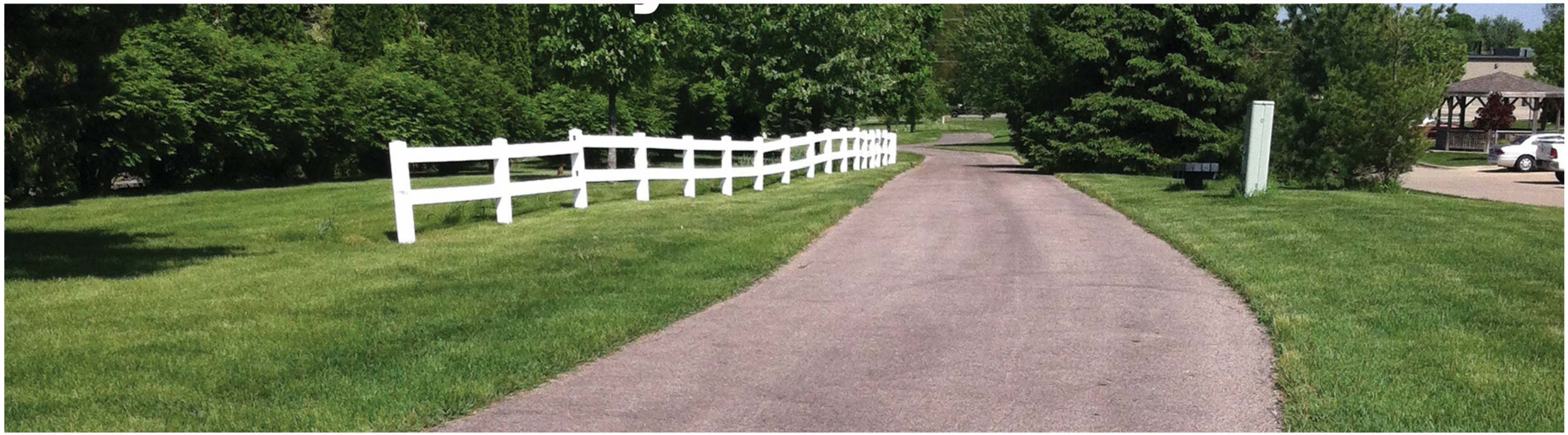
Knoxville Bicycle & Trail



MASTER PLAN

KNOXVILLE TRAILS

City of KNOXVILLE Iowa

SNYDER & ASSOCIATES
Engineers and Planners

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Adopted November 2, 2015

Introduction

CHAPTER 1

Purpose of the Plan
The Five E's of Bicycling
Plan Goals
Planning Process

Purpose Of The Plan

Communities that support bicycling and walking as:

- Safe, viable modes of transportation;
- Easy, close-to-home options for exercise; and
- Fun, enjoyable opportunities for recreation

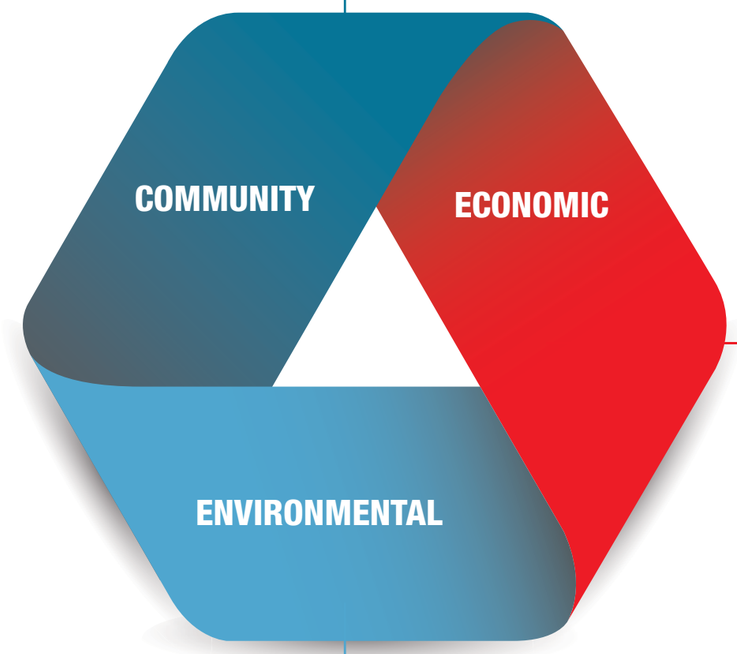
are also supporting happiness, health, and high quality of life for their residents. The various benefits for individuals and communities can be grouped into three categories of environmental, economic, and community benefits.

On-street bicycle and pedestrian facilities enable people to bike or walk to meet their daily transportation needs from home to work, school, shopping, and entertainment. Biking and walking offer low-cost, non-polluting, sustainable and healthy forms of transportation. Individual benefits include improved health, reduced stress, lower transportation costs, and increased social interaction. These facilities provide transportation options which create an equitable community in which all individuals can meet their daily transportation needs, regardless of their ability or desire to own or drive a car, ride a bicycle, or walk.

The community benefits from improved air quality and reduced vehicular emissions, reduced traffic congestion and reduced health care costs due to a healthier population. Individuals become better connected to the community and to each other, which strengthens community cohesion and can deter crime. Local businesses benefit through tourism and related spending and happier, healthier employees.

The Knoxville Bicycle and Trail Master Plan is intended to guide and influence policies, programs and development standards to make biking and walking within the City of Knoxville safe, efficient, comfortable and convenient for all residents and visitors. The plan provides the tools and mapping required to establish a comprehensive community-wide trail and on-street bicycle and pedestrian system. The ultimate goal of this effort is to make biking and walking a viable transportation and recreation option for all residents and visitors to the City of Knoxville.

The plan is a 20-year vision for a fully-developed bicycle system throughout the city and connecting to local and regional destinations. The recommendations herein serve as a policy guide for consideration of future land use and development proposals as well as Capital Improvement Plan expenditures. Implementation of individual projects or facilities in this plan may be subject to City Council and any board or commission that they may refer it to, and/or appropriate department level approval. Minor modifications to this plan may be made without a formal amendment to this plan. For example, if the map included herein calls for shared lane markings, and upon engineering design or review it becomes apparent that bike lanes are more appropriate, then such modification may be made upon City staff review and recommendation. Modifications to the plan must continue to promote the overall goal to integrate bicycling as a viable mode of the transportation system.



Community
Facilitate healthy lifestyles
Reduce stress
Promote equitable mobility
Increase social interaction
Improve quality of life

Economic
Reduce transportation costs
Attract tourism and related spending
Attract and retain businesses and residents
Increase property values

Environmental
Promote personal connection to your city & your environment
Reduce greenhouse gas emissions
Reduce use of fossil fuels
Reduce traffic congestion

The City of Knoxville has approved a reverse referendum which allows them to bond for $700,000 toward trail development. These funds, along with $200,000 already budgeted toward trails, can be used as local matching dollars when applying for grant funding. A Bicycle and Trail Master Plan is a critical component for successful acquisition of funding. State and federal grants typically allocate points to projects that are developed with substantial public involvement and are part of, or support the goals of, local, regional, and/or statewide plans. This Master Plan will guide the use of bond funds and any grant funds received.

The Five E's of Bicycling

This plan addresses the Five E's of Bicycling: Engineering, Education, Encouragement, Enforcement, and Evaluation.

While the City may take the lead on all five of the "E's," there are ample opportunities for others to spearhead certain elements. For example, volunteers and non-profit organizations may be able to lead Education and Encouragement efforts. Evaluation efforts may be a combination of city staff and a citizen user group. The City needs to take the lead on most Engineering efforts since they are likely to be associated with the City's capital improvements. Enforcement is led by the police department, but bicyclists must do their part by learning and following the bicycling laws and regulations.

Evaluation
Assessing the effectiveness of the bicycling network, programs, and policies and planning for changes and improvements. This includes a status report on the goals and objectives set forth in this Bicycle and Trail Master Plan.

Enforcement
Ensuring that roads are safe for all users through laws and regulations. Bicyclists should be treated fairly and equitably to ensure public safety.

Engineering
Designing and constructing safe and practical infrastructure which allows people of all skill levels the opportunity to bike for transportation and recreation. This includes connectivity of the bicycling network and secure and functional bicycle parking.

Education
Providing educational opportunities for people to learn and improve bicycling skills and to understand their rights and responsibilities on the road. Education is also important for motorists to learn to properly share road space with bicyclists.

Encouragement
Creating a community which celebrates bicycling for recreation, transportation, and fitness purposes. This includes special events, incentives, and anything that makes bicycling fun and easy.

Plan Goals

The following four goals were developed based upon input received through a citizen survey, meetings involving the Internal Review Team and the Bicycle Advisory Committee, and through an inventory of existing conditions.

Goal 1

Provide a complete bicycle & pedestrian system with connections to various destinations

- Implement the most appropriate type of bicycle and/or pedestrian facility (e.g. trail, bike lane, paved shoulders, shared lane, quiet street, etc.) in each location
- Accommodate multiple types of users including people of all ages and abilities who are walking, biking, or running on trails and on streets and sidewalks
- Provide user-friendly access to destinations throughout the community and region (e.g. parks, recreational facilities, trails, ballparks, campgrounds, raceway, schools, business districts, major employers, nearby communities)
- Provide bicyclist and pedestrian support facilities (e.g. shade, benches, bike parking, bike fix-it stations, showers, drinking water, maps) along routes and at end point destinations as appropriate
- Develop a trail system that offers scenic views
- Adopt a complete street policy that considers all users in street construction and renovation projects

Goal 2

Ensure biking and walking routes are safe for all users

- Provide safe trails and on-street facilities through excellent engineering design, signage, lighting, location, and surface materials
- Determine maintenance policies and address safety issues promptly (e.g. litter removal, vegetation management, snow removal, closure policies, graffiti removal, sign maintenance, asphalt/concrete maintenance)
- Coordinate with other agencies (e.g. schools, county, CIRTPA, etc.) to fund and develop educational programs on bicycling safety and trail etiquette

Goal 3

Encourage use of the bicycle and pedestrian system for fitness, recreational, transportation, and tourism purposes

- Provide a visitor-friendly trail system through wayfinding signage and trail maps
- Coordinate with Google Maps to ensure that trail and on-street bicycle facilities are depicted accurately
- Coordinate with the Iowa Natural Heritage Foundation to provide updates to the Iowa by Trail mobile application to ensure that the Knoxville trail system is depicted accurately
- Create programs and special events to encourage recreation and fitness activities on the trail system
- Promote bicycling and walking in economic development, tourism and job creation programs

Goal 4

Implement, evaluate & update the Knoxville Bicycle and Trails Master Plan

- Complete the proposed Phase I projects identified by the Knoxville Bicycle and Trails Master Plan
- Evaluate and update the Bicycle and Trails Master Plan periodically to reflect new policies and update priority projects
- Actively seek sources of funding for bicycle facilities, safety programs, and educational programs
- Prepare and make available to the public a current and five-year capital improvement program for trails and bicycle and pedestrian facilities

Planning Process

Ample public participation is key to developing a successful bicycle and trail master plan. The City solicited public input regarding existing bicycling and pedestrian conditions, obstacles to biking and walking, potential trail destinations, bike-friendly streets, desired intersection treatments and the types of facilities or programs needed to improve bike and pedestrian travel in Knoxville. The planning process included the following committees and public outreach activities:

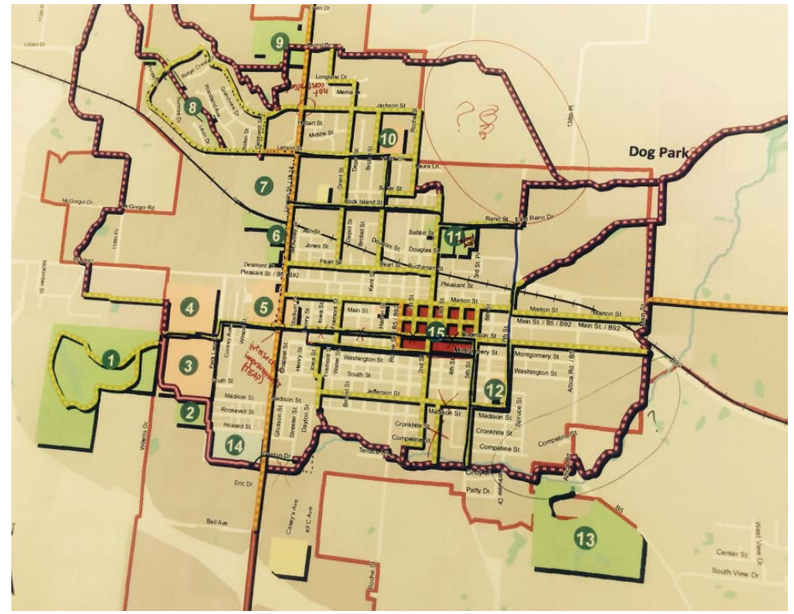
Internal Review Team (IRT)

This committee is comprised of City staff and other technical experts such as public works, planning, police, fire and parks and recreation. This committee ensures that all public services will continue to be fulfilled and that state and regional plans and regulations are adhered to during the development of new trails and bikeways. The IRT was involved in all key decisions including goals, routes, identifying preferred facility types, and prioritizing implementation efforts. The committee met a total of three times during the planning process. Following is the list of IRT committee members:

- Harold Stewart - City Manager (through August 15)
- Aaron Adams - Assistant City Manager (Interim City Manager - September 2015)
- Patrick Murphy - Sewer Superintendent
- Dennis Webb - Streets and Parks Supervisor
- Dan Lasoda - Police Chief
- Jim Mitchell - Fire Chief
- Brandon Nemmers - Recreation Center Director
- Lauren Dietz - Management Intern

Bicycle/Trail Advisory Committee (BAC)

This committee is made up of advocates and representatives from user groups, including people with varying degrees of bicycling and trail experience. City officials recommended individuals who would be key stakeholders in the planning process, whom are existing users and have shown interest in future trails and bicycle facilities planning. The recommended committee members were contacted by City staff and asked to attend the meetings. Additionally, the committee was open to the public and all who had an interest in a trail system. The committee helps to ensure that the resulting plan will meet the needs, interests, and concerns of the bicycling and trail community. The committee met a total of three times during the planning process.



Meetings

Meeting #1 - May 12, 2015

The meeting was mentioned at least once in KNIA/KRLS both on air and online. The meeting notice was posted in the "Knoxville Today" on May 6, 2015 and posted multiple times on the City's Facebook page. Approximately 30 residents attended the BAC meeting. The agenda for the first IRT and BAC meetings included the following:

- Presentation on Bike Planning and Facility Types – A copy of the presentation is included in Appendix A.
- Review Branding Options – IRT members voted on their favorite logo options.
- Route Mapping and Identify Concerns - The committee had a round-table discussion about the existing trail and potential routes. A large aerial map was provided with existing and proposed trails. Committee members were asked to mark where they would most like to see trails or bike facilities in town and to identify concerns and constraint areas.

Minutes of this meeting are included as Appendix B.

Meeting #2 - July 27, 2015

The meeting was mentioned at least once in KNIA/KRLS both on air and online. It was also posted multiple times on the City's Facebook page. An email was sent to everyone who had provided an email address at the first meeting or submitted an email address via the online survey. Approximately 30 residents attended the BAC meeting. The agenda for the second IRT and BAC meetings included the following:

- Presentation on Citizen Survey Results - A copy of the presentation is included in Appendix C.
- Presentation/Review Draft Goals and Objectives
- Review Draft Routes and Facility Types - The committee was encouraged to give feedback on the first draft of proposed facility locations and types. Large aerial maps were provided and committee members were encouraged to mark up the maps with additional suggestions regarding trails and bike facilities. Additional concerns and constraint areas were identified based on the proposed facility routes. Committee members were also encouraged to prioritize projects.

Minutes of this meeting are included as Appendix D.

Meeting #3 – October 1, 2015

The meeting notice was posted multiple times on the City's Facebook page. An email was sent to everyone who had provided an email address at the first meeting or submitted an email address via the online survey. Approximately 10 residents attended the BAC meeting. The agenda for the second IRT and BAC meetings included the following:

Presentation including:

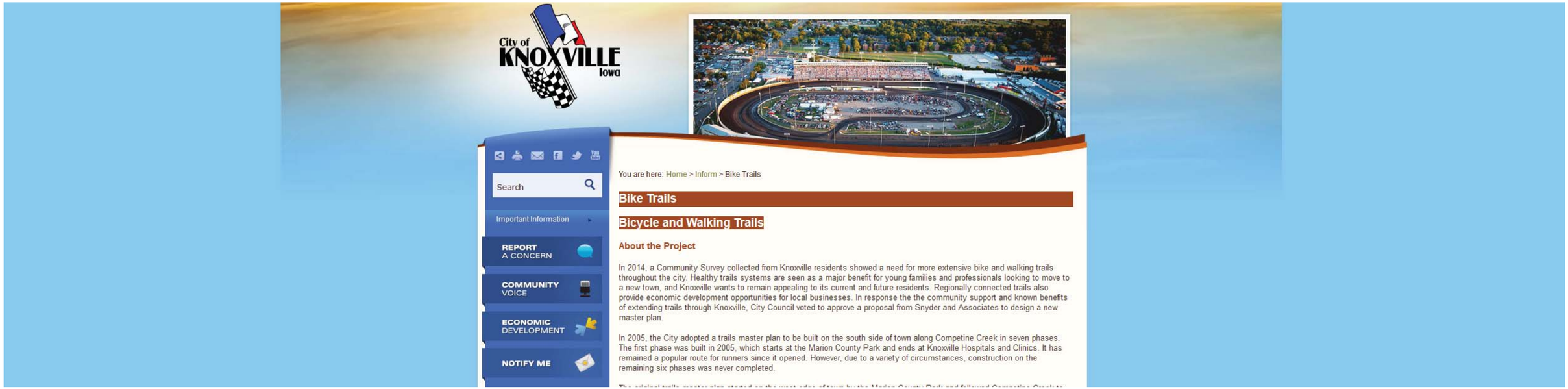
- Network Phasing
- Education and Encouragement
- Enforcement
- Evaluation
- Implementation
- Concept Plans - including the Downtown Shared Roadways, Attica Road Trail Crossing, Highway 14 Trail Crossing, and the 5th Street Quiet Street.

A copy of the presentation is included in Appendix E.

Group Discussion

The committees were encouraged to give feedback on the proposed bike and trail network, the phasing plan and the proposed concept plans. Large maps were provided and posted on tables and walls for viewing and marking.

Minutes of this meeting are included in Appendix F.



Bicycle and Trail Master Plan Community Survey

In mid-May 2015, a community survey was created to gather public input regarding existing and future bicycle and trail planning efforts. Questions were asked regarding why people do or do not bicycle, what/where are the barriers to bicycling, where the most desired facilities are, and what are the most population destinations. The survey was distributed through various outlets including existing email lists, the City's website, facebook page and through other marketing efforts. Hard copies of the survey were available at City Hall. The survey remained open through June 16, 2015 and received a total of 351 responses. A copy of the survey questions can be found in Appendix G and the results are in Appendix H. Email lists were also gathered through the survey participants and were used to inform the public of upcoming meetings and project status.

Ongoing Online

The City website was used to advertise the citizen survey and inform the public of the planning purpose, process, and opportunities for input.

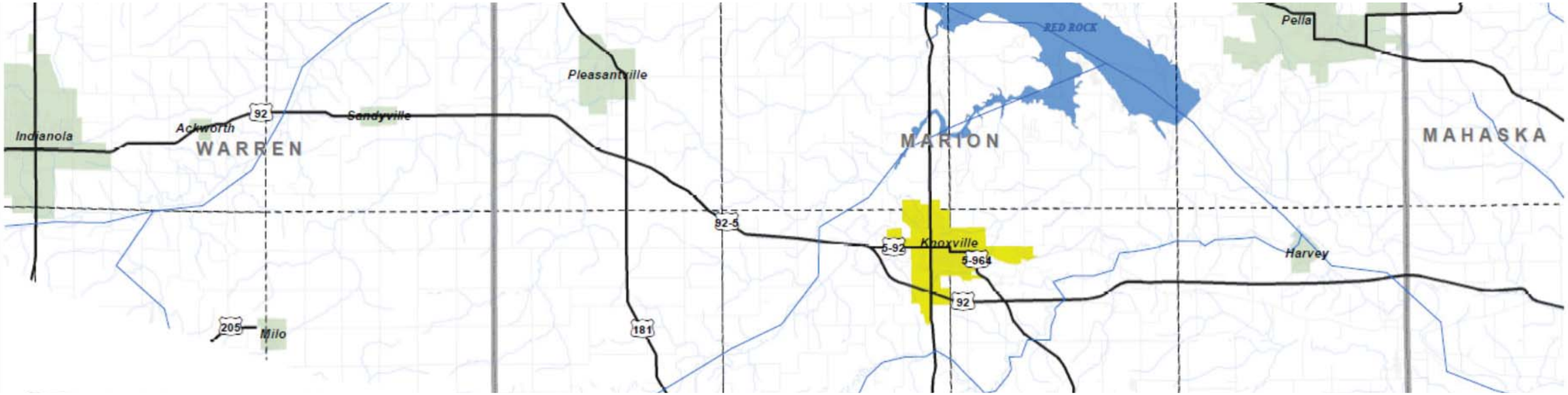
Public Hearing and Adoption

The Knoxville Planning and Zoning Commission reviewed and recommended approval of the draft Bicycle and Trail Master Plan at their regularly scheduled meeting on October 13, 2015. The City Council approved the Bicycle and Trail Master Plan at their regularly scheduled meeting on November 2, 2015.

CHAPTER 2

Existing Conditions

Physical Setting
Demographics
Existing Plans
Existing Trail and Bicycle Facilities
Knoxville City Ordinances Affecting Bicycling and Walking
Obstacles to Biking and Walking



Physical Setting

The City of Knoxville is the county seat of Marion County. It is home of the National Sprint Car Hall of Fame & Museum located next to the famous dirt track known as Knoxville Raceway. Knoxville is approximately 25 miles southeast of Des Moines and five miles southwest of Lake Red Rock. Iowa Highway 14 bisects the community, running north and south, and has an Annual Average Daily Traffic (AADT) count ranging from 3,170 on the northern and southern city limits to 9,400 in the town center. Iowa Highway 92/IA Highway 5 intersects with the southern part of the City and has an AADT of 4,070 to 5,700. This highway provides efficient transportation to Indianola and the Des Moines metro.

Knoxville has the potential to become a great bicycle- and pedestrian-friendly city; its grid street pattern, manageable size, and the location of the downtown near the center of the city make it a great place to travel on foot or bicycle. There are two distinct retail areas of Knoxville: along Highway 14 and downtown. Highway 14 consists of automobile-oriented commercial retail with gas stations, convenience stores and big-box retailers. Downtown consists of smaller retailers such as banks, real estate brokers, restaurants, and personal services.

Demographics

The City has experienced relatively stable population totals since 2000 with a 2010 Census population of 7,313. The median age in Knoxville was 41.0 as of the 2013 American Community Survey five-year estimates. This is slightly older than Marion County and the State of Iowa as a whole. Family households account for 60.7 percent of all households in Knoxville with 30.5 percent of households having children less than 18 years of age. Both of these statistics are lower than Marion County and the State of Iowa. Younger and older populations tend to be more dependent upon walking and biking for transportation purposes. These alternative means of transportation can also provide affordable commuting throughout the community. Knoxville has a median income of $41,958, lower than Marion County and the State of Iowa.

In 2013, the City of Knoxville, in partnership with the Iowa Workforce Development, conducted the Discover Knoxville Laborshed Report. The report indicates an out-commute rate of 43.9 percent - approximately 1,729 people living in Knoxville who work in other communities. Most of those individuals are commuting to Des Moines or Pella. The 2013 American Community Survey states that 52.2 percent of individuals in the workforce who live in Knoxville also work in Knoxville. An estimated 2.2 percent of the Knoxville workforce commutes to work via walking while only 0.1 percent commutes via bicycling. The American Community Survey also states that 37.9 percent of workers have a less than 10 minute commute while 32.1 percent commute more than 30 minutes. Short vehicular trips (in particular those which are less than 5 miles) are easier to replace with biking and walking trips than longer trips. These commute mode statistics indicate potential for a large percentage of the work force to be afforded the option to replace some vehicular commute trips with biking or walking.

Knoxville Population Statistics

	Knoxville	Marion County	State of Iowa
Median Age	41	38.6	38.1
Total Households	3,169	12,723	1,221,576
Family Households	60.7%	69.7%	64.7%
Households with children under 18	30.5%	32.8%	30.6%
Median Income	$ 41,958	$ 54,723	$ 51,843

Knoxville Commute Statistics

Means of Transportation		
Mode of Travel	Estimate	Percent
Car, Truck or Van	3,035	92.2%
Drove Alone	2,722	82.7%
Carpooled	312	9.5%
Walked	72	2.2%
Bicycle	3	0.1%
Worked at Home	102	3.1%
Other	82	2.5%
Travel Time to Work		
Time	Estimate	Percent
Less than 10 minutes	1,247	37.9%
10-14 minutes	375	11.4%
15-19 minutes	250	7.6%
20-30 minutes	362	11.0%
30 or more minutes	1,056	32.1%

Existing Plans

Current local and regional planning efforts were used in consideration for recommendations of this plan.

Knoxville Comprehensive Plan - 1999

One of the basic principles of this plan is the concept of a Green Network. The plan states that the Knoxville park system should be a network of parks, connected by continuous green corridors defined by trails, greenways, boulevards, and civic streets. The components of the greenway system will include its existing and future parks and major linear open space links, such as trails and civic streets. Connecting neighborhoods and activity centers together through the Competine Creek Greenway and other designated shared roadways and trails were recommended in the plan. As of the summer of 2015, the Comprehensive Plan is under review by the Planning and Zoning Commission for updates and revisions.

The Knoxville Strategic Plan - 2008

Bicycle and pedestrian facility development supports the findings outlined in The Knoxville Strategic Plan, which included a resident survey. Approximately 8.25 percent of respondents stated they preferred walking as their mode of transportation while 3 percent preferred biking. When asked what residents like to do for rest and relaxation, 60.75 percent stated they like to bike, walk or jog. When asked what improvements or additions to the community they would like to see, many respondents commented on recreation trails and connections to nearby communities and amenities. With the support and desire for additional bicycle and pedestrian facilities, the plan recommends a “complete street makeover.” Within this plan, it is recommended to increase the number of bike lanes and racks along the downtown square district. An additional recommendation was made to develop a Parks and Trails Master Plan that incorporates green/complete streets, open space and greenway designation and local and regional trail linkages.

City of Knoxville Community Survey - 2014

Knoxville’s 2014 Community Survey results showed that increasing walking and biking trails was a first or second choice priority by 49 percent of the respondents.

Regional Planning Affiliation 11

Central Iowa Regional Transportation Planning Alliance (RPA11 – CIRTPA): The CIRTPA Transportation Policy Board and Transportation Technical Committee consists of regional county and municipal stakeholders, including Knoxville, who work in developing long range transportation plans, corridor plans and transportation improvement plans. The key planning goal for the committee consists of promoting an integrated intermodal transportation system that facilitates the safe, efficient and economic movement of people and goods within the planning area and throughout the state. This regional support is further indication of the positive economic and quality of life results that can be seen by increasing bicycle and pedestrian facilities.

2014-2018 Iowa Transportation Improvement Program (TIP)

The statewide TIP program provides funds to establish transportation improvements including recreational trails. Though funding is not currently dedicated to Knoxville in this plan, future funds may be distributed to the City if a proposed trail plan is 1) part of a local, area-wide, regional or statewide plan; 2) the route is designed to enjoy scenic views or historical interest; and 3) the project includes at least 25% matching funds from other sources.

Master Concept Plans for Central Iowa Trails - 2015-2016

In 2015, Iowa Heartland Resource Conservation and Development, a non-profit organization focused on enhancing rural areas through conservation and sustainable development, began developing Master Concept Plans for Central Iowa Trails with a goal of linking all of Central Iowa Trails. This regional trail planning process, which includes Jasper, Marion, Warren, and Madison Counties, envisions trail connections to cities, but does not include trail or bicycle facility planning within those incorporated areas. As trails are planned and developed within the county and surrounding region, a plan for connections into and throughout Knoxville become more important.

Existing Trails & Bicycle Facilities

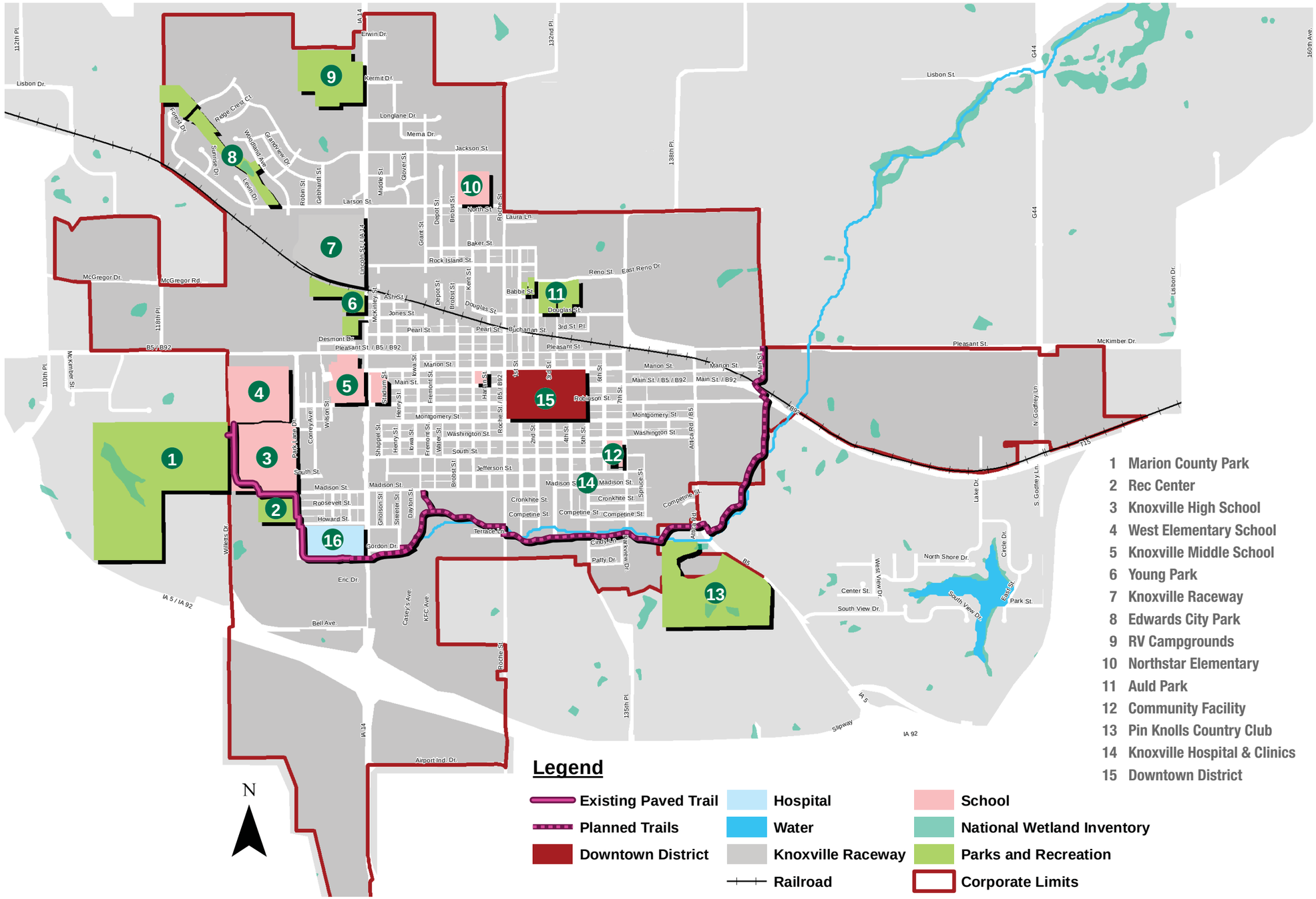
In 2005, the City of Knoxville adopted a plan for a paved recreational trail to be built on the south side of town along Competine Creek. The first of seven phases was built in 2005; however, due to a variety of circumstances, construction on the remaining six phases was never completed. The existing Competine Trail consists of 0.89 miles of paved off-street trail. The 12-foot-wide HMA trail begins along Willetts Drive near the Marion County Park entrance and heads south and east past the Knoxville Recreation Center and ends at Knoxville Hospitals and Clinics near Highway 14.

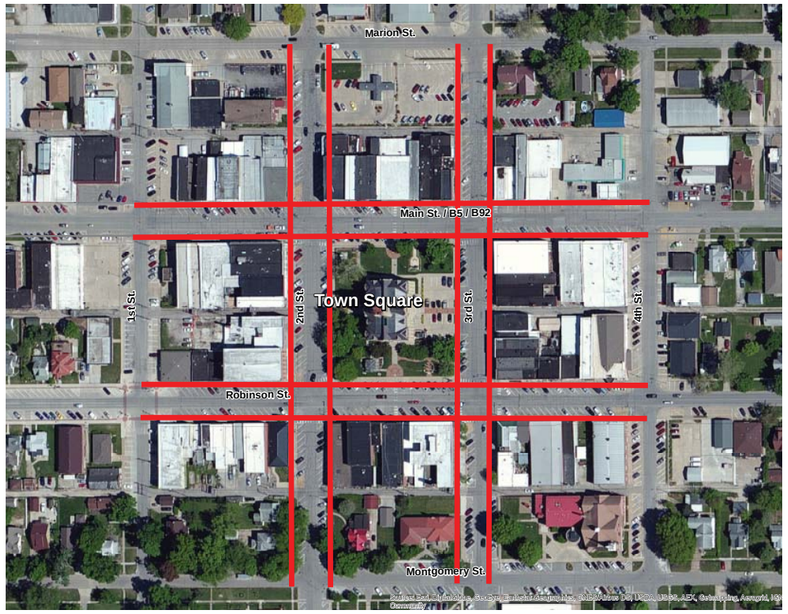
Currently, Knoxville does not have any existing on-street bicycle routes or wide sidewalks.

The existing facilities map depicts streets, highways, rivers, creeks, lakes and ponds, parks and recreation facilities, schools, hospitals, public land, businesses, special attractions, existing trails and the planned future Competine Creek Trail.

Much of the planned Competine Creek Trail is proposed to be located on city-owned land, existing trail easements, or existing sewer easements. The sewer easement language typically states that the easement conveys to the City "the perpetual right to enter and construct, erect, examine, repair and maintain a sanitary sewer, and appurtenances thereto…." This language does not specifically grant the right to build a trail on the sewer easement; this would have to be established through a modification of the existing or the acquisition of an additional easement. Similarly, the right to build a trail on any private property that does not already have a trail easement would either need to be acquired through purchase of the property or an easement.

KNOXVILLE BIKE AND TRAIL MASTER PLAN: EXISTING CONDITIONS





Knoxville City Ordinances Affecting Bicycling and Walking

Bicycle Ordinance

The city ordinance states that bicyclists have the rights and responsibilities of motor vehicles when traveling on the roadways in the City. This rule legitimizes bicyclists as modes of transportation and is consistent with the State of Iowa Code. Knoxville also allows bicycling on sidewalks in most areas, with the provision that bicyclists shall yield to pedestrians, which supports both bicycling and walking in the community.

Knoxville has prohibited bicycle riding on sidewalks in the downtown area. This ordinance is intended to reduce conflict between bicyclists and pedestrians in the downtown area where pedestrian activity is high. Providing a facility for people biking that is separate from people walking would support both types of activities. In order to promote economic activity and tourism to downtown businesses, a safe bicycle route to and within the downtown area and bicycle parking are necessary.

Title 5 – Motor Vehicles and Traffic; Chapter 1— Traffic Code, Knoxville City Code

5-1-13 Bicycles

A. Traffic Code Applies To Persons Riding Bicycles:
Every person riding a bicycle upon a roadway shall be granted all of the rights and shall be subject to all of the duties applicable to the driver of a vehicle by the laws of this state declaring rules of the road applicable to vehicles or by traffic ordinances of this city applicable to the driver of a vehicle, except as to those provisions which by their nature can have no application. Whenever such person dismounts from a bicycle he shall be subject to all regulations applicable to pedestrians.

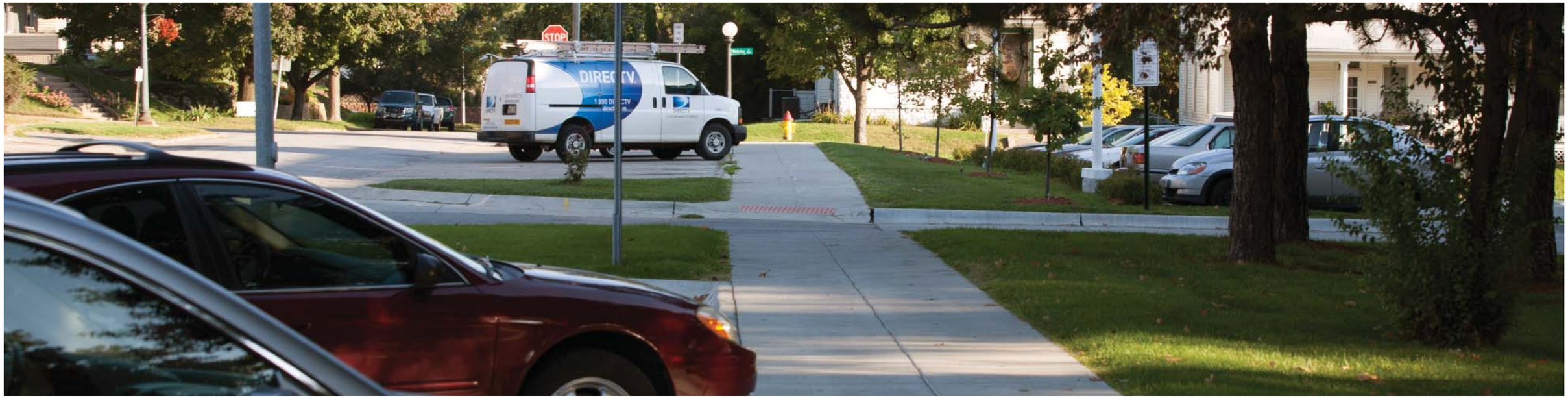
B. Riding On Sidewalks And Prohibited Areas:

1. Yield To Pedestrians: Whenever any person is riding a bicycle upon a sidewalk, such person shall yield the right of way to any pedestrian and shall give audible signal before overtaking and passing such pedestrian. When riding on sidewalks, bicycles shall be ridden in single file only.

2. Riding Prohibited On Certain Streets: Bicycles may be pushed, but may not be ridden upon the sidewalks along: Main Street between First Street and Fourth Street; Second Street between Marion Street and Montgomery Street; Robinson Street between First Street and Fourth Street; Third Street between Marion Street and Montgomery Street.

3. Signs: The chief of police is authorized to erect signs on any sidewalk or roadway prohibiting the riding of bicycles thereon by any person.

C. Additional Regulations: The chief of police may adopt other regulations applicable to bicycles, subject to the approval of the city council. (Ord. 13-11, 10-7-2013)



Sidewalk Ordinance

Knoxville's sidewalk ordinances state that the abutting property owner is responsible for construction, maintenance, and snow removal. Local governments commonly place these responsibilities on adjoining property owners.
The snow removal requirement is helpful in promoting year-round walkability and public safety throughout the community. When sidewalks are not promptly cleared of snow and ice, pedestrians are forced to choose between walking in the street, which is likely to have been plowed, or walking through the snow and ice, which can be difficult and dangerously slippery. Many children walk to school year-round and it is important for them to have a safe path. One drawback to the snow removal requirement is that property owners sometimes indicate the burden of snow removal as a reason for not installing a sidewalk on their property. Snow removal can be physically demanding and some individuals may struggle or be unable to complete the task. Snow removal assistance programs can help alleviate this concern.

Section 9-12-5 of the Knoxville City Code requires sidewalks to be installed prior to issuance of a certificate of zoning compliance for new construction. This requirement is important to maintain as new areas of Knoxville are developed or older areas are redeveloped. Within currently developed areas, the City has authority, by Council vote, to require property owners to install or replace sidewalks. A city-wide sidewalk assessment can indicate where sidewalk installation and replacement are necessary.

Section 7-3-10 of the Knoxville City Code states that the minimum sidewalk width is 4 feet in residential areas and 5 feet in the business district. Wider sidewalks, such as a minimum of 5 feet in residential areas and 6 or more feet in business districts, are more feet in business districts) establish a more pedestrian-friendly environment.

Title 7 – Public Ways and Property; Chapter 2 – Streets, Sidewalks, and Public Ways, Knoxville City Code

7-2-1: REMOVAL OF SNOW, ICE AND ACCUMULATIONS:
It shall be the responsibility of the abutting property owner to remove snow, ice or accumulations of any kind promptly from sidewalks. If the property owner does not remove snow, ice or accumulations within twenty four (24) hours, the city may do so and assess the costs against the property owner for collection in the same manner as property tax. (Ord. 09-09, 4-20-2009)

Title 7 – Public Ways and Property; Chapter 3 – Sidewalk and Driveway Construction, Knoxville City Code

7-3-3: PROPERTY OWNER RESPONSIBILITY:
It shall be the responsibility of the abutting property owners to maintain in a safe and hazard-free condition any sidewalks or driveways outside the lot and property lines and inside the curb lines or traveled portion of the public street. (Ord. 85-4, 5-20-1985)

7-3-4: AUTHORITY OF CITY:
The Council may by resolution adopted by a vote of three-fourths (3/4) of all the members of the Council, order and direct the owners, agents or occupants of adjoining lots and land to construct and rebuild sidewalks or driveways or both along or upon any of the streets, alleys or public grounds of said City; however, when the owners of a majority of the linear feet of the property fronting on the proposed improvement, and subject to assessment for the improvement, petition for the improvement, it may be ordered by majority vote of the whole Council. (Ord. 85-4, 5-20-1985)

Street Tree Planting Ordinance

Street trees and other landscaping in and along the street right-of-way can make a corridor more bicycle and pedestrian friendly. Street tree plantings can help to visually reduce the width of a roadway, which encourages traffic to slow down and improves safety for everyone within the street right-of-way. Trees provide visual interest, shade and promote a walkable environment. Environmental benefits include cleaner air, reduced storm water run-off, and natural habitat.

There are several areas in the City where additional landscaping could be added along a street corridor to beautify the area, calm traffic and promote walkability. The City Code requires a fee of $100 to plant a tree in the street right-of-way, which is to be used for maintenance of the trees. The permit fee can discourage property owners from planting trees in this area. The City provides maintenance to many street trees on a complaint-based system. The City Code also states that property owners are responsible for maintenance of the trees planted in the right-of-way.

Title 7 – Public Ways and Property; Chapter 6 – Tree Planting and Trimming, Knoxville City Code

7-6-4: DEFINITIONS:

For purposes of this chapter the following definitions are adopted:
PARKING AREAS: Those parts of the street right of way not covered by sidewalk and lying between the lot line and the curb line.
STREET TREES: All trees, bushes and shrubs located between the street and the sidewalk. For those lots that do not have a sidewalk, it shall be the area between the lot line and the curb line. (Ord. 15-07, 5-4-2015)

7-6-3: TREE PLANTING PERMITS:

Before planting trees or shrubs on parking areas, a permit must be received by the zoning and building administrator for review. The applicant shall demonstrate that all plantings will be done in accordance with all the rules and regulations as set out in this chapter. The cost of a tree planting permit shall be one hundred dollars ($100.00) and the revenue collected from this permit fee shall be held in a perpetual care fund for the care and maintenance of the trees in the parking areas. These funds shall not be used to replace trees removed by the city or the property owner. (Ord. 08-07, 7-21-2008)

7-6-8: MAINTENANCE OF STREET TREES:

Property Owner, Duty To Remove Overhanging Limbs: It shall be the duty of all private property owners having “street trees”, as defined herein, located in the “parking areas”, as defined herein, or abutting or overhanging any public property, street parkings, public alleyways, public sidewalks and other private property: (Ord. 15-07, 5-4-2015)

To keep all trees pruned so that the lower branches are not less than eight feet (8’) in height above public sidewalks, sixteen feet (16’) above the traveled portion of all public streets, public alleys and primary highways.

To remove all damaged and broken limbs; all limbs which are or may become dangerous to travel upon the public way and all limbs that obstruct the natural flow of any meandering public streams within the city limits.

To remove or prune all limbs of street trees that are or may become damaging, dangerous, or a potential nuisance to abutting real and personal property.

To maintain all street trees in such a manner so as not to interfere with the vision of drivers or vehicles approaching any intersection, street, or alley.

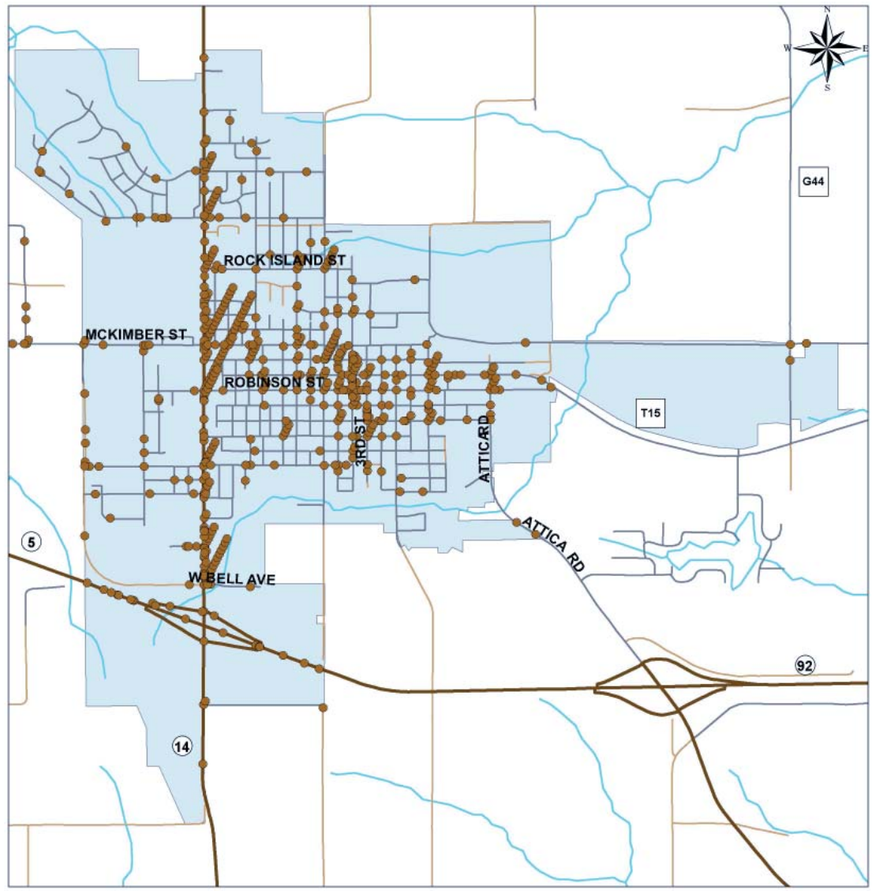
To keep all street trees trimmed so as not to unduly obstruct streetlights or traffic signs and signals. (Ord. 08-07, 7-21-2008)

Obstacles to Biking & Walking

Safety

The Iowa DOT Office of Traffic and Safety provides city and county profiles of crash data. Knoxville's maps show the areas with the greatest number of crashes, those that are at intersections, and the injuries associated with those crashes. These maps do not indicate whether bicyclists or pedestrians were involved in these particular crashes. The high accident areas are important to note for bicycle and pedestrian planning, since intersection improvements are likely to be needed to improve safety for all users.

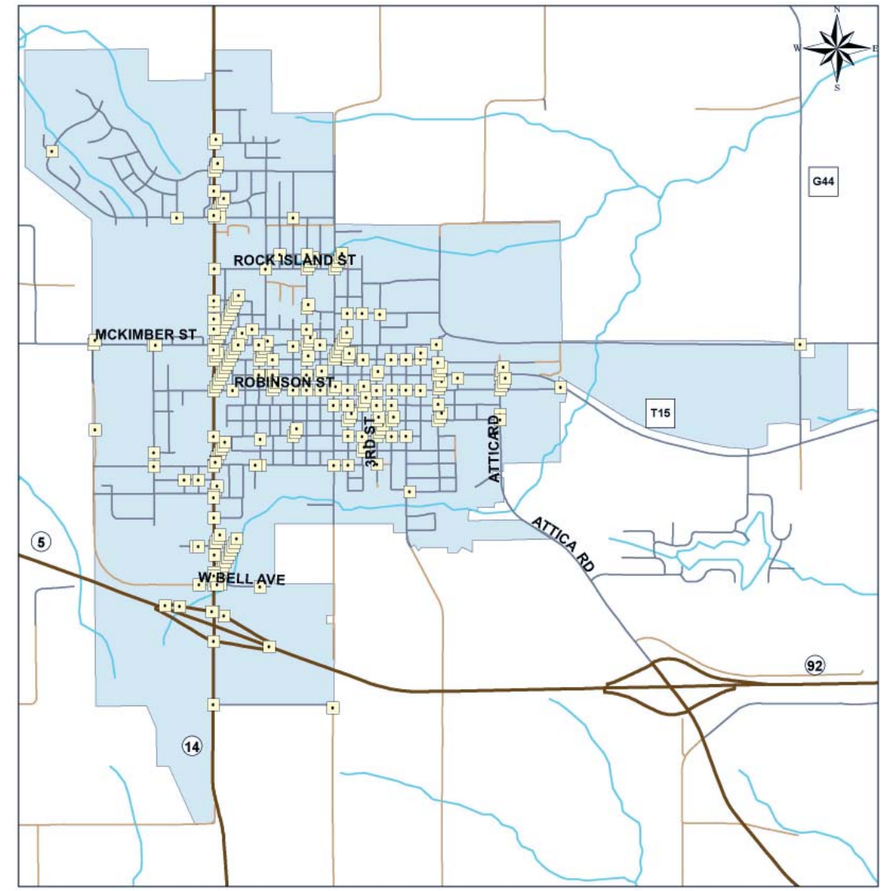
The Iowa DOT also provides statewide data on bicycle and pedestrian crashes and has provided the charts indicating the number of crashes associated with each type of injury.



City of Knoxville
Citywide
2008 - 2012 Reportable Crash History
All Urban Crashes
All Crashes

0.9 0.45 0 Miles

Legend
Interstate
US
Iowa
County
All Crashes



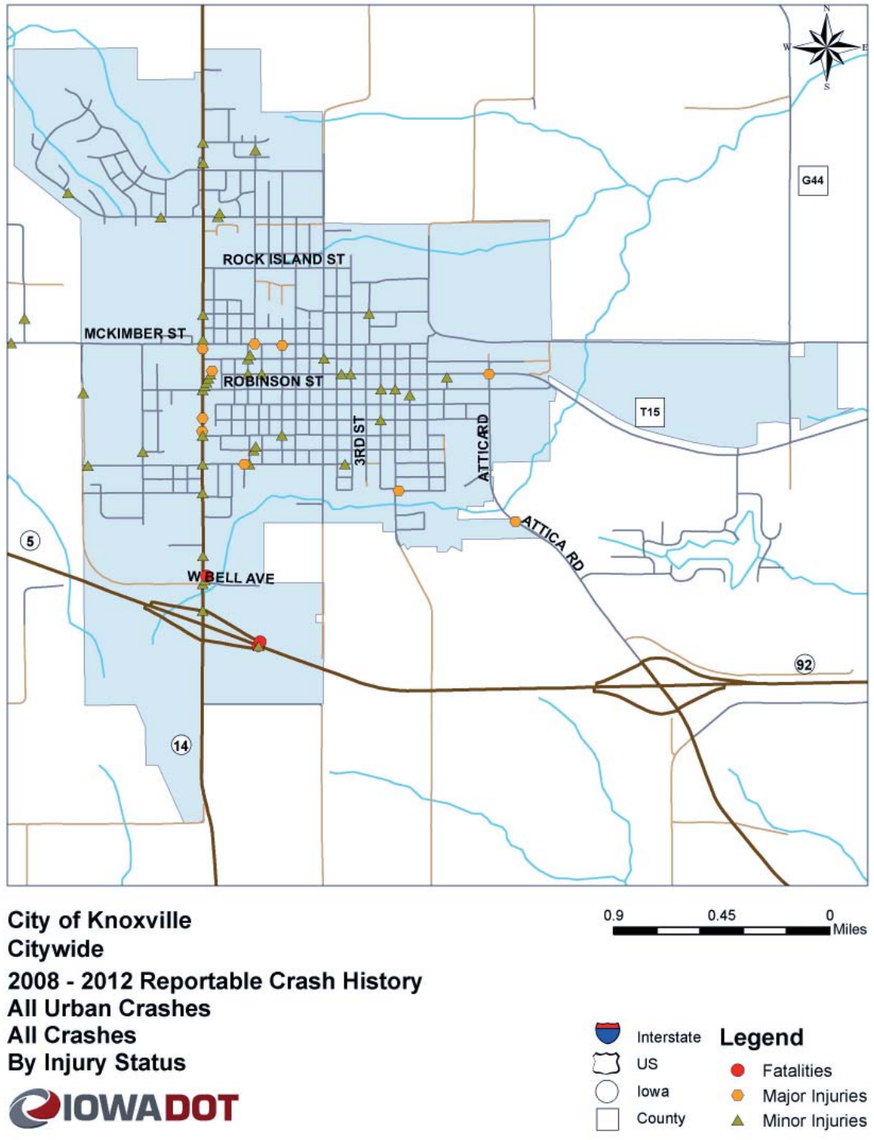
City of Knoxville
Citywide
2008 - 2012 Reportable Crash History
All Urban Crashes
Intersection Related

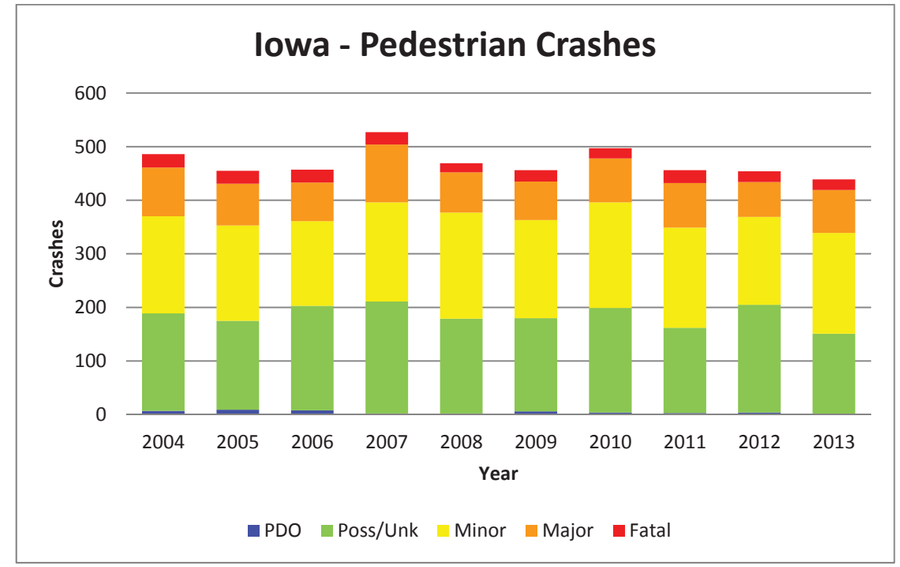
0.9 0.45 0 Miles

Legend
Interstate
US
Iowa
County
All Crashes

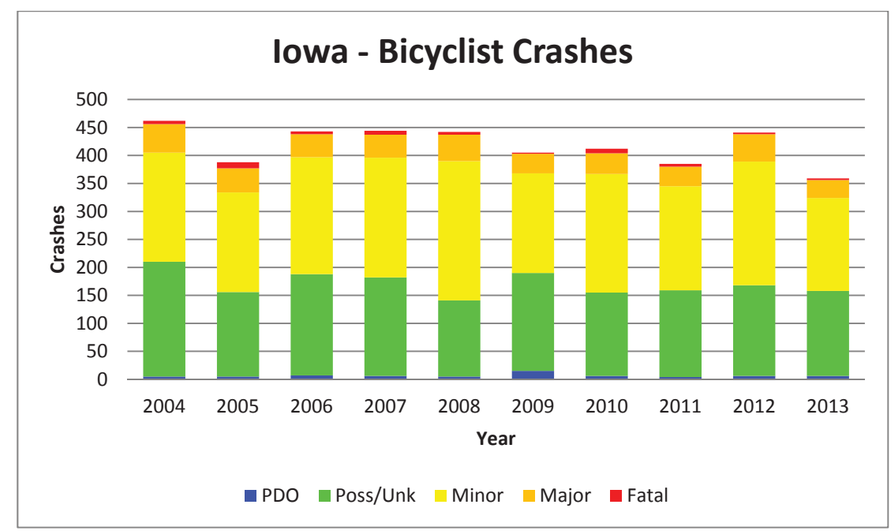
The Iowa Bicycle Coalition assembles bicycle crash data from the Iowa DOT Traffic and Safety Office. A review of data from 2010 through 2014 reveals the following:

- About half of bicycle crashes are at intersections (ranging between 42% to 50%)
- Most crashes are at 4-way intersections (32% to 40%)
- Road and trail intersection are a very small percentage of the total crash locations (2% to 4% of crashes)
- Failure to yield right-of-way at a stop sign is a small percentage of the total causes of crashes (4% to 5%)
- The bicyclists involved in a crash is often a child or young adult (25% to 30% of crashes involved children under 16 and 23% to 27% of crashes involved people between 16 and 24)
- The cause of the highest percentage of crashes was "no improper action" (35% to 45%)
- Traveling the wrong way on the road (9% to 13%) and failure to yield right-of-way to a pedestrian (7% to 15%) were the next most common causes of a bicycle crash.





Iowa DOT



Iowa DOT

CITY OF KNOXVILLE

ACCIDENTS	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Over $1000/$1500	131	136	127	102	120	94	72	93	86	84	1045
Under $1000/$1500	87	65	79	74	67	83	68	59	92	53	727
Reported - No Report Made	22	24	12	24	21	17	15	12	0	10	157
Hit and Run	26	53	25	17	10	7	14	18	22	19	211
Pedestrian/ Bicyclists injured	2	4	10	3	3	2	0	0	4	1	29
Persons Killed	0	1	0	2	0	1	0	0	1	0	5

Source: Knoxville Police Department

The Knoxville Police Department documents all crash reports taken place within the City. Since 2005, pedestrians and bicyclists have been injured in 29 separate crash instances. Ten of those accidents happened in 2007. Only one bicycle or pedestrian injury was reported in 2014.

The Knoxville Bicycle and Trails Master Plan Survey asked residents what their major concerns are when biking on streets. Approximately 71 percent of respondents stated they do not feel safe biking on streets. Another 53 percent stated that the existing roads are not smooth enough, which affects comfort as well as safety. Three of every four respondents stated that these concerns prevented them from doing these activities more often. Investments in additional bicycle and trail facilities combined with ongoing maintenance and education programs will alleviate safety concerns and increase ridership.

Lack of Facilities

Currently, the 0.89 Competine Trail is the only trail segment provided in the City. There are no on-street bicycle facilities. The recent downtown streetscape project has improved walkablity, accessibility and aesthetics in the downtown area, but there are still sidewalk gaps in other parts of the community.

There are three bicycle racks in the downtown area that appear like an aluminum picket fence panel. The racks are aesthetically pleasing and suitably placed; however, the design does not provide two points of contact for the bicycle frame that is recommended by the Association of Bicycle and Pedestrian Professionals. Racks that are designed to hold only the front tire can cause damage to the tire or bend the rim of the wheel if the bicycle is knocked over.

The survey results also showed that 25.5 percent of respondents stated that the lack of bike parking facilities was one of their top concerns and 10.4 percent stated they didn't know the best route. Both of these concerns can be attributed to the lack of existing facilities.

Additional Concerns

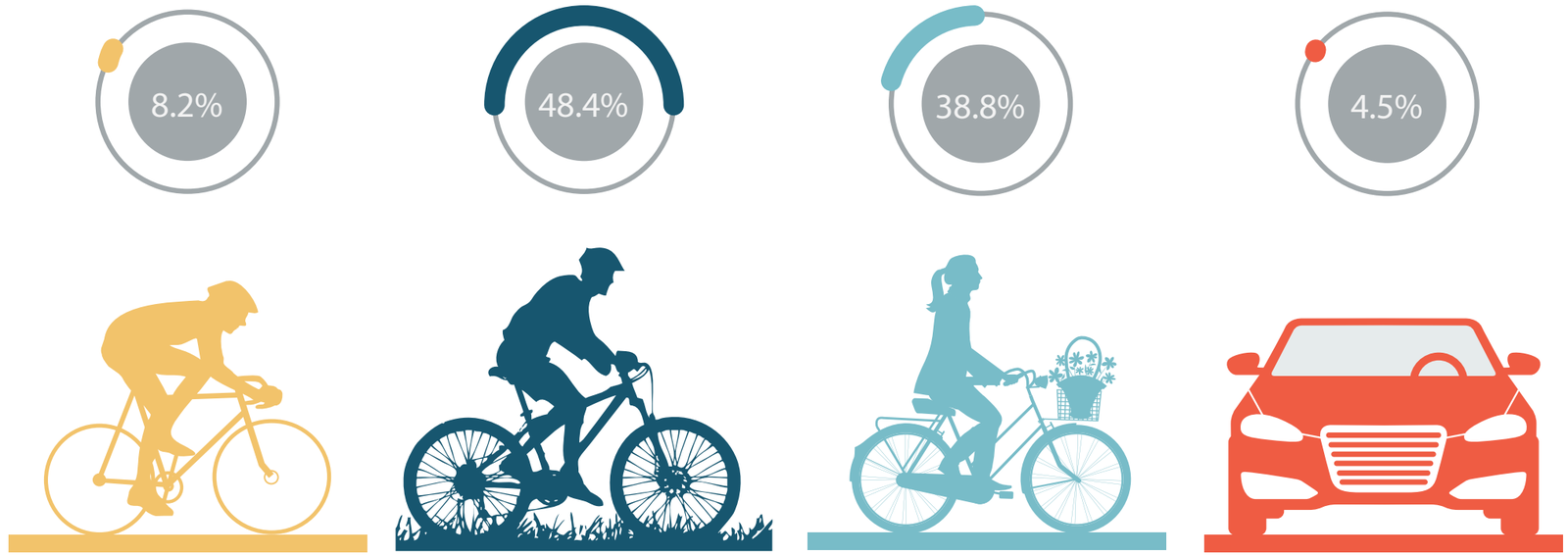
Additional concerns outlined from the survey states that 13.3 percent say the weather is too hot/cold/rainy/windy/snowy/ etc.; 20.8 percent are concerned that they can't haul everything they need on a bike (including children); and 7.2 percent of respondents state that there are too many hills. Even the best planning efforts can't control the weather or eliminate hills, but proper design and maintenance of trails, sidewalks, and bicycle facilities, such as design for adequate drainage and diligent snow and ice removal, can make biking and walking in less favorable weather and on hills safer. Educational programs that offer suggestions on how to haul items or safely transport children can help make bicycling with a load less intimidating.

CHAPTER 3

User Needs Assessment

Types of Bicyclists and Their Needs
Walking and Bicycling Demand
Strengths and Weaknesses
Destinations

How would you describe your biking ability?



To assess residents' bicycling and walking needs in Knoxville, the "Knoxville Bicycle and Trails Master Plan Survey" was conducted in May 2015. Questions were asked regarding the use of the existing trail, desire for future trails and bicycle facilities, perceived barriers, key destinations, and what can be done to increase biking and walking in Knoxville. The survey results along with other data sources have been used to identify the strengths and weaknesses of Knoxville's trail and bicycle facilities. This chapter identifies what types of activities residents in Knoxville are interested in and what can be done to increase trail usage, bicycle riding, walking and safety for everyone throughout the community.

Types of Bicyclists & Their Needs

Bicyclists vary in skill level, requiring different facility types and experiences in order to feel comfortable and safe. Bicyclists can be separated into four types of riders: Strong and Fearless, Enthused and Confident, Interested but Concerned, and No way, No How as described by Roger Geller in "Four Types of Transportation Cyclist." Using this classification allows us to gain a better understanding of the local market for bicycle transportation and identify the barriers to a safe, complete, street transportation system in Knoxville. The following sections describe the different types of riders, the different reasons for bicycling, and the respective needs of these categories of bicyclists.

Strong and Fearless

The strong and fearless category consists of individuals who are willing to ride regardless of the conditions. These bicyclists typically can ride faster than other user types, prefer direct routes, and will often choose roadways over separated bicycle facilities such as shared-use paths. This type of bicyclist comprises of 8.2% of respondents to the Knoxville Bicycle and Trails Master Plan Survey.

Confident and Enthused

This group encompasses intermediate bicyclists who are mostly comfortable riding on all types of bicycle facilities, but will usually prefer low traffic streets, bike lanes, or separated paths when available. They may diverge from a more direct route to take advantage of a lower volume road or preferred bicycle facility type. This type of bicyclist comprises of 48.4% of Knoxville residents.

Interested, but Concerned

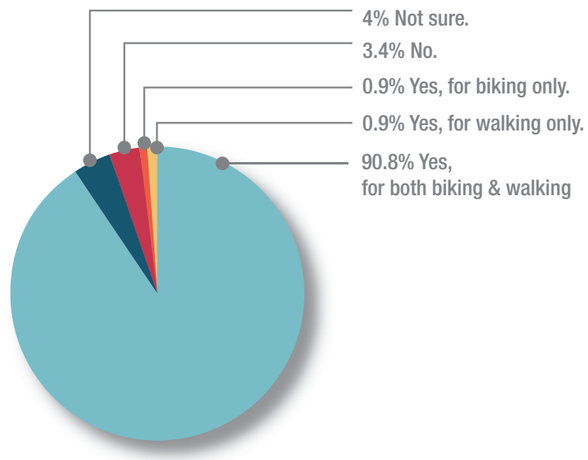
This user type makes up 38.8% of Knoxville respondents. They are cyclists who typically ride only on low traffic streets or paths under favorable conditions and weather. They perceive traffic and safety as significant barriers towards increased cycling. These cyclists may become enthused and confident with encouragement, education, experience and adequate facilities.

No Way, No How

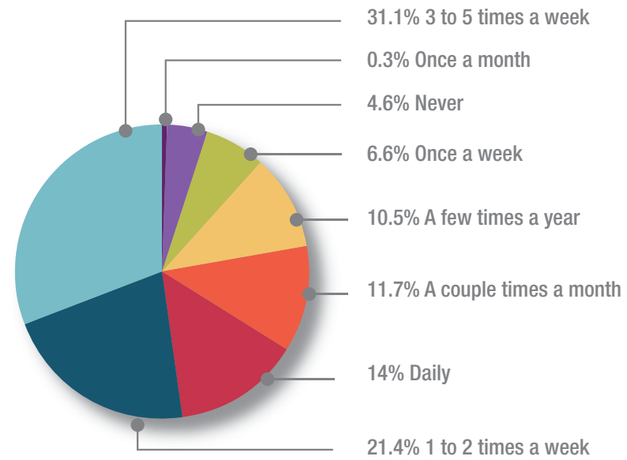
People in this category may not be physically able to bicycle or simply are not interested in bicycling for any purpose. This group comprises of 4.5% of Knoxville respondents.

Children are another user group, who would not have responded to the survey. Children riding on their own or with their parents require access to key destinations in their community such as schools, friend's houses, the library and convenience stores. Many parents allow adolescent children who are not yet able to drive, but are ready to explore their independence, to bicycle or walk alone or with friends on short, safe routes. With proper education and bicycle and pedestrian accommodations, children may be able to safely walk or bike along residential streets with low motor vehicle speeds and volumes. Approximately 68.9% of respondents to the survey are between the ages of 20 and 50, indicating the potential for children riding with their parents or grandparents. The 2010 Census lists a total of 1,470 individuals less than 15 years of age in Knoxville.

Do you think it is important for biking and walking to be viable transportation options in Knoxville?



On average, how often do you bike, run, or walk either along a trail or along the streets in Knoxville?



Walking and Bicycling Demand

The demand for additional biking and walking facility types in Knoxville has been apparent through many avenues such as the plans described in the Existing Conditions section. Most recently, the survey completed for the use of this plan asked residents if they think biking and walking should be a viable transportation option in Knoxville. Almost 91 percent of respondents stated that biking and walking should both be viable transportation options and another 1.8 percent said yes for biking only or yes for walking only. Let's make this data showing the 91% support for biking and walking being a viable transportation option as a graphic too.

The survey indicated that 73.1 percent of respondents bike, run or walk either on a trail or along the streets in Knoxville on a weekly basis. Fourteen percent partake in these activities on a daily basis.

Another question asks residents if they are satisfied with their ability to safely walk and bike throughout Knoxville. Only 13.1 percent stated they were satisfied and 37.9 percent stated they were somewhat satisfied. A significant number of respondents (43 percent) are not satisfied with their ability to walk or bike in Knoxville. This may indicate a need that although the support for trail and bicycle facilities is strong, the type of infrastructure or safety is not adequate enough to entice individuals to partake in these activities safely on a weekly basis. To support that claim, when asked about support for on-street bicycle facilities, 63.7 percent of respondents answered "yes, I would support the facilities," while another 28.6 percent stated they would support "some" on-street facilities. Only 7.6 percent of respondents were opposed to on-street facilities in Knoxville.

What is the likelihood that the following types of bike facilities would influence you to bike more often?

	Likely	Unlikely	Not Sure
Directional Signage	43.1%	28.2%	28.8%
Paved Shoulders	61.1%	21.5%	17.4%
Bike Boulevards	46.0%	29.4%	24.8%
Shared Lane Markings	32.0%	35.2%	32.9%
Bicycle Lanes	61.8%	21.5%	16.7%
Buffered Bike Lanes	52.3%	21.1%	26.6%
Protected Bike Lanes	68.0%	16.4%	15.5%
Intersection Improvements	63.2%	13.5%	23.2%
Off-street Paths	90.8%	5.4%	3.9%
Bike Parking	60.0%	14.3%	25.6%

The table above indicates the likelihood that additional facilities would influence the respondent to bike more often in Knoxville. Over 60 percent of respondents would be receptive of the following facility types: off-street paths (90.8%), protected bike lanes (68.0%) intersection improvements (63.2%), bicycle lanes (61.8%), paved shoulders (61.1%) and bike parking (60.0%). Only shared lane markings alone (35.2%) received an unlikely rating higher than 30 percent.

Another factor to consider when analyzing demand for additional facilities is what type of activities need to be accommodated. Biking along with Hiking and Walking both received the highest interest of 76 percent followed by Jogging/ Running at 49.3 percent. This is also an indication of demand for specific types of facilities. Higher bicycle demands may include off-street and on-street facilities while walking and running may indicate the need for off-street scenic trails and sidewalks.

Directional Signage for Bicyclists

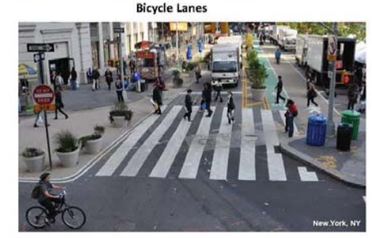
Paved Shoulders

Bike Boulevards (Shared, low-speed streets)

Shared Lane Markings

Bicycle Lanes

Buffered Bike Lanes

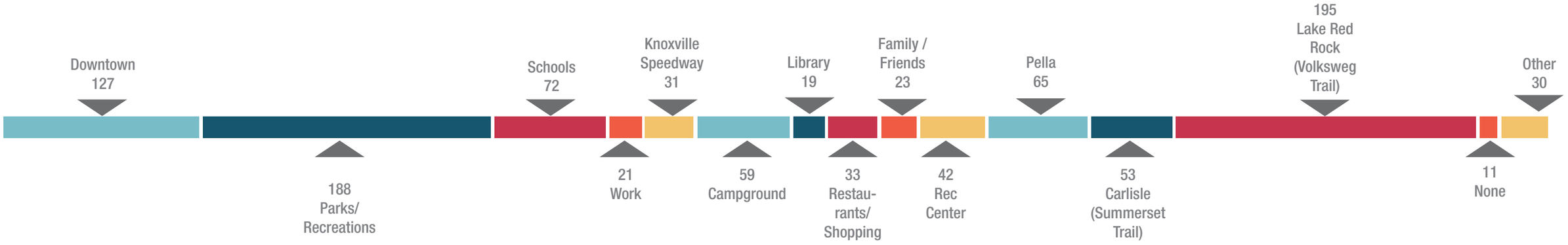

Protected Bike Lanes (curb or other physical separation)

Intersection Improvements

Off-street Paths (e.g. Trails)

Bike Parking

What destinations would you most like to get to via trail or bicycle?
(results from 351 respondents)



Strengths and Weaknesses

This section provides an analysis of the existing conditions for bikeways and trails in Knoxville and outlines opportunities for improvement. The section also identifies potential barriers to accommodating and encouraging bicycle and pedestrian trips, which this plan seeks to overcome.

Strengths

Various characteristics foster an environment where bicycling is safe and enjoyable in Knoxville. These system strengths are described below.

Topography

Much of Knoxville's topography is relatively flat with a few residential neighborhoods with steep hills. The existing Competine Trail has flat terrain and is in good condition for all users. Flat roads give motorists, bicyclists and pedestrians time to react to obstructions on the road. A few intersections and high traveled roads have steep slopes and will be outlined in the weaknesses section.

Demand

The residents of Knoxville have expressed desire and support for trails, biking and walking. As described above, 91 percent of survey respondents indicated they thought biking and walking should be an important option for transportation in Knoxville and 63.7 percent would support on-street bike facilities. With the lack of trail miles and on-street designations, the usage is still high with 73.1 percent of respondents stating they bike, run or walk on the trail or along the street in Knoxville at least once a week.

Bike Friendly Streets

Most residential areas in the city benefit from a bicycle-friendly environment. Most streets consist of low-volume traffic. This allows for bicyclists and pedestrians of all ages and skill to navigate around the community. Shared lane markings, signage, and possibly traffic calming measures can be added to these streets to enhance the safety and compatibility of these corridors.

Planned Improvements

Planned Improvements: The City has demonstrated its commitment to bicycling and trail development through a number of recent and planned system improvements. In July 2015, the City of Knoxville passed a reverse referendum that ensures $700,000 of funds will be available for future trail development. The goal is to use the bond money as a local match when applying for grant funding to continue construction on the Competine Trail. Additionally, the City has been working with the Iowa Department of Transportation to complete a study of US Highway 14, including the possibility of removing vehicular lanes and adding bicycle lanes.

In 2009, the City of Knoxville began design and engineering for a downtown streetscape Project which would replace 19 blocks of downtown infrastructure including sewers, drains, water services, electrical, paving, traffic signals and sidewalks. These sidewalk and crossing improvements are compliant with the American's with Disabilities Act, which greatly improves walkability within the downtown area.

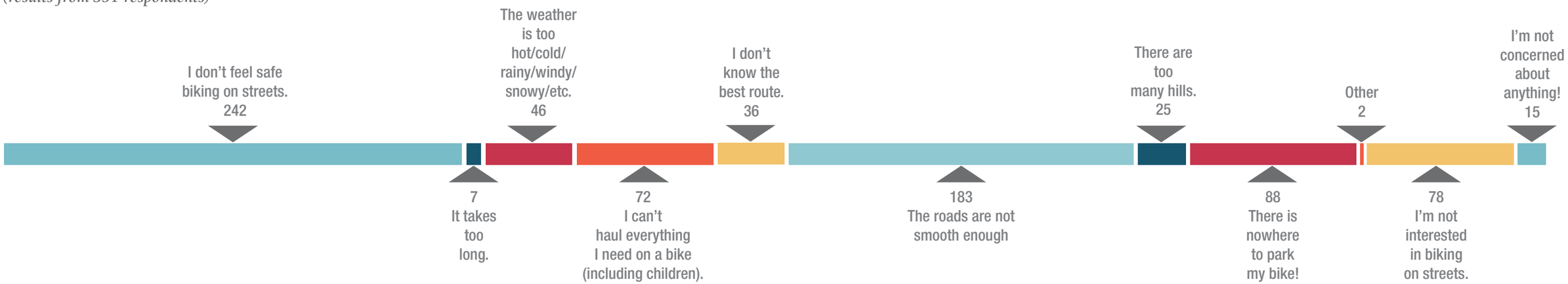
Opportunities to Better Utilize Existing Roadway Space

There are a number of streets in Knoxville that are designed for more vehicle capacity than necessary and could accommodate bike lanes or other alternatives.

Connectivity

Knoxville streets are well-connected and provide a convenient grid system. This is ideal for developing an on-street system with connectivity both east-west and north-south. Though many of these streets lack adequate bicycle accommodations, the grid system allows for future complete streets connectivity design.

When you consider biking on streets, what are your top 3 concerns?
(results from 351 respondents)



Weaknesses

Numerous issues and concerns were also identified that may impact the Bicycle and Trails Master Plan. A variety of challenges can deter or discourage the use of bicycles and other means of transportation. The Master Plan presents strategies for overcoming or reducing these weaknesses through network development and targeted programs.

Major Roads

The number one concern expressed in the planning survey was "I don't feel safe biking on streets." This accounted for 70.1 percent of all respondents. This can be due to higher vehicle speeds and volumes, which create uncomfortable and potentially unsafe crossing conditions.

Iowa Highway 14 bisects the community from north to south and is a major barrier due to high speeds, high volumes and wide lanes. Currently, bicycle facilities do not exist on this right-of-way. The existing Competine Trail system has been stalled for several years due to various reasons, one being the lack of crossing or intersection design to get from the west side of Highway 14 to the east side. Iowa Highway 5/Attica Road also presents high speeds and a challenging trail and street intersection as vehicles enter town from the south. The road is a blind banked curve at the proposed Competine Trail crossing. Robinson and Marion Streets also experience high traffic volumes and are impediments to east-west bicycle travel without proper facilities.

Major Waterways

The Competine Creek is the only major water barrier within the incorporated limits of Knoxville. The existing trail is proposed to be extended along the creek greenway. Bicycle and pedestrian crossings can be accommodated via trail bridges. The plan also considers existing street crossings for on-street bicycle facilities.

Railroads

The BNSF railroad bisects the north and south part of the community by running east and west. A total of ten at-grade crossings are located in Knoxville. These crossings must be designed for bicyclists to cross perpendicular to the tracks and have a clear view of oncoming trains.

Maintenance

The second leading concern from the planning survey was that "roads are not smooth enough." Providing smooth riding conditions is a necessity to develop an effective on-street system. Cracks and holes can be hazardous to cyclists, with potential for riders to fall or be forced into traffic. Routine maintenance is also important for off-street trail systems. The City has a current pavement management plan that prioritizes street re-surfacing through 2015 to address this weakness.

User Concerns

Additional concerns outlined in the survey consisted of no bike parking facilities (25.5%), Can't haul everything I need on my bike (20.9%), and inclement weather (13.3%). Approximately 74.7% of these respondents said the concerns outlined in above prevents them from doing trail and bicycle activities more often. Some of these obstacles can be overcome through engineering design and maintenance; others can be alleviated through programming and education.

Lack of Existing Facilities

Currently, the only bicycle facility that exists in the City of Knoxville is the 0.89 miles of paved Competine Trail. Without additional trails or on-street bicycle facilities, residents have few options for riding bikes, walking, and running. When asked if they had traveled to other cities to bicycle or use their trails in the last two years, 68.9 percent of respondents stated that they have, resulting in loss of economic growth as dollars are being spent outside of Knoxville.

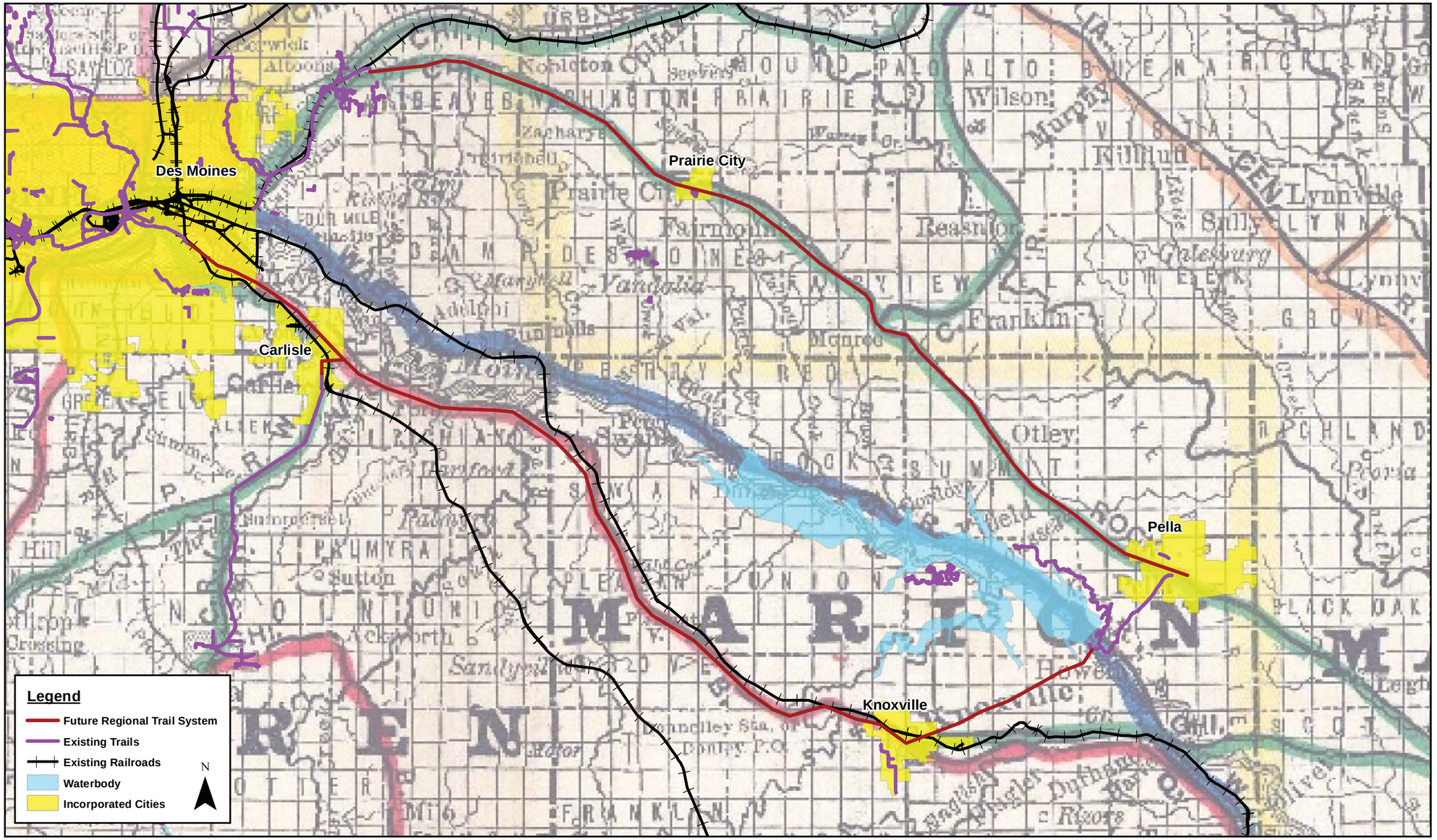
Destinations

Identifying popular destinations for people walking and biking is important when developing a trail and bicycle facility network. Providing access to these areas will increase ridership, improve overall quality of life in Knoxville, and encourage tourism. The Knoxville Bicycle and Trail Master Plan Survey conducted for this planning process identified the following places as primary destinations:

- Lake Red Rock (Volksweg Trail)
- Parks and Recreation Areas: Marion County Park, Rec Center, Young Park, Edwards City Park, RV Campgrounds, Auld Park, Pine Knolls Country Club
- Knoxville Downtown Business District
- Educational Facilities: Knoxville High School, West Elementary School, Knoxville Middle School, Northstar Elementary
- Nearby Communities: Carlisle, Des Moines, Pella
- Knoxville Raceway and National Sprint Car Hall of Fame & Museum

KNOXVILLE BIKE AND TRAIL MASTER PLAN: REGIONAL CONNECTIONS

Thinking on a larger, regional scale, we can envision a future trail loop around Lake Red Rock, which could include Knoxville, Lake Red Rock, Pella, Monroe, Prairie City, Mitchellville, Altoona, Pleasant Hill, Des Moines, Carlisle, and Hartford. Using a railroad map from 1902 as a base image, we can see colored lines where railroads crisscrossed through the countryside connecting communities. Many of these railroads have been abandoned and the former railroad corridor creates a potential opportunity for trail development. The historic railroad map has been overlaid with existing rail lines and existing trails. The vision of a regional trail loop is shown in red.



Source: IA DOT- 1902 Historic Railroads Map

Engineering: The Bicycle And Trails Network

CHAPTER 4

Proposed Network
Recommended Facility Types
Intersection Treatments
Bicycle Parking
Wayfinding Signage
Phasing Plan
Concept Plans

The Engineering aspect of a bicycle-friendly community is arguably the most important of the Five E's. Without safe and efficient bicycling facilities constructed within the community, there is little reason to support biking with the other E's of Education, Encouragement, Enforcement, and Evaluation.

There are several guidelines and requirements to consult when designing off-street trails and on-street bicycle facilities. Following these guidelines helps to develop safe and functional bicycle facilities that reflect the most recent research and best practices. Additionally, all designs ensure that trails and on-street facilities are equally accessible to all residents.

- Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)
  - » U.S. Department of Transportation, Federal Highway Administration (FHWA)
  - » http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm
- Guide for the Development of Bicycle Facilities
  - » American Association of State Highway and Transportation Officials (AASHTO)
  - » https://bookstore.transportation.org/collection_detail.aspx?ID=116
- Urban Bikeway Design Guide
  - » National Association of City Transportation Officials (NACTO)
  - » http://nacto.org/publication/urban-bikeway-design-guide/
- Iowa Statewide Urban Design and Specifications (SUDAS)
  - » Institute for Transportation, Iowa State University
  - » http://www.iowasudas.org/
- The Essentials of Bike Parking
  - » Association of Pedestrian and Bicycle Professionals
  - » http://www.apbp.org/?page=publications

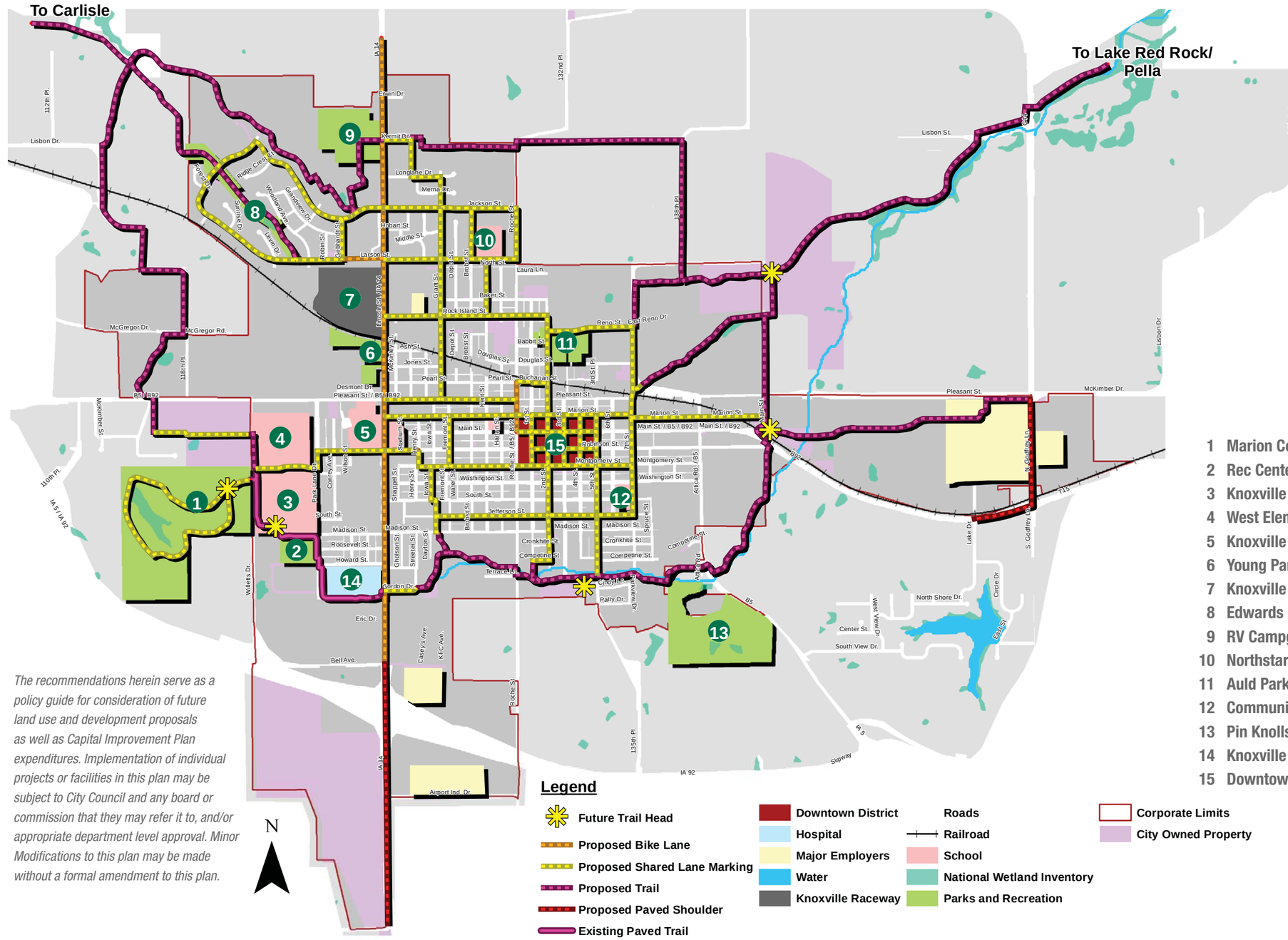
Proposed Network

The Knoxville Bicycle and Trail Master Plan include approximately 20 miles of new on-street bikeways which comprises 44.8% of the City street network. At present, the City of Knoxville trail network includes 0.89 miles of shared use paths. This plan proposes an additional 11.6 miles of paved off street paths, building off of the existing Competine Creek Trail to result in the "Knoxville Loop" around the community. Additional connections to Lake Red Rock, Pella and Carlisle can stem off of this plan. Trail heads that may include vehicular parking, restrooms, and system maps are proposed in five locations. Thus, the bicycle and trails network recommends a comprehensive expansion and diversification of bicycle and trail facilities to meet the needs of beginner, intermediate and advanced bicyclists.

In total, five different bikeway types are included: Shared Lane Markings (sharrows), Bicycle Lanes, Paved Shoulders, Quiet Streets, and Shared Use Paths (trails). The signs, pavement markings, and other traffic control devices related to the operations of these bikeways are included in the design and cost estimates and follow the design guidelines in the documents listed previously.

The recommendations herein serve as a policy guide for consideration during evaluation of future land use decisions, development proposals review, and Capital Improvement budgeting. Implementation of individual projects or facilities in this plan may be subject to City Council and any board or commission that they may refer it to, and/or appropriate department level approval. Minor modifications are acceptable, without formal amendment to the plan.

KNOXVILLE BIKE AND TRAIL MASTER PLAN: PROPOSED FACILITIES



1 Marion County Park
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The recommendations herein serve as a policy guide for consideration of future land use and development proposals as well as Capital Improvement Plan expenditures. Implementation of individual projects or facilities in this plan may be subject to City Council and any board or commission that they may refer it to, and/or appropriate department level approval. Minor Modifications to this plan may be made without a formal amendment to this plan.

Recommended Facility Types

Shared Use Paths (Trails)

Trails are separated from motor vehicle traffic. Trails should be at least 10 feet wide to accommodate both directions of travel. Some communities prefer 12-foot wide trails because they allow bicyclists and pedestrians to travel side-by-side without obstructing oncoming users and also allow easier passing of slower trail users. Trails can accommodate all non-motorized users and all skill levels of bicyclists, pedestrians, joggers, skaters among many others.

Sidepaths are within a roadway right-of-way, essentially a wide sidewalk. Special care should be taken when designing sidepaths, particularly at intersections and driveways. These crossings can be hazardous to trail users since vehicles are often not expecting to see them at the crossing.

The preferred location for a trail is in an area that is completely removed from vehicular traffic, but with various locations to connect into an on-street bicycle and sidewalk network. Trails are often located in an independent right-of-way that often follow waterways (greenways), utility corridors, or former railroad lines.

The proposed continuation of the Competine Creek Trail will follow the scenic creek greenway. Ultimately the trail system would take advantage of rural farm and prairie land surrounding Knoxville, creating a “Knoxville Loop” as the survey results indicated was the preferred trail system for Knoxville.

Proposed Shared Use Paths (Trails)

Name	From - To	Length (miles)
Competine Creek Trail	Knoxville Loop	8.28
Edwards City Park Trail	Larson Street - Competine Trail	1.04
Downtown Connection	7th Street - Competine Trail	0.56
Reno Connection	Reno Street - Competine Trail	0.35
3M Connection	Competine Trail - 3M Campus	1.08

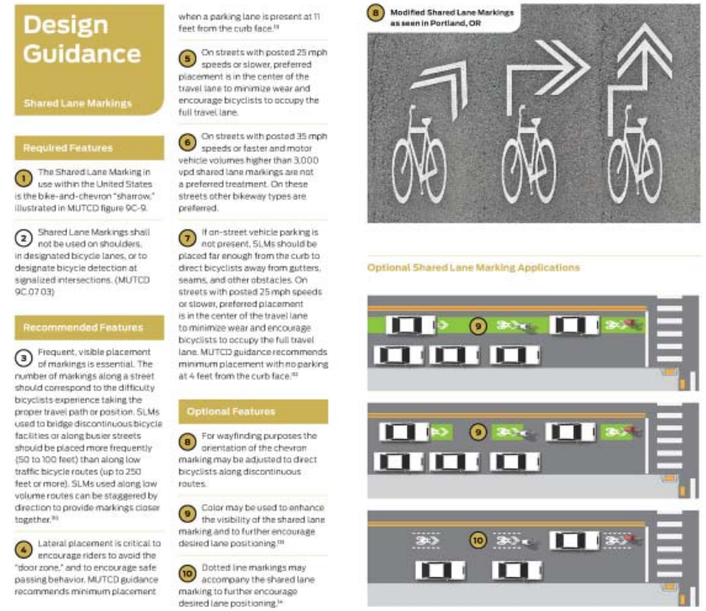
Shared Lane Markings (Sharrows)

Shared-lane markings (also commonly called “sharrows”) are pavement markings applied to a thoroughfare too narrow to accommodate bicycle lanes and/or with vehicular target speeds low enough to allow cyclists to move safely with motor vehicles. Shared lane markings are high-visibility pavement markings that help position bicyclists within a shared vehicle and bicycle travel lane. Shared lane markings may be supplemented by signage. Shared lane markings can be used as standard element in the development of quiet streets (aka bicycle boulevards).

In Knoxville, shared roadways are the most common proposed bikeway type. There are no specific width standards for shared roadways since the bicyclists and motorists are sharing the same travel lane. The suitability of a shared roadway decreases as motor vehicle traffic speeds and volumes increase. For a local street to function acceptably for bicyclists as a shared roadway, traffic volumes should not be more than 3,000 vehicles per day, and speeds should be 25 mph or less. If traffic speeds and volumes exceed these thresholds, separated facilities (bicycle lanes) should be considered or traffic calming and diversion should be applied.

Proposed Shared Lane Markings

Name	From - To	Length (miles)
Gordon Drive	Lincoln/ IA 14 - Streeter Street	0.13
Jefferson Street	Iowa Street - 7th Street	0.74
Montgomery Street	Henry Street - 7th Street	0.8
Marion Street	Lincoln/ IA 14 - Main Street	1.45
Pleasant Street	Lincoln/ IA 14 - Roche Street	0.5
Rock Island Street	Linclon/ IA 14 - 2nd Street	0.61
Larson Street	Jackson Street - Gabhardt Street	0.95
Larson Street	Lincoln/ IA 14 - Roche Street	0.5
Jackson Street	Larson Street - Roche Street	1.13
Reno Street	2nd Street - 7th Street	0.32
Buchanan Street	Roche Street - 2nd Street	0.12
Longlane Drive	Dolores Street - Grant Street	0.11
Main Street	Roche Street - 5th Street	0.3
Robinson Street	1st Street - 5th Street	0.24
Robinson Street	Park Lane Drive - Henry Street	0.38
Kermit Drive	Lincoln/ IA 14 - Dolores Street	0.1
Panther Drive	Willits Drive - Park Lane Drive	0.23
Competine Street	1st Street - 2nd Street	0.06
Marion County Park	within park	1.35
Graceland Cemetery	within cemetery	0.36
7th Street	Reno Street - Jefferson Street	0.71
4th Street	Marion Street - Montgomery Street	0.19
3rd Street	Marion Street - Montgomery Street	0.19
2nd Street	Competine Street - Rock Island Street	0.92
1st Street	Marion Street - Montgomery Street	0.19
Roche Street	Jackson Street - Larson Street	0.19
Brobst Street	Jackson Street - Larson Street	0.09
Kent Street	Larson Street - Rock Island Street	0.21
Grant Street	Longlane Drive - Pleasant Street	0.85
Dolores Street	Kermit Drive - Longlane Drive	0.13
Gebhardt Street	Jackson Street - Larson Street	0.15
Fremont Street	Marion Street - Montgomery Street	0.19
Iowa Street	Montgomery Street - Madison Street	0.27
Henry Street	Robinson Street - Montgomery Street	0.06



Design Guidance

Shared Lane Markings

Required Features

1. The Shared Lane Marking in use within the United States is the bike-and-chevron "sharrow," illustrated in MUTCD figure 9C-9.

2. Shared Lane Markings shall not be used on shoulders, in designated bicycle lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07.03)

Recommended Features

3. Frequent, visible placement of markings is essential. The number of markings along a street should correspond to the difficulty bicyclists experience taking the proper travel path or position. SLMs used to bridge discontinuous bicycle facilities or along busier streets should be placed more frequently (50 to 100 feet) than along low traffic bicycle routes (up to 250 feet or more). SLMs used along low volume routes can be staggered by direction to provide markings closer together.[93]

4. Lateral placement is critical to encourage riders to avoid the "door zone," and to encourage safe passing behavior. MUTCD guidance recommends minimum placement when a parking lane is present at 11 feet from the curb face.[13]

5. On streets with posted 25 mph speeds or slower, preferred placement is in the center of the travel lane to minimize wear and encourage bicyclists to occupy the full travel lane.

6. On streets with posted 35 mph speeds or faster and motor vehicle volumes higher than 3,000 vpd shared lane markings are not a preferred treatment. On these streets other bikeway types are preferred.

7. If on-street vehicle parking is not present, SLMs should be placed far enough from the curb to direct bicyclists away from gutters, seams, and other obstacles. On streets with posted 25 mph speeds or slower, preferred placement is in the center of the travel lane to minimize wear and encourage bicyclists to occupy the full travel lane. MUTCD guidance recommends minimum placement with no parking at 4 feet from the curb face.[93]

Optional Features

8. For wayfinding purposes the orientation of the chevron marking may be adjusted to direct bicyclists along discontinuous routes.

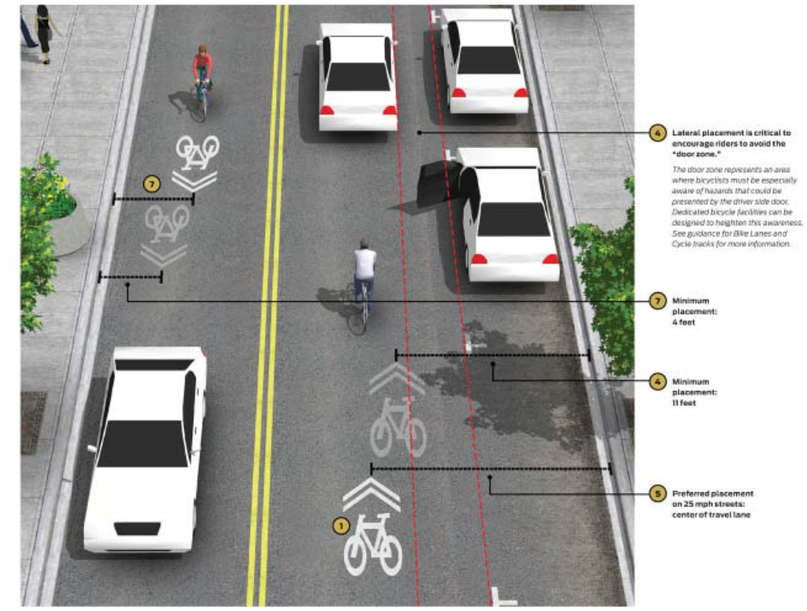
9. Color may be used to enhance the visibility of the shared lane marking and to further encourage desired lane positioning.[18]

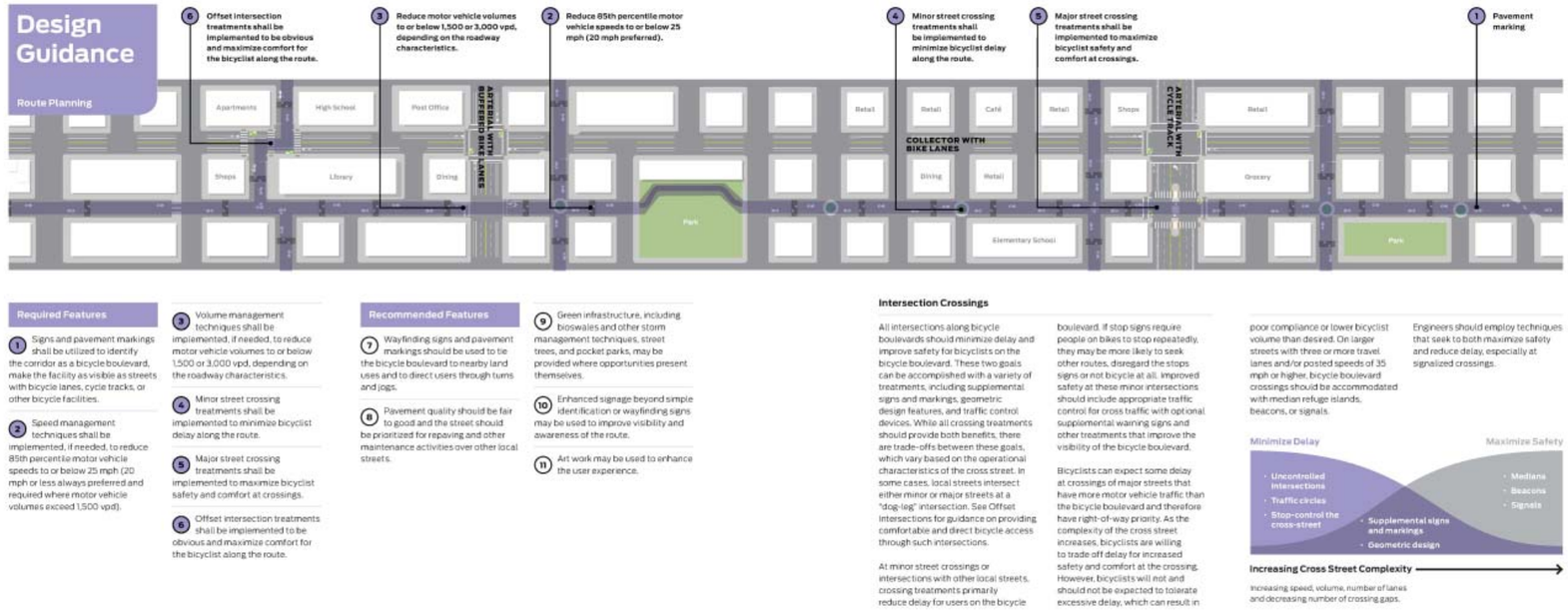
10. Dotted line markings may accompany the shared lane marking to further encourage desired lane positioning.[14]

8 Modified Shared Lane Markings as seen in Portland, OR

Optional Shared Lane Marking Applications

Source: Urban Bikeway Design Guide, NACTO





Source: Urban Bikeway Design Guide, NACTO

Quiet Streets (aka Bike Boulevards)

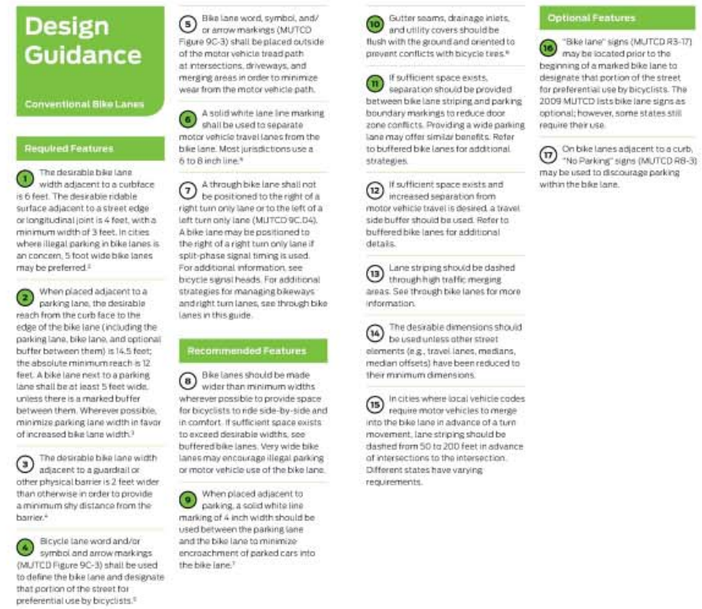
Quiet streets are low-volume and low-speed streets where motorists and bicyclists share the same space. There are different levels of implementation for a quiet street. At the most basic level, a quiet street may include pavement markings and signage to establish the bicycle-friendly route. If vehicular speed is an issue, traffic calming techniques may be incorporated. If vehicular volume is an issue, traffic diversion may be used to prohibit certain turning movements by motorists, but not by bicyclists or pedestrians. A complete quiet street should also provide sidewalks for pedestrians.

Quiet streets work best in well-connected street grids where riders can follow reasonably direct and logical routes and motorists can choose to take alternate routes. By calming and possibly diverting traffic, quiet streets also improve conditions for pedestrians. Quiet streets attract bicyclists who do not feel comfortable on busier streets and prefer to ride on lower traffic streets.

The plan proposed a quiet street connecting the Competine Creek Trail to the Downtown business district via 5th Street. Fifth Street is generally a low-volume street and would only require small-scale treatments such as shared lane markings, signage, and potentially intersection treatments. Other streets within the City that are proposed to have shared lane markings could also be considered quiet streets.

Proposed Quiet Streets

Name	From - To	Length (miles)
5th Street	Marion Street - Competine Trail	0.61



Design Guidance

Conventional Bike Lanes

Required Features

1. The desirable bike lane width adjacent to a curbface is 6 feet. The desirable ridable surface adjacent to a street edge or longitudinal joint is 4 feet, with a minimum width of 3 feet. In cities where illegal parking in bike lanes is an concern, 5 foot wide bike lanes may be preferred.[1]

2. When placed adjacent to a parking lane, the desirable reach from the curb face to the edge of the bike lane (including the parking lane, bike lane, and optional buffer between them) is 14.5 feet; the absolute minimum reach is 12 feet. A bike lane next to a parking lane shall be at least 5 feet wide, unless there is a marked buffer between them. Wherever possible, minimize parking lane width in favor of increased bike lane width.[3]

3. The desirable bike lane width adjacent to a guardrail or other physical barrier is 2 feet wider than otherwise in order to provide a minimum shy distance from the barrier.[4]

4. Bicycle lane word and/or symbol and arrow markings (MUTCD Figure 9C-3) shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists.[5]

5. Bike lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed outside of the motor vehicle tread path at intersections, driveways, and merging areas in order to minimize wear from the motor vehicle path.

6. A solid white lane line marking shall be used to separate motor vehicle travel lanes from the bike lane. Most jurisdictions use a 6 to 8 inch line.[6]

7. A through bike lane shall not be positioned to the right of a right turn only lane or to the left of a left turn only lane (MUTCD 9C.04). A bike lane may be positioned to the right of a right turn only lane if split-phase signal timing is used. For additional information, see bicycle signal heads. For additional strategies for managing bikeways and right turn lanes, see through bike lanes in this guide.

Recommended Features

8. Bike lanes should be made wider than minimum widths wherever possible to provide space for bicyclists to ride side-by-side and in comfort. If sufficient space exists to exceed desirable widths, see buffered bike lanes. Very wide bike lanes may encourage illegal parking or motor vehicle use of the bike lane.

9. When placed adjacent to parking, a solid white line marking of 4 inch width should be used between the parking lane and the bike lane to minimize encroachment of parked cars into the bike lane.[7]

10. Gutter seams, drainage inlets, and utility covers should be flush with the ground and oriented to prevent conflicts with bicycle tires.[8]

11. If sufficient space exists, separation should be provided between bike lane striping and parking boundary markings to reduce door zone conflicts. Providing a wide parking lane may offer similar benefits. Refer to buffered bike lanes for additional strategies.

12. If sufficient space exists and increased separation from motor vehicle travel is desired, a travel side buffer should be used. Refer to buffered bike lanes for additional details.

13. Lane striping should be dashed through high traffic merging areas. See through bike lanes for more information.

14. The desirable dimensions should be used unless other street elements (e.g., travel lanes, medians, median offsets) have been reduced to their minimum dimensions.

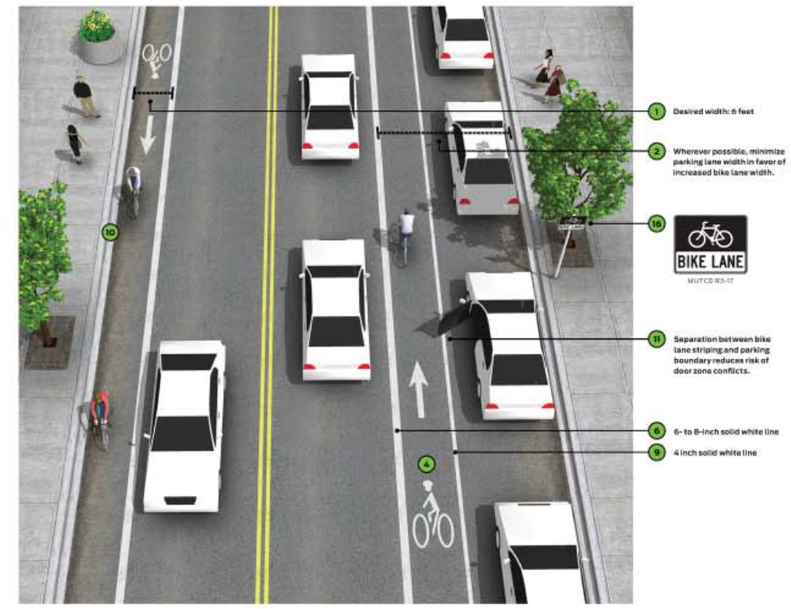
15. In cities where local vehicle codes require motor vehicles to merge into the bike lane in advance of a turn movement, lane striping should be dashed from 50 to 200 feet in advance of intersections to the intersection. Different states have varying requirements.

Optional Features

16. "Bike lane" signs (MUTCD R3-17) may be located prior to the beginning of a marked bike lane to designate that portion of the street for preferential use by bicyclists. The 2009 MUTCD lists bike lane signs as optional; however, some states still require their use.

17. On bike lanes adjacent to a curb, "No Parking" signs (MUTCD R8-3) may be used to discourage parking within the bike lane.

Source: Urban Bikeway Design Guide, NACTO



Bicycle Lanes

A bicycle lane is that portion of the roadway that has been designated by striping, bicycle symbols, and signage for the exclusive use of bicyclists. Bicycle lanes enable bicyclists to position themselves where they will be visible to motorists and promote predictable behavior and movements between bicyclists and motorists.

Bike lanes are most appropriate on arterial and collector streets where higher vehicle traffic volumes and speeds warrant greater separation between bicyclists and motorists. Bike lanes should be at least five feet wide and can also be designed with a buffer between the lane and adjacent vehicular traffic or parked vehicles. If there is on-street parking, it is important to situate the bike lane outside the "door zone" to avoid a crash in a case where a motorist opens the vehicle door to exit as the bicyclist is passing by.

The recommended bike lanes in Knoxville require reallocating street widths through striping modifications such as lane narrowing and four to three lane conversions. The proposed four to three lane conversion along Lincoln Street/ Highway 14 would require re-striping. Roche Street and Larson Street would both require re-striping and potentially parking reduction.

Proposed Bike Lanes

Name	From - To	Length (miles)
Lincoln/ IA 14	Erwin Drive - Bell Avenue	2.14
Larson Street	Gebhardt Street - Lincoln/ IA 14	0.16
Roche Street	Buchanan Street - Main Street	0.19

Source: Urban Bikeway Design Guide, NACTO

Paved Shoulders

Paved shoulders accommodate bicycle travel on rural roadways by providing a suitable area for bicycling and reducing conflicts with faster moving motor vehicles. Paved shoulders have similar characteristics as bike lanes, but may or may not be designated through pavement markings and signage.

Generally, paved shoulders are recommended to be six feet in width allowing bicyclists to ride far enough from the edge of the pavement to avoid debris and far enough from passing vehicles to avoid conflicts. When rumble strips are provided on the paved shoulder, care should be exercised to ensure at least a minimum rideable surface of four feet is provided. Rumble strips can be a benefit to bicyclists using a paved shoulder by notifying motorists when they begin to encroach upon the shoulder. There should be no parking allowed on the pavement when the shoulder is intended to be used as a bikeway.

Proposed Paved Shoulders

Name	From - To	Length (miles)
Lincoln / IA 14	Bell Avenue - City Limits	0.98
N. Godfrey Lane	Pleasant Street - Hwy T15	0.4
Highway T15	Lake Drive - N. Godfrey Lane	0.22

Intersection Treatments

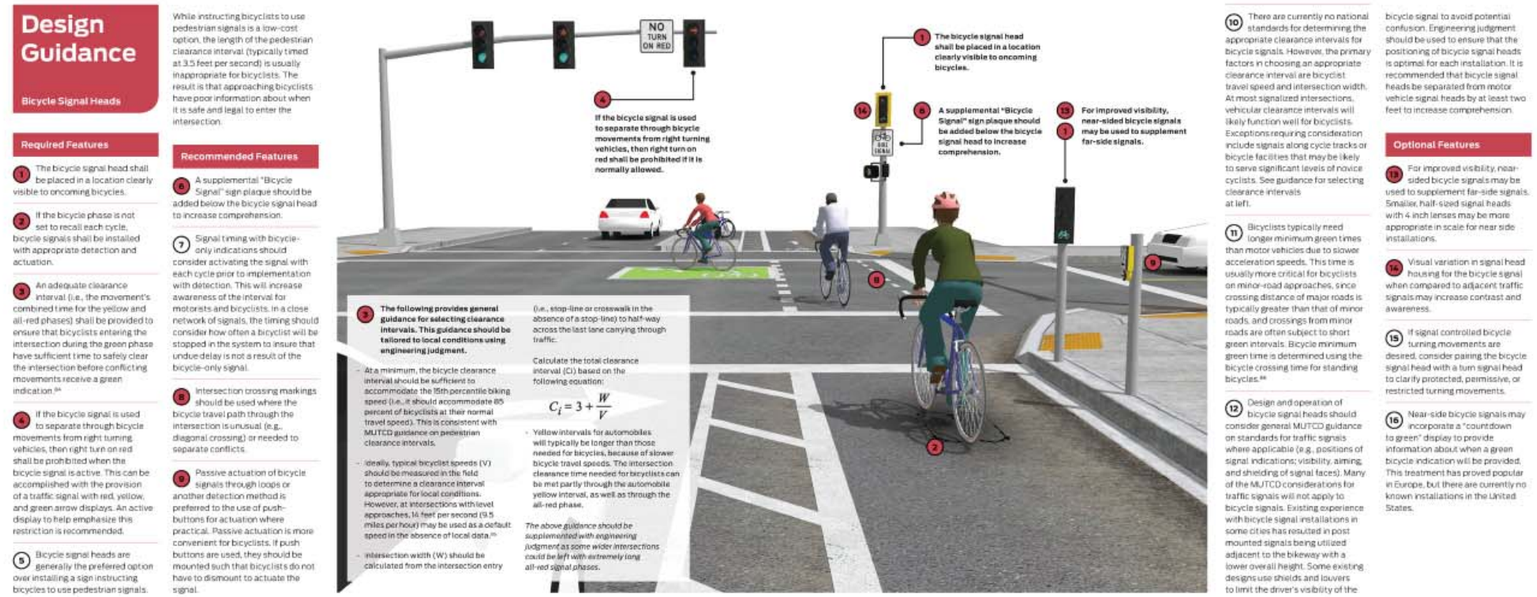
Intersections should be designed to accommodate bicyclists, pedestrians and motorists in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflicts between users by increasing visibility, identifying the right-of-way, and ensuring users are aware of each other. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, adjacent street functions, and adjacent land uses.

Bicycle Signal Detection

Bicyclists are unable to trigger a stop light to change in the same manner as motorists. Bicycle detection is used at actuated traffic signals to request a green light and reduce the likelihood of bicyclists running a red light due to the light not changing. Detection can be used either through the use of push buttons or by automated means. Automated detection methods include in-pavement loops or videos. Proper bicycle detection must accurately detect bicyclists and provide clear guidance to bicyclists on how to actuate detection.

Bicycle Signal Head

Bicycle signal heads may be installed at signalized intersections to improve safety for bicyclists. Signal heads provide guidance for bicyclist at intersections where they have different needs from other road users. Bike signals should only be used in combination with an existing conventional traffic signal or beacon. Bicycle signal heads are oriented toward the bicyclists and provide a green bicycle symbol to indicate when it is safe for them to proceed.



Design Guidance

Bicycle Signal Heads

Required Features

1. The bicycle signal head shall be placed in a location clearly visible to oncoming bicycles.

2. If the bicycle phase is not set to recall each cycle, bicycle signals shall be installed with appropriate detection and actuation.

3. An adequate clearance interval (i.e., the movement's combined time for the yellow and all-red phases) shall be provided to ensure that bicyclists entering the intersection during the green phase have sufficient time to safely clear the intersection before conflicting movements receive a green indication.[24]

4. If the bicycle signal is used to separate through bicycle movements from right turning vehicles, then right turn on red shall be prohibited when the bicycle signal is active. This can be accomplished with the provision of a traffic signal with red, yellow, and green arrow displays. An active display to help emphasize this restriction is recommended.

5. Bicycle signal heads are generally the preferred option over installing a sign instructing bicycles to use pedestrian signals. While instructing bicyclists to use pedestrian signals is a low-cost option, the length of the pedestrian clearance interval (typically timed at 3.5 feet per second) is usually inappropriate for bicyclists. The result is that approaching bicyclists have poor information about when it is safe and legal to enter the intersection.

Recommended Features

6. A supplemental "Bicycle Signal" sign plaque should be added below the bicycle signal head to increase comprehension.

7. Signal timing with bicycle-only indications should consider activating the signal with each cycle prior to implementation with detection. This will increase awareness of the interval for motorists and bicyclists. In a close network of signals, the timing should consider how often a bicyclist will be stopped in the system to insure that undue delay is not a result of the bicycle-only signal.

8. Intersection crossing markings should be used where the bicycle travel path through the intersection is unusual (e.g., diagonal crossing) or needed to separate conflicts.

9. Passive actuation of bicycle signals through loops or another detection method is preferred to the use of push-buttons for actuation where practical. Passive actuation is more convenient for bicyclists. If push buttons are used, they should be mounted such that bicyclists do not have to dismount to actuate the signal.

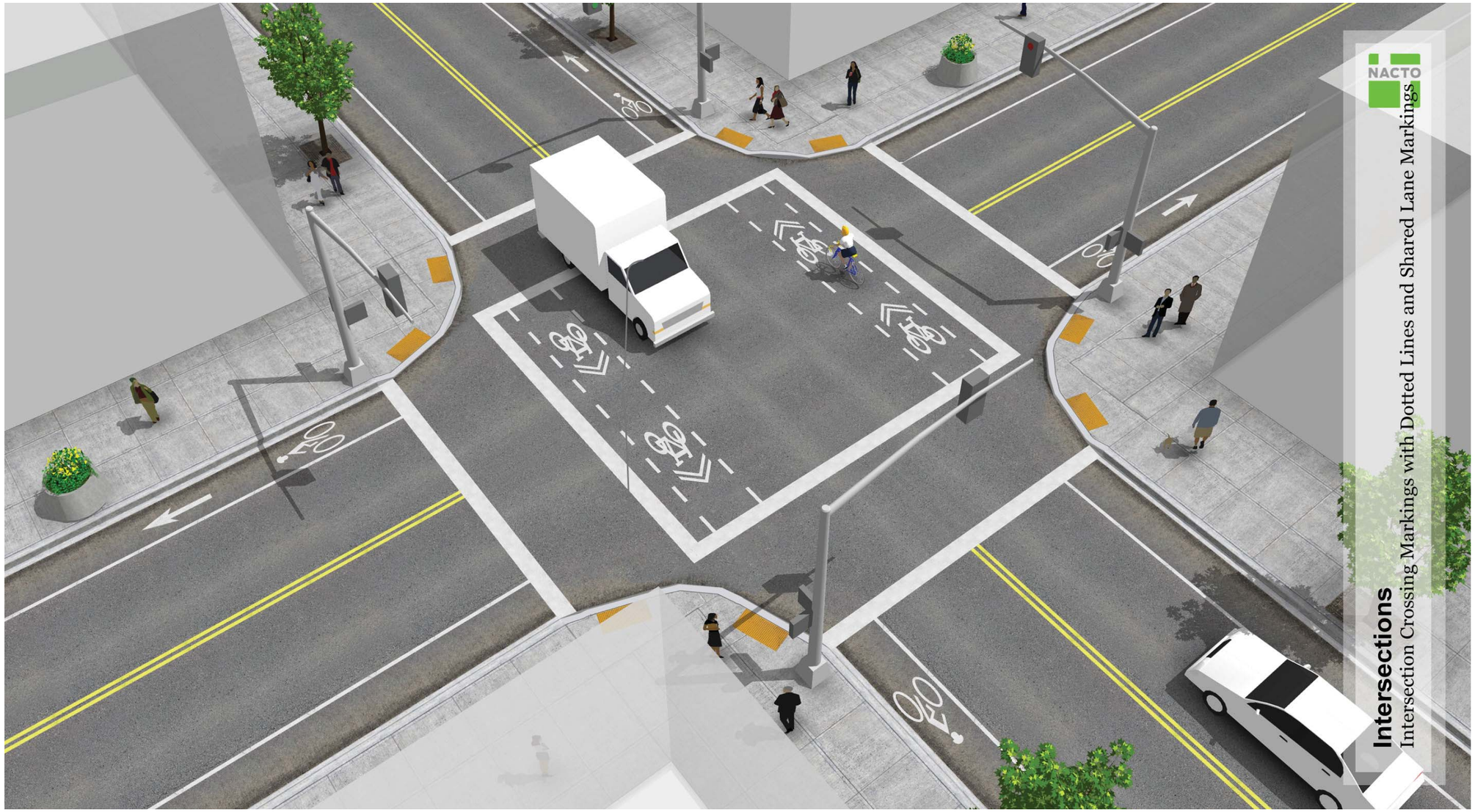
Active Warning Beacons

Active warning beacons are user-actuated amber flashing lights that supplement warning signs at unsignalized intersections or mid-block crosswalks. Beacons can be actuated either manually by a push button or passively through detection. Warning beacons can be installed on either two-lane or multi-lane roadways. Warning beacons should be used to alert drivers to yield where bicyclists and pedestrians have the right-of-way crossing a road. Rectangular rapid-flashing beacons have a vehicle yielding compliance of approximately 70% higher than a standard beacon.

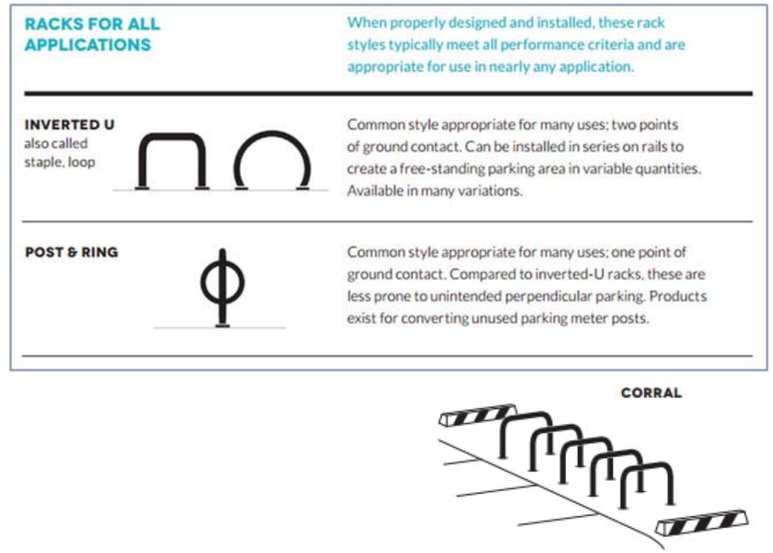
Source: Urban Bikeway Design Guide, NACTO

Bikeway Markings at Intersections

Continuing marked bicycle facilities at intersections ensures that separation, guidance on proper positioning, and awareness by motorists are maintained through these potential conflict areas.



Source: Urban Bikeway Design Guide, NACTO



Source: Association of Pedestrian and Bicycle Professionals

Bicycle Parking

While the designated bikeways are the most visible element in a citywide bikeway network, bicyclists must also have a secure, convenient, and obvious place to store their bicycles at a trip's end. This is important in promoting bicycling as a viable mode of transportation. On the Knoxville Bicycle and Trails Master Plan Survey, the lack of places to park a bicycle was the third most common concern when respondents considered biking on streets. Additionally, 60% of respondents stated that the addition of bike parking would influence them to bike more often.

The Association of Pedestrian and Bicycle Professionals (APBP) provides guidelines on the types and locations of bicycle parking.

Bike Rack Types

Bike racks should provide two points of contact with the frame of the bicycle in order to property support the bicycle. They should also easily allow a bike lock to be looped around the rack. All racks should be sturdy and well-anchored. An inverted-U type of rack is a popular option that meets these requirements. These types of racks each support two bicycles, one on each side of the rack. Racks can be custom designed to give a unique look and reflect the aesthetics of the area and still meet the recommendations of the APBP.

Bike Parking Location

Bike parking should be located in a convenient and accessible location for cyclists. Typically, bike parking should be close to the front entrance of the building and preferably visible from a window. Covered bike parking is a highly preferred amenity to protect the parking area from inclement weather. A well-lit and highly visible area will improve security.

In a downtown setting, bike parking can be provided on the sidewalk in areas that do not interfere with adjacent vehicle parking, handicap accessible routes, or access to other amenities such as mail boxes. This typically results in racks being installed parallel to the sidewalk and in line with other obstacles on the sidewalk such as planters, light poles, benches, waste receptacles or parking meters.

Another option for both downtown areas and parking lots is to convert a vehicular parking space to bicycle parking using a bike corral. When replacing a single auto parking space, a corral can generally fit 8-12 bicycles. Bike corrals can be installed seasonally, if so desired.

In downtown Knoxville, some of the sidewalks are too narrow to accommodate bicycle parking, but the angle parking on the street creates unusable space at the ends of rows of that could be suitable for bicycle parking. Potential sites are outlined on the downtown concept plan.

Wayfinding Signage

Wayfinding signage can alert visitors of important landmarks, natural features, civic destinations, neighborhoods and routes to key destinations or attractions. Effective signage can encourage more people to bicycle by leading people to on-street facilities that connect to various destinations. These signs also aid in users in identifying their location in an emergency call situation. Users also benefit from signage to identify the best routes to take to get to key destinations, saving time and energy. The MUTCD provides guidance on signage design, but custom signage can be developed that is complementary to the downtown wayfinding signage that has already been installed in Knoxville.

Trail head maps include the entire trail and on-street bicycle network in the area so people can plan their routes from the starting point.

Confirmation signs can be used along long routes to indicate that bicyclists or other users are continuing on a designated bikeway or trail. These signs include destinations and may include distance, but they do not include arrows since they are located along a straight path. For on-street bikeways, motorists are also made aware of the bicycle route.

Turn signs indicate where a bikeway turns from one street to another street. Turn signs include arrows and destinations and may include distance and estimated bicycling time. Turn signs should be placed on the near-side of intersections and may be supplemented with pavement markings.

Decision signs mark the junction of two or more bike routes or trails. Decision signs inform users of the designated routes to access key destinations. Decision signs include destinations, arrows, and may include bicycling travel times.

Phasing Plan

The Knoxville Bicycle and Trail Master Phasing Plan allows the City to focus and prioritize implementation efforts where they will provide the greatest community benefit with the shortest time frame. Through discussions with the IRT and BAC committees, a project phasing concept was developed to guide project completion throughout the 20-year planning horizon. The IRT should continue to prioritize projects on an annual basis in conjunction with the City's budget process and with input from the public. This section describes the methodology used for prioritizing Knoxville's proposed bike and trail facilities.

Through discussions with the IRT and BAC committees, it became apparent that the following criteria should be considered when phasing the master plan. The phasing approach lays out the best possible network by identifying which facilities will meet the needs of residents based on system connectivity, economic impact, population served, ease of implementation/cost, and correspondence with the pavement management plan.

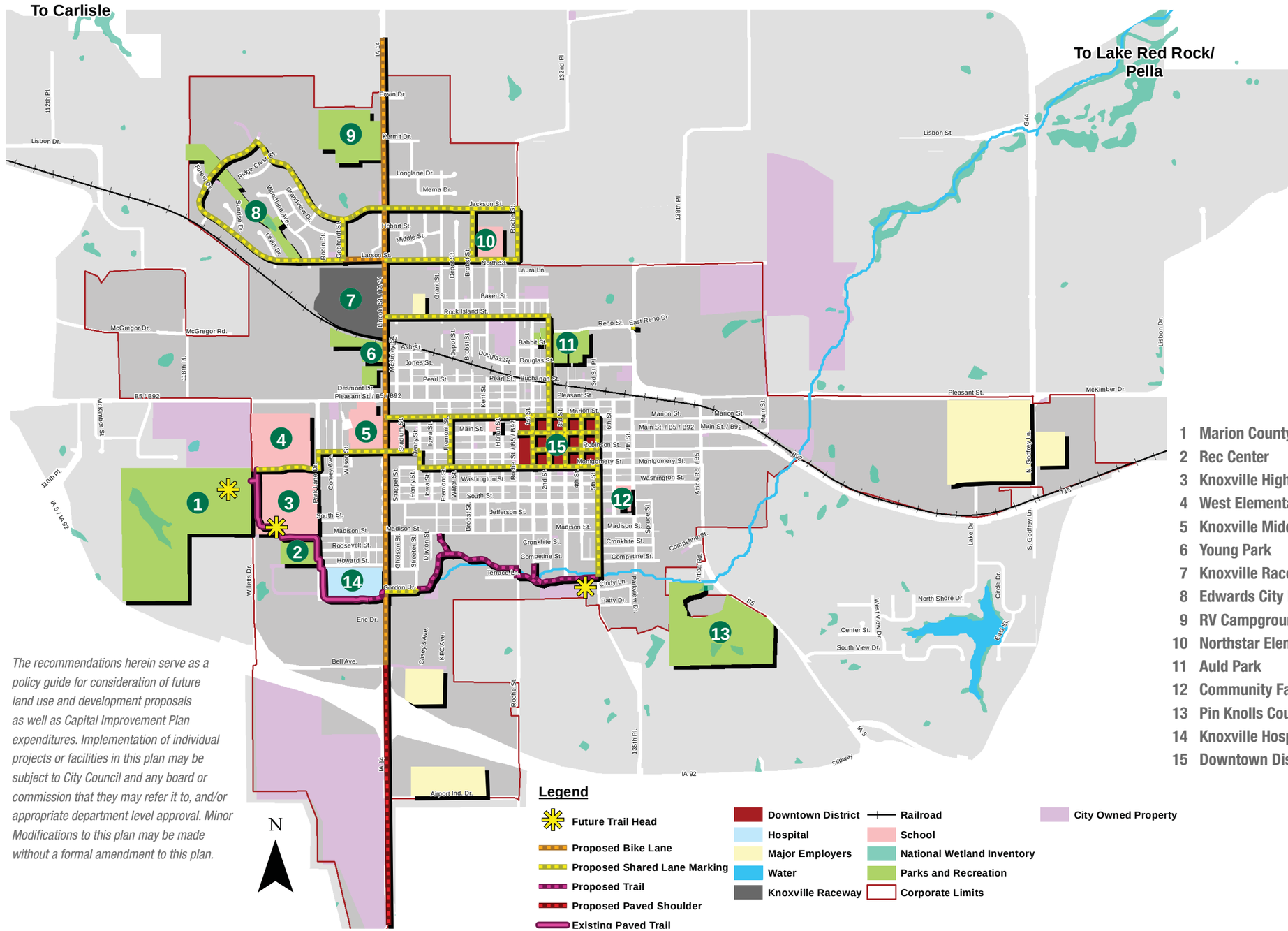
Criteria	Measurement
System Connectivity	Does the project provide connectivity to key destinations such as schools or downtown and fills gaps in the existing transportation network?
Economic Impact	Does the project provide local or regional benefit by increasing connectivity to downtown, shopping areas, places of business, or local or regional recreational destinations? Does it meet the demand for additional facilities?
Population Served	Does the project meet the desire of current residents? Will it connect new neighborhoods/populations to the existing transportation system? Does the project provide a route that would be comfortable to all types of users?
Ease of Implementation/Cost	What financial resources are available and/ or needed to implement the project? What is the ease of implementation such as right-of-way acquisition, environmental impacts, and cost?
Correspondence with the Pavement Management Plan	Does the project correlate to the City's pavement management plan? Does it provide effective and efficient use of funds to implement the project?

Based on these criteria, the recommended facilities were split into three phases and approximate timelines: Phase I (1-3 years), Phase II (3-6 years) and Phase III (6+ years).

Phase I

Consists of 1.09 miles of trail, 0.98 miles of paved shoulder, 2.53 miles of bike lanes and 8.6 miles of shared lane markings. This phase provides a loop addressing both the south and north populations of Knoxville by converting Highway 14 from four to three lanes with bike lanes, installing a safe Competine Creek Trail crossing across Highway 14, extending Competine Creek Trail to the east to connect to the 5th Street Quiet Street, and adding shared lane markings throughout the community. The phase provides connectivity to all schools and key destinations.

KNOXVILLE BIKE AND TRAIL MASTER PLAN: PHASE I



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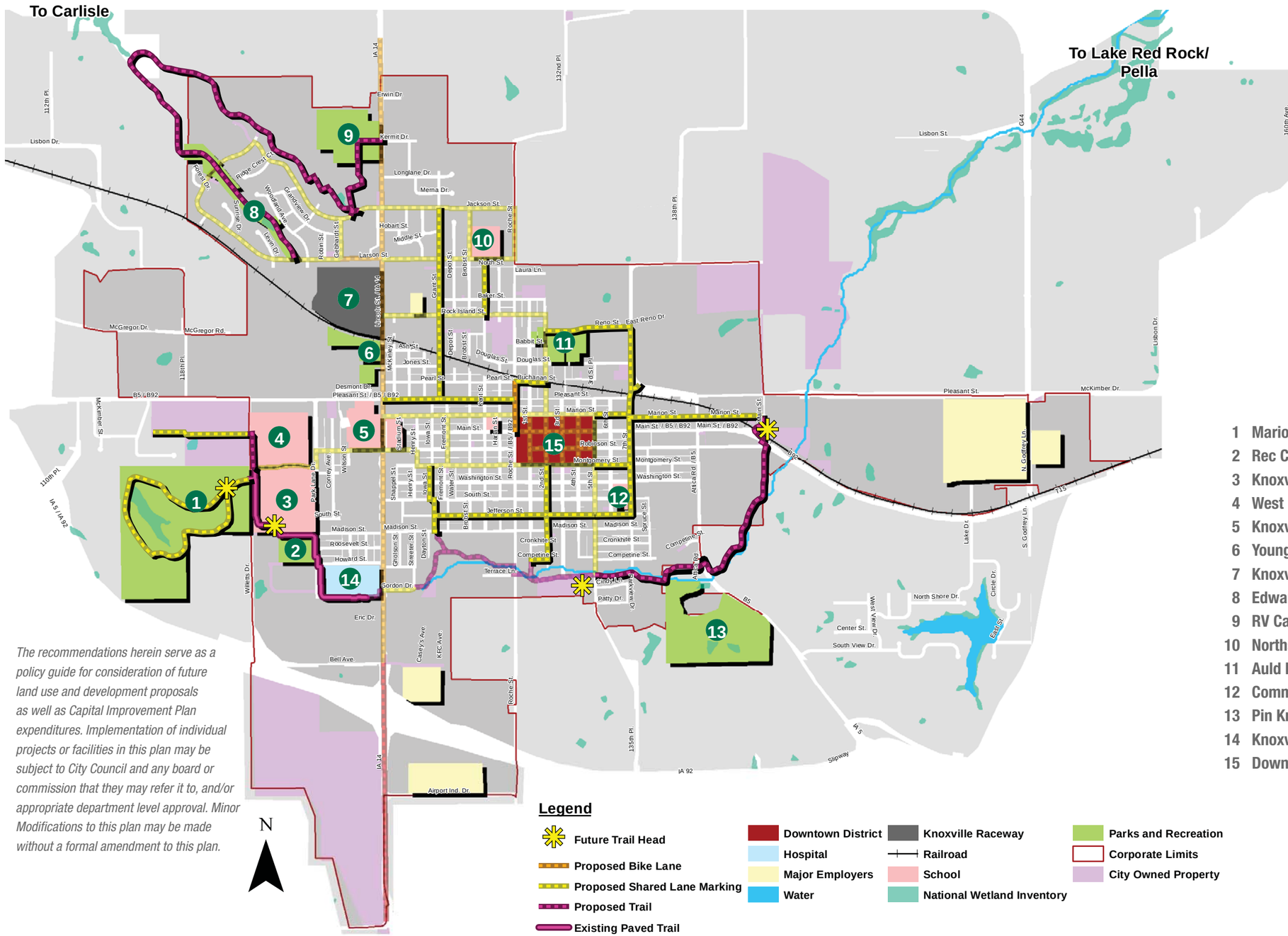
Phase II

Consists of 4.10 miles of trail, 0.19 miles of bike lanes and 6.57 miles of shared lane markings. This phase extends connectivity via trail and on-street facilities to the east side of Knoxville. Additional on-street connectivity routes are developed and a scenic trail serves the needs of populations to the north and tourists staying in the campgrounds.

KNOXVILLE BIKE AND TRAIL MASTER PLAN: PHASE II



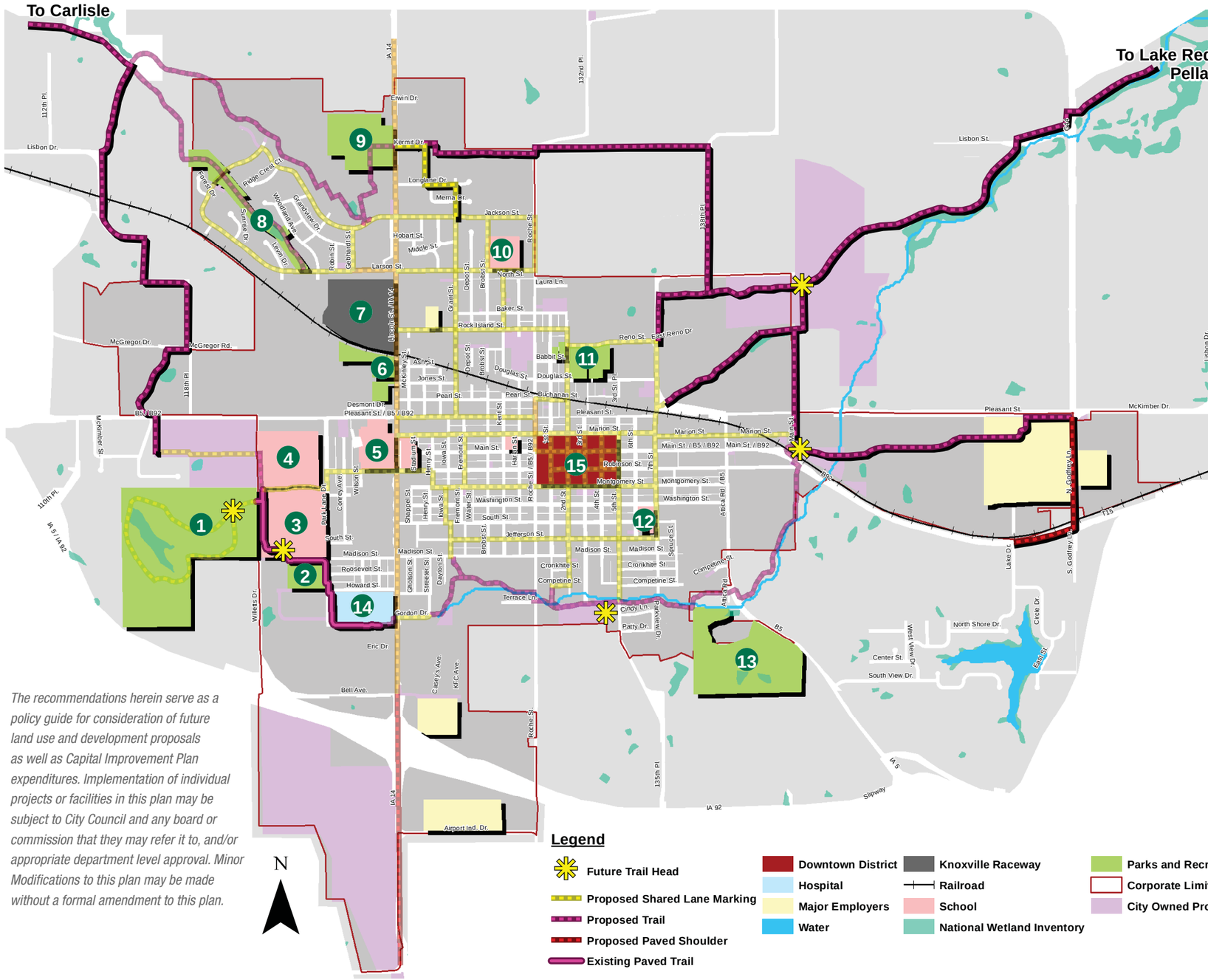
The recommendations herein serve as a policy guide for consideration of future land use and development proposals as well as Capital Improvement Plan expenditures. Implementation of individual projects or facilities in this plan may be subject to City Council and any board or commission that they may refer it to, and/or appropriate department level approval. Minor Modifications to this plan may be made without a formal amendment to this plan.

1 Marion County Park
2 Rec Center
3 Knoxville High School
4 West Elementary School
5 Knoxville Middle School
6 Young Park
7 Knoxville Raceway
8 Edwards City Park
9 RV Campgrounds
10 Northstar Elementary
11 Auld Park
12 Community Facility
13 Pin Knolls Country Club
14 Knoxville Hospital & Clinics
15 Downtown District

Phase III

Consists of 8.43 miles of trail, 0.62 miles of paved shoulder and 0.47 miles of shared lane markings. This phase completes the "Knoxville Loop" as desired in the project survey. Connections to the 3M campus and other large employers are included. This loop also opens up regional connectivity opportunities to Carlisle and Lake Red Rock.

KNOXVILLE BIKE AND TRAIL MASTER PLAN: PHASE III



1 Marion County Park
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Heuristic per mile costs for varying types of accommodations are presented in the following table:

Facility Type	Heuristic Cost per Mile	Modification Factors		Resulting Cost per Mile
New paved trail on independent alignment, 10' wide	$400,000	Former RR grade	0.5	$200,000
		Flat terrain	0.6	$240,000
		Rolling terrain	1	$400,000
		Hilly terrain	1.2	$480,000
		Along streambank	1.2	$480,000
New paved sidepath, 10' wide	$300,000	Along urban roadway	1	$300,000
		Along rural roadway	1.6	$480,000
		Densely developed urban	1.4	$420,000
New paved shoulders, 6' wide both sides	$330,000	Adequate shoulder width present	1	$330,000
		Embankment widening required	2	$660,000
Shared Lane Markings	$13,000	Shared lane markings and signing - Assumes $120/symbol; $250/sign; 2 signs and 2 symbols for every 300 ft block	1	$13,000
Bike Lane	$14,000	Bike lane striping, signing and symbols - Assumes $120/symbol; $250/sign; $60/100 l.f. of striping; 2 signs and 4 symbols for every 600 ft block + solid striping on both sides of street	1	$14,000

Phase I

Name	From - To	Facility Type	Length (miles)	Cost Per Mile	Estimated Project Cost
Competine Trail	Highway 14 - 5th Street	Trail	1.08	$480,000	$518,400
Competine Trail	Highway 14 Crossing Only	Crossing	0.04	n/a	$30,210
Lincoln / IA 14	Erwin Drive - Bell Avenue	Bike Lanes	2.14	$14,000	$29,960
Larson Street	Gebhardt Street - Lincoln/IA 14	Bike Lanes	0.16	$14,000	$2,240
Lincoln / IA 14	Bell Avenue - City Limits	Paved Shoulder	0.98	$330,000	$323,400
5th Street	Marion Street - Competine Trail	Quiet Street	0.61	$16,820	$10,260
Roche Street	Jackson Street - Larson Street	SLM	0.19	$13,000	$2,470
Brobst Street	Jackson Street - Larson Street	SLM	0.09	$13,000	$1,170
Gebhardt Street	Jackson Street - Larson Street	SLM	0.15	$13,000	$1,950
Larson Street	Jackson Street - Gabhardt Street	SLM	0.95	$13,000	$12,350
Larson Street	Lincoln/IA 14 - Roche Street	SLM	0.5	$13,000	$6,500
Rock Island Street	Linclon/IA 14 - 2nd Street	SLM	0.61	$13,000	$7,930
Marion Street	Lincoln/IA 14 - 5th Street	SLM	0.8	$13,000	$10,400
Fremont Street	Marion Street - Montgomery Street	SLM	0.19	$13,000	$2,470
4th Street	Marion Street - Montgomery Street	SLM	0.19	$13,000	$2,470
3rd Street	Marion Street - Montgomery Street	SLM	0.19	$13,000	$2,470
2nd Street	Montgomery Street - Rock Island Street	SLM	0.57	$13,000	$7,410
1st Street	Marion Street - Montgomery Street	SLM	0.19	$13,000	$2,470
Montgomery Street	Henry Street - 5th Street	SLM	0.67	$13,000	$8,710
Henry Street	Robinson Street - Montgomery Street	SLM	0.06	$13,000	$780
Robinson Street	1st Street - 5th Street	SLM	0.24	$13,000	$3,120
Robinson Street	Park Lane Drive - Henry Street	SLM	0.38	$13,000	$4,940
Main Street	Roche Street - 5th Street	SLM	0.3	$13,000	$3,900
Panther Drive	Willits Drive - Park Ln Drive	SLM	0.23	$13,000	$2,990
Gordon Drive	Lincoln / IA 14 - Streeter Street	SLM	0.13	$13,000	$1,690
					$1,000,660

These tables provide heuristic construction costs, which are intended to be general and used for planning purposes. These construction estimates do not include costs for additional planning, surveying, engineering design, right-of-way acquisition, mobilization, landscaping or aesthetics, utility adjustments, or construction administration.

Unit costs per mile for trails, sidepaths and paved shoulders are based on average construction costs of numerous trail projects over time.

Unit costs per mile for the on-street facilities assume only those markings that would not otherwise be present on the roadway (e.g. bike lane and shared lane markings symbols and additional striping and signage). They do not include removal of old markings or adjustment of vehicular travel markings. Average costs for signs and pavement markings were determined using bids in Iowa over the past year.

Phase II

Name	From - To	Facility Type	Length (miles)	Cost Per Mile	Estimated Project Cost
Edwards City Park Trail	Larson Street - Competine Trail	Trail	0.62	$480,000	$297,600
Park to Park Trail	Edwards Park - Highway 14 (Campgrounds)	Trail	2.03	$480,000	$974,400
Competine Trail	Marion County Park - Graceland Cemetery	Trail	0.15	$480,000	$72,000
Competine Trail	5th Street - Marion Street	Trail	1.61	$480,000	$772,800
Competine Trail	Attica Road Crossing	Crossing Only	n/a	n/a	$19,740
Roche Street	Buchanan Street - Main Street	Bike Lanes	0.19	$14,000	$2,660
Grant Street	Longlane Drive - Pleasant Street	SLM	0.85	$13,000	$11,050
Kent Street	Larson Street - Rock Island Street	SLM	0.21	$13,000	$2,730
Pleasant Street	Lincoln/ IA 14 - Roche Street	SLM	0.5	$13,000	$6,500
Buchanan Street	Roche Street - 2nd Street	SLM	0.12	$13,000	$1,560
Reno Street	2nd Street - 7th Street	SLM	0.32	$13,000	$4,160
Marion Street	5th Street - Main Street	SLM	0.13	$13,000	$1,690
Montgomery Street	5th Street - 7th Street	SLM	0.13	$13,000	$1,690
Graceland Cemetery	through cemetery	SLM	0.36	$13,000	$4,680
Marion County Park	through park	SLM	1.35	$13,000	$17,550
Jefferson Street	Iowa Street - 7th Street	SLM	0.74	$13,000	$9,620
Competine Street	1st Street - 2nd Street	SLM	0.06	$13,000	$780
7th Street	Reno Street - Jefferson Street	SLM	0.71	$13,000	$9,230
2nd Street	Competine Street - Montgomery Street	SLM	0.36	$13,000	$4,680
Iowa Street	Montgomery Street - Madison Street	SLM	0.27	$13,000	$3,510
					$2,218,630

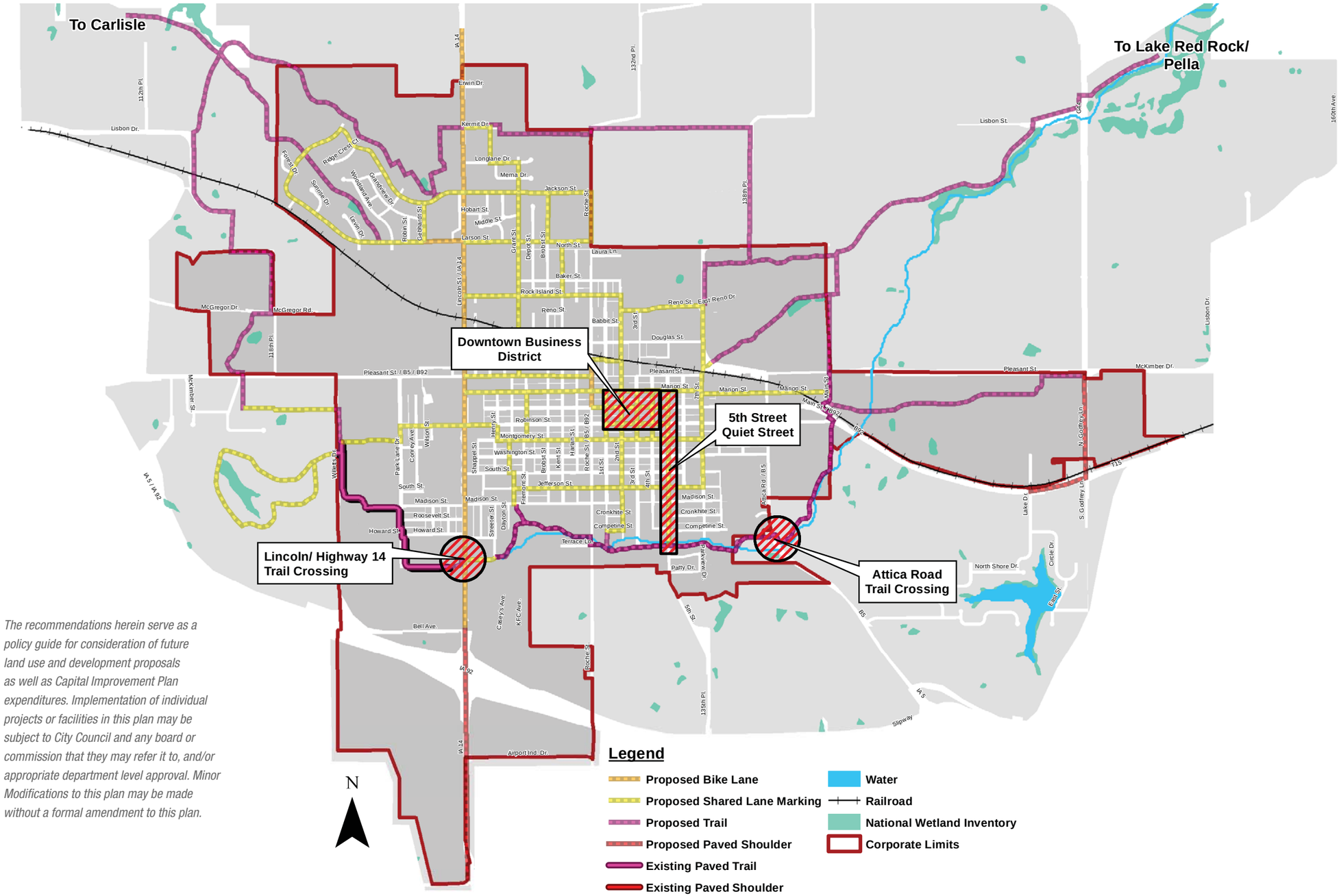
Phase III

Name	From - To	Facility Type	Length (miles)	Cost Per Mile	Estimated Project Cost
Cemetery - Park Trail	Graceland Cemetery - Edwards Park	Trail	2.25	$480,000	$1,080,000
Downtown Connection	7th Street - Competine Trail	Trail	0.56	$480,000	$268,800
Reno Connection	Reno Street - Competine Trail	Trail	0.35	$400,000	$140,000
3M Connection	Competine Trail - 3M Campus	Trail	1.08	$400,000	$432,000
Kermit Reno Trail	Kermit Drive - Reno Connector	Trail	1.64	$400,000	$656,000
N. Godfrey Lane	Pleasant Street - Hwy T15	Paved Shoulder	0.4	$330,000	$132,000
Highway T15	Lake Drive - N. Godfrey Lane	Paved Shoulder	0.22	$330,000	$72,600
Dolores Street	Kermit Drive - Longlane Drive	SLM	0.13	$13,000	$1,690
Kermit Drive	Lincoln/IA 14 - Dolores Street	SLM	0.1	$13,000	$1,300
Longlane Drive	Dolores Street - Grant Street	SLM	0.11	$13,000	$1,430
Jackson Street	Larson Street - Roche Street	SLM	1.13	$13,000	$14,690
					$2,800,510

Concept Plans

The IRT and BAC committees identified four key areas to study in further detail. These four locations are important connections and examples of how this plan can be implemented. Each concept plan provides details about the signs, pavement markings, and any infrastructure that might be necessary to implement the project. The Competine Creek Trail crossing of Lincoln/Highway 14 is a critical next step for expansion of the trail. The Attica Road Crossing will be important for a future phase. The 5th Street Quiet Street is the priority route identified to connect the future Competine Trail along the south side of town to the downtown area. The downtown area is important as a destination for both residents and visitors and to support economic activity in the area.

CONCEPT PLAN LOCATIONS



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Trail Crossing Lincoln Street/Highway 14

One of the barriers to extending the Competine Creek Trail to the east is the Lincoln Street/Highway 14 crossing. Currently, the street contains four lanes of high volume (9,500 to 10,700 Annual Average Daily Traffic (AADT) in 2014), high speed (35 – 40 mph posted) traffic. Trying to cross the street on foot or bicycle would pose significant safety concerns for users of both the trail system and highway system. The proposed four to three lane conversion with bicycle lanes on Highway 14, which was recommended in a recent Iowa DOT Traffic Engineering Assistance Program (TEAP) Study completed in September 2015, would provide bicycle connectivity to the Competine Creek Trail and a direct route to various businesses and attractions along Highway 14.

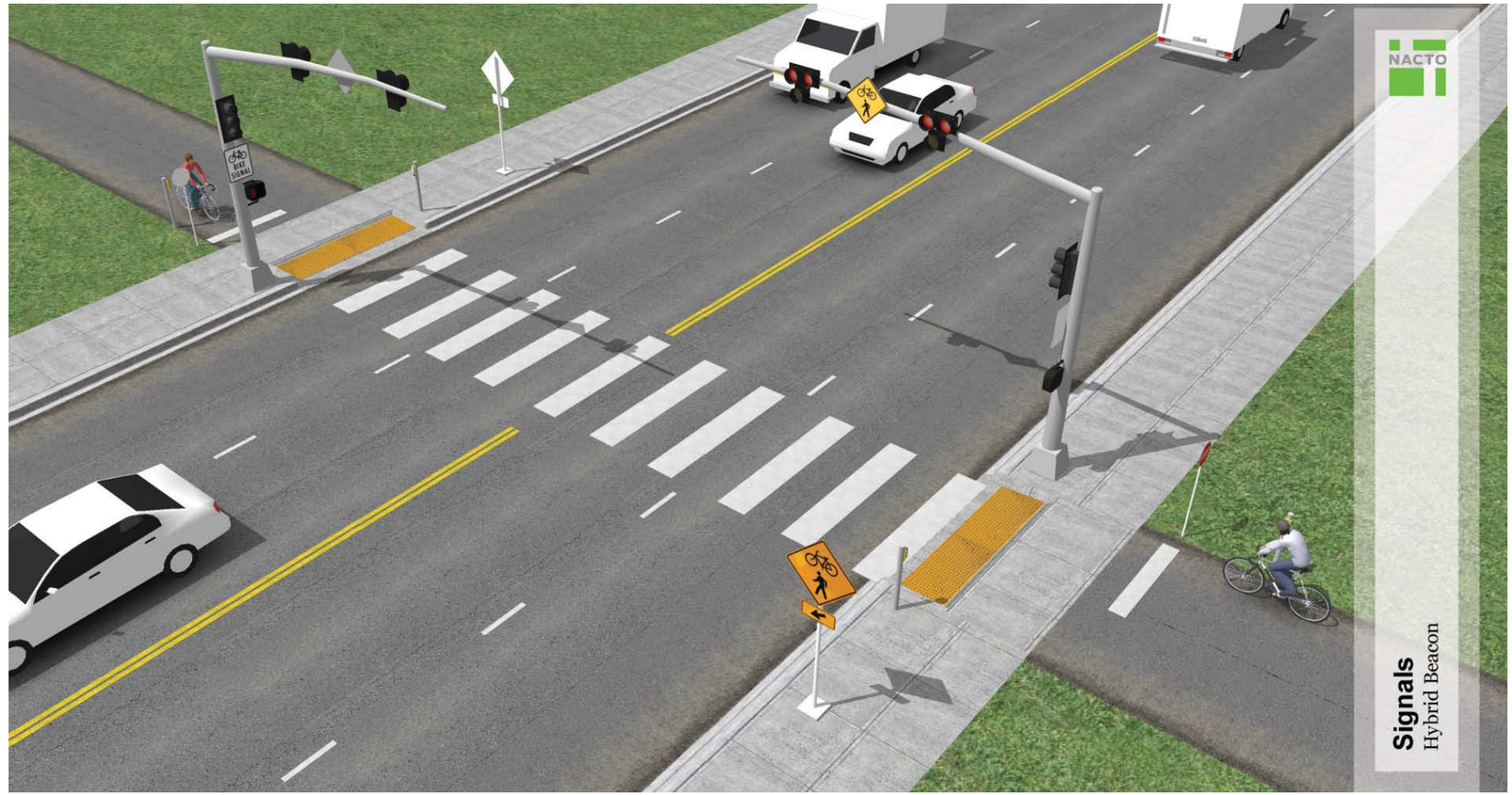
With the existing four-lane cross section on Highway 14, the safest place for pedestrians to cross is at the existing stop-light controlled intersection with Madison Avenue which is approximately 1200 feet to the north. This is not a convenient route for the Competine Creek Trail, since it creates an indirect path for trail users who would be required to travel north and back south along sidewalks between the trail and the Madison Avenue intersection.

When the four to three lane conversion is implemented, then mid-block crossings can safely be established. Crossing techniques vary from just signage alerting motorists to the potential for bicycle or pedestrians to cross at a particular location to lights requiring motorists to stop. In this case, a middle technique is recommended.

The proposed crossing treatment across Highway 14 includes a rectangular rapid-flashing beacon (RRFB). Bicycle and pedestrian crossing "AHEAD" signs should be placed approximately 100 feet prior to the crossing of the roadway. Crosswalks should be installed to direct trail users on where to cross and to notify vehicles of where to yield to pedestrians and bicyclists. Since Highway 14 is a proposed to be converted from four to three lanes, the center lane should be designed to include a curbed median refuge to provide a safety point as trail users cross. The existing speed limit changes from 35 to 40 mph approximately 100 feet south of the proposed crossing location. This speed limit change could be shifted even further south to keep traffic at a slower speed near the crossing.

If the number of trail users reaches a point of 50 users per hour at peak hour, then an upgraded crossing may be warranted. This would include a HAWK (High-Intensity Activated crossWalK) beacon, which would remain green for vehicles on Highway 14 until a sensor or push-button activated signal would give a red light to vehicles and indicate that trail users should cross.

The Competine Creek Trail route would continue to Gordon Drive and shared lane markings would be installed leading to a trail connection that would follow an existing City-owned parcel back toward the Creek. This differs from the original Competine Creek Trail Extension plan that was developed in 2010 and followed the south side of the creek greenway. The greenway area is very steep between the creek and the business to the south of the creek. The IRT and BAC committees agreed that using Gordon Drive was the preferred alternative.



Source: Urban Bikeway Design Guide, NACTO
If trail usage reaches 50 users per peak hour or more, the crossing could be upgraded to a HAWK hybrid beacon.

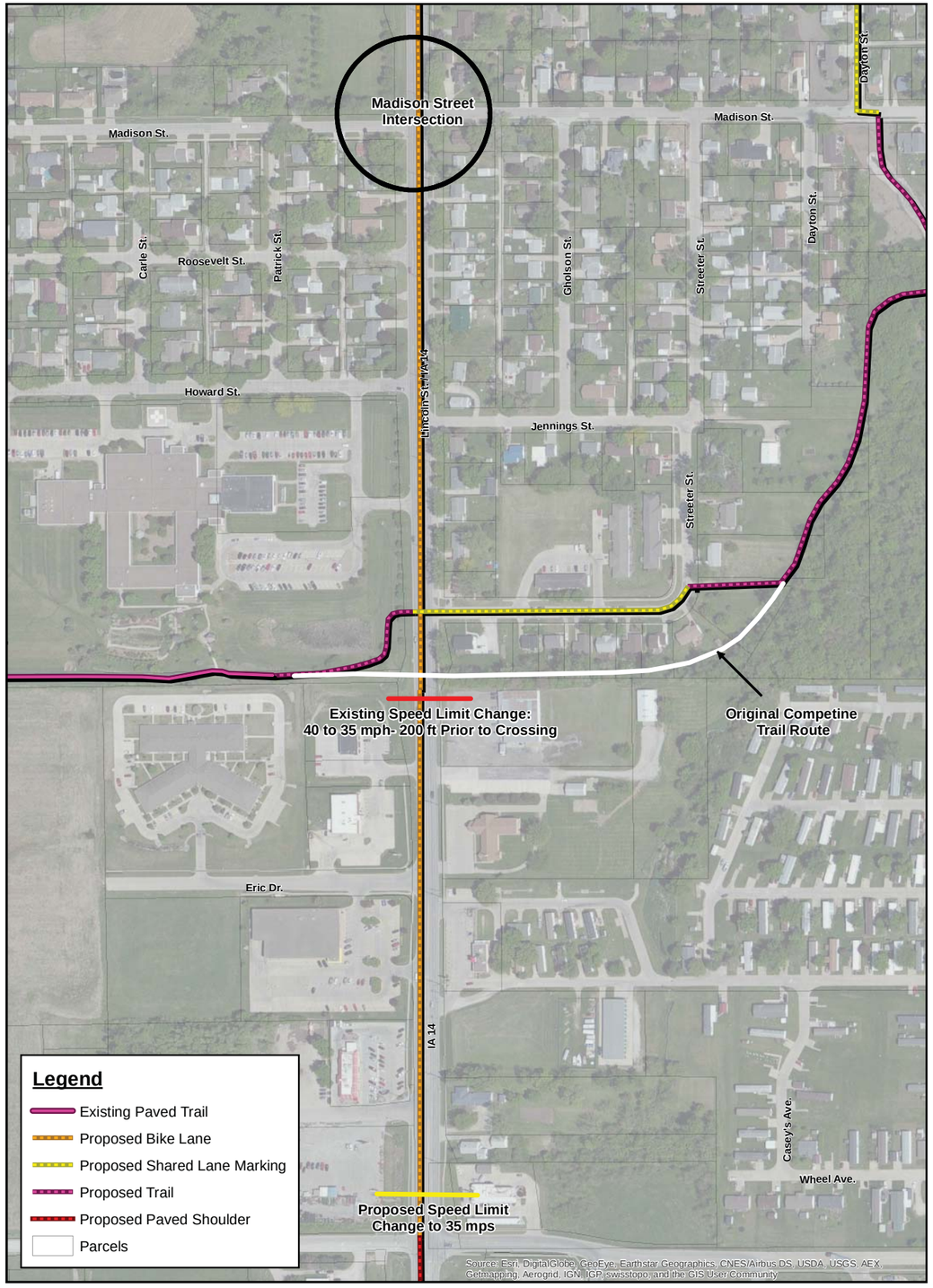
ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS
CONCEPTUAL PLAN

KNOXVILLE BICYCLE & TRAIL MASTER PLAN
Highway 14 Trail Crossing

Snyder & Associates Project No. 115.0356
October 25, 2015

ITEM NUMBER	ITEM DESCRIPTION	UNIT OF MEASURE	TOTAL UNITS	UNIT PRICE	EXTENDED COST
1	RECTANGULAR RAPID FLASH BEACON	EA	1	$ 15,000.00	$ 15,000.00
2	BICYCLE/PED CROSSING SIGN (W11-15) 30" x 30"	EA	4	$ 250.00	$ 1,000.00
3	AHEAD SIGN (W16-9P) 24" x 12"	EA	2	$ 115.00	$ 230.00
4	STOP SIGN (R1-1) 18" x 18"	EA	2	$ 140.00	$ 280.00
5	HIGH-VISIBILITY CROSSWALK PAINT	ST	7.2	$ 300.00	$ 2,160.00
6	MEDIAN REFUGE	SY	70	$ 100.00	$ 7,000.00
7	KEEP RIGHT SIGN (R4-7) 18" x 24"	EA	2	$ 145.00	$ 290.00
8	DESTINATION SIGN (D1-1b)	EA	3	$ 140.00	$ 420.00
9	SHARED LANE MARKINGS - PAINT* (GORDON DRIVE)	EA	4	$ 120.00	$ 480.00
			CONSTRUCTION SUB-TOTAL		$ 26,860.00
			CONTINGENCY (PRE-DESIGN)	15% +/-	$ 4,000.00
			CONSTRUCTION TOTAL		$ 30,860.00

*The City may elect to install durable pavement markings instead of paint. Durable markings can be expcted to last 2-3 years and cost approximately $270 each for shared lane markings.



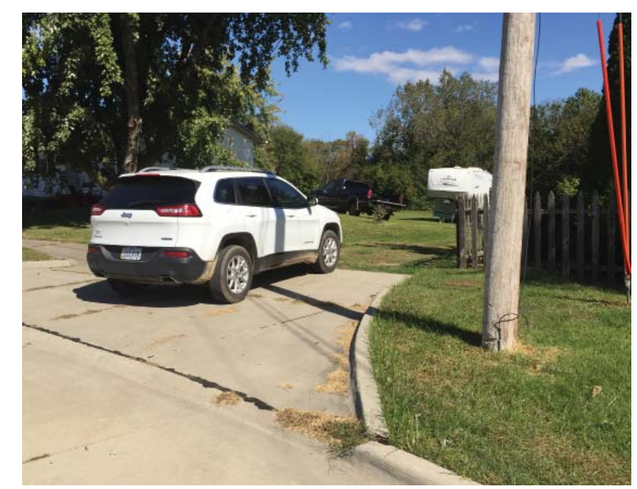
Facing north on Hwy 14 (west side)

Facing south on Hwy 14 (west side)

Facing north on Hwy 14 (east side)

Facing south on Hwy 14 (east side)

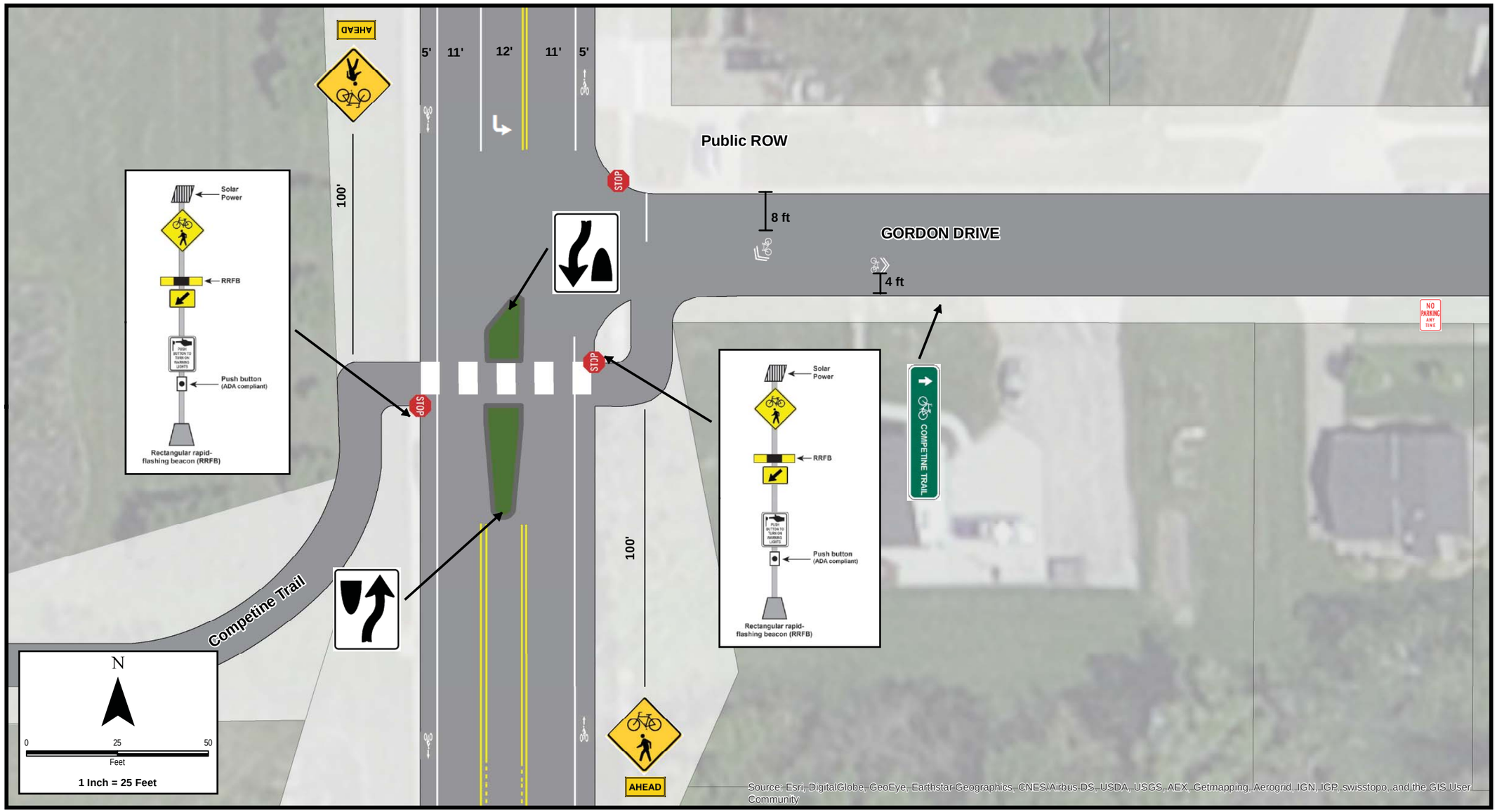
Facing east on Gordon Drive


Gordon Drive to trail connection

CONCEPT OVERVIEW
HIGHWAY 14 CROSSING

TRAIL CROSSING TREATMENT

SNYDER & ASSOCIATES
Engineers and Planners

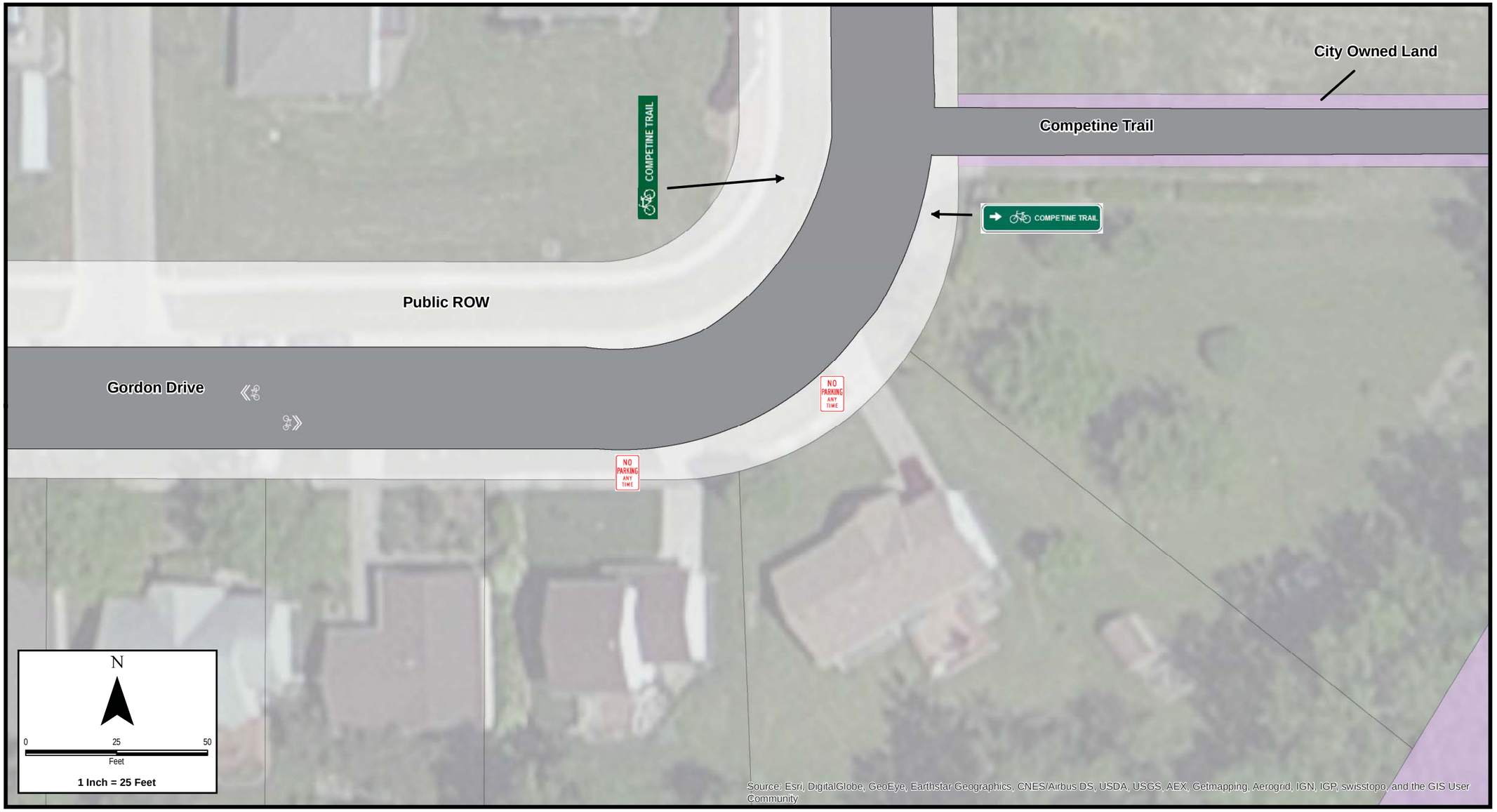


Page 1

CONCEPT OVERVIEW
HIGHWAY 14 CROSSING

TRAIL CROSSING TREATMENT

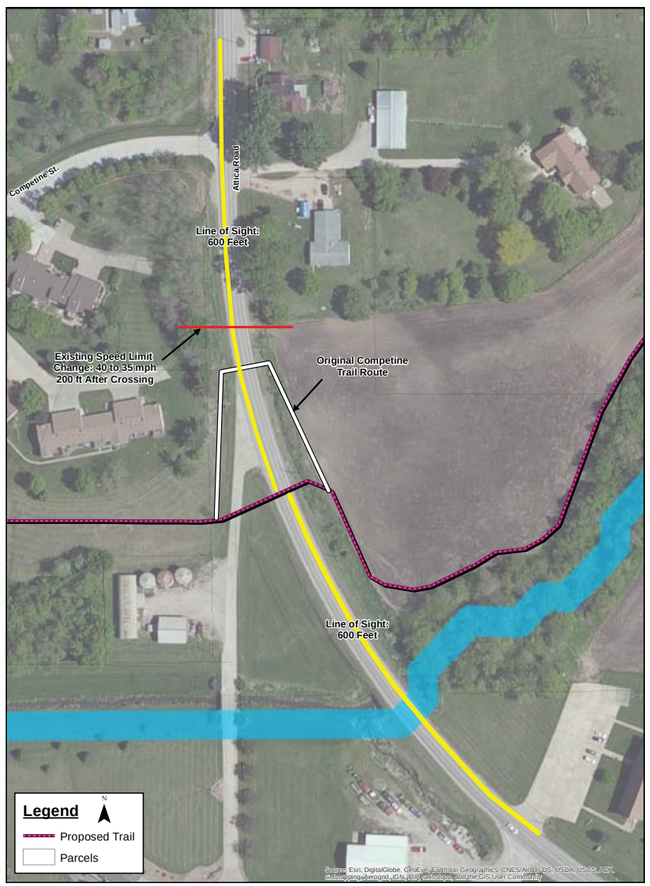
SNYDER & ASSOCIATES
Engineers and Planners



Trail Crossing Attica Road

Another barrier to the Competine Creek Trail construction is the Attica Road crossing. The original Competine Creek Trail Extension Plan developed in 2010, proposed a crossing point further north on Attica Road. This crossing location would require that trail users travel north and south, up and back down a hill, to stay on the trail route.

Creating a safe crossing at the location proposed in the conceptual plan will create a better accommodation for trail users than the originally proposed location. The recommended trail crossing site displays adequate line of site for trail users and oncoming motorists. Currently, the speed limit at the proposed crossing location is 45 mph, but changes to 35 mph approximately 200 feet to the north. The 35 mph speed limit should be shifted to a point south of the proposed crossing location so that traffic at the crossing should not be traveling faster than 35 mph. The 2014 traffic volume on this section of Attica Road was between 2600 and 2800 AADT. The proposed crossing treatment includes a manually-activated rectangular rapid-flashing beacon (RRFB) and a high-visibility marked crosswalk. Additional bicycle and pedestrian crossing "AHEAD" signs will be placed approximately 175 feet prior to the crossing of the roadway.



Facing north on Attica Road (west side)

Facing south on Attica Road (west side)

Facing north on Attica Road (east side)

Facing south on Attica Road (east side)

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS
CONCEPTUAL PLAN

KNOXVILLE BICYCLE & TRAIL MASTER PLAN
Attica Road Trail Crossing

Snyder & Associates Project No. 115.0356
October 25, 2015

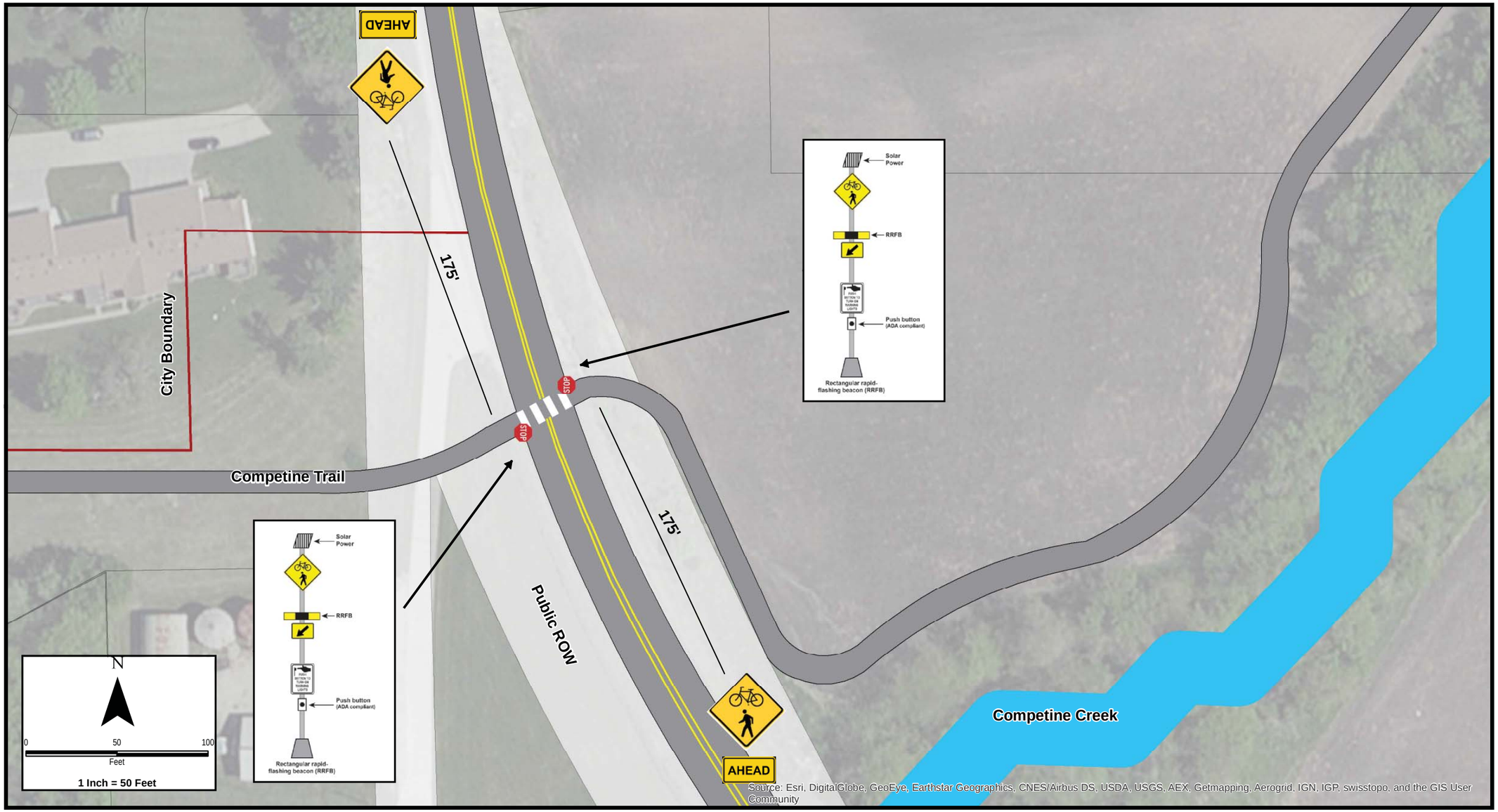
ITEM NUMBER	ITEM DESCRIPTION	UNIT OF MEASURE	TOTAL UNITS	UNIT PRICE	EXTENDED COST
1	RECTANGULAR RAPID FLASH BEACON (RRFB)	EA	1	$ 15,000.00	$ 15,000.00
2	AHEAD SIGN (W16-9P) 24" x 12"	EA	2	$ 115.00	$ 230.00
3	BICYCLE/PED CROSSING SIGN (W11-15) 30" x 30"	EA	2	$ 250.00	$ 500.00
4	HIGH-VISIBILITY CROSSWALK PAINT	STA	3.9	$ 300.00	$ 1,170.00
5	STOP SIGN (R1-1) 18"	EA	2	$ 140.00	$ 280.00
				CONSTRUCTION SUB-TOTAL	$ 17,180.00
				CONTINGENCY (PRE-DESIGN) 15% +/-	$ 2,560.00
				CONSTRUCTION TOTAL	$ 19,740.00

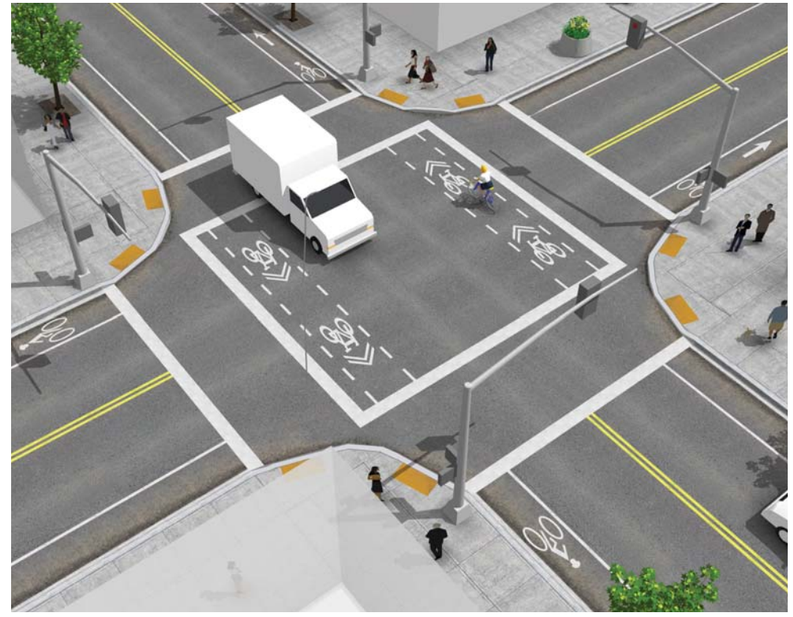
CONCEPT OVERVIEW
ATTICA ROAD CROSSING

TRAIL CROSSING TREATMENT

SNYDER & ASSOCIATES
Engineers and Planners

KNOXVILLE TRAILS





Source: Urban Bikeway Design Guide, NACTO

Fifth Street Quiet Street

One of the connectivity needs identified in Knoxville was a trail or on-street bicycle route between the proposed Competine Creek Trail extension to the downtown area. Designating 5th Street from the proposed Competine Creek Trail north to Marion Street as a quiet street (aka bicycle boulevard) will provide a direct route between the trail and the downtown area. This concept plan meets the following key characteristics of a quiet street:

Direct Access to Destinations

Fifth Street provides direct access from the proposed Competine Creek Trail to the Downtown Business District. Fifth Street is the best route because it crosses Competine Creek and it has recently been re-surfaced providing users with a smooth ride throughout their trips. Also, there is city owned property along the trail route near the creek that is planned to be a future park. While this creates an ideal route for on-street bicyclists, the sidewalks are not continuous throughout the entire corridor to appropriately accommodate pedestrians. The concept plan identifies areas with gaps in the sidewalk system that should be completed.

Signs and Pavement Markings

With on-street parking located on the east side of the street, shared lane markings should be offset to the middle of the street. This allows riders to stay out of the "door zone" and designates the entire roadway as a shared roadway. Shared lane markings should also be placed after every intersection so motorists entering the quiet street immediately know to be alert for people riding bicycles.

Proposed signage along the route include confirmation signs with a bicycle symbol and "TO Downtown" or "TO Competine Trail" text. These signs would be installed every other block with the bikes "May Use Full Lane" sign on the in between blocks. This provides notification of the route as a bikeway, but reduces sign clutter since there is only one sign per block in each direction. Directional signage should be used near the downtown to indicate to cyclists where to turn to access popular downtown destinations. The recommended Fifth Street signage is displayed on the concept plan.

Speed Management

Speed management measures for quiet streets bring motor vehicle speeds closer to those of bicyclists. Streets developed as quiet streets should have 85th percentile speeds at 25 mph or less (20 mph is preferred). Neither the IRT nor the BAC noted that speeding was currently an issue on Fifth Street, but if it becomes an issue in the future, there are multiple options of traffic calming techniques that can be considered.

Street Crossings

Minor street crossings for quiet streets typically involve the intersection of two residential or local streets with low motor vehicle volumes and speeds. At intersections with local streets and minor collectors, quiet streets should have right-of-way priority and reduce or minimize delay by limiting the number of stop signs along the route. All intersections except for Main Street, Robinson Street and Montgomery Street have stop signs requiring the cross traffic to stop, giving the right-of-way to the bicyclist. No additional intersection treatments are recommended for the intersections in which the cross streets are required to stop.

If the Fifth Street crossings at Main, Robinson, and Montgomery Streets become problematic for cyclists, there is potential to modify them to improve visibility and reduce delay for bicyclists. The following options can be considered:

- **Switch Stop Signs** – A simple way to improve Fifth Street for bicycling is the switch the stop signs on Robinson and Montgomery Streets. According to the Iowa DOT the average annual daily traffic at the Robinson intersection is 490-510 going east-west along Robinson and 600-670 going north south so switching the stop signs would favor the larger volume of traffic. One concern with this proposal is that vehicles on Fifth Street might be more included to speed since they no longer have a stop sign. If this becomes a problem, Knoxville could consider additional traffic calming measures such as curb extensions, raised crosswalks, or speed tables, or a different type of intersection improvement could be considered.
- **Continue Pavement Markings** – Another option to improve the intersection is to continue shared lane markings through the intersection to increase visibility of the bicycle route. This could be done either alone or in conjunction with switching the stop signs.
- **Speed Tables or Raised Crosswalks** - Speed tables are raised 3 to 3½ inches, extend across the entire length of the street, and allow vehicle operating speeds from 25 to 35 mph. When a speed table is marked and signed as a pedestrian crossing it becomes a raised crosswalk.

Green Infrastructure

Quiet streets present an opportunity to integrate storm water treatment techniques, street trees, and gathering spaces with traffic speed and volume management treatments. Street trees along a corridor can offer benefits such as improving aesthetics and property values, reducing storm water runoff, and visually narrowing the roadway so that motorists reduce their speed. The perceived side friction that is created from landscaping along the street causes motorists to slow down. The concept plan identifies potential landscape areas along Fifth Street.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS
CONCEPTUAL PLAN

KNOXVILLE BICYCLE & TRAIL MASTER PLAN
5th Street-Quiet Street

Snyder & Associates Project No. 115.0356
October 25, 2015

ITEM NUMBER	ITEM DESCRIPTION	UNIT OF MEASURE	TOTAL UNITS	UNIT PRICE	EXTENDED COST
1	SHARED LANE MARKINGS - PAINT*	EA	21	$ 120.00	$ 2,520.00
2	MAY USE FULL LANE SIGN (R4-11) - 30" x 30"	EA	9	$ 250.00	$ 2,250.00
3	TO DOWNTOWN SIGN (D11-1c) 24" x 18"	EA	5	$ 145.00	$ 725.00
4	TO COMPETINE TRAIL SIGN (D11-1c) 24" x 18"	EA	4	$ 145.00	$ 580.00
5	BICYCLE/PED CROSSING SIGN (W11-15) - 30 x 30"	EA	2	$ 250.00	$ 500.00
6	ARROW SIGN (W16-7P) - 24" x 12"	EA	2	$ 115.00	$ 230.00
7	YIELD SIGN (R1-2) - 18"	EA	2	$ 135.00	$ 270.00
8	HIGH-VISIBILITY CROSSWALK PAINT	STA	3.9	$ 300.00	$ 1,170.00
9	DESTINATION SIGNS (D1-1b)	EA	3	$ 140.00	$ 420.00
10	DESTINATION SIGNS (D1-2b)	EA	2	$ 140.00	$ 280.00
	CONSTRUCTION SUB-TOTAL				$ 8,945.00
	CONTINGENCY (PRE-DESIGN)			15% +/-	$ 1,315.00
	CONSTRUCTION TOTAL				$ 10,260.00
	Sidewalk Gaps				
	PCC SIDEWALK	SY	1361	$ 30.00	$ 40,840.00
	Intersection Options				
	SWITCH STOP SIGNS	EA	2	$ 100.00	$ 200.00
	SHARED LANE MARKINGS - PAINT* (3 in each direction through intersection)	EA	6.0	$ 120.00	$ 720.00
	RAISED CROSSWALKS	EA	2	$ 6,000.00	$ 12,000.00

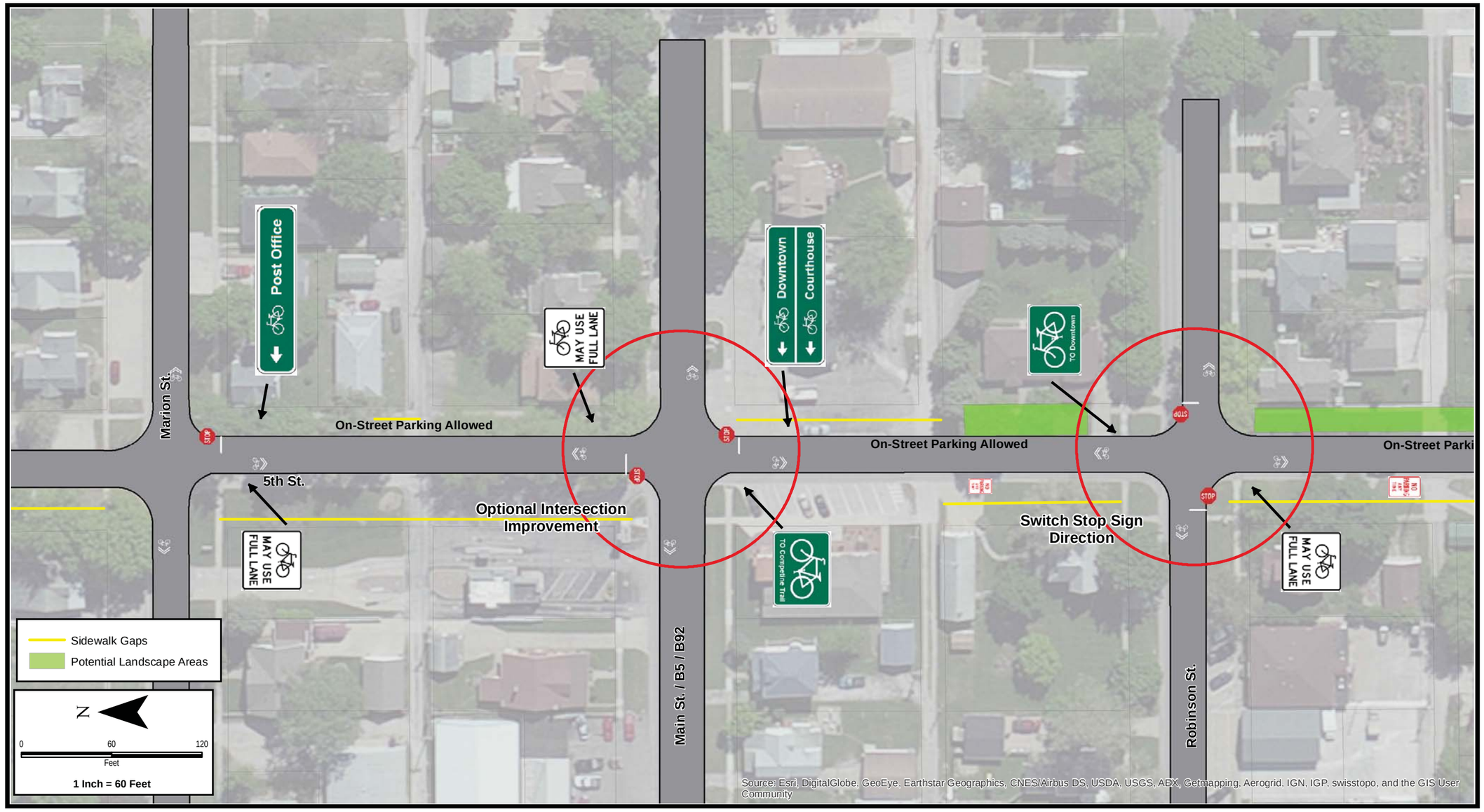
*The City may elect to install durable pavement markings instead of paint. Durable markings can be expcted to last 2-3 years and cost approximately $270 each for shared lane markings.

Facing North along 5th Street

5th & Montgomery Intersection

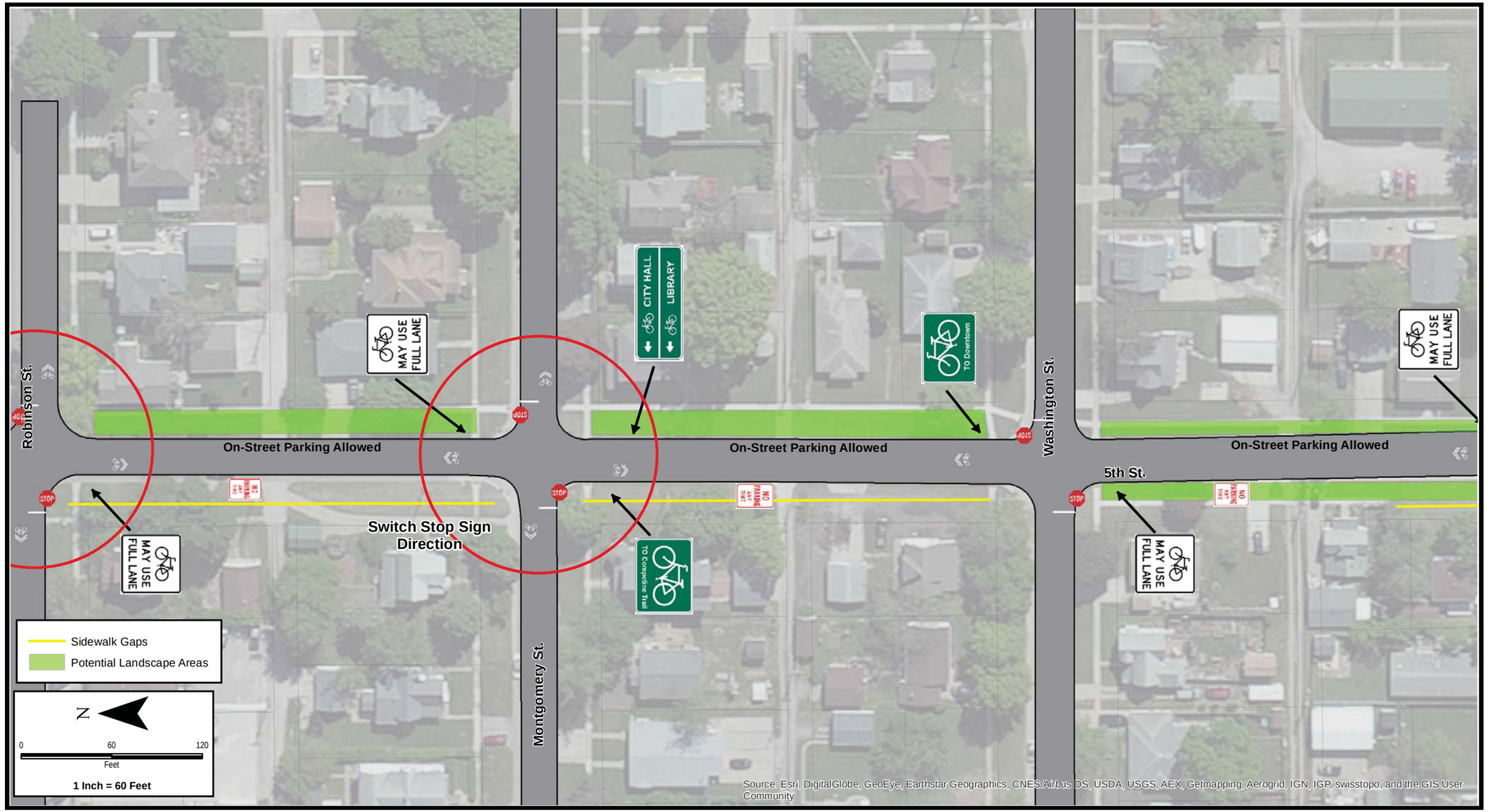
CONCEPT PLAN
FIFTH STREET

QUIET STREET



CONCEPT PLAN
FIFTH STREET

QUIET STREET

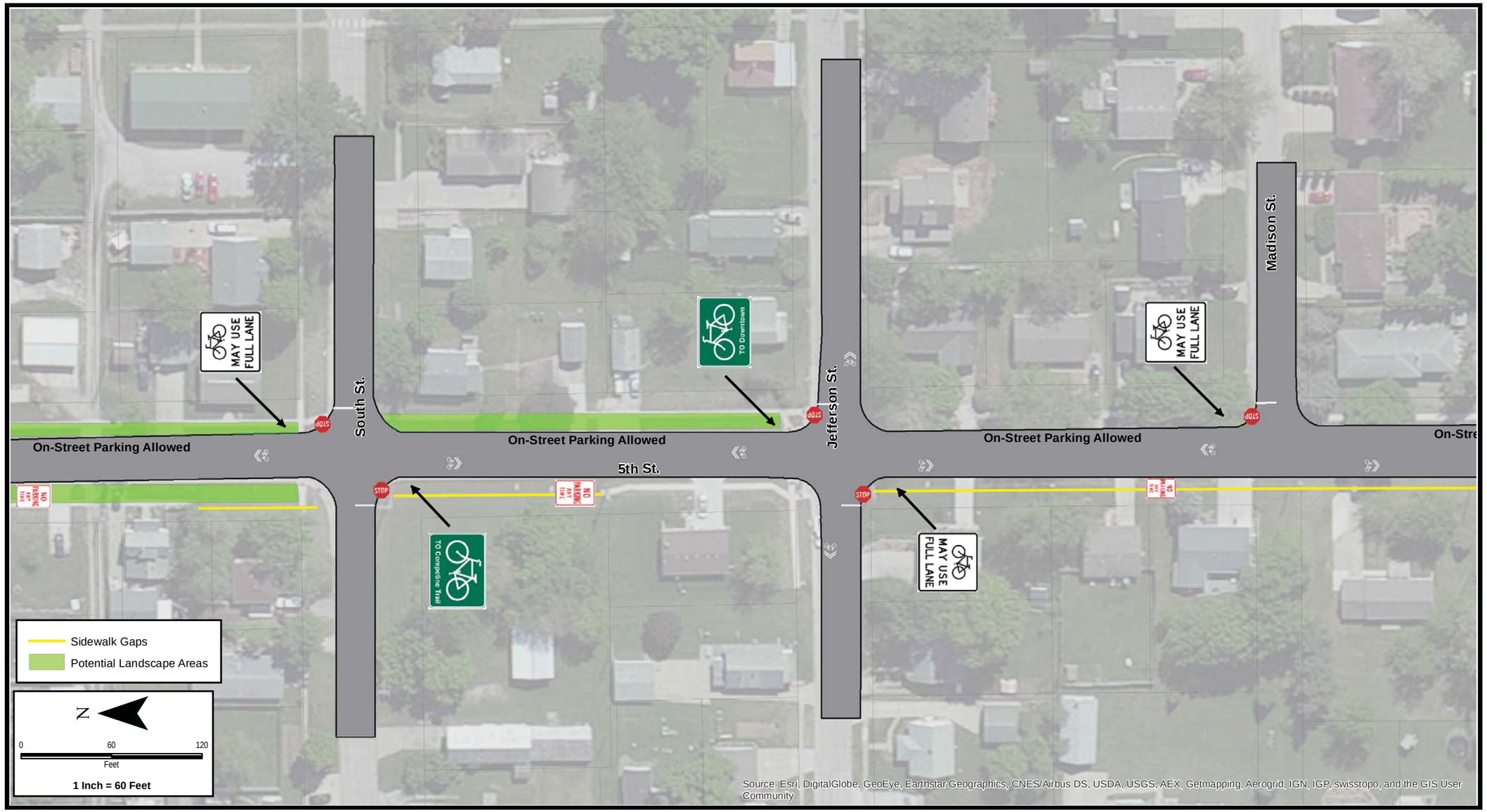


CONCEPT PLAN
FIFTH STREET

QUIET STREET

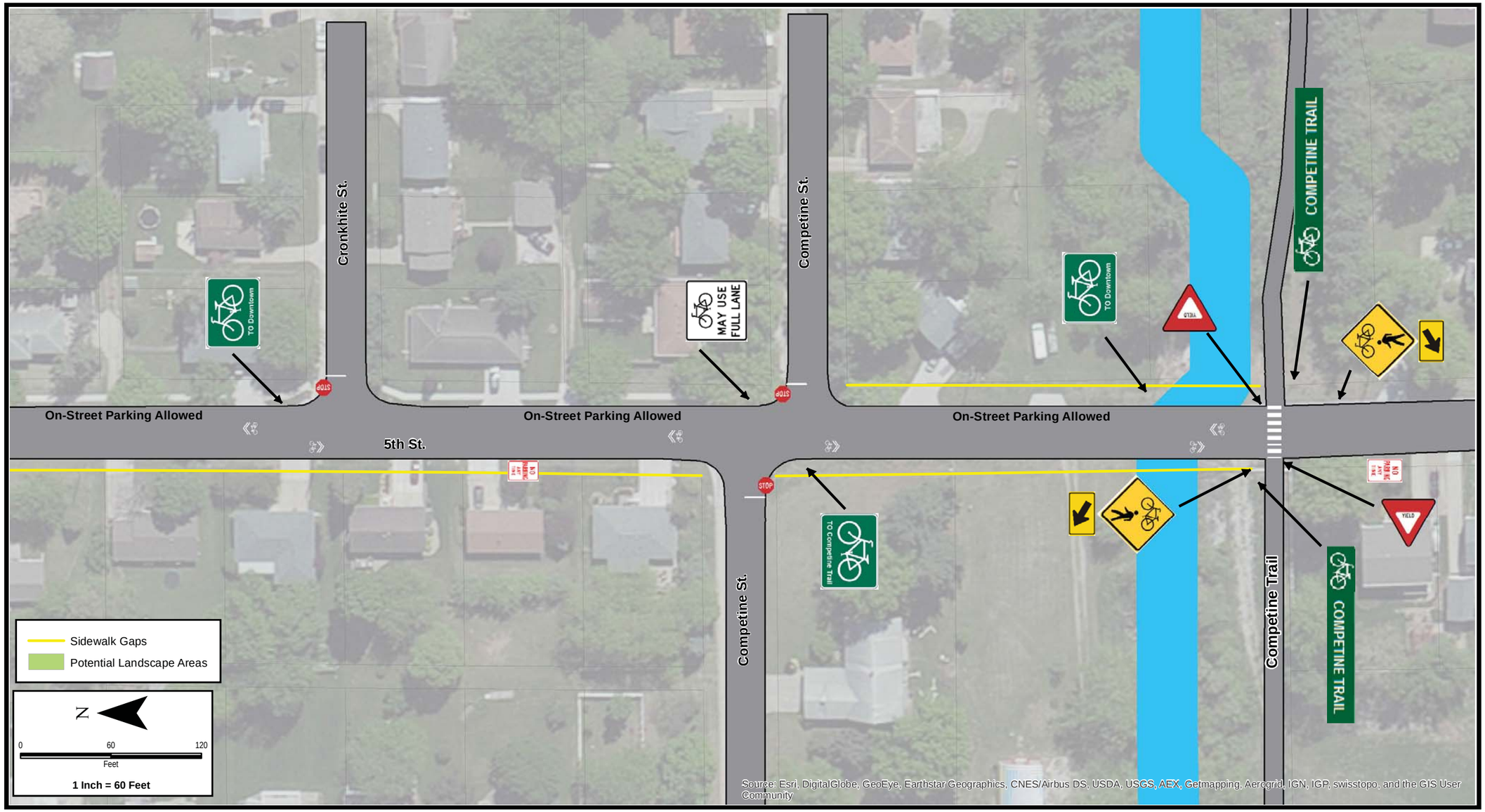
SNYDER & ASSOCIATES
Engineers and Planners

KNOXVILLE TRAILS



CONCEPT PLAN
FIFTH STREET

QUIET STREET



Downtown District

Shared lane markings and associated signage are the recommendation throughout the downtown business district, which is identified as 1st Street east to the designated quiet street (5th Street) and Marion Street south to Montgomery Street. All roadways within this district should be designated as a shared roadway. Shared lane markings are recommended to be placed near all intersections, viewable by all roadway users to alert them to the potential presence of bicyclists. All roadways entering the district should be properly signed by using the sign including the bike symbol and the text, "May Use Full Lane" application. Signs alert motorists that they have entered the downtown district and that all streets within the district are shared roadways by bicycles and vehicles.

Bicycle parking is also recommended throughout the district. Potential locations are identified on the concept plan overview.

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COSTS
CONCEPTUAL PLAN

KNOXVILLE BICYCLE & TRAIL MASTER PLAN
Downtown District

Snyder & Associates Project No. 115.0356
October 25, 2015

ITEM NUMBER	ITEM DESCRIPTION	UNIT OF MEASURE	TOTAL UNITS	UNIT PRICE	EXTENDED COST
1	SHARED LANE MARKINGS - PAINT*	EA	57	$ 120.00	$ 6,840.00
2	MAY USE FULL LANE SIGN (R4-11) 30" x 30"	EA	15	$ 250.00	$ 3,750.00
				CONSTRUCTION SUB-TOTAL	$ 10,590.00
				CONTINGENCY (PRE-DESIGN) 15% +/-	$ 1,700.00
				CONSTRUCTION TOTAL	$ 12,290.00

*The City may elect to install durable pavement markings instead of paint. Durable markings can be expeted to last 2-3 years and cost approximately $270 each for shared lane markings.

Downtown area has high pedestrian activity & good pedestrian accommodations

Potential bicycle parking area

Potential bicycle parking area

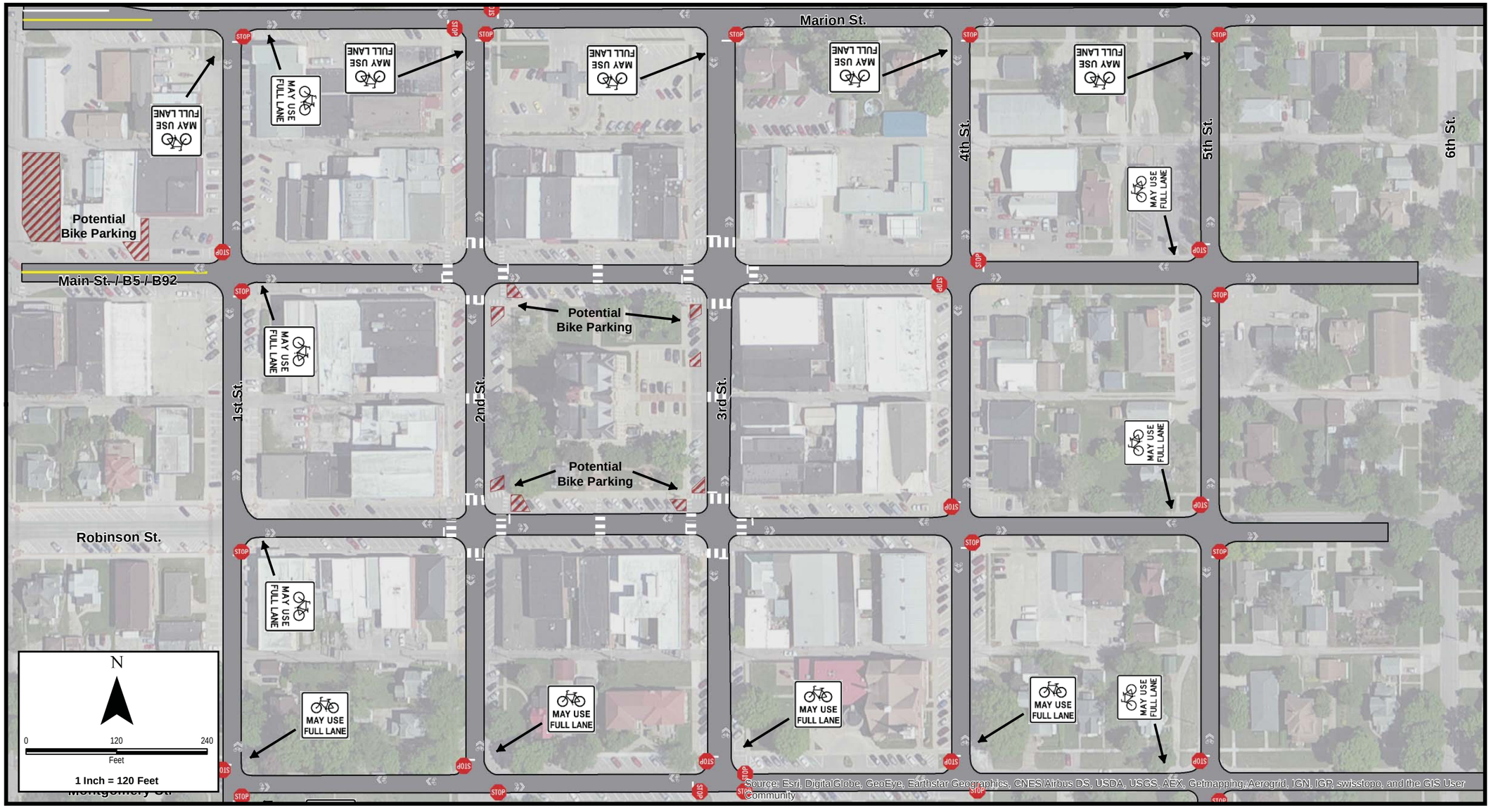
Downtown street with angle parking

CONCEPT OVERVIEW
DOWNTOWN DISTRICT

SHARED LANE MARKINGS

SNYDER & ASSOCIATES
Engineers and Planners

KNOXVILLE TRAILS



Four More E's: Education, Encouragement, Enforcement, and Evaluation

Education and Encouragement Programs
Enforcement Guidance
Evaluation Techniques

CHAPTER 5

Education and Encouragement

In addition to implementing safe and functional bikeways, education and encouragement efforts are also necessary to increase the number of people riding bicycles. Through special events, clubs, marketing and incentive programs, Knoxville residents will be encouraged to bike for fun, health, and transportation. Educational efforts can teach both adults and children how to ride safely and will teach all roadway users how to share the road properly.

While most engineering aspects of biking and walking must be led by a local government, education and encouragement efforts may be led by volunteers, local non-profits, for-profit businesses, or school districts with or without assistance from the local government. These are two areas in which residents can make a huge difference in making their community safer for people to bike, walk, run and enjoy an active lifestyle.

There are numerous resources available to assist in education and encouragement efforts. Following is a list of national, statewide, regional, and local groups that promote bicycling, walking, and/or trails in Iowa and can be used as a resource for education, events, encouragement, and advocacy.

Existing Clubs and Organizations

Alliance for Biking and Walking The Alliance for Biking & Walking creates, strengthens, and unites state and local bicycling and walking advocacy organizations. They give advocates tools to win campaigns that transform communities into great places to bike and walk.

http://www.bikewalkalliance.org/

League of American Bicyclists (aka Bike League) – The Bike League provides information, advocacy and promotion to create safer roads, stronger communities and a bicycle-friendly America. A wealth of resources for improving bicycling in your local community is available through the Bike League. The Bike League manages the Bicycle Friendly Community award program, which helps communities assess their progress toward making bicycling a realistic transportation and recreation option for all people.

www.bikeleague.org

Iowa Bicycle Coalition – The Iowa Bicycle Coalition builds partnerships, educates Iowans, and helps to establish safe and enjoyable bicycle transportation and recreation networks throughout Iowa.

www.iowabicyclecoalition.org/

Bike Iowa – BIKEIOWA is the number one interactive Cycling site in Iowa that keeps bikers informed on rides, news advocacy and other events. Users can post their own rides, news, classifieds and forum discussions, which lends to a very interactive experience amongst the bikers.

www.bikeiowa.com

Iowa Natural Heritage Foundation (INHF) – The Iowa Natural Heritage Foundation protects and restores Iowa's land, water and wildlife. They also partner with local governments on trail planning and development. The INHF spearheaded the development of the Iowa by Trail mobile application for trail navigation and information.

http://www.inhf.org/

Central Iowa Trail Association – Central Iowa Trail Association (CITA) is a 501(c)(3) non-profit organization and local chapter of the International Mountain Biking Association (IMBA). CITA is governed by a Board of Directors which oversees trail projects, coordinating work days and volunteers, and arranging events.

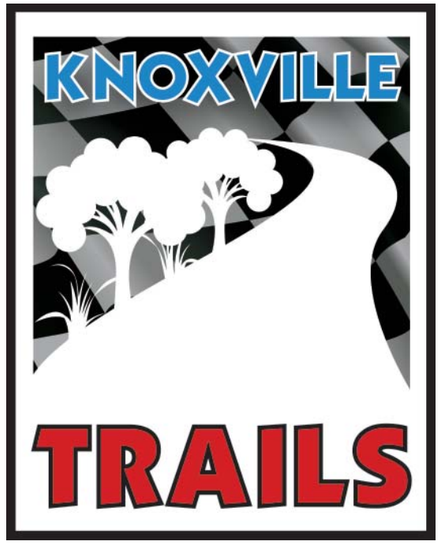
http://www.centraliowatrails.com/

Iowa Off Road Cycling Association (IORCA) – the IORCA was formed to serve as the governing body for the Iowa Mountain Bike Championship Series.

http://sports.groups.yahoo.com/group/IORCA/

Pella Cycling Club – Provides a cycling community for support and friendship who have a wide range of abilities and interests. Promotes cycling in Pella and surrounding areas.

http://www.pellacycling.com/



Tools and Programs

Branding and Adoption of Official Program Logo –The use of the official logo designed for this plan will help residents and visitors recognize the trail system in the City. The city should use the image on bicycle signage, websites, brochures, maps and promotional items distributed to the general public.

Knoxville Bicycle and Trail Map – Maintaining an updated bicycle facility and trails map is an effective way in encouraging people to bike and walk in the community. Maps may call out popular destinations, such as those identified in this plan, and allow users to plan the safest or flattest routes. Maps are critical for visitors who do not know which streets are biking or walking-friendly. The map should be distributed throughout the community to schools, businesses, and public buildings. The maps should also be distributed to surrounding cities such as Pella, Carlisle, and the Des Moines metro area to encourage regional tourism. The map should be updated annually, unless no changes have been made to the bicycling or walking network.

Biking and Trail Information – As trails and bicycle facilities continue to develop, many people do not know where to find information such as route maps, laws, local events and organizations. The City of Knoxville should provide local information on their website as well as provide links from their website to other existing websites for Bike Iowa and the Iowa Bicycle Coalition, which help to fulfill this need. Knoxville can submit local information such as events, news, trails, public meetings and more onto the Bike Iowa website to help market local amenities to bicyclists throughout the state.

"Iowa by Trail" Mobile Application –Knoxville can provide updated trail and on-street bicycle information to the Iowa Natural Heritage Foundation for inclusion in the Iowa by Trail mobile application. Iowa By Trail provides an interactive map that allows users to:

- Geo-locate their position and find the closest trail
- Find points of interest along the way, like local restaurants, museums and natural resource information
- Communicate with friends and followers about what they did along the trail.
- Keep track of distance, weather, news and events http://www.inhf.org/iowabytrail.cfm

Educational Programs – Bicycle and traffic education programs seek to reduce collisions and help people feel safe and comfortable on a bike. These programs include elements that help bicyclists and motorists understand their rights and responsibilities on the road. Educational program should be offered for all skill levels ranging from school aged children to adults.

One option for educational programming is through The League of American Bicyclists, which offers the only national cycle instructor certification program (League Certified Instructors - LCI). As of August 2015, there are 22 LCI's the State of Iowa. They can offer classes on Smart Cycling, Bicycling Skills 123 Youth, and Safe Routes to School.

The Iowa Bicycle Coalition offers free educational materials that the City may order and distribute to residents.

Bicycle Maintenance and Repair Training –The provision of bicycle repair training encourages residents to learn how to personally maintain their bikes so they can rely on the bicycle as a reliable transportation alternative, reducing one of the barriers to biking. This could be accomplished by partnering with a local organization or bike shop to develop a series of bicycle maintenance and repair classes.

Media Awareness and Safety Campaign – A broader educational effort that reaches all members of the community is necessary to establish bicycling as a viable mode of transportation. This type of educational effort covers the rights and responsibilities of both bicyclists and motorists. Safety of people riding bicycles is a prime concern in Knoxville according to the survey results, so this type of effort may focus on how bicyclist and motorists can accommodate each other on the roadways. Other types of community-wide campaigns may include describing some of the broader benefits of biking and walking such as to improve personal health, to reduce greenhouse gases, or to improve the local economy.

Special Events – Special events are a great way to attract new users and emphasize the importance of bicycling, running, and physical activity in the community. They bring people together to learn, socialize, be challenged, and celebrate their successes. Below are some examples of common biking-oriented special events:

- National Bike Month – Since 1956, May has been National Bike Month. Within the month are National Bike to Work Week and National Bike to Work Day. May is a great time of year to encourage and challenge people to try biking for transportation purposes. Even if someone can't bike to work, they may be able to bike to the store, out to eat, to their place of worship, or to a friend's house. Knoxville may celebrate Bike Month by hosting bike rides, commute challenges, bike rodeos, biking mentors, and more. The Bike League provides a guide to help with Bike Month activity ideas and programs. http://bikeleague.org/bikemonth
- Open Streets Event – Open streets initiatives temporarily close streets to automobile traffic, so that people may use them for walking, bicycling, dancing, playing, and socializing. They are different than a street fair in that they are typically health and activity-oriented and rather than having a lot of exhibits close together, they are laid out with room to run, bike, skate or even play basketball. There have been open street events in over 100 North American cities, including Des Moines and Decorah in Iowa. These free events may take place weekly, monthly, or annually during warmer months. http://openstreetsproject.org/
- Annual Mayor's Ride / Run - Many cities organize a "Mayor's Ride," which are led by the local Mayor and show the city's support for bicycling. Some cities also offer a "Mayor's Run." These events offer an opportunity to showcase the City's improvements in trails, biking and walking infrastructure over the past year. If the City chooses to charge a fee for the ride or run, it can serve as a fundraising event as well.

Employer Incentives – A common obstacle to biking to work is the lack of support facilities at the end of the ride. This includes showers, lockers, and bicycle parking. Even if showers are not available, lockers would be helpful for employees to keep personal items to help them freshen up before work. Employers can provide several incentives such as local discounts, fun events, friendly competitions, giveaways, organized rides, prizes, cash back, flextime, or special recognition. Many employers view bicycle commuting as a positive corporate wellness initiative.

Enforcement Guidance

Enforcement applies to city ordinances related to design and development as well as behavior of motorists, bicyclists, and pedestrians. The City should use local ordinances to promote the development and maintenance of safe sidewalks throughout the community, well-designed infrastructure for bicyclists and pedestrians in the street right-of-ways, bicycle parking near the entrances to multi-family and commercial areas, and pedestrian and bicycle connections between streets, parking lots and buildings.

Both motorists and bicyclists have a responsibility to follow the rules of the road to ensure the safety for all road-users. Bicyclists should be treated equitably by police officers, prosecutors, and judges. Police officers must treat bicyclists as equal to other road users when investigating traffic crashes, recognizing that:

- Bicyclists have a right to use roadway travel lanes as full and equal drivers making normal driver movements per the rules of the road;
- Bicyclists are entitled to due care in investigation work and reporting; and
- Bicyclists are entitled to equal treatment when fault is assigned.

The following actions are recommended to support equitable enforcement of traffic laws and ensure bicyclist and pedestrian safety:

- Provide fire and police departments with maps of the trail and on-street bicycle network, along with access points to gates/bollards.
- Educate police officers on proper enforcement and treatment of bicyclists when patrolling, investigating and issuing citations in the field.
- Enforce speed limits and other rules of the road on all users.
- Equip officers with bicycles for patrolling the trail and on-street bicycle network. This will facilitate access to places that may be difficult for a vehicle to reach, while also providing officers with a better understanding of the challenges particular to bicyclists trying to navigate throughout the city.

There are additional benefits to having a police bicycle patrol in the community. Bicycles take up less room and can enable officers to monitor areas where motor vehicles are limited. Bicycles are quiet and can be discreet when tracking or monitoring an area for criminal activity. When officers use bicycles through neighborhoods, they are more approachable and increase contact with residents which improves safety in the community. Knoxville currently has one certified bicycle patrol officer, who typically uses his bicycle during special events.

Evaluation Techniques

The evaluation plan enables the City of Knoxville to measure the success of the bicycle and trail network and the goals set forth in the Bicycle and Trails Master Plan. These efforts range from simple tasks, such as tracking the number of bicycle racks installed each year, to more complex techniques such as trail counts. All data should be collected and used to mark and communicate successes and identify areas of need. The City can then identify whether these issues need engineering, education, encouragement, enforcement or additional evaluation. The following actions are recommended to the City of Knoxville to evaluate the Bicycle and Trails Master Plan:

- Track Miles of Facilities – Measure the miles of trails, on-street bikeways, and new sidewalks completed each year. Calculate these as a percentage of the proposed completed networks to gauge the City's progress.
- Track Expenditures – Keep track of the amount of funding used for the following programs:
  - » Planning, design, engineering
  - » Education and outreach
  - » Encouragement
  - » Enforcement
  - » Evaluation
- Count Bike Racks – Record the total number and location of bike racks and whether they are city-owned or privately owned.
- Count Bicyclists and Pedestrians – By performing annual bicycle and pedestrian counts on both streets and trails, the City of Knoxville will be able to identify ridership trends over time. Counts should also be taken prior to installation of a new bicycle facility to establish a baseline for evaluating the impact of a facility after construction.

  The two main ways to count bicycles and pedestrians is by using infrared sensors and by manual counts. The benefit of sensors is that they can be placed in a hidden location and left for a long period of time, through all seasons and all hours of the day. The drawback is that the counter cannot distinguish between bicyclists and pedestrians, male and female, or person and animal. They also typically register only one count when two or more people are passing side by side.

  Manual counts can include numerous criteria that infrared counters cannot. In addition to those listed above, the people conducting the counts may note helmet usage, approximate age of user, or direction of travel. The National Bicycle and Pedestrian Documentation Project (NBPD) has developed a standardized methodology, survey and count forms, and reporting forms for counting bicyclists and pedestrians on trails and on streets. City staff may perform the counts themselves or assist partner agencies or volunteer groups in performing the counts. http://bikepeddocumentation.org/
- Track Crashes – Collaborate with the Knoxville Police Department to track bicyclist and pedestrian crash locations and statistics annually. This will help identify barriers and problem areas that may need some type of infrastructure improvement. It will also establish safety trends over time.
- ADA Compliance – Compliance with the Americans with Disabilities Act (ADA) is another way to monitor success toward making a walkable community. ADA requirements address details related to moving around in the public realm such as sidewalks, crosswalks, signage, railings, and pedestrian ramps. These types of elements can be improved to make the community safer and more accessible for people of all ages and abilities. Knoxville should conduct an ADA audit to identify areas needing improvement and track completion of those projects over time.
- Bicycle Friendly Community – The Bicycle Friendly Community award program through the League of American Bicyclists is designed to recognize progress that has been made as well as to assist communities in identifying priority projects to improve existing conditions. Communities are encouraged to fill out a detailed application that covers bike-related facilities, plans, education efforts, promotion initiatives, and evaluation work. The feedback from the League is a helpful tool for evaluating the effectiveness of the City's current efforts and providing feedback on projects, policies, programs, and plans to improve conditions for bicycling.
- Update the Bicycle and Trails Master Plan – Annually evaluate the goals and objectives and the progress toward those goals. Identify new priorities, funding, and improvements as they change over time.

Implementation Plan

CHAPTER 6

City Staff

Citizen Advisory Group

City Policies and Ordinances

Funding Opportunities

Maintenance Guidelines

City Staff

The City should employ a Bicycle and Pedestrian Coordinator to be responsible for monitoring and implementing the Bicycle and Trail Master Plan. Many city departments play a role in implementation, but one individual should be tasked with coordination and monitoring of these efforts. Cities that employ Bicycle and Pedestrian Coordinators often house them in their Public Works Departments, but they are also sometimes housed in Community Development, Parks and Recreation, and Administration Departments. In Knoxville, the Bicycle and Pedestrian Coordinator's responsibilities are likely to be less than a full-time position.

Citizen Advisory Group

A volunteer citizen group can help to implement this Master Plan. The group may take the form of an advisory committee, board or commission to the City Council. They can help assess the progress of the plan, set priorities, identify current safety and maintenance concerns, recommend policy changes, and evaluate the success of capital improvements and programs. The group may include people who enjoy bicycling, walking, running and using trails and streets for recreation, fitness, and transportation purposes. The group may consist of homeowners, business owners, and people interested or professionals associated with health, the natural environment, economic development, public safety, and community development.

City Policies and Ordinances

Municipal ordinances and zoning regulations should be regularly reviewed to identify and remove barriers for walking and biking and include policies that will improve conditions for pedestrians and bicyclists. Recommended policies include:

Overall Bicycle Policy

Section 5-1-13 of the Knoxville City Code addresses bicycling in the City. This policy should be reviewed to consider:

1. removing the restriction of sidewalk riding in the downtown area; and
2. additional regulations to support safe and equitable bicycling.

Additional regulations that could be considered include items related to bicycles such as lights and reflectors, ability to stop, applicability of motor vehicle laws, obedience to signals or signs, improper riding, carrying packages, control of the bicycle, place of riding, use of bicycle lanes or other on-street facilities, parking areas, and other items as deemed necessary by the locality. The Metro Advisory Council, whose purpose is to improve the quality of life an economic viability of the Central Iowa region, developed a model bike ordinance for Des Moines metro area communities to adopt. http://mac.dmgov.org/

Sidewalk Policy

Section 7-3-4 of the Knoxville City Code requires that adjacent property owners build and maintain the sidewalks along their properties. This type of policy is typical of many local governments, but can be challenging to enforce due to property-owner opposition. The Knoxville City Council has also set aside funds to fill gaps and replace deteriorated sidewalks throughout the community. This is an important step to promoting safety, walkability, and health for the residents of Knoxville. A sidewalk installation and replacement program also improves accessibility in accordance with the Americans with Disabilities Act.

Street Tree Policy

Section 7-6-3 of the Knoxville City Code requires a permit fee of $100 to plant a tree, bush or shrub in the street right-of-way, with the fees set aside for maintenance purposes. Since there are numerous benefits to street tree plantings and the City Code also specifies in section 7-6-8 that adjacent property owners are responsible for maintenance of the street trees, the City should consider eliminating the fee and instead assessing a fee to individual property owners based on actual maintenance performed by the City.

Complete Street Policy

A complete street is one that accommodates all types of users including pedestrians, bicyclists, motorists and transit riders regardless of age or ability. A typical complete street policy states that appropriate accommodations should be implemented for all users when reconstructing or making major repairs on an existing street or designing a new street. Planners and engineers are encouraged to routinely design and operate the entire right-of-way to enable safe access for all types of users. Streets that lack sidewalks or crosswalks, that don't have a safe place to wait for a school bus, or that require bicyclists to negotiate heavy traffic at high speeds are all examples of issues a complete streets policy would help to solve.

The Des Moines MPO has developed a complete streets policy template that can be adopted by local governments. They also provide numerous resources on communicating complete street benefits and guidance on complete streets infrastructure. http://dmampo.org/complete-streets/

Subdivision Ordinance

New development can also be used to develop new trails or on-street facilities. Requirements for dedicating right-of-way or easements for trail development can be implemented through a subdivision ordinance. For example, when a new subdivision is proposed in an area that is planned for a trail connection, the City can require the appropriate dedication of land for future trail development. The City may strengthen this code requirement to require that the subdivision construct the trail or on-street bicycle facility along with the other necessary infrastructure in the subdivision. Also, if a new subdivision is proposed near an existing or proposed trail or on-street facility, the City can require the new development to provide appropriate trail or on-street facilities to connect to those existing or proposed in this plan. Regulations can be set for width, grade, slope, terrain and accessibility to new and existing trail systems. Development of new parks should also have designations for trail and bike facility access.

Bike Parking Policy

Through the development of this plan, residents are encouraged to travel to, from and within the community by walking and biking. Bicycle parking is necessary to support biking as a viable mode of transportation for both customers and employees of businesses. A bicycle parking policy can either require or provide an incentive for commercial, industrial, retail, office, recreational and multi-family uses to install bicycle parking along with their development or re-development. The policy should specify the minimum number of bike parking spaces to be installed, which is often a percentage of the number of vehicle parking spaces installed (except in the case of schools or other establishments which attract a large number of children or other individuals who cannot or do not drive). The policy should also specify the location, type, and spacing of bike racks consistent with the Association of Pedestrian and Bicycle Professional's guidelines. The location should be noted on the development plan for City staff to review and approve.

Trail Policies

Local policies related to trails should address the approved types of users on the trails (e.g. no motorized uses), trail etiquette or rules, traveling at a safe speed, and the approval process for holding special events along the trail network (e.g. fundraising runs/walks).

Traffic control signs on trails are not subject to the same state laws as those placed along streets. For example, if a trail crossing a road has a stop sign oriented toward trail users, and if the City wants to be able to issue a citation for failure to obey the sign, then the City should have an adopted ordinance that regulates the need to comply with the sign and the fines associated with failure to do so.

Funding

Full funding for trails and on-street bicycling facilities will likely require multiple funding sources, including both public and private dollars. The City of Knoxville approved a reverse referendum which allows the City to bond $700,000 for trail development. These funds, along with $200,000 already budgeted for trails are an excellent start to assembling enough funding to implement projects that will make a major impact on biking and walking in the City.

This section lists some private and public funding opportunities followed by a recommendation for creating a funding plan. The table on the next page provides a matrix of the various funding opportunities, including award amounts and due dates. For all of these programs, Knoxville should carefully review the grant guidelines before applying and review the grant agreements upon award. Each of these programs may have additional details regarding project review criteria, eligible costs/activities, reporting requirements, recognition, maintenance standards and timeframe.

Private Funding Opportunities

3M

3M's website indicates that they support "initiatives that provide evidence-based solutions to some of the world's most pressing challenges." Trails and on-street bicycling can provide part of the solution to a community's pressing challenges such as community health, air pollution, and economic development. Government agencies are not eligible for grant awards, so a non-profit organization would need to make an application. The first contact should be to the local 3M plant manager. 3M targets communities where they have a facility and provides grants in the categories listed below. The opportunity for trails or on-street bicycling to fall under either the Community or Environmental category should be discussed with the local plant manager.

- Community Grants:
  - » Prepare youth for success through early childhood and out-of-school-time learning
  - » Enhance community vibrancy by improving the local communities where 3M has a presence
  - » Aid disaster preparedness, relief, and recovery
  - » Encourage and recognize volunteers
- Education Grants:
  - » Increase primary and secondary student achievement in STEM and business curriculum
  - » Support post-secondary programs that attract, retain and graduate students
  - » Drive access and academic success to ensure educational equity
- Environment Grants:
  - » Support sustainable communities
  - » Protect threatened ecosystems that provide natural services, underpin local economies, contribute to human health, livelihoods, and well-being and promote science-based environmental and conservation education.

Hormel Foods Charitable Trust

Hormel's Charitable Trust Giving guidelines indicate their areas of focus are education, hunger, and plant communities. An annual discretionary budget is established for each plant location to be administered by the plant manager and used for community-related activities. Eligible entities must be a 501(c)(3). Annual donations to a single organization typically do not exceed $15,000.

Prairie Meadows Community Betterment Grant

This statewide program awards grants between $100 and $99,999. A variable amount of funds, which may be near $2 million, is available to be awarded in the following four categories: Arts & Culture, Economic Development, Education, and Health and Human Services. Trails are eligible under the Economic Development category. Prairie Meadows also offers a Legacy Grant for requests of $100,000 or more, which must have at least 50 percent of the project budget secured. The applicant cannot apply for both the Community Betterment Grant and the Legacy Grant for the same project. The Community Betterment Grant requires that the project be completed within a year.

PeopleForBikes Community Grant Program

This national grant program awards up to $10,000 to worthy projects and programs that support bicycling. The grant cannot fund more than 50 percent of the project budget. The program is competitive with only 10 - 15 percent of proposals being funded. There are two grant cycles each year, with applications opening in June for the fall submittal and in December for the spring submittal. The process requires a letter of interest prior to submitting a full application.

Public Funding Opportunities

Resource Enhancement and Protection Grant (REAP)

Iowa Department of Natural Resources- REAP funds are appropriated by the Iowa Legislature and divided amongst various categories with 15 percent going to City Parks and Open Space. Cities with a population between 5,001 and 10,000 are eligible for grants up to $100,000. Applications are due on August 15 each year.

Regional TAP – Central Iowa Regional Transportation Planning Alliance (CIRTPA)

The CIRTPA administers the regional TAP grant funds for the area including Marion County. Approximately $280,000 is available annually, with a maximum award of 80 percent of the project budget or $100,000. Safe Routes to School programs are also funded through this program. Schools or the City can apply for non-infrastructure grants related to education and encouragement efforts, or for infrastructure grants such as on-street bicycle facilities or traffic calming within two miles of a school. The Iowa Bicycle Coalition is available to assist communities with Safe Routes to School programs. Applications are due on November 15 annually with review and approval in January and February. Regional TAP is a good option for funding since the grant must be awarded within the CIRTPA area.

State Recreational Trails – Iowa DOT

The amount of State Recreational Trails funding varies from year to year, but is often between $2 million and $6 million. The maximum award is 75 percent of the project cost. Applications are due on July 1 of each year.

Transportation Alternatives Program (TAP) – Iowa DOT

TAP is a portion of the Federal Surface Transportation Program (STP) funding the state receives. TAP funds may be used for a wide array of projects, including trails and other bicycle and pedestrian facilities. The Iowa DOT allocates the majority of TAP funds to the Metropolitan Planning Organizations and Regional Planning Authorities for local selection of local projects. They retain $1 million to be allocated on a statewide basis, with a maximum award of 80 percent of the project budget. Applications are due on October 1 each year.

Federal Recreational Trails – Iowa DOT

The Federal Recreational Trails program typically provides about $1 million per year on a competitive application basis, with a maximum award of 80 percent of the project cost. Applications are due on October 1 each year.

Traffic Safety Improvement Program (TSIP) - Iowa DOT

TSIP funds can be used for projects that address traffic safety and operations on a site with an accident history, installation or replacement traffic signals or signs, traffic safety studies or public information initiatives. The funds cannot be used for sidewalks or bicycle paths, except as an integral part of a traffic safety project. A four-to-three lane conversion that provides room for bicycle lanes to be added is an example of a project that could be funded through TSIP. The annual funding level is one-half percent of Iowa's Road Use Tax Fund (approximately $5 - $6 million per year). The maximum award for a site-specific project or for research studies and public information initiatives cannot exceed $500,000 annually. There is no match requirement; however, engineering design services are ineligible. Applications are due on August 15 of each year.

Due Date	Program	Max Award	Approximate fund in program (may vary)	Match Required	Date Funds Available	Completion Date	Website
December	DMAMPO STP TAP	None specified	$1M	20%	October 1, 2019; upon authorization	As per the grant agreement	http://dmampo.org/funding/surface-transportation-planning-funding-subcommittee/
January	PeopleforBikes Community Grant Award	$10,000	$50,000 per cycle	50%	30-May-15	Provide updates every 6 months	http://www.peopleforbikes.org/pages/community-grants
Mid April 2015	Dallas County Foundation	$20,000	$90,000	Required, but % not specified	1-Oct-15	Within 18 months	http://www.dallascountyfoundation.org/
July 1	State Recreational Trails	None specified	$2 - 6M	25%	Upon authorization	As per the grant agreement	http://www.iowadot.gov/systems_planning/fedstate_rectrails.htm
August 15	REAP	$125,000	$780,000	none	Oct-15	As per the grant agreement (~2 years)	http://www.iowadnr.gov/Environment/REAP/REAPFundingatWork/CityParksOpenSpaces.aspx
September 2015 (to DMAMPO)	ICAAP	None specified	$1M	20%	1-Oct-16	As per the grant agreement	http://www.iowadot.gov/systems_planning/icaap.htm
September	Prairie Meadows Community Betterment Grant	$99,999	$2M	none	1-Mar-16	Within 12 months	http://www.prairiemeadows.com/community/grant-program/
October 1	Federal Recreational Trails	$5,000 min – no upper limit	$1.3M	20%	Upon authorization	As per the grant agreement	http://www.iowadot.gov/systems_planning/fedstate_rectrails.htm
October 1	Statewide STP TAP	None specified	$1M	20%	Upon authorization	As per the grant agreement	http://www.iowadot.gov/systems_planning/trans_enhance.htm
November 15	CIRTPA Regional TAP	$100,000	$280,000	20%	Upon Award	As per the grant agreement	http://www.cirtpa.org/transportation-alternative-program/
Monthly	Community Attraction and Tourism (CAT)	None specified	$5M (1.7M for small population ares)	50%	Upon Award	As per the grant agreement	http://www.iowaeconomicdevelopment.com/Community/VisionIowa

Community Attraction and Tourism (CAT grants)

Iowa Economic Development Authority. The CAT program is designed to assist communities in the development and creation of multiple purpose attraction or tourism facilities. State legislation requires that one-third of each annual CAT allocations be reserved for small population areas (cities with less than 10,000 people or counties among the 33 least populated) each year. In fiscal years 2015 and 2016, the amount of funding for small population areas is at least $1,666,666 of the total $5,000,000 allocated to the program. In fiscal year 2015, a total $3,990,433 was allocated to small populations. As of July 9, 2015, $410,000 had been awarded to small populations for fiscal year 2016. CAT funding is limited to 50 percent of total project costs and must be the "last dollar" to complete the project. Applications are reviewed by the Vision Iowa Board. Local support, both philosophical and financial, is necessary for a CAT application to be successful.

Recommendation for a Funding Plan

Commit Funding

The first step for Knoxville is to determine how much local funding or funding per year they are willing and able to commit to the project. A significant investment which is greater than the minimum will indicate to grant review committees that Knoxville places a high priority on funding the project. This commitment should be officially documented in some way, such as through the Capital Improvement Program or a letter from the City Council.

Develop a Fundraising Committee

The second step is to form a small committee including local governmental leaders (e.g. City staff or City Council members), business owners, and citizen advocates to focus on fundraising for this project. Snyder & Associates, Inc. can provide technical support for this committee such as budgets, engineering design, and marketing materials.

This committee should become acquainted with the project details including the need, design, costs, and benefits. They should be able to show how there will be environmental, economic, and social benefits to multiple user groups such as bicyclists, pedestrians, children, and businesses. If the committee members have a comprehensive knowledge of the project details and benefits, they will be more successful in describing it to others and securing their support.

Seek Donations

The fundraising committee should be tasked with seeking private support for the project. Donations from private sources typically help to leverage state and federal grant dollars. Even small donations from local private sources will make applications for grant programs stronger because they indicate local support for the project. Also, potential donors/grantors prefer to see evidence that there will be enough funding in place for a project to be completed.

When deciding who to contact for private support, the fundraising committee should first identify which individuals, companies, or non-profits will benefit the most from the proposed project. The committee could start by approaching adjacent property owners to seek a letter of support for the project.

The committee could then move on to companies located nearby that maybe be able to contribute financially or in-kind. For example, 3M may be able to provide donations to develop a trail system that connects the residential neighborhoods to the 3M campus, providing connectivity for its employees. Incentive programs could be used to encourage the 3M workforce to utilize the trails and an alternative means of transportation to work. Hormel also has a program that allows for investment into the community.

The committee should develop a structure for recognizing various levels of support on the project. For example, perhaps a trail or route could be named for a major donor. Other donors could be recognized through temporary or permanent signage, a list on the City's website, an announcement via social media, or at a public ribbon cutting. There are numerous ways to offer recognition that may be considered.

The committee may want to consider crowd funding as an additional method of gaining private dollars. There are numerous crowd funding websites to choose from, with Kickstarter being one of the most well-known. In the most typical model, funders donate a particular amount in return for some product, perk, or reward.

The committee should also request support from groups and individuals even if they do not have funding that they can contribute to the project. For example, daycares, places of worship, bicycling/running clubs, and the school district may all see a benefit to the project but not have funds available to contribute. In this case, the committee should request a letter of support that indicates how that group will benefit. These letters may be included in grant applications.

Apply for Grants

The City of Knoxville and the Fundraising Committee should plan to apply for a regional TAP through CIRTPA in November 2015 and a REAP grant in August 2016.

The Federal Recreational Trails, State Recreational Trails, and Statewide TAP programs typically fund projects which can serve as a transportation purpose, not solely a recreational purpose. In order to create a fundable, successful project, routes to downtown business districts or major employers should be presented as a single project which creates a non-motorized transportation option between the residential neighborhoods and commercial districts, with phases identified for implementation purposes.

To make the transportation purpose even stronger, regional planning efforts, such as the Master Concept Plans for Central Iowa Trails developed by Iowa Heartland Resource Conservation and Development, may be able to show how Knoxville trails and bike facilities therein can function as part of a trail route to connect with the other trails in the planning area of Jasper, Marion, Warren and Madison Counties. This could establish a regional or statewide impact for the connection through Knoxville.

The CAT program prefers to be the last piece of funding to complete a project. The City and/or fundraising committee should discuss the project and fundraising plan with each of the program managers to determine how and when to apply.

If any of the grant programs do not award upon the first application, the City should consider applying again the following year (if allowed by the program). The City should request feedback on the application from the granting program so that it can be improved for the next submittal. During the year between applications, the fundraising committee should continue to gather additional support and strengthen the application.

Maintenance Guidelines

Sidewalks along with both off-street and on-street bikeways require regular maintenance. Bicycles and pedestrians are more susceptible than motor vehicles to pavement irregularities such as cracks, potholes, broken glass or gravel. Knoxville should establish an annual budget for maintenance and minor repairs of trails and bicycle facilities such as those activities listed in the table below. The City should create a maintenance plan for their trail and on-street bicycle facility system. If a crash or injury should occur, the City's liability may be lessened by a maintenance plan and documentation of compliance with that plan. If the City creates a maintenance plan, but fails to follow it, liability issues may be increased.

Sweeping/Blowing

Bicyclists often avoid shoulders, bike lanes and bridges filled with sanding materials, gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. On bridges, debris is often swept to the curb edge or the jersey wall, requiring cyclists to take a lane or share a narrow facility with cars. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.

Action items:

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes and bridges.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections and bridges, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Provide extra sweeping in the fall in areas where leaves accumulate in bike and pedestrian facilities.

Pavement Markings

Pavement markings help guide bicyclists to proper positioning in the roadway, direct pedestrians to safer crossing locations, and provide awareness of the potential for bicyclists and pedestrians to be in the area. Pavement markings can wear off quickly due to weather and vehicular travel.

Action items:

- Repaint pavement markings at least annually, preferably in spring.
- Consider twice a year applications for areas that have higher vehicular or bicycle/pedestrian volumes.
- Consider longer-term durable pavement markings for less frequent maintenance.

Roadway, Sidewalk or Trail Surface

Bicycles are much more sensitive to subtle changes in roadway surface than motor vehicles. Ridges, cracks, and uneven transitions between materials can cause hazardous conditions.

Action items:

- On bikeways, use the smallest possible chip for chip sealing.
- Ensure that on new roadway construction, the finished surface on bikeways does not vary more than ¼".
- Maintain a smooth surface on all bikeways that is free of potholes.
- Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition or adjacent to railway crossings.
- Replace broken sidewalk panels.

Gutter-to-Pavement Transition

On streets with concrete curbs and gutters, 1'-2' of the curbside area is typically devoted to the gutter pan, where water collects and drains into catch basins. On many streets, the bikeway is situated near the transition between the gutter pan and the pavement edge. It is at the location that water can erode the transition, creating potholes and a rough surface for travel. The pavement on many streets is not flush with the gutter, creating a vertical transition between these segments. This area can buckle over time, creating hazardous environment for bicyclists. Since it is the most likely place for bicyclists to ride, this issue is significant for bike travel.

Action items:

- Ensure that gutter-to-pavement transitions have no more than a ¼" vertical transition.
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.

Drainage Grates and Culverts

Drainage grates are typically located in the gutter area near the curb of a roadway. Many grates are designed with linear parallel bars spread wide enough for a tire to become caught so that if a bicycle were to ride on them, the front tire would become caught and fall through the slot. This would cause the cyclist to tumble over the handlebars and sustain potentially serious injuries. Also, drainage grates and culverts that become clogged can cause hazardous flooding along the bikeways.

Action items:

- Continue to require all new drainage grates be bicycle-friendly, including grates that have horizontal slats on them so that bicycle tires do not fall through the vertical slots.
- Inventory all existing drainage grates and replace hazardous grates as necessary.
- Inspect grates and culverts every fall and after storms to remove accumulation of debris that may block stormwater flow.

Drainage

Mud or algae from frequent ponding can be extremely slippery and hazardous to both bicycle and pedestrian traffic.

Action items:

- Grade adjacent shoulders and sod buildup for positive drainage.
- Add subdrains to encourage better subsurface drainage
- Add rain gardens to handle small areas by infiltration

Pavement Overlays

Pavement overlays represent good opportunities to improve conditions for cyclists if done carefully. A ridge should not be left in the area where cyclists ride (this occurs where an overlay extends part-way into a shoulder bikeway or bike lane). Overlay projects offer opportunities to widen a roadway or to re-stripe a roadway with bike lanes.

Action items:

- Extend the overlay over the entire roadway surface to avoid leaving an abrupt edge.
- If there is adequate shoulder or bike lane width, it may be appropriate to stop at the shoulder or bike lane stripe, provided no abrupt ridge remains.
- Ensure that inlet grates, manhole and valve covers are within ¼ inch of the pavement surface.
- Pave gravel driveways to the property line to prevent gravel from spilling onto shoulders or bike lanes.

Signage

Bike lanes, quiet streets and shared use paths all incorporate signage for way finding and regulations. Such signage is vulnerable to vandalism and wear, requiring regular maintenance and replacement. Most signage standards are covered in the Manual on Uniform Traffic Control Devices (MUTCD).

Action items:

- Check regulatory and way finding signage placed along bikeways for signs of vandalism, graffiti, or normal wear
- Replace signage along the bikeway network on an as-needed-basis
- Remain updated on changes to MUTCD standards and update signage accordingly

Landscaping

Bikeways and sidewalks can be rendered inaccessible or dangerous due to overgrown vegetation that can become an obstacle or block an otherwise clear line of sight.

Action items:

- Trim landscaping such that they do not impede passage or clear view along bikeways and sidewalks.
- Keep a 2-foot minimum clear zone horizontal on each side of the trail and a 10-foot clear zone vertical.
- After major damage incidents such as storms or nearby construction, remove fallen trees or other debris from bikeways and sidewalks as quickly as possible.

Bikeway and Sidewalk Closures and Detours

Bikeway and sidewalk users will need accommodation during construction and maintenance activities when segments of bikeways may be closed or unavailable to users. Wherever bicycles and pedestrians are allowed, measures should be taken to provide for the continuity of their trip through a work zone area. Only in rare cases should pedestrians and bicyclists be detoured to another street when travel vehicle lanes remain open. Users must be warned of impeding closures and given adequate detour information to bypass the closed section. Users should be warned through the use of standard signage approaching each affected section (e.g., “Bike Lane Closed,” “Sidewalk Closed”), including information on alternate routes and dates of closure. Alternate routes should provide a reasonable level of directness and equivalent traffic characteristics and be signed consistently.

Action items:

- Bicyclists and pedestrians should not be led into conflicts with work site vehicles, equipment, moving vehicles, open trenches or temporary construction signage.
- Efforts should be made to re-create the bike facility or sidewalk outside the construction zone if possible.
- Where there is insufficient space to provide a temporary bike facility adjacent to the construction zone, then a standard-width travel lane should be considered.
- Contractors should be made aware of the needs of bicyclists and pedestrians and be properly trained in how to safely route them through or around work zones.

Appendices

A – IRT & BAC Meeting #1 Presentation

B – IRT Meeting #1 Minutes

C – IRT & BAC Meeting #2 Presentation

D – IRT Meeting #2 Minutes

E – IRT & BAC Meeting #3 Presentation

F – IRT Meeting #3 Minutes

G – Community Survey Questions

H – Community Survey Results

Bicycle and Trail Master Plan

Mindy S. Moore, AICP
Jared Foss

May 12, 2015

Snyder & Associates

Master Plan Outline

- Existing Conditions
- User Needs Assessment
- Bicycle and Trail Goals
- Programs and Policies
- Bicycle and Trail Network
- Project Prioritization
- Concept Plans
- Implementation Plan

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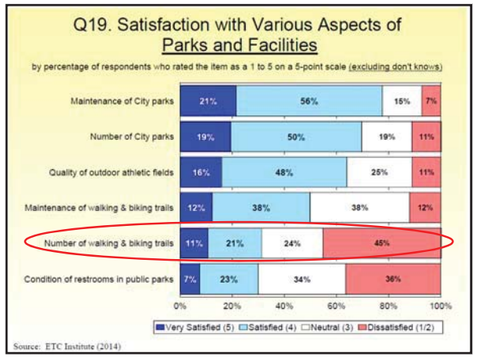
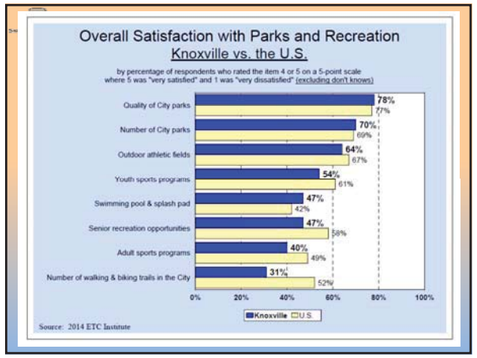
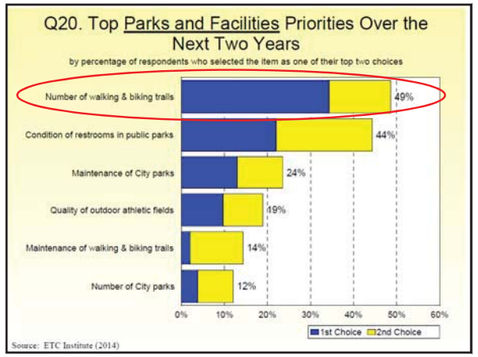
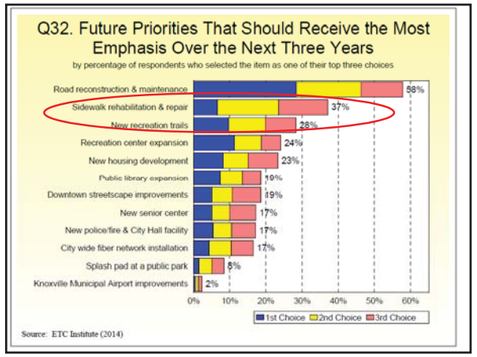
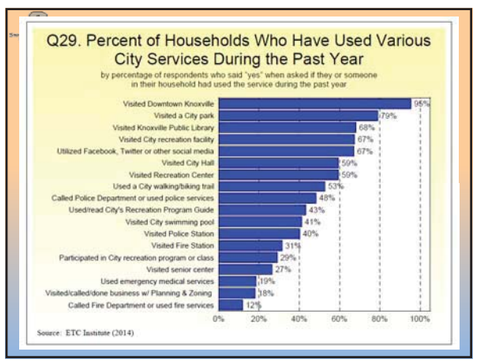
Bicycling and Walking Benefits

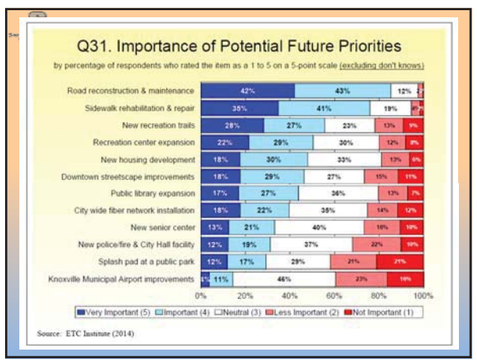












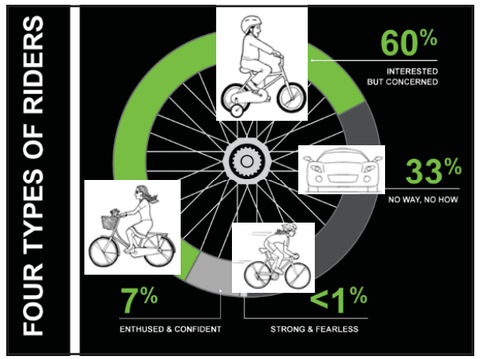
Master Planning Committees

- Internal Review Team (IRT)
  - City Departments
  - School District
  - Health Agency
  - Iowa DOT
  - CIRTPA
- Bicycle/Trail Advisory Committee (BAC)
  - Parks & Plan and Zoning Commissions
  - Citizens
  - Businesses
  - Interested Organizations

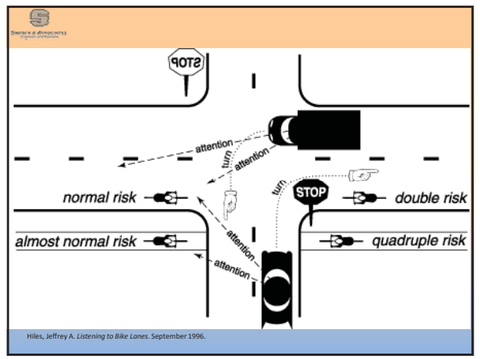
Design Guidance

Trail

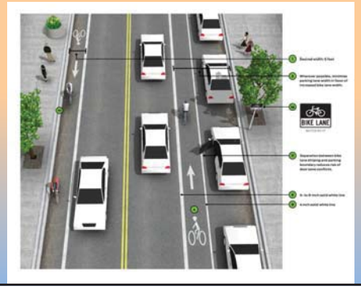
- 8 - 12' wide path
- Paved
- ADA compliant
- Follows rivers, creeks, greenways, railroad lines, streets
- Separated from the roadway
- Bicyclists AND Pedestrians



We Are All Pedestrians!



Bicycle Lanes



Bicycle Facilities/ Bicycle Accommodations/ Bikeways

- Trails/Sidepaths
- Bike Lanes/Buffered Bike Lanes
- Cycle Tracks/Protected Bike Lanes
- Shared Lane Markings/Sharrows
- Bicycle Boulevards/ Quiet Streets/ Neighborhood Greenways
- Shoulder Bikeways

Bicycle Lanes

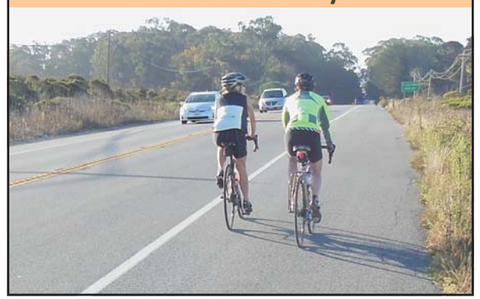
- Increases bicyclist comfort and confidence
- Creates separation between bicyclists and automobiles
- Increases predictability
- Increases street capacities
- Visually indicates bicyclists' right to the street

Conventional Bike Lane

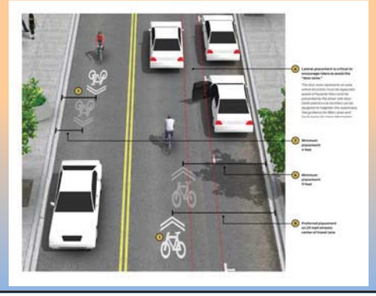
Buffered Bike Lanes

Left Side Bike Lane

Shoulder Bikeways



Shared Lane Markings



Cycle Tracks
Protected Bike Lane

Cycle Tracks

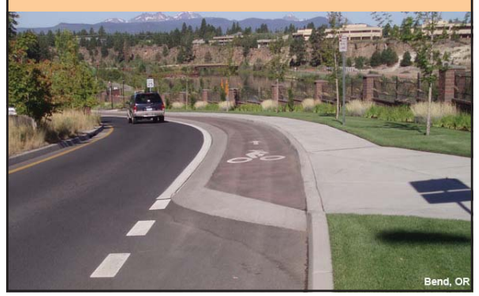
- Bicycle-only facility
- Mixes trail and bike lane aspects
- Separated from traffic by barrier
- Increases ridership

Shared Lane Markings

- Helps position bicycles on streets
- Notifies motorists to expect bicycle traffic
- Encourages bicyclists to ride in straight line
- Used on streets where bike lanes are preferred, but lack space
- Use on lower volume, lower speed streets

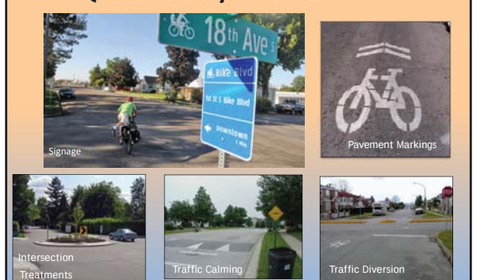
Shared Lane Markings

Raised Cycle Tracks



Two-way Cycle Track

Quiet Street/Bike Boulevards



Active Warning Beacons

Active Warning Beacons

- Lower cost alternative to traffic signals
- Increases driver yielding behavior
- Used at high-volume crossings and priority route crossings.

Bicycle Signal Heads

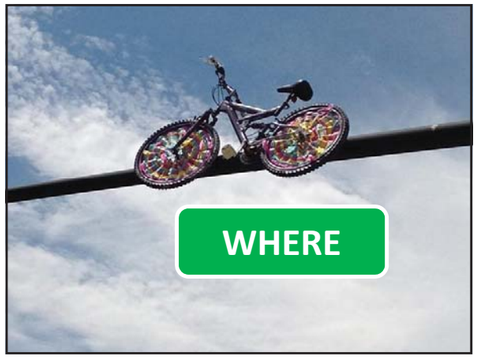
- Provides priority to bicyclists at intersections
- Protects bicyclists in the intersection
- Used where a shared use path crosses a street
- Use at complex intersections that may otherwise be difficult for bicyclists to navigate

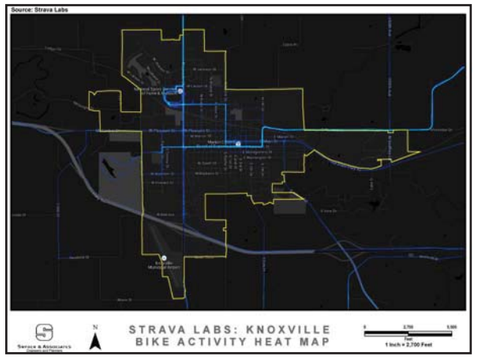
Signal Detection and Actuation

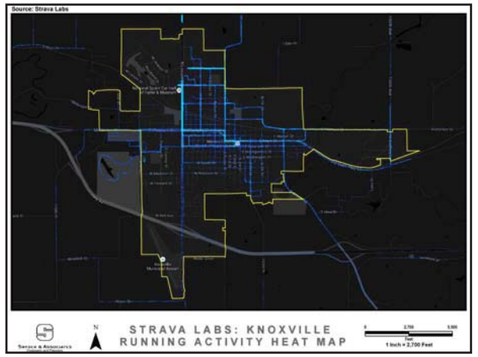
- Improves efficiency and reduces delay for bicycle travel
- Discourages red light running by bicyclists
- Designate where bicyclists should wait

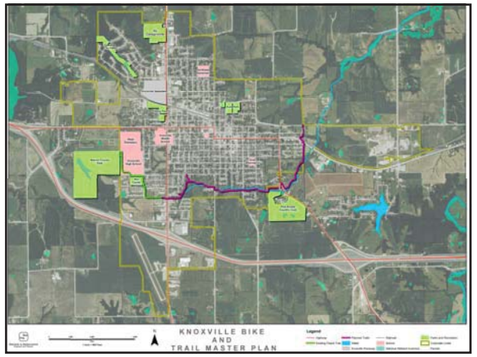
Bicycle Parking

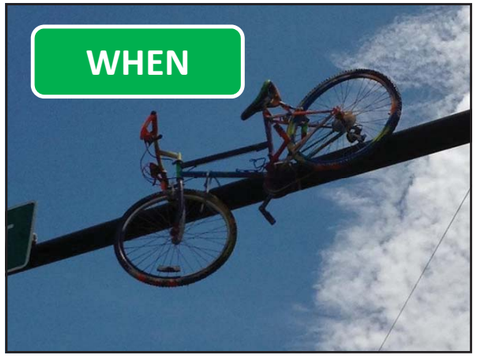
- Provide safe areas for bicycles
- Long- and short-term needed
- Location and style is key to success











Public Input

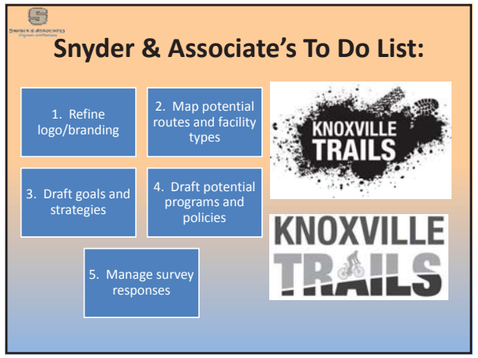
- Stakeholder Meetings
- Public Meetings (2)
- Survey
- Online
- Email list

What's Next?

May	Finalize and Distribute Survey
June	Stakeholder Meetings
July	2nd IRT and BAC meeting
August	1st Public Meeting
September	3rd IRT and BAC meeting
October	2nd Public Meeting (P&Z Commission)
November	Adoption

Knoxville's To Do List:

1. Vote on logo/branding
2. Identify stakeholders for interviews (if any)
3. Review and approve survey questions (post/distribute ASAP)
4. Set date for 2nd IRT and BAC meeting (July)
5. Set date, time, location for 1st public meeting (August)
6. Advertise for 1st public meeting


Snyder & Associate's To Do List:
1. Refine logo/branding
2. Map potential routes and facility types
3. Draft goals and strategies
4. Draft potential programs and policies
5. Manage survey responses
KNOXVILLE TRAILS
KNOXVILLE TRAILS

Knoxville Bicycle and Trail Master Plan

Internal Review Team
Meeting #1

May 12, 2015
10:30 am – 12:00 pm

MINUTES

In Attendance:

Harold Stewart, City Manager
Aaron Adams, Assistant City Manager
Patrick Murphy, Sewer Superintendent
Dennis Webb, Streets and Parks Supervisor
Dan Losada, Police Chief
Jim Mitchell, Fire Chief
Brandon Nemmers, Rec Center Director
Lauren Dietz, Management Intern
Mindy Moore, Snyder & Associates, Inc.
Jared Foss, Snyder & Associates, Inc.

Presentation on Bike Planning and Facility Types

- Mindy presented on the planning process and various bike facility types.

Review Branding Options

- Committee members circled their favorite 3 logos options.

Route Mapping & Identify Concerns

- Public safety concern – trails that are located behind houses or in other remote areas are difficult to access with emergency vehicles
- Concern that people don't know how to navigate roundabouts.
- There are a lot of runners and walkers in Knoxville. Track teams also use the existing trail.
- The existing trail gets used a lot by pedestrians.
- Bike parking is needed.
- Currently there are no existing roads that can accommodate a bike lane.
- Highway 14 is being studied for a 4 to 3 lane conversion. If this moves forward, there could be room to add bike lanes.
- When/if bike lanes cause the loss of a turn lane, they can make it difficult for emergency vehicles to get around.
- Developing the rest of the trail would meet the needs of most residents. They can drive and park to get onto the trail.
- Wondering about community support for developing a loop trail around the City. Would like to add a question to the survey about a loop trail.
- Add rec center to question 18 on survey.
- Want a trail connection to the downtown area.
- Want a connection to Peace Tree.
- The Competine Trail mostly follows sewer easements.
- A comment was made to address more runners in the survey as it is designed around bikers.
- Existing roadways are not conducive to riding a bike.
- Concern for future vehicle parking along the trail.
- Concern of "Trails to nowhere"
- There is a funding issue for the proposed Competine Trail
- The committee reviewed existing utility/ sewer easements for potential trail locations.
- A note was made that Knoxville generally has large ROW to take advantage of as they extend well beyond the curb of the street.
- Robinson Street is being reconstructed and is a relatively flat road for shared use.
- A recommendation was made to include 2-3 north/south and east/west bike friendly streets to connect to trails and destinations.
- Intersections around the middle school are difficult crossings.

The Committee reviewed the map and marked potential trail and on-street bike routes.

Knoxville's To Do List:

Identify stakeholders for interviews (if any)
Review and approve survey questions (post/distribute ASAP)
Set date for 2nd IRT and BAC meeting (June)
Set date, time, location for 1st public meeting (August)
Advertise for 1st public meeting

Snyder & Associate's To Do List:

Refine logo/branding
Map potential routes and facility types
Draft goals & strategies
Draft potential programs and policies
Manage survey responses

IRT and BAC Committee Meeting #2

Mindy S. Moore, AICP
Jared Foss

July 27, 2015

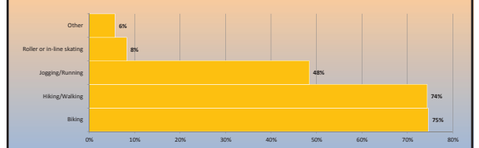
Presentation Agenda

Survey Results
Draft Goals and Objectives
Proposed Network
Potential Concept Plan Areas
What's Next

Survey Results: Support

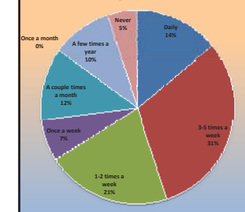
- 69% of respondents have traveled to another city to use their trails in the last two years.

Which of these trail activities are you most interested in?



Survey Results: Usage

How often, on average, do you bike, run or walk either on a trail or along the streets?

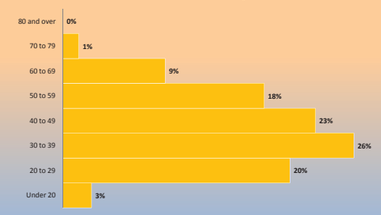


Survey Results: Demographics

- **351 surveys completed**
- Do you live in Knoxville?
  - **Yes (85%)** No (15%)
- Do you work in Knoxville?
  - **Yes (54%)** No (36%) Retired (10%)
- What is your gender?
  - Male (34%) **Female (66%)**

Survey Results: Demographics

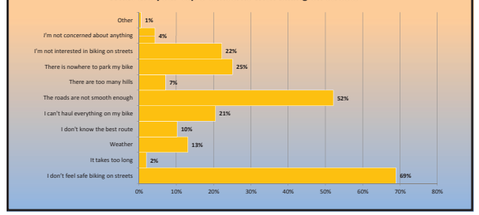
How old are you?



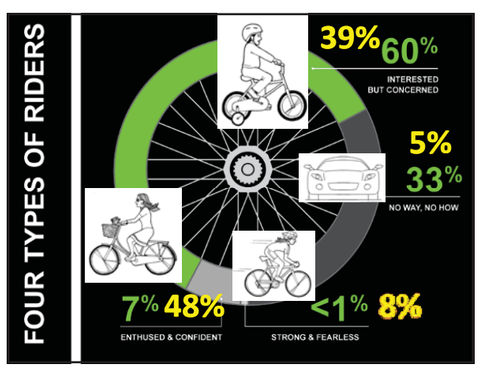
Survey Results: Obstacles

- 43% of respondents are not satisfied with their ability to safely walk or bike throughout Knoxville.

What are your top 3 concerns with biking on streets?



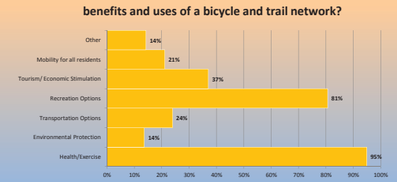
© Jonathan Maus/BikePortland



Survey Results: Support

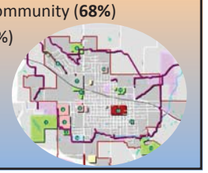
- 91% think biking and walking should be viable transportation options in Knoxville.

What are the top 3 most important benefits and uses of a bicycle and trail network?



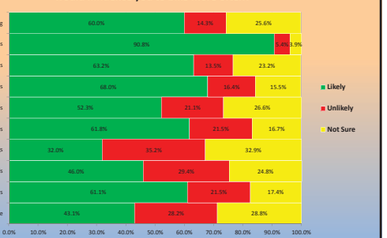
Survey Results: Design

- Would you support on street bike facilities?
  - Yes (**64%**) No (8%) Maybe some (28%)
- Which type of trail system would you prefer?
  - Knoxville Loop around the community (**68%**)
  - Out and back linear trail (21%)
  - Other (11%)



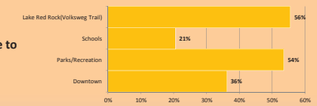
Survey Results: Design

What is the likelihood that the following types of bike facilities would influence you to bike more often?



Survey Results: Destinations

What destinations would you most like to get to via trail or bicycle?

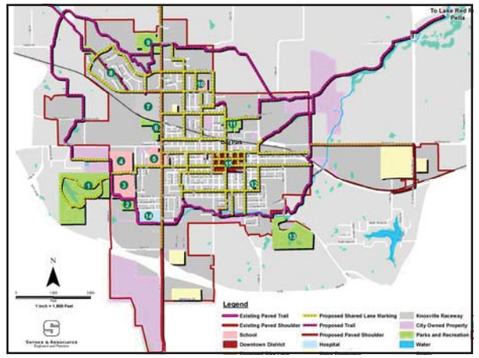


OTHER IMPORTANT CORRIDORS (# responses)

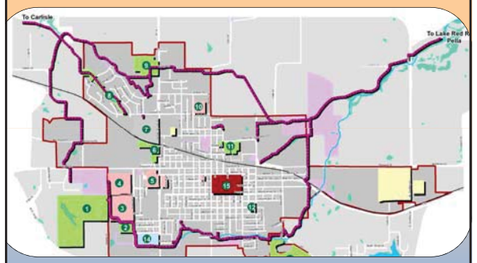
- Highway 14 Corridor including crossing (25)
- Off-street walking and biking trails (13)
- Robinson Street (9)
- Main street (8)
- Pleasant Street (7)
- North/South connections (7)
- On Street facilities (5)
- Knoxville Loop (5)
- Des Moines/Carlisle (4)
- Parking (3)
- Competine trail (3)
- Roche Street (2)
- Knoxville Raceway (2)
- East/West Connector (2)
- Signage (2)
- 3M (2)
- Peace Tree Brewery
- Jackson Street
- Highway 5
- Howard Street
- S-71 Whitebreast Park
- Mountain Bike/ Nature trails

Goal 1:
Provide a complete bicycle and pedestrian system with connections to various destinations

- Facility types
- Multiple Users
- Key Destinations
- Support Facilities
- Scenic Views
- Complete Street Policy

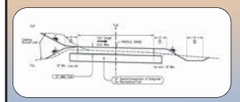


Off-Street Trails



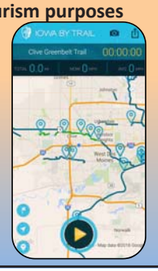
Goal 2:
Ensure biking and walking routes are safe for all users

- Excellent Design
- Maintenance
- Coordination with Other Agencies



Goal 3:
Promote usage of the bicycle and pedestrian system for fitness, recreational, transportation, and tourism purposes

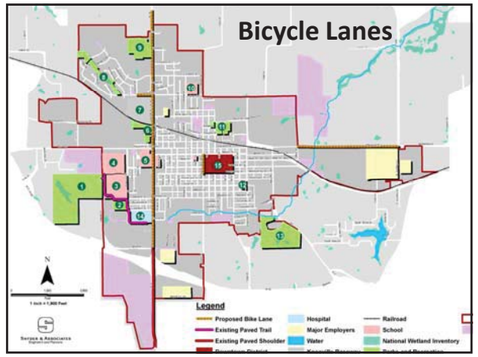
- Signage and Maps
- Google
- Iowa by Trail app
- Programming
- Economic Development



Trail

- 8 - 12' wide path
- Paved
- ADA compliant
- Follows rivers, creeks, greenways, railroad lines, streets
- Separated from the roadway
- Bicyclists AND Pedestrians

Bicycle Lanes



Goal 4:
Implement and update the Knoxville Bicycle and Trails Master Plan

- Top-Priority Projects
- Update Plan
- Seek Funding
- CIP for Trails/Biking

Your Routes

Bicycle Lanes

- **Typical Applications**
  - Most helpful on streets with > 3,000 AADT
  - Streets with posted speed >25 mph
  - On streets with high traffic volume, truck traffic, parking turnover.

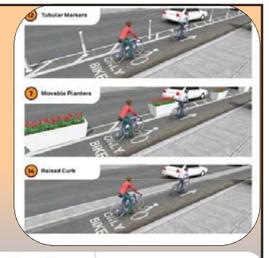
Bicycle Lanes

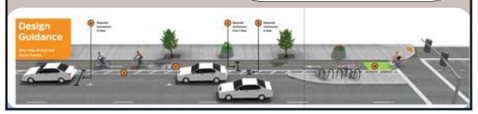
- Increases bicyclist comfort and confidence
- Creates separation between bicyclists and automobiles
- Increases predictability
- Increases street capacities
- Visually indicates bicyclists' right to the street

Cycle Tracks/Protected Bike Lanes

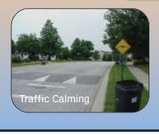
- Streets with Parking Lanes
- Streets with high vehicle speeds - high stress situations
- Streets with high bicycle volumes
- Streets with difficult intersection crossings

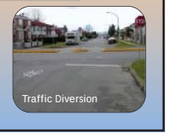
Cycle Tracks / Protected Bike Lane



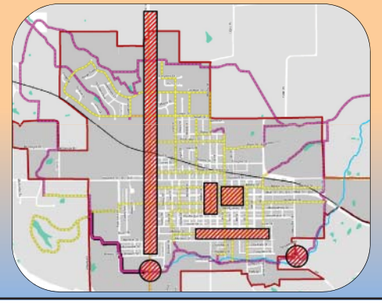


Quiet Street/Bike Boulevards

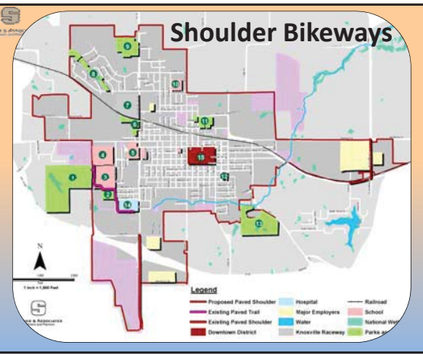




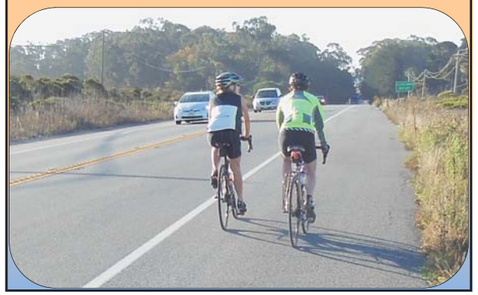
Concept Plan Areas



Shoulder Bikeways

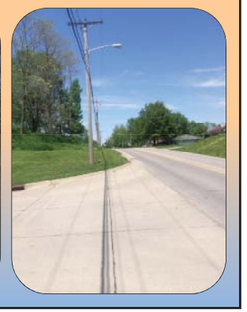


Shoulder Bikeways

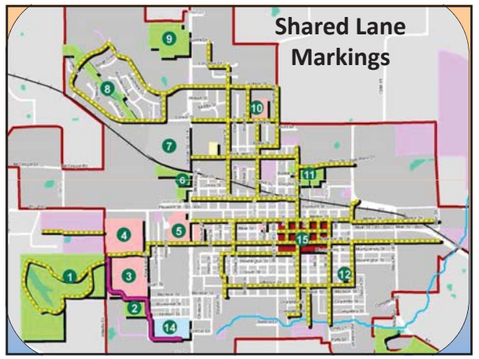


Lincoln/Hwy 14 Trail Crossing

Trail Crossing S. Attica Road



Shared Lane Markings



Shared Lane Markings

- Helps position bicycles on streets
- Notifies motorists to expect bicycle traffic
- Encourages bicyclists to ride in straight line
- Used on streets where bike lanes are preferred, but lack space
- Use on lower volume, lower speed streets

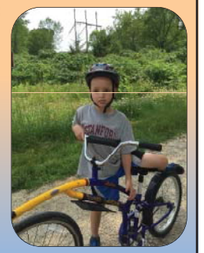
Downtown Area

Lincoln/Hwy 14 Roche Street

Typical Quiet Street

Master Plan Outline

- Introduction (including goals)
- Existing Conditions
- User Needs Assessment (survey results)
- Bicycle and Trail Network
  - Project Prioritization
  - Concept Plans
- Programs and Policies
- Implementation Plan



What's Next?

May	• Finalize and Distribute Survey
June	• Draft Document/Survey Results
July	• 2nd IRT and BAC meeting
August	• Edits & drafting new sections
September	• 3rd IRT and BAC meeting
October	• P&Z Commission
November	• Adoption

Knoxville's To Do List:

1. Provide feedback on draft text and maps
   - Which projects do you see as a priority?
   - Which projects do you want concept plans for?
2. Set date, time, location for 3rd IRT and BAC meetings.

Snyder & Associate's To Do List:

1. Edit text and maps based on feedback
2. Draft Concept Plans and Cost Opinions
3. Draft potential programs and policies
4. Draft Project Prioritization and Implementation Plan

Bicycle and Trail Master Plan

Internal Review Team
Meeting #2

July 27, 2015
2:00 pm

MINUTES

In Attendance:

Harold Stewart, City Manager
Aaron Adams, Assistant City Manager
Patrick Murphy, Sewer Superintendent
Dennis Webb, Streets and Parks Supervisor
Dan Losada, Police Chief
Jim Mitchell, Fire Chief
Brandon Nemmers, Rec Center Director
Lauren Dietz, Management Intern
Mindy Moore, Snyder & Associates, Inc.
Jared Foss, Snyder & Associates, Inc.

Presentation on Citizen Survey Results
Review Goals and Objectives
Review Draft Routes and Facility Types

- How many of the respondents live in Knoxville, but do not work in Knoxville?
- Need Pedestrian signage for downtown
- Bike lanes on Lincoln is a “no-brainer”
- Attica Road - sewer easement is at the bridge
- Use 7th Street instead of Attica Road
- Flashing ped diamonds, triggered by pedestrians could be retrofitted
- Need 50/peds per hour to get a signal
- Roach – two southbound lanes seem excessive – all three lights are to be removed.
- Need Bike lanes to 3M
- Goal Alternative to have a new name/ use.
- Dog park potentially being moved to Ault Park

Knoxville’s To Do List:
Provide comments
Determine project priorities

Snyder & Associate’s To Do List:
Edits based on meeting feedback
Begin Concept Plans
Begin Programs and Policies
Begin Implementation Plan

KNOXVILLE TRAILS

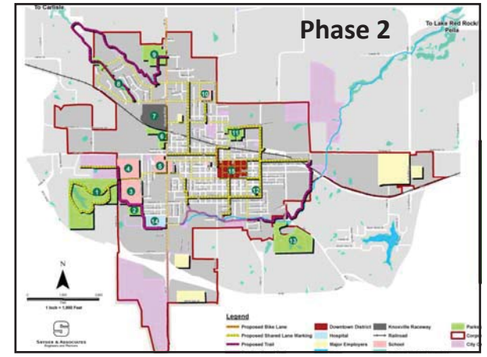
IRT and BAC Committee Meeting #3

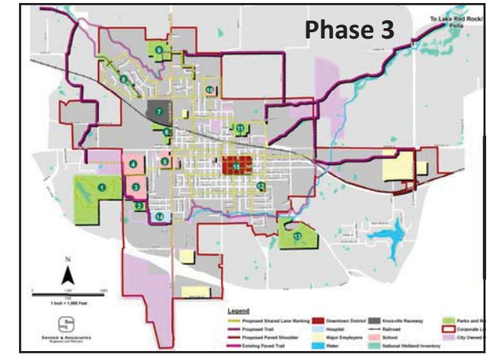
Mindy S. Moore, AICP
Jared Foss

October 1, 2015

Presentation Agenda

- Network Phasing
- Education & Encouragement
- Enforcement
- Evaluation
- Implementation
- Concept Plans
- Discussion

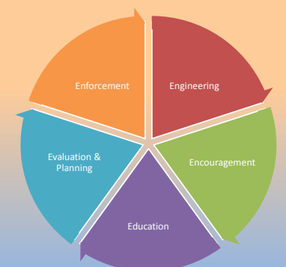




Plan Goals

Goal 1: Provide a complete bicycle and pedestrian system with connections to various destinations	Goal 2: Ensure biking and walking routes are safe for all users
Goal 3: Promote usage of the bicycle and pedestrian system for fitness, recreational, transportation, and tourism purposes	Goal 4: Implement and update the Knoxville Bicycle and Trails Master Plan

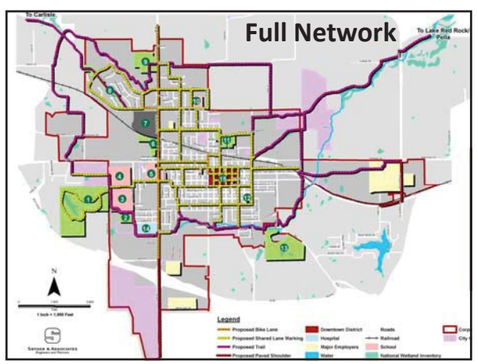
The Five E's of Bicycling

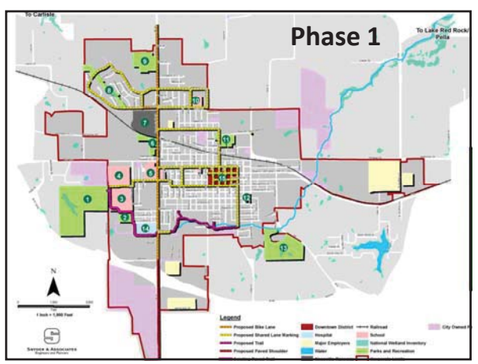


Education and Encouragement

Alliance for Biking & Walking
Iowa Natural Heritage Foundation
BIKEIOWA
IOWA BICYCLE COALITION
CITA
Pella Cycling Club

Education





Bike Maintenance and Repair

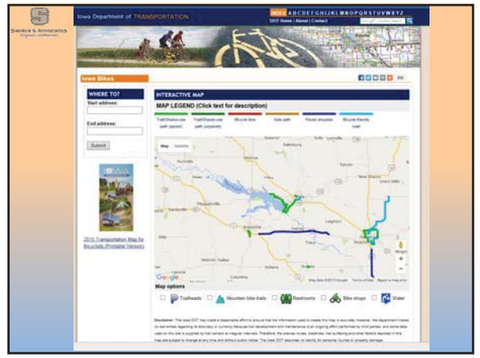
Names for every component on your bike	Repair a flat tire	Adjust brakes	Adjust derraileurs	Adjust and install seatpost, stem, handlebars, pedals, and crankset	Repair a broken chain

KNOXVILLE TRAILS

Branding/ Logo

- Signage
- Website
- Brochures
- Maps
- Promotional Items

Mapping



Enforcement

- Bicyclists
  - have a right to the road
  - are entitled to due care in investigation
  - are entitled to equal treatment

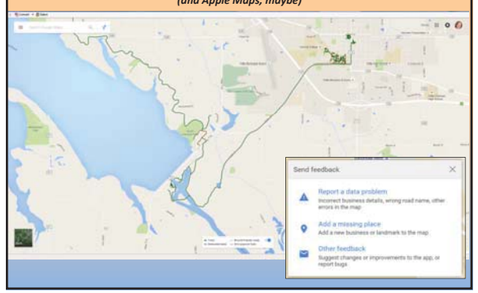
Enforcement

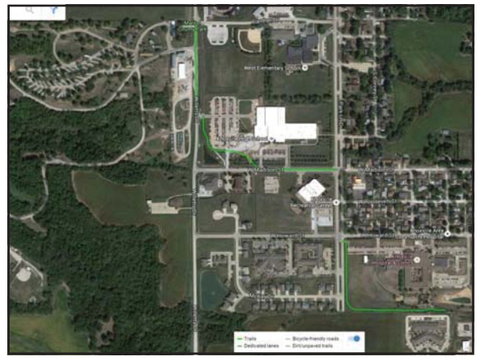
- Provide maps and access points
- Ensure officers are up-to-date on laws and local ordinances
- Enforce speed limits and other rules of the road on all users
- Equip officers with bicycles

321.397 LAMPS ON BICYCLES. Every bicycle shall be equipped with a lamp on the front exhibiting a white light, at the times specified in section 321.384, visible from a distance of at least three hundred feet to the front and with a lamp on the rear exhibiting a red light visible from a distance of three hundred feet to the rear; except that a red reflector may be used in lieu of a rear light. A peace officer riding a police bicycle is not required to use either front or rear lamps if duty so requires.

Google Maps

(and Apple Maps, maybe)





Bike Patrol

- Maquoketa
- Clear Lake
- Spencer
- Newton
- Muscatine
- Iowa City
- Cedar Rapids
- Dubuque
- Des Moines

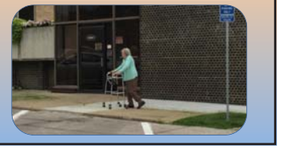
Benefits Beyond Bicycling:

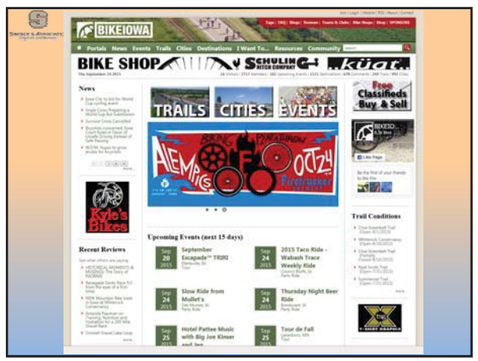
- Discrete, quiet
- Takes up less room
- Economical
- Contact with residents
- Monitor areas where motorized vehicles are limited
- Freedom of movement

Evaluation

COUNT!

- Miles of Facilities
- Expenditures
- Bike Racks
- Bicyclists and Pedestrians
- Crashes
- ADA Compliance

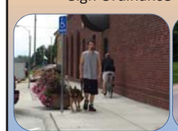




Special Events

Implementation

- Policies
  - Complete Street Policy
  - Subdivision Ordinance – Right-of-way
  - Bicycle Parking Policy
  - Bicycle Ordinance
  - Sign Ordinance



Private Funding Sources

3M

Knoxville

Hormel

Prairie Meadows

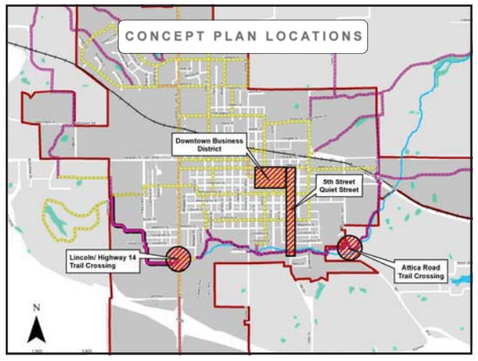
peopleforbikes.org

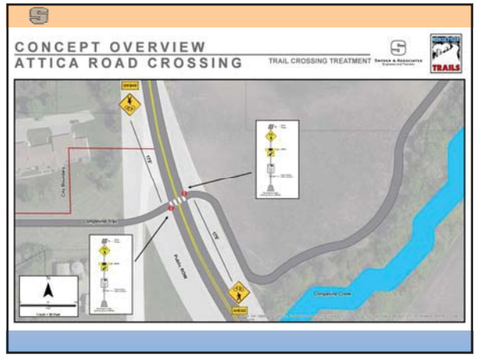
KICKSTARTER

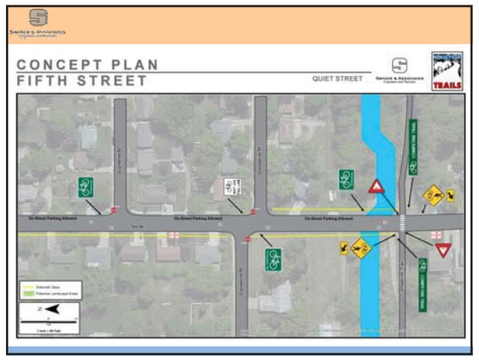
Alphabet Soup of Public Funding Sources

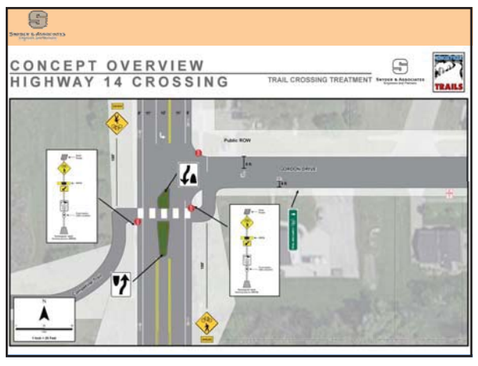
- **REAP – IDNR**
- FRT – Iowa DOT
- SRT – Iowa DOT
- **Regional TAP – CIRTPA**
- Statewide TAP – Iowa DOT
- SRTS – Iowa DOT
- TSIP – Iowa DOT
- CAT - IEDA

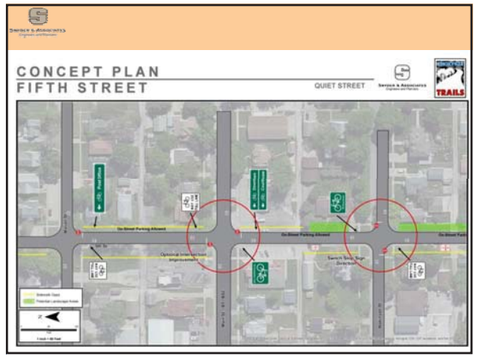
Fundraising Plan











Knoxville's To Do List:

1. Provide feedback on text, maps and concept plans
2. Put on P&Z Agenda

Snyder & Associates' To Do List:

1. Edit text and maps based on feedback
2. Refine concept plans and prepare cost opinions
3. Create final plan layout

What's Next?

May	• Finalize and Distribute Survey
June	• Draft Document/Survey Results
July	• 2nd IRT and BAC meeting
August	• Edits & drafting new sections
October	• 3rd IRT and BAC meeting
October	• P&Z Commission
November	• Adoption

Bicycle and Trail Master Plan

Internal Review Team
Meeting #3

October 1, 2015
3:00 pm

MINUTES

In Attendance:

Aaron Adams, Interim City Manager
Patrick Murphy, Sewer Superintendent
Dennis Webb, Streets and Parks Supervisor
Dan Losada, Police Chief
Jim Mitchell, Fire Chief
Brandon Nemmers, Rec Center Director
Mindy Moore, Snyder & Associates, Inc.
Jared Foss, Snyder & Associates, Inc.

Absent:

Lauren Dietz, Management Intern

Presentation on (see PowerPoint):
Network Phasing
Education and Encouragement
Enforcement
Evaluation
Implementation
Concept Plans
Discussion

- Recommendation of shifting the Attica Road speed limit when the trail is developed to reduce speed near intersection. (May want to consider moving the speed limit 6 months or a year prior to the trail development so that people can adapt to the change.)
- Utilizing 5th Street as the Quiet Street provides connection to the future park located south of Competine Road which is City-owned land.
- Montgomery Street stop signs were switched once, accidentally. The response was negative. However, a school used to be located along 5th Street and no longer exists; therefore, response may be different now.
- The city does not have a sidewalk policy for filling in gaps in the sidewalk system.
- The city has a fee for planting trees in the ROW of $100 per tree. Also restrictions on the type/breed of tree.
- Street tree plantings can improve property values, aesthetics, and help with traffic calming by creating a perception of narrowing the roadway. Trees planted in front yards can also help this effect.
- Police Chief Losada was not worried about switching stop signs at Montgomery and Robinson. He mentioned that they will need to be flagged and advertised for some time prior to and after the switch.
- The idea that switching stop signs is simple and inexpensive, so it can easily be done on a trial basis and switch back if it causes problems.
- The committee generally did not like the idea of a neighborhood traffic circle for the intersection of Main and 5th Street.
- A discussion was held on whether the city should plow their trails during the winter or choose not to. Unplowed trails can be used for snowshoeing or cross country skiing. Plowed trails are popular for people who continue to walk, run, and bike through the winter months. Each jurisdiction can decide whether they want to plow their trails or not. For example, Des Moines and West Des Moines plow their trails. Polk County and Urbandale do not.

Knoxville's To Do List:
Provide feedback on text and concept plans
Put on P&Z agenda

Snyder & Associates' To Do List:
Edits text and maps based on feedback
Refine concept plans and prepare cost opinions
Create final plan layout

Knoxville Bicycle and Trails Master Plan Survey

The City of Knoxville is developing a master plan for trails and on-street bicycle facilities. We want to know what YOU think about biking and walking in the City. Please complete this quick survey to help us understand the needs and priorities for the plan. This will only take a few moments and all questions are optional.

1. Do you live in Knoxville?

- ○ Yes
- ○ No

2. Do you work in Knoxville?

- ○ Yes
- ○ No
- ○ I'm retired or not working

3. How old are you?

4. What is your gender?

- ○ Male
- ○ Female

5. In your opinion, what are the top 3 most important benefits and uses of a bicycle and trail network?

- ☐ Health/Exercise
- ☐ Environmental Protection
- ☐ Transportation Options
- ☐ Recreation Options
- ☐ Tourism and Economic Stimulation
- ☐ Mobility for all residents
- ☐ Reduced traffic congestion
- ☐ Other

6. Do you think it is important for biking and walking to be viable transportation options in Knoxville?

- ○ Yes, biking and walking should both be viable transportation options.
- ○ Yes, for biking only.
- ○ Yes, for walking only.
- ○ Not sure.
- ○ No.

7. Which of these trail activities are you most interested in? (check all that apply)

- ☐ Biking
- ☐ Hiking/ Walking
- ☐ Jogging/ Running
- ☐ Roller or in-line skating
- ☐ Skateboarding
- ☐ None
- ☐ Other

8. How often, on average, do you bike, run, or walk either on a trail or along the streets in Knoxville?

- ☐ Daily
- ☐ 3 to 5 times a week
- ☐ 1 or 2 times a week
- ☐ Once a week
- ☐ A couple times a month
- ☐ Once a month
- ☐ A few times a year
- ☐ Never

9. Within the last two years, have you traveled to other cities to bicycle or use their trails?

- ○ Yes
- ○ No

10. How would you describe your biking ability?

- ☐ I am strong and fearless! I'll bike anywhere any time! Cars don't scare me!
- ☐ I am confident and enthused! I like to bike a lot, but I prefer trails, bike lanes, and other bicycle-friendly places.
- ☐ I am interested, but concerned. I'm not sure how or where to bike, but with a little guidance and a safe route, I'd definitely like to try biking more.
- ☐ No way, no how! You'll never get me on a bike. No matter what.

11. Are you satisfied with your ability to safely walk and bike throughout Knoxville?

- ○ Yes
- ○ Somewhat satisfied
- ○ No
- ○ Not sure

Directional Signage for Bicyclists

Paved Shoulders

Bike Boulevards (Shared, low-speed streets)

Shared Lane Markings

Bicycle Lanes

Buffered Bike Lanes

Protected Bike Lanes (curb or other physical separation)

Intersection Improvements

Off-street Paths (e.g. Trails)

Bike Parking

12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above)

	Very Likely	Likely	Not Sure	Unlikely	Very Unlikely
Directional Signage for Bicyclists	○	○	○	○	○
Paved Shoulders	○	○	○	○	○
Bike Boulevards (Shared, low-speed streets)	○	○	○	○	○
Shared Lane Markings	○	○	○	○	○
Bicycle Lanes	○	○	○	○	○
Buffered Bike Lanes	○	○	○	○	○
Protected Bike Lanes (curb or other physical separation)	○	○	○	○	○
Intersection Improvements	○	○	○	○	○
Off-street Paths (e.g. Trails)	○	○	○	○	○
Bike Parking	○	○	○	○	○

13. Would you support on-street bike facilities such as those described above in Knoxville?

- ☐ Yes
- ☐ No
- ☐ Maybe/Some

14. When you consider biking on streets, what are your top 3 concerns?

- ☐ I don't feel safe biking on streets.
- ☐ It takes too long.
- ☐ The weather is too hot/cold/rainy/windy/snowy/etc.
- ☐ I don't know the best route.
- ☐ I can't haul everything I need on a bike (including children).
- ☐ The roads are not smooth enough.
- ☐ There are too many hills.
- ☐ There is nowhere to park my bike.
- ☐ I'm not interested in biking on streets.
- ☐ I'm not concerned about anything!
- ☐ Other _____

15. Do these obstacles or concerns prevent you from doing these activities more often?

- ☐ Yes
- ☐ No

16. Which type of trail system would you prefer?

- ☐ "Knoxville Loop" trail around the community
- ☐ "Out-and-back" linear trail
- ☐ Other _____

17. What destinations would you most like to get to via trail or bicycle? (Check your top 3 choices)

- [ ] Downtown
- [ ] Parks/ Recreation
- [ ] Schools
- [ ] Work
- [ ] Knoxville Speedway
- [ ] Campgrounds
- [ ] Library
- [ ] Restaurants/Shopping
- [ ] Special events
- [ ] Family/Friends houses
- [ ] Rec Center
- [ ] Pella
- [ ] Carlisle (Summerset Trail)
- [ ] Melcher-Dallas
- [ ] Lake Red Rock (Volksweg Trail)
- [ ] None
- [ ] Other

18. What are the three most important corridors to improve for bicycling?

19. What else should we know as we prepare the bicycle and trail master plan for Knoxville?

You may enter your email to receive additional information on the Bicycle and Trail Master Plan process as it progresses.

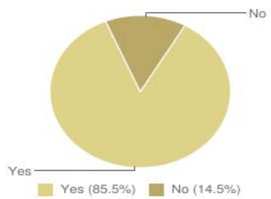
ex: myname@example.com

Submit

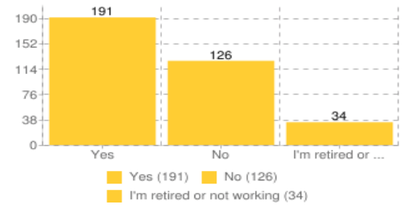
Knoxville Bicycle and Trails Master Plan Survey

May 2015

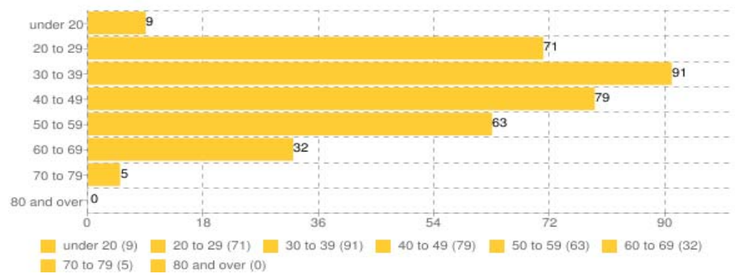
1. Do you live in Knoxville?



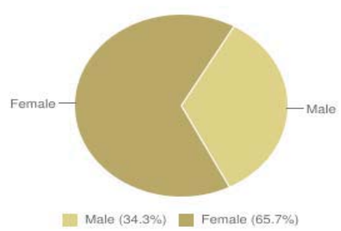
2. Do you work in Knoxville?



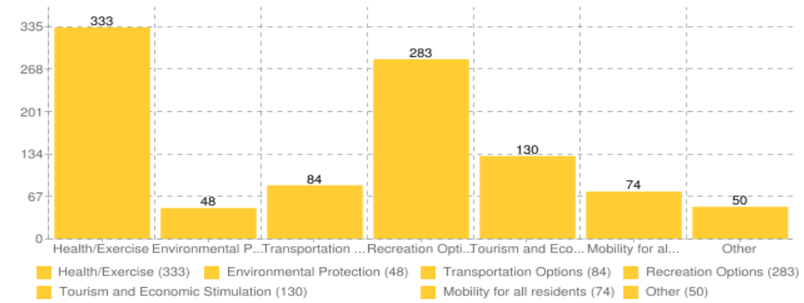
3. How old are you?



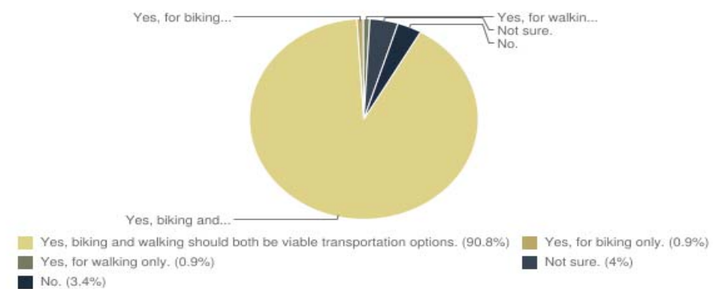
4. What is your gender?



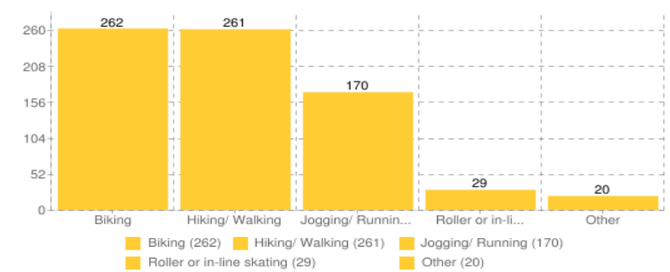
5. In your opinion, what are the top 3 most important benefits and uses of a bicycle and trail network?



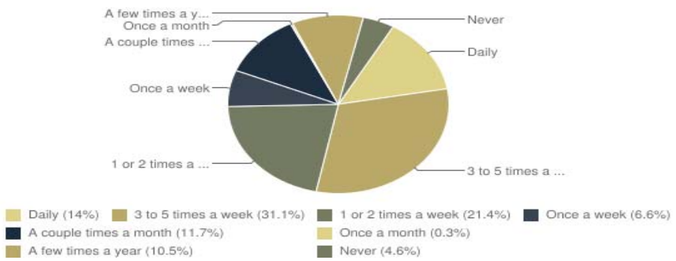
6. Do you think it is important for biking and walking to be viable transportation options in Knoxville?



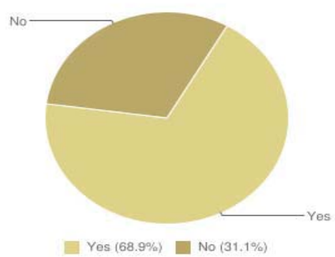
7. Which of these trail activities are you most interested in? (check all that apply)



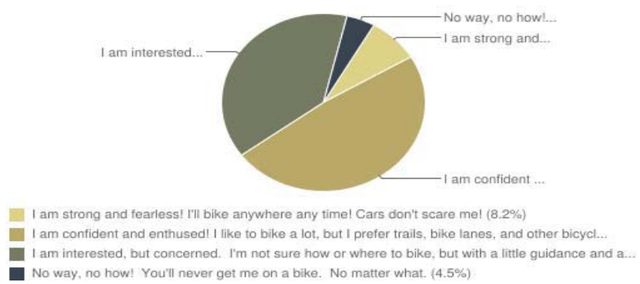
8. How often, on average, do you bike, run, or walk either on a trail or along the streets in Knoxville?



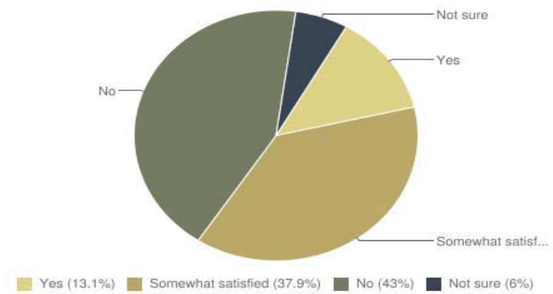
9. Within the last two years, have you traveled to other cities to bicycle or use their trails?



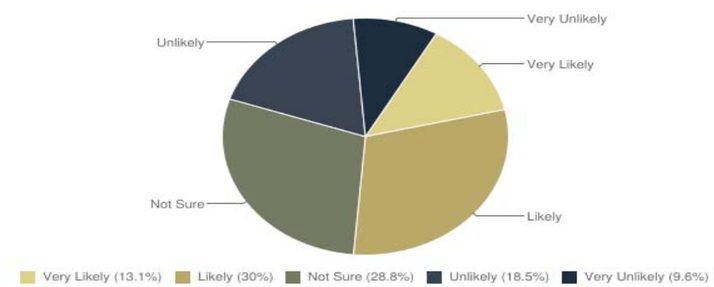
10. How would you describe your biking ability?



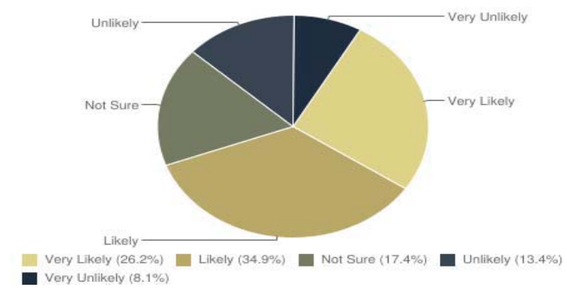
11. Are you satisfied with your ability to safely walk and bike throughout Knoxville?



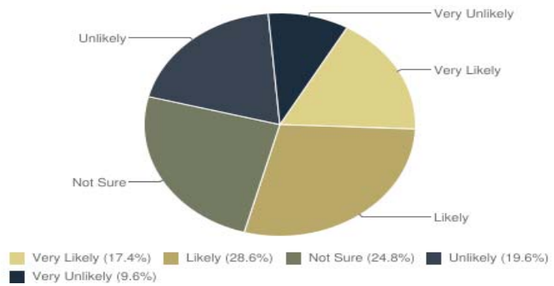
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Directional Signage for Bicyclists



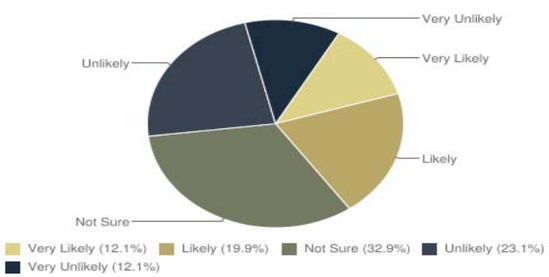
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Paved Shoulders



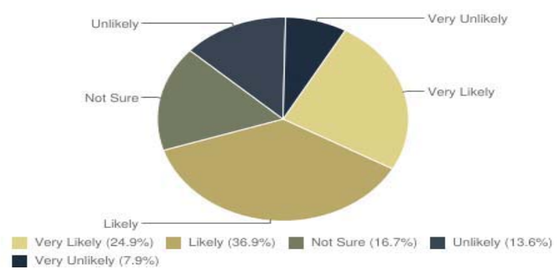
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Bike Boulevards (Shared, low-speed streets)



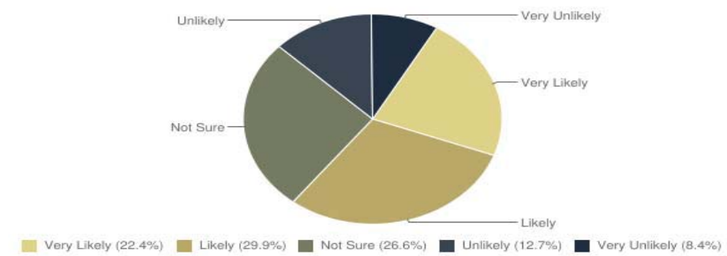
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Shared Lane Markings



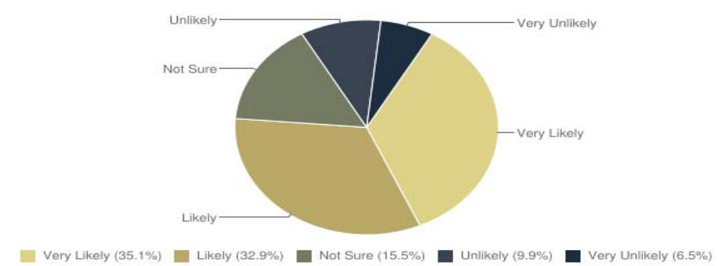
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Bicycle Lanes



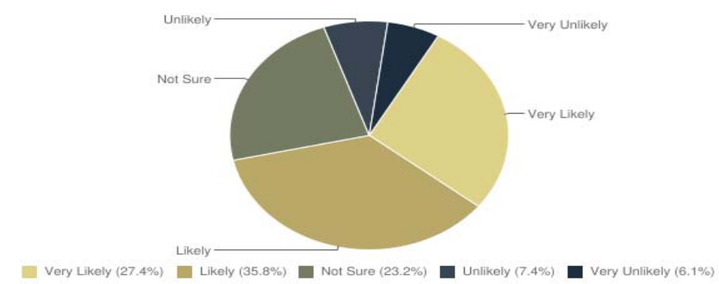
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Buffered Bike Lanes



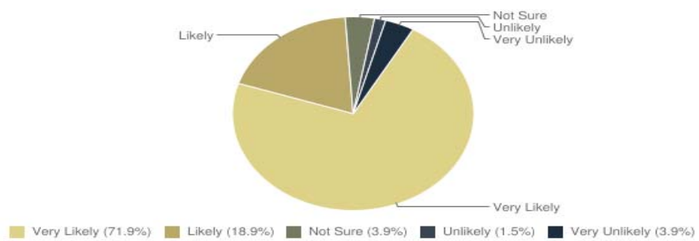
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Protected Bike Lanes (curb or other physical separation)



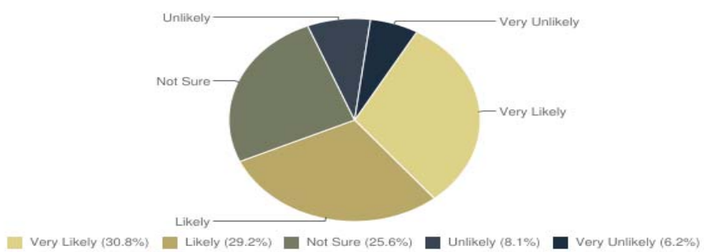
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Intersection Improvements



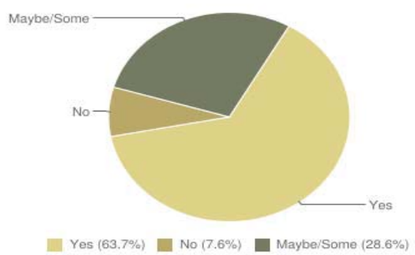
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Off-street Paths (e.g. Trails)



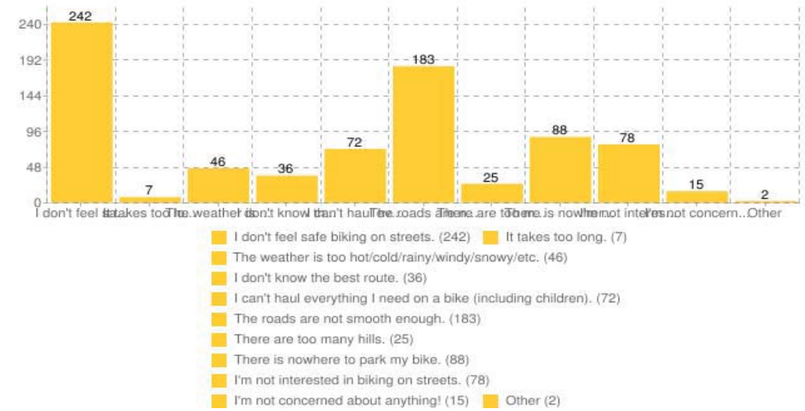
12. What is the likelihood that the follwing types of bike facilities would influence you to bike more often? (examples shown above) - Bike Parking



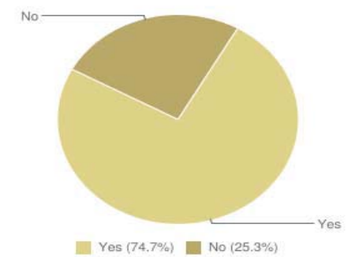
13. Would you support on-street bike facilities such as those described above in Knoxville?



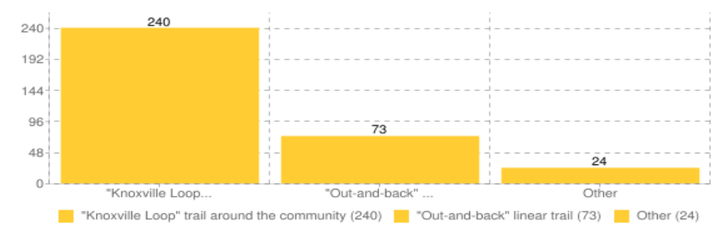
14. When you consider biking on streets, what are your top 3 concerns?



15. Do these obstacles or concerns prevent you from doing these activities more often?



16. Which type of trail system would you prefer?



Link to des Moines
Don't allow them to ride on the highways and require bicyclists to follow traffic rules.
Compentine Creek
Knoxville to Pella, Hwy 14 corridor
Facilitation, public awareness and county support
Needs to be a long term plan to connect from Knoxville to nearby communities.
Trails to keep bicyclists off the roadways
Road safety Accessibility to trails Activities to promote biking in the community
Streets are in very poor condition Non-biker ethics training for us that do
Routes to schools, social/recreation activities and link us with other trails.
Parking, safety, & ease of use
North Lincoln, Robinson Street, and Pleasant.
Trails at least 5 miles or more.
Continuation of trail across Hwy 14 and over Competine Creek. Continue north of existing trail to campgrounds. Trails to connect to lake trails.
Major Intersections of highways. Mark all side streets with Right-of-way signage including Yield/ Stop signs.
Hwy. 14 Pleasant St. Main St. (Hwy. T15)

PLEASANT STREET
PHASE 7
$162,748
ROBINSON STREET
WILLETTS DRIVE
PARK LANE DRIVE
LINCOLN STREET
DAYTON STREET
ROCHE STREET
5TH STREET
ATTICA ROAD
PHASE 6
$466,678
MADISON STREET
PHASE 1
$391,937
PHASE 5
$460,146
COMPETINE STREET
PHASE 3
$660,435
TERRACE LANE
CINDY LANE
MCKAY DRIVE
GORDON DRIVE
PHASE 4
$613,066
PHASE 2
$1,484,673
* FUNDS IN PLACE - PREVIOUS BOND -
$305,766, STP TE GRANT -
$143,461, LOSST - $163,868
KNOXVILLE, IOWA
COMPETINE CREEK TRAIL
PHASING PLAN

MODEL BICYCLE ORDINANCE
DRAFT

Sec. 1. Definitions.

"Bicycle" means either of the following:

1) A device having two or three wheels and having at least one saddle or seat for the use of a rider which is propelled by human power.

2) A device having two or three wheels with fully operable peddles and an electric motor of less than seven hundred fifty watts (one horsepower), whose maximum speed on a paved level surface, when powered solely by such a motor while ridden, is less than twenty miles per hour.

Drafter's Note: Same as Iowa Code section 321.1(40)

b) "multi-use recreational trail" means a way or place, the use of which is controlled by the city as an owner of real property, designated by the multi-use recreational trail maps, as approved by resolution by the city council, and no multi-use recreational trail shall be considered as a street or highway

Drafter's Note: Same as Des Moines Municipal Code section 114-1.

Sec. 2. Voluntary Registration, Fee and Dealer Duty.

a) Each resident of the city who is the owner of a bicycle may make application for registration with the police chief.

b) The registration is valid until the bicycle is sold, given away, or scraped by the registered owner.

c) Upon registration an identification sticker may be affixed to the bicycle by the owner.

Sec. 3. Alteration of serial frame number.

It shall be unlawful for any person to willfully or maliciously remove, destroy, mutilate or alter the manufacturer's serial frame number of any bicycle.

Sec. 4. Sirens and whistles prohibited.

A bicycle shall not be equipped with and a person shall not use upon a bicycle any siren or whistle. This section shall not apply to bicycles ridden by peace officers in the line of duty.

Drafter's Note: Same as Iowa Code section 321.434.

Sec. 5. Lamps and reflectors.

a) Every bicycle ridden at any time from sunset to sunrise and at such other times when conditions such as fog, snow, sleet, or rain provide insufficient lighting to render clearly discernible persons and vehicles on the highway at a distance of five hundred feet ahead shall be equipped with a lamp on the front exhibiting a white light visible from a distance of at least three hundred feet to the front

b) Every bicycle shall be equipped with a lamp on the rear exhibiting a red light visible from a distance of three hundred feet to the rear; except that a red reflector may be used in lieu of a rear light.

c) A peace officer riding a police bicycle is not required to use either front or rear lamps if duty so requires.

Drafter's Note: Same as Iowa Code sections 321.384 and 321.397, Wording here combines the two state code sections.

Sec. 6. Brakes.

Every bicycle used upon the city streets, sidewalks, highways, park roads or multi-use recreational trails shall be able to come to a complete stop within 100 feet.

Sec. 7. Applicability of motor vehicle laws.

Every person operating a bicycle upon the city streets, highways, park roads, or multi-use recreational trails shall be subject to this chapter and other city traffic ordinances and the state statutes applicable to the drivers of motor vehicles, except as to special regulations in this chapter and except as to those provisions of ordinances and statutes which by their

nature can have no application or those provisions for which specific exceptions have been set forth regarding police bicycles.

Drafter's Note: Same as Iowa Code Section 321.234(2)
Also, the reference to chapter is used because the intent is to include this ordinance in the "Traffic and Vehicles" chapter of the city code. Reference to the appropriate traffic chapter should be used where appropriate.

Sec. 8. Obedience to signals.

Every person operating a bicycle shall obey the directions of official traffic signals, signs and other control devices applicable to other vehicles, unless otherwise directed by a police officer, and shall obey direction signs relative to turns permitted, unless such person dismounts from the bicycle, when he or she shall then obey the regulations applicable to pedestrians.

Sec. 9. Improper Riding.

a) A person propelling a bicycle on any street, sidewalk, highway, park road or multi-use recreational trail, shall not ride other than upon or astride a permanent and regular seat attached to the bicycle and shall not use a bicycle to carry more persons at one time than the number of persons for which the bicycle is designed and equipped.

b) This section does not apply to the use of a bicycle in a parade authorized by proper permit from the city.

Drafter's Note: Same as Iowa Code section 321.234(3), (4) and (5)

Sec. 10. Carrying packages.

No person operating a bicycle upon a street, sidewalk, highway, park road or multi-use recreational trail shall carry any package, bundle or article which prevents the rider from keeping at least one hand upon the handlebars.

Sec. 11. Control with hands on handlebars

The operator of a bicycle upon a street, sidewalk, highway, park road or multi-use recreational trail shall keep the bicycle under control at all times and at all times during operation shall have one or both hands upon the handlebars and the feet engaged with the braking device if the braking device is designed to be actuated by the feet.

Sec. 12. Place of riding.

Every person operating a bicycle upon a street, sidewalk, highway, park road or multi-use recreational trail shall ride as near to the right-hand side of the way as practicable, exercising due care when passing a standing bicycle, other vehicle or one proceeding in the same direction. When so riding upon any street, sidewalk, highway, park road or multi-use recreational trail with other cyclists, there shall not be more than two abreast.

Sec. 13. Emerging from alley or driveway.

The operator of a bicycle emerging from an alley, driveway or building shall, upon approaching a sidewalk or the sidewalk area extending across any alleyway or driveway, yield the right-of-way to all pedestrians approaching on the sidewalk or sidewalk area and upon entering the roadway shall yield the right-of-way to all vehicles approaching on the roadway.

Sec. 14. Operation on sidewalk.

Bicycles may be operated upon the public sidewalks in a careful and prudent manner and at a rate of speed not exceeding eight (8) miles per hour except where signs are erected that prohibit the riding of a bicycle. Every person lawfully operating a bicycle upon a public sidewalk, shall yield the right-of-y when approaching a pedestrian shall give an audible signal before overtaking and passing.

Sec. 15. Clinging to other vehicles.

No person riding upon any bicycle on a street, sidewalk, highway, park road or multi-use recreational trail shall attach the bicycle or himself or herself to any moving vehicle by tow rope, hand grip or otherwise, and shall not tow or be towed by another bicycle or vehicle.

Sec. 16. Following Emergency Vehicles.

No person riding a bicycle shall follow closer than 500 feet of an emergency vehicle as defined by Iowa Code section 321.1 which has emergency lights and/or siren activated, and shall not stop, park, or leave a bicycle within 500 feet of an emergency vehicle stopped in response to an emergency.

Drafter's Note: The state code 321.367 covers fire apparatus, as such fire trucks would be covered by sec. 7 herein, but this proposed section includes all emergency vehicles as recommended by the Metro Advisory Council Bicycle Ordinance Study.

Sec. 17. Parking.

No person shall park a bicycle upon a street other than upon the sidewalk in a rack to support the bicycle or against a building or at the curb, in such a manner as to afford the least obstruction to pedestrian traffic, or upon the parking area between the sidewalk and the roadway.

Sec. 18. Reckless operation.

No person shall operate a bicycle with willful or wanton disregard for the safety of persons or property.