ACTIVATING MASON CITY

A BICYCLE & PEDESTRIAN MASTER PLAN

FEBRUARY 2014

We are grateful for the collaboration and insight of the Project Steering Committee, without whom this document would not have been possible. We especially appreciate the wonderful support, friendship, professionalism, and patience of Mason City's great staff, including Steven Van Steenhuyse, Brent Trout, Tricia Sandahl, and Mark Rahm.

This plan complements the city's previous planning initiatives and establishes a system of improvements to create an even more active community.

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The Blue Zones Project® is a community well-being improvement initiative designed to make healthy choices easier through permanent changes to environment, policy, and social networks.

"The last few years have resulted in a significant culture change across our entire community and the Blue Zones Project® has been a driving force in our River City Renaissance. It provided the format for collaboration of our whole town to develop this master plan and then built the will to implement it. This is truly a transformational project and will benefit all of our citizens into the future."

- Mayor Eric Bookmeyer

Blue Zones Project™ by Healthways
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TABLE OF CONTENTS

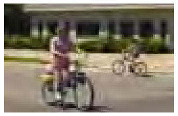
Bicycling for a purpose. A transportation cyclist on East State Street.

Consider a vehicle that weighs 1/6 as much as you do, easily travels at half the speed of a contemporary car in city traffic, gets the equivalent of 1,500 to 2,000 miles per gallon, produces zero emissions and almost no noise, can be parked outside the door of your destination or even inside your home or office, and makes you healthier. What would you call such a marvel? Science fiction? The answer to our transportation prayers? No – it's called a bicycle. And our own ability and efficiency in transporting ourselves under our own power is just as remarkable.

Now consider Mason City: a city of distinctive neighborhoods and a vital downtown, the home of the Music Man and the only active hotel in the world designed by Frank Lloyd Wright; a compact city, where most trips are under three miles and most slopes are gentle.; a city with a network of long, pleasant, and lightly traveled streets that take you conveniently to most of its features; a plains city still defined by water – the Winnebago River, a scenic urban creek system through the center of town, and lakes with public access and even beaches.

Walking and biking are very much parts of life in Mason City and people of all ages and capabilities use active transportation modes. It is no wonder that Mason City was one of ten Iowa communities selected to be demonstration communities for the Blue Zones Project®, designed to incorporate healthy living into the daily routine of citizens. Mason City is made for biking and walking, and while these modes do not work for every Mason City resident or every trip, they can play a more significant role in the city's transportation system. This Master Plan is dedicated to making Mason City a place that encourages its citizens to use these healthy, low-impact, and intrinsically fun forms of transportation as a greater part of their routine lives. Its primary purpose is to knit the city's neighborhoods and major destinations together with a network of facilities that is safe, pleasant, and comfortable for current and future bicyclists and pedestrians with a broad range of ages, capabilities, interests, and economic groups. In doing so, the plan also recognizes that this network must be practical and affordable to the community, and must deliver benefits far in excess of its costs.

It is the unique characteristic of active transportation that it combines utility and experience. Biking and walking are useful and convenient forms of transportation for many trips that are part of our daily activities: trips to work and school, to visit friends, to parks and recreation, to shopping and to worship, and to many other purposes of life. Moving under our own power is profoundly satisfying, and gives us the opportunity to experience the city, to be part of its pulse, and to see our fellow citizens on a personal basis. We know that most trips in Mason City will continue to be made by car. A balanced transportation system should offer choices, including the option to feel safe and comfortable using the healthy, sustainable, and socially satisfying means of mobility that the bicycle and walking offer.



Why Bikeways? Goals of this Master Plan

Mason City has completed major projects that are both important recreational assets and the basis for a broader bicycle transportation system. It has the core of an excellent trail system, with the Willow Creek, Winnebago River, East Park, and Trolley Trails. Other possibilities exist, including an abandoned right-of-way that can be Mason City's version of the famous High Line in New York and the developing Bloomingdale Trail in Chicago. By using streets, drainageways, parks and open spaces, disused rail rights-of-way, flood buyout property, and other opportunities to expand the reach and function of these trails to serve destinations in the city, this plan can help Mason City accomplish the following goals:

Goal One: Increase the number of people who use walking and biking for transportation as well as recreation. Mason City's multi-use trails are well utilized and have a transportation function, but the overwhelming majority of users are recreational cyclists and pedestrians. A measurement of the success of this plan will be significantly increasing the percentage of trips for a variety of purposes. Chapter Two includes estimates of current and future utilization of a bikeway system.

Goal Two: Improve bicycle and pedestrian access to key community destinations. A bicycle transportation system should get people comfortably and safely to where they want to go. Therefore, Mason City's system should be destination-based, providing clear and direct connections to key community features. Also, intersections, gaps in sidewalks, and other barriers can discourage people from walking along Mason City's streets and trails. Removing these barriers and creating more comfortable environments are important objectives of this plan.

Goal Three: Improve access to the city's pathway system by providing connecting links from neighborhoods to trails. Mason City's trails are the arteries of its bikeway system, and will continue to serve the majority of bicycle trips. But the city's emerging trail system can be connected to more neighborhoods by judiciously using the street system (and other development opportunities) as linkages.

Goal Four: Use walking and bicycling as part of an effort make Mason City more sustainable at three levels: global, community, and individual. Trips made by bicycle promote community sustainability in three ways:

- **Global sustainability.** Bicycle transportation reduces fossil fuel use and greenhouse gas emissions, helping the city reduce its impact on the global environment. A more walkable and bikeable Mason City will not save the planet. But as a great sage said about 2,000 years ago, "It's not your job to finish the task, but you are not free to walk away from it."

- Community sustainability. A complete and heavily used bicycle transportation system can help reduce the cost of government by marginally reducing the need for more expensive projects. In Portland, Oregon, for example, spending 2% of the city's overall transportation budget since 1996 has caused bicycling to increase from 1% to 6% of all commuter trips – an excellent return on investment. Reducing emissions also helps ensure that Mason City will maintain its status as a healthy environment for its citizens. On a social level, bicycling builds community by enhancing the quality of civic life, helping us interact with each other as people. Places that lead in bicycle transportation also tend to attract people because of their community quality.

- Individual sustainability. This is a very important objective of the Blue Zones Project®, which promotes community health through better individual health. Incorporating physical activity into the normal routine of daily life for everyone from kids to seniors makes all of us healthier, reduces overweight and obesity rates, improves wellness and lowers overall health care costs.

Goal Five: Increase safety on the road for motorists, bicyclists, and pedestrians. Improved safety is a critical goal for any transportation improvement, and is fundamental to efforts to increase the number of people who walk and bike in the city. In addition, national research indicates a strong relationship between the number of cyclists and bicycle crash rates. (Jacobson, Injury Prevention 9:205-209 [2003] Infrastructure must also be supported by education, enforcement, and encouragement programs, and its effectiveness measured by evaluation.

Goal Six: Capitalize on the economic development benefits of a destination-based bicycle transportation system. Mason City has many great features that appeal to visitors: the architectural masterpieces of Wright, Walter Burley Griffin and E.R. Bogardus; the Lime Creek Nature Center; parks like East Park that brings delight to all of its users; and one of Iowa's great lakes, connected to the center of the city by a trail that parallels America's last true electric interurban railroad, among others. The American Planning Association named Downtown Mason City as one of America's Great Places in 2013. Mason City as a pedestrian and bicycle-friendly community can add to the visitor experience, and attract new residents and investment.

The Measures of Success:
Guiding Criteria for an Effective Bicycle Transportation Network

The design of bicycle and pedestrian transportation systems should be guided by criteria that can be used to evaluate individual components and the effectiveness of the entire network. The Netherlands' Centre for Research and Contract Standardization in Civil and Traffic Engineering (C.R.O.W.), one of the world's leading authorities in the design of bicycle-friendly infrastructure, has developed especially useful requirements to help determine the design of bicycle and pedestrian systems. These same criteria also apply to pedestrian networks. Drawing on C.R.O.W.'s work in its excellent design manual, *Sign Up for the Bike*, Mason City's bicycle and pedestrian network should generally fulfill six basic requirements:

- **Integrity** (or, in C.R.O.W.'s term, Coherence): Mason City's bikeway network should, at all points in its evolution, form a coherent system that links starting points with destinations. The network should be understandable to its users and fulfill a responsibility to convey them continuously on their paths.
- **Directness:** Mason City's bikeway network should offer cyclists as direct a route as possible, with minimum detours or misdirections.
- Safety: Mason City's bikeway network should maximize the safety of using the bicycle for transportation, minimize or improve hazardous conditions and barriers, and in the process improve safety for pedestrians and motorists.
- **Comfort:** Most bicyclists should view the network as being within their capabilities and not imposing unusual mental or physical stress. As the system grows, more types of users will find that it meets their needs comfortably.
- **Experience:** The Mason City bicycle network should offer its users a pleasant and positive experience that capitalizes on the city's built and natural environments.
- **Feasibility:** The Mason City bicycle network should provide a high ratio of benefits to costs and should be viewed as a wise investment of resources. It is capable of being developed in phases and growing over time.

These criteria and the system design principles that logically follow from them are discussed in detail in Chapter Three.

Plan Methodology and Stakeholder Involvement

It was extremely important to structure a planning process that maximized both public involvement and our understanding of the physical structure and community character of Mason City. A Master Plan Committee, representing city and state staff, the Blue Zones Project® committee, bicycle and walking community members, the private sector, and other community interests met throughout the planning process, with an initial meeting on April 10, 2013. Major public involvement events included:

- **Field reconnaissance and stakeholder groups.** These visits included initial field work on bicycle and interest/stakeholder group discussions in each of Mason City's four quadrants, helping us become familiar with issues and the overall structure of Mason City's neighborhoods and street system. During this process, we rode virtually every mile of every street in the city and developed an inventory of almost 2,000 photographs.

- Bicycle and Pedestrian Survey. This survey, explored the characteristics of Mason City residents interested in bicycling and measured their level of comfort with different types of facilities. The survey attracted 373 responses and produced an enormous amount of information, helping to frame the direction of this plan.

- Quadrant Charrettes. The quadrant charrettes were a central part of the planning process. The city was divided into four quadrants: east and west of Federal Avenue, north and south of Highway 122. Each two-day charrette included extensive field work on bicycle during the days, and public meetings in the evening to discuss results and concepts.

During this process, we were able to talk directly with about 100 participants in stakeholder groups and quadrant charrettes; obtain written information from nearly 400 people through the on-line survey; and covered over 200 miles of Mason City's streets and trails by bicycle. The results of this process are used throughout the plan, and Chapter Two presents the results and implications of the survey in detail.

Organization of the Plan

The Activating Mason City: A Bicycle and Pedestrian Master Plan presents its analysis and recommendations in the following chapters:

Chapter One: Mason City's Active Transportation Environment. Chapter 1 examines existing conditions in the city pertinent to walking and bicycling, including determinants of a future bikeway system such as destinations, existing facilities, and opportunities.

Chapter Two: The Market for Active Transportation in Mason City. Chapter 2 estimates current pedestrian and bicycle demand and the potential future market. It also reviews the Mason City Bicycle and Pedestrian Survey, which provides extensive information about people interested in urban bicycling in Mason City and their needs, concerns, and preferences.

Chapter Three: The Bikeway Network: Principles and Structure. Chapter 3 uses the analysis of Chapters One and Two to establish over-all principles that guide the proposed Mason City network. It also elaborates on the measurement criteria previously presented to help guide the system's components. Finally, it presents a complete conceptual system of on-street bikeways, paths, and multi-use trails.

Chapter Four: Facility Design Guidelines. Chapter 5 presents the vocabulary of facilities and street adaptations proposed for the Mason City network, based on the City's specific design contexts and street characteristics. It concludes by applying the infrastructure types to the conceptual bikeway network and its various routes.

Chapter Five: Route Details and Sequencing. Chapter 5 includes a detailed, route-by-route facility program, showing proposed design solution for each segment of the system. It discusses criteria for determining the sequence of development and presents a phased implementation program, along with probable costs for different infrastructure types. Finally, it proposes an initial pilot network, based on serving all parts of the city and early feasibility.

Chapter Six: On Foot in Mason City Chapter 6 nalyzes the city's pedestrian environment, based again on extensive field research. It develops a strategic program for improving the web of sidewalks, paths, and other infrastructure, and examines ways of addressing and redesigning barriers that tend to discourage people from walking for enjoyment or transportation.

Chapter Seven: Support Programs. The League of American Bicyclists describes five "E's" as components of a bicycle-friendly community (BFC) program and judges BFC applications accordingly. These program categories are Engineering, Education, Encouragement, Enforcement, and Evaluation. Chapters One through Five largely address the Engineering component; Chapter Seven recommends initiatives that support these infrastructure investments to achieve bicycle transportation's full potential as part of Mason City's access environment.

CHAPTER 1

THE ACTIVE TRANSPORTATION ENVIRONMENT IN MASON CITY

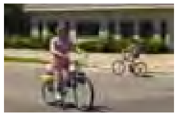


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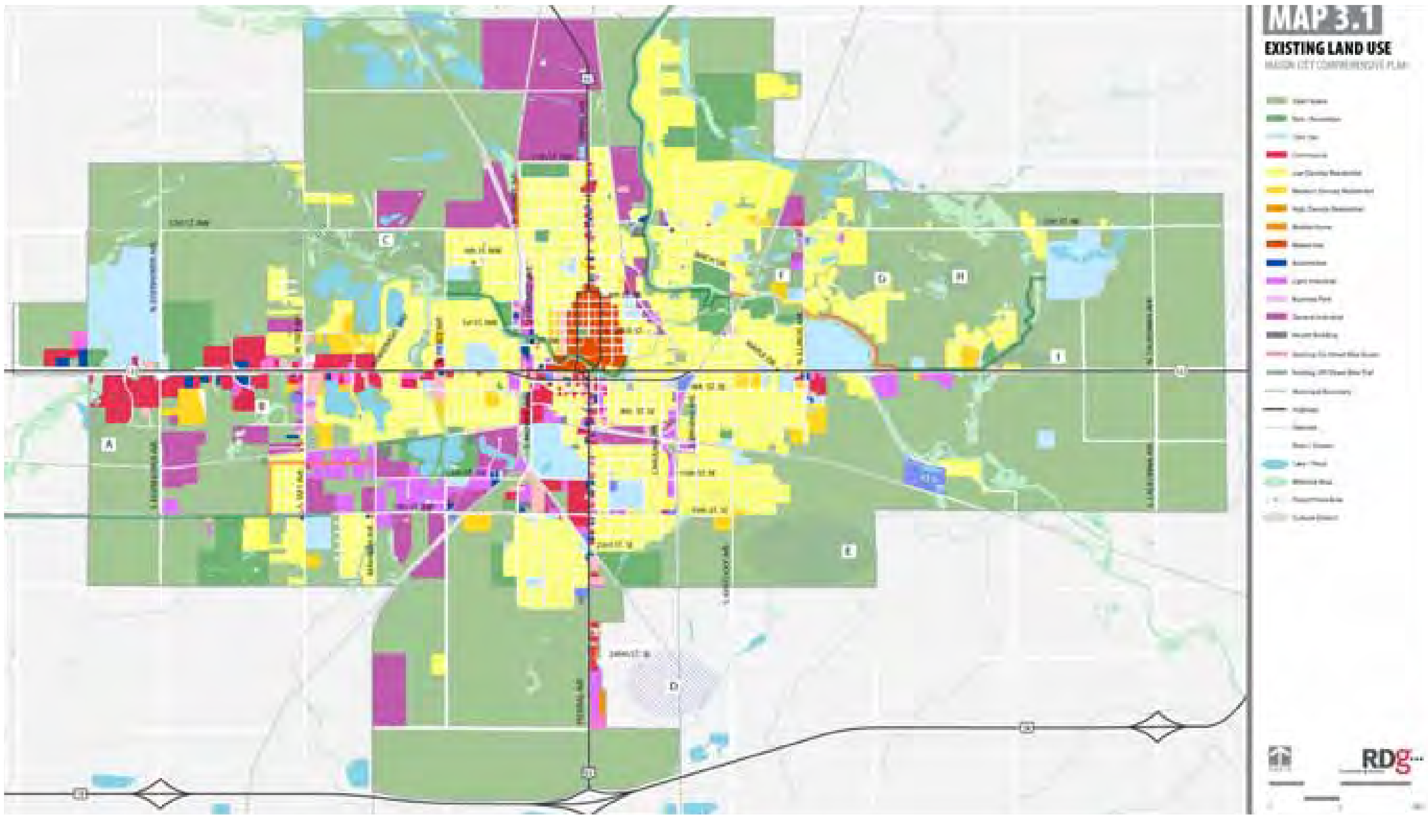
FIGURE 1.1: **EXISTING LAND USE**



The Existing Land Use Map from the Mason City comprehensive plan illustrates the distribution of development in the city. Notable aspects of the map include a primary commercial corridor along Highway 122, major employment and industrial complexes on the north and south edges, and a relatively compact development pattern with the city center at the georgraphic core. This pattern is very favorable to pedestrian and bicycle transportation.

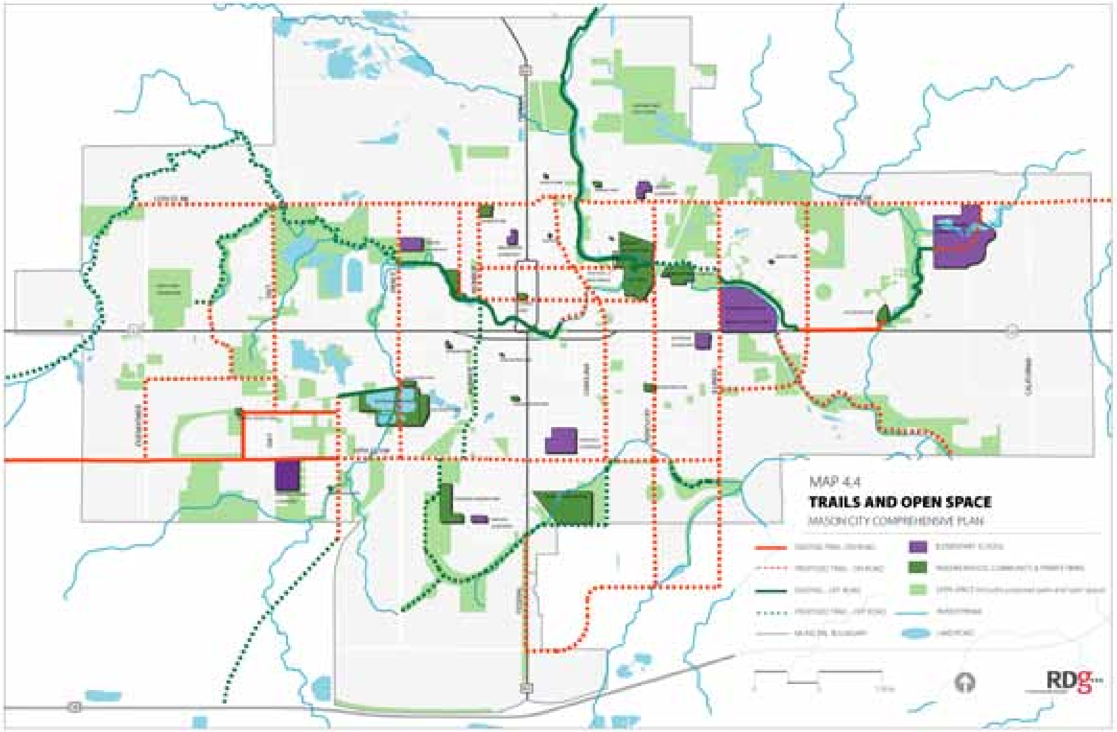


FIGURE 1.2: **TRAIL AND OPEN SPACE STUDY FROM MASON CITY COMPREHENSIVE PLAN**

The Comprehensive Plan included a trail and open space concept that provides a starting point for the analysis and ideas included in this much more complete document.

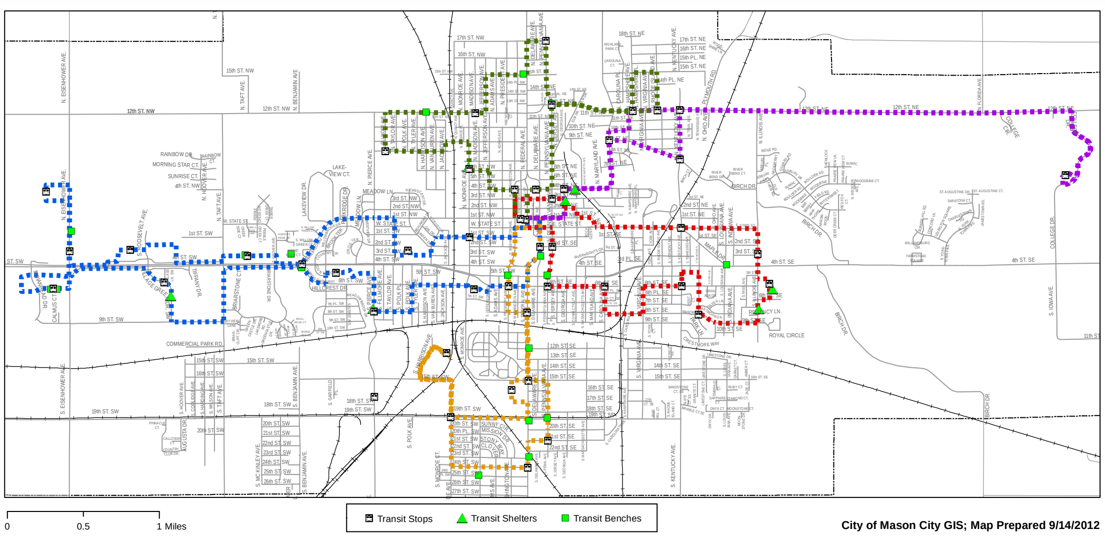


FIGURE 1.3: **TRANSIT SERVICE IN MASON CITY, 2013**

Transit services provide the opportunity for dual mode trips or for contingency plans for commuters in bad weather. The city has good bus coverage for a community of its size, and equipping vehicles with bike racks may have appeal to potential users.

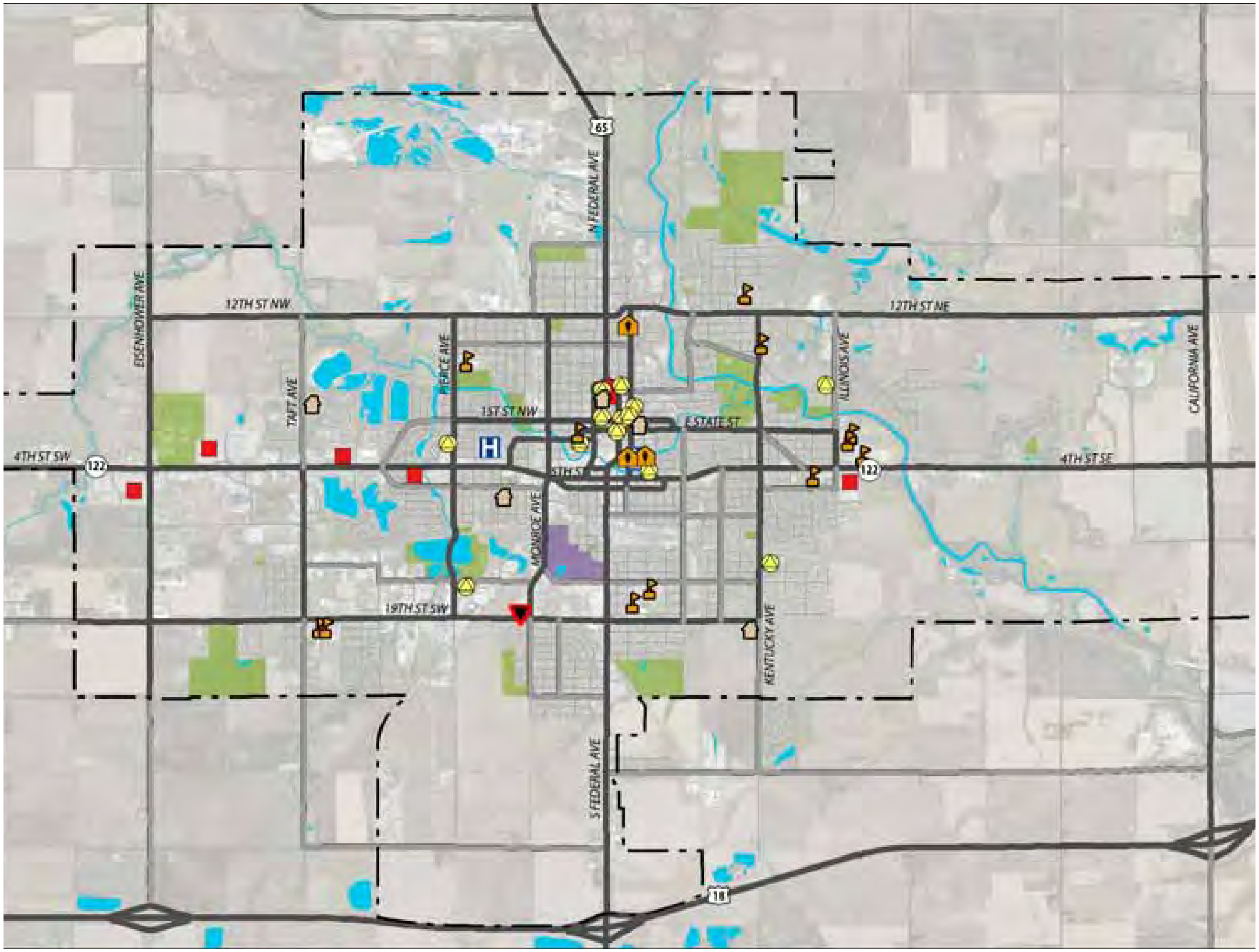
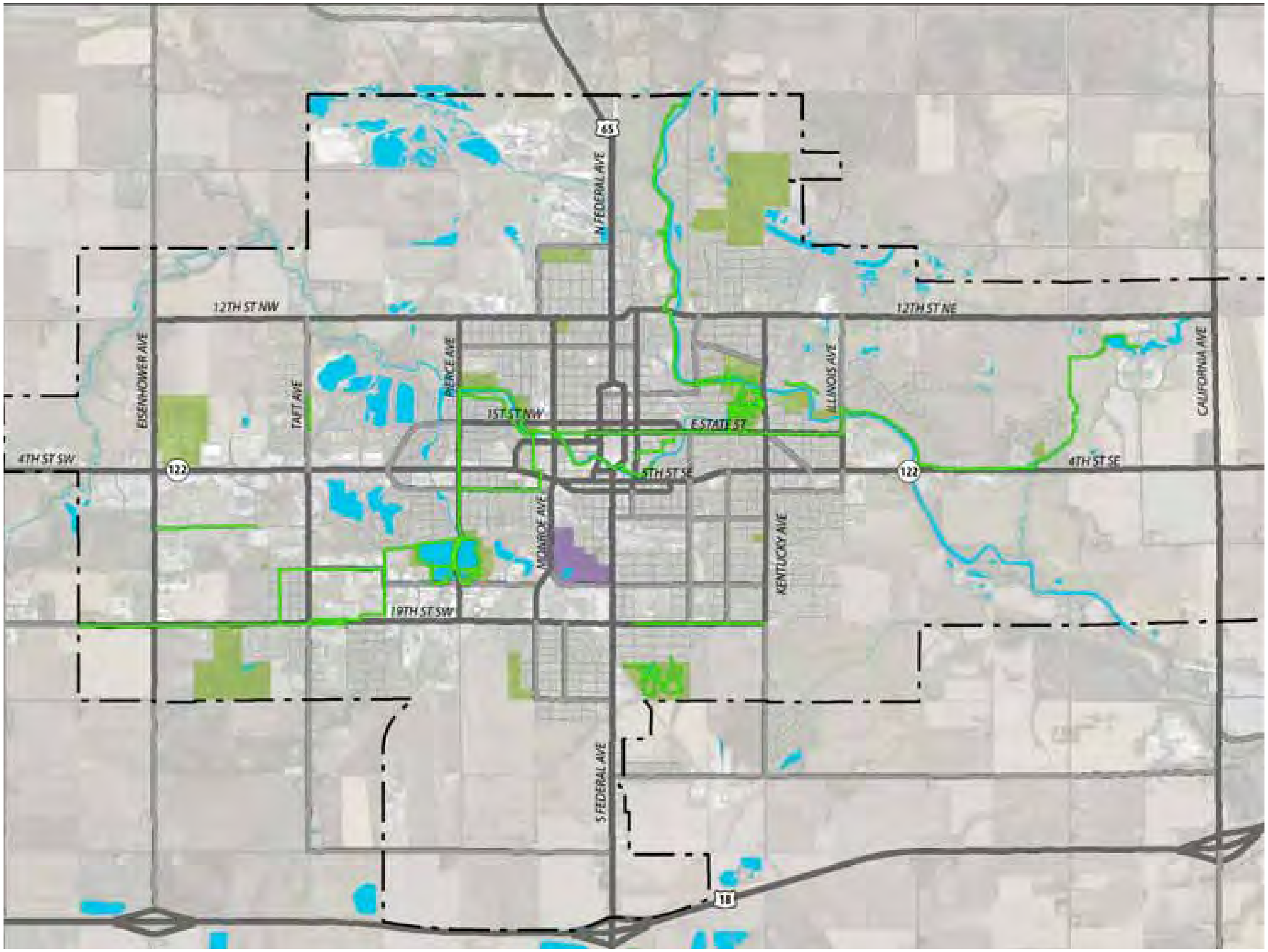


FIGURE 1.4: **DESTINATIONS**

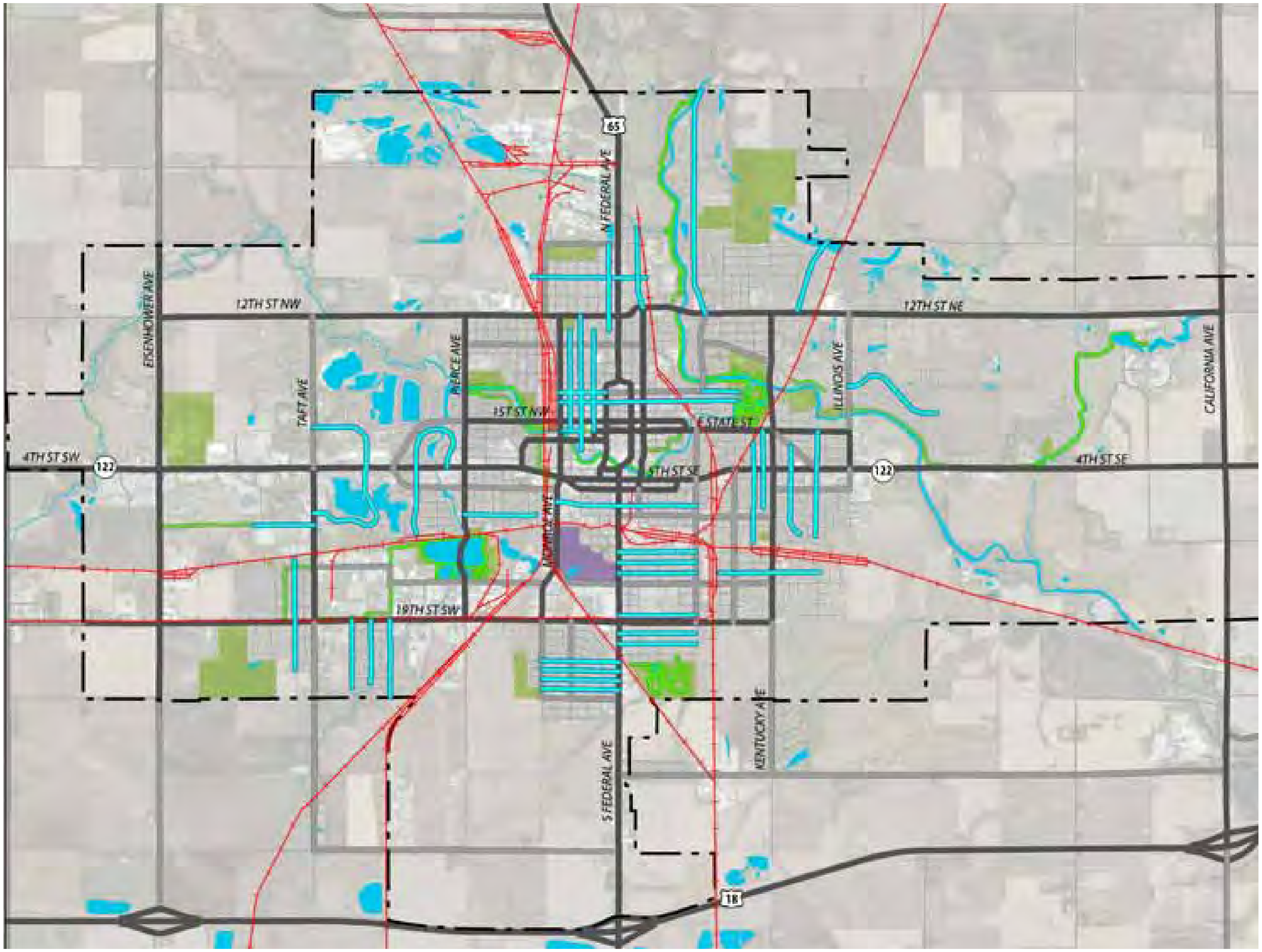
A bicycle and pedestrian transportation system should provide practical service to destinations. This map displays the layout of logical places that can be served by multi-modal transportation.

FIGURE 1.5: **EXISTING FACILITIES**



Street and open space networks provide the framework for an active transportation system.

FIGURE 1.6: **OPPORTUNITIES**



Opportunities for new routes include low-volume streets with good continuity, rail lines, waterways, parks, and similar features. While many of these are not suitable for use, they do provide intriguing opportunities for detailed on-site examination.

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CHAPTER 2

THE ACTIVE TRANSPORTATION MARKET IN MASON CITY

This chapter investigates the market for bicycling in Mason City – the number of potential cyclists and the preferences of that potential market. It draws heavily on new and recent census information, national trends, and the 373 citizens who responded to the Mason City Bicycle and Pedestrian Survey.

Before building a major shopping center or apartment project, a developer usually commissions a market analysis, designed to determine whether enough people will shop or live there to support the effort and to define the features that will appeal to customers. Similarly, an active transportation master plan should also evaluate the size and character of the potential market. This helps assess the impact of a bicycle and pedestrian transportation program on factors such as motor vehicle traffic and emissions. It also helps us understand what the existing and potential bicycling community wants of the program, in turn increasing the chances that bicycling can reach its potential in Mason City.

This market study uses two major instruments:

- **Estimates of existing and future pedestrian and bicycling demand:** Using a demand model developed by Alta Planning & Design. This model is clear, straightforward, and easy to track for future measurement.

- **The results of the Mason City Bikeways survey:** This survey was completed by 373 people, a very high participation rate for a community of this size, and provides valuable information about the city's potential active transportation community.

Existing Pedestrian and Bicycle Demand

Figures 2.1 and 2.2 use the Alta model to estimate existing and potential pedestrian and bicycle demand. Primary sources of information include the 2008-2012 average computations of the American Community Survey (ACS), developed by the Bureau of the Census, and 2010 Census data released to date. The model makes certain assumptions about transportation choices of populations such as k-12 and college students. The sources of these assumptions are included in the table.

Mason City now has an estimated 10,478 daily pedestrian trips and just over 2,000 daily bicycle trips for all purposes (including recreational activity). Bicycling has a 0.8% commuter mode share – that is, 0.8% of all commuters travel by bicycle, well above the national share of about 0.5%. This contrasts with Minneapolis with a bicycling mode share of about 3.9%, one of the highest in the nation. However, Mason City's share is relatively high for a city with limited commuting infrastructure.

Midpoint Demand

Figures 2.1 and 2.2 provide both projections of trips made by pedestrians and bicyclists at 50% and 100% completion of the proposed system, based on a twenty year implementation schedule. At the midpoint, enough infrastructure has been put in place to have a significant impact on transportation choices. This midpoint model paints a picture of what Mason City's transportation could be ten years from now with gradual implementation of an improved pedestrian and bicycle system. It assumes that:

- Walk-to-work commuters increase from about 4.5% to 5.2% of all workers, a very modest increase.

- Transit's share of the modal mix increases from 1.7% to a still modest 2%.

- Bicycle commuting, encouraged by new infrastructure, could increase to about 2.4% – a level equivalent to the more bicycle-friendly cities in the nation but well below top performers like Portland and Minneapolis.

- 20% of K-8 students will walk to school, about double the current level. This is still far lower than the 60% of students who walked to school thirty years ago.

FIGURE 2.1: **EXISTING AND PROJECTED PEDESTRIAN TRANSPORTATION TRIPS, 2010-2030**

PEDESTRIAN TRIPS IN MASON CITY	2012	2012 MODE SHARE (%)	2020	2020 MODE SHARE (%)	2030	2030 MODE SHARE (%)	ASSUMPTIONS/SOURCES
Population	27,959		30,658		31,431		2012: ACS; 2020 and 2030: Comprehensive Plan Projections: +0.25% annual growth
Total Commuting to Work	13,922		15,266		15,649		49.8% of Mason City (MC) population commutes to work, ACS 2012
Walking to Work (%)	4.5%		5.20%		6.0%		
Walking to Work (#)	626		794		939		
Work at Home	285		313		320		2% of MC workers work at home, ACS 2012
Work at Home Pedestrian Trips	71	25% make one ped trip	100	32%	128	40%	
Take Transit to Work (#)	237	1.7% take transit	275	1.8%	313	2%	
Walk to Transit	213	90% walk to transit	247	90%	282	90%	
School Population (K-8)	3,214		3,524		3,613		K-8 students = 11.5% of MC population, ACS 2012
School (K-8) Pedestrian Trips	354	11% walk to school	705	20%	1,084	30%	Safe Routes to School National Partnership, 2009. 13% of children walk OR bike to school
School Population (9-12)	1,432		1,570		1,610		9-12 students = 5.1% of MC population, ACS 2012
School (9-12)Pedestrian Trips	79	5.5% walk to school	86	5.5%	89	5.5%	
College	1,231	4.40%	1350		1,384		College Students=4.4% of MC population, ACS 2012
College Pedestrian Trips	62	5% walk to school	67	5%	69	5%	
Total Pedestrian Commuters	1,405		2,000		2,590		
Total Pedestrian Commuter Trips (Commuters x2)	2,809		4,000		5,181		2 trips for each commuter
Other Trips Ratio (commuter to non-commuter trips)	2.73		2.73		2.73		U.S. DOT, Federal Highway Administration, 2001 National Household Travel Survey, via Alta Planning & Design
Other Pedestrian Trips	7,669		10,919		14,144		Commuter Trips x Other Trips Ratio
Total Daily Pedestrian Trips	**10,478**		**14,919**		**19,325**		Commuter Trips + Other Trips

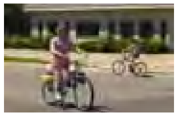


FIGURE 2.2: **EXISTING AND PROJECTED BICYCLE TRANSPORTATION TRIPS, 2010-2030**

BICYCLE TRIPS IN MASON CITY	2012	2012 MODE SHARE (%)	2020	2020 MODE SHARE (%)	2030	2030 MODE SHARE (%)	ASSUMPTIONS/SOURCES
Population	27,959		30,658		31,431		2012: ACS; 2020 and 2030: Comprehensive Plan Projections: +0.25% annual growth
Total Commuting to Work	13,922	49.8%	15,266	49.8%	15,649		49.8% of Mason City (MC) population commutes to work, ACS 2012
Biking to Work (%)	0.8%		2.40%		4.0%		
Biking to Work (#)	111		366		626		
Work at Home	285	2.0%	313		320		2% of MC workers work at home, ACS 2012
Work at Home Bike Trips	14	5% make one bike trip	19	6%	22	7%	
Take Transit to Work (#)	237	1.7%	275	1.8%	313	2%	
Bike to Transit	7	3%	11	4%	16	5%	
School Population (K-8)	3,214	11.50%	3,524		3,613		K-8 students = 11.5% of MC population, ACS 2012
School (K-8) Bike Trips	64	2%	211	6%	361	10%	Safe Routes to School National Partnership, 2009. 13% of children walk OR bike to school
School Population (9-12)	1,432	5.12%	1,570		1,610		9-12 students = 5.1% of MC population, ACS 2012
School (9-12) Bike Trips	14	1%	47	3%	80	5%	
College	1,231	4.40%	1350		1,384		College Students=4.4% of MC population, ACS 2012
College Bike Trips	62	5%	135	10%	208	15%	
Total Bike Commuters	273		790		1,313		
Total Bike Commuter Trips (Commuters x2)	546		1,579		2,627		2 trips for each commuter
Other trips ratio (commuter to non-commuter trips)	2.73		2.73		2.73		U.S. DOT, Federal Highway Administration, 2001 National Household Travel Survey, via Alta Planning & Design
Other Bike Trips	1,490		4,312		7,171		Commuter Trips x Other Trips Ratio
Total Daily Bike Trips	**2,036**		**5,891**		**9,798**		**Commuter Trips + Other Trips**

Applying these changes increases daily pedestrian trips from about 10,500 to about 15,000, a gain of almost 50% in ten years. Bicycle trips increase from about 2,036 to about 5,900, about a 300% increase. These very attainable changes begin to have a real impact on the overall transportation picture in Mason City. This model assumes that 9.5% of commuting trips are made by "active transportation" modes – bus, foot, and bicycle – in line with the 10% goal established by a number of cities.

2030 Potential Demand

Figures 2.1 and 2.2 project full implementation in Mason City of the complete pedestrian and bikeway system, along with supporting education and encouragement programs. This projection assumes that Mason City will grow at an average annual rate of 1/2% during the next 20 years. It also projects that active modes will claim a 13% mode share within 20 years and that 4% of Mason City residents will cycle to work – about the same rate as Minneapolis in 2011. The number of students walking to school will increase to 30%, still far below levels experienced twenty years ago. These assumptions result in an increase of weekday pedestrian trips from 10,400 today to about 19,300; and an increase in weekday bicycle trips from about 2,300 to about 9,800.

Achieving this level and assuming that 60% of these trips are currently being made by car saves 9,000 auto trips per weekday and about 2.25 million trips per year. If each trip averages 3 miles, Mason City residents drive 6.75 million fewer miles per year, saving 270,000 gallons of gasoline assuming an average of 25 mpg. Given uncertainties during the next 20 years, these projections could well prove conservative. But even these calculations indicate that citizens collectively will save the equivalent of $1,000,000 annually in gasoline purchases.

Active transportation also can have significant health benefits. Assuming that the average bicycle trip is about two miles and the average pedestrian trip is 0.5 miles, the projected number of trips made by active transportation adds 15,000 bicycle miles (or 1,250 hours at 12 mph) and 4,500 pedestrian miles (or 1,500 hours at 3 mph). The impact of this level of physical activity and calorie consumption can be highly beneficial to the city's residents.

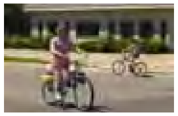
It is also important to note that these projections do not include technological change that can make bicycling even more widespread. Many observers believe that the introduction of e-bikes, which use a small electric motor to assist pedal-driven bicycles, will broaden the appeal of bicycling for transportation. On-street infrastructure is particularly well-suited to accommodating these more capable vehicles.

The Mason City Bikeway Survey

The estimates discussed above help quantify the size of a potential active transportation market and also help to assess some of the basic economic and health benefits achieved by reaching this market. With realistic mode projections, Mason City could reach 30,000 daytime active transportation trips. The Bicycle and Pedestrian Survey helps define the preferences and opinions of these prospective cyclists and pedestrians, and provides important guidance for designing the network.

Who are Mason City's Cyclists?

While the Bikeway Survey was not a scientific survey, the number and diversity of responses suggested that it represented a fairly representative sample of citizens with interest in urban bicycling. The first questions explored the characteristics of these responses, and found that:



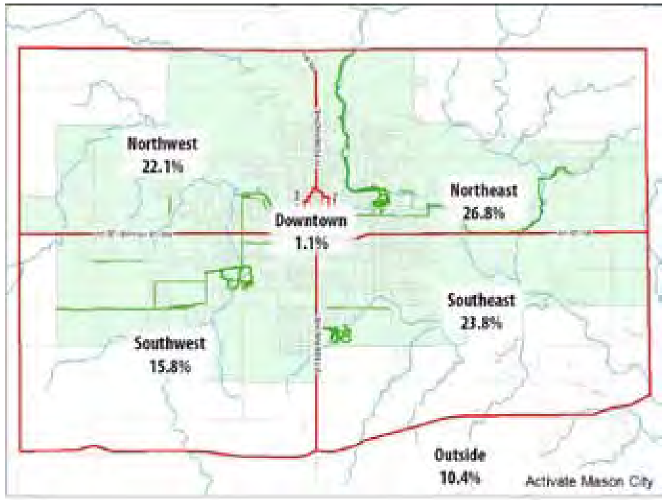


FIGURE 2.3:
PLACE OF RESIDENCE OF SURVEY PARTICIPANTS

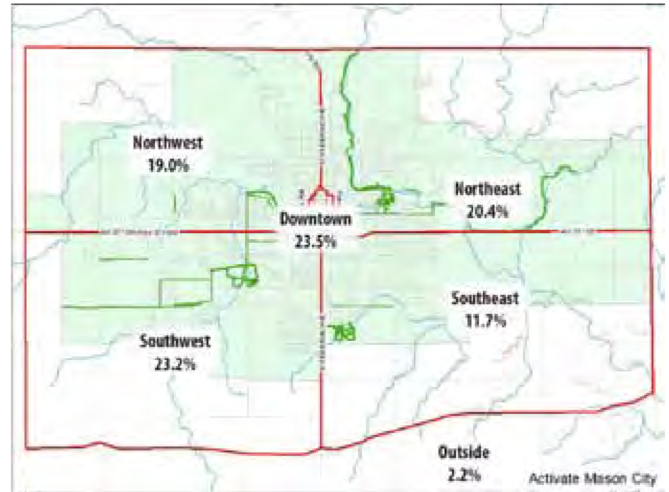


FIGURE 2.4:
COMMON DESTINATION OF SURVEY PARTICIPANTS

- **Survey respondents represent all parts of the city.** This suggests that residents in all parts of the city are interested in active transportation and that a complete system will find an audience in all four quadrants. About 50% or respondents live north of the Highway 122 axis, 40% south and 10% outside the city limits. Figure 2.3 illustrates the distribution of responses.

- **Destinations are also relatively evenly distributed, with the highest density destination being Downtown Mason City.** However, only the relatively small and largely residential southeast quadrant has a substantially smaller share of total trips. Again, this underscores the interest in active transportation in all parts of the community. (Figure 2.4)

- **Responses were about evenly split between frequent and infrequent cyclists.** In fact, a small majority (about 52%) of participants reported riding once or twice a month or less; 33% either did not ride or rode very infrequently. This is a very hopeful sign that reinforces market projections: many non-riders or occasional cyclists appear interested in the subject and in increasing their activity in bicycling. (Figure 2.5)

- **Exercise and recreation-related purposes are by far the most frequent reasons mentioned for bicycling.** The next three largest trip purposes (trips to parks or recreation facilities, family outings, and touring) also involve recreational purposes. A smaller but significant group use bicycles for transportation to work, social visits, errands, and community destinations. But recreation remains the most common reason for cycling and walking.

- **The largest group of respondents are cyclists most interested in improved infrastructure.** The largest single group, over 48%, characterized themselves as

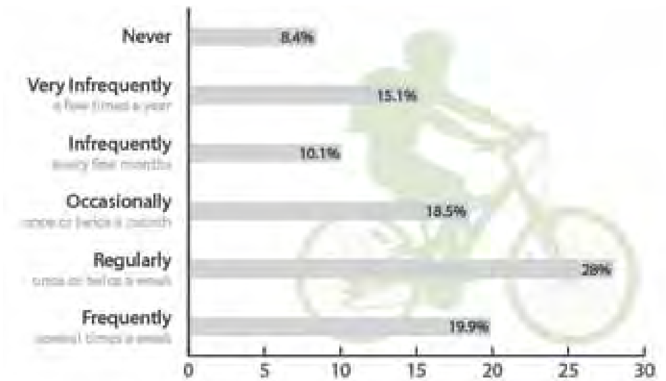


FIGURE 2.5:
FREQUENCY OF CYCLING

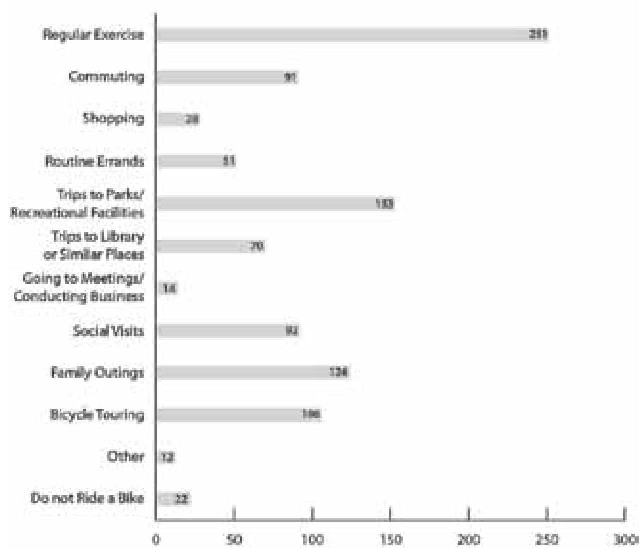


FIGURE 2.6:
PURPOSES OF CYCLING TRIPS

interested in cycling and capable of using low-volume streets, but concerned about riding in mixed traffic. The next largest group, about 30%, were committed urban cyclists comfortable in streets, but recognizing and supporting new facilities to expand ridership and improve safety. Very small groups were at the edge of the interest spectrum – no one responded to being comfortable in every situation and seeing no reason for infrastructure development, and few reported that they were likely to ride under any circumstances (3.9%)

Destinations

A bicycle transportation network should get people where they want to go. The survey listed a number of different community destinations or destination types, and asked respondents to rank them based on the importance of good bicycle access to them. Figure 2.8 describes the results, indicating the percentage of participants who considered good access important or very important. These in turn suggest the places that the network should serve.

Top priority destinations include the city's trails, principal parks, schools, Lime Creek Nature Center, the YMCA, and Downtown. However, every destination listed in the survey was rated as "very important" or "important" by over one-third of the respondents.

Infrastructure Types

Much of the survey was designed to assess the comfort of current and prospective bicyclists with different types of bicycle environments. The survey asked participants to respond to a gallery of photographs of streets and facilities. Most of the images for evaluating streets were in Mason City, while infrastructure

FIGURE 2.7:
SELF-CHARACTERIZATION OF PARTICIPANTS

COMMITTED AND FEARLESS: I am a committed bicyclist who rides in mixed traffic on every street. I don't believe that any significant further action on bicycle facilities is necessary. **0.0%**

COMMITTED URBAN CYCLIST: I am a committed bicyclist who rides in mixed traffic on most streets, but believes that new facilities like bike lanes, bike routes, and trails are needed to improve Mason City's biking environment for me and encourage other people to ride more often. **29.3%**

INTERESTED AND CONCERNED: I am interested in bicycling and use low-traffic streets, but am concerned about the safety of riding in mixed automobile traffic. More trails and bike lanes and routes would increase the amount of trips that I make by bicycle. **48.3%**

RECREATIONAL TRAIL USER: I am a recreational or occasional bicyclist and ride primarily on trails. I would like to see more trails, but am unlikely to ride on city streets even with bike lanes **10.8%**

INTERESTED NON-RIDER: I do not ride a bicycle now, but might be interested if Mason City developed facilities that met my needs better or made me feel safer. **7.2%**

NON-RIDER UNLIKELY TO RIDE: I do not ride a bicycle, and am unlikely ever to do so. **3.9%**

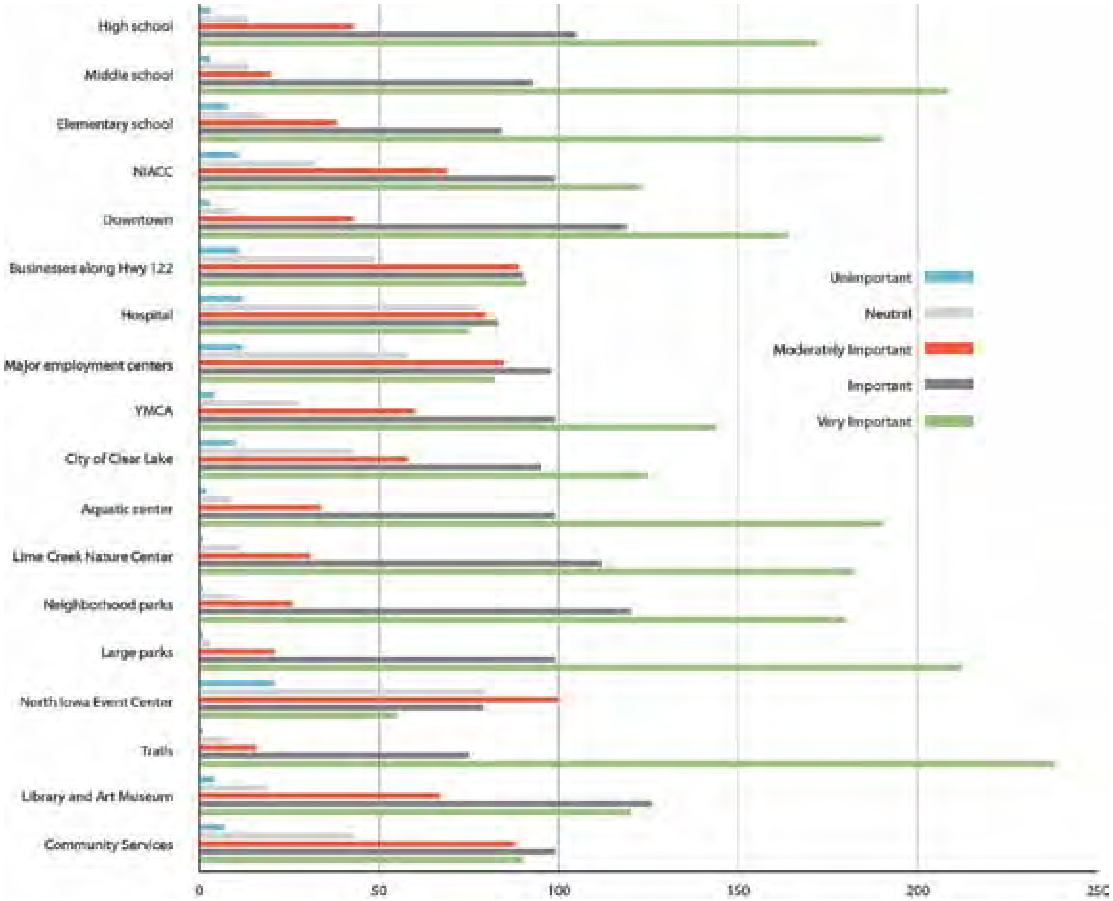


FIGURE 2.8:
IMPORTANCE OF VARIOUS DESTINATIONS

solutions typically came from other cities. Through their responses, participants determined:

- Whether the setting is comfortable for most or all cyclists.
- Whether the setting is comfortable for the respondent, but not necessarily for less capable cyclists.

The displays on the facing page group survey images on the basis of their combined favorability ratings and show the following results:

- The top-rated (over 90% favorable) settings include either completely separated paths, both along roads and on exclusive right-of-way), or bike lanes either in calm traffic situations or with some type of physical separation from travel lanes. New York City's buffered cycle track was the third highest-rated image in the survey.
- The next highest-rated group (80-90% favorable) included sidepaths (including the 12th Street overpass), bicycle boulevards, and buffered bike lanes in busier settings.
- The third highest rated group included arterial streets with conventional bike lanes, shared use lanes on collector streets, and unmarked wide avenues.
- Next in preference order were frontage roads without markings like the Highway 122 frontage road in Mason City, one-way streets, and major streets with narrow shoulders.
- The lowest rated settings were rural section two-lane busy streets like 12th Street NW and multi-lane commercial streets.

Another point of interest involves looking at settings rated as "comfortable for me" rather than "comfortable for most people" by a substantially larger number of people. These suggest situations that experienced riders find satisfactory for themselves, but not suitable for less capable cyclists. One infrastructure solution– the sharrow or shared lane marking – also displayed this disparity, indicating a comfort level for more experienced bicyclists that did not carry over to less experienced riders.

Importance of Various Actions

Responses to a list of possible actions to improve Mason City's bicycle environment indicated a strong priority for infrastructure programs. Initiatives that ranked highest included bike lanes, trails, roadside paths, and improved private project design for better pedestrian and bicycle accessibility. Supporting efforts, including a comprehensive designated bicycle network, advocacy, special events, and safety education were also considered important or very important by over 60% of respondents. Figure 2.14 presents the percentage of survey responses calling an action important or very important for increasing bicycling in the city.

Conclusions

This consideration of market potentials and preferences tells us that:

- There is a substantial potential market for urban bicycling in Mason City. The distribution of destinations and compact, bikeable nature of the city makes bicycling a viable form of transportation for many Mason City residents. Reasonable and attainable assumptions, based on meeting infrastructure and supporting needs, suggest that the number of

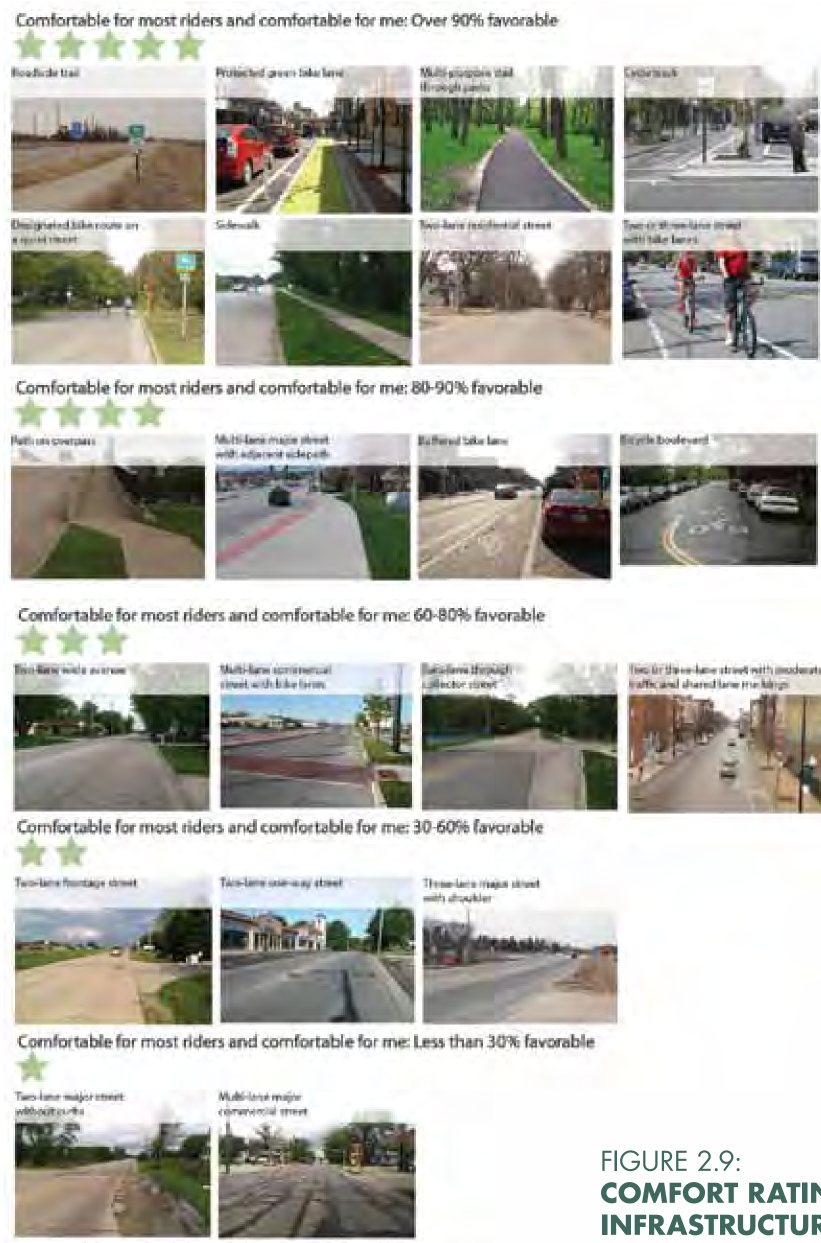


FIGURE 2.9:
COMFORT RATING OF VARIOUS INFRASTRUCTURE SETTINGS

Very Effective or Effective Over 70%	Very Effective or Effective 50-70%	Very Effective or Effective Less than 50%
More trail development	Wayfinding and directional signs	Shared lane markings
More safe routes to schools projects and activities	More community bicycling events	Share-the-Road or Bicycle Route signs
Bike lanes	Better markings at crosswalks	Better motorist education programs
Widened sidewalks or paths along major streets	More bicycle parking in strategic locations	Passage of laws that protect vulnerable road users, such as minimum passing distance laws
Better crossings of major streets	Challenges and promotions for bicycle commuters	Bike-sharing program
Better project design that encourages bicycle access	A strong bicycle advocacy organization	A "bike station" with showers, repair, and bike parking facilities
Bike safety activities designed for kids	More special events, such as benefit rides	
A system of designated on-street bicycle routes that lead to important destinations	Count down crossing signals	
Better design of sidewalk ramps at intersections	More information about bicycling clubs, events, programs	
	More enforcement of traffic laws	
	Showers and changing facilities at workplaces	
	Improved bicycle safety and education activities	

FIGURE 2.10:
EFFECTIVENESS OF VARIOUS ACTIONS

weekday trips made by bicycle can increase from the current level of about 2,000 trips to about 9,000 daily trips within twenty years.

- The nature of people responding to the Bikeways Survey helps substantiate the conclusion of substantial growth potential for active transportation. About half the respondents are at best infrequent bicyclists, but their participation and responses indicated a substantial interest in increasing their own level of activity.

- Participants placed a high priority on both infrastructure improvements and supporting initiatives like safety programs. Generally, projects that provide some level of separation – trails, paths, and bike lanes – were considered more effective than share the road or shared use markings.

- Generally, participants preferred settings that provided at least some degree of separation of bicyclists and motor vehicles, such as trails, sidepaths, bicycle tracks, and buffered bike lanes. However, quiet streets with good continuity – a significant asset of the city's street system – also were seen as very safe environments. Respondents also tended to rate multi-lane streets as less safe than two-lane corridors.

- Streets that included some form of infrastructure were seen as substantially safer than comparable streets lacking these features. On-street riding and some low-cost adaptive solutions, such as the use of shared lane markings, improved survey ratings for more experienced cyclists, but were seen as less suitable to inexperienced riders, children, and families.

Pedestrian Perceptions

Exercise and recreation-related purposes are by far the most frequent reasons mentioned for walking. The next three largest trip purposes (trips to parks or recreation facilities, family outings, and social visits) also involve recreational purposes. A smaller but significant group walks for transportation to train for events, errands, shopping and community destinations. But recreation remains the most common reason for cycling and walking.

The largest group of respondents are pedestrians most interested in improved infrastructure. The largest single group, over 45%, characterized themselves as confident pedestrians and capable of using any route, but believe improvements and new facilities will enhance their environment. The next largest group, about 40%, were interested in walking or running, but were concerned about safety along busy streets. Very small groups were at the edge of the interest spectrum – just over 2% responded to being comfortable in every situation and seeing no reason for infrastructure development, and fewer reported that they were unlikely to walk under any circumstances (1.5%)

FIGURE 2.11:
FREQUENCY OF WALKING/SELF-DESCRIPTION

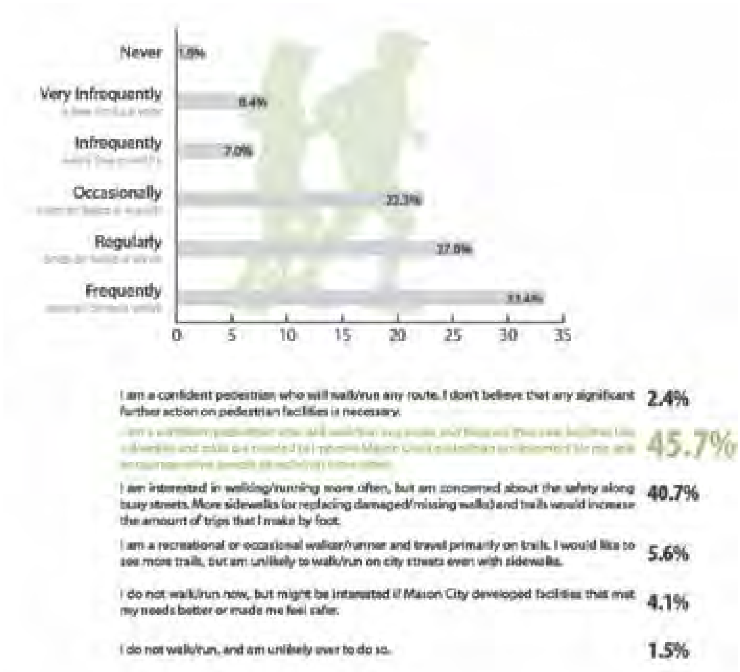
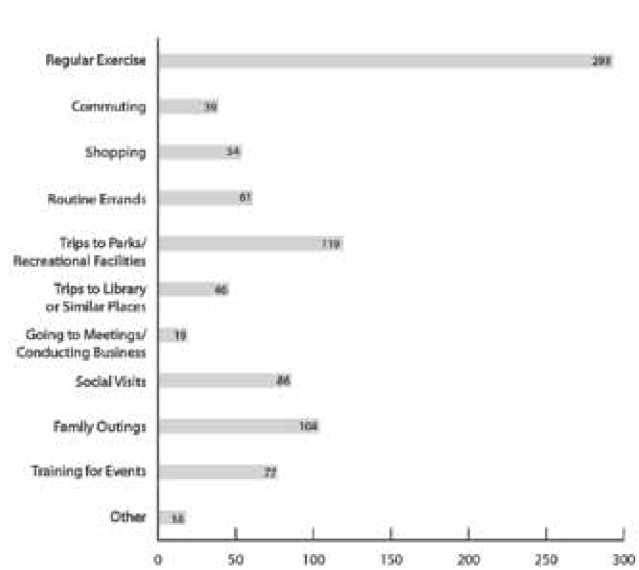


FIGURE 2.12:
PURPOSES OF WALKING TRIPS



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CHAPTER 3 THE BIKEWAY NETWORK: PRINCIPLES AND STRUCTURE

THIS CHAPTER presents the principles and design parameters that govern the design of Mason City's bikeway network. These principles, derived from the analysis of existing conditions and opportunities, the community engagement process, and market preferences help to generate the overall system concept. The chapter continues by presenting the system concept and describing the character of its individual components.

An effective network of bicycle and pedestrian facilities should follow specific principles and performance measurements. Some of the world's best work in identifying design principles was done by the Netherlands Centre for Research and Contract Standardization in Civil and Traffic Engineering. In this plan, we have adapted the Netherlands concepts to the contexts of medium-sized American cities, identifying six guiding requirements for an effective bicycle network:

Integrity: The ability of a system to link starting points continuously to destinations, and to be easily and clearly understood by users.

Directness: The capacity to provide direct routes with minimum misdirection or unnecessary distance.

Safety: The ability to minimize hazards and improve safety for users of all transportation modes.

Comfort: Consistency with the capacities of users and avoidance of mental or physical stress.

Experience: The quality of offering users a pleasant and positive experience.

Feasibility: The ability to maximize benefits and minimize costs, including financial cost, inconvenience, and potential political opposition.

These six requirements express the general attributes of a good system, but must have specific criteria and even measurements that both guide the system's design and evaluate how well it works. Figures 3.1 through 3.6 present criteria for each of the six more abstract requirements, and design guides and methods to manage ultimate performance.

ATTRIBUTES OF THE NETWORK

Based on this development of the six requirements presented in the tables, the Mason City system design follows the following major attributes:

Destination-Based. Destinations that the community and the potential market identifies as important help generate the structure of the network. The proposed network is more than a grid of bicycle-friendly streets. Rather, it is a transportation system that takes people to specific places.

Function Model. Several reasonable models for network planning exist, with choices dependent on the nature of the city. In planning the Mason City system, we identify routes based on describing their facility type and role in the system. Helping cyclists "read" the system with a minimum of supporting materials, we have also adapted a "transit model," that identifies destination-based routes almost as if they were bus lines.

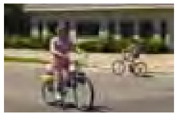
Incremental Integrity. As discussed in Figure 3.6 (Feasibility), incremental integrity – the ability of the network to provide a system of value at each step of completion – is an important attribute. The first step in completion should be valuable and increase bicycle access even if nothing else is done. Each subsequent phase of completion follows the same principle of leaving something of clear value and integrity, even if it were the ultimate stage of completion.

Evolution. As part of the concept of incremental integrity, the system is designed to evolve and improve over time. For example, a relatively low-cost project or design element can establish a pattern of use that supports something better in the future. To use a cliché, the perfect should not be the enemy of the good.

Conflict Avoidance. Few important actions are completely without controversy, but successful development of a bicycle transportation system in Mason City can and should avoid unnecessary controversy. For example, many communities have experienced difficulty with removing parking to provide space for bike lanes. While this might be the best long-term solution, it can generate opposition that jeopardizes the overall project. On most streets, shared streets and signage can provide satisfactory facilities that focus on the positive and minimize divisive conflicts. More extensive future solutions should always be done with the full participation and support of surrounding neighborhoods. These processes should demonstrate the multiple benefits of street adaptations. For example, bikeway de-

FIGURE 3.1: **Development of the INTEGRITY requirement**

PERFORMANCE FACTOR	MEASURES	PERFORMANCE STANDARD
Comprehensiveness	Number of connected destinations on system	Major destination types identified by survey and presented in destinations analysis should all be accessible by the network. 100% of top destination types, 80% of all destinations should be served. New destinations as developed should be developed along the network or served by extensions.
Continuity	Number of discontinuities along individual routes	Users headed on a route to a destination must not be dropped at a terminus without route or directional information. Even at incremental levels, route endings must make functional sense. Transitions between facility types must be clear to users and well-defined. Transitions from one type of infrastructure to another along the same route should avoid leading cyclists of different capabilities into uncomfortable settings or beyond their capacities. Infrastructure should be recognizable and its features (pavement markings, design conventions) consistent throughout the system
Wayfinding/directional information	Completeness and clarity of signage Economy and efficiency of graphics Complaints from users	Signs must keep users informed and oriented at all points Sign system should avoid ambiguities that cause users to feel lost or require them to carry unnecessary support materials. Signs should be clear, simple, consistent, and readable, and should be consistent with the Manual on Uniform Traffic Control Devices (MUTCD). Use of the Clearview font is recommended.
Route choice	Number of alternative routes of approximately equal distance	Ultimate system provides most users with a minimum of two alternatives of approximately equal distance. Minimum distance between alternative routes should be about 500 feet
Consistency	Percentage of typical reported trips accommodated by the ultimate network.	Typically, a minimum of 50-70% of most trips to identified destinations should be accommodated by the bikeways network.



sign can slow motorists and keep unwanted through traffic out of neighborhoods, benefitting both cyclists and neighbors.

Use of Existing Facilities. Great existing features like the East Park and NIACC Trails are integral to the bikeway system. Investments should make these facilities safer and more usable, such as improving signage at trail entrances or improving key segments under bridges.

Fill Gaps. In some cases, the most important parts of a network involve small projects that make connections rather than long distance components. Often, these short links knit longer street or trail segments together into longer routes or provide access to important destinations. These gaps may include a short trail segment that connects two continuous streets together, or an intersection improvement that bridges a barrier. The development of the overall network is strategic, using manageable initiatives to create a comprehensive system.

FIGURE 3.2: **Development of the DIRECTNESS requirement.**

PERFORMANCE FACTOR	MEASURES	PERFORMANCE STANDARD
Access	Coverage Access to all parts of the city	The network should provide convenient access to all parts of the city. As a standard, all urban residential areas should be within one-half mile from one of the system's routes, and should be connected to those routes by a relatively direct local street connection.
Bicycling speed	Design and average speed of system	The network should permit relatively consistent operation at a steady speed without excessive delays. System should be able to deliver an average point to point speed between 12 and 15 mph for users. Although aportion of routes should permit operation in a 15 to 20 mph range.
Diversions and misdirections	Maximum range of detours or diversions from a straight line between destinations. "Detour ratio:" Ratio of actual versus direct distance between two points.	Routes should connect points with a minimum amount of misdirections. Users should perceive that the route is always taking them in the desired direction, without making them reverse themselves or go out of their way to an unreasonable degree. Maximum diversion of a straight line connecting two key points on a route should not exceed 0.25 miles on either side of the line. Detour ratio (distance between two points/shortest possible distance) should not exceed 1:2 over long distances and 1:4 over short distances.
Delays	Amount of time spent not moving per mile	Routes should minimize unnecessary or frustrating delays, including excessive numbers of stop signs, and delays at uncontrolled intersections waiting for gaps in cross traffic. Routes should maximize use of existing signalized crossings. Target design should limit maximum delays to about 30 seconds per mile over long distances and 45 seconds per mile over short distances.
Intersections	Bicycle direction through intersections	Bicyclists should be able to continue through intersections as vehicles. Situations that force cyclists to become pedestrians in order to negotiate intersections should be avoided.

FIGURE 3.3: **Development of the SAFETY requirement**

PERFORMANCE FACTOR	MEASURES	PERFORMANCE STANDARD
Reduced number and fear of crash incidents	Number of incidents Reactions/perceptions of users	The network should reduce the rate of crashes over ten year periods. Data collection should be sufficient to trace baseline data and measure the impact of improvements. Bikeways system users should feel that the system protects their physical safety, as measured by both use of routes and survey instruments.
Appropriate routing: mixing versus separation of traffic	Average daily traffic (ADT) criteria for mixed traffic Traffic speed criteria for mixed traffic	System design should avoid encounters between bicyclists and incompatible motor traffic streams (high volumes and/or high speeds). Separation and protection of vulnerable users should increase as incompatibilities increase.
Infrastructure, visibility, signage	Pairing of context and infrastructure solutions Mutual visibility and awareness of bicycle and motor vehicles	Infrastructure should be designed for utility by at least 80% of the potential market. Mason City bikeways survey indicates that 75% of respondents are comfortable in at least some form of mixed traffic. Infrastructure applications should be matched with appropriate contexts. Warning signage directed to motorists should be sufficient to alert them to the presence of cyclists along the travel route. Surfaces and markings should be clearly visible to all users. Obstructions, such as landscaping, road geometry, and vertical elements, should not block routine visibility of cyclists and motorists. Trail and pathway geometries should avoid sharp turns and alignments that hide cyclists operating in opposing directions. Where these conditions are unavoidable, devices such as mirrors and advisory signs should be used to reduce hazards.
Door hazards and parking conflicts	Number of incidents Parking configurations Location of bicycle tracking guides	Component design should track bicycles outside of the door hazard zone. Back-out hazards of head-in parking should be avoided or mitigated when diagonal parking is used along streets.
Intersection conflicts	Location and types of pavement markings Number of intersections or crossings per mile	Intersections should provide a clearly defined and visible track through them for cyclists Cycle tracks (sidepaths) should generally be used on continuous segments with a minimum number of interruptions.
Complaints	Number of complaints per facility type	Complaints should be recorded by type of infrastructure and location of facility, to set priorities for remedial action.

Routes of Least Resistance. The Mason City Bikeways Survey showed that the city's potential urban cycling market is more comfortable in situations with some degree of separation or on quiet streets. It is not necessary to try to force bicycle access onto every major street when more comfortable, lower cost options exist on the Mason City grid. For example, bicycle boulevards – lower volume streets that parallel major arterials – satisfy the comfort requirement successfully. However, some important destinations, including major employers and shopping facilities are served by major arterials. Here, complete street standards should include bicycle and pedestrian accommodations in new major street projects. Several key routes in the network depend on building these multi-modal facilities.

FIGURE 3.4: **Development of the COMFORT requirement**

PERFORMANCE FACTOR	MEASURES	PERFORMANCE STANDARD
Road surface	Quality and type of road surface Materials Incidence of longitudinal cracking and expansion joints	The network's components should provide a reasonably smooth surface with a minimum of potholes and areas of paving deterioration. Roads should be free of hazardous conditions such as settlement and longitudinal cracks and pavement separation. All routes in the urban system should be hard-surfaced, unless specifically designated for limited use.
Hills	Number and length of hills and inclines Maximum grades on segments for both long and short distances	As a general rule, routes should avoid more than one incline over 5% for each mile of travel. Maximum average design grades should not exceed 7% over a hill not to exceed 400 feet in length; or 5% over the course of a mile. Off-road climbing facilities should be provided where slow-moving bike traffic can obstruct motor vehicles and increase motorist conflict.
Traffic stress	Average daily traffic (ADT) Average traffic speed Volume of truck traffic	Generally, the network should choose paths of lower resistance/incompatibility wherever possible and when DIRECTNESS standards can be reasonably complied with. The network should avoid mixed traffic situations over 5,000 vehicles per day (vpd) when alternatives exist. Alternatives can include bike lanes, separations, or alternative right-of-way.
Stops that interrupt rhythm and continuity	Number of stop signs/ segment	Network routes should avoid or redirect frequent stop sign controls. The number of stops between endpoints should not exceed three (1 per quarter mile average) per mile segment.

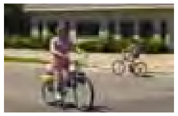
FIGURE 3.5: **Development of the EXPERIENCE requirement**

PERFORMANCE FACTOR	MEASURES	PERFORMANCE STANDARD
Surrounding land use	Neighborhood setting Adjacent residential or open space use, including institutional campuses Adjacent street-oriented commercial	Surrounding land use should provide the network user with an attractive adjacent urban environment. As a design target, a minimum of 75% of the length of the route should pass through residential, open space, or street-oriented (main street) commercial environments. Routes should provide access to commercial and personal support services, such as food places, convenience stores, and restrooms.
Landscape	Location and extent of parks or maintained open space	Network should maximize exposure or use right-of-ways along or through public parks and open spaces. Environmental contexts to be maximized include parks, waterways and lakes, and landscaped settings.
Social safety	Residential development patterns Observability: Presence of windows or visible uses along the route Population density or number of users	The network should provide routes with a high degree of observability – street oriented uses, residential frontages, buildings that provide vantage points that provide security to system users. Areas that seem insecure, including industrial precincts, areas with few street-oriented businesses, or areas with little use or visible maintenance should generally be avoided, except where necessary to make connections.
Furnishings and design	On-trail landscaping, supporting furnishings	Network routes should include landscaping, street furnishings, lighting, rest stops, graphics, and other elements that promote the overall experience. These features are particularly important along trails.

FIGURE 3.6: **Development of the FEASIBILITY requirement**

PERFORMANCE FACTOR	MEASURES	PERFORMANCE STANDARD
Cost effectiveness	Route cost Maximum use of low-cost components Population/destination density	The network should generate maximum benefit at minimum cost. Where possible, selected routes should favor segments that can be adapted to bicycle use with economical features rather than requiring major capital investments. Initial routes should be located in areas with a high probability of use intensity: substantial population density and/or incidence of destinations. Initial investments should integrate existing assets, such as the NIACC Trail, extending their reach into other neighborhoods and increasing access to them. Major off-street investments should concentrate on closing gaps in an on-street system.
Phasing and incremental integrity	Self-contained value Ability to evolve	The network should provide value and integrity at all stages of completion. A first stage should increase bicycle access and use in ways that make future phases logical. The network should be incremental, capable of building on an initial foundation in gradual phases. Phases should be affordable, fitting within a modest annual allocation by the city, and complemented by major capital investments incorporating other sources.
Neighborhood relationships and friction	Parking patterns Development and circulation patterns	The network should avoid conflict situations, where a route is likely to encounter intense local opposition. Initial design should avoid impact on potentially controversial areas, such as parking, without neighborhood assent. Involuntary acquisition of right-of-way should be avoided wherever possible. Detailed planning processes to implement specific routes should include local area or stakeholder participation.

On the trail. A pedestrian and friend on the Trolley Trail East.



THE FOLLOWING PAGES introduce the overall network and examine the characteristics of the functional and development characteristics of each component in the proposed Mason City bikeways network.

THE MASON CITY BIKEWAY SYSTEM

Figure 3.7 on the facing page displays the proposed Bikeway Master Plan for Mason City, based on the requirements and principles described previously in this chapter and the City's substantial facility development opportunities. The Activating Mason City: A Bicycle and Pedestrian Master Plan displays the ultimate system by component type, including:

- **Existing Multi-Use Trails.** As discussed earlier, Mason City's existing multi-use trails are the spine of the bikeway system, but lack continuity and connectedness, and in many cases require improvements and support features such as clear identification and wayfinding information. In the proposed system, these long-distance trails are fully integrated into the bicycle transportation network.
- **New Greenway Corridors.** These future corridors involve substantial extensions of the existing system, connections between existing facilities, or, in the case of the north-south Union Pacific right-of-way, new signature facilities.
- **Primary Trail Connections.** These primarily on-street routes use strategic, lower volume streets to link the trail system to major destinations or to one another. These gap-filling connections are specifically designed to satisfy the "integrity" requirements for the trail system. Together with other system components, primary trail connections link the Trolley Trail to Downtown, fill gaps to unify the Lime Creek, East Park, and NIACC Trails, and provide crosstown continuity for the Trolley Trail.
- **Cross-City Corridors.** These corridors use on-street infrastructure, short trail segments, and other infrastructure solutions to create crosstown transportation facilities, primarily in an east-west direction. They include two central bikeways, generally north and south of the Highway 122 corridor, that extend from the western edge of the city to the NIACC Trail.
- **Complete Streets.** These are significant transportation corridors, typically minor or major arterials that either have the capacity to accommodate multi-modal traffic in their current form or are likely to require substantial future improvements that should include bicycle and pedestrian accommodations. Pierce Avenue and Kentucky Avenue are good examples of the first category; Taft Avenue and 12th Street NW fall within the second.
- **Bicycle Boulevards.** These corridors, very important in the Mason City system, are typically local or collector streets with relatively low volumes that have good continuity and in many cases parallel higher order streets. They are far more comfortable for most cyclists (and pedestrians) than the busy corridors they parallel. Relatively minor adaptations can make these streets even more comfortable for a broad range of users.
- **Historic/Cultural Pathways.** This on-street route follows and expands the current signed bike route in historic central Mason City, and takes cyclists and pedestrians to such major architectural, cultural, and historical destinations as Music Man Square, the Library, the Rock Crest/Rock Glen District, the MacNider Art Museum, and the Stockman House.
- **Neighborhood Connectors.** These are short, primarily on-street routes, usually on low-volume local streets, that connect through routes and neighborhoods. Most require minimal infrastructure investment.

The master plan map highlights segments that involve major new capital investments, typically pathway development or substantial street modifications. Several of these involve complete street projects where existing traffic volumes will require eventual street widenings or upgrades that should also include bicycle and pedestrian facilities.

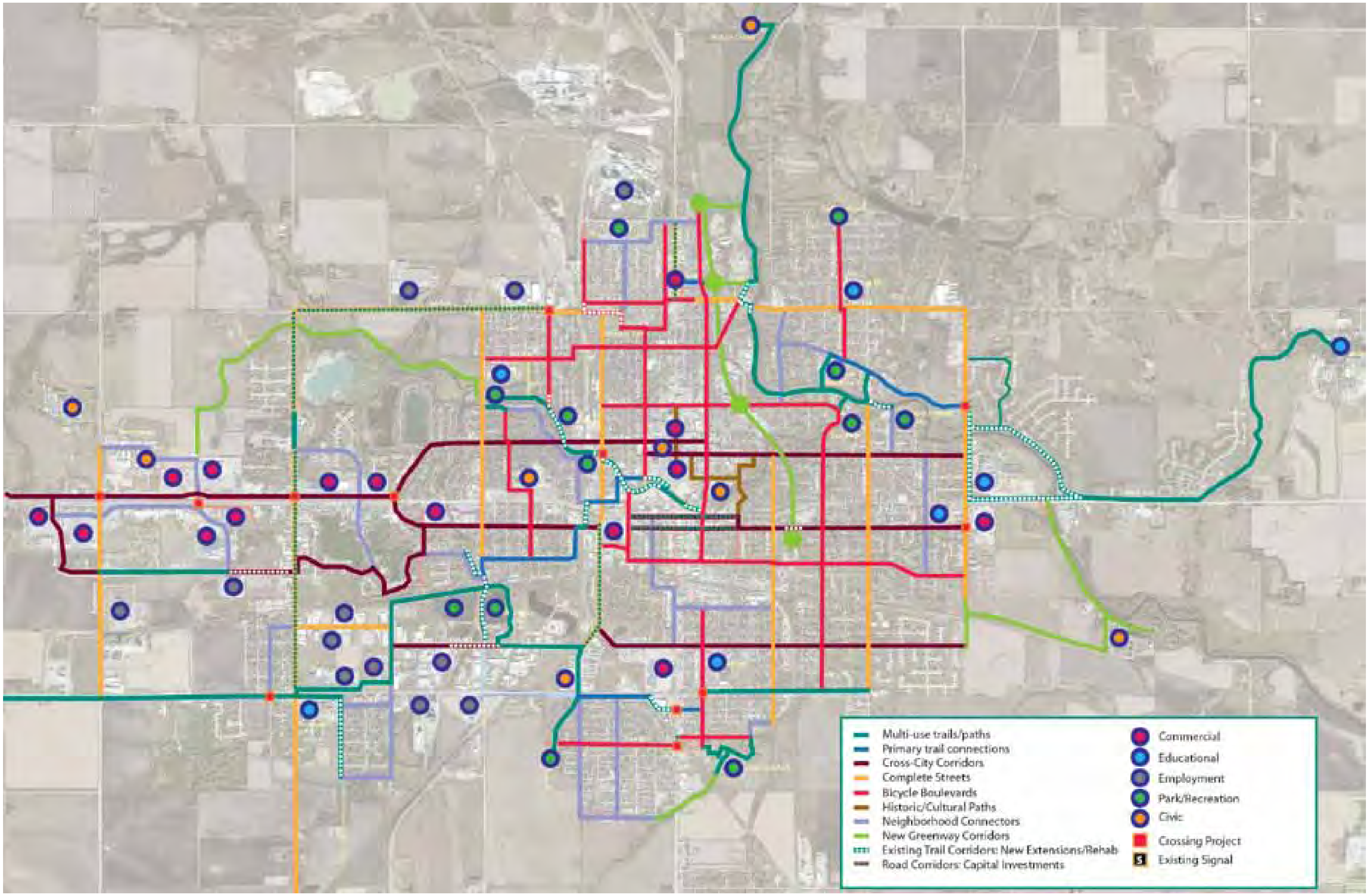


FIGURE 3.7: **BIKEWAYS SYSTEM MASTER PLAN**

THE TRAIL NETWORK:

- **MULTI-USE TRAILS**
- **NEW GREENWAY CORRIDORS**
- **PRIMARY TRAIL CONNECTORS**

The proposed trail network will build on the existing Trolley, Willow Creek, Lime Creek, East Park, and NIACC Trails to create a fully connected and improved group of facilities. It uses a combination of existing facilities, new trail corridors, and on-street connecting routes designed to be comfortable for most users. Highlights include:

Upgrades to existing trails, including paving, widening to uniform design standards, and a complete wayfinding system.

- A new "high line" trail along the north-south Union Pacific Railroad corridor east of US 65.
- Extension of the Willow Creek Trail to the west Highway 122 corridor.
- Direct connections to and through Downtown from the Trolley Trail and the East Park/Lime Creek Trails, using on-street trail connections.
- A southside connection that links Georgia Hanford with 29th Street and Washington Avenue

FUNCTIONAL DESCRIPTION	CHARACTERISTICS AND CRITERIA	TYPICAL INFRASTRUCTURE SOLUTION	EXAMPLES	DEVELOPMENT PHASE
NEW GREENWAY CORRIDORS				
Trail system extensions or new trail corridors	Linear, off-road corridors, including unused railroads, rail-with trails, and watercourses	• Off-street paths or trails, typically paved. Typical 10-foot standard width. • Special trail system marks and wayfinding , identification, and caution information. • Nodes or parks where opportunities are presented	• UP Trail "high line" • Willow Creek Trail west extension • Georgia Hanford Park link	Long-Term
PRIMARY TRAIL CONNECTIONS				
On-street connections between trail ends to provide continuity. On-street routes designated to link regional trails to critical community destinations or districts. Often coincides with bicycle boulevards.	Streets or combined routes with low to moderate average daily traffic (ADT). Relatively straight, continuous routes with minimum misdirection. Endpoints at trails or districts. Low-stress on-street routes to accommodate trail users	• Sharrows are the typical maximum infrastructure needed in lower-volume settings. Conventional bike lanes on more moderate volume streets. • Special trail connector (or greenway) signs to communicate connectivity. MUTCD (Manual of Uniform Traffic Control Devices) compliant wayfinding, identification, and caution information. • Stop signs positioned to provide trail connector priority. Arterial intersection design package at non-signalized crossings. • Continuous sidewalks to provide trail connectivity for pedestrians. • Often coincides with bicycle boulevards	• 8th Street SW • 5th/6th Street SW pedestrian bridge • Birch Drive	High visible impact with minimum cost makes short term implementation possible. Addresses initial short term needs and user questions (connecting Trolley Trail to Downtown, for example)

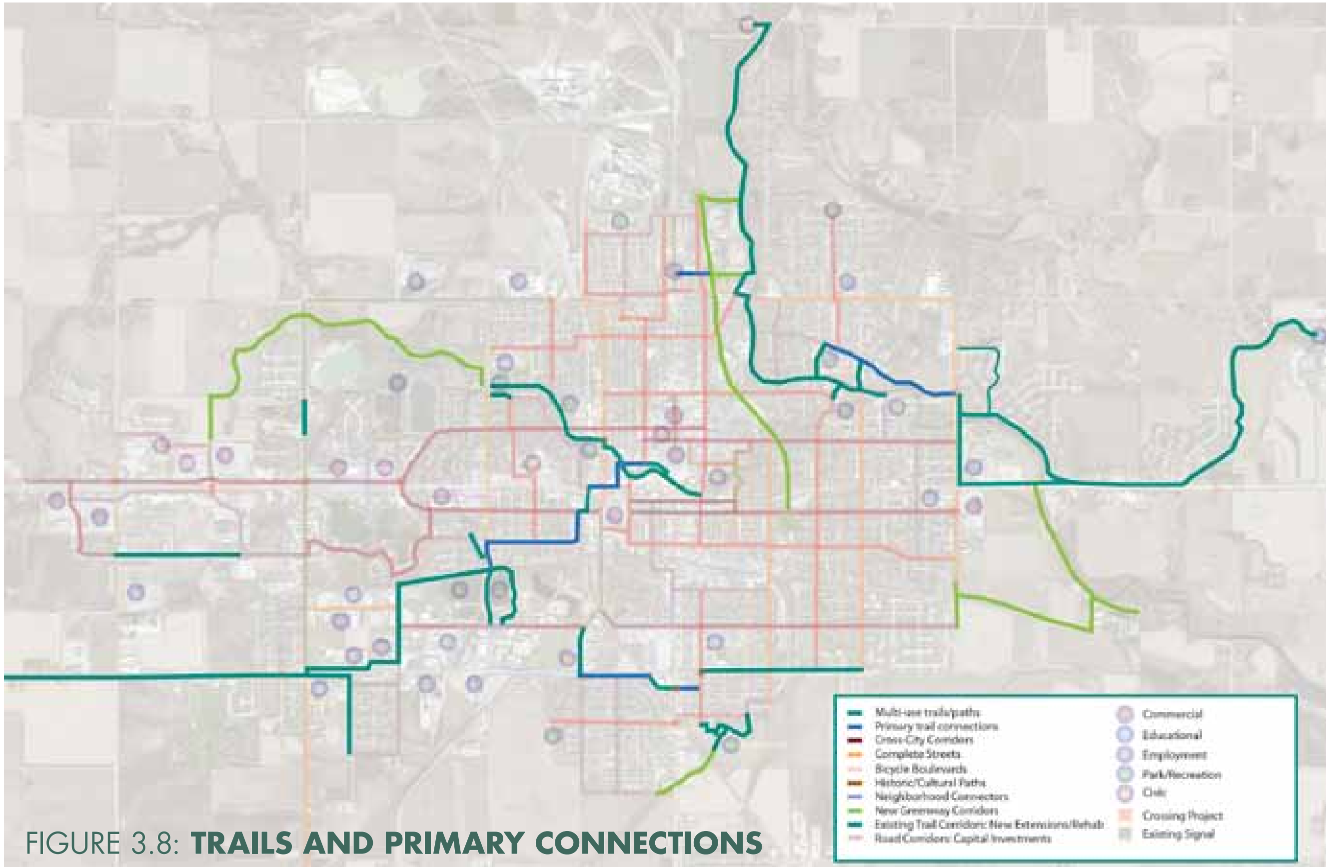


FIGURE 3.8: **TRAILS AND PRIMARY CONNECTIONS**

- Filling gaps to unify the NIACC, East Park, and Lime Creek Trails., including off-road paths around the high school campus.
- A connection to the planned Cerro Gordo County regional trail to Thornton and Belmond.

Paths along major streets that are also part of the trails network are described under the Complete Streets section. A more detailed development program that identifies specific trail projects appears later in this plan.

Above: Projects proposed as part of enhancements to the existing trail system. From top: widening of the path leading from 6th Street to the Highway 122 overpass; and improvements and barrier-free access for the Willow Creek Trail at 2nd Street.

Left: The Union Pacific "High Line" presents a superb new corridor opportunity through the middle of the city

CROSS CITY CORRIDORS

The Cross City Corridors are conceived as key transportation facilities that are the bicycle equivalents of 12th Street NE/NW, 4th Street SE/SW, and 19th Street SE/SW -- major east-west axes that connect key community features from the western city limits to NIACC on the east. As such, their primary market is the growing number of people who use bicycles for utilitarian purposes -- school, shopping, and work trips. For the most part, these cyclists are comfortable with riding in mixed traffic. Because these routes serve transportation cyclists, they maximize directness.

The crosstown systems include three routes that are central to many community features. They include:

- A "North of Highway 122" option that utilizes the commercial frontage roads and possible extensions along Highway 122, Winnebago Way, 1st Street North, and State Street.
- A "South of Highway 122" route from the Indianhead retail area along 9th Street, Briarstone/Springview Drives, and 5th/6th Street South. It will utilize the bike lanes currently programmed for the 5th/6th pair in 2014 as part of a corridor improvement project.
- A south crosstown route using 15th Street from Pierce east to Illinois Avenue, assuming an eventual south extension of that street.

All three routes interconnect with one another and with the trail system. A proposed path around the Mason City High School campus provides an off-road connection to the NIACC Trail and the College campus.

FUNCTIONAL DESCRIPTION	CHARACTERISTICS AND CRITERIA	TYPICAL INFRASTRUCTURE SOLUTION	EXAMPLES	DEVELOPMENT PHASE
Major through or commuter routes. General focus on cyclists who use bicycles for transportation purposes and are reasonably comfortable with mixed traffic settings.	Streets or combined routes with moderate average daily traffic (ADT), typically collectors and minor arterials. Straight, continuous crosstown routes, connecting to major destinations or districts. Connections to other components of the system.	• Bike lanes preferred where space permits to provide maximum identification and clarity. Sharrows used in areas with space or parking limitations. • Special crosstown corridor signs, or use of numbered routes, to communicate connectivity. MUTCD compliant wayfinding, identification, and caution information. • Stop signs positioned to provide trail connector priority. Arterial intersection design package at non-signalized crossings. • Continuous sidewalks to provide pedestrian connectivity.	• 1st Street NW • Highway 122 Frontage Roads • East State Street	High visible impact with minimum cost makes short term implementation possible. Addresses initial short term needs and user questions (connecting Trolley Trail to Downtown, for example)

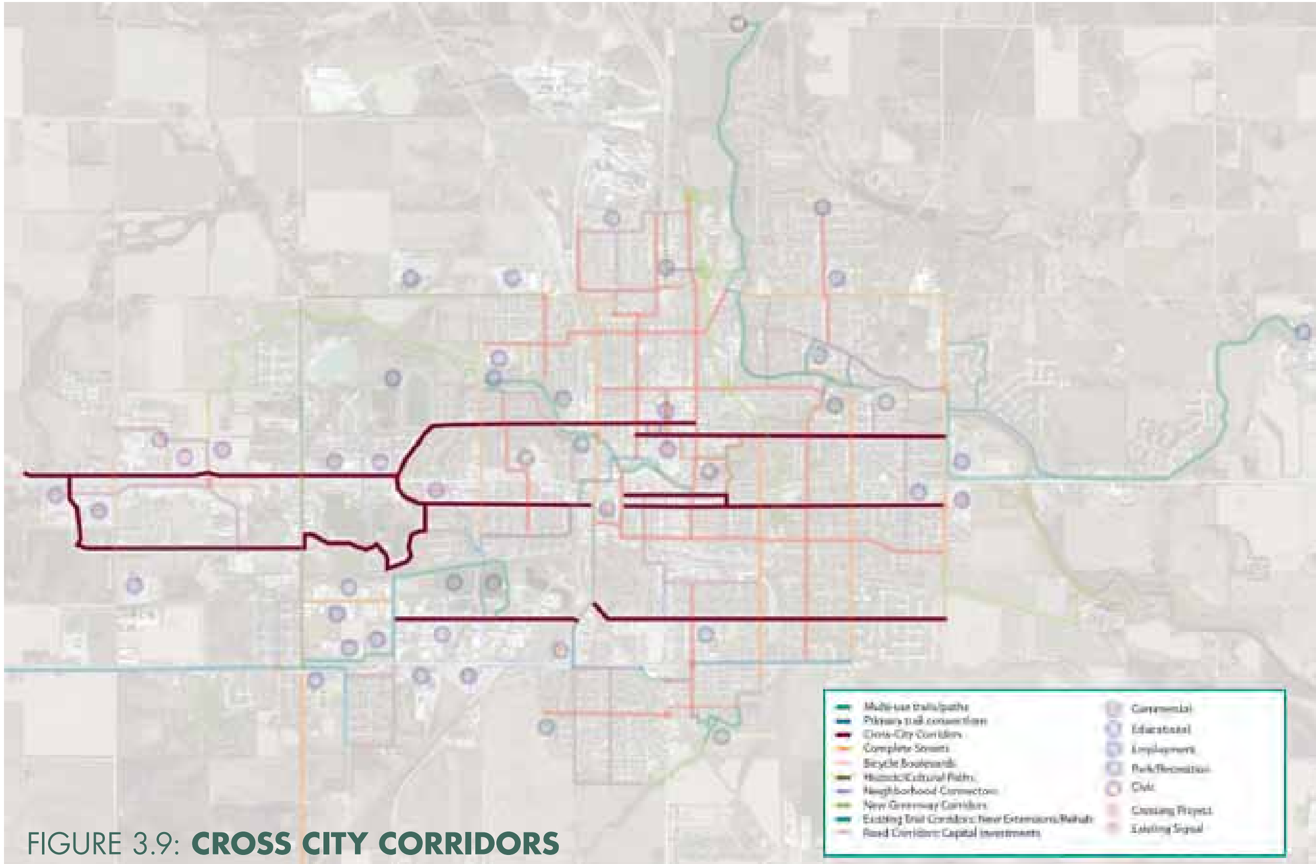


FIGURE 3.9: **CROSS CITY CORRIDORS**

Above: Comfortable streets with moderate traffic incorporated into the crosstown corridors. From top: Cerro Gordo Way and State Street.

Left: Highway 122 corridor. Frontage roads and off-road sidepaths can extend the cross city system along the Highway 122 commercial corridor.

COMPLETE STREETS

Complete (or multi-modal) streets are important components to the Mason City network, complementing the trails and central crosstown routes. Some streets may be "completed" relatively quickly, requiring only minor and relatively low-cost modifications to their current configuration. These include streets like Pierce Avenue and Kentucky Avenue. Others require significant construction, either through widening or construction of separated bicycle/pedestrian facilities in advance of major street improvements. 12th Street NW, a major commuter travel route, presents such a corridor. When streets designated as complete streets are improved, they should be brought up to the multi-modal standards established in Chapter Four.

FUNCTIONAL DESCRIPTION	CHARACTERISTICS AND CRITERIA	TYPICAL INFRASTRUCTURE SOLUTION	EXAMPLES	DEVELOPMENT PHASE
Provides pedestrian/ bicycle facilities along higher order streets, including collector and minor arterial corridors.	Streets or combined routes with moderate to high average daily traffic (ADT). Complete street standards may apply to regional arterials, but generally involve separated, off-street infrastructure.	• Typical bike lanes on one or two sides, potentially combined with parking restrictions on streets with moderate traffic. Lane diet in specific areas where appropriate to comply with ADT and provide multi-modal environment. • Higher speed conditions require greater separation, including buffered bike lanes, cycle tracks or separated sidepaths with access management. • Bike lanes and directional sidepaths may be combined to minimize counterflow movements. • System marks and MUTCD compliant wayfinding, identification, and caution information. • Crossings of streets and drives should be designed to caution motorists. Bicycles should share right-of-way of the major street. • Continuous sidewalks. • New or upgraded streets on system should include complete street features in design.	• Monroe Avenue • Pierce Avenue • 12th Street NE/NW • Kentucky Avenue	On minor in-city arterials with adequate width and limited parking demand, short- to medium term implementation. Medium-term implementation on existing corridors with adequate space for sidepaths. Long-term implementation for streets that involve major reconstruction, depending on capital improvement schedule.

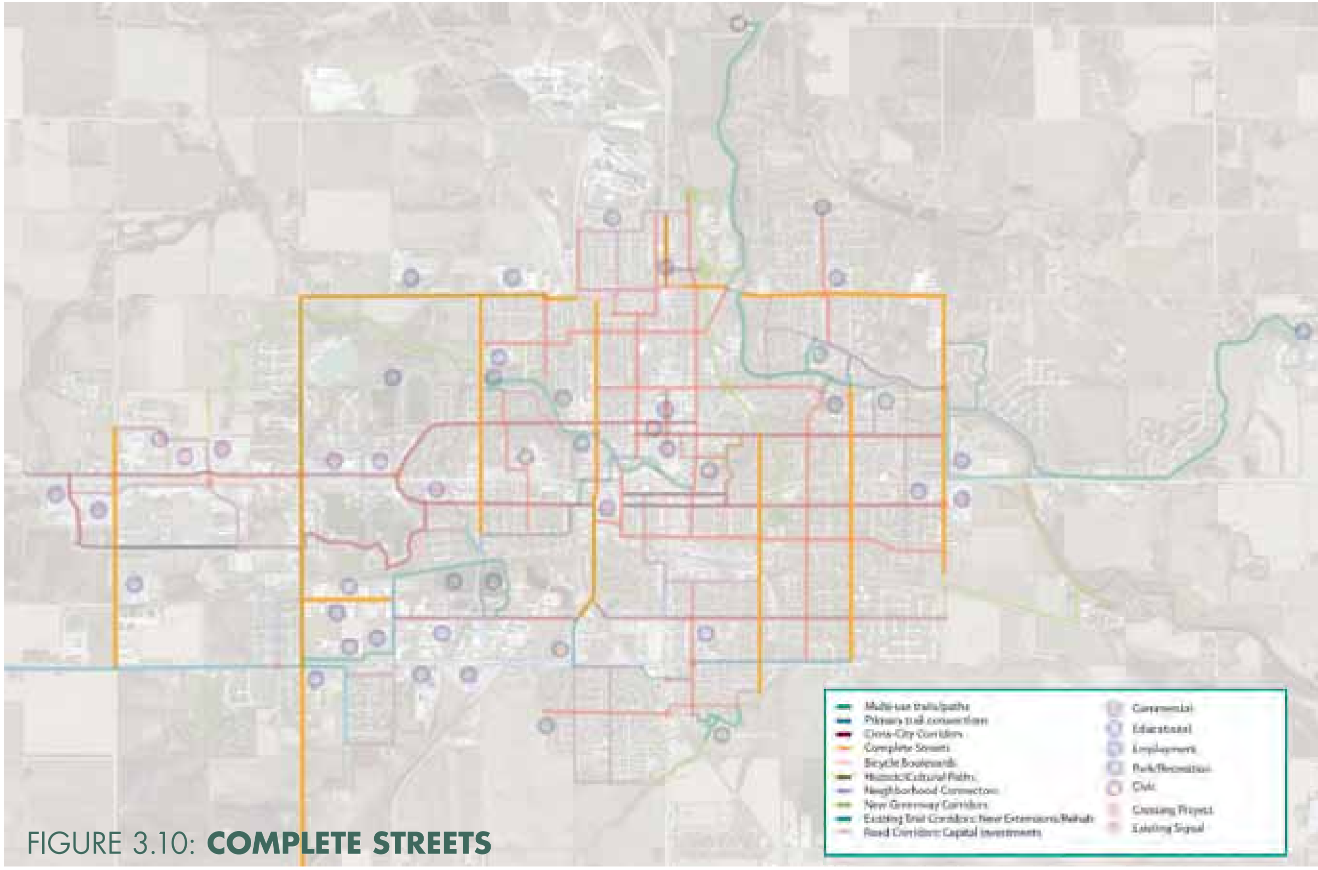
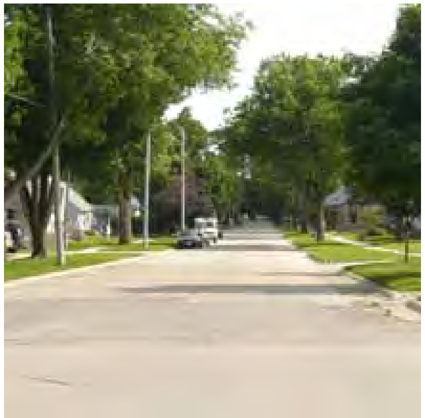


FIGURE 3.10: **COMPLETE STREETS**

Above: Streets with traffic needs that will eventually require improvement. These corridors, when upgraded, should comply with complete street standards. From top: 12th Street NW and S Taft Avenue .

Left: Streets that have both the need and capacity to be "completed" within their existing channels . From left to right, Pierce Avenue and Kentucky Avenue.

BICYCLE BOULEVARDS



Bicycle boulevards are enhanced shared streets that are especially applicable to the northside and the southeast quadrant of Mason City, with their relatively complete secondary street grids. These streets are direct segments that generally run parallel to higher order streets, and serve important destinations such as schools and parks. The ideal bicycle boulevard provides both direct routing and good continuity. Bicycle boulevard infrastructure usually involves minimum street modifications, typically pavement markings and special signage. In some cases, intersection priority may be reversed to reduce start and stop routines. When existing traffic speeds or volumes are a problem, traffic calming devices may also be introduced.

While Mason City has excellent bicycle boulevard opportunities in both directions, its north-south routes are especially useful in complementing the east-west trails and crosstown corridors. These quality routes include Quincy and Adams avenues, Taylor and Polk avenues, Pennsylvania Avenue, Virginia Avenue, and Rhode Island Avenue.

FUNCTIONAL DESCRIPTION	CHARACTERISTICS AND CRITERIA	TYPICAL INFRASTRUCTURE SOLUTION	EXAMPLES	DEVELOPMENT PHASE
Primary medium distance routes for pedestrians and bicyclists. Route development with relatively moderate public investment.	Streets or combined routes with low to moderate average daily traffic (ADT). Relatively straight, continuous streets with minimum misdirection. Endpoints at trails, destinations, or other system components. Generally runs parallel to higher volume streets, providing more comfortable options for cyclists and pedestrians.	• Sharrows are typically the maximum infrastructure needed in lower-volume settings. Conventional bike lanes in more moderate volume streets. • Special bicycle boulevard (or neighborhood greenway) signage and graphics, may be incorporated into street signs. • System mark and MUTCD compliant wayfinding, identification, and caution information. • Stop signs positioned to provide bicycle boulevard priority. Bike-sensitive loops at signalized intersections. Arterial intersection design package at non-signalized crossings. • Continuous sidewalks. • Traffic circles, neck-downs, and other traffic calmers where requested by neighborhoods	• Adams Avenue • Pennsylvania Avenue • 8th Street SE • 4th Street NE • 8th/9th Street NW • 23rd Street SW	High visible impact with minimum cost makes short term implementation possible. May be part of an initial implementation phase.

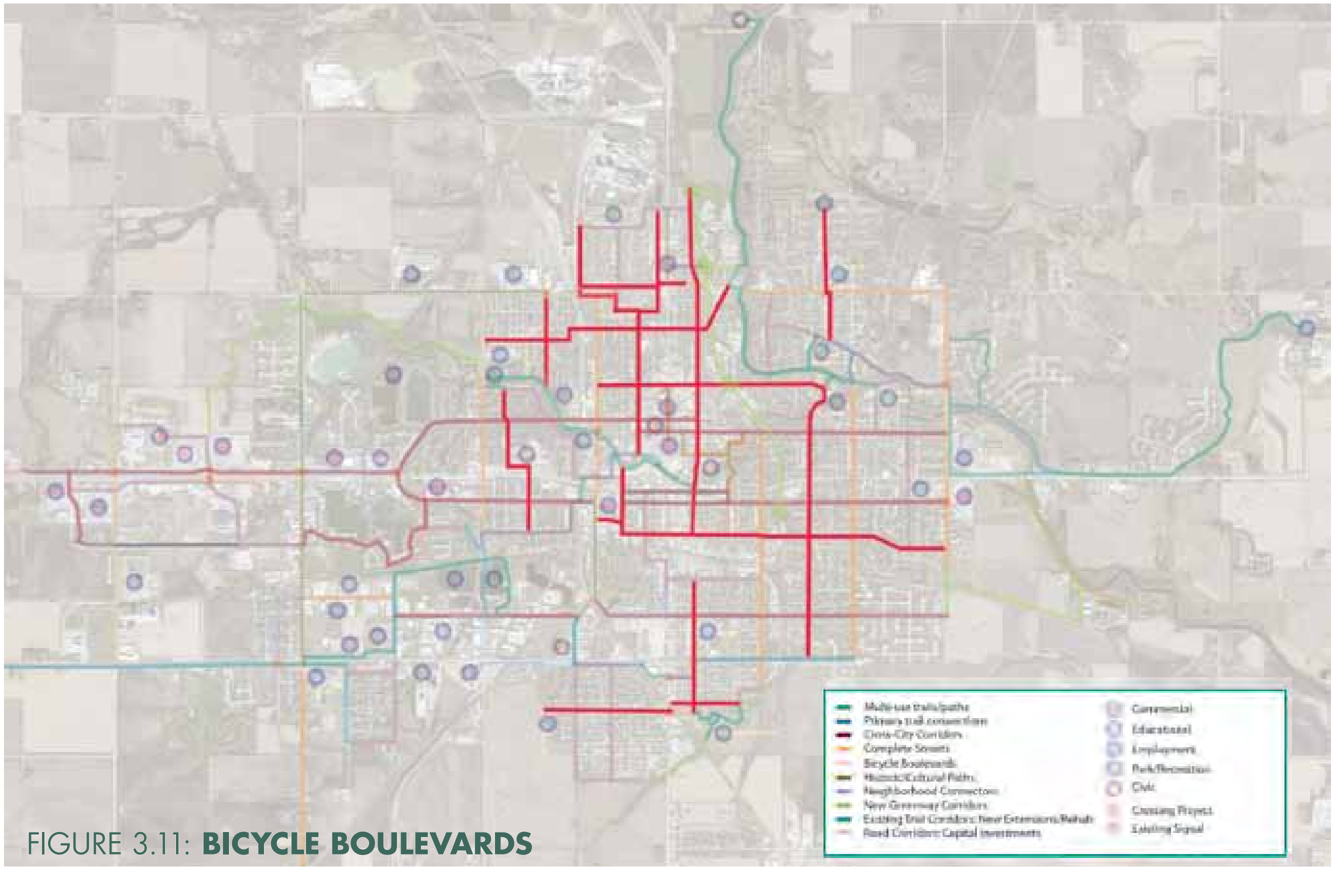
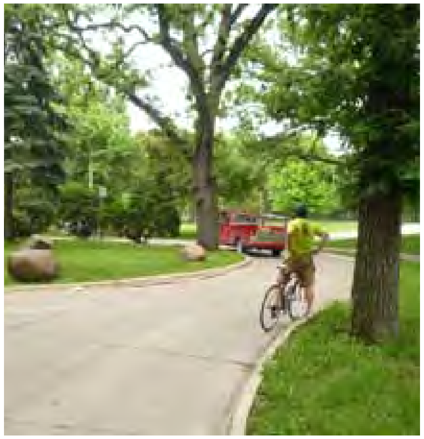
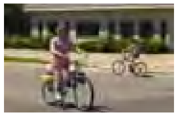


FIGURE 3.11: **BICYCLE BOULEVARDS**



Above: North-south bicycle boulevards with good continuity, moderate traffic, and quality environments. From top, Pennsylvania and Virginia avenues.

Left: Bicycle boulevard candidates that serve major destinations.. From left, Adams Avenue, connecting north neighborhoods to Downtown; and Polk Avenue, leading to the medical center.



NEIGHBORHOOD CONNECTORS

Neighborhood connectors are important parts of the system, but lack the continuity of bicycle boulevards. Different connectors have different functions, depending on context. They include short connections between other system components or between neighborhoods and the longer distance, destination-based routes. In some cases, they provide natural routes within neighborhoods or to such local destinations as elementary schools. Most of these routes are low volume local streets that require little modification other than advisory signage and, on occasion, sharrows.

The Historic/Culture Path designation is a special connector route that expands the existing signed bike route in the Downtown, Rock Crest/Rock Glen, and River Heights neighborhoods. This route also incorporates the famous Meredith Willson Footbridge.

FUNCTIONAL DESCRIPTION	CHARACTERISTICS AND CRITERIA	TYPICAL INFRASTRUCTURE SOLUTION	EXAMPLES	DEVELOPMENT PHASE
Relatively short, local or low-volume street routes within neighborhoods. Connects to higher-order components of the city system, providing direct routes across neighborhoods and to trails, bicycle boulevards, and other components.	Streets with low average daily traffic (ADT). Direct access to other system features. Endpoints at trails, destinations, or other system components.	• Typically, signage is adequate. Sharrows used where necessary to aid wayfinding or on streets with higher ADT. • System mark and MUTCD compliant wayfinding, identification, and caution information. • Continuous sidewalks with special treatment at key street crossings.	• 7th Place SW • 10th Street SE • N/S Louisiana Avenue • N Grover Avenue • Crescent Drive	Short- to medium term implementation because of relatively low cost.
HISTORIC/CULTURAL PATHS				
Low-volume streets in Downtown/Rock Glen Districts. Follows existing bike routes in historic districts	Local streets with high historic or thematic content.	• Sharrows provide adequate infrastructure in most cases. Signage may be adequate. • Special historic path signs. MUTCD compliant wayfinding, identification, and caution information, possibly with thematic frames. • Continuous sidewalks to provide pedestrian connectivity.	• 2nd Street SE • Meredith Willson Footbridge • Connecticut Avenue • Federal Avenue Downtown	Minor adaptations to existing routes provide short-term implementation possibility.

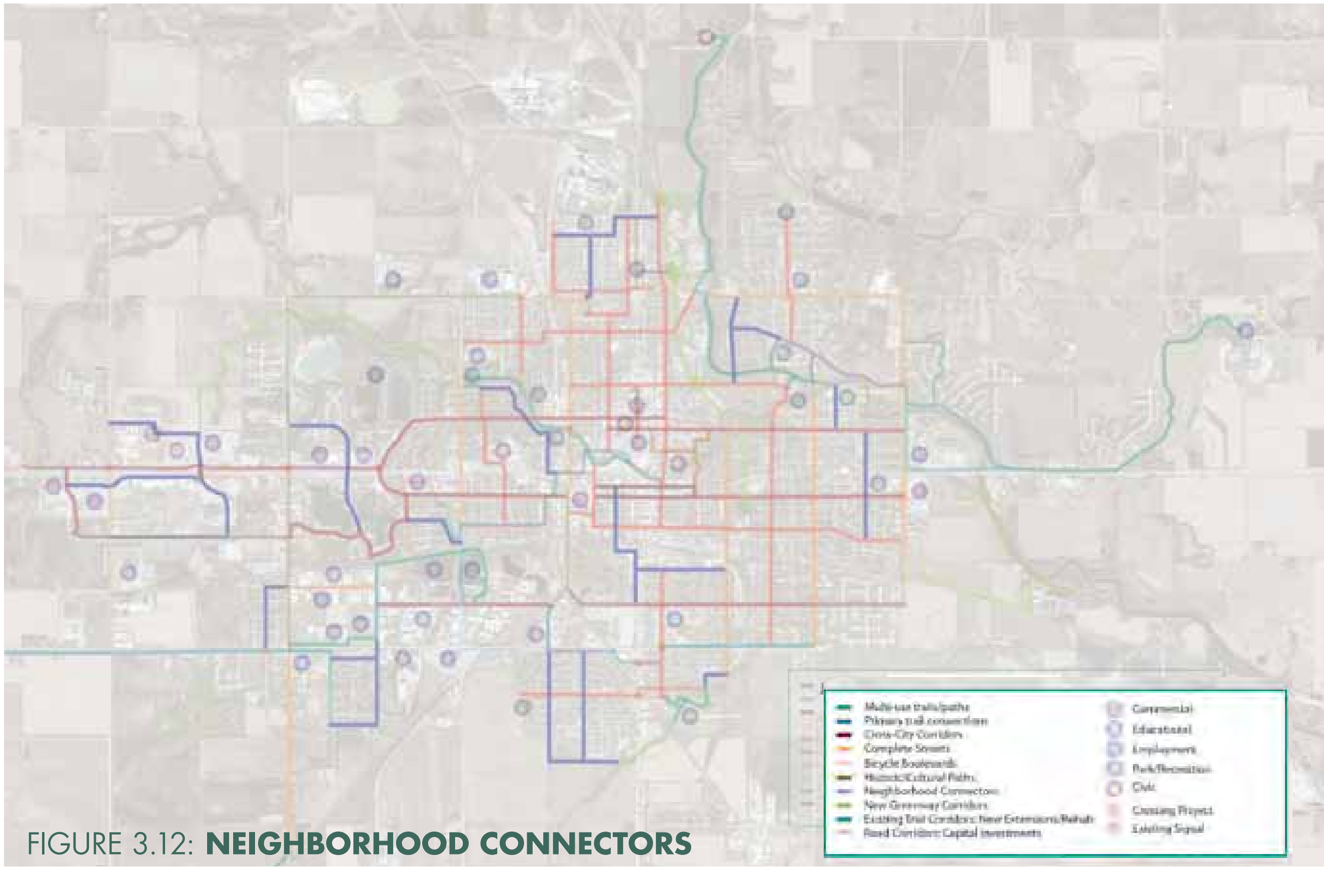
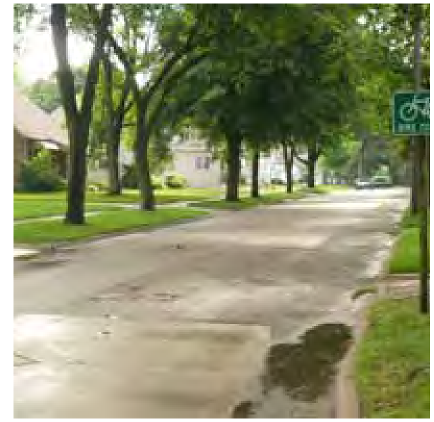
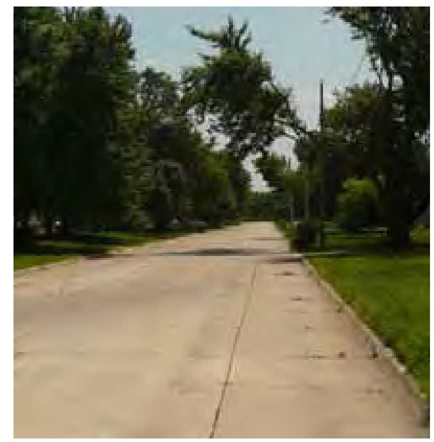


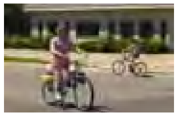
FIGURE 3.12: **NEIGHBORHOOD CONNECTORS**





Above: Neighborhood connectors display different functions. From top: Crescent Drive is an important part of a signed bike route that connects a short segment of the Willow Creek Trail to the Highway 122 pedestrian overpass; Harding Avenue is a central street that connects a southwest Mason City neighborhood to the Trolley Trail and Pierce Avenue.

Left: Streets along the Culture Path. From far left: 2nd Street SE near the library, Federal Avenue, and River Heights Drive.



THE BASIC SYSTEM

The Master Plan presented earlier in this chapter establishes a complete bikeway network for Mason City. Ideally, every street in the city would serve all modes of transportation, and every attractive off-road trail opportunity would be capitalized on. However, we know that energy and funding is limited, requiring a more focused and strategic approach to bicycle facility development.

The overall system filters all the available possibilities into a system that provides a high degree of coverage and connectivity to all parts of the city. As the infrastructure solutions for various facility components show, these corridors should also provide the spine of a pedestrian system, and that all active transportation corridors should serve multiple purposes. However, even this system, based on identifying the function of components, cannot be built all at once and a greater level of focus is necessary.

A further refinement of the Master Plan network, informed by the six performance requirements discussed at the beginning of this chapter, produces a basic bikeway system, composed of enhanced and expanded trails, ten primarily on-street transportation routes that serve most of the city's neighborhoods and major destinations, and key neighborhood connectors to provide better linkages between neighborhoods and the major route system.

The Basic System concept knits the various facility types and functions discussed in this chapter into a coherent and highly usable web of bikeways. Clarity is an especially important attribute of this basic system. Participants in this planning process frequently stated that existing trails and bike routes seemed disconnected, and that they had difficulty navigating to their destinations. To address this problem, the basic system uses a "transit model," identifying destination-based routes almost as if they were transit lines. This type of system helps bicyclists travel to destinations without requiring support materials once they select their initial routes. This system also emphasizes the interconnection of routes. Thus, a typical cyclist heading to a specific destination can travel from a point of origin and know the combination of designated routes that will lead to the destination.

Figure 3.13 displays this basic system; details of these routes are developed in Chapter Five. Routes names used here are intended for descriptive purposes. Actual route names, if implemented, will be determined by the city.

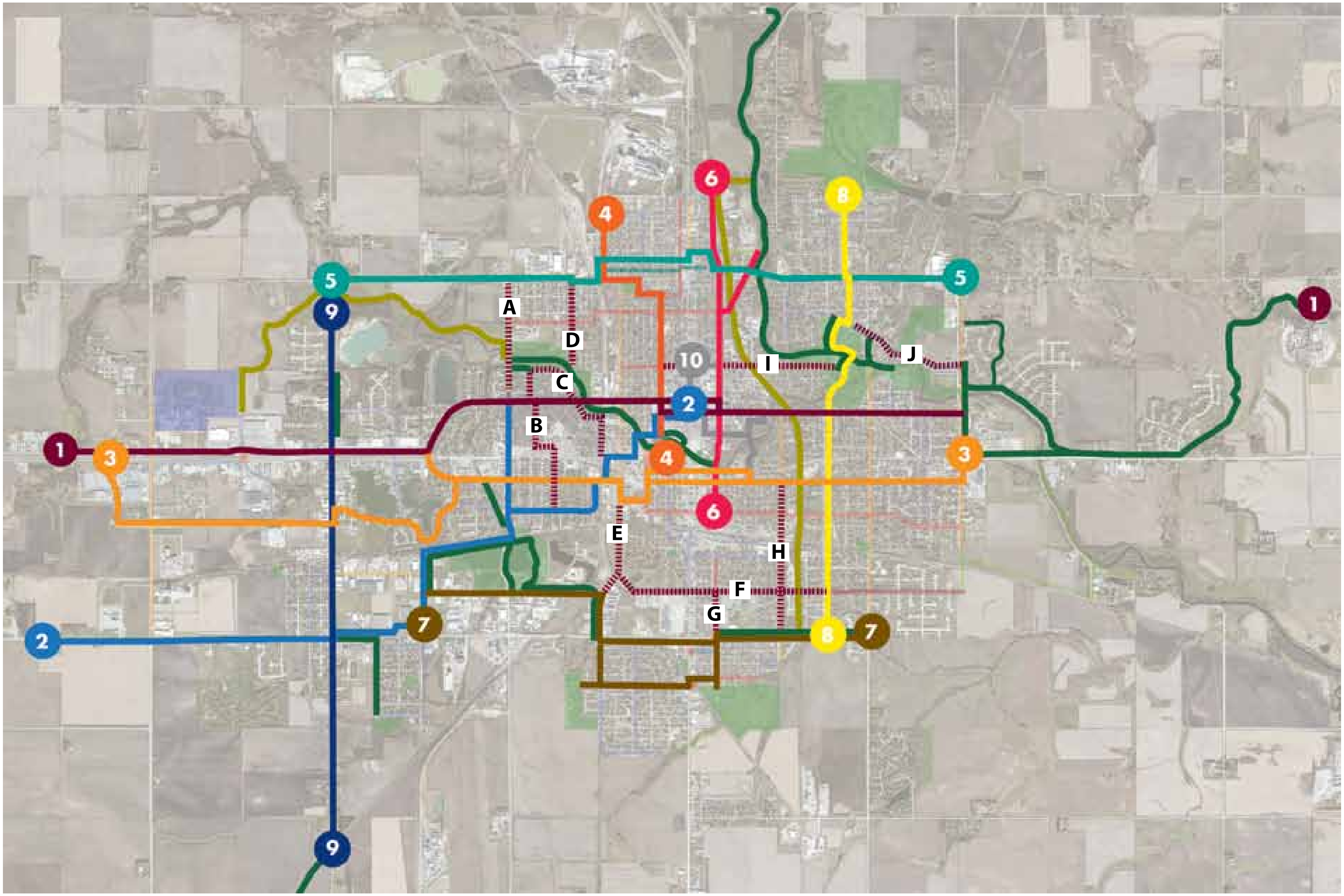


FIGURE 3.13: **BASIC SYSTEM**

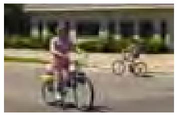
THROUGH ROUTE	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
1	**East-West Bikeway: North of Fourth**	Lark Avenue to NIACC	4th Street SW retail corridor, North Iowa Fairgrounds, MacNider and Parker Woods, West Park, Willow Creek Trail, Downtown, East Park, Mason City High School, Asbury Park, NIACC campus	Major east-west transportation route, using frontage roads and connecting paths along Highway 122; Winnebago Way/1st Street NW, State Street, and the NIACC Trail. Highlights include paths to fill frontage road gaps along West 4th Street; one-way bike lane pairs through Downtown on 1st Street NW and East State; bike-friendly adaptation of East State; and a path connection along the periphery of the high school campus to the NIACC Trail. Route helps connect separated trail segments and includes improved access to the Willow Creek Trail at West Park.	Short-term from Taft Avenue to High School. Extensions east and west require separated pathway construction, although short-term option exists along Birch Drive between Illinois Avenue and the NIACC Trail.
2	**Trolley Trail to Town (3T) Bikeway**	Trolley Trail at city limits to Central Park	Clear Lake, Trolley Trail, Newman Catholic Schools, Milligan and Rorick Parks, Big Blue Lake, Willow Creek Trail and West Park, Downtown	Direct, clear connection between the popular Trolley Trail and the center of Mason City. Uses existing multi-use trails to the north side of Big Blue, with two options to continue to Downtown, depending on comfort levels of cyclists. An option for cyclists comfortable with moderate traffic adapts Pierce Avenue as a complete street to 1st Street NW, continuing Downtown along Route 1. A quieter street alternative uses local streets and crosses Highway 122 at the trail overpass near Monroe. Infrastructure highlights include complete street adaptation of Pierce Avenue; an 8th Street SW bicycle boulevard; improved approaches to the 4th Street SW overpass; and improved approaches to Downtown.	Short-term using existing facilities. Eventual upgrades, including pathway improvement to and over 4th Street SW, will improve access.
3	**East-West Bikeway: South of Fourth**	Indianhead Retail Centers to NIACC	Indianhead, 9th Street Business Corridor, Morgan Park, Mercy Medical Center, 6th Street SW and Monroe commercial area, Jefferson Elementary, Mason City High School, Asbury Park, NIACC campus	Major east-west transportation route, mirroring Route 1 on south side of Highway 122. Uses existing 9th Street SWpath; collector streets in the Briarstone Lake neighborhood; and 6th Street SE/SW crosstown. Capitalizes on new bike lanes to be installed on the 5th/6th Street one-way pairs. Route provides a number of connections to Downtown, and can be combined with the Trolley and Big Blue Trails to create other east-west options.	Short- to medium term, requiring short sections of gap-filling paths. Connection to NIACC Trail requires path construction on south edge of high school campus.

THROUGH ROUTE	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
4	**Quincy-Adams Bicycle Boulevard**	Holcim Ballfields to Willow Creek Trail	Ballfields, Monroe Park, Parks/Recreation Department, Downtown, Southbridge Mall, Willow Creek	North-south bicycle boulevard, linking neighborhoods north and south of 12th Street NE with a pathway connection under the 12th Street NE overpass. Low traffic volume creates a comfortable on-street facility for most users.	Short-term. Path construction at 12th Street NE requires capital investment, but provides high returns for safe access.
5	**North Crosstown**	N Taft Avenue to N Illinois Avenue, with possible extension to Mason City High School	Curries and Kraft Foods plants, Monroe Park, North Federal business district, Winnebago and Lime Creek Trails, Harding Elementary School	Major east-west transportation route providing access to major employers. Provides off-road access to major northside industries and westside destinations. Uses sidepath from N Taft Avenue east; overpass sidewalk; path under overpass to 14th Street NW and 14th/13th Street NE to river. Continuation east requires bike lanes and parking restrictions.	Short-term between Winnebago Trail and Kraft plant. Path west to Taft may be short term if an established priority. Mid-term for other extensions.
6	**Pennsylvania Bicycle Boulevard**	17th Street/Dog Park area to 8th Street SE	Dog Park, Gooch Park, Downtown, Public Library, MacNider Art Museum, Music Man Square	North-south bicycle boulevard connecting northeast neighborhoods with city center. Parallels and connects to Winnebago River/East Park Trail system via Elm Drive and Dog Park link.	Short-term with only minor modifications needed.
7	**Trolley Trail East**	Taft Avenue to Illinois Avenue	Trolley Trail, Newman campus, Big Blue Lake and surrounding parks, YMCA, Georgia and Frederick Hanford Parks, Roosevelt Elementary and Lincoln Intermediate Schools	Extension of Trolley Trail east using 15th Street SW and frontage roads and paths paralleling 19th Street SE/SW between S Monroe and Pennsylvania avenues. Includes a safe neighborhood pedestrian/bike crossing at S Federal Avenue as part of a bicycle boulevard route between Frederick Hanford and Georgia Hanford parks using 23rd and 22nd streets SW.	Short-term. Major development issues include right of way paralleling 19th between Monroe and Pennsylvania; and design of pedestrian crossing at 23rd Street SW and S Federal Avenue.
8	**Rhode Island-Virginia Bicycle Boulevard**	Highland Park Golf Course to Trolley Trail	Highland Park Golf Course, Harding Elementary School, Margaret MacNider Campground, Aquatics Center, East Park, and Winnebago River Trail, Trolley Trail	North-south bicycle boulevard connecting eastside neighborhoods with East Park and associated trails. Primary development issue is 4th Street SE intersection with railroad diagonal.	Short-term.

THROUGH ROUTE	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
9	**Taft Avenue Bikeway**	12th Street NE to planned regional rail-trail to Thornton	Village Cooperative Housing, 4th Street SW and Taft commercial, Trolley Trail, Newman campus, future regional trail	Extension of existing sidepath south of Village Cooperative to 4th Street SW with continuous, north-south facility. South segment connects Trolley Trail to major commercial corridor and service facilities.	Short-term between 12th Street NW and 4th Street SW, and off-street connection between 9th Street SW and Briarstone Drive. Medium for continuation to Trolley Trail. Extension south depends on completion schedule for regional trail.
10	**Culture Trail**	N Federal Avenue/ 4th Street NE to 5th Street SW-River Heights Drive	Federal Avenue Downtown, Music Man Square, Library, Art Museum, Rock Crest/ Rock Glen historic district, Meredith Willson Footbridge, Stockman House, River Heights Drive	Guided short route serving major historical and cultural attractions in the central city. Connects to through routes and uses existing signed bike route streets with minor modifications and interpretive features.	Short-term

From left: Recent extension of the Taft Avenue sidepath between the Village Cooperative senior housing and the 4th Street SW commercial corridor (Route 9); and a cycling family on 2nd Street SE near the MacNider Art Museum, part of the proposed Culture Trail (Route 10)

CONNECTING STREET KEY	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
A	**Pierce NW**	12th Street NW to 1st Street NW	Willow Creek Trail, MacNider Woods, Hoover Elementary School	Continuation of complete street conversion from 1st Street NW to 12th Street NW	Medium
B	**Taylor/Polk NW**	Willow Creek Trail to 8th Street SW	MacNider Woods, Mercy Medical Center	Serves Medical center along 3rd Street SW, using signalized crossing at 4th Street SW	Short
C	**Crescent/Jackson**	Willow Creek Trail South to Highway 122 overpass		Existing bike route between trail segment and overpass	Short
D	**North Harrison**	12th Street NW to Willow Creek Trail		Neighborhood access to trail, requires short path extension to trail from street terminus.	Medium
E	**South Monroe**	7th Street SW to 15th Street SW	Monroe Avenue commercial, YMCA	Sidepath connecting the central east-west corridors to the YMCA and Trolley Trail.	Medium
F	**15th Street SW/SE**	S Monroe Avenue to S Virginia Avenue	Cemetery, Roosevelt Elementary School	In current form, route is appropriate for experienced cyclists. Option of using cemetery frontage for a path to S Federal Avenue.	Medium to long
G	**South Pennsylvania**	15th Street SE to Trolley Trail	Trail, Lincoln Intermediate	Connection to school campus. Requires minor safety redesign of alignment north of 19th Street SE.	Short
H	**Carolina**	6th Street SE to Trolley Trail		Uses first available crossing east of railyard to connect north and south neighborhoods.	Short
I	**4th Street NE/NW**	N Adams Avenue to N Virginia Avenue	Northbridge, Downtown, East Park	Shared route adaptation, connecting Culture Trail to East Park	Medium
J	**Birch Drive**	N Virginia Avenue to N Illinois Avenue	East Park, MacNider Campground, Evans Preserve, High School campus	Shared route with some segments of sidepath, providing a direct connection between the East Park/Winnebago and NIACC Trails	Short



TRAIL KEY*	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
T1	**Willow Creek Trail**	Existing Trail from Pierce to Pennsylvania Avenues	MacNider Woods, Parker Woods Park, West Park, Downtown	Upgrade of existing trails to uniform standards: 8-10 feet paving, ADA compliant access, wayfinding, and barrier-free and clearly marked street intersections.	Short to medium
T2	**Willow Creek Trail Extension**	Fairgrounds/Roosevelt Avenue to Pierce Avenue	MacNider Woods, West 4th commercial corridor	New trail extension connecting westside development areas and lakes to trail network	Long, depending on property ownership, available resources, and development
T3	**Taft Trail**	12th Street NW to Trolley Trail (19th Street SW)	12th Street industries, West 4th commercial corridor, Trolley Trail	Continuation of sidepath on east side of Taft Avenue, possibly including on-street options with complete street development.	Medium
T4	**Big Blue Trails**	Trolley Trail at Benjamin Avenue to YMCA	Big Blue Lake, Lester Milligan and Ray Rorick parks, YMCA	Existing trails, with upgrade of sidewalks along S Pierce Avenue and 15th Street SW to sidepath standards	Existing
T5	**Meadowbrook Trail**	6th Street SW to Big Blue Trail	Willowbrook Mall, Big Blue Lake, Lester Milligan and Ray Rorick parks	New trail along flood buyout area on east side of Meadowbrook Drive, including trail bridge to S Pierce Avenue over Cheslea Creek	Long
T6	**4th Street SW Overpass**	4th Street SW to 6th Street SW	Major component of cross city corridor	Upgrade to trail standards	Short
T7	**Downtown Connectors**	Willow Creek Trail to Southbridge Mall	Southbridge, overall system	Redesign of underutilized parking lot on south side of creek to include a cycle track, with upgraded connection to south landing of pedestrian bridge to Southbridge Mall; trail bridge extending S Adams Avenue bikeway across creek.	Short for parking lot reconfiguration; long for S Adams Avenue bridge
T8	**Union Pacific High Line**	18th Street NE to 19th Street SE	Dog Park, Lime Creek Trailhead, Gooch Park, Senior Center, East Park	Opportunity for signature greenway feature, with unique park development opportunities on elevated former railyards on grade separations; extensive neighborhood access opportunities.	Short for beginning acquisition process; medium to long for phased development.
T9	**Lime Creek Trail**	Lime Creek Nature Center to 13th Street NE	Winnebago River greenway, Lime Creek Nature Center	Minor upgrade to existing trail where repairs are needed, improved trailhead and off-road path link to Winnebago River Trail	Medium

TRAIL KEY*	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
T10	**Winnebago River Trail**	13th Street NE to East Park	Lime Creek Trailhead, Winnebago River Greenway, East Park	Upgrades to existing trail, including wayfinding and informational signage and repairs as required	Short to medium
T11	**East Park Trails**	N Carolina Avenue to Norris Softball Complex	Winnebago River greenway, East Park, MacNider Campground, Norris Softball Complex	Extension of existing trail, with improved access to Kentucky Avenue and softball complex.	Medium
T12	**Illinois Avenue/ MCHS Pathways**	Birch Drive to NIACC Trail	East Park, MCHS campus, 4th Street SE and S Illinois Avenue commercial, NIACC	Sidepaths along the west and south edges of the High School campus, linking East Park/Winnebago Trails to NIACC Trail	Short to medium
T13	**Birch Drive Trail**	N Illinois Avenue to Highway 122	East Park, NIACC	Conversion of unimproved Birch Drive to a "shared space" corridor with limited automobile use.	Medium to long
T14	**Asbury Trails**	Asbury neighborhood system	Asbury neighborhood, Asbury Park	Existing pedestrian paths	Existing
T15	**NIACC Trail**	Mason City High School to NIACC campus	MCHS campus, NIACC	Existing trail, to be enhanced with informational signage	Short
T16	**Trolley Trail East**	S Pennsylvania Avenue to S Kentucky Avenue	S Pennsylvania to S Kentucky avenues	Existing trail. Improvement of S Pennsylvania Avenue intersection and alignment for northbound turns, informational signage	Short
T17	**Kentucky Avenue Cycle Track**	Birch Drive to East Park Trail	Birch Drive corridor, East Park	Reconfiguration to provide two-way cycle track over the N Kentucky Avenue river bridge	Medium to long

*See trails map on page 138

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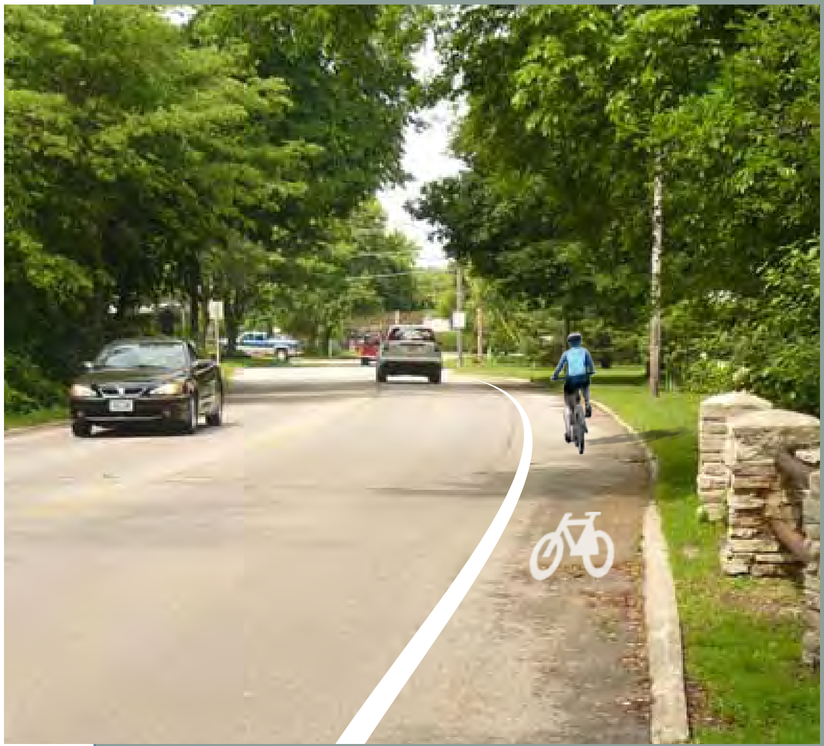
CHAPTER 4

INFRASTRUCTURE: DESIGN CONCEPTS AND GUIDELINES



THIS CHAPTER PRESENTS THE INFRASTRUCTURE OF THE MASON CITY BIKEWAY NETWORK, including facility types and design guidelines appropriate to the city's various street contexts and environments. These facility types form the building blocks of the network, and become the individual design components of the system's routes. It is important to remember that these corridors also serve pedestrian needs and that many of the off-street and intersection recommendations and facilities for bicycles also serve pedestrian needs. In addition, corridors included in the basic bicycle system also require pedestrian accommodations, typically continuous sidewalks in a state of good repair and barrier-free intersection crossings.

The Mason City bikeway network will be implemented on the ground by a variety of features: pavement markings, signs, capital projects like paths and trails, and supporting improvements. Each of these will increase the comfort and safety of cyclists traveling along the system, and encourage prospective riders to use the bicycle for transportation. These solutions are adapted to the characteristics of Mason City's streets: their roles in the street system, traffic volumes, widths, parking conditions, urban contexts, intersections, and linkages. In this chapter, we discuss the infrastructure components that are the building blocks of the route network, and present guidelines for their design. In Chapter Five, we show how these elements are assembled route-by-route to create the completed system

Facility types in the overall system and its individual routes should be relatively consistent. Because Mason City has many street contexts, the bikeway network combines more than one facility type even along specific routes. However, the system should use a common vocabulary for clarity and should avoid "choppiness" -- changing frequently from one facility to another or forcing frequent street crossings. Both of these conditions work against the requirements of integrity, comfort, and safety.

This chapter complements guidance and standards from authoritative national sources, adapting them to conditions found in Mason City.

These guidelines are intended to complement three authoritative sources of guidance for the design of bicycle facilities: the Urban Bikeway Design Guide, published in 2011 by the National Association of City Transportation Officials (NACTO); the Guide for the Development of Bicycle Facilities: Fourth Edition, released in 2012 by the American Association of State Highway and Transportation Officials (AASHTO); and the 2009 edition of the Manual of Uniform Traffic Control Devices (MUTCD) by the US Departmenmt of Transportation. It is important to note that individual routes require specific design, requiring flexible adaptation of these guidelines to individual conditions. Most situations are clear enough that guidelines can be applied directly. But more complex conditions require more customized solutions.

Facility Types

In general, the Mason City network will use the following types of facilities:

Shared streets, in which bicyclists and motor vehicles operate in common right-of-way. These streets usually have relatively low volumes and adequate continuity to be useful parts of the system. In many cases, they have on-street parking and are not wide enough to provide specific space for bicyclists. Shared streets include bicycle boulevards, using distinctive signage and design features to distinguish them as facilities that give special attention and even priority to the bicycle.

Bicycle lanes, in which bicyclists share the street right-of-way but operate within marked lanes reserved for their use. Bicycle lanes always provide for one-way movement, in most cases moving in the same direction as motor vehicles. Bicycle lanes are appropriate on streets that can comfortably accommodate bicyclists, but have higher traffic volumes than shared streets; provide adequate width in their current channels for both motor vehicles and bicycles; or as part of new street construction projects that integrate pedestrians, bicycles, and transit into their design (complete streets). Some contemporary bike lane installations are using new techniques to increase visibility and separation. These include buffered bike lanes, providing a painted separation between the bicycle and travel lanes, and colored or "green" bike lanes, painting all or part of the bike lane.

Sidepaths and Cycle Tracks. Sidepaths are wide paths located within a street right of way but fully separated from travel lanes. These facilities are widely used in both Mason City and the United States, but have been controversial because of potential bicycle-motor vehicle conflicts at intersections of streets and driveways. These facilities are especially useful along the street frontages with long distances and controlled access. Cycle tracks are one- or two-way "tracks" within street channels, buffered from moving traffic by horizontal barriers or buffers, including parked cars. These provide a degree of separation that many users find increases their comfort level and sense of safety, consistent with findings in the Mason City survey.

Multi-use trails. Trails on rights-of-way separated from streets make up much of Mason City's existing investment in bicycle facilities, including the Willow Creek, Winnebago River, and NIACC Trails. Trails following waterways, levees, railroads, campuses, and utility lines will continue to be staples of the bicycle network.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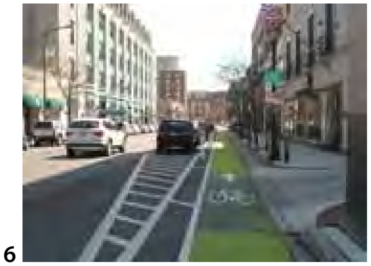
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Facility Types with Mason City Applications

1. Shared street with sharrow, Omaha, NE
2. Bike lane on existing street, Boston, MA
3. Complete street conversion, Green Bay, WI
4. Green bike lane, Los Angeles, CA
5. Sidepath, Mason City
6. Cycle track, Evanston, IL
7. Multi-use trail, Willow Creek, Mason City
8. Bicycle Boulevard, Yucca St, Los Angeles, CA
9. Sign along bicycle boulevard, Madison, WI


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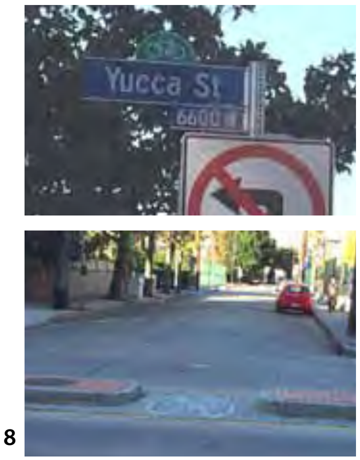

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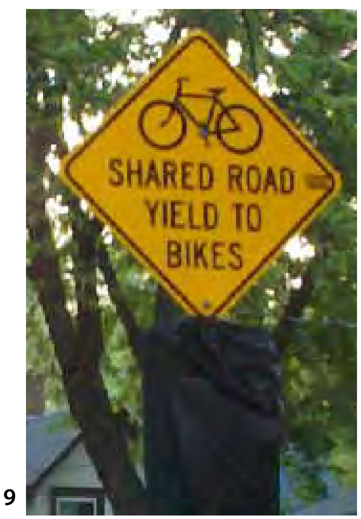

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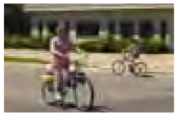


LOCAL SHARED STREETS

Shared, low-volume streets will make up the majority of on-street mileage in the Mason City bikeway system. On these streets, bicycles and motor vehicles operate within the same area. These streets should also have continuous sidewalks in good repair with barrier-free access on at least one side.

East State Street

Shared streets will be marked by shared lane markings, or sharrows, a new pavement marking now recognized in the Manual of Uniform Traffic Control Devices (MUTCD). Sharrows, made up of a bicycle symbol and a directional chevron, fill three primary functions:

- They provide route continuity for cyclists. The sharrow helps assure riders that they are on the bikeway system and moving along a street that is intended for bicycle use..
- Along with other signage, they increase motorist awareness of bicycles on the street.
- Properly placed, they help bicyclists position themselves safely on a street away from the "door zone" of adjacent parked cars.

Application to Mason City's Street Contexts

Characteristics of streets in the Mason City system that adapt to shared use include:

- *Low traffic volumes.* Streets with average daily traffic (ADT) below 5,000 vehicles per day (vpd), and preferably below 3,000 vpd are most appropriate for shared use. As volumes increase, the number of potential cyclists comfortable riding in the shared street environment will decrease.

- *Relatively low speeds.* The MUTCD recommends that sharrows not be placed on roadways with speed limits over 35 mph. A better maximum speed limit for streets with sharrows for Mason City is 30 mph.

- *On-street parking.* Many low-volume streets have on-street parallel parking on at least one side. The sharrow is useful in helping bicyclists position themselves away from the hazards of opening car doors.

- *Inadequate space for bike lanes.* Bike lanes, providing reserved space in the street channel for bicyclists, are often desirable, but many streets in the Mason City system are not wide enough to accommodate bike lanes, travel lanes, and on-street parking on both sides. On some corridors, sharrows may be a good initial solution that can be upgraded to bike lanes.

FIGURE 4.1: **TYPICAL DESIGNS FOR SHARED STREETS**

Left: Narrow local or neighborhood collector street with two-sided parking.

Center: Narrow local or neighborhood collector street with one-sided parking.

Right: Wide neighborhood avenue with two-sided parking.

These conditions are typically found in the following Mason City street types:

- Continuous local streets
- Continuous neighborhood collectors

Sharrows may be used on streets with somewhat higher volumes and speeds up to 35 mph where necessary to provide system continuity or to fill short gaps in the network. However, these routes will not be comfortable for all riders.

Design Contexts

In the Mason City system, shared streets will typically range from 28 to 42 feet wide, with parallel parking on at least one side. Figure 4.1 illustrates typical design contexts and sharrow placement dimensions for the Mason City system, with guidelines summarized in Figure 4.2.

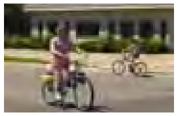
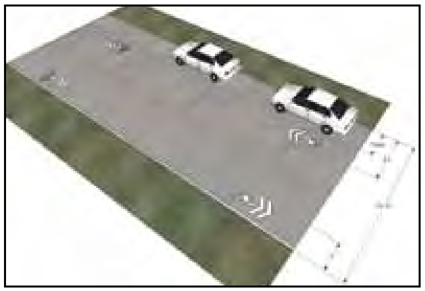


FIGURE 4.2: **DESIGN GUIDELINES FOR SHARED ROUTES**



DESIGN CONDITION	PAVEMENT MARKING AND SIGNAGE	TYPICAL STREET TYPE	COMMENTS
Two-sided parking, 25-31 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of the curb.	Continuous local, continuous neighborhood collector, neighborhood parkway	
One-sided parking, 25-29 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of curb on the parking side, minimum of 4 feet from face of curb on the no parking side	Continuous local, continuous neighborhood collector, neighborhood parkway	
One-sided parking, 29-32 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of curb on the parking side, minimum of 4 feet from face of curb on the no parking side. Painted white line to define parking lane, with outside edge 8 feet from face of curb	Neighborhood collector, neighborhood parkway, neighborhood avenue	White line should be used when the remainder of the street channel is at least 21 feet wide. Parking line helps define parking area and aids in bicyclists positioning themselves safely away from parked cars. In addition, when curbside parking is lightly utilized, the parking lane can serve as an informal bike lane for some cyclists.
Two-sided parking, 36-42 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of curb on the parking side, minimum of 4 feet from face of curb on the no parking side. Painted white line to define parking lanes, with outside edge 8 feet from face of curb.	Neighborhood avenue	White line should be used when the remainder of the street channel is at least 21 feet wide. Parking line helps define parking area and aids in bicyclists positioning themselves safely away from parked cars. In addition, when curbside parking is lightly utilized, the parking lane can serve as an informal bike lane for some cyclists.

BICYCLE BOULEVARDS

Bicycle boulevards are an important part of the proposed bikeways network presented in Chapter Four. These streets are direct segments that generally run parallel to higher order streets, and serve the same destinations as busier arterials. Bicycle boulevards utilize the pavement marking conventions discussed above, but include other identifying and functional enhancements. These vary in level of capital investment and complexity, and include (in relatively ascending order of complexity):

- *Signage.* Signage has the advantage of being highly visible and low in cost. Bicycle boulevard signs include identification signs (special street signs and bicycle boulevard identifiers) and advisory or caution signs (share-the-road signs). The entire system will also use a common signage system that incorporates identifying, directional, and wayfinding signs, discussed in Chapter Six.

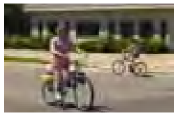
- *Intersection and road priority.* Bicycle boulevards should provide reasonable through priority to bicyclists, and by extension other users of the street. These include turning stop signs, to stop traffic on cross streets in favor of bicyclists and other users of the boulevard, and installing signs that explicitly give priority to cyclists.

- *Traffic calmers.* These features slow motor vehicle traffic at key points to equalize speeds between bicycles and cars. These techniques may include corner nodes with well-defined crosswalks, mini traffic circles, speed tables, and patterned or textured pavements at crosswalks or in intersections. In addition to aiding bicyclists, they also provide a better pedestrian environment and tend to discourage unwanted through traffic from using continuous neighborhood streets. Consequently, neighborhood residents frequently support installation of these features.

Signage concepts for bicycle boulevards. Signs are the least expensive solution but can be very effective in distinguishing these multi-use streets. Top row: Street signs with bicycle boulevard designations on Wilson Street in Madison (left) and Russell Street in Berkeley, CA. Bottom row from left: Bicycle boulevard identifier in Berkeley, intersection crossing caution in Portland, OR, share the road sign in Leawood, KS.

- *Arterial street crossing installations.* These features at crossings of bicycle boulevards and major streets help bicyclists cross arterials and preserve system continuity and safety. Techniques include installation or tuning of induction loops sensitive enough to detect bicycles; pedestrian and bicyclist activated hybrid beacons, possibly using bicycle loop detectors; and crossing refuge medians, short medians that allow bicyclists and pedestrians to negotiate one direction of traffic at a time. A special bicycle symbol is marked on the pavement to emphasize the point where the loop detects bicycles.

- *Traffic Diversion.* These are physical projects that change traffic patterns by preventing motor vehicle access onto a block while permitting through bicycle access. A diver-



sion device every half-mile on continuous local streets will direct through traffic to parallel arterials, while maintaining good access for residents into and out of residential areas. Naturally, bicycle boulevard techniques can also be utilized on other shared streets.

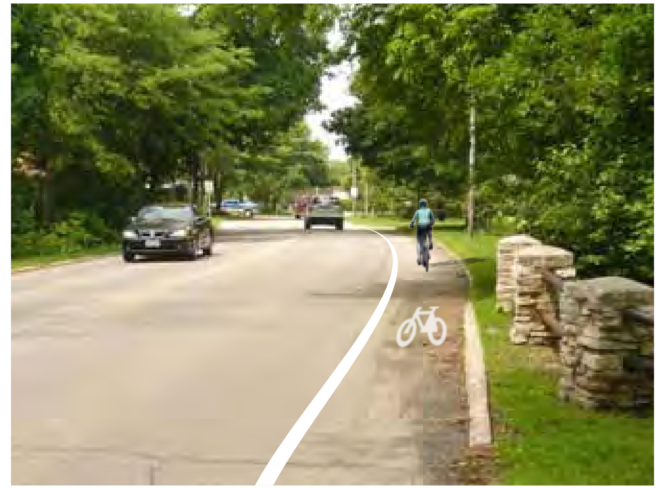
Increasing levels of intensity or investment on bicycle boulevards. Left: Bicycle priority sign on Wilson Street bicycle boulevard in Madison. Center: Mini-traffic circle in Berkeley. Right: Hybrid beacon signal in Tucson

Arterial street crossings for bicycle boulevards and pedestrian corridors. From left: Crossing median concept for urban corridor by RDG.; Median installation in Las Vegas; diverter island in Los Angeles.

Traffic diversion in Berkeley. These "chokers" permit bicycle traffic into the continuous boulevard but prevent or limit motor vehicle entry.

BIKE LANES

Bike lanes provide reserved (but not always exclusive) space for bicyclists operating within the street channel. Because they delineate a specific area for bicyclists, bike lanes provide an on-street environment both safer and more comfortable for cyclists on higher volume and/or higher speed roads than shared streets. The Mason City Bikeways Survey clearly indicated that bike lanes provided a preferred facility for many prospective cyclists.



Urban streets experience a number of demands that create potential conflicts, including traffic volume, on-street parking, and turning movements. Parking is a key variable that affects both the amount of right-of-way needed to accommodate bike lanes and the safe design of facilities.

In Mason City, bike lanes will occur on both two-way and one-way streets with different parking configurations. In addition, they will be added to streets in three different ways:

- *Retrofits of existing streets.* These projects, involving the least cost and difficulty, will reconfigure existing right-of-way to provide bike lanes as well as adequate capacity to meet traffic demands.

- *Minor street widenings.* These projects would widen existing street channels to add bike lanes, and may also adjust existing travel lanes.

- *New streets or street reconstructions.* These major investments address streets that need reconstruction to meet traffic demands or new corridors, anticipating development as "complete streets," designed to accommodate all modes of travel.

Application to Mason City's Street Contexts

Characteristics of streets in the Mason City system that adapt to bike lanes include:

- *Higher traffic volumes.* Bike lanes become more necessary as volumes increase, typically applying to streets with average daily traffic above 3,000 to 5,000 vehicles per day. These higher volumes require greater degrees of separation to maintain comfort for a maximum number of cyclists.

- *Medium speeds.* Speed differentials are generally more important than traffic volume in determining the application of bike lanes. However, lanes are most appropriately utilized on streets with typical speeds between 25 and 45 miles per hour. Above 45 mph, margins for error and, consequently, user comfort and safety decline.

FIGURE 4.3: **TYPICAL BIKE LANE DESIGNS FOR MASON CITY**

Left: Two-lane, two-way traffic with parking on both sides.

Center: Two-lane, two-way traffic with one-sided parking.

Right: Two-lane, two-way traffic with no curbside parking.

Additional travel lanes increase street width proportionately.

- *On-street parking.* Many candidate streets for bike lanes in Mason City's urban settings also provide on-street parking. Adequate space must be provided to avoid hazards from opening car doors.

- *One-way and two-way environments.* Mason City's one-way streets include wide downtown facilities with more lane capacity than traffic requires. In these situations, a bike lane is provided with relative ease and little impact on traffic.

These conditions are typically found in the following Mason City street types:

- Neighborhood avenues
- Urban arterials
- One-way pairs
- Downtown

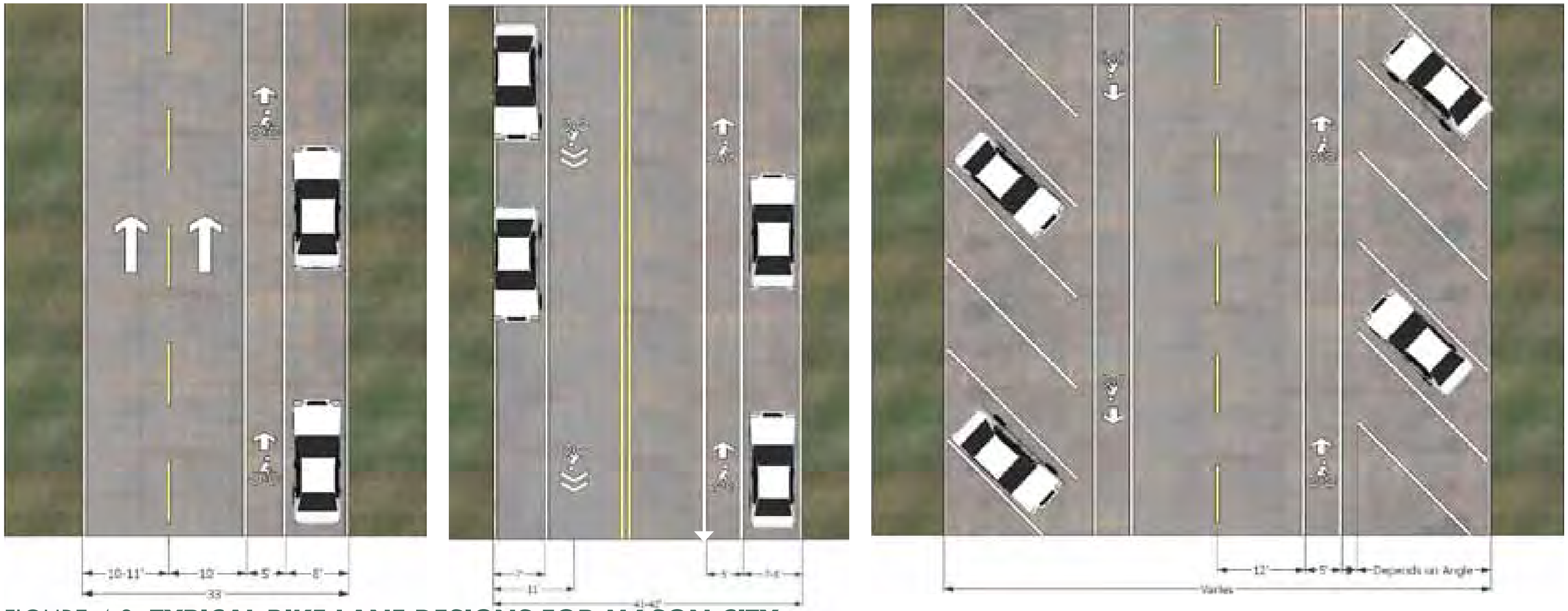


FIGURE 4.3: **TYPICAL BIKE LANE DESIGNS FOR MASON CITY**

Left: Two-lane, one-way traffic with parking on one side (5th/6th Street one-way pairs).

Center: Single directional bike lane paired with a sharrow. This option is a solution on streets where parking must be preserved on both sides but a bike lane is preferable.

Right: Diagonal parking adjacent to a bike lane should be converted to back-in diagonal parking for better visibility.

Overall Design Guidelines

In the Mason City system, streets with bike lanes typically vary in width from 30 to 50 feet, reflecting the city's diverse settings from relatively narrow corridors to wide downtown avenues. Figures 4.3 and 4.4 illustrates typical design contexts and bike lane dimensions for the Mason City system, with guidelines summarized in Figure 4.5. However, general design principles include the following:

- Bike lanes should always operate in a single direction, flowing with traffic.
- Bike lanes will typically be provided on both sides of two-way streets. Lanes on one-side only may invite inexperienced cyclists to use them in the wrong direction. In situations where bike lanes are needed but right-of-way only accommodates a single directional lane, a sharrow should be used in the opposite direction. The bike lane should be provided in the direction most likely to slow or create conflicts with other traffic, such as an uphill grade or when traffic issues are most severe in one direction.
- Normally, bike lanes will be located on the right-hand side of the street, consistent with traffic conventions and motorist expectations. Some large cities locate bike lanes on the left-hand side to avoid conflicts with buses and taxis, and to minimize car-door zone conflicts. However, these conditions generally do not occur in Mason City.
- Bike lane pavement markings should be used at the entrance and departure of each intersection.

FIGURE 4.4: **DESIGN GUIDELINES FOR BIKE LANES**

DESIGN CONDITION	PAVEMENT MARKING AND SIGNAGE	TYPICAL STREET TYPE	COMMENTS
Two-Way Traffic , two-sided parking	Standard of 8 foot parking lanes with 5 foot bike lanes. In constrained settings, a 12 foot combined parking/bike lane may be considered. Total minimum street width (face to face of curb: 46-48 feet for two-lane plus 11 feet for each additional travel lane.	Transit and civic avenues, neighborhood arterial	Supporting information should advise cyclists to ride in the left-hand part of the bike lane.
Two-Way Traffic, one-sided parking	Standard of 8 foot parking lanes with 5 foot bike lane on parking side. In constrained settings, a 12 foot combined parking/bike lane may be considered. Four foot bike lane is minimum on the non-parking side, excluding gutter pans. Total minimum street width (face to face of curb: 39 feet for two-lane plus 11 feet for each additional travel lane.	Transit and civic avenues, neighborhood arterial	Supporting information should advise cyclists to ride in the left-hand part of the bike lane.
Two-Way Traffic, no parking	Four-foot minimum bike lanes, excluding gutter pan. On major streets with higher volume and speed, bike lane width should increase to 5- to 7-feet, depending on street character and speed limits. Total minimum street width (face to face of curb: 30-32 feet for two-lane plus 11 feet for each additional travel lane.	Transit and civic avenues, neighborhood arterial, mixed use arterial	

General Notes:
1. Typical recommended placement of standard bike lane pavement markings is at the entrance and departure from each intersection.
2. Standard bike lane sign (R3-17) may be placed with an AHEAD plaque at the approach to the lane and with an END plaque at the terminus of the lane. Pavement markings should be used more frequently than signs and marking locations should be coincident where possible.

FIGURE 4.5: **DESIGN GUIDELINES FOR BIKE LANES**

DESIGN CONDITION	PAVEMENT MARKING AND SIGNAGE	TYPICAL STREET TYPE	COMMENTS
One-Way traffic , one-sided parking **5th/6th pairs (Highway 122)**	Standard of 8 foot parking lanes with 5 foot bike lanes on parking side. Bike lane buffering is highly desirable if space permits. A 12 foot combined parking/bike lane may be considered. Total minimum street width (face to face of curb: 28 feet for two-lane with off-peak parking permitted in one travel lane.	One-way pairs	
Single direction bike lane with parallel parking and opposing shared lane.	Street channels require a minimum of 42 feet from face of curbs with two-sided parking. Minimum width drops to about 35 feet with single-sided parking. The bike lane should be placed on the side of the street where cyclists in a shared lane would be most likely to delay traffic (such as an uphill or rising grade).		
One- or two-way with diagonal parking **(Downtown streets)**	Five-foot minimum bike lanes with diagonal stalls of adequate length to avoid encroaching into the bike lane. Back-in diagonal parking for stalls adjacent to bike lanes.	Downtown multi-lane, downtown boulevard	Conventional head-in diagonal parking is not recommended adjacent to bike lanes because of poor visibility. Back-in diagonal parking is being used successfully in many cities, and is recommended in Mason City when this condition exists. Back-in diagonal also provides greater safety to motorists pulling out of stalls, directs pedestrians leaving a vehicle to the sidewalk, and eases loading.
Two-sided parking, 36-40 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of curb on the parking side, minimum of 4 feet from face of curb on the no parking side. Painted white line to define parking lanes, with outside edge 8 feet from face of curb.	Neighborhood avenue	White line should be used when the remainder of the street channel is at least 21 feet wide. Parking line helps define parking area and aids in bicyclists positioning themselves safely away from parked cars. In addition, when curbside parking is lightly utilized, the parking lane can serve as an informal bike lane for some cyclists.

Buffered bicycle lane. Separation is provided by a cross-hatched neutral ground in this application in New York City. Some places use diagonal tick marks extending out from the parking lane line to mark the extent of the "door zone."

Back-in diagonal parking. This concept has proven successful here in Downtown Des Moines and other cities.

Painted advisory lane across intersections. This increases motorist awareness of the presence of bikes and also helps protect the pedestrian crosswalk. (Chicago)

INTERSECTION DESIGN

Intersection design is important to the safe operation of on-street facilities. Consistent practices should address conflicts between turning traffic and bicyclists proceeding straight ahead. In urban bicycling situations, bicyclists are advised to position themselves in the right-hand third of the lane that serves their destination. While this maximizes safety, many cyclists tend to move to the extreme right of an intersection, placing them in a position to be hit by turning motor vehicles. Like a number of towns, Mason City has many offset intersections, where a local or collector street does not align directly north and south of an intersecting arterial.

Intersection solutions for on-street bicycle facilities include:

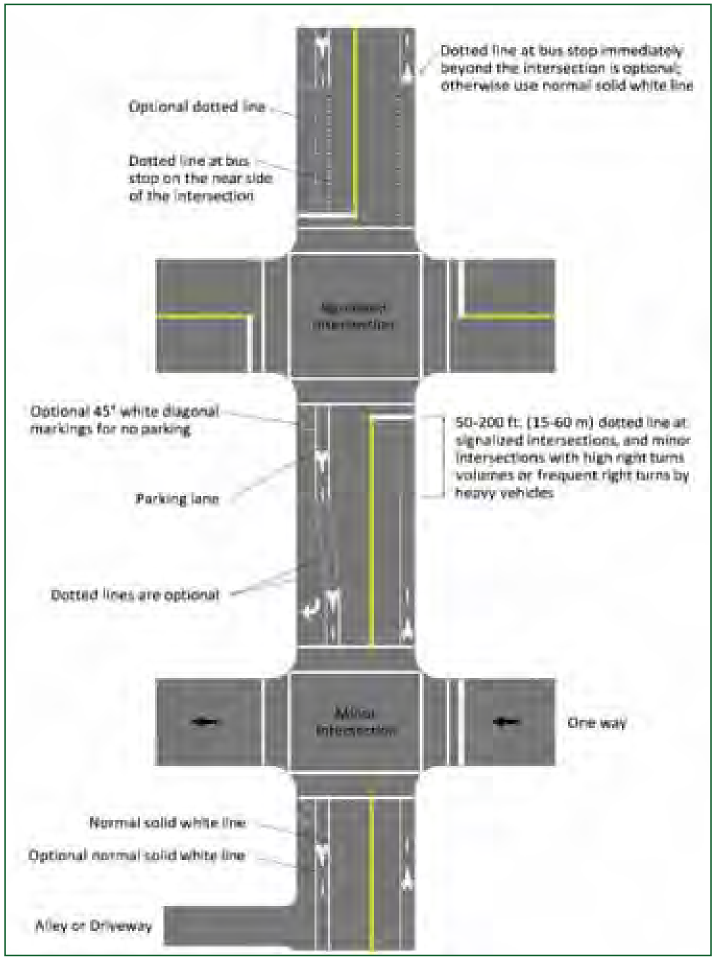
- Typical pavement markings.
- Right-Turn Pockets
- Bike Boxes for Left Turns
- Intersection Offsets

Intersection treatments recommended for bicycle boulevards, including refuge medians, are also applicable to streets with bike lanes.

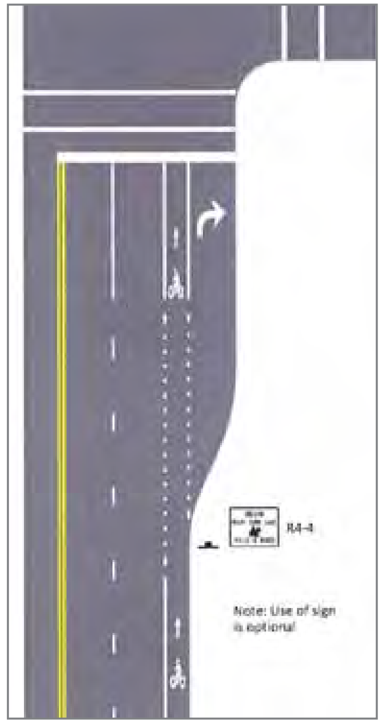
Typical Intersection Markings

Figure 4.6 illustrates typical pavement markings in various situations including intersections. Problems have emerged with bike lane installations that maintain solid lines up to the intersection. This encourages some cyclists to consider the bike lane to be inviolate, and opens them to the possibility of being hit by right-turning traffic. In response, current practice is to replace the solid white line with a dashed line, suggesting that the lane alignment should not be rigidly followed. This also encourages cyclists to behave like other traffic by leaving the right-hand bike lane to make left turns.

FIGURE 4.6: **LANE MARKINGS AT INTERSECTIONS**



Source: AASHTO Guide for the Development of Bicycle Facilities, 2012.



Bicycle box on Commonwealth Avenue in Boston. Bike lanes here are on the left side of the street channel, adjacent to the median.

Right-Turn Pockets

Some major intersections include right-turn only lanes to allow right turns on red signals or otherwise separate right turning movements from the direct flow of traffic. This creates a potential issue for bicyclists who are used to positioning themselves "as far to the right as practicable" in the language of many state laws, again exposing themselves to collision with right-turning motor vehicles. Figure 4.6 illustrates the recommended pavement markings position the bicyclists continuing straight ahead to the left of the right turn only (RTO) lane, providing a dashed stripe through the conflict zone. The solid stripe resumes on the other side of this conflict zone. Many cities are coloring the surface of this zone to increase motorist awareness of a potential collision hazard, A standard sign, advising motorists to yield to bikes on a direct route (R4-4) should also be installed.

Bicycle Boxes for Left Turns

Bicycle boxes are used at signalized intersections to extend a bike lane to the front of a traffic queue. The box sets the stop bar for motor vehicles behind the stopped bicycles. They provide clear visibility for bicyclists, minimize the problem of cyclists hugging the right-hand curb, and expedite left-turning bicycle movements. The boxes are defined by stripes and may be colored for greater visibility. Recommended depth of the box is 14 feet from the edge of the crosswalk.

Offset Intersections

While Mason City enjoys the benefits of a good local street grid, many of these streets are offset as they cross major arterials, typically at section lines. Some of these intersections are controlled by stop signs while others have signals at one of the intersection legs. These offsets place through cyclists on continuous, low-volume routes in a precarious position, often forcing them to attempt to join the traffic stream on the primary street.

Figure 4.7 illustrates three concepts that address this barrier issue. At low volume intersections, using chevrons to define the bike route is satisfactory. At unsignalized intersections with major arterials, a short one-way track allows the cyclist to track a straight line across the intersection and continue to the opposite leg without being forced into a heavy traffic stream. At signalized intersections, a two-way track aligns the cyclist with the continuation of the bike route.

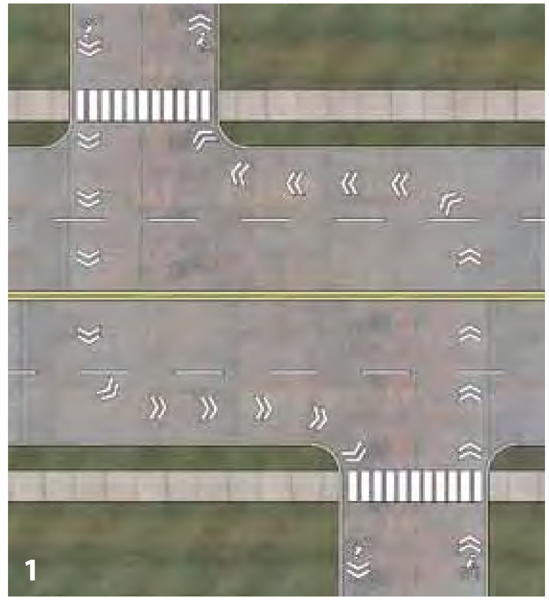
Developing Bike Lanes in the Network

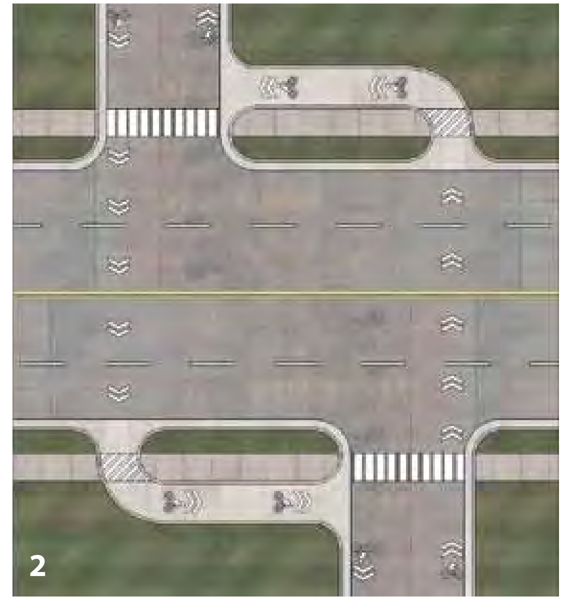
As mentioned above, bike lane installations in the Mason City system will be implemented in three ways: retrofits to existing streets, minor widenings, and major construction or reconstruction to complete street standards. This discussion considers how these three techniques apply to the Mason City bikeways network.

Retrofits

Street retrofits with bike lanes are relatively inexpensive projects because they simply reconfigure the existing road section without significant capital construction. Retrofits can be accomplished by:

- Adding bike lanes by using excess street width.
- Road diets.
- Parking and lane reconfigurations





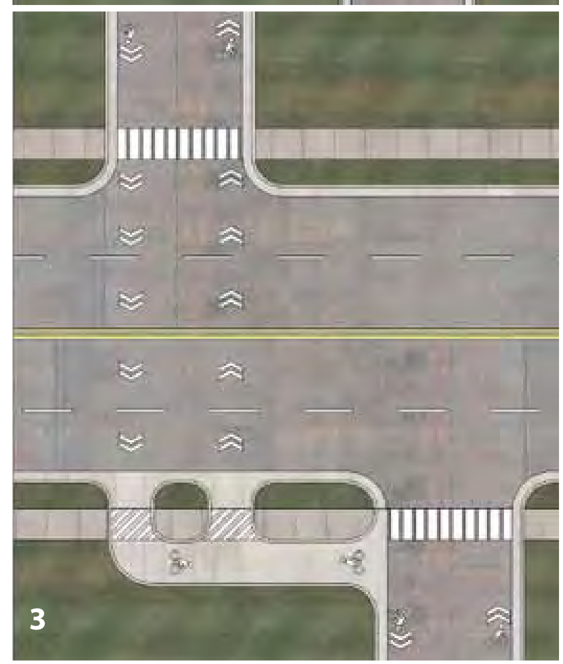
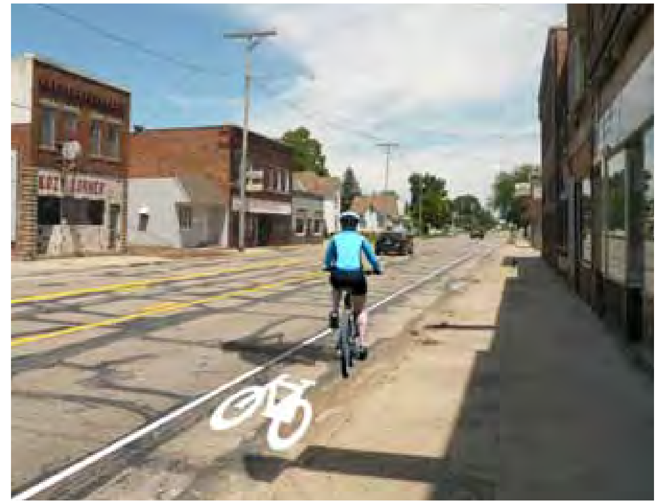


FIGURE 4.7: **OFFSET INTERSECTIONS**

Crossing offset intersections. Concepts are designed for three different situations. Case (1) illustrates an offset crossing with low cross traffic, where use of chevrons to mark a path through the intersection is sufficient. Case (2) illustrates an unsignalized intersection with a major street, employing a one-way cycle track to permit the cyclist to ride directly across the intersection and proceed without merging into the traffic stream. Case (3) addresses a signalized intersection, aligning the cyclist using the non-signalized leg to align with the signal and proceed on green across the street.

Retrofits within existing street channels: 6th Street SW



Using Excess Width

Some streets in the Mason City system are wide enough that bike lanes can be added no significant change in the existing street layout. Examples include Pierce Avenue and 6th Street SW, both of which are currently designated bike routes. Bike lanes on these streets also have the advantage of managing traffic, reducing speeds to desirable levels, and preventing passing on the right.

Road Diets

Road diets may have some applicability in Mason City, most notably along North Federal Avenue. Two principal strategies for road diets include:

Lane narrowing. In certain cases, space for a bike lane in at least one direction may be obtained by narrowing travel lanes from 12 or more feet to 11 feet. When room exists under this strategy for only one lane, the opposite direction should be accommodated with a cycle track or, at minimum, a shared lane.

Lane reduction. Lane reductions are most applicable on older four-lane facilities without left turn lanes with ADT's that no longer require a multi-lane facility. Reduction to a three-lane section, providing a capacity of 16,000 vpd, can provide additional space for bike lanes in both directions, as well as managing traffic speeds.

Parking and Lane Reconfigurations

Parking reconfigurations pick up road space by consolidating existing on-street parking. In these situations, which may involve relatively wide neighborhood streets such as State Street, underutilized two-sided parking is combined on one side of the street. On streets in excess of 35 feet wide, this provides an opportunity for a bike lane on one side of the street and a shared lane with a painted parking lane in the opposite direction. A lane reconfiguration may change the location of lanes on the street to accommodate mixed traffic.

Parking reconfigurations can have significant neighborhood impact and should be done only in close consultation with residents and businesses along a street. These possibilities are noted in the detailed route descriptions in Chapter Five.

Lane reduction. A lane reduction on 4-lane North Federal would provide a center left-turn lane and bike lanes, creating a safer facvility for all users and buffering the sidewalk from rapidly moving traffic.

Minor widening. Taft Avenue includes a southbound shoulder that already serves as a bike lane. A minor widening on the east side of the street could accommodate northbound bicyclists safely.

Minor Widenings

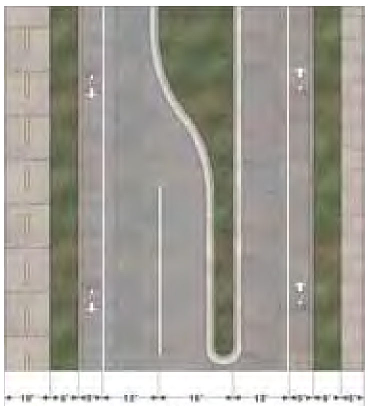
Minor widenings include construction of dual purpose paved shoulders on streets without curbs or relocating curbs on urban streets, most feasible as part of another improvement project. An opportunity for such a minor widening is Taft Avenue south of 4th Street SW, where a shoulder already exists on one side of the street. Shoulder bikeways should be 6 feet wide to accommodate bicycles and disabled vehicles comfortably on these relatively high speed corridors. Shoulders should also be marked with bike lane pavement markings.

Major Reconstructions/Complete Streets

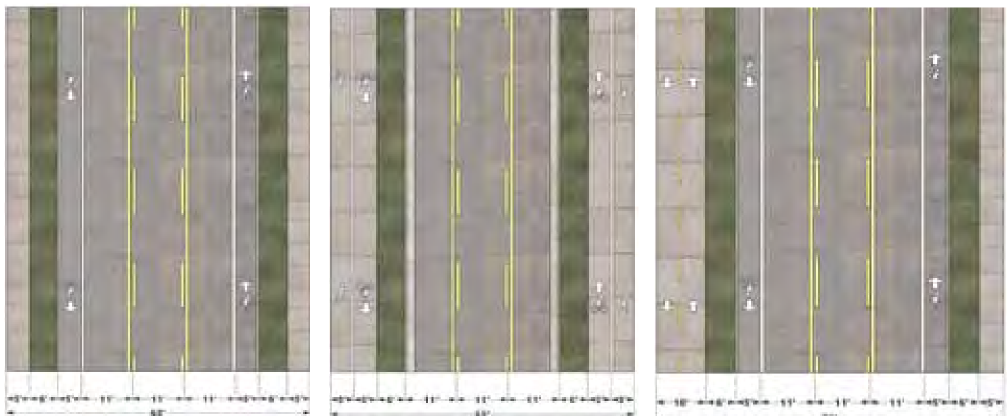
These major projects include either new corridors or upgrades to existing obsolete streets that no longer meet traffic requirements. They would be upgraded to complete street standards, providing bike lanes or comparable facilities. Because complete streets may also include off-road facilities, recommended guidelines are presented later in the discussion of sidepaths and cycle tracks.

FIGURE 4.8: **COMPLETE STREET DIMENSIONS AND SECTIONS**

SECTION TYPE	SIDEWALK/ SIDEPATH	PARKWAY SETBACK	BICYCLE LANE OR SHOULDER	STREET CHANNEL WIDTH	BICYCLE LANE OR SHOULDER	PARKWAY SETBACK	SIDEWALK/ SIDEPATH	TOTAL MINIMUM ROW
2 lane divided with sidepath	10	6	5	40	5	6	5	76
3 lane, no sidepath (35 mph)	5	6	5	33	5	6	5	65
3 lane, 1-way sidepaths (35 mph)	10	6	5	33	5	6	10	75
3 lane, 2-way sidepath (35 mph)	10	6	5	33	5	6	5	70
4 lane divided, 2-way sidepath (45 mph)	10	12	7	64	7	12	5	117
5-lane, no sidepath (35 mph)	5	8	5	55	5	8	5	91
5-lane, 1-way sidepaths (35 mph)	10	8	5	55	5	8	5	101
5-lane, 2-way sidepath (35 mph)	10	8	5	55	5	8	5	96

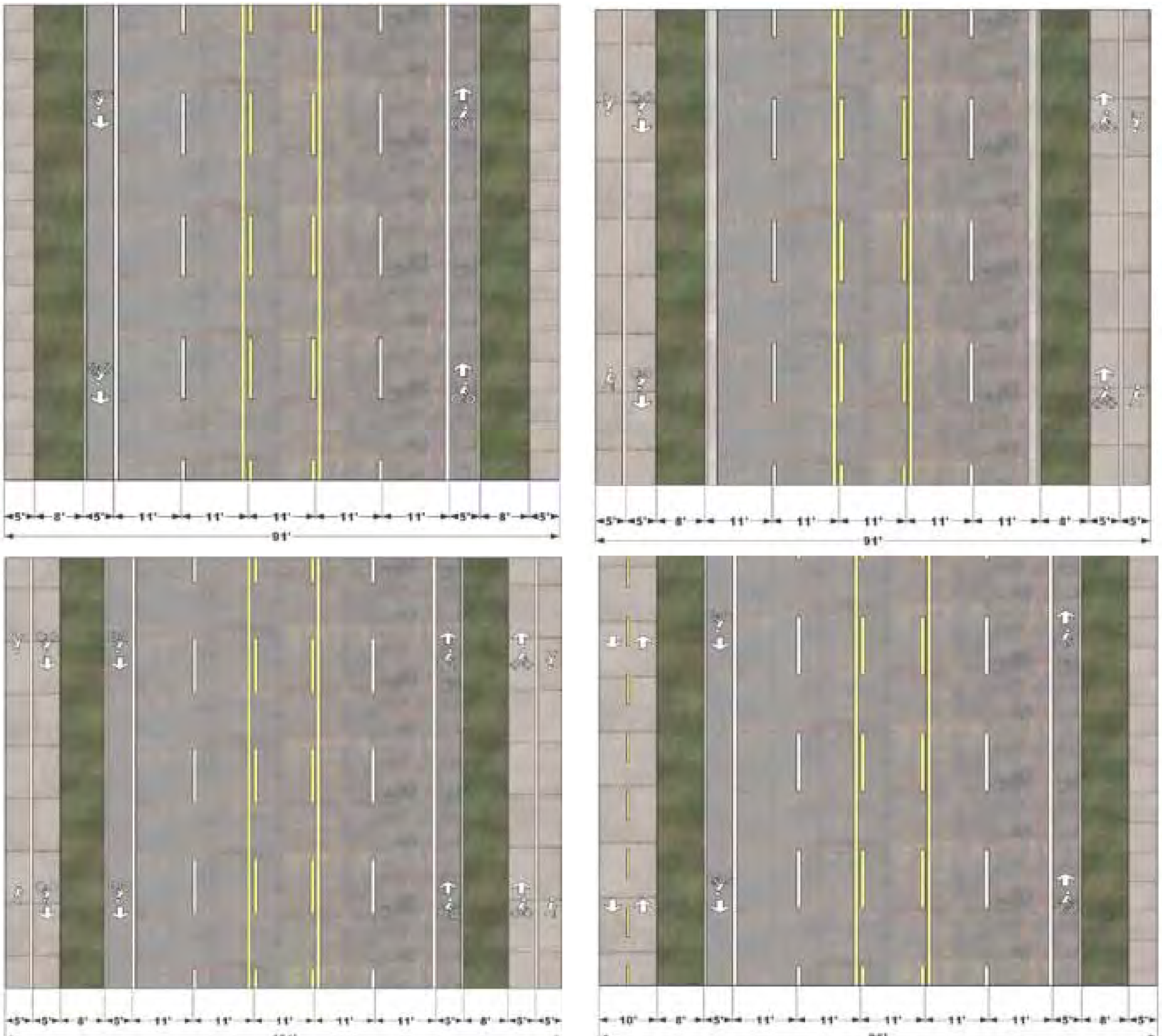


Two-lane divided section with sidepath



Three-lane sections: From left, bike lanes; one-way sidepath without bike lanes; and two-way sidepath with bike lanes.

Four-lane divided section with sidepath



Five-lane sections: Far left from top: bike lanes; and one-way cycle tracks with bike lanes. Left from top: One-way sidepaths with bike lanes; two-way sidepath with bike lanes

SIDEPATH AND CYCLE TRACKS

Sidepaths are paths separated from the stream of traffic but within the right-of-way of a street or road. They are a staple of European bicycle systems, but are controversial among facility designers and urban bicyclists. They present significant challenges at intersections but allow cyclists to operate comfortably on direct major routes. As such, they have a distinct role in the Mason City network.

Cycle tracks generally refer to protected paths within the street channel but physically buffered from travel lanes. These facilities are becoming increasingly popular in American cities and have some specific applications in Mason City.

Objections to the use of sidepaths in this country are based on conflicts with dominant motor vehicle traffic and include:

- Hazardous intersections. On two-way paths, motorists do not expect, and often do not see, bicyclists in the counterflow direction. Right-turning motorists in many cases ignore path users moving straight ahead, creating the possibility of a crash. This always places path users on the defensive.
- Right-of-way ambiguities at driveways and intersections. Usually, cyclists on a sidepath along a major street are forced to yield to intersecting traffic. Cyclists traveling on streets, on the other hand, have the same right of way rights as motorists.
- Path blockages. Cross traffic on driveways and intersecting streets frequently blocks the sidepath by stopping across it.

As a result, experienced cyclists usually prefer on-road facilities to roadside facilities. Yet, sidepaths, despite their

Variations on the cycle track theme. Top left: Colored crosswalk on the Trolley Trail at Taft Avenue. Top: An urban cycle path in Amsterdam. Above: A popular cycle path in New York's East Village, with parking buffering cyclists from moving motor vehicles.

shortcomings, are used frequently and remain popular with many users. Sidepath images were also rated highly for level of comfort by participants in the Mason City Bikeways Survey. Many cyclists justifiably fear rear-end (or overtaking) crashes or distracted drivers wandering into even a well-designed bicycle lane. Sidepaths accommodate pedestrians and other wheeled users who cannot use streets. Also, auto-era development replaced the traditional grid of local streets with cul-de-sacs and short curvilinear streets, causing through connections to depend solely on the arterial system. Sidepaths along major streets provide continuity where other alternatives, including trails or parallel local streets, are not available.

Roadside paths and cycle tracks are integral to the national bicycle system of the Netherlands, one of the world's premier cycling countries, and work because of careful design and motorist respect and acceptance of bicyclists. While research on American sidepath safety is scarce, a recent Harvard University study based on the Montreal system compared crash rates on sidepaths to on-street facilities. It suggested that sidepaths had higher crash rates at intersections and lower rates along their main line, producing about the same overall crash rates as on-street facilities. Since crashes at speed in mid-block areas have a higher probability of fatality than lower speed crashes at intersections, the study indicated that these facilities should not be excluded from urban bicycle systems in this country. They do in fact play a strategic role in the Mason City network, and have been successfully used in the past (Trolley Trail, 9th Street, Benjamin Avenue, and Taft Avenue).

Application to the Mason City System

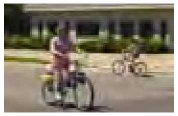
- Conventional multi-use sidepaths, typically wide paths parallel to arterial streets, should ideally be used in corridors with few driveway or street interruptions, and should not exclude use of on-road facilities when bike lanes and shoulders are feasible.
- Complete streets should include both on-street facilities and paths for pedestrians and bicyclists who are uncomfortable with riding even in protected, on-street bike lanes. Innovative concepts, like one-way cycle tracks on new or existing streets, can combine the safety benefits of off-road riding between intersections and vehicular cycling through intersections.
- The objective of sidepath design guidelines should be to make these facilities as safe as possible, specifically by addressing their greatest weakness: road and driveway intersections.
- Sidepaths are safest when driveway and cross-street interruptions are fewest. Therefore, they work best along arterial streets that have long stretches of relatively uninterrupted frontage, like parks, campuses, and cemeteries. Mason City has a number of such strategic opportunities, including the Mason City High School campus, St. Joseph/Elmwood Cemetery, and the Fairgrounds. When used along streets, access management becomes especially important,
- Contemporary cycle tracks, where an on-street path is provided along a curb and separated from moving traffic by buffering and parking, should be considered in downtown settings as an alternative to bike lanes.

Design Guidelines for Cycle Tracks/Sidepaths

Pathway Standards

Cycle tracks and sidepaths may be developed as two- or one-way facilities. Most US applications of off-road sidepaths are two-way facilities, adhering to a standard ten-foot width, typical of other multi-use trails. A one-way cycle track combined with a sidewalk should separate territory allocated to bicyclists and pedestrians, and include directional markings for bicyclists. These territories can be defined by paint or changes in pavement color, such as at

Sidepath sections. Sidepath width and construction standards are similar to those for multi-use trails. Top: Two-way sidepath along an arterial, a typical accommodation on contemporary streets. Above: One-way cycle track concept separates pedestrian from bicycle traffic. Bicycles move in the direction of traffic.



Sidepaths and Cycle Tracks. Top: Two-way sidepath typical of US multi-modal projects, US 40 in Lawrence, KS. Middle: Broadway in Boulder, CO, defining pedestrian and bicycle domains along a roadside trail. Lower: One-way cycle track and pedestrian path in Amsterdam.

the Trolley Trail at Taft Avenue. Minimum width for a one-way cycle track is four feet (five feet recommended) with an adjacent pedestrian path of similar width. Structure and materials for sidepaths should follow standards for multi-use trails on separated right-of-way.

Pathway Setbacks

Research conducted for the Florida Department of Transportation indicates that, to maximize safety, separation of the sidepath from a roadway should increase as road speeds increase. The Florida data suggest that at lower adjacent road speeds, a smaller separation produces crash rates lower than those of the adjacent road, while that threshold is reached at greater separations for high speed facilities. AASHTO 2012 recommends a minimum separation of five feet without a physical barrier. Figure 4.9 displays a standard separation for sidepaths based on the Florida findings.

Access Management

Access management makes sidepaths safer. There is no one clear standard for frequency of access points. Reasonable guidance is provided by the Idaho Department of Transportation, recommending a maximum of eight crossings per mile, with a preferred maximum of five crossings

FIGURE 4.9:
RECOMMENDED SIDEPATH SEPARATIONS

ADJACENT ROAD SPEED LIMIT (MPH)	RECOMMENDED SIDEPATH SEPARATION (FEET)
35	5-8
45	12-14
55	20-24

per mile. This access management policy should apply to the primarily arterial streets proposed for these corridors.

Sidepath Concepts and Adjacent Roadway Character

As mentioned earlier, two-way sidepaths, in common use in American road design as "multi-purpose paths," set up an unexpected counterflow direction that creates the possibility of crashes. Florida DOT research indicates that two-way sidepaths appear safer along 2- and 3-lane roadways and less safe along multi-lane roads with 2 or more lanes in each direction. In addition to the higher speeds typical of wider roads, this phenomenon can be explained by:

- The field of vision of motorists opposite the sidepath. On wider roadways, motorists cannot see or are less aware of a sidepath on the opposite side, creating a particular crash hazard between path users and left-turning traffic.

- Motorists exiting intersecting driveways or streets are looking for oncoming traffic at a shallower angle because of the greater street width, directing attention away from the already unexpected sidepath traffic to their right.

The previously discussed Harvard study on the Montreal system also suggests that sidepaths are safer than on-street operation between intersections, but more hazardous at street crossings. The one-way cycle track, in combination with bicycle lanes or shoulders on the adjacent road, addresses these issues, and AASHTO 2012 tends to recommend this design (Figure 4.10) Before reaching a major intersection, the cycle track is directed to and merges into the bicycle lane which, at major intersections, is located to the left of a right-turn only (RTO) lane. Inexperienced bicyclists have the option of becoming pedestrians and using the crosswalk. Thus, the one-way sidepath concept combines the relative mid-block security of the sidepath to many users with the safer options of behaving like other vehicles or as pedestrians at street intersections.

The one-way sidepath should be considered:

- Along four-lane divided or five-lane corridors with local street accesses.
- When a sidepath is recommended but, for various reasons, access cannot be closely managed.

Design of In-line Crossings at Driveways and Streets

Cycle tracks/sidepaths and multi-use trails share design characteristics at intersections. Guidelines for multi-use trails are presented later in this section. However, roadside facilities have special problems not experienced by the largely grade-separated trail system. Recommendations for the special conditions presented by sidepath crossings are presented here.

Ramp Design

- Curb/intersection cuts or ramps must be logical and in the direct travel line of bicyclists. We suggest avoiding the common practice of placing the ramp on a diagonal at the corner, tending to direct users into the middle of the intersection rather than to a crossing.
- A design that places a curb in the direct travel line of bicyclists is hazardous. The intersection area must be free of obstructions, such as poles for traffic signal mast arms or lighting standards.

Separation Distance

The separation of the trail crossing from the edge of the roadway is a troublesome issue. Some sidepath designs put users in serious jeopardy by placement that either provides poor visibility or inadequate reaction time. Based on specifications in Finland and the Netherlands, where

FIGURE 4.10:
ONE-WAY SIDEPATHS

A system of paired one-way sidepaths can minimize some of the operating hazards of two-way paths in certain settings. The one-way sidepath concept can be used both on streets without (top) and with bike lanes. Without bike lanes, the sidepath is the street's bicycle facility, but becomes a bike lane as it enters the intersections. If bike lanes are provided along the street, the cycle track merges into the bike lane. Left: Merger from street to one-way cycle track at Vassar Street cycle track on the MIT campus in Cambridge.

Poor Sidepath Intersection Design. Top: Ramps are narrow and located off line from a bicyclists normal path, creating a potential hazard. Above: The base of a signal mast arm obstructs the logical path through the ramp.

sidepaths are prevalent, the Florida DOT's path intersection design manual proposes three discreet and mutually exclusive separation distance categories:

- 1-2 meters (0-6.56 feet)
- 5-10 meters (16.4-32.8 feet)
- more than 30 meters (over 98.4 feet)

These distances are based on the interaction of five variables: motor vehicle turning speed, stacking distance, driver and/or pathway user awareness, and chance of pathway right-of-way priority. These categories are designed to prevent awkward conditions that may impair visibility and not give either the trail user or motorist opportunity to respond. Figure 4.11 summarizes the relative performance of each placement for these variables.

Defining Crossings

- All crossings across streets and major driveways should be clearly defined. Street intersection markings should utilize standard zebra or ladder markings incorporated at mid-block crossings and other major intersections. Colored concrete or asphalt surface treatments may also be used. A simpler dashed crosswalk boundary may be used as a convention at driveway crossings.
- At intersections controlled by stop signs or signals, stop bars should be provided for motor vehicles ahead of the crosswalk to discourage motorists from obstructing the path. Surface triangles that indicate a motorist yield may be used in place of stop bars. Unfortunately, many American motorists do not understand this marking.

Signage

Use warning signs along roads with sidepaths similar to advisories for parallel railroad tracks. This provides motorists with a background awareness of the parallel sidepath.

Right-of-Way Assignment

Ideally, pathway users paralleling a street with right-of-way priority should share that priority. However, sidepath users must be advised to ride defensively, and assume that they will often be forced to yield the right-of-way.

FIGURE 4.11:
PERFORMANCE APPLICATIONS OF VARIOUS SIDEPATH SEPARATIONS

Parameter	1-2m 0-6.56 feet	5-10m 16.4-32.8 feet	over 30m over 98.4 feet
Motor vehicle turning speed	Lowest	Higher	Highest
Motor vehicle stacking space	None	Yes, better at higher separation	Yes
Driver awareness of path user	Higher	Lower	High or Low
Path user awareness of driver	Higher	Lower	Highest
Chance of pathway ROW priority	Higher	Lower	Lowest
Source: *Intersection Design Manual, Florida Department of Transportation*			

Overly frequent stop signs will cause many path users to ignore the traffic control entirely. The Florida manual states that path users may be intolerant to delay, wish to maintain momentum, or have limited traffic knowledge. When stop signs are installed on a path at extremely low volume intersections or even driveways, path users tend to disregard them. The wheeled user cyclist or skater is, in effect, being taught this dangerous behavior by these "crying wolf" signs since he or she thinks there is little chance of cross traffic.

Intersection Geometrics

In addition to crossing visibility and access management techniques, the 2012 AASHTO advises the following design measures to address intersection and driveway crossing safety:

- Intersection and driveway design to reduce speed and heighten driver awareness of path users through tighter corner radii, avoidance of high-speed free flow movements, median refuge islands, and good sight lines.
- Design measures to reduce pathway user speed at intersection approaches, being certain that designs do not create hazards.
- Calming traffic speeds on the adjacent roadway.
- Designs that encourage good cyclist access between roadway and sidepaths at intersections.
- Keeping approaches to sidepaths clear of obstructions, including stopped motor vehicles, through stopbars and yield markings.

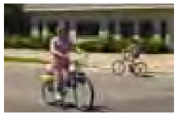
Crossing Definition. Sidepath/cycle track crossings should be defined for maximum visibility. Colored or textured surfaces can be effective in these situations. A clear stop bar should also be used with advisory signage, to discourage motorists from blocking the track.

Signal Cycles

- Avoid permissive left turns on busy parallel roads and sidepath crossings. Use a protected left-turn cycle with a sidepath-oriented bicycle/pedestrian signal, giving a red signal to the sidepath user when left turns are permitted.
- Prohibit right turns on red at intersections with a major sidepath crossing.

Sidepath Advisory Sign. Variation of the MUTCD's Railroad Advance Warning Sign, modified as a sidepath advisory. This sign should be used on both sides of a road with sidepaths. This installation is on Speer Boulevard in Denver, advising of the parallel Cherry Creek Trail. Florida DOT advises a similar sign.

Crossing Definition Treatments. From left: StreetPrint, an imprint and coloring applied to heated asphalt paving on the New Berlin Trail near Waukesha, Wisconsin.; Colored concrete on Military Avenue in Green Bay.



A Reminder to Designers. Sources that establish detailed standards for the design of bicycle facilities include the recent Urban Bikeway Design Guide (National Association of City Transportation Officials, 2011), the Manual of Uniform Traffic Control Devices (Federal Highway Administration, 2009), and the Fourth Edition of the AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities (American Association of State Highway and Transportation Officials, 2012. Designers of facilities should use these primary sources. The guidelines and standards included in this plan are intended to provide guidance that augments these authoritative standards to specific situations within a Mason City bikeways network.

On-Street Cycle Tracks

The discussion above has focused on off-road sidepaths – paths separated from the road and usually above a curb. However, on-road cycle tracks, imported from Dutch and Danish practice, are gaining great popularity in America and can provide excellent environments for urban cycling. Features of these cycle tracks include:

- Buffering from travel lanes, usually by parking and physical space defined by paint, bollards, or median. These cycle tracks invert the typical position of parking and bike lanes, and keep the motor vehicle domain contiguous.
- One- or two-way operation. Most facilities provide one-way operation for clarity, greater pedestrian safety, and reduction of conflicts. Two-way operation is accelerating, but requires great care in design. Special signal cycles that control conflicting turns are highly advisable at major intersections. A special cycle for bicycles prevents turning cars from cutting off cyclists proceeding ahead on a green light.
- Two-way cycle tracks also work well at bridge crossings or in locations with very few traffic interruptions. An example is the controversial but very effective cycle track along Prospect Park in Brooklyn.
- Very good visibility at intersections. Parking is stopped at sufficient distance from the intersection to provide good visibility.
- Vertical separation in the buffer area. In winter climates, this can be provided by flexible bollards that are removable for winter plowing and maintenance.

Advantages of the on-street cycle track over bike lanes are elimination of conflicts between parked vehicles and cyclists, including door hazards and backing movements out of diagonal spaces. As such, on-street cycle tracks may substitute for a bike lane on a road dieted one-way street. Figure 4.12 illustrates dimensional standards for such a facility.

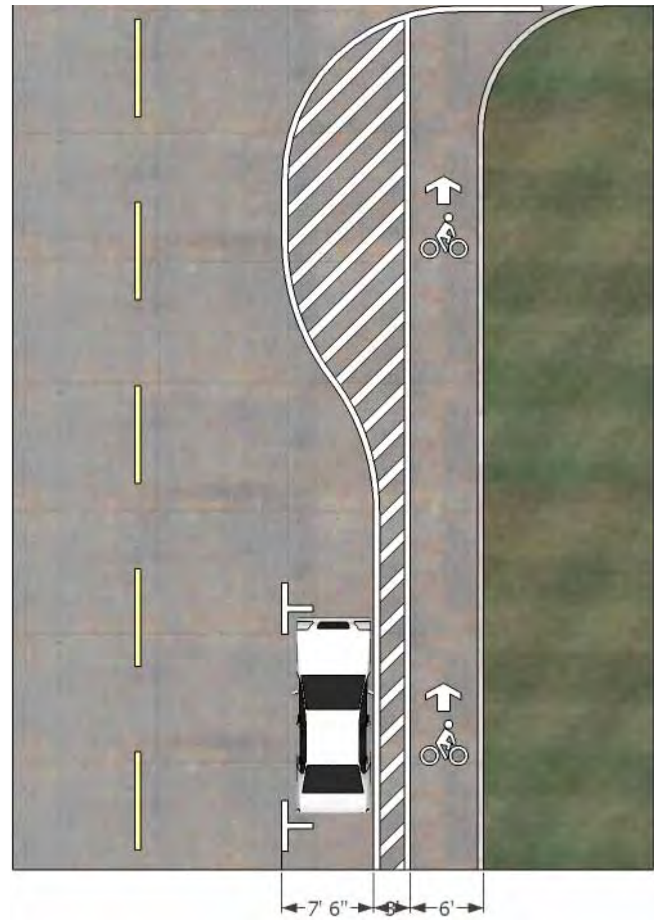


FIGURE 4.12:
ON-STREET CYCLE TRACK

This facility type inverts the usual location of parking and bicyclists, reducing conflicts between bicycle movements and adjacent parked cars.

On-Street Cycle Tracks. Clockwise from top left: Two-way cycle track along Prospect Park in Brooklyn; crossing treatment on Dearborn Street in Chicago, also applicable to sidepaths; flexible bollards used in buffers in Chicago; 2nd Avenue in Manhattan; 9th Avenue in Manhattan, the nation's first true cycle track project.

MULTI-USE TRAILS

Multi-use trails are important and popular resources for Mason City's residents and visitors, and should be fundamental parts of a bicycle and pedestrian transportation network. Trail-related projects include improvements to venerable assets like the Willow Creek Trail and development of new trails with demonstrable transportation benefits.

Trails with different functions. The NIACC Trail (left), provides a key (and very pleasant) transportation link to the college campus. However, it is disconnected from the rest of the system, limiting its utility. Above: Portions of the Willow Creek Trail provide a beautiful experience, but its discontinuities prevent it from meeting its full potential.

The Mason City Bikeways system, and its pedestrian network, will make extensive use of multi-use trails on separated rights-of-way. The City's existing trails should have important transportation functions, serving both utilitarian and recreational trips. Anticipated trail projects fit within three categories:

- Improvements to existing trails. The heavily-used trail system has several problems that need attention, particularly on older segments along the Willow Creek system. These important trails are often disorienting and hard to understand or use.
- New trail segments to connect to on-street routes. These relatively short, strategic links tie the system together. An important example of this the link under the 12th Street NW overpass that provides safe access between northside neighborhoods and Monroe Park and the rest of the bike/pedestrian system.
- Major new trails that will become major transportation corridors.

Individual trail projects are discussed in detail in the route by route analysis in the following chapter.

Design Guidelines for Multi-Use Trails

Standards for multi-use trail construction are established through past experience in the city, and contemporary practices are reflected in recent trail design, such as newer segments of the East Park Trail. Many of these guidelines are included in this part of the bikeways plan, along with others that reflect contemporary practice.

ADA/AASHTO Compliance

Trails should comply with American Association of Street and Highway Transportation Officials (AASHTO) standards

Filling gaps. A short pathway link on city property under the 12th Street overpass can provide major returns by linking the north and south sides of 12th Street together and provide much safer access to schools, parks, and Downtown.

FIGURE 4.13: **ATTRIBUTES OF TRAIL SURFACES**

SURFACE	ADVANTAGES	DISADVANTAGES
Soil Cement	Natural materials, more durable than soil, low cost, relatively smooth surface	Uneven wear, erodible, difficulty in achieving correct mix.
Granular Stone	Natural material, firm and smooth surface, moderate cost, multiple use	Erodible in storms, needs regular maintenance to maintain surface, discourages on-line skaters and some wheeled users
Asphalt	Hard surface, smooth with low resistance, stable, low maintenance when properly installed, multiple use	Relatively high installation cost, requires periodic resurfacing, freeze/thaw vulnerability, petroleum based material, construction access and impact
Concrete	Hardest surface, easy to form, lowest maintenance, best cold weather surface, freeze-thaw resistance	Highest installation and repair cost, construction access and impact
Native Soil	Natural material, very low cost, low maintenance, easy for volunteers to build and maintain	Dusty, ruts, limited use, unsightly if not maintained, not accessible
Wood Chips	Natural material, good walking surface, moderate cost	Decomposes when wet, requires regular maintenance and replenishment, not accessible
Recycled Materials	Good use of materials, surface can be adequate	High cost, uncertain performance

and Uniform Federal Accessibility Standards and the "Americans with Disabilities Act Accessibility Guidelines."

Materials

Figure 4.13 reviews attributes of various trail surface materials. Many of the city's urban trails are asphalt-surfaced. Asphalt provides an excellent surface when new and is somewhat less expensive than concrete. Concrete is often thought to provide a more durable, longer-lived surfaces. Without prescribing specific regional standards, AASHTO 2012 recommends a six inch minimum depth, including both surface and base courses, over a compacted subgrade. A stable sub-base is especially important to the durability of both materials. This is especially important around drainageways, where stream banks tend to slough off and produce serious cracking and deterioration. Expansion joints on concrete trails should be used to provide room for movement and saw-cut contraction joints should be used to control cracking.

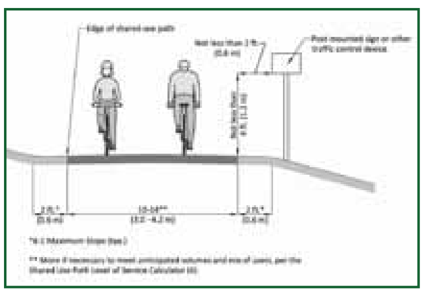
Trail Width and Clearances

- The accepted minimum width for two-way trails is 10 feet. Eight feet may be adequate for secondary segments in areas with severe right-of-way limits. However, eight feet width does not safely accommodate passing of or by users who require greater width than narrow profile road bicycles, including in-line skaters, bicyclists with child trailers, and recumbents.

- A two-foot minimum shoulder (3-5 feet is more desirable) with a maximum 6:1 cross-slope should be provided as a recovery zone adjacent to trails.

Asphalt surfacing. The recent eastern extension of the Trolley Trail illustrates Mason City's current paving standard.

Underpasses on Willow Creek Trail. These tight, steep and sometimes off-putting underpasses on the Trail pose problems for trail users. Retrofits include an easing of the grade, lighting, and widening.



Source: *AASHTO 2012*

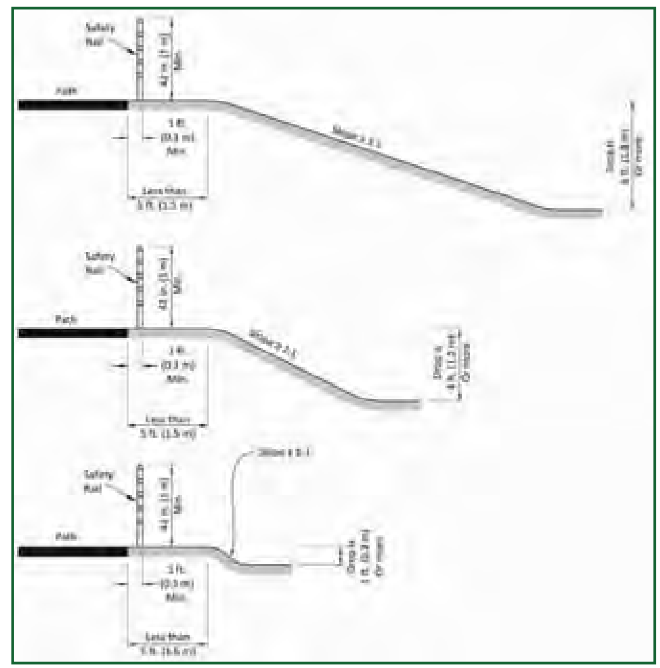
- Signs or other traffic control or information devices should be at least two feet from the edge of the trail surface. The bottom edge of any sign should be at least 4 feet from the grade of the trail surface.
- A soft surfaced two-foot extension to a paved trail can improve conditions for walkers and runners because of its resilience and lower impact.
- Minimum vertical clearance for trails is 8 feet; 10 feet is recommended unless clearance is limited. When conditions, like the height of a culvert or bottom of a bridge structure, further limits clearance, cyclists must be advised to walk bicycles.

Grades and Grade Changes

Most grades on Mason City's trail system are relatively easy, but there are some specific problem areas, most notably on underpasses and access points on the Willow Creek Trail. Recommended maximum grades for multi-use trails are 5% for any distance, 8.3% for distances up to 200 feet, and 10% for distances up to 30 feet (bicycles only).

- Grades over 5% must include landings and handrails compliant with the Americans with Disabilities Act.
- Ramps, bridges, and landings adjacent to abrupt grade changes must include 42-inch handrails, designed to meet AASHTO recommendations. Ramp surfaces should be slip-resistant.
- When underpasses require slopes over 5%, consider an alternate accessible route with reduced grades if possible, even if this route requires a grade crossing.
- Warning signs for trail users should be used on grades approaching 5% and greater.

FIGURE 4.14:
RAILINGS AND TRAIL SEPARATIONS FROM SLOPES



Source: *AASHTO 2012*

- AASHTO recommends avoiding grades less than 0.5% because of ponding problems.

Subsurface and Drainage

- Typically use a 4 to 8-inch compacted, smooth, and level subsurface. Individual conditions may require special design.
- Trail cross-section should provide adequate cross-drainage and minimize debris deposited by runoff. Typically, this involves a cross slope between 1% and 2%.
- When trails are adjacent to or cut into a bank, design should catch drainage on the uphill side of the trail to prevent slope erosion and deposits of mud or dirt across the trail.

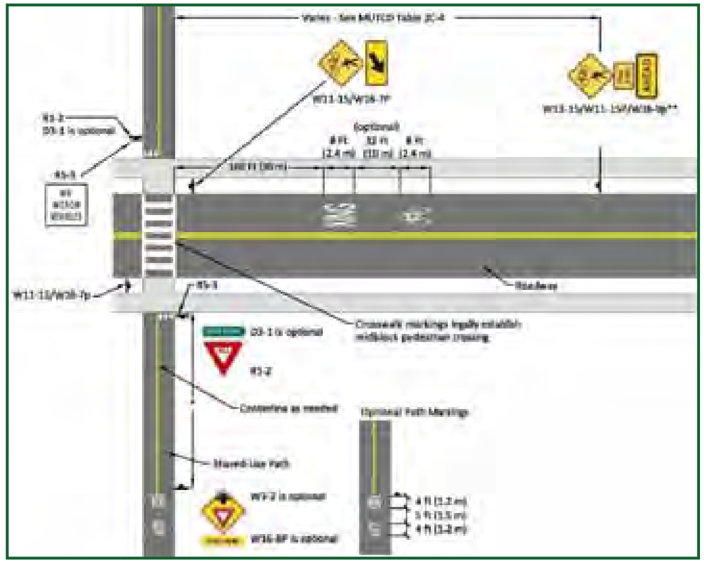
Intersection Design

- Design speed of 20 mph, with horizontal and vertical geometrics and stopping sight distances consistent with AASHTO 2010 standards, as published.
- In most cases, trail traffic will be subordinate to motor vehicles on intersecting roads. Figure 4.15 illustrates crossing treatments at mid-block intersections.
- Align or widen trail at railroad intersections to permit perpendicular crossing of tracks.

Crosswalk Delineation

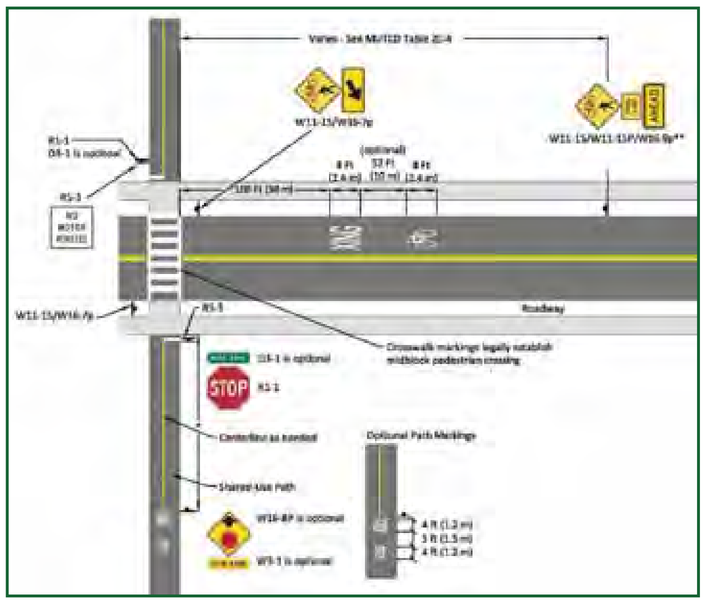
- The crossing surface should clearly delineate the trail right-of-way.
- Trail crossings should be delineated with standard pavement markings, such as the “ladder” or “zebra”

FIGURE 4.15:
INTERSECTION DESIGNS AND SIGNAGE FOR TRAIL/ROAD INTERSECTIONS



* Advance warning signs and solid centerline striping should be placed at the required stopping sight distance from the roadway edge but not less than 50 feet (15m).

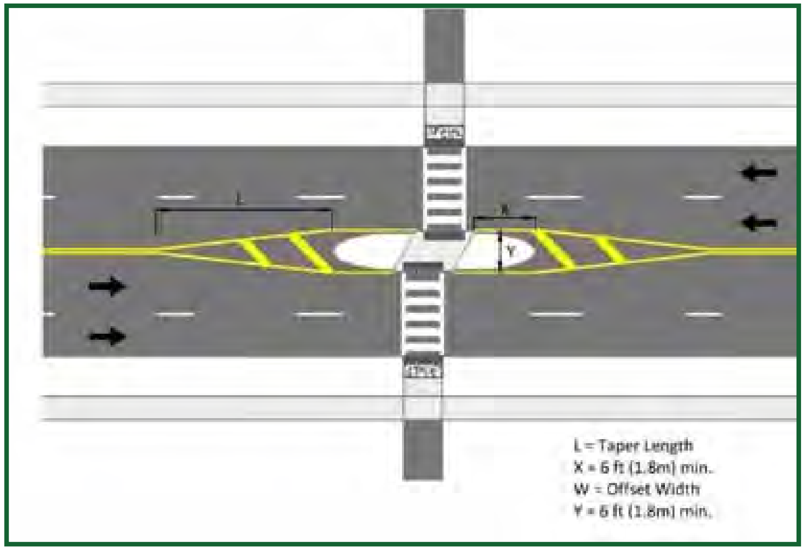
**W11 series sign is required, supplemental plaques are optional

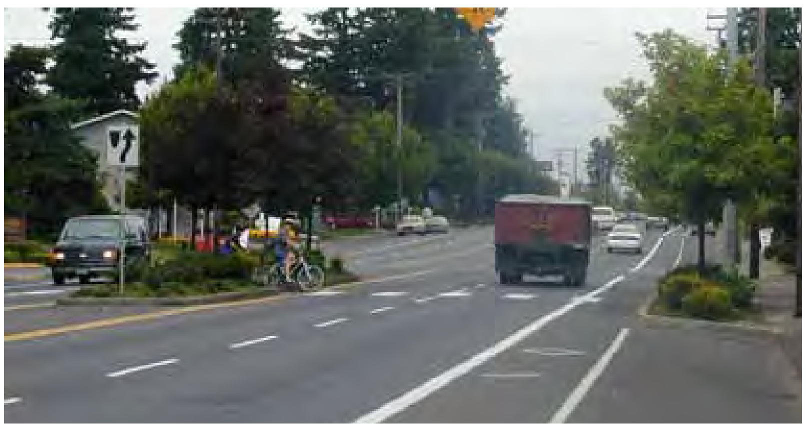


* Advance warning signs and solid centerline striping should be placed at the required stopping sight distance from the roadway edge but not less than 50 feet (15m).

**W11 series sign is required, supplemental plaques are optional

Source: *AASHTO 2012*





Midblock Refuge Medians. A crossing median provides refuge to trail users at mid-block crossings, reducing the distance that pedestrians and cyclists are exposed to traffic.

Contemporary trail crossing. This crossing of a major arterial includes a refuge median, defined crosswalk, effective warning signage, and the consultant's bike.

patterns. Another option is providing a contrasting surface that clearly defines the trail domain. These may include the use of stamped concrete, colored concrete, or pavement marking or patterning products such as StreetPrint or others.

- At midblock crossings of multi-lane roads, refuge medians should be used to reduce the distance that trail users must negotiate at one time.

Curb Cuts and Trail Access Points

- Avoid the use of bollards or obstacles at grade-level intersections unless operations prove they are needed. If necessary, use entrances with a median separating directional movements in place of bollards. Medians should be placed about 25 feet in from the edge of the roadway to permit space for cyclists to clear the intersection before slowing.

- When bollards or gateway barriers are used, provide a minimum opening of five feet, adequate to permit adequate clearance for all bicycles. Avoid poorly marked cross barriers that can create hazards for entering bicyclists, particularly in conditions of darkness.

- The bottom of the curb cut should match the gutter grade and have a minimal lip or bump at the seam. Truncated domes should be used to alert visually impaired users to the street crossing.

- The bottom width of the curb cut should be full width of the intersecting trail.

Signage

- Provide regulatory and warning signs consistent with the 2009 Edition of the Manual of Uniform Traffic Control Devices (MUTCD).

- Standard trail crossings signs, typically a bicycle in a diamond, should always be used to alert motorists of the trail crossing. See Figure 4.15 for suggested sign placement.

Traffic Control

- Right-of-way should be clearly established. Ordinarily, the trail will be stopped with right-of-way preference given defensively to the motorist.

- Controls for pedestrian signals should be easily accessible to trail users and should not require cyclists to dismount or move out of their normal path.

- New crossing technologies such as the hybrid beacon apply well to trail crossings.

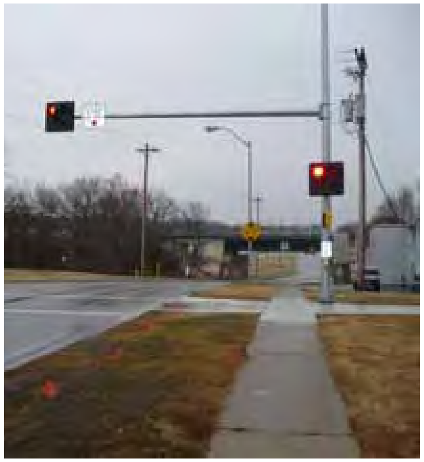
Design for Maintenance

- Provide adequate turning radii and trailhead access to maintenance and emergency vehicles.

Information and Support Facilities

- Establish a consistent informational sign system that includes a Mason City Bikeways logo, an identifying trail name, trail maps at regular intervals, mileage markers for reference and locating emergency situations, directional signage to destinations, and safety rules and advisories.

- Provide periodic minor rest stops, including benches, shaded areas, picnic areas, and informational signing. Ensure reasonable access to water, restrooms, and shelter.



Hybrid Beacon. The hybrid beacon (or HAWK signal) functions somewhat like school bus warning signals. It is dark when not in use. When actuated by a pedestrian, a flashing and then solid yellow light warns motorists to slow; a solid red light paired with a walk signal stops traffic and gives the right-of-way to the pedestrian. Users report a high degree of motorist compliance and a positive effect on pedestrian safety.

Identification signage. Entrance identification and advisory signage at the entrances to trails. Right top: Bismarck, ND; below: Yankton, SD.

Infrastructure Design Applied to the Network

Figure 4.16 on the facing page applies the trail design types to the entire Mason City system, showing the extent of different types of facilities, with the system map reproduced above for reference. The tables and maps in the next chapter detail each individual route and its specific features.

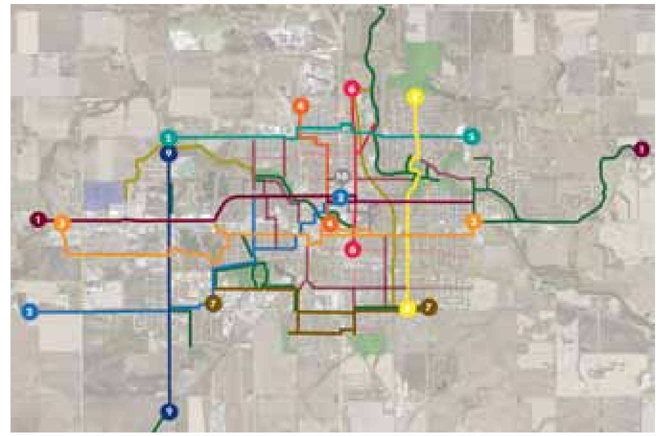
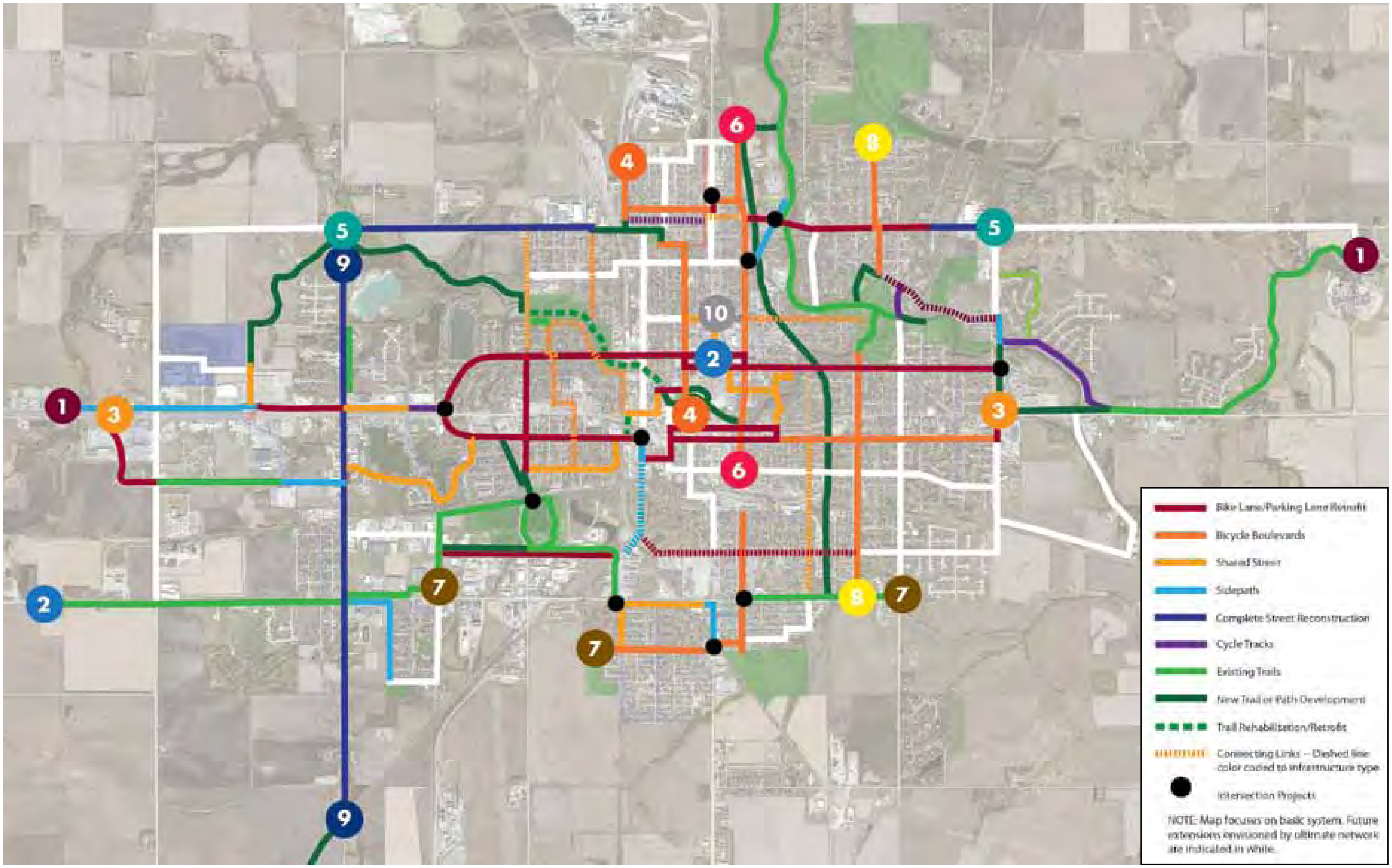


FIGURE 4.16:
INFRASTRUCTURE DESIGN APPLIED TO THE NETWORK



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CHAPTER 5
ROUTE DETAILS AND SEQUENCING

THIS CHAPTER CONSIDERS each of the ten potential routes in the proposed Mason City bikeways system in detail and also presents a development plan for the trail system. It provides guidance on the specific design of each significant segment of each route. Finally, it presents methods for staging the system over time.

The detailed presentation of each route includes a strip map that illustrates each street or pathway segment, key destinations along the way, and intersecting bikeway routes. The strip map is similar to maps used to illustrate transit lines, individualizing each line for clarity. The strip maps are keyed to the functional categories of each segment, as discussed in Chapter Three. The maps are divided into keyed segments, corresponding to key dividing points, milestones, or changes in infrastructure treatment. The number key for each segment corresponds to a row in the accompanying table.

The tables display:

- **The endpoints and length of each segment.**
- **The nature of the existing facility.** Street types reflect the typology discussed in Chapter One. Information also includes number of lanes and width of the street channel, using city records and plat maps, aerial photography, and field measurements.
- **The average daily traffic (ADT) on that specific segment.** In most cases, traffic volumes are from counts taken in 2009 and updated in 2012.
- **Short-term options for bikeway development.** This presents relatively low-cost ideas for adapting a segment for safer and more comfortable bicycle use, in many cases using techniques such as sharrows that raise motorists' awareness of and a greater level of security for cyclists. Short-term options also include other pavement markings such as bike lanes and striped parking lanes, and in some cases minor capital projects that fill short but important gaps or take advantage of opportunities such as planned street reconstruction projects. In many cases, the short-term option is the final state of the facility; in others, it is a useful interim measure that provides real benefits to riders.
- **Ultimate design.** This describes the best final design configuration for the segment. The ultimate design sometimes includes significant lane reconfigurations, alterations in parking patterns, or substantial capital improvements such as widening a street to include paved shoulders. However, in many cases, the ultimate design is simply a refinement or expansion of a short-term option, made more feasible as urban bicycling in Mason City becomes more established and the demand for upgraded facilities increases.

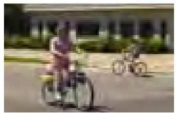
These recommendations should be refined further as individual projects are implemented. However, they provide a starting point for the more detailed design process, and provide guidance in determining priorities and costs of various improvements.

After presenting the details of each route, the chapter continues with a capital implementation program that includes:

- Criteria for determining priorities.
- Evaluation of segments and routes of the proposed bikeways system based on their relative ease of development.
- An implementation sequence of the system, assuming full development in 15 years, with three phases.
- A pilot bikeway program, that serves all parts of the city with strategic routes and path segments. This program includes statements of probable cost, based on current (late 2013) construction costs.

1 EAST-WEST BIKEWAY-NORTH ROUTE

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2009 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	4th Street SW frontage road access to Indianhead Drive	.25	4-lane divided highway with gravel shoulders, 100 feet from edge of shoulders	14,500	Sharrows on possible extension of rear access service road on south side of Highway 122.	Sidepath on north side, including bridge over creek, paved shoulders on Highway 122, or bike lanes with future frontage road extension.
2	Indianhead Drive to S Eisenhower Avenue	.25	4-lane divided highway with gravel shoulders, 100 feet from edge of shoulders	14,500	Sharrows on rear access service road on south side of Highway 122, or sharrows on future completion of north frontage road.	Sidepath on north side or bike lanes on future frontage road extension.
3	S Eisenhower Avenue to S Roosevelt Avenue	.5	4-lane divided highway with gravel shoulders, 100 feet from edge of shoulders; 31 foot frontage road from fair gate to S Roosevelt Avenue.	18,200	Sidepath on Fairgrounds property between facility gate and S Eisenhower Avenue, bike lanes with no parking on north frontage road from gate to S Roosevelt Avenue; or sharrows on south frontage road.	Sidepath on Fairgrounds property between facility gate and Eisenhower, bike lanes with no parking on north frontage road from gate to Roosevelt.



1 EAST-WEST BIKEWAY-NORTH ROUTE

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2009 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
4	S Roosevelt Avenue to S Taft Avenue	.50	4-lane divided highway with gravel shoulders; frontage road varying from 24 to 40 feet, with RTO lane at Fleet Farm access	18,200 on mainline	Sharrows on frontage road., with bike lanes at western edge where width permits.	Frontage road widening to incorporate bike lanes.
5	S Taft Avenue to S Grover Avenue	.34	4-lane divided highway without frontage road.	18,200 on mainline	Easement rights and sharrow markings along selected shopping center access drive.	Path adjacent to the south edge of shopping center parking lot, or redesign of parking lot to convert most remote parking row to a painted cycle track. All concepts require joint development with shopping center owners.
6	S Grover Avenue to Winnebago Way	.17	4-lane divided highway without frontage road. Urban section begins at Winnebago	18,200 on mainline	Conversion of southern 10 feet of parking lot to a painted cycle track, in cooperation with property owner. Parking surplus and relatively wide south driveway makes this a feasible solution.	Same.
7	Winnebago Way/1st Street NW, 4th Street SW to N Pierce Avenue	.62	2-lane urban minor arterial. 30 feet	4,640	Street reconfiguration with 10-foot travel lane, 5-foot painted shoulder functioning as bike lanes, but permitting parking. Redesign of Winnebago Way/Highway 122 intersection to provide transition to Segment 6.	Same with parking restriction on Winnebago Way/1st Street NW.
8	1st Street NW, N Pierce Avenue to Willow Creek Trail access	.41	2-lane urban minor arterial; 30 feet	4,050	Street reconfiguration with 10-foot travel lane, 5-foot painted shoulder functioning as bike lanes, but permitting parking. Improved and clarified trail access, including direct connection through Parker's Woods Park.	Same with parking restriction.
9	1st Street NW, Willow Creek to N Monroe Avenue	.20	2-lane, urban minor arterial, 30-32 feet	4,000-4,700	Street reconfiguration with 10-foot travel lane, 5-foot painted shoulder functioning as bike lanes.	Same.

1 EAST-WEST BIKEWAY-NORTH ROUTE

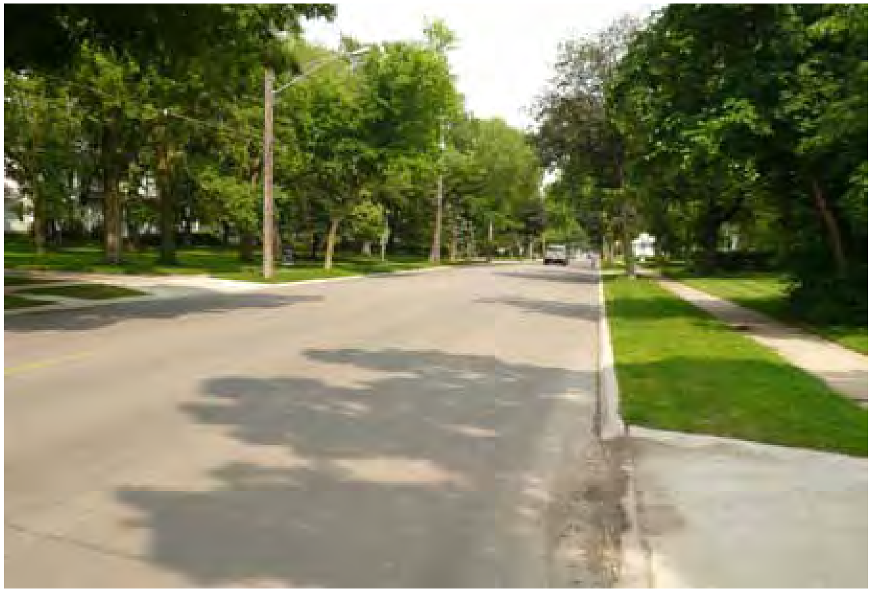
SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2009 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
10	1st Street NW, N Monroe Avenue to N Adams Avenue	.25	2-lane urban minor arterial, 40-42 feet, parking permitted on both sides	4,700	Street reconfiguration with 2 11-foot travel lanes, one-sided parking, and bike lanes. Alternative is 11-foot travel lanes with 9 foot combination bike/parking lanes	Street reconfiguration with 2 11-foot travel lanes, one-sided parking, and bike lanes.
11	1st Street NW, N Adams Avenue to N Pennsylvania Avenue	.25	2-lane downtown street with left-turn lanes at some locations 1-side diagonal parking on core blocks, 42-48 feet	3,500-4,780	Divert eastbound (EB) bike traffic to State via Adams bicycle boulevard. Convert to parallel parking on both sides with westbound (WB) bike lane.	Same
12	W State Street, N Adams Avenue to N Pennsylvania Avenue	.15	2-lane downtown street with 2-sided parallel parking; 40-42 feet	2,150-3,600	Parallel parking with EB only bike lane and sharrow in WB direction.	Same

1 EAST-WEST BIKEWAY-NORTH ROUTE

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2009 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
13	E State State, N Pennsylvania Avenue to future UP Trail overpass	.40	2-lane urban community avenue, parking typically permitted on both sides, 38-40 feet typical	3,670-6,700	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term. Improve Hampshire as the connection to the eventual UP Trail.
14	E State State, UP Trail overpass to N Illinois Avenue	.95	2-lane urban community avenue, parking typically permitted on both sides, 38-40 feet typical	4,460	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term.
15	S Illinois Avenue, E State Street to 4th Street SE	.25	3-lane urban minor arterial, 38-40 feet. No parking with continuous center left turn (LT) lane.	4,420	Sharrows in direct travel lane.	Multi-purpose path on west edge of high school campus, on or adjacent to Illinois Avenue right-of-way, complementing sharrows for on-street users.
16	4th Street SE (Highway 122), S Illinois Avenue to NIACC Trail	.61	3 to 4-lane highway, 50-60 feet with high speed traffic	9,700	Multi-purpose path along south edge of the high school campus, transitioning into walk on north side of Winnebago River bridge. Connection to NIACC Trail	Same
17	NIACC Trail	2.20	Multi-purpose path to community college campus	NA	Incorporate into East-West bikeway with identification and wayfinding signage.	Same

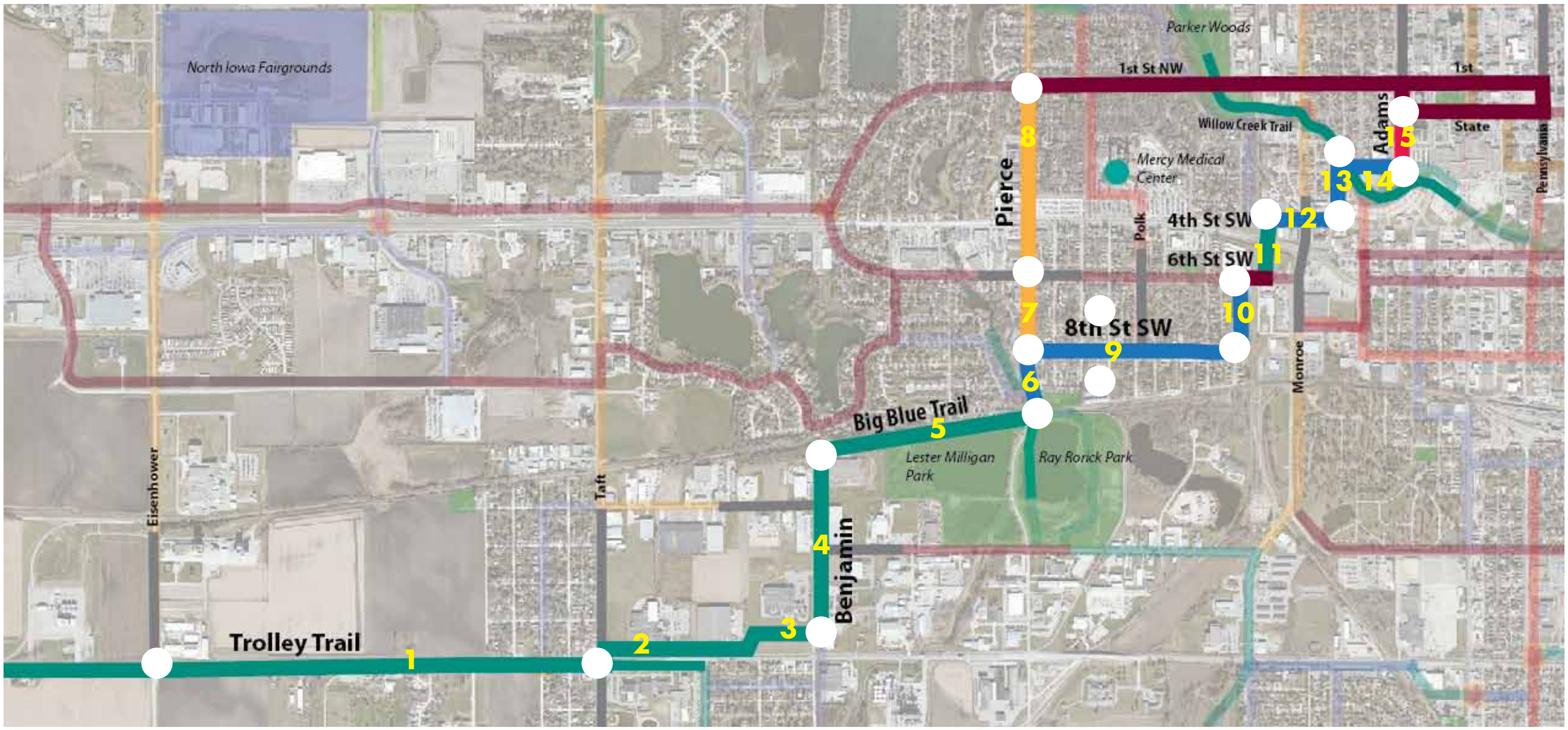
Bike lane on First Street NW.

Parking lot bike path. Cycle track connecting Winnebago Way with major retailing along Highway 122 uses a disused area on the edge of the K-Mart parking lot.



State Street options. Top: Existing State Street. Bottom left: Striped parking lanes and sharrows provide a proven design that has no impact on existing, two-sided parking. Bottom right: Restricting parking to one side of the street provides space for bike lanes.

2 TROLLEY TRAIL TO TOWN BIKEWAY

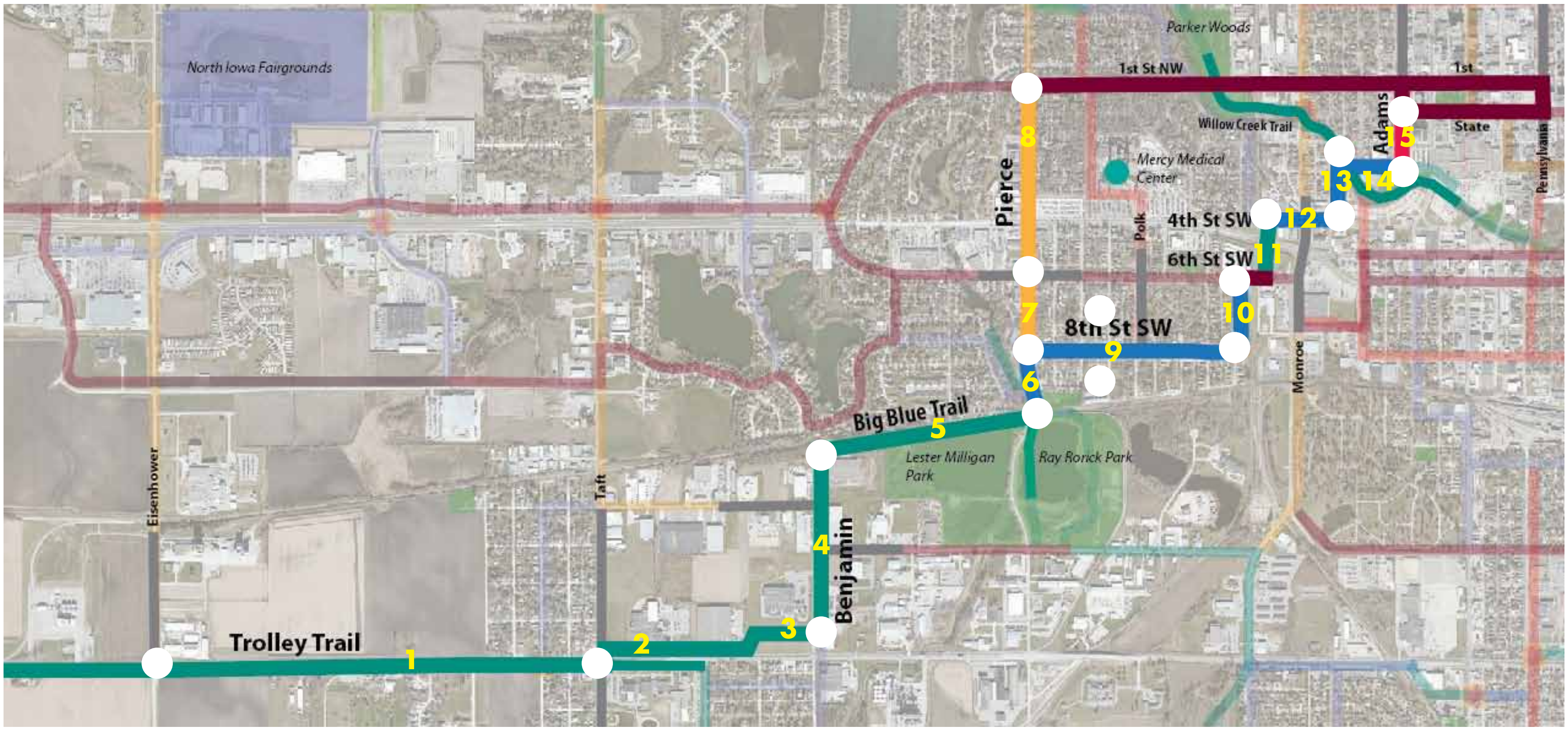


- Multi-use trails/paths
- Primary trail connections
- Cross-City Corridors
- Complete Streets
- Bicycle Boulevards
- Historic/Cultural Paths
- Neighborhood Connectors
- New Greenway Corridors
- Existing Trail Corridors: New Extensions/Rehab
- Road Corridors: Capital Investments

2 TROLLEY TRAIL TO TOWN BIKEWAY

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	Trolley Trail, city limits to S Taft Avenue	1.5	Existing paved trail along 19th Street SW.	NA	Marked crossing and bike crossing caution signs at S Harding Avenue intersection.	Same
2	S Taft Avenue crossing and Trolley Trail extension, S Taft Avenue to S Benjamin Avenue	.54	Existing paved trail	NA	NA	NA
3	S Benjamin Avenue crossing	NA	NA	4,500 on Benjamin	Marked crossing and painted refuge area across S Benjamin Avenue; bike crossing caution signs oriented to S Benjamin Avenue.	Same
4	S Benjamin Avenue sidepath, 19th Street SW to Big Blue Trail	.40	NA	4,560 on Benjamin	Paint path on edge of industrial parking lot to beginning of dedicated sidepath; paint crossings of path at 15th Street SW and driveways. Install bike crossing caution facing westbound (WB) 15th Street SW.	Same
5	Big Blue Trail, S Benjamin Avenue to S Pierce Avenue	.52	NA	NA	Upgrade crosswalk markings and bike crossing cautionary signage at Pierce Street crossing.	Same with exploration of path crossing over railroad at Garfield or into Meadowbrook greenway.
6	S Pierce Avenue, Big Blue Trail to 8th Street SW	.14	4-lane urban arterial, no parking, 48 feet	4,750	Sharrows on outer lanes for more experienced rides, direction of others to 6-foot eastside sidewalk.	Widen eastside sidepath to 10 feet. Add west side sidepath from Big Blue Trail and build trail bridge over Cheslea Creek to Meadowbrook greenway, with new path through greenway to 6th Street.
7	S Pierce Avenue, 8th Street SW to 6th Street SW	.18	2-lane urban arterial, parking on both sides, 41 feet, bike route designation	4,750	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term.
8	S Pierce Avenue, 6th Street SW to 1st Street NW	.44	2-lane urban arterial, parking on both sides, 41 feet; turn lane at 4th Avenue	4,200	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term.
9	8th Street SW, S Pierce Avenue to S Jackson Avenue	.46	2-lane local, unrestricted parking, 30 feet	<1,000	Sharrows	Same

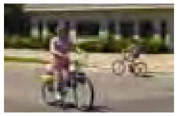
2 TROLLEY TRAIL TO TOWN BIKEWAY



- Multi-use trails/paths
- Primary trail connections
- Cross-City Corridors
- Complete Streets
- Bicycle Boulevards
- Historic/Cultural Paths
- Neighborhood Connectors
- New Greenway Corridors
- Existing Trail Corridors: New Extensions/Rehab
- Road Corridors: Capital Investments

2 TROLLEY TRAIL TO TOWN BIKEWAY

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
10	S Jackson Avenue, 8th Street SW to 6th Street SW	.18	2-lane local, unrestricted parking, 30 feet	<1,000	Sharrows, with route continuing on 6th Street SW to path	Same
11	Path and pedestrian bridge, 6th Street SW to 4th Street SW	.12	7-10 foot unpaved trail, paved bridge crossing	NA	Marked crossing from EB 6th Street SW to northbound (NB) path	Widen and pave path to 10-foot standard
12	4th Street SW, path landing to S Madison Avenue	.15	2-lane local commercial, parking both sides, 40-feet	NA	WB bike lane, EB sharrow, maintain existing parking	Same
13	S Madison Avenue, 4th Street SW to 2nd Street SW	.15	2-lane local mixed use, parking both sides, 30-feet	<1,000	Sharrow with signage. Explore option of routing through underutilized Principal parking lot on south side of Willow Creek	Same.
14	2nd Street SW, S Madison Avenue to S Adams Avenue	.15	2-lane local parking both sides, 40-42 feet		Bike lanes, maintain parking on north side only. South side parking unnecessary because of floodplain buyouts.	Same
15	S Adams Avenue (bicycle bouelvard), 2nd Street SW to W State Street	.15	2-lane local, parking both sides, 40 feet	1,350	Bike lanes, maintain parking on west side only. East side parking unnecessary because of abundant parallel off-street lots.	Same



3 EAST-WEST BIKEWAY-SOUTH ROUTE

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	Indianhead Drive, 4th Street SW to 9th Street SW	.30	2-lane collector, no parking, 30 feet	NA	Street reconfiguration with 2 10-foot travel lanes and bike lanes.	Same
2	9th Street SW, Indianhead Drive to S Eisenhower Avenue	.22	2-lane industrial/ commercial collector, no parking, 32 feet	NA	Multi-purpose sidepath on north side, continuing facility east of S Eisenhower Avenue. Redesign with connection to existing path at 9th Street SW and S Eisenhower Avenue intersection is necessary. Painted shoulders should also be installed to manage traffic speeds and provide an on-street bicycle facility.	Same
3	9th Street SW, S Eisenhower Avenue to Village Green Drive	.67	2-lane industrial collector, with northside multi-purpose path, 32 feet	NA	Existing sidepath	Same. Painted shoulders should be provided to manage traffic speeds and provide an on-street bicycle facility.

3 EAST-WEST BIKEWAY-SOUTH ROUTE

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
4	9th Street SW, Village Green Drive to S Taft Avenue	.35	2-lane industrial collector, 32 feet	NA	Multi-purpose sidepath on north side, continuing facility east from end of path at Village Green Drive.	Add painted shoulders/bike lanes to manage traffic speeds and provide an on-street bicycle facility.
5	S Taft Avenue, 9th Street SW to Briarstone Drive	.08	3-lane urban arterial, with shoulder on west side, no parking, 40 feet	9,800	Multi-purpose trail on east side of street, possibly divided into a northbound bicycle path and pedestrian track. Existing shoulder serves southbound (SB) bicycle traffic.	Same
6	Briarstone Drive, S Taft Avenue to Knollwood Lane	.43	2-lane residential collector, unrestricted parking, 31 feet	<1,000	Sharrows	Same
7	Knollwood Lane, Briarstone Drive to Springview Drive	.18	2-lane local, unrestricted parking, 30 feet	<1,000	Sharrows	Same
8	Springview Drive, Knollwood Lane to S Garfield Avenue	.34	2-lane residential collector, unrestricted parking, 32 feet	<1,000	Sharrows	Same
9	S Garfield Avenue, Springview Drive to 6th Street SW	.15	2-lane collector, unrestricted parking, 30 feet	<1,000	Sharrows	Same. Possible connection south of Springview Drive to trail at Milligan Park would be highly desirable, but requires cooperation from railroad
10	Cerro Gordo Way, 4th Street SW to S Garfield Avenue	.21	2-lane urban minor arterial, unrestricted but lightly used parking, 30 feet	4,000	Street reconfiguration with 10-foot travel lane, 5-foot painted shoulder functioning as bike lanes, but permitting parking. Link to North Route 1.	Same with parking restriction on Cerro Gordo Way, with neighborhood consultation and consent.
11	6th Street SW, S Garfield Avenue to S Pierce Avenue	.32	2-lane urban minor arterial, unrestricted but lightly used parking, 30 feet	4,360-5,600	Street reconfiguration with 10-foot travel lane, 5-foot painted shoulder functioning as bike lanes, but permitting parking.	Same with parking restriction on 6th Street SW with neighborhood consultation and consent.
12	6th Street SW, S Pierce Avenue to S Monroe Avenue	.60	2-lane community arterial, unrestricted parking, 40 feet	5,100	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term.

3 EAST-WEST BIKEWAY-SOUTH ROUTE

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
13	S Monroe Avenue, 6th Street SW to 7th Street SW	.10	4-lane urban arterial, no parking, 40-42 feet	10,400	Pedestrian/bike lane crossing at 6th to multi-purpose path on east side of street.	Same
14	7th Street SW, S Monroe Avenue to S Jefferson Avenue	.15	2-lane local, unrestricted but unnecessary parking, 30 feet	NA	Street reconfiguration with 2 10-foot travel lanes and bike lanes, with transition from S Monroe Avenue path to on-street travel	Same
15	S Jefferson Avenue, 7th Street SW to 5th Street SW	.17	2-lane local, unrestricted parking, 40-45 feet	NA	On-street parking on east side of street, 11-foot travel lanes and bike lanes	Same

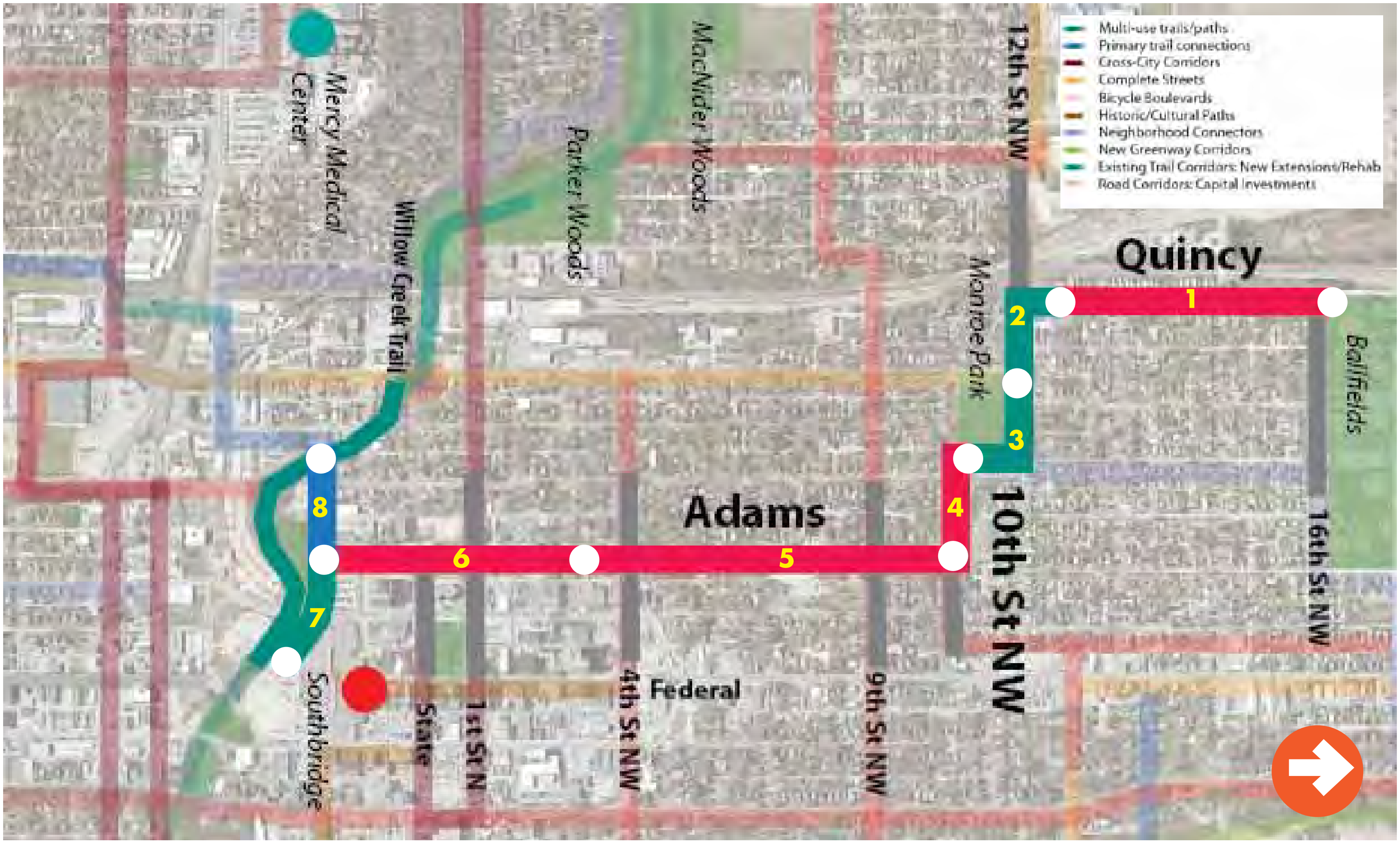
3 EAST-WEST BIKEWAY-SOUTH ROUTE

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
16	6th Street S, S Jefferson Avenue to S Connecticut Avenue	.56	2-lane one-way EB urban arterial (Highway 122), one-side parking, 40 feet	6,100-6,700	Anticipated street reconstruction project will reconfigure to include EB bike lane	State
17	5th Street S, S Jefferson Avenue to S Connecticut Avenue	.56	2-lane one-way WB urban arterial (Highway 122), one-side parking, 30-40 feet	6,500-7,700	Anticipated street reconstruction project will reconfigure to include WB bike lane	Same
18	S Connecticut Avenue, 5th Street SE to 6th Street SE	.10	2-lane residential, unrestricted parking, 32 feet	NA	Sharrows to transition WB route from 6th to 5th. Bike lane in NB/WB direction.	Same
19	6th Street SE, S Connecticut Avenue to South Carolina Avenue/ UP Trail	.28	2-lane local, unrestricted parking, 32 feet to Carolina, 24 feet Carolina to RR	<1,000	Sharrows. Continuation east of South Carolina Avenue requires railroad agreement and probable disposition of current right of way (ROW).	Same
20	6th Street Crossing of UP ROW.	.02	Disused railroad corridor, proposed as major north-south trail	NA	Paved 10-foot path across corridor.	Eventual development of rail corridor as UP Trail, a major proposal in this plan.
21	6th Street SE, UP corridor to S Illinois Avenue	.90	2-lane residential collector, unrestricted parking, variable widths from 24 to 32 feet	NA	Sharrows with signage	Same.
22	S Illinois Avenue, 6th Street SE to 4th Street SE	.13	3-lane urban arterial, no parking in this area, 42-45 feet	NA, est @ 4,000	Lane reconfiguration to 3 11+ foot lanes with standard 5-foot bike lanes.	Same. Connection to sidepath along high school campus.

Bike lanes along 6th Street SW.

Improved path leading to the trail overpass of Highway 122 west of Monroe Avenue.

4 QUINCY-ADAMS BICYCLE BOULEVARD



4 QUINCY-ADAMS BICYCLE BOULEVARD

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	N Quincy Avenue, 17th Street NW to 12th Street NW	.47	2-lane local residential, parking on both sides, 29-30 feet	280	Sharrows with signs	Same
2	12th Street NW Overpass Area	.21	New route under 12th Street overpass; 12th Street: 3-lane urban arterial on overpass, 48-feet, narrowing to 2-lanes, 30 feet east of Monroe	9,400	New path from N Quincy Avenue terminus under 12th Street NW overpass and on public ROW on south side of 12th Street NW	Same
3	Monroe Park	.23	Park land	NA	Path along north and east edges of park	Same
4	10th Street NW, Monroe Park to N Adams Avenue	.09	2-lane local residential, parking both sides, 30 feet	<1,000	Sharrows, including transition from park path to street at mid block alley	Same
5	N Adams Avenue, 10th Street NW to 3rd Street NW	.41	2-lane neighborhood collector, parking both sides, 30 feet	<1,000	Sharrows with bicycle boulevard signage	Same. Work with neighborhood to determine need for traffic calming techniques
6	Adams Avenue, 3rd Street NW to 2nd Street SW	.38	2-lane local, parking both sides, 40-42 feet	1,350	SB bike lane, NB sharrow with signs, maintaining parking on both sides.	Bike lanes, restricting parking to west side only.
7	Willow Creek, S Adams Avenue to Southbridge ped bridge	.12	2nd Street: 2-lane collector, 30 feet; Southbridge parking lot east of Washington Avenue	NA	Bike lanes with no parking on 2nd Street SW between S Adams Avenue and S Washington Avenue. Continuation through marked route within Southbridge parking lot to bridge	Improved Willow Creek Trail, with defined S Washington Avenue crossing, and minor redesigning of Southbridge lot to bridge, using south 10 feet of lot as a cycle track.
8	2nd Street SW, S Adams Avenue to Willow Creek (shared with route 2)	.12	2-lane local parking both sides, 40-42 feet	NA	Bike lanes, maintain parking on north side only. South side parking unnecessary because of floodplain buyouts.	Same

5 NORTH CROSSTOWN BIKEWAY

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	12th Street NW, N Taft Avenue to N Harrison Avenue	1.34	N Taft Avenue to N Pierce Avenue: 2-lane rural section arterial, 24 feet. N Pierce Avenue to N Harrison Avenue: 3-lane arterial, 45 feet, no parking permitted	8,000-11,300	10-foot sidepath on north side. Traffic volumes and speeds are too high for on-street solutions within existing channel.	Same. Eventual widening of 12th Street NW to match section east of N Pierce Avenue. Sidepath should be set back sufficiently to avoid disturbance during road reconstruction. Eventual extension to N Eisenhower Avenue.
2	N Harrison Avenue/N Van Buren Avenue Crossing	.05	3-lane urban arterial crossing, 45 feet	9,400	Marked crossing to south side at N Harrison Avenue with bike/pedestrian crossing caution signs	Upgraded crossing with flashing or hybrid beacons. Crossing may be shifted to midblock location between N Van Buren Avenue and N Harrison Avenue.

5 NORTH CROSSTOWN BIKEWAY

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
3	12th Street NW overpass	.14	3-lane railroad overpass, 42 feet with 7.5 foot sidepath on south side	9,400	Use of existing sidepath to east landing.	Same, with widening of existing sidewalk from N Harrison Avenue to west overpass approach
4	12th Street NW Path and N Quincy Avenue Connection	.21	New route under 12th Street NW viaduct; 12th Street NW: 3-lane urban arterial on viaduct, 45-feet,	9,400	New 10-foot path from east overpass landing backtracking parallel to and under overpass to N Quincy Avenue. Common segment with Route 4.	Same
5	Path link under overpass	.04	NA	NA	New 10-foot path under overpass to south terminus of N Quincy Avenue. Common segment with Route 4	Same
6	N Quincy Avenue, 12th Street NW to 14th Street NW	.09	2-lane local residential, parking on both sides, 29-30 feet	280	Sharrows with signs. Common segment with Route 4	Same.
7	14th Street NW, N Quincy Avenue to N Federal Avenue	.48	2-lane local residential, parking on both sides, 40 feet	<1,000 est	Sharrows with bicycle boulevard signs	Same
8	12th Street NW Alley Alternate, N Quincy Avenue to N Washington Avenue	.42	Gravel alley, 16 feet	NA	Work with residents to determine feasibility of using as a more direct alternative to 14th Street NW	Surfacing and conversion as a shared use alley and cycle track. Cycle track located in center of alley.
9	N Federal Avenue jogged crossing at N Federal Avenue	.02	4-lane urban arterial, no parking, 48 feet	7,500	Sharrows and chevron guidance on outer lanes, using offset intersection design guideline	Bike lanes with lane diet of North Federal to 3-lanes.

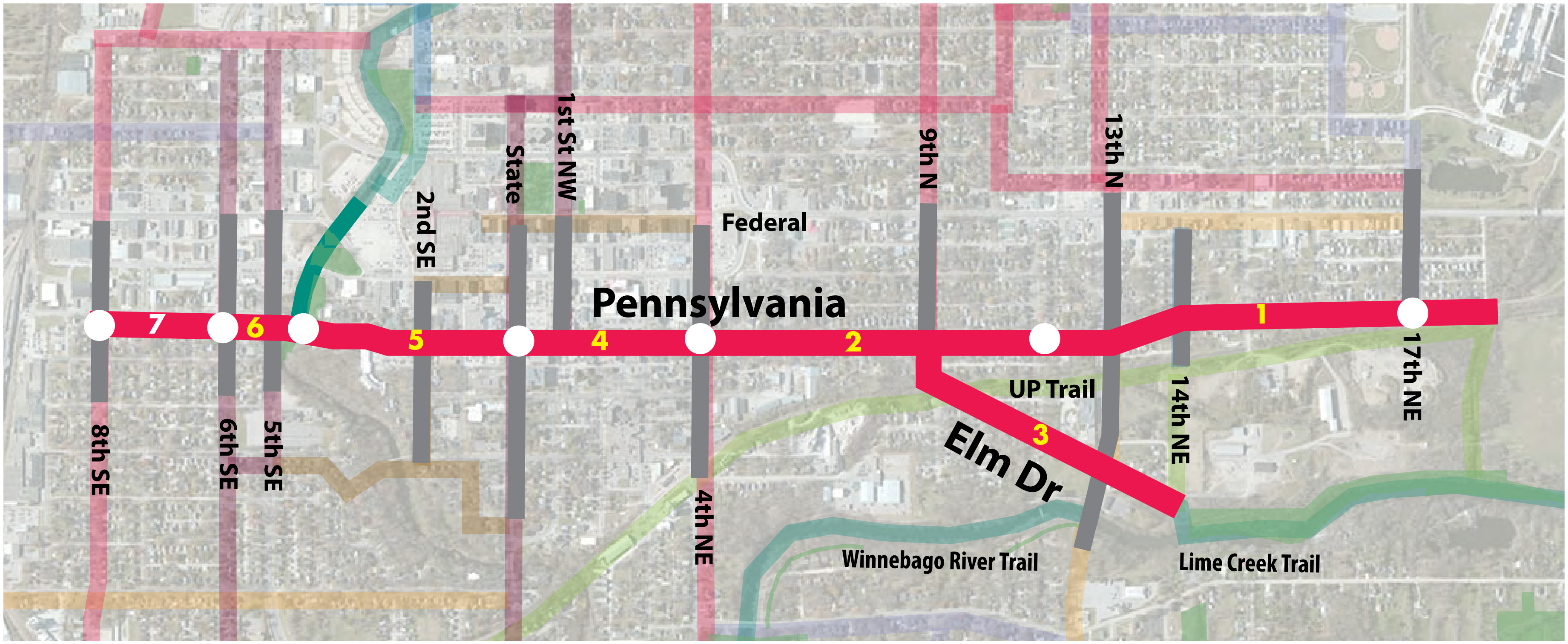
5 NORTH CROSSTOWN BIKEWAY

- Multi-use trails/paths
- Primary trail connections
- Cross-City Corridors
- Complete Streets
- Bicycle Boulevards
- Historic/Cultural Paths
- Neighborhood Connectors
- New Greenway Corridors
- Existing Trail Corridors: New Extensions/Rehab
- Road Corridors: Capital Investments

5 NORTH CROSSTOWN BIKEWAY

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
10	N Washington Avenue/ 13th Street NE crossing at N Federal Avenue (alternate concept)	.09	2-lane local, parking both sides, 30 feet. 13th Street block is currently gravel.		NA	Paving of 13th Street NE between N Federal Avenue and N Washington Avenue. Sharrows on local streets. At intersections, minor realignment of radius for bikes only to provide a direct path across N Federal Avenue. Advisory bike lane to provide direct connection at intersection.
11	14th Street NE, N Federal Avenue to N Pennsylvania Avenue	.13	2-lane local, parking both sides, 25 feet.		Sharrows	Same
12	13th Street NE, N Federal Avenue to N Pennsylvania Avenue (alternate concept)	.17	2-lane local with confluence with 12th Street occurring at midblock. Parking both sides, 42 feet		NA	Redesign of intersection to define 12th/13th as the primary route, with 13th forming the third leg of a T-intersection. Parking retained on "local" leg of 13th Street, and prohibited on arterial (east side). Sharrows west of the intersection, with bike lanes on the east side.
13	N Pennsylvania Avenue, 14th Street NE to 12th Street NE	.10	2-lane neighborhood collector, parking both sides, 31 feet	1,500	Sharrows with bicycle boulevard signage	Same. Work with neighborhood to determine need for traffic calming techniques
14	12th Street NE, N Pennsylvania Avenue to Winnebago River bridge	.27	2-lane urban arterial, no parking, 37-42 feet. 8-foot sidepath on south side to Elm Drive	8.800-9,700	2-12 foot lanes with bike lanes, no parking along arterial segment. Marked trail crossing connecting Winnebago and Lime Creek Trails across 12th.	Same with possible pedestrian signalization at trail crossing. Crossing may incorporate a crossing median for traffic calming. Access to UP High Line Trail.
15	12th Street NE, River to N Rhode Island Avenue	.44	2-lane urban arterial, parking not restricted but not commonly used, 36 feet	9,700	2-11-foot lanes, bike lanes,	Same
16	12th Street NE, N Rhode Island Avenue to N Illinois Avenue	.65	2-lane urban arterial, parking not restricted but not commonly used, 36 feet to N Kentucky Avenue, 48 feet to N Ohio Avenue; 24-foot rural section to N Illinois Avenue	4,350	2-11-foot lanes, bike lanes to Ohio	Same; extension east to N Illinois Avenue and N California Avenue as a sidepath, probably in concert with compete street reconstruction of rural section of 12th Street NE

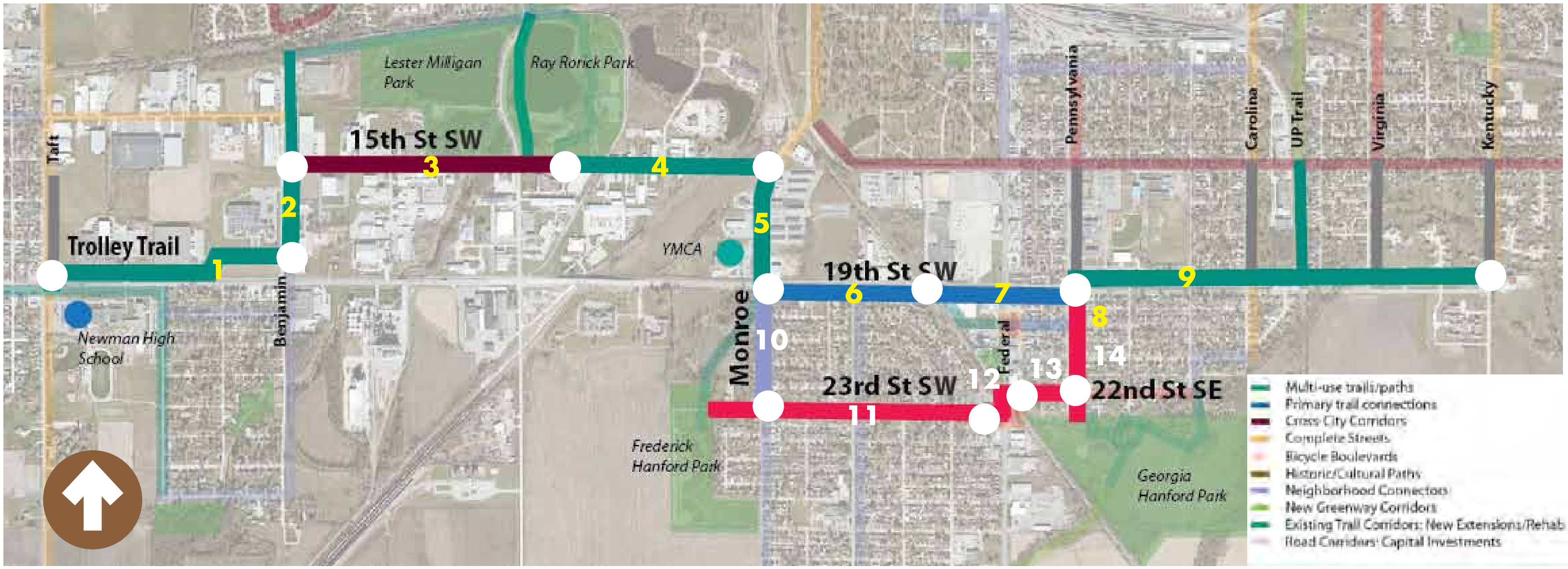
6 PENNSYLVANIA BICYCLE BOULEVARD



6 PENNSYLVANIA BICYCLE BOULEVARD

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	N Pennsylvania Avenue, 17th Street NE to 12th Street NE	.47	2-lane neighborhood collector, parking both sides, 31 feet	1,500	Sharrows with bicycle boulevard signage	Same. Work with neighborhood to determine need for traffic calming techniques
2	N Pennsylvania Avenue, 12th Street NE to 4th Street NE	.51	2-lane urban avenue, parking typically permitted on both sides, 40 feet typical	1,590-3,700	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term.
3	9th Street NE/Elm Drive, N Pennsylvania Avenue to Lime Creek Trailhead	.52	2-lane collector, parking permitted on both sides, 30-31 feet typical	NA	Sharrows with signs	Sidepath on east side of Elm Drive between 9th Street and trailhead. Marked conflict zone at Connecticut Avenue intersection, and marked trail crossing with caution signs at NE 12th Street intersection. Maintain sharrows for on-street users.
4	Pennsylvania Avenue, 4th Street NE to 1st Street SE	.32	2-lane downtown avenue, parking both sides, 48-50 feet	4,520	10.5-11 foot travel lanes with bike lanes in both directions	Same
5	Pennsylvania Avenue, E State Street to 5th Street SE	.27	2-lane urban avenue, parking typically permitted on both sides, 40-42 feet	4,000	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes. Convert to bike lanes with no parking over Willow Creek bridge with SB bike lane to left of RTO lane at Highway 122 intersection.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term.
6	5th Street SE to 6th Street SE	.06	2-lane urban avenue, no parking, left-turn lanes at 5th and 6th intersections, 40-42 feet	4,000	Bike lanes converting to shared direct at intersections	Same
7	6th Street SE to 8th Street SE	.17	2-lane urban avenue, parking typically permitted on both sides, 40-42 feet	4,000	2 11-foot travel lanes with 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.	Convert to one-sided parking with bike lanes in both directions. With neighborhood support, this could be advanced to the short-term.

7 TROLLEY TRAIL EAST

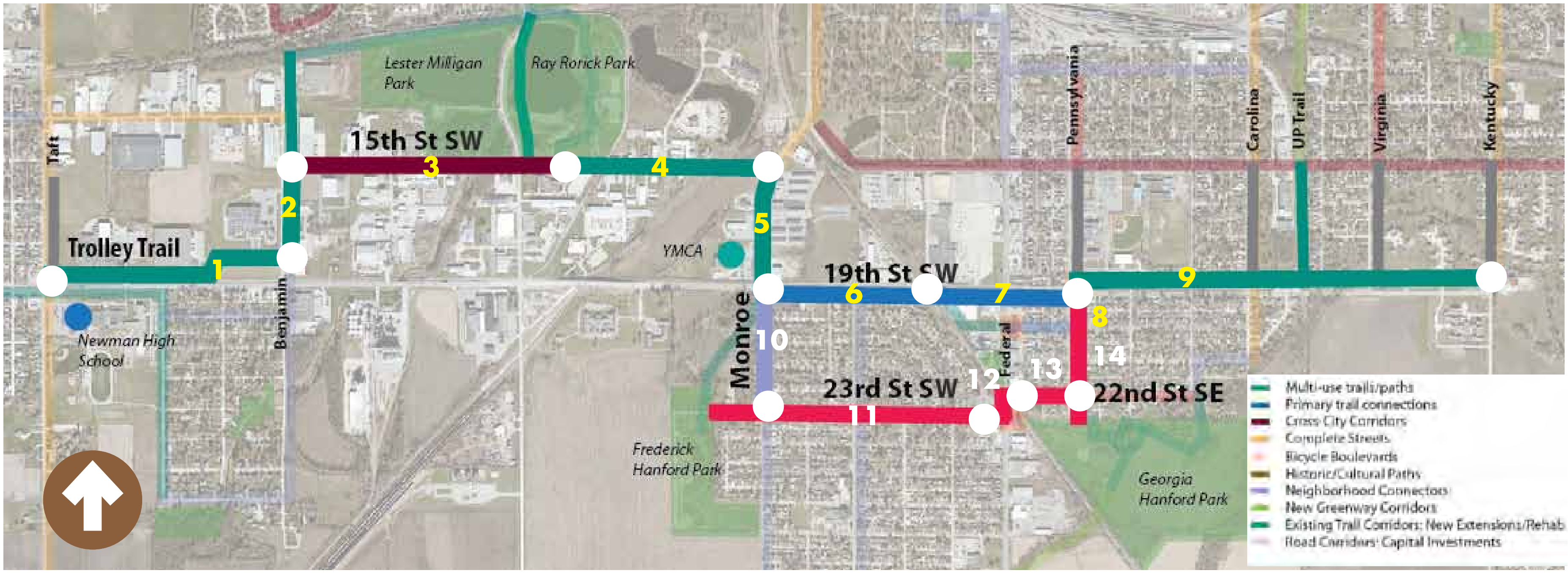


SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	Existing Trolley Trail extension, S Taft Avenue to S Benjamin Avenue	.54	Existing paved trail	NA	Same as existing	Same as existing
2	S Benjamin Avenue sidepath, 19th Street SW to 15th Street SW	.20	Existing paved sidepath	NA	Same as existing	Same as existing
3	15th Street SW, S Benjamin Avenue to Big Blue Trail	.56	2-lane minor arterial, no parking, 30 feet	6,400-9,100	Bike lanes	Same, with continuation of north side sidepath west to S Benjamin Avenue.

7 TROLLEY TRAIL EAST

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
4	15th Street SW Trail, Big Blue to S Monroe Avenue	.45	2-lane minor arterial, no parking, 30 feet; sidepath on north side	6,400-9,100	Existing sidepath	Same, with addition of 2 -11 foot lanes with 4 foot bike lane/shoulders.
5	S Monroe Avenue Trail, 15th Street SW to 19th Street SW/19th Street SW- S Monroe Avenue intersection	.24	15th: 2-lane minor arterial, no parking, 30 feet. Monroe: 3-lane urban arterial, 44 feet, no parking; Sidepath along north side of 15th and west side of Monroe Avenue.	6,000 (estimate)	Existing sidepath; bike lanes should also be extended to S Monroe Avenue	Same
6	19th Street SW Frontage/ Colonial Lane, S Monroe Avenue to UP track	.35	Local frontage road parallel to urban arterial, 30 feet, unrestricted parking; Colonial Lane is a drive aisle in a parking lot for a city building	NA	Utilize new crosswalks to direct bicycles to the frontage road; sharrows on frontage road, with designated cycle track painted on north edge of reconfigured parking lot.	Same
7	19th Street S, UP to S Pennsylvania Avenue	.29	4-lane urban arterial,	6,700	Other than existing sidewalk, no practical option	Sidepath development on south side of 19th S, coordinated with adjacent industry, and pedestrian/bike crossing of S Federal Avenue.
8	19th Street SE- S Pennsylvania Avenue intersection/S Pennsylvania Avenue to Roosevelt Elementary	.005	Signalized intersection	NA	EB to NB: Crosswalk and path landing on southeast corner of intersection; path crossing on east side of S Pennsylvania Avenue with curve radius to eastbound trail or continuation north across tracks and bike path transition to northbound S Pennsylvania Avenue. SB to WB: Crosswalk of 19th Street SE to WB sidepath and trail	Same.
9	East Trolley Trail, S Pennsylvania Avenue to S Kentucky Avenue	.87	Existing paved sidepath on north side of street		Same as existing	Same as existing

7 TROLLEY TRAIL EAST

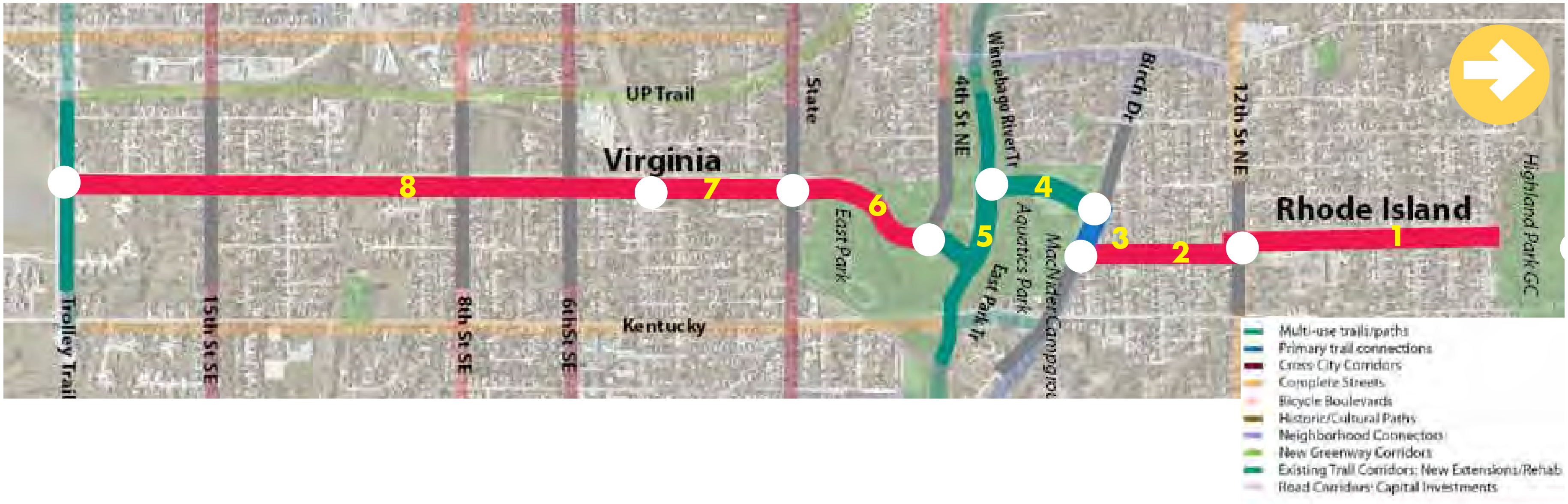


SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
10	S Monroe Avenue, 19th Street SW to 23rd Street SW	.26	2-lane neighborhood collector, parking both sides, 30 feet	3,580 to 23rd; 450 south	Sharrows with signage	Same. Possible future development of a path from 19th Street SW- S Monroe Avenue to Frederick Hanford Park with development of vacant parcel.
11	23rd Street SW, Frederick Hanford Park to S Federal Avenue	.61	2-lane neighborhood collector, parking both sides, 32 feet	NA	Sharrows with bicycle boulevard signage	Same.
12	S Federal Avenue transition and crossing from 23rd Street SW to 22nd Street SE	.05	T-intersections with S Federal Avenue (US 65).	8,400	Pedestrian crossing at 23rd Street SW, with path crossing railroad at right angle, transitioning to 22nd Street SE.	Same.

7 TROLLEY TRAIL EAST

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
13	22nd Street SE, S Federal Avenue to S Georgia Avenue	.25	2-lane neighborhood collector, parking both sides, 30 feet	NA	Sharrows with bicycle boulevard signage.	Same.
14	S Pennsylvania Avenue, 22nd Street SE to 19th Street SE	.26	2-lane neighborhood collector, parking both sides, 30 feet	NA	Sharrows with bicycle boulevard signage.	Same.

8 RHODE ISLAND-VIRGINIA BICYCLE BOULEVARD

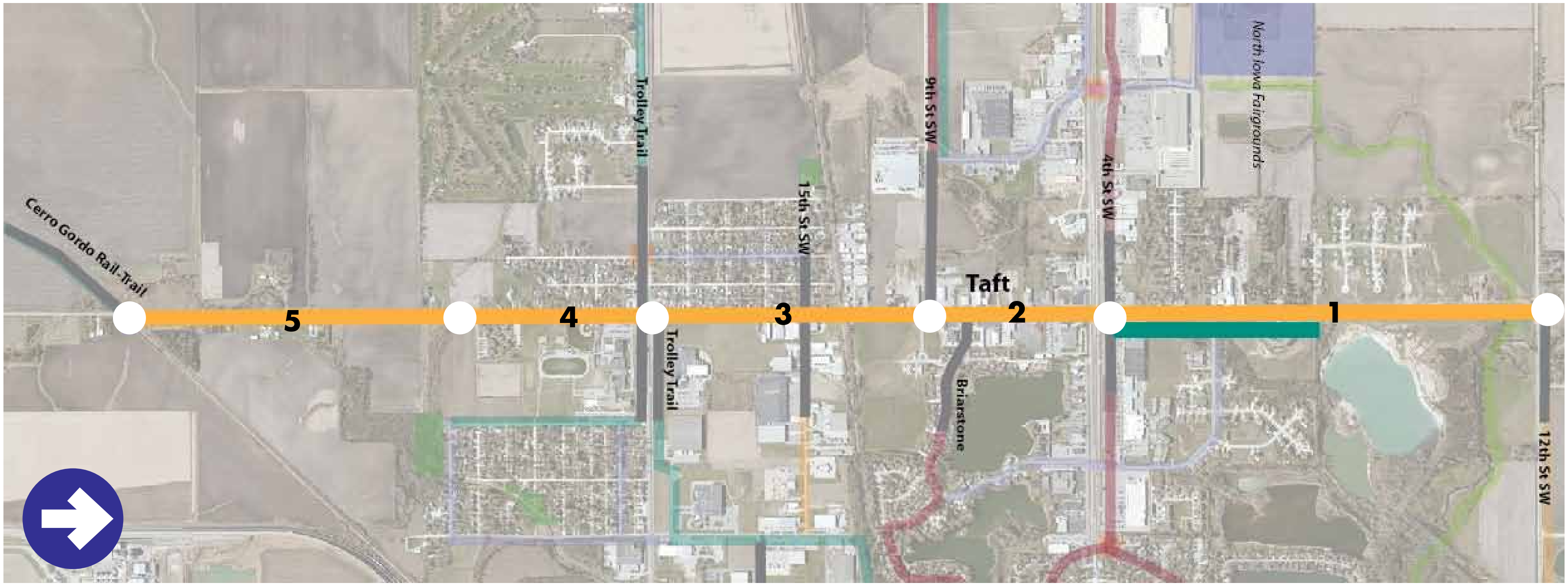


SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	N Rhode Island Avenue, 17th Street NE to 12th Street NE	.43	2-lane neighborhood collector, parking both sides, 35 feet	1,500 est	Sharrows with bicycle boulevard signage. Bicycle boulevard caution signs oriented to 12th Street NE. Special intersection markings to negotiate N Rhode Island Avenue offset at 12th Street NE.	Same. If needed, 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.
2	N Rhode Island Avenue, 12th Street NE to Birch Drive	.28	2-lane neighborhood collector, parking both sides, 30 feet	1,000 est	Sharrows with signs	Same
3	Birch Drive/MacNider Campground, N Rhode Island Avenue to N Virginia Avenue	.11	2-lane collector with open space on both sides, 32 feet.	1,450	Bike lanes on Birch Drive block from N Rhode Island Avenue to park entrance.	Same

8 RHODE ISLAND-VIRGINIA BICYCLE BOULEVARD

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
4	N Virginia Avenue/ MacNider Campground Trail to river pedestrian bridge	.20	Park: Park circulation road, 22 feet	NA	Sharrows on park drive to trailhead.	Redesign of parking lot to provide a one-way circulation loop with one-way bike lane, with direct bike access to and from trailhead.
5	East Park Trails to 4th Street NE	.17	Existing paved trail	NA	Existing trail	Same
6	N Virginia Avenue, 4th Street NE to E State Street	.31	2-lane park road, 25 feet, with parallel sidepath on the east side for most of the segment.	<1,000	Sharrows on N Virgina Avenue for on-street users. Maintain route on existing path.	Same, with widening of path to 8 or 10-foot standard for the entire distance to 4th Street. Define transition to on-street route south of 4th Street NE.
7	S Virginia Avenue, State Street to 4th Street SE	.26	2-lane collector, unrestricted parking, 35-36 feet	2,010 at 4th Street SE	Sharrows with bicycle boulevard signage. Bicycle boulevard caution signs oriented to 4th Street SE. Bike track alignment guidance to approach a right angle crossing of railroad track.	Same. If needed, 8-foot striped parking lanes that combine parking and some shared bike lane function. Sharrows in travel lanes.
8	S Virginia Avenue, 4th Street SE to Trolley Trail Extension (19th Street SE)	1.00	2-lane collector, unrestricted parking, 31 feet	370-1,340	Sharrows with bicycle boulevard signage.	Same

9 TAFT BIKEWAY



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9 TAFT BIKEWAY

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	12th Street NW to 4th Street SW	1.0	Rural highway section, 24 feet, widening to four lane near 4th Street NW intersection; sidepath on east side south of 4th Street NW	4,350	Continue sidepath north to 12th Street NW and south to 4th Street SW. Improve pedestrian/ path crossing at 4th Street SW with clearly demarcated crosspath and use of median as pedestrian refuge	Same
2	4th Street SW to 9th Street SW	.37	3-lane urban arterial with 4-foot shoulder on west side	9,800	Use of west side shoulder as a NB bike lane. Continuation of sidepath on east side as a multi-purpose use facility, Alternative is minor widening to provide a NB shoulder/bike lane.	Same. Ultimate design should provide both on-street bike lanes/shoulders and an east side sidepath.
3	9th Street SW to 19th Street SW	.63	3-lane urban arterial with 4-foot shoulder on west side	9,800	Use of west side shoulder as a NB bike lane. Continuation of sidepath on east side as a multi-purpose use facility, Alternative is minor widening to provide a NB shoulder/bike lane.	Same. Ultimate design should provide both on-street bike lanes/shoulders and an east side sidepath.
4	19th Street SW to 25th Street SW	.37	2-lane minor arterial, parking shoulders on both sides, 36 feet	5,100 at 19th Street, NA south	Stripe parking shoulders as joint use parking and bike lane. Extend sidewalk north from 25th Street SW to 19th Street SW on edge of Newman campus.	Same. Upgrade east side path to sidepath standards
5	25th Street SE to proposed Thornton rail trail	.80	2-lane rural section county road, 22-feet	NA	Sharrows and share the road signage	Pave shoulders as bike lanes, or extend sidepath south on east side of road to rail-trail.

10 CULTURE TRAIL

10 CULTURE TRAIL

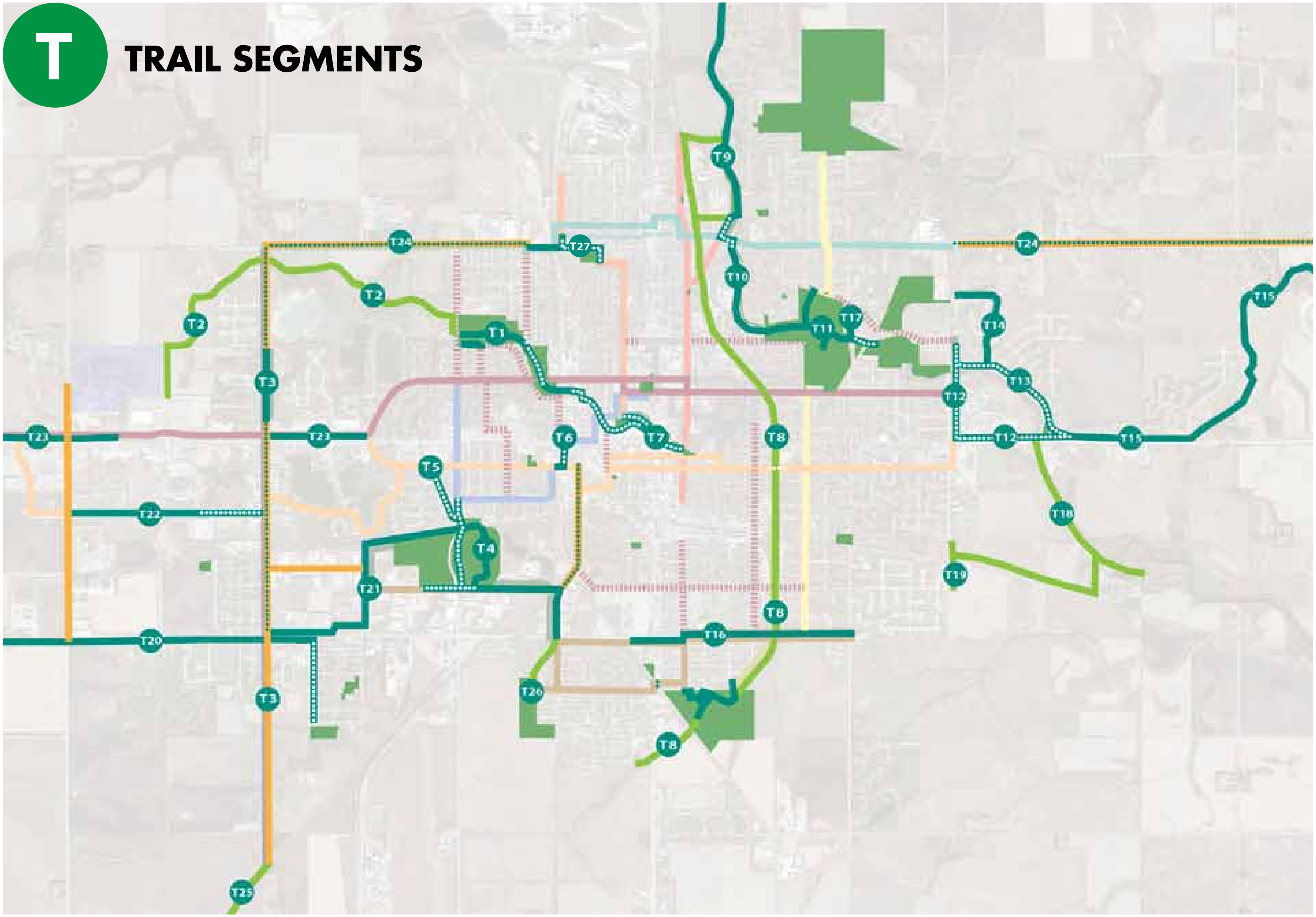
SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
1	N Pennsylvania Avenue, 4th Street NE to 1st Street NE	.20	2-lane downtown avenue, parking both sides, 48-50 feet	4,520	10.5-11 foot travel lanes with bike lanes in both directions (Same as Route 6). Special Culture Path signage (Route 6)	Same
2	1st Street NE, N Pennsylvania Avenue to E State Street	.32	2-lane downtown avenue and collector, parking both sides, 40 feet	3,500	Striped parking lane with sharrows; or bike lane in preferred (clockwise) EB direction. Special Culture Path signage	Investigate one-sided parking with bike lanes
3	E State Street, N Pennsylvania Avenue to N Connecticut Avenue	.16	2-lane downtown street with 2-sided parallel parking; 40-42 feet	2,150-3,600	Parallel parking with EB only bike lane and sharrow in WB direction. (Route 1)	Same
4	Rock Glen/1st Street SE/S Connecticut Avenue, E State Street to 2nd Street SE	.20	2-lane local streets, parking both sides, 24-32 feet; part of existing bike route	NA	Sharrows with special Culture Path signage.	Same
5	2nd Street SE, S Connecticut Avenue to S Delaware Avenue	.25	2-lane downtown avenue, parking both sides, 30-40 feet; part of existing bike route	NA	Sharrows with special Culture Path signage.	Same
6	S Delaware Avenue, 2nd Street SE to E State Street	.13	2-lane downtown arterial, currently carrying US 65 NB. parking both sides, 42 feet	7,000	NB sharrow with special Culture Path signage. Counterflow uses S Pennsylvania Avenue (Route 6)	With results of US 65 traffic study, may go to a two-way local street with US 65 routed on Washington Avenue. If so, bike lane in preferred (NB) direction, sharrow in counterflow
7	E State Street, S Delaware Avenue to S Federal Avenue	.08	2-lane downtown street with 2-sided parallel parking; 40-42 feet	2,150-3,600	Parallel parking with EB only bike lane and sharrow in WB direction. (Route 1)	Same

10 CULTURE TRAIL

10 CULTURE TRAIL

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE AND WIDTH	2012 ADT	SHORT TERM OPTIONS	ULTIMATE DESIGN
8	N Federal Avenue, State Street to 4th Street N	.18	Downtown Main Street with recent streetscape reconstruction; parking both sides, diagonal on east side of Central Park block; 42-55 feet	NA	Sharrows with special Culture Path signage.	Same
9	4th Street NE, N Federal Avenue to N Pennsylvania Avenue	.25	Downtown collector, parking both sides, 40 feet	2,550-3,100	Striped parking lanes with sharrows. Culture Path signage.	Same
10	Meredith Willson Footbridge, 2nd Street SE to River Heights	470 feet	Iconic pedestrian bridge	NA	Culture Path signage.	Same
11	S Connecticut Avenue, E State Street to River Heights Drive	.16	2-lane local residential, parking both sides, 28 feet	NA	Sharrows with special Culture Path signage.	Same
12	River Heights Drive, S Carolina Avenue to S Connecticut Avenue	.23	2-lane local residential, parking both sides, 31 feet	NA	Sharrows with special Culture Path signage.	Same
13	S Connecticut Avenue, 4th Street SE to 6th Street SE	.13	2-lane local residential, parking both sides, 32 feet	NA	Sharrows with special Culture Path signage.	Same

T TRAIL SEGMENTS



T TRAIL SEGMENTS

TRAIL KEY	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
T1	**Willow Creek Trail**	Existing Trail from N Pierce to N Pennsylvania Avenues	MacNider Woods, Parker's Woods Park, West Park, Downtown	Upgrade of existing trails to uniform standards: 8-10 feet paving, ADA compliant access, wayfinding, and barrier-free and clearly marked street intersections.	Short to medium
T2	**Willow Creek Trail Extension**	Fairgrounds/N Roosevelt Avenue to N Pierce Avenue	MacNider Woods, West 4th commercial corridor	New trail extension connecting westside development areas and lakes to trail network	Long, depending on property ownership, available resources, and development
T3	**Taft Trail**	12th Street NW to Trolley Trail (19th Street SW)	12th Street NW industries, West 4th commercial corridor, Trolley Trail	Continuation of sidepath on east side of N Taft Avenue, possibly including on-street options with complete street development.	Medium
T4	**Big Blue Trails**	Trolley Trail at S Benjamin Avenue to YMCA	Big Blue Lake, Lester Milligan and Ray Rorick parks, YMCA	Existing trails, with upgrade of sidewalks along Pierce and 15th to sidepath standards	Existing
T5	**Meadowbrook Trail**	6th Street SW to Big Blue Trail	Willowbrook Mall, Big Blue Lake, Lester Milligan and Ray Rorick parks	New trail along flood buyout area on east side of Meadowbrook Drive, including trail bridge to Pierce over Cheslea Creek	Long
T6	**4th Street Overpass**	4th Street SW to 6th Street SW	Major component of cross city corridor	Upgrade to trail standards	Short
T7	**Downtown Connectors**	Willow Creek Trail to Southbridge Mall	Southbridge, overall system	Redesign of underutilized parking lot on south side of creek to include a cycle track, with upgraded connection to south landing of pedestrian bridge to Southbridge Mall; trail bridge extending Adams Avenue bikeway across creek.	Short for parking lot reconfiguration; long for Adams Avenue bridge
T8	**Union Pacific High Line**	18th Street NE to Georgia Hanford Park	Dog Park, Lime Creek Trailhead, Gooch Park, Senior Center, East Park, Georgia Hanford Park	Opportunity for signature greenway feature, with unique park development opportunities on elevated former railyards on grade separations; extensive neighborhood access opportunities.	Short for beginning acquisition process; medium to long for phased development.

T TRAIL SEGMENTS

TRAIL KEY	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
T9	**Lime Creek Trail**	Lime Creek Nature Center to 13th Street NE	Winnebago River greenway, Lime Creek Nature Center	Minor upgrade to existing trail where repairs are needed, improved trailhead and off-road path link to Winnebago River Trail	Medium
T10	**Winnebago River Trail**	13th Street NE to East Park	Lime Creek Trailhead, Winnebago River Greenway, East Park	Upgrades to existing trail, including wayfinding and informational signage and repairs as required	Short to medium
T11	**East Park Trails**	N Carolina Avenue to Norris Softball Complex	Winnebago River greenway, East Park, MacNider Campground, Norris Softball Complex	Extension of existing trail, with improved access to Kentucky Avenue and softball complex.	Medium
T12	**Illinois Avenue/ MCHS Pathways**	Birch Drive to NIACC Trail	East Park, MCHS campus, 4th and Illinois commercial, NIACC	Sidepaths along the west and south edges of the High School campus, linking East Park/Winnebago Trails to NIACC Trail	Short to medium
T13	**Birch Drive Trail**	N Illinois Avenue to Highway 122	East Park, NIACC	Conversion of unimproved Birch Drive to a "shared space" corridor with limited automobile use.	Medium to long
T14	**Asbury Trails**	Asbury neighborhood system	Asbury neighborhood, Asbury Park	Existing pedestrian paths	Existing
T15	**NIACC Trail**	Mason City High School to NIACC campus	MCHS campus, NIACC	Existing trail, to be enhanced with informational signage	Short

T TRAIL SEGMENTS

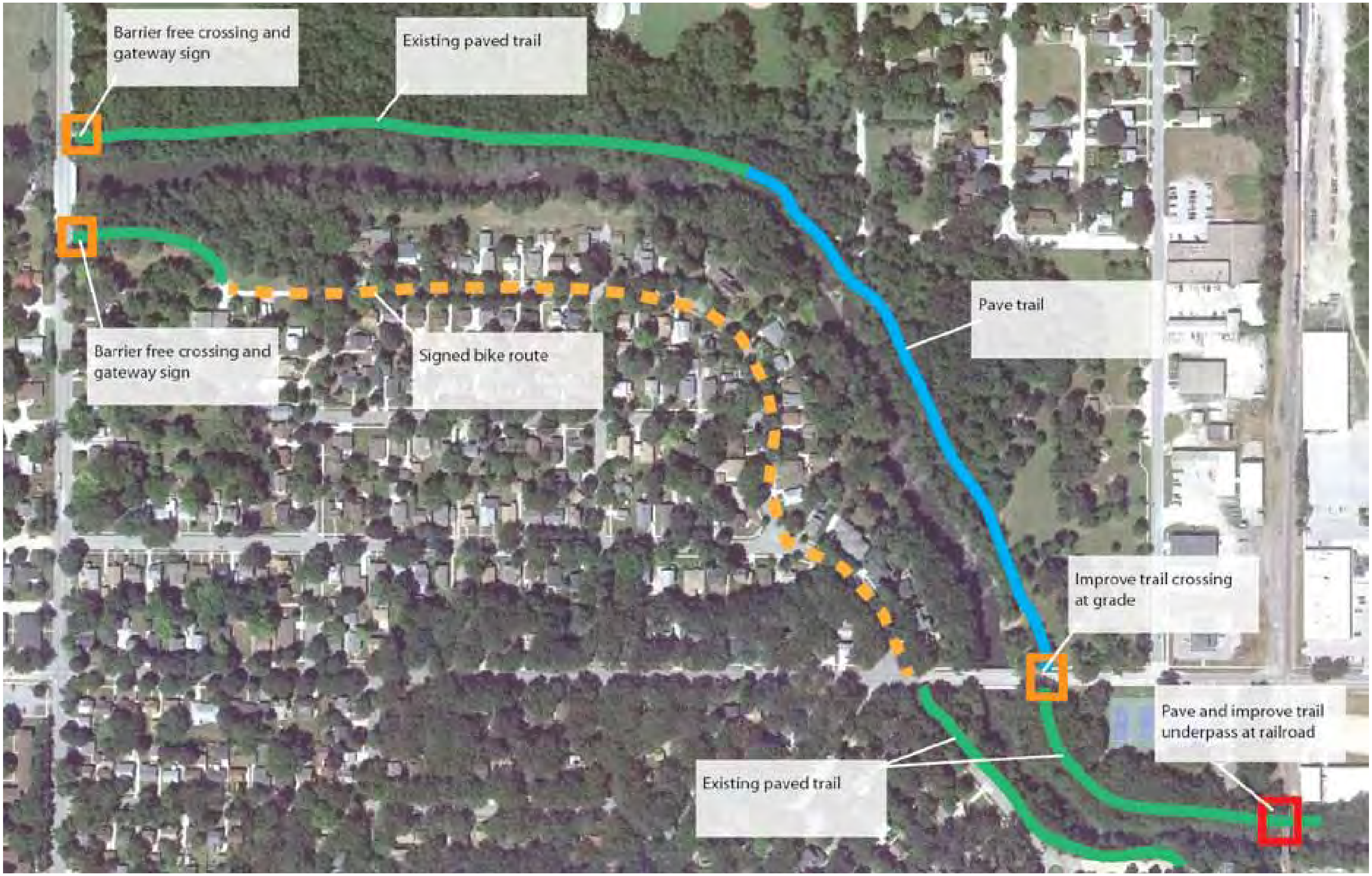
TRAIL KEY	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
T16	**Trolley Trail East**	S Pennsylvania Avenue to S Kentucky Avenue	Pennsylvania to Kentucky Avenues	Existing trail. Improvement of Pennsylvania Avenue intersection and alignment for northbound turns, informational signage	Short
T17	**Kentucky Avenue Cycle Track**	Birch Drive to East Park Trail	Birch Drive corridor, East Park	Reconfiguration to provide two-way cycle track over the Kentucky Avenue river bridge	Short to medium
T18	**South Birch Drive Trail**	MCHS campus to 9th and Illinois via Winnebago River and railroad loop	Asbury Park, Winnebago River greenway, city wastewater facility	New, primarily recreational trail loop serving scenic river corridor with access to rural roads	Long
T19	**Illinois Avenue Overpass**	9th Street SE to 15th Street SE	Path on grade separation	Sidepath on a future southeast grade separation, with possible trail extension south and east to the Trolley Trail extension at 19th and Kentucky.	Long
T20	**Trolley Trail**	19th Street SW and S Taft Avenue to Clear Lake	Clear Lake, Trolley Park, 19th Street corridor, Newman campus	Premier regional trail, with enhancements including better crosswalks, interpretive material about the Iowa Traction Railroad, wayfinding and orientation signage, some resurfacing	Continuing
T21	**Benjamin Avenue sidepath/Lester Milligan Park Trail**	Trolley Trail to Big Blue Lake	Newman campus, Lester Milligan and Ray Rorick parks, Big Blue Lake	Existing sidepath and trail, incorporated into Route 2, the Trolley Trail to Town corridor.	Existing
T22	**9th Street SW Trail**	Indianhead Drive to S Taft Avenue	Indianhead commercial area, mixed use development along 9th Street corridor	Sidepath completion, major part of the Route 3 cross-city corridor	Short

T TRAIL SEGMENTS

TRAIL KEY	NAME	ENDPOINTS	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	IMPLEMENTATION TERM
T23	**4th Street Retail Paths**	Lark Avenue to Winnebago Way	4th Street SW (Highway 122) retail corridor	Sidepaths to link sections of the north side of Highway 122 that lack frontage roads. Also includes conversion of underused areas in parking lots to bicycle and pedestrian "Tracks."	Short to S Taft Avenue; long to S Lark Avenue
T24	**12th Street Sidepaths**	N Taft Avenue to west overpass approach; N Illinois Avenue to N California Avenue	Major industries (Currie's and Kraft), NIACC, 12th Street corridor destinations	Sidepaths, most likely completed in connection with improvement of rural section roadway. N Taft Avenue to Overpass segment may advance earlier. Eventual extension to N Eisenhower Avenue.	Medium to long
T25	**Thornton Rail-Trail**	S Taft Avenue to Thornton and Belmond Iowa	On line communities	Conversion of abandoned rural rail corridor	Medium to long
T26	**Hanford Trail**	Trolley Trail/YMCA to Frederick Hanford Park	YMCA, Frederick Hanford Park	Alignment through undeveloped land, coordinated with eventual development of site.	Long
T27	**Quincy-Adams Connector**	12th Street NW - N Quincy Avenue to Monroe Park	Northside, Monroe Park. Basic part of Quincy-Adams bicycle boulevard	Path under 12th Street NW overpass, continuing on city property on south side of 12th Street NW and around park.	Short

T13 Birch Drive Shared Space Trail

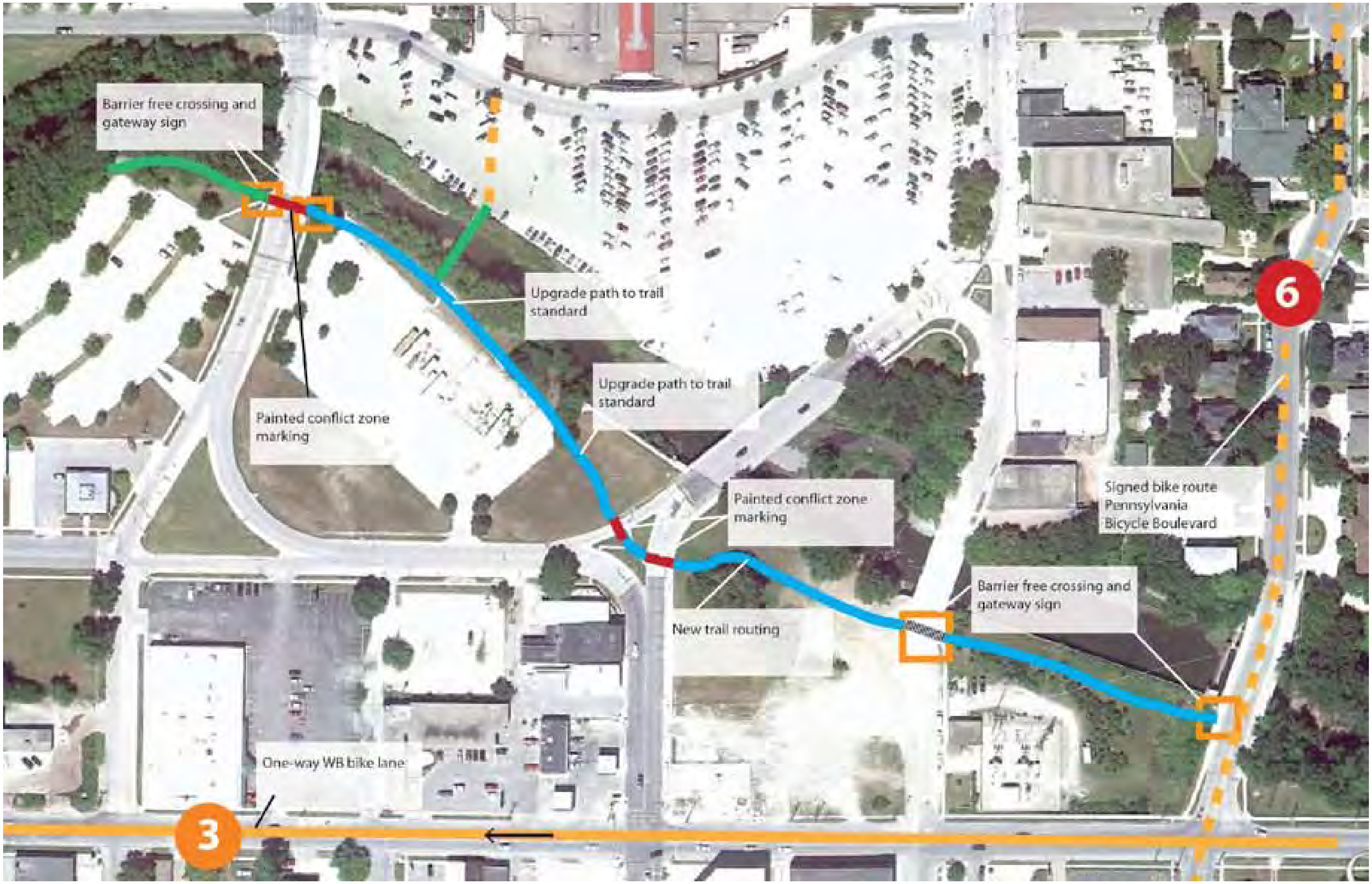
Sharing the Path. Birch Drive is a popular route connecting East Park and the NIACC Trail, but conflicts among pedestrians, bikes, and cars have hampered its level of service. The shared space concept would provide a separated path for cyclists and pedestrians within the existing roadway surface, and still provide a slow moving lane for one way automobile traffic.



T1 Willow Creek Trail Development Concepts

Willow Creek. The Willow Creek Trail looks excellent on paper but is very difficult for users to follow. Changes in surface and discontinuities create serious problems. These diagrams outline a program for rehabilitating this superb community resource.

T1 **Willow Creek Trail Development Concepts**



T7 Downtown Connectors

T8 High Line Segment Concepts

An Urban Trail. The disused Union Pacific line through the center of the city presents an opportunity for a signature project that can also generate new development around it. This project would convert a community liability into a major asset for Mason City.

T8 High Line Segment Concepts

The Beauty of Elevated Parks. The Union Pacific High Line concept provides for distinctive elevated parks at former mini-yards that cross 13th Street and 4th Street. Above are present and future elevated parks along two famous rail-trail conversions. From the top, the High Line in New York; above, the Bloomingdale Trail, now under construction in Chicago.

T8 High Line Segment Concepts

T6 4th Street Overpass

The overpass over 4th Street (Highway 122) is an integral part of the Trolley Trail to Town route. The trail concept calls for widening the relatively narrow paths that lead to the overpass.

T17 Kentucky Avenue Cycle Track

On-street bicycle trail. The Kentucky Avenue bridge over the Winnebago River is adequately wide to provide a cycle track -- an on-street buffered path – that connects the frequently used Birch Drive route to the East Park Trails.

Converting alleys. Innovative use of alleys can help to produce good bicycle and pedestrian environments. This concept illustrates bikeway shared use of an alley north of 12th Street as a way of serving a high demand corridor. Any project like this requires very close partnership with neighbors.

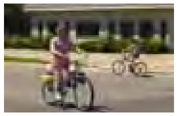
Scenes on the Trails


Willow Creek Trail


Willow Creek Trail


Winnebago River Bridge in East Park


Asbury trail network entrance on Birch Drive



PRIORITIES AND IMPLEMENTATION

The proposed Mason City bikeways network will be implemented in phases, and will almost certainly evolve over time. However, this plan establishes both an initial phase that guides activity during the next five years, and a concept for how the network emerges incrementally from that foundation. The sequencing of phases and specific routes proposed here follows these criteria and principles:

- **Response to demands.** In every phase, high priority routes should address existing demand patterns, and serve destinations that are valuable to users and appropriate endpoints for bicycle transportation. The survey results summarized in Chapter 3 provide valuable information on the importance of various destinations.

- **Route integrity.** High priority routes and projects should provide continuity between valid endpoints such as destinations and trails. When developed incrementally, routes should not leave users at loose ends.

- **Extensions of existing facilities.** Projects that make use of and extend the reach of key existing facilities that need attention, most notably the Willow Creek Trail, should have a significant priority.

- **Gaps.** Small projects that fill gaps in current facilities or tie relatively remote neighborhoods to the overall system can be especially useful at early stages n the system's development.

- **Opportunities.** The implementation sequence should take advantage of street projects such as the likely reconstruction and improvement of 12th Street NW, resurfacing and street rehabilitation projects, and other infrastructure projects. The anticipated reconstruction of the 5th and 6th streets SW pair will include bike lanes, and the 12th Street NW overpass included a walkway wide enough to accommodate both people on foot and bike.

- **Relative ease of development.** It is important that the a useful system be established relatively quickly and at comparatively low cost. Routes that require major capital cost or lead to neighborhood controversy should be deferred to later phases, when precedents are established and the network becomes part of Mason City's urban landscape.

While ease of development should not supersede other key factors, it is nevertheless a key strategic factor as Mason City begins to put its system on the ground. Projects or routes that perform well on other criteria and are relatively easy and inexpensive to achieve can provide early, substantive accomplishments that build future momentum.

Developability of routes is an important criterion in determining priorities. The initial system is designed to serve all parts of the city and provide good connectivity while minimizing large scale projects. Thus, the conceptual overall system was evaluated according to developability categories, which include:

- **Implementation without change.** These segments can be put in place with minimum change, primarily pavement markings and supporting graphics. They involve the lowest cost and least impact. Typical examples are streets with sharrows or enough width for bicycle lanes without other lane modifications.

- **Implementation with minor changes.** These segments and routes typically involve lane reconfigurations, such as narrower lanes, or parking change, such as possible limitation of parking to one side of the street. However, they do not require changes in the number of available travel lanes.

- **Major lane modifications.** These segments use existing street channels, but require major lane modifications such as road diets that reduce the number of available lanes while still remaining fully capable of accommodating current traffic volumes.

- **Minor roadway widening.** These road segments widen existing streets to provide shoulders or bicycle lanes.

- **Major roadway construction.** These projects include new streets or major reconstructions of existing streets, designed as complete streets to include bicycle and pedestrian accommodations.

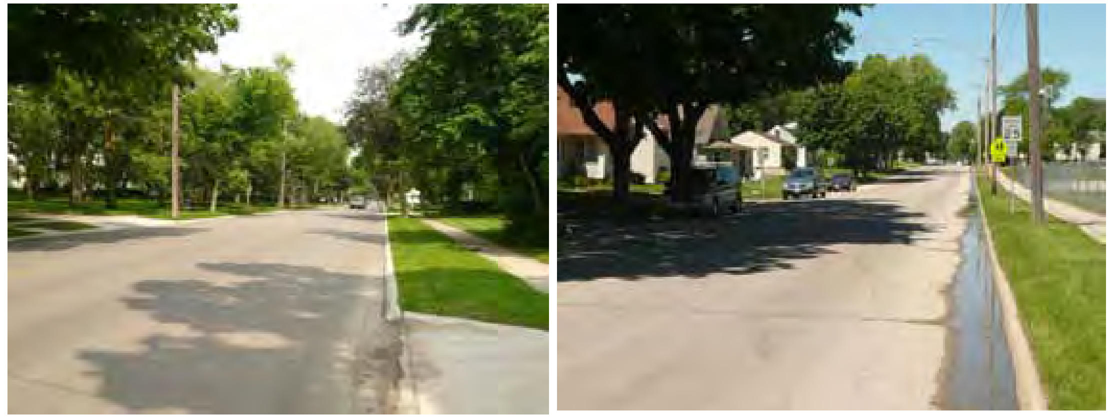
- **Connecting links.** These on-street links connect major routes in the system. Typically, they fall within the "implementation without change" category, requiring only pavement markings and information and identification graphics.

- **Projects under development.** These segments are opportunities that take advantage of projects either under construction or in the short-term pipeline as of late, 2013.

- **Existing trails.** These facilities are in place and are incorporated into the bicycle transportation system in their current form.

- **Minor path development and gap filling.** These separated segments include short pathways that fill gaps in the system or relatively short stretches of new sidepaths or cycle tracks within existing right-of-way.

- **Major path or trail development.** These elements are major new trails on exclusive right-of-way. They do not include all facilities proposed by Mason City's



Adaptation without Change. Streets such as Virginia and Rhode Island Avenues can be adapted to bikeway use without changing parking or traffic flow characteristics. The proposed solution at State Street would stripe parking lanes and use sharrows in travel lanes, or develop a bike lane in one direction. Rhode Island Avenue as a classical bicycle boulevard has relatively low traffic volumes that encourage shared use.

Adaptation with Minor or Major Lane Modifications. The 5th and 6th Street SW project is an example of a lane reduction, converting a lane that is not required for parking or traffic purposes into a bike lane. Other potential projects in this category include a cycle track over the Kentucky Avenue river bridge to link Birch Drive and the East Park Trail or a reduction of lanes on N Federal Avenue.

Minor Street Widening. Two-lane collector streets like 1st Street NW could be widened to add bike lanes. But a more likely example of a minor widening is S Taft Avenue between 4th and 19th Street SW, where a minor widening to one side of the street could provide an on-street bicycle facility.

Existing Trails. A key priority is taking care of existing resources. A major focus of these efforts is the upgrading of the Willow Creek Trail, which people expect to be the city's premier facility, but is often difficult to find and use.

Major Roadway Construction. High volume streets like 12th Street NW will eventually require major construction to increase capacity and improve safety. Future widenings or construction of new streets on the system should be built to complete street standards.

Intersection Projects. These projects, many of which are highlighted in Chapter 6, addressing pedestrian access, serve both cyclists and pedestrians. An example is creating a crossing of S Federal Avenue at 23rd Street SW.

regional trails and greenways plan, but only those that are integral to the bicycle transportation system.

- **Intersection Projects.** These projects involve intersections of a bikeway route with a major arterial street. These projects generally include refuge medians or short cycle tracks that resolve offset intersections.

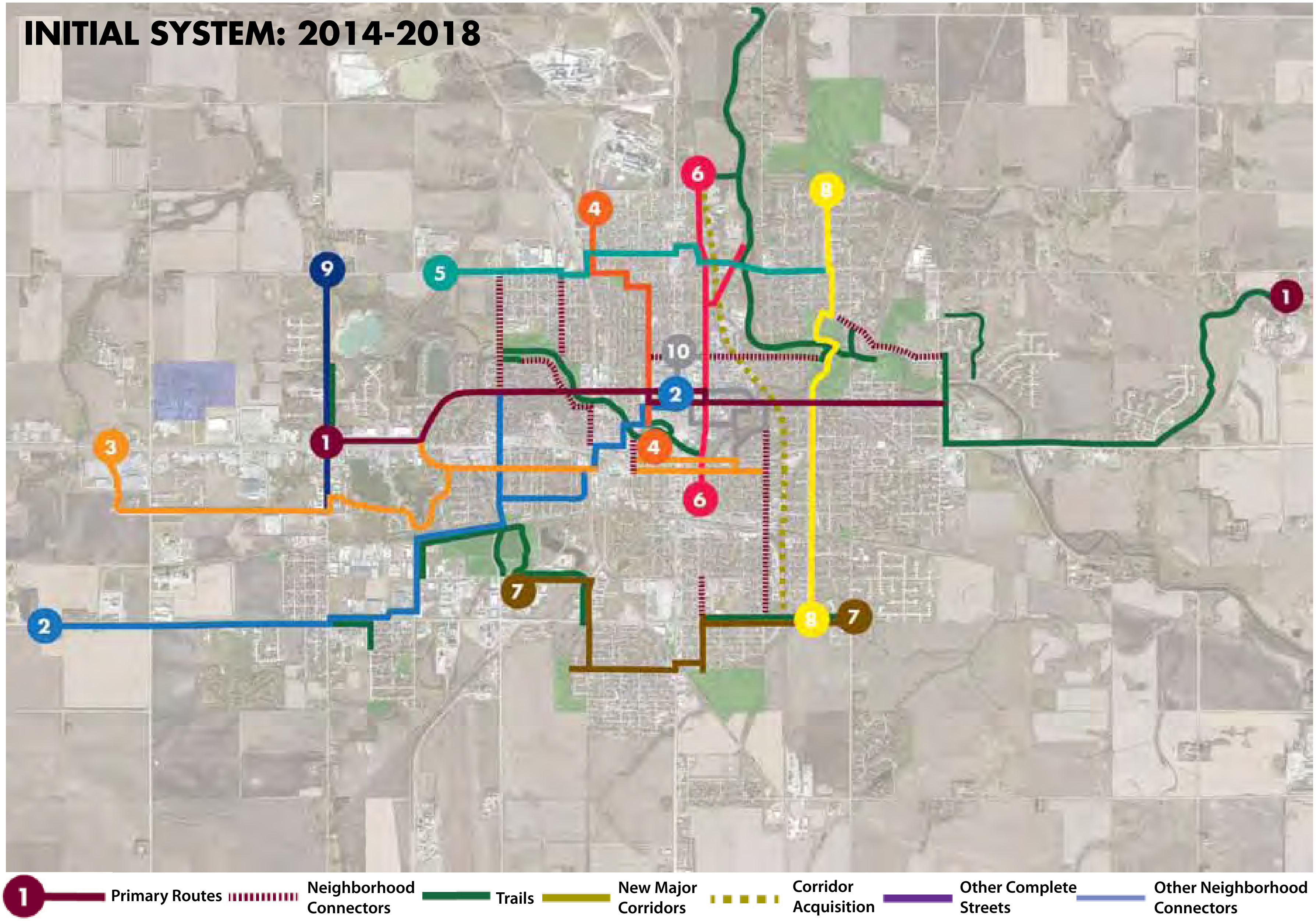
The System Developability Categories Map on the facing page classifies segments on the proposed Mason City Bikeways System based on relative ease of development.

Sequencing

The Sequencing Map combines the developability categories with the other priority criteria to stage the network in three time periods. Complete system development may occur within fifteen years, suggesting three-year development phases. Actual implementation depends on the amount of available funding. However, early program phases include the most immediately developable routes or route segments, with later stages involving major regional trails, and street reconstructions.

Initial System: The Starting Point

While the City and the user community will help to determine the order of projects within each phase, the system must start to emerge with some specific routes and route segments. This pilot system establishes the foundation of the ultimate network, and should provide maximum impact for minimum initial investment, link all parts of the city, and serve proven destinations and traffic patterns. The pilot system illustrated on the following pages assembles route segments that fit these criteria, capable of demonstrating the potential for bicycle transportation in Mason City.


INITIAL SYSTEM: 2014-2018
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Primary Routes
Neighborhood Connectors
Trails
New Major Corridors
Corridor Acquisition
Other Complete Streets
Other Neighborhood Connectors

Gap Filling. These high priority projects use small pathway segments to create major connections and represent extremely high value for each dollar of investment. A path connecting the south end of Quincy Avenue with Monroe Park is such a high benefit, low cost project. Filling the Pierce Avenue gap north of Big Blue is another example of a gap-filler.

Major Trails. The concept of a Union Pacific High Line Trail is an ambitious example of a facility that could add to Mason City's array of attractions.

Street-Oriented Pilot Routes

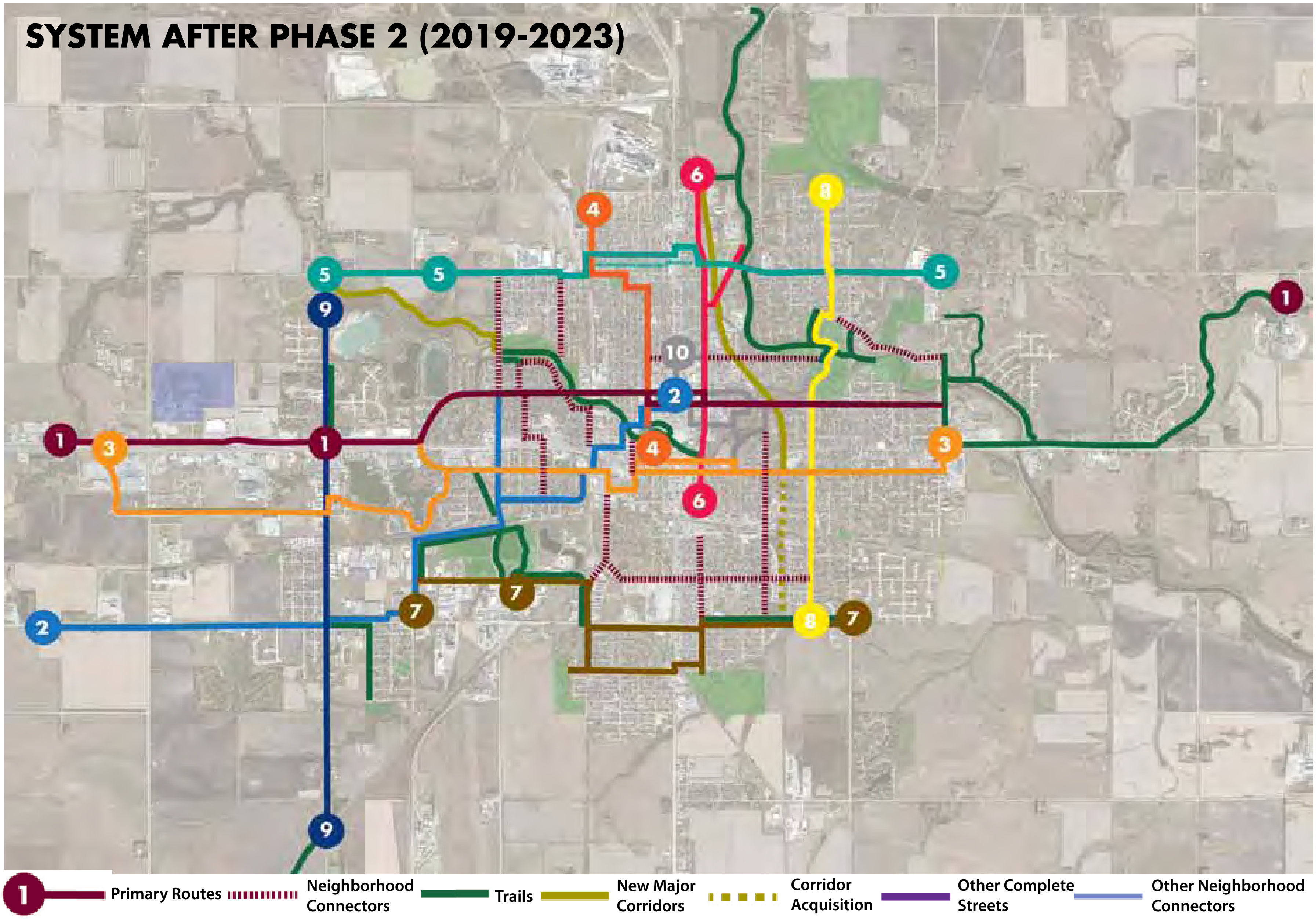
Components of the recommended initial system include:

- Route 1: Completion from N Taft to Mason City High School via 1st Street NW and State Street.
- Route 2: Completion from Trolley Trail at Taft to Downtown, including upgrade of path approach to Highway 122 trail overpass.
- Route 3: Completion from Indianhead Drive to 6th Street SW at the overpass pathway.
- Route 4: Completion of Quincy-Adams Bicycle Boulevard, including the pathway connection from the south terminus of N Quincy Avenue to Monroe Park under the 12th Street NW overpass.
- Route 5: Completion from Currie's Plant to N Rhode Island Avenue via a sidepath on the north side of 12th Street NW, and 14th Street NW.
- Route 6: Completion of the Pennsylvania Bicycle Boulevard from 17th Street NE to 8th Street SE.
- Route 7: Completion from Big Blue Trail (incorporating new 15th/Monroe sidepath), via Monroe Avenue, 23rd Street, and Pennsylvania Avenue. Includes a pedestrian crossing of S Federal at 23rd/22nd Streets.
- Route 8: Completion of Rhode Island-Virginia Bicycle Boulevard.
- Route 9: Completion of sidepath from 12th Street NW to 4th Street SW.
- Route 10: Completion of Culture Trail, with minor expansions of existing bike route.

Trail and Pathway Segments

Priority trail projects envisioned in the initial network include the following:

- Paving, underpass improvement, signage, and access improvements to the Willow Creek Trail between Pierce and Monroe.
- Entrance connection to the Lester Milligan Park Trail at Pierce Avenue, and path widening along Pierce between Big Blue and 8th Street SW.
- Cycle track on the west side of the N Kentucky Avenue bridge between Birch Drive and the East Park Trail.
- Sidepath along the edge of the High School campus between the East Park Trail and the NIACC Trail.
- Path connection between the Winnebago River Trail and the trailhead of the Lime Creek Trail.
- Acquisition of the disused Union Pacific north-south line between 17th Street NE and 19th Street SE.


SYSTEM AFTER PHASE 2 (2019-2023)
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Primary Routes
Neighborhood Connectors
Trails
New Major Corridors
Corridor Acquisition
Other Complete Streets
Other Neighborhood Connectors

Second Phase Expansion

The second five-year development period completes the basic system presented in Chapter 3. Its principal components include the following:

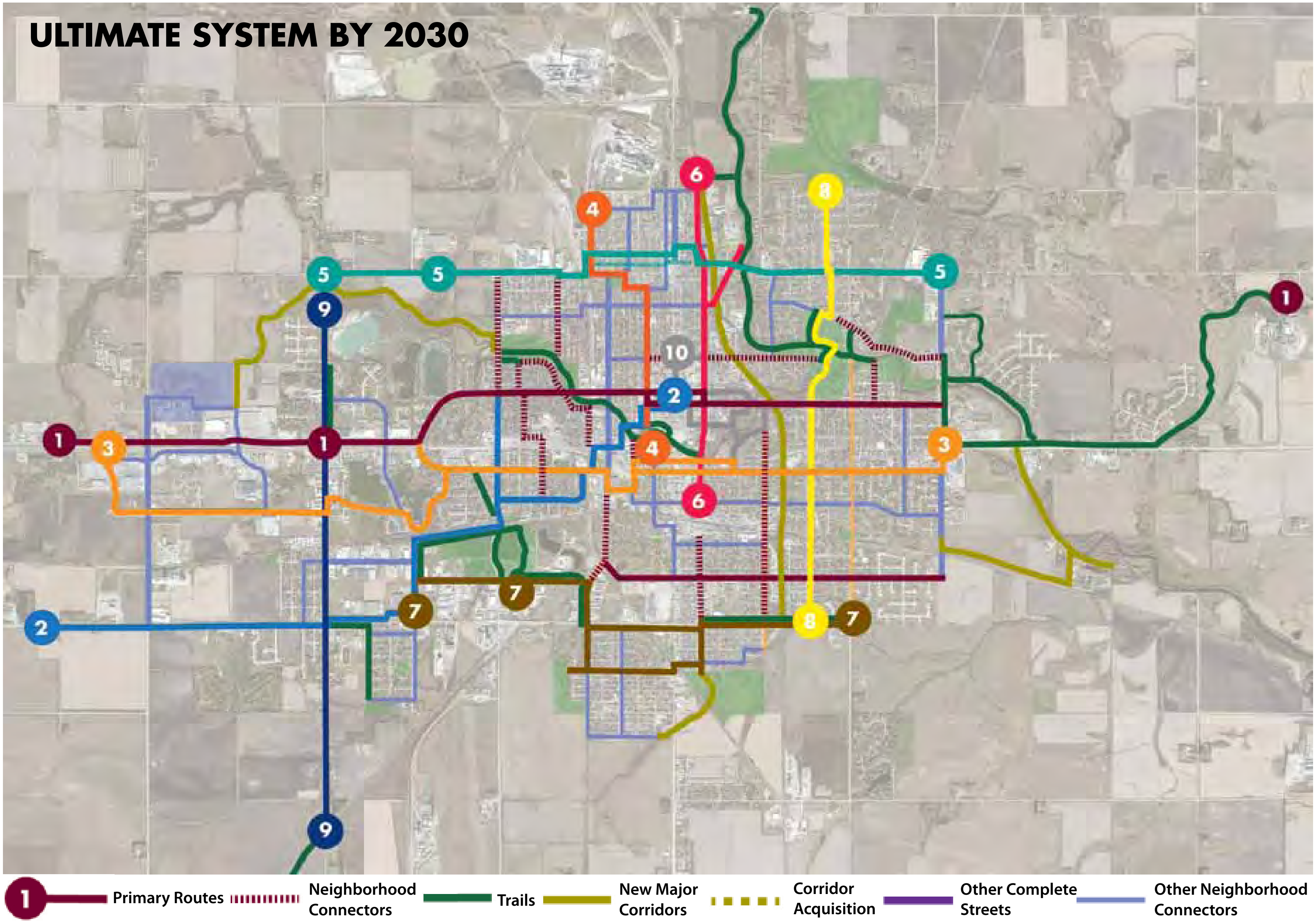
- Route 1: Completion from Lark Avenue to S Taft Avenue.
- Route 3: Completion from S Monroe to S Illinois Avenues. This assumes acquisition and ability to cross the proposed Union Pacific High Line Trail at 6th Street SE and 5th/6th Street SW one-way pair from Jefferson to Connecticut.
- Route 5: Completion from Taft Avenue to the Currie's plant and the eastern segment between Rhode Island and Illinois Avenues. Both of these projects may be part of a street upgrade for the 12th Street NW corridor. Consideration should also be given in this phase for the use of the alley paralleling and north of 12th Street NW as a bikeway, and a lane diet on North Federal Avenue as part of a business district revitalization initiative.
- Route 7: Use of the 19th Street SW south frontage road and extension of a sidepath between Monroe and Pennsylvania Avenue, with neighborhood route along Pennsylvania Avenue from 22nd Street SW to 19th Street SW.
- Route 9: Completion of Taft Avenue Bikeway to the Thornton Rail-Trail, along with beginning of construction on that trail.
- Neighborhood connections, including 15th Street SE, N Monroe Avenue between 1st Street NW and 12th Street NW, and a S Monroe Avenue sidepath between 6th Street SW and 15th Street SW.

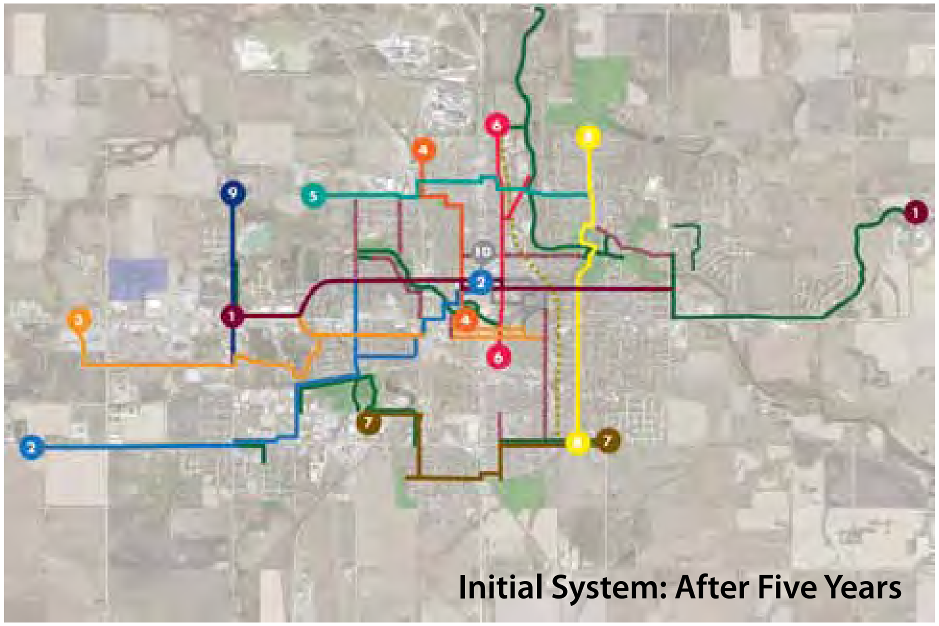
<u>Trail and Pathway Segments</u>

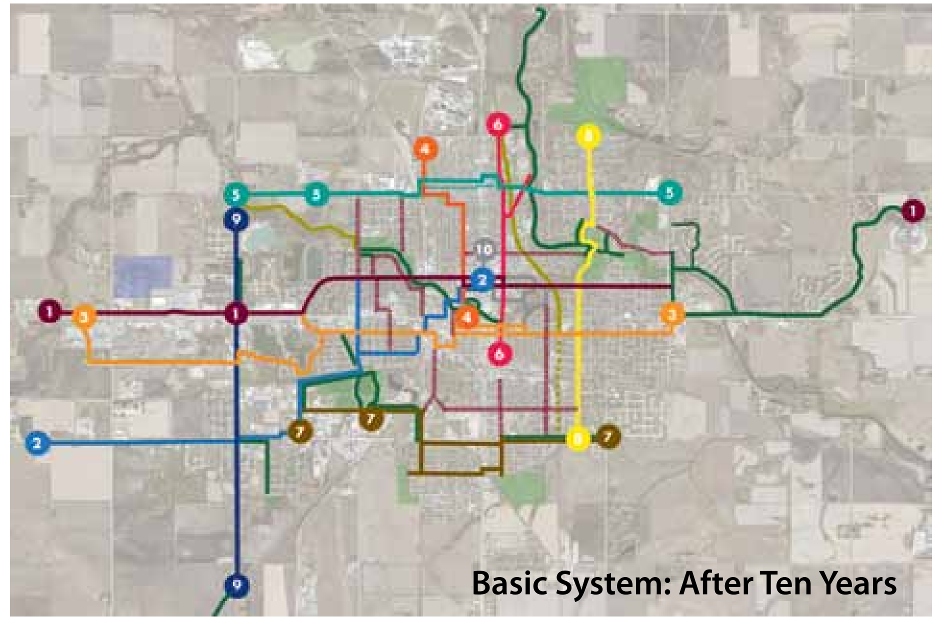
Trail projects envisioned in the second phase of network development include the following:

- Completion to proposed standards of the Willow Creek Trail to Pennsylvania, with adaptation of parking lots and improved road crossings into Downtown. This may be completed in concert with a redesign of the Delaware/Washington reconfiguration of US 65 through Downtown. This project may route the highway on Washington, and convert Delaware to local access.
- Completion of the Meadowbrook Greenway along flood buy-out property, with a trail and bridge crossing Cheslea Creek to Pierce Avenue.
- Extending a McKinley Avenue Pathway along the edge of the Newman campus to 26th Street SW. THis could eventually continue south to parallel or use the railroad right-of-way that runs to the Thornton rail-trail.
- Conversion of Birch Drive from Illinois to the NIACC Trail as a "shared space" street, providing priority to pedestrians and bicyclists, but permitting limited, single-directional motor traffic at slow speeds.
- Beginning of development of the Union Pacific High Line Trail between 6th Street SE and 17th Street NE.

ULTIMATE SYSTEM BY 2030




Initial System: After Five Years


Basic System: After Ten Years

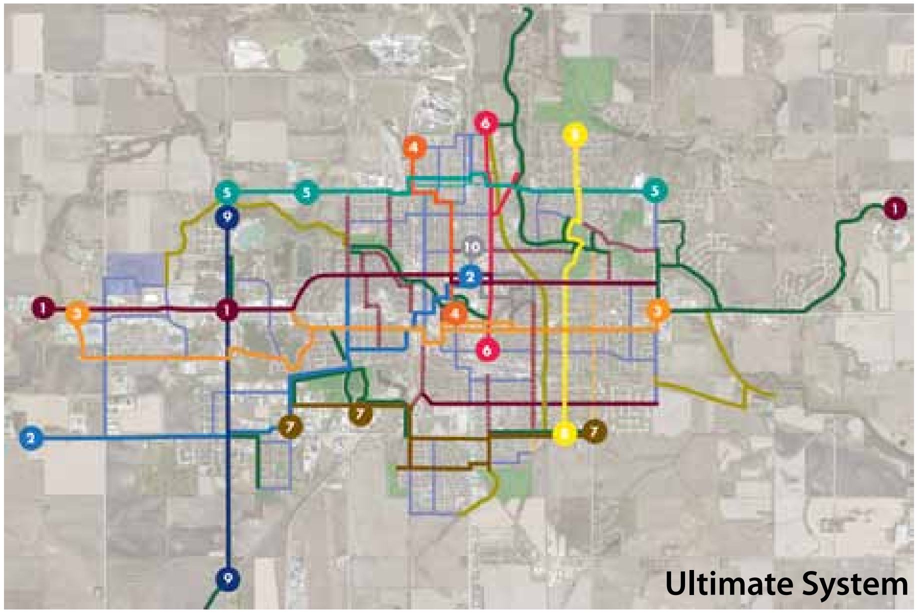
Ultimate System

The ultimate system proposes completion of the entire network by 2030, and focuses on a more extensive network of neighborhood connections and completion of higher cost trail and greenway projects, including:

- Completion of the Union Pacific High Line plan, with parks on street overpasses and adaptation of ramps to provide access from streets.
- Completion of the Willow Creek Trail extension to Roosevelt Avenue and through the North Iowa Events Center to Eisenhower Avenue.
- Extension of a 15th Street cross-city route to Illinois Avenue and extension of Illinois Avenue south to 15th Street, including an eastside overpass.
- Trail extensions from 26th Street SE to Georgia Hanford Park and along Birch Drive south of Highway 122.
- Complete street development along the Illinois Avenue, Eisenhower Avenue, 15th Street SE, and N Federal corridors.

Probable System Costs

The Probable Cost table presents a general opinion of costs for the initial system, based on unit cost factors per mile for various facility types displayed in the table on this page. These projected costs are in 2014 dollars and include 10% design fees and 15% contingency.



An Evolving System

The Mason City Bikeway System will develop in phases, each of which meets the system criteria discussed earlier through every stage of the development process. The maps on these pages illustrate how the system might evolve in five phases. While changes in projects and opportunities will inevitably cause changes in sequencing, it is important to make steady and continuous progress. The overall sequencing strategy calls for a focus on relatively attainable, low-cost street adaptations and highly popular trail projects to maximize bicycle transportation among probable urban cyclists. An increased and visible role for bicycle transportation then makes larger capital investments more acceptable in later stages, expanding bicycling into new markets.

ESTIMATED COST PER MILE BY FACILITY TYPE

Facility Type	Cost/Unit
10-foot asphalt trail on separated right-of-way	$264,000/mile
10-foot concrete trail on separated right-of-way	$385,000/mile
10-foot two-way concrete sidepath	$300,000/mile
5-foot one-way concrete sidepaths (including full installation on both sides of the street)	$330,000/mile
Mid-block or mid-section crossing with defined crossings and beacons	$30,000 each
Mid-block or mid-section crossing with center refuge median and beacons	$50,000 each
12-foot wide prefabricated bridge	$1,320/foot
5-foot bicycle lanes (incremental cost for new street construction projects (single side)	$77,000/mile asphalt $137,500/mile concrete
Bicycle lane pavement markings on existing streets	$15,000/mile
Bicycle lane pavement markings on existing streets with lane modification	$25,000/mile
Shared route markings (sharrows plus signage) on existing streets	$7,500/mile
First stage bicycle boulevard with signage	$15,000/mile
Enhanced bicycle boulevard with traffic calmers	$30,000-50,000/mile

INITIAL BIKEWAYS NETWORK: OPINION OF PROBABLE COST

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
1	S Taft Avenue to S Grover Avenue	.34	Sharrows on parking lot drives	$7,200	$2,448	Sharrows, both sides
	S Grover Avenue to Winnebago Way	.17	Painted cycle track in parking lot	$12,800	$2,176	8″ lines
	Winnebago Way/1st Street NW, 4th Street SW to N Pierce Avenue	.62	Shoulder/bike lanes; minor intersection redesign	$20,000	$12,400	Use as constructed (UAC) shoulder, bike lanes plus $4,500 for intersection
	1st Street NW, N Pierce Avenue to Willow Creek Trail access	.41	Shoulder/bike lanes; minor intersection redesign	$27,500	$11,275	UAC shoulder, bike lanes plus $4,500 for intersection
	1st Street NW, Willow Creek to Monroe	.20	Shoulder/bike lanes; minor intersection redesign	$35,000	$7,000	UAC shoulder, bike lanes plus $4,500 for intersection
	1st Street NW, N Monroe Avenue to N Adams Avenue	.25	Bike lanes	$12,800	$3,200	8″ lines
	1st Street NW, N Adams Avenue to N Pennsylvania Avenue	.25	One-way WB bike lane.	$4,800	$1,200	6″ line
	W State Street, N Adams Avenue to N Pennsylvania Avenue	.15	One-way EB bike lane, sharrow in counterflow	$12,000	$1,800	6″ line with sharrows
	W State Street, N Adams Avenue to N Pennsylvania Avenue	.40	Striped parking lanes, sharrows	$10,400	$4,160	4″ line with sharrows
	E State Street, N Pennsylvania Avenue to future UP Trail overpass	.95	Striped parking lanes, sharrows	$10,400	$9,880	4″ line with sharrows
	Initial Phase Subtotal for Route 1				**$55,539**	

INITIAL BIKEWAYS NETWORK: OPINION OF PROBABLE COST

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
2	Trolley Trail, S Benjamin Avenue and Big Blue Trail		Minor upgrades and crossings at existing trails	$4,500	$27,000	
	S Pierce Avenue, Big Blue Trail to 8th Street SW	.14	Sharrows with sidepath widening to 10 feet	$152,200	$21,308	Widen 5′
	S Pierce Avenue, 8th Street SW to 6th Street SW	.18	Striped parking lane with sharrows	$10,400	$1,872	
	S Pierce Avenue, 6th Street SW to 1st Street NW	.44	Striped parking lanes with sharrows	$10,400	$4,576	
	8th Street SW, S Pierce Avenue to S Jackson Avenue	.46	Sharrows	$7,200	$3,312	
	S Jackson Avenue, 8th Street SW to 6th Street SW	.18	Sharrows, with route continuing on 6th Street to path	$7,200	$1,296	
	Path and pedestrian bridge, 6th Street SW to 4th Street SW	.12	Widened path to 10 feet	$145,000	$17,400	Widen 5′
	4th Street SW, path landing to S Madison Avenue	.15	WB bike lane, EB sharrow	$12,000	$1,800	
	S Madison Avenue, 4th Street SW to 2nd Street SW	.15	Sharrows	$7,200	$1,080	
	2nd Street SW, S Madison Avenue to S Adams Avenue	.15	Bike lanes	$12,800	$1,920	
	Initial Phase Subtotal for Route 2				**$81,564**	

INITIAL BIKEWAYS NETWORK: OPINION OF PROBABLE COST

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
3	Indianhead Drive, 4th Street SW to 9th Street SW	.30	Bike lanes	$12,800	$3,840	
	9th Street SW, Indianhead Drive to S Eisenhower Avenue	.22	Sidepath and painted shoulders	$192,800	$42,416	5' Portland cement concrete (PCC) sidepath
	9th Street SW, S Eisenhower Avenue to Village Green Drive	.67	Existing sidepath	NA	NA	
	9th Street SW, Village Green Drive to S Taft Avenue	.35	Sidepath on north side	$180,000	$63,000	
	S Taft Avenue, 9th Street SW to Briarstone Drive	.08	Multi-purpose trail on east side of street	$290,000	$23,200	5' PCC sidepath
	Briarstone Drive, S Taft Avenue to Knollwood Lane	.43	Sharrows	$7,200	$3,096	
	Knollwood Lane, Briarstone Drive to Springview Drive	.18	Sharrows	$7,200	$1,296	
	Springview Drive, Knollwood Lane to S Garfield Avenue	.34	Sharrows	$7,200	$2,448	
	S Garfield Avenue, Springview Drive to 6th Street SW	.15	Sharrows	$7,200	$1,080	
	Cerro Gordo Way, 4th Street SW to S Garfield Avenue	.21	Shoulder/bike lanes	$12,800	$2,688	
	6th Street SW, S Garfield Avenue to S Pierce Avenue	.32	Shoulder/bike lanes	$12,800	$4,096	
	6th Street SW, S Pierce Avenue to S Monroe Avenue	.60	Striped parking lane with sharrows	$14,400	$8,640	
	6th Street S, S Jefferson Avenue to S Connecticut Avenue	.56	Anticipated street reconstruction project will reconfigure to include EB bike lane	NA		Costs included in future IDOT project
	5th Street S, S Jefferson Avenue to S Connecticut Avenue	.56	Anticipated street reconstruction project will reconfigure to include WB bike lane	NA		Costs included in future IDOT project
	S Connecticut Avenue, 5th Street SE to 6th Street SE	.10	Sharrows to transition WB route from 6th to 5th. Bike lane in NB/WB direction.	$7,200	$720	
	Initial Phase Subtotal for Route 3				**$156,520**	

INITIAL BIKEWAYS NETWORK: OPINION OF PROBABLE COST

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
4	N Quincy Avenue, 17th Street NW to 12th Street NW	.47	Sharrows with signs	$10,000	$4,700	Bicycle boulevard
	12th Street NW Overpass Area	.10	Paved trail	$290,000	$29,000	
	Monroe Park	.23	Paved trail	$290,000	$66,700	
	10th Street NW, Monroe Park to N Adams Avenue	.09	Sharrows	$7,200	$648	Bicycle boulevard
	N Adams Avenue, 10th Street NW to 3rd Street NW	.41	Sharrows	$7,200	$2,952	Bicycle boulevard
	Adams Avenue, 3rd Street NW to 2nd Street SW	.38	SB bike lane, NB sharrow	$10,000	$3,800	Bicycle boulevard
	Willow Creek, S Adams Avenue to Southbridge ped bridge	.12	Bike lanes	$12,800	$1,536	
	2nd Street SW, S Adams Avenue to Willow Creek (shared with route 2)	.12	Bike lanes	NA	NA	Costs attributed to Route 2
	Initial Phase Subtotal for Route 4				**$109,336**	

INITIAL BIKEWAYS NETWORK: OPINION OF PROBABLE COST

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
5	N Harrison Avenue/N Van Buren Avenue Crossing	.05	Street crossing	$10,000	$500	
	12th Street NW overpass	.14	Use of existing sidepath to east landing.	NA	NA	Attributed to Route 4
	12th Street NW Path and N Quincy Avenue Connection	.21	New 10-foot path. Common segment with Route 4.	NA	NA	Attributed to Route 4
	Path link under overpass	.04	New 10-foot path. Common segment with Route 4	$290,000	$11,600	Attributed to Route 4
	N Quincy Avenue, 12th Street NW to 14th Street NW	.09	Sharrows with signs. Common segment with Route 4	$10,000	$900	Attributed to Route 4
	14th Street NW, N Quincy Avenue to N Federal Avenue	.48	Sharrows	$7,200	$3,456	Bicycle boulevard
	N Federal Avenue jogged crossing at N Federal Avenue	.02	Sharrow guidance across intersection	$10,000	$200	
	14th Street NE, N Federal Avenue to N Pennsylvania Avenue	.13	Sharrows	$7,200	$936	
	N Pennsylvania Avenue, 14th Street NE to 12th Street NE	.10	Sharrows	NA	NA	Attributed to Route 6
	12th Street NE, N Pennsylvania Avenue to Winnebago River bridge	.27	Bike lanes, marked trail crossing at Winnebago River Trail	$12,800	$3,456	
	12th Street NE, River to N Rhode Island Avenue	.44	Bike lanes	$12,800	$5,632	
	Initial Phase Subtotal for Route 5				**$26,680**	

INITIAL BIKEWAYS NETWORK: OPINION OF PROBABLE COST

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
6	N Pennsylvania Avenue, 17th Street NE to 12th Street NE	.47	Sharrows	$7,200	$3,384	Bicycle boulevard
	N Pennsylvania Avenue, 12th Street NE to 4th Street NE	.51	Striped parking lanes with sharrows	$16,800	$8,568	Bicycle boulevard
	9th Street NE/Elm Drive, N Pennsylvania Avenue to Lime Creek Trailhead	.52	Sharrows	$7,200	$3,744	Bicycle boulevard
	Pennsylvania Avenue, 4th Street NE to 1st Street SE	.32	Bike lanes	$12,800	$4,096	Bicycle boulevard
	Pennsylvania Avenue, E State Street to 5th Street SE	.27	Striped parking lanes with sharrows. Bike lanes over Willow Creek bridge to 5th Street	$16,800	$4,536	Bicycle boulevard
	5th Street SE to 6th Street SE	.06	Bike lanes	$12,800	$768	Bicycle boulevard
	6th Street SE to 8th Street SE	.17	Striped parking lanes with sharrows	$16,800	$2,856	Bicycle boulevard
	Initial Phase Subtotal for Route 6				**$27,952**	

7	15th Street SW, S Benjamin Avenue to Big Blue Trail	.56	Bike lanes	$12,800	$7,168	
	15th and Monroe Avenue Trails, Big Blue to 19th Street	.70	Existing sidepath, to be completed in 2014	NA	NA	
	S Monroe Avenue, 19th Street SW to 23rd Street SW	.26	Sharrows with signage	$10,000	$2,600	
	23rd Street SW, Frederick Hanford Park to S Federal Avenue	.61	Sharrows with bicycle boulevard signage	$10,000	$6,100	Bicycle boulevard
	S Federal Avenue transition and crossing from 23rd Street SW to 22nd Street SE	.05	Pedestrian crossing at 23rd, with path crossing railroad at right angle, transitioning to 22nd.	NA	$10,000	
	22nd Street SE, S Federal Avenue to S Georgia Avenue	.25	Sharrows	$7,200	$1,800	Bicycle boulevard
	S Pennsylvania Avenue, 22nd Street SE to 19th Street SE	.26	Sharrows	$7,200	$1,872	Bicycle boulevard
	Initial Phase Subtotal for Route 6				**$29,540**	

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
8	N Rhode Island Avenue, 17th Street NE to 12th Street NE	.43	Sharrows with bicycle boulevard signage. Special intersection markings to negotiate offset at 12th Street.	$12,000	$5,160	Bicycle boulevard
	N Rhode Island Avenue, 12th Street NE to Birch Drive	.28	Sharrows	$7,200	$2,016	Bicycle boulevard
	Birch Drive/MacNider Campground, N Rhode Island Avenue to N Virginia Avenue	.11	Bike lanes on Birch Drive block from Rhode Island Avenue to park entrance.	$12,800	$1,408	
	N Virginia Avenue/MacNider Campground Trail to river pedestrian bridge	.20	Sharrows	$7,200	$1,440	
	East Park Trails to 4th Street NE	.17	Existing trail	NA	NA	
	N Virginia Avenue, 4th Street NE to E State Street	.31	Sharrows	$7,200	$2,232	Bicycle boulevard
	S Virginia Avenue, State to 4th Street SE	.26	Sharrows. Bike track alignment guidance to approach a right angle crossing of railroad track.	$7,200	$1,872	Bicycle boulevard
	S Virginia Avenue, 4th Street SE to Trolley Trail Extension (19th Street SE)	1.00	Sharrows.	$7,200	$7,200	Bicycle boulevard
	Initial Phase Subtotal for Route 8				**$21,328**	

9	12th Street NW to 4th Street SW	0.4	Continue sidepath north to 12th Street NW and south to 4th Street SW. Improve pedestrian path crossing at 4th Street	$290,000	$116,000	Total length of segment is 1.0 miles, balance is complete
	4th Street SW to 9th Street SW	.37	Bike lane markings on SB shoulder. Sidepath on east side	$192,800	$71,336	
	9th Street SW to 19th Street SW	.63	Bike lane markings on SB shoulder. Sidepath on east side	$192,800	$121,464	
	Initial Phase Subtotal for Route 9				**$308,800**	

ROUTE	SEGMENT	LENGTH (MILES)	BIKEWAY FACILITY TREATMENT	UNIT COST	COST	COMMENTS
10	N Pennsylvania Avenue, 4th Street NE to 1st Street NE	.20	Bike lanes, same as Route 6	NA	NA	Attributed to Route 6. Special Culture Path signage
	1st Street NE, N Pennsylvania Avenue to E State Street	.32	Bike lane in EB direction, sharrow in counterflow.	$10,000	$3,200	Special Culture Path signage
	E State Street, N Pennsylvania Avenue to N Connecticut Avenue	.16	Parallel parking with EB only bike lane and sharrow in WB direction. (Route 1)	$10,000	$1,600	Special Culture Path signage
	Rock Glen/1st Street SE/S Connecticut Avenue, E State Street to 2nd Street SE	.20	Sharrows with special Culture Path signage.	$15,000	$3,000	Special Culture Path signage
	2nd Street SE, S Connecticut Avenue to S Delaware Avenue	.25	Sharrows with special Culture Path signage.	$15,000	$3,750	Special Culture Path signage
	S Delaware Avenue, 2nd Street SE to E State Street	.13	NB sharrow with special Culture Path signage. Counterflow uses Pennsylvania Avenue (Route 6)	$11,400	$1,482	Special Culture Path signage
	E State Street, S Delaware Avenue to S Federal Avenue	.08	Parallel parking with EB only bike lane and sharrow in WB direction. (Route 1)	NA	NA	Attributed to Route 1. Special Culture Path signage
	N Federal Avenue, State Street to 4th Street N	.18	Sharrows	NA	NA	Special Culture Path signage
	4th Street NE, N Federal Avenue to N Pennsylvania Avenue	.25	Striped parking lanes with sharrows.	$14,400	$3,600	Special Culture Path signage
	Meredith Willson Footbridge, 2nd Street SE to River Heights	470 feet	Existing bridge	NA	NA	Special Culture Path signage
	S Connecticut Avenue, E State Street to River Heights Drive	.16	Sharrows	$7,200	$1,152	Special Culture Path signage
	River Heights Drive, S Carolina Avenue to S Connecticut Avenue	.23	Sharrows	$7,200	$1,656	Special Culture Path signage
	S Connecticut Avenue, 4th Street SE to 6th Street SE	.13	Sharrows	$7,200	$936	Special Culture Path signage
	Initial Phase Subtotal for Route 10				**$20,376**	

T INITIAL TRAIL SEGMENTS (NOT INCLUDED IN FRAMEWORK ROUTES)

TRAIL KEY	NAME	LENGTH (MILES)	TREATMENT	UNIT COST	ESTIMATED COST
T1	**Willow Creek Trail, Pierce to 2nd Street bridge**	1.0	Upgrade of existing trails to uniform standards: 8-10 feet paving, ADA compliant access, wayfinding, and barrier-free and clearly marked street intersections.	$217,500	$217,500
T4	**Big Blue Trail**	0.1	Replacement of bridge connecting S Pierce Avenue to the Lester Milligan Park Trail	$200,000	$200,000
T7	**Downtown Connectors**	0.6	Redesign of underutilized parking lot on south side of creek to include a cycle track, with upgraded connection to south landing of pedestrian bridge to Southbridge Mall	$290,000	$174,000
T8	**Union Pacific High Line**	3.22	Acquisition of trail rights	$120,000	$386,400
T12	**MCHS Pathways**	1.02	New paths along Illinois Avenue and 4th Street SE, on edge of high school campus between Birch Drive and NIACC Trail	$290,000	$295,800
T17	**Kentucky Avenue Cycle Track**	0.26	Two way cycle track on west side of street between Birch Drive and East Park Trails, over Winnebago River Bridge	$12,800	$3,328
	Initial Phase Subtotal for Other Trails				**$1,277,028**

INITIAL SYSTEM PROBABLE COST RECAP

Route	Projected Cost
Route 1	$55,539
Route 2	$81,564
Route 3	$156,520
Route 4	$109,336
Route 5	$26,680
Route 6	$27,952
Route 7	$29,540
Route 8	$21,328
Route 9	$308,800
Route 10	$20,376
Other Trails	$1,277,028
Total	**$2,114,663**

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CHAPTER 6 PEDESTRIAN ENVIRONMENT

Mason City should maintain a continuous network of sidewalks and trails to complement the street system.

Providing a good environment for non-motorized transportation can complement or even replace automobile trips. The incorporation of sidewalks into new development and the provision of sidewalks in areas of existing development are essential to maintaining a safe, convenient pedestrian environment.

At present, Mason City's older neighborhoods maintain a relatively complete sidewalk network within their traditional grid and behaves as a trail system. Ensuring that new development continues to provide these links and gradual adaptation of major pedestrian facilities to full accessibility will be an important priority for Mason City's pedestrian system. In addition, the city's multi-use trail network should be linked to activity centers, enhancing the city's walkability and allowing residents to safely walk to work and school, as well as being used for recreation.

Only within the last 50 to 60 years has community design moved away from a premise of pedestrian access. Today's development is more auto-dependent, with street patterns that can make pedestrian movement unsafe, which is true for the Highway 122 area. In a truly walkable community, neighborhood commercial services, schools, and other activity centers are located within walking distance of housing. Walkable communities also encourage social interaction and expand transportation options. The pattern and design of development should serve a range of users including pedestrians and bicyclists, as well as motorists, moving them around the community in a convenient and efficient manner.

Decisions regarding vehicular travel also affect a community's walkability. A good transportation network uses special design techniques to ensure that street traffic is consistent with pedestrian safety, which is important when linking the college to commercial and civic destinations around the community.

The goal of creating a walkable community is to:

- Ensure that all areas of the community are accessible by a network of sidewalks and trails.
- Key activity centers are accessible by residential areas.
- Design streets so that traffic moves at speeds that allow for pedestrian activity.

MODE SHARE

Mason City's mode share for commuting to work by walking is greater than the state and nation. About 4.5% of commuters walk to work in Mason City, compared to 3.6% for the State of Iowa and 2.8% for the nation.

Table 6.1 identifies commuter patterns based on Census block group data. Some block groups include area beyond the city limits, so the total count of commuters is larger than the total count of commuters for the City of Mason City.

Map 6.1 identifies block groups, while Maps 6.2 to 6.5 show maps that describe mode share split for public transportation, bicycling, walking, and car by block group.

Areas with greater mode share split are Downtown and the adjacent neighborhoods to its east and west. The proportion of walkers is higher to the west, while the higher proportion of bikers is to the east.

A Local Case for Neighborhood Sidewalks. The neighborhood west of Downtown has a relatively complete sidewalk system with few issues, according to the sidewalk assessment presented later in this chapter. These conditions likely contribute to the area's higher percentage of walkers. Also, the neighborhood has a high number of youth under 18. These conditions illustrate the importance of a neighborhood where a quality network of sidewalks may influence people's choice in transportation and housing.

Images of the public engagement process.

Table 6.1: Work Places and Employment for Mason City Trade Areas

ID	Tract	Block Group	Transportation To Work					Housing	Population		
			Total	Car	Public Transit	Bicycle	Walked	Housing Units	Total Population	Under 18	Over 18
1	950102	1	**577**	554	0	0	13	410	1018	241	777
2	950200	1	**605**	570	0	0	22	527	1293	411	882
3	950300	1	**535**	302	0	0	137	751	1323	389	934
4	950402	1	**448**	318	23	10	39	496	906	102	804
9	951400	1	**1004**	935	0	5	0	726	1663	307	1356
10	951600	1	**325**	325	0	0	0	403	684	146	538
11	950102	2	**385**	360	0	25	0	486	939	362	577
12	950200	2	**580**	498	19	11	52	700	1495	361	1134
13	950300	2	**273**	182	0	0	91	278	597	169	428
14	950402	2	**642**	642	0	0	0	586	1463	569	894
17	950800	2	**420**	382	0	0	0	287	539	51	488
19	951400	2	**743**	667	0	0	44	446	1531	419	1112
20	951600	2	**505**	505	0	0	0	485	1010	176	834
21	950102	3	**453**	428	12	0	13	396	836	178	658
22	950200	3	**494**	456	14	0	9	486	863	77	786
23	950300	3	**544**	483	13	17	23	422	932	142	790
24	950402	3	**475**	444	0	0	28	473	642	15	627
28	951400	3	**408**	270	137	0	0	406	690	56	634
29	951600	3	**811**	759	0	52	0	781	1489	275	1214
30	950102	4	**324**	273	28	0	17	236	467	69	398
31	950200	4	**490**	429	0	13	18	587	1163	230	933
32	950300	4	**761**	711	0	0	15	644	1537	293	1244
33	950402	4	**656**	604	0	0	52	539	1134	214	920
35	951600	4	**390**	369	0	0	11	586	1040	237	803
36	950102	5	**243**	243	0	0	0	281	641	155	486
37	950200	5	**797**	773	0	0	0	658	1479	356	1123
38	950300	5	**525**	483	0	0	0	431	890	215	675
39	950102	6	**283**	258	0	0	12	256	595	143	452
	TOTALS		**14,696**	13,223	246	133	596	13,763	28,859	6,358	22,501

Source: U.S. Census Bureau

Existing target users are indicated by a darker cell fill.

Map 6.1: Census Tracts for Mason City Area

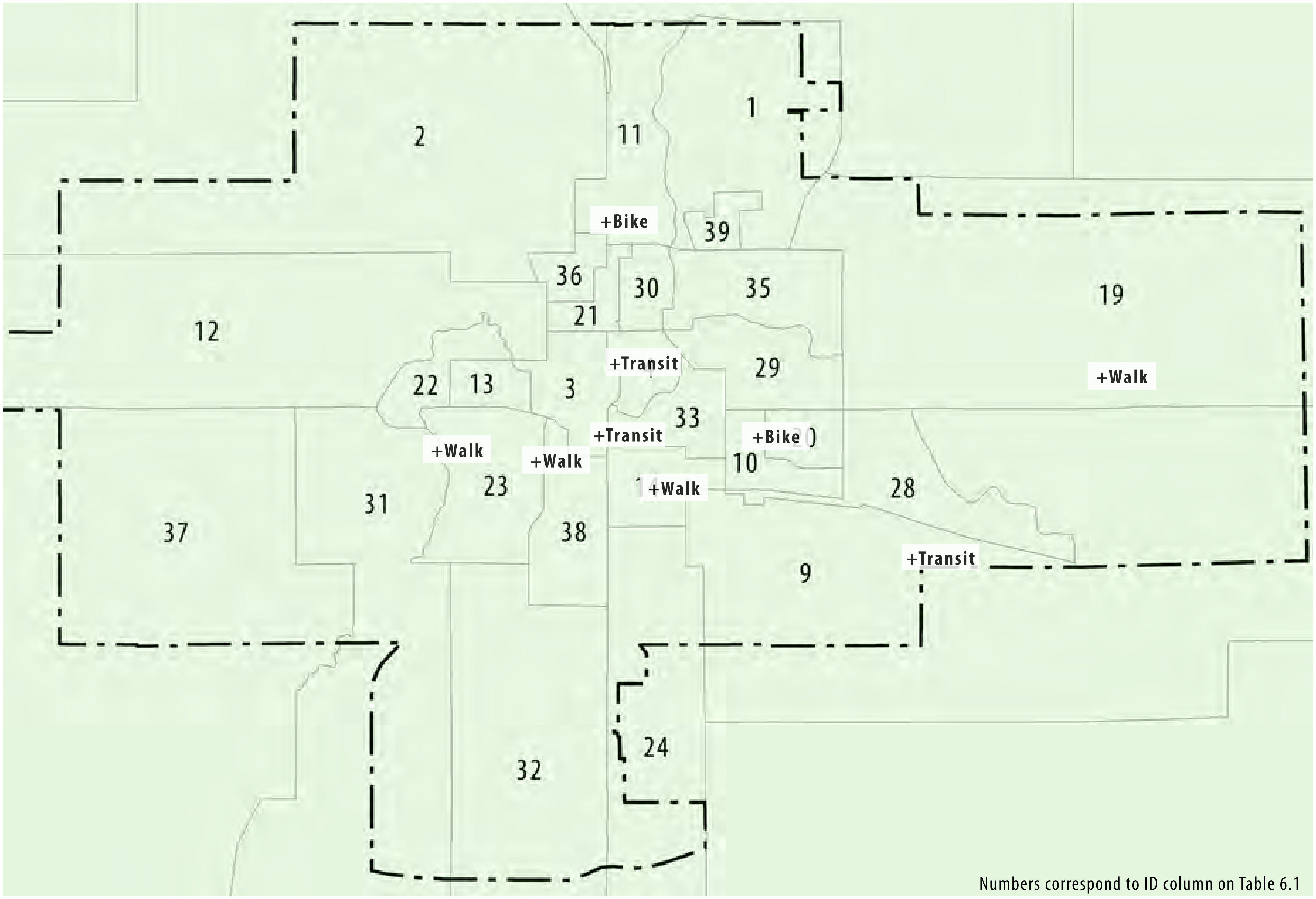
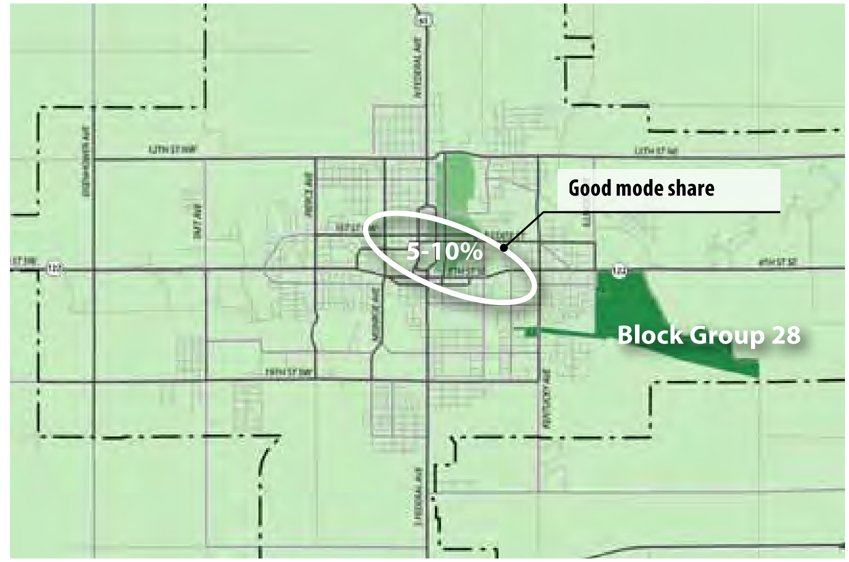


Table 6.2: Commuting to Work

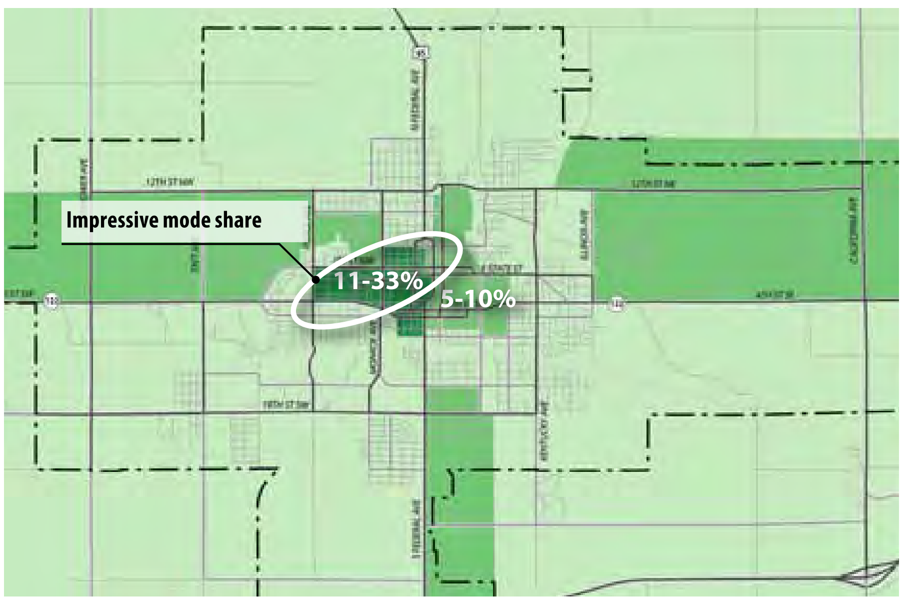
Mode of Commute	Workers	% of Workers
Workers 16 years and over	**13,922**	**100%**
Car	11,336	81.4%
Carpool	1,189	8.5%
Public transportation	237	1.7%
Walked	623	4.5%
Other means (Biking)	252	1.8%
Worked at home	285	2.0%

Source: US Census Bureau, 2012 American Community Survey 5-Year Estimates

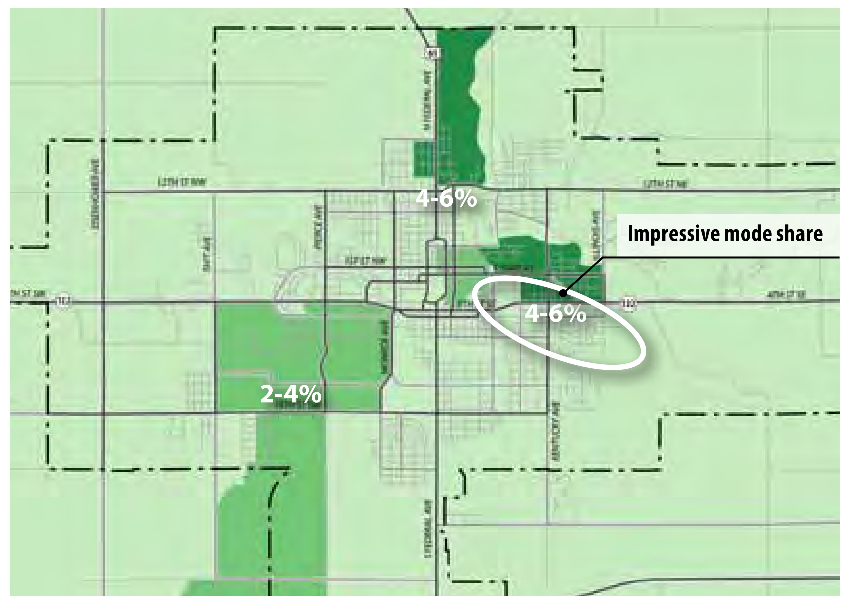
Map 6.3: % Commute by Public Transportation



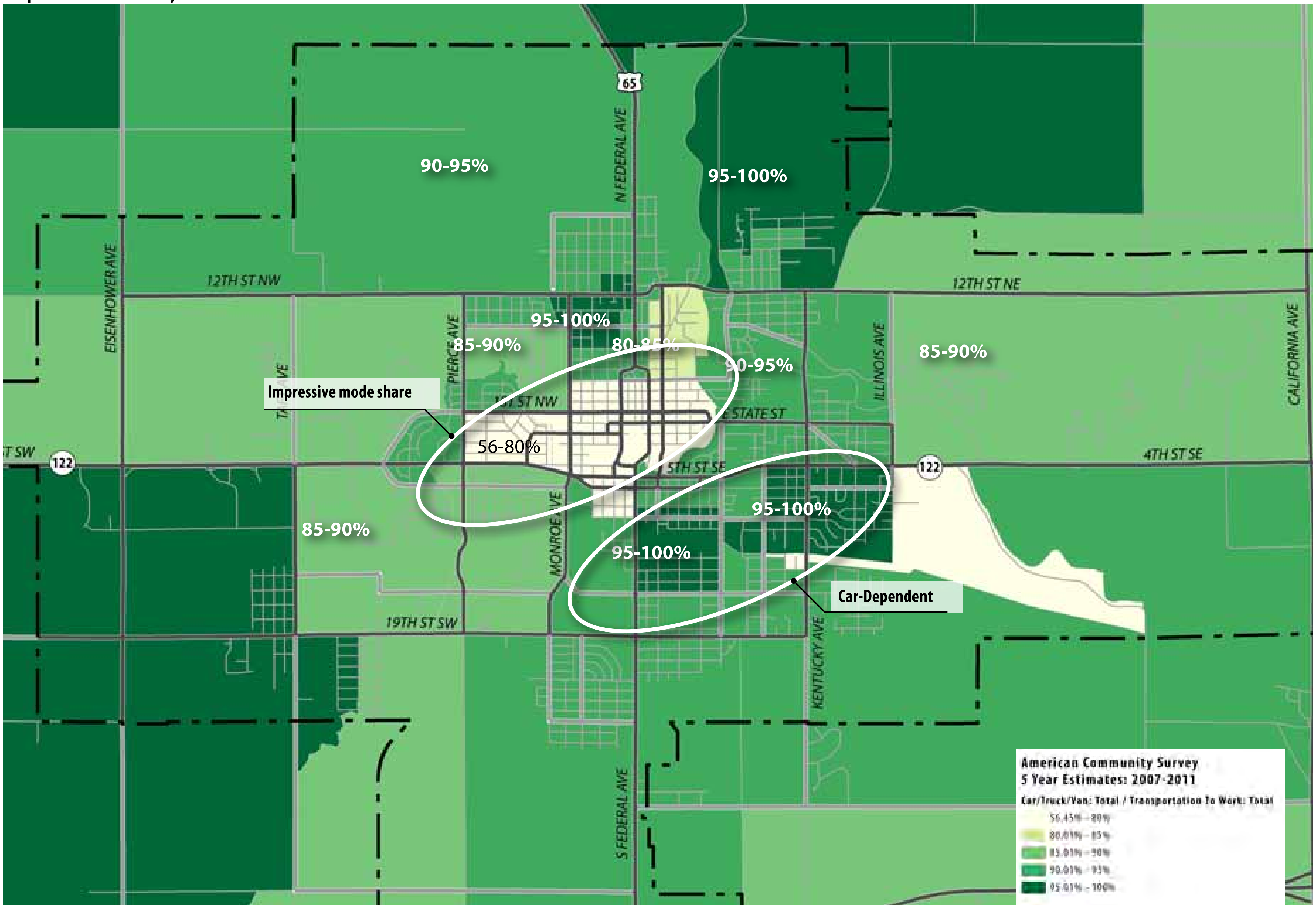
Map 6.2: % Commute by Walking

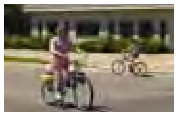


Map 6.4: % Commute by Bicycle



Map 6.5: Commute by Car





WALK SCORE

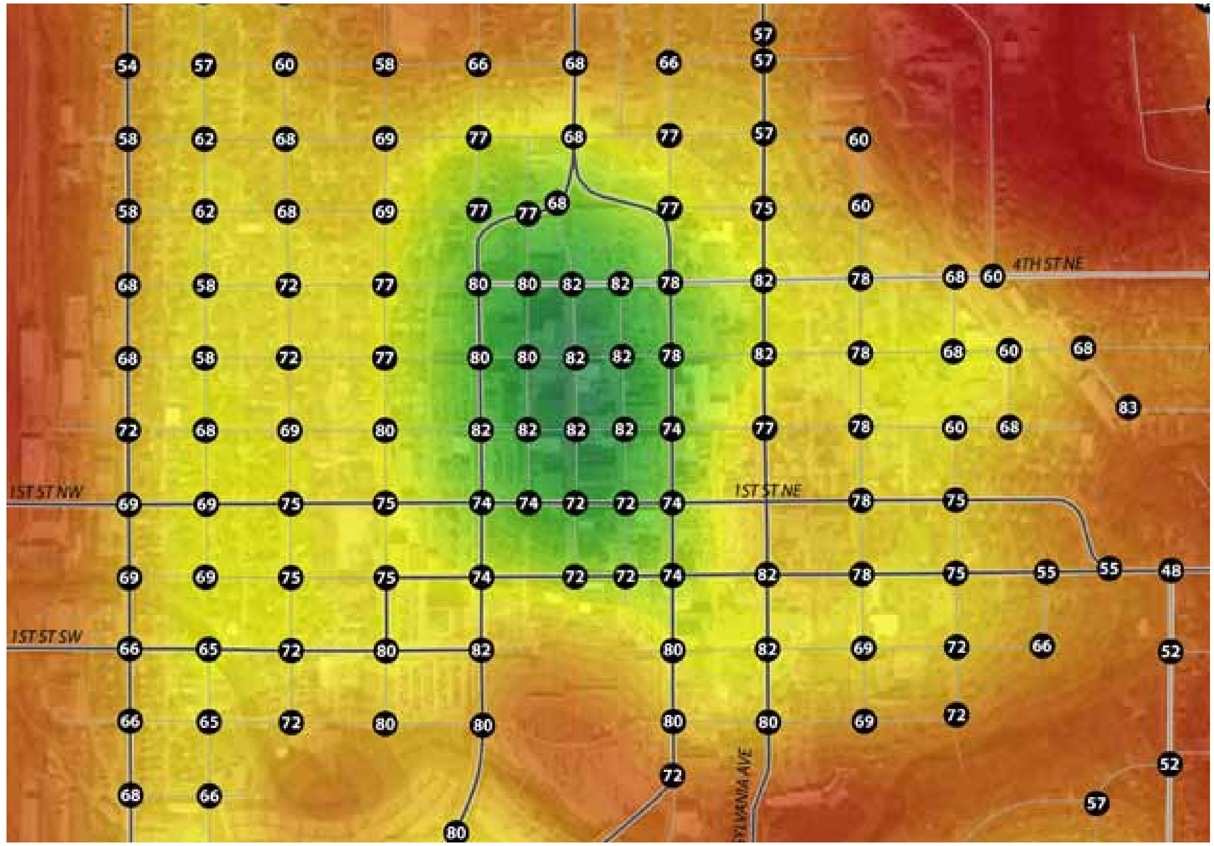
WalkScore.com is a website that maps the walkability of communities throughout the United States and other countries. The website indicates that the scores "measure walkability on a scale from 0 - 100 based on walking routes to destinations such as grocery stores, schools, parks, restaurants, and retail." The scoring system excludes connectivity of streets and sidewalks that lead to destinations, but indicates areas that may experience a higher demand for walking to destinations.

Overall, Mason City's walkability score is 36, and described as car-dependent with most errands requiring a car.

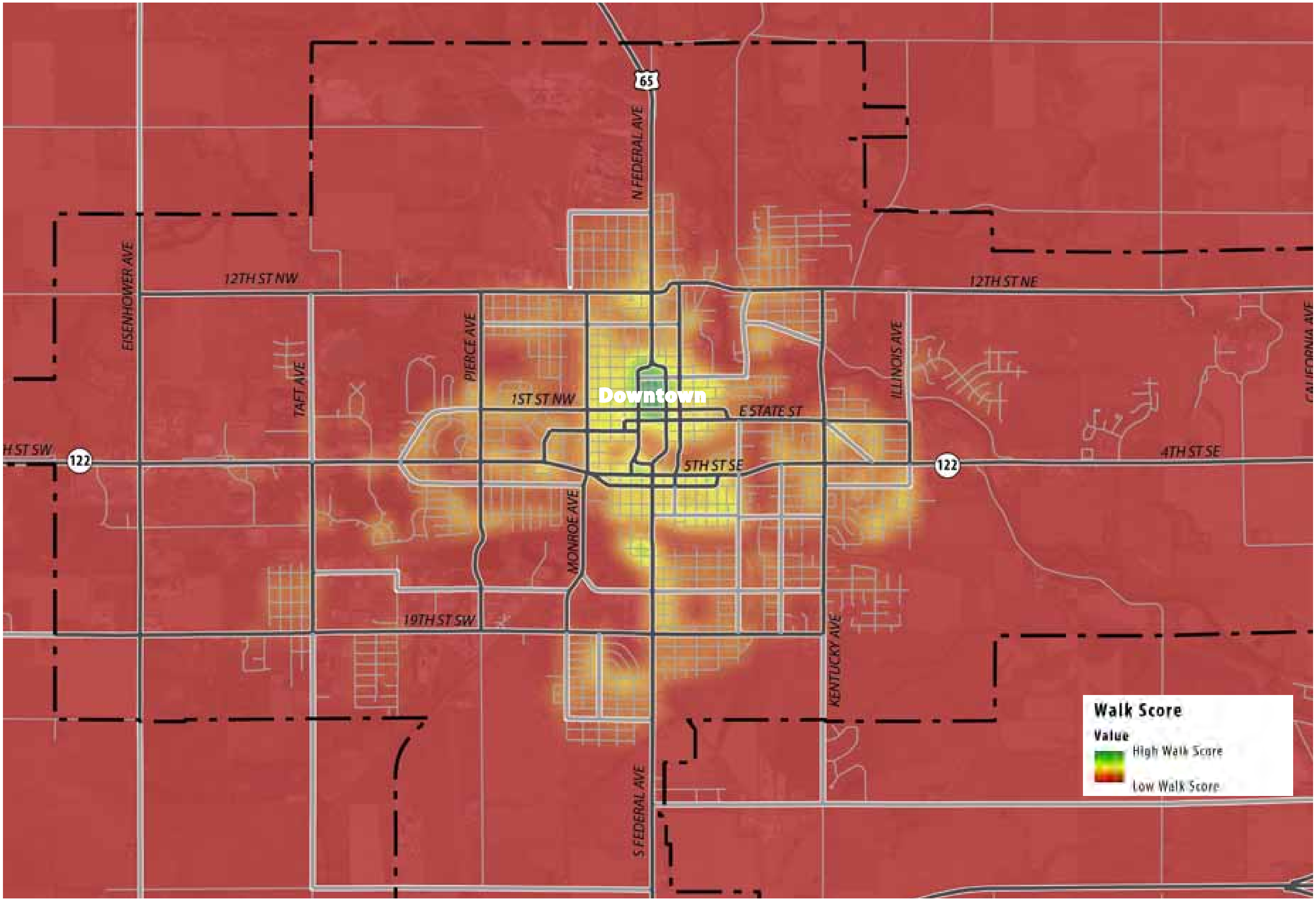
Map 6.6: Central Mason City Walkability shows the score of individual intersections in the downtown area. The colors of the map indicate the walkability of the area being higher in the downtown core, then declining away from the central city. Federal Avenue received the highest score in Downtown with 82.

Map 6.7: City of Mason City Walkability is a heat map reflecting the walkability scores for the entire community. Downtown remains the area with the highest scores for walkability. The area was designed for the pedestrian - buildings are built to the property line and host a variety of uses scaling from first floor service to upper-story housing and offices. The clustering of restaurants, cafes, hospitality, daily needs, and shopping create a set of amenities that influences people's sense of destination. People will walk blocks to their destination if they sense that they have already arrived.

Map 6.6: Walkability Scores of Downtown Mason City, 2013



Map 6.7: Walkability Scores of Mason City, 2013



Source: www.walkscore.com

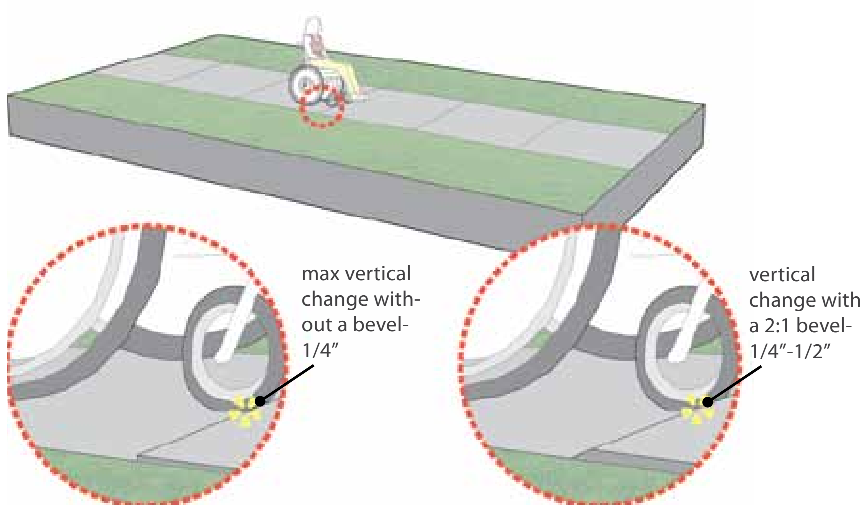
SIDEWALK ASSESSMENT

The process of evaluating Mason City's sidewalk system was conducted by a windshield survey for a majority of the community, with more detailed investigation near schools. Hundreds of photos were taken and field notes recorded. This data was transposed to GIS for future use by City staff.

Reports of damaged walks are not precise, but intended to reflect the frequency of damaged walks for a block. The survey identifies existing sidewalks in good condition, sidewalks that need improvement, gaps, and intersections where sidewalks do not comply with ADA standards. The level of detail shown in this survey is not part of the project's original scope, but included nonetheless. The assessment indicates patterns in the pedestrian environment that show the level of connectivity in neighborhoods.

The survey classifies sidewalks into the following categories:

- Existing sidewalk, Good Condition. Sidewalk is present and in good condition.
- Existing sidewalk, Needs Improvement. Sidewalk is present and obstruction is present. In general, improvements were based on whether a sidewalk was passable by wheelchair or stroller. Impairments may include: (1) concrete plates do not align, creating a tripping hazard; (2) significant cracking; (3) concrete damaged by use of salt and other chemicals; (4) heaving as a result of uprooting of trees; (5) too narrow of a walkway; and/or (6) overgrowth of plants in walkway or over walkway.
- Gaps. No sidewalk is present.



- ADA Intersection. Sidewalks at an intersection do not meet ADA requirements. Typical issues include: (1) no ramps at all, (2) ramp going in a single direction, or (3) obstruction in the path. The presence of truncated domes was not considered as part of the evaluation.

Pedestrian Traffic Counts. Mason City should conduct annual counts for pedestrians, bicyclists, and other forms of transportation/recreation at the following intersections. Counts should be conducted from 4pm to 7pm over the course of a week, and conducted twice a year. The City of Des Moines recruits volunteers to conduct surveys in return for rewards sponsored by restaurants. More intersections may be added.

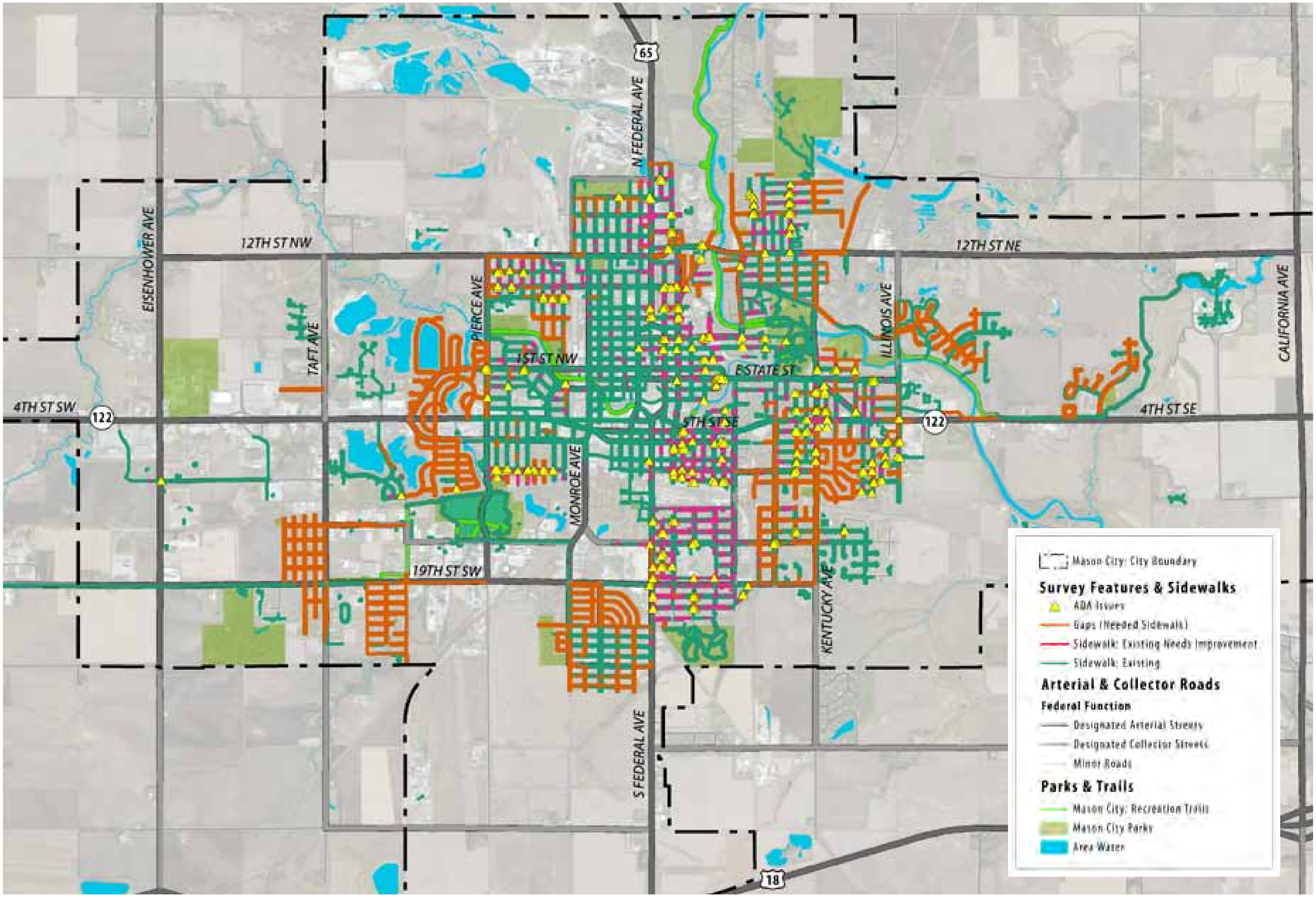
- E State Street and Delaware Avenue
- E State Street and Kentucky Avenue
- E State Street and N Virginia Avenue
- 5th Street SW and S Monroe Avenue
- 5th Street SE and South Carolina Avenue
- 4th Street SE and Maple Drive
- 12th Street NW and N Monroe Avenue
- 15th Street S and S Federal Avenue
- 1st Street NW and Crescent Drive

Patterns in the Environment. The following spread displays images of sidewalks in poor and good condition. Subsequent maps show a closer view of Map 6.8 by quadrant.

In general, older neighborhoods have aging sidewalks that are experiencing occasional heaving from uprooting of trees and cracking.

The most evident challenge is retrofitting intersections to comply with ADA requirements.

Map 6.8: Sidewalk Conditions Snapshot, 2013



Undesirable practices.


No sidewalk


Incomplete sidewalk


Obstructions


Deteriorating sidewalk


Cracking sidewalk


Material transition


Steps

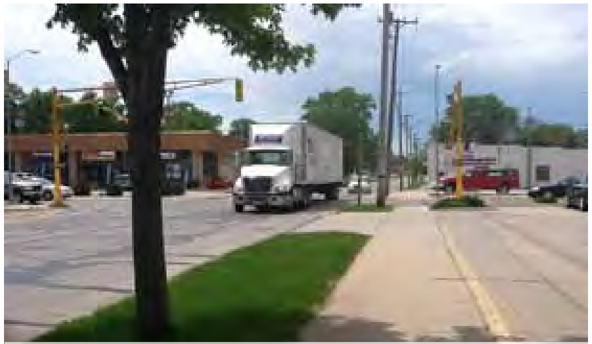

Overgrowth obstructions


Impaired Sidewalk

Desirable practices


Continuous walkway


Neighborhood

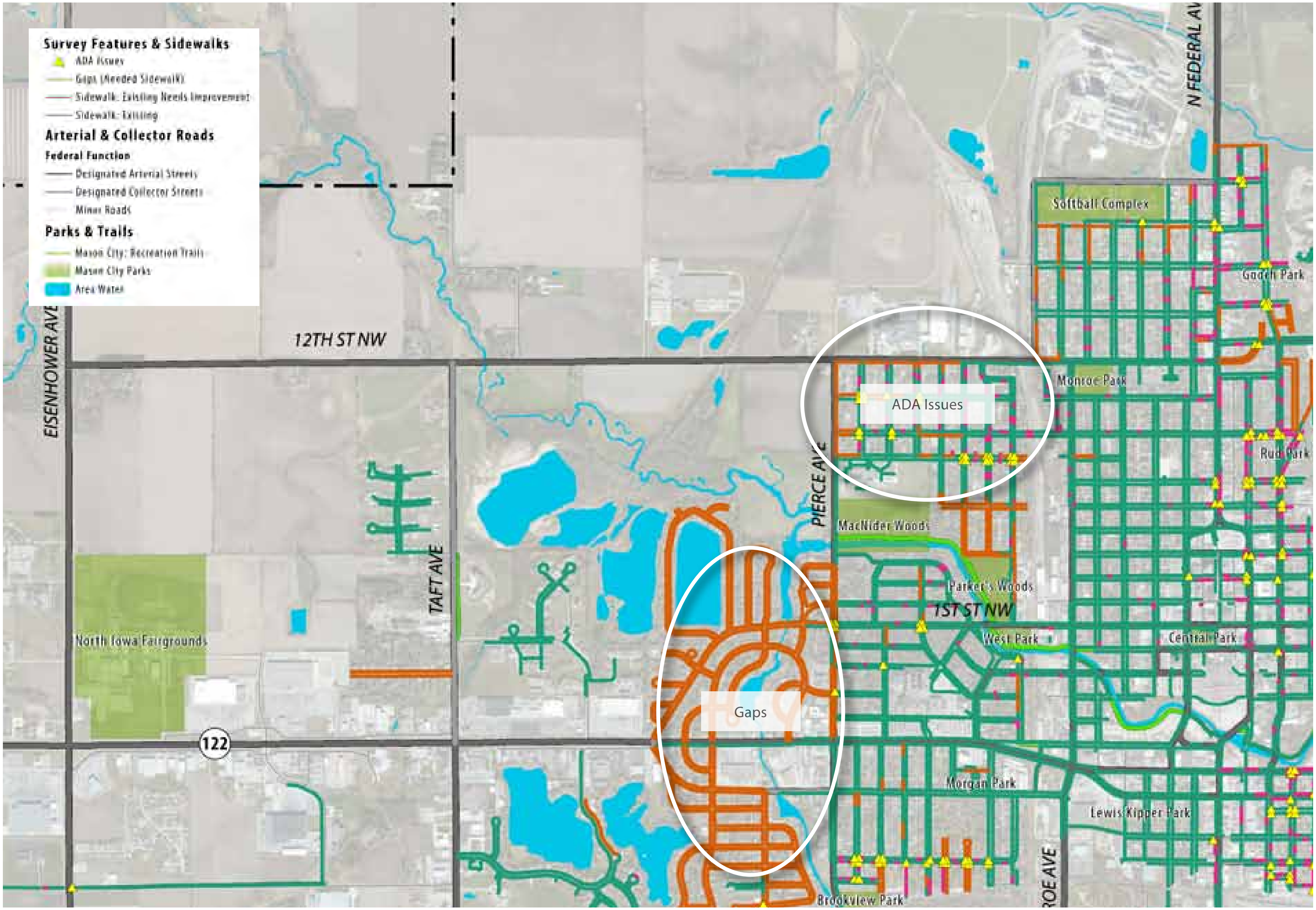

Buffer from busy street


Connections over busy street

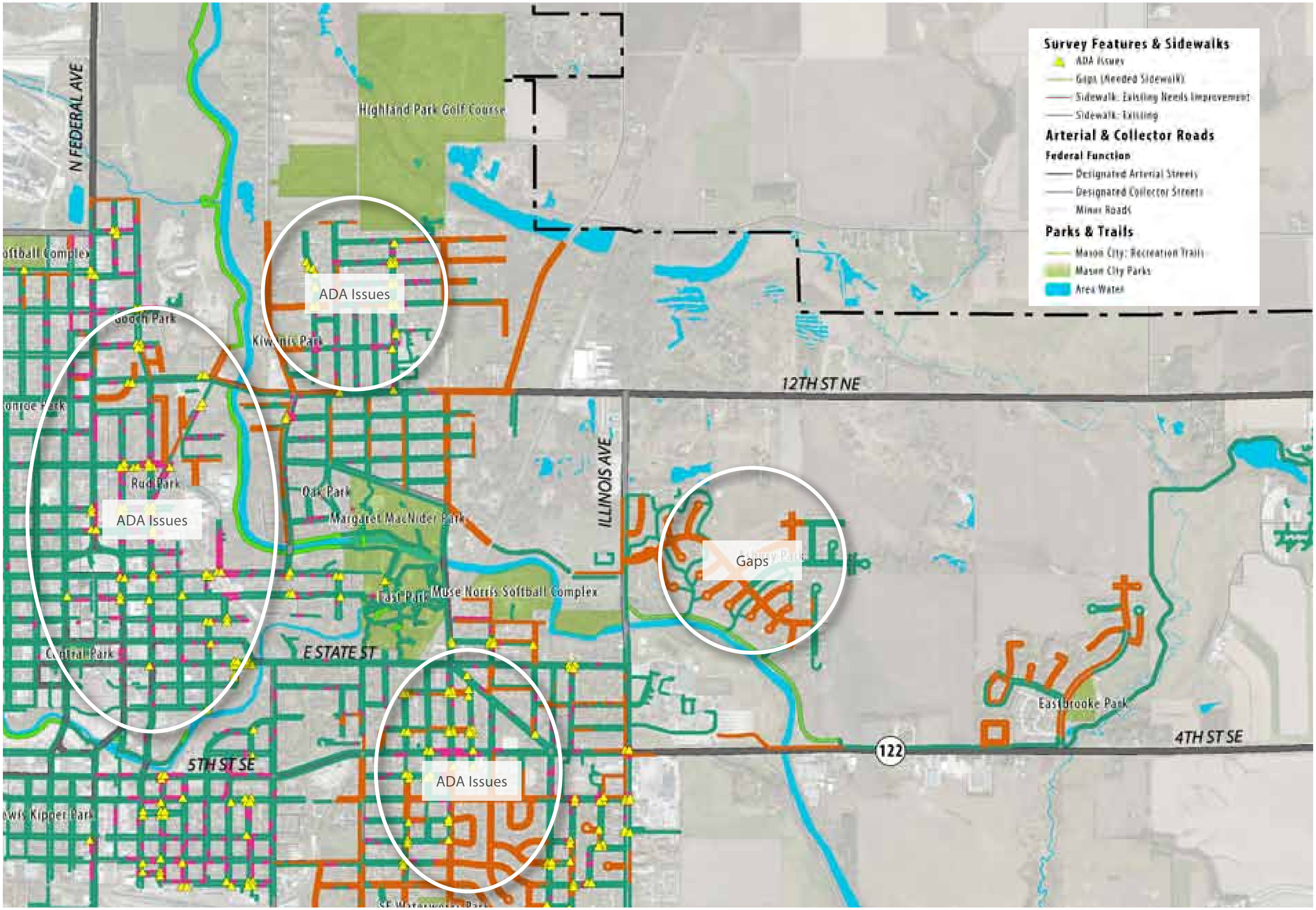

No overgrowth obstructions


Downtown

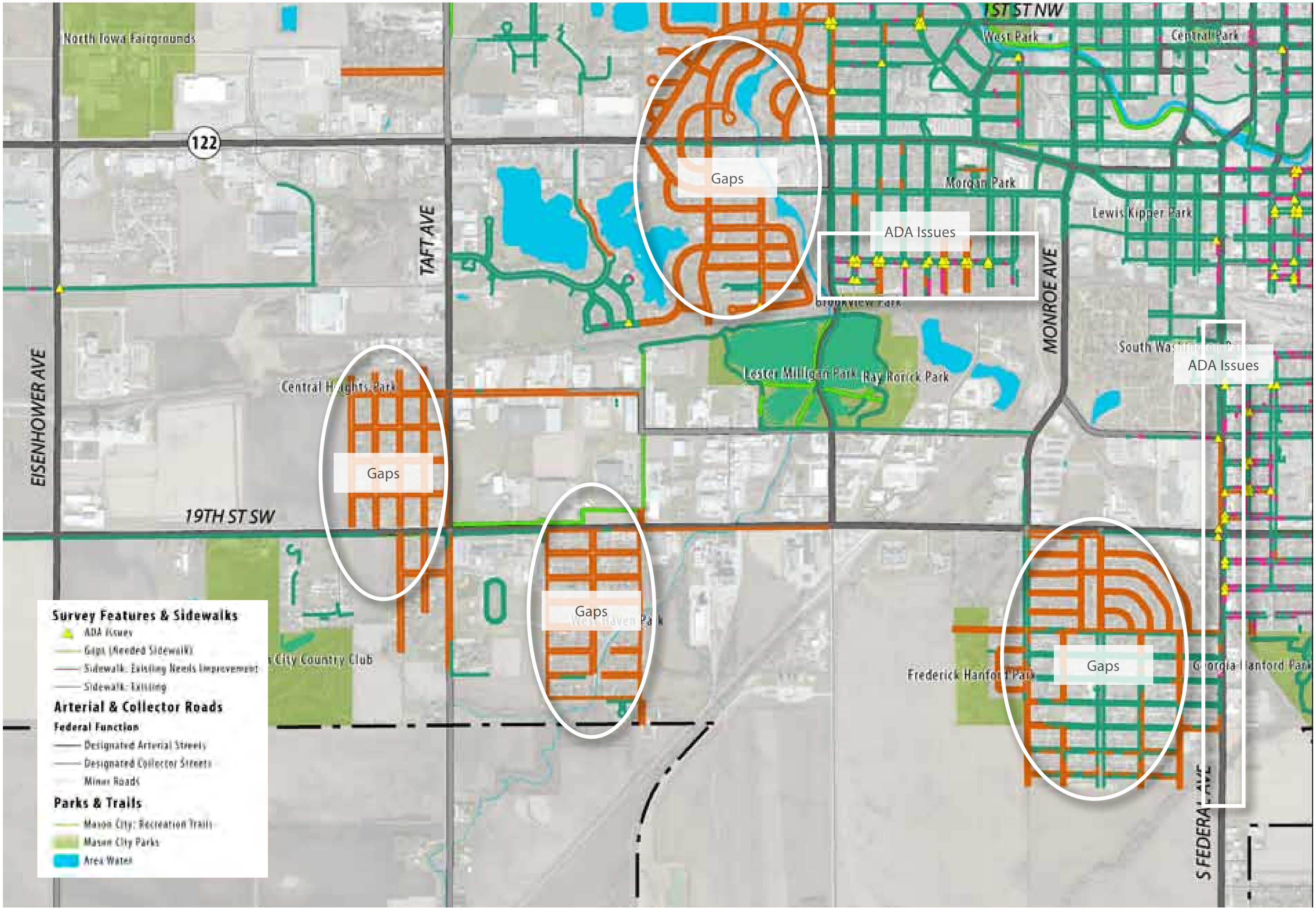
Map 6.8 NW: Northwest Quadrant Sidewalk Conditions



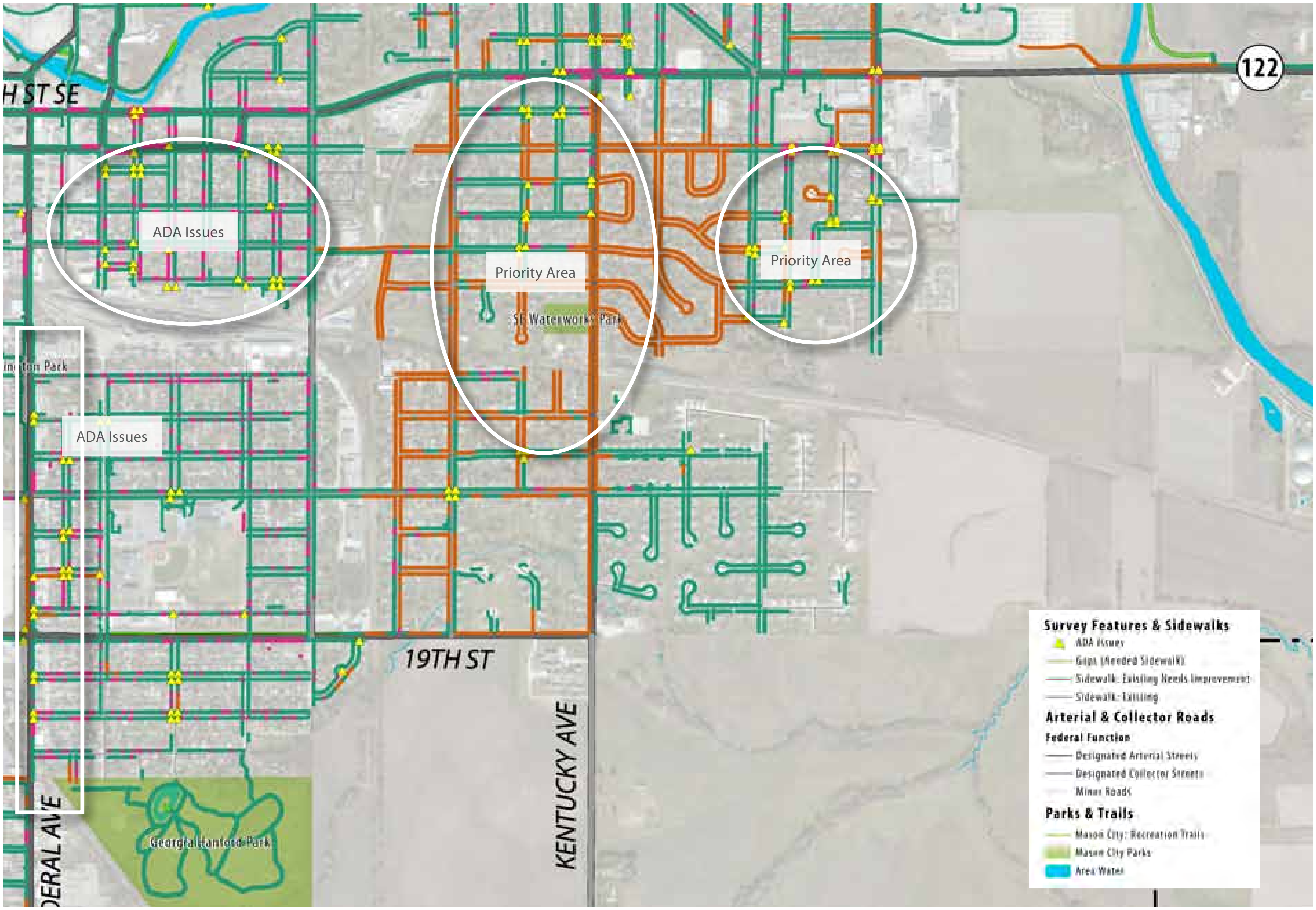
Map 6.8 NE: Northeast Quadrant Sidewalk Conditions



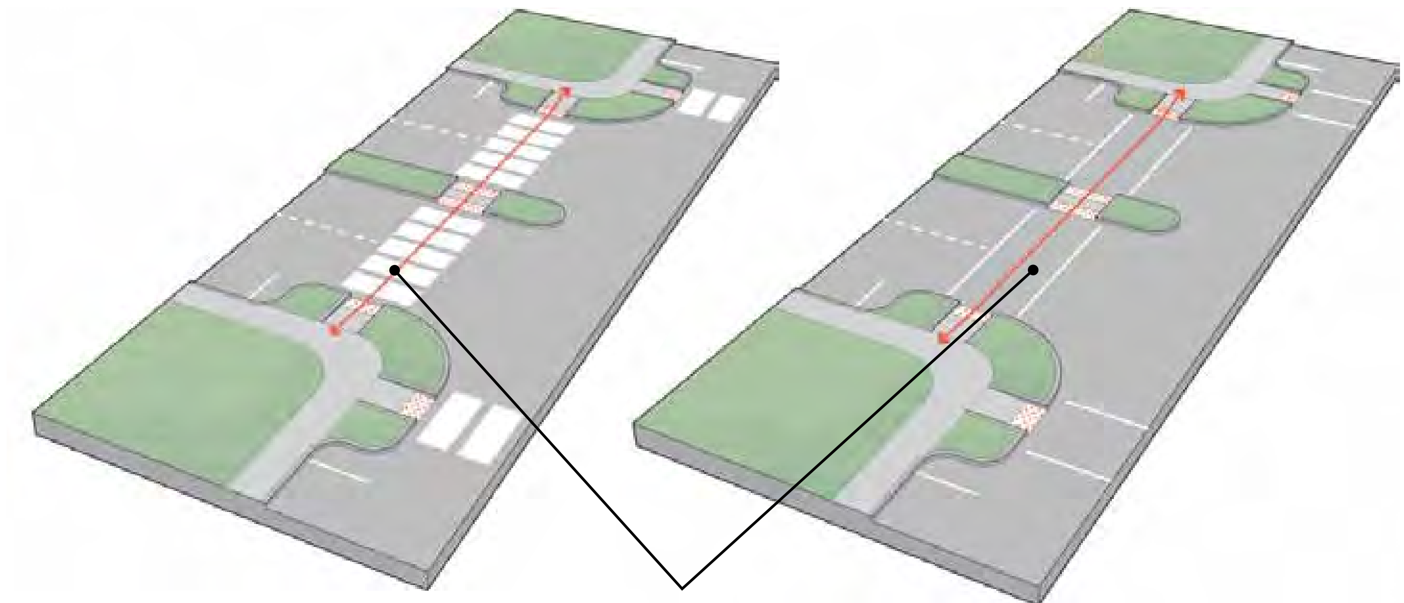
Map 6.8 SW: Southwest Quadrant Sidewalk Conditions



Map 6.8 SE: Southeast Quadrant Sidewalk Conditions



Medians and Pedestrian Refuge Islands. Medians and pedestrian refuge islands at street crossings shall be cut through level with the street or comply with the curb ramp requirements. The clear width of pedestrian access routes within medians and pedestrian refuge islands shall be a minimum 5.0 feet. If a raised median is not wider than 6 feet, it is recommended the nose not be placed in the pedestrian street crossing (SUDAS Chapter 12 Section 12A-2).

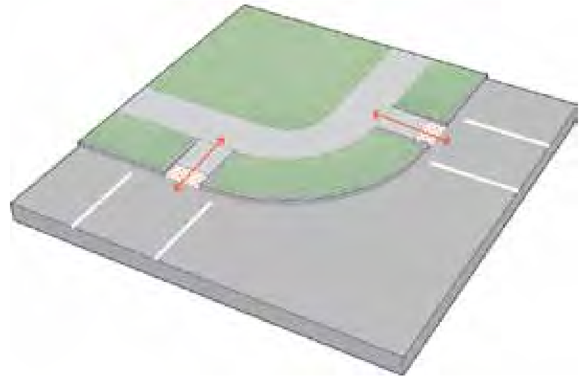


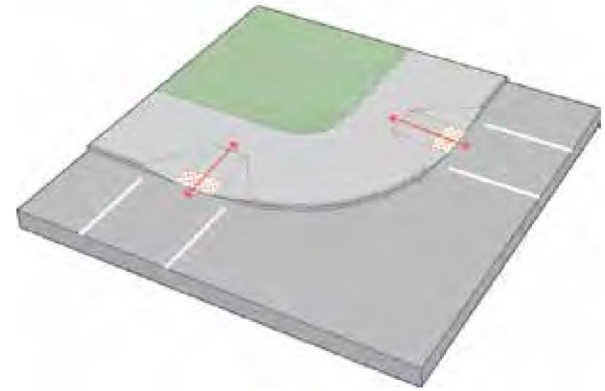
Ladder Striping vs Parallel Lines. Ladder striping can be seen better by motorists and pedestrians, while parallel lines is a more affordable application.

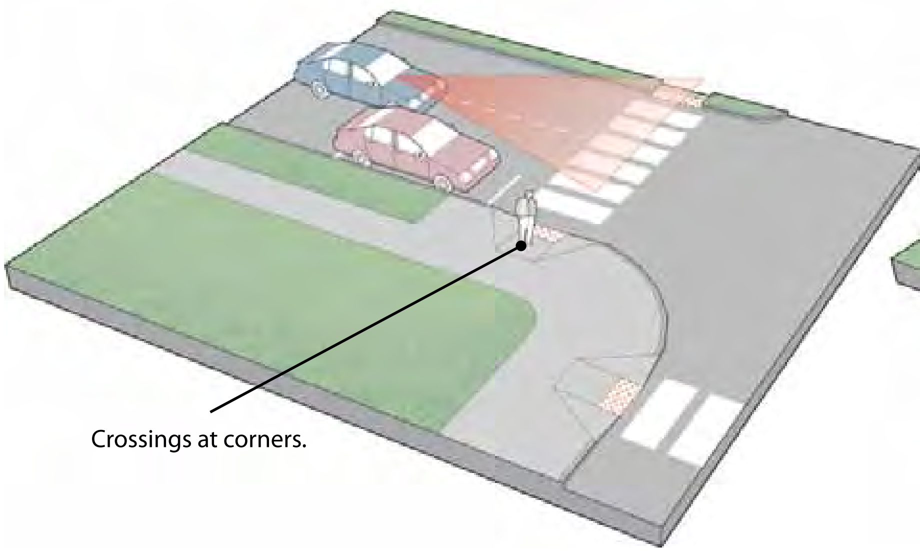
4-Lane Road with Refuge - River Drive in Davenport

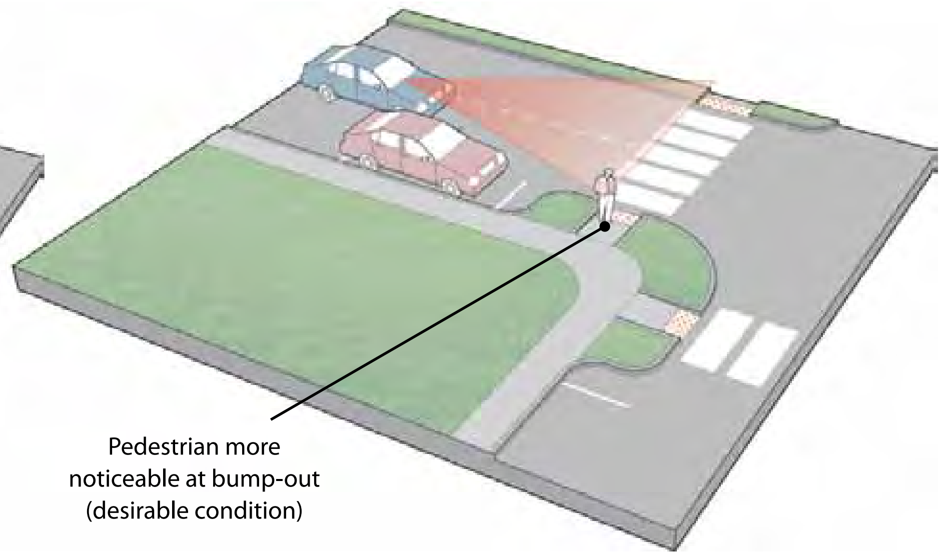
Parallel Line Simulation

Ladder Crossing Simulation







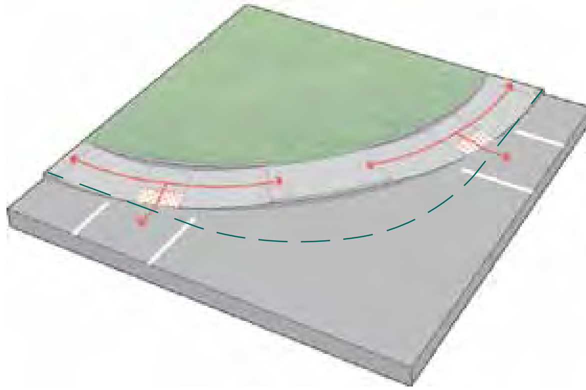


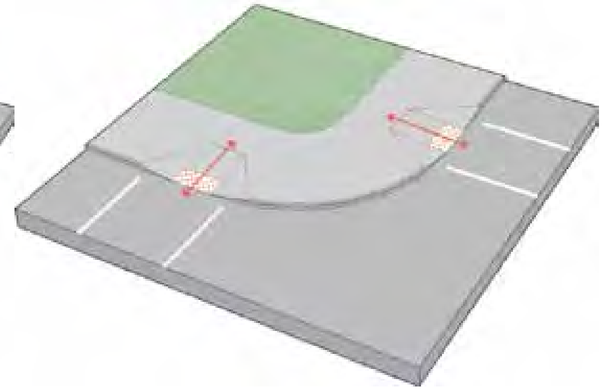
Crossing Locations. Awareness between drivers and pedestrians increase with improved visibility. Crossing should be located near the intersection. The illustrations above show desirable alignments for pedestrian crossings.

Therefore, curb ramps and pedestrian street crossings should be located as close to the edge of the adjacent traveled lane as practical. Where a stop sign or yield sign is provided, MUTCD requires the pedestrian street crossing, whether marked or unmarked, be located a minimum of 4 feet from the sign, between the sign and the intersection. It is recommended stop and yield signs be located no greater than 30 feet from the edge of the intersecting roadway; however, MUTCD allows up to 50 feet. Consult MUTCD for placement of curb ramps and pedestrian street crossings at signalized intersections (SUDAS Chapter 12 Section 12A-2).

Corner Radius

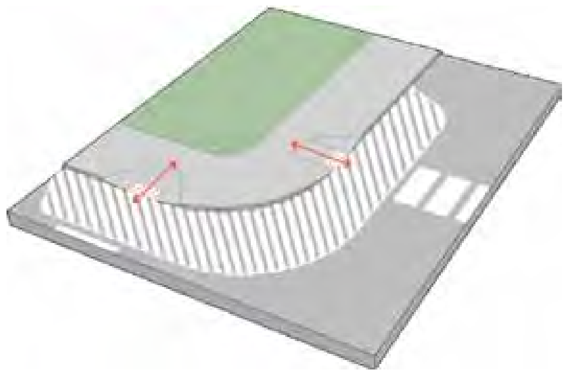
A tighter corner radius slows down the motorist when turning, while a broader radius encourages motorists to move faster through the intersection. The design of the corner improves the mobility of motorists at the cost of reducing safety for the pedestrian. Both practices to the right are acceptable. However, a tighter radius is preferred for pedestrian safety.





Bump-Outs

Bump-outs calm traffic, protect the edge of diagonal parking, and make streets more crossable for pedestrians. Bump-outs may include planting beds, including tree planting, paving, and street furniture. The nodes may also include interpretive graphics and public art.



Midblock bump-out in La Crosse, WI

Bump-outs in Omaha

Virtual Bump-Out in Esparto, CA

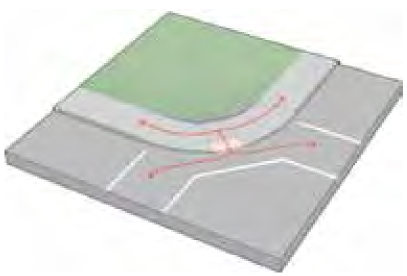
Desirable Practices. Photos indicate desirable practices at intersections in various urban settings in Mason City.

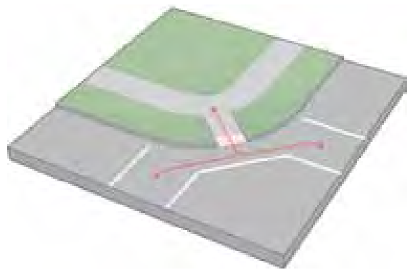
Downtown

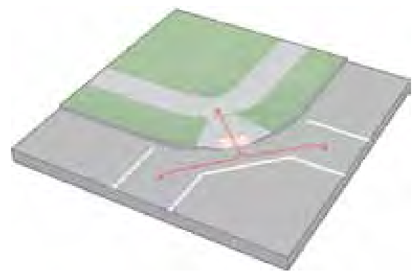
Neighborhoods

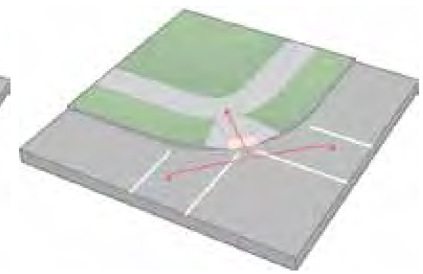
Neighborhoods (Update pedestrian signage)

Undesirable Practices. Intersection design should avoid directing pedestrians into the center of the intersection. The illustrations below represent examples of intersections witnessed in Mason City (Monroe Avenue and 5th Street). Photographs represent situations where intersections need to be completed or retrofitted.



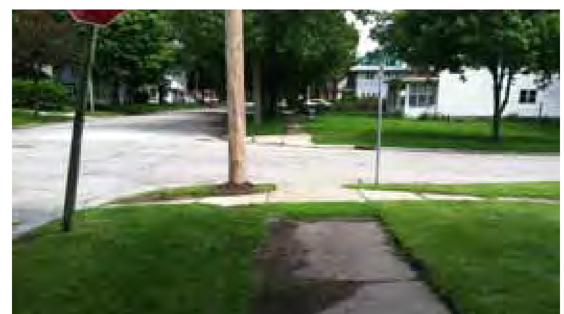






Incomplete corners

Drain intakes (hazards) at intersection



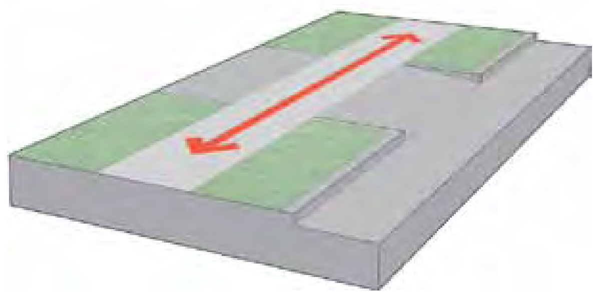
Incomplete corners

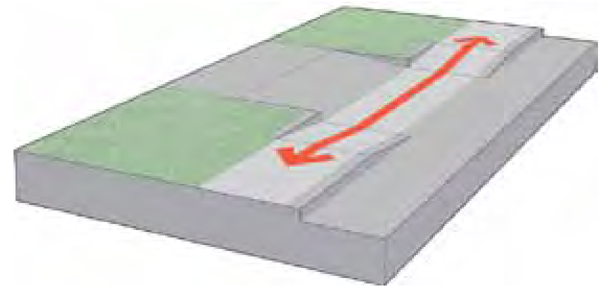
Driveway Tool Guide

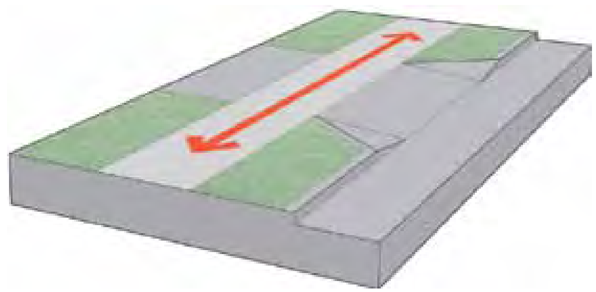
Sidewalks in existing neighborhoods should provide continuous access. The alignment of the sidewalk to the driveway is an important junction. Sidewalks should be flush with the driveway and allow the pedestrian to walk on an unobstructed path.

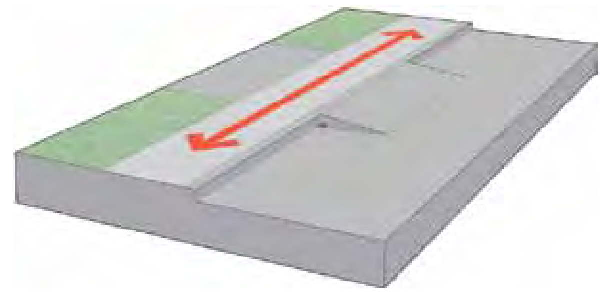
The figures on this page identify typical points of junction between sidewalks and driveways. Typical features include:

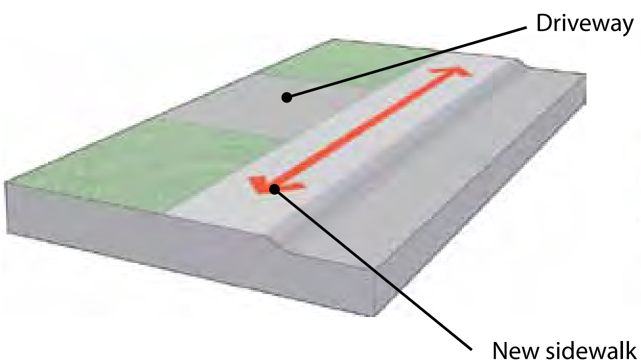
- **Consistent Setback.** Preferably, sidewalks are setback from the curb to (1) allow for space to plant trees and (2) prevent snow from being plowed from the street to the sidewalks. Sidewalks may meander, however subtly.
- Width. Sidewalk widths should be consistent throughout neighborhood and be a minimum of 4 feet.
- Material. Sidewalks should be constructed of concrete. Pavers and stones are irregular and do not provide a consistent surface.
- Maintenance. Property owners are responsible for keeping sidewalks clean and free of snow

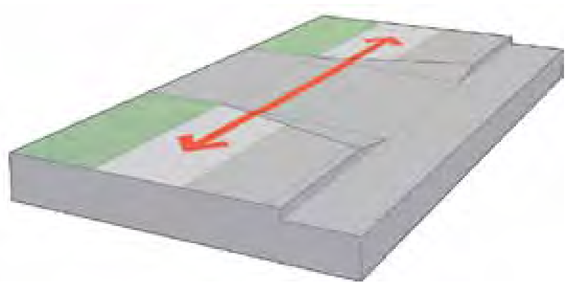


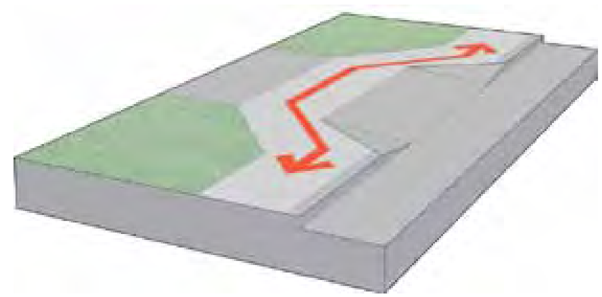








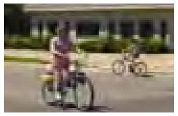




- Painting pavement markings, excluding parking stall delineations
- Crack filling and sealing
- Surface sealing
- Chip seals
- Slurry seals
- Fog seals
- Scrub sealing
- Joint crack seals
- Joint repairs
- Dowel bar retrofit
- Spot high-friction treatments
- Diamond grinding
- Minor street patching (<50% of the pedestrian street crossing area)
- Curb and gutter repair or patching outside the pedestrian street crossing
- Minor sidewalk repair that does not include the turning space and curb ramps
- Filling potholes

If a project involves work not included in the list above, or is a combination of several maintenance items occurring at or near the same time, the agency administering the project is responsible for determining if the project should be considered maintenance or an alteration (SUDAS Chapter 12 Section 12A-2).

Midblock Crossing in Davis, CA



DEMONSTRATIONS

Crossing median with pedestrian signal.

Crossing refuge

Highway 122 and 19th Street. Both Streets provide excellent east-west circulation, yet have relatively poor circulation for pedestrians.

Central Park. Central Park is Mason City's principal park in downtown that experiences significant traffic daily and during special events. Access and walkability of this park is paramount.

Highway 122. Highway 122 is a four-lane arterial that bisects the city in half. The majority of the City's highway-oriented retail businesses, located west of Cerro Gordo Way, are not served by sidewalks and intersections do not accommodate pedestrians. Sidewalks are present along the corridor from Cerro Gordo Way (near Kmart) to Illinois Avenue (near Mason City High School). The western portion of Highway 122 is an auto-oriented corridor with few to no amenities for pedestrians.

This plan proposes to establish sidewalks on frontage roads parallel to Highway 122. Sidewalks can be placed on either side of the street. Sidewalks on the business side provide more direct access and more consistent maintenance, while the highway side provides less interruption for driveways. The span from Taft Avenue to Tiffany Drive requires the most significant design. Altogether, a corridor study for Highway 122 is underway, and should include modifying the one-way pairs from Monroe to Massachusetts Avenue. Sidewalks along the entire corridor will provide pedestrians a dedicated space along the corridor and provide much needed circulation along the city's principal east-west route.

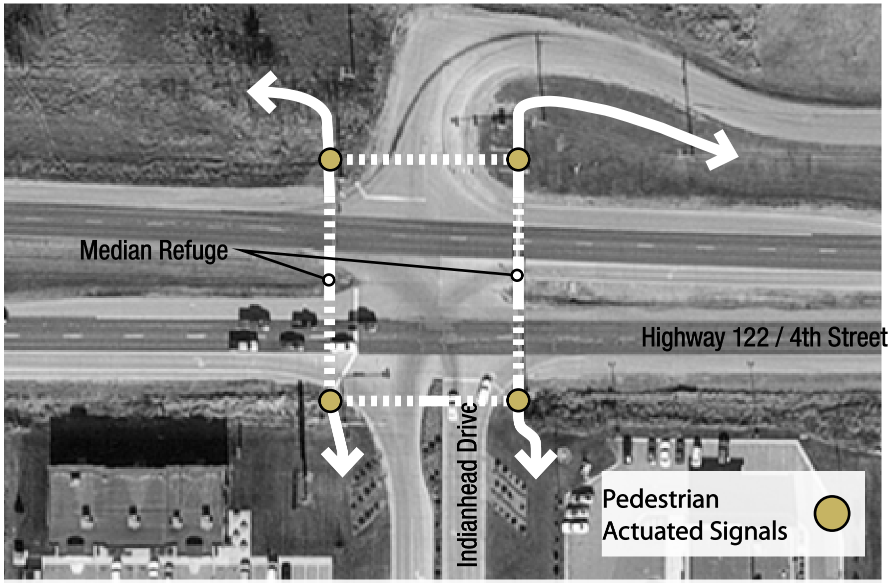
Adapting the western half of Highway 122 should include:

- **Medians.** Establishing medians can be curbed or open. MLK Parkway, a four-lane street in Des Moines, is curbed and raised with landscaping and lighting. Intersections are designed for improved safety and convenience for pedestrians. The investment in the public environment and care for pedestrian safety calms the speed of traffic.

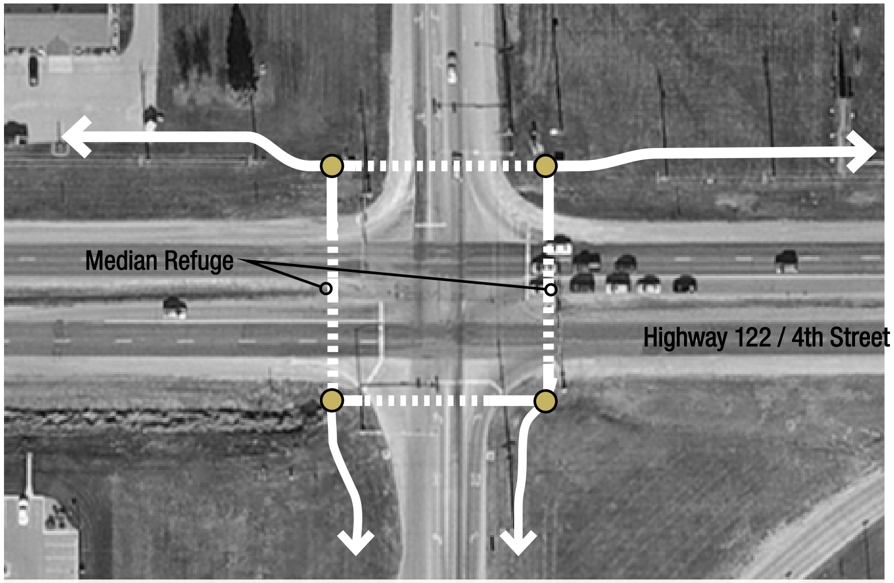
- **Pedestrian Refuges.** The width of Highway 122 and design of the intersections lends priority to the motorist. Placing crossing refuges near right-turn lanes and adapting medians for pedestrians will improve safety at intersections.

- **Pedestrian-Actuated Signals.** Pedestrian signals and countdown timers should be installed at each intersection. Pedestrian-actuated signals can interrupt the cycle to give pedestrians priority. Countdown timers (with audible signals) inform pedestrians on the time remaining to cross, while also alerting motorists to slowdown for an oncoming red light. Some intersections could be retrofitted with a median pedestrian signal.

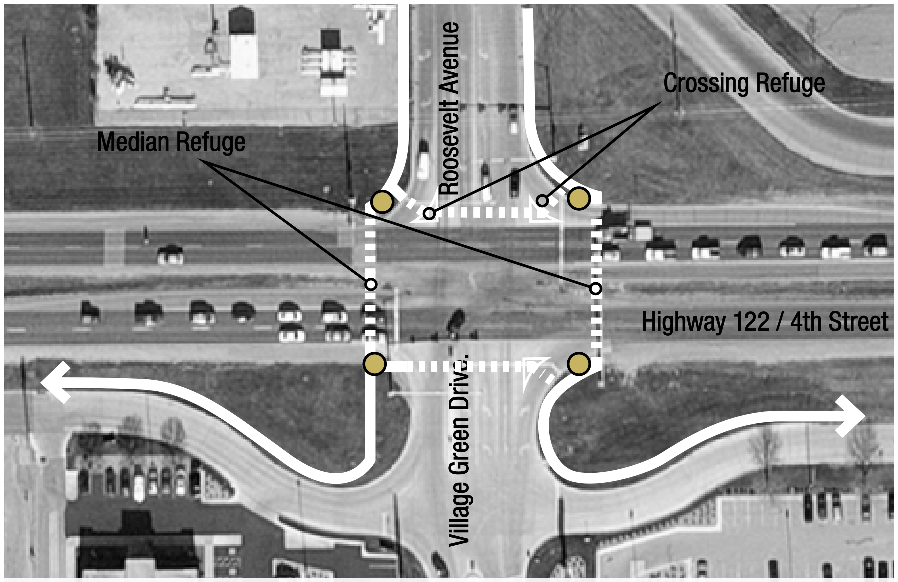
- **Streetscape Amenities.** Lighting, street trees, shrubs, flowers, banners, and public art are all features that calm the speed of motorists. Also, they help provide a sense of design for the community.



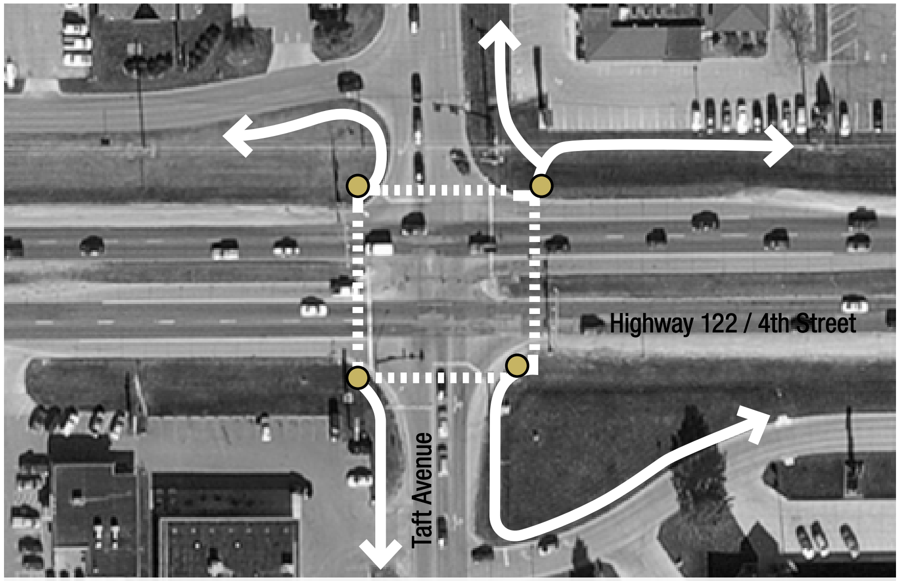
Highway 122 Crossing at Indianhead Drive



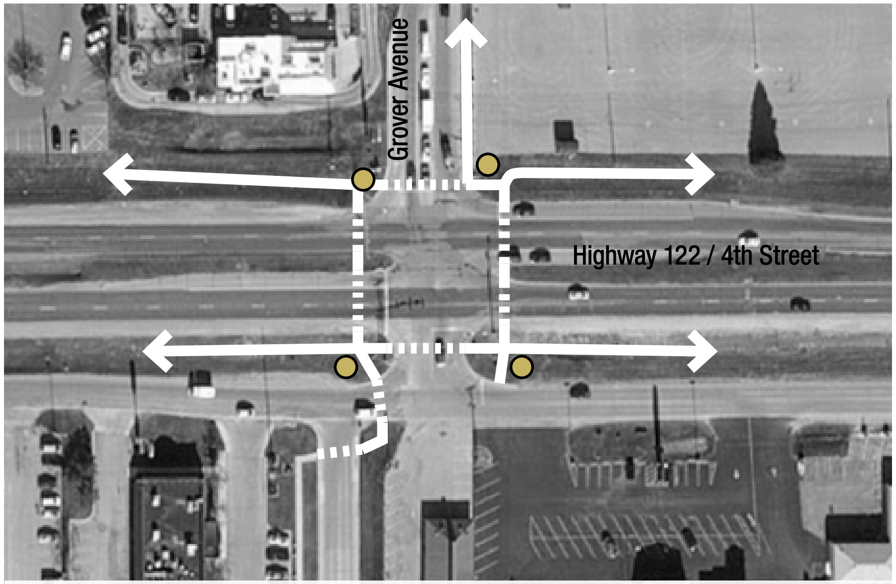
Highway 122 Crossing at S Eisenhower Avenue.



Highway 122 Crossing at Roovevelt Avenue. / Village Green Drive.

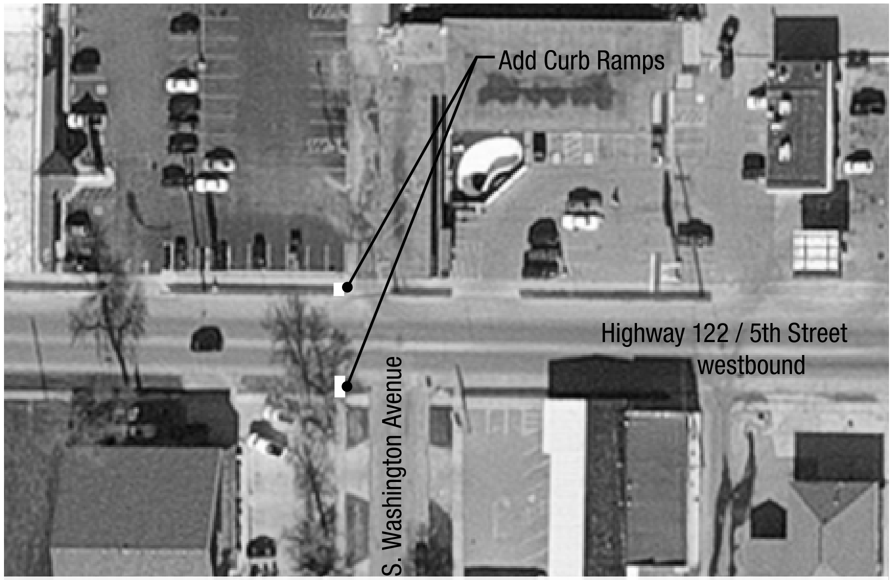


Highway 122 Crossing at S Taft Avenue.

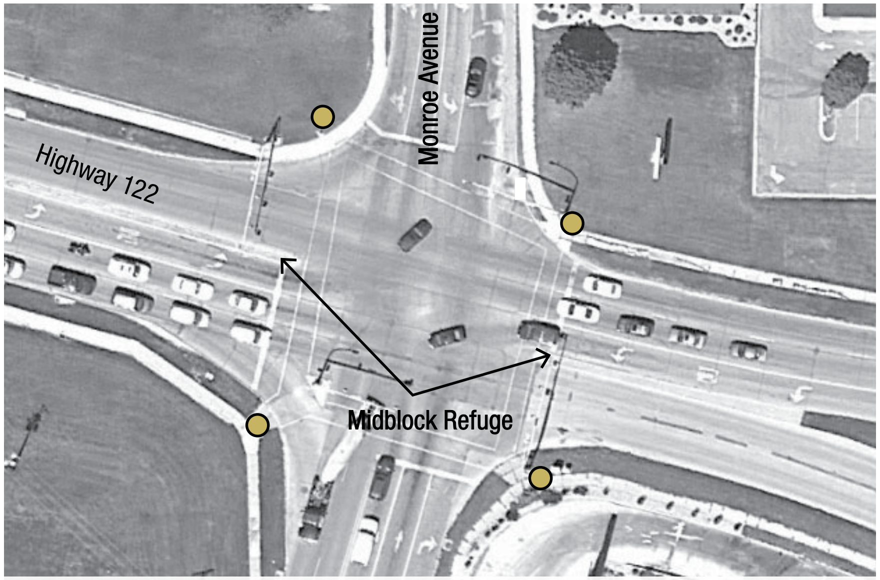


Highway 122 Crossing at Grover Avenue

Highway 122 Crossing at Garfield Avenue



Highway 122 Crossing at Washington Avenue

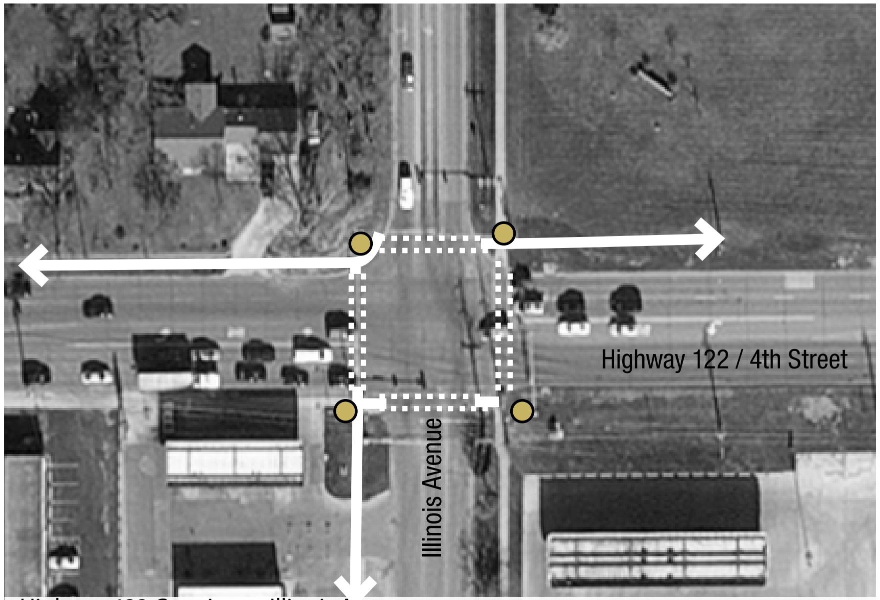


Highway 122 Crossing at Monroe Avenue

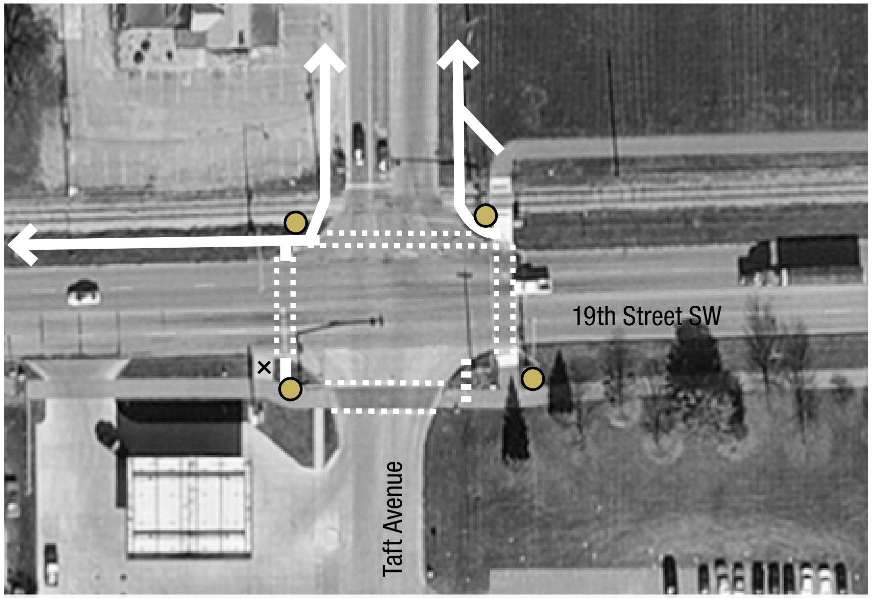
Highway 122 Crossing at S Louisiana/Maple Drive
Closed Street (Possible Scenario)

Highway 122 Crossing at S Louisiana/Maple Drive
Redirected Street (Possible Scenario)

1st Street and Crescent Drive

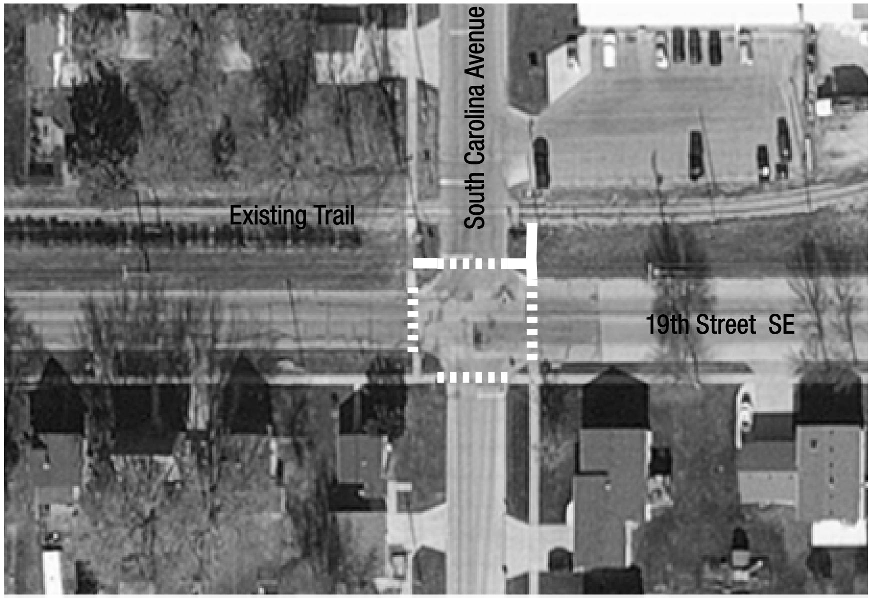


Highway 122 Crossing at Illinois Avenue



19th Street SW and Taft Avenue

19th Street SW and Monroe Avenue

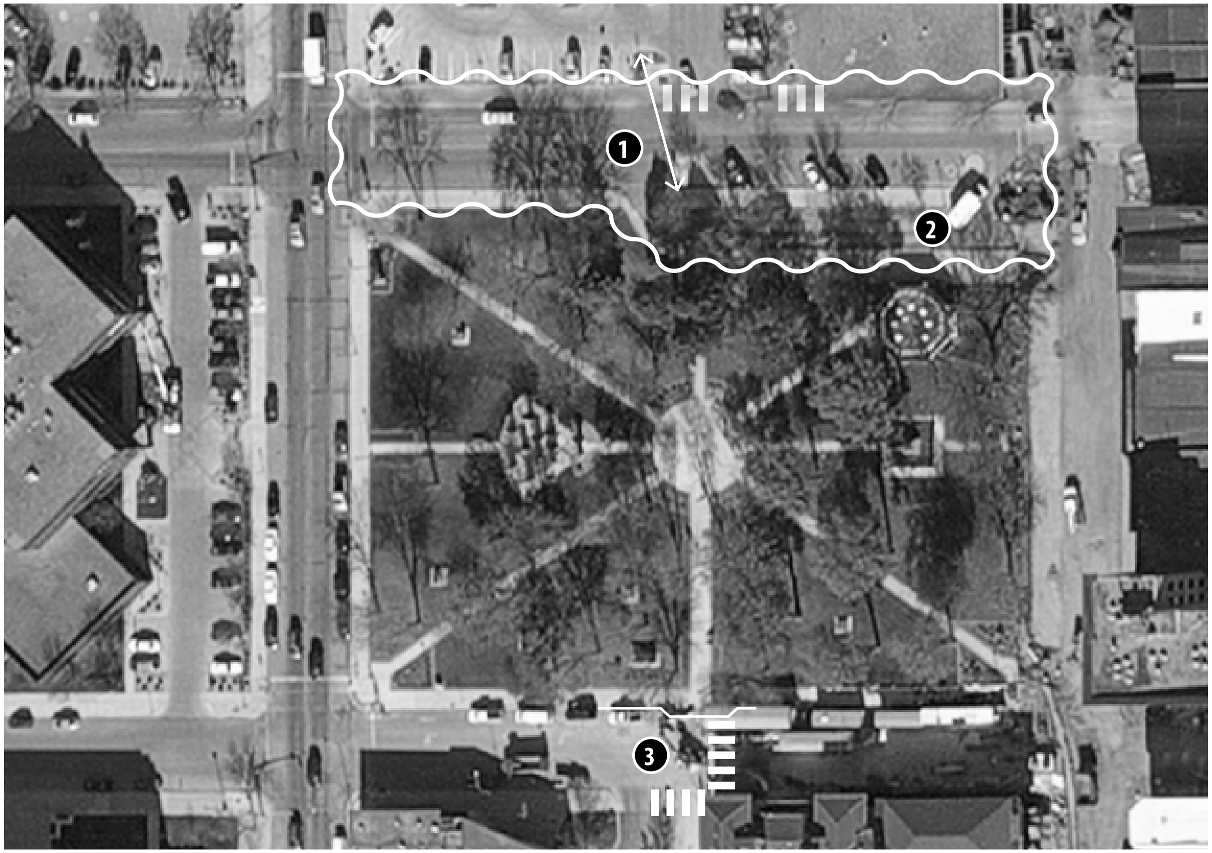


19th Street SE and South Carolina Avenue

19th Street SE and S Rhode Island Court

Central Park

1. **Central Park Crossings**. Pedestrian connections to the transit hub are indirect and inconvenient from the public parking lot.
2. **Central Park Circulation.** The transit hub influences the design and function of the park. The area could be repurposed.
3. **Midblock Crossing.** Pedestrians crossing between the hotel and park could be defined by a midblock crossing, steering pedestrians away from crossing in the middle of the street.



North Federal Avenue Curve

1. **Virtual Crosswalk.** Painting pathways in the parking lot will direct pedestrians, and limit walking in the street.
2. **Signage and Stripes.** Signage prior to and at crossings alert the motorist of pedestrians. Ladder stripping increases visibility of the crosswalk at greater distances. Pedestrians signs at crossings should flash when in use. Despite these safety improvements, the pedestrian should cross with care.
3. **Redirect crossings.** Crossing points are not aligned at ideal locations and should be redirect-


Poor visibility of oncoming traffic

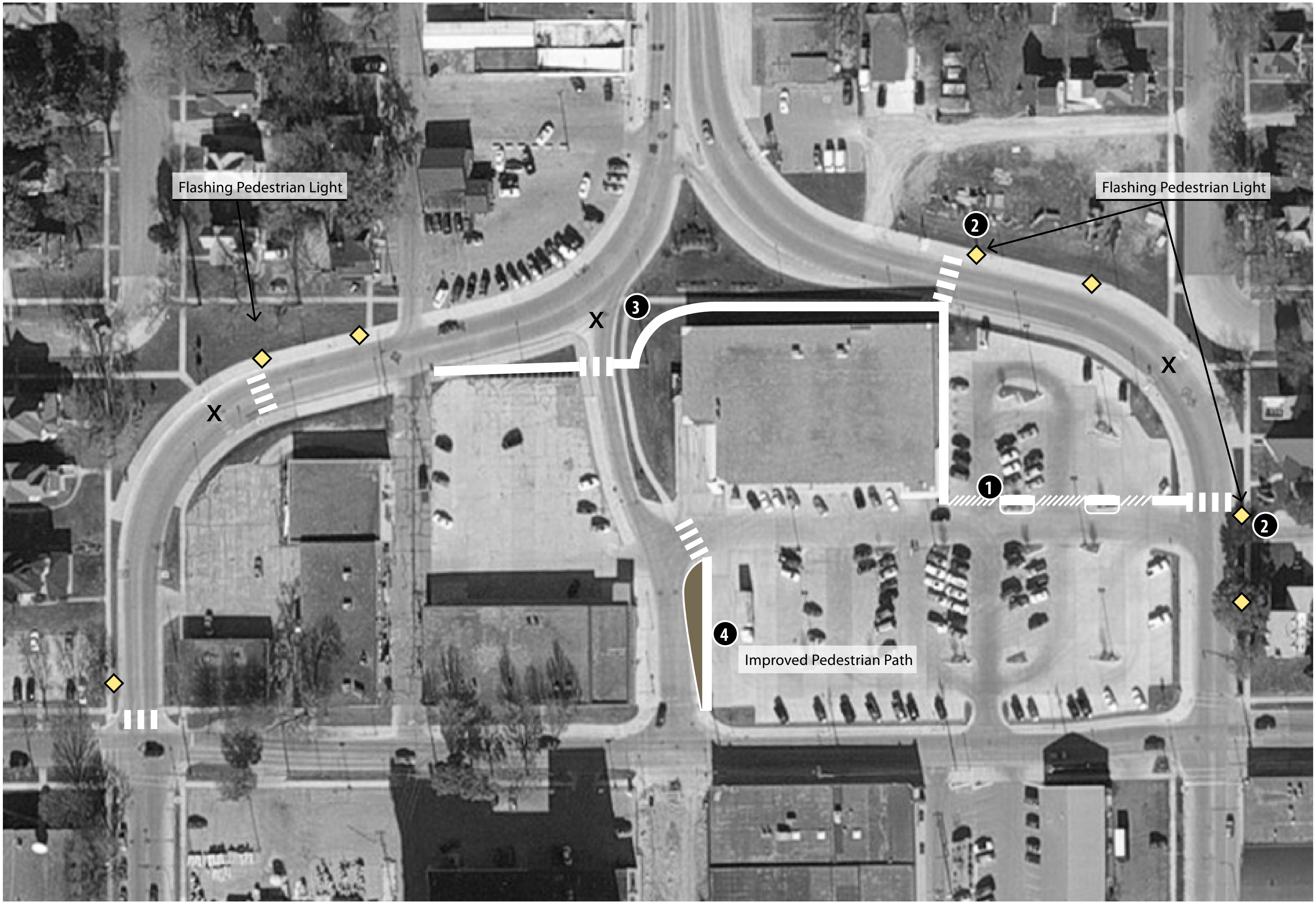

Northbound curve Delaware Avenue to Federal Avenue

Virtual Crosswalk created by paint

Signage and ladder stripping crosswalk

Poor visibility of oncoming traffic - Southbound curve Federal Avenue to Washington Avenue

Map 6.9: Demonstration of Improving Crosswalks



PRIORITY CRITERIA

Completing the entire sidewalk system will need to be accomplished through an incremental process that requires setting priorities and evaluating new conditions along the way.

Evaluative criteria apply questions such as the following to specific sidewalk projects when they are considered.

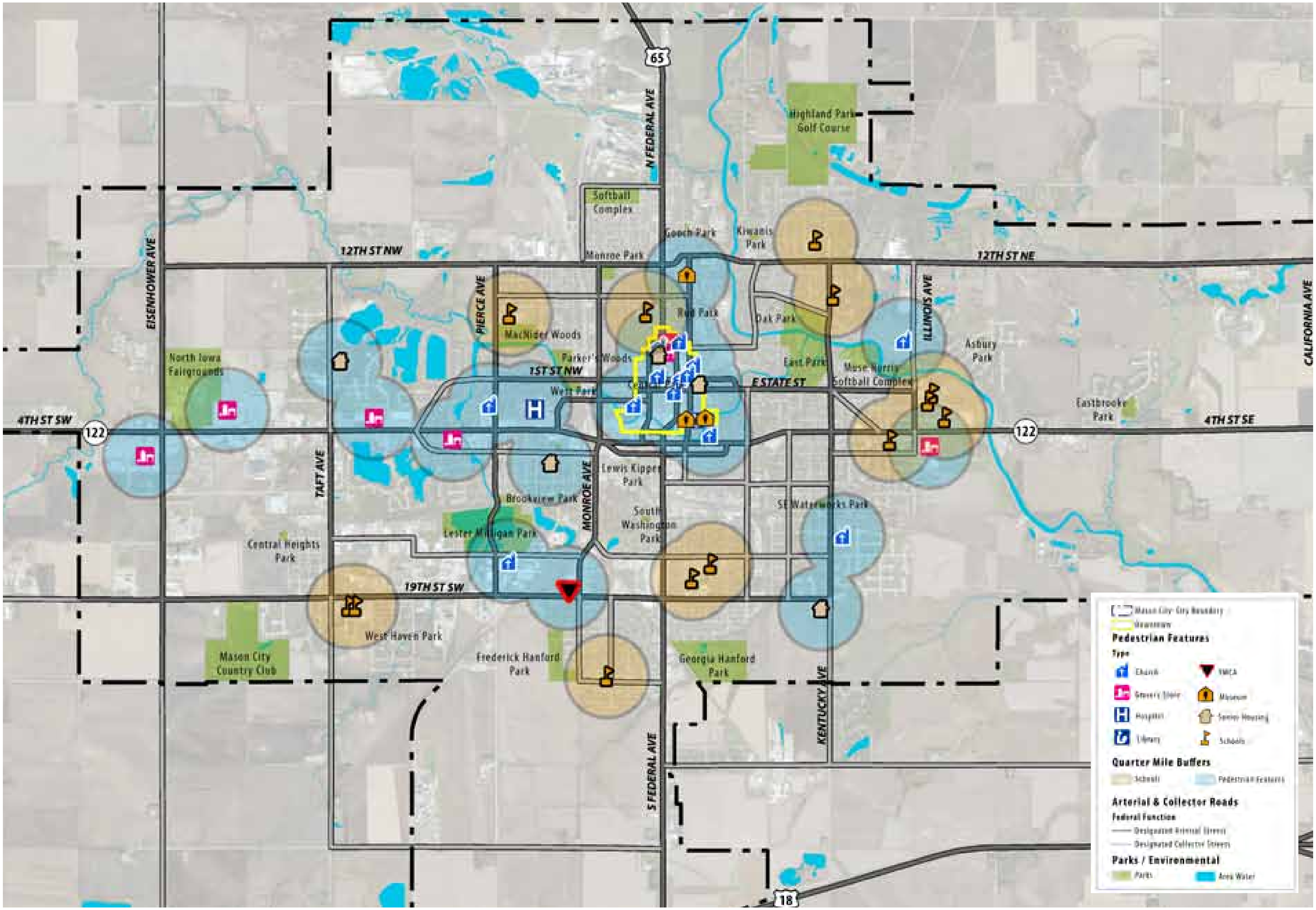
- Does the sidewalk **connect** important resources, such as schools to neighborhoods?
- Does the sidewalk provide **continuity and integrity** to the surrounding vicinity and overall system?
- Does the sidewalk create a **safer** path for pedestrians?
- Does the sidewalk generate community support or consensus?
- What is the sidewalk's potential to **transform the image** of the area?
- Does the sidewalk **respond to a specific need** for improved trail facilities?
- Does the sidewalk incorporate and **leverage outside funding sources,** such as state grants or charitable contributions?
- Is the engineering and cost feasible to construct?
- Does the sidewalk yield economic development opportunities?

The key to successful implementation will be to establish priorities based on the specific benefits of the project.

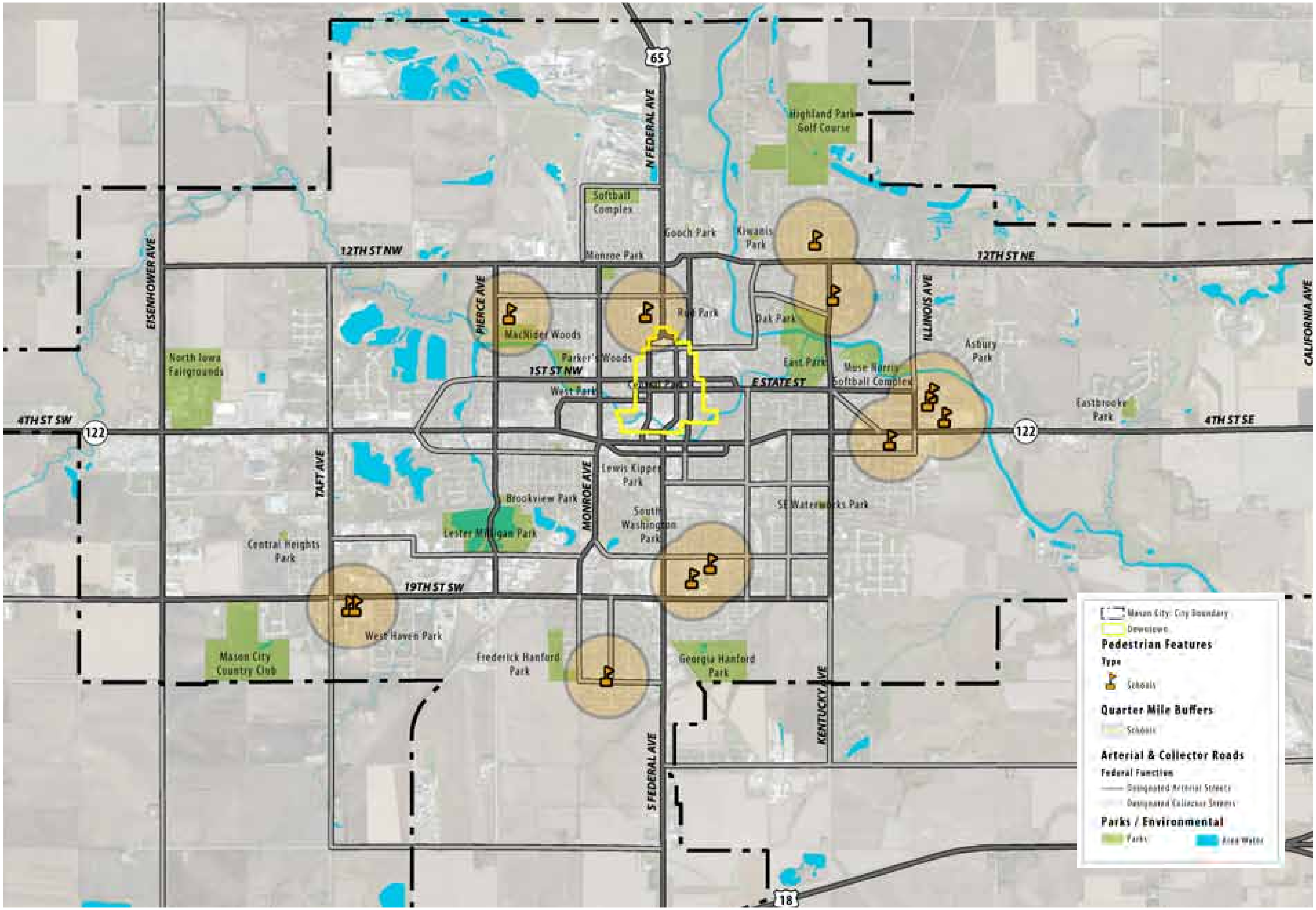
The criteria for Mason City's sidewalk system begins with identifying individual destinations and the quarter-mile area surrounding the destination. These target areas help establish a system of priorities that connect residents to amenities in the community. Destinations are further refined by school at attractions.

- **Schools.** Mason City completed a Safe Routes to School Plan.
- **Shopping Centers.** Providing convenience to downtown,and services along the Highways.
- **Employment Centers.** Providing convenience between homes and places of employment will encourage people to travel to work by alternative means.
- **Neighborhoods.** Connecting residents to businesses and work places, providing convenient trips by sidewalk.
- **Parks and Trails.** Completing the citywide trail plan will connect users to the city's parks and open spaces. Prioritizing the construction of the trails to create loops will increase their usability.
- **Community Attractions and Service Centers.** Library, Museums, Music Man Square, Churches, Hospital, Senior Center and senior housing.

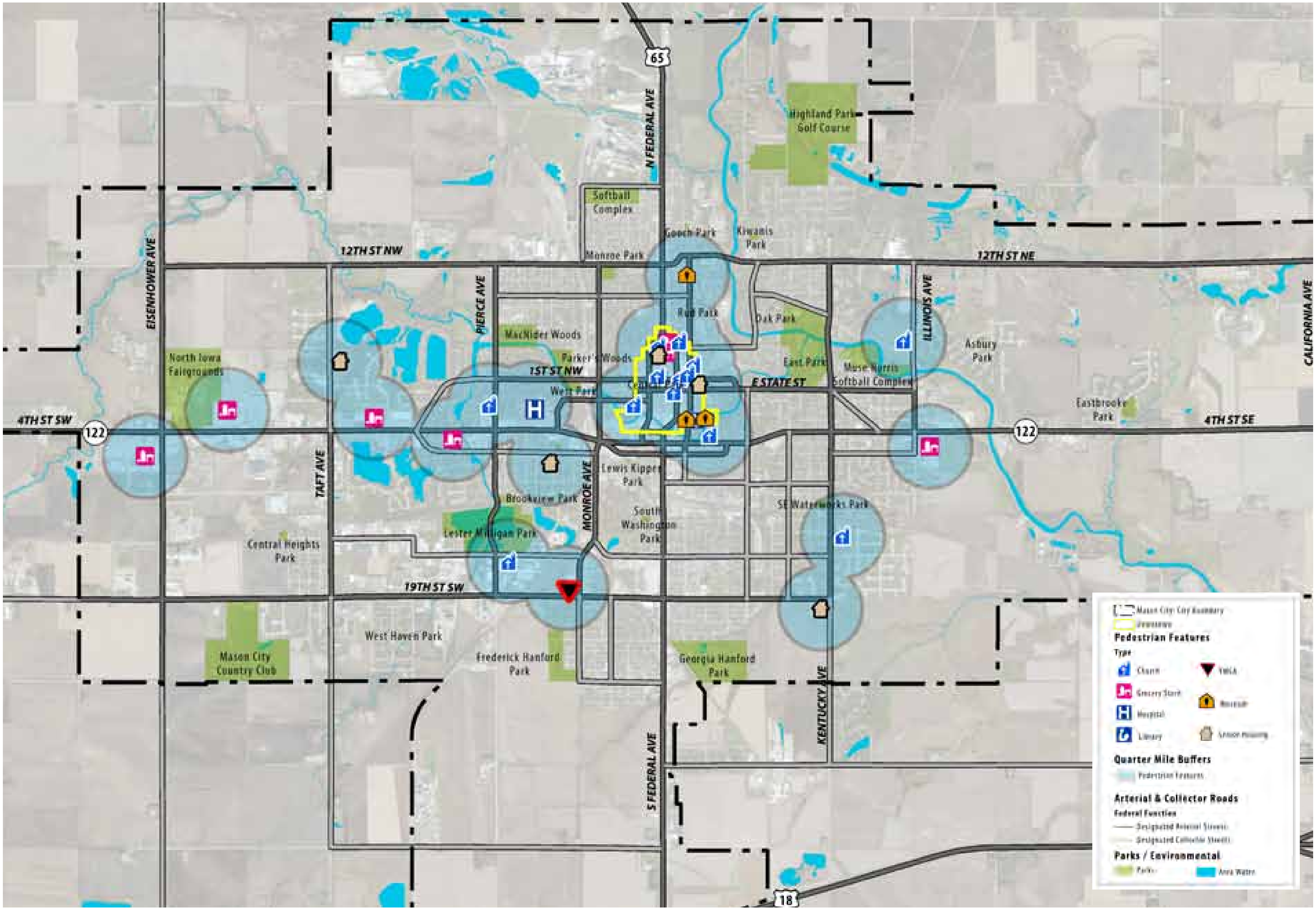
Map 6.10: Pedestrian Destinations



Map 6.11: Schools and 1/4 Mile Buffer



Map 6.12: Civic Destinations



STREET IMPROVEMENT PROGRAM

In an effort to create a balanced transportation system that meets the needs of both the automobile and the pedestrian, Mason City should establish a Sidewalk Improvement Program. The program should provide safe pedestrian access for all residents and assist the city in meeting requirements of the Americans with Disabilities Act. A Sidewalk Improvement Program (SIP) should provide a closed loop network of sidewalks throughout Mason City that can be easily accessed from any residence in the city.

Priorities for the program should include:

- Accessible routes to schools.
- Accessible along transit routes.
- Linkages along arterial streets that provide a safe area for pedestrians.
- Linkages to the city's trail system. These links may include widened sidewalks that are improved as a part of the city's Trail Master Plan.
- Missing ramps.

The development of the Sidewalk Improvement Program (SIP) began with a review of the city's current sidewalk system in Summer of 2013. Based on this inventory maps 6.14 and 6.15 were created to identify areas of needed improvement and missing links.

Corridor Priorities

Each year the city should budget for the SIP, in the past the city has done this at approximately $60,000 annually. The city should consider appropriating funds to include $60,000 of city led improvement projects and an additional $40,000 for matching grants. Funding of the SIP is discussed further under Implementation.

The program is broken down into priorities and within each of the phases yearly projects are identified based on quarter-mile radii around key destinations in the community. Many of these areas are overlapping and meet the priorities laid out above. Yearly projects may overlap as needs within service radii might not be as great or have been covered in previous years. Project phases and descriptions are as follows.

Top Priorities

Top Priority Routes are defined by the same criteria as High Priority Routes and overlay with the transit system's current circulation system. The transit system defines a strong base of circulation between residents, employers, and major service providers in the community.

High Priorities

High Priority Routes are defined by their proximity and direct connectivity to major destinations in the City. Participants in the planning process indicated that connections to schools, senior facilities and housing, employers and services, and downtown are the priority projects for enhancement.

- **Accessible Ramps.** Much of the city's sidewalk system meet grade requirements, however, they do not meet other design requirements. Missing ramps or ramps that are in poor condition should be a first priority, and all ramps at an intersection should be replaced to make them uniform. Those intersections that have not previously been addressed because they are currently in good condition should be addressed in this final stage.

  The city should re-evaluate the priorities and phases for the Street Improvement Program on an annual basis and re-assess sidewalk conditions every five years. The city should also consider a signage system that directs sidewalk users to key destinations within the city and to the city's trail system.

- **Schools.** Sidewalks and crossings that define "spine routes" within a quarter-mile of elementary schools should receive highest priority. The system can be extended to a half-mile as a later phase. Implementing the Safe Routes to School studies will improve access and circulation for students and parents.

  Specifying actions for improvement are beyond the scope of this plan. However, the existing condition survey indicates that adapting curbs to be compliant with ADA standards is the most critical item.

- **Senior Facilities and Housing.** Access and circulation around senior facilities should be complete and free from obstruction. These routes should provide wider sidewalks, possibly 5-6', to allow for easier movement.

- **Employers and Services.** Connecting residents to employers and visitors by sidewalk is critical to creating a complete transportation system for Mason City. Just as arterial and collector streets are important for moving vehicles, they are also important for moving pedestrians.

  Major projects include constructing sidewalks along frontage roads parallel to Highway 122 and extending sidewalks along 12th Street.

- **Downtown.** Sidewalks in Downtown are fairly complete and in good condition. Isolated issues are present, but can be resolved at minor expense.

Improving crosswalks is the most significant priority. Painting crosswalks and retrofitting signals with countdown timers and audible signals are a priority. Crosswalks along Washington and Delaware, particularly where the two streets diverge/merge on the northside of downtown, require pedestrians to cross at multiple locations at the risk of their safety.

Sidewalks are absent within large parking areas. This is true for the Fareway grocery store. The walkways should be defined more to direct pedestrians to the entrance of the building. This can be done with both visual and texture cues, including painting cross-hatched paths or using colored/stamped concrete.

Priority Routes
High Priority Routes define the spine routes for improvement, while the Priority Routes provide the support system and behave as collector routes.

- **Schools.** Priority Routes near schools are local streets that support the arterial, or High Priority, routes.

- **Neighborhoods.** Some Priority Routes connect neighborhoods, helping improve accessibility and encouraging extended trips.

- **Parks and Trails.** Connections to neighborhood parks are well-established. Improved access to the city's parks is an important project for all ages. The system should continue to restore missing connections and replace damaged walks.

- **Civic and Cultural Destinations.** The library, museums, Music Man Square, and architectural resources are popular destinations to visit and tour.

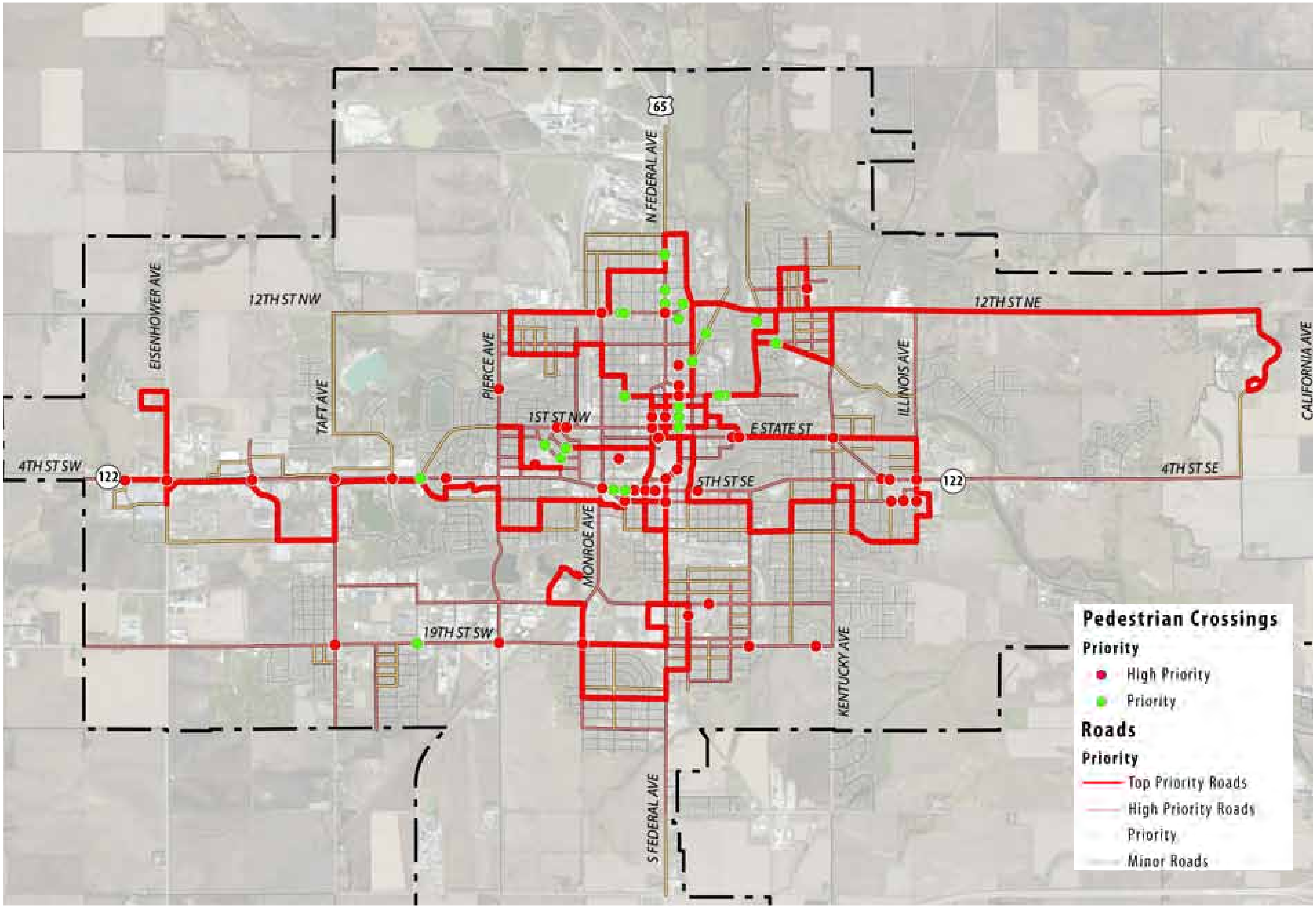
- **NIACC.** NIACC is primarily a commuter campus, yet the college should be accessible by all modes of transportation.

Intersection Priorities
In addition to addressing intersections that do not meet ADA requirements, this plan identifies crossings that should be maintained to the highest level of quality to ensure safety for pedestrians.

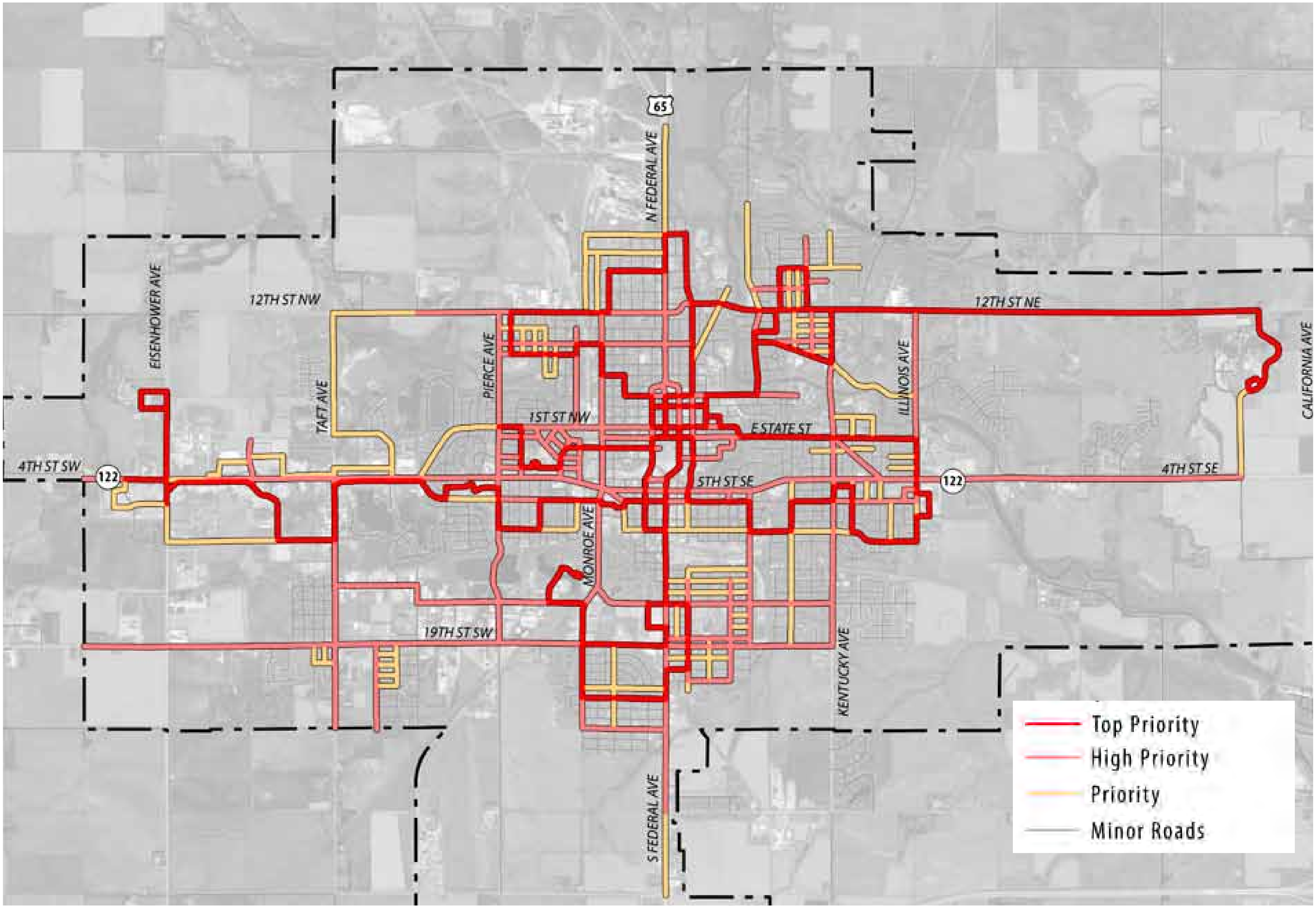
Map 6.14 identifies priority intersections, and classifies them based on their proximity to schools and ability to connect neighborhoods to destinations.

Priority intersections are eligible for enhanced crossing features, such as countdown timers and signage. High Priority intersections take precedence.

Map 6.14: Priority Crossings



Map 6.15: Sidewalk Priority Corridors System



PUBLIC TRANSIT

Bicycling, walking, and driving are major modes of moving about the city. Public transit is a critical mode to completing a community that is well-served by transportation choices.

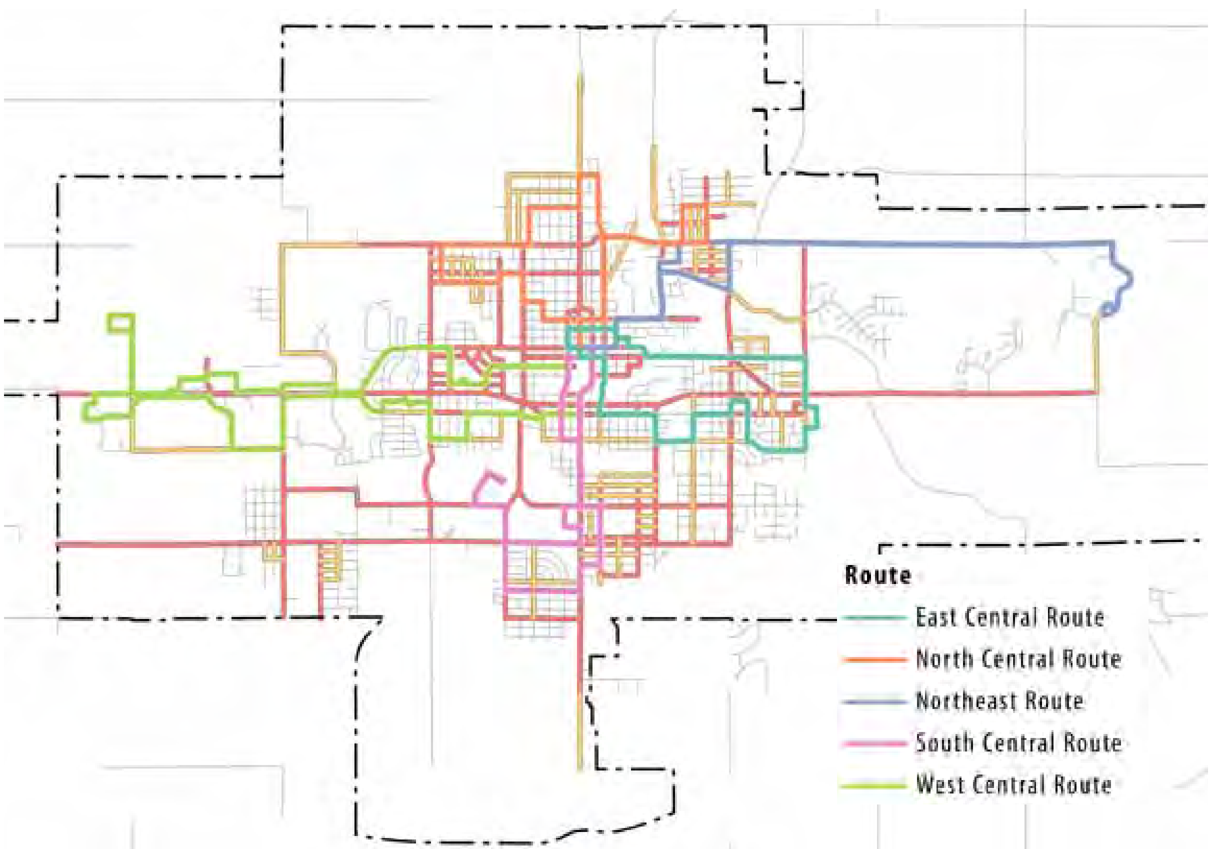
Mason City's transit system has six major system routes that serve the community, reaching as far east as NIACC and west to Eisenhower Avenue (see Map 6.16). The transit system connects residents to employers and services. Access to bus stops and shelters along the transit system is important to improve accessibility and encourage ridership.

Sidewalks that follow the transit routes, and within the quarter-mile of destinations are **Top Priorities** for replacing sidewalks and completing gaps.

Statewide Urban Design and Specifications (SUDAS) indicates that bus stops and shelters should address the following criteria.

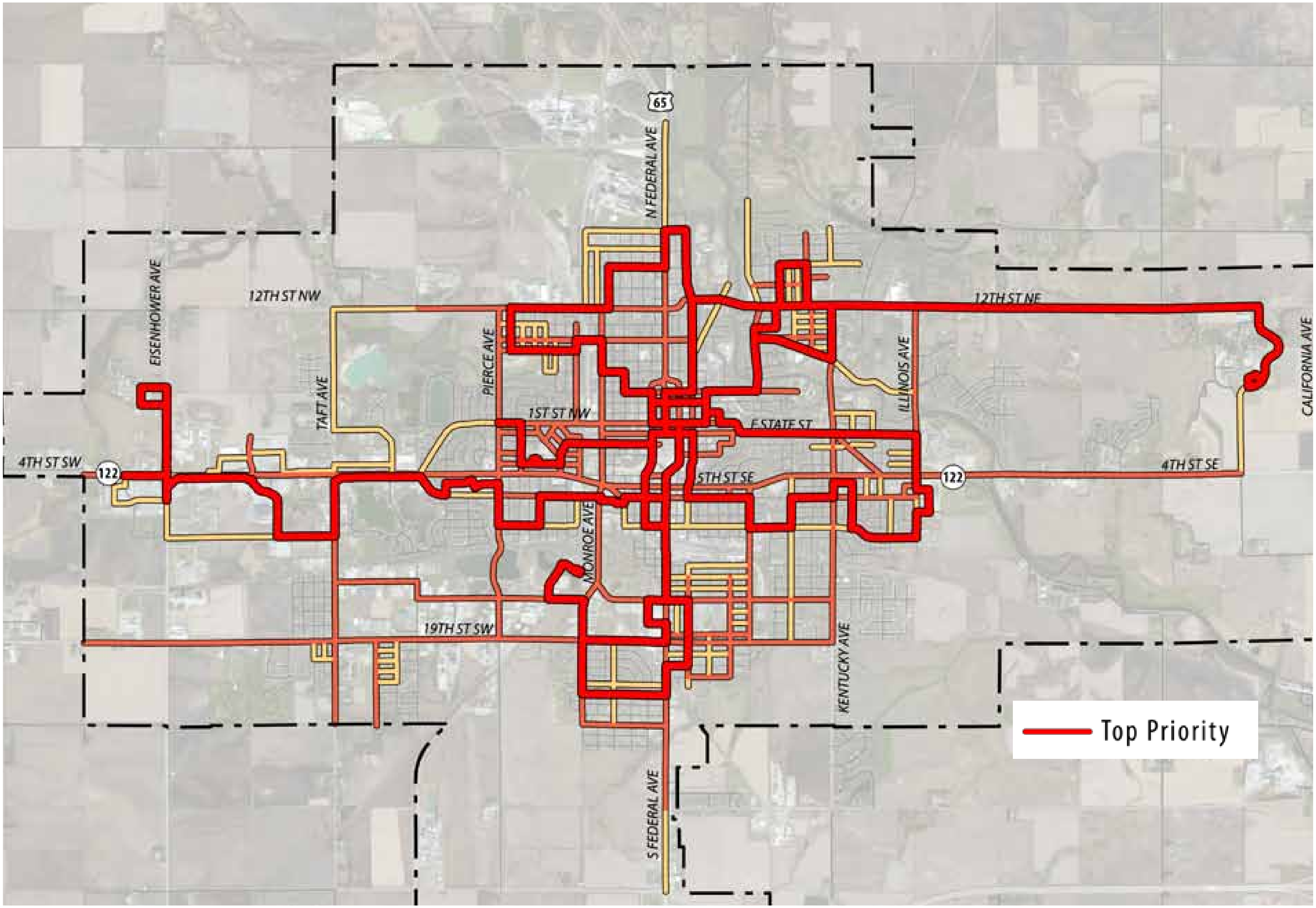
- **Bus Stop Pads.** New and altered bus stop pads shall meet the following criteria.
- Provide a firm, stable, and slip resistant surface (R308.1.3.1).
- Provide a minimum clear length of 8 feet (measured from the curb or roadway edge) and minimum clear width of 5 feet (measured parallel to the roadway) (R308.1.1.1).
- Connect the pad to streets, sidewalks, or pedestrian circulation paths with at least one accessible route (R308.1.3.2).
- The slope of the pad parallel to the roadway will be the same as the roadway to the maximum extent practicable (R308.1.1.2).

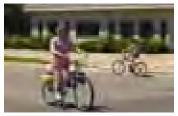
Map 6.16: Mason City Transit System, 2013



- Provide a desirable cross slope of 1.5% up to a maximum cross slope of 2.0% perpendicular to the roadway (R308.1.1.2).
- **Bus Shelters.** Where new or replaced bus shelters are provided, install or position them to allow a wheelchair user to enter from the public way. An accessible route shall be provided from the shelter to the boarding area. (R308.2)

Map 6.17: Top Priority Corridors





A PRIORITY STREETS APPROACH

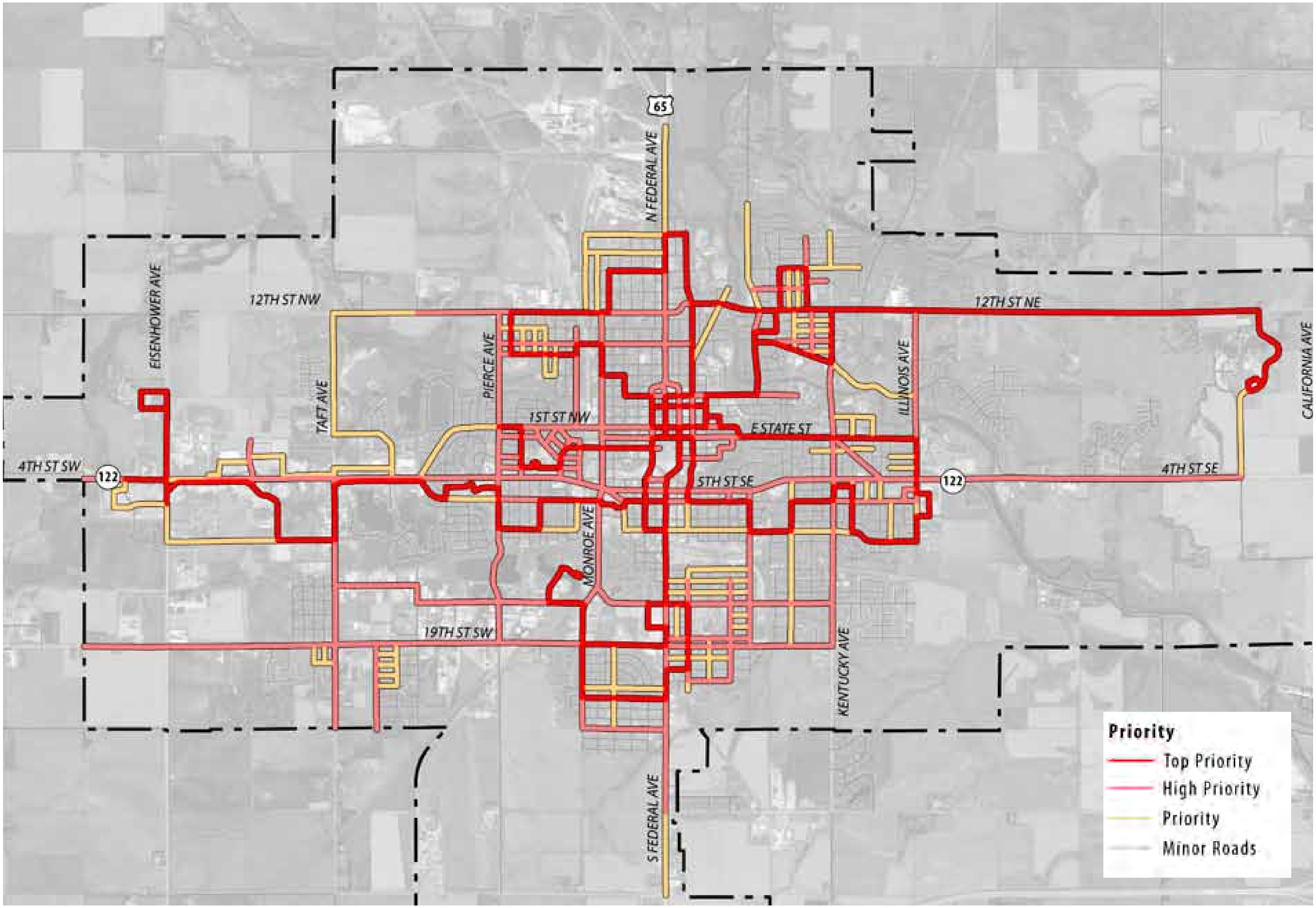
ZONE	PRIORITY AREA	ADA INTERSECTION		SIDEWALK GAPS	EXISTING SIDEWALKS: NEED IMPROVEMENT	GAPS & ESNI	PROBABLE IMPROVEMENT COSTS	
		LOW	HIGH				LOW	HIGH
1	Top Priority (RED)	$645,000	$967,500	$518,000	$4,391,000	$4,909,000	$4,519,000	$4,841,500
1a	Top Priority (Overlays with Transit Routes)	$381,000	$571,500	$245,000	$1,783,000	$2,028,000	$1,919,000	$2,109,500
1b	High Priority	$264,000	$396,000	$273,000	$2,609,000	$2,882,000	$2,600,000	$2,732,000
2	Priority (ORANGE)	$306,000	$459,000	$217,000	$1,443,000	$1,660,000	$1,966,000	$2,119,000
3	Other sidewalks (YELLOW)	excluded						
4	Trails and pathways	excluded						
	Total	$951,000	$1,426,500	$735,000	$5,834,000	$6,569,000	$6,485,000	$6,960,500

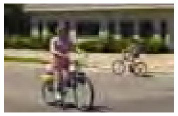
IMPLEMENTATION

Funding for the Sidewalk Improvement Program can be done through several approaches or a combination of approaches. These include:

- **New Subdivisions.** Construction of sidewalks in all new subdivisions on both sides of the street as part of the city's Subdivision regulations. The city may consider requiring them on only one side in projects where at least 50-percent of the units are affordable units or providing city assistance for sidewalks in those projects.
- **Arterial Streets.** Construction of sidewalks along arterial and collector streets with special emphasis to improving pedestrian crossings.
- **Street Improvement.** As major infrastructure projects are completed in city right-of-way or curb-replacement projects are completed, intersections should be brought to current ADA standards.
- **Cost Sharing.** In the past the city has funded sidewalk improvement programs through the general fund and then assessed the cost to the landowner. The city may wish to consider a cost sharing arrangement to ease the impact of the cost on the property owner. For instance, the city could require the owner to pay half the cost and be assessed for this cost over ten years. At current construction costs, approximately $25 a linear foot, the owner of a 50 foot wide lot would then be assessed $625 or $62.50 a year.
- **Grants.** Outside funding sources, including grant funding for designated routes and beautification projects. A good example of this is funding from the Blue Zones Initiative. Continued on page 218.

Map 6.18: Sidewalk Priority Routes





B SCHOOL IMPROVEMENT ZONES APPROACH

ZONE	SCHOOLS	ADA INTERSECTION		SIDEWALK GAPS	EXISTING SIDEWALKS: NEED IMPROVEMENT	GAPS & ESNI	PROBABLE IMPROVEMENT COSTS	
		LOW	HIGH				LOW	HIGH
1	Hoover Elementary	$69,000	$104,000	$141,000	$23,000	$164,000	$233,000	$266,855
2	Washington Early Childhood Center / AEA At Risk School	$117,000	$176,000	$7,000	$101,000	$108,000	$225,000	$282,932
3	Harding Elementary / Seventh Day Adventist	$78,000	$117,000	$514,000	$32,000	$546,000	$624,000	$662,473
4	Jefferson Elementary / John Adams Middle / Mason City High / Alternative School	$162,000	$243,000	$452,000	$65,000	$517,000	$679,000	$758,785
5	Roosevelt Elementary / Roosevelt Middle	$117,000	$175,500	$72,000	$147,000	$219,000	$336,000	$394,032
6	Madison Early Childhood Center	$0	$0	$700,000	$0	$700,000	$700,000	$700,000
7	Newman Catholic Schools	$0	$0	$696,000	$0	$696,000	$696,000	$696,000

Three common funding approaches to generating revenue for financing sidewalk improvements include:

- Special bond issues.
- Dedications of a portion of local sales taxes or a voter-approved sales tax increase.
- Use of the annual capital improvement budgets of Public Works and/or Parks agencies.

A number of communities can be cited for their implementation strategy and noted below. For additional approaches, visit www.pedbikeinfo.org/planning/funding_resources.cfm

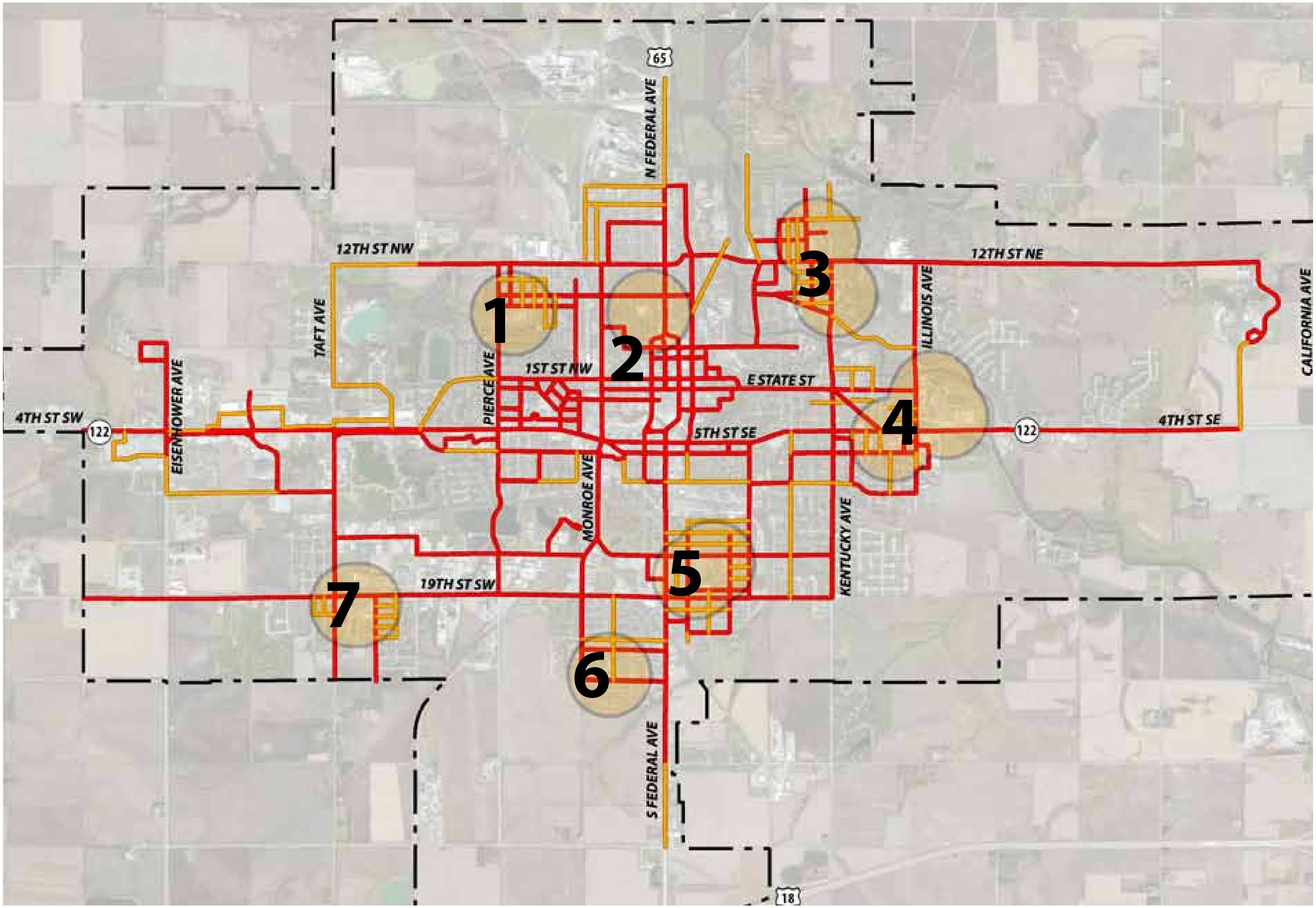
Ann Arbor, MI Approach. In November of 2011, voters approved a 1/8-mil increase to the Street Reconstruction Millage for the purpose of repairing sidewalks in the public right-of-way. Prior to the passage of this millage, property owners were required to repair or replace deficient sidewalks that adjoined their property. Beginning in 2012, the City assumed responsibility for the repair of the sidewalk system, which will be performed through this project over the course of the next five years.

Missoula, MT Approach. The city desires to spread a much larger percentage of the cost of installing sidewalks to the whole community by using an insurance model.

The financing model is based on the concept used in the health insurance industry. There will be a premium, deductible, co-pay, out of pocket maximum, and city payment cap. The program establishes a deductible of $300. The City co-pays 70% while the property owner pays 30%. The maximum out-of-pocket for the homeowner is $2,000 and the city caps out at $15,000. The owner would pay any amount over the city's cap. The premium is the increment in general taxes necessary to finance the program.

More detailed description can be reviewed at missoulagov.org/Sidewalks. Continued on page 222.

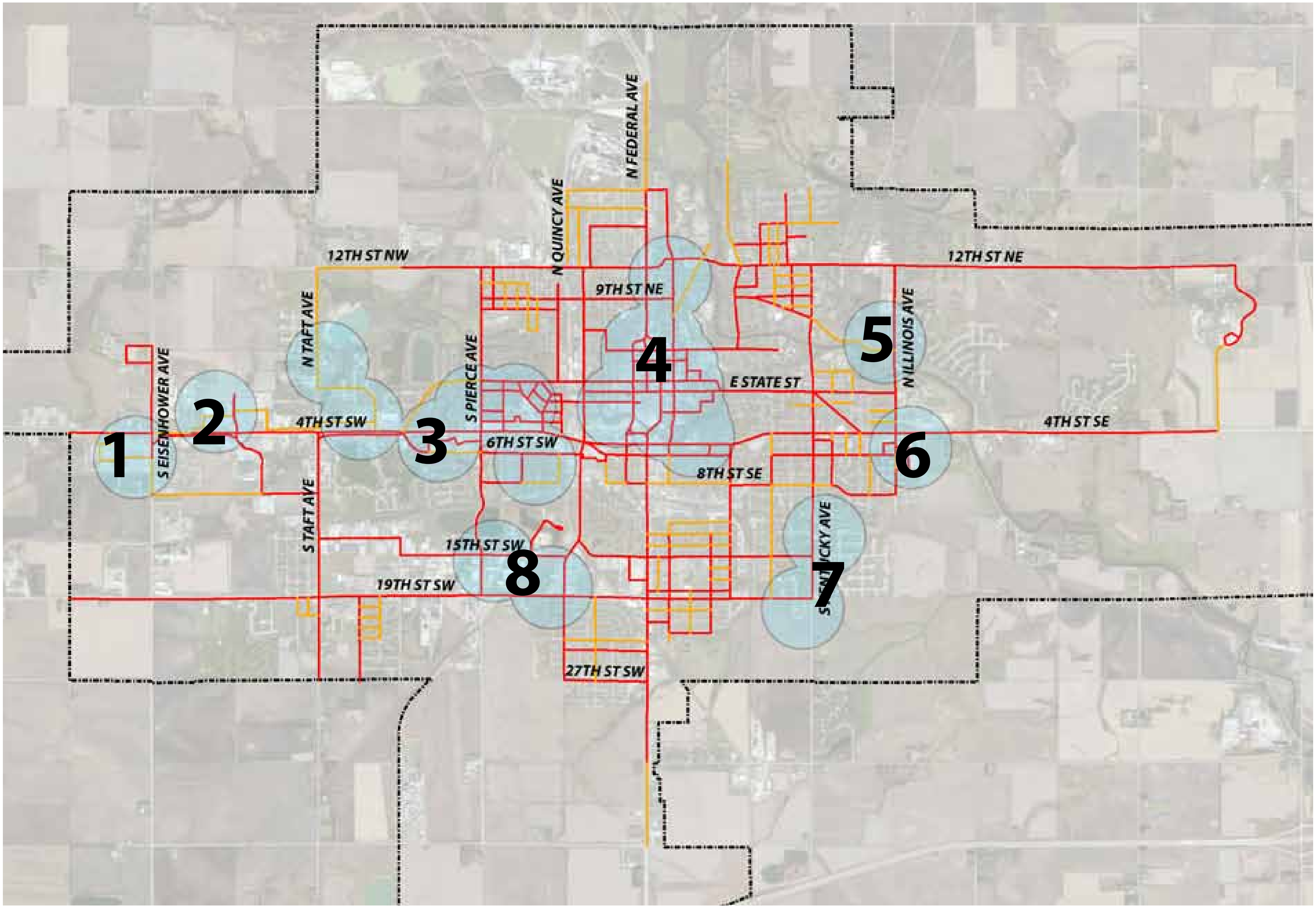
Map 6.19: Sidewalk Priority Routes, School Overlays

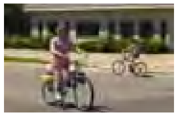


C FREQUENT DESTINATIONS APPROACH

ZONE	DESTINATIONS	ADA INTERSECTION		SIDEWALK GAPS	EXISTING SIDEWALKS: NEED IMPROVEMENT	GAPS & ESNI	PROBABLE IMPROVEMENT COSTS	
		LOW	HIGH				LOW	HIGH
1	Walmart	$0	$0	$1,000	$0	$1,000	$1,000	$1,000
2	SuperTarget	$0	$0	$0	$0	$0	$0	$0
3	Village Cooperative / Grant Village / Hy Vee / Dollar General / First Presbyterian Church / Mercy Medical Center	$84,000	$126,000	$43,000	$1,587,000	$1,630,000	$1,714,000	$1,756,000
4	Bethlehem Lutheran Church / Fareway / Rhythm Church / Dollar General / Trinity Lutheran Church / Saint Johns Episcopal Church / First Congregational United Church Of Christ / Praise Community Church / First Baptist Church / Mason City Public Library / St. Joseph's Catholic Church / Macnider Art Museum / Music Man Square / 2 Senior Centers	$279,000	$419,000	$337,000	$249,000	$586,000	$865,000	$1,005,000
5	Grace Evangelical Free Church	$0	$0	$0	$286,000	$286,000	$286,000	$286,000
6	Hy Vee East	$57,000	$86,000	$36,000	$181,000	$217,000	$274,000	$303,000
7	Church Of Jesus Christ of Latter-Day Saints / Faith Baptist Church / Kentucky Ridge Assisted Living	$12,000	$18,000	$11,000	$489,000	$500,000	$512,000	$518,000
8	Christian Fellowship Church / YMCA	$0	$0	$0	$233,000	$233,000	$233,000	$233,000

Map 6.20: Sidewalk Priority Routes, Frequent Destinations Approach





D QUADRANT APPROACH

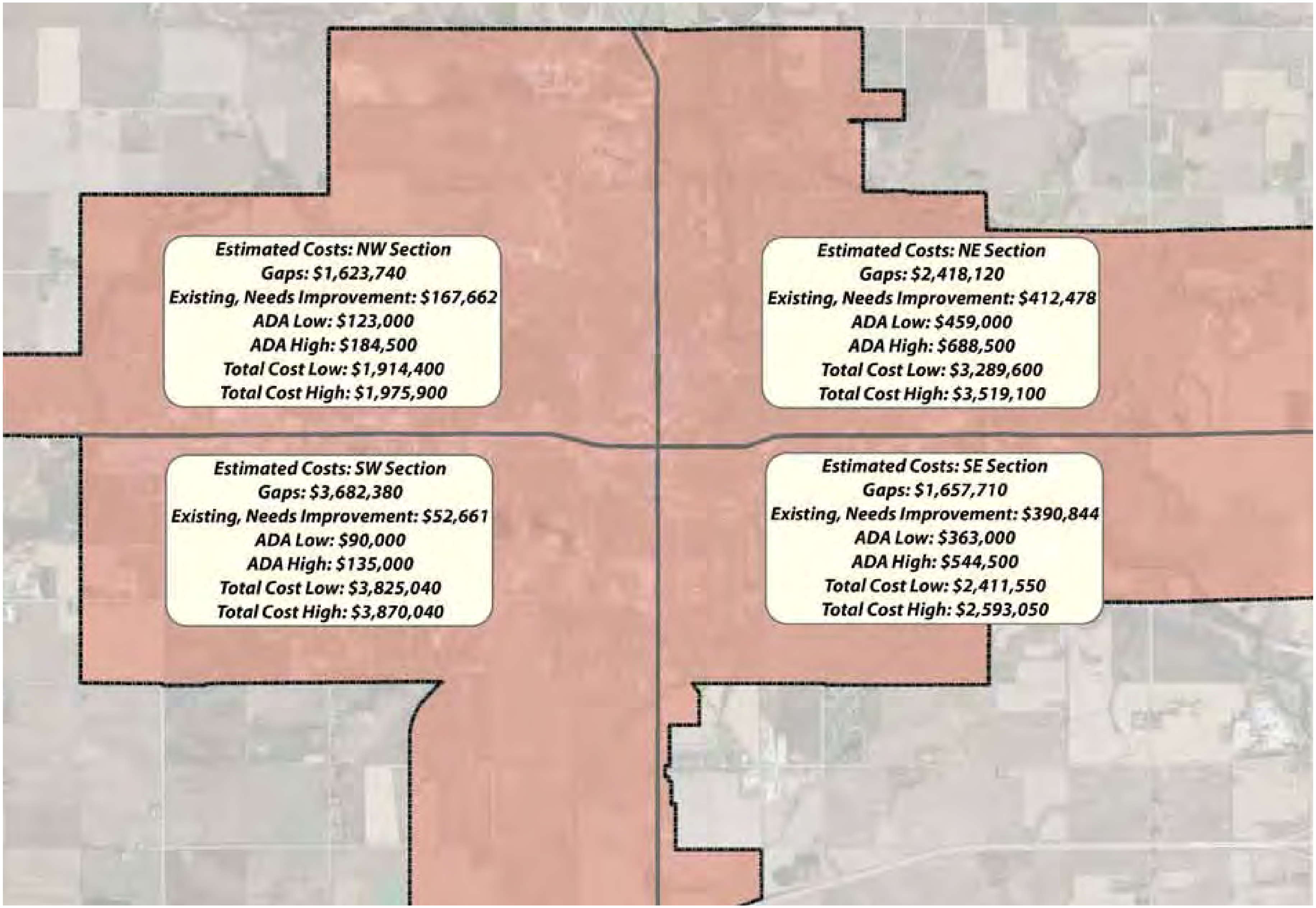
ZONE	QUADRANT	ADA INTERSECTION		SIDEWALK GAPS	EXISTING SIDEWALKS: NEED IMPROVEMENT	GAPS & ESNI	PROBABLE IMPROVEMENT COSTS	
		LOW	HIGH				LOW	HIGH
NE	Northeast	$459,000	$688,500	$2,418,120	$412,478	$2,830,598	$3,289,600	$3,519,100
SE	Southeast	$363,000	$544,500	$1,657,710	$390,844	$2,048,554	$2,411,550	$2,593,050
NW	Northwest	$123,000	$184,500	$1,623,740	$167,662	$1,691,402	$1,914,400	$1,975,900
SW	Southwest	$90,000	$135,000	$3,682,380	$52,661	$3,735,041	$3,825,040	$3,870,040
Total	Total	$1,035,000	$1,552,500	$9,381,950	$1,023,645	$10,405,595	$11,440,590	$11,958,090

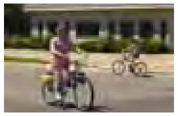
Manchester, NH Approach. The City provides a 50-50 match to property owners for sidewalk and/or curb construction. If the construction of a sidewalk necessitates the construction of a retaining wall, the homeowner is responsible for the cost and construction of said wall before construction on the sidewalk will commence. The retaining wall is to be constructed such that no part of said wall is within the City's right of way.

Outside Funding Sources. The Pedestrian and Bicycle Information Center offers a number of funding sources to assist in the construction and financing of sidewalk improvements. A few of the programs include:

- National Transportation Enhancements Clearinghouse (NTEC)
- Pedestrian and Bicycle Information Center (PBIC),
- Robert Wood Johnson Foundation's Active Living Research Program,
- Federal Highway Administration (FHWA)

Map 6.21: Quadrant Opinion of Probable Costs





CHAPTER 7

SUPPORT SYSTEMS

BUILDING THE MARKET

WHILE PREVIOUS CHAPTERS HAVE FOCUSED ON THE DESIGN AND CHARACTER OF A BIKEWAYS NETWORK, INFRASTRUCTURE BY ITSELF DOES NOT CREATE AN EXCELLENT BICYCLE TRANSPORTATION PROGRAM. TO GUIDE COMMUNITIES, THE LEAGUE OF AMERICAN BICYCLISTS (LAB), THROUGH ITS BICYCLE FRIENDLY COMMUNITIES (BFC) PROGRAM, ESTABLISHES FIVE COMPONENTS OF DESIGN THAT ARE USED TO DETERMINE WHETHER A CITY SHOULD BE AWARDED BFC STATUS – THE 5 E'S OF ENGINEERING, EDUCATION, ENCOURAGEMENT, ENFORCEMENT, AND EVALUATION.

According to the League, the evaluative elements of the 5E's are:

ENGINEERING: Evaluating what is on the ground and has been built to promote cycling in the community. Areas of evaluation include:

- Existence and content of a bicycle master plan.
- Accommodation of cyclists on public roads.
- Presence of both well-designed bike lanes and multi-use paths in the community.
- Availability of secure bike parking.
- Condition and connectivity of both the off-road and on-road network.

EDUCATION: Determining the amount of education available for both cyclists and motorists. Education includes:

- Community programs teaching cyclists of all ages how to ride safely in any area from multi-use paths to congested city streets.
- Education for motorists on how to share the road safely with cyclists.
- Availability of cycling education for adults and children.
- Number of League Cycling Instructors in the community.
- Distribution of safety information to both cyclists and motorists in the community, such as bike maps, tip sheets, and as a part of driver's education manuals and courses.

ENCOURAGEMENT: Concentrating on promotion and encouragement of bicycling. Areas of evaluation include:

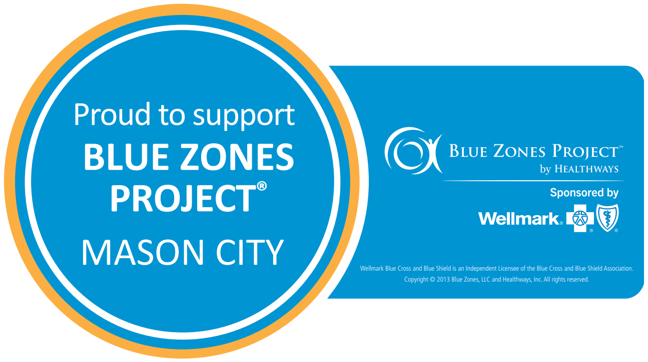
- Programming, such as Bike Month and Bike to Work Week events.
- Community bike maps and route finding signage.
- Community bike rides and commuter incentive programs.
- Safe Routes to School programs.
- Promotion of cycling or a cycling culture through off-road facilities, BMX parks, velodromes, and road and mountain bicycling clubs.

ENFORCEMENT: Addressing connections between the cycling and law enforcement communities, addressing:

- Liaisons between the law enforcement and cycling communities.
- Presence of bicycle divisions of the law enforcement or public safety communities.
- Targeted enforcement to encourage cyclists and motorists to share the road safely.
- Existence of bicycling related laws, such as those requiring helmet or the use of sidepaths.

EVALUATION & PLANNING: Considering programs in place to evaluate current programs and plan for the future, including:

- Measuring the amount of cycling taking place in the community.
- Tabulation of crash and fatality rates, and ways that the community works to improve these numbers.



Organizational support. The Blue Zones Project, with its support committees, provides an ideal base for the organizational infrastructure that can help advance the active transportation program.

- Presence, updating, and implementation of a bicycle plan, and next steps for improvement.

Most of this plan addresses the Engineering aspect of bicycle programming. But the "soft" systems, namely the other four E's, are critical to taking full advantage of infrastructure investments, improving the effectiveness and safety of bicyclist, and making Mason City a truly bicycle friendly community. The following discussion provides recommendations for the support systems for bicycling in the city, organized around the LAB's five categories of bicycle friendliness.

Organizational Infrastructure

A truly successful bicycle transportation program will require an organizational infrastructure that will grow over time. This framework must do several things, including advise decision makers in and out of city government, organize programs, advocate for pedestrian and bicycle interests, market educational efforts, and serve as a central point of communication for the bicycling community. Mason City's Blue Zones program, with its associated committees and corporate support should include the following components:

- **An active transportation advisory committee (ATAC).** This committee will initially act as a link between the active transportation community and city and county governments, with a scope that includes review of city, school and other public projects that affect or address bicycle/pedestrian access, identifying and addressing problems, advising city staff on specific issues, and assisting with public and private implementation of this plan. Other responsibilities are likely to emerge over time, potentially including such areas as legislation, technical planning, and educational programs.

  An ATAC should be formally established in city government by executive order or city council resolution to give it somewhat permanent status, and should meet on a regular basis. Formal status sends the message that the committee is taken seriously and its interests are a recognized part of Mason City's transportation picture. It might also be logical to consider the ATAC to be a regional body that also advises the Cerro Gordo County Commission.

- **A bicycle/pedestrian coordinator.** This position provides a consistent presence within city government for bicycle and pedestrian initiatives. Typically, the coordinator staffs the advisory committee, is critical-

Biking Rules. Excerpts from a street code to promote responsible urban cycling, developed by New York City's Transportation Alternatives advocacy organization.

ly involved in implementation and technical design of components of this plan, initiates and prepares grant applications, works with civic and private sector groups on programs, reviews development applications and projects, and generally becomes the public face for active transportation in the city. In Mason City, this responsibility may be assigned to an existing staff member with a particular interest in active transportation, or new part-time staff member, or staff in an allied organization such as the regional planning agency. This will reduce cost while still providing functional partnerships with departments and agencies that touch this vital area. These departments include Engineering, Operations and Maintenance, Parks and Recreation, Development Services, the regional planning agency, county government, the Iowa Department of Transportation, and private organizations. In many cases, funding for a bicycle/pedestrian coordinator comes in whole or in part from outside city government, such as health organizations or corporations.

- **An active transportation advocacy group.** Mason City is fortunate to have high quality bicycle retailers, an organization like the Northern Iowa Touring Club, and an active and highly knowledgeable community of bicyclists, as well as the structure of the Blue Zones program. The Northern Iowa Touring Club or other community organizations or members should consider launching an advocacy organization dedicated to active transportation. Such a group can be extremely important in coordinating specific programs such as education efforts, institutions such as bicycle cooperatives, special events, communications, and other actions in behalf of active transportation. Logical partners in advocacy include health providers, safety organizations and councils, and similar groups. In some cities, groups develop under the leadership of active living organizations.

EDUCATION

Increase the number of League Certified Instructors (LCI's) in Mason City. The League of American Bicyclists BikeEd program is recognized as the standard for bicycle safety education, and includes a variety of courses that serve young cyclists, recreational riders, and everyone up to road-hardened commuters. Successful operation of the program is dependent on one critical factor, however: the presence of local instructors. Therefore, a critical part of the program is training of instructors through the League Certification process. In this process, cyclists complete both prerequisite courses and a three-day course conducted by a specially trained instructor. Successful completion and passing written and on-road evaluations qualifies individuals as League Certified Instructors (LCI), who are then authorized to provide training to other cyclists. In addition to a cadre of instructors, a successful training program requires marketing and placement to match instructors with demand from schools, corporations, and other organizations. This can most appropriately be done through an advocacy or active living organization with staff to organize the education effort.

Integrate bicycle rules of the road into drivers education programs. Most drivers are unaware of the rights and responsibilities of vulnerable users such as bicyclists (as well as motorcyclists and pedestrians). These factors should be included in drivers education programs for new motorists and certification testing. In addition, a significant unit on bicycle, pedestrian, and motorcycle laws and behaviors should be included in defensive driving classes for drivers who have received citations for moving traffic violations. This often reaches motorists who may be most likely to drive inattentively or aggressively, and may be most likely to endanger cyclists.

Work with major employers to conduct on-site education programs. As part of efforts to encourage better employee health through greater active transportation, major employers often are willing to host BikeEd programs. Outreach and partnerships with companies to offer programs on-site can increase participation in bicycling, and assist employers with establishing an ethos based on healthy living.

Develop and implement bicycle education programs for kids. Young bicyclists perceive the riding environment differently from adults, and obviously have neither the visual perspective nor experiences of older riders. Schools and safety groups often offer "bike rodeos" which may or may not address the skills of riding even on local streets. The LAB's BikeEd program has a specific track that addresses these issues and skills, and they should be incorporated into these more frequently offered safety events.

Publish and post on-line an engaging and brief guide to safe bicycling. Information on safe urban cycling should be both ubiquitous and appealing to different audiences, including both motorists and bicyclists. Poor safety practices are both dangerous and bad for public relations, creating the possibility of backlash against cyclists. New York's Biking Rules program, an on-line guide to practice and law developed by the advocacy organization Transportation Alternatives, and a brief New York City DOT publication on safe riding are excellent examples. Chicago has published a safety booklet specifically targeted toward young cyclists. Mason City should develop similar guides, which also successfully avoid portraying bicycling as a hazardous activity.

ENCOURAGEMENT

Expand participation in active transportation through programs that engage corporations in competitions and fun, such as corporate commuter challenges. These programs track participation by number of trips and miles traveled during a multiple-month period, and give awards to winners at an event at the end of the period. Companies may be classified by size, so that competition is among similarly sized organizations. These challenge programs are successful by encouraging bicycle transportation within companies and in many cases produce a bicycle culture as companies compete against each other.

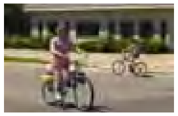
Institute a bike month celebration. Bike month events typically occur during May, and can involve a variety of activities, including short rides led by the mayor or other public officials, clinics on subjects such as riding technique and bicycle repair, special tour events, screenings of bicycle-related movies, and other programs.

Organize special rides that are within the capabilities of a broad range of riders and encourage family participation. On Memorial Day weekend, the Active Transportation Alliance's Bike the Drive closes Chicago's Lake Shore Drive for exclusive bicycle use for three hours on Sunday morning for cyclists to enjoy. During 2013, Omaha closed several streets in neighborhood business districts to celebrate bicycling and healthy living. In Madison, seven miles of downtown streets are closed to motor traffic for exclusive use by bicycles and pedestrians in a free event that attracts thousands. Many community rides and benefits have different lengths and routes to appeal to all ages. These events build interest, and make cycling comfortable and attractive to more people.

Implement a bicycle ambassador program in middle and high schools. Ambassadors are students with a special interest in bicycling who share that interest with their peers. Many cities also have adult ambassador programs, whose goal to provide safety education and market the many positive aspects of bicycling in the city.

Publish and maintain a Mason City Bicycle Map. The initial bicycle map can illustrate the bicycle network proposed

Encouragement through events large and small. From top: a community street festival celebrating bicycling and healthy living (South Omaha, NE); a group event for the opening of a new bike lane project in Bellevue, NE; the world's largest group ride, Bike New York's Five Boroughs Bike Ride, with 32,000 participants.



by this plan, along with trails. It categorizes streets based primarily on the quality of their bicycling environment, using such criteria as continuity, traffic volume, width, and service to destinations. It also illustrates existing trails and their interaction with the street system. This map should be published and distributed through bike stores, educational programs, employers, and community agencies and facilities. The map should also be posted on-line and paired with a blog or interactive website that invites comments and suggestions. The map should be updated periodically (typically every two years) as the system evolves.

Encourage Mason City businesses to participate in the League of American Bicyclists Bicycle Friendly Business (BFB) program. The program recognizes businesses that encourage their employees to use bicycles for transportation through efforts such as providing secure bicycle parking, sponsoring company rides, offering economic incentives, establishing internal bicycling events and bicycle interest groups, and supporting community bicycle initiatives.

Achieve Bicycle Friendly Community status within three to five years. In addition to recognition as a good bicycling environment, many observers also consider Bicycle Friendly Community status to be an indicator of overall community quality. As such, it is a significant community marketing tool, and reinforces substantial efforts in balanced transportation development.

ENGINEERING (FACILITIES)

Institute a bicycle parking program, installing facilities at strategic locations across the city. Bicycle parking is a low cost but significant physical improvement that both encourages cycling, provides greater security, and keeps bikes from damaging trees or street furniture, or obstructing pedestrians. The parking program includes several elements:

- **Identifying key locations for facilities.** Examples of priority locations include:
    - Major public facilities such as government buildings, the public library, community centers, parks and recreational destinations.
    - Locations near trails that offer support services such as restrooms, food, and water.
    - Neighborhood commercial centers and districts.
    - Museums and attractions.
    - Employment concentrations.
    - Bike corrals. In business districts, one on-street parking space can be converted to bike parking, and can accommodate up to 20 bikes.
    - Diagonal stalls in business districts. In areas with heavy demand, one stall can also accommodate up to 24 bicycles in a "bike corral."
- **Standardized bike parking equipment that is durable, relatively inexpensive, and unobtrusive.** Many of the bike racks in use today, including the so-called "schoolyard" rack and "waves" are inefficient, take up a great deal of space, and, in the case of the former, can actually damage bikes. Better in most cases are less obtrusive designs such as the inverted U, hitching post, or the new "theta" design that recently won a ~~bicycle parking design competition for New York City.~~
- **Develop a funding mechanism and incentive program for bicycle parking installations.** Mason City may provide a small allocation for installing facilities at public destinations. Bike parking on private property may be funded with the assistance of special events.

For example, Omaha's Eastern Nebraska Trails Network holds an annual Corporate Challenge ride, which in 2011 attracted a record 4,200 cyclists. A portion of the proceeds are used to purchase inverted U's, some of which are offered to targeted private businesses at reduced cost.

- **Amend zoning ordinances to require a specific amount of bicycle parking for high demand business types.**

Develop and install a unified bikeway network graphic system. While signs and sign clutter should always be minimized, a carefully designed identification and directional graphics system can greatly increase users' comfort and ease of navigating the street system. The graphic system may have individual features, but should generally follow the guidelines of the Manual of Uniform Traffic Control Devices (MUTCD). Types of signs in the system include:

- Route identifier, including a system logo and the number and name of the route. These signs reassure users that they are on the right path and is keyed to numbered routes.
- Intersection signs, indicating the intersection of two or more routes.
- Destination way finders, indicating the direction, distance, and time (using a standard speed, typically 9 miles per hour), to destinations along the route.
- Directional changes, signaling turns along a route.

The graphic system should be modular to provide maximum flexibility and efficiency in fabrication. Signs should also use reflective material for night visibility. The Clearview font is recommended as a standard for text.

Bike parking as art. Clockwise from left: inverted U's at the University of Nebraska at Omaha, enhanced with the school's mascot; Edsel bike parking lot; bicycle-shaped parking sculptures.

Bikeways System Graphics. Left: Bike Omaha destination and route intersection signs; above:, trail entrance identifier in Bismarck

Above: **Possible system components for Mason City.** From top: Identification signs, destination signs, route intersection, and mileage blade signs.

ENFORCEMENT

Involve a Police Department representative on the advisory committee, bike education efforts, and other aspects of the bicycle transportation program. Police participation adds a critical perspective to facility and safety program planning and implementation.

Enforce bicycle laws for both motorists and bicyclists. All users of the road have responsibilities to each other. Effective enforcement begins with police officers being completely familiar with legal rights and responsibilities of cyclists. But bicyclists must not have free passes to disobey traffic laws, and irresponsible riders often create backlash against all. Enforcement for all users leads to better, safer behavior and greater predictability and cooperation by all.

EVALUATION AND PLANNING

Institute an evaluation system that compiles bicycle traffic counts and crash information, and monitors mode split data through the American Community Survey and user surveys. Good evaluation information measures the effectiveness of the program and informs adjustments and improvements. The bicycle/pedestrian coordinator is ultimately responsible for developing and implementing this evaluative program.

Complete periodic surveys of system users, monitoring customer satisfaction and recommendations. The very high response to the survey in Chapter 2 indicates a large and committed constituency that is a great source of information and input. In addition to being an excellent measure of user satisfaction and recommendations for improvement, surveys keep the bicycle community actively engaged in the process of improving bicycle transportation in Mason City.

Max's Garden on 2nd Street NE