



**NEW JERSEY  
DEPARTMENT OF  
TRANSPORTATION**

**2011**

**WORK ZONE  
SAFETY  
SET-UP GUIDE**



## FORWARD

It shall be the responsibility of the person in charge to institute the placing of all appropriate cautionary devices and controls as may be required for the particular job. Traffic protection devices shall be placed in accordance with the diagrams shown in the most current work zone traffic control charts. (laminated charts also known as the workzone safety set-up guide) the charts are incorporated as part of the njdot safety manual by reference. It should be emphasized that these are minimum desirable standards for normal situations and that additional protection should be considered when special complexities and hazards prevail.

It shall be the responsibility of the person in charge based on job site conditions (type of highway, road user conditions, duration of operation, physical constraints, and the nearness of the work space or incident management activity to road users) to find which diagram in the current work zone traffic control charts apply. When conditions do not fit existing work zone traffic control charts follow the actions noted below in paragraph 3 of this section. During any work operation where employees and equipment are engaged in work on or near the main pavement or shoulders of the highway, appropriate protective devices shall be provided to protect personnel and the traveling public. A road crew's responsibility should be directed toward the safe and expeditious movement of traffic through a construction or maintenance work site, and to the safety of the work force performing these operations.

In particular situations not adequately covered by the provision of this section, the protection of the traveling public and employees on the scene will dictate the measures to be taken, consistent with the general principles of traffic control. Work zone set-ups in accordance with the MUTCD or approved by a traffic engineer shall be used when the specific situation is not addressed by the work zone traffic control charts.

### **NOTICE:**

This pocket reference is intended to provide reasonably current and accurate information and is designed to serve as a field operational reference only. Please refer to the workzone set-up guide and safety manual for complete details.

This pocket reference describes a limited selection of general guidelines and/or minimum requirements for typical situations. It is not possible to include illustrations to cover every situation which requires work site protection.



## GENERAL NOTES FOR WORK ZONE SAFETY SET-UP GUIDE

- |                                |  |
|--------------------------------|--|
| 1. Advance Warning Signs       | Signs shall be fluorescent in color, with approved legends and 48" X 48" in size. Distance of the advance warning signs should be increased (if possible) if the sight distance is restricted due to presence of a vertical or a horizontal curve.   |
| 2. Arrow Panels                | Arrow panels shall meet the MUTCD criteria- If the work area is closer to the taper, a TMA with an Arrow Panel should replace a stand-alone Arrow Panel. The 4-corner configuration is the preferred Caution Mode. Use of the single bar is acceptable when the arrow board does not allow the 4-corner configuration. Tow behind Arrow Panels shall stand alone and be disconnected from the towing vehicle. The towing vehicle shall not remain in the closed lane or shoulder.        |
| 3. Cones                       | Most maintenance operations can be carried out using cones. Only NJDOT issued/approved 28 inches high cones with two reflective tapes shall be used. Faded cones or cones covered with asphalt, tar, paint or other substances that cannot be removed should be discarded.   |
| 4. Devices, General Conditions | All devices used for traffic control shall meet the crashworthy criteria as required according to the current FHWA policy. E.g. Devices meeting the NCHRP Report 350 guidance document shall be considered "crashworthy". The condition of devices shall meet a quality standard for acceptability. For the purpose of determining quality, the most current version of a recognized standard shall be used, such as ATSSA's "Quality Guidelines for Temporary Traffic Control Devices". |
| 5. Driver's View               | The person in-charge of the safety or his/her designee, should at least one time, after the safety is set-up, drive and check the set-up from a driver's view. If the operation is for a longer duration the inspection should be done periodically.   |



**GENERAL NOTES FOR WORK ZONE SAFETY SET-UP GUIDE**  
**Continued**

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|--|---|
| <b>6. Drums</b>                          | Drums shall be used when the planned closure is for 48 continuous hours or more and the posted speed limit is 45 MPH or more.   |
| <b>7. Emergent Condition</b>             | An unplanned, unexpected emergency operation that is necessary to address an immediate hazard to the motoring public. An immediate hazard may be defined as an event that results in an unexpected situation urgently requiring prompt action. Examples include: large debris in the travel lanes; large debris in the shoulder that may find its way into the travel lane; disabled vehicles in the travel lanes or shoulder; snow and ice control; or IMRT response. Other than snow and ice control, reference the NJDOT Safety Standard Operating Procedure entitled, "Traffic Incident Management Safety" for the appropriate workzone safety criteria. Vehicles involved with snow and ice control must have all lights activated and in working order. |
| <b>8. Flagging</b>                       | For guidelines on flagging operations, see the Work Zone Section of the NJDOT Safety Manual. Optional Flagger, as referenced on the Charts, to be off the roadway and shoulder.   |
| <b>9. Intersection Options, Chart 25</b> | A planned detour may be requested through Traffic Operations and appropriately signed to direct traffic. Police traffic directors may be utilized to assist with the flow of traffic. In the event that there is heavy truck traffic turning right into the Work Area, an opposing left lane closure may be installed. See Chart 24 for the additional setup.   |
| <b>10. Mobile Operation</b>              | Operation that moves intermittently (stops up to 15 minutes) or continuously in the immediate area (approximately 1000 linear feet).  |
| <b>11. Mobile Operation Sign Option</b>  | An additional vehicle with a tail-gate mounted "Road Work Ahead" (RWA) sign can be used in place of the RWA advance warning sign.   |



12. Protection Vehicle with attached  
Crash Cushion/Truck Mounted  
Attenuator (TMA)

Protection Vehicles are used to protect the maintenance worker from being directly hit by an errant vehicle. It should be placed at a sufficient distance in advance of the workers and/or equipment being protected so that there will be adequate distance, (but not so much so that an errant vehicles will travel around the Protection Vehicle and strike the protected workers and/or equipment). The suggested distance is 75 - 150 feet or as recommended by the attenuator Manufacturer. Protection Vehicles must be equipped with an arrow panel.

Protection Vehicles are also used to warn traffic of the operation ahead. During a Mobile/Moving operation, where adequate stopping sight distance is available, the Protection Vehicle should maintain the recommended distance as mentioned above and proceeds 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.

The suggested distance of 75 - 150 feet or as recommended by the attenuator Manufacturer, applies to the Protection Vehicle(s) closest to the work area. The distance for additional Protection Vehicle(s) need to be adjusted to actual site conditions to prevent vehicles from entering the work area.

13. Shoulder Taper (S)

The shoulder taper should be used, when shoulder is closed for operations on the shoulder or the adjacent lane/lanes. The length of the shoulder taper is shown on the chart.

14. Signs on left side

Signs are warranted on the left side of the highway if the highway is:

- A. More than two lanes wide in the direction where the work is performed *AND*,
- B. The median or the left shoulder is at least eight (8) feet wide.

If the left shoulder or the center median width is less than eight (8) feet, at any of the specific locations required, and there is no other reasonable location close by, then skip that sign and place the rest of the signs. Try to place at least the advance warning signs such as ROAD WORK 1 MILE or ROAD WORK 2 MILES.



**GENERAL NOTES FOR WORK ZONE SAFETY SET-UP GUIDE**  
**Continued**

- |  |  |
|--|--|
| <b>15. Spacing of Cones and Drums</b>  | Use the Taper Lengths and Number of Cones Chart in this Guide.   |
| <b>16. Taper ( L )</b>                 | The approach taper should be minimum distance as shown on the " Taper Lengths And Number of Cones Chart" of this Guide. If the sight distance is restricted due to the presence of a vertical or horizontal curve the length of the taper should be increased if possible.             |
| <b>17. Traffic Incident Management</b> | An emergency road user occurrence or other unplanned event that effects or impedes the normal flow of traffic. Reference the NJDOT Safety Standard Operating Procedure entitled, "Traffic Incident Management Safety" for the appropriate workzone safety criteria.                    |
| <b>18. Variable Message Sign (VMS)</b> | VMS can be used to supplement the existing safety setup. It is to be placed in a clear and visible location off the roadway, with as much sight distance as possible. Traffic Operations should be consulted for appropriate messages, programming and recommended distance placement. |



<b>NJDOT Safety Standard Operating Procedure</b> <b>TRAFFIC INCIDENT MANAGEMENT SAFETY</b>
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**I. PURPOSE**

To establish temporary traffic control procedures for traffic incident management and employee safety measures. To address the initial response to the emergency, traffic control devices available on-site shall be used.

**II. SCOPE**

This procedure covers the required workzone safety criteria needed to perform and support emergency service patrol work and the protection of responding employees. Employees shall follow all other safety procedures for working on or near the roadway. Procedures containing detour approval and enacting the Incident Management Response Team process are not contained within this SOP.

**III. DEFINITIONS**

Traffic Incident – An emergency road user occurrence or other unplanned event that affects or impedes the normal flow of traffic. Examples include stalled vehicles, traffic crashes and highway spills that block lanes.

Minor Traffic Incident - A category of a traffic incident that has an expected duration less than 30 minutes.

Intermediate Traffic Incident – A category of a traffic incident that has an expected duration from 30 minutes to 2 hours.

Major Traffic Incident– A category of a traffic incident that has an expected duration of more than 2 hours.



<b>NJDOT Safety Standard Operating Procedure TRAFFIC INCIDENT MANAGEMENT SAFETY</b>
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Continued

**IV. PROCEDURE**

- A. Overview - In order to reduce response time and ensure the safety of the motoring public and employees, temporary traffic control measures shall be implemented. More stringent traffic control measures as outlined by the DOT Workzone Safety Setup Guide, MUTCD or a traffic engineer may be used appropriate to site conditions.
- B. Assessment and Categorization of the Traffic Incident (Minor, Intermediate, Major)
1. Within the first 15 minutes, the on scene employee shall estimate the duration of the lane closure and categorize the incident. Re-assessment shall be conducted at 30 minutes and 90 minutes after arriving at the scene, to determine if the category needs to be changed (upgraded to the next level). On-site employee(s) shall initiate traffic control appropriate for original assessment and reassessments.
  2. The employee shall establish traffic control and request assistance consistent with the estimated category of traffic incident.
- C. Traffic Control by Category
1. Every effort shall be made to remove the incident from the travel lane(s). The cause of the incident shall be relocated to the shoulder or off the road as soon as is practical. Employees shall approach the incident in a manner consistent with safe work practices that do not unnecessarily expose them to traffic. Appropriate warning devices and procedures for the Traffic Incident Category, as outlined below, shall be implemented.



continued

2. Employees shall always be aware of:
  - Their visibility to oncoming traffic
  - Roadway geometrics
  - The need for warning devices
  - Approaching traffic

3. Minor Traffic Incident Category –

Safety lights shall be activated. The arrow display or variable message board (VMS) shall be activated when available. If additional warning is needed, cones and warning signs may be placed in addition to the lights and arrow display/VMS being activated.

4. Intermediate Traffic Incident Category –

Safety lights shall be activated. The arrow display or variable message board (VMS) shall be activated when available. Cones, signs and a flare line (when it will not constitute a fire hazard) shall be placed as warning devices in addition to the lights and arrow display/VMS being activated. Additional protection/warning devices shall be installed. The additional protection shall include at least one of the following, in the priority order given:

- a) A truck mounted attenuator equipped protection vehicle (TMA) as soon as practical. [During normal work hours, Operations shall be contacted for durations in excess of 60 minutes.]
- b) A uniformed law enforcement officer
- c) A second advance warning vehicle with activated safety lights, an arrow display/VMS and additional cones and signs.
- d) A trained flagger

The decision on which additional protection is required, shall consider the actual traffic speed at the incident.



<b>NJDOT Safety Standard Operating Procedure TRAFFIC INCIDENT MANAGEMENT SAFETY</b>
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Continued

Major Traffic Incident Category –  
Safety lights shall be activated. The arrow  
display or variable message board (VMS)  
shall be activated when available.  
Operations shall be contacted to provide  
traffic control in accordance with the  
NJDOT Safety Manual.

D. Training

1. All employees responsible for assisting motorist  
and responding to traffic incidences shall be  
trained on these safety procedures.
2. Supervisors shall ensure that only trained  
employees are assigned this work.
3. Training documentation shall comply with Safety  
SOP TRAIN.



TAPER LENGTHS AND NUMBER OF CONES CHART

Speed	25 MPH				30 MPH				35 MPH				40 MPH			
	Width	Taper		Shoulder Taper	Taper		Shoulder Taper	Taper		Shoulder Taper	Taper		Taper		Shoulder Taper	# of cones
	W (ft.)	Length L (ft.)	# of cones	Length S (ft.)	Length L (ft.)	# of cones	Length S (ft.)	Length L (ft.)	# of cones	Length S (ft.)	Length L (ft.)	# of cones	Length L (ft.)	# of cones	Length S (ft.)	
1	20	2	3	20	2	3	20	2	3	20	2	3	40	3	20	3
2	40	3	3	20	3	3	20	3	3	20	4	3	60	4	20	3
3	40	3	3	20	3	3	20	3	3	20	5	3	80	5	40	3
4	60	4	3	20	3	3	20	3	3	20	6	3	100	7	40	3
5	60	4	3	20	3	3	20	3	3	20	7	3	120	8	60	4
6	80	5	3	40	3	3	40	3	3	40	8	3	140	9	60	4
7	80	5	3	40	3	3	40	3	3	40	9	3	160	11	80	5
8	100	6	3	40	3	3	40	3	3	40	10	3	180	12	80	5
9	100	6	3	40	3	3	40	3	3	40	11	3	200	13	80	5
10	120	7	3	40	3	3	40	3	3	40	12	3	220	15	100	6
11	120	7	3	40	3	3	40	3	3	40	13	3	240	16	100	6
12	140	8	4	60	4	4	60	4	4	60	14	5	260	17	120	7

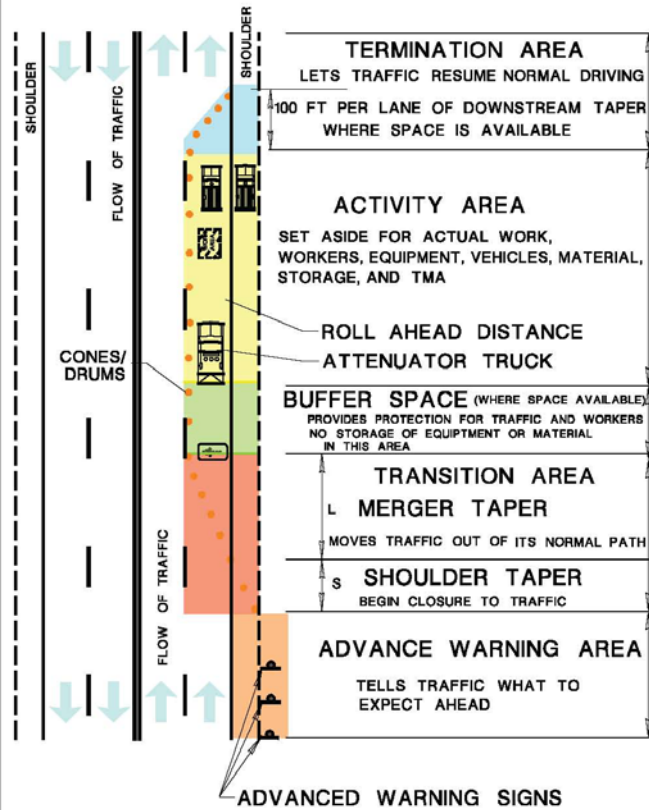


TAPER LENGTHS AND NUMBER OF CONES CHART

Speed		45 MPH				50 MPH				55 MPH				65 MPH			
Width  W (ft.)		Taper		Shoulder Taper		Taper		Shoulder Taper		Taper		Shoulder Taper		Taper		Shoulder Taper	
		Length L (ft.)	# of cones	Length S (ft.)	# of cones	Length L (ft.)	# of cones	Length S (ft.)	# of cones	Length L (ft.)	# of cones	Length S (ft.)	# of cones	Length L (ft.)	# of cones	Length S (ft.)	# of cones
1		60	4	20	3	60	4	20	3	60	4	20	3	80	5	40	3
2		100	6	40	3	100	6	40	3	120	7	40	3	140	8	60	4
3		140	8	60	4	160	9	60	4	180	10	60	4	200	11	80	5
4		180	10	60	4	200	11	80	5	220	12	80	5	260	14	100	6
5		240	13	80	5	260	14	100	6	280	15	100	6	340	18	120	7
6		280	15	100	6	300	16	100	6	340	18	120	7	400	21	140	8
7		320	17	120	7	360	19	120	7	400	21	140	8	460	24	160	9
8		360	19	120	7	400	21	140	8	440	23	160	9	520	27	180	10
9		420	22	140	8	460	24	160	9	500	26	180	10	600	31	200	11
10		460	24	160	9	500	26	180	10	560	29	200	11	660	34	220	12
11		500	26	180	10	560	29	200	11	620	32	220	12	720	37	240	13
12		540	28	180	10	600	31	200	11	660	34	220	12	780	40	260	14













## AREAS IN A TRAFFIC CONTROL ZONE



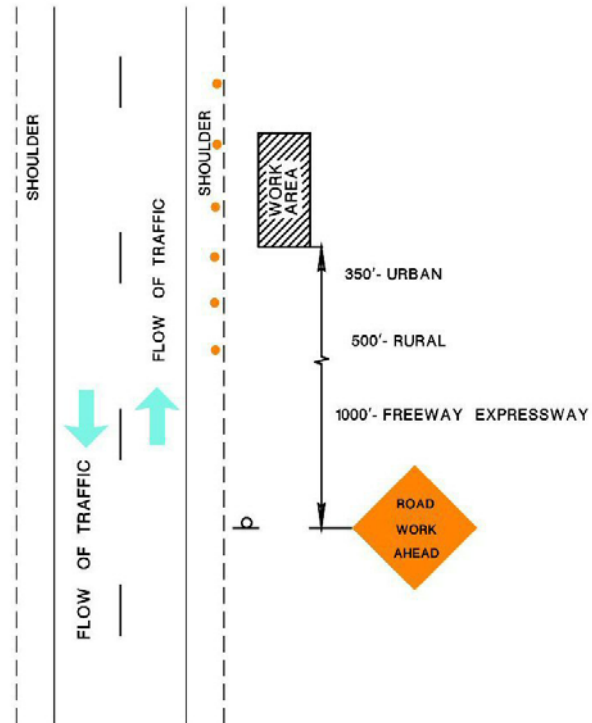


### LEGEND

	Cone/Drum
	Sign
	Work Vehicle
	Truck with attached attenuator (TMA)
	Use this sign in addition to the 1 MILE sign when the speed limit is 65 MPH
	Use only if highway is undivided
	Eliminate signs for opposite direction
	Arrow Panel
	Variable Message Sign (VMS)
	Stop/Slow safety sign paddle
W	Width of closed road
L	Taper Length
S	Shoulder Taper



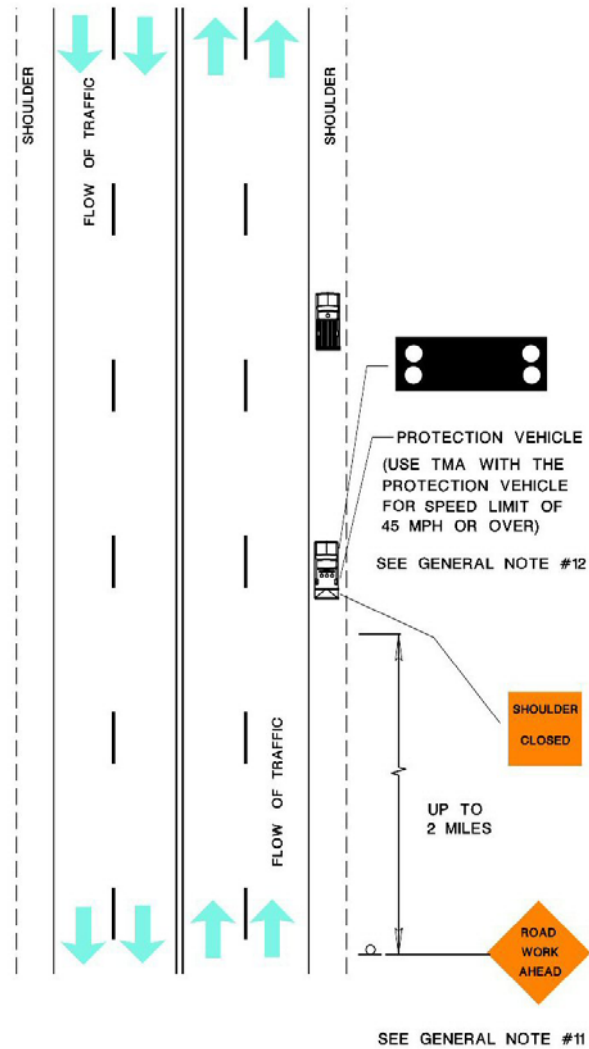
## WORK BEYOND THE SHOULDER



1. The ROAD WORK AHEAD sign may be replaced with other appropriate signs such as the signs such SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.
2. The ROAD WORK AHEAD sign may be omitted where:  
The work space is behind a barrier or guide rail, or  
More than 2 feet behind the curb, or  
15 feet or more from the edge of any roadway.
3. See General Notes for cone spacing.



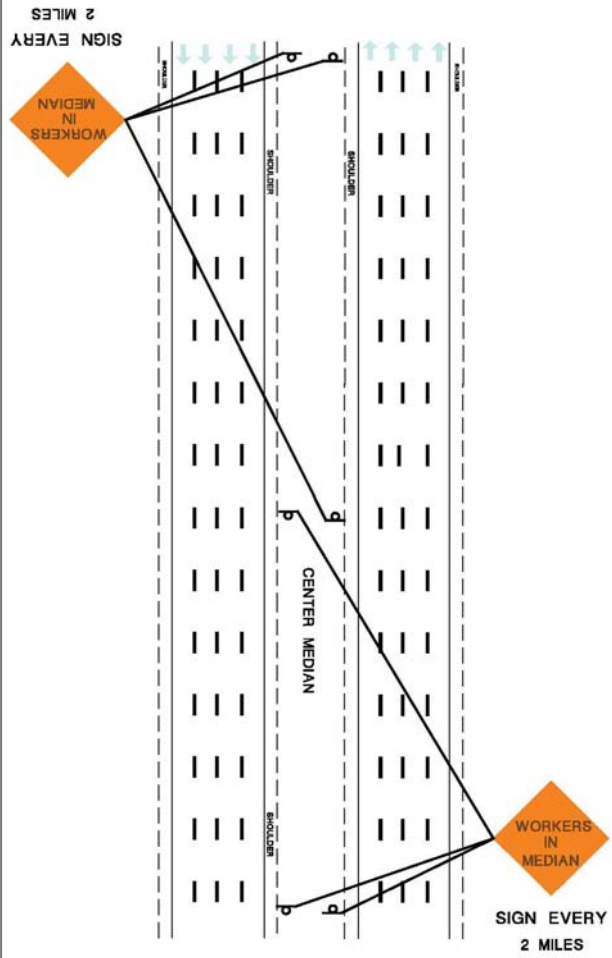
## MOBILE OPERATION ON RIGHT SHOULDER



SEE GENERAL NOTE #11

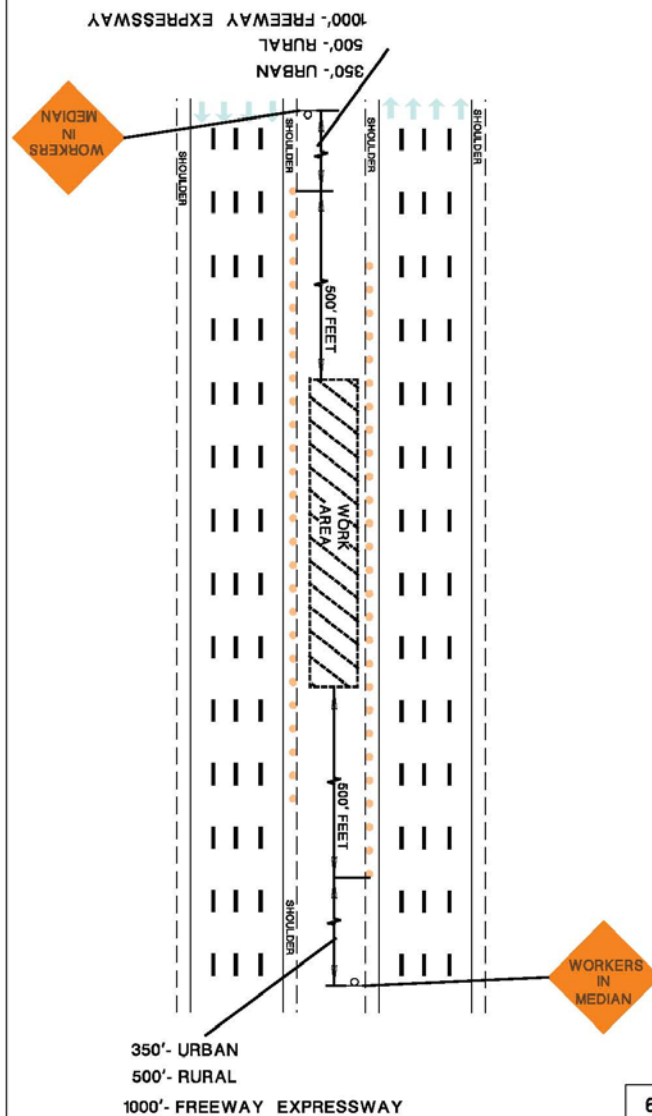


## MOBILE OPERATION IN CENTER MEDIAN





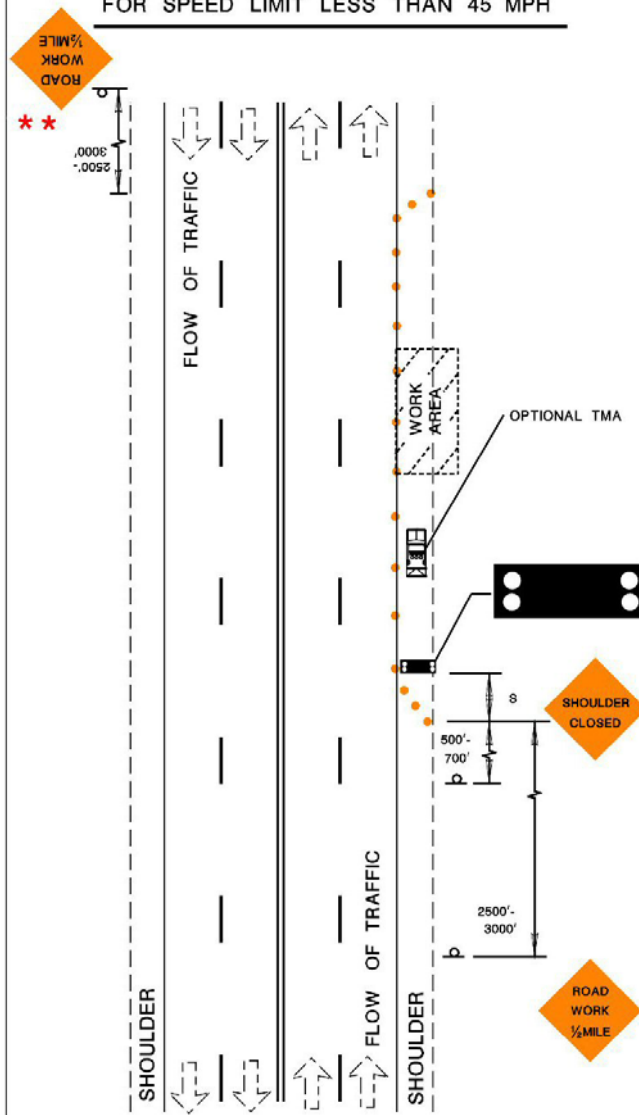
## IN CENTER MEDIAN





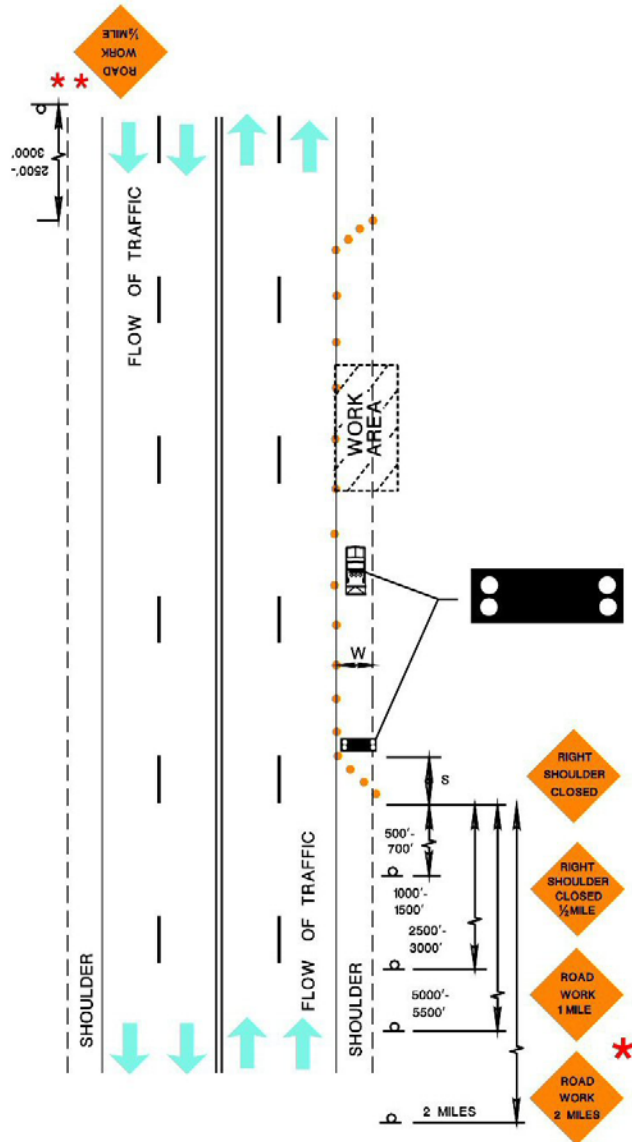
# WORK AREA IN SHOULDER

FOR SPEED LIMIT LESS THAN 45 MPH





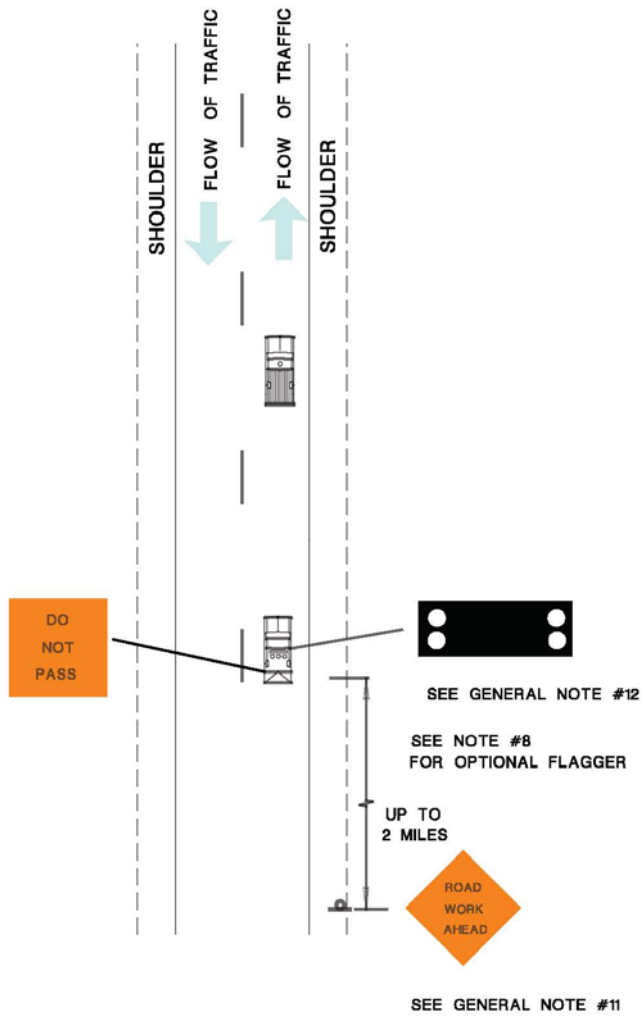
WORK AREA IN SHOULDER  
FOR SPEED LIMIT 45 MPH AND OVER





# 2 LANE ROAD

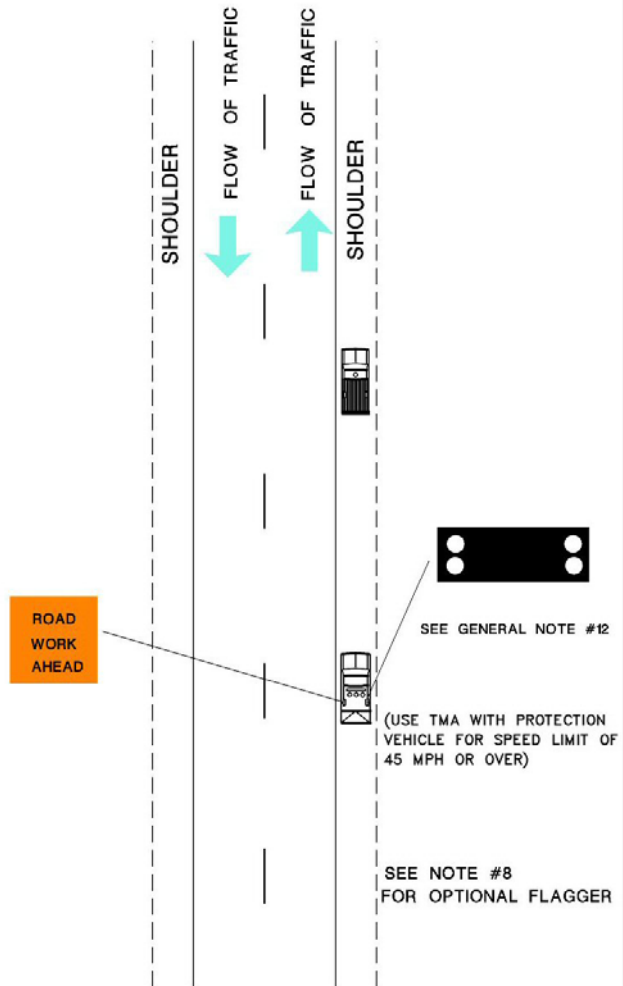
## MOBILE OPERATION





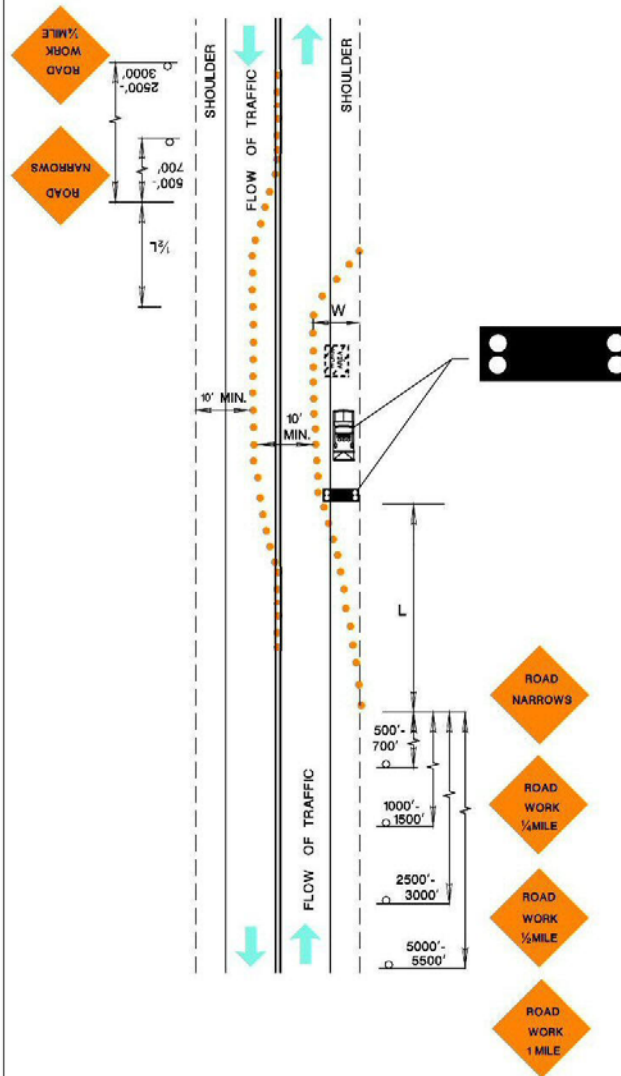
## 2 LANE ROAD

### MOBILE OPERATION





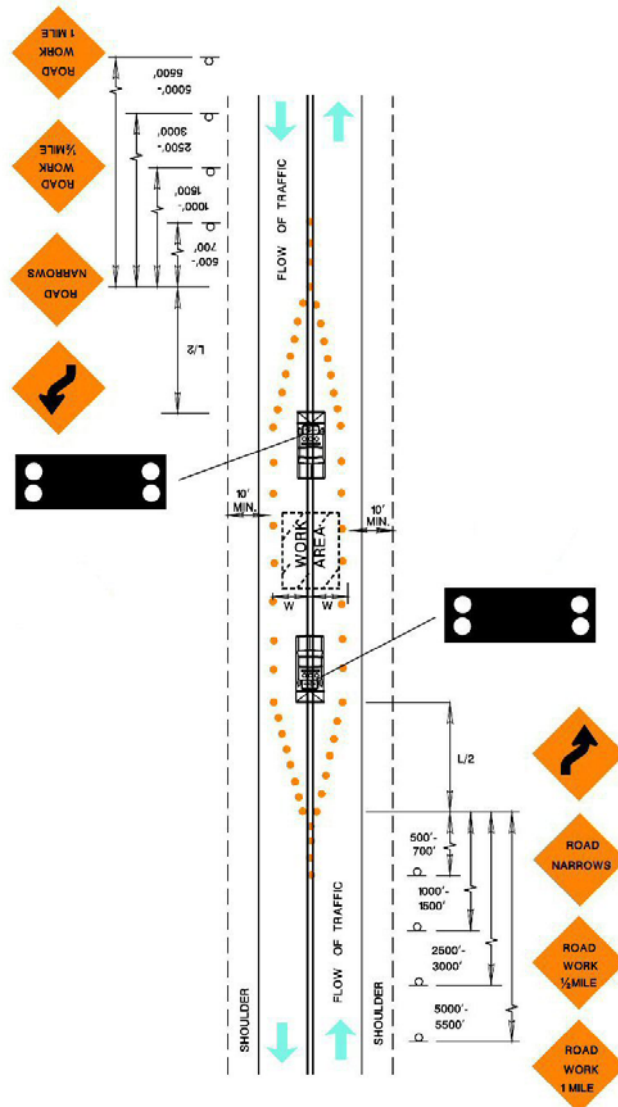
# 2 LANE ROAD WORK AREA PARTIALLY IN LANE





# 2 LANE ROAD

## WORK AREA IN CENTER OF ROAD





WORK AREA IN ONE LANE

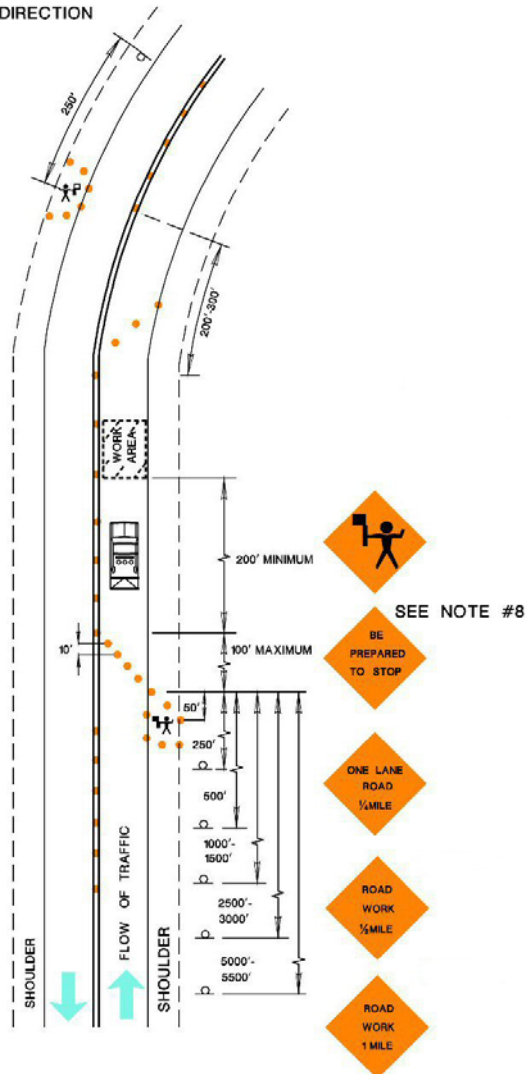




# 2 LANE ROAD

## WORK AREA IN LANE

FOR SIGNS SEE  
OTHER DIRECTION

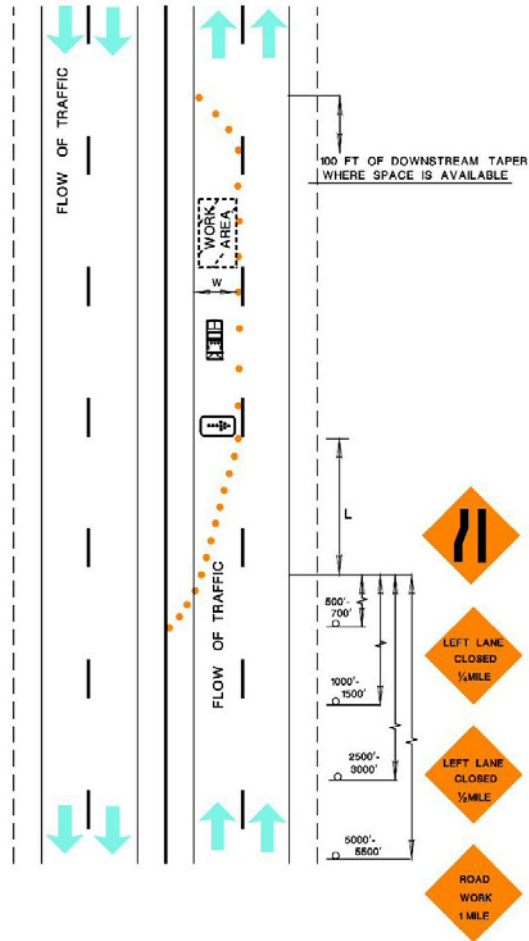




# MULTI-LANE ROAD-DIVIDED (LESS THAN 65 MPH)

## WORK AREA IN LEFT LANE

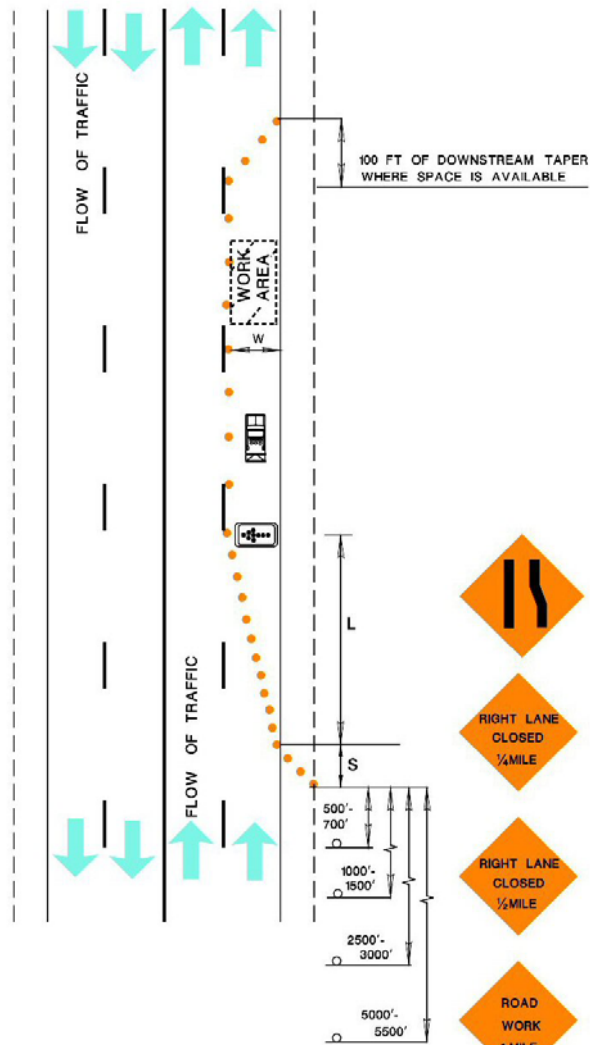
SEE GENERAL NOTE #14





# MULTI-LANE ROAD-DIVIDED (LESS THAN 65 MPH)

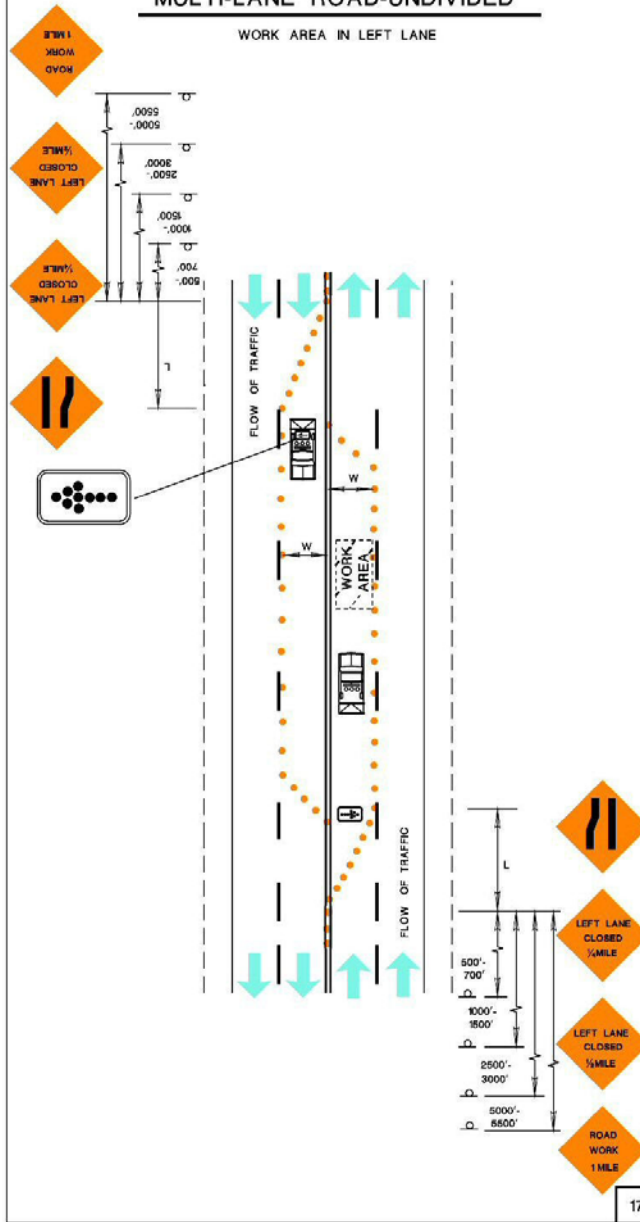
## WORK AREA IN RIGHT LANE





# MULTI-LANE ROAD-UNDIVIDED

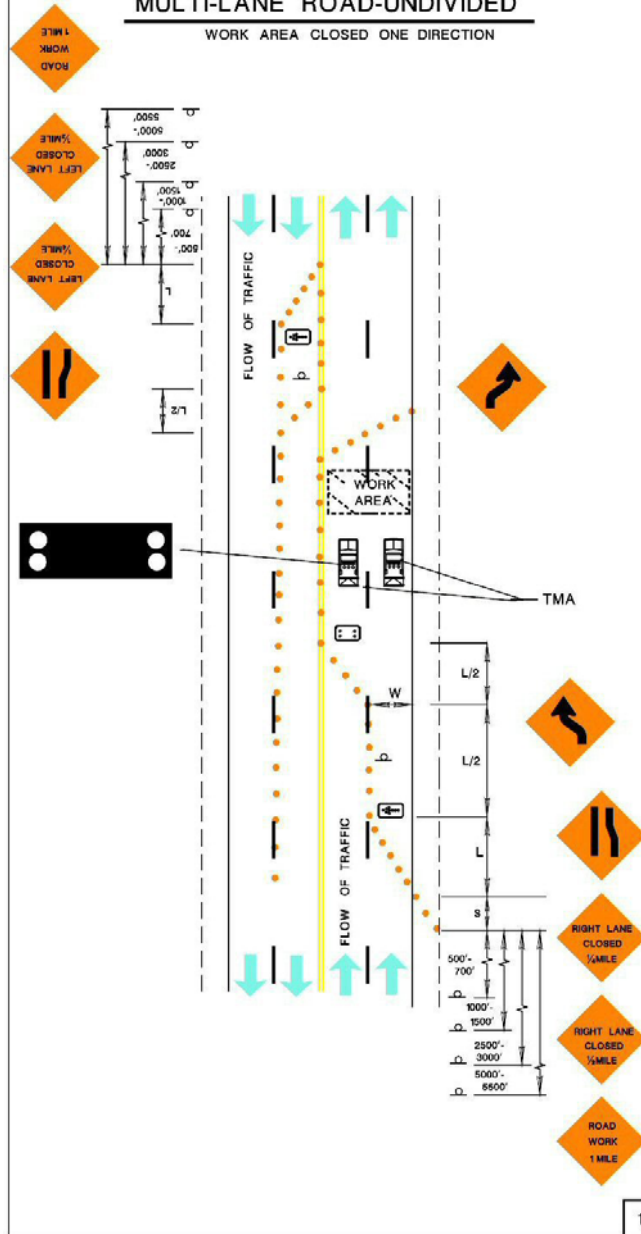
WORK AREA IN LEFT LANE





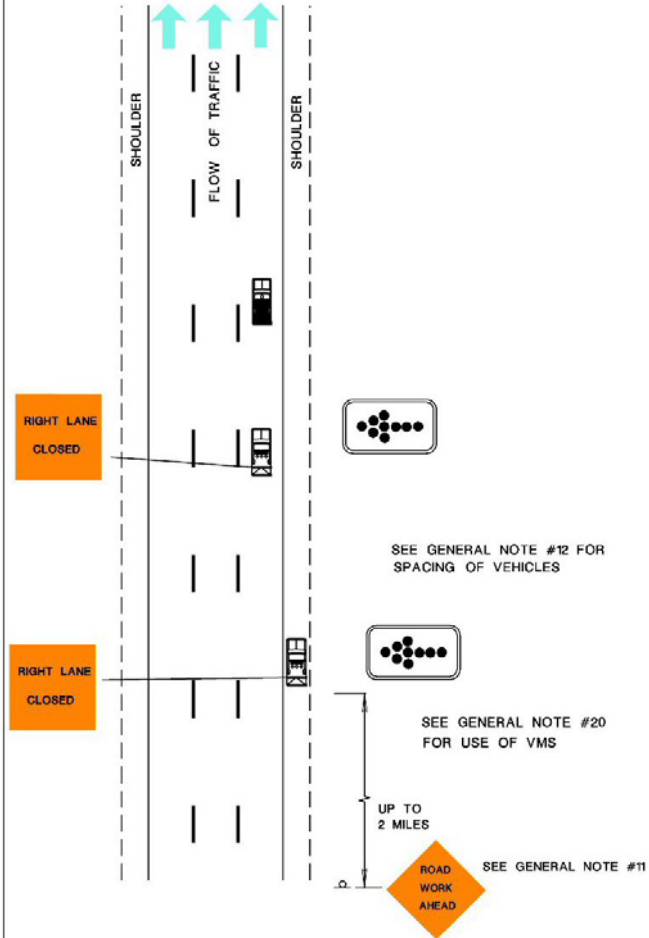
# MULTI-LANE ROAD-UNDIVIDED

WORK AREA CLOSED ONE DIRECTION



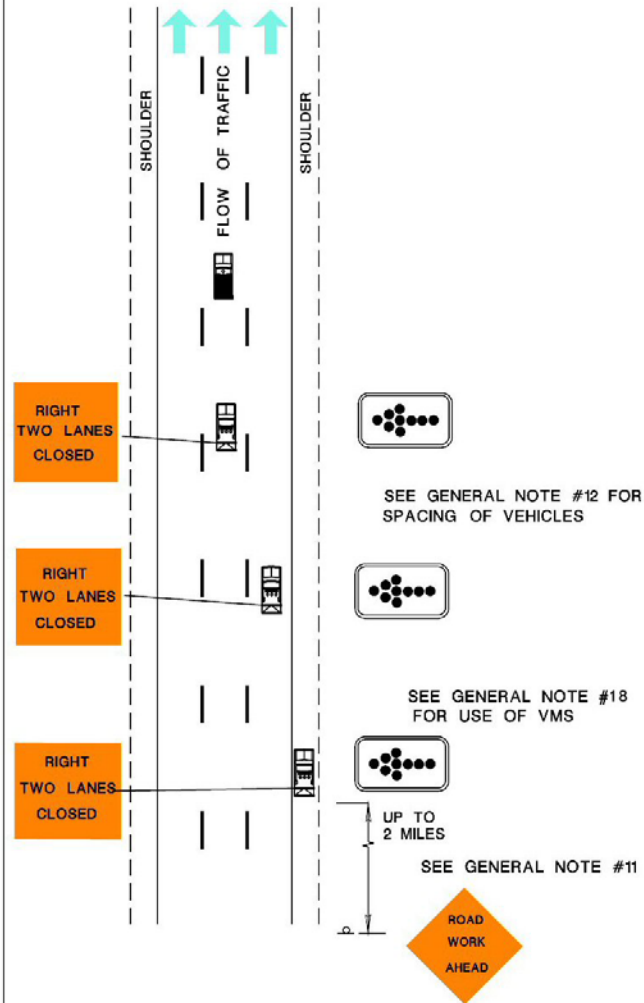


## MOBILE OPERATION ON MULTI-LANE ROAD



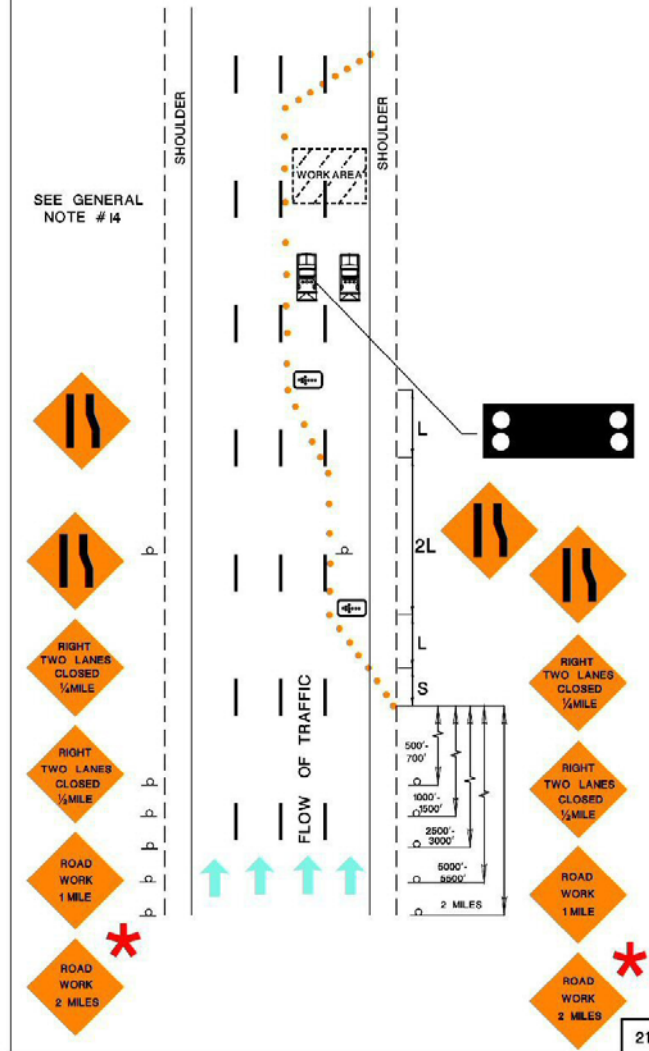


## MOBILE OPERATION ON MULTI-LANE ROAD





# RIGHT LANE OR TWO RIGHT LANES CLOSURE



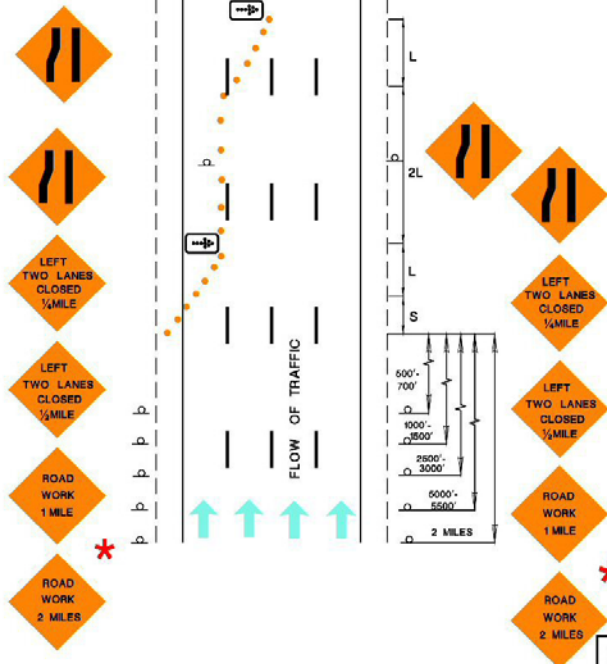


# LEFT LANE OR TWO LEFT LANES CLOSURE

## NOTE:

MAKE EVERY ATTEMPT  
TO INSTALL SIGNS  
ON LEFT SIDE IN  
THIS SCENARIO

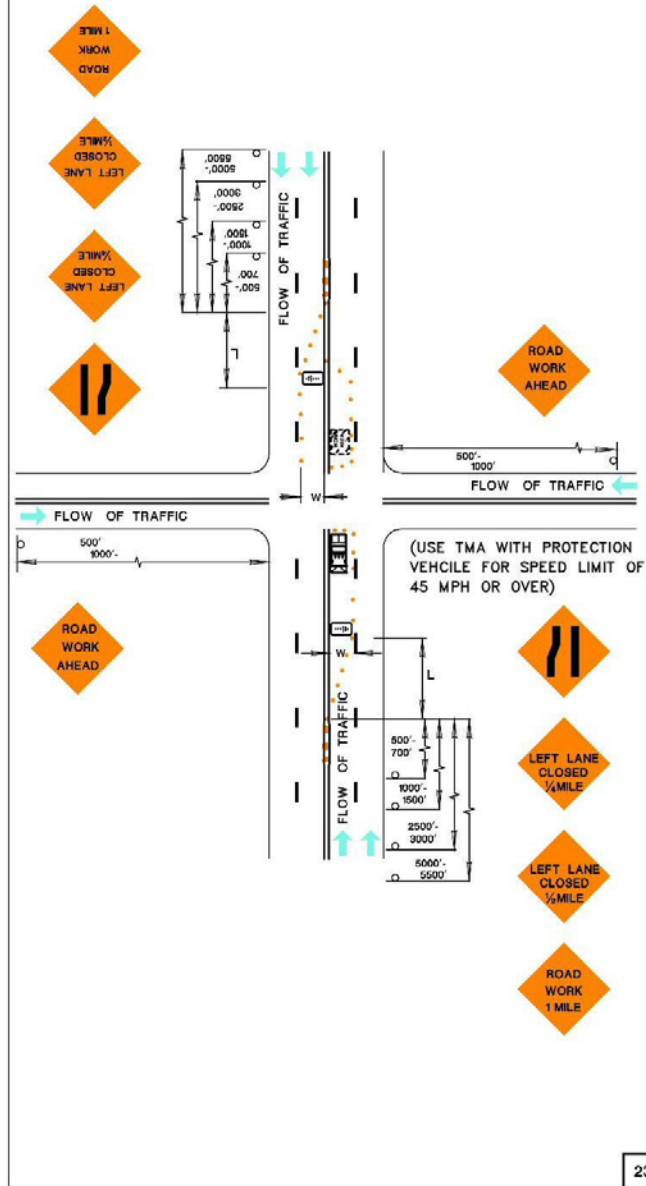
SEE GENERAL  
NOTE #14





# MULTI-LANE ROAD-UNDIVIDED

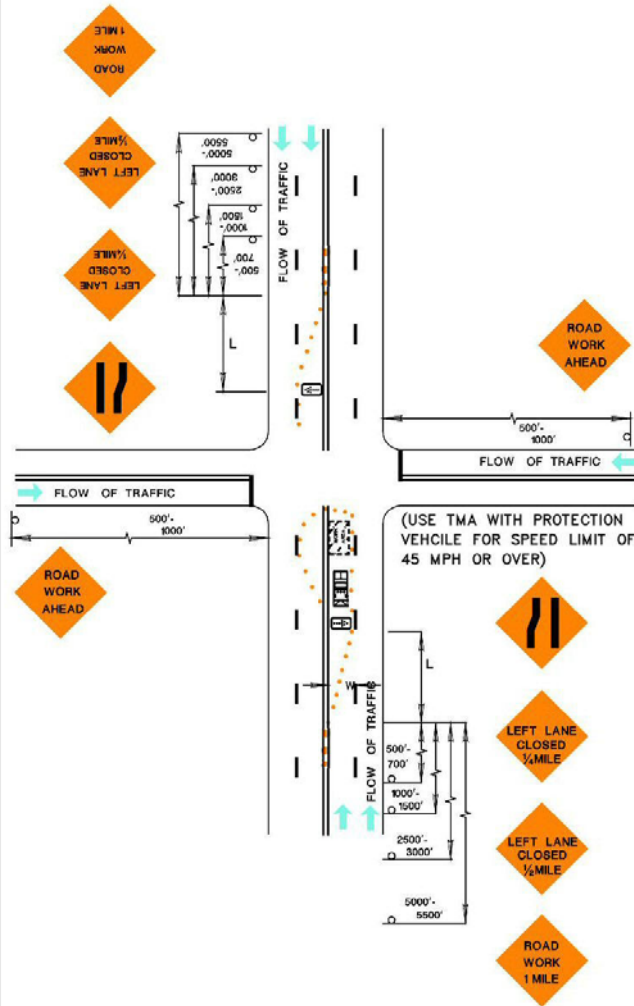
WORK AREA IN LEFT LANE AT INTERSECTION FAR SIDE





# MULTI-LANE ROAD-UNDIVIDED

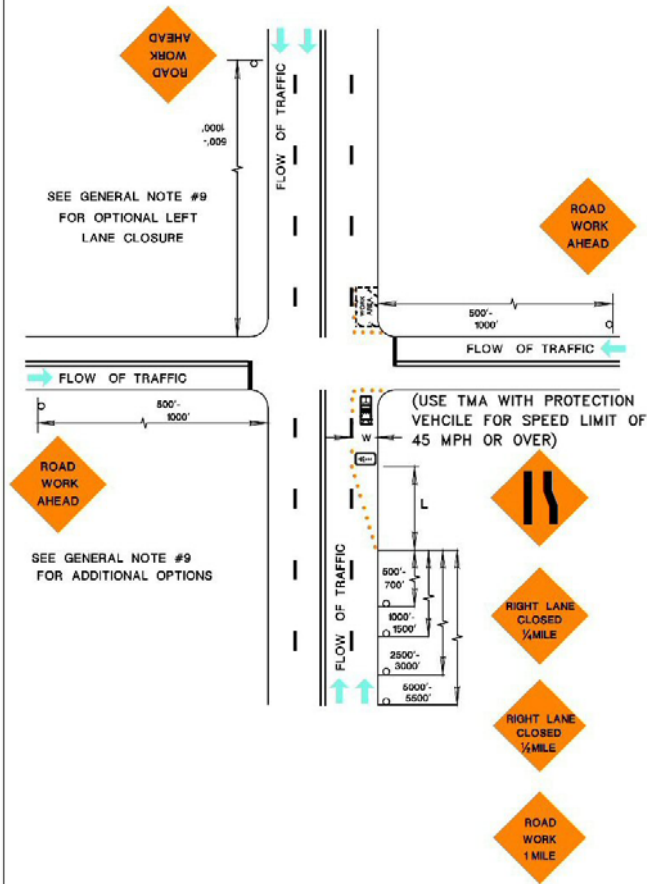
## WORK AREA IN LEFT LANE AT INTERSECTION NEAR SIDE





# MULTI-LANE ROAD-UNDIVIDED

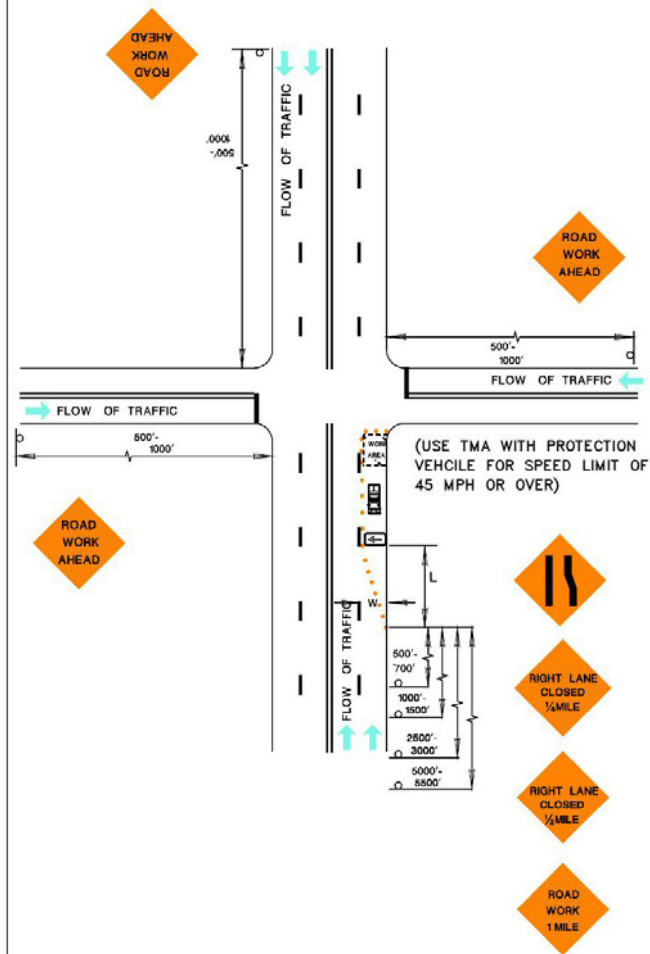
WORK AREA IN RIGHT LANE AT INTERSECTION FAR SIDE





## MULTI-LANE ROAD-UNDIVIDED

WORK AREA IN RIGHT LANE AT INTERSECTION NEAR SIDE









## **WORKING ON STATE ROADWAYS**

Contact the Regional Services Permits Group ...

North (973-770-5140): Bergen, Essex, Hudson, Morris,  
Passaic, Sussex, Union, Warren

Central (732-625-4330): Hunterdon, Mercer, Middlesex,  
Monmouth, Ocean, Somerset

South (856-486-6688): Atlantic, Burlington, Camden,  
Cape May, Cumberland, Gloucester, Salem

### **Before you dig, contact;**

NJ ONE CALL  
1-800-272-1000  
and

Regional Services Permits when  
working within NJDOT Right-of Ways

**NJDOT EMPLOYEE SAFETY**  
**609-530-5472**

**NJDOT GENERAL INFORMATION**  
[www.state.nj.us/transportation](http://www.state.nj.us/transportation)  
609-530-2000