1. 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)), 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 AHEAD (W21-5bR) sign shall be added to that side.

**NOTES** 

- 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 warning sign prior to this activity area. 4. For short duration operations of 1 hour or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity amber rotating, flashing, oscillating, or strobe lights is used.
- 5. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, oscillating, or strobe lights. Vehicle hazard warning signals can be used to
- supplement high-intensity amber rotating, flashing, oscillating, or strobe lights. 6. Taper length (L) and channelizing device spacing shall be at the following:

Taper Length (L)						
Speed Limit	Lane Width (Feet)					
(mph)	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		

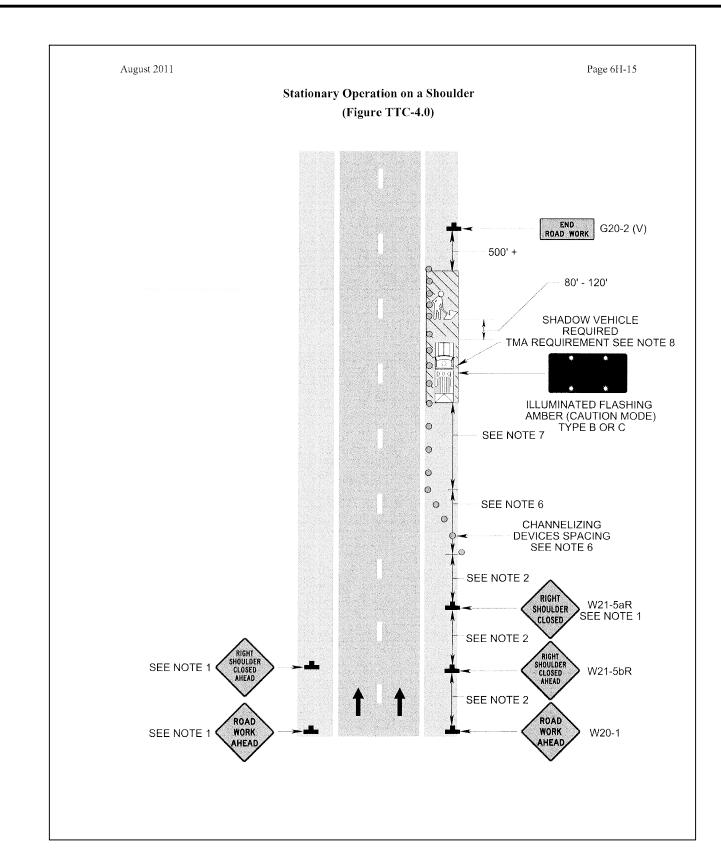
Minimum taper lengths for Limited Access

highways shall be 1000 feet.

Shoulder Taper = 1/₃ L Minimum

· · · · ·			
Jevice Spac	ıng		
Speed Limit (mph			
0 - 35	36 +		
20'	40'		
40'	80'		
80'	120'		
eased to this ne access pe			
ed shoulde, channeliz			
lose the s			
rging taper			
	0 - 35 20' 40' 80' eased to this ne access powed shoulde a, channeliz lose the seging taper		

- 7. The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit. 8. A shadow vehicle shall be used whenever a person is required to operate equipment mounted on or in the work vehicle such as buckets, augers, post drivers, etc. For work operations on the shoulder with a duration greater than 1 hour where workers are present, a shadow vehicle shall be used. 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
- 9. When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.



# Page 6H-38 August 2011 **Typical Traffic Control** Outside Lane Closure Operation on a Four-Lane Roadway (Figure TTC-16.0) **NOTES**

- 1. On divided highways having a median wider than 8', right and left sign assemblies shall be
- 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. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 611-3. For Limited Access highways a minimum of 1000' is desired. 4. All vehicles, equipment, workers, and their activities should be restricted to one side of the pavement.
- Standard 5. Taper Length (L) and Channelizing Device Spacing shall be:

Taper Length (L)								
Speed Limit	Lane Width (Feet)					Lane Width (Fed		
(mph)	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				

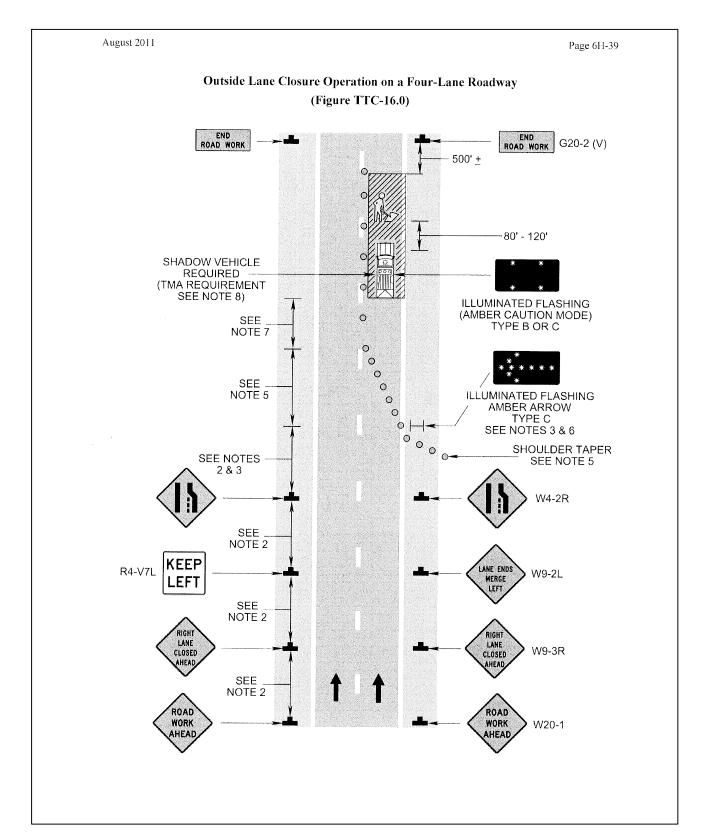
highways shall be 1000 feet.

Shoulder Taper = 1/3 L Minimum

placed as needed.

Location	Speed Limit (mph		
Location	0 - 35	36 +	
Transition Spacing	20'	40'	
Travelway Spacing	40'	80'	
Construction Access*	80'	120'	
* Spacing may be incre but shall not exceed or			
n roadways with pave ridth of 8 feet or more, hall be used to clo dvance of the merc	ed shoulde channeliz ose the s	rs having ing devic houlder	

- 6. An arrow board shall be used when a lane is closed. When more than one lane is closed, a separate arrow board shall be used for each closed lane (see Figure TTC-18).
- 7. The buffer space length shall be shown in Table 6H-3 on Page 6H-5 for the posted speed limit. 8. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one high intensity amber rotating, oscillating, or amber strobe light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-
- mounted attenuator shall be used. 9. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, oscillating, or strobe lights. Vehicle hazard warning signals can be used to
- supplement high-intensity amber rotating, flashing, oscillating, or strobe lights. 10. When a side road intersects the highway within the TTC zone, additional TTC devices shall be



### MAINTENANCE OF TRAFFIC

- LANE CLOSURES WILL NOT BE PERMITTED ON WEEKENDS BETWEEN 12:00 NOON, FRIDAY AND 12:01 AM., MONDAY. OR BETWEEN THE HOURS OF 6:30 AM TO 9:00 AM AND 3:30 PM AND 6:00 PM ON MONDAYS THROUGH FRIDAYS (EXCLUDING HOLIDAYS), UNLESS DIRECTED BY THE RESIDENT ENGINEER. BOTH LANES OF TRAFFIC IN EACH DIRECTION SHALL BE MAINTAINED EACH DAY WHEN CONSTRUCTION ACTIVITIES HAVE CEASED.
- TRAFFIC SHALL NOT BE STOPPED ON THE ROADWAYS AND/OR CONNECTOR ROADS FOR LONGER THAN FIVE MINUTES AT ANY TIME, UNLESS OTHERWISE DIRECTED BY THE RESIDENT ENGINEER.
- 3. TWO-WAY ONE-LANE TRAFFIC WILL BE PERMITTED TO FACILITATE SPECIFIC ISOLATED CONSTRUCTION ACTIVITIES THAT REQUIRE A LANE CLOSURE OR AS DIRECTED BY THE RESIDENT ENGINEER.
- 4. ACCESS TO ADJACENT PROPERTIES AND CONNECTING STREETS SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
- 5. WHEN CONSTRUCTION ACTIVITIES HAVE CEASED FOR THE DAY THE FOLLOWING OPERATIONS
- WILL BE PERFORMED TO ALLOW FOR TWO-WAY TRAFFIC TO RESUME TRAVEL A. ALL TRAFFIC CONES SHALL BE RELOCATED TO THE EXISTING EDGE OF PAVEMENT
- B. ALL SIGNAGE WITH THE EXCEPTION OF THE "ROAD WORK AHEAD" SIGN SHALL BE COVERED (SEE TRAFFIC CONTROL SIGNAGE NOTE 5)
- 6. BEFORE CONSTRUCTIN ACTIVITIES COMMENCE FOR THE DAY ALL OPERATONS IN NOTE 5 SHALL RESUME NORMAL TRAFFIC CONTROL STATUS.

#### SUGGESTED SEQUENCE OF CONSTRUCTION

- 1. A PRE-CONSTRUCTION CONFERENCE IS MANDATORY BEFORE ANY WORK IS DONE ON THE SITE. THE CONTRACTOR IS RESPONSIBLE FOR ARRANGING THE MEETING AMONG THE OWNER, COUNTY ENGINEER, VDOT, UTILITY DEPT. AND THE CONTRACTOR. FORTY-EIGHT (48) HOURS NOTICE IS REQUIRED.
- 2. INSTALL PERIMETER EROSION & SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. MAINTAIN EROSION AND SEDIMENT CONTROL ITEMS THROUGHOUT CONSTRUCTION.
- 3. INSTALL TRAFFIC CONTROL MEASURES (E.G. CONES, SIGNAGE, ETC) AS PER PLAN.
- 4. CLEAR, GRUB, STRIP TOPSOIL AND STOCKPILE, AND PERFORM GRADING OPERATIONS WHILE MAINTAINING TRAFFIC IN ACCORDANCE WITH WORK AREA PROTECTION MANUAL AND MAINTENANCE OF TRAFFIC NOTES (THIS SHEET). ANY STOCKPILE AREAS MUST BE PROTECTED BY MEANS OF A SILT FENCE OR APPROVED EROSION & SEDIMENT CONTROL MEASURES, AND SHOULD BE LOCATED IN AN AREA APPROVED BY THE ENGINEER OR HAULED OFF SITE.
- 5. PERFORM ROAD IMPROVEMENTS ACCORDING TO THE CONSTRUCTION NARRATIVE (THIS SHEET) AND THE PAVEMENT MARKING PLAN THIS SHEET.
- 6. SEED, FERTILIZE AND MULCH ALL DISTURBED AREAS THAT HAVE BEEN DENUDED AND ARE NOT TO BE PAVED.
- 7. AFTER GRASS AREAS HAVE BEEN ESTABLISHED AND ACCEPTED, CLEAN UP ALL EROSION AND SEDIMENT CONTROL MEASURES, REMOVE DEBRIS, AND DISPOSE OF OFF-SITE.

### PAVEMENT MARKING NOTES:

- 1. ANY EXISTING WHITE EDGE LINE SHALL BE REPLACED IF THE EXISTING LINE IS DAMAGED OR REMOVED IN AREAS OTHER THAN THE DRIVE ENTRANCE. THIS LINE SHOULD LOCATED 1' OFF OF THE EDGE OF PAVEMENT.
- 2. PAVEMENT MARKINGS WITHIN RIGHT OF WAY ARE TO BE THERMOPLASTIC TYPE B, CLASS I AND SHALL BE APPLIED BY A CONTRACTOR THAT IS ON THE VDOT PRE-APPROVED LIST OF QUALIFIED CONTRACTORS. MODIFICATIONS TO THE PAVEMENT-MARKING PLAN MAY BE MADE IN THE FIELD BY THE VDOT ENGINEER TO BEST-FIT EXISTING CONDITIONS.
- 3. PAVEMENT MARKING STRIPES AND ARROWS ARE TO BE WHITE UNLESS OTHERWISE INDICATED.

# TRAFFIC CONTROL CHANNELING DEVICES:

1. CONE SPACING SHALL BE AS FOLLOWS: SPEED (MPH) **LOCATION** <u>0-35</u> <u>36 +</u>

- TRANSITION SPACING 20' 40' TRANSITION SPACING 40' 2. CONES MAY BE USED IN AREAS WHERE PERSONNEL WILL BE PRESENT TO ENSURE
- SHALL BE REQUIRED. 3. GROUP II CHANNELING DEVICES WITH FLASHING WARNING LIGHTS ARE NO LONGER

THEIR PROPER ALIGNMENT, WHEN PERSONNEL ARE NOT PRESENT GROUP II DRUMS

4. ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE RIGHT OF WAY WHEN NOT SERVING A SPECIFIC PURPOSE RELATING TO TRAFFIC CONTROL. (SEE REMOVAL POLICY)

ALLOWED.

THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL TRAFFIC CONTROL DEVICES, SIGNAGE, EQUIPMENT, PERSONNEL, INCLUDING CERTIFIED TRAFFIC CONTROL PERSONNEL, ETC. TO CONTROL TRAFFIC DURING CONSTRUCTION | WITHIN VDOT MAINTAINED RIGHT—OF—WAY. ALL TRAFFIC CONTROL SHALL BE IN STRICT ACCORDANCE WITH THE STANDARDS, GUIDELINES, POLICES, AND OBJECTIVES OF THE LATEST EDITION OF THE VIRGINIA WORK AREA PROTECTION MANUAL, MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND ALL VDOT PERMITS.

## TRAFFIC CONTROL GENERAL NOTES:

- WORK AREA PROTECTION MANUAL. THE CONTRACTOR SHALL CONTACT THE RESIDENCY OFFICE 2 WEEKS BEFORE LANE(S) ARE TO BE CLOSED.
- 2. A "RIDE THROUGH" ALONG THE ENTIRE LANE CLOSURE SHALL BE PERFORMED BEFORE AND AFTER EACH CONSTRUCTION DAY (WITH ADJUSTMENTS MADE TO THE TRAFFIC CONTROL DEVICES IF NEEDED) TO ENSURE THAT THE LANE CLOSURE AND ASSOCIATED DEVICES ARE INSTALLED AND FUNCTIONING PROPERLY.
- 3. ALL AREAS EXCAVATED BELOW EXISTING PAVEMENT SURFACE AND WITHIN THE CLEAR ZONE, AT THE CONCLUSION OF EACH WORKDAY, SHALL BE BACK FILLED TO FORM AN APPROXIMATE 6:1 WEDGE. AGAINST THE PAVEMENT SURFACE FOR THE SAFETY AND PROTECTION OF VEHICULAR TRAFFIC. ALL COSTS FOR PLACING, MAINTAINING AND REMOVING THE 6:1 WEDGE SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS IN THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.
- 4. ANY CONTRACT ITEM(S) NOT SPECIFICALLY NOTED IN THE SEQUENCE OF CONSTRUCTION MAY BE SCHEDULED FOR CONSTRUCTION AT THE CONTRACTOR'S OPTION, AS APPROVED BY THE RESIDENT ENGINEER. HOWEVER, UNDER NO CIRCUMSTANCES WILL CONCURRENT CONSTRUCTION LEFT AND RIGHT OF ANY LANE OF TRAFFIC BE ALLOWED.

#### VEHICULAR REQUIREMENTS FOR TRAFFIC CONTROL

#### 1. VEHICLE WARNING LIGHTS:

WARNING LIGHTS ON VEHICLES SHALL BE MOUNTED AS TO BE VIEWED 360 DEGREES ON VEHICLES WITHOUT ARROW PANELS, AND 180 DEGREES ON VEHICLES WITH ARROW PANELS, AND SHALL MEET THE FOLLOWING CRITERIA:

#### ROTATING AMBER LIGHTS:

ROTATING AMBER LIGHTS SHALL CONSIST OF A MIMIMUM OF TWO HALOGEN SEALED BEAMS ENCLOSED WITHIN AN AMBER COLORED DOME. SEALED BEAMS SHALL BE AT LEAST 60,000 CANDLEPOWER AND SHALL HAVE A FLASH RATE OF 80 TO 100 FLASHES PER MINUTE. ROTATING LIGHTS SHALL BE APPROXIMATELY 8-1/2 INCHES OR GREATER IN DIAMETER AND HEIGHT (6 INCHES IN HEIGHT FOR MULTI-LIGHT BARS).

#### HIGH INTENSITY AMBER STROBE LIGHTS:

HIGH INTENSITY AMBER STROBE LIGHTS SHALL CONSIST OF A DOUBLE FLASH UNIT ENCLOSED WITHIN AN AMBER COLORED LENS. FLASH RATE SHALL BE 80 ±10 FLASHES PER MINUTE. STROBE LIGHTS SHALL BE APPROXIMATELY 6-5/8 INCHES IN DIAMETER AND 7-1/2 INCHES IN HEIGHT OR GREATER.

#### 2. NIGHT WORK LIGHTING:

OPERATIONS CONDUCTED AT NIGHT OFTEN REQUIRE ADDITIONAL LIGHTING TO SUFFICIENTLY ILLUMINATE THE WORK AREA IN THE TEMPORARY TRAFFIC CONTROL ZONE. LIGHTING SHALL BE ARRANGED SO AS NOT TO INTERFERE WITH OR IMPEDE TRAFFIC APPROACHING THE WORK AREA IN EITHER DIRECTION. DURING NIGHT OPERATIONS, ALL VEHICLES ENTERING AND EXITING THE WORK AREA SHOULD BE EQUIPPED WITH AND HAVE OPERATING AT LEAST ONE ROTATING AMBER LIGHT OR HIGH INTENSITY AMBER STROBE

- 3. A TRUCK WITH AT LEAST ONE ROTATING AMBER LIGHT OR HIGH INTENSITY AMBER STROBE LIGHT SHALL BE PARKED 50' TO 100' IN ADVANCE OF THE FIRST WORK CREW. THE ROTATING AMBER LIGHT CAN BE EITHER TRUCK OR TRAILER MOUNTED BUT MUST BE RELOCATED OUT OF THE ROAD (PREFERABLY WITHIN THE PROPOSED SUBDIVISION PROJECT) AT THE END OF EACH WORK PERIOD. RELOCATION TO THE SHOULDER IS PROHIBITED.
- 4. TRUCK MOUNTED ATTENUATORS SHALL BE INSTALLED (IN FULL LOCK DOWN POSITION) ON ALL ADVANCE WARNING VEHICLES LOCATED WITHIN THE RIGHT OF WAY. THE VEHICLE PARKING BRAKE SHALL BE SET WITH THE FRONT WHEELS TURNED FOR "AFTER-IMPACT PROJECTORY" INTO A SAFE AREA. THE TMA VEHICLE SHALL NOT BE USED AS WORK VEHICLE. ANY MATERIAL AND/OR EQUIPMENT ON THE TMA VEHICLE SHALL BE PROPERLY SECURED TO PREVENT SPILLAGE IF STRUCK BY A VEHICLE.

# TRAFFIC CONTROL SIGNAGE:

- 1. SIGN SPACING DISTANCE 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.
- 2. WHERE R/W OR GEOMETRIC CONDITIONS PREVENT THE USE OF 48"x48" SIGNS, 36"x36" SIGNS MAY BE USED.
- 3. ALL TRAFFIC CONTROL SIGNAGE SHALL BE MOUNTED ON A SINGLE BREAKAWAY POST SUPPORT.
- 4. ALL WARNING SIGNS SHALL BE FABRICATED OF FLOURESCENT ORANGE PRISMATIC LENS SHEETING.
- 5. ANY SIGN COVERINGS SHALL BE BLACK AND WEATHER RESISTANT FIRMLY SECURED TO ENSURE COVERAGE DURING HIGH WINDS.

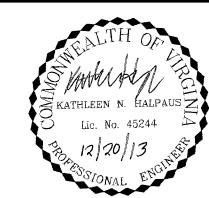
# TRAFFIC CONTROL DEVICES REMOVAL POLICY

- ALL TRAFFIC CONTROL METHODS AND INSTALLATIONS SHALL BE ACCORDING TO THE CURRENT EDITION OF THE VIRGINIA WORK AREA PROTECTION MANUAL AND AS FOLLOWS: ALL TRAFFIC CONTROL DEVICES SHALL BE REMOVED WHEN NO LONGER NEEDED OR WHEN WORK IS TEMPORARILY SUSPENDED, ADVANCE WARNING SIGNS THAT ARE NO LONGER APPROPRIATE SHALL BE REMOVED FROM THE ROADWAY OR COVERED. OTHER INAPPROPRIATE DEVICES SHALL BE REMOVED FROM THE WORK AREA SO THEY ARE NOT VISIBLE TO THE DRIVERS AS FOLLOWS:
- OONES, WHEN NOT REQUIRED, ARE TO BE REMOVED FROM THE R/W. OROUP II DEVICES (DRUMS), WHEN NOT REQUIRED, CAN BE MOVED TO THE SHOULDER IF THEY ARE TO BE USED IN THE SAME AREA WITHIN THREE WORKING DAYS. THIS IS BASED ON THE DIFFICULTY OF THEIR REMOVAL AND REINSTALLATION.

SIGNS INSTALLED ON PORTABLE STANDS SHALL BE REMOVED FROM THE R/W WHEN NO LONGER REQUIRED, ALONG WITH THE PORTABLE STANDS.

@RROW BOARDS, WHEN NOT REQUIRED, CAN BE LEFT ON THE SHOULDER IF THEY ARE TO BE USED IN THE SAME AREA WITHIN THREE WORKING DAYS. HOWEVER, THEY ARE TO BE DELINEATED WITH GROUP II DEVICES (DRUMS). \* WARIABLE MESSAGE SIGNS, WHEN NOT REQUIRED, CAN BE LEFT ON THE SHOULDER IF THEY ARE TO BE USED IN THE SAME AREA WITHIN THREE WORKING DAYS. HOWEVER, THEY ARE TO BE DELINEATED WITH GROUP II DEVICES (DRUMS). \*

\* THESE DEVICES SHOULD BE REMOVED WHEN NO LONGER REQUIRED IF THE INSTALLATION AND REMOVAL OF THESE DEVICES PRESENT LITTLE DIFFICULTY. THERE WILL BE TIMES WHEN THESE REQUIREMENTS WILL NOT WORK DUE TO UNUSUAL CIRCUMSTANCES. THESE CIRCUMSTANCES SHALL BE DISCUSSED WITH THE RESIDENT ENGINEER TO RECEIVE AN EXCEPTION TO THE REQUIREMENTS.



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