

CHAPTER 3 – Location of Work



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(MUTCD Section 6G.03, 6G.06 thru 6G.11)

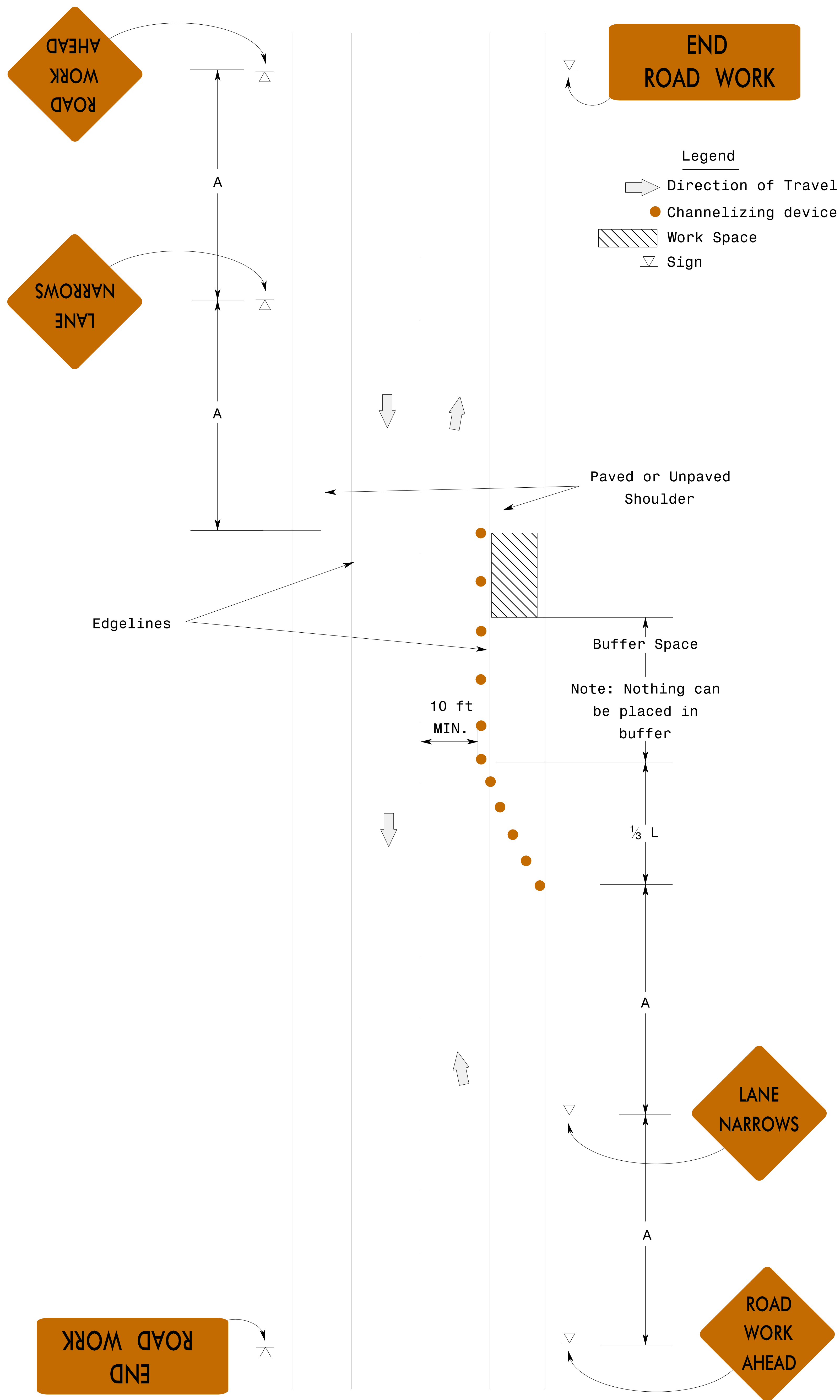
- This section discusses the work in relation to the travelway, i.e. whether it is in the travelway or how far it is from the edge of the travelway.
- **Work Duration Definition A, B, C, and D** will always require lane closures when **work is in the travelway (on or inside the white edge or yellow edge line)**. (Shown in this document and the NCDOT Roadway Standard Drawings)
- When posted speed is **45 MPH** or below travelway lane may be narrowed to 10 feet from edge of device to yellow line for **Work Duration Definition C & D (See page 67)**.

3.1 Notes for Shoulder Work with Minor Encroachment into Travelway

1. All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing devices.
2. The treatment shown should be used on a road where the posted speed 45 MPH or less. For higher-speed traffic conditions, a lane closure should be used.
3. Use “Lane Narrow” signs.
4. A truck-mounted attenuator may be used.
5. Work vehicles must use warnings lights. (See page 3 for definition).
6. 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 the driver’s view when work is not in progress.

Shoulder Work

with Minor Encroachment
into Roadway For Use on 45 Miles Per
Hour or Less



3.2 Consideration for Vehicle Speed & Volume of Traffic

- When posted speeds are **55 mph or less** and volumes are low, work in the travelway under **Work Duration Definition E** may be accomplished with warning lights (**See page 3 for definition**) and advance warning Temporary Traffic Control Signs for the work zone mounted on the shoulder.
- Work under these conditions that **moves intermittently** or is **stopped up to 15 minutes in the travelway** such as pot hole patching with asphalt could use signs such as “**Pot Hole Patching**” “**Next 2 Miles**” and “**Workers in Road**” “**Next 2 Miles**” at the beginning of the work zone with “**End Road Work**” at the end of the work zone to effectively delineate the work zone.
- Flaggers with appropriate “Stop/Slow” paddles and signing may be used with work such as this as long as they walk or are carried from place to place in the Work Zone inside a work vehicle. Go-carts, bicycle, etc., are not approved methods of Flagger transportation.

3.3 Pavement edge Drop-offs

- When work is performed along the edge of pavement the maximum allowable vertical drop off at the edge of pavement on roads with a 40 mph posted speed limit or less is **3 inches** at the end of the work day. When work is performed along the edge of pavement the maximum allowable vertical drop off at the edge of pavement on roads with a 45 mph posted speed limit or more is **2 inches** at the end of the work day. Vertical drop offs at the edge of pavement greater than those stated above require temporary treatment such as a 6 to 1 temporary slope of compacted stone or asphalt placed from the top of the existing pavement or the area may be completely back filled with temporary material. In all pavement edge drop-offs conditions use signs and traffic control devices to delineate the area to traffic.

3.4 Difference in Pavement Elevations Between open lanes

- The maximum vertical difference in elevation between open lanes of traffic is **2 inches** with a posted speed of 30 mph or more. If this condition exists on any section of roadway; close one of the lanes to traffic; pave the section to the same elevation; or taper the pavement at a 6 to 1 slope between the open lanes of travel. Use “Uneven Lanes” signs if lanes are open with a vertical difference between them of less than 2 inches or the lanes are open with a 6 to 1 slope between the lanes.

CHAPTER 4 – Basic Lane and Road Closures on Two-Lane, Two-Way and Four Lane Divided Roadways using Cones, Drums, and Barricade Traffic Control

- A. Work Zone traffic control devices shall be removed at the end of each work period.
- B. Any work, personnel and equipment that encroach on the travelway will require a lane closure under work duration definition A thru D, except in the case shown on pages 53 & 54.
- C. Before you begin to install a lane closure determine where it will go by marking out where your work space will be. Then lay out the buffer space, taper area, and advance sign locations using the charts, tables, and drawings in this document. Adjust the length of the buffer space to insure that the signs and any needed flaggers can be seen by the motorist from at least as far as the required Stopping Sight Distance shown on page 22.
- D. Install the lane closure by placing the signs, then begin flagging if flaggers are used, then the cones or skinny drums or drums along the work area and termination area, and then put the equipment and materials and workers in the work area. On a multi-lane roadway use the TMA to protect workers when they place the traffic control devices in the taper and tangent of the lane closure.
- E. Remove the lane closure in the reverse order.
- F. Use Law Enforcement Officers with Vehicles when possible to supplement signs & Flaggers during temporary Road Closures.
- G. Regular and consistent maintenance of work zone signs and devices is needed to provide clear direction to the motorist. Consider using a dedicated employee for this task in long term stationary work zones.

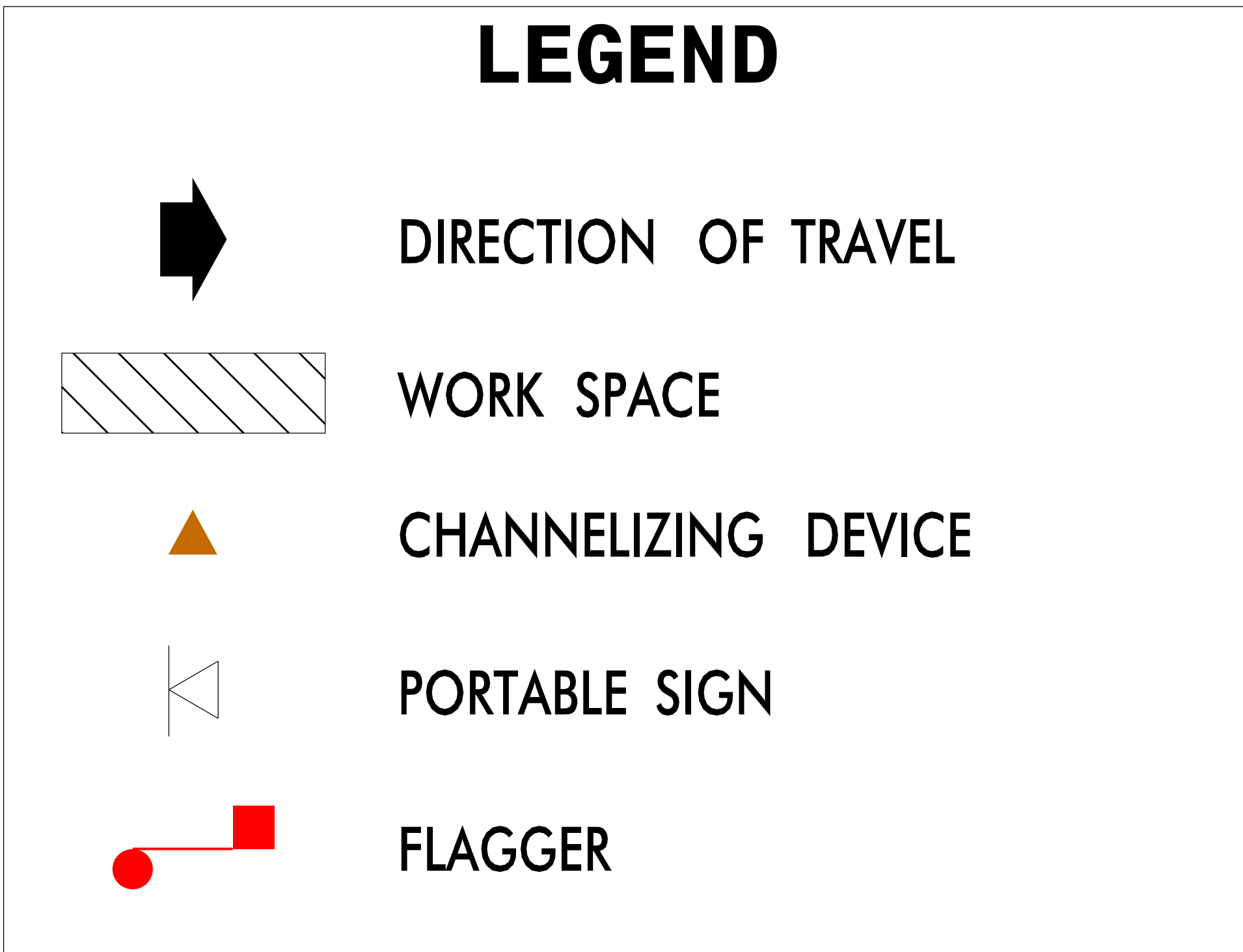


4.1 Notes for Flagging Operations on 2-Lane, 2-Way Roadway

- 1. Refer to Page 31 for sign spacing.
- 2. Install lane closures with the traffic flow, beginning with devices on the upstream side of the work zone.
- 3. Remove lane closures against the traffic flow, beginning with devices on the downstream side of work zone.
- 4. Place cones, drums, or skinny drums thru the work area at the maximum spacing equal in feet to 2 times the posted speed limit.
- 5. Extend longitudinal buffer space such that stopping sight distance shown on Page 25 is provided to the Flagger.
- 6. Do not stop traffic in any one direction for more than 5 minutes at a time. Best practice suggests every 2 to 3 minutes.
- 7. Use Flaggers to control traffic at intersections affected by the lane closure. Supplement Flaggers located at intersections with FLAGGER AHEAD signs (W20-7a) placed approximately 250 feet in advance of the Flagger down the side road. (See your Qualified Work Zone Supervisor for more info on this).
- 8. If roadway width is less than 22 feet (EOP to EOP), cones may not be required along work area, and at the discretion of the engineer, cones may be omitted along the work area if using a pilot car. Cones are required in the upstream and downstream tapers.

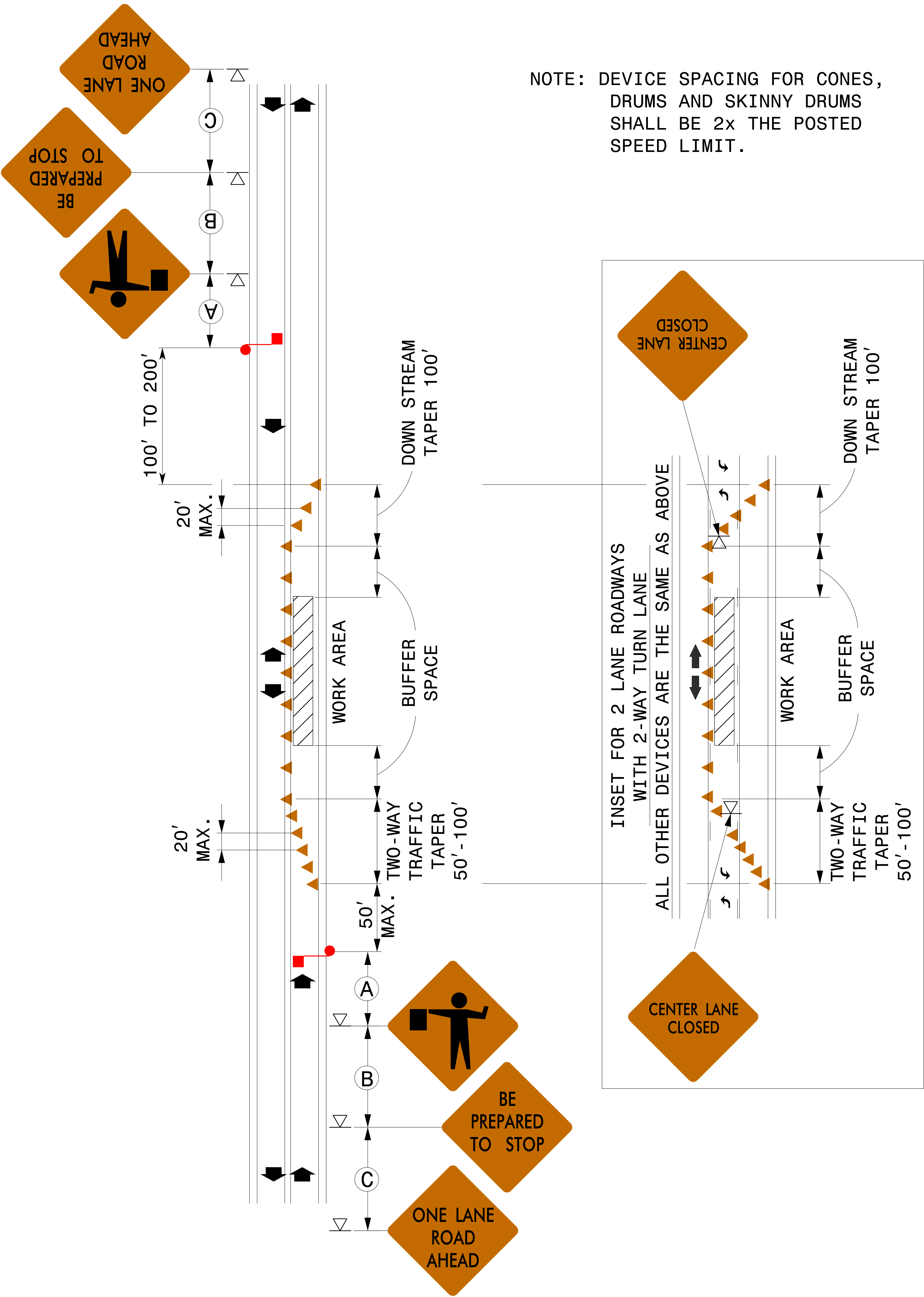
4.2 Notes for Pilot Car Operations in conjunction with Flaggers on 2-Lane, 2-Way Roadway

- 1. Use pilot cars when approved by your Work Zone Supervisor.
- 2. Mount sign G20-4 “PILOT CAR FOLLOW ME” at a visible location on the rear of the pilot vehicle.
- 3. Do not install more than one (1) mile of lane closure for a pilot car operation, measured from the beginning of the merge taper to the end of the lane closure.
- 4. Advise residents and businesses within the lane closure limits about methods of safe egress and ingress from driveways during flagging and pilot car operations.



Temporary Lane Closures

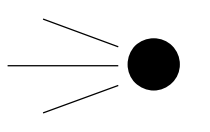
2-Lane, 2-Way Roadway - 1 Lane Closed




4.3 Notes for Temporary Lane Closures on Divided Multi-Lane Roadways – 1 Lane Closed (55 MPH & below)

- 1. When needed, use this drawing for suburban type streets where signs may be mounted on both sides of the roadway.
- 2. Place arrow boards on the shoulder (paved or unpaved). Place arrow boards within the taper if shoulders do not exist. Meet the requirements for stopping sight distance at the arrow board location. If needed, extend lane closures such that stopping sight distance to the arrow board is met as shown on page 22.
- 3. Place devices (cones, skinny drums or drums) in tapers at the maximum spacing equal in feet to the posted speed limit. Place devices along the buffer space and work area at the maximum spacing equal in feet to 2 times the posted speed limit.
- 4. See pages 19 and 20 for “L” distance and pages 27 and 28 for sign spacing.
- 5. Install lane closures with the traffic flow, beginning with devices on the upstream side of the work zone. Remove lane closures against the traffic flow, beginning with the devices on the downstream side of work zone.
- 6. TMA’s may be used in addition to a buffer space, when a buffer space cannot be attained, or when directed by the engineer or the plans. See pages 43 and 44 for TMA information. See your Qualified Work Zone Supervisor for more information on TMA’s.
- 7. See letter clarifying the sizes of Flashing Arrow Boards (REVISED):
Dated: February 5, 2013 at
https://connect.ncdot.gov/projects/WZTC/Documents/FEB_2013_FAB_REVISION.pdf

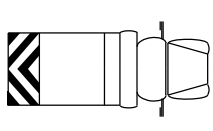
LEGEND



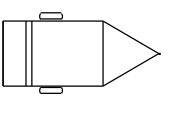
FLASHING ARROW BOARD (TYPE C)




FLASHING ARROW BOARD, TYPE "C"
(96"X48" MIN.), "CAUTION MODE"



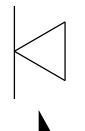
TRUCK MOUNTED ATTENUATOR(TMA)




CHANGEABLE MESSAGE SIGN (CMS)



DRUM



PORTABLE SIGN

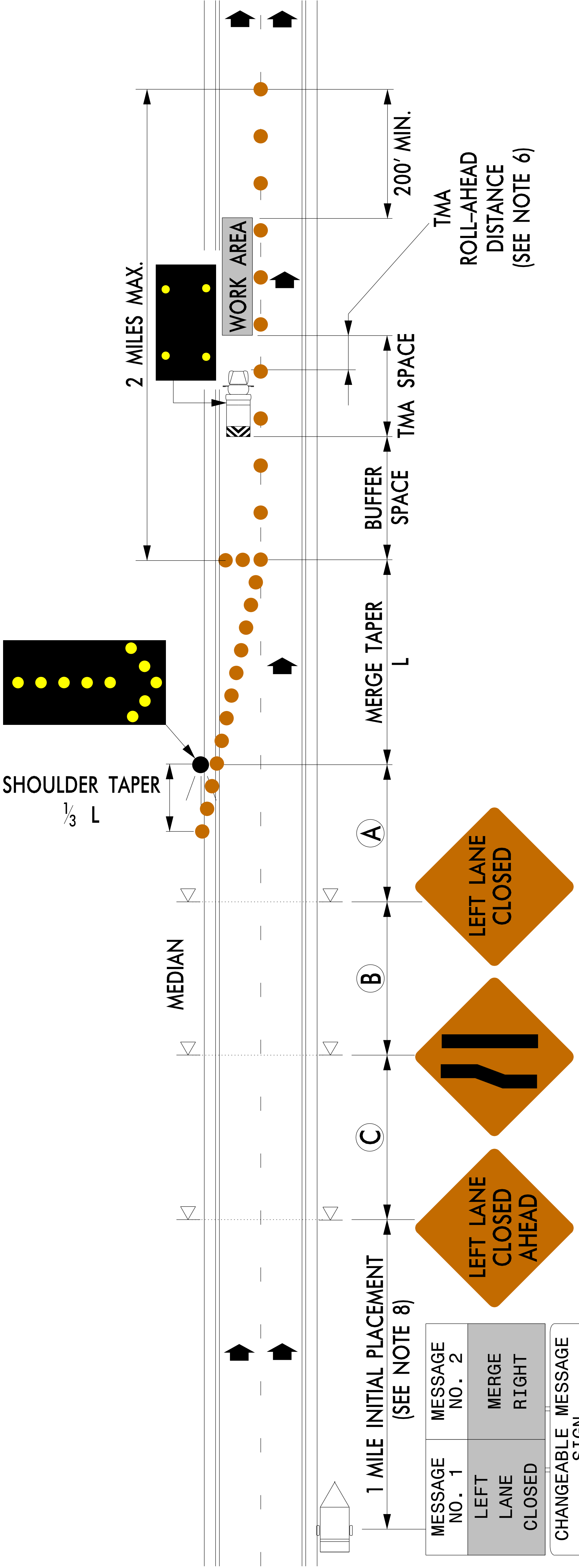


DIRECTION OF TRAFFIC FLOW

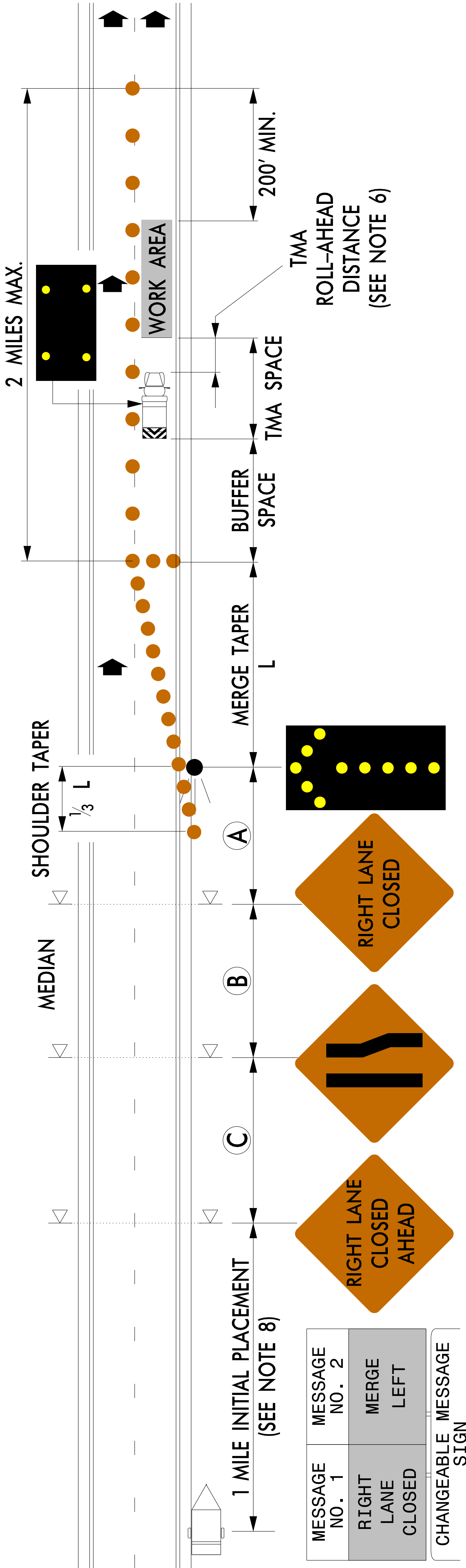
Temporary Lane Closures

Divided Multi-Lane Roadway-1 Lane Closed
55 mph Posted Speed Limit or Less

LEFT LANE CLOSURE




RIGHT LANE CLOSURE

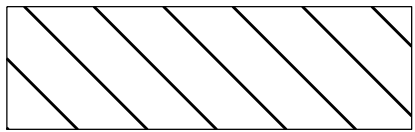



4.4 Notes for Temporary Road Closure

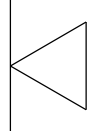
- 1. Conditions represented are for a planned closure not exceeding 30 minutes during the daytime. See your Qualified Work Zone Designer or Project Engineer for all other conditions.
- 2. A Flagger shall be used for this application. Flaggers shall follow the Flagger Operation Basics on Pages 8 thru 10.
- 3. Uniformed law enforcement Officer with a law enforcement vehicle with “Blue Lights” may be used.
- 4. BE PREPARED TO STOP and EXPECT DELAYS signs shall be used.
- 5. The BE PREPARED TO STOP sign shall be located before the Flagger symbol sign.

LEGEND

DIRECTION OF TRAVEL

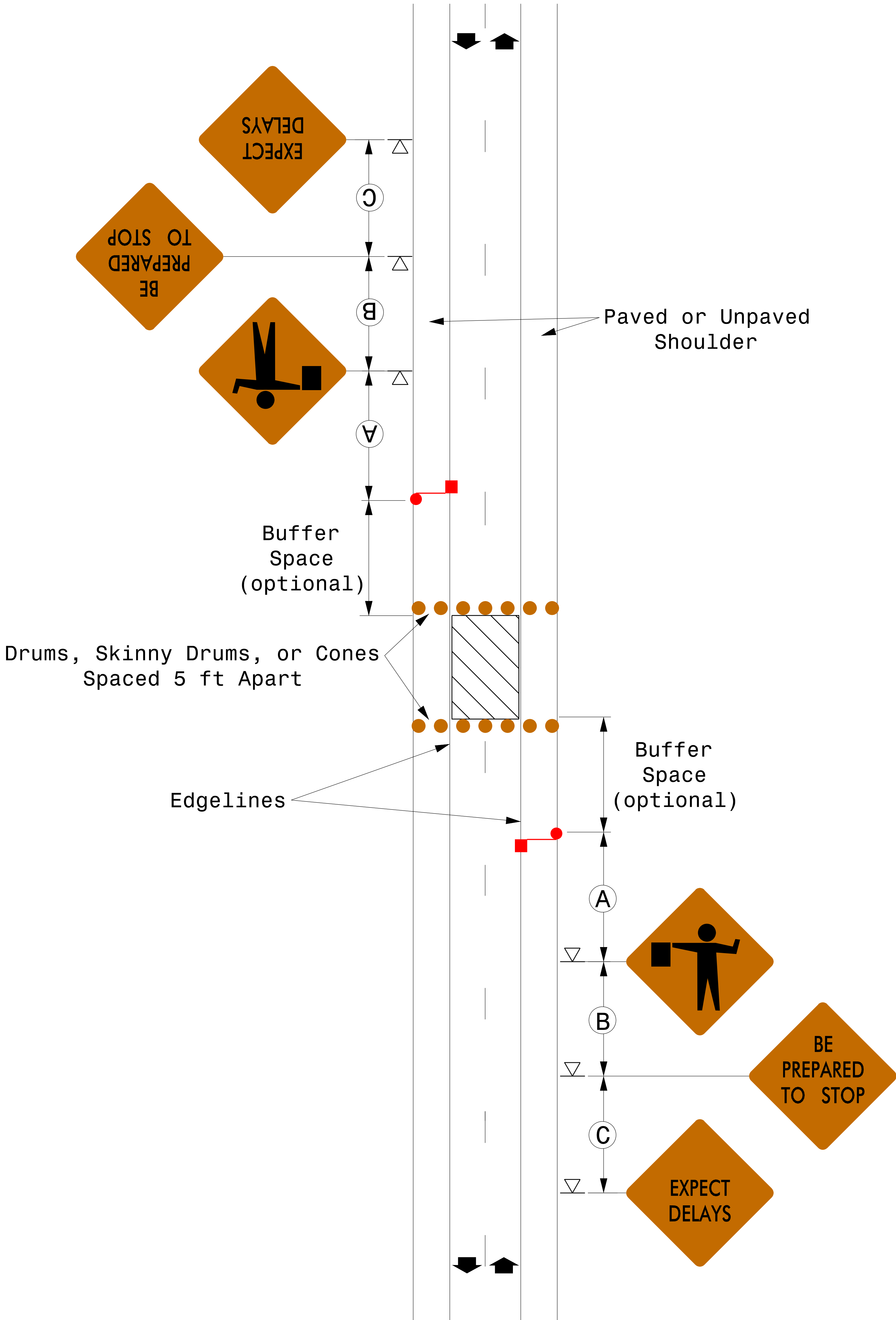
WORK SPACE

CHANNELIZING DEVICE

SIGN

Temporary Road Closure (Short Duration)

(Up To 30 Minutes) for 55 Miles Per
Hour or Less



4.5 Mobile Operations

- Mobile is work that moves intermittently or stopped up to 5 minutes.
- When using these type operations refer to page 74 for advance warning signing options and get approval from your Qualified Work Zone Supervisor before using any of the special detail drawings available for this type work.

4.6 Moving Operations

- Moving is work that moves at 3 MPH or greater.
- When using these type operations refer to page 54 for advance warning signing options and get approval from your Qualified Work Zone Supervisor before using any of the special detail drawings available for this type work. Driving construction equipment such as motor graders and back hoes along a highway is considered a moving operation work zone and needs advance warning. This can be provided by placing the proper vehicle warning lights on the vehicle as described on page 3 and/or a shadow vehicle with top mounted vehicle warning lights following at the proper distance.

4.7 Understand the basics of Temporary Traffic Control Plans and how to read one

- Review the entire plan before trying to implement any one drawing or picture.
- Start at the beginning and follow the construction staging process and implement all the temporary work zone traffic control discussed in the plan.
- Make sure you have all the temporary traffic control items required in the plan on hand before you start the job.
- If you see something you haven't seen before or don't understand something in the plan make sure you discuss this with your Qualified Work Zone Supervisor BEFORE you begin the job.
- Don't change anything without discussion with and approval from your Qualified Work Zone Supervisor.
- If they are not available, get approval from a Qualified Work Zone Designer or your Project Engineer.