MTPO Transportation Safety Plan
Work Plan

The Metropolitan Topeka Planning Organization (MTPO) Transportation Safety Plan is vital to the residents and community of Topeka and Shawnee County's mission to provide a safer, more secure transportation network. This plan will identify emphasis areas of focus, determine specific strategies to reduce severe crashes, empower local Engineering, Enforcement, Education and Emergency Services (4-E's) to implement those strategies, increase awareness and decrease severe crashes in the Topeka/Shawnee County MTPO Region. This is accomplished through a systemic safety management approach with a focus on low cost safety improvements. The plan will improve the quality-of-life of residents and visitors to the Topeka/Shawnee County Region by improving transportation safety along rural county roads, urban arterial roadways, collectors and local streets.

Task A – Project Management

The consultant team will provide the following Project Management tasks including:

- Schedule and facilitate the project "kick-off" meeting with the MTPO and stakeholder group as well as monthly coordination meetings (maximum of 10) through the life of the project.
- Prepare and distribute meeting minutes for the project "kick-off" meeting and monthly coordination meetings (maximum of 10)
- Coordinate with the MTPO regarding geospatially enabled crash data, and a roadway features database, which is essential to the analysis being performed in Task B.
- Meet with the stakeholders group on three occasions:
    - Task C
    - Task D
    - Task E
- Develop and submit monthly invoices to the MTPO.
- Meet project milestones and deadlines towards successful completion on or before the end of the project (September 30, 2018).
- Provide regular on-going coordination and communication (meetings/phone calls) within the consultant team.
- Provide Quality Assurance (QA) / Quality Control (QC) reviews as part of each task deliverable.

Task A Deliverables: Project "kick-off" meeting minutes; monthly coordination meeting minutes (maximum of 10); monthly invoices (maximum of 10); QA/QC reviews of project deliverables

Task B – Data Analysis

The consultant team will evaluate crash, traffic volume, and roadway inventory data to identify the locations along the roadway system with elevated crash risk. This task will be accomplished using a quantitative systemic safety approach, as described above.

Data Needs:

The consultant team will request from MTPO/Kansas Department of Transportation (KDOT) a database of crashes on city streets and county roads within the MTPO boundaries. The database will ideally contain, but will not be limited to, the following:

- Crash location (in a GIS shapefile, as latitude and longitude coordinates, or using a linear referencing system)
- Crash contributing factors, or first harmful event
- Relationship to an intersection (intersection crash, intersection-related crash, non-intersection related crash)
- Speeding, distraction, or aggressive driving
- Crash type » Driver impairment
- Crash severity
- Vehicle type
- Lighting condition (if known)
- Crash date
- Driver age
- Crash time
- Weather condition
- Crash narrative
- Pavement condition (if known)
- Seatbelt use
- Cell phone use (if included on the report)

Preliminary Crash Analysis and Identification of Target Crash Types

The consultant team will create a separate crash database for intersection and intersection-related crashes and for roadway segment crashes so that these two crash types can be evaluated separately. General crash trends will be identified and compared with crash frequency or rate thresholds, which will be identified in coordination with the MTPO and existing transportation safety plans at the local and state levels. Crash types that rise above the thresholds or benchmarks will be identified as potential crash types for further investigation in the systemic safety evaluation.

Examples of such thresholds may be:

- Crash types that are rising in number or as a percentage of total crashes over time
- Crash types identified in previous state or local safety plans as targets for reduction, and for which reduction goals have not been met
- Crash types that are more prevalent locally than on a statewide basis or for similar metro areas
- Crash types that make up the greatest proportion of total severe crashes
- Crash types that are considered the most “treatable” with available resources
- Crash types identified as important areas of focus by local leaders and stakeholders

Examples of the crash types that could be identified in the crash analysis include:

- Angle crashes at signalized intersections
- Crashes involving pedestrian and/or cyclists
- Crashes involving young drivers
- Crashes involving aggressive driving behavior
- Fixed object crashes
- Wet weather crashes

Potential crash types for consideration in this step may overlap, and each crash may fall into multiple "crash type" categories.

At the completion of this step of the analysis, the team and the MTPO will have agreed upon up to three crash types for which to identify specific risk factors in the next step of the analysis.

Identification of Risk Factors

The crash types identified in the previous step will be considered individually to identify crash or site characteristics that are overrepresented at locations where that specific crash type is occurring.

The potential risk factors that can be evaluated in this step will depend upon the availability and quality of specific roadway and crash characteristics available in the dataset. For example, if no information is available about the presence of left-turn lanes at signalized intersections, then left-turn lanes cannot be considered in the identification of risk factors.

The following characteristics for intersections and segments are desirable for inclusion in the roadway characteristics data:

Intersections	Segments
Traffic control type	Lengths
Major and minor route AADT	AADT
Number of legs	Number of Lanes
Number of left-turn lanes	Presence/width of median
Number of right-turn lanes	Lighting
Left-turn signal phasing	Type/width of shoulder or curb
Lighting	Presence/type of roadside barrier
Sight distance (at least an indication if a problem	Presence of bike lanes and sidewalks
Presence of crosswalks; number of approaches	Speed limit
Presence of pedestrian signals	Driveway density
Right-turn-on-red prohibition	Clear zone/ fixed object density
Median presence and width	Presence of rumble strips
Supplemental signs or markings present	Horizontal alignment / curve radius

The consultant team recognizes that many of these characteristics may not be available in an inventory for the entire roadway system. While it is unlikely that the resources available for this project would support the development of such a comprehensive database across the system, the MTPO may choose to include some of these characteristics in the risk factor analysis in one of two ways:

- The MTPO may request the research team collect this data for a limited number or area of sites using tools such as Google Earth as part of this effort, or
- The MTPO may choose to collect this data before or at the start of this project and provide it to the research team.

A database will be constructed that includes a row for each roadway segment or intersection, including its known characteristics. Information about the number and characteristics of the target crash types that occurred on each segment will be included in this database as well. The database will be analyzed to identify the variable values that are more prevalent at sites where crashes occurred than at all sites. These characteristics will be identified as risk factors.

At the completion of this step, the consultant team will develop a list of the risk factors identified for each target crash type identified in the previous step.

Ranking of Sites by Crash Risk

Once the target crash types and associated risk factors have been identified, a risk factor score can be calculated for each segment and intersection. Risk factor scores can range from a simple summation of the total number of risk factors present to a more complicated scoring system that weights each risk factor. Risk factor weights might be based on the degree to which that factor is overrepresented at crash sites, the priority that risk factor has been giving in existing safety plans, the ability to which that risk factor can be controlled or altered, or other relevant information.

Sites will be given a separate risk-factor score for each of the target crash types. If desired by the MTPO, the sites can also be given a total risk factor score considering all target crash types. The appropriate scoring system will be determined during the project. It is important to note that using this systemic approach, it is possible for roadway segments and intersections with minimal or no crash history to have a high risk-factor score. This is a feature of the approach, in that is allows agencies to identify where crashes are most likely to occur in the future, rather than chasing locations where crashes have occurred in the past. Because of this, the risk-based approach supports a more proactive safety program.

At the completion of Task B, the team will submit two lists of roadway sites: Intersections and Segments. These lists will provide a risk-factor score and/or priority ranking based on risk factors for each of the priority crash types evaluated.

Assumptions:

The plan for Task B is based on the following assumptions:

- MTPO and the City of Topeka will provide the team with the data listed in the Data Needs section above. No field data collection will be required by the team.

- Only roadway and crash characteristics and included in the roadway inventory and crash data provided by MTPO will be considered as possible risk factors in the analysis. Potential risk factors for which good data is not available to link to individual roadway sites or crashes will not be considered.

- The systemic analysis will focus on up to three prevalent crash types. Risk factors will be identified for those crash types and roadway segments and intersection sites will be prioritized based on the presence of the risk factors specific to those crash types.

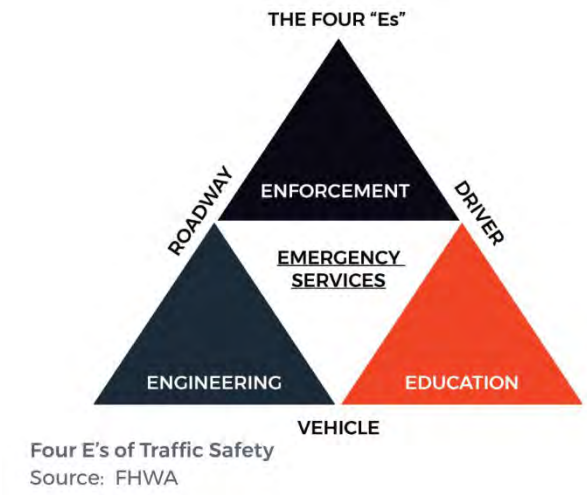
- The analysis will include city streets and county roads within MPTO's boundaries. State highways will be excluded.

Task B Deliverables: Develop crash databases (intersection / intersection related and roadway segment); Identification of target crash types (up to three); identification of risk factors for each crash type; Develop characteristics databases (roadway segments and intersections); Ranking of sites based on crash risk (roadway segments and intersections);

Task C – Emphasis Areas and Performance Measures

Task C will be performed partially in parallel with Task B (Data Analysis) after the review of existing crashes and before performing the risk assessment analysis. Identifying crash patterns of interest early in the process is consistent with FHWA's Systemic Safety Analysis Tool process.

The consultant team will engage with the stakeholder group comprised of representatives of the 4 E's – Engineering, Education, Enforcement and Emergency Services for this task. The consultant team will facilitate discussion with the stakeholder group and obtain the appropriate feedback regarding emphasis areas and performance measures.



Four E's of Traffic Safety
Source: FHWA

The consultant team will meet with the stakeholder group during three occasions:

- Task C: review of crash data, discussion and selection of Emphasis Areas for MTPO with a focus on each of the Four "Es"

- Task D: present preliminary Strategies for each Emphasis Area for discussion and comment

- Task E: present findings of the "Draft" Local Transportation Safety Plan

The existing Safety Performance Measures developed as part of the "Futures 2040" Long Range Transportation Plan (see below) will be reviewed by the consultant team and the Stakeholder Group for inclusion in the Local Transportation Safety Plan as well as any other Safety Performance Measures that should also be included.

Safety Performance Measures (Futures 2040)

a) **Number of fatalities:** adopted the Strategic Highway Safety Plan (SHSP) for Kansas goal of cutting the number of fatalities that occurred in 2009 by 50% by the year 2029. Rolling 5-year averages are used. As of 2015, fatalities are above what is desired at 15.6 average over 5 years; this goal is currently not being reached.

b) **Fatality rate:** adopted SHSP goal of 0.575 fatalities per 100 million vehicle-miles traveled by the year 2029. Rolling 5-year averages are used. As of 2015, the 5-year average fatality rate was 0.983, within the standard set for the goal.

c) **Number of serious injuries:** adopted the Strategic Highway Safety Plan (SHSP) for Kansas goal of cutting the number of serious injuries that occurred in 2009 by 50% by the year 2029. Rolling 5-year averages are used. As of 2015, there was a 5-year average of 61 injuries, within the standard set for the goal.

d) **Serious injury rate:** adopted SHSP goal of 2.435 serious injuries per 100 million vehicle-miles traveled by the year 2029. Rolling 5-year averages are used. As of 2015, there was a 5-year average of 3.846 injuries per 100 million VMT, within the standard set for the goal.

e) **Non-motorized fatalities + serious injuries:** set a goal of maintaining the existing number. Rolling 5-year averages are used. As of 2015, there was a 5-year average of 8 fatalities + serious injuries per year, above the goal.

The team will develop an implementation plan for each emphasis area including establishing baseline data for the performance measures.

Task C Deliverables: Develop emphasis areas and performance measures for each of the 4 E's – Engineering, Education, Enforcement and Emergency Services; Meet with the stakeholder group; Develop an implementation plan for each emphasis area including establishing a baseline data for the performance measures.

Task D – Identify Strategies

The consultant team will work closely with the MTPO and the stakeholder group to develop a listing of acceptable strategies (potential countermeasures) for each emphasis area. The "NCHRP Report 500: Guidance for Implementation of the AASHTO Strategic Highway Safety Plan", Volumes 1 – 23, will be utilized to specifically focus on systemic and implementable countermeasures for each selected emphasis area.

With Futures2040's focus on increased future multimodal transportation (peds, bikes and transit), potential countermeasures that will reduce exposure to vehicles for these vulnerable groups will be identified. For instance, reducing crossing distances at intersections for pedestrians using bulb-outs is a low-cost safety improvement in urban areas. While in rural areas, providing shoulders or shared-use paths along paved higher speed roadways to better facilitate bicyclists may be considered if consistent with existing Planning documents.

Members of the stakeholder group will be informed of the magnitude of the crashes which are occurring within each emphasis area and the effectiveness of potential countermeasures for each which will assist in the overall selection of countermeasures.

A 5-year plan for strategic implementation will be developed for inclusion in the Local Transportation Safety Plan with an estimated cost for each. The majority of the proposed projects will be systemic low-cost safety countermeasures that will benefit the MTPO transportation system as a whole.

Task D Deliverables: Develop a listing of acceptable strategies (potential countermeasures) for each emphasis area; Meet with the stakeholder group; Develop a 5-year plan for strategic implementation with an estimated cost for each.

Task E – Develop Local Transportation Safety Plan

The consultant team will develop a Local Transportation Safety Plan (LTSP) for the MTPO, which identifies the target crash types, risk factors, priority sites for improvement, and recommended countermeasures and treatments for the prioritized locations. The LTSP will include a brief description of the methodology used to develop the recommendations and the results of the study as background for the reader, but will focus primarily on presenting the recommendations for improvement and the justifications for those recommendations clearly.

The anticipated audience for the LTSP will be elected officials, policy makers, roadway designers and planners, safety engineers, and transportation safety stakeholders. Therefore, emphasis will be placed on making the document user-friendly with visual representations of the data where appropriate and a high level of readability. The goal of the document is to provide each reader with a tool to guide safety-

related decision-making and investment and support existing local, regional, and state transportation plans.

The document will include the following sections:

- **Executive Summary:** this section will be only a few pages and will present the more important elements of the report: the target crash types, the identified risk factors, and the suggested countermeasures. It will provide a snapshot of the existing crash patterns and the plan to improve safety across the system rather than at a few specific locations.

- **Introduction:** this section will provide a very brief description of the systemic safety approach and how it compares to a traditional hot spot analysis, emphasizing the proactive nature of the systemic approach. It will describe the purpose and goals of this project and the general approach taken to achieve those goals.

- **Methods:** this section will give the reader information about the specific methodology used to 1) Identify target crash types, 2) Identify risk factors for each crash type, and 3) develop a risk factor score. It will also describe the role of public involvement in each step of the process.

- **Findings:** this section will present the results of the research, and lead into the recommendation presented in the plan.

- **Implementation Plan:** this section will describe the target crash types identified, the risk factors for each crash type, the countermeasures identified to address the risk factors, and an implementation plan for each countermeasure. The implementation plan will include a list of priority locations for implementation as well as an estimate of the cost of treatment installation and maintenance per site.
- **Appendices:** Appendices will be used to document detailed data or other relevant information that would be too cumbersome to include in the body of the document but which may be important to some readers.

The LTSP will be designed to be thorough yet concise, technical yet understandable by a broad audience.

The team will provide a “draft” LTSP for review by MTPO staff prior to finalizing the document for use by members of the stakeholders group.

Task E Deliverables: Develop a “draft” Local Transportation Safety Plan (LTSP) for review and comment by MTPO staff and members of the stakeholders group; Develop a “final” Local Transportation Safety Plan (LTSP) for use by members of the stakeholders group; Document format includes: .pdf (electronic)

Project Schedule (see Table 1)

Task B Deliverables – March 30, 2018

Task C Deliverables – April 15, 2018

Task D Deliverables – July 15, 2018

Task E Deliverables – “Draft” LTSP (July 30, 2018); “Final” LTSP (September 30, 2018)

Budget

The overall budget for the consultant team on this project is $99,794.84.

Table 1: Project Schedule