

RESULTS SUMMARY

This project gives agencies guidance on the technical requirements and key considerations for developing a plow route optimization program, along with a contracting language template to help agencies build route optimization RFPs.

PROJECT DETAILS

Project Title: Synthesis of Technical Requirements and Considerations for Automated Snowplow Route Optimization

Project Number: CR19-04

Project Cost: \$73,516

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TOOLS FOR IMPROVING SNOWPLOW ROUTE OPTIMIZATION PROJECTS

Need for Research

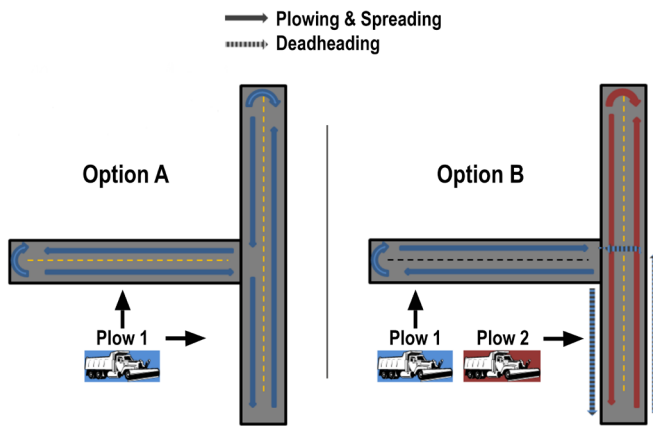
Snowplow route optimization programs offer transportation agencies an enticing opportunity to improve the efficiency and effectiveness of their winter maintenance activities. Using data such as the number of lane miles the agency manages, the number of snowplows in its fleet, and the amount of salt or deicing material each plow can carry, these customized software programs can help agencies streamline equipment, processes and procedures. Ultimately, agencies can save time and money by designing more efficient snowplow routes, optimizing the number of vehicles used, and pinpointing where maintenance facilities should be located.

However, even changes that demonstrate the opportunity to significantly reduce costs can be difficult for an agency to implement if they conflict with other priorities or lack support from upper management. In addition, while it's standard practice for agencies to seek competitive bids and include the technical details and goals of a project in a request for proposals (RFP), accurately conveying this information in a manner that attracts a range of viable software developers and service providers can be a time-consuming and challenging process. Clear Roads agencies needed guidance to help ensure that their plow route optimization efforts achieve the desired results.

Objectives and Methodology

To increase the likelihood that agencies' plow route optimization projects will be successful, this project sought to identify the myriad issues that an agency should consider before taking on a route optimization project as well as develop flexible contract language that agencies can use to develop a more effective RFP in less time.

To understand what data are needed to optimize snowplow routes, researchers consulted a [previous Clear Roads research project](#) that surveyed nearly a dozen transportation agencies that had completed or were in the midst of optimization projects in 2016, as well as five additional agencies that began the process more recently. The research indicated that detailed information about the agencies'



A comparison of two options for a single route (left: lower costs using a single plow; right: faster service using two plows) demonstrates how an agency's service priorities can affect optimization results.

current operations, including the time it takes to complete a plowing cycle, the locations where plows can safely turn around, and the geographic coordinates of material storage and maintenance facilities, was critical to the projects' success.

Next, the research team reviewed archived snowplow route optimization RFPs issued by six state, regional and local agencies to learn more about how this work has previously been described. The team then conducted in-depth discussions with winter maintenance organizations and experienced software vendors to gain insights into why optimized routes are not always implemented and how RFP solicitations and other communications should be written to achieve the desired project results.

Results

Researchers' efforts culminated in a [guidance document](#) that outlines six key considerations each agency should address prior to embarking on a route optimization project:

- 1. What is the primary purpose?** An agency may want to save costs and time, but which is more important in the event these goals conflict?
- 2. What are reasonable changes?** If recommendations include relocating a facility or adding vehicles, can these changes realistically be made?

- 3. What information is pertinent and where can it be found?** Identifying how data are gathered and stored will reduce obstacles as the project gets underway.
- 4. What operational practices are relevant?** The speeds vehicles travel and the amount of material they spread may be noteworthy.
- 5. How will results be reviewed?** Once optimized routes are created, who will review them to make sure they're safe and practical?
- 6. What else will be needed? How will the agency measure success?** What is the process for implementing new or improved routes?

These questions reveal the benefits of securing significant collaboration among multiple stakeholders within a single agency, including substantial support from management, before bringing on external partners. Once an agency is ready to pursue a partnership with a software developer or service provider through an RFP, the [template language](#) developed by the researchers will ensure that the agency's objectives are clear and all parties are united in their project approach.

Benefits

A great deal of information is required for a successful route optimization project. By working through these details, exploring the possible outcomes and communicating goals effectively before the project begins, agencies will be much more likely to develop routes that are safe, feasible and actionable.

"Optimizing an agency's snowplow routes requires more coordination, support and investment than most people realize. This research presents the issues to consider and template language to make the process as simple as possible."

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