

## Section 12 Temporary Traffic Control

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### Section 12 Temporary Traffic Control

#### 4-1201 General

This section provides guidelines for inspecting temporary traffic control devices in construction areas. For traffic control requirements, refer to Section 12, “Temporary Traffic Control,” of the *Standard Specifications* and to the *California Manual on Uniform Traffic Control Devices (California MUTCD)*. If a discrepancy occurs between the contract plans and specifications and the *California MUTCD*, the plans and specifications govern. Also refer to Section 2-2, “Traffic,” of this manual, which provides guidance and a general overview of providing a safe and convenient passage of public traffic through the construction area and is complementary to this section.

Temporary traffic control devices are divided into categories:

- Category 1 devices include traffic cones, plastic traffic drums, portable delineators, and channelizers.
- Category 2 devices include barricades and portable sign supports.
- Category 3 devices include crash cushions, impact attenuator vehicles, temporary railing, temporary barrier, and end treatments for temporary railings and barriers.

The condition of temporary traffic control devices should comply with the most current edition of the American Traffic Safety Services Association (ATSSA) publication *Quality Guidelines for Temporary Traffic Control Devices and Features*. Contact Construction at headquarters for a current hard copy.

#### 4-1202 Before Work Begins

Take the following steps before work begins:

- Determine what construction area signs should be placed before work begins for the entire project and before each stage of the project.
- Determine the methods and equipment the contractor will use for closing lanes, ramps, and roadways, and for flagging and controlling one-way traffic.

#### 4-1202A Flagging

Discuss any flagging operation with the contractor before the operation begins. Confirm flaggers are wearing American National Standards Institute (ANSI)-compliant garments in accordance with the Construction Safety Orders of the California Department of Industrial Relations, or the prime contractor’s or subcontractor’s Injury and Illness Prevention Program or *Code of Safe Practices*, whichever is more stringent. Review with the contractor how flaggers will communicate with each other, with pilot cars, and with workers inside the controlled

area. The contractor should develop a plan for handling emergencies and emergency vehicles in the control zone.

#### 4-1202B Temporary Traffic Control Devices

Verify that temporary traffic control devices comply with the contract requirements.

The resident engineer may accept use of contractor-proposed devices on the Authorized Materials List for Highway Safety Features.

Determine if the temporary traffic control devices to be used are on the Authorized Materials List for Signing and Delineation Materials and if they require a certificate of compliance.

Obtain self-certification using Form TR-0030, "Work Zone Category 1 Temporary Traffic Control Device Certificate of Crashworthiness," from the contractor.

Request a list of Category 2 temporary traffic control devices to be used on the project and copies of their Federal Highway Administration (FHWA) acceptance letters.

Verify that Category 3 temporary traffic control devices are on the Authorized Materials List for Highway Safety Features.

#### *4-1202B (1) Traffic Cones*

If the contractor plans to use cones for night work, determine the type of cone proposed. All cones should use the same type and brand of retroreflective sheeting.

#### *4-1202B (2) Plastic Traffic Drums*

All drums should use the same type and brand of retroreflective sheeting. Verify the base is shaped to prevent rolling if struck by vehicles.

#### *4-1202B (3) Portable Delineators*

Obtain a sample of the type of portable delineator to be used on the project. Verify the base is shaped to prevent delineators from rolling if struck by vehicles.

#### *4-1202B (4) Channelizers*

Verify the channelizer's post is predominantly orange.

#### *4-1202B (5) Barricades*

Verify barricade construction complies with Section 12-3.10, "Barricades," of the *Standard Specifications* and sheet A73C, "Delineators, Channelizers, and Barricades," of the *Standard Plans*.

Review the submittal for any Type 3 barricade to be used as a sign support for crashworthiness to the Transportation Research Board's *NCHRP Report 350* criteria or the American Association of State Highway and Transportation Officials (AASHTO's) *Manual for Assessing Safety Hardware (MASH)* as a single unit with a sign panel of the size and type used.

#### *4-1202B (6) Construction Area Signs*

At the preconstruction conference, remind the contractor to maintain an inventory of commonly required items at the job site and arrange for sign panels, posts, and mounting hardware or portable sign mounts to be furnished on short notice.

Verify construction area signs are from a commercial sign manufacturer and have a Type 3 or higher grade retroreflective sheeting.

Review Section 12-3.11, "Construction Area Signs," of the *Standard Specifications* for additional requirements.

#### *4-1202B (7) Telescoping Flag Trees*

Verify telescoping flag trees are from a commercial-quality material manufacturer.

#### *4-1202B (8) Type K Temporary Railing*

Request a certificate of compliance for Type K temporary railing.

Type K temporary railing placed within 10 feet of a traffic lane requires a reflector on each rail unit.

Review sheet T3B of the *Standard Plans* for staking requirements.

#### *4-1202B (9) Temporary Traffic Screens*

Review the specification requirements and sheet T4 of the *Standard Plans*.

#### *4-1202B (10) Temporary Crash Cushion Module*

Review the project plans and sheets T1A, T1B, and T2 of the *Standard Plans*. Frequently, the plans for stage construction, detour, or traffic handling will require arrays of temporary crash cushion modules. Changes to any of these plans may alter the need for temporary crash cushion modules.

If the contractor requests usage of alternative temporary crash cushion modules, verify that their proposed modules are on the Authorized Materials List for Highway Safety Features.

Verify that temporary crash cushion modules used were manufactured after March 31, 1997.

Inspect crash cushion modules to confirm they comply with the specification and manufacturer requirements.

Temporary crash cushions may be installed on wooden pallets as an option. Verify that pallet height is 4½ inches or less. Pallets that exceed this height raise the sand in the crash cushions above an acceptable level. Do not allow the use of commercial pallets that exceed the maximum height.

#### *4-1202B (11) Impact Attenuator Vehicles*

Verify that the impact attenuator vehicle complies with all specification requirements.

Check that the attenuator meets the test level requirement for the posted speed limit.

Verify that the weight of the attenuator and the weight of the support truck are within the specified limits as shown on the Authorized Material Lists for Highway Safety Features.

Verify the contractor conducts a meeting with all involved parties to discuss the operation of the impact attenuator vehicle.

#### *4-1202B (12) Flashing Arrow Signs*

Verify that Type 1 and Type 2 flashing arrow signs comply with the specification requirements, including number of panel lights, display modes, power source, and devices to plumb and level the trailer.

#### *4-1202B (13) Portable Flashing Beacons*

Verify that portable flashing beacons comply with the requirements in Section 12-3.31, "Portable Flashing Beacons," of the *Standard Specifications*.

#### *4-1202B (14) Portable Changeable Message Signs*

Request a certificate of compliance for each portable changeable message sign.

Obtain a contact cell phone number for the contractor before starting activities that require a portable changeable message sign and arrange for an inspection with the contractor before the first deployment.

Verify that the sign complies with the requirements of Section 12-3.32, "Portable Changeable Message Signs," of the *Standard Specifications*, including number of lines and characters in a line, display modes, power source, and devices to plumb and level the trailer.

#### *4-1202B (15) Portable Signal Systems*

Confirm portable signal systems comply with the requirements in Section 12-3.33, "Portable Signal Systems," of the *Standard Specifications*.

Verify that the line of sight visibility in the field meets sight distance standards. If sight distance is not adequate, contact the district traffic engineer for suggestions or recommendations.

When portable signal systems are used in forests or grasslands, confirm adherence to all fire safety requirements. Checking fire safety requirements may require coordination with personnel from the U.S. Forest Service, Bureau of Land Management, or California Department of Forestry and Fire Protection.

#### *4-1202B (16) Temporary Flashing Beacon Systems*

Confirm temporary flashing beacon systems comply with the requirements in Section 12-3.34, "Temporary Flashing Beacon Systems," of the *Standard Specifications*.

#### *4-1202B (17) Automated Work Zone Information Systems*

Verify that automated work zone information systems comply with the general system functionality, motorist information messages, system communications, traffic data acquisition, and user interface specification requirements.

Obtain the name and contact information for the assigned onsite system coordinator.

Request the user interface software and provide it to the transportation management center for installation.

#### *4-1202B (18) Portable Transverse Rumble Strips*

Obtain a copy of the manufacturer's instructions for the portable transverse rumble strips.

Verify portable transverse rumble strips comply with the requirements in Section 12-3.36 "Portable Transverse Rumble Strips" of the *Standard Specifications*.

#### *4-1202B (19) Portable Radar Speed Feedback Sign Systems*

Verify portable radar speed feedback sign systems comply with the requirements in Section 12-3.37 "Portable Radar Speed Feedback Sign Systems" of the *Standard Specifications*.

Obtain required submittals for the systems in accordance with Section 87-14 "Radar Speed Feedback Sign Systems," of the *Standard Specifications*.

#### *4-1202B (20) Automated Flagger Assistance Devices*

Verify that automated flagger assistance devices (AFAD) comply with the requirements in Section 12-3.38 "Automated Flagger Assistance Devices" of the *Standard Specifications*.

Obtain a copy of the manufacturer's operating instructions.

#### *4-1202B (21) Temporary Automated End of Queue Warning System*

Verify that temporary automated end of queue warning systems comply with the requirements in Section 12-3.39 "Temporary End of Queue Warning System," of the *Standard Special Provisions*.

#### 4-1202C Maintaining Traffic

Before work begins, carefully review the plans, specifications, closure charts, and sheets T9 through T17 of the *Standard Plans*. It is important to plan which personnel, signage, and equipment will be required to implement the traffic control system.

Verify that the contractor has all components on hand before setting up any traffic control system and that all components meet the specifications requirements.

Verify that the contractor notifies and cooperates with local authorities wherever the local authorities regulate traffic.

When multiple projects in one area occur at the same time, require contractors to coordinate their efforts by resolving schedule conflicts before submitting their schedules for closures, and verify there are no closure conflicts before implementation. Review these requirements with the contractors before work starts.

#### 4-1202C (1) *Traffic Control Systems*

Verify the contractor removes or covers any construction area signs that duplicate or contradict the signs for a project within 250 feet of another project. Refer to Section 5-1.20 “Coordination with Other Entities,” of the *Standard Specifications*, if applicable, and the special provisions.

- Inspect the signs and equipment the contractor proposes to use, at the contractor’s or subcontractor’s yard if possible, before their first use.
- Verify that all the necessary signs, cones, drums, and other equipment are on hand before the system is set up for the first time. If the proposed materials have been previously used, check them for acceptability listed in the ATSSA publication *Quality Guidelines for Temporary Traffic Control Devices and Features*, which may be obtained from Construction headquarters. Require the contractor to replace any unacceptable equipment. It is easier to correct deficiencies before the system is installed.
- If the contractor is to place the traffic control system repeatedly in the same place, the contractor can request to mark on the shoulder the locations of advance warning signs, cones, and drums. This will speed the placing of closures and allow for a more consistent taper alignment.

#### 4-1202C (1a) Lane Closure System

Contractors are required to request closures using the Caltrans Lane Closure System (LCS) and status closures using the Lane Closure System Mobile webpage.

To confirm that contractors can access LCS and LCS Mobile, do the following before work begins:

- Remind the contractor of the requirement to complete the LCS web-based training.
- Provide the contractor with the internet link to access the LCS web-based training.  
<https://dot.ca.gov/programs/construction/training>
- Obtain the information of trained contractor representatives, including whether they will be requesting or providing a status of closures, or both.
- Set up “Requestor” or representative that will provide a status of closures, LCS accounts for the trained contractor’s employees accordingly and provide them with their login information within 5 days after they have completed the training. The LCS will send the contractor’s employees a unique password by email after

the accounts are created. Create a “Requestor” LCS account and set the option in the account to status closures for those who will request and status closures.

- Contact the district traffic manager for assistance with either of these tasks.

#### *4-1202C (2) Temporary Pedestrian Access Routes*

Review Sections 12-4.04, “Temporary Pedestrian Access Routes,” and 16-2.02, “Temporary Pedestrian Facilities,” of the *Standard Specifications* for the temporary pedestrian facilities requirements.

If an existing pedestrian route will be affected by the work activities, verify the project includes Bid Item No. 124000 and that a designed temporary pedestrian access route (TPAR) is part of the contract plans or that the TPAR *Standard Plans* are appropriate for the pedestrian route affected by the work activities. If the bid item is not included in the project, process a change order to provide a TPAR.

During the preconstruction conference, discuss:

- TPAR requirements described in the specifications.
- The contractor’s responsibility to provide written notice 5 days before closing an existing pedestrian route.
- The design and construction at the contractor’s expense, when the contractor’s means and methods require the closure of an existing pedestrian route. Caltrans does not pay for providing the TPAR when the pedestrian route closure is the result of contractor’s means and methods. The contractor must submit a work plan and obtain authorization to proceed before starting work.
- The contractor’s responsibility to submit a Form DOT CEM-2311, “Temporary Pedestrian Access Route Contractor Compliance Report,” within 2 business days after construction of a temporary pedestrian access route, and a Form DOT CEM-2312, “Temporary Pedestrian Access Route Contractor Weekly Report,” within 2 business days of completing a weekly inspection. The contractor compliance report forms are available at:

<https://dot.ca.gov/programs/construction/forms>

Review the contractor’s work plan for compliance with the requirements in Section 12-4.04, “Temporary Pedestrian Access Routes,” of the *Standard Specifications*. Depending on the project conditions, the contractor may use the RSP T30 to T34 of the Revised *Standard Plans* as a baseline for designing and constructing a TPAR.

#### *4-1202C (3) Bridge Cleaning and Painting Activities*

Review Section 12-4.05, “Bridge Cleaning and Painting Activities,” of the *Standard Specifications*.

Verify signs to be used comply with the specification requirements.

#### 4-1202D Temporary Pavement Delineation

Review Sections 12-6, “Temporary Pavement Delineation” and 84-2, “Traffic Stripes and Pavement Markings,” of the *Standard Specifications* for temporary pavement delineation requirements.

#### *4-1202D (1) Temporary Pavement Markers*

Verify temporary pavement markers comply with Section 81-3, “Pavement Markers,” of the *Standard Specifications*, except for the waiting period before placing pavement markers on new asphalt concrete.

Verify signs to be used comply with the specification requirements.

Refer to Section 12-6, “Temporary Pavement Delineation” and Section 12-7 “Temporary Pavement Delineation for Seal Coats,” of the *Standard Specifications* for temporary signing requirements for no-passing zones.

#### **4-1203 During the Course of Work**

Use the most current edition of the American Traffic Safety Services Association (ATSSA) publication *Quality Guidelines for Temporary Traffic Control Devices and Features* to confirm acceptability of traffic control devices. Request the guidelines from Construction headquarters.

Inspect Category 2 temporary traffic control devices to confirm they are labeled with the FHWA acceptance letter code and the name of the manufacturer.

Verify Category 3 temporary traffic control devices are the type shown on the Authorized Materials List for Highway Safety Features.

Verify that traffic handling devices meet the visibility and legibility requirements.

Verify the contractor maintains all traffic control devices in good working order throughout the project’s life. Verify that all traffic control devices are correctly placed and functioning properly. If temporary traffic control devices are damaged, displaced, or stop operating or functioning as described from any cause during the progress of the work, have the contractor repair, repaint, or replace the components and restore them to their original positions.

Do not allow the contractor to mix different types of temporary traffic control devices on the same alignment. Types include plastic traffic drums, portable delineators, channelizers, tubular markers, traffic cones, and Type 1 and Type 2 barricades.

Verify the contractor removes traffic-handling equipment and devices from the job site when they are no longer needed for controlling traffic.

#### 4-1203A Flagging

Observe the flagging operation to verify that flaggers are using the correct procedures for directing motorists in accordance with California Code of Regulations, Title 8, Section 1599, (8 CCR 1599) “Flaggers,” and Chapter 6E, “Flagger Control,” of the *California MUTCD*. Also, verify that flagging stations are laid

out correctly, are visible to approaching traffic, are illuminated during nighttime, and have correct advance warning signs.

#### 4-1203B Temporary Traffic Control Devices

Inspect all traffic control devices to verify conformity with the specifications. If you authorize the devices for use, record the authorization in the daily reports.

##### *4-1203B (1) Traffic Cones*

Require the contractor to anchor bases of traffic cones that do not have enough size and weight to keep the cones in an upright position.

Prohibit the use of traffic cones that have been damaged or coated with asphalt or other substances that prevent the cones from functioning as intended.

##### *4-1203B (2) Plastic Traffic Drums*

Check the contractor's layout work. Allow only one type of plastic traffic drum on the project.

Require ballast for drums according to manufacturer specifications. Do not allow the use of sandbags.

Require proper maintenance of plastic traffic drums.

##### *4-1203B (3) Portable Delineators*

Allow only one type of portable delineator on the project.

Verify that portable delineators meet the dimension requirements.

Confirm that portable delineators remain upright when unattended, otherwise require the contractor to place a ballast on the delineator's base.

##### *4-1203B (4) Channelizers*

Check the contractor's layout work.

Verify the pavement is clean and dry and the contractor places the channelizers during conditions that meet the required temperatures. Review Section 81-3, "Pavement Markers," of the *Standard Specifications*. Do not allow the contractor to use the double-stick butyl pads provided by the channelizer manufacturer; these pads do not meet Caltrans requirements.

Ask the contractor to replace channelizers that are displaced or fail to remain in an upright position. The contractor is responsible for the replacement expenses.

##### *4-1203B (5) Barricades*

Check Type 3 barricades, used as sign supports, for label with FHWA acceptance letter number showing they have been crash tested as a single unit with a sign panel of the size and type used.

According to the Authorized Materials List for Signing and Delineation Materials, 0.5-inch Intelplast "Intelcel" or similar material is authorized, and according to FHWA Work Zone Letter 85 from the FHWA's Safety Program work zone device letter archive website, this type of sign substrate is authorized for use on Type 3 barricades.

Allow the contractor to use only bags of dry sand when weighting is necessary. Verify weights are placed on the feet or lower parts of the frame or stays. Do not allow the contractor to place objects any higher, or use hard objects such as concrete or rocks for weights.

Confirm the contractor maintains barricades in good condition and keeps the reflective surfaces clean.

#### *4-1203B (6) Construction Area Signs*

Remind the contractor to notify the regional notification centers before digging for the installation of signposts. Hand digging is required unless the location is free of underground utilities.

Allow only the use of sandbags when it is necessary to weigh down sign standards to prevent the wind from overturning them. Do not permit rocks, concrete, or other hard objects to be used for this purpose.

Check construction area signs often during the course of the work. Verify visibility and legibility requirements. Require the contractor to keep signs clean and clearly visible, and repair them if damaged.

Verify that construction area signs are placed outside the traveled way, do not block or protrude more than 4 inches into bicycle and pedestrian routes, and comply with Americans with Disabilities Act requirements.

Do not allow the use of nonretroreflective portable signs during hours of darkness.

Check sign posts to confirm compliance with breakaway features.

Verify that the contractor installs, relocates, covers, and removes signs as required. Construction signs should be covered or removed whenever they no longer serve a purpose. Verify that covers placed on sign panels completely block out any messages so that the messages cannot be seen day or night. The covers should also present an acceptable appearance.

#### *4-1203B (7) Telescoping Flag Trees*

Verify telescoping flag trees maintain an upright position when being used.

#### *4-1203B (8) Type K Temporary Railing*

Check the exposed surfaces of Type K temporary railing to verify they have received a fresh coat of white paint before initial placement on the job. Order repainting when needed.

Verify all new and used temporary railing elements comply with requirements for end connection and surface finish. Verify Type K temporary railing is placed on a firm, stable foundation uniformly graded throughout the entire length of the railing.

Check railing alignment for any substantial offset to each other.

Verify staking of railing according to sheet T3B of the *Standard Plans*.

Verify the contractor offsets the approach end of Type K temporary railing by 15 feet minimum from the edge of an open traffic lane, according to Section 7-1.04 "Public Safety," of the *Standard Specifications*.

Verify the contractor protects Type K temporary railing blunt ends within 15 feet of the edge of the traveled way with temporary crash cushions. If the blunt end is within 8 feet, appropriate approved crash cushion protection other than sand filled modules should be provided.

Check the installation and maintenance of Type P marker panel according to sheet A81C of the *Standard Plans*.

Confirm the contractor installs a reflector on each rail unit placed within 10 feet of a traffic lane.

Verify all threaded rods or dowels are removed and the area is restored to its previous condition or constructed to its planned condition after removal of Type K temporary railing.

#### *4-1203B (9) Temporary Traffic Screens*

After installation, review the screen placement, especially near entrance and exit ramps. If the screen blocks motorist visibility, order its removal and consult with the district traffic engineer concerning alternatives.

Confirm supporting steel pipes are placed on the traffic side of the screen so that if a panel becomes dislodged, the plywood will fall away from traffic.

The specifications require temporary traffic screen to have 3-foot-long openings spaced at 200-foot intervals. The purpose of the gaps is to allow drivers and passengers of vehicles to get behind the barrier in case of a disabled vehicle. If the opening has a drop off behind it that might present a hazard to the public, document in the resident engineer's daily report an exception to the *Standard Plans* note and have the contractor close the gap for public safety purposes.

#### *4-1203B (10) Temporary Crash Cushion Module*

Verify that one type of crash cushion module is used for a single grouping or array.

Verify the crash cushion array is in place before opening traffic lanes adjacent to the protected obstacle.

Verify that crash cushion module arrays are installed according to the manufacturer's instructions. Check that all crash cushion modules are filled with the proper weight of sand. Check pallet heights when used.

Verify a minimum clearance of 8 feet between the array and the nearest traffic lane. Contact the district traffic engineer for recommendations if the clearance to the traffic lane cannot be obtained.

Verify the contractor installs Type P or Type R markers when required.

#### *4-1203B (11) Impact Attenuator Vehicles*

Verify the contractor uses an impact attenuator vehicle as a shadow vehicle in moving closures and during placement and removal of components in stationary closures. After placing components of stationary closures, the contractor may place the impact attenuator vehicle in advance of the work area to protect workers and traffic.

Verify there is enough shoulder width before allowing the use of an impact attenuator vehicle for placement and removal of components on two-lane, two-way highways.

Do not allow the use of a damaged impact attenuator vehicle.

#### *4-1203B (12) Flashing Arrow Signs*

Verify the proper types of flashing arrow signs are used.

- Verify the flashing arrow sign trailer can be leveled and plumbed.
- Verify the lights are dimmed at night and set on bright during daylight hours.
- Verify the lights are not glaring into approaching traffic, especially truck traffic.
- Confirm compliance with the minimum legibility distances.
- Verify the signs are properly aimed at approaching traffic. Pay special attention to the aiming of the sign whenever solar-powered signs are used. The special bulbs used with solar signs have much narrower beams than conventional bulbs and, therefore, require greater care while being aimed.

#### *4-1203B (13) Portable Flashing Beacons*

Confirm the contractor places portable flashing beacons according to the plans and removes them from the traveled way at the end of each night's work.

Verify portable flashing beacons operate according to the specifications.

#### *4-1203B (14) Portable Changeable Message Signs*

Portable Changeable Message Signs (PCMS) are required only during times, places, or activities stated in the plans and specifications and are not required when the traffic control system is nonoperational or for discretionary use. PCMS can be used in place of an advance flagger to remove workers from the roadway to improve worker safety from traffic.

Verify that the trailer bearing the sign can be leveled and that the sign operates within the required minimum and maximum heights. Verify the contractor delineates a PCMS with a taper consisting of nine traffic cones.

Confirm the sign is placed where it is most visible to approaching motorists. Check that the sign complies with the visibility and legibility requirements. Pay special attention to locations where vertical or horizontal curvature restricts the sight distance. Drivers should be able to read the entire message at least two times before passing the sign.

Confirm the signs display only pre-approved messages and that the messages conform to the *Changeable Message Sign Guidelines*, and district and Caltrans policy. The *Changeable Message Sign Guidelines* developed by the Division of Traffic Operations provide a listing of approved abbreviations for PCMS. Prohibit messages that do not convey real-time information to the motorist. Examples of unacceptable messages include “Drive carefully,” “Have a Nice Day,” and “Thank you.”

PCMS are working equipment when actively displaying a message, otherwise they are nonoperating. Ask the contractor to remove nonoperating portable message signs from the job site away from traffic or protect it in accordance with Section 7-1.04 “Public Safety,” of the *Standard Specifications*. Consult with the district traffic engineer for other acceptable means to protect the sign instead of the Type K temporary railing required by the specifications. In many cases, placing a PCMS behind existing guard railing will protect it.

#### *4-1203B (15) Portable Signal Systems*

Verify the planned signal system includes a backup power source and automatic transfer switches.

Do not allow the use of power from private parties to power the temporary signal system.

If a system shutdown occurs, planned or unplanned, the contractor should provide flaggers to control traffic until the traffic signals are functioning correctly.

Periodically review the portable signal system to document its maintenance. Record inspection dates and conditions observed in the project records.

#### *4-1203B (16) Temporary Flashing Beacon Systems*

Verify the temporary flashing beacon system includes a backup power source and automatic transfer switches.

Do not allow the use of power from private parties to power the temporary flashing beacon system.

Verify temporary flashing beacon systems are relocated as work progresses according to the specifications.

#### *4-1203B (17) Automated Work Zone Information Systems*

Provide the contractor with the message content and the thresholds used for triggering when the messages will be displayed. Consult with the district traffic manager for assistance with these items.

When necessary, ask the contractor to adjust placement or message content of signs based on changing project or traffic conditions.

#### *4-1203B (18) Portable Transverse Rumble Strips*

Make sure that portable transverse rumble strips are placed before closing the lane to traffic.

Verify that the color of the portable transverse rumble strips is black or orange and arranged in accordance with Standard Plan T13.

Check that portable transverse rumble strips are not placed on sharp horizontal or vertical curves or through pedestrian routes.

If the portable transverse rumble strips become out of alignment or skewed by more than 6 inches, have the contractor readjust them to the original location.

#### *4-1203B (19) Portable Radar Speed Feedback Sign Systems*

Make sure that the contractor places the portable radar speed feedback sign systems as shown on *Standard Plans* T18, T19, T20, and T21 and as far from the traveled way as practical, where it is visible and legible to approaching traffic, taking into account any vertical or horizontal roadway curvatures.

Verify that additional speed limit signs indicating the reduced speed limit are placed within the construction work zone as specified.

For continuous construction work zone speed limit reduction, verify that advisory warning signs are posted to alert motorist of the roadway condition as specified and as shown on the *Standard Plans*.

#### *4-1203B (20) Automated Flagger Assistance Devices*

Automated flagger assistance devices (AFAD) can be used in place of flagger to remove workers from the roadway to improve worker safety from traffic

Confirm that AFAD are placed in accordance with the plans and where clearly visible to the AFAD operator and to approaching traffic.

When AFAD are in use, allow the contractor to use portable vehicle transverse rumble strips, but do not allow the use of a 48-inch-by-48-inch C9A(CA) sign or gate cones.

When an AFAD becomes inoperable, notify the contractor to immediately replace it with an identical device, use a flagger with the appropriate-size advance warning sign and gate cones as shown in Standard Plan T13 or stop all construction activities that require the device to be in operation.

#### *4-1203B (21) Temporary Automated End of Queue Warning System*

Verify that the contractor provides a Type 1 or Type 2 for each closure as shown on Standard Plan T26 and T27, respectively.

Make sure the temporary automated end of queue warning system is in operation only during work, unless special provisions require one for 24 hours a day, 7 days a week for certain construction activities.

Obtain a weekly temporary automated end of queue warning system operations report.

#### 4-1203C Maintaining Traffic

##### *4-1203C (1) Traffic Control Systems*

Do not allow the contractor to close two adjacent ramps in the same direction of travel unless necessary because of the operation or project conditions. Require the contractor to set up an off-the-highway detour before closing all ramps in both directions of travel at the same interchange.

Verify the contractor follows the notification and signing requirements before setting up any traffic control systems.

Remind the contractor of Americans with Disabilities Act requirements if the traffic control system will affect pedestrian traffic and a temporary pedestrian access route is needed.

##### *4-1203C (1a) Closure Schedules*

Confirm the contractor submits a schedule of planned closures in advance as required by Section 12-4.02A(3), "Submittals," of the *Standard Specifications*. Closures that will reduce horizontal or vertical clearances require even more notification. Inform the Transportation Permits Unit 15 days in advance of the closure. This notification allows Caltrans to coordinate work within the highway corridor.

Confirm that the contractor's closure requests comply with the closure charts. Review the requests to avoid oversights and overbooking.

##### *4-1203C (1b) Contingency Plans for Closures*

If the contractor fails to reopen the highway according to the closure charts, suspend work and request a detailed written construction contingency plan demonstrating that the highway will be opened as soon as possible. Refer to Section 2-214D, "Construction Contingency Plan," of this manual.

Do not permit any closures until the contractor submits this plan and it is authorized in accordance with the specifications.

When an operation is terminated before the time the specifications allow because of circumstances beyond the contractor's control, consider granting time, compensation, or both, within the terms of the contract. If the operation is terminated before completion of the planned work because of circumstances within the contractor's control or because of equipment breakdown, do not allow compensation and charge a working day as appropriate.

#### 4-1203C (1c) Lane Closure System

- Confirm the contractor's employee uses the assigned user identification to submit the closure requests in the Lane Closure System (LCS). The closure requests are stored with a "SAVED" status.
- Review the closure requests for compliance with the closure requirements charts and other contract requirements. If you accept a closure request, the status will change to "PENDING." If you reject a closure request, LCS will send the contractor an email asking for a correction and resubmission.
- Verify the district traffic manager reviews a closure request for conflicts before approving it. The status in LCS will change to "APPROVED." The LCS will notify the contractor by email of the approval or rejection.
- Confirm that the contractor cancels scheduled closures that are not needed at least 2 days in advance, using the LCS. The LCS will generate email notifications to the resident engineer and the district traffic manager when the contractor cancels a closure.

#### 4-1203C (1d) Status Updates for Authorized Closures

During the course of work, monitor the contractor's activities to verify closure status used in LCS as follows:

- Stationary closures on a traffic lane are 10-97 before placing the first cone on the traffic lane, and 10-98 after removing all the cones from the traffic lane.
- Stationary closures on the shoulder are 10-97 before placing the first cone after the last advance warning sign, and 10-98 after removing the last cone before the advance warning signs.
- Moving closures are 10-97 before the actual start time of the closure, and 10-98 after the actual end time of the closure.
- Closures not needed on the authorized date are 10-22 within 2 hours after the authorized start time.

The LCS will notify the resident engineers and designated inspectors by email when the contractor changes the status of a closure.

If a contractor is unable to access the LCS Mobile webpage, obtain the closure status from the contractor and notify the transportation management center.

Keep the project's completion dates current in the LCS. The contractor will not be able to access projects in LCS after the completion date.

#### 4-1203C (1e) Field Adjustments

Field adjustments to the traffic handling plans are frequent occurrences.

Adjustments should be made to create adequate sight distance, to avoid locations that require drivers to make multiple decisions, to accommodate expected queues, and to coordinate activities at multiple locations. The following are typical situations in which field adjustments are necessary:

- T Series *Standard Plans*—Show minimum acceptable standards for traffic control. Increasing taper lengths, adding signs, and increasing sign spacing to allow for traffic queuing are all acceptable measures as long as the *Standard Plans* minimum requirements are met.
- Signs—Review sign line of sight visibility and verify it complies with Section 12-3.11, “Construction Area Signs,” of the *Standard Specifications*. Signs should not be placed at the apex of horizontal curves, crests of vertical curves, or where trees or bushes hinder visibility of the sign.
- Vertical and horizontal curves—Verify tapers are visible for their entire length to approaching traffic. Do not hide the taper of a traffic control system behind a vertical or horizontal curve. Extend the straight section, known as the tangent portion of the closure, to better position the taper. Under ideal conditions, all advance warning signs and the taper would be in a tangent with the taper placed on a slight upgrade for improved visibility.
- Ramps and connectors—Managing ramps and connectors within a closure requires additional consideration. Extend exit ramp tapers back through the closure as an extension of the ramp’s shoulder line. Avoid sharply angled tapers. Extend entrance ramps through the closed lane by projecting the left shoulder line.
- Traffic queues—Contain traffic queues completely within the advance warning signs of any closure. Containment may require modestly increasing the spacing between signs or require the placing of additional signs. Some districts have adopted a practice of providing motorists additional warning by displaying information a mile or more in advance of the closure using portable or fixed changeable message signs. In metropolitan areas, this type of warning may be feasible with cooperation of the transportation management center. Refer to Section 12-4.02C(10), “End of Queue Monitoring and Warning with Pickup Truck Mounted Changeable Message Sign,” of the *Standard Specifications* for monitoring traffic end of queue and warning approaching traffic.
- Multiple closures and inter-project coordination—Avoid multiple closures with overlapping sign patterns. Connect closures by extending the tangents. Confirm that the contractors are coordinating placement and pickup of the closure so that the traffic control system is maintained in accordance with the *Standard Plans* at all times.
- Length of closure—Avoid long closures with no evidence of activity. Consider placing supplemental tapers within an existing closure. When the work has safely progressed beyond the supplemental taper, remove the upstream taper and tangent. Confirm that advance warning signs for the new taper are located correctly.

If long closures are unavoidable, protect the active work area by placing barricades or drums across the closed lanes, upstream of the work area. Also, when possible, use barrier vehicles or an impact attenuator vehicle between the approaching motorist and workers on foot.

#### 4-1203C (1f) Placement Sequence and the Start of Work

Verify the contractor completely installs the traffic control system before commencing work. An impact attenuator vehicle must be used for the placement and removal of temporary traffic control devices when required by the contract. The following are some possible installation procedures that may be used by the contractor, depending on the situation in which the system will be used:

- Systems affecting traffic only in one direction—Start with the first device that the drivers will see as they enter the work zone, usually a “Road Work Ahead” sign. Additional devices are placed in sequence, moving in the direction of the traffic flow. Move the workers and equipment onto the closed lanes only after all system components are in place.
- Systems affecting traffic in both directions—Install the first sign drivers will see traveling in the opposing direction. Then install in sequence all remaining signs and devices in the opposing direction of travel. Next install the first sign drivers will see in approaching the work area from the affected direction. Place all remaining signs and devices in sequence through the work area. If flaggers are to be used, have flaggers take their stations; then move workers and equipment onto the road.
- Removal of the traffic control system—Remove all workers and equipment from the roadway. Then remove the devices and signs in the reverse order of placement. Restore all signs and signals to normal operation.

#### 4-1203C (1g) Drive-Through Inspection

After installation and when the inspector is available, make a drive-through inspection of the system. During the inspection, drive through the system as though you had no knowledge of the work zone. Confirm the intended vehicle path is clearly visible. Remember that the motorist has no knowledge of the traffic control plan and is entirely dependent on the system for warning and guidance. Document this inspection in the daily report; indicate weather, traffic conditions, and time of inspection.

#### 4-1203C (1h) Maintenance

Verify contractors are assigning personnel and maintaining closures in accordance with the T Series *Standard Plans*. Maintaining such closures is a full-time assignment, and the assigned worker should have no other duty. Ideally, the assistant resident engineer should be able to communicate directly with the contractor’s maintenance person by radio or cell phone. The maintenance person should have spare cones, signs, and barricades available to replace or restore system elements displaced or damaged by traffic.

#### 4-1203C (1i) Reverse Operations Inside Closures

Workers may operate vehicles opposite the flow of traffic inside a closed lane only with the previous authorization of the resident engineer. Certain equipment, such as dike placement machines, can only operate off one side of the equipment and may

need to be operated against live traffic. Similarly, certain striping operations require the operator to operate against live traffic because of clearances.

The following practices are recommended if opposing operations are undertaken:

- During daylight operations, the vehicles facing oncoming traffic should have their headlights and their flashing amber lights turned on at all times.
- During night operations, the vehicles should have their headlights turned off and their hazard lights and flashing amber lights turned on.
- At no time should a U-turn be permitted in traffic.

#### *4-1203C (2) Temporary Pedestrian Access Routes*

- Confirm the contractor provides a temporary pedestrian access route (TPAR) nearby, off the traveled way, when the construction activities require the closure of an existing pedestrian route.
- If closure of an existing pedestrian route is required because of the contractor's means and methods, remind the contractor of their responsibility to design and construct a TPAR at their expense, and obtain authorization to proceed with the work activities. Do not pay the contractor for providing the TPAR.
- Verify TPARs are constructed in compliance with the requirements in Section 12-4.04, "Temporary Pedestrian Access Routes," of the *Standard Specifications* before allowing use by pedestrians. Use Form DOT CEM-2301, "Temporary Pedestrian Access Route Compliance Inspection Report," to document initial construction compliance of TPARs.
- Obtain from the contractor the completed Form DOT CEM-2311, "Temporary Pedestrian Access Route Contractor Compliance Report," within 2 business days after construction of a TPAR.
- Verify the contractor provides overhead covering, overhead lighting, or both when required.
- Inspect TPARs weekly to verify that they are clean and unobstructed and comply with the Americans with Disabilities Act and the work plan required by the specifications. Use Form DOT CEM-2302, "Temporary Pedestrian Access Route Weekly Inspection Report," to document that TPARs are maintained in compliance during the course of work.
- Obtain from the contractor, the completed Form DOT CEM-2312, "Temporary Pedestrian Access Route Contractor Weekly Report," within 2 business days of completing a weekly inspection.
- Form DOT CEM-2303, "Temporary Pedestrian Access Route Sidewalk Detour Inspection Report," may be used by the engineer and the contractor to report weekly inspections if the temporary pedestrian access route is provided using an existing pedestrian route.

- File completed ADA compliance reports in Category 23, “Temporary Pedestrian Access Routes,” of the project files.

#### *4-1203C (3) Bridge Cleaning and Painting Activities*

- Verify the required signs are placed during the cleaning and painting activities and removed at the end of each work shift.
- Verify the traveled way is free of obstructions and residue before opening the area to traffic.

#### 4-1203D Temporary Pavement Delineation

- Verify temporary or permanent pavement delineation is in place before opening the traveled way to traffic.
- Verify temporary pavement markers are the same color as the lane line or centerline markers being replaced. Confirm the contractor uses the long-term temporary pavement marker for 180 days or less and the short-term temporary pavement marker for 14 days or less.
- Do not allow the application of temporary pavement delineation over existing pavement delineation.
- Verify removal of any temporary delineation that conflicts with any subsequent or new traffic pattern for the area.

#### *4-1203D (1) Temporary Pavement Markers*

- Do not allow the use of epoxy adhesive to place pavement markers in areas where the removal of the pavement markers is required.
- Temporary pavement markers will not adhere to a cold in-place recycling surface. Use alternate methods to delineate this type of surface.
- Use of 180-day temporary pavement markers on an open-graded surface is not advised; when removed, the marker glue can peel up the open grade.

#### *4-1203D (2) Channelizers*

- Verify channelizers used for temporary edge line delineation are predominantly orange and the surface-mounted type.

#### *4-1203D (3) Temporary Lane Line and Center Delineation*

- Verify pavement marker spacing.
- Verify the contractor installs the temporary no-passing zone signs if no-passing centerline pavement delineation is obliterated. Determine the exact location of the temporary signs and when they are no longer needed for the direction of traffic.
- Verify no-passing zone signs are removed when no longer required.

#### 4-1203D (4) *Temporary Edge Line Delineation*

- Verify the contractor cements the bases of channelizers used for temporary edge line delineation as specified.
- Allow the use of paint only if the temporary traffic stripe is not required to be removed.

#### 4-1203D (5) *Temporary Traffic Stripe Tape*

- Verify that temporary traffic stripe tape for use more than 14 days is applied according to the specifications, and temporary traffic stripe tape to remain in use 14 days or less is applied according to the manufacturer's instructions.

#### 4-1203D (6) *Temporary Traffic Stripe Paint*

- Review Section 84-2.03, "Construction," of the *Standard Specifications* for the application requirements for temporary traffic stripe paint.

#### 4-1203D (7) *Temporary Pavement Marking Tape*

- Verify that temporary pavement marking tape to remain in place more than 14 days is applied according to the specifications, and that temporary pavement marking tape to remain in place 14 days or less is applied according to the manufacturer's instructions.

#### 4-1203D (8) *Temporary Pavement Marking Paint*

- Review Section 84-2.03, "Construction," of the *Standard Specifications* for the application requirements for temporary pavement marking paint.

#### 4-1203E Temporary Pavement Delineation for Seal Coats

- Verify the contractor installs the temporary no-passing zone signs if no-passing centerline pavement delineation is obliterated. Determine the exact location of the temporary signs and when they are no longer needed for the direction of traffic.
- Verify temporary pavement delineation is maintained until it is replaced with the permanent pavement delineation. Direct the contractor to remove any temporary pavement delineation that conflicts with the permanent pavement delineation.

#### **4-1204 Level of Inspection**

Conduct intermittent day and night inspections to verify compliance with visibility and legibility requirements for:

- Retroreflective bands on portable delineators.
- Retroreflective sheeting on channelizers.
- Retroreflective sleeves on traffic cones.
- Construction area signs.

- Portable changeable message signs.
- Flashing arrow signs.

#### **4-1205 Quality Control**

While specific levels of quality control for temporary traffic control are not included in Section 12, “Temporary Traffic Control,” of the *Standard Specifications*, the contractor is responsible for providing quality control under Sections 5-1.01, “General,” and 6-2.02, “Quality Control,” of the *Standard Specifications*.

Verify that the contractor schedules and conducts a meeting to discuss the operation of impact attenuator vehicle as required under Section 12-3.23A(4), “Quality Assurance,” of the *Standard Specifications*. Verify attendance of subcontractor’s and other contractor’s personnel involved with traffic control. Make sure your designated staff and other state staff involved with traffic control attend the meeting when possible.

#### **4-1206 Payment**

The following guidelines are for measuring and paying for various traffic control devices for construction areas.

##### 4-1206A Flagging

Compensation for flaggers shown on the contract plans, including advanced flaggers and additional flaggers will be included in the bid item for traffic control system. If advanced flaggers or additional flaggers are not shown or specified, then Caltrans pays 100 percent by change order. For public safety, when flaggers are not shown on the plans or specified and when ordered by the engineer, providing flaggers is change order work for which Caltrans pays 100 percent.

Compensation for flaggers used for all movements of workers, construction vehicles, and equipment on or across lanes open to traffic will be included in the bid item of work involved.

For public convenience, such as routing traffic through detours when not shown on the plans and when ordered by the engineer, providing flaggers is change order work for which Caltrans pays 100 percent.

##### 4-1206B Temporary Traffic Control Devices

###### *4-1206B (1) Traffic Cones*

Traffic cones are paid for as part of the contract item for the traffic control system.

###### *4-1206B (2) Plastic Traffic Drums*

Count the plastic traffic drums for payment as they are placed in the locations shown on the plans. Drums used instead of cones, barricades, or delineators as part of a traffic control system or used as specified under “Public Safety” section in the contract are not to be paid for at contract item price.

#### *4-1206B (3) Portable Delineators*

Portable delineators are paid for as part of the contract item for the traffic control system.

#### *4-1206B (4) Channelizers*

Channelizers are paid for by the unit. The contract item price includes the costs of maintaining, replacing, and repairing channelizers. The contract item price also includes the costs of work necessary to restore channelizers damaged by public traffic.

#### *4-1206B (5) Barricades*

Initial placement of each barricade is paid for as a contract item at the time of placement. Subsequent relocations of each barricade are paid for as extra work using the force account method. Damaged barricades should be repaired at the contractor's expense, regardless of the cause, including damage by public traffic.

#### *4-1206B (6) Construction Area Signs*

Construction area signs, except those used in traffic control systems for closures, are paid for as a lump sum item. The cost of the contractor's inventory of replacement sign materials is included in the contract price for construction area signs. Additional signs ordered by the resident engineer are paid for as extra work.

The cost of covering, uncovering, and removing signs no longer needed is included in the contract price for construction area signs.

When determining how much to include on a progress pay estimate, withhold some payment sufficient to cover the cost of maintaining and removing the signs.

#### *4-1206B (7) Type K Temporary Railing*

Review the "Public Safety" section in the contract. Do not use the contract item for Type K temporary railing to pay for temporary railing that is placed to fulfill the requirements of the "Public Safety" section.

Withhold some payment from progress pay estimates to cover the cost of removing Type K temporary railing

#### *4-1206B (8) Temporary Traffic Screens*

Measure and pay for temporary traffic screen according to the specifications.

#### *4-1206B (9) Temporary Crash Cushion Modules*

Review the "Public Safety" section in the contract. Do not use the contract item for temporary crash cushion modules to pay for temporary crash cushion modules that are placed to fulfill the requirements of the "Public Safety" section.

Withhold some payment from progress pay estimates to cover the cost of removing temporary crash cushion modules.

#### *4-1206B (10) Impact Attenuator Vehicles*

Impact attenuator vehicles are paid for as part of the contract item for the traffic control system.

#### *4-1206B (11) Flashing Arrow Signs*

Flashing arrow signs are paid for as part of the contract item for the traffic control system.

#### *4-1206B (12) Portable Flashing Beacons*

Portable flashing beacons are measured and paid for at contract item price by the unit except when they are part of a traffic control system. In that case, portable flashing beacons are paid for as part of the contract item for the traffic control system.

Directing the contractor to move the portable flashing beacon after initial placement is change order work.

#### *4-1206B (13) Portable Changeable Message Signs*

The contract item for PCMS, commonly bid as “furnish-each” or “furnish-lump sum,” includes all costs for placement, operation, maintenance, relocation, and removal of the signs.

Direct the contractor to provide PCMS for use not otherwise provided for in the contract, with a minimum notice of 1 full working day. Payment is computed as extra work.

#### *4-1206B (14) Portable Signal Systems*

If the portable signal system is out of operation, the contractor must provide flaggers to control the traffic until the traffic signals are in operation. The cost of providing flaggers is included in the bid item cost for portable signal systems.

#### *4-1206B (15) Temporary Flashing Beacon Systems*

The contract item for a temporary flashing beacon system, commonly bid as “furnish-each” or “furnish-lump sum,” includes all costs for placement, operation, maintenance, relocation, and removal of the system.

#### *4-1206B (16) Automated Work Zone Information Systems*

The lump sum payment for this item includes all costs for placement, operation, maintenance, relocation, and removal of the Automated Work Zone Information System.

#### *4-1206B (17) Portable Transverse Rumble Strips*

This will be paid under a contract bid item.

#### *4-1206B (18) Portable Radar Speed Feedback Sign Systems*

This will be paid under a contract bid item.

#### *4-1206B (19) Automated Flagger Assistance Devices*

This will be paid under a contract bid item.

If automated flagger assistance devices (AFAD) bid item is not shown on the bid item list, providing AFAD is change order work.

#### *4-1206B (20) Temporary Automated End of Queue Warning System*

If the temporary automated end of queue warning system malfunctions for a cumulative period of 4 hours or more, no payment will be made for the day.

#### 4-1206C Traffic Control Systems

For all project work, the lump sum payment for the traffic control system includes payment for all labor, equipment, and materials to install, maintain, and remove the traffic control system as shown on the plans or *Standard Plans*. The contract item for the traffic control system includes payment for portable signs, cones, delineators, and flashing arrow signs as shown on the plans for the traffic control system and impact attenuator vehicle.

Include compensation or credit in the change order when an ordered change in the work affects the contract item for the traffic control system.

Traffic control costs in support of extra work are to be paid as part of the extra work. Compute the payment as a force account or as an adjustment of compensation based on a force account analysis. The change order that authorizes the extra work should reflect these costs.

In addition to adjustments for ordered changes, process change orders that adjust compensation when increased or decreased closures are required because of underruns or overruns in the engineer's estimated quantities. Process change orders for bid items that require traffic control that are not caused by an ordered change for a contract item or items. Calculate the adjustment on a force account basis. The change order must clearly state there will be adjustment on the traffic control system item by reason of this change.