



REQUEST FOR PROPOSAL (RFP) #18-04

Roadway Lighting's Effect on Pedestrian Safety at Intersection and Midblock Crosswalks

POSTED DATE: 4/2/18 CLOSING DATE: 4/30/18

PROJECT INFORMATION

Funds: \$375,000 total, including a required 25% (\$93,750) cost share from proposing agency.

Estimated Contract Term: 30 months

Projected Start Date: 8/16/18

Deadline for Submitting Proposals: 4/30/18

Submit Proposals via Email to: ICTProjectManagement@illinois.edu

BACKGROUND

In 2016, there were approximately 6,000 pedestrian traffic fatalities along U.S. roadways. This constitutes increases of about 11% from 2015 and 22% from 2014. In 2015, 74% of pedestrian fatalities happened at night. Ninety-percent of the pedestrian fatalities happened on travel lanes including midblock (72%) and at intersections (18%). These statistics indicate that nighttime pedestrian safety is of great concern nationally.

Several safety treatments have been shown to be effective in increasing pedestrian safety at crosswalks. Among these are raised medians/pedestrian-refuge islands, Danish offsets/protected intersections, advanced stop lines and signs, in-street crossing signs, flashing beacons, and in-roadway lights. Roadway lighting has also been used as a successful countermeasure against pedestrian crashes at night. Research has shown it benefits both the driver and the pedestrian by enhancing the driver's ability to see at greater distances. Providing

or increasing roadway lighting, despite its benefits, is often not considered as cost-effective when compared to treatments such as signage, high-visibility striping, or flashing beacons.

Other than cost, one of the main reasons that roadway lighting is sometimes not considered as a pedestrian safety measure is the lack of ways to compare various other countermeasures with lighting. Countermeasures like flashing beacons and signage are evaluated based on driver yielding and speed behaviors at the crosswalk locations. Before/after crash studies and many crash modification factors (CMFs) have been developed for these and other crosswalk treatments but not for roadway lighting. Lighting can primarily be evaluated in terms of visibility distance, which is hard to measure and difficult to translate to a benefit level. Few, if any, CMFs are available for crosswalk lighting, and effectiveness of different potential lighting configurations/locations are not well-studied.

Research is required to better understand driver yielding and speed-adjustment behaviors in the presence of lighting at crosswalks in both midblock and intersection locations. Furthermore, alternative lighting designs at pedestrian crosswalks must be studied to determine the best way to illuminate crosswalks to increase visibility and therefore pedestrian safety. It could also be possible that a combination of countermeasures could further increase safe driving behaviors such as lighting with flashing beacons or lighting with signage.

OBJECTIVE

The objective of the study is to develop lighting treatments to increase pedestrian safety at crosswalks. The research will seek to define ways to light an intersection to maximize both motorist visibility in the intersection as well as motorist visibility of pedestrians in crosswalks. In addition, the project will identify optimal approaches for combination treatments that include additional countermeasures at midblock and intersection crosswalks; propose optimal lighting levels and locations based on prior studies and this research; and identify cost-effective, practical, and implementable recommendations for crosswalk lighting policy in Illinois. This research will assist with the ongoing work in implementing the current Illinois Strategic Highway Safety Plan, particularly in the Intersection and Pedestrian/Pedalcyclist Emphasis Areas.

RESEARCH TASKS AND REQUIRED DELIVERABLES

Good lighting design practice has long specified that roadway luminaires be installed on the departure side of intersections in order to maximize visibility for motorists in recognizing the typical vehicle conflict points within intersections. In Illinois and many other states this means luminaires are typically installed on combination traffic signal/ mast arm structures. However, recent research on pedestrian safety suggests that a better location for luminaires is on the entering side of the intersection (in advance of the crosswalk) in order to make pedestrians more visible to motorists since they are then front-lit and visible in positive contrast. Costs would be very high to add pedestrian-focused luminaires to already-lit intersections, and efficiency may be questionable since operating costs would also be high. This research will seek to better understand nighttime hazards for pedestrians in crosswalks and study a luminaire placement strategy which optimizes both motorist visibility and pedestrian safety. The research will study various techniques for midblock crosswalk and intersection crosswalk luminaire locations and recommend the optimal layout.

The proposed research shall address the following specific tasks:

Task 1 – Pedestrian Safety Evaluation: The research team shall evaluate potential pedestrian safety by studying driver detection distances, driver yielding, and driver speed-adjustment behaviors under several lighting designs (luminaire placement locations and lighting levels) for crosswalks at intersections and midblock locations. The data gathered will be summarized and provided in a format that is useful in identifying locations and levels that are most effective for driver recognition of pedestrians.

Task 2 – Comparison of Lighting to Its Countermeasure Methods: Recent Illinois research (ICT Project R27-167) investigated procedures and guidelines for pedestrian treatments at uncontrolled locations. Building on that research, the research team shall compare the effectiveness of lighting in influencing the driver behaviors in Task 1 to other treatments including signing, high-visibility striping, and flashing beacons. The effectiveness of a combination of treatments will be assessed to better understand how such treatments could potentially increase pedestrian safety at crosswalks.

Task 3 – Analysis of Luminaries and Lighting Locations: National policies that require the use of luminaires at intersections must be examined. In addition, a summary of the key components of lighting that can potentially optimize the safe operation of intersections at night shall be presented. Specific data that will guide Illinois decision-making on intersection luminaire locations where crosswalks are present shall be identified.

Task 4 – Policy Development: The research team is expected to develop draft policy elements that will allow IDOT to substantially advance statewide policy for nighttime safety of pedestrians along roadways. The policy will be intended to identify effective, defensible, cost-effective ways to implement lighting at crosswalks at both intersections and midblock locations, and provide design guidance. Current policy documents to be revised can be found at <http://www.idot.illinois.gov/>.

Please note that the federal funding used by IDOT and ICT for our contract research program requires that IDOT share technology developed through our contract research program. Any software, databases, and related computer programs, identified as a Research Project deliverable in the initial Research Project Work Plan, developed under this study will become the property of ICT, which is required to grant IDOT and the federal government free use of the software, and to share it with other states.

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 should be included on the first page. All potential Principal Investigators (PIs) should read and understand the responsibilities of ICT Principal Investigators, which are presented in Appendix B.

Technical questions regarding the research project or questions regarding the RFP procedures should be submitted to the ICT Project Management Team via email at ICTProjectManagement@illinois.edu. Technical questions and answers will be posted on the ICT website as they are received.

SPECIAL CONDITIONS FOR REVIEWING PROPOSALS AND AWARDING ICT FUNDS

Please note that the following two conditions will be applied during the review of all proposals received and in awarding ICT funds:

- 1) In reviewing and evaluating the proposals received from this solicitation, when multiple proposals are reviewed and have identical scores, preference will be given to Illinois universities (both public and private) over others.
- 2) The award of this project is contingent upon the availability of funds at the time of award.

**APPENDIX A:
GUIDELINES FOR PREPARING PROPOSALS FOR THE
ILLINOIS CENTER FOR TRANSPORTATION (ICT)**

Please use the following format for submitting ICT proposals for consideration. Please limit your total proposal to 15 pages in length (not including the Cover Page or optional Appendices) and use a font size no smaller than 10. We suggest Arial font with 1.5 spacing between lines.

1. Cover Page

Use the cover page found [here](#).

2. Research Plan

The research plan should clearly and concisely address 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 Objective

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

(b) Research Approach / Work Plan

Include details of the research project and strategy to accomplish the project objectives. Then itemize the tasks to be completed, explaining in sufficient detail what will be done and what will be produced or completed with each task.

(c) Anticipated Research Results

State the anticipated research results and deliverables.

(d) Expected Implementable Outcome

Describe how the anticipated research results can be used to support the expected implementable outcome.

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. Facilities and Equipment

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

6. Timeline Requirements

A timeline of the research project's tasks must be included in this section. Describe the amount of time that will be required to complete the research proposal, including final report preparation, ICT's editing, review of the report by the Technical Review Panel (TRP), and final review/publishing of the report. Please plan on submitting the draft final report to ICT for initial editing at least three months before the end date for the project. Below is an example of a project timeline.

Project Milestones (assuming a January 1 Start Date, and a 2 year project)	2018												2019											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1 Kickoff Meeting	█																							
2 PI conducts Research	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3 PI writes DRAFT report																								
4 PI Submits Final DRAFT report to ICT for editing																								
5 ICT Preliminary editing phase																								
6 PI/TRP editing phase																								
7 Final editing phase																								
8 Report Posted to ICT website																								
(Quarterly Progress Reports Due)			█			█			█			█			█			█			█			█
(Semi-annual Evaluations Due)						█					█							█				█		
(TRP / PI Meetings)			█			█			█			█			█			█			█			█

7. Itemized Budget

Provide an itemized budget for the entire project, including the cost of personnel, consultants, subcontracts, equipment, materials, travel, overhead/indirect costs and cost share (match).

Each project must include a budget that clearly shows the portion of the total cost requested from IDOT/ICT (75%) and the matching funds/cost share (25%) required from the proposing agency. The indirect cost rate (also known as overhead or F&A) used for facilities and administration (F&A) cannot exceed 50% of the modified total direct costs. If a subaward is necessary for extra support from outside the proposing agency, please note that the subaward cannot exceed 50% of the total project budget without prior approval.

A part of the 25% cost share requirement may be fulfilled through the use of unrecovered indirect costs. Any proposal submitted by an organization outside of the University of Illinois system that plans to use unrecovered indirect cost to meet part of the required 25% cost share must submit a request for approval to IDOT/FHWA (Federal

Highway Administration). More information on this letter will be provided if and when a proposal is selected for funding.

Please refer to ICT's budget templates when submitting a proposal to ICT: [UIUC Budget Template](#); [Subawardee Budget Template](#).

8. Budget Justification (Narrative)

Each project must include a budget justification that explains the itemized budget in narrative form. The budget justification provides sufficient detail so there is a clear understanding of how the project costs were calculated and why they are necessary. The narrative discussion of the project cost categories and related line items should be presented in the same order as they appear in the itemized budget.

If this project will require out-of-state travel or to in-state conferences, please list and explain the travel here. PI's requesting to travel out-of-state or to in-state conferences using ICT/IDOT funds must fill out a [Travel Request Form for PI's and Research Assistants](#) before traveling.

If this project will require the purchase of equipment, please list these equipment purchases here. Equipment purchases above the \$500 threshold must have an [Equipment Purchase Request Form](#) submitted *and approved* prior to purchasing.

9. Cooperative Features (if appropriate)

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

10. Appendices (if appropriate)

Items such 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 may be included here.

APPENDIX B:
**Principal Investigator (PI) Quick
Reference Guide for ICT/IDOT
Sponsored Projects**

Downloadable forms and guidelines are at:
<http://ict.illinois.edu/research/formsguidelines>

1. **Prepare and submit a detailed work plan:** The project's work plan is to include a line-item budget, budget justification, implementation strategy, and deliverables; and should be consistent with the "ICT Request for Research Ideas" submission or RFP (whichever is applicable).
2. **Finalize work plan with Technical Review Panel (TRP):** Revise the work plan as agreed upon with the TRP. E-mail the approved work plan and budget to ICT (ICTProjectManagement@illinois.edu), who will assign a project number and enter project data into the ICT website database.
3. **Complete PI section in the on-line ICT project database:** Go to the ICT website at <https://apps.ict.illinois.edu/projects/> to log into the database. New PIs can request a login user name and password from ICT at ICTProjectManagement@illinois.edu. Click on "View/Edit My ICT Projects" then click on the **Edit** icon on the right side of the screen and complete the following sections: Personnel (add project team members, including co-investigators and students); Project Details (add project tasks, a project description, the progress and significant results this quarter, the anticipated work next quarter, update the project schedule status and provide any project impediments and recommended solutions).
4. **Upload files or photos:** Click on the **Files** icon (upper right corner of screen) and complete the following fields: Document Type (required), Document Title, Authors, and Abstract. Then use the "Browse for File" button to navigate to the directory on your computer and select the file you wish to upload. This process should be repeated for any additional files or photos. You may also use the "e-mail us" link at the bottom of the screen to send ICT the files to upload.
5. **Conduct research as agreed upon with the TRP:** Notify the TRP if any problem develops during the project.
6. **Provide quarterly progress reports (QPRs):** No later than the end of each calendar quarter, update your project's on-line QPR and send to the TRP chair for review and approval. ICT will send e-mails reminding PIs to fill out the QPR for their research projects.
7. **Provide research progress updates to TRP:** Attend all TRP meetings as scheduled by the PI and TRP chair (generally once per quarter, at least every 6 months) to provide project updates and answer TRP members' questions about the project. If you would like help setting up a Go-To- Meeting, ICT can help facilitate this. Provide any presentations in advance to the meeting recorder at ICTProjectManagement@illinois.edu. Complete implementation worksheet with the TRP's help, and then review/update as necessary at TRP meetings.

8. **Complete a semi-annual Administrative Performance Evaluation of the TRP:** You will be sent a reminder 30 days prior to the evaluation deadline to download and complete the form.
9. **Write project report:** A final research project report in accordance with ICT guidelines is required to complete your project. Reports should fulfill project objectives set forth in the work plan, show adequate documentation, and be presented clearly and concisely; **the maximum page length (including references) is 75 pages (~35,000 words) not counting appendices.** Specific [report writing guidelines](#) may be downloaded from the ICT website. Complying with these guidelines will minimize publication delays. Six months and four months prior to your project end date, you will receive reminders from ICT to draft your project report.
10. **Submit project report to ICT for editing three months prior to project's end date:** Three months before the project's end date, submit the draft report to ICT for editing (**prior to submission to the TRP**). The three-month editorial process is conducted in three phases as follows:
 - **PRELIMINARY EDIT PHASE:** The PI submits the complete report to ICT Project Management (ICTProjectManagement@illinois.edu) in MSWord format (template can be downloaded [here](#)). The PI should follow the ICT report formatting guidelines. **Reports that do not follow ICT guidelines will be returned to the PI for resubmission.** A comprehensive technical edit of the report will be performed and then returned to the PI for review and revision. Additional useful documents and forms are on the [Report Guidelines and Documents](#) page.
 - **PI/TRP EDIT PHASE:** The PI reviews the ICT technical edits, accepts/rejects changes, addresses all comments, and forwards the edited report to the project's TRP Chair for review.
 - **FINAL EDIT PHASE:** When the report is approved by the TRP Chair, the PI forwards the final report and the [Final Edit Phase/TRP Final Approval](#) form to ICT Project Management for final editorial review. **Reports submitted without the TRP approval form will not be accepted.**

NOTE: The three-month report editing and review process must be built into your project timeline. That is, if your project ends on December 31, your report should be sent to ICT Project Management for editing no later than September 30.

11. **To release project information prior to the final report being published, IDOT approval must be obtained. IDOT requires 21 days to review the approval request.** After 21 days, publication or public disclosure of non-confidential and non-patentable results in professional refereed or peer-reviewed journals or papers to be presented at professional meetings may proceed without interference. The publication or release of non-scholarly work products, any information that is deemed confidential by IDOT, or information which includes patentable results may not be published/released without IDOT's approval. *If the scheduled time for presenting project information previously reviewed by IDOT does not permit formal review of a complete publication or presentation, notify IDOT of the scheduled presentation on the study and provide an abstract, presentation title, or agenda for the presentation. Such presentations shall include a statement that the IDOT/ICT acknowledgement statement and disclaimer statement (available on the ICT website) in all publications and presentations regarding research sponsored partially or fully by ICT which states paper/presentation has not been reviewed by IDOT.*

12. **Comply with the terms of the current ICT Intergovernmental Agreement which IDOT approved in July, 2017:** This agreement can be found on the ICT website on the [ICT Forms and Guidelines](#) page.
13. **Comply with the current ICT Operational Guidelines:** The current guidelines can be found on the ICT website on the [ICT Forms and Guidelines](#) page.