2. The ROAD WORK NEXT 2 MILES (W21-V2) sign should be used instead of the ROAD WORK AHEAD (W20-1) sign if the work locations occur over a distance of more than 2 miles.

Stationary warning signs may be omitted for short duration or mobile operations if the work vehicle displays high-intensity rotating, flashing, or oscillating lights.

4. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or oscillating lights.

5. If an arrow board is used for an operation on the shoulder, the caution mode shall be used.

 Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.

7. If multiple work crews are active at various locations throughout the 2 mile work zone, a shadow vehicle shall be used for each work crew.

8. A truck-mounted attenuator (TMA) shall be used on the shadow vehicle on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph for operations with a duration greater than 60 minutes.

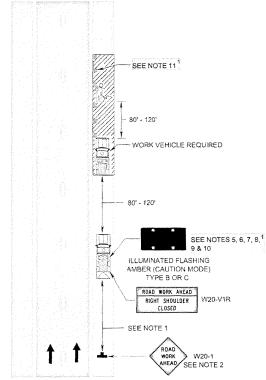
When the work operation is off the shoulder with a work duration of 1-15 minutes vehicle warning lights may be used on a work vehicle parked on the shoulder.

10. When the work operation is off the shoulder with a work duration of 15-60 minutes, vehicle warning

lights and a truck mounted sign (W20-V3, W20-V6, W20-V1, etc.) or a sign on a portable sign support should be placed behind the work operations vehicle.

11. The work area may be delineate by installing channelizing devices. The channelizing devices would start at the front of the shadow vehicle and extend through the work area. The spacing between channelizing devices may be reduced in the travelway to prevent motorists from entering the work area.

Mobile or Short Duration Shoulder Operation (Figure TTC-3.1)



1: Revision 1 - 4/1/2015

MOBILE OR SHORT DURATION 2 SHOULDER OPERATION DETAIL SCALE: N.T.S.

Shoulder Operation with Minor Encroachment (Figure TTC-5.1)

END ROAD WORK G20-2 (V) --- 80° - 120° SHADOW VEHICLE SEE NOTE 9

20' 40' 40' 80' ravelway Spacing Construction Access* 80° * Spacing may be increased to this distance, but shall not exceed one access per ½ mile. roadways with paved shoulders having a

Speed Limit (mph) 0 - 35 36 +

Channelizing Device Spacing

Location

Transition Spacing

width of 8 feet or more, channelizing device shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled

8. The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit. A truck-mounted attenuator (TMA) shall be used on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.

1 SHOULDER OPERATION DETAIL

SCALE: N.T.S Stationary Operation on a Shoulder (Figure TTC-4.1)

WORK BEYOND THE

-- SEE NOTE 1

Work Beyond the Shoulder Operation

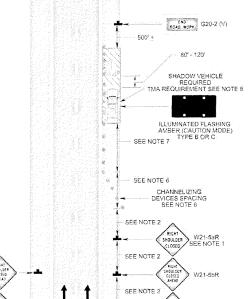
(Figure TTC-1.1)

-- EDGE OF PAVEMENT

- SEE NOTE 3

80' - 120'

WORK VEHICLE



8. A truck-mounted attenuator (TMA) shall be used on the shadow vehicle on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph for operations with a duration greater than 60 minutes.

Typical Traffic Control

Work Beyond the Shoulder Operation

(Figure TTC-1.1)

NOTES

The minimum distance between the sign and work vehicle should be 1300-1500' on Limited Access highways, and on all other roadways 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limited is 45 mph or less.

The ROAD WORK AHEAD (W20-1) sign may be replaced with other appropriate signs such as the SHOULDER WORK (W21-5) sign. The SHOULDER WORK sign may be used for work adjacent to

The ROAD WORK AHEAD sign may be omitted where the work space is behind a barrier, more than 4
feet behind vertical curb (Standard CG-2 and CG-6) on urban road ways, or outside of the clear zone for

4. For short-term, short duration or mobile operations, all signs and channelizing devices may be

5. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or doscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or oscillating lights.

If the work space is in the median of a divided highway, an advance warning sign shall also be placed on the left side of the directional roadway.

Typical Traffic Control

Stationary Operation on a Shoulder

(Figure TTC-4.1)

NOTES

For long-term stationary work (more than 3 days) on divided highways having a median wider than 8', sign assemblies on both sides of the roadway shall be required as shown (ROAD WORK AHEAD (W20-1), RIGHT SHOULDER CLOSED AHEAD (W21-5bR), RIGHT SHOULDER

2. Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways the sign spacing should be 500-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.

3. The SHOULDER WORK (W21-5) sign on an intersecting roadway may be omitted where drivers

emerging from that roadway will encounter another advance warping sign prior to this activity area.

4. For short duration operations of 60 minutes or less, all signs and channelizing devices may be

5. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or oscillating, lights.

6. Taper length (L) and channelizing device spacing shall be at the following:

liminated if a vehicle with activated high-intensity amber rotating, flashing, or oscillating lights is

Channelizing Device Spacing

Transition Spacing 20' 40'

Construction Access* 80' 120'

Spacing may be increased to this distance, but shall not exceed one access per ¼ mile.
On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled

Location

Travelway Spacing

Speed Limit (mph)

0 - 35 36 +

CLOSED (W21-5aR)¹), even though only one shoulder is being closed. For operations less than 3 days in duration, sign assemblies will only be required on the side where the shoulder is being closed and a RIGHT SHOULDER CLOSED (W21-5aR)¹ sign shall be added to that side.

eliminated if a vehicle with activated high-intensity amber rotating, flashing, or oscillating lights is

all other roadways. For clear zone values see Page A-4 of Appendix A.

Standard:

1: Revision 1 - 4/1/2015

Standard

When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.
 Revision 1 - 41/2015

3 STATIONARY OPERATION ON A SHOULDER DETAIL SCALE: N.T.S.

1: Revision 1 - 4/1/2015

NOTES For required sign assemblies for multi-lane roadways see Note 1, TTC-4.³

2. Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.

Typical Traffic Control

Shoulder Operation with Minor Encroachment

(Figure TTC-5.1)

3. When work takes up part of a lane on a high volume roadway; vehicular traffic volumes, vehicle mix, speed and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment analysis permits a centaining lane withof of 10 feet, the lane should be closed. If the closure operation is on a Limited Access highway, the minimum lane width is 11 feet.

4. The ROAD WORK AHEAD (W20-1) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.

 A shadow vehicle with either an arrow board operating in the caution mode, or at least one high-intensity amber rotating, flashing, or socillating light shall be parked 80' - 120' in advance of the first work crew.

6. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or oscillating lights.

7. Taper length (L) and channelizing device spacing shall be at the following:

Speed Limit (mph)	aper Length (L) Lane Width (Feet)			
	9	10	11	12
25	95	105	115	125
30	135	150	165	180
35	185	205	225	245
40	240	270	295	320
45	405	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840
Minimum tape highwa		s for Li		cess
Shoulder	Taper	= 1/3 L N	inimum	

When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.

1: Revision 1 - 4/1/2015

ILLUMINATED FLASHING AMBER (CAUTION MODE) TYPE B OR C - SEE NOTE 8 SEE NOTE 7 CHANNELIZING DEVICES SPACING SEE NOTE 7 SEE NOTE 2 + .009-SEE NOTE 2 HOWD WORK

> SHOULDER OPERATION 4 WITH MINOR ENCROACHMENT DETAIL SCALE: N.T.S.

TRAFFIC CONT SHEE"

W21-5bR

W20-1

WATER AUTHORITY

ssue Date 3-30-18

C-E

Minimum taper lengths for Limited Access highways shall be 1000 feet.

7. The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.

450 500 550 600 495 550 605 660

Taper Length (L)

Lane Width (Feet)
9 10 11 12

95 105 115 125

135 150 165 180

185 205 225 245

240 270 295 320

405 450 495 540

65 585 650 715 780 70 630 700 770 840