

1.0 Purpose and Need for Action

A Purpose and Need Statement describes the transportation problems that a proposed project is to address. This statement provides a description of the purpose of the K-10 Capacity Improvements Project and a demonstration of the need for improvements the proposed project is to address within the study area.

1.1 Project Overview and Background

The Kansas Department of Transportation (KDOT) and the Federal Highway Administration (FHWA) are proposing to modernize and expand the K-10 Corridor and improve connections with I-435 and I-35 in Johnson County, Kansas. The project proposes widening K-10 from four to six lanes, with three-lanes in each direction, from Renner Boulevard to E. 2300 Road and a new collector-distributor (CD) system from I-435 to Ridgeview Road.

1.1.1 Project Limits and Termini

The proposed project is located within the cities of Lenexa, Olathe, and De Soto in Johnson County, Kansas as well as unincorporated portions of Johnson County, Kansas. The overall study limits are on K-10 from west of the interchange at Evening Star Road to the I-435/I-35/K-10 Interchange. Portions of I-435 from W. 95th Street to I-35 and portions of I-35 at the I-435 Interchange are also included. Major roads at interchanges on K-10 are included within the study area, and include Evening Star Road, Edgerton Road, Lexington Avenue, Kill Creek Road, Cedar Creek Parkway/Canyon Creek Boulevard, Woodland Road, Ridgeview Road, and Renner Boulevard service interchanges. As well as potential connections from Clare Road and Lone Elm Road. Additionally, K-7 is included from Prairie Star Parkway to College Boulevard. **Figure 1-1** (at the end of the chapter) shows the study area for the project. The overall length is approximately 17.0 centerline miles along K-10. The study area boundaries represent the logical limits for the infrastructure improvements and environmental review.

1.1.2 Project Background

K-10 is one of Kansas' most important and fastest growing corridors. Serving nearly 70,000 vehicles per day, K-10 provides a vital connection between the southwest region of the Greater Kansas City metro area to Lawrence and I-70. The K-10 Transportation Study was conducted by KDOT, Mid-America Regional Council (MARC), and the Lawrence-Douglas County Metropolitan Planning Organization (MPO) in 2005. The purpose of the study was to identify needed future improvements for the K-10 Corridor between the City of Lawrence and the Kansas City metro area. The study evaluated existing and future traffic conditions, developed mainline widening and interchange configurations, and provided public engagement activities. Recognizing the importance of this corridor, KDOT has made significant investments starting with the K-10 Transportation Study, which led to projects like the South Lawrence Trafficway (SLT)

East Leg in Lawrence and the Johnson County Gateway at the K-10/I-435 Interchange. Progress continues with the SLT West Leg now in the Eisenhower Legacy Transportation (IKE) Program pipeline.

Although these investments addressed critical needs, challenges remain on K-10 including aging infrastructure throughout much of the corridor. Additionally, routine congestion during the morning and evening peak periods, particularly east of K-7, impacts commuter traffic daily. Geometric configurations are outdated and inadequate to support current demand and contribute to safety issues. K-10 is poised to experience unprecedented new growth dynamics. Additionally, planned development of a large manufacturing operation on the west end of the project corridor near De Soto is anticipated to further stress traffic conditions along the entire study corridor.

1.1.3 Proposed Action

The National Environmental Policy Act (NEPA) requires the FHWA to assess the environmental effects of projects that include federal funding or require a federal action. The NEPA process allows transportation officials to make project decisions that balance engineering and transportation needs with social, economic, and natural environmental factors. At the direction of FHWA, an Environmental Assessment (EA) is being prepared for the K-10 Capacity Improvements project to determine whether or not the Proposed Action has the potential to cause significant environmental effects to the natural or man-made environment. Within the EA, FHWA and KDOT are evaluating a 'No Action' or 'No-Build' alternative, the improvement of alternative routes, existing capacity management, multimodal options, and the addition of capacity through traditional widening or the use of express toll lanes as the Proposed Action to satisfy the Purpose and Need for the project. Roadway and interchange configurations are also being evaluated throughout the corridor.

1.2 Purpose and Need

1.2.1 Need for Proposed Project

The proposed project is needed to modernize and expand the K-10 Corridor from west of the interchange at Evening Star Road to the I-435/I-35/K-10 Interchange in Johnson County, Kansas. The corridor has become insufficient to meet current and future mobility needs, resulting in worsening safety, reliability, and congestion. There is also a need to address the corridor's issues with transportation improvements that offer long-term sustainability and flexibility for all users.

The proposed project is needed to:

- **Enhance safety performance** to address high crash areas and congestion related crashes.
- **Improve traffic operations** by reducing congestion and delay within the corridor to meet existing and future travel demands.

- **Improve infrastructure condition** and address ongoing operations and maintenance needs impacting long-term travel reliability and life-cycle costs.
- **Provide flexible transportation choices** by accommodating the needs of all users and modes.
- **Support local and regional growth** through coordinated transportation improvements consistent with current and future land use.

1.2.2 Purpose of the Proposed Project

The purpose of the K-10 Capacity Improvements Project is to provide the traveling public with an efficient transportation facility on K-10 and the broader highway system within the Kansas City metropolitan area, resulting in enhanced safety performance, improved traffic operations, improved infrastructure conditions, flexible transportation choices, and support of local and regional growth.

The proposed project is in alignment with identified needs and goals that are expressed within KDOT's Kansas Long Range Transportation Plan (LRTP) and MARC's metropolitan transportation plan, which is called *Connected KC 2050*. Goals that MARC identified for the region are as follows:

- Access to opportunity — Support a connected system that enables access to all activities, allowing people to succeed by removing transportation barriers.
- Public health and safety — Foster healthy communities and individuals by providing safe and secure places to live, walk, bike, ride the bus, and drive with clean air to breathe.
- Healthy environment — Prioritize and support investments that reduce pollution and greenhouse gas emissions and preserve and restore ecosystem health.
- Transportation choices — Provide a range of transportation choices for communities across the region to allow for ease of travel as well as public health and environmental benefits.
- Economic vitality — Maintain a multimodal transportation system that supports the efficient movement of people and goods and promotes economic development.

The following sections summarize the project need for each project purpose. Additional details on the project need can be found in the Purpose and Need Technical Memorandum found in **Appendix A**.

1.2.3 Enhance Safety Performance

A detailed study of traffic safety was conducted for the K-10 Corridor consisting of approximately 18-miles of roadway covering the study area using the most recent available crash data from KDOT for 2017 through 2021. In total, 1,325 crashes occurred on the corridor during this time period, resulting in four fatalities. Of the 1,325 total crashes, 1,075 resulted in property damage only and 246 resulted in some form of injury to vehicle occupants. Three predominant crash types occurred within the corridor including rear end, fixed object, and animal collisions. These three crash types

accounted for approximately 75 percent of all crashes within the corridor, with rear end collisions accounting for 29 percent of all crashes.

When compared to other four-lane divided urban and rural highway facilities in Kansas, 13 of the 20 roadway segments along the K-10 Corridor exceeded the Statewide Average Crash Rate for either total crashes or fatal crashes. Generally, Edgerton Road to Canyon Creek Boulevard/Cedar Creek Parkway and K-7 to I-435 experienced rates exceeding statewide averages.

Figure 1-2 shows the existing crash hot spots and breaks down the locations of rear-end crashes and fatal crashes.

Figure 1-2: Crash Hot Spots



Source: KDOT Crash Data 2017 – 2021

Future No-Build (FNB)

A 2060 Future No Build (FNB) analysis showed that rear end and fixed object collisions will continue to be the most frequent types of crashes on K-10 and K-7. The analysis also showed that K-10 is likely to experience an increase in crashes, particularly along the segments from Lexington Avenue to Canyon Creek/Cedar Creek Parkway, near the K-7 interchange, at the Ridgeview Road interchange, and at the Renner Boulevard interchange. Several arterials, including Ridgeview Road, Woodland Road, and Lexington Avenue, are predicted to experience a higher number of crashes, mostly attributed to rear end and angle collisions at ramp terminals.

1.2.4 Improve Traffic Conditions

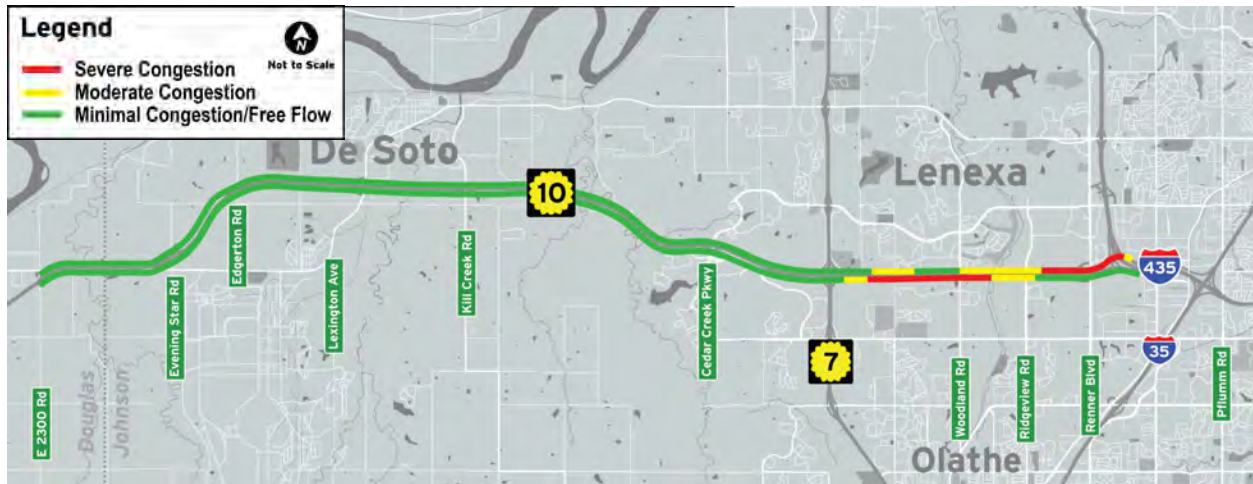
The traffic analysis found that the corridor is in need of improvements to provide congestion relief today and capacity improvements in the future. Using the National Performance Management Regional Data Set (NPMRDS) to analyze travel speeds for the years 2019 and 2023, severe congestion causing speeds to decrease to below 30 miles per hour (mph) was identified from I-435 to Woodland Road in the PM peak period in the westbound direction. During the AM peak period, congestion caused speeds to decrease to between 30-50 mph from K-7 to Ridgeview Road. In addition, due to

projected development in the De Soto area associated with the Astra Enterprise Park, traffic volumes are expected to increase in the future.

Under existing conditions in 2023, the corridor serves approximately 30,000 vehicles per day (vpd) on the west end of the corridor at E. 2300 Road and about 90,000 vpd on the east end at Renner Boulevard.

Figure 1-3 shows the existing (2023) congestion along the K-10 mainline occurs between I-435 and K-7.

Figure 1-3: Existing Conditions 2023: Areas of Congestion



Source: HNTB calculated values

Daily traffic volumes are anticipated to grow in the no-build scenario between 0.3 to 2.3 percent annually by the project design year of 2060, depending on location in the corridor and which corridor improvement scenario is selected. This projected increase in daily volume will add an additional 2,800 to 41,000 vehicles per day to K-10. The largest increase in daily traffic along K-10 is from Lexington Avenue and Kill Creek Parkway. This additional traffic volume is projected to further degrade operations in this area over time, leading to more congestion and the increasing presence of bottlenecks if no improvements are made.

1.2.5 Improve Infrastructure Condition

The K-10 Corridor is located on the edge of the Kansas City region in an area that is becoming more densely populated and heavily traveled. Growing congestion means safety, capacity, and reliability improvements will be needed to meet the needs of the corridor so the corridor can experience long-term sustainability. Because of the age of the existing infrastructure and projected traffic volumes, improvement of infrastructure condition is necessary.

The existing alignment of K-10 was constructed in sections starting from De Soto to K-7 in 1976, then from De Soto to Lawrence in 1978, and finally from K-7 to Ridgeview Road in 1984 and to I-435 in 2016. Over the years, the original pavement has been

overlaid several times throughout the sections of K-10 in an effort to keep the corridor in a serviceable condition. Routine maintenance will continue to be needed to keep the corridor in service, with reconstruction being necessary in the future.

Much of the K-10 geometric design and corresponding ramp geometry that was designed and constructed between 1970 and 1990 does not meet current minimum design criteria. Based on these results, a recommendation has been made to include geometric improvements to bring the geometrics in line with current criteria, especially for ramp improvements. In most locations, reconstruction would be required as well as the lengthening of many of the ramps in the study area.

Structures

In total, there are currently 60 open span bridges and four 10-foot to 20-foot bridge structures within the study area.

There are 42 mainline bridge structures within the study area, of these 33 were built prior to 1982, with the nine remaining mainline bridges being built between 2014 and 2016 as part of the Johnson County Gateway project. Structural evaluation of mainline bridges was completed in 2022. Three bridges were rated as fair, 10 were rated as satisfactory, 20 were rated as good, and nine were rated as very good. Nearly all bridges within the K-10 Corridor that were built between 1974 and 1981 have undergone several heavy maintenance actions. The mainline bridges that were constructed as part of Johnson County Gateway have not undergone any major repairs to date. The age and structure types of mainline bridges in the K-10 Corridor is anticipated to result in required frequent maintenance in the future for the bridges to remain in service.

The 10 ramp bridges within the study area were built as a result of the Johnson County Gateway project in 2015 and 2016. No major repairs are currently identified for the ramp bridges. Two ramp bridges are rated as satisfactory, one of the ramp bridges is rated as good and the remaining ramp bridges are rated as very good. Seven of the side road bridges were built between 1974 and 1993, with the remaining sideroad bridge being built in 2014 during the Johnson County Gateway project. Three of the bridges built in the late 1900s have undergone deck patching and overlays. One bridge is rated as fair, one is rated as satisfactory, one is rated as very good, and the remaining sideroad bridges are rated as good. The four 10-foot to 20-foot structures all serve as drainage structures, with one being built in 1981 and the rest being built in 1976. All four structures are rated as satisfactory.

Overall, of the 60 total open-span bridges in the study area, inventory ratings of HS (trucks with multiple axles) live load capacity have shown that nine mainline, one sideroad, and one ramp bridges fall short of the 36-ton load capacity and seven mainline and three sideroad bridges fall below the minimum vertical clearance of 16 feet and four inches. Almost one-third of the open-span bridges on the K-10 corridor qualify for a replacement or rehabilitation in order to function in a serviceable condition. When

considering the projected future congestion increases and safety concerns, the replacement and rehabilitation of those bridges will be necessary in order to accommodate those changes.

1.2.6 Provide Flexible Transportation Choices

A flexible transportation system is one that accommodates the needs of all users and modes. Typically, this includes walking, cycling, public transit, and commercial trucks in addition to passenger automobiles. The Preferred Alternative for the K-10 Capacity Improvements Project should be consistent with planned and proposed multimodal uses within the study area. These planned and proposed multimodal uses are outlined in local and regional planning documents, including, but not limited to:

- *Connected KC 2050* – The plan calls for a range of transportation choices to be provided to communities. The plan states that if an increased range of transportation choices were provided to communities, travel for all would be easier and public health and environmental benefits could be provided.
- *City of Lenexa Comprehensive Plan* – Lenexa’s comprehensive plan identifies the importance of mass transit and pedestrian and bicycle trails and the importance of continued future focus and development. One of the identified goals in the 2016 update that is anticipated to further Lenexa’s reputation as a regional leader in infrastructure and transportation planning implementation is, “promote multi-modal transportation options, including pedestrian, bicycle, transit, and personal vehicles, in both public and private development.”
- *City of Olathe Comprehensive Plan (PlanOlathe)* – Olathe’s comprehensive plan states that in 2040, people will have multiple, convenient options to travel within Olathe and the region and that Olathe will be an innovative and collaborative leader in regional transportation. The plan lays out the necessary goals and steps for achieving a connected multimodal transportation system by 2040.
- *City of De Soto Comprehensive Plan* – De Soto’s comprehensive plan identifies transportation objectives and implementation strategies. The 2019 update included a major goal that consisted of maintaining a safe and efficient transportation system that provides the necessary improvements to accommodate future traffic volumes, generate economic vitality, and provide connections for pedestrians and bicyclists. The plan does not outline detailed goals and steps for incorporating specific mass transit transportation modes.

The K-10 Corridor is served by one public transit agency, Johnson County Transit, in the study area. While Johnson County Transit owns and operates the routes, they are branded as RideKC in a branding partnership with the Kansas City Area Transportation Authority. Johnson County Transit operates five routes (95th Street, K-10 Connector, Olathe Express, Shawnee Express, and Gardener-OP Express) within the study area that cross or utilize K-10 directly. The K-10 Connector is the only route that utilizes K-10 and runs along the inside and the outside of the study area from Lawrence, Kansas to Overland Park, Kansas. There are currently no bus stops within the study area on the K-10 Connector route. The construction of the Panasonic factory in De Soto has the

ability to encourage the modification of existing bus routes or the potential development of new bus routes in order to serve the factory. In addition to bus routes, park and ride options could be encouraged as well. Increased development and traffic congestion within the K-10 Corridor can also play a role in the push for more flexible transportation choices to be provided.

A review of the existing bikeway and shared use paths took into consideration on-street bike lanes, sidewalks, and multi-use recreational trails. Within or adjacent to the study area, there are 22 trails, two are regional trails, 19 are local trails, and one is a private trail. All the trails within or adjacent to the study area are paved shared use paths, with most being 10-foot-wide. Additionally, there are four roadways within the study area where bike routes currently exist. Of the 22 trails within the study area, none have bicycle facilities that are shared use with K-10 travel lanes, but there are trails that are shared use lanes that run parallel to and cross the highway's right-of-way (ROW) and serve an integral purpose as part of the region's transportation facilities.

Commercial trucks are a component of the traffic stream within the study area. The K-10 Corridor has regional significance in goods movement, connecting eastern Douglas County, Kansas and western Johnson County, Kansas to the Kansas City metro area. According to KDOT's 2021 state traffic counts for K-10, around five percent of the average daily traffic (ADT) is identified as being heavy vehicles, ranging from 1,450 heavy vehicles on the west end of the corridor to 4,175 heavy vehicles on the east end of the corridor per day.

1.2.7 Support Local and Regional Growth

A key purpose of the K-10 Corridor project is to accommodate local and regional growth through coordinated transportation improvements consistent with planned and proposed community land use. Regional land use and development patterns provide insight into a community's potential transportation needs. MARC growth trends project between now and 2050 population will grow by 39 percent and employment by 49 percent within Johnson County. As the region grows and future land development occurs in harmony with local and regional land use plans, it is anticipated that traffic volumes will increase across the K-10 Corridor.

Connected KC 2050 (2020)

Connected KC 2050, adopted in 2020, is the current LRTP for the nine-county Kansas City metropolitan region and was developed by the MARC. *Connected KC 2050* serves as the Kansas City metro's regional transportation plan and is a blueprint for managing the region's transportation system. According to MARC, "the plan identifies and sets out a budget for federal transportation funds that the metro area expects to receive over the next three decades." A goal of the plan is to "continue to facilitate integrated land use, transportation and environmental planning in areas with significant pedestrian activity and transit services." The plan also aims to anticipate both positive and negative impacts on land use. *Connected KC 2050* encompasses the entire study area.

City of Lenexa Comprehensive Plan (2013)

The *City of Lenexa Comprehensive Plan*, adopted in 2013, is the guide for the future growth and development for the City. The comprehensive plan underwent a major update and the updated plan was adopted July 2, 2024. Segments of the study area discussed in the plan are on the north side of K-10 from the City of De Soto boundary in the west near the junction of K-10 and Cedar Creek Road and to the intersection of K-10 and Renner Road. The plan includes both the north and south sides of K-10 from the intersection of K-10 and Renner Road to the intersection of I-435 and K-10.

Future land uses in the study area include low density residential, suburban density residential, medium density residential, high density residential, public and open space, mixed use, neighborhood commercial center, community commercial center, office/employment center, office/research and development, and business park.

City of Olathe Comprehensive Plan (PlanOlathe, 2021)

The *City of Olathe, KS Comprehensive Plan (PlanOlathe)*, was adopted in 2010 and updated in 2021. *PlanOlathe* is utilized by the City as a policy guide for future land use and development. The comprehensive plan covers information on greenways, corridors, centers, neighborhoods, districts, street hierarchy, transit routes and facilities, natural features, parks and trails, population density, growth in Olathe, zoning, existing land use, surrounding jurisdictions, schools, school districts, sanitary sewer service, water service, public facilities, cultural facilities, and ward boundaries. The comprehensive plan includes the south side of K-10 and the study area from Gardner Road in the west to Renner Boulevard in the east.

City of De Soto Comprehensive Plan (2007)

The *City of De Soto Comprehensive Plan* was adopted by the Planning Commission and the City Council in 2007 and updated in 2019 and 2021. The comprehensive plan is utilized by the City as the “foundation of the City’s zoning code and all other land use policies and regulations within the City and its extraterritorial planning area.” The comprehensive plan includes the western most part of the study area in De Soto from the Douglas County line in the west to just west of where Cedar Creek Road crosses under K-10 in the east. This plan covers both the north and south sides of K-10.

- ***Plan Update (2021)*** – The comprehensive plan was updated in 2021. The plan update added information on infrastructure investments that occurred between 2007 and 2018 as well as identified strengths, weaknesses, opportunities, and threats for the City. Public participation was the main focus of the 2021 update. This included “meetings with the City’s Comprehensive Plan Steering Committee and City Staff, a series of focus sessions, several one-on-one stakeholder interviews, and a citizen survey.”
- ***Future Land Use Map (2019)*** – This map shows recommended future uses of land in De Soto. The uses in the study area include park and open space, public/

semi-public, agricultural, residential low density, residential medium density, multifamily, mixed use, commercial, light industrial, and heavy industrial.

1.3 Planned and Committed System Improvements

Several other projects are planned for the Johnson County area that need to be taken into consideration as the proposed improvements for the K-10 Corridor are developed. The projects include:



- K-7 improvements south of K-10 to Harold Road (*Metro Area TIP*)
- Lone Elm Road from K-10 to Prairie Star Parkway (*Connected KC*)
- Improve Prairie Star Parkway from Canyon Creek Boulevard to K-10 (*Connected KC*)
- Widening 95th Street from Renner Boulevard to Loiret Boulevard (*Connected KC*)
- Widening Woodland Road between K-10 and College Boulevard (*Connected KC*)
- Add capacity to the interchange at the intersection of Cedar Creek Parkway and K-10 (*Connected KC*)
- New interchange at K-10 and Lone Elm Road (*Connected KC*)
- Add capacity to K-10 from the Douglas/Johnson County line to I-435 (*Connected KC*)
- Add capacity to K-10 and Woodland Road Interchange (*Connected KC*)
- New 4-Lane Roadway: Clare Road from Prairie Star Parkway to K-10 (*Connected KC*)
- Reconfiguration of the K-10/K-7 interchange as part of The Gateway Project (*Connected KC*)
- Widening Ridgeview Road between K-10 and College Boulevard (*Connected KC*)
- Widening Lackman Road from 101st Street to 105th Street (*Connected KC*)



K-10 Capacity Improvements

KDOT # 10-46 KA-6549-01

Legend

-  City Boundary
-  Study Area

