



RESEARCH REQUEST FOR PROPOSAL (RRFP) #24-01

DEMAND RESPONSIVE TRANSVERSE RUMBLE STRIPS

POSTED DATE: 4/3/2024; CLOSING DATE: 5/1/2024

PROJECT INFORMATION

Funds:	\$245,000
Estimated Contract Term:	18 months
Projected Start Date:	August 26, 2024
Deadline for Submitting Proposal:	4:30:00 PM (local time) May 1, 2024
Submit Proposal via Email to:	research@getipass.com

BACKGROUND

An ongoing issue with operations on the Illinois Tollway is attempting to slow traffic at specific times or locations. This includes work zones where trucks are entering and exiting the work zone from the mainline; locations of recurrent queuing on the mainline; and locations where the Tollway facility terminates at a traffic signal. Various mitigation strategies have been used as an attempt to get drivers to slow down in these situations including additional signage or queue warning systems. However, even with this additional mitigations, operational issues sometimes persist. This is assumed to be lack of attention potentially caused by familiarity, fatigue, distractions, or other impairment.

Where signage or other visual warning systems have not achieved the desired operational improvements, other agencies have adopted non-visual warning systems as additional countermeasures. This includes audible systems and tactile warning systems such as transverse rumble strips (TRS). The Illinois Tollway uses TRS. Historically, TRS were widely used at all approaches to mainline toll plazas. Currently, TRS are used on shoulders. While effective at alerting drivers to slow down or redirect, the Tollway has also observed negative impacts with increased pavement noise to nearby residents and their effectiveness may degrade with traveler familiarity. To address these challenges, a counter measure of

demand-responsive transverse rumble strips (DRTRS) has been deployed in Nevada¹. This system can be activated when traffic conditions require, and then deactivated for normal operations. This system would allow for targeted use for specific times or operational conditions.

To date, the only deployment of a DRTRS system identified has been the system in Nevada. The Tollway believes there is great promise in the application of a similar system. However, additional research is required to better understand how a DRTRS should best be applied for the Illinois Tollway. This includes designing and deploying at least one test system in an appropriate environment addressing issues such as climate and traffic. Both permanent and temporary applications are to be considered in the planning stages of this project.

OBJECTIVE

To evaluate DRTRS and develop an alternative solution for an Illinois Tollway application, which uses active control to effectively activate and deactivate the TRS as appropriate for conditions and individual users.

RESEARCH TASKS AND REQUIRED DELIVERABLES

Several tasks are envisioned for completing this research project, as described below:

- A. Literature review to understand current practices which other agencies are using for tactile response systems including transverse rumble strips. This should include design, overall effectiveness, and effectiveness specific to conditions similar to operations on the Illinois Tollway. Researchers should also meet with the Illinois Tollway to discuss and understand demand activation requirements.
- B. Provide design alternatives based on information from the literature review and discussions with Tollway staff on activation experience and needs.
- C. Deploy a research pilot system in a test roadway environment in a location acceptable to the Illinois Tollway. This test deployment should be a demonstration of a permanent installation. Temporary installations may also be addressed based on discussions with the Tollway project manager after completion of Task B. This task will include evaluation of the system for various parameters including, but not limited to:
 - a. Ability to withstand various vehicle weights and volumes of traffic including snow plows
 - b. Ability to activate consistently on demand
 - c. Ability to function in wet and cold environments
 - d. Verify system does not adversely affect control of vehicles passing over the system in both an activated and deactivated condition.

Evaluation must include the research pilot deployment but may also include lab

¹ https://digitalscholarship.unlv.edu/cgi/viewcontent.cgi?article=1832&context=me_fac_articles

simulations.

- D. Design a pilot deployment system including activation methods based on the results of the research and test deployment in Task C. Fabricate the field components including the in-roadway equipment and systems that will control the field equipment and communicate with the Tollway ITS systems.

Deliverables that will be required throughout this project will include:

- Quarterly progress reports, in electronic format, containing a summary of effort performed during the quarter and expected progress for the following quarter including percent of remaining schedule and budget.
- Literature review, in electronic format, summarizing the results of this research effort as contained in Task A described above. The Tollway will review and provide comments and feedback within 15 days of receipt of the literature review. Then, the researcher shall have 30 days to address the comments and questions, make revisions, and resubmit the literature review.
- Concept design report, in electronic format, following the requirements of the Illinois Tollway's Design Section Engineering Manual², summarizing the results of this research effort as contained in Task B described above. The report should only address the design concepts of the DRTRS system. The researcher will present a summary of the report (virtually or in person) to the Tollway who will then review and provide comments and feedback within 15 days of receipt of the concept design report. At the time the Tollway responds, the Tollway will also provide authorization to proceed with the preferred alternative. Then, the researcher shall have 30 days to address the comments and questions, make revisions, and resubmit the design alternatives report.
- Test deployment summary report, in electronic format, summarizing the results of this research effort as contained in Task C described above. The researcher will present a summary of the report (virtually or in person) to the Tollway who will then review and provide comments and feedback within 15 days of receipt of the test deployment summary report. Then, the researcher shall have 30 days to address the comments and questions, make revisions, and resubmit the test deployment summary report.
- System design documents, in electronic format, detailing the components of the system sufficient to construct and procure the system as contained in Task D described above.
- An electronic copy (pdf) of all reports shall be submitted.

² [Manuals Policies Guidelines - Illinois Tollway](#)

INSTRUCTIONS FOR SUBMITTING A PROPOSAL

The proposal shall be prepared in accordance with the guidelines presented in Appendix A. The contact name/email and due date are presented on the first page. All potential Principal Investigators (PIs) should read and understand the responsibilities of Illinois Tollway Principal Investigators, which are presented in Appendix B.

Technical questions regarding the research project or questions regarding the RFP procedures should be submitted to research@getipass.com by 2:00:00 p.m. (local time) on April 17, 2024. Technical questions that are received by 2:00:00 p.m. (local time) on April 17, 2024 will have the question and answers posted on the Tollway's website at least 3 days before the proposal due date.

SPECIAL CONDITIONS FOR REVIEWING PROPOSALS AND AWARDING ILLINOIS TOLLWAY FUNDS

Please note that the following three conditions will be applied in reviewing all proposals received and in awarding Tollway funds:

- 1) The award of this project is contingent upon the availability of funds at the time of award.
- 2) Tollway research projects are entered into through an Intergovernmental Agreement. Therefore, the lead institution in a successful proposal is required to meet the definition of a "public agency" pursuant to Illinois' Intergovernmental Cooperation Act (5 Ill. Comp. Stat. 220) in order to enter into an Intergovernmental Agreement to complete the project. Prior to notification of a successful proposal, the Tollway may request the lead institution's W-9 form to verify compliance with this requirement.
- 3) The lead institution must perform at least 35% of the work (budgeted costs).

APPENDIX A: GUIDELINES FOR PREPARING A PROPOSAL FOR THE ILLINOIS TOLLWAY

Please use the following format for submitting a Tollway proposal for consideration. Please limit your total proposal to 5 pages in length (not including the Cover/Summary Page or optional Appendices), ensure file size is less than 5 MB, and use a font size no smaller than 10. We suggest Arial font with 1.5 spacing between lines.

1. Cover/Summary Page

Use the cover page included in Appendix C.

2. Research Plan

The research plan should describe in a specific and straightforward manner the proposed approach for solving the problem described in the problem statement. The research plan should be subdivided into the following sections:

(a) Introduction, including Research Idea Statement

Provide an introduction to the proposal and a concise overview of the research approach. Outline the objectives of the research project and explain the questions that will be answered by the research.

(b) Research Approach/Work Plan

Include the details of how the investigator will carry out the project and accomplish the project objectives. Itemize the tasks to be completed, explaining each in sufficient detail so the reviewers understand what will be done for each task and what will be produced or completed with each task.

(c) Anticipated Research Results

Specifically state the anticipated research results and deliverables.

(d) Applicability of Results to Illinois Tollway Practice

Describe how the anticipated research results can be used to improve Tollway practices.

3. Qualifications and Accomplishments of the Research Team

Identify who will perform the research and provide a brief explanation of each researcher's qualifications to perform the research. Please provide examples of similar research that the proposed individuals have performed.

4. Other Commitments of the Research Team

Briefly outline the other commitments of the proposed principal and co-principal investigators to demonstrate that both will be able to fulfill the commitments of the proposal.

5. Equipment and Facilities

Describe the facilities and equipment available to undertake the research proposal.

6. Time Requirements

Describe the time that will be required to complete the research proposal, including final report preparation, Tollway editing, review of the report by the Technical Review Panel (TRP), and final review/publishing of the report. Include a timeline for each task.

7. Itemized Budget

Provide an itemized budget for each of the Phases of the project and for the entire project, including the cost of personnel, consultants, subcontracts, equipment, materials, travel, overhead/indirect costs and cost share (match). The Illinois Tollway believes that an overhead/indirect rate of 20% is reasonable and competitive. Justification shall be provided if an indirect cost rate in excess of 20% is used. Please itemize equipment and travel requests, especially any requested out-of- state travel or planned attendance at conferences.

8. Cooperative Features (if appropriate)

If assistance or cooperation is required from other sectors, public or private, to complete this proposed research, describe the plans for securing this assistance.

9. Appendices (if appropriate)

You may include such things as statements regarding previous work on the problem or related problems, abstracts of related projects, a bibliography or list of references, or materials describing the submitting organization.

APPENDIX B: RESPONSIBILITIES OF ILLINOIS TOLLWAY PRINCIPAL INVESTIGATORS

1. Prepare and submit a project work plan and multi-year line-item budget, consistent with the Tollway RRFPP for the newly-approved research project.
2. Meet with the Technical Review Panel (TRP) and revise the project work plan and multi-year budget, as agreed with the TRP.
3. Assist the TRP chair in preparing an Implementation Planning Worksheet and work throughout the project to identify the expected benefits of the research, e.g., construction savings, operation and maintenance savings, increased lifecycle, safety, etc.
4. Carry out the project as agreed with the TRP, or notify the TRP if any problem develops regarding the project.
5. Provide online quarterly progress reports to the TRP chair for review and approval.
6. Attend TRP meetings to provide project updates and answer TRP members' questions about the project.
7. Provide the TRP a synopsis of the project's implementation potential as well as implementation strategies. In conjunction with the TRP, develop Implementation activities/ tools such as draft specifications, policy guidelines, software, and training on new test/ practice/ equipment/ software and develop an implementation cost estimate, if applicable.
8. Near the completion of the research project, draft a final research report in accordance with the Tollway report format. (The timeline for the work plan must allow adequate time to prepare the report, typically three months.)
9. At least 45 days before the end date for the project, submit the draft final report to the Tollway for review and work with the TRP chair to finalize the content of the report.
10. Re-submit the final report to the Tollway for publication. The Tollway will post the final report to the Tollway website.
11. The publication or release of all work products, any information that is deemed confidential by the Tollway, or information which includes patentable results may not be published/ released without the Tollway's approval.

12. Include the Illinois Tollway acknowledgement statement and disclaimer statement (available on the Tollway website) in all publications and presentations regarding research sponsored partially or fully by the Tollway.



**APPENDIX C:
PROPOSAL COVER SHEET FOR
SOLICITATION #24-01**

DEMAND RESPONSIVE TRANSVERSE RUMBLE STRIPS

DUE: May 1, 2024
TO: research@getipass.com

Submitted by: (Include Name and Address of Organization)	
Proposed Investigator(s):	
Corresponding Investigator Name:	
Corresponding Investigator Phone:	
Corresponding Investigator Fax:	
Corresponding Investigator Email:	
Submission Date:	