

## Section 643 Traffic Control

### 643.1 Description

- (1) This section describes providing, erecting, maintaining, moving, and removing temporary traffic signs, and demountable legend plaques, pavement markings, drums, barricades, flexible tubular markers, arrow boards, portable changeable message signs (PCMS), and lights.
- (2) This section also describes providing barricades and signs that will remain in place at contract completion and become the department's property.

### 643.2 Materials

#### 643.2.1 General

- (1) Furnish materials conforming to the MUTCD and meeting the criteria for acceptable devices according to the ATSSA publication Quality Guidelines for Temporary Traffic Control Devices. Replace devices the ATSSA guide defines as unacceptable. Maintain traffic control devices on the project at or above the quality the ATSSA guide defines as marginal by doing the following:
  1. Keep the retroreflective sheeting on drums, barricades, and other devices clean.
  2. Promptly repair scratches, rips, and tears in the sheeting.
  3. Repair or replace devices that have large areas of abrasion, missing reflective sheeting, asphalt splatter, concrete slurry, or other residue.
  4. Replace devices that have excessive color fading.
  5. The contractor shall not use devices fractured, punctured, dented, or deformed severely enough to affect the overall dimensions, stability, visibility, or reflectivity.
  6. Maintain the retro-reflectance of drums, posts, and barricades at a level not less than 50 percent of the minimum value specified for [ASTM D4956](#), type III reflective sheeting.

*Revise 643.2.1(2) to require fluorescent orange sheeting on all projects. This change was implemented in ASP 6 effective with the December 2015 letting.*

- (2) Use reflective sheeting from the department's approved products list on barricades, drums, and flexible tubular marker posts.

#### 643.2.2 Temporary Pavement Markings

- (1) Provide temporary pavement marking materials conforming to [649.2](#).

#### 643.2.3 Drums

*Revise 643.2.3(1) to allow manufacturers and suppliers to self-certify that their devices meet crashworthiness standards.*

- (1) Furnish impact-resistant, flexible nonmetallic reflectorized traffic control drums and drums with type C or type A warning lights. Submit written certification from the manufacturer or supplier that drums provided conform to NCHRP Report 350 or to MASH crashworthiness criteria.
- (2) Provide reboundable reflective sheeting on all drums.
- (3) Weight each drum with sand bags, or other engineer-approved material, to keep the drum in its intended location. The contractor shall not fasten together, or alter otherwise, 2-piece drums to perform in a way the manufacturer did not intend.

#### 643.2.4 Barricades

- (1) Furnish reflectorized barricades conforming to NCHRP Report 350 test level 3 or to MASH crashworthiness criteria. Submit written certification, from the manufacturer or supplier, that barricades provided conform to crashworthiness criteria. Include the federal-aid reimbursement eligibility letter with that submittal.
- (2) Provide non-reboundable reflective sheeting on all barricades.
- (3) For type III barricades with no sign attached, provide barricades 8 feet long unless the contract indicates otherwise or the engineer approves otherwise. For type III barricades with a sign attached, provide barricades 4 feet long or longer but in no case shorter than the width of the attached sign.
- (4) Under the Traffic Control Barricades Permanent bid items, provide new barricades with 8 foot long rails.

#### 643.2.5 Flexible Tubular Markers

##### 643.2.5.1 Flexible Tubular Marker Posts

- (1) Furnish reflectorized flexible tubular marker posts from the department's approved products list. Ensure that posts are free of burns, discoloration, contamination, and other objectionable marks or defects that affect appearance or serviceability.

- (2) Provide reboundable reflective sheeting for the flexible tubular marker posts. Use sheeting having acceptable performance and good evaluation ratings in 1-year NTPEP tests, for shrinkage, cracking, blistering, colorfastness, reflectivity, adhesion, flexibility, and impact resistance.
- (3) Provide new and unused flexible tubular marker posts if installed at a new location. The contractor may furnish used posts in like-new condition, with new reflective marking installed on the post, as replacement posts.

#### **643.2.5.2 Flexible Tubular Marker Bases**

- (1) Provide a surface mounted assembly that either bolts to the pavement surface using an engineer-approved or specified bolt adhesive system, or attaches using an engineer-approved or specified asphaltic adhesive. Provide a base designed to hold the post securely using locking pins, or other devices, to withstand a series of direct wheel impacts with speeds up to 65 mph.
- (2) On temporary pavements, or existing pavements later removed, the contractor may attach the base with an epoxy adhesive, or core the pavement and install a sleeve type base as the plans show.

#### **643.2.6 Arrow Board**

##### **643.2.6.1 General**

- (1) Provide arrow boards conforming to the MUTCD requirements for type C arrow panels.
- (2) Furnish, service, maintain, repair, or replace the arrow boards as necessary. Arrow boards remain the contractor's property.

##### **643.2.6.2 Sign Panel**

- (1) Provide sign panels 48 inches by 96 inches, non-reflective flat black, trailer mounted, and capable of operating in a stationary setup and while being towed, except, operate solar arrow boards only in stationary setups.
- (2) Provide sign panels with at least 15 SAE PAR 46 lamps per panel. Configure the lamps according to Part VI of the MUTCD. Use sealed beam type lamps with yellow lenses, or amber bulbs behind clear lenses, equipped with an upper hood that surrounds not less than 180 degrees of the lamp.
- (3) Provide arrow boards capable of these mode selections: left or right flashing shaft with arrow point, flashing shaft with double arrow points, or caution. The engineer will not allow sequential operation of arrow or chevrons.
- (4) Ensure the arrow board is continuously visible and identifiable for a distance of one mile in advance of the beginning of the lane closure taper. Ensure the lamps are visible at a minimum 18 degrees horizontal angle and 8 degrees vertical angle, measured from a perpendicular to the arrow board plane.

##### **643.2.6.3 Control System**

- (1) Provide electronically operated lamps controlled by a solid-state controller mounted to the frame in a weatherproof, ventilated, lockable enclosure.
- (2) Provide lamps capable of at least 50 percent dimming from their rated voltage. The flashing rate shall range from 25 to 40 flashes per minute. Ensure a minimum lamp "on" time of 50 percent. Ensure no lamps remain illuminated during "off" time. The control system shall provide for automatic dimming of lamps by reducing the voltage to 50 percent minimum for nighttime use and for the fail mode default setting. Provide a manual override backup switch.
- (3) Include with battery/solar powered arrow boards: a 120 volt AC/12 volt DC battery charger and voltage regulator with standard receptacles, a battery condition indicator with test switch, and a current meter.

##### **643.2.6.4 Power Supply**

- (1) Provide a reliable energy supply for arrow boards. Use self-contained batteries or electricity from a utility company. If using batteries as the primary power source, they must provide sufficient voltage, between charging, to each of the lamps to provide at least 15 days of continuous operation, in any mode, at full daytime intensity.
- (2) Provide an auxiliary power supply, available immediately, on the site in case the primary power supply fails.

#### **643.2.7 Portable Changeable Message Signs**

*Revise 643.2.7 to include portable changeable message sign with remote communications provisions.*

##### **643.2.7.1 General**

- (1) Furnish trailer-mounted portable changeable message signs that conform to the minimum requirements of the MUTCD. Shock mount the electronics and sign assembly to a street-legal trailer that has top fenders and 4 leveling jacks. Provide a battery power supply with a solar powered charging system and a backup power source. Do not use gasoline or diesel powered equipment.

- (2) Ensure that the associated sign controller conforms to the following:
  1. Has a power supply capable of providing continuous operation.
  2. Has a screen for reviewing messages before being displayed on the sign.
  3. Is controlled by an onboard computer programmable via an onboard input device and, if the special provisions require, programmable remotely. Ensure that the computer is capable of storing and recalling at least 150 programmed messages.
  4. Has a secure cabinet and requires a username and password to access the computer interface.
  5. Automatically adjusts the sign's intensity to maintain legibility under varying light conditions.
- (3) Provide a line matrix, character matrix, or full matrix sign message display no greater than 11-1/2 feet wide and capable of displaying 3 lines sequentially with 8 or more 18 inch high by 11 inch wide characters per line. Do not provide signs that have only flip-disk message displays for freeways or expressways.

#### **643.2.7.2 Cellular Communications**

- (1) Furnish a cellular modem registered to a 4G or 3G cellular carrier with a 12 volt DC power supply, built-in security features, port forwarding, and IP pass-through capabilities. Ensure that the modem is fully functional -30 C to +75 C temperatures.
- (2) Provide the department with an IP address, serial port settings, and passwords.

#### **643.2.8 Hand Signaling Devices**

- (1) Use the sign paddle as the primary hand-signaling device. Limit flag use to emergency situations. Mount the sign paddle on a rigid handle with a 5-foot minimum mounting height to the bottom of the sign.

#### **643.2.9 Signs**

##### **643.2.9.1 General**

- (1) Layout signs according to the FHWA Manual of Standard Highway Signs or the department's Sign Plate Book, unless the plans show otherwise.
- (2) Provide the sign size the contract specifies. If the contract does not specify the size, provide the size the MUTCD specifies for higher-speed locations or a larger size, except the engineer may allow smaller signs if space is limited and the MUTCD allows.
- (3) Use the materials and methods specified in [637](#), for type II signs, to manufacture and assemble signs. In addition, the contractor may use the following:
  1. For all signs, one or more of the following:
    - 1.1 An exterior grade B-B or better overlay plywood sign base 1/2-inch or thicker.
    - 1.2 For signs 24 inches or less wide, corrugated polypropylene or polyethylene plastic sign base.
      - 1.2.1 Provide a base 0.4 inches thick with wall thickness of 0.035 inches and cell size of 0.4 inches.
    - 1.3 An aluminum/plastic laminate sign base.
      - 1.3.1 Provide an aluminum faced composite base 0.080 - 0.100 inches thick, with aluminum outer layers 0.010 - 0.020 inches thick surrounding a core of polyethylene or other thermoplastic material.
  2. For signs mounted on portable sign supports or barricades, in addition to the materials and methods specified above, the contractor may also use one or more of the following:
    - For signs wider than 24 inches, corrugated polypropylene or polyethylene plastic sign base.
    - A retroreflective roll-up sign.
    - A sheet aluminum sign base 0.080 inches or thicker.
- (4) Prepare the sign base as the sheeting manufacturer recommends.
- (5) Provide a sign support system as follows:
  1. For signs mounted on posts, use posts from the FHWA list of accepted breakaway sign supports.<sup>[1]</sup>
  2. For signs mounted on portable sign supports or barricades, use signs and supports conforming to NCHRP Report 350 test level 3 or to MASH crashworthiness criteria.<sup>[1]</sup>

<sup>[1]</sup> Submit written certification, from the manufacturer or supplier, that sign support systems provided conform to crashworthiness criteria. Include the federal-aid reimbursement eligibility letter with that submittal.
- (6) Use prismatic sheeting on orange work zone traffic control signs. Use type H reflective sheeting from the department's approved products list on other sign types.
- (7) If a sign has an associated secondary sign mounted on the same assembly, ensure that the color of the secondary sign matches the primary sign unless the plans show, or the engineer directs, otherwise.
- (8) Stencil messages and borders directly on the sign background of standard construction signs, except as specified in [643.2.9.4](#) for sign overlays.

- (9) Keep the retroreflective sheeting on signs clean. Promptly repair scratches, rips, and tears in the sheeting. Repair or replace signs with abrasions, asphalt splatter, or concrete slurry on the sign face that makes the message or any letters illegible. Replace signs with noticeable color fading.
- (10) Maintain the level of retroreflectance for signs as follows:
  1. Type H sheeting; 50% or more of the minimum value specified for [ASTM D4956](#), type IV reflective sheeting.
  2. Prismatic sheeting; 50% or more of the minimum value specified in [643.2.9.2](#).

**643.2.9.2 Orange Work Zone Traffic Control Signs**

- (1) For sign face material, provide fluorescent orange, prismatic, retroreflective sheeting with a minimum initial coefficient of retroreflection as follows:

OBSERVATION	ENTRANCE	MINIMUM INITIAL COEFFICIENT OF RETROREFLECTION
ANGLE	ANGLE	in either cd/ft <sup>2</sup> or cd/lx/m <sup>2</sup>
0.2 deg	-4 deg	200
0.2 deg	+30 deg	80
0.5 deg	-4 deg	72
0.5 deg	+30 deg	34

- (2) Conform to the sheeting color chromaticity coordinates and the minimum luminance factor as follows:

**TABLE 643-1 SHEETING CHROMATICITY AND LUMINANCE**

SHEETING COLOR	CHROMATICITY COORDINATES								LUMINANCE FACTOR
	1		2		3		4		MINIMUM Y
	X	Y	X	Y	X	Y	X	Y	
Fluorescent Orange	0.583	0.416	0.535	0.400	0.595	0.351	0.645	0.355	25%

- (3) The department may require independent verification of the initial coefficient of retroreflection and sheeting color.
- (4) If using plywood sign bases with prismatic sheeting, use new plywood. For other sign base types, the contractor may use a reconditioned base if previous sheeting materials are removed before applying new prismatic sheeting. Do not remove messages and reapply new messages to existing signs with prismatic sheeting, except as specified for overlays in [643.2.9.4](#).

**643.2.9.3 Fixed Message Signs**

- (1) The contractor may use 0.08 inch or thicker sheet aluminum otherwise conforming to [637.2.1.3](#) instead of plywood for the sign base. Where the plans specify orange sheeting, conform to [643.2.9.2](#).

**643.2.9.4 Sign Message Overlays**

**643.2.9.4.1 General**

- (1) The contractor may alter the message on standard construction signs by applying demountable plaque overlays or direct-applied, pressure-sensitive sheeting overlays. Do not apply more than one overlay per sign. The contractor shall not encompass more than one line of the sign message with the overlay. On W20-5 or W20-58 series signs, the contractor may use 2 overlays to independently alter the right/left lane message and the ahead/distance message.
- (2) The message on the demountable plaque or sheeting overlay shall conform to the FHWA Manual of Standard Highway Signs or the department's Sign Plate Book, and match the specified letter height, letter series, and letter stroke width of the message on the sign on which mounting the plaque or overlay.
- (3) Ensure that the reflectivity and the color of the sheeting on the plaque or sheeting overlay, and the base sign are similar enough that the composite sign, both daytime and nighttime appearance, exhibits the visual impact of one integral sign.
- (4) Match the sign face material for overlays to the base sign reflective sheeting material.
- (5) The contractor shall not use sign overlays for symbol messages, except for the lane reduction transition sign, WO4-2.

**643.2.9.4.2 Demountable Plaque Overlay**

- (1) For the base material, use sheet aluminum conforming to [637.2.1.3](#).
- (2) Use reflective sheeting for sign face material conforming to the requirements for signs in 643.2.9.
- (3) Apply the sign message using stencil paste conforming to [637.2.3.2](#) and clear finish conforming to [637.3.2.5](#).

#### **643.2.9.4.3 Sheeting Overlay**

- (1) Use pressure-sensitive sheeting conforming to the requirements for signs in 643.2.9.

#### **643.2.9.5 Sign Covering Material**

- (1) Furnish sheet aluminum, plywood, or corrugated plastic sign covers conforming to the requirements for sign base materials as specified in [643.2.9.1](#), except the minimum thickness for aluminum covers is 0.040 inches. With the engineer's approval, the contractor may use systems specifically manufactured to cover highway signs or other weather resistant materials that will not damage the sign's reflective face. Do not use tape or other adhesives to fabricate or attach covers.
- (2) Ensure that covers are blank and opaque. For painted covers or covers with sheeting attached, match the sign background color or use a flat black or orange cover.
- (3) Furnish spacers, 0.08-inch nylon washers, that will not damage the sign's reflective face.

### **643.3 Construction**

#### **643.3.1 General**

- (1) Perform this work according to part VI of the MUTCD for temporary traffic controls except as noted below, in the contract, and as the engineer directs.
- (2) Under the Traffic Control bid items, perform the work described below, except work specifically covered by other traffic control and pavement marking items contained in the contract.
- (3) Under the Traffic Control Drums bid item, furnish, install, maintain, move, and remove traffic control drums.
- (4) Under the Traffic Control Barricades bid items, furnish, install, maintain, move, and remove barricades of the specified type.
- (5) Under the Traffic Control Barricades Permanent bid items, provide permanent barricades and associated signs in the locations the plans show. Maintain the barricades and associated signs until the engineer accepts the work as specified in [105.11](#). These barricades and signs become the department's property at contract completion.
- (6) Review traffic signs and control devices furnished and erected for location, position, visibility, adequacy, and manner of use under specific job conditions immediately after each setup and at least once every 24 hours and more frequently as necessary, to ensure the signs and control devices are in compliance with this section. Review the signs and devices from the same direction that approaching traffic views them.
- (7) Provide equipment, forces, and materials to promptly restore any traffic control devices or pavement markings damaged or disturbed within 2 hours of being contacted.
- (8) All traffic control devices remain the contractor's property upon completion of the work unless specified otherwise.
- (9) On the back face of each sign, a rail of each barricade, and on each drum and arrow board place the name and telephone number of the agency, contractor, supplier, or person responsible for 24-hour emergency service. Provide this information in non-reflective letters at least 3/4 inch but no more than 2 inches high.
- (10) If the plans or special provisions contain specific sign details, sequence of erection or special instructions for handling traffic, conform to them unless the engineer directs otherwise.
- (11) Ensure the proper placement and operation of signs and control devices before beginning construction work affected by those signs or devices. If performing work of a progressive nature, like resurfacing operations on a road open to traffic, then relocate the signs concurrently.
- (12) If, in the engineer's judgment, the contractor has not provided and maintained proper provisions for traffic control according to these specifications, the engineer may restrict construction operations affected by defective signs, devices, or markings until the contractor establishes and maintains the proper provisions. The department may also take steps to place them in proper condition at no expense to the department.

*Vacate 643.3.2 to eliminate the surveillance and maintenance bid item. That work is now done by special provision.*

#### **643.3.2 (Vacant)**

#### **643.3.3 Temporary Pavement Markings**

- (1) Apply as specified for temporary pavement markings in [649.3](#).

#### **643.3.4 Flexible Tubular Markers**

##### **643.3.4.1 Posts**

- (1) Under the Traffic Control Flexible Tubular Marker Posts bid item, furnish, install, maintain, and remove flexible tubular marker posts with reflective sheeting.

- (2) Attach the posts to the base using a locking pin or other engineer-approved system.

#### **643.3.4.2 Bases**

- (1) Under the Traffic Control Flexible Tubular Marker Bases bid item, furnish, install, maintain, and remove bases for flexible tubular marker posts.
- (2) Use bases designed for temporary installation that resist twisting or displacement from impact forces, and do not pose a hazard to vehicles.
- (3) Remove the base in a way that does not damage the final pavement. Repair damaged pavement at no expense to the department. Remove bolts flush with the pavement surface; no part of the bolts may protrude above the pavement surface.

#### **643.3.5 Warning Lights**

- (1) Under the Traffic Control Warning Lights bid items, furnish, install, maintain, move, and remove the specified warning lights.

##### **643.3.5.1 High Intensity Flashing Warning Lights**

- (1) Install type B, high Intensity flashing, warning lights on warning signs or barricades as the plans show or the engineer directs.
- (2) Mount each light installed with a warning sign on the back of the sign. Position the light so that the lens is outside the edge of the sign, to the traffic side, and between the midpoint and the top of the sign. Use a one-way light or lens-directed light visible only to traffic approaching the message side of the sign, unless the engineer orders otherwise.

##### **643.3.5.2 Low Intensity Flashing and Steady Burn Warning Lights**

- (1) Install type A, low intensity flashing, or type C, steady burn, warning lights on barricades and signs as the contract specifies or the engineer directs. Ensure that warning light attachments conform to NCHRP Report 350 or to MASH crashworthiness criteria. Submit written certification, from the manufacturer or supplier, that light attachments provided conform to crashworthiness criteria. Include the federal-aid reimbursement eligibility letter with that submittal.
- (2) Attach warning lights to traffic control drums with vandal resistant hardware.
- (3) Mount each type A light installed in conjunction with a warning sign on the back of the sign. Position the light so that the lens is outside the edge of the sign, to the traffic side, and between the midpoint and the top of the sign, unless the plans show otherwise. Use a one-way light or lens-directed light visible only to traffic approaching the message side of the sign, unless the engineer orders otherwise.
- (4) The engineer will not require type A lights on signs with fluorescent, or non-fluorescent orange prismatic reflective sheeting.

#### **643.3.6 Arrow Boards**

- (1) Under the Traffic Control Arrow Boards bid item, furnish, install, maintain, move, and remove arrow boards.
- (2) Operate arrow boards during the hours of darkness at an illumination level of not more than 50 percent of the daytime level.
- (3) Place arrow boards as the plans show, or as the engineer directs. The engineer will not allow the display of an arrow or chevrons by lighting in sequence from left to right, or right to left.
- (4) Remove and replace any arrow board that repeatedly fails with a properly functioning arrow board.

#### **643.3.7 Portable Changeable Message Signs**

*Revise 643.3.7 to include portable changeable message sign with remote communications provisions.*

##### **643.3.7.1 General**

- (1) Install or relocate PCMS units at locations the plans show and as the engineer directs. Ensure that the PCMS is level and operating satisfactorily before activating. Maintain the PCMS in good working condition. Repair damaged or malfunctioning PCMS units within two hours after discovering a problem. Remove the PCMS from the project when no longer needed.
- (2) Place the sign so that in the operating mode the bottom of the message panel is 7 feet or higher above the top of curb or near edge of pavement. In rural areas with no view obstructions, the contractor may reduce the minimum mounting height to 5 feet. Orient the message panel so the message is legible from 850 feet under both day and night conditions.
- (3) Store predetermined messages in the controller memory for recall on demand. In addition, store other messages as the engineer directs. Display messages using all upper case alphanumeric characters 18 inch high by 11 inch wide.

### **643.3.7.2 Cellular Communications**

- (1) Install the cellular modem in a lockable, weatherproof compartment in the PCMS trailer. Mount the antenna at the highest practical location on the PCMS.
- (2) A minimum of 14 days before deployment, demonstrate to the department that the cellular modem is capable of communications with the WisDOT traffic operations center. If remote communications are interrupted or temporarily unavailable, the department will notify the contractor to change messages manually. Update messages within 2 hours of receiving notification.

### **643.3.8 Signs**

#### **643.3.8.1 General**

- (1) Install post-mounted temporary traffic control signs with the bottom of the sign 7 feet or higher above the top of curb or near edge of pavement. In rural areas with no view obstructions, the contractor may reduce the minimum mounting height to 5 feet. Mount associated secondary signs no lower than one foot below these minimums. Do not install signs on existing posts unless the plans show or the engineer or post owner allows.
- (2) Trim posts neatly with top of sign, so that no portion of the post protrudes above the sign.

#### **643.3.8.2 Covering Signs**

- (1) If a sign message is no longer relevant, promptly remove the sign or cover all or, if the engineer allows, part of the sign face with materials conforming to [643.2.9.5](#). Ensure that neither the reflectivity nor irrelevant messages are visible. Use spacers between the sign and cover and attach at a minimum of four points per cover panel as follows:
  - For aluminum signs: use 3/16 inch diameter aluminum rivets or aluminum self-tapping screws.
  - For plywood signs: use 3/16 inch diameter wood screws.
- (2) Repair or replace damaged signs as the engineer directs. Remove covers when no longer necessary.

#### **643.3.8.3 Traffic Control Signs**

- (1) Under the Traffic Control Signs bid item, furnish, install, maintain, move, and remove temporary traffic signs including posts and other sign supports.

#### **643.3.8.4 Fixed Message Signs**

- (1) Under the Traffic Control Signs Fixed Message bid item, furnish, install, and remove fixed message signs, including posts.
- (2) If fastening a fixed message sign to an existing sign, completely cover the underlying sign message that is not applicable conforming to [643.3.8.2](#).
- (3) Install post-mounted fixed message signs at the height specified in [643.3.8.1](#). If the sign is larger than 50 square feet, install with the bottom of the sign at least 7 feet above the ground.

#### **643.3.8.5 Sign Message Overlays**

- (1) The contractor may overlay a direct-applied sheeting overlay by additional sheeting overlays, or by a demountable plaque. Do not overlay a demountable plaque overlay with another demountable plaque or by sheeting.
- (2) Use an overlay conforming to the sign message overlay specified in [643.2.9.4](#).
- (3) Non-word messages cannot be a sign overlay, except for the lane reduction transition sign, WO4-2.
- (4) Fasten the plaque overlay to the base sign with 4 bolts or screws, one in each corner of the plaque. Apply sheeting overlays so that no curling or lifting of the overlay occurs during the sign's usage. Promptly replace the sign if any part of the overlay curls or lifts.
- (5) Position the plaque or sheeting overlay on the base sign so that they appear to be an integral part of the message. Ensure that the plaque or sheeting overlay completely covers the underlying sign message that is no longer applicable. Do not overlay any other part of the base sign message, or let it extend beyond the base sign border.

#### **643.3.8.6 Traffic Control Detour Signs**

- (1) Under the Traffic Control Detour Signs bid item, furnish, erect, maintain, review, and remove M-series signs or signs the plans show, including posts and other sign supports, on designated detour routes.
- (2) Erect signing at engineer-approved locations. Use engineer-approved mounting methods.
- (3) Cover detour signs placed before the detour takes effect until needed.
- (4) If the detour signing occurs on a county or local road, coordinate with the local jurisdiction about placing the detour signing on existing posts.

- (5) Place requested additional signing within 48 hours of the engineer's notification.
- (6) Immediately remove or cover signing when the detour is no longer in effect.

**643.3.9 Traffic Control Detour**

- (1) Under the Traffic Control Detour bid items, perform work necessary to sign the designated detour or detours including but not limited to flagging and guiding of traffic and covering or uncovering signs, except that work specifically covered by other contract bid items for detour traffic control is not included under this item.
- (2) Partially or fully cover any sign messages conflicting with detour traffic as the plans show or as the engineer directs conforming to [643.3.8.2](#).

**643.4 Measurement**

**643.4.1 Traffic Control**

- (1) The department will measure the Traffic Control and Traffic Control Detour bid items as each individual unit acceptably completed and will not include any work performed under other specific traffic control or pavement-marking contract bid items.

**643.4.2 (Vacant)**

**643.4.3 Traffic Control Devices**

- (1) The department will measure Traffic Control Arrow Boards, Traffic Control Drums, the Traffic Control Barricades bid items, the Traffic Control Warning Lights bid items, and Traffic Control Signs by the day acceptably completed. The measured quantity will equal the number of calendar days the sign or device is in use. Each day that the device or sign is out of service for more than 2 hours, when it is required, will result in one day being deducted from the measured quantity.
- (2) The department will measure Traffic Control Detour Signs by the day acceptably completed. The measured quantity will equal the number of calendar days the sign is in use. The department will measure each sign of an assembly separately for payment. If any sign of an assembly is missing or does not comply with specifications, the department will not measure any of the signs on that assembly for the days the sign is missing or is not in compliance.
- (3) The department will not measure a traffic control sign or device on days that the bid item is not required, as the engineer determines.
- (4) The department will measure Traffic Control Flexible Tubular Marker Posts and Traffic Control Flexible Tubular Marker Bases as each individual installation and removal acceptably completed. The department will measure replacing damaged posts and bases by each post and base replaced.
- (5) The department will measure Traffic Control Signs Fixed Message by the square foot acceptably completed, measured as the area of the sign face.
- (6) The department will measure the Traffic Control Barricades Permanent bid items as each individual permanently installed 8-foot barricade acceptably completed.
- (7) The department will measure the Traffic Control Signs PCMS bid items by the day acceptably completed, measured as the number of calendar days each PCMS is available for exclusive use under the contract. The department will deduct one day for each calendar day the sign is required but out of service for more than 2 hours.

**643.4.4 Covering Signs**

- (1) The department will measure the Traffic Control Covering Signs bid items as each individual cover/uncover cycle acceptably completed, measured as the number of cover/uncover cycles for existing signs and for permanent signs provided under the contract. The department will not measure additional cover/uncover cycles as might be required to accommodate the contractor's operations.

**643.5 Payment**

**643.5.1 General**

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
643.0100	Traffic Control (project)	EACH
643.0300	Traffic Control Drums	DAY
643.0400 - 0449	Traffic Control Barricades (type)	DAY
643.0450 - 0455	Traffic Control Barricades Permanent (type)	EACH
643.0500	Traffic Control Flexible Tubular Marker Posts	EACH
643.0600	Traffic Control Flexible Tubular Marker Bases	EACH

643.0700 - 0799	Traffic Control Warning Lights (type)	DAY
643.0800	Traffic Control Arrow Boards	DAY
643.0900	Traffic Control Signs	DAY
643.0910	Traffic Control Covering Signs Type I	EACH
643.0920	Traffic Control Covering Signs Type II	EACH
643.1000	Traffic Control Signs Fixed Message	SF
643.1050	Traffic Control Signs PCMS	DAY
643.1051	Traffic Control Signs PCMS with Cellular Communications	DAY
643.2000	Traffic Control Detour (project)	EACH
643.3000	Traffic Control Detour Signs	DAY

### **643.5.2 Traffic Control**

- (1) Payment for the Traffic Control bid items is full compensation for constructing, assembling, painting, hauling, erecting, re-erecting, maintaining, restoring, and removing traffic signs, drums, barricades, and similar control devices, including arrow boards, unless provided otherwise; for partially or fully covering or uncovering signs not paid separately under the Traffic Control Covering Signs bid items; for providing, placing, and maintaining lights, including the fuel or power unless provided otherwise; and for providing, applying, and removing pavement markings, unless provided otherwise. If Traffic Control is not specified, but is later found necessary and is required, the department will pay for this work as extra work.
- (2) Payment for the Traffic Control Detour bid items is full compensation for supplying and performing flagging and guidance services; for providing, installing, reviewing, maintaining, and removing signs associated with guidance services; and for partially or fully covering or uncovering signs not paid separately under the Traffic Control Covering Signs bid items. If the bid item Traffic Control Detour is not specified, but is later found necessary and is required, the department will pay for this work as extra work.

### **643.5.3 (Vacant)**

### **643.5.4 Traffic Control Devices**

- (1) Payment for Traffic Control Arrow Boards is full compensation for providing, installing, moving, and removing portable, self-contained flashing arrow boards, including auxiliary power supply.
- (2) Payment for Traffic Control Drums is full compensation for providing, installing, moving, and removing drums, including the weights.
- (3) Payment for the Traffic Control Barricades bid items is full compensation for providing, installing, moving, and removing the barricades.
- (4) Payment for the Traffic Control Barricades Permanent bid items is full compensation for providing barricades and associated signs and for maintaining the installation until the engineer accepts the work as specified in [105.11](#).
- (5) Payment for the Traffic Control Warning Lights bid items is full compensation for providing, installing, moving, and removing warning lights of the specified type, including mounting hardware, batteries, and hold down devices.
- (6) Payment for Traffic Control Signs is full compensation for providing, installing, moving, and removing traffic control signs, including posts, signs, mounting hardware, orange flags, and hold down devices; and for partially or fully covering or uncovering signs provided under this bid item.
- (7) Payment for Traffic Control Signs Fixed Message is full compensation for providing materials; for the manufacture and assembly of the sign, including all messages; for hauling, handling, installing and removing the signs, including posts, fasteners and necessary hardware and vertical supports; and for partially or fully covering or uncovering signs provided under this bid item.
- (8) Payment for Traffic Control Flexible Tubular Marker Posts is full compensation for providing, installing, and maintaining the flexible tubular marker posts, and for removing the posts.
- (9) Payment for Traffic Control Flexible Tubular Marker Bases is full compensation for providing, installing, and maintaining the flexible tubular marker bases; for removing bases; and for repairing damaged pavements. The department will not pay to replace bases inadequately secured to the pavement.
- (10) Payment for Traffic Control Detour Signs is full compensation for providing, erecting, reviewing, maintaining, and removing M-series detour signs or detour signs the plans show, including posts, channels, signs, mounting hardware and flags; and for partially or fully covering or uncovering signs provided under this bid item.
- (11) The department will pay for temporary pavement marking bid items as specified in [649.5](#).

- (12) Payment for Traffic Control Signs PCMS is full compensation for providing PCMS and for operating, maintaining, relocating, and removing PCMS. The department will pay separately for remote programming required in the contract special provisions.

*Revise 643.5.4 to add a bid item for portable changeable message sign with remote communications.*

- (13) Payment for Traffic Control Signs PCMS with Cellular Communications is full compensation for providing PCMS and for operating, maintaining, relocating, and removing PCMS; for operating and maintaining a cellular modem and antenna; and for making message changes if cellular communications are interrupted or temporarily unavailable.

#### **643.5.5 Covering Signs**

- (1) Payment for the Traffic Control Covering Signs bid items is full compensation for providing full or partial sign covers, for removing covers, and for repairing or replacing damaged signs. Cover/uncover cycles required to accommodate the contractor's operations are incidental to the contract.