

**OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION
DEPARTMENT OF CONSUMER AND BUSINESS SERVICES**

PROGRAM DIRECTIVE

Program Directive A-290
Issued April 4, 2013
Revised September 15, 2021

SUBJECT: Inspection and Citation Guidance for Roadway and Highway Work Zones

**AFFECTED
STANDARDS/DIRECTIVES:**

Division 2/I, 437-002-0134(7), High Visibility Garments

Division 2/N, 437-002-2224(12), Traffic Control

Division 2/R, 437-002-0305, Traffic Control

Division 2/R, 437-002-0307(1), Personal Protective Equipment

Division 3/C, 437-003-0128, High Visibility Garments

Division 3/G, 1926.200(g)(1), Traffic Signs

Division 3/G, 437-003-0420(1),(2) and (3), Traffic Control

Division 3/P, 1926.651(d), Exposure to Vehicular Traffic

Division 7/F, 437-007-0510(3), Flagging

Oregon OSHA Field Inspection Reference Manual (FIRM)

Federal Highway Administration Millennium Edition of the Manual of
Uniform Traffic Control Devices (MUTCD), December 2000

[Federal Highway Administration Manual on Uniform Traffic Control
Devices for Streets and Highways \(MUTCD\), 2009 Edition, with Revision
Numbers 1 and 2 incorporated, dated May 2012](#)

[Oregon Temporary Traffic Control Handbook \(OTTCH\) for Operations of
3 Days or Less, December 2011](#)

American National Standards Institute (ANSI) D6.1e-1989

[U.S. Department of Labor, Occupational Safety and Health Administration, CPL 02-01-054](#), EFFECTIVE DATE: October 16, 2012
SUBJECT: Inspection and Citation Guidance for Roadway and Highway Construction Work Zones

[Oregon Department of Transportation \(ODOT\), Work Zone Fact Sheet 2015](#)

PURPOSE: To provide guidance to compliance safety and health officers (CSHOs) on how to conduct safety and health inspections of workplaces involved in construction, maintenance, or utility work activities on or near roadways and highways (hereinafter “work zones”) where public or site operation vehicular traffic exposes workers to struck-by hazards. This instruction supplements guidance on inspection procedures provided in Oregon OSHA’s Field Inspection Reference Manual (FIRM).

BACKGROUND: Working near fast-moving public traffic presents obvious hazards for CSHOs when performing work zone inspections. According to the [Oregon Department of Transportation’s Transportation Safety Division 2017 Facts and Tips](#), between 2011 – 2015, Oregon has averaged 488 work zone related crashes per year; averaging 13 serious injury and 5 fatal crashes per year. On average, a work zone crash occurs in Oregon every 18 hours, and more than one person is hurt every day in a work zone crash.

ACTION: This directive applies to all statewide construction, maintenance, or utility work zone activities subject to Oregon OSHA jurisdiction.

INSPECTION GUIDANCE: Work zone operations are normally transient and of limited duration. As a result, inspections are normally initiated by a CSHO observance that results in a referral inspection or a scheduled inspection conducted under a National or Local Emphasis Program (NEP or LEP), complaint, or internal and external referral.

(NOTE: See Appendix A for definitions of traffic control terms.)

- A. Arrival at a work zone.** Before beginning the inspection, the CSHO should take the following precautions for personal and public safety:
1. When a CSHO drives by a work zone, any hazards and potential violations should be identified only when the opportunity exists for the CSHO to look around while driving safely at a safe following distance. The CSHO should determine whether:
 - Advanced warning signs are in place.
 - Transition area tapers are at a safe distance.
 - Buffer spaces exist (an optional work zone component).
 - Cones are spaced correctly.

- The control devices indicate a clear path of travel.

For personal safety, the CSHO should pay particular attention to:

- Dangerous conditions that would require abrupt driving maneuvers.
 - The posted speed limit and the actual speed of passing traffic.
 - The presence of skid marks, as potential evidence of inadequate traffic controls.
2. CSHOs must not operate cameras or video recorders while driving. The use of such equipment by the driver should only be done when the vehicle is parked in a safe location that does not obstruct the normal flow of traffic.
 3. When two or more CSHOs are in the same vehicle, one CSHO must focus on driving while the other observes the work zone and documents potential hazardous conditions.
 4. If intending to conduct an inspection, the CSHO should initially drive-by the entire work zone to determine where to safely pull off and park. During this time, the CSHO must focus on driving safely and locating a safe place to park. When deciding where to park, CSHOs should consider the following before parking in the work zone:
 - Is there an employee parking area or a material staging or storage area?
 - Is there a general contractor trailer that is located outside the work zone in a protected area of the worksite?
 - Is there a parking area that is beyond the work zone and away from public traffic lanes and work zone traffic?
 5. If no other safe parking is available, then the CSHO may park within the work zone. When locating a parking spot within the work zone, the CSHO should take the following precautions:
 - Do not park in the advance warning area, the transition or taper area, or in an area that requires crossing lanes open to public traffic.
 - Stay clear of buffer spaces, if any. The buffer space is for the separation of traffic flow from the activity area and provides space for an errant vehicle. Work activity should not occur in this space and vehicles should not be parked there. A buffer space is optional since some work zones do not have adequate space to allow it.
 - Do not park in front of shadow vehicles or other impact attenuator vehicles (i.e., between the attenuator or shadow vehicle and approaching traffic, or in front of the front bumper of the attenuator or shadow vehicle).

- Do not park in an area that interferes with work activities or the internal traffic controls in the work zone.
 - Park the vehicle behind barriers whenever possible. If no barrier exists, park at a safe distance from the public traffic lane and work zone traffic.
 - Plan an exit strategy for leaving the work zone and for emergencies.
 - At the opening conference, the CSHO should verify with the employer whether the vehicle is parked in a safe place.
6. When performing inspections of work zones, the CSHO must wear all necessary personal protective equipment:
- High-visibility safety garment. A Class 3 high-visibility safety vest in accordance with ANSI/ISEA 107. Class 3 safety vests have sleeves.
 - Head Protection. A Type I hard hat, in accordance with ANSI Z89.1.
 - Eye Protection. Appropriate eye protection, such as safety glasses.
 - Foot Protection. Safety-toe footwear.
 - Hearing Protection. Have ready access to hearing protection while in the work zone.
 - Respiratory Protection. CSHOs should determine the presence of any airborne contaminants and, when possible, stay upwind. If a safety compliance officer (SCO) observes employee exposure to airborne contaminants, they should make a health referral. CSHOs who are approved to wear respiratory protection, must do so where appropriate.
7. While walking to a work zone activity area, the CSHO should:
- Expect the unexpected and do not assume that drivers see them.
 - Face traffic and stay as far away as safely possible from the live lane of traffic.
 - Identify areas where vehicle and mechanical equipment are in operation throughout the work zone and stay outside those areas until it is safe to enter. Watch out for “blind spots” and the swing radius of equipment. CSHOs may only approach equipment after the operator acknowledges their presence (eye contact), stops the equipment, and indicates it is safe to approach. If the CSHO cannot see the operator, the operator cannot see the CSHO.
 - Not stand or walk directly to the rear of any vehicles or mechanical equipment. Vehicles may be propelled by electric motors, and backup alarms may be inoperable or may not provide sufficient warning. (e.g., high ambient noise levels.)

- Follow internal traffic controls, including instructions from spotters, signalers, flaggers, and observers.
8. Once at the work zone activity area, CSHOs should:
- Continue being alert to public and work zone traffic, and facing traffic as much as possible.
 - Have an escape plan in case errant vehicles enter the work zone.
 - Never step outside of the work zone into the traveled way.
 - Perform interviews in a safe or protected area (e.g., in a car well off the roadway).
 - The CSHO should not approach workers performing flagger operations. Prior to interviewing a flagger, ensure that a replacement flagger is available and arrange with site personnel for a time and safe place to interview the flagger in an area away from the flagger station.

B. Inspection Activities. CSHOs should follow the inspection guidelines provided in the FIRM, and when applicable, the guidelines under any related National Emphasis Program (NEP) or Local Emphasis Program (LEP). During the opening conference, determine the nature of the work activities to properly evaluate applicable traffic control requirements.

CSHOs should consider work location, work type, work duration, and volume of road traffic when assessing the number and types of devices used in temporary traffic control zones.

When the work location is off the roadway (beyond the shoulders, but within the right-of-way), little or no temporary traffic control may be needed. Temporary traffic control generally is not needed where work is confined to an area 15 feet or more from the edge of the traveled way. However, temporary traffic control is appropriate where distracting situations exist, such as vehicles parked on the shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform the work operations (for example, mowing).

If the work type is related to an unexpected incident of an emergency nature (i.e., a road user incident, natural disaster, or special event), the MUTCD 2009 only requires the use of temporary traffic control devices on hand to be used for the initial response as long as they do not themselves create unnecessary additional hazards. Examples of incidents include a stalled vehicle blocking a lane, a road user crash blocking the traveled way, a chemical spill along a highway, floods and severe storm damage, a planned visit by a dignitary, or a major sporting event. If the incident is anticipated to last more than 3 days, applicable procedures and traffic control devices required under the Section 6 of the MUTCD 2009 should be used for construction and maintenance activities.

Work duration is also a major factor in determining the number and types of devices used in temporary traffic control zones. The duration of a temporary traffic control zone is defined relative to the length of time a work operation occupies a spot location. The five categories of work duration and their time at a location shall be:

- 1) Long-term stationary is work that occupies a location more than 3 days.
- 2) Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
- 3) Short-term stationary is daytime work that occupies a location for more than 1 hour, but less than 12 hours.
- 4) Short duration is work that occupies a location up to 1 hour.
- 5) Mobile is work that moves intermittently or continuously.

Comprehensive inspections of work zones have two main aspects:

- 1) Inspection of the activity area (or “work space”) containing the work activities that include workers, materials and equipment.

AND

- 2) Inspection of the temporary traffic controls for the work zone.

1. The activity area is the section of the highway where the work activities take place. Typical hazards normally found in the activity area may be related to:

- Noise
- Airborne hazards (silica or lead)
- Illumination
- Personal protective equipment
- Scaffolds, particularly during bridge construction
- Fall protection
- Equipment
- Excavations
- Precast/poured concrete
- Steel erection
- Overhead lines

- Machine guarding
 - Cranes
2. The primary function of temporary traffic control is to provide safe and efficient movement of vehicles through or around work zones. Employers must require employees to set up appropriate traffic controls (e.g., signs, channelizing devices, barriers, pavement markings, or work vehicles) when they work on or adjacent to a highway, street, or road in a way that creates a hazard and when traffic cannot adjust safely on its own. Depending on the work activity, the controls must conform to:
- The Federal Highway Administration Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition
 - Federal Highway Administration Millennium Edition of the Manual of Uniform Traffic Control Devices (MUTCD), December 2000 (*Division 7, Forest Activities, only*)
 - The most current edition of the Oregon Temporary Traffic Control Handbook (OTTCH) for Operations of 3 Days or Less
 - The American National Standards Institute (ANSI) D6.1e-1989 (*Division 2, Telecommunications, only*)

After CSHOs determine the type of work activity being performed, they should ask the employer which traffic control manual or handbook, and the edition, they are following.

While a temporary traffic control plan (TTC Plan) is not required for every work zone, TTC Plans provide for continuity of the movement of motor vehicles, bicycles, and pedestrian traffic; transit operations; and access to property and utilities when the normal function of the roadway is suspended. A temporary TTC Plan describes the measures to be used for safely facilitating road users through a work zone, and can range in scope from very detailed to simply referencing a diagram in the MUTCD. The degree of detail in a temporary TTC Plan depends entirely on the complexity of the situation.

When conducting an inspection following a work zone accident or when there is an independent basis for believing that a hazard exists, CSHOs should determine if the employer has a TTC Plan for the work zone and request a copy during the opening conference, in addition to other normally requested documents.

In addition to documenting the specific conditions that expose employees to struck-by vehicle hazards, CSHOs should document the following key points for the case file to support traffic control violations.

- Advanced warning sign locations (document number and type).

- Number of devices and spacing.
- Barricades.
- Flagger locations and setup.
- Truck mounted attenuators (TMA).
- The duration of work activities.
- Whether activities are fixed or mobile operations.
- Time of day and environmental conditions.

A field diagram can help recreate the work zone for the case file. Locations of fixed objects such as telephone poles, fire hydrants, etc. can greatly increase accuracy. CSHOs should ask the employer for:

- Start of taper to activity area.
- Width of offset (the amount of lateral space taken by the taper)
- Width of normal lane.
- Width of shoulder.
- Proximity of items within work zone to live traffic.

C. Departure from a Work Zone. When leaving a work zone, CSHOs should take the following precautions for personal and public safety:

1. CSHOs should ask if the contractor has an escort plan in place that covers moving vehicles in and out of the work zone.
2. If a plan exists, CSHOs should request an escort (ride) back to the CSHO's vehicle and traffic assistance when pulling out of the parking area.
3. If there is no escort plan and if local law enforcement is on site, CSHOs should request an escort from the officer back to the CSHO's vehicle and assistance when pulling out.
4. Before pulling out of the parking spot, CSHOs should assess the vehicle's acceleration ability, environmental factors, traffic flow and posted speed limit.
5. When pulling out, CSHOs should signal that they are entering traffic and should proceed in the closed lanes, if any, or the shoulders for as long as safely possible in order to accelerate to an appropriate merging speed.

**CITATION
GUIDANCE:**

It is Oregon OSHA's policy to allow employers to follow standards of the most current additions of the MUTCD, OTTCH, and ANSI D6.1e. However, citations are generally limited to when the employer failed to follow a provision required in the edition (year issued) referenced in the

rule. The variable language should include the standard, edition and the required provision that was violated to support employee exposures to struck-by vehicle hazards.

(NOTE: See Appendix B for examples of traffic control standards.)

For violations under 437-003-3224(12), 437-003-0420(1), 437-003-0420(2) 437-003-0420(3), 437-002-0316(2)(a), and 437-002-2224(12), if the scope of the operation is three days or less, then the rule allows employers to follow the most current edition of the Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less. CSHOs should cross-reference the provision used to support a citation to avoid discrepancies.

For citations involving utility work, CSHOs should determine if the work activity is construction or maintenance.

A. Oregon OSHA Traffic Control Rules for Construction Activities:

1. Traffic Signs – 1926.200(g)(1). At points of hazards, construction areas shall be posted with legible traffic control signs and protected by traffic control devices.
2. Traffic Control – 437-003-0420(1). Adequate and appropriate traffic control devices, including signs, signals, markings, and other devices must be provided and used for the protection of workers for all operations on or adjacent to a highway, street, or roadway. The traffic control devices' design and use must conform to the Manual of Uniform Traffic Control Devices (MUTCD), incorporated by reference in 1926.6.
3. Traffic Control – 437-003-0420(2). Signaling by flaggers and the use of flaggers, including warning garments worn by flaggers, must conform to the Manual of Uniform Traffic Control Devices (MUTCD), incorporated by reference in 1926.6.
4. Traffic Control – 437-003-0420(3). The design and use of barricades for the protection of employees must conform to the Manual of Uniform Traffic Control Devices (MUTCD), incorporated by reference in 1926.6.
5. Traffic Control – 437-003-3224(12). Adequate and appropriate traffic control devices must be used when vehicles are parked on or adjacent to a highway, street, or road in a way that creates a hazard and when traffic cannot adjust safely on its own. The traffic control devices' design and use must conform to the Manual of Uniform Traffic Control Devices for Streets and Highways, 2009 Edition, December 2009 (including Revision 1 dated May 2012 and Revision 2 dated May 2012) (MUTCD), incorporated by reference in 1926.6.

B. Oregon OSHA Traffic Control Rule for Maintenance Activities:

Traffic Control – 437-002-2224(12). Adequate and appropriate traffic control devices must be used when vehicles are parked on or adjacent to a highway, street, or road in a way that creates a hazard and when traffic cannot adjust safely on its own. The traffic control devices' design and use must conform to the Manual of Uniform Traffic Control Devices for Streets and Highways, 2009 Edition, December 2009 (including Revision 1 dated May 2012 and Revision 2 dated May 2012) (MUTCD), incorporated by reference in 1926.6.

C. Oregon OSHA Traffic Control Rule for Tree and Shrub Services Activities:

Traffic Control – 437-002-0305. Effective means for control of pedestrian and vehicular traffic shall be instituted on every job site on or adjacent to a highway, street or railway. Traffic controls shall conform to the American National Standards Institute (ANSI) D6.1e-1989, Manual on Uniform Traffic Control Devices for Streets and Highways.

D. Oregon OSHA Rule for Telecommunications Activities:

Employee Protection in Public Work Areas – 437-002-0316(2)(a). Before work is begun in the vicinity of vehicular or pedestrian traffic which may endanger employees, pedestrian and traffic control devices shall be provided for all operations on or adjacent to streets, alleys and walkways. The traffic control shall conform to the American National Standards Institute (ANSI) D6.1e-1989 Manual on Uniform Traffic Control Devices for Streets and Highways and the Oregon Department of Transportation's Short Term Work Zones Manual. Where further protection is needed, barriers shall be utilized. At night, warning lights shall be prominently displayed, and excavated areas shall be enclosed with protective barricades.

E. Oregon OSHA Traffic Control Rule for Forest Activities:

Flagging – 437-007-0510(3). Warning signs and flagging activities along state and county roads must comply with the requirements of the Millennium Edition of the (FHWA) Manual of Uniform Traffic Control Devices (MUTCD), December 2000.

TRAINING:

CSHOs should be adequately trained to safely inspect work zones. Training should enable the CSHO to observe and identify the four typical components of a work zone:

(NOTE: See Appendix C for a temporary traffic control diagram.)

A. Advance Warning Area. The advance warning area is the section of highway where road users are informed about the upcoming work zone or incident area. The advance warning area may vary from a single

sign or rotating/strobe lights on a vehicle to a series of signs in advance of the temporary traffic control zone activity area. Advance warning may be eliminated when the activity area is sufficiently removed from the road users' path so that it does not interfere with the normal flow. The following are examples of when the advance warning is required:

- Closed shoulder
- Work on the traveled way
- Closed lanes

B. Transition Area. The transition area is that section of highway where road users are redirected out of their normal path. When redirection of the road users' normal path is required, they must be channelized from the normal path to a new path. In mobile operations, the transition area moves with the work space. Transition areas usually involve strategic use of tapers, which because of their importance are discussed separately in detail.

C. Activity Area (including buffer spaces). The activity area is the section of the highway where the work activity takes place. It is comprised of the work space, the traffic space, and the buffer space:

1. Work space. The portion of the highway closed to road users and set aside for workers, equipment, and material, and a shadow vehicle if one is used upstream. Work spaces are usually delineated for road users by channelizing devices or, to exclude vehicles and pedestrians, by temporary barriers.
2. Traffic space. The portion of the highway in which road users are routed through the activity area.
3. Buffer space. The lateral and/or longitudinal area that separates road user flow from the work space or an unsafe area, and might provide some recovery space for an errant vehicle.

D. Termination Area. The termination area returns road users to their normal path. The termination area must extend from the downstream end of the work area to the END ROAD WORK signs, if posted. An END ROAD WORK sign, a speed limit sign, or other signs may be used to inform road users that they can resume normal operations.

History: Issued 4-4-2013 Revised 6-2-2015, 9-15-2021

APPENDIX A

Common terms used in the Federal Highway Administration Manual of Uniform Traffic Control Devices (FHWA MUTCD 2009 Edition):

Activity Area: The section of the highway where the work activity takes place. It is comprised of the work space, the traffic space, and the buffer space.

Advance Warning Area: The section of highway where road users are informed about the upcoming work zone or incident area.

Channelizing Devices: The function of channelizing devices is to warn road users of conditions created by work activities in or near the roadway and to guide road users. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and longitudinal channelizing devices.

Flagger: A person who actively controls the flow of vehicular into and/or through a temporary traffic control zone using hand-signaling devices or an Automated Flagger Assistance Device (AFAD).

Freeway: A divided highway with full control of access.

Highway: A general term for denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

Incident Area: The area of a highway where temporary traffic controls are imposed by authorized officials in response to a road user incident, natural disaster, or special event.

Pedestrian: A person afoot, in a wheelchair, on skates, or on a skateboard.

Retroreflectivity: A property of a surface that allows a large portion of the light coming from a point of source to be returned directly back to a point near its origin.

Roadway: The portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used herein shall refer to any such roadway separately, but not to all such roadways collectively.

Roadway Work Zone (includes “**Highway Work Zone**” and “**Temporary Traffic Control Zone**”): An area of a highway where road user conditions have changed because of a work zone or incident by the use of temporary traffic control devices, flaggers, police, or other authorized personnel.

Rural Highway: A type of roadway normally characterized by lower volumes, higher speeds, few turning conflicts, and less conflict with pedestrians.

Sidewalk: That portion of a street between the curb line or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved intended for use by pedestrians.

Sign: Any traffic control device that is intended to communicate specific information to road users through a word or symbol legend. Signs do not include traffic control signals, pavement markings, delineators, or channelization devices.

Temporary Traffic Control Zone: See “Roadway Work Zone,” above.

Termination Area: The section of the highway where road users are returned to their normal path.

Traffic: Pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for the purposes of travel.

Traffic Control Device: All signs, signals, markings, or other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bicycle path by authority of a public agency having jurisdiction.

Transition Area: That section of highway where road users are redirected out of their normal path.

Traveled Way: The portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.

Urban Street: A type of street normally characterized by relatively low speeds, wide ranges of traffic volumes, narrower lanes, frequent intersections and driveways, significant pedestrian traffic, and more businesses and houses.

Vehicle: Every device in, upon, or by which any person or property can be transported or drawn upon a highway, except trains and light rail transit operating in exclusive or semi-exclusive alignments. Light rail transit operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle.

Warning Sign: A sign that gives notice to road users of a situation that might not be readily apparent.

APPENDIX B

The following lists are traffic control standards CHSOs may reference when citing employee exposure to struck-by vehicle hazards in work zones; however, they do not include all the provisions of each source listed.

Note: Forest activities covered under Division 7 references the Millennium Edition of the (FHWA) Manual of Uniform Traffic Control Devices (MUTCD), December 2000, and is NOT included in this appendix. CSOs must use the Millennium Edition of the MUTCD to support citations of traffic control hazards related to forest activities.

Federal Highway Administration Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition

CHAPTER 5. TRAFFIC CONTROL DEVICES FOR LOW-VOLUME ROADS

Section 5A.01 Function:

- A low-volume road shall be defined for this Part of the Manual as follows:
 - A low-volume road shall be a facility lying outside of built-up areas of cities, towns, and communities, and it shall have a traffic volume of less than 400 annual average daily traffic (AADT).
 - A low-volume road shall not be a freeway, an expressway, an interchange ramp, a freeway service road, a road on a designated State highway system, or a residential street in a neighborhood. In terms of highway classification, it shall be a variation of a conventional road or a special purpose road as defined in Section 1A.13.
 - A low-volume road shall be classified as either paved or unpaved

Section 5A.02 Application:

The provisions contained in Part 5 shall not prohibit the installation or the full application of traffic control devices on a low-volume road where conditions justify their use.

Section 5A.03 Design:

- Traffic control devices for use on low-volume roads shall be designed in accordance with the provisions contained in Part 5, and where required, in other applicable Parts of this Manual.
- All signs shall be retroreflective or illuminated to show the same shape and similar color both day and night, unless specifically stated otherwise in other applicable Parts of this Manual. The requirements for sign illumination shall not be considered to be satisfied by street, highway, or strobe lighting.

- All markings shall be visible at night and shall be retroreflective unless ambient illumination provides adequate visibility of the markings.

Section 5A.04 Placement:

- Except as provided in Paragraph 3, the traffic control devices used on low-volume roads shall be placed and positioned in accordance with the lateral, longitudinal, and vertical placement provisions contained in Part 2 and other applicable Sections of this Manual.

CHAPTER 6. TEMPORARY TRAFFIC CONTROL ELEMENTS

(Note: whenever the acronym “TTC” is used, it refers to “temporary traffic control.”)

Section 6A.01 General:

- (02) The needs and control of all road users (motorists, bicyclists, and pedestrians within the highway, or on private roads open to public travel (see definition in Section 1A.13), including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II, Paragraph 35.130) through a TTC zone shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents.
- (10) TTC plans and devices shall be the responsibility of the authority of a public body or official having jurisdiction for guiding road users. There shall be adequate statutory authority for the implementation and enforcement of needed road user regulations, parking controls, speed zoning, and the management of traffic incidents. Such statutes shall provide sufficient flexibility in the application of TTC to meet the needs of changing conditions in the TTC zone.

Section 6B.01 Fundamental Principles of Temporary Traffic Control:

- (08) Before any new detour or temporary route is opened to traffic, all necessary signs shall be in place.
- (09) All TTC devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, TTC devices that are no longer appropriate shall be removed or covered.

Section 6C.05 Transition Area:

(02) When redirection of the road users’ normal path is required, they shall be directed from the normal path to a new path.

Section 6C.10 One-Lane, Two-Way Traffic Control:

(01) Except as provided in Paragraph 5, when traffic in both directions must use a single lane for a limited distance, movements from each end shall be coordinated.

(Paragraph 5) If the work space on a low-volume street or road is short and road users from both directions are able to see the traffic approaching from the opposite direction through and beyond the worksite, the movement of traffic through a one-lane, two-way constriction may be self-regulating.

Section 6C.13 Pilot Car Method of One-Lane, Two-Way Traffic Control:

- (03) The PILOT CAR FOLLOW ME (G20-4) sign (see Section 6F.58) shall be mounted on the rear of the pilot vehicle.
- (04) A flagger shall be stationed on the approach to the activity area to control vehicular traffic until the pilot vehicle is available.

Section 6D.03 Worker Safety Considerations:

- (04) All workers, including emergency responders, within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to work vehicles and construction equipment within the TTC zone shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2004 publication entitled “American National Standard for High-Visibility Safety Apparel and Headwear” (see Section 1A.11), or equivalent revisions, and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk exposure, except as provided in Paragraph 5. A person designated by the employer to be responsible for worker safety shall make the selection of the appropriate class of garment.

(Paragraph 5) Emergency and incident responders and law enforcement personnel within the TTC zone may wear high visibility safety apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication entitled “American National Standard for High-Visibility Public Safety Vests” (see Section 1A.11), or equivalent revisions, and labeled as ANSI 207-2006, in lieu of ANSI/ISEA 107-2004 apparel.

- (06) When uniformed law enforcement personnel are used to direct traffic, to investigate crashes, or to handle lane closures, obstructed roadways, and disasters, high-visibility safety apparel as described in this Section shall be worn by the law enforcement personnel.
- (07) Except as provided in Paragraph 8, firefighters or other emergency responders working within the right-of-way shall wear high-visibility safety apparel as described in this Section.

(Paragraph 8) Firefighters or other emergency responders working within the right-of-way and engaged in emergency operations that directly expose them to flame, fire, heat, and/or hazardous materials may wear retroreflective turn-out gear that is specified and regulated by other organizations, such as the National Fire Protection Association.

Section 6E.02 High-Visibility Clothing:

- (01) For daytime and nighttime activity, flaggers shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2004 publication entitled “American National Standard for High-Visibility Apparel and Headwear” (see Section 1A.11) and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. The apparel background (outer) material color shall be fluorescent orange-red, fluorescent yellow-green, or a combination of the two as defined in the ANSI standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 feet. The retroreflective safety apparel shall be designed to clearly identify the wearer as a person.
- (03) When uniformed law enforcement officers are used to direct traffic within a TTC zone, they shall wear high-visibility safety apparel as described in this Section.

Section 6E.03 Hand-Signaling Devices:

- (02) The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 18 inches wide with letters at least 6 inches high. The STOP (R1-1) face shall have white letters and a white border on a red background. The SLOW (W20-8) face shall have black letters and a black border on an orange background. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
- (06) If flashing lights are used on the STOP face of the paddle, their colors shall be all white or all red. If flashing lights are used on the SLOW face of the paddle, their colors shall be all white or all yellow.
- (07) If more than eight flashing lights are used, the lights shall be arranged such that they clearly convey the octagonal shape of the STOP face of the paddle and/or the diamond shape of the SLOW face of the paddle.
- (08) If flashing lights are used on the STOP/SLOW paddle, the flash rate shall be at least 50, but not more than 60, flashes per minute.
- (09) Flags, when used, shall be red or fluorescent orange/red in color, shall be a minimum of 24 inches square, and shall be securely fastened to a staff that is approximately 36 inches in length.
- (11) When used at nighttime, flags shall be retroreflectorized red.
- (13) When a flashlight is used for flagging in an emergency situation at night in a non-illuminated flagger station, the flagger shall hold the flashlight in the left hand, shall hold the paddle or flag in the right hand as shown in Figure 6E-3, and shall use the flashlight in the following manner to control approaching road users:
 - A. To inform road users to stop, the flagger shall hold the flashlight with the left arm extended and pointed down toward the ground, and then shall slowly wave the flashlight in front of the body in a slow arc from left to right such that the arc reaches no farther than 45 degrees from vertical.
 - B. To inform road users to proceed, the flagger shall point the flashlight at the vehicle’s bumper, slowly aim the flashlight toward the open lane, then hold the flashlight in that position. The flagger shall not wave the flashlight.

C. To alert or slow traffic, the flagger shall point the flashlight toward oncoming traffic and quickly wave the flashlight in a figure eight motion.

Section 6E.04 Automated Flagger Assistance Devices (AFADs)

- (04) AFADs shall only be used in situations where there is only one lane of approaching traffic in the direction to be controlled.
- (05) When used at night, the AFAD location shall be illuminated in accordance with Section 6E.08.
- (07) Because AFADs are not traffic control signals, they shall not be used as a substitute for or a replacement for a continuously operating temporary traffic control signal as described in Section 6F.84.
- (10) If used, AFADs shall be placed so that all of the signs and other items controlling traffic movement are readily visible to the driver of the initial approaching vehicle with advance warning signs alerting other approaching traffic to be prepared to stop.
- (11) If used, an AFAD shall be operated only by a flagger (see Section 6E.01) who has been trained on the operation of the AFAD. The flagger(s) operating the AFAD(s) shall not leave the AFAD(s) unattended at any time while the AFAD(s) is being used.
- (12) The use of AFADs shall conform to one of the following methods:
 - A. An AFAD at each end of the TTC zone (Method 1), or
 - B. An AFAD at one end of the TTC zone and a flagger at the opposite end (Method 2).
- (13) Except as provided in Paragraph 14, two flaggers shall be used when using either Method 1 or Method 2.

(Paragraph 14) A single flagger may simultaneously operate two AFADs (Method 1) or may operate a single AFAD on one end of the TTC zone while being the flagger at the opposite end of the TTC zone (Method 2) if both of the following conditions are present:

- A. The flagger has an unobstructed view of the AFAD(s), and*
- B. The flagger has an unobstructed view of approaching traffic in both directions.*

- (16) When the AFAD is not in use, the signs associated with the AFAD, both at the AFAD location and in advance, shall be removed or covered.

Section 6E.07 Flagger Procedures:

- (02) Flaggers shall use a STOP/SLOW paddle, a flag, or an Automated Flagger Assistance Device (AFAD) to control road users approaching a TTC zone. The use of hand movements alone without a paddle, flag, or AFAD to control road users shall be prohibited except for law enforcement personnel or emergency responders at incident scenes as described in Section 6I.01.
- (03) The following methods of signaling with paddles shall be used:

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

B. To direct stopped road users to proceed, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger shall motion with the free hand for road users to proceed.

C. To alert or slow traffic, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body.

- (05) The following methods of signaling with a flag shall be used:
 - A. To stop road users, the flagger shall face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.
 - B. To direct stopped road users to proceed, the flagger shall face road users with the flag and arm lowered from the view of the road users, and shall motion with the free hand for road users to proceed. Flags shall not be used to signal road users to proceed.
 - C. To alert or slow traffic, the flagger shall face road users 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 shall keep the free hand down.

Section 6E.05 Flagger Stations:

- (01) Flagger stations shall be located such that approaching road users will have sufficient distance to stop at an intended stopping point.
- (04) Except in emergency situations, flagger stations shall be preceded by an advance warning sign or signs. Except in emergency situations, flagger stations shall be illuminated at night.

Section 6F.01 Types of Devices:

- (06) Traffic control devices shall be defined as all signs, signals, markings, and other devices used to regulate, warn, or guide road users, placed on, over, or adjacent to a street, highway, private roads open to public travel (see definition in Section 1A.13), pedestrian facility, or bikeway by authority of a public body or official having jurisdiction.
- (07) All traffic control devices used for construction, maintenance, utility, or incident management operations on a street, highway, or private road open to public travel (see definition in Section 1A.13) shall comply with the applicable provisions of this Manual.
- (08) When standard orange flags or flashing warning lights are used in conjunction with signs, they shall not block the sign face.

Section 6F.02 General Characteristics of Signs:

- (14) All signs used at night shall be either retroreflective with a material that has a smooth, sealed outer surface or illuminated to show the same shape and similar color both day and night.
- (15) The requirement for sign illumination shall not be considered to be satisfied by street, highway, or strobe lighting.

Section 6F.03 Sign Placement:

(04) The minimum height, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement, of signs installed at the side of the road in rural areas shall be 5 feet (see Figure 6F-1).

Section 6F.07 Regulatory Sign Applications:

(01) If a TTC zone requires regulatory measures different from those existing, the existing permanent regulatory devices shall be removed or covered and superseded by the appropriate temporary regulatory signs. This change shall be made in compliance with applicable ordinances or statutes of the jurisdiction.

Section 6F.08 ROAD (STREET) CLOSED Sign (R11-2):

(4) The ROAD (STREET) CLOSED sign shall not be used where road user flow is maintained through the TTC zone with a reduced number of lanes on the existing roadway or where the actual closure is some distance beyond the sign.

Section 6F.10 Weight Limit Signs (R12-1, R12-2, R12-5)

- (01) A Weight Limit sign (see Figure 6F-3), which shows the gross weight or axle weight that is permitted on the roadway or bridge, shall be consistent with State or local regulations and shall not be installed without the approval of the authority having jurisdiction over the highway.
- (02) When weight restrictions are imposed because of the activity in a TTC zone, a marked detour shall be provided for vehicles weighing more than the posted limit.

Section 6F.16 Warning Sign Function, Design, and Application:

(02) TTC warning signs shall comply with the Standards for warning signs presented in Part 2 and in FHWA's "Standard Highway Signs and Markings" book (see Section 1A.11). Except as provided in Paragraph 3, TTC warning signs shall be diamond-shaped with a black legend and border on an orange background, except for the W10-1 sign which shall have a black legend and border on a yellow background, and except for signs that are required or recommended in Parts 2 or 7 to have fluorescent yellow-green backgrounds.

Section 6F.21 LANE(S) CLOSED Signs (W20-5, W20-5a):

(01) The Lane(s) Closed sign (see Figure 6F-4) shall be used in advance of that point where one or more through lanes of a multi-lane roadway are closed.

Section 6F.63 Channelizing Devices

- (01) Designs of various channelizing devices shall be as shown in Figure 6F-7. All channelizing devices shall be crashworthy.
- (18) Devices that are damaged or have lost a significant amount of their retroreflectivity and effectiveness shall be replaced.

Section 6F.56 Cones:

- (01) Cones (see Figure 6F-7) shall be predominantly orange and shall be made of a material that can be struck without causing damage to the impacting vehicle. For daytime and low-speed roadways, cones shall be not less than 18 inches in height. When cones are used on freeways and other high-speed highways or at night on all highways, or when more conspicuous guidance is needed, cones shall be a minimum of 28 inches in height.
- (02) For nighttime use, cones shall be retroreflectorized or equipped with lighting devices for maximum visibility. Retroreflectorization of cones that are 28 to 36 inches in height shall be provided by a 6-inch wide white band located 3 to 4 inches from the top of the cone and an additional 4-inch wide white band located approximately 2 inches below the 6-inch band.

Section 6F.81 Lighting Devices:

(05) Although vehicle hazard warning lights are permitted to be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights, they shall not be used instead of high-intensity rotating, flashing, oscillating, or strobe lights.

Section 6F.82 Floodlights:

- (03) Except in emergency situations, flagger stations shall be illuminated at night.
- (04) Floodlighting shall not produce a disabling glare condition for approaching road users, flaggers, or workers

Section 6F.86 Crash Cushions:

- (02) Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.
- (04) Stationary crash cushions shall be designed for the specific application intended.

- (05) Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Section 6G.02 Work Duration:

- (02) The five categories of work duration and their time at a location shall be:
 - A. **Long-term stationary** is work that occupies a location more than 3 days.
 - B. **Intermediate-term stationary** is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
 - C. **Short-term stationary** is daytime work that occupies a location for more than 1 hour within a single daylight period.
 - D. **Short duration** is work that occupies a location up to 1 hour. E. Mobile is work that moves intermittently or continuously.
- (04) Since long-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in long-term stationary TTC zones.
- (07) Since intermediate-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in intermediate-term stationary TTC zones.
- (22) Mobile operations shall have appropriate devices on the equipment (that is, high-intensity rotating, flashing, oscillating, or strobe lights, signs, or special lighting), or shall use a separate vehicle with appropriate warning devices.

Section 6G.03 Location of Work

- (03) When the work space is within the traveled way, except for short-duration and mobile operations, advance warning shall provide a general message that work is taking place and shall supply information about highway conditions. TTC devices shall indicate how vehicular traffic can move through the TTC zone.

Section 6G.07 Work on the Shoulder with No Encroachment:

- (02) When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct motor vehicle traffic to remain within the traveled way.
- (08) When used for shoulder work, arrow panels shall operate only in the caution mode.

Section 6G.12 Work within the Traveled Way of Multi-Lane, Non-Access Controlled Highways:

- (03) When a lane is closed on a multi-lane road for other than a mobile operation, a transition area containing a merging taper shall be used.

- (10) When only the left lane is closed on undivided roads, channelizing devices shall be placed along the center line as well as along the adjacent lane.
- (14) When a directional roadway is closed, inapplicable WRONG WAY signs and markings, and other existing traffic control devices at intersections within the temporary two-lane, two-way operations section shall be covered, removed, or obliterated.

Section 6G.12 Work Within the Traveled Way at an Intersection:

(05) When work will occur near signalized intersections where operational and capacity problems are anticipated, the highway agency having jurisdiction shall be contacted.

Section 6G.14 Two-Lane, Two-Way Traffic on One Roadway of a Normally Divided Highway:

- (02) When two-lane, two-way traffic control must be maintained on one roadway of a normally divided highway, opposing vehicular traffic shall be separated with either temporary traffic barriers (concrete safety-shape or approved alternate), channelizing devices, or a temporary raised island throughout the length of the two-way operation. The use of markings and complementary signing, by themselves, shall not be used.

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Section 4.1 Signs:

- Unless otherwise noted, all warning signs used for temporary traffic control shall have standard black legends and borders on an orange background except signs for emergency response which may be black legends and borders on fluorescent pink. A fluorescent yellow boarder may be added to truck-mounted signs to enhance their visibility.
- All warning and regulatory signs used for temporary traffic control shall be retro reflective.

Section 3.6.5 Flagger Apparel:

- (a) While on duty, flaggers shall be fully clothed. Do not wear abbreviated clothing such as swimsuits, shorts, tank tops or halter tops.
- (b) Flagger shall wear safety apparel meeting ANSI 107-2004 Class II risk exposure. Consider using Class III apparel for night work to enhance flagger visibility.

Section 3.5.1 Flagger Station Practices:

Flagger stations shall be located such that approaching road users will have sufficient sight distance to be able to stop at the intended stopping point.

Section 3.8 Night Flagging:

When flaggers and/or pilot cars are necessary during night operations, flagger stations shall be illuminated, and shall be illuminated separately from the work space.

Section 3.4.2 Flagging Principles:

DO NOT CONTROL TRAFFIC BY FLAGGING IN CONFLICT WITH NORMAL INTERSECTION TRAFFIC CONTROL.

Section 3.6 Flagging Signs & Equipment:

- The Flagger Ahead (W20-07) sign (symbol or text) shall always precede flaggers.
- (1) Flagger shall use a minimum 18" X 18" octagon-shaped retroreflective STOP/SLOW paddle. The paddle shall be made of a rigid material and the full face of the STOP and the SLOW sides shall be visible and legible at all times when the paddle is in use.

**Manual on Uniform Traffic Control Devices, 1988 Edition,
American National Standards Institute (ANSI) D6.1e – 1989**

Section 6A-5 Fundamental Principles:

- All traffic control devices used on street and highway construction, maintenance, utility or incident management operations shall conform to the applicable specifications of this Manual.
- Adequate warning, delineation, and channelization by means of proper pavement markings, signing, and use of other devices which are effective under varying conditions of light and weather should be provided to assure the motorist a positive guidance in advance of and through the work area.

Section 6B-3 Position of Sign:

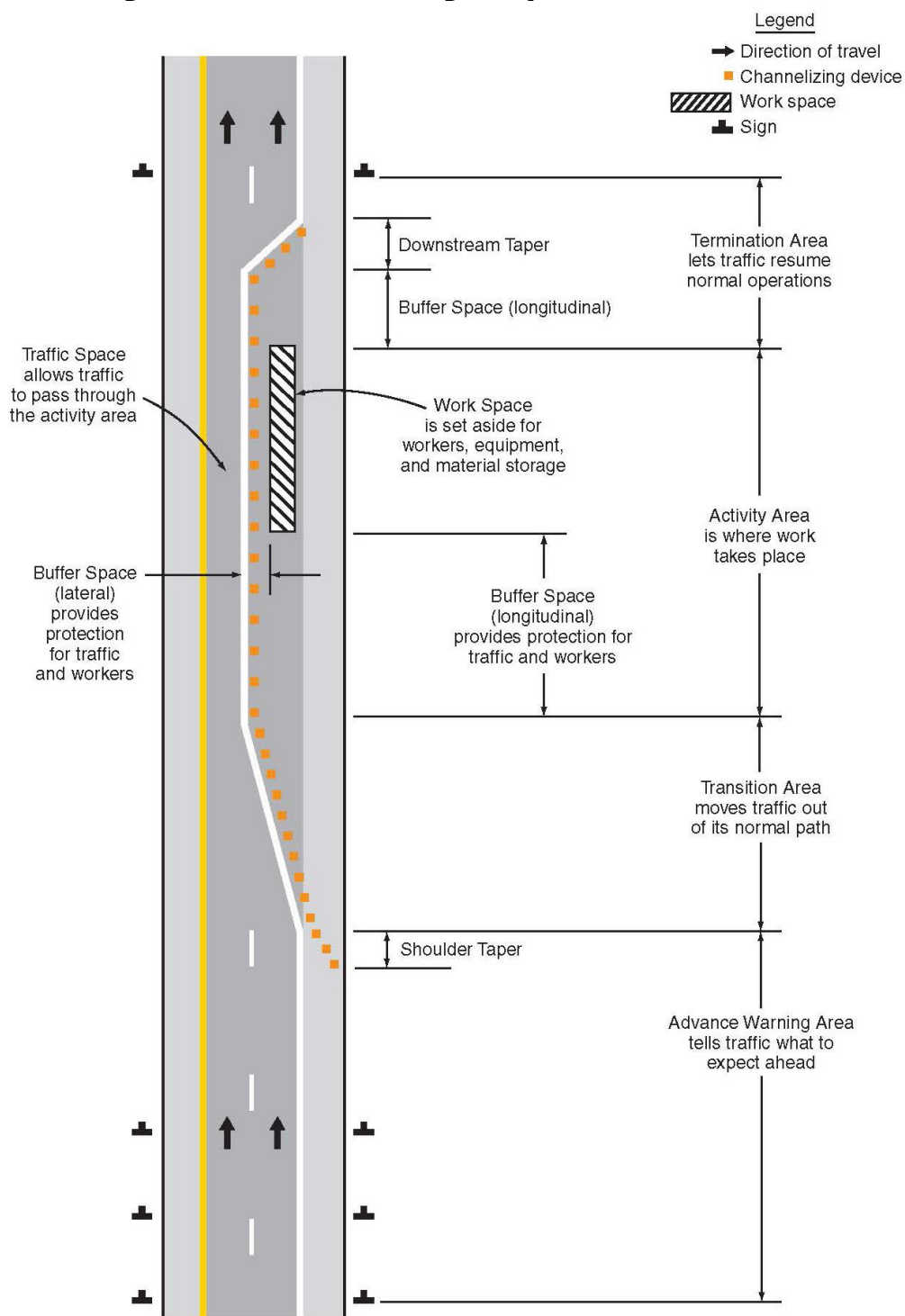
Signs shall be placed in positions where they will convey their messages most effectively and placement must therefore be accommodated to highway design and alignment. Signs shall be placed so that the driver will have adequate time for response.

Section 6F-5 Flagger Stations:

Flagger stations shall be located far enough in advance of the worksite so that approaching traffic will have sufficient distance to reduce speed before entering the project.

APPENDIX C

Component Parts of a Temporary Traffic Control Zone



Source: Federal Highway Administration Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition, page 553, Figure 6C-1.