Occupational Health & Safety Division: Instructional & Informational Memorandum

TO: All Project Development Employees during performance of Surveying Activities

FROM: Lee Bogle, PE
State Safety Engineer, Occupational Health & Safety Division

DATE: October 10, 2018

SUBJECT: **Improved Safety Awareness during performance of Surveying Activities**

Members of Project Development Staff have recently requested guidance and information regarding traffic control, specifically, Temporary Traffic Control procedures for their personnel while conducting survey activities. In most cases, these activities are conducted in a manner and during timeframes that are addressed in the *Manual on Uniform Traffic Control Devices* (MUTCD). This document is intended to provide instructional guidance and address common activities and how they should be conducted following the guidance and requirements outlined in the MUTCD.

It is encouraged that Project Development Supervisors discuss this information with direct reports engaged in survey activities. This document does not encompass all potential hazards associated with survey activities. However, it should be used as a discussion tool to highlight and identify potential hazards associated with these activities. Questions or requests for additional information may be directed to the Regional Safety Managers.

Application

This instructional and informational memorandum on Temporary Traffic Control procedures for **Improved Safety Awareness during performance of Surveying Activities;** applies to all managers, crew leaders, technicians and support personnel engaged in Surveying activities.

Definitions

As outlined in the current edition of the *MUTCD* in *Section 6G.02*, *Work Duration*, the criteria for duration should be reviewed to identify the type of operation being performed. Among the terms listed, the following will most often apply to typical survey activities:

- Short-Term stationary: is daytime work that occupies a location for more than 1 hour within a single daylight period.
- Short Duration: is work that occupies a location up to 1 hour

Portable Temporary Traffic Control (TTC) signs and sign stands should be utilized during all TTC activities. Sign sizes are shown in *Table 6F-1* of the *MUTCD*. Generally, a minimum of 36" x 36" sign should be used on State Routes with a speed ≤55 MPH and a minimum of 48" x 48" sign should be used on high speed State Routes ≥65 MPH and all Interstates.

Personal Protective Equipment (PPE) should be worn in accordance with *TDOT Policy 305-01*.

Guidance for lighting is provided in *TDOT's Warning Light Standardization Manual* with approved lighting packages that will satisfy criteria listed in the *Typical Applications* of *Chapter 6H* of the *MUTCD*, as sign substitutions. Check the specific *Typical Application* for guidance on appropriate substitutions.

Guidance Information

Survey activities for Project Development personnel are typically conducted on State ROW and Public / Private Properties. Some of the typical activities conducted include:

1. **Data collection/survey away from State owned/maintained facilities.**
    a. City/County road intersections – Utilize MUTCD guidance for TTC needed for the facility, type of work activity and duration
    b. Public / Private parcels – typically off-roadway system
    c. Drainage, structural, geotechnical features, survey control points - Utilize *MUTCD* guidance for TTC needed, based on the facility and type of work activity.

2. **Data Collection/survey not impacting traffic flow – *Work Beyond the Shoulder***
    a. Refer to *MUTCD, Figure 6H-1 – Typical Application 1*
        i. ***Note:*** *Option 4*; F*or short-term, short duration or mobile operation, all signs and channelizing devices may be eliminated if a vehicle with*

activated high-intensity rotating, flashing , oscillating or strobe lights is used.

3. **Data collection/survey adjacent to travel lanes – *Work on Shoulders***
    a. Identify duration of planned activity – *Short Term or Short Duration*, typical
        i. *Short Term (>1hr)*: TTC should be installed to include signs, cones and arrow boards
        ii. *Short Duration (≤1hr)*: As indicated in *Figure 6H-4, Typical Application 4, Option 4*; *Stationary warning signs may be omitted for short duration or mobile operations if the work vehicle displays high-intensity rotating, flashing , oscillating or strobe lights.*
    b. Refer to *MUTCD, Figures 6H-3&4 – Typical Applications 3 & 4*

4. **Data collection/survey in and near active travel lanes including medians, edge and center lines, intersections, ramps, bridges, drainage, geotechnical and all other control points and features, etc.**
    a. Identify duration of planned activity – *Short Term or Short Duration, typical*
        i. *Short Term (>1hr)*: TTC should be installed to include signs, cones and arrow boards in accordance with the current SOG for *Work Zone Temporary Traffic Control Flagging and Mobile Operations*
        ii. *Short Duration (≤1hr)*: As indicated in *Figure 6H-10, Typical Application 10*
    b. Coordination and communication with Operations may be required to effectively manage TTC for these activities.

5. ***Special Case* – conducting Survey Activities on, near or adjacent to high speed (≥65MPH) State Routes and all Interstates.**
    a. Use of an attenuator with arrow or message board is required during all activities utilizing Temporary Traffic Control on high speed State Routes and all Interstates.

Tables & Figures:

Table 6E-1. Stopping Sight Distance as a Function of Speed

Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed

Table 6H-3. Meaning of Letter Codes on Typical Application Diagrams

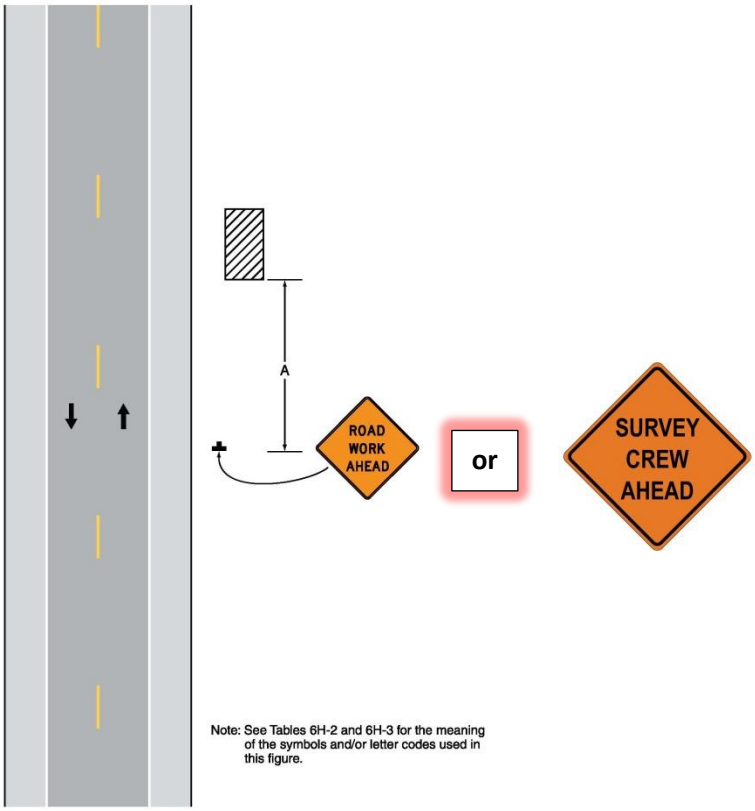
Road Type	Distance Between Signs**		
	A	B	C
Urban (low speed)*	100 feet	100 feet	100 feet
Urban (high speed)*	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* Speed category to be determined by highway agency

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Tables & Figures:

Figure 6H-1. Work Beyond the Shoulder (TA-1)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 1

Denotes Information added to Typical Applications.

Notes for Figure 6H-1—Typical Application 1
Work Beyond the Shoulder

Guidance:

1. *If the work space is in the median of a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.*

Option:

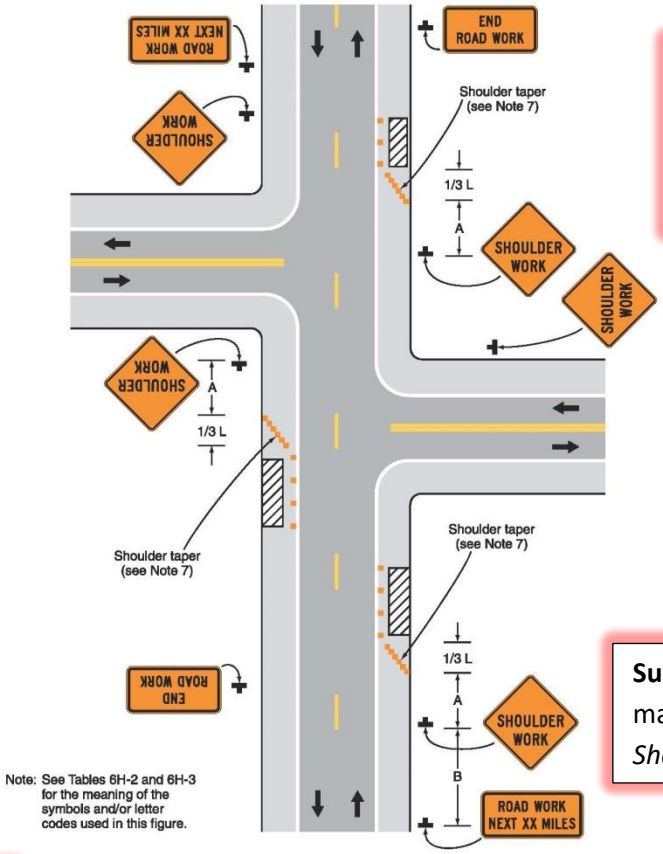
2. The ROAD WORK AHEAD sign may be replaced with other appropriate signs such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.
3. The ROAD WORK AHEAD sign may be omitted where the work space is behind a barrier, more than 24 inches behind the curb, or 15 feet or more from the edge of any roadway.
4. For short-term, short duration or mobile operation, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Tables & Figures:

Figure 6H-3. Work on the Shoulders (TA-3)



Typical Application 3

Note: An attenuator is required per *SOG 477-01* on all State Routes with a speed >45 MPH.

Survey Crew Ahead sign(s) may be used in place of the *Shoulder Work* sign(s).

Denotes Information added to Typical Applications.

Notes for Figure 6H-3—Typical Application 3
Work on the Shoulders

Guidance:

1. *A SHOULDER WORK sign should be placed on the left side of the roadway for a divided or one-way street only if the left shoulder is affected.*

Option:

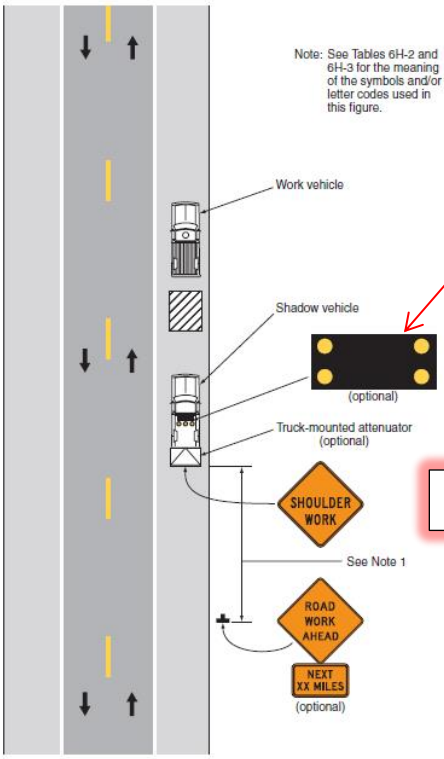
2. The Workers symbol signs may be used instead of SHOULDER WORK signs.
3. The SHOULDER WORK AHEAD sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
4. For short duration operations of 60 minutes or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**
7. **When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain within the traveled way.**

Tables & Figures:

Figure 6H-4. Short-Duration or Mobile Operation on a Shoulder (TA-4)



Typical Application 4

December 2009

Note: Use of a Truck or Trailer-Mounted Arrow Board or Message Board is required with the work vehicle.

or

Note: An attenuator is required per *SOG 477-01* on all Interstates and State Routes with a speed >45 MPH.

Denotes Information added to Typical Applications.

Notes for Figure 6H-4—Typical Application 4
Short Duration or Mobile Operation on a Shoulder

Guidance:

1. *In those situations where multiple work locations within a limited distance make it practical to place stationary signs, the distance between the advance warning sign and the work should not exceed 5 miles.*
2. *In those situations where the distance between the advance signs and the work is 2 miles to 5 miles, a Supplemental Distance plaque should be used with the ROAD WORK AHEAD sign.*

Option:

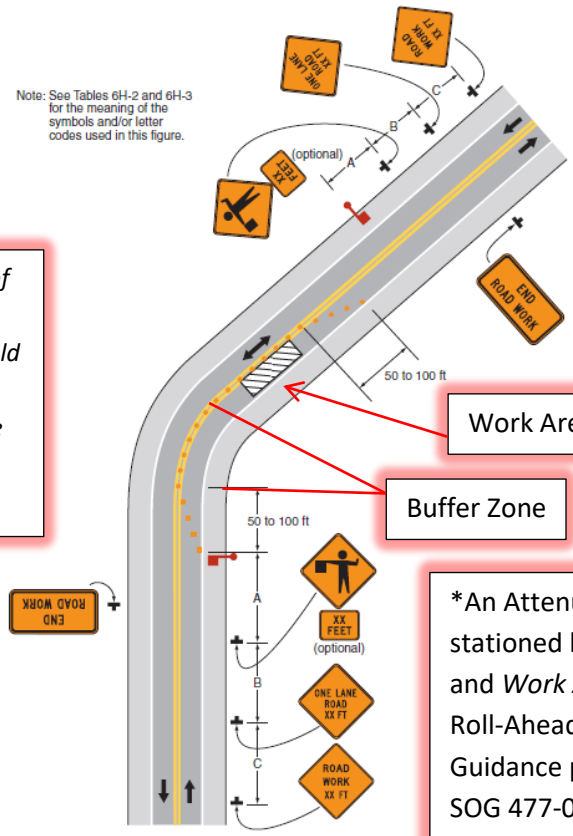
3. The ROAD WORK NEXT XX MILES sign may be used instead of the ROAD WORK AHEAD sign if the work locations occur over a distance of more than 2 miles.
4. Stationary warning signs may be omitted for short duration or mobile operations if the work vehicle displays high-intensity rotating, flashing, oscillating, or strobe lights.
5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**
7. **If an arrow board is used for an operation on the shoulder, the caution mode shall be used.**
8. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**

Tables & Figures:

Figure 6H-10. Lane Closure on a Two-Lane Road Using Flaggers (TA-10)



Typical Application 10

Notes for Figure 6H-10—Typical Application 10
Lane Closure on a Two-Lane Road Using Flaggers

Option:

1. For low-volume situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6E).
2. The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short-duration operations.
3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

4. *The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.*

Standard:

5. **At night, flagger stations shall be illuminated, except in emergencies.**

Guidance:

6. *When used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the ONE LANE ROAD sign.*
7. *When a grade crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the grade crossing, the TTC zone should be extended so that the transition area precedes the grade crossing.*
8. *When a grade crossing equipped with active warning devices exists within the activity area, provisions should be made for keeping flaggers informed as to the activation status of these warning devices.*
9. *When a grade crossing exists within the activity area, drivers operating on the left-hand side of the normal center line should be provided with comparable warning devices as for drivers operating on the right-hand side of the normal center line.*
10. *Early coordination with the railroad company or light rail transit agency should occur before work starts.*

Option:

11. A flagger or a uniformed law enforcement officer may be used at the grade crossing to minimize the probability that vehicles are stopped within 15 feet of the grade crossing, measured from both sides of the outside rails.

NOTE: *Due to the amount and types of devices needed for Temporary Traffic Control, this level of survey work should be conducted with coordination and assistance from Operations to provide equipment and personnel managing the Work Zone and devices.*

Denotes Information added to Typical Applications.

*An Attenuator should be stationed between the *Buffer Zone* and *Work Area* with an appropriate Roll-Ahead Distance provided. Guidance provided in the current SOG 477-01 for *WZ TTC Flagging and Mobile Operations*.