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Chapter 4  Construction Details

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 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 guidelines 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.

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, 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 Material List for Highway Safety Features.

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

Obtain self-certification for crashworthiness of Category 1 temporary traffic control devices.

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 Material 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 stuck by vehicles.

4-1202B (4) Channelizers
Verify the channelizer’s post is predominantly orange.

4-1202B (5) Barricades

Request proof that any Type 3 barricade to be used as sign support has been crash-tested to the Transportation Research Board’s NCHRP Report 350 criteria or AASHTO’s Manual for Assessing Safety Hardware (MASH) as a single unit with a sign panel of the size and type used on the project.

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.


4-1202B (7) Type K Temporary Railing
Determine if Type K temporary railing is to be cast on or off the project. If the temporary railing is cast off the project, obtain a certificate of compliance.
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 (8)  Temporary Traffic Screens
Review the specification requirements and sheet T4 of the Standard Plans.

4-1202B (9)  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 Material 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 (10)  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 List for Highway Safety Features.

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

4-1202 B (11)  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 (12)  Portable Flashing Beacons
Verify that portable flashing beacons conform to the specification requirements.

4-1202 B (13)  Portable Changeable Message Signs
A certificate of compliance should be requested for each portable changeable message sign (PCMS).

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 *Standard Specifications* requirements including number of lines and characters per line, display modes, power source, and devices to plumb and level the trailer.

4-1202B (14) Temporary Signal Systems

Confirm temporary signal systems comply with the requirements in Section 12-3.33, “Temporary Signal Systems,” of the *Standard Specifications*.

As early as possible, verify that all Department-furnished equipment is available at the location specified. If the equipment is not available, make other arrangements as soon as possible.

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 temporary 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, U.S. Bureau of Land Management, or California Department of Forestry and Fire Protection.

4-1202B (15) 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 (16) 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.

4-1202C 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 the contractor notifies and cooperates with local authorities wherever the local authorities regulate traffic.

When multiple projects in a particular area occur at the same time, require contractors to coordinate their efforts by resolving schedule conflicts prior to submitting their schedules for closures and verify there are no closure conflicts prior to 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 setting up the system for the first time. If the proposed materials have already been used, check them for acceptability in the ATSSA publication Quality Guidelines for Temporary Traffic Control Devices and Features. 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 web page.

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.

  http://www.dot.ca.gov/hq/construc/training.htm

- Obtain the information of trained contractor representatives, including whether they will be requesting or statusing closures, or both.

- Set up “Requestor” or “Statuser” 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) Pedestrian Facilities


If an existing pedestrian facility 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 facility 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 5 days’ written notice before closing an existing pedestrian route.

• The contractor’s responsibility to design and construct a TPAR at their 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 prior to starting work.

• The contractor’s responsibility to submit a Form CEM-2311, “Temporary Pedestrian Access Route Contractor Compliance Report,” within 2 business days after construction of a temporary pedestrian access route, and a Form 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:

  http://www.dot.ca.gov/hq/construc/forms.htm

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 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


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 ATSSA publication Quality Guidelines for Temporary Traffic Control Devices and Features to confirm acceptability of traffic control devices.

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 Material 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 located 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 locations and 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, “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. If there are questions as to flagger competency, contact your construction safety coordinator to have them come and observe the flagging operation. When pilot vehicles are used, radios are required.

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 the portable delineators meet the dimension requirements.

Confirm 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 on the project. According to the Authorized Material List for Signing and Delineation Materials, 0.5 inch Intelplast “Intecelel” or similar material is authorized and according to FHWA Work Zone Letter 85 from the FHWA’s Safety Program 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 construction area signs are placed outside the traveled way, do not block or protrude more than 4 inches into bicycle and pedestrian pathways, 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 a workmanlike appearance.
4-1203B (7) 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 (8) 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 diary an exception to the Standard Plans note and have the contractor close the gap for public safety purposes.

4-1203B (9) 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 (10) 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 (11) 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 (12) 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 (13) Portable Changeable Message Signs

PCMSs are a supplement to and not a substitute for the traffic control system required by the specifications and Standard Plans.

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 PCMSs. 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.”

PCMSs 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 in lieu of the Type K temporary railing required by the specifications. In many cases, placing a PCMS behind existing guard railing will protect it.

PCMSs 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.

4-1203B (14) Temporary Signal Systems
Verify the planned temporary 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 temporary signal system to document its maintenance. Record inspection dates and conditions observed in the project records.

4-1203B (15) 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 (16) 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.

4-1203C 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 facility 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 affords Caltrans the opportunity to coordinate work within the highway corridor.

Confirm the contractor’s closure requests comply with the closure charts. Review the requests to avoid oversights and to identify and reduce the number of unnecessary requests (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 in a timely manner in the future (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 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 the closure request, the status will change to “PENDING.” If you reject the closure request, LCS will send the contractor an email asking for a correction and resubmission.

• Verify the district traffic manager reviews the closure requests 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 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 closures are statused 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 web page, 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 where field adjustments are necessary:

• T Series Standard Plans—Show minimum acceptable standards for traffic control. Increasing taper lengths, addition of extra 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 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 through the cooperation of the transportation management center.
• 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 pick up 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 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 W20-1 “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 prior 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) Pedestrian Facilities

- 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.
- Obtain from the contractor, the completed Form CEM-2311, “Temporary Pedestrian Access Route Contractor Compliance Report,” within 2 business days after construction of a temporary pedestrian access route.
- Verify the contractor provides overhead covering, overhead lighting, or both when required.
- Inspect TPARs on a weekly basis to ensure that they are clean and unobstructed and comply with the Americans with Disabilities Act and the work plan required by the specifications. Use Form 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 CEM-2312, “Temporary Pedestrian Access Route Contractor Weekly Report,” within 2 business days of completing a weekly inspection.
- 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:

1. Retroreflective bands on portable delineators.
2. Retroreflective sheeting on channelizers.
3. Retroreflective sleeves on traffic cones.
4. Construction area signs.
5. Portable changeable message signs.
6. 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. Ensure 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**

Section 12-1.04 “Payment,” of the *Standard Specifications* requires that the cost of providing flaggers be divided equally between Caltrans and the contractor. Determine the total cost using the force account method. The contractor is to be paid one-half of the computed total amount.

The division of costs applies to all flagging required to perform the planned work except in special situations cited in the special provisions. Caltrans’ share of flagging costs is to be paid only when public traffic is involved.

The cost of providing flaggers includes the cost of transporting personnel between a central point and the location of the work, or from one location to another as necessary. The cost does not include the costs of placing, maintaining, and removing construction area signs or lighting for nighttime operations during flagging operations nor does it include the cost of the pilot car or pilot car operator. That cost is paid as part of the contract item for traffic control system.

The flagging costs incurred in connection with increased or decreased work paid for at contract prices will be subject to the 50-50 split. It is assumed that the contractor’s share of such costs is included in the contract item price.

When work is added and paid for as extra work, the contractor should be compensated 100 percent for flagging costs associated with the extra work.

If changes are made at the request of, and for the benefit of the contractor, the contractor must pay for the additional flagging costs unless there are also particular benefits to the state that would warrant a sharing of the costs.

Include 50 percent of flagging costs in costs calculated in accordance with Section 4-1.05 “Changes and Extra Work,” of the *Standard Specifications*. Also, include the contractor’s 50 percent share of flagging costs in cost calculations for computing adjustments for increased or decreased item quantities.

**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 (when they are 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.
4-1206B (13)  Portable Changeable Message Signs
The contract item for PCMSs, 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 PCMSs 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)  Temporary Signal Systems
The lump sum payment for this item includes all the costs of hauling Department-furnished materials between the designated pickup locations, the project, and the designated salvage location. If the pickup or salvage location is changed, then additional costs or savings to Caltrans should be recognized.

Flaggers are not a shared cost if the contractor provides them as a result of a shutdown of the signals for any reason. This provision is an exception to the general practice of sharing the cost of flaggers.

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.

4-1206C  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, consider adjustments to the contract item for the traffic control system when the following circumstances exist and result in additional closures:

- A material change exists over or under the engineer’s estimated quantity that is not caused by an ordered change for a contract item or items.
- Insufficient information exists in the contract for the contractor to verify the engineer’s estimated quantity for the contract item or items. The contractor relied on
the engineer’s estimated quantity or quantities to determine the number of closures required.

- The additional closures are solely for work on the contract item or items meeting the criteria for the above.

Calculate adjustments for the circumstances listed above on a force account basis.