



## Drainage 101: Understanding and Managing Drainage Issues

Increased regulation and rising levels of precipitation have made stormwater management a more routine and time-consuming issue than in previous decades. A new resource provides guidance and best practices that will help city and county engineers, local officials and private property owners navigate the complex, often public-facing issues related to recurring drainage problems and stormwater management.

### What Was the Need?

Effectively managing drainage from county road ditches and city storm sewers while also addressing drainage requests from the public can be challenging for Minnesota transportation agency engineers. The legal implications of drainage issues must also be considered, making these matters even more complex. City and county engineers invest considerable time researching drainage laws and finding the best approach to solving drainage problems.

The Local Road Research Board needed a reference guide to provide quick and easy access to resources that local agencies can use as they handle local drainage issues

while responding to concerns from private citizens. In addition, best practices and legal information were needed related to regional watershed protection, city and county drainageways, and other drainage infrastructure.

### What Did We Do?

Investigators began this project by collaborating with the Technical Advisory Panel (TAP) to identify common drainage issues and gaps in available knowledge and guidance. The TAP included professionals with direct experience on drainage topics from multiple perspectives, such as attorneys, watershed district managers, and city and county engineers.

*“This project developed a succinct, easily accessible report on drainage issues that people can read online and find the resources they need.”*

—STEVE BOT, CITY ADMINISTRATOR/PUBLIC WORKS DIRECTOR,  
CITY OF ST. MICHAEL

Next, a survey of local engineers and watershed managers gathered information about their experience with drainage management to identify issues that respondents encountered when managing drainage, approaches to resolving these issues, and solutions and best practices for resolving drainage issues.

Information and practices provided by survey respondents along with resources and materials used by these stormwater professionals were then compiled into a concise guide. Resources cover a range of topics, from legislative statutes to facility design, water and soil resources, vegetation management and stormwater treatment.

## What Was the Impact?

This project produced a reference guide of easily accessible resources to support new and experienced city and county engineers, stormwater professionals and the general public as they navigate drainage concerns. In addition to relevant drainage and stormwater management documents, the guide includes:

- An overview of applicable drainage law, water rights and the rights of adjacent landowners for work within the right of way or easement. This section of the guide includes a matrix of common issues and resolutions for both public and private drainage

concerns based on the reasonable use concept.

- Templates that agencies can use to draft drainage permits to work on existing or new drainage infrastructure, as well as drainage policies for road authorities. Investigators synthesized information from example documents provided by survey respondents to develop the new templates in this guide.
- Fact sheets that detail the responsibilities of landowners and road authorities, describe the agencies involved in drainage issues and projects, explore the fundamental concepts of drainage design, and explain water and drainage law. These educational materials can be distributed to transportation professionals as well as members of the public, local elected officials and others interested in stormwater management issues.
- A cost–benefit analysis that compiles information on actual costs and risks related to mitigation projects and preventive maintenance. Agencies considering a project that would be funded with taxpayer dollars can use this analysis to explore all the variables that should be considered in project decision-making.
- A summary of geographic information system (GIS) use to effectively monitor and manage drainage assets as part of agencies’ asset management systems.

## What’s Next?

The guide produced in this effort provides quick access to information needed to address and resolve drainage issues. The most critical next steps will be to disseminate project results throughout the state. Agencies may also want to develop training materials and a class based on the outcomes of this project for engineers and technicians either new to or experienced in stormwater drainage.

An additional follow-up project could include research on the complexities of drainage law, possible scenarios that a drainage professional may encounter and tips on how to handle public drainage law issues. More research could also focus on the drainage cost–benefit analysis, potentially developing a quantitative cost–benefit process for city and county engineers and local officials.

## About This Project

### REPORT 2023RIC08

“Drainage 101 County Roadways, City Streets and Drainageways: Best Practices and Resources Guide.”  
Find it at [mdl.mndot.gov](http://mdl.mndot.gov).

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### LRRB PROJECT COST

\$85,329

[www.mndot.gov/research](http://www.mndot.gov/research)