

Traffic Control Manual

California State University East Bay
October 16, 2009

TRAFFIC CONTROL MANUAL

- 1.0 **REFERENCE.** California Vehicle Code Sections 21400 and 21401, State of California, Department of Transportation Rules and Regulations, Traffic Manual (Caltrans)
- 2.0 **POLICY.** It is the policy of California State University East Bay to establish and maintain a Traffic Control Manual designed to assist the University in providing a campus environment for students, staff, faculty and visitors that is safe and healthful and will not subject them to accidental injury.
- 3.0 **PURPOSE.** The manual establishes guidelines and procedures for Traffic Control functions at California State University East Bay, Hayward and Concord. The success of the Environmental Health and Safety Program at the University depends on the full cooperation of all academic and non-academic personnel, students and visitors. The manual's primary objective is to eliminate on campus accidents, which cause injuries and property damage
- 4.0 **RESONSIBILITIES.** The major responsibility for traffic control and accident prevention lies with each manager and supervisor. One of the most important parts of their job is to protect personnel from moving traffic while getting the work done
 - 4.1 Letting the motorist know what is going on and where to drive. For this we use signs, flags, barricades and cones.
 - 4.2 Avoiding the errant driver. Face traffic, stay alert by using your eyes and ears for possible dangers. Plan your escape route.
 - 4.3 Using protective equipment.
 - 4.4 Planning the work to reduce employee exposure to traffic.

- 5.0 **TRAINING.** The following employees will receive training as specified below. All training will be documented in writing. Annual refresher training is recommended:
- 5.1 Employees working in roadways, on/near curbs or the sides of roadways shall be trained, prior to conducting the work, on the procedures in this program.
 - 5.2 Employees supervising the previously identified employees shall also be trained, prior to conducting the work, on the procedures in this program.
 - 5.3 Additionally, Flaggers shall be trained in the proper fundamentals of flagging moving traffic before being assigned as flaggers. Signaling directions used by flaggers shall conform to the " California Manual on Uniform Traffic Control Devices for Streets and Highways, September 26, 2006, published by the State Department of Transportation ". The training and instructions shall be based on the "Manual" and work site conditions and also include the following:
 - 5.3.1 Flagger equipment which must be used.
 - 5.3.2 Layout of the work zone and flagging station.
 - 5.3.3 Methods to methods of one-way traffic control signal traffic to stop proceed or slow down.
 - 5.3.4 Methods of one-way traffic control.
 - 5.3.5 Trainee demonstration of proper flagging methodology and operations.
 - 5.3.6 Emergency vehicles traveling through the work zone.
 - 5.3.7 Handling emergency situations.
 - 5.3.8 Methods of dealing with hostile drivers.
 - 5.3.9 Flagging procedures when a single flagger is used (when applicable).
- 6.0 **NOTIFYING UNIVERSITY POLICE.** After the jobs have been planned and scheduled, the University Police Department and Parking & Transportation Services must be notified of all work being performed on roads, parking lots and manhole vaults to facilitate movement of emergency vehicles through the campus.
- 7.0 **WORK SITE SAFETY.** Each work site must be routinely reviewed to:
- 7.1 Inspect all field and facility work site areas to identify, document and eliminate physical or environmental hazards that may contribute to illnesses and injuries.
 - 7.2 Enforce all rules, laws and policies that will promote, protect and preserve employee safety and health.
- 8.0 **INDIVIDUAL RESPONSIBILITIES.** All personnel shall do everything reasonably necessary to protect their own safety and health and that of others, by complying with all occupational safety and health policies, procedures, laws, rules or regulations.

9.0 **RESPONSIBLE PERSON IN CHARGE.** It is the practice and policy that whenever two or more employees are assigned to work together near moving traffic one person shall be placed in charge. The responsibility is usually assigned to the lead worker based upon his knowledge of the job and the training he has received.

10.0 **PERSONAL PROTECTIVE EQUIPMENT.** The University department performing the work shall provide the personal protective equipment (PPE) that employees will need to work safely. This equipment is for worker protection and they shall use it properly to prevent injuries

All employees working in roadways, on/near curbs or the sides of roadways (e.g. roads, parking lots, or underground vault in these locations) will wear orange reflective vests at all times.

Personal Protective Equipment consists of many items (e.g. Hard hats, orange shirts, orange safety vests, safety glasses, ear plugs, and gloves).

The lead man should select and provide the proper equipment required for the job to ensure the worker's safety and then monitor these employees to make sure the equipment is used and worn.

11.0 **EMERGENCY FIRST AID.** An approved first aid kit must be available at each work site. First aid kits and supplies shall be kept in sanitary and usable condition and inspected at least monthly.

12.0 **PLANNING WORK TO REDUCE WORKER EXPOSURE.** A Tailgate Safety Meeting shall be conducted prior to the start of work to allow for the planning required by this section. The work at the job site shall be planned to minimize the amount of time employees are exposed to moving traffic. This can be done by choosing proper work methods, combining operations, avoiding high traffic volume periods, and reducing the threat from non-attentive speeding drivers.

Work methods and procedures shall be designed to keep the amount of time that workers are exposed to moving traffic to a minimum.

- 13.0 **WORKING NEAR MOVING TRAFFIC.** When working on or near a road where there is moving traffic for any amount of time, workers must be aware of the hazards from errant vehicles. If available, a barricade or parked maintenance vehicle, regardless of size, shall be used as physical protection from the traffic. Workers on foot shall face the traffic whenever possible. If two or more persons are working close together, a lookout must be used as a further warning and protection. Employees should work quickly, but safely.

All workers must be constantly on the alert when working in areas where the traffic is on the move. When employees are working, they must make sure that they use their eyes and ears to look and listen for danger signals to ensure their personal safety.

All employees working in roadways, on/near curbs or the sides of roadways (e.g. roads, parking lots or underground vault in these locations) will wear orange reflective vests at all times.

It is recommended that all personnel need to be highly visible during the day and should wear white coveralls with an orange reflective vest to increase their contrast against the orange equipment.

- 14.0 **FACING TRAFFIC (EMPLOYEES ON FOOT).** All work shall be planned to minimize the time workers will have their backs to the traffic.

Unless there is a clear reason for doing otherwise, employees shall continually face oncoming traffic while working on or near any moving vehicles. This is the personal responsibility of every worker.

Facing traffic is the most important safety rule workers can follow to protect themselves and their coworkers while working on or near moving traffic. Facing traffic gives workers a better opportunity to see and hear errant vehicles. This allows them a chance to move out of harms way and warn fellow workers.

- 15.0 **WARNING SYSTEMS / LOOKOUTS.** Workers on foot on or near moving traffic shall be protected by using an assigned person as a lookout. A lookout shall be assigned if any of these conditions exist:

- Work occurs on a road with a posted speed limit of 25 miles per hour or more.
- Workers exposed to traffic are without physical protection.
- Two or more people are working close to each other and exposed to traffic.
- A person is on foot and exposed to traffic.

- 15.1 The lookout shall continually watch the approaching traffic for errant vehicles that may hit workers on foot. If trouble is suspected, the lookout shall warn the workers by yelling, using a warning horn, portable lookouts alarm device or any system capable of communicating the warning message. The warning is intended to give workers time to use a planned escape route to avoid the errant vehicle.

- 15.2 A lookout shall not be assigned any other duties.**

15.3 Lookouts shall be rotated often enough to keep them alert.

15.4 The lead may use a crew lookout whenever he or she thinks it is needed. Even if workers are physically protected, using a lookout may be beneficial.

16.0 **SIGNS / CONES / WARNING TAPE.** This section covers work in roads, parking lots and underground vaults.

16.1 Orange Safety cones will be positioned at 50 feet and 100 feet from the work site for on-coming traffic.

16.2 Road work warning signs will be posted at the 75 feet and 100 feet distance from the work site to alert all drivers of on-coming traffic that there is road work ahead and in progress.

- At 75 feet from the work site. Sign – “Workers Ahead”
- At 100 feet from work site. Sign – “Speed Limit 10 mph”
- If work area is in a parking lot, Additional orange warning signs stating, “Workers Ahead”, will be placed at all parking lot entrances.

16.3 Orange safety cones, orange warning signs and yellow caution tape will be used at work sites to alert moving vehicles and pedestrian foot traffic that work is being performed on roads, parking lots, and underground vaults.

16.4 All employees working in roadways, on/near curbs or the sides of roadways (e.g. roads, parking lots or underground vault in these locations) will wear orange reflective vests at all times.

17.0 **FLAGGERS.** Flaggers will be utilized in any of the following conditions:

- Locations where barricades and warning signs cannot control the moving traffic
- When two-way traffic must share the same lane because of work in the other lane.
- When drivers' vision is impaired because of smoke or dust in work zones.
- When trucks must turn on the traveled way to load or dump.

17.1 Flaggers shall follow established flagging procedures (see Appendix A - Caltrans Flagging Instruction Handbook 2007)

17.2 They should be rotated and relieved periodically to maintain alertness.

17.3 The flagger should wear orange vests with the reflectorized silver and lime-yellow stripes. This will increase the flaggers' contrast with orange equipment and will make them more visible to approaching traffic.

17.4 During the hours of darkness, flaggers' stations shall be illuminated such that the flagger will be clearly visible to approaching traffic. Section 1523 Title 8 California Code of Regulation requires 10 foot candles for night time road work.

- 17.5 On some two-lane roads one flagger may be used to control traffic. Traffic volume must be very light and the length of the one-lane section should be short so that one end is visible from the other. The sight distance for approaching vehicles must be long enough that traffic can be safely controlled from one end of the work zone. This method must be approved by the Supervisor.
- 17.6 The minimum distance required between the flagger and the work area shall be determined from the Table titled "Distance of Flagger Station in Advance of the Work Space" located on Page 5 of Appendix A - Caltrans Flagging Instruction Handbook 2007.
- 17.7 Where the end of a one-lane section is not visible from the other end, the flaggers shall maintain contact by means of radio or field telephones.
- 17.8 Traffic signals may be used to control traffic on two-lane roads.

18.0 EQUIPMENT LIST.

All tools in good order

Reflective Safety Vests (Vests must comply with American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA) 107-2004, High Visibility Safety Apparel and Headwear)

Warning Signs which comply with the "California Manual on Uniform Traffic Control Devices for Streets and Highways, September 26, 2006," ("Workers Ahead" and "Speed Limit 10 mph")

Orange Safety Cones

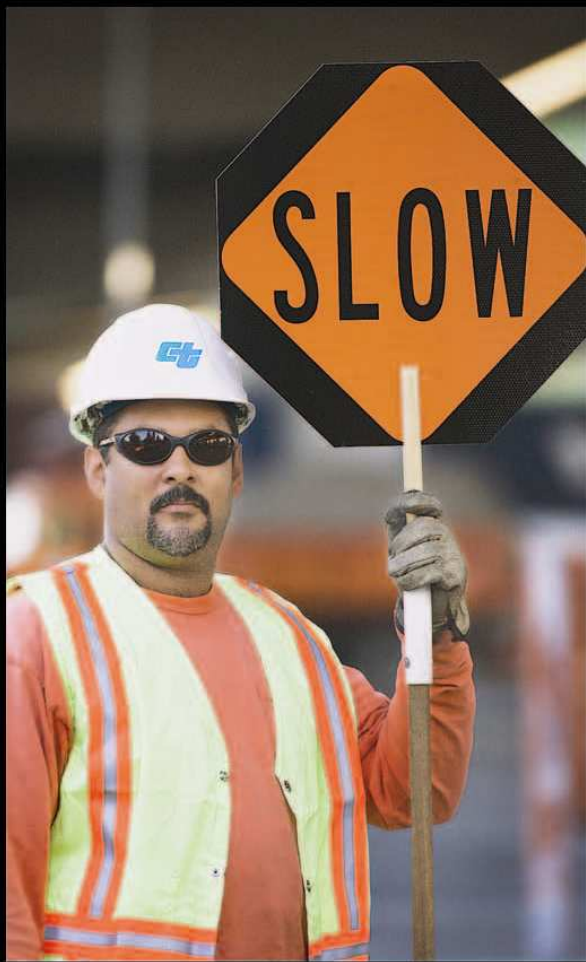
Yellow Caution Tape

Warning Horn (for lookout)

HT with separate radio channel

First Aid Kit

FLAGGING INSTRUCTION HANDBOOK



May 2007

**This instruction handbook is for
informational purposes only.**

NOTE: *These instructions are for
flaggers who are directing the traffic.
For the purposes of this manual
the term "traffic" should be used
interchangeably with: vehicles,
pedestrians, bicyclists and other
users of the roads.*



**California Department
of Transportation
Division of Construction**

May 2007

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FLAGGING INSTRUCTION HANDBOOK

FLAGGER CONTROL

Required Flagger Training and References

The Division of Occupational Safety and Health, Title 8, Chapter 4, Subchapter 4 (Construction Safety Orders), Article 11, Section 1599 requires that flaggers be trained in the proper fundamentals of flagging moving traffic before being assigned as flaggers. The training and instructions requirements for flaggers are included in the *California Manual on Uniform Traffic Control Devices* (CA MUTCD) Chapter 6.

Qualifications for Flaggers

Flaggers are responsible for public safety and for temporary traffic control. Because flaggers have frequent contact with traffic, they should demonstrate the following abilities:

- Receive and communicate specific instructions clearly, firmly, and courteously.
- Move and maneuver quickly in order to avoid danger from errant vehicles.
- Control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers approaching a temporary traffic control zone in frequently changing situations.
- Understand and apply safe traffic control practices, sometimes in stressful or emergency situations.
- Hear, see and recognize dangerous traffic situations and warn workers in sufficient time to avoid injury.

DEMONSTRATION OF PROPER METHODOLOGY AND OPERATIONS

Methodology

- The STOP/SLOW paddle is the primary and preferred hand signaling device because the STOP/SLOW paddle gives the public more positive guidance than red flags. Use of hand signaling with red flags is limited to emergency situations.
- A flagger must demonstrate the proper use of the STOP/SLOW paddle and hand signals before being assigned as a flagger.
- When a flagger is used only to slow traffic, use the SLOW side of the paddle, and the word STOP should be covered.
- The STOP/SLOW paddle must always be held by the flagger, never placed in a traffic cone or on a barricade and never used from inside a vehicle. Do not lean, sit, or lie on a vehicle.

Operations

Location and visibility are important factors in flagging operations.

- Place flagger stations at points of maximum visibility, preferably at the end of tangent sections.
- Flagger stations should be on the shoulder and opposite to the active work area.
- Ensure that flaggers are easily identified by traffic and not confused with other workers in the area.
- Stand alone next to the active work area. Do not allow other workers to congregate around the flagger station.
- Stay out of areas that are in shadows, do not blend with the background.
- Place personal items out of the way, so they will not distract approaching traffic or block your escape route.
- Cover completely, turn or remove C-9A (CA) flagger symbol and W3-4 (C36 CA) "BE PREPARED TO STOP" signs when flaggers are no longer needed.

HIGH VISIBILITY SAFETY APPAREL

Flaggers must wear ANSI 107-99 Class 2 apparel with a background (outer) material color that is either fluorescent orange-red or fluorescent yellow-green, as defined in the standard. The retroreflective material must be either orange, yellow, white, silver, yellow-green or a fluorescent version of these colors and must be visible at a minimum distance of 1,000 feet. The retroreflective clothing, or the retroreflective material added to the clothing, must be designed to clearly identify the wearer as a person and must also have a minimum of one horizontal stripe around the torso. High visibility clothing must be kept clean and in good repair or otherwise replaced.

Flaggers must wear safety glasses, and a white hard hat.

For nighttime work, ANSI 107-99 Class 3 apparel should be considered. White outer garments with retroreflective material may be worn during hours of darkness in lieu of colored vests, jackets and shirts but never during snow or fog conditions.

When uniformed law enforcement officers are used, they should wear high-visibility clothing as described above.

FLAGGER STATIONS

Flagger stations must be located such that the traveling public has sufficient distance to stop at an intended stopping point before entering the work space. Flagger stations should be preceded by advance warning signs. Except in emergency situations, flagger stations must be illuminated during hours of darkness with a minimum 20-foot diameter illumination footprint (at 10-foot candles per CSO 1523) so the flagger is clearly visible to approaching traffic.

The flagger should stand either on the shoulder adjacent to the traffic being controlled or in the closed lane before stopping vehicle traffic. A flagger should only stand in the lane being used by moving traffic after traffic has stopped. The flagger should be clearly visible to all traffic at all times. The flagger should stand alone, never permitting a group of workers to congregate around the flagger station. Park all vehicles away from the flagger station.

At a spot construction, the flagger may have to take a position on the shoulder opposite the closed section in order to operate effectively.

Table for Stopping Distances (see page 13) may be used to determine the visibility distance for traffic approaching the flagger. At spot lane closures where adequate sight distance is available for the safe handling of traffic, the use of one flagger may be sufficient.

Distance of Flagger Station in Advance of the Work Space

Speed** (mph)	Distance (ft)	Distance*		
		-3% (ft)	-6% (ft)	-9% (ft)
20	115	116	120	126
25	155	158	165	173
30	200	205	215	227
35	250	257	271	287
40	305	315	333	354
45	360	378	400	427
50	425	446	474	507
55	495	520	553	593
60	570	596	638	686
65	645	682	728	785
70	730	771	825	891
75	820			

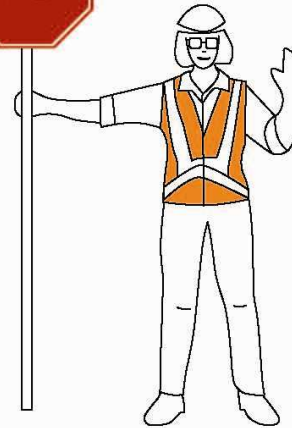
* Exhibit 3-2. *A policy on Geometric Design of Highways and Streets*, AASHTO, 2001. p. 115.

** Posted speed, off-peak 85th-percentile speed before the start of work, or the anticipated operating speed.

The distance shown may also be increased for other conditions that affect stopping distance.

FLAGGER PROCEDURES

The following methods of signaling with STOP/SLOW paddles must be used:

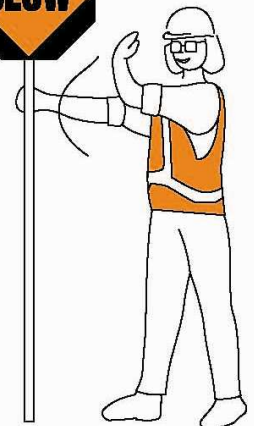


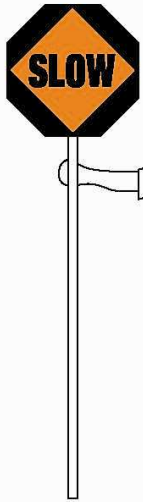
To Stop Traffic

To stop traffic, the flagger must face traffic and aim the STOP paddle face toward traffic in a stationary position with the arm extended horizontally away from the body. The free arm must be held with the palm of the hand above shoulder level toward approaching traffic.

To Let Traffic Proceed

To direct traffic to proceed after stopping, the flagger must face traffic with the SLOW paddle face aimed toward traffic in a stationary position with the arm extended horizontally away from the body. The flagger must motion with the free hand for traffic to proceed.



Flagger Procedures (continued)**To Alert and Slow Traffic**

To alert or slow traffic, the flagger must face traffic with the SLOW paddle face aimed toward traffic in a stationary position with the arm extended horizontally away from the body. To further alert or slow traffic, the flagger holding the SLOW paddle face toward traffic may motion up and down with the free hand, palm down.

Flags Must Be Limited to an Emergency**The following methods of signaling with a flag must be used:**

To stop traffic, the flagger must face traffic and extend the flag staff horizontally across the traffic lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm must be held with the palm of the hand above the shoulder level toward approaching traffic.

To direct stopped traffic to proceed, the flagger must stand parallel to the traffic movement and with the flag and arm lowered from the view of the traffic, and should motion with the free hand for traffic to proceed. Flags **must not** be used to signal traffic to proceed.

To alert or slow traffic, the flagger must face traffic and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger should keep the free hand down.

HAND SIGNALING DEVICES AND FLAGGING EQUIPMENT

Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags, are used to control the vehicles through temporary traffic control zones, and must be visible to the first approaching vehicle at all times. The flagger should also be visible to other traffic. The flagger should be stationed sufficiently in advance of the workers to warn them (for example, with audible warning devices such as horns, whistles, etc.) of approaching danger by out-of-control vehicles.

The STOP/SLOW paddle must have an octagonal shape on a rigid handle. STOP/SLOW paddles must be at least 18 inches wide with letters at least 6 inches high and should be fabricated from light semi-rigid material. The background of the STOP face must be red with white letters and border. The background of the SLOW face must be orange with black letters and border. When used at night, the STOP/SLOW paddle must be retroreflectorized.

The STOP/SLOW paddle may be modified to improve visibility by incorporating white flashing lights. Two lights may be installed and centered vertically above and below the STOP legend, or centered horizontally on either side of the STOP legend. Instead of the above two light arrangements, one light may be centered below the STOP legend.

The STOP/SLOW paddle may be used with either a 12-inch short handle or 66-inch long handle. The 24 x 24-inch size of the STOP/SLOW paddle may be used where greater emphasis is needed and speeds are 30 mph or more.

Flags must be a minimum 24-inch square, made of a good grade red material, and securely fastened to a staff that is approximately 36 inches in length. The free edge of a flag should be weighted so the flag will hang vertically, even in heavy winds. Flags must be retroreflectorized when used at nighttime. Flags must only be used in emergency situations and only until a STOP/SLOW paddle is available.

Each advance warning sign in each direction of travel must be equipped with at least two flags for daytime closures. Each flag must be at least 16 inches square in size and must be orange or fluorescent red-orange in color. Flashing beacons must be placed at the locations indicated for lane closures during hours of darkness.

Additional flagger equipment: advance warning signs; channelizing devices, such as cones; a method of communication, such as 2-way radios and other auditory warning devices as needed; drinking water; and protective clothing, in case of a change in weather. However, keep the flagger station clean and organized, eliminating distractions like chairs, books, or personal radios.

METHOD OF ONE-LANE, TWO-WAY TRAFFIC CONTROL

One-way traffic control can be handled by a single flagger at each end of the work zone. A pilot or official car is used with flaggers for lengthy work zones.

Single Flagger

- When a single flagger is used, the flagger should be stationed on the shoulder opposite the construction zone, or in a position where good visibility and traffic control can be maintained at all times.
- When a one-lane, two-way temporary traffic control zone is short enough to allow a flagger to see from one end of the zone to the other.
- When traffic is normally light to avoid the possibility of opposing traffic arriving at the traffic control zone at the same time.

Two Flaggers

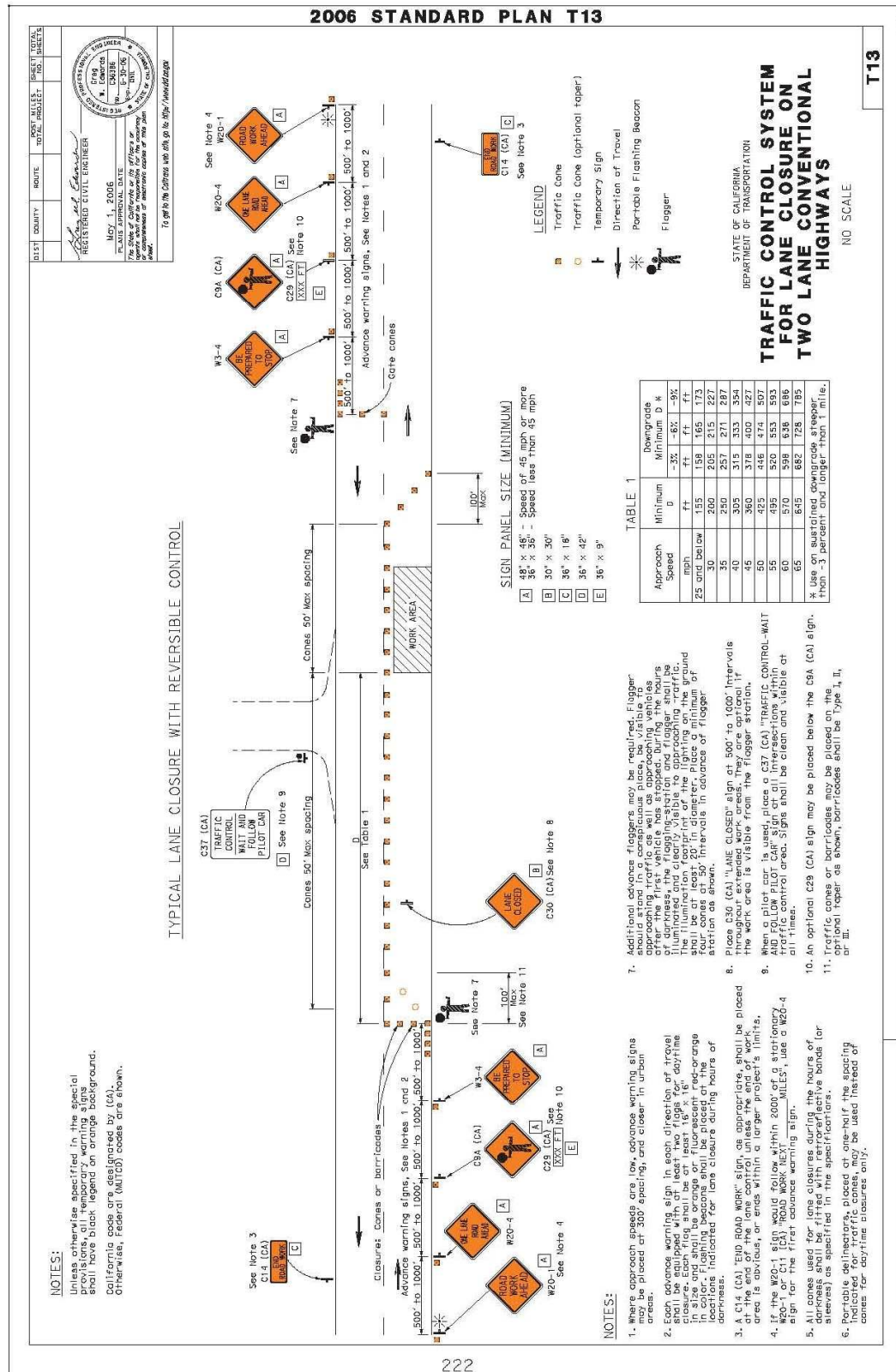
- One of the flaggers should be designated as the lead flagger.
- Flaggers should be able to communicate with each other orally, electronically, or with manual signals that cannot be mistaken for flagging signals.

Pilot Car

- All traffic waits for the pilot car.
- Guides a line of vehicles through the temporary traffic control zone or detour.
- Two or more pilot cars may be used to guide two-way traffic through a particularly complex detour.
- Contractor or contracting authority's name should be prominently displayed.
- The PILOT CAR FOLLOW ME (G20-4) sign must be prominently mounted on the rear of the vehicle.

Official Car

- Always follows the last public vehicle proceeding through the section.
- May also be used to guide hauling trucks out of the closure and into live traffic.



URGENT SITUATIONS

Flaggers must know how to handle emergency flagging operations, traffic control violations, accidents in traffic control zones, and hostile individuals.

Dealing with Emergency Vehicles

- When informed in advance of an approaching emergency vehicle, the flagger should clear an unimpeded path for the emergency vehicle by stopping traffic from all directions.
- When no advance notice is given, first stop the emergency vehicle, stop all traffic including construction equipment to provide a clear path for the emergency vehicle to pass.
- When the type of work, such as blasting or excavation makes the roadway impassable, advance arrangements should be made with the local police agency that has jurisdiction over the roadway.

Traffic Control Violations

- Warn construction workers, either visually or with an audible warning device, when a driver has run the flagger station.
- Stop all vehicles entering the work area, but do not put yourself in an unsafe situation.
- Be prepared for these possibilities.
- Plan your escape route in an emergency.

Traffic Accidents

- Notify your supervisor and call for help.
- If accidents happen in the line of waiting traffic, stay at your station and continue to control traffic until you receive instructions from your supervisor or a police officer.
- If an accident happens within the controlled area, hold approaching traffic and follow instructions from your supervisor, the head flagger or from a police officer.
- Flaggers must communicate with each other before releasing or stopping traffic.

Dealing with Hostile Individuals

- Be courteous and professional.
- Do not argue with motorists or pedestrians.
- If a motorist fails to follow your instructions and threatens the safety of the work area, note the vehicle license number, description of vehicle, and driver.
- Report the information to your supervisor for the purpose of filing a police report.

STOPPING DISTANCES

Road conditions affect stopping distance

Stopping distances vary according to road and weather conditions. On an icy road, for example, a vehicle may travel four times the distance it would require to stop on dry pavement.

The following chart compares stopping distances for a variety of road conditions.

