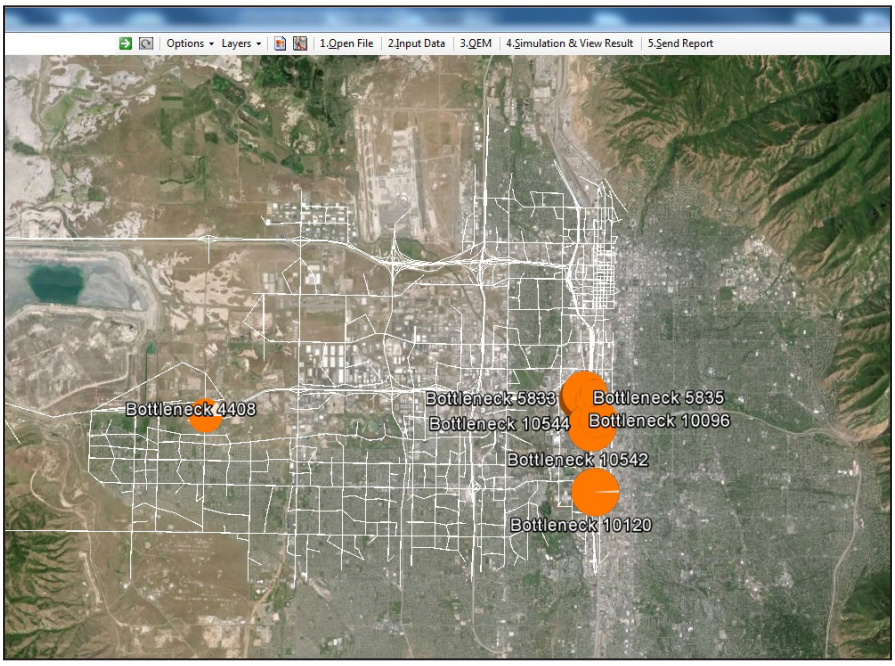
MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 17-317 (project 403) | January 2017

Simplified Web-based Decision Support Method for Traffic Management and Work Zone Analysis



the **ISSUE**

There are numerous tools to analyze work zone impacts. However, they have limitations and may not fully capture the dynamic nature of drivers' responses. This research develops an open-source tool that integrates Dynamic Traffic Assignment (DTA) and traffic signal estimation to better capture overall impacts of work zones.

the **RESEARCH**

The primary objective of this research is to develop a simple, open-source Google Maps/Google Earth interface for scenario-based traffic simulation analysis, primarily focused toward work zone analysis. Engineers may use the simplified interface and spreadsheet methods to prepare different scenarios without interacting with the calibrated model input data, which are prepared by the local MPO. Input data are hosted online, and the simulation engine is offered as a web-application/service to simplify data preparation and improve computational efficiency.

Secondary objectives of this research project are to provide decision support methods for traffic engineers toward implementing online DTA for Advanced Travel Demand Management in daily practice. First, providing the traffic estimation tool as a backend computational engine can significantly shorten analysis time. Offering a simple user interface in a familiar software package like Google Maps or Google Earth makes it easier to perform this type of analysis, and their built-in visualization tools may be extremely useful for interpreting analysis results and preparing presentations/reports for decision-makers and stakeholders. Additionally, storing the planning and traffic sensor data sets online reduces the time and effort spent preparing input data and requires less training for engineers using the software.

MOUNTAIN-PLAINS CONSORTIUM REGION 8

A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

Colorado State University
North Dakota State University
South Dakota State University
University of Colorado Denver
University of Denver
University of Utah
Utah State University
University of Wyoming

Lead Investigator(s)

Dr. Milan Zlatkovic
mzlatkov@uwyo.edu
University of Wyoming

Project Title

Simplified Web-based Decision Support Method for Traffic Management and Work Zone Analysis

Co-Investigator(s)

Dr. Xuesong Zhou
xzhou74@awu.edu
Arizona State University

Research Assistant(s)

Jeffrey Taylor
Graduate Assistant

Tie Shi, Visiting Student

Sponsors | Partners

Utah Department of Transportation

Wasatch Front Regional Council

USDOT, Research and Innovative Technology Administration

the FINDINGS

The developed tool is based on the integration of a mesoscopic traffic simulation and Excel-based signal timing estimation applications. Using the cross-resolution modeling capabilities, the majority of regional planning networks, which are in most cases macroscopic, can be edited and analyzed with the presented tool, and automatically prepared for microsimulation analysis. The tool is tested on an actual work zone site in West Valley City, UT. The results show that these two applications integrated can provide detailed performance measures on multiple levels in a short period of time, and can help with planning, designing and managing work zones and impacted areas. The tool is also coupled with a Google Earth-based visualization application, which simplifies the communication of the results and their presentation to stakeholders.

the IMPACT

The study is directly related to freeway work zone efficiency and safety. It represents a unique way of work zone analysis, where the assessment is made on freeways, arterials and signalized intersections. It helps in understanding the impacts on multiple levels. The web-based graphical user interface of the tool is also unique and easy to use. It has been tested on a real-world work zone project and provided results that corresponded to the findings from the field, while at the same time being inexpensive and easy to use.

For more information on this project, download the entire report at http://www.ugpti.org/resources/reports/details.php?id=864

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7938 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.

This publication was produced by the Mountain-Plains Consortium at North Dakota State University. The contents of this brief reflect the views of the authors, who are responsible for facts and the accuracy of the information presented herein. This document is disseminated under the program management of the USDOT, Office of Research and Innovative Technology Administration in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.

NDSU

NDSU does not discriminate in its programs and activities on the basis of age, color, gender expression/identity, genetic information, marital status, national origin, participation in lawful off-campus activity, physical or mental disability, pregnancy, public assistance status, race, religion, sex, sexual orientation, spousal relationship to current employee, or veteran status, as applicable. Direct inquiries to Vice Provost for Title IX/ADA Coordinator, Old Main 201, NDSU Main Campus, 701-231-7708, ndsu.eoaa@ndsu.edu.