THE TOPEKA BIKEWAYS MASTER PLAN

DEVELOPED FOR THE CITY OF TOPEKA AND THE METROPOLITAN TOPEKA PLANNING ORGANIZATION BY RDG PLANNING & DESIGN AND COOK, FLATT & STROBEL

We are grateful for the collaboration and insight of the Project Advisory Committee, without whom this document would not have been possible. We especially appreciate the wonderful support, friendship, and patience of City Councilmember Karen Hiller, who chaired the committee and the City of Topeka's incomparable staff: David Thurbon, Carlton Scroggins, Linda Voss, Bill Riphahn, Tim Paris, and Loreena Munoz, who helped create what we all believe is a great document that we hope will help the City of Topeka pedal down the road to bicycle friendliness.

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THE TOPEKA
BIKEWAYS
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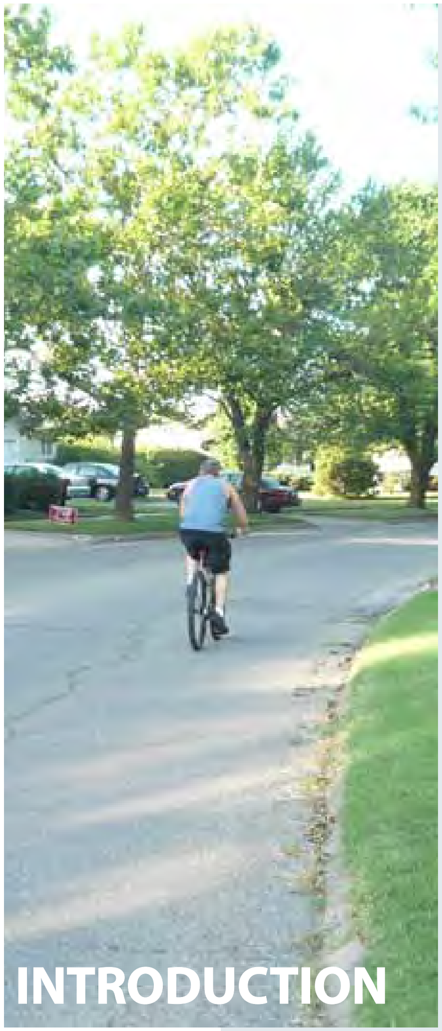


Consider a vehicle that weighs 1/6 as much as you do, easily travels at half the speed of a contemporary car in city traffic, gets the equivalent of 1,500 to 2,000 miles per gallon, produces zero emissions and almost no noise, can be parked outside the door of your destination or even inside your home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

Now consider Topeka: a city of distinctive neighborhoods and a vital downtown, the capital of Kansas with a rich history and many unique features. A compact city, where most trips are under six miles and most of the hills are gentle. A city with a network of long, pleasant, and lightly traveled streets that take you conveniently to most of its features. An inland, plains city nevertheless defined by water – a major river, a scenic system of watercourses, and two large lakes.

Bicycles and Topeka are made for each other, and while bicycling does not work for every Topekan or every trip, it can play a significant role in the city's transportation system. This Topeka Bikeways Master Plan is dedicated to making Topeka a place that encourages its citizens to use this healthy, low-impact, and intrinsically fun form of transportation as a greater part of their routine lives. Its primary purpose is to knit the city's neighborhoods and major destinations together with a network of facilities that is safe, pleasant, and comfortable for current and future bicyclists with a broad range of ages, capabilities, interests, and economic groups. In doing so, the plan also recognizes that this network must be practical and affordable to the community, and must deliver benefits far in excess of its costs.

It is the unique characteristic of bicycle transportation that it combines utility and experience. Bicycling can be a useful and convenient form of transportation for many trips that are part of our daily activities: trips to work and school, to visit friends, to parks and recreation, to shopping and to worship, and to many other purposes of life. But moving under our own power is profoundly satisfying, and gives us the opportunity to experience the city, to be part of its pulse, and to see our fellow citizens on a personal basis. We know that bicycling for transportation does not meet everyone's needs and that most trips in Topeka will continue to be made by car. But a balanced transportation system should offer choices, including the option to feel safe and comfortable using the healthy, sustainable, and socially satisfying means of mobility that the bicycle offers.

Why Bikeways? Goals of this Master Plan

Topeka has completed major projects that are both important recreational assets and the basis for a broader bicycle transportation system. The Shunga Trail – a greenway that links many of Topeka's parks along Shunganunga Creek – connects the city's west side with downtown and has just been extended to the eastern edge of town. The Landon Trail joins the Shunga just south of downtown and continues for 4.5 miles through southeast Topeka, continuing on into the surrounding Flint Hills, and the Soldier Creek Trail serves North Topeka. Other multi-purpose trails are in the planning or early development stages. By

using streets, levees, greenways, drainageways, parks and open spaces, and other opportunities to expand the reach and function of these trails to serve destinations in the city, this plan can help Topeka accomplish the following goals:

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

Goal Two: Improve bicycle access to key community destinations. A bicycle transportation system should get people comfortably and safely to where they want to go. Therefore, Topeka's system should be destination-based, providing clear and direct connections to key community features.

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

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

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

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

- **Individual sustainability.** Incorporating physical activity into the normal routine of daily life for everyone from kids to seniors makes all of us healthier, and reduces overweight and obesity rates and improves wellness and lowers overall health care costs.

Goal Five: Increase safety on the road for motorists, bicyclists, and pedestrians. Improved safety is a critical goal for any transportation improvement, and good infrastructure can reduce crashes and increase comfort for all users of Topeka's transportation network. In addition, national research indicates a strong relationship between the number of cyclists and bicycle crash rates. Infrastructure must also be supported by education, enforcement, and encouragement programs, and its effectiveness measured by evaluation.

Goal Six: Capitalize on the economic development benefits of a destination-based bicycle transportation system. Topeka has many great features that appeal to visitors: the Brown v. Board of Education historical site, Gage Park with its zoo and new Discovery Center, the Kansas History Center, the State Capitol, distinctive commercial districts, and many other attractions. Topeka as a bicycle-friendly community can add to the visitor experience, and attract new residents and investment.

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

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

- **Integrity** (or, in C.R.O.W.'s term, Coherence): Topeka's bikeway network at all points in its evolution forms a coherent system that links starting points with destinations. The network is understandable to its users and fulfills a responsibility to convey them continuously on their paths.

- **Directness:** Topeka's bikeway network should offer cyclists as direct a route as possible, with minimum detours or misdirections.

- Safety: Topeka's bikeway network should maximize the safety of using the bicycle for transportation, minimize or improve hazardous conditions and barriers, and in the process improve safety for pedestrians and motorists.

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

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

- **Feasibility:** The Topeka bicycle network should provide a high ratio of benefits to costs and should be viewed as a wise investment of resources. It is capable of being developed in phases and growing over time.

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

Plan Methodology and Stakeholder Involvement

It was extremely important to structure a planning process that maximized both public involvement and our understanding of the physical structure and community character of Topeka. A Project Oversight Committee (POC), representing city and state staff, bicycle community members, the private sector, and other community interests met throughout the planning process, with an initial meeting on June 3, 2010. Major public involvement events included:

- **Field reconnaissance and stakeholder groups on July 15-16 and July 22, 2010.** This visit included initial field work on bicycle and interest/stakeholder group discussions, helping us become familiar with issues and the overall structure of Topeka's neighborhoods and street system.

- **Bikeways Survey.** This survey, which went on-line in August, 2010, was designed to explore characteristics of Topekans interested in bicycling and to measure their level of comfort with different types of facilities. The survey attracted 1,051 responses and produced an enormous amount of information, helping to frame the directions of this plan.

- **Quadrant Charrettes.** The quadrant charrettes were a central part of the planning process. The city was divided into four quadrants: east and west of Topeka Boulevard, north and south of 21st Street. Each two-day charrette included extensive field work on bicycle during the days, and public meetings in the evening to discuss results and concepts. These events occurred on September 21/22, 2010 (Northwest with evening workshops at Central Park Community Center); September 23/24, 2010 (Northeast at Oakland Community Center); October 7/8, 2010 (Southeast at Hillcrest Community Center); and October 14/15, 2010 (Southwest at Crestview Community Center).

During this process, we were able to talk in person with about 100 participants in stakeholder groups and quadrant charrettes; obtain written information from over 1,000 people through the on-line survey; and cover over 400 miles of Topeka's streets and trails by bicycle. The results of this process are used throughout the plan, and Chapter Two presents the results and implications of the survey in detail.

Organization of the Plan

The Topeka Bikeways Master Plan presents its analysis and recommendations in the following chapters:

Chapter One: Topeka's Bicycling Environment. This chapter examines existing conditions in the city pertinent to bicycling, including determinants of a future bikeway system such as destinations, existing facilities, and opportunities.

Chapter Two: The Market for Bicycling Topeka. This chapter estimates current pedestrian and bicycle demand and the potential future market. It also reviews the Topeka Bikeways Survey, which provides extensive information about people interested in urban bicycling in Topeka and their needs, concerns, and preferences.

Chapter Three: The Bikeway Network: Principles and Structure. This chapter uses the analysis of

Chapters One and Two to establish over-all principles that guide the proposed Topeka network. It also elaborates on the measurement criteria presented above to help guide the system's components. Finally, it presents a complete conceptual system of on-street bikeways, paths, and multi-use trails.

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

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

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

Photograph and excerpt from the City of Topeka's comprehensive plan, circa 1976.

large amount of open "green space". The space is the result of legislation passed in the 1970's which required the dedication of open space to provide for better health of residents of new subdivisions.

We also see special paths winding along the road and through parks. These paths are reserved for bicycles. Large numbers of users are on the trails, from youngsters to businessmen with briefcases.

The paths are heavily used by commuters in the morning and evening we are told.

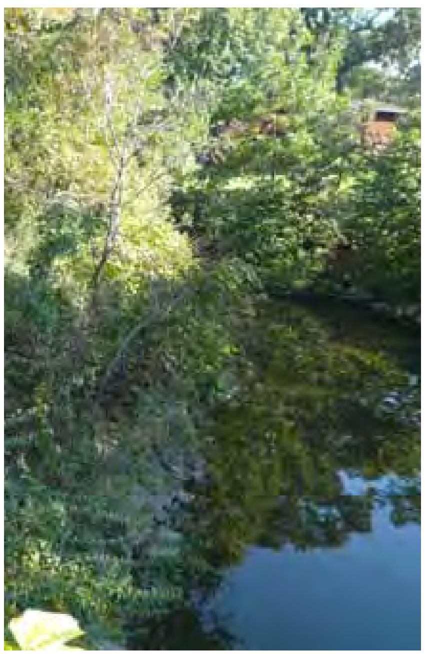
In fact, the bike has become so popular, special rainsuits, which cover both bike and rider and come complete with stiff hat, visor and electric visor wipers are being sold.

CHAPTER 1

TOPEKA'S BICYCLING ENVIRONMENT

This chapter describes key characteristics and features that affect the design of Topeka's bikeways network, including:

- **Geography and Topography**
- **Land Use and Development Patterns**
- **Destinations**
- **Existing Bikeway Facilities**
- **Street Connectivity and Types**
- **Network Opportunities**



Geography and Topography (Figure 1.1)

Topeka's generally gentle topography is one of a number of community features that encourage urban bicycling. While not entirely flat, most grades (with some notable exceptions) are relatively easy and offer few hills that significantly challenge a majority of cyclists. Features of the natural environment that help to define bicycling in Topeka include:

• ***The Kansas River.*** Despite Topeka's location in the Plains, water is a particularly important determinant of both urban form and the bicycling context. The Kansas River and its very wide floodplain divide north and south Topeka and help create a sense of geographically distinct communities on both sides of the river. Most of the North Topeka and Oakland neighborhoods are contained within this floodplain and have experienced past flooding, but flood control levees and stormwater management projects have reduced this risk. These levees provide trail development opportunities and the nature of the floodplain avoids the steep hills that sometimes mark the edges of river channels.

• *Watercourses.* Topeka's system of creeks, draining into the Kansas River from west to east, both define city form and bikeway possibilities. The Shunganunga Creek system includes the main channel, a south branch that joins the main creek in Big Shunga Park, and Deer Creek, joining the main channel near northwest of 2nd and Rice link major parks and green spaces together and also form the city's main exist-ing trail corridors. Dams on Shunga Creek in the southwest part of the city and Deer Creek on the south-east create Topeka's main lakes – Lake Sherwood and Lake Shawnee, respectively. On the north side of town, an improved channel on Soldier Creek, the primary drainage corridor on that side of the city, reduces previous flood risks in North Topeka and diverts drainage away from an older Soldier Creek channel through the neighborhood. The Soldier Creek Trail, between Lyman Road and Garfield Park, runs along the bank of those old channel.

• *Grades and Escarpments.* Most of Topeka's land area, within the I-470 south loop and south of US 24, features relatively easy grades, with gentle slopes rising out of the Shunga Creek valley to the south and a moderate escarpment along the south edge of the Kansas River floodplain, part of which is topped by I-70. For the most part, these slopes in the central part of the city are not factors for bicycle planning. Steeper slopes are found outside of the I-470 loop, especially around the two lakes and southwest of I-470 in a sector between Gage Boulevard and 29th Street. A more rolling topography also occurs north of Soldier Creek.

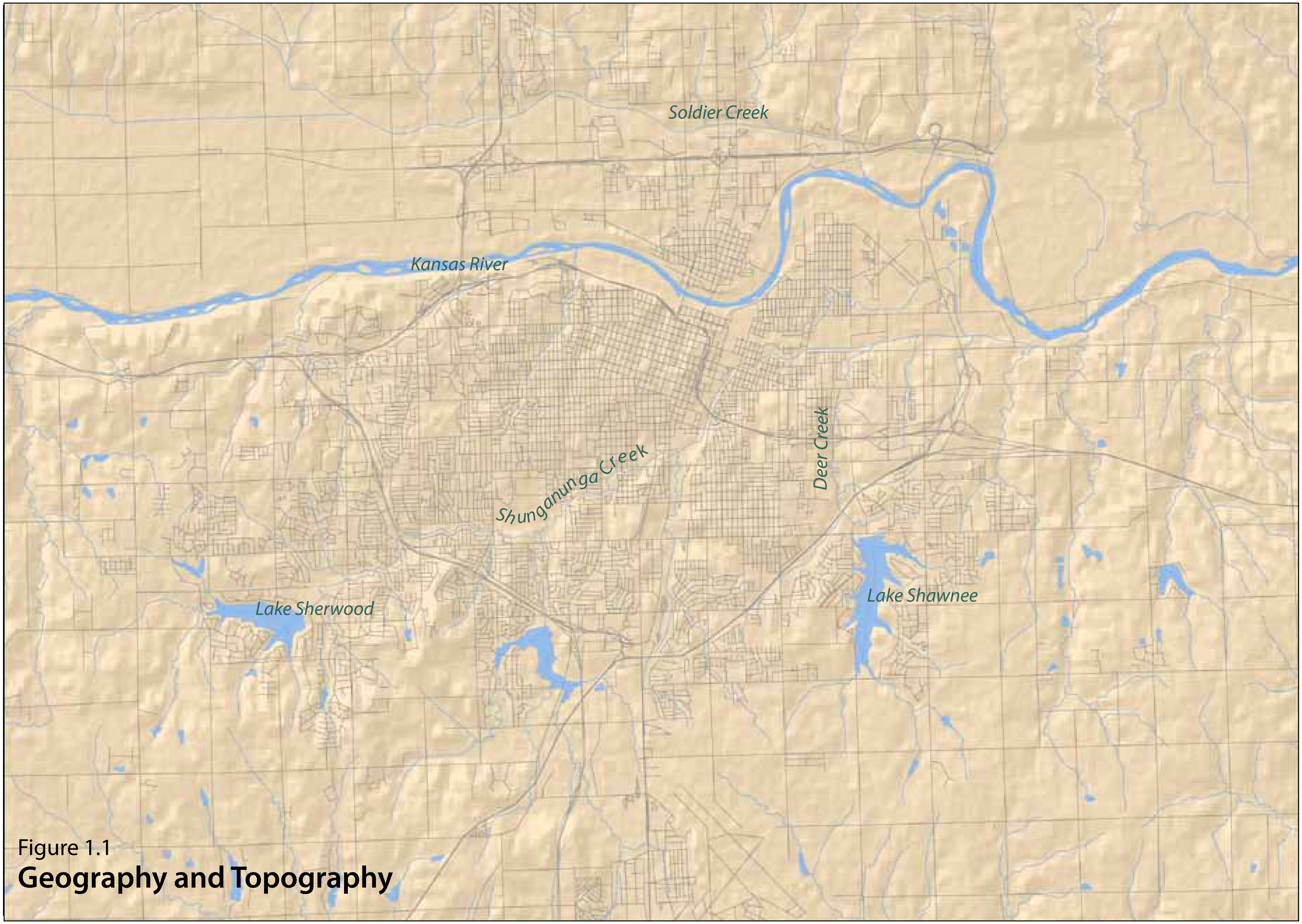


Figure 1.1
Geography and Topography

Land Use and Development Patterns (Figure 1.2)

The primary Topeka urban area that is the major focus of the bikeways plan is an approximate square about 10 miles on a side, with downtown near the center. Despite this apparent symmetry, the majority of population and development is south of the Kansas River within the I-470 loop. Lower density, contemporary residential development occurs to the west beyond I-470 and in the Lake Shawnee area.

Residential Use

The pattern of residential development is an important determinant of bicycle network service. The city's population according to the 2010 census is 127,473, accommodated within an area of about 57 square miles, a density of about 2,240 people per square mile. Despite this relatively low gross density, Topeka's central core, within the I-70/I-470 loop and west of Adams Street, is a relatively compact, higher-density area. The gross population density within the city is also reduced by a large amount land devoted to public use, including the Capitol District, the Kansas History Center campus, Cedar Crest, institutional uses such as the VA Hospital and the KNA campus, the ExpoCentre, and other public and institutional uses.

In common with similarly sized cities, Topeka's residential pattern displays different eras of development, and older neighborhoods built on small lots on a regular urban grid display a higher population density than new, suburban neighborhoods on large lots. Traditional urban neighborhoods around downtown and east of Gage Boulevard and in strongly identifiable satellite districts, including Oakland and North Topeka, are relatively dense, while larger lots characterize post-World War II development within the freeway ring but west of Gage. Lower density, single-family urban residential predominates outside the loop, along the US 75 corridor north of the Kansas River, and around Lakes Sherwood and Shawnee. Dispersed rural residential along section lines fills out the extremities of the urbanized area.

Areas with multi-family housing concentrations typically

Commercial environments in Topeka. From left on this page: mixed use redevelopment near Washburn University and Brookwood Shopping Center. Both types of commercial development are well designed for bicycle access. A short trail link between the Shunga Trail and 29th Street connects Brookwood directly into the city's trail system.

have a large number of present and prospective cyclists. In addition to high densities, residents of apartments may have fewer automobiles per household, be younger, and be more likely to use alternative transportation as part of their daily lives. Multi-family concentrations outside of traditional, mixed density neighborhoods include:

- Villa West area northwest of 29th and Wanamaker
- Wanamaker Drive district, southwest of 29th and Wanamaker Road to Arrowhead
- Westport Drive corridor south of 21st Street
- Northwest of 10th and Robinson
- Northwest of Huntoon and Glendale
- East of Gage Boulevard between 29th and I-470/US 75
- South of 11th Street, California to Golden
- 25th and Golden area

Commercial Uses

Commercial development, as clusters of services and employment, can be significant determinants of a bicycle transportation system, although trips for commercial/retail purposes typically lag behind trips for other purposes. Also, different commercial configurations are better suited for bicycle transportation than others. Therefore, we can place substantial commercial uses into several categories with different degrees of influence on the system.

- *Main Street or mixed use urban districts.* These pedestrian-oriented districts are very well suited to bicycle transportation's speed, scale, and limited parking space requirements. These districts include Kansas Avenue and adjacent streets in Downtown, North Topeka, Westboro Village at Huntoon and Oakley, and redevelopment along Lane Street between 14th and 17th.

- *Lifestyle centers or districts.* These projects are sometimes outside of normal commercial strip corridors and feature a number of businesses clustered so that a customer can park once and walk to different destinations. The scale, walkability, and typical business mix of these centers make them good bicycle destinations. Commercial uses in these categories include Brookwood (29th and Oakley) and Fleming Place (10th and Gage).

Main Street Districts. From left, Westboro Village near Huntoon and Oakley and North Topeka's traditional town center. The manageable scale of the street and buildings, and the relatively calmed traffic moving through these districts makes them good potential destinations for bicycle trips.

Special destinations. Iconic businesses, such as Porubsky Grocery in North Topeka, can be distinctive destinations for bicycle trips.

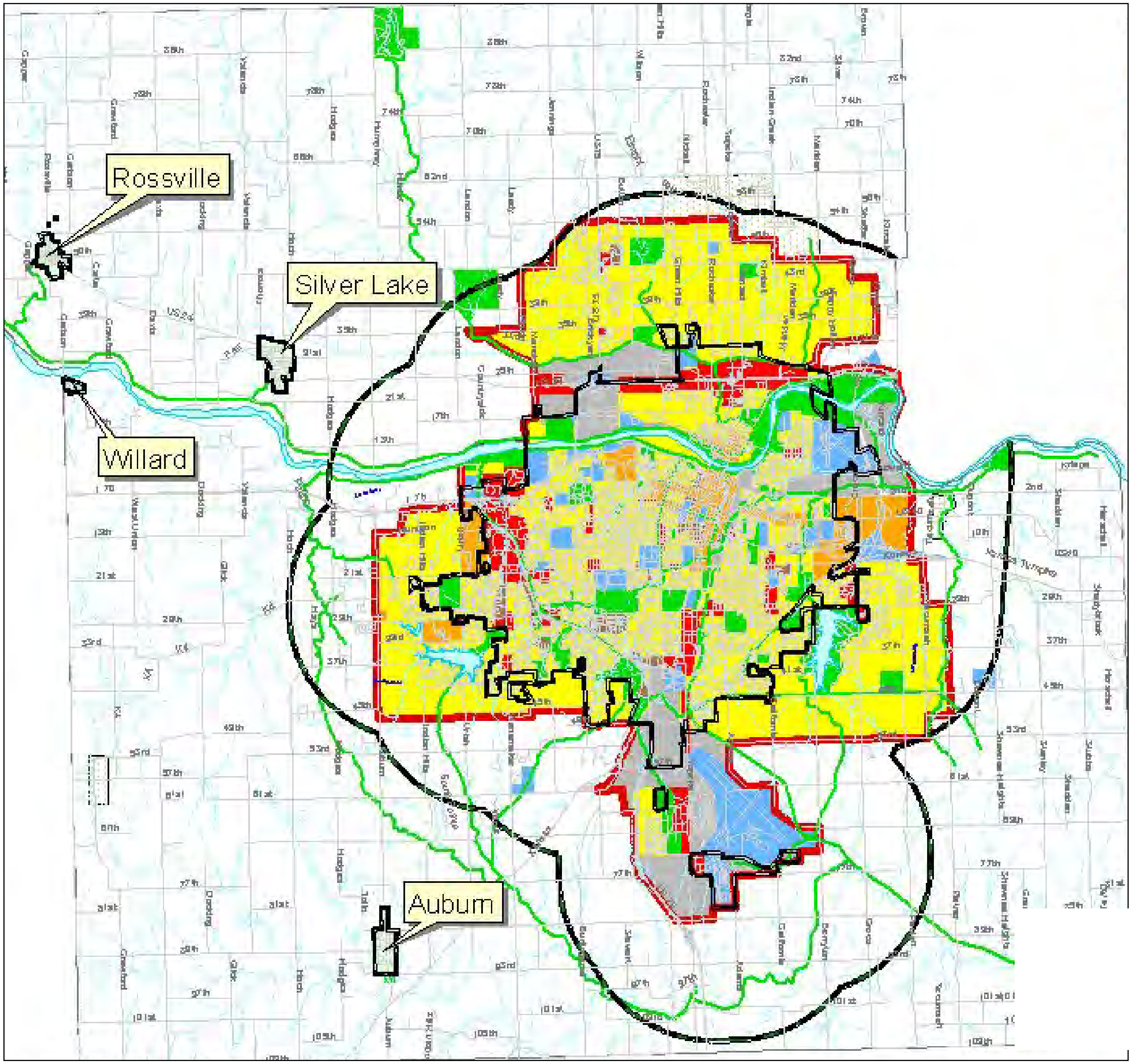
- *Linear commercial corridors.* These linear districts along major arterials include the majority of Topeka's commercial use. Wanamaker Road between 10th and 29th Street is currently Topeka's dominant corridor. Other significant commercial strips include Gage Boulevard (between 10th to 15th, 17th to 21st, and 29th to I-470), Topeka Boulevard and Kansas Avenue south of 29th, California Avenue from I-70 to 29th Street, and Topeka Boulevard from Broad Street to US 24. While commercial development here might attract cyclists, heavy traffic, multi-lane facilities, a lack of bicycle infrastructure, and frequent driveway accesses make these corridors unfriendly for bicycle transportation.

- *Regional centers.* West Ridge Mall, northwest of 21st and Wanamaker, is Topeka's dominant mall and is a major destination for all modes.

Office Clusters

Office concentrations often have significant bicycle commuting potential. While office facilities are scattered

around Topeka, the largest concentration by far occurs in Downtown and the Capitol area, with an extension south along Topeka Boulevard. A major office and commercial center is also emerging north of I-70 on both sides of Wanamaker Road. Topeka's major service and civic organizations and hospitals are also significant employment centers.



Regional Land Use. Approved land use map from the City of Topeka's *Land Use and Growth Management Plan – 2025.*

Figure 1.2
Land Use

- Mixed Use
- Commercial/Office
- Industrial
- Parks/Open Space/Recreation
- Public/Quasi-Public
- Medium/High Density Residential
- Urban/Suburban Low Density Residential
- Rural Residential/Agriculture /Undeveloped
- Existing Low Density Residential Outside of Planned Growth Areas
- Other Incorporated Cities
- Topeka City Limits
- Planned Growth Area (PGA)
- Trails
- Water
- 3-Mile Area
- County Limits

Destinations (Figure 1.3)

Residential, commercial, office, and civic land use patterns all influence bicycle network design, but major destinations –activity points or attractions that are places that attract people for recreation, employment, civic or cultural life, entertainment, or other activities – should be directly served by the system. Figure 1.3 displays the deployment of many of these significant destination points in Topeka, including:

- **Educational facilities,** including elementary and secondary schools, Washburn Tech, and Washburn University. Elementary schools may be undertaking a consolidation program, producing large, K-8 centers.

- **Major park and recreation facilities,** including large multi-purpose parks, among which are Gage, Hummer Sports Park, Dornwood, Garfield, the Shunga Greenway chain of parks, Hillcrest, Lake Shawnee, Oakl-and, Auburndale; neighborhood parks to the maximum degree possible; and city community centers and YMCA's. The Shunga parks and Lake Shawnee are of course served by very popular trails, but the system should provide access from neighborhoods to these facilities.

- **Hospitals and medical facilities,** including Saint Francis, the Veterans' Administration Medical Center, and Kansas Neurological Institute.

- **Key public destinations and museums,** including the Topeka Public Library, Kansas Expocentre, the Kansas History Center, the Brown v. Board of Education historical site, the State Capitol, and others.

- **Commercial centers adaptable to bicycle transportation,** including Downtown, North Topeka, Westboro, Brookwood Center, Fleming Place, and West Ridge Mall.

- **Major employment concentrations,** including office clusters, downtown, and the Capitol area.

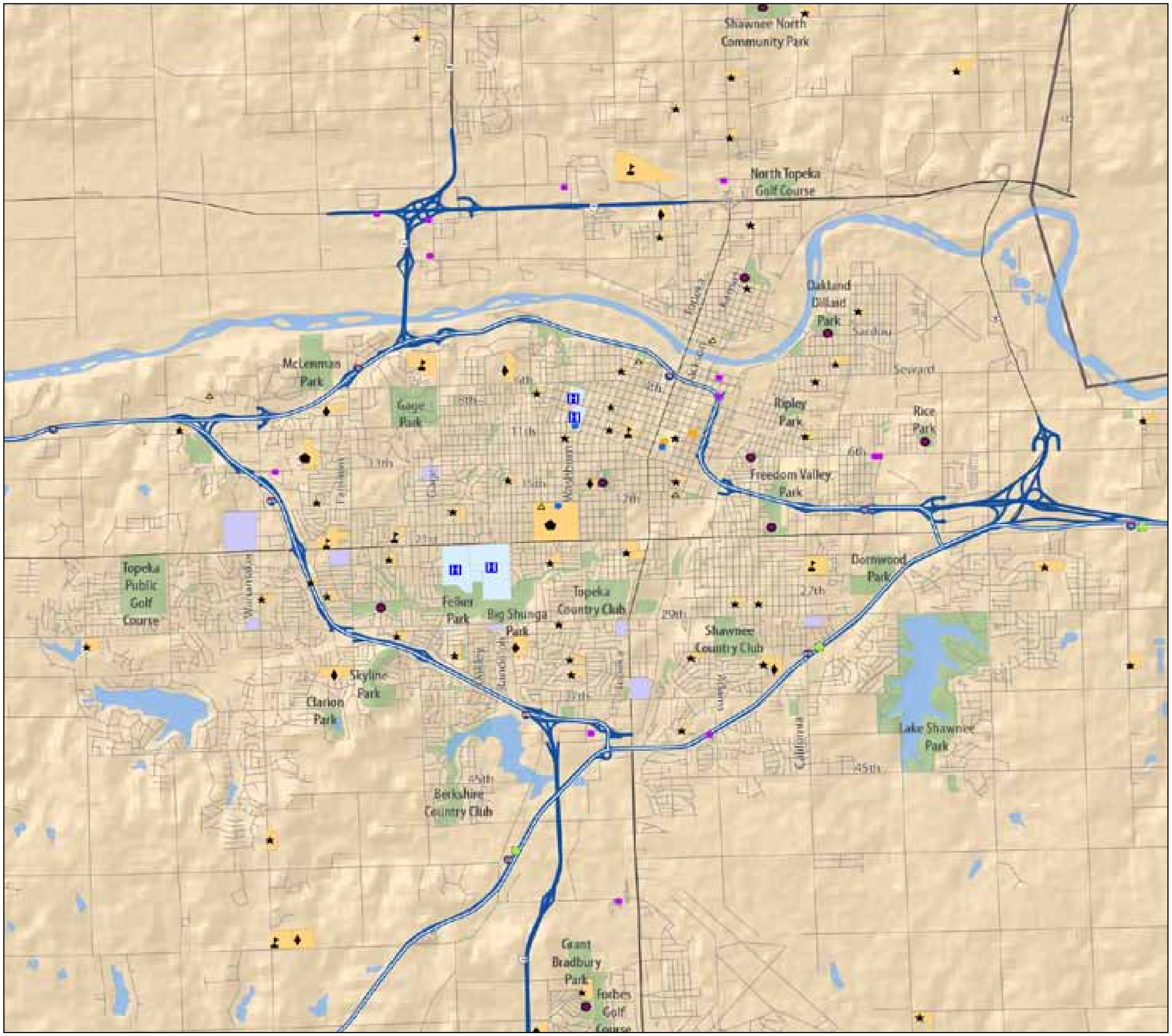


Figure 1.3

Potential Destinations

- Parks
- Schools
  - Elementary
  - Middle
  - Secondary
  - Higher Education
- Shopping Centers
- Health Care Institutions
- State Capitol
- Museums
- Major Businesses
- Community Centers
- Libraries
- Government Buildings

Existing Bikeway Facilities (Figure 1.4)

Existing facilities form the foundation of the bikeway network. Topeka currently lacks significant mileage of on-street bicycle infrastructure (bike lanes, marked shared routes, or bicycle boulevards), sidepaths (paths on public right of way but separated from travel lanes), or cycle tracks. In 2011, it installed its first sharrows and has been coordinating pavement markings helpful to bicycle transportation, such as striped parking lanes, with its recently approved street rehabilitation and resurfacing program. However, the city features a good system of increasingly interconnected multi-use trails that serve both recreational and transportation functions. These facilities include:

• **Shunga Trail.** The spine of the Topeka trail system extends about 8.25 miles along Shunganunga Creek from Fairlawn Avenue to the Deer Creek confluence on the east side of town. The recently extended trail connects five major parks along the Shunga Greenway and provides access to Downtown along several routes, including Van Buren Street and 10th Street. A planned extension to the west will continue under I-470 and use both trail and on-street routes to reach French Middle School.

• **Landon Trail.** This regional rail-trail begins at 17th Street east of Kansas Avenue, and currently continues about 12.5 miles to SE 89th Street and Ratner Road near Shawnee. An urban gap between 25th and 45th Street in Topeka was filled in 2011, using funding through the American Reconstruction and Recovery Act (ARRA). The Landon Trail is paved to the city line and intersects the Shunga Trail near its north terminus. Eventually, the Landon will extend over 38 miles into the scenic Flint Hills.

• **Lake Shawnee Trail.** This popular 7.5 mile recreational trail surrounds Lake Shawnee but does not connect to the rest of the city system.

• **Oakland Park Trail.** This short park trail begins at River Road north of Division Street and continues around the edge of Oakland Park, linking to Oakland Community Center.

• **Soldier Creek Trail.** This one-mile long North Topeka trail connect Garfield Park with Lyman Road east of Rochester Road.

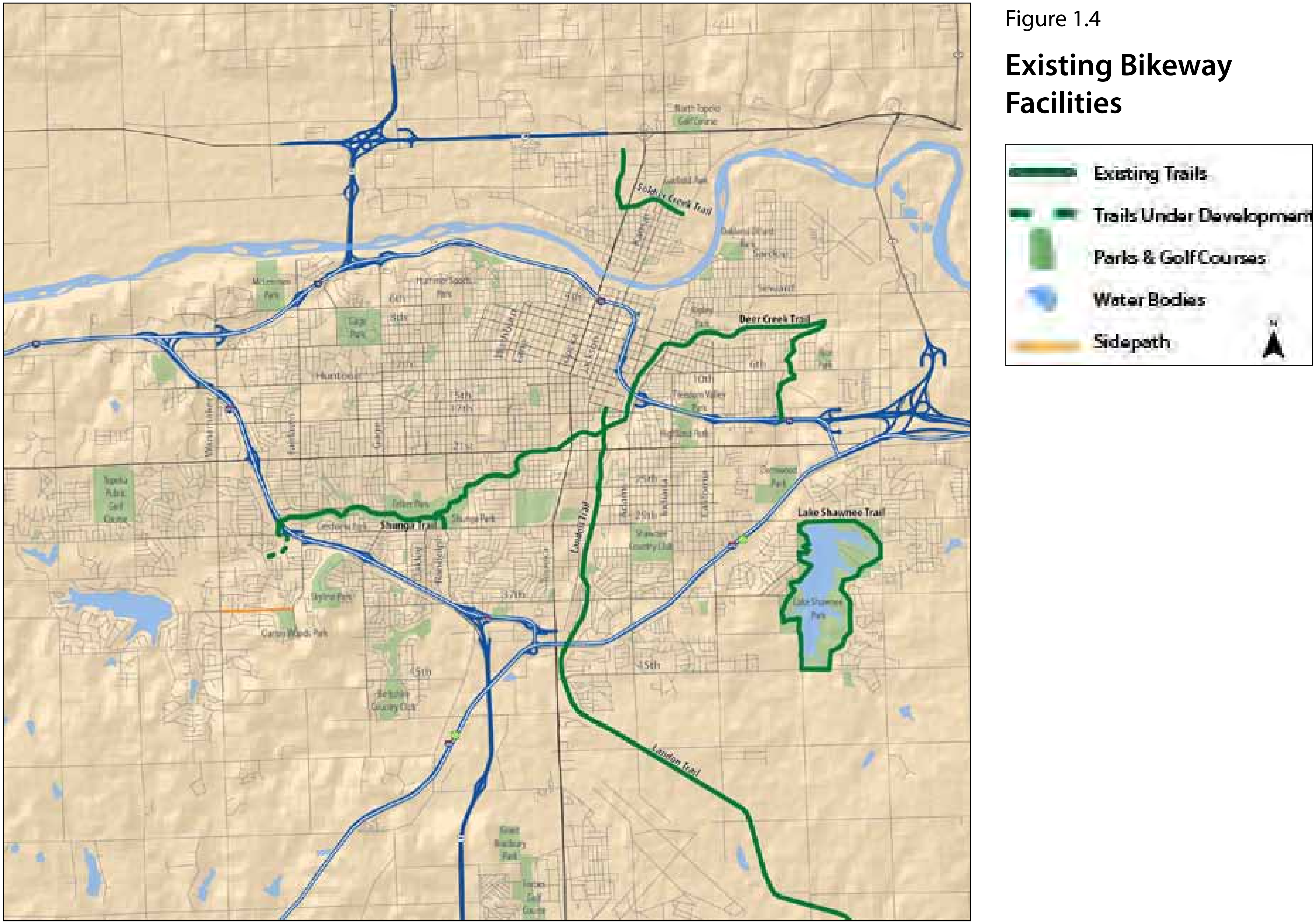


Figure 1.4

Existing Bikeway Facilities

Street Connectivity and Types (Figures 1.5,1.6)

Like many Midwestern and Great Plains cities, Topeka's arterial street system is built on the section-line grid that dates back to the surveys and land divisions of the Homestead Act. Unlike many cities, however, Topeka's street network has two major attributes that make it very adaptable for bicycle transportation:

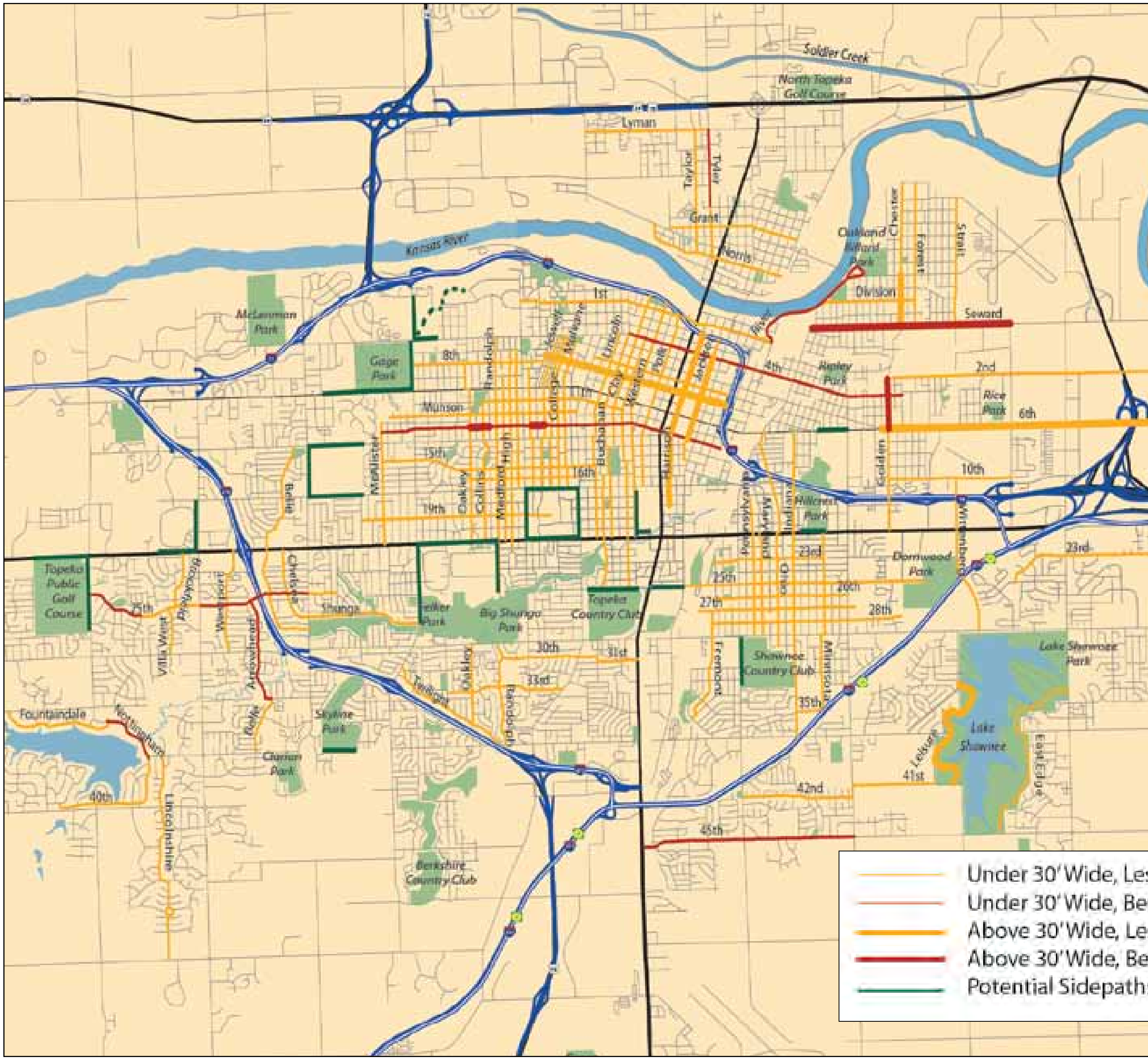
- **An unusually good secondary street system.** While some of section-line arterials (6th Street, Huntoon Street, 21st, 29th, 37th, and 45th in an east-west direction; California, Adams, South Topeka Boulevard, MacVicar, Gage, Fairlawn, Wanamaker, and Urish in a north-south direction) carry heavy traffic that in their current form give even experienced bicyclists pause, Topeka has an excellent secondary street network that parallels major corridors, and have both good continuity and low traffic volumes. This is especially true within the traditional urban grid between Gage Boulevard and the Butcher Creek (Landon Trail) corridor within the south freeway loop. This system is interrupted by Shunga Creek and modified on the east as streets change direction to parallel the creek and railroad, but trails along these potential barriers more than make up for the discontinuities. Neighborhood districts outside of the central grid, including North Topeka, Oakland, the east side between Butcher and Deer Creeks, and the west side between Gage and Urish either continue the fine-grained grid or at least have continuous streets that avoid major arterials. Figure 1.5 illustrates this secondary system, mapping streets that have both good continuity (at least one mile without interruption) and low traffic volumes.

- **A ring freeway system.** Topeka's freeways go around rather than through the central part of the city, to the great benefit of both the city's neighborhoods and secondary street connectivity. The dividing effect of most urban freeways is minimized in Topeka. The ring further places heavy regional traffic and interchanges that are difficult for bicyclists to negotiate safely on the periphery.

- **Reasonable freeway permeability.** In many cities, freeway crossings occur only at section lines, and these crossings are typically complicated by interchanges. The Topeka system was planned differently, with secondary overpasses without interchanges at half-mile intervals. These unifying crossings occur at 17th, 25th, Adams, California Wittenberg, Golden, Indiana, and Kansas. The south leg of the loop between Fairlawn and Adams is more challenging, but Topeka's loop is generally possible to move across.

Figure 1.6 identifies street types and configurations within

Figure 1.5
On-Street Opportunities



Under 30' Wide, Less than 3000 Vehicles per Day
Under 30' Wide, Between 3000-5000 Vehicles per Day
Above 30' Wide, Less than 3000 Vehicles per Day
Above 30' Wide, Between 3000-5000 Vehicles per Day
Potential Sidepaths

its framework. The width and traffic characteristics each street type will generate different treatments to adapt them for bicycle transportation. Of these, streets that most effectively satisfy the six measures of success identified in the Introduction – integrity, directness, safety, comfort, experience, and feasibility – are streets with relatively low traffic volumes, high continuity, and adequate width for mixed traffic.

Street Type	Lanes	ADT	Street Width (ft)	Speed (mph)	Continuous length (miles)	Other Features	Examples
Continuous Local	2	Under 1,000	24-31	25	0.5-1.0		15th St.
Continuous Neighborhood Collector	2	Under 5,000	24-32	25	1.5	Traffic control at major intersections, residential and commercial contexts	25th St. Belle Ave
Neighborhood Parkway	2	Under 3,000	24-32	25-30	1.0	Often borders parks and open spaces	Shunga Dr Edgewood Ave
Neighborhood Avenue	2	Under 3,000	30-42	25-30	1.0-2.0	Traffic control at major intersections, mixed uses at intersections, street oriented houses	College Ave Oakley Ave Clay St
Transit and Civic Avenues	2-4	3,000-10,000	40-60	25-35	2.0 miles and over	Traffic control at major intersections, mixed uses, on-street parking	6th St east of Branner
Neighborhood Arterial	2-3	Under 3,000	30-42,	25-30	1.0-2.0	Traffic control at major intersections, mixed uses at intersections, street oriented houses, on-street parking	College Ave Oakley Ave
Urban Arterial	4	Over 10,000	44-50	30-40	1.0-2.0	Traffic control at major intersections, mixed uses, no or limited on-street parking	21st St Fairlawn
Mixed Use Arterial	4-5	Over 15,000	48-64	35-45	Over 4.0	Traffic control at major intersections, mixed uses with commercial emphasis, no or limited on-street parking	Wanamaker Rd Gage Blvd
Mixed Use Boulevard	4-5	Over 15,000	55+	35-45	Over 4.0	Traffic control at major intersections; mixed uses with commercial, office, some residential; on-street parking where width permits	Topeka Blvd
Urban One-Way Pairs	2	Over 8,000	32-40	30-35	Over 3.0	Traffic control at major intersections; mixed uses with commercial, office, some residential; on-street parking where width permits	12th/Huntoon; Lane/Washburn
Downtown Multi-Lane	2-4	5,000-15,000	60+	25-30	Downtown Topeka	Traffic control at major intersections; mixed uses; on-street parallel or diagonal parking	Jackson St 7th St
Downtown Main Street	2-4	5,000-15,000	55-80	25	Downtown settings	Traffic control at major intersections; mixed uses; on-street diagonal parking	Kansas Ave North Kansas Ave

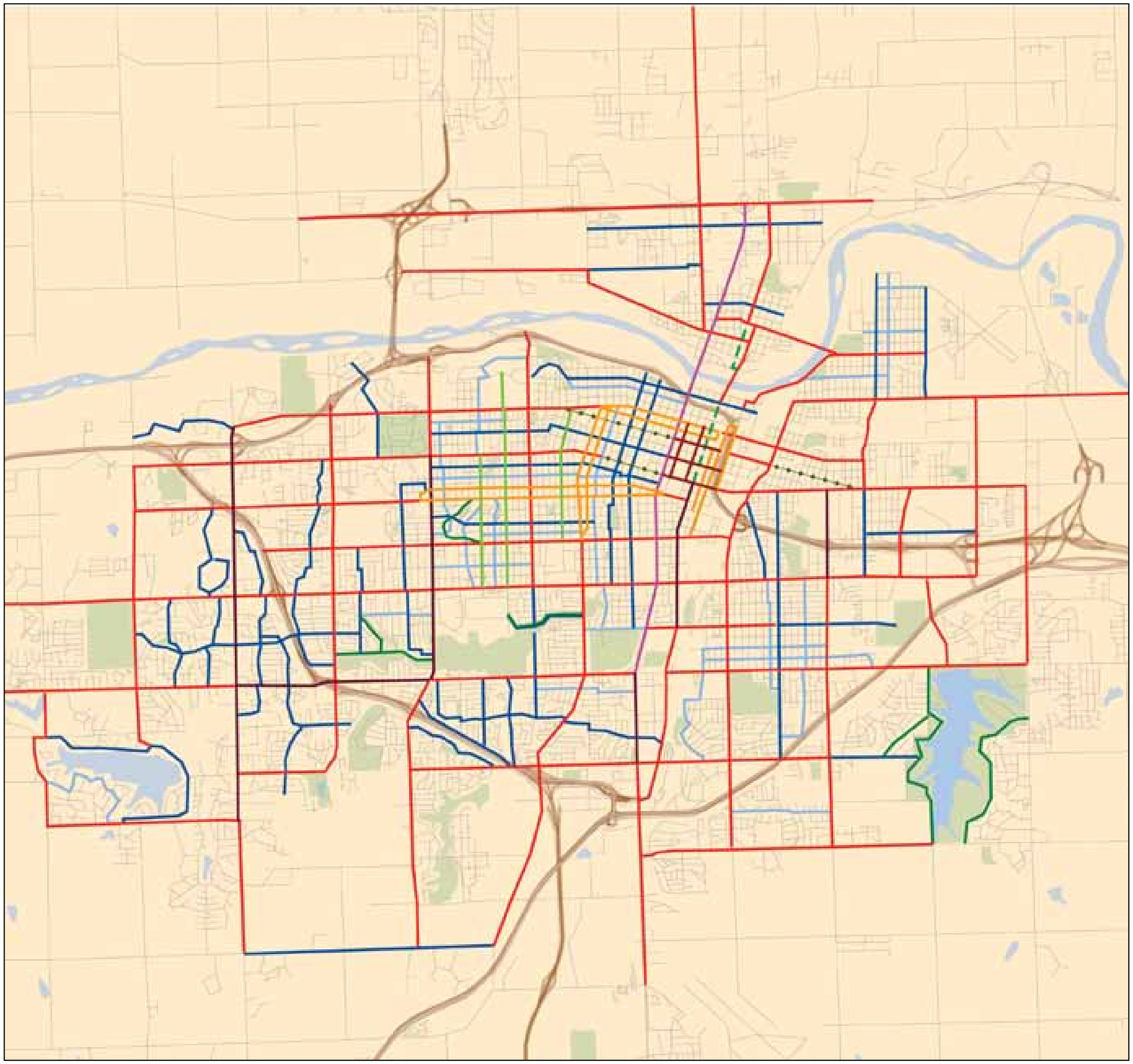
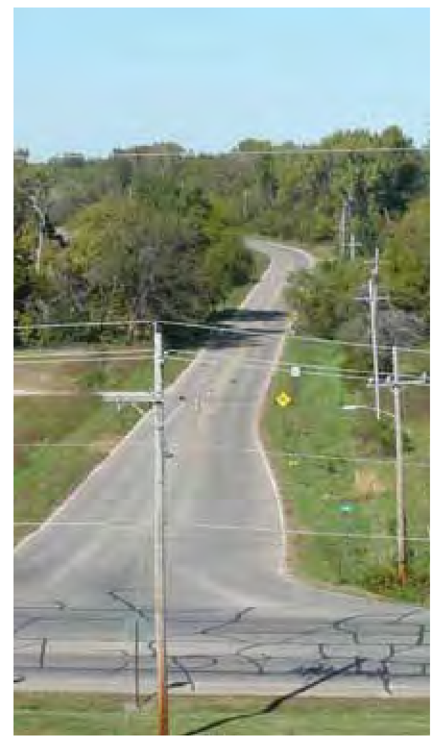
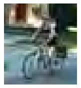
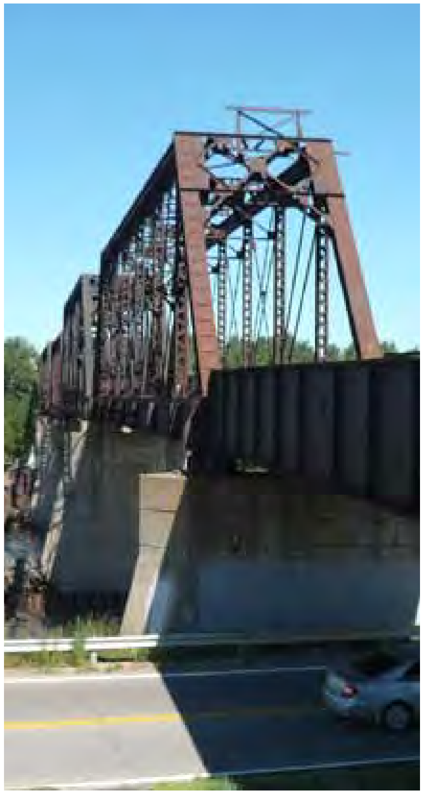


Figure 1.6
Street Typology

- Continuous Local
- Continuous Neighborhood Collector
- Neighborhood Parkway
- Neighborhood Avenue
- Civic Avenue
- Urban Arterial
- Mixed Use Arterial
- Mixed Use Boulevard
- One-way Pairs
- Downtown Main Street/Boulevard
- Downtown Multi-lane







Other Network Opportunities (Figure 1.7)

In addition to low-volume continuous streets, Topeka provides other opportunities that can help to build a system that satisfies the six performance criteria. These features can accommodate facilities physically separated from travel lanes such as separated pathways adjacent to streets (sidepaths or cycle tracks) or multi-use trails. They include:

• **Potential complete streets.** These are streets that are now too narrow for their current or projected traffic load and will require major widening and reconstruction. Projects should include bicycle and pedestrian accommodations as part of their basic design. Examples are 10th Avenue west of Gage Boulevard and Urish Road.

• **Major open spaces or institutional uses with continuous street frontage of at least ½ mile.** These include parks, cemeteries, the Washburn University campus, golf courses, the VA/KNI (Kansas Neurological Institute) campuses, and large public uses like the ExpoCentre and airports. Off-street paths parallel to streets can be located along these relatively uninterrupted frontages.

• **Street retrofits,** where streets are unnecessarily wide or have more lane capacity than required to manage their traffic load. On these streets, bicycle lanes may be introduced without affecting capacity or traffic movement. Examples include 6th Avenue east of Branner.

• **Parks and campuses capable of accommodating trails.** These uses and site plans enable trails to cross through their interiors without compromising their use. Examples are the VA/KNI campus, Hummer Sports Park, and major parks like Gage Park.

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

- Drainageways and watercourses, often tributaries to the city's major water corridors, with banks and sufficient adjacent public or common land to accommodate pathways.

- Levees along rivers and drainageways.

- Railroads and railroad structures such as bridges that have either ceased operations or have a reasonable probability of becoming unnecessary in the foreseeable future.

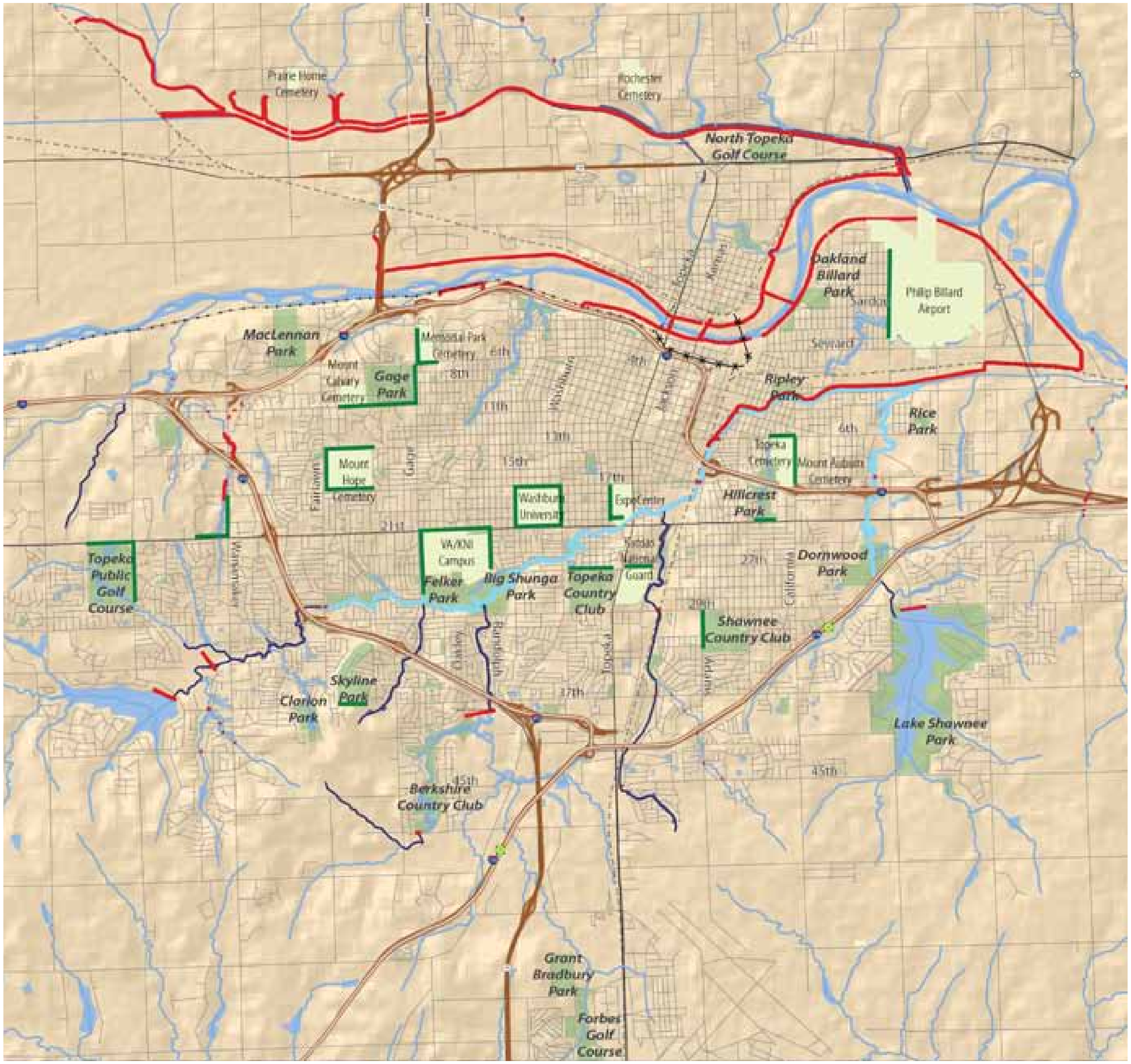
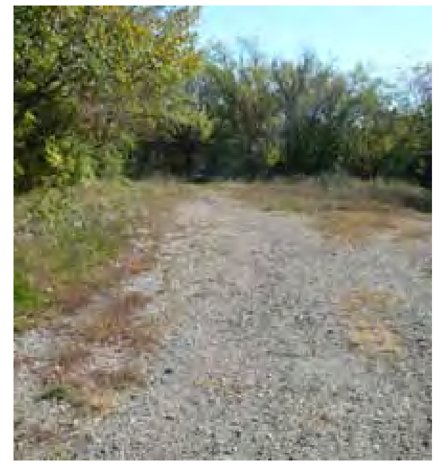
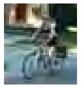


Figure 1.7
Network Opportunities





Summary of Existing Bicycling Conditions and Opportunities (Figure 1.8)

Figure 1.8 forms the basis for a map that illustrates the city's existing bicycling environment, serving as a guide for urban cyclists planning trips through the city. Facility classifications include:

Multi-Use Trails. These trails, for the exclusive use of non-motorized users, are separated from streets, and run along waterways (Shunga and Soldier Creek Trails), abandoned railroads (Landon Trail), and greenways, or through parks. When these trails run along streets, they are widely separated from the roadway. Trails only encounter cars and trucks at surface intersections. Because they also accommodate pedestrians and skaters, they also require special care and courtesy by cyclists. Multi-use trails currently planned for completion are displayed the map, but may not yet available for use.

Sidepaths. Sidepaths are pathways that run along streets, separating cyclists and pedestrians from motor vehicles. They cross streets and driveways at the surface, requiring cyclists to be especially careful to watch for turning or crossing traffic. The terms sidepath and cycle track can be used interchangeably. However, in contemporary bicycle planning, cycle track is often used to describe a reserved right-of-way for bicycles witnin the street channel but buffered from motor vehicle travel lanes, sometimes by parked cars.

Bike Lanes. Bike lanes provide a painted lane intended only for the use of cyclists within the roadway. Bicyclists riding in bike lanes are subject to all regulations for vehicles. As of 2011, Topeka does not have bike lanes. However, it has begun to stripe parking lanes in certain streets that can function as bike lanes for users uncomfortable with operating in a regular travel lane.

Paved Shoulders. Paved shoulders are most often found on highways and roads without curbs. While intended to provide a safety measure for motor vehicles, they are a refuge for cyclists, especially on busy, high-speed roads. Many principal highways in Kansas have paved shoulders.

Continuous Streets These streets have relatively low volumes (usually below 3,000 vehicle per day) and good continuity, connecting with other similar streets in neighborhoods. These characteristics allow users to assemble long routes by following these continuous streets, which form the building blocks of a future on-street bicycle system. Many cyclists find these streets to be relatively comfortable cycling environments, but they still require caution and safe cycling technique.

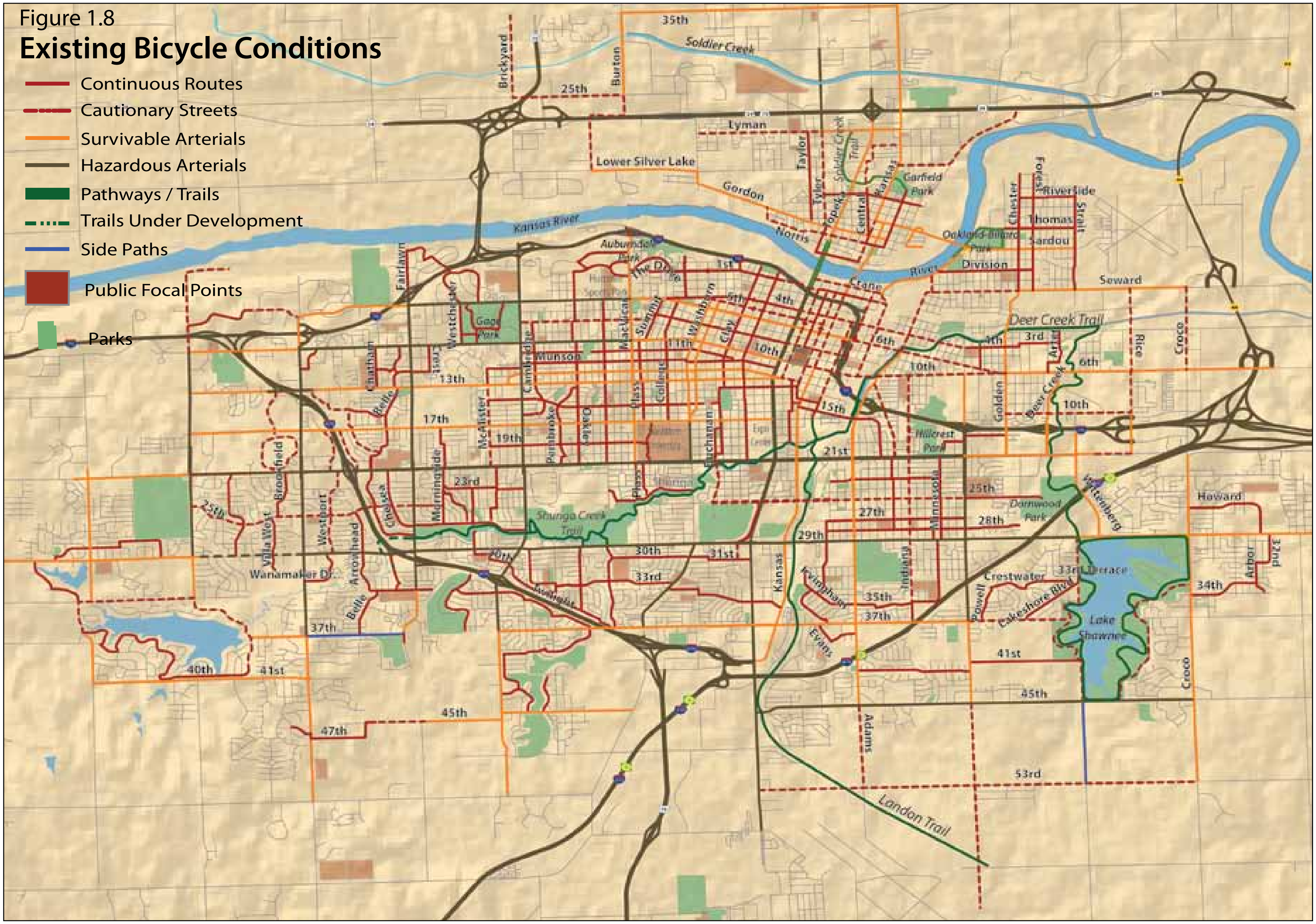
Cautionary Streets These streets are used by many cyclists, but their higher traffic volumes (usually between 3,000 and 7,500 vehicle per day) require more experience and comfort riding in mixed traffic than the Continuous Streets category.

Survivable Arterials These are major streets that sometimes must be used to fill gaps and get cyclists to their destinations. Their medium to high traffic volumes (usually above 7,500 vehicles per day) and sometimes high speeds requires a high level of experience, and require special care and skill of cyclists. Riders who are not comfortable with these streets but who must use them should consider walking or riding carefully along sidewalks for short distances.

Other Streets Some major arterials are indicated for reference purposes only. Cyclists are prohibited by law from using Interstate Highways or freeways. The map also indicates the web of local streets that serve neighborhoods. These streets usually have very low volumes, but do not provide the connections needed to make longer trips.

Figure 1.8

Existing Bicycle Conditions




TOYOTA

CHAPTER 2

THE MARKET FOR BICYCLING IN TOPEKA

This chapter investigates the market for bicycling in Topeka – the number of potential cyclists and the preferences of that potential market. It draws heavily on new and recent census information, national trends, and the 1,051 citizens who took the time to respond to the Topeka Bikeways Survey

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

This market study uses two major instruments:

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

- **The results of the Topeka Bikeways survey,** This survey was completed by 1,051 people, a very high participation rate, and provides valuable information about the city's potential bicycling community.

Existing Pedestrian and Bicycle Demand

Figures 2.1 and 2.2 use the Alta model to estimate existing pedestrian and bicycle demand. Primary sources of information include the 2005-2009 average computations of the American Community Survey (ACS), developed by the Bureau of the Census, and 2010 Census data released to date. The model makes certain assumptions about mode split of populations such as school and college students. The sources of these assumptions are included in the table.

Topeka now has an estimated 73,600 daily pedestrian trips and just under 9,600 bicycle trips for all purposes (including recreational activity). Bicycling has a 0.42% commuter mode share – that is, 0.42% of all commuters travel by bicycle, approximately the same as the national share of about 0.5%. This contrasts with Minneapolis with a bicycling mode share of about 3.9%, one of the highest in the nation. However, Topeka's share is respectable for a city with limited commuting infrastructure.

Alternative "Possible Demand"

Figures 2.2 and 2.3 present an "alternative reality" for the present day, assuming that enough infrastructure has been put in place to have a significant impact on transportation choice. This alternative model paints a picture of what Topeka's split could be in 2011. It assumes that:

- Walk-to-work commuters increase from about 2.13% to 4% of all workers.

- Transit's share of the modal mix increases from a very low 1.34% to a still modest 3%.

- Bicycle commuting, encouraged by new infrastructure, could increase to about 2.5% – among the more bicycle-friendly cities in the nation but well below top performers like Portland and Minneapolis.

- K-8 students are twice as likely to walk to school as they do today, to about 20%. This is still far lower than the 60% of students who walked to school thirty years ago.

Applying these changes increases daily pedestrian trips from about 73,600 to about 102,000, a gain of about 39%. Bicycle trips increase from about 9,500 to about 25,000, about a 160% increase. These very attainable changes begin to have a real impact on the overall transportation picture in Topeka. This model assumes that 9.5% of commuting trips are mode by "active transportation"

Figure 2.1: **Existing Pedestrian Trips, Topeka**

	2010 Data or Estimates	Sources/Assumptions
Study Area Population	127473	2010 Census
Employed Population	61946	Based on % in ACS, 2005-09
Ped mode share	2.133%	ACS, 2005-09
Ped commuters	1322	
Work at home	2.504%	ACS, 2005-09
Work at home ped trips	388	Assumes 25% make at least one ped trip
Transit mode share	1.334%	ACS, 2005-09
Transit commuter trips	830	
Transit ped trips	620	75% walk to bus
School, K-8	15031	ACS, 2005-09
School, K-8 ped mode share	11.00%	National Safe Routes to Schools Surveys, 2003
School, K-8 ped trips	1653	
School, 9-12	6542	ACS, 2005-09
School 9-12 ped mode share	5.50%	50% of K-8 rate
School, 9-12 ped trips	360	
College	9210	ACS, 2005-09
College ped mode share	60%	*National Bicycling and Walking Study, FHWA, 1995*
College ped trips	5526	
Total ped commuters	9868	
Total ped commuter trips	19737	Two X number of individual commuters
Other trips ratio	2.73	*National Household Transportation Surveys*, 2001
Other ped trips(non-commuter)	53882	
Total daily pedestrian trips	**73619**	

Figure 2.2: **Existing Daily Bicycling Trips, Topeka**

	2010 Data or Estimates	Sources/Assumptions
Study Area Population	127473	2010 Census
Employed Population	61946	Based on % in ACS, 2005-09
Bike mode share	0.415%	ACS, 2005-09
Bike commuters	257	
Work at home	2.504%	ACS, 2005-09
Work at home bike trips	155	Assumes 10% make at least one bike trip
Transit mode share	1.334%	ACS, 2005-09
Transit commuter trips	830	
Transit bike trips	41	5% bike to bus
School, K-8	15031	ACS, 2005-09
School, K-8 bike mode share	2.00%	National Safe Routes to Schools Surveys, 2003
School, K-8 bike trips	301	
School, 9-12	6542	ACS, 2005-09
School 9-12 bike mode share	1.00%	50% of K-8 rate
School, 9-12 bike trips	65	
College	9210	ACS, 2005-09
College bike mode share	5%	*National Bicycling and Walking Study, FHWA, 1995*
College bike trips	461	
Total bike commuters	1280	
Total bike commuter trips	2560	Two X number of individual commuters
Other trips ratio	2.73	*National Household Transportation Surveys*, 2001
Other bike trips(non-commuter)	6989	
Total daily bike trips	**9549**	

modes – bus, foot, and bicycle – in line with the 10% goal established by a number of cities.

2030 Potential Demand

Figures 2.5 and 2.6 assume full implementation in Topeka of a pedestrian and bikeway system, along with supporting education and encouragement programs. This projection assumes that Topeka will grow at an average annual rate of 1/2% during the next 20 years. It projects that active modes will claim a 14% mode share within 20 years and that 4% of Topekans will cycle to work – about the same level of Minneapolis in 2011. The number of students walking to school will increase to 25%, still far below levels experienced twenty years ago. These assumptions result in an increase of weekday pedestrian trips from 73,600 today to about 128,000; and an increase in weekday bicycle trips from about 9,600 to about 40,000. Achieving this level and assuming that 60% of these trips are currently being made by car saves 51,000 auto trips per weekday and about 13,260,000 trips per year. If each trip averages 3 miles, Topekans drive 38.8 million fewer miles per year, saving 1,600,000 gallons of gasoline assuming an average of 25 mpg. Given uncertainties during the next 20 years, these projections could well prove conservative.

Figure 2.3: **"Alternative Present" Pedestrian Trip Model for Topeka**

	2010 Data or Estimates	Sources/Assumptions
Study Area Population	127473	2010 Census
Employed Population	61946	Based on % in ACS, 2005-09
Ped mode share	4.000%	Based on infrastructure and educational programs
Ped commuters	2478	
Work at home	2.504%	ACS, 2005-09
Work at home ped trips	620	Assumes 40% make at least one ped trip
Transit mode share	3.000%	Similar to mid-level transit cities
Transit commuter trips	1858	
Transit ped trips	1394	75% walk to bus
School, K-8	15031	ACS, 2005-09
School, K-8 ped mode share	22.00%	2 times existing percentage
School, K-8 ped trips	3307	
School, 9-12	6542	ACS, 2005-09
School 9-12 ped mode share	5.50%	No increase from earlier assumption
School, 9-12 ped trips	360	
College	9210	ACS, 2005-09
College ped mode share	60%	*National Bicycling and Walking Study, FHWA, 1995*
College ped trips	5526	
Total ped commuters	13685	
Total ped commuter trips	27370	Two X number of individual commuters
Other trips ratio	2.73	*National Household Transportation Surveys*, 2001
Other ped trips(non-commuter)	74719	
Total daily pedestrian trips	**102088**	

Figure 2.4: **"Alternative Present" Bicycling Trip Model for Topeka**

	2010 Data or Estimates	Sources/Assumptions
Study Area Population	127473	2010 Census
Employed Population	61946	Based on % in ACS, 2005-09
Bike mode share	2.500%	Increase with new infrastructure from 0.42%
Bike commuters	1549	
Work at home	2.504%	ACS, 2005-09
Work at home bike trips	310	Assumes 20% make at least one bike trip
Transit mode share	3.000%	ACS, 2005-09
Transit commuter trips	830	
Transit bike trips	93	5% bike to bus
School, K-8	15031	ACS, 2005-09
School, K-8 bike mode share	3.00%	Increase from 2%
School, K-8 bike trips	451	
School, 9-12	6542	ACS, 2005-09
School 9-12 bike mode share	3.00%	
School, 9-12 bike trips	196	
College	9210	ACS, 2005-09
College bike mode share	8%	Increase from 5%
College bike trips	737	
Total bike commuters	3336	
Total bike commuter trips	6672	Two X number of individual commuters
Other trips ratio	2.73	*National Household Transportation Surveys*, 2001
Other bike trips(non-commuter)	18213	
Total daily bike trips	**24885**	

Figure 2.5: **2030 Proposed Pedestrian Trip Model for Topeka**

	2030 Estimates	Sources/Assumptions
Study Area Population	138310	2010 Census
Employed Population	67212	Based on % in ACS, 2005-09
Ped mode share	5.000%	Based on infrastructure and educational programs
Ped commuters	3361	
Work at home	2.504%	ACS, 2005-09
Work at home ped trips	841	Assumes 40% make at least one ped trip
Transit mode share	5.000%	Similar to mid-level transit cities
Transit commuter trips	3360	
Transit ped trips	2520	75% walk to bus
School, K-8	16309	ACS, 2005-09
School, K-8 ped mode share	25.00%	2 times existing percentage
School, K-8 ped trips	4077	
School, 9-12	7098	ACS, 2005-09
School 9-12 ped mode share	5.50%	No increase from earlier assumption
School, 9-12 ped trips	390	
College	9993	ACS, 2005-09
College ped mode share	60%	*National Bicycling and Walking Study, FHWA, 1995*
College ped trips	5996	
Total ped commuters	17186	
Total ped commuter trips	34372	Two X number of individual commuters
Other trips ratio	2.73	*National Household Transportation Surveys*, 2001
Other ped trips(non-commuter)	93836	
Total daily pedestrian trips	**128208**	

Figure 2.6: 2030 Proposed Bicycling Trip Model for Topeka

	2010 Data or Estimates	Sources/Assumptions
Study Area Population	138310	2010 Census
Employed Population	67212	Based on % in ACS, 2005-09
Bike mode share	4.000%	Increase with new infrastructure from 0.42%
Bike commuters	2688	
Work at home	2.504%	ACS, 2005-09
Work at home bike trips	337	Assumes 20% make at least one bike trip
Transit mode share	5.000%	ACS, 2005-09
Transit commuter trips	3360	
Transit bike trips	168	5% bike to bus
School, K-8	16309	ACS, 2005-09
School, K-8 bike mode share	5.00%	Increase from 2%
School, K-8 bike trips	815	
School, 9-12	7098	ACS, 2005-09
School 9-12 bike mode share	5.00%	
School, 9-12 bike trips	355	
College	9993	ACS, 2005-09
College bike mode share	10%	Increase from 5%
College bike trips	999	
Total bike commuters	5363	
Total bike commuter trips	10725	Two X number of individual commuters
Other trips ratio	2.73	*National Household Transportation Surveys*, 2001
Other bike trips(non-commuter)	29281	
Total daily bike trips	**40006**	

The Topeka Bikeway Survey

The previous discussion helps quantify the size of a potential bicycle system market, indicating that with realistic mode selection, Topeka could reach 40,000 daytime cyclists. The Bikeway Survey helps define the preferences and opinions of these prospective cyclists, and provides important guidance for designing the bikeways network.

Who are Topeka's Cyclists?

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

- **A majority (56%) of respondents (and probably a majority of the potential bicycling market) lives in the north central and southwest parts of the city.** A smaller but still significant group live in the south central and southeast parts, but citizens of the east and north parts of Topeka appeared less inclined to respond. Figure 2.7 displays the geographic sectors, while Figure 2.8 illustrates the distribution of responses.

- **On the other hand, a majority (62%) are headed for destinations in Downtown and the North Central parts of the city,** between the Butcher Creek/railroad corridor and I-470 and north of 21st Street. The next largest destination sector was the southwest portion. This suggests significant travel to commuting destinations, Washburn, and the Shunga Creek greenway. (Figure 2.9)

- **Responses were about evenly split between frequent and infrequent cyclists.** In fact, a small

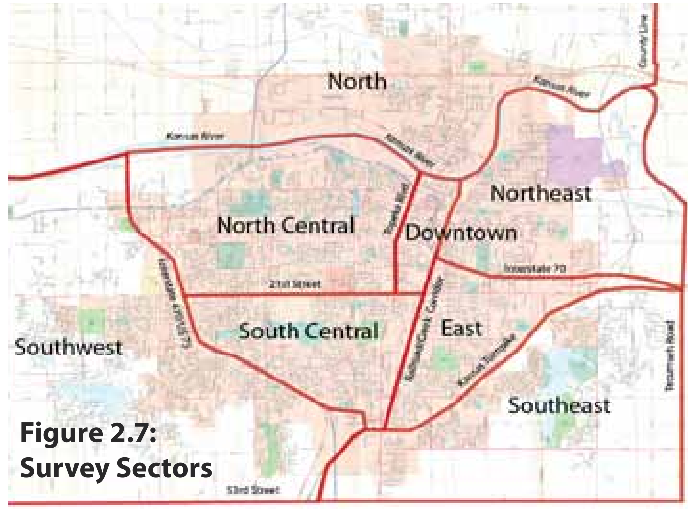
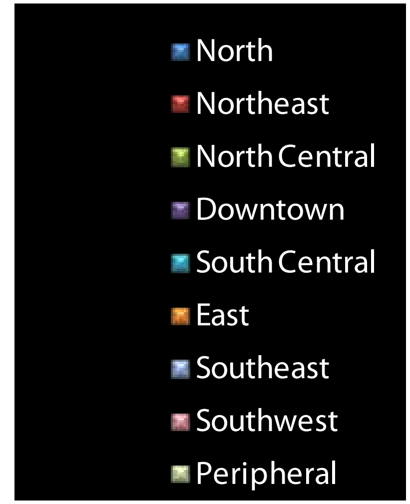


Figure 2.7: Survey Sectors



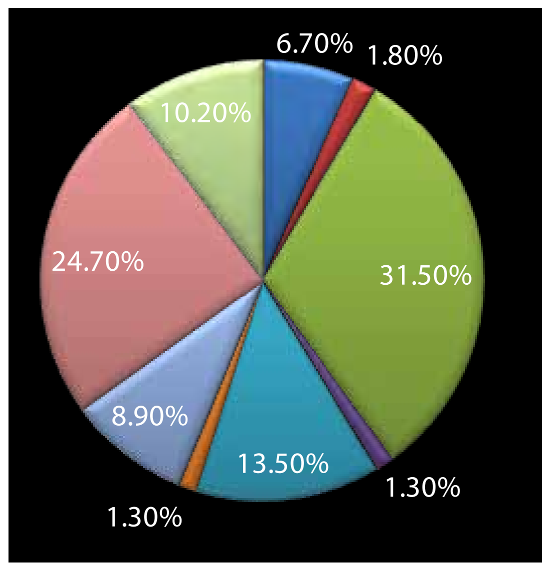


Figure 2.8: Place of Residence or Point of Origin for Respondents. A majority live or begin their most common trips in the north central and southwest parts of the city.

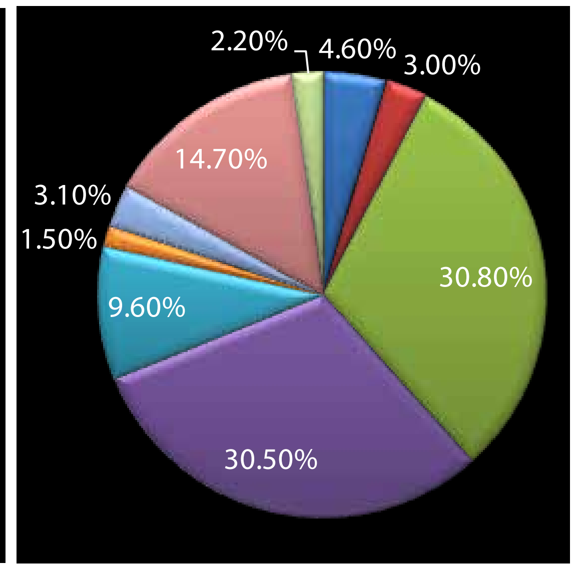


Figure 2.9: Location of Most Frequent Destinations. The majority of respondents are cycling to destinations in Downtown and the north central sectors.

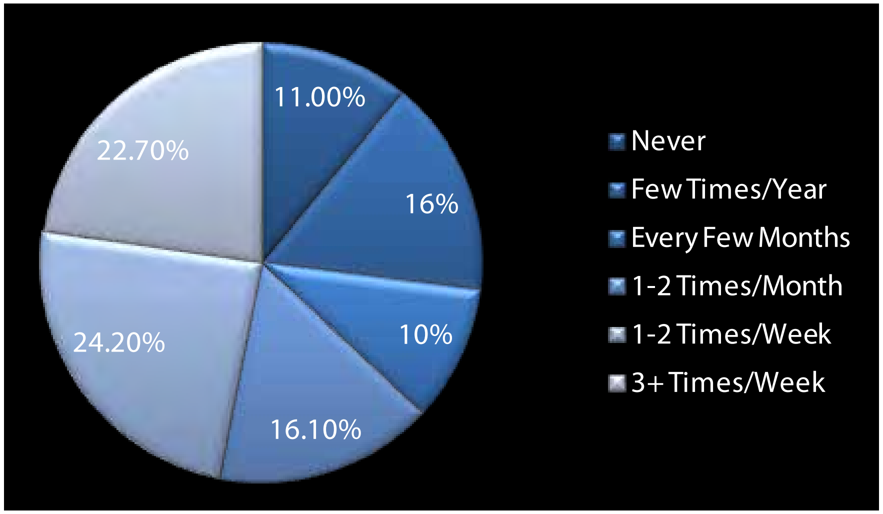


Figure 2.10: Frequency of Bicycling. A surprising number of survey respondents (53%) are infrequent cyclists or non-riders. This suggests a possibility for significant growth.

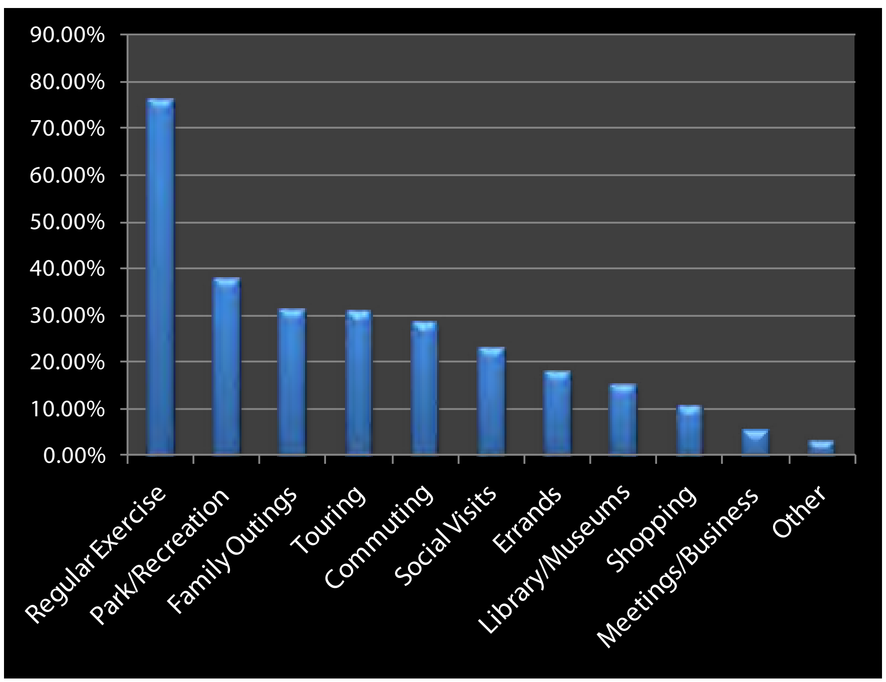


Figure 2.11: Purposes of Cycling Trips. Most participants report that regular exercise is the most frequent reason for bicycling, followed by trips to parks or recreational destinations. Significant minorities report use bicycles for transportation purposes.

majority (53%) of participants reported riding once or twice a month or less; 37% either did not ride or rode very infrequently. This is a very hopeful sign that reinforces market projections: many non-riders or occasional cyclists appear interested in the subject and in increasing their activity in bicycling. (Figure 2.10)

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

- **The largest group of respondents are cyclists most interested in improved infrastructure.** The largest single group characterized themselves as interested in cycling and capable of using low-volume streets, but concerned about riding in mixed traffic. The next largest group were committed urban cyclists comfortable in streets, but recognizing and supporting new facilities to expand ridership and improve safety. Very small groups were at the edges of the interest spectrum – comfortable in every situation and seeing no reason for infrastructure development (0.7%) or not likely to ride under any circumstances (4.1%)

Destinations

A bicycle transportation network should get people where they want to go. The survey listed 32 different community destinations or destination types, and asked respondents to rank them based on the importance of good bicycle access to them. Figure 2.13 describes the results, indicating the percentage of participants who considered good access important or very important. These in turn suggest the places that the network should serve.

Top priority destinations include the Shunga Greenway, principal park and recreational facilities (such as Gage Park, Lake Shawnee, and community centers), schools including Washburn, the Public Library, and Downtown. Shopping destinations and visitor attractions generally rank lower, as do suburban office parks and industrial employment centers.

Infrastructure Types

Much of the survey was designed to assess the comfort of current and prospective bicyclists with different types of bicycle environments. The survey asked participants to respond to a gallery of photographs of streets and facilities. Most of the images for evaluating streets were in Topeka, while infrastructure solutions typically came from other cities. Through their responses, participants determined:

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

The displays on pages 41 and 42 group survey images on the basis of their combined favorability ratings and show the following results:

- The top-rated (over 90% favorable) settings include either completely separated paths, both along roads and on exclusive right-of-way), or bike lanes either in calm traffic situations or with some type of physical separation from travel lanes. New York City's buffered cycle track was the third highest-rated image in the survey.

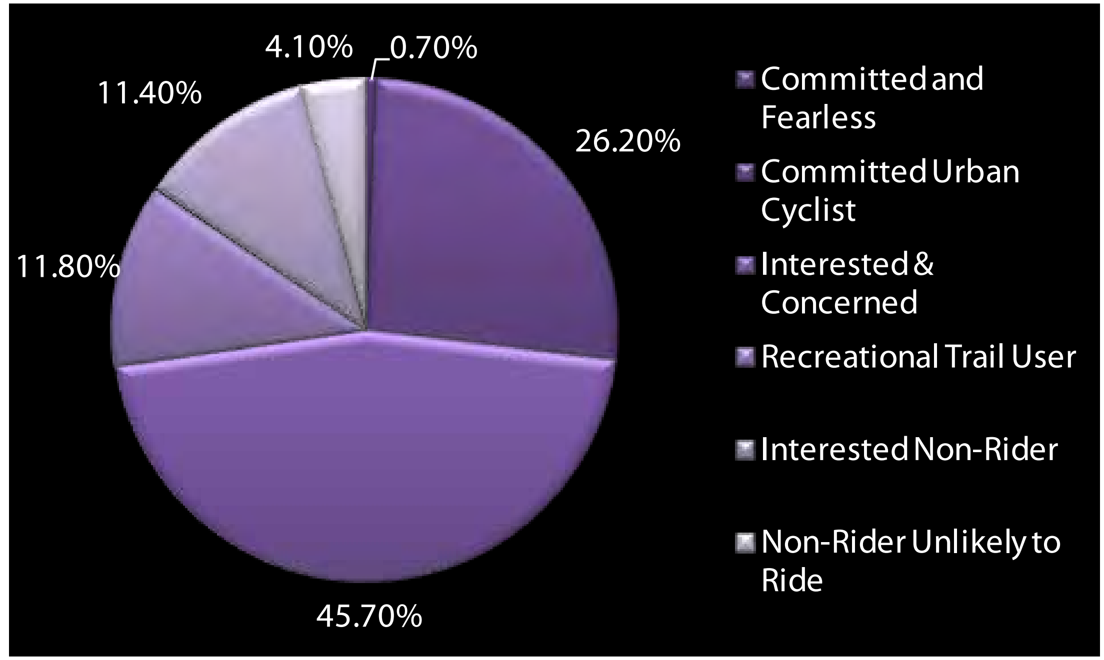


Figure 2.12: Self-Characterization of Riders. Different riders have different needs, depending on their experiences, purposes, and comfort with riding in mixed traffic. The groups that participants chose to describe themselves indicates a substantial interest in new on- and off-street infrastructure.

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

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

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

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

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

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

Destination	% Reporting Important or Very Important
Shunga Creek Trails & Parks	87.9
Washburn University	86.5
Lake Shawnee	83.0
Topeka Public Library	81.3
Neighborhood Parks	80.6
Gage Park	75.3
Kansas Avenue/Downtown	74.8
Community Centers	74.2
Middle Schools	71.6
High Schools	71.0
Washburn Tech	70.2
State Capitol Area	68.8
Cedarcrest	66.5
Elementary Schools	61.3
Hummer Sports Park	60.5
Kansas History Center	50.8
Garfield Park	49.3
Westridge Mall/Wanamaker	48.4
North Topeka “Main Street”	46.9
Fleming Place	45.9
10th Avenue Sports Center	44.7
St. Francis Health Center	43.0
VA Hospital	40.5
General Shopping Areas	38.7
Great Overland Station	37.1
Sunflower Soccer Complex	34.4
Security Benefit	32.0
River Hill Offices	29.4
Holiday Square	28.7
Resers/Payless Area	25.1
Brown v Board of Ed	24.1
Golf Courses	16.8

Figure 2.13: Ratings of Destinations for Bicycle Access. Major park and recreational facilities, neighborhood parks, Washburn, other schools, the library, and downtown are all considered important destinations by over 70%. In general, shopping destinations, suburban employment centers, and some types of recreational facilities ranked lower, as did areas that might be outside the normal range of respondents, such as North Topeka features.

- The next highest-rated group (80-90% favorable) included quiet residential streets without special infrastructure, a colored bike lane otherwise unseparated from the travel lane, and the separated path along the Topeka Boulevard bridge over the Kansas River.

- The third highest rated group largely included a shared streets with unbuffered bike lanes or sharrows (shared lane markings) depending on street quality; a sidepath along an arterial street; and moderate volume through collector street without infrastructure.

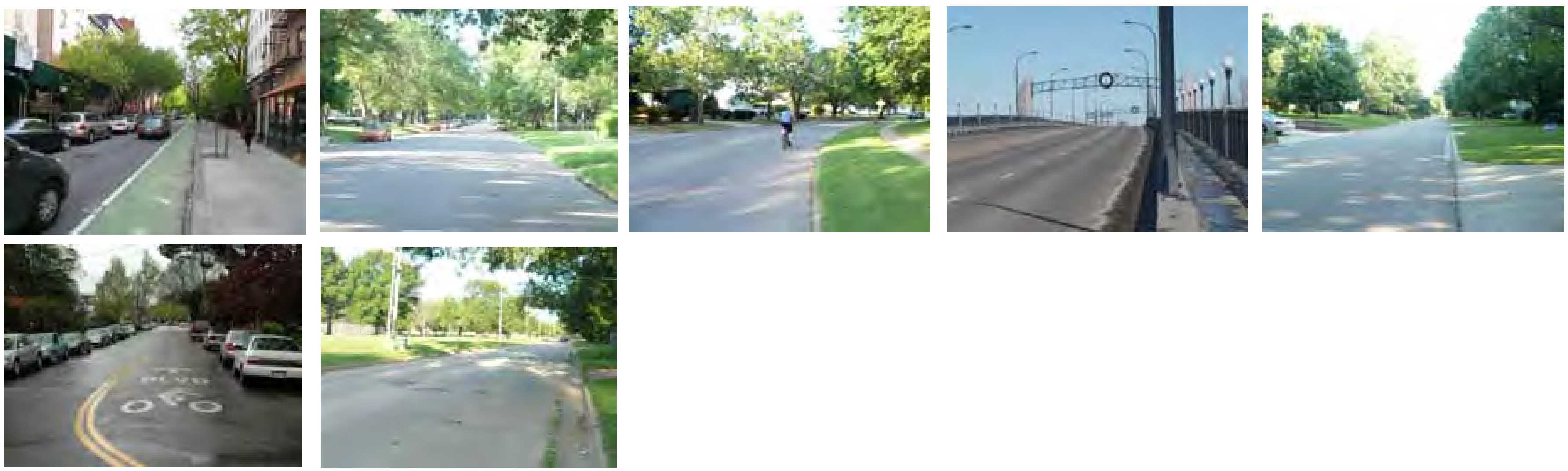
- The lowest rated settings were streets with higher traffic volumes lacking trails, paths, or pavement markings. The lowest rated segment in the survey was Wanamaker Road.

Another point of interest involves looking at settings in which a substantially larger number of people rated an environment as “comfortable for me” rather than “comfortable for most people.” These suggest situations that experienced riders find satisfactory for themselves, but not suitable for less capable cyclists. These settings included wide downtown streets like Kansas Avenue and 6th Avenue; wide two-lane streets without bike lanes like East 6th Avenue; 2- and 3-lane arterials; and low-volume bridges represented by the Wittenberg Road bridge. One infrastructure solution– the sharrow or shared lane marking – also displayed this disparity, indicating a comfort level for more experienced bicyclists that did not carry over to less experienced riders.

Finally, the survey results indicated that infrastructure and pavement markings make a difference, even in heavily trafficked settings. Wanamaker Road, a five-lane arterial facility received the lowest favorable rating in the survey (10.6%). However, a similar five-lane facility with bike lanes received a 66.2% favorable response. Bike lanes had an

Over 90% favorable (comfortable for most riders + comfortable for me)

80-90% favorable (comfortable for most riders + comfortable for me)



60-80% favorable (comfortable for most riders + comfortable for me)

equally marked benefit along narrower streets. Sharrows also displays a significantly higher favorable rating (although not as large a difference as for bike lanes) over comparable streets.

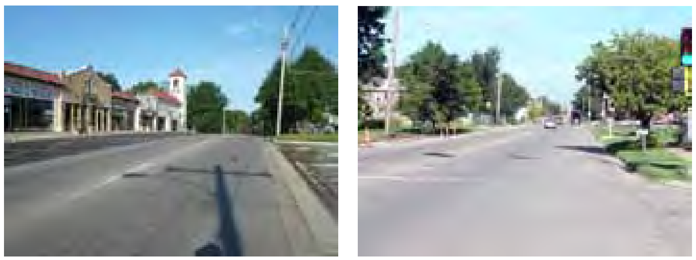
Bike Racks on Buses

Topeka's bus fleet is almost fully equipped with bike racks, and racks have been successful in many locations for encouraging dual mode trips. The bicycle is used as the local distributor, connecting the rider's home or destination with the bus route, or assisting the rider by reducing the length or difficulty of the bicycle trip. However, in the survey, about 90% of respondents reported never using the racks; only about 1.1% reported using them once a week or more. This may result from Topeka's relatively compact nature and the central location of principal destinations, making the majority of trips relatively short. Nevertheless, dual mode trips can be an excellent solution for many, including residents of outlying areas or people who want to cycle in only one direction.

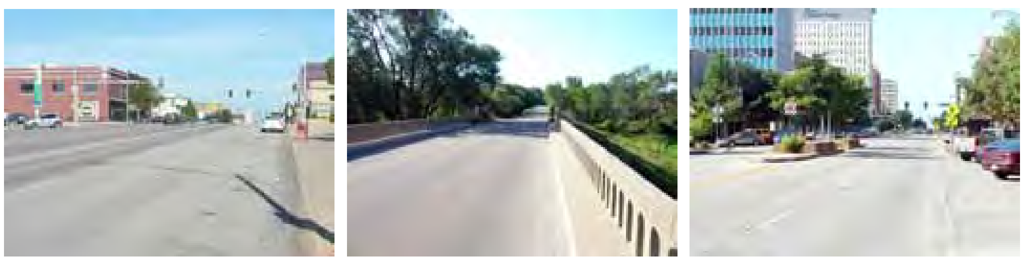
Importance of Various Actions

Responses to a list of possible actions to improve Topeka's bicycle environment indicated a strong priority for infrastructure programs. Initiatives ranked highest included bike lanes, trails, roadside paths, and improved private project design for better pedestrian

50-60% favorable (comfortable for most riders + comfortable for me)



40-50% favorable (comfortable for most riders + comfortable for me)



Under 40% favorable (comfortable for most riders + comfortable for me)

Five-lane arterials with and without bike lanes, with relative favorability responses indicated

Two-lane residential collectors with and without bike lanes.

Wide two-lane mixed use streets with and without sharrows.

Figure 2.14: Importance of Various Actions

Action	% Reporting Important or Very Important
Bike Lanes	92.3
More trails	92.2
Widened sidepaths along streets	86.2
Better project design for bike/ped accessibility	86.0
Destination-based bicycle network	77.9
Strong bike advocacy organization	72.5
Bike safety programs for kids	71.9
More bike parking	68.8
Commuter Challenge event	65.7
Showers at workplaces	64.2
Wayfinding signage	62.7
Improved bike education	59.9
Special events	59.4
Motorist education about bikes	56.8
More information about clubs/programs	56.5
Protective laws	55.1
Share the Road signs	51.2
Sharrows	47.5
Bike share program	43.3
Bike Station	41.4

and bicycle accessibility. Supporting efforts, including a comprehensive designated bicycle network, advocacy, special events, and safety education were also considered important or very important by over 60% of respondents. Figure 2.14 presents the percentage of survey responses calling an action important or very important for increasing bicycling in the city.

Conclusions

This consideration of market potentials and preferences tells us that:

- There is a substantial potential market for urban bicycling in Topeka. The distribution of destinations and compact, bikeable nature of the city makes bicycling a viable form of transportation for many Topekans. Reasonable and attainable assumptions, based on meeting infrastructure and supporting needs, suggest that the number of weekday trips made by bicycle can increase from the current level of about 10,000 trips to about 40,000 trips within twenty years.

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

- Participants placed a high priority on infrastructure improvements, while not excluding supporting initiatives.

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

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

CHAPTER 3 THE BIKEWAY NETWORK: PRINCIPLES AND STRUCTURE

This chapter presents the principles and design parameters that govern the design of Topeka's bikeway network. These principles, derived from the analysis of existing conditions, the community involvement process, and market preferences help to generate the overall system concept proposed here.

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

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

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

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

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

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

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

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

Attributes of the Network

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

Destination-Based. The Topeka network is generated by destinations that the community and the potential market identifies as important. While the bicycle suitability of streets is an important consideration, the proposed network is more than a grid of bicycle-friendly streets. Rather, it is a transportation system that takes people to specific places.

Transit Model. Several reasonable models for network planning exist, with choices dependent on the nature of the city. For the Topeka system, we use a "transit model," identifying destination-based routes almost as if they were transit lines. This type of system helps bicyclists travel to destinations with minimum consultation of support materials , once they select their initial routes. This system also emphasizes the interconnection of routes. Thus, a typical cyclist heading to a specific destination with travel from a point of origin and know the combination of designated routes that will lead to the destination.

Incremental Integrity. As discussed in Table 3.6 (Feasibility), incremental integrity – the ability of the network to provide a system of value at each step of completion – is an important attribute. The first step in completion should be valuable and increase bicycle access even if nothing else is done. However, its coherence expands bicycle use, demonstrates the potential that bicycle transportation has as a cost-effective mode, and builds support for continued development. Each subsequent phase of completion follows the same principle of leaving something of clear value and integrity, even if it were the ultimate stage of completion.

Evolution. As part of the concept of incremental integrity, the system is designed to evolve and improve over time. For example, a relatively low-cost project or design element can establish a pattern of use that supports something better in the future. To use a cliche, the perfect should not be the enemy of the good. Rather than trying to accumulate funds to develop an optimum facility, we should establish an initial network that is both functional for many potential users and provides a foundation for the future.

Conflict Avoidance. Few important actions are completely without controversy, but successful development of a bicycle transportation system in Topeka should avoid unnecessary discord and impact on neighborhoods. For example, many communities have experienced difficulty with removing parking to provide space for bike lanes. While this might be the best long-term solution, it can generate opposition that jeopardizes the overall project. On

Figure 3.1: **Development of the INTEGRITY requirement.**

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

local streets, shared routes and signs that do not disturb business in the neighborhood can provide an adequate facility that focuses on the positive and minimizes divisive conflicts. More extensive future solutions should always be done with the full participation of surrounding neighborhoods, and the mutual benefits of street adaptations should be emphasized. For example, bikeway design can slow motorists and keep unwanted through traffic out of neighborhoods, benefitting both cyclists and neighbors.

Use of Existing Facilities. Great existing features like the Shunga and Landon Trails are integral to the bikeway system and should not be taken for granted. Indeed, investments that can make these facilities safer, such as improving visibility at bends on the Shunga Drive, extending sign programs to the trails, and increasing width in very heavily used areas, can be very important parts to enhancing the quality and experience of the larger system.

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

Performance Factor	Measures	Performance Standard
Access	Coverage Access to all parts of the city	The network should provide convenient access to all parts of the city. As a standard, all urban residential areas should be within one-half mile from one of the system's routes, and should be connected to those routes by a relatively direct local street connection.
Bicycling speed	Design and average speed of system	The network should permit relatively consistent operation at a steady speed without excessive delays. System should be able to deliver an average point to point speed between 12 and 15 mph for users. Through portion of routes should permit operation in a 15 to 20 mph range.
Diversions and misdirections	Maximum range of detours or diversions from a straight line between destinations. "Detour ratio:" Ratio of actual versus direct distance between two points.	Routes should connect points with a minimum amount of misdirections. Users should perceive that the route is always taking them in the desired direction, without making them reverse themselves or go out of their way to an unreasonable degree. Maximum diversion of a straight line connecting two key points on a route should not exceed 0.25 miles on either side of the line. Detour ratio (distance between two points/shortest possible distance) should not exceed 1.2 over long distances and 1.4 over short distances.
Delays	Amount of time spent not moving per mile	Routes should minimize unnecessary or frustrating delays, including excessive numbers of stop signs, and delays at uncontrolled intersections waiting for gaps in cross traffic. Routes should maximize use of existing signalized crossings. Target design should limit maximum delays to about 30 seconds per mile over long distances and 45 seconds per mile over short distances.
Intersections	Bicycle direction through intersections	Bicyclists should be able to continue through intersections as vehicles. Situations that force cyclists to become pedestrians in order to negotiate intersections should be avoided.

Figure 3.3: Development of the SAFETY requirement.

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

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

Routes of Least Resistance. The Topeka Bikeways Survey showed that the city's potential urban cycling market is more comfortable in situations with some degree of separation or on quiet streets. It is not necessary to try to force bicycle access onto every major street when more comfortable, lower cost options exist on the Topeka grid. In Chapter Four, we present the concept of bicycle boulevards – local streets that parallel major arterials and can serve cyclists needs in ways that satisfy the comfort requirement successfully. However, complete streets are also part of a comprehensive network, where several critical links in the Topeka system involve incorporating bicycle and pedestrian accommodation into new major street projects. Several key routes in the network depend on building these multi-modal facilities, consistent with the city's recently adopted complete streets policy.

Figure 3.4: **Development of the COMFORT requirement.**

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

Figure 3.5: **Development of the EXPERIENCE requirement.**

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

North Topeka Destinations. Features like North Topeka's main street district along Kansas Avenue and iconic businesses like the grocery in Little Russia are special destinations that add both function and flavor to the experiences offered by the network.

Figure 3.6: **Development of the FEASIBILITY requirement.**

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

The Topeka Bikeway System

Figure 3.7 displays the proposed Bikeway Master Plan for Topeka, based on the requirements and principles described previously in this chapter. The proposed system includes:

- **Through Routes.** At completion, the network recommends 25 point-to-point "through routes," using on-street infrastructure, short trail connections, and strategic sidepaths/cycle tracks to create an interconnected bicycle transportation grid. For clarity, these lines are identified by associated color and number, requiring an identification system that would be adapted to the city environment. The subsequent tables in this chapter summarize the individual through route. Chapter Five discusses each individual route in detail.
- **Connecting Links.** These connections are not part of the through route structure, but use strategic streets to serve other destinations or to connect major routes together. They are typically lower volume streets that would be marked to identify them as shared use connectors.
- **Multi-Use Trails.** These long-distance trails, both existing and future, are fully integrated into the bicycle transportation network. The majority of the trail mileage is in place, but major additions include facilities along the Kansas River, connections between the Deer Creek and Lake Shawnee Trails via Dornwood Park, and the extension of the Soldier Creek Trail in North Topeka.

Figure 3.7
Topeka Bikeways System

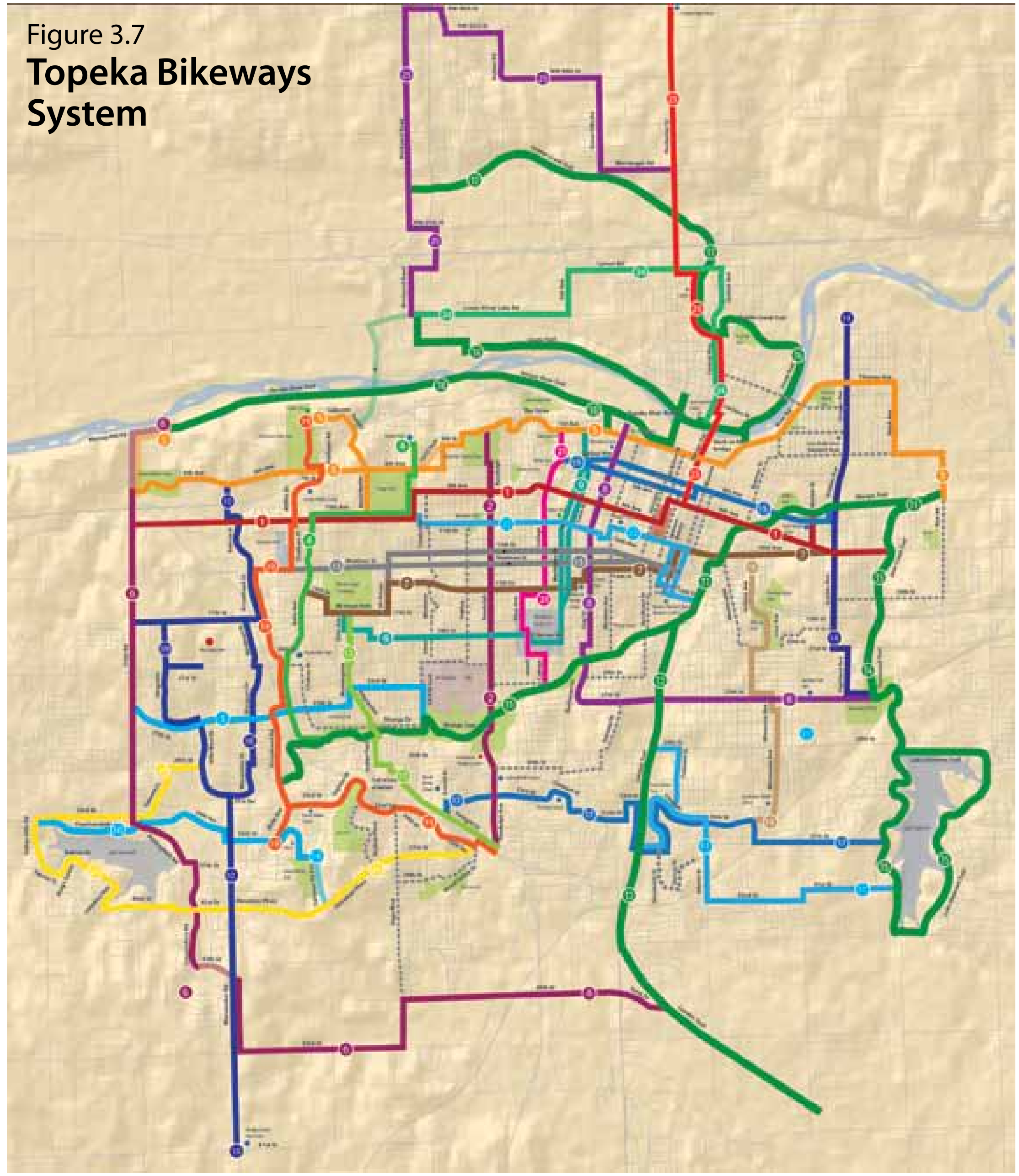
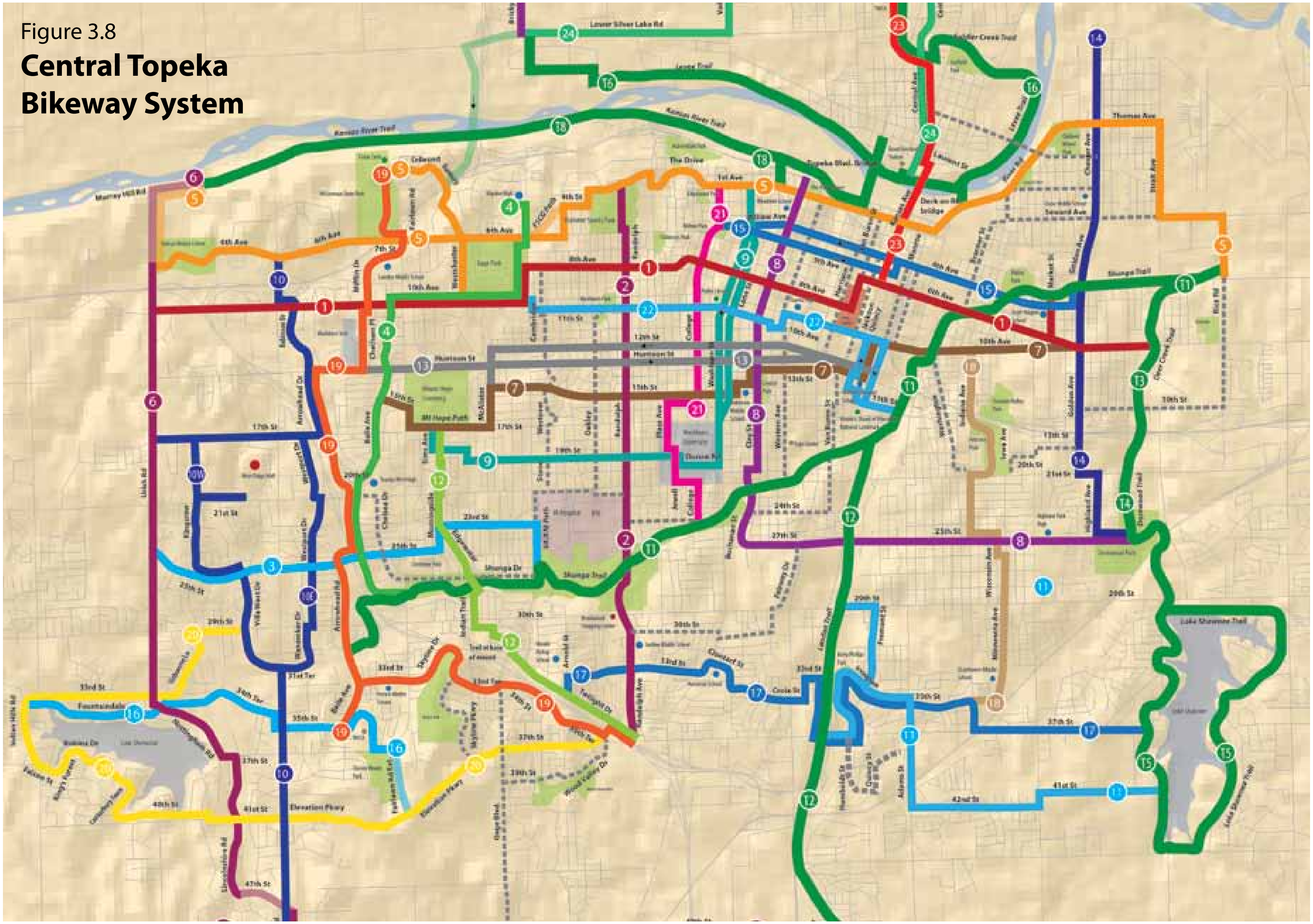


Figure 3.8
Central Topeka Bikeway System



Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
1	**East-West Bikeway**	Deer Creek Trail at 6th (E) to 10th and Urish (W)	Deer Creek Trail, Rice Park, Downtown, Capitol, Topeka High, St. Francis, Children's Park, Gage Park, Washburn Tech, Wanamaker District, Sports Center	Major east-west route, using 6th, 8th, and 10th as principal routes, and features bike lanes on 6th and a complete street conversion on 10th. Major commuter route connects eastside trails, Downtown and the Capitol area, Gage Park, the Wanamaker corridor, and the northwest part of the city.	Short-term from Deer Creek to Gage Park. 10th Street project to Fairlawn advances extension to Belle Avenue. Completion depends on schedule for rest of 10th St.
2	**Randolph Bikeway**	West and Center Drive (Hummer Sports Park) to 37th-Randolph	Hummer Sports Park, Washburn Park, Randolph E.S., KNI/VA, Big Shunga Park, Shunga Trail, Brookwood Shopping, Jardine M.S.	Major north-south route, using shared lanes on Randolph Street, and including a path connection on the edge of the KNI campus to the Shunga Trail. Continues south along existing trail spur to 29th Street, with a crossing at that point. Continues south along the Shunga Creek south trib and Randolph to 37th Stret, and along the creek under I-470 to connect with other southwest routes.	Short-term from Hummer Sports Park to Big Shunga Park, using Randolph through KNI, with short link to Shunga Trail. Extension south includes crossing at 29th Street and link to 37th Street.
3	**25th Street Bikeway**	Shunga Trail at Gage Blvd (E) to 25th-Urish (W)	Shunga Trail, Felker Park, VA Hospital, Edgewater Park, McClure E.S., Christ the King School, Wanamaker corridor, Topeka Public Golf Course	East-west on-street shared route on low volume local collector. Includes Gage Blvd. cycle track connection on VA campus, connecting to Shunga Trail, and the existing 25th Street overpass without ramps at I-470.	Short-term, requiring little modification of infrastructure. Cycle track connection along west edge of VA campus and a Gage Blvd. crossing are short to medium term projects.
4	**Belle Bikeway**	Hayden High (N) to Shunga Trail at Crestview Park (S)	Hayden High, Gage Park, Hillsdale Park, McCarter ES, Topeka West HS, Fairlawn Plaza, McClure ES, Crestview Park and Community Center, Shunga Trail	North-south on-street shared route on low volume local collector. Extension beyond 10th and Belle involves 10th Avenue complete street improvement. Park road connections can be used through Gage Park before path construction is completed, with path around or through park completing ultimate concept.	Short-term, requiring little modification of infrastructure between 10th and Belle and Crestview Park.

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
5	**Oakland-Potwin Bikeway**	Shunga Trail at Rice Rd (E) to Kansas History Center/Murray Hill Station (W)	Shunga/Deer Creek Trails, Phillip Billard Airport, Lundgren ES, Oakland Billard Park and Community Center, Santa Fe Park, Downtown and Riverfront, Ward Meade Park, Meadows ES, Auburndale Park, Hummer Sports Park, Family Services Campus, McLenman State Park, Security Benefit Campus, Kansas History Center	Complex but rich east-west route that includes a variety of infrastructure types. Links to eastern terminus of Shunga Trail with cycle tracks along Phillip Billard Airport, with on-street tie to Oakland Park. Incorporated into riverfront development, including bicycle shoulders on River Drive and future route dependent on Polk/Quincy viaduct and I-70 interchange design. Possibility of trail crossing using abandoned railroad bridge to North Topeka and levee. On-street routes through historic Potwin neighborhood, continuing on paths through Hummer Sports Park and Family Services campus, and continuing west along 6th Avenue complete street project to Kansas History Center. Potential continuation to trailhead of a future trail along the south side of the Kansas River.	Medium- to long-term, requiring major capital investments and resolution of Polk/Quincy viaduct design.
6	**Southwest Belt Bikeway**	Landon Trail at Terra Drive to Kansas History Center (E) and Murray Hill Station (N)	Landon Trail, Jay Scheidler ES, Lake Sherwood, Farley School, Cypress Ridge/Family Park, Wanamaker ES, 10th Street Sports Park, Kansas History Center	Peripheral loop based on upgrades or shoulders on 49th and 53rd, complete street improvement of South Wanamaker, and future complete street widening of Urish Road. Uses shared routes on Lincolnshire and Nottingham	Long-term to achieve full route integrity. Individual projects should be designed to complete street standards.
7	**10th/15th Street Bikeway**	Deer Creek Trail at 6th (E) to 15th-Belle (W).	Deer Creek Trail, Rice Park, Freedom Valley Park, Shunga Trail, Capitol and environs, Central Park and Community Center, Robinson MS, Washburn University area, Randolph ES, Gage Shopping Center, Hillsdale Shoppjng Center, McCarter ES	Largely on-street, east-west route with important trail connections. Includes path connections at Robinson Middle School campus and on edge of Mt. Hope Cemetery, along with major street crossing improvements.	Medium-term between 10th and Golden to Belle Avenue terminus. Portions of route would be developed in the short-term.

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
8	**25th/Clay Bikeway**	Dornwood Park (E) to Ward Meade Park (N)	Dornwood Park (Lake Shawnee with connecting trail), Highland Park HS, Landon Trail, National Guard, Topeka Country Club, Shunga Glen Park and Shunga Trail, Chesney Park, Central Park and Community Center, Holy Name ES, Topeka HS, Meadows ES, Old Prairie Town	L-shaped route linking central Topeka to Lake Shawnee. Initial on-street route, using shared lanes for most of its length. Bike lane opportunity on east end of 25th Street, with cycle tracks possible along other segments of 25th Street.	Short-term for immediate on-street route; medium-term for ultimate infrastructure along 25th Street.
9	**Washburn Bikeway**	1st and Greenwood, Potwin (N) to 17th-Sims (W)	Potwin, St. Francis Hospital, Public Library, Robinson MS, Washburn University, Whitson ES	L-shaped route with one-way bike lanes (potentially advisory) on Washburn and Lane, with cycle track distributor on periphery of Washburn campus. Continues on-street on 19th Street to terminus with Route 7.	Resurfacing of Lane/ Washburn should be coordinated with pavement markings. Internal campus roads and 19th link to Randolph route. Medium-term route extension west of Randolph.
10	**Wanamaker Corridor Bikeway**	6th and Wanamker to Washburn Rural HS and MS	Washburn Rural schools, Jay Scheidler MS, Wanamaker commercial and office corridor, Westridge Mall, Kansas DNR, River Hill office park	North-south route dependent on improvement of Wanamaker Road between 31st and 37th and sidepath development south of 37th. Splits into east and west on-street segments on either side of Wanamker, using Villa West/Brookfield to the west and Westport to the east, reconnecting via proposed bike lane on 17th. Also includes extension of Arrowhead north of 17th, and a new trail link between Huntoon and Robinson Drive. Includes bicycle-friendly adaptations of Wanamaker overpass north of 10th St.	Short- to medium-term between 17th and 37th Street; Medium- to long-term for north and south components of the route.

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
11	**Lake to Landon Bikeway**	Neighborhood connection between Landon Trail and Lake Shawnee Trail at 41st Street	Lake Shawnee Park and Trail, St. Matthew ES, Betty Phillips Park, Landon Trail	East-west route connecting Landon Trail and southeast neighborhoods to Lake Shawnee. Includes short access sidepaths along 29th and 37th to link local streets and Betty Phillips Park to Landon Trail. Ultimate design uses son-street shared legs on 242nd/41st, and a sidepath segment on Adams Street between 35th and 42nd. Existing pedestrian bridge helps connect Betty Phillips Park to Landon Trail.	Short- to medium-term for low-volume portions, but medium-term for full route integrity. Could be advanced if Wittenberg Bridge improvement or Dornwood Trail link to Lake Shawnee Trail are indefinitely delayed.
12	**Edgewater Bikeway**	17th-Sims (N), interconnecting with Routes 7,9 to 37th and Twilight (S) interconnecting with Route 2.	Edgewater Park, Crestview Park and Community Center, Shunga Trail and spur to south neighborhoods, McEachron ES, Gage Blvd. commercial, Wood Valley area	Connecting route on low-volume streets, connecting Shunga Trail and Crestview Park to surrounding neighborhoods. Link to Randolph Street bikeway and crossing to Wood valley area using proposed trail segment along creek under I-470.	Medium-term assuming development of new Gage Blvd crossing.
13	**Huntoon Bikeway**	12th and Monroe (E) to Wanamaker and Huntoon (W), interconnecting Routes 10 and 20	Brown v. Board, Williams Magnet School, Capitol environs, Westboro commercial village, Hillsdale Park, Washburn Technical, Wanamaker corridor	East-west commuter route, with road modifications to provide one-way bike lanes on 12th Street/Huntoon one-way pair. Continuation west to Wanamaker requires one-way cycle tracks or bike lanes.	Short-term between Capitol area and Gage Blvd. with coordination of street rehabilitation and pavement markings. Medium-term for westward extension using cycle tracks.
14	**Golden Bikeway**	Riverside ATV Park (N) to Dornwood Park (S)	Riverside Park, Lundgren ES, Oakland-Billard Park and Community Center, State St ES, Chase MS, Shunga Trail, Scott Magnet School, Dornwood Park (Lake Shawnee connection)	North-south route on east side of town, linking Oakland to Shunga Trail and Dornwood Park. On-street shared route on Chester to Seward, with off-road trail connection along Golden to the Shunga Trail. Continuation requires shoulders or cycle tracks along Golden, a cycle track along 21st to Highland and an on-street route on Highland to connect with Route 8.	Short-term from Riverside to Shunga Trail. Medium- to long-term for full route completion.

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
15	**4th Avenue Bikeway**	Shunga Trail at Golden Ave(E) to Willow Park (W)	Shunga Trail, Scott Magnet School, Shunga Trail, Ripley Park, Amtrak, Downtown, Sumner School, Meadows ES, Willow Park	East-west connecting route linking east side with central Topeka. Shared lanes or bike lanes on 4th Avenue with one-way bike lanes on 4th/5th one-way pair to Willow Park, connecting to Washburn Bikeway.	Medium- term
16	**Clarion Bikeway**	Clarion Park at 37th and Fairlawn to 33rd and Indian Hills	Clarion Park, YMCA, Lake Sherwood, Farley School	Short east-west route, largely using trails to connect Lake Sherwood area and other neighborhoods to YMCA and Clarion Park. Route uses trail on periphery of YMCA campus and through drainage corridor to Belle Avenue; continues west on-street along 35th Street and 34th Terrace, and continues along Shunga Creek on public land to Nottingham and Fountaindale to 33rd. Further extension of east endpoint south through Clarion Park to proposed Elevation Parkway.	Medium- term, requiring significant trail development. Extension through Clarion Woods depends on Elevation Pkwy scheduling
17	**33rd Street Bikeway**	Lake Shawnee at 37th Street (E) to Stone/33rd and Twilight Drive, connecting with Route 12	Lake Shawnee, Eisenhower MS, Betty Phillips Park, Landon Trail, White Lakes Mall, Avondale West ES, Shaner ES, Jardine MS, Bishop ES	East-west route, linking south-central neighborhoods and Shunga Trail with the Landon and Lake Shawnee Trails. From Lake Shawnee, includes bike lanes on 37th Street to Indiana, and continues with shared routes to the Landon Trail at Betty Phillips Park. Uses trail to link to 33rd Street and Croix Street, continuing on-street through neighborhoods via 33rd Street. Possible trailhead upgrade at 33rd Street on Landon Trail.	Medium-term, requiring crossing to Landon Trail at Betty Phillips Park and improved Croix Street crossing.
18	**Hillcrest Bikeway**	10th and Indiana (N) to 35th and Indiana (S)	Freedom Valley Park, Hillcrest Park and Community Center, Eisenhower MS, Ross ES	North-south connecting route uses Indiana and a trail through Hillcrest Park to 21st and Minnesota. Continues south along improved Indiana Avenue, and continues south to middle school along bicycle boulevard using Wisconsin/Minnesota Ave.	Medium to long-term

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
19	**Arrowhead Bikeway**	L-configured route from Cedar Crest/ McLennan Park (N) to 37th to Randolph (S), with access to Wood Valley at Shunga Creek South Branch connection	Kansas DNR, River Hill office park, Landon MS, Washburn Tech, Wanamaker corridor, French MS, Skyline Park, Horne Park	L-shaped trail, paralleling I-470 and serving adjacent neighborhoods. Predominately on-street route uses local streets between Huntoon and Cedar Crest and coincides with Wanamaker Bikeway north of 17th Street. Route continues on-street, utilizing Arrowhead Drive and 33rd Street, crossing Fairlawn, A short trail at the base of Skyline Park's hill connects to 33rd/34th, and 35th terrace, together paralleling the south side of I-470 and linking to the route terminus at 37th and Randolph.	Medium-term, requiring several gaps for full route integrity
20	**Elevation Parkway**	37th and Randolph (E) to 29th and Wanamker (NW) connecting with Route 10	Skyline Park, Clarion Woods, Lake Sherwood, Indian Hills ES, Wanamker Corridor	Loop route around Lake Sherwood, connecting to the system "node" at 37th and Randolph. Route east of Wanamaker depends on future construction of Elevation Parkway, which should be built as a complete street. On-street segments from Nottingham (Route 6) to 33rd and Indian Hills complete a loop around Lake Sherwood. Indian Hills and 29th Street segments propose complete street construction,with bike lanes.	Short-term for on-street route on south side of Lake Sherwood. Long-term for balance of route. 29th Street, a near-term project, should be developed as a complete street between Gisbourne and Wanamaker
21	**College Bikeway**	Auburndale Park (N) to Shunga Trail at Plass Street	Auburndale Park, Willow Park, St. Francis Hospital, Public Library, Washburn University, Shunga Trail	North-south central city route, using on-street routes including College Avenue, internal streets through Washburn Uinversity, and College Avenue to the trail. A short path segment included through Willow Park, linking College and Elmwood Avenues. Proposes a pathway link on south edge of campus between Jewell and College, and improved crossings of 17th and 21st.	Short-term
22	**11th Street Bikeway**	Shunga Trail at 15th Street (E) to Gage Park	Shunga Trail, Brown v. Board of Education, Williams Magnet, Capitol and environs, Topeka HS, Public Library, Washburn Park, Gage Park	East-west connecting route, connecting major community features. Almost completely on-street route, but requires some street modifications, including bicycle boulevard configuration on 11th Street. 11th Street should have reduced number of stop signs and possible improvement of ped bridge at Washburn Park.	Short-term for core of the route, providing library access. Pavement marking modifications have been completed as part of 10th St resurfacing in 2011.

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
23	**North Topeka Bikeway**	Seaman HS (N) to 10th and Kansas (S)	Seaman HS, Rochester ES, YMCA, Great Overland Station, North Topeka Main Street, Downtown Topeka, Capitol and environs	North-south through trail, incorporating Central Avenue bicycle boulevard, existing Soldier Creek Trail, and major improvement of Rochester/Tyler Street with shoulders/ bike lanes. Uses on-street shared route along Laurent to center of North Topeka business district, with paths connecting to Kansas/Quincy bridge under the span. Road diet on bridge can produce bike lanes. Bicycle access also should be designed into new plan for Kansas Avenue. Back-in diagonal parking should be utilized along Kansas where bike lanes are employed.	Long-term for entire route. Short-term adaptations for segment between Downtown and Tyler and Lyman, using Soldier Creek Trail.
24	**Lyman/Lower Silver Lake Bikeway**	Great Overland Station Brickyard and Lower Silver Lake (W)	Logan JHS, Lyman ES, North Kansas Ave business corridor, Soldier Creek Trail, Garfield Park, North Topeka Main Street, Great Overland Station	East-west North Topeka route. Lyman and Lower Silver Lake can be signed as shared routes for experienced riders, but require shoulders for safe access. Blaine Avenue, Central Avenue, and Kansas Avenue segments are on-road shared routes to Great Overland. Continuity requires ped crossing at Central over Soldier Creek. Use of westbound/southbound movement over Gateway Bridge is legal but not encouraged.	Medium-term for North Topeka segment between Great Overland Station and Logan Middle School; long-term for balance.
25	**46th Street/ Hunters Ridge Bikeway**	Seaman HS to Brickyard and Lower Silver Lake	Seaman HS, Hunter's Ridge commercial	Eventual north loop along developing 46th Street corridor, anticipates bicycle shoulders or cycle track along 46th Street. More feasible route to Hunters Ridge uses rural section roads from Rochester Road. Brickyard Road connection to Lower Silver Lake may be signed immediately for shared traffic, but eventually includes shoulders for the entire length.	Long-term

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
T1	**Shunga Trail**	Shunga Creek at Rice Road (E) to Arrowhead Drive	Scott Magnet School, Ripley Park, Downtown, Expocentre, Shunga Glen Park, Stout ES, Washburn University, Big Shunga Park, Warren Park, Felker Park, KNI, VA, Crestview Park, French MS	Topeka's premier trail, with recent extension to Deer Creek. Extension under I-470 to French MS via McClure Street. Trail requires gradual improvement/ reconstruction program to address visibility issues at curves and underpasses, resurfacing needs, and widening to separate bike and pedestrian traffic in high use areas. System also requires trail access from Buchanan Street on Route 8 and improved wayfinding.	Short-term for west extension, continuing improvement program
T2	**Landon Trail**	Shunga Trail junction to California Avenue and south		Urban trail completed in 2011. Main requirements are improved local access to trail, with connections to Betty Phillips Park, Croix Street, Terra Drive	Medium-term for new trail access bridges
T3	**Deer Creek Trail**	Shunga Trail (N) to Dornwood Park (S)		Extension of Deer Creek Trail from 10th Street south to Dornwood Park, a key element of trail continuity to Lake Shawnee	Short-term, depending on funding.
T4	**Dornwood Trail**	Dornwood Park to Lake Shawnee Trail	Dornwood Park, Lake Shawnee Park	Trail extension uses a new Wittenberg Road bridge with cycle track access. In short-term, bridge may be signed for shared motorized/bicycle traffic.	Short- to medium-term. High priority regional trail segment, but requires adaptation or replacement of Wittenberg bridge over the Kansas Turnpike.

Through Route	Name	Endpoints	Major Destinations Served	Highlights	Implementation Term
T5	**Lake Shawnee Trail**	Circumferential trail		Trail serves Lake Shawnee Park. Excellent condition, with primary requirement being redesigning extremely steep incline along 45th Street on south side of lake.	Short-term
T6	**North Levee Trail**	Garfield Park (E) to Brickyard and Lower Silver Lake Roads	Garfield Park, Oakland via Sardou Avenue bridge, North Topeka industrial areas	Trail on levee top, connecting to Soldier Creek Trail at Garfield Park. River crossing options include a connection to the Sardou Avenue bridge or reuse of a disused railroad bridge east of Kansas Avenue, connecting to River Drive. Railroad bridge provides a better trail option, and reinforces riverfront development in Topeka.	Medium- to long-term
T7	**Soldier Creek Trail**	Terminus of existing trail at Lyman Road to Brickyard Road	Youth Center, North Topeka industries	Trail along new channel completes North Topeka trail loop	Long-term
T8	**South Bank Trail**	Murray Hill Station to Crane Street		Trail on south bank of river, probably predicated on future abandonment of railroad, currently in full operation. Current railroad bridge west of Topeka Boulevard could provide access to Levee Trail.	Long-term


STOP

CHAPTER 4 INFRASTRUCTURE DESIGN CONCEPTS

This chapter presents the infrastructure of the Topeka Bikeways network, including facility types and design guidelines appropriate to the city's various street contexts and environments. These facility types form the building blocks of the network, and become the individual design components of the system's routes.

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

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

In addition, it is important to note that, despite these guidelines, individual routes still require specific design. While these guidelines are appropriate to Topeka's contexts, they should be flexible and adapted to individual conditions. Some situations are clear enough that guidelines can be applied directly. But in more complex conditions, the guidelines help inform a more customized solution.

Facility Types

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

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

Bicycle lanes, in which bicyclists share the street right-of-way but operate within marked lanes reserved for their use. Bicycle lanes always provide for one-way movement, in most cases moving in the same direction as motor vehicles. Bicycle lanes are appropriate on streets that can comfortably accommodate bicyclists, but have higher traffic volumes than shared streets; provide adequate width in their current channels for both motor vehicles and bicycles; or as part of new street construction projects that integrate pedestrians, bicycles, and transit into their design (complete streets).

Sidepaths or cycle tracks. Sidepaths, referred to in Europe and increasingly in America as "cycle tracks," are bicycle paths located within a street right of way but fully separated from travel lanes. These facilities are popular in Europe and are frequently used in the United States, but have been controversial, largely because of potential bicycle-motor vehicle conflicts at intersections of streets and driveways. These facilities are especially useful along the street frontages of major campuses, parks, open spaces, and limited entry developments with long distances and few interruptions. Cycle tracks within street channels that are buffered from moving traffic by parked cars have also gained increased popularity.

Multi-use trails. Trails on rights-of-way separated from streets make up most of Topeka's existing investment in bicycle facilities, including the Shunga, Landon, and Soldier Creek Trails. Trails following waterways, levees, railroads, campuses, and utility lines will continue to be staples of the bicycle network.

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Facility Types with Topeka Applications

1 Shared street with sharrow, Omaha, NE
2 Bike lane on existing street, Boston, MA
3 Complete street conversion, Green Bay, WI
4 Sidepath, Lawrence, KS
5 Cycle track, Cambridge, MA
6 Multi-use trail, Shunga Trail, Topeka
7 Multi-use trail, Lake Shawnee Trail, Topeka

Local Shared Streets

Shared, low-volume streets will make up the majority of on-street mileage in the Topeka bikeway system. On these streets, bicycles and motor vehicles operate within the same area.

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

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

Application to Topeka's Street Contexts

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

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

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

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

- *Inadequate space for bike lanes*. Bike lanes, providing reserved space in the street channel for bicyclists, are often desirable, but many streets in the Topeka system are not wide enough to accommodate bike lanes, travel lanes, and on-street parking.

These conditions are typically found in the following Topeka street types:

- Continuous local streets
- Continuous neighborhood collectors
- Neighborhood parkways
- Neighborhood avenue

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

Design Contexts

In the Topeka system, shared streets will typically range from 25 to 40 feet wide, with parallel parking on at least one side. Figure 4.1 illustrates typical design contexts and sharrow placement dimensions for the Topeka system, with guidelines summarized in Figure 4.2.

Figure 4.1. Design Configurations for Shared Routes

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

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

Right: Wide neighborhood avenue with two-sided parking.

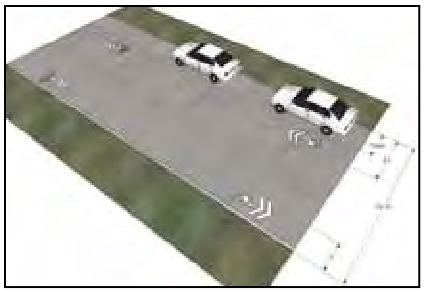


Figure 4.2. Design Guidelines for Shared Routes

Design Condition	Pavement Marking and Signage	Typical Street Type	Comments
Two-sided parking, 25-31 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of the curb.	Continuous local, continuous neighborhood collector, neighborhood parkway	
One-sided parking, 25-29 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of curb on the parking side, minimum of 3 feet from face of curb on the no parking side	Continuous local, continuous neighborhood collector, neighborhood parkway	
One-sided parking, 29-32 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of curb on the parking side, minimum of 3 feet from face of curb on the no parking side. Painted white line to define parking lane, with outside edge 8 feet from face of curb	Neighborhood collector, neighborhood parkway, neighborhood avenue	White line should be used when the remainder of the street channel is at least 21 feet wide. Parking line helps define parking area and aids in bicyclists positioning themselves safely away from parked cars. In addition, when curbside parking is lightly utilized, the parking lane can serve as an informal bike lane for some cyclists.
Two-sided parking, 36-40 foot width	Sharrows with center of chevron a minimum of 11 feet from the face of curb on the parking side, minimum of 3 feet from face of curb on the no parking side. Painted white line to define parking lanes, with outside edge 8 feet from face of curb.	Neighborhood avenue	White line should be used when the remainder of the street channel is at least 21 feet wide. Parking line helps define parking area and aids in bicyclists positioning themselves safely away from parked cars. In addition, when curbside parking is lightly utilized, the parking lane can serve as an informal bike lane for some cyclists.

Bicycle Boulevards

Bicycle boulevards are enhanced shared streets that are especially applicable in Topeka with its strong secondary street grid. These streets are direct segments that generally run parallel to higher order streets, and serve the same destinations as busier arterials. Within the system concept, candidates for bicycle boulevard designation include:

- 11th Street, paralleling the 12th/Huntoon one-way pair.
- 8th Avenue , paralleling 6th and 10th Avenues between Downtown and Gage Park.
- 13th/15th Street, paralleling 17th Street between Monroe Street and Gage Boulevard.
- Belle Avenue, paralleling Fairlawn Road between 10th and the Shunga Trail.
- Randolph Street, paralleling MacVicker Avenue between 1st and 37th Street.
- Clay Street, paralleling Washburn/Lane Street between 1st and 27th Street.
- Arrowhead Drive, paralleling I-470 between 10th and 37th Street.
- Westport Drive/Wanamaker Drive, paralleling Wanamaker Road between Huntoon and 31st Terrace.
- Minnesota/Wisconsin Avenue paralleling California Avenue between 21st and 35th.
- College Avenue between Willow Park and Washburn University.

Bicycle boulevards utilize the pavement marking conventions discussed above, but include other identifying and functional enhancements. These vary in level of capital investment and complexity, and in relatively ascending order of complexity include:

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

- *Intersection and road priority.* Bicycle boulevards should provide reasonable through priority to bicyclists, and by

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

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

extension other users of the street. These include turning stop signs, stopping cross streets in favor of bicyclists and other users of the boulevard, and installing signs that explicitly give priority to cyclists.

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

Arterial street crossing installations. These features at crossings of bicycle boulevards and major streets help bicyclists cross arterials and preserve system continuity and safety. Techniques include installation or tuning of induction loops sensitive enough to detect bicycles; pedestrian and bicyclist activated hybrid beacons, possibly using bicycle loop detectors; and crossing refuge medians, short medians that allow bicyclists and pedestrians to negotiate one direction of traffic at a time. A special bicycle symbol is marked on the pavement to emphasize the point where the loop detects bicycles. Topeka installed its first hybrid beacon at the Landon Trail crossing with 29th Street.

Traffic Diversion. These are physical projects that change traffic pattens by preventing motor vehicle access onto a block while permitting through bicycle access. A diversion device every half-mile on continuous local streets will force through traffic to parallel arterials, while maintaining good access for residents into and out of residential areas.

Naturally, bicycle boulevard techniques can also be utilized on other shared streets.

Arterial street crossings for bicycle boulevards. Top: Crossing median concept for urban corridor by RDG. Above: Median installation in Las Vegas.

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

Bike Lanes

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

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

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

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

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

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

Application to Topeka's Street Contexts

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

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

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

Figure 4.3. Design Dimensions for Bike Lanes on Two-Way Streets

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

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

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

Additional travel lanes increase street width proportionately.

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

- *One-way and two-way environments.* Topeka's one-way streets include wide downtown facilities with more lane capacity than traffic requires. In these situations, a bike lane is provided with relative ease and little impact on traffic. Topeka also includes longer distance, two-lane one-way pairs (12th/Huntoon, Washburn/Lane) that provide direct routes but difficult design challenges.

These conditions are typically found in the following Topeka street types:

- Transit and civic avenues
- Neighborhood arterial
- Mixed use arterial
- Mixed use boulevard
- One-way pairs
- Downtown multi-lane
- Downtown boulevard

Overall Design Guidelines

In the Topeka system, streets with bike lanes may vary in width from 30 to 80 feet, reflecting the city's diverse set-

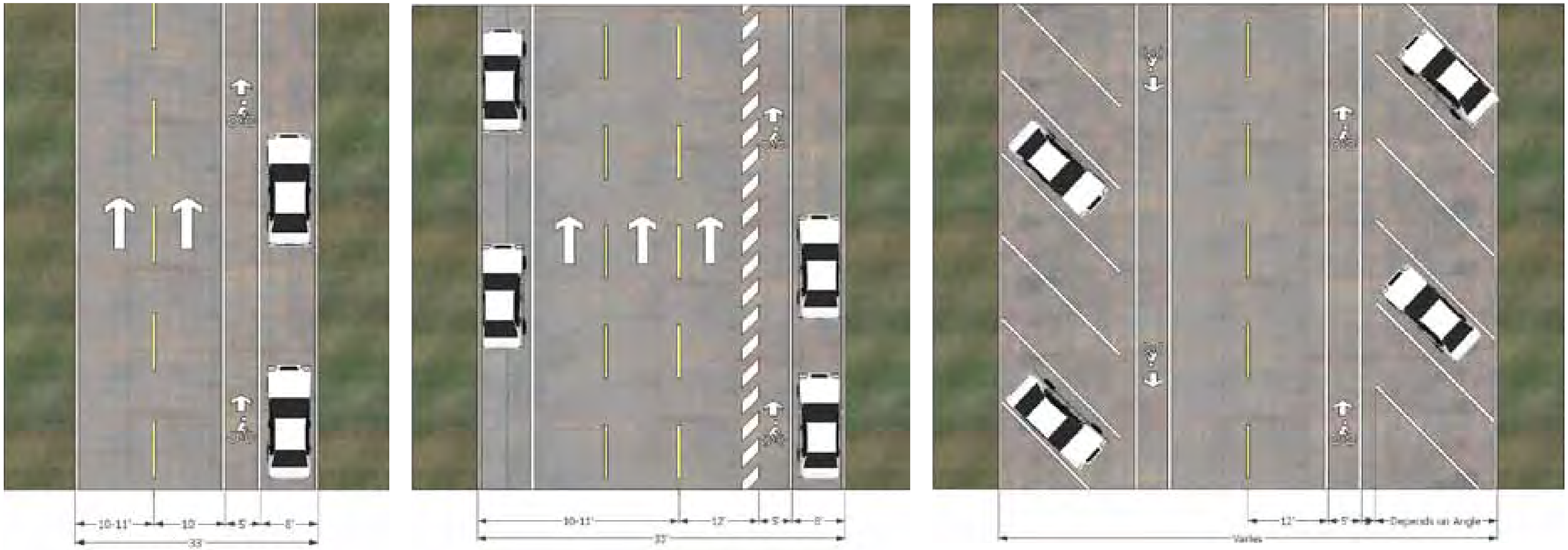


Figure 4.4. Design Dimensions for Bike Lanes on One-Way Streets and with Diagonal Parking

Left: Two-lane, one-way traffic with parking on one side (Washburn/Lane and 12th/Huntoon one-way pairs. Changing sections and parking configurations on these streets complicates design, and street widths do not uniformly accommodate bike lanes. On westbound 12th, a left-hand bike lane accommodates existing off-street parking on the right-hand peak hour travel lane.

Center: Conversion of an existing multi-lane one-way street by replacing one travel lane with a buffered bike lane.

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

tings from relatively narrow corridors to wide downtown avenues. Figures 4.3 and 4.4 illustrates typical design contexts and bike lane dimensions for the Topeka system, with guidelines summarized in Figure 4.5. However, general design principles include the following:

- Bike lanes must always operate in a single direction, flowing with traffic.
- Bike lanes will typically be provided on both sides of two-way streets. Lanes on one-side only may invite inexperienced cyclists to use them in the wrong direction. In situations where bike lanes are needed but right-of-way only accommodates a single directional lane, a sharrow should be used in the opposite direction. The bike lane should be provided in the direction most likely to slow or create conflicts with other traffic, such as an uphill grade.
- Normally, bike lanes will be located on the right-hand side of the street, consistent with traffic conventions and motorist expectations. Some large cities locate bike lanes on the left-hand side to avoid conflicts with buses and taxis, and to minimize car-door zone conflicts. However, these conditions generally do not occur in Topeka.
- The 12th/Huntoon pair presents an exception to this principle because of permitted off-peak parking in the right-hand travel lane. In this situation, a bike lane on the left-hand side of the street maintains current on- and off-peak traffic flow conditions.
- Bike lane pavement markings should be used at the entrance and departure of each intersection.

Figure 4.5. Design Guidelines for Bike Lanes

Design Condition	Bike Lane, Parking Lane, and Total Street Width	Typical Street Type	Comments
Two-Way Traffic , two-sided parking	Standard of 8 foot parking lanes with 5 foot bike lanes. In constrained settings, a 12 foot combined parking/bike lane may be considered. Total minimum street width (face to face of curb: 46-48 feet for two-lane plus 11 feet for each additional travel lane.	Transit and civic avenues, neighborhood arterial, mixed use boulevard	Supporting information should advise cyclists to ride in the left-hand part of the bike lane. Four foot bike lanes are acceptable in constrained situations with a minimum 8 foot parking lane.
Two-Way Traffic, one-sided parking	Standard of 8 foot parking lanes with 5 foot bike lane on parking side. In constrained settings, a 12 foot combined parking/bike lane may be considered. Four foot bike lane is minimum on the non-parking side, excluding gutter pans. Total minimum street width (face to face of curb: 39 feet for two-lane plus 11 feet for each additional travel lane.	Transit and civic avenues, neighborhood arterial	Supporting information should advise cyclists to ride in the left-hand part of the bike lane. Four foot bike lanes are acceptable in constrained situations with a minimum 8 foot parking lane.
Two-Way Traffic, no parking	Four-foot minimum bike lanes, excluding gutter pan. On major streets with higher volume and speed, bike lane width should increase to 5- to 7-feet, depending on street character and speed limits. Total minimum street width (face to face of curb: 30-32 feet for two-lane plus 11 feet for each additional travel lane.	Transit and civic avenues, neighborhood arterial, mixed use boulevard, mixed use arterial	

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

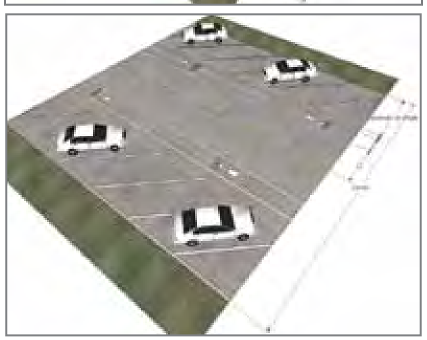


Figure 4.5. Design Guidelines for Bike Lanes in Special Topeka Contexts

Design Condition	Bike Lane, Parking Lane, and Total Street Width	Typical Street Type	Comments
One-Way traffic , one-sided parking **(12th/Huntoon, Washburn/Lane pairs, and 4th/5th pairs)**	Standard of 8 foot parking lanes with 5 foot bike lanes on parking side. A 12 foot combined parking/ bike lane may be considered. Minimum four foot bike lane on the non-parking side, excluding gutter pans. Bike lanes may be used interchangeably with sharrows, depending on conditions on individual blocks. Bike lane should be located in left-hand lane if right-hand lane permits off-peak parking. Parking use reduces street to one through lane, and left-hand bike lane does not affect operation. Total minimum street width (face to face of curb: 28 feet for two-lane with off-peak parking permitted in one travel lane.	One-way pairs	
One-way traffic, two-sided parking **(4th, 5th, 8th, 10th Avenues)**	Removal of one travel lane, reconfiguring street with an 8 foot parking lane, 5 foot bike lane and 2-3 foot buffer between bike lane and adjacent travel lane.	Downtown multi-lane	
One- or two-way with diagonal parking **(Downtown streets, Huntoon Street at Westboro Mart)**	Five-foot minimum bike lanes with diagonal stalls of adequate length to avoid encroaching into the bike lane. Back-in diagonal parking for stalls adjacent to bike lanes.	Downtown multi-lane, downtown boulevard	Conventional head-in diagonal parking is not recommended adjacent to bike lanes. because of poor visibility. Back-in diagonal parking is being used successfully in many cities, and is recommended in Topeka when this condition exists. Back-in diagonal also provides greater safety to motorists pulling out of stalls, directs pedestrians leaving a vehicle to the sidewalk, and eases loading.

Buffered bicycle lane. Separation is provided by a cross-hatched neutral ground in this application in New York City.

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

Intersection Design

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

Intersection solutions for on-street bicycle facilities include:

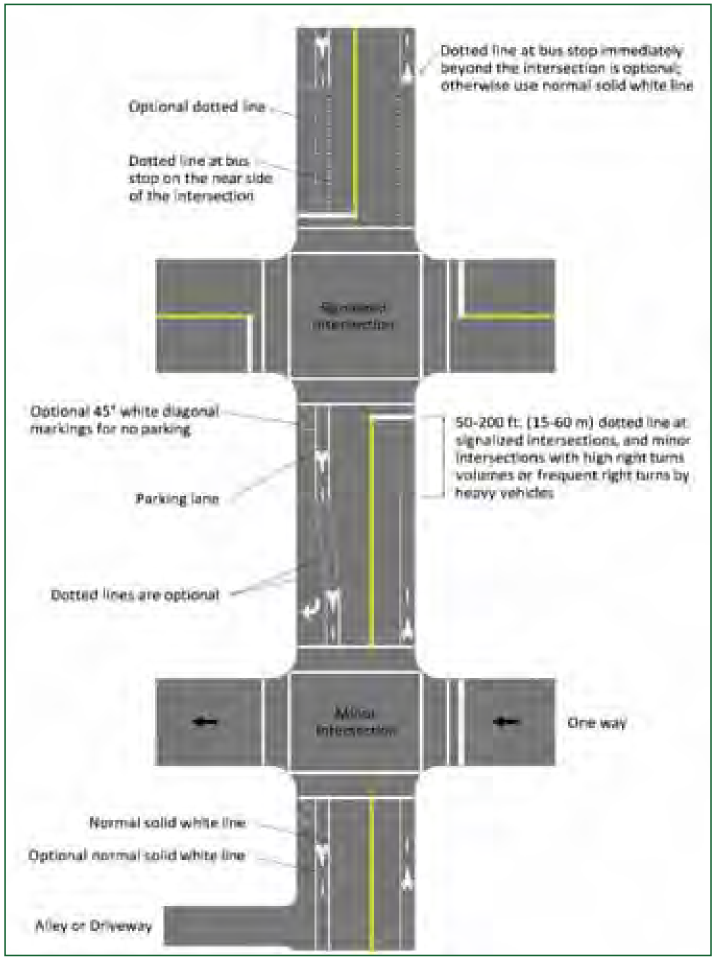
- Typical pavement markings.
- Right-Turn Pockets
- Bike Boxes for Left Turns
- Intersection Offsets
-

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

Typical Intersection Markings

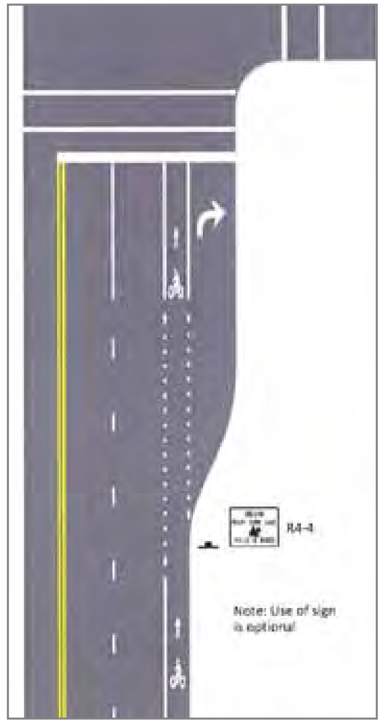
Figure 4.6 illustrates typical pavement markings in various situations including intersections. Problems have emerged with bike lane installations that maintain solid lines up to the intersection. This encourages some cyclists to consider the bike lane to be inviolate, and opens them to the possibility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

Figure 4.6. Recommended Lane Markings at Typical Intersections



Source: AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities, February, 2010 Draft

Figure 4.7. Recommended Lane Markings at Right Turn Only Lanes



Right-Turn Pockets

Some major intersections include right-turn only lanes to allow right turns on red signals or otherwise separate right turning movements from the direct flow of traffic. This creates a potential issue for bicyclists who are used to positioning themselves "as far to the right as practicable" in the language of many state laws, again exposing themselves to collision with right-turning motor vehicles. Figure 4.7 illustrates the recommended pavement markings position the bicyclists continuing straight ahead to the left of the RTO lane, providing a dashed stripe through the conflict zone. The solid stripe resumes on the other side of this conflict zone. Many cities are coloring the surface of this zone to increase motorist awareness of a potential collision hazard, A standard sign, advising motorists to yield to bikes on a direct route (R4-4) should also be installed.

Bicycle Boxes for Left Turns

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

Offset Intersections

While Topeka enjoys the benefits of a good local street grid, many of these streets are offset as they cross major arterials, typically at section lines. Some of these intersec-

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

tions are controlled by stop signs while others have signals at one of the intersection legs. These offsets place through cyclists on continuous, low-volume routes in a precarious position, often forcing them to attempt to join the traffic stream on the primary street.

Figure 4.8 illustrates three concepts that address this barrier issue. At low volume intersections, using chevrons to define the bike route is satisfactory. At unsignalized intersections with major arterials, a short one-way track allows the cyclist to track a straight line across the intersection and continue to the opposite leg without being forced into a heavy traffic stream. At signalized intersections, a two-way track aligns the cyclist with the continuation of the bike route.

Developing Bike Lanes in the Network

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

Retrofits

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

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

Using Excess Width

Some streets in the Topeka system are wide enough that

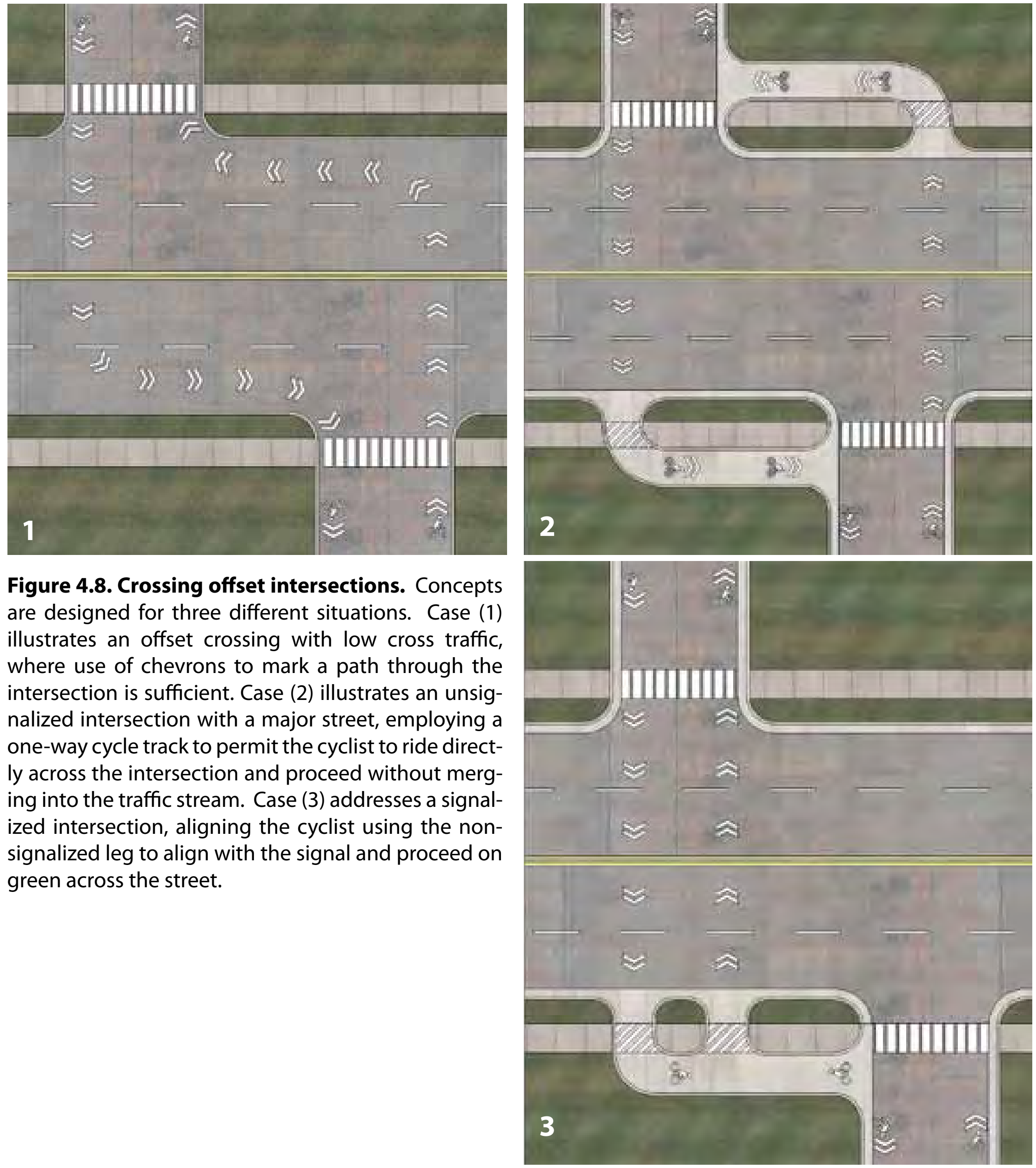


Figure 4.8. Crossing offset intersections. Concepts are designed for three different situations. Case (1) illustrates an offset crossing with low cross traffic, where use of chevrons to mark a path through the intersection is sufficient. Case (2) illustrates an unsignalized intersection with a major street, employing a one-way cycle track to permit the cyclist to ride directly across the intersection and proceed without merging into the traffic stream. Case (3) addresses a signalized intersection, aligning the cyclist using the non-signalized leg to align with the signal and proceed on green across the street.

Retrofits within existing street channels in Downtown Topeka. Both Van Buren (left) and 6th Avenue are included in the system concept and can be easily modified to include bike lanes with little change to existing traffic.

Lane reconfiguration concept for 12th Street. This concept includes a bike lane on the right-hand side of the street, shifting the peak hour travel/off-peak parking lane to the left side.

bike lanes can be added no significant change in the existing street layout. Examples include 6th Avenue between Golden and Branner and between I-70 and Tyler; 25th Street east of California Avenue; Seward Avenue between Golden and Branner; and Van Buren between 4th and the Capitol. Segments of the Lane/Washburn pair can also accommodate bike lanes adjacent to parking. Bike lanes on these streets also have the advantage of managing traffic, reducing speeds to desirable levels, and preventing passing on the right.

Road Diets

Road diets may have some applicability in Topeka, based on actual lane dimensions. Two principal strategies for road diets include:

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

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

Parking and Lane Reconfigurations

Parking reconfigurations pick up road space by consolidating existing on-street parking. In these situations, which may involve neighborhood collectors such as 8th Avenue and 1st Avenue, underutilized two-sided parking is combined on one side of the street. On streets in excess of 35 feet wide, this provides an opportunity for a bike lane on one side of the street and a shared lane with a painted parking lane in the opposite direction. A lane reconfiguration may change the location of lanes on the street to accommodate mixed traffic. For example, on westbound 12th Street, where off-peak parking is permitted along the right-hand travel lane, a possible reconfiguration option could place a combined parking/peak hour travel lane on the left side of the street, while providing a continuous bike lane on the right side.

Parking reconfigurations can have significant neighborhood impact and should be done only in close consultation with residents and businesses along a street.

Minor Widenings.

Minor widenings include construction of dual purpose paved shoulders on streets without curbs or relocating curbs on urban streets, most feasible as part of another improvement project. Candidate streets for shoulder construction include 37th Street between I-470 and Lake Shawnee; Golden Avenue south of Shunga Creek; Strait Avenue between Seward and Thomas; Tyler Street north of Laurent Street; River Road from 1st Avenue to Oakland

Park; other North Topeka rural section roads like Rochester Street, NW 46th Street, Brickyard Road, Lower Silver Lake Road, and Lyman Road; 37th Street from Wanamaker Road to Nottingham Road; and several others. Shoulder bikeways should be 6 feet wide to accommodate bicycles and disabled vehicles comfortably on these relatively high speed corridors. Shoulders should also be marked with bike lane pavement markings. Urban widening may be appropriate for 17th Street, a three-lane facility with very narrow lanes.

Major Reconstructions/Complete Streets

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

- 10th Avenue from Gage Boulevard to Urish Road.
- 6th Avenue from Gage Boulevard to Wanamker Road.
- Urish Road from 6th Avenue to Nottingham Road.
- Wanamaker Road from 31st Terrace to 53rd Street.
- Elevation Parkway, a planned new corridor from Wanamaker Road to 37th and Randolph.

Complete street redesign. Military Avenue in Green Bay, Wisconsin was both "road dieted," downsizing from six to four travel lanes, and reconceived as a complete street. This concept features bike lanes and colored concrete crosswalks and is viewed as both a transportation improvement and an economic development tool.

Figure 4.9. **Typical Complete Street Sections**

Section Type	Sidewalk/ Sidepath	Parkway Setback	Bicycle Lane or Shoulder	Cartway	Bicycle Lane or Shoulder	Parkway Setback	Sidewalk/ Sidepath	Total Minimum ROW
2 lane divided with sidepath	10	6	5	40	5	6	5	76
3 lane, no sidepath (35 mph)	5	6	5	33	5	6	5	65
3 lane, 1-way sidepaths (35 mph)	10	6	5	33	5	6	10	75
3 lane, 2-way sidepath (35 mph)	10	6	5	33	5	6	5	70
4 lane divided, 2-way sidepath (45 mph)	10	12	7	64	7	12	5	117
5-lane, no sidepath (35 mph)	5	8	5	55	5	8	5	91
5-lane, 1-way sidepaths (35 mph)	10	8	5	55	5	8	5	101

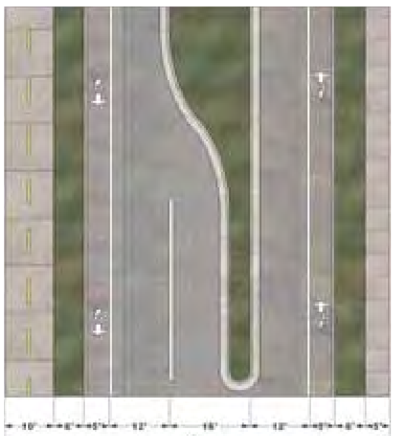


Figure 4.10. Two-lane divided section with sidepath

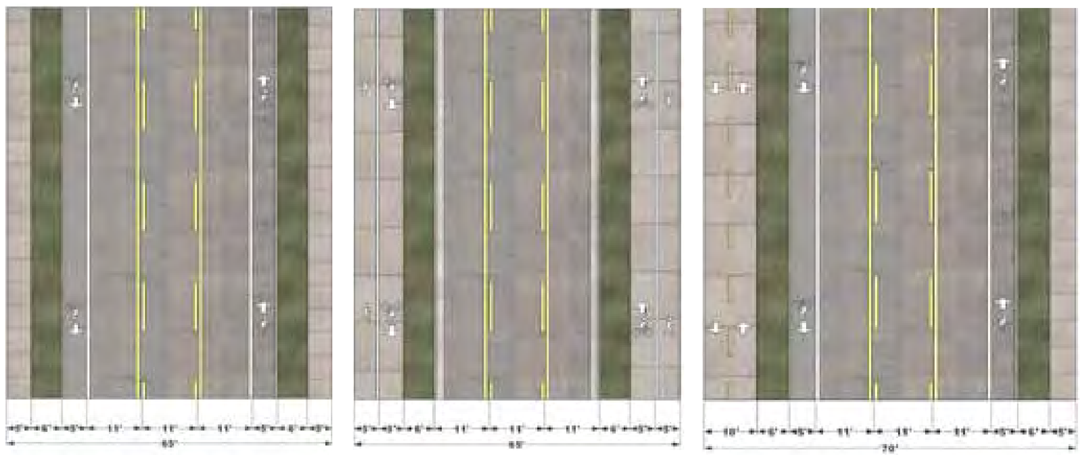


Figure 4.11. (right) Three-lane sections: From left, bike lanes; one-way sidepath without bike lanes; and two-way sidepath with bike lanes.

Figure 4.12: Four-lane divided section with sidepath

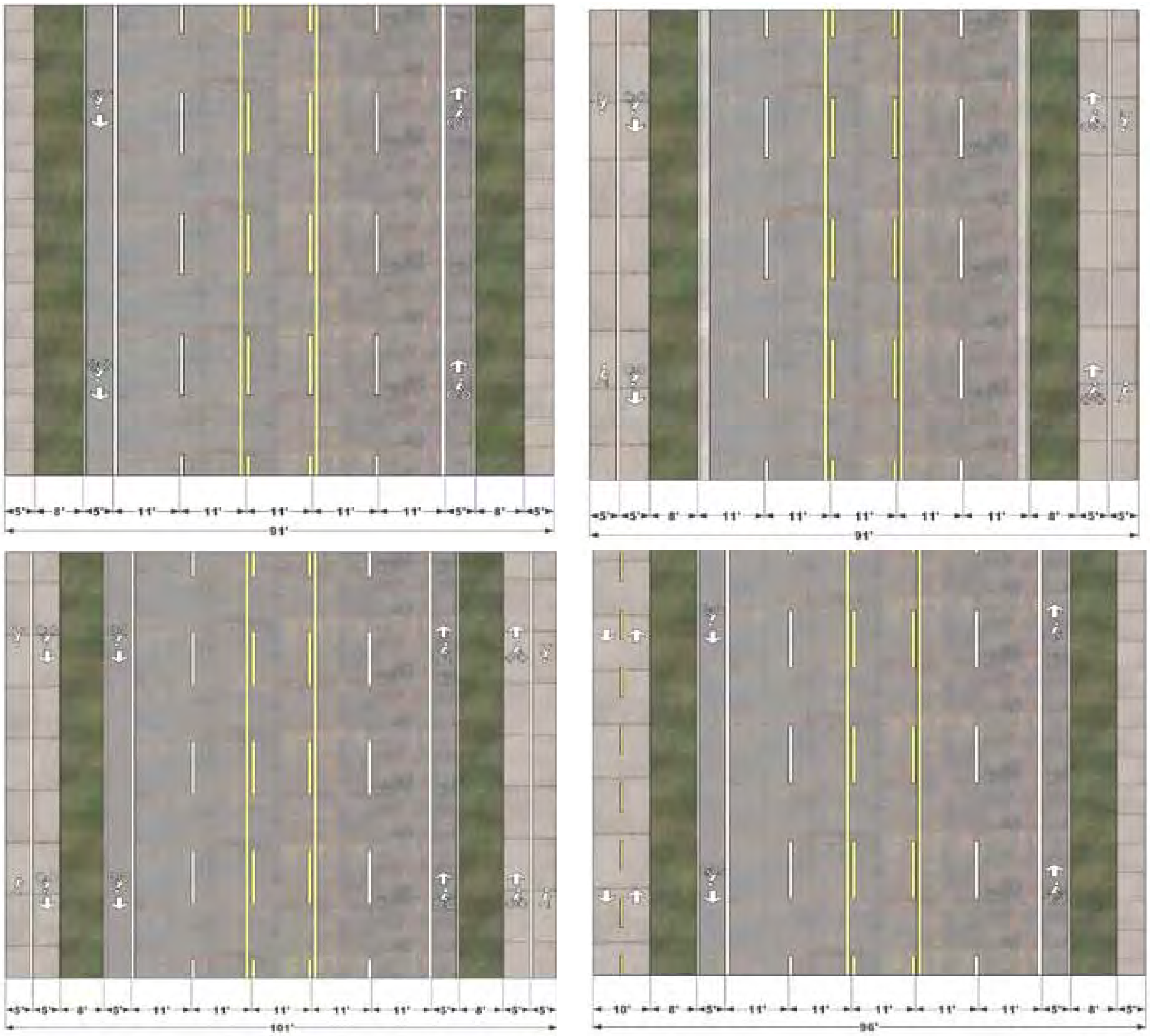


Figure 4.10. Five-lane sections: Far left from top: bike lanes; and one-way cycle tracks with bike lanes. Left from top: One-way sidepaths with bike lanes; two-way sidepath with bike lanes

Cycle Tracks/ Sidepaths

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

Objections to the use of cycle tracks or sidepaths (these terms will be used interchangeably here) in this country are based on conflicts with dominant motor vehicle traffic and include:

- Hazardous intersections. On two-way paths, motorists do not expect, and often do not see, bicyclists in the counterflow direction. Right-turning motorists in many cases ignore path users moving straight ahead, creating the possibility of a crash. This always places path users on the defensive.

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

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

As a result, experienced cyclists usually prefer on-road

Variations on the cycle track theme. Top left: Separated paths along the Topeka Boulevard bridge were rated high as comfortable settings by survey participants. Top: An urban cycle path in Amsterdam. Above: A popular cycle path in New York's East Village, with parking buffering cyclists from moving motor vehicles.

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

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

Application to the Topeka System

- Conventional multi-use sidepaths, typically wide paths parallel to arterial streets, should in most cases complement rather than replace on-road facilities if on-road facilities are feasible. Their primary purpose in the Topeka system is to provide continuity where alternatives that meet the six performance requirements do not exist.
- Complete streets should include both on-street facilities and paths for pedestrians and bicyclists who are uncomfortable with riding even in protected, on-street bike lanes. Innovative concepts, like one-way cycle tracks on new or existing streets, can combine the safety benefits of off-road riding between intersections and vehicular cycling through intersections.
- The objective of sidepath design guidelines should be to make these facilities as safe as possible, specifically by addressing their greatest weakness: road and driveway intersections.
- Sidepaths are safest when driveway and cross-street interruptions are fewest. Therefore, they work best along arterial streets that have long stretches of relatively uninterrupted frontage, like parks, campuses, and cemeteries. Topeka has a number of such strategic opportunities, including features like Gage Park, Washburn University, the VA/KNI campuses, the McFarland Farms development, and Mount Hope Cemetery. When used along streets, access management becomes especially important,
- Contemporary cycle tracks, where an on-street path is provided along a curb and separated from moving traffic by buffering and parking, should be considered in downtown settings as an alternative to bike lanes.

Design Guidelines for Cycle Tracks/Sidepaths

Pathway Standards

Cycle tracks and sidepaths may be developed as two- or one-way facilities. Most US applications of off-road sidepaths are two-way facilities, adhering to a standard ten-foot width, typical of other multi-use trails. A one-way cycle track combined with a sidewalk should separate ter-

Figure 4.9. Sidepath (cycle track) sections. Sidepath width and construction standards are similar to those for multi-use trails. Top: Two-way sidepath along an arterial, a typical accommodation on contemporary streets. Above: One-way cycle track concept separates pedestrian from bicycle traffic. Bicycles move in the direction of traffic.

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

ritory allocated to bicyclists and pedestrians, and include directional markings for bicyclists. These territories can be defined by paint or changes in pavement color. Minimum width for a one-way cycle track is four feet (five feet recommended) with an adjacent pedestrian path of similar width. Structure and materials for sidepaths should follow standards for multi-use trails on separated right-of-way.

Pathway Setbacks

Research conducted for the Florida Department of Transportation indicates that, to maximize safety, separation of the sidepath from a roadway should increase as road speeds increase. The Florida data suggest that at lower adjacent road speeds, a smaller separation produces crash rates lower than those of the adjacent road, while that threshold is reached at greater separations for high speed facilities. AASHTO 2010 recommends a minimum separation of five feet without a physical barrier. Figure 4.10 displays a standard separation for sidepaths based on the Florida findings.

Access Management

Access management makes sidepaths safer. There is no one clear standard for frequency of access points. Reasonable guidance is provided by the Idaho Department of Transportation, recommending a maximum of eight crossings per mile, with a preferred maximum of five crossings per mile. This access management policy should apply to the primarily arterial streets proposed for these three corridors.

Figure 4.10. Separation for Roadside Paths

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

Sidepath Concepts and Adjacent Roadway Character

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

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

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

The previously discussed Harvard study on the Montreal system also suggests that sidepaths are safer than on-street operation between intersections, but more hazardous at street crossings. The one-way cycle track, in combination with bicycle lanes or shoulders on the adjacent road, addresses these issues. (Figure 4.11) Before reaching a major intersection, the cycle track is directed to and merges into the bicycle lane which, at major intersections, is located to the left of a right-turn only (RTO) lane. Inexperienced bicyclists have the option of becoming pedestrians and using the crosswalk. Thus, one-way sidepath concept combines the relative mid-block security of the sidepath to many users with the safer options of behaving like other vehicles or as pedestrians at street intersections.

The one-way sidepath should be considered:

- Along four-lane divided or five-lane corridors with local street accesses, including major upcoming Topeka projects such as 10th Avenue and South Wanamaker Road.
- When a sidepath is recommended but, for various reasons, access cannot be closely managed.

Design of In-line Crossings at Driveways and Streets

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

Ramp Design

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

Separation Distance

The separation of the trail crossing from the edge of the roadway is a troublesome issue. Some sidepath designs

Figure 4.11 One-Way Sidepath Concept. A system of paired one-way sidepaths can minimize some of the operating hazards of two-way paths in certain settings. The one-way sidepath concept can be used both on streets both without (top) and with bike lanes. Without bike lanes, the cycle track is the street's bicycle facility, but becomes a bike lane as it enters the intersections. If bike lanes are provided along the street, the cycle track merges into the bike lane. Left: Merger from street to one-way cycle track at Vassar Street cycle track on the MIT campus in Cambridge.

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

put users in serious jeopardy by placement that either provides poor visibility or inadequate reaction time. Based on specifications in Finland and the Netherlands, where sidepaths are prevalent, the Florida DOT's path intersection design manual proposes three discreet and mutually exclusive separation distance categories:

- 1-2 meters
- 5-10 meters
- more than 30 meters

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

Defining Crossings

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

Signage

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

Right-of-Way Assignment

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

Figure 4.11. Sidepath Separation from Roadway: Performance at Intersections

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

will often be forced to yield the right-of-way.

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

Intersection Geometrics

In addition to crossing visibility and access management techniques, the 2010 AASHTO draft advises the following design measures to address intersection and driveway crossing safety:

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

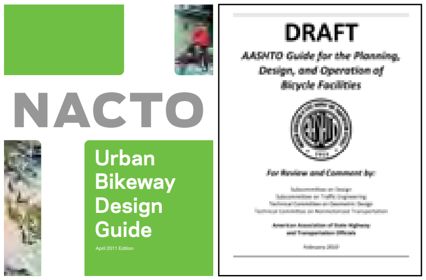
Crossing Definition. Sidepath/cycle track crossings should be defined for maximum visibility. Colored or textured surfaces can be effective in these situations. A clear stop bar should also be used with advisory signage, to discourage motorists from blocking the track.

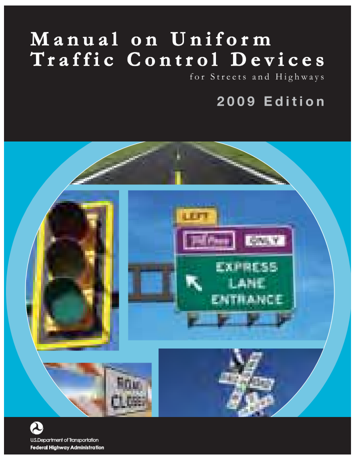
Sidepath Advisory Sign. Variation of the MUTCD's Railroad Advance Warning Sign, modified as a sidepath advisory. This sign should be used on both sides of a road with sidepaths. This installation is on Speer Boulevard in Denver, advising of the parallel Cherry Creek Trail. Florida DOT advises a similar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

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

Signal Cycles

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





Sources. Sources that establish detailed standards for the design of bicycle facilities include the recent Urban Bikeway Design Guide (National Association of City Transportation Officials, 2011), the Manual of Uniform Traffic Control Devices (Federal Highway Administration, 2009), and the draft AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities (American Association of State Highway and Transportation Officials, 2010). Designers of facilities should use these primary sources. The guidelines and standards included in this plan are intended to provide guidance that augments these authoritative standards to specific situations within a Topeka bikeways network.

On-Street Cycle Tracks

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

- Buffering from travel lanes, usually by parking and physical space defined by paint, bollards, or median. These cycle tracks invert the typical position of parking and bike lanes, and keep the motor vehicle domain contiguous.
- One-way operation. Some examples of two-way cycle tracks have been developed, often on the outside of major parks or open spaces. An example is the controversial but very effective cycle track along Prospect Park in Brooklyn. However, most facilities provide one-way operation for clarity, greater pedestrian safety, and reduction of conflicts.
- Special signalization. Many on-street cycle tracks provide special signal cycles for bicycles, to prevent turning cars from cutting off cyclists proceeding ahead on a green light.
- Very good visibility at intersections. Parking is stopped at sufficient distance from the intersection to provide good visibility.

Advantages of the on-street cycle track over bike lanes are elimination of conflicts between parked vehicles and cyclists, including door hazards and backing movements out of diagonal spaces. As such, on-street cycle tracks may substitute for a bike lane on a road dieted one-way street, be incorporated into a reconstruction of Kansas Avenue through the downtown center, or be used on the wide portion of 6th Avenue between Monroe and Topeka Boulevard. Figure 4.12 illustrates dimensional standards for such a facility.

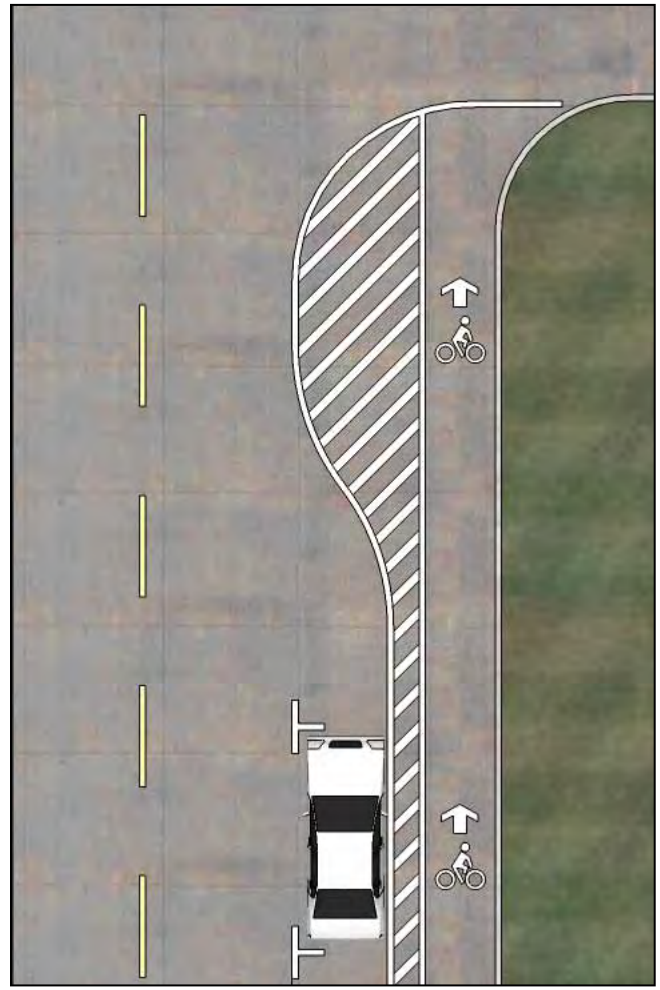


Figure 4.12. On-Street Cycle Track. This facility type inverts the usual location of parking and bicyclists, reducing conflicts between bicycle movements and adjacent parked cars.

On-Street Cycle Tracks. Clockwise from top left: Two-way cycle track along Prospect Park in Brooklyn; new facility in Cambridge; 2nd Avenue in Manhattan; 9th Avenue in Manhattan, the nation's first true cycle track project.

Multi-Use Trails

Multi-use trails are the foundation of Topeka's current bikeway system and the city is opening or building important new extensions in 2011. Trail-related projects include improvements to venerable assets like the Shunga Trail and development of new trails with demonstrable transportation benefits.

Trails with different functions. The Shunga Trail (left), linking many of the city's neighborhoods and parks with the central business district fills many purposes, including commuting. Trail investment policy should help it serve these multiple purposes more safely and enjoyably for all users by using current knowledge to improve design and provide separate facilities in congested areas for conflicting users like through cyclists and strolling pedestrians. The Lake Shawnee Trail (right) today is largely a recreational facility because it is disconnected from the rest of the system. However, a linkage to the Deer Creek Trail via Dornwood Park would increase its usefulness fro transportation.

The Topeka Bikeways system will make extensive use of multi-use trails on separated rights-of-way. The city's existing trails have important transportation functions, serving both commuters to the downtown area via the Shunga/Landon trail system, and recreational trips, most notably on the Shunga which connects major activity centers along Shunganunga Creek. Anticipated trail projects fit within three categories:

- Improvements to existing trails, most notably the Shunga Trail. This heavily-used trail has several problems that need attention, particularly in its older, central Topeka segments.
- New trail segments to connect on-street routes. These relatively short, strategic links tie the system together.
- Major new trails that will become major transportation corridors.

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

Design Guidelines for Multi-Use Trails

Standards for multi-use trail construction are established through past experience in the city, and contemporary practices are reflected in recent trail design, including the Shunga Trail extension, the Lake Shawnee Trail, and the Landon Trail. Many of these guidelines are included in this part of the bikeways plan, along with others that reflect contemporary practice.

Filling gaps. A trail along this short segment of a Shunga Creek tributary under I-470 links the Wood Valley neighborhood with the Randolph bikeway and the Shunga Trail system. This is an example of a small investment that can generate enormous benefits for a major part of town.

Figure 4.13. Attributes of Trail Surfaces

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

ADA/AASHTO Compliance

Trails should comply with American Association of Street and Highway Transportation Officials (AASHTO) standards and Uniform Federal Accessibility Standards and the "Americans with Disabilities Act Accessibility Guidelines." The new AASHTO manual is still in the review process and is scheduled for release in 2011.

Materials

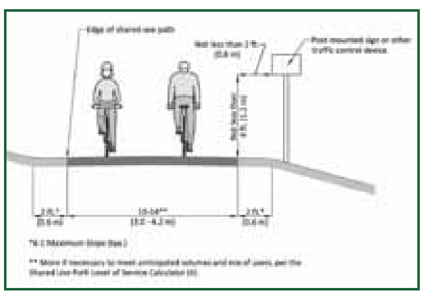
Figure 4.13 reviews attributes of various trail surface materials. The Shunga Trail is largely asphalt-surfaced, but recent projects have used concrete. Asphalt provides an excellent surface when new and is somewhat less expensive than concrete. Concrete provides a more durable, longer-lived surface, particularly in climates like Topeka's with freeze-thaw cycles, and can be replaced panel by panel if necessary. Without prescribing specific regional standards, AASHTO 2010 recommends a six inch minimum depth, including both surface and base courses, over a compacted subgrade. A stable sub-base is especially important to the durability of both materials. This is especially important around drainageways, where stream banks tend to slough off and produce serious cracking and deterioration. Expansion joints on concrete trails should be saw-cut to provide room for movement.

Trail Width and Clearances

- The accepted minimum width for two-way trails is 10 feet. Eight feet may be adequate for secondary segments in areas with severe right-of-way limits. However, eight feet width does not safely accommodate passing of or by users who require greater width

Concrete surfacing. The Shunga Trail extension to 29th Street illustrates Topeka's current paving standard.

Steep underpass on the Shunga. These tight, steep and sometimes slippery underpasses on the Shunga Trail pose problems for trail users. Retrofits may include an easing of the grade, lighting, and even mirrors to improve visibility around curves. Mirrors have been used on tight curves on Denver's Cherry Creek Trail.



Source: *AASHTO 2010*

than narrow profile road bicycles, including in-line skaters, bicyclists with child trailers, and recumbents.

- A two-foot minimum shoulder (3-5 feet is more desirable) with a maximum 6:1 cross-slope should be provided as a recovery zone adjacent to trails.
- Signs or other traffic control or information devices should be at least two feet from the edge of the trail surface. The bottom edge of any sign should be at least 4 feet from the grade of the trail surface.
- A soft surfaced two-foot extension to a paved trail can improve conditions for walkers and runners because of its resilience and lower impact.
- Minimum vertical clearance for trails is 8 feet; 10 feet is recommended unless clearance is limited. When conditions, like the height of a culvert or bottom of a bridge structure, further limits clearance, cyclists must be advised to walk bicycles.

Grades and Grade Changes

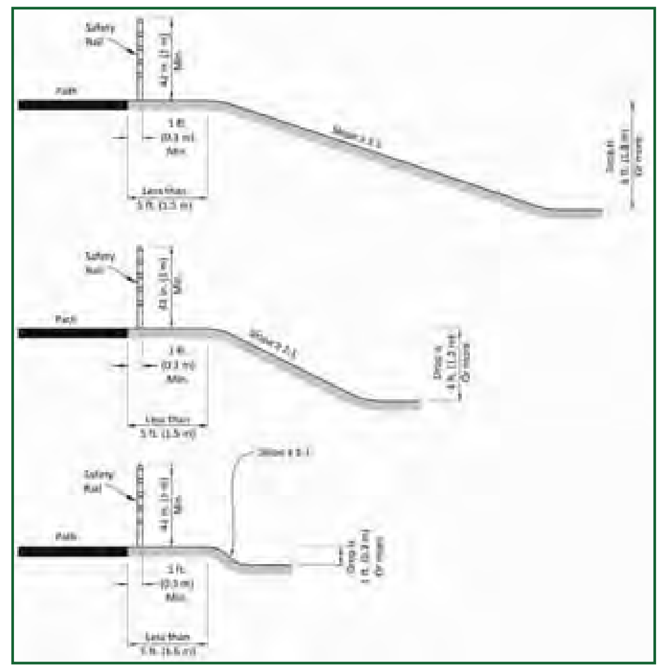
Most grades on Topeka's trail system are relatively easy, but there are some specific problem areas, most notably on some older underpasses on the Shunga Trail and at the south edge of the Lake Shawnee Trail. Recommended maximum grades for multi-use trails are 5% for any distance, 8.3% for distances up to 200 feet, and 10% for distances up to 30 feet (bicycles only).

- Grades over 5% must include landings and handrails compliant with the Americans with Disabilities Act.
- Ramps, bridges, and landings adjacent to abrupt grade changes must include 42-inch handrails, designed to meet AASHTO recommendations. Ramp surfaces should be slip-resistant.
- When underpasses require slopes over 5%, consider an alternate accessible route with reduced grades if possible, even if this route requires a grade crossing.
- Warning signs for trail users should be used on grades approaching 5% and greater.
- AASHTO 2010 recommends avoiding grades less than 0.5% because of ponding problems.

Subsurface and Drainage

- Typically 4 to 8-inch compacted, smooth, and level. Individual conditions may require special design.

Figure 4.14.
Railings and Trail Separations from Adjacent Slopes



Source: *AASHTO 2010*

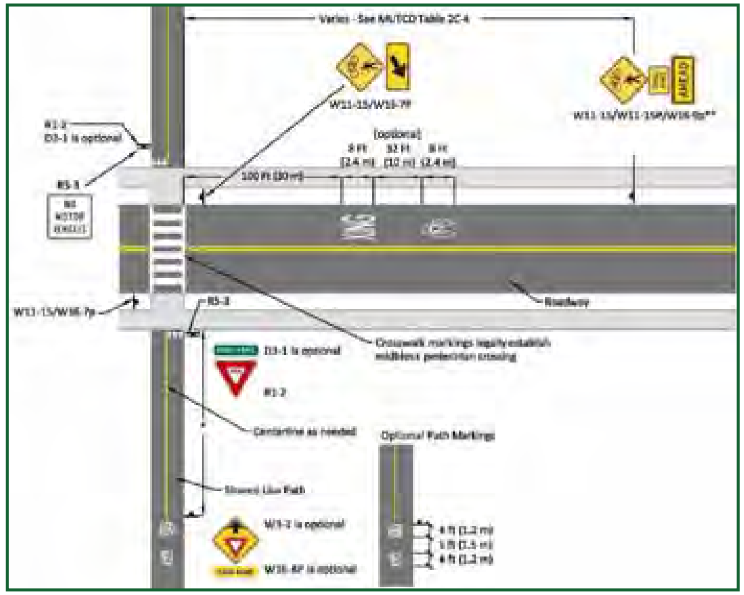
- Trail cross-section should provide adequate cross-drainage and minimize debris deposited by runoff. Typically, this involves a cross slope between 1% and 2%.
- When trails are adjacent to or cut into a bank, design should catch drainage on the uphill side of the trail to prevent slope erosion and deposits of mud or dirt across the trail.

Intersection Design

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

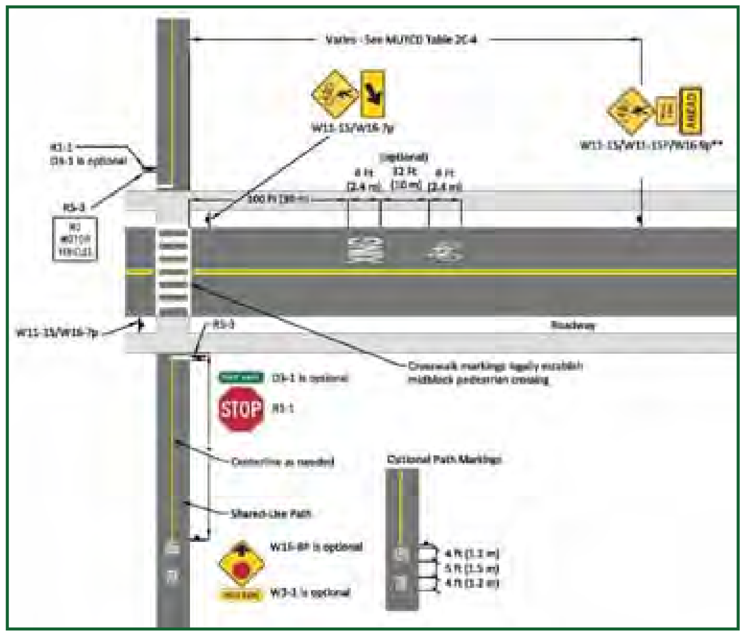
Crosswalk Delineation

- The crossing surface should clearly delineate the trail right-of-way.
- Trail crossings should be delineated with standard pavement markings, such as the “ladder” or “zebra” patterns. Another option is providing a contrasting surface that clearly defines the trail domain. These may include the use of stamped concrete, colored concrete, or pavement marking or patterning products such as StreetPrint or others.
- At midblock crossings of multi-lane roads, refuge medians should be used to reduce the distance that trail users must negotiate at one time.



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

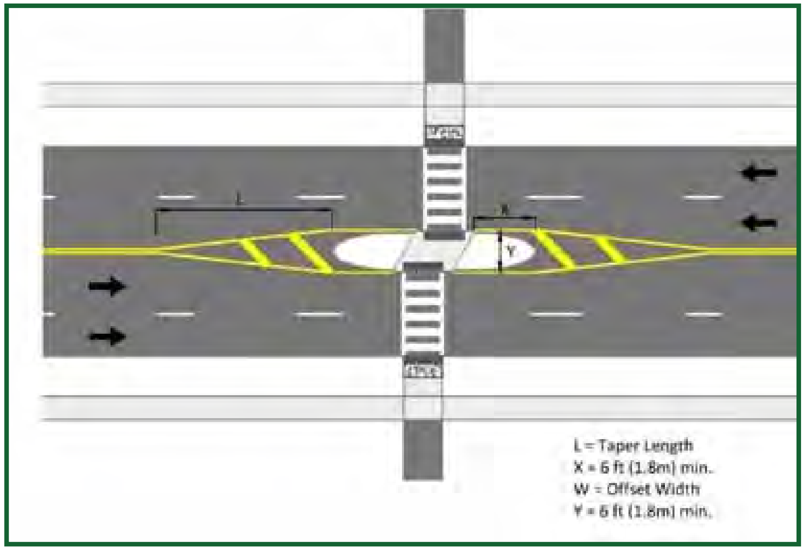
**W11 series sign is required, supplemental plaques are optional

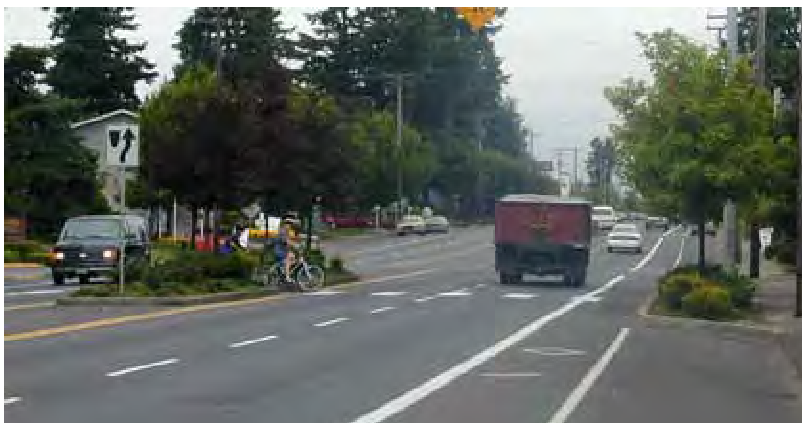


* Advance warning signs and solid centerline striping should be placed at the required stopping sight distance from the roadway edge but not less than 50 feet (15m).

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

Figure 4.15. Intersection Conditions for Midblock Trail/Road Intersections: Yield and Stop Controlled
Source: *AASHTO 2010*





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

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

Curb Cuts and Trail Access Points

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

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

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

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

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

Signage

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

- Standard trail crossings signs, typically a bicycle in a diamond, should always be used to alert motorists of the trail crossing. See Figure 7.3 for suggested sign placement.

Traffic Control

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

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

- New crossing technologies such as the hybrid beacon apply well to trail crossings. Topeka is installing such a hybrid signal at the 29th Street crossing of the Landon Trail. Assuming that the pilot installation is successful, this beacon should be used at other busy trail grade crossings.

Design for Maintenance

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

Information and Support Facilities

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

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

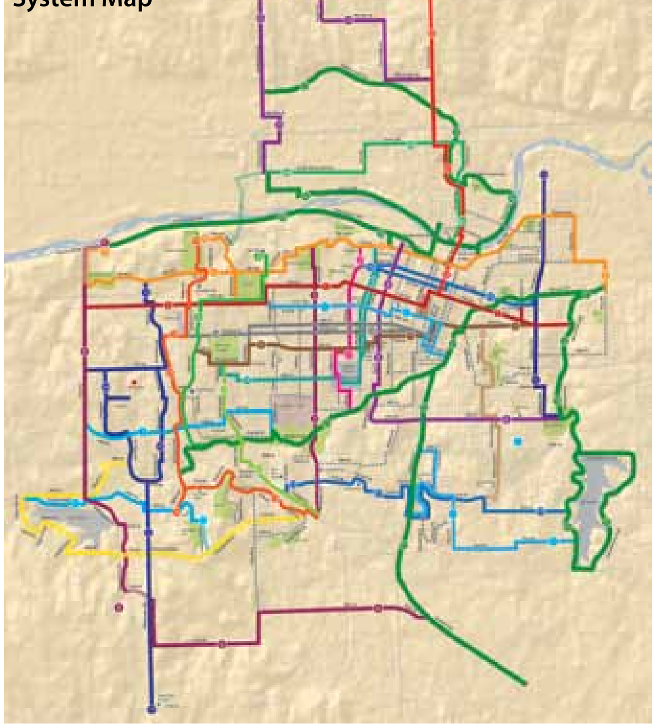
Hybrid Beacon. In 2011, Topeka installed its first hybrid beacon at the 29th Street crossing of the Landon Trail (above). The beacon functions somewhat like school bus warning signals. It is dark when not in use. When actuated by a pedestrian, a flashing and then solid yellow light warns motorists to slow; a solid red light paired with a walk signal stops traffic and gives the right-of-way to the pedestrian. Users report a high degree of motorist compliance and a positive effect on pedestrian safety.

Infrastructure Design Applied to the Network

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

Shared Streets	Complete Streets
Bicycle Boulevards	Sidepaths/ Cycle Tracks
Bike Lane Retrofit	Existing Multi-use Trails
Bike Lane Widening	Future Multi-use Trails
Hybrid Shared/Bike Lanes	Intersections

System Map



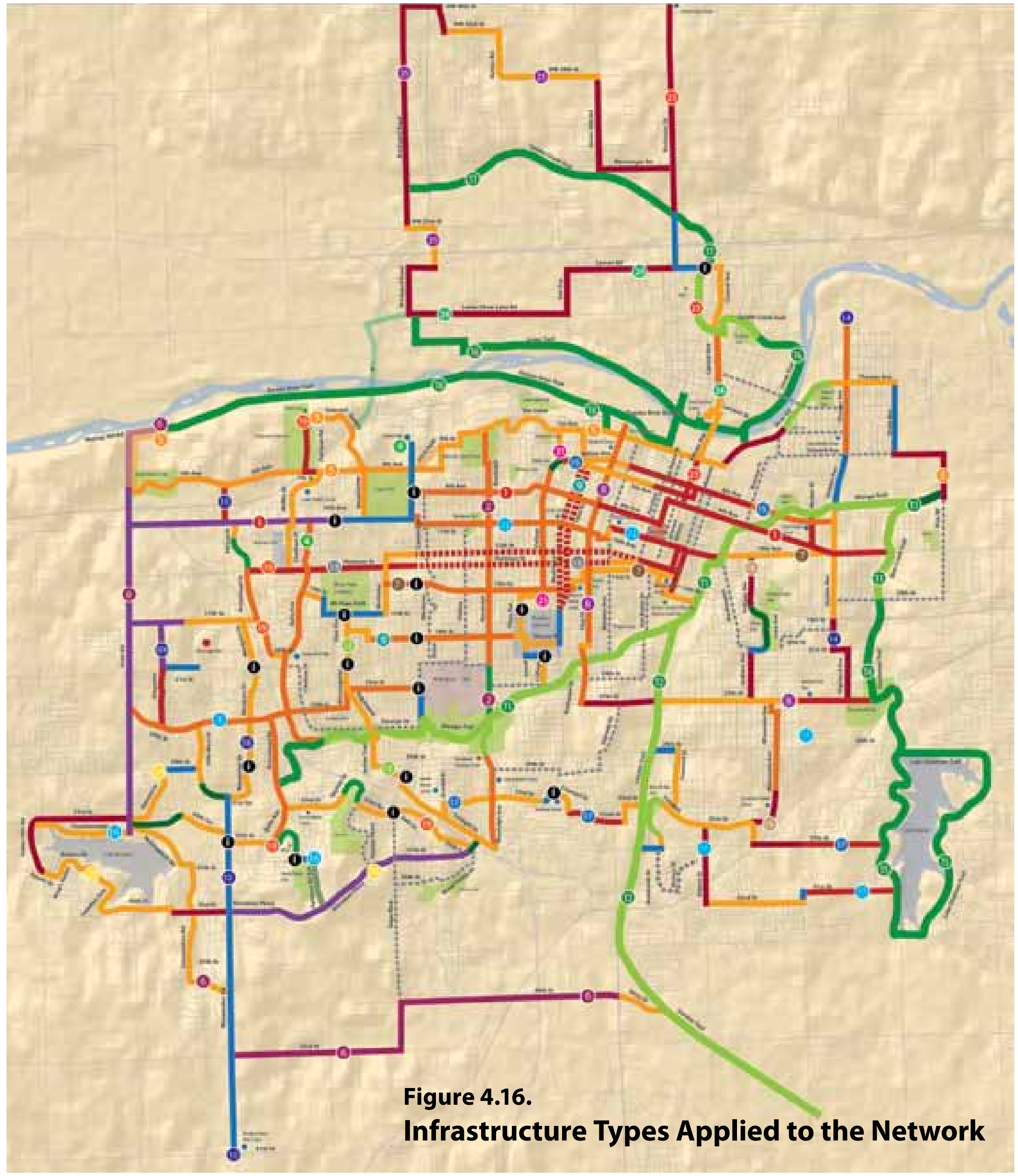


Figure 4.16.
Infrastructure Types Applied to the Network

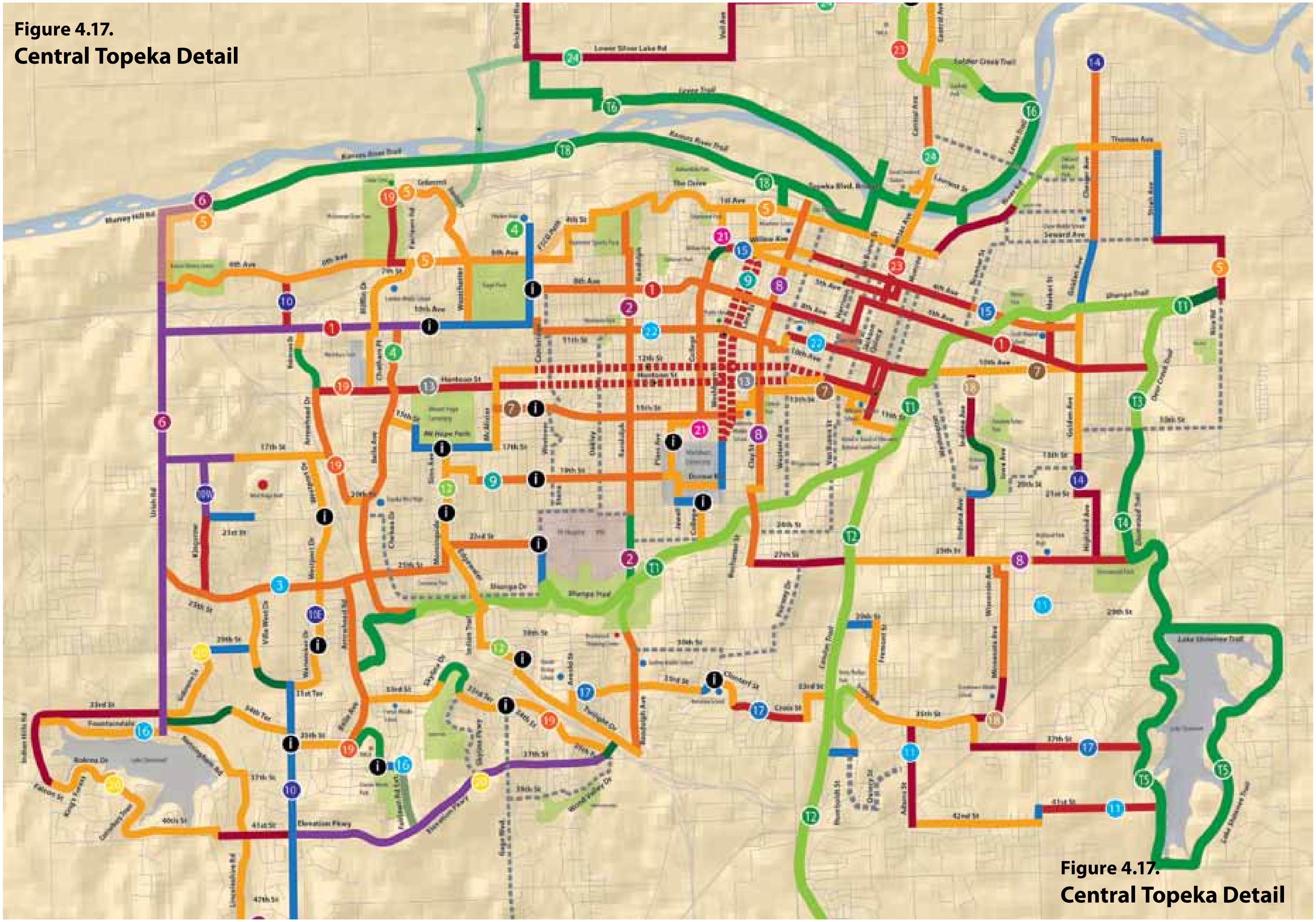


Figure 4.17.
Central Topeka Detail

Figure 4.17.
Central Topeka Detail

CHAPTER 5 ROUTE DETAILS AND IMPLEMENTATION

This chapter considers each of the twenty-five potential routes in the proposed Topeka bikeways system in detail. It provides guidance on the specific design of each significant segment of each route. Finally, it presents methods for staging the system over time.

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

The tables display:

- **The endpoints and length of each segment.**

- **The nature of the existing facility.** Street types reflect the typology discussed in Chapter One. Information also includes number of lanes and width of the street channel, using city records and plat maps, aerial photography, and field measurements.

- **The average daily traffic (ADT) on that specific segment.** In most cases, traffic volumes are from counts taken in 2011 and released during October of that year. Data marked by an asterisk (*) are older counts from 2007.

- **Short-term options for bikeway development.** This presents relatively low-cost ideas for adapting a segment for safer and more comfortable bicycle use, in many cases using techniques such as sharrows that raise motorists' awareness of and a greater level of security for cyclists. Short-term options also include other pavement markings such as bike lanes and striped parking lanes, and in some cases minor capital projects that fill short but important gaps or take advantage of opportunities such as planned street reconstruction projects. In many cases, the short-term option is the final state of the facility; in others, it is a useful interim measure that provides real benefits to riders.

- **Ultimate design.** This describes the best final design configuration for the segment. The ultimate design sometimes includes significant lane reconfigurations, alterations in parking patterns, or substantial capital improvements such as widening a street to include paved shoulders. However, in many cases, the ultimate design is simply a refinement or expansion of a short-term option, made more feasible as urban bicycling in Topeka becomes more established and the demand for upgraded facilities increases.

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

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

- Criteria for determining priorities.

- Evaluation of segments and routes of the proposed bikeways system based on their relative ease of development.

- An implementation sequence of the system, assuming full development in 20 to 25 years, with five phases.

- A pilot bikeway program, the serves all parts of the city with strategic routes and path segments. This program includes statements of probable cost, based on current (late 2011) construction costs.

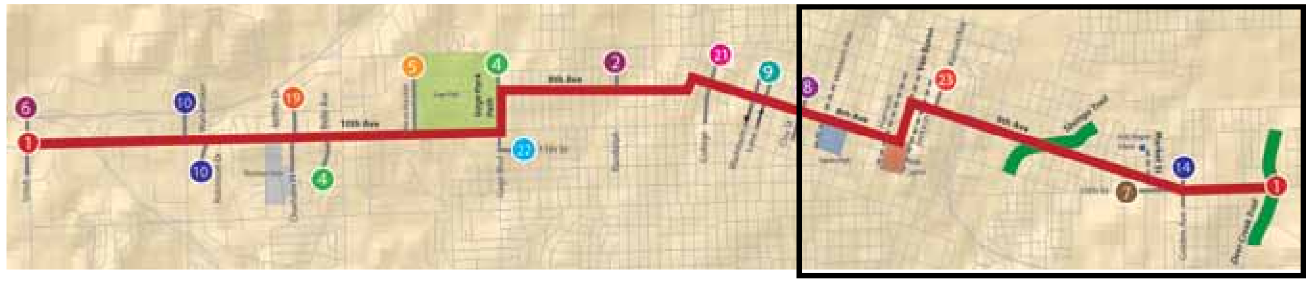
Short-term options and ultimate design (8th Avenue on Route 1, the East-West Bikeway). (1) Existing view of 8th Avenue. (2) A short-term option for 8th Avenue, with a 31-foot street width, provides sharrows and bicycle boulevard identification through special signs. (3) An eventual low-capital option consolidates parking on one side. An ultimate design, more feasible when bicycle use of the corridor becomes more established, may be a minor widening to provide bike lanes. This would establish 8th Avenue as a primary bicycle transportation corridor.

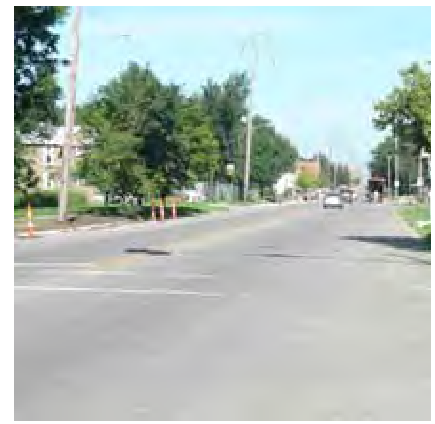
Lane modification options (8th Avenue on Route 1, the East-West Bikeway). (1) Existing view of 8th Avenue, a narrow four-lane section permitting on-street parking during off-peak hours. (2) A lane reduction to two travel lanes provides bike lanes and retains parking on one side on an all-day basis. (3) A lane reduction to a three lane section removes parking and provides bike lanes with a center left-turn lane. Reconfiguration options are based on establishing 6th, 10th, and the 12th/Huntoon pair as the primary east-west routes for motorists, while emphasizing bicycle transportation on 8th.

1 East-West Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	6th Avenue, Deer Creek to Golden	.47	5-lane urban arterial; 62 feet	5,135	Lane modification to 11-foot travel lanes, 10-foot center lane, 4 foot bike lane/shoulders; or Sidewalk modification to one-way sidepaths; or lane modification to 11-foot basic travel lanes with wider outside lanes and sharrows	Same
2	6th Avenue, Golden to Lamar	.42	2-lane transit avenue; 39 feet	5,885	Lane modification with seven foot parking lane on one side, two 11-foot travel lanes, two 5-foot bike lanes	Same
3	6th Avenue, Lamar to Shunga Creek	.60	2-lane transit avenue; 50 feet	7,175	Lane modification: eight parking lanes on both sides, two 12-foot travel lanes, two 5-foot bike lanes. Connection to Shunga Trail extension	Same
4	6th Avenue, Shunga Creek to Adams	.24	4-lane urban arterial including railroad viaduct; 54-60 feet	8,630	Lane modification: 4-11 foot travel lanes, with 5-foot minimum bike lanes. No parking	Same; consider buffered bike lanes where width is adequate
5	6th Avenue, Adams to Monroe	.22	4-lane downtown avenue; 66 feet, including I-70 overpass	8,630	Five 11-foot travel lanes with two 5-foot bike lanes with no parking; or four 12-foot travel lanes with bike lanes and one-sided parking	Same
6	6th Avenue, Monroe to Van Buren	.32	5-lane, App 90 feet, with diagonal parking on one or both sides	12,000	Lane modification: 10-foot left-turn lane, 10.5 foot travel lanes, 2- 5 foot bike lanes, reversal of diagonal parking to back-in	Same; reconsider need for diagonal parking on both sides.

1 East-West Bikeway





Primary Route 8

Connecting Routes

Other System Links

Connecting Trails

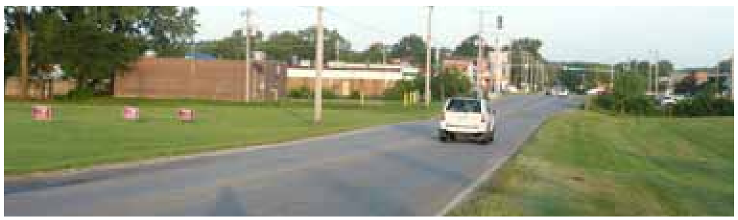
Segment Keys

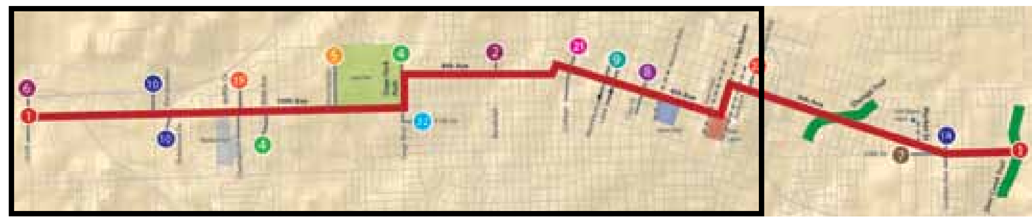
1 East-West Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
8	8th Avenue, Van Buren to Tyler	.24	4-lane downtown avenue with 14 foot median, some diagonal parking; 60 feet	NA	Lane modification to 10.5 foot travel lanes, and 4-foot bike lanes or lane modification to 10.5 foot inner, wide outer travel lane with sharrows. Convert diagonal parking to back-in;	Consider lane diet to three lanes with standard bike lanes.
9	8th Avenue, Tyler to Clay	.40	2-lane urban collector; 31-feet	6,000*	Lane modification with two 11 foot travel lanes with two 5-foot bike lanes; parking on one side,	Same
10	8th Avenue, Clay to Lincoln	.15	4-lane civic avenue with landscaped median; 24 feet on either directional channel.	6,000*	Lane modification: two lane divided with 7.5 foot parking lane, 5 foot bike lanes, and 11 foot travel lane on either side of median	Same
11	8th Avenue, Lincoln to Summit, Summit to Gage	1.85	2 lane neighborhood collector; 31 foot	2,250	First stage bicycle boulevard, with sharrows and identification	Enhancement withone-sided parking in striped parking lane. A more aggressive but better facility is a minor widening to bikeway standards to a 40 feet section with one-sided, 8-foot parking lane, 5 foot bike lanes, 11 foot travel lanes
12	Gage Street Intersec-tion		Crossing of 4-lane arterial	19,460 on Gage	Defined crossing with warning signage	Intersection project to realign southbound lanes and provide center crossing median. Precludes southbound to eastbound left turns
13	Gage Park	.78	NA	NA	10- foot pathway on park perimeter, paralleling Gage and 10th	Same
14	10th Street, Gage Park to Fairlawn	.46	2-lane urban arterial; 25 feet	10,980	Short-term project to widen 10th to Fairlawn elevated priority of project. Two-way cycle track on north side to near Prairie with hybrid protected crossing. Bike lanes or 1-way cycle tracks to and through the Fairlawn intersection to Belle.	Same as part of complete street improvement of 10th Street.

1 East-West Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	ADT (2007)	Short Term Options	Ultimate Design
15	10th, Fairlawn to Urish	2	2-lane urban arterial; 29-feet	8,000	None. Route continues south on Belle Avenue bicycle boulevard.	Reconstruction of 10th to complete street standards, with bike lanes. If rural section continues west of Wanamaker, addition of shoulders for bicycle accommodation and road section improvement.





Primary Route 1

Other System Links

Segment Keys

Connecting Routes

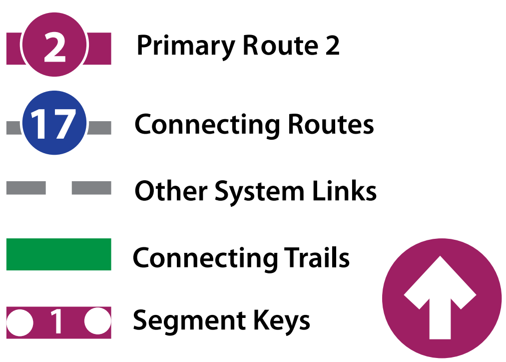
Connecting Trails

2 Randolph Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	Randolph, 37th to 33rd	.58	2-lane neighborhood collector; 27 feet	1,295	First stage bicycle boulevard with sharrows and identification.	Same, with one-sided parking in striped parking lane.
2	Randolph, 33rd to 30th	.29	2-lane neighborhood collector; 41 feet	2,370	Bicycle boulevard with sharrows, identifcation, and striped parking lanes.	Enhanced bicycle boulevard with one-sided parking and bike lanes.
3	Randolph, 30th to 29th	.15	2-lane neighborhood collector; 27 feet	2,370	First stage bicycle boulevard with sharrows and identification.	Same, with one-sided parking in striped parking lane.
4	Brookwood Spur, Randolph to Brookwood Shopping Center	.1	4-lane, 54-60 feet (29th Street)	NA	Existing sidewalks from Randolph Ave	Sidepath on south side of 29th Street, or trail across creek on alignment of shopping center drive aisle.
5	Shunga Trail Spur, 29th Street to Shunga Trail	.05	10-foot trail on exclusive ROW, including underpass at 29th	NA	Same as existing	Same
6	Trail Extension, Shunga Trail to SW Randolph at TARC	.50	NA	NA	10-foot multi-use trail	Same
7	Randolph, TARC to 21st Street	.53	2-lane neighborhood collector; 27 feet	2,580	First stage bicycle boulevard with sharrows and identification.	Addition of 10-foot multi-use trail on west side of street, to provide trail continuity from Shunga Trail to 21st.
8	Randolph, 21st to 15th	.70	2-lane neighborhood collector; 31 feet	NA	First stage bicycle boulevard with sharrows and identification.	Enhanced bicycle boulevard with one-sided parking in striped lane and traffic calming techniques.
9	Randolph, 15th to 6th	1.30	2-lane neighborhood collector; 27 feet	NA	First stage bicycle boulevard with sharrows and identification.	Enhanced bicycle boulevard with one-sided parking in striped lane and traffic calming techniques.

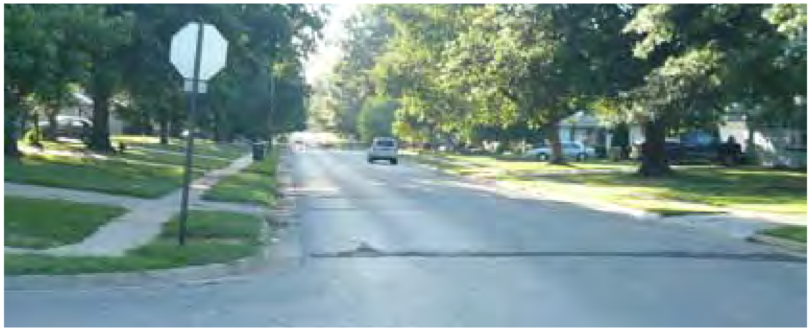
2 Randolph Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
10	6th Street Intersection at Randolph/Tuffy Kellogg		Intersection with 5-lane urban arterial	15,400 on 6th	Warning signs with defined crosswalks.	Signalization
11	Tuffy Kellogg Drive, 6th Street to Outer Circle Drive	.36	2-lane local access; 32 feet	NA	Sharrows on existing road.	10-foot multi-use path between road and parking lot of Hummer Sports Center.



3 25th Street Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	Felker Park/VA, Shunga Trail to 23rd Street	.46	Park and Hospital Campus parallel to Gage Blvd.	NA	Two-way path parallel to east side of Gage Boulevard	Same
2	Gage Boulevard Crossing			20,340 on Gage	Warning signs and defined crosswalks at 23rd and Gage	Defined crossing with hybrid beacons and refuge median to Seabrook Park, minimum of 100 feet south of 25th.
3	23rd Street, Gage to Morningside Drive	.75	2-lane local; 27-32 feet	NA	First stage bicycle boulevard, with sharrows and identification	Same
4	Morningside Drive, 23rd to 25th	.20	2-lane local; 27 feet	NA	First stage bicycle boulevard, with sharrows and identification	Same
5	25th Street, Morningside to Westport	1.04	2-lane neighborhood collector; 27 feet	3,910; 6,255 w. of Belle	First stage bicycle boulevard, with sharrows and identification	Enhanced bicycle boulevard, adding traffic calming techniques
6	25th Street, Westport to Urish	1.36	2-lane neighborhood collector; 31-32 feet	2,480-3,950	First stage bicycle boulevard, with sharrows and identification	Enhanced bicycle boulevard, adding one-sided parking in striped parking lane, traffic calming techniques



3 25th Street Bikeway

2 Primary Route 2

17 Connecting Routes

Other System Links

Connecting Trails

1 Segment Keys

4 Belle Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	28th Street/Belle Avenue, Shunga Trail to 21st Street	1.41	2-lane neighborhood collector; 27 feet	3,175	First stage bicycle boulevard with sharrows and identification.	Enhanced bicycle boulevard adding traffic calming techniques.
2	21st Street intersection		3-lane, 36 feet with left turn pocket	2,855	Sharrows in direct Belle Avenue lane.	Minor widening to provide bicycle lanes for north-south traffic.
3	Belle Avenue, 21st to 17th Street	.58	2-lane neighborhood collector; 32 feet	2,855	First stage bicycle boulevard, with sharrows and identification.	Enhanced bicycle boulevard, adding one-sided parking in a striped parking lane and traffic calming techniques.
4	Belle Avenue, 17th to Huntoon Street	.52	2-lane neighborhood collector; 27 feet	2,205	First stage bicycle boulevard, with sharrows and identification.	Enhanced bicycle boulevard adding traffic calming techniques.
5	Huntoon Street intersection at Belle Avenue offset	.03	Intersection with 5-lane urban arterial; 60 feet	12,000 on Huntoon	Defined bicycle track through offset with sharrows in curb lane.	Cycle tracks for non-signalized intersections using cycle tracks (see page ___).
6	Belle Avenue, Huntoon to 10th Avenue	.53	2-lane neighborhood collector; 29 feet	NA	First stage bicycle boulevard, with sharrows and identification.	Enhanced bicycle boulevard adding traffic calming techniques.
7	10th Avenue, Belle to Prairie Road	.34	2-lane, 27 feet, widened to 44 feet at Fairlawn with turn lanes	8,725-10,980	Two-way cycle track on north side to near Prairie with hybrid protected crossing. Bike lanes or 1-way cycle tracks to and through the Fairlawn intersection to Belle.	Same with complete street improvement of 10th Avenue.
8	10th Avenue, Prairie Road intersection		2-lane, 29 feet	10,980	Striped cycle track crossing to north side of 10th Street	Complete street conversion of 10th Avenue with bicycle lanes
9	Mt. Calvary Cemetery/ Gage Park, Prairie to 6th		NA	NA	10- foot pathway on park perimeter, paralleling Gage and 10th, shared with Route 1	Same; monitoring of use for separate pedestrian/bicycle tracks

4 Belle Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
10	Gage Boulevard, 6th Avenue intersection		5-lane multi-use arterial; 60 feet with left turn pocket	19,460 on Gage s. of 6th; 5,850 on 6th	Defined sidepath crossing on west side of Gage Boulevard	Same
11	Gage Boulevard, 6th Avenue to Hayden High	.22	5-lane multi-use arterial; 60 feet	14,680	Sidepath on west side to Hayden High entrance. Other options include connection through Gage Ct., or easement through Chalet Apartments	Same

5 Oakland-Potwin Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	Rice Road, Shunga Creek to Seward Ave	.40	2-lane rural collector; 25 feet	575*	Sharrows	Connection to Shunga Trail extension on north creek levee from Golden to Rice; bicycle shoulders with trail extension.
2	Seward Ave, Rice Rd. to Strait Avenue	.50	2-lane, rural collector; 25 feet	4,110	Sharrows	Bicycle shoulders or 2-way cycle track on north side of street
3	Strait Avenue, Seward to Thomas Avenue	.75	2-lane neighborhood collector; 25 feet	2,130	Sharrows	10-foot, 2-way cycle track on west edge of Billard Airport
4	Thomas Avenue, Strait to Oakland Park	.63	2-lane continuous local; 27feet	NA	Sharrows	Same
5	Oakland Park Trail, Poplar Street to River Road	.57	Existing trail	NA	Existing trail	Same
6	River Road/Adams Street, Oakland Park to 1st Avenue	1	2-lane collector; 25 feet; 50 feet on Adams Street segment	4,960	Sharrows	Paved shoulders to improve street section and accommodate bicycles safely; bike lanes on Adams Street segment. Future connection to north Levee Trail by reuse of former railroad bridge of River Road.
7	1st Avenue, Adams to Kansas Avenue	.32	4-lane downtown avenue; dual street channel with 94-foot total width; 37 foot median with disused rail	1,470	Single directional bicycle lanes on both channels	Same, with promenade in current median as part of a riverfront development program. With promenade development, bike lanes may be shifted to the left side of each channel, adjacent to the median. Final configuration partially dependent on design of Polk-Quincy viaduct.
8	1st Avenue, Kansas Avenue to Taylor	.57	2-lane neighborhood collector; 32 feet	2,835	First stage bicycle boulevard with sharrows and identification.	Same; a path connecting Kansas and Taylor must be integrated into final design of the Polk-Quincy viaduct project
9	1st Avenue, Taylor to Quinton	.41	2-lane neighborhood collector; 26 feet	980	First stage bicycle boulevard with sharrows and identification.	Same

5 Oakland-Potwin Bikeway

2 Primary Route 2

9 Connecting Routes

Other System Links

Connecting Trails

1 Segment Keys

5 Oakland-Potwin Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
10	1st Avenue, Quinton to The Drive	.62	2-lane neighborhood collector; 31 feet	980	First stage bicycle boulevard with sharrows and identification.	Same
11	The Drive/1st Avenue, 1st Avenue to MacVicar	.54	2-lane neighborhood collector; 27 feet	1,485 on 1st e. of MacVicar	Sharrows	Same
12	MacVicar, 1st Avenue to East Circle Drive	.1	2-lane urban arterial; 32 feet	12,205	Reconfiguration with icycle lanes with no parking; otherwise two-way cycle track on west (campus) side	Same
13	East Circle and Center Building Drive, MacVicar to Oakley	.58	2-lane local circulation road; 25 feet	NA	Sharrows on East Circle and Center Building Drive through Hummer Sports Center; paths around ballfields to Oakley	Addition of paths along and connecting East and West Circle Drives to Oakley
14	Oakley Avenue, West Drive to 4th Street	.13	2-lane continuous local; 32 feet	NA	Sharrows	Same
15	4th Street, Oakley to Frazier Avenue	.21	2-lane local; 27 feet	NA	Sharrows	Same
16	Frazier Avenue, 4th to 6th Street	.22	2-lane local; 27 feet	NA	Sharrows	Path along ponds through Family Services campus and along 6th Street frontage of cemetery to 6th and Gage.
17	6th Street, Frazier to Gage Blvd.	.28	5-lane; 60 feet	15,005	Two-way cycle track segment on north side	Same; long-term path in segment 16 satisfies same function.
18	6th Street, Gage to Westchester	.53	2-lane urban arterial; 25 feet	5,850	Two-way cycle track on north side of Gage Park as part of circumferential path	Future complete street conversion of 6th Street with bicycle lanes

5 Oakland-Potwin Bikeway

Primary Route 2

Connecting Routes

Other System Links

Connecting Trails

Segment Keys

5 Oakland-Potwin Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
19	6th Street, Westchester to Fairlawn	.46	2-lane urban arterial; 25 to 29 feet	4,060	Continuation west on existing street is only suitable for experienced cyclists with Share the Road signage. Short-term bikeway route uses Westchester and Cedar Crest branches	Complete street conversion with bicycle lanes
20	Westchester Branch: Westchester, 6th to 10th Avenue	.50	2-lane; 27 feet	440	Sharrows, connecting to Bikeway Route 4 at 10th Avenue	Same
21	Cedar Crest Branch: Westchester/Danbury/ Cedar Crest	.58	2-lane, 27 feet	NA	Defined crossing of 6th Avenue with caution signs; sharrows	Same
22	6th Street, Fairlawn to Wanamaker	1.01	2-lane, 25-29 feet	NA	Share the Road signage without biukeway designation	Complete street conversion with bicycle lanes
23	6th Street Wanamaker to Kansas History Center	.82	3-lane, 40 feet to Alfrey Road; 2-lane, 25 feet to History Center parking lot	NA	Sharrows	Widening with bicycle lanes
24	Kansas History Center to Urish	.30	NA	NA	Existing unpaved service road or existing paths	10-foot path to Urish Road gate, connecting to Route 6. Possible future segment to north with ultimate development of trail on south side of Kansas River (T8)

5 Oakland-Potwin Bikeway

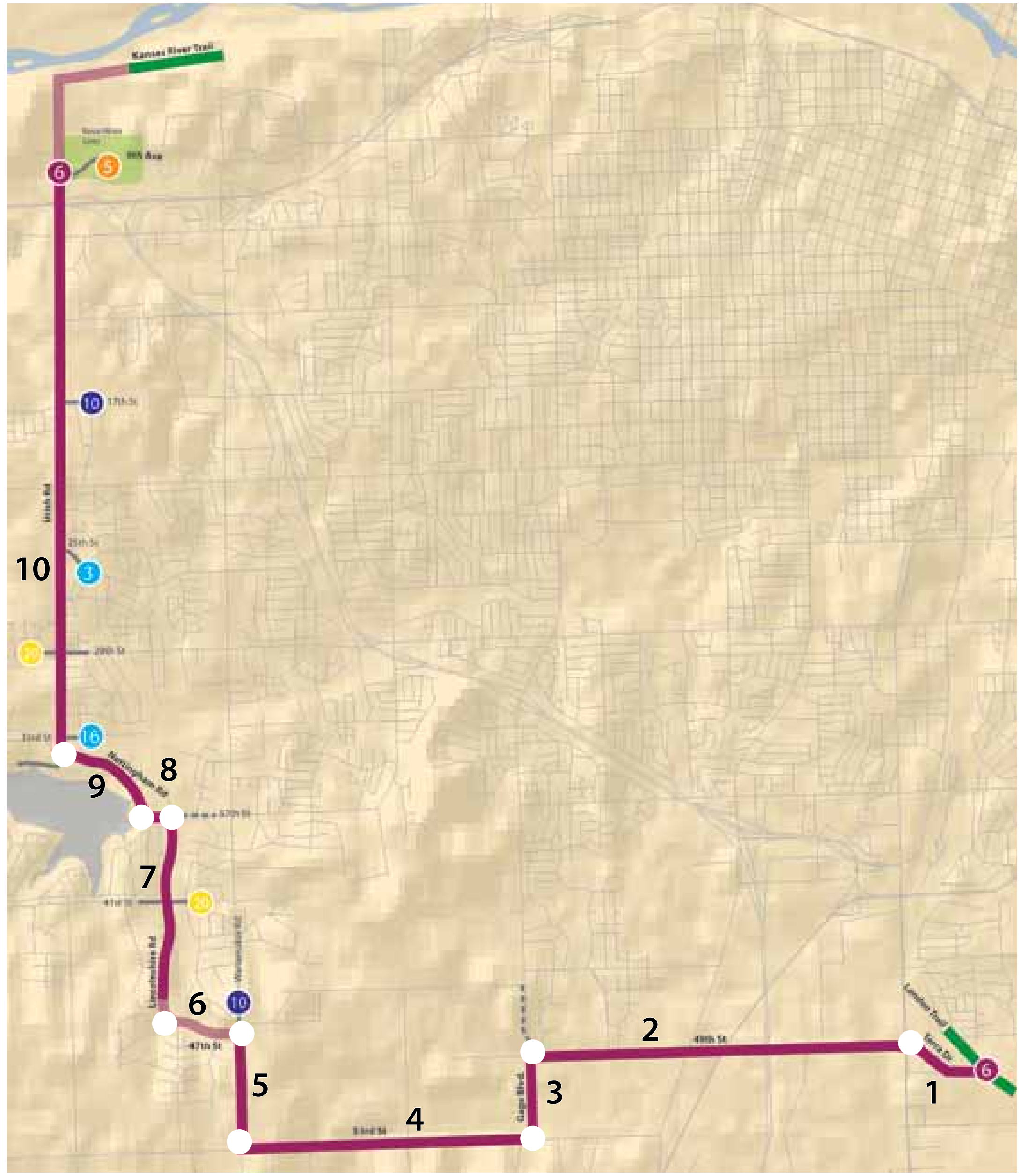
Median promenade and bike lanes, Commonwealth Avenue in Boston

Riverfront bikeway opportunities. Top: Disused railroad in the 1st Avenue median could become a promenade as a catalyst for surrounding development. Bike lanes would flank the center greensward. Above right: The unused railroad bridge and River Road. Right: Approach path from River Road to the bridge level. The bridge could eventually connect with a Levee Trail on the north side of the Kansas River, and provide a safer substitute for the Kansas/ Quincy Bridge.

6 Southwest Loop Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	Terra Drive, Landon Trail to Topeka Blvd. via frontage road	.46	2-lane local; 25 feet	NA	Sharrows with connection to Landon Trail	Same
2	49th Street, Topeka Blvd. to Gage Blvd.	2.27	2-lane unpaved future arterial; 25 feet	NA	None	Bicycle lanes or shoulders with eventual paving of street.
3	Gage Blvd, 49th to 53rd	.50	2-lane rural arterial; 25 feet travel surface with shoulders	1,800	Share the road signage	Bicycle lanes or shoulders
4	53rd Street, Gage Blvd. to Wanamaker Road	1.76	2-lane rural arterial; 27 feet	2,110	Share the Road signage without bikeway designation	Bicycle lanes or shoulders if rural section remains
5	Wanamaker Road, 53rd to 47th Street (future)	.74	3 to 5-lane arterial on city edge; 38-60 feet	7,195 at 41st St.	Share the Road signage without bikeway designation	Sidepath
6	47th Street (future), Wanamaker to Lincolnshire	.60	2-lane future neighborhood collector	NA	Continue route along Wanamaker to 41st, and along 41st to Lincolnshire	Sharrows or bike lanes on 47th
7	Lincolnshire, 47th to 37th; street is currently developed to about 46th.	1.16	2-lane continuous local; 27 feet	NA	Sharrows north of 41st	Sharrows
8	37th, Lincolnshire to Nottingham	.12	2-lane, rural section neighborhood collector; 27 feet	NA	Share the road signage between Wanamaker and Nottingham	Minor widening to add shoulders to accommodate bicycles and motorist safety
9	Nottingham, 37th to Urish Road	.70	2-lane neighborhood collector; 27 feet	5,550	Sharrows	Minor widening to add shoulders to accommodate bicycles and motorist safety
10	Urish Road, Nottingham to 6th Street	3.42	2-lane, 27 feet, with roundabouts at some intersections	7,680-10,465	None	Improvement to complete street standards, with bicycle lanes included in widening.

6 Southwest Loop Bikeway

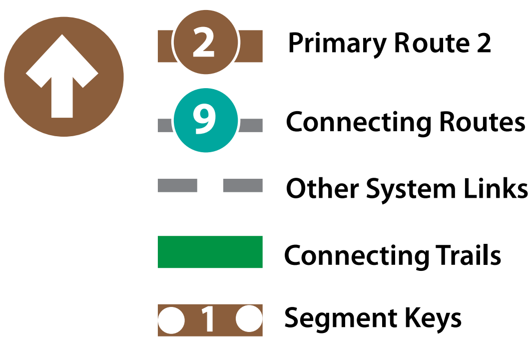


- Primary Route 2
- Connecting Routes
- Other System Links
- Connecting Trails
- Segment Keys

7 15th Street Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	6th Avenue, Deer Creek to 10th Street divergence	.62	5-lane urban arterial; 62 feet	5,135-8,830	Lane modification to 11-foot travel lanes, 10-foot center lane, 4 foot bike lane/shoulders; or Sidewalk modification to one-way sidepaths; or lane modification to 11-foot basic travel lanes with wider outside lanes and sharrows.	Same
2	10th Street, 6th Avenue to Shunga Trail Bridge	1.09	2-lane neighborhood collector; 31 feet	3,570	Striped parking lane on single parking side, sharrows	Same
3	10th Street Bridge over Shunga Creek	.1	5-lane, 70 feet	3,570	New bridge in design. Two-way cycle track on south side to connect Shunga Trail segments; WB bike lane on north side	Same
4	10th Street, Shunga Trail to Quincy Street	.40	4 to 5-lane, 60-70 feet	4,000* 10,370 w. of Quincy	Lane modification to 11-foot travel lanes, parking on one side, and 5-foot bicycle lanes.	Same
5	Quincy Street, 10th to 13th Street	.51	5-lane, 76 feet from 10th to 11th; 2-lane, 31 feet from 11th to 13th.	NA	Lane reduction from 5 to 3 lanes with bicycle lanes on 10th to 11th block; sharrows to 13th with caution signage at 12th Street intersection.	Minor widening for bicycle lanes on 11th to 13th segment.
6	13th Street, Quincy to Jackson	.08	2-lane, 31 feet	NA	Single-side parking in striped lane; direction through intersection jog at Jackson using chevrons	Same
7	13th Street, Jackson to Clay	.73	2-lane local; 30-31 feet	Under 1,000*	Sharrows	Single-side parking in striped lane with sharrows
8	Clay, 13th to 15th (Coincident with Bikeway Route 8)	.17	2-lane neighborhood collector, 30 feet	NA	First stage bicycle boulevard with sharrows and identifying signs. Motorist advisory signage at intersections with 12th and Huntoon	Enhanced bicycle boulevard with sharrows, one-sided parking with striped parking lane, and additional traffic calming techniques. Path through Central Park to align with Clay north of 13th.

7 15th Street Bikeway



7 15th Street Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
9	15th/Robinson Middle School		School campus	NA	Sharrows on 14th, Lincoln, and 15th around school campus.	Sharrows on 15th Street, with path adjacent to tennis courts leading to 15th and Lincoln
10	15th Street, Lincoln to McAlister	1.96	2-lane continuous local; 30-31 feet	NA	First stage bicycle boulevard with sharrows and identification.	Enhanced bicycle boulevard with traffic calming techniques at key locations, and single-sided parking in striped parking lane.
11	McAlister, 15th to 17th	.31	2-lane neighborhood collector, 27 feet	NA	Sharrows	Same
12	17th Street/Mt. Hope Cemetery to 15th and Fairlawn	.92	3-lane urban arterial; 32 feet	9,670	Share the road signage without bikeway designation. Short-term Route 7 ends t 17th and McAlister	Two-way cycle track on south and west sides of cemetery to 15th and Fairlawn.
13	15th and Fairlawn Intersection		4-lane, 49 feet	14,500 on Fairlawn	None.	Minor street realignment to provide pedestrian refuge median; warning signage or beacons.
14	15th, Fairlawn to Belle Avenue	.21	2-lane local; 32 feet	NA	Sharrows	Same

7 15th Street Bikeway

- Primary Route 2
- Connecting Routes
- Other System Links
- Connecting Trails
- Segment Keys

8 Clay/25th Street Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007)	Short Term Options	Ultimate Design
1	25th, Dornwood Park to California	.74	2-lane neighborhood collector, 41 feet	NA	Lane modification to 11 foot travel lanes, parking on one side, bike lanes	Same
2	25th, California to Landon Trail	1.32	2-lane neighborhood collector, 27-37 feet	1,580	Sharrows	Sharrows with one-sided parking with striped parking lane.
3	25th/27th, Landon Trail to Buchanan Street	.95	2-lane neighborhood collector, 27-30 feet	1,275	Sharrows	One-way EB cycle track on south side along Armory and Country Club sites. Minor widening for WB bike lane.
4	Buchanan, 27th-21st	.51	2-lane neighborhood collector; 27-31 feet with speed humps	NA	First stage bicycle boulevard with sharrows and identifying signs. Signalized intersection at 21st Street. Signs directing cyclists to Shunga Trail. Chevrons to define path across 21st Street.	Enhanced bicycle boulevard with sharrows, one-sided parking with striped parking lane, and additional traffic calming techniques. New access to Shunga Trail.
5	Buchanan/Hampton, 21st to Clay	.07	2-lane local, 27 feet	NA	Sharrows	Same
6	Clay, 21st to Huntoon	1.06	2-lane neighborhood collector; 31 feet	NA	First stage bicycle boulevard with sharrows and identifying signs. Motorist advisory signage at intersections with 12th and Huntoon	Enhanced bicycle boulevard with sharrows, one-sided parking with striped parking lane, and additional traffic calming techniques. Path through Central Park to align with Clay north of 13th.
7	Clay, Huntoon to Old Prairie Town	1.43	2-lane neighborhood collector; 31 feet	NA	First stage bicycle boulevard with sharrows and identifying signs.	Enhanced bicycle boulevard with sharrows, one-sided parking with striped parking lane, and additional traffic calming techniques.

8 Clay/25th Street Bikeway

8 Primary Route 8

3 Connecting Routes

Other System Links

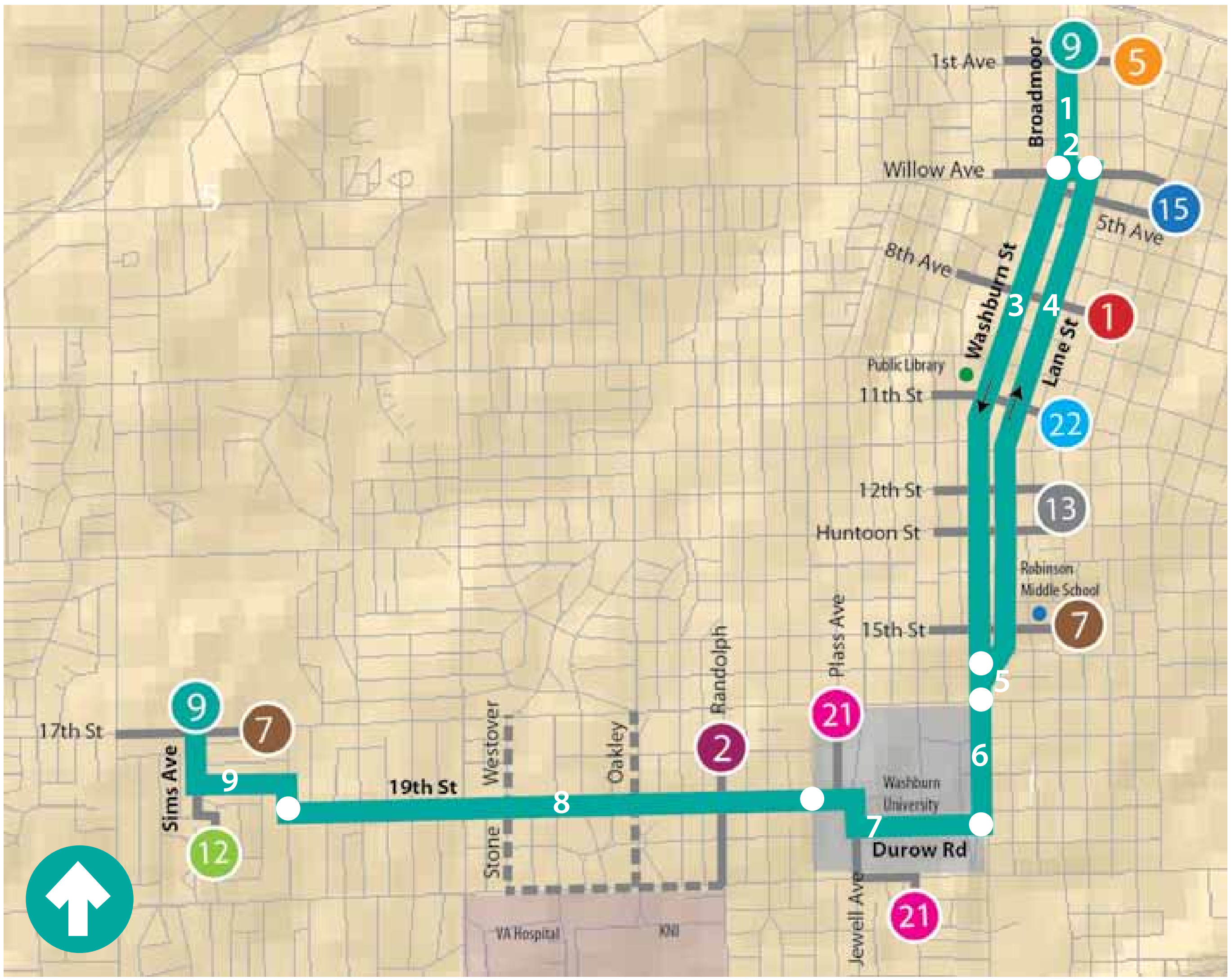
Connecting Trails

1 Segment Keys

9 Washburn Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1	Broadmoor, 1st to 4th	.32	2-lane local, 27-29 feet	NA	Sharrows	Same
2	4th Avenue, Washburn to Lane	.08	2-lane one-way pair, 31 feet	3,435	Chevron pavement marking to guide from SB Broadmoor to SB Washburn on left side of street (facing west). WB bike lane on right side. Striped parking lane.	Same
3	Washburn SB, 4th to Lane/ Washburn divergence	1.51	2-lane one-way pair with varying parking configuration and width between 27 and 32 feet.	4,415-7,280	Sharrows in right SB lane, bike lane where width permits. Minimum width with bike lane of 27 feet without parking, 34 feet with parking. Striped parking lane.	Same
4	Lane NB, Lane/Washburn divergence to 4th	1.53	2-lane one-way pair with varying parking configuration and width between 27 and 32 feet.	5,410-7,510	Sharrows in right SB lane, bike lane where width permits. Minimum width with bike lane of 27 feet without parking, 34 feet with parking. Striped parking lane.	Same. One-way cycle track is possible in landscaped area on east side of Lane, merging into street at 16th Street.
5	Washburn, 17th to Washburn/Lane divergence	.02	4-lane mixed-use arterial, 49 feet + left turn at 17th	15,900 at 21st	Sharrows on both curb lanes with chevron guidance to campus paths. Striped parking lane.	Same
6	Washburn University Pathway, 17th to Durow Road	.34	Washburn Avenue on east edge of campus.	NA	Sidepath along west side of Washburn Avenue, created by widening existing path or building a new path.	Same
7	Durow Road/ Jewell Ave/19th Street, Washburn to Macvicar	.60	Internal campus streets	NA	Sharrows on internal campus streets	Same
8	19th, Macvicar to Hope	1.50	2-lane, continuous local, 27 feet		First stage bicycle boulevard with sharrows and identifying signs. Defined crossing of Gage Blvd.	Enhanced bicycle boulevard with sharrows, one-sided parking with striped parking lane, and additional traffic calming techniques.
9	19th-Hope to 17th at Mount Hope Cemetery	.24	2-lane, local, 27 feet		Sharrows on Hope, 18th, Sims	Same, Protected crossing of 17th Street to Mount Hope cycle track.

9 Washburn Bikeway

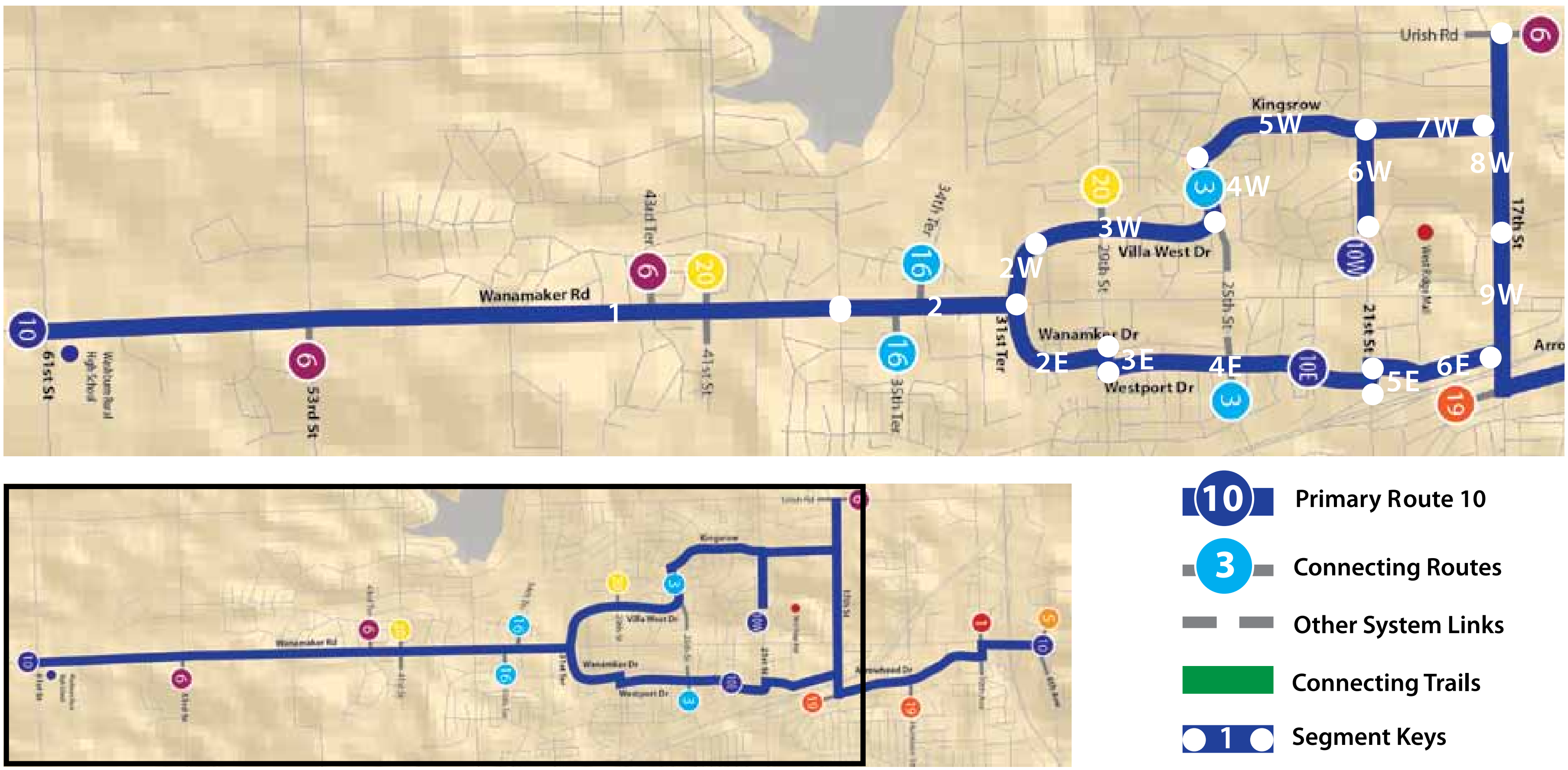


10 Wanamaker Corridor Bikeway

Segment Key		Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1		Wanamaker Road, 61st to 37th	3.68	3-lane arterial between 50th and 61st, 38 feet; 5-lane arterial between 37th and 50th, 60 feet. Roundabouts at major intersections.	3,385-9,210	None	Upgrade of existing or planned sidewalks to sidepath standards.
2		Wanamaker Road, 37th to 31st Terrace		2-lane rural section, 27 feet.	9,300-11,490	Programmed construction project will include sidepath with defined crossings at key intersections (34th Terrace, 31st Terrace)	Same
10E	2E	31st Terrace/Wanamaker Drive to 29th Street	.54	2-lane neighborhood collector; 31 feet	NA	Sharrows	Same
	3E	Wanamaker Drive/Westport Drive transition at 29th	.05	Offset intersection without signals	NA	Street crossing as a pedestrian, curb lane use for experienced cyclists	Major street intersection design without signalization, using chevron guidance and one-way cycle tracks (see page __)
	4E	Westport Drive, 29th to 21st	1.02	2-lane neighborhood collector; 27 feet	1,725-5,300	Sharrows, with one-sided parking in striped parking lane	Same
	5E	Westport Drive jog at 21st Street	.05	Offset intersection with signals	23,320 on 21st St.	Use of sidewalk on south side to alignment with signalized intersection leg	Major street intersection design with signalization, using chevron guidance and two-way cycle track (see page __)
	6E	Westport Drive, 21st to 17th	.53	2-lane neighborhood collector; 29-39 feet	NA	Sharrows, with one-sided parking in striped parking lane	Same
10W	2W	31st Terrace to Villa West	.35	Creek	NA	None	Multi-use trail along Shunga Creek tributary to foot of Villa West Drive
	3W	Villa West, south terminus to 25th	.65	2-lane neighborhood collector; 32 feet	NA	Sharrows	Sharrows, with one-sided parking in striped parking lane
	4W	25th, Villa West to Kingsrow	.26	2-lane neighborhood collector; 31-32 feet	2,480	First stage bicycle boulevard, with sharrows and identification (Coincident with Route 3)	Enhanced bicycle boulevard, adding one-sided parking in striped parking lane, traffic calming techniques
	5W	Kingsrow, 25th to 21st	.70	2-lane neighborhood collector; 40 feet	1,020	Bike lanes with one-sided parking	Same

10 Wanamaker Corridor Bikeway

Segment Key		Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
	6W	21st Street, Kingsrow to Mall entrance	.40	2- to 5-lane major arterial	11,000	Two-way sidepath on north side of street	Same



10 Wanamaker Corridor Bikeway

Segment Key		Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
10W	7W	Kingsrow, 21st to 17th	.50	No existing street	NA	None	Bike lanes with two-way sidepath when street is developed
	8W	17th, Arvonia to Urish	.39	No existing street west of Mall	NA	None without street extension	Bike lanes from Arvonia to Urish with development of street.
	9W	17th, Arvonia to Arrowhead	.58	3-lane multi-use arterial, widening to 5 lanes at Wanamaker intersection	8,480	Sharrows in curb lane. Reconfiguration to provide bike lanes or advisory lanes on I-470 bridge.	Minor widening to include bike lanes
10		Arrowhead, 17th to Huntoon	.52	No street between 17th and Drury; 2-lane local, Drury to Huntoon; 29 feet	NA	New street segment with sharrows; sharrows in existing street; one-sided parking in striped parking lane	Same
11		Creek path, Huntoon to Robinson	.33	NA	NA	Ashworth Place from Arrowhead to Huntoon; negotiated easement using continuation of Ashworth through Home Depot Center to Wanamaker; widened sidewalk on east side of Wanamaker to 11th Street; 11th to Robinson.	Path east of commercial center along drainageway; defined crossing of Huntoon
12		Robinson Avenue, path terminus to 10th	.27	2-lane local; 27-29 feet	NA	Sharrows	Same
13		10th, Robinson to Wanamaker	.15	2-lane obsolete rural section arterial; 26 feet	10,980	None	Complete street with bike lanes or one-way cycle tracks; combined route with Route 1
14		Wanamaker, 10th to 6th	.39	4-lane divided multi-use arterial; 60 feet with median	7,760-21,735 n. of Huntoon	Sharrows in curb lane; cautionary for experienced cyclists only	NB: Existing shoulder with protected perpendicular crossing at EB I-70 ramps. Bike lane over bridge with elimination of unnecessary center left turn lane. SB: Combination of one-way cycle track with SB bike lane with elimination of center left turn lane on overpass.

10 Wanamaker Corridor Bikeway

Primary Route 10

Connecting Routes

Other System Links

Connecting Trails

Segment Keys

11 Lake to Landon Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1	41st Street, Lake Shawnee to California	1	2-lane neighborhood collector, rural section; 20 feet	NA	Sharrows	Widening of street to standard dimensions with bicycle shoulders
2	California Avenue, 41st to 42nd	.11	2-lane rural section arterial, 21 feet	3,900	Two-way sidepath on east side with defined crossing to 42nd Street.	Same
3	42nd Street, California to Adams	1.01	2-lane continuous local; 30-41 feet	NA	Sharrows with path connection between two street ends west of Illinois Avenue	Same
4	Adams, 42nd to 37th	.58	2-lane rural section arterial, 22 feet	6,035	Minor widening with bicycle shoulders	Street widening to standard dimensions with bicycle shoulders or lanes
5	Adams, 37th to 35th	.23	4-lane urban arterial, 49 feet + left turn lane at 37th	8,300	Sharrows on both curb lanes	One-way cycle tracks or minor widening for bike lanes, continuing proposed bike lanes south of 37th
6	35th Street/Irvingham, Adams to Betty Phillips Park	.56	2-lane continuous local, 27 feet	NA	Sharrows. Sharrows on Irvingham continue to Betty Phillips Park.	Same
7	Betty Phillips Park to Humboldt St	.44	Park pathway and pedestrian bridge	NA	Existing with completion of bridge to Humboldt St cul-de-sac	Same; possible widening of park path depending on demand
8	Humboldt St, Pedestrian bridge to 37th Street	.13	2-lane local cul-de-sac	NA	Sharrows	Same
9	37th Street, Humboldt to Landon Trail	.07	3-lane urban arterial, 36 feet	NA	10-foot sidepath on north side of street	Same

11 Lake to Landon Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	ADT (2007)	Short Term Options	Ultimate Design
10	Fremont/Cunningham, Irvingham to 29th Street	.79	2-lane, continuous local, 25-32 feet	NA	Sharrows	Same
11	29th Street, Cunningham to Landon Trail	1.81	2-lane, local, 27-30 feet	510	Sidepath on south side of street.	Same.

12 Edgewater Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1	Connector Path, 37th-Randolph to Oak Parkway		2-lane urban arterial (37th Street); 27 feet	8,655	Two-way sidepath on north side of 37th Street, with crossing at Oak Pkwy. with continuation to path along creek under I-470	Same
2	Oak Parkway, 37th to Twilight Drive	.15	2-lane neighborhood parkway; 27 feet	NA	Sharrows	Same
3	Twilight Drive, Oak Pkwy to Gage Blvd.	1.08	2-lane neighborhood collector; 27 feet	NA	Sharrows	Same
4	Gage Blvd, Twilight Dr. to 30th St.	.04	5-lane multi-use arterial, 62 feet	17,930	Crosswalks across Gage and sidewalk use (walking) on west side of Gage Blvd.	Enhanced crosswalk with 2-way cycle track to negotiate intersection jog between Twilight and 30th Street.
5	30th, Burnett, 29th Terrace, and Indian Trail, Gage Blvd. to 29th St.	.45	2-lane local streets, 27-32 feet	NA	Sharrows	Same
6	Indian Trail, 29th St intersection		Intersection with 5-lane multi-use arterial		Existing crosswalks with additional warning signs	Enhanced intersection including pedestrian refuge median. Possible diversion with median of left-turning traffic to adjacent streets, primarily Eveningside to the west
7	Indian Trail, 29th to Shunga Trail access	.21	2-lane local, 32 feet	NA	Sharrows	Same
8	Shunga Trail access via Indian Trail bridge over creek	.07	Existing path and bridge	NA	Chevron guidance to direct cyclists to bridge; route continues to and through Crestview Community Center parking lot to Shunga Drive.	Path east of parking lot from Shunga Trail to Shunga Drive.
9	Edgewater/ Morningside, Shunga Drive to 21st	.75	2-lane neighborhood parkway; 30 feet	NA	Sharrows	Same. Improved intersection at Morningside and Edgewater with a possible roundabout or improved geometry.

12 Edgewater Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
10	Morningside, 21st Street intersection		Intersection with multi-use arterial; 44 feet	21,000	Crosswalks with improved warning signage; chevron directionals to Sims Avenue	Major street intersection design without signalization, using chevron guidance and one-way cycle tracks.
11	Sims Avenue, 21st to 17th	.53	2-lane local; 29 feet	NA	Sharrows	Same. Possible transitional path through Sims Park to link street offset around open space.

12 Primary Route 12

17 Connecting Routes

Other System Links

Connecting Trails

1 Segment Keys

13 Huntoon Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1	12th, Monroe to Harrison	.40	2-lane at Monroe, widening to 4-lane divided downtown multi-lane	8,000*	Sharrows in curb lane	Same or minor widening for bike lanes. Possible street conversion to two 10-foot, low speed travel lanes and a 4-foot bike lane in each direction.
2W	12th, Harrison to Western	.37	2-lane WB member of one-way pair; 35 feet	3,640	Sharrows with striped parking lane on one (north) side); where space permits, lane width reduction to 10.5-11 feet with 5-foot right-side bike lane.	Same
3W	12th, Western to Gage Blvd.	2	2-lane WB member of one-way pair; 27 feet. Off-peak parking permitted in right lane	4,970-5,685	Options: 1) Peak hour travel/off-peak parking lane on left curb lane, bike lane on right side. 2) Right-side joint bike/parking lane, with shared territory defined by pavement marking	Same
4W	12th, Gage to McAlister	.31	2-lane WB member of one-way pair; turnoff to 2-lane local; 25-32 feet	4,925	Sharrows directing cyclists to 12th Street from 12th/Huntoon convergence, with sharrows continuing on 12th.	Same
5W	McAlister, Gage to Huntoon		2-lane local; 25 feet	NA	Sharrows	Same
2E	Huntoon, McAlister to Gage	.30	3-lane urban arterial, transitioning to 2-lane, EB member of one-way pair	9.775	Sharrows in right lane	One-way EB cycle track, transitioning to bike lane at Gage intersection
3E	Huntoon, Gage to Western	1.99	2-lane EB member of one-way pair; 35 feet. Off-peak parking permitted in right lane	5,375-5,660	Options: 1) Peak hour travel/off-peak parking lane on left curb lane, bike lane on right side. 2) Right-side joint bike/parking lane, with shared territory defined by pavement marking	Same; convert diagonal parking against bike lane to back-in configuration
4E	Huntoon, Western to Harrison	.35	2-lane EB member of one-way pair; 30 feet.	NA	Sharrows	Right-side bike lane with no on-street parking

13 Huntoon Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
6	Huntoon, McAlister to Fairlawn	.68	4 to 5-lane urban arterial; 50-60 feet	12,850	Use of existing sidewalks and/or sharrows on curb lanes. Sidewalk use is feasible because of limited interruptions and pedestrian traffic.	One-way cycle tracks, resolving into bike lanes at Fairlawn intersection.
7	Huntoon, Fairlawn to Wanamaker	1.00	5-lane urban arterial; 60 to 62 feet	10,995-14,570	Restriping to provide bike lanes while retaining five-lane section.	Same

13 Primary Route 13

17 Connecting Routes

Other System Links

Connecting Trails

1 Segment Keys

14 Golden Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1	25th, Dornwood Park to Highland Ave	.21	2-lane neighborhood collector; 41 feet	NA	Lane modification to 11 foot travel lanes, parking on one side, bike lanes	Same
2	Highland Ave, 25th to 21st	.50	2-lane rural section neighborhood collector; 25 feet	1,045	Sharrows	Bike shoulders on rural section road
3	21st Street, Highland to Golden	.12	2-lane rural section arterial; 25 feet.	3,600*	Sharrows	Bike shoulders on rural section road; bike lanes incorporated into any street reconstruction
4	Golden, 21st to I-70	.32	2-lane rural section neighborhood collector; 22 feet	1,995	Sharrows	Bike shoulders on rural section road; bike lanes incorporated into any street reconstruction
5	Golden, I-70 to 6th Avenue	.68	2-lane neighborhood collector; typical 41 feet	2,075-3,020	Sharrows with striped parking lanes	Bike lanes with consolidation of on-street parking to one side
6	Golden, 6th Avenue to Shunga Trail	.61	2-lane neighborhood collector; 31-32 feet	3,810	Sharrows, with ramp and direction to Shunga Trail	Same
7	Golden, Shunga Trail to Seward Avenue	.42	2-lane neighborhood collector; 32 feet	6,540	Sharrows with sidepath on west side of street	Same
8	Chester, Seward to Riverside RV Park	1.42	2-lane neighborhood collector; 27-31 feet	2,275-3,095	First stage bicycle boulevard with sharrows and identification	Same, with traffic calming enhancements

14 Golden Bikeway

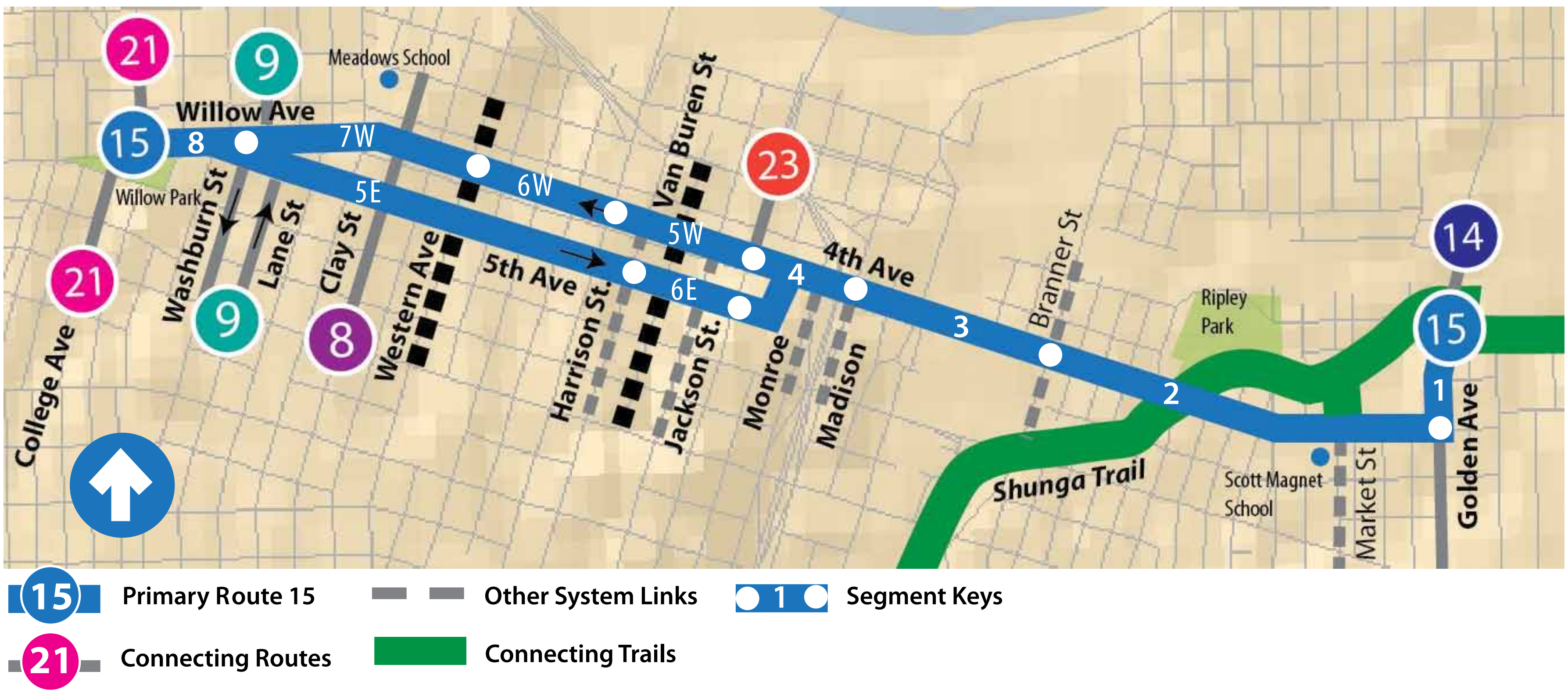
- 14 Primary Route 14
- 17 Connecting Routes
- Other System Links
- Connecting Trails
- 1 Segment Keys

15 4th Avenue Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1	Golden, Shunga/ Deer Creek Trail to 4th Avenue.	.29	2-lane neighborhood collector; 31-32 feet	2,250*	Sharrows, with ramp and direction to Shunga Trail; coincident with Route 14	Same
2	4th Avenue, Golden to Branner	.89	2-lane neighborhood collector; 32-38 feet	1,610	First stage bicycle boulevard with sharrows; alternative is bike lanes with parking permitted. Upgraded bridge at Market Street between Scott Magnet School and Shunga Trail.	Same
3	4th Avenue, Branner to Madison	.45	2-lane collector; 38 feet	3,070	Bike lanes with parking on one side; upgrade paving surface at railroad crossing	Same
4	4th Avenue, Madison to Kansas	.24	5-lane downtown multi-lane with two-sided parking; 76 feet	6,030	Reduced lane width or number of lanes to add bike lanes in both directions.	Same
5W	4th Avenue, Kansas to Topeka Blvd.	.32	3-lane downtown one-way; 41-48 feet	3,474*	Convert right side lane to bike lane	Same
6W	4th Avenue, Topeka Blvd. to Western	.32	2-lane WB member of one-way pair; 41 feet	3,120	Maintain two 11-foot travel lanes with WB bike lane and existing parking	Same
7W	4th Avenue/Willow Avenue, Western to 5th Avenue convergence	.5	2-lane WB member of one-way pair; 31 feet	3,435	WB sharrows with parking on one side in striped parking lane	Same
5E	5th Avenue, 4th Avenue divergence to Topeka Blvd.	.83	2-lane EB member of one-way pair; 31 feet	2,450-3,290	EB sharrows with parking on one side in striped parking lane	Same

15 4th Avenue Bikeway

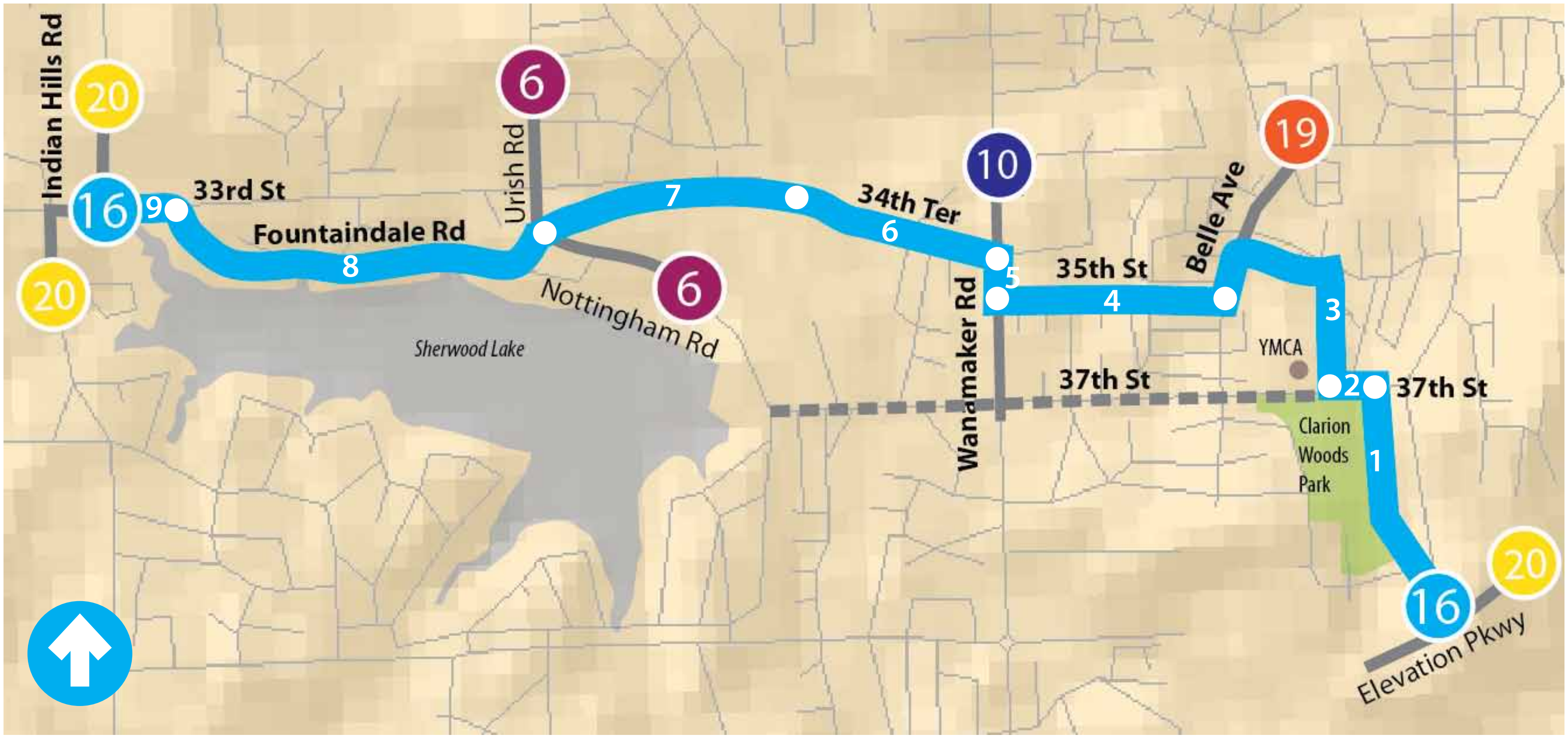
Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
6E	5th Avenue/Qunicy Street, Topeka Blvd to 4th Ave	.32	2 to 3-lane EB member of one-way pair; 48-54 feet.	2,955	Lane reconfiguration with 11-foot travel lanes, EB bike lane, and two-sided parking; sharrows on 5th and Quncy east of Kansas.	Same
8	Willow Avenue, Convergence to Willow Park/College Avenue	.3	2-lane collector; 31 feet	3,435	Bike lanes on both sides to park. Existing parking permitted but likely to be infrequent.	Ultimate removal of on-street parking from this segment.



16 Clarion Woods Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT (* 2007))	Short Term Options	Ultimate Design
1	Clarion Woods Park, Elevation Parkway to 37th Street	.51	Informal path on Fairlawn alignment	NA	None	Multi-use trail to connect to future Elevation Parkway
2	37th Street, Fairlawn to Chelsea	.11	3-lane neighborhood collector; 32 feet	5,670	None	Two-way cycle track to Clarion Woods Park entrance along south side of street. Mid-block crossing of 37th Street, using refuge median
3	YMCA site and drainage corridor, 37-Chelsea to 35-Belle	.41	NA	NA	None	Multi-use trail along edge of YMCA and Covenant Baptist sites, linking into path system of retention and wetlands structures east of Belle Avenue. Final alignment to be developed with participating organizations
4	35th Street, Belle to Wanamaker	.49	2-lane continuous local, 26-32 feet	NA	None	Sharrows
5	Wanamaker, 35th to 34th Terrace	.09	2-lane obsolete rural section arterial; 27 feet	9,300	None	Complete street, probably a five-lane section with bike lanes or one-way cycle tracks, resolving to bike lanes at major intersections. Crossing at 34th Terrace intersection to accommodate Route 16.
6	34th Terrace, Wanamaker to end of street	.35	2-lane local; 32 feet	NA	None	Sharrows
7	Sherwood Wastewater Plant and Farley School site to Fountaindale and Nottingham	.67	Open space and public property	NA	None	Multi-use trail across Shunga Creek and around the edge of Sherwood wastewater plant and Farley School sites. Connection to Route 6 at Urish Road
8	Fountaindale, Nottingham to 33rd	.91	2-lane continuous local; 25 feet	NA	Sharrows	Same
9	33rd, Fountaindale to Indian Hills Road	.13	2-lane rural section collector; 25 feet	1,000	Sharrows	Same

16 Clarion Woods Bikeway



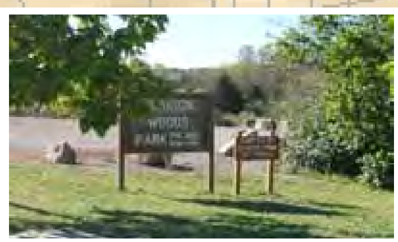
16 Primary Route 16

6 Connecting Routes

Other System Links

Connecting Trails

1 Segment Keys



17 33rd Street Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
1	37th Street, West Edge to California	.91	2-lane neighborhood collector; 36 feet	2,955*	Lane definition, with 12 foot travel lanes and bike lanes.	Same
2	37th Street, California to Indiana	.50	3-lane neighborhood arterial; 36 feet	3,820	Sharrows	Minor widening to add bike lanes. A lane reconfiguration to 10 foot travel lanes and 11 foot center left-turn lane and reduce scope of widening to a single side.
3	Indiana Avenue, 37th to 35th Terrace	.23	2-lane neighborhood collector; 32 feet	3,110	Sharrows	Same
4	35th Terrace/35th Street, Indiana to Adams	.55	2-lane continuous local; 32 feet	NA	Sharrows	Same
5	35th Street/Irvingham Street, Adams to Betty Phillips Park	.54	2-lane continuous local; 27 feet	NA	Sharrows	Same
6	Betty Phillips Park to Landon Trail	.64	Park path, 2-lane local cul-de-sac (Humboldt St), and 3-lane urban arterial (37th St)	NA	Existing path through Betty Phillips Park; pedestrian bridge to Humboldt St; sharrows on Humboldt; sidepath on north side of 37th St to trail; Coincident with Route 11	Same
7	Landon Trail, 37th to 33rd Street	.48	Existing trail to 33rd Street trailhead	NA	None	Further development of trailhead
8	33rd Street, Landon Trail to Van Buren	.13	2-lane local; 32 feet	NA	Sharrows	Same
9	Van Buren, 33rd to Croix	.18	2-lane local; 30 feet	NA	Sharrows	Same
10	Croix Street, Van Buren to Westview	.67	3 to 4-lane collector, 48 feet east of Brendan; 2-lane collector, 41 feet west of Brendan	2,500	Conversion to three lanes with bike lanes east of Brendan; bike lanes with one-sided parking west	Same

17 33rd Street Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
11	Westview, Croix to Clontarf	.16	2-lane neighborhood collector, 32 feet	NA	Sharrows	Same
12	Clontarf, Westview to Burlingame	.17	2-lane neighborhood collector, 30-36 feet	NA	Sharrows with crossing at signalized intersection at Burlingame	Same; possible pathway alternative through Avondale School site
13	Burlingame, Clontarf to 33rd Street	.10	4-lane urban arterial, 48 feet	12,700	Sidepath for short segment on west side of street	Same
14	33rd Street, Burlingame to Arnold	1.29	2-lane neighborhood collector; 32 feet	2,760	Sharrows	Same
15	Arnold Street, 33rd Street to Twilight Drive	.07	2-lane local; 27 feet	NA	Sharrows	Same; connection to Route 12

17 Primary Route 17
2 Connecting Routes
Other System Links
Connecting Trails
1 Segment Keys

18 Hillcrest Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
1	35th Street, Indiana to Minnesota	.25	2-lane local; 22 feet rural section	NA	Sharrows	Bike shoulders. Alternative of a crossing to Eisenhower Middle School/Highland Park elementary, with multi-use path through the school site to the north boundary at Minnesota Avenue.
2	Minnesota Avenue, 35th to 31st Street	.48	2-lane neighborhood collector; 22 feet rural section	NA	First stage bicycle boulevard with sharrows and identification. Crossing to Eisenhower Middle School.	Enhanced bicycle boulevard with minor widening to add bicycle shoulders to rural section.
3	Minnesota Avenue, 31st to 29th	.24	2-lane neighborhood collector, 22 feet	NA	First stage bicycle boulevard with sharrows and identification. Transition to signalized crossing at Wisconsin Avenue using signalized offset intersection design.	Enhanced bicycle boulevard with minor widening to add bicycle shoulders to rural section; sharrows on curb side.
4	Wisconsin Avenue, 29th to 25th	.50	2-lane local; 27 feet	NA	First stage bicycle boulevard with sharrows and identification.	Same
5	25th, Wisconsin to Indiana	.20	2-lane neighborhood collector, 27-37 feet	1,580	First stage bicycle boulevard with sharrows and identification; coincident with Route 8	Same with one-sided parking and striped parking lane.
6	Indiana Avenue, 21st to 25th	.50	2-lane collector, 28 feet	2,785	Sharrows or painted shoulder 10.5 feet from face of curb	Minor widening to provide full scale bike lanes
7	21st Street, Indiana to Hillcrest Community Center	.30	4-lane urban arterial, 48 feet	8,420	Two-way sidepath/cycle track on north side of street, most of which is on park property	Same
8	Hillcrest/Freedom Valley Parks, park boundary to Indiana Avenue overpass of I-70	.67	Park	NA	None	Multi-use trail through parks on topographically accessible alignment, leaving public land at the Indiana Avenue interstate overpass.
9	Indiana Avenue, I-70 to 10th Street	.5	2-lane collector; 22 feet	1,035	Sharrows	Minor widening to standard two-lane section with bike lanes.

18 Hillcrest Bikeway

- 18 Primary Route 18
- 17 Connecting Routes
- Other System Links
- Connecting Trails
- 1 Segment Keys

19 Arrowhead Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
1	37th-Oak Parkway to 37th-Wood Valley	.19	Shunga Creek tributary and north side of 37th Street	5,415 on 37th	Short segments of multi-use trail under I-470 and 2-way cycle track along north side of 37th to Wood Valley intersection.	Same
2	35th/34th/33rd Terrace, 37-Wood Valley to Gage Blvd	1.04	2-lane continuous local; 25-27 feet	NA	Sharrows; defined crossing with caution signage for Gage Blvd motorists	Same
3	33rd Terrace/SW Skyline Parkway to terminus of street	.66	2-lane local, 27 feet	NA	Sharrows	Same
4	Skyline Park	.39	NA	NA	Multi-use trail segment connecting SW Skyline Pkwy to head of Skyline Drive	Same
5	Skyline Dr/33rd Street to Fairlawn	.15	2-lane continuous local; 25 feet	NA	Sharrows	Same
6	33rd Street, Fairlawn to Arrowhead	.41	2-lane neighborhood collector; 32 feet	2,290	Sharrows	Sharrows with one-sided parking in a painted parking lane.
7	Belle Avenue, 33rd to 37th	.58	2-lane neighborhood collector; 31 feet	NA	First stage bicycle boulevard with sharrows and identification; spur of Arrowhead system connecting Routes 18 and 16.	Same
8	Arrowhead, 33rd to 25th	.98	2-lane collector; 31 feet	3,430	First stage bicycle boulevard with sharrows and identification	Enhanced bicycle boulevard with traffic calming features; potential of one-sided parking in a painted parking lane
9	25th Street Overpass over I-470, Arrowhead to Belle	.19	2-lane neighborhood collector; 27 feet	4,255	Sharrows; coincident with Route 3	Same
10	Belle Avenue, 25th to 20th	.58	2-lane neighborhood collector; 27 feet	NA	First stage bicycle boulevard with sharrows and identification; coincident with Route 4; signalized intersection at 21st Street	Same

19 Arrowhead Bikeway

18 Primary Route 19

3 Connecting Routes

Other System Links

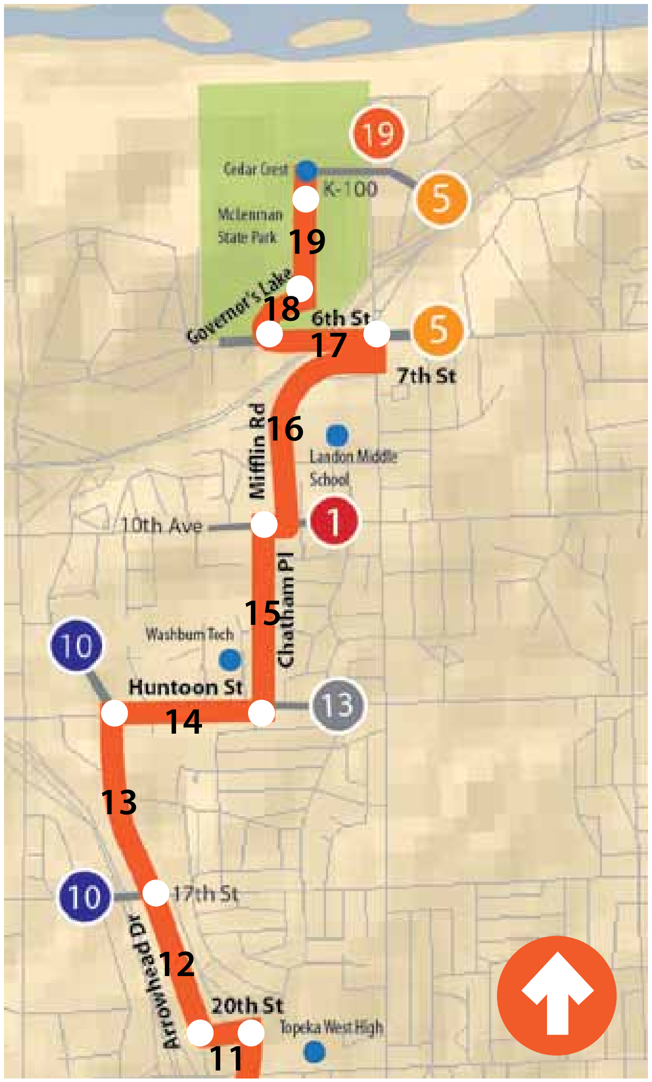
Connecting Trails

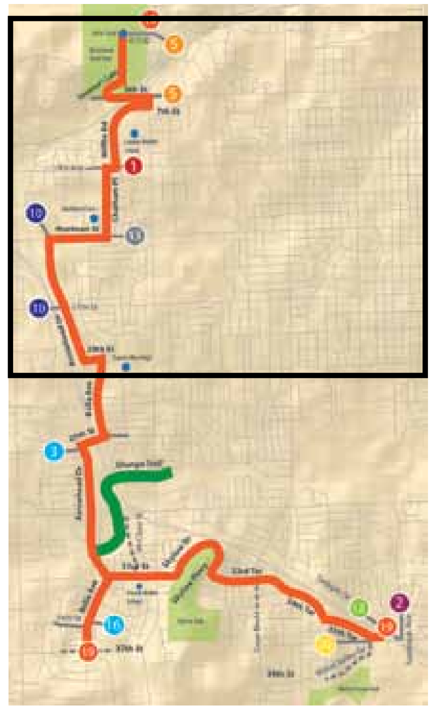
1 Segment Keys

19 Arrowhead Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
11	20th, Belle to Arrowhead	.13	2-lane local; 27 feet	NA	Sharrows; 20th Street alignment avoids difficult intersection at 21st and Arrowhead	Same
12	Arrowhead, 20th to 17th	.41	2-lane neighborhood collector; 25-27 feet	NA	First stage bicycle boulevard with sharrows and identification. Defined crossing at 17th Street.	Same
13	Arrowhead, 17th to Huntoon	.52	No street between 17th and Drury; 2-lane local, Drury to Huntoon; 29 feet	NA	First stage bicycle boulevard along new street segment between 17th and Drury, with sharrows and identification. Bicycle boulevard continues in existing street with one-sided parking in striped parking lane. Coincident with Route 10.	Same
14	Huntoon, Arrowhead to Chatham Place	.44	5-lane urban arterial; 60 feet	11,000-14,570	Restriping to provide bike lanes while retaining five-lane section.	Same
15	Chatham Place, Huntoon to 10th	.5	2-lane continuous local; 29 feet	NA	Sharrows	Same
16	Mifflin/7th, 10th to 6th and Fairlawn	.70	2-lane neighborhood collector; 25 feet	NA	Sharrows	Bike lanes incorporated into eventual street widening to serve adjacent office uses; new path on diagonal route behind office development along 7th Street to 6th and Fairlawn intersection.
17	6th Street, Fairlawn to Governor's Lake Road	.25	2-3 lane urban arterial with paved shoulders, 42-54 feet	4,000	Use existing paved shoulders as bike lanes	Same
18	Governor's Lake Road, 6th to terminus of road	.14	2-lane access road with shoulders	NA	Use existing paved shoulders as bike lanes	Same
19	Lane to Cedar Crest Mansion	.43	10 foot path	NA	Use existing path	Same

19 Arrowhead Bikeway





- 18 Primary Route 19
- 3 Connecting Routes
- Other System Links
- Connecting Trails
- 1 Segment Keys

20 Sherwood/Elevation Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
1	37th Street, Wood Valley to Gage Blvd.	.82	2-lane rural section arterial; 24 feet	4,390-5,185	None	Complete street design as part of a future Elevation Parkway, including bike lanes
2	Elevation Parkway, Gage to Wanamaker	1.92	Future arterial corridor	NA	None	Complete street design with bike lanes and off-street option
3	41st Street, Wanamaker to Gamwell	.60	2-lane rural section arterial	3,330	Off-street, one-way EB path or shoulder for climbing.	Bike lanes; as part of an Elevation Parkway project, may be upgraded to complete street standards
4	Gamwell/40th Street/ Canterbury Town Drive/ Robins Drive/Kings Forest Drive/Falcon Drive from 41st Street to Indian Hills Road	2.20	2-lane, continuous local system; 25 to 27 feet	1,095 at Indian Hills	Sharrows	Same
5	Indian Hills Road, 37th to 33rd Street	.53	2-lane collector; 25 feet, rural section	130	Sharrows	Same; bike shoulders or lanes with increased future development and potential upgrade of street.
6	33rd Street, Indian Hills to Gisbourne Lane	1.25	2-lane minor arterial, rural section; 25 feet	1,985	Sharrows	Bike shoulders or lanes with increased future development and potential upgrade of street.
7	Gisbourne Lane/ Tutbury Town Rd, 33rd to 29th	.60	2-lane local; 25 feet, rural section	NA	Sharrows	Same
8	29th, Tutbury Town to Wanamaker	1.64	5-lane multi-use arterial; 60 feet	7,415-11,490	Sidepath on south side of reconstructed street	Same

20 Sherwood/Elevation Bikeway

Primary Route 20

Connecting Routes

Other System Links

Connecting Trails

Segment Keys

21 College Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
1	College Avenue, Shunga Trail to 21st Street	.33	2-lane neighborhood avenue; 29-36 feet	NA	Sharrows; striped 7-foot parking lanes when width is 36 feet or above	Same
2	College Avenue crossing at 21st Street		Crossing of 5-lane multi-use arterial; 60 feet	19,430	Enhanced crossing with median refuge on west leg of intersection, where left turns are not permitted; defined crosswalk	Same; possible ped/bike actuated signalization at crossing
3	21st Street, College to Jewell Avenue entrance	.17	5-lane multi-use	19,430	Widening of existing path to add a separated two-way cycle track between College and Jewell Avenue entrance.	Same.
4	Washburn University campus to 17th and Plass	.54	2-lane campus street system	NA	Sharrows using Jewell and Plass to 17th Street.	Sidepath on Washburn Avenue edge of campus, connecting 21st and College and 17th and College. (3A).
5	Plass Avenue, 17th to 15th	.20	2-lane neighborhood avenue; width varies from 29 to 41 feet	NA	Sharrows	Same
6	15th Street, Plass to College	.23	2-lane continuous local; 30-31 feet	NA	First stage bicycle boulevard with sharrows and identification. Coincident with Route 7	Enhanced bicycle boulevard with traffic calming techniques at key locations, and single-sided parking in striped parking lane.
7	College Avenue, 17th to 7th Avenue	1.4	2-lane neighborhood avenue; width varies from 29 to 41 feet	NA	Defined crossing at 17th Street. First stage bicycle boulevard with sharrows and identification. Painted 7-foot parking lanes along 41-foot section.	Same.
8	7th Avenue/Mulvane St to 6th Avenue	.18	2-lane local, 28-31 feet	NA	Sharrows.	Same.

21 College Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
9	Willow Park, 6th and Mulvane to Willow and Elmwood	.08	Park	NA	Existing path through Willow Park. Defined crossings at intersections with 6th and Willow Avenues.	Widened path to trail standard.
10	Elmwood Avenue, Willow to 1st	.32	2-lane local, 31 feet	NA	Sharrows	Same

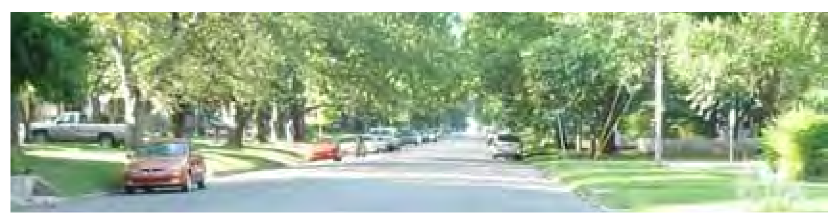
21 Primary Route 21

16 Connecting Routes

Other System Links

Connecting Trails

1 Segment Keys



22 11th Street Bikeway

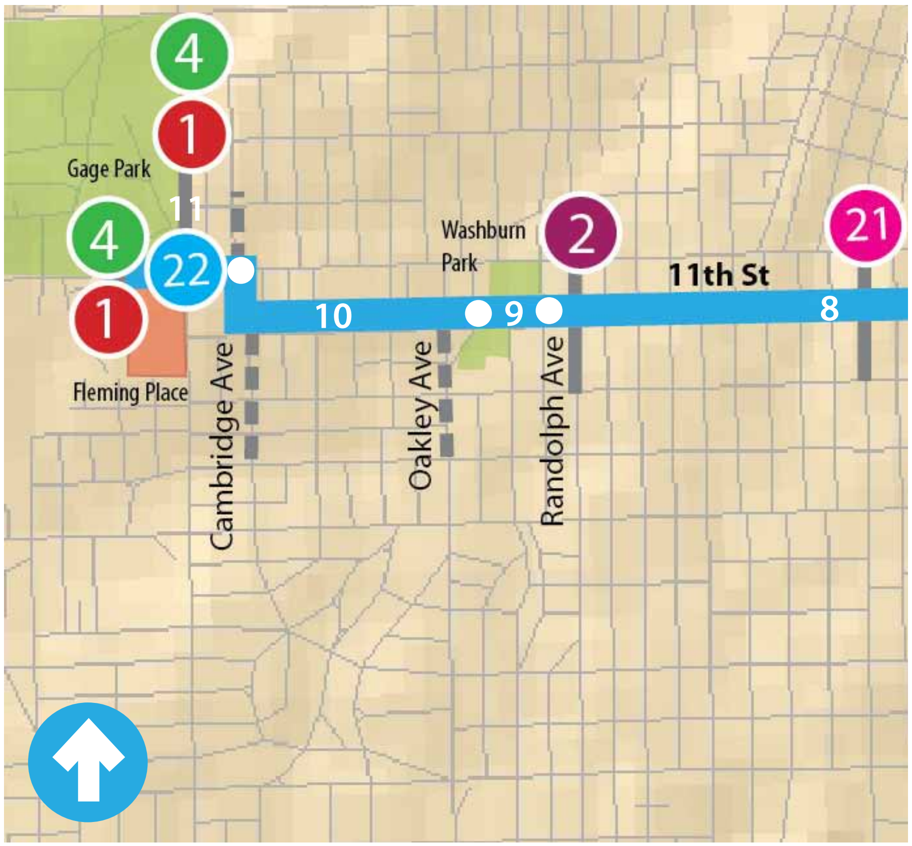
Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
1	15th Street, Shunga Trail to Monroe/Quincy	.34	2-lane collector; 27 feet	NA	Sharrows	Minor widening for bike lanes; alternative is WB sharrow and EB cycle track and pedestrian path through Cushinberry Park.
2	Monroe (SB), 10th Avenue to 17th Street	.59	Two-lane, one-way neighborhood collector; 27-30 feet	NA	One-way SB bike lane; if parking remains, this may be a shared bike/parking lane.	Same with removal of parking.
3	Quincy Street (NB), 17th Avenue to 12th Street	.57	Two-lane local; 30-36 feet	NA	NB sharrow, with jog using alley between 13th and 14th Street around Williams Magnet School.	Same with NB bike lane where width permits, with one-side parking.
4	Quincy Street (NB), 12th to 10th Avenue	.20	Two to five-lane downtown street; 30-64 feet	NA	NB bike lane by removing unnecessary on-street parking on 12th to 11th block; lane reconfiguration on 11th to 10th block to provide NB bike lane.	Same.
5	10th Avenue, Monroe to Topeka Blvd.	.48	Typically 5-lane, two-way downtown street, with diagonal parking on some blocks; 70-76 feet, excluding diagonal parking areas		Sharrows in outer lanes in either direction; striped parallel parking lanes. Recommended reversal of diagonal parking to back-in design for bicycle and pedestrian safety.	Land reconfiguration to provide bike lanes, with 10-foot travel lanes, 7-foot parking lanes, and 5-foot bike lanes in 74-foot section.
6	10th Avenue, Topeka Blvd. to Western Avenue	.32	5-lane urban arterial; 60	12,270	Sharrows in outer lanes	Land reconfiguration to provide bike lanes, with 10-foot minimum travel lanes, and 5-foot bike lanes in 60-foot section; alternative road diet establishing three-lane or four-lane assymetrical section with bike lanes and center left-turn lane.
7	Western Avenue, 10th to 11th (Munson)	.22	2-lane neighborhood collector, 31 feet	1,050	Sharrows	Same

22 11th Street Bikeway

22 11th Street Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
8	11th Street, Western Avenue to Washburn Park at Collins Street	1.29	2-lane continuous local; 25-31 feet	NA	First stage bicycle boulevard with sharrows, identification, and reduction of stop signs to provide bicycle priority; defined crossings at Washburn and lane intersections. Alignment jogs from Munson to 11th at Fillmore Street.	Same
9	11th Street bridge at Washburn Park	.06	Pedestrian bridge in park	NA	Use of existing bridge, with advisory to walk bikes.	Replacement with standard, prefabricated trail bridge.
10	11th Street, Billard Avenue to Cambridge Avenue	.46	2-lane continuous local; 25-27 feet	NA	First stage bicycle boulevard with sharrows, identification, and reduction of stop signs to provide bicycle priority.	Same.
11	Cambridge, 11th to 10th	.12	2-lane continuous local; 26 feet	NA	First stage bicycle boulevard with sharrows, identification, and reduction of stop signs to provide bicycle priority.	Same.
12	10th Street, Cambridge to Gage	.14	Three- to five-lane multi-use arterial, with protected left-turns at 10th; 48-62 feet.	12,000	Lane reconfiguration with three to five lane taper approaching Gage Boulevard. 10 to 11-foot lane width permits introduction of bike lane to the left of WB to NB right-turn only lane.	Same

22 11th Street Bikeway



22 Primary Route 22

16 Connecting Routes

Other System Links

Connecting Trails

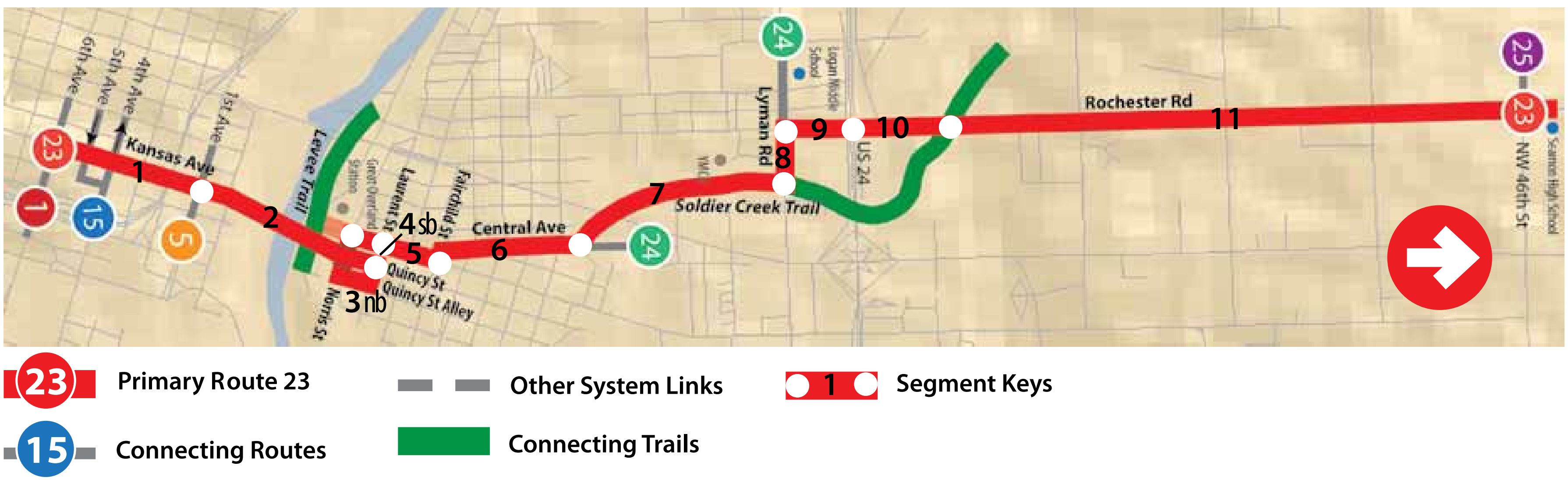
1 Segment Keys

23 North Topeka Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
1	Kansas Avenue, 6th to 1st Avenue	.52	4-lane with center median to 5-lane downtown boulevard; 90 feet with diagonal parking	9,125	Sharrows in outer travel lane	Bike lanes or cycle tracks incorporated into final design of Kansas Avenue. Section to be determined, could include one travel lane in each direction, a left-turn lane or median; and bike lanes. Cycle track may be located between pedestrian path and parking.
2	Kansas/Quincy Bridge, 1st Avenue to Laurent Street	.66	Dual bridge with 2 travel lanes in each direction; 25 feet channel width in each direction	9,200	Sharrows with associated use of walks on SB side of bridge	Same. Possible use of advisory colored bike lanes, establishing a visible bicycle territory in the outer travel lanes.
3	Laurent/Quincy-Monroe Alley/Norris St to Kansas	.28	2-lane downtown streets and alley; 36 to 40 foot streets, 22 foot alley	NA	NB Route: Sharrows with defined on-street parking lanes on Laurent/ Norris; sharrows on Quincy-Monroe alley	Same. Possible path though park between bridge and alley
4	Laurent, Quincy to Kansas	.08	2-lane downtown street; 36 to 45 feet	NA	SB Route: Sharrows with defined on-street parking lanes.	Same.
5	Kansas Avenue, Norris to Fairchild	.30	2-lane downtown avenue with diagonal parking; 57 feet	1,415	Sharrows	Same, with back-in diagonal parking for greater safety
6	Fairchild/Central Avenue, Kansas to Soldier Creek Trail	.59	2-lane neighborhood collector; 32 feet	NA	First stage bicycle boulevard with sharrows, identification, and reduction of stop signs to provide bicycle priority. Alternative path through plaza to Central Ave cul-de-sac	Same.
7	Soldier Creek Trail, Central Avenue to Lyman Road	1.00	Existing 10-foot trail		Same as existing	Same
8	Lyman Road, Soldier Creek Trail to Tyler	.22	3-lane urban arterial; 40 feet with right turn lane at Tyler	7,705	Midblock crossing at trail, two-way sidepath on north side of street	Upgrade midblock crossing with median refuge and HAWK or similar ped actuated signal.

23 North Topeka Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	2011 ADT	Short Term Options	Ultimate Design
9	Tyler St, Lyman to US 24	.22	3-lane urban arterial, 38 feet	8,070	Sharrows in curb lane; probable use of interior drives in parking lots for shopping center bound users.	Two-way sidepath on east side of street.
10	Tyler St/Rochester Road, US 24 to Soldier Creek	.31	5-lane multi-use arterial tapering to 2-lane, rural arterial	16,455	Design depends on design of US 24 improvement. Medium term option is a two-way sidepath on the east side of Rochester Road, connecting to an extension of the Soldier Creek Trail.	Incorporate full bicycle access into design of the US 24 improvement project. Sidepath on east side of Rochester to Soldier Creek Trail may be an adequate long-term solution, transitioning to bicycle shoulders on Rochester Road north of the creek.
11	Rochester Road, Soldier Creek to Seamon High School	2.81	2-lane rural arterial	4,200-5,565	None, other than use of parallel low-volume roads (Green Hills)	Addition of paved shoulders accommodating bicycles to rural section; inclusion of bike lanes into any future urban section upgrade

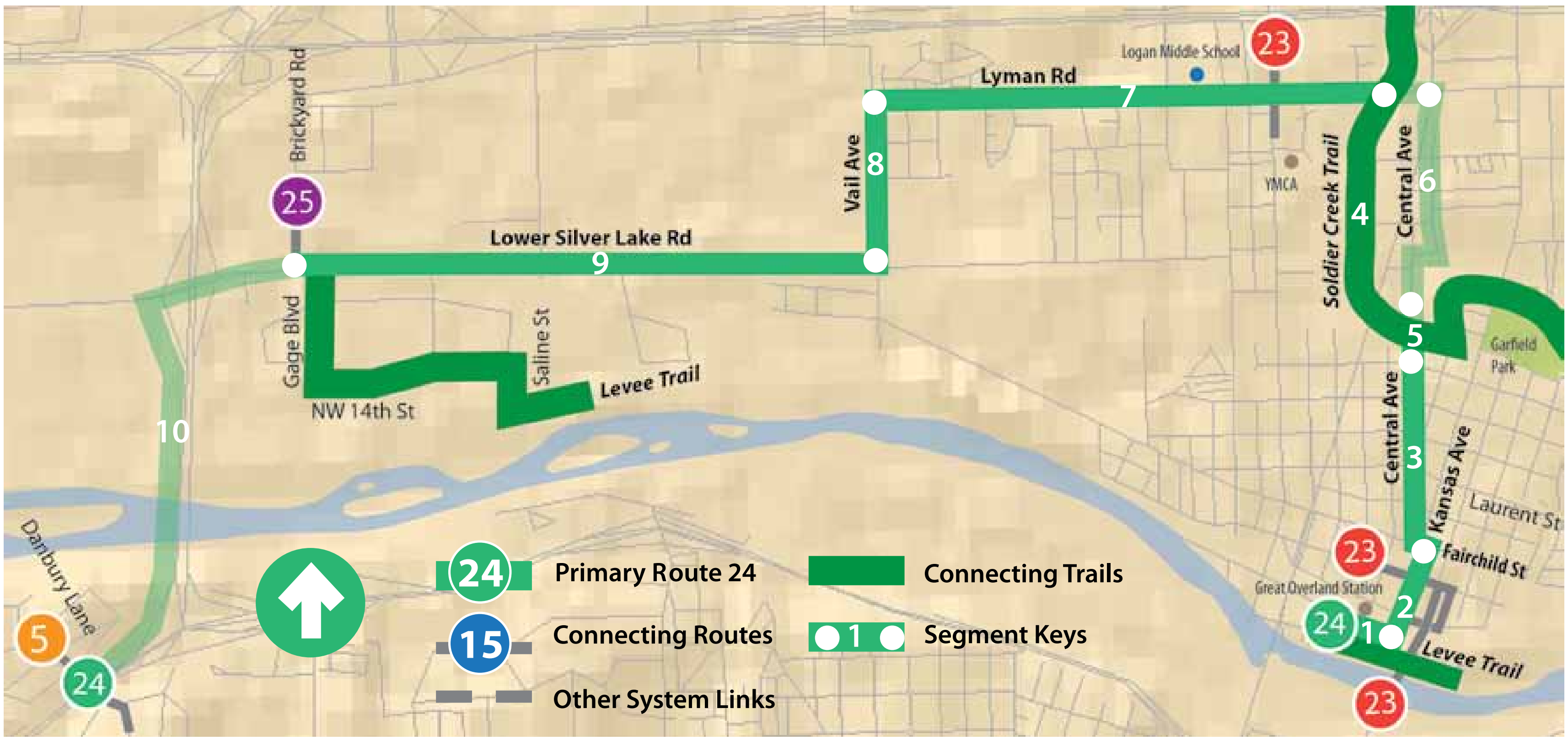


24 Lyman/Silver Lake Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	ADT (2011)	Short Term Options	Ultimate Design
1	Great Overland Station to Kansas and Curtis	.20	2-lane drive and business district local street; 26 feet	NA	Sharrows	Same
2	Kansas Ave, Curtis to Fairchild St	.43	2-lane downtown avenue with diagonal parking; 57 feet	1,415	Sharrows	Same, with back-in diagonal parking for greater safety
3	Fairchild/Central Ave, Kansas Avenue to Soldier Creek Trail	.59	2-lane neighborhood collector; 32 feet	NA	First stage bicycle boulevard with sharrows, identification, and reduction of stop signs to provide bicycle priority. Alternative path through plaza to Central Ave cul-de-sac	Same.
4	Soldier Creek Trail, Central Avenue to Lyman Road	.96	Existing Trail	NA	Existing	Same
5	Soldier Creek bridge for bicycle access to commercial uses on North Topeka Blvd	.06	NA	NA	Soldier Creek Trail to Topeka Blvd. sidewalk; routing of bicycles on sidewalk to Bowery Street.	Approximately 230 foot pedestrian/bike bridge between two ends of Central Ave.
6	Central Ave North, Soldier Creek to North Topeka Blvd.	.59	2-lane business district local; 20 feet	NA	Sharrows for local access to North Topeka commercial development; existing Topeka Blvd. sidewalks to Lyman Road	Sidewalk widening to cycle track standards
7	Lyman Road, Soldier Creek Trail to Vail Avenue	1.36	2-lane rural section arterial; 24 feet	2,640	Share the Road signage	Minor widening with bicycle shoulders on rural section roadway
8	Vail Avenue, Lyman Road to Lower Silver Lake Road	.46	2-lane rural section collector; 24 feet	2,025	Share the Road signage	Minor widening with bicycle shoulders on rural section roadway
9	Lower Silver Lake Road, Vail to Brickyard Road	1.66	2-lane rural section arterial; 24 feet	2,875	Share the Road signage	Minor widening with bicycle shoulders on rural section roadway

24 Lyman/Silver Lake Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	ADT (2007)	Short Term Options	Ultimate Design
10	Kansas River Crossing, Lower Silver Lake Road and US 75 to Danbury Lane		4-lane divided rural arterial (Lower Silver Lake); 4-lane, divided freeway (US 75)	8,955 (Silver Lake); 50,000 (US 75)	Legal but hazardous and inadvisable southbound access on US 75 bridge to Danbury.	New westside pedestrian/bicycle bridge, possibly with two-way cycle track on south side of Lower Silver Lake' defined crossings of ramps; and addition to west side of Gateway Bridge (US 75).

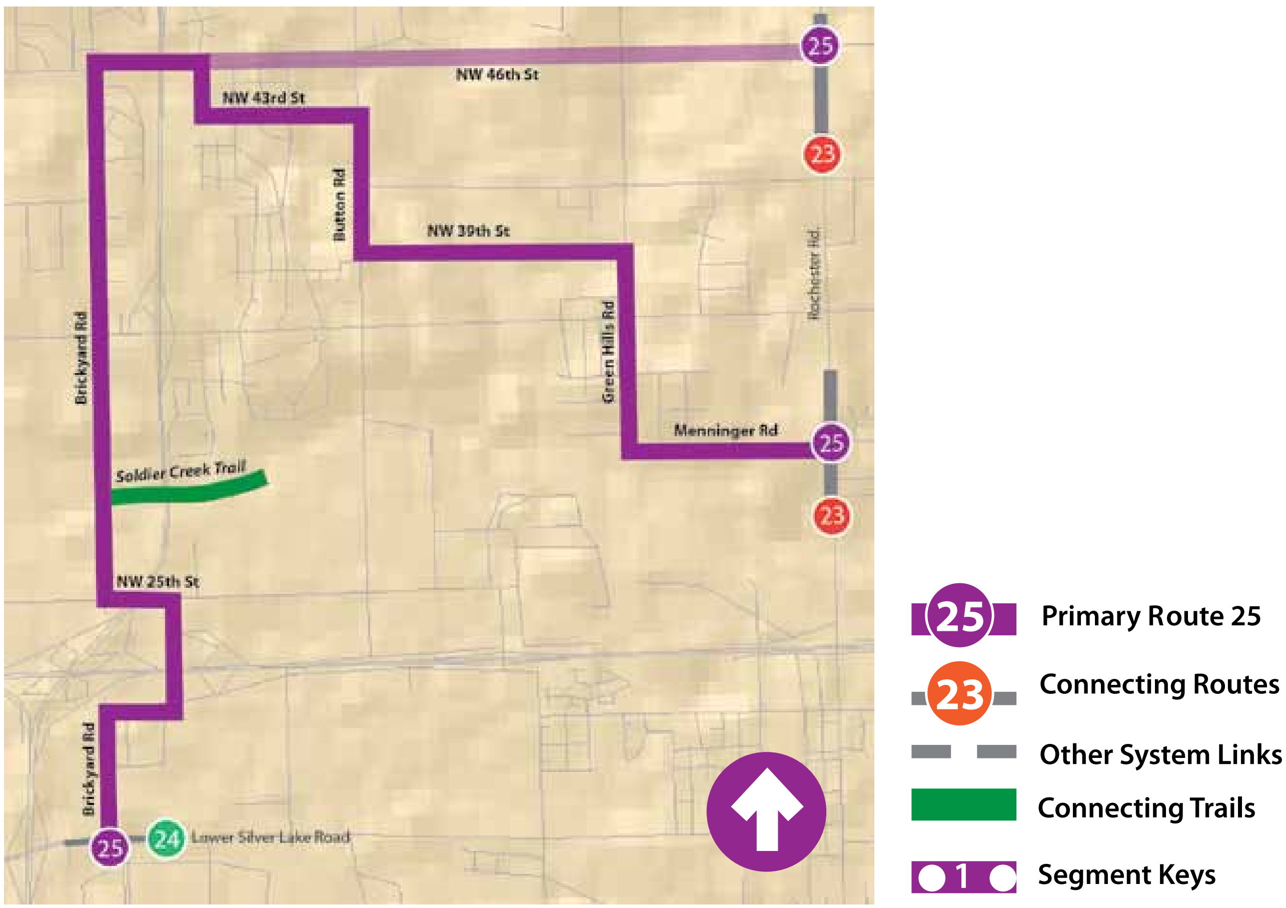


25 46th Street/Hunters Ridge Bikeway

Segment Key	Segment	Length (Miles)	Street Type and Width	ADT (2011)	Short Term Options	Ultimate Design
1	Menninger Rd, Rochester Rd to Green Hills Rd	.77	2-lane rural section collector, 20 feet	960	Sharrows with share the road signage	Paved shoulders also designed to accommodate bicycle traffic
2	Green Hills Rd, Menninger to NW 39th St	1.00	2-lane rural section collector; 21 feet	360	Sharrows with share the road signage	Paved shoulders also designed to accommodate bicycle traffic
3	NW 39th St, Green Hills to Button Rd	1.00	2-lane rural section collector; 21 feet	NA	Sharrows with share the road signage	Same
4	Button Rd, NW 39th to NW 43rd	.50	2-lane rural section collector; 25 feet	NA	Sharrows with share the road signage	Same
5	NW 43rd, Button to Oakley	.60	2-lane rural section collector; 26 feet	NA	Sharrows with share the road signage	Same
6	Oakley, NW 43rd to NW 46th	.40	2-lane rural section collector; 31 feet	NA	Sharrows with share the road signage	Paved shoulders also designed to accommodate bicycle traffic
7	NW 46th, Oakley to Brickyard Rd	.38	2-lane rural section with roundabouts; 24 feet with gravel shoulders	4,575-7,165	Sharrows with share the road signage	Paved shoulders also designed to accommodate bicycle traffic
8	Brickyard Rd, NW 46th to NW 25th	2.40	2-lane rural section collector; 24 feet	1,515	Sharrows with share the road signage	Paved shoulders also designed to accommodate bicycle traffic
9	NW 25th Street between Brickyard Rd. segments	.25	2-lane rural section collector; 24 feet	860	Sharrows with share the road signage	Same
10	Brickyard Rd, NW 25th to US 24 Frontage Road	.38	4-lane divided collector	1,765	Sharrows in outer lanes with share the road signage	Same
11	US 24 Frontage Road between Brickyard Rd. sections	.28	2-lane industrial frontage road; 24 feet	NA	Sharrows with share the road signage	Paved shoulders also designed to accommodate bicycle traffic; final configuration depends on US 24 upgrade project.
12	Brickyard Rd, US 24 Frontage Road to Lower Silver Lake Road		2-lane rural section collector; 24 feet	1,765	Sharrows with share the road signage	Paved shoulders also designed to accommodate bicycle traffic

25 46th Street/Hunters Ridge Bikeway

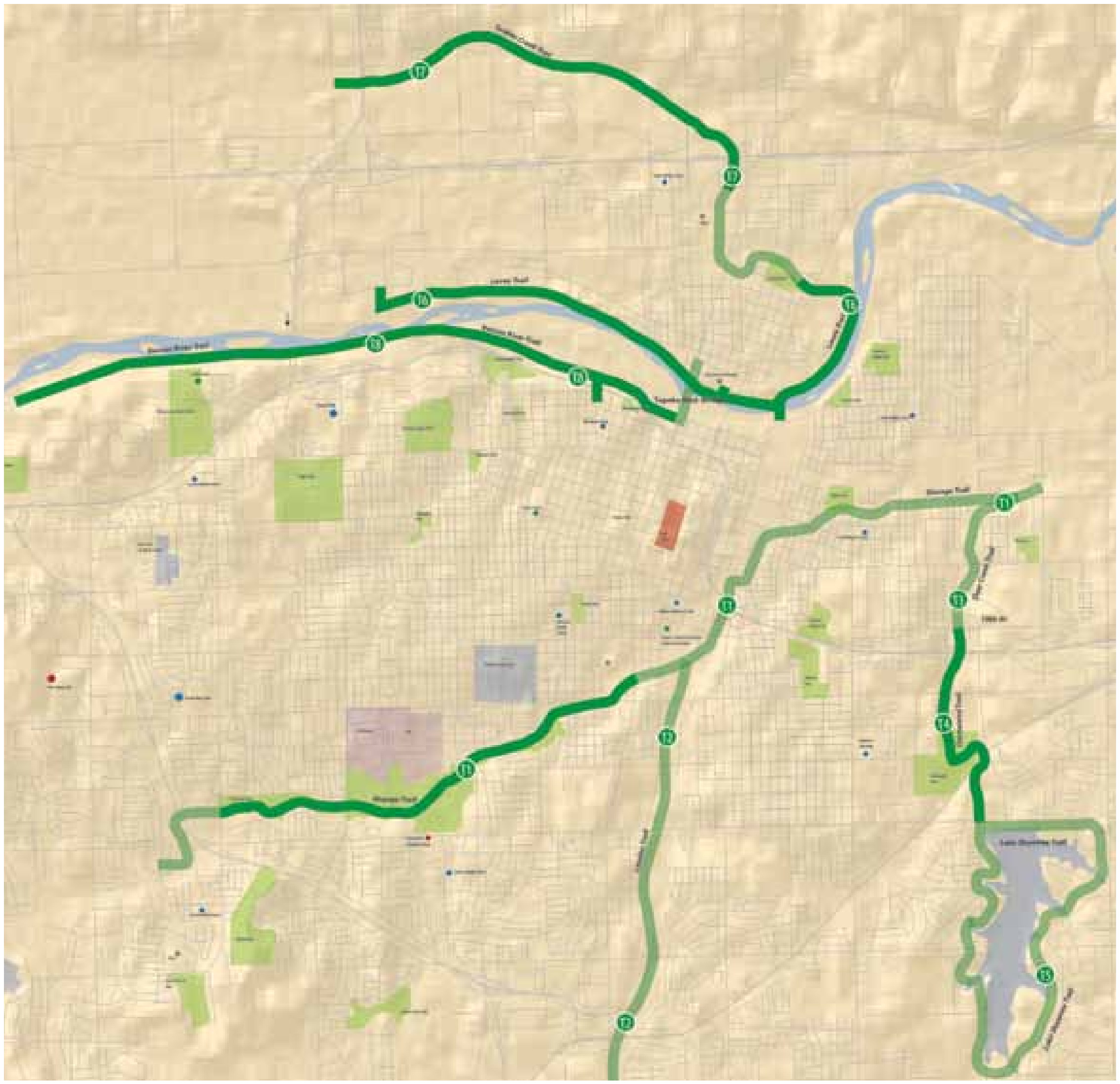
Segment Key	Segment	Length (Miles)	Street Type and Width	ADT (2011)	Short Term Options	Ultimate Design
13	NW 46th, Rochester to Oakley	2.40	2-lane rural section arterial; 24 feet	6,615	None	Paved shoulders also designed to accommodate bicycle traffic



T Regional Trail Segments

Segment Key	Segment	Length (Miles) of New or Rehabilitated Path	Comments
T1	Shunga Trail	4.50 (1.16 of separated trail from Fairlawn to Gage)	Resurfacing and enhancement of existing trail from Topeka Blvd. to Fairlawn. Separation of pedestrian and bicycle tracks from Gage to Fairlawn. Installation of lighting and visibility aids, such as mirrors, at underpass. Assumes completion in 2012 of extension from Fairlawn to McClure.
T2	Landon Trail	--	New trail within city.
T3	Deer Creek Trail, Shunga to 10th Street	--	New trail within city
T4	Deer Creek/Dornwood Trail, 10th to 29th	2.50	Includes new Wittenberg Road bridge over Kansas Turnpike. Short-term use of sharrows or advisory bike lane on bridge.
T5	Lake Shawnee Trail	.40	Realignment and replacement of overly steep grade along south leg of trail.
T6	Levee Trail,	4.70	Connects with Soldier Creek Trail at Garfield Park. Trail deck on Kansas River Railroad bridge adds .2 miles.
T7	Soldier Creek Trail, Lyman to Brickyard Road	3.90	
T8	Kansas River Trail, Murray Hill to Topeka Blvd Bridge	5.90 (approximate)	Based on long-term abandonment of south bank BNSF line

T Regional Trail Segments



New or Rehabilitated Trails

Existing Trails

Priorities and Implementation

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

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

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

- **Extensions of existing facilities.** Projects that make use of and extend the reach of key existing facilities such as the Shunga and Landon trails, should have a significant priority.

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

- **Opportunities.** The implementation sequence should take advantage of opportunities such as street projects such as the Wanamaker and 10th Street improvements, resurfacing and street rehabilitation projects, major investments such as proposed Polk-Quincy viaduct, and other infrastructure projects.

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

While ease of development should not supersede other key factors, it is nevertheless a key strategic factor as Topeka begins to put its system on the ground. Projects or routes that perform well on other criteria and are relatively easy and inexpensive to achieve can provide early, substantive accomplishments that build future momentum. The city's complete streets policy requires consideration of multi-modal transportation in new projects, and provides a specific annual allocation to adapt or enhance active transportation. This significant and predictable annual allocation adapts particularly well to projects that accomplish much per dollar spent.

Routes that Figure 6.1 rates segments of the network by their relative developability. These developability categories include:

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

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

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

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

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

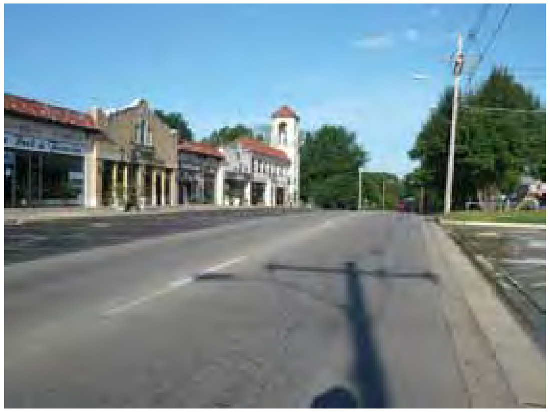
- **Connecting links.** These on-street links connect major routes in the system. Typically, they fall within the "implementation without change" category, requiring only pavement markings and information and identification graphics.

- **Projects under development.** These segments are opportunities that take advantage of projects either under construction or in the short-term pipeline as of fall, 2011.

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

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


Adaptation without Change. Both College Avenue (left) and East 6th Street (right) can be adapted to bikeway use without changing parking or traffic flow characteristics. The proposed solution at College would stripe parking lanes and use sharrows in travel lanes. Sixth is wide enough to use bike lanes without modification.




Adaptation with Minor or Major Lane Modifications. While both adaptations can be implemented at low cost, they both involve at least minor lane modification. Huntoon Street at left would change lane widths to include a bike lane, or provide a bike lane combined with a combination peak hour travel lane/off-peak parking lane. Sixth Street downtown would slightly reduce lane width to make room for bike lanes.

Major Lane Modifications. Above left: 17th Street over Interstate 470 (Route 10) and East 6th Street (Route 1) are examples of streets that accommodate bicycle lanes with major in-channel modifications such road diets, reducing the number of travel lanes to provide bicycle accommodation. This device should be a tool in the Topeka system, but is used relatively infrequently in this plan. Topeka's good secondary street system makes road diets less necessary than in many other cities.

Minor Street Widening. Two-lane collector streets like indiana Avenue above serve important destinations like schools, parks, and community centers, and have manageable traffic volumes, but provide little comfort to many riders. Minor widenings with shoulders that function as bike lanes can provide a safer facility for all modes.

Major Roadway Construction. High volume streets like 10th Street east of Wanamaker will undergo major construction to increase capacity. Future widenings or construction of new streets on the system should be built to complete street standards.

- **Major path or trail development.** These elements are major new trails on exclusive right-of-way. They do not include all facilities proposed by Topeka's regional trails and greenways plan, but only those that are integral to the bicycle transportation system.

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

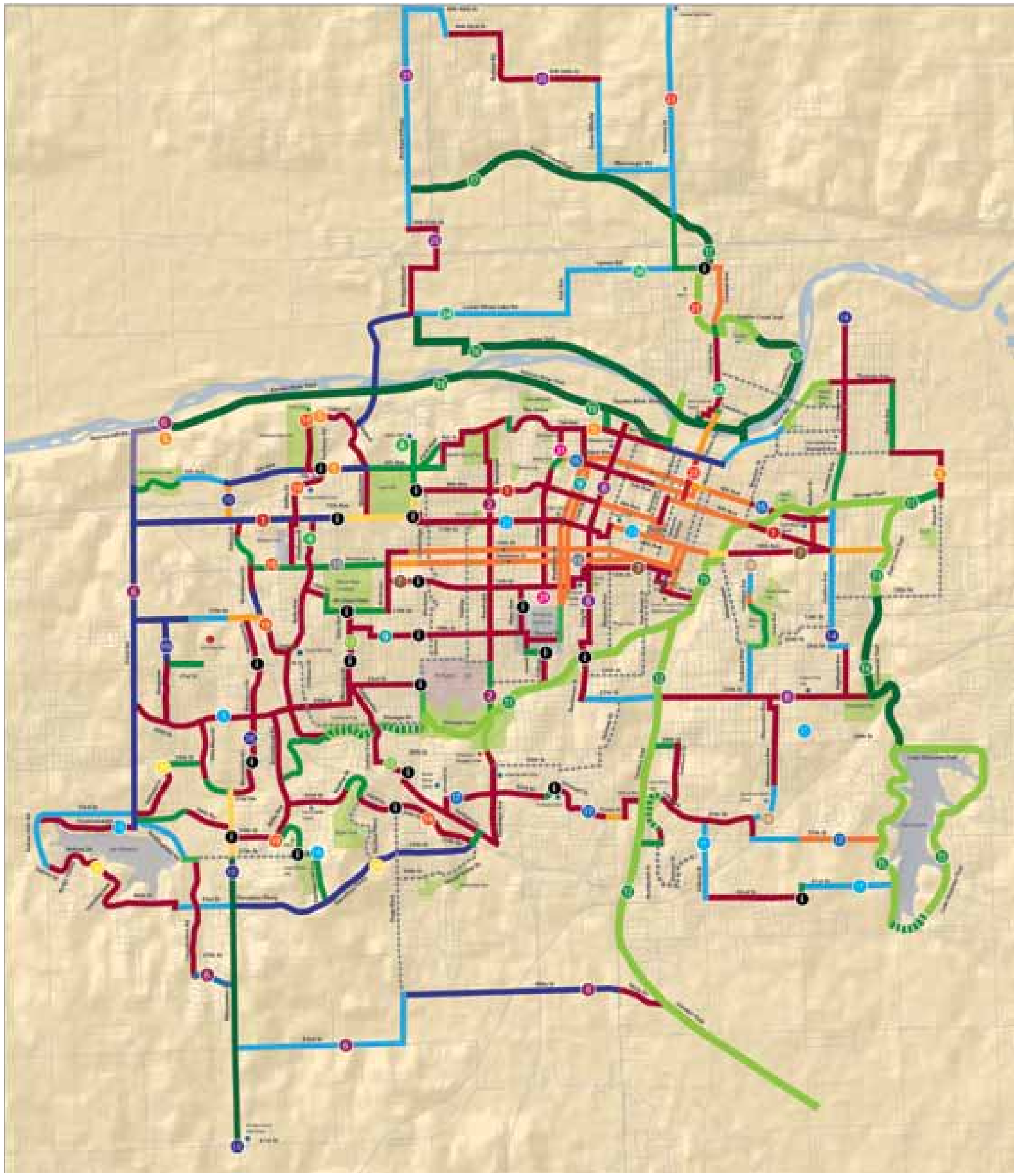
The System Developability Categories Map on the facing page classifies segments on the proposed Topeka Bikeways System based on relative ease of development.

Sequencing

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

Developability Categories

- Implementation without Change
- Minor Modifications
- Major Lane Modifications
- Minor Widening
- Major Roadway Construction
- Projects Under Development
- Minor Trail Development/Gap Filling
- Major Trail or Path Development
- Trail Rehabilitation/Retrofit
- Existing Trails
- Connecting Links
- Intersection Projects



Gap Filling. These high priority projects use small pathway segments to create major connections and represent extremely high value for each dollar of investment. Above, a path under I-470 following a Shunga Creek tributary connects the Wood Valley area and south part of Topeka to the Shunga Trail system and other parts of the bikeway network.

Major Trails. A trail through Dornwood Park connecting to the Deer Creek Trail is a critical link that makes Lake Shawnee accessible to much of the rest of the city.

Sequencing. The connection between Downtown and Oakland along the Kansas River (part of Route 5) is a scenic route that links important parts of town. It also includes a mid-street promenade using a disused railroad right-of-way along First Street, and a connection to the Levee Trail over a little used railroad bridge. However, the impact of a long-term capital project (Polk-Quincy Viaduct on I-70) and the short-term status of the railroad cause this important link to a later stage of development.

Pilot System: The Starting Point

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

<u>Street-Oriented Pilot Routes</u>

Components of the recommended pilot system include:

- **Route 1** (East-West Bikeway) between the Shunga Trail at Market Street near Scott Magnet School to Gage Park and 10th and Belle Avenue. This route incorporates new bike lanes along 6th on the east side and a popular existing route along 8th Avenue.

- **Route 2** (Randolph Bikeway) between Hummer Sports Park and 37th and Randolph. This north-south route connects parks and schools with the Shunga Trail and Sunga Creek greenway, and links the north and south sides of Topeka. It also intersects the East-West route at 8th Avenue.

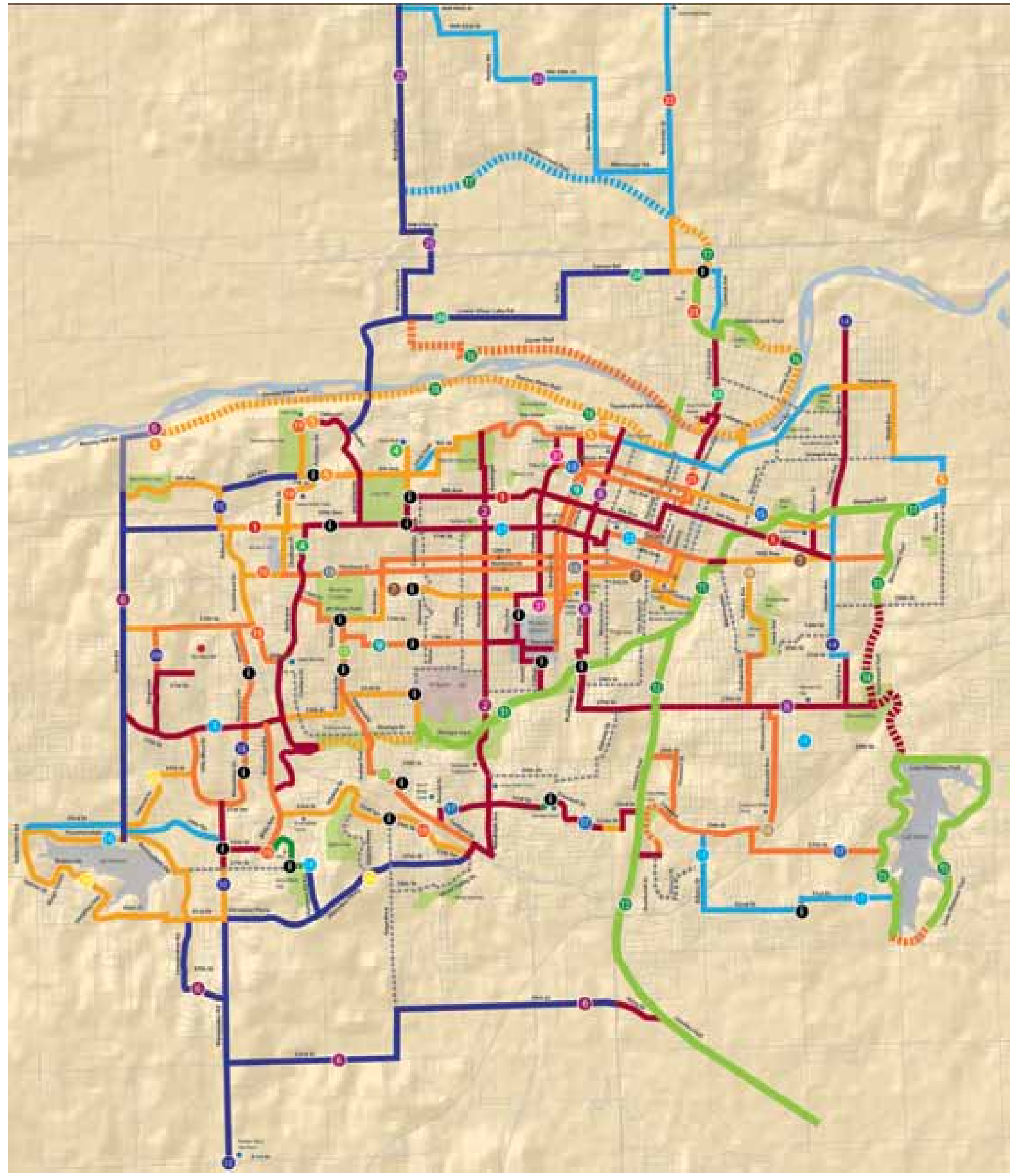
- **Route 3 (25th Street Bikeway)** between Belle and Urish Avenues. This segment of the longer Route 3 uses takes advantage of a moderately trafficked crossing of I-470 to link westside neighborhoods to the rest of the system, including the Shunga Trail.

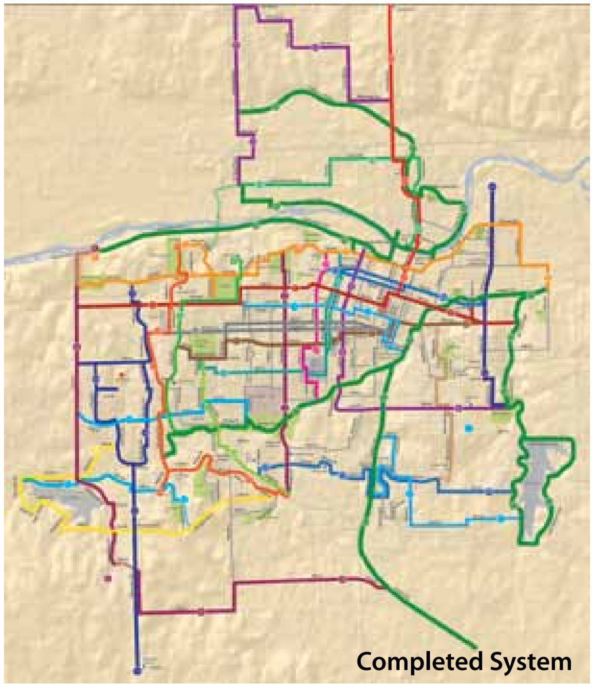
- **Route 4 (Belle Bikeway)** between Gage Park and the Shunga Trail at Crestview Park and Fairlawn Road. This

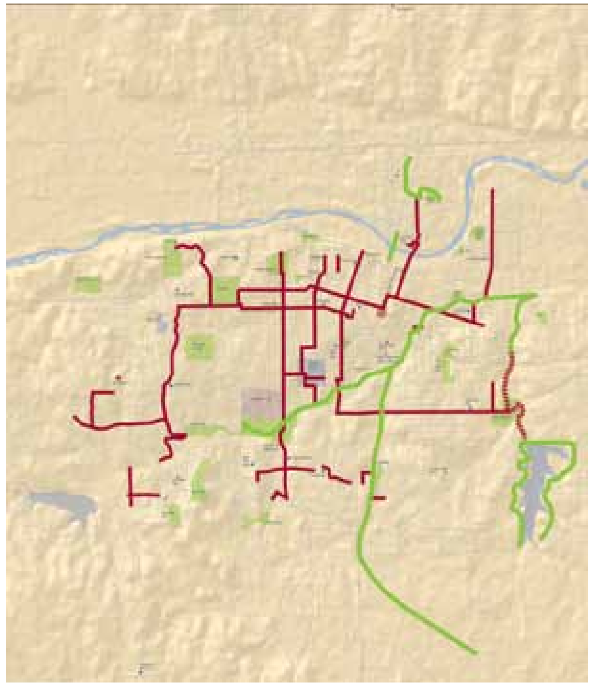
Sequencing. The ease of establishing bike lanes on a strategic street that knits east and west sides together elevates this segment of 6th Street to a high phase.

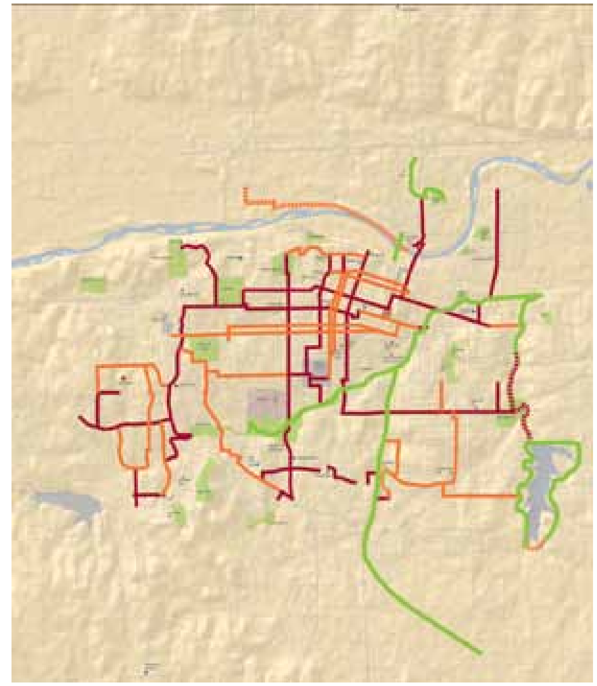
Sequencing Concept

- Phase One: 2012-2014
- Phase Two: 2015-2017
- Phase Three: 2018-2020
- Phase Four: 2021-2023
- Phase Five: 2024-2026









An Evolving System

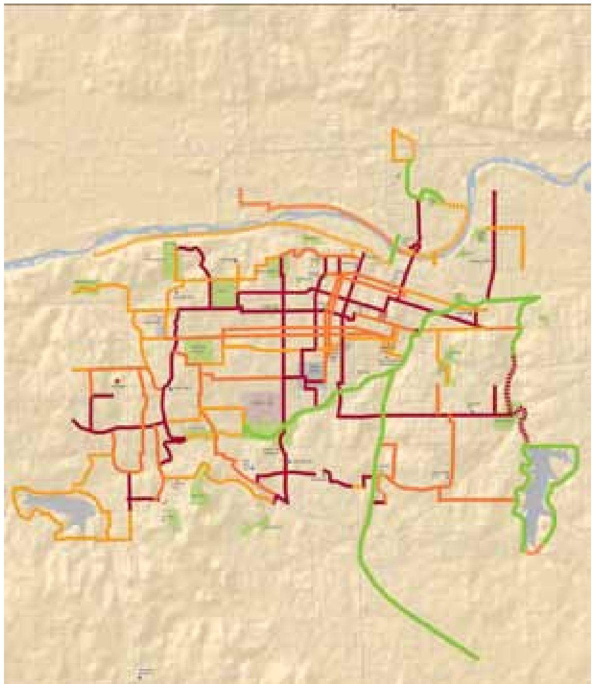
The Topeka Bikeway System will develop in phases, each of which meets the system criteria discussed earlier through every stage of the development process. The maps on these pages illustrate how the system might evolve in five phases. While changes in projects and opportunities will inevitably cause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

Phase One

Phase One combines existing trails with relatively easily convertible streets and short, gap-filling path segments to create the foundation for the comprehensive bikeways system. The phase one system provides service to all parts of the city, and generally reflects the pilot system presented in this chapter. Its densest coverage, though, occurs in the central part of Topeka, providing (with the Shunga Trail) a grid of three continuous east-west and north-south corridors. It also connects Lake Shawnee to the rest of the citywide network.

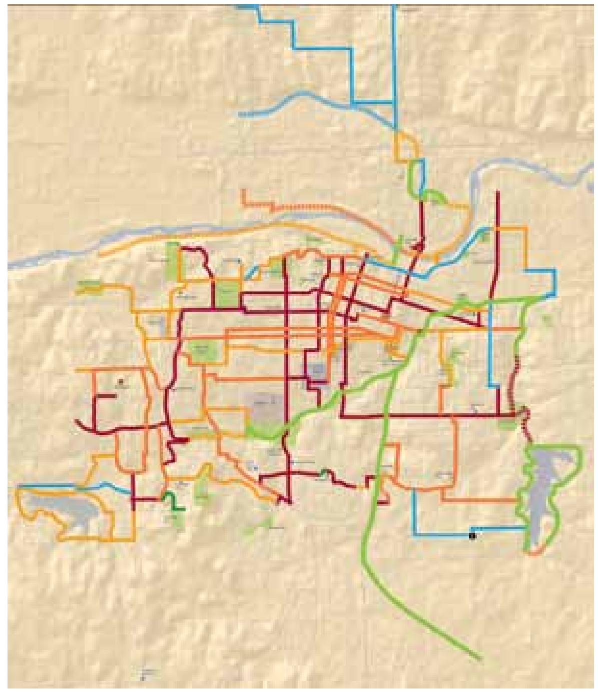
Phase Two

Phase Two adds to the coverage of the central city grid and fills out service in the southwestern and southeastern parts of the city. It establishes a direct east-west street connection to Lake Shawnee and adds on-street service that parallels the Wanamaker Road commercial corridor. It also includes development of the Levee Trail on the north side of the Kansas River.



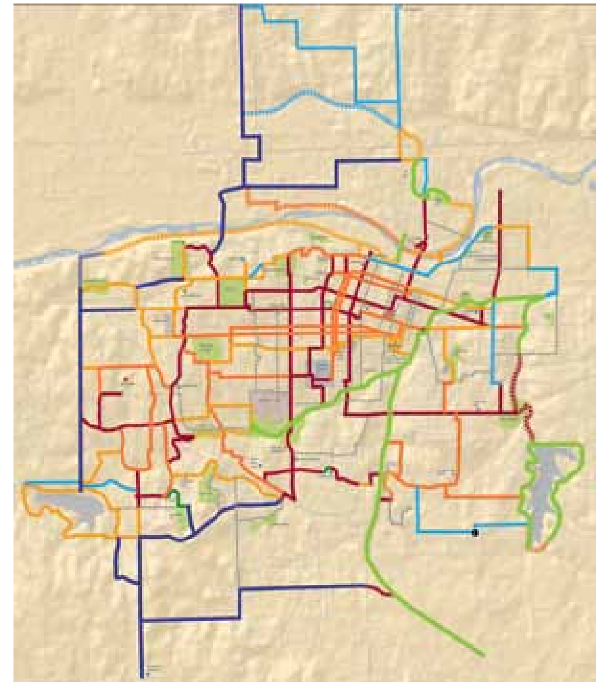
Phase Three

Phase Three completes most of the on-street system that can be developed without substantial capital construction. It completes much of the bikeways street system on the west side of the system, and adds important, but more limited connections in the east. It also anticipates completion of the Kaw River Trail on the south bank and extension of the north bank Levee Trail to Garfield Park in North Topeka.



Phase Four

Phase Four adds some on-street connections, but assumes that bicycle transportation's mode share has increased to the degree that significant capital projects, such as minor widening for bike lanes, become acceptable to the Topeka public. Strategically, less expensive, on-street projects using the existing system maximize mode share among street-capable cyclists, and the system has matured to address new markets who are less comfortable with sharing even lightly traveled streets. The majority of phase four projects are on the eastern and northern peripheries of the city, where rural road sections and development patterns encourage minor widenings. Phase Four may also see enhancement of some parts of the urban system. It also anticipates completion of the Polk/Quincy I-70 project and associated bike facilities.



Phase Five

Phase Five completes the system by including major long-range projects that would be developed to complete street standards. Some of these projects (such as Urish Road) may be completed much earlier in the process because of traffic and development demand, and the phasing would adjust accordingly. Phase Five projects focus around the north, west, and south peripheries of the city. They may also include upgrades of the in-city system to the ultimate design westside connection adapts Belle Avenue, a popular route that connects to the Shunga Trail, to bicycle boulevard status, and takes advantage of a pending improvement project along 10th Street.

- **Route 8 (Clay/25th Street Bikeway)** between Ward Meade Park and Dornwood Park, utilizing Clay, Buchanan, and 25th Streets to form a long, L-shaped route that serves schools, community centers, and parks. It includes a new direct connection to the Shunga Trail at the Buchanan Avenue bridge over Shunga Creek.

- **Route 14 (Golden Bikeway)** between the Shunga Trail at the Golden Avenue crossing and Oakland-Billard Park. This segment of a longer future route serves the Oakland neighborhood and connects a major park, community center, and schools to the main system. It also provides a short-term, safe commuter route to downtown, in advance of a longer-term project along River Drive.

- **Route 17 (33rd Street Bikeway),** between the Landon Trail at 37th Street and Lake Shawnee. This is the eastern segment of a longer east-west route that provides a short-term solution to connecting the Lake Shawnee Trail into the rest of the city's network. The route utilizes a lightly travelled portion of 37th Street and a new bridge crossing linking Betty Phillips Park and its surrounding neighborhood to the new segment of the Landon Trail.

- **Route 21 (College Bikeway)** from Edgewood Park to the Shunga Trail. This north-south route connects the historic Potwin neighborhood and Willow Park to Washburn University and the Shunga Greenway. It uses existing streets through the university campus.

- **Route 23 (North Topeka Bikeway)** from 6th and Kansas to the Soldier Creek Greenway. This initial segment links North Topeka into the system by way of the Kansas Avenue bridge and a bicycle boulevard along Central Avenue to the existing trail. The Topeka Boulevard bridge is not included in the pilot system because of the probable disruption created by construction of the Polk/Quincy project.

- **Van Buren Street** between First Street and the Capitol. This connecting street easily accommodates bike lanes, and provides a highly visible path to the Capitol Building.

- **19th Street.** This short segment of the ultimate Route 9 (Washburn Bikeway) connects the Randolph Bikeway to the College Bikeway and Washburn campus.

- **11th Street.** This short bicycle boulevard segment of the 11th Street Bikeway (Route 22) serves the Public Library and Topeka High School, two key destinations.

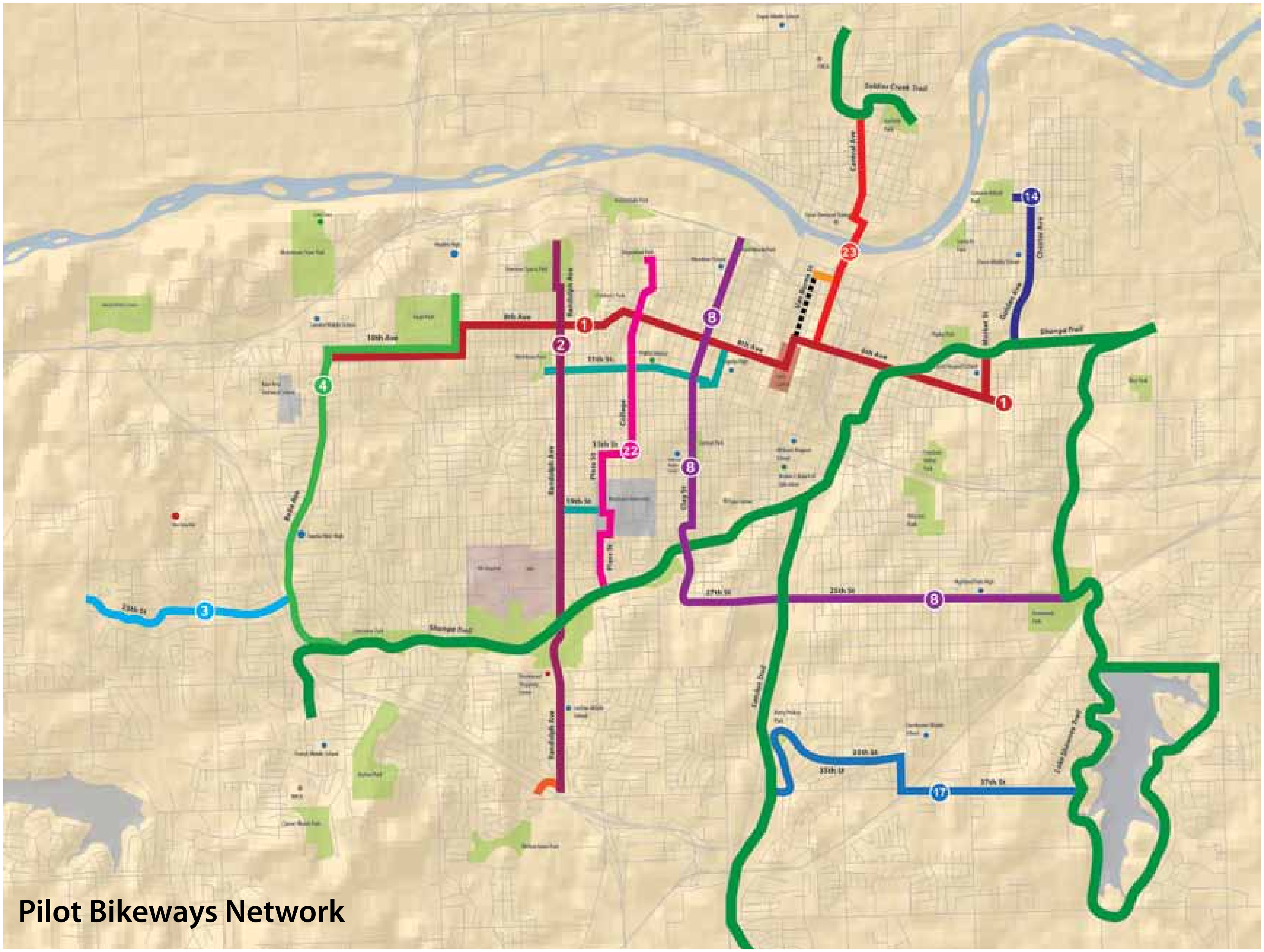
<u>Trail and Pathway Segments</u>

Priority trail segments that support the pilot on-street network include:

- **The planned extension of the Shunga Trail** under I-470 to McClure Street and French Middle School.

- **The Deer Creek/Dornwood Trail system,** connecting the current terminus of the Deer Creek Trail at 10th Street to the Lake Shawnee Trail.

- **The Wood Valley link from 37th and Randolph under I-470.** This short but strategic pathway follows a Shunga Creek tributary under I-470 and provides a badly needed link between south Topeka neighborhoods like Wood Valley to the rest of the network.



Pilot Bikeways Network

Opportunities

The pilot network should also take advantage of opportunities presented by street rehabilitation or major construction projects as they emerge. Examples include resurfacing of 10th Street and the Lane/Washburn one-way pair. These projects should include pavement markings or sections consistent with the recommendations of the Bikeways Plan.

Implementation and Opinion of Probable Cost

The Probable Cost table presents a generalized opinion of costs for the pilot system, based on unit cost factors per mile for various facility types displayed in the table on this page. These projected costs are in 2011 dollars and include 10% design fees and 15% contingency.

Estimated Cost per Mile by Facility Type

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

Includes 10% allowance for design fees and 15% contingency.
*Assumes one to two traffic calming treatments per mile (such as circles, speed tables, curb extensions, etc.)

Pilot Bikeways Network: Opinion of Probable Cost

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
1	Market Street, Shunga Trail to 6th Avenue	.33	Sharrows and signage between existing bridge and 6th.	7,500/mi	2,475	Market Street crossing to Shunga Trail was previously completed
	6th Avenue, Golden to Lamar	.42	Bike lanes	15,000/mi	6,300	
	6th Avenue, Lamar to Shunga Creek	.60	Bike lanes	15,000/mi	9,000	
	6th Avenue, Shunga Creek to Adams	.24	Lane modification with bike lanes	25,000/mi	6,000	
	6th Avenue, Adams to Monroe	.22	Lane modification with bike lanes	25,000/mi	5,500	
	6th Avenue, Monroe to Van Buren	.32	Lane modification with bike lanes	25,000/mi	8,000	
	Van Buren, 6th to 8th Avenue	.21	Bike lanes with installation of back-in diagonal parking	25,000/mi	5,250	
	8th Avenue, Van Buren to Tyler	.24	Lane modification with bike lanes	25,000/mi	6,000	
	8th Avenue, Tyler to Clay	.40	Lane modification with bike lanes	25,000/mi	10,000	
	8th Avenue, Clay to Lincoln	.15	Lane modification with bike lanes	25,000/mi	3,750	
	8th Avenue, Lincoln to Summit, Summit to Gage Park	1.85	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	27,750	
	Gage Street Intersection		Defined crossing and warning beacons	25,000/mi	30,000	
	Gage Park, 8th Street to Westchester	.78	10 foot sidepath	300,000/ mi	234,000	
	10th Avenue, Westchester to Belle Avenue	.46	10 foot sidepath; 5 feet of path should be attributed to planned street project	300,000/ mi	69,000	Cost is for extra path width along planned construction project.
	Totals	**6.22**			**423,025**	**Street adaptation costs are $120,025 of the total.**

Pilot Bikeways Network: Opinion of Probable Cost

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
2	Randolph, 37th to 33rd	.58	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	8,700	
	Randolph, 33rd to 30th	.29	First-stage bicycle boulevard with sharrows and identification, striped parking lanes	20,000/mi	5,800	
	Randolph, 30th to 29th	.15	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	2,250	
	Brookwood Spur, Randolph to Brookwood Shopping Center	.1	Widening of existing sidewalk to sidepath standards	150,000/ mi	15,000	
	Shunga Trail Spur, 29th Street to Shunga Trail	.05	Existing	NA		
	Trail Extension, Shunga Trail to SW Randolph at TARC	.50	10 foot asphalt or concrete trail	264,000/ mi	132,000	Cost assumes asphalt
	Randolph, TARC to 21st Street	.53	First-stage bicycle boulevard with sharrows and identification, no calmers	25,000/mi	13,250	Additional cost for enhancement of existing 21st Street intersection
	Randolph, 21st to 15th	.70	First-stage bicycle boulevard with sharrows and identification	15,000/mi	10,500	
	Randolph, 15th to 6th	1.30	First-stage bicycle boulevard with sharrows and identification	15,000/mi	19,500	
	6th Street Intersection at Randolph/Tuffy Kellogg		Defined crosswalks with warning beacons	30,000 ea	30,000	
	Tuffy Kellogg Drive, 6th Street to Outer Circle Drive	.36	Sharrows	7,500/mi	2,700	
	Totals	**4.56**			**239,700**	Street adaptation costs are $107,700 of the total.

Pilot Bikeways Network: Opinion of Probable Cost

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
3	25th Street, Belle to Westport	.42	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	6,300	
	25th Street, Westport to Urish	1.36	First-stage bicycle boulevard with sharrows and identification, no clamers	15,000/mi	20,400	
	Totals	**1.78**			**26,700**	
Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
4	28th Street/Belle Avenue, Shunga Trail to 21st Street	1.41	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	21,150	
	21st Street intersection		Signal loop modifications and sharrows in travel path	10,000 ea	10,000	
	Belle Avenue, 21st to 17th Street	.58	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	8,700	
	Belle Avenue, 17th to Huntoon Street	.52	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	7,800	
	Huntoon Street intersection at Belle Avenue offset	.03	Defined bicycle track through offset with warning beacons	45,000 ea	45,000	Includes off-street, one-way cycle tracks on Huntoon between offset segments.
	Belle Avenue, Huntoon to 10th Avenue	.53	First-stage bicycle boulevard with sharrows and identification, no calmers	15,000/mi	7,950	Connects with sidepath to Gage Park proposed in Route 1.
	Totals	**3.07**			**100,600**	

Pilot Bikeways Network: Opinion of Probable Cost

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
8	25th, Dornwood Park to California	.74	Bike lanes	15,000/mi	11,100	Market Street crossing to Shunga Trail was previously completed
	25th, California to Landon Trail	1.32	Sharrows and signage	7,500/mi	9,900	
	25th/27th, Landon Trail to Buchanan Street	.95	Sharrows and signage	7,500/mi	7,125	
	Buchanan, 27th-21st	.51	First-stage bicycle boulevard with sharrows and identification	15,000/mi	7,650	
	Buchanan access to Shunda Trail		New ramp and lighting	65,000 ea	65,000	Includes new trail ramp, pavemnet markings, lighting, and signage
	Buchanan/Hampton, 21st to Clay	.07	Sharrows	7,500/mi	525	
	Clay, 21st to Huntoon	1.06	First-stage bicycle boulevard with sharrows and identification	20,000/mi	21,200	Extra cost includes motorist advisory signs at intersections with 12th and Huntoon
	Clay, Huntoon to Old Prairie Town	1.43	First-stage bicycle boulevard with sharrows and identification	15,000	21,450	
	Total	**6.08**			**143,950**	

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
14	Golden, Shunga Trail to Seward Avenue	.42	Sidepath either expanding existing sidewalk on west side of street or developing a new path on east side	300,000/ mi	126,000	Route plan proposes sharrows as an interim measure. Separated path is preferable solution for a sort segment. Cost is lower if existing walk can be expanded.
	Chester, Seward to Riverside RV Park	1.42	First-stage bicycle boulevard with sharrows and identification	15,000/mi	21,300	
	Total	**1.84**			**147,300**	

Pilot Bikeways Network: Opinion of Probable Cost

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
17	37th Street, West Edge to California	.91	Lane definition with bike lanes	25,000/mi	24,750	
	37th Street, California to Indiana	.50	Sharrows and signage	7,500/mi	3,750	
	Indiana Avenue, 37th to 35th Terrace	.23	Sharrows and signage	7,500/mi	1,725	
	35th Terrace/35th Street, Indiana to Adams	.55	Sharrows and signage	7,500/mi	4,125	
	35th Street/Irvingham Street, Adams to Betty Phillips Park	.54	Sharrows and signage	7,500/mi	4,050	
	Betty Phillips Park to Landon Trail	.64	Sharrows and connecting sidepath on 37th Street to Landon Trail	7,500/mi for on-street work, 300,000/mi for sidepath (.1 mile)	35,000	Uses existing Betty Phillips Park path and pedestrian bridge to H\ umboldt Street. Does not include path modification.
	Total	**3.37**			**73,400**	

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
23	Kansas Avenue, 6th to 1st Avenue	.52	Bike lanes	25,000/mi	13,000	Alternative of lanes and cycle track should be integrated into Kansas Avenue redesign
	Kansas/Quincy Bridge, 1st Avenue to Laurent Street	.66	Sharrows and adaptation of walk for SB bike traffic	20,000/mi	13,200	
	Laurent Street/Quincy-Monroe Alley/ Norris Street to Kansas Avenue intersection	.28	NB Route: Sharrows with defined on-street parking lanes on Laurent/Norris; sharrows on Quincy-Monroe alley	10,000/mi.	2,800	
	Laurent, Quincy to Kansas	.08	Sharrows and signage	7,500/mi	600	
	Kansas Avenue, Norris to Fairchild	.30	Sharrows and signage.	10,000/mi	3,000	Back in diagonal parking should be considered.
	Fairchild/Central Avenue, Kansas to Soldier Creek Trail	.59	First-stage bicycle boulevard with sharrows and identification	15,000/mi	8,850	
	Total	**2.43**			**41,450**	

Pilot Bikeways Network: Opinion of Probable Cost

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
21	College Avenue, Shunga Trail to 21st Street	.33	Sharrows and signage with striped parking lanes	15,000/ mi.	5,000	
	College Avenue crossing at 21st Street		Enhanced crossing with median refuge and warning beacons	50,000 ea	50,000	
	21st Street, College to Jewell Avenue entrance	.17	10-foot sidepath or widening of existing path to sidepath standards	300,000/ mi	51,000	
	Washburn University campus to 17th and Plass	.54	Sharrows on campus streets	7,500/mi	4,050	
	Plass Avenue, 17th to 15th	.20	Sharrows and signage	7,500/mi	1,500	
	15th Street, Plass to College	.23	First stage bicycle boulevard with sharrows and identification	15,000/mi	3,450	
	College Avenue, 17th to 6th Avenue	1.50	First stage bicycle boulevard with sharrows and identification, striped parking lanes	20,000	30,000	
	Willow Park, 6th and College to 4th and Willow	.08	Connecting path through park, defined crossing with warning beacons at 6th Street	300,000/mi, 30,000 for crossing	54,000	
	Elmwood Avenue, Willow to 1st	.32	Sharrows and signage	7,500	2,400	
	Total	**3.37**			**201,400**	
Link	Van Buren, 1st to 8th	.72	Bike lanes with installation of back-in diagonal parking	25,000/mi	18,000	6th to 8th Street portion is part of Route 1
Link	19th Street, Jewell to Randolph	.37	Sharrows with signage	7,500/mi	2,775	
22	11th Street, Randolph to Western; Western, 11th to Topeka High	1.40	First stage bicycle boulevard with sharrows and identification	15,000/mi	21,000	
Link	Western, 11th to 8th	.20	Sharrows and signage	7,500	1,500	
	Total	**2.69**			**57,275**	

Pilot Bikeways Network: Opinion of Probable Cost

Route	Segment	Length (Miles)	Bikeway Facility Treatment	Unit Cost	Cost	Comments
Trail	Deer Creek/Dornwood, 10th to 29th	2.50	10 foot concrete trail	385,000/ mi	$962,500	Does not include cost of new or adapted Wittenberg Road Bridge over Kansas Turnpike. Short term use of sharrows or advisory bike lane on existing bridge.
Trail	Wood Valley Connector, 37th and Randolph to 37th and Wood Valley	.25	10 foot concrete path	385,000/ mi.	96,250	Route uses Oak Parkway and parallels Shunga Creek trib under Interstate
	Total	**2.75**			**1,058,750**	

Recap of Pilot System by Route

Route	Name	Length (Miles)	Cost
1	East-West	6.22	423,025
2	Randolph	4.56	239,700
3	West 25th	1.78	26,700
4	Belle	3.07	100,600
8	Clay/East 25th	6.08	143,950
14	Golden	1.84	147,300
17	33rd Street	3.37	73,400
21	College	3.37	201,400
23	North Topeka	2.43	41,450
Links	11th, 19th, Van Buren	2.69	57,275
Trail	Deer Creek/Dornwood	2.50	962,500
Trail	Wood Valley Connector	.25	96,250
Total	**Complete Pilot System with trails**	**34.79**	**2,513,550**

Recap of Pilot System by Infrastructure Type

Infrastructure Type	Length (Miles)	Cost
Street Adaptation*	29.92	631,725
Route-Related Pathways	2.73	842,275
Trails	1.78	1,058,750
Total	**34.43**	**2,532,750**

* Intersection improvements are calculated as street adaptations

CHAPTER 6 SUPPORT SYSTEMS

While previous chapters have focused on the design and character of a bikeways network, infrastructure by itself does not create an excellent bicycle transportation program. To guide communities, the League of American Bicyclists through its Bicycle Friendly Communities (BFC) program, establishes five components of program design that are used to determine whether a city should be awarded BFC status – the 5 E's of Engineering, Education, Encouragement, Enforcement, and Evaluation.

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

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

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

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

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

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

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

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

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

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

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

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

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

Organizational Infrastructure

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

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

  A BPAC should be formally established in city government by executive order or city council resolution to give it somewhat permanent status, and should meet on a regular (preferably monthly) basis. Formal status sends the message that the committee is taken seriously and its interests are a recognized part of the city's transportation picture.

- **A bicycle/pedestrian coordinator.** This position provides a consistent presence within city government for bicycle and pedestrian initiatives. Typically, the coordinator staffs the advisory committee, is critically involved in implementation and technical design of components of this plan, initiates and prepares grant applications, works with civic and private sector groups on programs, reviews development applications and project and for access, and generally becomes the public face for active transportation in the city. This position may be assigned to an existing staff member, but this may be a convenient and relatively low-cost short term arrangement. However, the most effective coordinators devote full-time attention to pedestrian and bicycle transportation and builds functional partnerships with departments and agencies that touch this vital area. These departments include Public Works, Parks and Recreation, Planning, the Metropolitan Planning Organization, the Kansas Department of Transportation, and private organizations.

  In many cases, funding for a bicycle/pedestrian coordinator comes in whole ad in part from outside city government. For example, in Omaha, funding for the position is largely shared by a major health care provider and the MPO. This funding is provided on a three-year basis, after which is effectiveness will be evaluated, and at least a portion of funding will transition to the city.

- **A bicycle transportation advocacy organization.** An advocacy organization dedicated to bicycle transportation can be extremely important in coordinating specific programs such as education efforts, insti-

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

tutions such as bicycle cooperatives, special events, communications, and other actions in behalf of active transportation. These groups evolve and take different forms in different cities, often emerging as a partnership of other groups and clubs. Topeka already has some of the elements of such an organization. The Kaw Valley Bicycle Club represents bicycle interests, but like many clubs, concentrates on events and group rides. Bike Topeka complements the club by providing information and communication through it's website. Other logical partners include health providers, safety organizations and councils, and similar nest groups. In some cities, groups develop under the leadership of active living organizations.

Education

Increase the number of league certified instructors in Topeka. The League of American bicyclists BikeEd program is recognized a the standard for bicycle safety education, and includes a variety of courses that serve young cyclists, recreational riders, and everyone up to road-hardened commuters. Successful operation of the program is dependent on one critical factor, however - local presence of instructors. Therefore, a critical part of the program is training of instructors through the League Certification process. In this process, cyclists complete both prerequisite courses and a three-day course conducted by a specially trained instructor. Successful completion and passing written and on-road evaluations qualifies individuals as League Certified Instructors (LCI), who are then authorized to provide training to other cyclists. As of 2011, Topeka has only one certified instructor and certainly has a need for more. In addition to a cadre of instructors, a successful training program requires marketing and placement to match instructors with demand from schools, corporations, and other organizations. This can most appropriately be done through an advocacy or active living organization with staff to organize the education effort.

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

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

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

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

Encouragement

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

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

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

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

Publish and maintain a Topeka Bicycle Map. The initial bicycle map is based on research and surveying completed for this plan. It categorizes streets based primarily on the quality of their bicycling environment, using such criteria as continuity, traffic volume, width, and service to destinations. It also illustrates existing trails and their interaction with the street system. This map should be published and distributed through bike stores, educational programs, employers, and community agencies and facilities. The street map may be merged with the city's present trails map, but may also be a separate document because the two publications serve somewhat different publics. The map should also be posted on-line and paired with a blog or interactive website that invites comments and suggestions. The map should be updated periodically (typically every two years) to reflect new recommendations, public input, new construction, and network progress. A specific organization should be assigned responsibility for map maintenance. Candidates include the City, the MPO, or a local bicycle coalition or organization.

Apply the Portland model of focus on increasing bicycling on a neighborhood by neighborhood basis. Portland, arguably the nation's leading large city for bike transportation, concentrates on specific neighborhood districts for a period of time to increase participation. It uses a variety of tools, including surveys, events, education, and other programming before moving on to another district. Topeka should experiment with this approach on a pilot basis and evaluate is effectiveness.

Encouragement through Events. The largest group bike ride in the country is Bike New York's Five Borough Bike Tour, with 32,000 riders. But much more modest rides also provide fun and support for riders of all abilities.

Encourage Topeka businesses to participate in the League of American Bicyclists Bicycle Friendly Business (BFB) program. The program recognizes businesses that encourage their employees to use bicycles for transportation through efforts such as providing secure bicycle parking, sponsoring company rides, offering economic incentives, establishing internal bicycling events and bicycle interest groups, and supporting community bicycle initiatives. As of 2011, Kansas has only one BFB, located in Overland Park.

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

Engineering (Facilities)

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

- **Identifying key locations for facilities.** Examples of priority locations include:

  - Major public facilities such as government buildings, the public library, community centers, parks and recreational destinations, the zoo, and the Discovery Center.

  - Locations near trails that offer support services such as restrooms, food, and water.

  - Neighborhood commercial centers and districts.

  - Museums and attractions.

  - Employment concentrations.

  - Parking structures. One stall in a public parking structure can be devoted to bicycle parking, and can accommodate as many as 12 inverted u-racks, serving up to 24 bicycles. Unused space such as corners where parking stalls change orientation can also be easily used for bicycle parking.

  - Diagonal stalls in business districts. In areas with heavy demand, one stall can also accommodate up to 24 bicycles in a "bike corral."

- **Standardizing on bike parking equipment that is durable, relatively inexpensive, and unobtrusive.** Many of the bike racks in use today, including the so-called "schoolyard" rack and waves are inefficient, take up a great deal of space, and, in the case of the former, can actually damage bikes. Better in most cases are less obtrusive designs such as the inverted U, hitching post, or the new "theta" design that recently won a bicycle parking design competition for New York City.

- **Develop a funding mechanism and incentive program for bicycle parking installations.** The City of Topeka may provide a small allocation for installing facilities at public destination. Bike parking on private property may be funded with the assistance of special events~~. For~~ example, Omaha's Eastern Nebraska Trails Network holds an annual Corporate Challenge ride, which in 2011 attracted a record 4,200 cyclists. A portion of the proceeds are used to purchase inverted U's, some of which are offered to targeted private businesses at reduced cost.

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

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

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

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

Establish a Bike Station in downtown Topeka. Bike stations are increasing in popularity in cities, and offer commuters secure daytime parking, light repairs and maintenance, and possible support facilities such as showers and restrooms. Some stations also include retail items and bike rentals. While a station may be well into the future, downtown's high office employment concentration may make such a facility especially appealing.

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

Bikeways System Graphics. Clockwise from bottom: Destination sign, route intersection sign, and route identifier.

Right: Concept applied to a Topeka system, using Kaw Valley Bicycle Club logo as a system mark.

Bike Stations in Different Settings. From top: Minneapolis Midtown Greenway; Berkeley (CA) BART (Bay Area Rapid Transit Station; Chicago's Millennium Park.

Institute a bike share system. The clustering of destinations in central Topeka, including city and state government offices, Washburn University, the library, hospitals, the ExpoCentre, and other facilities within a two mile radius create an excellent bike share environment. These programs locate special bicycles at strategically located stations, released by credit cards or passes. Bicycles can be returned to any station in the system. These systems can be used by auto and transit commuters, visitors, and others looking for a quick method of moving around the city center. They are often funded by a consortium of sponsors and may be operated and maintained by the supplying vendor, bicycle shops, or an operating organization.

Bike share system in Washington, D.C.

Enforcement

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

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

Evaluation and Planning

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

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

Logo of Topeka's Kaw Valley Bicycle Club