

CHAPTER 4E. PEDESTRIAN CONTROL FEATURES

Section 4E.01 Pedestrian Signal Heads

Support:

Pedestrian signal heads provide special types of traffic signal indications exclusively intended for controlling pedestrian traffic. These signal indications consist of the illuminated symbols of a WALKING PERSON (symbolizing WALK) and an UPRAISED HAND (symbolizing DONT WALK).

Guidance:

Engineering judgment should determine the need for separate pedestrian signal heads (see Section 4D.03) and accessible pedestrian signals (see Section 4E.06).

Support:

Chapter 4F contains information regarding the use of pedestrian hybrid signals and Chapter 4N contains information regarding the use of In-Roadway Warning Lights at unsignalized marked crosswalks.

Section 4E.02 Meaning of Pedestrian Signal Head Indications

Standard:

Pedestrian signal head indications shall have the following meanings:

- A. A steady WALKING PERSON (symbolizing WALK) signal indication means that a pedestrian facing the signal indication is permitted to start to cross the roadway in the direction of the signal indication, possibly in conflict with turning vehicles. The pedestrian shall yield the right-of-way to vehicles lawfully within the intersection at the time that the WALKING PERSON (symbolizing WALK) signal indication is first shown.**
- B. A flashing UPRAISED HAND (symbolizing DONT WALK) signal indication means that a pedestrian shall not start to cross the roadway in the direction of the signal indication, but that any pedestrian who has already started to cross on a steady WALKING PERSON (symbolizing WALK) signal indication shall proceed to the far side of the traveled way of the street or highway, unless otherwise directed by signs or signals to proceed only to the median of a divided highway or only to some other island or pedestrian refuge area. If a countdown pedestrian signal indication is also shown, pedestrians shall be permitted to leave the curb if they are able to travel to the far side of the traveled way or to a median by the time a conflicting vehicular movement is allowed to proceed.**
- C. A steady UPRAISED HAND (symbolizing DONT WALK) signal indication means that a pedestrian shall not enter the roadway in the direction of the signal indication.**
- D. A flashing WALKING PERSON (symbolizing WALK) signal indication has no meaning and shall not be used.**

Section 4E.03 Application of Pedestrian Signal Heads

Standard:

Pedestrian signal heads shall be used in conjunction with vehicular traffic control signals under any of the following conditions:

- A. If a traffic control signal is justified by an engineering study and meets either Warrant 4, Pedestrian Volume or Warrant 5, School Crossing (see Chapter 4C);**
- B. If an exclusive signal phase is provided or made available for pedestrian movements in one or more directions, with all conflicting vehicular movements being stopped;**
- C. At an established school crossing at any signalized location; or**
- D. Where engineering judgment determines that multiphase signal indications (as with split-phase timing) would tend to confuse or cause conflicts with pedestrians using a crosswalk guided only by vehicular signal indications.**

Guidance:

Pedestrian signal heads should be used under any of the following conditions:

- A. If it is necessary to assist pedestrians in deciding when to begin crossing the roadway in the chosen direction or if engineering judgment determines that pedestrian signal heads are justified to minimize vehicle-pedestrian conflicts;**

- 1 B. If pedestrians are permitted to cross a portion of a street, such as to or from a median of sufficient
2 width for pedestrians to wait, during a particular interval but are not permitted to cross the remainder
3 of the street during any part of the same interval; and/or
4 C. If no vehicular signal indications are visible to pedestrians, or if the vehicular signal indications that
5 are visible to pedestrians starting a crossing provide insufficient guidance for them to decide when to
6 begin crossing the roadway in the chosen direction, such as on one-way streets, at T-intersections, or
7 at multiphase signal operations.

8 **Standard:**

9 When the pedestrian signal heads associated with a crosswalk are displaying either a steady
10 WALKING PERSON (symbolizing WALK) or a flashing UPRAISED HAND (symbolizing DONT
11 WALK) signal indication, a steady or a flashing red signal indication shall be shown to any conflicting
12 vehicular movement that is perpendicular or nearly perpendicular to the crosswalk.

13 **Section 4E.04 Size, Design, and Illumination of Pedestrian Signal Head Indications**

14 **Standard:**

15 All new pedestrian signal head indications shall be displayed within a rectangular background and
16 shall consist of symbolized messages (see Figure 4E-1), except that existing pedestrian signal head
17 indications with lettered or outline style symbol messages shall be permitted to be retained for the
18 remainder of their useful service life. The symbol designs that are set forth in the “Standard Highway
19 Signs and Markings” book (see Section 1A.11) shall be used. Each pedestrian signal head indication
20 shall be independently displayed and emit a single color.

21 If a two-section pedestrian signal head is used, the UPRAISED HAND (symbolizing DONT WALK)
22 signal section shall be mounted directly above the WALKING PERSON (symbolizing WALK) signal
23 section. If a one-section pedestrian signal head is used, the symbols shall be either overlaid upon each
24 other or arranged side-by-side with the UPRAISED HAND symbol to the left of the WALKING
25 PERSON symbol, and a light source that can display each symbol independently shall be used.

26 The WALKING PERSON (symbolizing WALK) signal indication shall be white, conforming to the
27 publication entitled “Pedestrian Traffic Control Signal Indications” (see Section 1A.11), with all except
28 the symbol obscured by an opaque material.

29 The UPRAISED HAND (symbolizing DONT WALK) signal indication shall be Portland orange,
30 conforming to the publication entitled “Pedestrian Traffic Control Signal Indications” (see Section
31 1A.11), with all except the symbol obscured by an opaque material.

32 When not illuminated, the WALKING PERSON (symbolizing WALK) and UPRAISED HAND
33 (symbolizing DONT WALK) symbols shall not be readily visible to pedestrians at the far end of the
34 crosswalk that the pedestrian signal head indications control.

35 For pedestrian signal head indications, the symbols shall be at least 150 mm (6 in) high.

36 The light source of a flashing UPRAISED HAND (symbolizing DONT WALK) signal indication
37 shall be flashed continuously at a rate of not less than 50 or more than 60 times per minute. The
38 displayed period of each flash shall be not less than half and not more than two-thirds of the total flash
39 cycle.

40 **Guidance:**

41 Pedestrian signal head indications should be conspicuous and recognizable to pedestrians at all distances
42 from the beginning of the controlled crosswalk to a point 3 m (10 ft) from the end of the controlled crosswalk
43 during both day and night.

44 For crosswalks where the pedestrian enters the crosswalk more than 30 m (100 ft) from the pedestrian
45 signal head indications, the symbols should be at least 225 mm (9 in) high.

46 If the pedestrian signal indication is so bright as to cause excessive glare in nighttime conditions, some
47 form of automatic dimming should be used to reduce the brilliance of the signal indication.

48 **Option:**

49 An animated eyes symbol may be added to a pedestrian signal head in order to prompt pedestrians to look
50 for vehicles in the intersection during the time that the WALKING PERSON (symbolizing WALK) signal
51 indication is displayed.

52 **Standard:**

1 **If used, the animated eyes symbol shall consist of an outline of a pair of white steadily-illuminated**
2 **eyes with white eyeballs that scan from side to side at a rate of approximately once per second. The**
3 **animated eyes symbol shall be at least 300 mm (12 in) wide with each eye having a width of at least 125**
4 **mm (5 in) and a height of at least 62 mm (2.5 in). The animated eyes symbol shall be illuminated at the**
5 **start of the walk interval and shall terminate at the end of the walk interval.**

6 **Section 4E.05 Location and Height of Pedestrian Signal Heads**

7 **Standard:**

8 **Pedestrian signal heads shall be mounted with the bottom of the signal housing including brackets**
9 **not less than 2.1 m (7 ft) or more than 3 m (10 ft) above sidewalk level, and shall be positioned and**
10 **adjusted to provide maximum visibility at the beginning of the controlled crosswalk.**

11 **If pedestrian signal heads are mounted on the same support as vehicular signal heads, there shall be**
12 **a physical separation between them.**

13 **Section 4E.06 Accessible Pedestrian Signals**

14 **Support:**

15 The primary technique that pedestrians who have visual disabilities use to cross streets at signalized
16 locations is to initiate their crossing when they hear the traffic in front of them stop and the traffic alongside
17 them begin to move, which often corresponds to the onset of the green interval. The existing environment is
18 often not sufficient to provide the information that pedestrians who have visual disabilities need to cross a
19 roadway at a signalized location.

20 **Guidance:**

21 If a particular signalized location presents difficulties for pedestrians who have visual disabilities to cross
22 the roadway, an engineering study should be conducted that considers the needs of pedestrians in general, as
23 well as the information needs of pedestrians with visual disabilities. The engineering study should consider
24 the following factors:

- 25 A. Potential demand for accessible pedestrian signals;
- 26 B. A request for accessible pedestrian signals;
- 27 C. Traffic volumes during times when pedestrians might be present, including periods of low traffic
28 volumes or high turn-on-red volumes;
- 29 D. The complexity of traffic signal phasing (such as split phases, protected turn phases, leading
30 pedestrian intervals, and exclusive pedestrian phases); and
- 31 E. The complexity of intersection geometry.

32 **Support:**

33 The factors that make crossing at a signalized location difficult for pedestrians who have visual
34 disabilities include: increasingly quiet cars, right turn on red (which masks the beginning of the through
35 phase), continuous right-turn movements, complex signal operations, traffic circles, and wide streets.
36 Furthermore, low traffic volumes might make it difficult for pedestrians who have visual disabilities to discern
37 signal phase changes.

38 Local organizations, providing support services to pedestrians who have visual and/or hearing disabilities,
39 can often act as important advisors to the traffic engineer when consideration is being given to the installation
40 of devices to assist such pedestrians. Additionally, orientation and mobility specialists or similar staff also
41 might be able to provide a wide range of advice. The U.S. Access Board (www.access-board.gov) provides
42 various techniques for making pedestrian signal information available to persons with visual disabilities (see
43 Page i for the address for the U.S. Access Board).

44 Accessible pedestrian signals provide information in nonvisual format (such as audible tones, speech
45 messages, and/or vibrating surfaces).

46 Information regarding detectors for accessible pedestrian signals is found in Section 4E.09.

47 **Standard:**

48 **When used, accessible pedestrian signals shall be used in combination with pedestrian signal timing.**
49 **The information provided by an accessible pedestrian signal shall clearly indicate which pedestrian**
50 **crossing is served by each device.**

51 **Under stop-and-go operation, accessible pedestrian signals shall not be limited in operation by the**
52 **time of day or day of week.**

1 Support:

2 Accessible pedestrian signals that are located as close as possible to pedestrians waiting to cross the street
3 provide the clearest and least ambiguous indication of which pedestrian crossing is served by a device.
4 Technology that provides different sounds for each nonconcurrent signal phase has frequently been found to
5 provide ambiguous information.

6 Research indicates that a rapid tick tone for each crossing on separated poles located close to each
7 crosswalk provides unambiguous information to pedestrians who are blind or visually impaired. Vibrotactile
8 indications provide information to pedestrians who are blind and deaf and are also used by pedestrians who
9 are blind or who have low vision to confirm the walk signal in noisy situations.

10 **Standard:**

11 **Accessible pedestrian signals shall have both audible and vibrotactile walk indications.**

12 **Accessible pedestrian signals shall have an audible walk indication during the walk interval only.**
13 **The audible tone(s) shall be audible from the beginning of the associated crosswalk.**

14 **Accessible pedestrian signals shall not provide an audible pedestrian change interval indication.**

15 **Audible walk indications shall be a percussive tone. Audible tone walk indications shall repeat at 8**
16 **to 10 ticks per second. Audible tones used as walk indications shall consist of multiple frequencies with**
17 **a dominant component at 880 Hz.**

18 **Vibrotactile walk indications shall be provided by a tactile arrow on the pushbutton that vibrates**
19 **during the walk interval (see Section 4E.09).**

20 Guidance:

21 The sound level of audible pedestrian indications should be adjusted to be low enough to avoid misleading
22 pedestrians who have visual disabilities when the following conditions exist:

- 23 A. Where there is an island that allows unsignalized right turns across a crosswalk between the island
24 and the sidewalk.
- 25 B. Where multileg approaches or complex signal phasing require more than two pedestrian phases, such
26 that it might be unclear which crosswalk is served by each audible tone.
- 27 C. At intersections where a diagonal pedestrian crossing is allowed, or where one street receives a
28 WALKING PERSON (symbolizing WALK) signal indication simultaneously with another street.

29 Support:

30 A pushbutton locator tone is a repeating sound that informs approaching pedestrians that a pushbutton to
31 actuate pedestrian timing or receive additional information exists, and that enables pedestrians who have
32 visual disabilities to locate the pushbutton (see Section 4E.09).

33 **Standard:**

34 **Tones shall be set to be no more than 5 dBA louder than ambient sound except when a louder signal**
35 **is provided in response to an extended button press. Automatic volume adjustment in response to**
36 **ambient traffic sound level shall be provided up to a maximum volume of 100 dBA.**

37 **The accessible walk signal shall have the same duration as the pedestrian walk signal except when**
38 **the pedestrian signal rests in walk.**

39 Guidance:

40 If the pedestrian signal rests in walk, the accessible walk signal should be limited to the first 7 seconds of
41 the walk interval. The accessible walk signal should be recalled by a button press during the walk interval
42 provided that the crossing time remaining is greater than the pedestrian change interval.

43 Option:

44 An alert tone, which is a very brief burst of high-frequency sound at the beginning of the audible walk
45 indication that rapidly decays to the frequency of the walk tone, may be used to alert pedestrians to the
46 beginning of the walk interval. An alert tone may be particularly useful if the walk tone is not easily audible
47 in some traffic conditions.

48 Support:

49 Speech messages communicate to pedestrians which street has the walk interval. Speech messages might
50 be either directly audible or transmitted, requiring a personal receiver to hear the message. To be a useful
51 system, the words and their meaning must be correctly understood by all users in the context of the street

1 environment where they are used. Because of this, tones are the preferred means of providing audible walk
2 indications.

3 If speech messages are used, pedestrians have to know the names of the streets that they are crossing in
4 order for the speech walk messages to be unambiguous. In getting directions to travel to a new location,
5 pedestrians who are blind do not always get the name of each street to be crossed. Therefore, it is desirable to
6 give users of accessible pedestrian signals the name of the street controlled by the pushbutton. This can be
7 done by means of a speech pushbutton information message during the flashing or steady don't walk intervals,
8 or by raised print and Braille labels on the pushbutton housing.

9 By combining the information from the pushbutton message or Braille label, the tactile arrow aligned in
10 the direction of travel on the relevant crosswalk, and the speech walk message, pedestrians with visual
11 disabilities are able to correctly respond to speech walk messages even if there are two pushbuttons on the
12 same pole.

13 **Standard:**

14 **If speech messages are used to communicate the pedestrian interval, they shall provide a clear**
15 **message that the walk interval is in effect, as well as to which crossing it applies. Speech walk messages**
16 **shall be used only at intersections where it is technically infeasible to install two accessible pedestrian**
17 **signals at one corner separated by a distance of at least 3 m (10 ft).**

18 **Speech messages that are used at intersections having pedestrian phasing that is concurrent with**
19 **vehicular phasing shall be patterned after the model: "Broadway. Walk sign is on to cross Broadway."**

20 **Speech messages that are used at intersections having exclusive pedestrian phasing shall be**
21 **patterned after the model: "Walk sign is on for all crossings."**

22 **Walk interval messages shall not contain any additional information, except they shall include**
23 **designations such as "Street" or "Avenue" where this information is necessary to avoid ambiguity at a**
24 **particular location.**

25 **Guidance:**

26 Speech messages should not state or imply a command to the pedestrian, such as "Cross Broadway now."
27 Speech messages should not tell pedestrians that it is "safe to cross," because it is always the pedestrian's
28 responsibility to check actual traffic conditions.

29 **Standard:**

30 **A speech message is not required at times when the walk interval is not timing, but, if provided:**

31 **A. It shall begin with the term "wait."**

32 **B. It need not be repeated for the entire time that the walk interval is not timing.**

33 **Support:**

34 Section 4E.09 contains additional information regarding speech pushbutton information messages when
35 the walk interval is not timing.

36 **Option:**

37 Accessible pedestrian signals that provide speech messages may provide similar messages in languages
38 other than English, if needed, except for the terms "walk sign" and "wait."

39 Pedestrians may be provided with additional features such as increased crossing time, audible beaconing,
40 or a pushbutton information message as a result of an extended pushbutton press.

41 **Standard:**

42 **If an extended pushbutton press is used to provide any additional feature(s), a pushbutton press of**
43 **less than one second shall actuate only the pedestrian timing and any associated accessible walk signal,**
44 **and a pushbutton press of one second or more shall actuate the pedestrian timing, any associated**
45 **accessible walk signal, and any additional feature(s).**

46 **Support:**

47 Audible beaconing is the use of an audible signal in such a way that blind pedestrians can home in on the
48 signal from the target corner as they cross the street.

49 Not all crosswalks at an intersection need audible beaconing; audible beaconing can actually cause
50 confusion if used at all crosswalks at some intersections. Audible beaconing is not appropriate at locations
51 with channelized turns or split phasing, because of the possibility of confusion.

52 **Guidance:**

1 Audible beaconing should only be considered following an engineering study at:

- 2 A. Crosswalks longer than 21 m (70 ft), unless they are divided by a median that has another accessible
- 3 pedestrian signal with a locator tone;
- 4 B. Crosswalks that are skewed;
- 5 C. Intersections with irregular geometry, such as multiple legs;
- 6 D. Crosswalks where audible beaconing is requested by an individual with visual disabilities; or
- 7 E. Other locations where a study indicates audible beaconing would be beneficial.

8 Option:

9 Audible beaconing may be provided in several ways, any of which are initiated by an extended
10 pushbutton press.

11 **Standard:**

12 **If audible beaconing is used, the volume of the locator tone during the pedestrian change interval of**
13 **the called pedestrian phase shall be increased and operated in one of the following ways:**

- 14 A. **The louder audible walk indication and louder locator tone comes from the target corner, as**
15 **pedestrians cross the street,**
- 16 B. **The louder locator tone comes from both ends of the crosswalk, or**
- 17 C. **The louder locator tone comes from an additional speaker that is aimed at the center of the**
18 **crosswalk and that is mounted on a pedestrian signal head.**

19 **Section 4E.07 Countdown Pedestrian Signals**

20 **Standard:**

21 **Except at crosswalks that are so short that the duration of the pedestrian change interval is 3**
22 **seconds or less, all new pedestrian signal heads shall include a pedestrian change interval countdown**
23 **display in order to inform pedestrians of the number of seconds remaining in the pedestrian change**
24 **interval. A pedestrian change interval countdown display shall be added to all existing pedestrian**
25 **signal heads, except those being used for crosswalks that are so short that the duration of the pedestrian**
26 **change interval is 3 seconds or less, within the 10-year compliance period specified in the Introduction**
27 **of this Manual.**

28 **Countdown pedestrian signals shall consist of Portland orange numbers that are at least 150 mm (6**
29 **in) in height on a black opaque background. The countdown pedestrian signal shall be located**
30 **immediately adjacent to the associated UPRAISED HAND (symbolizing DONT WALK) pedestrian**
31 **signal head indication.**

32 **The display of the number of remaining seconds shall begin only at the beginning of the pedestrian**
33 **change interval (flashing UPRAISED HAND). After the countdown displays zero, the display shall**
34 **remain dark until the beginning of the next countdown.**

35 **The countdown pedestrian signal shall display the number of seconds remaining until the**
36 **termination of the pedestrian change interval (flashing UPRAISED HAND). Countdown displays shall**
37 **not be used during the walk interval or during the yellow change interval of a concurrent vehicular**
38 **phase.**

39 **Guidance:**

40 **If used with a pedestrian signal head that does not have a concurrent vehicular phase, the pedestrian**
41 **change interval (flashing UPRAISED HAND) should be set to be approximately 4 seconds less than the**
42 **required pedestrian crossing time (see Section 4E.10) and an additional clearance interval (during which a**
43 **steady UPRAISED HAND is displayed) should be provided prior to the start of the conflicting vehicular**
44 **phase. In this case, the countdown pedestrian signal should display the number of remaining seconds only**
45 **during the display of the flashing UPRAISED HAND, should display zero at the time when the flashing**
46 **UPRAISED HAND changes to a steady UPRAISED HAND, and should be dark during the additional**
47 **clearance interval prior to the start of a conflicting vehicular phase.**

48 **Standard:**

49 **If a concurrent vehicular green indication continues to be displayed after the display of the flashing**
50 **UPRAISED HAND has terminated, such as when an actuated phase has a maximum green interval that**
51 **is longer than the pedestrian crossing time or when the duration of the green interval for a parallel**
52 **concurrent vehicular movement has been intentionally set higher than the pedestrian clearance time to**

1 **provide turning drivers additional green time to make their turns (see Section 4E.10), the countdown**
2 **pedestrian signal shall be dark during the additional green time.**

3 Guidance:

4 For crosswalks where the pedestrian enters the crosswalk more than 30 m (100 ft) from the countdown
5 pedestrian signal display, the numbers should be at least 225 mm (9 in) in height.

6 Because some technology includes the countdown pedestrian signal logic in a separate timing device that
7 is independent of the timing in the traffic signal controller, care should be exercised by the engineer when
8 timing changes are made to pedestrian change intervals.

9 If the pedestrian change interval is interrupted or shortened as a part of a transition into a preemption
10 sequence (see Section 4E.10), the countdown pedestrian signal display should be discontinued and go dark
11 immediately upon activation of the preemption transition.

12 **Section 4E.08 Pedestrian Detectors**

13 Option:

14 Pedestrian detectors may be pushbuttons or passive detection devices.

15 Support:

16 The provisions in this Section place pedestrian pushbuttons within easy reach of pedestrians who are
17 intending to cross each crosswalk and make it obvious which pushbutton is associated with each crosswalk.
18 These provisions also position pushbutton poles in optimal locations for installation of accessible pedestrian
19 signals. Information regarding reach ranges can be found in the “Americans with Disabilities Act
20 Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11).

21 **Standard:**

22 **If pedestrian pushbuttons are used, they shall be capable of easy activation and conveniently located**
23 **near each end of the crosswalks. Except as noted in the Guidance below, pedestrian pushbuttons shall**
24 **be located to meet all of the following criteria (see Figure 4E-2):**

- 25 **A. Unobstructed and adjacent to a level all-weather surface to provide access from a wheelchair;**
- 26 **B. Where there is an all-weather surface, a wheelchair accessible route from the pushbutton to the**
27 **ramp;**
- 28 **C. Between the edge of the crosswalk line (extended) farthest from the center of the intersection**
29 **and the side of a curb ramp (if present), but not greater than 1.5 m (5 ft) from said crosswalk**
30 **line;**
- 31 **D. Between 0.45 m (1.5 ft) and 1.8 m (6 ft) from the edge of the curb, shoulder, or pavement;**
- 32 **E. With the face of the pushbutton parallel to the crosswalk to be used; and**
- 33 **F. At a maximum mounting height of 1.2 m (4 ft) above the sidewalk.**

34 Guidance:

35 Where there are constraints that make it impractical to place the pedestrian pushbutton adjacent to a level
36 all-weather surface, the surface should be as level as feasible.

37 Where there are constraints that make it impractical to place the pedestrian pushbutton between 0.45 m
38 (1.5 ft) and 1.8 m (6 ft) from the edge of the curb, shoulder, or pavement, it should not be farther than 3 m (10
39 ft) from the edge of curb, shoulder, or pavement.

40 A mounting height of approximately 1.1 m (3.5 ft) above the sidewalk should be used for pedestrian
41 pushbuttons.

42 Except as noted in the Option below, where two pedestrian pushbuttons are provided on the same corner
43 of a signalized location, the pushbuttons should be separated by a distance of at least 3 m (10 ft) (see Figure
44 4E-2).

45 Option:

46 Where there are constraints on a particular corner that make it impractical to provide the 3 m (10 ft)
47 separation between the two pedestrian pushbuttons, the pushbuttons may be placed closer together or on the
48 same pole.

49 Support:

50 Figure 4E-3 shows typical pushbutton locations for a variety of situations.

51 **Standard:**

1 **If two accessible pedestrian pushbuttons are placed on the same pole, the accessible pedestrian**
2 **pushbuttons shall be provided with the features described in Section 4E.09 for this situation.**

3 **Signs (see Section 2B.59) shall be mounted adjacent to or integral with pedestrian pushbuttons,**
4 **explaining their purpose and use.**

5 Option:

6 At certain locations, a supplemental sign in a more visible location may be used to call attention to the
7 pedestrian pushbutton.

8 **Standard:**

9 **The positioning of pedestrian pushbuttons and the legends on the pedestrian pushbutton signs shall**
10 **clearly indicate which crosswalk signal is actuated by each pedestrian pushbutton.**

11 **If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of**
12 **sufficient width for pedestrians to wait and the signals are pedestrian actuated, an additional pedestrian**
13 **detector shall be provided in the median.**

14 Guidance:

15 The use of additional pedestrian detectors on islands or medians where a pedestrian might become
16 stranded should be considered.

17 If used, special purpose pushbuttons (to be operated only by authorized persons) should include a housing
18 capable of being locked to prevent access by the general public and do not need an instructional sign.

19 **Standard:**

20 **If used, a pilot light or other means of indication installed with a pedestrian pushbutton shall not be**
21 **illuminated until actuation. Once it is actuated, the pilot light shall remain illuminated until the**
22 **pedestrian's green or WALKING PERSON (symbolizing WALK) signal indication is displayed.**

23 **If a pilot light is used at an accessible pedestrian signal location, each actuation shall be**
24 **accompanied by the speech message "wait."**

25 Option:

26 At signalized locations with a demonstrated need and subject to equipment capabilities, pedestrians with
27 special needs may be provided with additional crossing time by means of an extended pushbutton press.

28 **Standard:**

29 **If additional crossing time is provided by means of an extended pushbutton press, a FOR MORE**
30 **CROSSING TIME: HOLD BUTTON DOWN FOR 2 SECONDS (R10-32P) plaque (see Figure 2B-29)**
31 **shall be mounted adjacent to or integral with the pedestrian pushbutton.**

32 **Section 4E.09 Accessible Pedestrian Signal Detectors**

33 **Standard:**

34 **An accessible pedestrian signal detector shall be defined as a device designated to assist the**
35 **pedestrian who has visual or physical disabilities in activating the pedestrian phase.**

36 Option:

37 Accessible pedestrian signal detectors may be pushbuttons or passive detection devices.

38 **Standard:**

39 **At accessible pedestrian signal locations where pedestrian pushbuttons are used, each pushbutton**
40 **shall activate both the walk interval and the accessible pedestrian signals.**

41 **An accessible pedestrian pushbutton shall incorporate a locator tone.**

42 **Pushbutton locator tones shall have a duration of 0.15 seconds or less and shall repeat at 1-second**
43 **intervals.**

44 **Pushbutton locator tones shall be intensity responsive to ambient sound, and be audible 1.8 to 3.7 m**
45 **(6 to 12 ft) from the pushbutton, or to the building line, whichever is less. Pushbutton locator tones**
46 **shall be no more than 5 dBA louder than ambient sound.**

47 **Pushbutton locator tones shall be deactivated when the traffic control signal is operating in a**
48 **flashing mode.**

49 **To enable pedestrians who have visual disabilities to distinguish and locate the appropriate**
50 **pushbutton at an accessible pedestrian signal location, pushbuttons shall clearly indicate by means of**

1 **tactile arrows which crosswalk signal is actuated by each pushbutton. Tactile arrows shall be located**
2 **on the pushbutton, have high visual contrast (light on dark or dark on light), and shall be aligned**
3 **parallel to the direction of travel on the associated crosswalk.**

4 Guidance:

5 Pushbuttons for accessible pedestrian signals should be located as close as possible to the crosswalk line
6 furthest from the center of the intersection and as close as possible to the curb ramp.

7 Except as noted in the Option below, where two accessible pedestrian pushbuttons are provided, the
8 pushbuttons should be separated by a distance of at least 3 m (10 ft) such that they clearly indicate which
9 crosswalk has the WALKING PERSON (symbolizing WALK) indication.

10 Option:

11 Where there are constraints on a particular corner that make it impractical to provide the 3 m (10 ft) of
12 separation between the two accessible pedestrian pushbuttons, the pushbuttons may be placed closer together
13 or on the same pole.

14 **Standard:**

15 **If two accessible pedestrian pushbuttons are placed on the same pole, each accessible pedestrian**
16 **pushbutton shall be provided with the following features:**

- 17 **A. A pushbutton locator tone,**
- 18 **B. A tactile arrow,**
- 19 **C. A speech walk message for the WALKING PERSON (symbolizing WALK) indication (see**
20 **Section 4E.06), and**
- 21 **D. A speech pushbutton information message.**

22 **If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of**
23 **sufficient width for pedestrians to wait and accessible pedestrian detectors are used, an additional**
24 **accessible pedestrian detector shall be provided in the median.**

25 Option:

26 At locations with pretimed traffic control signals or nonactuated approaches, pedestrian pushbuttons may
27 be used to activate the accessible pedestrian signals.

28 Additional features may be provided for pedestrians such as additional crossing time, audible beaconing,
29 or a speech pushbutton information message as a result of an extended pushbutton press.

30 **Standard:**

31 **If an extended pushbutton press is used to provide any additional feature(s), a pushbutton press of**
32 **less than one second shall actuate only the pedestrian timing and any associated accessible walk**
33 **interval, and a pushbutton press of one second or more shall actuate the pedestrian timing, any**
34 **associated accessible walk interval, and any additional feature(s).**

35 **If additional crossing time is provided by means of an extended pushbutton press, a FOR MORE**
36 **CROSSING TIME: HOLD BUTTON DOWN FOR 2 SECONDS (R10-32P) plaque (see Figure 2B-29)**
37 **shall be mounted adjacent to or integral with the pedestrian pushbutton.**

38 Option:

39 The name of the street to be crossed may also be provided in accessible format, such as Braille or raised
40 print.

41 Support:

42 Specifications regarding the use of Braille or raised print for traffic control devices can be found in the
43 “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see
44 Section 1A.11).

45 Option:

46 Tactile maps of crosswalks may be provided.

47 Speech pushbutton information messages may be made available by actuating the accessible pedestrian
48 signal detector when the walk interval is not timing. These messages may provide intersection identification,
49 as well as information about unusual intersection signalization and geometry, such as notification regarding
50 exclusive pedestrian phasing, leading pedestrian intervals, split phasing, diagonal crosswalks, and medians or
51 islands.

52 **Standard:**

1 **If speech pushbutton information messages are made available by actuating the accessible**
2 **pedestrian signal detector, they shall only be actuated when the walk interval is not timing. They shall**
3 **begin with the term “Wait,” followed by intersection identification information modeled after: “Wait to**
4 **cross Broadway at Grand.” If information on intersection signalization or geometry is also given, it**
5 **shall follow the intersection identification information.**

6 Guidance:

7 Speech pushbutton information messages should not be used to provide landmark information or to
8 inform pedestrians with visual impairments about detours or temporary traffic control situations.

9 Support:

10 Additional information on structure and wording of pushbutton messages is included in ITE’s “Electronic
11 Toolbox for Making Intersections More Accessible for Pedestrians Who Are Blind or Visually Impaired,”
12 which is available at ITE’s website (see Page i).

13 **Section 4E.10 Pedestrian Intervals and Signal Phases**

14 **Standard:**

15 **At intersections equipped with pedestrian signal heads, the pedestrian signal indications shall be**
16 **displayed except when the vehicular traffic control signal is being operated in the flashing mode. At**
17 **those times, the pedestrian signal indications shall not be displayed.**

18 **When pedestrian signal heads are used, a WALKING PERSON (symbolizing WALK) signal**
19 **indication shall be displayed only when pedestrians are permitted to leave the curb or shoulder.**

20 **A pedestrian clearance time shall begin immediately following the WALKING PERSON**
21 **(symbolizing WALK) signal indication. The first portion of the pedestrian clearance time shall consist**
22 **of a pedestrian change interval during which a flashing UPRAISED HAND (symbolizing DONT**
23 **WALK) signal indication shall be displayed. The second portion, if used, shall consist of the yellow**
24 **change interval during which a steady UPRAISED HAND (symbolizing DONT WALK) signal**
25 **indication shall be displayed. The third portion, if used, shall consist of the red clearance interval**
26 **(prior to a conflicting green being displayed), during which a steady UPRAISED HAND (symbolizing**
27 **DONT WALK) signal indication shall be displayed.**

28 Option:

29 The pedestrian clearance time may be:

- 30 A. Entirely contained within the vehicular green interval, such that the yellow change and red clearance
31 intervals provide pedestrians with crossing time in addition to that calculated for the pedestrian
32 clearance time;
- 33 B. Entirely contained within the vehicular green and yellow change intervals, such that the red clearance
34 interval provides pedestrians with crossing time in addition to that calculated for the pedestrian
35 clearance time; or
- 36 C. Entirely contained within the vehicular green, yellow change, and red clearance intervals.

37 Guidance:

38 Except as noted in the Option immediately below, the pedestrian clearance time should be sufficient to
39 allow a pedestrian crossing in the crosswalk who left the curb or shoulder at the end of the WALKING
40 PERSON (symbolizing WALK) signal indication to travel at a walking speed of 1.1 m (3.5 ft) per second to at
41 least the far side of the traveled way or to a median of sufficient width for pedestrians to wait.

42 Option:

43 A walking speed of up to 1.2 m (4 ft) per second may be used to evaluate the sufficiency of the pedestrian
44 clearance time at locations where equipment such as an extended pushbutton press or passive pedestrian
45 detection has been installed to provide slower pedestrians an opportunity to request and receive a longer
46 pedestrian clearance time.

47 Guidance:

48 Where pedestrians who walk slower than 1.1 m (3.5 ft) per second, or pedestrians who use wheelchairs,
49 routinely use the crosswalk, a walking speed of less than 1.1 m (3.5 ft) per second should be considered in
50 determining the pedestrian clearance time.

1 Except as noted in the Option below, the walk interval should be at least 7 seconds in length so that
2 pedestrians will have adequate opportunity to leave the curb or shoulder before the pedestrian clearance time
3 begins.

4 Option:

5 If pedestrian volumes and characteristics do not require a 7-second walk interval, walk intervals as short
6 as 4 seconds may be used.

7 Support:

8 The walk interval is usually shorter than the pedestrian clearance time calculated for the roadway width,
9 because the walk interval is intended only for pedestrians to start their crossing. The pedestrian clearance
10 time is intended to allow pedestrians who started crossing during the walk interval to complete their crossing.
11 Longer walk intervals are often used when the duration of the vehicular green phase associated with the
12 pedestrian crossing is long enough to allow it.

13 Guidance:

14 The total of the walk interval and pedestrian clearance time should be sufficient to allow a pedestrian
15 crossing in the crosswalk who left the pedestrian detector (or, if no pedestrian detector is present, a location
16 1.8 m (6 ft) from the face of the curb or from the edge of the pavement) at the beginning of the WALKING
17 PERSON (symbolizing WALK) signal indication to travel at a walking speed of 0.9 m (3 ft) per second to the
18 far side of the traveled way being crossed. Any additional time that is required to satisfy the conditions of this
19 paragraph should be added to the walk interval.

20 Option:

21 On a street with a median of sufficient width for pedestrians to wait, a pedestrian clearance time that
22 allows the pedestrian to cross only from the curb or shoulder to the median may be provided.

23 **Standard:**

24 **Where the pedestrian clearance time is sufficient only for crossing from the curb or shoulder to a**
25 **median of sufficient width for pedestrians to wait, median-mounted pedestrian signals (with pedestrian**
26 **detectors if actuated operation is used) shall be provided (see Sections 4E.08 and 4E.09) and signing**
27 **such as the R10-3d sign (see Section 2B.59) shall be provided to notify pedestrians to cross only to the**
28 **median to await the next WALKING PERSON (symbolizing WALK) signal indication.**

29 Option:

30 During the transition into preemption, the walk interval and the pedestrian change interval may be
31 shortened or omitted as described in Section 4D.27.

32 At intersections with high pedestrian volumes and high turning vehicle volumes, a brief leading pedestrian
33 interval, during which an advance WALKING PERSON (symbolizing WALK) indication is displayed for the
34 crosswalk while red indications continue to be displayed to parallel through and/or turning traffic, may be
35 used to reduce conflicts between pedestrians and turning vehicles.

36 Guidance:

37 When a leading pedestrian indication is used, it should be no less than 3 seconds in duration and should be
38 timed to allow pedestrians to cross at least one lane of traffic before turning traffic is released. During a
39 leading pedestrian interval, right turns across the crosswalk should be prohibited by the display of:

- 40 A. A steady RED ARROW indication in a separate right-turn signal face, a flashing yellow arrow signal
41 face, or a flashing red arrow signal face (see Sections 4D.21 through 4D.24);
- 42 B. Steady CIRCULAR RED indications for the approach, accompanied by the display of a NO TURN
43 ON RED (R10-11) or No Right Turn (R3-1) message on a changeable message or blank-out sign; or
- 44 C. Steady green indications for the approach, accompanied by the display of a No Right Turn (R3-1)
45 message on a changeable message or blank-out sign.

46 Option:

47 If a static NO TURN ON RED (R10-11) sign or No Right Turn (R3-1) sign is in place to prohibit such
48 movements on a full-time or part-time basis (see Section 2B.59), a changeable message or blank-out sign may
49 not be needed.

50 At intersections with pedestrian volumes that are so high that drivers have difficulty finding an
51 opportunity to turn across the crosswalk, the duration of the green interval for a parallel concurrent vehicular
52 movement may be intentionally set higher than the pedestrian clearance time to provide turning drivers
53 additional green time to make their turns while the pedestrian signal head is displaying a steady UPRAISED

1 HAND (symbolizing DONT WALK) signal indication after pedestrians have had time to complete their
2 crossings.
3

CHAPTER 4F. PEDESTRIAN HYBRID SIGNALS

Section 4F.01 Application of Pedestrian Hybrid Signals

Support:

A pedestrian hybrid signal is a special type of hybrid signal used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

Option:

A pedestrian hybrid signal may be considered for installation at a location that does not meet other traffic signal warrants to facilitate pedestrian crossings.

Standard:

If used, pedestrian hybrid signals shall be used in conjunction with signs and pavement markings to warn and control traffic at locations where pedestrians enter or cross a street or highway. A pedestrian hybrid signal shall only be installed at a marked crosswalk.

Guidance:

If a location meets the traffic control signal warrants under Sections 4C.05 and/or 4C.06 and a decision is made not to install a traffic control signal, a pedestrian hybrid signal should be considered. If one of the signal warrants of Chapter 4C is met and a traffic control signal is justified by an engineering study, and if a decision is made to install a traffic control signal, it should be installed based upon the provisions of Chapters 4D and 4E.

If a traffic control signal is not justified under the signal warrants of Chapter 4C and if gaps in traffic are not adequate to permit pedestrians to cross, or if the speed for vehicles approaching on the major street is too high to permit pedestrians to cross, or if pedestrian delay is excessive, the need for a pedestrian hybrid signal should be considered on the basis of an engineering study that considers major-street volumes, speeds, widths, and gaps in conjunction with pedestrian volumes, walking speeds, and delay.

For a major street where the posted or statutory speed limit or the 85th-percentile speed is 60 km/h or less or is 35 mph or less, the need for a pedestrian hybrid signal should be considered if the engineering study finds that the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4F-1 for the length of the crosswalk.

For a major street where the posted or statutory speed limit or the 85th-percentile speed exceeds 60 km/h or exceeds 35 mph, the need for a pedestrian hybrid signal should be considered if the engineering study finds that the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding total of all pedestrians crossing the major street for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4F-2 for the length of the crosswalk.

For crosswalks that have lengths other than the four that are specifically shown in Figures 4F-1 and 4F-2, the values should be interpolated between the curves.

Section 4F.02 Design of Pedestrian Hybrid Signals

Standard:

Except as otherwise specified in this Section, a pedestrian hybrid signal shall meet the provisions of Chapters 4D and 4E.

A pedestrian hybrid signal face shall consist of three signal sections, with a CIRCULAR YELLOW signal indication centered below two horizontally aligned CIRCULAR RED signal indications (see Figure 4F-3).

When an engineering study finds that installation of a pedestrian hybrid signal is justified, then:

- A. At least two pedestrian hybrid signal faces shall be installed for each approach of the major street,**
- B. A stop line shall be installed for each approach of the major street,**
- C. A pedestrian signal head conforming to the provisions set forth in Chapter 4E shall be installed at each end of the marked crosswalk, and**
- D. The pedestrian hybrid signal shall be pedestrian actuated.**

Guidance:

1 When an engineering study finds that installation of a pedestrian hybrid signal is justified, then:

- 2 A. Parking and other sight obstructions should be prohibited for at least 30 m (100 ft) in advance of and
- 3 at least 6.1 m (20 ft) beyond the marked crosswalk,
- 4 B. The installation should include suitable standard signs and pavement markings, and
- 5 C. If installed within a signal system, the pedestrian hybrid signal should be coordinated.

6 On approaches having posted speed limits or 85th-percentile speeds in excess of 60 km/h (35 mph) and on
7 approaches having traffic or operating conditions that would tend to obscure visibility of roadside hybrid
8 signal face locations, both of the minimum of two pedestrian hybrid signal faces should be installed over the
9 roadway.

10 On multi-lane approaches having posted speed limits or 85th-percentile speeds of 60 km/h (35 mph) or
11 less, either a pedestrian hybrid signal face should be installed on each side of the approach (if a median of
12 sufficient width exists) or at least one of the pedestrian hybrid signal faces should be installed over the
13 roadway.

14 Support:

15 Section 4D.11 contains additional provisions regarding lateral and longitudinal positioning of signal faces
16 for approaches having a posted or 85th-percentile speed exceeding 60 km/h or exceeding 40 mph.

17 **Standard:**

18 **A CROSSWALK STOP ON RED (symbolic circular red) (R10-23) sign (see Section 2B.59) shall be**
19 **mounted adjacent to a pedestrian hybrid signal face on each major street approach. If an overhead**
20 **pedestrian hybrid signal face is provided, the sign shall be mounted adjacent to the overhead signal**
21 **face.**

22 Option:

23 A Pedestrian (W11-2) sign (see Section 2C.52) with an AHEAD (W16-9P) supplemental plaque may be
24 placed in advance of a pedestrian hybrid signal. A warning beacon may be installed to supplement the W11-2
25 sign.

26 Guidance:

27 If a warning beacon supplements a W11-2 sign in advance of a pedestrian hybrid signal, it should be
28 programmed to flash only during the yellow and red signal indications of the pedestrian hybrid signal.

29 **Standard:**

30 **If a warning beacon is installed to supplement the W11-2 sign, the design and location of the beacon**
31 **shall comply with the provisions of Sections 4L.01 and 4L.03.**

32 **If a pedestrian hybrid signal is installed at or immediately adjacent to an intersection with a side**
33 **road or driveway, vehicular traffic on the side road or driveway shall be controlled by STOP signs.**

34 **Section 4F.03 Operation of Pedestrian Hybrid Signals**

35 **Standard:**

36 **Pedestrian hybrid signal indications shall be dark (not illuminated) during periods between**
37 **actuations.**

38 **Upon actuation by a pedestrian, a pedestrian hybrid signal face shall display a flashing CIRCULAR**
39 **YELLOW signal indication, followed by a steady CIRCULAR YELLOW signal indication, followed by**
40 **both steady CIRCULAR RED signal indications during the pedestrian walk interval, followed by**
41 **alternating flashing CIRCULAR RED signal indications during the pedestrian clearance interval (see**
42 **Figure 4F-3). Upon termination of the pedestrian clearance interval, the pedestrian hybrid signal faces**
43 **shall revert to a dark (not illuminated) condition.**

44 **Except as noted in the Option below, the pedestrian signal heads shall continue to display a steady**
45 **UPRAISED HAND (symbolizing DONT WALK) signal indication when the pedestrian hybrid signal**
46 **faces are either dark or displaying flashing or steady CIRCULAR YELLOW signal indications. The**
47 **pedestrian signal heads shall display a WALKING PERSON (symbolizing WALK) signal indication**
48 **when the pedestrian hybrid signal faces are displaying steady CIRCULAR RED signal indications. The**
49 **pedestrian signal heads shall display a flashing UPRAISED HAND (symbolizing DONT WALK) signal**
50 **indication when the pedestrian hybrid signal faces are displaying alternating flashing CIRCULAR RED**
51 **signal indications. Upon termination of the pedestrian clearance interval, the pedestrian signal heads**
52 **shall revert to a steady UPRAISED HAND (symbolizing DONT WALK) signal indication.**

1 Option:

2 Where the pedestrian hybrid signal is installed adjacent to a roundabout to facilitate crossings by
3 pedestrians with visual disabilities and an engineering study determines that pedestrians without visual
4 disabilities can be allowed to cross the roadway without actuating the pedestrian hybrid signal, the pedestrian
5 signal heads may be dark (not illuminated) when the pedestrian hybrid signal faces are dark.

6 Guidance:

7 The duration of the flashing yellow interval should be determined by engineering judgment.

8 The steady yellow interval should not have a duration of less than 3 seconds or more than 6 seconds (see
9 Section 4D.26). The longer intervals should be reserved for use on approaches with higher speeds.

10