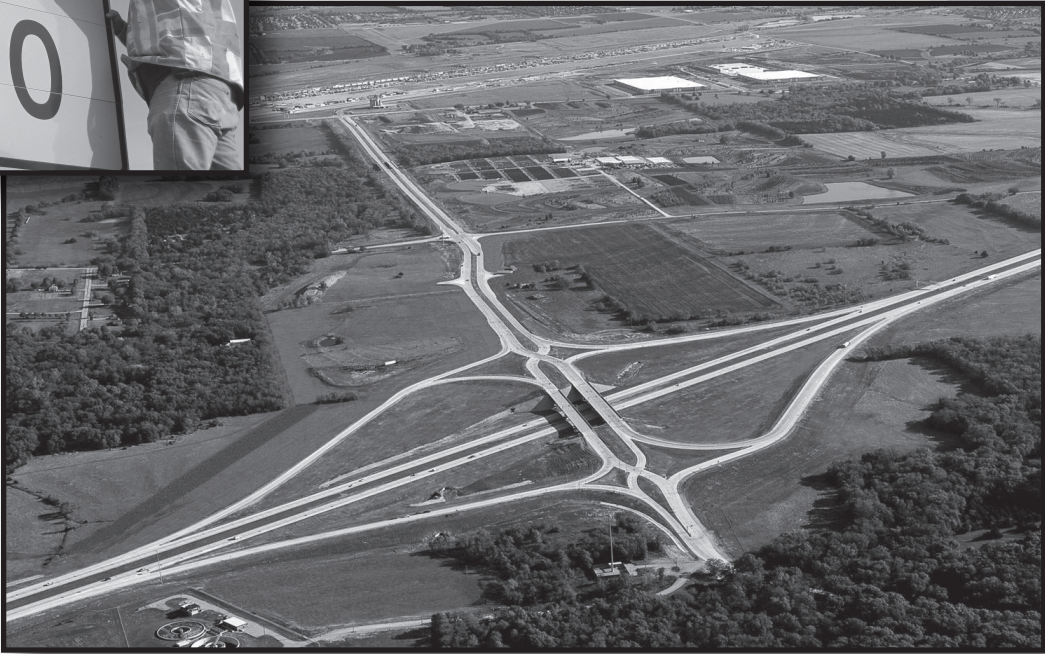
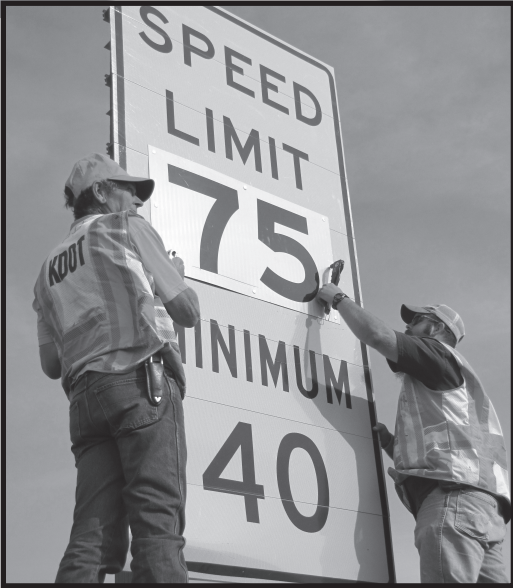


# Performance Measures



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## PERFORMANCE MEASURES

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Under the federal transportation acts Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) and Fixing America's Surface Transportation Act (FAST Act), the development of the national transportation infrastructure moved from a policy and programmatic framework to a multimodal performance and outcome based program. In this new framework, states incorporate performance-based measures, goals and targets into their planning processes in project selection and implementation. Specifically, states were mandated to invest in projects that achieve individual targets developed during MAP-21 and enacted under the FAST Act that help the nation move towards the achievement of national goals.

Included in this narrative discussion is a description of the federally adopted performance measures, the targets KDOT has in place for each measure and a high-level discussion of the way projects planned in this STIP move KDOT towards the attainment of these targets.

### —FEDERAL PERFORMANCE GOALS & MEASURES—

The seven national performance goals established under MAP-21 for the Federal highway program are:

- 1) Safety- to significantly reduce traffic fatality and serious injury accidents on public roads
- 2) Highway Infrastructure Condition- to maintain the highway system already in place in good repair
- 3) Congestion Reduction- to achieve significant reduction in congestion on the National Highway system
- 4) System Reliability- to improve the efficiency of the surface transportation system
- 5) Freight Movement and Economic Vitality - to improve the National Highway Freight Network, strengthen rural communities' access to national and international economic markets and to support regional economic development
- 6) Environmental Sustainability- to protect and sustain the natural environment while improving transportation system performance
- 7) Reduction in Delays in Project Completion - to reduce delays in project development and delivery processes; thereby, expediting the movement of people and goods

To achieve these goals the Federal Highway Administration (FHWA) and Federal Transit Association (FTA) in cooperation with the states embarked on a lengthy rulemaking process to identify specific

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measures related to the seven performance goals. Thus far, measures have not been established for goals six and seven. The measures established related to highway transportation in 49 USC 625 and 23 CFR 490 are as follows with the data source identified in parenthesis:

**Safety:**

- Number of Fatalities (FARS)
- Fatalities per 100M vehicle miles travelled
- Number of Serious Injuries
- Serious Injuries per 100M vehicle miles travelled
- Non-Motorized Fatalities and Serious Injuries

**Infrastructure:**

- Percentage of Interstate Pavements rated as **Good** Condition
- Percentage of Interstate Pavements rated as **Poor** Condition
- Percentage of Non-Interstate NHS Pavements rated as **Good** Condition
- Percentage of Non-Interstate NHS Pavements rated as **Poor** Condition
- Percentage of NHS bridges (by deck area) rated as **Good** Condition
- Percentage of NHS bridges (by deck area) rated as **Poor** Condition

**Congestion Reduction:**

- Peak Hour Excessive Delay (PHED) Measure: the annual hours of PHED per capita
- Non-Single Occupancy Vehicle (SOV) Travel Measure: Percent of SOV travel

- Emissions Measure: Total emissions reductions
- Percentage Change in Tailpipe CO2 Emissions on the NHS compared to the Base Year (2017) Levels

Currently, Kansas is not required to participate in the congestion reduction measure as there are no regions in the state that are designated as non-attainment for air quality standards.

**System Reliability- NHS Interstate Performance, Non-NHS Interstate Performance & Freight Movement:**

(The System Reliability measures are a combination of performance goals four and five.)

- Interstate Travel Time Reliability Measure (TTRM): the percent of person- miles traveled on the Interstate that are reliable
- Non-Interstate Travel Time Reliability Measure (NTTRM): the percent of person-miles traveled on the Non- Interstate NHS that are reliable
- Interstate Freight Reliability Measure: Truck Travel Time Reliability (TTTR) Index

Concurrently with the FHWA performance measure process, the Federal Transit Administration (FTA), went through a similar process and established performance measures and targets related to transit. The transit performance measure information required by FTA is reported in the Transit section of the STIP.

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## —FEDERAL PERFORMANCE TARGETS—

After the Federal performance goals and national measures were established, Kansas gathered initial data for:

- Interstate and National Highway System (NHS) pavement conditions,
- bridge conditions,
- fatality and injury accident rates,
- traffic congestion and
- freight movement.

From this initial set of data, Kansas has set performance targets to support the federal measures previously identified.

## -SAFETY-

The first federal performance measures and state targets established under FAST were those pertaining to safety and the prevention of serious injury and fatality accidents. Safety is a priority for KDOT and is one of the three key principles identified in the Kansas Long Range Transportation Plan (LRTP). Furthermore, the purpose of the Modernization Program, a core KDOT program outlined in the Project Selection Criteria section of this STIP, is safety through improvement of roadways and/ or structures. While the Kansas LRTP provides the broad framework for the direction and priority of the agency, several additional state plans and programs augment the LRTP by providing focus and detail for executing the ob-

jectives outlined in the LRTP. Specifically, the Strategic Highway Safety Plan (SHSP), the Highway Safety Plan (HSP) and the Highway Safety Improvement Program (HSIP) contribute substantively to KDOT's achievement of the goal of safety. Together, these three planning tools the LRTP, SHSP, and the HSP along with the projects within the HSIP and HSP enable KDOT to manage and implement a statewide safety strategy.

According to the FHWA Office of Safety, "a Strategic Highway Safety Plan (SHSP) is a major component and requirement of the Highway Safety Improvement Program (HSIP) (23 U.S.C. § 148)". The Kansas Strategic Highway Safety Plan (SHSP) is a statewide-coordinated plan that provides a comprehensive approach to reducing highway fatalities and serious injuries on all public roads. This five-year planning level document identifies the state's key safety needs and guides investment decisions towards strategies and countermeasures with the most potential to save lives and prevent injuries. The SHSP also influences KDOT policy and research and contributes to activities of partner agencies. The SHSP is championed by a multi-agency Executive Safety Council, developed by a cross-section of diverse and talented individuals and support teams, and is designed to drive KDOT's HSIP and HSP programs.

Specifically, some projects in the STIP list of projects (Appendix A) address the infrastructure goals from the SHSP of increased intersection safety and lowered incidence of roadway departures.

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Projects in the STIP listing related to intersection safety may be recognized by the HSIP fund category and the HAZ /HES subcategories referenced in the project information. Projects developed to address roadway departures are those projects with the HSIP fund category and subcategories LTG- Lighting, SOS- Highway Signing and PMR- Pavement Marking. (KDOT uses a Parent-Child project development approach for these subcategories which means one project is created for each year of the STIP. This Parent project covers the total anticipated obligation effort anticipated for each STIP year for each of the three subcategories. Then as individual projects are developed, they are tied to the Parent project listed in the STIP.) This is done to enable a better representation of the expected obligations for this effort in the STIP as projects in these subcategories are developed in an ongoing pattern as need dictates over an entire year which does not correlate to the STIP preparation period. KDOT's current SHSP document may be viewed online at <https://www.ksdot.org/Assets/wwwksdotorg/bureaus/burTrafficSaf/reports/reportspdf/SHSP2020.pdf>

The second plan, the Highway Safety Plan (HSP)-link [https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/ks\\_fy21\\_hsp.pdf](https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/ks_fy21_hsp.pdf) - is a one-year project level document that describes the processes followed by the state of Kansas in the use of federal highway behavioral safety funds, consistent with the guidelines, the priority areas, and other requirements established under Section 402, 405, 408, 410 and 1906 of federal code.

This plan and associated funding are under the jurisdiction of the National Highway Traffic Safety Administration (NHTSA). Each year, based on this detailed problem and solution-oriented plan, a program is developed, and projects are created that focus on the issues identified. The plan and associated program of projects developed are intended to influence human behavior by identifying highway safety-related problems and implementing effective educational and enforcement programs focusing on prevention. Although the projects developed from the HSP are not part of the core program or, the STIP document, the effort from the HSP and its program of projects is a major contributor to achieving safety in Kansas. Monetarily for 2022 Kansas has about \$8.5M in planned project obligations for the HSP.

The third tool that KDOT uses in its effort to improve highway-related safety is the Highway Safety Improvement Program (HSIP). A foundation of the HSIP is the direct link between the data-driven priorities established in the SHSP and the identification, development, and implementation of the HSIP projects. Projects in the HSIP are funded with HSIP funding, a core Federal-aid fund program (discussed in the Program Financing section of this document). In Kansas HSIP dollars are spent in a variety of independently managed sub-programs that are denoted by subcategories. Subcategories are groups of projects that have similar characteristics of funding type or work type. (For an in-depth discussion of

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the four core KDOT programs and associated subcategories refer to the Project Selection Criteria section of this document.) The KDOT subcategories that use HSIP funding are:

- HES/HAZ- intersections and other safety projects on or off the National Highway System (NHS),
- SOS- highway signing,
- PMR- pavement markings,
- LTG- highway lighting,
- RXR/RRX-rail crossing protection on and off the NHS,
- RES- local construction KDOT administered (only projects specific to the High-Risk Rural Roads program)
- SSI- strategic safety improvement program
- GSI-general safety improvements.

Additionally, many of the subcategories that KDOT has established focus directly or indirectly on safety. At the end of the performance measure discussion is a Performance Measure/ Program-Subcategory Crosswalk. This crosswalk maps the relationship between the KDOT subcategories in the four core programs and the performance measure(s) showing which performance measures are impacted by the work in each subcategory. Collectively, the subcategories and programs that focus on safety cover all 140,000 centerline miles of public roads in Kansas while applying a multitude of proven countermeasures designed to reduce fatal and serious injury

crashes statewide. Combined, the subcategories directly related to safety compose one-third of the subcategories that make-up KDOT core programs.

The highway-related safety projects in the HSIP program and the few federally funded safety projects in the Modernization program are approved and implemented via the STIP process. Projects in Appendix A of this STIP that are safety related and federally funded may be identified by the fund category of HSIP in the project information. Those projects that are state funded and safety related may be identified by the program/subcategory codes and their scope. The program /subcategory code used in the project listings is a four- letter code that identifies the program and subcategory to which the project is grouped. The program/subcategory is part of the project information provided for each of the projects listed in Appendixes A of this STIP. For guidance about reading the project information listed in the Appendixes refer to the Projects Administered by KDOT section that precedes the Appendixes. The projects so denoted in Appendix A support KDOT's effort outlined in our SHSP and HSP to meet the federal safety performance measures. Federally funded safety projects developed after the STIP is in place that are not in the LTG/ SOS/ PMR subcategories will be amended to the STIP using the amendment procedures in place. For 2022 Kansas, plans to spend \$19M in HSIP federal safety funding. All anticipated safety HSIP projects may not be built and at the time the STIP is pre-

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pared. Projects developed after the preparation of the STIP will be added using the amendment process in place. For more information about funding refer to the Federal funding section of the Program Financing narrative of this document. Additionally, for information about the most recent actual HSIP obligations (projects let and underway), refer to the current Kansas HSIP at <https://www.ksdot.org/Assets/wwwksdotorg/bureaus/burTrafficSaf/reports/HSIP2020AnnualReport.pdf>.

Projects using federal HSIP funding are projects with the sole purpose of improving safety and help move Kansas towards improving safety and meeting the safety performance measures. However, many other projects undertaken by KDOT contribute to roadway safety. The core program, Modernization whose purpose is safety, has a total estimated spend for SFY 2022 of \$144.7. Of these dollars only about \$5M are funded with federal HSIP funding, the remainder is additional planned expenditure using state and other categories of federal funds to improve roadway safety in Kansas. (Modernization expenditure cited is from the 2022 year of the 2022-2025 Cash-Flow located in the Program Finance Section of this document.)

The SHSP, HSIP and the HSP all utilize the same performance measures and targets and thus provide continuity of goals. While the HSP projects concentrate on changing behaviors, the SHSP and HSIP focus on the physical improvement of Kansas roads or bridges to en-

hance their safety. These planning tools work together to reduce roadway serious injury and fatalities and to make the roads and bridges in Kansas safer.

The final aspect of safety in Kansas is the coordination between KDOT, local public authorities (LPAs) and metropolitan planning organizations (MPOs) that ensures a unified approach to safety across the state. This coordination of effort is vital to the statewide success in achieving the goals and objectives of the federal performance measures. Input from both LPAs and MPOs help guide program decisions and project selections. Together, KDOT, LPAs and MPOs continue to contribute and support the goals established in the safety plans and subsequently encourage development of safety projects that help meet established safety performance targets.

Actual data for each of the five federal safety performance measures for calendar years 2019 and 2020 along with the targets for 2021 are provided in the table on the following page. Targets for 2022 will be established in summer 2021, as safety data is gathered on a calendar year basis and requires until mid-summer of the following year for analysis and compilation of the data to be finalized. A noteworthy difference in this data from previous years is the change from tracking disabling injuries to tracking serious injuries. This change was made at a national level to ensure that all states were using the same standard. Serious injury is a more broadly defined category and as a result the number for this category is larger than the previously reported disabling injury.

<b>Federal Safety Performance Measures</b>					
<b>Measure</b>	<b>2019 Actual</b>	<b>2019 FYA*</b>	<b>2020 Actual</b>	<b>2020 FYA*</b>	<b>2021 Targets</b>
Number of Fatalities	410	<b>412</b>	423	<b>425</b>	364
Fatalities per 100 million Vehicle Miles Travelled	1.26	<b>1.28</b>	1.47	<b>1.35</b>	1.16
Number of Suspected Serious Injuries	1,394	<b>1,160</b>	1,481	<b>1,217</b>	1,190
Suspected Serious Injuries per 100 million Vehicle Miles Travelled	4.291	<b>3.6198</b>	5.158	<b>3.889</b>	3.726
Non-Motorized Fatalities and Serious Injuries	149	<b>140*</b>	166	<b>147</b>	138
* Five-year average Targets for 2022 have not yet been established.					

For more information about the safety measures and targets visit KDOT's Performance Measure web page at [https://www.ksdot.org/Assets/wwwksdotorg/bureaus/divPlanning/PM\\_for\\_Website.pdf](https://www.ksdot.org/Assets/wwwksdotorg/bureaus/divPlanning/PM_for_Website.pdf)

### **-INFRASTRUCTURE-**

KDOT adopted new performance measures and targets for infrastructure in 2018, as part of the continuing performance measures requirement deadlines outlined in the federal transportation act, FAST. Prior to adopting these new measures, KDOT was using infrastructure performance measures developed internally in the 1980's. However, since the new federal infrastructure methodologies and measures treat road and bridge information differently than those previously

developed by KDOT, the prior measures are supplanted by the information provided below.

### **Roadway Infrastructure**

With the new federal rating system, the state's highway pavement is evaluated using the variables of cracking, smoothness and rutting or faulting. The variables are very similar to those used previously by KDOT with the exception of cracking. Information about each of these variables is gathered for portions of roadway and a rating system is applied to assign a condition. Under the new federal method, for a segment of roadway to be rated as good, all three variables (roughness, cracking, and rutting or faulting) must be rated good. If any two variables are rated as "poor", then the overall roadway rating is poor. All other rating combinations result in a roadway rating of fair. At the end of



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the four-year period the data for the nation will be reviewed by FHWA and recommendations for improvements or modifications to the federal performance measure methodology, if needed, will be made.

There are several key differences between the previous KDOT measures and the newly adopted federal ones. The first difference is in the breadth of roadways being measured. The roadways included in the new measures are strictly roads on the National Highway System (NHS) and encompass only about half of the State Highway System in Kansas. (For a map of the NHS system in Kansas, refer to the second to last page of this narrative section.) In contrast, past performance measures set by KDOT attempted to address **all** roads on the State highway system. Thus, the number of roadways currently being reviewed has decreased from the KDOT measures. A second difference between the two sets of measures is how ratings are assigned. Under the prior KDOT system not all pavement surface condition variables had to have a rating of “good” for a roadway to be assigned an overall rating of “good”. Instead, some variable combinations of good and fair were acceptable for a rating of “good” to still be assigned to a roadway. As previously described, in the newly adopted federal rating system this is not the case. The outcome of this change is that under the newly adopted federal rating system fewer roadway sections obtain a “good” rating than under the prior KDOT rating system. A third

difference is how pavement surface conditions are being reported. Under the federal system, pavement surface conditions are now reported every 0.1 mile, where previously under the KDOT system the segments were reported in 1-mile lengths. As a result, many more segments are being reviewed and assigned a rating and while this may provide an overall more accurate roadway condition, it will increase the likelihood of rating differences between the two systems. The considerable differences between the two methodologies preclude comparisons between prior data using KDOT’s method and data generated using the newly adopted federal method.

The targets established for roadway infrastructure in Kansas are:

- **Targets for the Percentage of Interstate Pavements in Good Condition for State Fiscal Years (SFY) 2018-2021:**

Baseline:	66.7%
Two Year Target:	65%
<b>Two Year Actual:</b>	<b>60.7%</b>
Four Year Target:	65%
- **Targets for the Percentage of Interstate Pavements in Poor Condition for State Fiscal Years (SFY) 2018-2021:**

Baseline:	0.3%
2-Year Target:	0.5%
<b>2-Year Actual:</b>	<b>0.3%</b>
4-Year Target:	0.5%

- **Targets for the Percentage of Non-Interstate NHS Pavements in Good Condition for State Fiscal Years (SFY) 2018-2021:**

Baseline:	62.7%*
2-Year Target:	55.0%
<b>2-Year Actual:</b>	<b>56.3%</b>
4-Year Target :	55.0%

\* Baseline as calculated by KDOT using all roadway attributes.

- **Targets for the Percentage of Non-Interstate NHS Pavements rated as Poor Condition for State Fiscal Years (SFY) 2018-2021:**

Baseline:	1.1%*
Two Year Target:	1.5%
<b>Two Year Actual:</b>	<b>1.5%</b>
Four Year Target:	1.5%

\* Baseline as calculated by KDOT using all roadway attributes.

After a two-year period of acquiring and reviewing data, all states had the option to modify their initial targets based on the information collected in their first two years. Upon reviewing the data and considering the work planned in the recently passed Eisenhower Legacy Transportation Program (ELTP), KDOT elected not to modify their pavement condition targets. At the end of the four-year period, the performance of all states will be reviewed by FHWA and recommendations will be made.

## Bridge Infrastructure

As with the roadway infrastructure, KDOT had a previous system for measuring and rating bridge infrastructure before the implementation of performance measures at the federal level. In the prior KDOT rating system, three attributes or variables- deck, superstructure and substructure were used to assign bridge condition to all bridges counted. The variable data for each bridge was then combined to assign an overall bridge rating to each bridge. From this group of rated bridges, a statewide bridge condition was determined with each bridge counted and weighted equally regardless of bridge size.

Under the new federal performance measures and targets, the same set of attributes are used to determine individual bridge condition. However, each bridge is scored using the National Bridge Inventory Condition Rating Thresholds for National Highway System (NHS) Bridges (see chart of scale below).

**NBI Bridge Condition Rating Thresholds for NHS Bridges**

NBI Rating Scale <i>(from 0 – 9)</i>		9	8	7	6	5	4	3	2	1	0
		Good			Fair		Poor				
Bridge	Deck <i>(Item 58)</i>	≥ 7			5 or 6		≤ 4				
	Superstructure <i>(Item 59)</i>	≥ 7			5 or 6		≤ 4				
	Substructure <i>(Item 60)</i>	≥ 7			5 or 6		≤ 4				

Under this rating system, individual bridge variables are considered “Good” if

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they have a rating score of 7 or greater. Like roadways, for a bridge to be rated “good” condition under the new federal method all three variables must have a “good” rating. This differs from the prior KDOT rating system where a bridge could have a combination of good and fair ratings among the three variables and still attain an overall condition rating of “good”. For a bridge under the new federal rating system to be rated “poor”, one of the three attributes scored must receive a rating of 4 or less on the NBI rating scale. Bridges that do not have a variable that scores 4 or lower but have a variable that scores below 7 (i.e. 5-6), receive a “fair” condition rating.

Moreover, there are two key differences in how bridge information is treated and reported under the new federal measures than in prior KDOT measures. First, only bridges on the National Highway System (NHS) are rated under the new federal system, while previously KDOT’s bridge rating measure included both NHS and Non-NHS bridges in its data (which means under the new measure fewer bridges are being reviewed.) Second, as explained earlier KDOT based their bridge unit of measure on bridge count and under the new federal methodology the unit of measure is based on the deck area of each bridge. This change in measure means that larger bridges now have more impact to the overall bridge rating score than smaller bridges have. This change in performance measure unit precludes the performance measure values and thresholds from prior years (before SFY 2017) from being adjusted to the

new rating system. Therefore, the bridge data is completely being supplanted and new data is being gathered beginning with SFY 2017. Data from SFY 2017 was used as the baseline for new bridge targets.

The new targets established for NHS Bridge roadway infrastructure in Kansas are:

- **Targets for the Percentage of NHS Bridges (by deck area) in Good Condition for State Fiscal Years (SFY) 2018-2021:**

Baseline:	74.8%
Two Year Target:	70%
<b>Two Year Actual:</b>	<b>71.3%</b>
Four Year Target:	70%
- **Targets for the Percentage of NHS Bridges (by deck area) in Poor Condition for State Fiscal Years (SFY) 2018-2021:**

Baseline:	1.5%
Two Year Target:	3.0%
<b>Two Year Actual:</b>	<b>1.7%</b>
Four Year Target:	3.0%

States had a two-year period for acquiring and reviewing data, for bridge infrastructure like roadway infrastructure, and at the end of this period, states had the option to modify initial targets based on the information collected. After reviewing the first two years of data during the evaluation period and considering the work programmed in the ELTP, KDOT has chosen not to modify their bridge condition targets. At the end of the four-year period, the performance of all states will

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be reviewed by FHWA and recommendations will be made.

The infrastructure projects are associated with all three Core programs- Expansion, Modernization and Preservation. Therefore, the \$199.7M in Expansion (estimated Expansion from the Cash Flow less non-road related subcategories of EDP, ITS and CSP), \$139.77M in Modernization (less the \$5M in HSIP safety included in modernization) and the \$494.9M in Preservation anticipated for expenditure in these three programs in 2022 (dollars excerpted from the Cash Flow presented in the Program Financing section) help move Kansas towards meeting the performance measure targets in place.

#### **-System Reliability- NHS Interstate Performance, Non- Interstate NHS Performance & Freight Movement-**

System reliability and specifically performance measures focused on tracking reliability are new to KDOT. This performance measure was established under the FAST Act. Although the FAST Act concluded in 2020, this requirement is anticipated to continue to be tracked in any future reauthorizations or new programs. System reliability of the federal transportation program is concerned with the consistency in the travel times day to day or the travel times across different times of day for a given highway or road or travel route (multiple roadways). Although travel times do vary from day to day, travelers remember the poor travel experiences and are impacted more by the

unexpected delays than the known and anticipated everyday congestion.

Since KDOT has no prior experience or data concerning these measures and the degree of influence that KDOT project and scope selections have on these measures, the agency's selected targets are set very conservatively. Additionally, the FHWA measures only focus on the roads in Kansas that are part of the National Highway System (NHS). However, in Kansas a significant portion of state roadways are **not** on the NHS (see map of NHS roads on the last page of this discussion.) Thus, data from these non-NHS roadways are not calculated into the achievement of these performance measures.

The measure that FHWA implemented for this performance measure is the Level of Travel Time Reliability (LOTTR) and is defined as the ratio of the 80th percentile travel time of a reporting segment to the travel time of the 50th percentile which is a comparison of days with high delay to days with average delay. KDOT accessed data from FHWA's free National Performance Management Research Data Set (NPMRDS) or equivalent where data is collected in 15-minute segments during all time periods other than 8 p.m.-6 a.m. local time. The measures are the percent of person-miles traveled on the relevant NHS areas that are reliable. Person-miles account for the users of the NHS and may include bus, auto and truck occupancy levels. This measure is being tracked in two segments one for the interstate portions of the NHS

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and then a measure for all non-interstate NHS roadways.

The new targets established for system reliability in Kansas are:

- Targets for the **Percentage of Reliable Person-Miles travelled** on the Interstate\* for State Fiscal Years (SFY) 2018-2021:

Baseline: 95.4%  
Two Year Target: 95%  
**Two Year Actual: 94.7%**  
Four Year Target: 95%

\* All interstates are part of the NHS.

- Targets for the **Percentage of Reliable Person-Miles travelled on Non-Interstate NHS** for State Fiscal Years (SFY) 2018-2021 (only a Four-Year Target was required to be set for this category.):

Baseline: 96.2%  
Two Year Target: 95%  
**Two Year Actual: 95.7%**  
Four Year Target: 95%

KDOT, like all other state departments of transportation (DOTs) had the option to adjust all initial four-year targets at the Mid-Performance Period Progress report in October 2020. Additionally, State DOTs were not required to provide baseline condition or two-year targets for the Non-interstate NHS prior to October 2021. This will provide all State DOT's time to gather and consider more complete data before establishing performance targets in this new and unfamiliar area of measure.

While the Interstate reliability mid-point target was not met, the value is within the envelope of uncertainty. Again, with not many years of data upon which to base a decision, KDOT has decided to leave the four-year targets unchanged. The cutbacks in travel due to COVID-19 allowed the reliability on the Interstate to reach 99.2% and on non-Interstate NHS highways to reach 97.4% in 2020.

In addition to system reliability measures for Interstate and Non-Interstate NHS, FHWA, also, required states to establish a performance measure for freight movement. Freight movement is concerned with how well freight moves across the Nation's transportation system. The effort to understand how freight moves across the nation and where travel inefficiencies exist will aid in the development of the best policies, plans and investments at both the state and federal levels to improve freight travel. Consequently, freight travel will yield economic, environmental and safety benefits.

Freight movement is measured using a system reliability measure termed the Truck Travel Time Reliability (TTTR) Index. Data for this index is divided into five reporting periods: morning peak (6-10 am), midday (10am-4pm) and afternoon peak (4-8 pm) Monday-Fridays. Weekends are assessed from (6am-8pm); and overnights for all days are assessed from (8pm-6am). The system reliability measure, the TTTR index is generated by

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dividing the 95<sup>th</sup> percentile time (high delay travel time) by the 50<sup>th</sup> percentile (“normal” travel time). Data used to determine the index for Kansas was obtained from the FHWA’s National Performance Management Research Data Set (NPMRDS).

The target established for freight movement in Kansas is:

- **Target for the Index of Truck Travel Time Reliability (TTTR) on the NHS system in Kansas for State Fiscal Years (SFY) 2018-2021:**

Baseline:	1.14
Two Year Target:	1.16
<b>Two Year Actual:</b>	<b>1.18</b>
Four Year Target:	1.16

The closer the index value approaches 1, which is optimal, the better the freight movement reliability. KDOT’s target is set at 1.16 for truck travel reliability although the baseline would indicate that KDOT’s 2019 reliability was measured at 1.18, higher (worse) than the target of 1.16. KDOT chose to leave the 4-year target at 1.16 in part due to uncertainty from COVID-19 travel impacts. In 2020, with less traffic, the index was 1.13, much better than 1.16. In the future, as more years of data are gathered and KDOT develops more expertise with this measure and has a greater understanding of how project selections impact the index, changes to the index may be warranted.

Generally, the projects in the system reliability and freight movement per-

formance measures are associated with KDOT’s Expansion program and predominantly are met through work done in the IRC and RIC subcategories. As such the projects that address these measures are most generally quite large and capital intensive which means that there are not a large number of projects programmed at any given time. Monetarily speaking the system reliability and freight movement measures do not correlate completely to the Expansion program but of the subcategories that correlate, monetarily in SFY 2021 the total anticipated construction dollars programmed are estimated at \$199.7M.

While loose monetary correlations may be drawn in regard to the performance measures and the core programs that KDOT has in place, rarely does a project provide benefit exclusively to one performance measure (at least not the larger more complex projects). For example, Expansion projects that are designed to improve system reliability in their areas, should, also, impact the infrastructure and safety measures as well. There rarely exists a one-to-one relationship between projects and performance measures. One project will frequently contribute towards the realization of multiple performance measures.

## —STATE PERFORMANCE MEASURES & TARGETS—

Prior to the performance measure initiative undertaken at the federal level, KDOT had developed and implemented over the span of several years a data

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driven and performance minded process. As part of this process, KDOT established several performance measures to ensure that the practices and expenditures in place for agency business are efficient, improve accountability with the public and ensure that our actions undertaken are sufficient to meet our transportation needs. The performance measures that KDOT established covered many business aspects of the agency beyond the core construction program (the focus of the federal performance measures), and most of these KDOT measures will continue to be tracked internally and reported in at a state level in conjunction with the federal performance measures. Of these measures one is discussed below as it relates to regular maintenance which is covered under the United States Code (USC) Title 23 for the STIP.

### **-REGULAR MAINTENANCE-**

KDOT has used a level of service measure for many years to monitor the operation activities of Regular (formerly termed routine) Maintenance and will continue to track this performance measure. The operations regular maintenance performance measure coupled with roadside mowing and snow and ice guidance ensure that the expenditures in place for these activities are sufficient to meet the need. The Maintenance Quality Assurance (MQA) Program, the Managing Kansas' Roadsides (MKR) guidelines for mowing and Managing Snow & Ice (MS&I) guidance are initiatives that measure the value of the maintenance effort and ensure that routine maintenance

is being performed at adequate levels. Of these three initiatives used by KDOT to monitor routine maintenance, only the MQA is quantitative in nature and included on the Performance Measure website.

The MQA program is a management tool that assists managers in prioritizing maintenance projects and resources (personnel, equipment, and materials) and determining the corresponding funding needs. The program involves an annual physical inspection of randomly selected 0.1-mile sample segments using identified Level of Service (LOS) criteria (desired maintenance conditions) for various highway rating elements in the following maintenance categories:

- 1) Travelway- the portion of the roadway for the movement of vehicles;
- 2) Traffic Guidance-all KDOT maintained signs, pavement markings, striping or anything used to regulate, warn or guide traffic;
- 3) Shoulders-areas of consideration are joint separation, cracking, drop-off or build-up and vegetation;
- 4) Drainage- areas of focus include curb and gutter, ditches, erosion control, culverts and pipes; and
- 5) Roadside- areas of focus include fencing, litter, vegetation control, erosion and side roads and entrances.

Based upon KDOT staff expertise and public input from surveys and correspondence, statewide and district-wide target Level of Service (LOS) values were established for both maintenance categories (travelway, shoulders, roadside,

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drainage, and traffic guidance) and for the individual rating elements comprising these maintenance categories. These targets are reviewed periodically and adjusted as needed. The data from the inspections are compiled into the LOS reports. These reports provide information about the Kansas highway system at the State, District, Area and Subarea levels. From these reports, KDOT staff make determinations about what areas need increased maintenance efforts or if additional funding should be requested in the next budget for additional equipment or materials to meet the ongoing maintenance effort. To date in SFY 2021, KDOT's actual monetary investment in regular maintenance activities is \$124.2M (Approximately two weeks remain in the state fiscal year so most of the dollars expended are in this figure.) Estimated Regular Maintenance expenditure for SFY 2022 is \$154.4M as taken from the Cash Flow provided in this STIP in the Program Financing section.

In state fiscal year (SFY) 2020, the statewide level of service (LOS) rating was 89 which is the average of the state ratings in each of the five maintenance categories. (The LOS rating does not denote that all districts- areas -subareas had this rating nor that all segments monitored met their target LOS but merely that the overall rating for the state is a level of service is 89.) The five maintenance categories are Travelway with a LOS rating of 94, Shoulders with a LOS rating of 90, Roadside with a LOS rating of 92, Drainage with an LOS rating of 85 and Traffic Guidance with an LOS rating of 83.

Further information about Statewide MQA ratings may be found at this link [http://kdotweb.ksdot.org/Bureaus/Bur-Maint/docu-ments/MQA/Maintenance\(QA\)Program.asp](http://kdotweb.ksdot.org/Bureaus/Bur-Maint/docu-ments/MQA/Maintenance(QA)Program.asp).

The second resource that KDOT uses to monitor routine maintenance is the Managing Kansas' Roadsides (MKR) program. KDOT successfully maintains more than 150,000 acres of highway right-of-way using a flexible approach that adjusts to the needs of differing areas. The MKR program is a responsive program that uses different mowing approaches to achieve greater mowing efficiency. The reduction in mowing accidents has reduced KDOT employee injury and time away from duties. Additionally, this modified approach to mowing benefits our environment and wildlife by reducing roadside erosion and increasing necessary cover. For more information about KDOT's roadside management, refer to the following web page <https://www.ksdot.org/bureaus/bur-maint/connections/roadside/Roadside.asp>.

The Managing Snow and Ice (MS&I) guidance is the third initiative used in monitoring routine maintenance activities. MS&I is used to manage the 10,000 miles of Kansas Highways during snow and ice events. To use resources effectively and efficiently, KDOT bases road treatment on the number of vehicles that travel a road daily. The three categories are: 1) Roads with > than 3,000 vehicles daily, 2) Roads with 1,000- 3,000 ve-

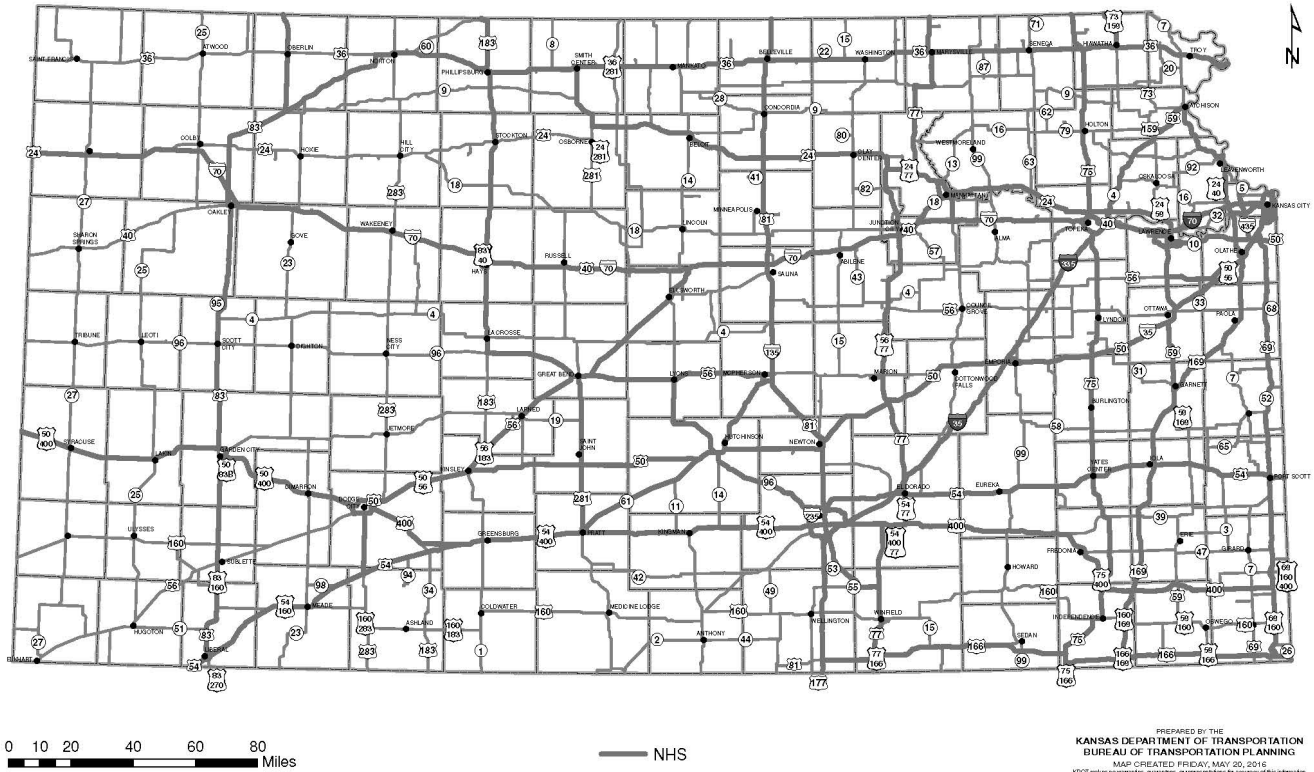


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hicles daily and 3) Roads with < 1,000 vehicles daily. Each category of road has a level of service for snow and ice control that KDOT crews attempt to attain. Even with this approach, there are times when weather prevents KDOT from maintaining a passable highway. When this happens, the road is closed and reopened when the conditions allow. For more information about snow and ice management at KDOT refer to the following web page  
[https://www.ksdot.org/PDF\\_Files/SnowandIceEfforts.pdf](https://www.ksdot.org/PDF_Files/SnowandIceEfforts.pdf).

The lines shaded a darker gray indicate National Highway System (NHS) routes in Kansas.

### National Highway System on the State System



The tables below relate the Program-Subcategory of Projects listed in Appendix A of this document to the Performance Measures described in this section.

**Program -Subcategory Relationship to Performance Measures**

Performance Measure(s) Addressed	Expansion & Enhancement- Expansion Program: E- Subcategory			
	E-IRC	E-ITS	E-RIC	E-RSL
	Safety		X	
Infrastructure- Road	X		X	
Infrastructure-Bridge	X		X	
System Reliability	X		X	
Truck Travel Time	X		X	

Performance Measure(s) Addressed	Local Construction on Local Roads-Local Program: L- Subcategory									
	L-HAZ	L-HES	L-K1R	L-K2R	L-K3R	L-LBT	L-LOC	L-RES	L-RRX	L-RXR
Safety	X	X					X	X	X	X
Infrastructure- Road			X	X	X			X		
Infrastructure-Bridge								X		
System Reliability										
Truck Travel Time										

Performance Measure(s) Addressed	Safety, Resurface & Shoulder Improvements- Modernization Program: M- Subcategory									
	M-1RS	M-COR	M-GSI	M-ICT	M-IRI	M-KCC	M-LTG	M-MPR	M-RIM	M-SAF
Safety	X	X	X	X	X	X	X	X	X	X
Infrastructure- Road	X			X	X				X	
Infrastructure-Bridge				X	X				X	
System Reliability										
Truck Travel Time										

Performance Measure(s) Addressed	Taking Care of What We Have- Preservation Program: P- Subcategory														
	P-1RR	P-BCR	P-BSP	P-BSR	P-CMN	P-IRP	P-ISR	P-PBR	P-PCR	P-PDR	P-PMR	P-RIP	P-RRS	P-SLR	P-SOS
Safety												X		X	X
Infrastructure- Road	X					X	X	X						X	
Infrastructure-Bridge		X	X	X			X		X	X	X		X		
System Reliability															
Truck Travel Time															