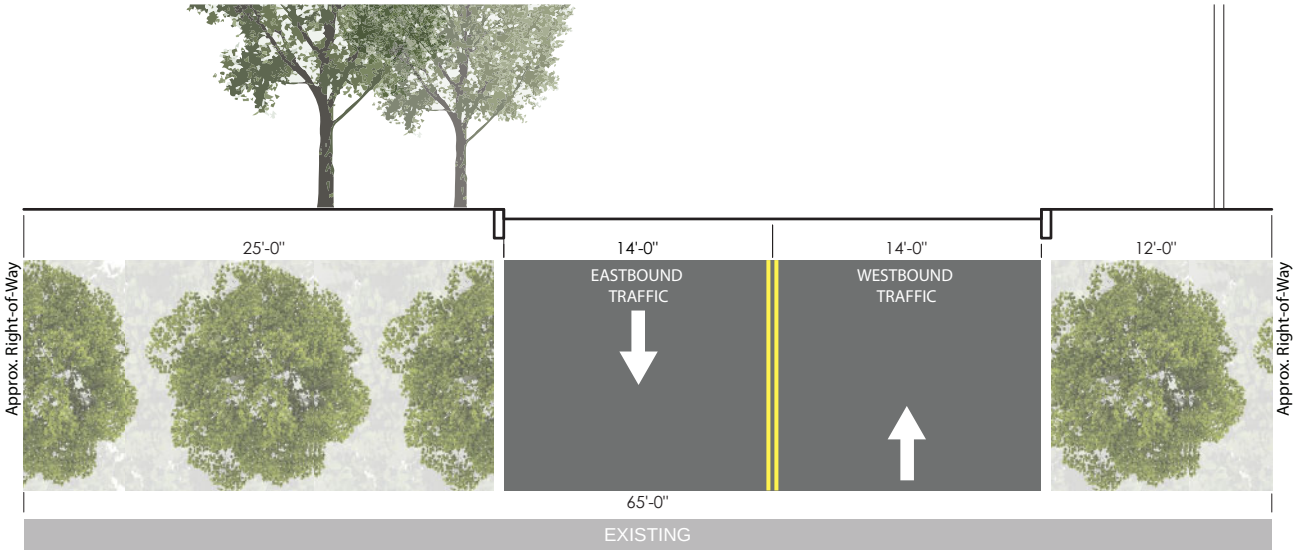
EXISTING

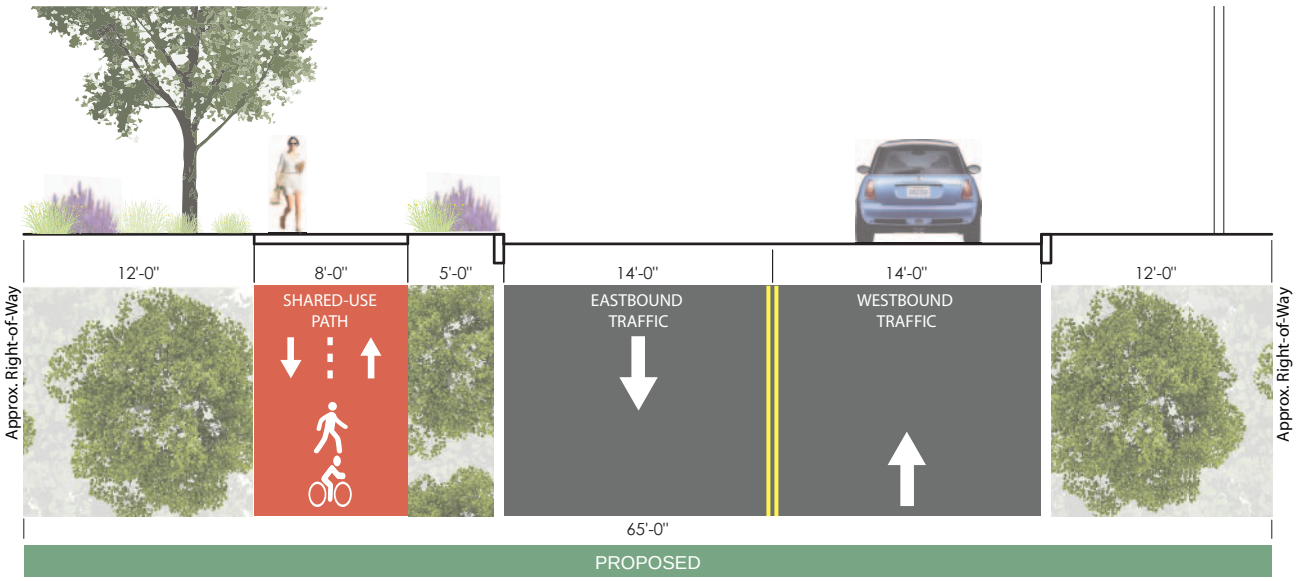
- One 14’ wide lane in each direction
- Existing curbs on both sides of the road

RECOMMENDATION

- Provide an 8’ wide shared-use path on the west side of the road







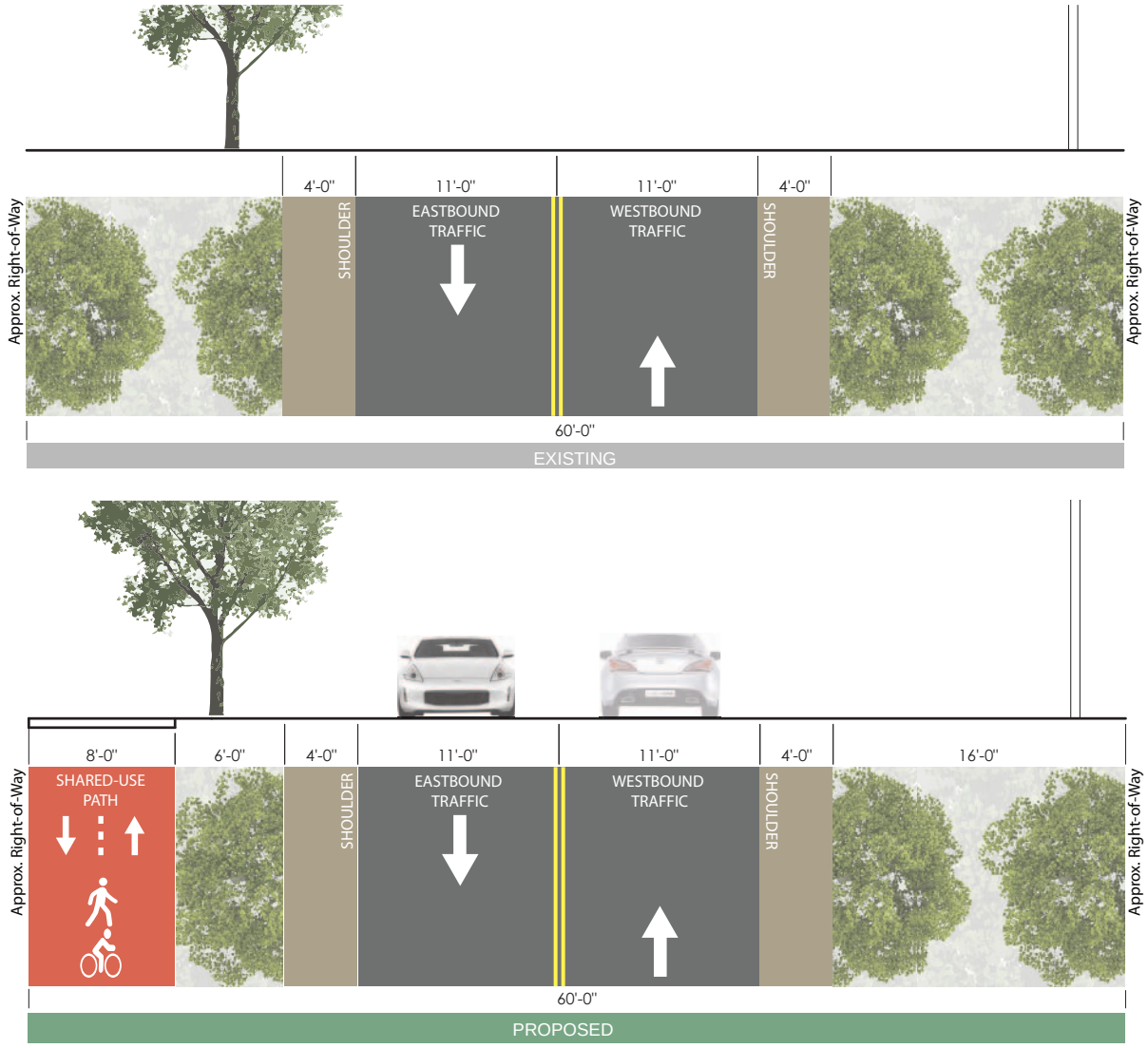
CONDITION B

EXISTING

- One, 11’ wide travel lane in each direction
- 4’ wide shoulder on both sides of the road

RECOMMENDATION

- Provide an 8’ wide shared-use path on the west side of the street
- Provide 10’ wide buffer from the edge of road



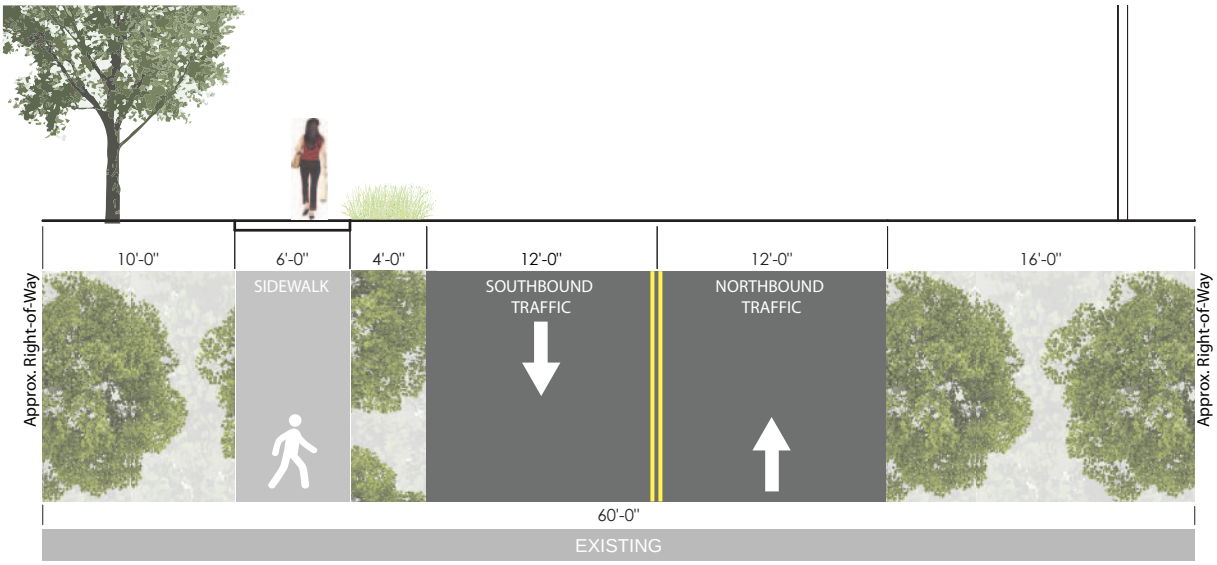
CR 500 West and CR 600 West

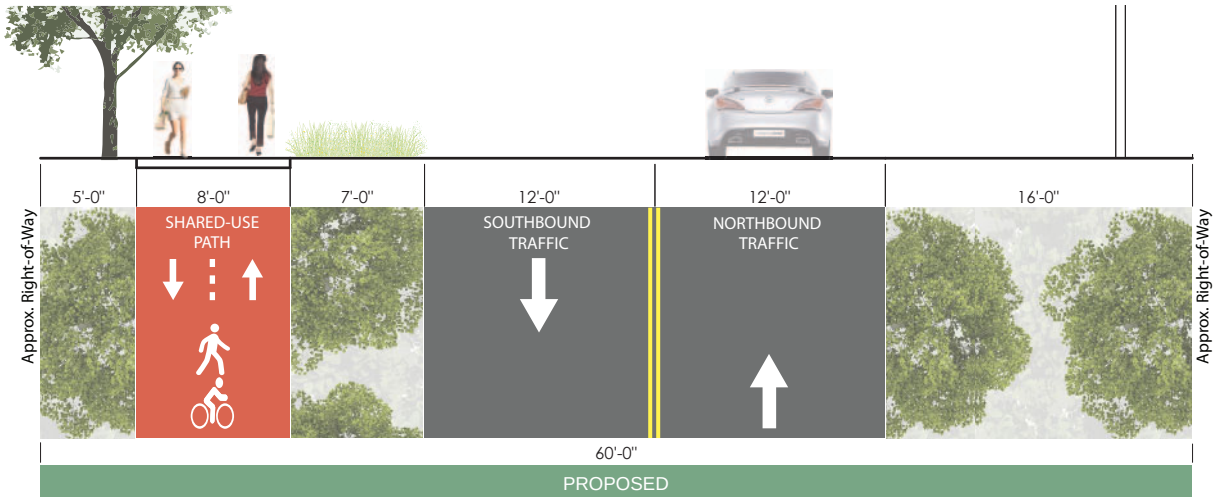
EXISTING

- One 12’ wide travel lane in each direction
- 6’ wide sidewalk on a portion of west side of the street

RECOMMENDATION

- Provide an 8’ wide shared-use path on the west side of the street





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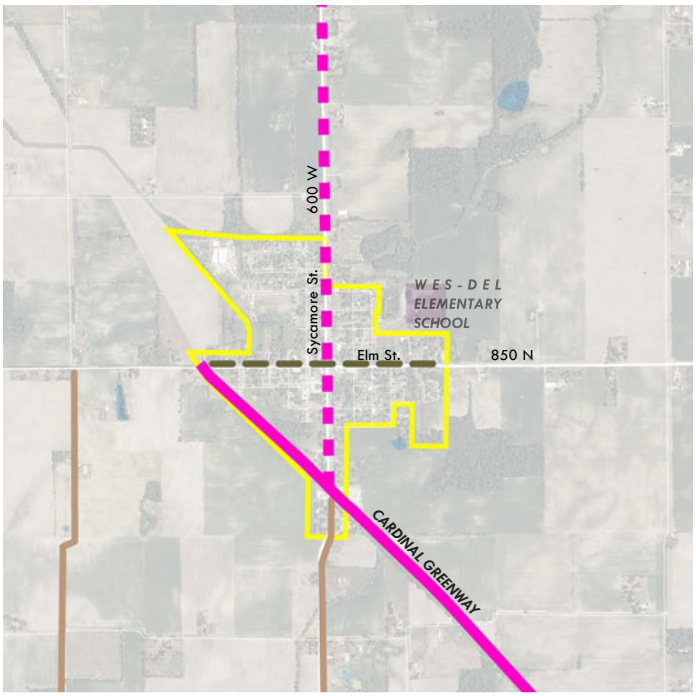
Gaston



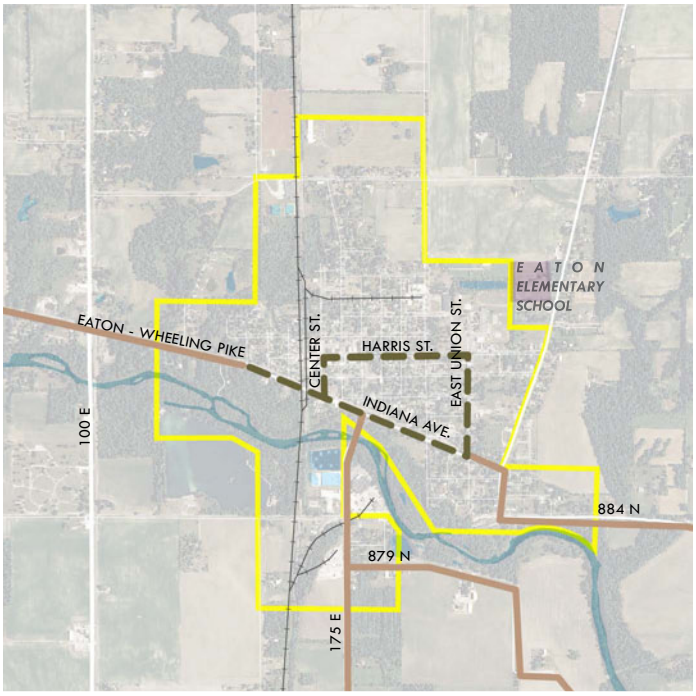
EXISTING

- Cardinal Greenway reaches Elm St. on the west side of Gaston.
- County bicycle route on C.R. 600 W goes through the town
- Sidewalks along Elm St.

POTENTIAL ROUTE

- Shared-use path on Sycamore St. / 600 W for Cardinal Greenway Extension
- Provide pedestrian and bicycle facilities on Elm St.

Eaton



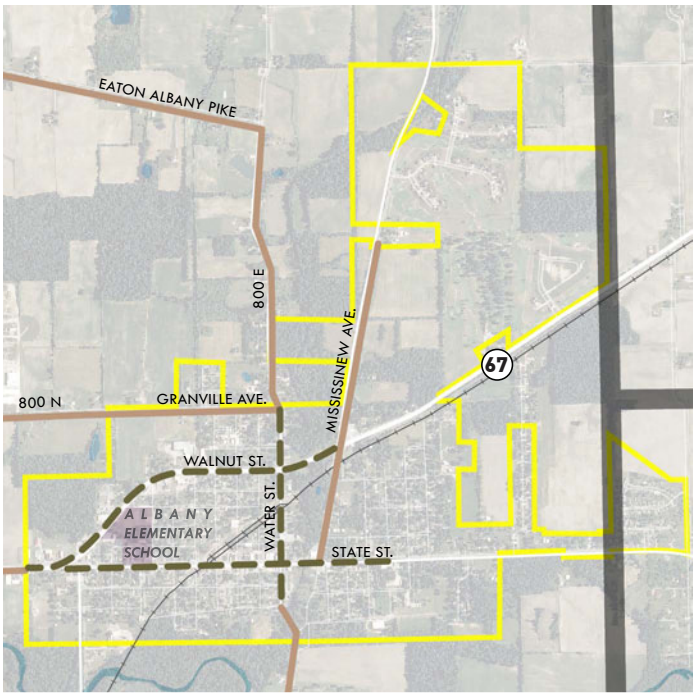
EXISTING

- County bicycle route on C.R. 175 E, 884 N and Eaton-Wheeling Pike

POTENTIAL ROUTE

- Provide pedestrian and bicycle facilities on Indiana Ave., Center St., Harris St. and East Union St.

Albany



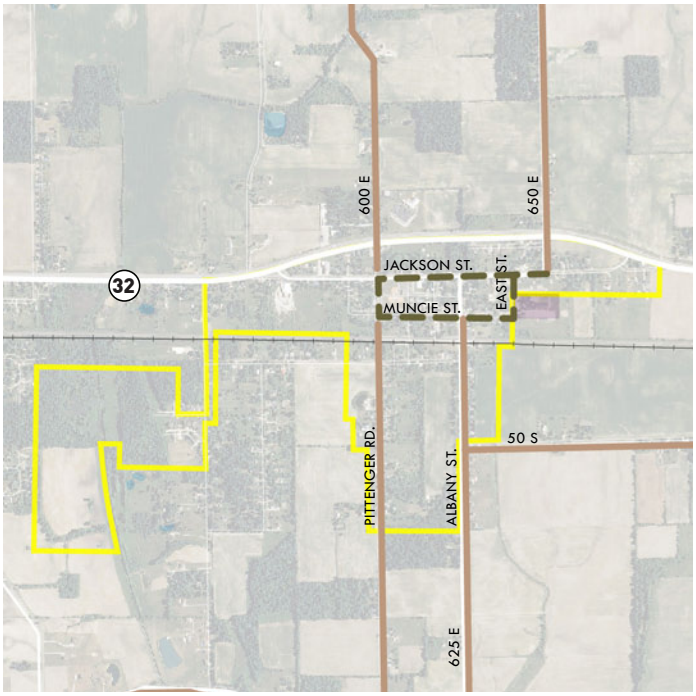
EXISTING

- County bicycle routes on C.R. 800 E, 800 N and Mississinew Ave.
- Existing sidewalks on both sides of State St.
- Existing sidewalk on a portion of Water St.

POTENTIAL ROUTE

- Provide bicycle and pedestrian facilities on Walnut St., State St. and Water St.

Selma



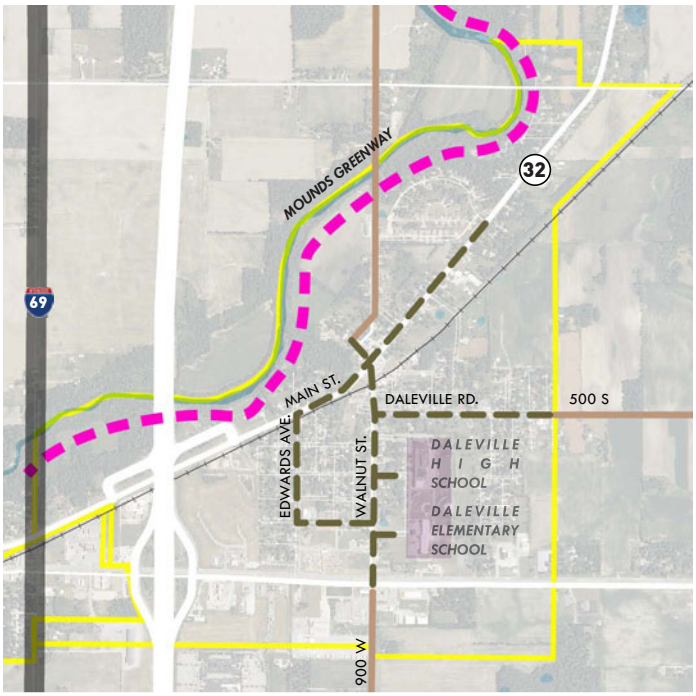
EXISTING

- County bicycle routes on C.R. 600 E and 650 E

POTENTIAL ROUTE

- Provide pedestrian and bicycle facilities on Jackson St. and Muncie St.

Daleville



EXISTING

- Future Mounds Greenway northwest of town
- County bicycle route on C.R. 500 S and 900 W

POTENTIAL ROUTE

- Provide facilities for pedestrian and cyclist on Indiana Ave., Center St., Harris St. and East Union St.

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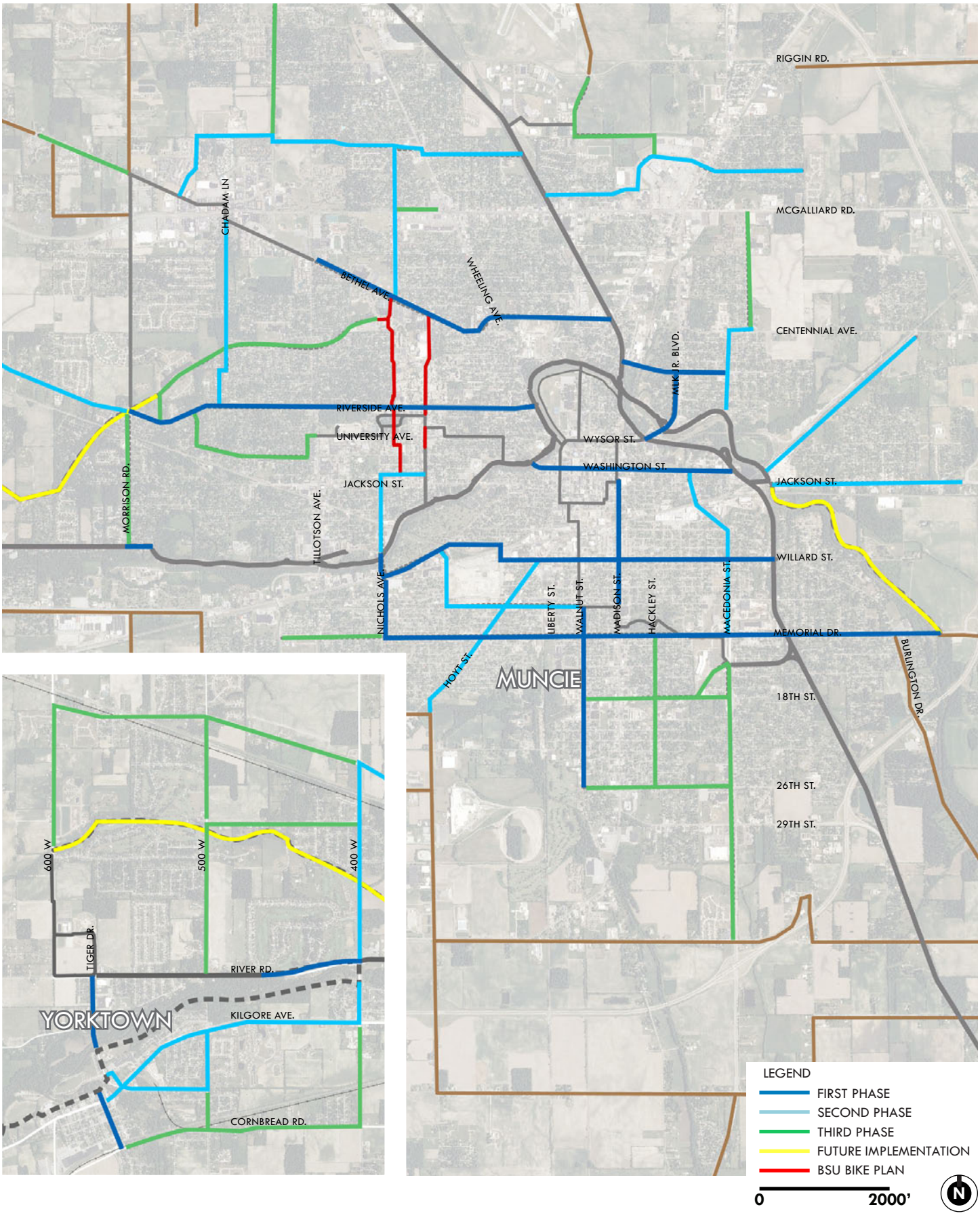
Trail Implementation Plan - Muncie & Yorktown



PHASING PLAN

The phasing plan for bicycle and pedestrian facilities identified in this plan focus around downtown Muncie, and radiate out from the core.

First Phase projects link directly with downtown Muncie, or provide a critical connection to a particular area of need in the City. Job Density analysis and Residential Density analysis were used to determine what projects should be consider first. Refer to the Muncie Art and Culture Trail scoping report for a phasing strategy of this project. This plan does not make recommendations for its implementation schedule. Plans specific to Ball State University should be coordinate with the University's Bicycle Master Plan.

PLANNING COSTS

Below are planning level costs that Delaware County and City of Muncie can use to determine or assist with future implementation considerations.

Facility Type	Facility Width	Material Type	Linear Foot Cost
Sidewalk	6'	Concrete	$48
Sidewalk	8'	Concrete	$65
Sidewalk	10'	Concrete	$80
Shared Use Path	8'	Asphalt	$45
Shared Use Path	10'	Asphalt	$50
Shared Use Path	12'	Asphalt	$60
Sharrows	n/a	Pavement Markings, signage	$5
Bike Lanes, one in-each direction	5'	Pavement Markings, signage	$12
Two-Way Protected Bike Lanes*	8', with 2' min. buffer & bollards	Pavement Markings, signage	$20
Cycle Track*	8', with 3' buffer	Unit Pavers	$220
Cycle Track*	10', with 3' buffer	Unit Pavers	$260
Cycle Track, Amenities & Street Infrastr.	8', with 3' buffer	Unit Pavers, lighting, infrastructure, etc.	$1,750

*Only includes costs for actual bicycle/pedestrian facility. Does not include site amenities, new adjacent sidewalks, or infrastructure costs.

All costs include hard construction costs only, based on 2018 pricing. Design, contingency, construction administration, survey and all other soft costs are not included.

Policy Review & Recommendations

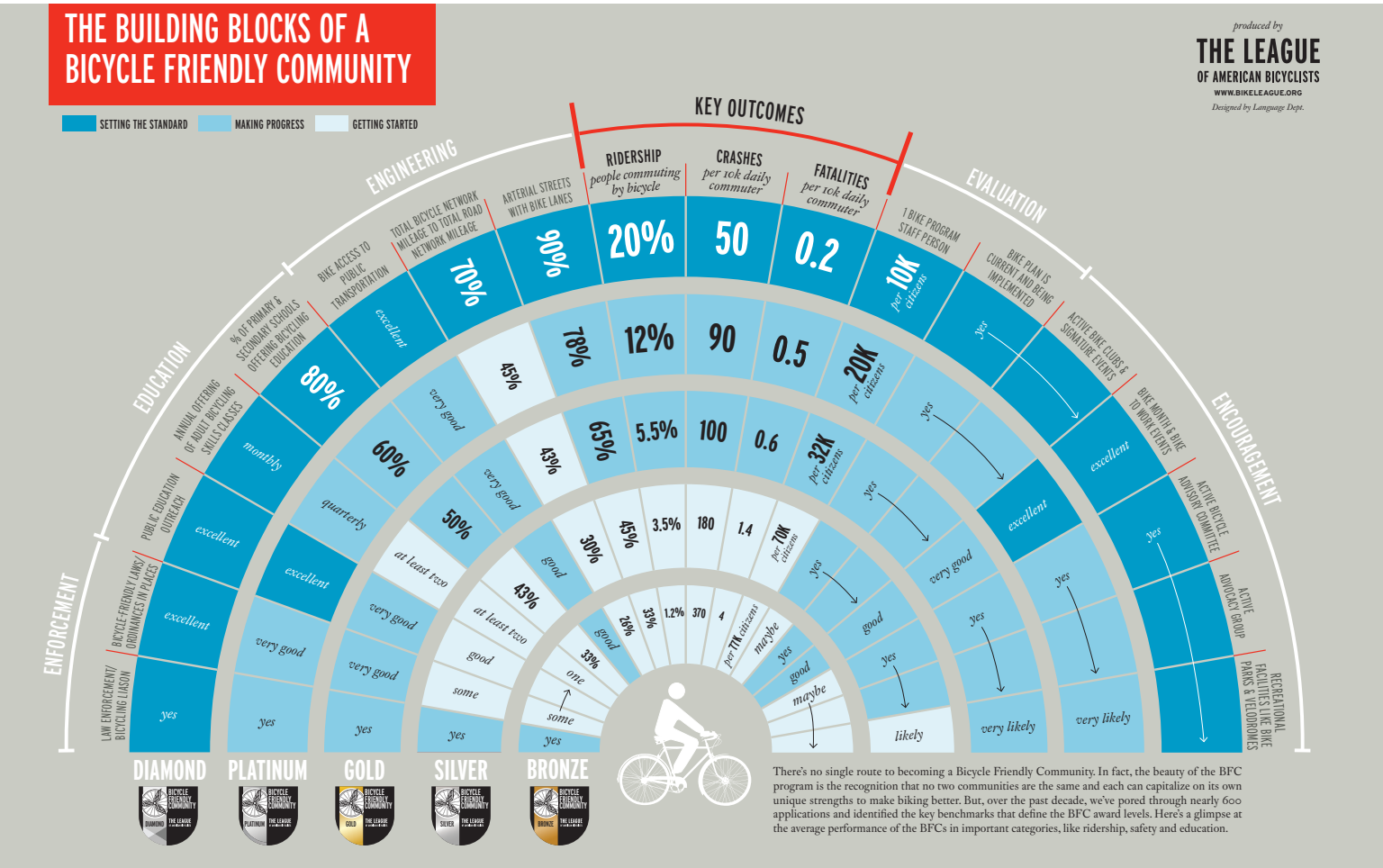
Photo: Cardinal Bike Fest 2017

POLICIES, THE 5 E'S, AND BICYCLE FRIENDLY MUNCIE

According to the League of American Bicyclists, five categories known as the 5 "E's," are essential for creating a successful bicycle network:

- Engineering
- Education
- Encouragement
- Enforcement
- Evaluation and Planning

Throughout the study process, concerns were raised about existing conditions in each of these areas. As each of these "E's" plays a vital role in bringing about the holistic change that can transform a city.



ESSENTIAL ELEMENTS OF BICYCLE PLANNING - THE 5 E'S

ENGINEERING

Engineering improvements are represented by the physical facilities that are provided for bicyclists and pedestrians. The recommendations of the plan and street cross sections are the various forms of engineering that would improve bicycle and pedestrian safety throughout Delaware County. Contributing factors include:

1. Bike Access to Public Infrastructure

2. Total Bicycle Network Mileage to Total Road Network Mileage

3. Arterial Streets with Bike Lanes

EDUCATION

Education of the residents and businesses IN Delaware County is essential to expanding the role of walking and biking within the community and creating safer interactions and better harmony among bicyclists, pedestrians and motorists.

Successful education campaigns rely not only on the content of the messages, but also in how they are delivered. It must be recognized that influencing behavior is challenging, and that creative approaches are needed to gain the attention of students in particular. The following policies provide ways to facilitate the distribution of education programs:

1. Public Outreach

Partner with local organizations on bicycle education events and continue to leverage the progress of BikeMuncie, which includes a variety of information regarding how and where to bike. The outreach work headed by BikeMuncie has allowed a great deal of information to be available for local cyclists. This information should continue to be shared and made readily accessible to the public.

Muncie's BikeFest is an annual support and festival supporting bike riding in Delaware County and Central Indiana. Public events that encourage and celebrate cycling promote a positive bicycling culture and builds a sense of pride amongst cyclists. These activities also allow for separate or unique cycling or outdoor recreation groups to meet and collaborate. BikeMuncie and the Cardinal Greenways should consider expanding other outdoor recreation activities and programs to continue to build momentum for BikeFest.

A list of existing and potentially new resources that the City of Muncie and BikeMuncie can provide include the following:

- Maps and other resources (a bicycle user map could be provided as a part of this plan);

- Links to laws, statutes, and ordinances related to walking and biking – both local and state;

- Information about local biking and walking events;

- List of and links to local bike shops and their numbers; and

- List of and links to all walking and biking groups, including clubs, racing teams, and advocacy groups.

2. Annual Offering of Adult Bicycling Skills Classes

- Investigate offering a bicycle and pedestrian education course as an alternative for bicyclists, pedestrians, and motorists who are first time offenders of bicycle and pedestrian-related rules of the road. Offering a bicycle and pedestrian education course as an alternative for bicyclists, pedestrians, and motorists who are first-time minor offenders of bicycle and pedestrian-related rules of the road is an efficient and cost effective way to deal with infractions. The City/County could explore this option for educating rather than punishing some rules of the road violators, or issuing fines. Some offenders may choose to avoid the fine by participating is such courses.

- Include at least one piece of bicycle and pedestrian education annually communications to residents (newsletter, utility bills, tax bills, etc.). Including bicycle and pedestrian related

educational pieces in utility or tax bills is an easy way to reach a large group of people. Simple communications could cover a seasonal topic such as rules of the road, common etiquette, local bicycling ordinances and back-to school safety information.

3. Percentage of Primary and Secondary Schools Offering Bicycling Education

- Provide materials to local schools to regarding bicycle education. Ensure that the material is being presented in a consistent and positive nature to encourage cycling.

ENCOURAGEMENT

Encouragement combines many initiatives and the strategies of other policies and programs to build enthusiasm and interest in bicycling and walking.

1. Bike Month and Bike to Work/School Events

- Bike to Work weeks and Bike and Walk to School days are national activities that are part of National Bike Month (May of each year). Bike/Walk to School Day is an important component of Safe Routes to School as it both encourages and educates students on how to get to school via bike or their feet.

2. Active Bike Clubs and Signature Events

- Encouragement programs include National Bike Month activities, Walk to School days, launch parties for new pathways and facilities and employer-driven incentive strategies such as mileage reimbursements.

- Continue to build momentum for cycling through BikeFest

The City of Muncie and Delaware County should explore ways to encourage more of these types of events by partnering with the school system. Activities for these events may include:

• Morning commute stations where cyclists are treated to free coffee and breakfast, bike tune ups, and other incentives;

• Group rides with local civic leaders;

• Themed rides, such as a bike parade to school; and

• Discounts at local businesses for commuters and participants.

3. Support Existing and New Community Events

Sponsor and/or support local family-friendly events that promote walking and bicycling. Family friendly events can be a great way to capture the interested but concerned portion of the cycling population, as well as a great way to introduce kids to cycling as part of everyday normal life. Often these events are community oriented and can be as simple as a group ride organized on a Sunday. Other events include themed rides and rides organized around existing neighborhood festivals, parks, or cultural destinations.

- Develop and publicize a bicycle user map. People who are not familiar with bicycling in a specific area, including visitors, new residents, and long-time residents new to bicycling, often have a difficult time determining what their route to a specific location should be. Streets that they might use to drive to a destination may not be streets on which they are comfortable bicycling. Providing maps of bicycle facilities and streets that are suitable for bicycling is a good way to encourage people to bicycle more and to raise awareness of bicycle facilities.

ENFORCEMENT

Enforcement includes policies and actions that address safety issues such as speeding, illegal turns and movements, and general rules of the road. Programs include options for community members to work collaboratively to promote safe bicycling, walking and driving.

1. Continue to enforce posted speed limits, particularly in school speed zones. Studies show that the probability of serious injury and death to non-motorized users when hit by a car exponentially increases with each increment of 5 mph. The enforcement of posted speed limits through warning, ticketing and yard sign campaigns can quickly make compliance the rule of the neighborhood.

2. Utilize automated speed-tracking equipment to provide feedback to motorists when they are exceeding the speed limit. The use of automated speed-tracking equipment is a cost effective way to alert motorists to their speed. Often located near schools and other places where pedestrians are known to be present, automated speed-tracking equipment can cause motorists to consciously slow down.

3. Expand law enforcement training as a part of police academy curriculum and ongoing officer education. Law enforcement officers play a daily role in helping to foster a culture of respect and responsibility among all road users. Regular training creates a uniform understanding of their responsibilities with regard to traffic law enforcement for bicyclists, pedestrians, and motorists.

EVALUATION AND PLANNING

Evaluation and planning policies and actions include monitoring outcomes, documenting the results of the implementation of the policies and programs, and planning subsequent actions. Data collection before and after infrastructure improvements are implemented, such as user surveys and bicycle and pedestrian counts, are critical to measuring the overall effectiveness of the network.

1. Conduct annual bicycle and walking counts throughout the City and County to measure the usage of facilities and growth in these modes of travel. Annual bicycle counts provide a direct mechanism for tracking bicycling trends over time and for determining the impact of projects, policies, and programs that have been implemented.

There are three potential methods available for performing counts:

- Volunteer-Based Visual Counts – The National Bicycle and Pedestrian Documentation Project provides a recommended methodology, survey and count forms, and reporting forms available for free online. Local trainers for the program are also available. Counts are conducted using volunteer labor and therefore put little financial burden on municipal budgets. It is important that counts be performed over a period of multiple days at various times in order to account for peak use. In other words, counts should be performed on weekends and weekdays and in the morning, midday, and late afternoon.

- Electronic Counts – These methods involve using electronic equipment to automatically count the number of users. The traditional method is to use pneumatic tube counters, which are readily available and easy to use. However, they can only count bicycles—not pedestrians. Another, more effective method is to use infrared counters, which are able to count pedestrians and differentiate between pedestrians and bicyclists. With either version of this method, counters should be installed or one entire week (including weekends) in various locations, twice per year to account for seasonal variation.

- Estimates using GPS, or Strava Data – New technologies and systems allow users to record trips using GPS devices and then upload this data to an online system. The City of Muncie has some experience with basic data provided by Strava, which shows the most heavily-traveled routes. The limitation with this method is that it primarily records recreational bicyclists

(though the company claims commuting bicycle trips can be estimated from its data). In addition, this data will provide citywide information, but only as estimates for any given street or path. This is opposed to the other methods, which provide accurate counts, but only for a few select locations.2

2. Develop and maintain a Capital Improvement Plan for bikeways and paths. Part of this Plan includes priority/ phasing recommendations, but it is still recommended that the County-City develop and maintain, or include a multi-year capital improvement plan for bicycle and pedestrian projects. The emphasis of this plan will be on closing gaps in the path system and constructing high-priority routes. The plan will also track the total amount of bicycle facilities that have been built (including everything that exists today). Keeping track of the installed facilities will allow staff to plan appropriately for future improvements. Having a good understanding of existing conditions will enable planners to make the best use of capital dollars when implementing new facilities.

3. Continue to develop and Promote a Safe Routes to School plan to improve the safety of children walking and biking to school. Safe Routes to School is a multi-disciplined program designed to increase walking and bicycling to and from school and educate children about the basics of roadway safety. Successful Safe Routes to School Programs require support and leadership from the school district, individual schools, and Parent-Teach Associations. Once a program has been established in the schools, provide assistance by construction infrastructure improvements and providing police-led bicycle and pedestrian safety programs.

4. Establish a City-wide Wayfinding System for Bicyclists and Pedestrians. Wayfinding is a means of providing key information about destinations, direction, and distance to help bicyclists and pedestrians determine the best routes for their trips. Complete wayfinding signs provide on-the-ground information that help people find their way around a community, or between communities, significantly stretching the utility of bikeway and path networks.

   Establishing a wayfinding sign system involves four steps:

- Identify key destinations - Consider destinations for transportation and recreational users, including shopping and dining areas. The number of destinations will be limited so that wayfinding signs do not include too much text. Ideally, 2-3 destinations will be identified (downtown, a major park, etc.) that will be listed on signs, as well as 6-8 local destinations (for each half of the city) that will only be listed on nearby sign

- Identify primary routes - Wayfinding systems are most effective when they provide turn-by-turn guidance to destinations. This is best achieved by prioritizing sign placement to the primary routes that will be used by bicyclists and pedestrians to access destinations. In other words, signs are more effective along a path that parallels an arterial street than along a neighborhood street that sees relatively little use.

- Determine sign placement - The placements and spacing of signs depends entirely on the distance to destinations and turns in the route that is being followed. In general, a wayfinding sign will be placed at the "decision point" (approximately 100 feet in advance of an intersection) so the user has adequate time to determine whether they should turn or go straight. Subsequently, confirmation signs will be placed approximately 100 feet beyond the intersection to assure users they have made the correct decision.

- Determine sign content - In general, it is recommended that destinations that are straight ahead be placed at the top of the sign, followed by destinations that require a left turn, then destinations that require a right turn.

5. Consider creating the position of bicycle and pedestrian coordinator or assigning the duties to existing staff. Once the Plan is complete, it will need to be implemented in order for successful improvements to be made within the community. The best way to achieve this is to have a Bicycle and Pedestrian Coordinator on staff. Hiring a bicycle/pedestrian coordinator or formally designating a coordinator within current staff would provide a centralized point of contact for planning, programming and policies related to both on and off street facilities. Typical job duties could include:

- Planning and managing new programs in the areas of non-motorized accommodations, safety, education, enforcement, courses, and recreation;
- Developing safety and promotional information such as quarterly newsletters and route maps;
- Arranging for special displays and events at public and technical information presentations;
- Development, review, and implementation of Plan projects and updates;
- Serving as principal contact with Federal, state, and local agencies on bicycles and pedestrian matters;
- Coordinating and maintaining budget and forecast budgetary needs;
- Seeking funding for implementation of bicycle facilities and working with appropriate offices to fully integrate bicycle and pedestrian projects in programming decisions;
- Developing priorities for special studies in areas such as the location and cause of crashes; effectiveness of new facility designs; barrier removal analysis; and pedestrian counts
- Coordinate projects between Ball State University and the City of Muncie, with special consideration toward implementing and maintaining the Muncie Art and Culture Trail.

6. Create a Facility Assessment and Repair Sheet

- A facility assessment process should be conducted to ensure all facilities are inventoried and the condition documented prior to performing maintenance tasks. A facility assessment and repair sheet could be developed to keep this process consistent across facility types and through the years as facilities age. The form could include information to document needed maintenance, repair locations, and types of repair. Items to be included on the form include: maintenance issue description, strategies to repair, notes on the trail or facility condition, space for sketches of the problem and/or solution, and action to be taken.
- Assessment of the facilities should include walking and riding the facility. Facilities should be inspected on a routine basis to identify current conditions, drainage issues, erosion, and other areas of needed repair. In addition, amenities such as fences, restrooms, kiosks, and wayfinding should be assessed. Walking or riding the facility will allow the person conducting the assessment to perform a more accurate assessment in terms of facility use and safety.
- Assessment reports could be coordinated between the Bicycle Coordinator and the City of Muncie

BICYCLE FRIENDLY IMPROVEMENTS

Many of the policy recommendations noted will assist the City of Muncie improve from Bronze to Silver ranking. Chief among potential improvements identified by The League of American Bicyclists includes developing and implementing a Complete Streets Policy for the City of Muncie. A complete streets policy will insure that all future roadway infrastructure work follows the requirements of the City of Muncie, beyond those that have been specifically identified within this report.

MUNCIE, IN

TOTAL POPULATION
70,085

TOTAL AREA *(sq. miles)*
27.4

POPULATION DENSITY
2558

OF LOCAL BICYCLE FRIENDLY BUSINESSES **1**

OF LOCAL BICYCLE FRIENDLY UNIVERSITIES **0**

10 BUILDING BLOCKS OF A BICYCLE FRIENDLY COMMUNITY

	Average Silver	*Muncie*
Arterial and Major Collector Streets with Bike Lanes	45%	2.5%
Total Bicycle Network Mileage to Total Road Network Mileage	30%	5%
Public Education Outreach	GOOD	SOME
Share of Transportation Budget Spent on Bicycling	7%	MORE THAN 19%
Bike Month and Bike to Work Events	GOOD	SOME
Active Bicycle Advocacy Group	ACTIVE	YES
Active Bicycle Advisory Committee	ACTIVE	MONTHLY
Bicycle-Friendly Laws & Ordinances	SOME	SOME
Bike Plan is Current and is Being Implemented	YES	SOMEWHAT
Bike Program Staff to Population	1 PER 70K	UNKNOWN

CATEGORY SCORES

ENGINEERING *Bicycle network and connectivity*	2/10
EDUCATION *Motorist awareness and bicycling skills*	2/10
ENCOURAGEMENT *Mainstreaming bicycling culture*	2/10
ENFORCEMENT *Promoting safety and protecting bicyclists' rights*	4/10
EVALUATION & PLANNING *Setting targets and having a plan*	3/10

KEY OUTCOMES

	Average Silver	*Muncie*
RIDERSHIP *Percentage of Commuters who bike*	3.5%	1.6%
SAFETY MEASURES **CRASHES** *Crashes per 10k bicycle commuters*	180	131
SAFETY MEASURES **FATALITIES** *Fatalities per 10k bicycle commuters*	1.4	4.4

» Launch a 'respect' safety campaign. Ensure that the campaign message clearly conveys that both motorists and cyclists have the same rights and responsibilities on the road. See, e.g. http://insightstudiopei.com/portfolio-items/respect-traffic-safety-campaign/.

» Hire a full-time employee dedicated to improving bicycling in Muncie. The Bicycle and Pedestrian Advisory Committee is currently doing many things that would likely be better supported by a full-time employee.

» Continue work to adopt a Complete Streets policy. Make sure that your Complete Streets policy includes intersection treatments and signal detection. A Complete Streets policy can lower the cost of bicycle infrastructure by integrating it into maintenance and development projects.

» Work with Ball State to encourage them to become a Bicycle Friendly University and partner with the City to create a bike share system open to the public.

» Increase the amount of safe bicycle infrastructure by connecting neighborhoods through a well-planned system of bike paths, lanes and trails that incorporates NACTO design standards and network stress analysis.

» Expand youth and adult bicycle education opportunities so that it is easy for members of the community to learn bicycling skills and about the opportunities to bike in Muncie.