

***ITS Warrants
and
IWZ Research
Project***

CCTV Warrants



RWIS Warrants



DMS Warrants



Work Zone Warrants



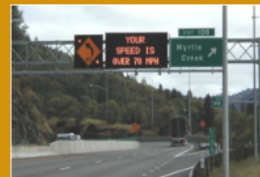
HAR Warrants



Ramp Meter Warrants



Curve Warning System Warrants



Variable Speed Limit (VSL) Warrants



Dynamic Speed Display Warrants



Agenda

- ENTERPRISE Program
- ITS Warrants Project
- IWZ Research Project



ENTERPRISE Program

Design and Evaluation Guidance for Intersection Conflict Warning Systems (ICWS)

Version 1: December 2011

ENTERPRISE

ENTERPRISE Program FY 2012 Work Plan

Prepared for the
ENTERPRISE Pooled Fund Study
TPF-5(231)

Prepared by

ENTERPRISE

Understanding Utilization of Third Party Data and Information Final Report

Evaluating **N**ew **T**Echnologies for
Road **P**Rogram **I**nitiatives in **S**afety
and **E**fficiency

ENTERPRISE

ENTERPRISE Program

- Goals
 - Facilitate rapid progress in the development and deployment of ITS technologies
 - Accelerate the systematic advancement of selected ITS projects
 - Members carry out ITS projects and activities including fundamental research, technology development, demonstration, standardization and deployment



ENTERPRISE Program

Members

- Arizona DOT
- Georgia DOT
- Idaho Transportation Department
- Illinois DOT
- Iowa DOT
- Kansas DOT
- Maricopa County, Arizona
- ***Michigan DOT****
- Minnesota DOT
- Mississippi DOT
- Oklahoma DOT
- Texas DOT
- Virginia DOT
- Washington State DOT
- Ontario Ministry of Transport
- Transport Canada
- Dutch Ministry of Transport
- FHWA

** Michigan DOT administers program and is a founding member*

ITS Warrants Project

- Project began in 2009
 - Need for an efficient and effective methodology to determine if ITS deployments are appropriate
- Goals
 - Assist agencies with decisions about where to deploy ITS devices
 - Is a device warranted at a specific location?
 - Should further considerations be performed?
 - Eliminate locations where a device is not warranted
 - Validate locations of existing ITS device deployments



ITS Warrants Project

- Warrants have been developed for 10 devices
 - CCTV
 - Curve Warning System
 - DMS
 - Dynamic Speed Display Sign
 - HAR
 - Ramp Meter
 - RWIS
 - Variable Speed Limit
 - ITS Devices in Work Zones
 - ICWS (DRAFT)
- Gathered input from
 - Interactive Website
 - ENTERPRISE Member States and Non-Member States
 - ITE Mid-Year Meeting
 - ITS Canada Workshop
 - TRB, ITS World Congress, ITS America Sessions

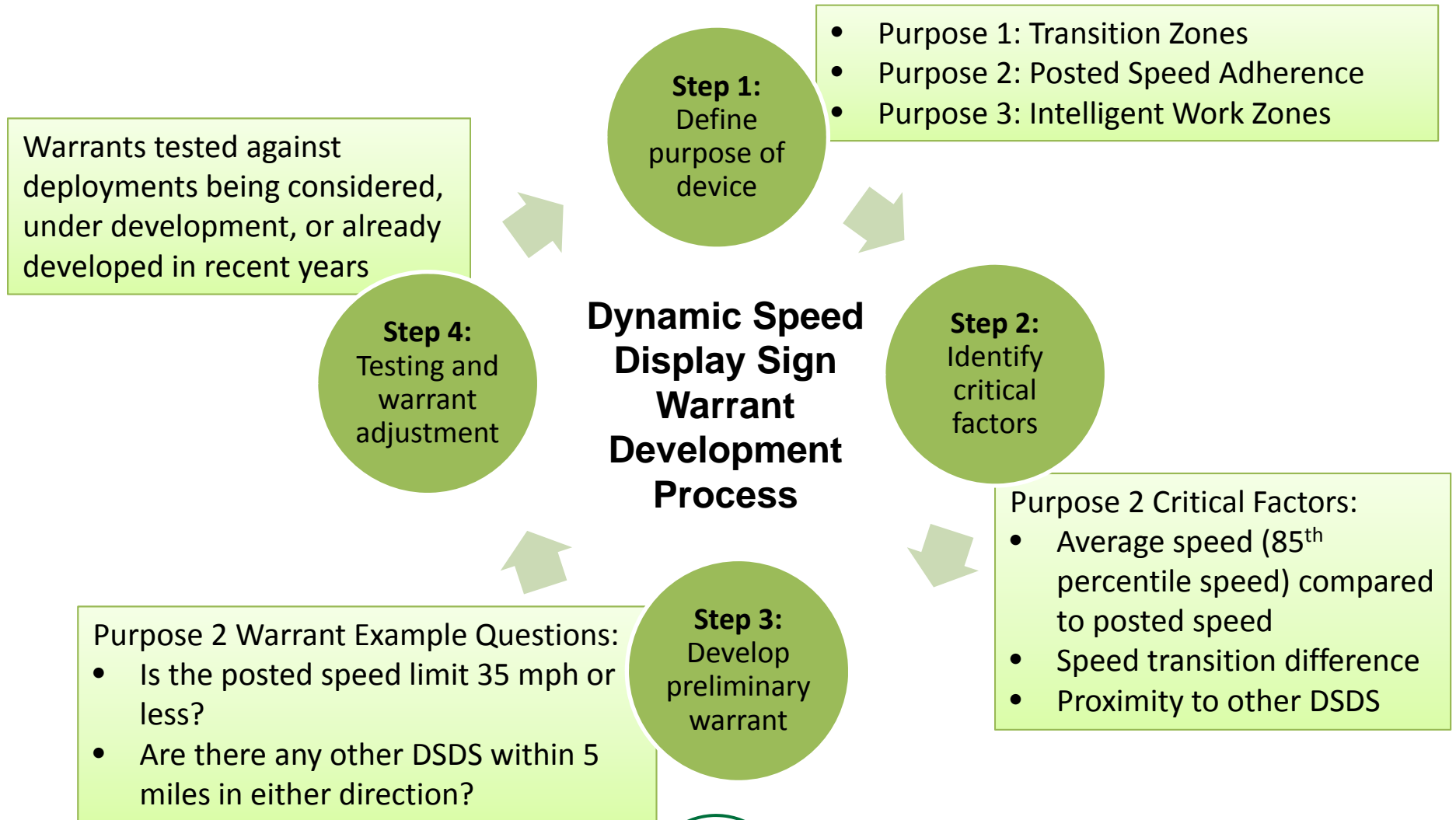


ITS Warrants Project

- Warrants Use
 - This is one tool to use in the decision making process
 - Series of 'yes' or 'no' questions that can be answered quickly, avoiding the complexity of collecting a lot of data before using the warrants
 - Warrants have been used for real world decision for ITS deployments by: ND, KS, MN, VA
 - VDOT has used the warrants as an initial screening tool for selecting RWIS deployments



ITS Warrants Project



ITS Warrants Project

Dynamic Speed Display Sign

- Purpose 1: Transition Zones
- Purpose 2: Posted Speed Adherence
- **Purpose 3: Intelligent Work Zones**

Variable Speed Limits

- Purpose 1: Maximize Capacity
- Purpose 2: Safe Stopping Distances
- Purpose 3: Safe Travel Speeds for Conditions
- **Purpose 4: Work Zones**



DSDS Warrant 3: IWZ

Purpose: To promote speed limit adherence in locations where posted speed have temporarily been reduced for construction, maintenance or other traffic control.

Device is warranted if:

1. The work zone is currently in operation and observations suggest that the 85th percentile speed at a location within the work zone exceeds the posted speed limit by at least 5 mph.

OR

2. Workers will be located adjacent to the open traffic lane.

OR

3. Hazardous roadway conditions, such as a temporary unusually tight curve, or a rough road surface, requiring extra driving precaution.

Note: Signs tend to be most effective where there are two lanes or less in one direction of travel.

ITS Warrants Project

Intelligent Work Zone Warrants

Collection of devices that warn travelers of various hazards associated with work zones.

DMS Warrant - 3:

Changing Traffic Control or Conditions

Purpose: To notify drivers in advance of special changing traffic conditions and roadway configuration changes associated with road construction or maintenance in order to reduce driver confusion that could result in a crash.

CCTV Warrant - 6:

Intelligent Work Zone

Purpose: To allow travelers or transportation professions to understand construction or maintenance traffic delay by viewing images of the roadway remotely.

HAR Warrant - 3:

Changing Traffic Conditions

Purpose: To notify drivers in advance of special changing traffic conditions and roadway configurations associated with road construction or maintenance.

VSL Warrant - 4:

Work Zones

Purpose: To post varying speed limits for construction zones in order to only slow traffic when necessary or to maintain consistent speeds to promote safety.

DSDS Warrant - 3:

Intelligent Work Zone

Purpose: To promote speed limit adherence in locations where posted speeds have temporarily been reduced for construction, maintenance or other traffic control.

Ramp Meter Warrant - 3:

Ramp Metering During Work Zone Activity

Purpose: To meter on-ramp traffic during road work activities to improve safety and/or consistent traffic flow.

ITS Warrants Project

enterprise.prog.org/itswarrants

Home | Background | Warrant Use | ENTERPRISE | Contact

CCTV | DMS | HAR | RWIS | VSL | Dynamic Speed Displays | Ramp Meters | Curve Warning Systems | Intelligent Work Zones

Warrants for the Installation and Use of Technology Devices for Transportation Operations and Maintenance

ENTERPRISE Transportation Pooled Fund Study

Welcome







To the ENTERPRISE Program Warrants Research Project website, ENTERPRISE program representatives from member states worked together with the goal of building a tool which would provide guidance in helping make the initial decision of whether or not to deploy Intelligent Transportation Systems (ITS) solutions.

To get started with using the Warrants either:

- Select an ITS device below to begin the process of determining if deployment is warranted at your location; or
- [click here](#) for more information on how to use the warrants

We encourage you as transportation professionals to contribute to the enhancement and use of the ITS warrants by continuing to provide feedback. If you have questions about the warrants or have input from your use of them [contact us](#).

To learn more about the ENTERPRISE Pooled Fund program [click here](#).

<h4>CCTV Warrants</h4> 	<h4>RWIS Warrants</h4> 	<h4>DMS Warrants</h4> 
<h4>Work Zone Warrants</h4> 	<h4>HAR Warrants</h4> 	<h4>Ramp Meter Warrants</h4> 

IWZ Research Project

- Project Purpose
 - Document the best practices and lessons learned regarding IWZ technologies from various sources to draw conclusions about what approaches work best in what situations.
- Project Focus:
 - Dynamic Merge
 - End of queue warning systems
 - Alternate Routes
 - Variable Speed Limits



IWZ Research Project

- 2013 Work Zone Test Bed to track
 - Locations of signs and sensors
 - Messages used on signs
 - Thresholds used to active sign messages
 - Adjustments made to configurations
 - Public outreach approach

Minnesota Dynamic Late Merge System

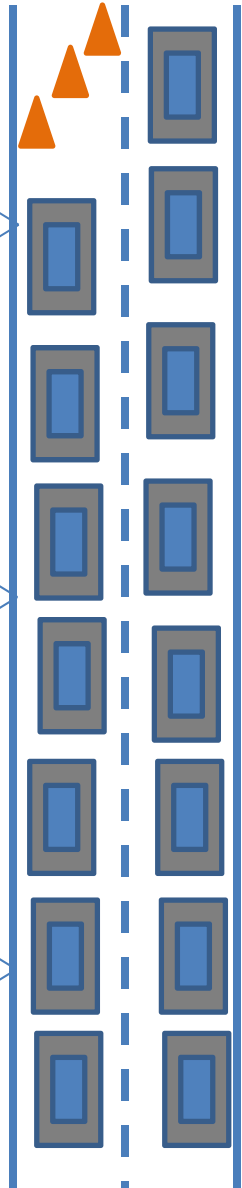
Congestion

- Speeds < 20 mph (guide)
- Vol. < 1500 v/hr. (guide)
- Trend (reduced speeds & increased vol.)
- DLM Messages
- Late Merge Approach

MERGE HERE
/
TAKE TURNS

MERGE AHEAD
/
USE BOTH LANES

STOPPED TRAFFIC AHEAD
/
USE BOTH LANES



Michigan Dynamic Late Merge System

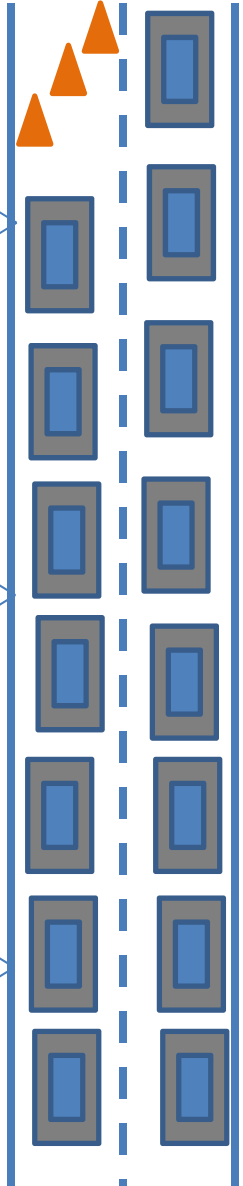
Congestion

- Speeds < 45 MPH (35)
- DLM Messages
- Late Merge Approach

TAKE YOUR TURN
/
MERGE HERE

USE BOTH LANES
/
STAY IN YOUR LANE

STOPPED TRAFFIC AHEAD
/
USE BOTH LANES



IWZ Research Project

2013 Projects to Track

Dynamic Merge

- EB I-96 near MM 9 in Ottawa County (Michigan)
- MnDOT SP 2772-96 – Hwy 169 (Minnesota)

Queue Warning System

- End of Queue Warning System on I-35 (Texas)
- Congestion Warning Milwaukee Area (Wisconsin)
- Queue Warning in Jefferson County (Missouri)

Alternate Routes

- Travel Time System (Wisconsin)
- I-94 Travel Time System (Minnesota)
- Metro Wide Detection System (Minnesota)
- Travel Time and Alternate Route System – Effingham County (Illinois)

Variable Speed Limits

Contact

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