

**TRAFFIC CONTROL:**

(03-20-07)

RWZ-1Revised

Maintain traffic in accordance with Divisions 10, 11 and 12 of the *Standard Specifications*, the latest revisions thereto and the following provisions:

Use a lane closure (refer to the *Roadway Standard Drawings* Nos. 1101.02, 1101.11, 1110.02, 1130.01 and details for the Advance Work Zone signing in contract) or a slow-moving operation as shown in details of this contract. Use a moving operation only if the minimum speed maintained at all times is 3 mph with no stops that narrow or close a lane of travel. If the moving operation is progressing slower than 3 mph at any time, install a lane closure. Maintain the existing traffic pattern at all times, except in the immediate work zone where lane closures are allowed as determined by the Engineer.

Refer to Attached Details and the *Roadway Standard Drawings* Nos. 1101.02, 1101.03, 1101.04, 1101.05, 1101.11, 1110.01, 1110.02, 1115.01, 1130.01, 1135.01, 1145.01, 1150.01, 1165.01, 1170.01 and 1180.01 when closing a lane of travel in a stationary work zone such as pavement patching resurfacing, or pavement marking removal. Properly ballasted cones may be used instead of drums for lane closures during daylight hours. However, drums are required for the upstream taper portion of lane closures in all applications. The stationary work zone shall be a maximum of **1 mile** in length at any given time unless otherwise directed by the Engineer. **The Contractor shall work in only one location per direction at a time and complete this work before moving to the next location unless directed otherwise by the Engineer.** A pilot vehicle operation may be used in conjunction with flaggers and the appropriate pilot vehicle warning signing as directed by the Engineer. During periods of construction inactivity, return the traffic pattern to the existing alignment and remove or cover any work zone signs. When covering work zone signs, use an opaque material that prevents reading of the sign at night by a driver using high beam headlights. Use material, which does not damage the sign sheeting. Replace any obliterated markings as required by other sections of the *Standard Specifications* and the Engineer.

When personnel and/or equipment are working on the shoulder adjacent to an undivided facility and within 5 feet of an open travel lane, close the nearest open travel lane using the *Roadway Standard Drawings* No. 1101.02 unless the work area is protected by barrier or guardrail. When personnel and/or equipment are working on the shoulder, adjacent to a divided facility and within 10 feet of an open travel lane, close the nearest open travel lane using the *Roadway Standard Drawings* No. 1101.02 unless the work area is protected by barrier or guardrail. When personnel and/or equipment are working within a lane of travel of an undivided or divided facility, close the lane according to the traffic control plans, *Roadway Standard Drawings* or as directed by the Engineer. Conduct the work so that all personnel and/or equipment remain within the closed travel lane. Do not work simultaneously, on both sides of an open travel way, within the same location, on a two-lane, two-way road. Do not perform work involving heavy equipment within 15 feet of the edge of travel way when work is being performed behind a lane closure on the opposite side of the travel way. Perform work only when weather and visibility conditions allow safe operations as directed by the Engineer.

Do not exceed a difference of 2 inches in elevation between open lanes of traffic for nominal lifts of 1.5 inches. Install advance warning UNEVEN LANES signs (W8-11 at 48" X 48") 500 feet in advance and a minimum of once every half mile throughout the uneven area.

Backfill at a 6:1 slope up to the edge and elevation of existing pavement in areas adjacent to an open travel lane that has an edge of pavement drop-off as follows:

(A) Drop-off that exceeds 2 inches on roadways with posted speed limits greater than 45 mph.

(B) Drop-off that exceeds 3 inches on roadways with posted speed limit of 45 mph or less.

Backfill the unacceptable drop-off with suitable compacted material, as approved by the Engineer, at no expense to the Department. This work is not considered part of shoulder reconstruction.

When utilizing a slow-moving operation for such items as pavement marking placement, pavement marker installation and pesticide spraying, the slow moving operation caravan shall consist, as a minimum, of the vehicles and devices shown on the Moving Operation Caravan Detail(s) herein. Traffic cones may be used when necessary to provide additional protection of wet pavement markings. Ballast all traffic cones so they will not be blown over by traffic.

**Failure to comply with the following requirements will result in a suspension of all other operations. Coordinate the median barrier construction and the milling, patching and resurfacing operations such that these operations are completed in the order as directed by the Engineer.**

**1. Perform Milling/Resurfacing operations on I-40 as follows:**

- Mill a single lane and pave back by the end of each work day.
- Close to traffic the lane being milled/resurfaced.
- Close to traffic adjacent lane(s) if the drop off exceeds 3".
- Length of drop off area shall not exceed 1,000 feet.
- The posted speed limit shall be lowered to 45 mph in areas where the drop off exceeds 1.5" in depth
- Do not conduct more than one milling/resurfacing operation per direction on I-40
- The maximum length of lane closure on I-40 is one mile as measured from beginning taper to the end of the down stream taper
- Maintain a minimum of two lanes open to traffic at all times per each direction within the 3 lane section of I-40
- Maintain a minimum of one lane open to traffic at all times per each direction within the 2 lane section of I-40
- Replace all pavement markings by the end of each work day.
- Do not block or close access to more than one "Runaway" truck ramp at any time.
- Maintain traffic in the outside lane when 2 lanes are closed.
- Use a minimum of two Changeable Message Signs (CMS) to warn truck traffic about which "Runaway" truck ramp is being closed.
- Use a Changeable Message Sign (CMS) to warn traffic about slow moving trucks when lanes are being closed on I-40.
- Use a Changeable Message Sign (CMS) at least one mile in advance of lane closure to warn traffic about the lane closure on I-40 as shown in TCP-1.

- All CMSs shall be located on I-40 as directed by the Engineer. Coordinate messages displayed on CMSs with the Engineer. Coordinate messages displayed on CMSs with existing signs already in operation on I-40.
- 2. Perform Milling/Resurfacing operations in the vicinity of the Truck Warning Station on I-40 as follows:**
  - Mill a single lane and pave back by the end of each work day.
  - Close to traffic the lane being milled/resurfaced, drop off shall not exceed 3" in depth.
  - The posted speed limit shall be lowered to 45 mph in areas where the drop off exceeds 1.5" in depth.
  - Maintain a minimum of one lane open to traffic at all times at the Truck Warning Station.
  - Replace all pavement markings by the end of each work day.
- 3. Perform Resurfacing operations on the "Runaway" truck ramps on I-40 as follows:**
  - Do not close or block access to more than one "Runaway" truck ramp at any time.
  - Close the "Runaway" truck ramp where active resurfacing operation is taking place.
  - Work continuously to complete the work at each "Runaway" truck ramp.
  - Use a minimum of two Changeable Message Signs (CMS) to warn truck traffic about which "Runaway" truck ramp is being closed. Both CMSs shall be located on I-40 as directed by the Engineer. Coordinate message displayed on CMS with Engineer. Coordinate messages displayed on CMSs with existing signs already in operation on I-40.
  - Notify the Engineer fifteen (15) calendar days before closing a "Runaway" truck ramp.
- 4. Perform Median Barrier construction on I-40 as follows:**
  - Use RSD 1101.02 to close adjacent traffic lanes in both direction of I-40 while completing median barrier construction.
  - Close any gaps in the median barrier at the end of the work day, using approved traffic control devices that provide positive protection.
  - The maximum length of lane closure on I-40 is one mile as measured from beginning taper to the end of the down stream taper.
  - Replace all pavement markings by the end of each work day.

Submit a sequence of operation for all maps to the Engineer at the first pre-construction meeting for approval by the Engineer. Approved sequence can not be altered without written permission of the Engineer.

Notify the Engineer 48 hours before milling or resurfacing will interfere with the existing Signal Loops. Loops may need to be placed in milled surface before resurfacing occurs. Coordinate all signal loop operations with the Engineer.

Notify the Engineer 15 consecutive calendar days before resurfacing a bridge or its approaches. Patch and make repairs to bridge surface and its approaches before resurfacing occurs. Coordinate all operations on the bridge and its approaches with the Engineer.

Notify the Engineer 48 hours before resurfacing the areas of existing pavement that require patching. Patch these areas before resurfacing occurs. Allow full depth asphalt patching to cool to the point of supporting traffic without displacement or rutting before reopening closed lane. Coordinate the resurfacing operations of the patched areas with the Engineer.

During a resurfacing only operation, bring all newly resurfaced lanes to the same elevation within 72 hours. Maintain vehicular access in accordance with Section 1101-13 of the *Standard Specifications* using suitable backfill material approved by the Engineer. Operate equipment and conduct operations in the same direction as the flow of traffic. Do not cross medians with equipment, except at properly designated interchanges.

Review and record the existing pavement markings and markers prior to resurfacing. Use the record of existing pavement markings and markers in conjunction with the *Roadway Standard Drawings* to re-establish the proposed pavement markings and markers unless otherwise directed by the Engineer.

Provide appropriate lighting in accordance with Section 1413 of the *Standard Specifications* **when working at night. Portable Lighting will be paid for as described in Division 14 of the Standard Specifications and any Special Provisions.**

Remove existing pavement markers in preparation for paving. Repair any pavement damage due to existing pavement marker removal prior to the end of the work day. Dispose of existing pavement markers as directed by the Engineer. No direct payment will be made for this work, as it will be incidental to the paving operation.

Slope the pavement at the beginning and ending of the daily milling operation as directed by the Engineer. Sweep and remove all milled material from the roadway as soon as the daily milling operation is completed. Continue milling operations until the particular section of roadway being milled is complete. Remove any existing pavement adjacent to the milled area that has been damaged, and replace with patch material as directed by the Engineer.

**Payment will be made for the signing and traffic control items in accordance with the bid items in the contract. Any other items necessary for traffic control and signing will be considered incidental to the various other bid items in the Contract.**

### **WORK ZONE SIGNING:**

(1-16-07)

RWZ-3Revised

#### **Description**

Install and maintain signing in accordance with Divisions 11 and 12 of the *Standard Specifications*, the *Roadway Standard Drawings* and the latest revisions thereto, and the following provisions:

Furnish, install, maintain, and remove advance warning work zone signs and any required lane closure signing.

Furnish, install, and maintain general work zone warning signs for resurfacing and/or milling such as ROUGH ROAD (W8-8 at 48" X 48") (for milling only), UNEVEN LANES (W8-11 at 48" X 48"), LOW SHOULDER (W8-9 at 48" X 48"), LOW / SOFT SHOULDER (DOT No. 16-79860 at 48" X 48"), UNMARKED PAVEMENT AHEAD (DOT No. 116087130 at 48" X 48") and DO NOT PASS (R4-1 at 24" X 30"). When construction is completed in any given area of the project, relocate signs to the next work site, as directed by the Engineer. Remove these signs at the completion of the project.

All work zone signs may be portable.

### **Construction Methods**

#### **(A) General**

Install all warning work zone signs before beginning work on a particular map. If signs are installed three days prior to the beginning of work on a particular map, cover the signs until the work begins. Install each work zone warning sign separately and not on the same post(s) / stand(s) with any other sign except where an advisory speed plate or directional arrow is used.

#### **(B) Advance Warning Work Zone Signs**

Install advance warning work zone signs (see attached Details and the *Roadway Standard Drawings* Nos. 1101.02 and 1110.01 and advance signing details) prior to beginning of work and remove upon final completion of the project. If there is a period of construction inactivity longer than two weeks, remove or cover advance warning work zone signs. Uncover advance warning work zone signs no more than 3 days before work resumes. All other operations could be suspended upon failure to comply with the above requirements. Such suspended operations would not be resumed until the above requirements are fulfilled.

#### **(C) Lane Closure Work Zone Signs**

Install any required lane closure signing needed during the life of the project in accordance with the *Roadway Standard Drawings* Nos. 1101.02, 1101.11 and 1110.02.

#### **(D) General Work Zone Warning Signs**

Install general work zone warning signs for resurfacing and/or milling such as ROUGH ROAD (W8-8 at 48" X 48") (for milling only), UNEVEN LANES (W8-11 at 48" X 48"), LOW SHOULDER (W8-9 at 48" X 48") and LOW / SOFT SHOULDER (W8-9B at 48" X 48") at 1 mile intervals starting at a minimum of 500 feet in advance of the condition for both directions of travel (undivided roadways only) and at any other points determined by the Engineer.

Install the LOW SHOULDER (W8-9 at 48" X 48") or LOW / SOFT SHOULDER (DOT No. 16-79860 at 48" X 48") signs prior to any resurfacing in an area where shoulder construction will be performed.

Install general work zone warning signs such as UNMARKED PAVEMENT AHEAD (DOT No. 116087130 at 48" X 48") and DO NOT PASS (R4-1 at 24" X 30") alternately at 1/2 mile intervals starting at a minimum of 500 feet in advance of the condition for both directions of travel (undivided roadways only) and at any other points determined by the Engineer. Install signs prior to the obliteration of any pavement markings.

### **Measurement and Payment**

**Payment will be made for Work Zone Signing as shown elsewhere in the contract.**

### **TIME LIMITATION FOR PAVEMENT MARKINGS AND MARKERS ON NEWLY RESURFACED AREAS:**

(9-19-06)

RWZ-4Revised

#### **Markings: Full-Control-Of-Access Multi-Lane Facilities including Interstates**

**For all full-control-of-access multi-lane facilities including interstates, place all pavement markings and symbols by the end of each workday's operation after they have been obliterated by the resurfacing operation.**

#### **Markings: Two-Lane, Two-Way Facilities**

For all two-lane, two-way facilities, place all edge lines and other symbols within 30 calendar days after they have been obliterated by the resurfacing operation.

#### **Markings: All Facilities**

The pavement markings on a specific map are subject to a 180-day observation period that begins with the satisfactory completion of all pavement markings required on a specific map and shall meet all requirements as specified in Subarticle 1205-3(H) Observation Period of the *Standard Specifications*.

Replace any portion of stop bars at signalized intersections by the end of each workday's operation on a multilane roadway when lane is opened to traffic. Replace any portion of stop bars at signalized intersections by the end of 5<sup>th</sup> calendar day on a 2-lane 2-way roadway after they have been obliterated by the resurfacing operation.

#### **Markers: All Facilities**

Install permanent pavement markers within 60 calendar days after completing the resurfacing on each map.

**ROADWAY STANDARD DRAWINGS FOR PAVEMENT MARKINGS AND MARKERS:**

(7-18-06)

RWZ-5

Use the following in conjunction with the *Standard Specifications*:










**Standard Pavement Markings**

*Roadway Standard Drawings:*

1205.01, 1205.02, 1205.03, 1205.04, 1205.05, 1205.06,  
1205.07, 1205.08, 1205.09, 1205.10, 1205.11, 1205.12

Date: 07-11-2007

**LEGEND**

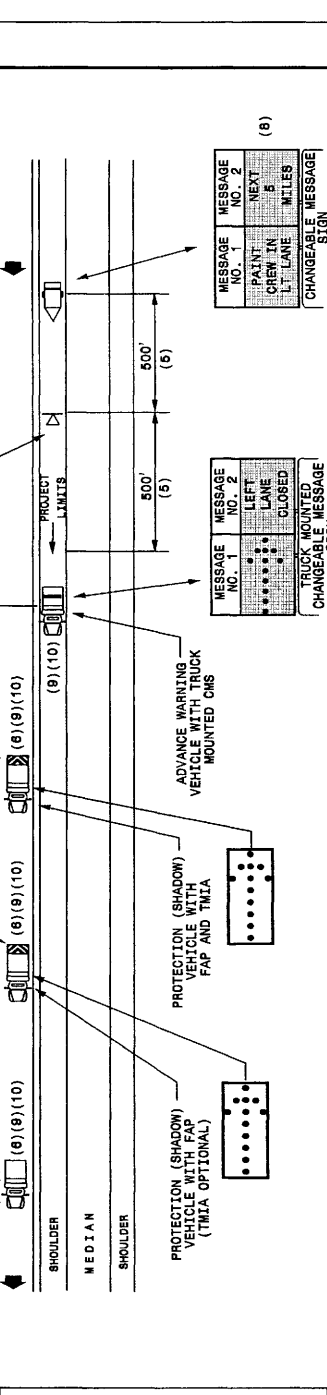
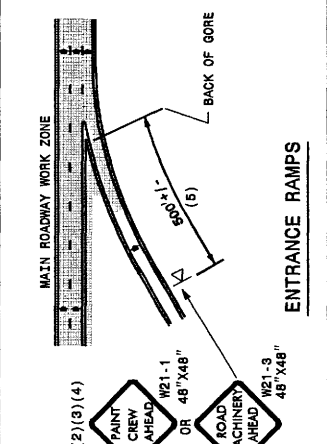
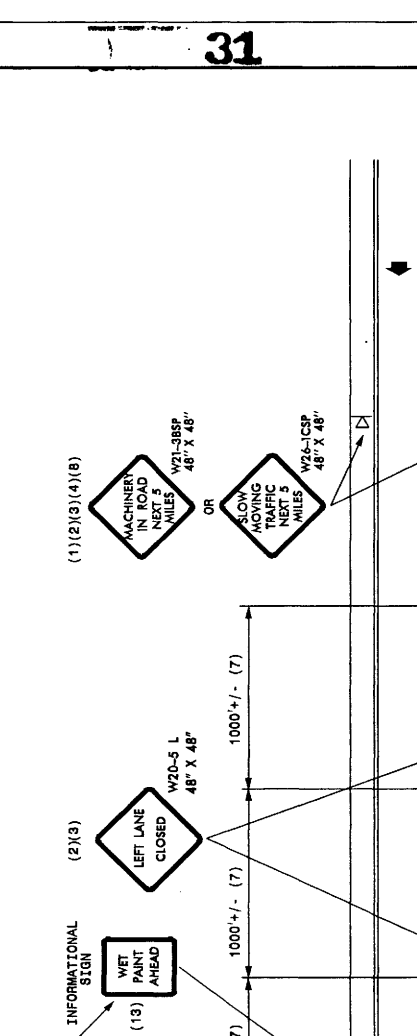
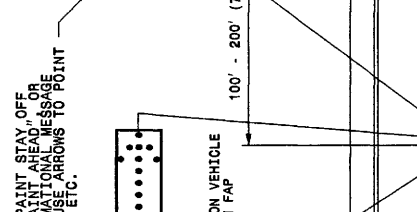
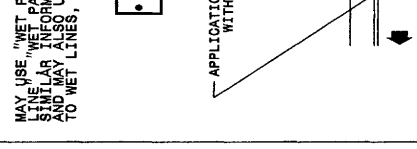
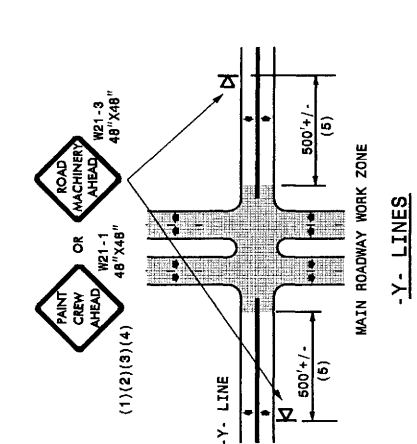
-  PORTABLE SIGN. SIGNS MUST BE NCHRP-350 AND NCDOT APPROVED.
-  DIRECTION OF TRAFFIC FLOW
-  APPLICATION VEHICLE WITH LIGHT BAR
-  PROTECTION VEHICLE WITH TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)
-  STANDARD SIGN (SEE LOADMIA MUST BE NCHRP-350 TEST LEVEL 3 (60-MPH) APPROVED.
-  ADVANCE WARNING VEHICLE WITH TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (LETTER HEIGHT SHOULD BE A MINIMUM OF 10 INCHES.
-  FLASHING ARROW PANEL TYPE "B" (60"x30" MIN.)
-  APPROPRIATE DIRECTION INDICATED
-  CHANGEABLE MESSAGE SIGN

**GENERAL NOTES**

- (6) ADDITIONAL VEHICLES SHOULD BE USED IN WORK CARAVAN TO FACILITATE DRYING OF PAVEMENT MARKING MATERIAL (TMIA'S ARE OPTIONAL ON THESE ADDITIONAL VEHICLES). HOWEVER, THE FIRST VEHICLE MOTORISTS SEE IN THE TRAVEL LANE SHALL HAVE A TMIA.
- (7) ADJUST DISTANCE AS NEEDED TO PREVENT MOTORISTS FROM ENTERING SPACE BETWEEN THE APPLICATION AND PROTECTION VEHICLE. DISTANCE CAN BE LENGTHENED TO ACCOMMODATE SIGHT DISTANCE NEEDS.
- (8) ROUND UP MILEAGE TO NEXT WHOLE MILE. WORK ZONE SHOULD NOT EXCEED FIVE (5) MILES IN LENGTH.
- (9) RADIO COMMUNICATION BETWEEN VEHICLES IS REQUIRED.
- (10) USE OF A LIGHT BAR ON ALL VEHICLES IS PREFERRED, BUT A ROTATING BEACON MAY BE USED INSTEAD.
- (11) IF WORK IS PERFORMED AT NIGHT, THE WORK AREA MUST BE ILLUMINATED WITH MACHINE AND/OR TOWER LIGHTS AS APPROVED BY THE ENGINEER.
- (12) ALL TRAFFIC CONTROL DEVICES WILL BE CONSIDERED INCIDENTAL TO THE PAVEMENT MARKING AND MARKERS.
- (13) INFORMATIONAL SIGNS SHOULD BE ACTIVITY SPECIFIC. I.e. "PAINT CREW IN ROAD" SIGNS MAY BE RECTANGULAR OR DIAMOND SHAPE. SIGN SIZE SHOULD BE BASED ON THE MOTORIST ABILITY TO RECOGNIZE SIGN WHEN TRAVELING FIVE (5) MILES ABOVE POSTED SPEED LIMIT.

**GENERAL NOTES**

- (1) THE FOLLOWING OPTIONS MAY BE USED FOR ADVANCE WARNING SIGNS:
  - A. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
  - B. TRUCK MOUNTED CHANGEABLE MESSAGE SIGN (CMS)
  - C. GROUND MOUNTED ADVANCE WARNING SIGNS (MUST CIRCLE TO PICK UP SIGNS)
  - D. GROUND MOUNTED CHANGEABLE MESSAGE SIGN (CMS) (MUST USE CIRCLE TO PICK UP SIGNS)
- (2) ALL ADVANCE WARNING SIGNS MUST BE 48" X 48" WITH FLUORESCENT ORANGE TYPE VII, VIII OR IX SHEETING. IF SPACE LIMITATIONS ON SHOULDER PROHIBIT A 48" X 48" SIGN, A SMALLER SIGN CAN BE USED WITH APPROVAL FROM ENGINEER.
- (3) SIGNS ON VEHICLES SHOULD BE MOUNTED A MINIMUM OF ONE (1) FOOT FROM THE GROUND AND SHOULD NOT BLOCK THE MOTORIST'S SIGHT OF THE FLASHING ARROW PANEL AND/OR LIGHTBAR.
- (4) GROUND MOUNTED ADVANCED WARNING SIGNS SHOULD BE MOUNTED A MINIMUM OF FIVE (5) FEET FROM THE GROUND TO BOTTOM OF SIGN.
- (5) SIGN SPACING SHOULD BE ADJUSTED FOR HORIZONTAL AND VERTICAL CURVES, ETC. TO IMPROVE SIGHT DISTANCES.



**DRAWING NUMBER 8**  
IMPLEMENTATION DATE: 11/03/04  
REVISED:

**MOVING OPERATION CARAVAN**  
(OPERATIONS TRAVELING 3 MPH OR FASTER)  
PLACING PAVEMENT MARKING OR MARKERS ON INTERSTATE ROADWAYS

MESSAGE NO. 1	MESSAGE NO. 2
PAINT CREW IN LANE	NEXT 5 MILES
ROAD MACHINERY AHEAD	CHANGEABLE MESSAGE SIGN

MESSAGE NO. 2	MESSAGE NO. 1
LEFT LANE CLOSED	ROAD MACHINERY AHEAD
ROAD MACHINERY AHEAD	CHANGEABLE MESSAGE SIGN