

WORK AREA PROTECTION GUIDE

STREET AND UTILITY REPAIRS

2010

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The Manual of Uniform Traffic Control Devices
(MUTCD)**

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INTRODUCTION

This handbook generally represents minimum requirements for typical situations. It is not intended as a substitute for engineering judgment and may need to be altered to fit the conditions of a particular site. At a minimum all traffic control must be in compliance with the Manual on Uniform Traffic Control Devices (MUTCD) which contains information in addition to what is included in this guide. Proper traffic control must be used when utility operations, or other types of road or street construction occurs on any road open to public travel.

WHY YOU SHOULD FOLLOW THIS BOOK

Federal Regulation: The Manual on Uniform Traffic Control Devices (MUTCD) is incorporated by reference in 23 Code of Federal Regulations (CFR), Part 655, Subpart F and **shall** be recognized as the national standard for traffic control devices installed on any street, highway, or bicycle trail open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). The policies and procedures of the Federal Highway Administration (FHWA) to obtain basic uniformity of traffic control devices **shall** be as described in 23 CFR 655, Subpart F.

State Law: 625 ILCS 5/11-304 Local traffic-control devices: Local authorities in their respective maintenance jurisdiction **shall** place and maintain such traffic-control devices upon highways under their maintenance jurisdiction as required to indicate and carry out the provisions of this Chapter, and local traffic ordinances, or to regulate, warn, or guide traffic. All such traffic control devices **shall** conform to the State Manual and Specifications and **shall** be justified by traffic warrants stated in the Manual. Placement of traffic-control devices on township or road district roads also **shall** be subject to the written approval of the county engineer or superintendent of highways.”

MUTCD DEFINITIONS

Standard – a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. The verb **shall** is typically used. Standards are sometimes modified by Options.

Guidance – a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or an engineering study indicates the deviation to be appropriate. The verb **should** is typically used. Guidance statements are sometimes modified by Options.

Option – a statement of practice that is a permissive condition and carries no requirement or recommendation. Options may contain allowable modifications to a Standard or Guidance. The verb **may** is typically used.

Support – an informal statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. The verbs **shall**, **should**, and **may** are not used in Support Statements.

FUNCTION OF GOOD TRAFFIC CONTROL

The primary function of temporary traffic control (TTC) is to provide for the reasonably safe and efficient movement of road users through or around temporary traffic control zones while reasonably protecting workers, responders to traffic incidents, and equipment.

FUNDAMENTAL PRINCIPLES OF TEMPORARY TRAFFIC CONTROL

The needs and control of road users through a TTC zone **shall** be an essential part of highway construction, utility work, maintenance operations, and incident management. Road user and worker safety, and accessibility in TTC zones should be an integral and high priority element of every project from planning, through design, and construction. All TTC zones, including maintenance and utility work zones, should be planned and conducted with the safety and accessibility of all motorists, bicyclists, pedestrians, and workers

being considered at all times. If the TTC zone includes work at or near a highway rail grade crossing, early coordination with the railroad company should take place.

1) Road user movement **should** be restricted as little as practical based on the following considerations:

A. TTC at work and incident sites **should** be designed on the assumption that drivers will only reduce their speed if they clearly perceive a need to do so.

B. Frequent and abrupt changes in geometrics, such as lane narrowing, dropped lanes, or main roadway transitions that require rapid maneuvers **should** be avoided.

C. Provisions **should** be made for the reasonably safe operation of work, particularly on high-speed, high-volume roadways.

D. Road users **should** be encouraged to use alternate routes that do not include TTC zones.

E. Bicyclists and pedestrians **should** be provided with access and reasonably safe passage through the TTC zone.

F. Roadway occupancy **should** be scheduled during off-peak hours and, if necessary, night work **should** be considered.

G. Early coordination with officials having jurisdiction over the affected cross streets and providing emergency services should occur before roadway or ramp closings.

2) Motorists, bicyclists, and pedestrians **should** be guided in a clear and positive manner while approaching and traversing TTC zones and incident sites. Use adequate warning, delineation and channelization devices. Inconsistent devices **should** be removed or covered.

3) To provide acceptable levels of operations, routine day and night inspections of TTC elements **should** be performed as follows:

A. Individuals who are knowledgeable in the principles of proper TTC **should** be assigned responsibility for safety in TTC zones.

B. As the work progresses, TTCs and/or working conditions **should** be modified in order to provide reasonably safe and efficient road user movement and to promote worker safety.

C. TTC zones **should** be carefully monitored under varying conditions of road user volumes, lighting conditions, and weather to check that applicable TTC devices are effective, clearly visible, clean and in compliance with the TTC plan.

D. Crash records in TTC zones **should** be monitored to identify the need for changes in TTC plans.

4) Attention **should** be given to the maintenance of roadside safety devices through the duration of the TTC zone by applying the following principles:

A. Unencumbered roadside recovery areas or clear zones **should** be provided, where practical.

B. Work equipment, worker's private vehicles, materials, and debris should be stored in such a manner as to reduce the probability of impact by run-off-the-road vehicles.

5) Maintaining positive public relations is necessary.

A. The needs of all road users should be assessed, and adequate advance notice be given to them.

B. News media should be contacted in an effort to publicize TTC zones.

C. The needs of adjoining property owners, residents, and businesses should be assessed.

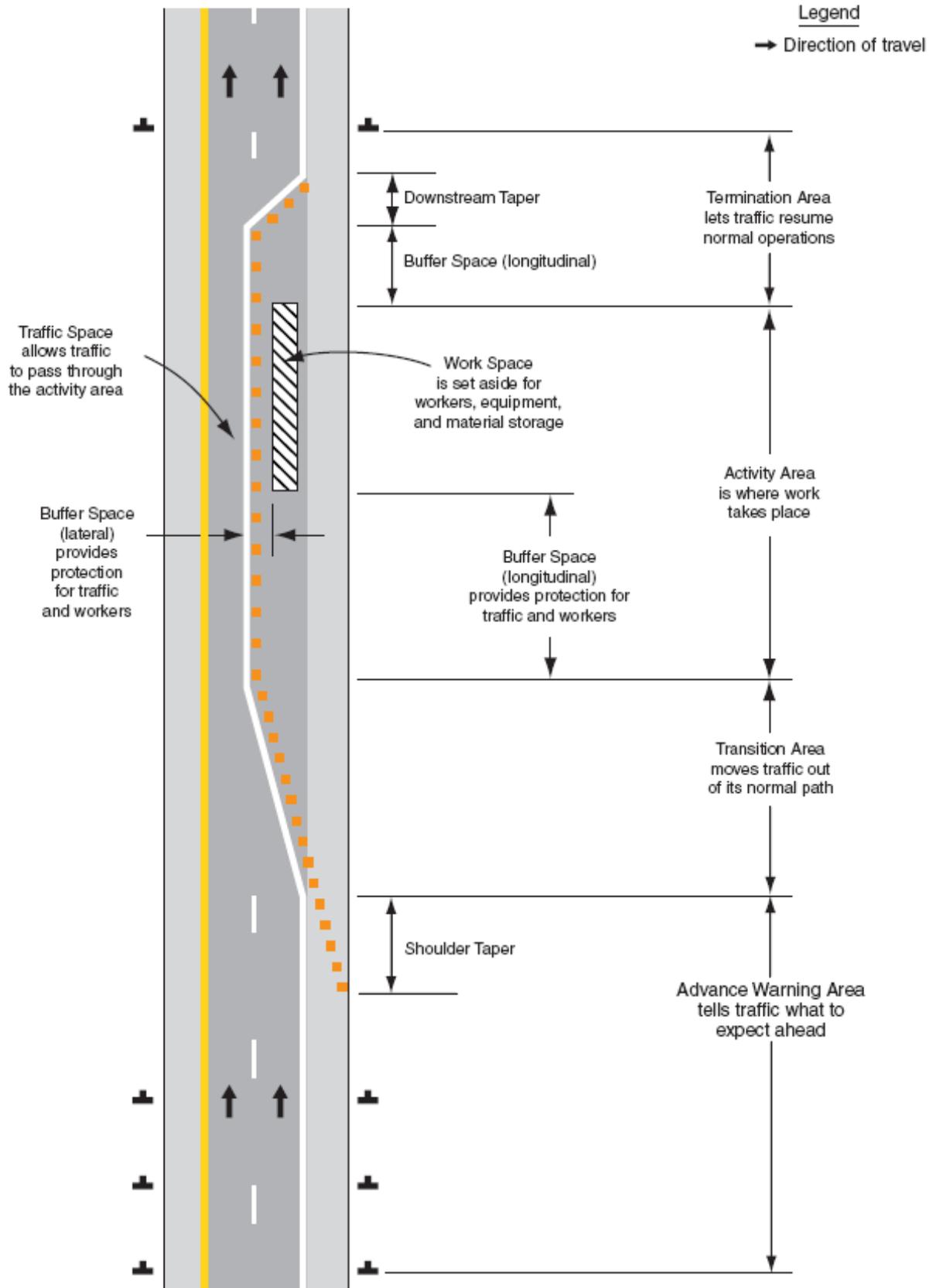
D. The needs of emergency service providers, railroads and transit, and commercial vehicles should be assessed. Appropriate accommodations should be made.

TEMPORARY TRAFFIC CONTROL ZONE COMPONENTS

Most TTC zones are divided into four areas: The advance warning area, the transition area, the activity area, and the termination area.

- 1) **Advanced warning area** – the section of highway where road users are informed about the upcoming work zone or incident area.
- 2) **Transition area** – the section of highway where road users are redirected out of their normal path. When redirection of the road users' normal path is required, they **shall** be channelized from the normal path to a new path.
- 3) **Activity area** – the section of highway where the work activity takes place. It is comprised of the workspace, the traffic space and the buffer space.
- 4) **Termination area** – shall be used to return road users to their normal path. The termination area shall extend from the downstream end of the work area to the last TTC device.

Figure 6C-1. Component Parts of a Temporary Traffic Control Zone



TAPERS

Tapers **may** be used in both the transition and termination areas. Tapers are created by using a series of channelizing devices and/or pavement markings to move traffic out of or into the normal path. Whenever tapers are to be used in close proximity to an interchange ramp, crossroads, curves, or other influencing factors, the length of the tapers **may** be adjusted. Longer tapers are not necessarily better than shorter tapers, because extended tapers tend to encourage sluggish operation and to encourage drivers to unnecessarily delay lane changes. Types of tapers are as follows:

- 1) **Merging taper** – a merging taper **should** be long enough to enable merging drivers to have adequate advance warning and sufficient length to adjust their speeds and merge into a single lane before the end of the transition.
- 2) **Shifting taper** – a shifting taper is used when a lateral shift is needed. A shifting taper **should** have a length of approximately 0.5 L
- 3) **Shoulder taper** – a shoulder taper **may** be beneficial on a high-speed roadway where shoulders are part of the activity area and are closed, or when improved shoulders might be mistaken as a driving lane. Shoulder tapers **should** have a length of approximately 0.33 L
- 4) **Downstream taper** – a downstream taper **may** be useful in termination areas to provide a visual cue to the driver that the original lane or path that was closed is open again. When used, a downstream taper **should** have a minimum length of approximately 100 ft per lane with devices placed at a spacing of approximately 20 ft.
- 5) **One-Lane, two-way taper** – the one-lane, two-way taper is used in advance of an activity area that occupies part of a two-way roadway in such a way that a portion of the road is used alternately by traffic in each direction. Traffic should be controlled by a flagger or temporary traffic signals. A short taper having a maximum length of 100 ft with channelizing devices spaced at approximately 20 foot spacing should be used to guide traffic into the one-way section.

TAPERS

Figure 6C-2. Types of Tapers and Buffer Spaces

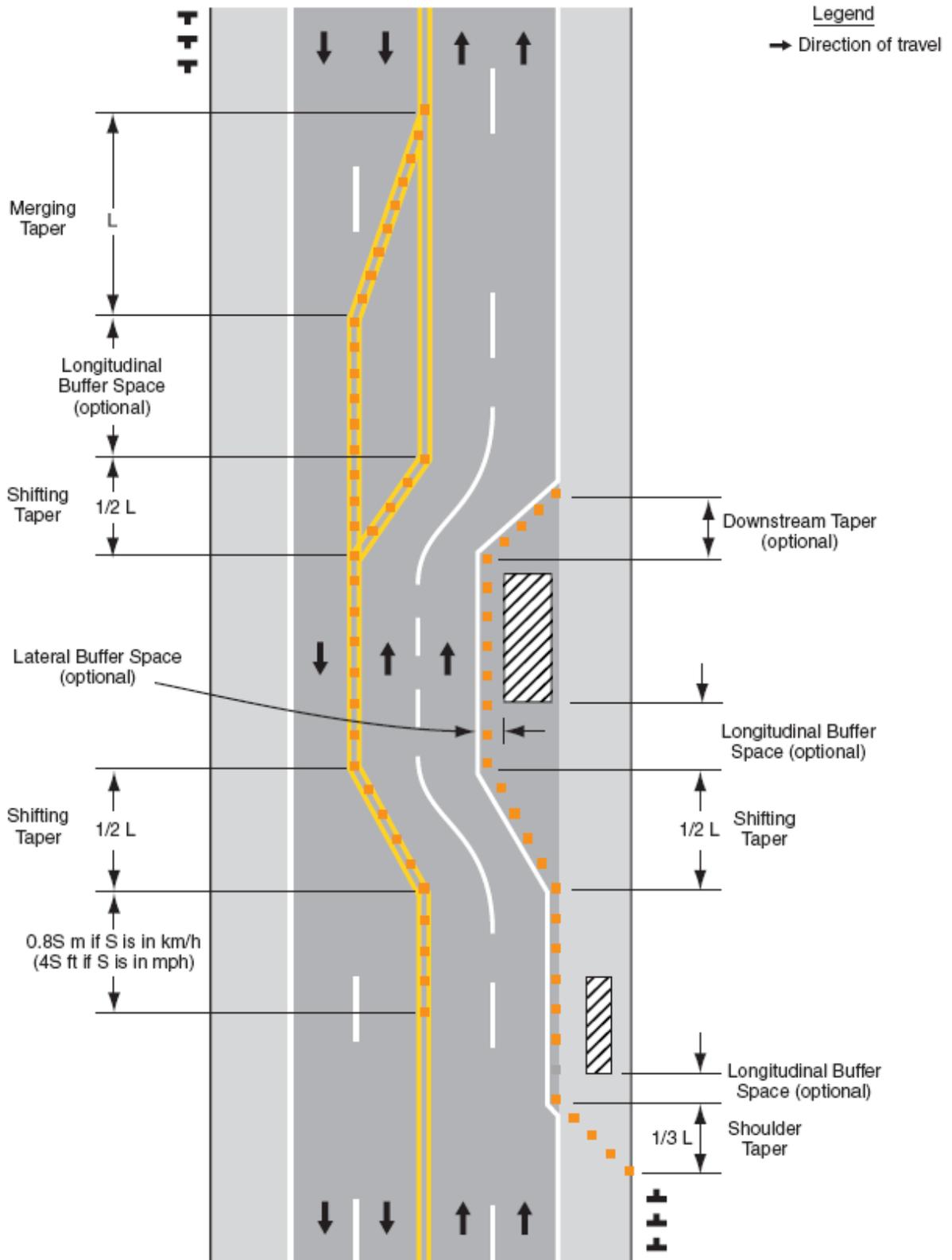


Table 6C-3. Taper Length Criteria for Temporary Traffic Control Zones

Type of Taper	Taper Length (L)*
Merging Taper	at least L
Shifting Taper	at least 0.5L
Shoulder Taper	at least 0.33L
One-Lane, Two-Way Traffic Taper	30 m (100 ft) maximum
Downstream Taper	30 m (100 ft) per lane

Table 6C-4. Formulas for Determining Taper Lengths

Speed Limit (S)	Taper Length (L) Meters	Speed Limit (S)	Taper Length (L) Feet
60 km/h or less	$L = \frac{WS^2}{155}$	40 mph or less	$L = \frac{WS^2}{60}$
70 km/h or more	$L = \frac{WS}{1.6}$	45 mph or more	$L = WS$

Where: L = taper length in meters (feet)

W = width of offset in meters (feet)

S = posted speed limit, or off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in km/h (mph)

Table for Taper Length L

Posted Speed (MPH)	Taper Length L	Posted Speed (MPH)	Taper Length L
20	80	45	540
25	125	50	600
30	180	55	660
35	245	60	720
40	320	65	780

GUIDELINES FOR LONGITUDINAL BUFFER SPACE

Speed (mph)	Length (ft)	Speed (mph)	Length (ft)
20	35	40	170
25	55	45	220
30	85	50	280
35	120	55	335

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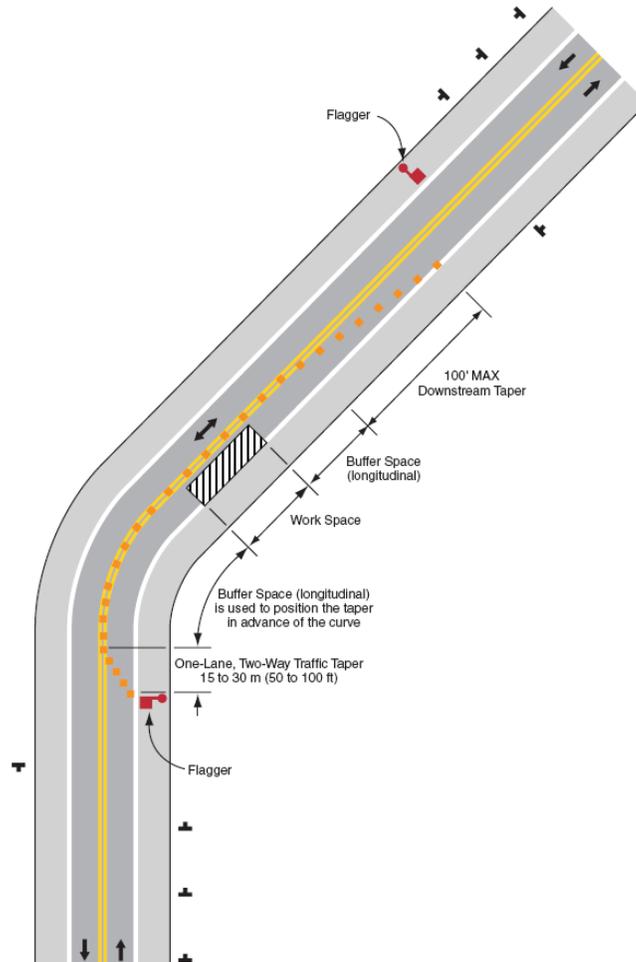
DETOURS AND DIVERSIONS

A detour is a temporary rerouting of road users onto an existing highway in order to avoid a TTC zone. Detours **should** be clearly signed over their entire length so road users can easily use existing highways to return to the original highway. A diversion is a temporary rerouting of road users onto a temporary highway or alignment placed around the work area.

ONE-LANE, TWO-WAY TRAFFIC CONTROL

When traffic in both directions must use a single lane for a limited distance, movements from each end **shall** be coordinated. Provisions **should** be made for alternate one-way movement through the constricted section. Control points at each end **should** be chosen to permit easy passing of opposing lanes of vehicles.

Figure 6C-3. Example of a One-Lane, Two-Way Traffic Taper



FLAGGERS

When a one-lane, two-way TTC zone is short enough to allow a flagger to see from one end of the zone to the other, traffic **may** be controlled by either a single flagger or by a flagger at each end of the section. When a single flagger is used, the flagger **should** be stationed on the shoulder opposite the constriction or work space, or in a position where good visibility and traffic control can be maintained at all times. When good visibility and traffic control cannot be maintained by one flagger station, traffic **should** be controlled by a flagger at each end of the section. One of the flaggers **should** be designated as the coordinator. Flaggers **should** be able to communicate with each other orally, electronically, or with manual signals. These manual signals **should** not be mistaken for flagging signals.

A flagger **shall** be a person who provides TTC. Because they are responsible for road user safety, and because they make frequent contact with the public, they should be trained in safe traffic control practices and public contact techniques. Flaggers **should** be able to satisfactorily demonstrate the following abilities:

A: Ability to receive and communicate specific instructions clearly, firmly, and courteously;

B: Ability to move and maneuver quickly in order to avoid danger from errant vehicles;

C: Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers approaching a TTC zone in frequently changing situations;

D: Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations; and

E: Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury.

HIGH-VISIBILITY CLOTHING

For daytime work, flaggers shall wear safety apparel meeting the requirements of the ANSI 107-2004 standard performance for Class 2 risk exposure. For nighttime work, safety apparel meeting the requirements of standard performance Class 3 should be considered.

The apparel background material color for Class 2 or 3 shall be either fluorescent orange-red or fluorescent yellow-green as defined in the standard. The retroreflective material shall be either orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1000 feet. The retroreflective safety apparel shall be designed to clearly identify the wearer as a person.

Class 2 vests for law enforcement have different characteristics, mainly shorter length to allow access to their belt. They are labeled as such by the manufacturer.

FLAGGER DEVICES

Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags, are used to control road users through TTC zones. The STOP/SLOW paddle **should** be the primary and preferred hand-signaling device because the STOP/SLOW paddle gives road users more positive guidance than red flags. Use of flags **should** be limited to emergency situations.

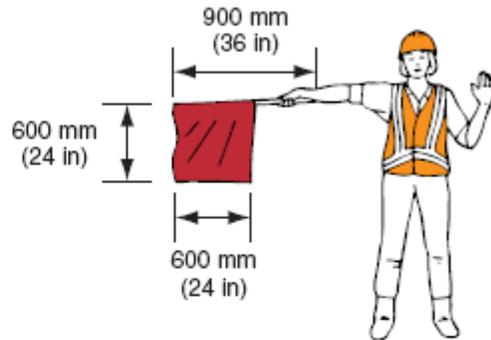
The STOP/SLOW paddle **shall** have an octagonal shape on a rigid handle. STOP/SLOW paddles **shall** be at least 18" wide (IDOT uses a 24" paddle) with letters at least 6" high and **should** be fabricated from light semi-rigid material. The background of the STOP face **shall** be red with white letters and border. The background of the SLOW face **shall** be orange with black letters and border. When used at night, the STOP/SLOW paddle **shall** be retroreflectorized.

Flags, when used, **shall** be a minimum of 24" square, made of a good grade of red material, and securely fastened to a staff that is approximately 36" in length. The free edge of a flag **should** be weighted so the flag will hang vertically, even in heavy winds. When used at night, flags **shall** be reroreflectorized red.

Figure 6E-1. Use of Hand-Signaling Devices by Flaggers

PREFERRED METHOD
STOP/SLOW Paddle

EMERGENCY SITUATIONS ONLY
Red Flag



TO STOP TRAFFIC



TO LET TRAFFIC PROCEED



TO ALERT AND SLOW TRAFFIC

FLAGGER PROCEDURES

The following methods of signaling with paddles **shall** be used:

- 1) To stop road users, the flagger **shall** face road users and aim the STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm **shall** be held with the palm of the hand above shoulder level toward approaching traffic.
- 2) To direct stopped road users to proceed, the flagger **shall** face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger **shall** motion with the free hand for road users to proceed.
- 3) To alert or slow traffic, the flagger **shall** face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body.

The following methods of signaling with flags **shall** be used:

- 1) To stop road users, the flagger **shall** face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm **shall** be held with the palm of the hand above the shoulder level toward approaching traffic.
- 2) To direct stopped road users to proceed, the flagger **shall** stand parallel to the road user movement with flag and arm lowered from the view of the road users, and shall motion with the free hand for road users to proceed. Flags **shall** not be used to signal road users to proceed.
- 3) To alert or slow traffic, the flagger **shall** face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger **shall** keep the free hand down.

FLAGGER STATIONS

Flagger stations **shall** be located far enough in advance of the work space so that approaching road users will have sufficient distance to stop before entering the work space. Except in emergency situations, flagger stations **should** be preceded by proper advance warning signs. At night, flagger stations **should** be illuminated.

The flagger **should** stand either on the shoulder adjacent to the traffic lane being controlled or in the closed lane prior to stopping road users. A flagger **should** only stand in the traffic lane being used by moving road users after road users have stopped. The flagger **should** be clearly visible to the first approaching road user at all times. The flagger also **should** be visible to other road users. The flagger **should** be stationed sufficiently in advance of the workers to warn them (by horns, whistles etc.) of approaching danger by out-of-control vehicles. The flagger **should** stand alone. Never permit a group of workers to congregate around the flagger station.

TEMPORARY TRAFFIC CONTROL ZONE DEVICES

Traffic control devices **shall** be defined as all signs, signals, markings, and other devices used to regulate, warn, or guide road users, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway by authority of a public body or official having jurisdiction. All traffic control devices used on street and highway construction, maintenance, utility, or incident management operations **shall** conform to the applicable provisions of this Manual.

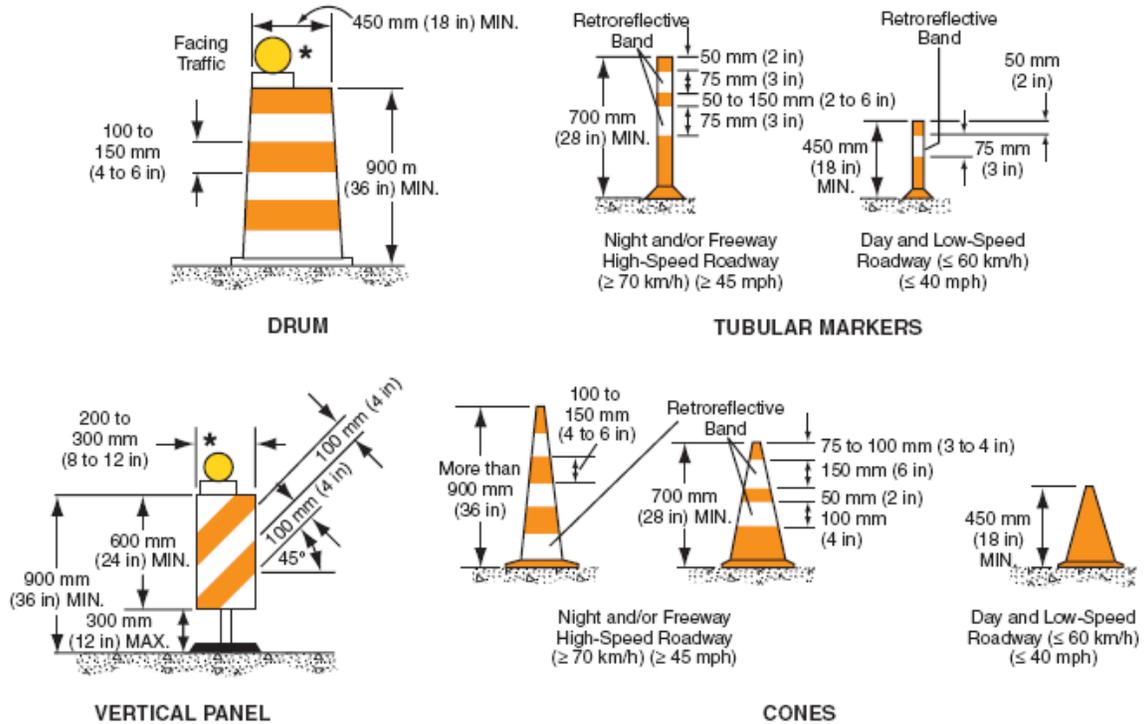
SPACING FOR CHANNELIZING DEVICES

Spacings for channelizing devices should not exceed

<u>MPH</u>	<u>TANGENT</u>	<u>TAPER</u>	<u>MPH</u>	<u>TANGENT</u>	<u>TAPER</u>
20	40'	20'	40	80'	40'
25	50'	25'	45	90'	45'
30	60'	30'	50	100'	50'
35	70'	35'	55	110'	55'

Device spacing for one-lane, two-way shall be 20' regardless of speed

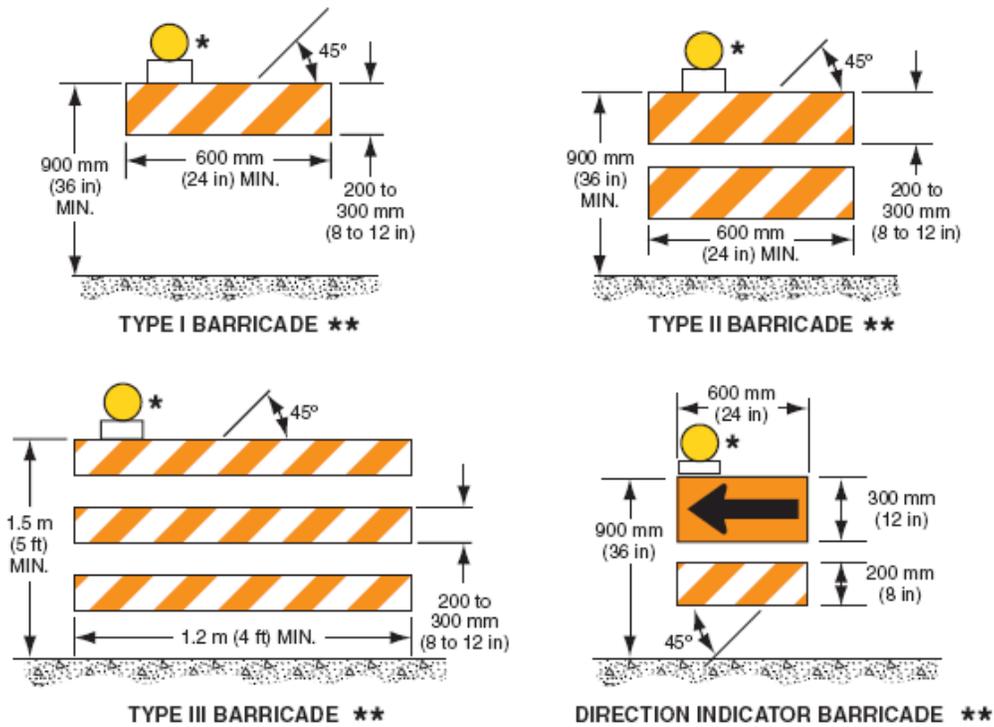
Figure 6F-7. Channelizing Devices (Sheet 1 of 2)



* Warning lights (optional)

Note: If drums, cones, or tubular markers are used to channelize pedestrians, they shall be located such that there are no gaps between the bases of the devices, in order to create a continuous bottom, and the height of each individual drum, cone, or tubular marker shall be no less than 900 mm (36 in) to be detectable to users of long canes.

Figure 6F-7. Channelizing Devices (Sheet 2 of 2)



* Warning lights (optional)

** Rail stripe widths shall be 150 mm (6 in), except that 100 mm (4 in) wide stripes may be used if rail lengths are less than 900 mm (36 in). The sides of barricades facing traffic shall have retroreflective rail faces.

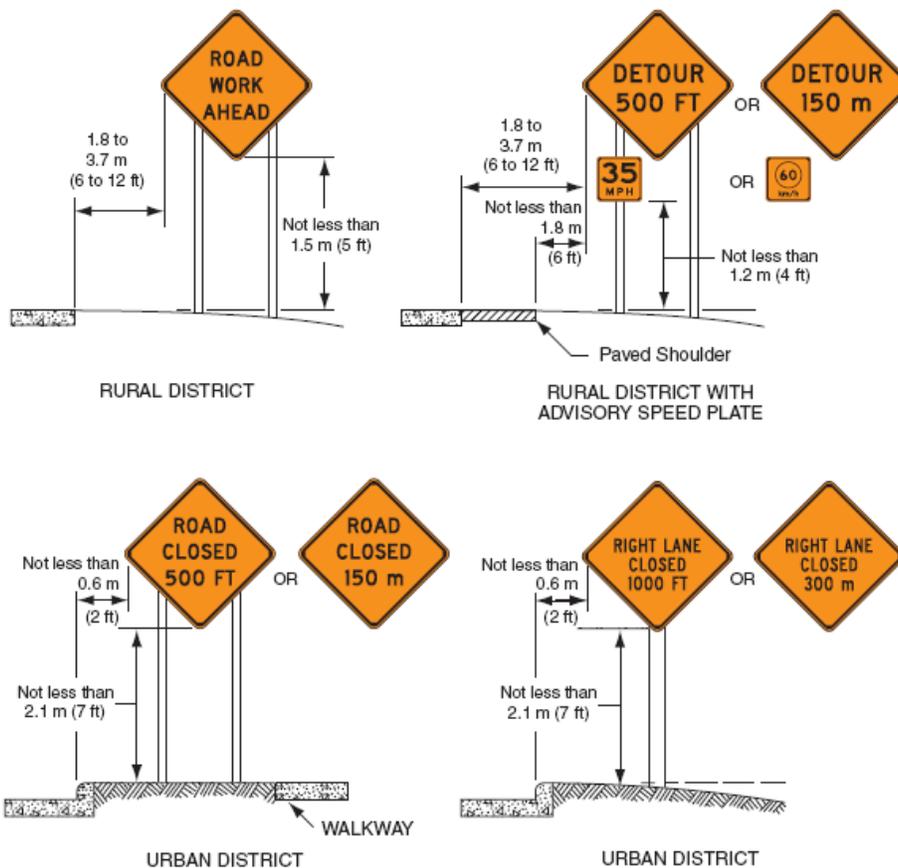
Note: If barricades are used to channelize pedestrians, there shall be continuous detectable bottom and top rails with no gaps between individual barricades to be detectable to users of long canes. The bottom of the bottom rail shall be no higher than 150 mm (6 in) above the ground surface. The top of the top rail shall be no lower than 900 mm (36 in) above the ground surface.

SIGNS

TTC zone signs convey both general and specific messages by means of words or symbols, and have the same three categories as all road user signs: regulatory, warning, and guide. With few exceptions, warning signs in TTC zones **shall** have a black legend on an orange background.

All signs used at night **shall** be either retroreflective with a material that has a smooth, sealed outer surface, or illuminated to show the same shape and similar color both day and night. The requirement for sign illumination shall not be considered to be satisfied by street, highway, or strobe lighting.

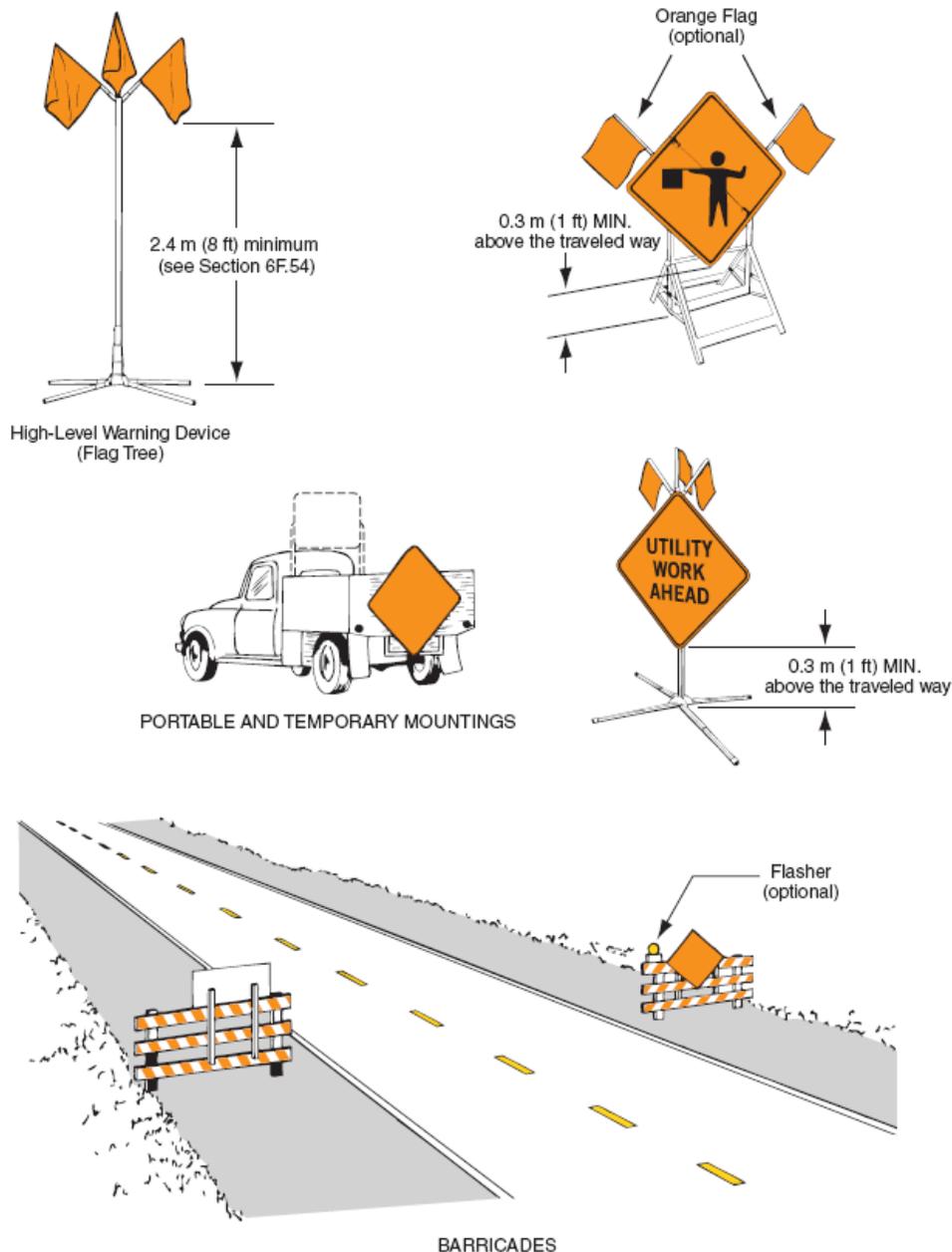
Ground-mounted signs installed at the side of the road in rural areas **shall** be mounted at a height at least 5 ft measured from the bottom of the sign to the near edge of the pavement. In business, commercial, and residential districts where parking and/or bicycle or pedestrian movement is likely to occur, or where there are other obstructions to view, the distance between the bottom of the sign and the top of the near edge of the traveled way **shall** be at least 7 ft.



Sign supports **shall** be crashworthy. Signs mounted on barricades and barricade/sign combinations **shall** be crashworthy. Signs mounted on barricades, or other portable supports, **shall** be no less than 1 ft above the traveled way.

Signs **shall** be properly maintained for cleanliness, visibility, and correct positioning. Signs that have lost significant legibility **shall** be promptly replaced.

Figure 6F-2. Methods of Mounting Signs Other Than on Posts



IDOT GUIDELINES

Sign Size Designation

Road Type			
Posted Speed Limit	2-Lane Low ADT	2-Lane	Multi-Lane
≤35	30"	36"	48"
40-50	36"	48"	48"
≥55	36"	48"	48"

Sign Spacing

Distance Between Signs

Road Type	A	B	C
Urban Low Speed (<40)	100 ft	100 ft	100 ft
Urban High Speed (45-50)	350 ft	350 ft	350 ft
Rural (55)	500 ft	500 ft	500 ft
Expressway/Freeway	1000 ft	1600 ft	2600 ft

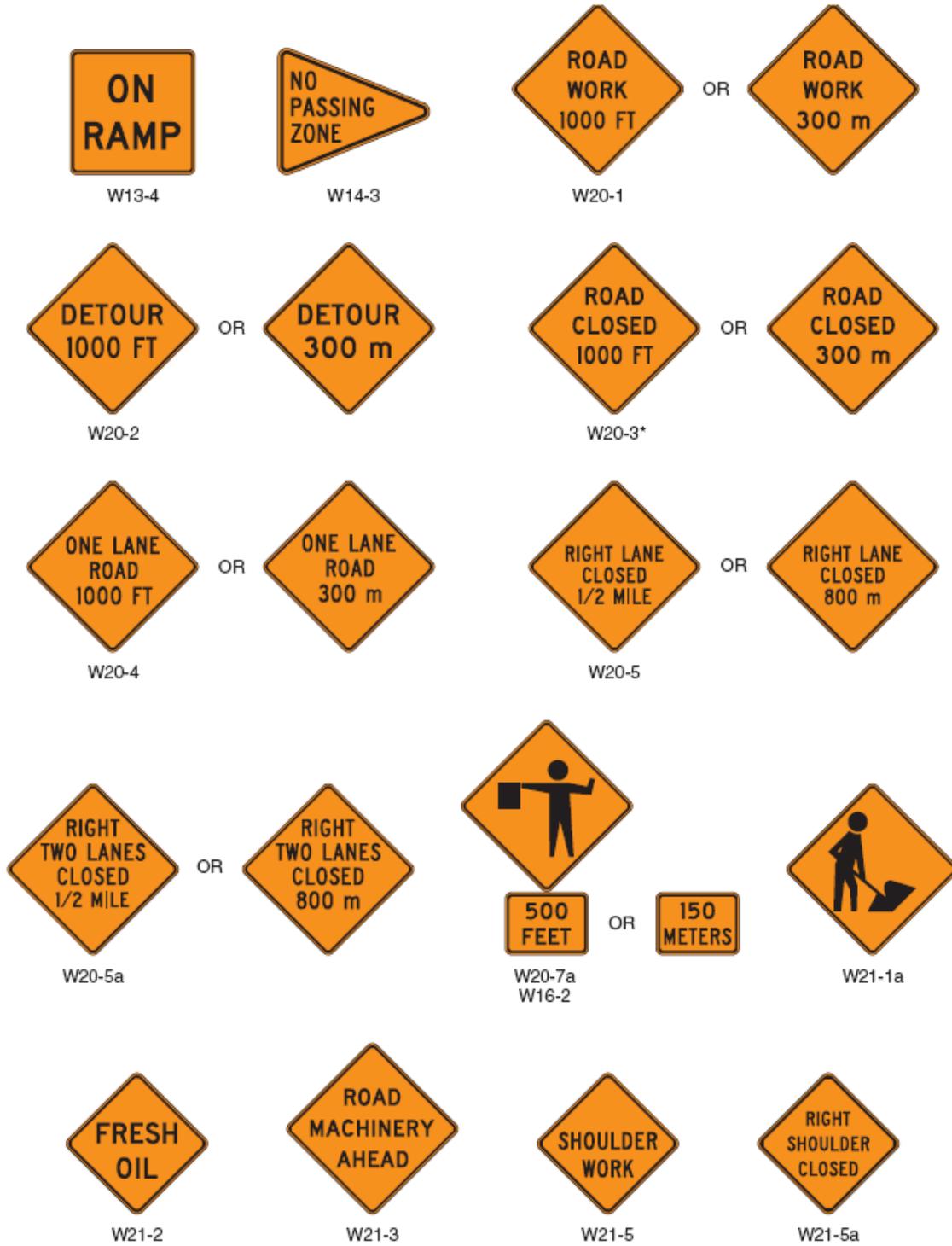
Figure 6F-4. Warning Signs in Temporary Traffic Control Zones
(Sheet 1 of 4)



Figure 6F-4. Warning Signs in Temporary Traffic Control Zones
(Sheet 2 of 4)



Figure 6F-4. Warning Signs in Temporary Traffic Control Zones
(Sheet 3 of 4)



* An optional STREET CLOSED word message sign is shown in the "Standard Highway Signs" book.

Figure 6F-4. Warning Signs in Temporary Traffic Control Zones
(Sheet 4 of 4)

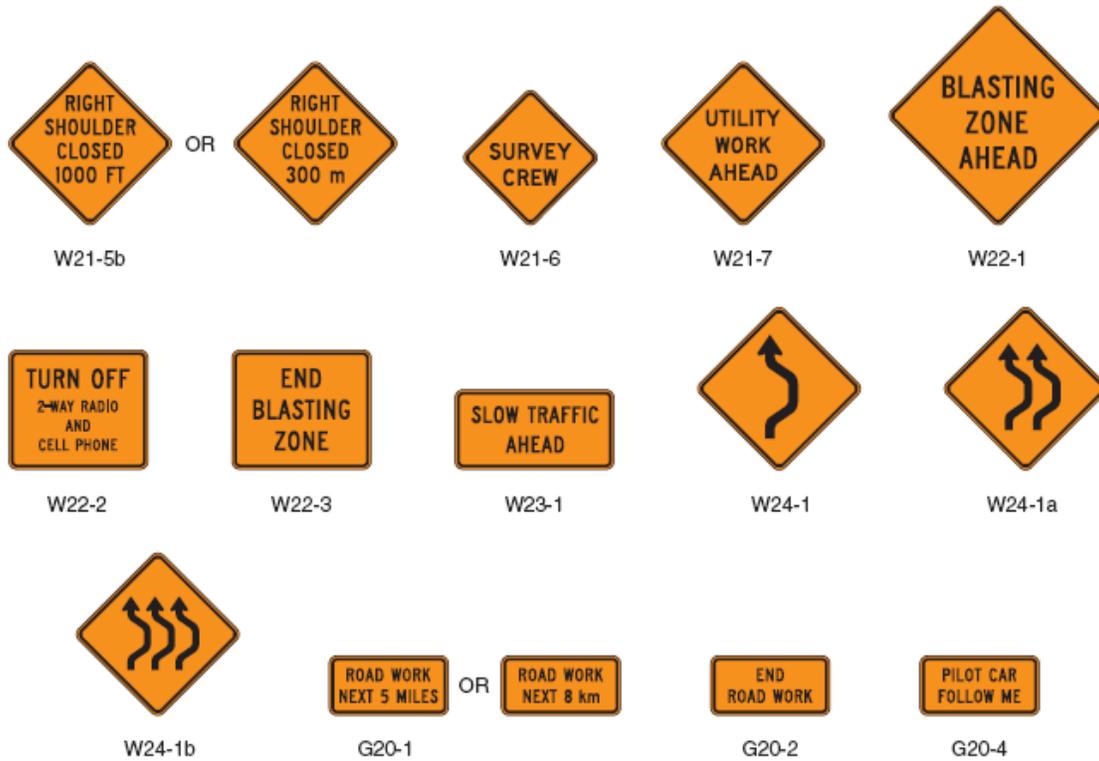
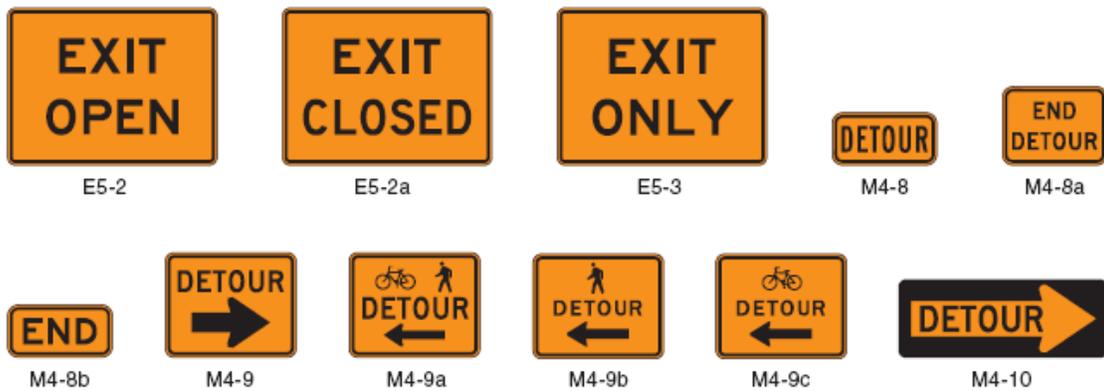


Figure 6F-5. Exit Open and Closed and Detour Signs



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SELECTING THE TYPICAL APPLICATION

Each TTC zone is different. Many variables, such as location of work, road type, geometrics, vertical and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, cars) and road use speeds affect the needs of each zone. The goal of TTC in work zones is safety with minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment.

Typical applications of TTC zones are organized according to duration, location, type of work, and highway type. Typical applications **should** be altered, **when necessary**, to fit the conditions of a particular TTC zone.

Duration of Work – work duration is a major factor in determining the number and types of devices used in TTC zones. The duration of a TTC zone is defined relative to the length of time a work operation occupies a spot location. The five categories of work duration and their time at a location **shall** be:

- A. **Long-term stationary** – work that occupies a location more than 3 days.
- B. **Intermediate-term stationary** – work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
- C. **Short-term stationary** – daytime work that occupies a location for more than 1 hour within a single daylight period.
- D. **Short duration** – work that occupies a location up to 1 hour.
- E. **Mobile** – work that moves intermittently or continuously.

Location of work – the choice of TTC needed for a TTC zone depends upon where the work is located. As a general rule, the closer the work is to road users, the greater the number of TTC devices. Procedures are described later in this book for establishing TTC zones in the following locations:

- A. Outside the shoulder – when work is being performed off the roadway, little or no TTC may be needed. As a rule of thumb, work confined to 15 feet or more from the edge of the traveled way generally does not require TTC.

However, TTC is appropriate where distracting situations exist, such as vehicles accessing the work site via the highway and equipment traveling on or crossing the roadway. A single warning sign like ROAD WORK AHEAD **should** be used.

- B. On the shoulder with no encroachment – when paved shoulders of 8ft width or more are closed; at least one advance warning sign **shall** be used. In addition, channelizing devices **shall** be used to close the shoulder.
- C. On the shoulder with minor encroachment – when work takes up part of a lane, judgment is required to determine whether the affected lane should be closed. Traffic volume, speed, and road capacity should be taken into account.

If the lane encroachment does not permit a remaining lane width of 10 feet, the lane should be closed.

- D. Within the median – if work in the median of a divided highway is within 15 feet from the edge of the traveled way of either direction of travel, TTC should be used.
- E. Within the traveled way – follow the appropriate typical application

TYPICAL APPLICATION INDEX

Selected Applications for use by Counties, Municipalities, Townships, and Utility Companies.

Location, Roadway Type	Application
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<u>All roadways</u>	
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For additional diagrams see the MUTCD, Chapter 6.

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- Detour for closed street TA-20
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intersection
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intersection
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Multilane undivided

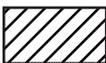
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highway

Multilane divided

- Lane closure on divided highway TA-33
- Mobile operation on multilane road.....TA-35

For additional diagrams see the MUTCD, Chapter 6.

Table 6H-2. Meaning of Symbols on Typical Application Diagrams

	Arrow panel
	Arrow panel support or trailer (shown facing down)
	Changeable message sign or support trailer
	Channelizing device
	Crash Cushion
	Direction of temporary traffic detour
	Direction of traffic
	Flagger
	High level warning device (Flag tree)
	Luminaire
	Pavement markings that should be removed for a long term project
	Sign (shown facing left)
	Surveyor
	Temporary barrier
	Temporary barrier with warning lights
	Traffic or Pedestrian signal
	Truck mounted attenuator
	Type III Barricade
	Warning lights
	Work space
	Work vehicle

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.

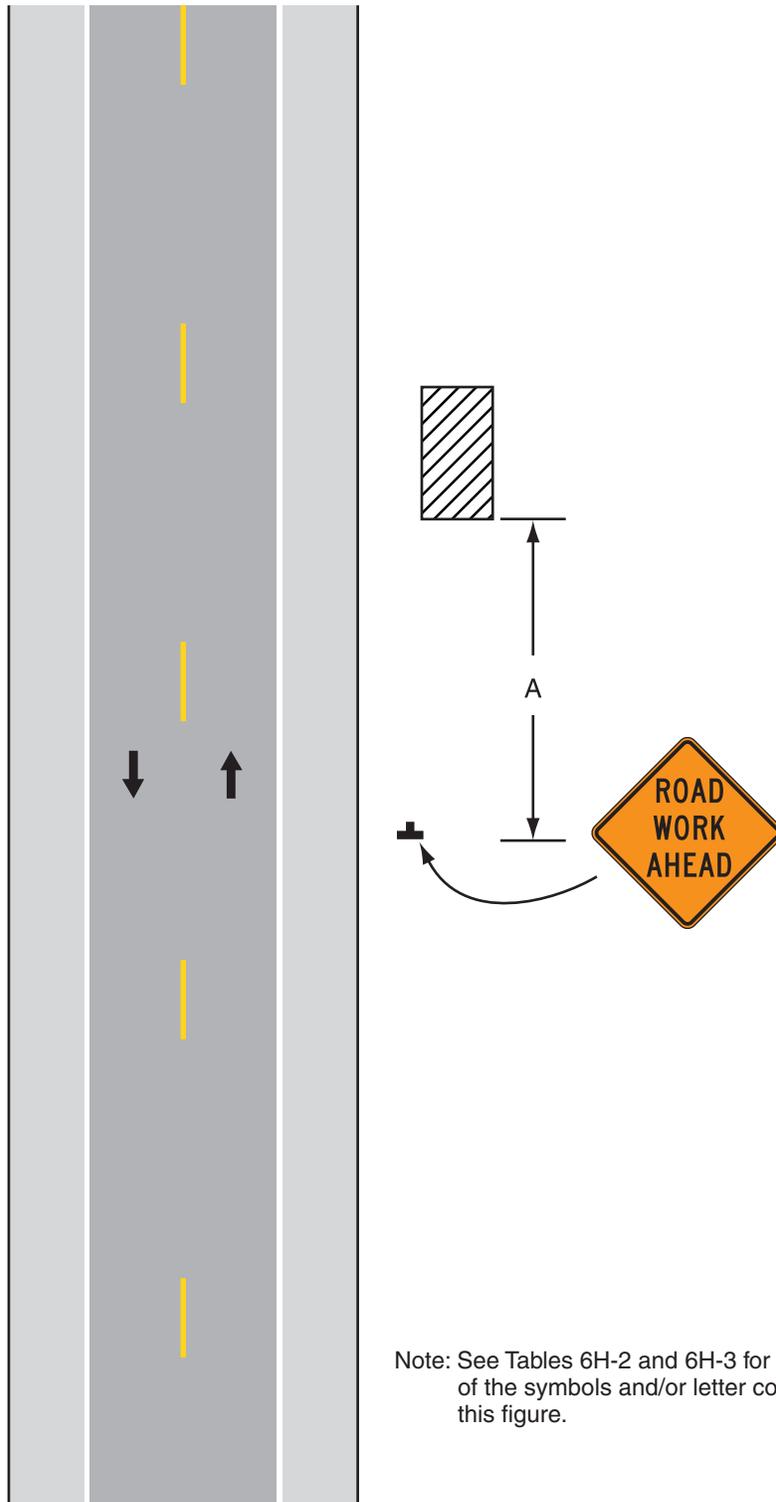
Option:

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 600 mm (24 in) behind the curb, or 4.6 m (15 ft) 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.**

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

Notes for Figure 6H-3—Typical Application 3

Work on 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.

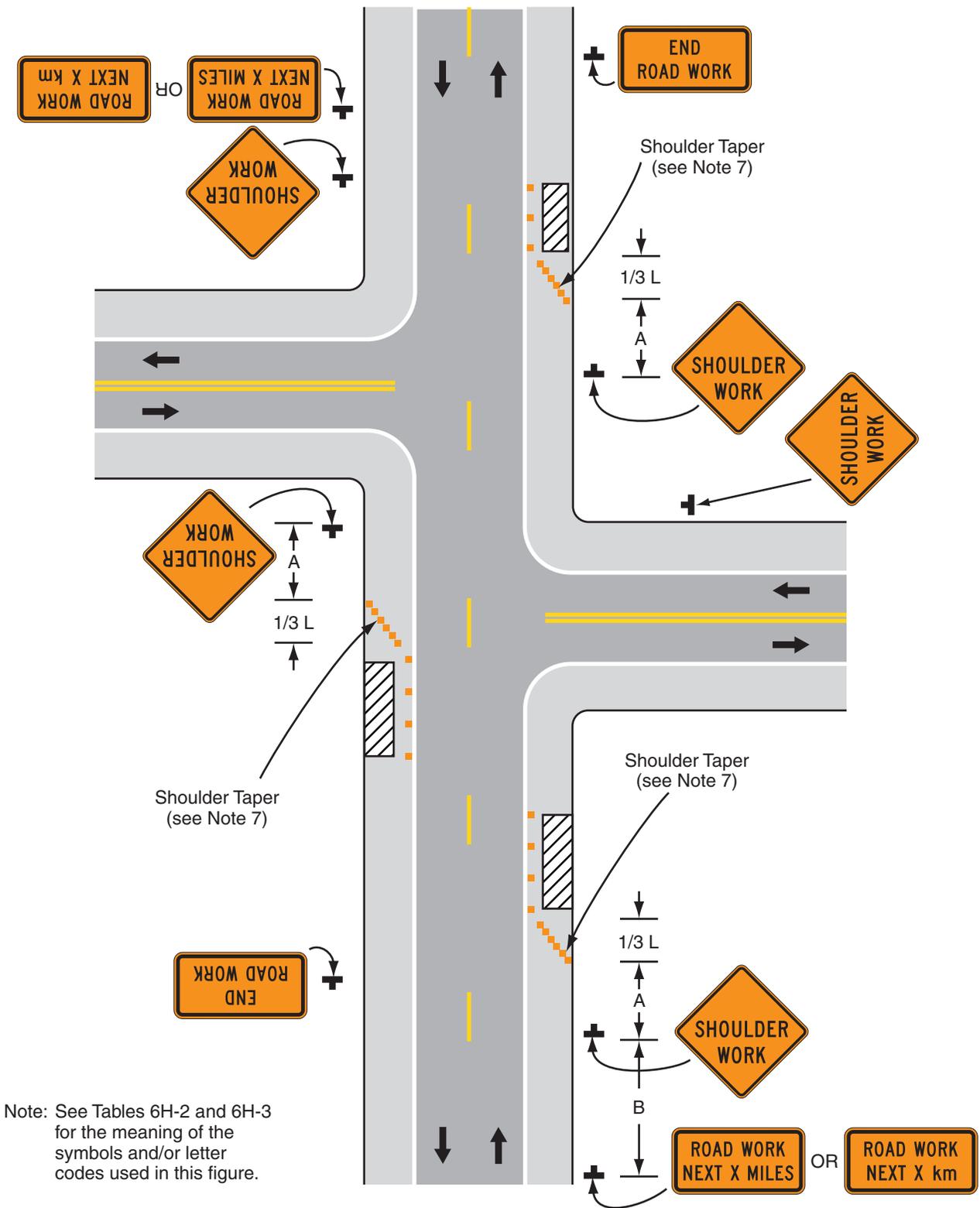
Option:

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 2.4 m (8 ft) 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.**

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



Typical Application 3

Notes for Figure 6H-4—Typical Application 4
Short-Duration or Mobile Operation on 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 8 km (5 mi).
2. In those situations where the distance between the advance signs and the work is 3.2 km (2 mi) to 8 km (5 mi), a Supplemental Distance plaque should be used with the ROAD WORK AHEAD sign.

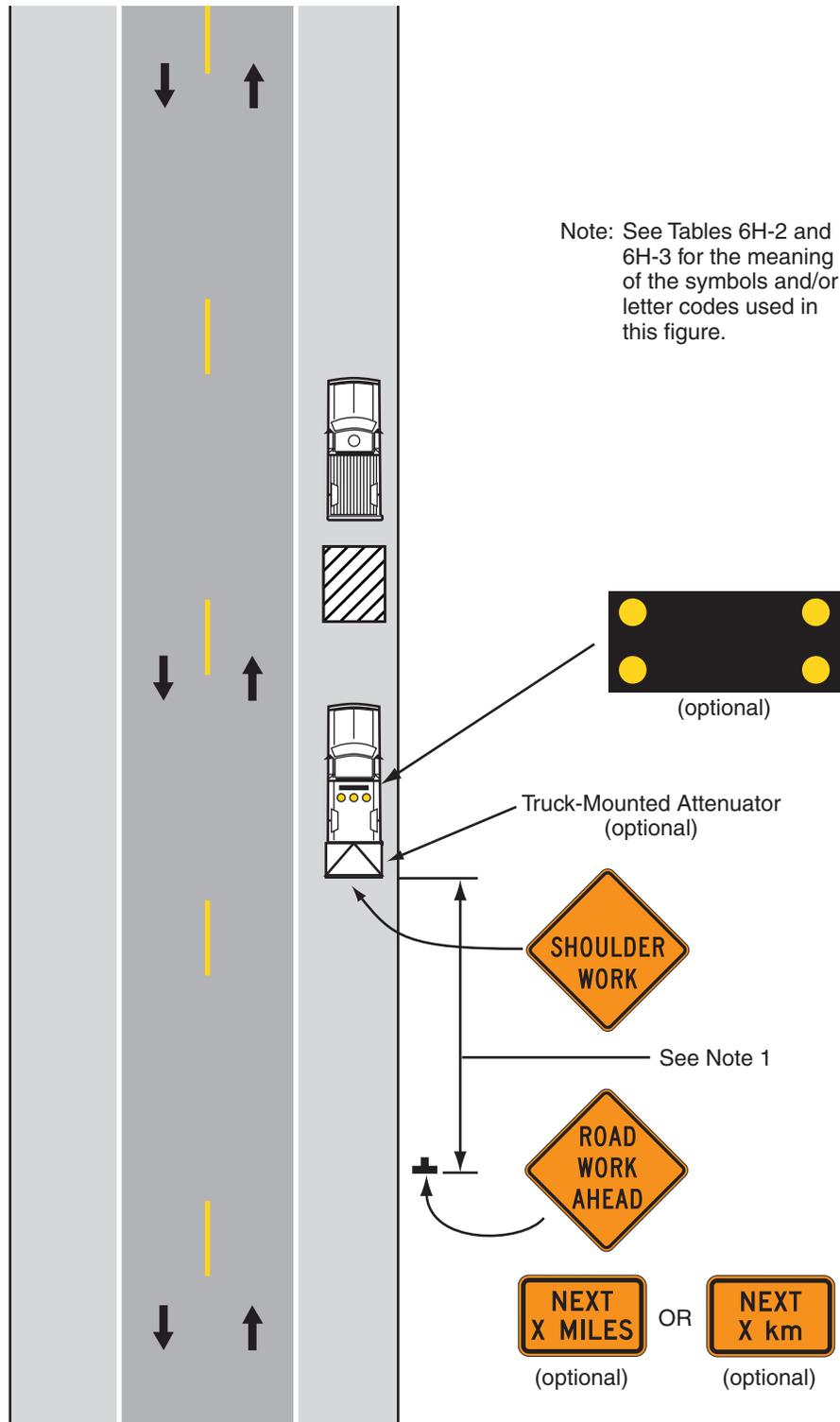
Option:

3. The ROAD WORK NEXT XX km (MILES) sign may be used instead of the ROAD WORK AHEAD sign if the work locations occur over a distance of more than 3.2 km (2 mi).
4. Warning signs may be omitted when the work vehicle displays high-intensity rotating, flashing, oscillating, or strobe lights if the distance between work locations is 1.6 km (1 mile) or more, and if the work vehicle travels at vehicular traffic speeds between locations.
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 panel is used for an operation on the shoulder, the caution mode shall be used.**

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



Typical Application 4

Notes for Figure 6H-6—Typical Application 6

Shoulder Work with Minor Encroachment

Guidance:

1. All lanes should be a minimum of 3 m (10 ft) in width as measured to the near face of the channelizing devices.
2. The treatment shown should be used on a minor road having low speeds. For higher-speed traffic conditions, a lane closure should be used.

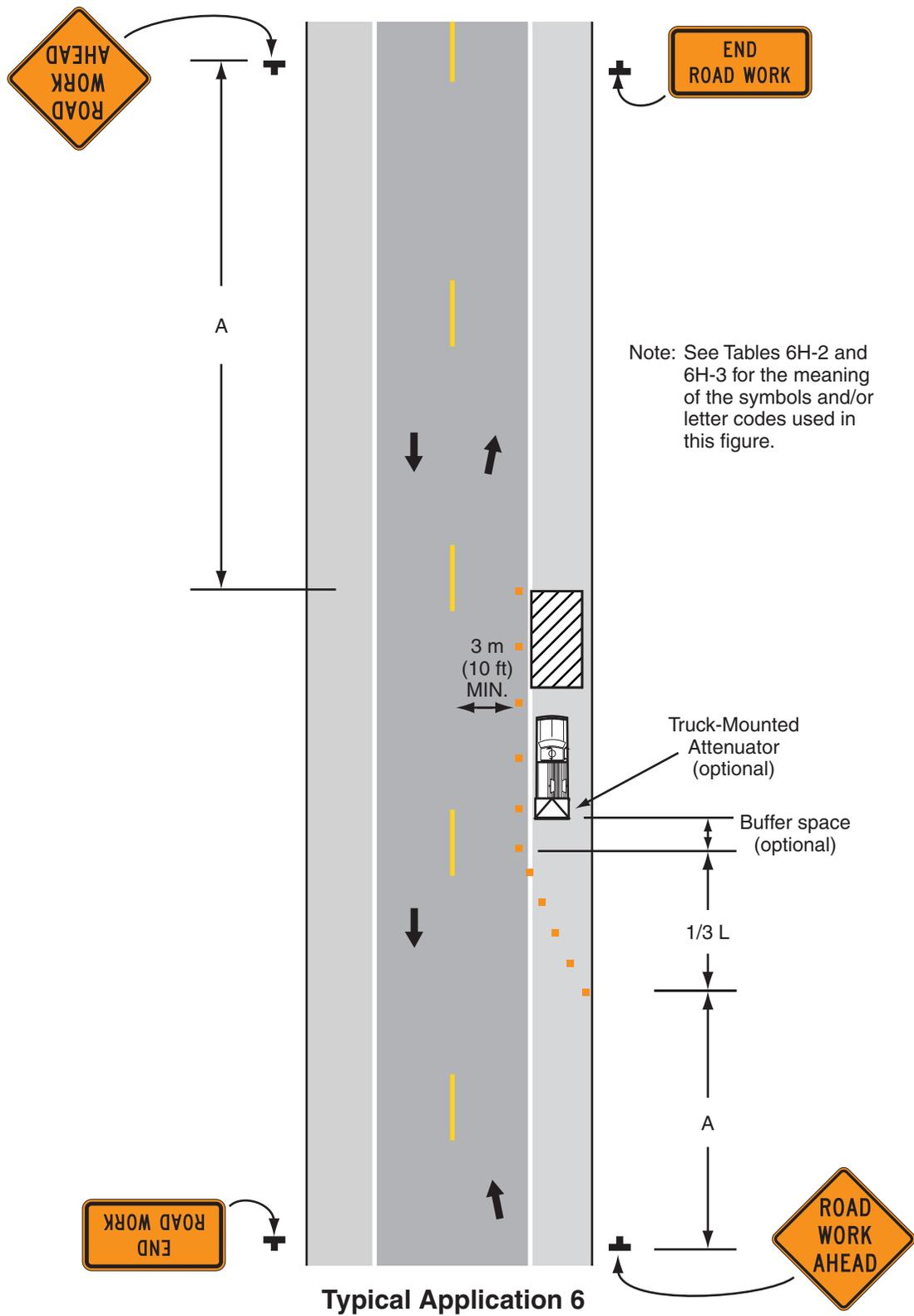
Option:

3. For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include longer and wider heavy commercial vehicles, a minimum lane width of 2.7 m (9 ft) may be used.
4. Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate width, lanes may be shifted by use of closely spaced channelizing devices, provided that the minimum lane width of 3 m (10 ft) is maintained.
5. Additional advance warning may be appropriate, such as a ROAD NARROWS sign.
6. Temporary traffic barriers may be used along the work space.
7. The shadow vehicle may be omitted if a taper and channelizing devices are used.
8. A truck-mounted attenuator may be used on the shadow vehicle.
9. For short-duration work, the taper and channelizing devices may be omitted if a shadow vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
10. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

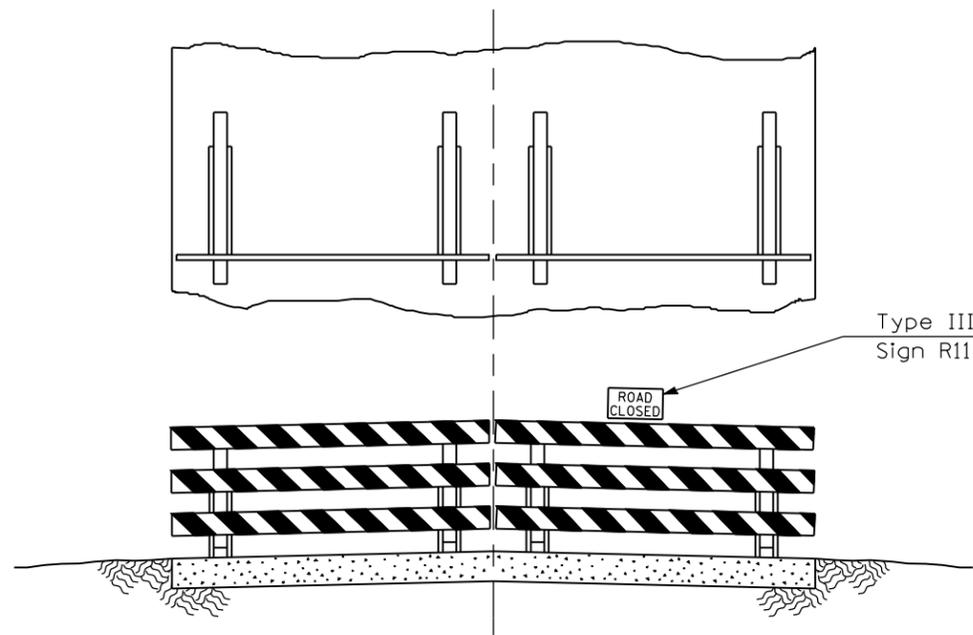
Standard:

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

Figure 6H-6. Shoulder Work with Minor Encroachment (TA-6)

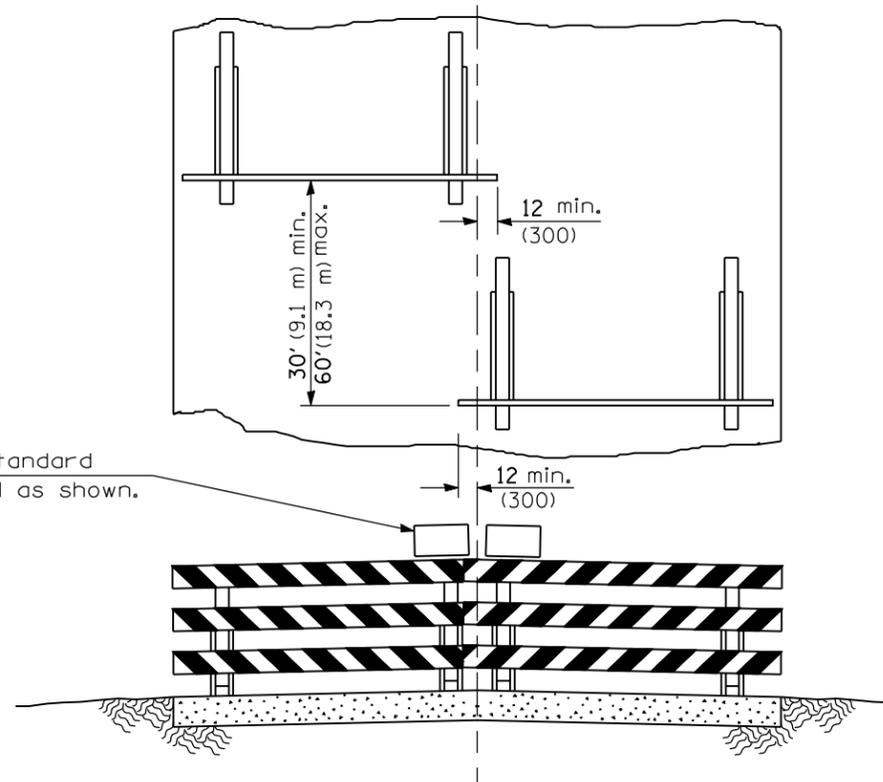


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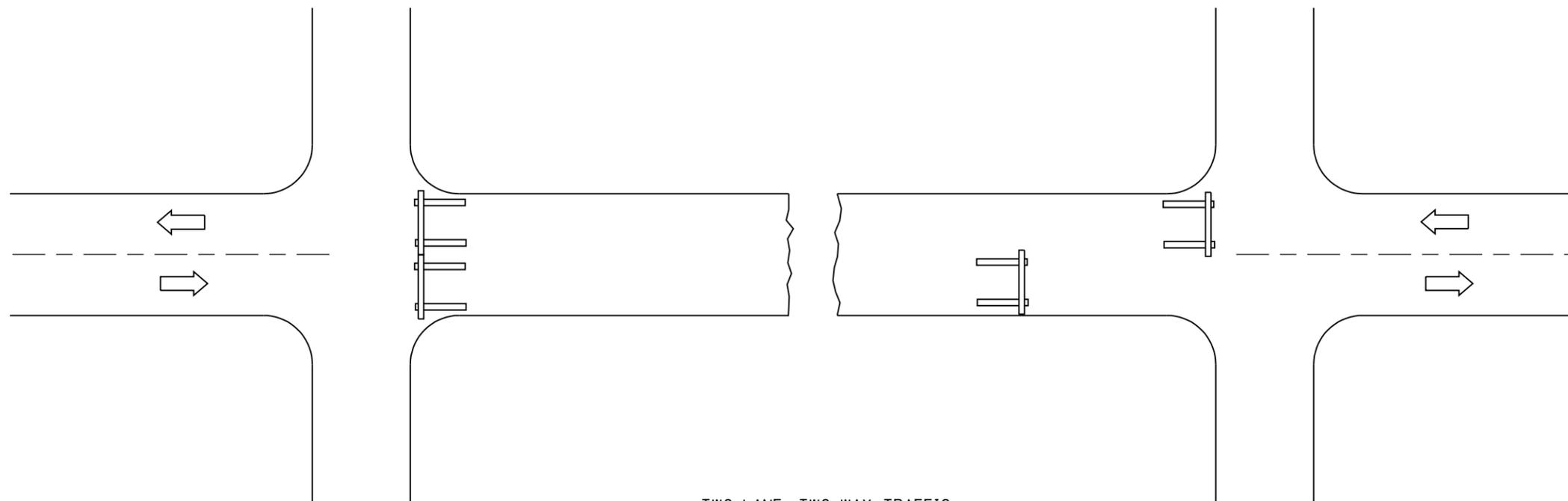


Resident traffic and day labor force's equipment to use road shoulder for passing barricade.

Type III Barricades with Standard Sign R11-2 or R11-4 mounted as shown.



Use when shoulders are too narrow for passage of traffic.



TWO-LANE, TWO-WAY TRAFFIC,
RURAL OPERATIONS EXCEEDING
ONE DAYLIGHT PERIOD

GENERAL NOTES

Type III barricades to be width of pavement only.

ReflectORIZED striping shall appear on both sides of barricades. Barricades shall be positioned so that stripes slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflectorized backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-98	Rev. "R11-1" to "R11-4".
	Rev. 4th General Note.

TRAFFIC CONTROL DEVICES - DAY LABOR CONSTRUCTION

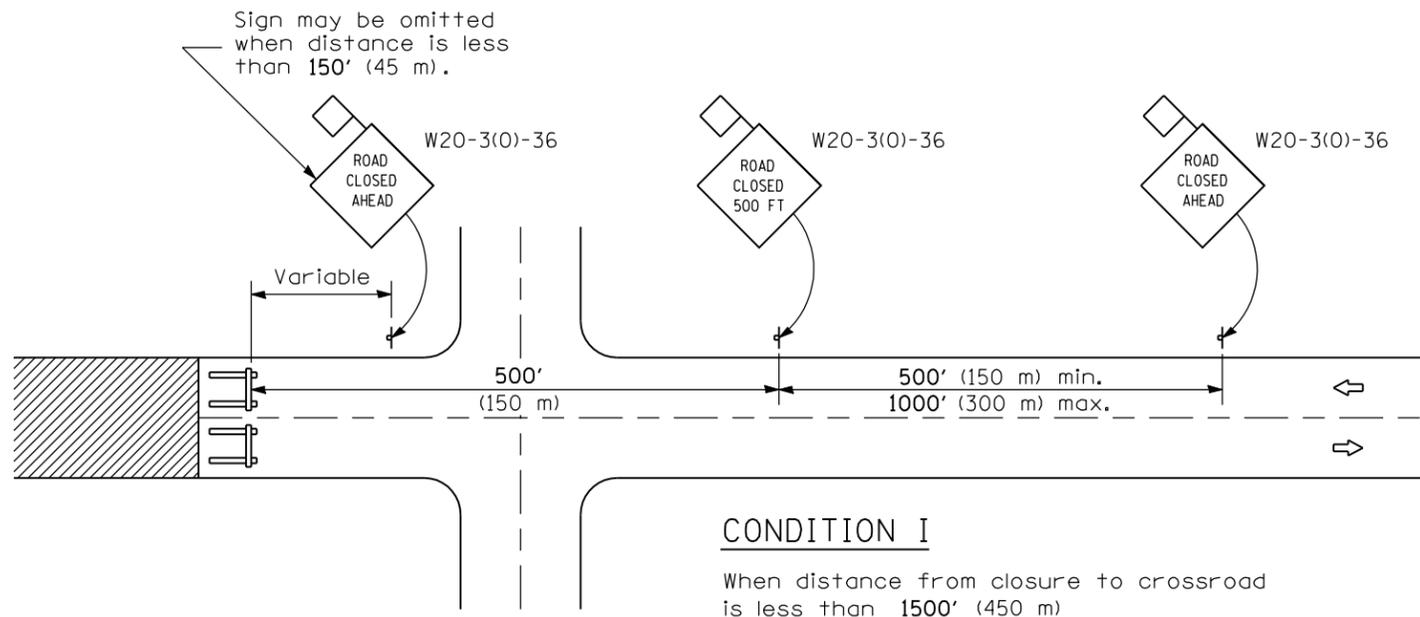
STANDARD B.L.R. 17-4

Illinois Department of Transportation

APPROVED January 1, 2009
Charles J. Russell
ENGINEER OF LOCAL ROADS AND STREETS

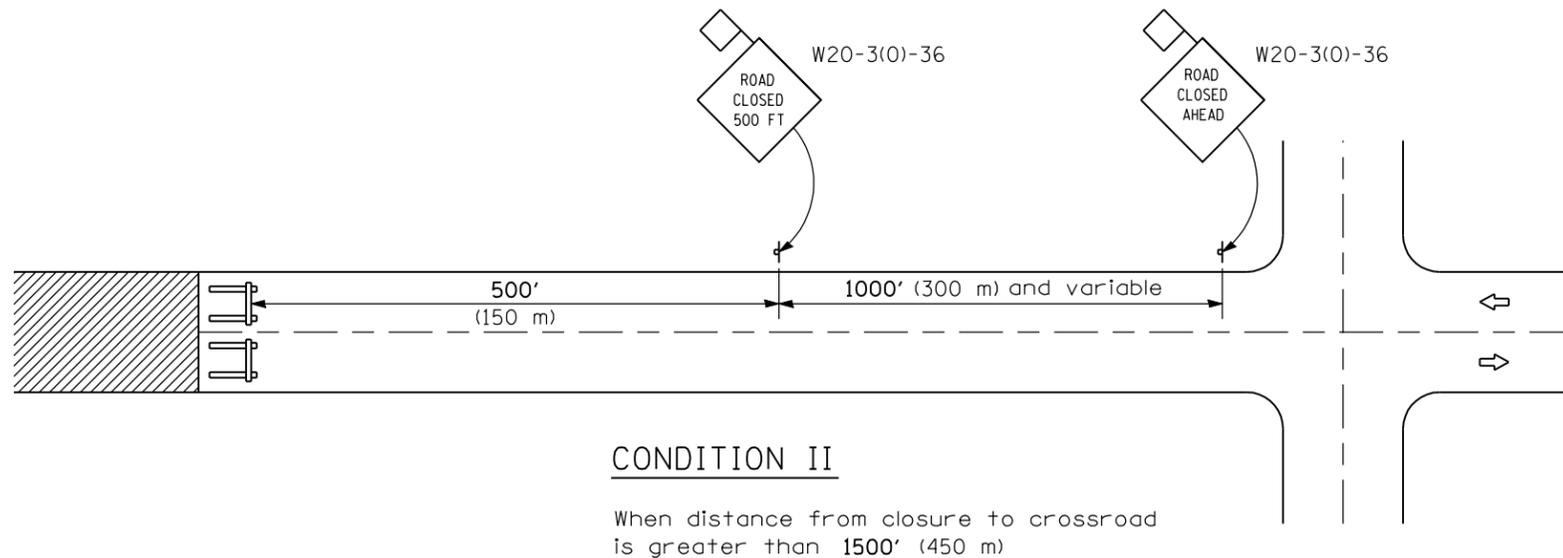
APPROVED January 1, 2009
Ken E. Han
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97



CONDITION I

When distance from closure to crossroad is less than 1500' (450 m)



CONDITION II

When distance from closure to crossroad is greater than 1500' (450 m)

SYMBOLS



Work area



Type III Barricade



Sign with 18x18 (450x450) min. orange flag attached

GENERAL NOTES

Type III Barricades and R11-2-4830 signs shall be positioned as shown in "Road Closed To All Traffic" detail on Highway Standard 701901.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area during hours of darkness. One light shall be installed above the barricades and the other above the first advance warning sign.

All signs shall be post mounted if the closure time exceeds four days.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

All work zone signs are required to meet, as a minimum, Type B reflectivity requirements of Table 1091-2 in Article 1091.02 of the Standard Specifications.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

When the distance between the barricade and the intersection is between 1500' (450 m) and 2000' (600 m), the advance sign shall be placed at the intersection. When the distance between the barricade and the intersection is over 2000' (600 m), an additional sign shall be placed at the intersection. The additional sign shall give the distance to the barricade in miles or fractions of a mile.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-08	Revised General Notes to reference Standard 701901.

TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS

STANDARD B.L.R. 21-8

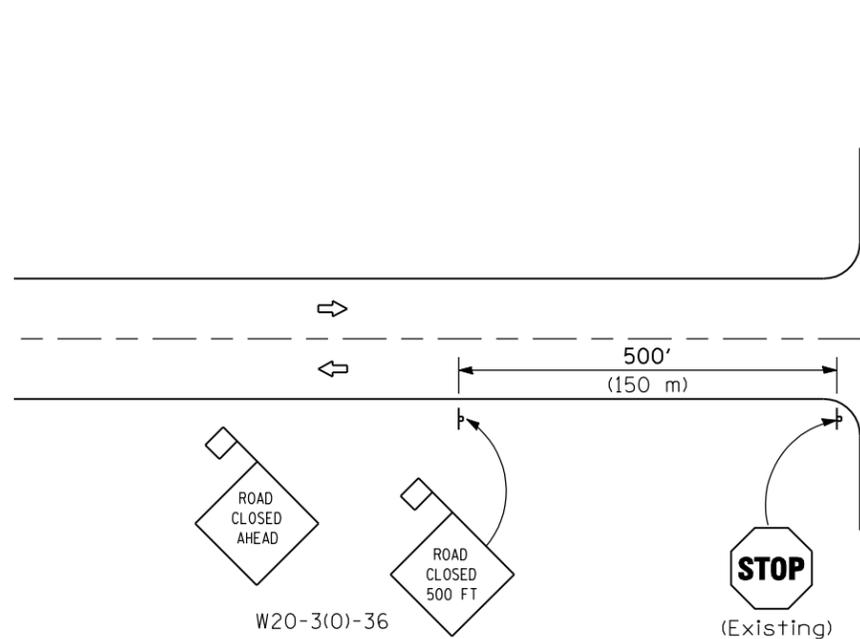
Illinois Department of Transportation

APPROVED January 1, 2009
Charles J. Russell
 ENGINEER OF LOCAL ROADS AND STREETS

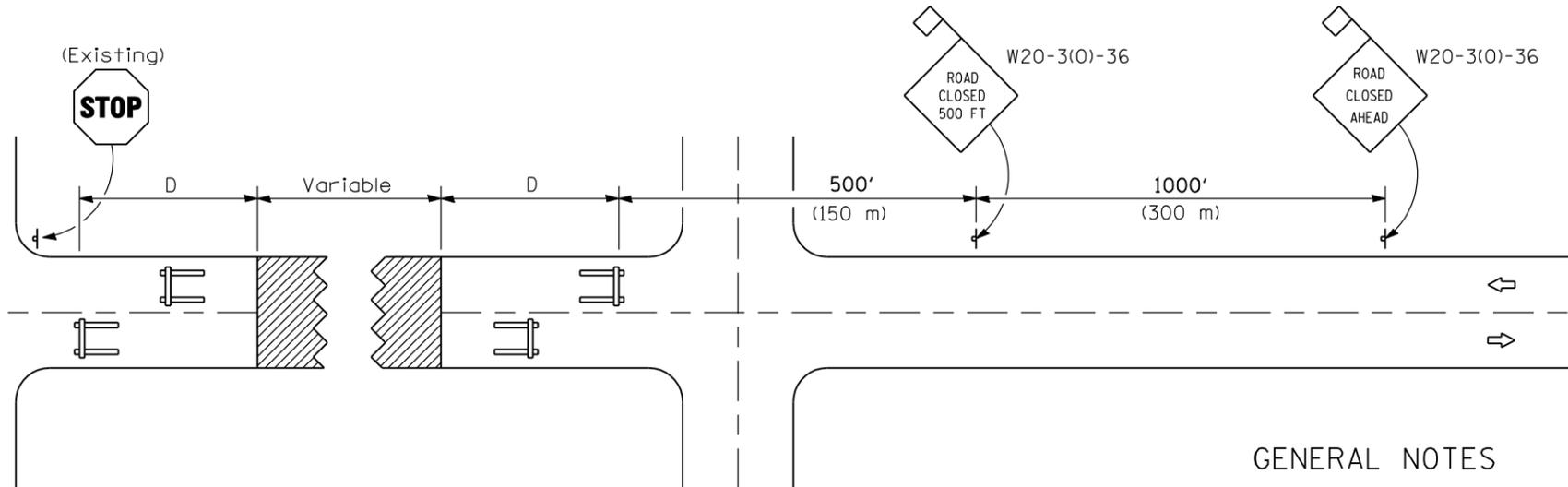
ISSUED 1-1-97

APPROVED January 1, 2009
Ken E. Han
 ENGINEER OF DESIGN AND ENVIRONMENT

**CONDITION I
APPROACH TRAFFIC STOPPED**



**CONDITION II
APPROACH TRAFFIC
DOES NOT STOP**



SYMBOLS

-  Work area
-  Type III Barricade
-  Sign with 18x18 (450x450) min. orange flag attached

GENERAL NOTES

Type III Barricades and R11-4-6030 signs shall be positioned as shown in the "Road Closed To All Traffic" detail on Highway Standard 701901. If the distance "D" exceeds 2000' (600 m), an additional set of barricades and R11-4-6030 shall be placed at each end of the work area.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area. One light shall be installed above each barricade. If only one barricade is required, the other light shall be installed above the first advance warning sign.

All signs shall be post mounted if the closure time exceeds four days.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

All work zone signs are required to meet, as a minimum, Type B reflectivity requirements of Table 1091-2 in Article 1091.02 of the Standard Specifications.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Revised General Notes and switched units to English (metric).
1-1-08	Revised General Notes to reference Standard 701901.

TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS (TWO-LANE TWO WAY RURAL TRAFFIC) (ROAD CLOSED TO THRU TRAFFIC)

STANDARD B.L.R. 22-6

Illinois Department of Transportation

APPROVED January 1, 2009
Charles J. Russell
ENGINEER OF LOCAL ROADS AND STREETS

APPROVED January 1, 2009
Ken E. Han
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

Notes for Figure 6H-10—Typical Application 10

Lane Closure on 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 highway-rail 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 highway-rail grade crossing, the TTC zone should be extended so that the transition area precedes the highway-rail grade crossing.
8. When a highway-rail 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 highway-rail grade crossing exists within the activity area, drivers operating on the left side of the normal centerline should be provided with comparable warning devices as for drivers operating on the right side of the normal centerline.
10. Early coordination with the railroad company should occur before work starts.

Option:

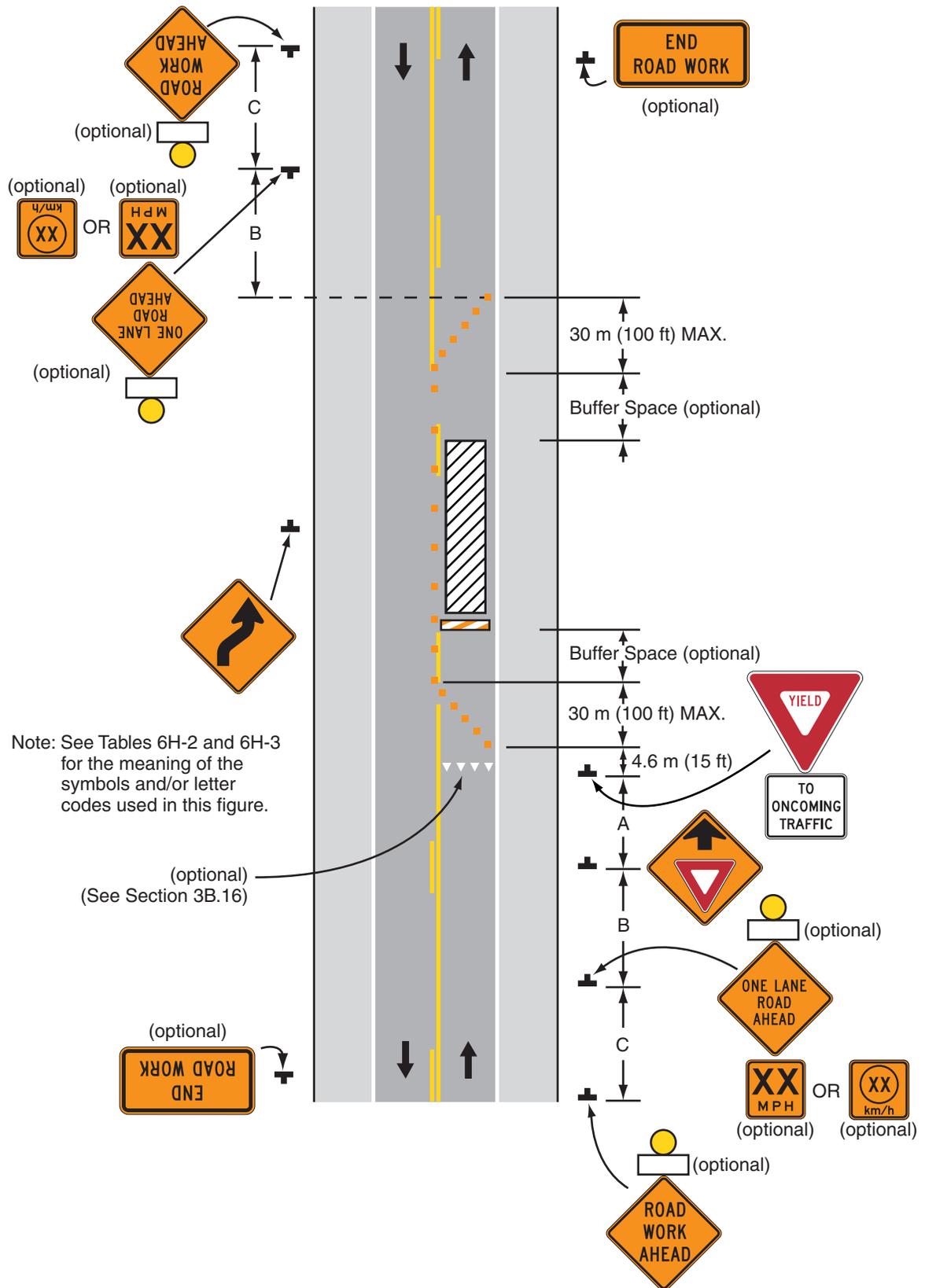
11. A flagger or a uniformed law enforcement officer may be used at the highway-rail grade crossing to minimize the probability that vehicles are stopped within 4.6 m (15 ft) of the highway-rail grade crossing, measured from both sides of the outside rails.

Notes for Figure 6H-11—Typical Application 11
Lane Closure on Two-Lane Road with Low Traffic Volumes

Option:

1. This TTC zone application may be used as an alternate to the TTC application shown in Figure 6H-10 (using flaggers) when the following conditions exist:
 - a. Vehicular traffic volume is such that sufficient gaps exist for vehicular traffic that must yield.
 - b. Road users from both directions are able to see approaching vehicular traffic through and beyond the work site and have sufficient visibility of approaching vehicles.
2. The Type B flashing warning lights may be placed on the ROAD WORK AHEAD and the ONE LANE ROAD AHEAD signs whenever a night lane closure is necessary.

Figure 6H-11. Lane Closure on Two-Lane Road with Low Traffic Volumes



Typical Application 11

Notes for Figure 6H-12—Typical Application 12
Lane Closure on Two-Lane Road Using Traffic Control Signals

Standard:

1. **TTC signals shall be installed and operated in accordance with the provisions of Part 4. TTC signals shall meet the physical display and operational requirements of conventional traffic control signals.**
2. **TTC signal timing shall be established by authorized officials. Durations of red clearance intervals shall be adequate to clear the one-lane section of conflicting vehicles.**
3. **When the TTC signal is changed to the flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.**
4. **Stop lines shall be installed with TTC signals for intermediate and long-term closures. Existing conflicting pavement markings and raised pavement marker reflectors between the activity area and the stop line shall be removed. After the TTC signal is removed, the stop lines and other temporary pavement markings shall be removed and the permanent pavement markings restored.**
5. **Safeguards shall be incorporated to avoid the possibility of conflicting signal indications at each end of the TTC zone.**

Guidance:

6. Where no-passing lines are not already in place, they should be added.
7. Adjustments in the location of the advance warning signs should be made as needed to accommodate the horizontal or vertical alignment of the roadway, recognizing that the distances shown for sign spacings are minimums. Adjustments in the height of the signal heads should be made as needed to conform to the vertical alignment.

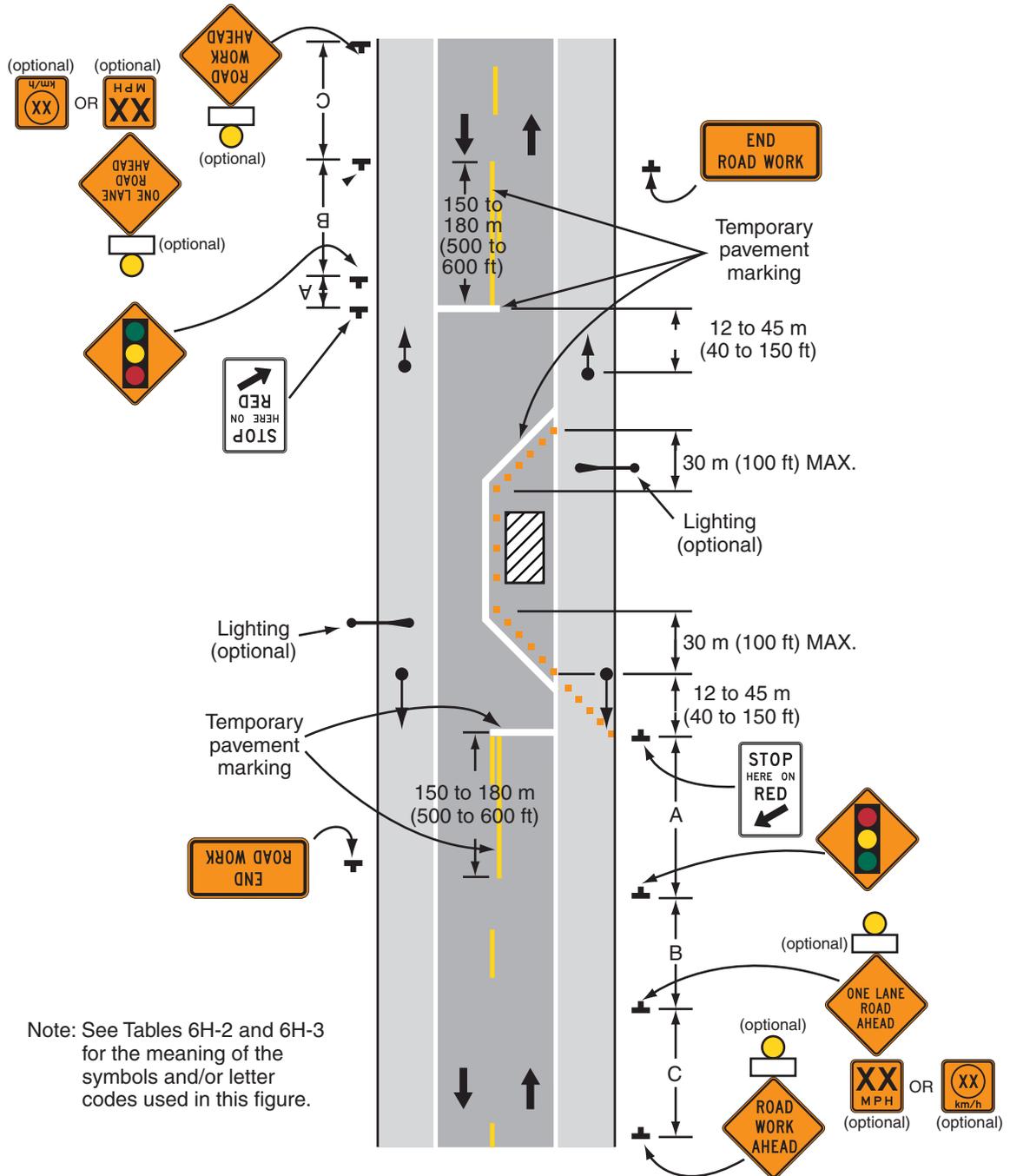
Option:

8. Flashing warning lights shown on the ROAD WORK AHEAD and the ONE LANE ROAD AHEAD signs may be used.
9. Removable pavement markings may be used.

Support:

10. TTC signals are preferable to flaggers for long-term projects and other activities that would require flagging at night.
11. The maximum length of activity area for one-way operation under TTC signal control is determined by the capacity required to handle the peak demand.

Figure 6H-12. Lane Closure on Two-Lane Road Using Traffic Control Signals (TA-12)



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

Typical Application 12

Notes for Figure 6H-13—Typical Application 13
Temporary Road Closure

Support:

1. Conditions represented are a planned closure not exceeding 20 minutes during the daytime.

Standard:

2. **A flagger or uniformed law enforcement officer shall be used for this application. The flagger, if used for this application, shall follow the procedures noted in Sections 6E.04 and 6E.05.**

Guidance:

3. The uniformed law enforcement officer, if used for this application, should follow the procedures noted in Sections 6E.04 and 6E.05.

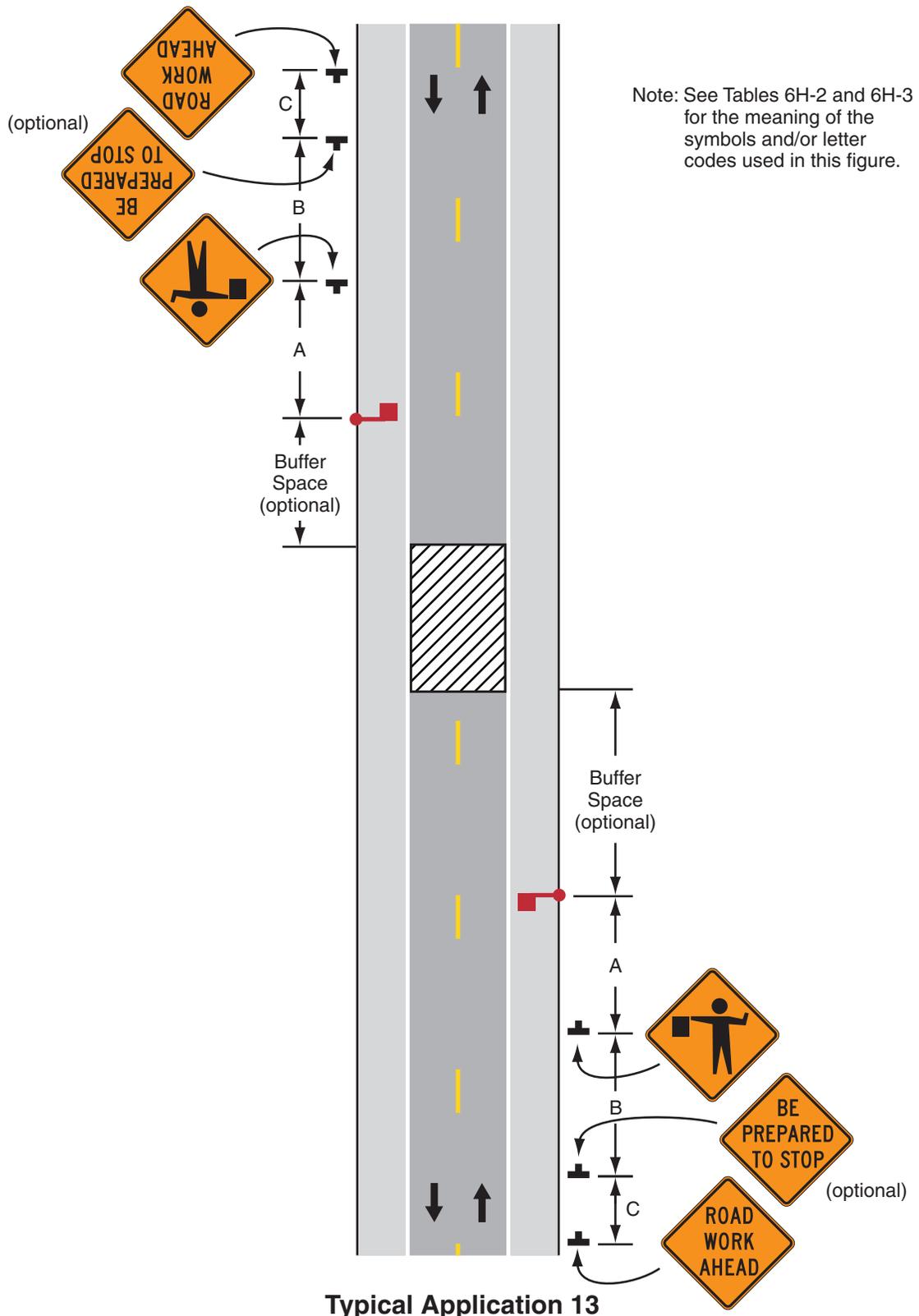
Option:

4. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

5. When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.

Figure 6H-13. Temporary Road Closure (TA-13)



Notes for Figure 6H-15—Typical Application 15
Work in Center of Road with Low Traffic Volumes

Guidance:

1. The lanes on either side of the center work space should have a minimum width of 3 m (10 ft) as measured from the near edge of the channelizing devices to the edge of pavement or the outside edge of paved shoulder.
2. Workers in the roadway should wear high-visibility safety apparel as described in Section 6D.03.

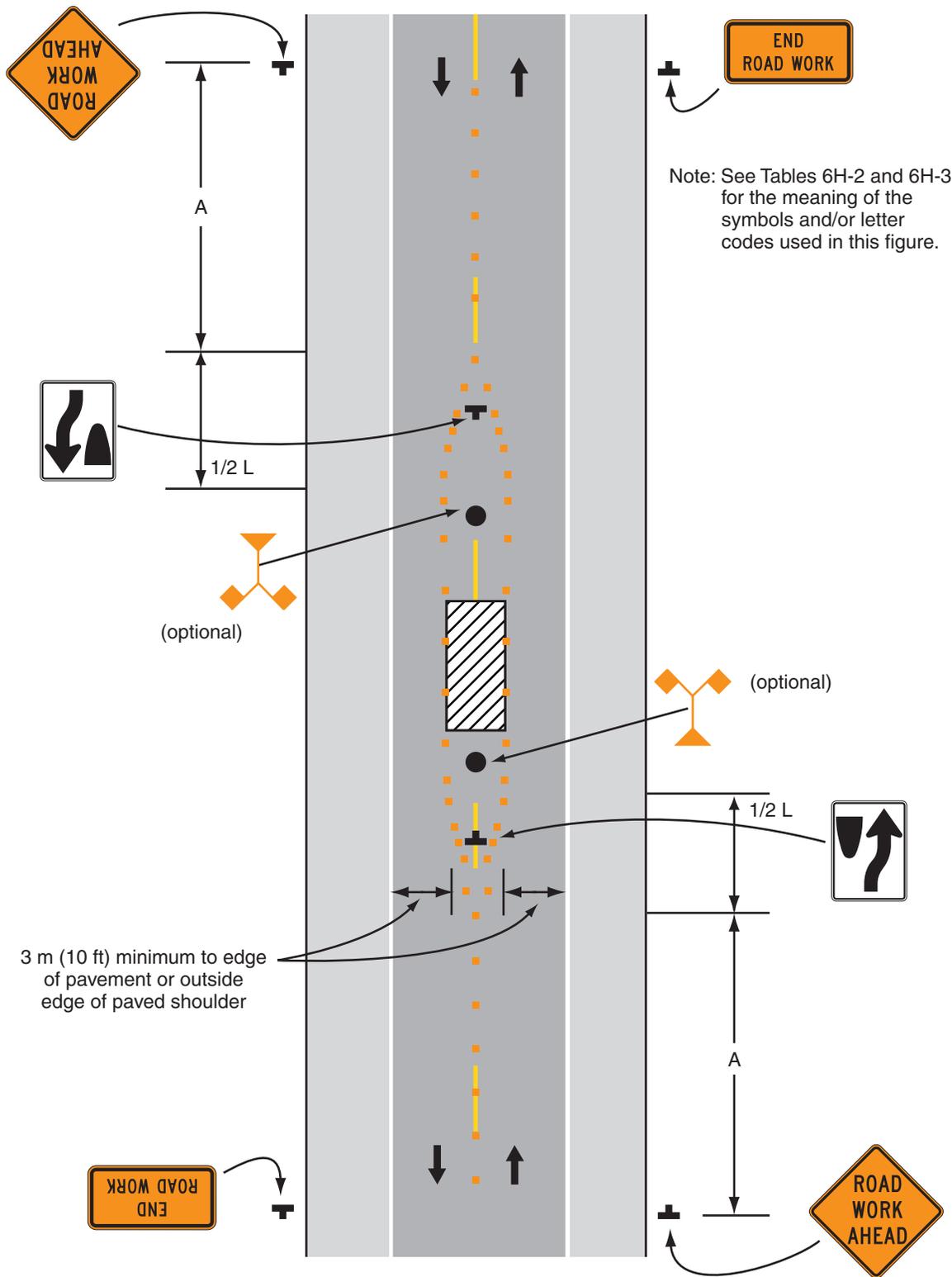
Option:

3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. If the closure continues overnight, warning lights may be used on the channelizing devices.
5. A lane width of 2.7 m (9 ft) may be used for short-term stationary work on low-volume, low-speed roadways when motor vehicle traffic does not include longer and wider heavy commercial vehicles.
6. A work vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights may be used instead of the channelizing devices forming the tapers or the high-level warning devices.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

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

Figure 6H-15. Work in Center of Road with Low Traffic Volumes (TA-15)



Typical Application 15

Notes for Figure 6H-17—Typical Application 17
Mobile Operations on Two-Lane Road

Standard:

1. **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.**
2. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
3. **If an arrow panel is used, it shall be used in the caution mode.**

Guidance:

4. Where practical and when needed, the work and shadow vehicles should pull over periodically to allow vehicular traffic to pass.
5. Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the minimum distance from the work vehicle and proceed at the same speed. The shadow vehicle should slow down in advance of vertical or horizontal curves that restrict sight distance.
6. The shadow vehicles should also be equipped with two high-intensity flashing lights mounted on the rear, adjacent to the sign.

Option:

7. The distance between the work and shadow vehicles may vary according to terrain, paint drying time, and other factors.
8. Additional shadow vehicles to warn and reduce the speed of oncoming or opposing vehicular traffic may be used. Law enforcement vehicles may be used for this purpose.
9. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
10. If the work and shadow vehicles cannot pull over to allow vehicular traffic to pass frequently, a DO NOT PASS sign may be placed on the rear of the vehicle blocking the lane.

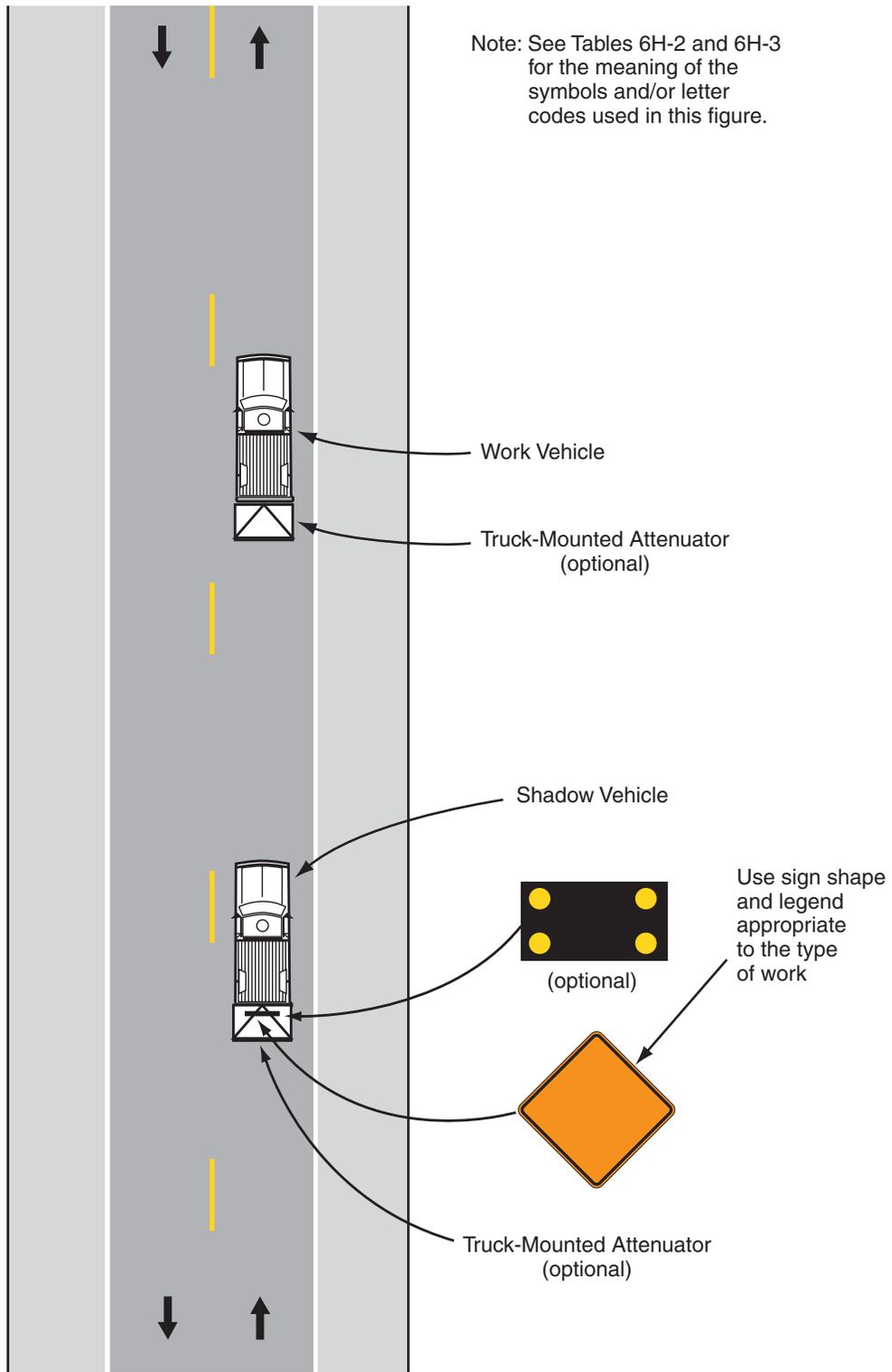
Support:

11. Shadow vehicles are used to warn motor vehicle traffic of the operation ahead.

Standard:

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

Figure 6H-17. Mobile Operations on Two-Lane Road (TA-17)



Typical Application 17

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GENERAL NOTES

Maintenance operations shall be confined to one traffic lane, leaving the opposite lane open to traffic. At least 500' (150 m) of both traffic lanes shall be available for traffic movement between work areas at intervals not greater than 1000' (300 m).

When operations are on the pavement and stationary or moving at a speed less than 4 mph (6 kph), a ONE LANE AHEAD, or other appropriate sign, shall be installed in each direction between the ROAD WORK AHEAD sign and the work area. The distance between this sign and the work area shall be a minimum of 400' (120 m) but in no case to exceed the length of one-half day's operation or 4 miles (6 km), whichever is less. The distance between the two signs shall be approximately 400' (120 m).

All signs are to be removed at completion of the day's operation.

Any unattended obstacle, excavation, or pavement drop off greater than 3 (75) in the work area shall be protected by Type I or Type II barricades with flashing lights.

Longitudinal dimensions may be adjusted slightly to fit field conditions.

All vehicles, equipment, men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 60 minutes on the shoulder respectively.

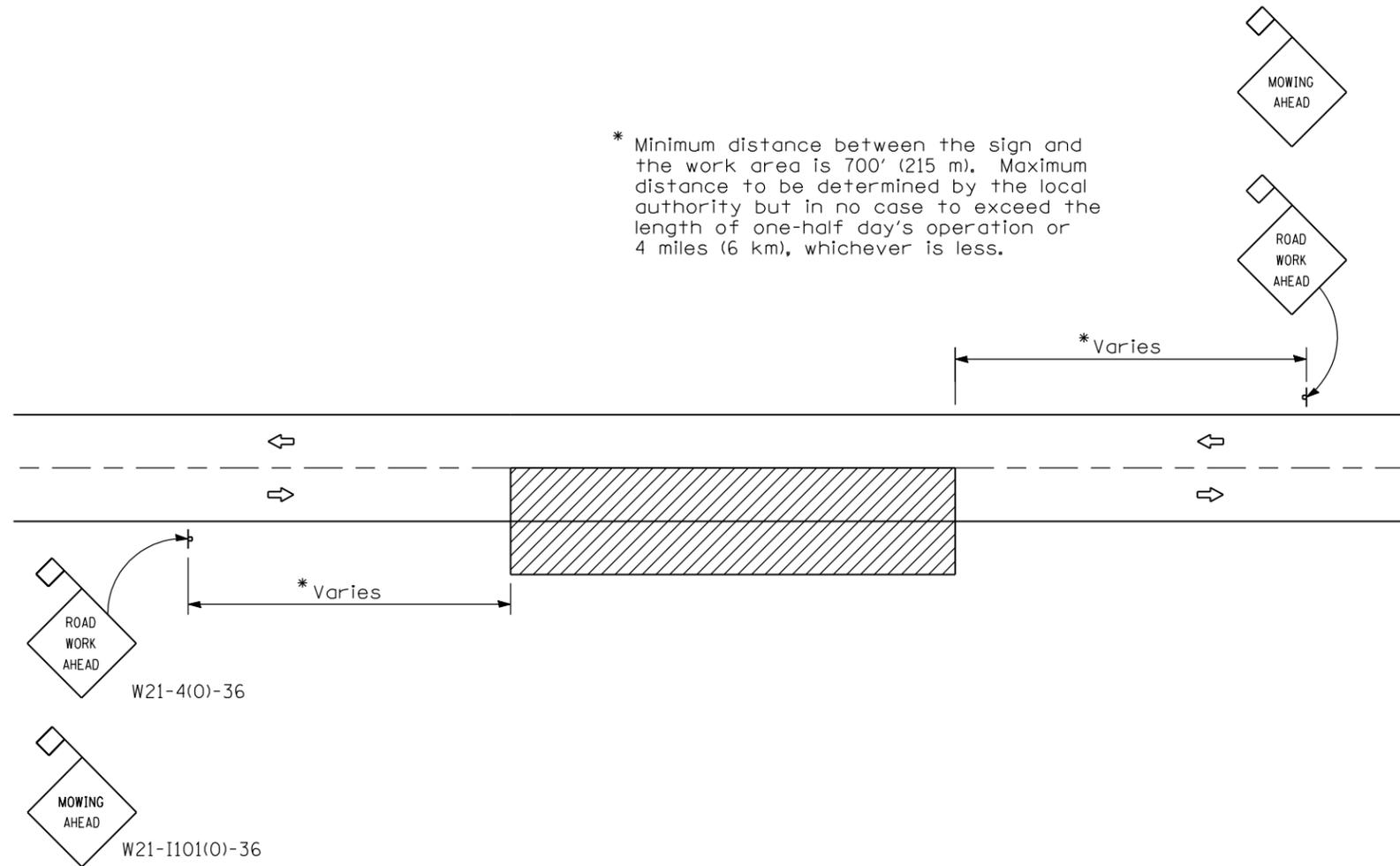
All warning signs shall have minimum dimensions of 36x36 (900x900) and have black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

All dimensions are in inches (millimeters) unless otherwise shown.

* Minimum distance between the sign and the work area is 700' (215 m). Maximum distance to be determined by the local authority but in no case to exceed the length of one-half day's operation or 4 miles (6 km), whichever is less.



TWO-LANE, TWO-WAY TRAFFIC
RURAL OPERATIONS
DAY OPERATIONS ONLY

SYMBOLS



Work area



Sign with 18x18 (450x450) min.
orange flag attached.

TYPICAL APPLICATIONS

MOWING
SPREADING AGGREGATE
WEED SPRAYING
SURFACE MAINTENANCE
BITUMINOUS RESURFACING
CRACK POURING
SHOULDER REPAIR
CLEANING DITCHES

DATE	REVISIONS
1-1-09	Switched units to English (metric). Moved one General Note.
1-1-99	Delete ROW Line.

TRAFFIC CONTROL
DEVICES-DAY LABOR
MAINTENANCE

STANDARD B.L.R. 18-5

Illinois Department of Transportation	
APPROVED January 1, 2009 <i>Charles J. Russell</i> ENGINEER OF LOCAL ROADS AND STREETS	ISSUED 1-1-97
APPROVED January 1, 2009 <i>Ken E. Han</i> ENGINEER OF DESIGN AND ENVIRONMENT	

Notes for Figure 6H-18—Typical Application 18
Lane Closure on Minor Street

Standard:

1. **This TTC shall be used only for low-speed facilities having low traffic volumes.**

Option:

2. Where the work space is short, where road users can see the roadway beyond, and where volume is low, vehicular traffic may be self-regulating.

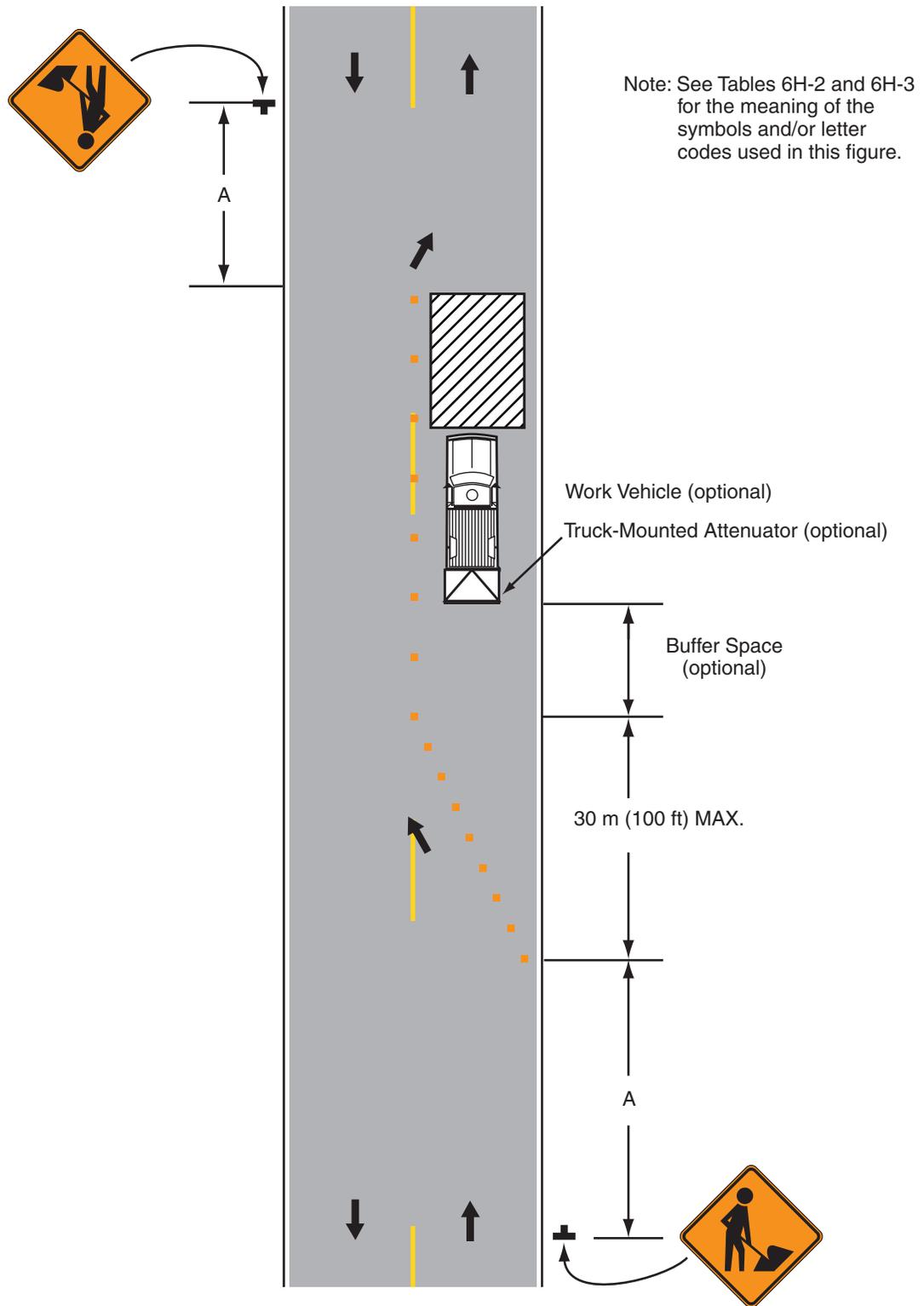
Standard:

3. **Where vehicular traffic cannot effectively self-regulate, one or two flaggers shall be used as illustrated in Figure 6H-10.**

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. A truck-mounted attenuator may be used on the work vehicle and the shadow vehicle.

Figure 6H-18. Lane Closure on Minor Street (TA-18)



Typical Application 18

Notes for Figure 6H-20—Typical Application 20
Detour for Closed Street

Guidance:

1. This plan should be used for streets without posted route numbers.
2. On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.

Option:

3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. Flashing warning lights may be used on Type III Barricades.
5. Detour signs may be located on the far side of intersections. A Detour sign with an advance arrow may be used in advance of a turn.
6. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white on green or black on orange.

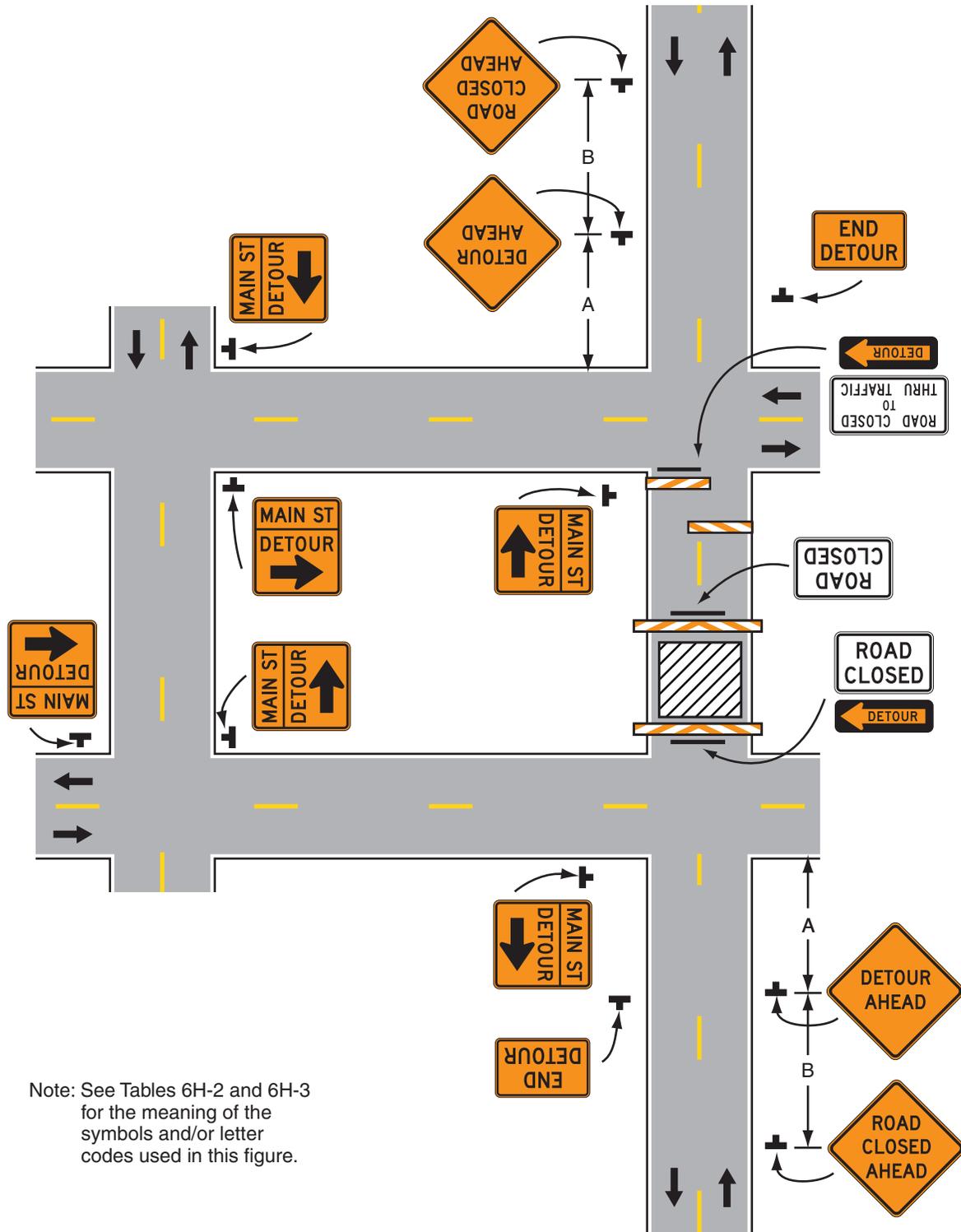
Standard:

- 7. When used, the Street Name sign shall be placed above the Detour sign.**

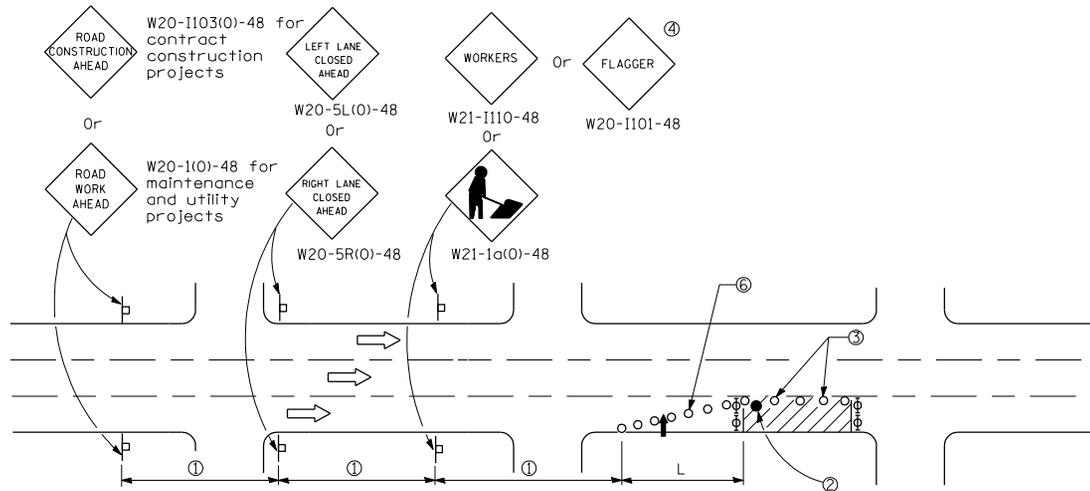
Support:

8. See Figure 6H-9 for the information for detouring a numbered highway.

Figure 6H-20. Detour for Closed Street (TA-20)



Typical Application 20



SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SYMBOLS

- Arrow board
- Cone, drum or barricade
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing light
- Type III barricade with flashing lights
- Flagger with traffic control sign.

- ① Refer to SIGN SPACING TABLE for distances.
- ② Required for speeds > 40 MPH
- ③ Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- ④ Use flagger sign only when flagger is present.
- ⑤ For approved sideroad closures.
- ⑥ Cones, drums or barricades at 20' (6 m) in taper.

GENERAL NOTES

This Standard is used where at any-time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in urban areas.

Calculate L as follows:

SPEED LIMIT	FORMULAS
40 mph (70 km/h) or less:	English (Metric) $L = \frac{WS^2}{60}$ $L = \frac{WS^2}{150}$
45 mph (80 km/h) or greater:	$L = (W)(S)$ $L = 0.65(W)(S)$

W = Width of offset in feet (meters).
S = Normal posted speed mph (km/h).

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

APPROVED January 1, 2009
ENGINEER OF OPERATIONS

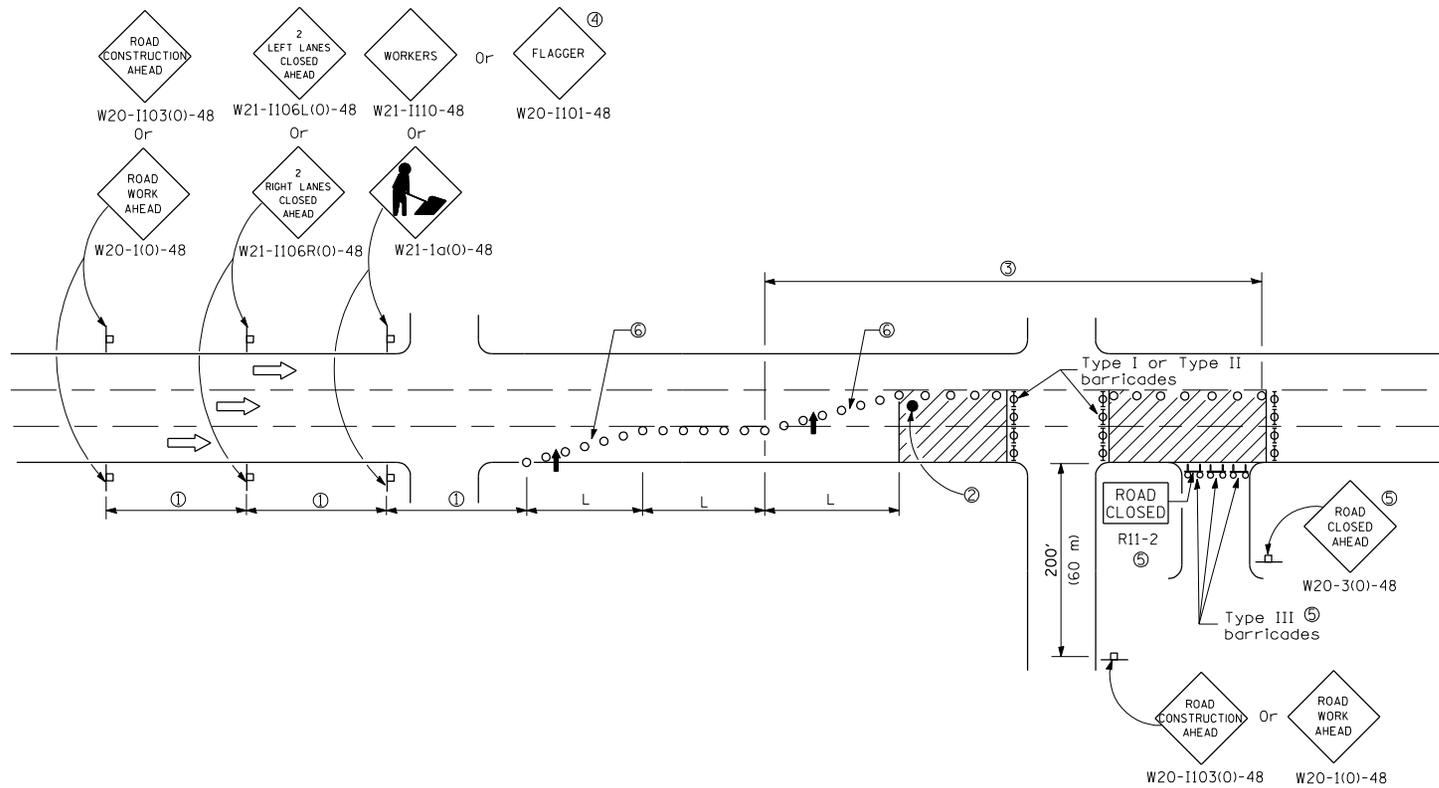
APPROVED January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

DATE	REVISIONS
1-1-09	Switched units to English (metric). Corrected sign No.'s.
1-1-08	Added note ⑥

URBAN LANE CLOSURE,
MULTILANE, 1W OR 2W WITH
NONTRAVERSABLE MEDIAN
(Sheet 1 of 2)

STANDARD 701601-06



Illinois Department of Transportation

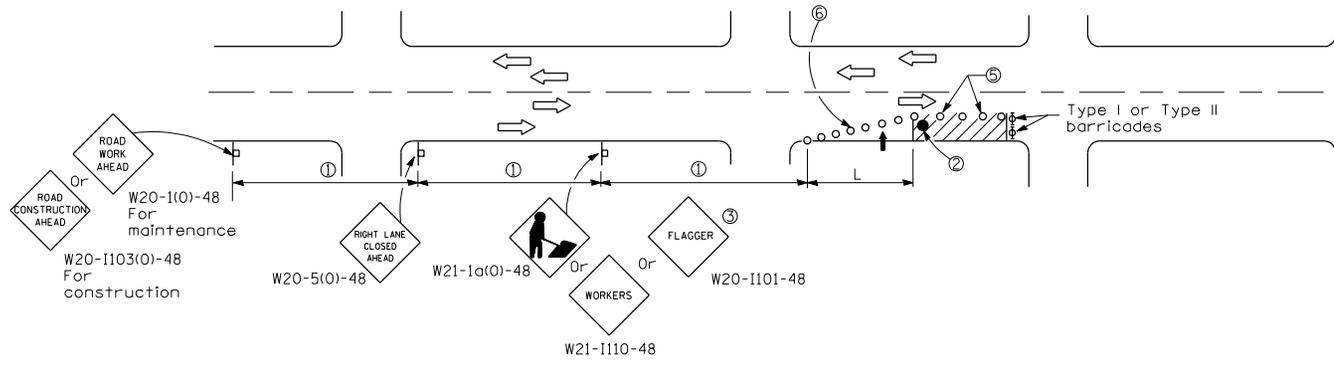
APPROVED January 1, 2009
[Signature]
 ENGINEER OF OPERATIONS

APPROVED January 1, 2009
[Signature]
 ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

URBAN LANE CLOSURE,
 MULTILANE, 1W OR 2W WITH
 NONTRAVERSABLE MEDIAN
 (Sheet 2 of 2)

STANDARD 701601-06



SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SYMBOLS

-  Arrow board
-  Cone, drum or barricade
-  Sign on portable or permanent support
-  Work area
-  Barricade or drum with flashing light
-  Type III barricade with flashing lights
-  Flagger with traffic control sign.

- ① Refer to SIGN SPACING TABLE for distances.
- ② Required for speeds > 40 MPH
- ③ Use flagger sign only when flagger is present.
- ④ For approved sideroad closures.
- ⑤ Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- ⑥ Cones, drums or barricades at 6' (20 m) centers in taper.
- ⑦ Repeat every 1 mile (1.6 km).

GENERAL NOTES

This Standard is used where at anytime, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one or more traffic lanes in an urban area.

Calculate L as follows:

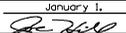
SPEED LIMIT	FORMULAS	
40 mph (70 km/h) or less:	English $L = \frac{WS^2}{60}$	(Metric) $L = \frac{WS^2}{150}$
45 mph (80 km/h) or greater:	$L = (W)(S)$	$L = 0.65(W)(S)$

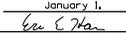
W = Width of offset in feet (meters).

S = Normal posted speed mph (km/h).

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

APPROVED January 1, 2009

 ENGINEER OF OPERATIONS

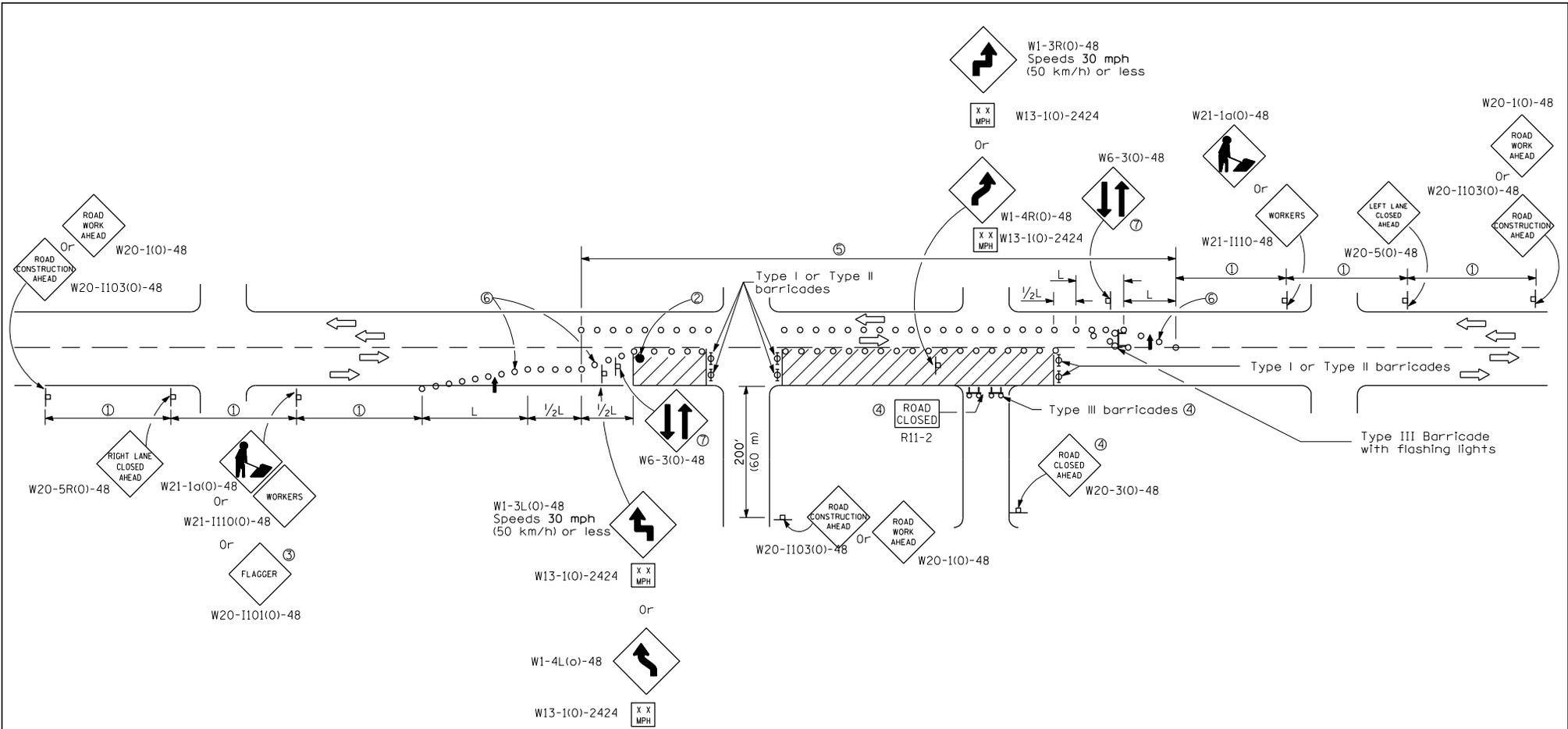
APPROVED January 1, 2009

 ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

DATE	REVISIONS
1-1-09	Switched units to English (metric). Omitted large arrow signs.
1-1-08	Replaced arrow board with lane shift sign.
	Added notes ⑥ & ⑦

URBAN LANE CLOSURE,
 MULTILANE, 2W WITH
 MOUNTABLE MEDIAN
 (Sheet 1 of 2)

STANDARD 701606-06



Illinois Department of Transportation

APPROVED January 1, 2009
 ENGINEER OF OPERATIONS
 APPROVED January 1, 2009
 ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

URBAN LANE CLOSURE,
 MULTILANE, 2W WITH
 MOUNTABLE MEDIAN
 (Sheet 2 of 2)

STANDARD 701606-06

Notes for Figure 6H-21—Typical Application 21
Lane Closure on Near Side of Intersection

Standard:

- 1. The merging taper shall direct vehicular traffic into either the right or left lane, but not both.**

Guidance:

2. In this typical application, a left taper should be used so that right-turn movements will not impede through motor vehicle traffic. However, the reverse should be true for left-turn movements.
3. If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.

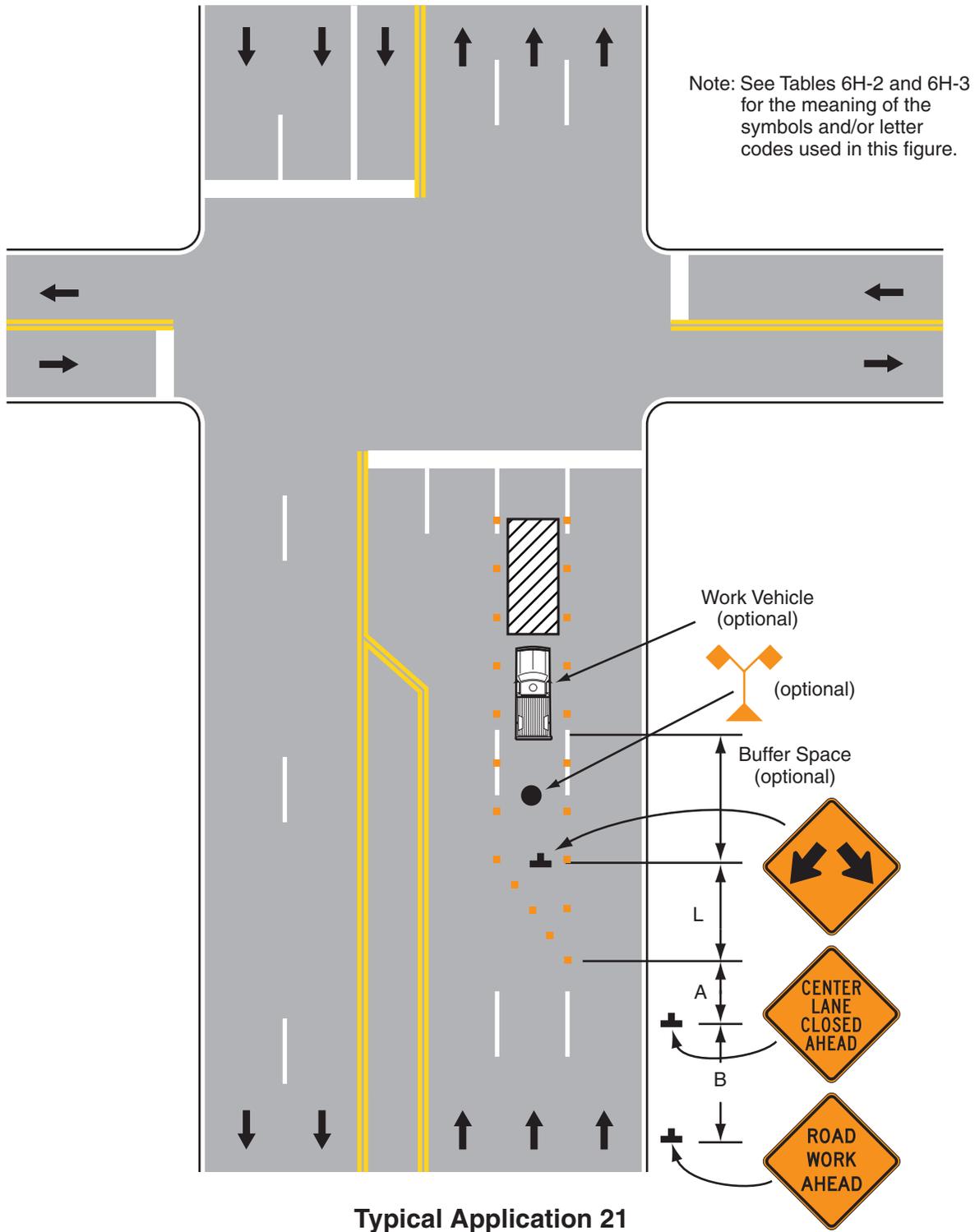
Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. A shadow vehicle with a truck-mounted attenuator may be used.
6. A work vehicle with high-intensity rotating, flashing, oscillating, or strobe lights may be used with the high-level warning device.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

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

Figure 6H-21. Lane Closure on Near Side of Intersection (TA-21)



Notes for Figure 6H-22—Typical Application 22
Right Lane Closure on Far Side of Intersection

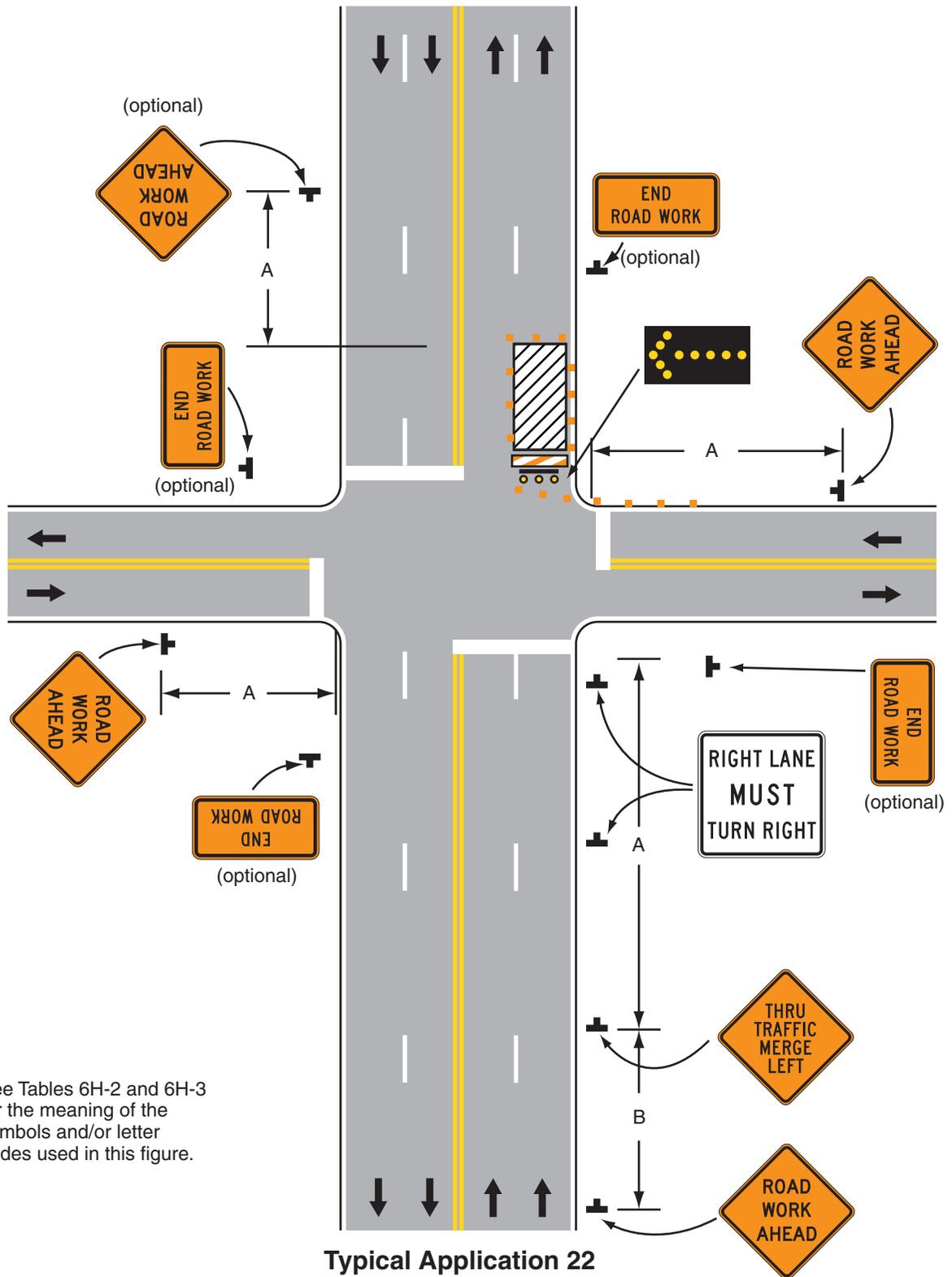
Guidance:

1. If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.

Option:

2. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a right lane having significant right turning movements, then the right lane may be restricted to right turns only, as shown. This procedure increases the through capacity by eliminating right turns from the open through lane.
3. For intersection approaches reduced to a single lane, left-turning movements may be prohibited to maintain capacity for through vehicular traffic.
4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. Where the turning radius is large, it may be possible to create a right-turn island using channelizing devices or pavement markings.

Figure 6H-22. Right Lane Closure on Far Side of Intersection (TA-22)



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

Notes for Figure 6H-23—Typical Application 23
Left Lane Closure on Far Side of Intersection

Guidance:

1. If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6H-29.

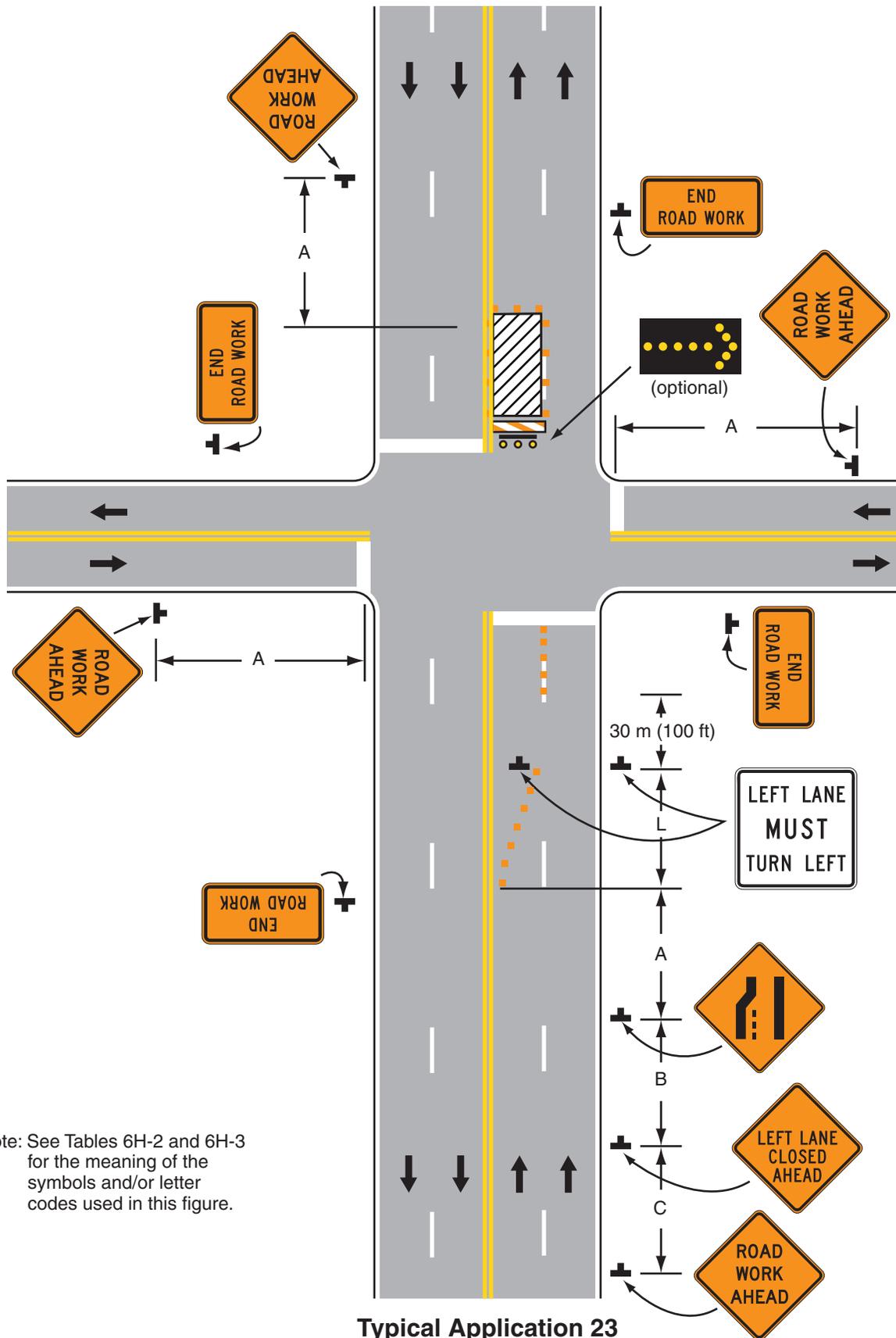
Option:

2. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
3. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a left lane having significant left-turning movements, then the left lane may be reopened as a turn bay for left turns only, as shown.

Support:

4. By first closing off the left lane and then reopening it as a turn bay, an island is created with channelizing devices that allows the LEFT LANE MUST TURN LEFT sign to be repeated on the left adjacent to the lane that it controls.

Figure 6H-23. Left Lane Closure on Far Side of Intersection (TA-23)



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

Typical Application 23

Notes for Figure 6H-26—Typical Application 26
Closure in Center of Intersection

Guidance:

1. All lanes should be a minimum of 3 m (10 ft) in width as measured to the near face of the channelizing devices.

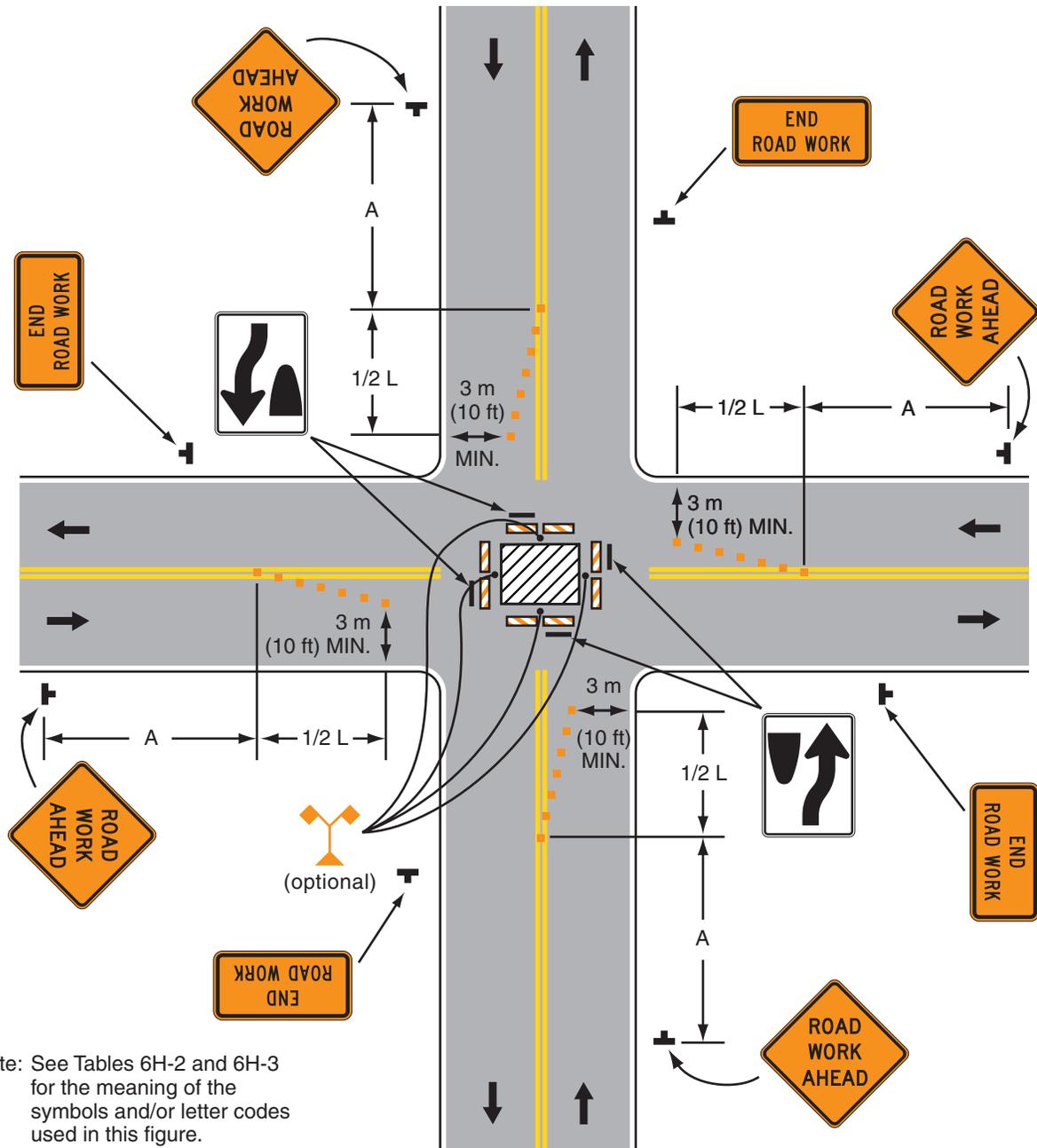
Option:

2. A high-level warning device may be placed in the work space, if there is sufficient room.
3. For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include longer and wider heavy commercial vehicles, a minimum lane width of 2.7 m (9 ft) may be used.
4. Flashing warning lights and/or flags may be used to call attention to advance warning signs.
5. Unless the streets are wide, it may be physically impossible to turn left, especially for large vehicles. Left turns may be prohibited as required by geometric conditions.
6. For short-duration work operations, the channelizing devices may be eliminated if a vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work space.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

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

Figure 6H-26. Closure in Center of Intersection (TA-26)



Typical Application 26

Notes for Figure 6H-27—Typical Application 27
Closure at Side of Intersection

Guidance:

1. The situation depicted can be simplified by closing one or more of the intersection approaches. If this cannot be done, and/or when capacity is a problem, through vehicular traffic should be directed to other roads or streets.
2. Depending on road user conditions, flagger(s) or uniformed law enforcement officer(s) should be used to direct road users within the intersection.

Standard:

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

Option:

4. ONE LANE ROAD AHEAD signs may also be used to provide adequate advance warning.
5. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
6. For short-duration work operations, the channelizing devices may be eliminated if a vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work space.
7. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

8. When used, the BE PREPARED TO STOP sign should be located before the Flagger symbol sign.

Support:

9. Turns can be prohibited as required by vehicular traffic conditions. Unless the streets are wide, it might be physically impossible to make certain turns, especially for large vehicles.

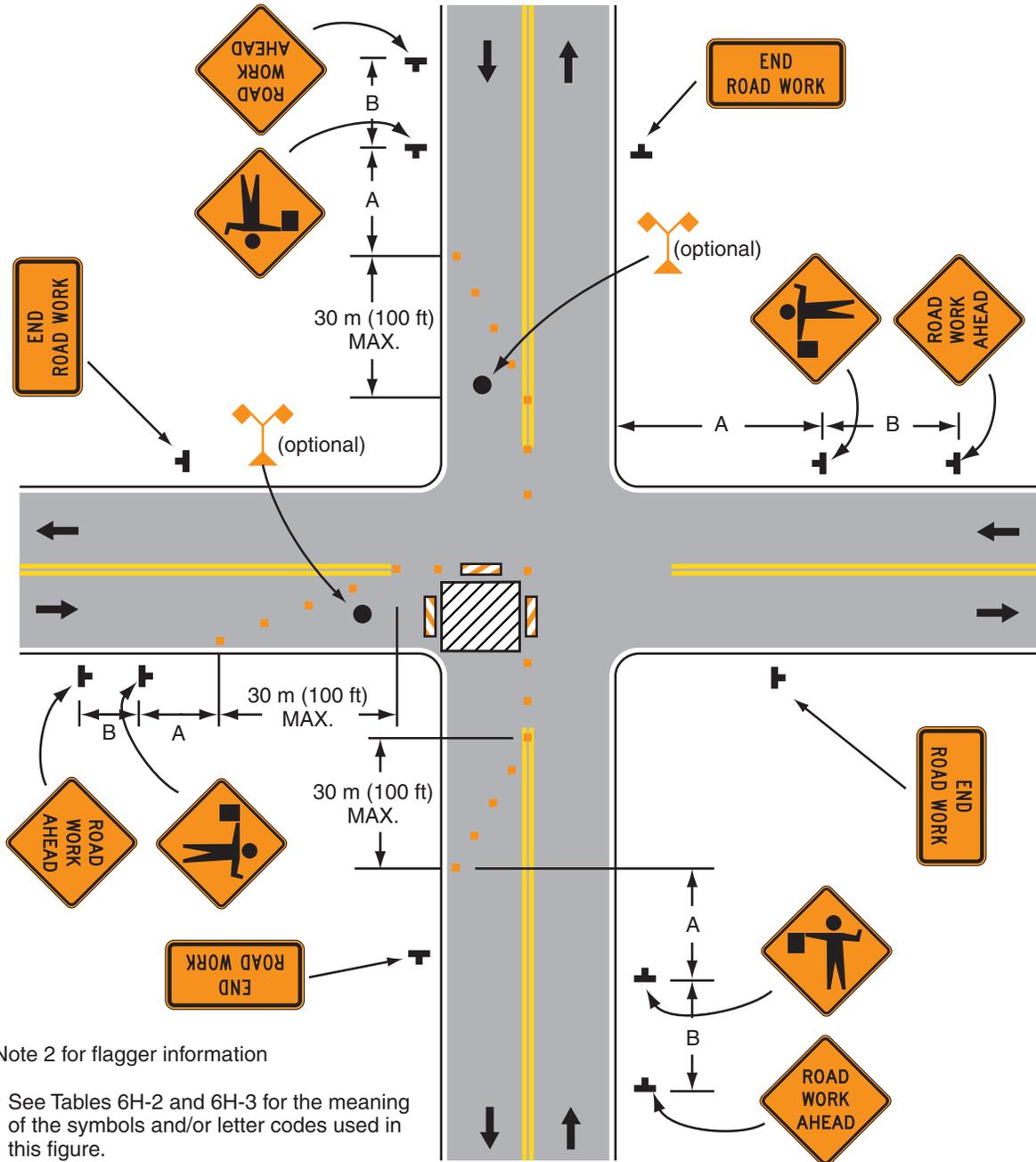
Option:

10. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

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

Figure 6H-27. Closure at Side of Intersection (TA-27)



Typical Application 27

Notes for Figure 6H-28—Typical Application 28

Sidewalk Closures and Bypass Sidewalks

Standard:

- 1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**

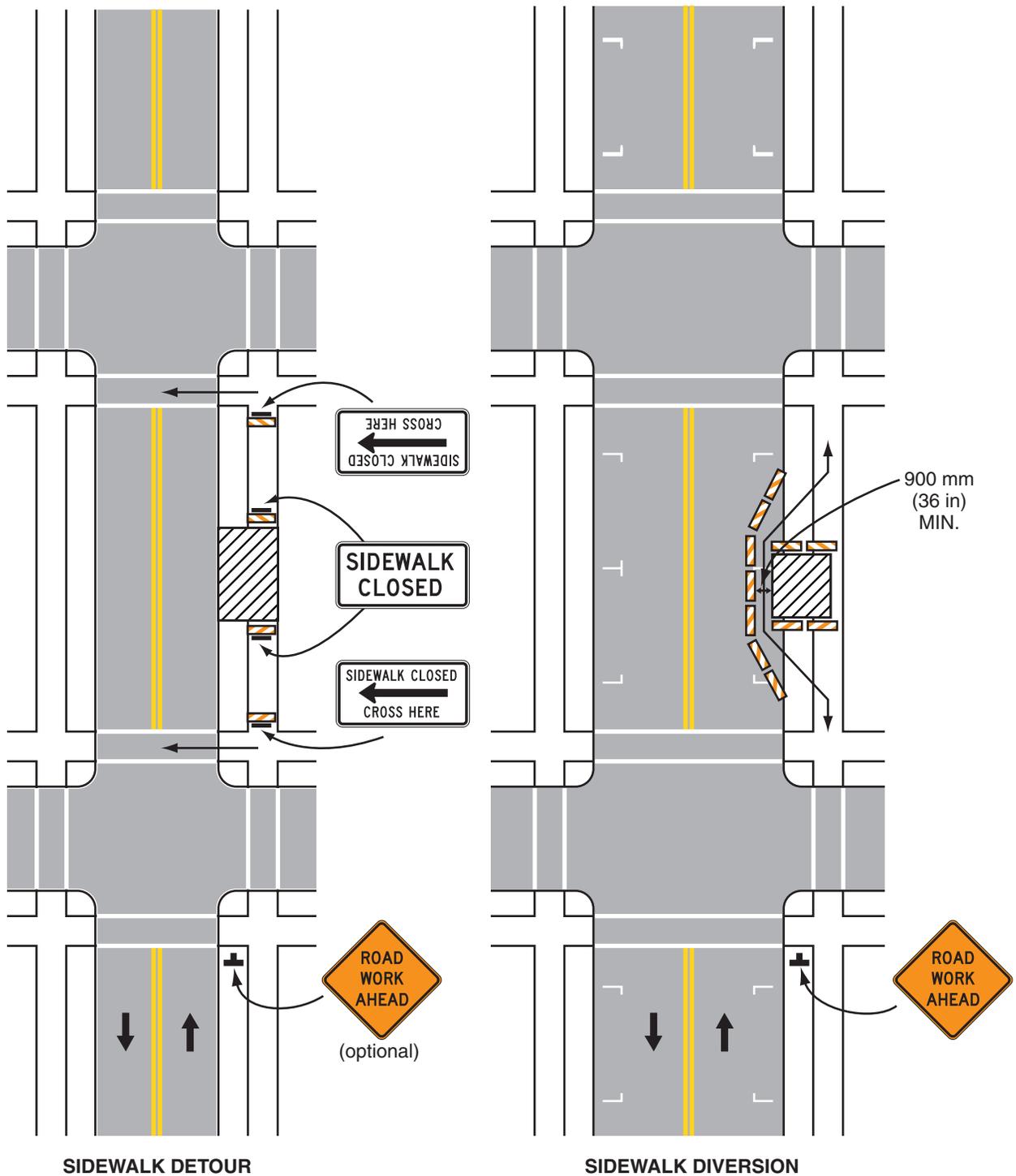
Guidance:

2. Where high speeds are anticipated, a temporary traffic barrier and, if necessary, a crash cushion should be used to separate the temporary sidewalks from vehicular traffic.
3. Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.

Option:

4. Street lighting may be considered.
5. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
6. For nighttime closures, Type A Flashing warning lights may be used on barricades that support signs and close sidewalks.
7. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the temporary sidewalks from vehicular traffic flow.
8. Signs, such as KEEP RIGHT (LEFT), may be placed along a temporary sidewalk to guide or direct pedestrians.

Figure 6H-28. Sidewalk Detour or Diversion (TA-28)



Typical Application 28

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

Notes for Figure 6H-29—Typical Application 29
Crosswalk Closures and Pedestrian Detours

Standard:

- 1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**
- 2. Curb parking shall be prohibited for at least 15 m (50 ft) in advance of the midblock crosswalk.**

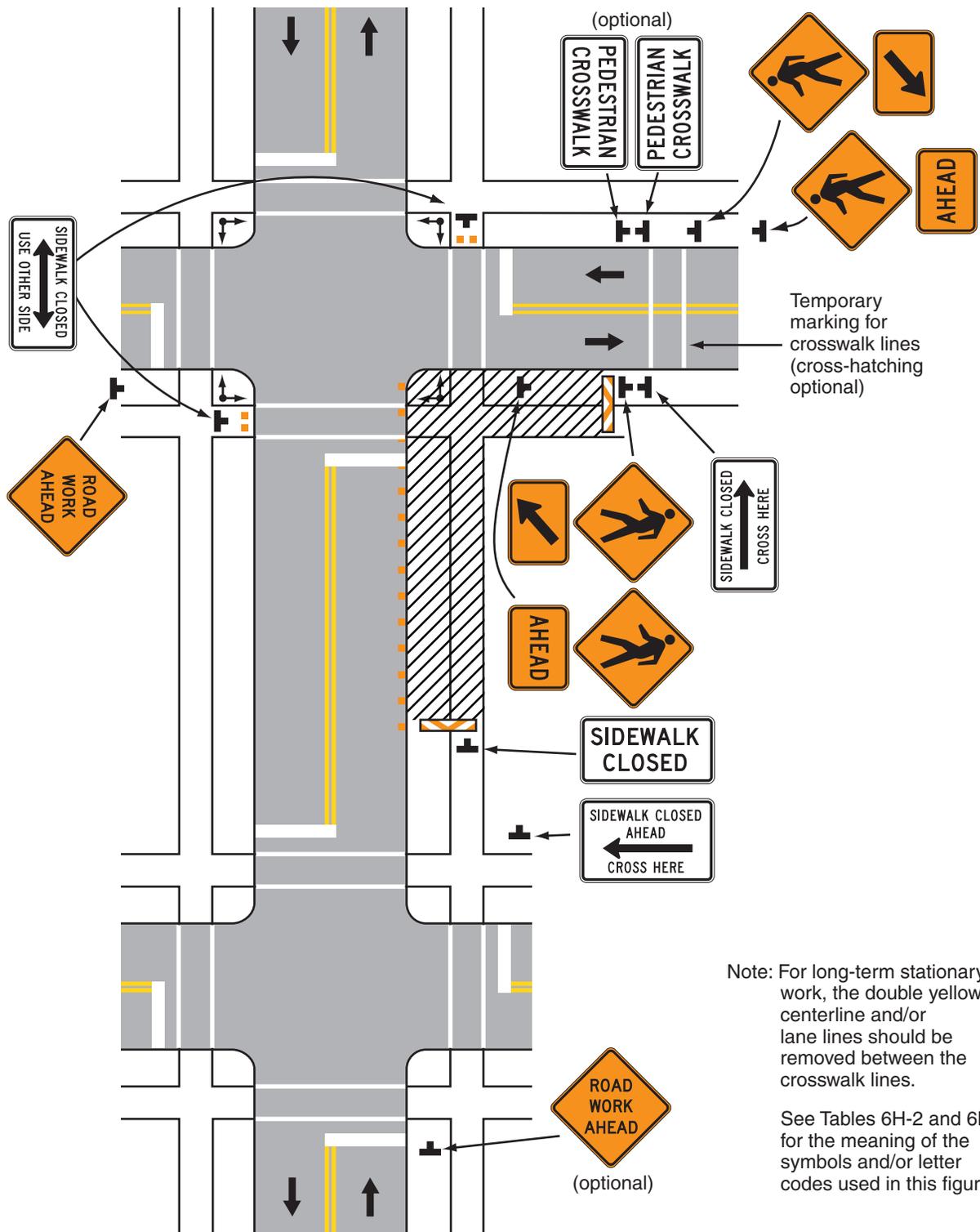
Guidance:

3. Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.
4. Pedestrian traffic signal displays controlling closed crosswalks should be covered or deactivated.

Option:

5. Street lighting may be considered.
6. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
7. For nighttime closures, Type A Flashing warning lights may be used on barricades supporting signs and closing sidewalks.
8. Type C Steady-Burn warning lights may be used on channelizing devices separating the work space from vehicular traffic.
9. In order to maintain the systematic use of the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs in a jurisdiction, the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs may be used in TTC zones.

Figure 6H-29. Crosswalk Closures and Pedestrian Detours (TA-29)



Note: For long-term stationary work, the double yellow centerline and/or lane lines should be removed between the crosswalk lines.

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

Typical Application 29

Notes for Figure 6H-30—Typical Application 30
Interior Lane Closure on Multi-lane Street

Guidance:

1. This information applies to low-speed, low-volume urban streets. Where speed or volume is higher, additional signing such as LEFT LANE CLOSED XX m (FT) should be used between the signs shown.

Option:

2. The closure of the adjacent interior lane in the opposing direction may not be necessary, depending upon the activity being performed and the work space needed for the operation.
3. Shadow vehicles with a truck-mounted attenuator may be used.

Guidance:

4. When a highway-rail grade crossing exists within or upstream of the transition area and it is anticipated that backups resulting from the lane closure might extend through the highway-rail grade crossing, the TTC zone should be extended so that the transition area precedes the highway-rail grade crossing.
5. Early coordination with the railroad company should occur before work starts.

Notes for Figure 6H-32—Typical Application 32
Half Road Closure on Multi-lane, High-Speed Highway

Standard:

1. **Pavement markings no longer applicable shall be removed or obliterated as soon as practical. Except for intermediate-term and short-term situations, temporary markings shall be provided to clearly delineate the temporary travel path. For short-term and intermediate-term situations where it is not feasible to remove and restore pavement markings, channelization shall be made dominant by using a very close device spacing.**

Guidance:

2. When paved shoulders having a width of 2.4 m (8 ft) or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.
3. Where channelizing devices are used instead of pavement markings, the maximum spacing should be 0.1 S meters where S is the speed in km/h (0.5 S feet where S is the speed in mph).
4. If the tangent distance along the temporary diversion is more than 180 m (600 ft), a Reverse Curve sign, left first, should be used instead of the Double Reverse Curve sign, and a second Reverse Curve sign, right first, should be placed in advance of the second reverse curve back to the original alignment.

Option:

5. Warning lights may be used to supplement channelizing devices at night.

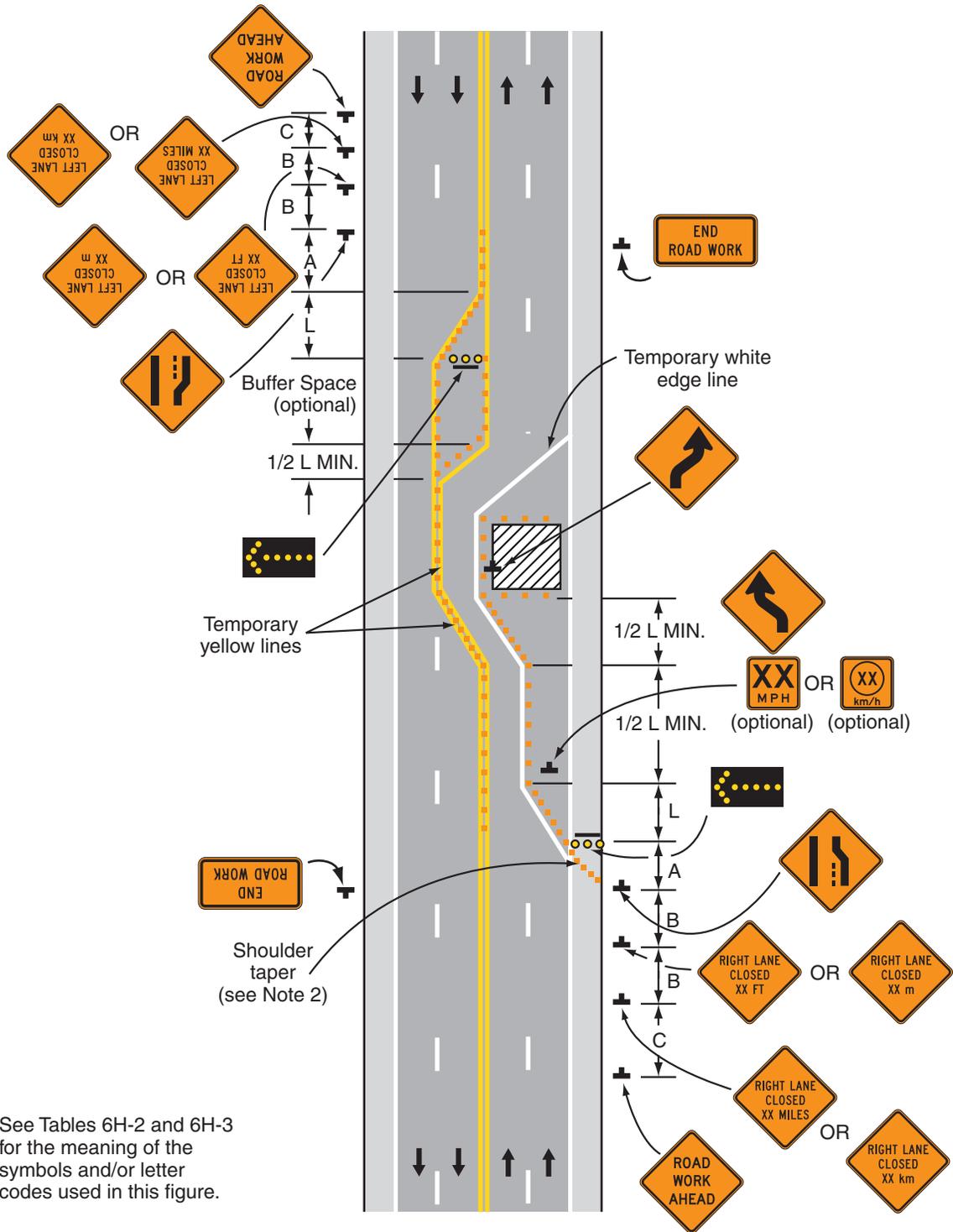
Guidance:

6. When a highway-rail grade crossing exists within or upstream of the merging taper and it is anticipated that backups resulting from the lane closure might extend through the highway-rail grade crossing, the TTC zone should be extended so that the merging taper precedes the highway-rail grade crossing.
7. When a highway-rail grade crossing exists within the activity area, provisions should be made to provide road users operating on the left side of the normal centerline with comparable warning devices as supplied for road users operating on the right side of the normal centerline.
8. When a highway-rail grade crossing exists within the activity area, early coordination with the railroad company should occur before work starts.

Option:

9. When a highway-rail grade crossing exists within the activity area, a flagger may be used at the highway-rail grade crossing to minimize the probability that vehicles are stopped within 4.6 m (15 ft) of the highway-rail grade crossing, measured from both sides of the outside rails.
10. A truck-mounted attenuator may be used on the work vehicle and/or the shadow vehicle.

Figure 6H-32. Half Road Closure on Multi-lane, High-Speed Highway (TA-32)



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

Typical Application 32

Notes for Figure 6H-33—Typical Application 33
Stationary Lane Closure on Divided Highway

Standard:

1. **This information also shall be used when work is being performed in the lane adjacent to the median on a divided highway. In this case, the LEFT LANE CLOSED signs and the corresponding Lane Ends signs shall be substituted.**
2. **When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed as needed.**

Guidance:

3. When paved shoulders having a width of 2.4 m (8 ft) or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.

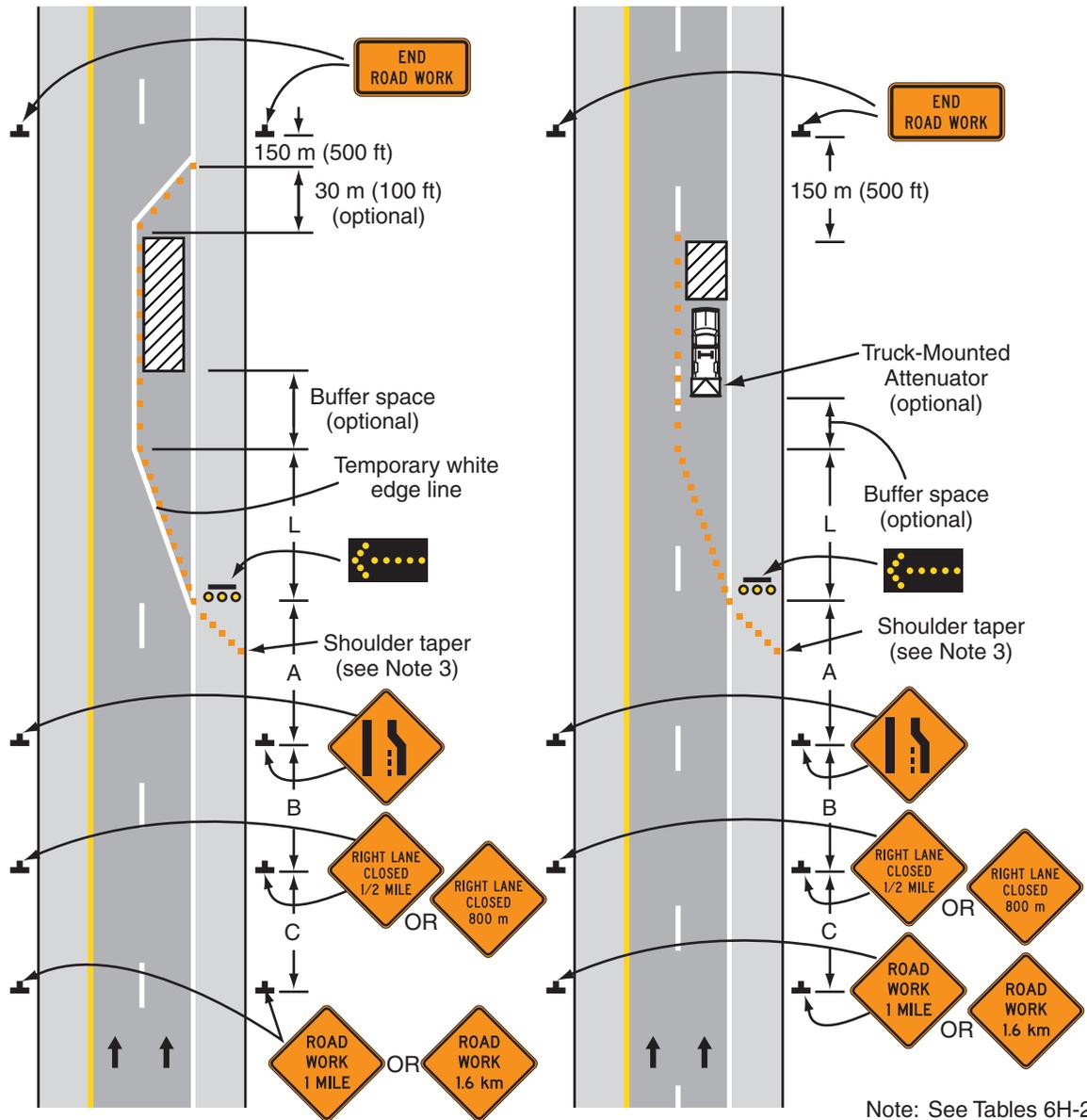
Option:

4. A truck-mounted attenuator may be used on the work vehicle and/or shadow vehicle.

Support:

5. Where conditions permit, restricting all vehicles, equipment, workers, and their activities to one side of the roadway might be advantageous.

Figure 6H-33. Stationary Lane Closure on Divided Highway (TA-33)



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

Typical Application 33

Notes for Figure 6H-35—Typical Application 35
Mobile Operation on Multi-lane Road

Standard:

- 1. Arrow panels shall, as a minimum, be Type B, with a size of 1500 x 750 mm (60 x 30 in).**

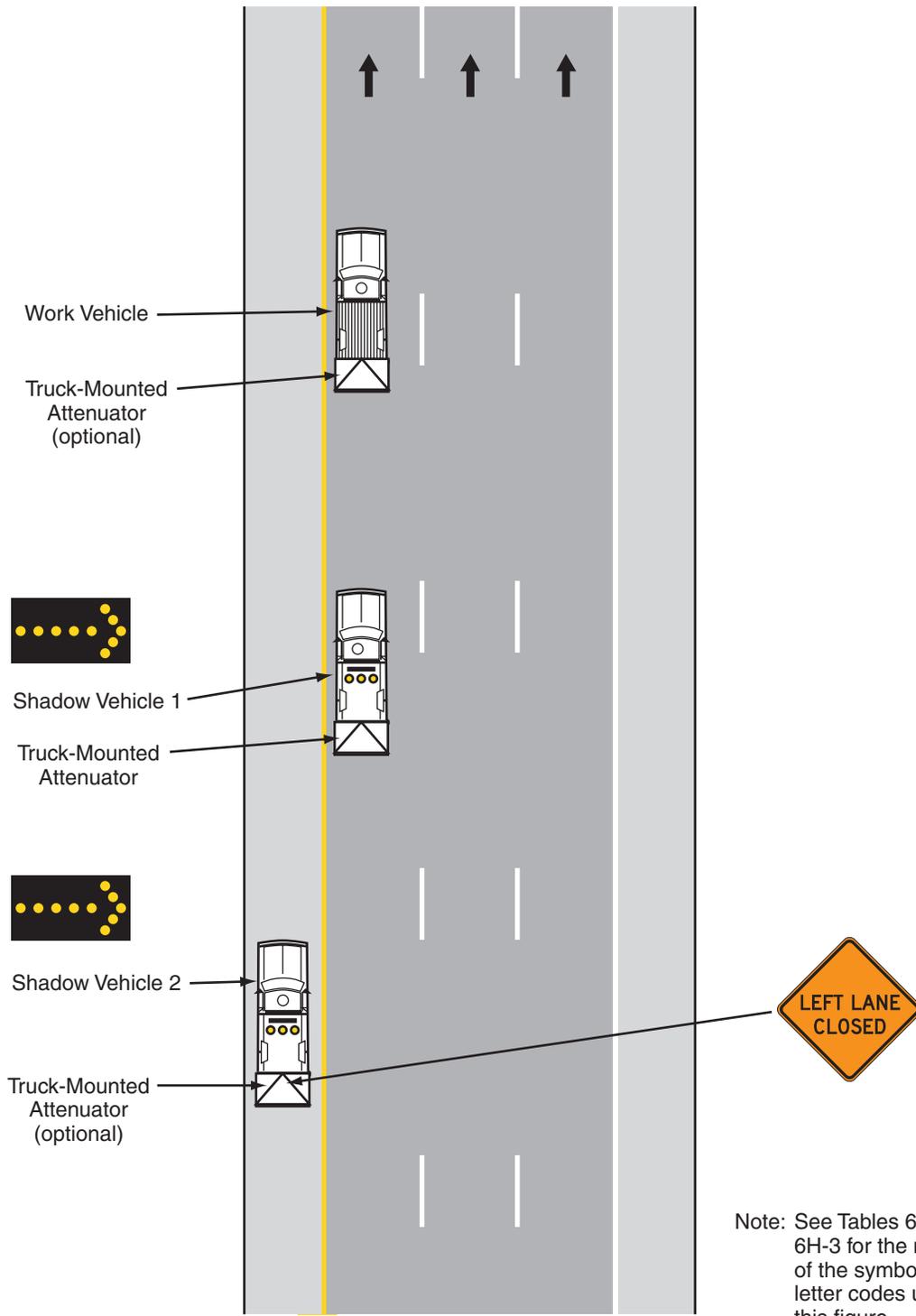
Guidance:

2. Vehicles used for these operations should be made highly visible with appropriate equipment, such as: high-intensity rotating, flashing, oscillating, or strobe lights, flags, signs, or arrow panels.
3. Shadow Vehicle 1 should be equipped with an arrow panel and truck-mounted attenuator.
4. Shadow Vehicle 2 should be equipped with an arrow panel. An appropriate lane closure sign should be placed on Shadow Vehicle 2 so as not to obscure the arrow panel.
5. Shadow Vehicle 2 should travel at a varying distance from the work operation so as to provide adequate sight distance for vehicular traffic approaching from the rear.
6. The spacing between the work vehicles and the shadow vehicles, and between each shadow vehicle should be minimized to deter road users from driving in between.
7. Work should normally be accomplished during off-peak hours.
8. When the work vehicle occupies an interior lane (a lane other than the far right or far left) of a directional roadway having a right shoulder 3 m (10 ft) or more in width, Shadow Vehicle 2 should drive the right shoulder with a sign indicating that work is taking place in the interior lane.

Option:

9. A truck-mounted attenuator may be used on Shadow Vehicle 2.
10. On high-speed roadways, a third shadow vehicle (not shown) may be used with Shadow Vehicle 1 in the closed lane, Shadow Vehicle 2 straddling the edge line, and Shadow Vehicle 3 on the shoulder.
11. Where adequate shoulder width is not available, Shadow Vehicle 3 may drive partially in the lane.

Figure 6H-35. Mobile Operation on Multi-lane Road (TA-35)



Typical Application 35

**ALL SPEEDS
TWO-LANE & MULTILANE
SHOULDER WORK WITH
MINOR ENCROACHMENT
60 MINUTES OR LESS
SIGHT DISTANCE OF 1000' TO
APPROACHING TRAFFIC REQUIRED**

**WZ 03
DAY AND NIGHT**

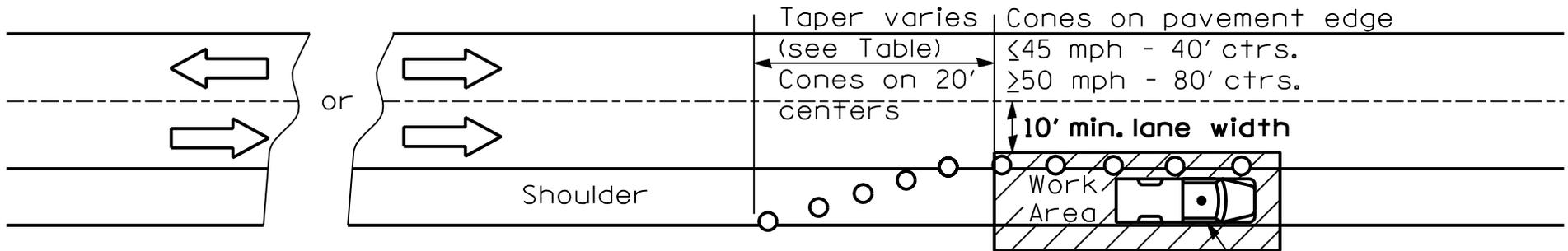


TABLE OF TAPER LENGTHS (FT.)					
SPEED MPH	SHOULDER WIDTH (FT.)				
	2	4	6	8	10
65	45	90	130	175	220
55	40	75	110	150	185
45	30	60	90	120	150
40	20	35	55	70	90
35	15	30	40	55	70
30	10	20	30	40	50

When workers encroach onto roadway, a protective vehicle is required (see page 14). All vehicles shall operate strobe lights.

**THIS CASE IS ONLY ALLOWED
DURING NON-PEAK TRAFFIC.**

ALL SPEEDS TWO-LANE AND MULTILANE LESS THAN 60 MINUTES SHOULDER WORK

WZ 04 DAY OR NIGHT

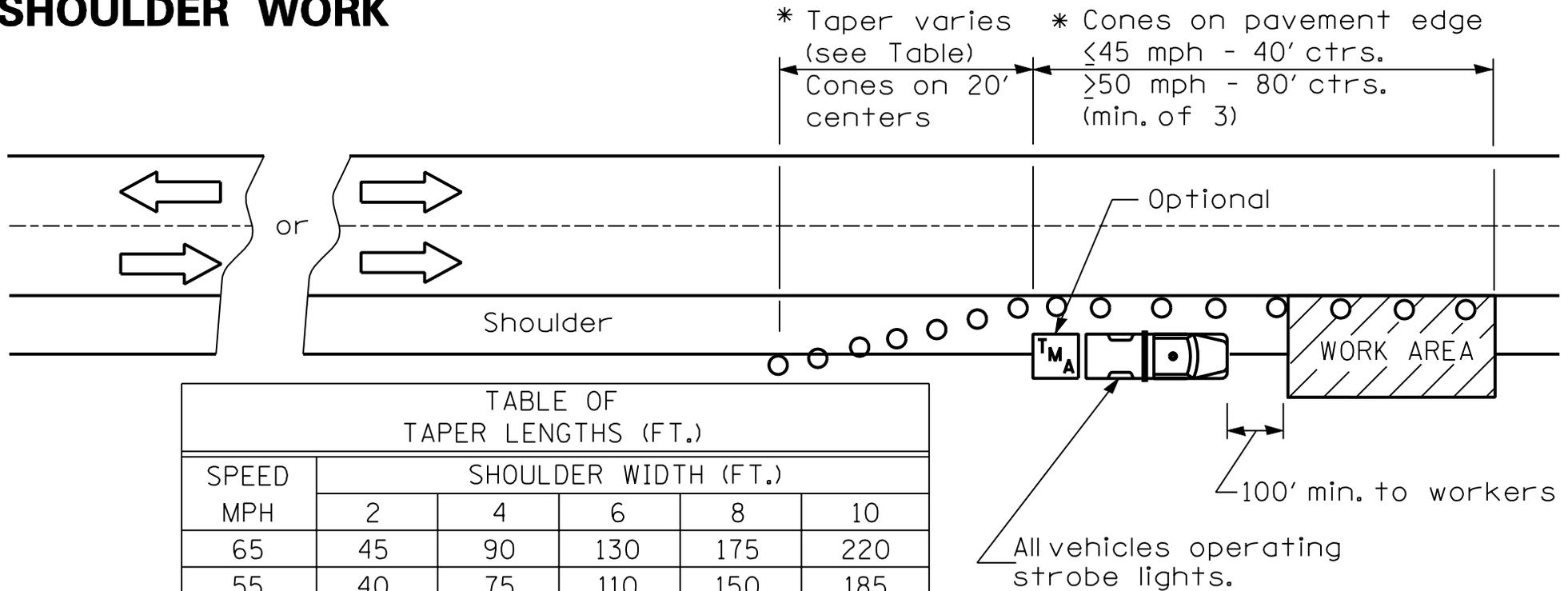
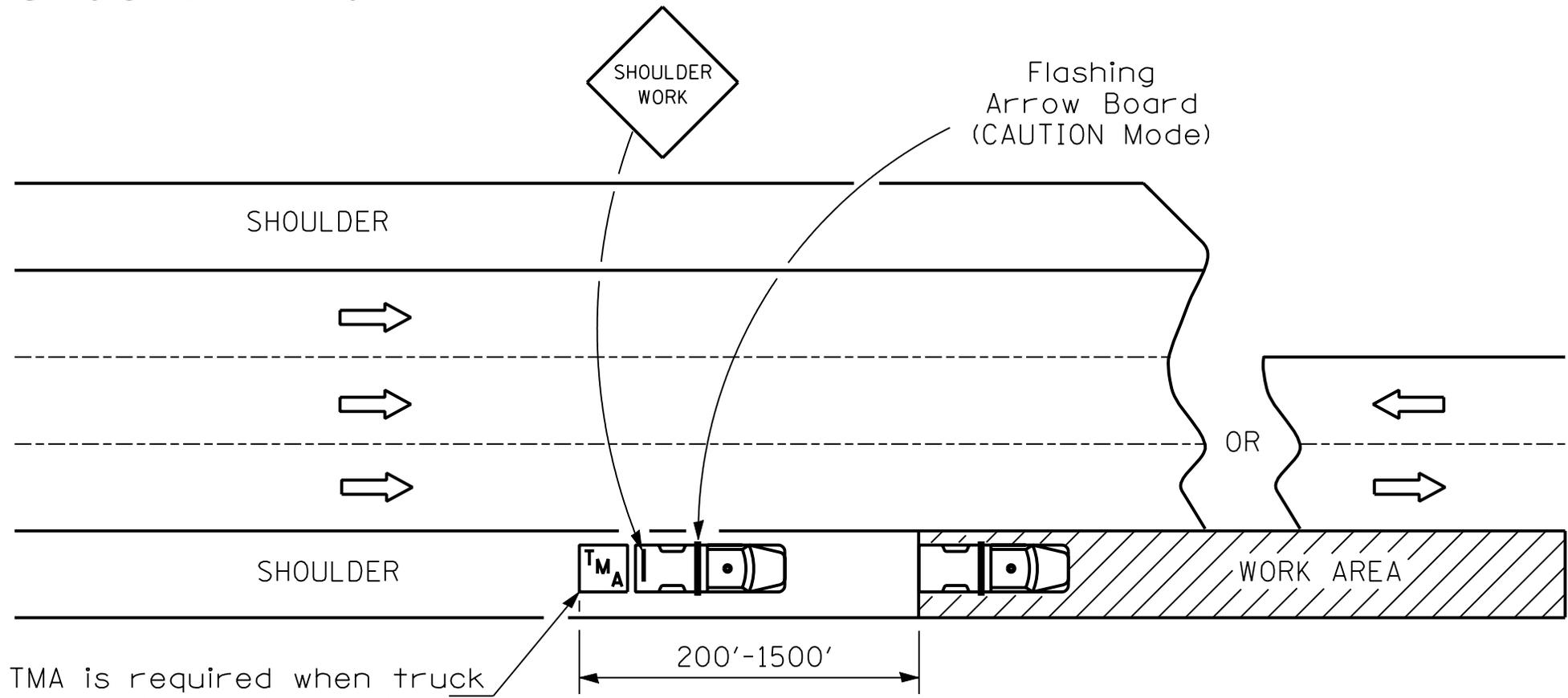


TABLE OF TAPER LENGTHS (FT.)					
SPEED MPH	SHOULDER WIDTH (FT.)				
	2	4	6	8	10
65	45	90	130	175	220
55	40	75	110	150	185
45	30	60	90	120	150
40	20	35	55	70	90
35	15	30	40	55	70
30	10	20	30	40	50

* Cones required when work is within 2' of pavement.

INTERMITTENT/MOVING OPERATION SHOULDER WORK

WZ 05



TMA is required when truck encroaches onto roadway.

All vehicles operating strobe lights.

ALL SPEEDS TWO-LANE AND MULTILANE 60 MINUTES OR MORE SHOULDER WORK

For work more than 2 hours
an Arrow board is required.

TABLE OF TAPER LENGTHS (FT.)					
SPEED MPH	SHOULDER WIDTH (FT.)				
	2	4	6	8	10
65	45	90	130	175	220
55	40	75	110	150	185
45	30	60	90	120	150
40	20	35	55	70	90
35	15	30	40	55	70
30	10	20	30	40	50

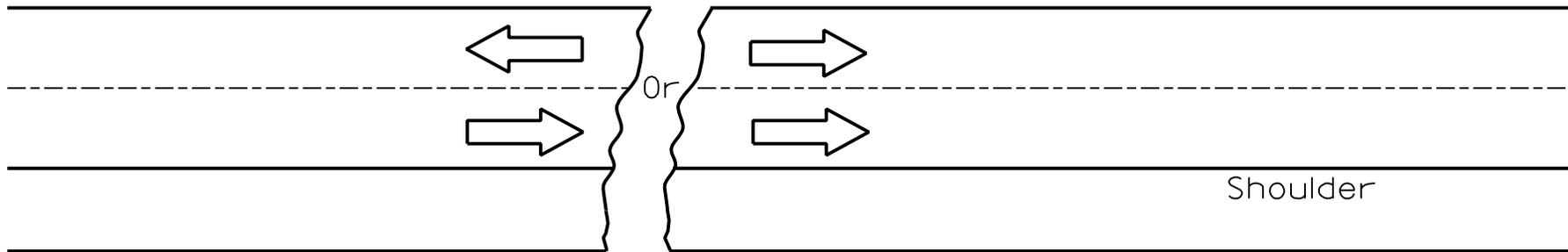
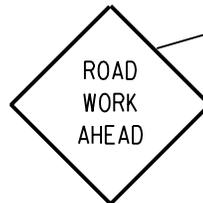


TABLE OF SIGN SPACING		
SPEED MPH	LENGTH A	LENGTH B
65	1,000'	1,600'
55-60	500'	500'
45-50	350'	350'
≤40	100'	100'

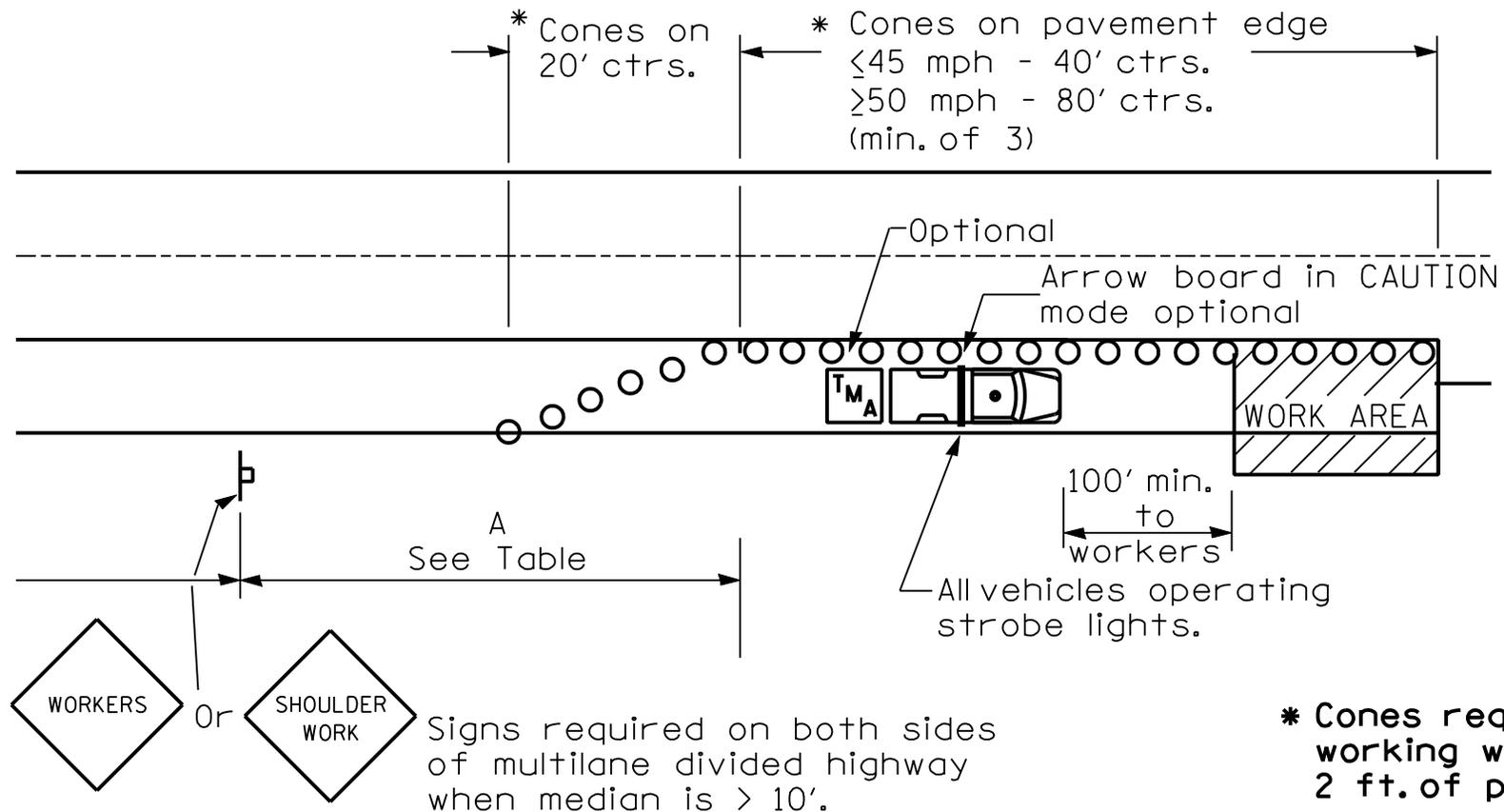


If work area
is >15' from
pavement edge,
no signs are
required.

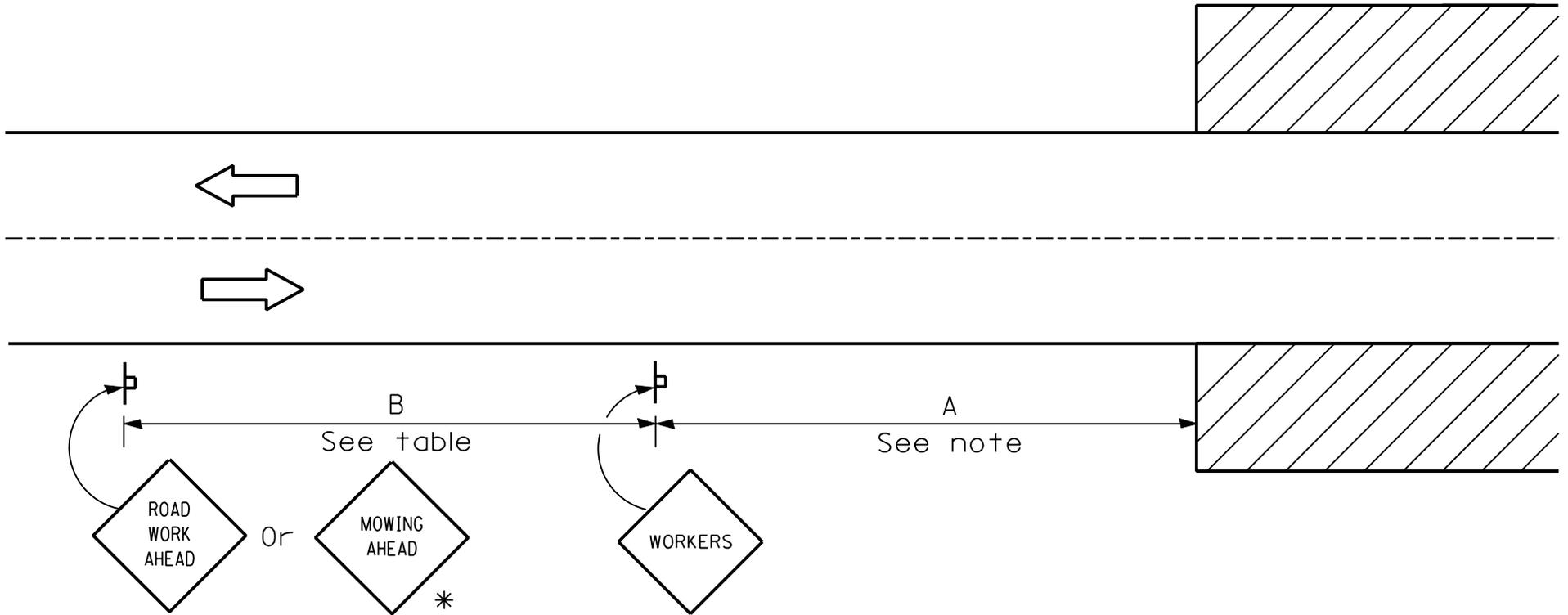


These are minimum dimensions
to be increased if needed to
fit field conditions.

Arrow board in CAUTION mode, required when sight distance is not available.



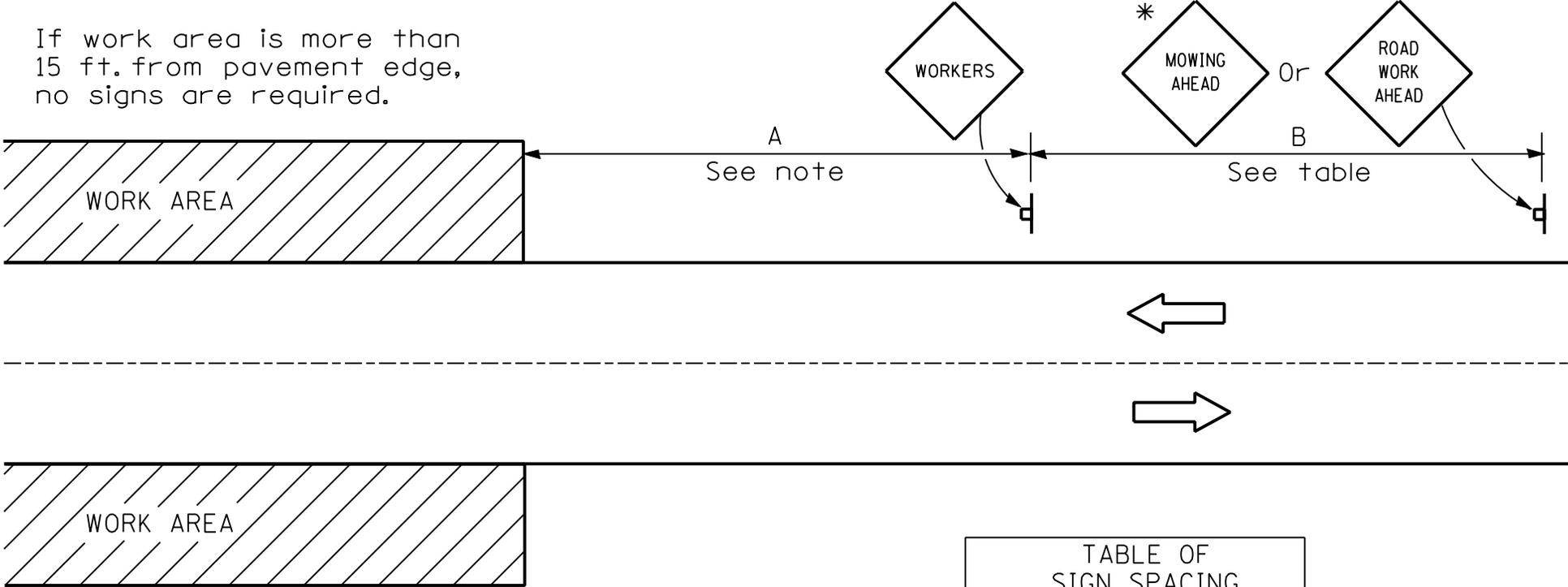
**ALL SPEEDS
2 LANE 2 WAY
OFF ROAD MOVING OPERATION
NO TIME LIMIT**



* May be used for maintenance mowing operations

WZ 07a

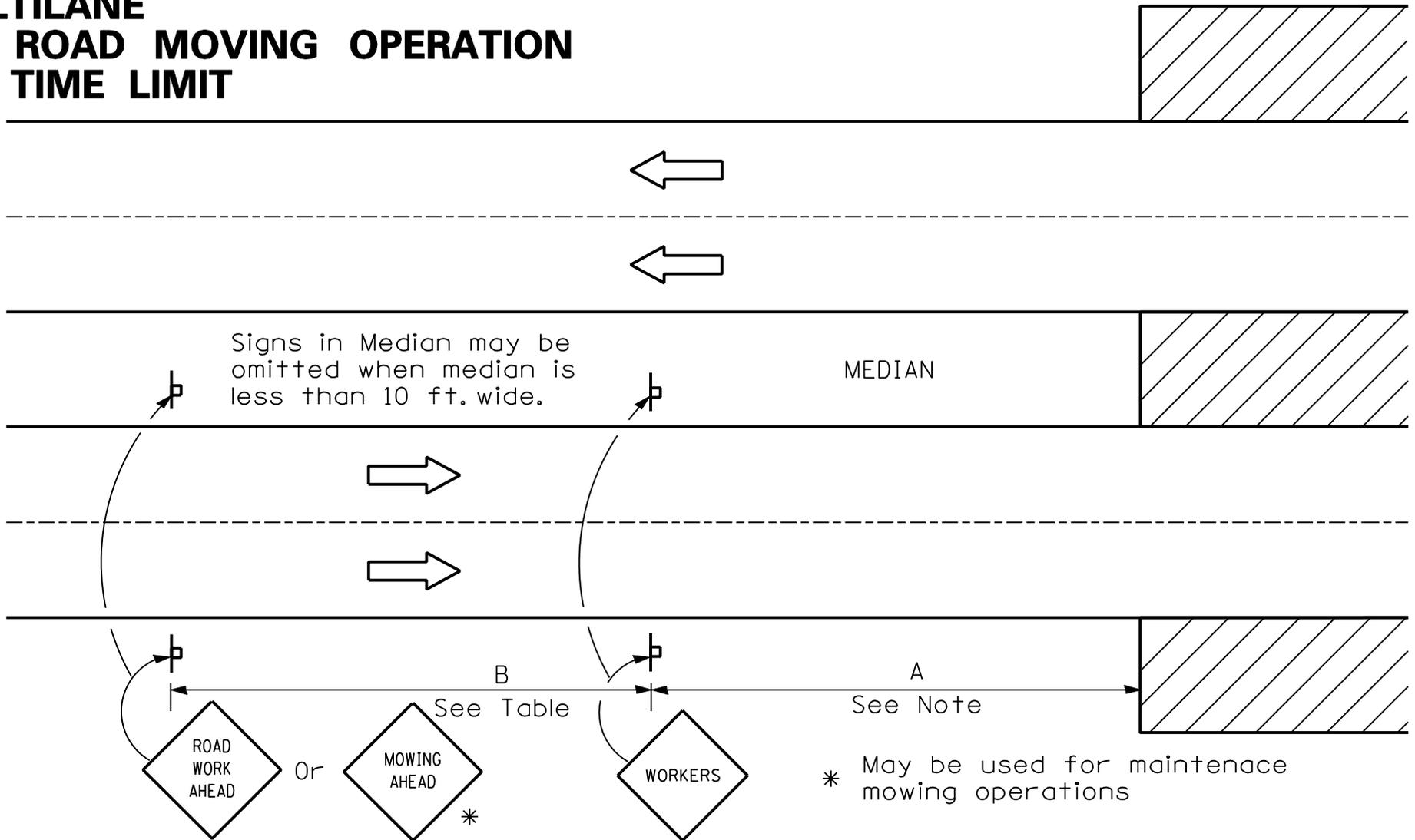
If work area is more than 15 ft. from pavement edge, no signs are required.



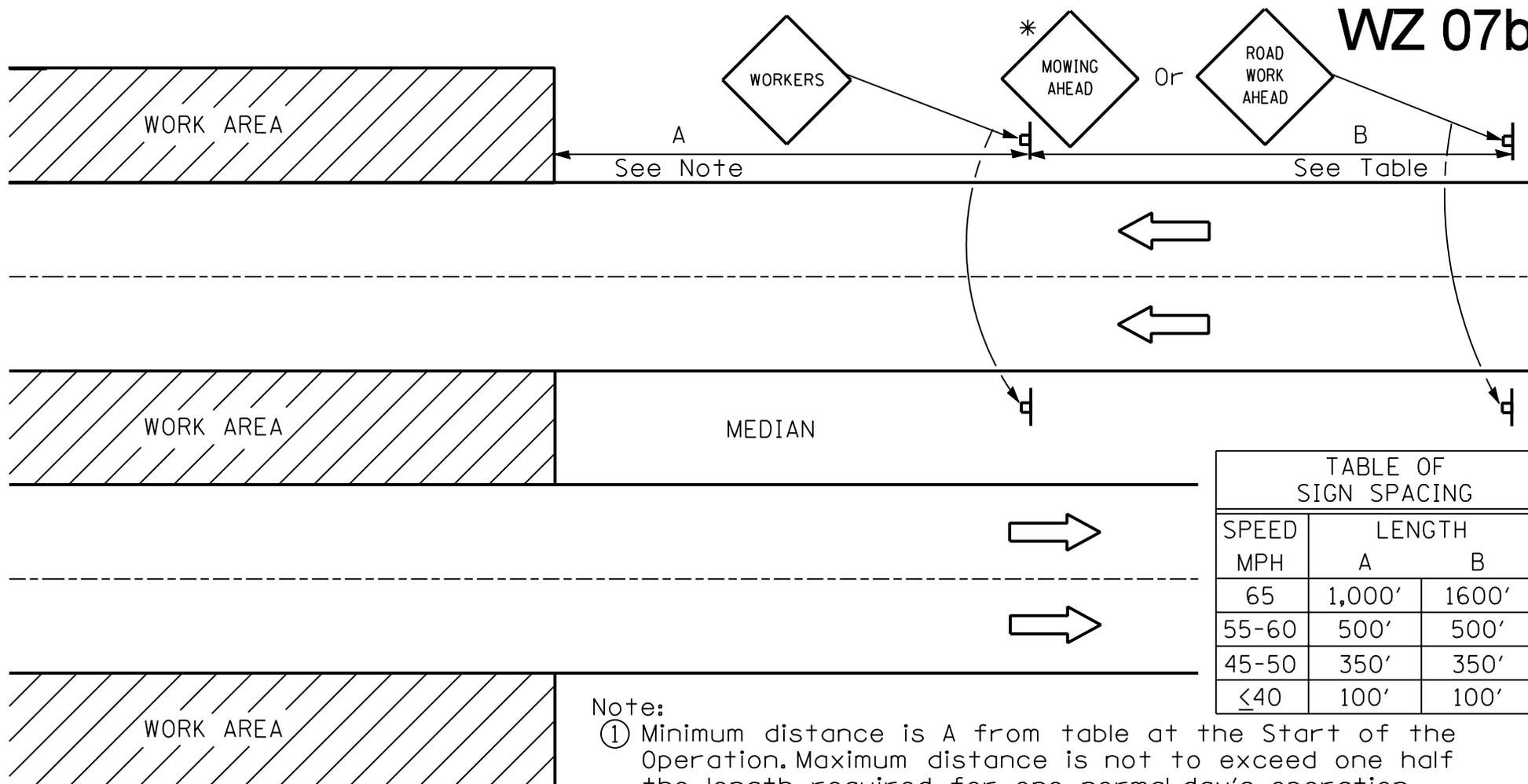
Note:
Minimum distance is A from table at the Start of the Operation. Maximum distance is not to exceed one half the length required for one normal day's operation (4 miles maximum).

TABLE OF SIGN SPACING		
SPEED MPH	LENGTH	
	A	B
55	500'	500'
45-50	350'	350'
≤40	100'	100'

**ALL SPEEDS
MULTILANE
OFF ROAD MOVING OPERATION
NO TIME LIMIT**



WZ 07b

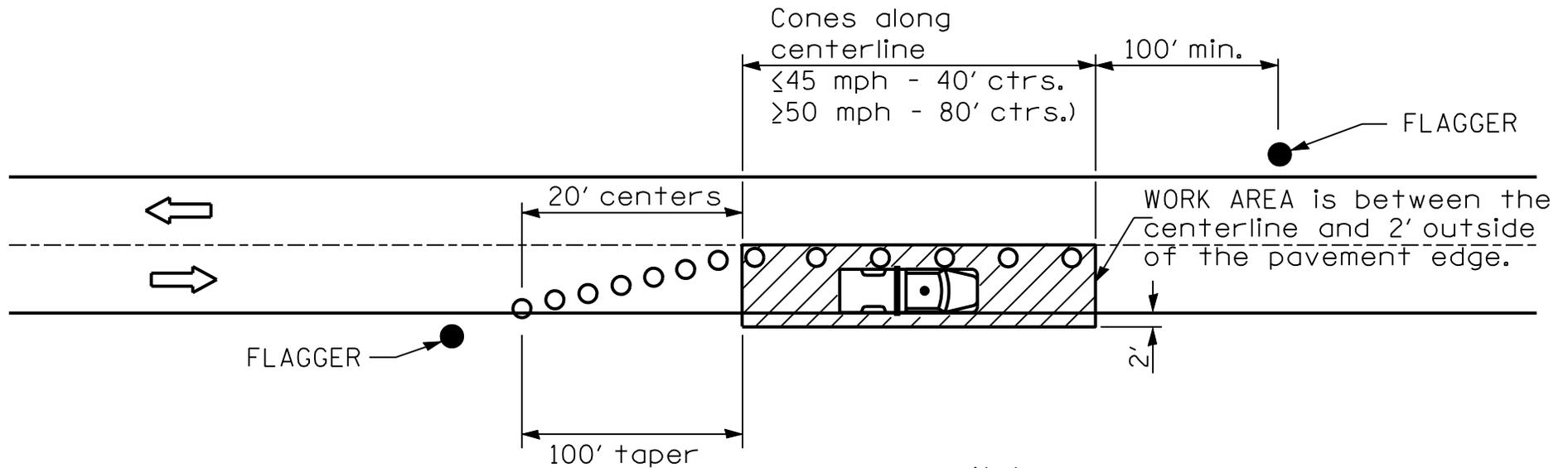


If work area is more than 15 ft. from pavement edge, no signs are required.

- Note:
- ① Minimum distance is A from table at the Start of the Operation. Maximum distance is not to exceed one half the length required for one normal day's operation (4 miles maximum).
 - ② No Advance Warning Signs are required in opposite direction if work is on outside shoulder only.

**ALL SPEEDS
LESS THAN 60 MINUTES**

WZ 20



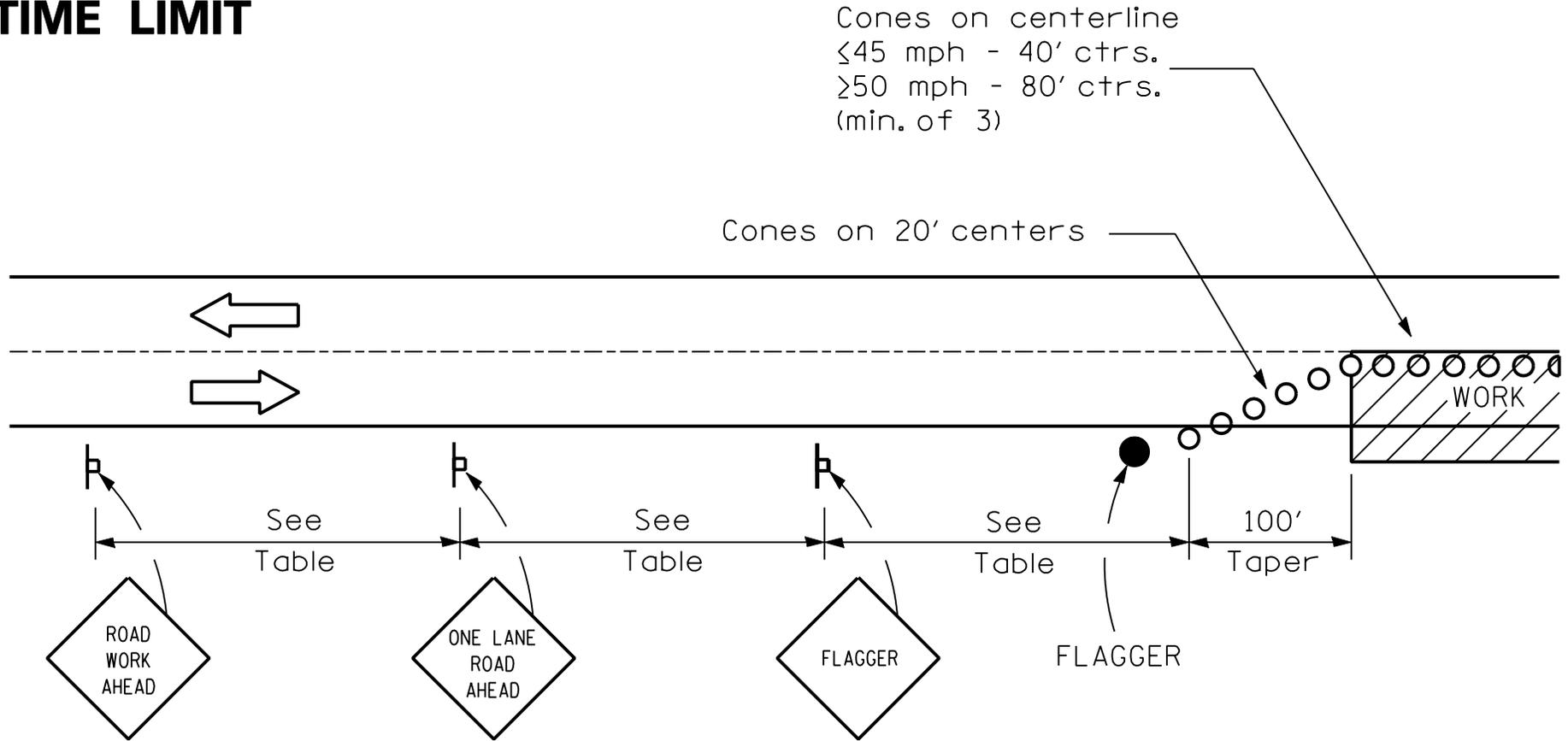
Notes:

Cones required after 30 minutes.

All vehicles operating
strobe lights.

Adequate sight distance of 1000' required
otherwise utilize CASE WZ-21.

ALL SPEEDS NON-MOVING OPERATION NO TIME LIMIT



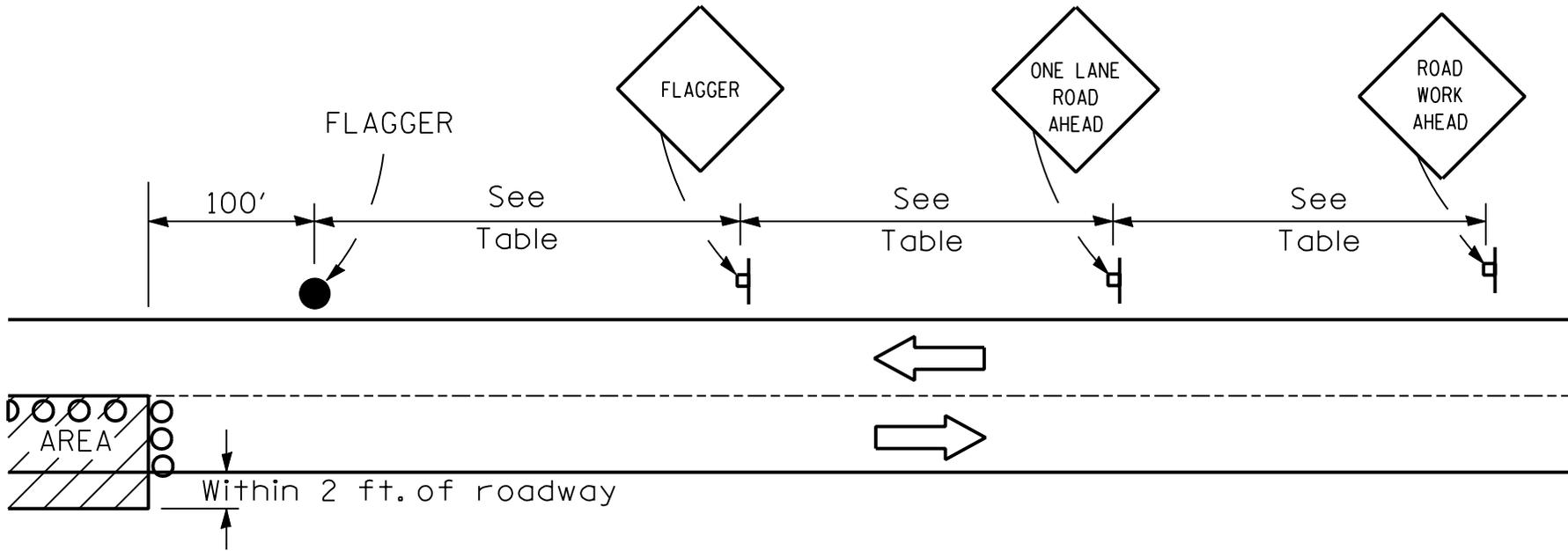
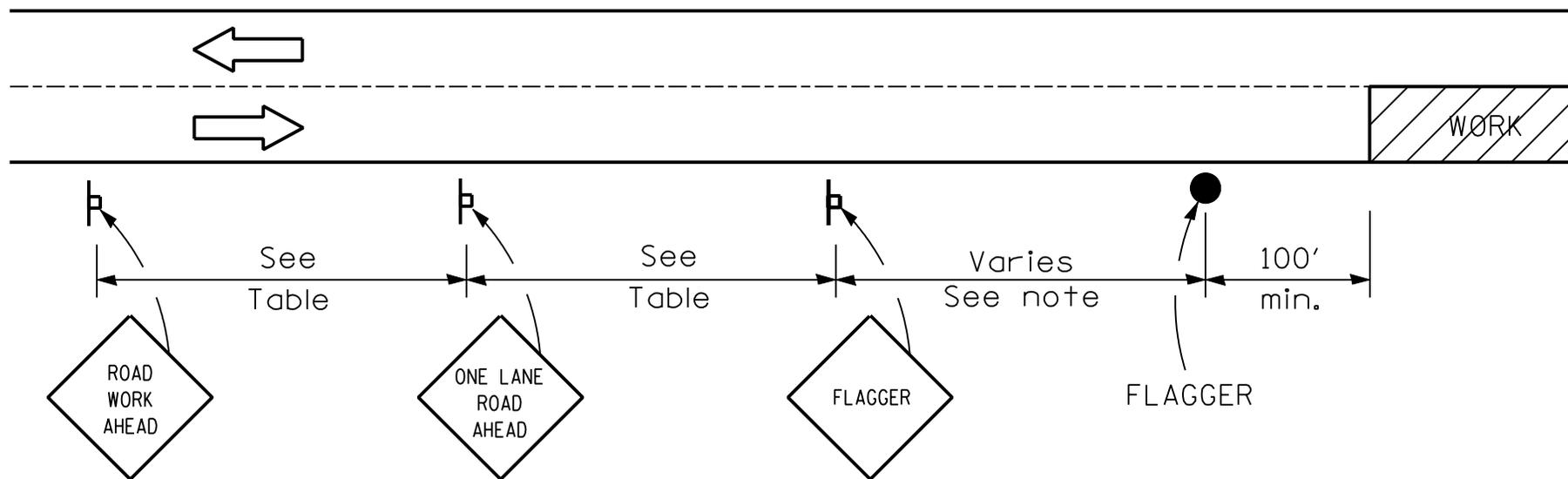


TABLE OF SIGN SPACING	
SPEED MPH	LENGTH
55	500'
45-50	350'
≤40	100'

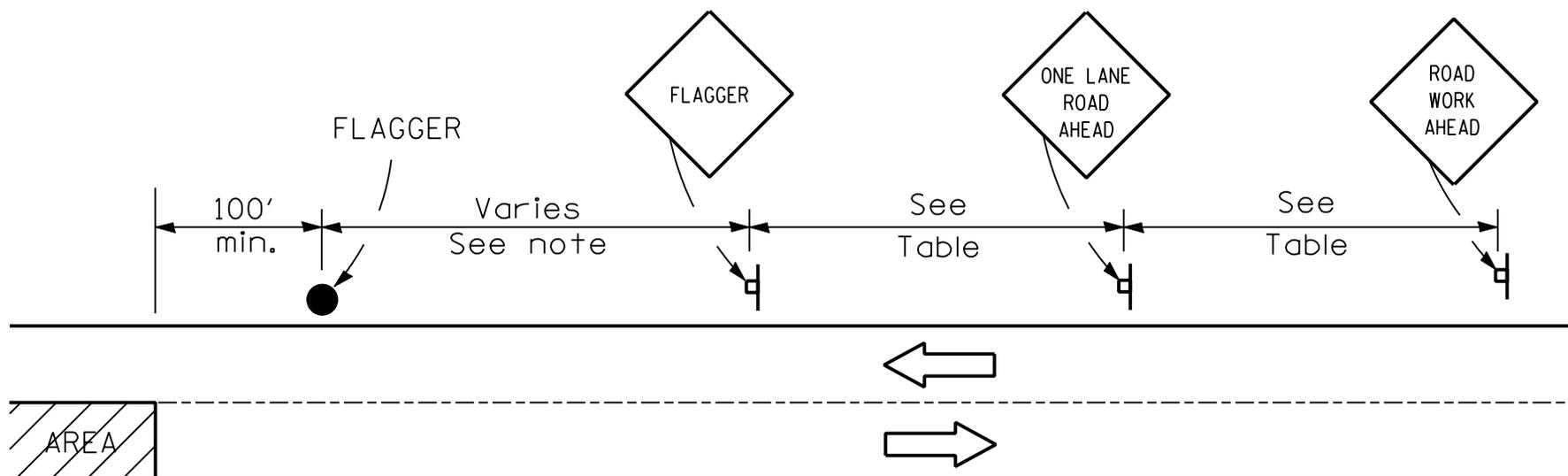
ALL SPEEDS MOVING OPERATION NO TIME LIMIT

Flaggers used for moving operations are dependent on the travel speed. If the work operation moves too fast for flaggers, the flaggers may be omitted and the FLAGGER signs shall be replaced with WORKER signs. In lieu of flaggers, a protective vehicle with a TMA and an arrow board in CAUTION mode shall be used in advance of the work area.



If work operation exceeds 2 miles per 1/2 day, utilize detail WZ24.

All vehicles operating strobe lights.



See Flagger Handbook for flagger instructions and requirements

NOTE:
 Minimum distance is 200 ft. at Start of Operation. Maximum distance is 2 miles but in no case to exceed one half the distance required for one normal day's operations, whichever is less.

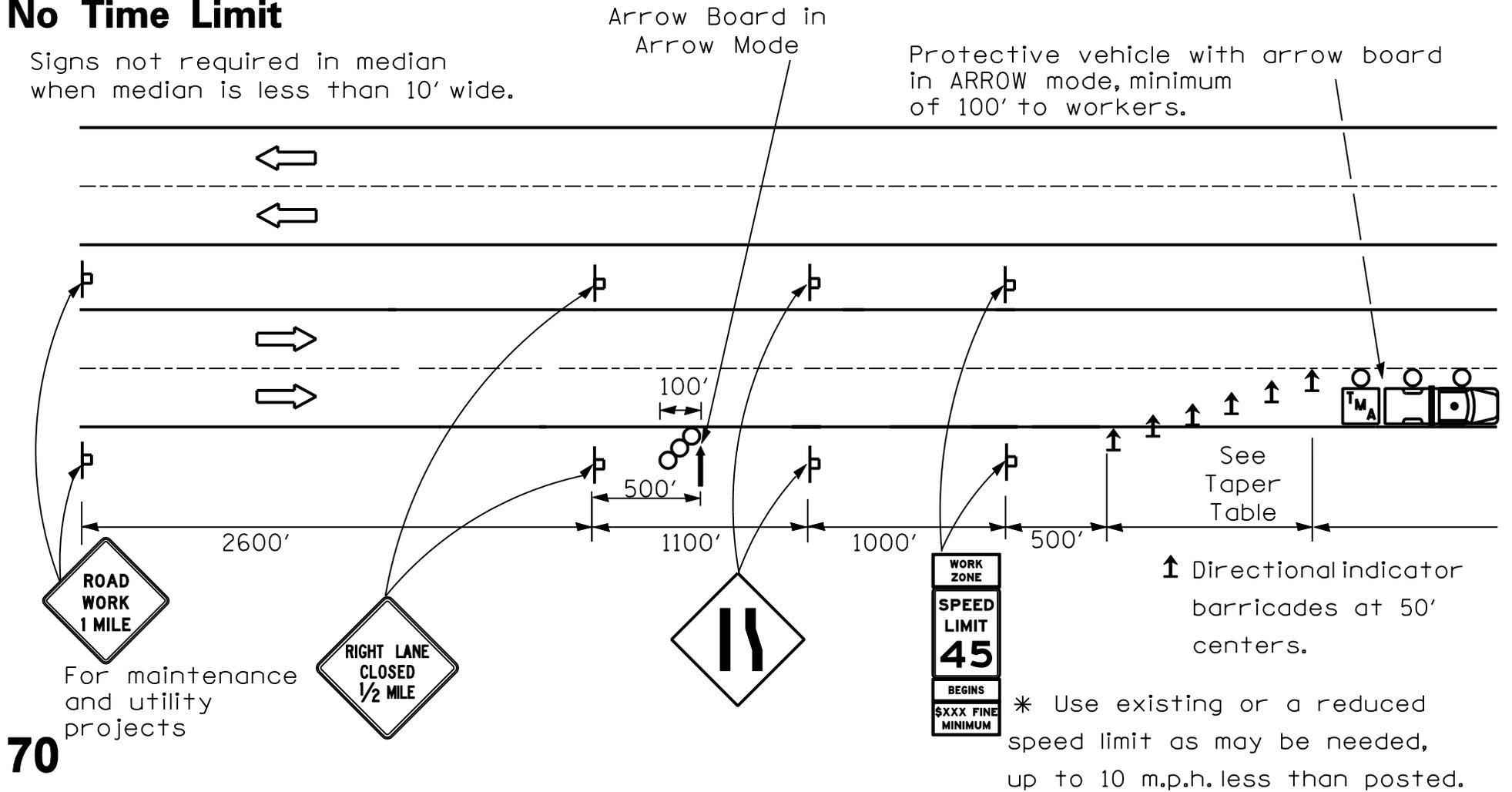
TABLE OF SIGN SPACING	
SPEED MPH	LENGTH
55	500'
45-50	350'
≤40	100'

MULTILANE Less than or equal to 55 mph ONE LANE CLOSED No Time Limit

Signs not required in median when median is less than 10' wide.

When protective vehicle is moved forward to protect workers, an arrow board shall be placed at the start of the taper.

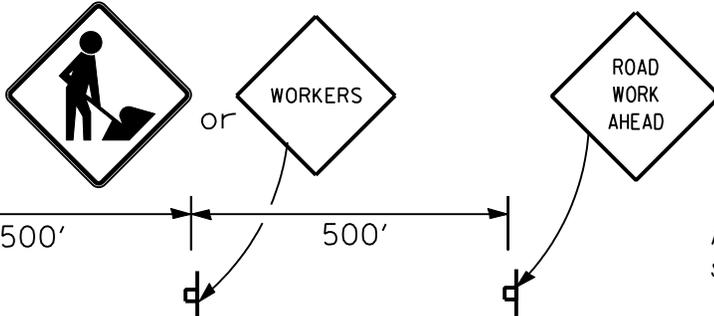
Protective vehicle with arrow board in ARROW mode, minimum of 100' to workers.



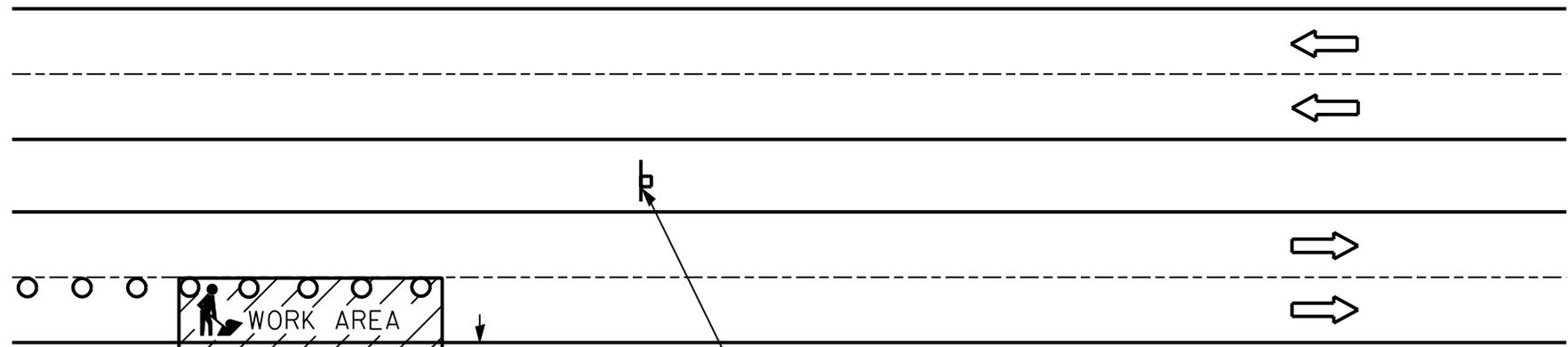
For maintenance and utility projects

Add these signs when work is being performed in the left lane for an undivided highway.

The opposing inside lane should be closed when work is within 2' of the centerline.



All vehicles operating strobe lights.



150 m min.
(500')

Taper Table	
Speed	Length
55 mph	660'
45 mph	540'
40 mph	320'
35 mph	245'
30 mph	180'

**END
WORK ZONE
SPEED LIMIT**

When work is being performed in the left lane, corresponding left lane information shall be used.

Cones at 50' centers.

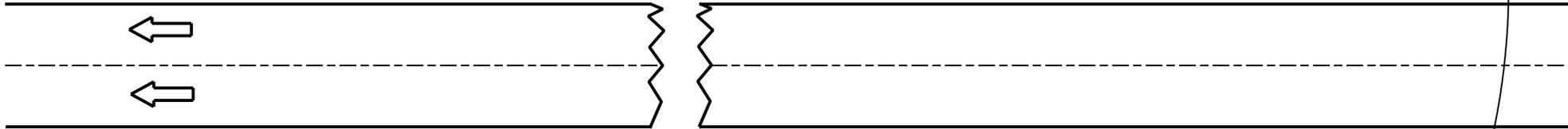
When drums or barricades are used, the 50' spacing may be doubled.

INTERSTATE ONE LANE CLOSURE NO TIME LIMIT ANY SPEED

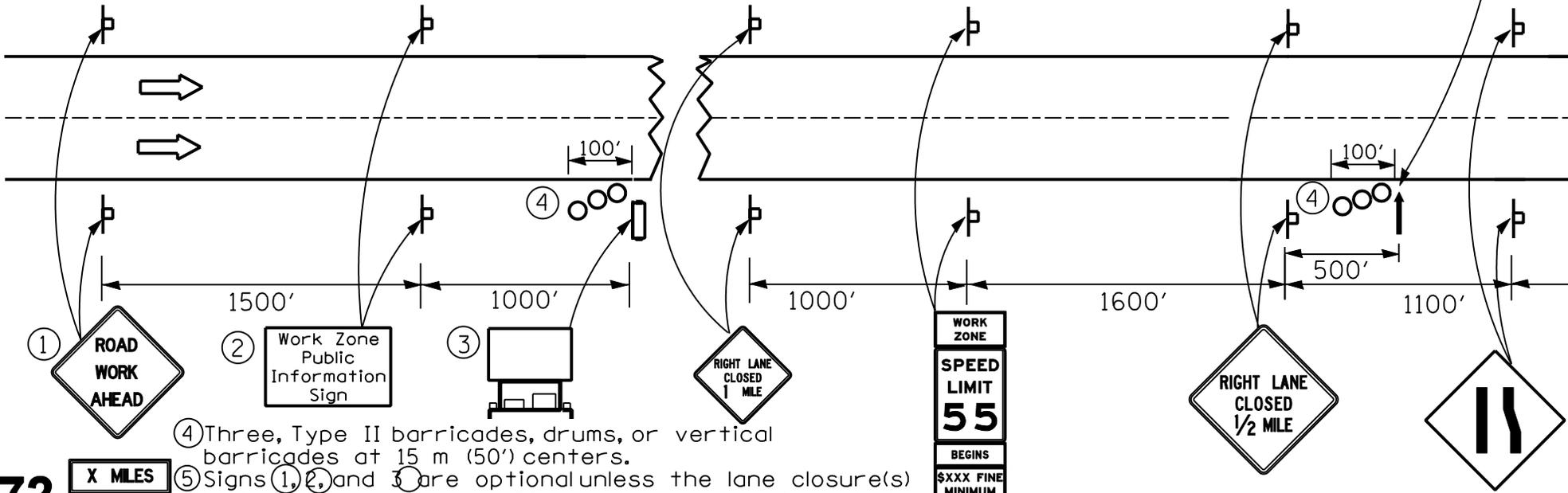
The first 2 signs and message board are stationary.

- ① The Road Work Ahead sign shall be located 3 to 5 miles in advance of the project limits.
- ② The message and size of the Work Zone Public Information sign shall be as specified by the Bureau of Operations.
- ③ The message board shall be used to display status of lane within the project. The primary message shall be:
"Right Lane Closed"/ "X Miles Ahead"
"Left Lane Closed"/ "X Miles Ahead"
"All Lanes Open"

Arrow Board in
Arrow Mode



Signs not required in median when median is less than 10' wide.

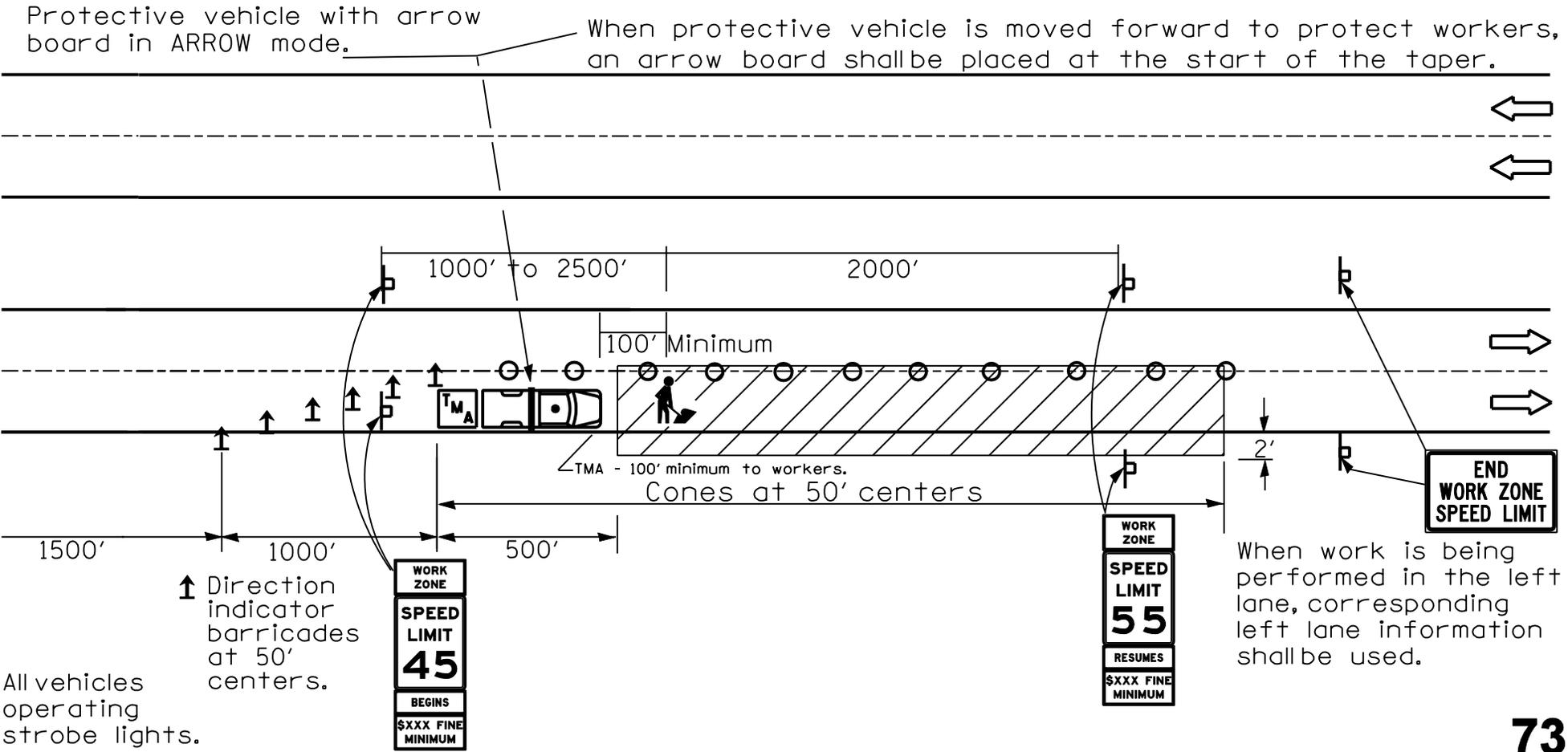


④ Three, Type II barricades, drums, or vertical barricades at 15 m (50') centers.

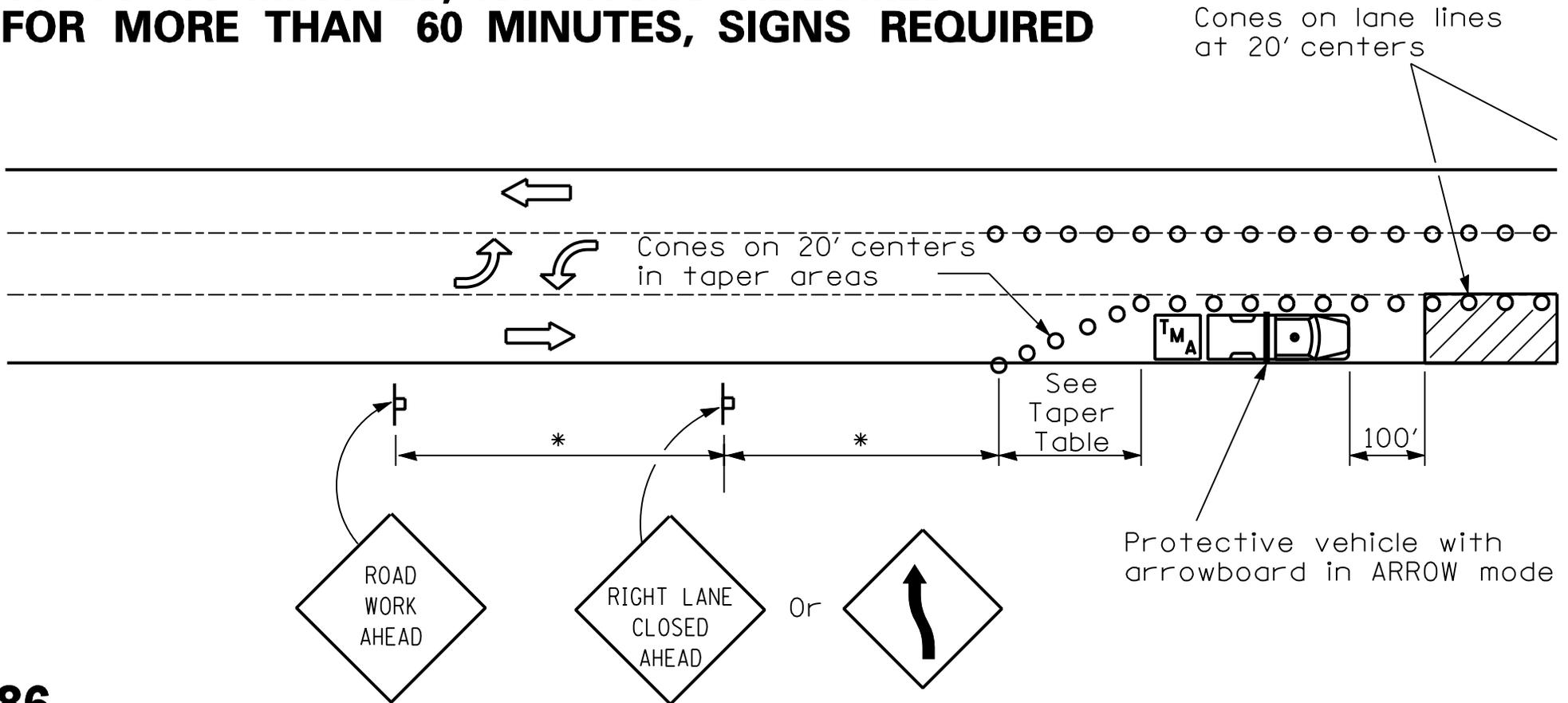
⑤ Signs ①, ②, and ③ are optional unless the lane closure(s) last(s) overnight or traffic backups are anticipated.

⑦ If signs ①, ②, and ③ are not used, replace the RIGHT LANE CLOSED 1 MILE with ROAD WORK AHEAD sign.

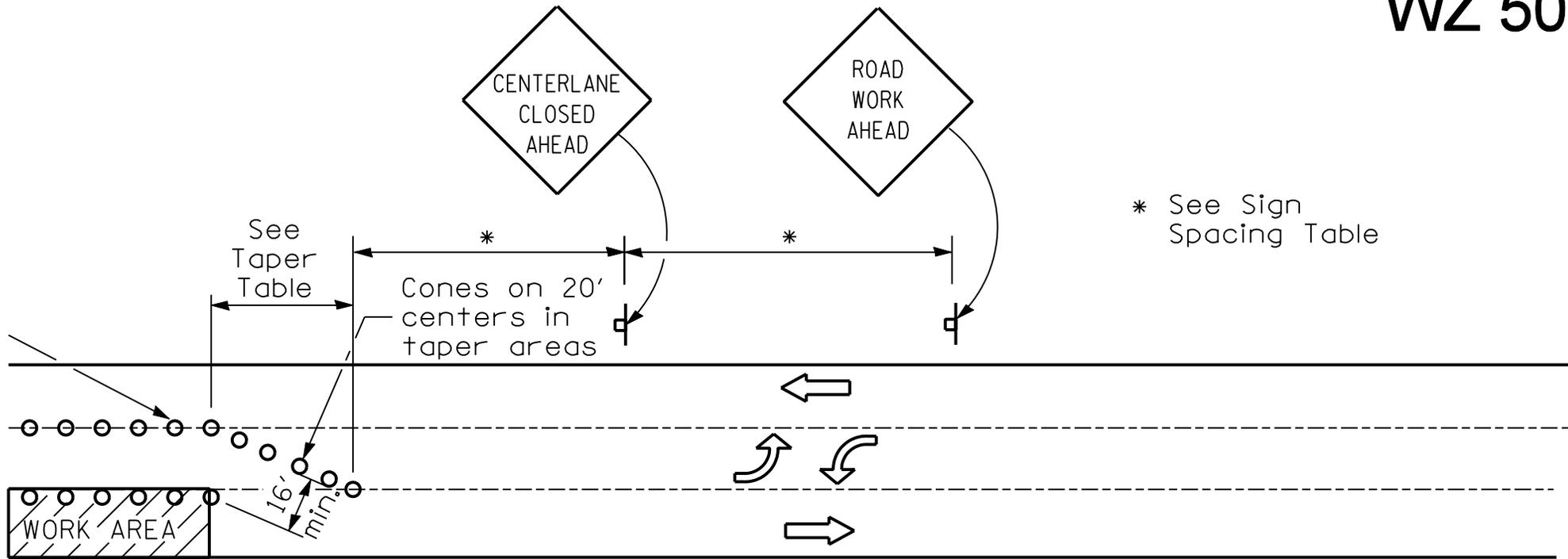
⑥ Work Zone speed limit 45 signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity.



**45 MPH OR LESS
 CENTER LANE USED AS
 THRU LANE
 NO TIME LIMIT
 UP TO 60 MINUTES, NO SIGNS REQUIRED
 FOR MORE THAN 60 MINUTES, SIGNS REQUIRED**



WZ 50

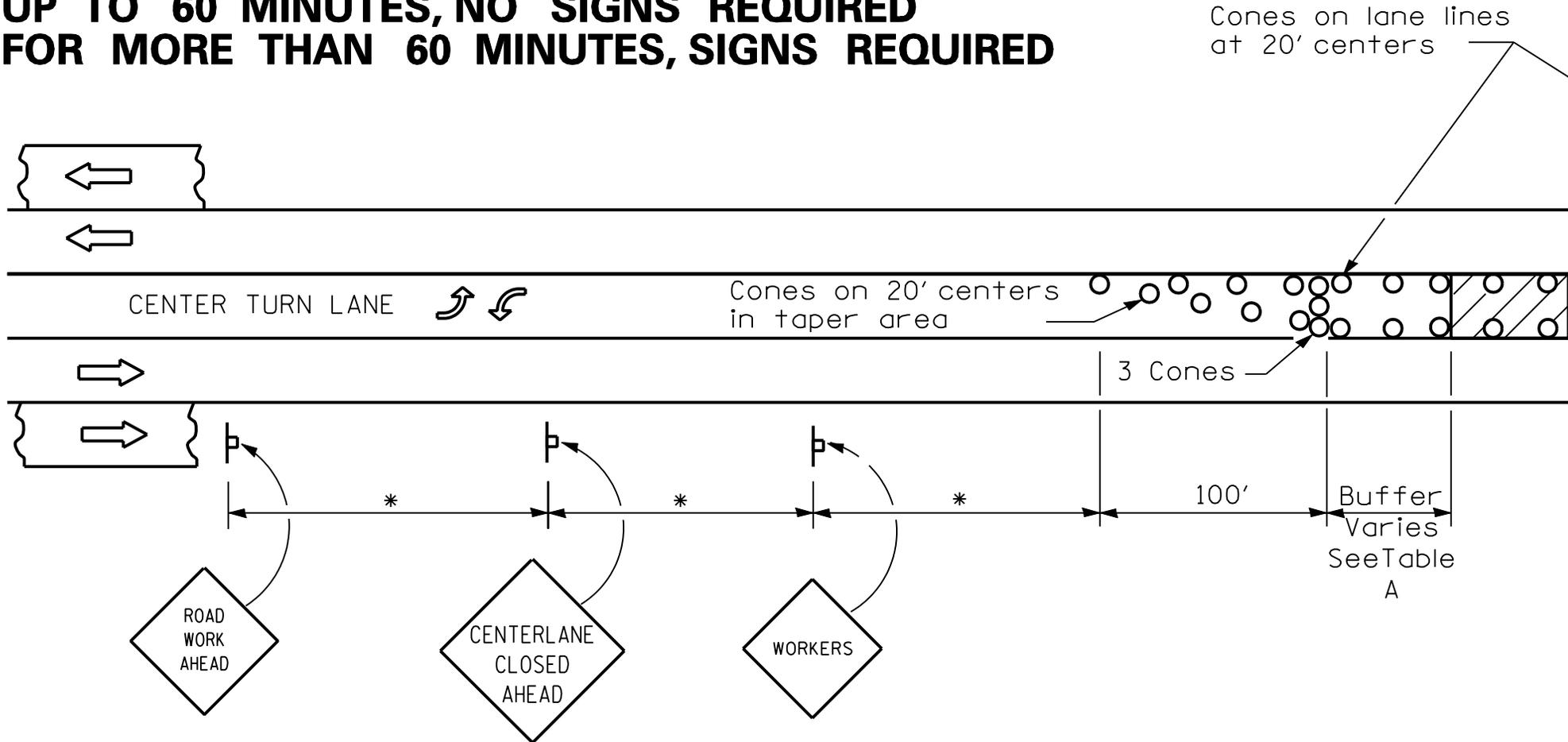


All vehicles operating strobe lights

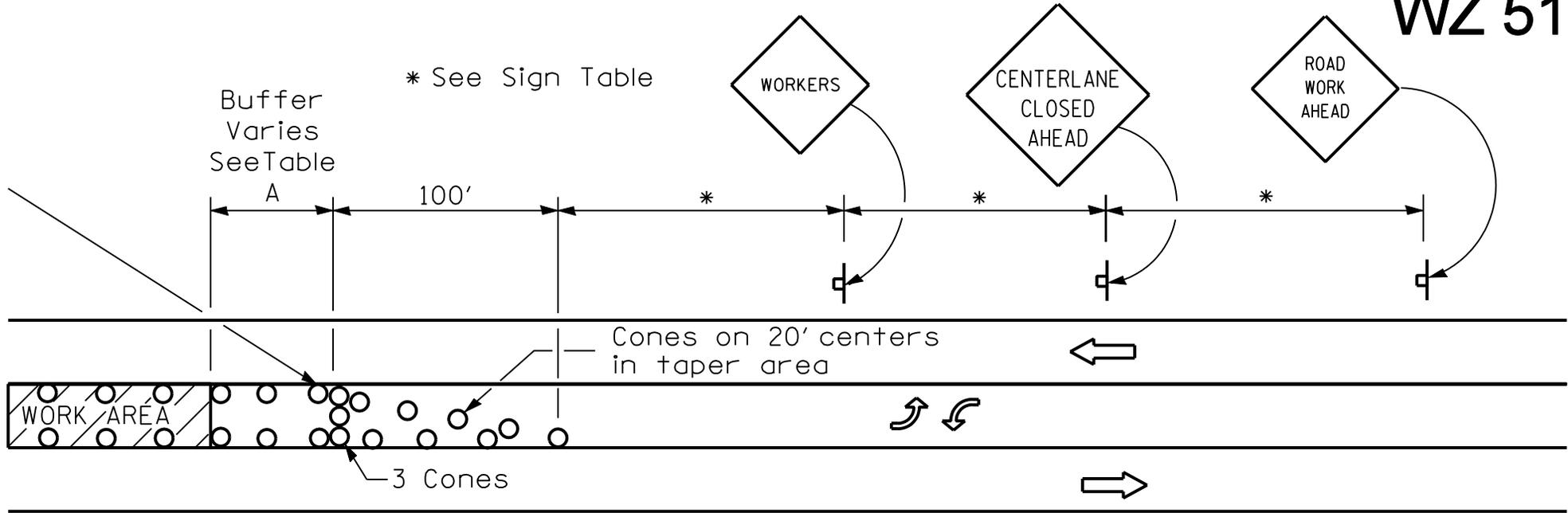
Taper Table Length	
Speed	Length
45	270'
40	170'
35	125'
30	90'

Sign Spacing	
Speed	Length
45	350'
≤40	100'

**45 MPH OR LESS
 CENTER LANE CLOSURE
 NO TIME LIMIT
 UP TO 60 MINUTES, NO SIGNS REQUIRED
 FOR MORE THAN 60 MINUTES, SIGNS REQUIRED**



WZ 51



If operational problems are evident and caused by left-turning vehicles, the R3-9b signs in the immediate area of the work-zone should be temporarily covered and/or adjustments made in the lengths of the work area, buffer areas and tapers. All dimensions shown may be increased.

TABLE A	
SPEED MPH	BUFFER LENGTH
45	220'
40	170'
35	120'
30	85'

Sign Spacing	
Speed	Length
45	350'
≤40	100'