



BIKE/PEDESTRIAN ANALYSIS TECHNICAL MEMORANDUM

Prepared for the
Kansas Department of Transportation
and the
K-7 Corridor Review Committee



HNTB

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INTRODUCTION

The 2006 *K-7 Corridor Management Plan* identified the need for transportation improvements along the K-7 Corridor to improve regional mobility. To accomplish this goal, the *K-7 Corridor Management Plan* identified improvements to mainline K-7 as well as the parallel local network. Recommended mainline improvements included upgrading portions of K-7 to a freeway facility with grade separated crossings with new or upgraded supporting parallel local road network.

To implement the *K-7 Corridor Management Plan*, the Kansas Department of Transportation (KDOT) and participating communities along the K-7 Corridor signed a Memorandum of Understanding (MOU) that summarized key Plan outcomes and recommendations including the formation of a Corridor Review Committee. The purpose of this committee is to serve as an advisory board to regularly review and evaluate developments that may impact the Plan as well as to help guide the implementation strategy. As part of these ongoing discussions, the committee identified the opportunity to assess the potential of a true multi-modal transportation network that balances the needs of motorists, transit, pedestrians and cyclists. As a result, the committee commissioned the University of Kansas' Department of Urban Planning Transportation Implementation class to conduct a study on alternative transportation modes within the K-7 Corridor. The result was the 2011 *K-7 Multimodal Corridor Study*, which recommended an inventory of existing pedestrian and bicycle facilities compiled into a Geographic Information Systems (GIS) clearinghouse for information sharing. See the Appendix for a summary of the major recommendations in this study. This recommendation provided the impetus for this technical analysis.

The purpose of the analysis is to identify the potential for a connected pedestrian and bicycle network for the K-7 Study Corridor. This analysis will result in development of the following:

- a consolidated map delineating the existing and planned pedestrian and bicycle network facilities for all jurisdictions within the K-7 Study Corridor;
- identification of priority network gaps; and
- preliminary concepts for safe, convenient and practical crossings at the Kansas River and the I-35, K-10, and I-70 Interchanges.

The analysis is intended to be used as a resource for planning future pedestrian and bicycle facilities within the K-7 Corridor.

STUDY AREA

The Study Area is comprised of a 2.5-mile buffer around the original K-7 Corridor. The K-7 Corridor stretches 40-miles north-south from 223rd Street in Miami County, Kansas to K-5/ Muncie Road in Leavenworth, Kansas.

PROCESS

The analysis process included three phases:

- Phase I: Data Collection
- Phase II: Analysis
- Phase III: Next Steps

Each of these phases are described in detail on the following pages.

PHASE I: DATA COLLECTION

PLAN COORDINATION

Currently, there is no macro-scale forecasting method in the region for bicycle demand. However, local jurisdictions have noted an interest in bicycle and pedestrian facilities through a number of plans, projects, and initiatives. As part of the technical analysis, the following documents were reviewed and evaluated:

- *K-7 Corridor Management Plan*
- *K-7 Multimodal Corridor Study (University of Kansas)*
- *Unified Government Sidewalk and Trail Master Plan*
- *MetroGreen Action Plan*
- *Transportation Outlook 2040*
- *1996 Wyandotte and Johnson County Bicycle Plan*
- City and County Comprehensive Plans
 - *Johnson County Rural Comprehensive Plan*
 - *Spring Hill Comprehensive Plan*
 - *PlanOlathe*
 - *Lenexa Comprehensive Plan*
 - *Shawnee Comprehensive Plan*
 - *Bonner Springs Comprehensive Plan*
 - *Unified Government Master Plan*
 - *Leavenworth County Comprehensive Plan*
 - *Basehor Comprehensive Plan*
 - *Lansing Comprehensive Plan*
 - *City of Leavenworth Comprehensive Plan*

PEDESTRIAN AND BICYCLE FACILITY DATA

GIS layers for all known existing and planned pedestrian and bicycle facilities were collected from the Mid-America Regional Council (MARC) as well as the Study Area jurisdictions. Definitions for each facility were provided by MARC and are consistent with the most recent nomenclature for pedestrian and bicycle facilities. The data included the following:

- Existing Sidewalks
- Existing and Planned/Future Trails
 - Trails: include a wide variety of pedestrian and bicycle facilities for transportation and/or recreation.
- Existing and Planned/Future Bicycle Facilities
 - Shared Use Paths: A bikeway physically separated from motorized vehicular traffic by an open space or barrier. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. Shared use paths are shown on both the pedestrian and bicycle networks.
 - Bike Lanes: a portion of a roadway which has been designated by pavement markings and, if used, signs, for the preferential or exclusive use of bicyclists.
 - Shared Roadway: a roadway that is open to both bicycle and motor vehicle travel. This may be an existing roadway (signed with a "Share the Road" sign assembly, shared lane marking or other approved traffic control device), a road with wide curb lanes, or a road with paved shoulder lanes that are open to bicycle and motor vehicular use.

NATURAL RESOURCES

Natural resources provide opportunities and constraints that significantly influence the location of pedestrian and bicycle facilities. Natural resource data was provided by MARC in the form of a GIS Natural Resource Inventory (NRI). MARC developed this inventory to delineate valuable natural resource assets and ecological features as a resource for environmental planning at local and regional levels. This information was used in the analysis and included the following:

- Rivers
- Major Streamway Corridors
- Topography

Kansas River

The Kansas River serves as a significant barrier to future cross-county bicycle and pedestrian connections between Wyandotte and Johnson Counties. Currently, there are no provisions for pedestrian or bicycle connections across the river.

Major Streamway Corridors

Streamway corridors should be protected to limit erosion of stream banks, provide a water storage area for floods, and preserve water quality by filtering sediment from runoff before it enters rivers and streams. The *MetroGreen Plan* identifies the potential use of major streamway corridors for greenway trails. Mill Creek Streamway Park in Johnson County on the eastern edge of the Study Area has 17-miles of pedestrian and bicycle facilities.

Topography

Topography has heavily influenced development patterns and the transportation network within the Study Area. When selecting regional pedestrian and bicycle facility alignments, identifying corridor alignments which minimize grade change is essential. Portions of the Study Area, especially large portions of western Lenexa and Shawnee, are constrained by dramatic topographic changes.

TRANSPORTATION NETWORK

Pedestrian and Bicycle facilities are part of the overall transportation network. The "Complete Street" concept includes provisions for transportation facilities that are planned, designed, operated and maintained with the needs and safety of all travelers within a single facility. This concept works well under the right conditions where there is high pedestrian and bicycle demand and there is enough right-of-way to accommodate multiple facilities.

- Interstates and Highways
- Local Road Network
- Rail Lines
- Transit Routes

Facilities in Interstate, Highway and Local Right-of-Way

Under the United States Department of Transportation (USDOT) Policy Statement on Bicycle and Pedestrian Accommodation, "*The USDOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including USDOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide - including health, safety, environmental, transportation, and quality of life - transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.*"

While USDOT advocates accommodating bicycles and pedestrians, there are important considerations when locating pedestrian and bicycle facilities adjacent to or near high-speed limited access highways. According to the 2007 *Study of Shared Use Paths in Limited Access Highway Corridors* prepared for the State University of New York at Albany, there are at least 30 shared use paths across the United States that are in or adjacent to limited access highway corridors. Notable examples of shared use paths adjacent to limited access highway facilities include the Bay Trail adjacent to I-80 in Berkeley California, the Bronx River Greenway which is adjacent to the Bronx River Parkway in the Bronx, New York and the Glenwood Canyon Recreation Path adjacent to I-70 in Glenwood Springs, Colorado. In some cases, these trails are adjacent to the highway within the highway right-of-way, while others the trail is adjacent to the right-of-way.



Glenwood Springs Recreation Path near I-70
Source: 2007 *Study of Shared Use Paths in Limited Access Highway Corridors*

The most important consideration is sufficient right-of-way to provide separation from adjacent high-speed vehicular traffic in the form of a greenspace buffer. In addition to a greenspace buffer, these facilities also may include a protective wall or other physical barrier. Other considerations include providing safe accommodations for pedestrian and bicycle crossings at high-volume ramp intersections. For these reasons, most pedestrian and bicycle facilities near limited access highways are located within greenways along rivers, streamways and creeks, or along the parallel local road network with lower vehicular speeds. As shown in the graph in the lower right side of the page, higher traffic speeds greatly raises the pedestrian's chance of a fatality if hit by a motor vehicle.

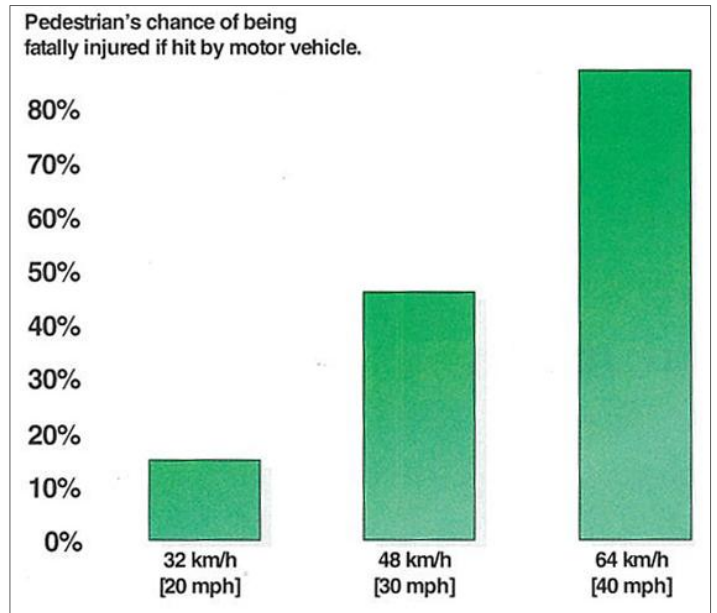


Bay Trail in Berkeley California near I-80
Source: 2007 *Study of Shared Use Paths in Limited Access Highway Corridors*

Note: Any use of K-7 highway right-of-way for a pedestrian and/or bicycle facility as described above may require a city or county/state agreement stipulating that the local jurisdiction will be responsible for the provision of accessible detour routes if required by the Federal Highway Administration and will be responsible for maintenance of the facility.

Transit Considerations

The location of future pedestrian and bicycle facilities should be heavily influenced by proximity to existing transit service. Convenient access to transit can help expand transportation options and improve mobility for transit-dependent demographic groups which include zero car households, low-income populations, populations younger than 16 years old (legal driving age) and elderly populations. Additionally, pedestrian and bicycle facilities with convenient access to transit can help attract choice riders who are interested in walking or biking and transit as an alternative transportation mode. *PlanOlathe* recommends a balance between all modes including pedestrian and bicycle connections to regional transit. Existing transit lines are shown as dashed purple lines on the Pedestrian and Bicycle Network Maps.



Source: AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities.*

ACTIVITY CENTERS

Pedestrian and bicycle demand can be driven by recreation needs or as a transportation mode to access important destinations. For the purposes of this analysis, key activity centers considered include the following:

- Schools
- Parks
- Major Shopping Centers/Mixed-Use Areas

Schools and Parks

In a recent survey completed for the *Unified Government Sidewalk and Trail Master Plan*, the primary destinations for pedestrians and bicyclists were schools followed closely by parks. This is not surprising, especially for elementary and middle school children. Schools are shown as a black school building symbol and parks as shaded green areas on the Pedestrian and Bicycle Network Maps.

Shopping Centers/Mixed-Use Areas

Key destinations include shopping centers and mixed-use areas. Within the Study Area, major shopping centers are shown as a red box on the Pedestrian and Bicycle Network Maps and include the Great Mall of the Great Plains in Olathe, Lenexa City Center in Lenexa and the Legends in Kansas City, Kansas. These are major local and regional destinations within the Study Area with walkable centers with the potential for transit connections.



Legends in Kansas City, Kansas

A majority of pedestrians and bicyclists are likely to travel to local commercial districts within 1/4 to 1/2-mile of where they live or work. Some of the larger local centers may include more extensive pedestrian and bicycle facilities, however, the smaller neighborhood commercial areas will likely be accessed through sidewalks and/or share the road facilities.

PHASE II: ANALYSIS

All information compiled during Phase I were divided into two separate exhibits for analysis. It was acknowledged early on in the process that based on user types that pedestrian and bicycle facilities should be viewed as individual networks with their own unique needs and challenges. This does not mean that each network should be viewed individually in a vacuum, rather, it acknowledges that provisions need to accommodate all users. Both networks include shared use paths which accommodate pedestrians, bicycles and other non-motorized modes, however, it is acknowledged that these facilities are limited in their ability to serve all user types.

USER TYPES

Pedestrians are grouped into three categories:

- Runners, joggers, power-walkers and hikers typically prefer softer surfaces (such as rubber, mulch or crushed rock) to lessen impacts on their knees. These users also are likely to select facilities that cover longer distances (5+ miles).
- Walkers, especially with strollers, may prefer more compact surfaces and are likely to select facilities that cover short to intermediate distances (1 to 5 miles).
- In-line skaters, roller skaters and wheelchair users (both non-motorized and motorized) require hard surfaces.

Bicyclists are grouped into three categories based on comfort and skill level:

- **Advanced:** This category includes utilitarian and recreational riders who are competent riding on busier roads with minimal accommodation to reach destinations. This group rides routinely while making up the smallest percentage of the population. Utilitarian riders of this category will tend to pick the most direct route.
- **Basic:** This group includes utilitarian and recreational riders who are competent riding on low traffic roadways with lower speed limits, or busier roadways that provide bike lanes or shared-use paths. This group rides occasionally. Utilitarian riders of this category may deviate from the most direct route to ride on low-traffic streets or share-use paths.
- **Interested, but Concerned:** This category includes a wide range of people of all ages who ride rarely. They are more likely to ride on shared-use paths, on-street protected facilities, bike lanes, or low traffic/low speed streets. The majority of the population fall under this category.

As shown in the Pedestrian and Bicycle Network Maps, Johnson County has the most extensive and complete existing and planned pedestrian and bicycle network. Spring Hill has an extensive planned network, however, it currently has few dedicated pedestrian or bicycle facilities. Multiple jurisdictions within Leavenworth and Wyandotte Counties have completed plans for future pedestrian and bicycle facilities, most recently Kansas City, Kansas and Bonner Springs. However, there are few existing facilities within these jurisdictions. Both of these plans identify the opportunity to connect into the extensive existing bicycle and pedestrian system in Johnson County.

It should be noted that identified future bicycle and pedestrian connections are conceptual and may be modified based on changing conditions and more detailed study. In some areas, evolving development patterns and major infrastructure investments may require an alignment modification or even consideration of a different facility type.

GAP ANALYSIS

Pedestrian and bicycle network gaps were identified where existing or future/planned bicycle and pedestrian facilities were disconnected. Gaps in the network commonly occur where there is a built or natural barrier including but not limited to highways, rail lines, rivers, major streams, steep grades, etc. Other gaps occur where existing facilities have been built over time as development has occurred and are disconnected within greenfield or undeveloped areas of the respective city or county.

Ideally, there would be an extensive pedestrian and bicycle network connecting to multiple destinations throughout the study area. However, like any other public infrastructure, tight local and state budgets make prioritization of pedestrian and bicycle network improvements a necessity. Based on priorities identified from previous planning efforts, as well as input received at the Stakeholder Workshop, the following criteria was developed to guide the identification of priority network gaps.

Priority network gaps provide the most direct connection to the following:

1. Connection to Existing Regional Network (Existing bicycle and pedestrian facilities that connect multiple jurisdictions)
2. Connection to Major Activity Centers
 - Schools
 - Parks
 - Downtowns
 - Shopping Centers/Mixed-Use Areas
 - Neighborhood commercial districts
 - Public Transit
3. Opportunity Areas
 - Identified Future Roads
 - Major Streamways
 - Utility Corridors
 - Levees
 - Vacated Right-of-Way (Old Rail Right-of-Way)

This criteria was used as a guide for the identification of priority network gaps (shown as orange highlights on the Pedestrian and Bicycle Network Maps). These maps are intended to serve as a big-picture guide for the prioritization of pedestrian and bicycle planning and investments. The goal is to develop a connected pedestrian and bicycle network serving major destinations throughout the Study Area. As previously mentioned, there is an extensive, yet disjointed, existing network within the Study Area. The connection of the facilities and destinations between these gaps will provide an opportunity to develop a true regional network.

K-7 PLAN FUTURE ROAD NETWORK

The future arterial and collector network identified in the *K-7 Corridor Management Plan* (shown as a dashed black line on the Pedestrian and Bicycle Network Maps) provides an opportunity for future bicycle and pedestrian facilities. This parallel network provides important north-south connections, and in many cases, will provide access to emerging commercial and residential areas along future K-7. In fact, some communities including Kansas City, Kansas have already planned for future bicycle and pedestrian connections along these roads.

These future roads provide an excellent opportunity to plan, design and build complete streets. This would include equal consideration for motor vehicles, transit, pedestrians and bicyclists. Provisions for pedestrians

and bicyclists should include consideration of all user types due to the regional nature of these facilities and the density of the adjacent land uses. For this reason, communities should consider the following improvements as part of the final design for these future road segments:

- Dedicated Bike Lane on both sides of the road; and
- 10' Shared Use Path in urbanized areas, 8-10' bicycle/pedestrian facility in rural areas.

The most significant physical barriers in the study area are the interstates (I-35 and I-70), major highways (K-7 and K-10), and the Kansas River. Provisions for safely crossing these areas are critical to establishing a viable regional network. This section identifies existing, new, planned and potential future crossings within the Study Area. New crossings are designed, funded and will be constructed in the near future (1-3 years). Existing, new and planned crossings are shown as a black asterisk on the Pedestrian and Bicycle Network Maps. Potential future crossings have been identified within one of the planning processes described earlier in this report but are conceptual with no identified funding source. Potential future crossings are shown as a green asterisk on the Pedestrian and Bicycle Network Maps.

Existing Crossings

The following interchanges provide accommodations for pedestrians and/or bicycles:

- I-35 and Lone Elm: shared use path over I-35
- I-35 and US-169: sidewalk over I-35
- K-10 and Woodland: sidewalk under K-10 bridge

New Crossings

The following crossings do not exist at the time of the analysis, however, they have been designed and will be constructed in the near future:

- I-70 and Riverview: Planned 8' sidewalk over I-70
- I-70 and 118th Street: Planned 6' sidewalk over I-70

Planned Crossings

The following crossings have been identified in local or state plans, however, they are conceptual and are not currently funded:

- Future K-10/Lone Elm Interchange: Future interchange design could include bike/pedestrian access
- Future K-10/Clare Interchange: Future interchange design could include bike/pedestrian access.
- Future K-10/Cedar Creek Parkway Interchange: Future interchange design could include bike/pedestrian access



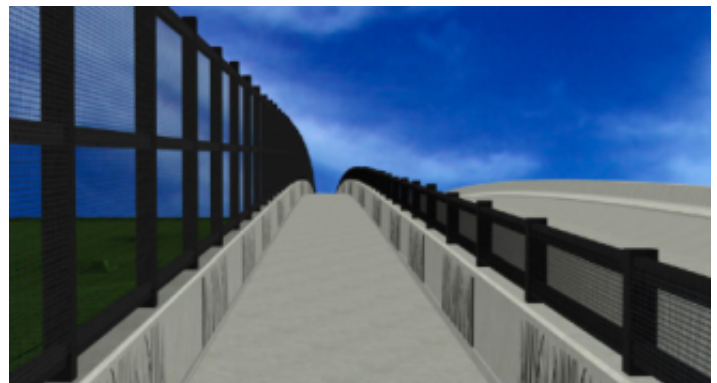
Compete Street with Separate Pedestrian and Bicycle Facilities



Existing Crossing at I-35 and Lone Elm



Existing Crossing at K-10 and Woodland



Planned Sidewalk over I-70 and 118th Street

Potential Future Crossings

The following crossings were considered during the process to address areas without safe or convenient access for pedestrians and bicycles as part of the gap analysis:

I-70 and 134th Street

Currently, 134th Street is a 2-lane road that runs under I-70. Although this road is currently unimproved, there are plans for a future water line relocation that could provide an opportunity for a bicycle/pedestrian facility .

- Pros: Existing underpass. Opportunity to provide bike/pedestrian access as part of the future water line relocation
- Cons: Narrow road with limited right-of-way. Could be a share the road bike route.

Kansas River

The Kansas River serves as a significant barrier to future pedestrian and bicycle connections. Currently, there are no pedestrian or bicycle accommodations on the existing north and southbound K-7 bridges crossing the Kansas River. The MARC Policy on Bicycle and Pedestrian Accommodations on Missouri and Kansas River Bridges, adopted April 2006, states that safe, practical and appropriate bicycle and pedestrian accommodations be considered in the planning and design of all surface transportation projects that cross the Kansas and Missouri Rivers where warranted and feasible. The policy applies to projects in Transportation Outlook 2040, MARC’s Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP). Implementation of this policy will require a partnership between KDOT and the appropriate local jurisdiction(s).

Three options for crossing the Kansas River were considered:

1. New Pedestrian Bridge over Kansas River east of K-7

- Pros: Most direct connection of existing network
- Cons: Cost of new bridge structure, land acquisition

2. New Pedestrian Bridge over Kansas River west of K-7

- Pros: Direct connection to proposed MetroGreen System
- Cons: Cost of new bridge structure, land acquisition

Due to cost, potential pedestrian and bicycle-only bridges as described would be a long-term option, but should be considered given: 1) the high cost to modify the superstructure; and 2) the bridge retrofit concerns identified in the next sub-section.

3. Retrofit K-7 Bridges over Kansas River

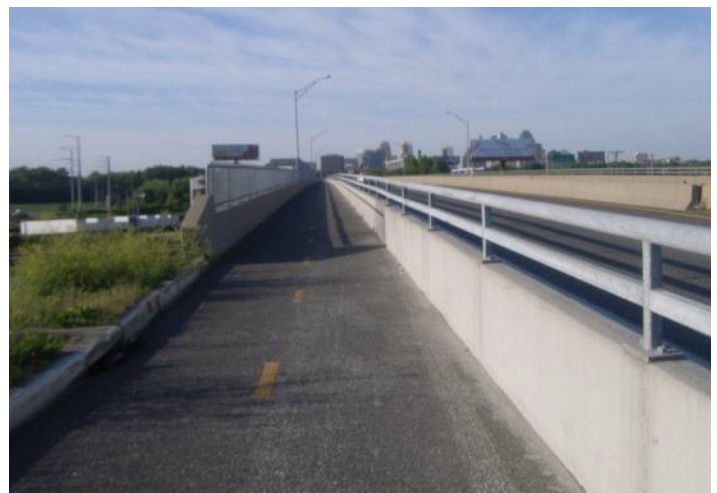
- A retrofit of one of the K-7 bridges would include using a portion of the shoulder and/or narrowing the vehicular



Existing 134th Street under I-70



Existing Northbound K-7 Bridge over Kansas River



Heart of America Bridge with Shared Use Path Retrofit

travel lanes to accommodate a Shared Use Path separated from vehicular traffic by a concrete barrier (as shown in the photo to the right). An example of this type of retrofit is the Heart of America Bridge (9 Highway) connecting Downtown Kansas City, Missouri to North Kansas City, Missouri. Concerns about this option include the reduced ability to use a wider shoulder for incident and emergency management vehicles as well as maintenance, including snow removal.

Pros: Utilizes existing infrastructure to cross river.

- Cons: K-7 bridge structures cannot support cantilevered extension without modifications to the superstructure; long span with limited shoulder has safety, maintenance, incident management implications; federal requirements for detour provisions when pedestrian and bike facilities are closed for maintenance or improvements.

The northbound or southbound K-7 bridges may be able to be retrofitted with a shared use path like the Heart of America Bridge, however, it should be noted that there are key differences between these facilities:

- Travel speeds are higher on the K-7 bridges. K-7 operates like a suburban freeway within this section while the Heart of America bridge is more urban with lower speeds at peak periods.
- The K-7 bridges are much longer than the Heart of America bridge making emergency access on narrow shoulders more problematic.

A retrofit is obviously a much less expensive option than modifying the superstructure or constructing a new bicycle and pedestrian bridge over the Kansas River. However, this report has identified several concerns and issues with a potential retrofit:

- Higher traffic speeds greatly raises the pedestrian's chance of a fatality if hit by a motor vehicle (see page 3).
- The majority of bicyclists are most comfortable on low traffic local streets (see page 4). The number of bicyclists and pedestrians that would use a shared use path on a retrofitted K-7 bridge has not been analyzed.
- The K-7 bridges have a much longer span and higher posted speeds than the Heart of America bridge example.
- Loss of the existing shoulder would reduce the ability of KDOT to provide adequate safety, maintenance and incident management.
- Federal requirements for detour provisions.
- Potential litigation by non-motorized users that claim that they were harmed by the provision of inadequate or unsafe bicycle and pedestrian facilities on the bridge.

Due to these concerns, KDOT does not support a retrofit to the existing Kansas River bridge(s).

STAKEHOLDER MEETING

The consultant facilitated a stakeholder meeting with local government and KDOT staff to discuss the analysis and preliminary recommendations. Participants included local government staff (planners, landscape architects and engineers representing public works, planning and parks departments) with at least two representatives from each participating jurisdiction.

The meeting began with an overview presentation of the analysis and preliminary crossing concepts. Participants then were divided into two groups: the Northern Section (Shawnee to Leavenworth) and the Southern Section (Spring Hill to Shawnee). There was overlap between the two sections allowing both groups to discuss the Kansas River crossing.

- The Kansas River crossing is critical to providing a true regional bicycle and pedestrian system. Participants acknowledge the maintenance and vehicular safety issues with retrofitting the existing K-7 bridges for pedestrian and bicycle access. However, they also acknowledge that a new dedicated bike/pedestrian bridge to the east or west would be costly and very long term.
- During the crossing discussion, there was consensus that any new or significantly modified interchange, bridge or underpass should consider accommodations for safe and convenient pedestrian and bicycle connections. This includes providing a shared-use facility with a width of at least 10' to accommodate pedestrians and bicycles.
- Jurisdictions have developed their own standards and terminology for pedestrian and bicycle facilities. Some facilities are 8' while others are 10' wide. Additionally, some jurisdictions provide facilities on both sides of the street while others on only one side. There was discussion about potential consistency of standards, however, it was noted that standards should fit within the natural and physical context of each area. Some areas are rural with low pedestrian and bicycle volumes while other areas are more urbanized with higher volumes.
- Participants noted that a major focus of initial analysis was north-south connections in the Study Area. However, east-west connections to local road networks as well as major activity centers in the Study Area are equally important. Based on this discussion, participants provided recommendations for more east-west connections. As a result of this discussion, the final Pedestrian and Bicycle Facility Maps and associated priority gaps were modified.

- There was a general consensus that the future arterial and collector road network identified in the 2006 *K-7 Corridor Management Plan* would provide an excellent opportunity for future pedestrian and bicycle connections. However, there was not a consensus what types of facilities should be provided. Some participants noted the opportunity for a Complete Street concept with a 10' Shared Use Path and dedicated Bike Lanes on both sides of the street while others, especially within rural areas, are planning for an 8' path on one side of the street. The shared use path could be on one side of the street with a standard sidewalk on the other, however, dedicated bicycle facilities need to be provided on both sides of the street.

PHASE II: NEXT STEPS

The following next steps are intended to provide a guide on the use of this analysis by KDOT and local jurisdictions to help implement a connected pedestrian and bicycle network throughout the Study Area. It should be acknowledged that more often than not, bicycle/pedestrian facilities are implemented based on opportunities that cannot always be foreseen in a conceptual long-range plan. Therefore, the local governments and bicycle/pedestrian advocates should remain flexible and take advantage of opportunities as they arise.

- Use this analysis to help inform MARC's *Regional Bike Plan* process within the K-7 Study Area. The Regional Bike Plan, expected to begin Fall 2013, will evaluate plans, programs and policies; analyze the region's current and future bikeway network; identify a regional bikeway and trail network; develop a toolkit; and engage local government stakeholders.

Responsibility: MARC, Local Jurisdictions and KDOT

- Use the Pedestrian and Bicycle Network inventory and gap analysis as a resource for future capital improvement planning for transportation facilities within the Study Area.

Responsibility: KDOT, Local Jurisdictions and MARC

- Consider creating an MOU to encourage ongoing dialogue and coordination of pedestrian and bicycle facility improvements. This MOU may include more detailed discussions of future alignments, and agreement on common nomenclature for facility types as well as consistent standards. Parties to the MOU would be KDOT and local jurisdictions within the Study Area including potentially Spring Hill, Olathe, Lenexa, Shawnee, Bonner Springs, Unified Government of Wyandotte County and Kansas City, Kansas, Basehor, Lansing and Leavenworth, as well as Miami, Johnson and Leavenworth Counties.

Responsibility: KDOT, Local Jurisdictions and MARC

- Consider a formal corridor policy within the aforementioned MOU that any major transportation investment within the Study Area consider provisions for safe and convenient pedestrian and bicycle access and connections for all user types as outlined within existing adopted plans as well as this technical report.

Responsibility: KDOT, Local Jurisdictions and MARC

- Consider preserving additional right-of-way along the identified future arterial and collector roads that will parallel K-7 for a 10' shared use path and appropriate bicycle facilities which may also include a bike lane on both sides of the road.

Responsibility: Local Jurisdictions

- Consider participating monetarily toward bicycle and pedestrian facilities throughout the study area, particularly as part of major investment projects.

Responsibility: KDOT, Local Jurisdictions and MARC

- Consider amending local land development regulations to require any development within 1/2-mile of a planned or existing bicycle/pedestrian facilities to provide a direct connection to future facilities at the owner/developer's expense.

Responsibility: Local Jurisdictions

NEXT STEPS SPECIFIC TO THE KANSAS RIVER

The K-7 Corridor Review Committee members view a Kansas River bicycle and pedestrian crossing as a regional need, and support consideration of a retrofit similar to the Heart of America bridge example (see Stakeholder Meeting section). As noted previously, however, KDOT does not support a retrofit that would provide bicycle and pedestrian accommodations on the existing bridge.

The following next steps are recommended:

- Continue discussion and analysis, including funding scenarios of pedestrian bridges downstream or upstream. This analysis may include a feasibility study to further evaluate engineering, safety and operational challenges.

Responsibility: KDOT, Local Jurisdictions and MARC

- Consider revising bicycle and pedestrian plans to include facilities in locations that could connect to a potential Kansas River crossing.

Responsibility: Local Jurisdictions and MARC



- Consider bicycle and pedestrian accommodations if one or both of the Kansas River bridges is modified or replaced to the extent that a shared use path can be added without creating the safety and maintenance issues identified in this report and if another crossing has not already been identified.

Responsibility: KDOT

- Consider MARC's Policy on Bicycle and Pedestrian Accommodations on Missouri and Kansas River Bridges when evaluating accommodations for bicycles and pedestrians.

Responsibility: KDOT, Local Jurisdictions and MARC

PEDESTRIAN NETWORK ANALYSIS MAP

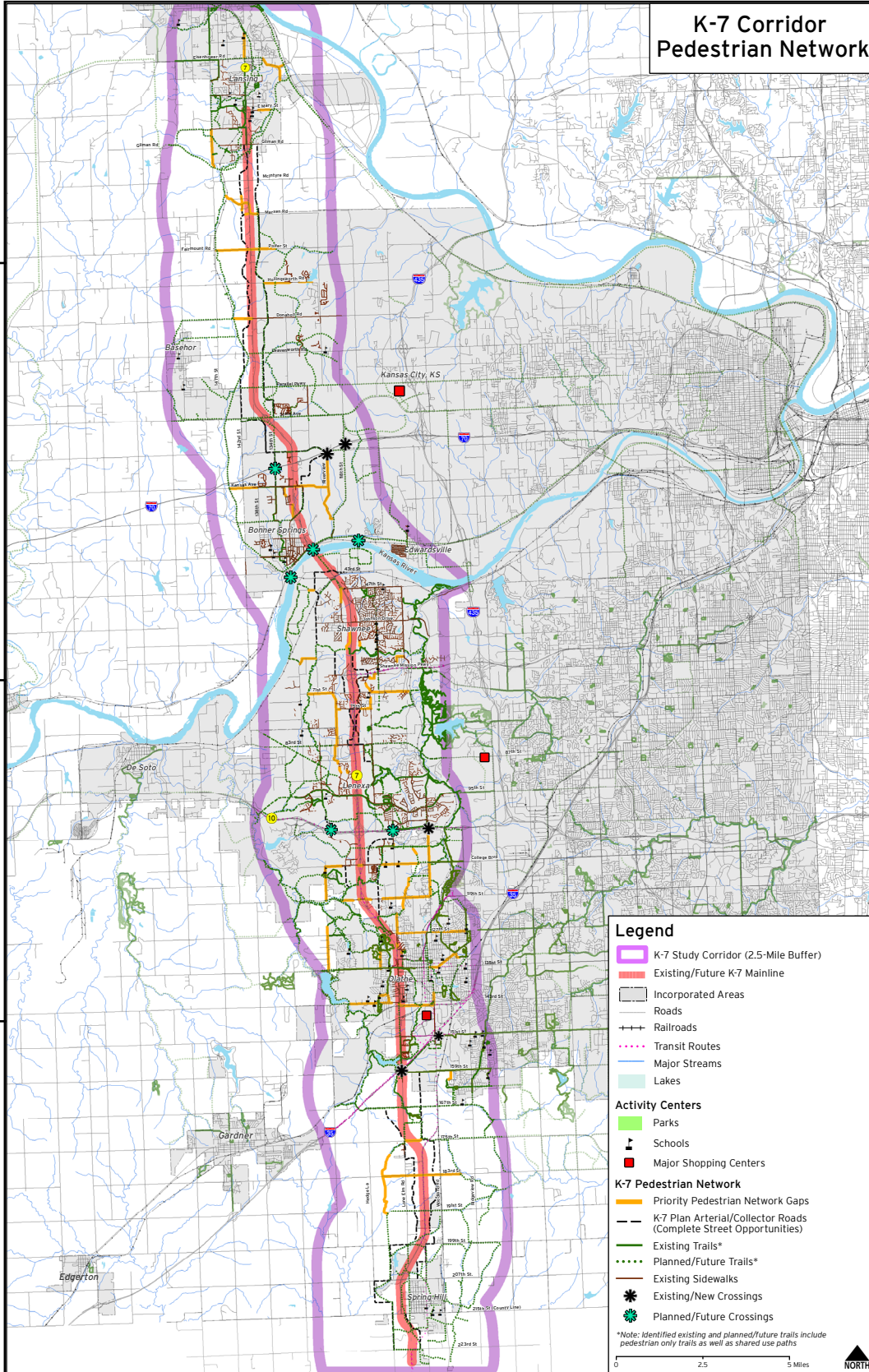
K-7 Corridor
Pedestrian Network

Inset 4

Inset 3

Inset 2

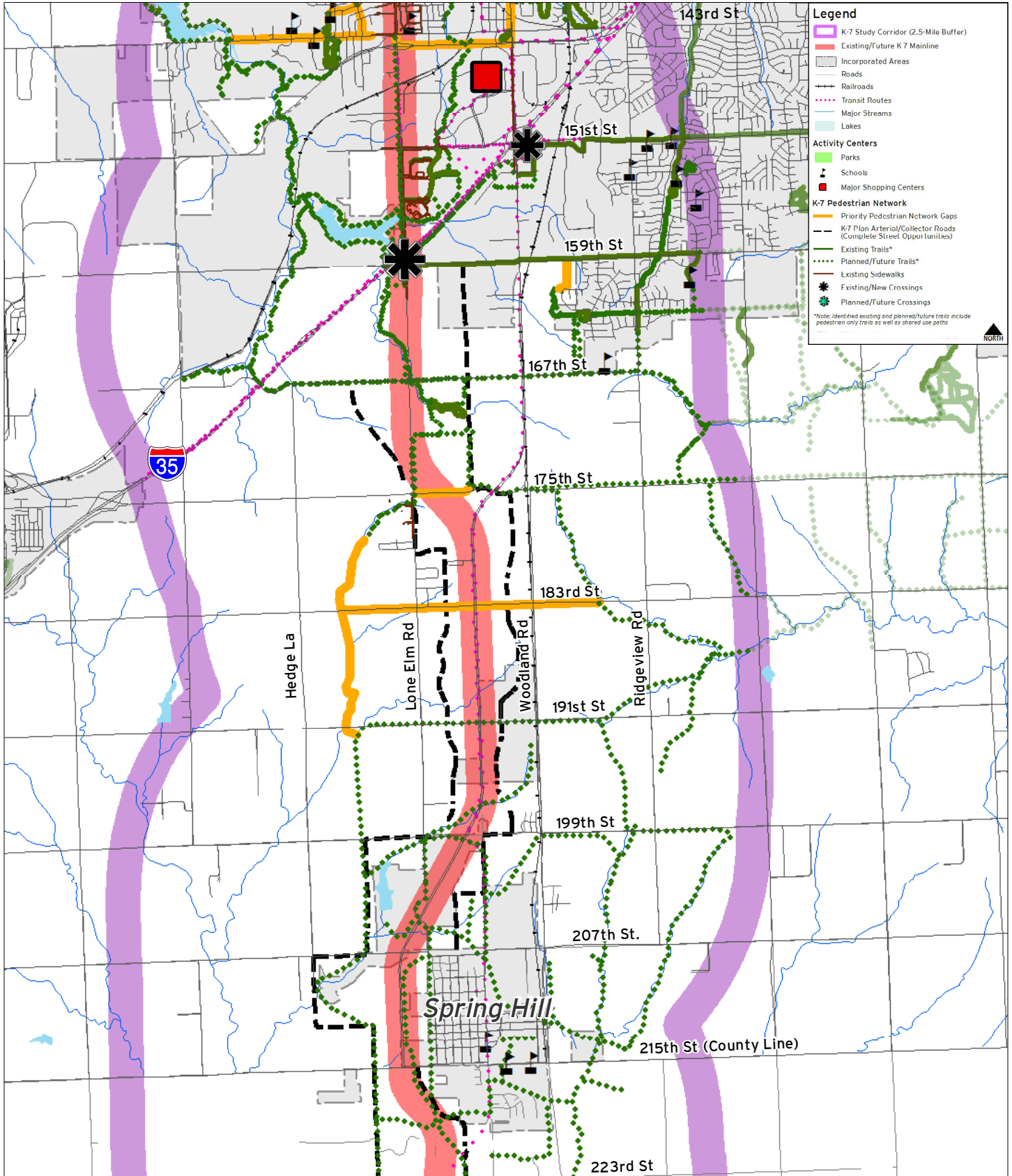
Inset 1



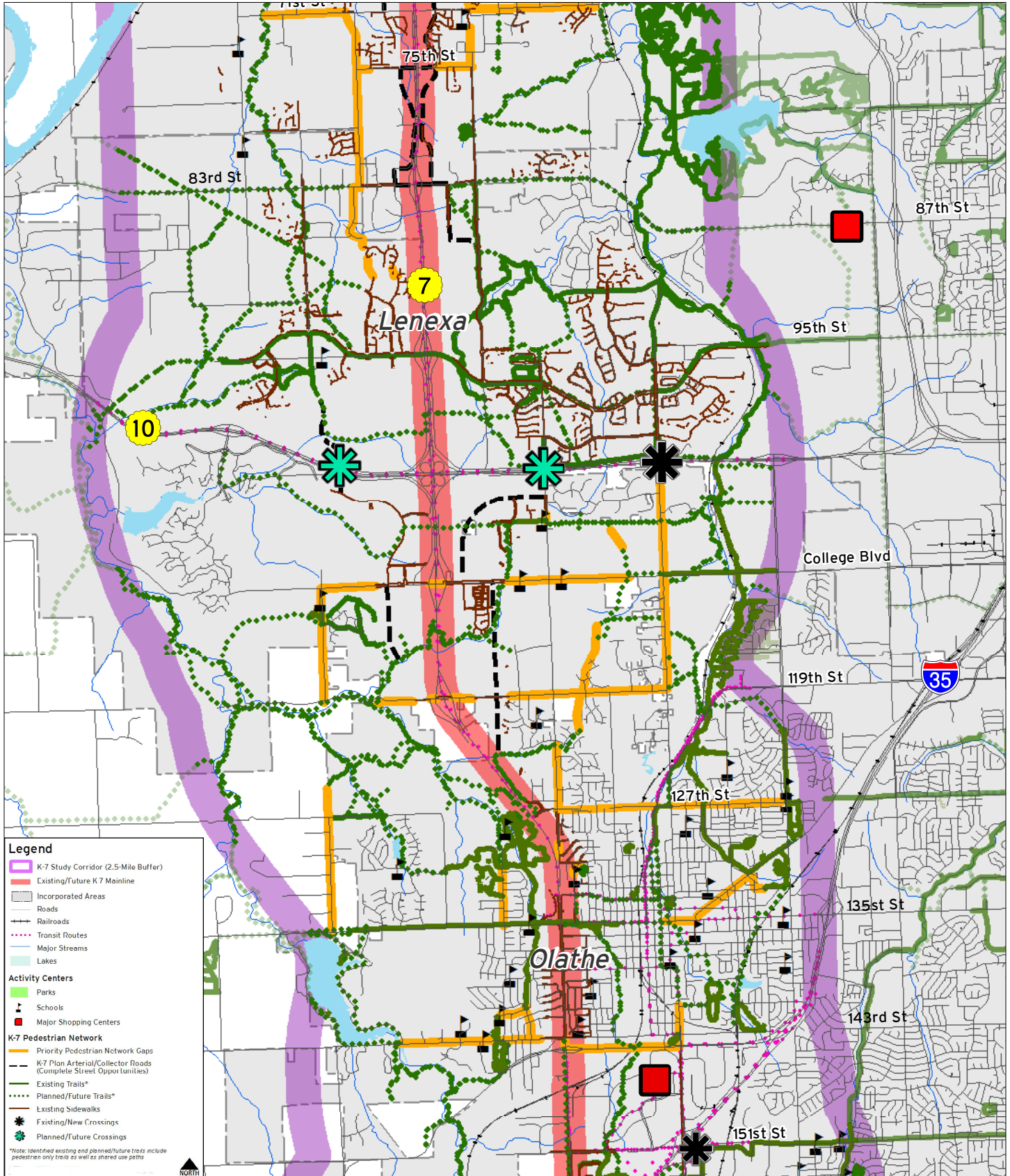
- Legend**
- K-7 Study Corridor (2.5-Mile Buffer)
 - Existing/Future K-7 Mainline
 - Incorporated Areas
 - Roads
 - Railroads
 - Transit Routes
 - Major Streams
 - Lakes
- Activity Centers**
- Parks
 - Schools
 - Major Shopping Centers
- K-7 Pedestrian Network**
- Priority Pedestrian Network Gaps
 - K-7 Plan Arterial/Collector Roads (Complete Street Opportunities)
 - Existing Trails*
 - Planned/Future Trails*
 - Existing Sidewalks
 - Existing/New Crossings
 - Planned/Future Crossings

*Note: Identified existing and planned/future trails include pedestrian only trails as well as shared use paths

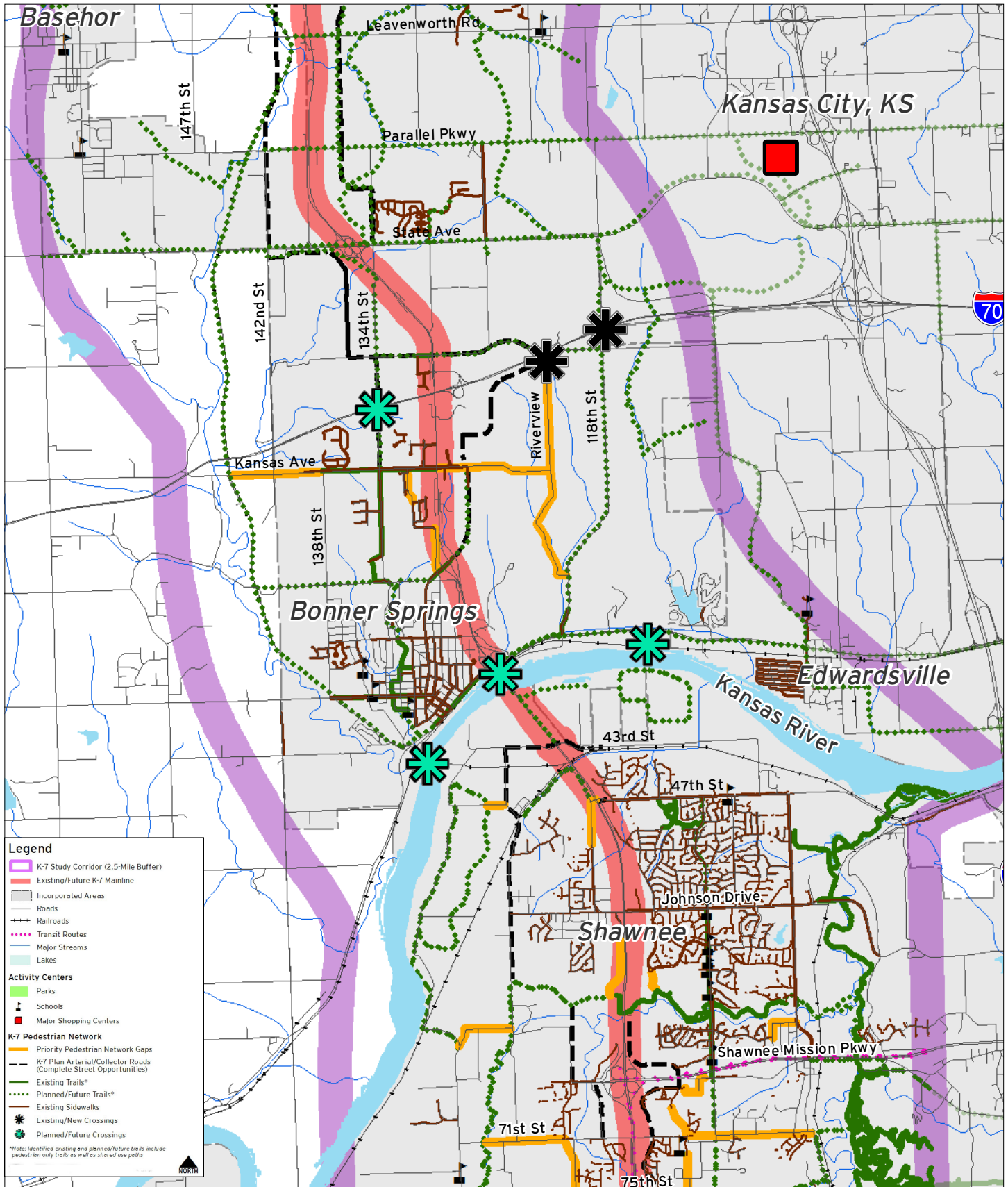
PEDESTRIAN NETWORK ANALYSIS MAP (INSET 1)



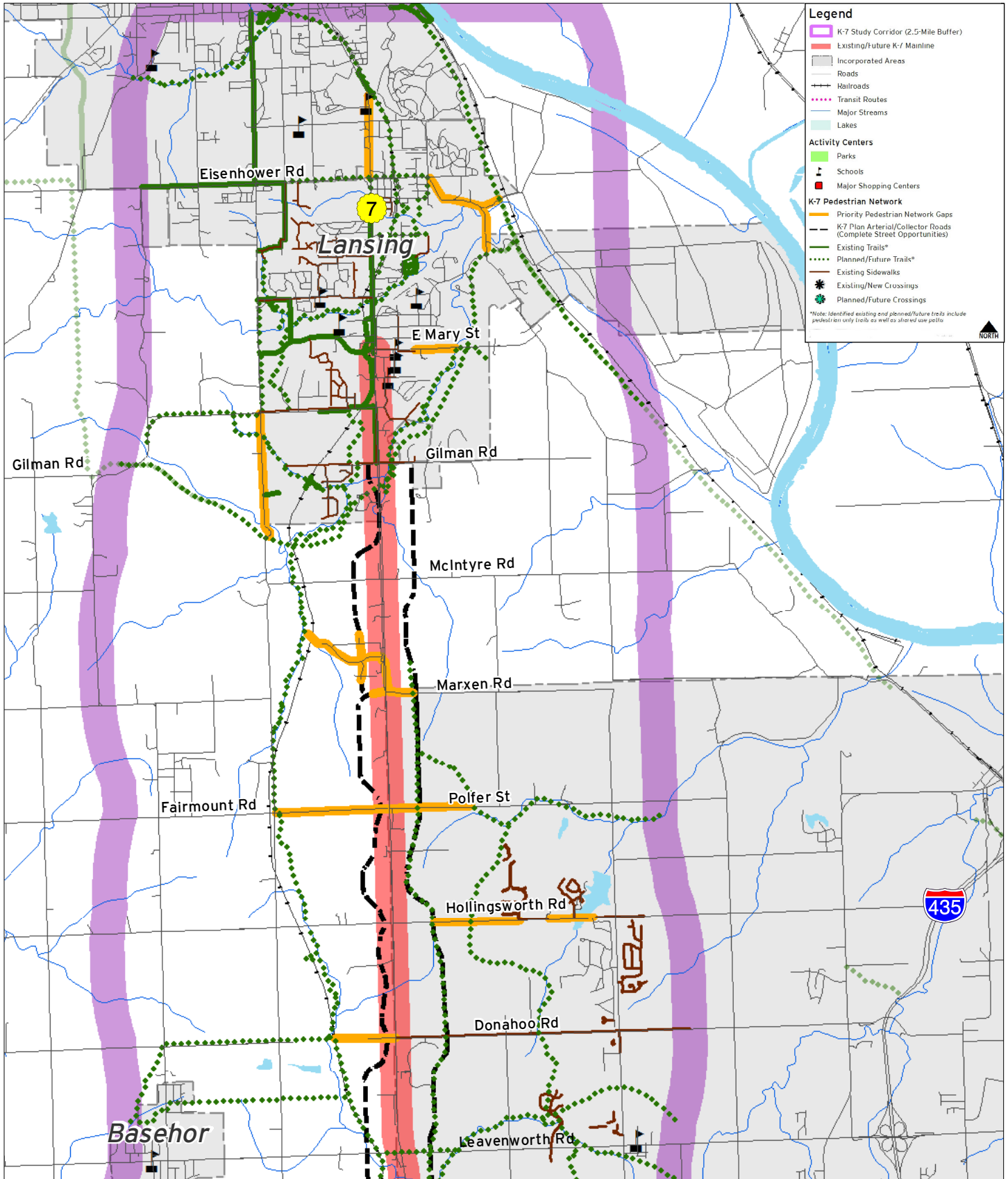
PEDESTRIAN NETWORK ANALYSIS (INSET 2)



PEDESTRIAN NETWORK ANALYSIS (INSET 3)



PEDESTRIAN NETWORK ANALYSIS (INSET 4)



BICYCLE NETWORK ANALYSIS MAP

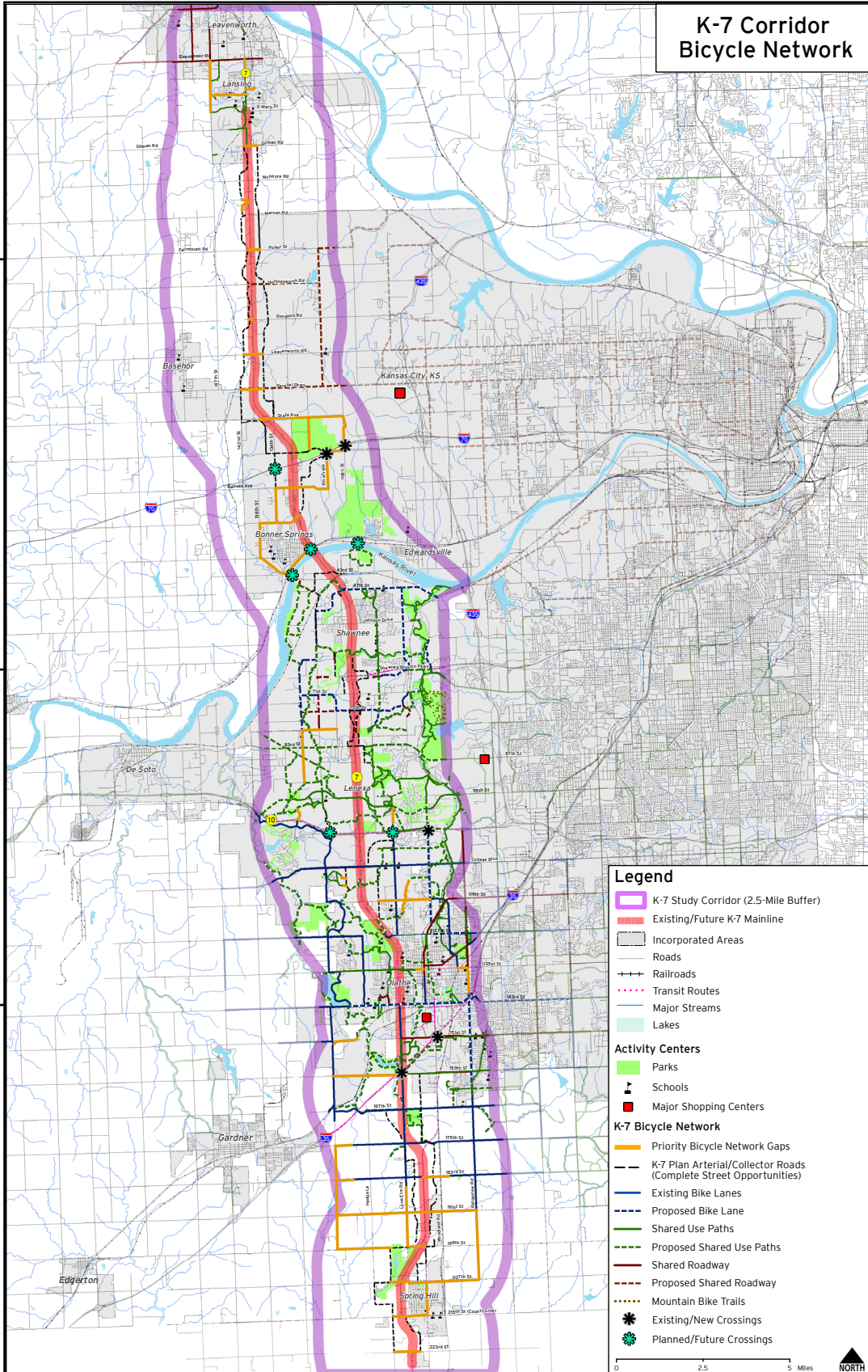
**K-7 Corridor
Bicycle Network**

Inset 4

Inset 3

Inset 2

Inset 1



Legend

- K-7 Study Corridor (2.5-Mile Buffer)
- Existing/Future K-7 Mainline
- Incorporated Areas
- Roads
- Railroads
- Transit Routes
- Major Streams
- Lakes

Activity Centers

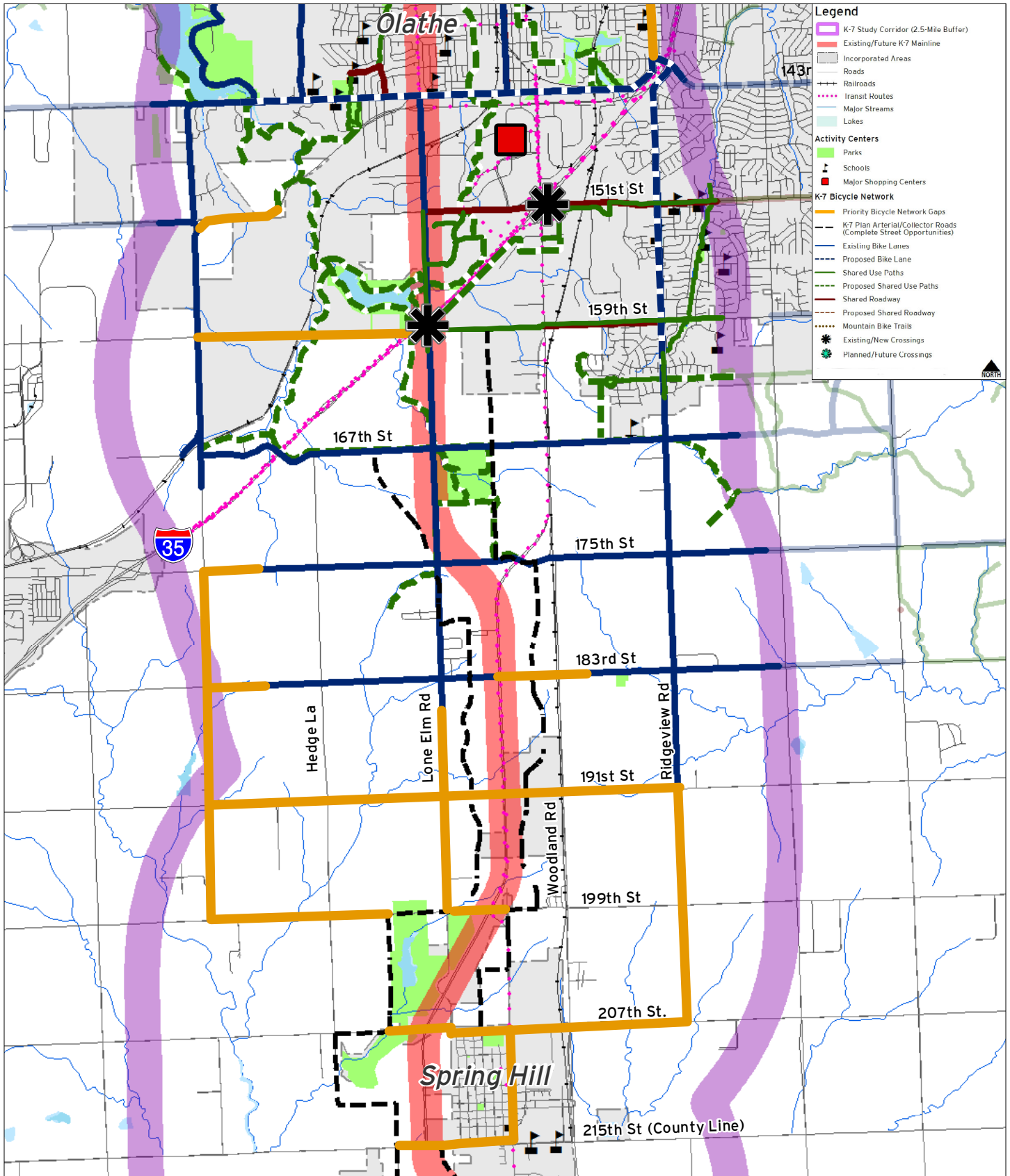
- Parks
- Schools
- Major Shopping Centers

K-7 Bicycle Network

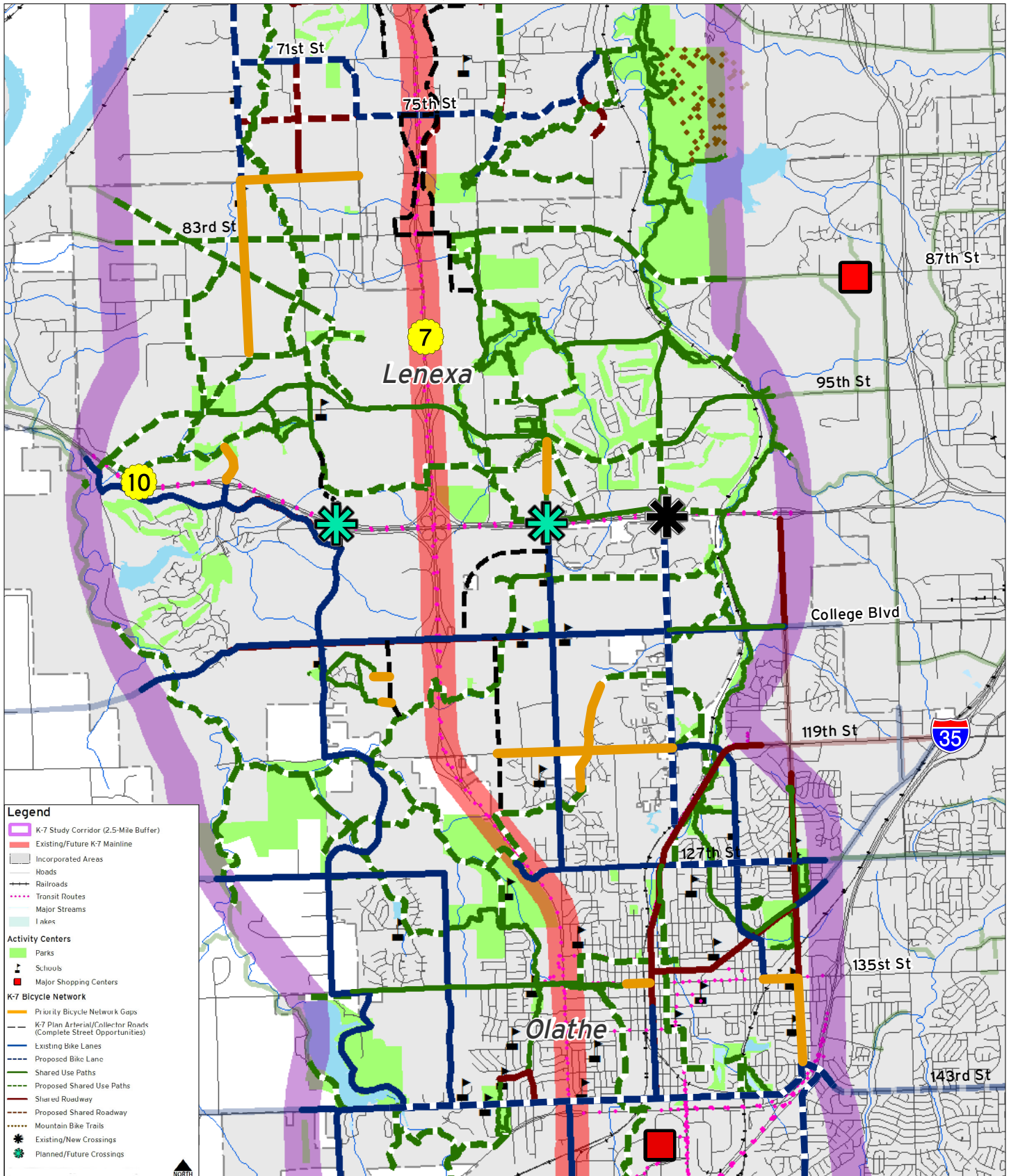
- Priority Bicycle Network Gaps
- K-7 Plan Arterial/Collector Roads (Complete Street Opportunities)
- Existing Bike Lanes
- Proposed Bike Lane
- Shared Use Paths
- Proposed Shared Use Paths
- Shared Roadway
- Proposed Shared Roadway
- Mountain Bike Trails
- Existing/New Crossings
- Planned/Future Crossings

0 2.5 5 Miles **NORTH**

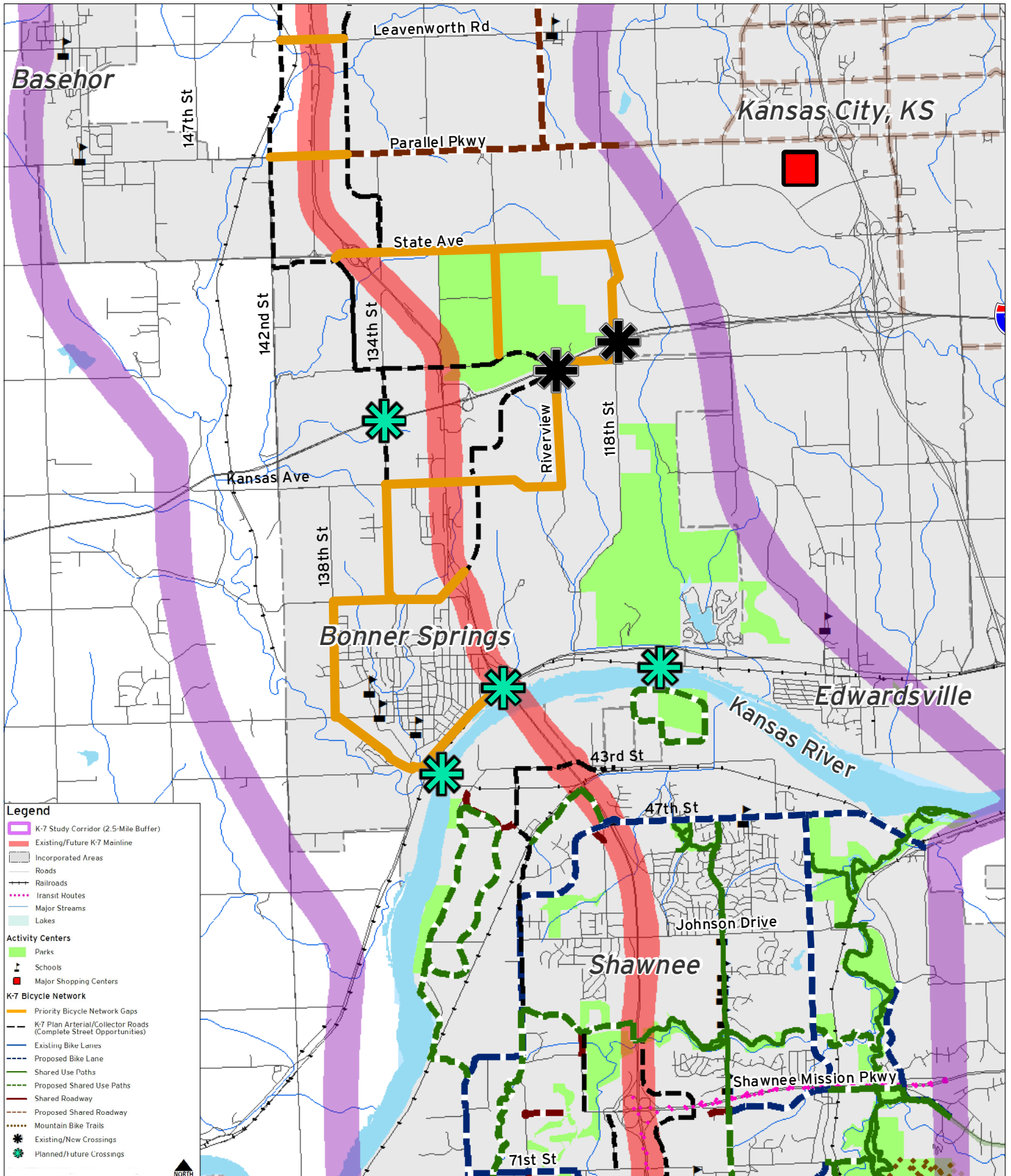
BICYCLE NETWORK ANALYSIS MAP (INSET 1)



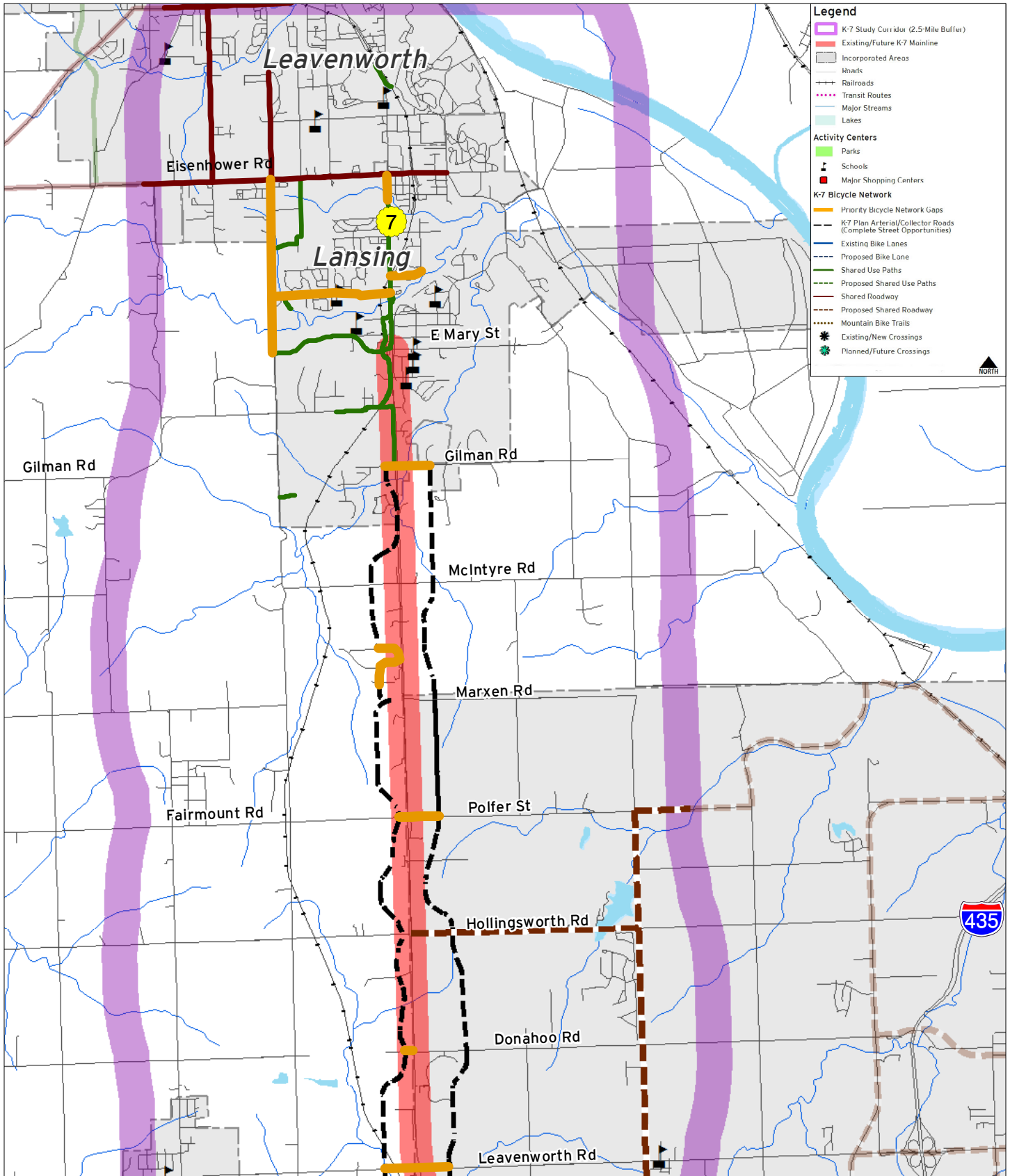
BICYCLE NETWORK ANALYSIS (INSET 2)



BICYCLE NETWORK ANALYSIS (INSET 3)



BICYCLE NETWORK ANALYSIS (INSET 4)





Appendix

K-7 Multimodal Corridor Study
Recommendations Summary



10 WAYS TO IMPROVE MULTIMODAL TRAVEL WITHIN THE K-7 CORRIDOR



1 CONCENTRATE LAND USES

Future land use plans in the Corridor should concentrate development rather than emphasize sprawl, which does not promote multimodal travel. Local land use plans should be more conducive to multimodal travel which means higher-density mixed-use transit-oriented centers where housing, shopping, and employment are clustered together. Such developments decrease trip distances. A majority of pedestrians prefer to walk only five to ten minutes to reach their destination while most cyclists are willing to spend up to 15 minutes riding to their final destination. Addressing existing institutional or legal obstacles to building pedestrian-friendly, mixed-use transit-oriented developments should be a top priority for Corridor communities.

2 PRESERVE THE RIGHT-OF-WAY FOR MULTIMODAL TRAVEL

Commit to preserving a portion of the right-of-way for multimodal transportation including public transit, cycling, and walking. Current K-7 plans calls for a 300-foot right-of-way for a future six-lane freeway with, in many cases, two additional auxiliary lanes. The K-7 Corridor Management Plan shows that a minimum of six lanes will be necessary to handle projected traffic in 2030. Yet, communities across the nation are finding that adding capacity does not equate to alleviating congestion. In fact, studies have shown that adding supply only increases demand. Use multimodal transportation to provide attractive alternatives, which will reduce traffic congestion and increase quality of life.

3 PROMOTE TRANSIT

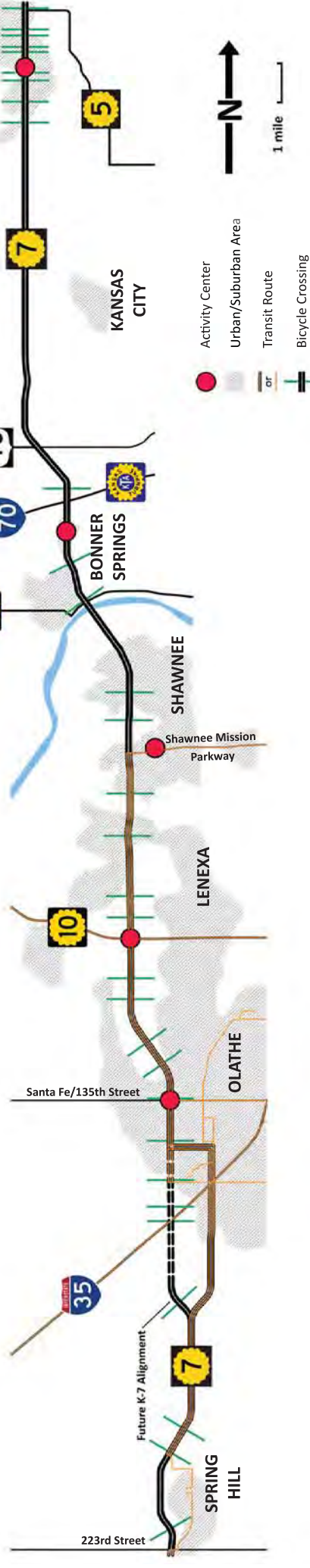
Study the implementation of a K-7 Connector with a limited number of stops to reduce travel times and increase competitiveness with personal vehicles. Consider operating this service in an HOV lane, in mixed traffic, or as a bus-on-shoulder. Implementing an HOV lane could eliminate the need for a third general lane. HOV lanes can be converted to general purpose during non-peak hours if demand is not sufficient to support HOV use. Such facilities can result in faster, more reliable commute times. Increased congestion results in increased carpooling and HOV lane use—as congestion continues to increase, adding lanes will not always be a practical or beneficial solution.

4 COMPLETE STREETS FOR ALTERNATIVE MODES

Evaluate transit connections to the recommended activity centers seen on the map and to local service in the communities adjacent to the corridor. Olathe currently has the highest potential for transit service of the Corridor communities. Also, consider connecting the currently-proposed east-west BRT routes on Shawnee Mission Parkway and State Avenue to K-7. Other local link services could be added to connect surrounding areas to these BRT stops. Consider expanding local link transit service to adjacent communities, particularly Olathe, Lenexa, and Shawnee.

5 USE CONSISTENT BIKE AND PEDESTRIAN NOMENCLATURE

Reduce confusion and promote comprehensive planning by developing consistent cycling and pedestrian facilities, signage, striping and usage policies. Decrease confusion and conflicts, especially for users having to cross municipal boundaries. Adopting consistent nomenclature and policies for cycling and pedestrian facilities in Corridor communities can ensure a safe, accessible, attractive, and cost-effective system. Using consistent nomenclature and policies will improve the user's experience while enhancing the transportation value of these facilities.



6 DEVELOP A REGIONAL BIKE AND PEDESTRIAN MAP AND PLAN

Use the standard nomenclature to update the cycling and pedestrian maps that have been created by local jurisdictions. Develop a comprehensive map of cycling and pedestrian routes for the entire region that also includes transit stops. Numerous other regions recognize the need to develop regional cycling and pedestrian maps that include all jurisdictions. These comprehensive maps provide users complete information on existing facilities and allow them to plan their preferred routes beyond the borders of any one jurisdiction; thereby, increasing the accessibility to the whole system for all users. In addition, keep in mind cycling facilities when designing the new K-7 freeway, especially at those points where cycling facilities intersect with K-7 as shown above.

7 INSTALL BICYCLE PARKING

Install secure bicycle parking and service stations at bus stops and park-and-ride lots. Commuters can then bike to the nearest bus stop, store their bicycles either at the stop or on the bus' bike rack, and then ride the bus to their destination in a truly multimodal commute. Planners should also look to increase the area from which cycling commuters can access transit by building new and upgrading existing cycling facilities throughout the Corridor. Also, developing a bike-share system, bundling it with transit services, and integrating transit service design with the regional cycling network will further encourage commuters to bike to work.

8 CONTINUE K-7 MULTIMODAL STUDIES

Review these recommendations with the public and with stakeholders representing transit users, cyclists, and pedestrians. Developing a work scope for continued studies and collecting more detailed information on the needs and opportunities for multimodal use as the first step. Having the right data and tools will ensure that resources are spent efficiently while satisfying the various needs of different communities. Collecting data on household travel as to land use activities, transit use by pedestrians and cyclists, cycling and pedestrian counts for existing facilities, vehicle ownership, single-occupant vehicles versus multiple-occupant vehicles, carpools, demographic characteristics are key to driving the process.

9 ADOPT A RESOLUTION ADDRESSING MULTIMODAL TRAVEL

Consider adding a resolution to the current K-7 Corridor Management Plan that reflects a new commitment to providing alternative modes of travel. The resolution needs to include a detailed approach on how to increase network mobility for all modes throughout the Corridor while assessing the current pedestrian and cyclist facilities. Another important consideration is connectivity to transit and other destinations beyond the corridor during this stage, along with implementation strategies to ensure a more balanced transportation system.

10 USE ALTERNATIVE TRANSPORTATION