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1 — INTRODUCTION

The purpose of this manual is to set forth basic principles and to recommend standards, to be observed by all those who perform work in a public street, which provide safe and effective work areas; and to warn, control, protect and expedite vehicular and pedestrian traffic.

2 — GENERAL INFORMATION

Proper traffic control techniques shall be effectively utilized to:
1. Reduce accidents.
3. Reduce damage to private and public property, including damage to the construction project and construction equipment.
4. Minimize the possibility of claims and litigation arising from construction zone accidents.
5. Reduce confusion to motorists.
6. Expedite traffic flow.
7. Improve public relations.

In order to assure driver understanding of traffic devices in work areas it is necessary to standardize the type and placement of signs, barricades and delineators. Nationwide standards are set forth in general terms in the Traffic Control Devices Handbook published by the U.S. Department of Transportation, Federal Highway Administration. State standards are established by departments of transportation and highways and contained in manuals published by such states.

3 — AUTHORITY

No work may be performed in any public right-of-way without permission from the authorizing agency. Traffic control shall be in accordance with the provisions of the latest edition of this manual or the agency's permit for the work.

4 — RESPONSIBILITY

All contractors, permittees or agencies doing work in public streets or public rights-of-way shall:
1. Obtain all necessary permits.
2. Provide timely notification to all affected agencies, includ-
ing the following departments and public agencies.
A. Police Department.
B. Fire Department.
C. Department of Public Works.
D. Bus and Transit Companies.
E. School Districts.

3. Coordinate the work with all affected agencies and the public.
4. Inform occupants of abutting properties, either orally or by written notice, of access limitations made necessary by the work.
5. Install and maintain required traffic control devices.
6. Provide flaggers when required.
7. Schedule and expedite the work to cause the least inconvenience to the public.
8. Provide adequate safeguards for workers and the general public.
9. Assure that survey crews and other employees working in or adjacent to a traveled roadway wear flagging garments as required for flaggers.
10. Patrol the construction site as required to insure that all devices are in place and operating at all times.
11. Remove traffic control devices when they are no longer needed.

5 — PLANNING

All work shall be planned well in advance to keep traffic obstructions, public inconvenience and lost working time to a minimum.

Those responsible shall visit the jobsite before starting the work to consider:
1. Traffic conditions.
2. Existing traffic controls.
3. Traffic lane requirements.
4. Physical features.
5. Visibility restrictions.
6. Problems of access to private property.
7. Business access and activities.
8. The type, number and location of signs, barricades, lights and other traffic devices required for the work.
9. Pedestrian traffic, including means of mitigating any adverse effect upon the blind or other physically disabled persons.

6 — TEMPORARY TRAFFIC LANES

Temporary control of traffic in work areas requires provision of adequate street space to accommodate traffic demands, particularly during peak traffic hours. Temporary traffic lane requirements for construction activities in arterial streets may be specified on the permit, on the plan or in the contract specifications. These requirements constitute a part of the work agreement and must be adhered to as rigidly as any other specification.

Maintenance activities in arterial streets shall be planned and scheduled to minimize interference with traffic. Except for emergency situations, no maintenance work shall encroach into a moving lane of traffic between the hours of 7:00 to 9:00 a.m. or from 3:30 to 6:00 p.m. unless otherwise authorized.

All temporary traffic lanes shall be a minimum of 10 feet in width unless otherwise authorized. This 10-foot minimum lane width is essential for the safe movement of buses, trucks and trailers. In addition, lane clearance shall be a minimum of five feet from an open excavation and two feet from a curb or other vertical obstruction. The 2-foot clearance at the curb is required due to the tendency of drivers to shy away from the curb or obstructions behind the curb, resulting in encroachment into the adjacent traffic lane, whereas additional clearance from an open excavation is required because the open excavation is recognized by the driver as a greater problem. The 5-foot clearance also reduces the surcharge from traffic loads on the nearest face of the excavation and provides workers with a reasonable space in which to work without the need to step into the adjacent traffic lane.

Suitable surfacing must be provided for temporary traffic lanes in work areas. When traffic is diverted from the existing pavement, temporary surfacing shall be provided and shall be in conformance with the current standard specifications for such work issued by the authorizing agency.

Construction equipment not actively engaged in the work, employee vehicles and official vehicles of the agency shall not be parked in the vicinity of the work in such a manner as to further restrict or obstruct traffic flow. Vehicles and equipment in continuous or frequent use may be operated or parked in the same traffic lane as the work obstruction. Construction spoil or materials may be similarly stored in this area or on the nearby parkway or sidewalk area, provided four feet of sidewalk is kept clear for pedestrian use. To prevent the spoil bank from occupying too great a space at its base, toe boards may be used to keep it two feet from the edge of the excavation on one side and two feet from the edge of the traffic lane on the other.
7 - CONTROL, WARNING AND GUIDANCE DEVICES

The most effective system of warning and guidance is provided through the properly planned usage of standard devices, uniformly placed and well maintained. Simplicity is the keynote to effectiveness. Excessive signs, barricades, delineators and lights only confuse the driver.

All control, warning and guidance devices shall conform to this handbook and to the manual covering warning signs, lights and devices for use in performance of work upon highways, as may be published by the local state's department of transportation or highways.

Devices fall into six categories: Signs; Barricades; Delineators; High Level Warning Devices; Warning Lights/Illumination; and Flashing Arrow Signs.

7-1. SIGN TYPES

Traffic signs are classified into several functional groupings: Construction, Warning, Guide and Regulatory.

The Construction (C) series, illustrated on pages 11 through 16, is to be used only for construction or maintenance work on or adjacent to the street. The Warning (W) series, shown on pages 17 through 20, is primarily intended for permanent installation but does have application for temporary construction situations. This is also true of the Guide (G) series. Signs in the Regulatory (R) series are shown on pages 22 and 23.

Existing Regulatory signs within or adjacent to the work area must be maintained by the contractor or permittee.

If existing signs are not appropriate for traffic conditions in the work area, the authorizing agency shall be notified to determine if signs shall be covered, replaced or relocated.

7-2. SIGN PLACEMENT

Temporary “No Parking” signs shall be installed and removed as directed by the authorizing agency.

The location of the signs as shown in the illustrations are guidelines, and actual locations will depend upon alignment, grade, location of street intersections and posted speed limit. Signs shall face and be visible to oncoming traffic and be mounted so as to resist displacement. The center of signs shall be at least four and one-half feet above the roadway unless mounted on barricades located outside of the travelled roadway. Vertical clearance for signs where pedestrian traffic is permitted shall be seven feet. Advance Warning signs shall be located on the right-hand side of traffic lanes. On divided highways, supplemental Advance Warning signs shall be placed on the divider.

All signs which are to convey their messages during darkness shall be reflectorized or illuminated. No signs or supports shall bear any commercial advertising.

Signs shall be installed immediately before work is to commence and shall be removed immediately after work is complete. If at any time a sign is not required, it shall be covered or removed.

7-3. BARRICADES (See page 24)

Barricades serve the following purposes:

1. To alert the public to the fact that a particular area is closed to traffic.
2. To prevent drivers and pedestrians from entering the area.
3. To protect workers.
4. To support signs and warning lights.

Barricades shall not be placed in a moving lane of traffic without advance warning, such as a high level warning device and appropriate delineation.

Barricades shall be one of three types: Type I, Type II or Type III. The characteristics of these types are shown in the table and illustrations on page 24.

The Type III barricade is the largest type and is normally used for closing streets to through traffic and for other major operations where the barricades must remain in place for extended periods.

When barricades are used to close a street, normally they should be placed so there is no gap large enough for a vehicle to pass, except where necessary to provide access for local traffic or emergency vehicles.

Type III barricades have the following advantages:

1. Provide large surface areas that can be readily seen by approaching traffic.
2. Provide a positive barrier at the limits of the work area.
3. Have greater stability and are not likely to be blown over.

Type I barricades should not be used where they would be encountered by blind pedestrians unless horizontal tie bars are provided not more than six inches from the bottom of the barricade. Marking for barricade rails shall be alternate orange and white stripes sloping downwardly to the left at an angle of 45 degrees. The entire area of white and orange shall be effectively reflectorized for nighttime use. The minimum reflectorized area facing traffic shall be 270 square inches.
The predominant color for other barricade components shall be white. Owner identification shall not be imprinted on the reflectorized face of any rail.

7-4. Delineators (See page 21)

Delineators are markers which aid the driver in determining the location and alignment of the traffic lane. Typical examples of acceptable delineators are shown on page 21. By day, the effectiveness of the delineator is determined by position, spacing, form, texture, size and color. By night, the effectiveness is determined by position and visibility. All delineators used at night must be reflectorized adequately. Delineators are used:

1. To channel and divert traffic in advance of work zones.
2. To define traffic lanes through the work zone.
3. To define a change in the position of the existing lanes around the work zone.
4. To define curves and the edges of the roadway on detours.

On arterial streets, opposing traffic shall be separated by delineators, traffic striping, or raised pavement markers. Where traffic is diverted into a painted median to the left of an existing double yellow centerline or into a left turn lane, delineators shall be utilized beyond the work area to return traffic to normal lanes.

For low speed situations delineator-mounted directional arrows may be used.

Delineators shall be of a material that will withstand impact without appreciable damage to the device, the striking vehicle or passing traffic. Due consideration also must be given to the necessity for stability against knockdown from wind or turbulence due to passing traffic. Devices which could roll into the adjacent traffic lane when hit shall not be used. Metal or wooden posts mounted in concrete-filled buckets or on old automobile wheels are examples of the types which are prohibited.

<table>
<thead>
<tr>
<th>MINIMUM RECOMMENDED DELINERATOR AND SIGN PLACEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAFFIC SPEED</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>25 MPH</td>
</tr>
<tr>
<td>30 MPH</td>
</tr>
<tr>
<td>35 MPH</td>
</tr>
<tr>
<td>40 MPH</td>
</tr>
<tr>
<td>45 MPH</td>
</tr>
<tr>
<td>50 MPH</td>
</tr>
<tr>
<td>55 + MPH</td>
</tr>
</tbody>
</table>

*Note: See Section 8 for high speed situations.

7-5. HIGH LEVEL WARNING DEVICES (See page 20)

High level warning devices provide advance warning of a work area by being visible to a driver even when the work area is obstructed from view by vehicles or construction equipment. High level warning devices shall be at least nine feet high with legs, base or truck mounting designed to resist overturning in brisk winds. Sandbags may be used to add weight to the base or legs. High level warning devices shall be equipped with a yoke at the top to accommodate at least three flags. Flags shall be 16 inches square (minimum) and fabricated of high visibility orange material. Torn or dirty flags shall be immediately replaced.

High level warning devices shall be used as indicated on pages 26 through 48, at street approaches to locations where construction or maintenance work is being performed within or immediately adjacent to a traffic lane.

7-6. WARNING LIGHTS—ILLUMINATION

Yellow flashing warning lights shall be used only outside the work area and to provide advance warning. Flashing warning lights shall not be used to channelize traffic; to separate opposing traffic; or to delineate the path that traffic is to follow. (It is not intended to prohibit the use of flashing warning lights which are uniformly spaced, interconnected and sequentially cycled). Flashing warning lights used for advance warning must be clearly distinguishable from the primary delineation and shall be positioned above the normal reflectorized barricades.

Warning lights* are portable, lens directed, enclosed and mounted at a minimum height of three feet measured from the bottom of the lens to the underlying surface. The color of the light emitted shall be yellow. They may be used in either a steady burn or flashing mode. Barricade warning lights shall be in accordance with the requirements of ANSI D.10.1.

### WARNING LIGHTS

<table>
<thead>
<tr>
<th>Type A</th>
<th>Type B</th>
<th>Type C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Intensity</td>
<td>High Intensity</td>
<td>Steady Burn</td>
</tr>
<tr>
<td>Lens Size</td>
<td>7' dia.</td>
<td>12' dia.</td>
</tr>
<tr>
<td>Lens Directional Faces</td>
<td>1 or 2</td>
<td>1</td>
</tr>
<tr>
<td>Flash Rate per Minute</td>
<td>55 to 75</td>
<td>55 to 75</td>
</tr>
<tr>
<td>Flash Duration</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Minimum Effective Intensity</td>
<td>40 Candela</td>
<td>35 Candela</td>
</tr>
<tr>
<td>Minimum Beam Candle Power</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hours of Operation</td>
<td>Dusk to Dawn</td>
<td>24 hrs/day</td>
</tr>
</tbody>
</table>

1. Length of time that instantaneous intensity is equal to or greater than effective intensity.
2. These values must be maintained within an elliptical pattern 9 in. on each side of the vertical axis; and 5 in. above and 5 in. below the horizontal axis.

Type A low intensity flashing warning lights are most commonly mounted on separate portable supports or on Type I or Type II barricades. They are intended to continually warn the driver that he or she is approaching or adjacent to a hazardous area.

Type B high intensity flashing warning lights are normally mounted on the advance warning signs or on independent sup-

* Under certain circumstances use of flashing warning lights is optional. For permitted optional uses see appropriate illustrative charts in rear of book.
ports. As these lights are effective in daylight as well as dark, they are designed to operate 24 hours per day.

Type C steady burn warning lights are intended to be used to delineate the edge of the traveled way on detour curves, lane changes, lane closures and other similar conditions.

Because of fire hazard, torches and flares shall be used only in patrolled emergency situations or when a flagger is on duty.

7-7. FLASHING ARROW SIGNS (FAS)

Flashing arrow signs (FAS) are sign panels with a matrix of electric lights, capable of sequential arrow displays. All FAS shall meet the following requirements:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MINIMUM SIZE</th>
<th>MINIMUM NUMBER OF PANEL LAMPS</th>
<th>MINIMUM LEGIBILITY DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>36&quot; x 72&quot;</td>
<td>13</td>
<td>¼ mile</td>
</tr>
<tr>
<td>I</td>
<td>48&quot; x 96&quot;</td>
<td>15</td>
<td>1 mile</td>
</tr>
</tbody>
</table>

FAS are intended to supplement, not replace, other work area traffic control devices. They provide additional, high level, advance warning of lane closures. FAS are effective for all lane closures and should be considered for all high speed situations.

Location of FAS should be as shown in the traffic control placement details of this manual and varied as needed to achieve the desired recognition.

8 — HIGH SPEED SITUATIONS

When the prevailing speed of traffic is 45 MPH or greater, the following increases in the minimum standards shall apply:

1. A flashing arrow sign should be used for each lane closed.
2. The minimum height for traffic cones should be 28 inches.
3. Two lane closure signs (C20) should be used on the approach to a lane closure.

9 — TEMPORARY PAVEMENT STRIPING/MARKING

The authorizing agency shall determine the need for and extent of striping removal and restriping to supplement devices used for delineation.

On major construction projects where traffic is diverted for extended periods, pavement striping or markers are required to assure positive delineation and minimize driver confusion.

In addition to major construction projects, restriping will be considered for minor construction or maintenance activities under the following conditions:

10 — FLAGGER CONTROL

Flaggers are required:

1. Where workers or equipment intermittently block a traffic lane.
2. Where plans or permit allow the use of one lane for two directions of traffic (one flagger is required for each direction of traffic).
3. Where the safety of the public and/or workers determines there is a need.

Flaggers must be selected with care and certified where required. They shall be alert, intelligent, neat in appearance, have good hearing and eyesight and should be trained in the proper fundamentals of flagging traffic before being assigned as flaggers. They should be stationed far enough from the work to slow down or stop vehicles before they enter the work area.
A symbol sign of a flagger (C9A) shall be placed as far ahead of the flagger as practicable. (See pages 12, 26 and 27.)*

All flaggers shall be provided with an orange jacket (or vest) for daytime use and a reflectorized garment for use at night. Flaggers shall be equipped with a sign paddle. From sunset to sunrise flagger stations shall be illuminated so that the flagger will be clearly visible to approaching traffic. Lights for illuminating the station shall be approved by the authorizing agency. Flagging procedures (signaling) shall be the same as those prescribed for day work. Under emergency conditions the flagger may use a flashlight and hand signals to direct traffic, until proper illumination can be effected.

The hand signals and equipment to be used by flaggers for controlling and directing traffic are shown in the illustrations on pages 26 and 27.

*For high speed situations a "Prepare to Stop" (C36) sign should also be used.

11 — PEDESTRIAN TRAFFIC

When the work area encroaches upon a sidewalk, walkway or crosswalk area, special consideration must be given to pedestrian safety. Since the pedestrian moves at a relatively slow rate, a minimum of advance warning is required for him or her. However, effort must be made to separate the pedestrian from the work area.

Protective barricades, fencing, handrails and bridges, together with warning and guidance devices and signs, must be utilized so that the passageway for pedestrians, especially blind and other physically disabled persons, is safe and well defined.

Walkways in construction areas shall be maintained at least four feet in width and free of abrupt changes in grade. Obstructions within the walkways shall be illuminated during hours of darkness. Minimum vertical clearance to any obstruction within the walkway shall be seven feet.

Where walks are closed by construction, an alternate walkway shall be provided, preferably within the parkway. Where it is necessary to divert pedestrians into the parking lane of a street, barricading or delineation shall be provided to separate the pedestrian walkway from the adjacent traffic lane. At no time shall pedestrians be diverted into a portion of the street used for vehicular traffic. Any deviation from the above must have prior approval of the authorizing agency.

At locations where adjacent alternate walkways cannot be provided, appropriate signs and barricades must be installed at the limits of construction and in advance of the closure at the nearest crosswalk or intersection to divert pedestrians across the street.

12 — BRIDGING OF-excavations

(See page 25)

Whenever necessary, trenches and excavations shall be bridged to permit an unobstructed flow of traffic.

1. Bridging shall be secured against displacement by using adjustable cleats, angles, bolts or other devices.
2. Bridging shall be installed to operate with minimum noise.
3. The trench shall be adequately shored, to support the bridging and traffic.
4. Steel plates used for bridging shall extend one foot minimum beyond the edges of the trench. Temporary paving materials (premix) shall be used to feather the edges of the plates to minimize wheel impact.

CONSTRUCTION SIGNS

C1
ROAD CLOSED
LOCAL TRAFFIC ONLY
Use where detour is provided. Use plate to show distance.

C3
DETOUR AHEAD
Use when traffic is diverted to a temporary roadway or route.

C2
ROAD CLOSED
TO THRU TRAFFIC
Use where road is closed to through and local traffic.

C4
FRESH OIL
Use only where traffic is diverted to an alternate route. Available with right, left and vertical arrow.

C5
CONSTRUCTION SIGNS

C6: LOOSE GRAVEL

C7: END DETOUR

C8: ROAD MACHINERY AHEAD

C9A: SLIDE AHEAD

C10: END CONSTRUCTION

C13: END ROAD WORK

C14: END ROAD WORK

C16: ONE LANE ROAD AHEAD

Use where two-way traffic must use the same lane. Provide flaggers. See C9A.

C17: ROAD WORK SPEED LIMIT 25

FRONT

END 25 SPEED LIMIT BACK

To be placed only by Agency authorization.

C18: ROAD CONSTRUCTION AHEAD

Use for major construction.

C19: ROAD CLOSED AHEAD

Use with C1 if detour is provided.
CONSTRUCTION SIGNS

C20
CENTRE
Or
RIGHT

C21
LEFT LANE CLOSED AHEAD

C22B
Use for minor construction or maintenance.

C23
ROAD WORK AHEAD

C24
SHOULDER WORK AHEAD

C25
SURVEY PARTY

Alternate Legend:
SURVEY CREW

C27
OPEN TRENCH

C28A
STOP

C28B
SLOW

Front
SIGN PADDLE FOR USE IN FLAGGING OPERATIONS

Back

C29
1000 FT

The 500 feet, 1000 feet, 1500 feet plate (C29) may be used to cover the word "AHEAD" on construction signs when a definite distance to the posted condition is desirable.

C30
LANE CLOSED

C36
PREPARE TO STOP

Mount on barricade in head-on position at point of closure.
## Specifications for Construction Signs

<table>
<thead>
<tr>
<th>CODE</th>
<th>Standard Size</th>
<th>Acceptable Reduced Size</th>
<th>Height of Letters Standard</th>
<th>Height of Letters Reduced Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>8&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C2</td>
<td>48&quot; x 30&quot;</td>
<td>36&quot; x 24&quot;</td>
<td>8&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C3</td>
<td>—</td>
<td>48&quot; x 24&quot;</td>
<td>6&quot;–5&quot;–4&quot;</td>
<td>5&quot;–4&quot;–3&quot;</td>
</tr>
<tr>
<td>C3A</td>
<td>—</td>
<td>48&quot; x 24&quot;</td>
<td>4&quot;–5&quot;</td>
<td>3&quot;–5&quot;</td>
</tr>
<tr>
<td>C4</td>
<td>24&quot; x 24&quot;</td>
<td>—</td>
<td>5&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C5</td>
<td>48&quot; x 18&quot;</td>
<td>—</td>
<td>6&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C6</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
<td>5&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C7</td>
<td>30&quot; x 18&quot;</td>
<td>—</td>
<td>5&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C8</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>C9A</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>C10</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
<td>5&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C13</td>
<td>60&quot; x 24&quot;</td>
<td>42&quot; x 18&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C14</td>
<td>42&quot; x 18&quot;</td>
<td>—</td>
<td>5&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C16</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C17</td>
<td>24&quot; x 24&quot;</td>
<td>3&quot;–10&quot;</td>
<td>4&quot;–8&quot;–3&quot;</td>
<td>—</td>
</tr>
<tr>
<td>(Front)</td>
<td>24&quot; x 24&quot;</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>(Back)</td>
<td>24&quot; x 24&quot;</td>
<td>—</td>
<td>4&quot;–8&quot;–3&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C18</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>8&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C19</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C20(Rt or Lt)</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C21</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C22B</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
<td>5&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>C23</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
<td>4&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C24</td>
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<td>—</td>
<td>4&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C25</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
<td>5&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>C27</td>
<td>24&quot; x 24&quot;</td>
<td>—</td>
<td>4&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C28A</td>
<td>18&quot; Diameter</td>
<td>—</td>
<td>6&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C28B</td>
<td>18&quot; Diameter</td>
<td>—</td>
<td>6&quot;</td>
<td>—</td>
</tr>
<tr>
<td>C29</td>
<td>36&quot; x 9&quot;</td>
<td>24&quot; x 7&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
</tr>
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<td>C30</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>6&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>C36</td>
<td>48&quot; x 48&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>7&quot;</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

(Note: C1, C3, C9, C16, C18, C19, C20 and C21 signs may be used with the appropriate C29 sign.)

## Warning Signs

- **W1**: U-turn
- **W2**: U-turn
- **W3**: Left turn
- **W4**: Right turn
- **W5**: Left turn
- **W6**: 40 MPH
- **W7**: Road narrows
- **W8**: Soft shoulder

(Note: The images of the signs are not described in the text.)
WARNING SIGNS

W19  PAVEMENT ENDS
W33  ROUGH ROAD
W44  ROCK SLIDE AREA
W50
W56
W57

Use at street closure where traffic may turn right or left.

WARNING SIGNS

W58  Use to split traffic moving in the same direction.
W59
W81

TYPE L MARKER
TYPE N MARKER

TYPE K MARKER

SPECIFICATIONS FOR WARNING SIGNS

<table>
<thead>
<tr>
<th>CODE</th>
<th>Standard Size</th>
<th>Acceptable Reduced Size</th>
<th>HEIGHT OF LETTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1 (Rt or Lt)</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W2 (Rt or Lt)</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W3 (Rt or Lt)</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W5 (Rt or Lt)</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W6</td>
<td>24&quot; x 24&quot;</td>
<td>18&quot; x 18&quot;</td>
<td>12&quot; - 4½&quot;</td>
</tr>
<tr>
<td>W15</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>W18</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>6&quot;</td>
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<tr>
<td>W33</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
<td>5&quot;</td>
</tr>
<tr>
<td>W44</td>
<td>42&quot; x 42&quot;</td>
<td>36&quot; x 36&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W50</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W56</td>
<td>48&quot; x 24&quot;</td>
<td>36&quot; x 18&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W57</td>
<td>48&quot; x 24&quot;</td>
<td>36&quot; x 18&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W58</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
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<td>W59</td>
<td>36&quot; x 36&quot;</td>
<td>30&quot; x 30&quot;</td>
<td>—</td>
</tr>
<tr>
<td>W81</td>
<td>30&quot; x 36&quot;</td>
<td>24&quot; x 30&quot;</td>
<td>—</td>
</tr>
<tr>
<td>Type K Marker</td>
<td>15&quot; x 6&quot;</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Type L Marker</td>
<td>8&quot; x 24&quot;</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Type N Marker</td>
<td>18&quot; x 18&quot;</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
WARNING DEVICES

18" Square (Min.) Typical

9' MIN.

High Level Warning Device
(Flag Standard — See page 7)

DELINEATORS

Supplemental directional or warning signs may be mounted on cones and delineators subject to agency approval.

TRAFFIC CONE

28" MIN. for high speed situations.

Reflective Cone Sleeve

13 IN. MIN.

POST TUBE

36" MIN.

EPOXIED IN PLACE

FIXED TUBE

28" MIN.
REGULATORY SIGNS
To be used only when directed by the authorizing agency.

R7
R10
R10A
R11
R11A
R16
R17

RIGHT LANE MUST TURN RIGHT
TWO WAY TRAFFIC AHEAD
RIGHT TURN ONLY
LEFT TURN ONLY
DO NOT PASS

SPECIFICATIONS FOR REGULATORY SIGNS

<table>
<thead>
<tr>
<th>CODE</th>
<th>Standard Size</th>
<th>Acceptable Reduced Size</th>
<th>HEIGHT OF LETTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R7</td>
<td>36&quot; x 45&quot;</td>
<td>24&quot; x 30&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>R10</td>
<td>48&quot; x 16&quot;</td>
<td>36&quot; x 12&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>R10A</td>
<td>18&quot; x 24&quot;</td>
<td></td>
<td>5&quot;</td>
</tr>
<tr>
<td>R11</td>
<td>36&quot; x 36&quot;</td>
<td></td>
<td>5&quot;</td>
</tr>
<tr>
<td>R11A</td>
<td>36&quot; x 21&quot;</td>
<td></td>
<td>5&quot;</td>
</tr>
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<td>R16</td>
<td>30&quot; x 30&quot;</td>
<td>24&quot; x 24&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>R17</td>
<td>30&quot; x 30&quot;</td>
<td>24&quot; x 24&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>R18</td>
<td>36&quot; x 36&quot;</td>
<td>20&quot; x 32&quot;</td>
<td>4&quot; - 5&quot;</td>
</tr>
<tr>
<td>R34</td>
<td>30&quot; x 30&quot;</td>
<td>24&quot; x 24&quot;</td>
<td>4&quot;</td>
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<tr>
<td>R34-2</td>
<td>30&quot; x 30&quot;</td>
<td>24&quot; x 24&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>R40</td>
<td>24&quot; x 30&quot;</td>
<td></td>
<td>5&quot;</td>
</tr>
<tr>
<td>R41</td>
<td>30&quot; x 36&quot;</td>
<td></td>
<td>6&quot;</td>
</tr>
<tr>
<td>R42</td>
<td>30&quot; x 36&quot;</td>
<td></td>
<td>6&quot;</td>
</tr>
<tr>
<td>R63</td>
<td>24&quot; x 30&quot;</td>
<td></td>
<td>6&quot;</td>
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</table>
BARRICADE SPECIFICATIONS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Rail</td>
<td>8&quot; - 12&quot;</td>
<td>8&quot; - 12&quot;</td>
<td>8&quot; - 12&quot;</td>
</tr>
<tr>
<td>Length of Rail</td>
<td>2′ min.</td>
<td>2′ min.</td>
<td>4′ min.</td>
</tr>
<tr>
<td>Width of Stripe</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Height</td>
<td>3′ min.</td>
<td>3′ min.</td>
<td>5′ min.</td>
</tr>
<tr>
<td>Number of Rail Faces Reflectorized</td>
<td>2 (one each direction)</td>
<td>4 (two each direction)</td>
<td>3 if facing traffic in one direction, 6 if facing traffic in two directions.</td>
</tr>
<tr>
<td>Type of Frame</td>
<td>&quot;A&quot; Frame</td>
<td>&quot;A&quot; Frame</td>
<td>Post or Skids</td>
</tr>
</tbody>
</table>

A: 4" stripes may be used if length of rail is 3′ or less.
B: All dimensions are nominal lumber dimensions.
C: Bottom of bottom rail on types II and III barricades shall be a minimum of 4" and a maximum of 6" from the ground.
D: Barricades shall have a minimum of 270 square inches of retroreflective rails facing traffic.

NOTE: Trench walls and adjacent soils shall be sufficiently stable for the use of the above plate.

MINIMUM THICKNESS OF STEEL PLATES

<table>
<thead>
<tr>
<th>WIDTH OF TRENCH</th>
<th>MINIMUM THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 foot</td>
<td>1/8 inch</td>
</tr>
<tr>
<td>1.5 feet</td>
<td>1/4 inch</td>
</tr>
<tr>
<td>2.0 feet</td>
<td>3/8 inch</td>
</tr>
<tr>
<td>3.0 feet</td>
<td>7/16 inch</td>
</tr>
<tr>
<td>4.0 feet</td>
<td>1 inch</td>
</tr>
</tbody>
</table>

NOTE: For spans greater than 4 feet a structural design shall be prepared by a registered civil engineer and approved by the agency.
INSTRUCTIONS

NOTE:
Between sunset and sunrise flagger station shall be adequately lighted.

TO FLAGGERS

TO STOP TRAFFIC
The flagger shall face traffic and hold the "STOP" paddle in a vertical position at arm's length. For greater emphasis, the free arm may be raised with the palm toward approaching traffic.

TO SLOW TRAFFIC
The flagger shall face traffic and hold the "SLOW" paddle in a vertical position at arm's length. For added emphasis, the flagger may slowly raise and lower free hand with the palm down.

TRAFFIC PROCEED
The flagger shall stand parallel to the traffic movement, and either with paddle and arm lowered from view of the driver, or with "SLOW" paddle held in a vertical position, motion traffic ahead with free arm. Never use a paddle as a signal to move traffic.

Note:
A C28 shall be used to control traffic; a flag shall NEVER be used.