Title:	Enhancing Freeway Safety Prediction Models
The Problem:	Freeway safety analysis methodologies are limited in their applicability to some complex urban freeway configurations. Because of cost and right-of-way constraints, urban freeway widening projects often require challenging tradeoffs between narrowing lanes, or inside or outside shoulders, reducing median width, replacing cable median barrier with concrete barrier, and it is not always clear which combinations of cross-sectional widths will minimize crash frequency, or whether the tradeoffs should differ depending on the number of lanes. For example, if shoulder widths need to be decreased by 4 feet for a short distance because of bridge columns at a system interchange, should the width be taken from the inside or outside shoulder, and should the decision vary based on the number of lanes? Additionally, safety prediction models do not exist for 12-lane freeway segments or freeway segments with managed lanes; e.g., high-occupancy-vehicle (HOV) lanes or high-occupancy-toll (HOT) lanes or HOV reversible lanes. Safety prediction models have been developed for urban freeway segments in TxDOT research projects 0-4703, Incorporating Safety into the Highway Design Process, and 0-6811, Reducing Lane and Shoulder Width to Permit an Additional Lane on a Freeway, in addition to NCHRP 17-45, Enhanced Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges, to apply to cross sections up to 10 lanes wide. These projects yielded resources, such as the Roadway Safety Design Workbook, the Texas Roadway Safety Design (TRSD) spreadsheet program, additions to the Highway Safety Manual (HSM), Interactive Highway Safety Model (IHSDM), spreadsheet-based Enhanced Interchange Safety Analysis Tool (ISATe), and crash modification factors (CMFs). The HSM and IHSDM are acknowledged in the TxDOT Project Development Process Manual and have been used by various district personnel, particularly in the evaluation of project alternatives or analysis of design exceptions. Additional research is needed to address the aforementioned knowledge gaps as well as to develop updated local calibration factors for the models.
Technical Objectives:	The researchers shall address the following: 1. Develop safety prediction models for 12-lane freeways and freeways with managed lanes. 2. Update existing models for narrower urban freeways (i.e., segments with 4-10 lanes) to account for correlations between lane count and cross-sectional width elements. 3. Develop crash modification factors. The expectation of this project is that the end product will obtain a TRL level 5.
Desired Deliverables:	1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Value of Research (VoR) that includes both qualitative and economic benefits, to be included in the final research report. 4. Research report documenting the findings of the research, including new safety prediction models and updated features within the TRSD spreadsheet program. 5. Project Summary Report.
Proposal Requirements:	1. Utilize the “Proj/Agre” and “PA_Form” templates located at the TxDOT RTI website. 2. Proposals will be considered non-responsive and will not be accepted for technical evaluation if they are not received by the deadline or do not meet the requirements stated in RTI's University Handbook, which is also located at the RTI website. 3. Proposals should be submitted in PDF format, 1 PDF file per proposal. File name should include project name and university abbreviation. 4. This project will be tracked during the life of the project using a Technology Readiness Level (TRL) scale. For more information about the use of a TRL, click.