

CITY OF BIG RAPIDS
**BICYCLE AND
PEDESTRIAN PLAN**

DECEMBER 2012



SMALL
TOWN
STUDIO

BICYCLE AND PEDESTRIAN PLAN

CITY OF BIG RAPIDS

BY SMALL TOWN STUDIO - FALL 2012:

(UNDER TUTELAGE OF ASSISSTANT PROFESSOR PAUL LONG)

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EXECUTIVE SUMMARY 01

A BRIEF OVERVIEW OF THE PROJECT AND FINAL RESULTS

By COURTNEY PARKS

Big Rapids, Michigan is a community rich with assets. The beautiful Muskegon River runs through the city, and the scenic Riverwalk running alongside it provides a recreational destination for all. A historic downtown with locally owned businesses, such as a butcher shop and a local barber, bring the community together. Big Rapids blends the arts, recreation, and culture offered in larger communities with a family environment to create a city in which people can live, visit, or raise a family.

As of right now, the community is dependent upon the automobile. Every person needs an alternative to driving, whether it's because automobile use is expensive or the health of the public needs to be improved. In Big Rapids, the mixed population of city residents and Ferris State University students can both benefit from having alternate transportation options. Research was conducted to take a deeper look at Big Rapids to decipher what could be done to help improve the community's options of walking and bicycling. First, the demographics were analyzed to determine the social and economic makeup of Big Rapids, before looking at physical infrastructure.

To give a starting point for researching the city, the physical infrastructure of a city can be looked at from a "Kevin Lynch" perspective. Kevin Lynch, an American Urban Planner in the late twentieth century, laid out definable terms for the "image" of a city. The "image" of a city, according to Mr. Lynch includes paths, edges, districts, nodes, and landmarks. By defining each concept in accordance with the city of Big Rapids, strengths and weaknesses were uncovered. The city became easier to define and specific issues were mapped, such as where sidewalks, parking, and stop signs are. Looking at these elements in a broader sense on an overall map helps to determine visually where pedestrian and bicycle connections need to be made. The need for a master bicycle and pedestrian plan is apparent for the city of Big Rapids.

The Big Rapids Bicycle and Pedestrian Plan is a significant step toward incorporating bicycles and pedestrian paths into the planning, infrastructure, and culture of Big Rapids. The plan outlines suggestions of exactly how different arterial and connecting paths in Big Rapids should look. It is then followed by policies to uphold the plan and potential funding opportunities to give an idea of how this plan can be financially feasible. The plan cannot succeed without having priorities with detailed descriptions of different areas that need more attention than others. Currently, examples of immediate action for Big Rapids are striping roads like Michigan to accommodate for bicycle traffic or designating pedestrian walkways by putting in sidewalks on Ferris Drive.

In addition, the plan includes an outline for the future measures of success. The Big Rapids Bicycle and Pedestrian Plan is a continuous, long-term process that will span over many years. Measures of success will allow the city of Big Rapids to see the progress and provide encouragement as they meet the goals along the way. The plan will need to be continually updated according to the demographics and needs of the Big Rapids community.

The Big Rapids Bicycle and Pedestrian Plan has the possibility to be the catalyst for changing residents' attitudes toward bicycling and walking as a legitimate and desirable mode of transportation. The projects, procedures, programs, and policies contained in this Big Rapids Bicycle and Pedestrian Plan respond to the existing physical infrastructure of the town and the population of Big Rapids. This plan will make Big Rapids an even more enticing community to live in, work in, go to school in, or raise a family.

INTRODUCTION 02

A DEFINITION OF THE PROBLEM WITH ALL RELEVANT FACTS

BY KATELIN POST

02.1 Reasons for a Bicycle and Pedestrian Plan

As the price of gas rises and there becomes greater movement towards sustainable practices, people across the nation are looking for cheaper and smarter alternatives to their daily commutes. The City of Big Rapids is no exception. In order to make these alternatives a possibility in Big Rapids, bicycle and pedestrian infrastructure need improvements.

02.2 Goals and Objectives

This document serves to outline existing conditions, implementation, priorities, a long-term plan, and measures of success for the development of a new bicycle and pedestrian infrastructure. The overall goal is to develop a permanent bicycle and pedestrian plan that can easily be integrated and implemented into both current and future conditions, thus allowing community members and tourists to experience a new side of Big Rapids.

02.3 Community Information

The City of Big Rapids is located in northwestern Mecosta County and is the county seat. Big Rapids is the largest city within a 40 mile radius and home to Ferris State University, Mecosta County Medical Center, and areas of commercial and industrial development. Big Rapids is serviced by the north-south Highway US 131, which lies approximately 1 ½ miles west of the city limits. Highway US-131 runs from rural Indiana north 267 miles to Petoskey, Michigan, and runs as a freeway from south of Portage to Manton, Michigan. Highway M-20 runs east-west through the middle of the state and directly through Big Rapids. M-20 runs from near Lake Michigan at the US 31 freeway in New Era east to Midland, Michigan.

Big Rapids manages and maintains 37 miles of its own network of streets and 9.5 miles of alleys. An additional 5.5 miles of state trunk lines are managed through a maintenance contract between the Michigan Department of Transportation (MDOT) and the city. Other transportation routes include a 4 mile non-motorized, paved Riverwalk trail, 2.5 miles of State Park linear paved trails, 35 miles of public sidewalks, and the Roben-Hood Airport.

Demographically, Big Rapids’ population has decreased slightly from 2000 to 2010. The 2010 population of the city was 10,601, a 2.3% decrease from 2000. The City of Big Rapids accounts for 24.8% of the total population in Mecosta County. While Big Rapids’ population is expected to remain relatively stable, growth in the surrounding townships may place greater pressure on the development of city parks and recreation resources. FIG. 1 details the population change for the city of Big Rapids, Big Rapids Charter Township, and Mecosta County, from 2000 to 2010.

GENERAL POPULATION

COMMUNITY	2000	2010	% CHANGE 2000-2010
BIG RAPIDS	10,849	10,601	-2.30%
BIG RAPIDS CHARTER TOWNSHIP	3,249	4,208	22.80%
MECOSTA COUNTY	40,553	42,789	5.20%

FIG 1: BIG RAPIDS BASIC POPULATION INFORMATION SOURCE: U.S. CENSUS, 2000 AND 2010

SUMMARY OF EXISTING CONDITIONS 03

A BRIEF OVERVIEW OF THE EXISTING INFRASTRUCTURE CONDITIONS

BY DON BUCHOLZ & KATELIN POST

In order to accurately understand the needs of the city of Big Rapids it is crucial to gauge what the existing conditions are. This initial analysis reveals the strengths, weakness, and conditions that affect the outcome of the bicycle and pedestrian plan for the city. Data provided by the city, field analysis, internet and satellite information, and thorough surveys were compiled to accurately assess the existing conditions within the city and the immediately surrounding areas. This chapter explains the components of that initial analysis and the results. By documenting the existing conditions it becomes possible to narrow the scope of the project into a more targeted focus. The initial analysis helps define the true meaning of the issues regularly faced by the city and the residents.

03.1 BIG RAPIDS CITY ANALYSIS

DON BUCHOLZ

The first step was to identify the five elements that define the spaces within Big Rapids and graphically represent them on a map of the city.

Paths: The places that people do or potentially will use to travel through the city; these include streets as well as routes used by pedestrians and bicycle traffic.

Edges: The linear elements in a city that typically create a break between two or more entities. These elements can be semi-penetrable or impenetrable. For example, in Big Rapids some edges are the Muskegon River, State Street, and Perry Avenue.

Districts: The large sections of a city which can be perceptibly entered into. Districts are easily identifiable from the outside, and may hold a unique style of architecture or other identifying feature that makes them stand out.

Nodes: The specific spots that can be entered into. They can be junctions of paths, breaks in infrastructure, or simply a condensation of a particular use or function. Examples would include a prominent park or major intersection that many paths converge around.

Landmarks: They are similar to nodes in that they are also considered a reference point. The distinction lies in the fact, that for the most part, the space is not entered.

- 1 BIG RAPIDS HIGH SCHOOL
- 2 BR ASSEMBLY OF GOD
- 3 BULLDOG PARTY STORE
- 4 PERRY/STATE INTERSECTION
- 5 FLITE LIBRARY
- 6 THE GATE
- 7 BR PUBLIC LIBRARY
- 8 MECOSTA COUNTY MEDICAL CENTER
- 9 BRUTUS DOG PARK
- 10 MECOSTA-OSCEOLA INT. SCHOOL
- 11 BR MOVIE THEATRE
- 12 STAR SHOOTERS
- 13 STATE/MAPLE INTERSECTION
- 14 CLAY CLIFFS NATURE TRAILS
- 15 BLUE COW
- 16 HEMLOCK PARK
- 17 HAWORTH
- 18 HANCHETT
- 19 WOLVERINE WORLD WIDE
- A BR ASSEMBLY OF GOD
- B STATE ST. WATER TOWER
- C FLITE LIBRARY
- D MECOSTA COUNTY FAIRGROUNDS

LEGEND

- CITY LIMITS
- NODES
- LANDMARKS
- PATHS
- EDGES
- FSU DISTRICT
- COMERCIAL DISTRICT
- OUTER DOWNTOWN
- INNER DOWNTOWN
- I1
- R1
- R2
- R3
- R4
- R5
- R6
- R7
- R8
- M1
- M2
- S1

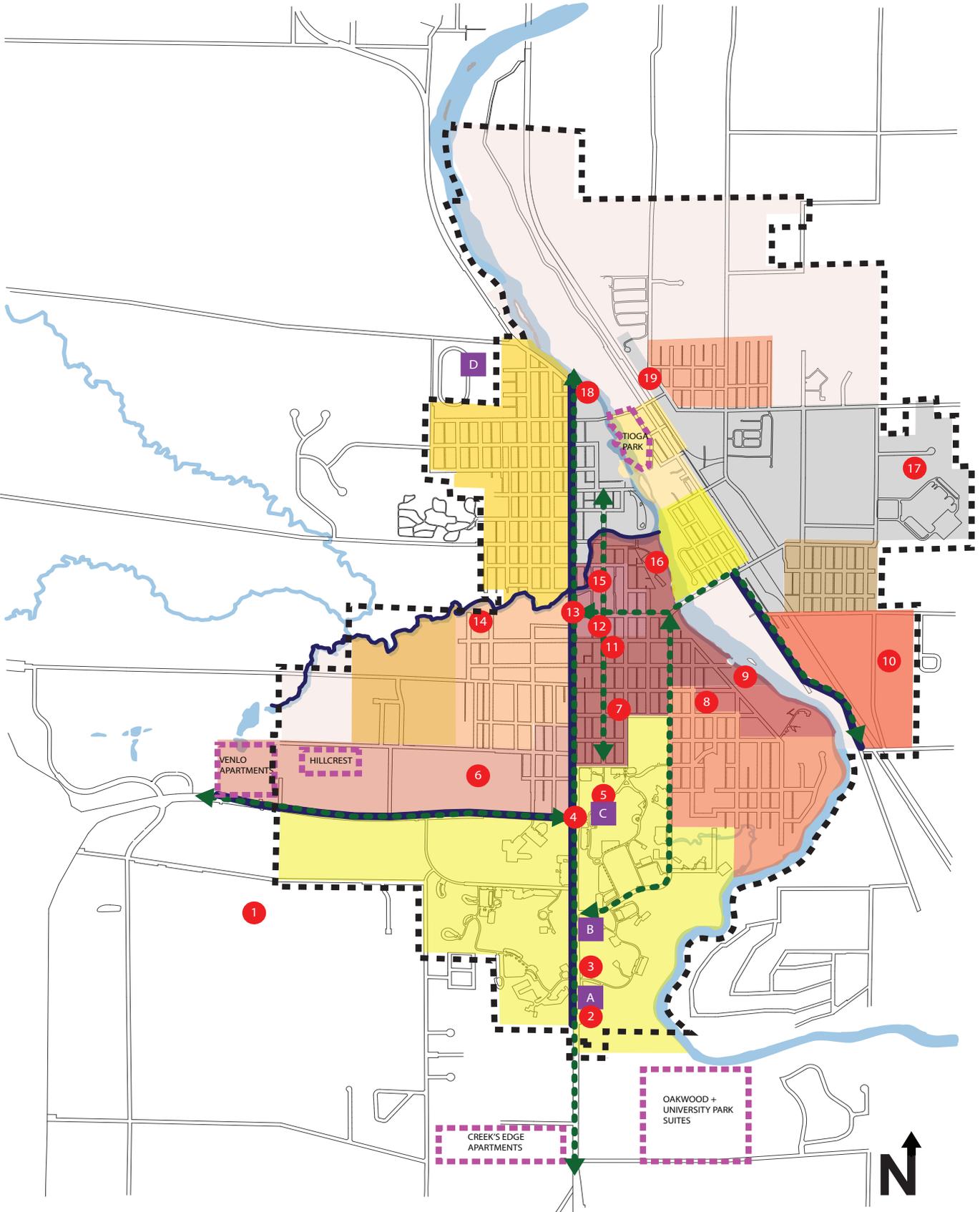


FIG 2: BIG RAPID'S CITY ANALYSIS (ANTHONY AMATO)



The second part of this initial analysis of the city was to further investigate individual areas and determine the condition of existing infrastructure. Road widths and conditions, sidewalk conditions, on street parking, traffic control devices, and unsafe conditions were all documented and graphically represented on the following maps. In addition to these things there was a cooperative effort to identify any gaps in mobility, and the areas of origins and destinations within the city. This additional part revealed a very real disconnect between parts of the city, many areas which present an inherent safety concern to bicyclists and pedestrians. This existing conditions chapter lays out the data that was discovered during the investigation, and reveals that Big Rapids lacks adequate bicycle and pedestrian infrastructure.

03.2 DEMOGRAPHICS

KATELIN POST

Big Rapids is a vastly diverse city including permanent residents from the community and university students. In order to better understand the Big Rapids community, an analysis of the demographics was conducted to give a background of the social and economical conditions. The city was separated into three regions based on the average median household income: those which earn less than \$25,000, those which earn between \$25,000 and \$50,000, and those which earn more than \$50,000. According to the US Census Bureau, the United States' poverty line for a household of four is \$23,000, while the state of Michigan's average median income is \$48,500 and Mecosta county has an average median income of \$36,000.

The map on the following page shows where each region exists within the city of Big Rapids. A majority of those areas that earn less than \$25,000 per household have less than adequate infrastructure for both pedestrians and bicyclists. These areas need to be emphasized because those below the poverty line are less likely to own a vehicle, and therefore depend on alternative methods of transportation throughout the city.

LEGEND

- CITY LIMITS
- >50k INCOME
- 25k-50k INCOME
- <25k INCOME

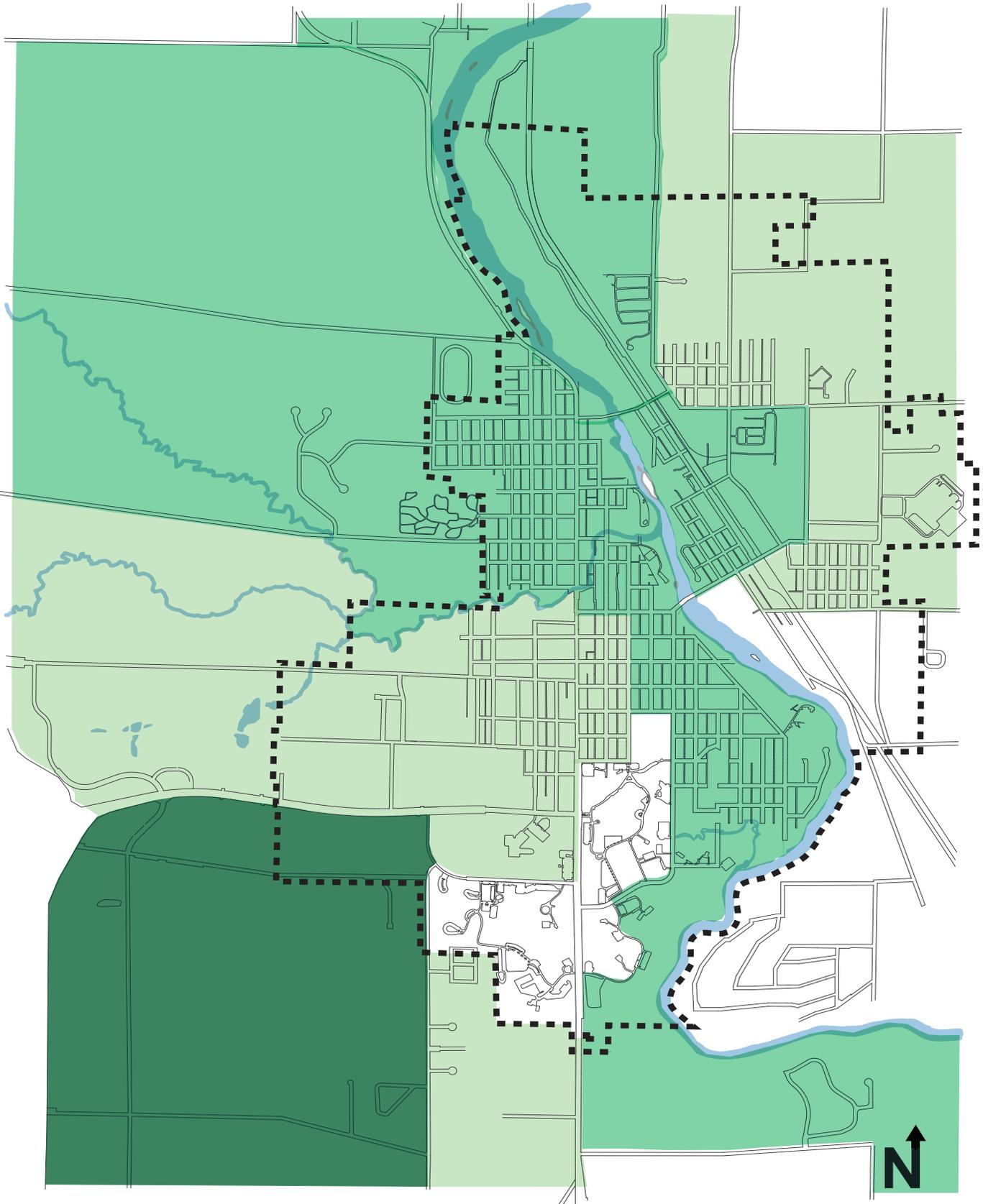


FIG 3: BIG RAPIDS DEMOGRAPHIC REGIONS (ALL)



03.3 SIDEWALK CONDITIONS

DON BUCHOLZ

These not only provide a place for people to walk, they also provide a place for kids to play. Well-cared-for sidewalks make neighborhoods feel inviting and comfortable to live in. Residents feel pride for their neighborhoods if they see the city take pride as well.

Sidewalks represented in blue indicate needed repair, green indicates sidewalks in good condition, and red indicates no sidewalks are present. Very quickly we began to see that once one gets further from the core of the city, the sidewalks deteriorate and eventually disappear. This shows a clear disconnect of pedestrian mobility from the fringes of the city limits and specifically, where instant improvement should be made.



FIG 4: POOR SIDEWALK (KATE POST)



FIG 5: GOOD SIDEWALK (EVAN WEAVER)



FIG 6: POOR SIDEWALK (ANTHONY AMATO)



FIG 7: GOOD SIDEWALK APRON (EVAN WEAVER)

LEGEND

- CITY LIMITS
- GOOD SIDEWALKS
- POOR SIDEWALKS
- NO SIDEWALKS

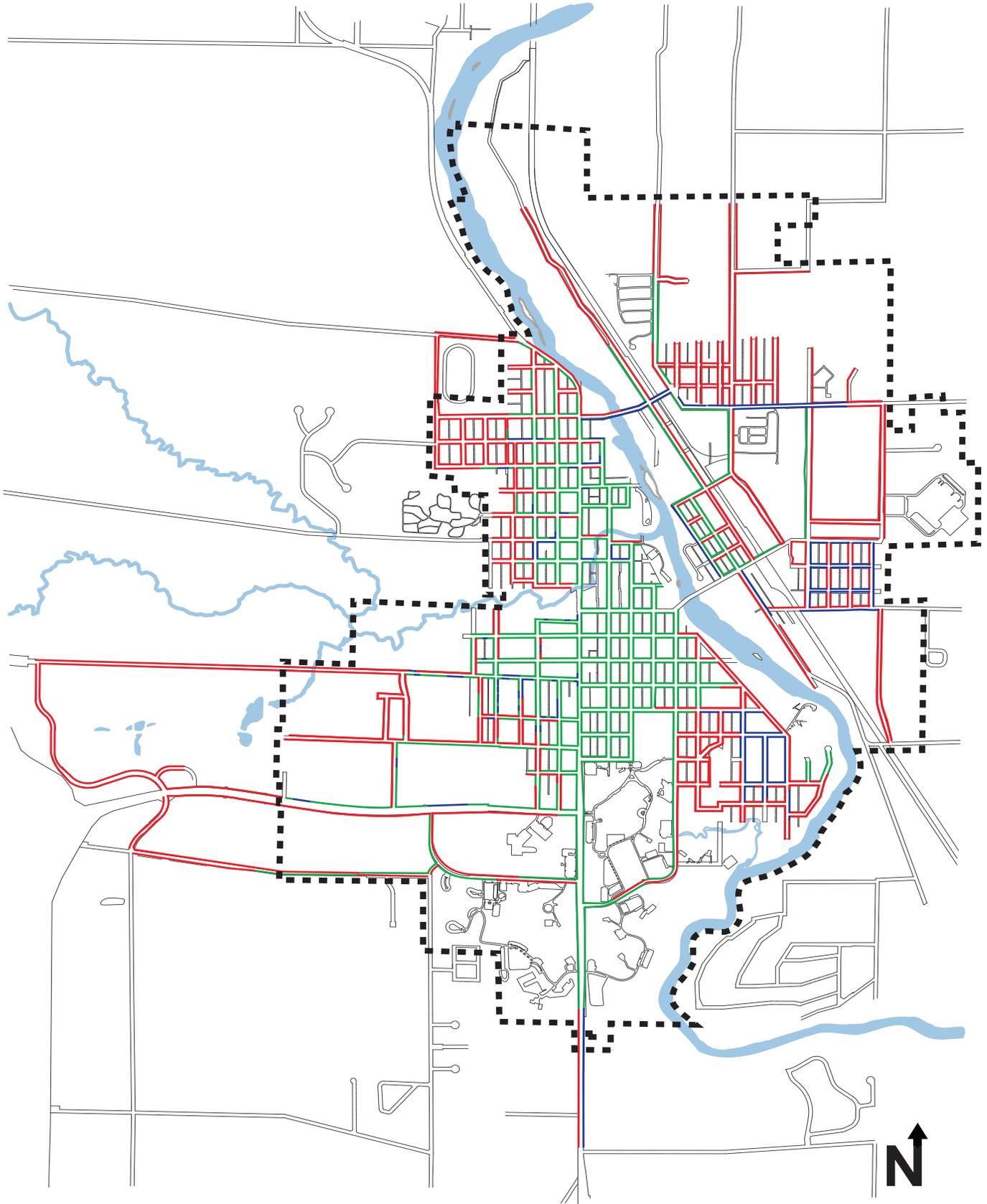


FIG 8: BIG RAPIDS SIDEWALK CONDITIONS (ALL)



03.4 ROAD WIDTHS & CONDITIONS

DON BUCHOLZ

Another component of the initial analysis of existing conditions was to define the width and condition of each street in the city. A laser distance measurer was used to determine the street widths. Then, through photographic documentation, we divided each street into two subsequent grades: acceptable, represented with a solid line, and needs-improvement, represented by a dashed line.

Determining the width and condition of each road is important in determining which existing surface street would be acceptable for additional bicycle infrastructure, and in determining which streets would need to be improved before additional design changes could be made. Through this analysis it was determined that the typical street width in the city is roughly 35'-0" to 38'-0".



FIG 9: POOR ROAD (EVAN WEAVER)



FIG 10: GOOD ROAD (DON BUCHOLZ)



FIG 11: POOR ROAD (ANTHONY AMATO)



FIG 12: GOOD ROAD (ANTHONY AMATO)

LEGEND

- CITY LIMITS
- LESS THAN 20'
- LESS THAN 20' POOR CONITION
- 20' - 29'
- 20' - 29' POOR CONITION
- 30' - 39'
- 30' - 39' POOR CONITION
- 40' - 49'
- 40' - 49' POOR CONITION
- GREATER THAN 50'

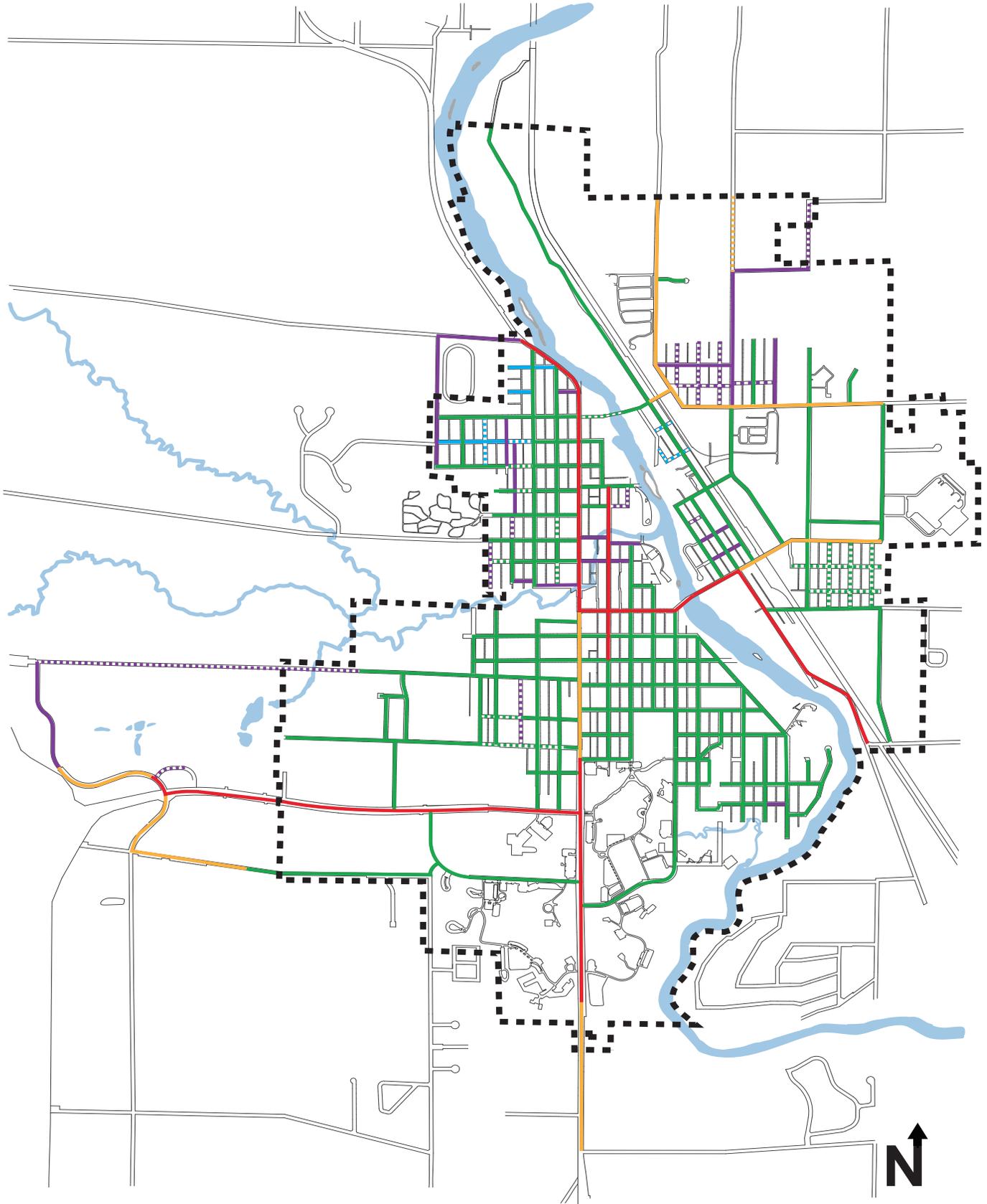


FIG 13: BIG RAPIDS ROAD WIDTHS & CONDITIONS (ALL)



03.5 ON STREET PARKING

KATELIN POST

On any street parking is a major component. Parallel parking consumes roughly 8' on each side. The vast majority of streets in the city of Big Rapids allow parallel parking on both sides, however, there are areas where parking is limited or not allowed. In order to accommodate bicycle infrastructure on some streets, parking needs to be modified or removed. Accurately identifying current parking availability in the city is essential in determining if parking can or must be removed. This map graphically represents the current on-street parking in Big Rapids. Green lines indicate parking, while red lines indicate no parking.



FIG 14: ON-STREET PARKING (MICHAEL MOY)

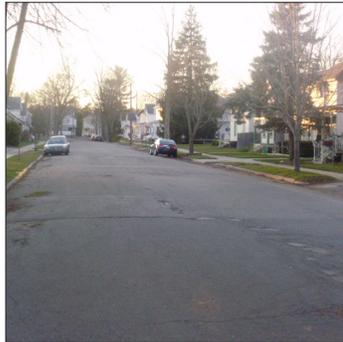


FIG 15: ON-STREET PARKING (EVAN WEAVER)



FIG 16: NO PARKING (EVAN WEAVER)



FIG 17: NO PARKING (DON BUCHOLZ)

LEGEND

- CITY LIMITS
- NO ON-STREET PARKING
- ON-STREET PARKING

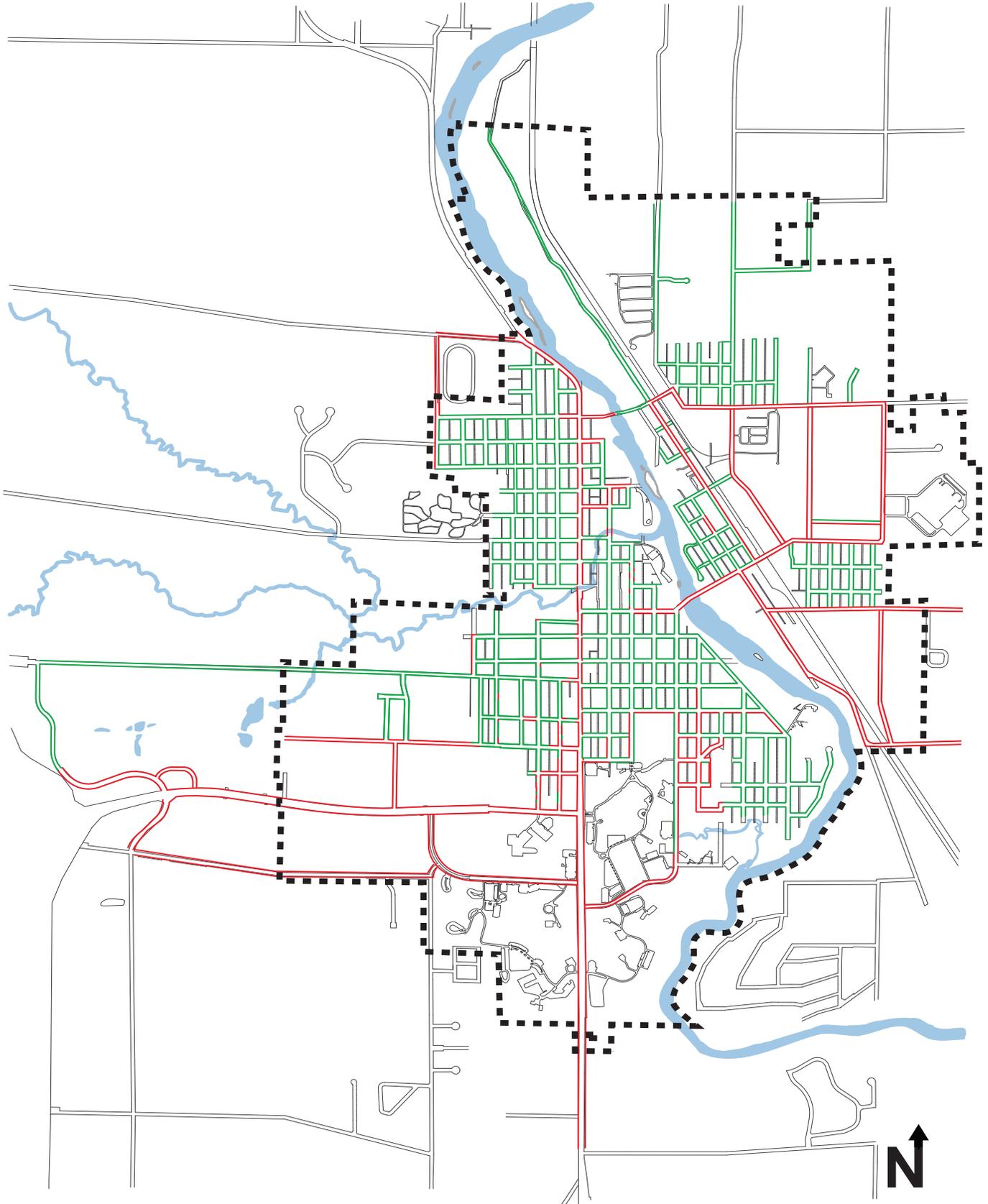
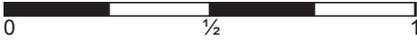


FIG 18: BIG RAPIDS ON-STREET (ALL)



03.6 COMFORTABLE BIKABLE RADIUS

DON BUCHOLZ

Rather than determining the city's boundaries by the actual city limit lines, using building densities to determine the boundaries is more informative. The city of Big Rapids is not exclusive and does not represent the perceived city as a whole. A map in which building footprints throughout the city have been darkened shows where the most dense urban developments are, thus defining the philosophical city borders. This representation, when covered with a circle showing a two mile radius (the maximum comfortable bicycling distance for most people), shows that the vast majority of residents within Big Rapids live within that two mile radius. The data confirms that a bicycle and pedestrian plan will positively affect all residents within the perceived boundaries of Big Rapids.

LEGEND

- CITY LIMITS
- 1 - MILE DIAMETER
- 2 - MILE DIAMETER

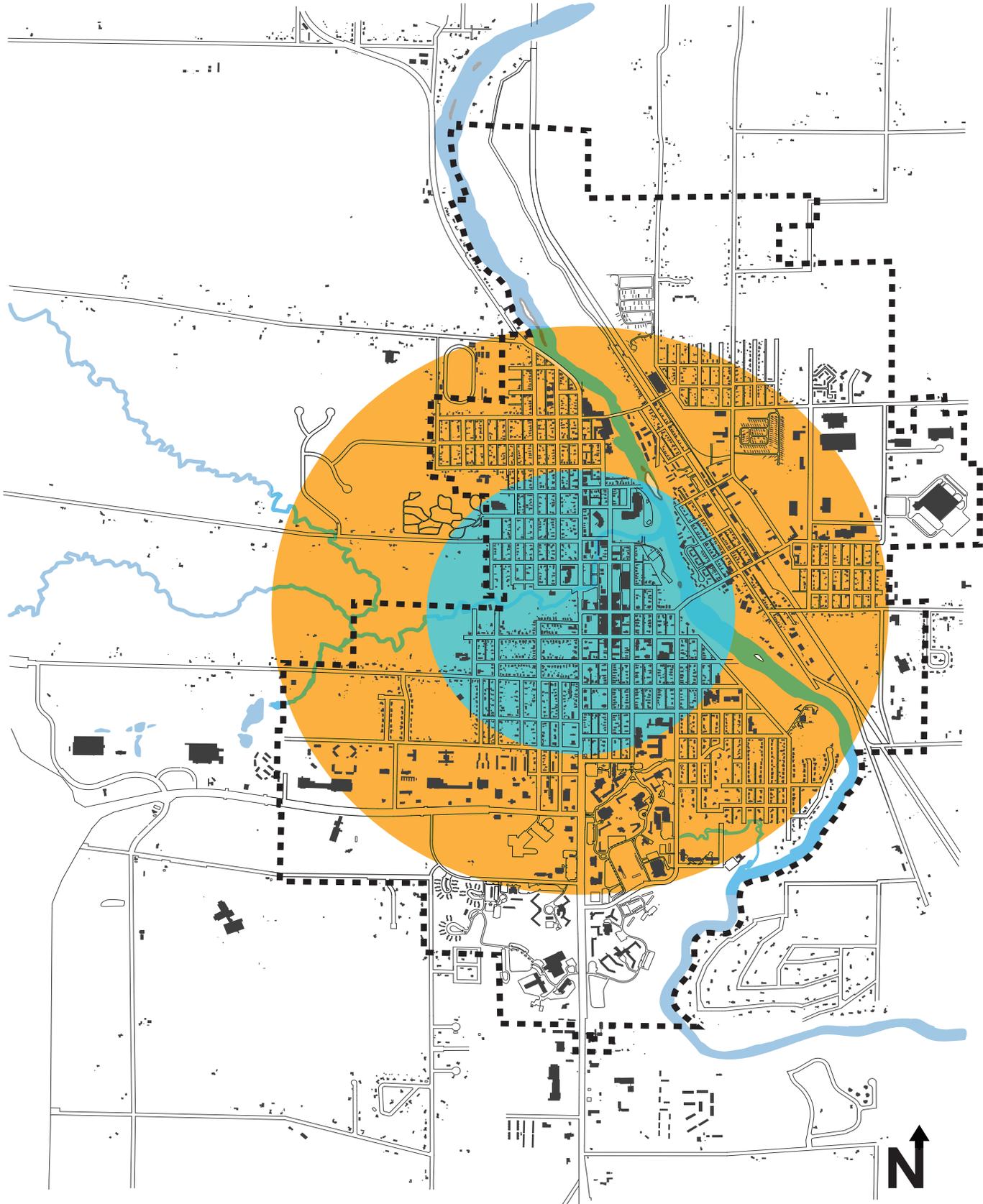


FIG 19: BIG RAPIDS RADIAL DIAGRAM (ALL)



03.7 ORIGINS

DON BUCHOLZ

Travel typically begins from condensed residential areas, such as apartment complexes, dense neighborhoods, student housing, and university dormitories. These represent real or perceived places of origin for the population of Big Rapids. Shown graphically, origins define the beginning points for residents' daily commutes, and indicate important places that should be included in the bicycle and pedestrian plan. On the map, magenta represents the primary origins which are considered more dense and populated than the secondary origins, represented in light green.



FIG 20: HILLCREST (MICHAEL MOY)



FIG 21: NEIGHBORHOOD (RACHEL WELLER)



FIG 22: VENLO PLACE (MICHAEL MOY)



FIG 23: CRAMER HALL (MICHAEL MOY)

LEGEND

- CITY LIMITS
- PRIMARY ORIGINS
- SECONDARY ORIGINS

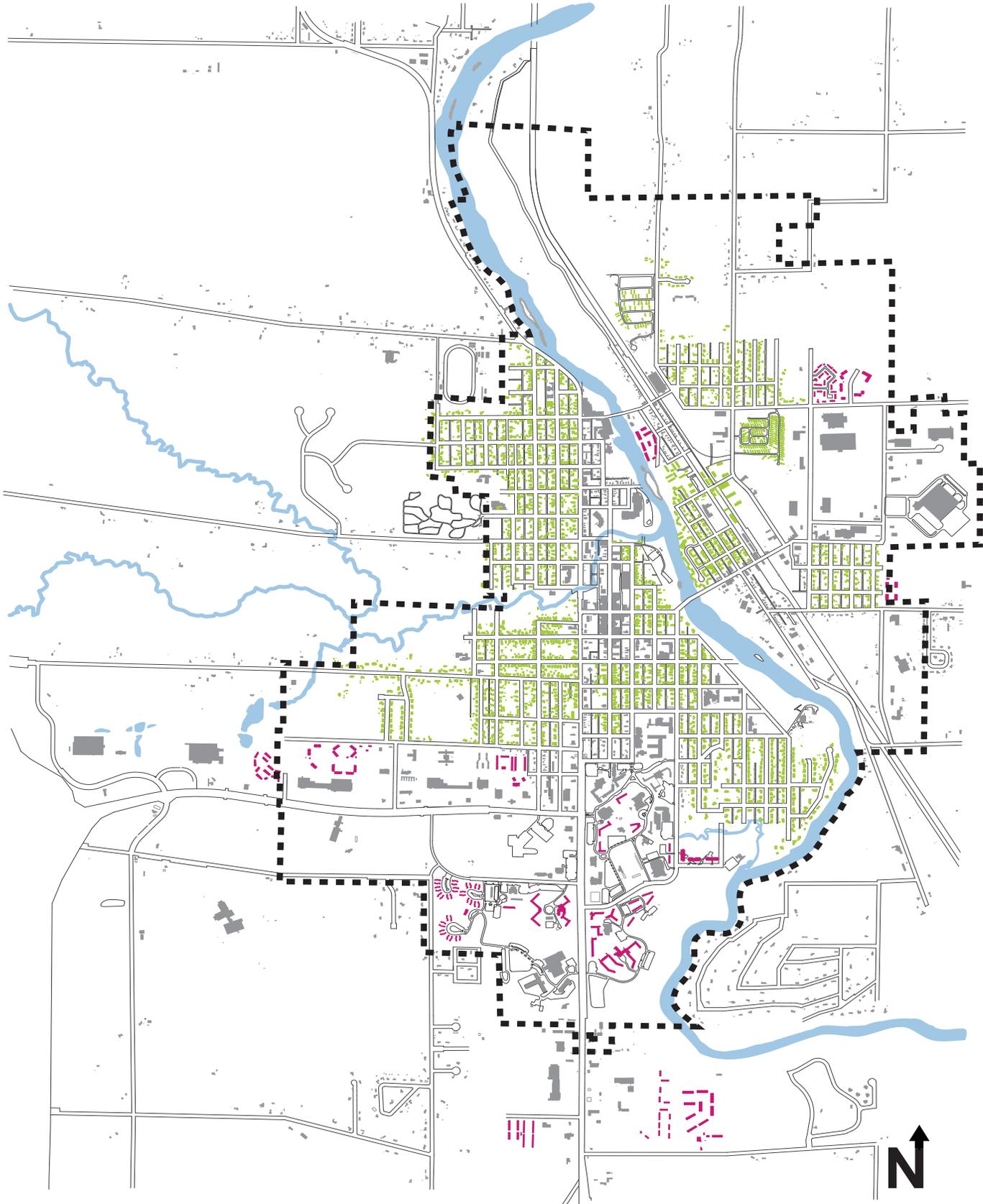


FIG 24: BIG RAPIDS ORIGINS (ALL)



03.8 DESTINATIONS

DON BUCHOLZ

Places of employment or business that are known to draw a sizable crowd or population base are considered to be destination points. Furthermore, a destination is a place people would typically travel during the day while they are away from home. This map defines popular ending points of a typical commute. Combining commuter information with the origins data map shows where the most people could be affected positively with mobility improvement, and what connections and relationships are the most important.

The map shows primary destinations as orange, which are areas that typically draw a large population. Primary areas include businesses such as Meijer, Wal-Mart, and those within the downtown area. Secondary destinations, represented in teal, include areas such as Hemlock Park and the fairgrounds. The designations of origins and destinations are very broad in their scope and are intended to roughly identify residential densities and the major areas of business.



FIG 25: SCHUBERGS BAR & GRILL (RACHEL WELLER)



FIG 26: NESBITT BUILDING (RACHEL WELLER)



FIG 27: FLITE (DON BUCHOLZ)



FIG 28: THE GATE (DON BUCHOLZ)

LEGEND

- CITY LIMITS
- PRIMARY DESTINATIONS
- SECONDARY DESTINATIONS

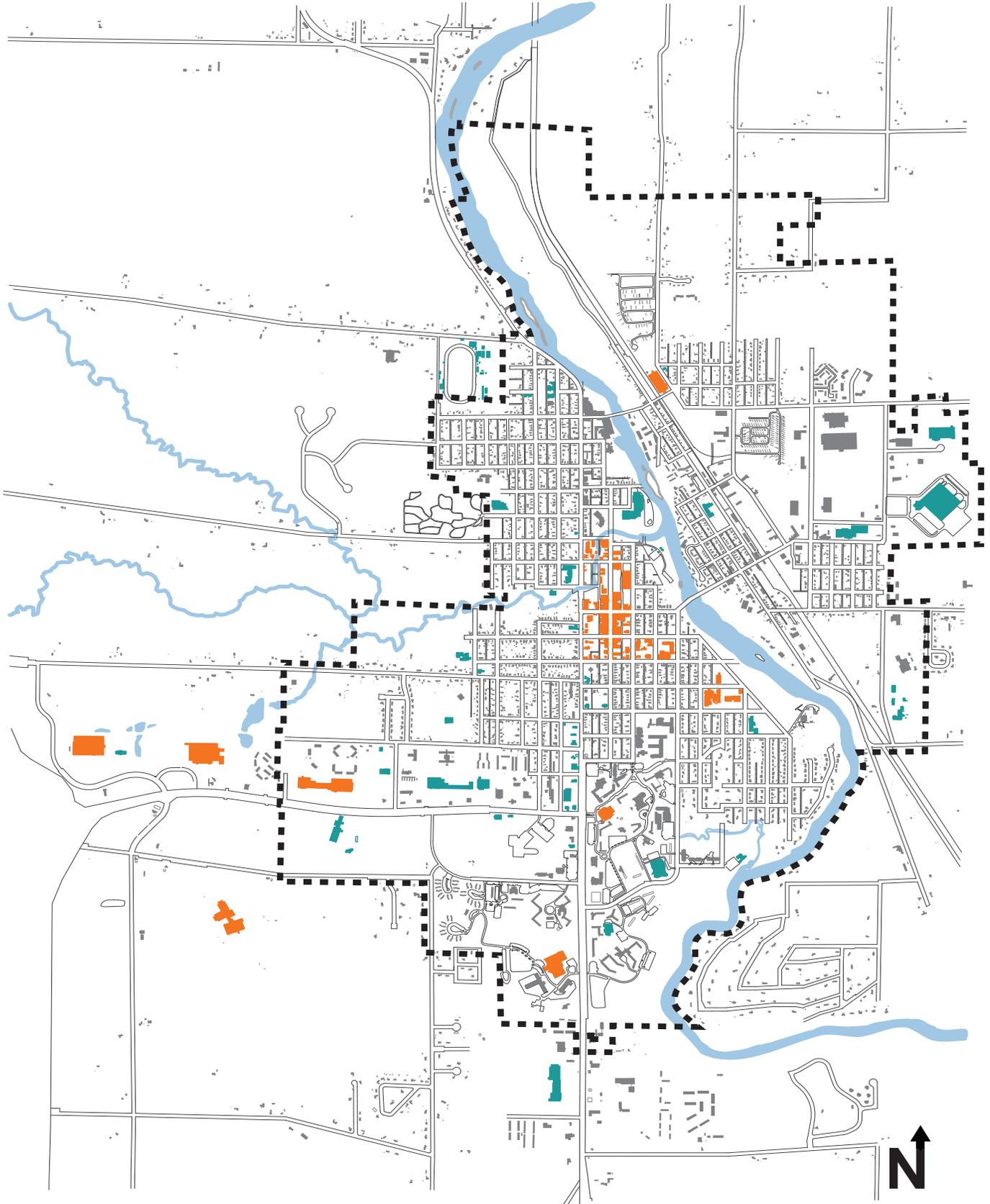


FIG 29: BIG RAPIDS DESTINATIONS (ALL)



03.9 GAP ANALYSIS

DON BUCHOLZ

An analysis of existing gaps which impede bicycle and pedestrian mobility is crucial to understanding where points in the city that lack a safe connection are located. Furthermore, a gap analysis can help refine the scope and individual areas to be targeted as separate entities. Each district was investigated more deeply for areas that impede the flow of pedestrians, bicycles, or both. Gaps do not necessarily represent where movement cannot happen, they may also indicate where movement is difficult or unsafe. On the map, red lines indicate gaps in the bicycle and pedestrian infrastructure, and blue lines represent gaps in pedestrian movement.

The gap analysis displays perceived and actual gaps between points in the city. By overlaying this analysis on the origins and destinations map it becomes clear which gaps are the biggest detriments to the current infrastructure. The bicycle and pedestrian mobility plan begins to bridge those gaps, making the entire city more accessible to all residents.

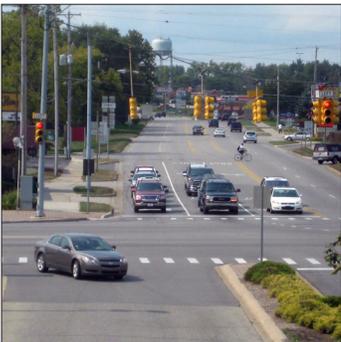


FIG 30: PERRY AVE. (DON BUCHOLZ)



FIG 31: MUSKEGON RIVER (DON BUCHOLZ)



FIG 32: STATE ST. (EVAN WEAVER)



FIG 33: MITCHELL CREEK (ANTHONY AMATO)

LEGEND

- CITY LIMITS
- BICYCLE GAP - REGION
- PEDESTRIAN GAP - REGION
- BICYCLE GAP - PATH
- PEDESTRIAN GAP - PATH

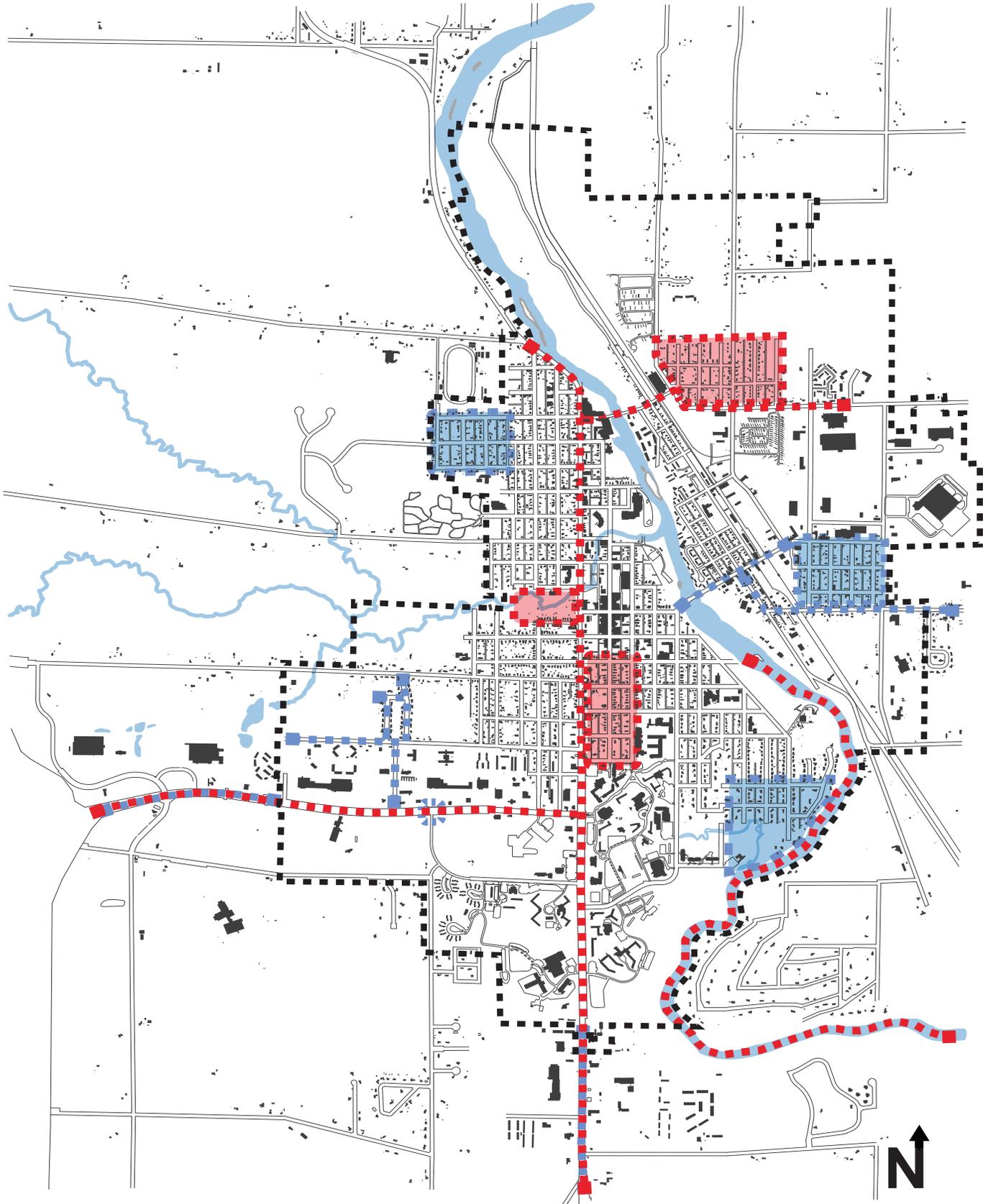


FIG 34: BIG RAPIDS GAPS (ALL)



IMPLEMENTATION 04

THE MEANS TO COMPLETE THE PROJECT

BY RACHEL WELLER, ANTHONY AMATO & ERIC MILLER

Implementation is the means by which the project will be completed. This section shows the the types of paths to be used, design guidelines, a timeline, phasing to break down the project into key steps for full integration, new suggested policies, and funding opportunities.

04.1 TYPES OF PATHS

RACHEL WELLER

A singular loop reaching many areas of Big Rapids is the main focus of the bicycle network. From the loop, additional routes reach more areas in and around Big Rapids, seeking to provide access to and from the main origins and destinations determined in the analysis of the city. The bicycle network consists of different types of routes within the loop and connections.

There are currently two major infrastructures for bicyclists and pedestrians within the city that have been included in the proposed plan. These are the White Pine Bicycle Trail and the Riverwalk. The White Pine Bicycle Trail is a pedestrian and bicycle system that runs from Comstock Park to Cadillac for a total of 91 miles. The Riverwalk follows the Muskegon River as it runs through the city.

LEGEND

- CITY LIMITS
- MAIN LOOP
- EXISTING TRAILS

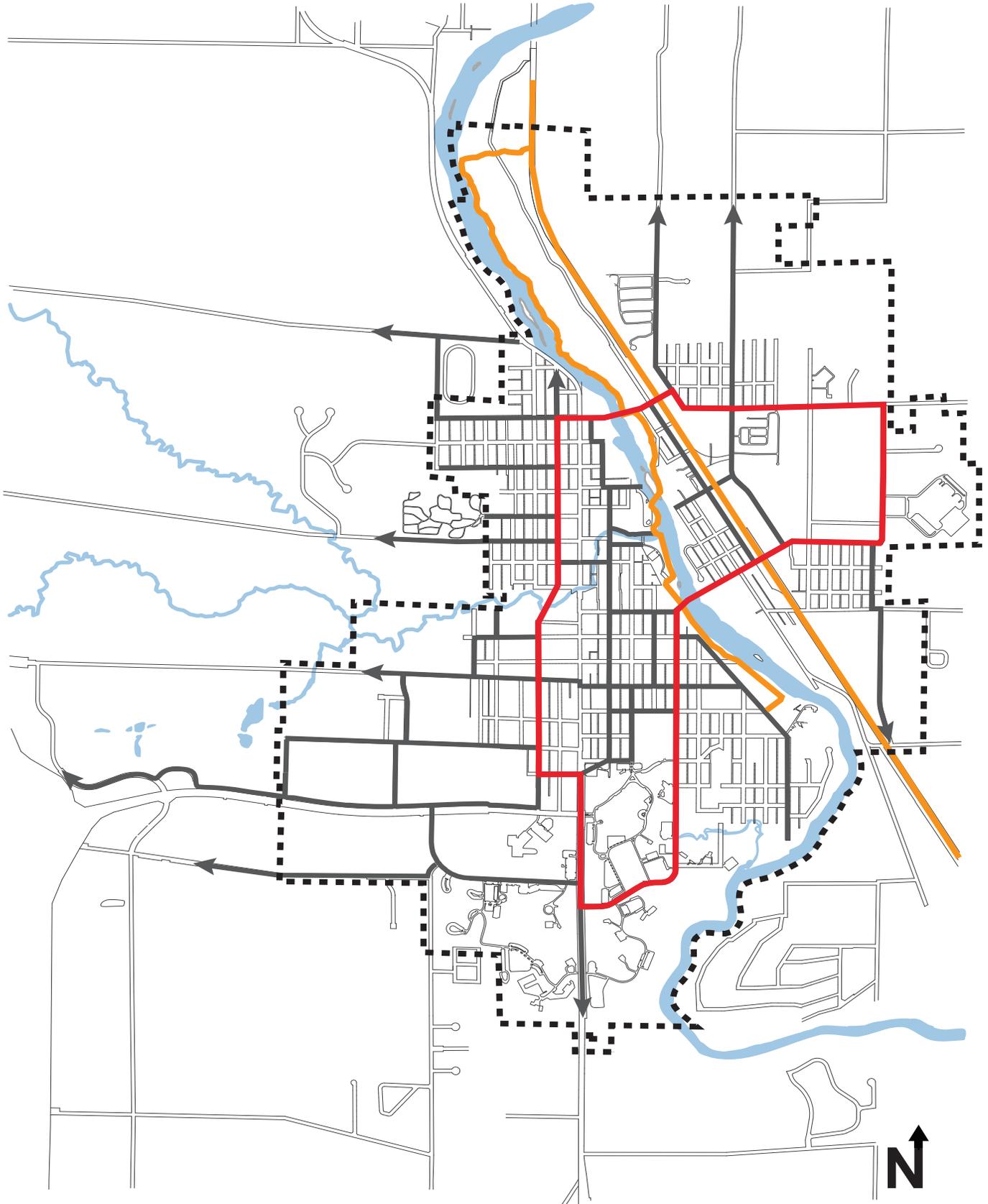


FIG 35: BIG RAPIDS BICYCLE NETWORK MAIN LOOP (ALL)
MILES



Bicycle Lanes: These key components of the system provide a direct and efficient way for bicyclists to travel within a designated space rather than on sidewalks or with vehicular traffic. This creates a safe environment for all bicyclists and raises awareness about bicycling among drivers. Some of the bicycle lanes also utilize alternating parking, which is a system of street parking where all vehicles are only on one side of the road for set distance, alternating sides down the length of the road. Benefits include allowing bicycle lanes on roads that would be too narrow if parking were on both sides, slower traffic, and safer environments for bicyclists.

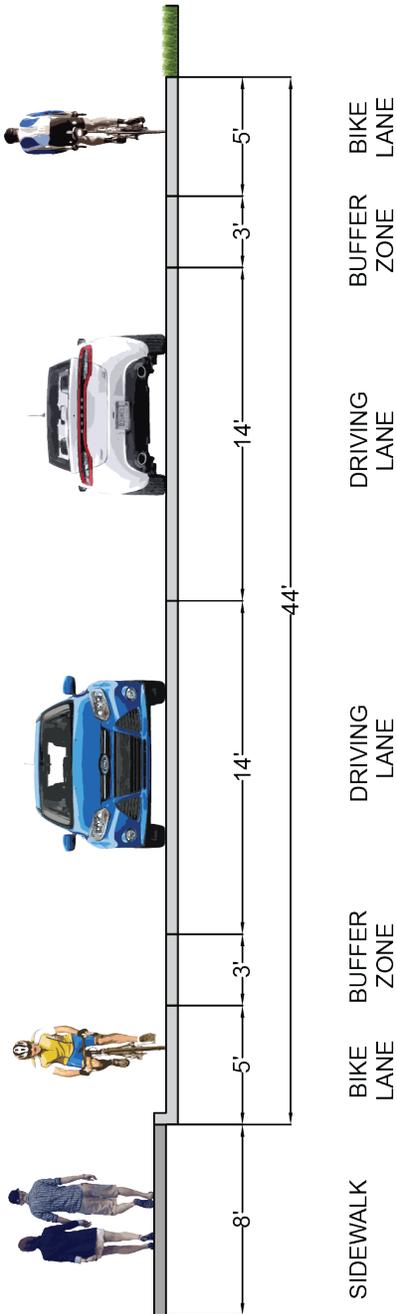


FIG 36: BICYCLE LANE ROAD SECTION (MICHAEL MOY)

LEGEND

- CITY LIMITS
- NO PARKING
- ALTERNATING PARKING
- PARKING ONE SIDE
- PARKING TWO SIDES

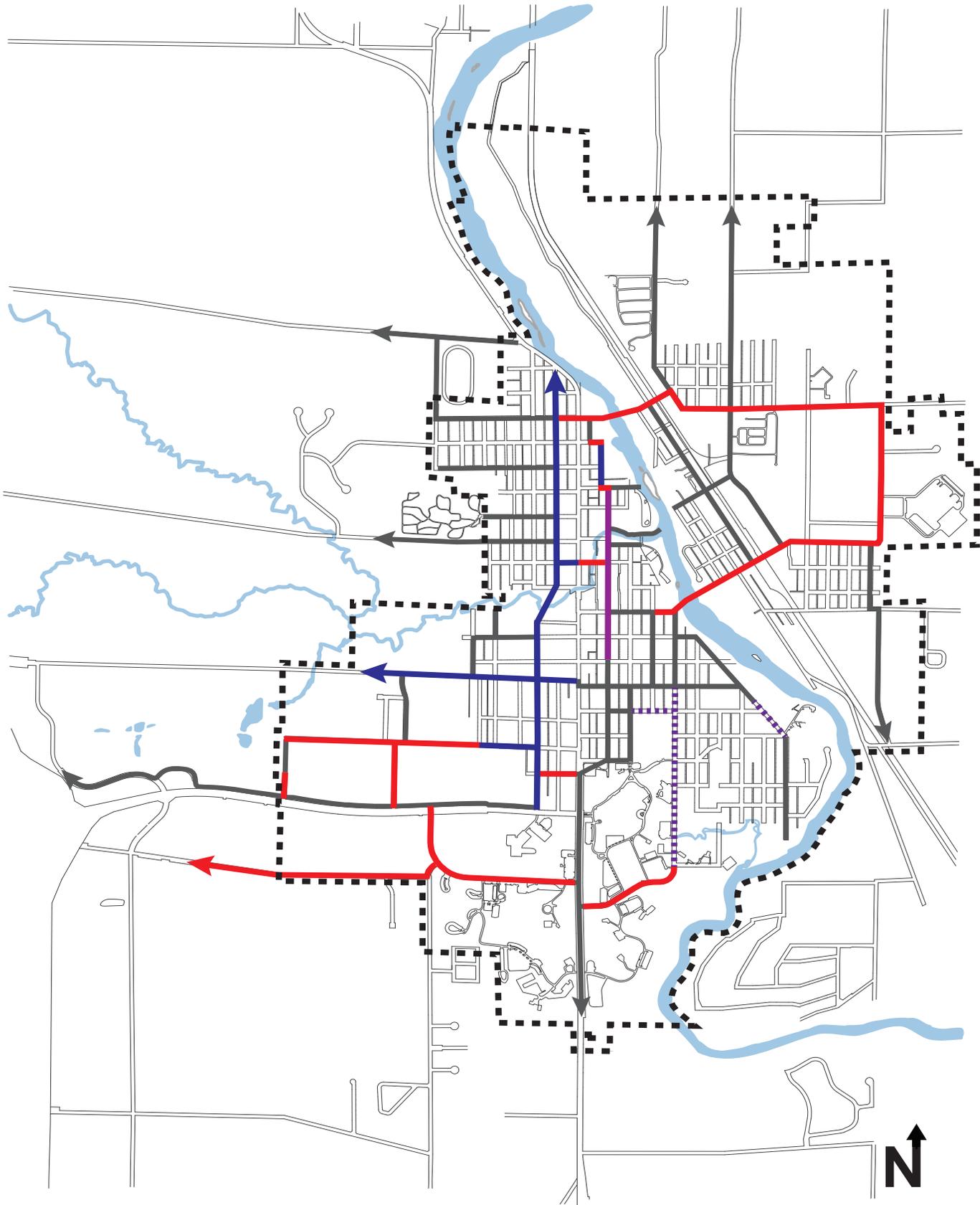


FIG 37: BIG RAPIDS BICYCLE NETWORK BICYCLE LANES (ALL)
 MILES
 0 1/2 1

Advisory Lanes: Roads which are too narrow to allow full, separate driving and bicycle lanes can use advisory lanes instead. They have no center line and require bicyclists and drivers alike to be conscientious of each other because they are sharing lanes. When two cars meet, they yield for passing bicyclists and then utilize the shared bicycle lanes to complete their pass.

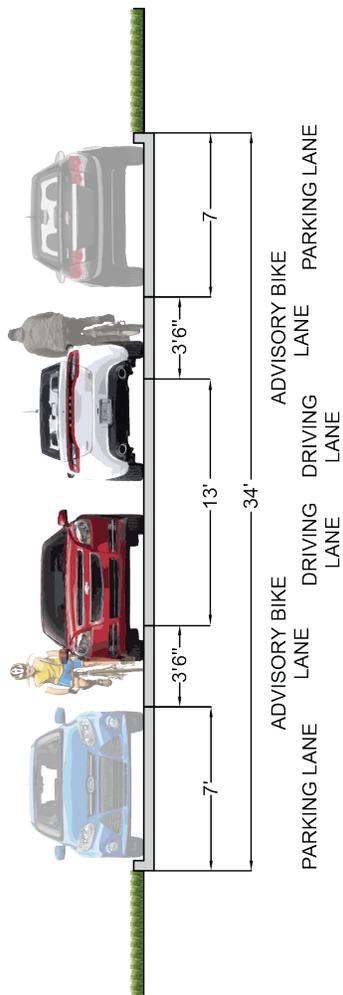


FIG 38: ADVISORY LANE ROAD SECTION (MICHAEL MOY)

LEGEND

- CITY LIMITS
- NO PARKING
- PARKING ONE SIDE
- PARKING TWO SIDES

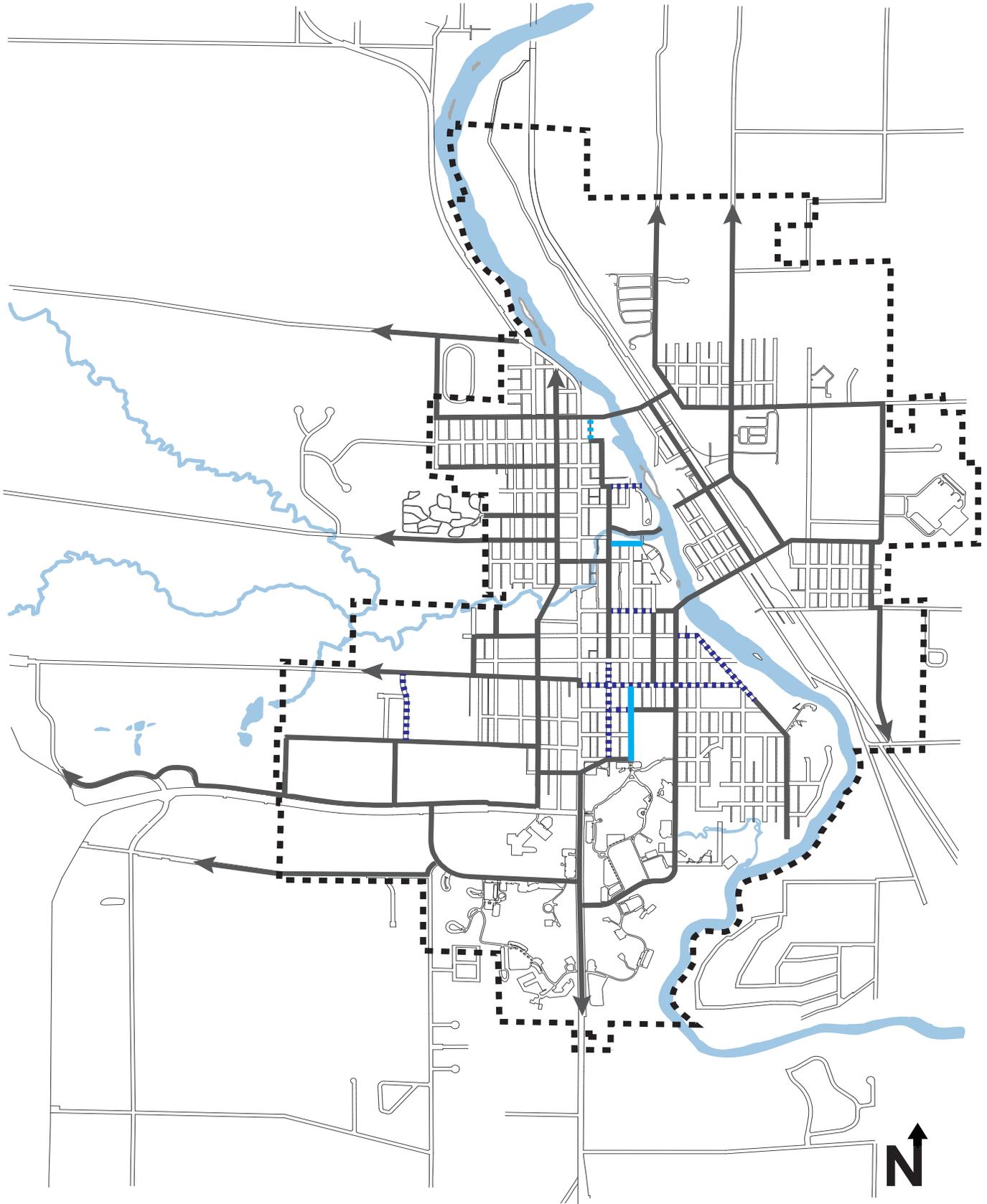


FIG 39: BIG RAPIDS BICYCLE NETWORK ADVISORY BIKE LANES (ALL)



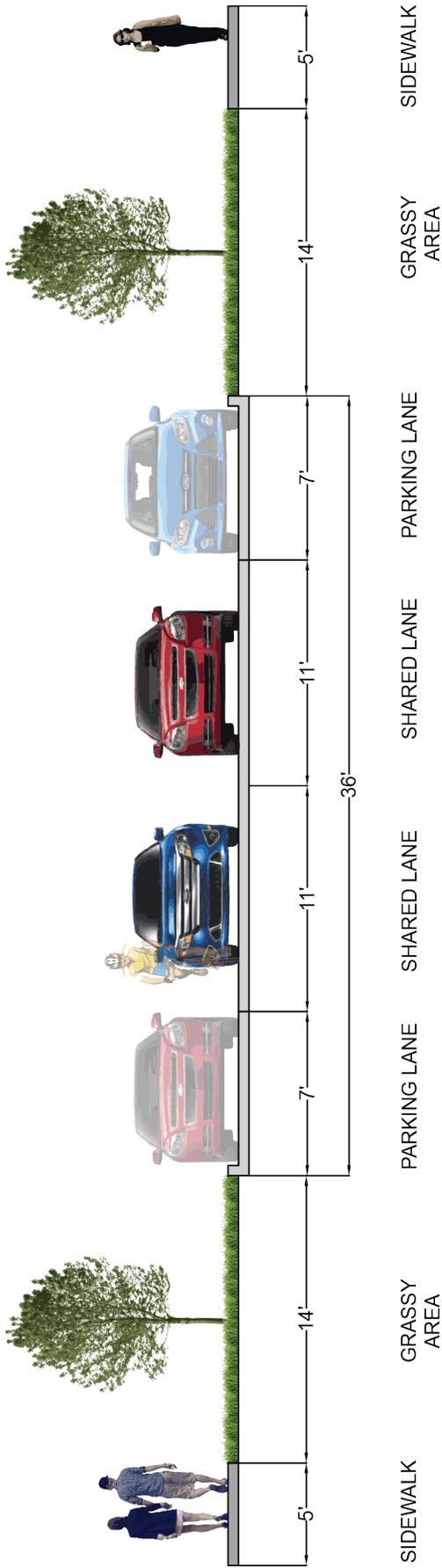


FIG 40: SHARED LANE ROAD SECTION (MICHAEL MOY)

LEGEND

- CITY LIMITS
- SHARED LANES

Shared-Use Roads: Vehicles and bicyclists share these roads, which often require bicyclists to have a higher level of comfort when sharing the road with lower-speed vehicular traffic. They are marked with symbols painted on the pavement to make a road’s purpose clear to both motorists and bicyclists. The number of these roads are limited to make them stand out as dedicated bicycle areas. As our map indicates, shared-use roads lead to many major city attractions.

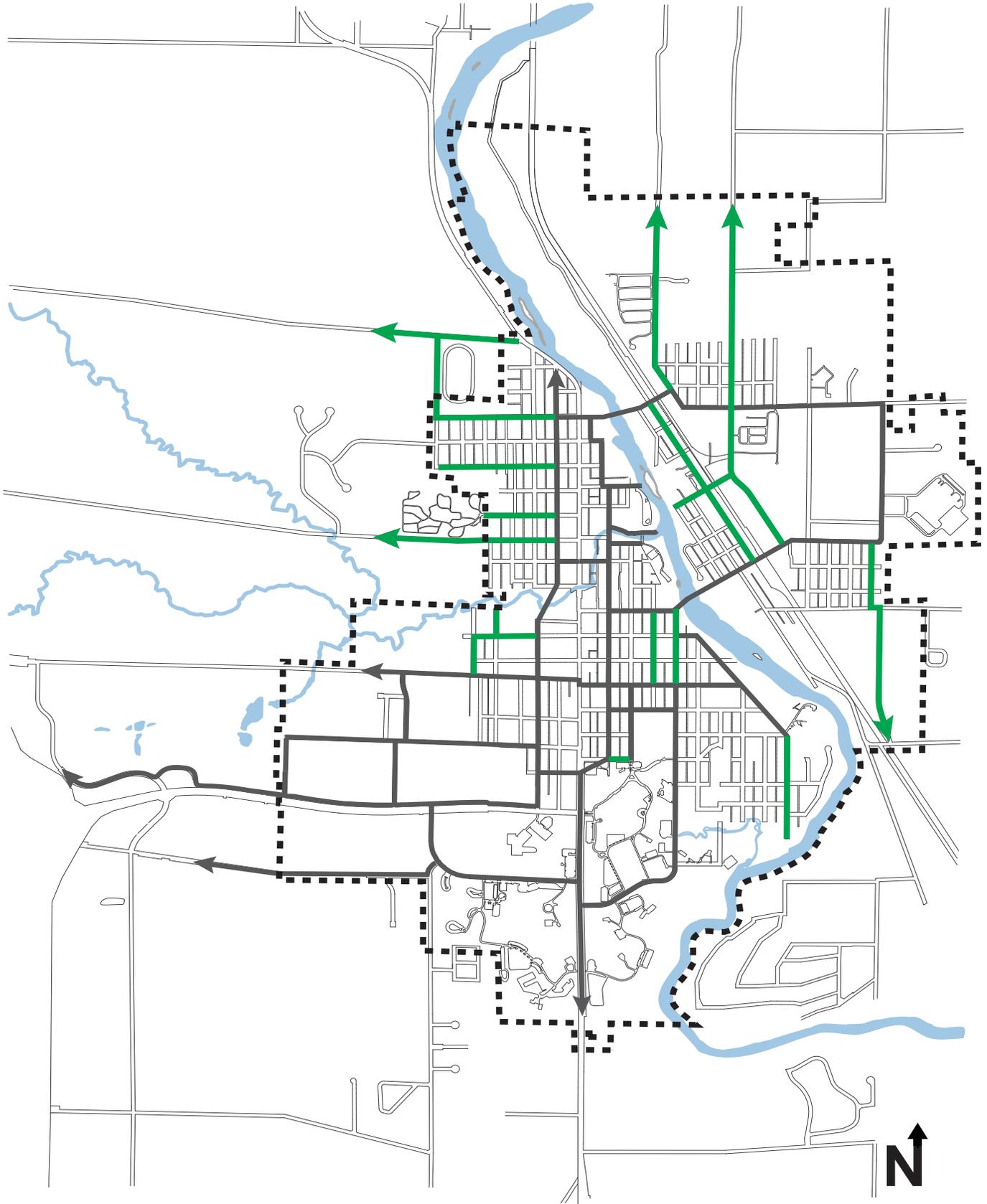
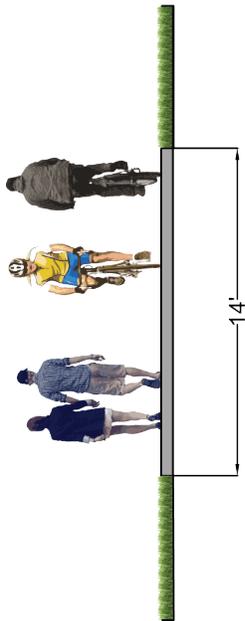


FIG 41: BIG RAPIDS BICYCLE NETWORK SHARED BIKE LANES (ALL)



Multi-Use (Bicycle and Pedestrian) Paths: These paths fill gaps in areas with heavy vehicular traffic. They bring bicycle traffic off roads and on to separate paths, which allows for safer travel.



MULTI-USE PATH

FIG 42: MULTI-USE PATH EXAMPLE (MICHAEL MOY)

LEGEND

- CITY LIMITS
- MULTI-USE PATHS

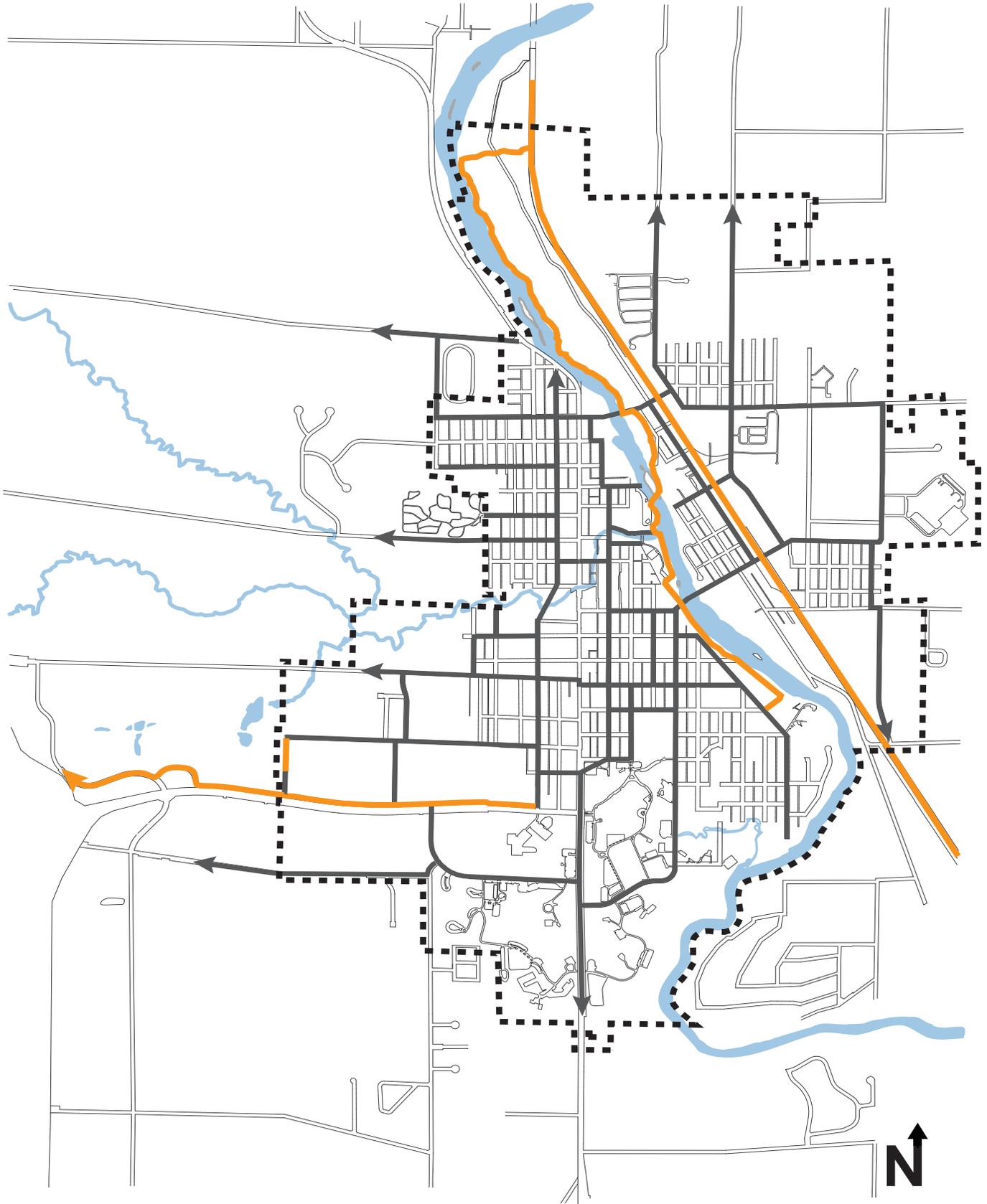


FIG 43: BIG RAPIDS BICYCLE NETWORK MULTI-USE PATHS (ALL)

MILES



Bicycle-Only Paths: These paths are for use only by bicycle traffic, and separate routes are designated for pedestrian traffic. This separation helps prevent bicycle and pedestrian accidents.

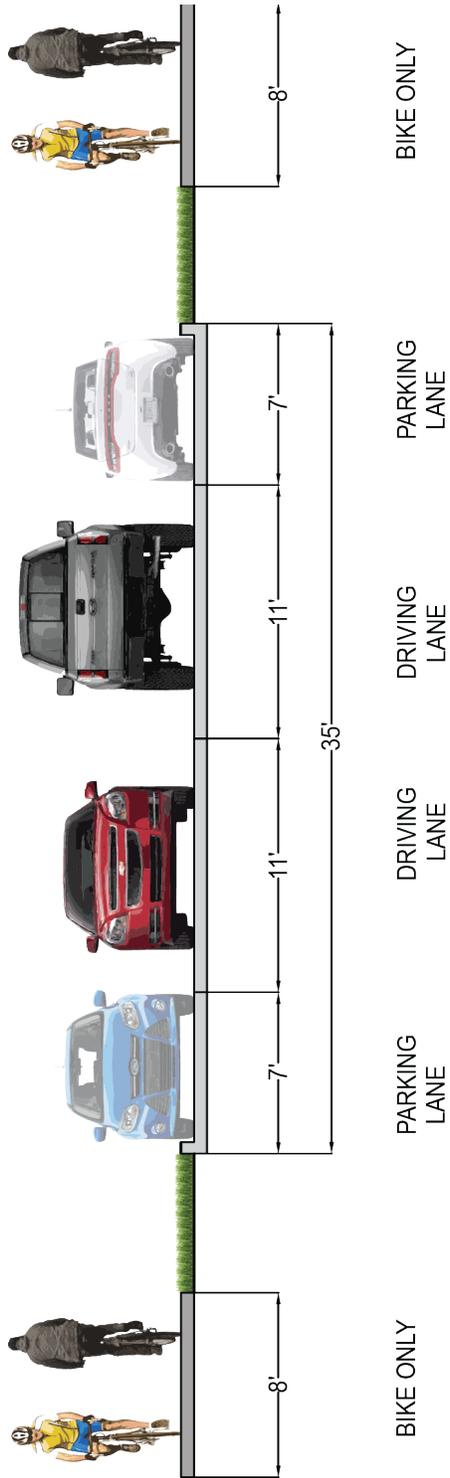


FIG 44: BICYCLE ONLY PATH EXAMPLE (MICHAEL MOY)

LEGEND

- CITY LIMITS
- BICYCLE ONLY PATHS

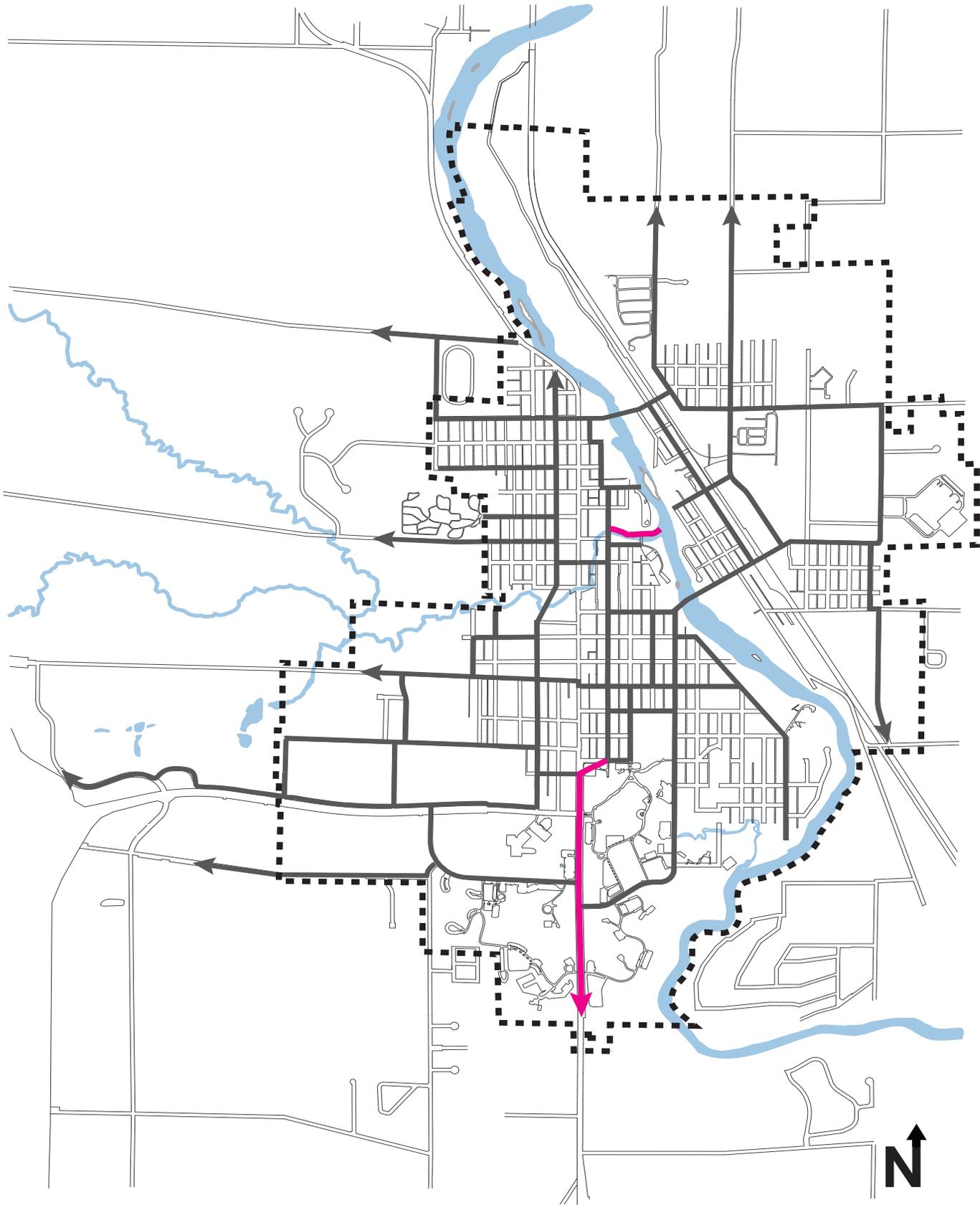


FIG 45: BIG RAPIDS BICYCLE NETWORK BICYCLE ONLY PATHS (ALL)





FIG 46: MICHIGAN STREET BICYCLE LANES (DON BUCHOLZ)

Bicycle Plan: All of the above elements aided in informing the bicycle element of the Big Rapids Bicycle and Pedestrian Plan. Combining various types of paths into the current plan, it allows for paths to be available for every skill level of bicyclist; in addition to that, the plan also connects to every part of town, thus allowing the entire community to utilize it.



FIG 47: MAPLE STREET BICYCLE LANES (DON BUCHOLZ)

LEGEND

- BIKE LANE - NO PARKING
- - - BIKE LANE - PARKING ONE SIDE
- BIKE LANE - PARKING TWO SIDES
- - - ADVISORY LANE - NO PARKING
- ADVISORY LANE - PARKING ONE SIDE
- - - ADVISORY LANE - PARKING TWO SIDES
- ALTERNATING PARKING
- SHARED ROADS
- MULTI-USE PATH
- BICYCLE ONLY PATH

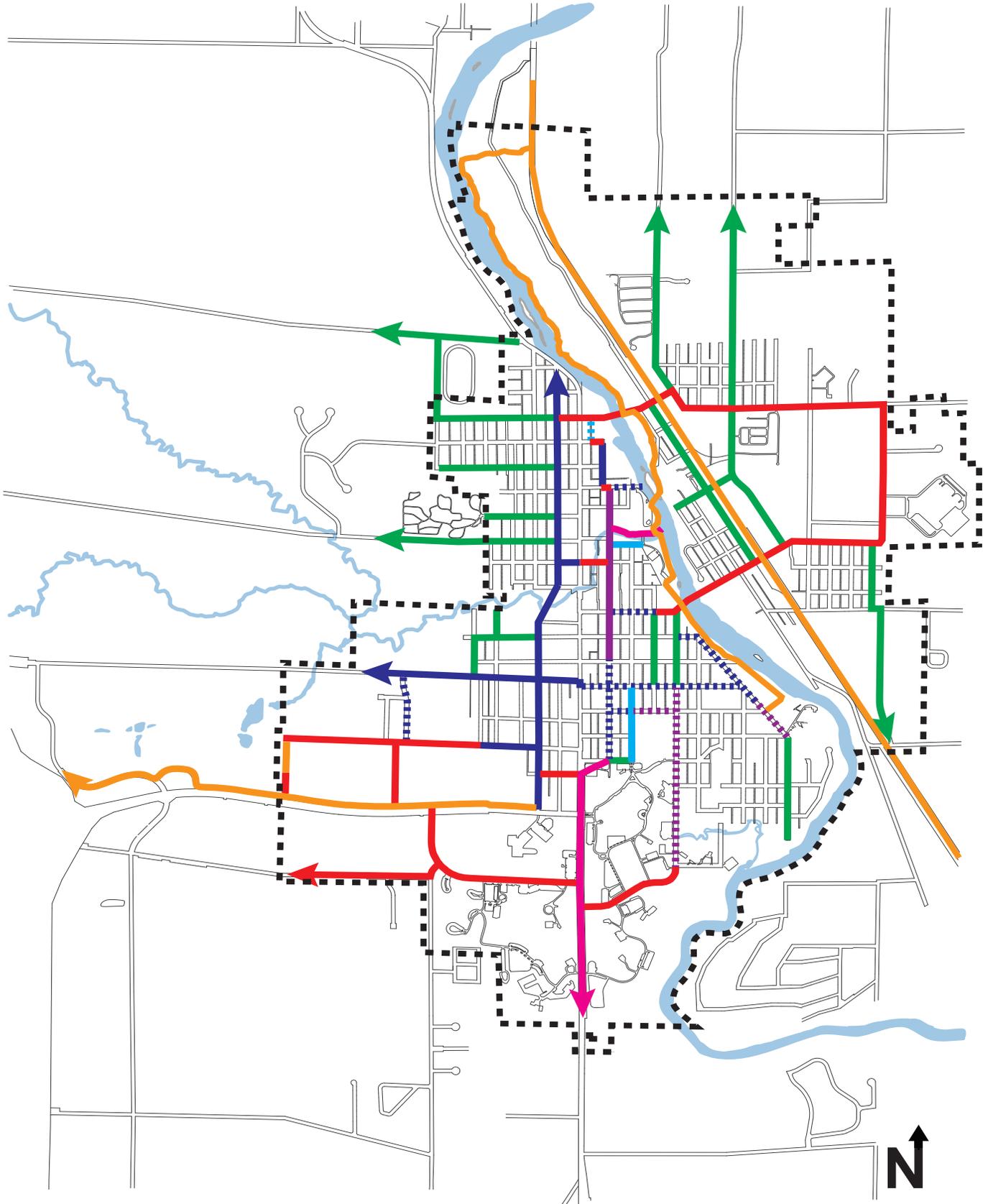


FIG 48: BIG RAPIDS BICYCLE NETWORK (ALL)



Sidewalks: As this is a pedestrian plan as much as it is a bicycle plan, the network of pedestrian infrastructure needs to be analyzed and have improvements made for the implementations proposed. The sidewalks were extensively analyzed during the research of existing conditions within Big Rapids, and the current conditions of the sidewalks can be seen in figure 8 under the existing conditions section. Currently, sidewalks are present in the center of downtown Big Rapids and in good condition, but once away from the center of downtown, the quality of sidewalks deteriorates to the point where sidewalks become almost non-existent.

The presence of sidewalks encourages and allows residents to travel about the neighborhoods they live in and venture into adjacent areas of town. Allowing a safe area of travel for pedestrians encourages people to get out and walk. As residents begin to travel about their neighborhoods, the feeling of safety increases by having more people present; additionally it allows residents to have the opportunity to see and meet more people in their neighborhood, creating connections to the neighborhood they live.

The sidewalk infrastructure was assessed for areas needing improvement. These were areas that needed to be addressed immediately; areas within neighborhoods that were imperative in increasing travel throughout; and finally areas with seemingly little significance but vital for pedestrian infrastructure.

LEGEND

-  PRIMARY
-  NEIGHBORHOOD STREETS
-  ADDITIONAL EXPANSION

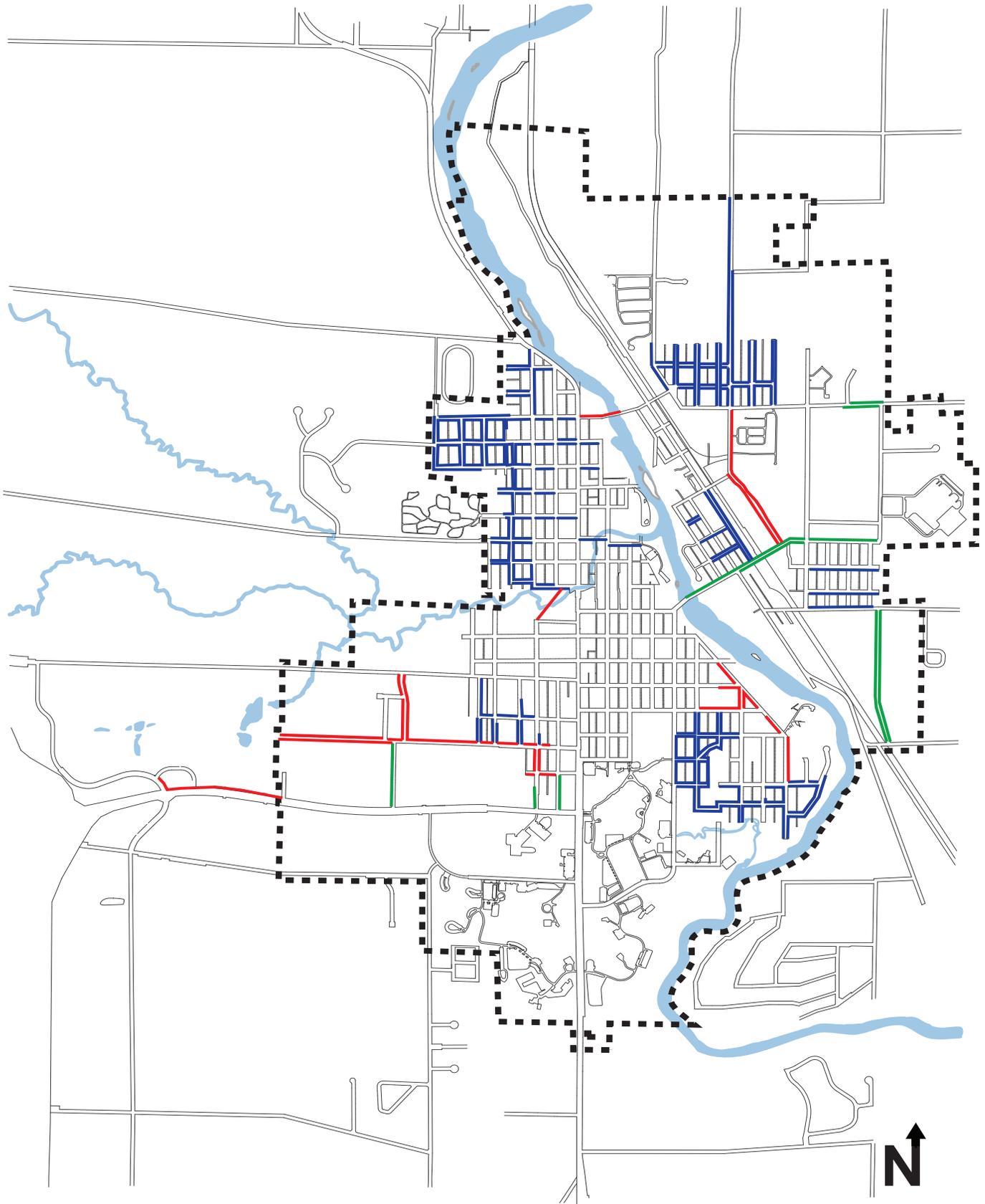


FIG 49: BIG RAPIDS SIDEWALK IMPROVEMENT MAP (ALL)



04.2 PHASING

RACHEL WELLER

The bicycle and pedestrian plan is to be implemented in separate phases, as outlined in the attached map.

Phase 1: Creation of the main loop includes, but is not limited to, the construction of a new bridge across Mitchell Creek and bicycle lanes on Marion Ave., Maple St., Division Ave., Woodward Ave., 15 Mile Rd., and Ives St.

Phase 2: The next step is to identify bicycle lanes on roads that lead to the main loop, including Michigan Ave., Hemlock Rd., and River St.

Phase 3: Complete marking of shared lanes and the new path from Venlo Dr. to Fuller Ave.

LEGEND

-  PHASE 1
-  PHASE 2
-  PHASE 3

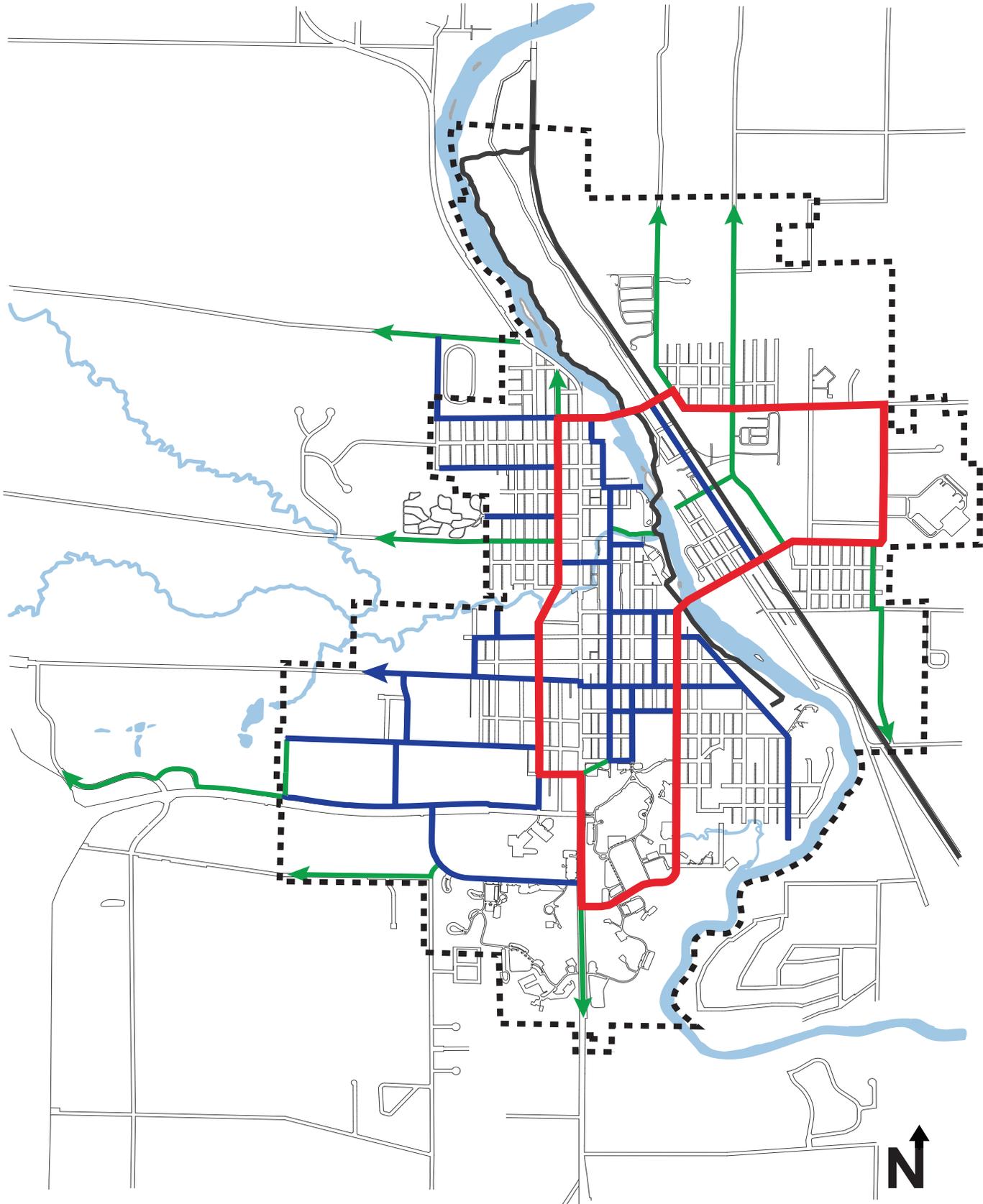


FIG 50: BIG RAPIDS BICYCLE NETWORK PHASING (ALL)



04.3 TIMELINE

RACHEL WELLER

A sample timeline was established regarding the Big Rapids Bicycle and Pedestrian Plan.

- January - Definition of roles and responsibilities. Delegation of project components to project partners. Project expectations clearly defined.
- February - Goals and policy framework completed and presented to the Big Rapids City Council for input. Maintenance policy and public input policy discussions begin.
- March - Needs-analysis completion based on observations. Needs-analysis to include trails, bicycle lanes, bicycle parking, education, enforcement, tourism, transit connections, and safety initiatives. Start design guideline discussions in alignment with a 10-Year Transportation Action Plan.
- April - Prioritize projects and initiatives. Determine cost estimates and timelines for various projects. Continue design guideline discussions in alignment with a 10-Year Transportation Action Plan.
- May - Determination of funding and implementation strategies for various projects and initiatives. Determination concerning how to measure success. Continue design guideline discussions in alignment with a 10-Year Transportation Action Plan.
- June - Public open house held to solicit public input on draft routes and draft policies. Complete design guideline discussions in alignment with a 10-Year Transportation Action Plan.
- July - Refine public book based on public input. Complete bicycle plan maps.
- August - Work on detailed design standards for trails, bicycle lanes, and shared-use lanes. Hold discussions regarding shared-use facilities with vehicles, pedestrians, and bicycles.
- September - Work on detailed design standards for trail crossings, bicycle path detours, wayfinding, and informational signage.
- October - Complete maintenance policy for bicycle pathways.
- November - Complete community process policy.
- December - Draft Plan presented for final comments.
- January - Final Plan presented to the City Council and School Board for approval.
- February - Further studies, including more detailed traffic engineering studies, to determine the impact of the proposed bicycle pathways.
- March - Input from neighboring businesses and residents. Public workshops will be held to gather this input.
- April - Identify funding.
- May - Approval is gained by state and city councils.

04.4 DESIGN GUIDELINES

ERIC MILLER

The design standards and recommendations in this document are for use on Michigan roadways. The standards set in this manual are to ensure the safety of everyone who uses the on and off-road bicycle facilities. Making safety a main concern helps ensure that even the most novice bicycle rider can access and use the facilities with ease.

The relationship between this document, AASHTO, and NACTO: This plan contains recommendations for practices that exceed the standards set by both the American Association of State Highway and Transportation Officials (AASHTO) and the National Association of City Transportation Officials (NACTO). On state highways, the standards in NACTO must be met as a minimum. On local agency projects where funds are administered through MDOT, AASHTO standards must be met as a minimum, and for projects using local funds, local agencies can adopt AASHTO or the practices recommended in this plan. The following are guidelines adhere to the implementations outlined in this plan. These standards can be used on any road within the city of Big Rapids.

Bicycle Lanes: Ideal bicycle lane widths are from 4' minimum to 6' maximum, measured from the outside edges of a lane.

- Where parking is present the optimal bicycle lane width is 6', otherwise a buffer area is recommended.
- The minimum bicycle lane width is 3'-6".

A bicycle lane with parking must be a minimum of 11' from curb pan to the outside striping of a bicycle lane.

Shared Roadways: Ideal shared-road lane width is at a minimum 12' and a maximum of 15'. (The total road width must be 24' or more from curb pan to curb pan.)

- The minimum width is 11' wide.

Advisory bicycle lanes: Advisory bicycle lane road width must be a minimum of 13' from the interior side of the dashed line in the center of the road to the curb pan. The width of the advisory bicycle lane itself must be from 3'-6" minimum to 7' maximum.

Multi-Use Paths: Ideal multi-use bicycle lanes must be at least 4' wide, and a maximum of 6' wide.

Sidewalks used for multi-use paths can be between 3' and 5' wide.

Markings and Signage: Lane striping width for bicycle lanes, advisory lanes, shared roads, and buffer areas can be either 6" or 8" wide.

Buffer areas for bicycle lanes should be anywhere from 6" to 5' wide.

Bicycle lane symbols marked on roads should be 6'-6" long by 3'-6" wide.

Bicycle lane arrows should be 3' deep by 3'-6" wide.

Bicycle lanes must be separated from driving lanes by solid white lines.

Advisory lanes must be marked with dashed white lines.

Sharrow ("shared-road") symbols must be 11' from the curb where parking is present, and 4' from the outside of the road or curb pan to the center of the sharrow symbol where there is no parking. Sharrow symbols should be 3'-4" by 9'-4".

Buffers can be between a bicycle lane and vehicular traffic or on-street parking.

Existing On-Road Conditions: Parking width is 7' to 8' measured from the curb to the inside edge of a bicycle lane or buffer area line.

New drain covers must be installed to prevent accidents with small bike tire widths.

	4' BIKE LANE	5' BIKE LANE	6' BIKE LANE	SHARED BIKE LANE	ADVISORY LANE	BUFFER 0-1'	BUFFER 1'-2'	BUFFER 3'-5'
-20'				Red		Red		
20'-24'				Red		Red		
25'-29'	Pink			Red	Blue	Grey		
30'-34'	Pink	Yellow		Red	Blue	Grey	Pink	
35'-39'	Pink	Yellow	Green	Red	Blue	Green	Yellow	Pink
40'-44'	Pink	Yellow	Green			Grey	Grey	Grey
45'-49'		Yellow	Green				Grey	Grey
50'+		Yellow	Green				Grey	Grey

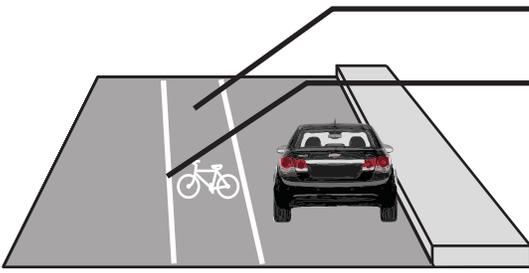
FIG 51: ROAD WIDTH INFRASTRUCTURE OPTIONS (ERIC MILLER)

BICYCLE LANE

Ideal bicycle lane 4' min to 6' max

Bicycle lane with parking must be 11' from curb pan to interior side of lane

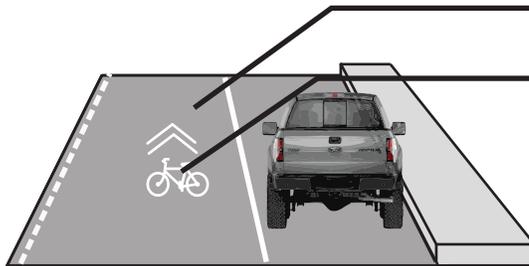
A. Minimum bicycle lane 3'-6"



SHARED ROAD

Road lane must be 13' from center line to curb pan

Sharrow symbol must be 11' from side of road where parking is present or 5' from side of road where no parking is present



MARKINGS

Buffer areas can range from 6" up to 5'

On road arrow 3' Long by 3'-6" Wide

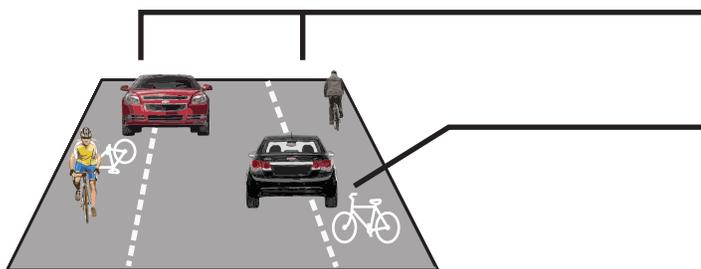
On road bicycle lane and sharrow symbol 6'-6" Long by 3'-6" Wide



ADVISORY LANE

Road width minimum 13' from interior sides of dashed lines

Bicycle lane width from 5' minimum to 7' maximum



MULTI-USE PATH

Ideal bicycle lanes are 4' minimum and 6' maximum

Sidewalks are 3' minimum and 5' maximum

A. Minimum multi-use bike path 8'

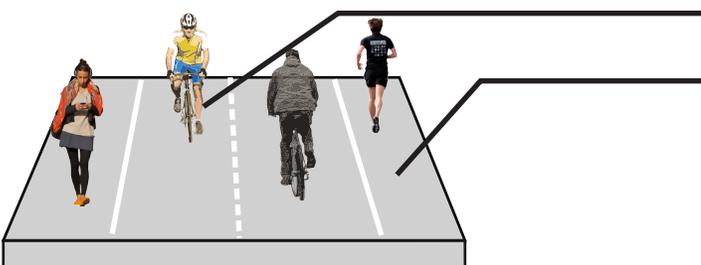


FIG 52: DESIGN GUIDELINE ILLUSTRATION (ERIC MILLER)

04.5 NEW POLICIES

ANTHONY AMATO

The following policies suggest methods the city of Big Rapids can use to help maintain and improve the bicycling infrastructure as ridership increases. Many of the policies represent standards which the general public must abide by in order to facilitate a safe and healthy environment.

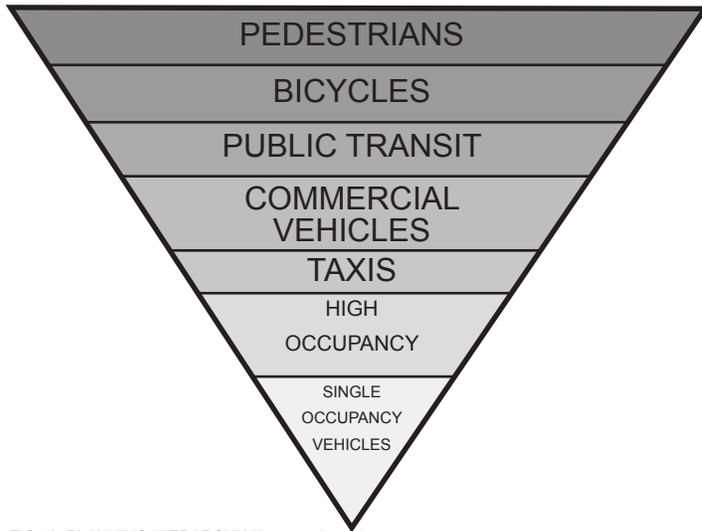


FIG 53: PLANNING HIERARCHY (ANTHONY AMATO)

Bicycle and Pedestrian Infrastructure: The policies included in this section are designed to facilitate improvement to all existing infrastructure and to assist with future expansion and planning.

Adopt a new green transportation hierarchy. This is changing the way future infrastructure is planned. Emphasis is placed on the pedestrian and bicyclist rather than on cars. This promotes sustainability and will improve both the health and safety of the community.

Establish a bicycle and pedestrian planning committee. This could potentially function jointly with the park and recreation board.

Bicycles may not be chained or attached to shrubbery, trees, plants, guide rails, posts, doors, lamps, telephone poles, or other objects not designated for the purpose of securing bicycles.

Bicycles may not be parked in a way that would block or impede the access to a building entrance or exit.

Bicycles may be parked only in those areas which have been specifically designated for this purpose. A bicycle parking area is indicated by the presence of bicycle racks. All bicycles must be parked in bicycle racks, and it is recommended that they are secured to deter theft.

The following tables display how many bicycle parking spaces are required for each listed building use. All existing and future buildings shall provide bicycle parking in accordance with the following tables:

NON-RESIDENTIAL (EXCEPT HOTEL/MOTEL AND LOW OCCUPANCY FACILITIES)

GROSS FLOOR AREA	REQUIRED MINIMUM NUMBER OF BICYCLE PARKING SPACES
0 - 6,000 S.F.	0
6,001 - 20,000 S.F.	1
OVER 20,000 S.F.	1 PER EVERY 10,000 S.F. OR FRACTION THEREOF

FIG 54: BICYCLE PARKING TABLE (ANTHONY AMATO)

MULTI-UNIT RESIDENTIAL

NUMBER OF DWELLING UNITS	REQUIRED MINIMUM NUMBER OF BICYCLE PARKING SPACES
LESS THAN 12	1
12 OR MORE	1 PER EVERY 3 DWELLING UNITS OR A FRACTION THEREOF

FIG 55: BICYCLE PARKING TABLE (ANTHONY AMATO)

At least 60% of all bicycle parking spaces provided must be protected bicycle parking spaces.

COMMERCIAL PARKING AND PARKING STRUCTURE USES

NUMBER OF AUTOMOBILE PARKING SPACES	REQUIRED MINIMUM NUMBER OF BICYCLE PARKING SPACES
0 - 4	0
4 - 20	1
21 - 40	2
OVER 40	1 PER EVERY 10 SPACES OR A FRACTION THEREFORE

FIG 56: BICYCLE PARKING TABLE (ANTHONY AMATO)

LOW OCCUPANCY FACILITIES AND HOTEL/MOTEL USES

NUMBER OF EMPLOYEES	REQUIRED MINIMUM NUMBER OF BICYCLE PARKING SPACES
0 - 5	0
6 - 20	1
21 - 80	2
OVER 80 FRACTION THEREOF	1 PER EVERY 20 EMPLOYEES OR A FRACTION THEREOF

FIG 57: BICYCLE PARKING TABLE (ANTHONY AMATO)

To certify a building or use as a low-occupancy facility, the building owner or applicant shall attach to any zoning permit application, an affidavit attesting to the number of employees required for the use.

Provide consistent ADA compliant features at uncontrolled pedestrian crossings, especially within pedestrian districts and at intersections of crosstown connector streets. (Adopted from the Windsor Bicycle and Pedestrian Master Plan).

Coordinate sidewalk maintenance and installation of new sidewalks with the existing improvement committee.

- Whenever a property is purchased, the owner is responsible for adding sidewalks for their property (if they are not already present). If there are existing sidewalks with extensive damage they must be repaired or replaced (at the discretion of the city).
- Refer to the Big Rapids Street and Sidewalk Code regarding maintenance or construction of sidewalks.

Analyze the locations of police-reported pedestrian and bicycle crashes to identify what areas need improvement or changes to increase the safety of bicyclists and pedestrians. (Adopted from the Vermont Pedestrian and Bike Policy Plan).

Bicycle Equipment Standards: The policies included in this section discuss what equipment bicyclists are required to wear. It also details equipment that is required on a bicycle.

All bicyclists are required to wear helmets to promote safety.

Reflective gear is required after dusk (when the sun sets) and very early in the morning to increase the visibility of bicyclists.

The following equipment should be installed/affixed to a bicycle at all times:

- A front-mounted lamp, which shall produce a visible white light at a distance of no less than 500 feet. A generator lamp is acceptable as an alternative.
- A rear-mounted lamp that shall emit either a flashing or steady red light visible from a distance of no less than 500 feet to the rear.
- Rear and side reflectors facing outward at right angles to the bicycle frame that are visible in all distances from 100 feet to 600 feet when directly in front of lawful lower beams of car headlamps.

A bicyclist may be equipped with lights or reflectors in addition to the aforementioned bicycle lamps and reflectors.

Lamps worn by the operator shall comply with the above standards, provided they can be seen at the distances specified.

Every bicycle shall be equipped with a brake which will enable to the operator to make the braked wheels skid on dry, level, clean pavement. (Adopted from the Baton Rouge, Louisiana Planning Commission Bicycle & Pedestrian Initiative).

Bicycle Operation: The policies included in this section outline the appropriate methods in which a bicyclist is required to ride a bicycle.

Bicyclists shall use the common hand signals for the appropriate turn.

Traffic laws apply to persons riding bicycles. Every person riding a bicycle upon a highway of this state shall be granted all the rights and shall be subject to all the duties applicable to the driver of a vehicle.

A person riding a bicycle shall not ride other than on or astride a permanent regular seat attached to the bicycle, nor shall a bicycle be used to carry more persons at one time than the number for which it is designed and equipped. In addition, a person operating a bicycle shall at all times keep at least one hand upon the handlebars.

No person riding on a bicycle shall attach himself/herself or the bicycle to any vehicle on a highway.

Every person shall ride as far to the right as practical, proceeding in the same direction, except under any of the following conditions:

- When passing or overtaking another bicycle or vehicle moving in the same direction.

- When preparing for a left turn at an intersection, private road, or driveway.
- When it is reasonably necessary to avoid fixed or moving objects (when safe to do so).
- When approaching a place where a right turn is authorized.

Motor Vehicles: The policies included in this section refer to the way motor vehicle operators should drive and interact with bicyclists. As bicycling facilities are incorporated, motor vehicle drivers will need to respect and be more aware of sharing the road.

No person shall operate a motor vehicle in a bicycle lane except as follows:

- To prepare for a turn within a distance of 200 feet from the intersection.
- To enter or leave the roadway onto an alley, private road, or driveway.
- To enter or leave a parking space when parking is permitted adjacent to the bicycle lane.

Any parked vehicle obstructing the flow of bicycle lanes is on grounds for being towed at the expense of the owner of the vehicle. Exceptions can be made by arranging for a permit from City Hall.

A person may operate a motor vehicle upon a bicycle lane under the following conditions:

- When making a turn
- When entering or leaving an alley, private road, or driveway
- As required in the course of official duty, such a to allow the passage of emergency vehicles. (Adopted from the Oregon Statutes Pertaining To Pedestrians and Bicycles).

Cars passing bicyclists on roads must give at least 3 feet of space when passing on shared roads and should only do so when it is safe.

Coordination with Ferris State University: The policies in this section suggest cooperating with Ferris State University. As the bicycle network spreads through the city, the university can continue to expand the bicycle network on-campus.

The city of Big rapids should collaborate with Ferris State University in order to promote safe bicycling and the development of a strong connection between campus and downtown Big Rapids.

Ferris State University should adopt the following policies followed by the city of Big Rapids.

- Bicycles may not be parked or left standing in any lobby or hallway of any building.
- Bicycles may not be parked in a way that would block or impede the access to a building entrance or exit.
- Bicycles may be parked only in those areas which have been specifically designated for this purpose. A bicycle parking area is indicated by the presence of bicycle racks. All bicycles must be parked in bicycle racks, and it is recommended that they are secured to these bicycle racks to deter theft. (Adopted from the South Carolina Campus Bicycle Policy).

Education: The policies included in this section identify methods the city can employ to increase the education and awareness of the general public about safe and healthy bicycling practices.

Distribute bicycle and pedestrian safety, educational, and promotional materials through law enforcement activities, at scholastic orientations, through drivers training and citation diversion programs, and to new political representatives.

Encourage events that introduce residents to walking and bicycling, such as bike-to-work, walk/bike-to-school days, senior walks, and historic walks.

Educate the general public and the officials of state, county, and local law enforcement agencies on common vehicle code infractions involving bicyclists and other users of roadways or off-road pathways. (Adopted from the Windsor Bicycle and Pedestrian Master Plan).

Hold seminars and presentations by certified league instructors from the League of American Bicyclists to facilitate smarter and safer cycling.

04.6 FUNDING

RACHEL WELLER

All programs need funding. This funding can come from any number of different sources. Funds would be spent on signage, repaving of roads and sidewalks, restriping roads, bridge and trail building, and education. Information on which funding program would be best for the Big Rapids Bicycle and Pedestrian Plan can be found in the document “Which Federal Program is right for my project” by the organization America Bikes. This chart can be found in the appendix.

State and Federal Funding Programs: There are many different federal funding programs available for bicycle and pedestrian trails. Each type of funding has its pros and cons, and each is best used for different situations.

- Alliance for Walking and Biking: This group provides Advocacy Advance Grants to start up organizations and innovative campaigns. They provide \$225,000 in grants annually.
- DALMAC Fund: This group grants over \$500,000 to a variety of bicycling activities in Michigan ranging from safety and education programs to bicycle trail development.
- Bikes Belong: A national coalition of bicycle suppliers and retailers that provide grants to organizations that are committed to “putting more people on bicycles more often.” Applicants can be granted up to \$10,000 each.
- Safe Routes to School: This program provides funding for the creation of bicycle and pedestrian access to and from schools. Many funding options are available through this program, but it can only be used to help create routes within a 2 mile radius of schools. Funding is used for projects that focus on making it safe for children (grades K-8) to bicycle and walk to and from school.
- Act 51 Section 10k: This program governs state appropriations for Michigan transportation programs and requires that at least 1% of the funds go to non-motorized transportation services.
- Section 402 - State and Community Highway Safety Grant Program: This federal program provides funds for education, enforcement, and research to help prevent traffic crashes, deaths, injuries, and property damage. Much of these funds go to vehicular roads but 2.67% of the funds currently go toward bicycle and pedestrian accommodations. Both communities and universities are eligible to apply.
- Highway Safety Improvement Program: This is a Federal Highway Administration (FHWA) program that funds highway safety projects to reduce highway fatalities and serious injuries. Bicycle and pedestrian projects are eligible for funding, but this program is largely overlooked by those seeking it.
- The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU): This six-year transportation plan funds hundreds of specifically-authorized high priority projects, including \$52 million in trails projects in Michigan. Additionally, the Federal

Highway Administration administers a number of different programs authorized by SAFETEA-LU legislation in which funding can be used for trail development.

- Congestion Mitigation and Air Quality Improvement Plan (CMAQ): This program funds transportation projects that improve air quality and reduce traffic congestion in areas that do not meet air quality standards.
- Transportation Enhancement (TE) Program: These federal funds support 41% of all bicycle and pedestrian projects. All bicycle and pedestrian infrastructure that have a relationship to transportation are eligible. TE can also fund safety and educational programs.

Locally Funded Programs: Many different publicly funded programs are directly paid for by local taxpayer dollars. Most cities put forth at least 10% of their transportation funding to provide infrastructure for bicyclist and pedestrian programs. This is the traditional way of funding this type of program.

- Transportation Improvements Program (TIP) and Capital Improvements Program (CIP): Local units of government can include and fund non-motorized improvements, within road right-of-ways, as incidental parts of larger transportation projects. Such improvements qualify for the same transportation funds as the rest of the roadway construction or improvement project.
- Millages, Bonds, and Assessments: Local, county, or state millages and bond issues may be passed by voters or governing bodies. A number of Michigan communities have millages for park operations, maintenance, development, and land acquisition, which can be one of the most effective approaches for funding a local trail system initiative.

Private Funding: Some communities look toward non-profit organizations, businesses, foundations, or other creative private and public partnerships to help fund bicycle and pedestrian initiative projects. Some funds come from local businesses or groups that would benefit from the building of pedestrian and bicycle routes. There are a wide range of foundations that help provide funds to cities in need. Although there are national foundations, usually local and regional foundations help fund bicycle, pedestrian, or trail projects.

- Mecosta County Community Foundation: This group currently provides funding for things such as scholarships, environmental issues, worthwhile community projects, and other community needs. The funds typically come from donor grants, such as the Dennis Lerner Advised, the Lerner, Csernai & Fath Financial Group, and the Mecosta County Community Foundation Community Needs Fund.

PRIORITIES 05

A LIST OF ITEMS THAT NEED TO BE ADDRESSED IN ORDER OF IMPORTANCE

By EVAN WEAVER

Priorities for the Big Rapids Bicycle and Pedestrian Plan are divided into two sections - bicycle infrastructure and pedestrian infrastructure. The bicycle infrastructure priorities consist of a list of items that begin implementation of the bicycle and pedestrian plan. The pedestrian infrastructure priorities consist of areas that need to be addressed in order to increase walkability and pedestrian safety.

In accordance with the design guidelines presented previously, the priorities list items for both bicycle and pedestrian infrastructure that will begin implementation of the plan into the city.

05.1 Bicycle Infrastructure Priorities

The first steps to begin implementation of bicycle infrastructure within the city of Big Rapids are listed below.

Baldwin St. Bridge connection: The Baldwin St bridge is scheduled to have major repairs done to it. When this occurs, bicyclists must be given adequate space on the road. In addition, a connection between the bridge and the Riverwalk should be made to allow people access to them both at the northern part of the bicycle route.

Stripe Michigan: Striping Michigan Ave. to include bicycle lanes, in accordance with the standards presented in the design guidelines, will show everyone where bicycles belong and where they need to travel. Michigan is also the major north to south connection within the bicycle route system, which will allow users the freedom to travel about the city in other ways besides the loop.

Implement alternative parking: Division St., Marion Ave., Woodward Ave., Fuller Ave., and Osceola Ave. need new signage and road striping to indicate alternate parking. These roads are a part of the main bicycle loop system around Big Rapids, and will require reconfiguration of on-street parking to allow adequate space for bicycles to have designated lanes.

Repave and stripe Fuller Ave.: Fuller Ave. is in need of repair. Repaving Fuller Ave. will allow for easier travel by bicycle and vehicle traffic. Fuller Ave. is a high priority because it reaches a high concentration of university students. The road should be striped according to the standards presented in the design guidelines.

Stripe Maple St., Bronson Ave., Milton Ave., Baldwin St., Ives Ave., and South St.: These roads comprise the eastern and university portions of the main bicycle loop and will draw attention to the presence of bicycles on streets. These roads need bicycle lanes, advisory lanes, or shared-road symbols painted to designate where bicycles belong. Roads should be painted and striped according to the standards presented in the design guidelines.

Stripe Ferris Dr., 15 Mile Rd., Watertower Rd., and Morrison Ave.: These roads are the final connection streets needed to complete the full loop of the bicycle system. They create designated routes to high traffic areas such as Big Rapids High School and Ferris State University from the signed bicycle route. Road should be painted and striped according to the standards presented in the design guidelines.

Stripe remaining bicycle lanes within city limits: As seen in the Implementation section, there are bicycle lanes throughout the city, not just on the main loop. These bicycle lanes provide freedom for users to choose how they would like to get around the city without being confined to only a couple roads. These roads should be painted and striped according to the design guidelines.

Stripe all advisory lanes within city limits: These streets will continue to increase the connectivity throughout town and provide more route options for riders. They will most likely be used by those more comfortable with riding on streets and, therefore, need to be implemented later to provide people a chance to get accustomed to riding adjacent to vehicles. Roads should be painted and striped according to the standards presented in the design guidelines.

Stripe sharrows within city limits: Another way to designate direction and create a distinct presence of bicycles is with the use of sharrows. Sharrows increase user options throughout the expanding network, and should be addressed after other options have been implemented. Roads should be painted and striped according to the standards presented in the design guidelines.

Stripe sharrows leading out of town: Striping sharrows shows users a designated path to leave the bicycle loop system and venture to other areas, thus increasing connectivity to places outside of the city. Roads should to be painted and striped according to the standards presented in the design guidelines.

Mitchell Creek connection: This connection is crucial to the bicycle system because it creates a safe path for bicyclists to cross Mitchell Creek, while keeping riders from having to detour onto State St., which is a less desirable route for bicycle traffic.

05.2 Pedestrian Infrastructure Priorities

Areas of focus for improvement of pedestrian access and walkability throughout the entire city of Big Rapids are presented below.

Baldwin St. Bridge connection: The Baldwin St Bridge is scheduled to have major repairs. During repairs, pedestrians should be provided with an adequate place to travel along the bridge. A connection between the bridge and the Riverwalk should be made to allow people access to these city amenities.

Fuller Ave. to Venlo Dr. connection: A connection between the end of Fuller Ave. and Venlo Dr. will provide a safe route for pedestrians to two of the biggest destinations in Big Rapids, Wal mart and Meijer. The current sidewalk along Perry St. crosses several busy entrances for commercial businesses on the north side of the street. Vehicles trying to access these businesses create an unsafe situation for pedestrians. Bypassing this section and accessing Perry St. via the connection between Fuller Ave. and Venlo Dr. provides a safer route for pedestrians.

River St.: Convenient and safe pedestrian access from River St. to the dog park and sport fields is needed. River St. draws a large number of pedestrians due to the amenities in the dog park and sports complex, and the hospital. Currently there is no designated area for pedestrians to travel to and from these amenities safely.

Bailey Dr.: This street is the main thoroughfare from Woodward Ave. to Fuller Ave. for both pedestrians and vehicles. Pedestrians need a safe path away from vehicular traffic. A sidewalk needs to be added along the road without interrupting the existing curb, gutter, and road.

Ferris Dr.: This street is a main thoroughfare through the west side of the university campus, and needs a sidewalk along the east and north sides.

Hemlock Rd.: This street connects directly to Hemlock Park, but is not a welcoming route for pedestrians. A clear path from Michigan Ave. into Hemlock Park is needed along Hemlock Rd. to create a more welcoming entrance into the park. A sidewalk directly into Hemlock Park with lights is needed.

Northeast neighborhood: The neighborhood off Catherine St., including Olaf St., Henderson St., and Hanson St., have no designated pedestrian paths, which prevents people from traversing within the neighborhood and accessing other areas outside of the neighborhood. Sidewalks throughout this neighborhood need to be added to increase travel.

4th Ave. neighborhood: The neighborhood surrounding 4th Ave. does not have a designated path for pedestrians. People trying to travel within and through the neighborhood do not have a safe manner in which to accomplish this task. Sidewalks throughout this neighborhood need to be added to increase travel throughout and across the neighborhood.

South of Maple neighborhood: The neighborhood on the east side of the Muskegon River, south of Maple St., does not have a designated area for pedestrians. People trying to travel within the neighborhood do not have a safe way to accomplish this task. Sidewalks need to be added to allow residents to travel throughout the neighborhood in a safe manner.

Maple St. Bridge: The bridge has existing sidewalks that are in fair condition, but pedestrians feel unsafe due to the height of the sidewalks above the road and the close proximity to vehicles. A physical barrier is needed along both sidewalks to separate pedestrian from vehicle traffic and to prevent falls.

Perry Ave.: Two big destinations in Big Rapids are Walmart and Meijer, just outside of town. No clear and safe path exists for pedestrians to get to these locations. A well-used dirt path exists on the grass leading to these locations, indicating the need for a safe way to reach them without having to compete with vehicles. A sidewalk from Venlo Dr. to the entrance of Walmart is needed to allow pedestrians a safe area to travel along this busy street.

LEGEND

BICYCLE INFRASTRUCTURE PRIORITIES

- 1 BALDWIN STREET BRIDGE CONNECTION
- 2 STRIPE MICHIGAN
- 3 IMPLEMENT ALTERNATIVE PARKING
- 4 REPAVE AND STRIPE FULLER AVE
- 5 STRIPE MAPLE ST, BRONSON AVE, MILTON AVE, BALDWIN ST, IVES AVE, AND SOUTH ST
- 6 STRIPE FERRIS DR, 15 MILE RD, WATERTOWER RD, AND MORRISON AVE
- 7 MITCHELL CREEK CONNECTION

PEDESTRIAN INFRASTRUCTURE PRIORITIES

- 1 BALDWIN STREET BRIDGE CONNECTION
- 2 FULLER AVE TO VENLO DR CONNECTION
- 3 RIVER ST
- 4 BAILEY DR
- 5 FERRIS DR
- 6 HEMLOCK RD
- 7 NORTHEAST NEIGHBORHOOD
- 8 4TH AVE NEIGHBORHOOD
- 9 SOUTH OF MAPLE NEIGHBORHOOD
- 10 MAPLE ST BRIDGE
- 11 PERRY AVE

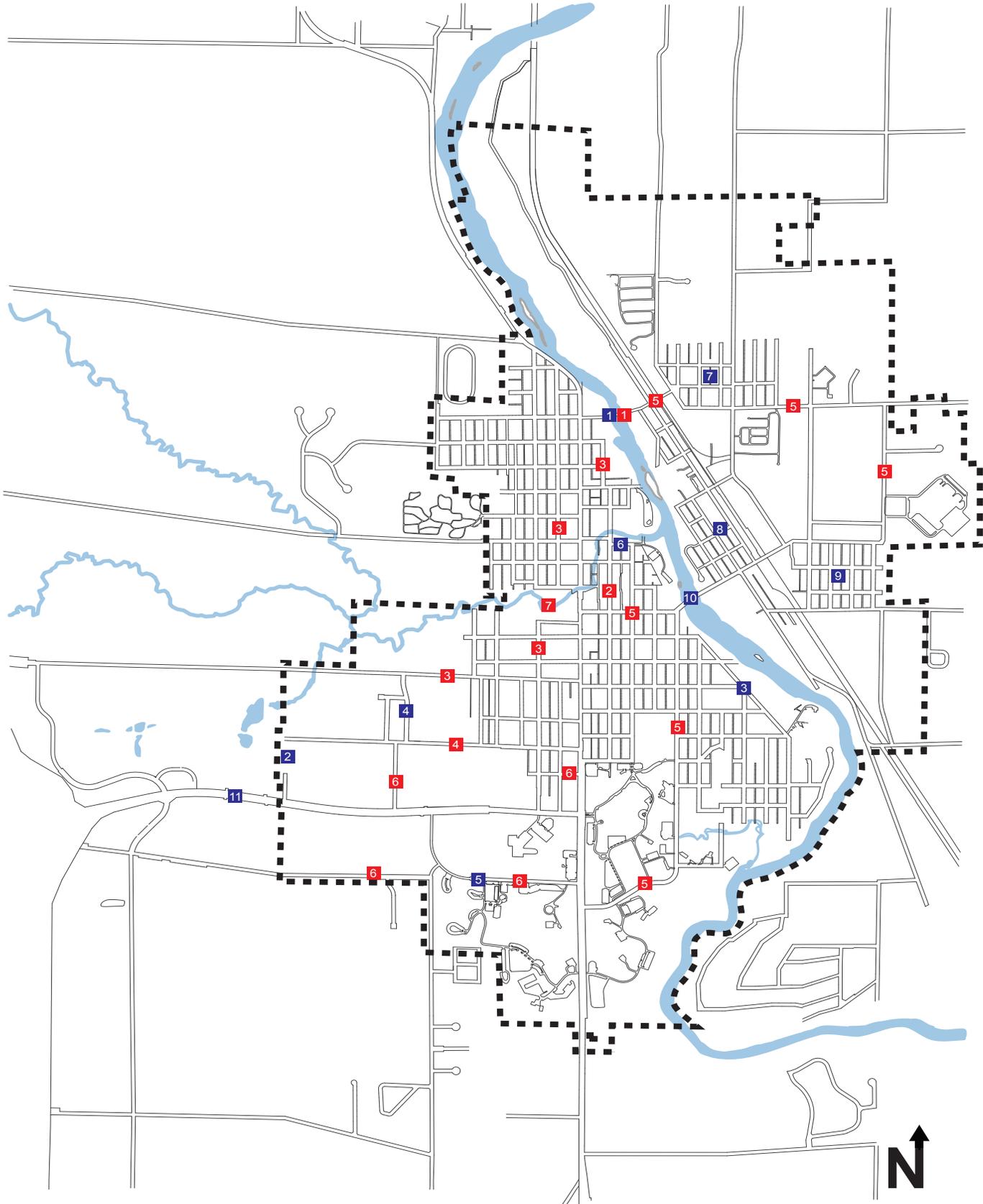


FIG 58: PRIORITIES (ALL)



LONG TERM PLAN 06

LOOKING FORWARD 10 TO 30 YEARS

BY WILL HINKLEY

The long-term plan is made up of four main sections: Vision, Outcomes over the next 20 years, Suggestions, and Plan Updating. The vision is a broad statement of what the Bicycle and Pedestrian Plan looks to achieve within the city of Big Rapids, and how it can be accomplished. The outcomes state the intended size that the plan should reach and the number of facilities it should encompass. The suggestions section consists of possibilities offered by the Small Town Studio which should be considered as bicycling increases throughout the city. The last section, plan updating discusses how often the plan shall be updated based upon changing conditions.

06.1 VISION

The Big Rapids Bicycle and Pedestrian Plan not only establishes the vision, but also establishes practical steps that are needed in the future to ensure that Big Rapids will become a bicycle and pedestrian-friendly city. The plan is an important first step, but much work lies ahead. By providing the necessary human and financial resources to accomplish this plan, Big Rapids will establish a safe, efficient system of routes, easily accessible and routinely used by members of the community. It will therefore be important in the future to measure progress, reassess priorities, and strive to further increase the use and safety of bicycle transportation as the city moves forward with the implementation of the Big Rapids Bicycle and Pedestrian Plan.

06.2 OUTCOMES OF IMPLEMENTING THE BIKE AND PEDESTRIAN PLAN FOR BIG RAPIDS SHOULD INCLUDE OVER THE NEXT 20 YEARS

Over the next 20 years, the Big Rapids Bicycle and Pedestrian Plan shall aim to accomplish the following items:

- Bicycle facilities on 40% (6 miles) of Big Rapids streets
- A 10 mile system of signed bicycle routes, connecting all parts of Big Rapids
- A signed route within ¼ mile of 80% of Big Rapids schools
- A bicycle facility within ¼ mile of 70% of Big Rapids residents

06.3 SUGGESTIONS

The Small Town Studio has come up with several suggestions that should be considered as bicycling increases in Big Rapids. These suggestions are as follows:

- Reconfiguration of roadways with less travel and/or narrower lanes, and more space for bicycle facilities.
- Intersection improvements that allow bicyclists on non-arterial streets to safely cross arterial streets.
- Designation of bridges that provide safe, convenient access for bicycles.
- Installation of bicycle facilities at intersections (bicycle boxes, bicycle turn pockets, traffic signals for bicycles only, and special signal phasing for bicyclists).
- Provision of a bicycle and pedestrian bridge across the Muskegon River.

- Provision of high-capacity bicycle parking in more retail areas, parks, schools, and public buildings, such as libraries and community centers.
- Assurance that all new commercial, office, and industrial buildings are equipped with lockers and showers for bicyclists.

06.4 UPDATE PLAN

As conditions change, new information is gathered, and new ideas emerge, it will be necessary to update the Big Rapids Bicycle and Pedestrian Plan. It is recommended that the plan be reviewed annually with revisions performed every five years. Public participation in decisions involving major changes to the priority routes or Master Plan should be encouraged.

MEASURES OF SUCCESS 07

HOW WE WILL GAUGE OUR SUCCESS

BY REBECCA THAYER

As conditions change, new information is gathered, and new ideas emerge, it will be necessary to update the Big Rapids Bicycle and Pedestrian Plan. It is recommended that the plan be reviewed annually with revisions performed every five years. Public participation in decisions involving major changes to the priority routes or Master Plan should be encouraged.

07.1 BEFORE IMPLEMENTATION

The potential success of the plan can be examined during the research and analysis stages listed below.

- Analysis of the city and existing conditions.
- Identification of key areas where pedestrian and bicycle access is unsafe or limited.
- Identification of origins, destinations, and gaps.
- Analysis of the proposed plan to determine overall comprehensiveness of access and connections.

07.2 AFTER IMPLEMENTATION

Once the plan is in place, there are studies and observations that can be done to determine whether or not the bicycle and pedestrian plan are being used as intended. They are listed below.

Observation of the use of routes for safety, accessibility, and functionality.

Identification of barriers and needed improvements.

Observation of the number of users at strategic points along new path network at regular intervals to gauge usage patterns. Counts should be restricted in the following manner:

- Same locations
- Same time of year, day of year, and time of day.
- Similar weather conditions
- Avoid observing Friday through Monday, which may not reflect a “normal” day due to short work-weeks and holidays.
- Conduct separate counts during special events

Observation of actual use. When observing, the following questions should be considered.

- Are spaces used as intended?
- Do people follow rules as posted or marked?
- Do people act confused?
- Are any areas or crossings regularly avoided?
- Is bicycle parking adequate or overcrowded?
- Are bicycles parked at other locations indicating a need for more bicycle parking?

Comparison of current data with past (baseline) data and creation of graphs, charts, etc. This information can help determine if new bicycle and pedestrian paths are actually creating a safer overall environment for users throughout the

city, and provide insight into the number of users. Comparison data may include the following:

- Information from city analysis
- Police reports concerning bicycle and pedestrian involved accidents
- Transportation data showing increase (or decrease) of walkers and bicyclists

Obtain public input. Listed below are several methods that can be used to gain insight from community members.

- Surveys
- Telephone hotlines
- Internet comment forums
- Community open-houses
- Development of a citizen committee
- Involvement with other organizations that promote bicycle and pedestrian travel (Safe Routes to School, Complete Streets, etc.)

Future growth. As the city of Big Rapids grows it will likely need to expand the bicycle and pedestrian plan. The list below contains items for consideration when making future plans.

- Policies
- Education of drivers about bicycle and pedestrian safety
- Education of bicyclists and pedestrians about routes and safety with training, workshops, way-finding tools (maps, brochures, flyers), and development of a website.

Adoption of a plan coordinator. The Big Rapids Bicycle and Pedestrian Plan is somewhat complicated already. As the route system expands in the future it will become even more difficult to keep track of. Therefore, someone to coordinate all facets of the proposed and any future plans would be extremely valuable.

DESIGN SOLUTIONS 08

EXAMPLE SOLUTIONS FOR KEY AREAS

BY SMALL TOWN STUDIO

LEGEND

- 1** MITCHELL CREEK CONNECTION
- 2** FULLER TO VENLO CONNECTION
- 3** WOODWARD/LOCUS INTERSECTION
- 4** RIVERWALK STAIRS
- 5** STATE STREET BICYCLE PATH
- 6** BICYCLE ONLY PATH THROUGH UNIVERSITY
- 7** MICHIGAN STREET REDESIGN
- 8** MAPLE STREET REDESIGN
- 9** RIVERWALK BRIDGE OVER MUSKEGON RIVER

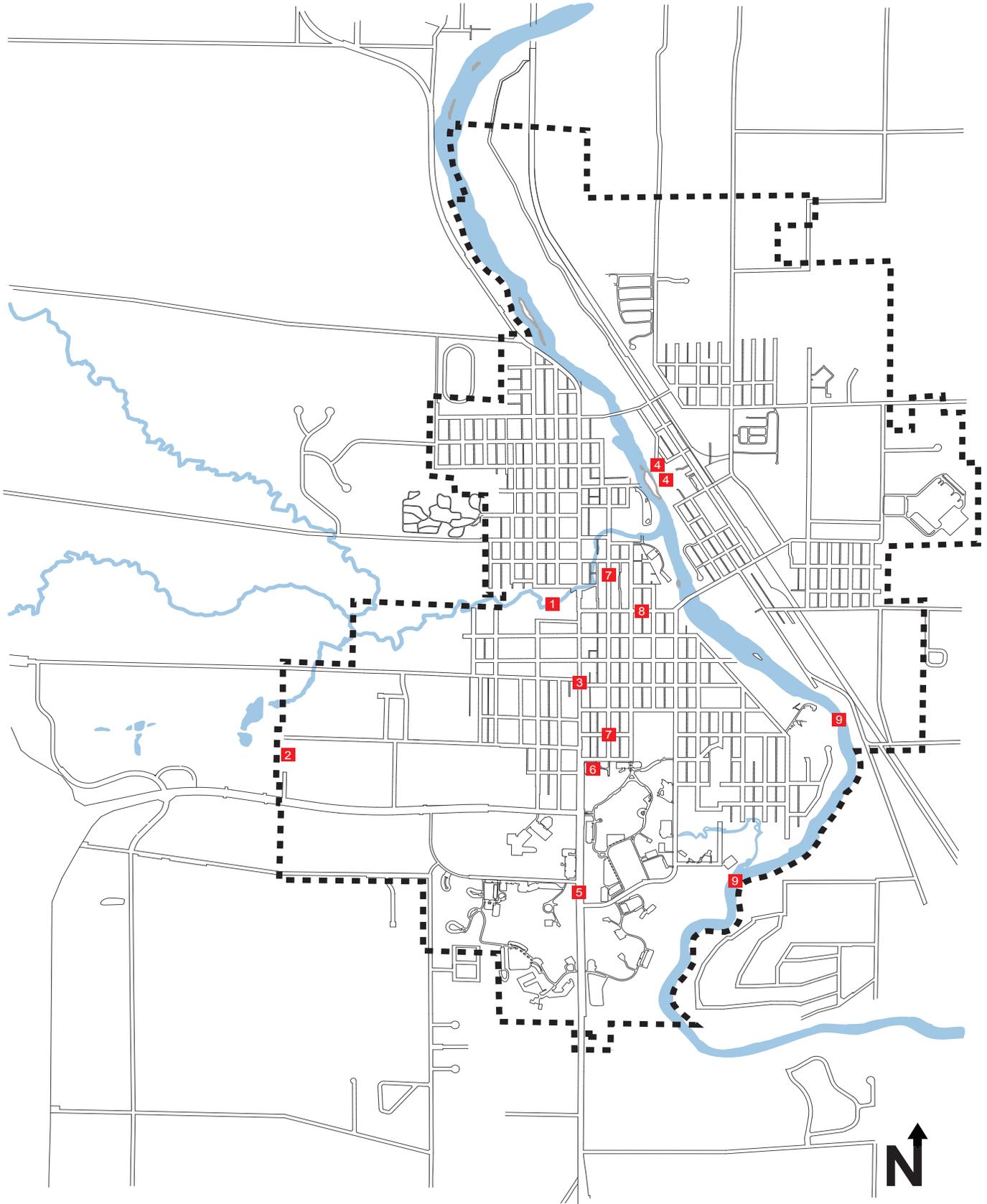


FIG 59: DESIGN SOLUTION LOCATIONS MAP (ALL)



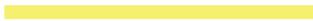
MITCHEL CREEK 08.1

CREATING A CONNECTION

BY ANTHONY AMATO & EVAN WEAVER

Mitchell Creek is defined as a gap within in the city of Big Rapids, based on an analysis of the city. To increase connectivity between the neighborhood districts north and south of Mitchell Creek, a clear and safe route over the creek is needed.

LEGEND

-  PROPOSED PATH
-  PROPOSED BRIDGE
-  MITCHELL PROPOSED
-  SECTION CUT
-  PROPOSED POCKET PARK

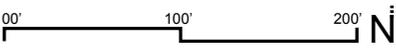


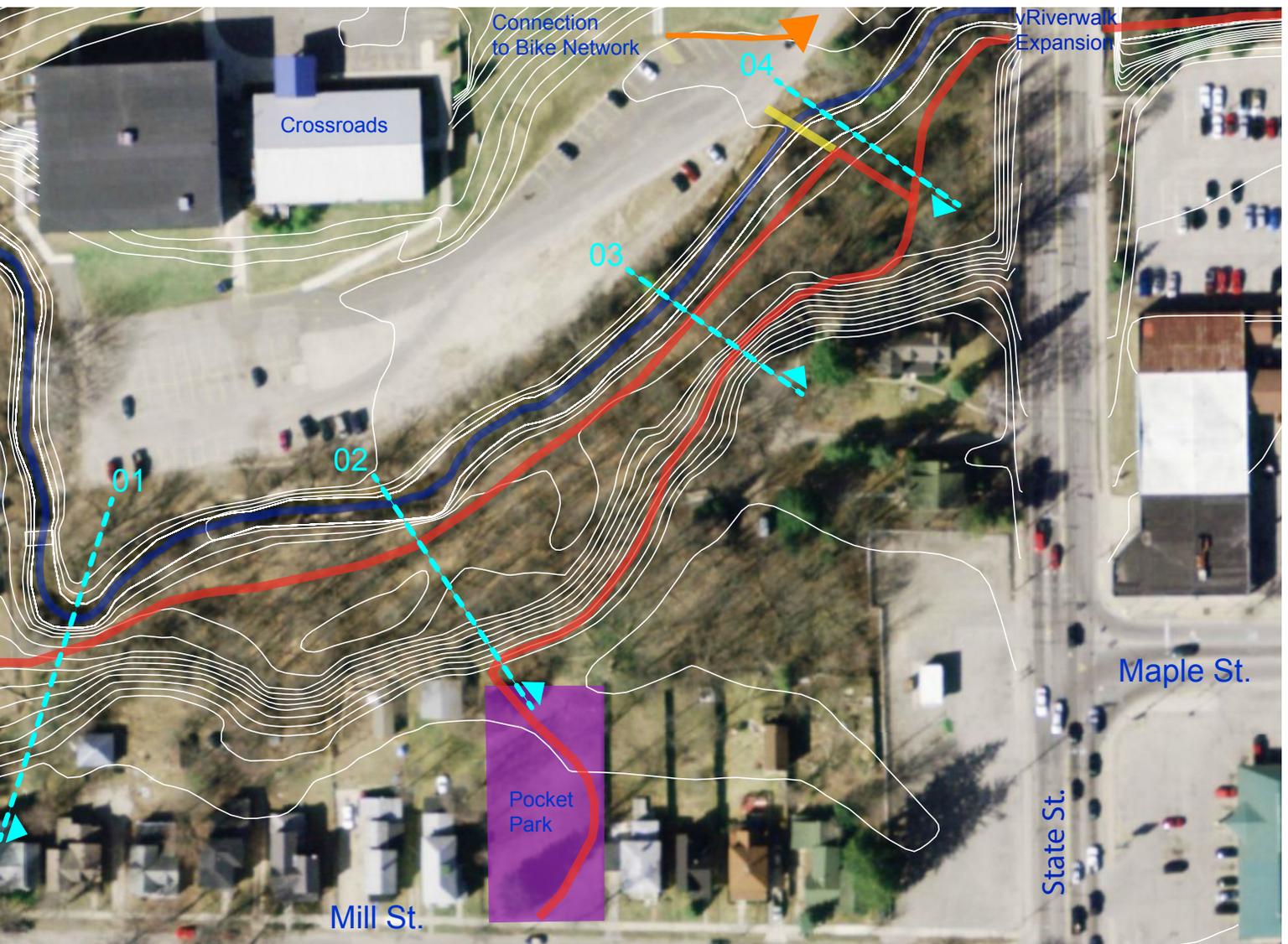
FIG 60: MITCHELL CREEK PATH PLAN (ANTHONY AMATO)

MITCHELL CREEK 08.1.1

CREATING A CONNECTION

BY ANTHONY AMATO

This approach focuses on establishing not just a connection from the neighborhoods to the North and South, but creating a network of paths for pedestrians and bicyclists. This design also asks the city to develop a small neighborhood park. The path has two components, one which slopes downhill and below State Street, and the other, which continues along Mitchell Creek, through the athletic field, and connects to Clay Cliffs parking lot.



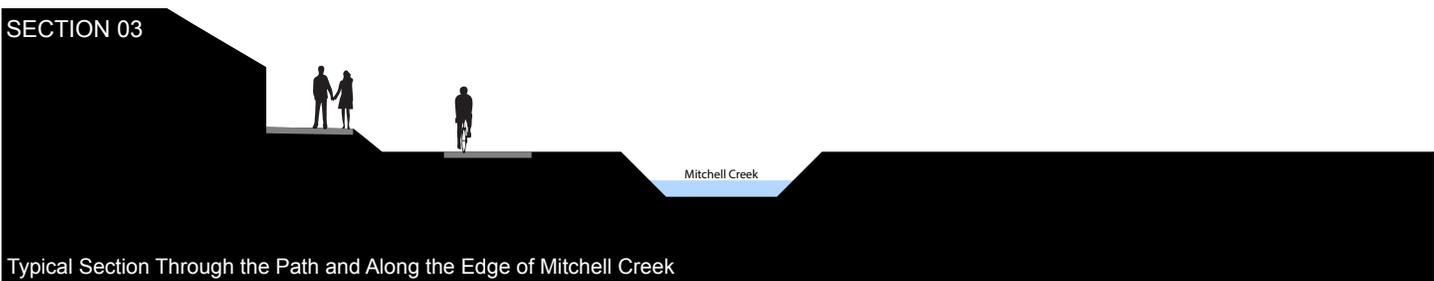
SECTION 01



SECTION 02



SECTION 03



SECTION 04

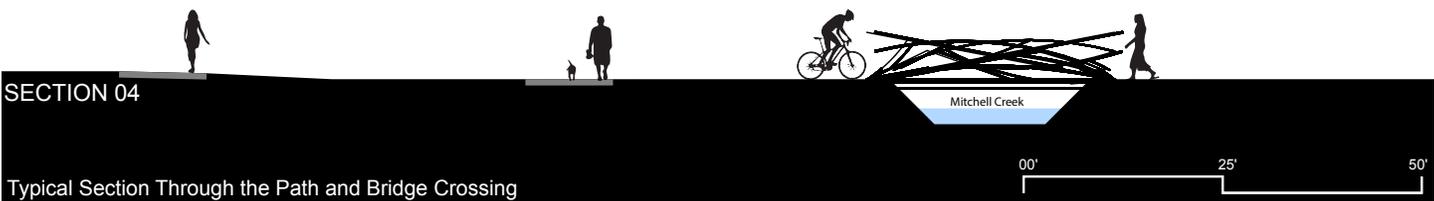


FIG 61: MITCHELL CREEK SECTIONS (ANTHONY AMATO)



FIG 62: MITCHELL CREEK BEFORE (ANTHONY AMATO)



FIG 63: MITCHELL CREEK AFTER (ANTHONY AMATO)



FIG 64: PATH EXAMPLE BEFORE (ANTHONY AMATO)



FIG 65: PATH EXAMPLE AFTER (ANTHONY AMATO)



FIG 66: PASSAGE BELOW STATE STREET (ANTHONY AMATO)

The upper-left photo displays the existing conditions of the low-lying area which follows along Mitchell Creek. The upper-right photo suggests what a bridge may look like crossing the creek.

The middle-left photo again displays an existing conditions along Mitchell Creek. This particular photo shows where a natural footpath has been established by pedestrian traffic. The middle-right photo shows how the current trail could be transformed to accommodate not just foot-traffic but also bicycle traffic.

The bottom-left photo documents the existing condition located where Mitchell Creek passes beneath State Street. The underpass provides adequate overhead clearance traverse. In the proposed plan, the new path would pass below State Street with the intention to make a new future connection to the Riverwalk, thus expanding and providing more access to the existing network of trails.



FIG 67: EXISTING PROPERTY VIEW FROM STREET (ANTHONY AMATO)



FIG 68: EXISTING PROPERTY CONDITION (ANTHONY AMATO)

The photos displayed above are of an existing lot situated south of Mitchell Creek off of Mill Street. This property is integral in the success of the new path network. Sitting on the site are two existing structures which can either be repurposed or recycled. The end result would be creating a “pocket park” within the neighborhood.

The graphic spanning the bottom of the page is an analysis of the new proposed path’s slope down the hill from the vacant property on Mill Street. The colors represent different slope gradients which indicates how steep or how minimal the slope of the path is. Green portions are segments which require no grading and are well-within the recommended gradient. Yellow are areas which are slightly above accepted tolerances and require slight grading. Red areas are the segments which exceed well-over what is acceptable and require significant grading to be safely travelled.

GRADIENT ANALYSIS ALONG PROPOSED PATH

- AREAS REQUIRING NO GRADING
- AREAS REQUIRING MINIMAL GRADING
- AREAS REQUIRING MAJOR GRADING
- OPTIMAL GRADIENT: 5%
- MINIMUM GRADIENT: 8.3%

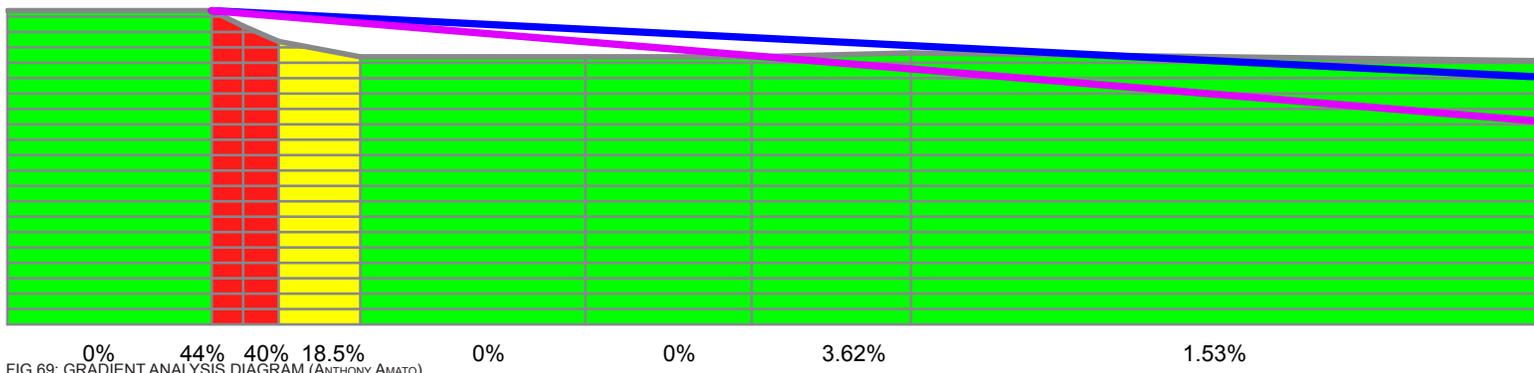
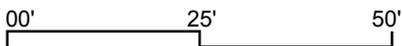


FIG 69: GRADIENT ANALYSIS DIAGRAM (ANTHONY AMATO)

ACTION NEEDED TO IMPLEMENT THE NEW PATH NETWORK:

1. Reach an agreement with the Crossroads Schools.
2. Acquire the vacant property off of Mill Street.
3. Begin construction on the new paths and bridge

The graphic to the right is an example of how the vacant property off of Mill Street could potentially be developed. This property can become a centerpiece of the neighborhood and establish another access point to the existing trail network in the city of Big Rapids. The park design itself consists of a curved extension to the path which will connect to Mill Street. The park will feature simple landscaping promoting low maintenance. Benches and picnic tables will be placed on site to provide small gathering spaces. The central feature of the park is a circular bench which in the center contains a fire pit. The intention is to create a small community space where neighbors can gather to socialize.

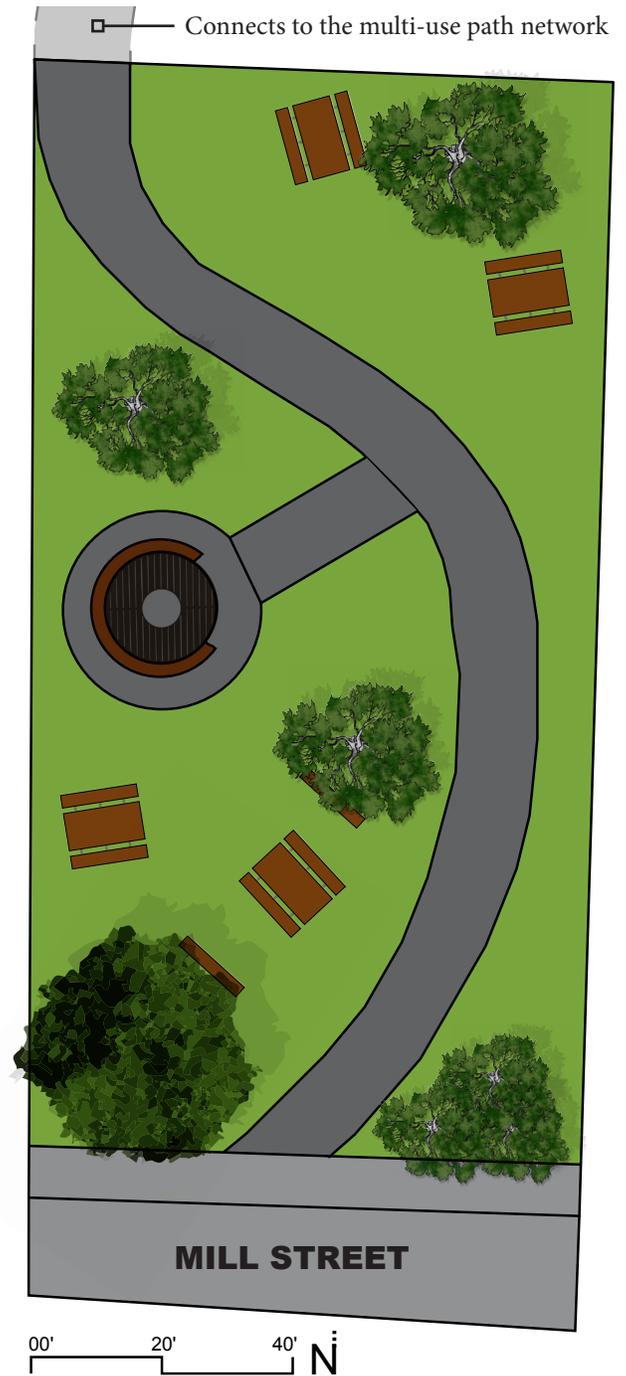
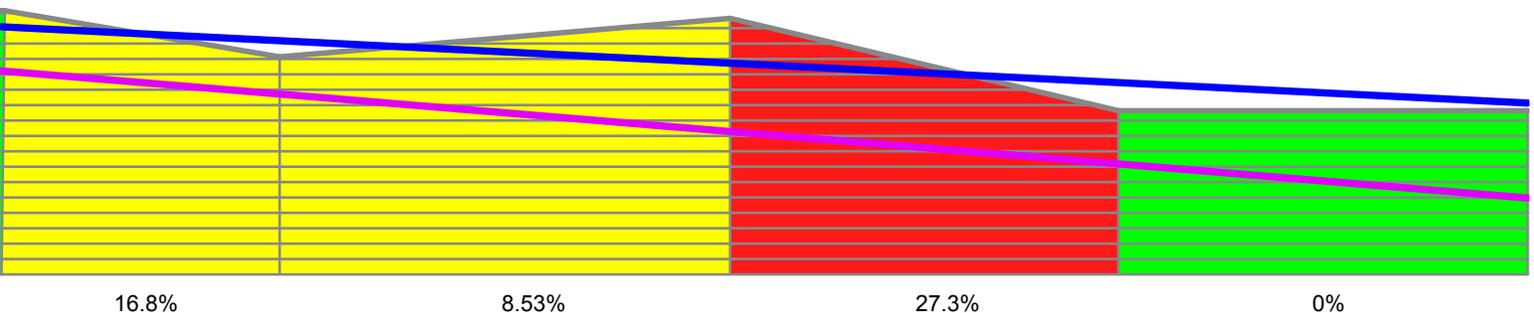


FIG 70: POCKET PARK PLAN (BY ANTHONY AMATO)



MITCHELL CREEK 08.1.2

CREATING A CONNECTION

BY EVAN WEAVER

Mitchell Creek is defined as a gap within in the city of Big Rapids, based on an analysis of the city. To increase connectivity between the neighborhood districts north and south of Mitchell Creek, a clear and safe route over the creek is needed. The connection is on property owned by Crossroads Charter Academy school, and it will proceed along Mitchell Creek, the school's athletic field and connect to the community pool and Hutchinson Street, as seen in the image below. The path will connect the north and south bicycle infrastructures.

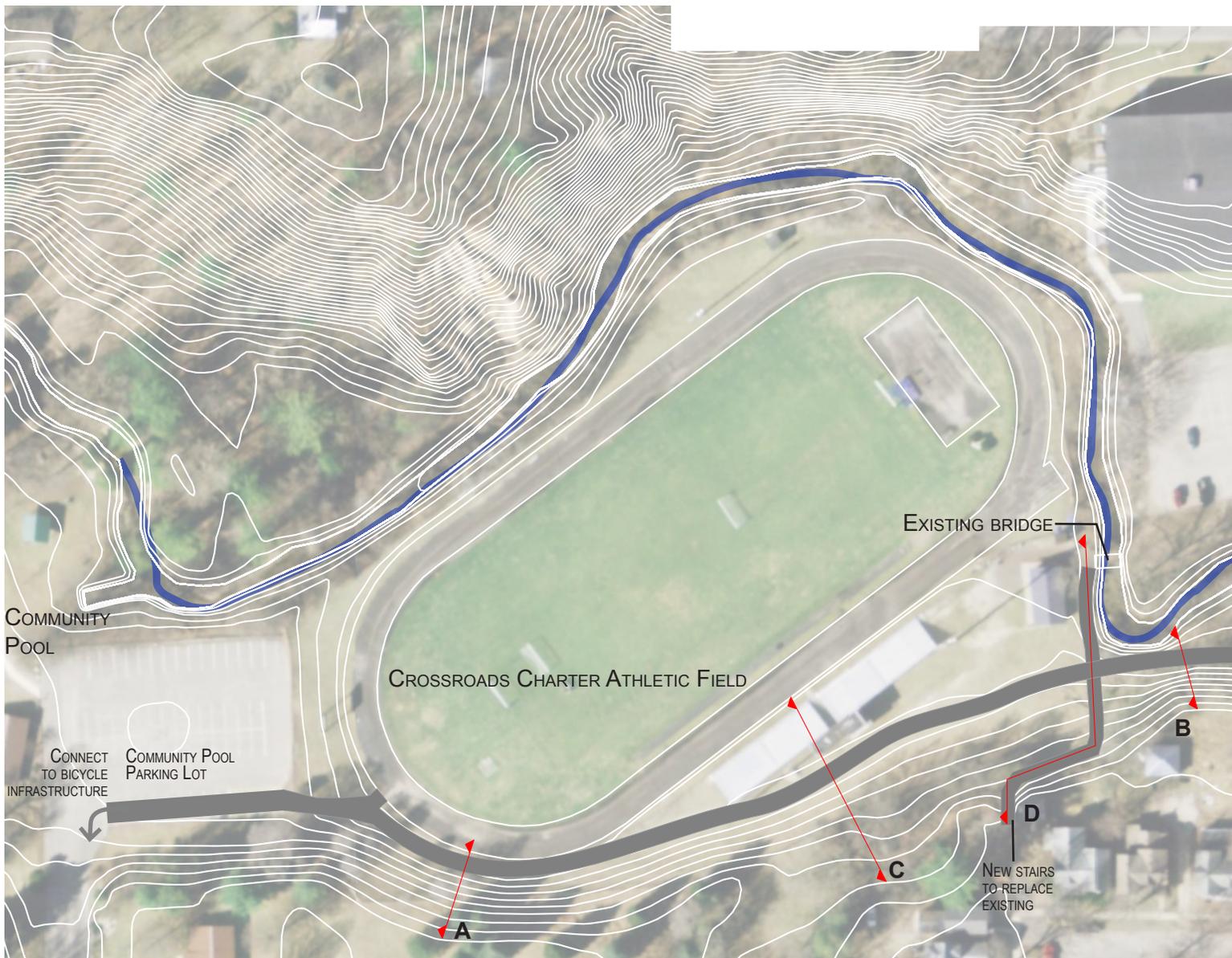
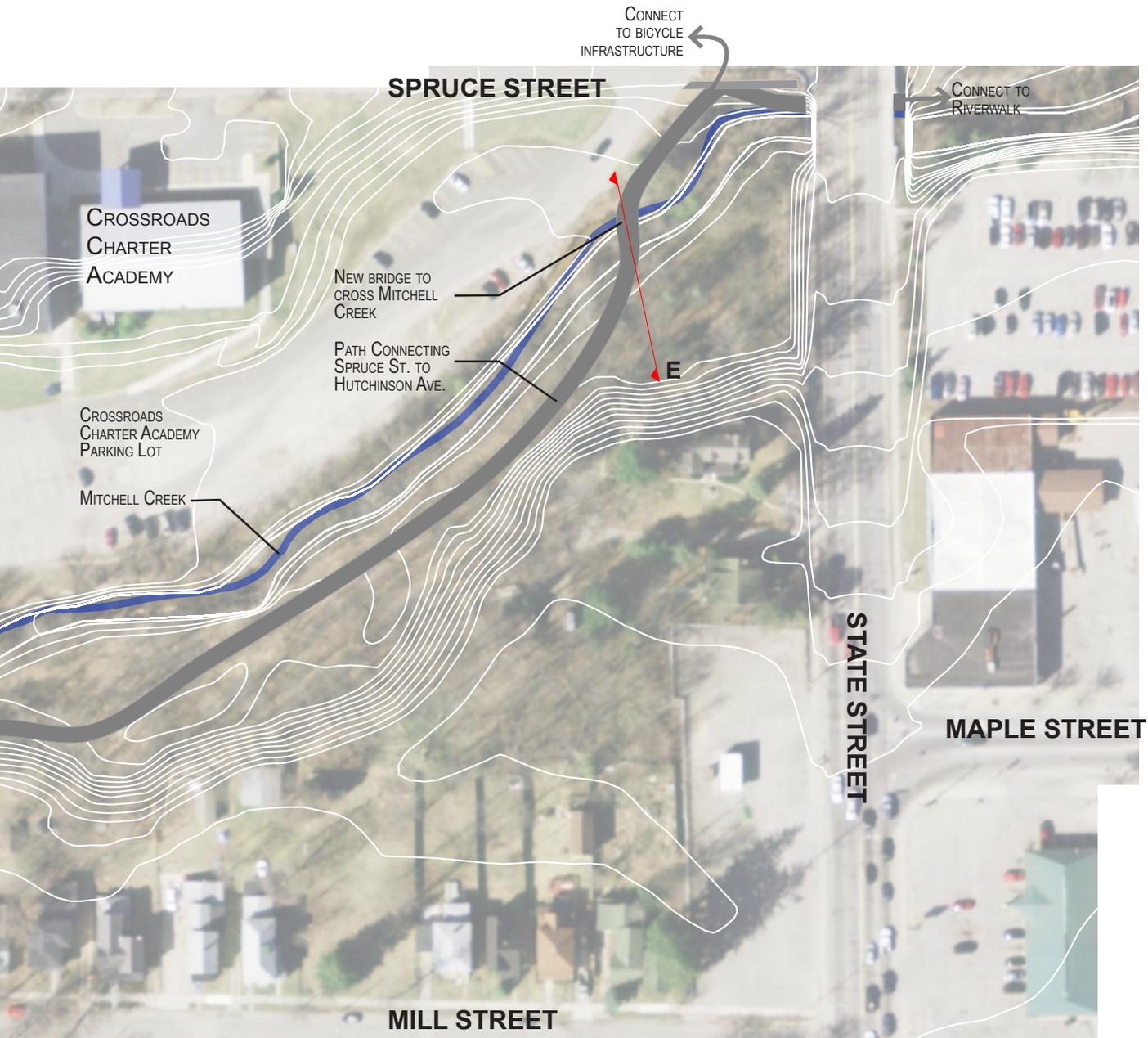
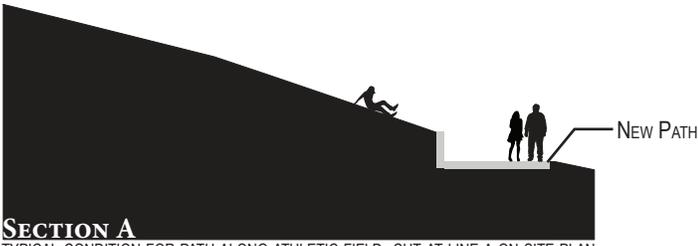


FIG 71: SITE PLAN OF CONNECTION OVER MITCHELL CREEK (EVAN WEAVER)

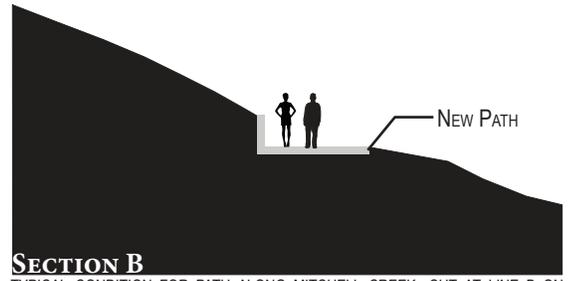
LEGEND

- New Path
- Section Cut
- Mitchell Creek

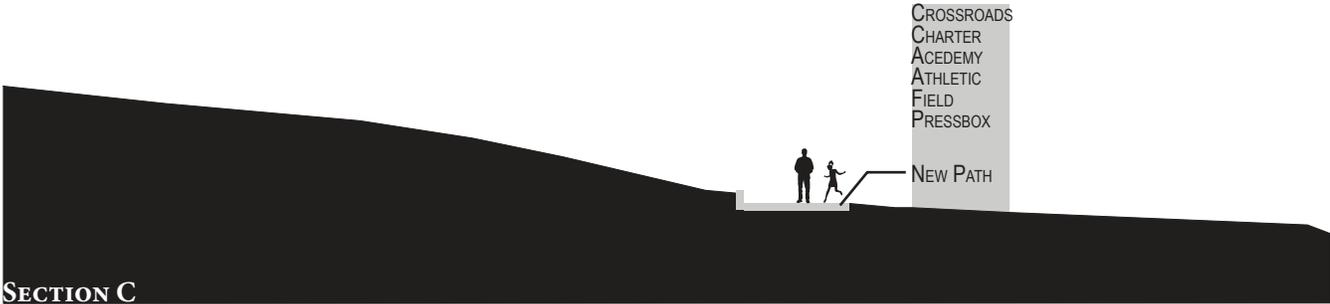




SECTION A
TYPICAL CONDITION FOR PATH ALONG ATHLETIC FIELD, CUT AT LINE A ON SITE PLAN ON PREVIOUS PAGE



SECTION B
TYPICAL CONDITION FOR PATH ALONG MITCHELL CREEK, CUT AT LINE B ON SITE PLAN ON PREVIOUS PAGE



SECTION C
TYPICAL CONDITION FOR PATH BEHIND ATHLETIC FACILITY, CUT AT LINE C ON SITE PLAN ON PREVIOUS PAGE



SECTION D
TYPICAL CONDITION ALONG CONNECTION FROM EXISTING STAIRS TO EXISTING BRIDGE, CUT AT LINE D ON SITE PLAN ON PREVIOUS PAGE



SECTION E
TYPICAL CONDITION AT NEW BRIDGE ACROSS MITCHELL CREEK, CUT AT LINE E ON SITE PLAN ON PREVIOUS PAGE



FIG 72: PATH GRADIENT SHOWING SLOPE ALONG THE PATH IN THE DIRECTION OF TRAVEL. BLACK - SEVERE SLOPE TO WHITE - NO SLOPE. (EVAN WEAVER)



FIG 73: PROPOSED IMAGE OF NEW PATH (EVAN WEAVER)
 LANDSCAPED BERM NEW PATH RETAINING WALL



FIG 74: PROPOSED IMAGE OF NEW PATH (EVAN WEAVER)
 RETAINING WALL NEW PATH LANDSCAPED BERM



FIG 75: NEW BRIDGE TO CROSS MITCHELL CREEK (EVAN WEAVER)

The connection through Mitchell Creek will include a bridge over the creek and a path through Crossroads Charter Academy property. When the path proceeds along the athletic field it will remain its own entity with landscaping devices to keep people along the path. The path will begin to increase the aesthetics in this area, which will draw more people to the area. With more people coming to the school property they will begin to increase its use for more community events.

SLOPE ALONG PATH

The image below displays the slope of the entire path from the Hutchinson Street entrance to the Spruce Street entrance. A comfortable slope for walking is five percent and allows for handicap accessibility along the path. The white areas in the image represents no slope and as the slope increases the closer to black the color gets.



MULTI-USE WETLANDS TRAIL 08.2

MULTI-USE TRAIL FROM FULLER AVE. TO VENLO DR.

BY ERIC MILLER, MICHAEL MOY

The area we are proposing the multi-use path for is located between the ends of Fuller Ave. and Venlo Dr., this is to connect the bicycle and pedestrian route to the shopping district west of town to the city of Big Rapids. There needs to be a safe and accessible connection for pedestrians. The site has a few different considerations that can't be overlooked. The first consideration being the contours on the site and the second consideration being the site is covered with low-lying wetlands. A connecting path, if implemented will serve as a safe route for people going to and coming from the city of Big Rapids and will connect to our proposed bicycle and pedestrian master plan.

MULTI-USE TRAIL 08.2.1

FULLER TO VENLO AVE.

The goal of this proposed bridge is to make a useful multi-use access from Fuller Avenue to Venlo Dr. The site itself is considered to be wetlands and because of this I did not want to disrupt them if at all possible.

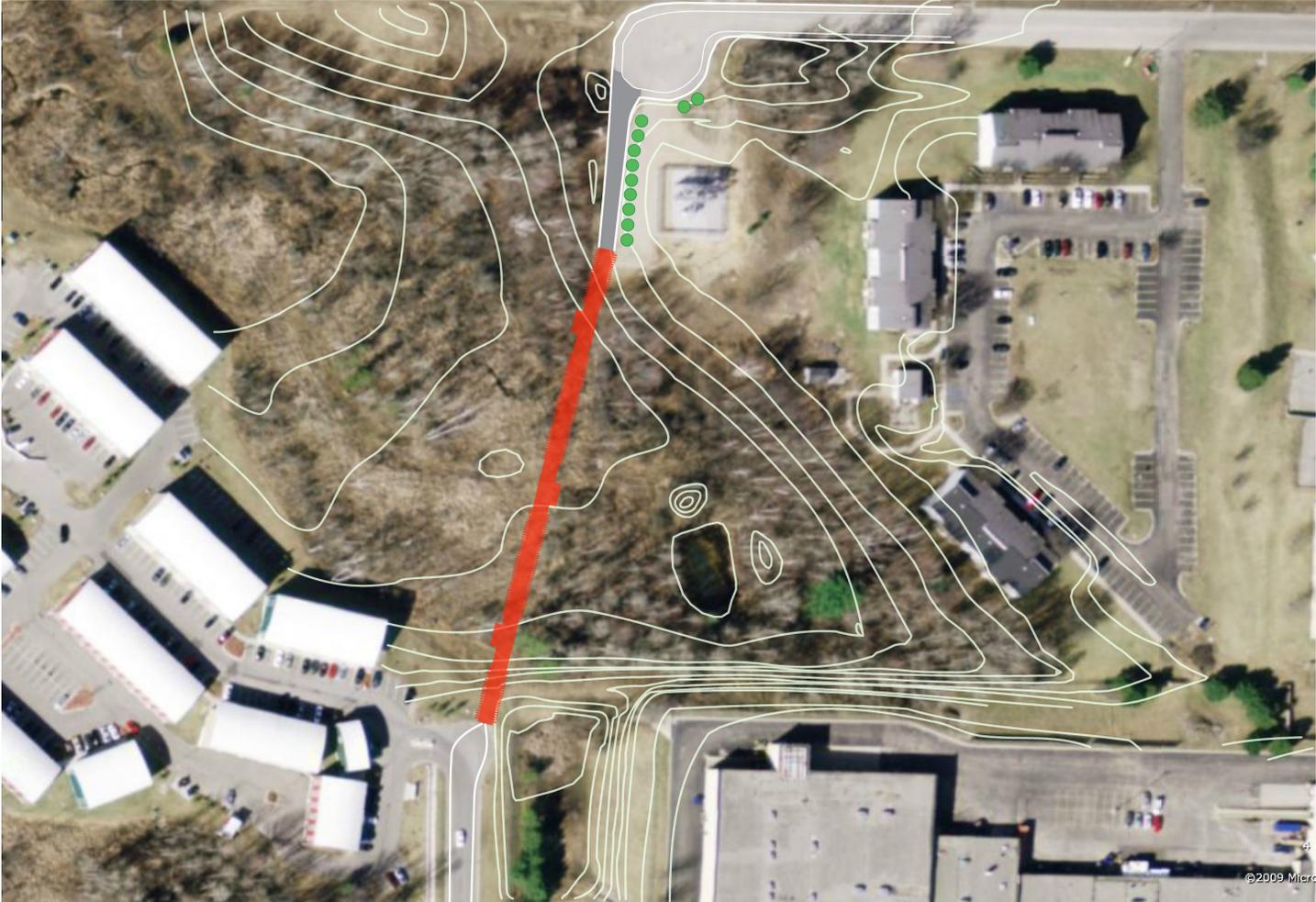


FIG 76: SITE PLAN

0 50' 100' 200'

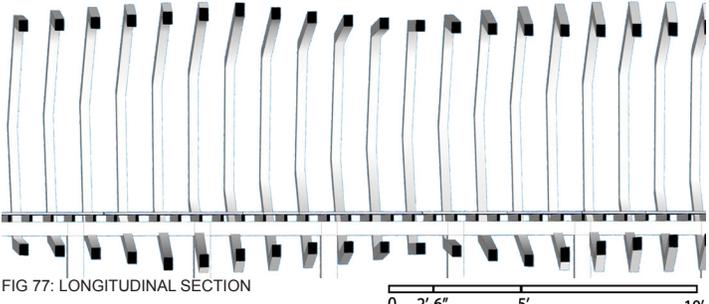


FIG 77: LONGITUDINAL SECTION

0 2'-6" 5' 10'

The trail itself will connect To the bike route previously mentioned in this plan. It allows people to move in a safe way from one point to another but still allowing them to interact with the wetlands. The bridge is a focal point along the bike path that people will want to frequent because of its unique design. The simplest of shapes can make complex geometric designs that make people want to interact with them.

The form of the structure is a spiraling tunnel that has sections removed from within it. The goal of these spiraling sections of tunnels is so that people utilizing the bridge are focusing down the length of the bridge and not out the sides. When this happens, people watch where they are going and also watch out for any other people using the bridge at the same time. The sections of the tunnel that are removed are replaced by viewing platforms, these platforms give space for multiple people to pass one another on the bridge. Another function of the platforms is an area to view and interact with nature and with the wetlands to the North-West of the site. This gives the bridge itself more than one function to the community of Big Rapids.

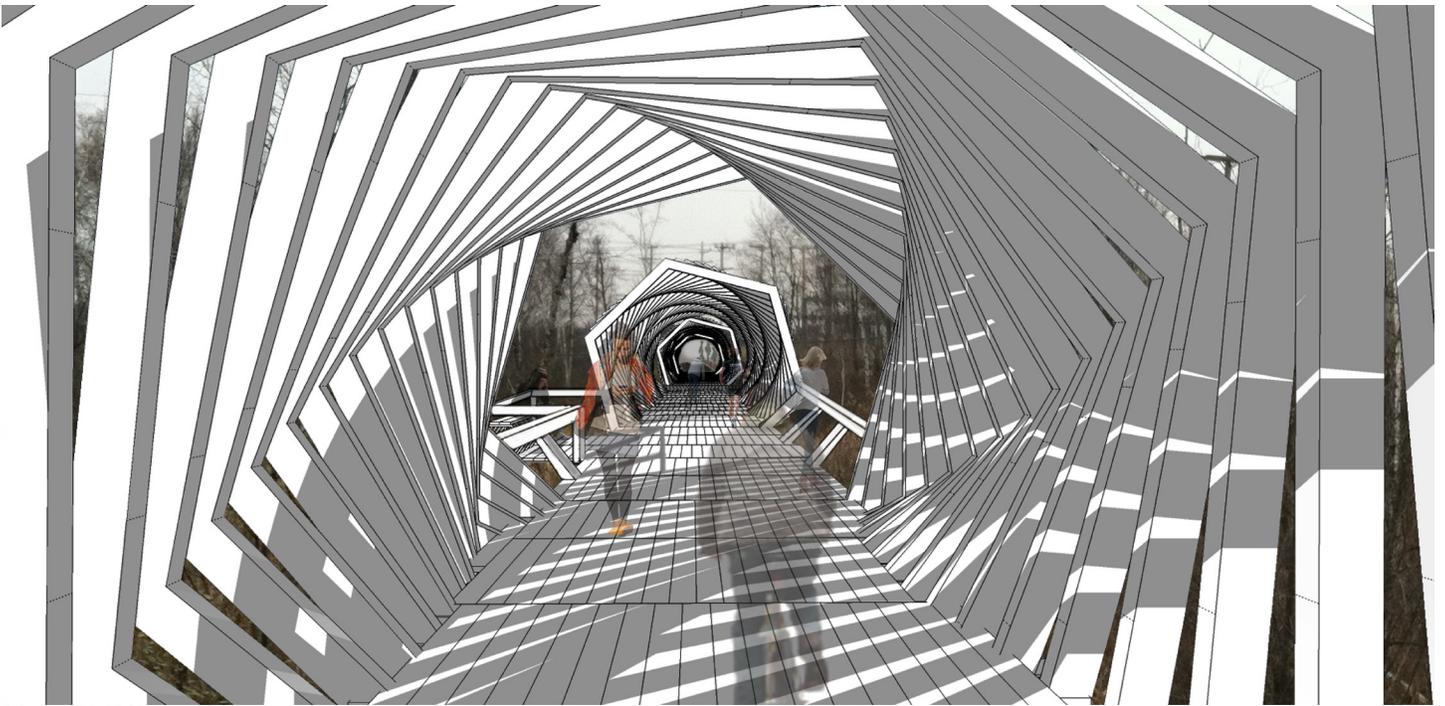


FIG 78: VIEW FROM VENLO RD.

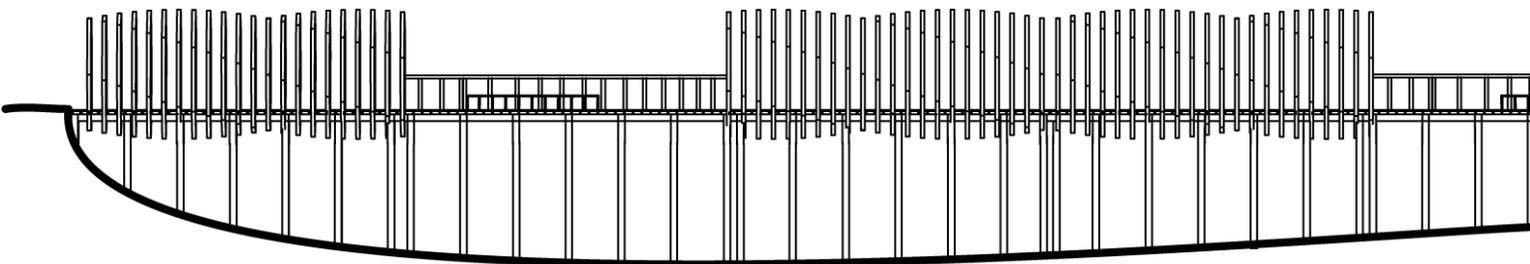


FIG 79: WEST ELEVATION

The structure of the bridge is comprised of three different elements, the first being the foundation for the bridge. This is made up of piles that will be driven into the soil; the piles won't harm the wetlands and will not restrict or block the head waters that flow into Mitchel Creek. This makes the bridge useful during all parts of the year. The second element of the bridge is the walking platform; this is a basic construction platform, it is most similar to what you would see in most homes. On top of the joists would be decking that would run parallel to the bridge, this is done to emphasize looking down the path and not from side to side. The width of the path will vary because of the spiraling tunnel, but the path will not be less than 10' wide.

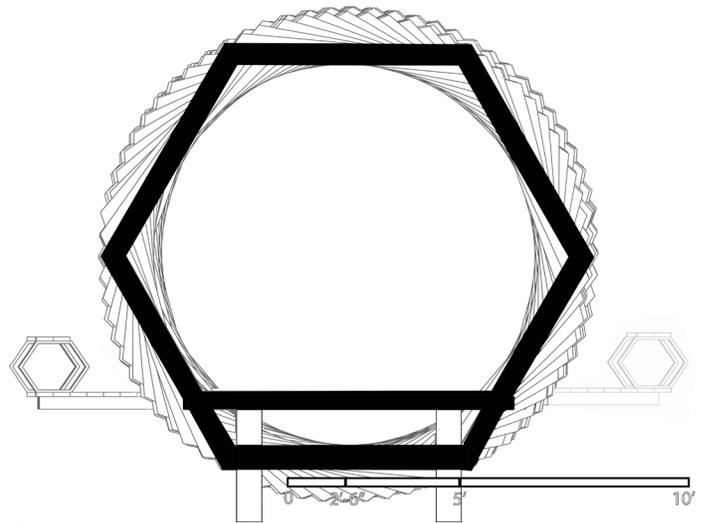


FIG 81: TRANSVERSE SECTION



FIG 80: VIEW FROM FULLER AVE.

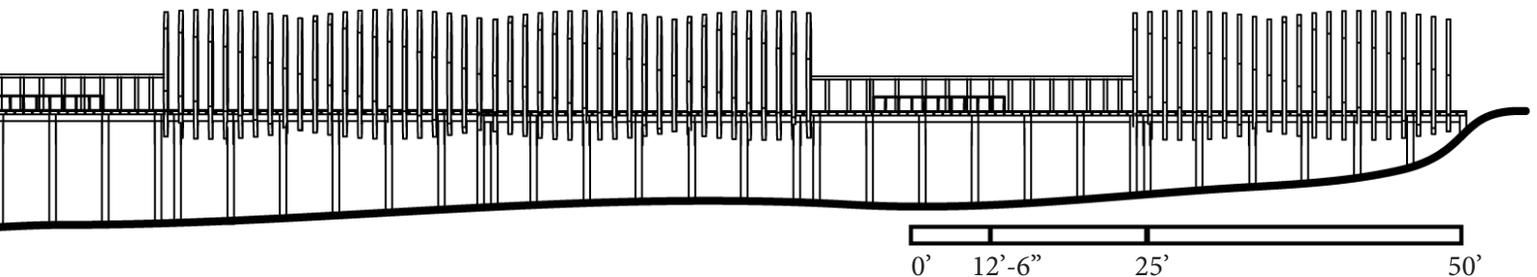




FIG 82: SITE PLAN (MICHAEL MOY)

MULTI-USE WETLANDS TRAIL 08.2.2

MULTI-USE TRAIL FROM FULLER AVE TO VENLO DR

By MICHAEL MOY

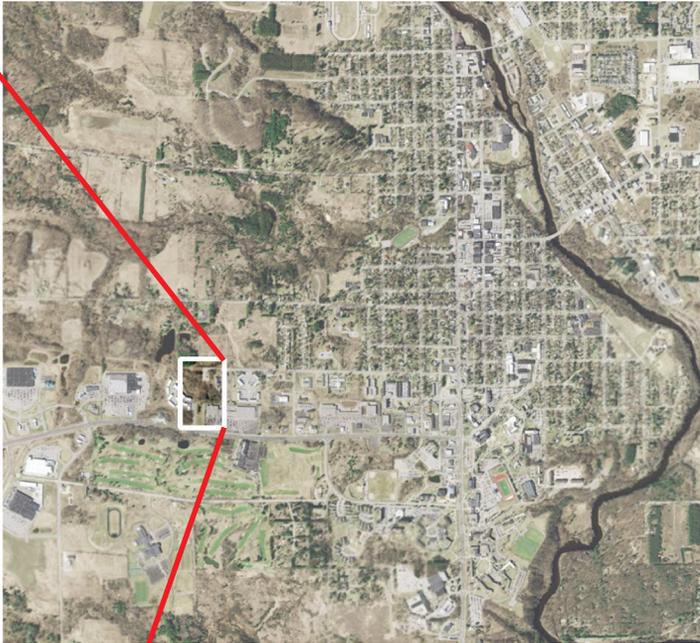


FIG 83: BIG RAPIDS AERIAL VIEW (MICHAEL MOY)

There is potential to re-route bicycle and pedestrian activity from the dangerous road of Perry Ave. to the end of Fuller Ave. and onto Venlo Dr. A low-lying wetland area separates the end of Fuller Ave. and the entrance to the Venlo apartments. Here are two options to connect the two roads. Option A is a straight path about 500 feet in length. The site will have to significantly grade the site to meet the 10% maximum slope requirement. Option B is a longer path about 800 feet in length. In order to avoid re-grading the whole area this multi-use path follows the existing contour lines. By following these contour lines, the path starts next to a power station located at the end of Fuller Ave., snakes around a small pond, and ends rising up a small hill behind some commercial buildings and finishes at the entrance to Venlo Dr. Both options link up with the proposed sidewalks and bike lanes on Fuller Ave. and Venlo Dr.



FIG 84: CONDITIONS BEFORE (MICHAEL MOY)

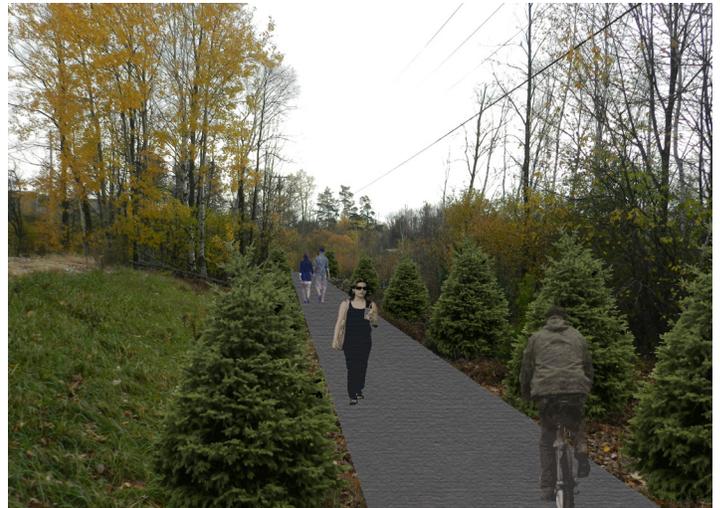


FIG 85: CONDITIONS AFTER (MICHAEL MOY)

Option A

Option B

FIG 86: ELEVATION PROFILES (MICHAEL MOY)

LOCUST & WOODWARD INTERSECTION

08.3

MAKING THE INTERSECTION SAFE AND MANAGEABLE

BY KATELIN POST & REBECCA THAYER

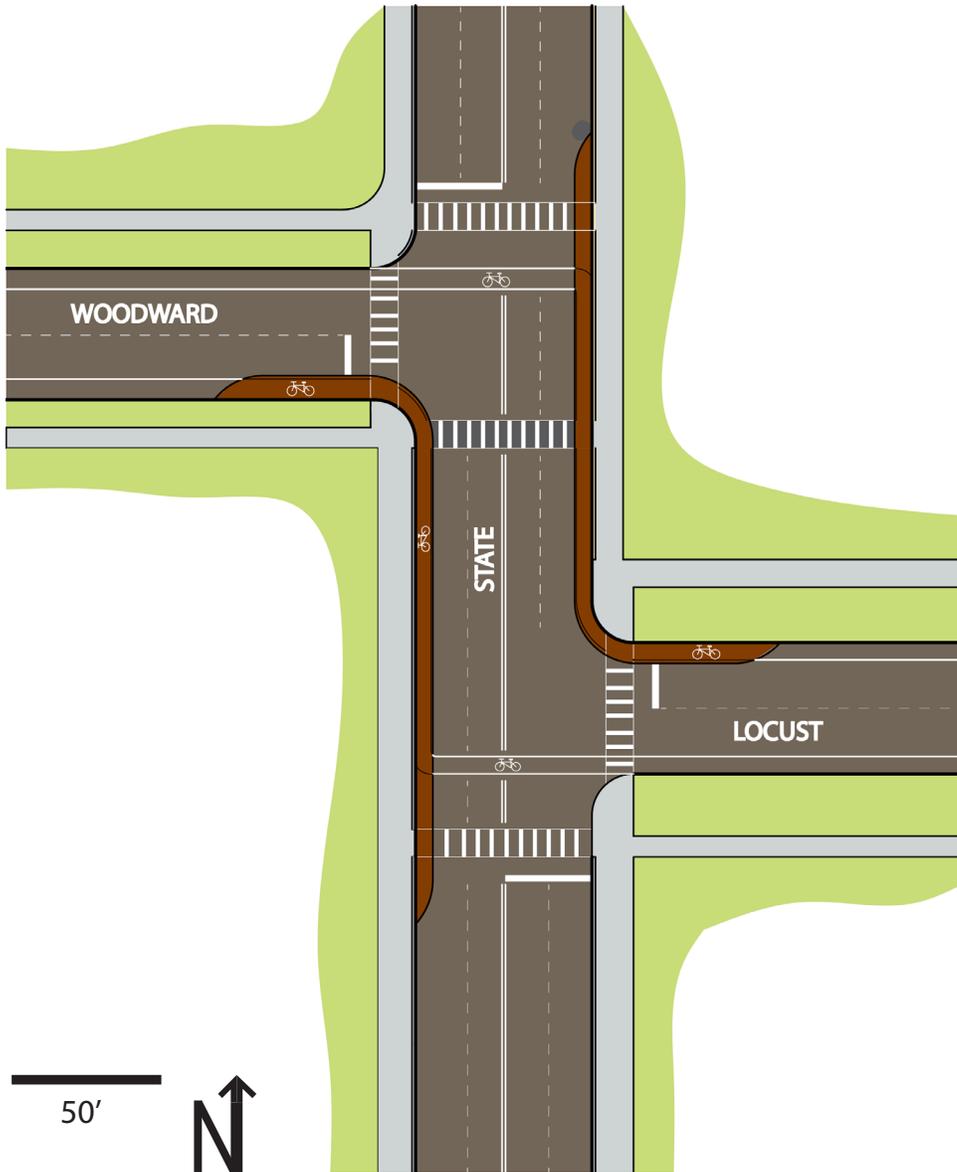
The existing intersection where Locust and Woodward Avenues meet up with State Street is dangerous and difficult to cross for bicyclists. The overall proposed plan includes bicycle paths on both Locust and Woodward, and a better connection between these sections of bicycle path is needed. The following design solutions were created to provide a safe transition for both bicycles and pedestrians alike.

LOCUST & WOODWARD INTERSECTION

08.3.1

MAKING THE INTERSECTION SAFE AND MANAGEABLE

BY REBECCA THAYER



Attributes:

- Bikes kept separate from both vehicular and pedestrian traffic
- No interruptions to current sequence of traffic lights
- Bicyclists cross with pedestrians at lights
- Minimal infrastructure changes
- Bike paths shown in brown are raised 2" from street level and bordered from traffic by a 6" high lip
- On State Street, bike paths are 4 1/2' wide and car lanes are reduced to 10' wide, helping to slow traffic

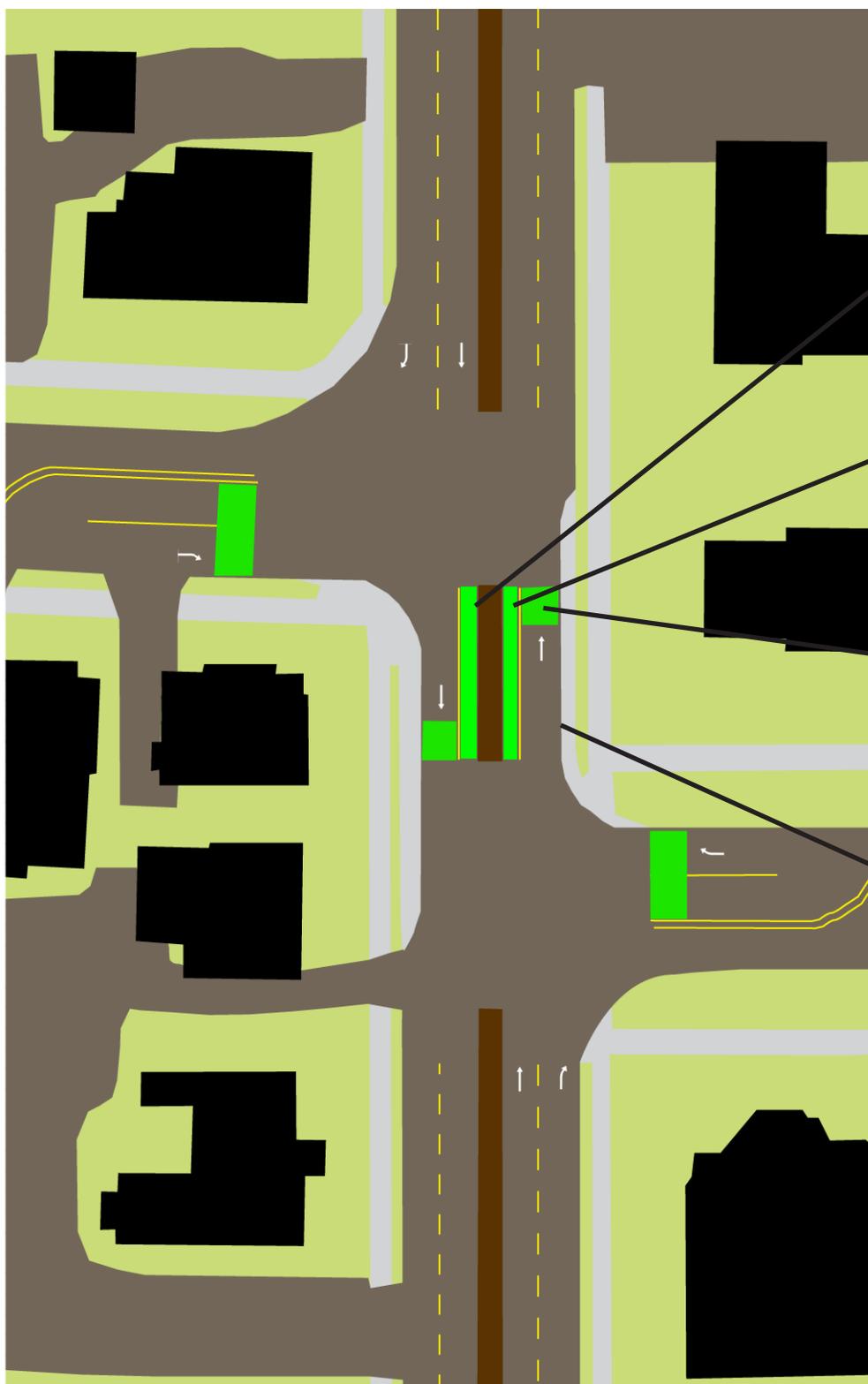
Plan view of the Woodward-Locust Intersection with State Street

LOCUST & WOODWARD INTERSECTION

08.3.2

MAKING THE INTERSECTION SAFE AND MANAGEABLE

BY KATELIN POST



- Medians allow for safe pedestrian access across roads and also allow for areas of refuge.

- Bike lanes on either side of the median allow for ease of passage through this intersection.

- Bicycle boxes at each major intersection allows for bikes to be easily seen prior to entering the intersection.

- Adding chincanes to the portion of street between Woodward and Locust allows for a narrowing of the street to make the drivers more aware of the pedestrians and bicyclists.

- Eliminating the left turn lane allows for a better flow of traffic and an overall safer intersection for pedestrians and bicyclists.

RIVERWALK ACCESS STAIRS 08.4

ESTABLISHING A CONNECTION TO THE RIVERWALK

BY KATELIN POST & REBECCA THAYER

A connection to the Fourth Street neighborhood is pivotal in establishing an East to West connection for the city of Big Rapids. By utilizing the River Walk as the backbone to which this connection is made, it will create a safe and secure path of travel. Addressing the current stair and how to make improvements will insure a strong connection can be made.

RIVERWALK ACCESS STAIRS 08.4.1

ESTABLISHING A CONNECTION TO THE RIVERWALK

BY REBECCA THAYER

Plan 1 - Ramp

Plan 2 - Stair



100'



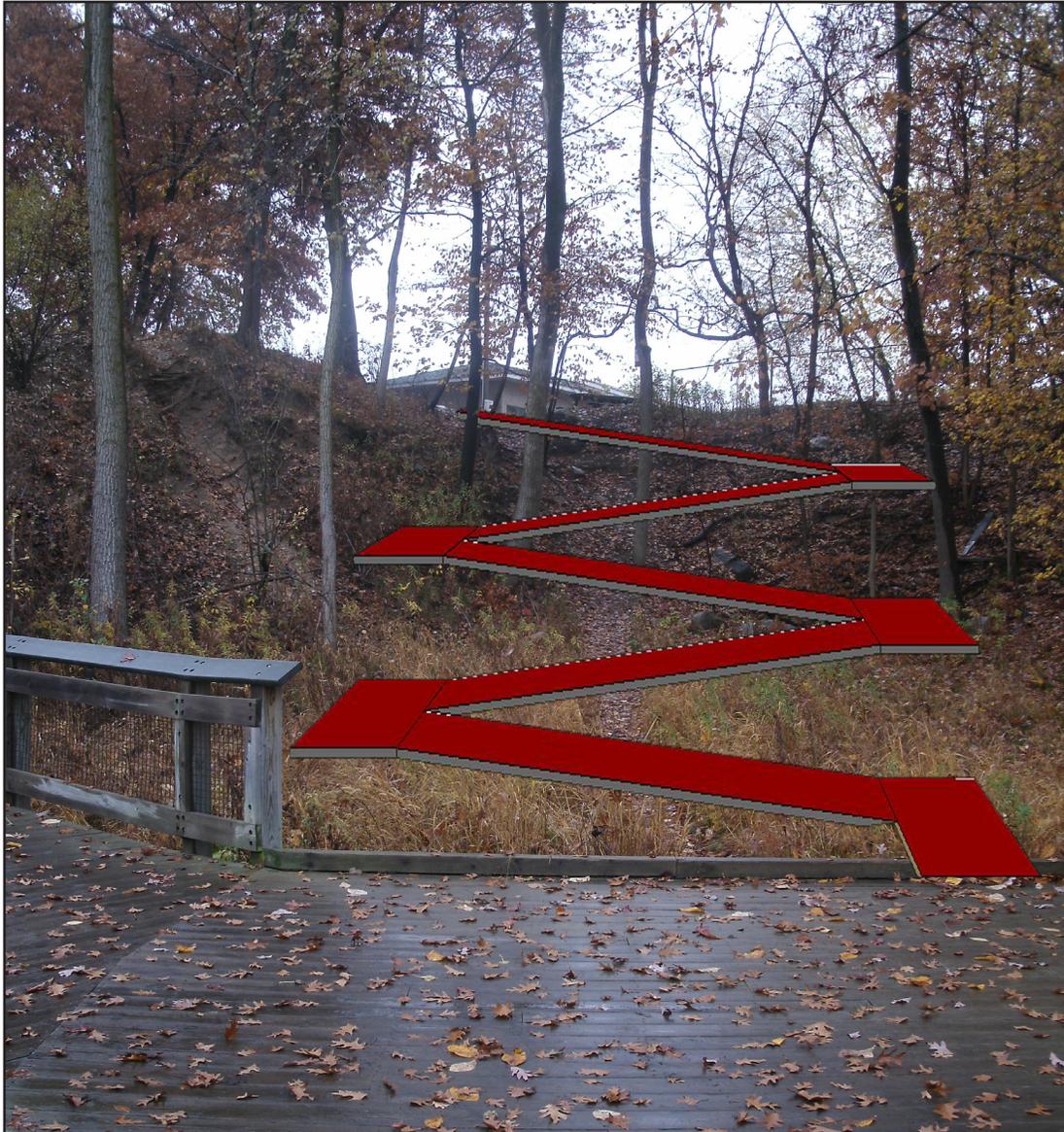
The existing stair that leads to the Riverwalk is narrow and the concrete is chipped. Although it is well used, it is inaccessible by bicycle. As the Riverwalk has been incorporated as a key connection for the Big Rapids Bicycle and Pedestrian Plan, it is important to provide access points for surrounding neighborhoods. The existing stair is already in a great location,

centered between the school to the west and apartment communities to the north and east. In order to make the stair area work as a connection, a multi-use path will need to be constructed as well. Two options are shown, one that connects to the corner of Madison and 2nd Streets, and one that connects to 4th Street.

PLAN 1 - RAMP

Attributes:

- Open to more users
- ADA compliant
- 1:12 slope
- 144' total of ramp, five 28.8' sections
- Bicyclists to walk with bikes



A ramp constructed of wood decking to match the existing platform that it leads to would blend in nicely. Note the dirt bicycle path running down the hill in the background.

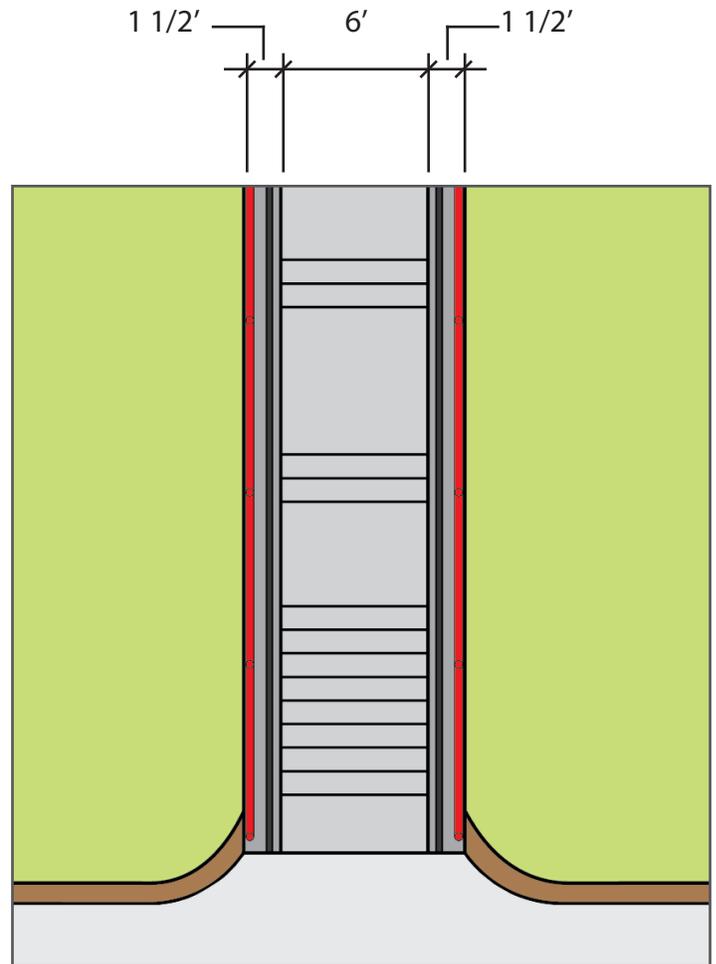
PLAN 2 - STAIR

Attributes:

- Widens existing stair to allow people to pass in opposite directions
- Same step pattern as existing stair

Bicycle grooves:

- Separate up and down routes
- Concrete channels 3" wide x 2" deep
- Rubberized for extra grip
- Landings create rest spots



STAIR CROSS SECTION - LOOKING SOUTH

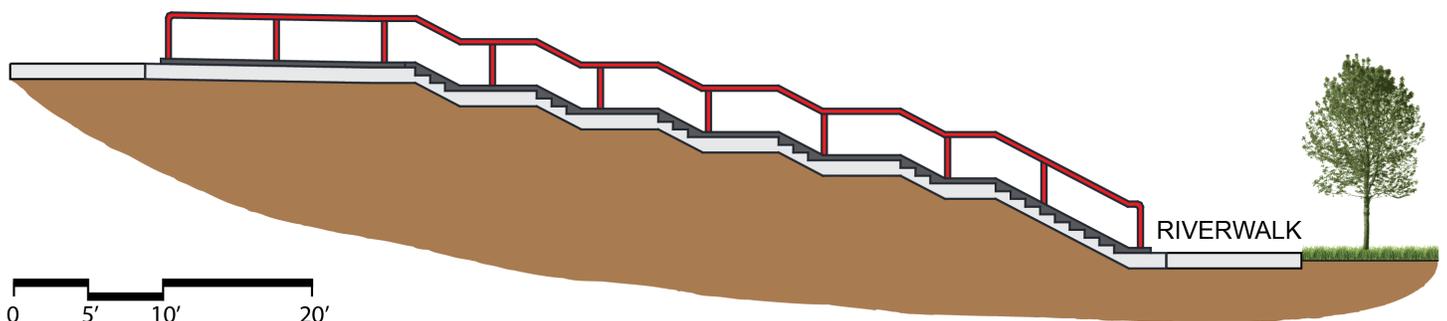


FIG 87: VIEW LOOKING AT THE SIDE OF THE PROPOSED STAIR THAT CONNECTS TO THE RIVERWALK

PERSPECTIVE - STANDING ON THE RIVERWALK



FIG 88: VIEW OF THE PROPOSED STAIR WHILE STANDING ON THE RIVERWALK

PERSPECTIVE - FROM ABOVE

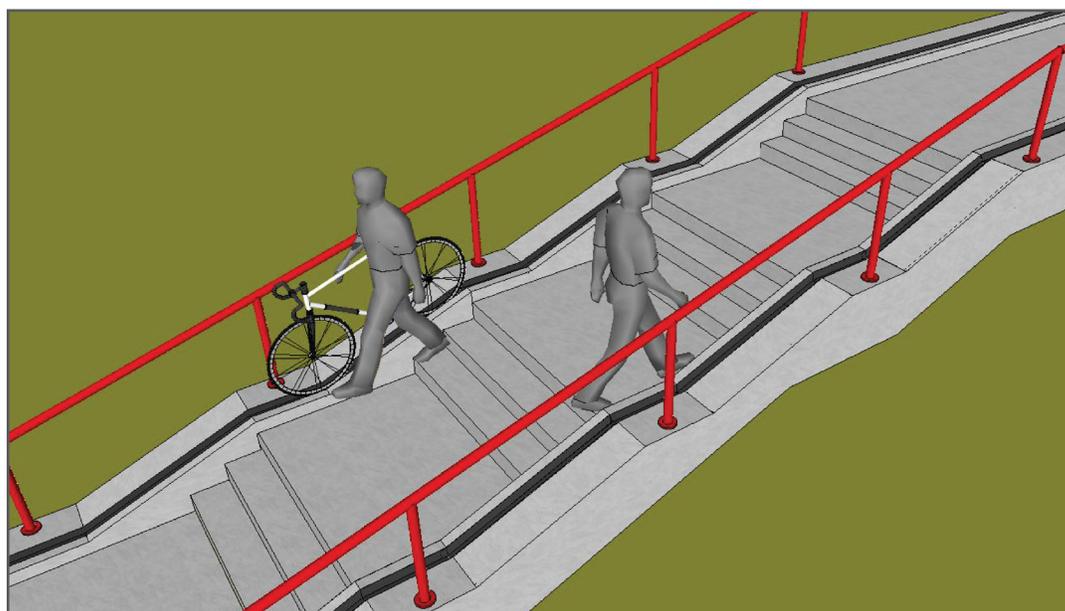


FIG 89: VIEW OF THE PROPOSED STAIR FROM ABOVE

RIVERWALK ACCESS STAIRS 08.4.2

ESTABLISHING A CONNECTION TO THE RIVERWALK

By KATELIN POST

While the current stairs serves as a great access to the part of the 4th Street neighborhood, a large portion seems to be unserved by the current set of stairs. An additional set of stairs is needed to service the other portion of the neighborhood, as well as to provide a much needed connection from the Riverwalk to the Whitepine trail.



FIG 90: LOOKING NORTH TOWARDS NEW STAIRS



FIG 91: LOOKING SOUTH TOWARDS NEW STAIRS



SITE PLAN

STATE STREET BICYCLE PATH 08.5

IMPLEMENTING A BICYCLIST-ONLY PATH IN THE ROUTE

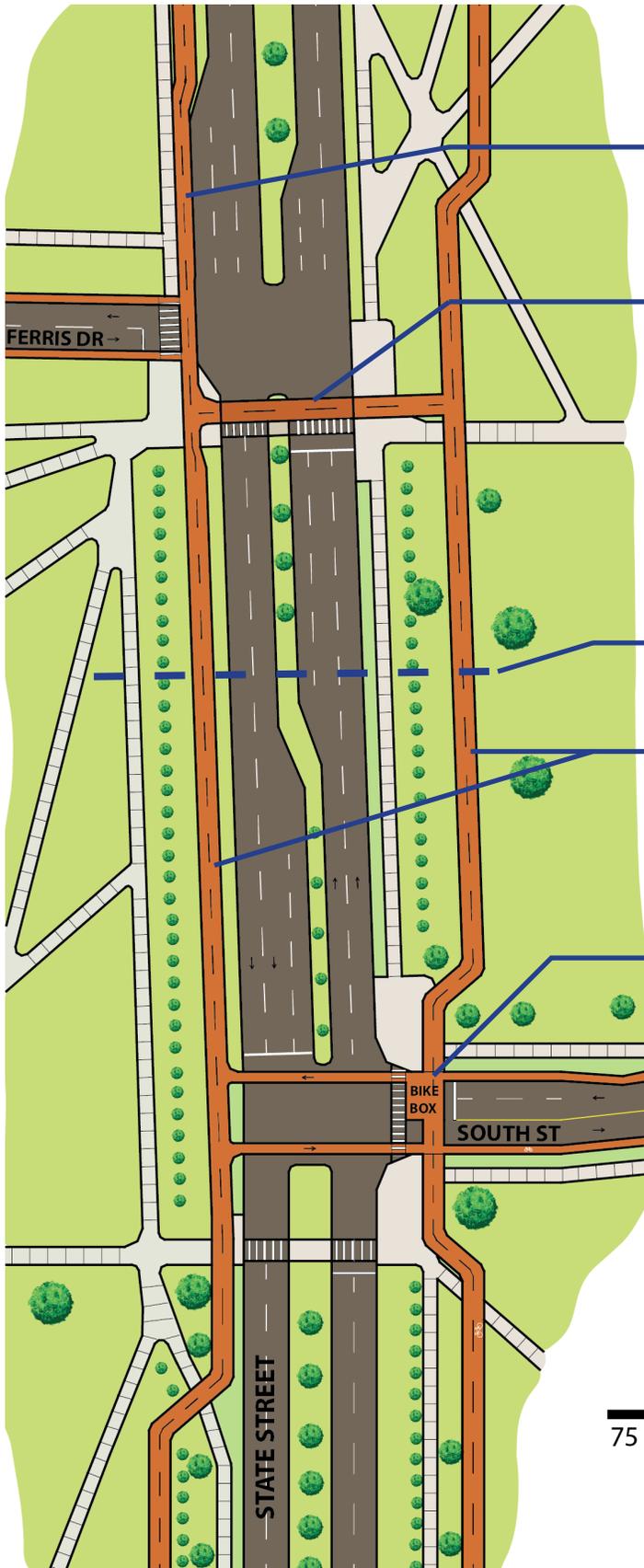
BY REBECCA THAYER

State Street is a major north to south arterial road running through Big Rapids. The southern portion of State Street runs directly between sections of Ferris State University, and provides an opportunity to utilize the existing infrastructure to implement bicycle transportation options. The following design solution proposes two separate bicycle-only paths on either side of State Street, creating connections for university students and citizens of Big Rapids.

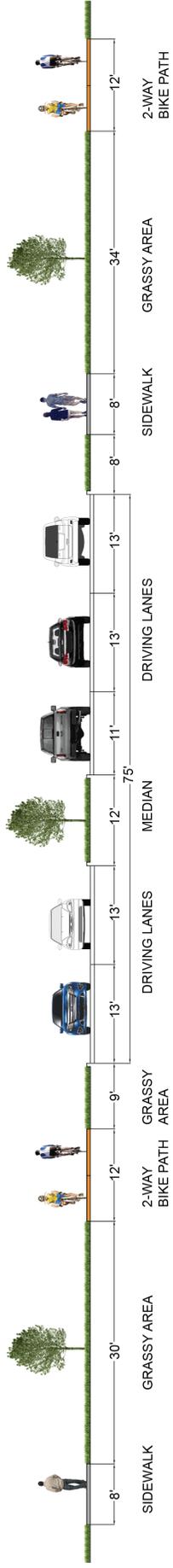
STATE STREET BICYCLE PATH 08.5.1

IMPLEMENTING BICYCLIST-ONLY PATHS IN THE ROUTE

BY REBECCA THAYER



- Bicycle lanes are each 6' wide except along this small strip, where they are 5' wide
- Bicycle path timed with existing pedestrian walkway at light
- Bicycle routes are lengthy with minimal stops
- Bicyclists give right-of-way to pedestrians at all crossings
- Section on opposite page is taken here
- Bicycle trails separate from pedestrian walkways, and on both sides of the street to prevent unnecessary crossing
- Bicycle box allows bicyclists to go before automobiles
- State Street bicycle trails connect to other sections of the overall proposed route, including South Street and Ferris Drive, as shown here. They also connect with the portion of the bike trail that would cross through the university campus on the northwest corner of State and Cedar Street, creating the connection from State Street to Michigan Street.



STATE STREET - SOUTH OF PERRY

FIG 92: CROSS SECTION OF STATE STREET SHOWING PLACEMENT OF BICYCLE-ONLY PATHS WITHIN THE EXISTING INFRASTRUCTURE

MICHIGAN STREET & DOWNTOWN 08.6

**A REDESIGN OF THE DOWNTOWN AREAS INCLUDING
MICHIGAN AVE, MAPLE ST, STEWART**

BY RACHEL WELLER & DON BUCHOLZ

MICHIGAN STREET & DOWNTOWN 08.6.1

A REDESIGN OF THE DOWNTOWN AREAS INCLUDING MICHIGAN AVE, MAPLE ST, STEWART

BY DON BUCHOLZ

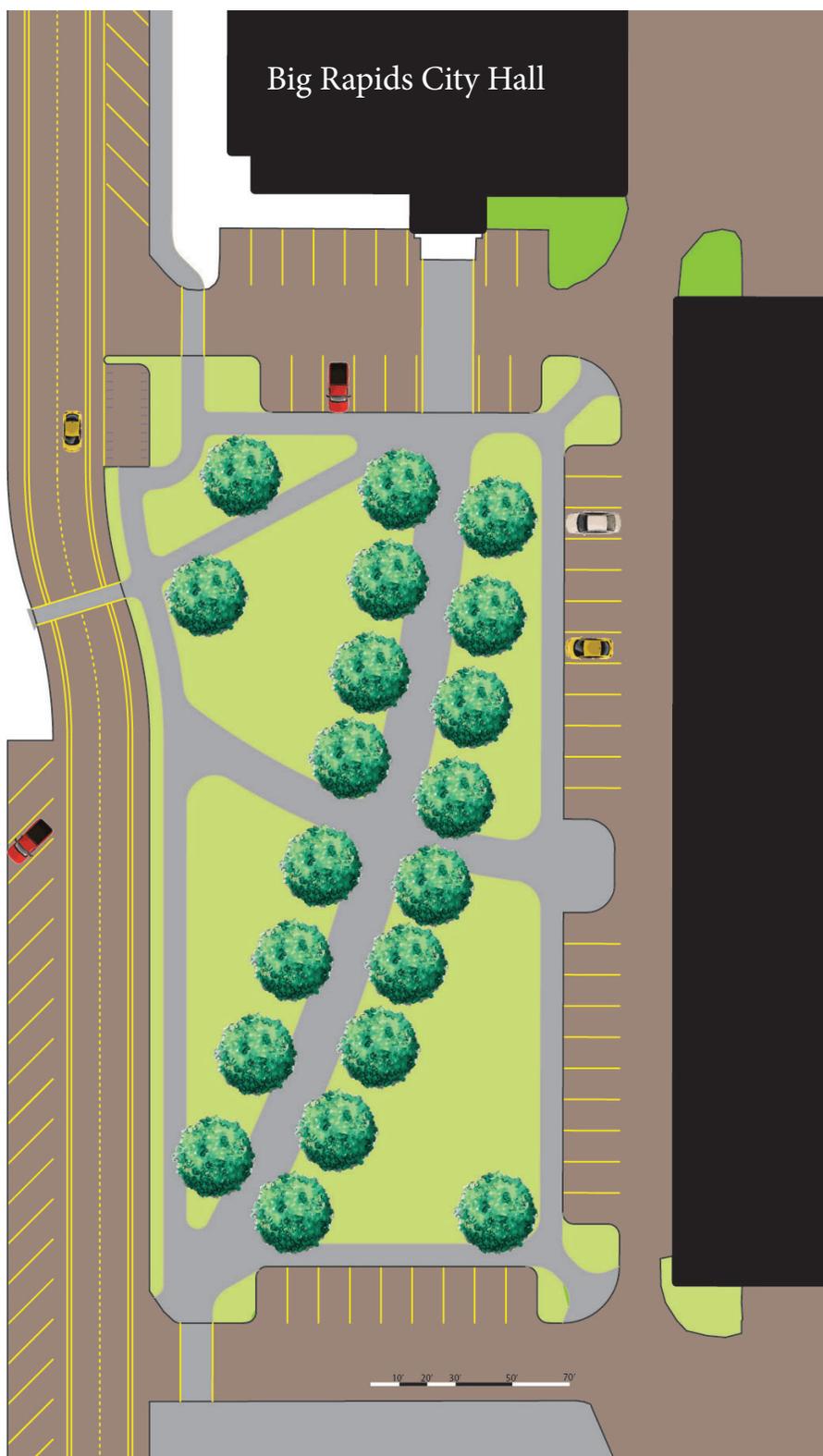


FIG 93: THIS NEW CENTRAL PARK WILL BE LOCATED IN THE PLACE OF THE EXISTING PARKING LOT NEXT TO CITY HALL

There is an additional component you must consider when designing a more walkable city. Not only must you design a safe and interesting place to walk you must also provide an appropriate destination for people to walk to. My design for Michigan Ave accomplishes just that. First, by redesigning the streets you slow vehicular traffic down making it safer for pedestrians and bicyclists. The second and most important part of this design is the transformation of two parking areas into parks that provide a space for different types of social interactions, reconnect some important buildings to the main street and create a space for small entrepreneurial endeavors.

This first park is located in the existing parking lot immediately south of the entrance to City Hall. Right now the main entrance is facing the parking lot, which gives superiority to the resident who owns a car. Any person who walks or cycles here has to drive through a massive parking lot to get to the front door. This park lowers the volume of parking and slows the speed of any vehicles passing through. More importantly, it aligns the existing main entrance to a 20' wide walkway through a colonnade of trees, which further aligns to the existing sidewalks of the downtown area, further connecting the main entrance to Michigan Ave and downtown rather than the parking lot. This 20' wide walkway provides adequate space not only for walking or cycling but also to host events such as a farmer's market, street performers and food vendors. Residents would be drawn to this area during these events and would be equally drawn to walk along the streets of downtown. People who work in the area would be drawn to the park to eat lunch, or grab a cup of coffee from one of the street vendors and sit on a bench under a tree.

The second park I have designed for the downtown area is located on the now gravel lot between the Movie Theater and Snyders market. This park provides a destination for the south side of downtown and encourages people to walk between the two parks and experience downtown Big Rapids. This park provides a space for outdoor presentations on the small stage and movies to be projected onto the side of the movie theater. The seamless transition between each side across the street removes the park boundaries and integrates the space seamlessly into the downtown fabric.



FIG 94: THIS SECOND PARK IS LOCATED ON THE LOT BETWEEN THE THEATRE AND SNYDERS MARKET. CREATING PARK SPACE DOWNTOWN WILL ATTRACT VISITORS AND RESIDENTS

Moving to the southern end of Michigan where it meets oak street and butts into the Williams Auditorium parking lot I have designed a through bike lanes which allows cyclists to bypass the intersection of Cedar and State and directs them to the safe crossing that was recently installed. (Here) The Lane is 10' wide and is for bikes only. The path will have markings, similar to a street, to indicate the bike only status of this path.

The final section of street I have redesigned is Maple Street between the 3rd Avenue and Downtown. I have reduced the eastbound lanes to one and the westbound lanes reduce to one after Stewart Ave. At the intersection of Stewart there is a one block long median with trees planted on it. This serves 3 purposes. First: to slow down traffic Second: To bring more green space to that area and provide an entrance to the downtown area. Third: To allow pedestrians to cross safely.



FIG 95. WHEN MICHIGAN AND CEDAR MEET THIS BIKE PATH WILL PASS THROUGH THE CORNER OF THE CAMPUS TO CONNECT TO THE EXISTING LIGHTED CROSSWALK



FIG 96: ONE OPTION FOR MICHIGAN AVE IS TO PAINT BIKE LANES ON THE EXISTING STREET

The final section of street I have redesigned is Maple Street between the 3rd Avenue and Downtown. I have reduced the eastbound lanes to one and the westbound lanes reduce to one after Stewart Ave. At the intersection of Stewart there is a one block long median with trees planted on it. This serves 3 purposes. First: to slow down traffic Second: To bring more green space to that area and provide an entrance to the downtown area. Third: To allow pedestrians to cross safely.

These improvements will make the downtown safer and more inviting to cyclists and pedestrians and bring more people to the downtown area which will boost current business and encourage future business investments.



FIG 98: THE NEW PARK BY THE THEATRE MIGHT LOOK LIKE THIS.



FIG 97: STEWART AVE. IS DESIGNED TO HAVE A ONE WAY BIKE ADVISORY LANE



FIG 99: MAPLE STREET REDESIGN, ONE BLOCK LONG MEDIAN WEST OF STEWART

MICHIGAN AVE CONNECTION 08.6.2

CONNECTING FERRIS STATE UNIVERSITY TO DOWNTOWN BIG RAPIDS BY RACHEL WELLER

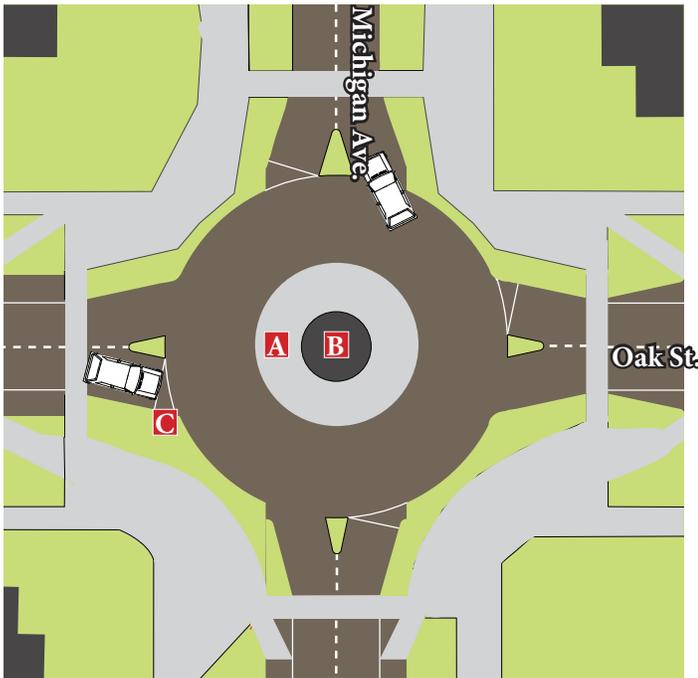


FIG 100: ROUNDABOUT AT MICHIGAN AND OAK (RACHEL WELLER)

This plan comes from the necessity of a connection between Ferris State University and Downtown Big Rapids. Michigan starts by having bicycle lanes and generous sidewalks.

There are two Roundabouts designed for this plan. Roundabouts create both safer areas for bicycles and pedestrians and create focal points that draw both the eye and ideally the students to the downtown area. Roundabouts have been found to have significantly lower accident rates than signalized intersections of the same speed. These roundabouts are located in two main thoroughfares. The first on Ceder and Michigan which is the closest intersection to the Ferris State campus. It is this roundabout that services as an directional marker for students. It shows how the head Downtown. The second on Oak and Michigan which is in front of the library. This is another intersection that would benefit from a roundabout because it is directly in front of the Big Rapids Library. It makes the area around it more walkable which makes the library safer to get to. The center of the roundabouts can be used to showcase statues or instillations from local artists.

Another measure of safety is backed in angled parking. This is generally called safety parking. The parking alternates between sides of the streets to create weaving chicanes to calm traffic.

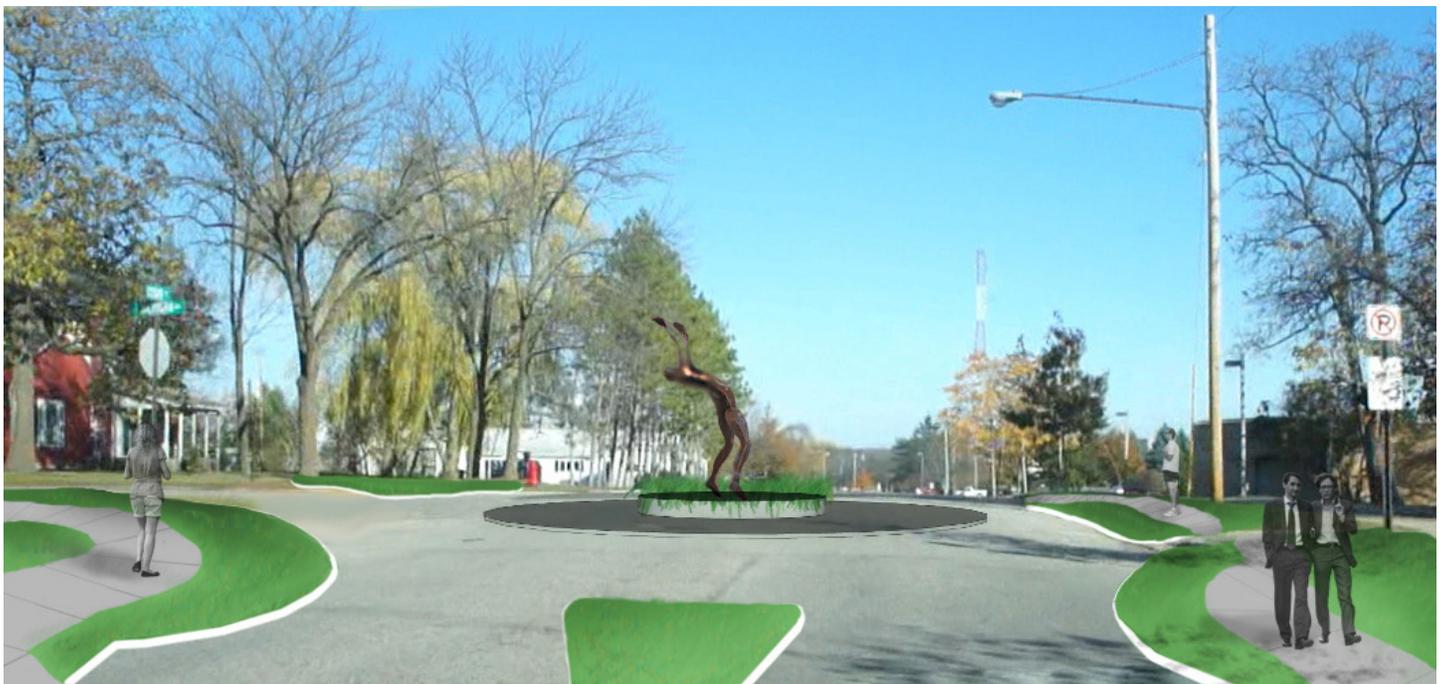


FIG 101: RENDERING LOOKING EAST TO ROUNABOUT ON CEDER AND MICHIGAN (RACHEL WELLER)

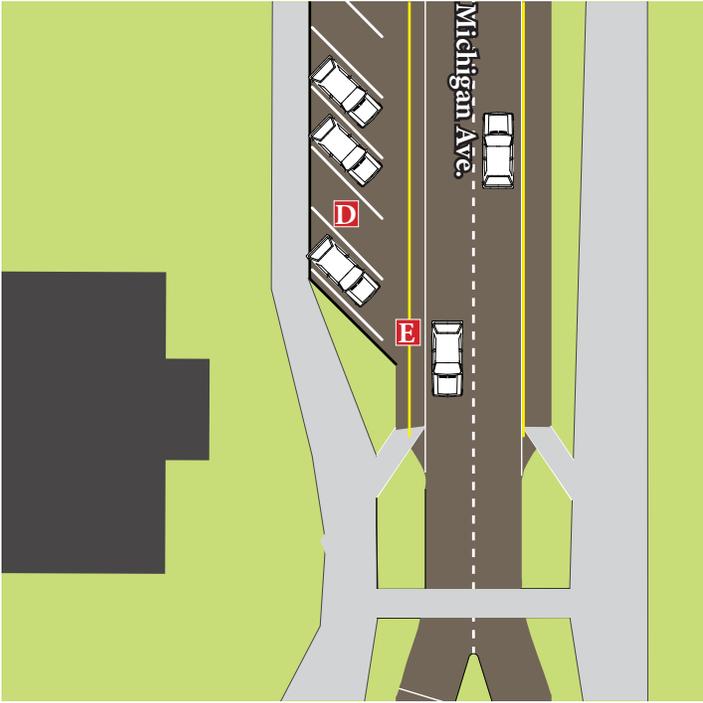


FIG 103: SAFETY PARKING IN FRONT OF BIG RAPIDS PUBLIC LIBRARY (RACHEL WELLER)

- A** Drivable Median
- B** Center Island
- C** Yield-at-Entry
- D** Angled Safety Parking
- E** Bike Lanes with Buffer



FIG 104: SAMPLE ROAD SECTION WITH SAFETY PARKING (RACHEL WELLER)

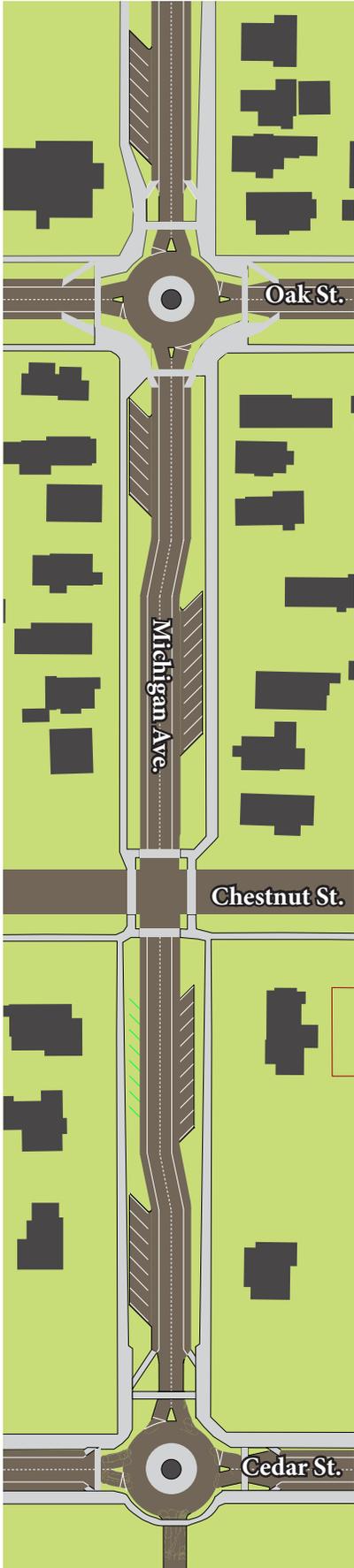


FIG 102: MICHIGAN AVE OVERVIEW (RACHEL WELLER)

BICYCLE & PEDESTRIAN BRIDGE 08.7

AN ANALYSIS OF POTENTIAL LOCATIONS FOR A NEW BRIDGE

BY COURTNEY PARKS AND WILL HINKLEY

Researching the solutions: Currently, options for bicyclists and pedestrians to cross the Muskegon River are few and far between. In order for the bicycle and pedestrian plan to establish a concrete connection between the east and west sides of the river, implementation of a new bicycle and pedestrian bridge is necessary. Through extensive field studies we were able to highlight several potential locations for the placement of the bridge. After each individual location was further analyzed, we were able to narrow the several potential locations down to the two which fit best within the context of the river and provided the best connection to both sides of the river. The results of our findings are shown on the following pages.

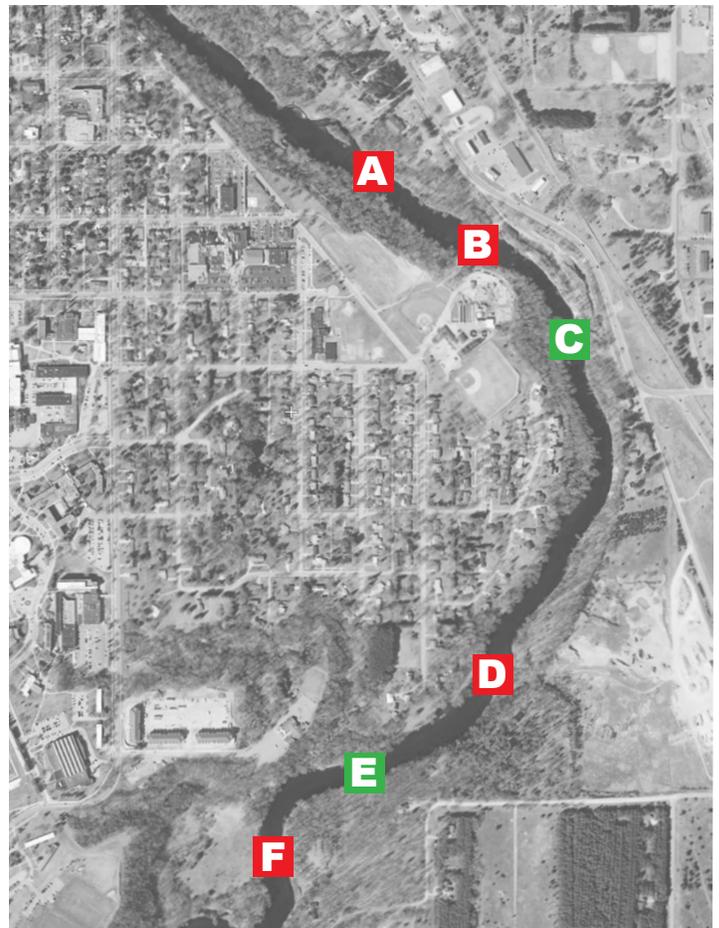


FIG 105: PROPOSED BRIDGE LOCATIONS (BY WILL HINKLEY)

BICYCLE & PEDESTRIAN BRIDGE 08.7.1

AN ANALYSIS OF THE THREE SOUTHERN LOCATIONS

By COURTNEY PARKS

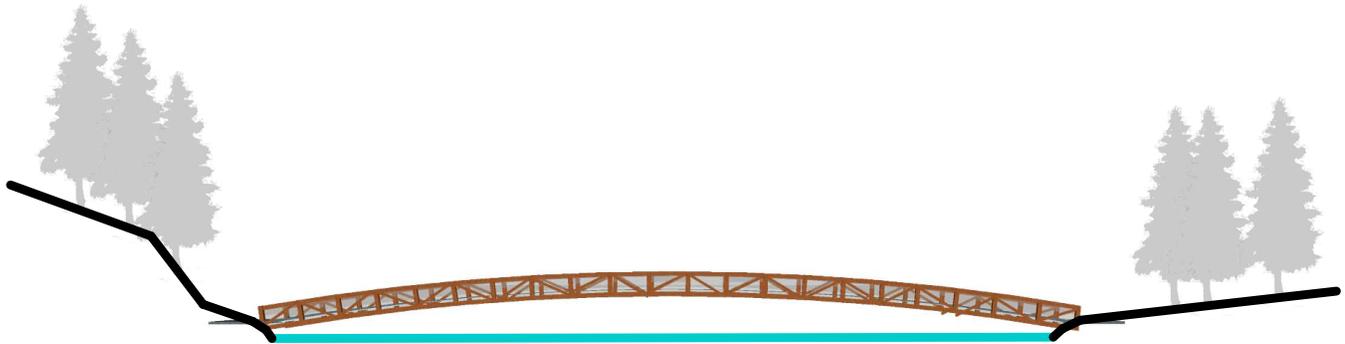


FIG 106: LOCATIONSMAP1



A PROBLEMATIC SOLUTION D

Due to the fact that the river bank on the east side of the river is extremely steep, causing an unsafe bridge slope, and there are numerous plots of private property on both sides of the river, this location is not suitable for the new bridge.



THE IDEAL LOCATION E

The location behind St. Paul's Church is a viable solution because there are already stairs in place, it is close to the University, river banks are at relatively the same height allowing a flat bridge slope, and the location is accessible from both sides of the river.



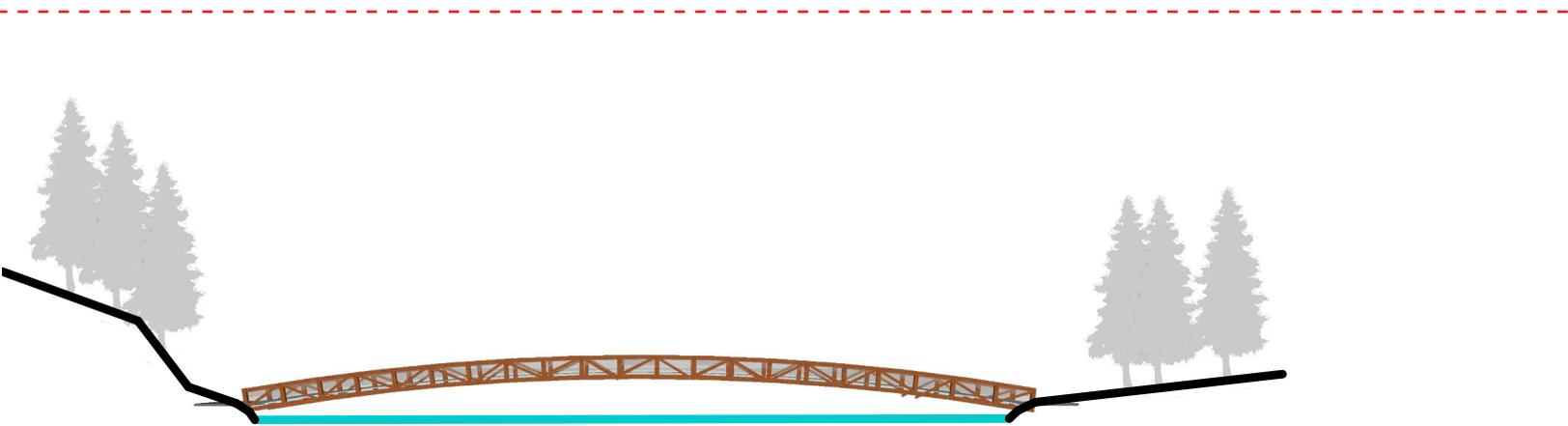
A PROBLEMATIC SOLUTION F

A bridge at this location would cause a great deal of infrastructure to be added on the west side of the river in order to connect it to the university. Also, the sandy west river bank washes out at times, damaging the bridge base.



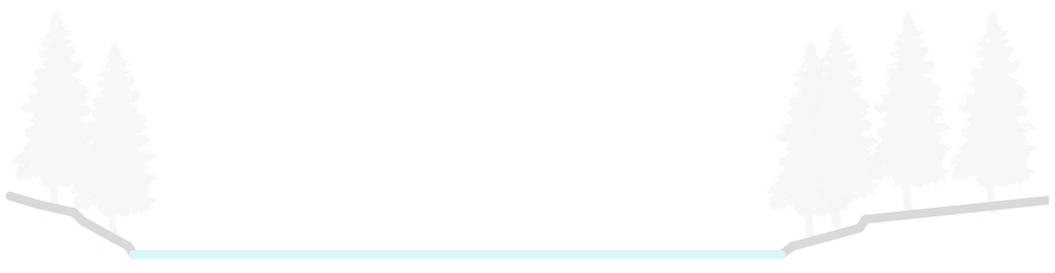
D **A PROBLEMATIC SOLUTION**

Due to the fact that the river bank on the east side of the river is extremely steep, causing an unsafe bridge slope, and there are numerous plots of private property on both sides of the river, this location is not suitable for the new bridge.



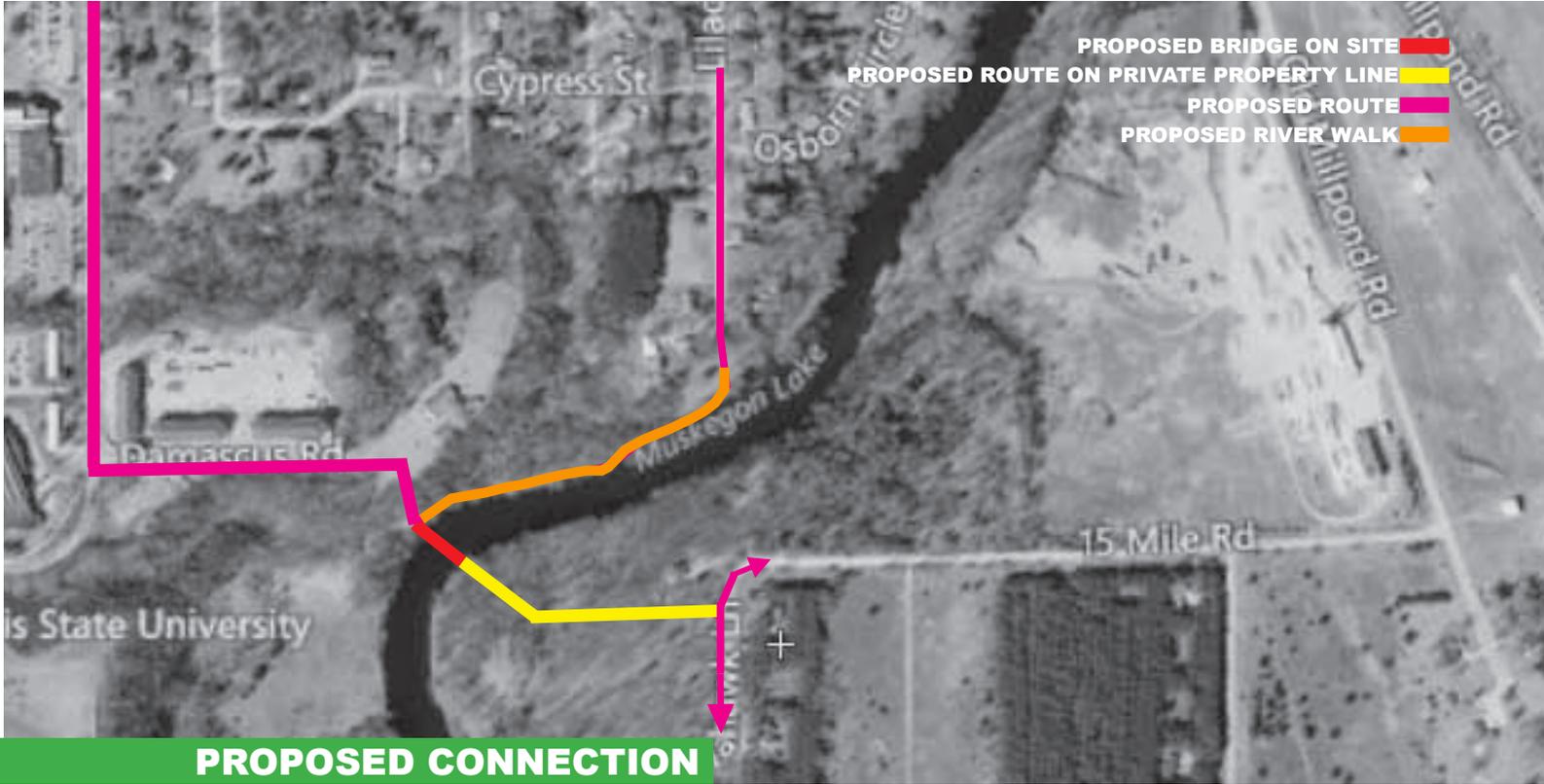
E **THE IDEAL LOCATION**

The location behind St. Paul's Church is a viable solution because there are already stairs in place, it is close to the University, river banks are at relatively the same height allowing a flat bridge slope, and the location is accessible from both sides of the river.



F **A PROBLEMATIC SOLUTION**

A bridge at this location would cause a great deal of infrastructure to be added on the west side of the river in order to connect it to the university. Also, the sandy west river bank washes out at times, damaging the bridge base.



PROPOSED CONNECTION

Although the end of Lilac is not a good location to construct a bridge, there is great potential to extend the riverwalk on the west side of the river. This proposed section of the riverwalk will not only connect more of *the loop* to the proposed bridge, but will also complete a continuous loop within *the loop*. The proposed bridge will then have a good connection to Damascus and Lilac on the West side of the river and a good connection to Tomahawk Drive and 15 Mile Road on the east side. To connect the bridge to the streets on the east side of the river, there is a proposed route along the private property lines

The new bridge will span 198 feet at a comfortable width of 12 feet. Because this will be a bicycle and pedestrian bridge, there will be no need for multiple spans and heavy foundation structures underneath the bridge. The bridge will be appropriately arched to allow tubers, kayakers, and fisherman to pass under comfortably.

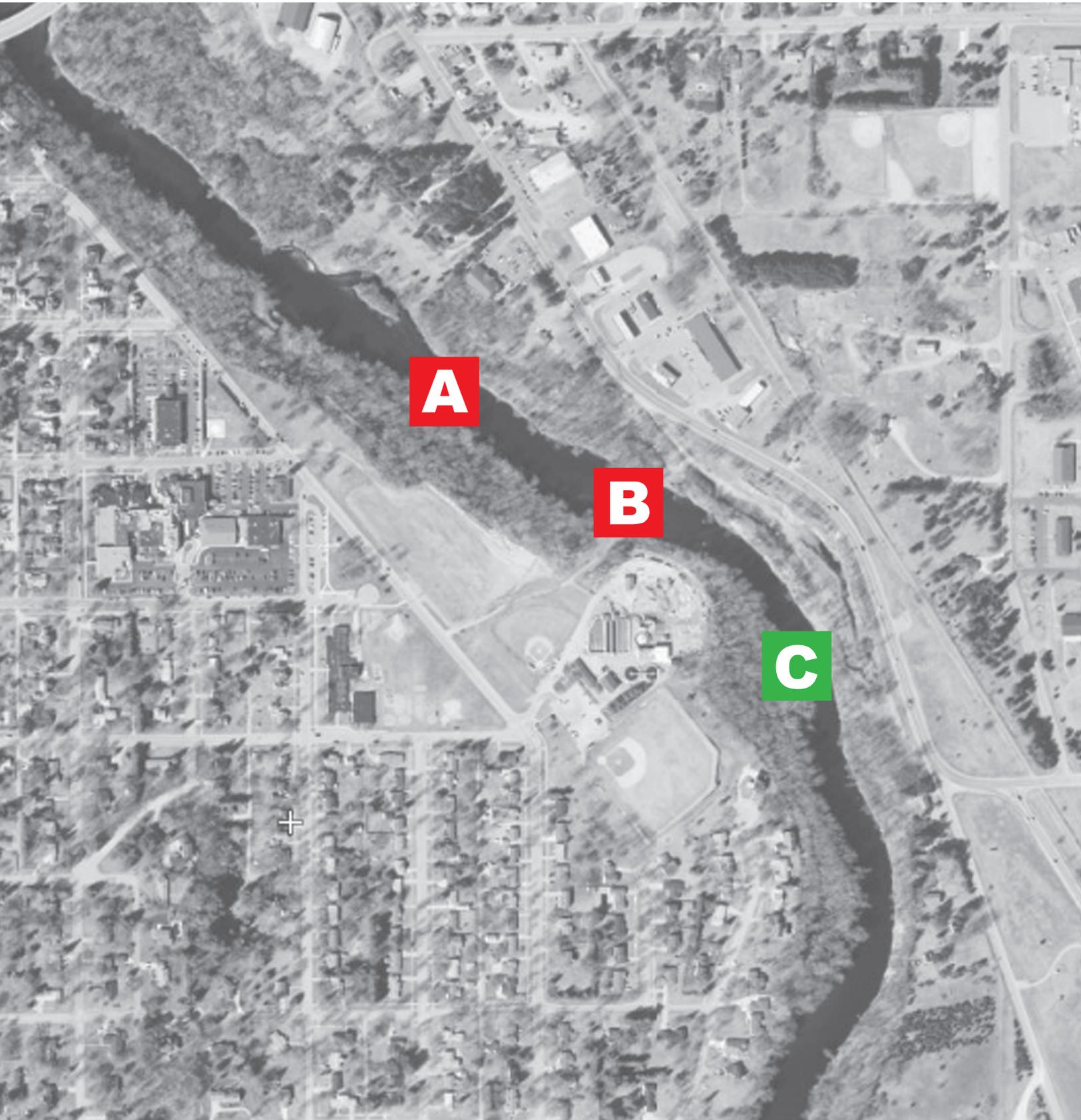


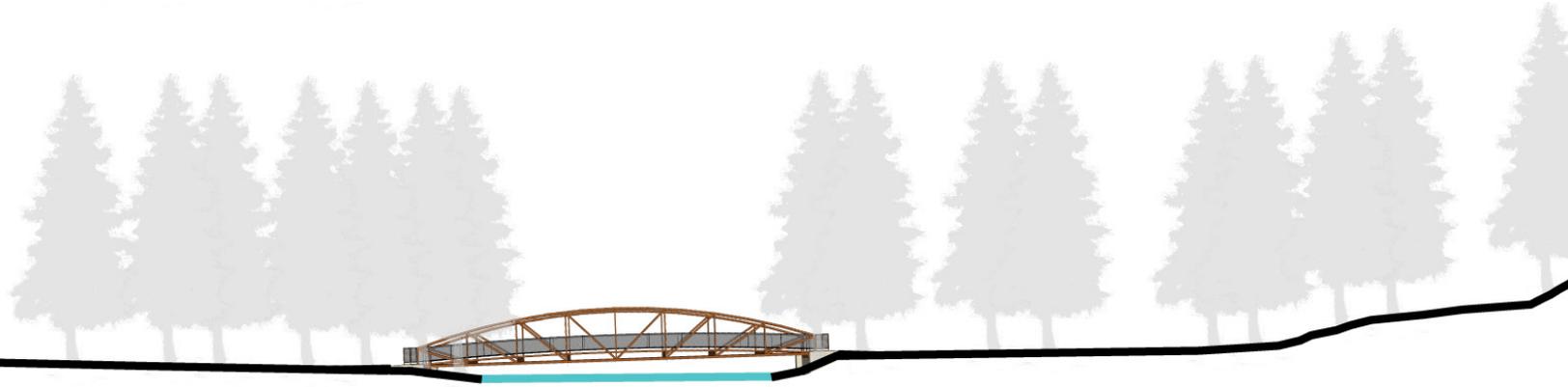
THE BRIDGE ON SITE

BICYCLE & PEDESTRIAN BRIDGE 08.7.2

AN ANALYSIS OF THE THREE NORTHERN LOCATIONS

BY WILL HINKLEY

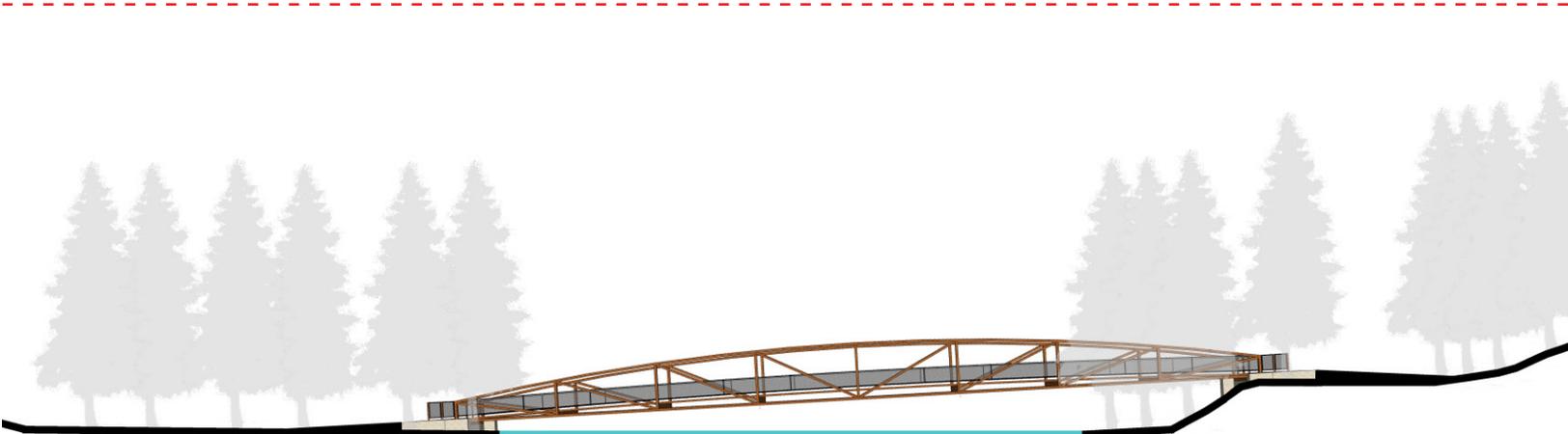




A PROBLEMATIC SOLUTION

A

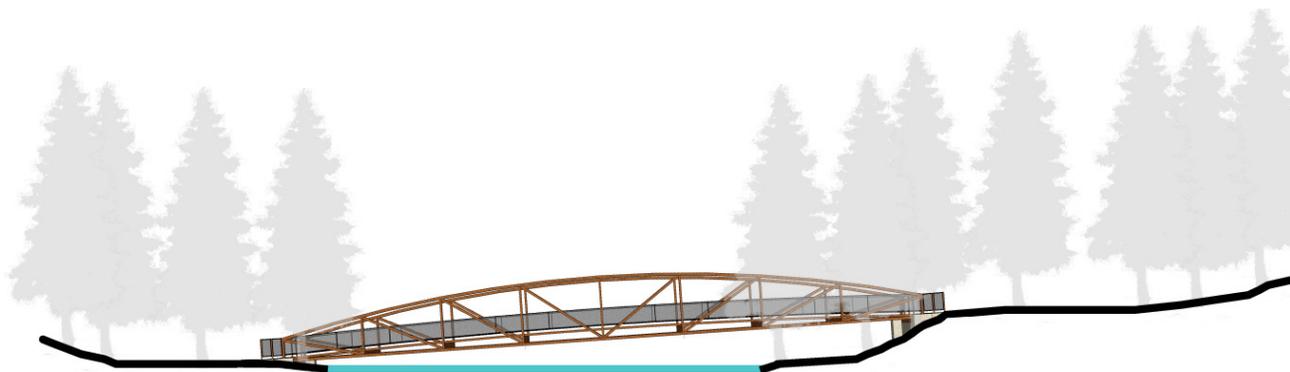
A Bridge at the northern most site is viable in terms of the span distance and slope. However, due to both public and private property located at the top of the east river bank, there would be inconvenient access to the bridge itself.



A PROBLEMATIC SOLUTION

B

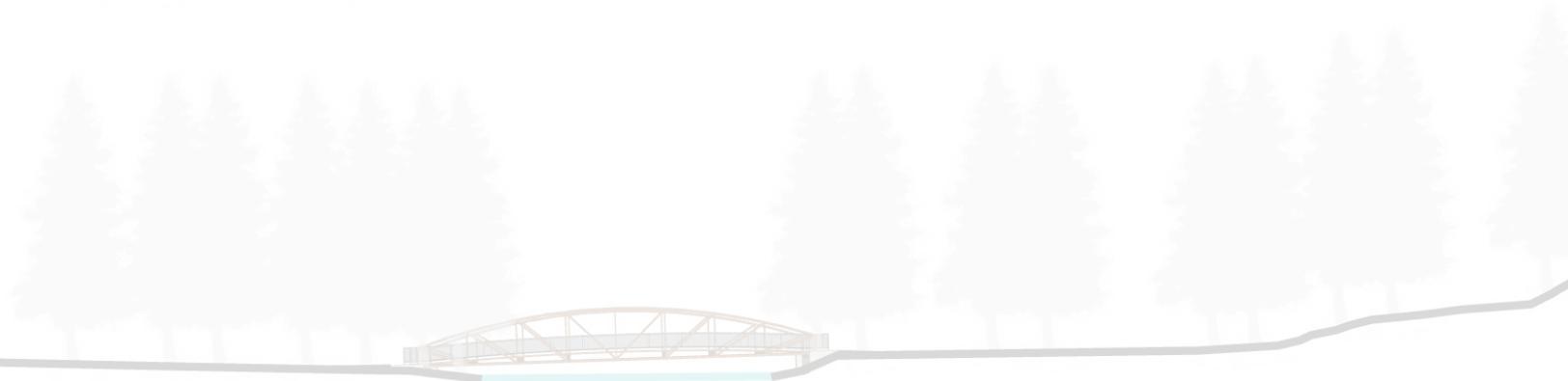
Although a bridge located at the central site would appear to be the most obvious location of the three, the drastic height difference in the east and west river banks would make the slope of the bridge very uncomfortable, and the span excessively long.



THE IDEAL LOCATION

C

A bridge at the southern most location appears to be the best location. It's span of roughly 180' is accomplishable, it's slope is bicycle and pedestrian friendly, and it can easily accessed from the the east and west sides.



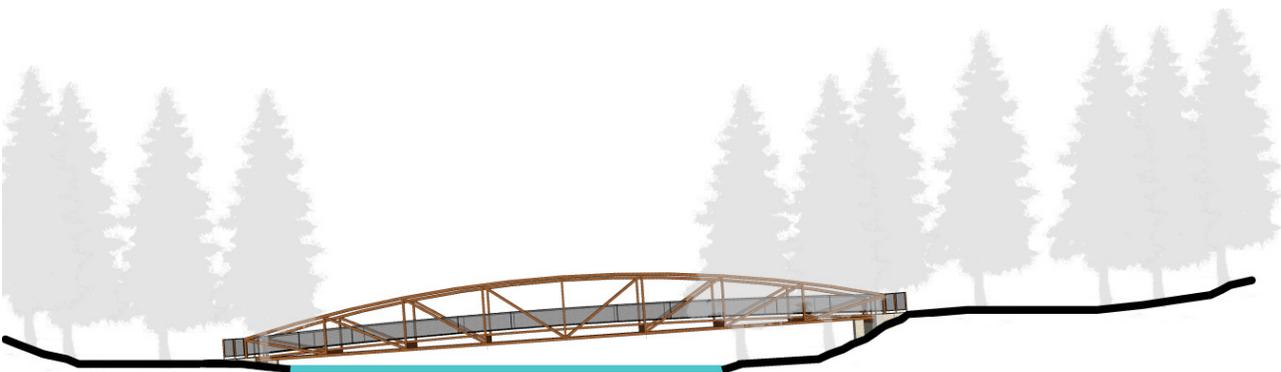
A **A PROBLEMATIC SOLUTION**

A Bridge at the northern most site is viable in terms of the span distance and slope. However, due to both public and private property located at the top of the east river bank, there would be inconvenient access to the bridge itself.



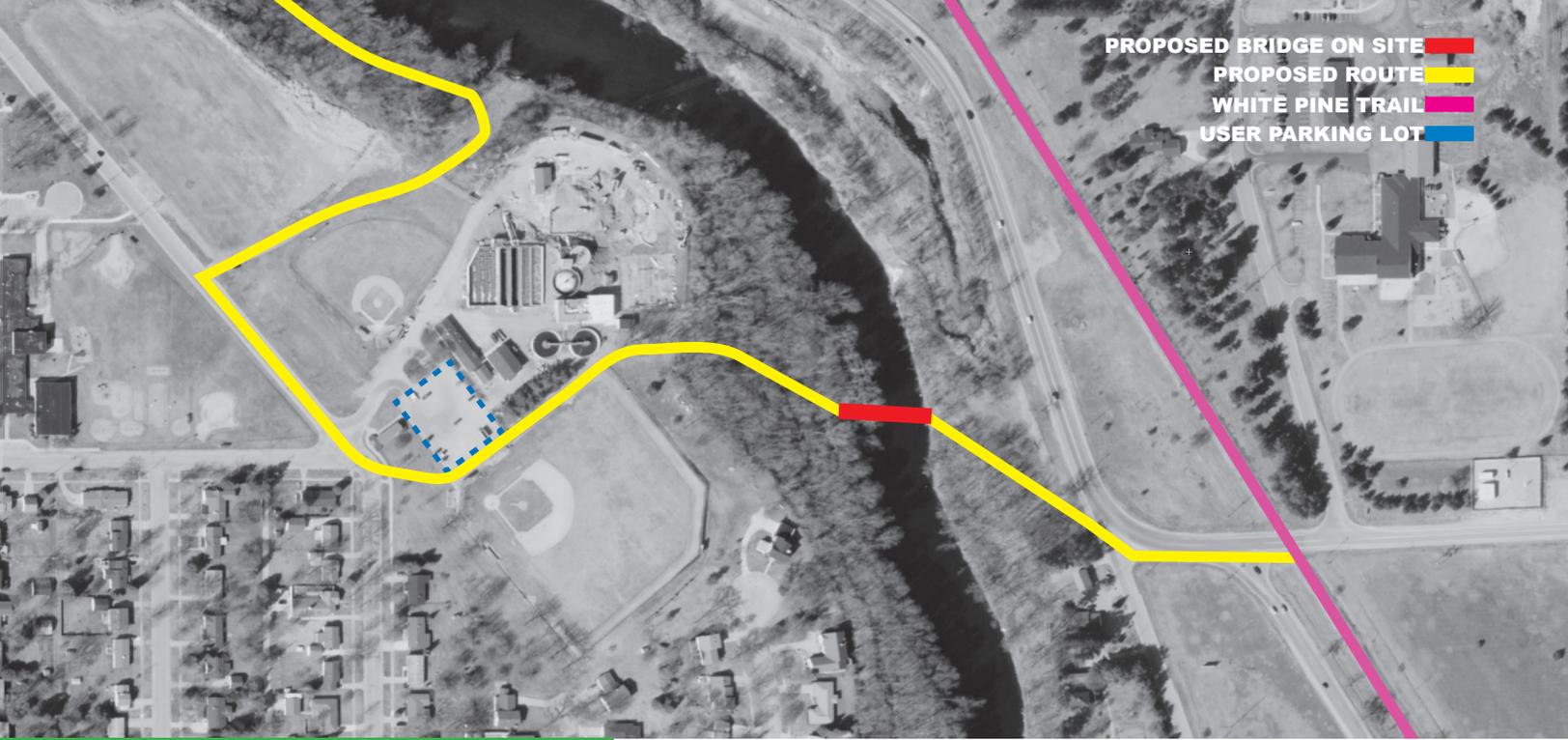
B **A PROBLEMATIC SOLUTION**

Although a bridge located at the central site would appear to be the most obvious location of the three, the drastic height difference in the east and west river banks would make the slope of the bridge very uncomfortable, and the span excessively long.



C **THE IDEAL LOCATION**

A bridge at the southernmost location appears to be the best location. It's span of roughly 180' is accomplishable, it's slope is bicycle and pedestrian friendly, and it can easily accessed from the the east and west sides.



PROPOSED CONNECTION

An extension of the river walk down River street via bike lanes, continuing it between the Wastewater Treatment Plant and the baseball field, down to the river via a new concrete path easily connects the river walk to the bridge. On the east side of the river, a concrete path cutting diagonally up the riverbank to the intersection of M-20 and Old Millipond Rd, and continuing to run down M-20 for less than 1/4 mile would provide access from White Pine trail to the bridge.

The new bridge will span a distance of 186 feet at a comfortable width of 12 feet. Due to the lightweight usage of the bridge it is able to span the river without the help of costly, underbody support. Also, because of the low density of trees on both sides of the river at this location, the installation of a path on both sides will require only a minimal amount of trees to be taken down.

THE BRIDGE ON SITE



APPENDIX 09

A SECTION CONTAINING OTHER INFORMATION AND DATA

**POTENTIAL STREET SECTIONS FOR
SPECIFIC ROADS WITHIN BIG RAPIDS**

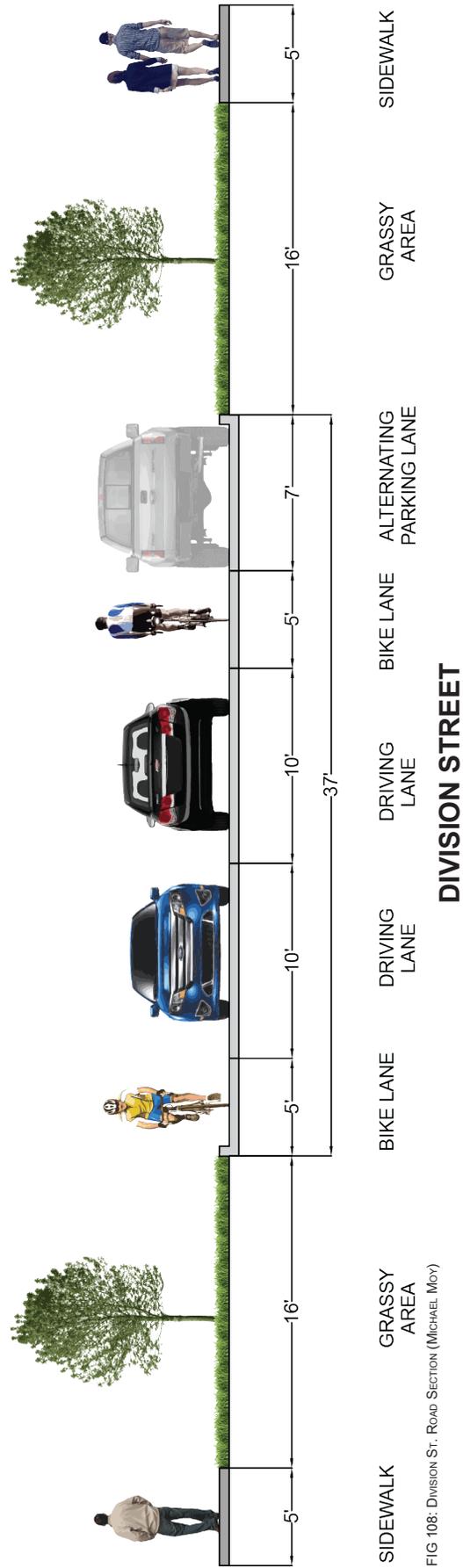
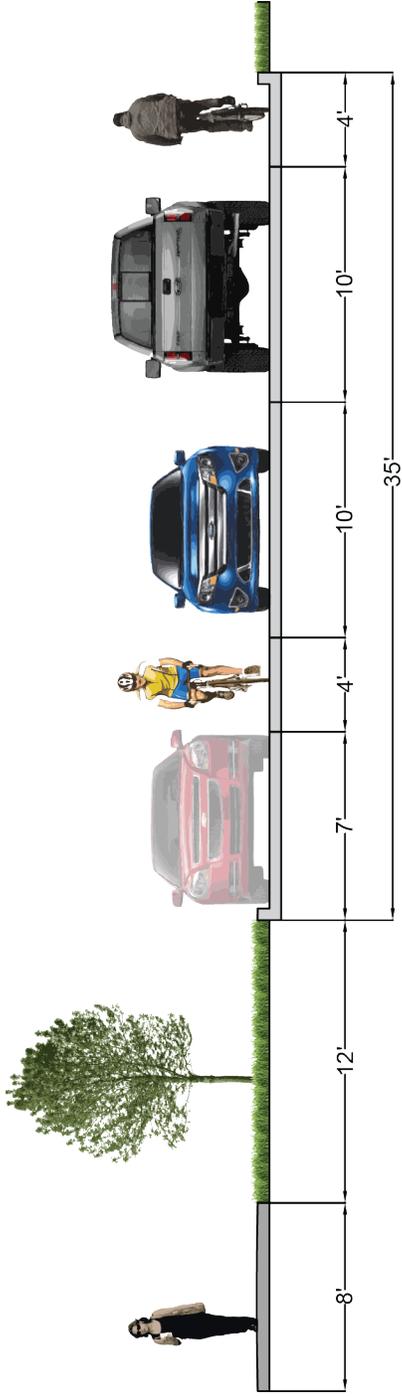


FIG 108: DIVISION ST. ROAD SECTION (MICHAEL MOY)



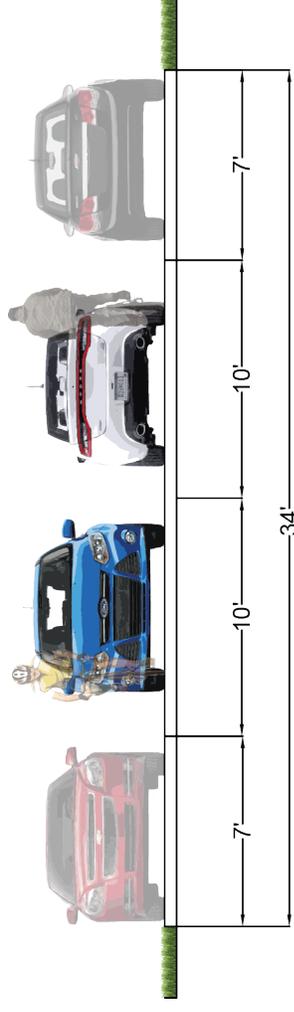
SIDEWALK **GRASSY AREA** **PARKING LANE** **BIKE LANE** **DRIVING LANE** **BIKE LANE** **DRIVING LANE**

FIG 109: IVES ST. ROAD SECTION (MICHAEL MOY) **IVES STREET**



SHARED LANE **SHARED LANE**

FIG 110: WEST AVE. ROAD SECTION (MICHAEL MOY) **WEST AVENUE**



PARKING LANE **SHARED LANE** **SHARED LANE** **PARKING LANE**

FIG 111: MADISON AVE. ROAD SECTION (MICHAEL MOY) **MADISON AVENUE**

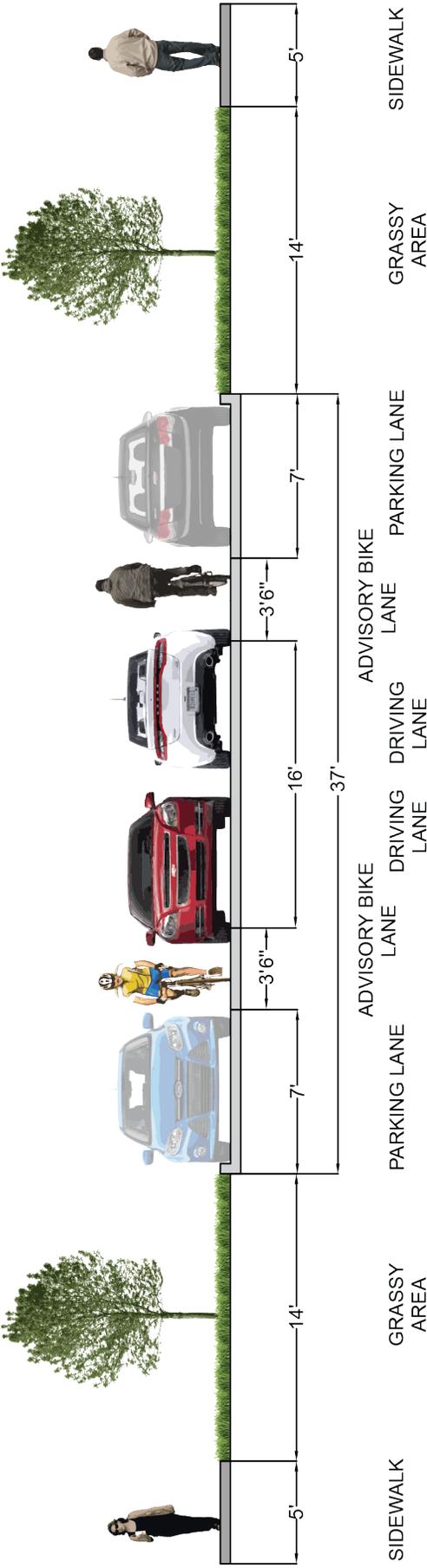


FIG 113: LOCUST ST. ROAD SECTION (MICHAEL MOY)

LOCUST STREET

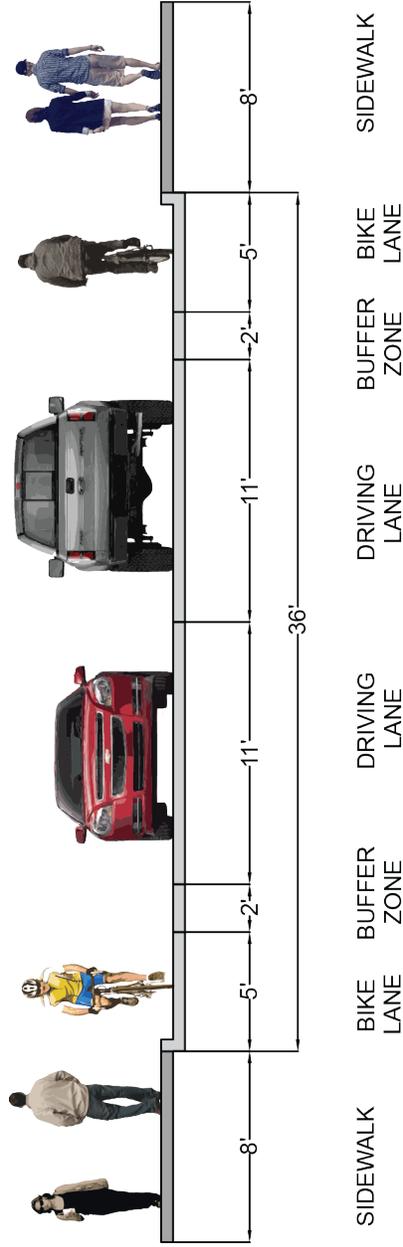


FIG 112: MILTON AVE. ROAD SECTION (MICHAEL MOY)

MILTON AVENUE

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FUNDING



Which Federal Program is Right for My Project?

	Transportation Enhancements (TE)	High-Priority Projects (HPPs)	Congestion Mitigation and Air Quality Improvement (CMAQ)	Non- TE Surface Transportation Program (STP)	Safe Routes to Schools (SRTS)	Recreational Trails Program (RTP)	Highway Safety Improvement Program (HSIP)	Section 402-- State and Community Highway Safety Grant Program
Percent of Federal Bike/Ped Funding ¹	41.0%	20.8%	16.0%	9.9%	6.8%	3.0%	0.8%	n/a
Program Purpose	To expand travel choice and enhance the transportation experience by improving the cultural, historic, aesthetic and environmental aspects of our transportation infrastructure.	To fund key transportation projects deemed important by elected officials.	To fund transportation projects to improve air quality and reduce traffic congestion in areas that do not meet air quality standards.	To provide flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the NHS, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities.	To enable and encourage children to walk and bicycle to school; and to facilitate the planning, development and implementation of projects that will improve safety, and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.	To provide funds to the States to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses.	To fund highway safety projects aimed at reducing highway fatalities and serious injuries.	To create safety programs aimed at reducing crashes, deaths, injuries, and property damage.
Eligible Infrastructure	All bike/ped infrastructure that has a relationship to surface transportation (as opposed to recreation alone)	All bike/ped infrastructure	Most bike/ped infrastructure including bike paths, lanes, racks, lockers, bike sharing programs	All bike/ped infrastructure	Bike/ped infrastructure within a 2 mile radius of the school	Bike trails, trailside and trailhead facilities, both development and maintenance	Bike lanes, bike parking, crosswalks and signage	None
Eligible Non-Infrastructure	Safety and educational programs for pedestrians and cyclists are also eligible	None	Most bike/ped programs and "outreach related to safe bicycle use," and "establishing and funding State bicycle/pedestrian coordinator positions..."	All bike/ped programs	Encouragement, Enforcement and Education activities, for children in grades K-8	Trail construction and maintenance equipment; land and easement acquisition; safety and environmental education; assessment of trail conditions; state program administration	States can spend 10 percent of their HSIP funds on public awareness campaigns, education programs and enforcement activities	Safety programs such as bike or pedestrian safety education, helmet distribution, or distribution of safety information
Key Project Requirements	Must relate to surface transportation, and must comply with all federal administrative laws that apply to highway projects	No official requirements, but offices need to know how the project will help their community and that local officials endorse the project	1) Must be spent in non-attainment and maintenance areas. 2) Will be evaluated on air quality emissions	n/a	Focus is on making it safer for more children (grades K-8) to walk and bicycle to school	30% of state's funding must be used for nonmotorized trail projects; 30% for motorized; 40% for projects that encourage diversity of use of trail corridor, trailhead, etc. (categories may overlap); projects encouraged to have environmental benefit and use youth conservation and service corps	Project must address goals written in State Highway Safety Plan (SHSP)	Project must address goals written in State Highway Safety Plan (SHSP)
Process Timing	Different in every state; see www.enhancements.org/Stateprofile.asp to learn about your state	HPPs are decided every 6 years with the transportation bill; Appropriations projects are similar to HPPs, but are decided annually with the appropriations bill	Different in every state and MPO	n/a	Different in every state	Varies by state	HSIP Projects decided every year. SHSP updated every year as well.	n/a
Local Match Required	Varies, usually 20%	No match requirement, but projects with a local match are generally prioritized	Typically 20%	20%	None	Typically 20%; some 50%	10%	n/a
Who Should I Talk to About This?	State TE Coordinator	Congressional Office	MPO to find out who runs your CMAQ Program	Bike/Ped Coordinator	DOT SRTS Coordinator	State Trail Administrator	Bike/Ped Coordinator, HSIP Manager	DOT Traffic Safety Office
For More Info: ²	National Transportation Enhancements Clearinghouse	Congressional Office	"Congestion Mitigation and Air Quality Improvement Program," Advocacy Advance Report	n/a	Safe Routes to School National Partnership	FHWA Web site: www.fhwa.dot.gov/environment/recretrails/index.htm	"Highway Safety Improvement Program," Advocacy Advance Report	"Section 402," Advocacy Advance Report

¹ FY2009. Does not include Recovery Act funds.

² All Advocacy Advance Reports can be found at www.bikeleague.org/resources/reports

