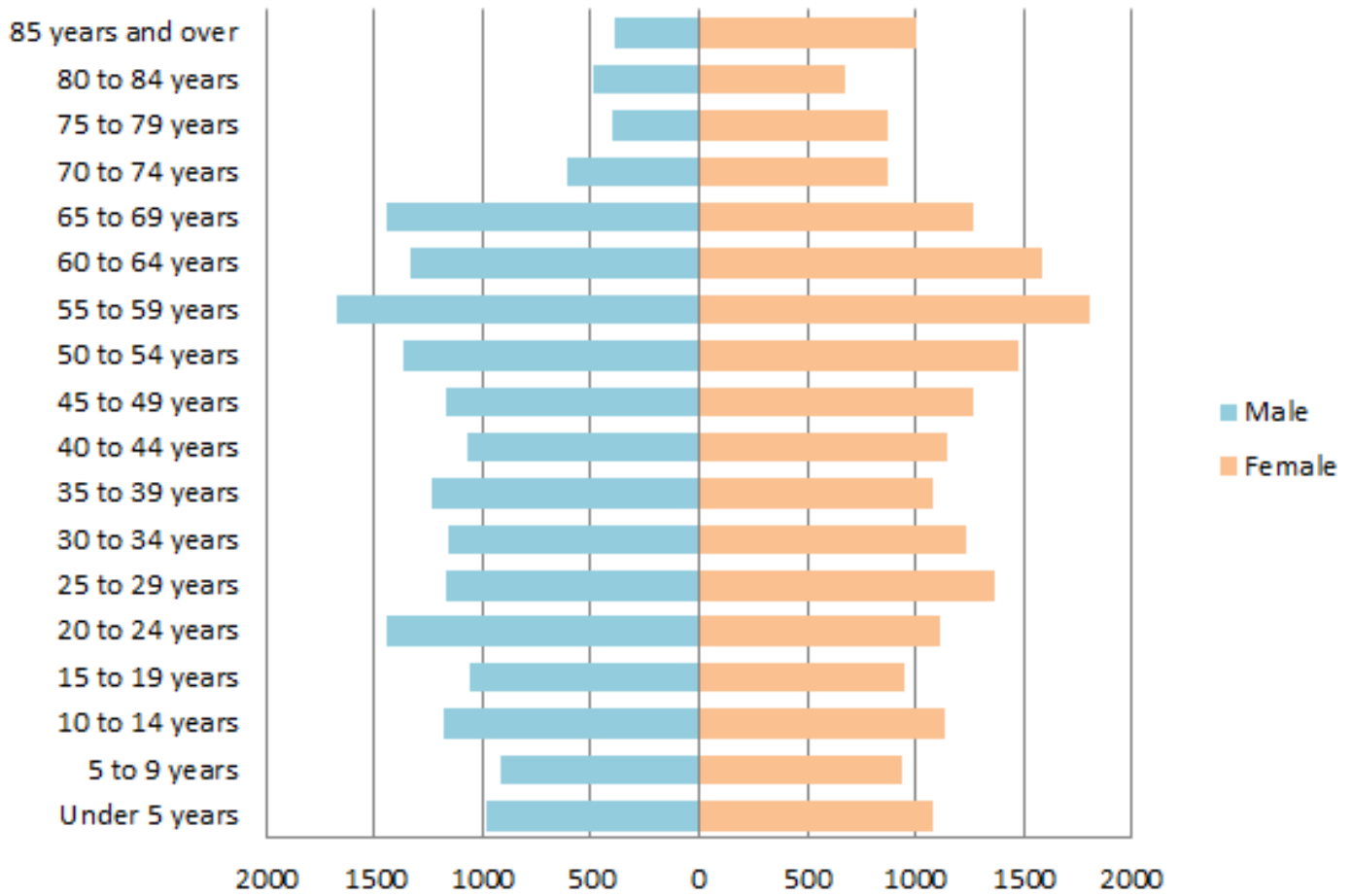


APPENDIX A

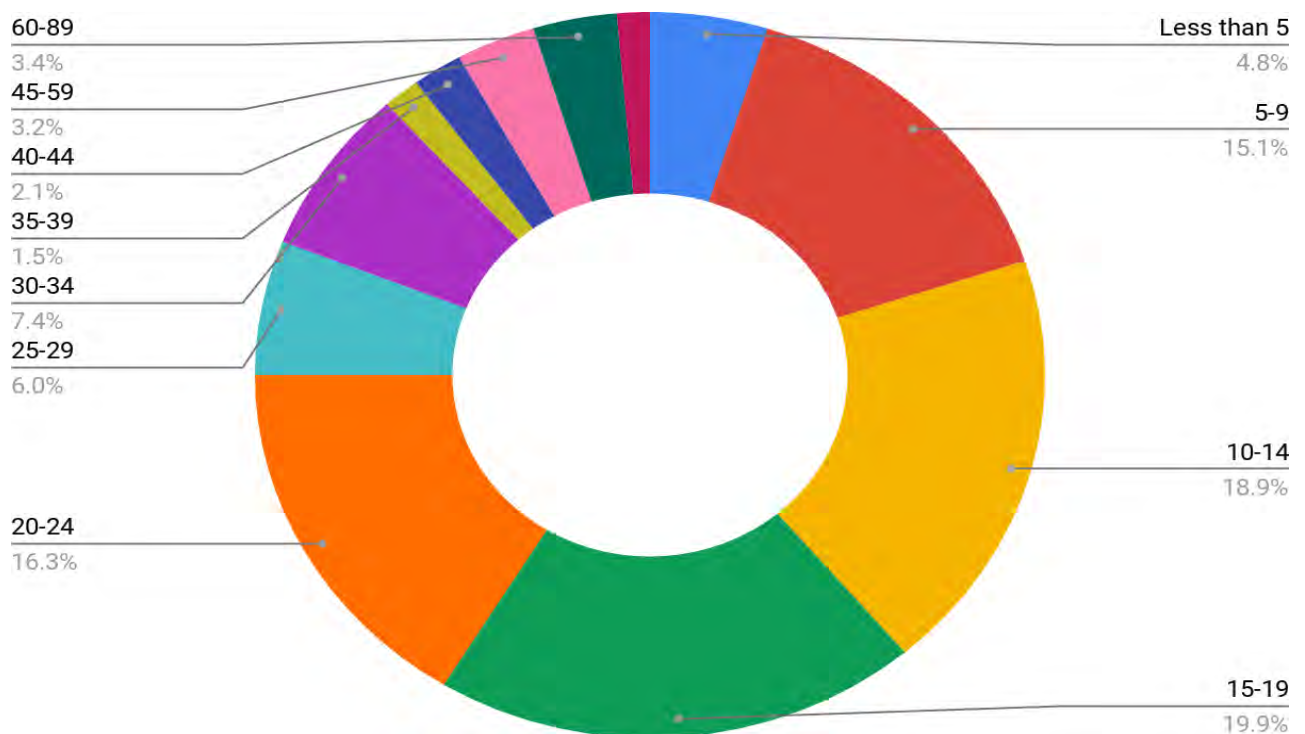
MAPS & DATA



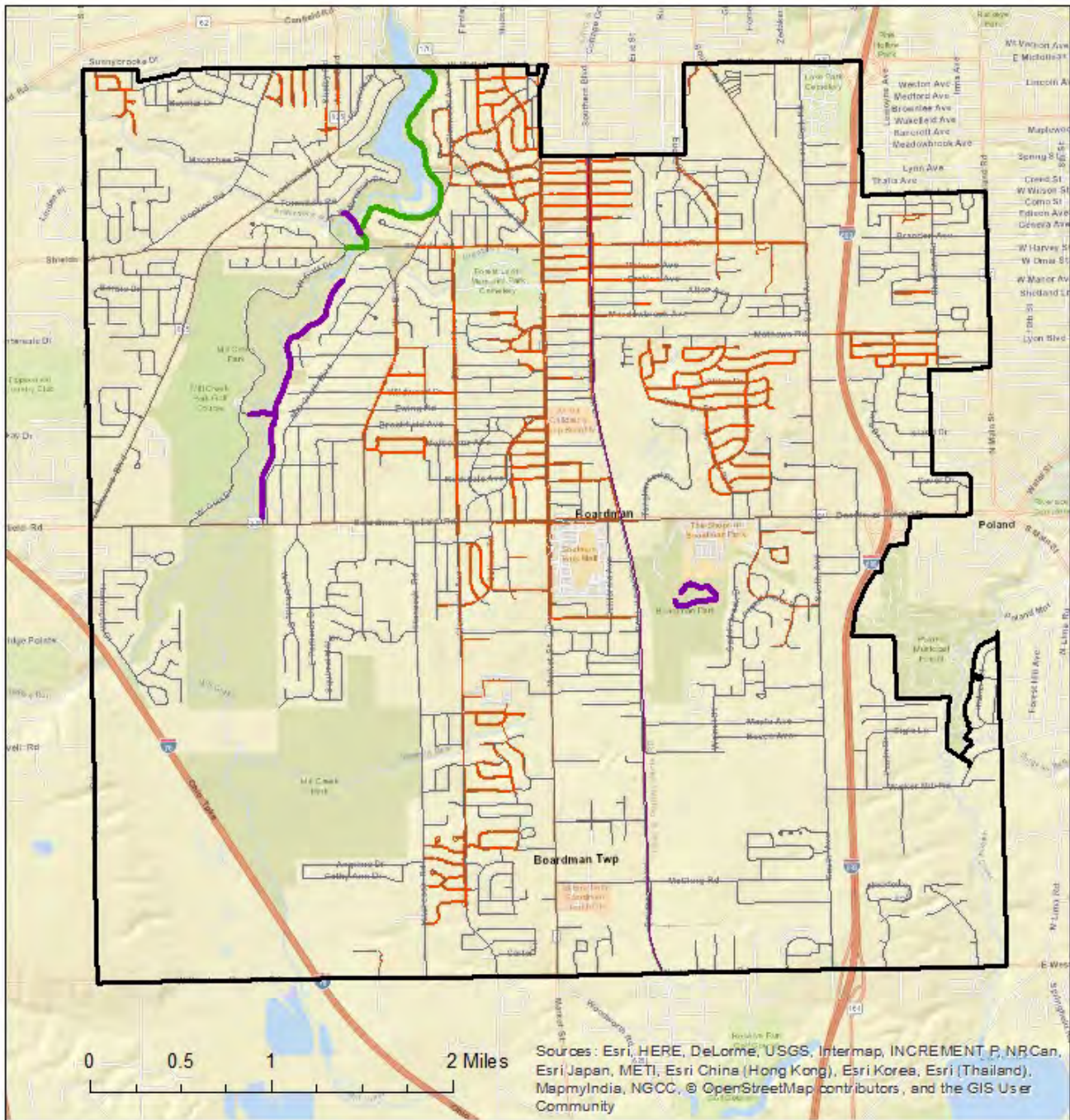
Population by Age and Sex



Travel Time to Work



Bike & Sidewalk Infrastructure, Boardman Township

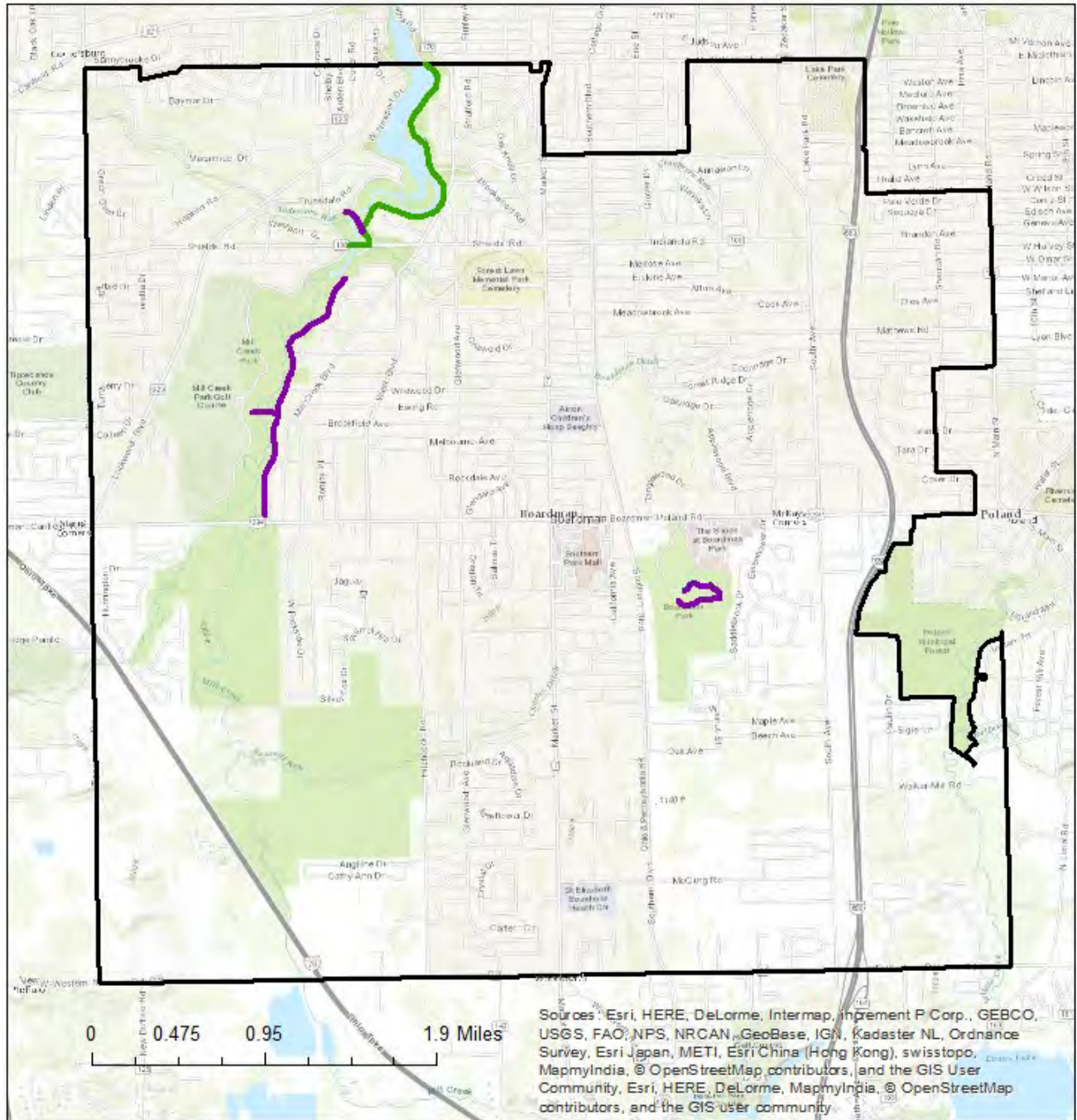


-  Boardman
-  Sidewalks
-  Bike Paths
-  Bike Lanes
-  Bike Path Conceptual
-  Roads



Created by: Tricia D'Avignon
 Source: Eastgate Regional Council of Governments, 2017

Bike Paths in Boardman Township



-  Bike Paths
-  Bike Lanes
-  Boardman

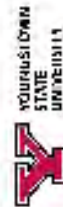
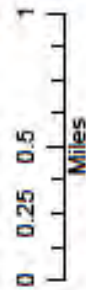


Created by: Tricia D'Avignon
Source: Eastgate Regional Council of Governments, 2017



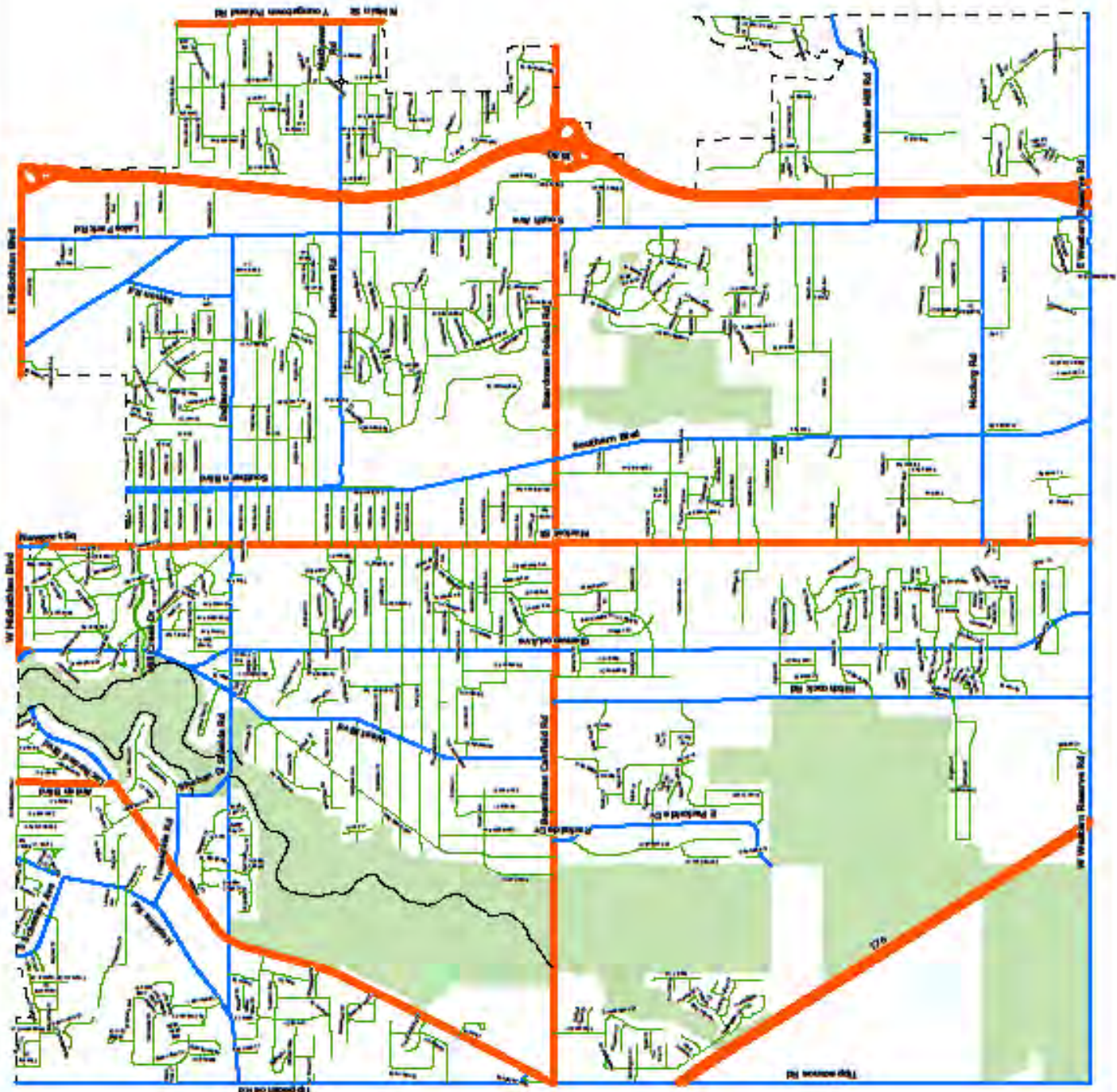
Boardman Township Road Maintenance

- Road Inventory**
- State Road
 - County Road
 - Township Road
 - Other Road Type
 - Township Boundary

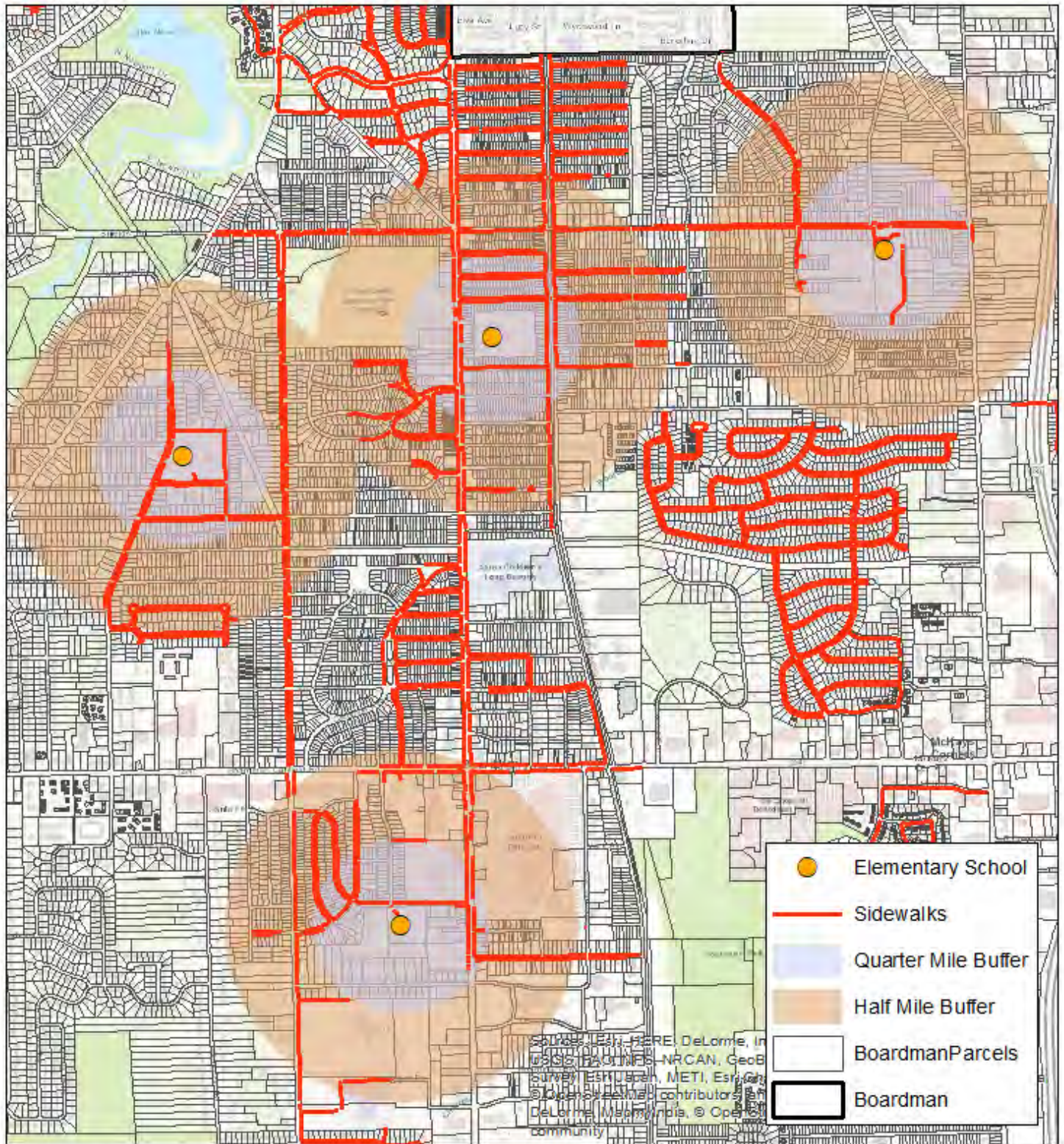


Prepared by: The Center for
Urban and Regional Studies
Youngstown State University
Source: Mahoning County
Enterprise GIS files, ODOT

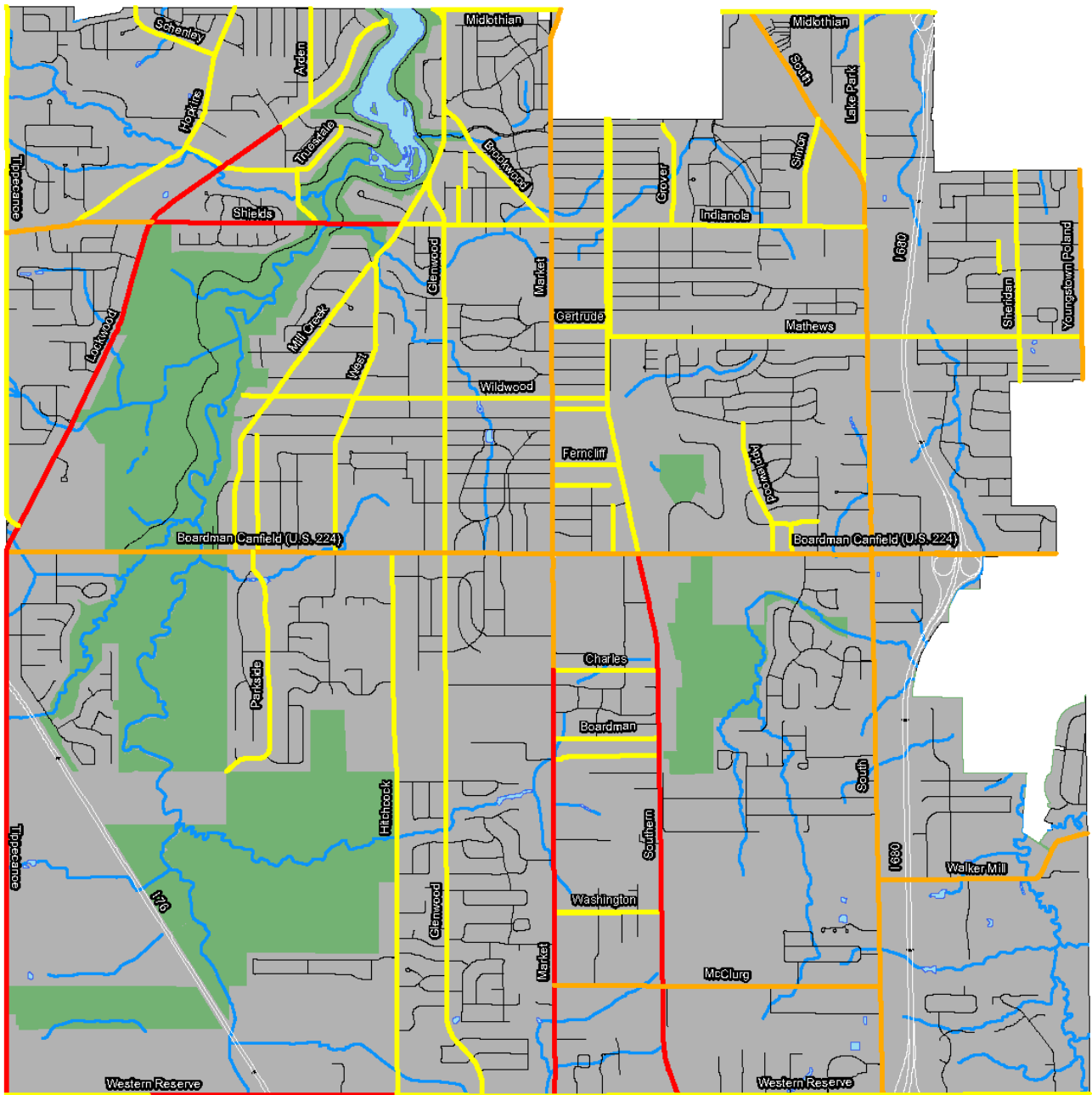
3/9/2018 8:45 AM



Elementary Schools with sidewalks, Boardman Township



Boardman Township



Legend

25mph	Stream/River		
35mph	Lake/Pond		
40mph	Park		
45mph	Boardman Twp		



Boardman Schools: Crash Map

Legend

- Boardman Schools
- 1/2 Mile Buffer
- 1 Mile Buffer
- 2 Mile Buffer

2017 Crashes

- Crashes
- Pedalcycles
- Pedestrian

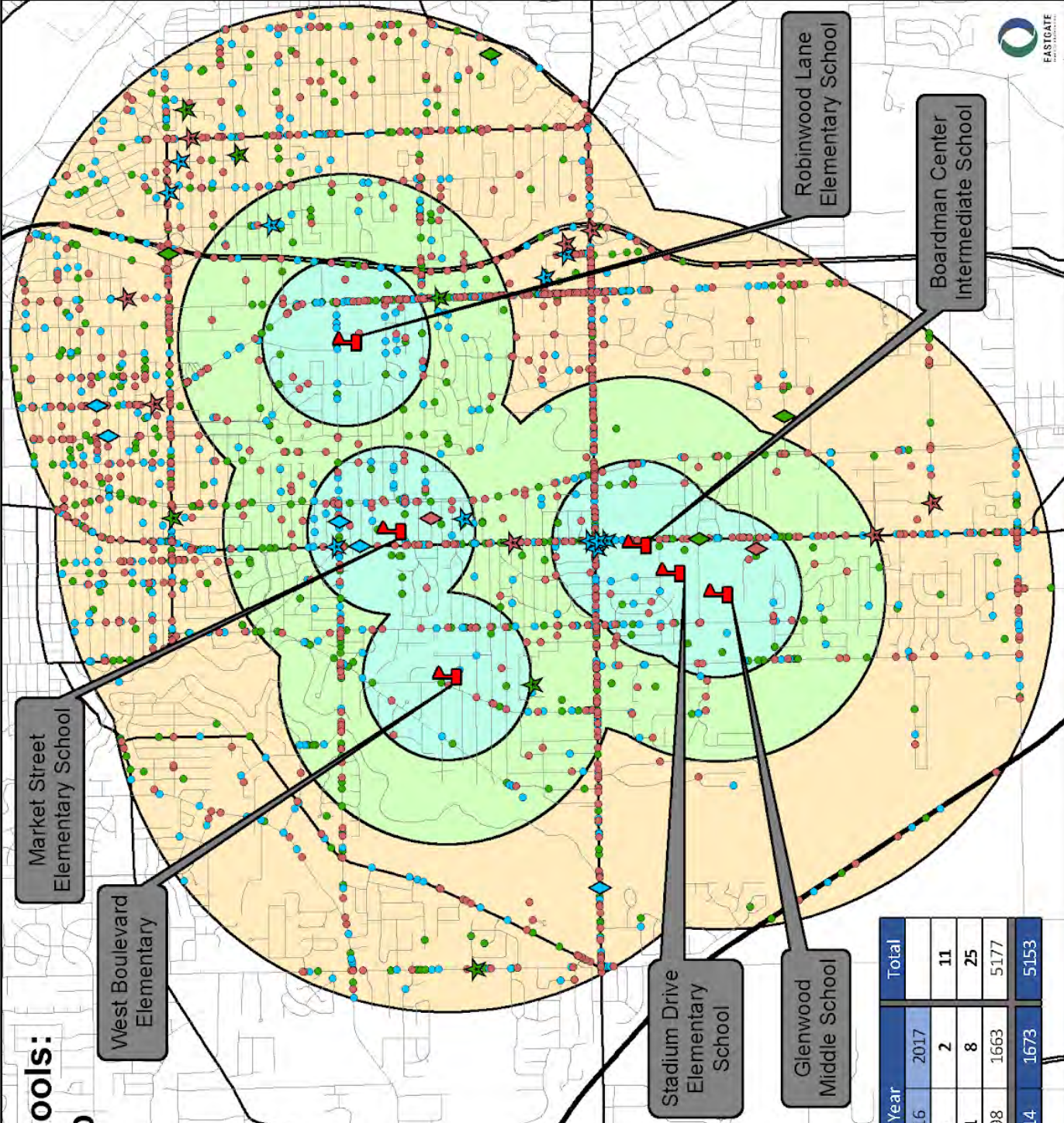
2016 Crashes

- Crashes
- Pedalcycles
- Pedestrian

2015 Crashes

- Crashes
- Pedalcycles
- Pedestrian

0 0.5 1 Miles

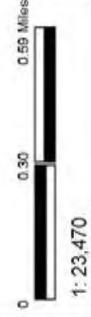


Crash Type	Crash Year			Total
	2015	2016	2017	
Pedalcycles	4	5	2	11
Pedestrian	6	11	8	25
Other	1756	1698	1663	5117
Total	1766	1714	1673	5153



Legend

- NR Public Listings
 - Listed
 - National Historic Landmark
 - Delisted
- Dams
- UTM Zone Split
- NR Boundaries
- Highways
- Cities
- Counties



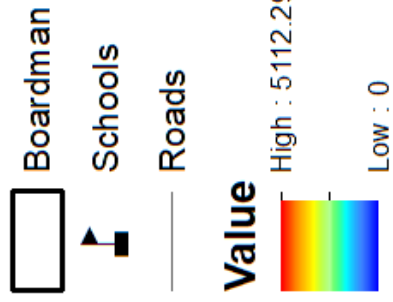
Copyright/Disclaimer

This map is a user generated static output from an internet mapping service and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

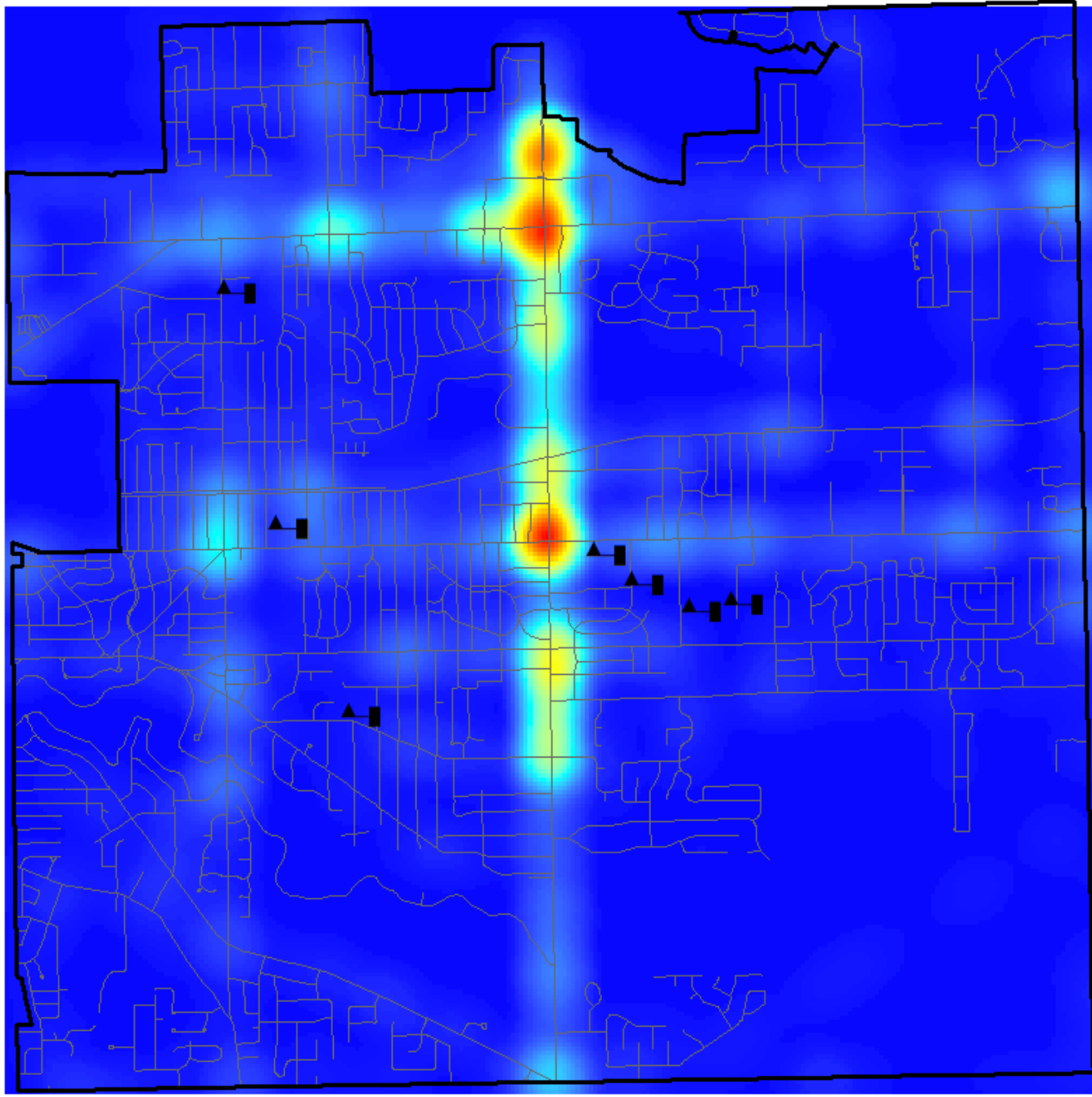
Datum: [Datum]
 Projection: WGS_1984_Web_Mercator_Auxiliary_Sphere



Vehicle Crashes Boardman Township 2015-2017

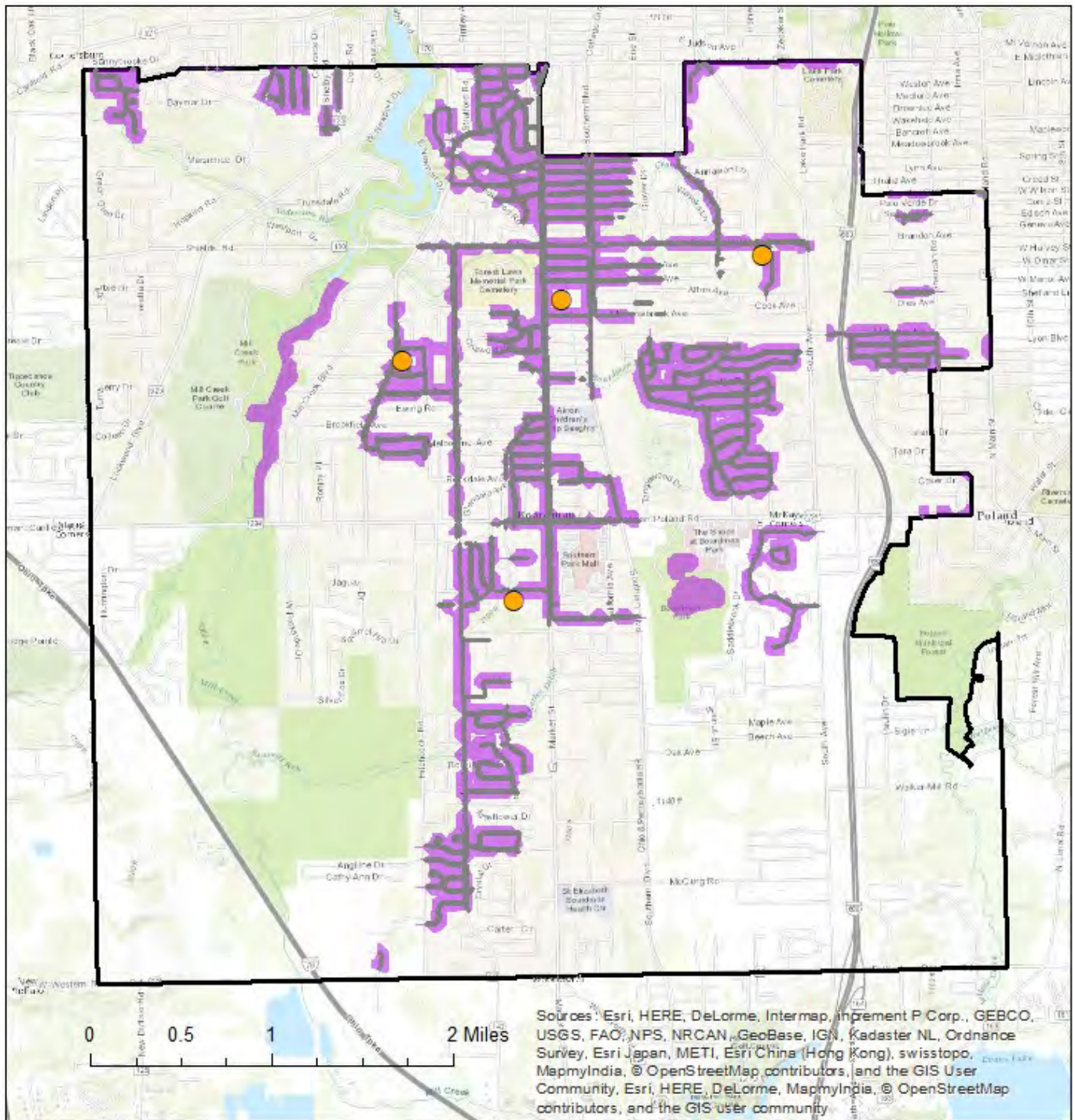






1.5 Miles



Created By: Tricia D'Avignon Source: Eastgate Regional Council of Governments, 2017

Walkable Areas in Boardman Township

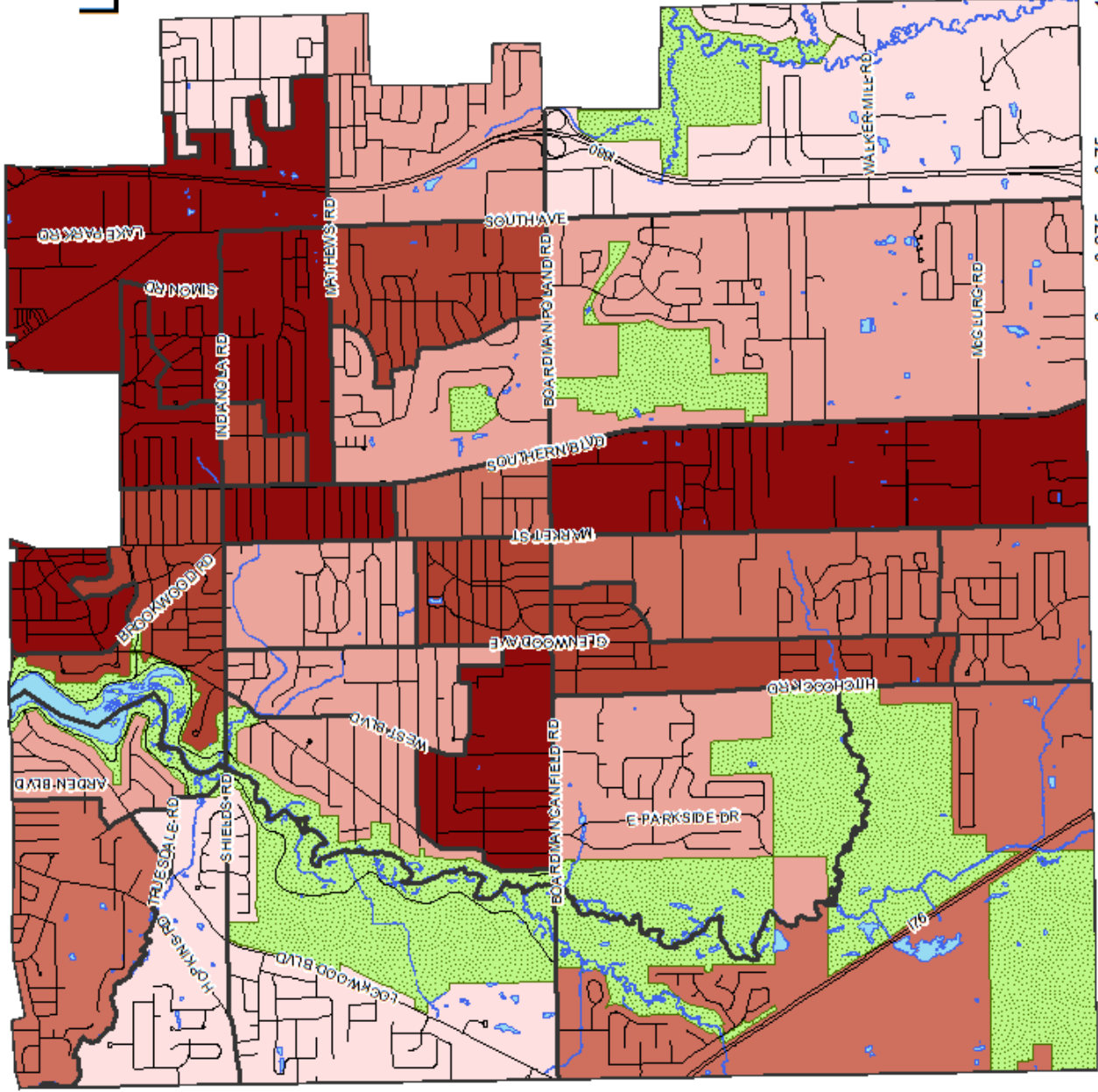


-  Elementary School
-  Sidewalks
-  Walkable Zones
-  Boardman



Created by: Tricia D'Avignon
 Source: Eastgate Regional Council of Governments, 2017

2014 Percent Living in Poverty



Park

2014 Poverty

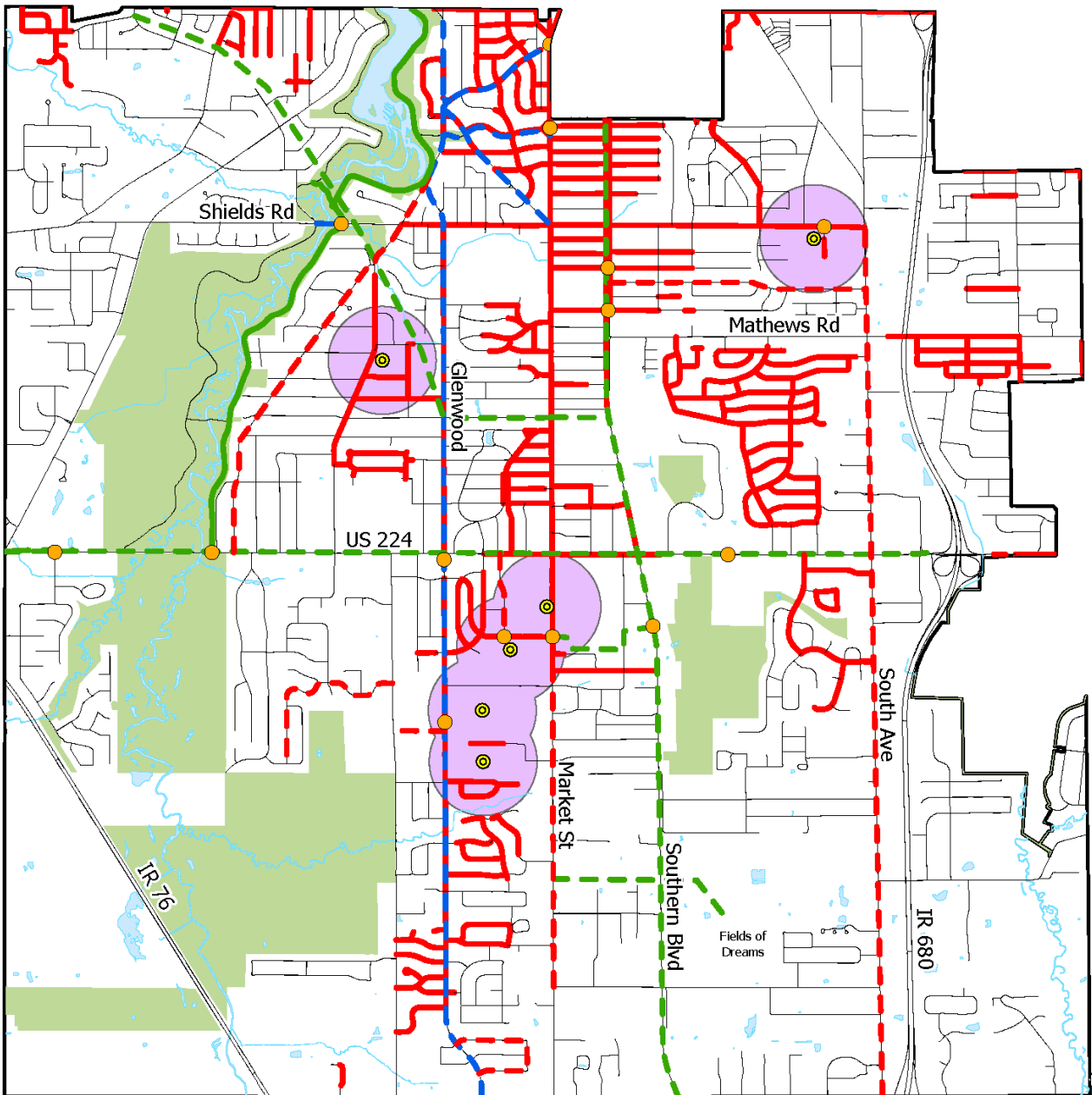
- 0% - 2.3%
- 2.4% - 6%
- 6.1% - 10.5%
- 10.6% - 14%
- 14.1% - 22.7%

Source: U.S. Census

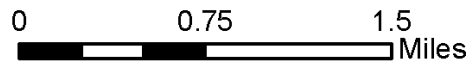


0 0.375 0.75 1.5 Miles

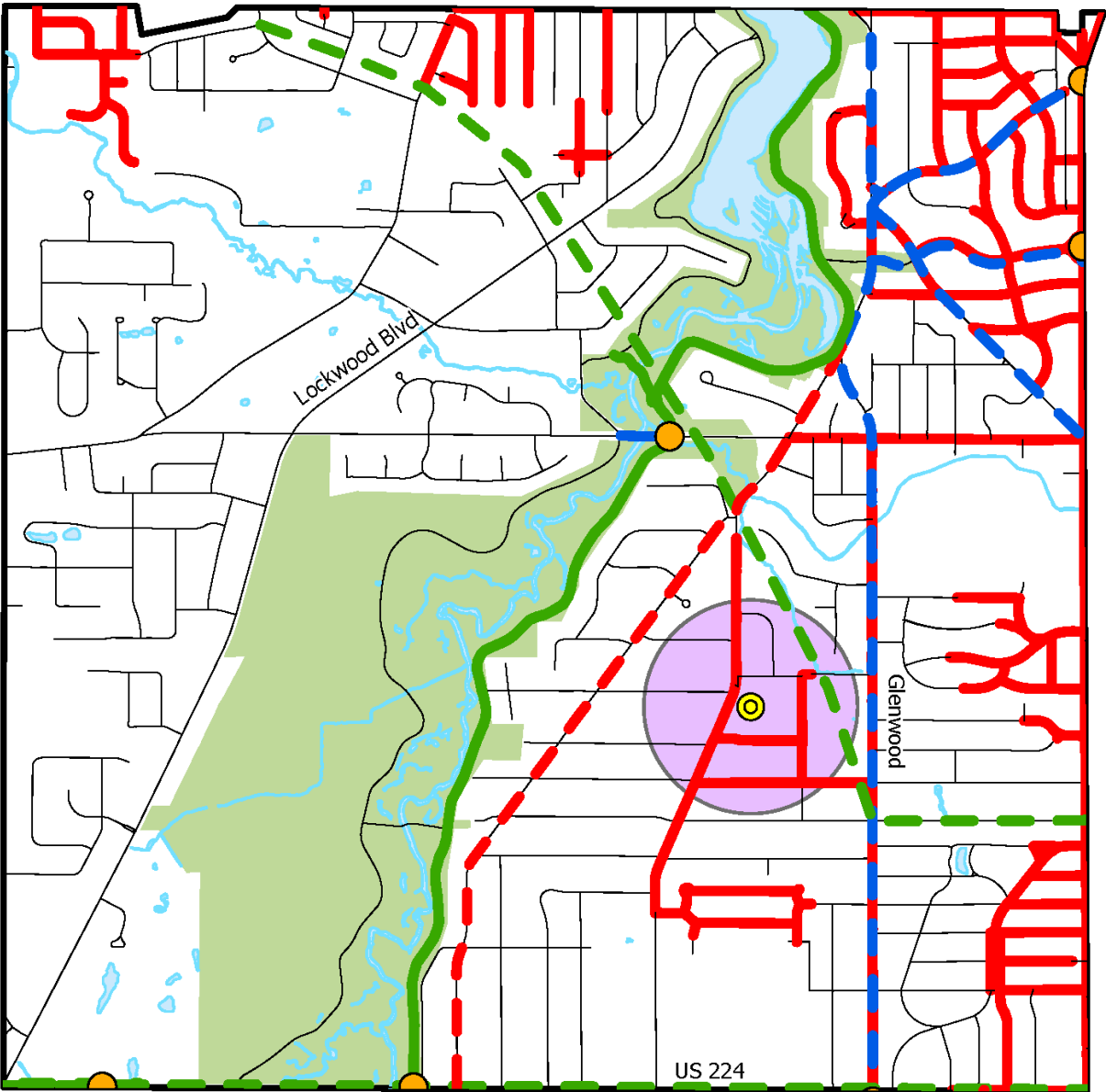
Boardman Township: Active Transportation Plan



- ⊙ Boardman Schools
- Proposed Crosswalk Improvements
- Existing Multimodal Trail
- - - Proposed Multimodal Trail
- Existing Bike lane
- - - Proposed Bike lane
- - - Proposed Sidewalk
- Existing Sidewalks
- Parks
- 1/4 Mile Buffer



Boardman Township: Active Transportation Plan



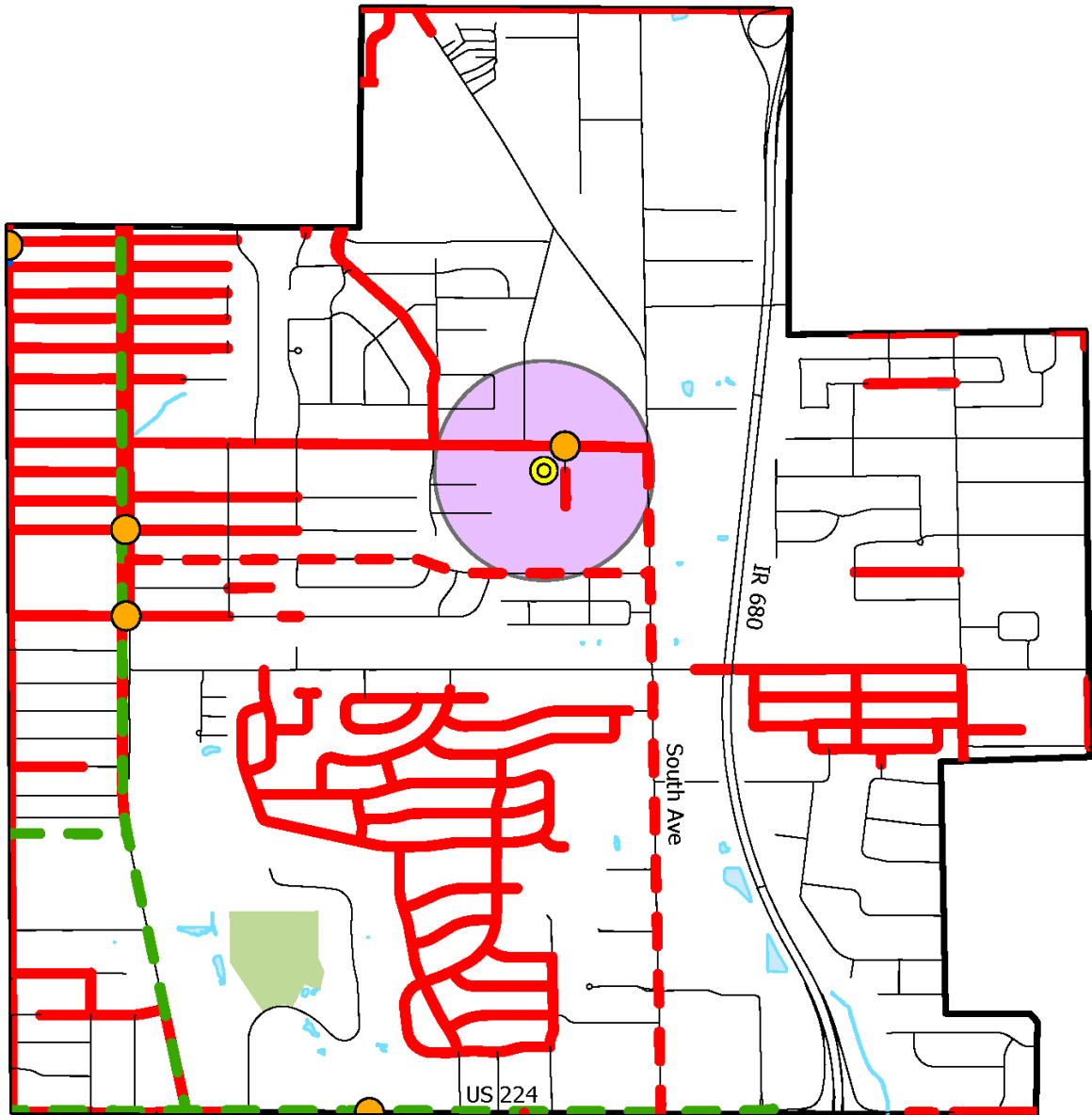
- Boardman Schools
- Proposed Crosswalk Improvements
- Existing Multimodal Trail
- - - Proposed Multimodal Trail
- Existing Bike lane
- - - Proposed Bike lane
- - - Proposed Sidewalk
- Existing Sidewalks
- Parks
- 1/4 Mile Buffer



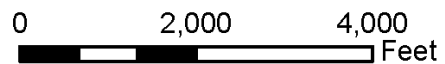
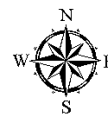
0 2,000 4,000
 Feet



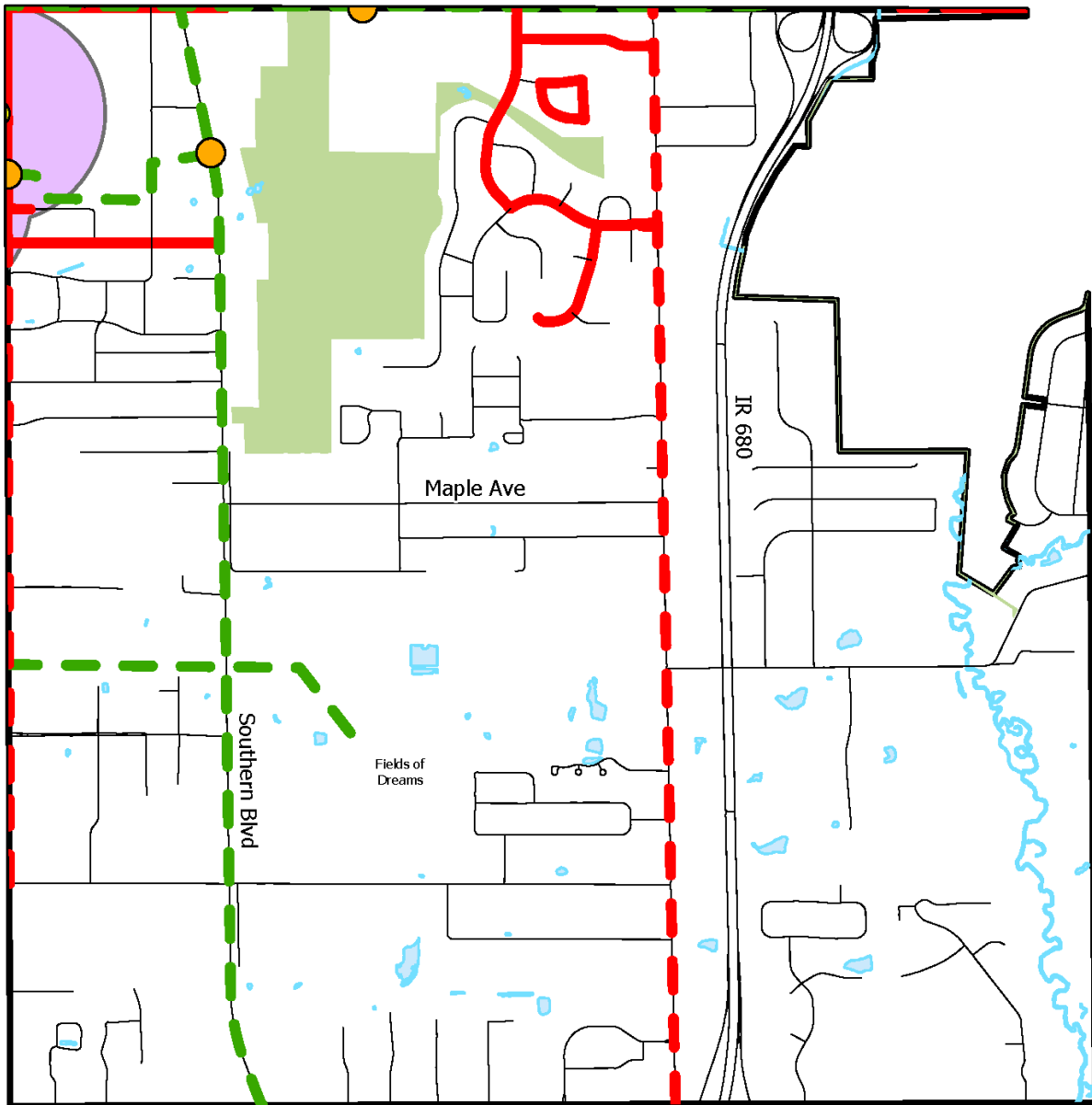
Boardman Township: Active Transportation Plan



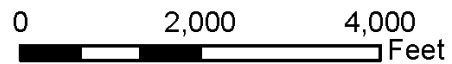
- Boardman Schools
- Proposed Crosswalk Improvements
- Existing Multimodal Trail
- - - Proposed Multimodal Trail
- Existing Bike lane
- - - Proposed Bike lane
- - - Proposed Sidewalk
- Existing Sidewalks
- Parks
- 1/4 Mile Buffer



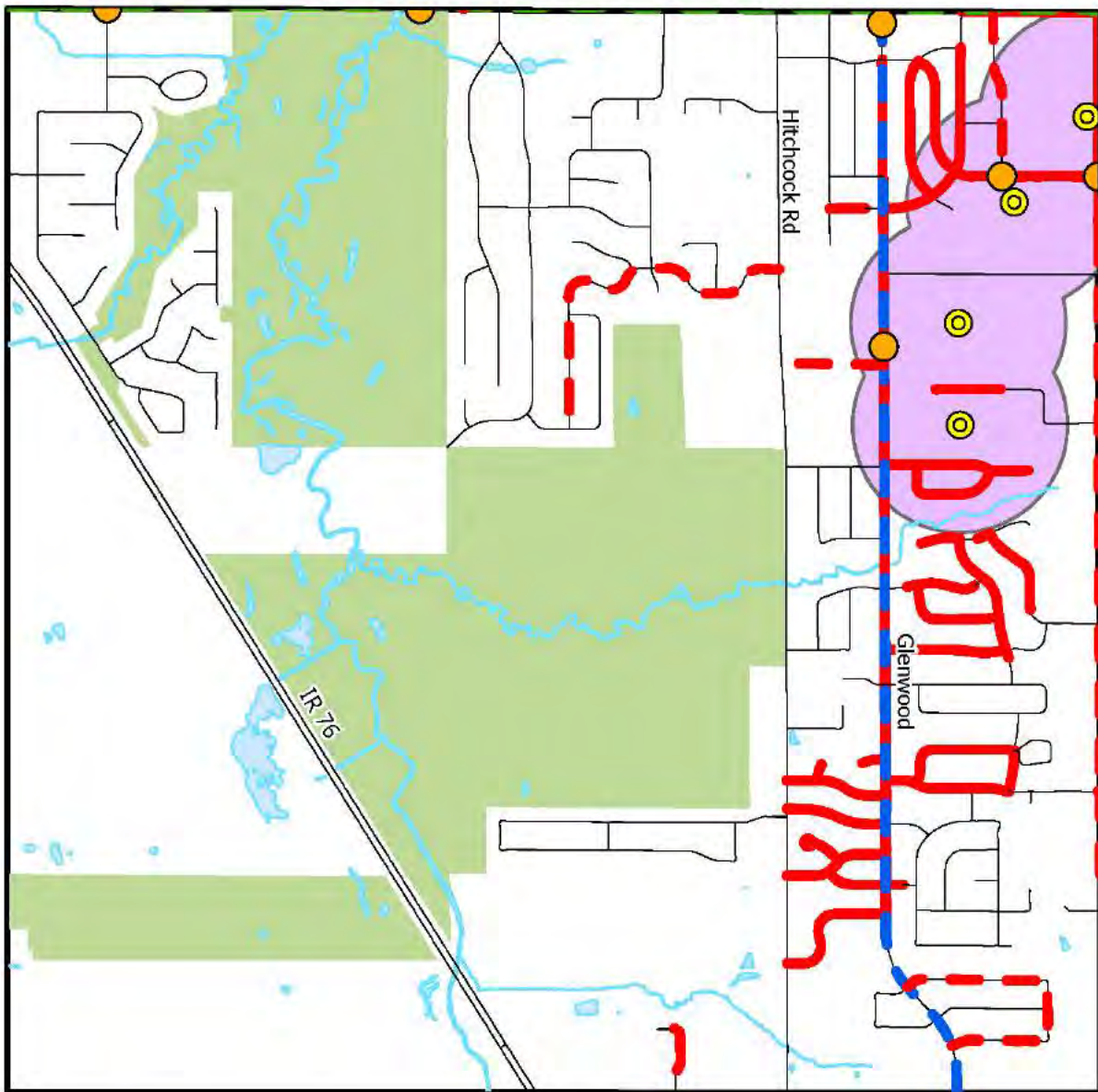
Boardman Township: Active Transportation Plan



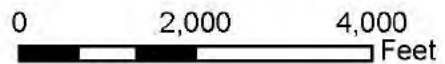
- ⦿ Boardman Schools
- Proposed Crosswalk Improvements
- Existing Multimodal Trail
- - - Proposed Multimodal Trail
- Existing Bike lane
- - - Proposed Bike lane
- - - Proposed Sidewalk
- Existing Sidewalks
- Parks
- 1/4 Mile Buffer



Boardman Township: Active Transportation Plan



- ⊙ Boardman Schools
- Proposed Crosswalk Improvements
- Existing Multimodal Trail
- - - Proposed Multimodal Trail
- Existing Bike lane
- - - Proposed Bike lane
- - - Proposed Sidewalk
- Existing Sidewalks
- Parks
- 1/4 Mile Buffer



APPENDIX B

**COMPLETE
STREETS
DESIGN
GUIDELINES**



ROAD STYLES

Complete Streets are roadways designed to be safe for all users, including pedestrians, cyclists, public transit riders, and motor vehicles. Complete Streets also focuses on assuring that sidewalks are ADA compliant and that wheelchair users are able to access the public amenities. Attention is paid to where pedestrian-activated buttons are located in relation to the sidewalk, sidewalk drop offs, and require the installation of tactile pavers to aid the visually impaired.

Complete Streets are the basis for strong, healthy and resilient communities, with their focus on walkability and bikeability, they allow residents to lead a more active lifestyle.

DESIGN GUIDELINES

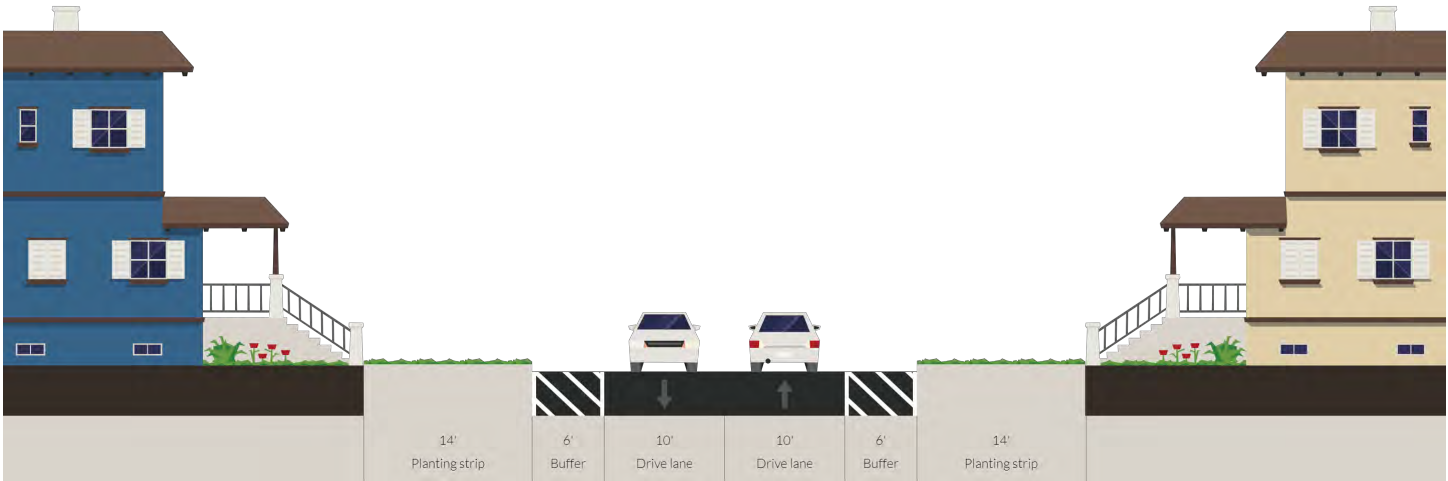
While many municipalities establish design guidelines for downtown areas, business districts, or neighborhoods, these design guidelines are general and adaptable to a variety of implementation variations.

All of the previous infrastructure improvements in this plan have been related to the overall vision of building a safe community of complete streets, however this specific section deals directly with the design standards of these same elements.

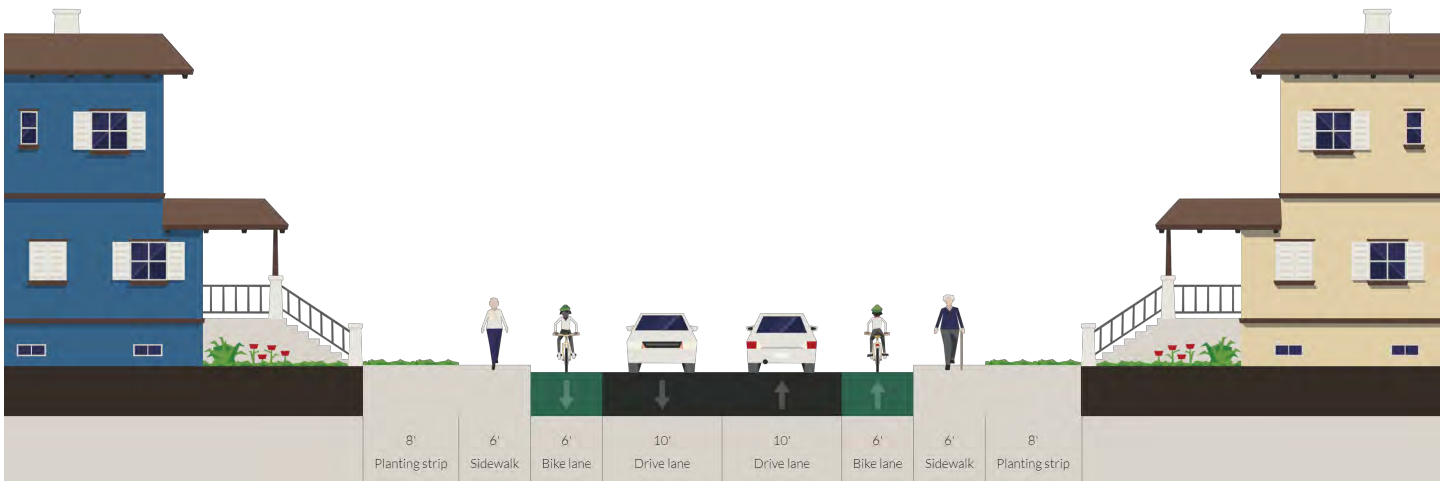
In many locations, we are limited in what changes can be implemented. These limitations are either due to a lack of road maintenance (either maintained by Mahoning County or the Ohio Department of Transportation), or due to a lack of right-of-way on a road.

Definition of Complete Streets is from [Smart Growth America](#).

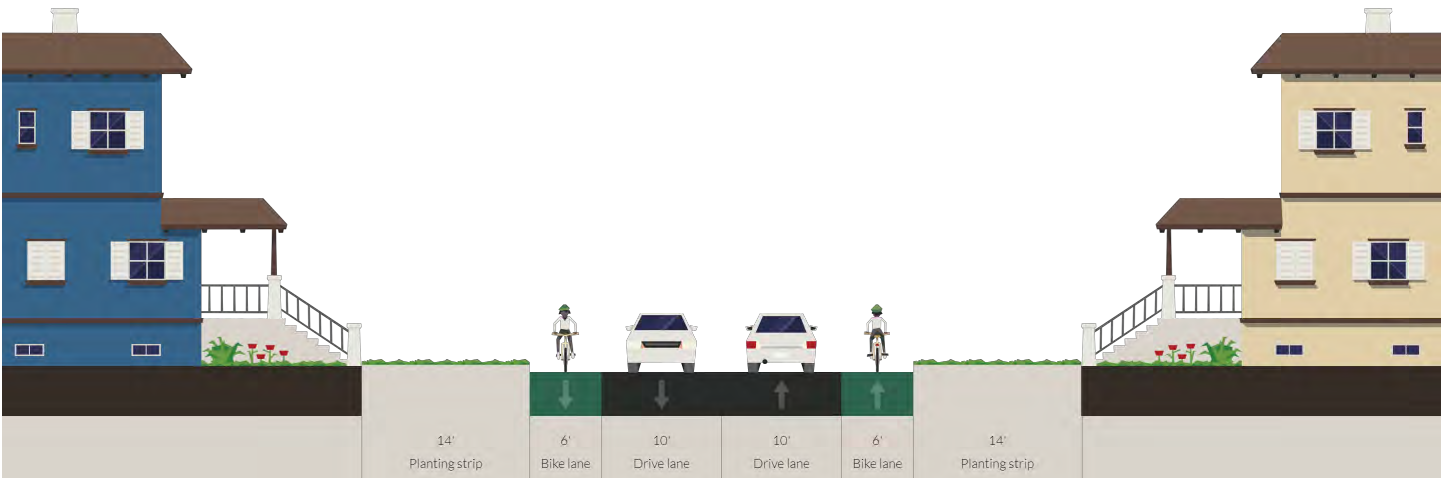
BROOKWOOD OPTIONS



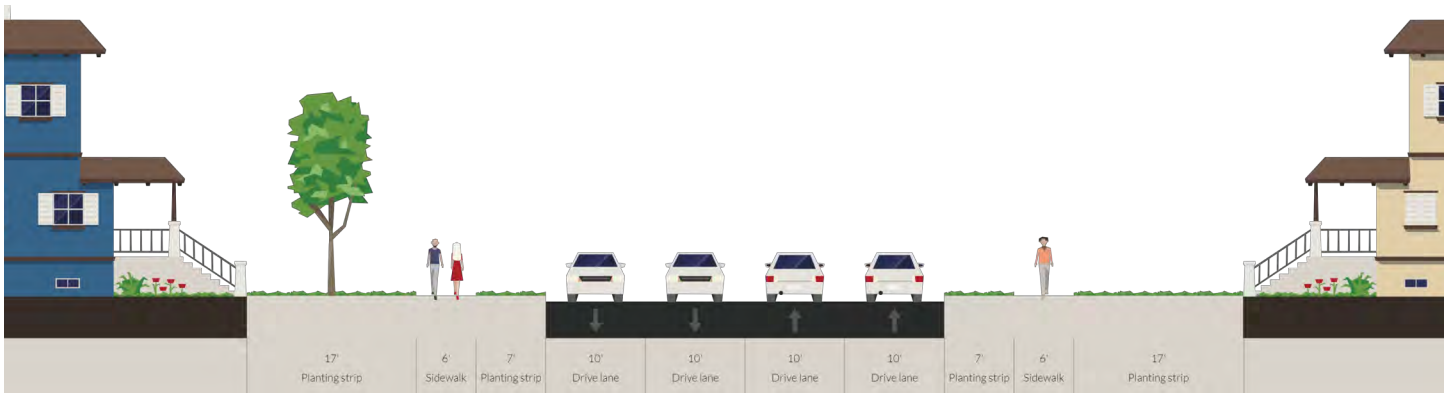
Brookwood Road, current.



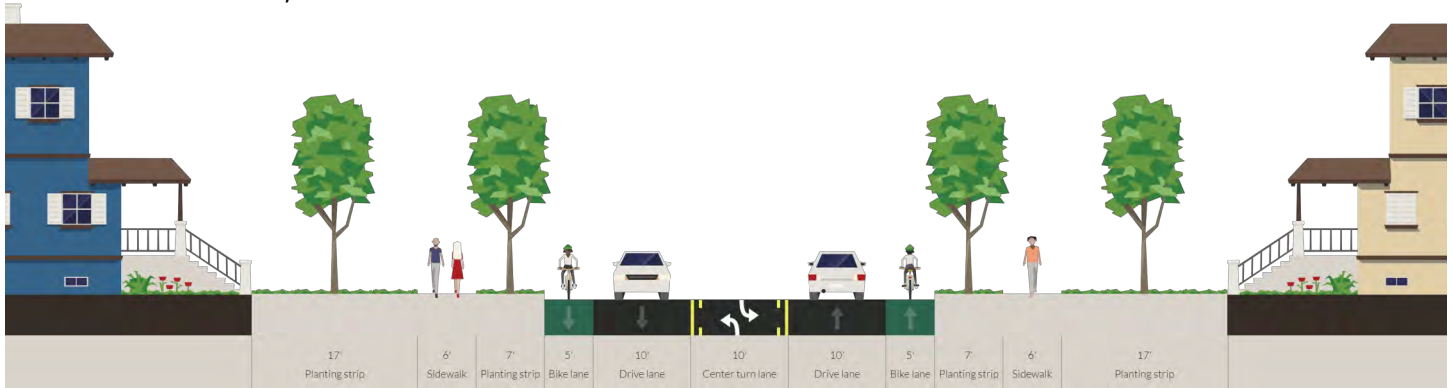
Brookwood Road, remix. Complete Street



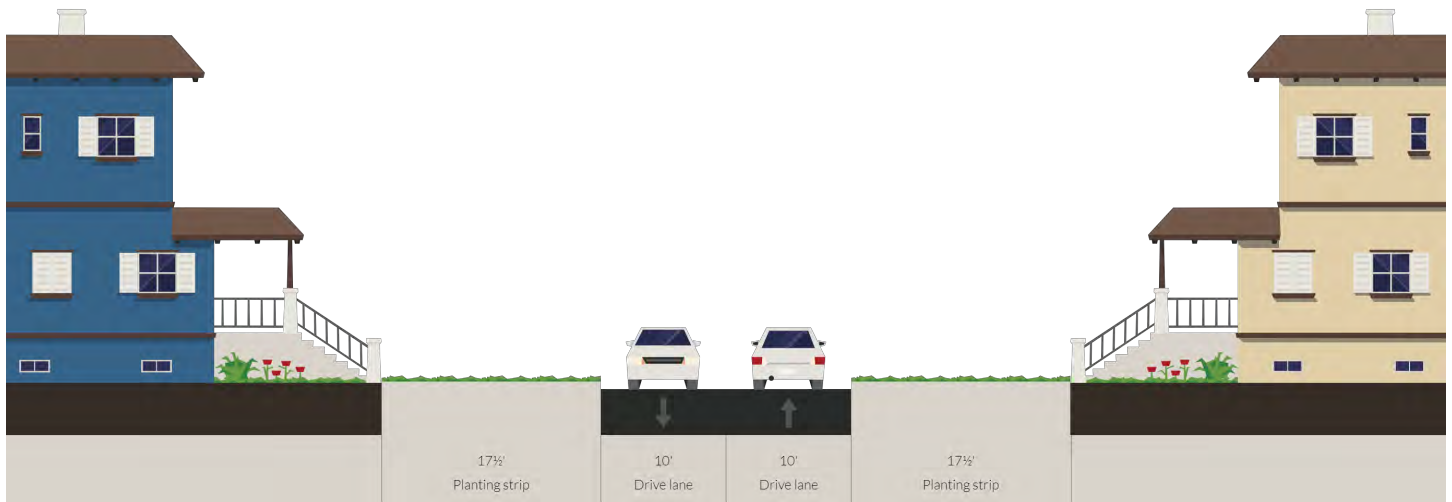
Brookwood Road, remix (alternative)



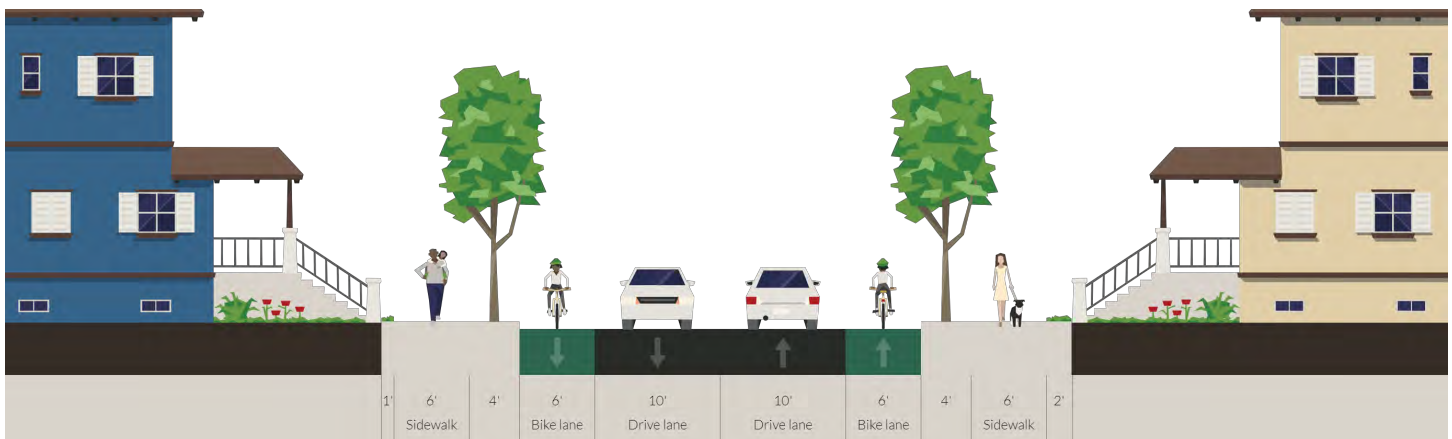
Glenwood Avenue, Current.



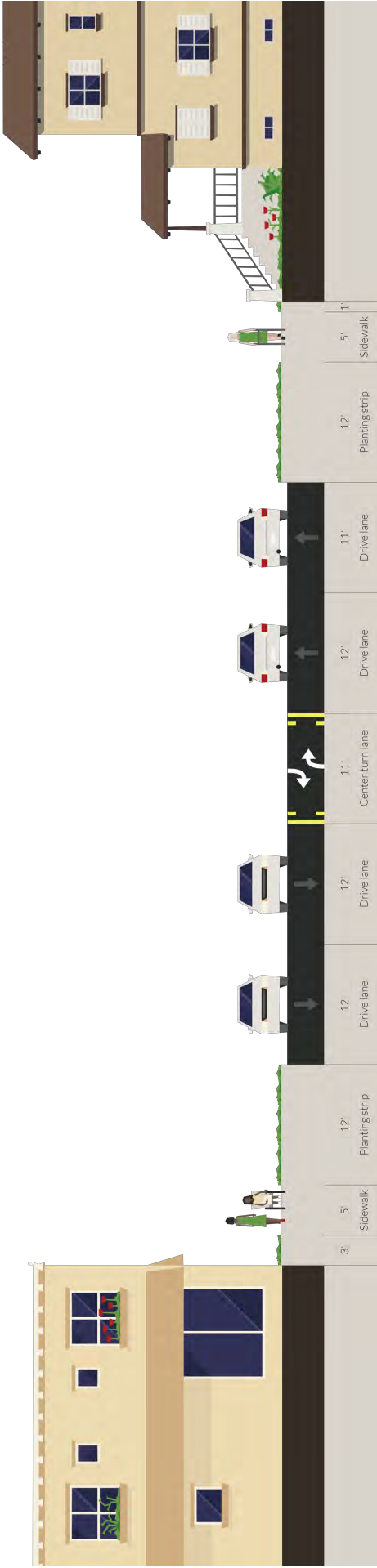
Glenwood Avenue, Remix. Complete Street



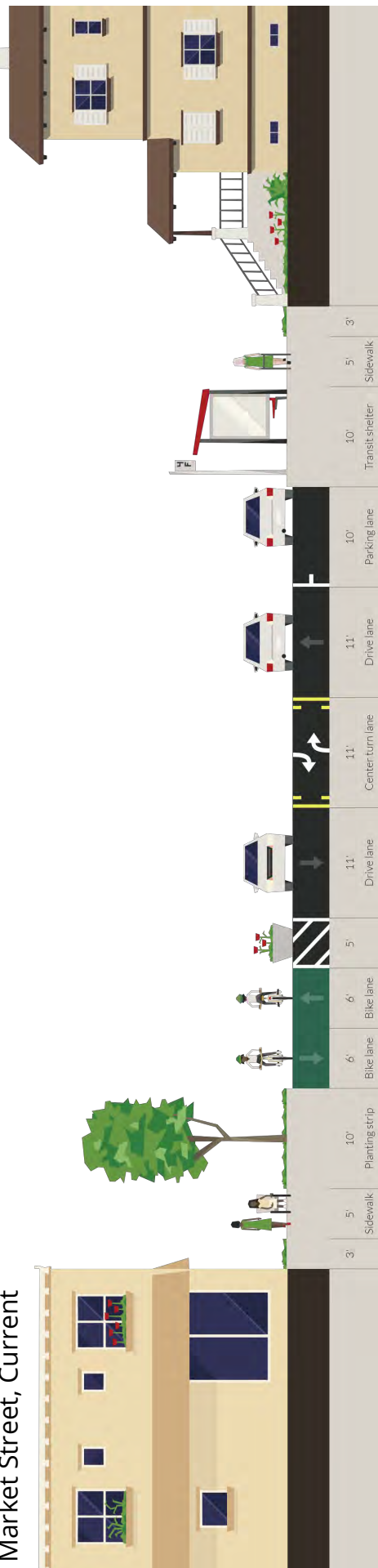
Hitchcock Road, current.



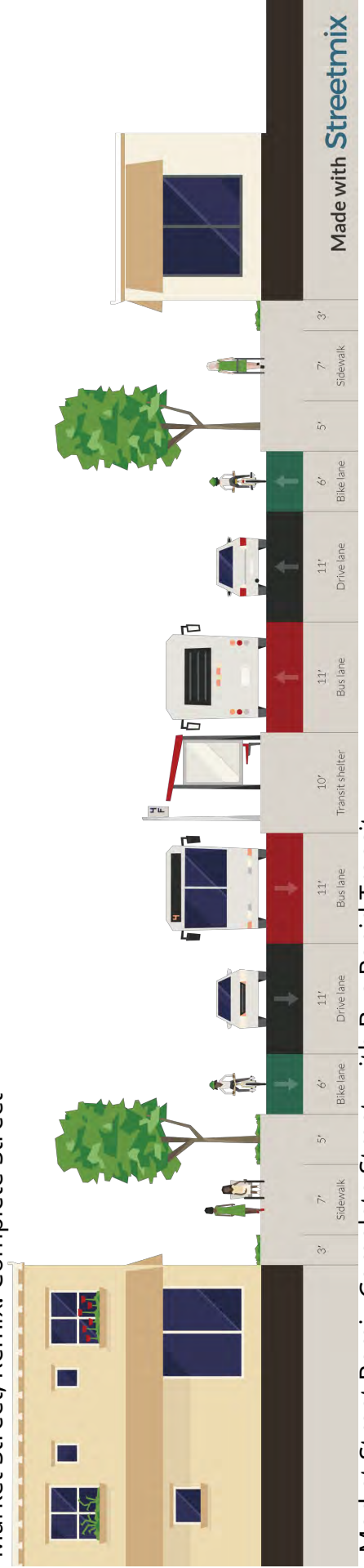
Hitchcock Road, Remix. Complete Street



Market Street, Current

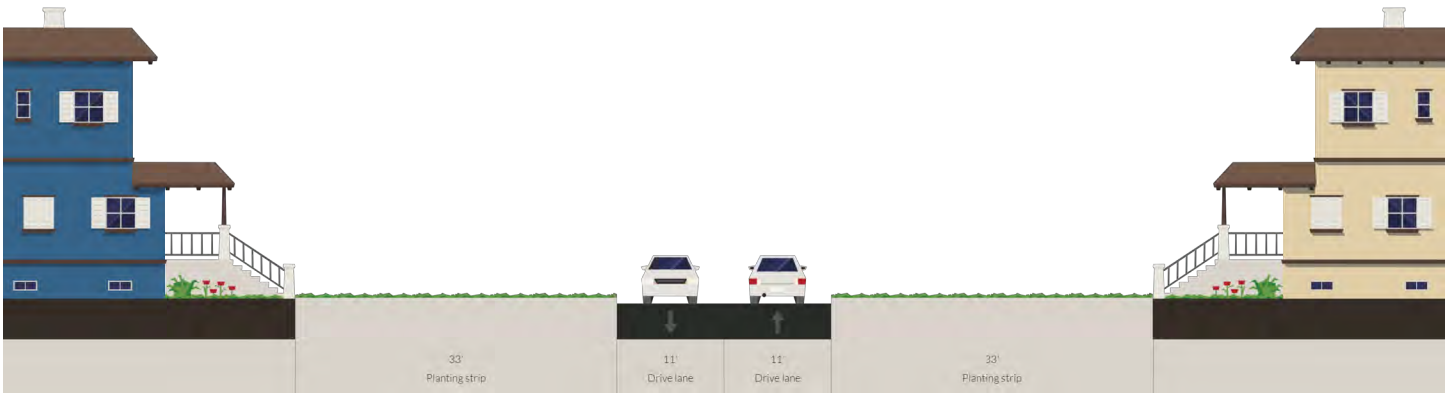


Market Street, Remix. Complete Street

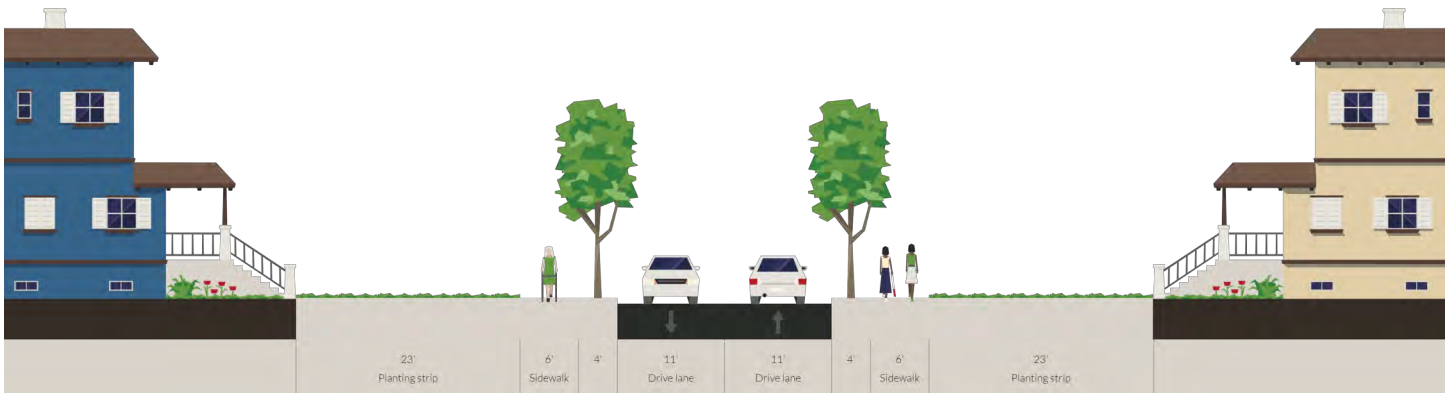


Market Street Remix Complete Street with Bus Rapid Transit

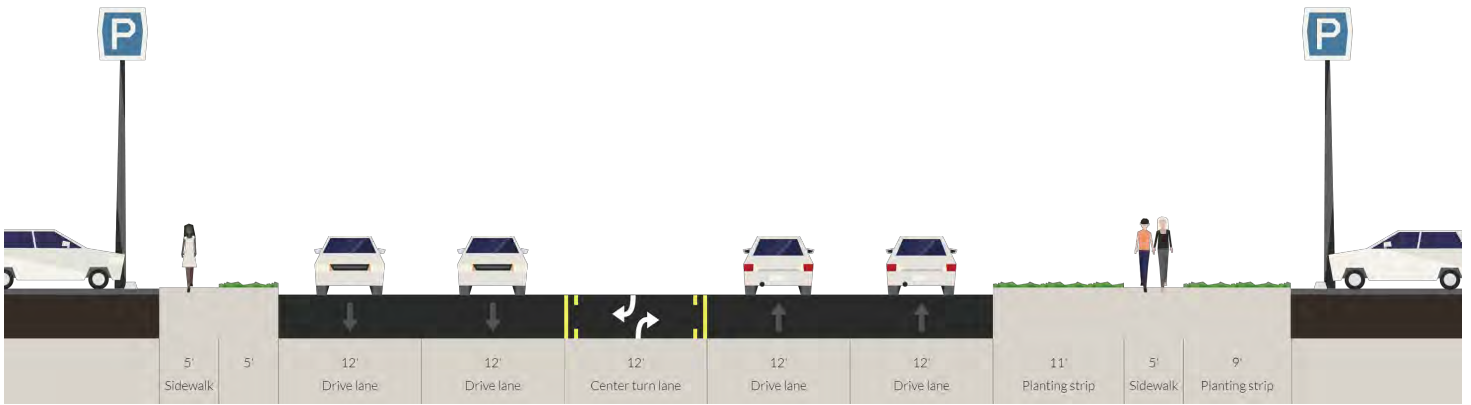
Made with Streetmix



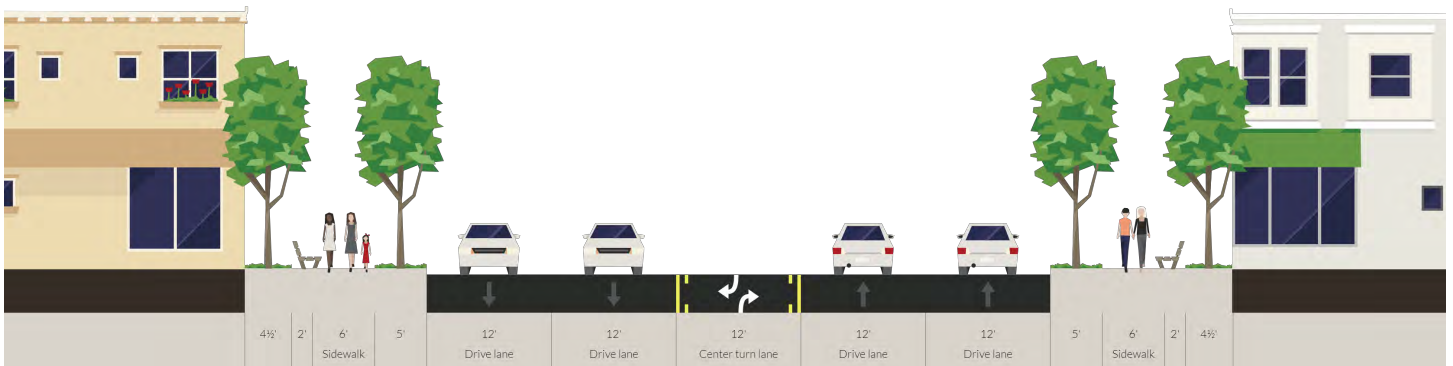
Mill Creek Blvd., Current.



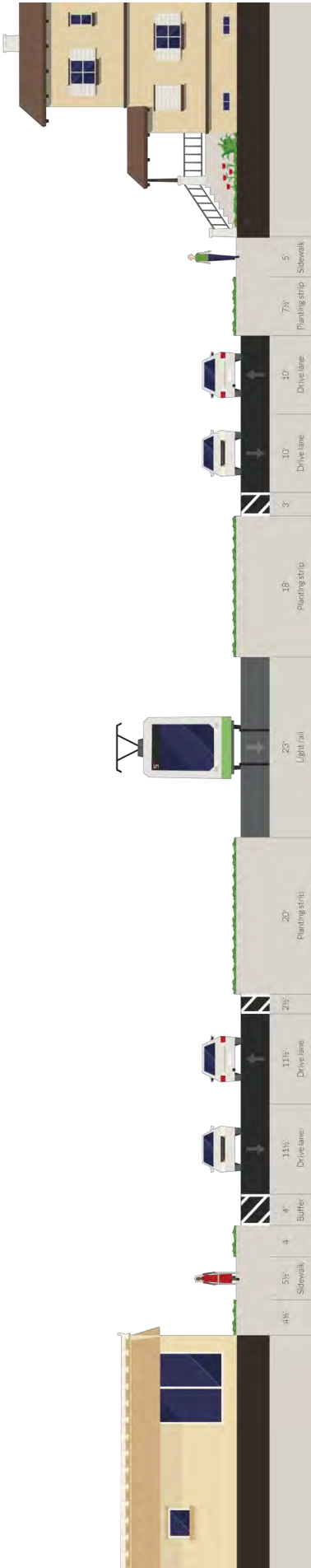
Mill Creek Blvd., Remix.



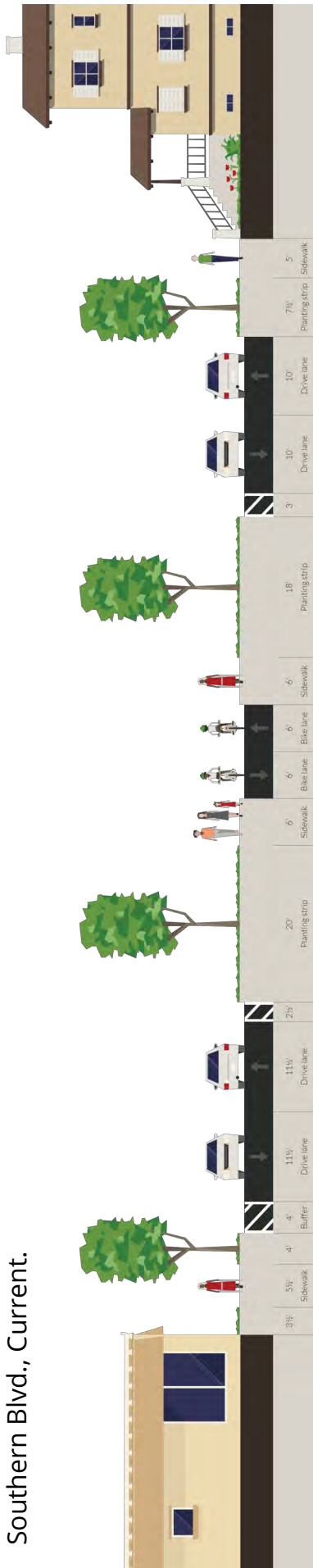
US 224 at Claybourne and Amhurst, Current.



US 224 at Claybourne and Amhurst, Remix.



Southern Blvd., Current.



Southern Blvd., Remix.

A photograph of a residential street. In the foreground, a gravel path leads from the bottom center towards the middle ground. The path is flanked by green grass. In the background, a paved road curves to the right. Beyond the road, there is a grassy area with a house, trees, and a black car parked on the right side.

APPENDIX C

**PUBLIC
COMMENTS**

“My neighborhood has a lack of sidewalks and therefore no photo. Both N. Cadillac Drive and S. Cadillac Drive lack sidewalks, and it is dangerous since most vehicle traffic speed on these streets. It is not unusual to see many motorists travel 40 - 50 mph. "Pedal to the metal." Many motorists use this as a way to by-pass heavily congested areas and avoid traffic signals. It is dangerous to walk and ride on these streets. We have many walkers, bikers, and strollers utilizing the area for exercise and to access the Dairy Queen located at the intersection of Market Street and Cadillac Blvd.

During childhood, I did live on a street in Boardman which had sidewalks and it was wonderful. We never worried about being struck by a car. “

It would be such a selling point for new residents and existing ones too if there were a sort of Boardman Greenway, with mileage marked, with benches at regular intervals, shade trees, and sidewalks wide enough for a stroller or two or three people walking their dogs. There could be fitness activities, walking or running groups, and more.

As a nation in which half of us will be sixty or older by 2030, these sorts of investments in the community will have the added benefit of helping us all stay healthy and be independent for longer too. I am soon turning the corner on a new decade and also walk 4-7 miles daily usually. A Fitbitter for over seven years, I'm approaching 10,000 miles of walking.

Anyway, now I'm just dreaming, I know. Easy to dream, more difficult to accomplish the nitty gritty details.

“Who is responsible for fixing sidewalks? Someone told me it is the responsibility of the homeowner.”

“aren't the sidewalks the responsibility of the homeowner? therefore, if i send you a picture of my crumbling sidewalk, i will be responsible now to fix it if it is deemed a nuisance?? “

Thank you. My only sidewalk issue is that there are none anywhere near our new home. It is a shame that Boardman is decidedly pedestrian unfriendly. It was one of the definite appeals of Poland when we were attempting to move there that so much of Poland Village has sidewalks.

I moved to 855 Mayfield Drive 44512 in May 2017 from Fredericktown, north of East Liverpool. We had no sidewalks in Fredericktown as it is a 19th century unincorporated village. I was really hoping for them when we moved. Instead, the only sidewalks I can think of near us are the ones found in area shopping plazas along Route 224. There are none in our neighborhood, none along McClurg, South Avenue, Southern Blvd, Market Street, or Western Reserve Road.

So here's to a more pedestrian friendly Boardman!

“Our development (Huntington Woods) doesn’t have sidewalks and along the edge of the streets the pavement is broken up. It makes it difficult to walk with a stroller or ride a bike and most runners run in the middle of the street which presents some safety concerns. The street dept needs to look into repairing our streets, which were made worse by recent flooding.”

“My concerns are a part of the initiative about “issues that affect health and well-being”. I love where I live.

Having pedestrian access (Perhaps installing pedestrian lights at busy intersections might also help.) to cross Rte 224 or South Ave, then walk nearby safely, would be helpful for shoppers as well as for out of town guests at hotels; who prefer to walk to a local restaurant or store.

Posting signs that state : “Pedestrians Have the Right of Way” would be a great reminder to those drivers who do not have common sense courtesy. “

“I Forestlake the sidewalk ends at each intersection. Homes on corners do not have sidewalks.”

COMMENTS ON “CONNECTING BOARDMAN”
BOARDMAN TOWNSHIP’S ACTIVE TRANSPORTATION PLAN
DRAFT VERSION, 2019

Frank Krygowski, PE (retired)

I’ve thoroughly reviewed the draft copy of Boardman Township’s Active Transportation plan. There is much to like in the document, and I heartily agree with its objectives. I’ve penciled extensive notes into the printed copy I was given, which I’m returning. The following is intended to supplement and/or further explain some of my feedback.

Like many American suburbs, Boardman was populated by people seeking low density, who were happy to drive. Car culture caused Boardman to develop into a collection of spaghetti-like cul-de-sacs separated from almost all business and shopping. Accommodating non-motorized transportation is now difficult.

But there is an important and often unrecognized side effect of the car culture. As walking and especially bicycling grew more and more unfamiliar, they were labeled as “dangerous.” Bicyclists in particular are now told they must never ride without special hats, garish clothing and even daytime lights. They are told they need extreme segregation from all automobile traffic to be safe. Lately, they are told that if a car tire ever touches the surface where a bicyclist rides, that area is not safe enough. The result of this fear mongering has been a steady decline in bike riding, especially among children. Now almost no kids bike to school, and the typical bicyclist is upper-middle-aged. These bode ill for active transportation and public health.

None of this fear is justifiable by data! Bicycling is safer per hour than many common activities, like swimming. It is safer per mile traveled than pedestrian travel. Bicyclists comprise fewer than 1% of America’s brain injury fatalities. Bicycling has repeatedly been found to have benefits far greater than its tiny risks; this means on average, bicycling is safer than *not* bicycling. And many of the purported solutions - helmets, bright clothing, segregated bike lanes - have had at best only very questionable benefits.

Echoing the “Danger! Danger!” cries and the claims that protected bike lanes are absolutely necessary will kill the budget and prevent any real increases in bicycling for the foreseeable future. We should focus on publicity that points out the real safety of bicycling, and spend money on facilities only where really necessary.

Sidewalks: I’m strongly in favor of the provision of good quality sidewalks. I agree with prioritizing sidewalks to schools, in addition to prominent crosswalks, enforcement of speed limits, etc. **But** I’d also like to prioritize sidewalks connecting residential areas with shopping areas. South Avenue, especially north of 224, has quite a few walkers, and its entire length should have had sidewalks added when it was widened. 224 should have sidewalks on its north side from I-680 into Poland Village. 224 should have sidewalks on both sides over the Boardman Park hill, as well as connecting the various shopping centers. Indeed, anywhere there are worn tracks in the grass, there should be a sidewalk. Walking is *the* fundamental form of transportation.

Sidewalks for bicycling: In most instances where there is significant motor traffic, sidewalks are more dangerous than riding the street. This has been confirmed by several studies. Problems include drop-offs from bad edges, collisions with poles or other obstacles, crashes into pedestrians, etc. but the main danger is car-bike crashes. Motorists don’t notice bicycles moving faster than pedestrians, and hit them at intersections and driveways. Very young kids may be better on sidewalks, but in general, please don’t think of (or promote) a sidewalk as a bike facility.

Pedestrian refuge islands: I’d like to see much more emphasis on mid-way crossing refuge islands. The most challenging streets for crossing are easily 60 feet wide. Even if pedestrian green light phases were adequate, there are problems from right-on-red drivers. An island can be very valuable on many roads, and may sometimes alleviate the need for pedestrian crossing lights.

“Protected” bike lanes and other “innovative” solutions: In the last few years, organizations have popped up that demand barrier or parking “protection” for cyclists and other “innovative” ideas, claiming “bike lane stripes are not enough.” They frequently point to the Netherlands as their model. I strongly urge Boardman officials to employ extreme skepticism.

Members of this movement generated two well-known research papers using data from Canadian cities to tout the safety of “protected bicycle lanes,” either behind barriers or behind parked cars. But one paper was shown to have taken most of its data from a “protected” lane on a long bridge, where no intersection conflicts were present. The other compared “protected” lanes vs. normal traffic on supposedly equivalent streets, but other reviewers showed the streets in question were very different indeed, biased toward the new lanes.

By contrast, Columbus, Ohio installed a mile of “parking protected” bike lanes on Summit Street (north of OSU) in 2015. The car-bike crashes jumped from an average of 1.5 per year to over 12 per year. Bike traffic increased about 75%, but car-bike crashes increased over 700%, just as skeptics had predicted.

In 2007, Soren Jensen conducted a detailed before-after study of “protected” bike lanes in Copenhagen. Despite accounting for increased bike traffic lured by the supposed safety of the bike lanes, he found that users were at significantly increased risk of crashes.

Similarly, a “parking protected” bike lane was installed in bike-famous Davis, California in the 1960s, and a “barrier protected” bike lane in Columbus in the 1970s. Both were removed within a year because of greatly increased crashes. In essence, these segregated lanes work to reduce the very rare hit-from-behind crashes, but complicate traffic and generate confusion and crashes at intersections.

“Protected” bike lanes may be justified and workable on busy roads and perhaps on other roads where no crossing conflicts exist. But I think implementing one on, say, 224 between South and Southern would be a disaster. Given their cost and danger, the hype must be resisted.

AASHTO vs. NACTO: I strongly recommend following AASHTO guidelines, which are based on data on actual car-bike crashes, plus knowledge of traffic patterns. NACTO is based largely on what works in Netherlands, a flat country with a 100 year bicycling culture and unlimited bike facility budget. NACTO was actually founded and promoted by designers who felt restricted by the engineering aspects of AASHTO. But I feel strongly that ordinary citizens should not be subjected to undisciplined experiments. Traffic design should be conservative, not surprising.

Sharrows: Those pushing fancier bike facilities have demeaned sharrows. (I’ve attached my online review of one rather terrible paper demeaning sharrows.) But data by FHWA and even by the skeptic Ferenchak have found modest benefits, and there are lots of reports of rider satisfaction with them. Practically speaking, there are plenty of streets in America where bike lanes are impractical, and sharrows seem to do a reasonable job of alerting motorists to riders. I would not discount them.

Alternate routes: *East-West access is difficult for Boardman bicyclists.* I’ve attached a map highlighting various bicycling routes I’ve used when I wanted to avoid the busiest roads. Perhaps the best example is accessing the Mall via McKay Court, the back edge of the Shops at Boardman Park’s lots, and Boardman Park itself. Another is accessing Mill Creek Park via Afton and Erskine, passing through Forest Lawn Cemetery. I know these can’t be declared “official” routes due to property issues, but perhaps routes like this could be developed and provided with way-finding signs. Might there be enough right-of-way along Drake Run to connect South Avenue to Southern Blvd. with a separate bike/ped trail?

(The Shops at Boardman Park actually have, or had, “No Bicycling” signs. While I’ve never seen a hint of enforcement, that is terribly counterproductive. Instead, shops should have bike racks!)

My Qualifications: I’ve been involved with bicycling and bike safety for many decades. I’ve been Safety Chairman of the local Out-Spokin’ Wheelmen bicycle club since approximately 1990 (having also served as President, Vice President, Ride Captain etc.) and I’ve been a board member of the Ohio Bicycle Federation for perhaps 15 years. I was nationally certified as a cycling instructor by the League of American Bicyclists in the early 1990s, and I’ve taken at least three different cycling classes myself and taught many more.

I have a large library of books and research papers on bicycling. I’ve written many articles on cycling and bike safety, and contributed to two well respected books on bicycling.

My personal experience includes decades of commuting and utility riding, recreational riding, long-distance touring both here and in about 12 other countries, including one self-guided coast-to-coast bicycle tour with my wife and daughter.

I am a Professor Emeritus of Engineering Technology at YSU.