INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

100 North Senate Avenue
Room N925
Indianapolis, Indiana 46204

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Mitchell E. Daniels, Jr., Governor
Michael B. Cline, Commissioner

AGENDA

September 16, 2010 Standards Committee Meeting

MEMORANDUM

August 30, 2010

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Agenda for the September 16, 2010 Standards Committee Meeting

A Standards Committee meeting is scheduled for 9:00 a.m. on September 16, 2010 in the 9th Conference Center that is located on the north side of the building near the east elevator bank.

The following agenda items are listed for consideration.

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items on this agenda)

NEW BUSINESS

1. Approval of the June 17, 2010 Minutes

2. 2012 Standard Specifications:

   a. Schedule for submitting and approval revisions

   b. Metric system in 2012 book

   c. Recurring Special Provisions for 2012

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items on this agenda)

(Continued)

NEW BUSINESS

(No items on this agenda)

C. STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS ITEMS

OLD BUSINESS

Item No. 09 06/17/10 (2010 SS)	Mr. Boruff	page 3
Recurring Special Provision:		
805-T-XXX	*WIRELESS VEHICLE DETECTION* SYSTEMS	
Recurring Plan Details:		
805-T-XXXd	*WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE*	
Design Manual:		
77-4.02(03)	Other Detector Types	
77-4.02(04)	*Decision making criteria for when to use another type of detection*	
FIGURE 77-4H	*Typical Wireless Vehicle Detection System Design*	
FIGURE 77-4I	*Typical Hybrid Wireless Vehicle Detection System Design*	

NEW BUSINESS

Item No. 01 09/16/10 (2010 SS)	Mr. Wright	page 22
601-R-497	SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS	

Item No. 02 09/16/10 (2010 SS)	Mr. Boruff	page 26
Standard Drawings:		
801-TCSN-06	Traffic Control Signs	
801-TCSN-12 (Sheet 1 of 2)	Sign Design Details	
801-TCSN-12 (Sheet 2 of 2)	Sign Design Details	
801-TCSN-13	Sign Design Details	

Item No. 03 09/16/10 (2010 SS)	Mr. Wright	page 33
104.07	Rights in and Use of Materials Found in the Project Site	
107.10	~~Blank~~*Archaeological Artifacts*	
203.08	Borrow and Disposal	

Item No. 04 09/16/10 (2010 SS)	Mr. Boruff	page 38
801.02	Materials	
801.15(b)	Changeable Message Signs	
801.17	Method of Measurement	
801.18	Basis of Payment	
Design Manual:		
83-2.06	Portable Changeable Message Signs	

cc: Committee Members (11)
FHWA (1)
ICA (1)

SPECIFICATION REVISIONS (OLD BUSINESS ITEM)

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Sometimes it is difficult to install inductive loop detectors on an approach to a signalized intersection due to poor pavement condition, lack of underground conduit, right-of-way constraints, or other circumstances. The construction of underground cable and conduit and inductive loop detectors, particularly for dilemma zone loops at high-speed intersections, is expensive.

PROPOSED SOLUTION:

Wireless magnetometer detection systems make it possible to install vehicle detection on an approach without cutting loops or running conduit and detector housings. The magnetometers are installed in cored holes in the pavement. They transmit wirelessly to either receiver processors or through repeaters to receiver processors. Detection of a vehicle and/or vehicular counts are transmitted via ethernet cable to contact closure cards in a standard detector rack in the controller cabinet where they're processed as detected vehicles from inductive loops typically are. The development of a recurring special provision and plan details, a revision of the Indiana Design Manual, and a new Indiana Test Method (ITM) will ensure that the system is designed and constructed properly.

APPLICABLE STANDARD SPECIFICATIONS: 805.10, 805.15, 805.16, 922.11

APPLICABLE STANDARD DRAWINGS: 805-SGLI-01

APPLICABLE DESIGN MANUAL SECTION: Section 77-4.02(03) and Section 77-4.02(04)

APPLICABLE SECTION OF GIFE: none

APPLICABLE RECURRING SPECIAL PROVISIONS: 805-T-169, 922-T-168

Submitted By: David Boruff, P.E.

Title: Traffic Administration Manager

Organization: INDOT

Phone Number: (317) 899-8626

Date: 7/26/10

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad-hoc review by district traffic and construction and contractors.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

PROPOSED RECURRING SPECIAL PROVISION *805-T-XXX WIRELESS VEHICLE DETECTION SYSTEM*

805-T-XXX WIRELESS VEHICLE DETECTION SYSTEM

(Adopted XX-XX-XX)

Description

This work shall consist of furnishing and installing wireless vehicle detection systems for vehicle detection at traffic signals.

Materials

The wireless vehicle detection system, WVDS, is comprised of wireless in-pavement magnetometers, contact closure cards, receiver processors, and wireless repeaters installed for a signalized intersection. The system shall be capable of monitoring vehicles on a roadway via detection of changes in inductance caused by the presence or passage of a vehicle and shall provide detector outputs to a traffic signal controller.

The WVDS shall include in-pavement magnetometers, a minimum of two receiver processors, the required mounting equipment, cables, rack mounted cards, set-up and operating software, all connectors, and miscellaneous equipment necessary for the installation and operation of the system. If required, the WVDS shall also include wireless repeaters.

Only models from the Department’s approved materials list shall be used.

Ethernet cable for wireless vehicle detectors shall be outdoor rated and UV shielded.

Construction Requirements

Prior to the installation, the Contractor shall test all in-pavement sensors and demonstrate proper operation and communication between the in-pavement sensors and the receiver processor and wireless repeater, if required.

Prior to the installation, the Contractor shall demonstrate that each in-pavement sensor will be installed within range of its corresponding receiver processor, using wireless repeaters as necessary. All in-pavement sensors assigned to either a receiver processor or wireless repeater shall be located within a 120° arc measured from the receiver processor or wireless repeater.

The Contractor shall install each in-pavement sensor in the roadway according to the manufacturer’s recommendations and as shown on the plans. Holes cored in the pavement shall be cleaned and dried before installing in-pavement sensors. The cored pavement shall be backfilled according to the manufacturer’s recommendations.

Receiver processors and wireless repeaters will be mounted on traffic signal steel strain, or cantilever poles, or signal pedestals on type A foundations. The mounting height of receiver processors above the pavement surface shall be between 20 ft (6.0 m) and 35 ft (10.7 m). The mounting height of wireless repeaters above the pavement surface shall be between 13 ft (3.9 m) and 35 ft (10.7 m).

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

PROPOSED RECURRING SPECIAL PROVISION *805-T-XXX WIRELESS VEHICLE DETECTION SYSTEM* (CONTINUED)

The minimum distance between a receiver processor and wireless repeater mounted on the same structure shall be 2 ft (0.6 m). This distance may be increased to enable better communication between the devices.

After installation, the Contractor shall demonstrate successful communication between each in-pavement sensor, receiver processor, and wireless repeater to the Project Engineer.

Method of Measurement

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be measured by the number of units installed.

Basis of Payment

Wireless magnetometer detectors, contact closure cards, receiver processors and wireless repeaters will be paid for at the contract unit price per each.

Pay Item	Pay Unit Symbol
Contact Closure Card	EACH
Receiver Processor	EACH
Wireless Magnetometer Detector Type____	EACH
Wireless Repeater	EACH

The cost of coring the pavement, sealant, and all work necessary for proper installation and operation of the in-pavement sensors shall be included in the cost of the wireless magnetometer detector.

The cost of cables, connectors, set-up and operating software, access boxes, rack mounted expansion cards, and all hardware necessary to complete the installation shall be included in the cost of the contact closure cards.

The cost of required mounting equipment, cables, connectors, and miscellaneous equipment necessary for proper installation and operation of the receiver processors shall be included in the cost of the receiver processors.

The cost of required mounting equipment, connectors, and miscellaneous equipment necessary for proper installation and operation of the wireless repeaters shall be included in the cost of the wireless repeaters.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

PROPOSED RECURRING SPECIAL PROVISION *805-T-XXX WIRELESS VEHICLE DETECTION SYSTEM* (CONTINUED)

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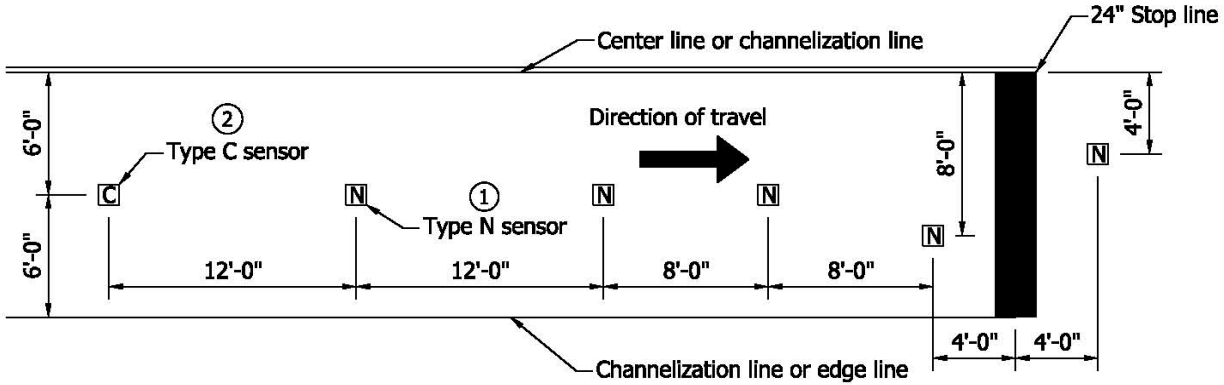
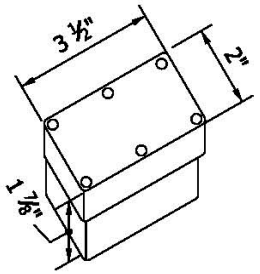
REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL (OLD BUSINESS ITEM)

PROPOSED RECURRING PLAN DETAILS *805-T-XXXd WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE* (DRAFT)

GENERAL NOTES

1. Type N sensors detect only vehicle presence.
2. Type C sensors detect vehicle presence and provide vehicle counts.
3. There should be at least ¼" and no more than ½" of clearance between the top of the sensor and the top of the pavement





DETAIL A

Wireless in-pavement sensor
(both types)

INDIANA DEPARTMENT OF TRANSPORTATION

WIRELESS VEHICLE DETECTORS
STOP BAR DETECTION ZONE
DRAFT

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL (OLD BUSINESS ITEM)

PROPOSED RECURRING PLAN DETAILS *805-T-XXXd WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE* (DRAFT)

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REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT
REVISION TO IDM 77-4.02(03) OTHER DETECTOR TYPES
ADDITION IDM *77-4.02(04) DECISION MAKING CRITERIA FOR WHEN TO USE ANOTHER TYPE OF DETECTION*

77-4.02(03) Other Detector Types

There are numerous types of vehicular detectors available. However, INDOT typically uses the inductive-loop detector. The following discusses several other detector types that are available.

1. Magnetic Detector

Magnetic detectors consist of a small coil of wires located inside a protective housing embedded into the roadway surface. As vehicles pass over the device, the detector registers the change in the magnetic field surrounding the device. This signal is recorded by an amplifier and relayed back to the controller as a vehicular detection. A major problem with this detector is that it can only detect the passage of a vehicle traveling at speeds of 3 mph (5 km/h) or greater. It cannot be used to determine a stopped vehicle's presence. The advantages are that they are simple to install and are resistant to pavement-surfacing problems.

2. Magnetometer Detector

A magnetometer detector consists of a magnetic metal core with wrapped windings, similar to a transformer. This core is sealed in a cylinder about 1 in. (25 mm) in diameter and 4 in. (100 mm) long. The detector is placed in a drilled vertical hole about 1 ft (0.3 m) deep in the pavement surface. Magnetometer detectors sense the variation between the magnetic fields caused by the passage or presence of a vehicle. The signal is recorded by an amplifier and is relayed to the controller as a passage or presence vehicle. Magnetometer detectors are sufficiently sensitive to use to detect bicyclists or as a counting device. A problem with the magnetometer detector is that it does not provide a sharp cutoff at the perimeter of the detection vehicle (i.e., it may detect vehicles in adjacent lanes).

3. Wireless Vehicle Detector

A wireless vehicle detector is similar to a magnetometer detector except that it uses a low-power radio to transmit the signal to a wireless repeater or receiver processor. The signal is recorded by an amplifier and is relayed to the controller as a passage or presence vehicle. The detector is placed in a drilled vertical hole about 0.2 ft (60 mm) deep in the pavement surface. Magnetometer detectors are sufficiently sensitive to use to detect bicyclists or as a counting device. An additional problem with the wireless magnetometer detector beyond those of a wired magnetometer detector is that the wireless magnetometers have to be replaced, at a maximum, every 10 years, and the wireless repeaters' batteries have to be replaced every 2 years. See Figure 77-4H and Figure 77-4I for typical installation designs.

4. Microloop Detector

A microloop detector is similar to the magnetometer detector, but it can work with the standard inductive loop detector amplifiers. The microloop is typically installed by drilling a 3-in. (75 mm) diameter hole 1'-6" (500 mm) deep into the pavement structure, by securing it to the underside of a bridge deck, or inserting a 3" diameter conduit under the pavement to accommodate a series of microloops (non-invasive microloop system). A major disadvantage of the microloop detector is that it requires some motion to activate the triggering circuitry of the detector and does not detect stopped vehicles. This type of detector would typically require two detectors placed side-by-side per lane due to its limited field of detection.

5. Video Image Detection

The video image detector consists of one to six video cameras, an automatic control unit and a supervisor computer. The computer detects a vehicle by comparing the images from the camera(s) to those stored in memory. The detector can work in both the presence and passage modes. This detector also allows the images to be used for counting and vehicular classification. Special housings are required to protect the camera from environmental elements. Early models experienced problems with the video detection during adverse weather conditions (e.g., fog, rain, snow). INDOT currently allows video detection only for temporary signals.

6. Pedestrian Detectors

The most common pedestrian detector is the pedestrian push or call button. These pedestrian call buttons should be placed so that they are convenient to use, reachable by the handicapped and not placed in the direct path for the blind. Inconvenient placement of pedestrian detectors is one of the reasons pedestrians may choose to cross the intersection illegally and unsafely.

7. Bicycle Detectors

The two most common methods for bicycle detection are:

a. Pedestrian Push-Button Detector

With the push-button detector, the bicyclist must stop and push the detector button for the controller to record the detection. This may require the bicyclist to leave the roadway and proceed on the sidewalk to reach the detector.

b. Inductive-Loop Detector

The inductive-loop detector can detect the bicycle without the bicyclist's interaction. For the greatest sensitivity of the detector, the bicyclist should be guided directly over the wire. A problem with bicycle inductive-loop detectors is that they require a significant amount of metal to be activated. Today's bicycle designs tend to use a substantial amount of non-

magnetic, man-made materials to increase their strength and reduce their weight. This has substantially reduced the metal content that can be detected.

77-4.02(04) Decision making criteria for when to use another type of detection

Detection systems other than inductive loops require a specialized design. In order to use a type of detection other than inductive loops, INDOT designers and consultants and local agency consultants must provide and submit documentation that 2 of the following 3 conditions have been met:

1. *An inductive loop design will not work because of a physical limitation (R/W, geometrics, pavement conditions, obstructed conduit paths, etc).*

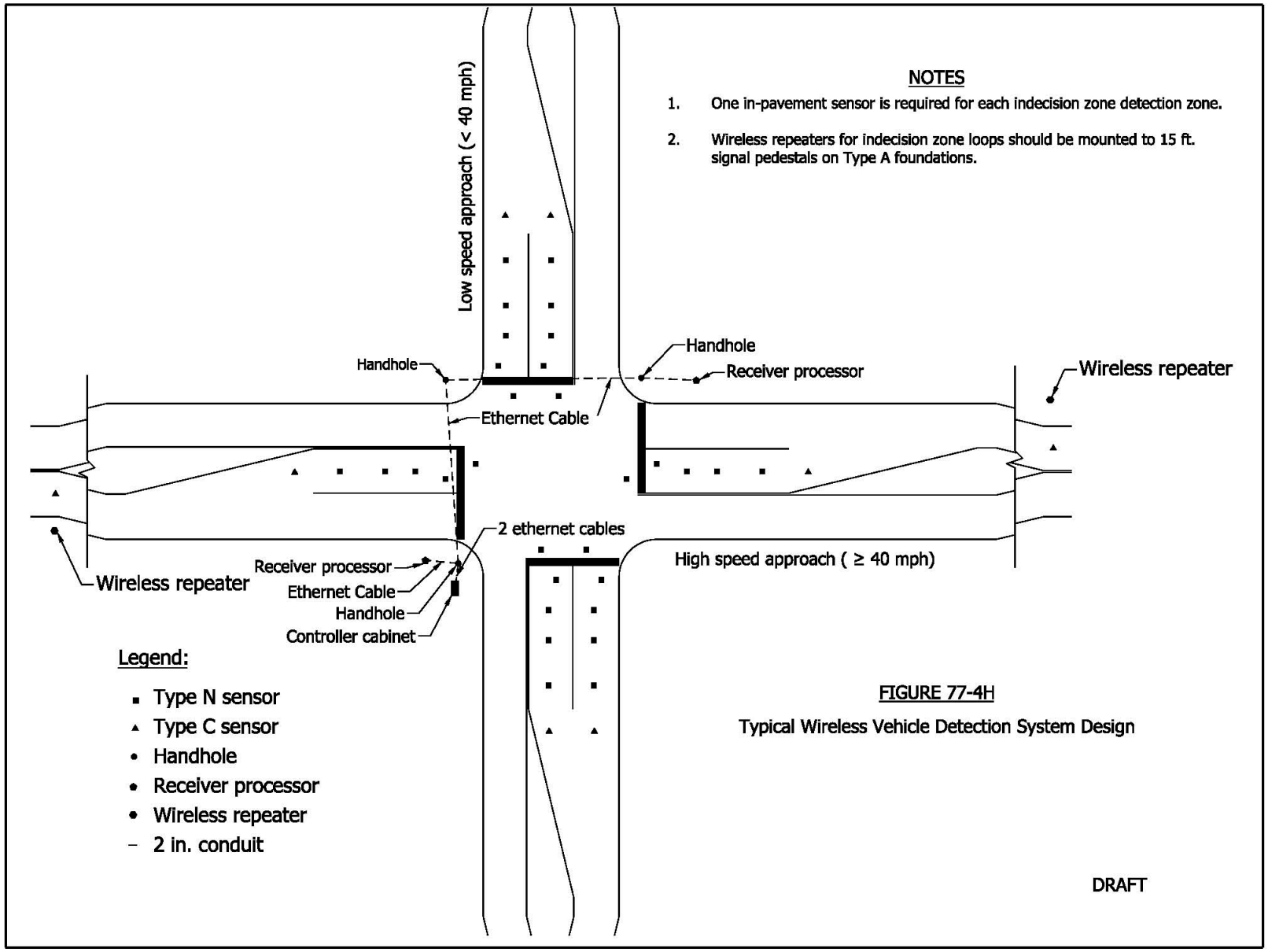
2. *A full inductive loop design has been considered and there is a post-design lifecycle cost advantage to using a detection system other than loops. No design time cost or labor savings will be considered in lifecycle cost calculations.*

3. *A hybrid design using loops at the stop bar and wireless magnetometers for advance vehicle detection has been considered and evaluated where wireless magnetometers have been evaluated for advance vehicle detection only, and the hybrid design is the most cost effective (post design lifecycle cost).*

In addition, written concurrence from both the INDOT Office of Traffic Control Systems and the District Traffic Engineer, or the local agency for local projects, before wireless vehicle detection may be used at a specific location.

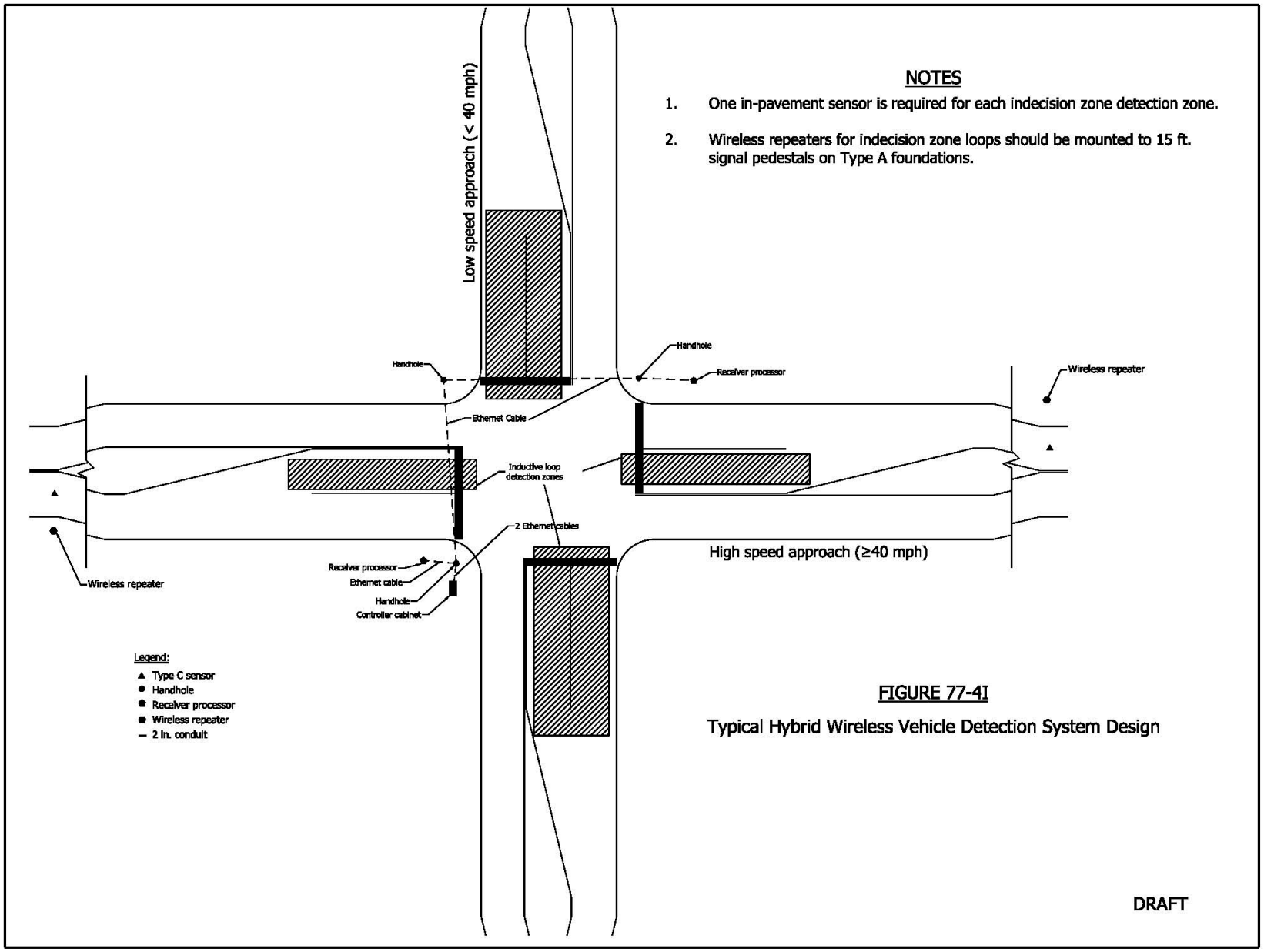
REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL (OLD BUSINESS ITEM)

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT
ADDITION: FIGURE *77-4H TYPICAL WIRELESS VEHICLE DETECTION SYSTEM DESIGN (DRAFT)*



REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL (OLD BUSINESS ITEM)

IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT
ADDITION: FIGURE *77-4I TYPICAL HYBRID VEHICLE DETECTION SYSTEM DESIGN (DRAFT)*



New ?-??-10

Effective ?-??-10

INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF MATERIALS MANAGEMENT

PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) ITM No.

1.0 SCOPE.

1.1 This test procedure covers the methods that a wireless vehicle detection system (WVDS) is bench tested, evaluated in the field, and is placed on, maintained on, or removed from an approval list.

1.2 The values stated in either English or acceptable SI metric units are to be regarded separately as standard, as appropriate for a specification with which this Indiana Testing Method (ITM) is used. Within the text, SI metric units are shown in parentheses. The values stated in each system may not be exact equivalents; therefore each system shall be used independently of the other, without combining values in any way.

1.3 This ITM may involve hazardous materials, operations, and equipment. This ITM does not purport to address all of the safety problems associated with the ITM's use. The ITM user's responsibility is to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 Indiana Test Methods or Procedures

Indiana Test Method No. 934-08P, Procedure for Evaluating Vehicle Detection Performance

2.2 NEMA Standards.

2003 NEMA Standards Publication TS-2 Traffic Signal Controller Assemblies.

3.0 TERMINOLOGY. Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101 and NEMA TS-2 Section 1.

3.1 Abbreviations Wherever the following abbreviations are used in this ITM, they are to be construed the same as the respective expressions represented.

WVDS	Wireless Vehicle Detection System

4.0 SIGNIFICANCE AND USE.

4.1 This Indiana Testing Method (ITM) is used to evaluate, approve, maintain approval, and remove from the approval listing of wireless vehicle detection systems which is placed on the Department's List of Approved Traffic Controller Equipment. Each model of WVDS will be bench tested and field tested separately.

5.0 APPARATUS.

5.1 A fully functional instrumented intersection, with detector data output logging and live video overlay capabilities.

6.0 SAMPLING. The manufacturer shall furnish, at no cost to the Department, one randomly selected production-run wireless vehicle detection system of each model for bench testing and field testing. The model shall include all components and purpose-built cables and connectors necessary for operation.

The wireless vehicle detection system shall consist of all electronic equipment, in-pavement sensors, receiver/processors, repeaters, mounting hardware, cables, and power supplies.

7.0 PROCEDURE. The Department will evaluate the performance of individual vehicle detectors upon successful completion of all other requirements specific to the vehicle detector being tested.

8.0 SUBMITTAL REVIEW. The documentation will be reviewed for usability of the WVDS with Department approved NEMA TS-2 traffic controller assemblies. The documentation will be reviewed for product compliance with the MUTCD and the draft INDOT specifications. The manufacturer's recommended schedule and extent of maintenance will be reviewed for acceptability.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) (CONTINUED)

9.0 BENCH TESTING. The WVDS will be bench tested for compatibility with all NEMA TS-2 signal controller assemblies used by the Department. The WVDS will be verified for full NEMA TS-2 functionality & full manufacturer's claimed optional functionality.

10.0 FIELD TESTING. Field testing of the WVDS shall be in accordance with ITM 934-08P.

11.0 REPORT. A final report will include the notations and findings from the electronic bench test and field testing results and documentation.

12.0 APPROVAL LIST

12.1 Approval of a wireless vehicle detection system. The WVDS model may be placed on the approval list when the following conditions are met:

12.1.1 A potential net benefit to the Department is realized by inclusion of the item on the list.

12.1.2 The bench and field testing are completed with satisfactory results.

12.1.3 The required documentation is submitted.

12.1.4 No excessive amount of routine or periodic maintenance is required.

12.1.5 No failure with any of the different types of NEMA TS-2 traffic controller assemblies or individual traffic control components used by the Department.

12.1.6 The wireless vehicle detection system shall include:

- All manuals & documents
- All required software to realize full potential of the WVDS.

12.1.7 Only minimal maintenance operations were necessary during the field testing.

12.2 Maintaining Approval. Maintaining approval of the WVDS shall be in accordance with ITM 934-08P.

12.3 Removal from Approval List. Removal from the approval list shall be in accordance with ITM 934-08P.

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS)

ITM ???-??

New x-xx-xx
. Effective 9-01-xx

APPENDIX A

INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF OPERATIONS SUPPORT
PRELIMINARY INFORMATION FOR PRODUCT MATERIAL EVALUATION

Trade Name _____ Date _____

Manufacturer _____ Patented? Yes _____ No _____ Applied for ____

Address _____
Street No (P. O. Box) City State Zip Code

Representative _____ Phone No ( )_____

Address _____
Street No (P. O. Box) City State Zip Code

Product Information _____
_____

Materials Composition _____
_____
_____

** Is this product considered HAZARDOUS MATERIAL when disposing of non-used or surplus materials? Yes _____ No _____

** What is the shelf life of this material? Years ___Months _____N/A_____

Recommended Use-Primary _____

_____

_

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) (CONTINUED)

_____

Recommended Use-Alternate _____

_____

Advantages and/or Benefits _____
_____
_____

** Materials specifications by manufacturer, installation/operation manual, maintenance manual, literature, test results, guarantee, hazardous material data sheets, plan, picture or sketch must be submitted with this form. In the case of electronic devices the schematic diagram, parts list, and parts layout diagram must be submitted for each printed circuit board within the device.

Meets following specifications:

AASHTO _____ _____

ASTM _____ _____

OTHER _____

Use by highway authorities or similar agencies in other states.

Agency	Years Used	Remarks
_____	_____	_____
_____	_____	_____
_____	_____	_____

** Has product ever been evaluated by and rejected for use by a governmental agency?

Yes _____ No _____ yes, by what agency and for what reason?
_____
_____

Will demonstration be provided? Yes _____ No _____

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) (CONTINUED)

Availability: Seasonal _____ Nonseasonal _____ Delivery at site _____

After receipt of order, are quantities limited? Yes _____ No _____

** Will FREE SAMPLES be furnished? Yes _____ No _____
If yes, Quantity Furnished _____

** If the sample is salvageable, do you desire to have it returned Yes ___ No ___

(Desired return of salvageable samples will be at the supplier's expense.)
(The manufacturer agrees upon the return of salvageable samples, such samples may be damaged or non-operable. Normal care will be taken that the samples, when returned, are in operable condition; INDOT, however, does not guarantee that the returned samples are operable.)

Will laboratory analysis be furnished? Yes _____ No _____

** Approximate cost _____ Royalty Cost _____

When was the product introduced to the market? _____

This product is an alternate for what product? _____
_____
_____

Will warranty be provided? Yes _____ No _____ If yes, for how long? _____
Background of company, including principal products _____
_____
_____
_____

What offices of the Indiana Department of Transportation have been contacted?
_____
Additional Information _____
_____
_____
_____
(Attach additional sheets as necessary)

Person furnishing information _____
Name Title

Address _____

REVISION TO THE SPECIAL PROVISIONS, PLAN DETAILS AND DESIGN MANUAL

BACKUP No. 1 (ITM) APPENDIX A
PROCEDURE FOR BENCH TESTING, FIELD TESTING, AND APPROVAL LIST REQUIREMENTS FOR WIRELESS VEHICLE DETECTION SYSTEMS (WVDS) (CONTINUED)

Street No (P. O. Box) City State Zip Code

Items marked ** MUST BE RESPONDED TO or further consideration may not be given for this product.

Please mail this form to:

Manager, Office of Traffic Engineering
100 N. Senate Ave., Room N925
Indianapolis, IN 46204-2249

If INDOT elects to evaluate your product/material - traffic signal equipment will be shipped to:

Electronic Technician Supervisor
Indiana Department of Transportation
6400 E. 30th Street
Indianapolis, IN 46219-8222

While all other materials to be evaluated will be shipped to:

Traffic Evaluations Engineer
Indiana Department of Transportation
6400 E. 30th Street
Indianapolis, IN 46219-8222

COMMENTS AND ACTION

RECURRING SPECIAL PROVISION *805-T-XXX WIRELESS VEHICLE DETECTION SYSTEM*
RECURRING PLAN DETAILS *805-T-XXXD WIRELESS VEHICLE DETECTORS STOP BAR DETECTION ZONE*
REVISION TO IDM 77-4.0 TRAFFIC SIGNAL EQUIPMENT

Motion: Second: Ayes: Nays:	Action: ____ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: SECTION 805 TRAFFIC SIGNALS Recurring Special Provisions: 805-T-169 TRAFFIC SIGNALS Standard Sheets affected: 805-SGLI-01 Design Manual Sections affected: SECTION 77-4.02 GIFE Sections cross-references: NONE	____ 20__ Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? ____

Mr. Wright
Date: 09/16/10

SPECIFICATION REVISIONS

REVISION TO THE RECURRING SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The Recurring Plan Detail 601-R-497d, which illustrates the Spare Parts Packages for INDOT Approved Attenuators, contains spare parts information for both Stage 1 and Stage 2 spare parts packages. The Pay Item shown in Standard Specifications section 601.14, for Impact Attenuator Spare Parts Package, currently contains spaces to determine the type-width, and the test level. This current pay item does not contain any space for the determination of desired Stage.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.
A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

PROPOSED SOLUTION: The proposed editorial update of the aforementioned pay item will allow the designer to specify the type-width, the test level, and the stage for the desired spare parts package.

APPLICABLE STANDARD SPECIFICATIONS: 601.08

APPLICABLE STANDARD DRAWINGS: 601-IAED-01

APPLICABLE DESIGN MANUAL SECTION: 49-8.04

APPLICABLE SECTION OF GIFE: 21.1

APPLICABLE RECURRING SPECIAL PROVISIONS: 601-R-497

Submitted By: John Wright

Title: Roadway Services Manager

Organization: INDOT

Phone Number: 317-232-5147

Date: August 26, 2010

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad-hoc review by members of the Impact Attenuator Committee.

REVISION TO THE RECURRING SPECIAL PROVISION

REVISION TO 601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS

601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS

(Revised xx-xx-xx)

The Standard Specifications are revised as follows:

SECTION 601, BEGIN LINE 202, DELETE AND INSERT AS FOLLOWS:

~~If a spare parts package is required for the unit being installed, such package shall consist of those parts which are shown on the list provided by the manufacturer. The spare parts shall correspond to those shown on the list for the unit to be placed. The package shall be delivered to the location directed and will become the property of the Department.~~ _____ *stage 1 spare parts package(s) and* _____ *stage 2 spare parts package(s) shall be supplied for each type of impact attenuator being installed. The spare parts package shall consist of those parts which are shown on the replacement parts list shown in the Contract Information Book. The spare parts package(s) shall be delivered to the following location.*

_____

SECTION 601, LINE 253, DELETE AS FOLLOWS:

each. Impact attenuators~~,~~ *and* reset*ing* impact attenuators~~, and impact attenuator spare parts packages~~ will be measured per each for the type and width and test level, complete in place.

SECTION 601, AFTER LINE 261, INSERT AS FOLLOWS:

Impact attenuator spare parts packages will be measured per each for the type and width, test level, and stage for which it is specified.

SECTION 601, LINE 276, DELETE AS FOLLOWS:

paid for at the contract unit price per each, complete in place. Impact attenuators~~,~~ *and* reset*ing* impact attenuators~~, and impact attenuator spare parts packages~~ will be paid for at the contract unit price per each for the type and width, and test level specified.

SECTION 601, AFTER LINE 282, INSERT AS FOLLOWS:

Impact attenuator spare parts packages will be paid for at the contract unit price per each for the type and width, test level and stage for which it is specified.

SECTION 601, BEGIN LINE 318, INSERT AS FOLLOWS:

Impact Attenuator Spare Parts Package, _____,
type-width
_____,_____.....EACH
test level *stage*

REVISION TO THE RECURRING SPECIAL PROVISION

BACKUP NO. 1: RECURRING PLAN DETAIL 601-R-497d SPARE PARTS PACKAGES FOR INDOT APPROVED ATTENUATORS

601-R-497d Spare Parts Packages for INDOT Approved Attenuators

(Revised 08-23-10) 11-01-10

Unit	Type	Manufacturer
QUADGUARD II	Impact Attenuator	Energy Absorption Systems, Inc.

Notes:

Packages are to include all associated hardware with the specified items.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.

A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

	Stage 1 Spare Parts Package			Stage 2 Spare Parts Package		
	Option	Qty	Item	Option	Qty	Item
QUADGUARD II TL 3 (ED, R1, R2, SD, W1)		1	Nose Assembly		1	Nose Assembly
		3	Energy Absortion Cartridge Type 1		3	Energy Absortion Cartridge Type 1
					3	Energy Absortion Cartridge Type 2
QUADGUARD II TL 2 (ED, R1, R2, SD, W1)		1	Nose Assembly		1	Nose Assembly
		2	Energy Absortion Cartridge Type 1		2	Energy Absortion Cartridge Type 1
					1	Energy Absortion Cartridge Type 2
QUADGUARD II (LS, W1)		1	Nose Assembly		1	Nose Assembly
		1	Energy Absortion Cartridge Type 1		1	Energy Absortion Cartridge Type 1
					1	Energy Absortion Cartridge Type 2

Unit	Type	Manufacturer
TAU II	Impact Attenuator	Barrier Systems, Inc.

Notes:

Packages are to include all associated hardware with the specified items.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.

A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

*** For W2 and W3 units:**

1. **Include all Type A Cartridges for Stage 1**
2. **Include all Type A and B Cartridges for Stage 2**

	Stage 1 Spare Parts Package			Stage 2 Spare Parts Package		
	Option	Qty	Item	Option	Qty	Item
TAU II TL 3 (ED, R1, R2, SD, W1)		3	Energy Absortion Cartridge Type A		3	Energy Absortion Cartridge Type A
		1	Energy Absortion Cartridge Type B		5	Energy Absortion Cartridge Type B
TAU II TL 2 (ED, R1, R2, SD, W1)		1	Energy Absortion Cartridge Type A		1	Energy Absortion Cartridge Type A
		1	Energy Absorption Cartridge Type B		3	Energy Absortion Cartridge Type B

Unit	Type	Manufacturer
TRACC	Impact Attenuator	Trinity Highway Products, LLC

Notes:

Packages are to include all associated hardware with the specified items.

A Stage 1 Spare Parts Package includes parts to repair a minor hit.

A Stage 2 Spare Parts Package includes parts to repair a 100% design hit.

	Stage 1 Spare Parts Package			Stage 2 Spare Parts Package		
	Option	Qty	Item	Option	Qty	Item
TRACC TL-3 (ED, R1, R2, SD)		1	Nosepiece and reflective assembly		1	Nose piece and reflective assembly
		1	Stage 2 Rip Plate Repair Kit		1	Stage 3 Rip Plate Repair Kit
TRACC TL-2 (ED,R1,R2,SD)		1	Nosepiece and reflective assembly		1	Nose piece and reflective assembly
		1	Stage 2 Rip Plate Repair Kit		1	Stage 3 Rip Plate Repair Kit

**** There are NO spare parts packages for Impact Attenuator, Type CR**

COMMENTS AND ACTION

REVISION TO 601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS

Motion: Second: Ayes: Nays:	Action: ____ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: 601.08 pg 353; 601.13 pg 354; 601.14 pg 356. Recurring Special Provisions: 601-R-497 SPARE PARTS PACKAGE FOR IMPACT ATTENUATORS Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	____ 20__ Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? ____

SPECIFICATION REVISIONS

REVISION TO THE STANDARD DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The regulatory version of the Reduced Speed Ahead sign is still being used even though it was eliminated from the current Manual on Uniform Traffic Control Devices and replaced by a warning sign version. All regulatory Reduced Speed Ahead signs must be replaced by the FHWA compliance date of 12/22/18.

PROPOSED SOLUTION: The Reduce Speed Sign should be included in standard drawings for Traffic Control Signs and Sign Design Details with a Design Memo sent as notification of the correct sign to be used.

APPLICABLE STANDARD SPECIFICATIONS: n/a

APPLICABLE STANDARD DRAWINGS: 801-TCSN-06; 801-TCSN-12; 801-TCSN-13

APPLICABLE DESIGN MANUAL SECTION: n/a

APPLICABLE SECTION OF GIFE: n/a

APPLICABLE RECURRING SPECIAL PROVISIONS: n/a

Submitted By: Dave Boruff

Title: Supervisor, Traffic Administration Section

Organization: INDOT

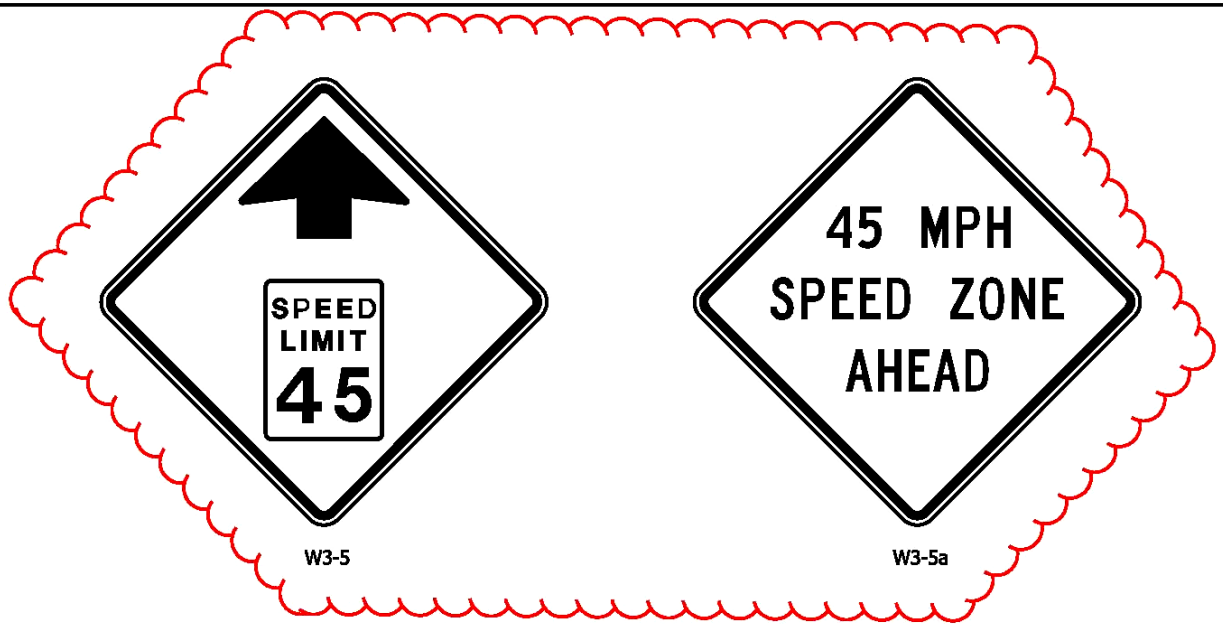
Phone Number: 317-899-8626

Date: 8.12.10

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad hoc review by Tony Uremovich, Pat McCarty.

REVISION TO THE STANDARD DRAWINGS

REVISION TO 801-TCSN-06 TRAFFIC CONTROL SIGNS (DRAFT)



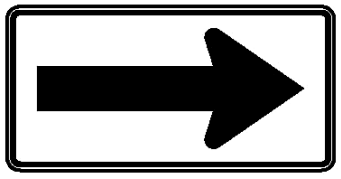
W3-5

W3-5a

NOTE:

① See Standard Drawing E 801-TCSN-11 for additional general notes.

XW13-1-A
To be used below a warning sign only.



XW1-6
XW1-6-A ①

XW6-2a-A
XW6-2a-B ①

XW8-3-A

INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL
SIGNS

SEPTEMBER 2010

STANDARD DRAWING NO. E 801-TCSN-06

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

REVISION TO THE STANDARD DRAWINGS

REVISION TO 801-TCSN-12 SIGN DESIGN DETAILS (SHEET 1 OF 2) (DRAFT)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	WORD OR LINE (1)	PCT. (1)	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4 WOOD	STEEL		BACKGROUND	COPY								HEAD	SHAFT		ONE	TWO
XG20-1	"Road Construction Next ___ Miles"	*	B	60 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C					2 1/4		X
XG20-2	"End Construction"	*	B	60 x 24	Orange	Black	1/2	3/8	6 - Series C	6 - Series C						1 1/2		X
XG20-2a	"End Road Work"	*	B	48 x 18	Orange	Black	1/2	3/8	6 - Series C	6 - Series C						1 1/2		X
XG20-4	"Pilot Car Follow Me"	--	--	36 x 18	Orange	Black	1/2	3/8	5 - Series C	5 - Series C						1 1/2		
XG20-5	(Route number or) "Lane Closed" __ (date)	*	B	48 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C	6 - Series C					2 1/4		X
XG20-5-B	"Worksite" plate	--	--	48 x 16	Orange	Black	1/2	3/8	8 - Series C							1 1/2	----	----
XW20-6	"Lane Restrictions On Or After *** ** 2007	*	B	60 x 30	Orange	Black	3/4	1/2	5 - Series C	5 - Series C	4 - Series C					1 7/8		X
XW20-6a	"Lane Restrictions On Or After *** ** 2007	*	B	72 x 36	Orange	Black	7/8	5/8	6 - Series C	6 - Series C	5 - Series C					2 1/4		X
XM4-9 (R or L)	"Detour" (above black arrow)	*	A	30 x 24	Orange	Black	1/2	3/8	5 - Series D			"Detour"		7 x 8	11 x 3 1/2	1 1/2		X
XM4-9-B (R or L)	"Detour" (above black arrow)	*	B	60 x 48	Orange	Black	1 1/4	3/8	10 - Series D			"Detour"		14 3/4 x 16	21 3/4 x 7	3		X
XM4-10 (R or L)	"Detour" (inside orange arrow)	*	B	48 x 18	Black & Orange	Black	----	3/8	6 - Series D					12 x 13 3/8	29 3/4 x 8	1 1/2		X
XW1-1-A (R or L)	(Turn symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-1-B (R or L)	(Turn symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-2-A (R or L)	(Curve symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-2-B (R or L)	(Curve symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-3-A (R or L)	(Reverse turn symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-3-B (R or L)	(Reverse turn symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-4-A (R or L)	(Reverse curve symbol)	*	A	36 x 36	Orange	Black	3/4	1/2						10 5/8 x 12	5 1/4	2 1/4		X
XW1-4-B (R or L)	(Reverse curve symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						14 1/8 x 16	7	3		X
XW1-6	(Single headed arrow)	*	B	48 x 24	Orange	Black	3/4	3/4						13 1/8 x 15	26 x 6 1/2	1 1/2		X
XW1-6-A	(Single headed arrow)	*	B	60 x 30	Orange	Black	3/4	1/2						16 3/8 x 18	32 1/2 x 8	2 1/4		X
XW4-2 (R or L)	(Lane ends merge ___ symbol)	*	A	36 x 36	Orange	Black	3/4	1/2	See Standard Sheet 3A Detours							2 1/4		X
XW4-2-A (R or L)	(Lane ends merge ___ symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4	See Standard Sheet 3A Detours							1 1/2		X
XW6-2a-A	(Divided highway ends symbol)	*	A	36 x 36	Orange	Black	3/4	1/2	5 - Series D	5 - Series D	5 - Series D					2 1/4		X
XW6-2a-B	(Divided highway ends symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D					3		X
XW3-5-A	Arrow - "Speed Limit ___"	*	A	36 x 36	Orange	Black	7/8	5/8	3 - Series E	3 - Series E	12 - C					2 1/4		X
XW3-5-B	Arrow - "Speed Limit ___"	*	B	48 x 48	Orange	Black	1 1/4	3/4	4 - Series E	4 - Series E	15 C					3		X
XW3-5a-A	"___ - MPH - Speed Zone Ahead"	*	A	36 x 36	Orange	Black	7/8	5/8	5 - Series C	5 - Series C	5 - Series C					2 1/2		X
XW3-5a-B	"___ - MPH - Speed Zone Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C					3		X

*Wood post permitted.

NOTES:

(1) Spacing between letters of this word or line shall be reduced by this percentage as shown in the FHWA document, Standard Highway Sign.

2. See Standard Drawing E 801-TCSN-11 for additional general notes.

3. All dimensions are in inches.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DESIGN DETAILS
(Sheet 1 of 2)

SEPTEMBER 2010

STANDARD DRAWING NO. E-801-TCSN-12

/s/ XXXXXXXXX 01/01/09
DESIGN STANDARDS ENGINEER DATE

/s/ XXXXXXXXX 01/01/09
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

REVISION TO THE STANDARD DRAWINGS

REVISION TO 801-TCSN-12 SIGN DESIGN DETAILS (SHEET 2 OF 2) (DRAFT)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN		SIGN SIZE	SIGN COLOR		BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES-LINE 1	LETTER HEIGHT SERIES-LINE 2	LETTER HEIGHT SERIES-LINE 3	WORD OR LINE ①	PCT. ①	ARROW SIZE		CORNER RADIUS	NUMBER OF POSTS	
		4 x 4 WOOD	STEEL		BACKGROUND	COPY								HEAD	SHAFT		ONE	TWO
XW6-3-B	(Two way traffic symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4						11 5/8 x 13 3/4	23 1/2 x 6	3		X
XW8-1-A	"Bump"	*	A	36 x 36	Orange	Black	3/4	1/2	10 - Series D							2 1/4		X
XW8-1-B	"Bump"	*	B	48 x 48	Orange	Black	1 1/4	3/4	12 - Series D							3		X
XW8-2-A	"Dip"	*	A	36 x 36	Orange	Black	3/4	1/2	10 - Series E							2 1/4		X
XW8-2-B	"Dip"	*	B	48 x 48	Orange	Black	1 1/4	3/4	12 - Series E							3		X
XW8-3-A	"Pavement Ends"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X
XW8-4-A	"Soft Shoulder"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X
XW8-4-B	"Soft Shoulder"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C						3		X
XW8-6-A	"Truck Crossing"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X
XW8-6-B	"Truck Crossing"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C						3		X
XW9-1-A (R or L)	" ___ Lane Ends"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series D	6 - Series D	6 - Series D					2 1/4		X
XW9-1-B (R or L)	" ___ Lane Ends"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series D	8 - Series D	8 - Series D					3		X
XW9-2-A (R or L)	"Lane Ends Merge ___"	*	B	48 x 48	Orange	Black	1 1/4	3/4	6 - Series C	8 - Series D	8 - Series D					2 1/4		X
XW12-1-C	(Double headed arrow)	*	B	48 x 48	Orange	Black	1 1/4	3/4						12 1/2 x 15	12 x 5 1/4	3		X
XW13-1-A	" ___ MPH" (Advisory speed plate)	*	A	24 x 24	Orange	Black	1/2	3/8	10 - Series E	4 - Series E						1 1/2	----	----
XW20-1	"Road Construction Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C	"Construction"	25			3		X
XW20-1-A	"Road Construction Ahead"	*	B	60 x 60	Orange	Black	1 1/2	1	8 - Series C	8 - Series C	8 - Series C	"Construction"	25			95		X
XW20-1a	"Road Repairs Next ___ Miles"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series C	8 - Series C	6 - Series C					3		X
XW20-2	"Detour Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	8 - Series D	8 - Series D		"Detour"	25			3		X
XW20-3	"Road Closed Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D					3		X
XW20-4	"One Lane Road Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series C	7 - Series C	7 - Series C					3		X
XW20-5 (R, C, or L)	" ___ Lane Closed Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	6 - Series C	6 - Series C	6 - Series C		2			3		X
XW20-7a-A	(Flagger symbol)	*	B	48 x 48	Orange	Black	1 1/4	3/4								1 1/2		X
XW21-1a	(Workers symbol)	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series D							2 1/4		X
XW21-2	"Fresh Oil"	*	A	30 x 30	Orange	Black	3/4	3/8	6 - Series D	6 - Series D		"Fresh"	2/4			1 7/8	X	
XW21-2-A	"Fresh Oil"	*	A	36 x 36	Orange	Black	3/4	1/2	7 - Series D	7 - Series D		"Fresh"	3/4			2 1/4		X
XW21-3-A	"Road Machinery Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D	"Machinery"	25			3		X
XW21-4-A	"Road Work Ahead"	*	B	48 x 48	Orange	Black	1 1/4	3/4	7 - Series D	7 - Series D	7 - Series D					3		X
XW21-5-A	"Shoulder Work"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C		"Shoulder"	1			2 1/4		X
XW21-6-A	"Survey Crew"	*	A	36 x 36	Orange	Black	3/4	1/2	6 - Series C	6 - Series C						2 1/4		X

*Wood post permitted.

NOTES:

① Spacing between letters of this word or line shall be reduced by this percentage as shown in the FHWA document, Standard Highway Sign.

2. See Standard Drawing E 801-TCSN-11 for additional general notes.

3. All dimensions are in inches.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DESIGN DETAILS
(sheet 2 of 2)

SEPTEMBER 2010

STANDARD DRAWING NO. 801-TCSN-12

/s/ XXXXXXXXX 01/01/09
DESIGN STANDARDS ENGINEER DATE

/s/ XXXXXXXXX 01/01/09
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

REVISION TO THE STANDARD DRAWINGS

REVISION TO 801-TCSN-13 SIGN DESIGN DETAILS (DRAFT)

SIGN NUMBER	SIGN MESSAGE	POST DESIGN 4 x 4 WOOD	POST DESIGN STEEL	SIGN SIZE	SIGN COLOR BACKGROUND	SIGN COLOR COPY	BORDER WIDTH	MARGIN WIDTH	LETTER HEIGHT SERIES–LINE 1	LETTER HEIGHT SERIES–LINE 2	LETTER HEIGHT SERIES–LINE 3	LETTER HEIGHT SERIES–LINE 4	ARROW SIZE HEAD	ARROW SIZE SHAFT	CORNER RADIUS	NUMBER OF POSTS ONE	NUMBER OF POSTS TWO
XW101–1	"Mowing Crews Ahead"	•	A	36 x 36	Orange	Black	3/4	1/2	6 – Series C	6 – Series C	6 – Series C				2 1/4		X
XW101–1–A	"Mowing Crews Ahead"	•	B	48 x 48	Orange	Black	1 1/4	3/4	8 – Series C	8 – Series C	8 – Series C				3		X
XW102–1	"Mowing Crews Next ___ Miles"	•	A	36 x 36	Orange	Black	3/4	1/2	6 – Series C	6 – Series C	4 – Series C	4 – Series C			2 1/4		X
XW102–1–A	"Mowing Crews Next ___ Miles"	•	B	48 x 48	Orange	Black	1 1/4	3/4	8 – Series C	8 – Series C	6 – Series C	6 – Series C			3		X
XW103–1	"Watch For Stopped Traffic"	•	B	48 x 48	Orange	Black	1 1/4	3/4	7 – Series C	7 – Series C	7 – Series C				3		X
XW104–1	"Overhead Sign Installation"	•	B	60 x 24	Orange	Black	1/2	3/8	6 – Series C	6 – Series C					1 1/2		X
XW105–1–A	"Right Lane Exit Open"	•	B	48 x 48	Orange	Black	1 1/4	3/4	8 – Series C	8 – Series C					3		X
XW106–1–A	"Exit Closed"	•	B	48 x 48	Orange	Black	1 1/4	3/4	7 – Series C	7 – Series C					3		X
XW106–2–A	"Exit Open"	•	B	48 x 48	Orange	Black	1 1/4	3/4	7 – Series C	7 – Series C					3		X
XW108–1	"Utility Work Ahead"	•	A	36 x 36	Orange	Black	3/4	1/2	6 – Series D	6 – Series D	6 – Series D				2 1/4		X
XW108–1–A	"Utility Work Ahead"	•	B	48 x 48	Orange	Black	1 1/4	3/4	6 – Series C	6 – Series C	6 – Series C				3		X
XW109–1	"Exit" (above black arrow)	•	B	48 x 48	Orange	Black	1 1/4	3/4	12 – Series D						3		X
R2–1	"Speed limit ___"	•	A	24 x 30	White	Black	1/2	3/8	4 – Series E	4 – Series E	10 – Series E				1/2	X	
R2–1–B	"Speed limit ___"	•	B	48 x 60	White	Black	1 1/4	3/4	8 – Series E	8 – Series E	16 – Series E				3		X
R2–15b–B	"Reduced Speed ___ Ahead"	——	——	48 x 60	White	Black	1 1/4	3/4	8 – Series E	8 – Series E	14 – Series E	8 – Series E			3	——	——
R3–2–A (R or L)	(No ___ turn symbol)	•	A	30 x 30	White	Black	3/4	3/8							2	X	
R3–2–C (R or L)	(No ___ turn symbol)	•	B	48 x 48	White	Black	1 1/4	3/4							3		X
R4–1	"Do Not Pass"	•	A	24 x 30	White	Black	1/2	3/8	6 – Series D	6 – Series D	5 – Series D				1 7/8	X	
R4–1–B	"Do Not Pass"	•	B	48 x 60	White	Black	1 1/4	3/4	10 – Series D	10 – Series D	10 – Series D				3		X
R5–1–A	"Do Not Enter" (inside symbol)	•	A	36 x 36	Red	White	Radius 17 1/2		5 – Series D	6 x 30 Bar	5 – Series D				2 1/4		X
R5–1–B	"Do Not Enter" (inside symbol)	•	B	48 x 48	Red	White	Radius 23 1/2		6 – Series D	8 x 40 Bar	6 – Series D				3		X
R6–1 (R or L)	"One Way" (inside white arrow)	•	A	36 x 36	Black & White	Black	——	3/8	4 – Series D				7 1/2 x 8 1/2	22 1/4 x 5 1/4	1 1/2		X
R6–2–A (R or L)	"One Way" (above black arrow)	•	A	24 x 30	White	Black	1/2	3/8	6 – Series D	6 – Series D			5 1/4 x 6	8 x 2 1/4	1 1/2	X	
R11–2	"Road Closed"	•	B	48 x 30	White	Black	3/4	3/8	8 – Series D	8 – Series D					1 7/8		X
R11–3	"Road Closed ___ Miles Ahead" "Local Traffic Only"	•	B	60 x 30	White	Black	3/4	3/8	8 – Series C	5 – Series C	4 – Series C				1 7/8		X
R11–4	"Road Closed To Thru Traffic"	•	B	60 x 30	White	Black	3/4	3/8	6 – Series C	5 – Series C	6 – Series C				1 7/8		X
R12–1	"Weight Limit ___ Tons"	•	A	24 x 30	White	Black	1/2	3/8	4 – Series D	4 – Series D	5 – Series E	5 – Series D			1 1/2	X	
R12–1–A	"Weight Limit ___ Tons"	•	B	36 x 48	White	Black	3/4	1/2	8 – Series D	8 – Series D	8 – Series E	10 – Series D			2 1/4		X
S 4–4	"When Flashing" plate	——	——	48 x 20	White	Black	1/2	3/8	5 – Series D	5 – Series D					1 1/2	——	——

* Wood post permitted.

GENERAL NOTES

1. See Standard Drawing 801–TCSN–11 for additional general notes.
2. All dimensions are in inches.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN DESIGN DETAILS

SEPTEMBER 1999

STANDARD DRAWING NO. E 801–TCSN–13

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 9–01–99
DESIGN STANDARDS ENGINEER DATE

/s/ Donald W. Lucas 9–01–99
CHIEF HIGHWAY ENGINEER DATE

Source Sheet: Det3A,
Source Sheet: Det5, 5A

INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 10-__
Technical Advisory

July 2, 2010 DRAFT

TO: **All Design, Operations, and District Personnel, and Consultants**

FROM: **_____**
Richard L. VanCleave
Roadway Engineering Standards Engineer
Highway Design and Technical Support Division

SUBJECT **Reduced-Speed-Limit Ahead Sign**

REVISES: ***Indiana Design Manual*** **Section 83-2.03(01) item 7**

EFFECTIVE: **???????????**

With the adoption of the 2008 Indiana Manual on Uniform Traffic Control Devices the regulatory sign, R2-15b, "Reduced Speed XX Ahead" is no longer to be specified. Instead, reduced-speed-limit warning sign W3-5 or W3-5a will be utilized. This applies to permanent signing and temporary traffic control. The details are shown on Recurring Plan Detail 801-R-___d, attached herewith. Only one of the designations should be specified for the entire project.

The recurring plan detail should be called for through the August 2011 letting. It will be superseded by standard drawings beginning with the September 2011 letting.

___:alu

[P:\Structural Services\Design Memos\Pending\2010\10SpSn-ta.doc]

COMMENTS AND ACTION

REVISION TO THE STANDARD DRAWINGS:
801-TCSN-06 TRAFFIC CONTROL SIGNS
801-TCSN-12 SIGN DESIGN DETAILS (SHEET 1 OF 2)
801-TCSN-12 SIGN DESIGN DETAILS (SHEET 2 OF 2)
801-TCSN-13 SIGN DESIGN DETAILS

Motion: Second: Ayes: Nays:	Action: ____ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: SECTION 805 TRAFFIC SIGNALS Recurring Special Provisions: Standard Sheets affected: 801-TCSN-06, -12, -13. Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	____ 20__ Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? ____

Mr. Wright
Date: 09/16/10

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Current specs regarding archaeological discoveries do not reflect current laws and procedures.

PROPOSED SOLUTION: Update specification with proposed revisions.

APPLICABLE STANDARD SPECIFICATIONS: Sections 104, 107 and 203

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

B

Submitted By: John Wright

Title: Director or Roadway Services

Organization: INDOT

Phone Number: 317.232.5147

Date: 8.27.10

APPLICABLE SUB-COMMITTEE ENDORSEMENT?

Item No. 03 09/16/10 (2010 SS)
Mr. Wright
Date: 09/16/10

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 104 – SCOPE OF WORK
104.07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE PROJECT SITE

The Standard Specifications are revised as follows:

SECTION 104, BEGIN LINE 544, DELETE AND INSERT AS FOLLOWS:

~~If~~ *Discovery of* archaeological artifacts ~~are~~ encountered during ~~excavation operations, these operations shall be ceased in the immediate vicinity and the Engineer shall be notified~~ *construction shall be addressed in accordance with 107.10*. ~~An archaeologist will be provided by the Department and a determination will be made as to the significance and the disposition of such findings. In no event shall an employee of the Contractor or the State of Indiana share in such ownership, or profit from salvaged archaeological findings. Unless otherwise agreed to in writing, compliance with this requirement will not be paid for directly. The cost thereof shall be included in the cost of the pay items.~~

Item No. 03 09/16/10 (2010 SS)
Mr. Wright
Date: 09/16/10

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC
107.10 ~~BLANK~~ *ARCHAEOLOGICAL ARTIFACTS*

The Standard Specifications are revised as follows:

SECTION 107, BEGIN LINE 389, DELETE AND INSERT AS FOLLOWS:

107.10 ~~Blank~~ *Archaeological Artifacts*

If archaeological artifacts, cultural features, or human remains are discovered, all work within a minimum 100 foot radius of the discovery shall cease immediately, the area shall not be further disturbed and the Contractor shall notify the Engineer immediately.

For discoveries other than human remains, the Department will coordinate with IDNR, Division of Historic Preservation and Archaeology to mitigate impacts to the discovery. Work within the area of the discovery shall not resume without written authorization.

In accordance with IC 14-21-1-27, if human remains are discovered, the Contractor shall notify the local law enforcement agency immediately and the Engineer immediately thereafter. The Department will notify IDNR, Division of Historic Preservation and Archaeology within two days. Work within the area of the discovery shall not resume without written authorization.

In no event shall an employee of the Contractor or the State of Indiana share in ownership or profit from salvaged archaeological findings.

Unless otherwise agreed to in writing, compliance with this requirement will not be paid for directly. The cost thereof shall be included in the cost of the pay items.

Item No. 03 09/16/10 (2010 SS)
Mr. Wright
Date: 09/16/10

REVISION TO THE STANDARD SPECIFICATIONS

SECTION 203 – EXCAVATION AND EMBANKMENT
203.08 BORROW OR DISPOSAL

The Standard Specifications are revised as follows:

SECTION 203, BEGIN LINE 117, DELETE AND INSERT AS FOLLOWS:

Except when a commercial source is utilized, a qualified archaeologist shall perform a record check and field survey of borrow or disposal limits to determine if any significant archaeological sites are within the limits. Results of the record check and survey shall be furnished in writing prior to the excavation of any material. If any archaeological sites are identified, the archaeologist shall establish the limits of the site along with a reasonable border. The site shall not be disturbed unless the archaeological site is cleared by established procedures and written authorization to enter the site has been issued. ~~Under no circumstances shall an employee of the Contractor or the State of Indiana share in the ownership or profit from the sale of any archaeological artifacts that may be salvaged.~~ No extension of completion time will be granted due to any delays in securing approval of a borrow or disposal site.

Discovery of archaeological artifacts encountered during operations shall be addressed in accordance with 107.10.

Item No. 03 09/16/10 (2010 SS)
Mr. Wright
Date: 09/16/10

COMMENTS AND ACTION

104.07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE PROJECT SITE
107.10 ~~BLANK~~ *ARCHAEOLOGICAL ARTIFACTS*
203.08 BORROW OR DISPOSAL

Motion: Second: Ayes: Nays:	Action: ____ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: 104.07 pg 37; 107.10 pg 69; 203.08 pg 141. Recurring Special Provisions: NONE Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	____ 20__ Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: ____ ____ Revise RSP (No.____) Effective ____Letting RSP Sunset Date: ____ Standard Drawing Effective ____ ____ Create RPD (No. ____) Effective ____Letting ____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By ____ Addition or ____ Revision Frequency Manual Update Req'd? Y__N__ By ____ Addition or ____ Revision Received FHWA Approval? ____

SPECIFICATION REVISIONS

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Maintenance of traffic plans often do not include any details about portable changeable message sign (PCMS) location and purpose leaving uncertainty for bidders about the amount of effort that will be involved in changing messages and locations. Too often for contracted and in-house work PCMS do not display appropriate messages or are improperly located.

PROPOSED SOLUTION: Develop an INDOT wide guideline for PCMS use. With it certain revisions to the Design Manual and Standard Specifications are necessary.

APPLICABLE STANDARD SPECIFICATIONS: 801.02, 801.15, 801.17, and 801.18

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: Section 83-2.06

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

B

Submitted By: David Boruff, P.E.

Title: Traffic Administration Manager

Organization: INDOT

Phone Number: (317) 899-8626

Date: 8/4/10

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Developed by a Task Group that included Paul Berebitsky, Myron Short, Steve Apple (Industry), Ron Heustis, Steve Wuertz, Todd Shields, Pat McCarty, Abby Lalko (INDOT).

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

SECTION 801 – TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS
801.02 MATERIALS
801.15(b) CHANGEABLE MESSAGE SIGNS
801.17 METHOD OF MEASUREMENT
801.18 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 801, AFTER LINE 66, INSERT AS FOLLOWS:

Only Portable Changeable Message Signs from the Department's list of approved Solar Powered Traffic Control Devices shall be used.

SECTION 801, BEGIN LINE 714, DELETE AND INSERT AS FOLLOWS:

(b) Changeable Message Signs

This shall consist of furnishing, installing, and maintaining a trailer-mounted, portable sign upon which varying electronically generated messages will be displayed to traffic. The message being relayed to traffic shall be legible and easily understood for a minimum distance of 650 ft (200 m).

~~A malfunctioning sign shall be repaired or replaced within 24 h.~~

The Contractor shall display the messages shown in the plans or as approved or directed by the Engineer. Messages shall be formatted per the "INDOT Guidelines for Portable Changeable Message Signs". Only upper case letters shall be used. Each message phase shall be displayed for at least 2 seconds. Display time for an entire message shall not exceed 8 seconds.

Placement of the PCMS's shall be as shown on the plans or as directed by the Engineer. A 7 ft (2.1 m) minimum clearance from pavement to the bottom of the PCMS shall be provided. Units shall be level and trailers shall be leveled. PCMS's shall be turned from the view of traffic, placed in "stand-by" mode, or left blank until there is a valid message to be displayed. When in use PCMS's shall be turned approximately 3° from perpendicular towards oncoming traffic to minimize glare.

When specified, the PCMS shall be equipped with an Aries Field Processor and shall include IP cellular phone service to allow the Department to connect to and control the PCMS remotely.

SECTION 801, BEGIN LINE 845, DELETE AS FOLLOWS:

801.17 Method of Measurement

Construction signs, detour route marker assemblies, detour route marker assemblies-multiple routes, temporary worksite speed limit sign assemblies, road closure sign assemblies, ~~temporary~~ *portable* changeable message signs, and temporary raised pavement markers will be measured by the number of units installed, maintained, and removed.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

SECTION 801 – TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS (CONTINUED)

801.02 MATERIALS
801.15(b) CHANGEABLE MESSAGE SIGNS
801.17 METHOD OF MEASUREMENT
801.18 BASIS OF PAYMENT

SECTION 801, BEGIN LINE 915, DELETE AND INSERT AS FOLLOWS:

801.18 Basis of Payment

The accepted quantities of construction signs, detour route marker assemblies, detour route marker assemblies-multiple routes, temporary worksite speed limit sign assemblies, road closure sign assemblies, permanent road closure sign assemblies and temporary raised pavement markers will be paid for at the contract unit price per each. Payment for temporary worksite speed limit assemblies, ~~and temporary~~ *portable* changeable message signs, *PCMS, and Aries Field Processors* will be made for the maximum number of such assemblies in place at any one time during the life of the contract**.** *No additional payment will be made for changes in PCMS message or location that are shown in the plans or suggested by the Contractor. Additional materials necessary to place the PCMS in a secure and level manner for site conditions such as wet ground or slopes shall be included in the cost of the pay item.* Type III-A, type III-B, and permanent type III barricades will be paid for at the contract unit price per linear foot (meter).

SECTION 801, BEGIN LINE 1004, DELETE AND INSERT AS FOLLOWS:

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Aries Field Processor for PCMS	*EACH*
Barricade, _____ type	LFT (m)
Barricade, III, Permanent	LFT (m)
Barrier, Direction Indicator	EACH
Construction Sign, _____ type	EACH
Detour Route Marker Assembly	EACH
Detour Route Marker Assembly, Multiple Routes	EACH
Drum, Permanent	EACH
Energy Absorbing Terminal, CZ, TL - _____ test level	EACH
Flashing Arrow Sign	DAY
Maintaining Traffic	LS
Patroller	DAY
Road Closure Sign Assembly	EACH
Road Closure Sign Assembly, Permanent	EACH
Temporary Buzz Strips	LFT (m)
Temporary Traffic Barrier, _____ type	LFT (m)

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

SECTION 801 – TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS (CONTINUED)

801.02 MATERIALS
801.15(b) CHANGEABLE MESSAGE SIGNS
801.17 METHOD OF MEASUREMENT
801.18 BASIS OF PAYMENT

Temporary Traffic Barrier, Anchored, _____ type .....LFT (m)

Temporary Crossover, _____ type .....EACH
Temporary Crossover, _____ type, Refurbish .....EACH
Temporary Crossover Drainage Pipe .....LFT (m)
~~Temporary~~ *Portable* Changeable Message Sign .....EACH
Temporary Illumination .....LS
Temporary Panel Signs ..... SFT (m2)
Temporary Panel Sign Supports.....LFT (m)
Temporary Pavement Marking, _____ in. (mm) width .....LFT (m)
Temporary Pavement Marking, Removable, _____ in. (mm) width ...LFT (m)
Temporary Pavement Message Marking, _____ description .....EACH
Temporary Pavement Message Marking, Removable, _____ description .....EACH
Temporary Raised Pavement Marker, _____ grade .....EACH
Temporary Traffic Signal.....LS
Temporary Traffic Signal with Detectors .....LS
Temporary Transverse Pavement Marking, _____ in. (mm) width .....LFT (m)
Temporary Transverse Pavement Marking, Removable, _____ in. (mm) width .....LFT (m)
Temporary Worksite Speed Limit Sign Assembly .....EACH
Tubular Marker, Permanent .....EACH

SECTION 801, BEGIN LINE 1118, DELETE AND INSERT AS FOLLOWS:

Each construction sign, barricade, temporary worksite speed limit sign assembly, ~~temporary changeable message sign,~~ or flashing arrow sign will be paid for only once regardless of how many times each is moved, replaced, or how many times each is altered to change the sign message. Payment will not be made for signs or barricades used for the convenience of the Contractor.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

SECTION 801 – TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS (CONTINUED)

801.02 MATERIALS
801.15(b) CHANGEABLE MESSAGE SIGNS
801.17 METHOD OF MEASUREMENT
801.18 BASIS OF PAYMENT

All costs required to furnish, install, program, and maintain PCMS shall be included in the cost of the pay item. The cost of IP cellular phone service shall be included in the cost of the pay item.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

IDM 83-2.0 HIGHWAY SIGNS
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS

83-2.06 Portable Changeable Message Signs

~~A portable~~ *Portable* changeable message ~~sign~~ signs (PCMS) ~~is~~ *are very* effective in communicating the construction zone information to the general public. ~~NDOT's practice is to use PCMS on each applicable freeway construction project~~ ~~The use of a PCMS on another type of facility should be determined on a project-by-project basis based on road alignment, traffic routing, or other situation requiring advance warning and information~~. *Their use in construction projects shall be as outlined in "INDOT Guidelines for Portable Changeable Message Signs".* ~~For each facility, the applications where the PCMS device may be effectively used in construction zones are as follows:~~

~~1. where speed is expected to drop substantially;~~
~~2. where significant traffic queuing and delays are expected;~~
~~3. where a change in road alignment or surface conditions are present;~~
~~4. to provide advance notice of a ramp, lane, or road closure;~~
~~5. to notify or direct motorists to alternate routing; or~~
~~6. to show a work-site speed limit as supplemental to other regulatory signs.~~

It is INDOT's practice to consider the need for PCMS on all construction projects involving:

1. intermittent or short term, road, lane or ramp closures
2. frequent changes in traffic patterns
3. roads with traffic volumes that will be at or over capacity during construction
4. other projects as deemed necessary by

a. the District Office
b. the Construction Management Division or
c. the Traffic Management Business Unit.

PCMS should not be used to convey messages that can be made effectively with static signing.

When PCMS are specified the following information will be provided on the plans or in the contract documents:

1. The approximate location of each PCMS. Unless there are specific reasons otherwise PCMS's should be located per tables I and II of the Guidelines.

2. The message content for each PCMS. Messages should be per the Guidelines either selected from the standard messages given in table VII or developed as non-standard.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

IDM 83-2.0 HIGHWAY SIGNS
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS
(CONTINUED)

3. A programming sheet for each non-standard message given. Programming sheets should be included in the contract documents. Consult the MUTCD for guidance on phase and cycle lengths.

The Schedule of Pay Items should include the pay item "Portable Changeable Message Sign" and the appropriate quantity.

The *MUTCD* provides the design and application criteria relative to a PCMS. The designer should also consider the following ~~in~~ *when* specifying a PCMS.

1 Display. The display should provide no more than the maximum amount of information that can be read and comprehended by the motorist at a quick glance (i.e., no rolling messages). ~~A PCMS~~*The typical changeable message sign* is capable of displaying three lines of eight characters each. There should be ~~not~~ *no more* than ~~three~~ *two* messages phased in order to provide readability and comprehension. Each message *phase* should be able to stand alone. For ~~a~~ multiple messages, use two signs.

~~2~~ Location. The sign should be visible from 2500 ft under ideal day and night conditions~~.~~, *and* ~~T~~*t*he first message should be legible at a minimum distance of 650 ft from ~~each~~ *all* lanes. ~~A~~ PCMS should *typically* be placed in advance of *any* other advance~~-~~warning sign~~s~~. *For further instruction on PCMS plan location see the Placement section of the Guidelines.* ~~If two signs are needed to communicate a multiple message, they should be placed on the same side of the roadway and separated by at least 1000 ft. A PCMS is placed on the shoulder, but if practical may be farther from the traveled way. Overhead placement may also be considered.~~

3 Traffic-Control Devices. A PCMS may be used as a supplement, but it should not be used as a substitute to the proper use of conventional traffic- control devices.

4 Flashing-Arrow Signs. A PCMS should not be used as an alternative to ~~a~~ flashing-arrow sign*s*. However, a PCMS may be used to simulate an arrow display in ~~a~~ *the* message.

As part of the Traffic Management Plan for projects in Advanced Traffic Management System (ATMS) areas, the designer should consult with district construction and the appropriate Traffic Management Center to determine whether TMC control of the PCMS is desired.. The ATMS areas are:

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

IDM 83-2.0 HIGHWAY SIGNS
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS
(CONTINUED)

Indianapolis (Indy TMC)
I-65, from SR 44 (mile 90) to US 52 (mile 141)
I-69, from I-465 (mile 0) to SR 9/109 (mile 26)
I-70, from SR 39 (mile 59) to SR 9 (mile 104)
I-74, from SR 267 (mile 66) to I-465 (mile 73)
I-74, from I-465 (E. Jct- mile 94) to Pleasant View Rd (mile 101)
I-465, (mile 0 to mile 53)
I-865, from I-65 (mile 0) to I-465 (mile 5)

Northwest Indiana (Gary TMC)
I-65 from US 231 (mile 247) to I-90 (mile 262)
I-80/94 from the Illinois State Line (mile 0) to I-90 (mile 16)
I-94 from I-90 (mile 16) to SR 49 (mile 26)

If the PCMS will be TMC controlled the designer will place the ATIS Compatibility Clause and Aries Field Processor Special Provisions in the Contract. These provisions may be obtained through the ITS Technology Deployment Division of the Traffic Management Business Unit.

PROGRAMMING SHEET FOR
PORTABLE CHANGEABLE MESSAGE SIGNS

LOCATION OF PCMS:_____

MESSAGE DISPLAYED DURING (MOT phase, event, etc.): _____

_____

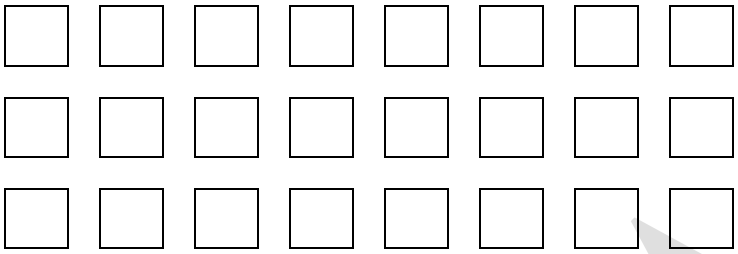
CREATED BY _____

_____

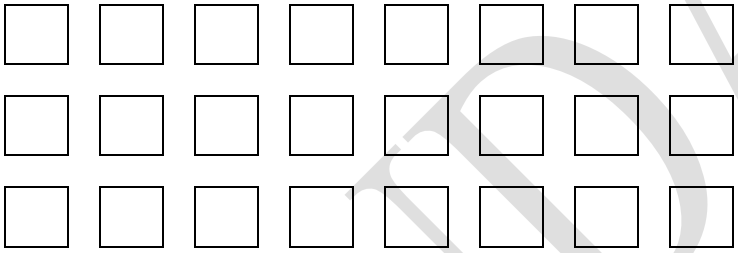
REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

IDM 83-2.0 HIGHWAY SIGNS
REVISION TO IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGNS
(CONTINUED)

MESSAGE PHASE 1



MESSAGE PHASE 2



TIMING:

MESSAGE PHASE 1 WILL BE RUN ____.____ SECONDS.

MESSAGE PHASE 2 WILL BE RUN ____.____ SECONDS.

INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS

POLICY STATEMENT

This policy provides specific requirements and guidelines for the use of portable changeable message signs (PCMS) on the Indiana highway system. PCMS's provide an excellent means to communicate with motorists since they are easily noticed and command attention. It is for these reasons that PCMS's must be used appropriately. Therefore it is INDOT's policy that these principles be followed when considering a PCMS message:

PRINCIPLE #1- RELEVANCE
PCMS's shall convey only accurate, pertinent and up to date roadway or emergency information. The display of a message like "CAUTION/CAUTION/CAUTION" is not relaying specific information and as such is not an acceptable use of a PCMS. *(Recommendation 2009 MUTCD 2M.02)*

PRINCIPLE #2- CLARITY
PCMS messages shall be conveyed in a standard, non-confusing manner. Drivers must be able to both read and react to the information given in a timely fashion. *(Recommendation 2009 MUTCD 2M.02)* Messages shall be one or two phases (display screens) in length; three phase messages are not acceptable.

PRINCIPLE #3- SINGULARITY
PCMS's should not display messages for an extended period of time that can be effectively conveyed with static signing (panel or sheet signs). The display of standard highway sign messages on a PCMS over an extended time diminishes the ability of PCMS to command attention. (*Variation on the recommendation 2009 MUTCD 6F.57)*

PRINCIPLE #4- IMPARTIALITY
PCMS's *shall not* display messages that in any way advertise commercial events or entities *(Requirement 2009 MUTCD 2M.01).* Messages shall be for the benefit the general motoring public.

AUTHORITY AND RESPONSIBILITIES

CONTRACTED ACTIVITIES
For contracted activities the Contractor or designated-sub will:

- Supply the PCMS

- Maintain the PCMS
- Relocate the PCMS
- Enter messages (except when the TMC controls)
- Verify message correctness (except when the TMC controls)
- Change messages (except when the TMC controls)

The contractor is not responsible for selecting messages, but rather the designer or District Construction, Traffic or Maintenance and Operations office will determine the appropriate message(s) for each phase of construction or change of conditions. The designer will:

- Determine all messages associated with the bid MOT plan
- Include all planned messages in the bid plans
- Develop programming sheets for all non-standard, planned messages
- Include the programming sheets in the contract proposal

If the maintenance of traffic plan is changed after letting the engineer will determine the applicability of the original messages. The engineer may also direct the contractor to display applicable standard messages when the plans do not address a need (see Table VII, page 19). These messages will not supersede applicable higher priority messages detailed in the plans.

For contracted activities in Advanced Traffic Management System areas the District Construction office and the Traffic Management Center (TMC) may agree to control the PCMS through the TMC. This decision will be made during the design process as part of the Traffic Management Plan. In these cases the TMC will generate and change the messages and ensure that the correct message is displayed.

NON-CONTRACTED ACTIVITIES

For non-contracted activities the District Highway Maintenance and Operations or Traffic office will determine the message(s) to be displayed. The PCMS deployer will enter/change messages and ensure that the correct message is displayed.

The TMC may also provide messages for contracted work outside of the ATMS areas or non-contracted activities. However, in these cases it is the Engineer's or PCMS deployer's responsibility to ensure that the message is correct and the highest priority message is displayed.

PLACEMENT

Typical placement of PCMS's are given in tables I and II for various work zone conditions. Engineering judgment should be applied to specific temporary traffic control plan to best locate the PCMS's.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

TABLE I: PCMS PLACEMENT FOR FREEWAYS

Event	Duration	Min. # required per approach	Location of 1st PCMS	Location of 2nd PCMS
Road Closure	any length	2	**1 mile** in advance of the detour exit (if detour is provided) or the closure	1000' in advance of the detour exit (if detour is provided) or the closure
Ramp Closure	less than 1 week (or less than 1 month for unplanned closure)	2	**1 mile** in advance of detour exit (if detour is provided) or the closed ramp	1000' in advance of the detour exit (if detour is provided) or the closed ramp
Lane Closure w/ Anticipated Queuing	any length	2	**1 mile** in advance of the previous exit upstream of the anticipated queue length	1000' in advance of anticipated queue length
Lane Closure	mobile or stationary at any one location less than 2 weeks	2	2500' in advance of previous exit upstream of the closure	1000' in advance of the first construction sign
Frequent or Intermittent changes in Alignment	any length	1	1000' in advance of the first construction sign	n/a
Frequent or Intermittent Changes in Pavement Condition	any length	1	1000' in advance of the first construction sign	n/a
Speed Limits reduced by 20 mph or more for Work Zone	any length	1	1000' in advance of the first construction sign	n/a
Location with a Significant Crash History	any length	1	1000' in advance of the first construction sign	n/a

TABLE II: PCMS PLACEMENT FOR NON-FREEWAY STATE HIGHWAYS

Event	Duration	Min. # required per approach	Location of 1st PCMS
Road Closure	less than 2 weeks	1	500' in advance of the first construction sign
Side Road Closure	less than 1 week (or less than 1 month for unplanned closure)	1	500' in advance of the closed side road
Lane Closure w/Peak Hour Delay > 5 minutes	any length	1	1500' in advance of the first construction sign
Lane Closure	mobile or stationary at any one location less than 2 weeks	1	500' in advance of the closed side road
Frequent or Intermittent Changes in Alignment	any length	1	500' in advance of the first construction sign
Frequent or Intermittent changes in Pavement Condition	any length	1	500' in advance of the first construction sign
Speed Limits reduced by 20 mph or more for Work Zone	any length	1	500' in advance of the first construction sign
Location with a Significant Crash History	any length	1	500' in advance of the first construction sign

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

Further guidance on the spacing and placement of PCMS's:

- Where possible, PCMS's should be placed behind barrier wall, guardrail or outside the construction clear zone provided that the area can be accessed and the PCMS can be leveled without undue effort. Where it is not practical to positively protect or place outside the construction clear zone the minimum lateral offset should be 6 feet or 12 feet where shoulders are 6 feet or less in width.

- Where possible, PCMS's should be on the right side of the road with the following exceptions:

    - On divided highways the preferred placement for PCMS's is in the median behind protection as might be found at a bridge pier or overpass.

    - In the case of a left lane closure on freeway where the median is at least 30' in width PCMS's should be placed off the left shoulder.

- On curve alignments the angle of placement should be determined by the direction of approaching traffic rather than the roadway edge at the PCMS location.

- Placement in sag curves and just beyond crests should be avoided.

- For work zones in place for at least 1 week the locations of PCMS's used to display queuing/delay information should be adjusted from the planned location according to field observations of actual maximum queue.

- If more than two phases are required for a message then the PCMS's shall be used in series–that is two consecutive PCMS's displaying the first and last part of the message. For freeways PCMS's used in series shall be placed on the same side of the roadway and spaced at approximately 1000'- for non-divided roads the spacing should be approximately 500'.

- PCMS's oriented for the same direction of travel should not be placed opposite one another on both the left and right sides of the road.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

MESSAGE TYPE AND PRIORITY

Portable PCMS's may be used to display messages as indicated in Table III. Priority level 1 messages take precedence over level 2, level 2 over level 3, and so on. In the event that more than one message of the same priority level is needed judgment must be used as to which is most beneficial. The District Traffic office, the Work Zone Safety Section or the Traffic Management Centers may be consulted to make this determination.

TABLE III: MESSAGE PRIORITY

PRIORITY LEVEL	MESSAGE TYPE
1 (highest)	Road Closure
2	Ramp Closure/Access Restriction
3	Hazardous Conditions
4	Real-time traffic information
5	Advance notice for scheduled events.
6 (lowest)	Public information pertinent to highway safety

MESSAGE TYPES:

1. **Road Closure**– These are events where complete traffic diversion is required and the closures or effect of the closures will be of sufficient duration for the PCMS to be deployed and programmed.

Examples:

- The Department of Homeland Security conducting nuclear or hazardous material evacuation
- The military requiring road closure for major troop/equipment transport
- Closure of the facility due to a crash, damaged structure, pavement failure or toxic spill
- Roadway closures resulting from hazardous conditions such as landslides, flooding, blizzards, whiteouts, or other severe weather that greatly affects visibility or driver ability
- Road closure due to setting of overhead structures or signals.

Phase 1	Phase 2
I-70 CLOSED	**EXIT 106 TO I-465**

In an emergency where another agency is in command of the situation that agency may direct specific use of PCMS's. n all likelihood, the command agency will rely on INDOT for locating and programming signs and developing the exact messages.

2. **Ramp Closure/Access Restriction**– If planned detours are to be in place for more than a week, conventional detour signing should be used. If the detour was not planned, the PCMS can be used as an alternate to conventional signing; however, if the detour is expected to remain in place for more than a month, conventional signs should be installed as soon as possible. These messages can be especially useful for a partial audience for which no other signing is in place. Care must be taken to keep these messages updated with correct information.

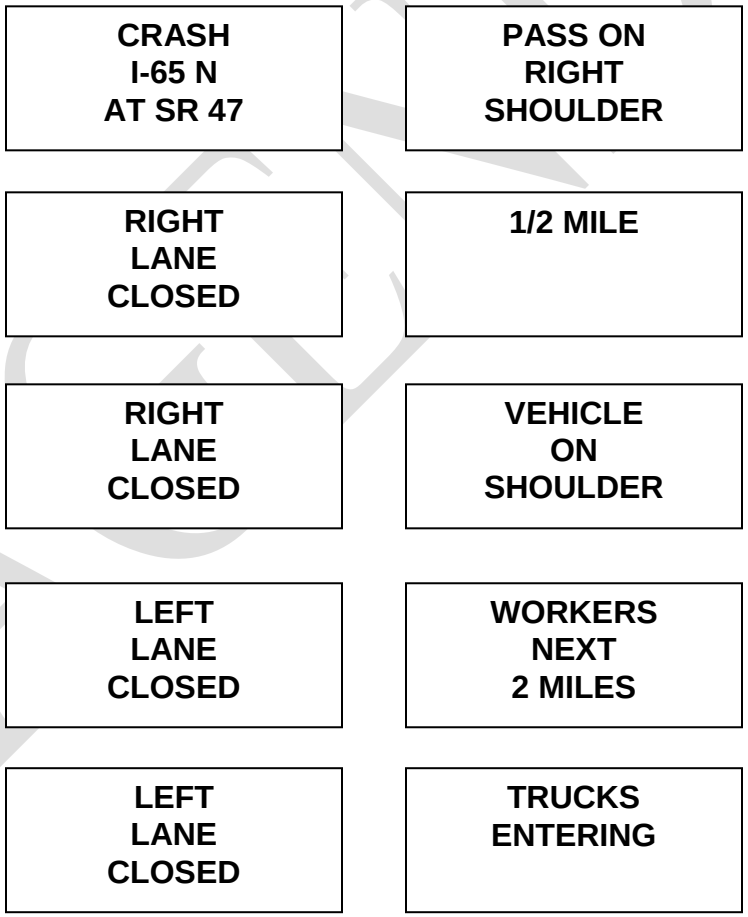
Examples:

- Detour for specific audience such as over-width vehicles that cannot traverse a construction zone with barriers
- Overnight ramp closure for which no detour is given because it is assumed that motorists know alternate routes
- Closing of an intersecting roadway adjacent to mainline

WIDELOAD USE I-94 TO I-90	**USE CHICAGO SKYWAY**

3. **Hazardous Conditions** – These messages warn of hazardous conditions that do not result in road closure and that cannot be effectively signed for statically by panel or sheet signs. The majority of information relevant to the motorists would fall into this category, therefore it is extremely important for all parties to cooperate and ensure that motorists are receiving the most important information at any particular time. Examples:

- Crash and/or emergency vehicles in a lane or on the shoulder within or adjacent to the work zone
- Unplanned or short term lane/shoulder closures or blockages
- Extreme weather that impairs driving ability and/or visibility such as ice, snow, fog, flooding
- Unusual roadway conditions for the roadway type such as lane shifts, rough pavement or narrow lanes on a freeway due to construction or maintenance
- Workers or construction equipment in close proximity to an open travel way
- Speed reduction (e.g. caused by congestion)

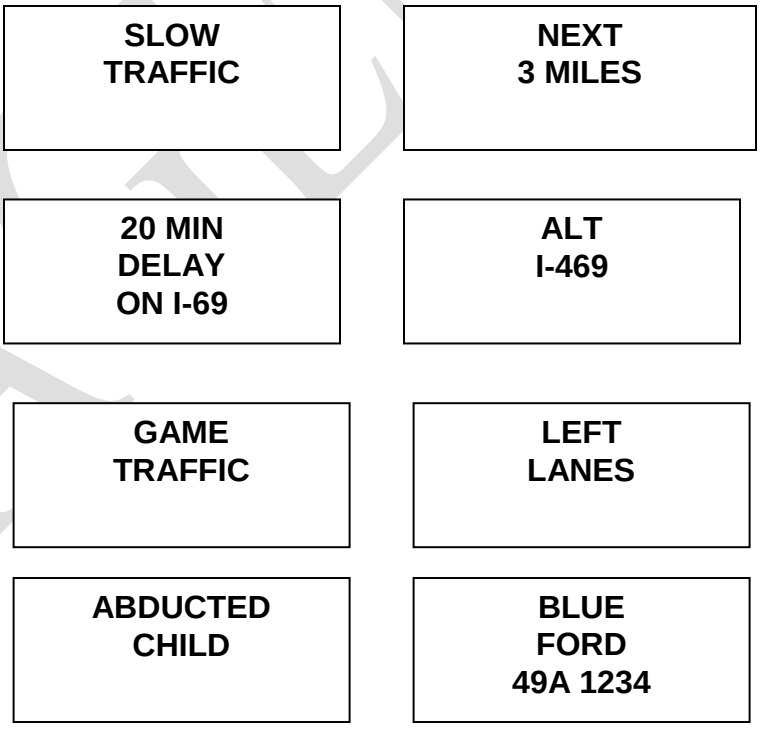


4. **Real-Time Traffic Information**– Information about real-time traffic conditions will help motorists to avoid congestion and delays. In order for motorists to react to this

type of information they must trust that it is accurate or they will not change their route of travel. Unless facilities for real-time data collection are provided in the contract or delays are visually confirmed by the Engineer or District Traffic office, the Traffic Management Center will provide this type of information and may recommend the corresponding messages. Identification of alternate routes must be coordinated with District Traffic/Maintenance and Operations. Local routes will not be used as alternates without the prior approval by the agency of jurisdiction.

Examples:

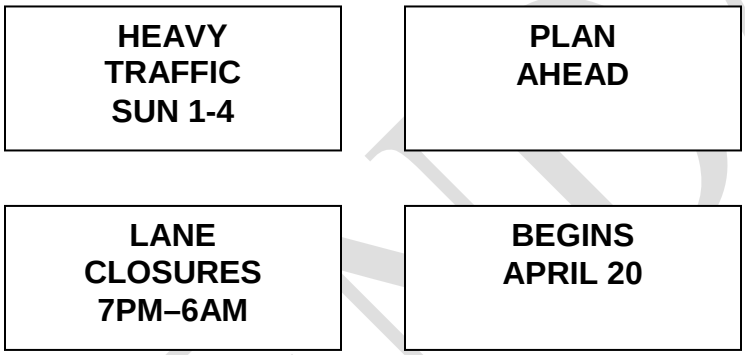
- Real-time travel delay; allowing motorists to consider an alternate route
- Suggested alternate route(s)
- Combination of the above
- Suggested routes to a large traffic generator
- Amber Alerts (these alerts are provided only through the TMC).



5. **Advance Notice of Special Events** – If a planned event such as a road/ramp/lane closing is expected to occur, motorists should be warned ahead of time to avoid that area during the event.

Examples:

- Large, traffic-generating sports event
- Scheduled lane closure with a heavy traffic impact



6. **Public Information Pertinent to Highway Safety** – This type of message requires an action by drivers and shall only be displayed with the District Traffic/Maintenance & Operations Engineer's or their designee's approval. The intended use for this message type is to improve safety and mobility, and to reduce congestion.

Example:

- License, DUI, seat-belt or weight check by law enforcement.

MESSAGE SELECTION & NON STANDARD MESSAGE DEVELOPMENT

To promote consistency in INDOT work zones, pre-approved, standard messages are provided on pages 19 - 22.

The Designer or District Traffic/Maintenance and Operation Office will create non-standard messages. The Traffic Management Centers and the Work Zone Safety Section may be consulted for advice on non-standard messages. For contracted work a "Programming Sheet for Changeable Message Sign Use" will be included in the special provisions for each non-standard message identified in the maintenance of traffic plans.

COMPONENTS OF A MESSAGE

When designing a message, enough information needs to be given to the motorists to enable them to react and possibly make a decision. If this is not done, the message may be ignored. The message can be broken down into the 5 W's (what, where, when, who and why). All of these components are not necessarily needed for each and every message. They may often be implied. Generally the message can address any of the following:

1. **What** action should be taken
2. **Where/When** is the event
3. **Who** is affected
4. **Why** the action is needed

If a message or element of a message is not addressing one or more of these points then it should not be used.

What? – What action is required by the motorist?

- This is the instruction you want motorists to follow. It could be to reduce speed, divert to a specific route, begin to merge, etc. The motorists will tend to ignore a simple WHAT statement unless they are also given a WHY. Motorists need to have as much information as possible so they can make an informed decision.

- The WHAT component of a message may be implied. The following future event message is an example:

This message gives the motorists a WHY and WHEN, but it implies that they need to plan to be elsewhere at that time. If the driver population is very familiar with an area, a WHY and WHERE may be given as:

HEAVY
TRAFFIC
SUN 1-4

KEYSTONE AVE CLOSED

This implies that motorists must find an alternate route for Keystone Avenue.

The WHAT component is the most important piece of information given that will affect drivers' decisions. They must be clear, comprehensible and recognizable. or example:

WHAT:	DETOUR EXIT 247	WHY:	ROAD CLOSED

WHATs include MERGE RIGHT, MERGE LEFT, KEEP RIGHT, KEEP LEFT, PREPARE TO STOP, REDUCE SPEED, DO NOT PASS, STAY IN LANE, SLOW TO xx MPH, STAY IN VEHICLE, TUNE RADIO 530 AM, EXIT 1 MILE, FOLLOW DETOUR, FOLLOW ALT ROUTE, etc..

Where? – Where is the decision point at which motorists must take an action. The following guidelines should be observed on WHERE messages:

- When giving a location, only use major points of reference such as exit numbers. Interchange names may be use in combination with an exit number. Overpass or underpass names should not be used.

- When the majority of motorists are interstate travelers who are not familiar with the names of local cross-streets, locations should be described in distances to the nearest ½ mile.

- If the majority of motorists are local, use the local street names. Most urban drivers are more familiar with street names than route numbers, SR numbers, mile markers, or reference markers.

- AHEAD is not a WHERE; it's a filler word. For notices of an incident, lane closure or heavy congestion, an actual distance should be given instead of just the word AHEAD. This will give the driver a point of reference and the opportunity to divert based on the driver's knowledge of the area.

WHERE includes xx MILES AHEAD, AT MOREHEAD ST., NEAR (LANDMARK), EXITS xx TO xx.

When? – When will an event occur for which drivers should change their actions?

For future events, give specific data for its traffic disruption only if it is certain to occur. The PCMS's will lose their credibility if they advertise traffic conditions that never occur. An example is a major, traffic-generating sports event. Do not make the message specific if real time information cannot be kept current. This type of message is usually required to be combined with a WHERE.
An example of a **message not to display** is:

ROAD **OPENS** **21 DAYS**

The road may not open as planned. WHEN can be a date, time, holiday, or weekend.

Who? – If only a partial audience is required to take an action, who are they?

A partial audience could potentially include:

- Over-width vehicles.
- Motorists with a particular destination; such as in a secondary road or ramp closure detour situation.
- Traffic en-route to a specific event such as:

GAME **TRAFFIC**

USE **LEFT** **LANES**

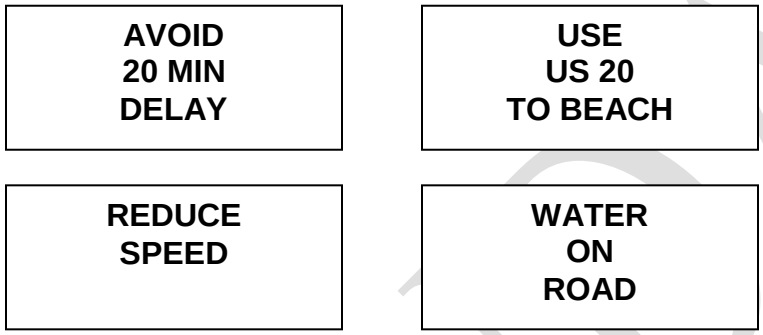
WHO includes ALL TRAFFIC, THRU TRAFFIC, CARS, TRUCKS, BUSES, WIDELOAD, EMER VEH/ONLY, highway/road name with a direction, LOCAL/TRAFFIC, etc.. Downstream cities and destinations (e.g. CHICAGO TRAFFIC) identify an audience also.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

Why? – Additional information to assist and/or spur motorists' decision making.

This is intended to encourage motorists to make a change to their driving and follow the message instruction. The following are examples:



Without the WHY statements the motorists will most likely ignore the instruction, but with the additional information they will make an informed decision. WHY includes LEFT LANE CLOSED, RIGHT LANE CLOSED, RAMP CLOSED, xx MILE BACKUP, xx MIN DELAY, SLOW TRAFFIC, RIGHT SHOULDER CLOSED, EXPECT DELAYS.

WORD USAGE

Avoid filler words such as AHEAD or CAUTION. Both of these words can be implied in most instances. Drivers will realize that if you are giving a warning you are also advising caution. They will also assume that they would only be advised of situations ahead of them. However, there are times where AHEAD is beneficial as it can differentiate between the distance to a lane restriction versus the length of a lane restriction. For example, RIGHT/LANE /CLOSED|5 MILES/AHEAD makes it clear that the right lane is closed 5 miles ahead, not that the right lane is closed for 5 miles. The word, TRAFFIC, when addressing a specific audience, may be deleted when space considerations do not allow.

When using more than one phase, repeat key words. Do not use potentially contradictory terms. For instance both LEFT and RIGHT should not be used in the same sequence, such as RIGHT/LANE/CLOSED|MERGE LEFT. Inattentive drivers will scramble the message. A better message is RIGHT/LANE/CLOSED|PREPARE/TO/ MERGE or the basic standard message (no 13) RIGHT/LANE/CLOSED.

Use vocabulary familiar to the driver population. Express Lanes, for instance, are not utilized in Indiana except in Chicago and Indianapolis metro areas, so the message THRU/TRAFFIC|USE/ EXPRESS/LANE could be confusing outside of those locales.

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

The use of abbreviations should be kept at a minimum. When space will not allow all key words to be spelled out the standard abbreviations found on pages 16-18 should be used.

ADDITIONAL REQUIREMENTS FOR PCMS MESSAGES

The standards and guidelines found in the Manual on Uniform Traffic Control Devices (MUTCD) regarding portable changeable message signs shall be observed. Only upper case letters shall be used. Alternating a line and leaving the other lines the same between the first and second phase of a two phase message is not permissible.

LIMITS TO MESSAGE SIZE

At normal highway speeds motorists are limited in the amount of information they can read on one sign. This was recognized in the current MUTCD in which greater limits have been placed on message size. As a result it is INDOT's policy to limit the amount of information displayed on a PCMS per the MUTCD and as follows:

- A maximum of 8 characters per line (including spaces) shall be used
- PCMS's shall display no more than 3 lines per phase
- No more than two phases per message. One phase should be used when possible.
- When two phases are used to create a message each phase should be understandable on its own
- Each phase should be limited to three units of information (or data items used for decision making). As an example standard message #1 (see page 19) consists of 1 phase with two units of information- the first unit is "ROAD WORK" the second is "XX MILES"
- Each message should be limited to 4 units of information

If the message exceeds these limitations then the amount of information in the message should be reduced by deleting the least significant or the lowest priority information. In general the priority based on type of information is:

1 Why
2 Where
3 When (if applicable)
4 What (may be implied in many instances)
5 Who (if applicable)

MULTIPLE MESSAGES

It may be necessary to relay multiple pieces of information to motorists. This can be accomplished by careful message design. For instance, if a segment of I-70 is closed due to an overhead bridge collapse; a priority 1 message will result. If, at the same time, the truck that hit

the bridge is on fire and billowing smoke on to the alternate route, I-465, a priority 3 message may be necessary. In the following example, three phases are used to inform motorists that there is an emergency requiring action on their part and to warn of a potentially hazardous condition that could be encountered after taking the action.

I-70 CLOSED EXIT 90	DETOUR EXIT 90	EXPECT HEAVY SMOKE

Three phases should only be used if there is no reasonable way to convey critical information on two. When three phases are needed multiple PCMS's should be used in series to convey the message in order to satisfy the MUTCD and INDOT policy regarding the maximum number of phases per message.

APPROVAL OF NON-PRIORITY MESSAGES

PCMS's shall only display messages that pertain to highway safety or congestion. Special use of PCMS may be requested by the Commissioner, Deputy Commissioner, Traffic Management, or the District Deputy Commissioner, but messages must still conform to policy and special messages must be approved by the District Traffic/Maintenance & Operations Engineer.

MESSAGE TYPES TO AVOID

Message types that are not permitted:

1. PCMS's shall not display messages that in any way advertise commercial events or entities. An example of a **message not to display** is:

RCA CHMPSHPS TRAFFIC	USE EXIT 79A

An acceptable message is:

TENNIS TRAFFIC	USE EXIT 79A

Although the same information is relayed, no names are used. This awareness will prevent businesses from being able to accuse INDOT of advertising their competitors.

The placement of advertisements in advance notification messages should also be avoided. The following is a message warning motorists of expected heavy traffic due to a planned athletic event. INDOT cannot be accused of advertising the event or any of its teams because this message does not include names.

HEAVY TRAFFIC SUN 1-4	**USE ALT ROUTE US 40**

2. PCMS's should not be used to convey a message for an extended period of time, approximately two weeks or more, that could be conveyed with a conventional warning or guide sign. An example of this is ROAD/WORK/AHEAD being displayed for more than two weeks while the standard construction sign could have been used**.**

3. PCMS's should not display generic messages that convey non specific information about the work zone or road conditions (e.g. CAUTION/CAUTION/CAUTION).

STANDARD ABBREVIATIONS

These easily understood Standard abbreviations may be used:

TABLE IV: STANDARD ABBREVIATIONS

Word	Abbr.	Word	Abbr.
Afternoon/Evening	PM	Lane	LN
Alternate	ALT	Left	LFT
Avenue	AVE/AV	Maintenance	MAINT
Bicycle	BIKE	Morning	AM
Boulevard	BLVD	Normal	NORM
Cannot	CANT	Northbound	N-BND
CB Radio	CB	Parking	PKING
Center	CNTR	Right	RHT
Circle	CIR	Road	RD

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

Crossing	XING	Route	RTE
Do Not	DONT	Service	SERV
Eastbound	E-BND	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Entrance, Enter	ENT	Southbound	S-BND
Expressway	EXPWY	Speed	SPD
Feet	FT	Street	ST
Freeway	FRWY, FWY	Temporary	TEMP
Hazardous	HAZ	Traffic	TRAF
Highway	HWY	Travelers	TRVLRS
Hour(s)	HR	Vehicle	VEH
Information	INFO	Warning	WARN
It Is	ITS	Westbound	W-BND
Junction	JCT	Will Not	WONT

Other abbreviations may be used with approval of the District Traffic/Maintenance & Operations Engineer.

Other abbreviations are easily understood whenever they appear in conjunction with a particular word commonly associated with it. These words and abbreviations are as follows:

TABLE V: ABBREVIATIONS ACCEPTABLE WITH PROMPT WORD

Word	**Abbr.**	**Prompt**
Ahead	AHD	Fog*
Blocked	BLKD	Lane
Bridge	BRDG	[Name]
Chemical	CHEM	Spill
Condition	COND	Traffic*
Congested	CONG	Traffic*
Construction	CONST	Ahead
Downtown	DWNTN	Traffic
Exit	EX, EXT	Next
Frontage	FRNTG	Road
Interstate	I	[Number]
Major	MAJ	Crash
Mile(s)	MI	[Number]*
Minor	MNR	Crash
Oversized	OVRSZ	Load
Minute(s)	MIN	[Number]*

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

Prepare	PREP	To Stop
Pavement	PVMT	Wet*
Quality	QLTY	Air*
Roadwork	RDWK	Ahead [Distance]
Route	RTE	Best*
Vehicle	VEH	Stalled*
Cardinal Directions	N, E, S, W	[Number]*

* These prompt words should precede the abbreviation.

TABLE VI: UNACCEPTABLE ABBREVIATIONS

Abbreviation	Intended Word	Common Misinterpretations
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

STANDARD MESSAGES

The following table lists messages that are considered standard and as such may be displayed when appropriate without authorization as specified in the "AUTHORITY AND RESPONSIBILITIES" section on page 2:

TABLE VII: STANDARD MESSAGES

Number	First Phase Line 1/Line 2/ Line 3	Second Phase Line 1/Line 2/ Line 3
1	ROAD/WORK/xx MILES	n/a
2	WORK/ZONE/xx MILES	n/a
3	NIGHT/WORK/xx MILES	n/a
4	DETOUR/xx MILES	n/a

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

5	MEDIAN/WORK/xx MILES	n/a
6	SIGNAL/xx MILES	n/a
7	CRASH/xx MILES	n/a
8	YIELD/xx MILES	n/a
9	STOP/xx MILES	n/a
10	WATER/ON/ROAD	n/a
11	FOG/xx MILES	n/a
12	FLAGGER/xx MILES	n/a
13	RIGHT/LANE/CLOSED	n/a
14	LEFT/LANE/CLOSED	n/a
15	CENTER/LANE/CLOSED	n/a
16	RIGHT 2/LANES/CLOSED	n/a
17	LEFT 2/LANES/CLOSED	n/a
18	MERGE/xx MILES	n/a
19	MERGE/LEFT	n/a
20	MERGE/RIGHT	n/a
21	KEEP/LEFT	n/a
22	RIGHT/LANE/NARROWS	n/a
23	KEEP/RIGHT	n/a
24	PASS/LEFT	n/a
25	PASS/RIGHT	n/a
26	TRUCK/CROSSING	n/a
27	ROAD/CLOSED/xx MILES	n/a
28	ALL/TRAFFIC/EXIT RHT	n/a
29	CRASH/AHEAD/SLOW	n/a
30	USE/LEFT/LANE	n/a
31	USE/RIGHT/LANE	n/a
32	DO/NOT/PASS	n/a
33	ROAD/CLOSED/xx MILES	n/a
34	ROAD/WORK/xx MILES	RIGHT/LANE/CLOSED
35	ROAD/WORK/xx MILES	RIGHT 2/LANES/CLOSED
36	ROAD/WORK/xx MILES	LEFT/LANE/CLOSED
37	ROAD/WORK/xx MILES	LEFT 2/LANES/CLOSED
38	ROAD/WORK/xx MILES	CENTER/LANE/CLOSED
39	WORK/ZONE/xx MILES	RIGHT/LANE/CLOSED
40	WORK/ZONE/xx MILES	RIGHT 2/LANES/CLOSED
41	WORK/ZONE/xx MILES	LEFT/LANE/CLOSED
42	WORK/ZONE/xx MILES	LEFT 2/LANES/CLOSED
43	WORK/ZONE/xx MILES	CENTER/LANE/CLOSED
44	NIGHT/WORK/xx MILES	RIGHT/LANE/CLOSED
45	NIGHT/WORK/xx MILES	RIGHT 2/LANES/CLOSED
46	NIGHT/WORK/xx MILES	LEFT/LANE/CLOSED

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

47	NIGHT/WORK/xx MILES	LEFT 2/LANES/CLOSED
48	NIGHT/WORK/xx MILES	CENTER/LANE/CLOSED
*49	RIGHT/LANE/CLOSED	PREPARE/TO/STOP
*50	LEFT/LANE/CLOSED	PREPARE/TO/STOP
*51	CENTER/LANE/CLOSED	PREPARE/TO/STOP
*52	RIGHT 2/LANES/CLOSED	PREPARE/TO/STOP
*53	LEFT 2/LANES/CLOSED	PREPARE/TO/STOP
54	CRASH/AHEAD	DETOUR/AT/EXIT xxx
55	CRASH/ON/BRIDGE	DETOUR/AT/EXIT xxx
56	CRASH/AT/EXIT xxx	FOLLOW/DETOUR/EXIT xxx
57	CRASH/AT/EXIT xxx	PASS ON/RIGHT/SHOULDER
58	CRASH/AT/EXIT xxx	SLOW/MOVING/TRAFFIC
59	CRASH/AT/EXIT xxx	ALL/LANES/CLOSED
60	CRASH/AT/EXIT xxx	RIGHT/LANE/CLOSED
61	CRASH/AT/EXIT xxx	RIGHT 2/LANES/CLOSED
62	CRASH/AT/EXIT xxx	LEFT/LANE/CLOSED
63	CRASH/AT/EXIT xxx	LEFT 2/LANES/CLOSED
64	CRASH/AT/EXIT xxx	CENTER/LANE/CLOSED
65	CRASH/AT/MILE xxx	FOLLOW/DETOUR/EXIT xxx
66	CRASH/AT/MILE xxx	PASS ON/RIGHT/SHOULDER
67	CRASH/AT/MILE xxx	SLOW/MOVING/TRAFFIC
68	CRASH/AT/MILE xxx	ALL/LANES/CLOSED
69	CRASH/AT/MILE xxx	RIGHT/LANE/CLOSED
70	CRASH/AT/MILE xxx	RIGHT 2/LANES/CLOSED
71	CRASH/AT/MILE xxx	LEFT/LANE/CLOSED
72	CRASH/AT/MILE xxx	LEFT 2/LANES/CLOSED
73	CRASH/AT/MILE xxx	CENTER/LANE/CLOSED
74	ROAD/CLOSED	USE/DETOUR/EXIT xxx
75	ROAD/CLOSED/*DATE*	USE/EXIT xxx
76	BRIDGE/CLOSED	USE/DETOUR/EXIT xxx
77	BRIDGE/CLOSED/*DATE*	USE/EXIT xxx
78	EVENT/TRAFFIC	USE/RIGHT 2/LANES
79	GAME/TRAFFIC	USE/RIGHT/LANE
80	CONCERT/TRAFFIC	FOLLOW/SIGNS
**81	EXIT xx/CLOSED	*DATE (e.g. DEC 4-7)*
**82	EXIT xx/CLOSED	*DAY(S) (e.g. MONDAY)*
83	ICY/BRIDGE	REDUCE/SPEED
84	SLIPPERY/ROAD	REDUCE/SPEED
85	DENSE/FOG	REDUCE/SPEED
86	HIGH/WINDS	REDUCE/SPEED
87	ROAD/FLOODED	REDUCE/SPEED

REVISION TO THE STANDARD SPECIFICATIONS AND DESIGN MANUAL

BACKUP NO. 1 INDOT GUIDELINES FOR PORTABLE CHANGEABLE MESSAGE SIGNS (CONTINUED)

88	BLOWING/SNOW	REDUCE/SPEED
89	ROAD/FLOODED	SLOW/MOVING/TRAFFIC
90	TRUCK/CROSSING	WATCH/FOR/TRUCKS
91	TRAVEL/ LANE/CLOSED-	USE/SHOULDER
92	LOAD/SPILL	FOLLOW/DETOUR/EXIT xx
93	LANE/MARKING	EXPECT/DELAYS
94	LANE/MARKING	SLOW/MOVING/TRAFFIC
95	LANE/MARKING	LEFT/LANE/CLOSED
96	LANE/MARKING	CENTER/LANE/CLOSED
97	LANE/MARKING	RIGHT/LANE/CLOSED
98	LANE/MARKING	*Duration (e.g. 10AM-3PM)*
***99	TRAFFIC/ADVISORY	TUNE/TO/530 AM (or1610 AM)
100	FLAGGER/AHEAD	PREPARE/TO/STOP
101	ROAD/WORK	SLOW/MOVING/TRAFFIC
102	DEBRIS/ON/ROAD	RIGHT/LANE/BLOCKED
103	DEBRIS/ON/ROAD	CENTER/LANE/BLOCKED
104	DEBRIS/ON/ROAD	LEFT/LANE/BLOCKED
105	DEBRIS/ON/ROAD	MERGE/RIGHT
106	DEBRIS/ON/ROAD	MERGE/LEFT
107	EMER/VEHICLES/AHEAD	MERGE/RIGHT
108	EMER/VEHICLES/AHEAD	MERGE/LEFT
109	NEW/TRAFFIC/PATTERN	LANES/SHIFT/xxx FT
110	EXIT xx/CLOSED	DETOUR/xxMILES/AHEAD
111	EXIT xx/RAMP/CLOSED	FOLLOW/DETOUR/EXIT xx

Notes:

* Messages 49 through 53 should be use only during times when queuing is occurring. Queuing can be detected by real time technologies, observed by personnel on site, or by inference as queuing has been previously detected or observed at the same location during the same time of day and day of week.

** Message #81 is preferred when displayed 7 days or more in advance or when the closure will be longer than one week. Message #82 is preferable when the closure will occur within 7 days.

*** The use of message #99 must be coordinated with the Traffic Management Center

COMMENTS AND ACTION

801.02 MATERIALS
801.15(b) CHANGEABLE MESSAGE SIGNS
801.17 METHOD OF MEASUREMENT
801.18 BASIS OF PAYMENT
IDM 83-2.06 PORTABLE CHANGEABLE MESSAGE SIGN*S*

Motion: Second: Ayes: Nays:	Action: ____ Passed as Submitted ____ Passed as Revised ____ Withdrawn
Standard Specifications Sections affected: 801.02 pg. 653; 801.15(b) pg.668; 801.17 pg. 671; 801.18 pg. 673, 675, 677 Recurring Special Provisions: NONE Standard Sheets affected: NONE Design Manual Sections affected: SECTION 83-2.06 GIFE Sections cross-references: NONE	_____ 20__ Standard Specifications Book ____ Create RSP (No.____) Effective ____Letting RSP Sunset Date: _____ ____ Revise RSP (No.____) Effective ____Letting RSP Sunset Date: _____ Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective ____Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y__N__ By _____ Addition or _____ Revision Received FHWA Approval? _____