

LOUISIANA DEPARTMENT OF
TRANSPORTATION & DEVELOPMENT



**MAINTENANCE
TRAFFIC CONTROL
HANDBOOK**

FOR
MAINTENANCE OPERATIONS
REVISED JUNE 2020

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INTRODUCTION

This handbook is based on the 2009 *Manual on Uniform Traffic Control Devices* (MUTCD) published by the Federal Highway Administration. The Highway Safety Act of 1966 requires that traffic control devices on all highways and streets in each state conform to this manual. The Louisiana Department of Transportation and Development (DOTD) adopted the 2009 MUTCD on December 13, 2011. The information in DOTD's *Maintenance Traffic Control Handbook*, developed specifically for maintenance situations, follows the guidelines and reflects the philosophy stated in the MUTCD. It is the intent that the provisions of this manual be guidelines for traffic control devices installation, but not a legal requirement for installation. The manual is not a substitute for engineering judgment.

The DOTD *Maintenance Traffic Control Handbook* has been prepared for the supervisors and operators who are responsible for planning and installing the traffic controls at the maintenance work sites. The information in this handbook is to be used as a guide for the many decisions which must be made. Because of the numerous conditions that must be considered, careful traffic control planning must be made for every work site.

As stated in the MUTCD,

“No one set of TTC devices can satisfy all conditions for a given project or incident. At the same time, defining details that would be adequate to cover all applications is not practical.”

In this handbook, an attempt has been made to illustrate many of the typical maintenance operations with the normal or most common situations that exist. The intent of the written text is not to describe each traffic control situation in detail, but to call attention to particular features of each traffic control situation and to illustrate some examples of typical maintenance activities that would be used. Naturally, all possible scenarios that could be encountered could not be shown.

The typical operations that are illustrated are to be considered as guides. The traffic control devices shown, the arrangement, or position of the devices and the distances prescribed in the tables are all in conformance with the MUTCD. These are minimum requirements.

According to the MUTCD, Part 6,

“The TTC plans and devices should follow the principles set forth in Part 6.”

“TTC plans may deviate from the typical applications described in Chapter 6H to allow for conditions and requirements of a particular site or jurisdiction.”

If you do not follow the guidelines, you should make a note on your Daily Work Report giving the reason why the guidelines were not followed.

The MUTCD continues by stating,

“Other devices may be added to supplement the devices and device spacing may be adjusted to provide additional reaction time or delineation. Fewer devices may be used based on field conditions.”

You are authorized to supplement the installation whenever the need is indicated. Traffic movement through the work site is to be observed, and an inspection of all traffic control devices is to be made at each location.

The immediate response to an emergency situation must by necessity make use of available devices and equipment. Given the opportunity, however, longer term emergencies should be treated in a manner similar to other temporary traffic control work sites.

DEFINITIONS

WORK DURATION

Long-Term Stationary

Work that occupies a location more than 3 days.

Intermediate-Term Stationary

Work that occupies a location from overnight to 3 days or night time work lasting more than 1 hour.

Short-Term Stationary

Daytime work that occupies a location from 1 to 12 hours.

Short-Duration

Work that occupies a location up to 1 hour.

Mobile

Work that moves intermittently or continuously.

Intermittent - Stop and go

Continuous - Constantly moving

Slow Moving - operations that move less than 3 mph

Fast Moving - operations that move 3 mph or faster

TYPES OF TAPERS:

1. **Merging Taper**

A channelizing taper used to guide traffic out of the repair lane on a multi-lane road.

2. **Shifting Taper**

A channelizing taper used to move traffic without reducing the number of lanes. **Planning done by District Traffic Office.**

3. **Shoulder Taper**

A channelizing taper used to close the shoulder.

4. **One Lane, Two-Way Traffic Taper (Example: Flagger Taper)**

A taper, sometimes called a stopping taper, which is a 50-100 foot taper placed in advance of a two-lane road work zone when a portion of the road is used alternately by traffic in each direction. **This is not a channelizing taper. We do not use a merging taper on a two-lane road.** You will need 6 cones for this taper plus the additional cones to outline the work site.

5. **Downstream Taper**

A 100 foot taper made up of cones marking the end of the work site on both two-lane and multi-lane roads. You will need 6 cones spaced at 20 feet.

SPEED:

High Speed

Greater than 40 miles per hour

Low Speed

Less than or equal to 40 miles per hour

INSTRUCTIONS

The maintenance supervisor must decide which traffic control devices to install to protect the traveling public and the road maintenance personnel.

To use this handbook, start with the Decision Guide on page 1. The Decision Guide will take you to the page showing an illustration of a work site closely matching the conditions of the area where you plan to work. Charts for sign spacing using this traffic layout, along with the brief description and notes, are shown on the opposite page. Starting on page 1, be sure to read the note at the top of the page. Answer the first question in the flow chart, **DO YOU HAVE TO CLOSE THE ROAD?** If your answer is NO, you go to page 2. If it is YES, then you must answer the question, **WILL THE ROAD BE CLOSED MORE THAN 20 MINUTES?** If the answer is NO go to page 18. If the answer is YES then you will need to contact the District Traffic Office.

Turn to the proper page, read the title at the top and then read the questions in the diamond-shaped symbols. Follow the directional arrows to your answers. You will be directed to another question or to another page. Continue this procedure until you find the appropriate illustration.

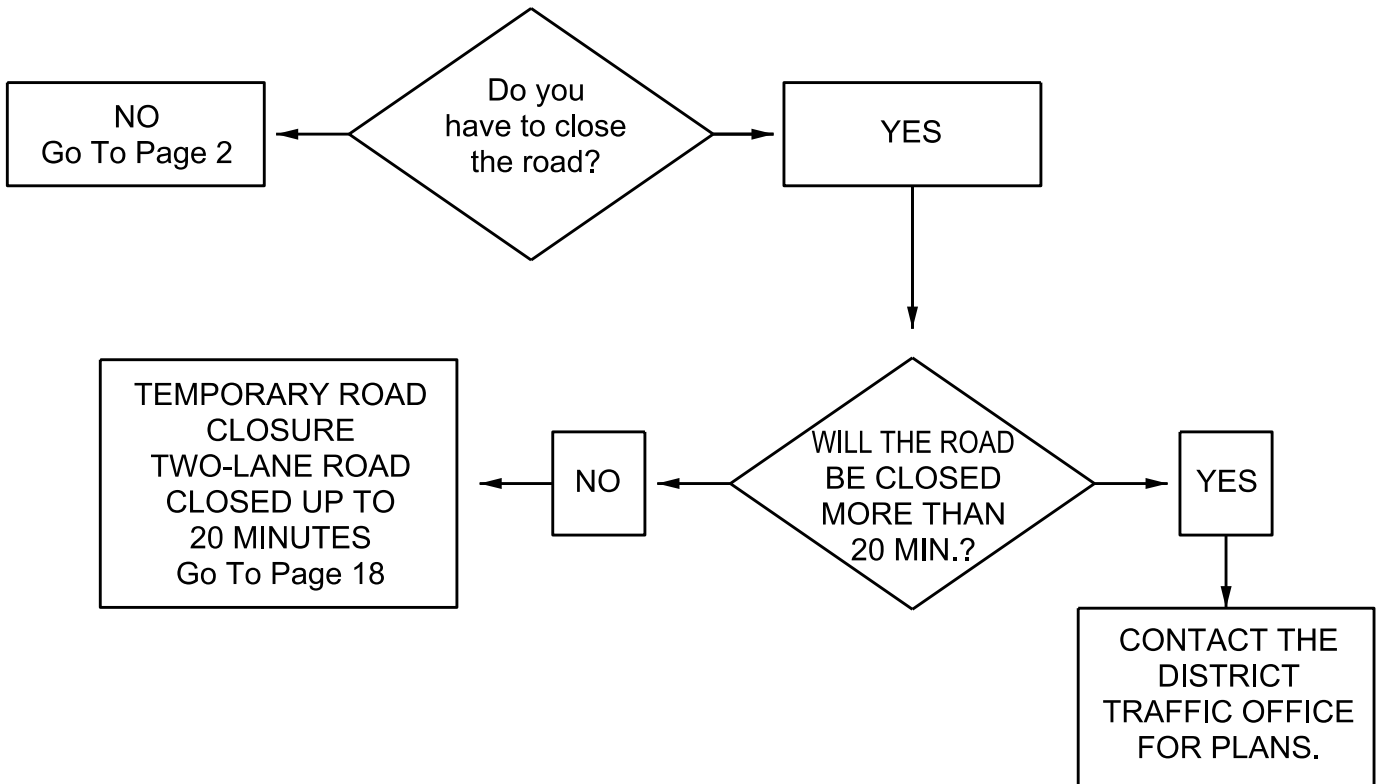
Read the title of the illustration to make sure you have not made a mistake. Study the layout of traffic control devices and read every note. Notice, especially, whether or not a flagger is necessary or required.

Keep your *Maintenance Traffic Control Handbook* with you on the job and use it to guide you to safe traffic control for most typical maintenance activities.

DECISION GUIDE

ROAD CLOSURE (Both directions of a two-lane road)

Begin using this decision guide by answering the question,
"Do you have to close the road?"



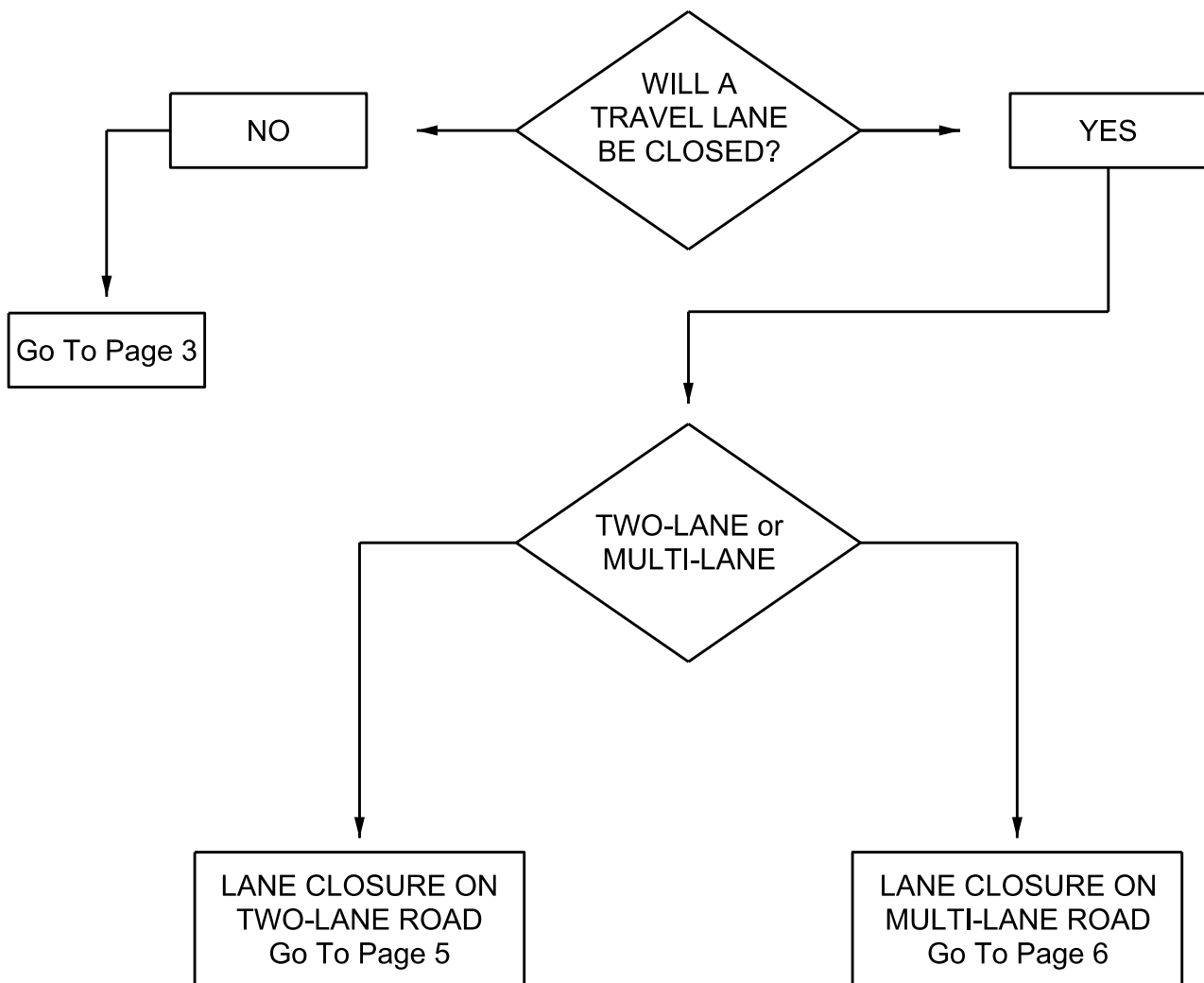
TRAFFIC LANE CLOSURE

NOTE

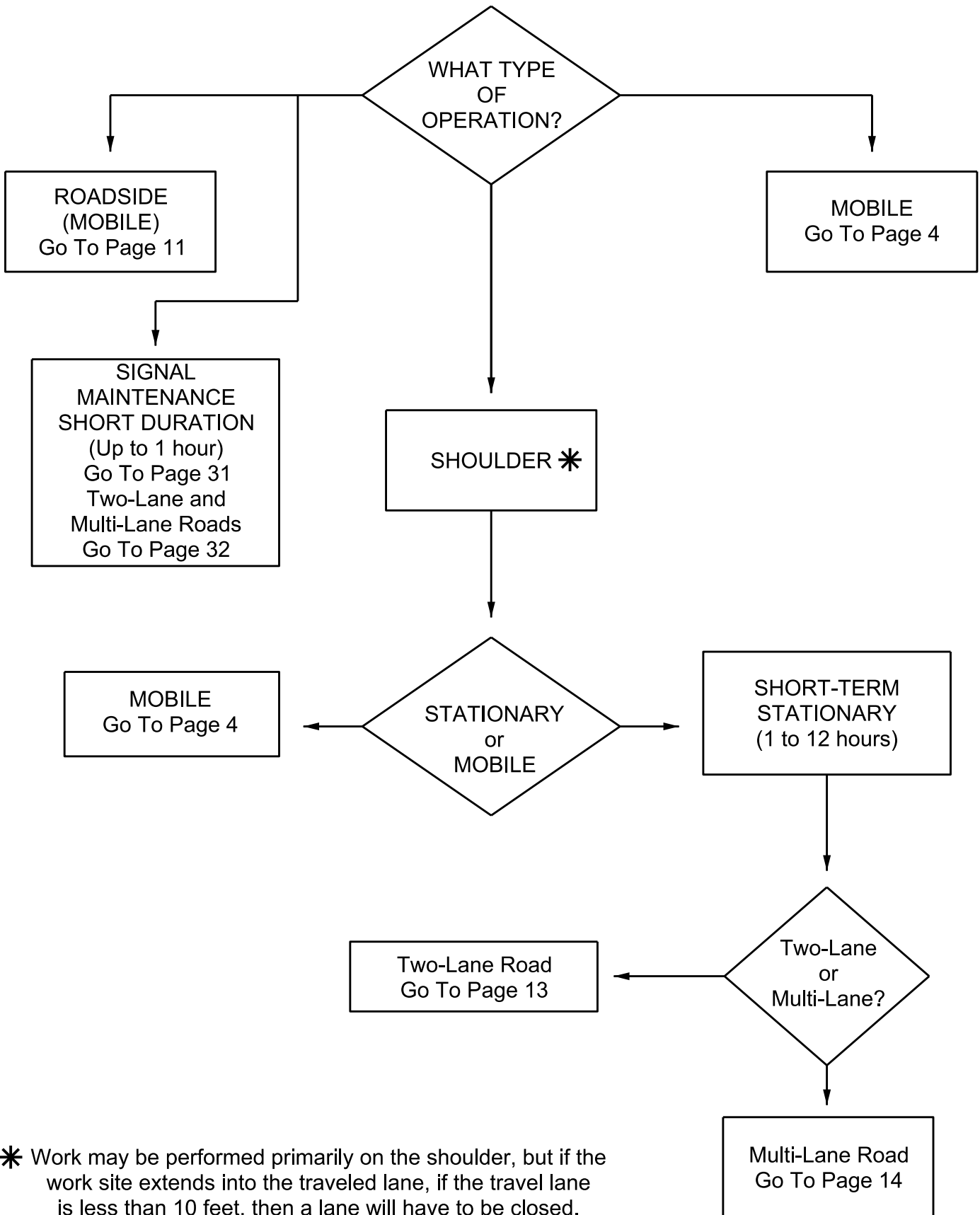
The travel lane is obstructed when men, equipment, or materials must be left in the lane.

Work may be performed primarily on the shoulder, but if the work site extends into the traveled lane, and if the remaining available travel lane is less than 10 feet, then a lane will have to be closed.

A mobile operation is not considered a lane closure.

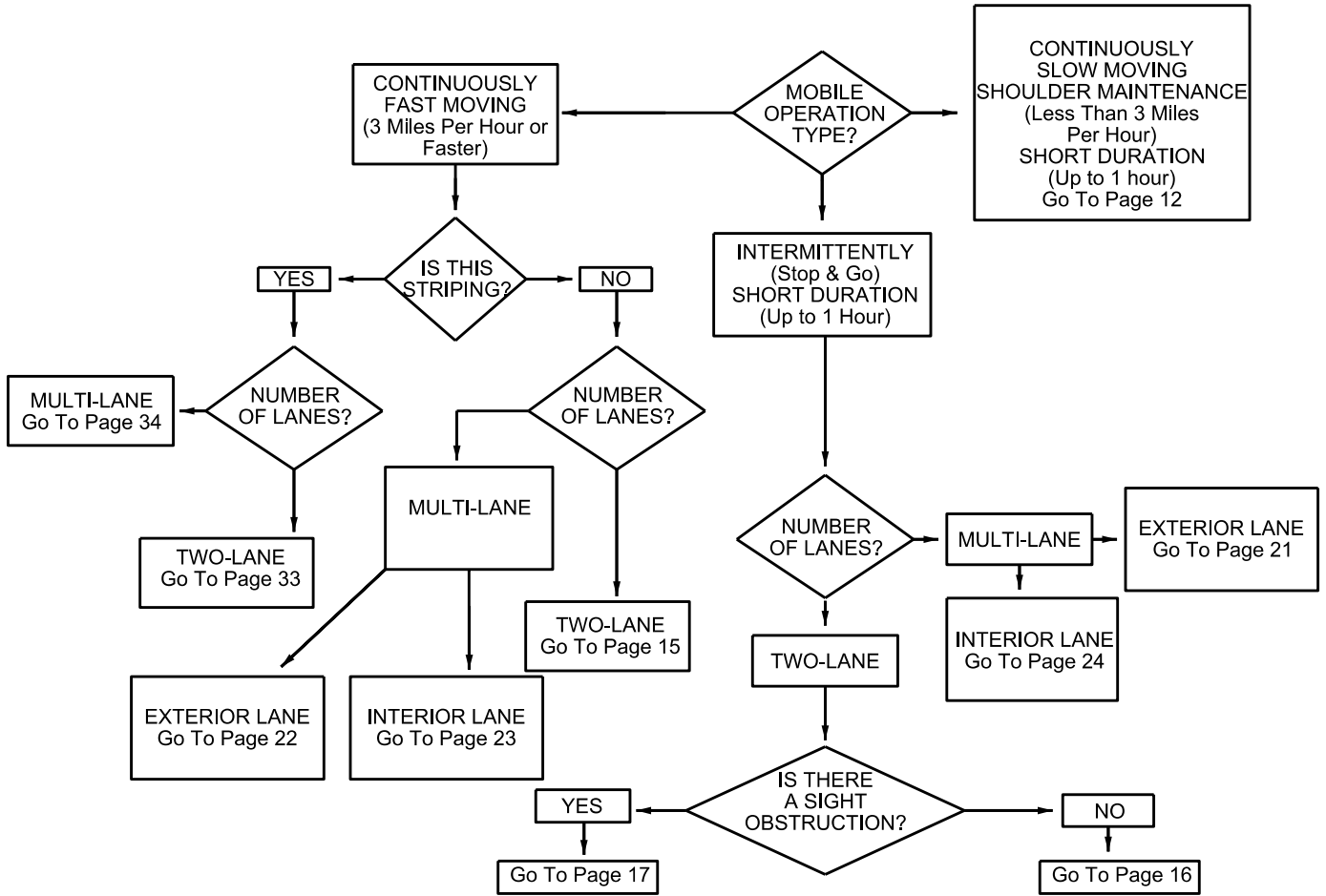


NO LANE CLOSURE ALL TYPES OF ROADS

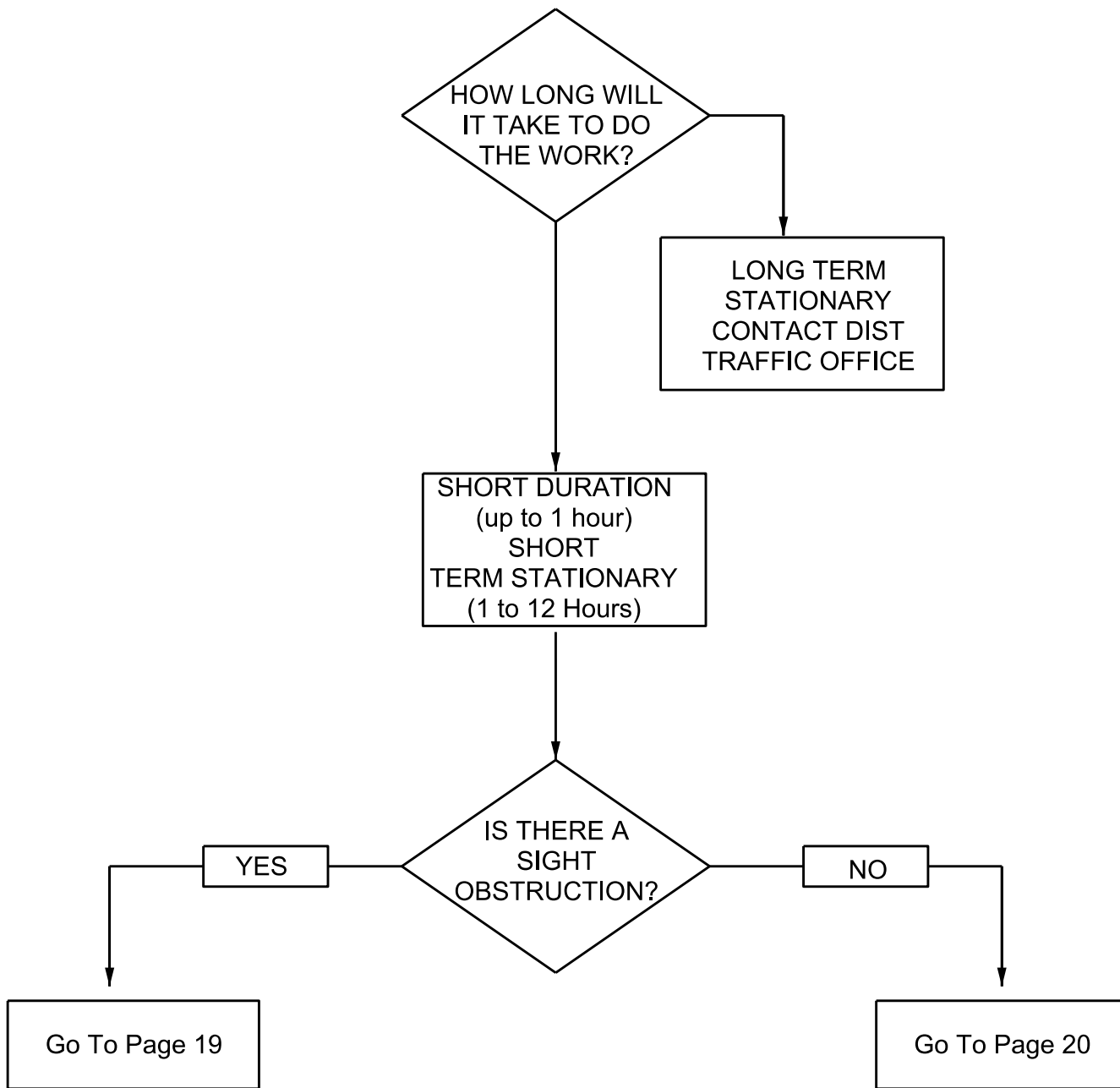


* Work may be performed primarily on the shoulder, but if the work site extends into the traveled lane, if the travel lane is less than 10 feet, then a lane will have to be closed.

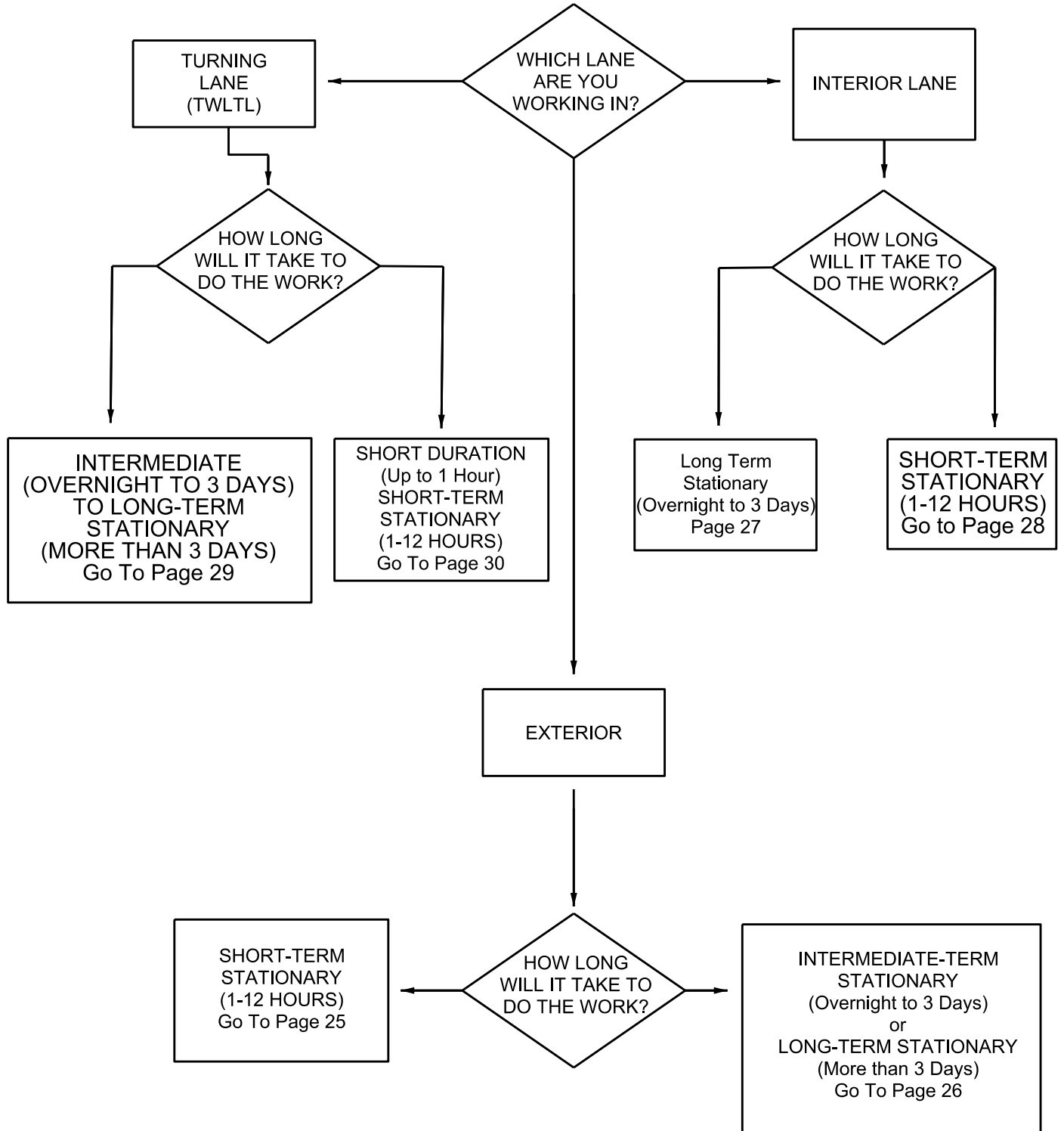
MOBILE OPERATIONS



LANE CLOSURE TWO-LANE ROAD

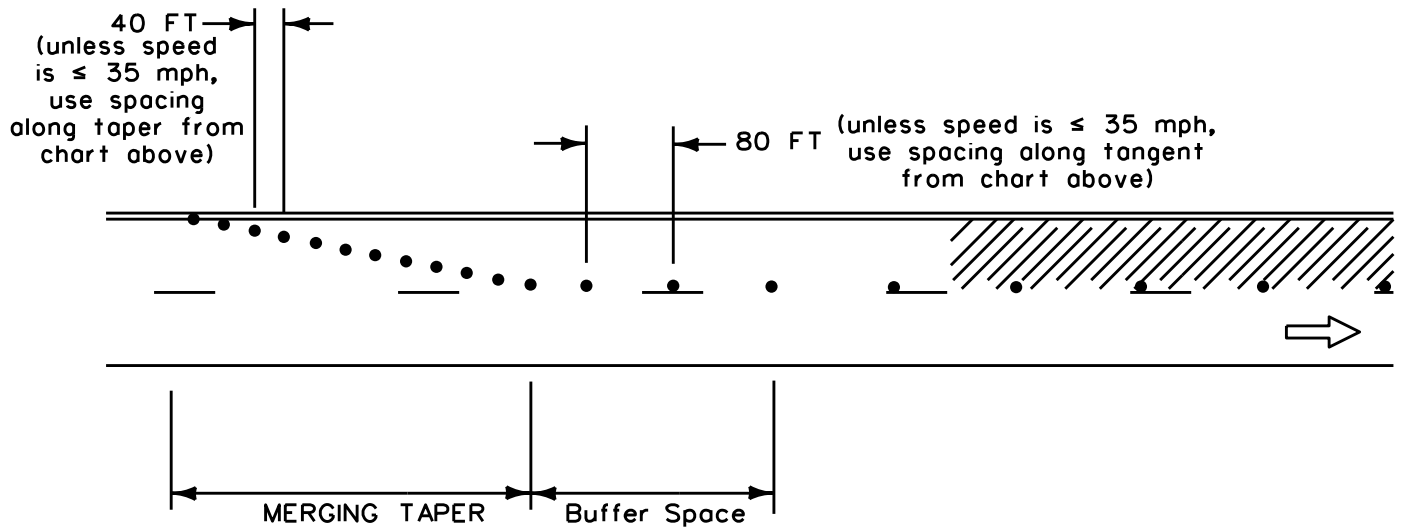


LANE CLOSURE MULTI-LANE ROADS



MERGING TAPER SPACING AND BUFFER SPACE

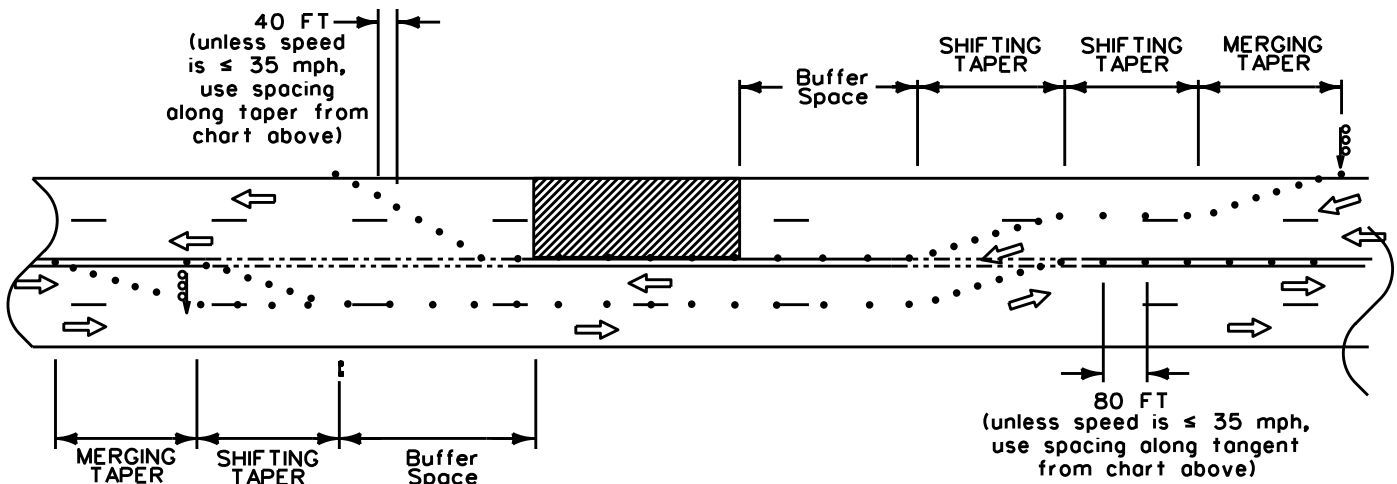
SPEED LIMIT	MERGING TAPER LENGTH (L)				STANDARD CONES/DRUMS SPACING IN FEET		BUFFER SPACE
	Lane Width (FT)				Along Taper	Along Tangent	
MPH	9	10	11	12	Along Taper	Along Tangent	FT
25	94	105	115	125	20	40	155
30	135	150	165	180	30	60	200
35	184	205	225	245	35	70	250
40	240	267	294	320	40	80	305
45	405	450	495	540	40	80	360
50	450	500	550	600	40	80	425
55	495	550	605	660	40	80	495
60	540	600	660	720	40	80	570
65	585	650	715	780	40	80	645
70	630	700	770	840	40	80	730
75	675	750	825	900	40	80	820



Note: cone/drum spacing may be reduced based on posted advisory speed in curves

SHIFTING TAPER SPACING AND BUFFER SPACE

SPEED LIMIT	SHIFTING TAPER LENGTH (1/2)(L)						STANDARD CONE SPACING IN FEET		BUFFER SPACE
	Lane Width (FT)						Along Taper	Along Tangent	
MPH	2	4	6	8	10	12	Along Taper	Along Tangent	FT
25	11	21	32	42	52	63	20	40	155
30	15	30	45	60	75	90	30	60	200
35	21	41	62	82	102	123	35	70	250
40	27	54	80	107	134	160	40	80	305
45	45	90	135	180	225	270	40	80	360
50	50	100	150	200	250	300	40	80	425
55	55	110	165	220	275	330	40	80	495
60	60	120	180	240	300	360	40	80	570
65	65	130	195	260	325	390	40	80	645
70	70	140	210	280	350	420	40	80	730
75	75	150	225	300	375	450	40	80	820

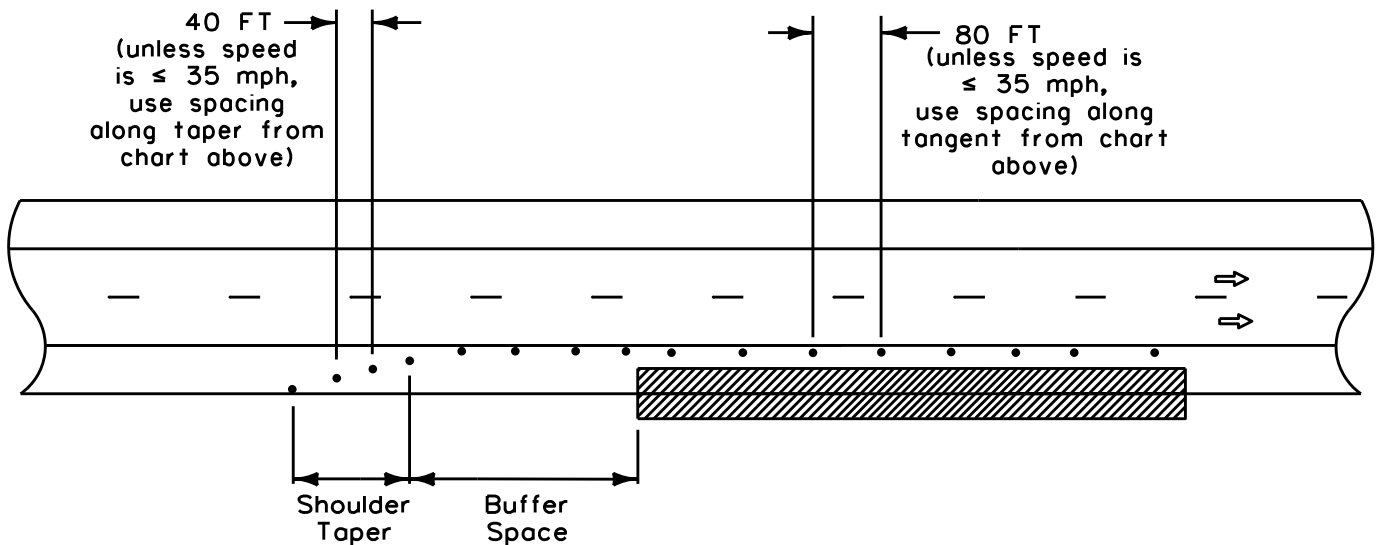


Note: cone/drum spacing may be reduced based on posted advisory speed in curves

Note: see sheet seven for merging taper

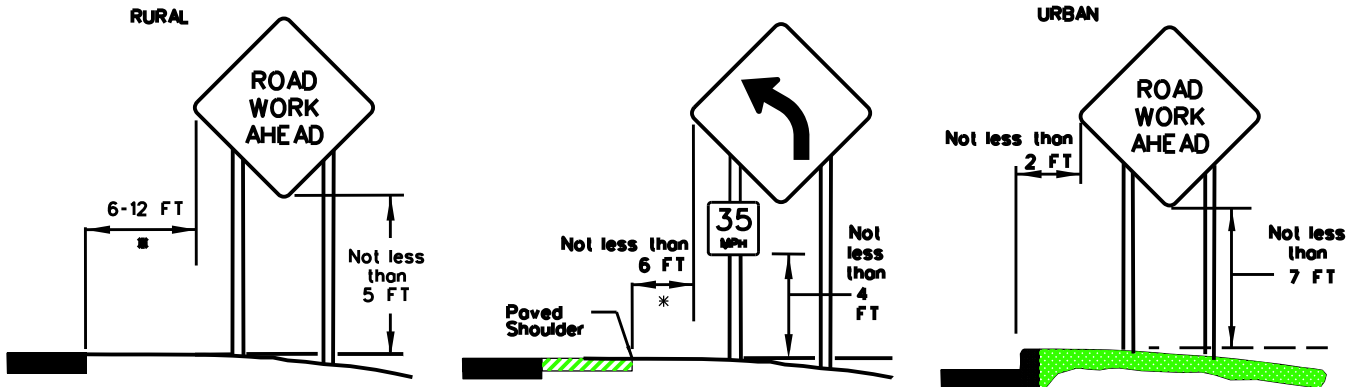
SHOULDER TAPER SPACING AND BUFFER SPACE

SPEED LIMIT	SHOULDER TAPER LENGTH (1/3)(L)						STANDARD CONE SPACING IN FEET		BUFFER SPACE
	Lane Width (FT)						Along Taper	Along Tangent	
MPH	2	4	6	8	10	12	Along Taper	Along Tangent	FT
25	7	14	21	28	35	42	20	40	155
30	10	20	30	40	50	60	30	60	200
35	14	28	41	55	68	82	35	70	250
40	18	36	54	72	89	107	40	80	305
45	30	60	90	120	150	180	40	80	360
50	34	67	100	134	167	200	40	80	425
55	37	74	110	147	184	220	40	80	495
60	40	80	120	160	200	240	40	80	570
65	44	87	130	174	217	260	40	80	645
70	47	94	140	187	234	280	40	80	730
75	50	100	150	200	250	300	40	80	820



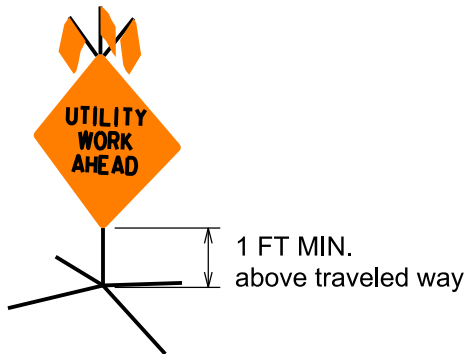
Note: cone/drum spacing may be reduced based on posted advisory speed in curves

SIGNS



* If lateral distance is not practical, the sign may be placed no less than 2 feet.

- All signs shall be visible to the drivers (i.e. no obstructions such as on street parking or other traffic control devices shall block the sign).
- On divided highways, signs shall be placed on the right and the left as shown on the TTC standards.
- 1 foot portable sign stands may be used if the work zone is in place for 12 hours or less and there are no more than 2 lanes in each direction.



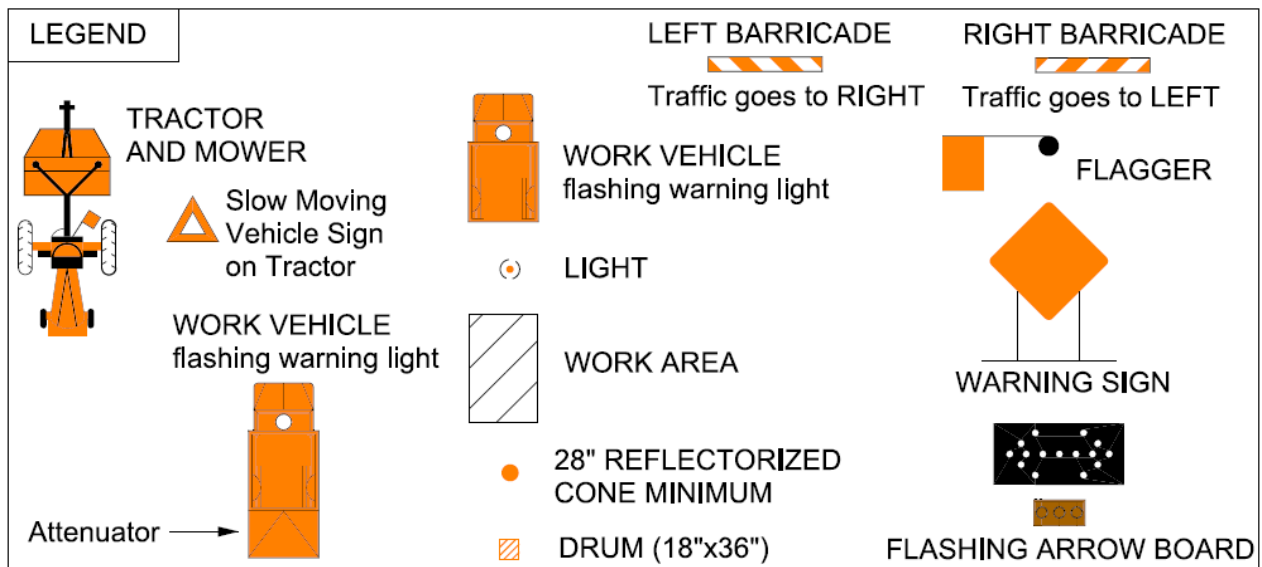
**MOBILE OPERATION
ROADSIDE MAINTENANCE
(beyond shoulder and in right-of-way or on median)**

- Continuously and Intermittently
- Two-lane and Multi-lane Road

These are roadside maintenance operations. With no lane or shoulder closure, the roadside maintenance operations require less control devices, and normally no flagger is needed. This rule holds true for both multi-lane and two-lane roadways. The crew vehicle with flashing warning lights may be on the shoulder for a short duration.

For the roadside maintenance functions, the work vehicle is equipped with a flashing light and the SLOW MOVING VEHICLE sign. An advance warning sign is placed on both shoulders. On two-lane roads a sign is placed at each end of the work area to warn traffic approaching from both directions. As the work progresses, the warning signs should never be more than three miles from the work area. Warning signs should be relocated as needed to meet this requirement.

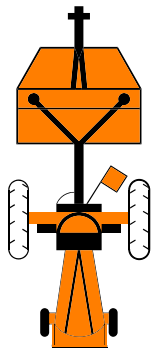
Normally, a flagger is not assigned for a roadside maintenance operation. However, the foreman may use a crew member to flag traffic when a piece of equipment is being moved on or across the highway.



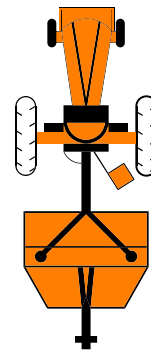
**MOBILE OPERATION
ROADSIDE MAINTENANCE**
(beyond shoulder and in right-of-way
or on median)

- Continuously and Intermittently
- Two-Lane and Multi-Lane Road

Minimum Requirements



Tractor is mounted with slow moving vehicle sign, flags, and flashing warning light.



Tractor is mounted with slow moving vehicle sign, flags, and flashing warning light.



Up to three miles

**MOBILE OPERATION
SHOULDER MAINTENANCE**

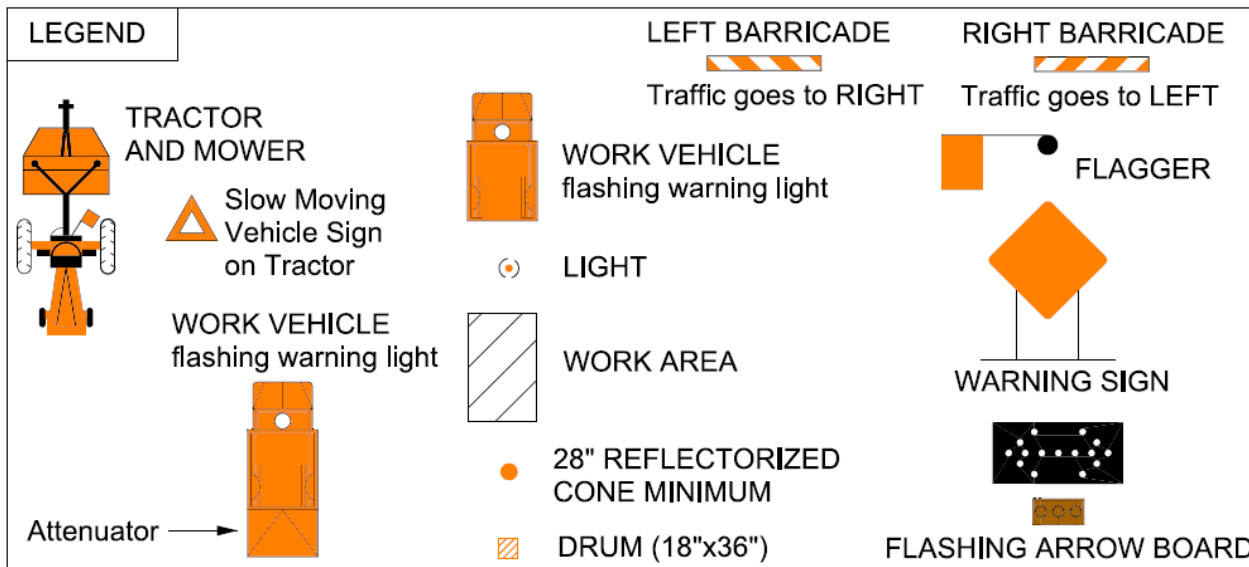
- **Short Duration (up to 1 hour)**
- **Continuously Slow Moving (less than 3 miles per hour)**
- **Two-lane and Multi-lane Roads**

Normally, crew members working on the shoulder are not exposed to traffic moving in the open lane. However, their position right next to the traffic lane exposes them to careless or reckless drivers. For "short duration" repairs such as Premix Patching on Shoulders the work vehicle with flashing warning light serves as a warning device.

Even though the crew may be working along a lightly traveled road, the work vehicle should be used to protect them whenever possible. Cones are optional.

Usually for the slow moving shoulder operations, such as blading, the work vehicle (mounted with a flashing warning light) provides sufficient warning to passing motorists. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

If a crew member doing shoulder repairs is walking in the traffic lane, then he must be protected. Another work vehicle equipped with a flashing warning light could be used for crew protection. For the "short duration" or mobile operation (less than 3 mph) and work sites that are confined to the shoulders, the minimum traffic control is the work vehicle itself, mounted with a flashing warning light.





MOBILE OPERATION SHOULDER MAINTENANCE

- Short Duration (Up to 1 Hour)
- Continuously Slow Moving (Less Than 3 Miles Per Hour)
- Two-Lane and Multi-Lane Roads

Minimum Requirements

Work vehicle is mounted with flashing warning light.

Use rollahead distance required by the manufacturer. See Attachment - 1 for recommended spacing.

roll ahead distance

Up to three miles

Arrow board optional. (Caution Mode Arrows are to be used for this function.)

Use another work vehicle equipped with flashing warning light for crew protection when available.

Attenuator (optional)

Cones are optional.



Crewman flags if needed.

See Flagging Procedures page 35.

See p. 9
Shoulder
Taper
Spacing



SHOULDER MAINTENANCE

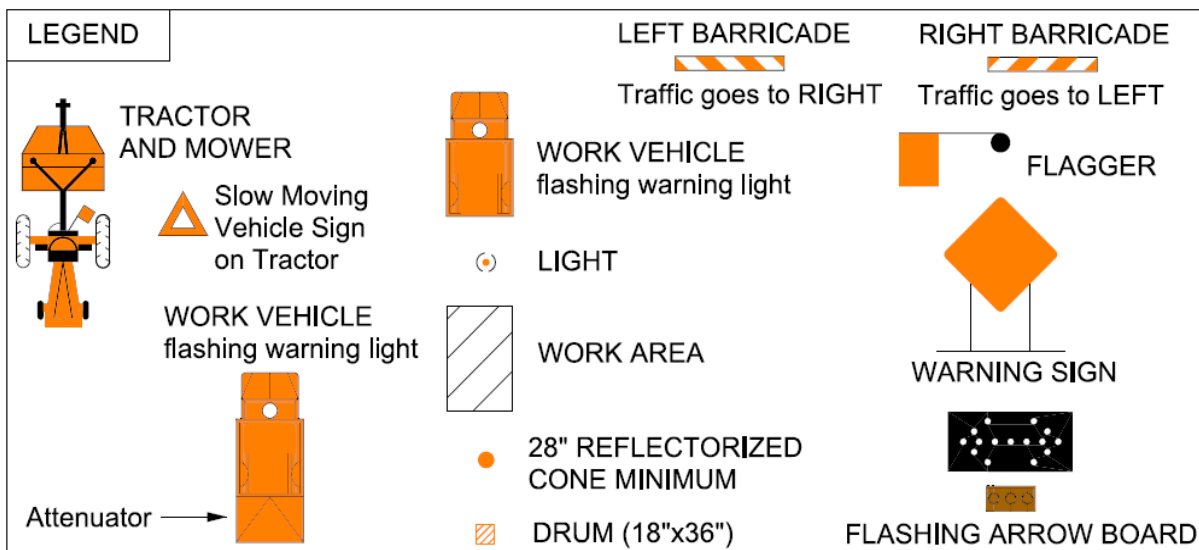
- **Short-Term Stationary
(1 to 12 hours)**
- **Two-lane Roads**

These are situations requiring traffic controls for a shoulder operation lasting over one hour on two-lane roads. If the travel lanes become less than 10 feet once the cones are placed, then a lane will need to be closed. See page 20 for lane closure. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The work vehicle is mounted with a flashing warning light. Advance warning signs reading ROAD WORK AHEAD are placed at both ends of the work to warn drivers approaching from both directions.

The distance the sign is placed from the work area is based on the posted speed limit as shown on the table below. Add crewman flags if needed.

Speed Limit (prior to construction)	Sign Spacing
≤ 40 mph	500 FT
45 – 50 mph	1000 FT
≥ 55 mph	1500 FT



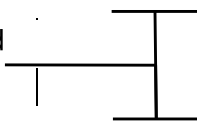


Use roll ahead distance required by the manufacture. See Attachment - 1 for recommended spacing.



See Table p. 13 Left for sign spacing

roll ahead distance



See p. 9 Shoulder Taper Spacing

See Table p. 13 Left for sign spacing



SHOULDER MAINTENANCE
• Short-Term Stationary (1 to 12 Hours)
• Two-Lane Roads

Minimum Requirements

End of the work zone.

All work vehicles are mounted with flashing warning light.

* When work is complete and shoulder is still closed, place a Type III barricade on both sides of work area.

Crewman flags if needed.

See Flagging Procedures page 35.

Attenuator (optional)



SHOULDER MAINTENANCE

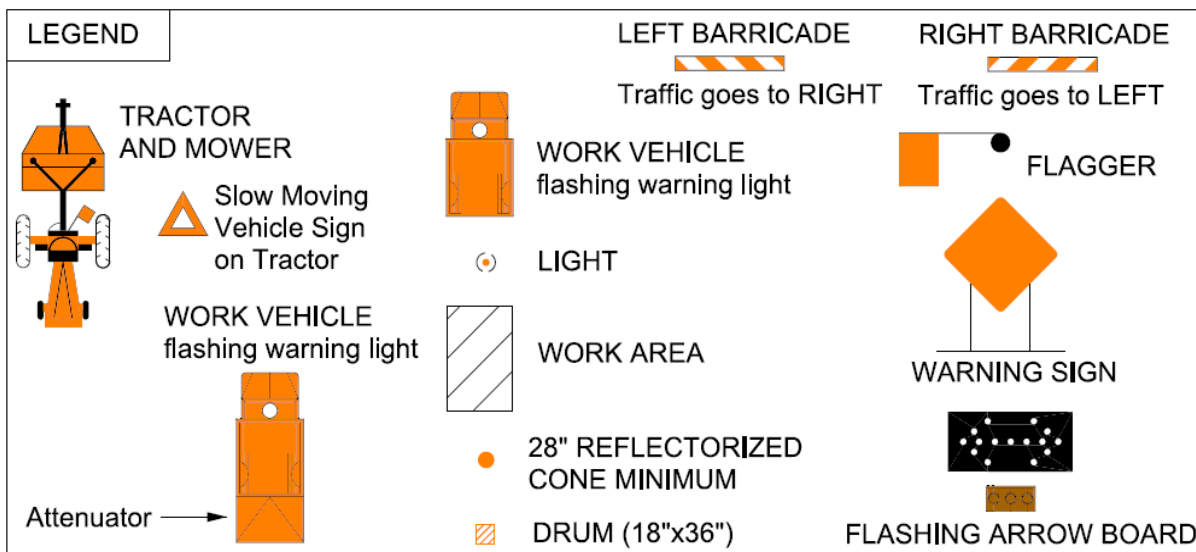
- **Short-term Stationary
(1 to 12 hours)**
- **Multi-lane Roads**

These are situations requiring traffic controls for a shoulder operation lasting more than one hour on multi-lane roads. If the travel lanes become less than 10 feet once cones are placed, then a lane will need to be closed. See page 20 for lane closure. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The work vehicle is mounted with a flashing warning light. Advance warning signs reading ROAD WORK AHEAD are used.

The distance the signs are placed from the work area is based on the posted speed limit as shown on Table below.

Speed Limit (prior to construction)	Sign Spacing
≤ 40 mph	500 FT
45 – 50 mph	1000 FT
≥ 55 mph	1500 FT



SHOULDER MAINTENANCE

- Short-Term Stationary (1 to 12 Hours)
- Multi-Lane Roads

Minimum Requirements

Use roll ahead required by the manufacturer. See Attachment -1 for recommended spacing.

roll ahead distance

All work vehicles are mounted with flashing warning light.

See tables page 9 for cone spacing.

* When work is complete and shoulder is still closed, place a Type III barricade on front side of work area.

Attenuator (optional)

See Table p. 14 Left for minimum sign spacing.

See Shoulder Taper Spacing p. 9

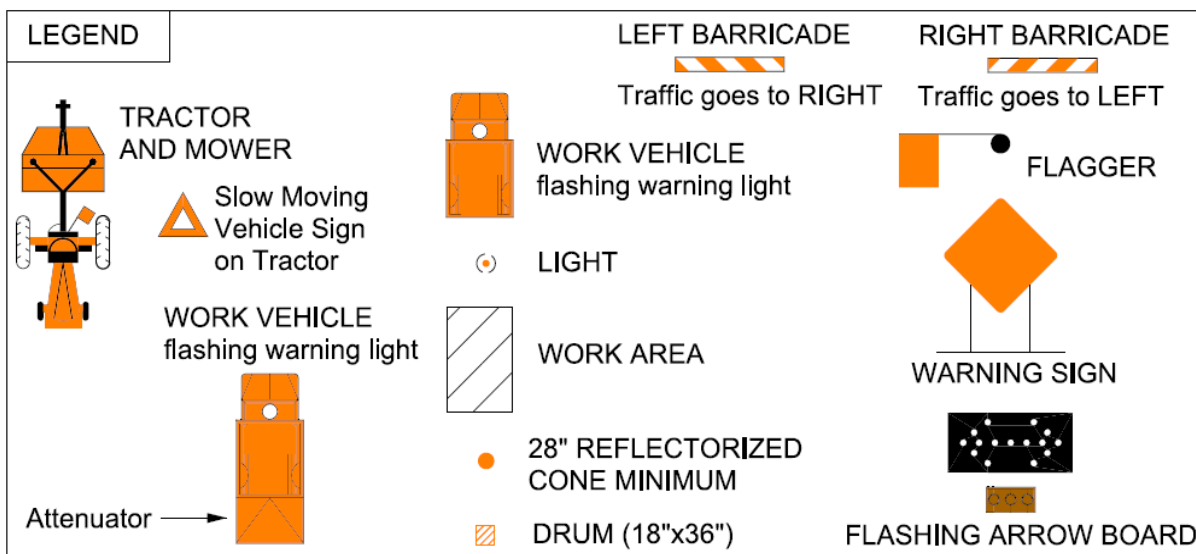


MOBILE SHOULDER OPERATION

- Continuously **FAST** Moving
(3 miles per hour or faster)
- Two-lane Roads

Under normal conditions, you do not need advance warning signs for a mobile operation work site. The work vehicle is equipped with a flashing warning light. Another work vehicle equipped with flashing warning light and a ROAD WORK AHEAD sign mounted on the back is at the beginning of the work area. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

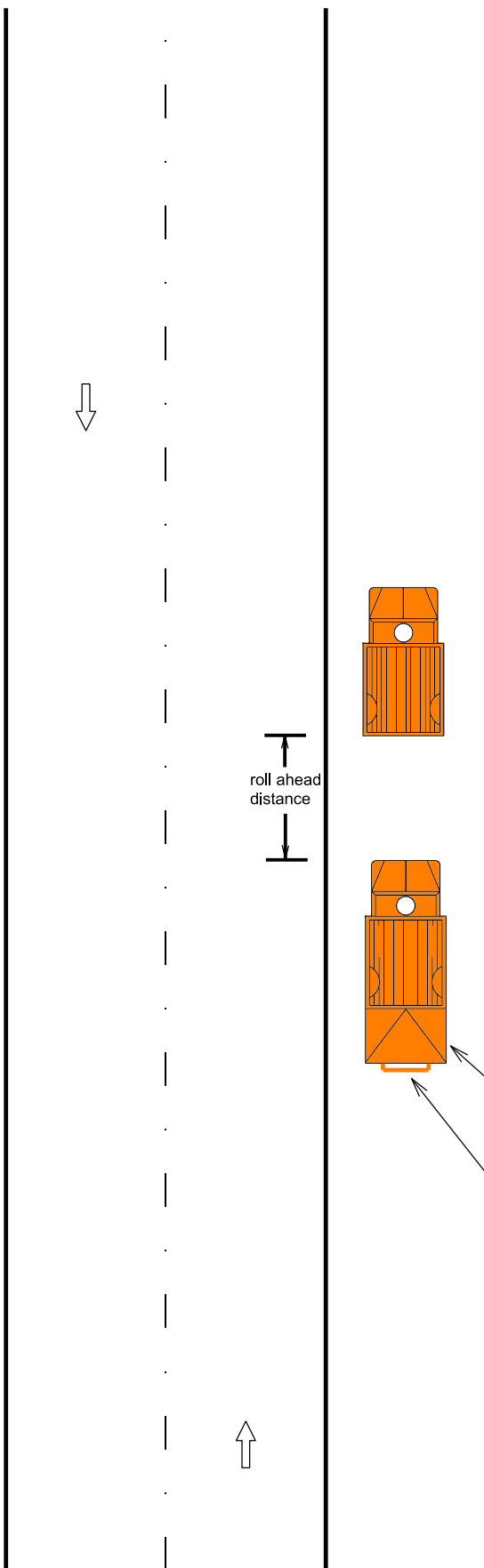
For striping operations and pavement marker installations, see page 33.



MOBILE SHOULDER OPERATION

- Continuously Fast Moving (3 Miles Per Hour or Faster)
- Two-Lane Roads

Minimum Requirements



All work vehicles are mounted with flashing warning lights.

Arrow panel mounted on truck when no follow truck present. (Caution Mode)

Use rollahead distance required by the manufacturer. See Attachment - 1 for recommended spacing.

Use another work vehicle equipped with flashing warning light and ROAD WORK AHEAD sign mounted on the back. (when available).

Attenuator (optional)



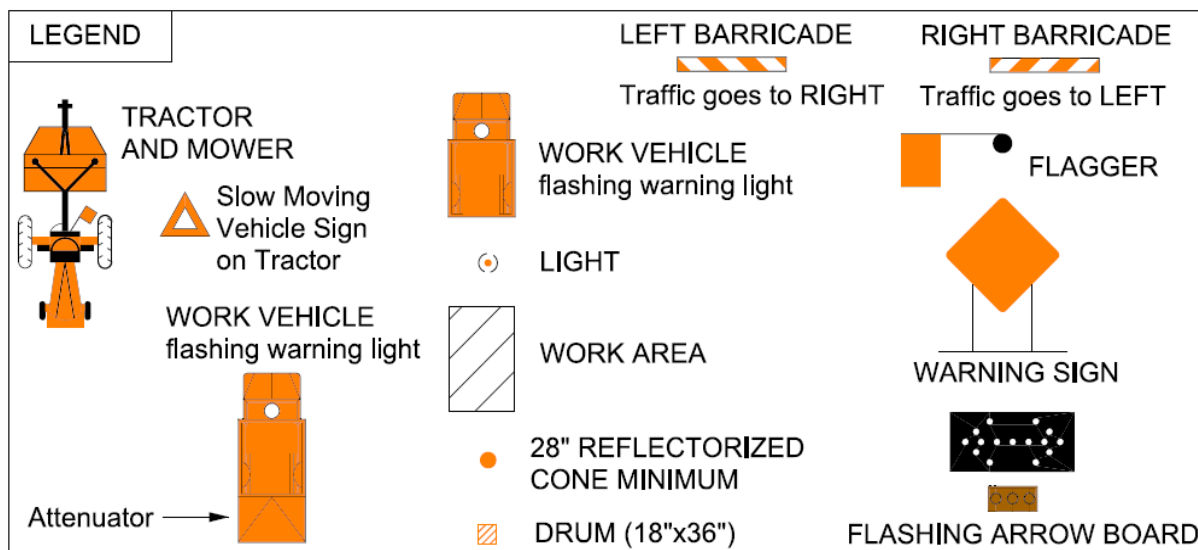
Use emergency flashers and flashing warning light.

MOBILE OPERATION

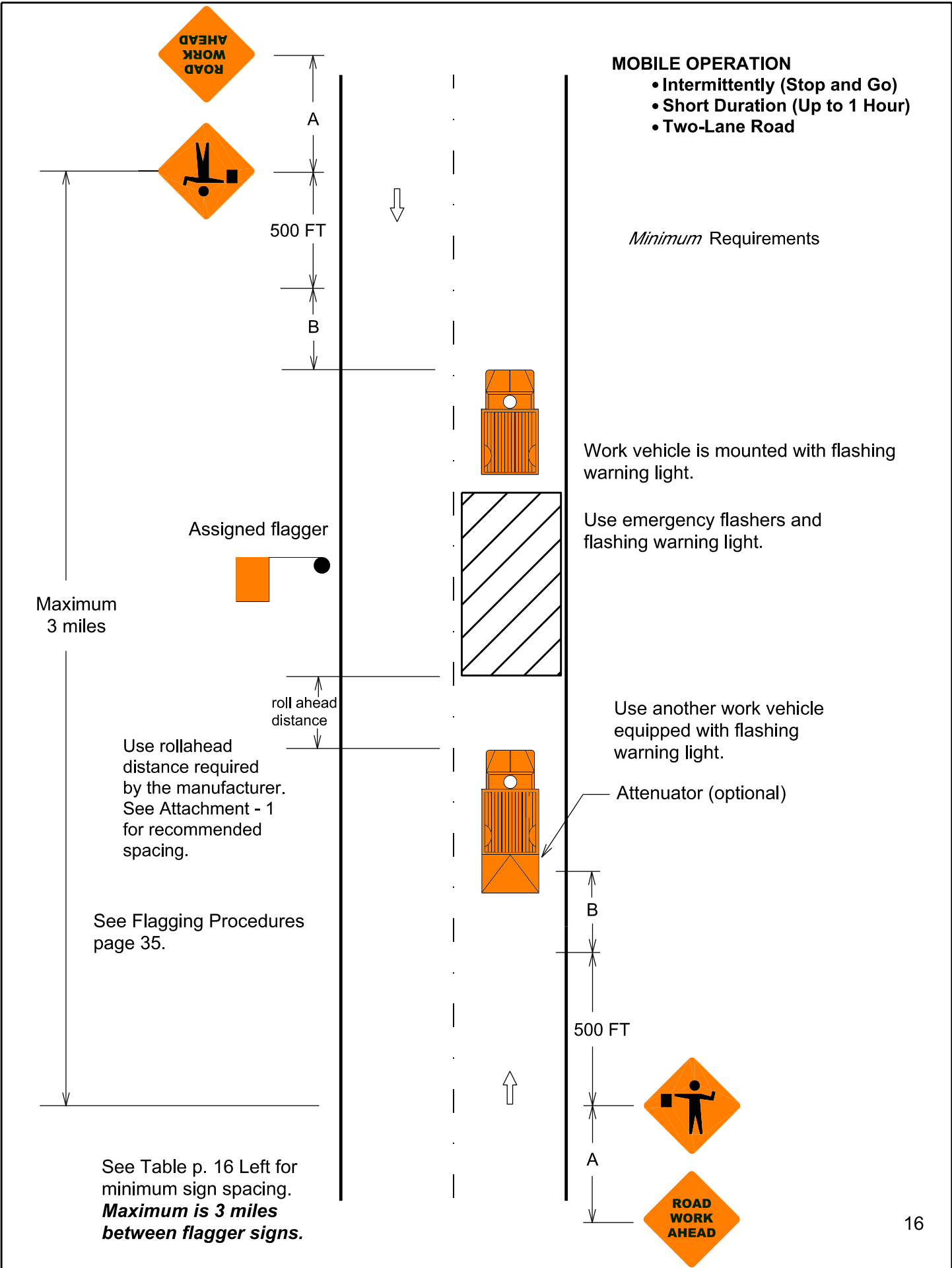
- Intermittently (stop and go)
- Short Duration (up to 1 hour)
- Two-lane Road

Traffic control for a Short Duration (up to one hour) Intermittently (stop and go) Mobile Operation on a two-lane road with a low volume of traffic will consist of the work vehicle mounted with a flashing warning light for crew protection.

The foreman will select a crew member to act as a flagger if one is needed. The assigned flagger shall be stationed on the shoulder across from the work site. Use another work vehicle equipped with flashing warning light and Road Work Ahead sign. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.



SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT



MOBILE OPERATION

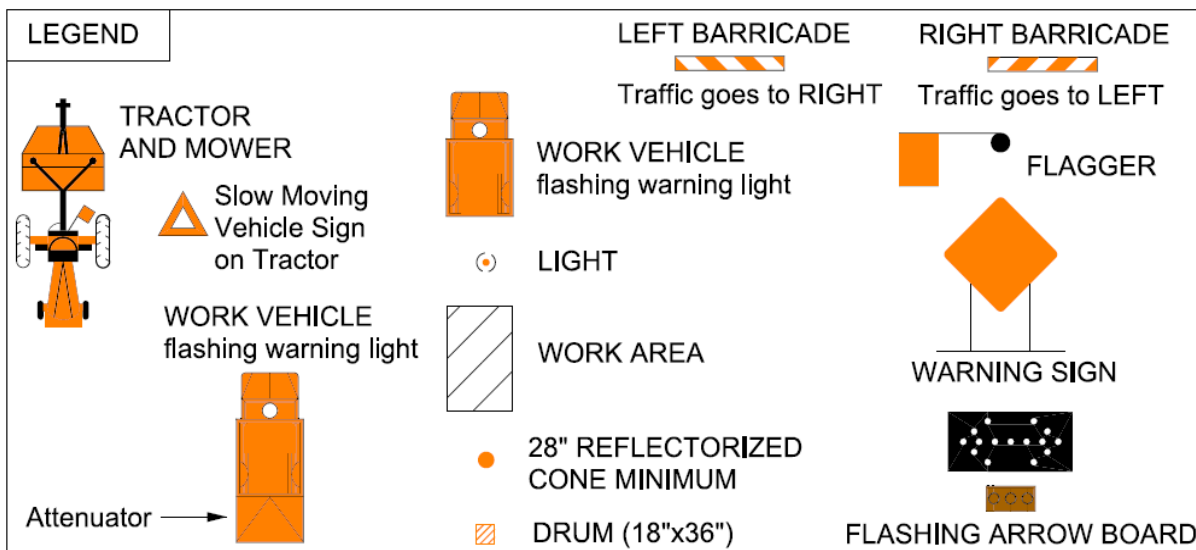
- Intermittently (stop and go)
- Short Duration (up to 1 hour)
- Two-lane Road
- Sight Obstruction

For mobile operations lasting up to one hour affected by a sight obstruction, use the advance warning signs, ROAD WORK AHEAD, ONE LANE ROAD AHEAD and FLAGGER SYMBOL signs at each end of the work zone.

Two flaggers shall be assigned. They are stationed on opposite shoulders in clear view of the approaching traffic. Flagger must be visible to each other or use radios. A mandatory third flagger/spotter must be used for crew protection. Use another work vehicle equipped with flashing warning light. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The distance the signs are placed from the work area is based on the posted speed limit as shown on table below.

SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT



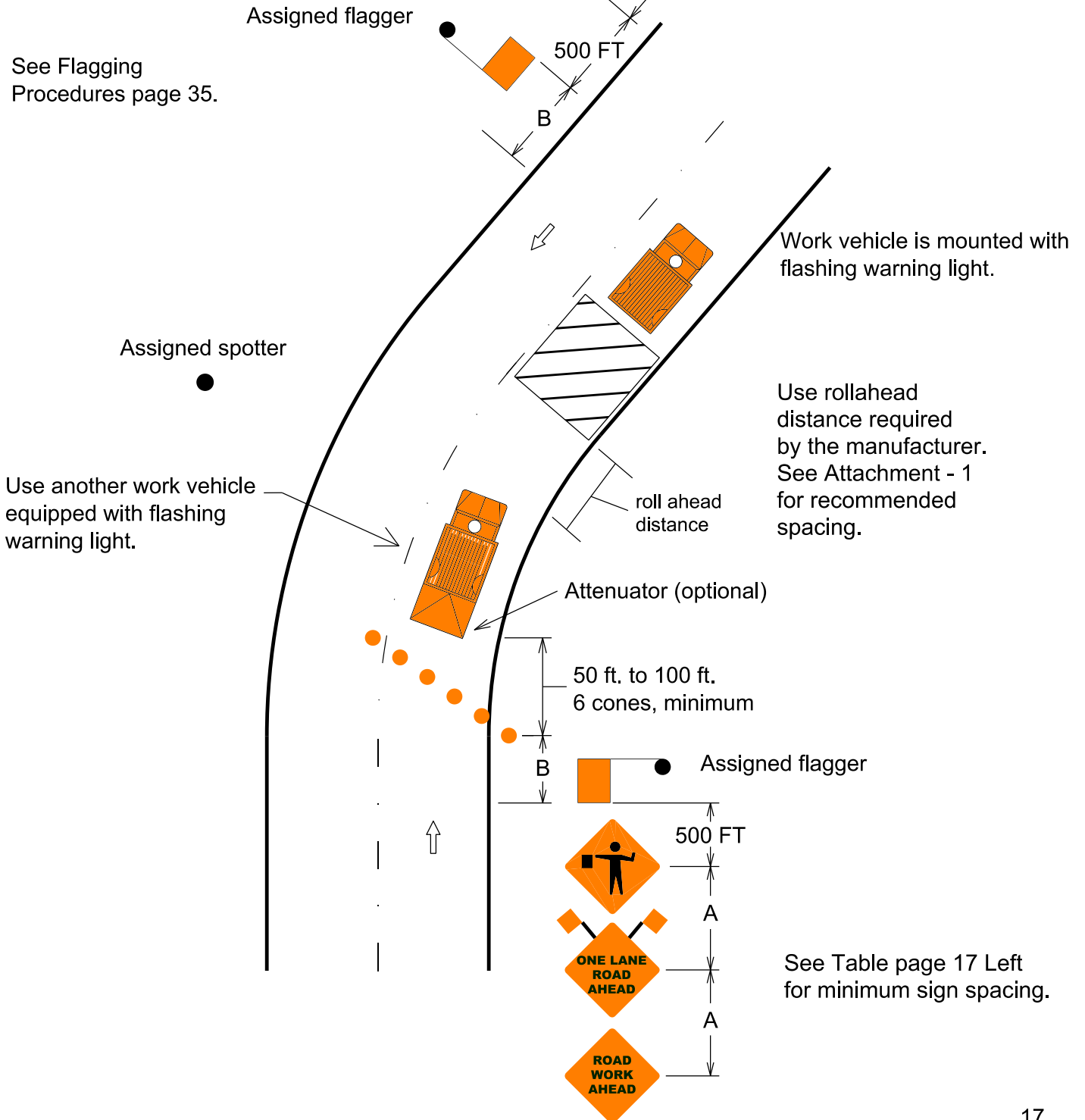
MOBILE OPERATION

- Intermittently (Stop and Go)
- Short Duration (Up to 1 Hour)
- Two-Lane Road
- Sight Obstruction

Minimum Requirements

See Flagging Procedures page 35.

See Table page 17 Left for minimum sign spacing.



TEMPORARY ROAD CLOSURE

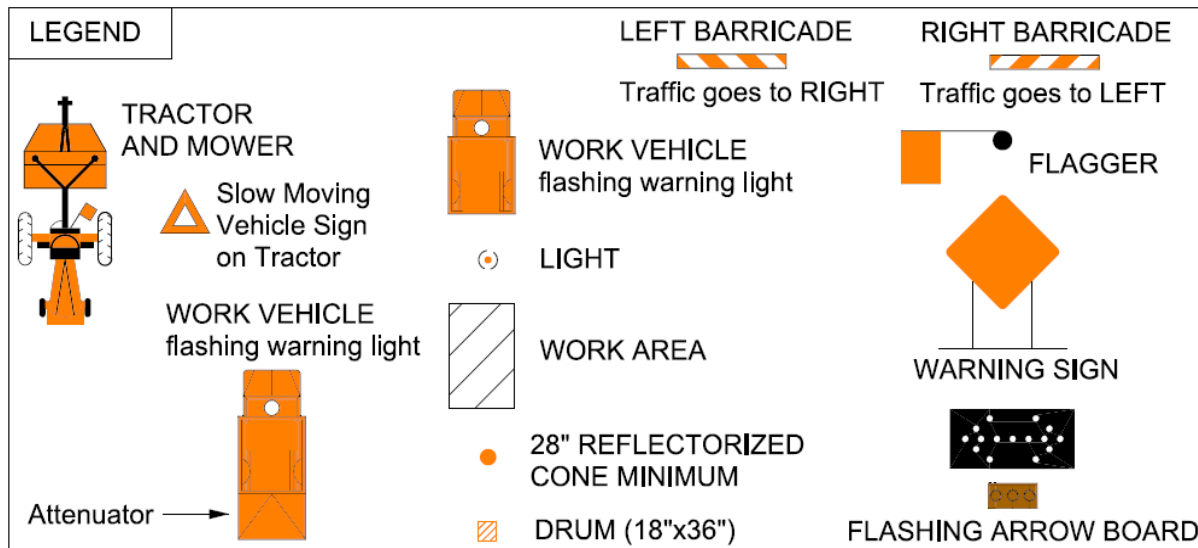
- Two-Lane Road
(closed up to 20 minutes)

A flagger is stationed at each end to control traffic approaching from each direction. The flaggers shall stop the first vehicle from the position shown, then move to the centerline to stop approaching traffic. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

Three Advanced Warning Signs are installed at each end of the work area. They are the ROAD WORK AHEAD, BE PREPARED TO STOP (optional), and the FLAGGER SYMBOL sign. As progress is made during the working day, it will be necessary to relocate the signs.

* The time is limited to 20 minutes because if longer than 20 minutes, the traffic may back-up beyond the advance warning signs.

SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT



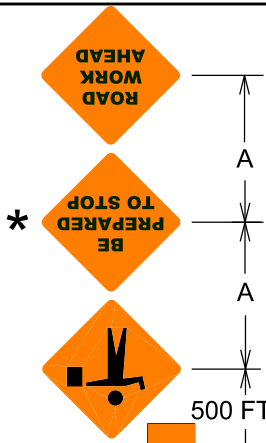
See Table page 18 Left for minimum sign spacing

Maximum 3 miles

Use rollahead distance required by the manufacturer. See Attachment -1 for recommended spacing.

Maximum is 3 miles between flagger signs.

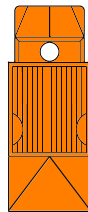
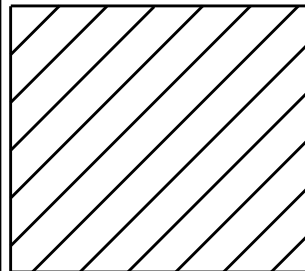
* Optional



Assigned flagger

Attenuator (optional)

roll ahead distance



TEMPORARY ROAD CLOSURE
 • Two-Lane Road
 (Closed up to 20 Minutes)

Minimum Requirements

Before removing traffic control devices, provide temporary centerline delineation whenever centerline is obliterated. Temporary delineation can be used until striping can be scheduled.

Work vehicle is mounted with flashing warning light.

Two assigned flaggers move along with project.

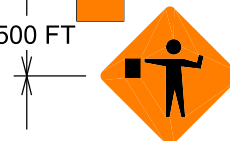
See Flagging Procedures page 35.

roll ahead distance

Attenuator (optional)

Assigned flagger

500 FT



See Table page 18 Left for minimum sign spacing

LANE CLOSURE

- **Two-Lane Road**
- **Short Duration
(Up to 1 Hour)**
- **Short-Term Stationary
(1 to 12 Hours)**
- **Sight Obstruction**

Advance warning signs, ROAD WORK AHEAD, ONE LANE ROAD AHEAD and the FLAGGER SYMBOL sign are placed at both ends. Many times the entire work site will be hidden from the driver. For this reason, it is most important that we use our signs to warn traffic before they reach the sight obstruction.

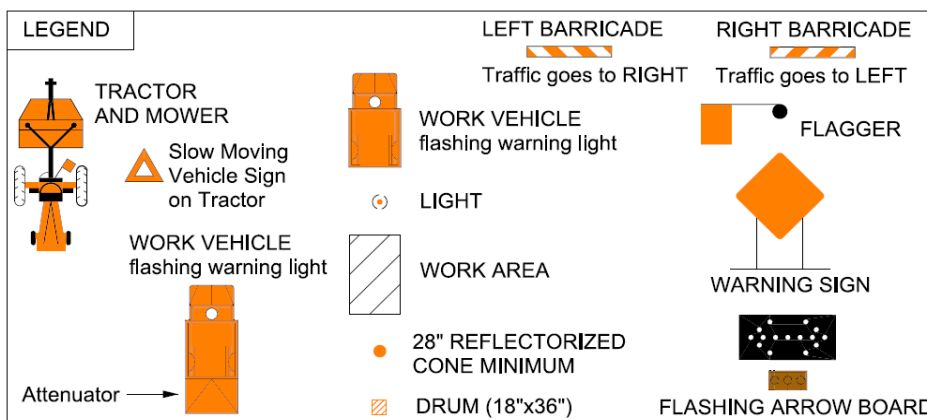
If the work site is a little farther from the curve in the road, there is a change in the placement of the warning signs. Rather than place the ROAD WORK AHEAD sign in the curve of the road, it is moved farther from the work site to a straight portion of the road.

Traffic must be warned before reaching the sight obstruction. Assign two flaggers and set up three advance warning signs, regardless of traffic conditions. Flaggers must be able to see each other or radios must be used. A third flagger/spotter may be used for crew protection.

The work vehicle is mounted with a flashing warning light. Use another work vehicle with flashing warning lights. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The distance the signs are placed from the work area is based on the posted speed limit as shown on table below.

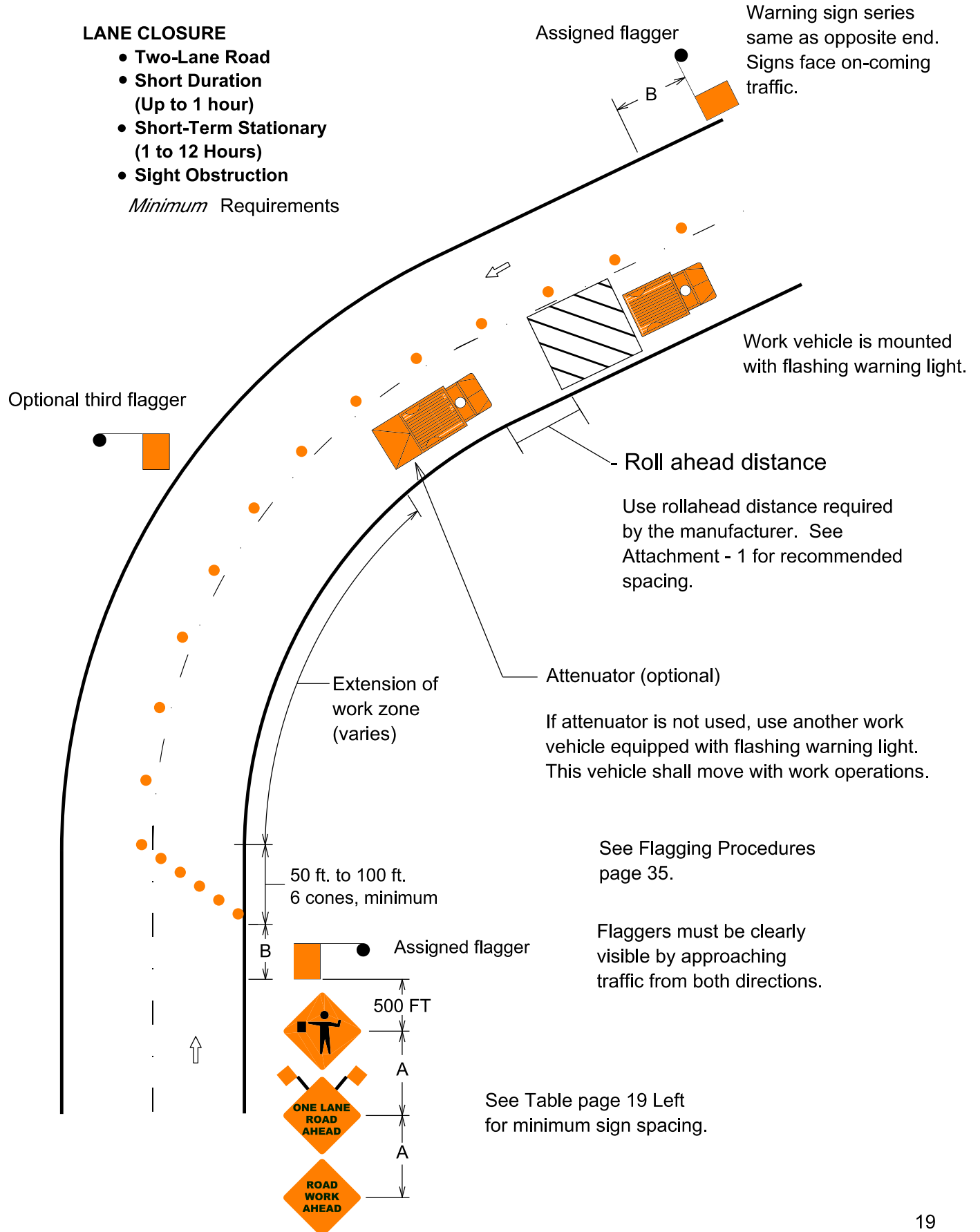
SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT



LANE CLOSURE

- Two-Lane Road
- Short Duration (Up to 1 hour)
- Short-Term Stationary (1 to 12 Hours)
- Sight Obstruction

Minimum Requirements



LANE CLOSURE

- Two-Lane Road
- Short Duration
(Up to 1 Hour)
- Short-Term Stationary
(1 to 12 Hours)

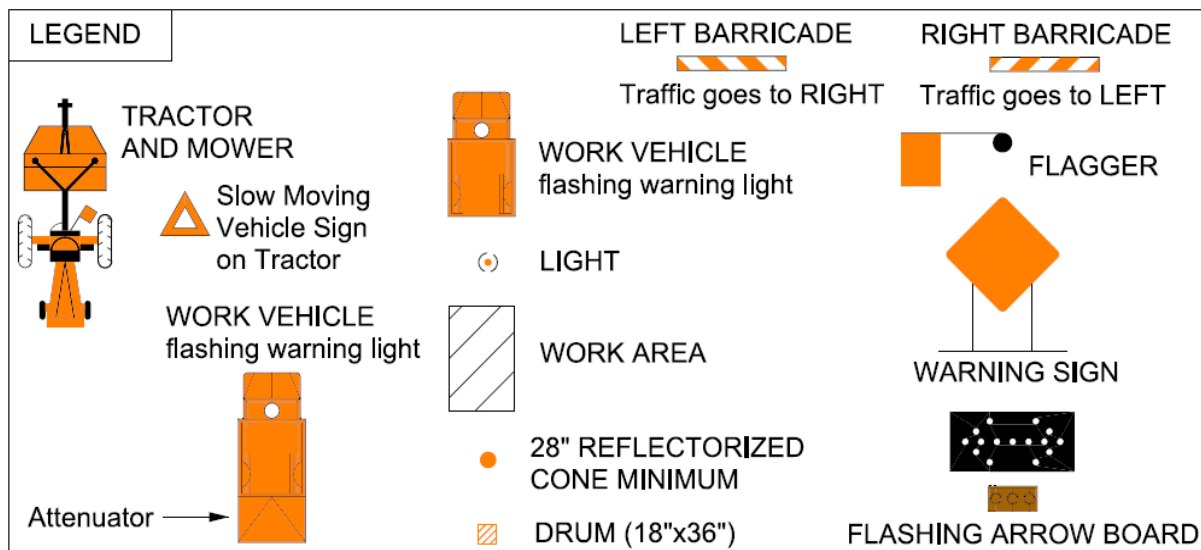
Advance warning signs, ROAD WORK AHEAD, ONE LANE ROAD AHEAD, and FLAGGER SYMBOL sign are placed on both ends. A work site protection taper plus more cones outlining the entire work area are also used.

Two flaggers are used for this work area.

The work vehicle is mounted with a flashing warning light. Use another work vehicle with flashing warning lights. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The distance the signs are placed from the work area is based on the posted speed limit as shown on table below.

SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT



LANE CLOSURE

- Two-Lane Road
- Short Duration (Up to 1 Hour)
- Short-Term Stationary (1 to 12 Hours)

Minimum Requirements

Warning sign series same as opposite end. Signs face on-coming traffic.

Assigned flagger

B

Use rollahead distance required by the manufacturer. See Attachment - 1 for recommended spacing.

roll ahead distance

Attenuator (optional)

If attenuator not used, use another work vehicle equipped with flashing warning lights.

Before removing traffic control devices, provide temporary centerline delineation wherever centerline is obliterated. Temporary delineation can be used until striping can be scheduled.

Work vehicle equipped with flashing warning light.

Over 300 ft.

Distance Varies Min. 100 ft.

See Flagging Procedures page 35.

50 ft. - 100 ft. (max.) (6 cones min.)

Assigned flagger

B

500 FT

See Table page 20 Left for minimum sign spacing.



MOBILE OPERATION

- Intermittently (stop and go)
- Short Duration (up to 1 hour)
- Multi-Lane Road
- Exterior Lane Work

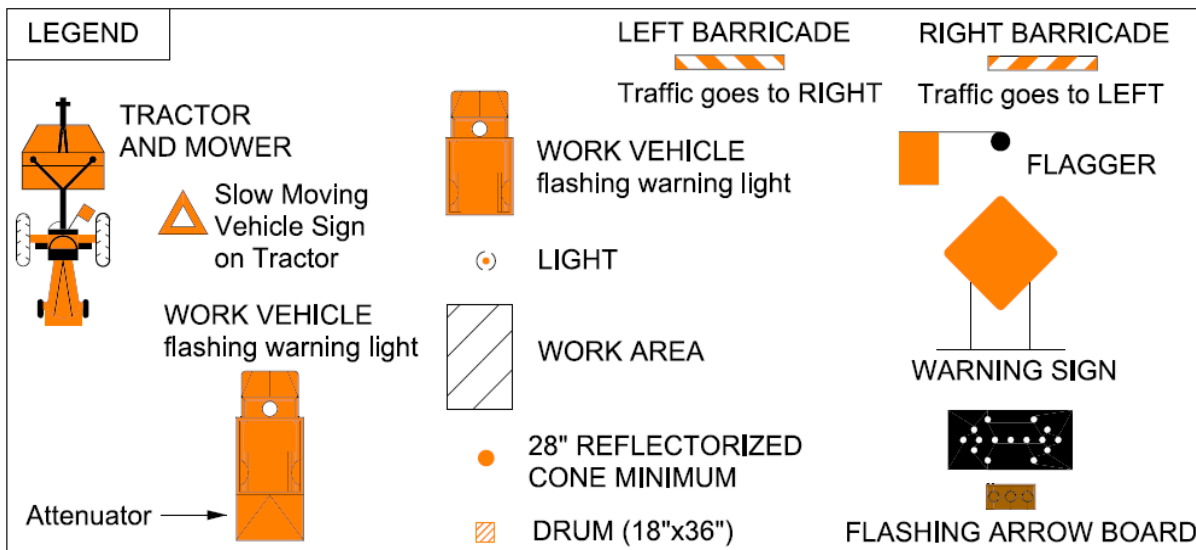
This operation requires work in an exterior lane on a multi-lane road for up to 1 hour.

Two work vehicles are required with flashing warning lights.

Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

Use a third work vehicle with flashing warning light and appropriate lane closure sign when available and where a shoulder exists.

With a site obstruction, a vehicle must be stationed on top of an overpass or hill or at a point where it can be seen from a distance of 750 feet or more.



MOBILE OPERATION

- Intermittently (Stop and Go)
- Short Duration (Up to 1 Hour)
- Multi-Lane Road
- Exterior Lane Work

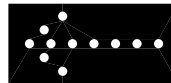
Minimum Requirements

Work vehicle is mounted with flashing warning light.

Use emergency flashers.

Use rollahead distance required by the manufacturer. See Attachment - 1 for recommended spacing.

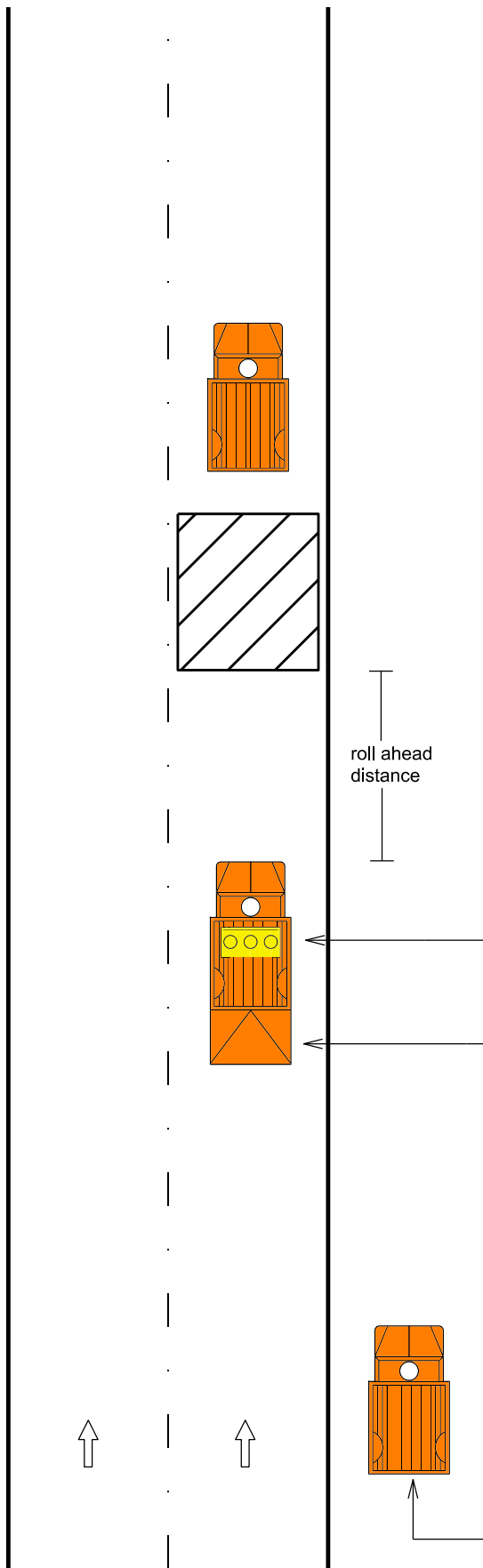
Second work vehicle equipped with flashing warning light. This vehicle shall move with work operations.



Attenuator (optional)

With a sight obstruction, a vehicle must be stationed on top of overpass or hill or at a point where it can be seen clearly from a distance of 750 feet or more.

Use a third work vehicle with flashing light and appropriate lane closure sign when available and where a shoulder exists.



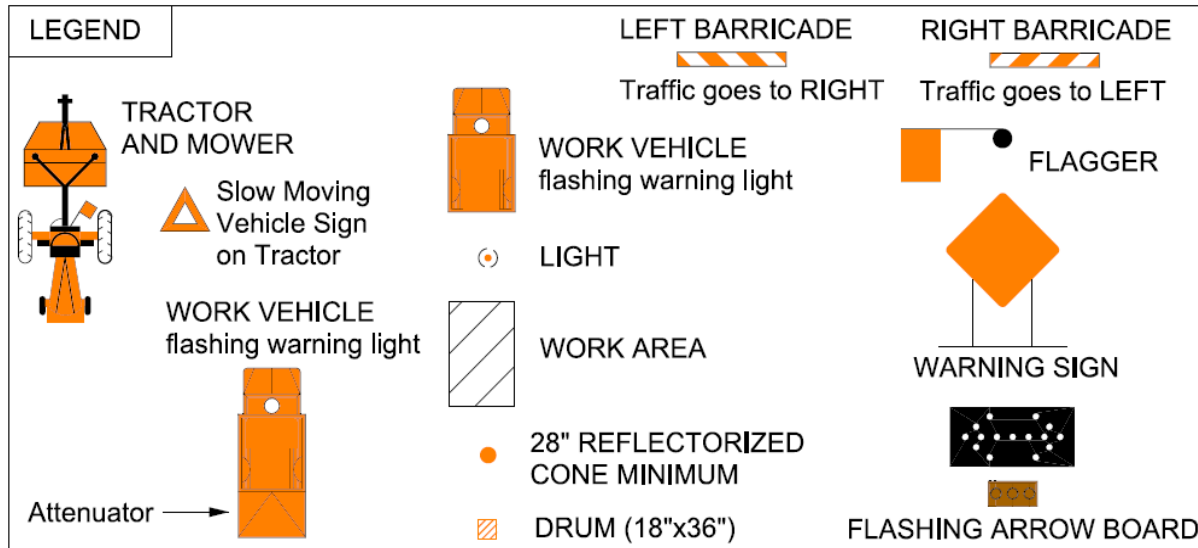
MOBILE OPERATION

- Continuously Fast Moving (3 miles per hour or faster)
- Multi-Lane Road
- Exterior Lane Work

This operation requires work in an exterior lane on a multi-lane road. Two work vehicles are used and are mounted with a flashing warning light. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

A third work vehicle with flashing warning light and appropriate lane closure sign may be used when available and when a shoulder exists.

With a sight obstruction, a vehicle must be stationed on top of the overpass or hill at a point where it can be seen clearly from a distance of 750 feet or more.



MOBILE OPERATION

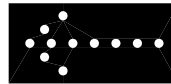
- Continuously Fast Moving (3 Miles Per Hour or Faster)
- Multi-Lane Road
- Exterior Lane Work

Minimum Requirements

Work vehicle is mounted with flashing warning light.

Use emergency flashers.

Use rollahead distance required by the manufacturer. See Attachment - 1 for recommended spacing.



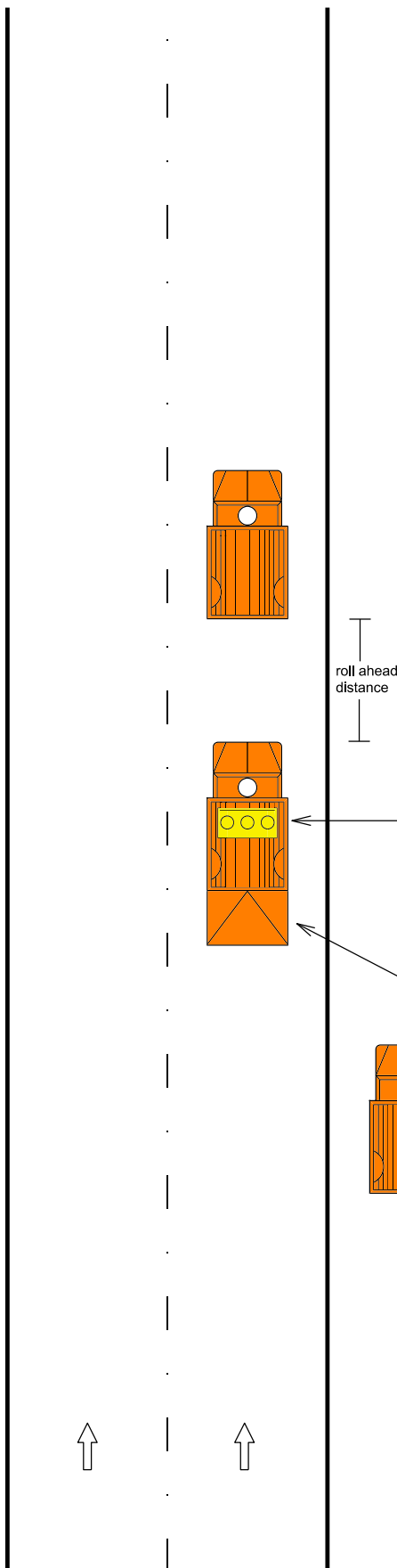
Second work vehicle equipped with flashing warning light. This vehicle shall move with work operations.

Attenuator (optional)

Use a third work vehicle with a flashing light and appropriate lane closure sign when available and where a shoulder exists.



With sight obstruction, a vehicle must be stationed on top of overpass or hill at a point where it can be seen clearly from a distance of 750 feet or more.



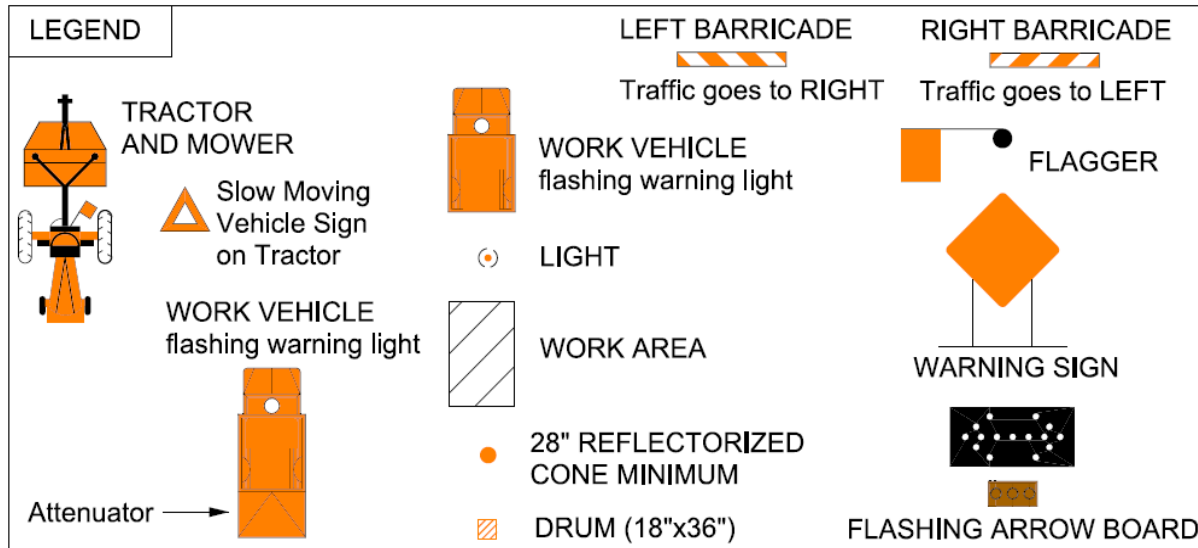
MOBILE OPERATION

- Continuously Fast Moving (3 miles per hour or faster)
- Multi-Lane Road
- Interior Lane Work

This operation requires work in an interior lane on a multi-lane road. Two work vehicles are used and are mounted with a flashing warning light. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

A third work vehicle with flashing warning light and appropriate lane closure sign may be used when available and when a shoulder exists.

With a sight obstruction, a vehicle must be stationed on top of the overpass or hill at a point where it can be seen clearly from a distance of 750 feet or more.



MOBILE OPERATION

- Continuously Fast Moving (3 Miles Per Hour or Faster)
- Multi-Lane Road
- Interior Lane Work

Minimum Requirements

Work vehicle is mounted with flashing warning light.

Use emergency flashers.

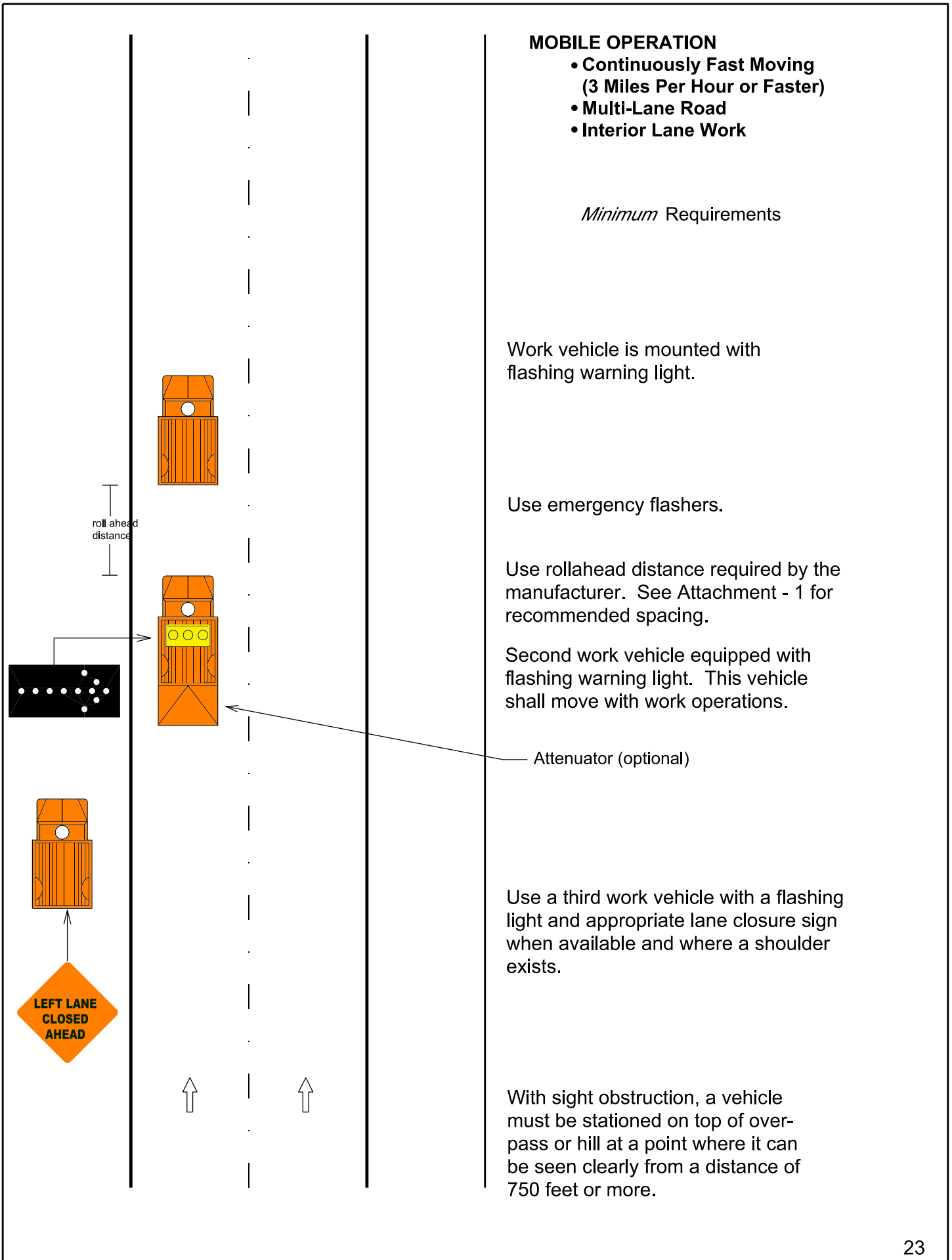
Use rollahead distance required by the manufacturer. See Attachment - 1 for recommended spacing.

Second work vehicle equipped with flashing warning light. This vehicle shall move with work operations.

Attenuator (optional)

Use a third work vehicle with a flashing light and appropriate lane closure sign when available and where a shoulder exists.

With sight obstruction, a vehicle must be stationed on top of overpass or hill at a point where it can be seen clearly from a distance of 750 feet or more.



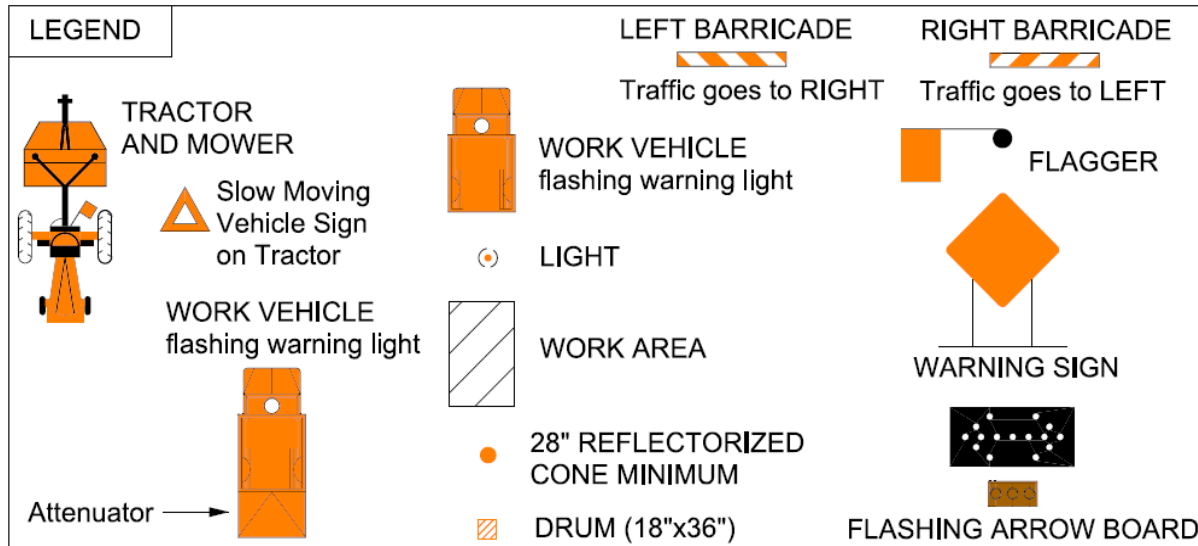
MOBILE OPERATION

- Intermittently (stop and go)
- Short Duration (up to 1 hour)
- Multi-Lane Road
- Interior Lane Work

This operation requires work in an interior lane for a short duration work function such as pothole patching on an open stretch of road with no sight obstruction. Even under ideal conditions, the interior lane work sites may be hazardous and should be completed as quickly as possible.

Two work vehicles are used and are mounted with flashing warning lights. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area. A third work vehicle with flashing warning light and appropriate lane closure sign may be used when available and when a shoulder exists.

With a sight obstruction, another work vehicle and arrow board must be stationed on top of the overpass or hill at a point where it can be seen clearly from a distance of 750 feet or more.



MOBILE OPERATION

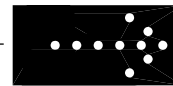
- Intermittently (Stop and Go)
- Short Duration (Up to 1 Hour)
- Multi-Lane Road
- Interior Lane Work

Minimum Requirements

Work vehicle is mounted with flashing warning light.

Use rollahead distance required by the manufacturer. See Attachment -1 for recommended spacing.

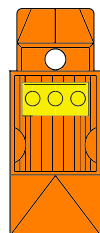
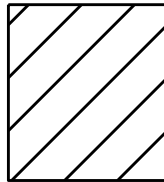
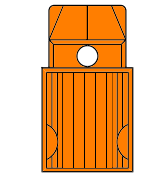
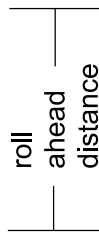
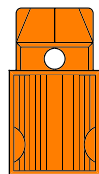
Second work vehicle equipped with flashing warning light. This vehicle shall move with work.



Attenuator (optional)

With a sight obstruction, another work vehicle and arrow board must be stationed on top of overpass or hill or at a point where it can be seen clearly from a distance of 750 feet or more.

Use a third work vehicle with flashing light and appropriate lane closure sign when available and where a shoulder exists.



LANE CLOSURE

- Multi-Lane Road
- Exterior Lane
- Short-Term Stationary
(1 to 12 hours)

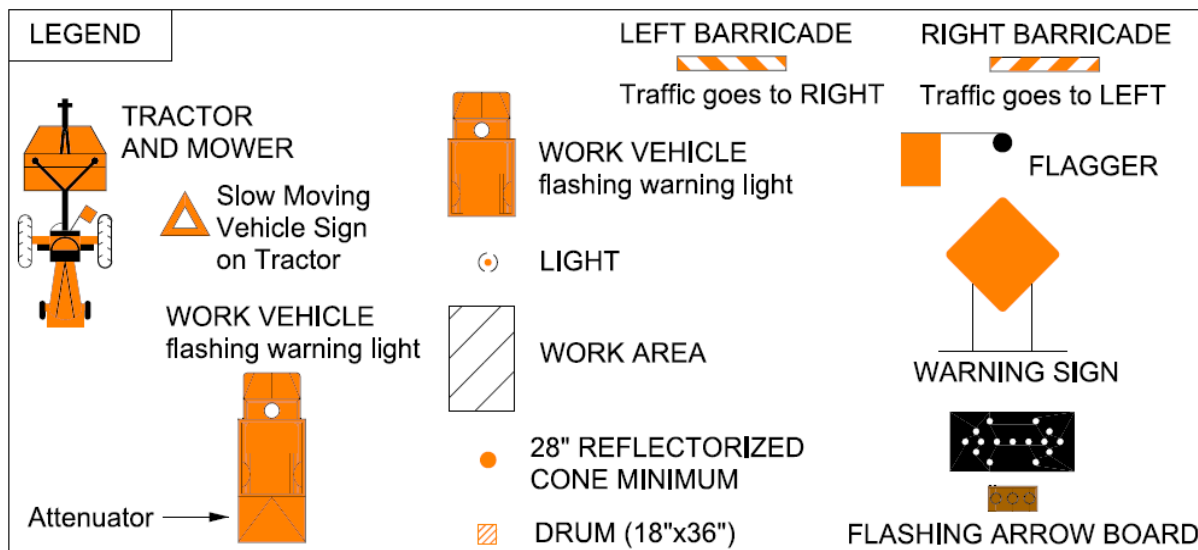
Warning signs must be placed on BOTH sides of the roadway.

Avoid closing a lane during peak traffic hours in the peak direction. All lane closures shall be approved by the District Traffic Operations Engineer.

The work vehicle is mounted with a flashing warning light. Use another work vehicle with flashing warning lights. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The distance the signs are placed from the work area and the taper lengths are based on the posted speed limit as shown on table below.

SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
45 mph	1000 FT	500 FT
50 mph	1000 FT	500 FT
≥ 55 mph	1640 FT	1000 FT



Use rollahead distance required by the manufacturer. See Attachment -1 for recommended spacing.

LANE CLOSURE

- Multi-Lane Road
- Exterior Lane
- Short-Term Stationary (1 to 12 Hours)

Minimum Requirements

Work vehicle is mounted with flashing warning light.

roll ahead distance

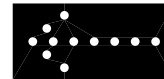
Use another work vehicle equipped with flashing warning light.

See charts p. 7 for merger taper length, cone spacing, and buffer space.

Buffer Space

Attenuator (optional)

Arrow board optional.



Shoulder



See Table page 25 Left for minimum sign spacing.

LANE CLOSURE

- Multi-Lane Road
- Exterior Lane
- Intermediate-Term stationary
(overnight to 3 days)
OR
- Long-Term Stationary
(more than 3 days)

OVERNIGHT LANE CLOSURES WILL BE PLANNED BY THE DISTRICT TRAFFIC OFFICE.

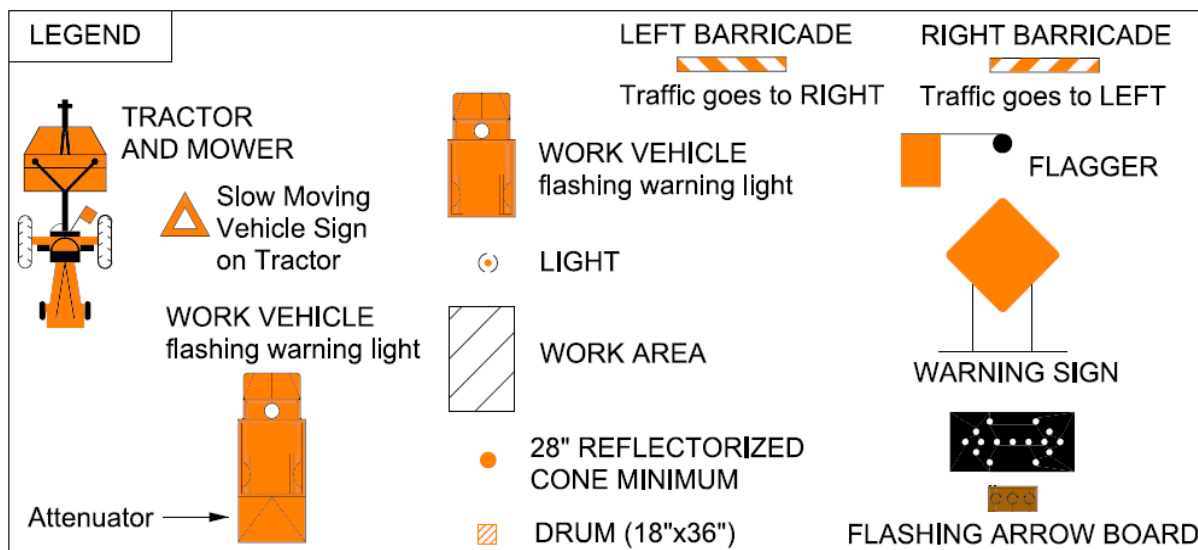
Certain work functions cannot be completed in one day, forcing DOTD to maintain traffic control through the night and for a second day or even longer.

A traffic control plan for an overnight lane closure for an exterior lane might look like the one shown here. Drums will be used instead of cones in the taper, and drums or super cones will be used in the tangent. **Use a flashing light (steady burn during nighttime) on each of the warning signs and channelization drums, as well as two on each barricade.** If practical, the closure should be made after the peak traffic hour on Friday and reopened before the peak traffic hour on Monday.

Provisions should be made by the superintendent for regular inspection of the work site. All lighting used in the traffic controls must be maintained in proper working order.

The distance the signs are placed from the work area is based on the posted speed limit as shown on table below.

SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT



LANE CLOSURE

- Multi-Lane Road
- Exterior Lane
- Intermediate-Term Stationary (Overnight to 3 Days) OR
- Long-Term Stationary (More than 3 Days)

Minimum Requirements

PLANNING DONE BY DISTRICT TRAFFIC OFFICE.

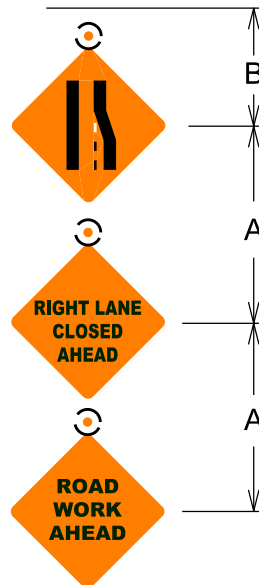
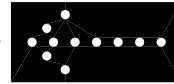
Use two flashing warning lights at each barricade. (Set lights to steady burn for overnight use.)

Buffer Space (zone)

This control is in place when workers not present.

See charts p. 7 for merger taper length, cone/drum spacing, and buffer space.

Arrow board



See Table page 26 Left for minimum sign spacing.

LANE CLOSURE

- Multi-Lane Road
- Interior Lane
- Long-Term Stationary
(Over-Night to 3 Days)

OVERNIGHT LANE CLOSURES WILL BE PLANNED BY THE DISTRICT TRAFFIC OFFICE.

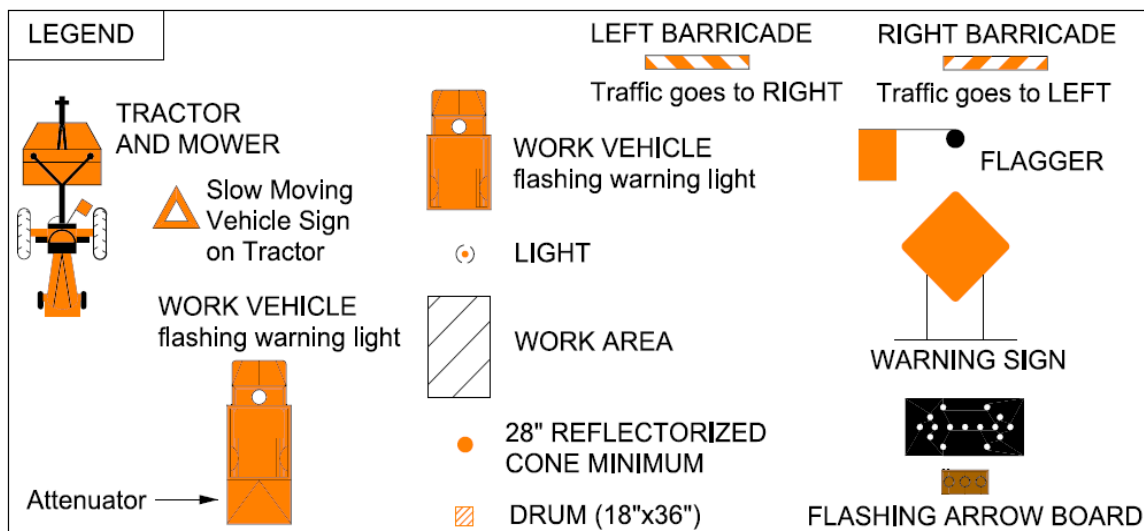
Usually a multi-lane road will carry a high volume of traffic. A low traffic situation might occur on a multi-lane road during off-peak hours or on a weekend. Because we have reduced three lanes to one lane, traffic will be delayed and slow moving even during off-peak hours. Close lanes after morning and afternoon peak traffic hours.

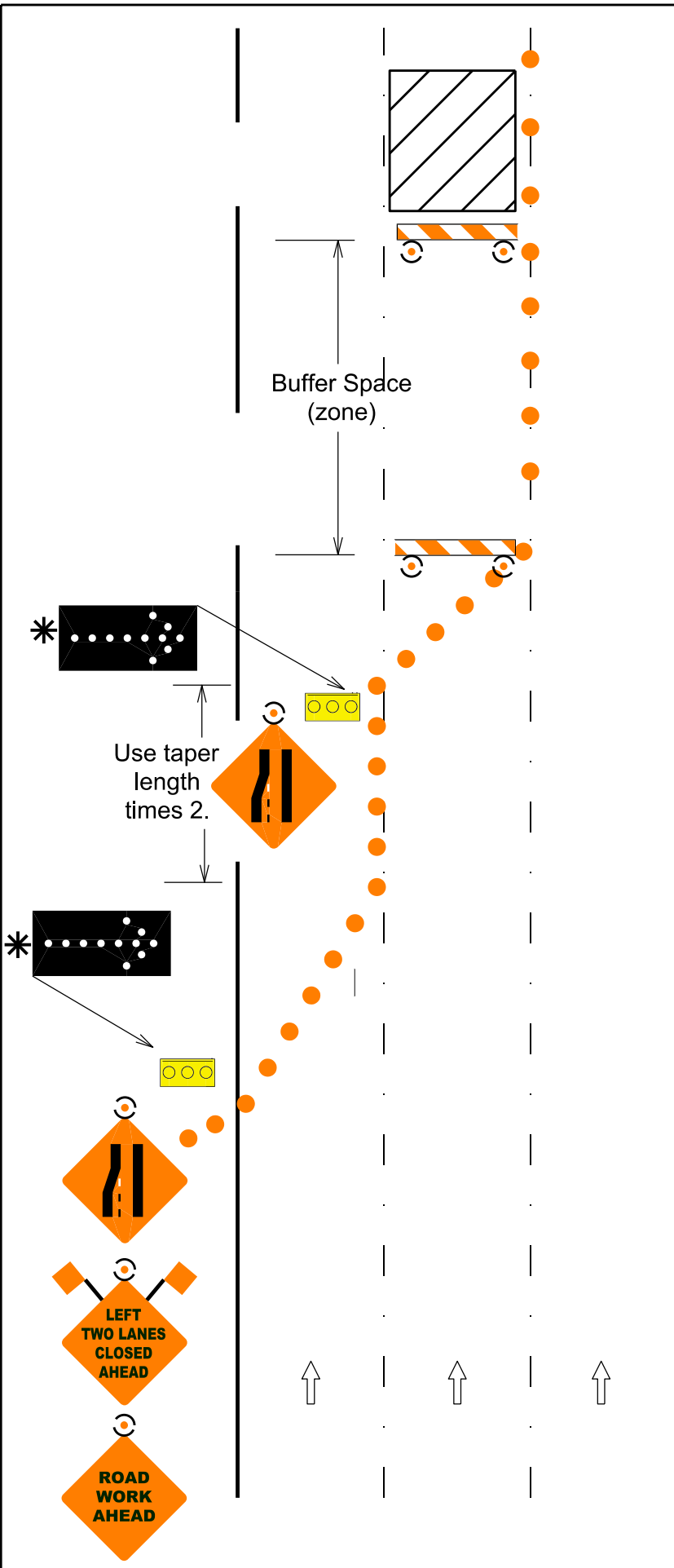
Use arrow boards at the beginning of each channelizing taper and use drums with lights (for nighttime) for channelization. For nighttime closures **use a steady burn light on each of the warning signs, as well as two on each barricade.**

The work vehicle is mounted with a flashing warning light. Use another work vehicle with flashing warning lights. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The distance the signs are placed from the work area is based on the posted speed limit as shown on table below.

SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT





LANE CLOSURE

- Multi-Lane Road
- Interior Lane
- Long-Term Stationary (overnight - 3 days)

Minimum Requirements

PLANNING DONE BY DISTRICT TRAFFIC OFFICE.

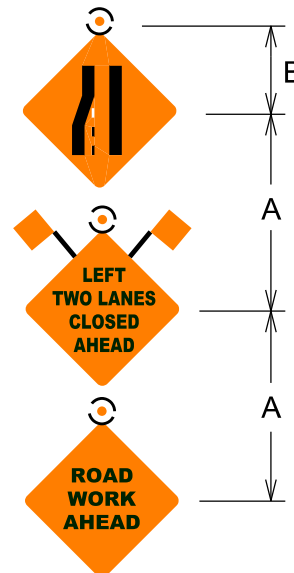
This control is in place when workers not present.

Use two flashing warning lights at each barricade. (Set to steady burn for overnight use.)

* Arrow boards are required on freeways, otherwise they are optional; however, if one is used the other must be used also.



See charts p. 7 for merger taper length, cone/drum spacing, and buffer space.



See Table page 27 Left for minimum sign spacing.

LANE CLOSURE

- Multi-Lane Road
- Interior Lane
- Short-Term Stationary (1-12 Hours)

OVERNIGHT LANE CLOSURES WILL BE PLANNED BY THE DISTRICT TRAFFIC OFFICE.

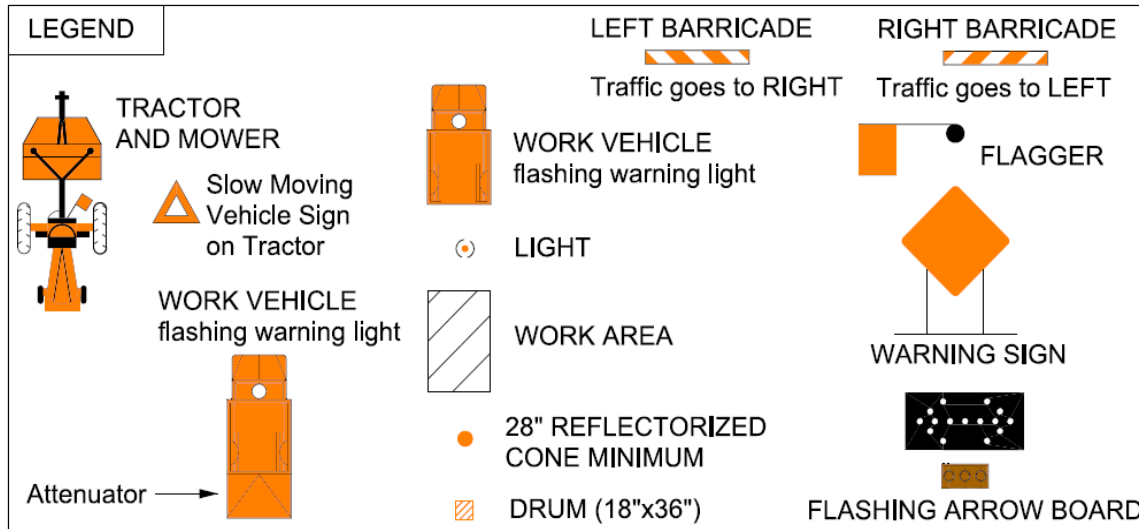
Usually a multi-lane road will carry a high volume of traffic. A low traffic situation might occur on a multi-lane road during off-peak hours or on a weekend. Because we have reduced three lanes to one lane, traffic will be delayed and slow moving even during off-peak hours. Close lanes after morning and afternoon peak traffic hours.

Use arrow boards at the beginning of each channelizing taper and use cones (daytime) or drums with lights (nighttime) for channelization. **For nighttime closures use a steady burn light on each of the warning signs, as well as two on each barricade.**

The work vehicle is mounted with a flashing warning light. Use another work vehicle with flashing warning lights. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The distance the signs are placed from the work area is based on the posted speed limit as shown on table below.

SPEED LIMIT (prior to construction)	SIGN SPACING	
	A	B
≤ 40 mph	500 FT	250 FT
45 – 50 mph	1000 FT	360 FT
> 50 mph	1500 FT	495 FT

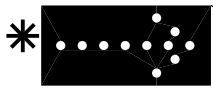


Work vehicle is mounted with a flashing warning light.

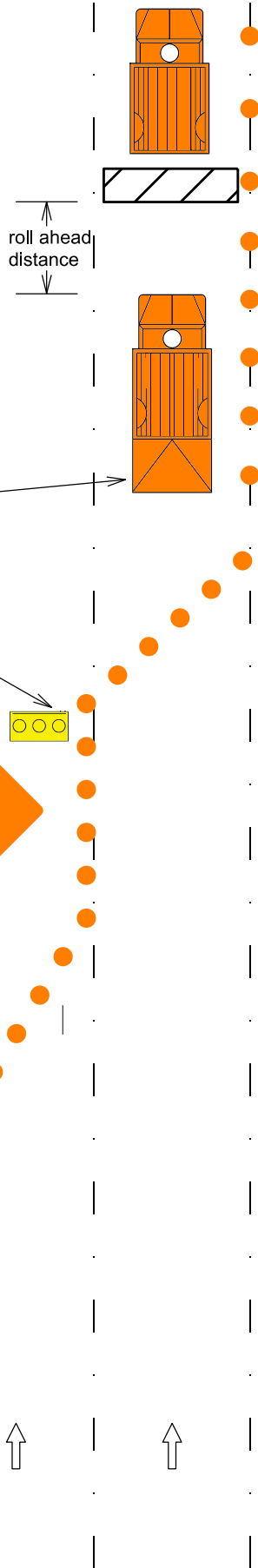
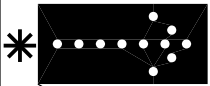
The roll ahead distance required by the manufacturer. See Attachment -1 for recommended spacing.

Use another work vehicle equipped with flashing warning light and arrow board.

Attenuator (optional)



Use taper length times 2.

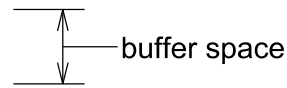


LANE CLOSURE

- Multi-Lane Road
- Interior Lane
- Short-Term Stationary (1-12 hours)

Minimum Requirements

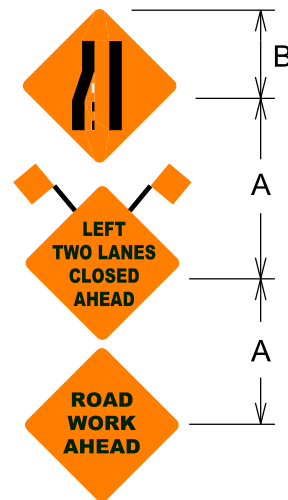
PLANNING DONE BY DISTRICT TRAFFIC OFFICE.



* Arrow boards are required on freeways, otherwise they are optional; however, if one is used the other must be used also.



See charts p. 7 for merger taper length, cone spacing, and buffer space.



See Table page 28 Left for minimum sign spacing.

LANE CLOSURE

- Multi-Lane Road
- Turning Lane
- Intermediate-Term Stationary (Overnight to 3 Days)
- Long Term Stationary (More than 3 Days))

OVERNIGHT LANE CLOSURES WILL BE PLANNED BY THE DISTRICT TRAFFIC OFFICE.

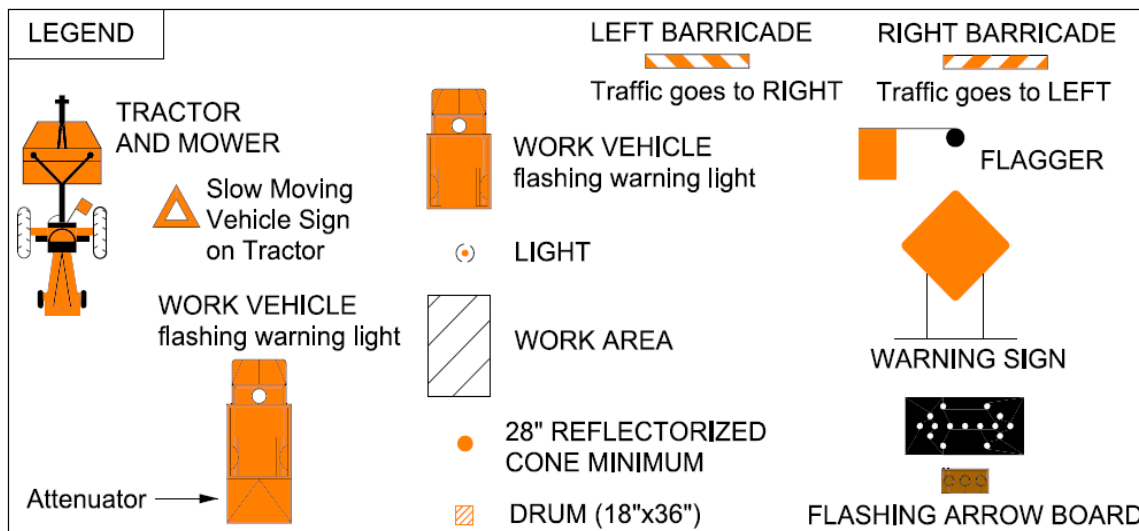
Usually a multi-lane road will carry a high volume of traffic. A low traffic situation might occur on a multi-lane road during off-peak hours or on a weekend. Because we have reduced three lanes to one lane, traffic will be delayed and slow moving even during off-peak hours. Close lanes after morning and afternoon peak traffic hours.

For nighttime closures, use a steady burn light on each of the warning signs and drums, as well as two on each barricade.

The work vehicle is mounted with a flashing warning light. Use another work vehicle with flashing warning lights. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The distance the signs are placed from the work area is based on the posted speed limit as shown on table below.

SPEED LIMIT (prior to construction)	SIGN SPACING
	A
≤ 40 mph	500 FT
45 – 50 mph	1000 FT
> 50 mph	1500 FT



LANE CLOSURE

- Multi-Lane Road
- Turning Lane
- Intermediate-Term Stationary (Overnight to 3 Days)
- Long Term Stationary (More than 3 days)

Minimum Requirements

Cones are required.

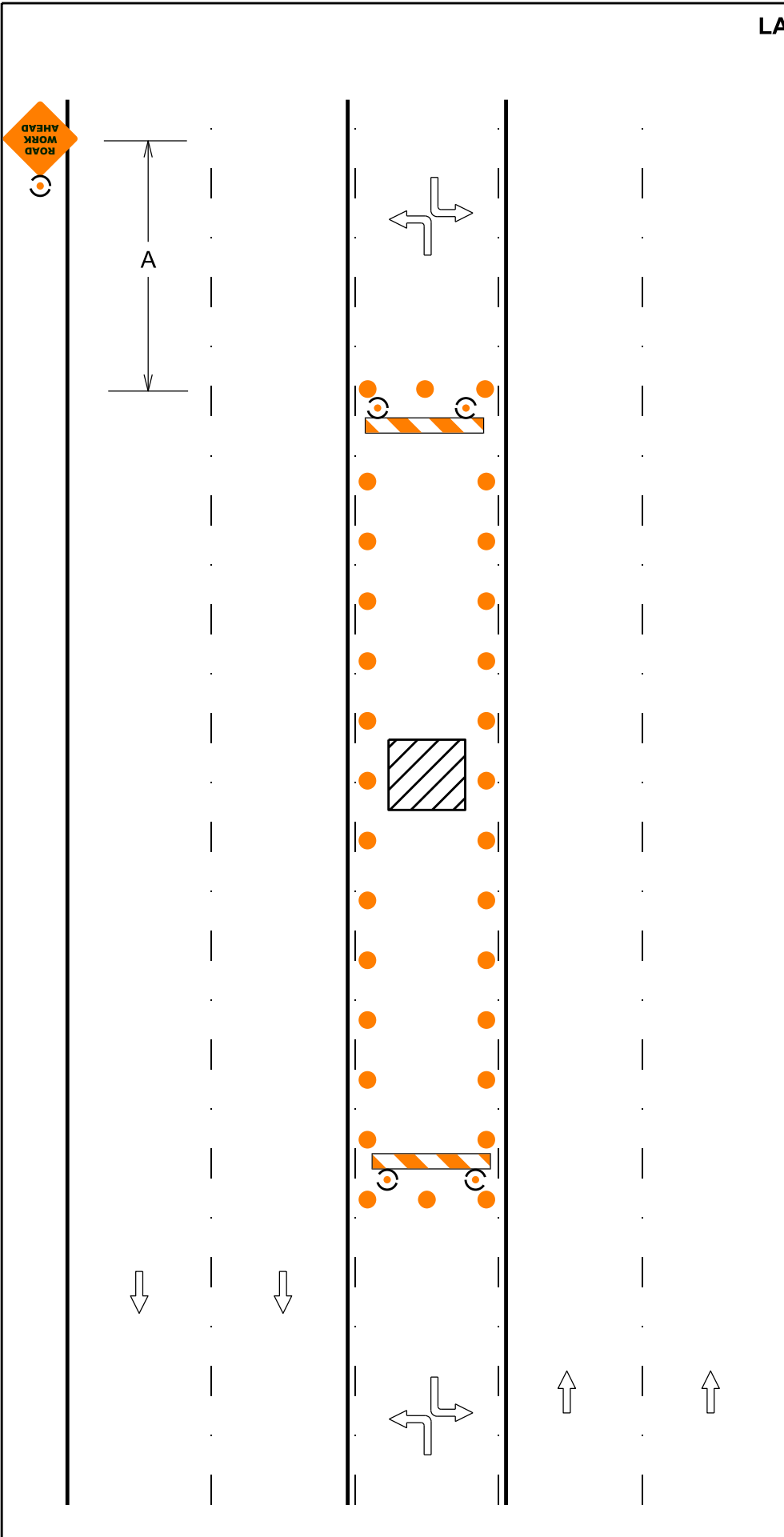
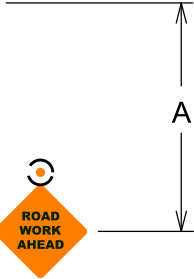
Drums with lights may be used in place of cones.

PLANNING DONE BY DISTRICT TRAFFIC OFFICE.

This control is in place when workers not present.

Use two flashing warning lights at each barricade. (Set to steady burn for overnight use.)

See table Page 29 Left for minimum sign spacing.



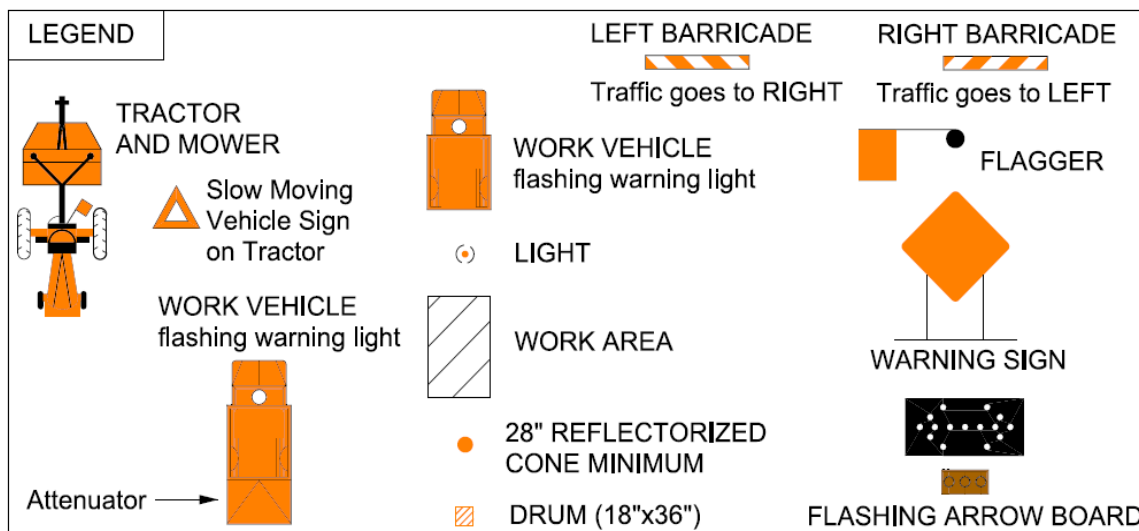
LANE CLOSURE

- Multi-Lane Road
- Turning Lane
- Short Duration (up to 1 hour)
- Short-Term Stationary (1 to 12 hours)

The work truck is mounted with a flashing warning light. Use another work vehicle with flashing warning light and cones to outline the work area as shown. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

The lane closure should be made after peak traffic hours.

SPEED LIMIT (prior to construction)	SIGN SPACING A
≤ 40 mph	500 FT
45 – 50 mph	1000 FT
> 50 mph	1500 FT



LANE CLOSURE

- Multi-Lane Road
- Turning Lane
- Short Duration (Up to 1 Hour)
- Short-Term Stationary (1 to 12 hours)

Minimum Requirements

Attenuator (optional)

Work vehicle is mounted with flashing warning light.

Use roll ahead distance required by the manufacturer. See Attachment -1 for recommended spacing.

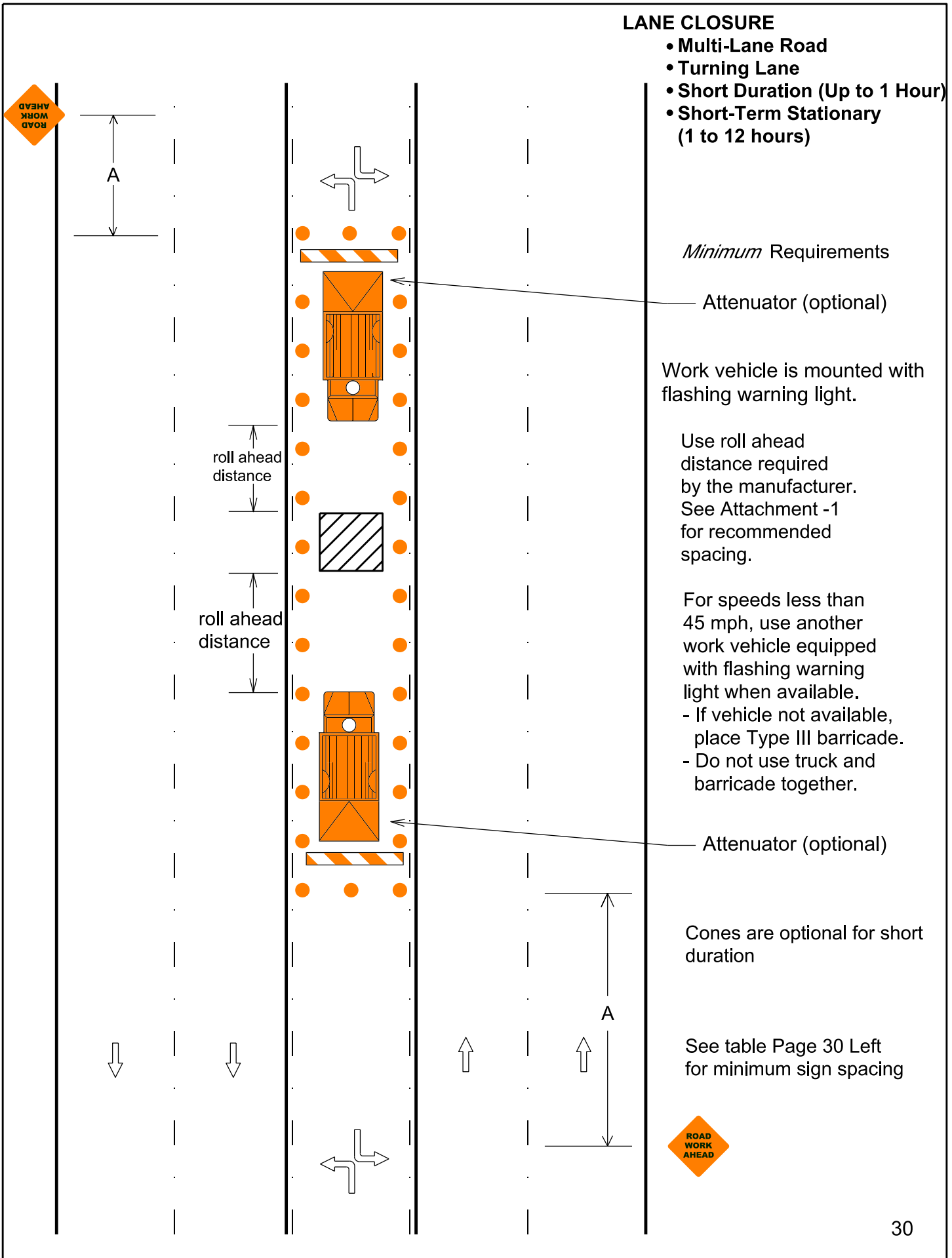
For speeds less than 45 mph, use another work vehicle equipped with flashing warning light when available.

- If vehicle not available, place Type III barricade.
- Do not use truck and barricade together.

Attenuator (optional)

Cones are optional for short duration

See table Page 30 Left for minimum sign spacing



SIGNAL MAINTENANCE OPERATIONS

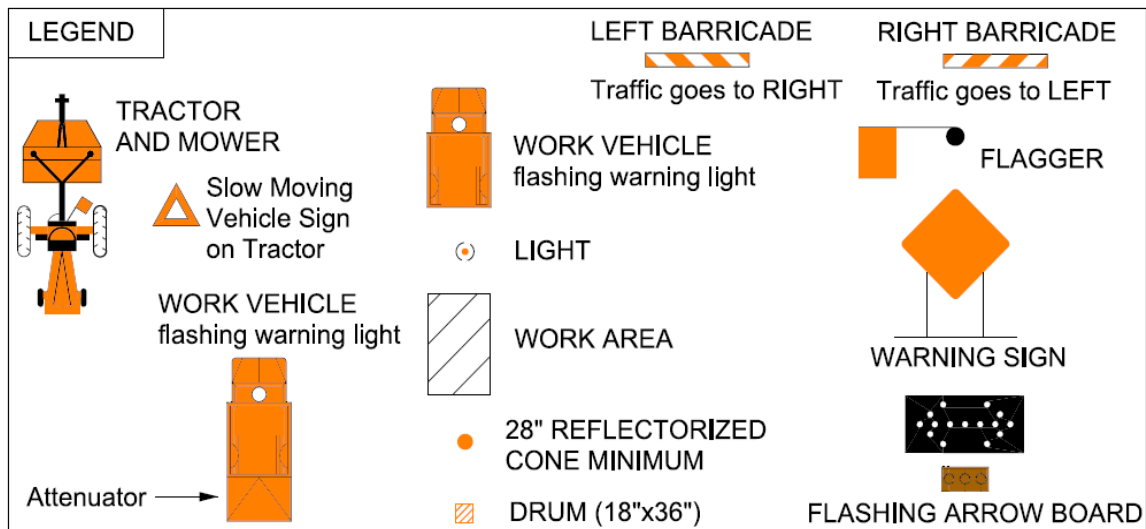
- Short Duration
(Up to 1 hour)
- Two-Lane Roads

Because of the location of signal lights, this operation may be dangerous.

The signal truck is equipped with a flashing warning light.

The position of the truck and cones may vary according to the work required. The second work vehicle and attenuator are optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

For two-lane two-way roadways, a police car with flashing lights and 2 police officers may be required for intersection traffic control.

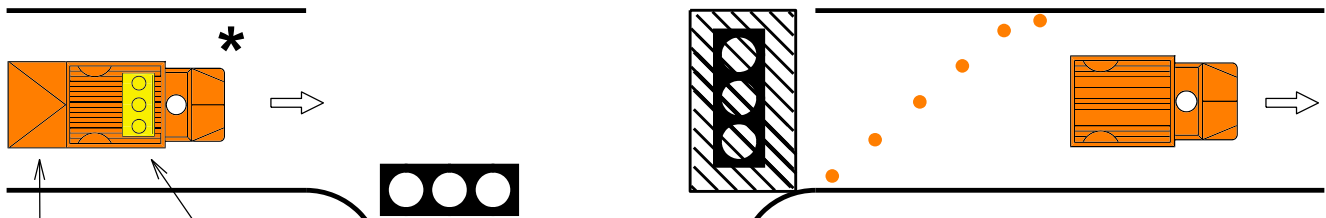
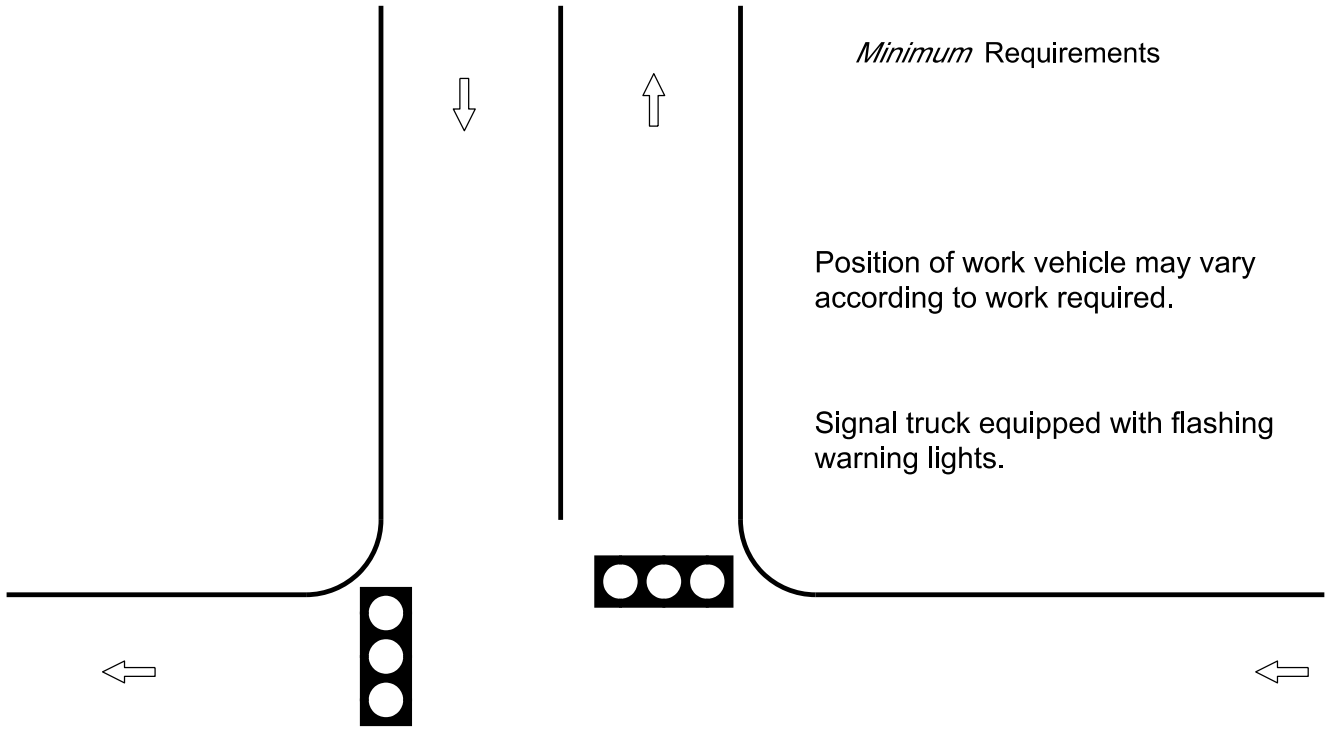


SIGNAL MAINTENANCE OPERATIONS
 • Short Duration (Up to 1 Hour)
 • Two-Lane Roads

Minimum Requirements

Position of work vehicle may vary according to work required.

Signal truck equipped with flashing warning lights.



Attenuator (optional)

NOTE:
 A police car with flashing lights and 2 police officers may be required for intersection traffic control.

* Second work vehicle equipped with flashing warning light and arrow board in caution mode.

* Optional

SIGNAL MAINTENANCE OPERATIONS

- Short Duration
(Up to 1 hour)
- Multi-Lane Roads

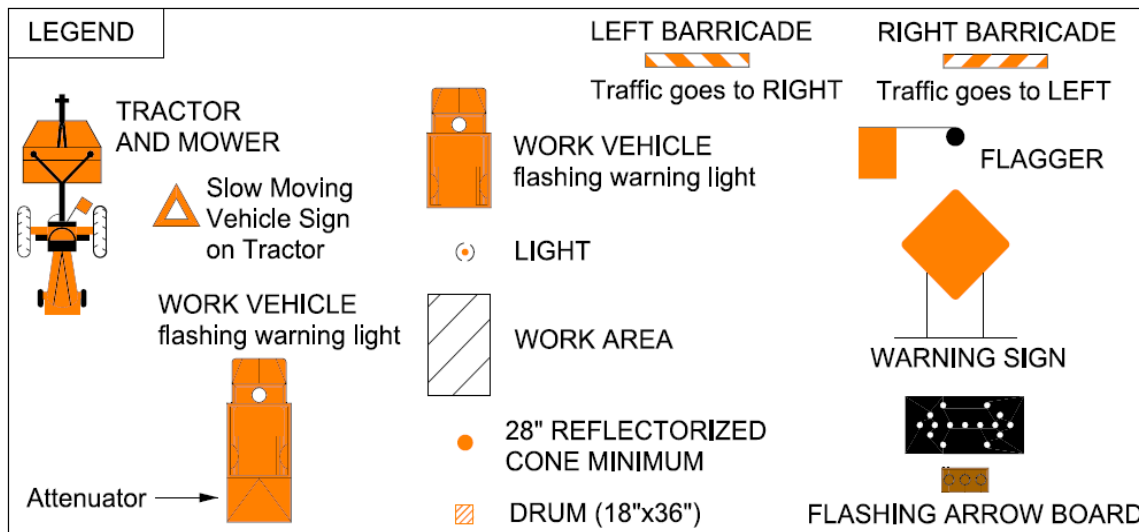
Because of the location of signal lights, this operation may be dangerous.

The signal truck is equipped with a flashing warning light.

The position of the signal truck may vary according to the work required. Use an optional second work vehicle equipped with a flashing warning light and arrow board to shift traffic prior to signal being worked on. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

A uniformed police officer may direct traffic for short duration lane closures.

SPEED LIMIT (prior to construction)	SIGN SPACING
	B
≤ 40 mph	250 FT
45 – 50 mph	360 FT
> 50 mph	495 FT



SIGNAL MAINTENANCE OPERATIONS

- Short Duration (Up to 1 Hour)
- Multi-Lane Roads

Minimum Requirements

Position of work vehicle may vary according to work required.

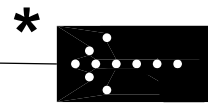
Signal truck equipped with flashing warning lights.

NOTE:

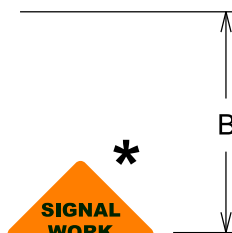
A uniformed police officer may direct traffic for short duration lane closures.

* Optional

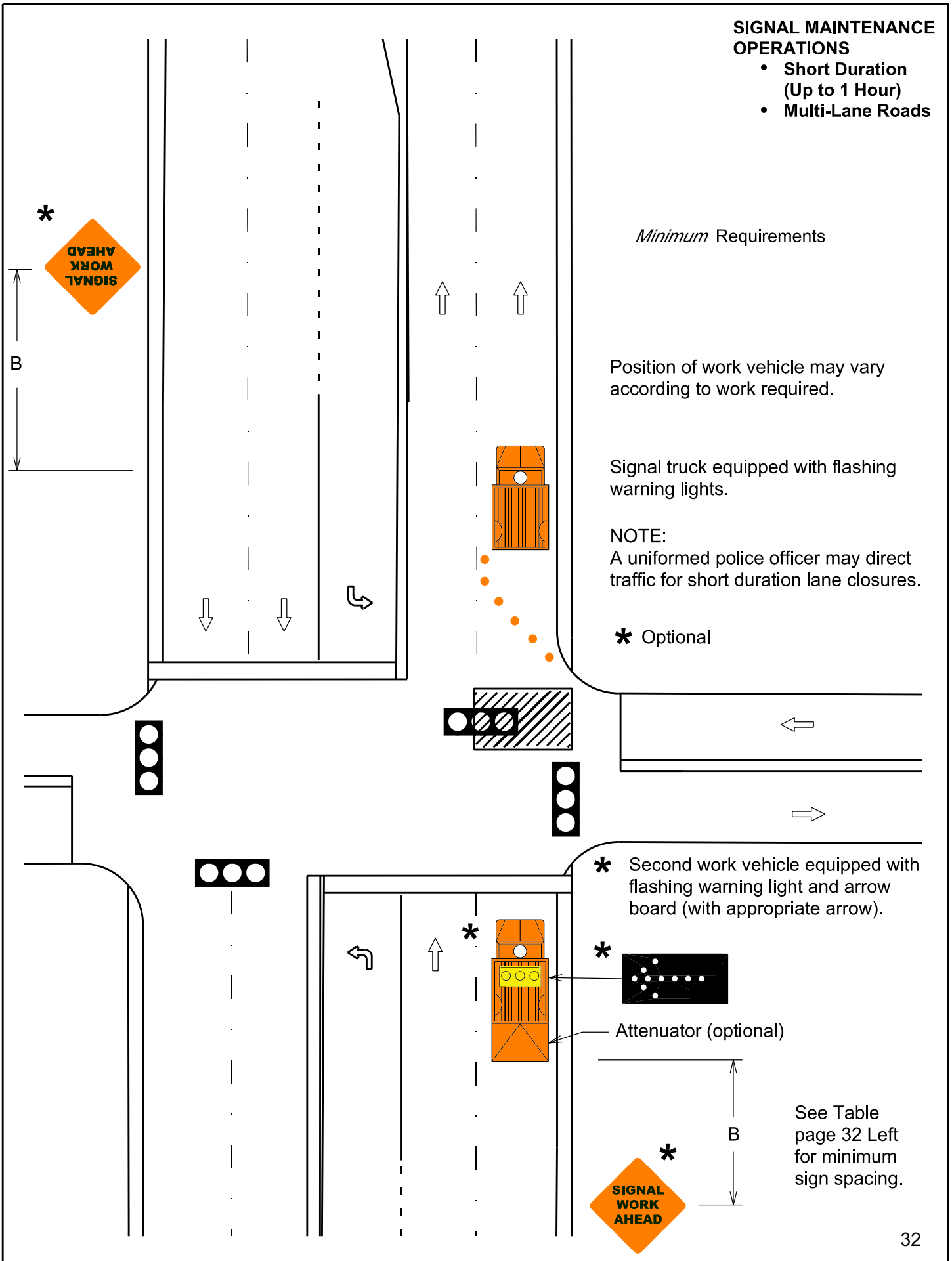
* Second work vehicle equipped with flashing warning light and arrow board (with appropriate arrow).



* Attenuator (optional)



See Table page 32 Left for minimum sign spacing.



MOBILE OPERATION (Striping Operations)

- Continuously Fast Moving (3 miles per hour or faster)
- Two-lane Road

Where practicable and when needed, the work and protection vehicles should pull over periodically to allow traffic to pass.

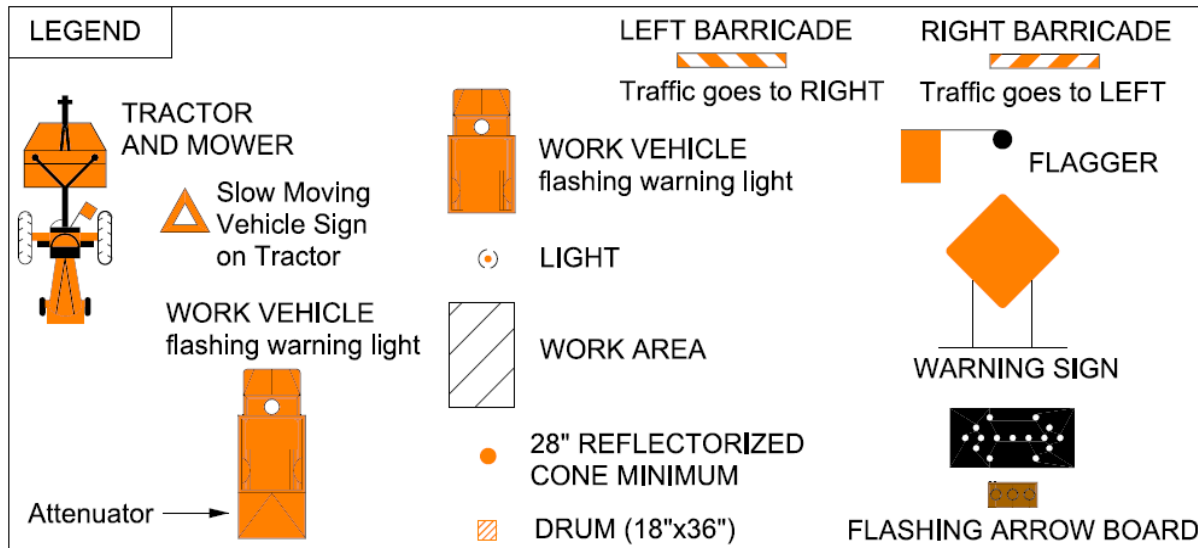
The distance between the work and protection vehicles will vary according to terrain, paint drying time, and other factors. Protection vehicles are used to warn traffic of the operation ahead. Whenever adequate stopping sight distance exists to the rear, the protection vehicle should maintain the minimum distance and proceed at the same speed as the work vehicle. The protection vehicle should slow down in advance of vertical or horizontal curves that restrict sight distance.

Additional protection vehicles to warn and reduce the speed of opposing traffic may be used.

The striping vehicle shall be equipped with beacons and flashing lights mounted on the outriggers of the striper. In addition the striper shall be equipped with a flashing arrow board displaying the caution mode.

Each protection vehicle shall be equipped with beacons and a sign reading: CAUTION STRIPING MACHINE AHEAD KEEP OFF WET PAINT. May use a standard sign, lighted message board, or some combination. Attenuator is optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

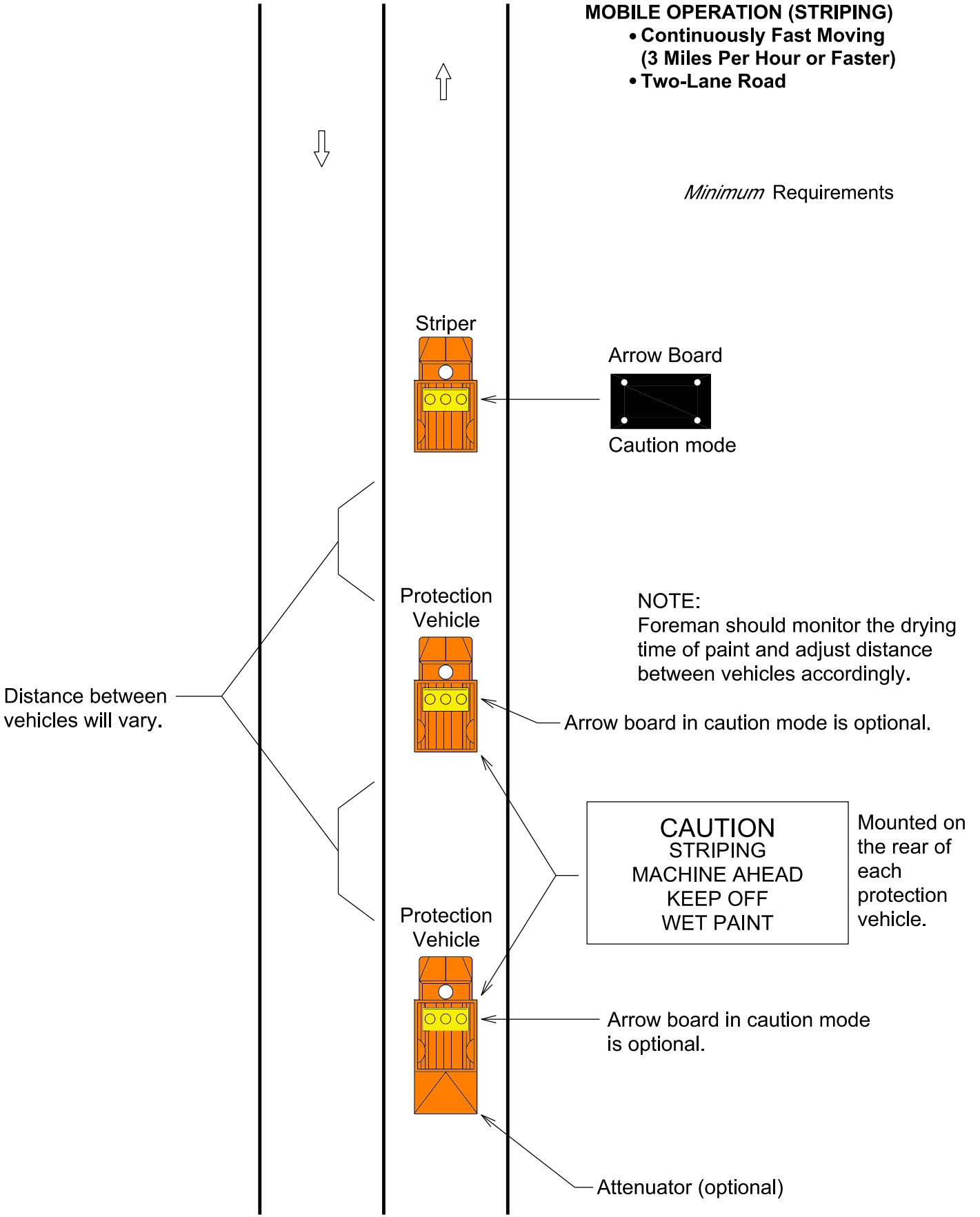
Vehicle-mounted sign legends shall be covered or turned from view when work is not in progress.



MOBILE OPERATION (STRIPING)

- Continuously Fast Moving (3 Miles Per Hour or Faster)
- Two-Lane Road

Minimum Requirements



MOBILE OPERATION (Striping Operations)

- **Continuously Fast Moving (3 miles per hour or faster)**
- **Multi-Lane Road**

Vehicles used for these operations should be made highly visible with appropriate equipment, such as flashing lights, rotating beacons, flags, signs, or arrow displays.

On high speed roads a minimum of three vehicles should be used, all of which are in the work lane. Each protection vehicle is mounted with a sign that reads: CAUTION STRIPING MACHINE AHEAD KEEP OFF WET PAINT. May use a standard sign, lighted message board, or some combination of the two.

Protection vehicle #1 must be equipped with emergency flashers and beacon lights. An arrowboard and truck mounted attenuator are optional. See *Attachment 1 – Rollahead Distances* for recommendations on shadow vehicle spacing upstream from the beginning of the work area.

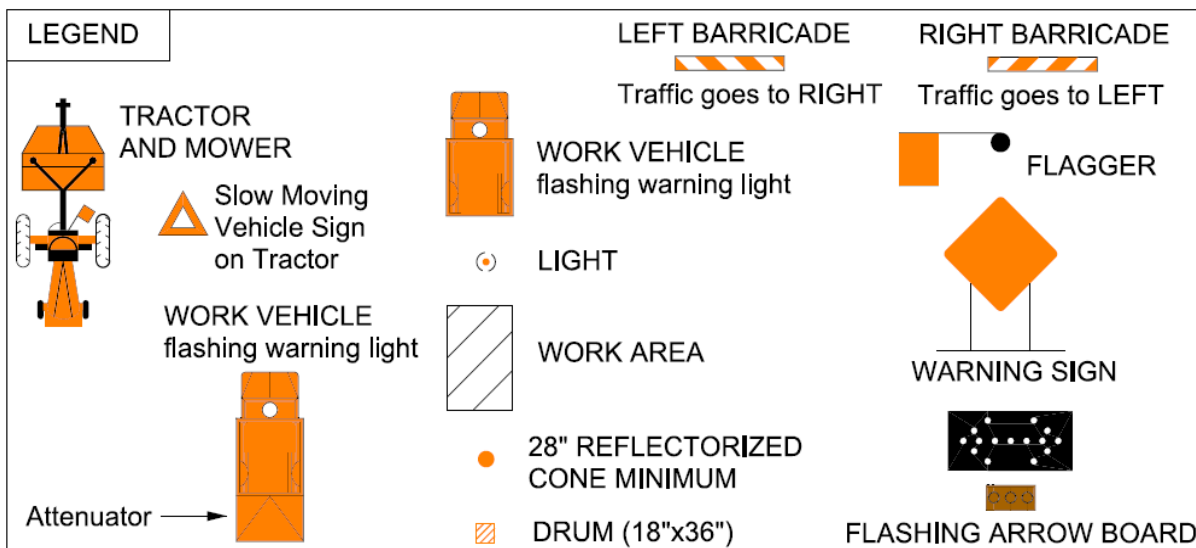
Protection vehicle #2 must be equipped with emergency flashers and beacon lights. An arrowboard and truck-mounted attenuator are optional.

Protection vehicles #1 and #2 should travel at a varying distance from the work operation so as to provide adequate sight distance for traffic approaching from the rear.

Vehicle #3 (striper) must be equipped with an arrow board and flashing lights on the outriggers in addition to emergency flashers and beacon lights.

Only the first arrow board that a motorist approaches will display the arrow. All subsequent boards will be in caution mode.

The foreman should monitor drying time of paint and adjust distance between vehicles accordingly. Work should normally be done during off-peak hours.



**MOBILE OPERATION
(STRIPING OPERATION)**

- Continuously Fast Moving
- (3 Miles Per Hour or Faster)
- Multi-Lane Road

Minimum Requirements

All three vehicles must be equipped with emergency flashers and beacon lights.

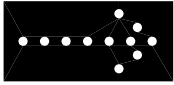
NOTE:
Foreman should monitor the drying time of paint and adjust distance between vehicles accordingly.

**CAUTION
STRIPING
MACHINE AHEAD
KEEP OFF
WET PAINT**

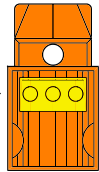
Mounted on the rear of each protection vehicle.

Arrow boards should display the appropriate arrow.

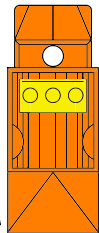
Arrow board required.



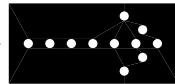
#3
Striper



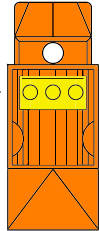
#2
Protection
Vehicle



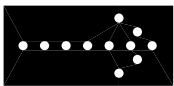
Arrow board optional.



#1
Protection
Vehicle



Arrow board optional.



Attenuator
(optional)

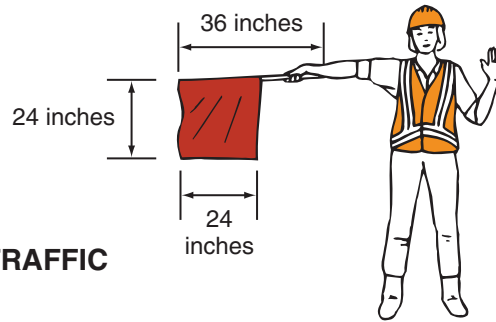
Distances will vary between vehicles.

Attenuator
(optional)

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**

Flagging

Hand signaling devices, such as stop/slow paddles, lights, and red flags are used to control traffic through work zones. The sign paddle with the clear messages **STOP** or **SLOW** is the primary hand-signaling device. Flag use 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 inches wide with letters at least 6 inches high. This combination sign should be made from sheet metal or other 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 used for signaling purposes shall be a minimum of 24 inches square, made of a good grade of red material and securely fastened to a staff approximately 3 feet long. The free edge should be weighted to make sure that the flag will hang vertically, even in heavy winds. When used at night, the flag shall be retroreflectorized red.

Flagging Procedures

The following methods of signaling with sign paddles will be used:

1. **TO STOP TRAFFIC.** The flagger shall face traffic and extend the **STOP** sign paddle in a stationary position with the arm extended horizontally away from the body. The free arm is raised with the palm toward approaching traffic.
2. **WHEN IT IS SAFE FOR STOPPED TRAFFIC TO PROCEED.** The flagger shall face traffic with the **SLOW** sign paddle held in a stationary position with the arm extended horizontally away from the body. The flagger motions with the free hand for the traffic to proceed.
3. **WHEN IT IS DESIRED TO ALERT OR SLOW TRAFFIC.** The flagger shall face traffic with the **SLOW** sign paddle held in a stationary position with the arm extended horizontally away from the body. The flagger may motion up and down with the free hand, palm down, indicating that the vehicle should slow down.

The following methods of signaling with a flag will be used:

1. **TO STOP TRAFFIC.** The flagger shall face traffic and extend the flag staff horizontally across the traffic lane in a stationary position so that the full area of the flag is visible hanging below the staff. The free arm should be raised with the palm toward approaching traffic.
2. **WHEN IT IS SAFE FOR STOPPED TRAFFIC TO PROCEED.** The flagger shall face traffic with the flag and arm lowered from view of the driver. With the free hand, the flagger should motion traffic to proceed. *Flags shall not be used to signal traffic to proceed.*
3. **WHERE IT IS DESIRED TO ALERT OR SLOW TRAFFIC.** The flagger shall face traffic and slowly wave the flag in a sweeping motion of the extended arm from the shoulder level to straight down, without raising the arm above a horizontal position. The flagger shall keep the free hand down.

The use of the sign paddle and flag is illustrated on page 35.

Flaggers

The primary function of traffic control procedures is to move vehicles as safely and promptly through or around temporary traffic control zones while protecting workers and the motoring public. A flagger should be properly trained, mentally alert, and able to react in an emergency situation.

Flagger Clothing

For daytime work, the flagger's vest, shirt, or jacket shall be orange, yellow, strong yellow-green or fluorescent versions of these colors. For nighttime work, similar outside garments shall be retroreflective. The retroreflective material shall be orange, yellow, white, silver, strong yellow-green, or fluorescent versions of these colors and shall be designed to clearly identify the wearer as a person and be visible through a full range of body motions. A flagger must wear DOTD approved headgear.

Nighttime Work

To flag traffic at night, signal lights approved by the appropriate Department authority or retroreflectorized sign paddles or retroreflectorized flags shall be used. Whenever such lights, paddles, or flags are used at night, daytime flagging procedures shall be followed. Except in emergency situations, flagger stations shall be illuminated at night.

Flagger Stations

Flaggers should be clearly visible to approaching traffic at all times. For this reason, the flagger must stand alone. Flagger stations shall be located far enough ahead of the work site so that approaching traffic will have sufficient distance to reduce speed or stop before entering the project. This distance is related to approach speed and physical conditions at the site; the distances shown in the table below may be used for the location of a flagger station. In urban areas when speeds are low and streets closely spaced, the distance necessarily must be decreased. These distances may be increased for downgrades and other conditions that affect stopping distance. Flagger stations should be adequately protected and preceded by proper advance warning signs.

Stopping Sight Distance as a Function of Speed

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

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

The flagger should stand either on the shoulder next to the traffic being controlled or in the barricaded lane. At a sight obstruction, a position may have to be taken on the shoulder opposite the barricaded section to operate effectively. **Under no circumstances should a flagger stand in the lane being used by moving traffic.** Again, the flagger should stand alone, never permitting a group of workers to congregate around the flagger station. The flagger should be stationed far enough ahead of the work force to warn them of approaching danger, such as out-of-control vehicles.

For a short, two-way, unusually low-volume, and/or unusually low speed maintenance lane closures where adequate sight distance is available for the safe handling of traffic, the use of one flagger may be sufficient.

Flagger Control

Where the one-lane section is short enough so that each end is visible from the other end, traffic may be controlled by means of a flagger at each end of the section. One of the two should be designed as the chief flagger for purposes of coordinating movement. They should be able to communicate with each other verbally or by means of signals. These signals should be different from the flagging signals so that they are not mistaken for flagging signals.

Where the end of a one-lane section is not visible from the other end, the flaggers must maintain contact by means of radio or field telephones. So that a flagger may know when to allow traffic to proceed into the section, the last vehicle from the opposite direction can be identified by description or license.

Attachment 1 – Rollahead Distances

This attachment contains excerpts from the *Field Guide for the Use and Placement of Shadow Vehicles in Work Zones*. The field guide was developed by the American Traffic Safety Services Association (ATTSSA) for Federal Highway Administration (FHWA), and is intended to provide guidelines on the use of shadow vehicles and Truck Mounted Attenuators (TMAs) in highway work zones.

Rollahead Spacing Guidelines

The following tables provide guidelines for spacing shadow vehicles upstream from the beginning of the work area. Always ensure that the rollahead distance used complies with the manufacturer’s specifications.

Operating Speed ^a	Recommended Spacing ^b for Vehicles Weighing > 22,000 lbs.	
	Stationary Operation	Moving Operation ^c
Greater than 55 mph	150 feet	172 feet
45 to 55 mph	100 feet	150 feet
Less than 45 mph	74 feet	100 feet

Operating Speed ^a	Recommended Spacing ^b for Vehicles Weighing 9,900 to 22,000 lbs.	
	Stationary Operation	Moving Operation ^c
Greater than 55 mph	172 feet	222 feet
45 to 55 mph	123 feet	172 feet
Less than 45 mph	100 feet	100 feet

a Should use operating speed if higher than posted speed limit.

b Recommended spacing is distance between front of shadow vehicle and beginning of work area, that is the first worker/operation/vehicle to be protected.

c Distances are appropriate for shadow vehicle speeds up to 15.5 mph

Notes for the Rollahead Spacing Guidelines

- Weights of typical shadow vehicles: loaded 1-ton cargo truck, 10,000 lb; loaded 4-yard dump truck, 24,000 lb.
- The heaviest shadow vehicle should be used to optimize protection of maintenance or construction workers. Because roll-ahead is minimized with heavier shadow vehicles, they can be placed closer to the work space to minimize the risk of vehicles cutting in ahead of the shadow vehicles.
- The spacing distance is good with or without a TMA. A vehicle equipped with a TMA may move less than a truck not equipped with a TMA. However, the recommended spacing is conservative enough to allow the same spacing for a vehicle with a TMA versus one without.
- Distances are intended as minimum guidelines. However, engineering judgment should be used to increase distances to take into account traffic conditions, vehicle mix, sight distance, and other site conditions.