ACTIVE BARTON

A BICYCLE AND PEDESTRIAN MASTER PLAN FOR BARTON COUNTY, KANSAS

Be well BARTON COUNTY

GOLDEN BELT COMMUNITY FOUNDATION

RDg PLANNING ● DESIGN

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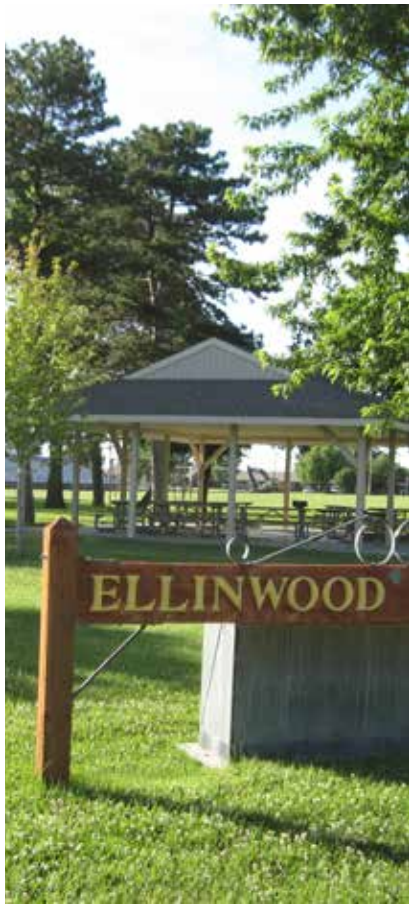


INTRODUCTION

How we move is important to how well we live and affects our own health and that of our communities and environment. We have been blessed with the capacity to travel under our own power, Some of us can cover tremendous distances on foot, all the while thinking and taking delight in the beauty of our towns and natural environment. We can travel even further and faster by bicycle, a remarkable invention that we can easily lift, travels at half the speed of cars in cities but gets the equivalent of 1,500 to 2,000 miles per gallon, produces no greenhouse gases, makes almost no noise, can be parked almost anywhere, and makes us healthier. Our ability to transport ourselves is surely a gift.

This ability also makes great economic and social sense. Pedestrian and bicycle infrastructure costs far less to install that streets and roads, and active users place very little stress on facilities. Feet and bicycles have almost no environmental impact. And these methods of travel are inherently enjoyable, and give us time and space to appreciate our fellow human beings and the places in which we live.

Many people in Barton County understand these virtues. The county has an active bicycling community and provides visitors with a number of bicycle routes on which they can see its unique countryside. Great Bend has built a five Bike and Hike Path. Share the road signs have been installed in various places and a program to add new signs that inform motorists about minimum passing distances is underway, and the county's communities have popular Walking School Bus programs in operation.

Walking and biking are truly parts of life in Barton County and the good road networks, relatively flat topography, and short distances create a promising environment for active travel. Active Barton is dedicated to expanding the routine use of these healthy, low-impact, and enjoyable means of travel around and between its communities. This plan will propose a program that considers the needs and opportunities of each of the county's four largest towns – Great Bend, Ellinwood, Hoisington, and Claflin – and of the county as a whole. In doing so, it recognizes that this program must be practical and affordable, delivering benefits that substantially outweigh its costs.

WHY ACTIVE TRANSPORTATION:

People in Barton County have a strong interest in health and active transportation, evidenced by the creation of Be Well Barton County and the enthusiasm communicated to us during this planning process. This plan will build on this interest by helping the governments, organizations, and residents of the county achieve the following goals:

Goal One: Increase the number of people who use the bicycle for transportation as well as recreation. A measurement of the success of this plan will be significantly increasing the percentage of trips for a variety of purposes.

Goal Two: Improve bicycle access to key county destinations. To be successful, a bicycle and pedestrian transportation system should get people

comfortably and safely to where they want to go. People most often walk or bike for recreational or school trips, and trips to parks, ballgames, and community centers are important contributors to overall travel. But other destinations like shopping areas, Barton County Community College, the Wetlands Education Center, and Cheyenne Bottoms are also within reach. Finally, the unique distribution of towns in the county makes occasional interurban travel an option.

Goal Three: Use bicycling as part of an effort make Barton County healthier at three levels: global, community, and individual. Active trips promote health in three ways:

- Global health. Active transportation reduces fossil fuel use and greenhouse gas emissions, reducing impact on the global environment. A more walkable and bikeable Barton County 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 health. Walking or biking instead of driving on short trips marginally reduces road wear and repair projects. But more importantly, active travel enhances the quality of civic life, encouraging us interact with each other as people. Places identified as leaders in bicycle and pedestrian transportation also tend to attract people because of their community quality.

- Individual health. Physical wellness is a key priority of Be Well Barton County. Incorporating physical activity into the normal routine of daily life for everyone from kids to seniors makes all of us healthier, and reduces overweight and obesity rates and is associated with better quality of life and lower health care costs.

Goal Four: Increase safety on the road for motorists, bicyclists, and pedestrians. Improved safety is a critical goal for any transportation improvement, and good infrastructure can reduce crashes and increase comfort for all users of Barton County's transportation network.

Goal Five: Take advantage of the business and economic development potential of active tourism. Recent research in Oregon and other states quantifies the potential positive impact of bicycle tourism, especially when visitors stay overnight. Barton County, recognizing the possibilities in an extensive system of low-volume paved roads,

unique natural and historical features, towns, and easy topography, has included bicycle tourism in its promotional efforts.

Goal Six: Realize these benefits within a reasonable time period. Sometimes bicycle and pedestrian plans are overly expensive or ambitious, and can only be completed with considerable expense and effort over many years. It is important that we achieve short term rewards, and create a good initial system that is within the means of our region.

MEASURING SUCCESS

Guiding Principles for an Effective System

The design of any active transportation system 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 systems. Adapting C.R.O.W.'s work in its excellent design manual, *Sign Up for the Bike,* an urban bicycle network should generally fulfill six basic requirements:

- **Integrity** (or, in C.R.O.W.'s term, Coherence): An active network at all points in its phased development should connect starting points with destinations. It should be easy to understand and keep users oriented.

- **Directness**: The active network should offer routes that are as direct as possible, with minimum detours or misdirections.

- **Safety:** The network should maximize safety for all users and minimize or improve hazardous conditions and barriers. On the other hand, no system is totally free of risk and can at best improve but not guarantee user safe

- **Comfort:** Most users should view the basic network as being within their capabilities and not imposing unusual mental or physical stress. As the system grow, more types of users will find that it meets their needs comfortably.

- **Experience:** The active network should offer its users a pleasant and positive experience that capitalizes on the city's built and natural environments.

- **Feasibility:** The 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 Two.

PLAN METHODOLOGY AND STAKEHOLDER INVOLVEMENT

The Active Barton planning process was designed to maximize public engagement and our understanding and familiarity with the county and its communities. An Active Barton project committee included representatives of county and city gov-


Barton County

Bicycle
&
Pedestrian

Master Plan - Project Launch

Kansas Wetlands Education Center - 592 NE K-156 Hwy

Wednesday, August 26th, 6:00 pm

6:00 – 6:30 pm Open House
6:30 – 7:00 pm Kickoff Presentation

RDG Planning and Design, consultants for the Bicycle and Pedestrian Master Plan, will make a kickoff presentation explaining the goals of the plan & possibilities for active transportation in Great Bend, Hoisington, Ellinwood, & Claflin.

Starting at 7:00 pm

Road Bike Ride–Golden Belt Bicycle's Neil Frizell will lead a skinny tire ride from KWEC & return you to the same location before dark.

Mountain Bike Ride – Golden Belt Bicycle's Claire Schmitt will lead a fat tire, gravel ride from KWEC & return you to the same location before dark.

Nature Trail – Join Barton County Health Department's Janel Rose for a stroll around the ¼ mile paved loop is on the west end of the KWEC parking lot. It's wheelchair accessible & has benches along the trail.

ernment, communities, bicyclists, pedestrians, the private sector, and people with visual impairments. This committee met at key points during the process. Major public involvement techniques and events included:

Kick-off Event: This event, attended by about 70 people, took place on August 26, 2015 and featured a mini bike expo, displays on active transportation planning and infrastructure, a presentation on the process, and road and gravel cycling rides.

Field reconnaissance: Bicycle field work on this plan and a companion project on adapting the Kansas Byway system for active tourism gave us the opportunity to travel through much of the county and all four principal towns by bicycle.

Bicycle and Pedestrian Survey: This Survey Monkey instrument explored the characteristics of Barton County respondents and measured their level of comfort with various types of infrastructure. The survey received 70 responses and provided information that contributed to the directions of this plan.

Community workshops: Workshops in Great Bend, Ellinwood, Hoisington, and Claflin took place on September 29-30 and October 5-6. At these working sessions, members of the public from each community worked with us over maps and aerial photos to define destinations, resources, problem areas, and route ideas.

The results of this process informed the plan, and Chapter Two presents the detailed results of the survey.

ORGANIZATION OF THE PLAN

The Active Barton Plan is organized into the following chapters:

Chapter One: Barton County Markets and Preferences. This chapter reviews the results of the Active Barton survey and their implications for system planning. It also considers some of the possible economic impacts from a fully developed active transportation system in the county.

Chapter Two: Active Transportation Principles and Guidelines. This chapter establishes overall principles that guide the proposed network. It also presents the vocabulary of facilities, street adaptations, and other improvements proposed for Barton County, addressing both bicycle and pedestrian infrastructure.

Chapters Three through Seven: City and County Networks: These five chapters examine existing conditions in the four cities and rural county that pertain to walking and bicycling, including destinations, existing facilities, and opportunities. They describe the individual networks, priority phases, and statements of probable costs for each community and the county.

Chapter Eight: Support Programs. The League of 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 Seven largely address the Engineering component; Chapter Nine recommends initiatives that support these infrastructure investments to integrate bicycle and pedestrian transportation into Barton County's transportation environment.


LUMPY'S

CHAPTER 1

BARTON COUNTY MARKETS AND PREFERENCES

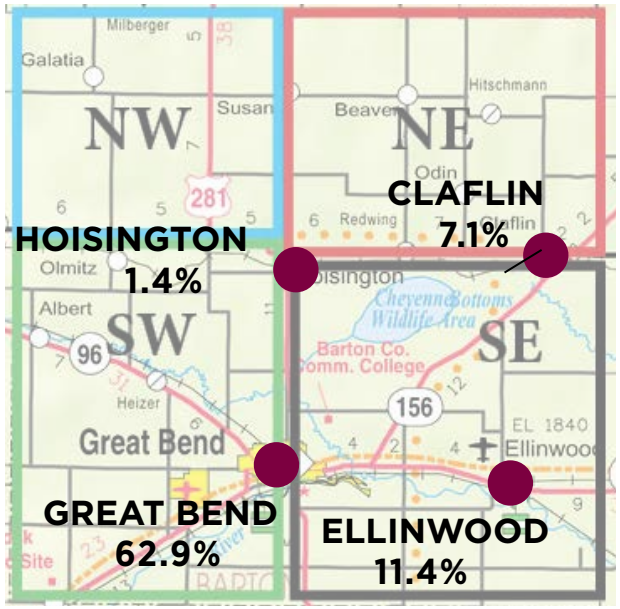
ACTIVE BARTON SURVEY

The Active Barton Survey was designed to explore the preferences and opinions of current and prospective bicyclists and pedestrians. Survey questions addressed three general categories:

- Characteristics of respondents, including demographics, their active travel behavior (such as how often and for what purposes they walk or bike), and their self-perceptions as pedestrians or bicyclists.
- Opinions about destinations best served by a pedestrian and bicycle network and the relative effectiveness of different actions in increasing the number of people who walk or bike for specific purposes.
- Opinions about different types of pedestrian or bicycle facilities.

WHO PARTICIPATED?

While the Active Barton survey is not statistically significant, it represented a useful group of people with a specific interest in biking, walking, and running. About 63% of participants live in Great Bend, whose residents make up 58% of the county's total population. About 11% of respondents were from Ellinwood (compared to an 8% share of Barton County's population), 7% from Claflin (compared to 2.3% share of the county), and about 19% from the rest of the county.



About 42% of respondents were between ages 30 and 44, 16% between 45 and 54, and 27.5% were 55 and over. About 80% of respondents reported household size from two to four people.

PEDESTRIAN RESPONSES

- **People walk frequently for specific purposes.** About 58% of participants reported walking at least once or twice a week; 39% of respondents walk but only infrequently, and only 3% do not walk at all. This suggests that any improvements to a pedestrian system will see a high level of activity and encourage those who do not regularly, but are interested in walking more.
- **Exercise and recreation-related purposes are by far the most frequent reasons mentioned for walking.** The next four most mentioned trip purposes (walking pets, trips to parks or recreation facilities, training for events, and family outings) all have recreational elements. A smaller but significant group walks for transportation to errands, hiking, social visits, shopping, and going to meetings. But recreation remains the most common reason for pedestrian activity.
- **Most respondents are pedestrians most interested in improved infrastructure.** The largest single group (39%) 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 31 percent, were interested in walking or running, but were concerned about safety along busy streets. Another 19% do not walk now, but might with safer facilities. Very small groups were at the edge of the interest spectrum: 4.7%percent responded being comfortable with existing facilities and 6.3% reported that they were unlikely to walk under any circumstances.

- **People were fairly evenly split about motorist behavior toward pedestrians.** 50% of respondents viewed behavior of Barton County motorists toward pedestrians as "fair." On the positive side, though, more people considered motorist behavior to be good or very good (30%) than poor (20%).

Infrastructure Types

A portion of the survey asked participants to respond to several photographs of streets and facilities. Through their responses, participants determined:

- Whether the setting is comfortable for most or all pedestrians.
- Whether the setting is comfortable for the respondent, but not necessarily for less avid walkers/runners.

The responses indicate that infrastructure matters to people. Key findings include the following:

- **For low-traffic streets, sidewalks create a much safer setting for most people.** About 43% of respondents considered a low-volume residential street without sidewalks as a safe walking environment for most or all pedestrians. Sidewalks increased that proportion to 88.5%.
- **Comfort levels increase with more separation there is between vehicular and pedestrian traffic.** On a major street, 95% of respondents rated a sidewalk with a boulevard separation safe for most or all pedestrians, versus 67% for back of curb sidewalks. Sidewalks with streetscape enhancements were viewed as safe by 100% of respondents.
- **People believe that good crosswalks increase safety.** A conventional crosswalk was viewed as safe for most or all pedestrians by 75% of survey pedestrians. But a more visible "zebra" crosswalk design with wide horizontal stripes increased

Figure 1.1: Frequency of Walking

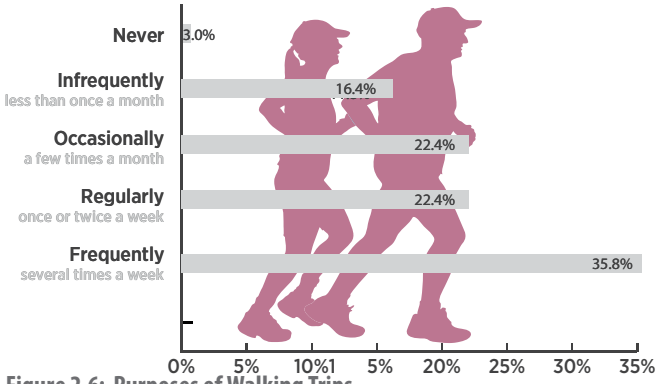


Figure 2.6: Purposes of Walking Trips

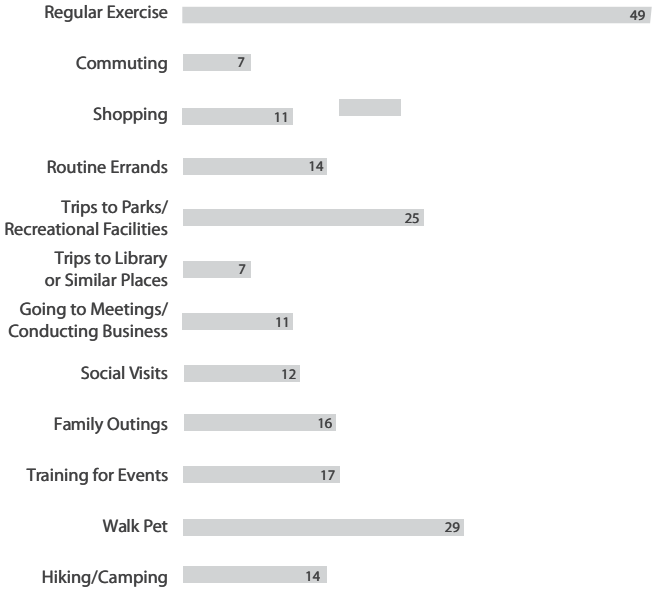


Figure 1.2:
Self-Characterization of Participants as Pedestrians

CONFIDENT AND FEARLESS: I am a confident pedestrian who will walk/run any route. I don't believe that any significant further action on pedestrian facilities is necessary. **4.7%**

COMMITTED PEDESTRIAN: I am a confident pedestrian who will walk/run any route, but believes that new facilities like sidewalks and trails are needed to improve Barton County's pedestrian environment for me and encourage other people to walk/run more often. **39.1%**

INTERESTED AND CONCERNED: I am interested in walking/running more often, but am concerned about the safety along busy streets. More sidewalks (or replacing damaged/missing walks) and trails would increase the amount of trips that I make by foot. **31.3%**

INTERESTED NON-WALKER: I do not ride a walk/run now, but might be interested if Barton County towns developed facilities that met my needs better or made me feel safer. **18.7%**

NON-WALKER UNLIKELY TO WALK: I do not walk/run, and am unlikely ever to do so. **6.2%**

that highly positive response to 93.4%. And 90% considered an enhanced colored crosswalks with a crossing median across a major, multi-lane arterial to be safe for most or all pedestrians.

- 95% of respondents rated a sidewalk with a boulevard separation safe for most or all pedestrians, versus 67% for back of curb sidewalks. Sidewalks with streetscape enhancements were viewed as safe by 100% of respondents.

BICYCLIST RESPONSES

- **As expected, bicyclists represent a somewhat narrower group than pedestrians.** A high 51% of participants reported biking at least once or twice a week (comparing favorably to 58% for pedestrian travel); 13% of respondents bike infrequently, and 19% do not walk at all (compared to 3% for pedestrians). This respondent sample clearly includes a higher proportion of cyclists than the general population. About 70% of al respondents answered the bicycle-related questions.
- **Exercise and recreation-related purposes are by far the most frequent reasons mentioned for walking, but people are more likely to bike rather than walk for transportation-related trips.** While 88% of respondents reported that they ride for recreation or fitness, the next cluster of reasons for biking (between 30 and 40%) included commuting to work and school (36%), routine errands (36%), trips to parks (34%), social visits (30%), and touring (40%).
- **Most respondents are pedestrians most interested in improved infrastructure.** The largest group, at about 48%, described themselves as at least occasional bicyclists who were concerned about their safety on streets. Many of these interested and/or occasional cyclists avoided streets entirely in favor of trails. Another 10% are non-riders who might be interested with better facilities.

  In common with national surveys, about one-third of respondents characterized themselves as confident bicyclists capable of using any route, but believe improvements and new facilities will enhance their environment. Only 1.6% describe themselves as capable of riding in mixed traffic under most conditions and comfortable with existing facilities and 6.5% reported that they were unlikely to bike under any circumstances.
- **Barton County cyclists generally ride on paved roads and streets.** About 65% of respondents report that they ride medium to long distances on paved roads, followed by 59% cycling shorter distances in and around cities and 50% ridig o paved trails. Roughly one-third do gravel or single-track riding. This reflects Barton County's excellent inventory of lightly traveled, paved county roads.
- **People were fairly evenly split about motorist behavior toward pedestrians.** 56% of respondents viewed behavior of Barton County motorists toward bicyclists as "fair." More respondents considered motorist behavior to be poor or very poor (28%) than good or very good (15.5%).

Infrastructure Types

As with pedestrians, bicyclist responses indicate that infrastructure matters. Specific findings indi-

Figure 2.13: Importance of Various Destinations

cate that:

- **Bike lanes on major multi-lane streets greatly increase perception of comfort, although they are still not viewed as safe for most users.** Only 2% of respondents considered a multi-lane arterials without bike lanes as comfortable for most or all cyclists. Addition of bike lanes increased this percentage to 29%. The number who perceived this setting as comfortable for themselves (but not for less experienced riders) increased from 30% to 48%.
- **Bike lanes also increased perception of comfort for two-lane roads.** Only 17% viewed two-lane city streets without bike facilities as safe for most or all users, and a surprising 44% of this relatively experienced sample viewed themselves as uncomfortable on these streets. The comfort perception dropped to less than 5% for highways without shoulders. However, highways with wide shoulders (like K-156) were seen as safe for most or all cyclists by 38%; county roads with bike shoulders by 36%; and buffered bike lanes by 65%.
- **Low traffic city streets were viewed as comfortable for most users.** About 60% of respondents viewed low-volume city streets as comfortable for most or all users. Shared-lane markings did not add to the comfort level. However, "bicycle boulevards" (local streets open to motor vehicles but having features to make them bicycle-friendly) were seen as comfortable for most or all cyclists by 75%.
- **Separated facilities received very high comfort ratings.** Multi-use paths on exclusive or roadside

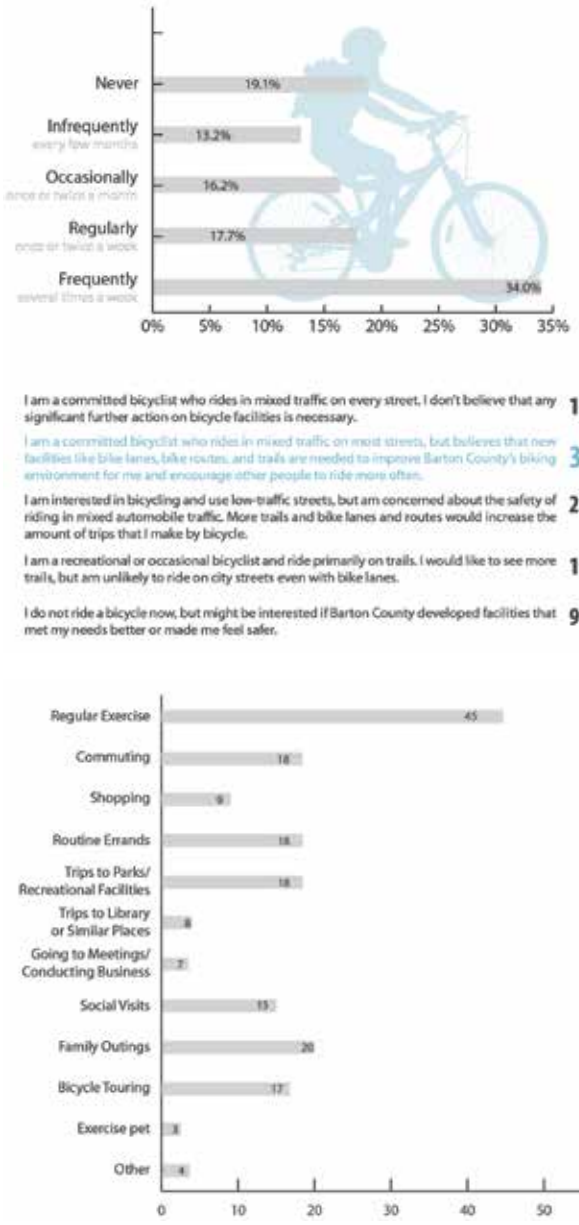


Figure 1.4:
Self-Characterization of Participants as Bicyclists

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NON-WALKER UNLIKELY TO WALK: I do not walk/run, and am unlikely ever to do so. **6.2%**

right-of-way were seen as comfortable for most or all users by over 95% of respondents. About 87% considered a cycle track to be comfortable for most or all bicyclists.

DESTINATIONS

An active transportation network should get people where they want to go. The survey listed 17 different community destinations or destination types, and asked respondents to rank them based on the importance of good bicycle access to them. All responses were considered important: the destinations ranked lowest for being "important" or "very important" (shopping destinations outside of downtowns and churches) were still considered as such by over 85% of respondents. Using frequency of responses rating destinations as "very important" can help establish key areas that the system must serve. Top responses (with percentages of "very important" ratings were:

1) Elementary schools (79.7%)
2) Middle schools (76.9%)
3) Trails e.g. Great Bend Bike and Hike Trail (75.4%)
4) High schools (67.19%)
5) Downtown Great Bend (60.9%)
6) Sports complexes and ballfields (56.9%)
7) Brit Spaugh Park (56.25%)
8) Community libraries (55.6%)
9) Other community parks (54.7%)
10) Barton County Community College (54.6%)

POLICIES AND ACTIONS

The survey identified 17 pedestrian-related actions or programs and 24 actions that related to bicycling, asking respondents to rate each on the basis of usefulness. As with destinations, all received positive responses, but some were considered more useful than others. To evaluate priorities, we assigned a score to each response, from 1 (bad idea) to 5 (very useful, best idea) and calculated weighted averages. The top ten rated pedestrian and bicycle actions follow. Actions with the same weighted average are listed in order of number of people rating that action as "very useful/best idea."

Bicycle Actions

1) More off-street paths or trails (4.56 out of 5)
2) Widened sidewalks or paths along major streets (4.3)
3) Bike lanes on streets (4.21)
4) Designated bike route system (4.11)
5) Bike safety activities designed for kids (4.09)
6) Better coordination between city and county governments (4.04)
7) Better motorist education programs (4.02)
8) Better traffic enforcement (3.91)
9) Stronger bicycle advocacy (3.89)
10) Better information on health benefits of bicycling (3,89)

Top-ranked bicycle actions proposed improvements to basic infrastructure, with an emphasis on providing some level of separation between bicycles and motor vehicles (paths and bike lanes)

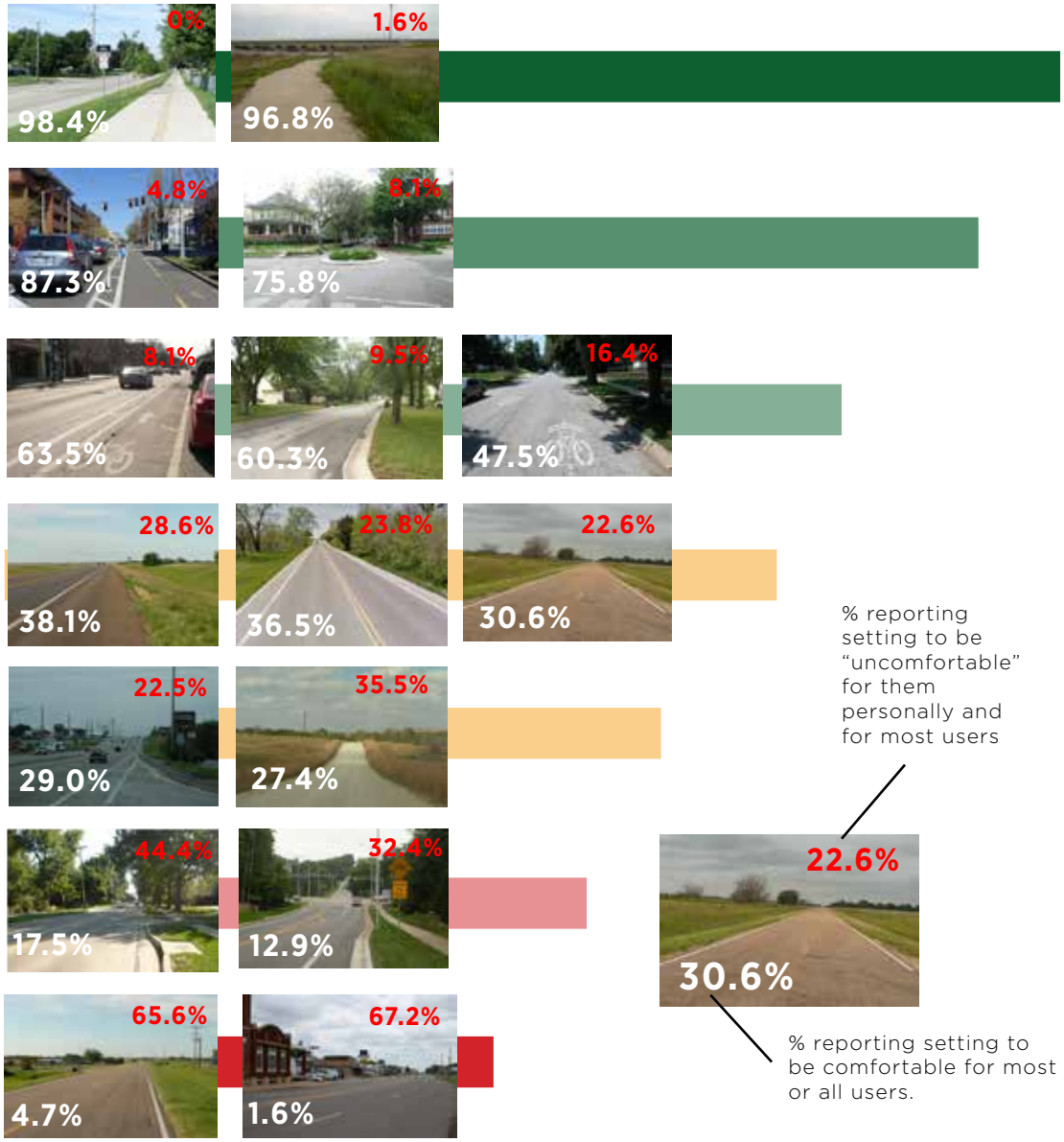
and identifying a specific bike route system. Importantly, respondents placed a high priority on non-capital support programs, including education and enforcement activities, two of the League of American Bicyclist's "5 E's" in its Bicycle Friendly Communities program. These priorities, together with those on destinations, help provide structure for a bicycle network.

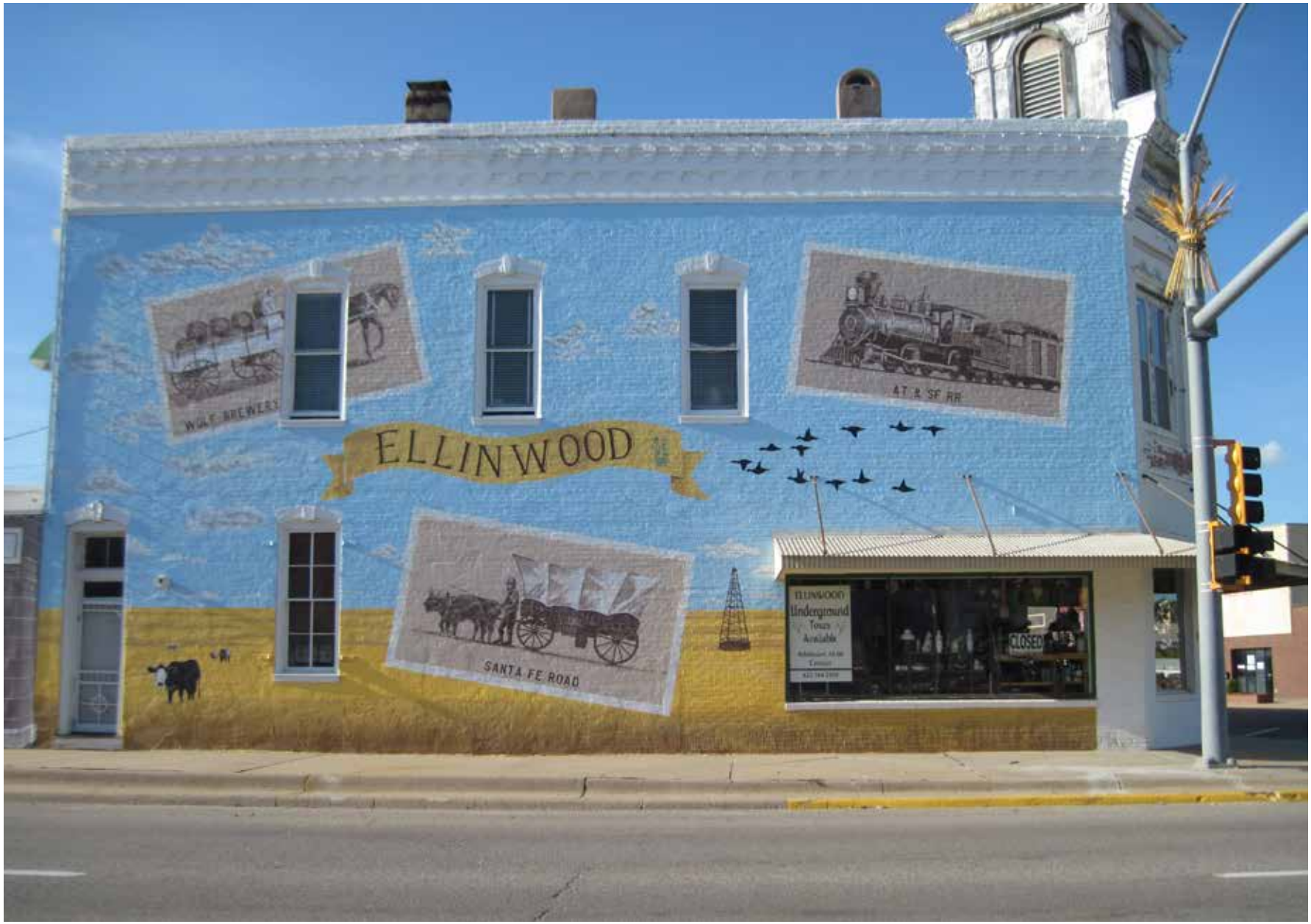
Pedestrian Actions

1) Better crosswalks with safety features across major streets (4.45)
2) Sidewalks around schools and other pedestrian destinations (4.44)
3) Sidewalks along commercial streets (4.44)
4) More walking and hiking trails in parks (4.43)
5) Zoning and subdivision requirements for sidewalks in new developments (4.36)
6) More safe routes to schools projects and activities (4.15)
7) Clearer crosswalk markings (4.13)
8) Greater separation between streets and sidewalks (4.07)
9) Better design of accessible ramps at intersections (4.00)
10) Audio on traffic signals for visually impaired pedestrians (3.98)

Top-ranked pedestrian actions involve basic infrastructure: sidewalks at key locations and improved crosswalks. Initiatives that were sensitive to the needs of people with visual or mobility impairments such as intersection ramp design and audio and count-down pedestrian signals, also received attention.

Figure 1.5: Comfort Rating of Various Infrastructure Settings

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CHAPTER 2

THE ACTIVE NETWORK PRINCIPLES AND DESIGN GUIDELINES

THIS CHAPTER PRESENTS THE PERFORMANCE PRINCIPLES AND FRAMEWORK OF AN ACTIVE TRANSPORTATION NETWORK FOR BARTON COUNTY.

THESE PRINCIPLES, DERIVED FROM THE ANALYSIS OF EXISTING CONDITIONS AND OPPORTUNITIES, THE COMMUNITY ENGAGEMENT PROCESS, AND MARKET PREFERENCES GENERATE THE OVERALL SYSTEM CONCEPT.

The introductory section identified six guiding requirements for an effective bicycle network, adapted from work completed by the Netherlands Centre for Research and Contract Standardization in Civil and Traffic Engineering:

Integrity: The ability of a system to link starting points continuously to destinations, and to be easily and clearly understand 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 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. Tables 2.1 through 2.6 describe performance criteria to guide implementation of the network over time and evaluate its effectiveness. Each table includes:

- The **performance factors r**elevant to each requirement. For example, the INTEGRITY requirement addresses the ability of users to understand the system and use it to get to their destinations. Examples of performance factors that help satisfy this requirement include clear wayfinding and directional information and continuity, ensuring that users do not confront dead-ends as they move along the route.

- The **measurements** that can be used to evaluate the success of the system and its ultimate design. For example, we can measure the effectiveness of a wayfinding system by its ability to guide users intuitively without either creating too many signs.

- The **performance standards** that establish the design objectives and guidelines for each of these factors. For example, a wayfinding system should avoid ambiguities that confuse users and follow graphic standards that are immediately and clearly understood.

Integrity issue Examples

Bike lanes drop cyclists in high-traffic high-way conditions.

Sidewalk interruptions cut continuous access for pedestrians.

Left: Bike shoulder designed to link Great Bend to the Hike and Bike Trail ends at Great bend city limits as trafdfic intensifies.

Figure 2.1: The **INTEGRITY** Requirement Developed

Performance Factor	Measures	Performance Standard
Comprehensiveness	Number of connected destinations on system	Major destination types, including parks, schools, BCCC, libraries, hospitals, downtowns, major retail concentrations, and regional tourism destinations should be served by the ultimate network. 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 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.

Directness issues.

Lack of direct route to Great Bend Regional Hospital and baseball complex requires people walking or biking to these facilities requires a circuitous route using McKinley Street.

Safety issues.

Left: US 56 presents a formidable barrier to pedestrians and bicyclists traveling from north to south.

Figure 2.2: The **DIRECTNESS** Requirement Developed

Performance Factor	Measures	Performance Standard
Access	Coverage Access to all parts of the county and largest tons	The network should provide convenient access to all parts of the county and the four largest towns. As a standard, all urban residential areas should be within one-quarter to 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. Through portion 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 2.3: The **SAFETY** Requirement Developed

Performance Factor	Measures	Performance Standard
Reduced number and fear of crash incidents	Number of incidents Reactions/perceptions of users	Bikeways system users should feel that the system protects their physical safety, as measured by both use of routes and survey instruments. A particular area of concern in Great Bend, Hoisington, and Ellinwood are crossings of major highway arterials (10th St, K-4, US 56)
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. 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 As a rule, sidepaths should 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.

Comfort issues.

Right: New signs o county roads advising motorists of minimum passing distance requirements provides some level of comfort to bicyclists by increasing awareness of traffic laws.

Figure 2.4: The COMFORT Requirement Developed

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 component for both long and short distances	Hills and grades are generally not a factor within Hays. Grades are most significant at separations over or under roads and railroads. 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. When street width restricts bike lanes to one side of the street only, facilities should generally be placed on the upgrade side. 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 when average daily traffic (ADT) exceeds 5,000 vehicles per day 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.

Experience issues.

Great Bend's Forest Avenue provides a very pleasant neighborhood experience that makes it an extremely appealing route city bicyclists.

Figure 2.5: The **EXPERIENCE** Requirement Developed

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. Routes should provide access to commercial and personal support services, such as food service, convenience stores, and restrooms.
Landscape	Location and extent of parks or maintained open space	Network should maximize exposure of 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.

Feasibility issues.

Right: A relatively small investment at the troublesome 10th and Harrison intersection in Great Bend can pay big dividends in pedestrian accessibility.

Figure 2.6: The **FEASIBILITY** Requirement Developed

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, 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.

NETWORK ATTRIBUTES

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

Tailored to User Groups. Planning a network for Barton County, with both in-town and interurban travel, should respond to specific user group needs. These groups include:

- People traveling within towns for relatively short distances to specific community destinations or for recreational purposes such as walking loops.
- People traveling from towns to nearby destinations of purpose or specific interest. Examples are Barton County Community College, Barton Lake, the Wetlands Education Center, and Cheyenne Bottoms. These travelers may include both local citizens and visitors.
- Intercity bicyclists including both utilitarian and recreational trips.

Transit Model. Great Bend and the Wetlands and Wildlife National Scenic Byway have previously developed a system of color-coded bicycle loops that can be readily incorporated into the countywide network. In Great Bend, with a much more complex street system than the smaller towns, designating a grid of destination-based routes analogous to a transit system can produce the most readable wayfinding system. This idea guides bicyclists to destinations with minimum consultation of support materials and emphasizes the interconnection of routes. Thus, cyclists heading to a specific destination will know the combination of designated routes that take them where they want to go. However, the smaller size and lower traffic volumes make this kind of interconnected network becomes less necessary in Ellinwood, Claflin, and Hoisington.

Using existing facilities. Facilities like the Great Bend Bike & Hike Path are the foundation for an expanded active transportation network.

Incremental Integrity. Incremental integrity – the ability of the network to provide a system of value at each step of completion – is an important attribute. The initial phase should be valuable, increase active access, and satisfy the six performance criteria, even if later phases or extensions were never

implemented. Each subsequent phase of completion follows the same principle of leaving something of clear value and integrity.

Evolution. 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 cliche, 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 should avoid unnecessary controversy. On most streets, shared streets and signage can provide satisfactory facilities that focus on the positive and minimize divisive conflicts. Projects should demonstrate the multiple benefits of street adaptations. For example, bikeway design can slow motorists and keep unwanted through traffic out of neighborhoods, benefiting both cyclists and neighbors.

Use of Existing Facilities. Existing features like the Great Bend Bike and Hike Path, existing and well-tested bicycle and pedestrian routes (including designated loops in visitor information, safe routes to school paths, and the pedestrian circuit around Claflin), existing installed bike route and advisory signage, and similar features for the practical foundation for an active access network in Barton County and should be incorporated into a new system.

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.

Routes of Least Resistance. The Barton County Bikeways Survey showed that much of the city's potential urban cycling market is comfortable in on-street situations, but understandably prefer quiet streets or corridors with some degree of separation from motor traffic. It is not necessary to try to force bicycle access onto every major street when more comfortable, lower cost options exist. 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 access options and pedestrian accommodations in new major street projects and retrofits.

Facilities for Different Capabilities. The Bicycle and Pedestrian Survey indicated that people walk and bike for different purposes and display different capabilities. Active users range from long-distance road cyclists who thrive on existing paved roads to pedestrians with visual impairments who love to walk but do not want a lack of facilities to place them in unsafe conditions. The Active Barton County system should recognize a range of capabilities and needs.

BICYCLE FACILITY GUIDELINES

The ultimate Barton County network will be realized using a variety of features: pavement markings, signs, capital projects like paths and trails, and supporting improvements. Each of these is designed to increase the comfort and safety of bicyclists traveling along the system, and to encourage citizens of Barton County to consider using bicycles for at least some of their routine trips.

FACILITY TYPES

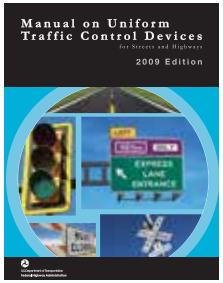
In general, the Active Barton bicycle network will use the following types of facilities. These facility types form the building blocks of the network, and become the individual design components of the system's routes. These facilities also meet pedestrian needs and that many of the off-street and intersection 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.

- **Shared streets and roads,** 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 most cases, they have on-street parking, but in many cases are wide enough to accommodate motorists and bicyclists comfortably.

- **Paved shoulders,** typically but not always rural section roads without curbs where hard-surfaced shoulders are provided that separate the travel lane from the edge of the pavement. Shoulders normally are provided on higher volume highways to provide a greater measure of safety for motorists and a place to pull over safely in case of emergencies or mechanical failure. While usually not marked as bikeways, they also provide a place for cyclists separate from moving traffic and perform the function of a bike lane.

- **Bike lanes,** in which bicyclists share the street right-of-way but operate within marked lanes reserved for their use. Bike 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). Where streets are not wide enough for bike lanes on both sides, the system proposes bike lanes on one side of the street, with a shared lane on the opposite side. Buffered or protected bike lanes have a neutral area or buffer that separates them from motor vehicle travel lanes, often creating a higher level of user comfort than normal bike lanes.

- **Sidepaths.** Sidepaths are multi-use paths located within a street right of way but fully separated from travel lanes. These facilities are popular in Europe and are frequently used in the United States, but have been controversial, largely because of potential bicycle-motor vehicle conflicts at intersections of streets and driveways. These facilities are especially useful along the street frontages of major campuses, parks, open spaces, and limited entry developments with long distances and few interruptions.



Sources. Sources that establish detailed standards for the design of bicycle facilities include the *Urban Bikeway Design Guide* (National Association of City Transportation Officials, 2011), the *Manual of Uniform Traffic Control Devices* (Federal Highway Administration, 2009), and the AASHTO *Guide for the Development 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 Hays bikeways network.

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Facility Types with Active Barton Applications

1 Low-volume continuous local street, Great Bend
2 Shared street with shared lane marking, Topeka
3 Bike lane, Boston, MA
4 Protected bike lane, Chicago, IL
5 Sidepath, Bettendorf, IA
6 Multi-use trail, Great Bend
7 Paved shoulder, Barton County
8 Low-volume paved county road, Barton County

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8

SHARED STREETS OR ROADS

Shared, low-volume streets will make up the majority of on-street mileage in urban areas. On these streets, bicycles and motor vehicles operate within the same area. In rural settings, these shared right-of-ways will typically be on low-volume county roads.

Shared streets will include bike route identification and wayfinding signs and may include shared lane markings, or "sharrows," a pavement marking now recognized within 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.

Sharrows have been used in limited applications in Great Bend along 19th Street. They require maintenance and respondents in the survey did not appear to think the markings created a more comfortable bicycling environment. Contemporary research is beginning to suggest that the chief value of sharrows is providing guidance rather than enhanced safety performance.

Application to Street Contexts in Barton County Contexts

Characteristics of streets in the Active Barton system that adapt to shared use include:

- Low traffic volumes. Streets with average daily traffic (ADT) below 1,000 vpd (vehicles per day)are most appropriate for shared use. As volumes increase, the number of potential cyclists comfortable riding in the shared street environment will decrease. County roads in rural areas typically have ADT below 500 vpd.

- 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 city contexts is 25-30 mph. County roads in rural settings typically operate at 55 mph, above the recommended effective speed for the markings.

- On-street parking. Most low-volume streets in Barton County towns do not restrict on-street parallel parking. The sharrow, when used, can help bicyclists position themselves away from the hazards of opening car doors.

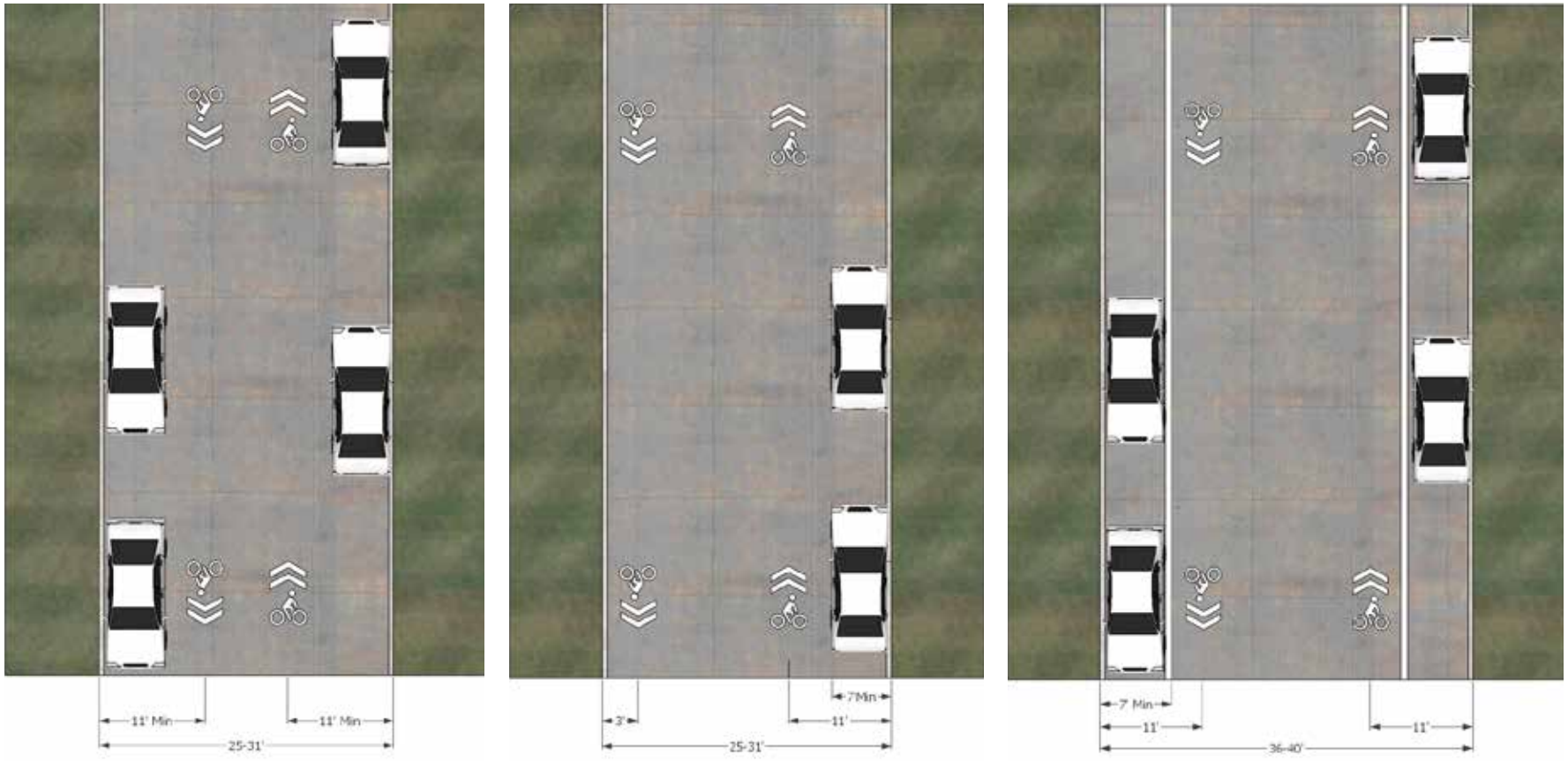
- Inadequate space for bike lanes. Bike lanes, providing reserved space in the street channel for bicyclists, are often desirable, but most low-traffic city streets in Barton towns are not wide enough to accommodate bike lanes, travel lanes, and on-street parking. Providing all of these features typically requires a 44-46 feet minimum curb to curb width.

These conditions are typically found in the following 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.

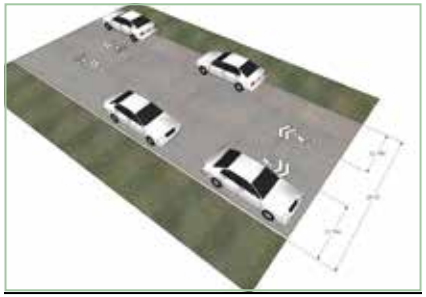
Figure 2.7: Typical Designs for Shared Streets



These conditions are typically found in Great Bend and other towns on continuous local streets or neighborhood collectors. Markings are unnecessary on very short segments, other than to provide directional guides to users. Sharrows may be used on streets with somewhat higher volumes and speeds up to 30 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.

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.

Figure 2.8: Guidelines for Shared Streets



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. Typically recommended spacing in urban settings is 250 feet. One sharrow at the head of each block may be acceptable.	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.

BICYCLE BOULEVARDS

Signage concepts for bicycle boulevards. Signs are the least expensive solution but can be very effective in distinguishing these multi-use streets.
Top to bottom: Street signs with bicycle boulevard designations in Topeka and a bicycle boulevard identifier in Berkeley.

Left to right: intersection crossing caution in Portland, OR, and share the road sign in Leawood, KS

Bicycle boulevards (sometimes referred to as "neighborhood greenways" or "green streets") are a type of shared street that has applications to Active Barton, and especially within Great Bend. Typically, "bicycle boulevards" are direct street segments that parallel busier streets, while serving the same destinations. Bicycle boulevards utilize the pavement marking conventions discussed above, but include other identifying and functional enhancements. Despite the name, "bicycle boulevards" are open as usual to motor vehicles, but include some features to make them more hospitable to bicyclists and pedestrians. These vary in level of capital investment and complexity, and include (in relatively ascending order of complexity):

Signage. Signage has the advantage of being 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.

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 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

Traffic calmer on a bicycle boulevard in Seattle

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 provide a better pedestrian environment and tend to discourage unwanted through traffic from using continuous neighborhood streets.

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.

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: Median installation in Chicago; Crossing median concept for urban corridor by RDG.; diverter island in Los Angeles.

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. They are also logically used on streets with moderate traffic where capacity exceeds traffic demand, encouraging excessive speeds. Here, the bike lanes both accommodate bicycles and slow traffic to safe speeds.

In Barton County settings, bike lanes are proposed in four situations:

Retrofits of existing streets. These streets are wide enough to accommodate bike lanes without affecting the existing number of lanes. Examples include Washington Street in Great Bend and South Main Street in Ellinwood. Both streets are important parts of a potential system because of their access to important destinations.

"Lane diets." These are typically older four lane streets that can serve their traffic volumes more safely if converted to three lanes with a left-turn lane. This then provides enough space for bike lanes on strategic corridors. An example is Kansas Avenue in Great Bend.

New streets or street widenings. These major investments are proposed by the comprehensive plan to meet future traffic demands or create new corridors. An example would be eventual extension of Grant Street in Great Bend.

Shoulders in rural contexts. Shoulders on rural section roads may or may not be marked as bike lanes, but serve the function of both increasing road safety and durability and providing a refuge that separates bicyclists from high speed travel lanes. Examples include West 10th Street (Barton County Road) from west of Patton Road to the Bike & Hike Path; Kansas Highway 156; US 281 between Great Bend and Hoisington; US 56 from Great Bend to Ellinwood; and County Road 30 between US 281 and Barton County Community College.

Application to Street Contexts in Barton County

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

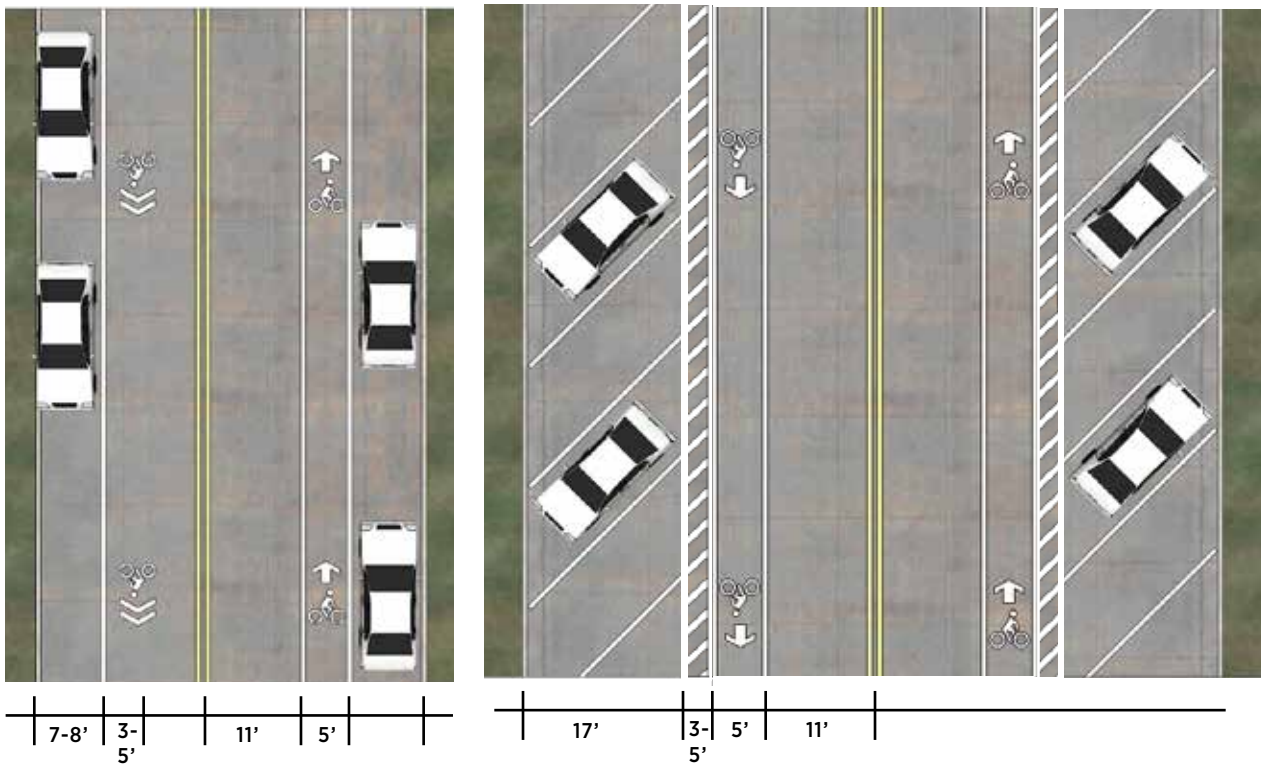
- Higher traffic volumes or high speeds. Bike lanes become more necessary as volumes or speeds increase, applying to streets with average daily traffic above 2,000 vehicles per day or speed limits about 30 mph. These higher volumes and speeds require greater degrees of separation to maintain comfort 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 30 and 45 miles per hour. Above 45 mph, margins for error and, consequently, user comfort and safety decline.

- Traffic calming situations. In some situations, strategically located streets are very wide but carry relatively low amounts of traffic. This encourages excessive speeds that can create hazards for all road users. Bike lanes reduce the perceptual width of the street, and encourage motorists to moderate their speed.

- On-street parking. Some candidate streets for bike lanes also provide on-street parking. Adequate space must be provided to avoid hazards from opening car doors. Bike lanes should be avoided behind head-in diagonal parking stalls unless separated by a buffer of at least five feet.

Figure 2.9: Typical Designs for Bike Lanes



TYPE 1

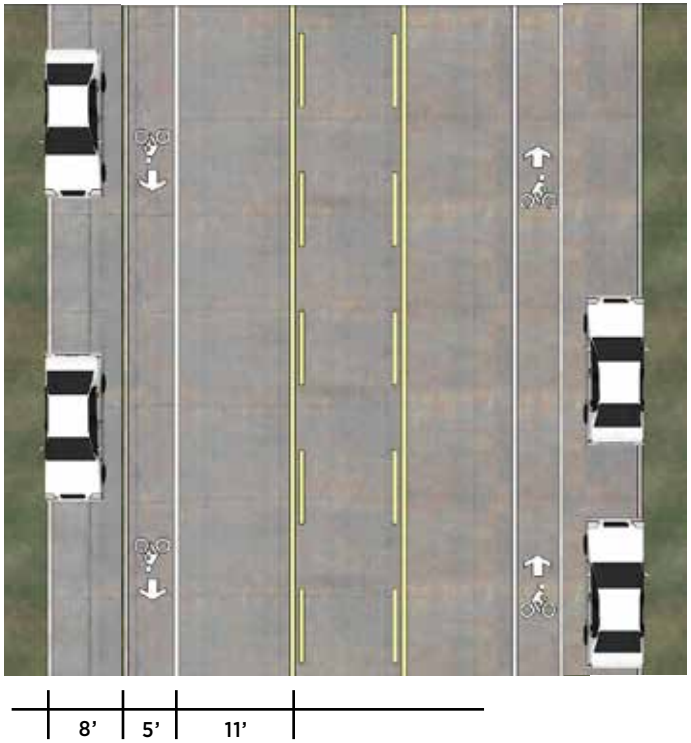
Single direction bike lane with parallel parking and opposing shared lane. Street channels require a minimum of 42 feet from face of curbs with two-sided parking. Minimum width drops to about 35 feet with single-sided parking. The bike lane should be placed on the side of the street where cyclists in a shared lane would be most likely to delay traffic (such as an uphill or rising grade).

TYPE 2

Two direction buffered bike lanes with diagonal parking. This context includes Kansas Street in Downtown Great Bend. “Back-in” diagonal parking is most desirable with bike lanes, but is often resisted by motorists. If conventional head-in diagonal parking is retained, a 3 to 5 foot buffer should be provided to allow bicyclists to be seen by backing cars. Street channel requires a minimum of 72 feet from face of curbs.

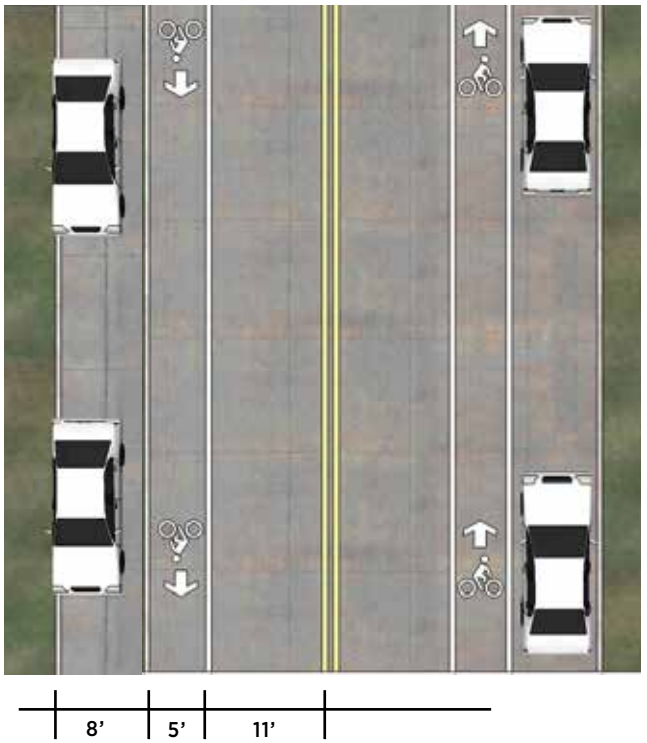
Washington Avenue, a key north-south corridor in Great Bend. The street’s typical 48-foot width is adequate to maintain parking and add bike lanes.

17th Street Terrace in Great Bend, an excellent east-west through corridor that serves Veteran’s Memorial Park and had both the width and demand to accommodate bike lanes.



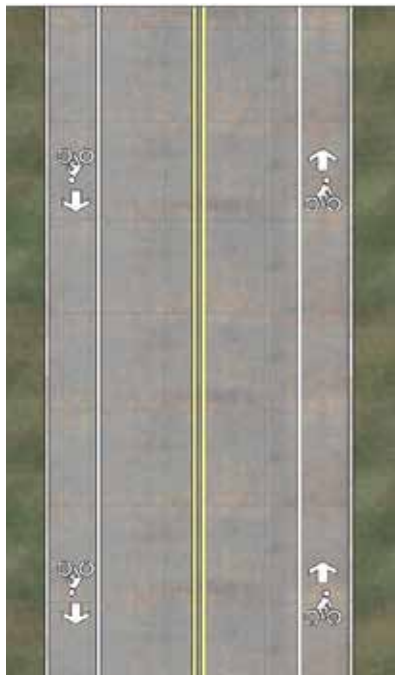
TYPE 3

Four to three lane arterial road diet. Required minimum width depends on parking arrangement. Desirable width with parking on both sides is 60 feet. Minimum reduces to 52 feet with one-sided parking and 44 feet with no parking. This type applies to Kansas Street between Downtown and 19th Street in Great Bend.



TYPE 4

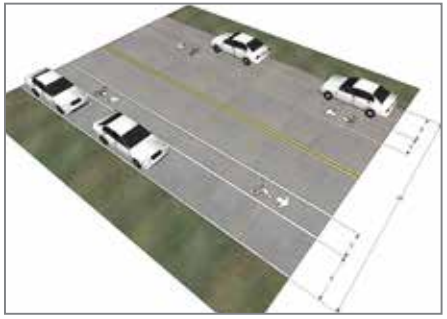
Two direction bike lanes with two-sided parallel parking. Desirable minimum curb to curb width is 48 feet. This section applies to Washington Avenue in Great Bend or South Main in Ellinwood. 17th Terrace in Great Bend places diagonal parking on one side, and could replace the parallel scheme shown above with buffered diagonal parking as shown

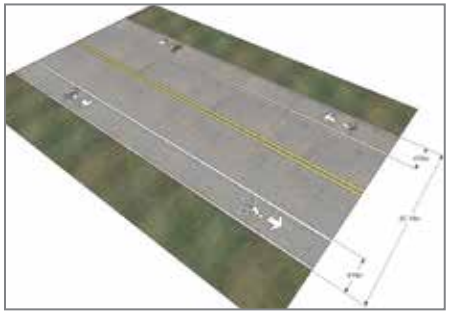


TYPE 5

Rural Section Shoulders. Shoulders may not be marked as bike lanes but will function that way on rural section roads and highways.

Figure 2.10: Guidelines for Bike Lanes





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.

Design Condition	Bike Lane, Parking Lane, and Total Street Width	Typical Street Type	Comments
Two-Way Traffic with parallel 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: With 2-sided parking: 46-48 feet for two-lane plus 11 feet for each additional travel lane. With 1-sided parking, 38-40 feet plus 11 feet for each additional travel lane.	Collectors and minor arterials	Supporting information should advise cyclists to ride in the left-hand part of the bike lane. Four foot bike lanes are acceptable in constrained situations with a minimum 8 foot parking lane.
Two-Way Traffic with conventional diagonal parking	Standard of 17 foot parking stall perpendicular distance to curb with 3 to 5 foot buffer zone and 5 foot bike lane. Four foot bike lane is sufficient with five-foot buffer. Total minimum street width with diagonal parking on both sides(face to face of curb): 72 feet; with diagonal parking on one side and parallel on the opposite: 60 feet	Collectors and minor arterials	Occurs in downtown and some commercial district settings. Buffers are not necessary if back-in diagonal parking is used.
Two-Way Traffic, no parking or rural section roads	Four-foot minimum bike lanes, excluding gutter pan. On highways with higher speed, shoulder or bike lane width should increase to 5- to 7-feet depending on street character and speed limits. If rumble strips are used, minimum distance of 4 feet from outside edge of rumble strip to edge of pavement.	Minor arterial, county roads, highways	

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.

Intersection solutions for on-street bicycle facilities include:

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

Typical Intersection Markings

Figures on the opposite page illustrate 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.

Right-Turn Lanes

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. Recommended pavement markings position the bicyclists continuing straight ahead to the left of the 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

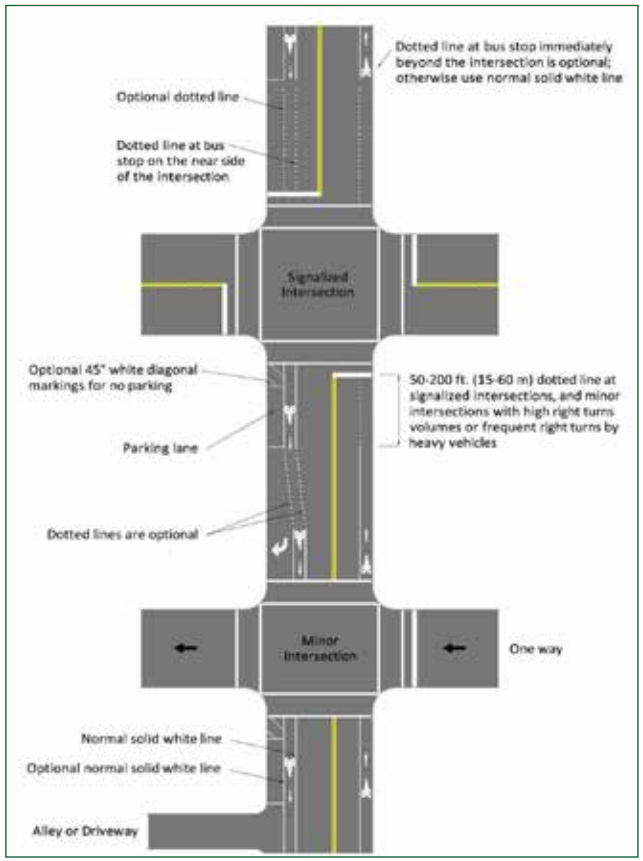
Bicycle boxes are used at signalized intersections to extend a bike lane to the front of a traffic queue. The box sets the stop bar for motor vehicles behind the stopped bicycles. They provide clear visibility for bicyclists, minimize the problem of cyclists hugging the right-hand curb, and expedite 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.

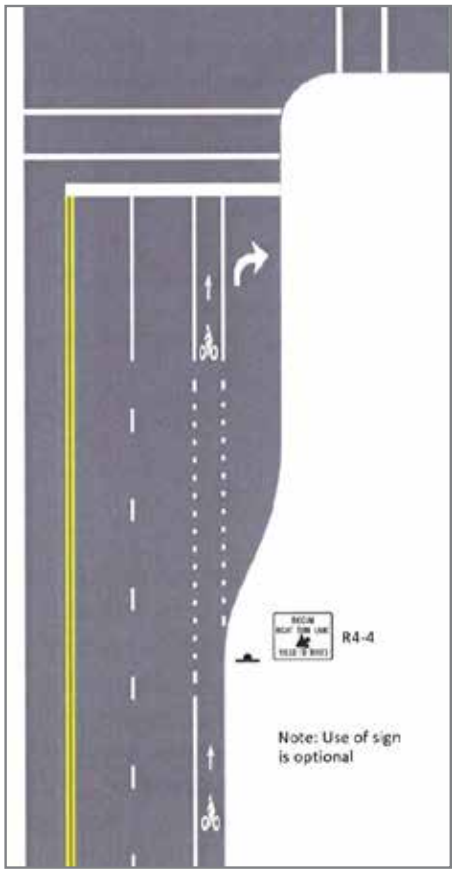
Offset Intersections

Some candidate bike routes are offset as they cross major arterials, typically at section lines. 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. Examples of these offsets include Vine Street at K-4 Highway in Hoisington and 17th Street at McKinley in Great Bend. Figure 2.12 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 path aligns the cyclist with the continuation of the bike route.

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

Figure 2.11: Lane Markings at Intersections

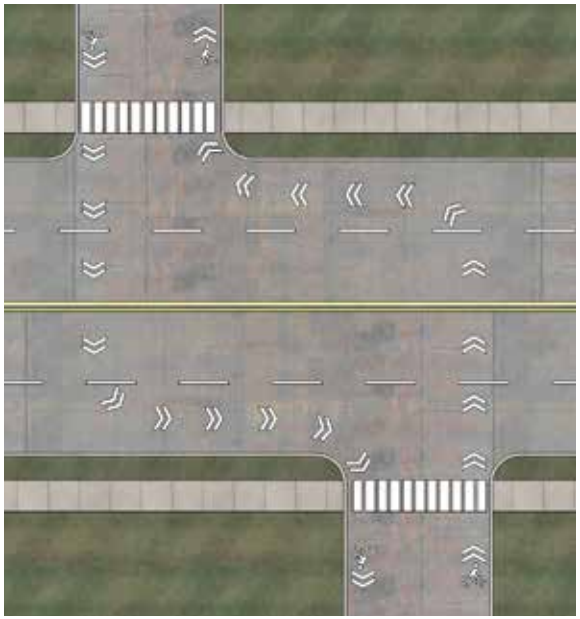




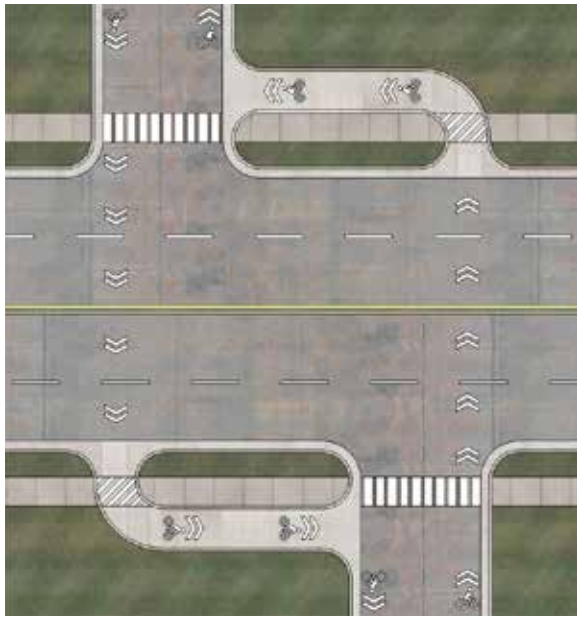
Source: AASHTO Guide for the Development of Bicycle Facilities, 2012

Figure 2.12: Offset Intersections

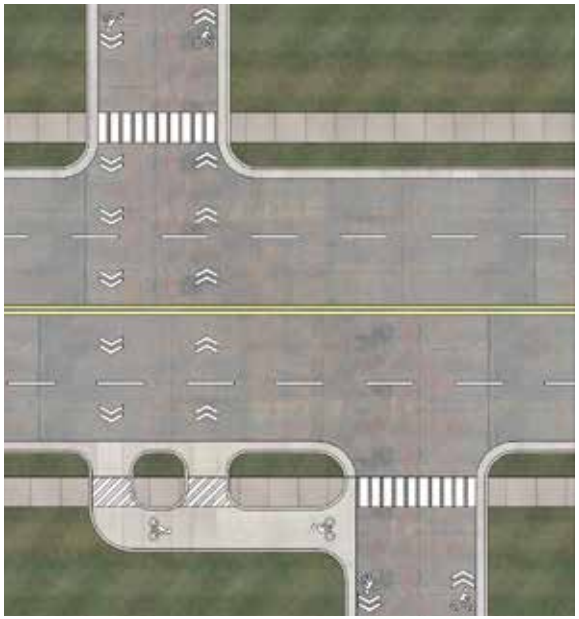
Crossing offset intersections. Concepts are designed for three different situations. Case (1) illustrates an offset crossing with low cross traffic, where use of chevrons to mark a path through the intersection is sufficient.



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.



Intersection offset of 17th Street/17th Terrace at McKinley Street in Great Bend.

SIDEPATHS

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 and are popular among roadway designers, but have been controversial among bike facility designers and urban bicyclists. They present significant challenges at intersections but allow cyclists to operate comfortably on direct major routes.

While the Barton County survey indicates that many current and potential cyclists are comfortable operating in mixed traffic, many others want to be separated from motor vehicles. The sidepath has been a response to this concern, using road right-of-way to accommodate a multi-use path. The extra cost of these facilities is relatively small, since sidewalks are already required in most urban street projects.

Yet sidepaths have been controversial as well. The 1999 AASHTO standards generally advised against their use. The new 2012 standards are somewhat more tolerant, but still include major reservations about these roadside facilities. 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.

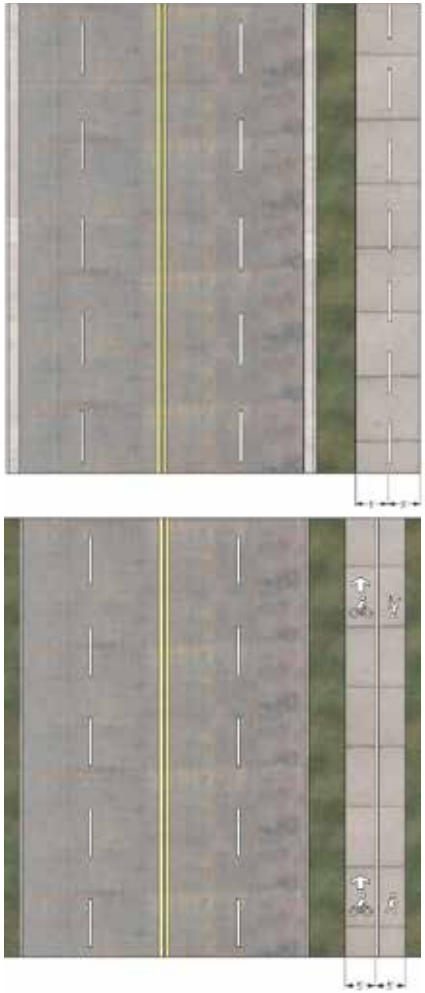
- **Right-of-way ambiguities at driveways and intersections.** Usually, cyclists on a sidepath along a major street are forced to yield to intersecting traffic. Cyclists traveling on streets, on the other hand, have the same right of way rights as motorists.

- **Path blockages.** Cross traffic on driveways and intersecting streets frequently blocks the sidepath by stopping across it.

Sidepath with well-marked crossing, Clayton Road in Saint Louis County, MO

As a result, experienced cyclists usually prefer on-road facilities to roadside facilities. Yet, sidepaths, despite their issues, are used frequently and remain popular with many users. Many cyclists justifiably fear rear-end (or overtaking) crashes or distracted drivers wandering into even a well-designed bicycle lane. Sidepaths also accommodate pedestrians and other wheeled users who cannot use streets. Along major streets, they also 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



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.

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 a Barton County network.

Application to the Barton County System

- Conventional multi-use sidepaths, typically wide paths parallel to arterial streets, should ideally be used with relatively few driveway or street interruptions. Good settings include the edge of open spaces such as large parks, cemeteries, and school sites and campuses.
- 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.

Design Guidelines for 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. 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 2010 recommends a minimum separation of five feet without a physical barrier. Table 2.13 displays recommended separations 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 per mile. This access management policy should apply to the primarily arterial streets proposed for these three corridors.

Figure 2.13: Sidepath Separation from Road Channels

Adjacent Road Speed Limit (mph)	Recommended Sidepath Separation (feet)
35	5-8
45	12-14
55	20-24

Sidepaths and Adjacent Roadway Character

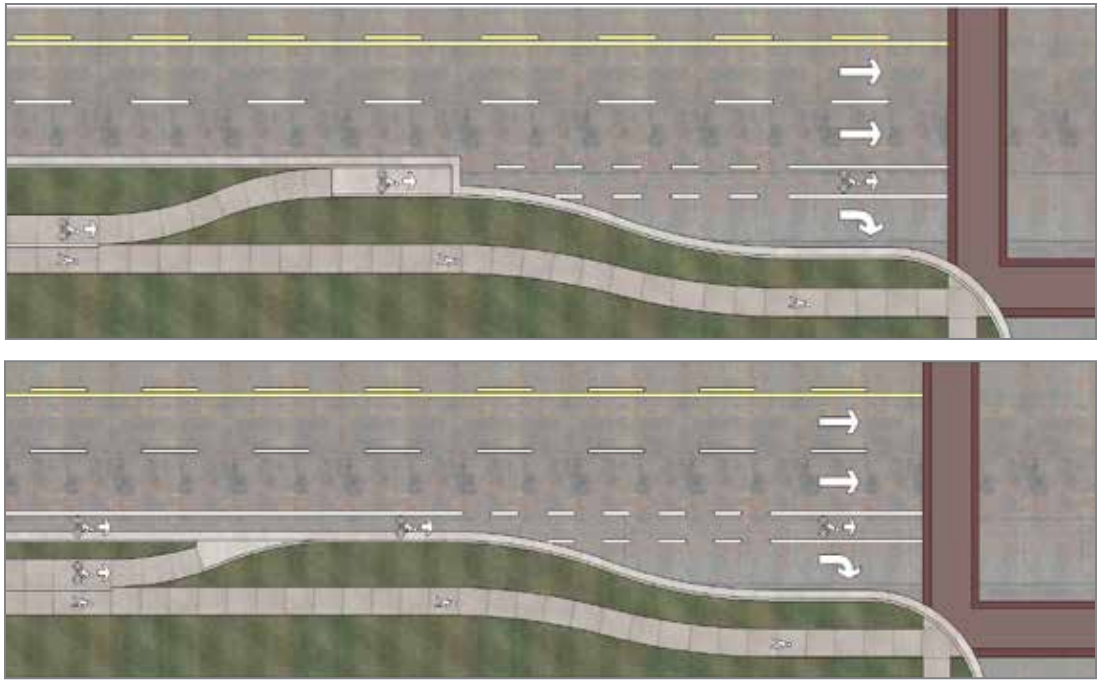
As mentioned earlier, two-way sidepaths set up an unexpected counterflow direction that creates the possibility of crashes. Florida DOT research indicates that two-way sidepaths appear safer along 2- and 3-lane roadways and less safe along multi-lane roads with 2 or more lanes in each direction. In addition 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 tends to be favored by the 2012 AASHTO guide. 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 becom-

Sidepath connections along Holland and 7th Streets link the Bike & Hike Path to the center of Great Bend.

Figure 2.14: One-Way Sidepath Concept



One-Way Sidepath Concept. 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 both without (top) and with bike lanes. Without bike lanes, the cycle track 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.

ing pedestrians and using the crosswalk. Thus, 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 multi-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 sidepaths are prevalent, the Florida DOT's path intersection design manual proposes three discreet and mutually exclusive separation distance categories: 1-2 meters; 5 to 10 meters; more than 30 meters

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 2.15 summarizes the relative performance of each placement for these variables.

Defining Crossings

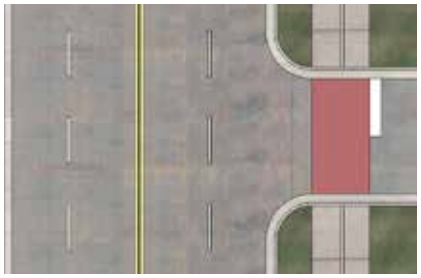
- All crossings across streets and major driveways should be clearly defined. Street intersection markings should utilize standard zebra or ladder markings incorporated at mid-block crossings and other major intersections. Colored concrete or asphalt surface treatments may also be used. A simpler dashed 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.

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.

Good sidepath intersection design: Ramp is directly in line with travel path, crosswalk is unobstructed and clearly marked.

Figure 2.15: Sidepath Separation from Street at Intersections

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			



Crossing Definition. Sidepath 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 path.

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.
- Use signs facing intersecting streets to advise approaching motorists of the presence of a sidepath. A particular hazard is the likelihood that motorists will look in the direction of on-coming traffic, but will not think to look in the opposite direction for pedestrians or cyclists.

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.

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.

Sidepath Advisory Signs. Top: 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. Above: Trail crossing advisory sign on an intersecting side street, installed on Clayton Road in suburban Saint Louis.

Intersection Geometrics

In addition to crossing visibility and access management techniques, AASHTO 2012 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.
- Keep approaches to sidepaths clear of obstructions, including stopped motor vehicles, through stopbars and yield markings.

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.

MULTI-USE TRAILS

The Great Bend Bike & Hike Path is the best example of a true multi-use trail in Barton County. Users consider trails on their own rights-of-way to be the most comfortable of all pedestrian and bicycle environments, and the county has specific opportunities where they can become more integral to the active transportation system.

From top right: Existing Great Bend Bike & Hike Path and maintenance path parallel to the old drainage channel around the north side of the city.

The Great Bend Bike & Hike Trail is already a major asset and suggests the appeal of additional trails in the Active Barton network. Anticipated trail projects fit within three categories:

- Improvements to existing trails, most notably the Bike & Hike Trail. A key issue here is better access to the trail between Washington Avenue and the current trailhead on 10th Street west of the city.
- New trails to connect on-street routes and use drainageways effectively. The channel north of Great Bend includes a maintenance path that functions as an off-road trail These relatively short, strategic links tie the system together.
- New paths to key destinations, including linking communities to Barton County Community College.

Individual trail projects are discussed in detail in the route by route analysis in the following chapter. However, trail design goes deeper than simply paving a linear path. This section presents guidelines for design of these important pedestrian and bicycle components.

Design Guidelines for Multi-Use Trails

ADA/AASHTO Compliance

Trails should comply with American Association of Street and Highway Transportation Officials (AASHTO) standards and Uniform Federal Accessibility Standards and the "Americans with Disabilities Act Accessibility Guidelines."

Materials

Figure 2.16 reviews attributes of various trail surface materials. Asphalt, used on the existing Great Bend trail, provides an excellent surface when new and is somewhat less expensive than concrete. Concrete is often thought to provide a more durable, longer-lived surface, particularly in view of freeze-thaw cycles, and can be replaced panel by panel if necessary. Without prescribing specific regional standards, AASHTO 2012 recommends a six inch minimum depth, including both surface and

Valkommen rail-trail in Lindsborg, with adjacent playground.

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 saw-cut to provide room for movement and minimize 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 recumbent bicycles and tricycles.

- A two-foot minimum shoulder with a maximum 6:1 cross-slope should be provided as a recovery zone adjacent to trails.

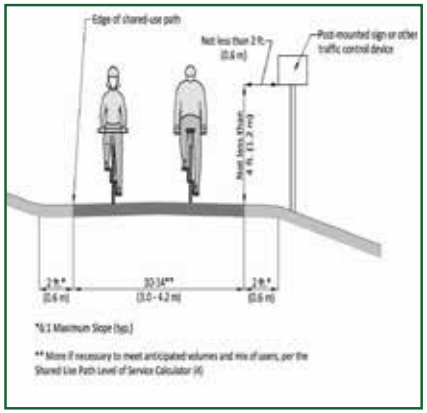
- Signs or other traffic control or information devices should be at least two feet from the edge of the trail surface. The bottom edge of any sign should be at least 4 feet from the grade of the trail surface.

- 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

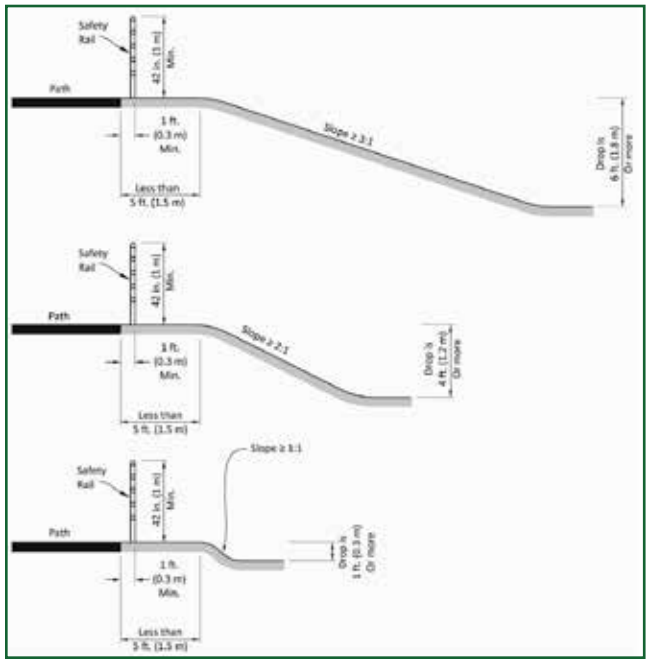
Figure 2.16: Comparison of Trail Surfaces

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



Source: *AASHTO 2012*

Figure 2.17: Railings and Trail Separations from Adjacent Slopes



culvert or bottom of a bridge structure, further limits clearance, cyclists must be advised to walk bicycles.

Grades and Grade Changes

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.
- AASHTO 2010 recommends avoiding grades less than 0.5% because of ponding problems.

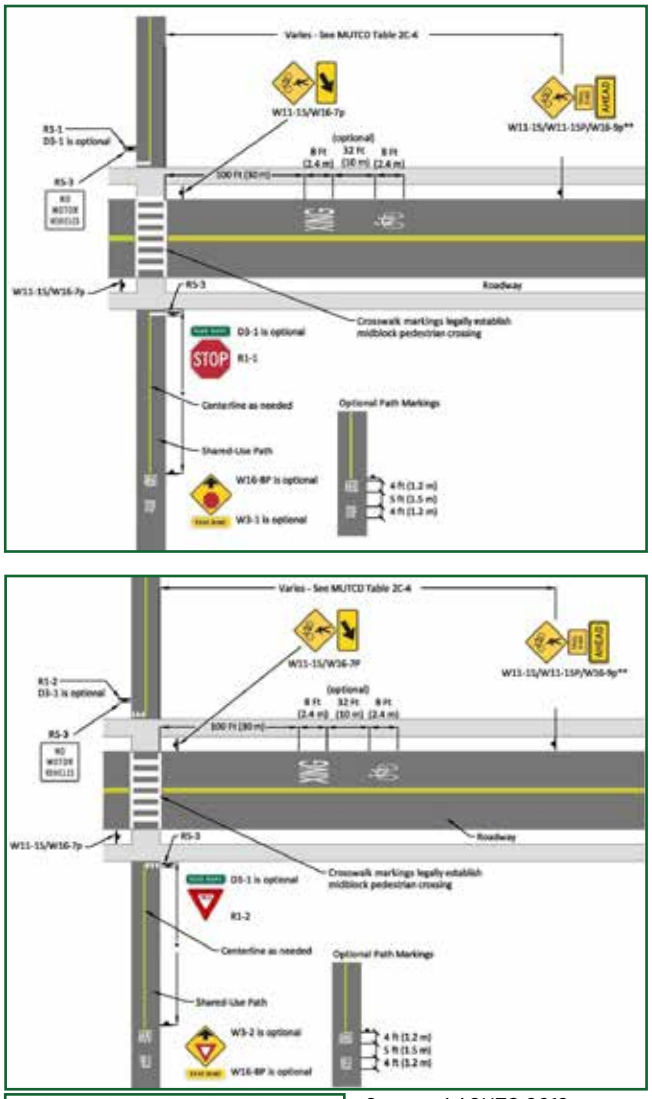
Subsurface and Drainage

- Typically 4 to 8-inch compacted, smooth, and level. Individual conditions may require special design.
- Trail cross-section should provide adequate cross-drainage and minimize debris deposited by run-off. 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.

Figure 2.18: Intersection Designs for Midblock or Rural Trail/Road Crossings



* 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

- 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" 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.

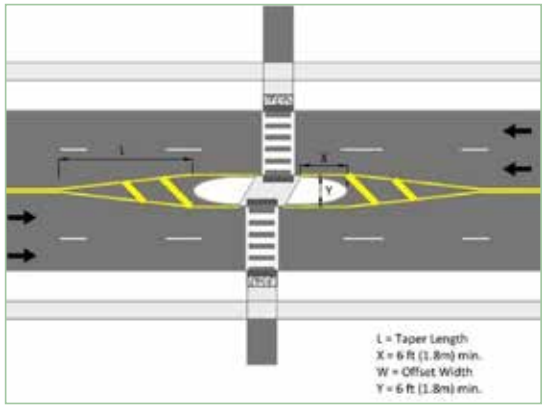
- At midblock crossings of multi-lane roads, refuge medians should be used to reduce the distance that trail users must negotiate at one time.

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,

Trail Crossing Features



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.

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.

- At midblock crossings of multi-lane roads, refuge medians should be used to reduce the distance that trail users must negotiate at one time.
- 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 2.1 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

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.

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 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.

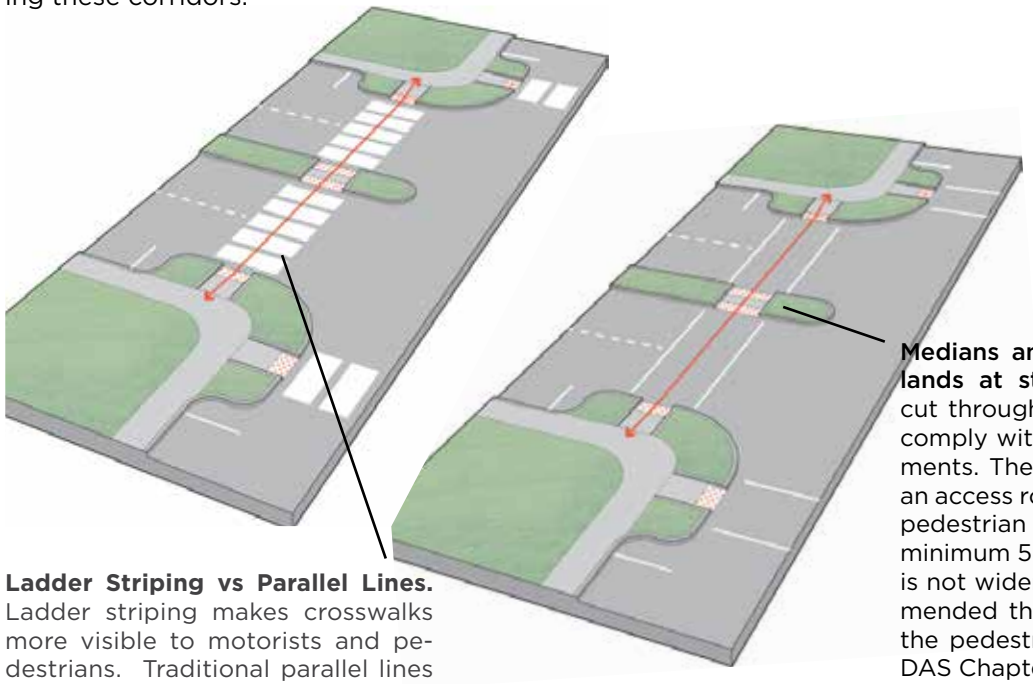
Trail sign system, Auld-Brokaw Trail, Yankton, SD

PEDESTRIAN FACILITIES

Many of the standards for bicycle facilities, especially those for sidepaths and trails, also pertain to pedestrians. However, detailed issues of sidewalk design, corners, ramps for people with disabilities, and other factors are vital to pedestrian comfort and safety. Most communities have standard plates that address sidewalks. These guidelines and diagrams address ideas and possible modifications to standard procedures that cosider pedestrian priorities.

MAJOR STREET CROSSINGS.

Pedestrian safety at major street crossings is a key concern. Examples of problem corridors that tend to discourage pedestrian access include 10th Street and McKinley Street in Great Bend, K-4 in Hoisington, and US 56 in Ellinwood. These diagrams describe design features that can help address the problems of crossing these corridors.

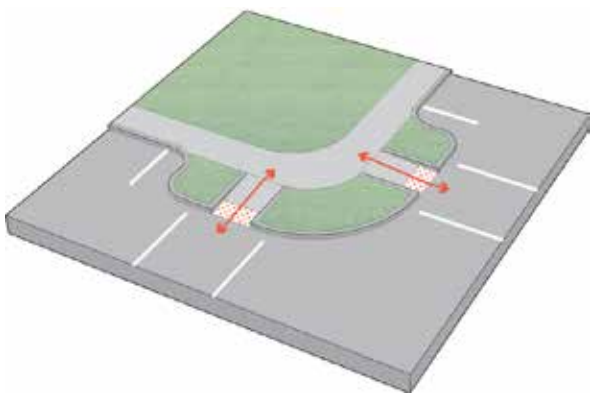


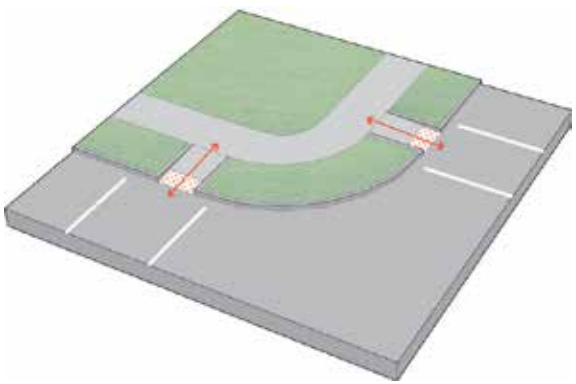
Ladder Striping vs Parallel Lines. Ladder striping makes crosswalks more visible to motorists and pedestrians. Traditional parallel lines are less expensive to install and maintain, but are more difficult to see, especially with wear.

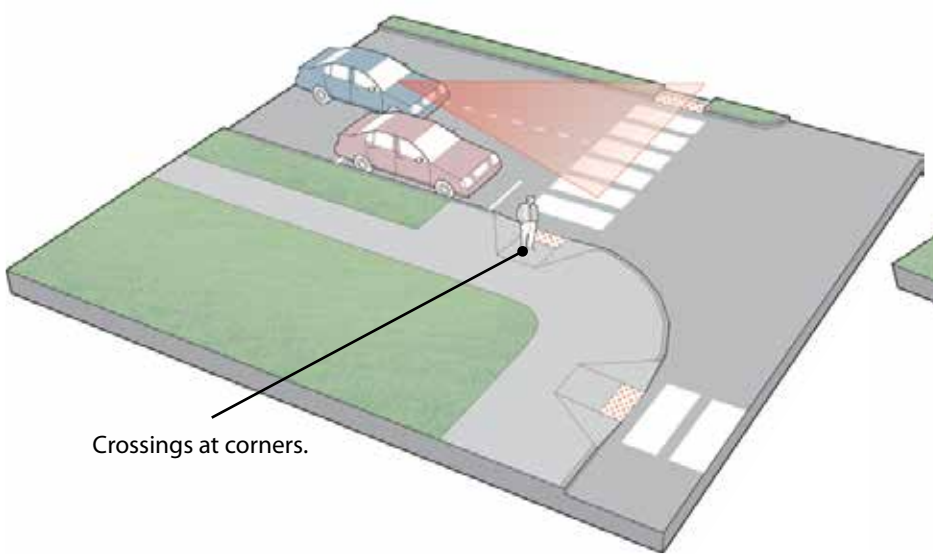
Medians and pedestrian refuge islands at street crossings shall be cut through level with the street or comply with the curb ramp requirements. The clear width of pedestrian access routes within medians and pedestrian refuge islands shall be a minimum 5.0 feet. If a raised median is not wider than 6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

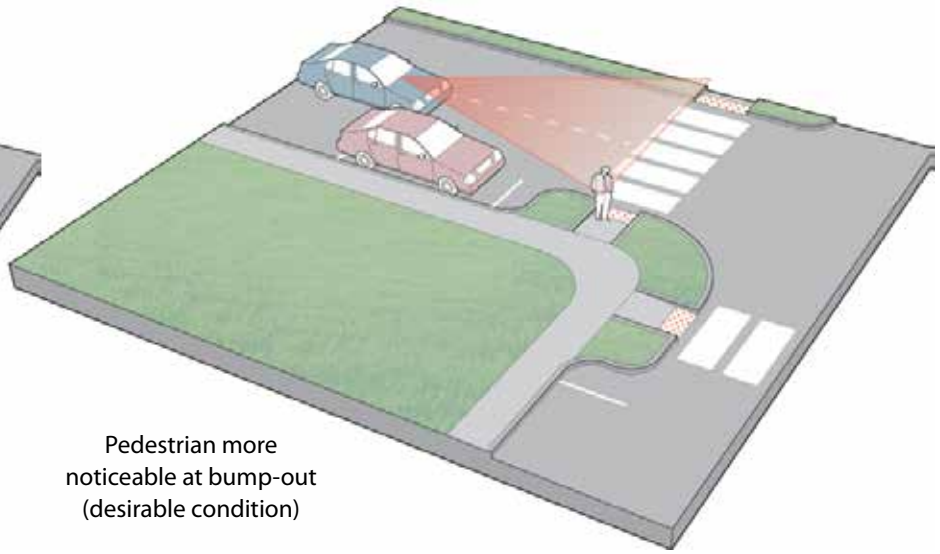
4-Lane Road with Refuge - River Drive in Davenport, IA

Ladder Crossing at 10-Harrison intersection





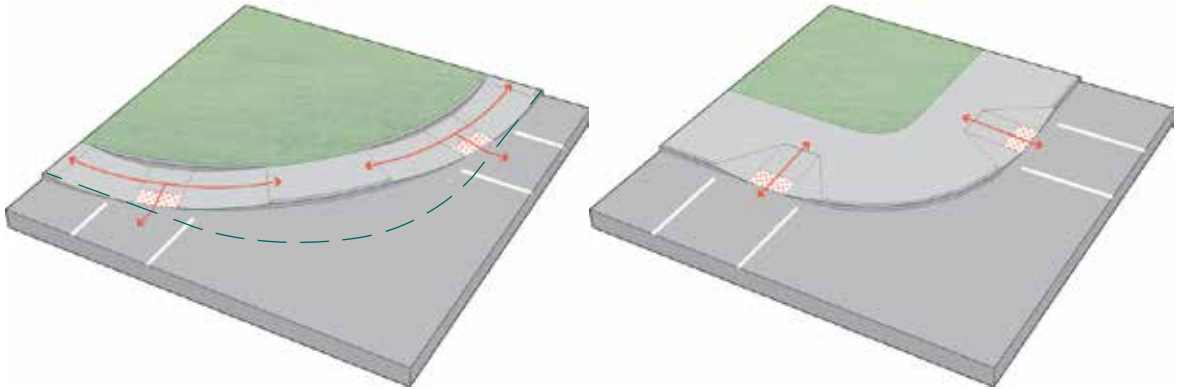




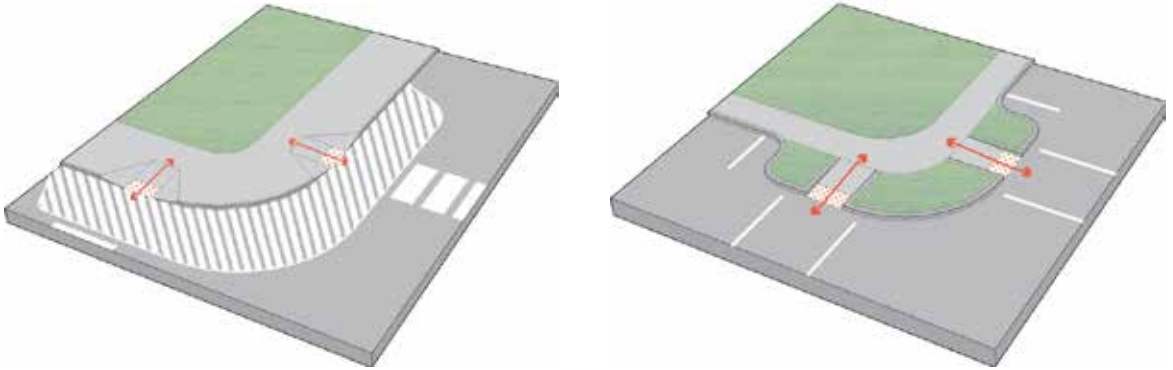
Crossing Locations. Awareness between drivers and pedestrians increases with improved visibility. Crosswalk locations should maximize visibility. The illustrations above illustrate desirable alignments for pedestrian crossings. However, in some cases (including crossings protected by pedestrian signals) midblock locations that eliminate ambiguity about right of way and conflicts with turning traffic are desirable. Typically, 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. Recommended locations for stop and yield signs be are 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 DESIGN

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

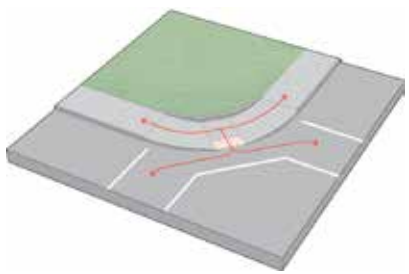
Recommended Practices. Photos indicate desirable practices at intersections in various urban settings.

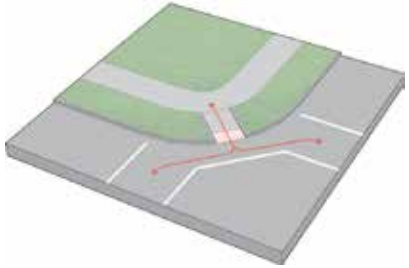
Downtown

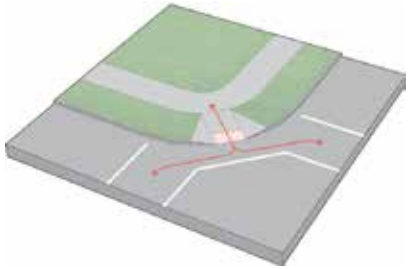
Neighborhoods

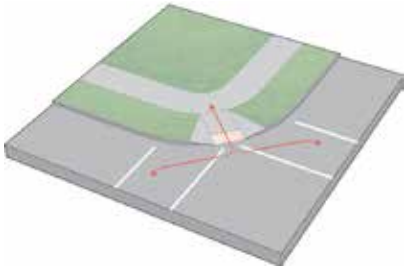
Neighborhoods (Update pedestrian signage)

Undesirable Practices. Intersection design should avoid directing pedestrians into the center of the intersection. Photographs represent situations where intersections need to be completed or retrofitted.









Incomplete corners

Drain intakes (hazards) at intersection

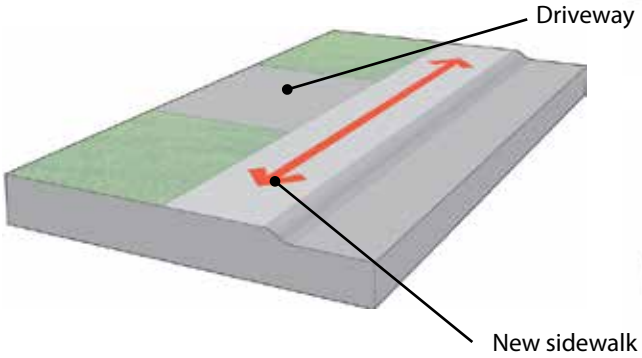
Incomplete corners

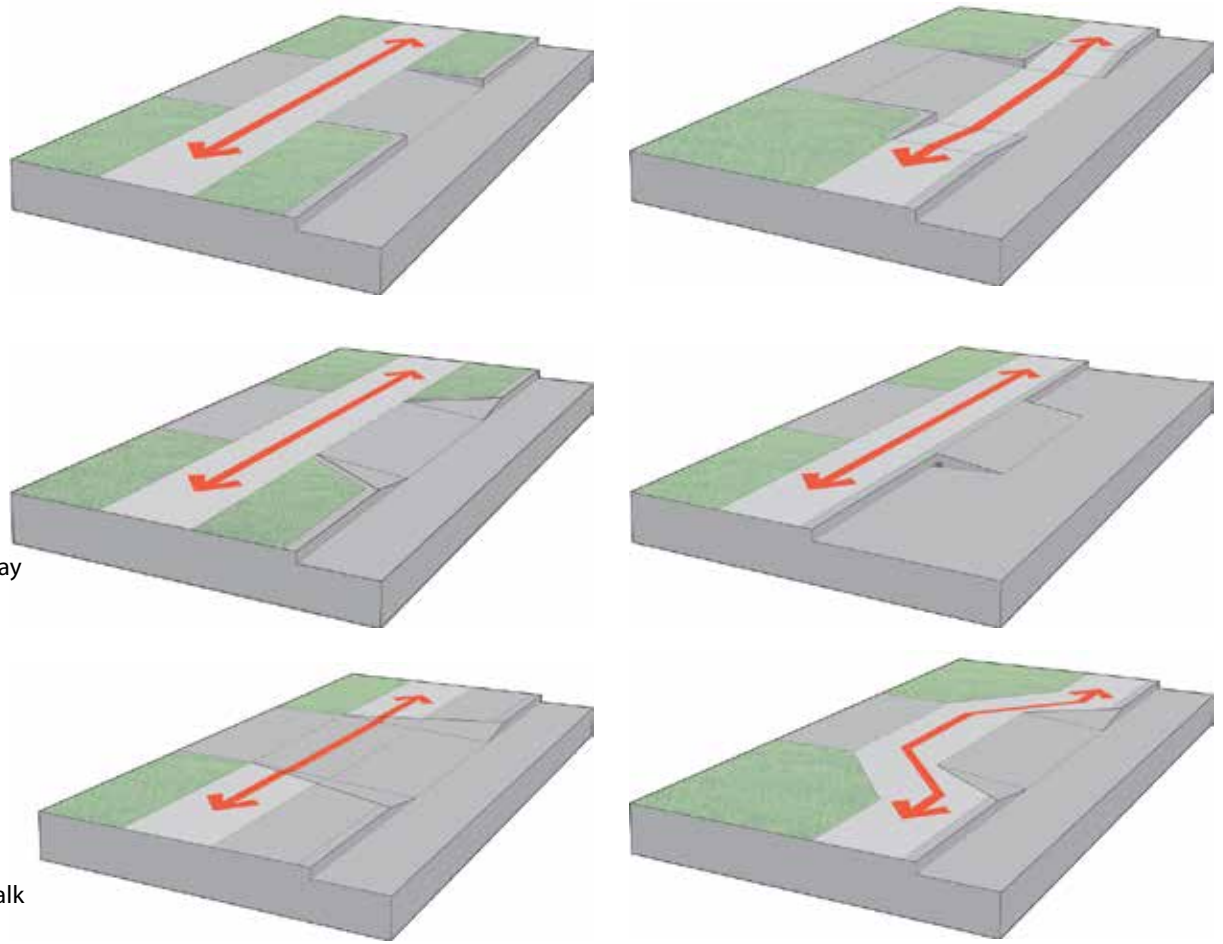
SIDEWALKS AND DRIVEWAY CROSSINGS

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





PEDESTRIAN ISSUES

- No curb ramp
- Sewer inlet at logical crossing point
- Back of curb sidewalk on principal street

- Inaccessible driveway crossing

- No sidewalk on intersecting street
- Pole obstruction
- No curb ramp

- Complex intersection with poor visibility

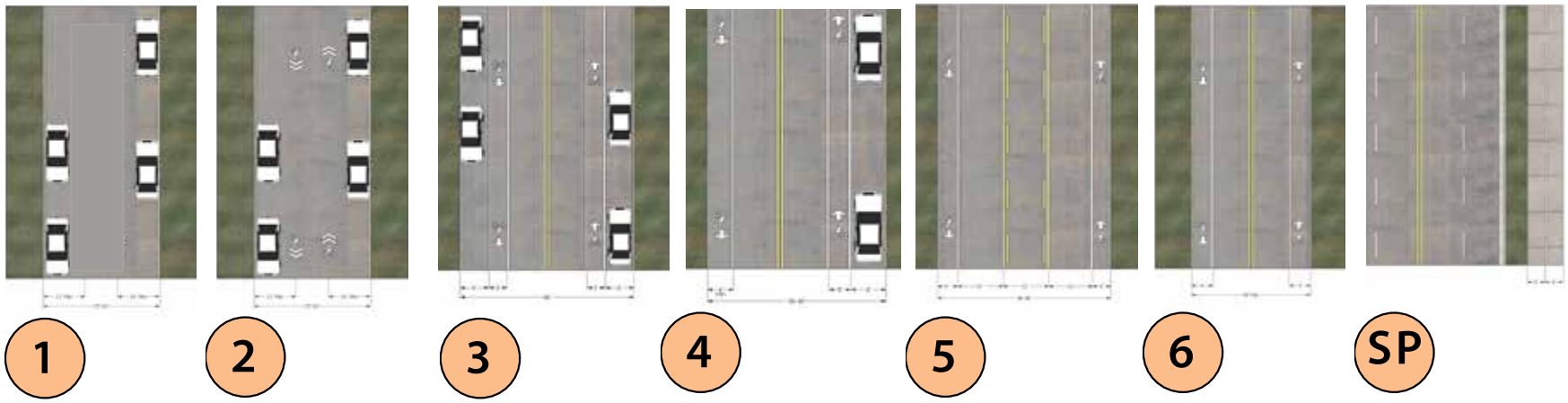


Figure 2.19: Probable Costs of Various Infrastructure Solutions

Facility Type	Description	Cost/Unit
1	Shared road with wayfinding signage	$10,000/mile
2	Sharrows with wayfinding signage	$15,000/mile
3	Two-direction bike lanes with two-side parallel parking	$20,000/mile
4	Two-direction bike lanes with one-side parallel parking	$18,000/mile
5	Four to three-lane road diet with two-side bike lanes	$50,000/mile
6	Two-side bike lanes or shoulders with no parking	$18,000/mile
SP	Sidepath: 10 foot concrete	$150,000/mile
MUP	Multi-use Pathway: 10 foot concrete	$250,000/mile

PROBABLE COSTS

Table 2.19 displays probable costs for various types of bicycle and pedestrian infrastructure. These costs are the basis for opinions of probable costs calculated for various route segments for community systems in Chapters Three through Six.

CHAPTER 3

GREAT BEND

GREAT BEND DESTINATIONS

Residential, commercial, office, and civic land use patterns all influence pedestrian network design, but major destinations, the places that attract people for learning, recreation, employment, civic or cultural life, shopping, entertainment, or other activities – should be directly served by the system. Identifying key destinations was informed by the survey results described in Chapter One. Figure 3.1 displays the location of many of these significant destination points in Great Bend, including:

- Educational facilities, including elementary and secondary schools. Barton County Community College is also a significant Great Bend destination, even though it is located beyond the city limits.

- Major park and recreation facilities, including the city's two large community parks, Brit Spaugh and Veterans Memorial; the Activity Center; the Sports Complex; and the Bike & Hike Trail.

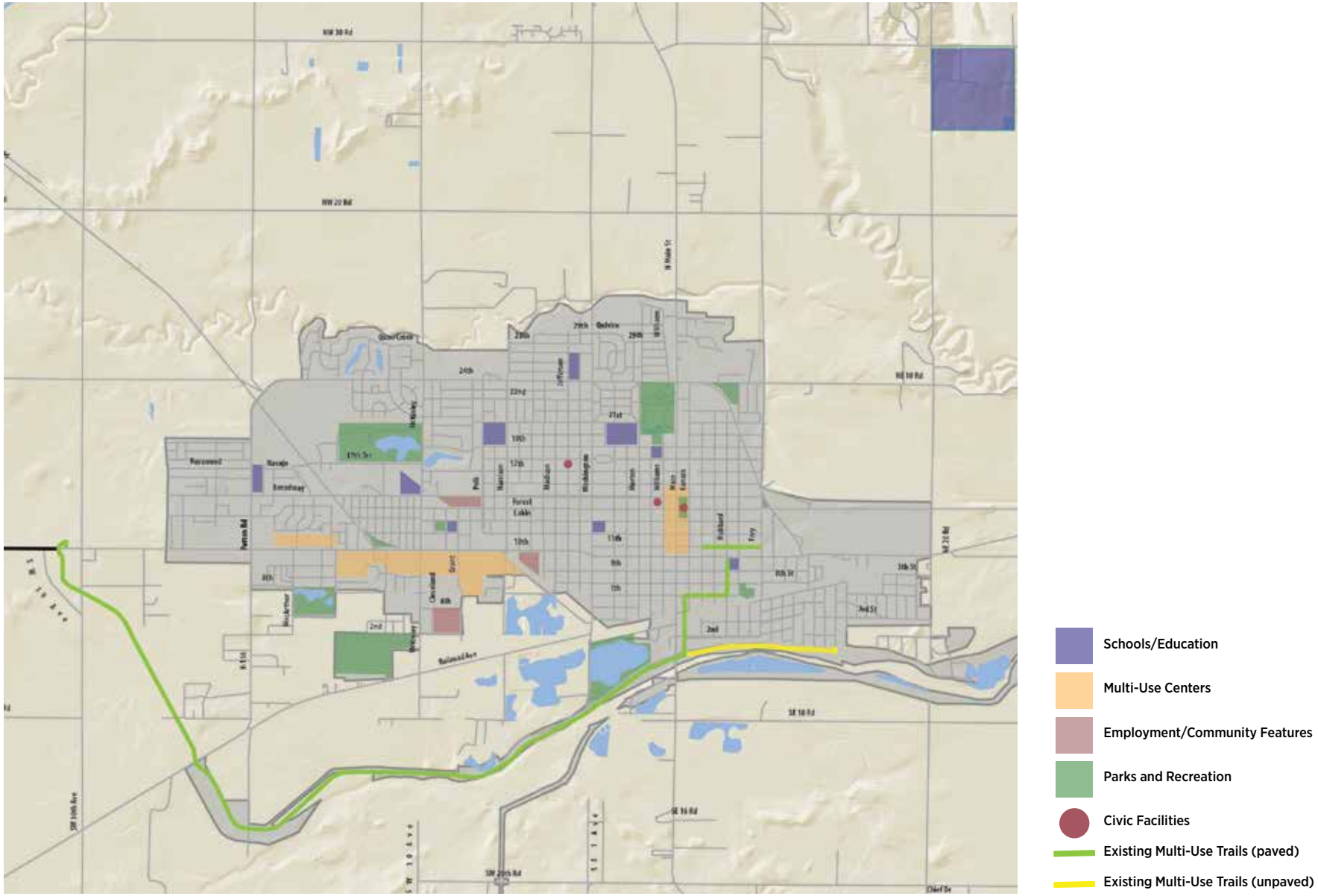
- Hospitals and medical facilities, including the Great Bend Regional Hospital.

- Key public destinations and museums, including the Public Library, Front Door, and Historical Museum.

- Commercial and employment enters adaptable to bicycle transportation, including Downtown, and retail nodes along 10th Street.

- Environmental and Open Space Features, the Arkansas River corridor, Stone Lake, and the Dry Walnut Creek channel.

Figure 3.1: Great Bend Destinations



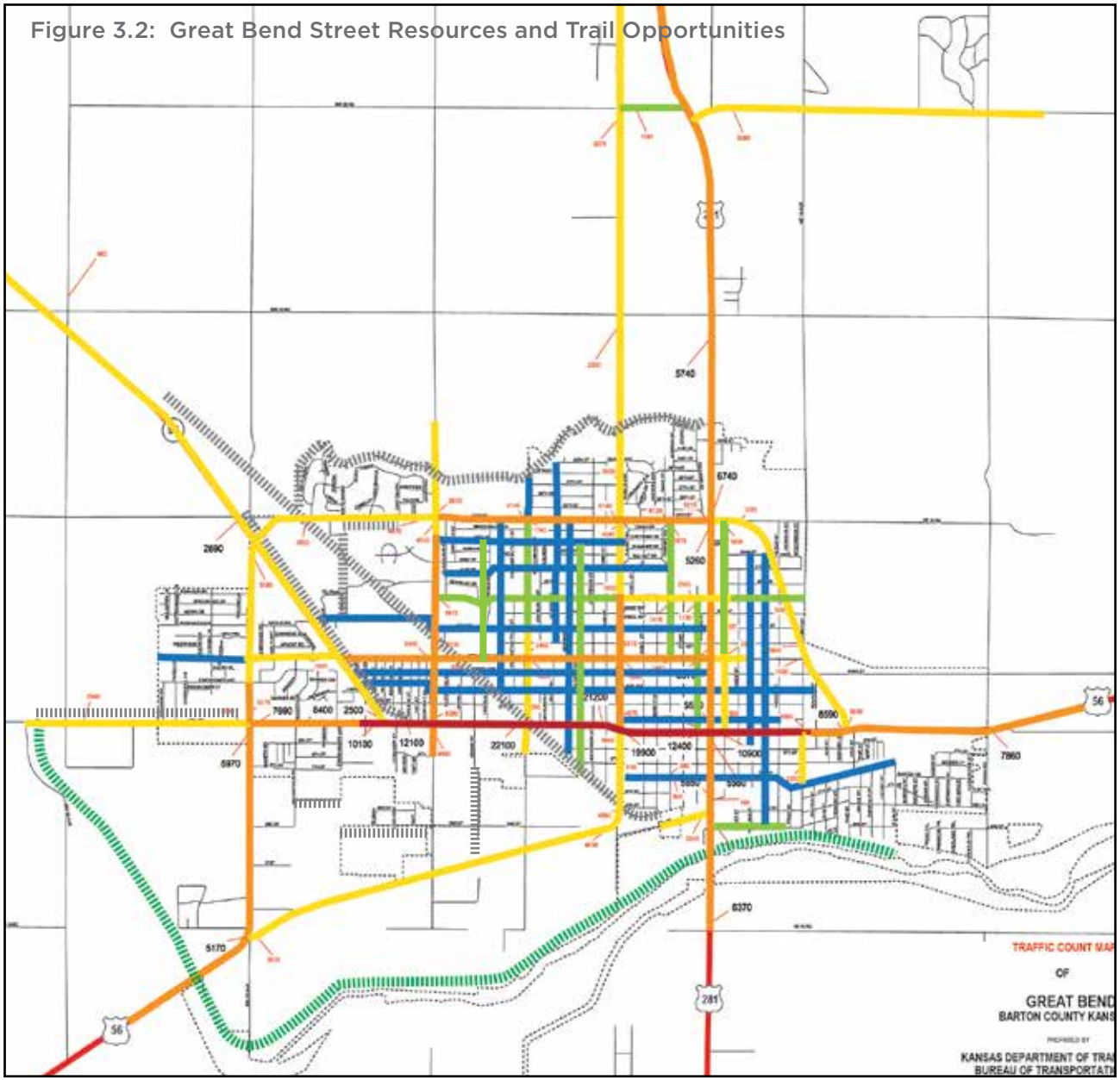
GREAT BEND OPPORTUNITIES

Like many Midwestern and Great Plains cities, Great Bend's street system is built on the section-line grid that dates back to the surveys and land divisions of the Homestead Act. The original section lines follow Frey, Washington, McKinley, and Patton north and south; and 10th and 24th east and west. The street grid is most continuous between 10th and 24th Streets from Frey to Harrison, and breaks down somewhat to the west, south, and north. Within that grid, the system adjusted to geographic features such as the Kansas & Oklahoma Railroad, the Arkansas River and associated drainageways. In general, though, the city's street pattern lends itself to a good active transportation network. These include:

- **Good local street continuity.** Within the grid created by through arterials, Great Bend's secondary streets connect to each other, creating an internal system that is relatively easy to navigate through. These streets generally have low traffic volumes, making them comfortable for most prospective cyclists. Figure 3.2 displays streets with low traffic volumes (under 2,000 vehicles per day) that continue for a mile or more across town. These streets have the added virtue of serving many of our primary destinations. These low traffic streets may be seen as the main "arterials" of the system.

- **Potential complete streets and road diets.** Several important streets have higher traffic than local streets, but have enough width to accommodate both parking and bike lanes. The most significant of these are Washington and Kansas Avenues. Washington is currently a wide two lane section with parallel and some diagonal parking and carries significant traffic. Kansas, on the other hand, carries relatively light traffic but is a wide four-lane facility. The street lends itself well to a lane diet, with restriping to three lanes with bike lanes.

Figure 3.2: Great Bend Street Resources and Trail Opportunities



- 10,000+ vpd. Not advisable for on-road bike facilities in Great Bend setting. Sidewalks should be separated from curbs when possible and protected street crossings provided.
- 5,000-10,000 vpd. Bikes feasible in separated facilities: bike lanes, shoulders, enhanced sidepaths. Sidewalks should be separated from curbs when possible and protected street crossings provided.
- 2,000-5,000 vpd. Bikes ideally in separated facilities: bike lanes or shoulders. Experienced riders may use shared facilities, but sharrows and signs should be used. Sidewalks and protected street crossings provided within system.
- 1,000-2,000 vpd. Important network resources. Bikes feasible in mixed traffic. Bike lanes desirable for maximum comfort but sharrows and signage is normally adequate.Sidewalks continuity provided within system.
- Under 1,000 vpd with one mile or more continuity. Key network resource. Bikes feasible in mixed traffic. Sidewalks continuity provided within system.
- Existing trail
- Primary trail opportunity: rail with trail, wide green area along highway corridor, park or open space edges, drainage corridor

- Linear corridors that accommodate significant new trail facilities that serve transportation purposes and/or fill gaps in the existing system. Examples include:

  - The diagonal Central Kansas Railroad corridor, connecting he center of the 10th Street commercial district with Veterans' Memorial Park and several residential areas. This corridor is distinguished by a wide right of way, opening the possibility of joint rail with trail development.

  - The K-96 corridor, also a diagonal but about a mile west of the railroad where it intersects 10th Street.

  - The Dry Walnut Creek streambed along the north city limits of Great Bend. This channel no longer carries drainage after the construction of the westside drainage bypass to the Arkansas River, but includes a maintenance path on its levee top and provides an intriguing potential trail resource.

Trail opportunities. From top, Central Kansas corridor north of 10th Street and old Dry Walnut Creek channel.

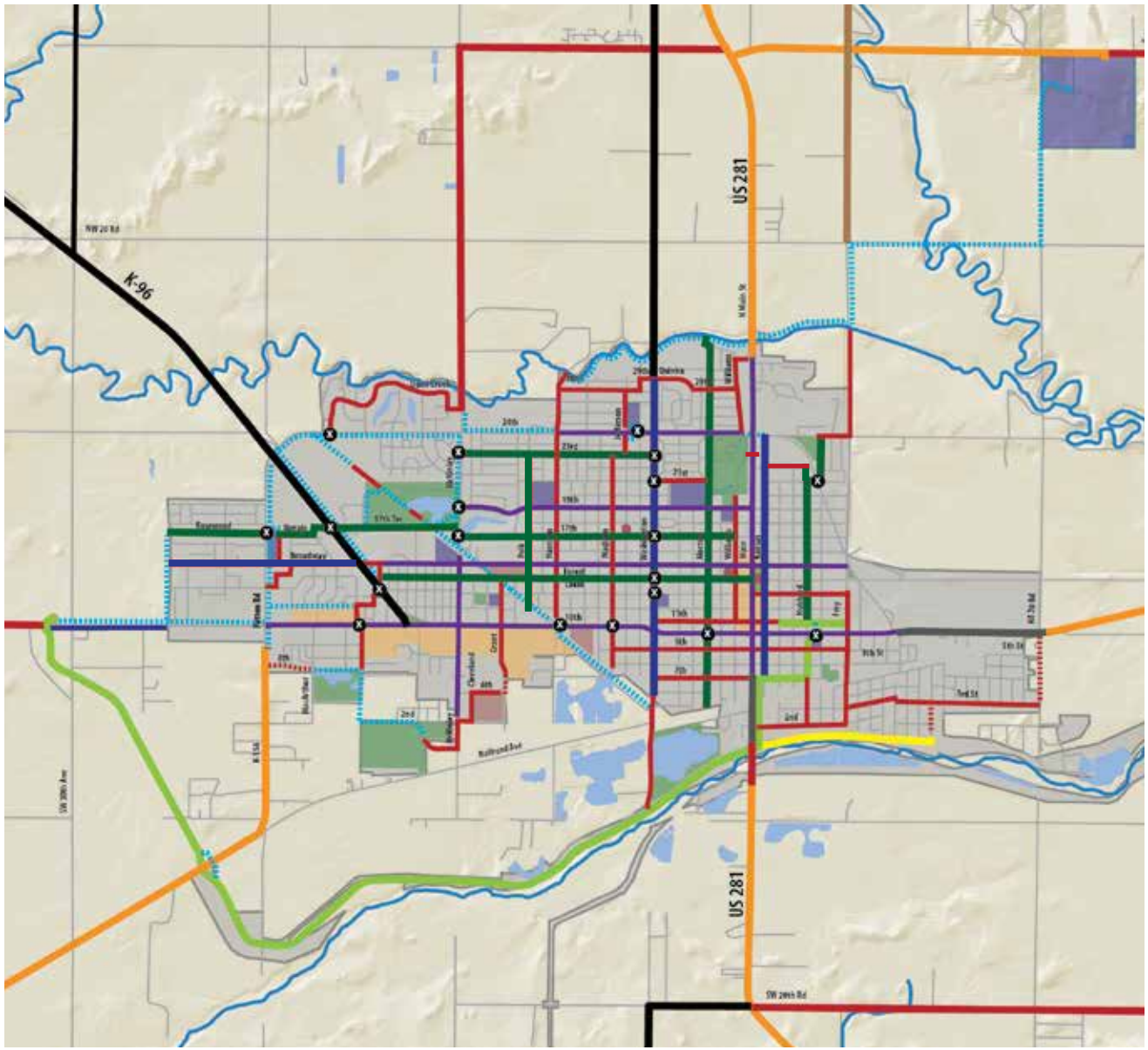
Great Bend Network Plan

Figure 3.3 illustrates the proposed Great Bend area active network with its various types of facilities. The individual facility types refer back to the descriptions in Chapter Two and include:

Shared roads/streets: These are typically low-traffic streets with good continuity. Infrastructure investments are minimal, and include identification and directional signage and sharrows on higher traffic segments over 1,000 vehicles per day.

Bicycle boulevards (neighborhood greenways): These are shared traffic streets with special characteristics, such

Figure 3.3: Active Barton Network: Great Bend Focus



- Shared Road
- Bicycle Boulevard
- Bike Lane
- Highway Shoulders
- Existing Paved Trail
- Existing Unpaved Trail
- Multi-Use Path
- Complete Street Corridor
- X Enhanced Intersection

as low traffic, crosstown continuity that permit cyclists to travel on one street for long distances without turns, service to important destinations, and a positive overall user experience. Bicycle boulevard enhancements vary, an in Great Bend may include special street signs, traffic control like stop signs or signals at arterial intersections where they do not currently exist, arranging stop signs to provide reasonable right-of-way to bicyclists, and traffic calming features. In the Great Bend network, bicycle boulevards include north-south Hubbard Street (including a signalized pedestrian crossing of 10th Street at Riley School); Morton Street, and Polk Street; and east-west Forest Street, 17th Street/ Terrace, and 23rd Street.

Bike lanes: Streets with bike lanes carry more traffic than shared routes and bicycle boulevards, and the bike lanes provide bicyclists with a specific territory separate from motor vehicles. Streets with bike lanes include Kansas Street, where a reduction from four to three lanes provides bike lanes on this relatively lightly traveled street paralleling Main Street; Washington Street, wide enough to permit bike lanes while narrowing travel lanes to more normal width; and Broadway west of K-96, which includes striped parking lanes that receive relatively little use and can also accommodate bikes.

Highway shoulders: US 281 and US 56/K-156 both have paved shoulders that connect to regional routes. NE 30 Road also has paved shoulders between US 281 and Barton County Community College, providing a reasonable route for experienced commuters before possible connection by trail.

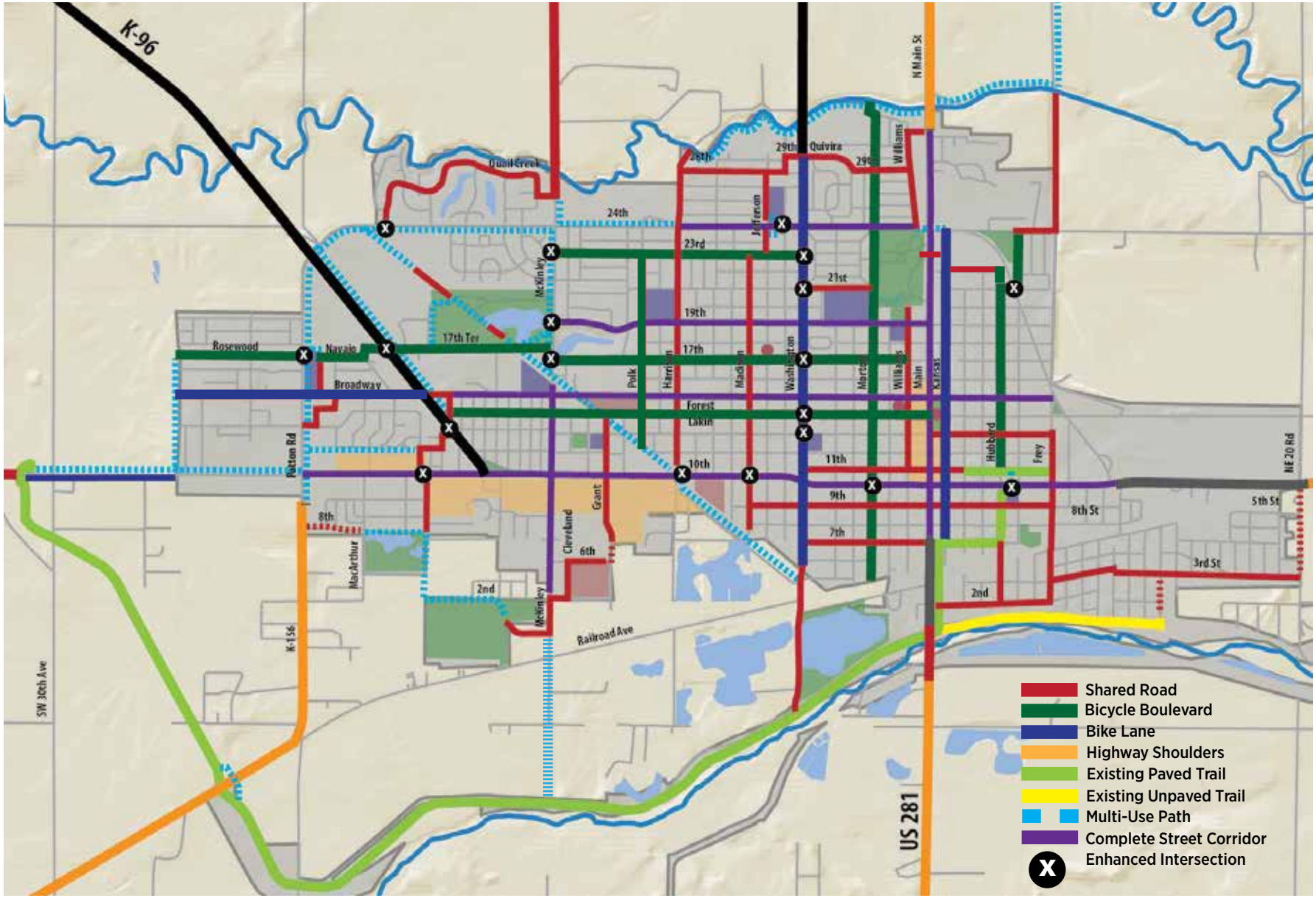
Existing trails. The Great Bend Bike & Hike Path extends from West Barton County Road to South Main Street, and is connected by sidepaths along Main, 7th, and Hubbard Street to Riley Elementary School at 10th and Hubbard. While an important asset, the lack of connections between Washington Street and the west trailhead at Barton County Road/10th Street isolates the trail from its surroundings. The plan proposes two new trail connections: ramps that link the trail to US 56/K-156 where the trail currently goes under the highway without connection; and McKinley Street through a connection of street improvements and a trail connection along public right-of-way.

Proposed multi-use paths. New paths in the Great Bend network provide key connections that ultimately complete the system. Trails are typically the most expensive part of an active network, and will develop gradually over time. However, short initial segments can make a big difference to a complete network. The ultimate network shown in Figure 3.4 includes the following multi-use paths:

- The K&O Rail-Trail, a “rail with trail” project that uses the wide open corridor east of the K&O tracks between 24th Street and Washington Street. The priority segment is between 17th Terrace and Monroe/9th Street. Rail with trail projects typically include fencing or other barriers to separate an active railroad from the path.

- K-96 Trail between 10th and 24th Street, using the highway’s wide right-of-way. First priority segment is the segment between Lakin Street and 17th Terrace.

Figure 3.4: Central Great Bend Inset



- Patton Road sidepath from 10th Street to K-96. The priority connector of this path extends from 10th Street to Rosewood Drive.

- 24th Street sidepath from K-96 to Harrison Street. This is a later phase project, to be built with adjacent development.

- Dry Walnut Trail along the old creek channel between Harrison and Frey on the north edge of the city. This trail is a key part of a connection from the city to Barton County Community College.

- BCCC Trail from the Dry Walnut Trail to the Barton County Community College campus. Most probable trail route uses NE 10 Avenue, NE 20 Road, and NE 20 Avenue, all of which are currently gravel roads. Because a shouldered road route already exists using US 281 and NE 30 Road, this route could potentially be developed as a high quality but unpaved rural trail.

- Grant Street Trail between 10th Street and 6th Street, a short but important segment to provide access to the regional hospital and sports complex. Grant Street should also be extended over this length, and the trail may either precede this project or be incorporated into it.

- South McKinley Trail, connecting McKinley Street to the existing Bike & Hike Path.

Figure 3.4 shows other short segments that would be completed with future urban development or on edges of public lands.

Complete Street Corridors. These streets may accommodate experienced bicyclists but relatively heavy traffic makes them uncomfortable for many users. However, these streets, including Broadway, Main Street, 10th Street, 19th Street, serve major destinations or have a quality that makes them very suitable for pedestrians. Major active transportation investments on these corridors should focus on pedestrian safety improvements, sidewalk continuity, and better crosswalks.

Enhanced Intersections. These are key street crossings that create potential barriers in the pedestrian and bicycle network. Specific actions for these intersections include improved crosswalks, pedestrian signals, audio and count-down walk signals, crossing medians, and intersection redesign.

Pedestrian Policy

Street corridors within Great Bend shown as shared streets or roads, streets with bike lanes, and bicycle boulevards should all have a continuous sidewalk along their length on at least one side of the street. They define a “major sidewalk system” that should be funded like major streets, using public funds for all or part of their cost. Areas within a 1/4 mile walk of elementary schools should also include continuous sidewalks on at least one side of each street. Clearly, multi-use paths benefit all active users and should be appropriately designed for both pedestrian and bicycle use.

Bikeway System Design

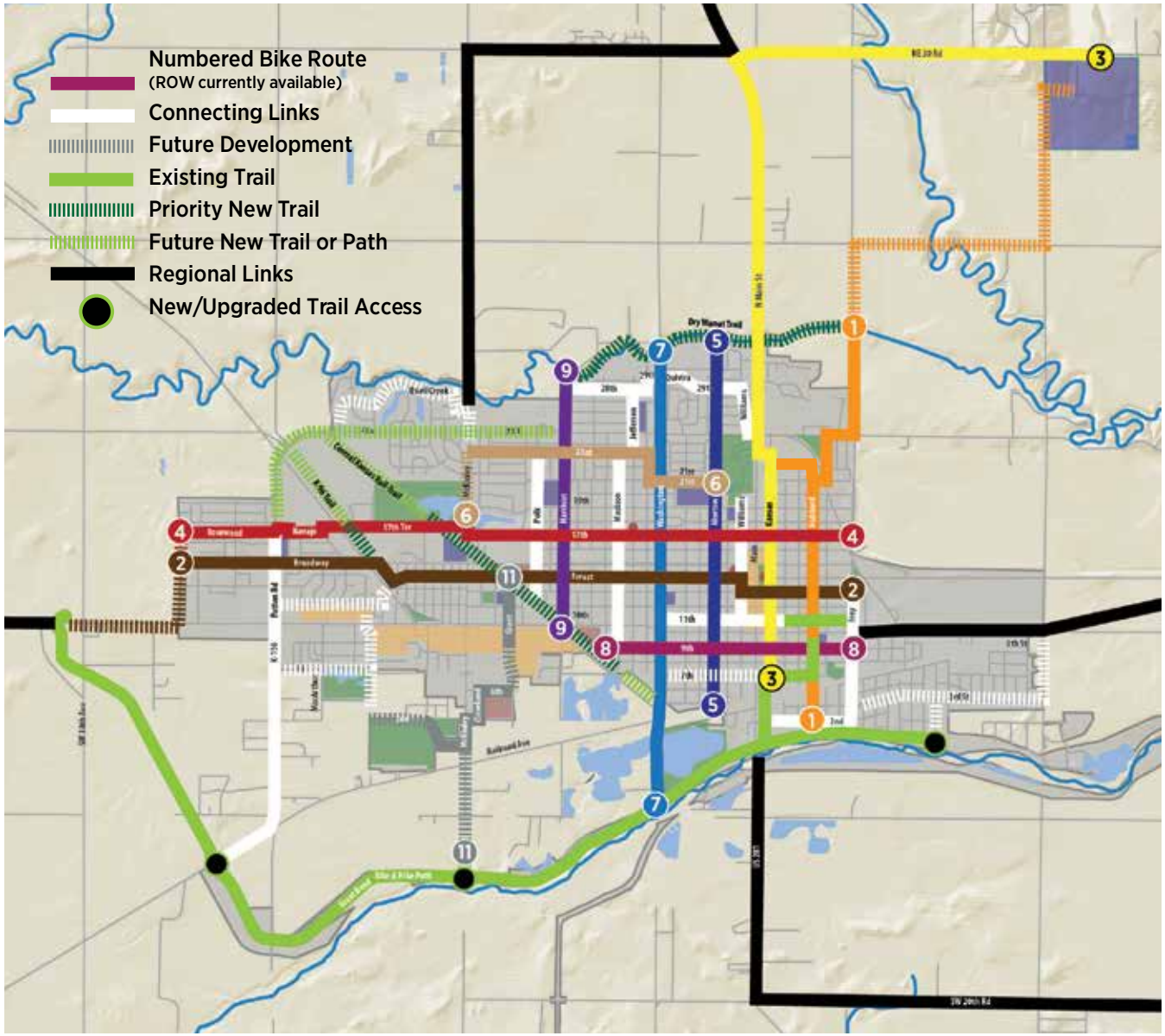
Figure 3.5 uses the "transit" wayfinding model to define a bikeway system for Great Bend. This system design includes:

An initial phase, attainable within a five year period. This phase proposes routes identified by number and associated color. Most of the initial system (shown in solid lines) uses existing streets and paths enhanced with identification and wayfinding signage, pavement markings, lane diets, graphics, bike parking, and kiosks. This phase also includes significant trail development.

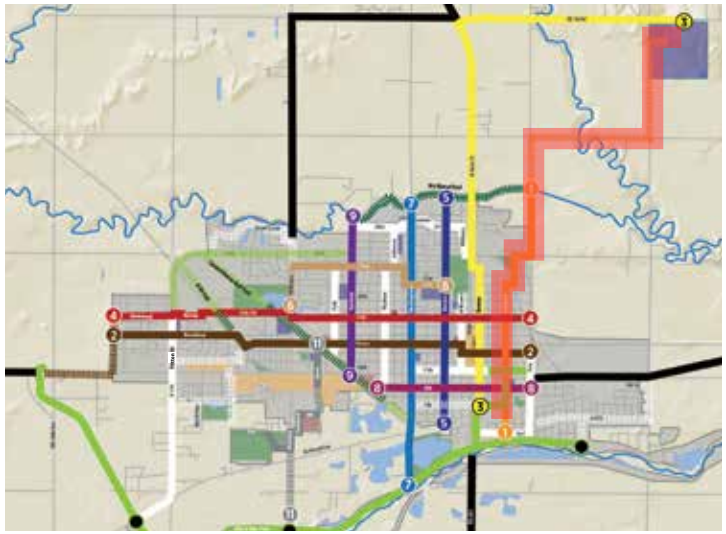
Later phases, which would extend the initial system and include both street and trail segments. Some of these "later phases" include priority features that would be advanced if funding is available. These priorities would connect the city to Barton County Community College by trail; and provide an improved connection to the Bike & Hike Path trailhead on West Barton County Road.

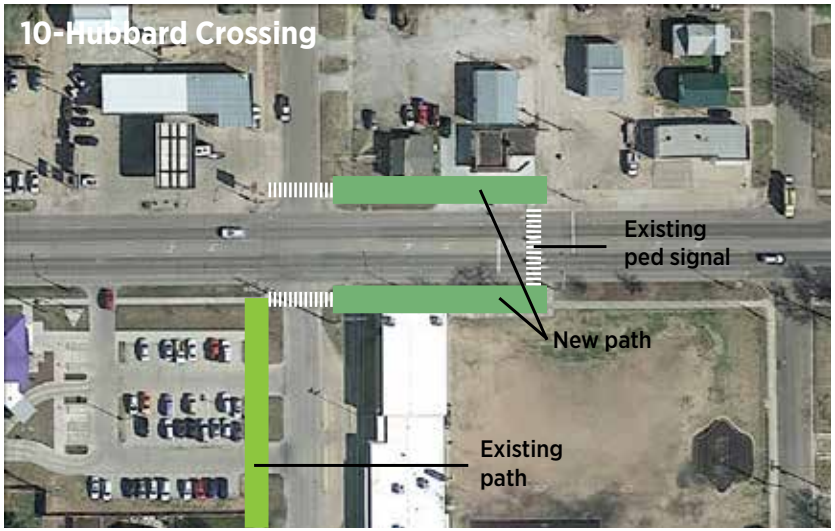
The following tables describe each of these routes and provide information on individual segments, infrastructure treatment, and cost opinions.

Figure 3.5: Great Bend Bikeway Concept



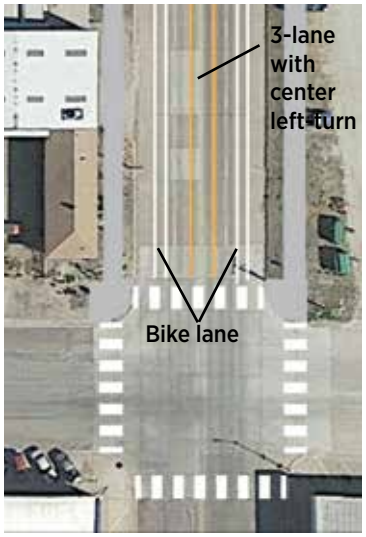
1 EASTSIDE-BCCC

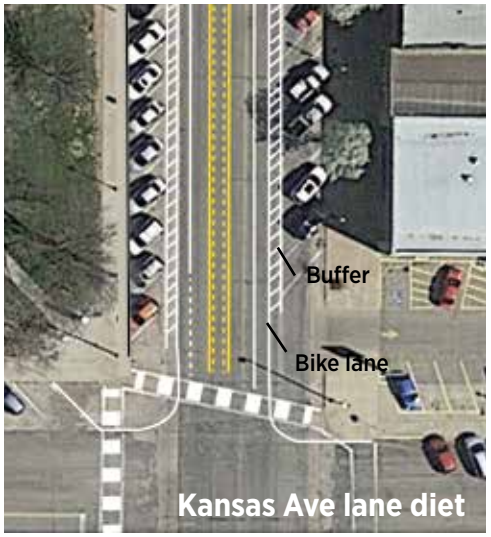




Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost	Comments
Hubbard. 2-7	.24	Bicycle boulevard, signage	15,000	3,600	
Hubbard, 7-10	.23	Existing sidepath, upgraded crosswalks, signage	15,000	3,450	
10th Street Hubbard to street crossing, both sides	.10	Wide sidewalk path to pedestrian signal and crossing	250,000	25,000	Alternative of using alley on north side from 10th to 11th
10 St crossing		Existing ped crossing	NA		
Hubbard, 10-22	.90	Bicycle boulevard, signage	15,000	13,500	
22, Hubbard to Kansas	.22	Shared street, wayfinding signage	10,000	2,200	Includes both street channels.
21, Hubbard to Heizer	.07	Shared street, caution signage, crossing beacon at US 281 crossing	50,000 LS	50,000	
Heizer, 21-24; 24, Heizer to Frey; Frey, 24 to Dry Walnut Creek Trail	.96	Shared street, wayfinding signage	10,000	9,600	Access to ballfields
Trail, Creek Trail to BCCC	2.50	Granulated stone path	150,000	375,000	Assumes US 281/NE 30 Rd route for road commuters
Total	5.22			482,350	Deferral of BCCC trail and connection reduces cost to $57,350

3 KANSAS-BCCC





Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost	Comments
Kansas, 7-10	.23	5' bike lanes with parallel parking. 5' bike lanes with 3-5 foot buffer behind head-in diagonal parking	25,000	5,750	
10 St crossing		Existing traffic signal; upgraded crosswalk	10,000 LS	10,000	
Kansas, 10-16	.44	Lane diet to 3 lanes with 5' bike lanes. 3-5' buffer behind head-in diagonal parking	50,000	22,000	
Kansas, 16-23	.50	Lane diet to 3 lanes with 5' bike lanes.	50,000	25,000	
23, Kansas-Main/Brit Spaugh Park	.07	Shared street, wayfinding signage	10,000	700	
Main/Brit Spaugh to beginning of North Main shoulders	.10	Sidepath on west side of Main with enhanced crosswalk at 24th	250,000	25,000	On-road option using Main available to experienced cyclists
North Main/US 281, 24th to NE 30 Road	2.0	Existing shoulders with wayfinding signage	10,000	20,000	
NE 30 Rd, US 281 to BCCC	2.0	Existing shoulders with wayfinding signage	10,000	20,000	
Total	5.34			128,400	

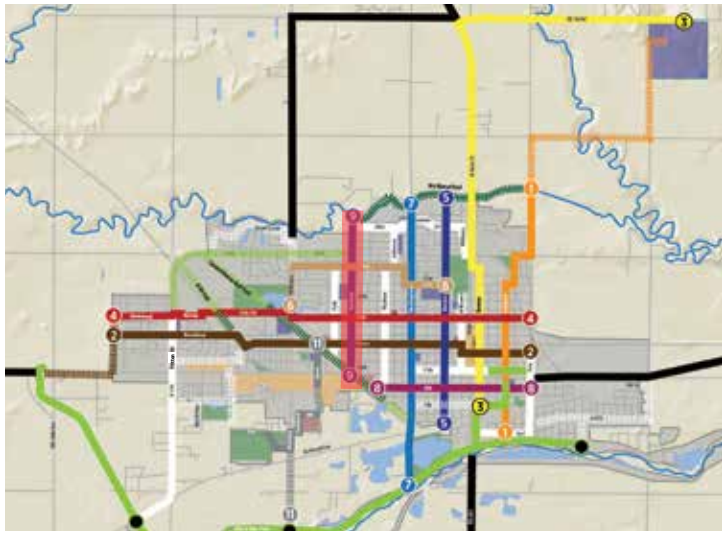
5 MORTON

Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost	Comments
Morton, 7-10	.24	Bicycle boulevard, signage	10,000		
10th St Crossing		Ped/bike caution signs, upgraded crosswalks, study of refuge median	25,000 LS	25,000	Bicycle boulevard may terminate at 11th from the north pending study, eliminating crossing at 10th. However, ped crossing at Morton is recommended
Morton, 10-Broadway	.36	Bicycle boulevard, signage	15,000		
Morton, Broadway-24	.68	Bicycle boulevard, sharrows and signage	20,000		Possible joint use of painted parking lane when available
24th St intersection		Upgraded ped crosswalk; short path segment to align with Morton north of 24th, warning signage for bed/bike crossing with flashing beacon	50,000 LS	50,000	
Morton/32 St Place to Dry Walnut Trail	.53	Bicycle boulevard, signage; short path segment	30,000	16,050	Short path segment along soccer fields to future trail
Total	1.81			91,050	

7 WASHINGTON

Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost	Comments
Washington St, Trail to 5th St	.50	Shared street; sharrows where paved	10,000	5,000	Street south of Railroad is unpaved. Any future upgrade should include bike lanes. Redesign of Railroad and Washington intersection to remove apparent free right turns to Railroad should be considered with right-of-way clarified. A separated path on the east side of the street between 5th and a point south of Railroad south of the K&O tracks would be preferable.
Washington, 5-10	.40	4- to 3-lane road diet with 5' bike lanes	50,000	20,000	
Washington, 10-Quivera	1.30	5' bike lanes retaining 2-sided parking	20,000	26,000	
Washington, Quivira to Dry Walnut Trail	.20	Bicycle shoulder	100,000	20,000	
Total	1.90			66,000	

9 HARRISON



Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost	Comments
Harrison, 10-24	1.0	In 38-40' wide segments, striped parking lane with sharrows	15,000	15,000	
24 St intersection		Upgraded ped crosswalk; short path segment to align with Morton north of 24th, warning signage for bed/bike crossing with flashing beacon	50,000 LS	50,000	
Harrison, 24-28	.24	Shared street, wayfinding signage	10,000	2,400	
Path, 28 to Dry Walnut Trail	.10	Multi-use path	250,000	25,000	Short trail link follows development of Dry Walnut Trail
Total	1.34			92,400	

11 GRANT SOUTH

Segment	Length (Miles)	Bikeway Facility Treatment	Cost/ Mile	Cost	Comments
Trail on McKinley alignment, GB Bike & Hike Path to SW 10 Rd and McKinley	.32	Multi-use path on McKinley south right-of-way	250,000	80,000	Access to Bike & Hike Path
McKinley, SW 10 Rd to Railroad Ave	.28	Multi-use path along McKinley, or bike lanes with paving of the street	250,000	70,000	
McKinley, Railroad Ave to 2nd St	.23	Shared street with sharrows, wayfinding signage	15,000	3,450	
Sports Complex Drive, McKinley St west	.30	Shared street with sharrows, wayfinding signage	15,000	4,500	Upgrade to trail with future park and private development to west
2nd St, McKinley to Cleveland; Cleveland, 2-6; 6th St, Cleveland to Grant	.40	Shared street with sharrows, wayfinding signage	15,000	6,000	
Grant, 6th to current terminus	.12	Multi-use path to east of future street.	150,000	18,000	Assumes path is built before street construction. If street is built, shared street with sharrows or adequate width for bike lanes are options
Grant, current terminus to 10th	.30	Option of shared street with sharrows, or widening of existing sidewalk to create a functional sidepath	15,000-75,000	22,500	Cost depends on selected option. Sidepath option is calculated in this table
Grant, 10-Forest Ave	.25	Shared street with wayfinding signage	10,000	2,500	
Total	2.21			206,950	

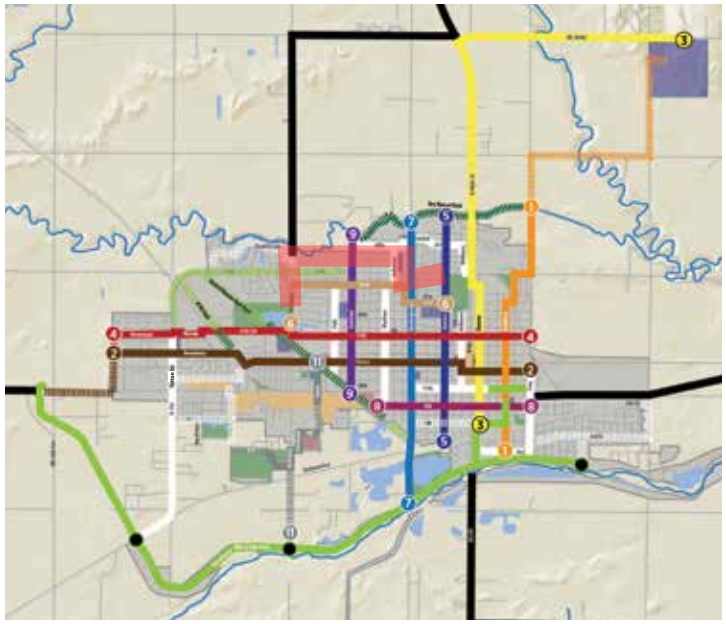
2 FOREST-CROSSTOWN

Segment	Length (Miles)	Bikeway Facility Treatment	Cost/ Mile	Cost	Comments
Lakin, Frey to Williams	.58	Bicycle boulevard, signage	15,000	8,700	
Williams, Lakin to Forest	.08	Shared street with sharrows, wayfinding signage	15,000	1,200	
Forest, Williams to Sherman	1.85	Bicycle boulevard, signage	20,000	37,000	Includes intersection caution signage and enhanced crosswalks at major street crossings: Washington and McKinley. Does not include future enhancements like traffic calmers
Sherman, Forest to Central KS rail-with-trail	.10	Shared street with wayfinding signage	10,000	1,000	
Trail, Sherman to Broadway	.16	Multi-use trail	250,000	40,000	Total cost of priority trail segment allocated to this cross-town project
Broadway, Central Kansas RR to Patton Road	.50	Shared street using marked parking lanes as dual purpose lanes accommodating bikes wayfinding and advisory signage	10,000	5,000	Includes both street channels.
Broadway, Patton to city edge	.50	Shared street with sharrows, wayfinding signage	15,000	7,500	
City edge path, Broadway to West Barton County Road	.32	Multi-use trail along alley.	150,000	48,000	
West Barton County Rd from city edge to trailhead	.63	Sidepath on north side of highway	150,000	94,500	Interim use of existing bike shoulders,
Total	4.72			242,900	

4 17TH-CROSSTOWN

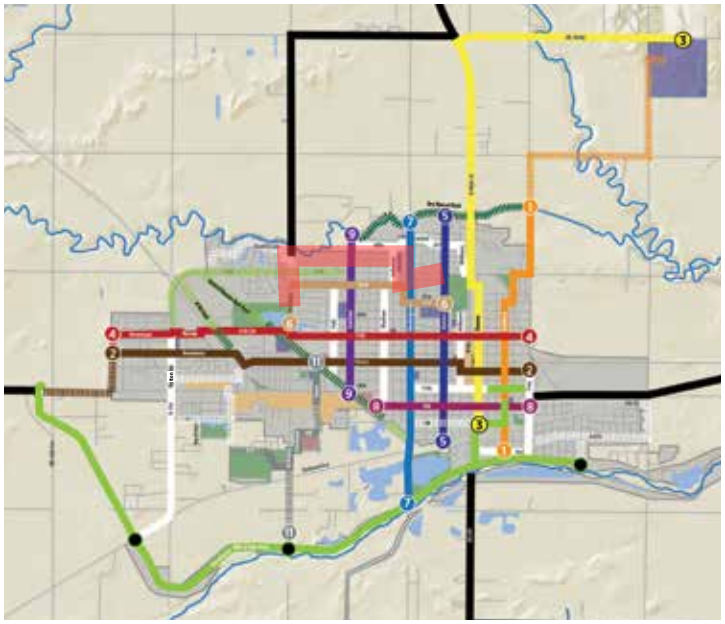
Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost	Comments
16th, US 281 bypass to Williams	.41	Shared street with wayfinding signage	10,000	4,100	
17th, Williams to McKinley	1.42	Bicycle boulevard, signage	15,000	21,300	
McKinley, 17 to 17 Terr Intersection	.05	Offset intersection with short path section	150,000	7,500	
17th Terrace, McKinley to K-96	.67	Shared use of parking lane, wayfinding signage	10,000	6,700	
K-96 intersection		Clear crosswalk markings, caution signage and flashing beacon on K-96	50,000 LS	50,000	Potential HAWK beacon in place of flashing beacon. Increases cost to $100,000 for signals plus path to separate crossing from intersection
Navajo, K-96 to Lincoln Elem	.30	Shared street with wayfinding signage	10,000	3,000	
Lincoln ES site to midblock between Rosewood & 16th Ter	.12	Perimeter multi-use path	150,000	18,000	
Midblock crossing of Patton,		Ped signal, widened sidewalk back to Rosewood	80,000 LS	80,000	
Rosewood, Patton to city limit	.50	Shared street with wayfinding signage	10,000	5,000	
Total	3.47			195,600	

6 23RD-CROSSTOWN



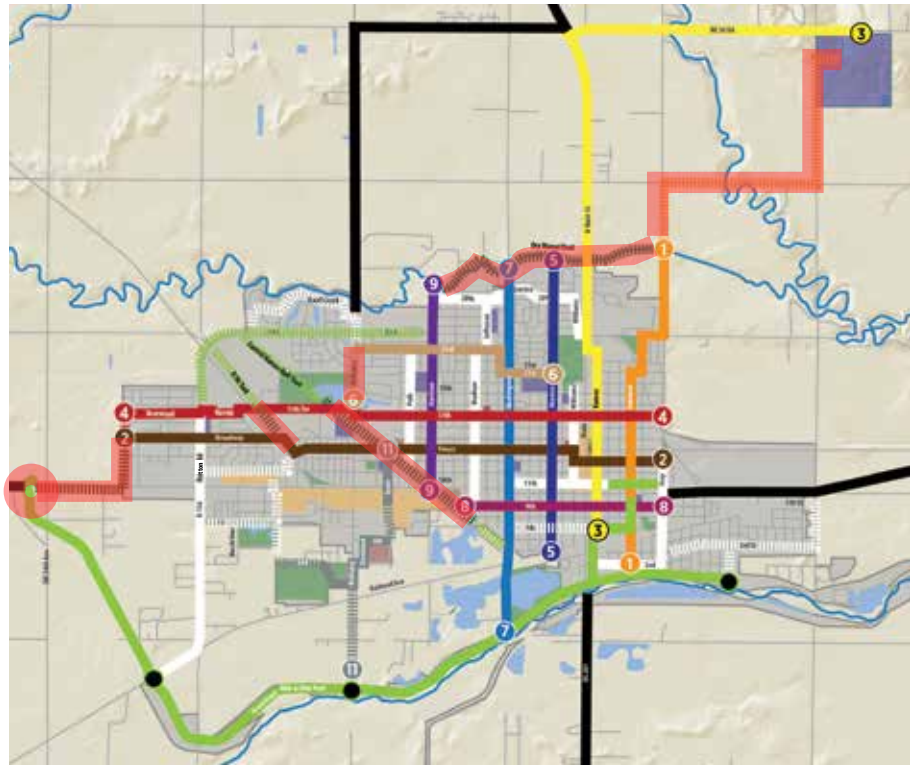
Segment	Length (Miles)	Bikeway Facility Treatment	Cost/ Mile	Cost	Comments
21st, Morton-Washington	.28	Shared street with wayfinding signage	10,000	2,800	
Washington, 21-23		Bike lanes in Route 7	included in Route 7		
23rd, Washington-McKinley	1.0	Shared street with wayfinding signage	10,000	10,000	
McKinley, 23-17 Terrace	.40	Enhanced crossing at 23-McKinley, sidepath on park side between 23 and 17 Terrace	150,000	60,000	
Total	1.68			72,800	

8 SOUTH CROSSTOWN



Segment	Length (Miles)	Bikeway Facility Treatment	Cost/ Mile	Cost	Comments
9th St, Frey to Central Kansas Trail	1.36	Shared use of parking lane, wayfinding signage	10,000	13,600	
Main Street intersection		Enhanced crossing with caution signs oriented to Main	10,000 LS	10,000	
Washington Street intersection		Enhanced crossing with caution signs oriented to Washington	10,000 LS	10,000	
Total				33,600	

TRAIL PROJECTS: INITIAL PHASE



Trail Segment	Length (Miles)	Cost/Mile	Cost	Part of Route
Initial Phase				
K&O Trail, Monroe Street to 17th Terrace	1.13	300,000	339,000	2
Dry Creek Trail, Frey to Harrison	1.11	300,000	330,000	
K-96 Trail, Broadway to 17th Terrace	.26	250,000	65,000	
Barton Community College Trail. Dry Creek to campus	2.00	150,000	300,000	3
Bike & Hike Path, Barton County Road Access		75,000 LS	75,000	
City Edge, Rosewood to Barton County Road	.50	250,000	125,000	2, 4
West Barton County Road, City Limit to Bike & Hike Path	.62	150,000	93,000	2
McKinley, Bike & Hike Path to Railroad	.60	250,000	150,000	11
McKinley Path, 17th to 23rd	.40	150,000	60,000	6
Total	6.61		1,537,000	

Barton County Trail route potential

Dry Creek Trail corridor

Kansas & Oklahoma Railroad corridor

Hubbard Street connection to Bike & Hile Path

Wayfinding Sign Program

Wayfinding signs should be used minimally but effectively in the Great Bend system. Several variations exist, depending on whether a numerical route system is used. Prototype signs proposed for the system are displayed on this page.

The D11-1c Bike Route sign is used at the start of each route and at key points along the way, usually after major street crossings or the crossing of two routes. It displays the standard bicycle symbol and either the endpoint of the route or a dominant destination along the way. After passing the destination, the destination line changes to the endpoint or another key destination later on the route.

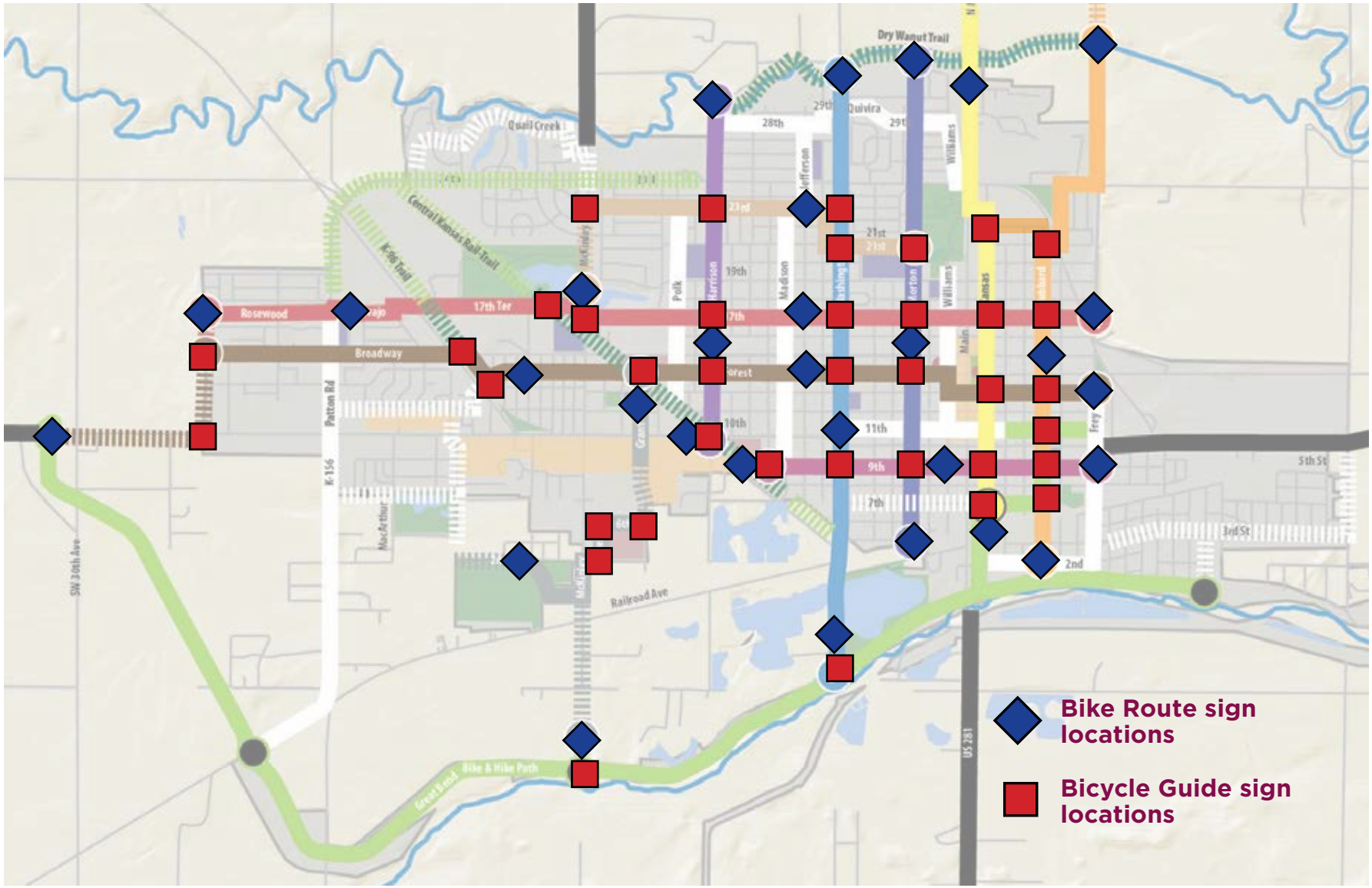
The W11-15 sign would be used at unsignalized crossings of bike and pedestrian routes at major streets. The signs provide advance warning of the presence of pedestrians and bicyclists and is oriented to the major street.

The Bicycle Guide Sign uses the D11-1a sign in combination with route number designators and is an unobtrusive sign used for local guidance in combination with maps or apps. It is located at the crossing of two numbered routes.

The more standard D1 series Bicycle Guide Sign may complement or replace the numbered route guide sign, and uses specific destinations with distances if necessary. It is more appropriate in places where people have less familiarity with the bicycling environment, such as rural parts of the county.

Special street sign for bicycle boulevards. These reinforce the special quality of these streets and would be used in place of standard street signs. Topeka is using a version of this concept on its primary bike routes.

Figure 3.6: Conceptual sign location plan



Pedestrian Network

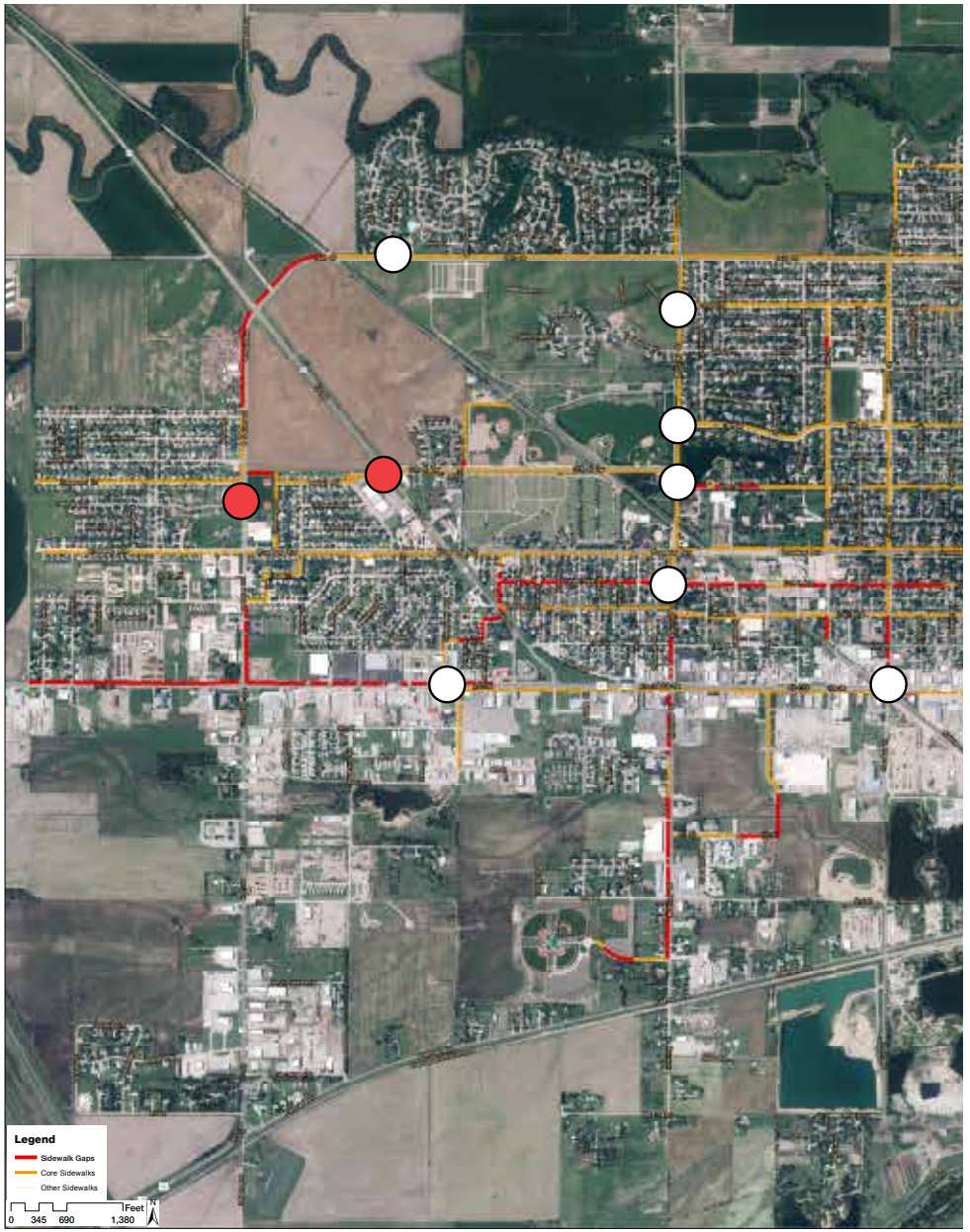
Figure 3.7 illustrates gaps in Great Bend's proposed pedestrian network. As stated above, the pedestrian proposes continuous sidewalks on at least one side of the street for:

- Bicycle boulevards and other streets in the bicycle route system.
- "Complete street corridors" that do not necessarily have special bicycle accommodations.
- Streets within 1/4 mile walking distance of schools.

The map to the right also displays intersections that appear to need special attention or already have pedestrian crossing signals.

Sidewalk gaps in the overall proposed system have a total length of 59,593 feet. Assuming a sidewalk cost of about $20 per linear foot, the cost of filling these gaps is estimated at $1,19 million.

Figure 3.7: Pedestrian Network Needs (West)



Sidewalks present in system

Sidewalk gaps

Existing ped signals

Possible ped signals

Enhanced ped crossings

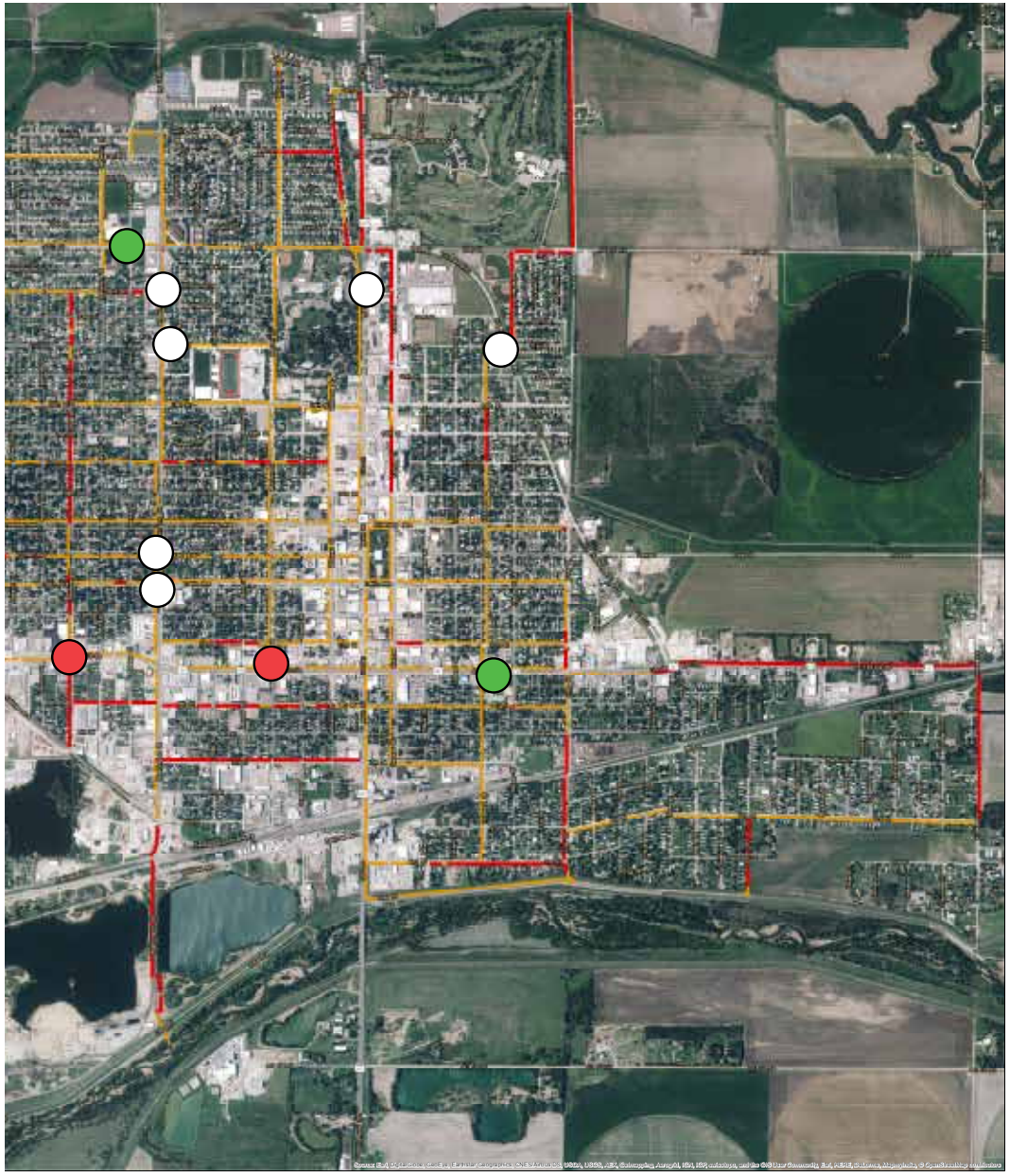


Figure 3.7: Pedestrian Network Needs (East)

Proposed redesign of 10th and Harrison intersection. The railroad crossing in the center of this intersection creates significant challenges for pedestrians. Trail development along the Kansas & Oklahoma RR will simplify access. In addition, the railroad cuts through the existing right turn bypass median, requiring relocation of the crosswalk from the west to the south. Signage should advise right turning motorists to yield to

- Sidewalks present in system
- Sidewalk gaps
- Existing ped signals
- Possible ped signals
- Enhanced ped crossings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CHAPTER 4

HOISINGTON

HOISINGTON DESTINATIONS

In Hoisington as elsewhere, land use patterns all influence pedestrian network design, but major destinations, the places that attract people for learning, recreation, employment, civic or cultural life, shopping, entertainment, or other activities – should be directly served by the system. In a town of Hoisington's size, however, schools determine the system structure more than in Great Bend. The city also has an extremely active Walking School Bus program that the system must accommodate. Key destinations include:

- Schools, including two elementary schools. the middle school, and the high school. Barton County Community College is also a significant Great Bend destination, even though it is located beyond the city limits.

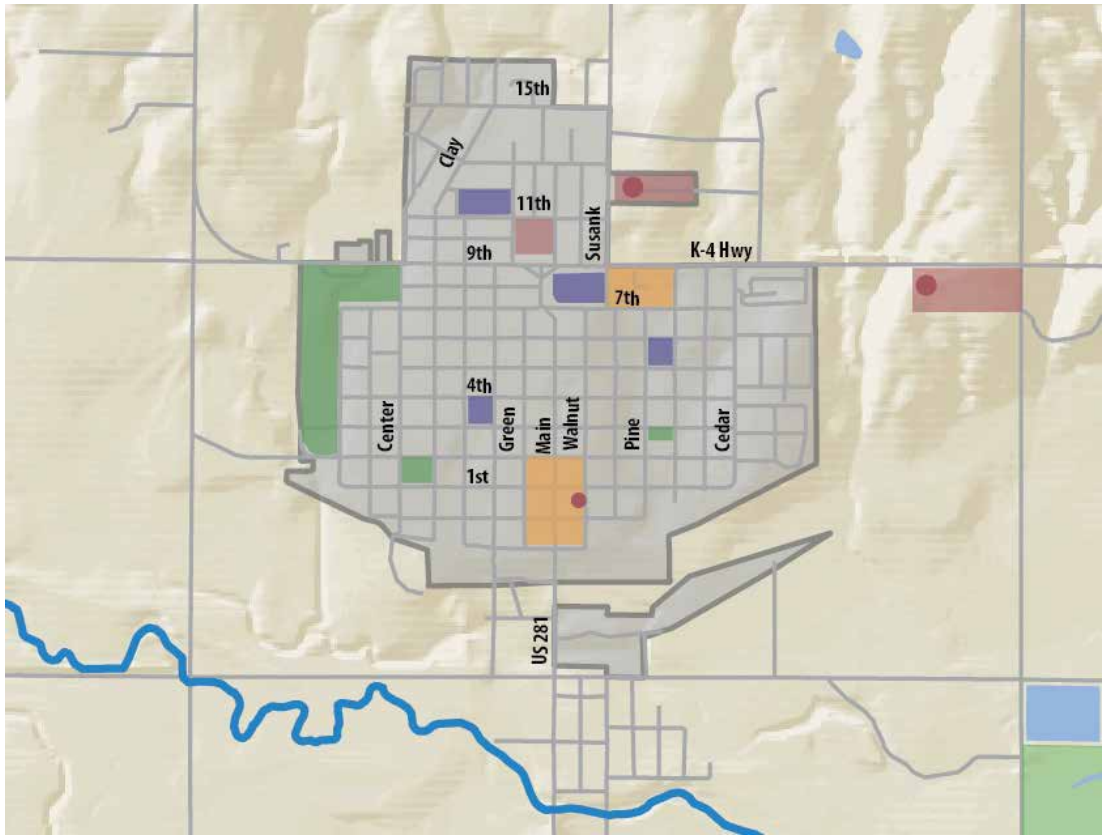
- Major park and recreation facilities, including the city's large community park, Bicentennial Park with its own internal trail, and two neighborhood parks, Heritage and Pride. A key destination is the Hoisington recreation Center along Susank Road on the east side of town.

- Clara Barton Hospital. The hospital, middle school, and high school form a civic cluster divided by Kansas Highway 4.

- Key public destinations, notably downtown and the public library.

- Commercial and employment centers, including the Superior Essex plant on K-4 east of town. In addition to downtown, the commercial cluster at 9th (K-4) and Elm Street also is an important destination.

Figure 4.1: Hoisington Destinations



Schools/Education

Multi-Use Centers

Employment/Community Features

Parks and Recreation

Civic Facilities

Existing Multi-Use Trails (paved)

Existing Multi-Use Trails (unpaved)

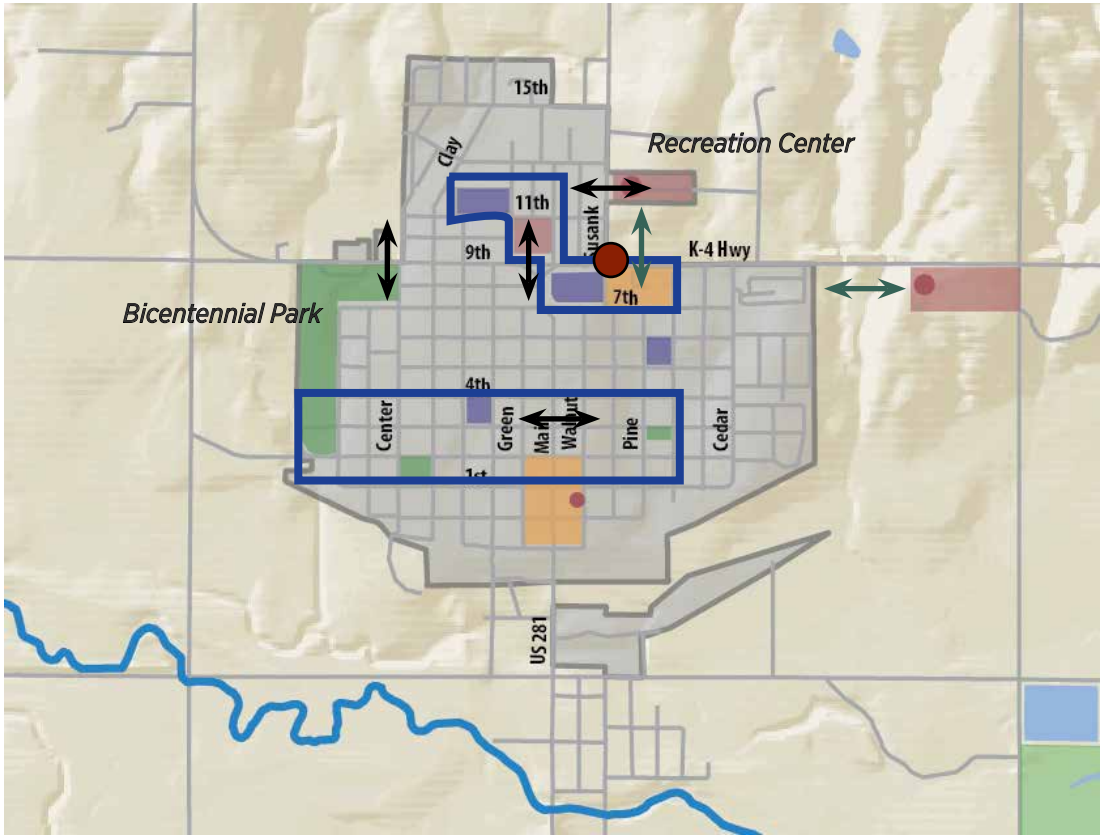
HOISINGTON OPPORTUNITIES

Hoisington's street network between the railroad and K-4 is a regular grid of continuous streets with low traffic. Most east-west streets from 5th Street south are surfaced with brick in generally good condition. Street widths at 28 to 32 feet (Broadway is wider), adequate to support light local traffic. The grid is slightly less regular in newer areas north of K-4, and rotates to follow drainage patterns from Clay Street west. However, most streets continue across town and internal circulation is generally easy.

The main challenges to mobility are the the highway crossroads of east-west K-4 and north-south US 281. US 281 and K-4 share the 9th Street right-of-way from the west town limits to Main Street, where US 281 turns south. The south legs of this T-intersection have big radii to expedite free-flow movements on US 281, but these also complicate pedestrian crossings. The east-west corridor and high-speed turn also divide the continuous civic cluster created by the adjacent middle school, hospital, and high school campuses. This corridor appears to carry between 1,700 and 3,500 vehicles per day, with traffic increasing west of Main. South of 9th Street, US 281 (Main Street) is relatively calmed by its urban context, while K-4 maintains its highway character, including paved shoulders within the city limits. Only one defined pedestrian crossing of K-4 is in place, at Elm/Susank Road. This further divided the north and south parts of town, both of which have important destinations.

The relative clustering of community destinations also helps define future routes. As noted above, the middle school, hospital, high school, and 9th and Elm commercial cluster are contiguous. Also, the neighborhood parks, downtown, and elementary schools also cluster around an east-west route. The Hoisington Recreation Center, on the east side of Susank Road, is somewhat isolated from these clusters. Susank is a county road with moderate traffic, but its rural character on the edge of town tends to encourage higher speed.

Figure 4.2: Hoisington Issues and Opportunities



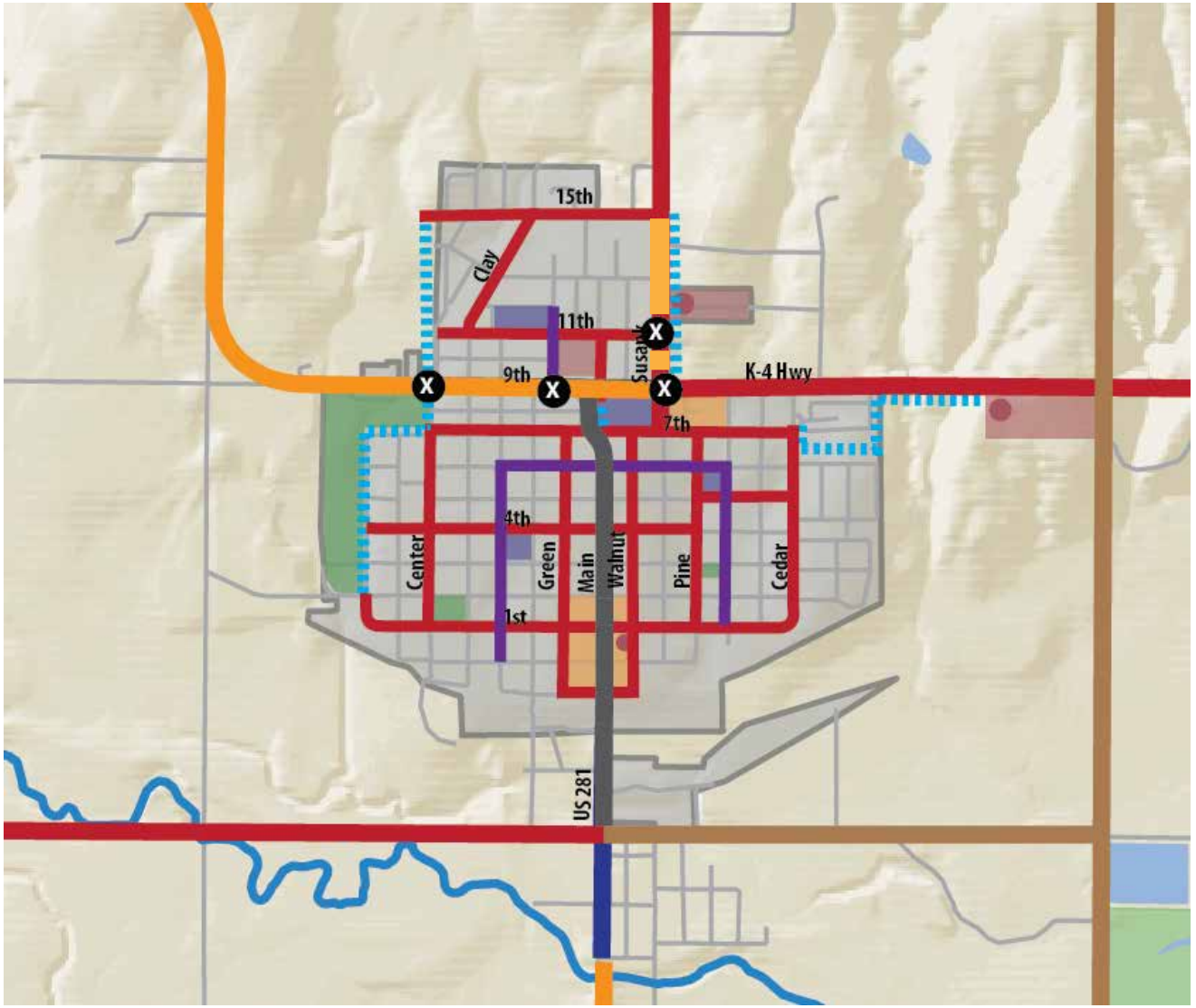
The Hoisington Network Plan

Figure 4.3 illustrates the proposed Hoisington active network with its various types of facilities. The individual facility types refer back to the descriptions in Chapter Two and include:

Shared roads/streets: These are typically low-traffic streets with good continuity. Infrastructure investments are minimal, and include identification and directional signage. With the exception of the highways and Susank Road, other streets in the system have average daily traffic (ADT) below 1,000 vehicles per day. In these cases, shared lane markings (or sharrows) are primarily used to build awareness

- Shared Road
- Bicycle Boulevard
- Bike Lane
- Highway Shoulders
- Existing Paved Trail
- Existing Unpaved Trail
- Multi-Use Path
- Complete Street Corridor
- Enhanced Intersection

Figure 4.3: Active Barton Network: Hoisington Focus



of bicycle transportation or provide guidance for local cyclists.

Bike lanes: For the most part, the light traffic on the town's streets do not require bike lanes and are not wide enough to accommodate them. The concept proposes bike lanes along a short segment of US 281 between the K&O tracks and Forest Avenue. This segment is a four-lane "bridge" between the two-lane, low-speed Main Street in Downtown and the two-lane shouldered highway to Great Bend. Conversion to a three-lane section with bike lanes/shoulders transitions traffic from highway to urban downtown speeds, and recognizes that the shouldered US 281 corridor will be the principal route for intercity bike travel to Great Bend.

Highway shoulders: US 281 outside the city and K-4 through town as 9th Street both have paved shoulders that make them important parts of the system, particularly for experienced cyclists.

Existing trails. The Bicentennial Park trail is a recreational 8-foot loop that should connect to the city's street system for greater functionality.

Proposed multi-use paths. New paths in the Hoisington network can provide key connections that improve safety and make the network more useful to more people. The ultimate network shown in Figure 4.3 includes the following multi-use paths:

- **The Susank Road Path,** a path on the east side of Susank Road between 9th and 15th Street with a branch into the Recreation Center. This, combined with enhanced street crossings, provides better access to this important community facility.

- **Westside Path** connecting the west side of town north of K-4 to the Bicentennial Park path, and including an enhanced crossing of K-4 at or near Center Street. This can also include imporved, more direct paths along the Monroe Street edge of Bicentennial Park.

Pedestrian Street Corridors. These local streets, like all streets, are available to bicyclists but reflect routes used by the town's excellent Walking School Bus program. They are designed to provide continuous sidewalks for these safe routes to schools.

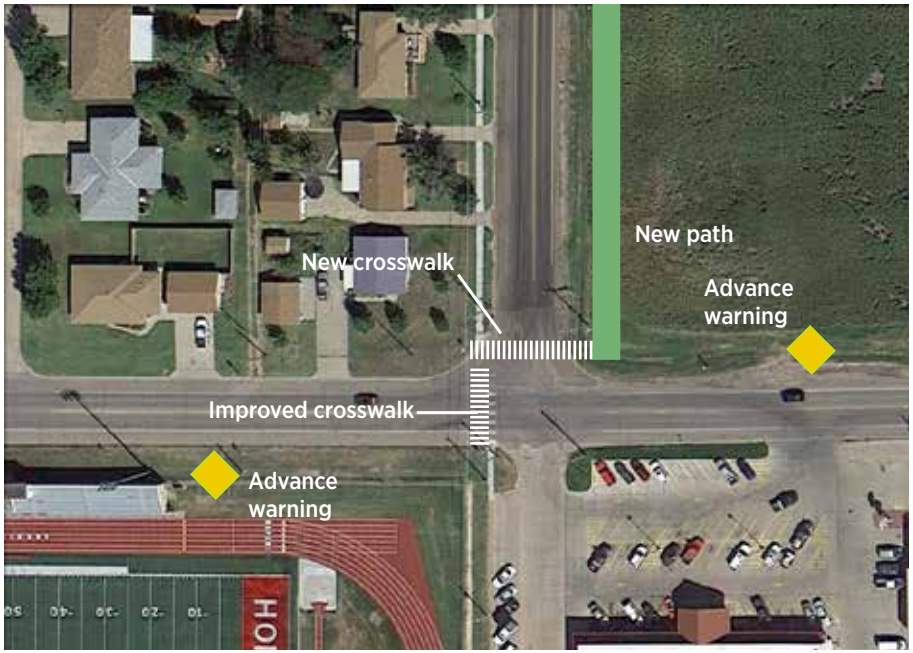
Enhanced Intersections. Intersections are an important safety issue for Hoisington and K-4 in particular presents a key barriers in the pedestrian and bicycle network. Specific actions for these intersections include improved crosswalks, pedestrian signals, crossing medians, and intersection redesign. These key crossings include three points on K-4 (Susank Road, Vine/Main Street, and Bicentennial Park) and one location on Susank Road for access to the Recreation Center. Figure 4.4 illustrates concepts for these intersection. Addressing them may require a policy change from the Kansas Department of Transportation (KDOT) on pedestrian crossing points of K-4.

Pedestrian Policy

Most street corridors (with the exception of US 281 south of Downtown) within Hoisington shown as

Figure 4.4: Hoisington Crossing Concepts

9th-Vine Crossing



9th-Elm Crossing

Recreation Center Crossing

shared streets or roads should all have a continuous sidewalk along their length on at least one side of the street. They define a "major sidewalk system" that should be funded like major streets, using public funds for all or part of their cost. Areas within a 1/4 mile walk of elementary schools should also include continuous sidewalks on at least one side of each street. Clearly, multi-use paths benefit all active users and should be appropriately designed for both pedestrian and bicycle use.

Bikeway System Design

Figure 4.5 defines a bikeway wayfinding system for Hoisington. This system design includes:

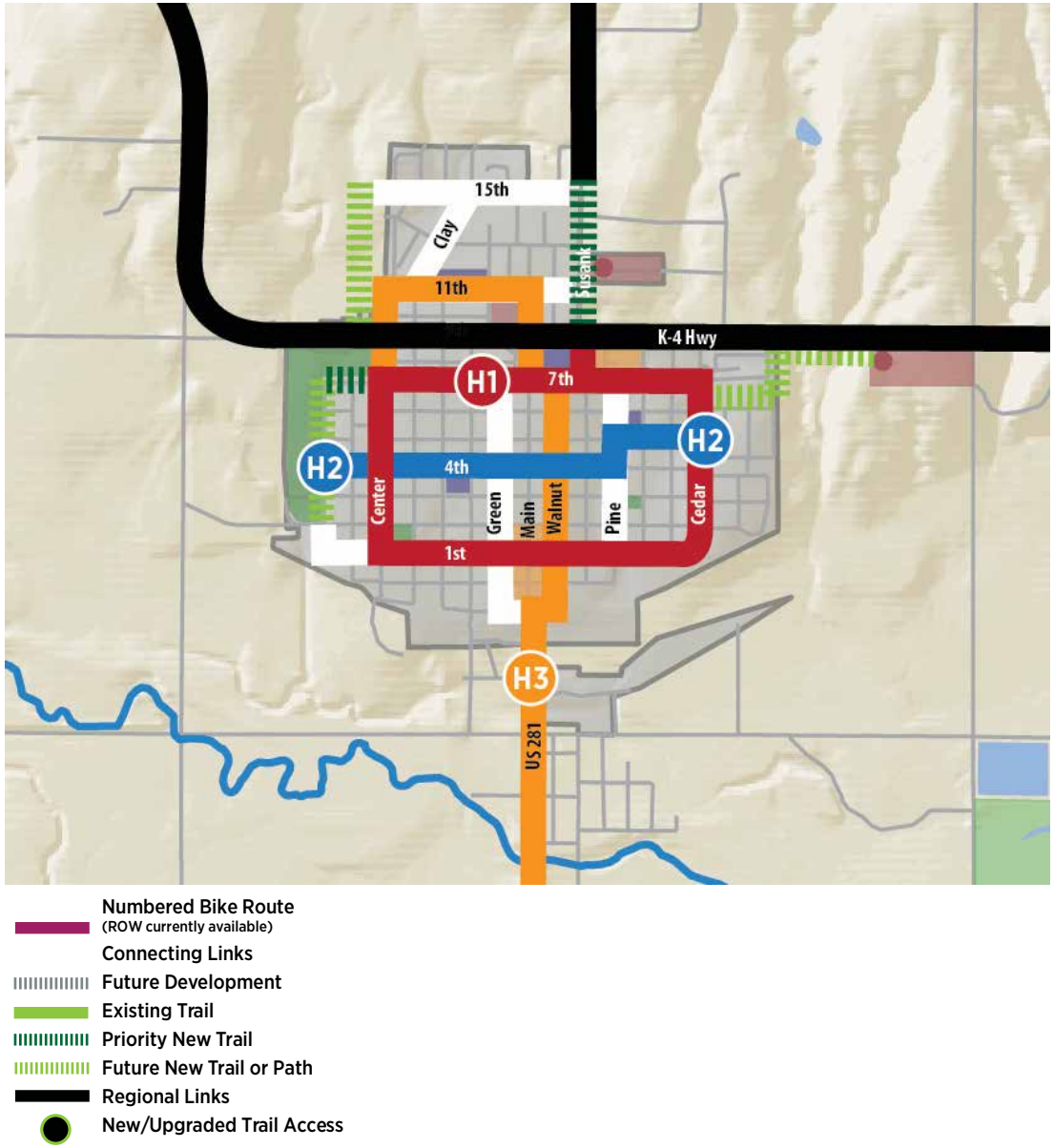
An initial phase, attainable within a five year period. This phase proposes three routes that use existing streets. These routes include:

- Hoisington Loop (H1) that uses 7th Street to serve major features along the K-4 corridor, Downtown, and two of the three city parks. The Loop includes a spur on Elm Street to connect to the 9th and Elm retail area and Recreation Center.
- A 4th Street Crosstown Route (H2).
- A North-South Route (H3) that uses Walnut Street, crosses K-4 at Main Street, and leads to the hospital, youth center, and middle school, continuing back to Bicentennial Park.

Path linkages to the Recreation Center and the Bicentennial Park Trail are included in this first phase. Highest priority intersection improvements are a new crossing at Main and K-4 (see previous concept) and improvements at the existing Susank Road crossing. The street segments all use wayfinding signs, but do not require additional pavement markings.

Later phases add paths linking to Essex, along Bicentennial Park, and on the westside. The other two priority pedestrian crossings, improving the existing Recreation Center crossing of Susank and adding a K-4 crossing at Center are also included in this phase.

Figure 4.5: Hoisington Bikeway Concept



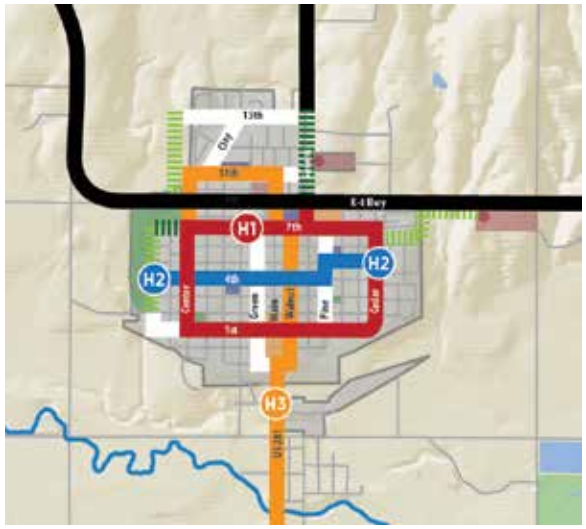


Table 4.6 at right shows a range of costs for projects related to the proposed Hoisington network. The largest items address pedestrian/bicycle crossings of K-4, ultimately providing three protected crossing points. The table also includes the proposed recreation center sidepath along Susank Road between K-4 and 15th Street.

Figure 4.6: Opinion of Cost, Hoisington Bikeway System

Route #	Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost
H1	Hoisington Loop: 1st, 7th, Cedar, Center	2.5	Shared street with wayfinding signage	10,000	25,000
H2	4th/Pine/5th, Bicentennial Park to Cedar	1.0	Shared street with wayfinding signage	10,000	10,000
H3	US 281, Creek to Railroad	.60	4- to 3-lane lane reduction with shoulders	50,000	30,000
	Railroad St/Walnut, Main to 7th	.65	Shared street with wayfinding signage	10,000	6,500
	Main Street Path, 7th to 9th	.11	Sidepath on east side	150,000	16,500
	Main and K-4 crossing		Upgraded ped crossing with flashing beacon	50,000 LS	50,000
	Medical Center path, Main to Vine	.1	Sidepath on south edge of hospital site	150,000	15,000
	Vine/11th/Center paralleling K-4	.4	Shared street with wayfinding signage	10,000	4,000
	Upgraded ped crossing at K-4 and Center		Upgraded ped crossing with pedestrian crossing with flashing beacon	50,000 LS	50,000
	Path connection to Recreation Center, K-4 to 15th	.4	Path on east side of Susank Road	150,000	60,000
	Path connection to Bicentennial Park walking loop from 7th	.2	Path from terminus of 7th St	150,000	30,000
	Total	5.96			297,000

Wayfinding Sign Program

Wayfinding signs should be used minimally but effectively in the Hoisington system. Hoisington's concept is similar to Great Bend's, and it would be advantageous to use a system througout the county Prototype signs proposed for the system are displayed on this page.

The D11-1c Bike Route sign is used at the start of each route and at key points along the way, usually after major street crossings or the crossing of two routes. It displays the standard bicycle symbol and either the endpoint of the route or a dominant destination along the way. After passing the destination, the destination line changes to the endpoint or another key destination later on the route.

The W11-15 sign would be used at unsignalized crossings of bike and pedestrian routes at major streets. The signs provide advance warning of the presence of pedestrians and bicyclists and is oriented to the major street.

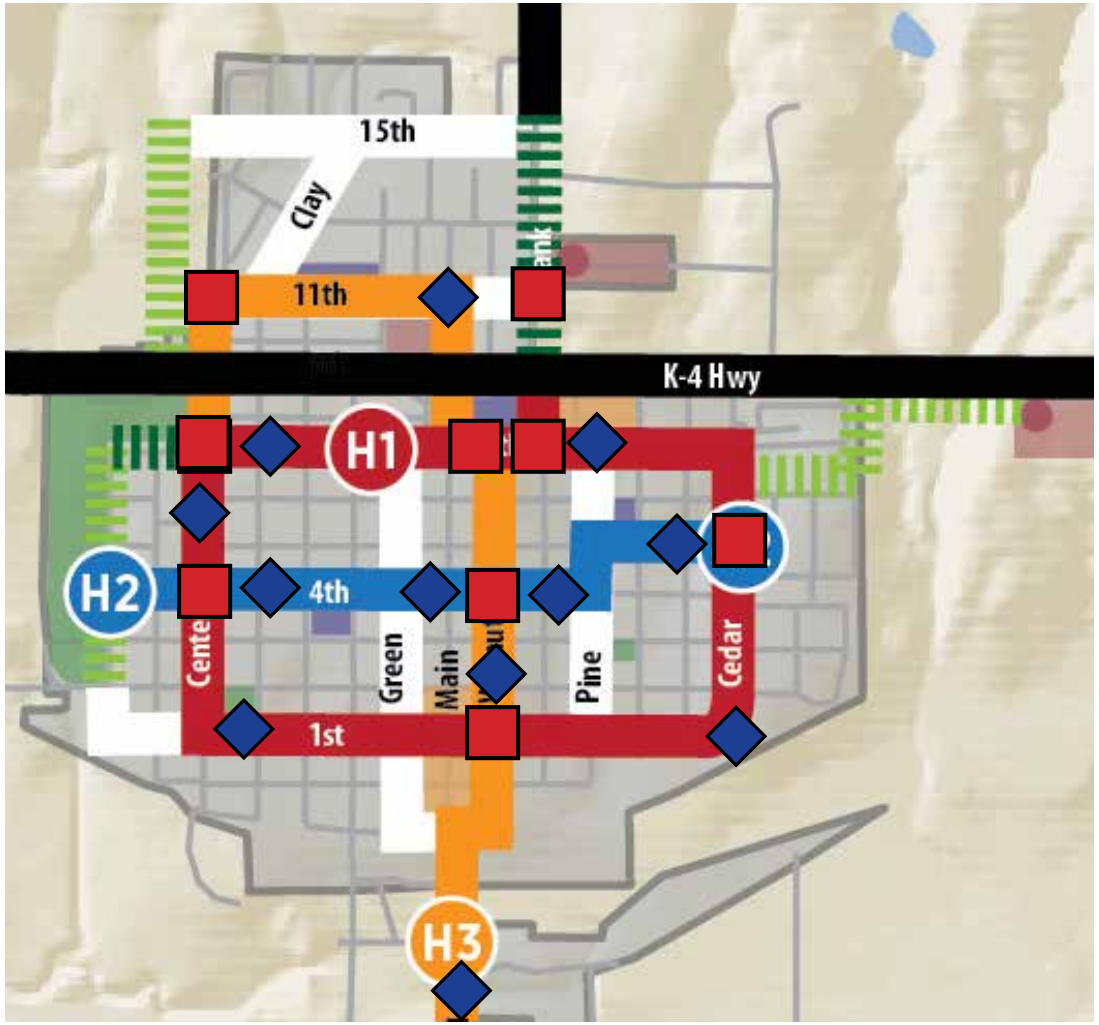
The Bicycle Guide Sign uses the D11-1a sign in combination with route number designators and is an unobtrusive sign used for local guidance in combination with maps or apps. It is located at the crossing of two numbered routes or at intersections with key connecting links.

The more standard D1 series Bicycle Guide Sign may complement or replace the numbered route guide sign, and uses specific destinations. Showing distances will not be necessary in Hoisington because most trips will be less than one mile.

Special street sign for bicycle routes. This technique may be particularly appropriate in Hoisington and can replace some of the D11-1c signs along the route. Color is used to reflect the colors of the Hoisington Cardinals.

Safe routes signage. This sign, designed specifically for Omaha, NE, is used to identify safe routes to school..

Figure 4.7: Conceptual sign location plan



Bike Route sign locations

Bicycle Guide sign locations

Pedestrian Network

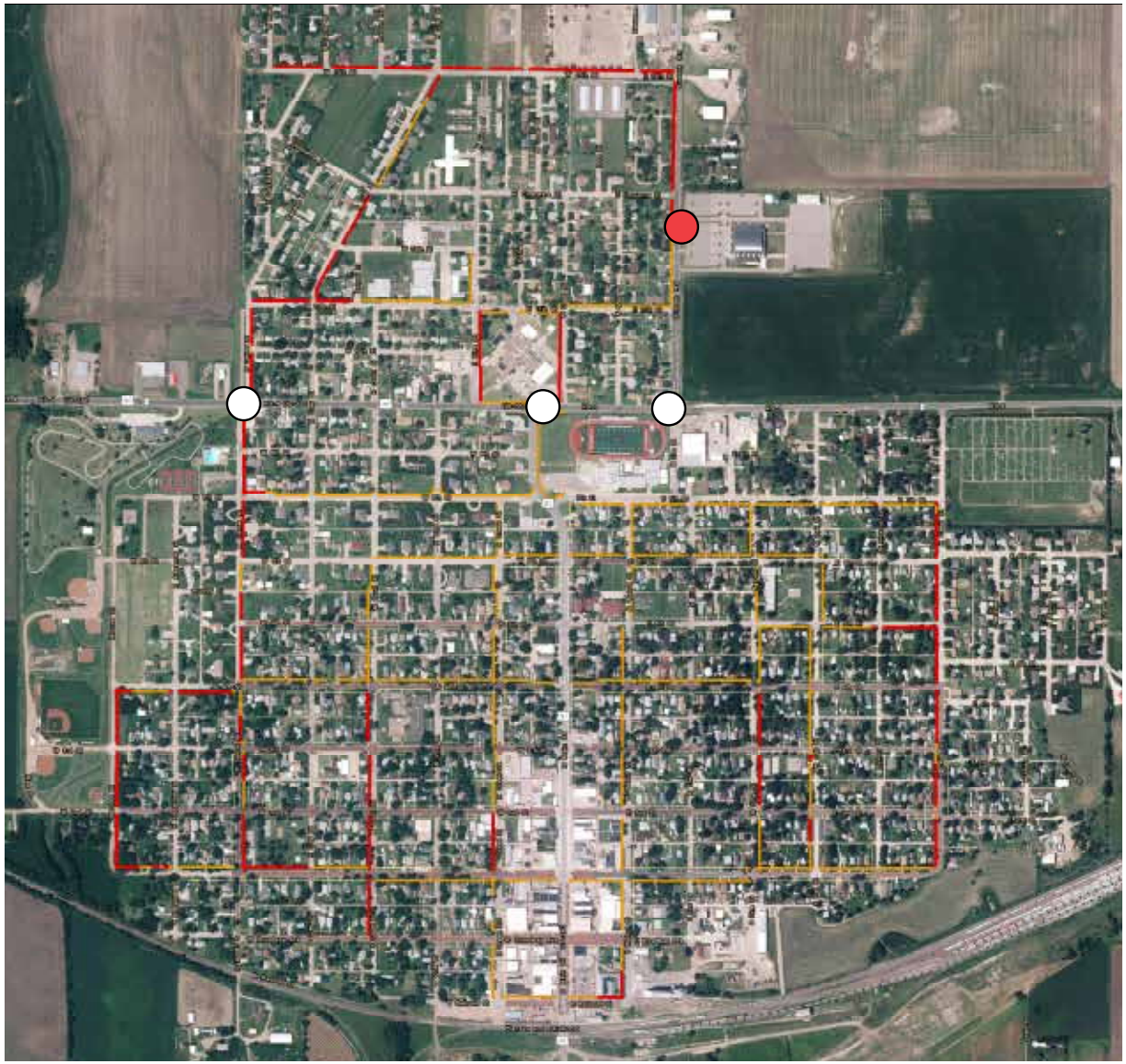
Figure 4.8 illustrates gaps in Hoisington's proposed pedestrian network. As stated above, the pedestrian proposes continuous sidewalks on at least one side of the street for:

- Streets in the bicycle route system.
- "Complete street corridors" that do not necessarily have special bicycle accommodations.
- Streets within 1/4 mile walking distance of schools.

The map to the right also displays intersections that appear to need special attention or already have pedestrian crossing signals.

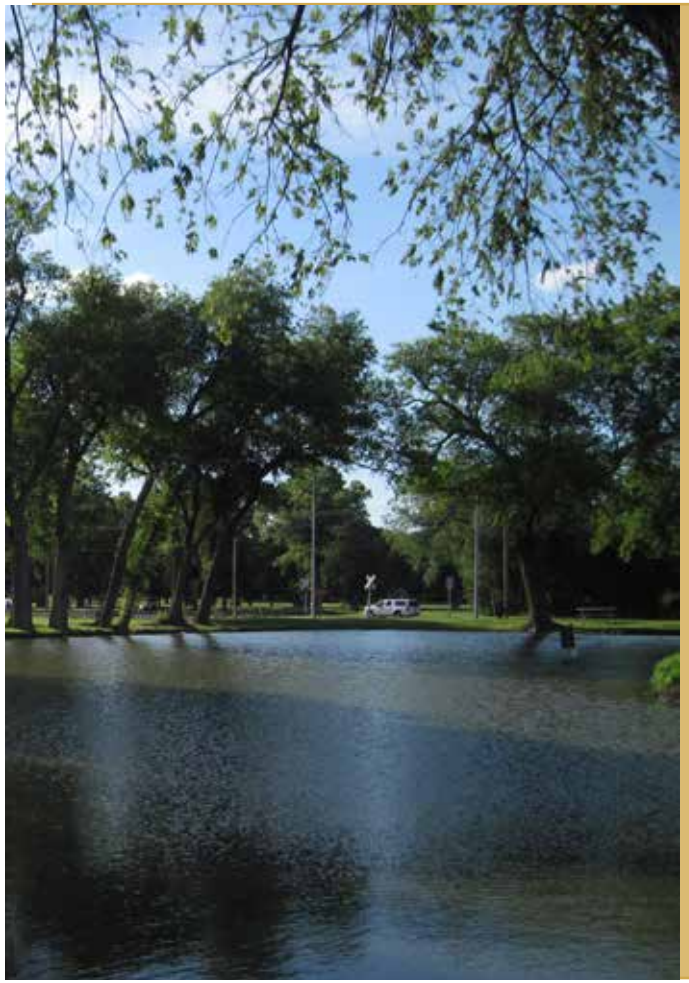
Sidewalk gaps in the overall proposed system have a total length of 15,421 feet. Assuming a sidewalk cost of about $20 per linear foot, the cost of filling these gaps is estimated at $310,000

Figure 4.8: Pedestrian Network Needs



CHAPTER 5

ELLINWOOD

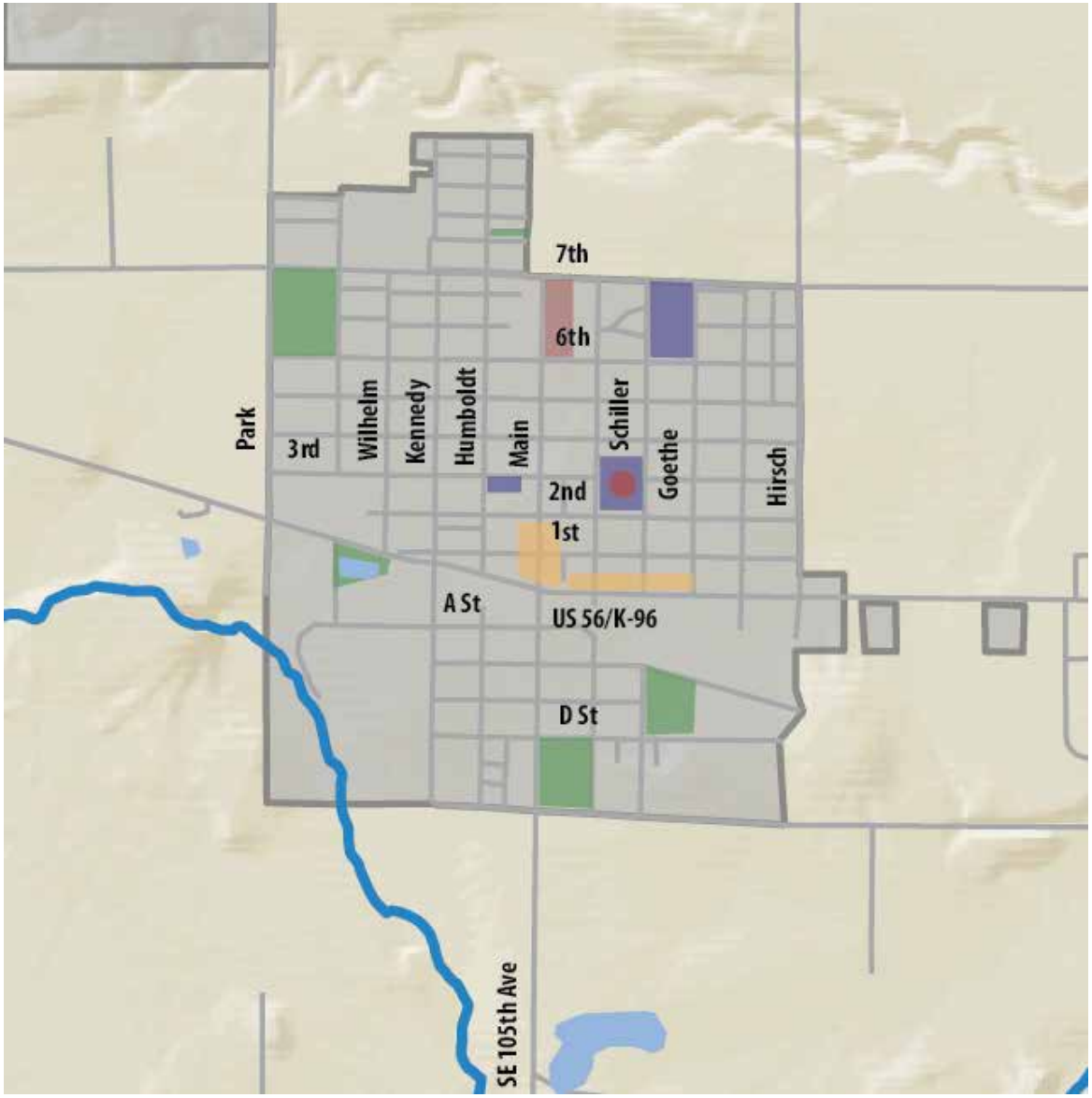


ELLINWOOD DESTINATIONS

In Ellinwood, as elsewhere, land use patterns all influence pedestrian network design, but major destinations, the places that attract people for learning, recreation, employment, civic or cultural life, shopping, entertainment, or other activities – should be directly served by the system. As in the county's smaller cities, schools and parks are major system determinants. Key Ellinwood destinations include:

- Schools, primarily the high school near Downtown (also including the public library) and the grade school in the northeast part of town.
- Major park and recreation facilities, including City Park on the northwest corner of the city. Several of the city's park and recreation and divided resources, including Wolf Pond Park and ballfields, are south of US 56 corridor and separated from the rest of town by that major highway.
- Ellinwood District Hospital, adjacent to St John's Child Development Center and two blocks west of the grade school.
- Key public destinations, notably downtown and the public library.
- Commercial and employment centers, including Downtown with its community wellness center and retail and office base.

Figure 5.1: Ellinwood Destinations



Schools/Education

Multi-Use Centers

Employment/Community Features

Parks and Recreation

Civic Facilities

Existing Multi-Use Trails (paved)

Existing Multi-Use Trails (unpaved)

ELLINWOOD OPPORTUNITIES

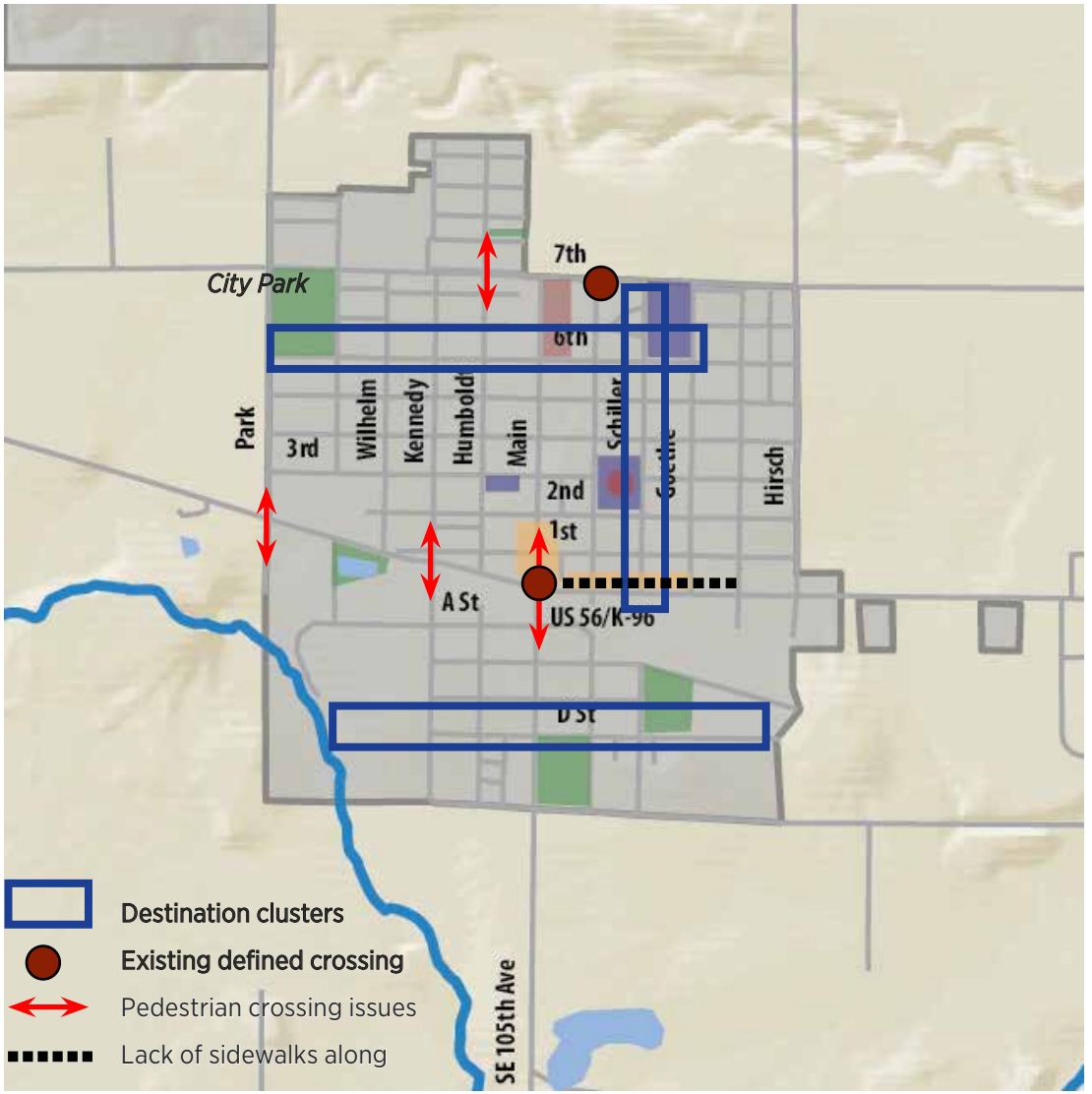
Ellinwood's street network north of the US 56/ Kansas & Oklahoma Railroad corridor is a regular grid of continuous streets with low traffic. North-south section line roads for the edges of town and continue north of the city. Main Street bisects this mile wide grid, and continues south of the highway and railroad, turning west toward Great Bend as SE 20 Road. East-west Seventh Street diverges from US 56 about 1.5 miles west of the city and carries somewhat more traffic than other city streets. Specific traffic counts are not available for this local system.

The grid south of US 56 is less fully developed, with D Street providing greatest connectivity as it connects the two ballfield facilities and the city cemetery. South Main carries relatively heavier traffic south of the highway.

Connecting the north and south parts of town across the highway and railroad corridor presents the main challenges to local pedestrian and bicycle access. Two north-south streets, Main and Kennedy, cross both corridors, and only Main has a signalized intersection. Despite the signal, active users report difficulty in crossing the four-lane highway. Several important community commercial destinations are located along US 56 corridor, which lacks sidewalks or sidepaths. A planned reconstruction of US 56 does not appear to include paths or significant redesign of the Main and US 56 intersection.

From an opportunity perspective, major destinations line up relatively well along such streets as 6th Street, Schiller Street, Goethe Street, and D Street. THis helps provide relatively clear routes through the city and makes active transportation a real option for short distance local trips.

Figure 5.2: Ellinwood Issues and Opportunities

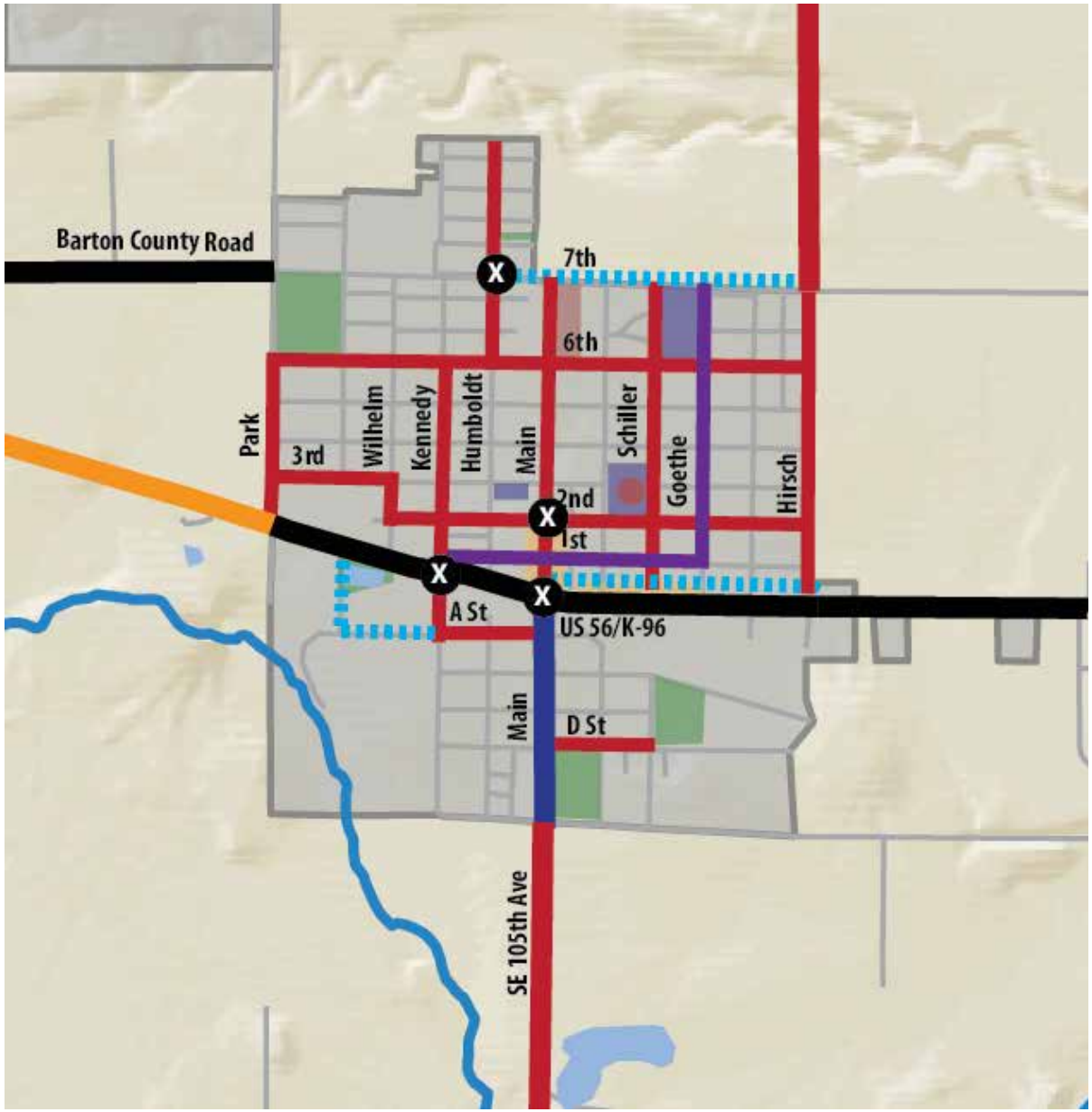


The Ellinwood Network Plan

Figure 5.3 illustrates the proposed Ellinwood active network with its various types of facilities. The individual facility types refer back to the descriptions in Chapter Two and include:

Shared roads/streets: These streets are typically low-traffic streets with good continuity. Infrastructure investments are minimal, and include identification and directional signage. With the exception of US 56 and potentially 7th Street (Barton County Road) and Main Street, other streets in the system have average daily traffic (ADT) well below 1,000 vehicles per day. On these local streets, shared lane markings (or sharrows) are not necessary; when used, their primary purpose is to build awareness of bicycle transportation or provide

Figure 5.3: Active Barton Network: Ellinwood Focus



guidance for local cyclists. However, sharrows are recommended for Main Street through Downtown to 7th Street

Bike lanes: For the most part, the light traffic on the town's streets do not require bike lanes. However, the concept proposes bike lanes along South Main between US 56 and the south city limits. Bike lanes would tend to slow traffic speeds entering the city, and provide a defined area for people reaching south side recreation resources.

Highway shoulders: US 56 has wide shoulders between Great Bend and Ellinwood, but at the city limits converts to a four-lane, undivided section that is uncomfortable for most cyclists. Consideration should be given to converting the US 56 section to three lanes with shoulders, but this conversion is not included in plans for reconstruction of the highway east of Main Street.

Proposed multi-use paths. New paths in the Ellinwood network can provide key connections that improve safety and make the network more useful to more people. The ultimate network shown in Figure 4.3 includes several short multi-use paths:

- 7th Street Path, between Humboldt and Hirsch Streets. The north side of the road offers an uninterrupted path and does not disturb adjacent development, but requires users to cross 7th Street.

- Wolf Pond Path linking the Main Street bikeway to the park without using US 56.

- Highway Path providing safer pedestrian and bicycle access to community businesses on the highway corridor between Main and Hirsch Street. This path is not included in current US 56 reconstruction plans.

Pedestrian Street Corridors. These local streets, like all streets, are available to bicyclists but reflect routes used frequently by pedestrians.

Enhanced Intersections. Ellinwood shares the issue of safe crossing of highways and major streets with other Barton County towns. The US 56/K-96 corridor along with the parallel Kansas & Oklahoma Railroad, presents a major barrier between north and south. Residents view the signalized Main Street intersection with the highway as especially important, with access complicated by its size and lack of defined area for vulnerable users.

The concept identifies four key intersections. A minor realignment of the north pavement edge line of US 56 west of Main can provide room for a pedestrian refuge median that reduces the distance that pedestrians are exposed to the roadway. This improved west side crosswalk would link to a sidepath/sidewalk on the west side of Main across the tracks to A Street, then converting to a sidewalk and bike lanes south of A (Figure 4.4). Other significant intersections requiring enhancement are:

- 2nd and Main (replacement of single-line crosswalks with more visible "ladder" or "zebra" crosswalks.
- 7th and Humboldt (zebra crosswalk with advance warnings of pedestrian crossing)

- Possibility of a pedestrian crossing of US 56 at Kennedy. A crossing here would require some form of signalized protection.

Pedestrian Policy

Most street corridors within Ellinwood shown as shared streets or roads should all have a continuous sidewalk along their length on at least one side of the street. They define a "major sidewalk system" that should be funded like major streets, using public funds for all or part of their cost. Areas within a 1/4 mile walk of elementary schools should also include continuous sidewalks on at least one side of each street. Clearly, multi-use paths benefit all active users and should be appropriately designed for both pedestrian and bicycle use.

Figure 5.4: Main and US 56 Intersection Concept

Bikeway System Design

Figure 5.5 defines a bikeway wayfinding system for Ellinwood. This system design includes:

An initial phase, attainable within a five year period. This phase proposes three routes that use existing streets. These routes include:

- Main Bikeway (E1), a continuous north-south route using Humboldt and Main Street to serve the center of town. This route includes sharrows on the segments north of US 56 and bike lanes from A Street south to the city limits. This route assumes improvement of the highway intersection (see Figure 5.4). Links on A and D Streets connect the Main Bikeway to ballparks and eventually to Wolf Pond.

- 6th Street Crosstown Route (E2), serving City Park and the Elementary School.

- Park/2nd Street Crosstown Route (E3) that links City Park, Grove Park Golf Course, Downtown, Ellinwood High School, and the Library.

- Schiller Route (E4) connecting the two schools and library, and extending eventually to a path along US 56.

A path along the north side of US 56 should be developed at an early stage, and ideally would be integrated into the upcoming reconstruction project.

Later phases add paths from A and Kennedy Ave to Wolf Park and along 7th Street on the north edge of town. An protected pedestrian crossing at Kennedy Avenue and US 56 would also improve access to Wolf Pond Park and the south side.

Figure 5.5: Ellinwood Bikeway Concept

Table 5.6 at right shows a range of costs for projects related to the proposed Ellinwood network. The largest item is the Main and US 56 intersection and the need for a multi-use path within the city along US 56. Both projects involve a federal highway and require major state and federal participation.

Figure 5.6: Opinion of Cost, Ellinwood Bikeway System

Route #	Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost
E1	South Main, E Street to US 56	.4	Bike lanes in wide street	25,000	10,000
	South Main, A to US 56	.07	Multi-use path/walk on west side of Main	150,000	10,500
	Main and US 56 intersection		Intersection redesign with crossing median and minor road realignment	200,000 LS	200,000
	Main, US 56 to 6th	.45	Shared street with wayfinding signage	10,000	4,500
	Humboldt, 6th to north city limit	.11	Shared street with wayfinding signage	10,000	1,100
E2	6th, Hirsch to Park	1.0	Shared street with wayfinding signage	10,000	10,000
E3	2nd/3rd, Hirsch to Park	1.0	Shared street with wayfinding signage	10,000	10,000
	Park, 3rd to Barton County Road	.4	Shared street with wayfinding signage	10,000	4,000
	Schiller, US 56 to 7th	.6	Shared street with wayfinding signage	10,000	6,000
	US 56 Path, Hirsch to Main	.5	Path on north side of corridor	150,000	75,000
	Total	4.53			331,100

Wayfinding Sign Program

Wayfinding signs should be used minimally but effectively in the Ellinwood system. Ellinwood's concept is consistent with those of other communities in the county. Prototype signs proposed for the system are displayed on this page.

The D11-1c Bike Route sign is used at the start of each route and at key points along the way, usually after major street crossings or the crossing of two routes. It displays the standard bicycle symbol and either the endpoint of the route or a dominant destination along the way. After passing the destination, the destination line changes to the endpoint or another key destination later on the route.

The W11-15 sign would be used at unsignalized crossings of bike and pedestrian routes at major streets. The signs provide advance warning of the presence of pedestrians and bicyclists and is oriented to the major street.

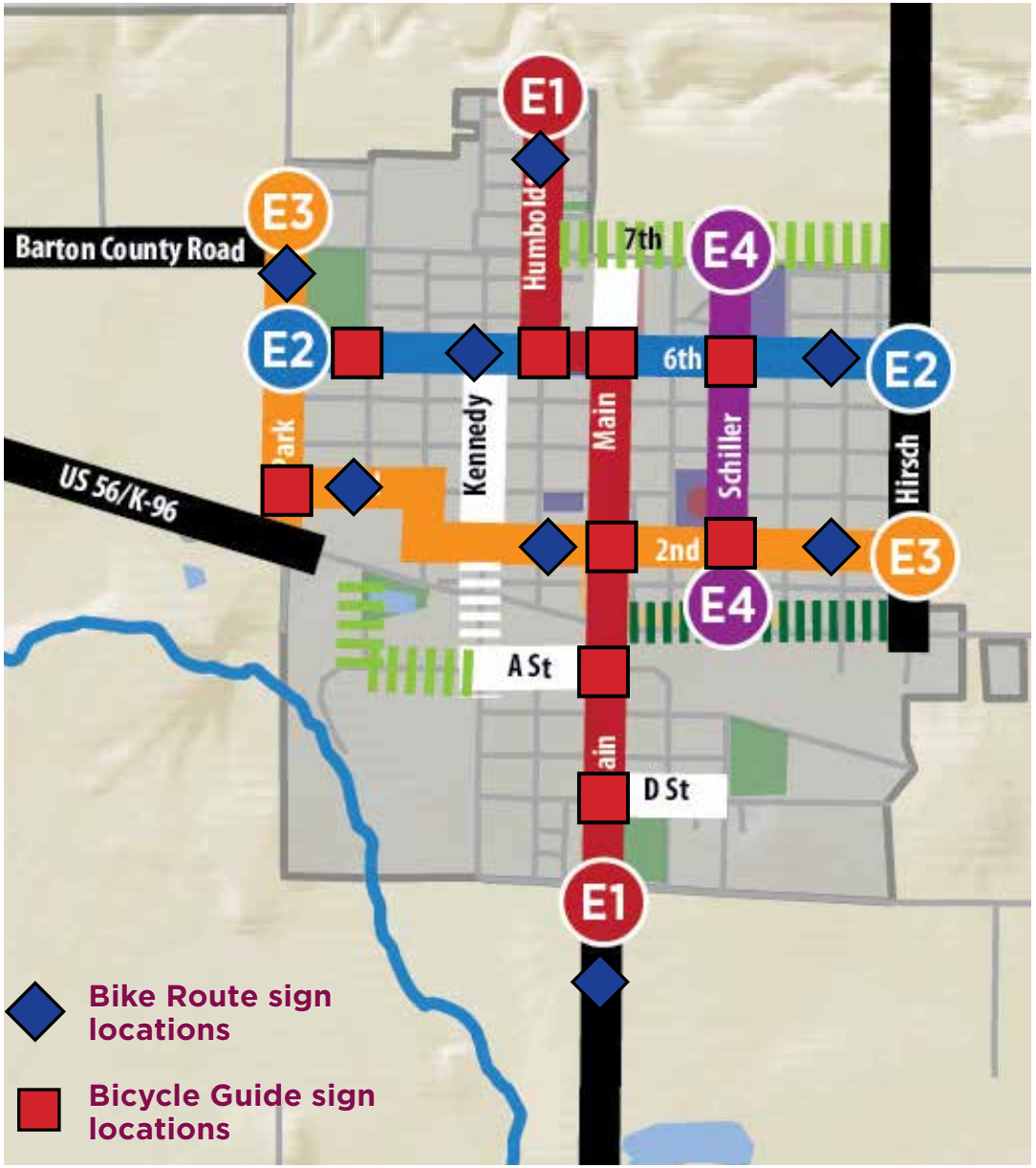
The Bicycle Guide Sign uses the D11-1a sign in combination with route number designators and is an unobtrusive sign used for local guidance in combination with maps or apps. It is located at the crossing of two numbered routes or at intersections with key connecting links.

The more standard D1 series Bicycle Guide Sign may complement or replace the numbered route guide sign, and uses specific destinations. Showing distances will not be necessary in Ellinwood because most trips will be less than one mile.

Special street sign for bicycle routes. This technique may be particularly appropriate in Ellinwood and can replace some of the D11-1c signs along the route. Color is used to reflect the blue of the Ellinwood Eagles.

Walking routes. A special sign could be employed to mark good pedestrian routes, including loops for recreational walking.

Figure 5.7: Conceptual sign location plan



Pedestrian Network

Figure 5.8 illustrates gaps in Ellinwood's proposed pedestrian network. As stated above, the pedestrian proposes continuous sidewalks on at least one side of the street for:

- Streets in the bicycle route system.
- "Complete street corridors" that do not necessarily have special bicycle accommodations.
- Streets within 1/4 mile walking distance of schools.

Sidewalk gaps in the overall proposed system have a total length of 14,687 feet. Assuming a sidewalk cost of about $20 per linear foot, the cost of filling these gaps is estimated at $294,000

The map to the left also displays intersections that appear to need special attention or already have pedestrian crossing signals.

Sidewalks present in system

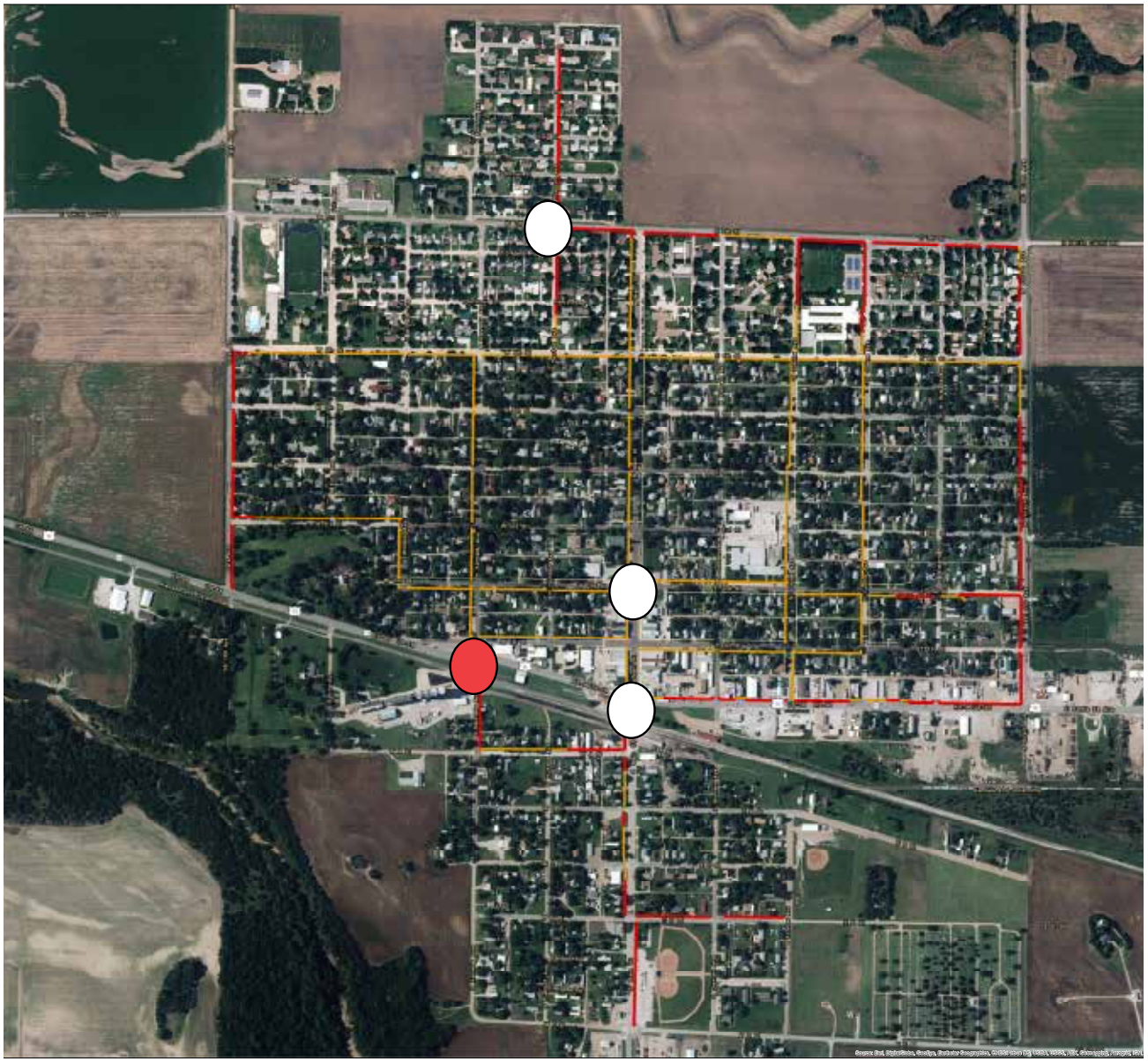
Sidewalk gaps

Existing ped signals

Possible ped signals

Enhanced ped crossings

Figure 5.8: Pedestrian Network Needs




THE CITIZENS STATE BANK
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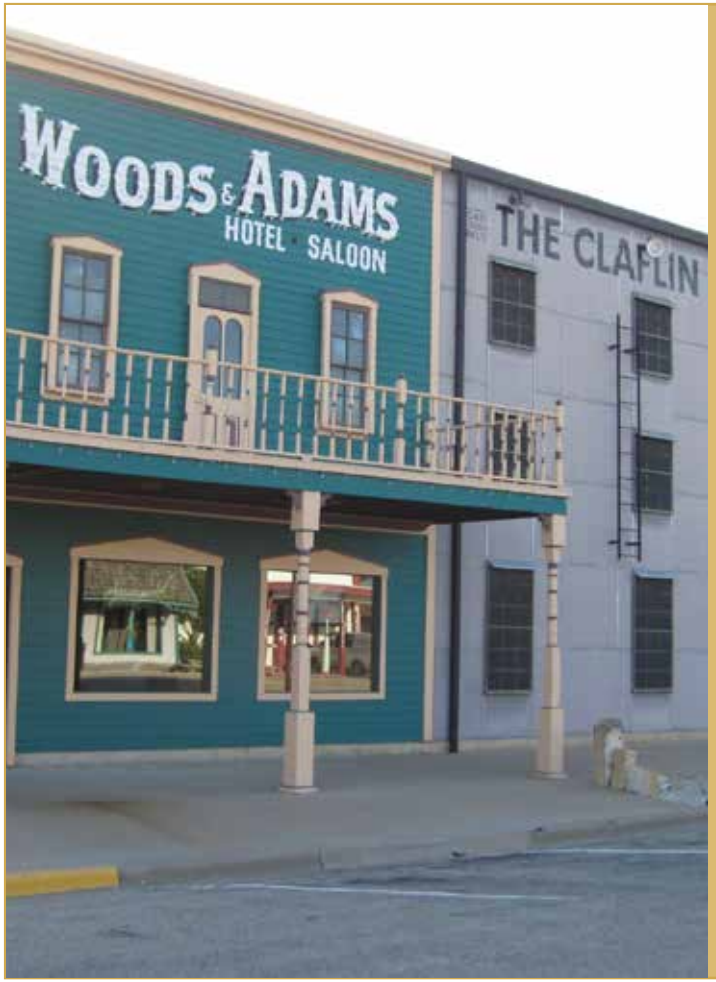
THE LUX THEATER
FEATURING
FURNITURE
FLOORING AND
SLEEP SHOP

CHAPTER 6 CLAFLIN



CLAFLIN DESTINATIONS

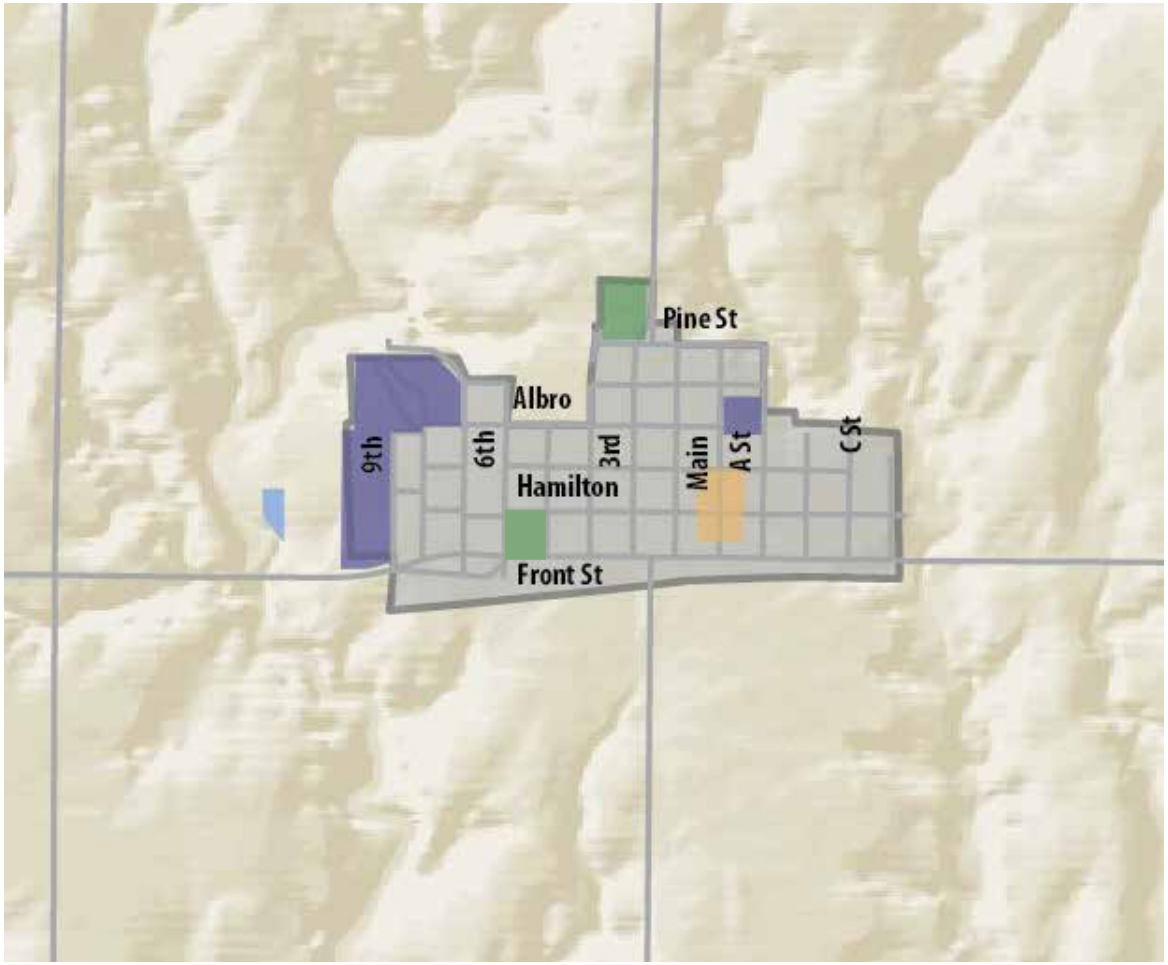
Claflin is the smallest of the four Barton County cities, and consequently has the smallest area and number of destinations. Most distances between points in the city are within easy walking distance. Schools and parks are major determinants. Key Claflin destinations include:

- Schools, which include Central Plains High School and Quivera Heights Elementary School. The high school campus functions as a multi-activity center for the community and entire region.

- Park and recreation facilities, including the Pine Street ballfield and the city park and pool between 4th and 5th Streets.

- Main Street, a two-block commercial district whose dominant destination is the iconic Miller Furniture Company, but also includes the public library and a food store.

Figure 5.1: Claflin Destinations



Schools/Education

Multi-Use Centers

Employment/Community Features

Parks and Recreation

Civic Facilities

Existing Multi-Use Trails (paved)

Existing Multi-Use Trails (unpaved)

CLAFLIN OPPORTUNITIES

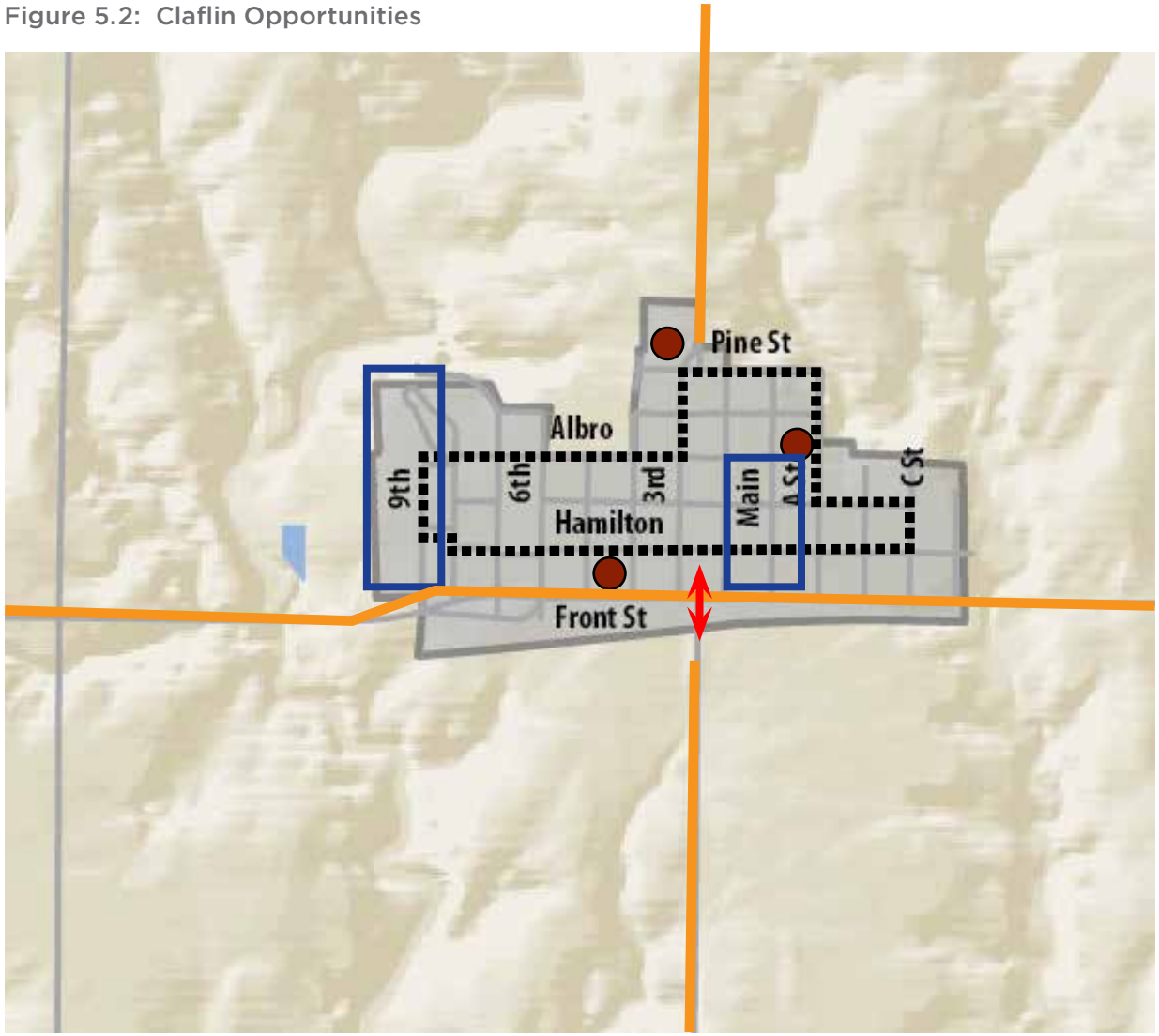
Like the rest of Barton County's towns, Claflin's street system is a relatively regular grid, interrupted slightly by the long north-south orientation of the 5th to 6th Street block. Unusually, several streets (Main, 3rd, Hamilton, and Williamson) form crossroads of especially wide avenues, presenting particular opportunities for active transportation.

Front Street (K-4 Highway) forms the southern edge of town and is the primary link to K-156 to the east and Hoisington and US 281 to the west. NE 130 Avenue intersects Front Street between 2nd and 3rd Street, and provides the most direct north-south route to K-156, Cheyenne Bottoms and the Wetlands Education Center, and ultimately to US 56 and Great Bend and Ellinwood. These routes are particularly useful to regional bicyclists.

Claflin's small size and street configuration help make the city particularly suitable to both pedestrian transportation and recreational walking. Residents report using a regular walking loop around the perimeter of town. This loop is almost exactly two miles long, an ideal course for recreational walking. This informal loop also serves most of Claflin's key destinations.

Workshop participants reported that the town's primary active access problem is the lack of pedestrian access along and across K-4. Other potential needs include filling sidewalk gaps to provide a continuous pedestrian path on the perimeter route and establishing bike routes for the short distances to major community destinations.

Figure 5.2: Claflin Opportunities



Regional destinations
Other local destinations
Regional links
Pedestrian crossing issues
Lack of sidewalks along

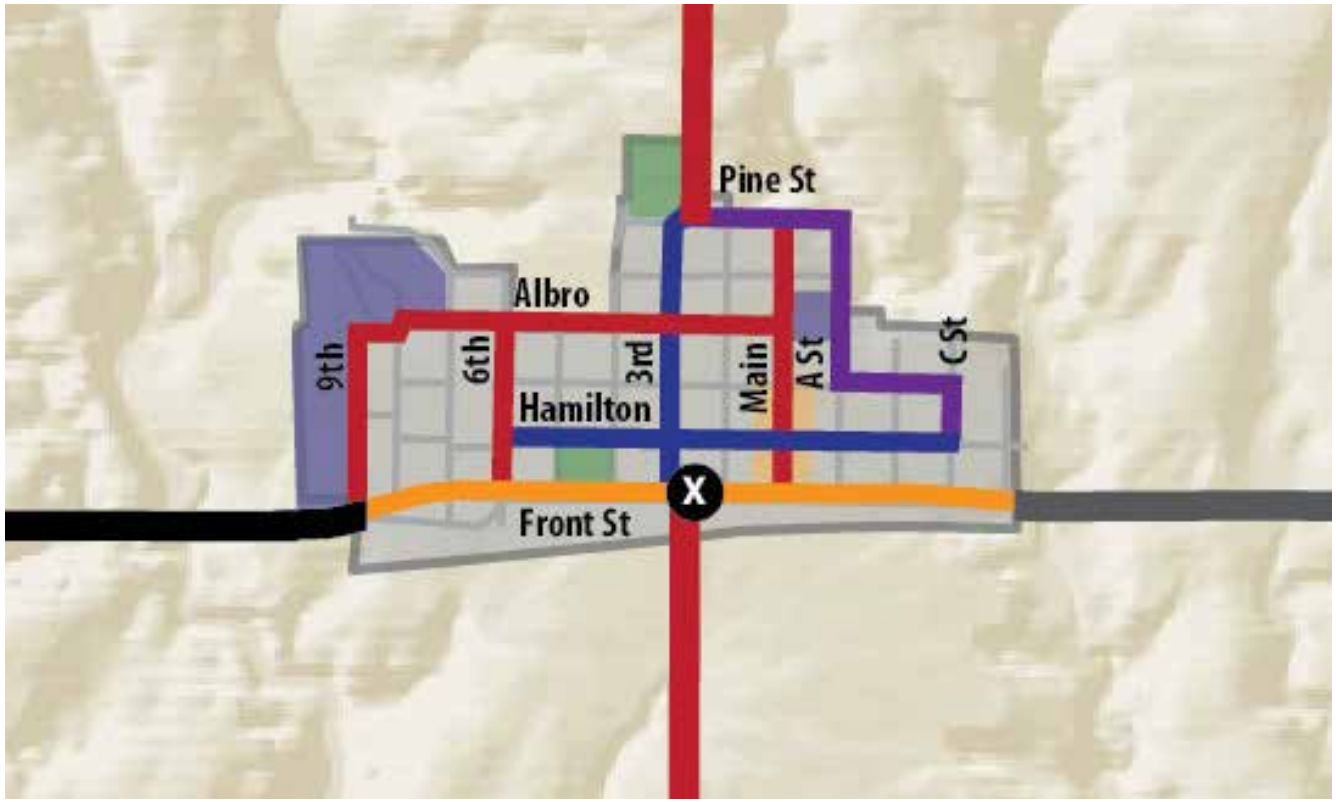
The Claflin Network Plan

Figure 6.3 illustrates the proposed Claflin active network with its various types of facilities. The individual facility types refer back to the descriptions in Chapter Two and include:

Shared roads/streets: These streets are typically low-traffic streets that make good connections across Claflin. Infrastructure investments are limited to identification and directional signage. With the exception of K-4 and major events, the town's streets are lightly traveled. The most important of these links is Albro Street, with the two schools at either end. Main is also a key segment that is wide enough for bike lanes. However, back-out diagonal parking in the town center makes dedicated bike lanes inadvisable. However, sharrows are appropriate on Main Street between K-4 and Pine Street.

Bike lanes: Hamilton and 3rd Street are important routes that are wide enough to accommodate bike lanes and parallel parking. Third Street connects the two

Figure 5.3: Active Barton Network: Claflin Focus



segments of NE 130 Avenue north and south of town, and continues that potential county route through Claflin. Bike lanes along east-west Hamilton will also help channel motor vehicles on that very wide street.

Pedestrian Street Corridors. These local streets, like all streets, are available to bicyclists but reflect routes used frequently by pedestrians. In Claflin, these routes trace the walking course around the edge of town.

Enhanced Intersections. The primary intersection of note here is a crossing of K-4 between 2nd and 3rd Street that aligns with NE 130 Avenue. The design of this intersection includes a bicycle crossing at 3rd Street marked by chevrons and connected to NE 130 Avenue by a short length of path on the south side of the highway.

Pedestrian Policy

As in the other cities, street corridors within Claflin within the system should have a continuous sidewalk along their length on at least one side of the street. They define a “major sidewalk system” that should be funded like major streets, using public funds for all or part of their cost. Areas within a 1/4 mile walk of the elementary and middle/high school campuses should also include continuous sidewalks on at least one side of each street.

Figure 5.4: 3rd and K-4 Bike Crossing Concept

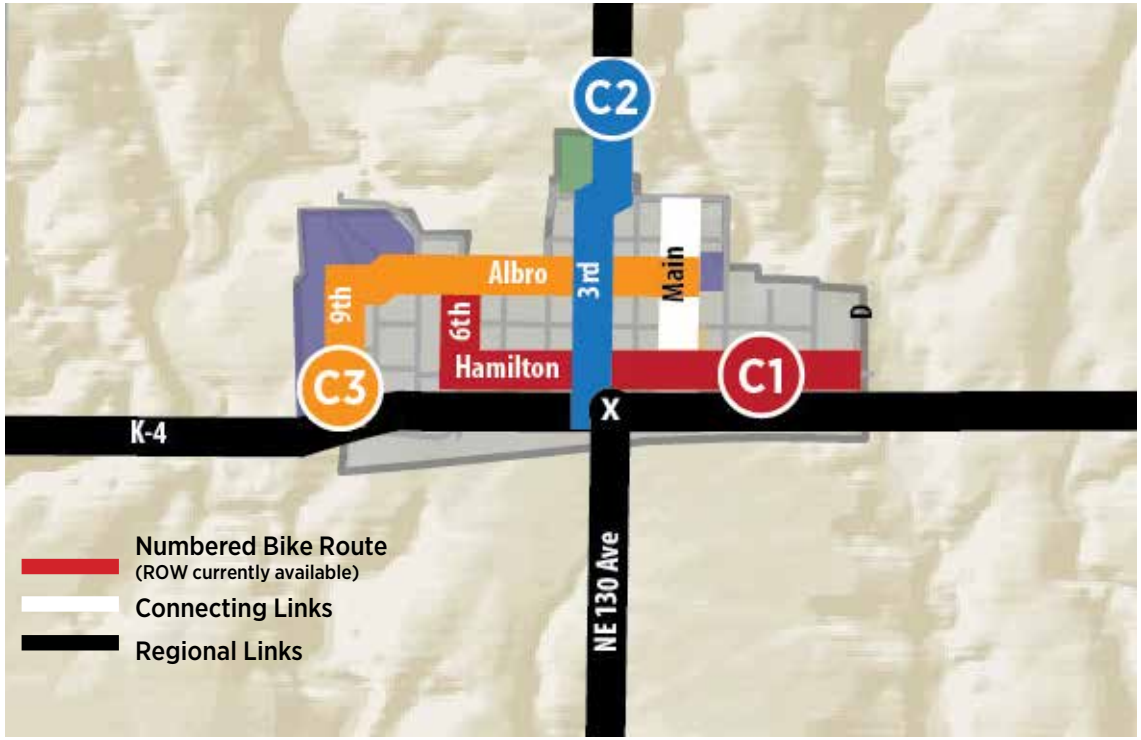
Bikeway System Design

Figure 5.5 defines a bikeway wayfinding system for Claflin. This system design includes:

An initial phase, attainable within a five year period. This phase proposes three routes that use existing streets. These routes include:

- Hamilton Bikeway (C1), using the width of Hamilton to create a good route from the east edge of town through the center and ultimately north to Albro via 6th Street.
- Albro Crosstown Route (C2), connecting the two school sites and high school sports fields.
- 3rd Street Crosstown Route (C3) continuing the regional NE 130 Avenue route through town.

Figure 5.5: Claflin System and Opinion of Probable Cost



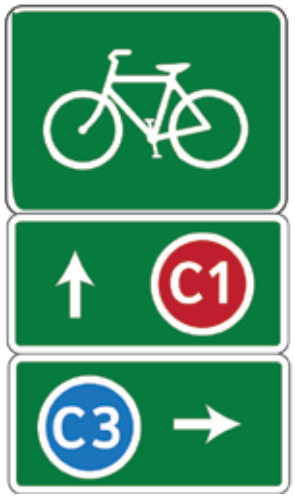
Route #	Segment	Length (Miles)	Bikeway Facility Treatment	Cost/Mile	Cost
C1	Hamilton, D to 6th	.65	Bike lanes in wide street	25,000	16,250
	6th, Hamilton to Albro	.15	Shared street with wayfinding signage	10,000	1,500
C2	3rd, K-4 to Plne	.36	Bike lanes in wide street	25,000	9,000
C3	Albro/9th, Main to K-4	.80	Shared street with wayfinding signage	10,000	8,000
	3rd and K-4 intersection	.04	Path links and shared route markings	15,000 LS	15,000
	Total	2.0			49,750

Wayfinding Sign Program

Wayfinding signs should be used minimally but effectively in the Claflin system. This concept is consistent with those of other communities in the county. Prototype signs proposed for the system are displayed on this page.

The D11-1c Bike Route sign is used at the start of each route and at key points along the way, usually after major street crossings or the crossing of two routes. It displays the standard bicycle symbol and either the endpoint of the route or a dominant destination along the way. After passing the destination, the destination line changes to the endpoint or another key destination later on the route.

The W11-15 sign would be used at unsignalized crossings of bike and pedestrian routes at major streets. The signs provide advance warning of the presence of pedestrians and bicyclists and is oriented to the major street.



The Bicycle Guide Sign uses the D11-1a sign in combination with route number designators and is an unobtrusive sign used for local guidance in combination with maps or apps. It is located at the crossing of two numbered routes or at intersections with key connecting links.

The more standard D1 series Bicycle Guide Sign may complement or replace the numbered route guide sign, and uses specific destinations. Showing distances will not be necessary in Claflin because most trips will be less than one mile.

Special street sign for bicycle routes. This technique may be particularly appropriate in Claflin and can replace some of the D11-1c signs along the route. Color is used to reflect the green of Central Plains High School.

Walking routes. A special sign could be employed to mark good pedestrian routes, most notably the Claflin Walking Loop around the town's perimeter.

Figure 6.6: Conceptual sign location plan

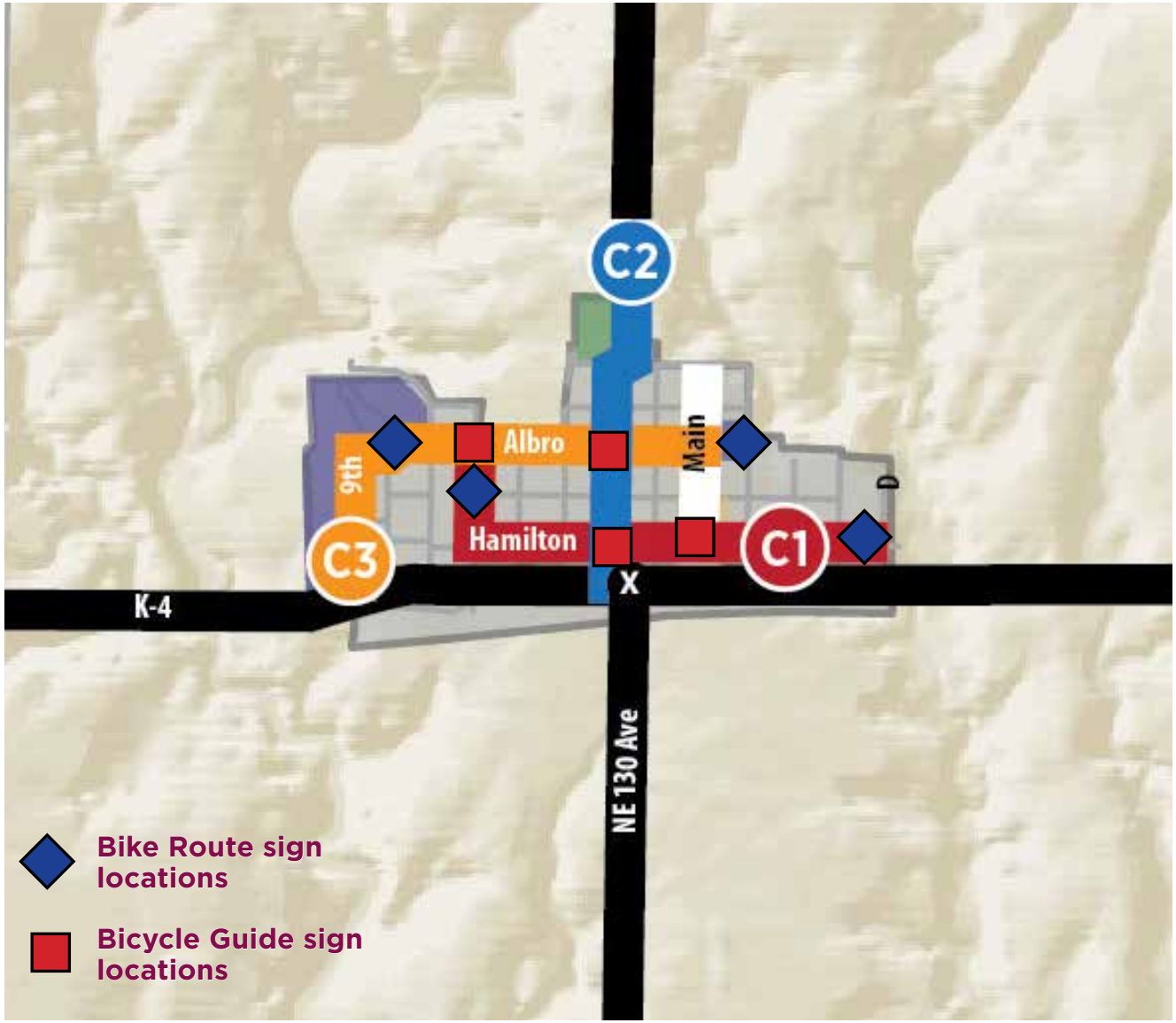
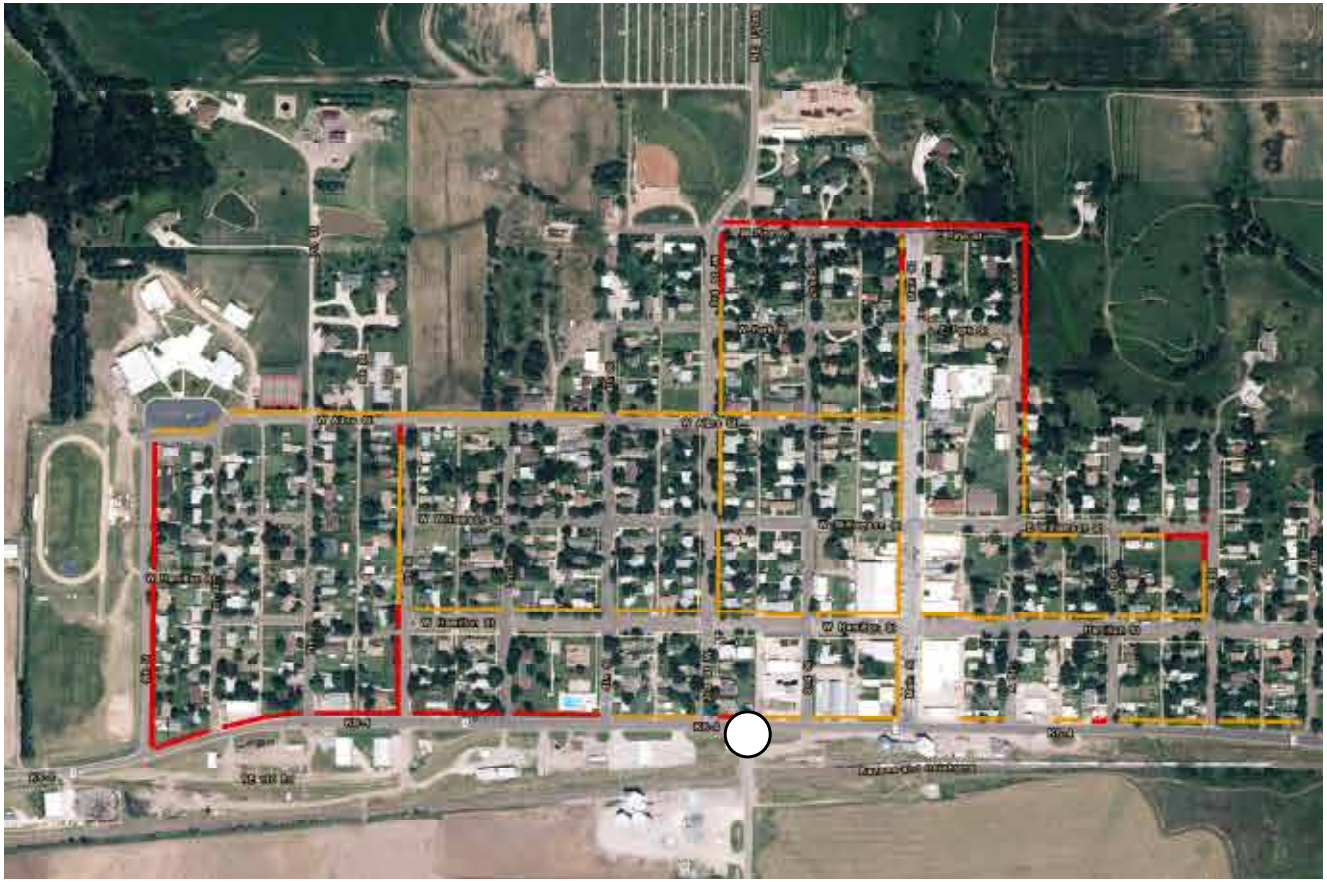


Figure 6.7: Pedestrian Network Needs



Sidewalks present in system

Sidewalk gaps

Enhanced crossings

Pedestrian Network

Figure 6.7 illustrates gaps in Claflin's proposed pedestrian network. As stated above, the pedestrian proposes continuous sidewalks on at least one side of the street for:

- Streets in the bicycle route system.
- "Complete street corridors" that do not necessarily have special bicycle accommodations.
- Streets within 1/4 mile walking distance of schools.

Sidewalk gaps in the overall proposed system have a total length of 5,903 feet. Assuming a sidewalk cost of about $5 per square foot, the cost of filling these gaps is estimated at $118,060.

CHAPTER 7

BARTON COUNTY

A BARTON COUNTY CONCEPT

Barton County, along with the entire Wetlands and Wildlife National Scenic Byway region, is ideal for both recreational and transportation bicycling. Some of the county's attractions and destinations, especially the Cheyenne Bottoms Wildlife Area which is a unique "Central Park" for the county, are also great walking and hiking environments. And fortunately very little is required in the way of new capital investment to take advantage of this opportunity for both enhancing the quality of life for residents and sharing the riches of our region to visitors. Barton County has built and maintains an enviable network of lightly traveled, paved roads that provide access to all bicyclists to every part of the county. Our primary task is threefold:

1) to make the system more readable to users through route identification and wayfinding

2) to make the county's roads safer by making motorists more aware of bicyclists and using bicycle-friendly maintenance practices, and

3) to complete short but strategic trail and pathway projects in the county that serve major destinations and attractions.

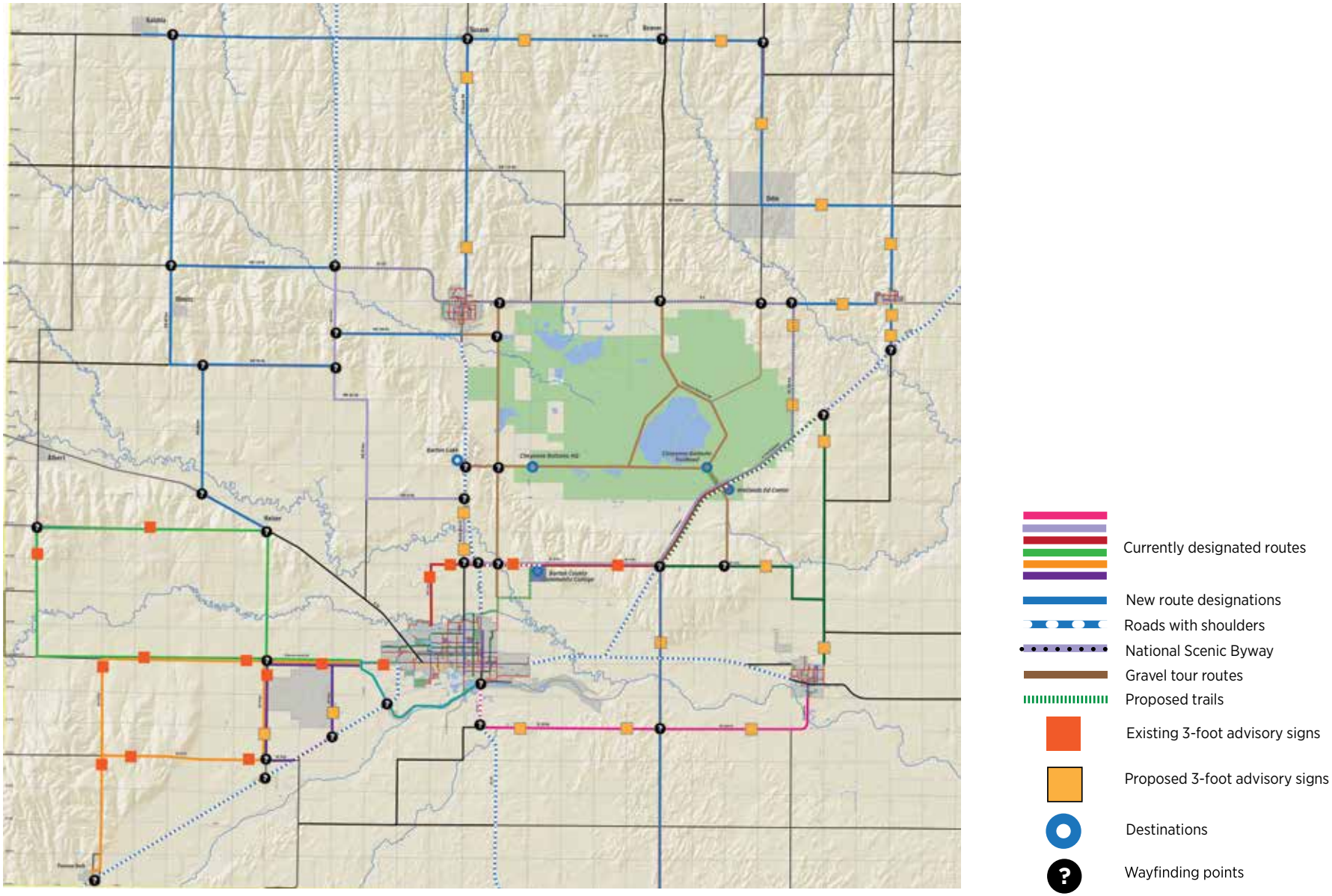
Barton County Destinations

The countywide system should serve a number of major destinations, many of which were identified through the planning process. These destinations include:

- **The cities and towns of Barton County.** Previous chapters have considered bicycle and pedestrian systems for each of the four primary communities in Barton County. But the system should also serve the county's smaller towns and villages, and can provide economic opportunities for them as well.

- **Cheyenne Bottoms.** This world-class wetlands and wildlife habitat is a virtual "central park" in

Figure 7.1: The Countywide Plan



the square defined by Great Bend, Hoisington, Claflin, and Ellinwood. It takes up about 40% of the area enclosed by those four cities. The Bottoms includes an extensive gravel road system and network of hiking trails.

- **Kansas Wetlands Education Center.** This unique facility, located on Kansas Highway 156 about nine miles from Great Bend and also near Claflin and Ellinwood, is operated by Fort Hays State University and is a leading center for wetlands interpretation and environmental education.

- **Barton County Community College.** BCCC is a regional education resource located on NE 30 Road about five miles from Downtown Great Bend. Travel from the city to BCCC was identified as a major priority during the planning process.

- **Barton Lake.** This mostly dry lake between Great Bend and Hoisington just off US 281, received frequent mention as a destination for its mountain biking trails..

Barton County Route Designation

The County and its communities have already taken significant steps toward defining and marketing highly desirable bicycle routes. These efforts, adopted as part of this plan, include:

- **The work of the Great Bend Convention and Visitors Bureau.** The CVB has defined six color coded out and back loops that radiate from Great Bend. Four of these routes, which range from 8 to 30 miles, start and end at the Great Bend Bike & Hike Path trailhead on West Barton County Road. The other two serve specific destinations: the "Pink Route" to Ellinwood and the "Red Route" to Barton County Community College and the Kansas Wetlands Education Center.

- **The Wetlands and Wildlife National Scenic Byway.** The byway itself enters Barton County on SE 60 Avenue and continues past the Wetlands Education Center, follows K-156 and NE 100 Avenue to K-4 west of Claflin, and continues along K-4 to Hoisington. In addition, the Great Bend CVB and Byway Committee has identified four bike loops within Barton County with distances between 25 and 43 miles. These routes are incorporated in the countywide plan illustrated here.

Some parts of the county, particularly the areas north of K-4, are not connected to these routes. In addition, some of the county's major highways have wide shoulders that provide good bicycle facilities even on busy roads. These include US 281, US 56, and K-156, all of which supplement the quieter routes covered by the ten designated cycling loops. Finally, "gravel grinding" (bicycling on unpaved roads) is a rapidly growing part of the bicycling market and Barton County in general and Cheyenne Bottoms in particular offer great gravel cycling opportunities.

To that end, the countywide plan proposes the following:

- Establishing the CVB's previously tested loops in this plan.

- Providing a signage system on the ground should make it easy and clear for regional residents and visitors alike to follow these routes easily and comfortably without referring to maps.

- Including several new categories of routes. The plan includes additional road segments that provide access to areas not served by the existing loops, gravel routes, the National Scenic Byway, shouldered highways, and several trail segments.

Barton County Wayfinding and Signage

While routes have been effectively designated and presented in print materials, watyfinding on the route is largely absent. Figures 7.1 through 7.5 show locations for wayfinding signs that provide directional and distance information to towns and key features. This system is generally consistent with the Manual of Uniform Traffic Control Devices and the family of graphics proposed for the municipal systems.

The County has also instituted signage that in some cases advises motorists of shared traffic (for example, on West Barton County Road) but largely focus on the recent three-foot passing ordinance statute. The countywide maps illustrate existing installations, most of which are on loops around Great Bend. New sites extend the reach of these important signs to Ellinwood, and communities in the north part of the county. They define some new riding opportunities in other parts of the county

Trail Projects

As mentioned earlier, the Barton County rural system requires relatively little in the way of major capital investment. Most capital items are focused on the urban bikeway and pedestrian systems. However, a few short trail segments can be extremely useful. These include:

- A trail connection from Great Bend to Barton County Community College.

- An off-road route between Great Bend and the Bike & Hike Path trailhead, generally running from 10th and Patton to the trailhead west of town. This path would link to on-street routes into the city center.

- A short multi-use path connecting the Wetlands Education Center with the Cheyenne Bottoms Trailhead about one mile away.

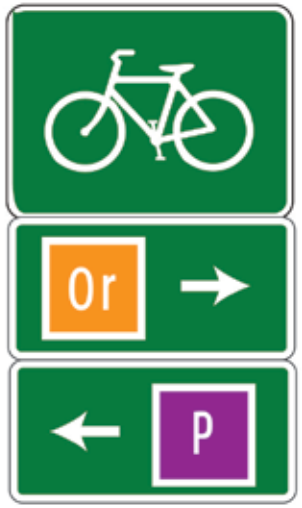
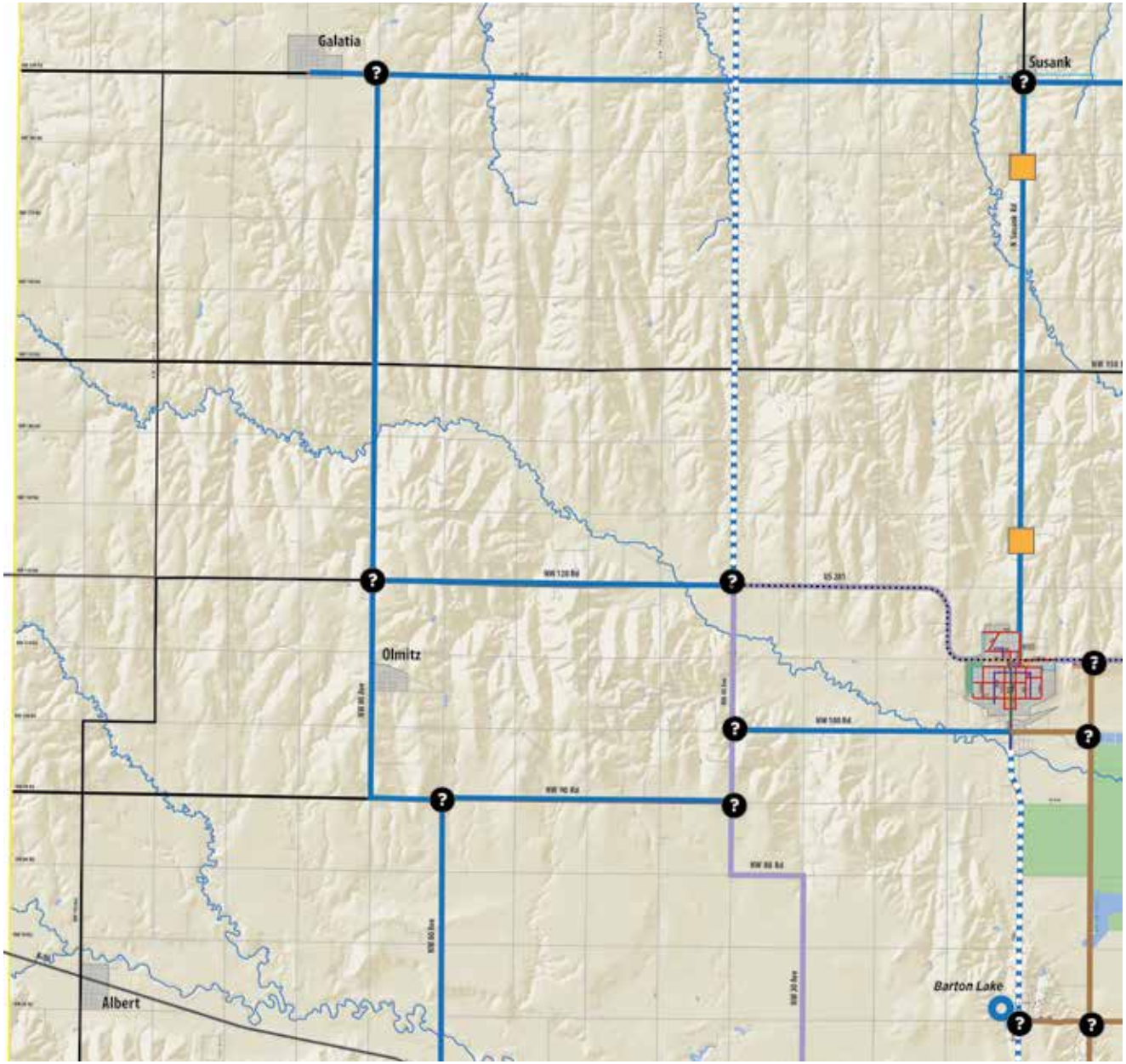


Figure 7.2: The Northwest Quadrant



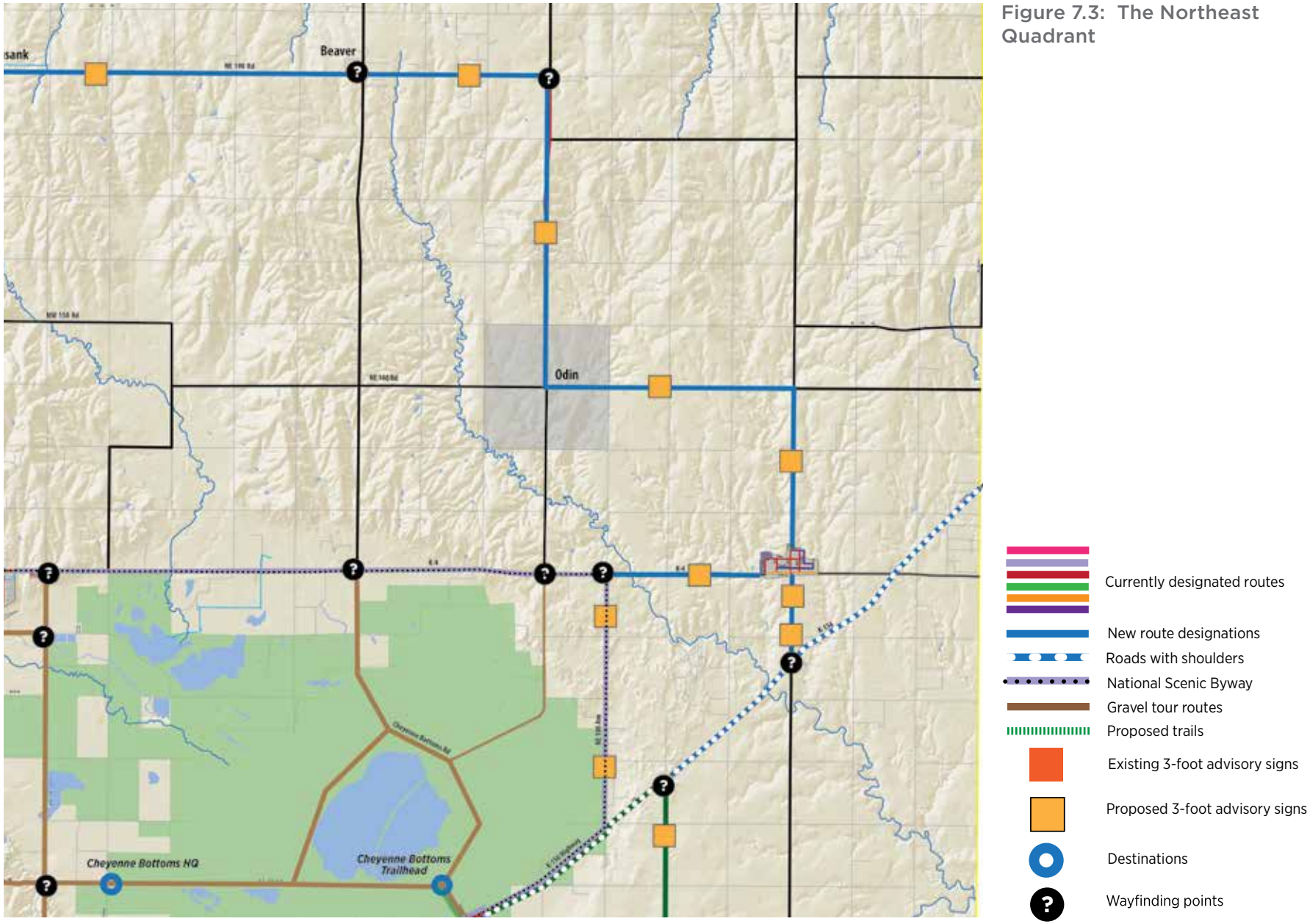
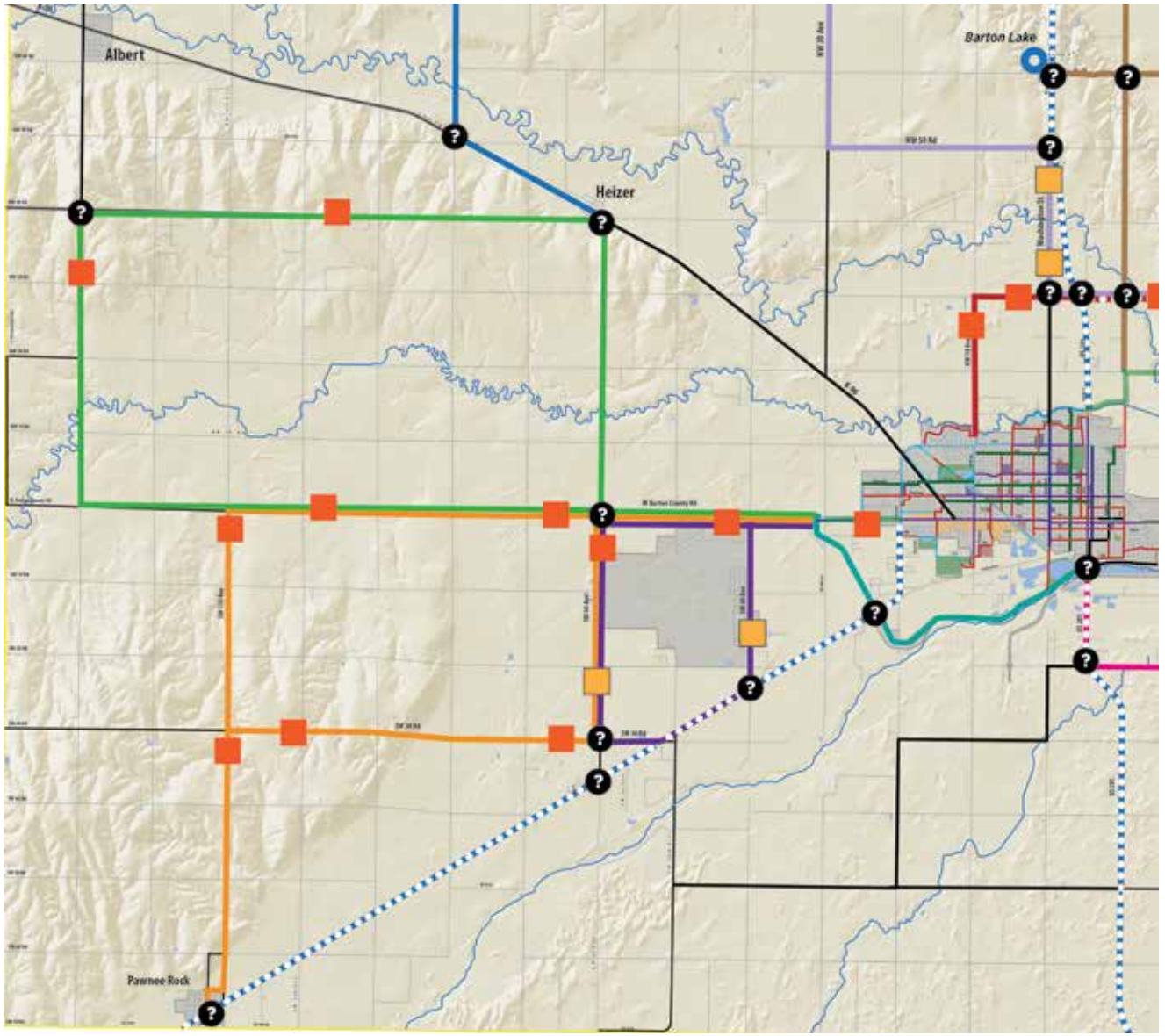


Figure 7.3: The Northeast Quadrant

Figure 7.4: The Southwest Quadrant



Currently designated routes
New route designations
Roads with shoulders
National Scenic Byway
Gravel tour routes
Proposed trails
Existing 3-foot advisory signs
Proposed 3-foot advisory signs
Destinations
Wayfinding points

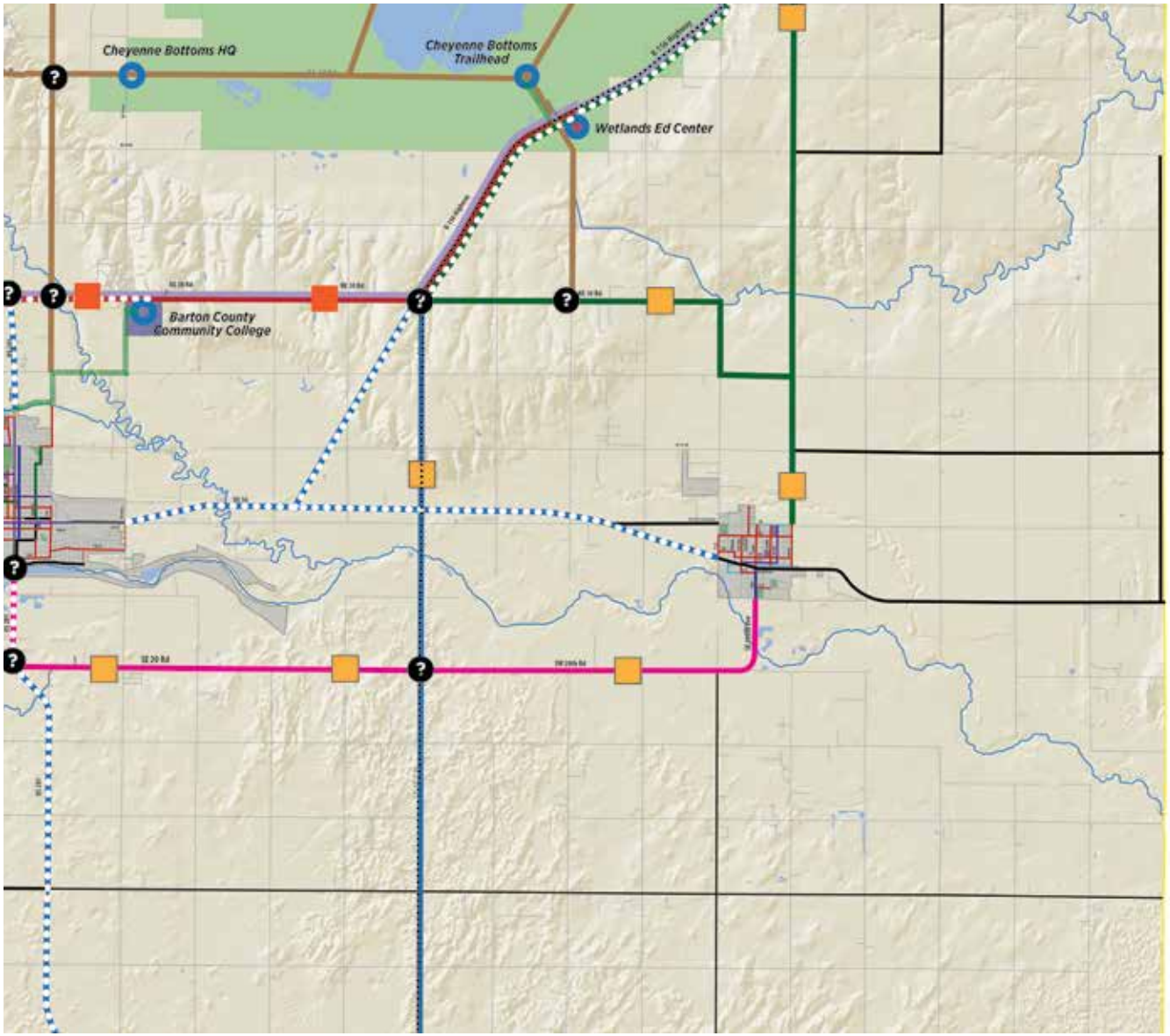


Figure 7.5: The Southeast Quadrant


Mon - Sat 8:00 - 5:00
Sunday 1:00 - 5:00
TREK

CHAPTER 8

SUPPORT SYSTEMS

INFRASTRUCTURE BY ITSELF DOES NOT CREATE AN EXCELLENT BICYCLE TRANSPORTATION PROGRAM. TO GUIDE COMMUNITIES, THE LEAGUE OF AMERICAN BICYCLISTS THROUGH ITS BICYCLE FRIENDLY COMMUNITIES (BFC) PROGRAM, ESTABLISHES FIVE COMPONENTS OF PROGRAM DESIGN THAT ARE USED TO DETERMINE WHETHER A CITY OR COUNTY SHOULD BE AWARDED BFC STATUS – THE 5 E'S OF ENGINEERING, EDUCATION, ENCOURAGEMENT, ENFORCEMENT, AND EVALUATION. BARTON COUNTY HAS THE POTENTIAL TO BECOME ONE OF AMERICA'S FEW BICYCLE FRIENDLY COUNTIES!

In more detail, these five areas are:

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:

According to the LAB, 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 is distributed 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.

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

The previous chapters of this plan address 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 Hays 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.

Education

- Increase the number of league certified instructors (LCI's) in Barton County. The League of American bicyclists BikeEd program is recognized a 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 - local presence of 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 decertification testing. In addition, a significant unit on bicycle, pedestrian, and motorcycle laws and behaviors should be included in defensive driving classes for drives 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 area 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 bicy-

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

cling, 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 ad 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 motors 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 online guide to practice and law, developed by the advocacy organization Transportation Alternatives, and a brief city DOT publication on safe riding are excellent examples. Chicago has published a safety booklet specifically targeted toward young cyclists. Barton County can develop similar guides, which also successfully avoid portraying bicycling as a hazardous activity.

Encouragement

- Expand participation in bicycle transportation through programs that engage corporations in competitions and fun, such as corporate commuter challenges. These programs track participation by numb 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 case 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. 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. Hays has scheduled similar events in the past to demonstrate the possibilities of bicycle trans-

portation. Cyclovia programs that close a major street or streets in a part of the city have become very popular around the country as a community festival.

- 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 to provide safety education and market the many positive aspects of bicycling in the city.

- Encourage county businesses and employers 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. Great Bend has already raised funds for purchase of bike parking facilities and is in the process of defining locations for them. Good candidates include park destinations that attract bicyclists (water parks, ballfields), the public library, schools, downtown districts, convenience stores on significant trails and bike routes, retail centers, city halls and county courthouses, visitors centers, and featured community attractions.

- Standardizing on 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. Bike parking on private property may be funded with the assistance of special events. For example,

Bicycle Parking. Inverted U's at the University of Nebraska at Omaha, enhanced with the school's mascot.

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. This is an important part of the Active Barton Plan and has been discussed in detail earlier in this document.

Enforcement

- Involve a Police Department or Sheriff's Office 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.

At the state level, Kansas has made two major statutory steps to become more friendly to bicyclists: the 3-foot separation requirement for motorists passing bicycles, and the Dead Red law, permitting bicyclists and motorcyclists to go through red signals that do not detect their presence. Barton County can take pride in its program to post signs advising motorists of the 3-foot legislation.

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 two 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 Barton County.