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**MEMORANDUM**

**Date:** September 11, 2013  
**To:** MMS Steering Committee Members & MPO Staff  
**From:** Tom Huber & Kevin Luecke  
**Re:** Lawrence-Douglas County MPO Draft Bicycle Network

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This memo provides the initial recommendations for the bicycle network in Douglas County and the Lawrence Urban Area. The recommendations are divided into two sections: Douglas County (including Eudora, Baldwin City, and Lecompton) and the Lawrence Urban Area. Recommendations for the County are new bikeway recommendations, while recommendations for the Lawrence Urban Area build upon the bikeway network developed for the Transportation 2040 long-range transportation plan.

Please note that specific recommendations and maps for some of the priority areas are still in development and are not highlighted in this memo.

Tom will be in Lawrence and Douglas County in mid-September for the next series of Steering Committee meetings. At that time he will further field-verify many of these recommendations especially the rural recommendations and recommendations for Eudora and Baldwin City. If you would like Tom to visit a particular location, please email him a note specifying the locations and he will visit them as time allows.

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## Bikeway Types

Brief descriptions of the different bikeway types included in the initial recommendations are provided below.

### Bike Lane

A bike lane is a pavement marking that designates a portion of a street for the preferential or exclusive use of bicycles. Bike lane markings are typically dashed where vehicles are allowed to cross the bike lane, such as for right turns or at bus stops. Bike lanes are recommended on two-way arterial and collector streets where there is enough width to accommodate a bike lane in both directions, and on one-way streets where there is enough width for a single bike lane.



### Buffered Bike Lane

Buffered bike lanes are created by striping a buffer zone between a bike lane and the adjacent travel lane. Some buffered bike lanes also offer a painted buffer between the bike lane and an adjacent parking lane. Buffered bike lanes should be considered at locations where there is excess pavement width or where adjacent traffic speeds are above 35 mph.



### Climbing Bike Lane

A climbing lane is a bikeway design for a two-way street that has a steep slope and insufficient width to permit bike lanes in both directions. A bike lane (the climbing lane) is provided in the uphill direction to accommodate slow moving bicyclists in the uphill direction and a shared lane marking is provided in the downhill direction, where bicyclists can typically travel at speeds close to motor vehicles.



### Colored Bike Lane

All of the above bike lanes may have green color applied to them to highlight the presence of the bike lane. Colored lanes are typically used in high-conflict areas such as through complicated intersections, in areas where traffic is merging across the bike lane, or in areas where traffic frequently turns across the bike lane. In 2011, colored bicycle lanes received interim approval from FHWA to be used on streets, thereby making way for their ultimate inclusion in the Manual of Uniform Traffic Control Devices in its next update.



### Shared Lane Marking – Collector or Arterial Street

Shared lane markings (sharrows) are used on streets where bicyclists and motor vehicles share the same travel lane. The sharrow helps position bicyclists in the most appropriate location to ride. It also provides a visual cue to motorists that bicyclists have a right to use the street. On a four lane street, sharrows should be placed in the outside lane. If the outside travel lane is too narrow for a motorist to comfortably pass a cyclist while staying within the travel lane (generally less than 13 feet) the sharrow marking may be centered in the lane. This encourages cyclists to “take the lane,” and encourages motorists to use the left lane to pass. In a 12-14 foot lane, the marking may be offset from the curb by 4 feet. For 10-12 foot lanes, the BIKES MAY USE FULL LANE SIGN is recommended, because drivers are not used to sharing the road with cyclists and may not provide comfortable clearance when passing. Sharrows are not appropriate on streets with speed limits greater than 35 mph.



### Shared Lane Marking – Neighborhood Street

Shared lane markings (sharrows) may also be used on residential streets to designate bicycle facilities where there is not sufficient width for bike lanes. Studies have shown that sharrows direct bicyclists away from the “door zone” of parked cars, alert motorists of appropriate bicyclist positioning and encourage safe passing of bicyclists by motorists.



### Signed Bike Route

Signed bike routes provide distance and directional information as a wayfinding aid for bicyclists. Signed routes may be established on streets, trails or any combination of facility types that offer a continuous bicycling environment. Signs should offer cyclists information about alternative routes and accessible destinations from their current location, and not simply designate the street as a bike route. They also can be used to suggest the types of conditions cyclists can expect on a route by referencing trails or roadways by name. Signed routes provide new cyclists greater confidence when they are exploring utilitarian cycling for the first time or when they are in unfamiliar territory. Signed routes can also prevent cyclists from getting lost in residential areas with curvilinear street layouts and few through streets.



### Signed Bike Route with Paved Shoulders

Signed bike routes on busier roads should provide a paved shoulder for bicyclists to use. In addition to benefitting bicyclists, paved shoulders increase the longevity of the roadway, reduce pavement maintenance, provide safety benefits to motorists, provide additional space for agricultural equipment and other slow moving vehicles, and provide a number of other benefits to all users of the roadway.



### Shared-Use Path

A shared-use path is an off-street bicycle and pedestrian facility that is physically separated from motor vehicle traffic. Typically SUPs are located in an independent right-of-way such as in a park, stream valley greenway, along a utility corridor, or an abandoned railroad corridor. Shared-use paths are used by other non-motorized users including pedestrians, skaters, wheelchair users, joggers, and sometimes equestrians.



## Sidepath

A sidepath is a shared-use path located adjacent to a street. It is designed for two-way use by bicyclists and pedestrians. Sidepaths are sometimes created by designating a wide sidewalk for shared use, or they may be a segment of a longer trail or network of trails. Sidepaths are sometimes provided to facilitate connections to on- and off-street bicycle facilities. A sidepath is not generally a substitute for on-street bicycle facilities, but may be considered in constrained conditions, or in addition to on-street facilities. Sidepaths may not be appropriate in areas of high pedestrian activity unless there is space to successfully manage conflicts. Sidepaths may also not be appropriate and streets with numerous driveways or intersections, particularly in commercial areas with high traffic volumes.



Planning considerations and design details for these facility types are available from the following resources:

- The American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities, 4<sup>th</sup> Edition* (2012)  
[https://bookstore.transportation.org/item\\_details.aspx?id=1943](https://bookstore.transportation.org/item_details.aspx?id=1943)
- The Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices* (2009)  
<http://mutcd.fhwa.dot.gov/>
- The National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide* (2012)  
<http://nacto.org/cities-for-cycling/design-guide/>

## Sidepaths

The Lawrence area has a growing network of sidepaths along city streets, particularly in West Lawrence. Sidepaths can be a good bicycle facility for some bicyclists, but they also present conflicts at intersections and driveways. In general, bike lanes should be included on any urban street that also has a sidepath. Providing bike lanes allows faster bicyclists to use a more direct route than a sidepath. They also allow bicyclists to access destinations on the opposite side of the street that the sidepath is located. Field work conducted this summer indicates that many of the streets with sidepaths can accommodate bike lanes by being re-striped in the future.

Kansas has a "mandatory sidepath law" – a law that requires bicyclists to ride on a sidepath if one exists. Our understanding is that this law only applies when the adjacent sidepath is for the exclusive use of bicyclists.<sup>1</sup> All paths in Lawrence and Douglas County that are open to bicyclists are also open to pedestrians and other non-motorized users; as such, Kansas's sidepath law does not apply to these paths. Additionally, it is unclear if the law is being enforced in Lawrence and if the law would apply if both bike lanes and a sidepath exist in the same street right-of-way. The MPO should request a legal opinion about the applicability of the sidepath law given the Kansas Supreme Court ruling. If counsel agrees that the law does not apply to the types of paths that exist in the Lawrence area, that opinion should be communicated to law enforcement agencies in the area. If the opinion is provided within the next month it can also provide us direction to us on our bike lane recommendations.

<sup>1</sup> Hugh, Brent. "Kansas Sidepath Law Clarified: Schallenberger v. Rudd 244 Kan 230." Missouri Bicycle & Pedestrian Federation. January 27, 2009. <http://mobikefed.org/2009/01/kansas-sidepath-law-clarified-schallenberger-v-rudd-244-kan-230.php>

## Douglas County Bikeway Network

Douglas County provides a beautiful, rolling countryside that can be an excellent bicycling venue. With the communities of Eudora, Baldwin City, and Leocompton, and scenic attractions such as Clinton Lake and Lone Star Lake, the rural areas of the county provide attractions and destinations for people on bicycles. However, without a designated bikeway network, it can be challenging for people to know what roads to take to reach specific destinations and which roads are the best to travel on as a bicyclist. Bicycle travel in Douglas County is further complicated by the fact that a large portion of the roads are not paved – something that may be a simple annoyance to a motorist, but can be a show-stopper for a bicyclist. For these reasons, it is important to provide a network of bikeways that connects communities, parks, and other attractions in Douglas County and surrounding areas.

Map 1 at the end of this memo provides a visual display of the recommended bikeway network for Douglas County. The map includes the *Transportation 2040* bikeway network for the Lawrence Urban Area. Table 1 provides a summary of the total miles of different bikeways recommended for Douglas County (not including the Lawrence Urban Area).

Table 1: Summary of proposed bikeways in Douglas County

Facility	Miles
Bike Lanes	4.66
Bike Routes	94.61
Bike Routes with Paved Shoulders	74.15
Shared Use Paths	5.53
<b>Total</b>	<b>178.95</b>

The following tables provide a list of roads by recommended facility type. The final recommendations will include the jurisdiction the road or street falls under, and the roads or streets that bound each facility.

Table 2: Recommended Shared-Use Paths for Douglas County

Name	Jurisdiction	From	To	Miles
N 1400 Rd/Eudora Elementary Path	Eudora	Ash St	Peach St	0.50
Eudora Sidepath	Eudora	Cedar St	Main St	0.45
12th St - Eudora Elementary Path	Eudora	12 <sup>th</sup> St	Eudora Elem. Grounds	0.23
Sycamore - 15th Street Path	Eudora	Sycamore St	15 <sup>th</sup> St	0.24
Sandusky St - Eudora Elementary Path	Eudora	Sandusky St	Eudora Elem. Grounds	0.02
Elm Street Path	Baldwin City	Elm St	Elm St	0.35
Lawrence-Eudora Sidepath	Douglas County	E 1750 Rd	Cedar St	3.74
			<b>Total</b>	<b>5.53</b>

Table 3: Recommended Bike Lanes for Douglas County

Name	Jurisdiction	Class	From	To	Miles
Main St	Eudora	local/rural			0.43
E 10th St	Eudora	minor arterial			0.32
W 10th St	Eudora	minor arterial			0.37
Ames St	Baldwin City	principal arterial			0.64
N 6th St	Baldwin City	principal arterial			2.01
High St	Baldwin City	street			0.89
				<b>Total</b>	<b>4.66</b>

Table 4: Recommended Bike Routes for Douglas County

Name	Jurisdiction	Class	From	To	Miles
E 175 Rd		major collector			2.36
E 1900 Rd		local/rural			8.03
Church St		local/rural			1.09
N 600 Rd		major collector			1.46
E 661 Diagonal Rd		major collector			2.58
E 800 Rd		major collector			0.73
N 700 Rd		major collector			1.00
N 1190 Rd		major collector			0.26
E 550 Rd		major collector			0.32
E 550 Rd		major collector			1.63
N 2100 Rd		major collector			3.46
E 1250 Rd		major collector			9.24
E 1300 Rd		major collector			1.01
N 400 Rd		major collector			1.83
W 10th St		minor arterial			0.03
E 900 Rd		minor arterial			2.01
E 550 Rd		minor arterial			9.52
E 100 Rd		minor arterial			1.48
N 850 Rd		minor arterial			0.77
N 851 Diagonal Rd		minor arterial			4.72
N 500 Rd		minor arterial			1.98
E 1100 Rd		minor arterial			1.44
N 650 Rd		minor arterial			2.83
E 1200 Rd		minor arterial			1.01
N 1400 Rd		minor arterial			0.90
E 2100 Rd		minor collector			0.65
N 200 Rd		minor collector			2.01
E 665 Rd		park road			1.64
E 715 Rd		park road			1.06
E 700 Rd		park road			0.58
N 1190 Rd		park road			1.59
E 2200 Rd		principal arterial			12.04
E 1400 Rd		principal arterial			0.40
N 600 Rd		principal arterial			3.02
N 700 Rd		principal arterial			7.02
W 12th St		street			1.07
Peach St		street			0.36
E 14th St		street			0.92
Fir St		street			0.11
Sycamore St		street			0.22
Hawthorne St		street			0.09
Hickory St		street			0.17
					<b>Total 94.61</b>

Table 5: Recommended Bike Routes with Paved Shoulders for Douglas County

Name	Jurisdiction	Class	From	To	Miles
Church St		principal arterial			0.91
40 Hwy		principal arterial			2.30
E 2300 Rd		minor arterial			0.24
N 1400 Rd		minor arterial			1.03
Main St		local/rural			0.27
E Woodson Ave		major collector			0.55
N 1400 Rd		minor arterial			0.25
N 1400 Rd		minor arterial			0.15
N 1400 Rd		minor arterial			0.85
N 1400 Rd		minor arterial			1.00
N 1400 Rd		minor arterial			0.50
N 1400 Rd		minor arterial			0.45
E 23rd St		minor arterial			0.31
E 23rd St		minor arterial			0.24
E 2200 Rd		minor arterial			0.38
E High St		minor collector			0.61
N 200 Rd		principal arterial			5.00
N 201 Diag Rd		principal arterial			2.04
N 300 Rd		principal arterial			11.13
N 1000 Rd		principal arterial			10.02
E 1700 Rd		principal arterial			3.04
N 950 Rd		principal arterial			3.13
N 1200 Rd		principal arterial			0.16
E 1000 Rd		principal arterial			1.94
N 1000 Rd		principal arterial			1.47
E 850 Rd		principal arterial			0.46
E 251 Diagonal Rd		principal arterial			3.95
E 250 Rd		principal arterial			3.94
N 1600 Rd		principal arterial			6.52
E 50 Rd		principal arterial			0.87
N 1700 Rd		principal arterial			0.47
E 600 Rd		principal arterial			3.94
N 700 Rd		principal arterial			0.48
E 1650 Rd		principal arterial			2.41
E 1600 Rd		principal arterial			1.82
High St		street			0.61
Lawrence St		street			0.73
<b>Total</b>					<b>74.15</b>

Many of the roads selected as bike routes with paved shoulders already have paved shoulders. Those that do not should be considered priority projects as the County evaluates what shoulders to pave in the future. TDG will provide a qualitative assessment of the expense to provide paved shoulders at varying widths for roadways that currently do not have paved shoulders and are recommended to receive them.



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## Lawrence Urban Area Bikeway Network

A bikeway network was prepared for the Lawrence Urban Area as part of the *Transportation2040* planning process. The recommendations in this memo are primarily targeted at changes to the T2040 network and follow fieldwork conducted in June, 2013. Table 6 displays the miles of existing and proposed bikeways in the Lawrence Urban Area as well as the percentage of each facility type that has been implemented from the T2040 plan.

Table 6: Miles of existing and proposed bikeways in the Lawrence Douglas County Region T2040 Bikeway System Map

Facility	Existing	Proposed	Total	% Implemented
Bike Lane	12.17	44.26	56.43	22%
Bike Route	44.16	77.86	122.02	36%
Shared Use Path	46.28	66.86	113.14	41%
<b>Total</b>	<b>102.61</b>	<b>188.98</b>	<b>291.59</b>	<b>35%</b>

Note: Bike lanes along some median-divided streets are double counted, which increases the distance total.

### General Urban Area Recommendations

The following general recommendations are made for the Lawrence Urban Area:

- **Include bike lanes on all future arterial and collector streets.**  
Numerous new streets are proposed in the T2040 plan, with the majority of these new streets located on the outer edges of Lawrence. All new streets that are classified as arterials or collectors should include bike lanes, even if they also include sidepaths. As noted earlier in this memo and in the *AASHTO Guide for the Development of Bicycle Facilities, 4<sup>th</sup> Edition*, there are a number of reasons for including bike lanes, even when a sidepath is present. A map will display this recommendation in the final plan.
- **Include bike lanes when reconstructing urban arterial and collector streets.**  
A number of streets in Lawrence that have been reconstructed in recent years are slightly too narrow to accommodate standard bicycle lanes. In general, these streets are 30 feet from curb-to-curb. When accounting for the gutter pan, this width does not allow for the provision of a standard bike lane. When arterials and collectors are reconstructed, standard bike lanes should be included, even if this means slightly widening the street. In general, an absolute minimum width of 30 feet of pavement (not including gutters) should be provided for a two lane street with bike lanes. Preferably, the cross-section should be 32 feet in width providing 11 foot travel lanes and 5 foot bike lanes.
- **Use shared lane markings to connect currently discontinuous segments of bike lanes.**  
Bike lanes have been installed in discontinuous segments on a number of streets in Lawrence. Although there are legitimate reasons for why this has occurred, an effort should be made to connect these segments together. If bike lanes cannot be installed due to width or other restrictions, shared lane markings should be installed until bike lanes can be installed.
- **Narrow travel and/or center turn lanes on select streets in order to accommodate bike lanes.**  
A number of streets in Lawrence can accommodate bike lanes within the current curb lines by narrowing the travel and/or center turn lanes. A number of streets provide center turn lanes, but have relatively few driveways or streets to turn onto. Although a traffic study may be needed, it appears that several of these streets provide an opportunity to narrow or eliminate the center lane and use the width to provide bike lanes or buffered bike lanes.

- **Provide shared lane markings (sharrows) on all bike routes with an ADT greater than 1,500.**  
Many bike routes in the T2040 network are on busier streets that are too narrow to accommodate bike lanes. Sharrows should be added on all bike routes that carry over 1,500 vehicles per day. The sharrows will help guide bicyclists to the proper position on the street and will help reinforce to motorists that bicyclists will be on the street.

### Adjustments to the T2040 Bikeway System

This section provides recommendations for changes to the bikeways proposed in the T2040 plan. The majority of the recommendations provided are for specific changes to planned facilities on the T2040 map; additional changes to the network may be provided with the final recommendations. A map is attached that highlights the recommended projects.

Table 7: Recommended changes to the T2040 bikeway map

Street	From	To	Current	Recommend	Major Action
Delaware St.	E. 8th St.	E. 13th St.	-	Sharrows	
E. 11th St.	Tennessee St.	Haskell Ave.	Bike Route (Future)	Bike Lane	May require 10' travel lanes and 3.5' + 1.5' shoulder and/or parking removal
E. 9th St.	Connecticut St.	Delaware St.	-	Sharrows	
Harvard Rd.	Monterey Way	Lawrence Ave.	Bike Route	Climbing Lane	Add climbing lanes uphill and sharrows downhill
Harvard Rd.	Stone Ridge Dr.	Wakarusa Dr.	Bike Route	Bike Lane	
Haskell Ave.	E. 23rd St.	E. 31st St.	-	Bike Lane	May require reducing or eliminating center lane
Inverness Dr.	Bob Billings Pkwy.	Clinton Pkwy.	Bike Route	Bike Lane	
Kasold Dr.	Peterson St.	Bob Billings Pkwy.	Bike Route	Bike Lane	Narrow existing lanes to add bike lanes
Lawrence Ave.	Clinton Pkwy.	W. 31st St.	Bike Route	Bike Lane	May require 10' travel lanes and 3.5' + 1.5' shoulder
Legends Dr.	Bob Billings Pky	Wakarusa Dr.	Bike Route	Bike Lane	
Massachusetts St.	6th St.	11th St.	-	Sharrows	
N. 3rd St.	North St.	Locust St.	Bike Route (Future)	Bike Lane	Will require 10' travel lanes and 3.5' + 1.5' shoulder
New Hampshire St.	W. 6th St.	W. 11th St.	Bike Route	Bike Lane	Narrow existing lanes or eliminate center turn lane
Vermont St.	W. 6th St.	W. 11th St.	Bike Route	Bike Lane	Narrow existing lanes or eliminate center turn lane
W. 14th St.	Jayhawk Blvd.	Tennessee St.	Bike Route	Climbing Lane	Add climbing lane uphill and sharrows downhill
W. 27th St.	Iowa St.	Louisiana St.	Bike Route	Sharrows	
W. 27th St.	Lawrence Ave.	Iowa St.	Bike Route	Bike Lane	May require 10' travel lanes and 3.5' + 1.5' shoulder
W. 4th St.	McDonald Dr.	Indiana St.	-	Bike Lane	Will require 10' travel lanes and 3.5' + 1.5' shoulder
W. 7th St.	Near Iowa St.	Michigan St.	-	Climbing Lane	Add climbing lane uphill and sharrows downhill
W./E. 7th St.	Tennessee St.	New Jersey St.	Bike Route	Bike Lane	Narrow existing lanes or eliminate center turn lane
W./E. 9th St.	Vermont St.	Connecticut St.	-	Bike Lane	Stripe bike lanes
N/A	Harvard Rd.	Harvard Rd.	-	Shared Use Path	Add path along creek to connect Harvard Rd.

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## Signing of the Bicycle Network

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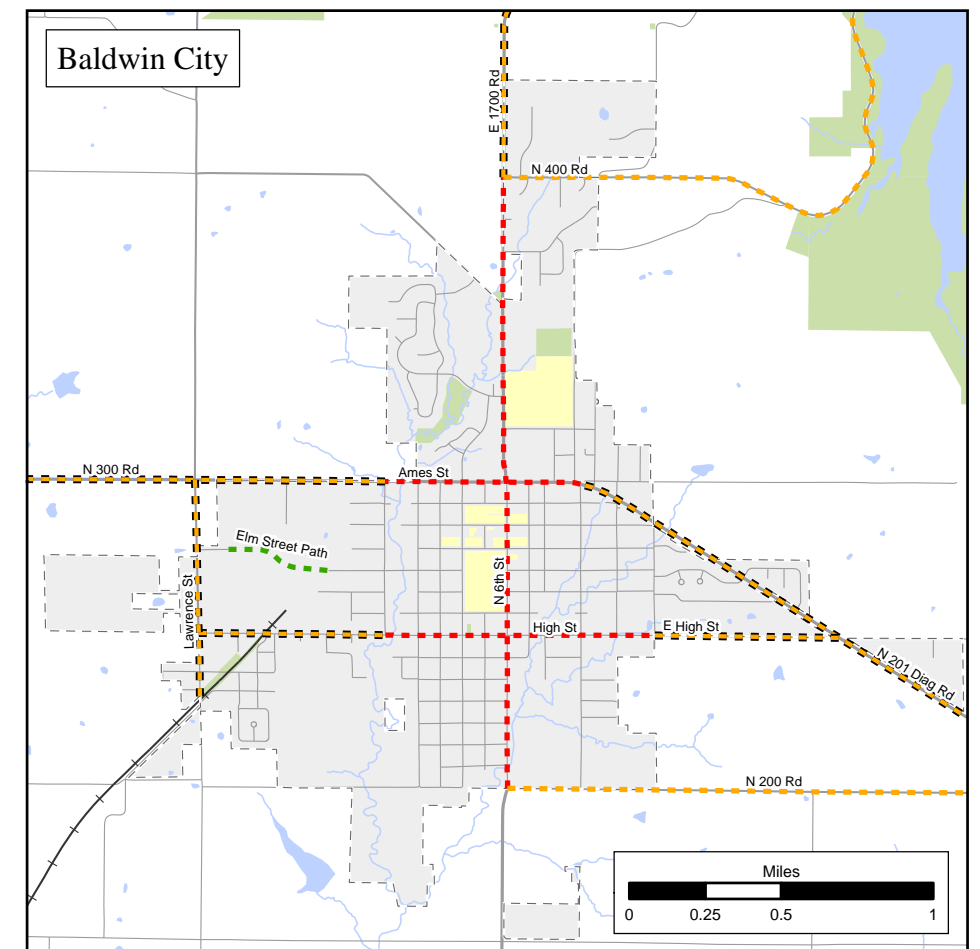
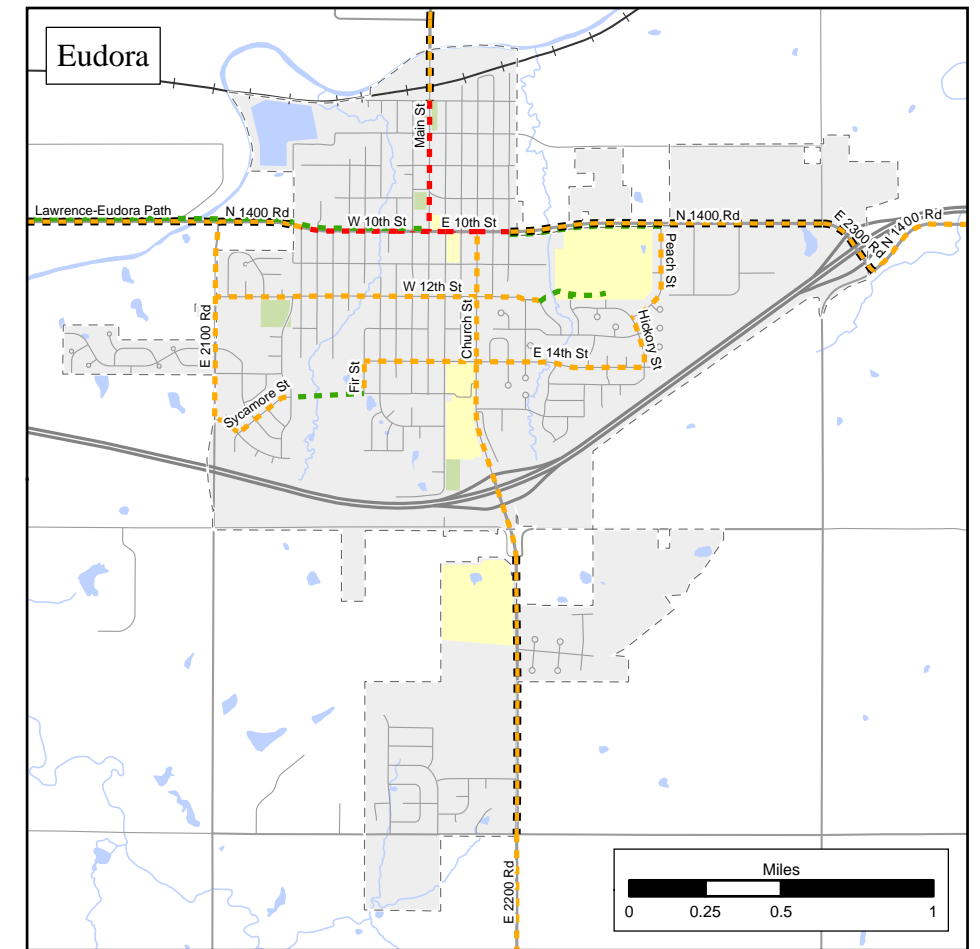
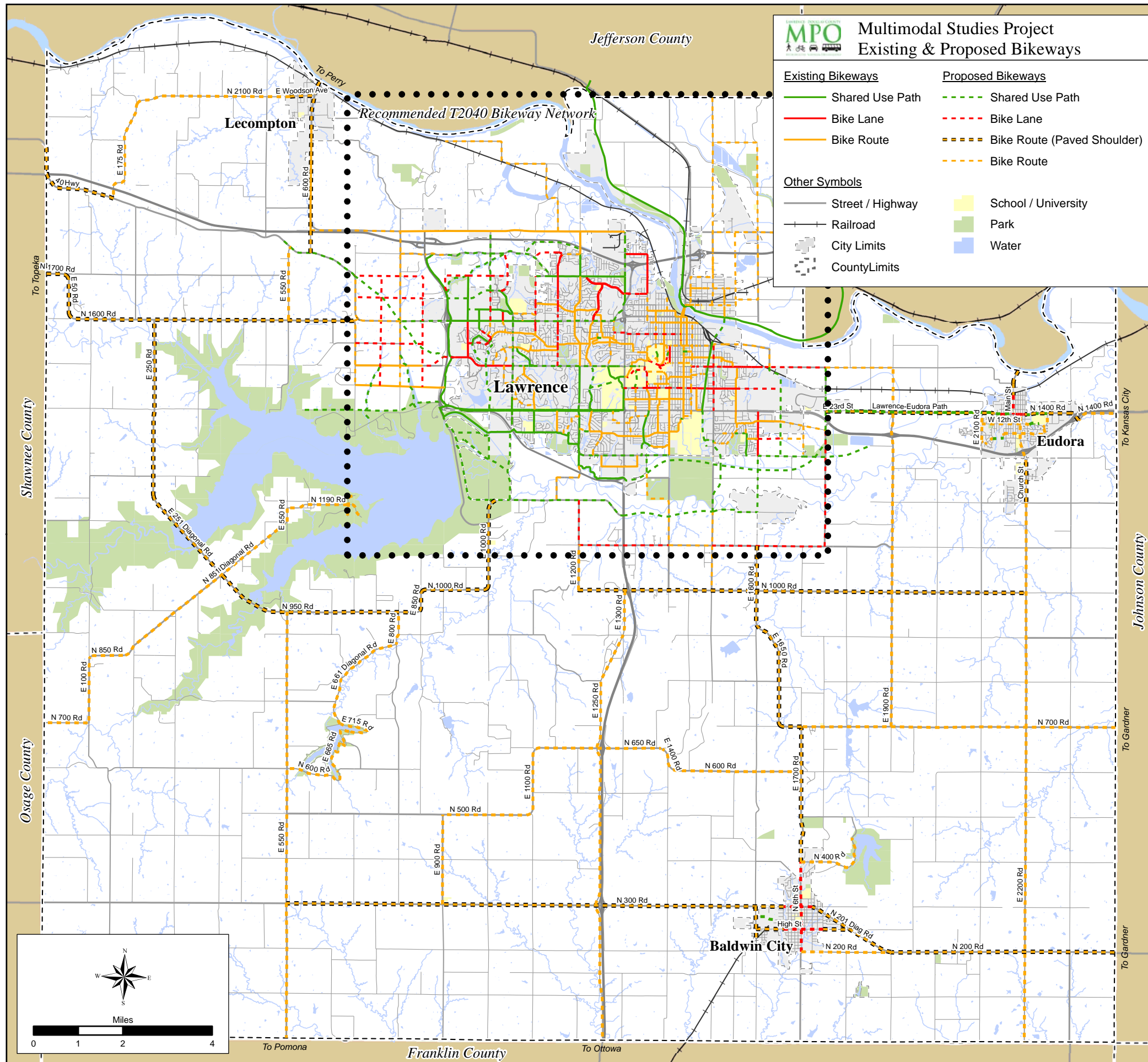
Wayfinding signs provide information about destinations, direction, and distance to help bicyclists determine the best route to take to major destinations. Signs provide on-the-ground information that helps bicyclists understand and use the on- and off-street network without the use of a map. Directional signs also provide additional messaging to motorists to expect bicycles on the roadway. The presence of signs encourages bicycling on designated corridors because users feel the signs will direct them to the best route for getting to their destination. Signs may also be used to direct bicyclists around barriers. Providing better wayfinding is perhaps one of the main ways of at least initially providing better connections between marked bicycle lanes and paths and addressing one of the main concerns (disconnected bikeway system) voiced by the public.

Wayfinding is an important component of establishing the recommended bicycle network. Wayfinding signs may be used alone as a signed route, or in combination with other pavement markings such as bike lanes or shared lane markings. The installation of signs and other bicycle network improvements do not need to occur at the same time. For example, for some lower speed/lower volume streets, installation of wayfinding signage may precede the striping of bike lanes, and could be used as an interim step toward implementing additional recommended treatments. The recommended network consists of several signed routes that have no pavement markings. Over time, the city or county may find it makes sense to add additional signed routes to the network. The decision to develop a signed route versus installing a bike lane or shared lane marking may be based on the following criteria:

- Alternate routes parallel, and within close proximity (less than a half mile), to a route with bicycle facilities.
- Lower volume streets.
- Spur routes, or routes that may span a relatively short distance and terminate at a specific destination or loop back into the main route.

Guidance for establishing a comprehensive wayfinding system can be found in the latest Manual on Uniform Traffic Control Devices (MUTCD) standards, the American Association of State Highway Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*, and the Wisconsin Department of Transportation *Bicycle Facility Design Handbook*.

- The American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*, 4<sup>th</sup> Edition (2012)  
[https://bookstore.transportation.org/item\\_details.aspx?id=1943](https://bookstore.transportation.org/item_details.aspx?id=1943)
- The Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices* (2009)  
<http://mutcd.fhwa.dot.gov/>



- Proposed T2040 Bikeway Changes**
- Shared Use Path
  - Bike Lane
  - Climbing Lane
  - Shared Lane Marking

- Other Symbols**
- Street / Highway
  - Railroad
  - City Limits
  - County Limits
  - School / University
  - Park
  - Water

