SAFE AND EFFECTIVE USE OF LAW ENFORCEMENT PERSONNEL IN HIGHWAY WORK ZONES

- POCKET GUIDE –

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PREFACE

The purpose of this guide is to present basic guidelines for the safe and effective use of law enforcement officers in highway work zones. This handy reference presents information on the options available to both officers and contractors working on highway construction sites.

Most of the information contained in this guide was obtained from the *Manual on Uniform Traffic Control Devices* (MUTCD), 2003 Edition, several focus groups with traffic safety and law enforcement personnel, and other references listed in the References section of this document.

This guide does constitute a standard, recommended procedure or regulation of any kind. Specific standards and procedures that apply to the use of law enforcement officers may vary from jurisdiction to jurisdiction, depending on the type of work, its duration, and several other factors. Users should not rely on the information contained in this guide but use it solely to develop their own specific procedures as needed. Users are also encouraged to obtain specific information about state-specific standards and guidelines, local requirements, best practices and successful lessons learned.

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INTRODUCTION

Highway work zones can be dangerous to everyone involved. Passenger and commercial vehicles travel very close to highway workers and construction crews. Motorists often miss or purposely ignore regulatory and warning signs. Work zone crashes often involve highway workers and can be deadly. In an attempt to reduce work zone crashes, many state highway agencies use uniformed police officers to deter risky or unsafe driving. The safety of workers and law enforcement personnel within the work zone is just as important as the safety of the traveling public. While they enable the efficient completion of highway work, work zones present constantly changing conditions road users do not expect. This increases the risk for workers and law enforcement personnel on or near the roadway.

Although the use of police officers is promoted as a way to increase work zone safety, no specific guidance exists that addresses the need to coordinate traffic control and enforcement activities with the officers. The *Manual on Uniform Traffic Control Devices* (MUTCD), which defines the principles and procedures used by all States when designing and implementing work zones, does not provide guidance on this issue. However, the widespread use of police officers in highway work zones underscores the need for such guidance.

This pocket guide explains work zone operations and outlines roles and responsibilities. It contains guidelines and concepts developed from the MUTCD and meetings of the work zone law enforcement training steering group. These guidelines are intended to help law enforcement and transportation agencies provide more efficient traffic control, prevent crashes and save lives.

Common pitfalls when using law enforcement officers in highway work zones include:

- Lack of communication between work zone participants (project owner, workers, and officers)
- Lack of understanding of each other's roles and responsibilities
- Lack of planning and coordination
- Inadequate training of law enforcement personnel in traffic control procedures within highway work zones
- Officers' lack of knowledge of proper work zone standards, guidelines and procedures

This guide addresses these pitfalls utilizing simple, non technical language. It is designed to be used as a field reference, to be carried by officers assigned to work in highway work zones for quick consultation.

This guide does not constitute a recommended procedure or regulation of any kind. Specific standards and procedures may apply to the use of law enforcement officers in your jurisdiction. You should supplement the information in this guide with applicable regulations, standards and requirements.

OBJECTIVES OF HIGHWAY WORK ZONES

The primary objectives of temporary traffic control in highway work zones are to:

- Provide for the safe and efficient movement of road users, including motorists, pedestrians and bicyclists, through or around the work area

- Protect workers, equipment and law enforcement personnel.

Work zones present constantly changing conditions that may be unexpected by the road user. This creates an even higher degree of vulnerability for the workers and law enforcement personnel on or near the roadway.

Road user safety, worker and officer safety and the efficiency of road user flow is integral to every work zone, from planning through completion.

ROLES AND RESPONSIBILITIES

Safe and effective work zones result from good planning and execution. Several agencies may have roles and responsibilities in the process.

Typically, the project owner designs the work zone and hires a contractor to execute the work. The contractor may have workers and supervisors monitoring the field work and may use a traffic control services vendor to implement the traffic control plan. The contractor may also hire the services of law enforcement officers to assist with various tasks. The Department of Transportation (DOT) may also have agreements with law enforcement agencies to use officers in work zones.

The table below summarizes roles and responsibilities of typical work zone stakeholders.

Stakeholder	Typical Agency	Typical Roles and Responsibilities
Project Owner	State Department of Transportation, County, City, etc.	• Conceive the project • Fund the project • Design the project[1] • Develop and approve a Traffic Control Plan (TCP) • Hire contractor to execute the project • May require and hire (directly or indirectly) law enforcement officers, if needed • Supervise the project
Highway Contractor	Construction Company, etc.	• Execute the project • Ensure that the work zone is according to the approved plan on a daily basis • Temporary traffic control • Installation and removal of traffic control devices • Documentation of the project • Designate a field Point of Contact (POC) • Ensures that the approved traffic control plan is followed • Hire law enforcement officers, if needed
Contractor's Point of Contact (POC)[2]	Traffic control supervisor, foreman,	• Represent the contractor in the field

[1] May contract-out these responsibilities.

	highway agency inspector, etc.	• Make minor modifications to the approve Traffic Control Plan, if authorized • Supervise field workers • Communicate/coordinate with law enforcement personnel, if used • Inspect the work zone periodically • Be trained in safe traffic control practices • Be visible and alert
Field workers	Traffic control technicians, workers, etc.	• Report to the work zone supervisor • Install and remove devices as instructed • Notify supervisor of problems and close calls • Understand and support the role of law enforcement • Be trained in safe traffic control practices • Be visible and alert
Law enforcement officers	State police agency, police department, etc.	• Reduce the likelihood of speeding through presence • Enforce traffic laws • Control traffic, if applicable • Maintain communication with POC • Be visible and alert • Position themselves in an area that is both safe and effective • Be informed about the project's objectives, schedule and progress • Drive through the work zone • Notify the point of contact of potential problems • Be trained in safe traffic control practices

COMMON POLICE SERVICES IN WORK ZONES

Law enforcement officers may provide various services when assigned to a highway work zone. It is important for officers to have a complete understanding of their role in a work zone.

The following table lists some law enforcement responsibilities.

Type of Service	Typical Activities
Presence	• Deter speeding and aggressive driving • Gain the attention of drivers • Protect workers • Most common service in work zone • Usually involves “off-duty” officers • Presence officers are not primarily involved with traffic law enforcement.
Enforcement	• Active enforce traffic laws in the work zone • May not be as common as presence • May be combined with presence • Usually involves “on-duty” officers
Traffic Control	• Control traffic where needed and where flaggers cannot (intersections, traffic incident areas, etc.) • May be used in detour situations • Direct traffic to keep it moving • Requires training and special equipment
Emergency Assistance	• Control traffic in and around the incident area • Minimize the probability of a secondary crash • Report crashes

The following table highlights tasks every law enforcement officer in a work zone should Perform:

Task	Activities
Communicate	• Report to the POC at beginning of shift • Contact project engineer for clarification & directions • Remain in contact with local dispatch
Be Visible	• Emergency lights on, headlights off • If outside the patrol vehicle & within the work zone, shall wear retroreflective safety vest (ANSI 107-2004 Class 2 or higher)
Be Alert	• Stay alert all times • Avoid activities that may be distracting • Keep your eye on traffic
Drive-Through	• Drive through the work zone in both directions and from all entry points • Become familiar with the work zone and its activities • Determine safe places to investigate crashes and for enforcement • Identify hazardous conditions • Notify the point of contact of any deficiencies and/or potential problems
Investigate Crashes	• May investigate minor property damages crashes, if time to investigate is minimal • Do not abandon position if in “presence” function • Do no investigate crashes with injuries • Call for assistance
Arrive Early and Leave Late *(“15-minute rule”)*	• Be present when the traffic control devices are being installed or removed • Arrive at least 15 minutes before devices are installed • Leave 15 minutes after devices are removed
Monitor compliance with the traffic control plan (TCP)	• May inspect the TCP for problems • Detect safety violations • Notify supervisor of possible problems

UNDERSTANDING WORK ZONE TRAFFIC CONTROL

Standards and Guidelines

Minimum Federal temporary traffic control standards can be found in the *Manual on Uniform Traffic Control Devices* (MUTCD), published by the US Department of Transportation, Federal Highway Administration. The standards, guidelines and options included in this Federal publication are applicable in all streets and roadways open to public travel. States and other local jurisdiction may deviate from the MUTCD as long as their standards and guidelines exceed those found in the Manual.

Although the MUTCD does not contain explicit guidelines for the use of law enforcement officers in work zones, the same principles that govern the design and usage of traffic control devices apply.

Not all work zones are the same. They vary depending on many factors, such as specific state requirements, duration and/or location of the work and other variables. Work zones do share some basic concepts and terms. For example, all work zones have an "advance warning area," where motorists are warned, through the use of warning signs, about the conditions ahead.

Component Parts of a Typical Work Zone

Although work zones vary in design, the following figure illustrates components of a typical work zone:

NOTE TO PRINTER: USE MUTCD FIGURE 6C-1 HERE. The figure is on page 6C-3 of MUTCD or on page 7 of the "TCT Guide"

1. The Advance Warning Area

The advance warning area is the section of highway where road users are informed about the upcoming work zone area. This area usually contains "advance warning signs" in advance of the work zone activity area:

- First sign alerts motorists (i.e., ROAD WORK AHEAD)
- Second sign indicates the condition ahead (i.e., RIGHT LANE CLOSED AHEAD
- Third sign indicated the required action (i.e., symbolic MERGE LEFT)

The following table lists some advance warning sign guidelines:

Shape	• Diamond shape
Min. Size	• 48" x 48" in high speed highways • 36" x 36" in moderate speed highways
Color	• Orange in work zones • Fluorescent pink in incident management areas (optional)
Material	• Aluminum if post mounted • Vinyl "rollups" if attended • Mesh for daytime only • Retroreflective at night
Min. Height (from elevation of pavement to bottom of sign)	• 7' for post-mounted signs in urban areas • 5' for post-mounted signs in rural areas • 1' for signs mounted on temporary supports
Lateral clearance (from corner of the sign to travel surface)	• 2' - 4' in urban areas • 6' - 12' in rural areas • May be used on both sides of highway facility.
Spacing between signs	• 100' in low-speed urban areas[3] • 350' in high-speed urban areas • 500' in rural areas • 1000' - ½ mile in freeways and expressways
Sign covering	• Cover or remove the sign completely if sign is not applicable, even for short periods of time

[3] *Individual states define "low speed" and "high speed," but the dividing line is generally 35–40 mph. Use your jurisdiction's rules and/or guidelines. If in doubt, assume it is "high speed".*

	• Burlap is not permitted • Covering of only the legend is not permitted

2. The Transition Area

The transition area is where road users are redirected out of their normal path. This area usually involves the use of tapers (gradual transitions). Tapers are critical to the effective operation of lane closures and other transitions. They are created using channelizing devices (cones, barricades or drums) and/or pavement markings to move traffic out of or into the normal path. Improper tapers may create unnecessary congestion and unsafe conditions.

- Lane closures require merging tapers in which traffic is required to merge from one lane to another.
- Transition areas are formed by traffic control devices such as cones, drums and barricades
- Long tapers help traffic maintain speed, eliminating congested conditions quickly.
- Short tapers encourage drivers to slow down. As a general rule, long tapers are better than short tapers.

IMPORTANT EXCEPTION: "FLAGGING TAPER"

When closing one lane of a two-lane road, the transition area requires short tapers (50'–100' maximum) and flaggers, who may need to stop traffic in one direction to prevent head-on collisions.

Traffic control devices are used to warn road users of the conditions created by the work activities and to provide the necessary guidance and control. The following table provides general guidelines for various devices that may be used in the work zone (may vary by jurisdiction):

Cones	• Two white retroreflective band for night use • At least 28" in height for high-speed facilities • Must be attended
Drums	• Alternating orange and white stripes • May be supplemented with steady-burn warning lights when used to form a taper or tangent (straight line).

Barricades	• Diagonal stripes slope down to the traffic side
Arrow Panels	• Use in addition to signs, not in lieu of • On the shoulder, displaying an arrow, for lane closures • If possible, out of the travel lane • May be inside taper if no shoulder is available • Not in buffer space • Do not use on two-lane roads or lane shifts • When off, store at least 30 feet from the travel lane • 50% dimming for nighttime use
Warning Lights	• Yellow lens • At least 30” high • Steady-burn for delineation (used in series along the taper and/or work areas) • Flashing if used on signs or to draw attention to hazardous areas

Arrow Panels

Arrow panels (or arrow boards) can supplement static signs on lane or shoulder closures:

- Some states require them for high-speed lane closures and high traffic density.
- When used for a lane closure on a multilane highway, place at the beginning of the taper, on the shoulder.
- Keep out of the travel lane, if possible.
- If closing more than one lane, use an arrow panel for each closed lane.
- If shoulder is not available or too narrow, place inside the taper as close as possible to the beginning of the taper.
- When off, store at least 30 feet from the travel lane.
- Do not use arrow panels (displaying arrows) on two-lane roads or on lane shifts.
- At night, they shall be dimmed
- Use arrows (or chevrons, if permitted) ONLY when a lane is closed

The appropriate taper length (L), maximum channelizing device spacing and buffer length (BL) should be determined using the following table:

Speed (mph)	Merging Taper, L (feet)	Shifting Taper, ½ L (feet)	Max. Device Spacing On Taper (feet)	Max. Device Spacing On Tangent (Past Taper) (feet)	Buffer Length, BL (feet)
25	125	63	25	50	155
30	180	90	30	60	200
35	245	123	35	70	250
40	320	160	40	80	305
45	540	270	45	90	360
50	600	300	50	100	425
55	660	330	55	110	495
60	720	360	60	120	570
65	780	390	65	130	645
70	840	420	70	140	730
75	900	450	75	150	820

NOTES:

1. A merging taper generally reduces the number of lanes, while a shifting taper moves traffic over, maintaining the same number of lanes. Shifting tapers are used when a lateral shift is needed.
2. Spacing (separation) between devices, in feet, must be less than the posted speed, in mph.

HOW TO APPROXIMATE DISTANCES IN THE FIELD

1. **Pacing Method:** In advance, determine the length of your stride and how may paces it would take you to cover the suggested taper and device spacing. Enter this information in the table below.

2. **Skip-Line Method:** Upon arrival, determine the pattern of the skip lines. Most skip lines are on a "10-30" pattern: the painted lines are 10 feet long and the gap between them is 30 feet long. For this example, there are 40 feet from the beginning of one line to the beginning of the next line, so counting 10 skips would equal 400 feet.

Speed (mph)	Merging Taper, L (Paces)	Shifting Taper, ½ L (Paces)	Max. Device Spacing On Taper (Paces)	Max. Device Spacing on Tangent (Past Taper) (Paces)	Buffer Length, BL (Paces)
< 25					
30					
35					
40					
45					
50					
55					
60					
65					
70					
75					

3. The Activity Area

The table below describes the different areas within the “activity area”:

Buffer Space (BL)	• Separates road users from the work zone. • Provides recovery space for an errant vehicle. • Should be completely empty. • Do not position a patrol vehicle in the buffer space. • Some buffer is better than no buffer at all. • See taper table for recommended buffer lengths (BL).
Work Space	• Area closed to road users and set aside for workers, materials, work equipment and work vehicles. • Usually marked off by cones, drums or other channelizing devices.
Traffic Space	• Area open to road users

4. Termination Area

The termination area is used to return road users to their normal path.

- It extends past the work area to return traffic to normal.
- May include (optional) a termination taper (100' minimum, per lane) and an END ROAD WORK sign (rectangular in shape and orange).

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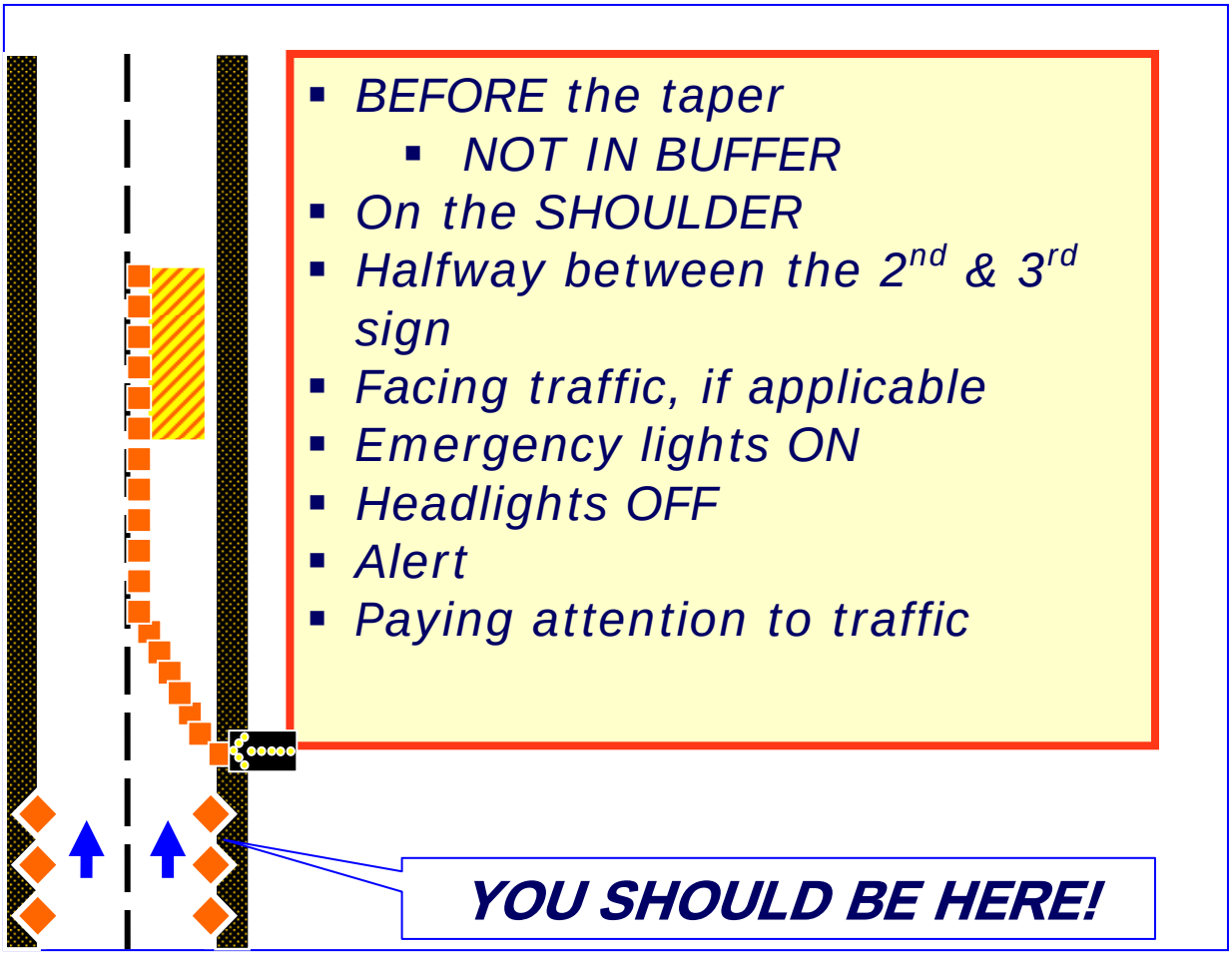
RECOMMENDED PRACTICES

The following recommendations may assist officers who are assigned to "presence" duty in a highway work zone.

- These are not standards or regulations
- Specific standards and procedures may vary from jurisdiction to jurisdiction
- Do not rely only on this information, but use it to develop your own specific procedures
- Obtain information about state-specific regulations, local requirements, best practices and successful lessons learned.

Where should you be?



Recommended practices for the use of law enforcement officers on highway lane closures (when serving the function of "presence"):

Stage	Recommended Activities

Before the work begins	• Attend the pre-construction conference, if possible
	• Familiarize yourself with the project
	• Identify your points of contact and establish communication:
	  o Project owner
	  o Field contact
	• Ask questions about your role
	• Voice concerns about your safety, if any

Upon arrival at the work zone	• Arrive early at the project, at least 15 minutes before devices are installed • Contact your point of contact • Identify your role and safest location • Gather information about the project • Drive-through the work zone • Note signs in the advance warning area • Identify possible relocating procedures • Turn emergency lights on and headlights off
While at the work zone	• Be alert, paying constant attention to traffic • If applicable, face traffic! • Be visible! • Do not assume drivers will see you. • Expect the unexpected and be ready to react • Be in contact! • Headlights off and turn emergency light on • Pay attention to queues that may form and relocate as necessary • Contact your POC if adjustments are needed or if you see any deficiencies in the work zone **<u>If work zone is stationary:</u>** • Position your vehicle **on the shoulder**, between the second and third sign in the advance warning area • Do not park in buffer space • Relocate as needed based on traffic conditions, trying to be ¼ mile behind the end of the queue **<u>If work zone is continuously moving:</u>** • Move with the work zone, if appropriate, depending on the speed of the work zone • It may not be feasible to face traffic so pay as much attention to traffic as possible • Relocate as needed based on traffic conditions, trying to be ¼ mile behind the end of the queue

After the work is completed	• Stay at least 15 minutes to monitor traffic conditions

FIELD CHECKLIST

- ☐ I have a complete understanding of the work zone in which I have been assigned to work (type of work, duration, advance warning signs, tapers, buffers, etc.).
- ☐ I know and understand my role at this work zone.
- ☐ I have identified and contacted the point of contact in the field.
- ☐ I have driven through the work zone, from both directions and all entry points, to familiarize myself with the work zone.
- ☐ If applicable, I have expressed concerns about my safety and I am satisfied with the resolution.
- ☐ I arrived at least 15 minutes before traffic control devices were installed.
- ☐ I have identified the safest, most effective location to position my patrol vehicle.
- ☐ I have my patrol vehicle's headlights off.
- ☐ I have my emergency lights on.
- ☐ My patrol vehicle is as visible as it can be.
- ☐ My vehicle is facing traffic, if applicable.
- ☐ My patrol vehicle IS NOT parked in the buffer space or in an open lane of traffic.
- ☐ I am alert and paying complete attention to traffic.
- ☐ If traffic backs-up, I have identified a relocation procedure.
- ☐ My patrol vehicle is positioned at least ¼ mile before the beginning of the queue of traffic.
- ☐ I have a retroreflective vest (ANSI 107-2004 Class 2 or higher) in case I need to be outside my patrol vehicle.
- ☐ I will leave the work zone at least 15 minutes after the traffic control devices are removed.

TYPICAL APPLICATIONS

The following example illustrations show typical applications of various highway work zones, as included in the Manual on Uniform Traffic Control Devices (MUTCD), 2003 Edition (http://mutcd.fhwa.dot.gov/). These examples cover a variety of situations commonly encountered in work zones.

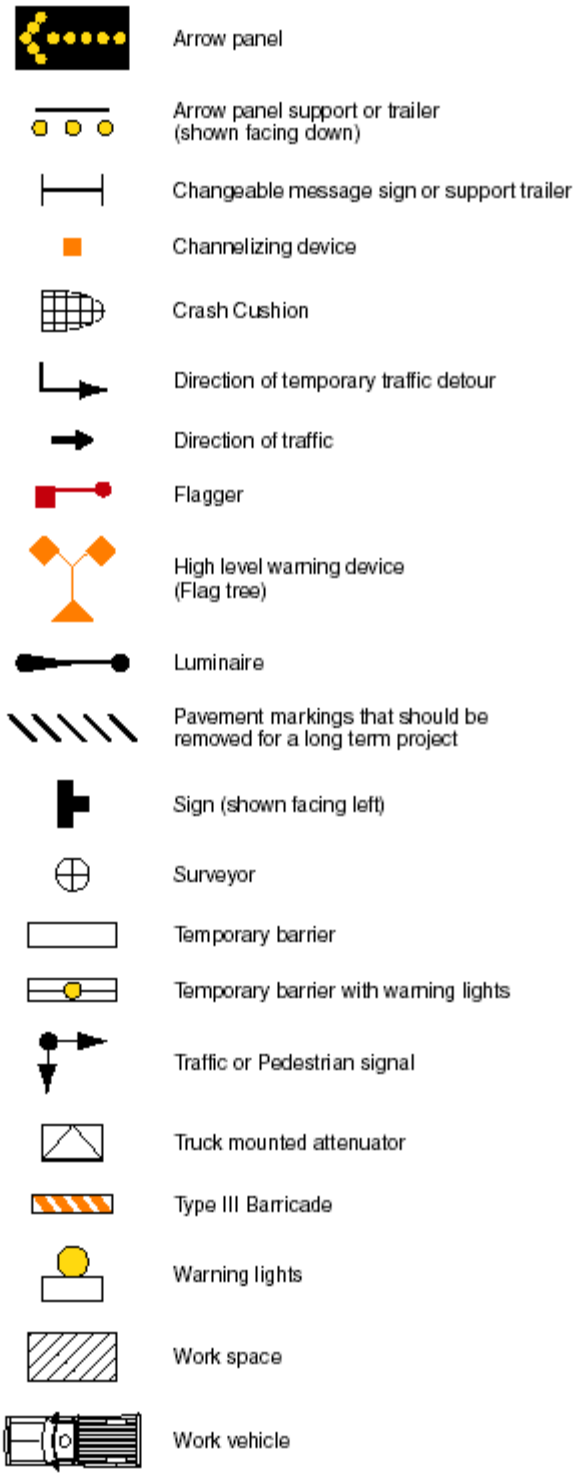
In general, these illustrations show minimum solutions. The information can be adapted to a broad range of conditions.

These illustrations do not address the use of law enforcement officers in work zones. Additionally, officers should use judgment based on the traffic control setup, site characteristics, and location of adjacent driveways or parking lots.

They are intended as a guide to help you identify possible inappropriate and unsafe traffic control setups and conditions.

You must study the roles of law enforcement officers in work zones carefully on a case-by-case basis. State and local standards, guidelines and regulations may vary.

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



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

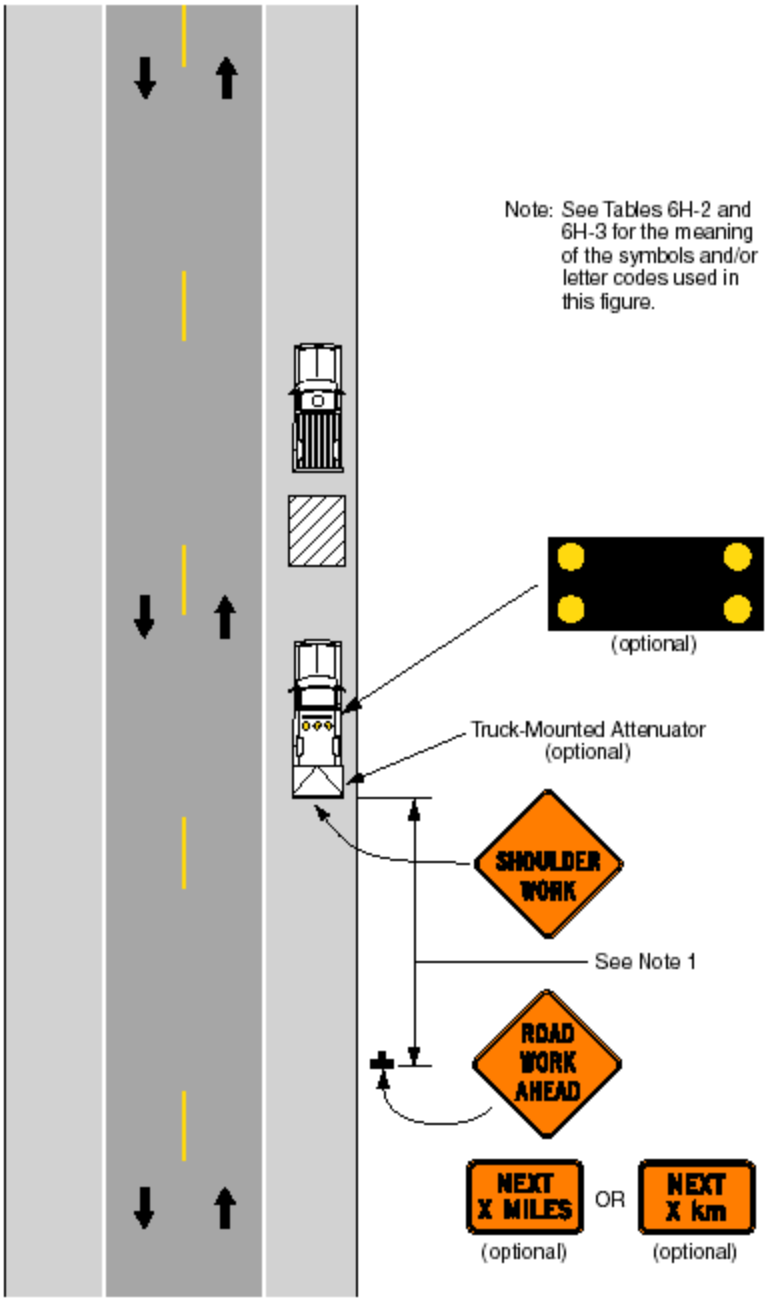
Type III Barricade

Warning lights

Work space

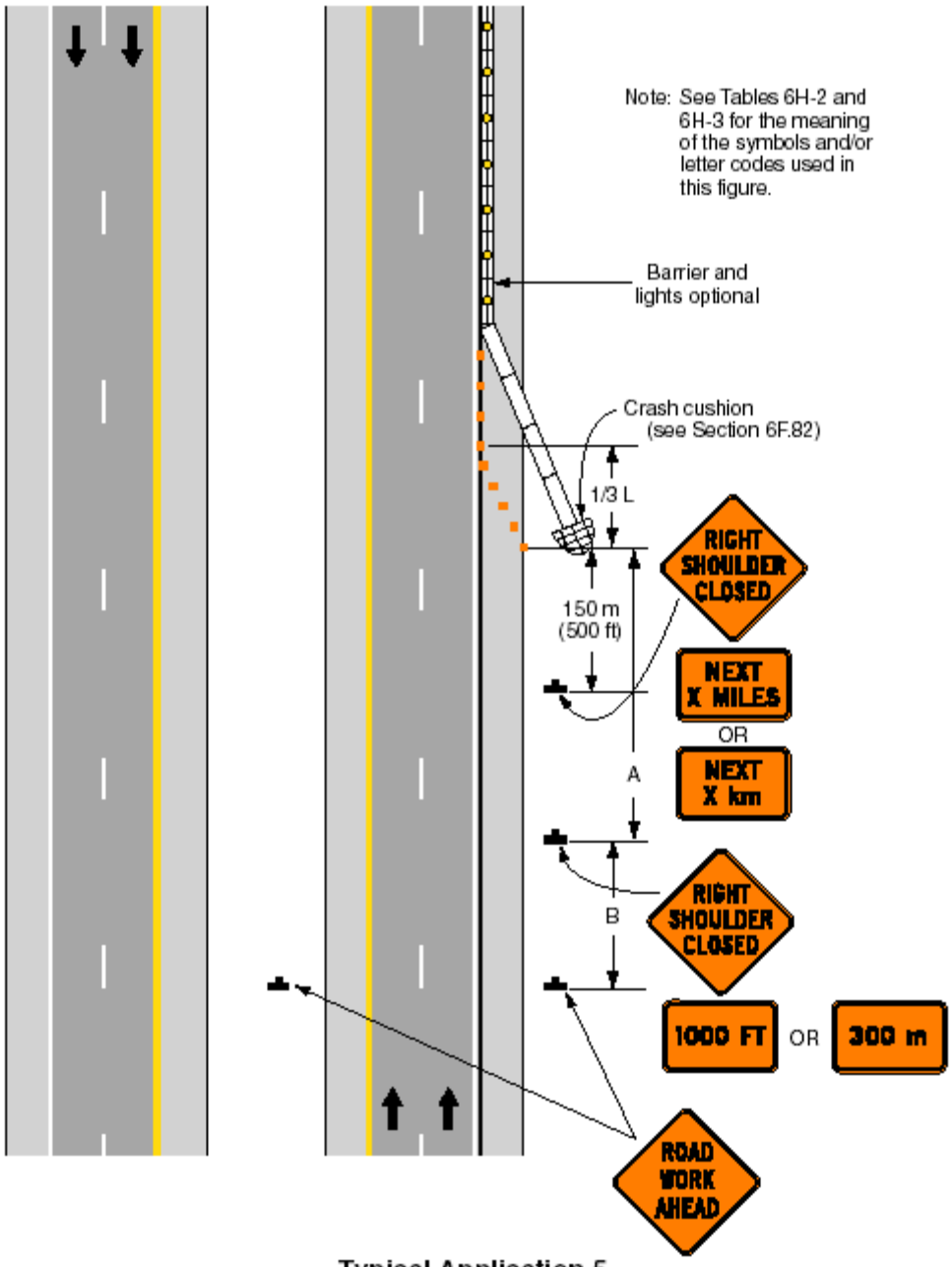
Work vehicle

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



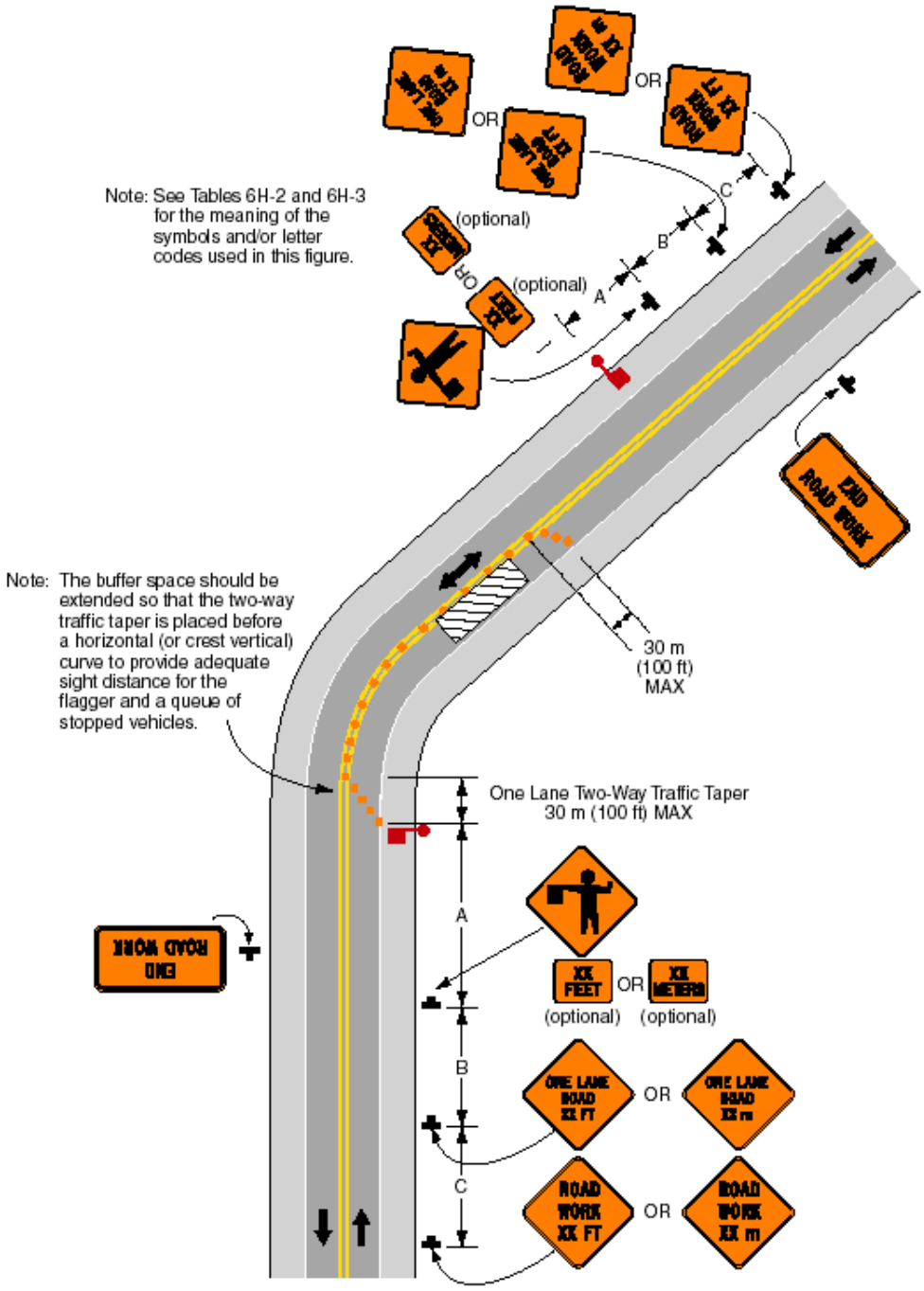
Typical Application 4

Figure 6H-5. Shoulder Closure on Freeway (TA-5)



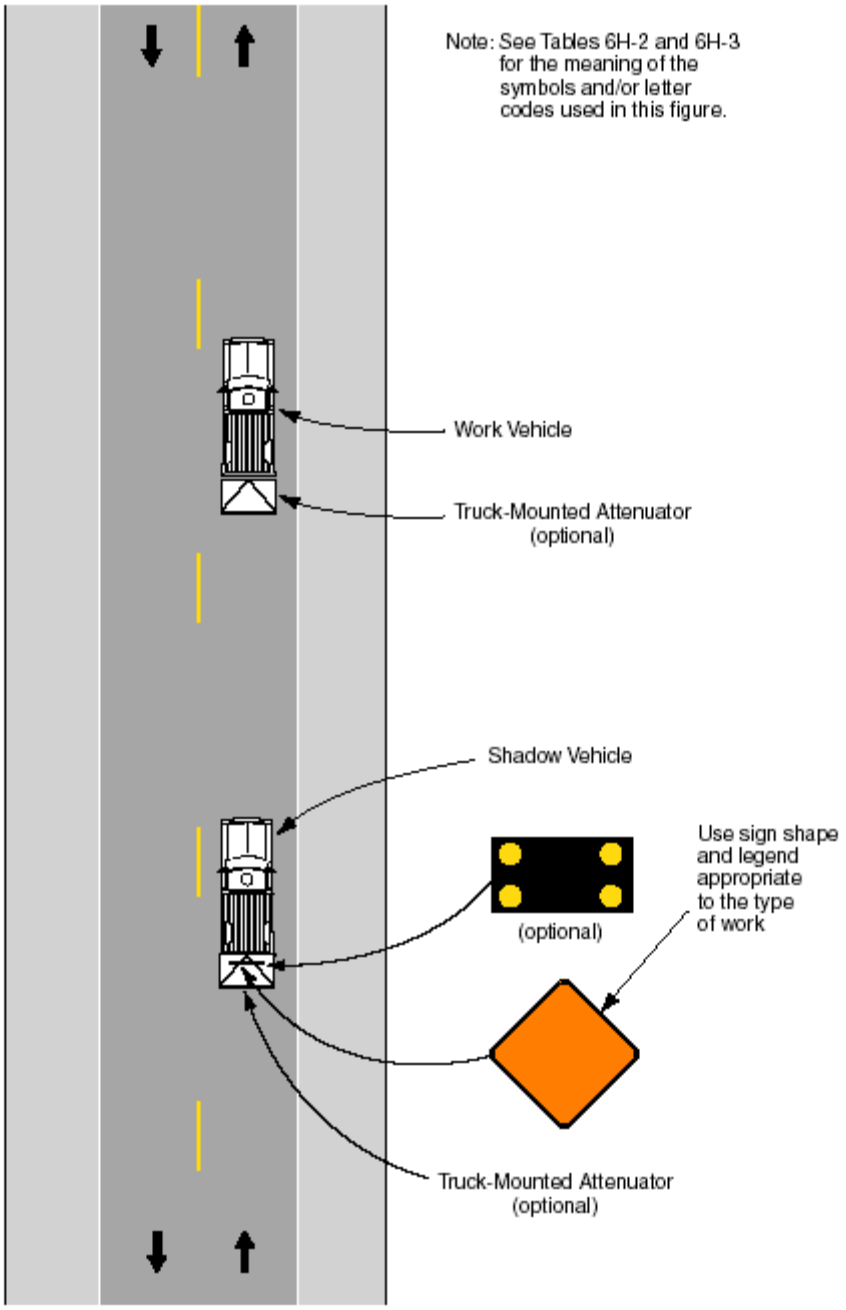
Typical Application 5

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



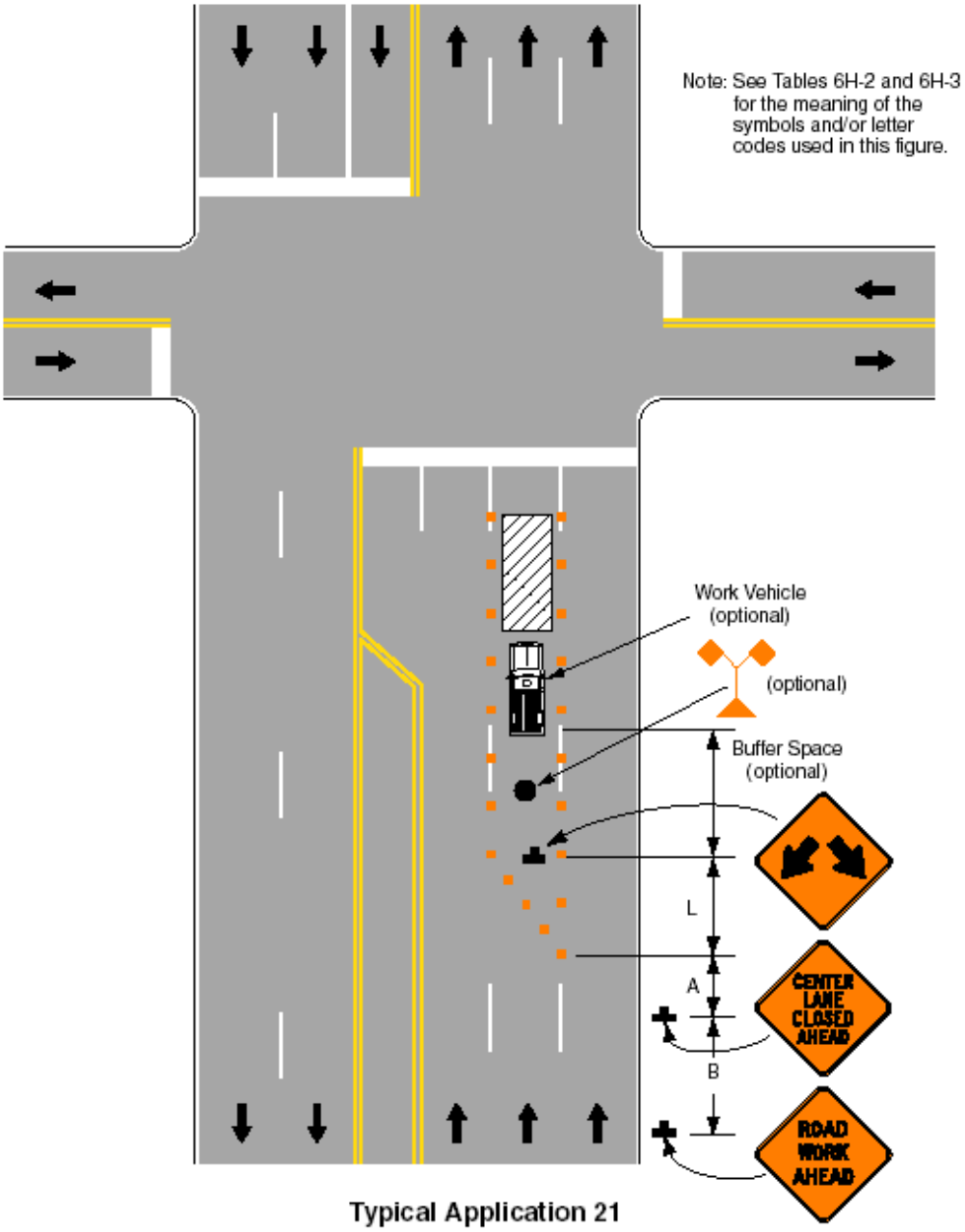
Typical Application 10

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



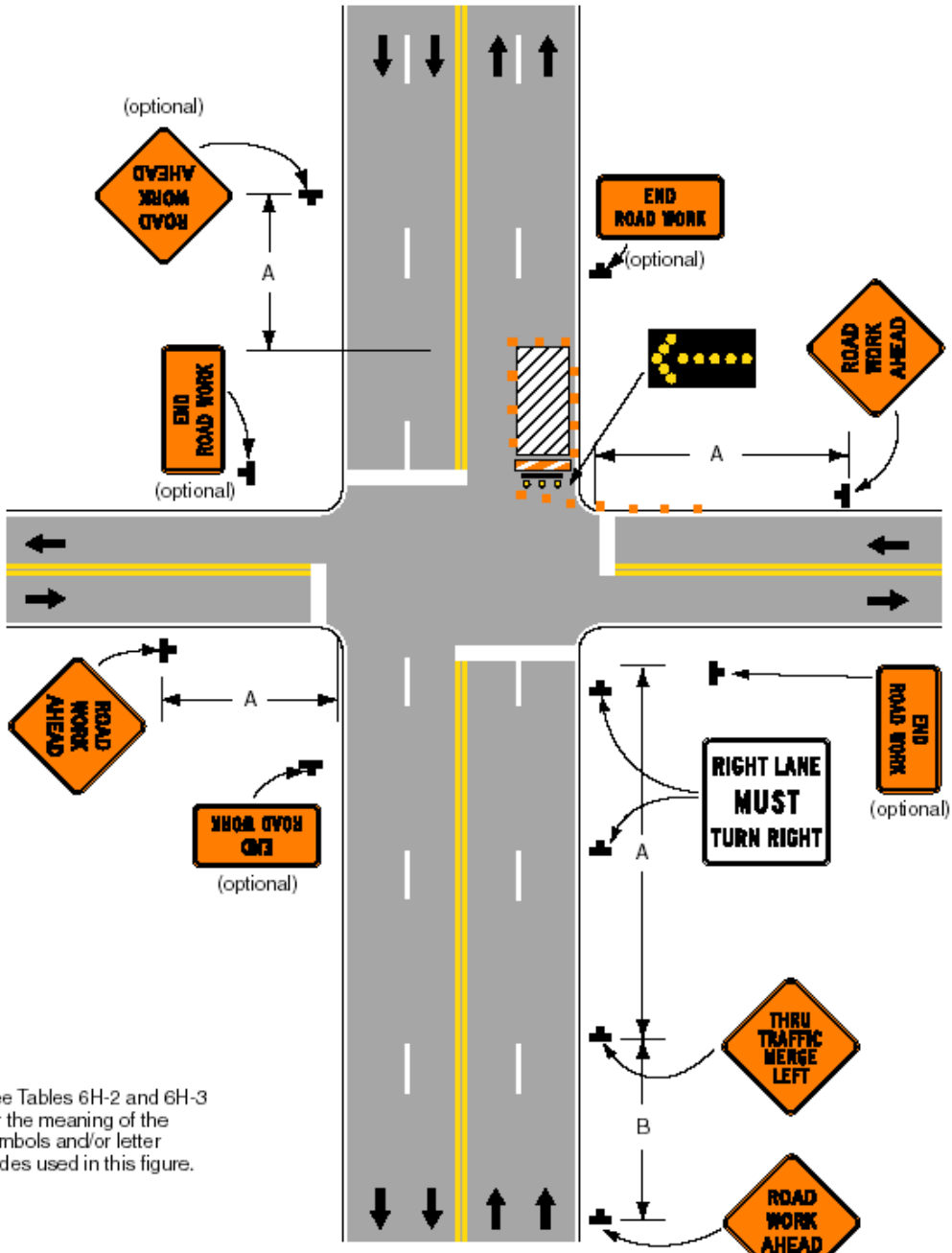
Typical Application 17

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



Typical Application 21

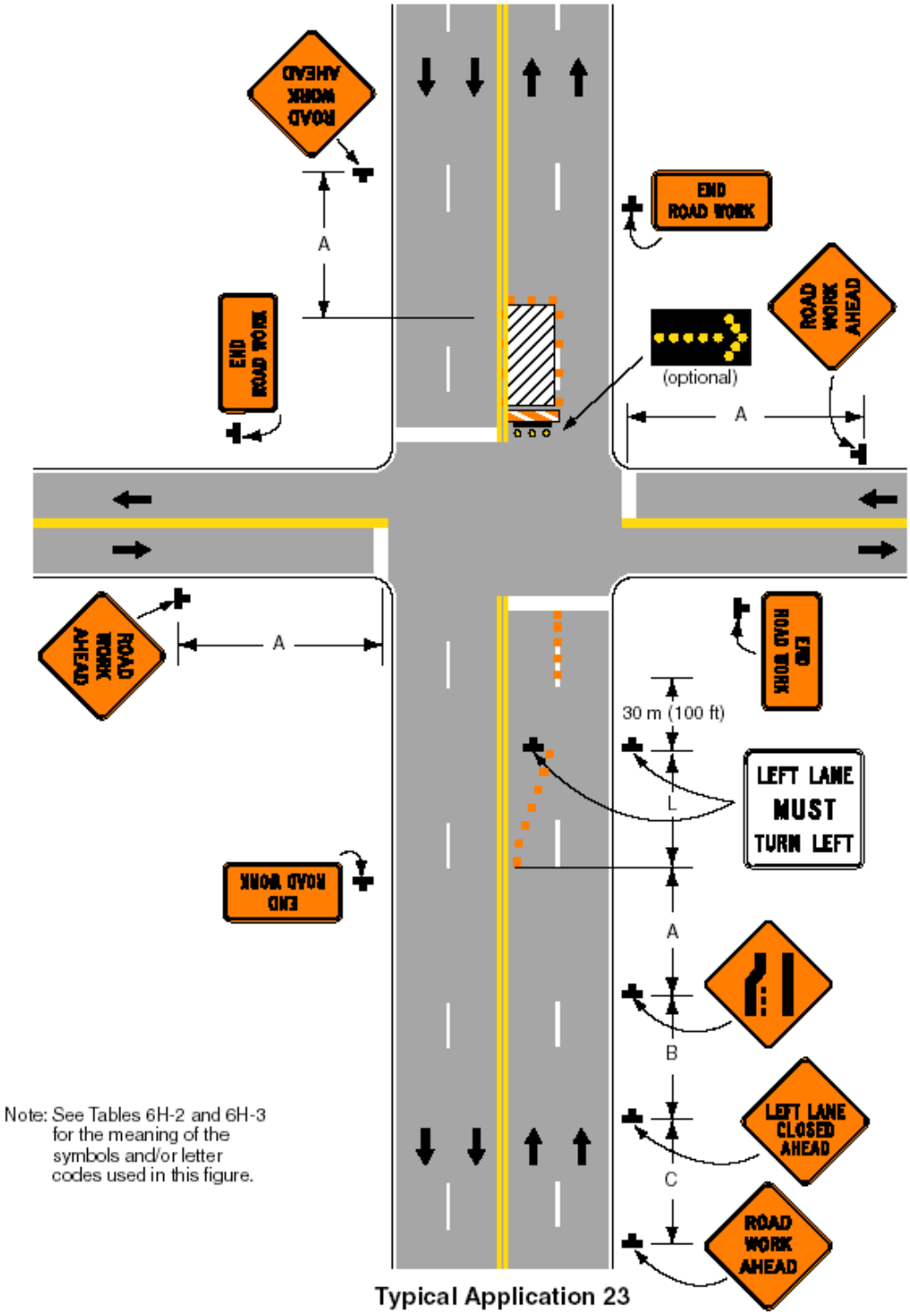
Figure 6H-22. Right Lane Closure on Far Side of Intersection (TA-22)



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

Typical Application 22

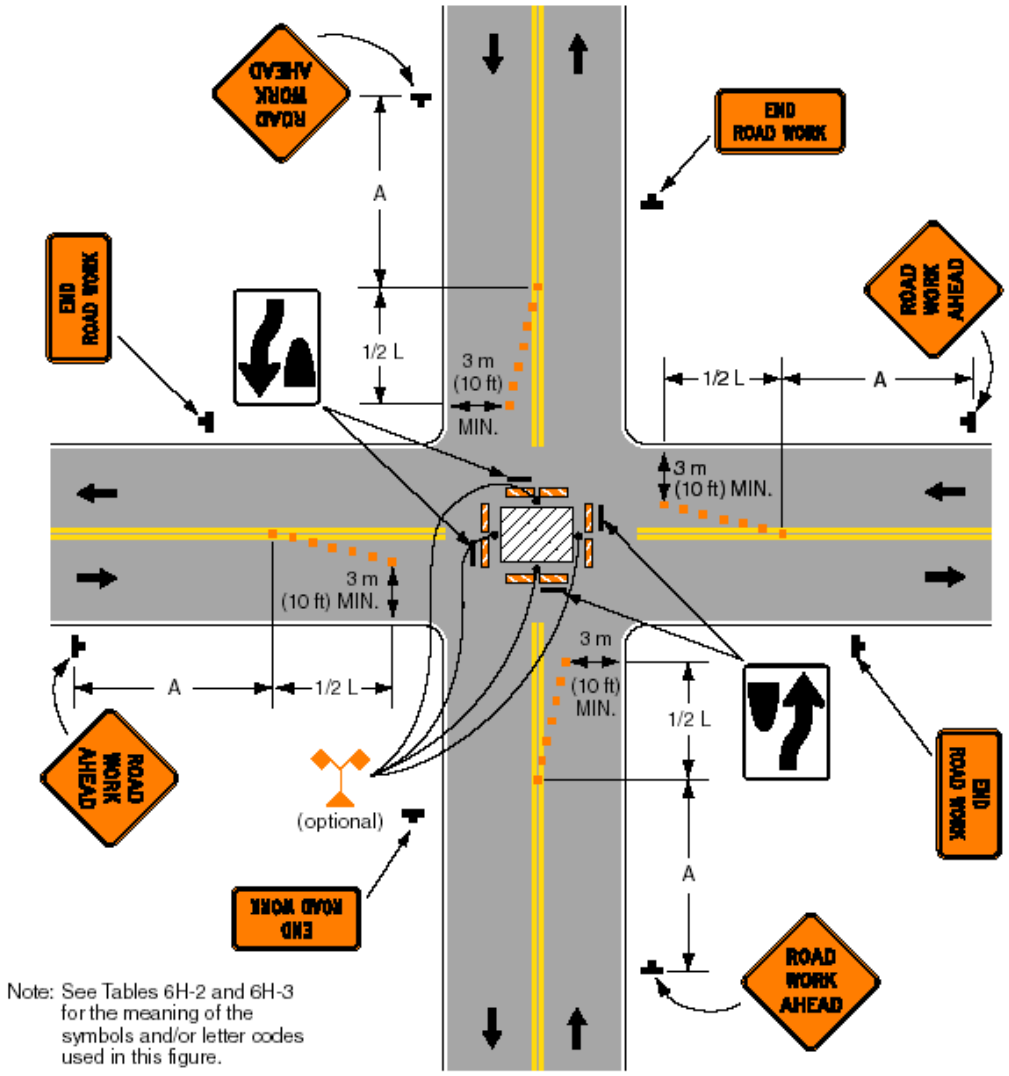
Figure 6H-23. Left Lane Closure on Far Side of Intersection (TA-23)



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

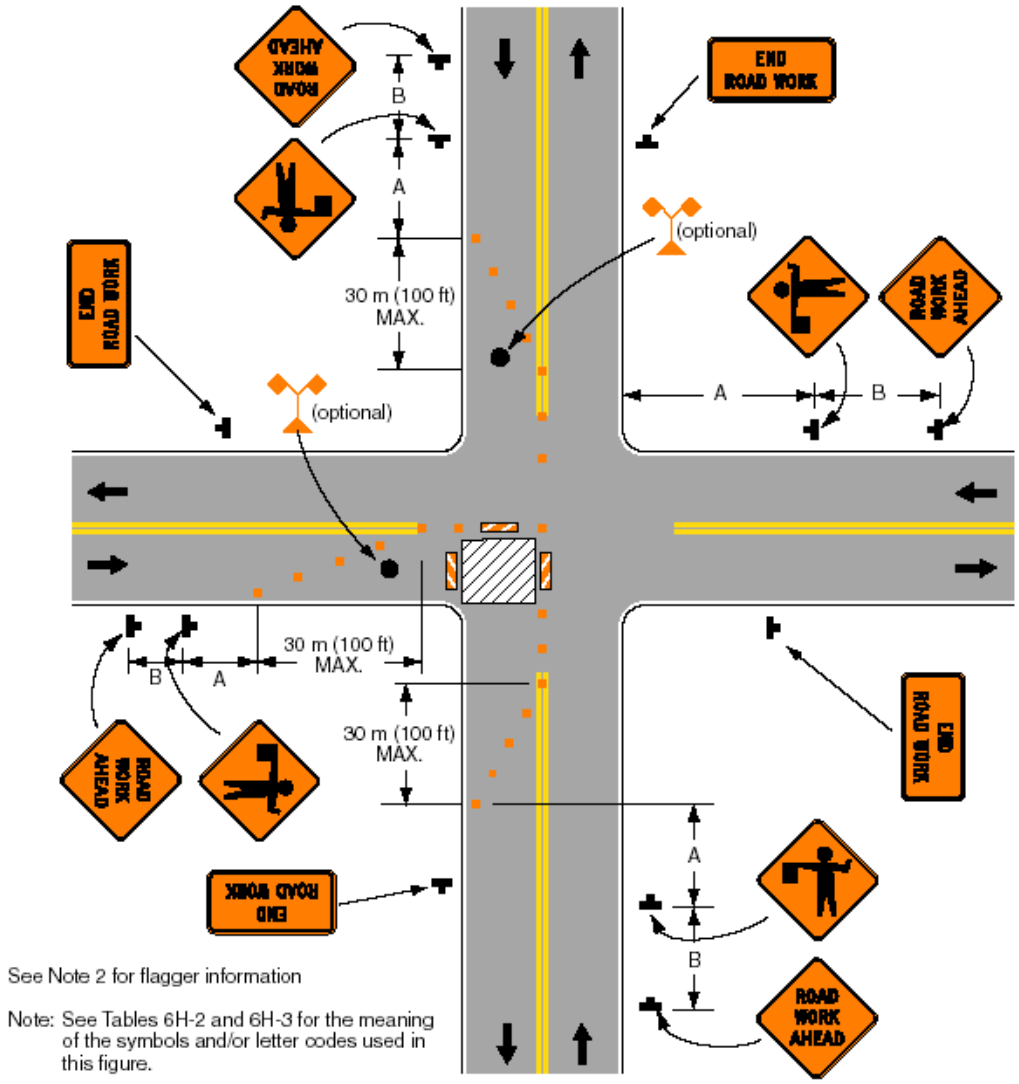
Figure 6H-26. Closure in Center of Intersection (TA-26)



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

Typical Application 26

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

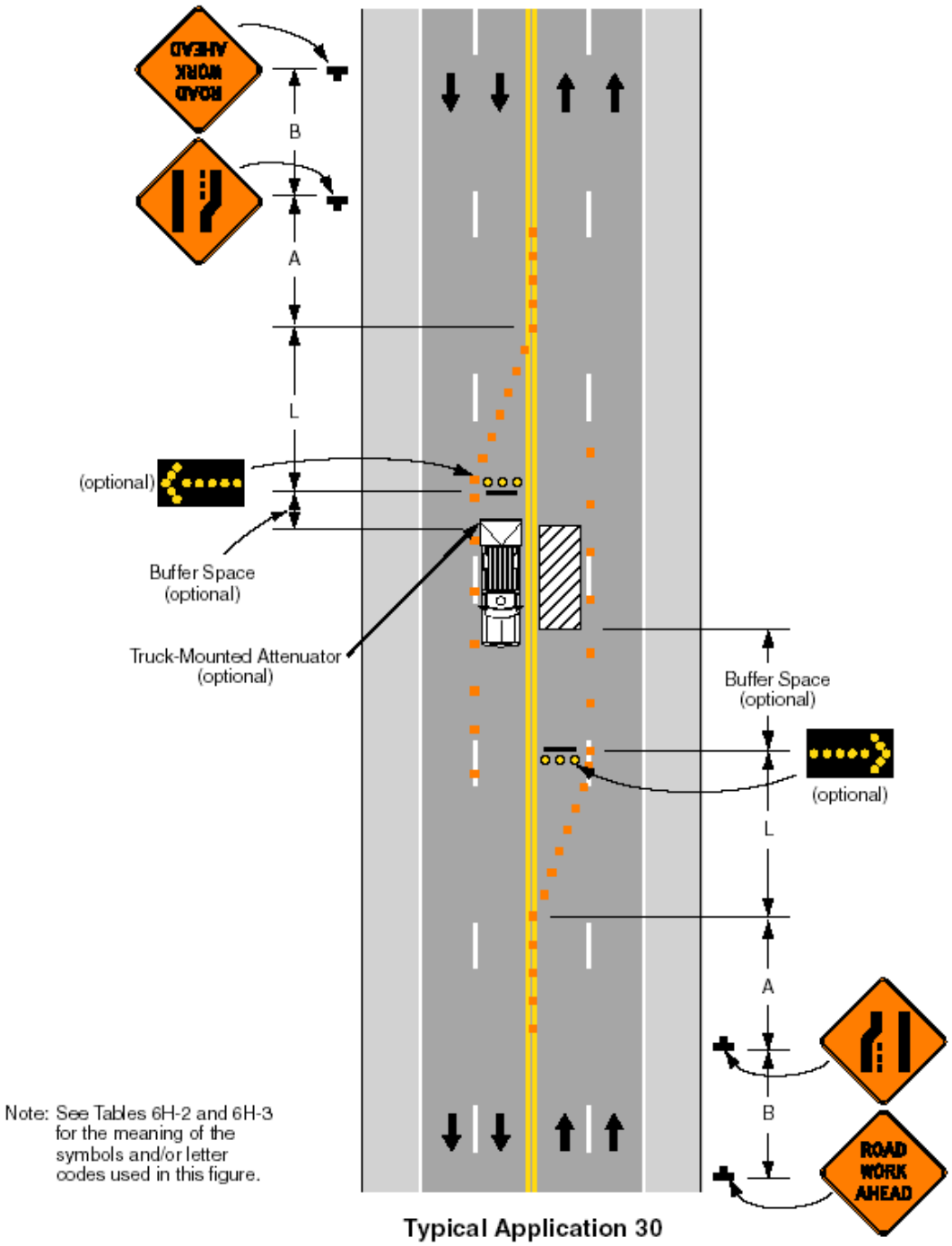


See Note 2 for flagger information

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

Typical Application 27

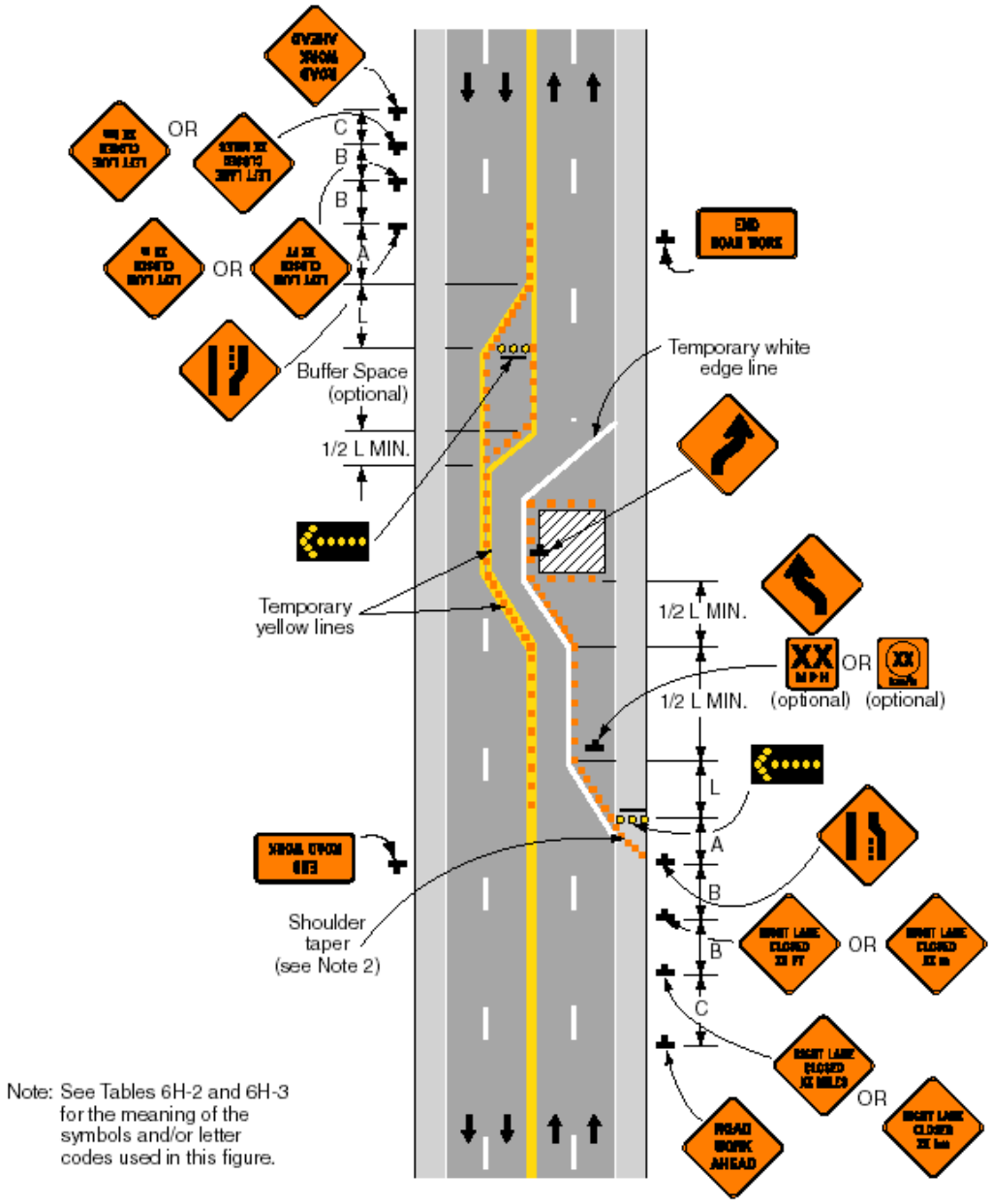
Figure 6H-30. Interior Lane Closure on Multi-lane Street (TA-30)



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

Typical Application 30

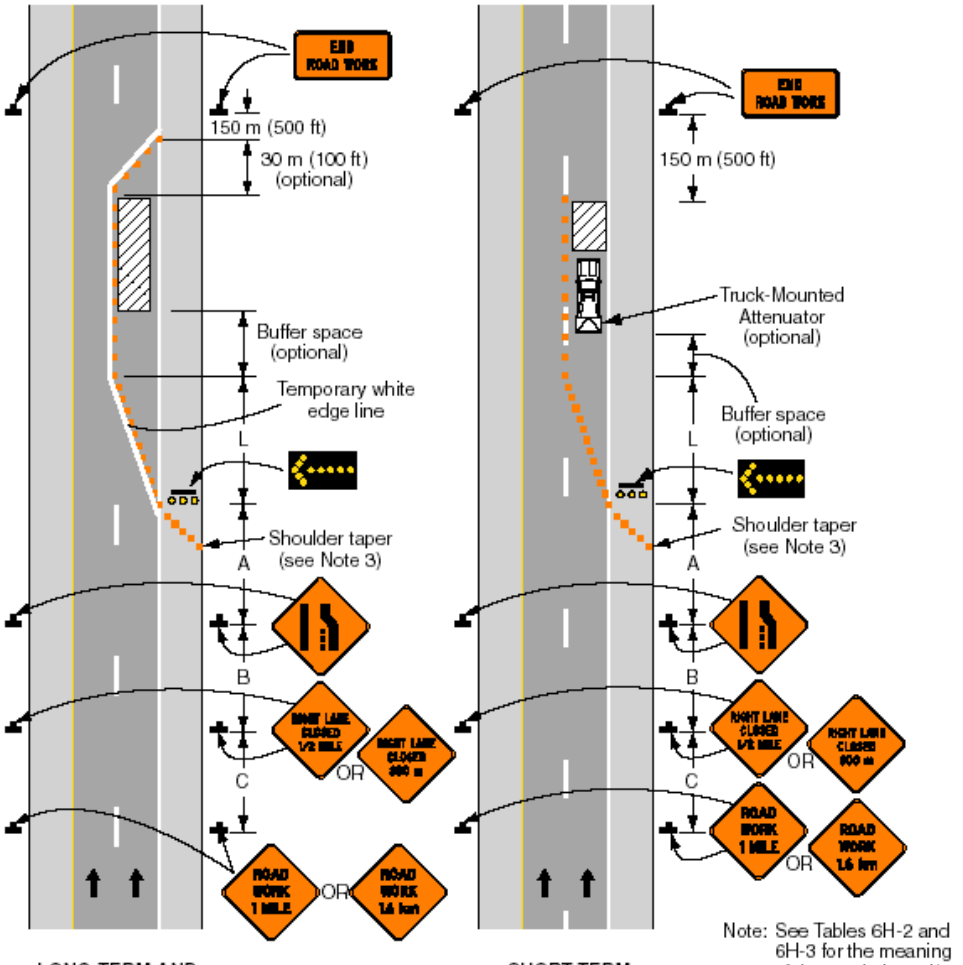
Figure 6H-32. Half Road Closure on Multi-lane, High-Speed Highway (TA-32)



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

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



Typical Application 33

Figure 6H-34. Lane Closure with Temporary Traffic Barrier (TA-34)

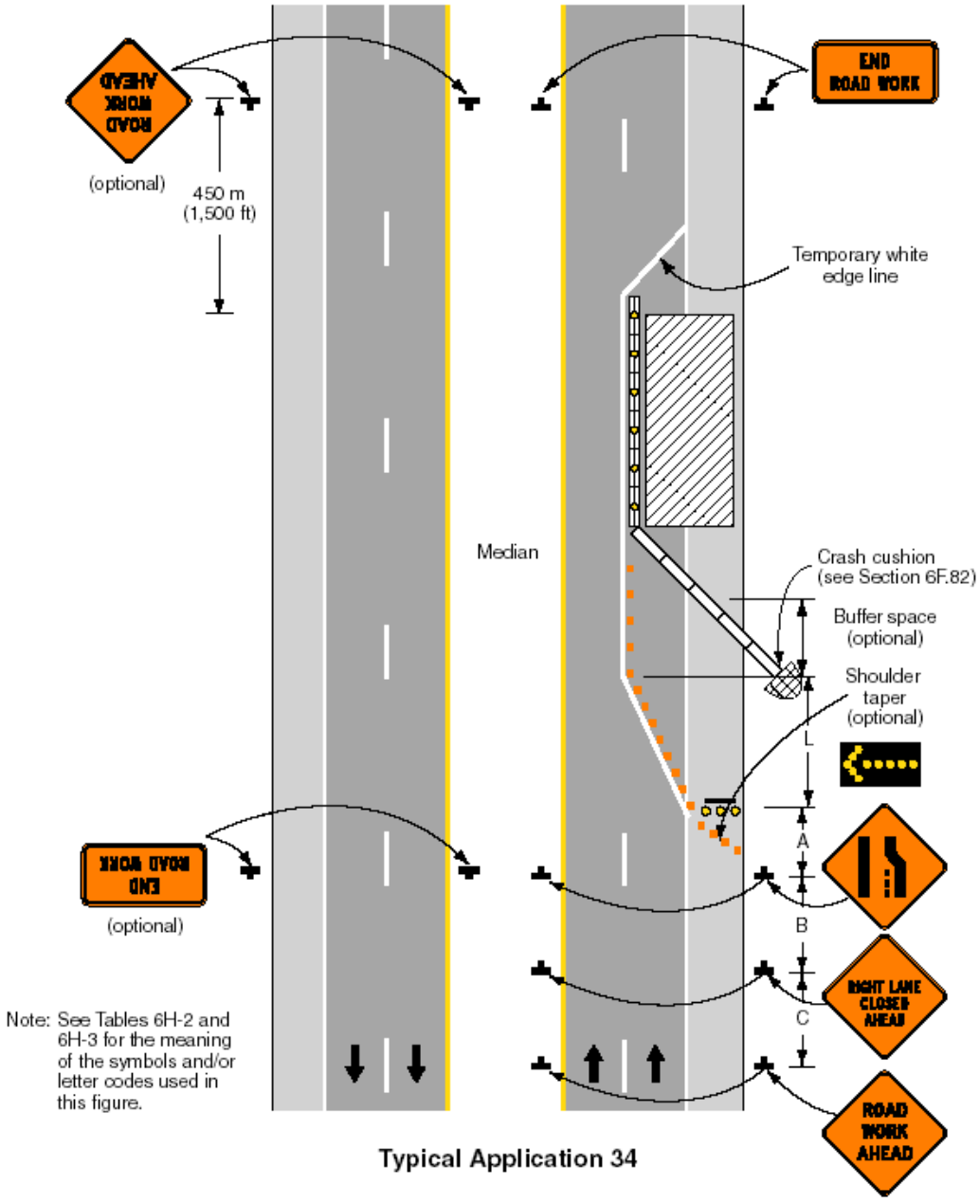


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Figure 6H-35. Mobile Operation on Multi-lane Road (TA-35)

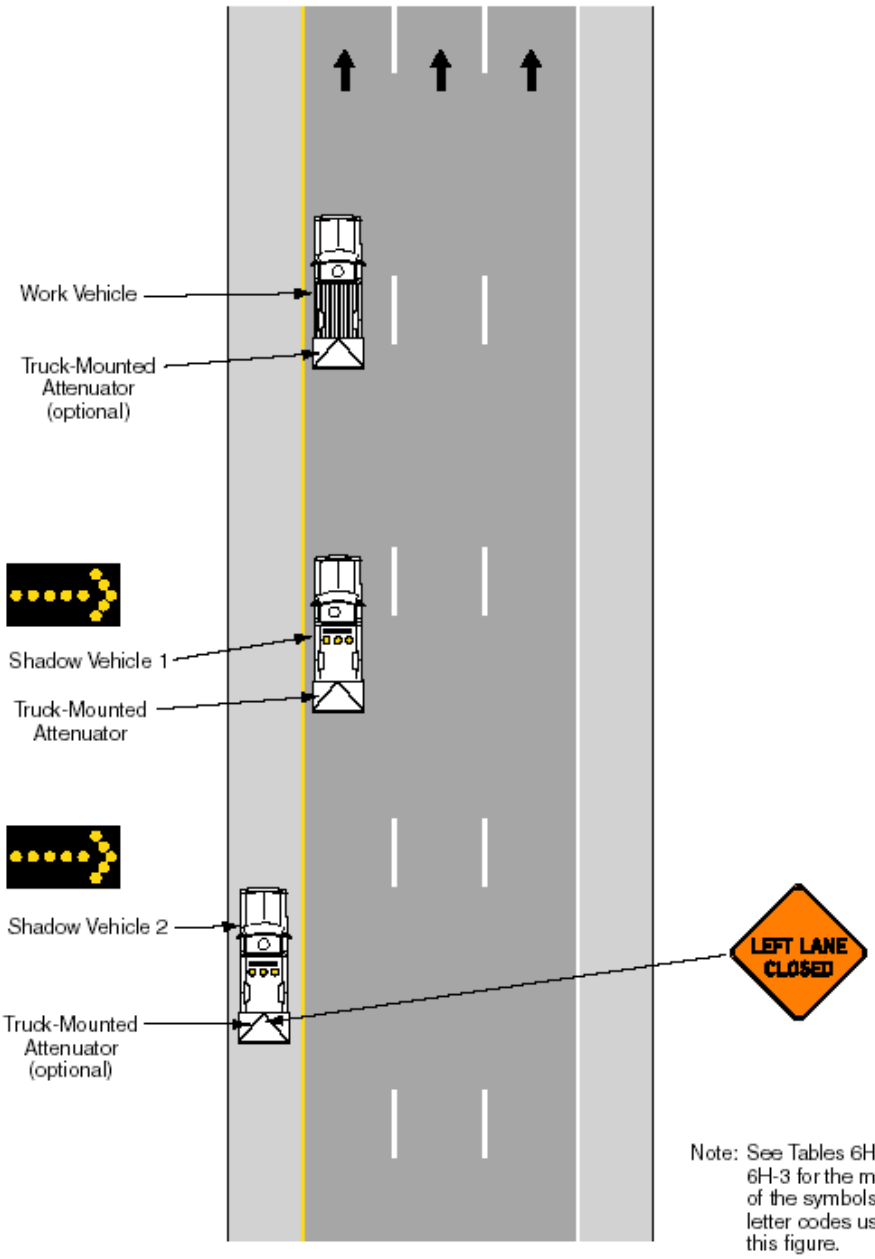

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Figure 6H-36. Lane Shift on Freeway (TA-36)

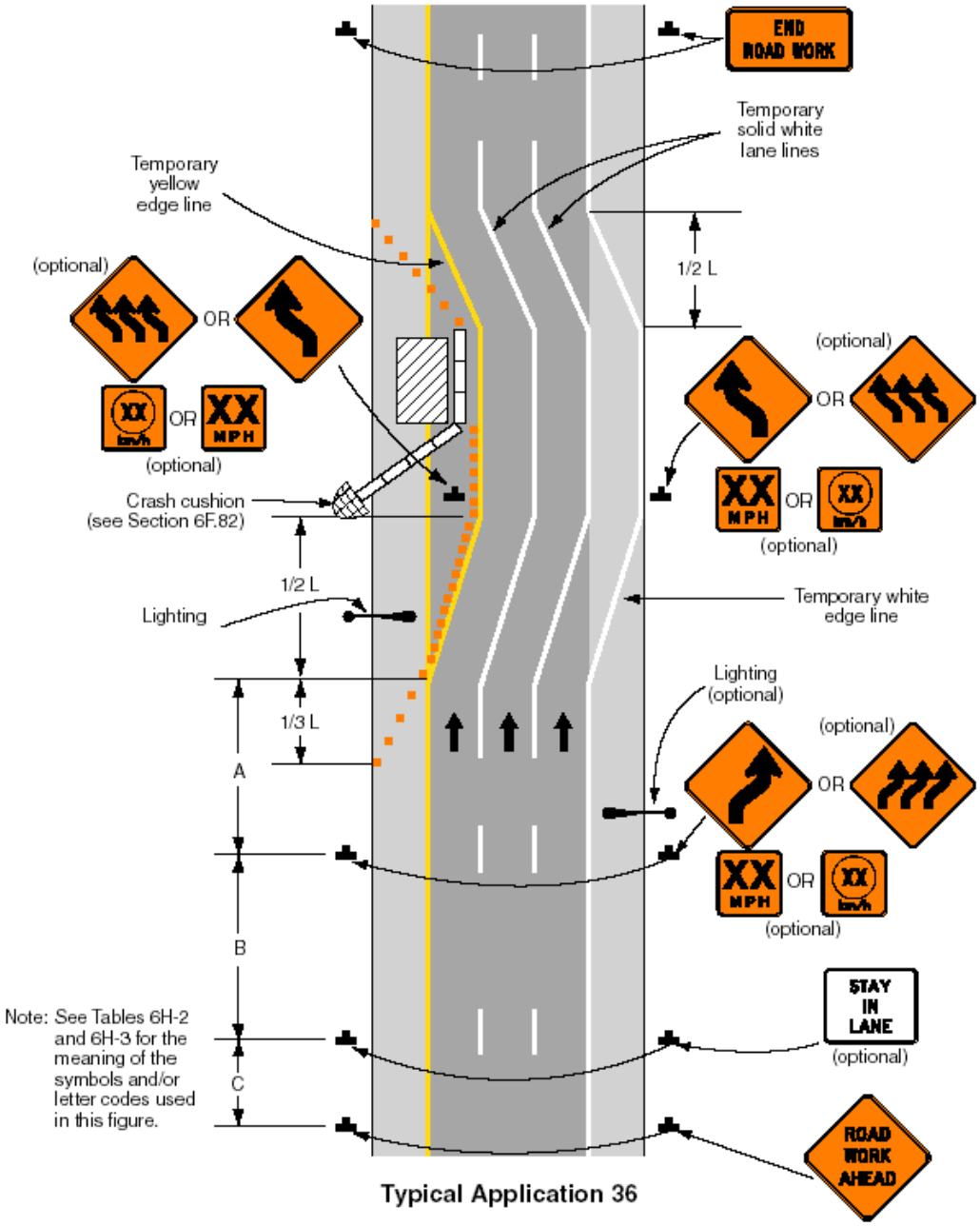

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Figure 6H-37. Double Lane Closure on Freeway (TA-37)

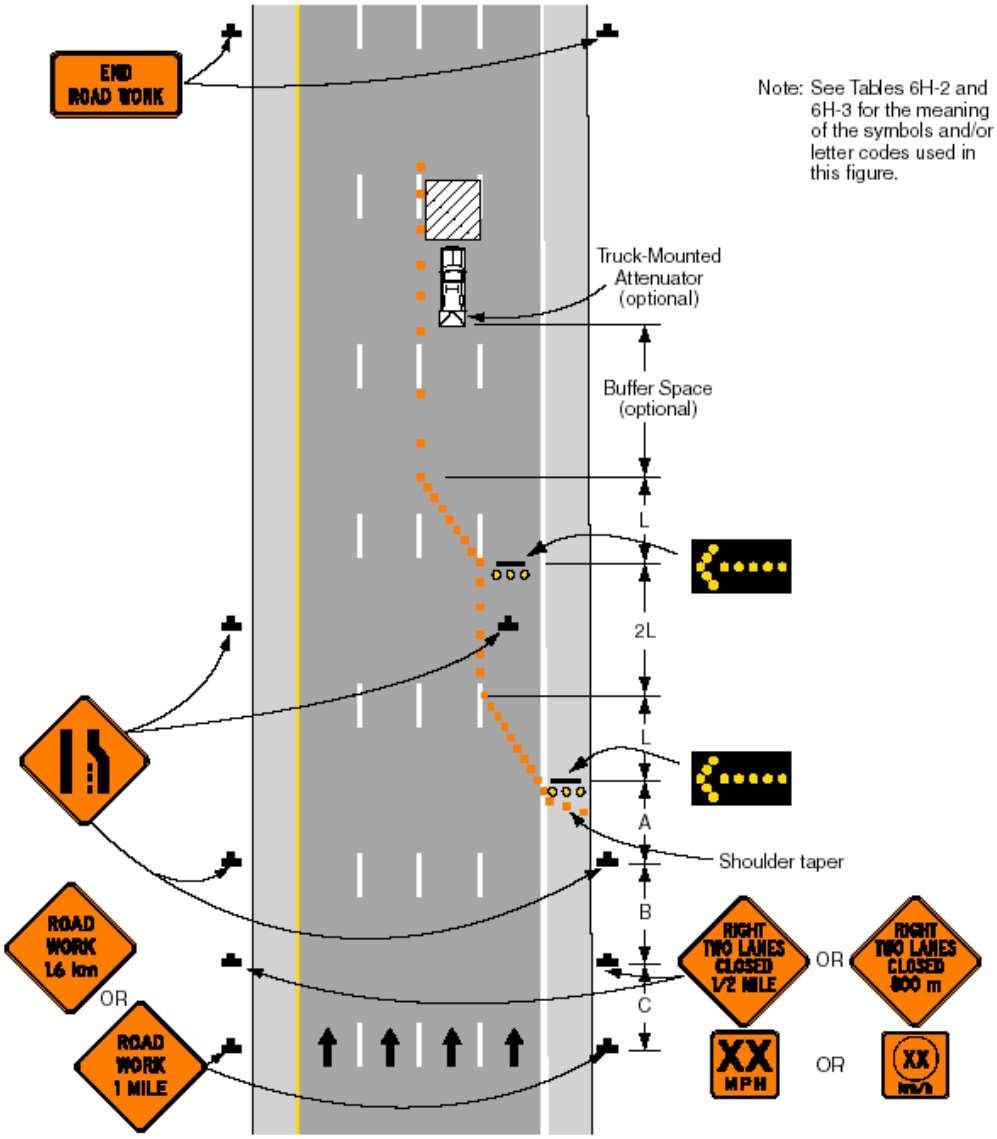

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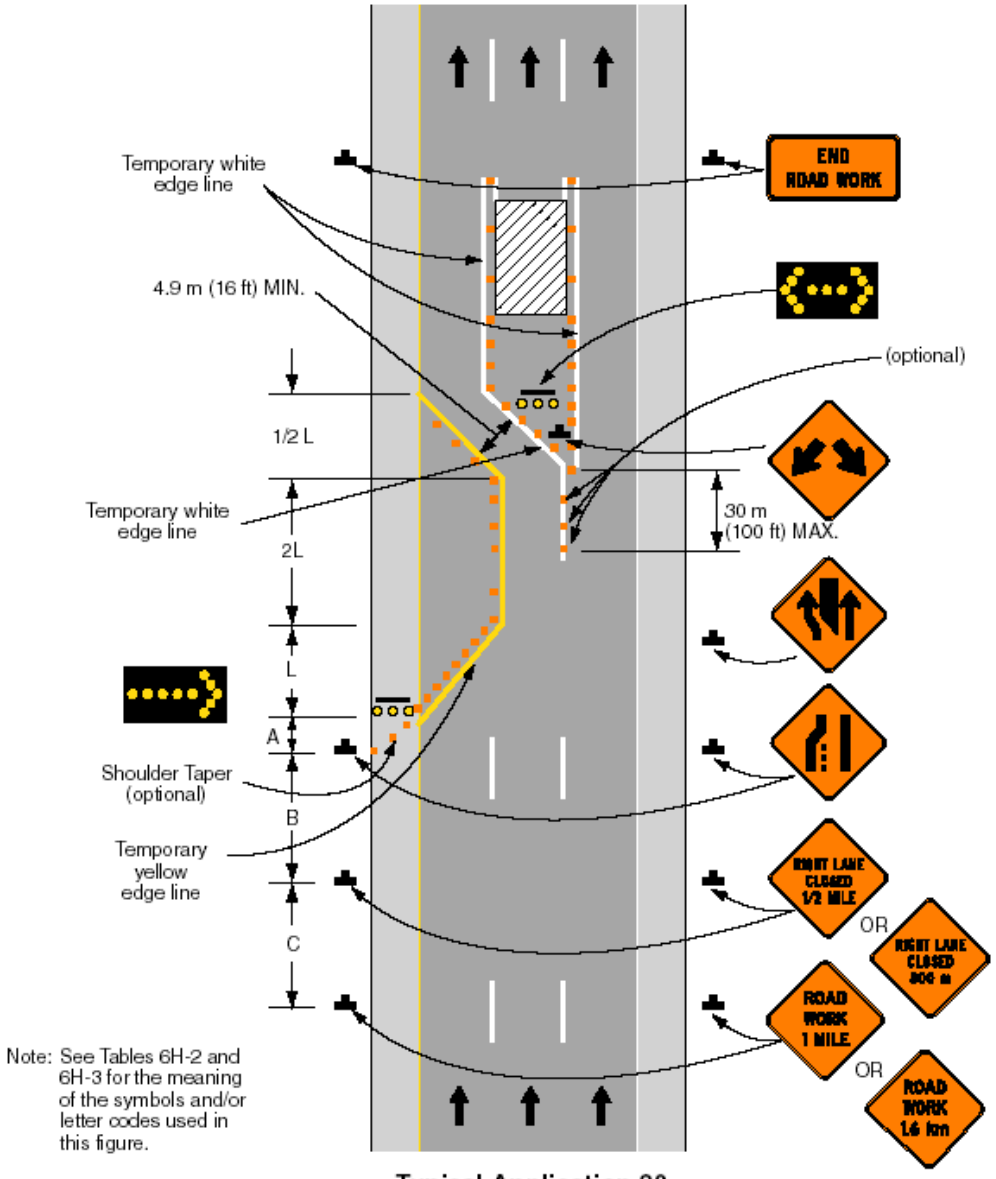
Figure 6H-38. Interior Lane Closure on Freeway (TA-38)



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

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Figure 6H-39. Median Crossover on Freeway (TA-39)

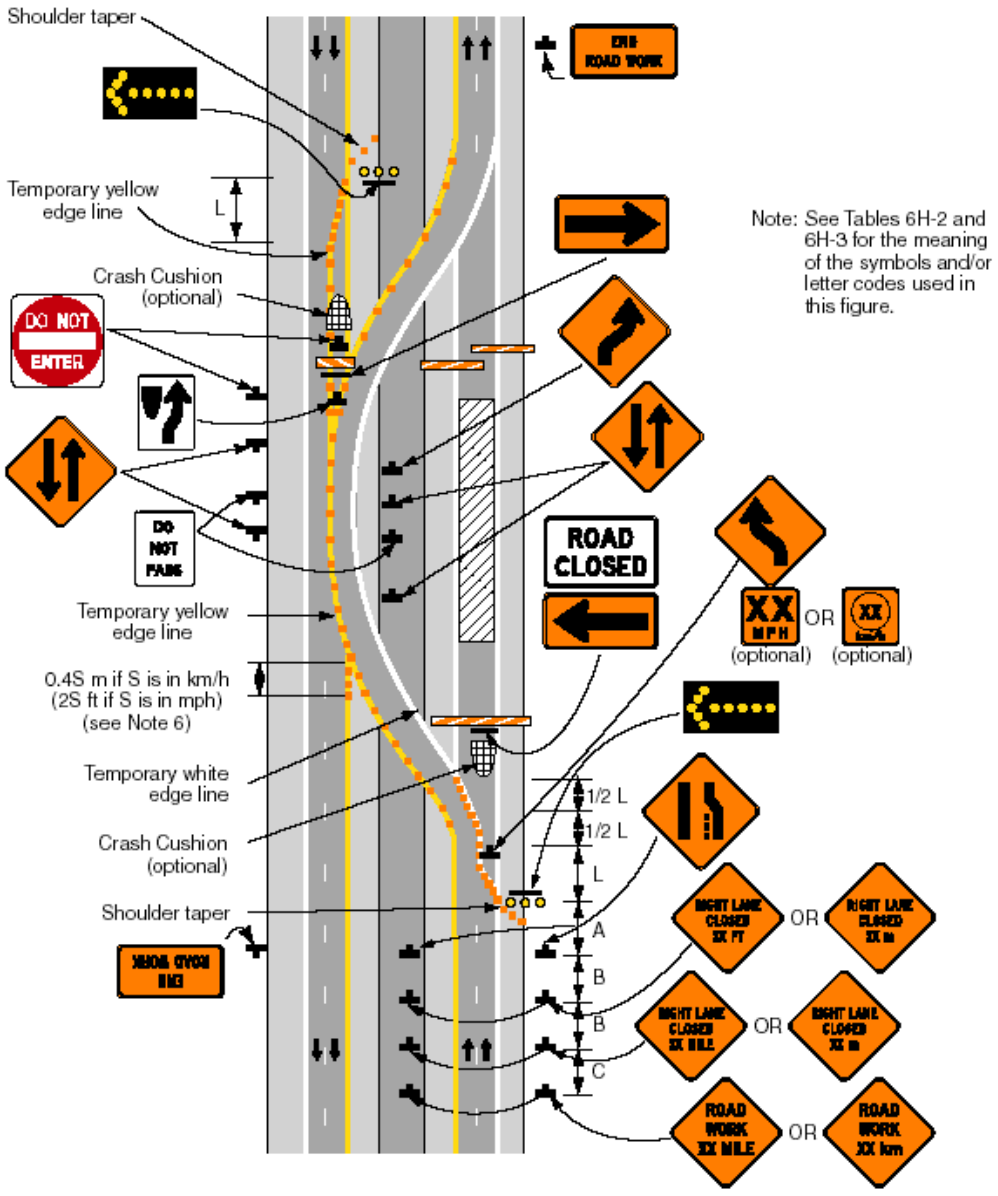

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Figure 6H-42. Work in Vicinity of Exit Ramp (TA-42)

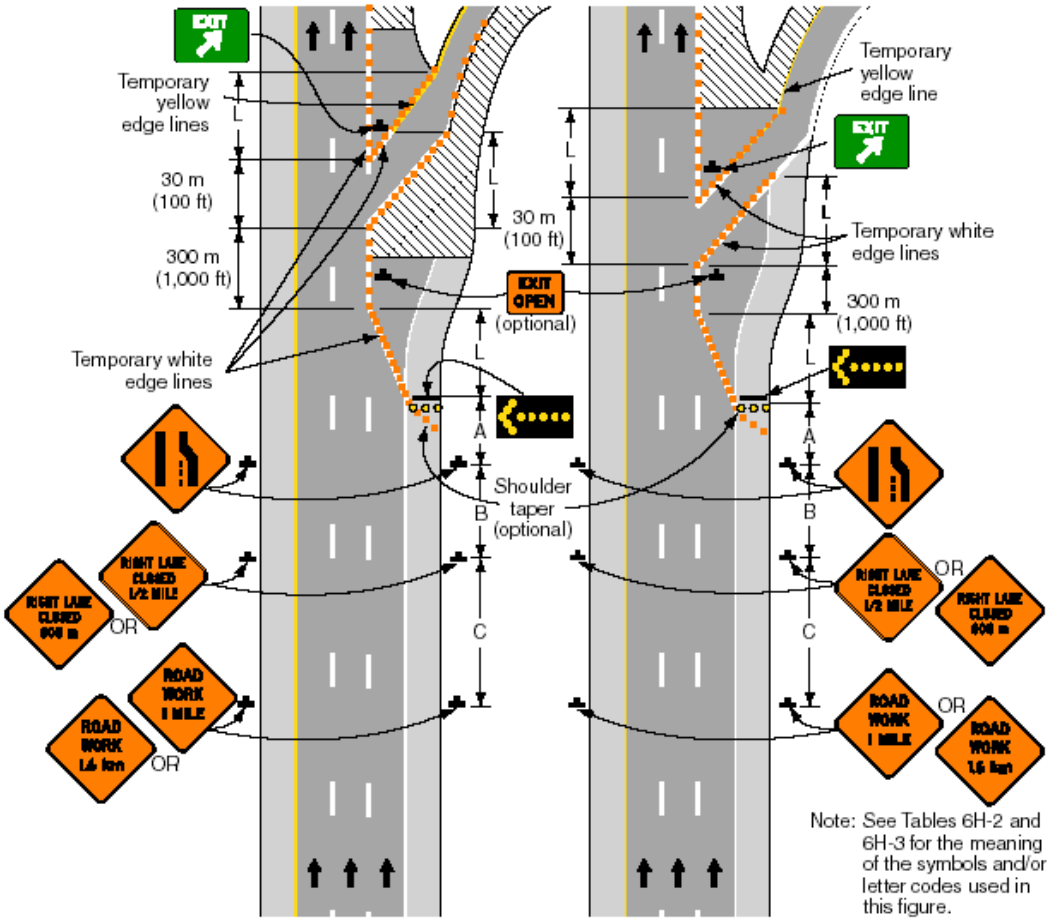

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Figure 6H-43. Partial Exit Ramp Closure (TA-43)

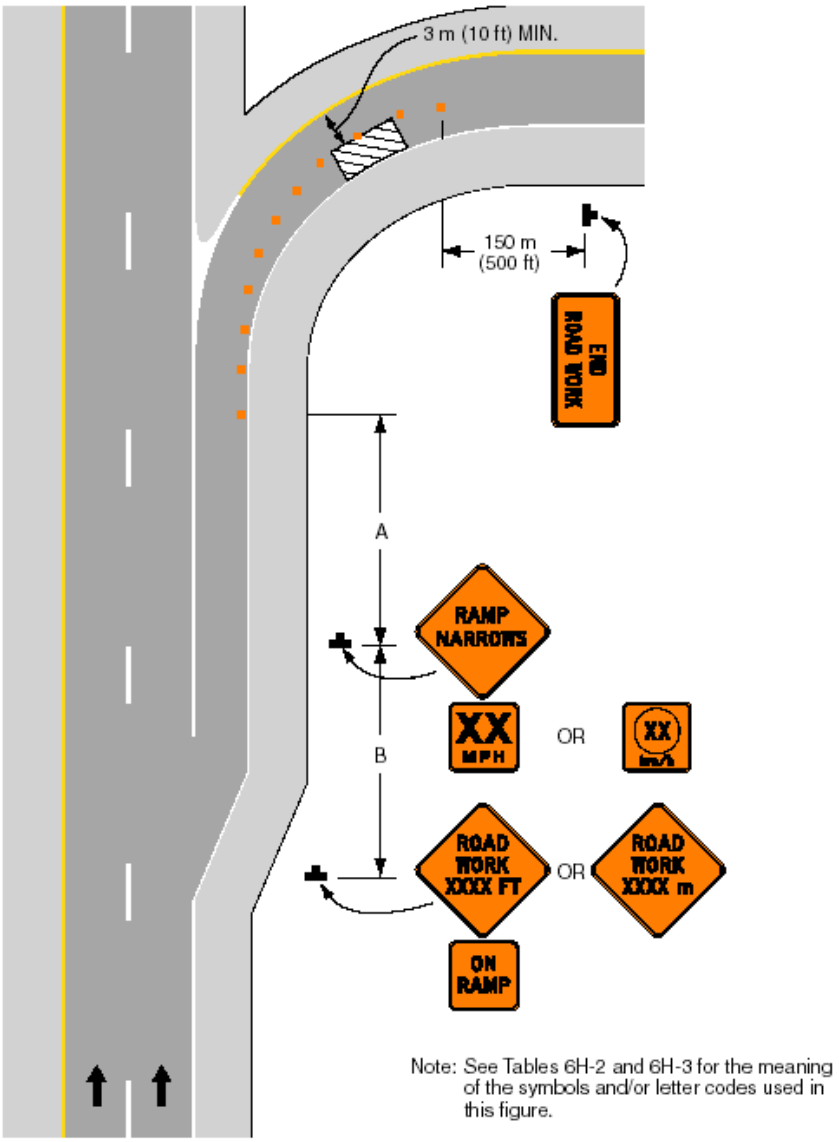

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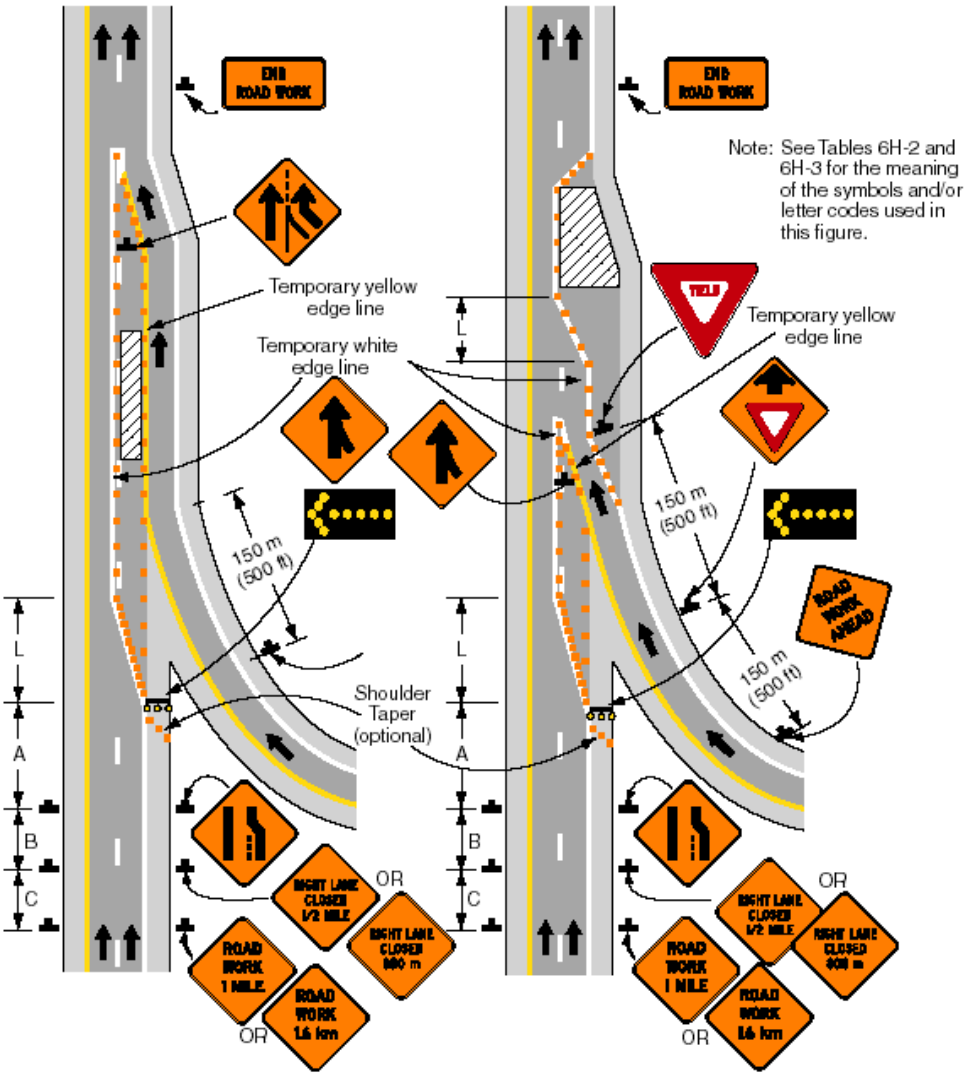
Figure 6H-44. Work in Vicinity of Entrance Ramp (TA-44)



Typical Application 44

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