

**Notes for Figure 6H-31 — Typical Application 31  
Lane Closure on a Street with Uneven Directional Volumes**

Potential Substantial  
conformance  
issue.

**Standard:**

1. The illustrated information shall be used only when the vehicular traffic volume indicates that two lanes of vehicular traffic shall be maintained in the direction of travel for which one lane is closed.

**Option:**

2. The procedure may be used during a peak period of vehicular traffic and then changed to provide two lanes in the other direction for the other peak.

**Guidance:**

3. For high speeds, a *LEFT LANE CLOSED XX FT* sign should be added for vehicular traffic approaching the lane closure, as shown in Figure 6H-32-6H-32(CA).
4. Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is not practical, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of  $1/2 S$  feet where  $S$  is the speed in mph. Temporary markings should be installed where needed. *The spacing of channelizing devices should not exceed the maximum distances shown in Table 6F-102(CA). Refer to Section 6F.63 for spacing of channelizing devices.*
5. If the lane shift has curves with recommended speeds of 30 mph or less, Reverse Turn signs should be used.
6. Where the shifted section is long, a Reverse Curve sign should be used to show the initial shift and a second sign should be used to show the return to the normal alignment.
7. If the tangent distance along the temporary diversion is less than 600 feet, the Double Reverse Curve sign should be used at the location of the first Two Lane Reverse Curve sign. The second Two Lane Reverse Curve sign should be omitted. *Use the Reverse Curve (W1-4) signs for both locations instead of the Double Reverse Curve or Two Lane Reverse Curve signs.*

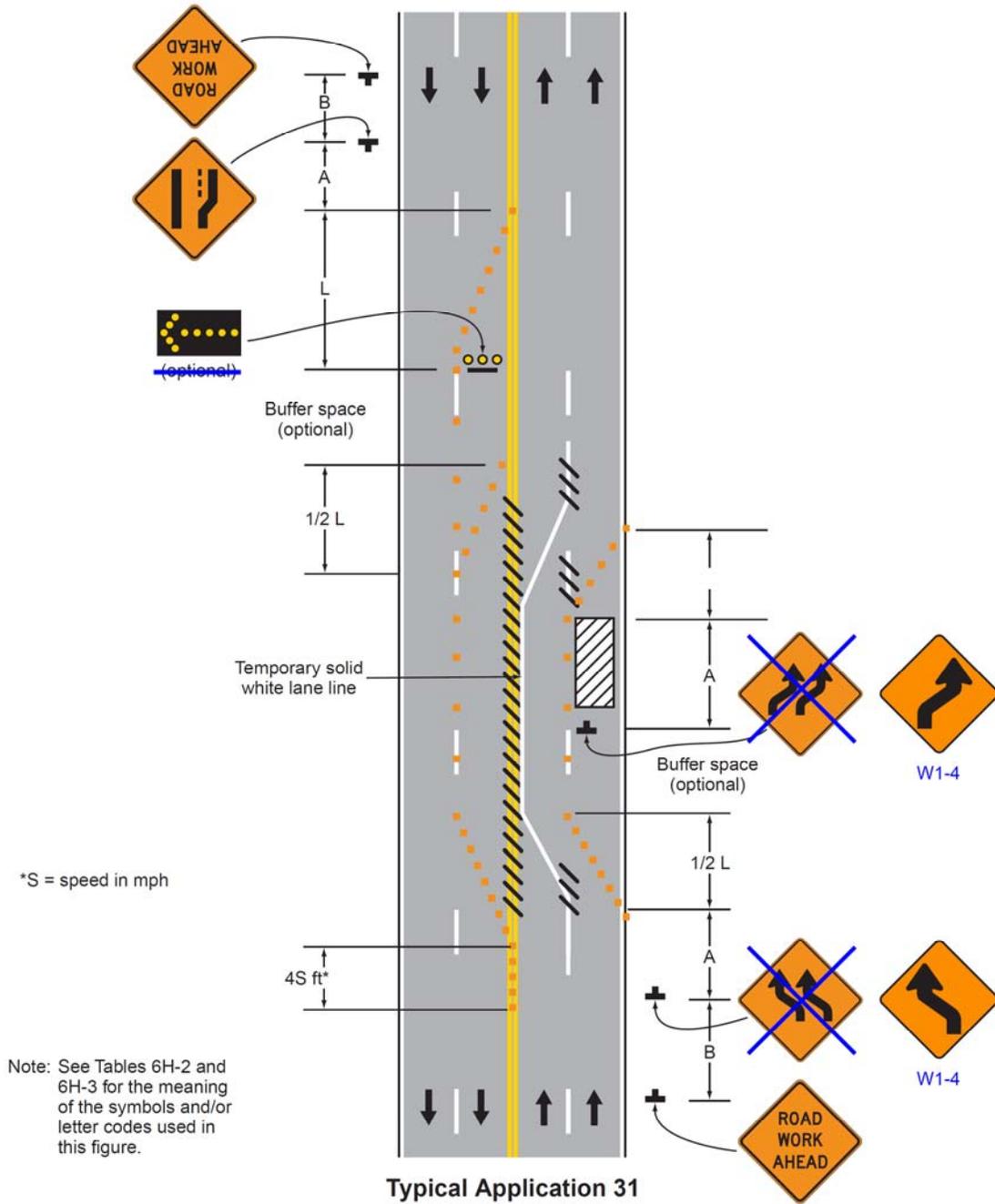
**Standard:**

8. ~~The number of lanes illustrated on the Reverse Curve or Double Reverse Curve signs shall be the same as the number of through lanes available to road users, and the direction of the reverse curves shall be appropriately illustrated.~~ *Curve warning signs with multiple arrows shall not be used in California. Only W1-3, W1-4 and W24-1 signs shall be used.*

**Option:**

9. A longitudinal buffer space may be used in the activity area to separate opposing vehicular traffic.
10. Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP) plaque (see Figure 6F-4) may be used instead of a sign that illustrates the number of lanes. *Use Reverse Curve (W1-4) sign instead of ALL LANES THRU Plaque.*
11. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.
12. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.

**Figure 6H-31. Lane Closures on a Street with Uneven Directional Volumes (TA-31)**



**Notes for Figure ~~6H-32~~ 6H-32(CA) — Typical Application 32  
Half Road Closure on a 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 8 feet 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  $1/2 S$  feet where  $S$  is the speed in mph. The spacing of channelizing devices should not exceed the maximum distances shown in Table 6F-102(CA). Refer to Section 6F.63 for spacing of channelizing devices.*
- 4. If the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve sign should be used instead of the first Reverse Curve sign, and the second Reverse Curve sign should be omitted.*

*Option:*

- 5. Warning lights may be used to supplement channelizing devices at night.*
- 6. A truck-mounted attenuator may be used on the work vehicle and/or the shadow vehicle.*

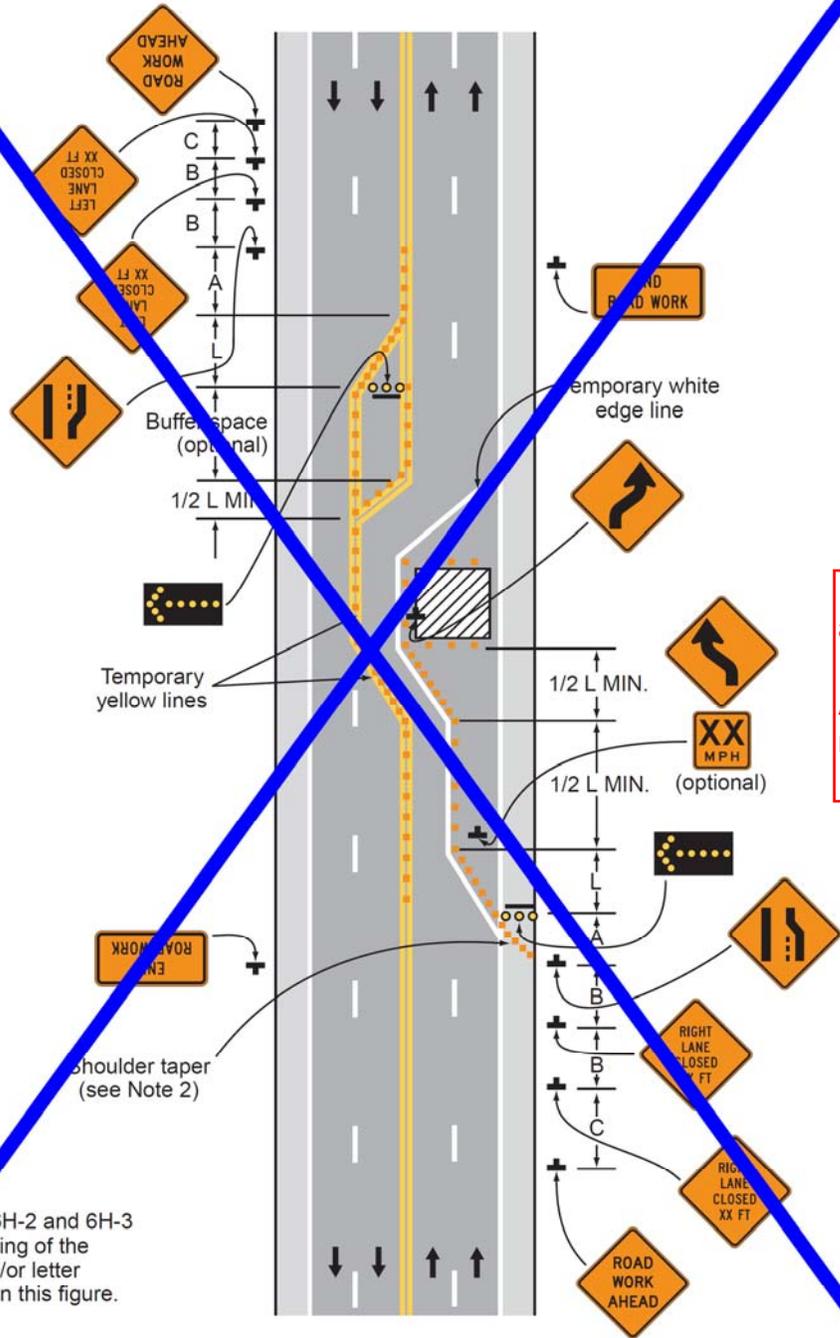
*Support:*

- 7. See Section 6F.106(CA) for use of the Slow For The Cone Zone (SC19(CA) and SC20(CA)) Signs.*

*Guidance:*

- 8. All advance warning signs should be placed so that the path of travel for bicycles is not blocked, while maintaining visibility for road users.*
- 9. If bicyclists are able to use the shoulder throughout the TTC zone, the Bicycle Crossing (W11-1) sign should be used and the SHARE THE ROAD (W16-1P) plaque should be omitted.*
- 10. The speeds used for the shoulder taper calculations should be of bicyclists in the project vicinity or if a special event such as a bike race, the expected speed of bicyclists approaching the TTC zone.*
- 11. If bicyclists are sharing the traveled way lanes with motorists, speed reduction countermeasures should be used to reduce traffic speeds in the TTC zone. Refer to Sections 6C.01 and 6D.03.*
- 12. When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (see Section 6G.02) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, the Bicycle Crossing (W11-1) sign and the SHARE THE ROAD (W16-1P) plaque should be used to advise motorists of the presence of bicyclists in the travel way lanes.*

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



Recommend adding a note indicating a REDUCE SPEED AHEAD sign may be needed.

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



There is no Figure 6H-33 (CA)

**Notes for Figure ~~6H-33~~ 6H-33(CA)**

**Stationary Lane Closure on a 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 8 feet 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.*

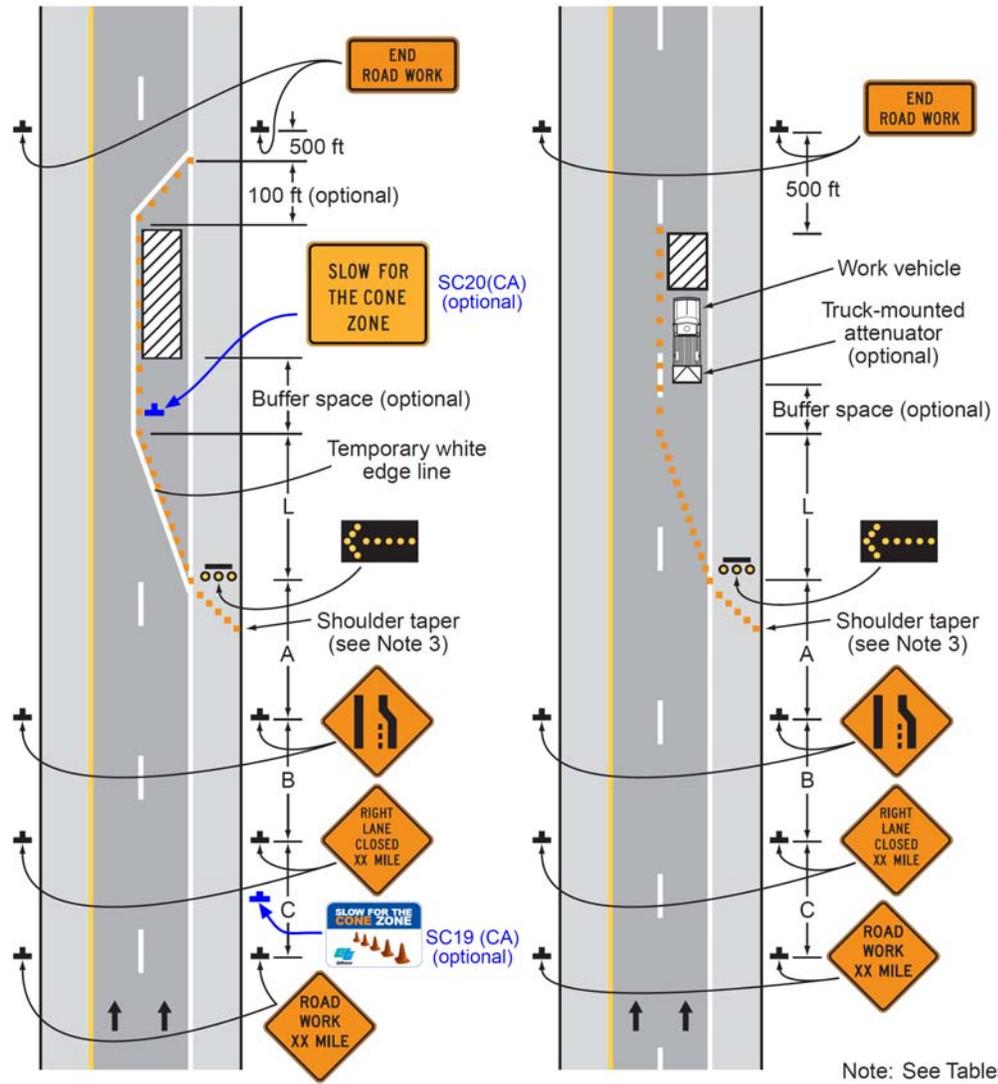
**Standard:**

- 6. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

*Support:*

- 7. See Section 6F.105(CA) for use of the Slow For The Cone Zone (SC19(CA) and SC20(CA)) Signs.*

**Figure 6H-33. Stationary Lane Closure on a 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-34—Typical Application 34 Lane Closure with a Temporary Traffic Barrier**

**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.**

*Guidance:*

- 2. For long-term lane closures on facilities with permanent edge lines, a temporary edge line should be installed from the upstream end of the merging taper to the downstream end of the downstream taper, and conflicting pavement markings should be removed.*
- 3. The use of a barrier should be based on engineering judgment.*

**Standard:**

- 4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.85.**
- 5. The barrier shall not be placed along the merging taper. The lane shall first be closed using channelizing devices and pavement markings.**

*Option:*

- 6. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to the edge of pavement for nighttime lane closures.*
- 7. The barrier shown in this typical application is an example of one method that may be used to close a lane for a long-term project. If the work activity permits, a movable barrier may be used and relocated to the shoulder during non-work periods or peak-period vehicular traffic conditions, as appropriate.*

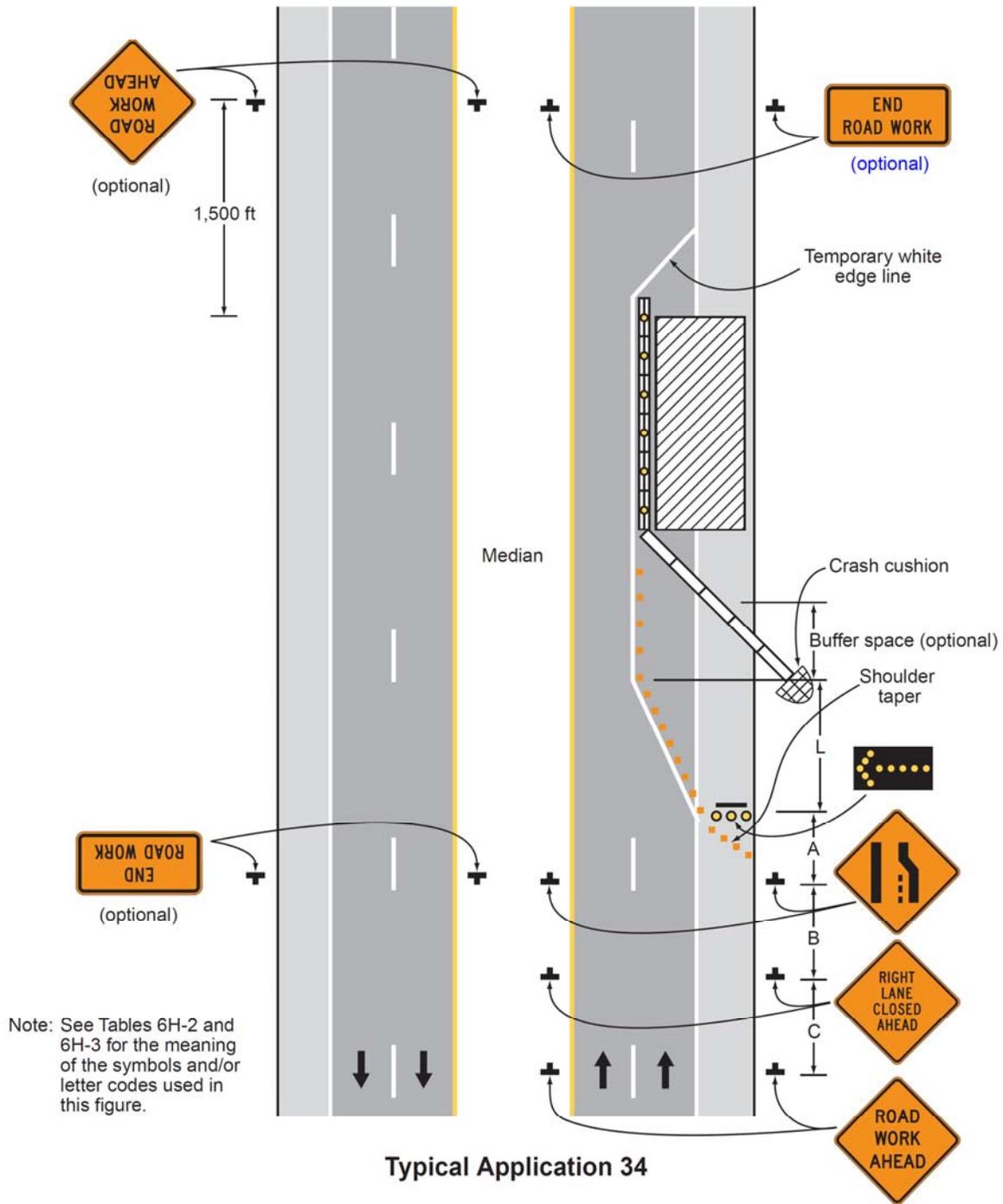
**Standard:**

- 8. If a movable barrier is used, the temporary white edge line shown in the typical application shall not be used. During the period when the right-hand lane is opened, the sign legends and the channelization shall be changed to indicate that only the shoulder is closed, as illustrated in Figure ~~6H-5~~ 6H-5(CA). The arrow board, if used, shall be placed at the downstream end of the shoulder taper and shall display the caution mode.**

*Guidance:*

- 9. If a movable barrier is used, the shift should be performed in the following manner. When closing the lane, the lane should be initially closed with channelizing devices placed along a merging taper using the same information employed for a stationary lane closure. The lane closure should then be extended with the movable-barrier transfer vehicle moving with vehicular traffic. When opening the lane, the movable barrier transfer vehicle should travel against vehicular traffic from the termination area to the transition area. The merging taper should then be removed using the same information employed for a stationary lane closure.*

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



### **Notes for Figure 6H-35—Typical Application 35 Mobile Operation on a Multi-Lane Road**

**Standard:**

- 1. Arrow boards shall, as a minimum, be Type B, with a size of 60 x 30 inches. For State highways, the arrow boards shall, as a minimum, be type II, with a size of 72 x 36 inch. Refer to Department of Transportation's Standard Specifications Section 12-3.03 for minimum size and type of arrow panels cited above. See Section 1A.11 for information regarding this publication.**
- 2. 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.**
- 3. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
- 4. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

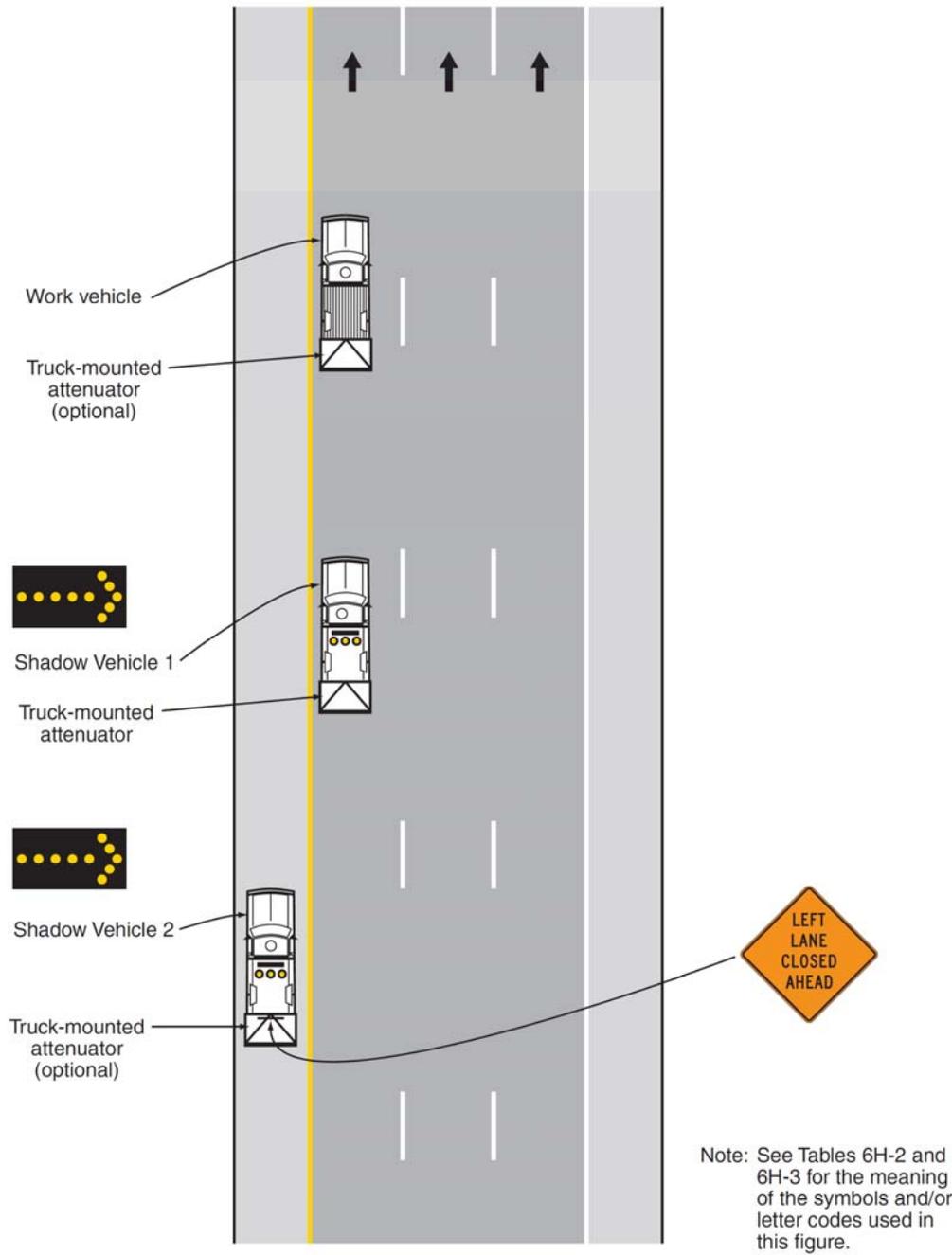
*Guidance:*

- 5. Vehicles used for these operations should be made highly visible with appropriate equipment, such as flags, signs, or arrow boards.*
- 6. Shadow Vehicle 1 should be equipped with an arrow board and truck-mounted attenuator.*
- 7. Shadow Vehicle 2 should be equipped with an arrow board. An appropriate lane closure sign should be placed on Shadow Vehicle 2 so as not to obscure the arrow board.*
- 8. 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.*
- 9. 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.*
- 10. Work should normally be accomplished during off-peak hours.*
- 11. 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-hand shoulder 10 feet or more in width, Shadow Vehicle 2 should drive the right-hand shoulder with a sign indicating that work is taking place in the interior lane.*

**Option:**

- 12. A truck-mounted attenuator may be used on Shadow Vehicle 2.**
- 13. 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.**
- 14. Where adequate shoulder width is not available, Shadow Vehicle 3 may also straddle the edge line.**

**Figure 6H-35. Mobile Operation on a Multi-Lane Road (TA-35)**



**Typical Application 35**

**Notes for Figure ~~6H-36~~ 6H-36(CA) — Typical Application 36  
Lane Shift on a Freeway**

*Guidance:*

1. The lane shift should be used when the work space extends into either the right-hand or left-hand lane of a divided highway and it is not practical, for capacity reasons, to reduce the number of available lanes.

*Support:*

2. When a lane shift is accomplished by using
  - (1) geometry that meets the design speed at which the permanent highway was designed,
  - (2) full normal cross-section (full lane width and full shoulders), and
  - (3) complete pavement markings, then only the initial general work-zone warning sign is required.

*Guidance:*

3. When the conditions in Note 2 are not met, the information shown in the typical application should be employed and all the following notes apply.

**Standard:**

4. Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.85.
5. The barrier shall not be placed along the shifting taper. The lane shall first be shifted using channelizing devices and pavement markings.

*Guidance:*

6. A warning sign should be used to show the changed alignment.

**Standard:**

7. ~~The number of lanes illustrated on the Reverse Curve signs shall be the same as the number of through lanes available to road users, and the direction of the reverse curves shall be appropriately illustrated.~~

*Option:*

8. Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP) plaque (see Figure 6F-4) ~~may~~ **shall** be used instead of a sign that illustrates the number of lanes. The Reverse Curve (W1-4) sign shall be used instead of the Reverse Curve (W1-4a & W1-4b) signs which shows the number of lanes.

*Option:*

9. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.

*Guidance:*

10. Where the shifted section is longer than 600 feet, one set of Reverse Curve signs should be used to show the initial shift and a second set should be used to show the return to the normal alignment. If the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve sign should be used instead of the first Reverse Curve sign, and the second Reverse Curve sign should be omitted. *Use the Reverse Curve (W1-4) signs for both locations instead of the Double Reverse Curve (W24-1) sign.*
11. If a STAY IN LANE sign is used, then solid white lane lines should be used.

**Standard:**

12. The minimum width of the shoulder lane shall be 10 feet.
13. For long-term stationary work, existing conflicting pavement markings shall be removed and temporary markings shall be installed before traffic patterns are changed.

*Option:*

14. For short-term stationary work, lanes may be delineated by channelizing devices or removable pavement markings instead of temporary markings.

*Guidance:*

15. If the shoulder cannot adequately accommodate trucks, trucks should be directed to use the travel lanes.
16. The use of a barrier should be based on engineering judgment.

*Option:*

17. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to the edge of the pavement for nighttime lane closures.

Option:

18. Detail 11 (see Figure 3A-102(CA)) may be used instead of the temporary solid white lane line, which is shown in Figure 6H-36(CA).

Support:

19. See Section 6F.105(CA) for use of the Slow For The Cone Zone (SC19(CA) and SC20(CA)) Signs.

Guidance:

20. *All advance warning signs should be placed so that the path of travel for bicycles is not blocked, while maintaining visibility for road users.*
21. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (see Section 6G.02) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, the Bicycle Crossing (W11-1) sign and the SHARE THE ROAD (W16-1P) plaque should be used to advise motorists of the presence of bicyclists in the travel way lanes.*
22. *Except for short durations and mobile operations, when a highway shoulder is occupied and bicyclists would be sharing a lane with vehicular traffic, as a result of the TTC zone, speed reduction countermeasures should be used to reduce traffic speeds in the TTC zone. Refer to Sections 6C.01 and 6D.03.*
23. *Except for short durations and mobile operations, when a highway shoulder is occupied and bicyclists would be sharing a lane with vehicular traffic, as a result of the TTC zone, before narrowing the outside lane other measures such as widening the outside shoulder to allow bicyclists and motor vehicles to travel side by side through the TTC zone should be considered.*
24. *If traffic volumes make it feasible, the two left lanes should be merged into one lane to avoid using the shoulder as a traveled way lane and allowing continued use for emergency purposes and bicycle travel.*
25. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (see Section 6G.02) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, a separate path should be considered for bicyclists.*

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

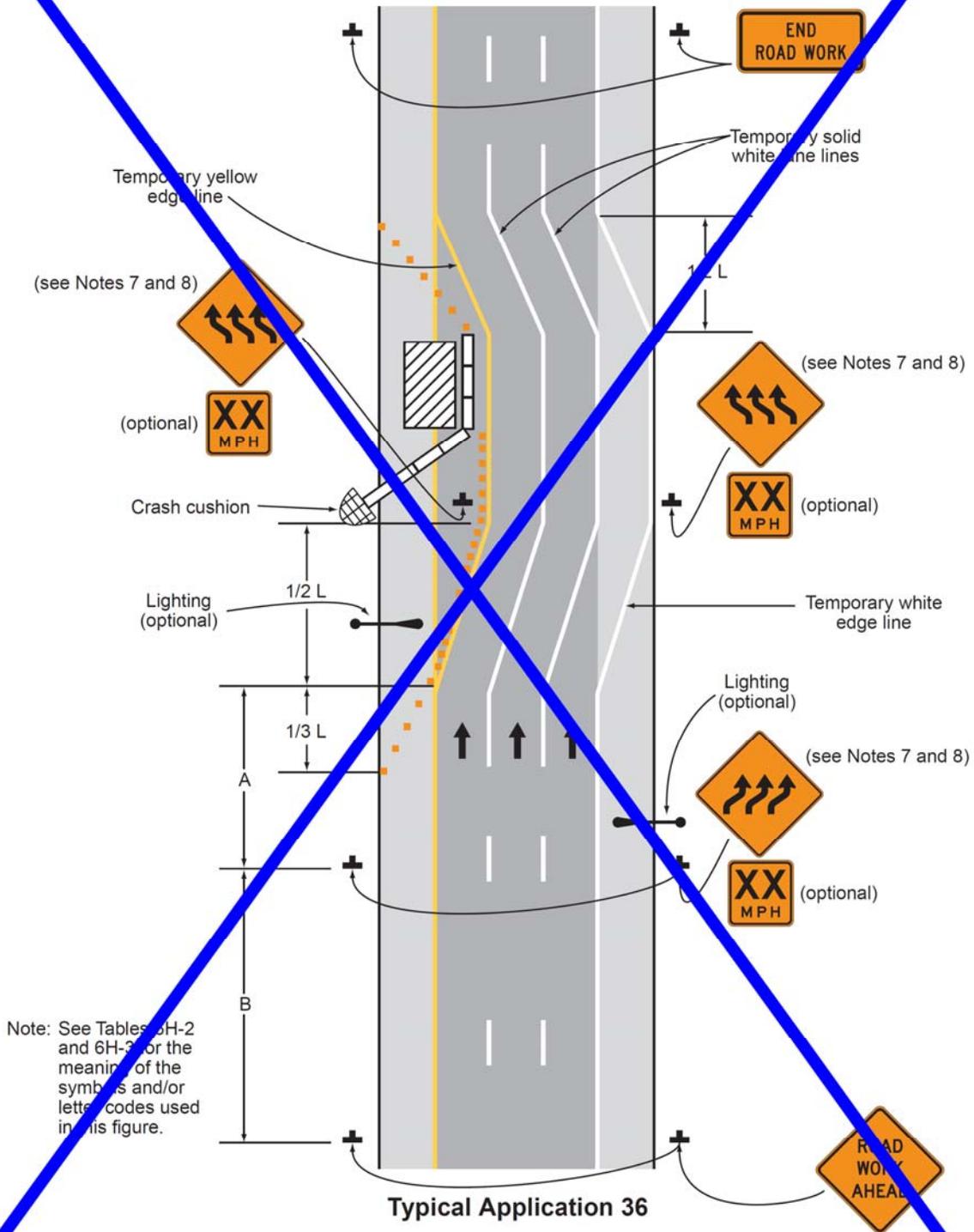
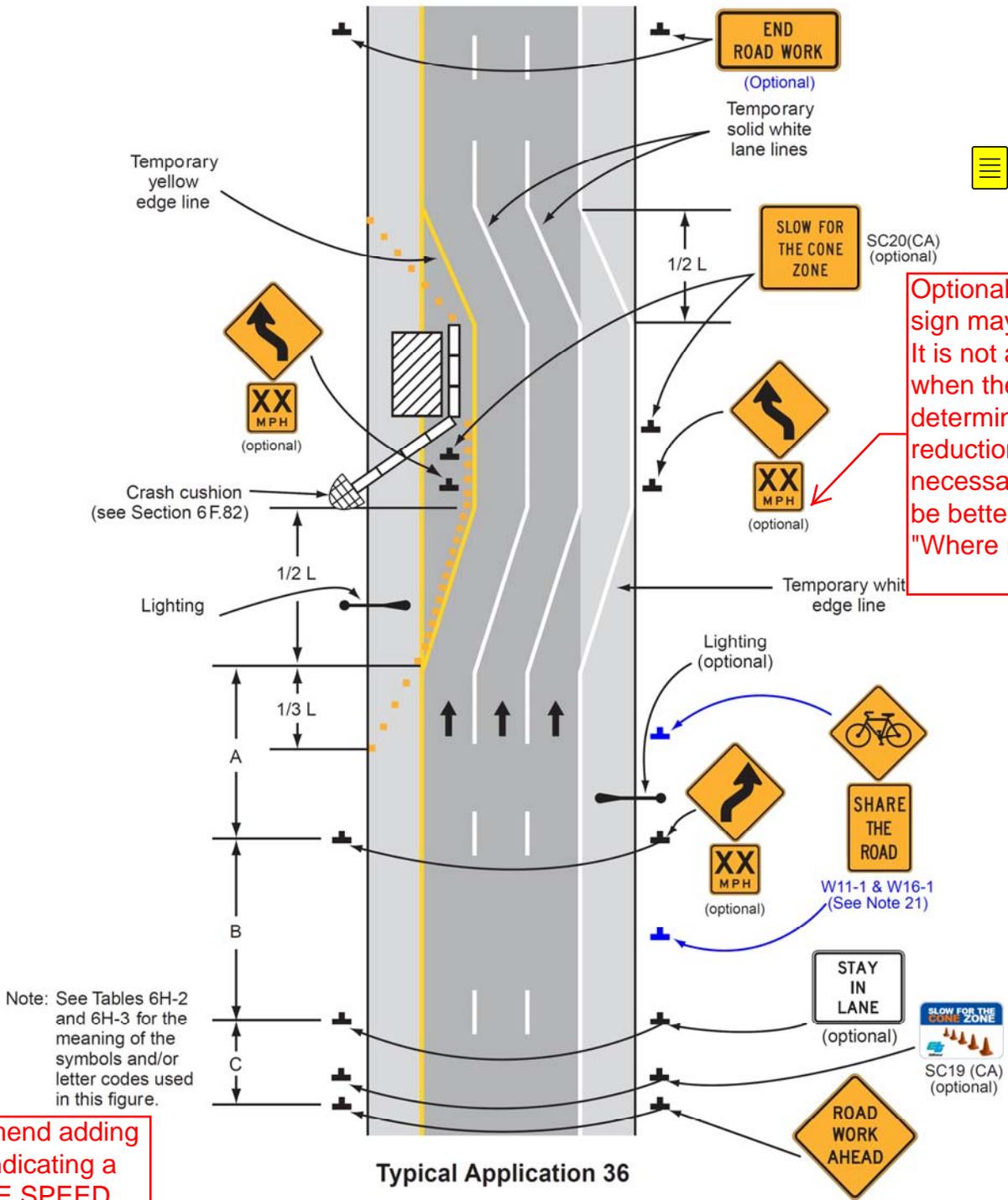


Figure 6H-36 (CA). Lane Shift on Freeway (TA-36)



Optional implies the sign may be omitted. It is not an option when the Engineer determines a speed reduction is necessary. It may be better to say "Where required."

Recommend adding a note indicating a REDUCE SPEED AHEAD sign may be needed.

### Notes for Figure 6H-37—Typical Application 37 Double Lane Closure on a Freeway

**Standard:**

1. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.

*Guidance:*

2. Ordinarily, the preferred position for the second arrow board is in the closed exterior lane at the upstream end of the second merging taper. However, the second arrow board should be placed in the closed interior lane at the downstream end of the second merging taper in the following situations:
  - a. When a shadow vehicle is used in the interior closed lane, and the second arrow board is mounted on the shadow vehicle;
  - b. If alignment or other conditions create any confusion as to which lane is closed by the second arrow board; and
  - c. When the first arrow board is placed in the closed exterior lane at the downstream end of the first merging taper (the alternative position when the shoulder is narrow).

**Option:**

3. Flashing warning lights and/or flags may be used to call attention to the initial warning signs.
4. A truck-mounted attenuator may be used on the shadow vehicle.
5. If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left and adjacent interior lanes may be closed and vehicular traffic carried around the work space on the right-hand lane and a right-hand shoulder.

*Guidance:*

6. When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.

**Standard:**

7. 3 cones or 2 Type II barricades shall be placed transversely across each closed lane at end of each merging taper and every 2000 feet throughout the lane closure.
8. On freeways, maximum spacing of channelizing devices shall be 50 feet in advance warning and transition areas, 100 feet in activity and termination areas (see figure 6C-1).

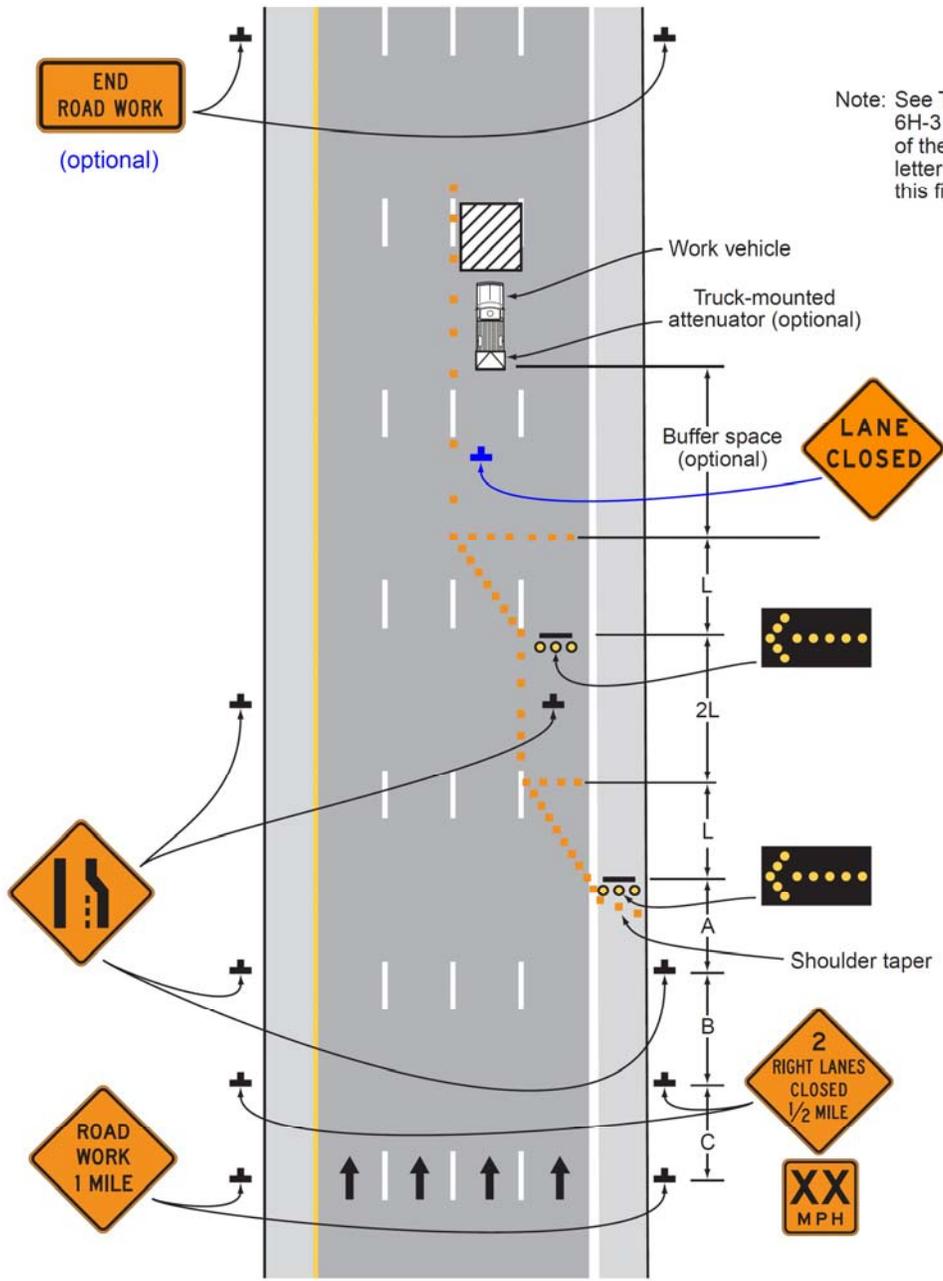
*Guidance:*

9. LANE CLOSED C30(CA) sign should be placed every 2000 feet throughout the lane closure adjacent to the open lane within the closed lane.
10. For State highways, see Department of Transportation's Standard Plan T10. See Section 1A.11 for information regarding this publication

See previous comments regarding referencing other documents.



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



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

**Typical Application 37**

**Notes for Figure 6H-38—Typical Application 38  
Interior Lane Closure on a Freeway**

**Standard:**

- ~~1. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.~~
- ~~2. If temporary traffic barriers are installed, they shall comply with the provisions and requirements in Section 6F.85.~~
- ~~3. The barrier shall not be placed along the shifting taper. The lane shall first be shifted using channelizing devices and pavement markings.~~
- ~~4. For long term stationary work, existing conflicting pavement markings shall be removed and temporary markings shall be installed before traffic patterns are changed.~~

*Guidance:*

- ~~5. For a long term closure, a barrier should be used to provide additional safety to the operation in the closed interior lane. A buffer space should be used at the upstream end of the closed interior lane.~~
- ~~6. The first arrow board displaying an arrow pointing to the right should be on the left hand shoulder at the beginning of the taper. The arrow board displaying a double arrow should be centered in the closed interior lane and placed at the downstream end of the shifting taper.~~
- ~~7. If the two arrow boards create confusion, the 2L distance between the end of the merging taper and beginning of the shift taper should be extended so that road users can focus on one arrow board at a time.~~
- ~~8. The placement of signs should not obstruct or obscure arrow boards.~~
- ~~9. For long term use, the dashed lane lines should be made solid white in the two lane section.~~

**Option:**

- ~~10. As an alternative to initially closing the left hand lane, as shown in the typical application, the right hand lane may be closed in advance of the interior lane closure with appropriate channelization and signs.~~
- ~~11. A short, single row of channelizing devices in advance of the vehicular traffic split to restrict vehicular traffic to their respective lanes may be added.~~
- ~~12. DO NOT PASS signs may be used.~~
- ~~13. If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left hand and center lanes may be closed and motor vehicle traffic carried around the work space on the right hand lane and a right hand shoulder.~~

*Guidance:*

- ~~14. When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.~~

**Standard:**

This typical application is deleted for application and shall not be used on freeways in California. Whenever an interior lane needs to be closed on freeways, all adjacent lane(s) to one side of this lane shall be closed as illustrated in Figure 6H-37.

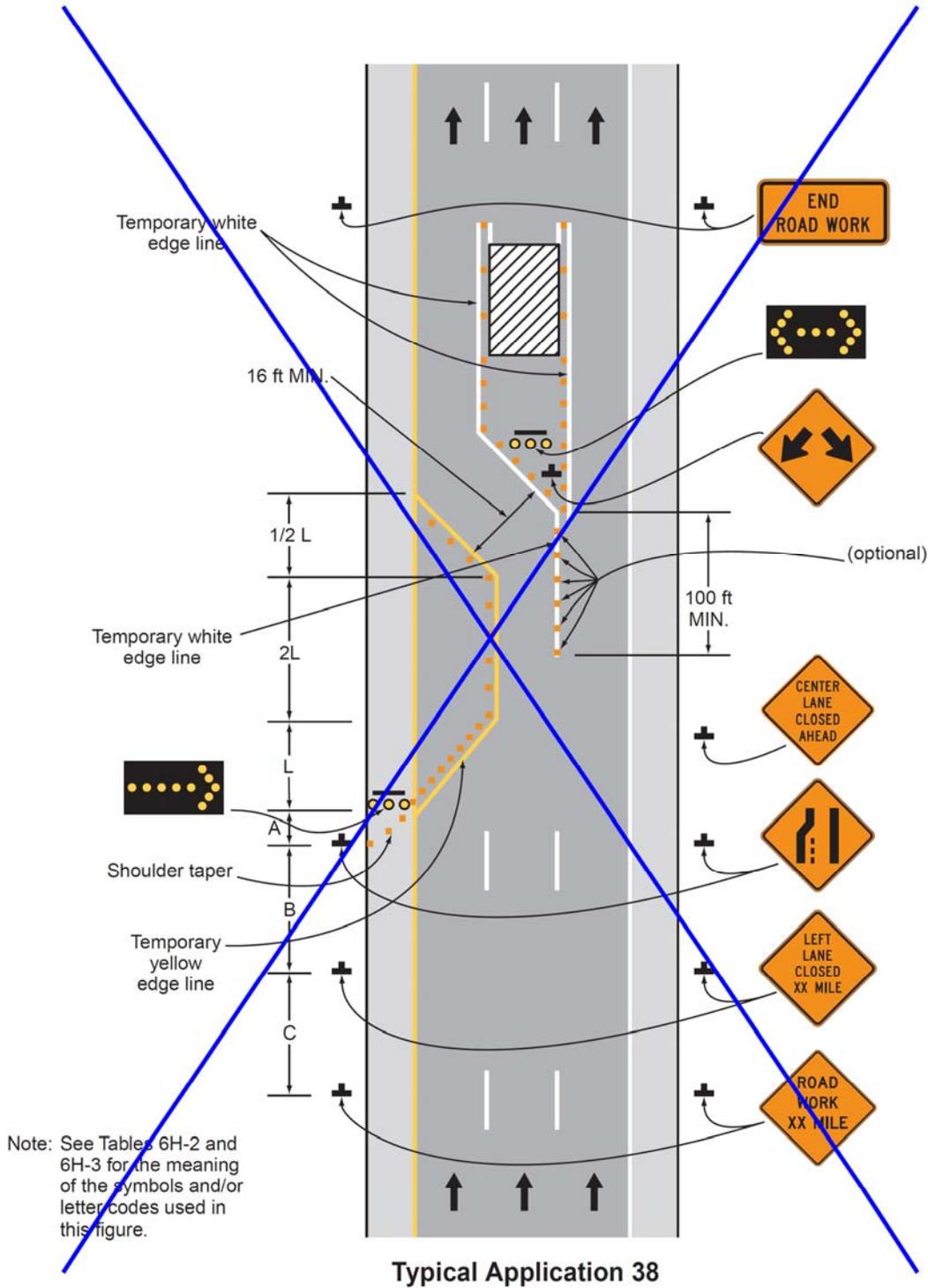
**Support:**

For state highways, see Department of Transportation's Standard Plan T10, T10A and T14. For interior lane closure on Freeways using mobile operation, see Department of Transportation's Standard Plan T16. See Section 1A.11 for information regarding this publication.

See previous comments regarding referencing other documents.



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



### **Notes for Figure 6H-39—Typical Application 39 Median Crossover on a Freeway**

**Standard:**

- 1. Channelizing devices or temporary traffic barriers shall be used to separate opposing vehicular traffic.**
- 2. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

*Guidance:*

- 3. For long-term work on high-speed, high-volume highways, consideration should be given to using a temporary traffic barrier to separate opposing vehicular traffic.*

*Option:*

4. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic, Do Not Pass, KEEP RIGHT, and DO NOT ENTER signs may be eliminated.
5. The alignment of the crossover may be designed as a reverse curve.

*Guidance:*

- 6. When the crossover follows a curved alignment, the design criteria contained in the AASHTO "Policy on the Geometric Design of Highways and Streets" (see Section 1A.11) should be used.*
- 7. When channelizing devices have the potential of leading vehicular traffic out of the intended traffic space, the channelizing devices should be extended a distance in feet of 2.0 times the speed limit in mph beyond the downstream end of the transition area as depicted.*
- 8. Where channelizing devices are used, the Two-Way Traffic signs should be repeated every 1 mile.*

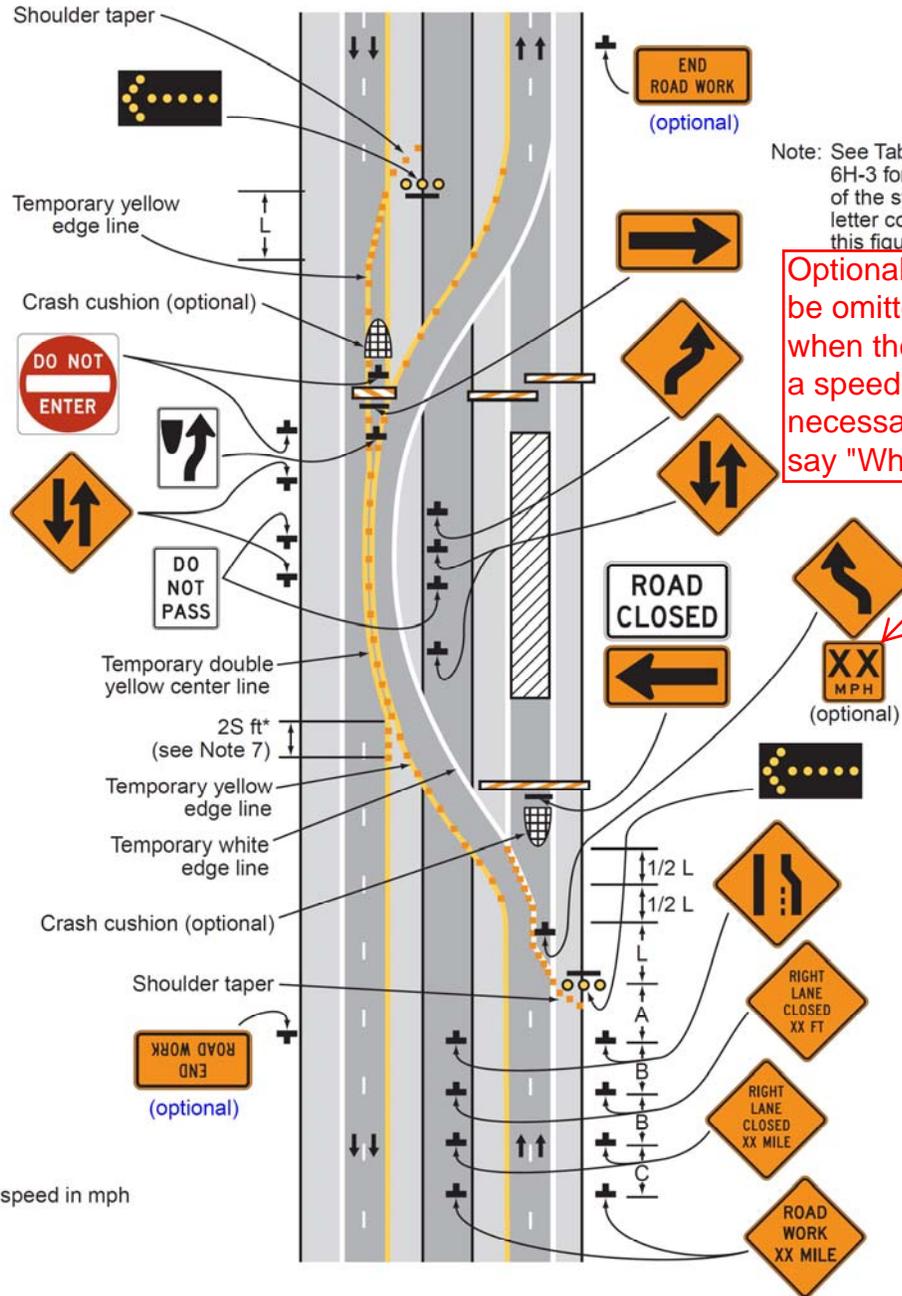
*Option:*

9. NEXT XX MILES Supplemental Distance plaques may be used with the Two-Way Traffic signs, where XX is the distance to the downstream end of the two-way section.

*Support:*

10. When the distance is sufficiently short that road users entering the section can see the downstream end of the section, they are less likely to forget that there is opposing vehicular traffic.
11. The sign legends for the four pairs of signs approaching the lane closure for the non-crossover direction of travel are not shown. They are similar to the series shown for the crossover direction, except that the left lane is closed.

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



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

Optional implies the sign may be omitted. It is not an option when the Engineer determines a speed reduction is necessary. It may be better to say "Where required."

Recommend adding a note indicating a **REDUCE SPEED AHEAD** sign may be needed.

**Typical Application 39**

\*S = speed in mph

### **Notes for Figure 6H-40—Typical Application 40 Median Crossover for an Entrance Ramp**

*Guidance:*

- 1. The typical application illustrated should be used for carrying an entrance ramp across a closed directional roadway of a divided highway.*
- 2. A temporary acceleration lane should be used to facilitate merging.*
- 3. When used, the YIELD or STOP sign should be located far enough forward to provide adequate sight distance of oncoming mainline vehicular traffic to select an acceptable gap, but should not be located so far forward that motorists will be encouraged to stop in the path of the mainline traffic. If needed, yield or stop lines should be installed across the ramp to indicate the point at which road users should yield or stop. Also, a longer acceleration lane should be provided beyond the sign to reduce the gap size needed.*

*Option:*

- 4. If vehicular traffic conditions allow, the ramp may be closed.*
- 5. A broken edge line may be carried across the temporary entrance ramp to assist in defining the through vehicular traffic lane.*
- 6. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic signs and the DO NOT ENTER signs may be eliminated.*

**Figure 6H-40. Median Crossover for an Entrance Ramp (TA-40)**

