

RESEARCH SPOTLIGHT

Project Information

REPORT NAME: Developing a Consistent Data Driven Methodology to Multimodal, Performance Based and Context Sensitive Design

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New tool helps MDOT customize roadway designs for all users

In Michigan and across the United States, road design has historically focused on the needs of motor vehicles, with intersections, lane characteristics and other features designed to accommodate anticipated traffic volumes. In recent years, design practices have expanded to also consider the needs of other road users, such as pedestrians and bicyclists, as well as the traits of the surrounding community. To support its planners and road designers in creating context-sensitive and inclusive infrastructure, the Michigan Department of Transportation (MDOT) developed a tool that leverages data to identify site-specific solutions that meet the needs of all road users.

PROBLEM

Historically, transportation agencies have designed streets, sidewalks and other roadway features with a one-size-fits-all approach, using standards and specifications that tend not to consider the broader context of where these facilities are located or who uses them. Modern transportation design practices are more flexible, however, recognizing the individuality of each community and the range of complex social, economic and environmental factors that play a role in whether a person walks, bikes or uses another form of transportation to get around.

To help MDOT's planners and engineers create transportation infrastructure that is more context-sensitive, or better suited to



Through context-sensitive design practices, MDOT can create roadway features that increase mobility and safety for all users.

its setting and purpose, the agency wanted data-backed tools that could be used in project scoping and early planning stages to engage community members and help all stakeholders visualize and understand how different treatments would realistically affect safety, mobility and other considerations.

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“These new tools help MDOT consider design options earlier, which can increase public engagement and ensure that the final plans will suit the needs and goals of the community.”

John Martin
Project Manager

RESEARCH

In an effort to better understand the principles and benefits of context-sensitive design and identify national best practices, researchers examined previously published research and other publications. These resources showed that the tailored solutions that come from applying context-sensitive design principles to transportation projects are often more cost-effective and result in greater customer satisfaction than traditionally designed treatments, since those that are designed specifically for the characteristics of the location are better sized and equipped to accommodate the needs of the community. A review of the documents used by MDOT and other state transportation agencies to guide their highway design decisions also revealed a number of successful pedestrian- and bicycle-friendly strategies installed across the country, such as pedestrian traffic signals with push buttons and bike boxes at intersections.

Finally, to develop a methodology that would help MDOT’s planners and engineers identify appropriate transportation solutions for the scale and features of their surroundings, researchers combed through a variety of online databases to find reliable sources of information for traffic volumes, speed limits, population demographics, and land use data throughout Michigan. With data that can be scaled to four sizes of Michigan communities and applied to four

different types of sites – including pedestrian segments, bicycle segments, midblock crossings, and intersections – planners gain a more holistic view of how the area is used as well as objective support for selecting traffic control devices, crosswalks and other treatments that increase safety and add value to the larger community.

RESULTS

The research culminated in a decision matrix for each of the four site types that can be used to identify potential treatments based on specific parameters and population levels. By offering solution options that consider a combination of factors, these matrices provide greater flexibility in the early stages of a project when it’s easier and more economical to explore alternatives that will best meet the needs of pedestrians, bicyclists and other non-motorists.

To make using the matrices even simpler, a spreadsheet-based tool allows MDOT’s planners to enter information related to traffic volume, speed limit, road features, and other conditions and receive up to three solutions that can be prioritized based on budget and other constraints. MDOT’s new tool was designed to complement other Michigan planning resources, such as the multimodal tool developed by the Southeast Michigan Council of Governments. With a variety of resources available, MDOT’s planners and engineers will have greater interdisciplinary insight and decision-making power in their holistic planning efforts. Future versions of MDOT’s tool will be able to consider additional information, such as transit routes and bus stops.

IMPLEMENTATION

The new tools give MDOT’s designers and planners a consistent and data-driven approach to identifying possible highway design treatment options. Traditional transportation engineering standards will still need to be applied during the design phase to confirm that the options can

be installed at specific sites. With better decision-making power that can be applied earlier in the design process, MDOT will be well equipped to collaborate with local communities and find thoughtful solutions that work for the location and the people who will use them. As a result, the state’s investments will be more cost-effective and valuable for everyone involved. After some finishing touches, MDOT hopes to make this tool available this year.

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www.Michigan.gov/MDOT/-/media/Project/Websites/MDOT/Programs/Research-Administration/Final-Reports/SPR-1719-Report.pdf.

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