Wisconsin Department of Transportation

Bureau of Traffic Operations
4802 Sheboygan Ave., Room 501
P.O. Box 7986
Madison, WI 53707-7986

December 2, 2011

Hari Kalla
MUTCD Team Leader
Office of Transportation Operations (HOTO)
Federal Highway Administration Rm 3408
400 Seventh Street SW
Washington, D.C 20590

Dear Mr. Kalla:

Attached is the Wisconsin Department of Transportation's (WisDOT) request for experimentation with the use of Yellow Arrows on Lane Control Sign (LCS). Included in the request are the requirements set forth under Section 1A.10 of the 2009 Manual on Uniform Traffic Control Devices (MUTCD).

Our research indicates that the use of Yellow Arrows on the LCS is not protected by any patents or copyrights.

WisDOT agrees to stop use of the Yellow Arrows on the LCS and comply with the provisions in the MUTCD within three months following the end of the experiment unless a request has been made to change the MUTCD to include this application of devices. WisDOT also agrees to terminate the use of the Yellow Arrows on the LCS during the experimental stage if at any time WisDOT detects any significant safety concerns attributable to them. Furthermore, WisDOT acknowledges that the Federal Highway Administrations Office of Transportation Operations has the authority to terminate this experiment at any time if there is an indication of safety concerns.

The LCS are being installed as part of a roadway construction project. They will begin to be used during the next stage of construction in January 2012. In order to use the Yellow Arrows on the LCS at the beginning of the next construction stage, WisDOT would appreciate a response to this request by December 22nd, 2011. If you have any questions or concerns regarding this request, please feel free to contact Chris Hager at christopher.hager@dot.wi.gov or (262) 521-4433.

Sincerely,

Angela Adams
State Traffic Engineer, Bureau of Traffic Operations

Attachments

Cc: Angela Adams, P.E., State Traffic Engineer
Tom Heydel, P.E, SE Region Traffic Engineer
William Bremer, P.E., Federal Highway Administration, Madison
John Berg, P.E., Federal Highway Administration, Madison
Kurt Flierl, Project Manager, SE Region
Chris Quesnell, P.E., Traffic Operations Engineer, STOC

u: LCS Yellow Arrows request to experiment

WISCONSIN DEPARTMENT OF TRANSPORTATION

Request to Experiment

USE OF DOWNWARD YELLOW ARROW AND SIDE WAY YELLOW ARROW IN LCS DISPLAY FOR OPERATIONS IN THE MITCHELL INTERCHANGE

MILWAUKEE, WISCONSIN

Prepared by

CHRISTOPHER HAGER

For

WISCONSIN DEPARTMENT OF TRANSPORTATION

DIVISION OF TRANSPORTATION SYSTEM DEVELOPMENT

BUREAU OF TRAFFIC OPERATIONS

TRAFFIC ENGINEERING DESIGN UNIT

December 2, 2011

Nature of Problem:

The 2009 MUTCD currently allows only three symbols for traffic management on Freeways using Lane Control Signs (LCS) per section 4M.02: a GREEN downward arrow, a RED X, and a YELLOW X.

A GREEN downward arrow display clearly indicates that a lane is open to traffic. However when a lane is blocked, could a YELLOW arrow describe more clearly to motorists the need to slow down (yield) due to the blockage in an adjacent lane, better than a GREEN ARROW in conjunction with a RED X (which is what would be allowed per the current MUTCD guidance)?

In addition, consecutively placed LCS provide an opportunity to use the first overhead LCS sign to show a YELLOW arrow to tell the motorist to merge out of the lane. Then the second LCS sign can show a RED X for the downstream lane closure. Could this be a clearer message to motorists, than the usage of a RED X and YELLOW X (which is what would be allowed per the current MUTCD guidance)? The MUTCD states a steady YELLOW X signal indication shall mean that a road user is to prepare to vacate the lane over which the signal indication is located because a lane control change is being made to a steady RED X signal indication.

Proposed Evaluations:

To assist drivers in the situations explained above, WisDOT would like to propose the following:

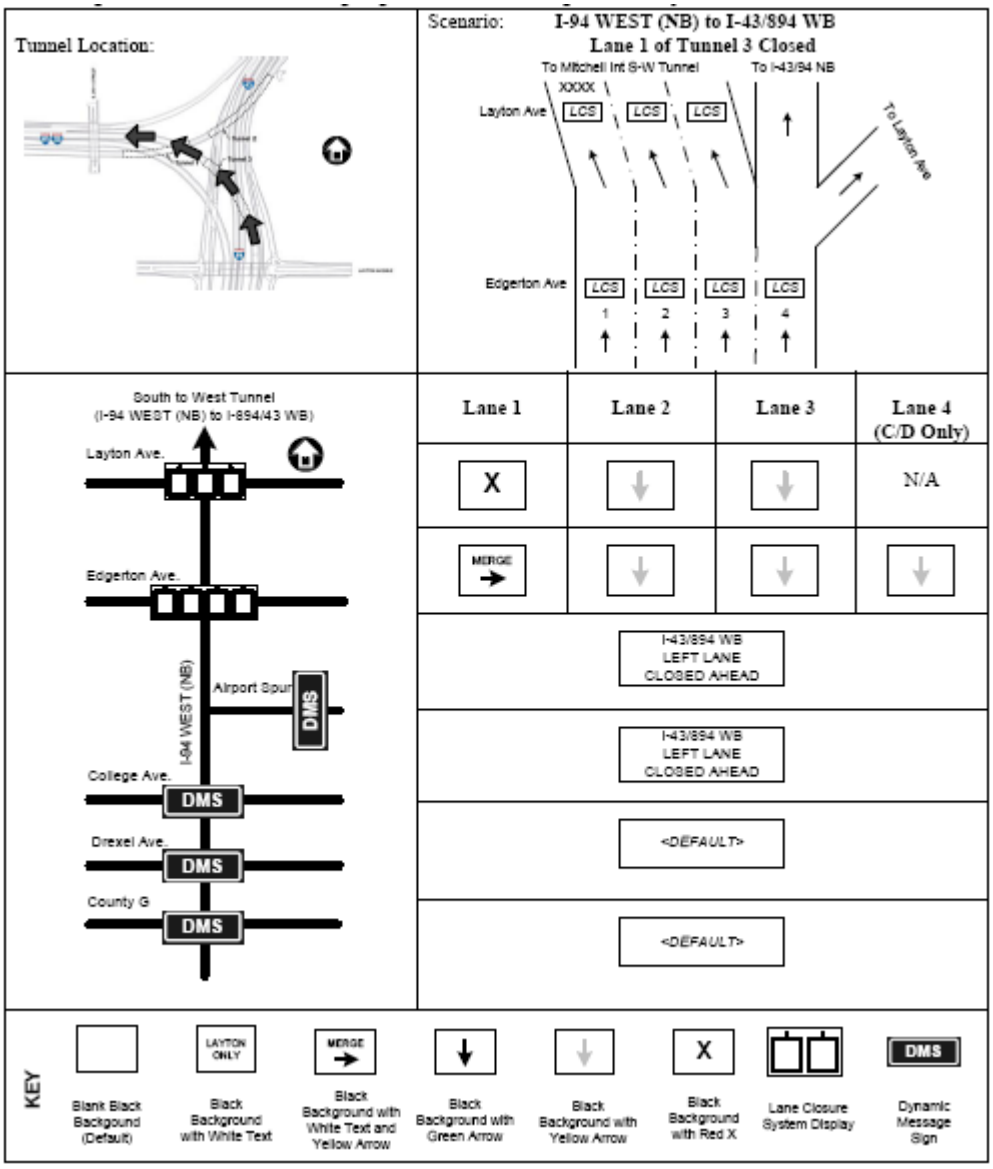
1. Evaluate the use of a YELLOW downward arrow versus a GREEN downward arrow. The study team seeks to determine whether a YELLOW downward arrow more clearly communicates to drivers, and that drivers understand, that they shall reduce speeds in the adjacent and open lanes.

   Section 6 (Page 7 & 64) of Texas Transportation Institute's 1993 study for FHWA – "Driver Interpretations of Existing and Potential Lane Control Signal Symbols for Freeway Management" (Report No – FHWA/TX-93/1298-1) studies the use of YELLOW downward arrows. The study found YELLOW downward arrows, used in conjunction with RED X's, effectively communicate that the travel lane is open. The YELLOW downward arrow, according to the study, also increases driver awareness to reduce speeds in the adjacent and open lanes.

2. Evaluate the use of MERGE text with a YELLOW horizontal arrow versus a YELLOW X to indicate an upcoming lane closure, which would encourage traffic to merge out of the upcoming closed lane. The study team will use a separate downstream LCS with a RED X in conjunction with the MERGE & YELLOW horizontal arrow to indicate a closed lane.

Configuration

The following exhibit shows the configuration of the LCS, the location of the LCS, and an example of how WisDOT would like to utilize the YELLOW arrows.



Experiment Locations:

WisDOT is currently reconstructing the Mitchell Interchange, a major system interchange at the confluence of I-43/894/94, in Milwaukee County, Wisconsin. As part of the project, two of the system ramp movements utilize tunnels - the northbound to westbound movement and the eastbound to northbound movement. LCS's are located upstream from each tunnel movement to provide lane closure information for motorists during an incident. See the figure on the next page.

Evaluation Plan and Time Period:

Evaluation of these LCS revisions will use the following resources:

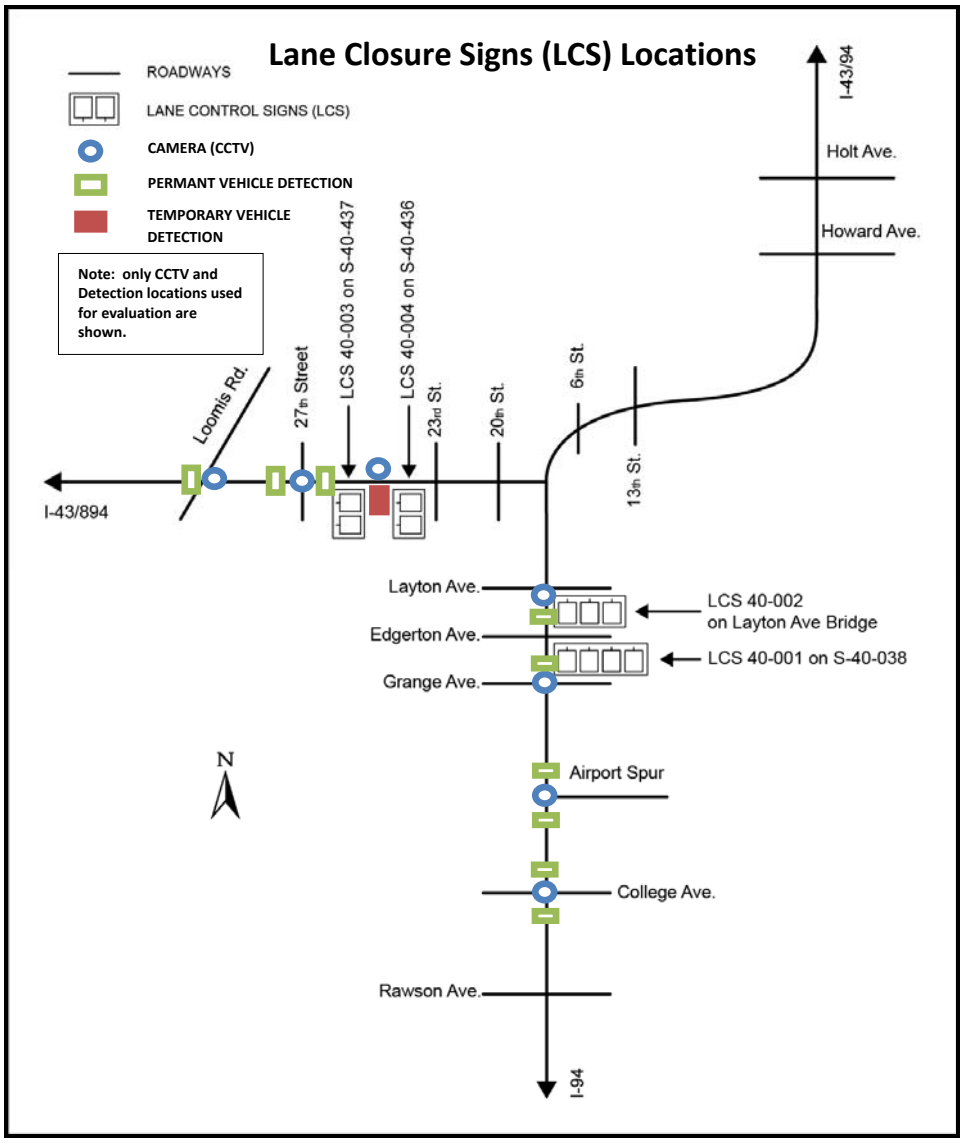
- CCTV cameras to study lane use and lane change patterns at the LCS
- Vehicle detection to study change in volume and speed patterns at the LCS
- Use group surveys for gathering user interpretations of the different LCS display messages.
- Law enforcement input through observations of traffic patterns and traveler interaction

The figure on the next page shows the location of detection and cameras in relation to the LCS.

The evaluation will determine if using YELLOW downward arrows in conjunction with RED X indications provide for a safer operation compared to using GREEN downward arrows. Construction projects use YELLOW arrows on portable electronic boards to warn drivers of lane closures in work zone temporary traffic control situations. Accordingly, the application of YELLOW arrows have been used, but not for electronic downward arrows.

WisDOT will also seek to determine if a MERGE & YELLOW horizontal arrow indication used in conjunction with a downstream RED X more clearly states to a driver to merge out of a closed lane than compared to using a YELLOW X followed by a RED X.

The time duration of this analysis will be one year with a completion date of January 1, 2013. WisDOT will prepare a semiannual progress report and a final report within 3 months of the end of the experiment.



Conclusion:

Should the test results prove successful, WisDOT would recommend that future MUTCD editions would include the new proposed LCS displays.