

TRAFFIC CONTROL DEVICES

SIGNS

Temporary traffic control work zone signs include regulatory, warning and guide signs utilized to provide regulations, warnings and guidance information to road users impacted by the presence of a work zone within the highway rights-of-way. Henceforth, for general purposes when specific references are not required, all temporary traffic control work zone signs will be referred to as advance warning signs.

Mount the advance warning signs on either ground mounted u-channel or square steel tube posts, approved temporary sign supports or Type III barricades. **Do not mount advance warning signs on Type II barricades.** The mounting height of an advance warning sign, dependent upon the type of sign support the sign is attached to, is measured from the either the ground or the near edge of the adjacent travel lane or sidewalk when a sidewalk is present to the bottom edge of the sign. The mounting height of a sign attached to a ground mounted u-channel or square steel tube post is measured from the bottom edge of the sign to the grade elevation of the near edge of the adjacent travel lane or sidewalk when a sidewalk is present. The mounting height of a sign attached to an approved temporary sign support or Type III barricade is measured from the bottom edge of the sign to the ground or surface on which the sign support is located.

The mounting height of a primary regulatory or advance warning sign erected on a ground mounted u-channel or square steel tube post is 7 feet to 8 feet from the bottom edge of the sign to the grade elevation of the near edge of the adjacent travel lane or sidewalk when a sidewalk is present. The minimum mounting height of a secondary sign mounted on the same assembly is 6 feet from the bottom edge of the secondary sign to the grade elevation of the near edge of the adjacent travel lane or sidewalk when a sidewalk is present unless otherwise specified.

The minimum mounting height for guide signs, including detour sign assemblies with multiple sign panels, erected on ground mounted u-channel or square steel tube posts should be no less than 5 feet from the grade elevation of the near edge of the adjacent travel lane to the bottom of the route sign or the detour sign panel (M4-9) unless otherwise directed by the Department.

On primary and secondary routes, the minimum mounting height of advance warning signs erected on portable sign supports is 1 foot from the bottom edge of the sign to the ground. **However, during flagging operations, the minimum mounting height of advance warning signs erected on portable sign supports is 5 feet from the bottom edge of the sign to the ground.**

On interstate routes, the minimum mounting height of advance warning signs mounted on portable sign supports is 5 feet from the bottom edge of the sign to the ground or surface on which the sign support is located.

In accordance with the requirements of the MUTCD, the minimum mounting height of a temporary "Exit" sign (E5-1) (M1025-00) located within a temporary gore area during a lane closure on a multilane roadway is 7 feet from the bottom edge of the sign to the pavement surface.

On multilane primary routes, avoid placement of signs mounted on portable sign supports within paved median areas utilized for two-way left turns unless otherwise directed by the Engineer.

When mounting signs on multiple ground mounted sign supports, ensure that each post is of the same type. Combining and installing both ground mounted u-channel and square steel tube posts within the same sign assembly is prohibited.

When mounting signs on ground mounted u-channel or square steel tube posts, utilize either a sign support / ground support post combination with an approved breakaway assembly or a single direct driven post for each individual sign support of a sign assembly installation. Do not combine a sign support / ground support post combination and a direct driven post on the same sign assembly installation that contains two or more sign supports. Regarding sign support / ground support post combination installations, ensure that post lengths, stub heights and breakaway assemblies comply with the manufacturer's requirements and specifications. Use approved breakaway assemblies found on the *Approved Products List For Traffic Control Devices in Work Zones*.

Fabricate advance warning signs mounted on portable sign supports or Type III barricades from an approved roll-up retroreflective fabric material or an approved rigid aluminum laminate composite substrate.

Advance warning signs fabricated with 0.080 inch or 0.100 inch thick aluminum sign blanks are PROHIBITED for use with portable sign supports or Type III barricades. Refer to the *Approved Products List For Traffic Control Devices in Work Zones* for approved roll-up retroreflective fabric sign materials and approved rigid aluminum laminate composite sign substrates.

Fabricate rigid advance warning signs mounted on ground mounted u-channel or square steel tube posts from an approved sign substrate material constructed of aluminum or an approved aluminum laminate composite material. Use aluminum sign blanks that meet SCDOT specifications or sign blanks fabricated from approved aluminum laminate composite materials included on the *Approved Products List For Traffic Control Devices in Work Zones*.

Reflectorize orange advance warning signs and any orange areas of a multi-colored advance warning sign with fluorescent orange colored microprismatic retroreflective sheeting. Reflectorize white advance warning signs and any white areas of multi-colored advance warning signs with a white colored microprismatic retroreflective sheeting.

When advance warning signs mounted on portable sign supports are not in use, remove and relocate the portable sign supports to a location beyond 15 feet from the near edge line of a primary or secondary travel lane and beyond 30 feet from the near edge line of an interstate travel lane. On primary and secondary routes, when the 15 foot clear zone distance or rights-of-way is unavailable, store the portable sign supports at the greatest possible distance from the near edge of the adjacent travel lane. **Do not simply redirect a sign when not in use.** Ensure that all portable sign supports lie flat with the legs in a retracted position when not in use.

When advance warning signs mounted on ground mounted u-channel or square steel tube posts are not in use, cover the signs in their entirety with an opaque material or remove them from the work area when not in use. Cover the signs in their entirety to prevent any visualization of any portion of the sign by the motorist. Use weather resistant materials to cover signs to prevent any exposure of a covered sign due to adverse weather conditions or long periods.

When covering signs with opaque materials, do not attach a covering material to the face of the sign with tape or a similar product or any method that may leave a residue on the retroreflective sheeting. The residue from tape or similar products, as well as many methods utilized to remove such residue, will damage the retroreflectivity of the sign and render the sign ineffective, especially during the hours of darkness.

Install the advance warning signs at spacing intervals based on the posted regulatory speed limit of the roadway prior to beginning any work. When a work zone traffic control plan or a typical work zone traffic control standard drawing for maintenance operations is not available to indicate the spacing intervals for a typical 3 advance warning sign array installation, see *Table 3, Advance Warning Sign Placement Intervals for a Typical 3 Advance Warning Sign Array*.

Table 3 Advance Warning Sign Placement Intervals for a Typical 3 Advance Warning Sign Array

URBAN / RURAL (LOW SPEED) 35 MPH or LESS	200 / 200 / 200 Feet
URBAN / RURAL (INTERMEDIATE SPEED) 40 - 50 MPH	350 / 350 / 350 Feet
RURAL (HIGH SPEED) 55 MPH or GREATER	500 / 500 / 500 Feet
INTERSTATE	1000 / 1500 / 2600 Feet

CHANNELIZING DEVICES

Channelizing devices provide warning to motorists of potential hazards in work zones. These devices channelize vehicular and pedestrian traffic away from potential hazards. Also, these devices provide guidance to motorists by delineating the travel path intended for use by motorists. Typical channelizing devices utilized by SCDOT include 28" or 36" standard traffic cones, 42" oversized traffic cones, portable plastic drums and barricades. **The following paragraphs provide descriptions of these traffic control devices and how these devices may be used. Specific applications of these devices will be determined by the typical traffic control setup and any specific requirements of the maintenance activity.**

Standard Traffic Cones -

The 28" or 36" standard traffic cones may be utilized to delineate travel lanes and to channelize traffic through the tangent section or activity area of lane closures, during daytime shoulder closures and to mark specific hazards. When utilized in lane closures, replace the 28" or 36" standard traffic cones with 42" oversized cones or portable plastic drums when a daytime operation extends into the nighttime hours. Use reflectorized 28" or 36" standard traffic cones during the hours of darkness during emergencies ONLY. Non-reflectorized 28" or 36" standard traffic cones are PROHIBITED for emergency use during nighttime hours.

Standard traffic cones utilized during daytime lane closures on interstate roadways shall have a minimum height of 36 inches.

Maintain 28" or 36" standard traffic cones in good condition. Replace and do not use 28" or 36" standard traffic cones that have completed their functional service life.

42" Oversized Traffic Cones -

The 42" oversized traffic cones may be utilized to delineate and channelize traffic through the tangent section or activity area of lane closures and to mark specific hazards. Also, the 42" oversized traffic cones may be utilized during flagging operations on two-lane two-way roadways. Reflectorize the 42" oversized traffic cones with Type III flexible microprismatic retroreflective sheeting unless otherwise directed by the department. Use 42" oversized traffic cones in place of 28" or 36" standard traffic cones in lane closures during the hours of darkness.

The 42" oversized traffic cones are permitted for use during flagging operations on two-lane two-way roadways, lane closures on multilane roadways, daytime shoulder closures and to mark specific hazards ONLY. The 42" oversized traffic cones are unacceptable for delineation of a pavement edge; portable plastic drums are required for delineation of a pavement edge.

Maintain 42" oversized traffic cones in good condition. Replace and do not use 42" oversized traffic cones that have completed their functional service life.

Portable Plastic Drums -

Portable plastic drums may be utilized to delineate travel lanes, channelize traffic through the tangent section or activity area of a lane closure, delineate shoulder closures, delineate the pavement edge of a roadway and delineate excavations and structures. Reflectorize portable plastic drums with Type III flexible microprismatic retroreflective sheeting unless otherwise directed by the department. Portable plastic drums are the preferred traffic control device for channelization and delineation of a travel way during the hours of darkness.

Maintain portable plastic drums in good condition. Replace and do not use portable plastic drums that have completed their functional service life.

Barricades -

Type II barricades may be utilized to develop taper sections and channelize traffic into lane closures, delineate travel lanes and delineate excavations and structures.

Although included in this section regarding channelizing devices, Type III barricades are used to close a roadway to traffic and to prevent traffic from entering a work area rather than channelizing traffic around or away from a potential hazard. However, in some installation scenarios the alternating diagonal orange and white stripes do indicate a possible direction of travel or lack thereof.

Reflectorize all barricades with Type III high intensity or Type IX or XI Microprismatic retroreflective sheeting unless otherwise directed by the department.

Type II barricades shall have alternating diagonal orange and white stripes sloping downward at a 45 degree angle in the direction traffic is to pass.

Type III barricades shall have alternating diagonal orange and white stripes sloping downward at a 45 degree angle. At locations where the barricades extend entirely across a roadway, the stripes should slope downward in the direction toward which motorists must turn or pass. At locations where both right and left turns are provided, the stripes should slope downward in both directions from the center of the barricade or from the center of the assembly of barricades to the outside edges. At locations where the roadway is closed to traffic and no turns are available, the stripes should slope downward toward the center of the barricade or the center of the assembly of barricades.

Type III barricades may be supplemented with advance warning signs. Only advance warning signs fabricated from either an approved roll-up retroreflective fabric material or an approved rigid aluminum laminate composite substrate may be mounted on or attached to a Type III barricade. Do not attach a sign fabricated from any other type of sign substrate to a Type III barricade. Refer to the *Approved Products List For Traffic Control Devices in Work Zones* for approved roll-up retroreflective fabric sign materials and approved rigid aluminum laminate composite sign substrates.

Maintain barricades in good condition. Replace and do not use barricades that have completed their functional service life.

Installations of the traffic control channelizing devices illustrated on the drawings are for normal conditions. Adjustments may be required due to horizontal and/or vertical alignments or other sight distance restrictions.

Maximize the effective and positive impact of a traffic control channelizing device by installing the device in a location and in an application suitable to the device. Always consider roadway type, roadway classification, light conditions (day vs. night), traffic speeds, traffic volumes, potential sight distance restrictions, etc., when determining which traffic control channelizing device is best suited for a traffic control setup. Unless otherwise directed by a work zone traffic control plan or a typical work zone traffic control standard drawing for maintenance operations, utilize the specified traffic control channelizing devices within lane closures and shoulder closures as directed. See *Table 4, Traffic Control Channelizing Device Applications*.

Table 4 Traffic Control Channelizing Device Applications

LANE CLOSURE				SHOULDER CLOSURE			
PRIMARY & SECONDARY		INTERSTATE		PRIMARY & SECONDARY		INTERSTATE	
DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT
28" Cones	-----	-----	-----	28" Cones	-----	-----	-----
36" Cones	-----	36" Cones	-----	36" Cones	-----	36" Cones	-----
42" Cones	42" Cones	42" Cones	42" Cones	42" Cones	-----	42" Cones	-----
Drums	Drums	Drums	Drums	Drums	Drums	Drums	Drums

WARNING LIGHTS

Supplemental Warning Lights for Traffic Control Devices -

Type A, Type B, Type C and Type D warning lights are yellow or amber, portable, lens directed and enclosed. Types A and B lights operate in a flashing mode and Types C and D lights operate in a steady burn mode.

All warning lights shall meet the requirements of the *MUTCD*. The weight of these lights shall not exceed 3.3 pounds in accordance with the requirements of *NCHRP Report 350* or the *AASHTO Manual for Assessing Safety Hardware (MASH)*.

Mount all warning lights on signs or channelizing devices in a manner that, if hit by an errant vehicle, the light will not be likely to penetrate the windshield of the errant vehicle.

The minimum mounting height of a warning light is 30 inches from the bottom of the lens of the light to the travel lane surface when placed in a roadway or to the grade elevation of the near edge of the adjacent travel lane when placed adjacent to a roadway.

When utilizing a warning light with a battery pack, ensure the battery pack is detachable and place the battery pack on the ground.

Use Types A, B, C and D warning lights as supplemental traffic control devices for signs and barricades.

Auxiliary Warning Lights for Vehicles and Equipment -

All vehicles and equipment that operate within or adjacent to a roadway within the highway right-of-way in an active continuous or intermittent mobile operation or a stationary work zone are required to be supplemented with auxiliary warning lights. Also, this requirement shall include vehicles that must operate within the roadway or on a roadway shoulder at reduced speeds. For further information regarding auxiliary warning light requirements, see the “SCDOT Warning Light Standardization” guide, latest edition.

All auxiliary warning lights supplementing vehicles and equipment within active work zones shall be yellow or amber in color.

All auxiliary warning lights shall be high intensity rotating, flashing, oscillating or strobe lights.

Mount all auxiliary warning lights on vehicles and equipment no less than 3 feet above the ground and in conspicuous locations to provide good visibility to approaching motorists.

Standard vehicle hazard warning lights are only permitted as a supplement to the auxiliary warning lights.

A “Directional Arrow” warning light device, Arrow Board Type D, is not considered an equal to an advance warning arrow panel and is **PROHIBITED** as a substitute for an advance warning arrow panel when an advance warning arrow panel is specified and required.

A “Directional Arrow” warning light device, Arrow Board Type D, should only be utilized as a supplement to SCDOT approved high intensity rotating, flashing, oscillating or strobe lights.