Addendum to SDDCTEA Pamphlet 55-17: Better Military Traffic Engineering
Effective: 21 July 2015

Crosswalk Guidelines

Warrants for Uncontrolled Crosswalk Locations

<u>Crosswalks at Midblock Locations and on Uncontrolled Approaches to Intersections</u>

Crosswalk lines should not be used indiscriminately. An engineering study should be performed before they are installed at uncontrolled locations. Uncontrolled refers to the absence of traffic control (yield, stop or signals) on the approach to a crosswalk.

This section provides criteria for marking a pedestrian crossing at a midblock location or on an uncontrolled approach to an intersection. If warrants are met and a crosswalk is marked, additional enhancements will be required. Warrants and recommended enhancements, within this document, apply to school zones; however, refer to Part 7 of the MUTCD for specific signs to use at school crosswalks.

Standard:

For a proposed crosswalk at a midblock or on an uncontrolled approach to an intersection, the following two criteria shall be satisfied in conjunction with the proposed marked crosswalk:

- **The crosswalk shall provide adequate sight distance; to include vertical, horizontal, and intersection stopping sight distance.**
- **The crosswalk shall not cross any part of an auxiliary lane and its transition. Auxiliary lanes include left turn, right turn, acceleration and deceleration lanes. Two-way left-turn lanes are not considered auxiliary lanes.**

Guidance:

Locations being considered for a crosswalk (midblock or an uncontrolled approach to an intersection) should have a minimum level of traffic and pedestrian volumes. All of the following four criteria should be satisfied prior to installation:

- *Location of midblock crossings should be a minimum of 300 feet (200 feet with an engineering study) from any controlled intersection (all-way signal/stop/yield control or pedestrian overpass).*
- *Pedestrian crossing volumes should meet one of the following conditions:*
    - *20 pedestrians in an hour, or*
    - *15 elderly, disabled and/or children in an hour, or*
    - *60 pedestrians total for the highest consecutive pedestrian 4-hour period.*

  Pedestrian counts should only include pedestrians crossing within 100 feet either side of the proposed crosswalk location in an attempt to capture only potential users of the proposed crosswalk.

- *The two-way traffic volume should meet the minimum of 1500 vehicles for the average daily traffic (ADT) or 150 vehicles in the pedestrian count hour.*

- *The current pedestrian crossing is not due to a correctable gap in the sidewalk system.*

Support:

After determination is made that a crosswalk is warranted, Table 1 provides enhancements that should be added when a crosswalk at a midblock or an uncontrolled approach to an intersection is implemented. The enhancements contained in Table 1 are for guidance purposes and should be applied with engineering judgment. Major improvements, such as pedestrian hybrid beacons and pedestrian signals, must meet MUTCD guidelines and warrants; and be justified by an engineering study.

Guidance:

Table 1 Guidelines for Enhancements of Crosswalks at Midblock Locations and on Uncontrolled Approaches to Intersections

X = Required Treatment √ = Recommended Treatment	Vehicle Volume 1,500 ≤ ADT ≤ 12,000 OR 150 ≤ 1-Hour Volume ≤ 1,200												Vehicle Volume ADT > 12,000 OR 1-Hour Volume > 1,200											
	2-Lanes Two-way			3-Lanes Two-way (TWLTL)			≥ 4-Lanes Divided With Raised Median			≥ 4-Lanes Undivided			2-Lanes Two-way			3-Lanes Two-way (TWLTL)			≥ 4-Lanes Divided With Raised Median			≥ 4-Lanes Undivided		
Enhancement Type	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph
Pavement Marking																								
Crosswalk Marking: Section 3B.18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Added Visibility Crosswalk Marking: Section 3B.18, Para 13									√			√			√		√	√	√	√	√	√	√	√
Signing and Lighting																								
Pedestrian Crossing (W11-2) warning sign W/ Downward Diagonal Arrow (W16-7P) Plaque : Section 2C.50	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Yield Here To (Stop Here For) Pedestrians (R1-5, R1-5a, R1-5b, or R1-5c) signs with Yield (Stop) Line marking: Section 2B.11 & 3B.16 (Yield or Stop scenario is dictated by local state law)							√	√	√	√	√	√							√	√	√	√	√	√
An advance Pedestrian Crossing (W11-2) warning sign with Ahead (W16-9P) plaque: Section 2C.50			√			√			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Lighting	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Midblock Drawing #	**1**	**1**	**2**	**1**	**1**	**2**	**3**	**3**	**4**	**4**	**4**	**4**	**2**	**2**	**2**	**2**	**2**	**2**	**4**	**4**	**4**	**4**	**4**	**4**
Uncontrolled Approach to Intersection Drawing #	**5**	**5**	**6**	**5**	**5**	**6**	**7**	**7**	**8**	**8**	**8**	**8**	**6**	**6**	**6**	**6**	**6**	**6**	**8**	**8**	**8**	**8**	**8**	**8**
Major Improvements	***Traffic Engineering Study is required to determine applicability of Hybrid Beacons, Pedestrian Signals or a Pedestrian Overpass***																							
Pedestrian Actuated Signals (Section 4C.05) ***Drawing # 9, 12*** ***OR*** *Pedestrian Hybrid Beacons (Section 4F.01)* ***Drawing # 10, 11, 13, 14*** ***OR*** *Pedestrian Overpass (based on ITE Design and Safety of Pedestrian Facilities Manual)*			√			√			√			√	√	√	√	√	√	√	√	√	√	√	√	√
FHWA PUBLICATION: HRT-04-100 *	C	C	P	C	P	P	C	P	N	P	P	N	C	P	N	P	N	N	N	N	N	N	N	N

* ***The letters (C,P, or N) describe the baseline minimum enhancements for midblock crosswalks according to FHWA publication number HRT-04-100. SDDCTEA's recommendations contained in this table are based on this publication's minimum criteria.***

C = Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

If the existing speed limit is > 40 mph and pedestrian signals/hybrid beacons are not warranted, consider reducing the roadway speed limit prior to placement of crosswalk.

Unless otherwise stated, all section references are to the 2009 National MUTCD

TWLTL = Two-Way Left-Turn Lane

Speed Limit = Posted Speed Limit

ADT = Average Daily Traffic (total of both directions)

Support:

Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians without first providing adequate design features and/or traffic control devices. "*Adding crosswalks alone will not make crossings safer, nor will they increase vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., signing, raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing."* Good engineering judgment should be used in individual cases for deciding where to install crosswalks. (FHWA PUBLICATION # HRT-04-100)

For additional guidance, refer to SDDCTEA's pamphlets on traffic engineering available on our website (**http://www.sddc.army.mil/sites/tea/Pages/default.aspx)**

SIGNING AND STRIPING LAYOUTS (NON-SIGNALIZED)

GENERAL NOTES (APPLICABLE TO DRAWINGS 1-8):

1) ALL REFERENCES ARE TO THE 2009 NATIONAL MUTCD, UNLESS OTHERWISE NOTED.

2) STOP AND YIELD LINES SHALL BE IN ACCORDANCE WITH SECTION 3B.16

3) CROSSWALK MARKINGS SHALL BE IN ACCORDANCE WITH SECTION 3B.18

4) LOCAL STATE LAW WILL DICTATE WHETHER STOP OR YIELD TO PEDESTRIANS SHOULD BE USED.

5) YIELD (STOP) LINES AND YIELD HERE TO (STOP HERE FOR) PEDESTRIANS SIGNS SHOULD NOT BE USED IN ADVANCE OF CROSSWALKS THAT CROSS AN APPROACH TO OR DEPARTURE FROM A ROUNDABOUT. (SECTION 2B.11)

6) UNLESS OTHERWISE NOTED, INTERSECTION PARKING RESTRICTIONS SHALL BE IN ACCORDANCE WITH SECTION 3B.19

7) SIGNING SHOWN FOR ONE APPROACH ALSO APPLIES TO OPPOSITE APPROACH UNLESS SHOWN OTHERWISE.

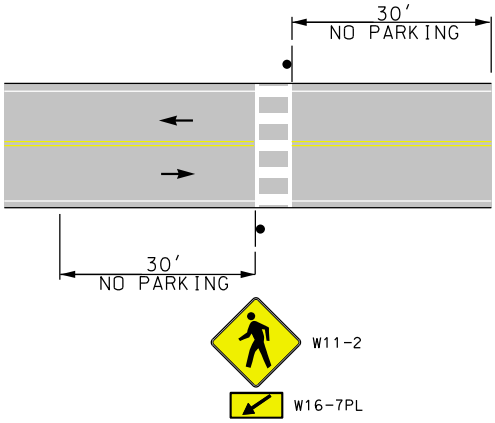
8) SIGN HEIGHT SHALL BE A MINIMUM OF 7FT MEASURED TO THE BOTTOM OF THE SIGN PANEL. SIGN OFFSET SHALL BE IN ACCORDANCE WITH SECTION 2A.16 AND 2A.19

SIGN SPACING DISTANCE
TABLE 2C-4

POSTED OR 85TH PERCENTILE SPEED	"X" DISTANCE
35 MPH OR LESS	100 FT
40 MPH	125 FT
45 MPH	175 FT
50 MPH	250 FT
55 MPH	325 FT

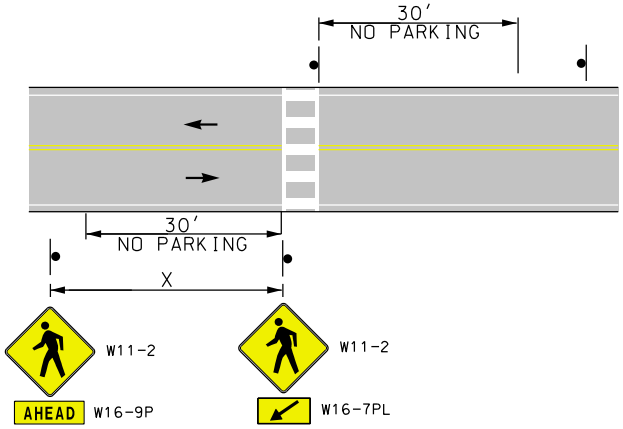
SIGNING AND STRIPING LAYOUTS (MIDBLOCK)

PEDESTRIAN CROSSING LAYOUT



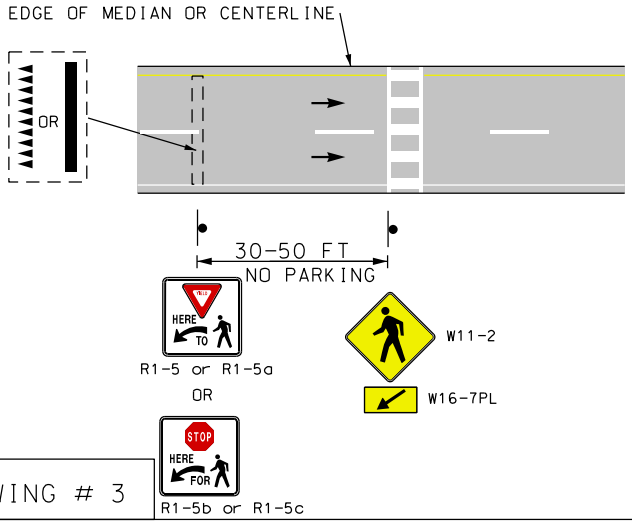
DRAWING # 1

PEDESTRIAN AHEAD CROSSING LAYOUT



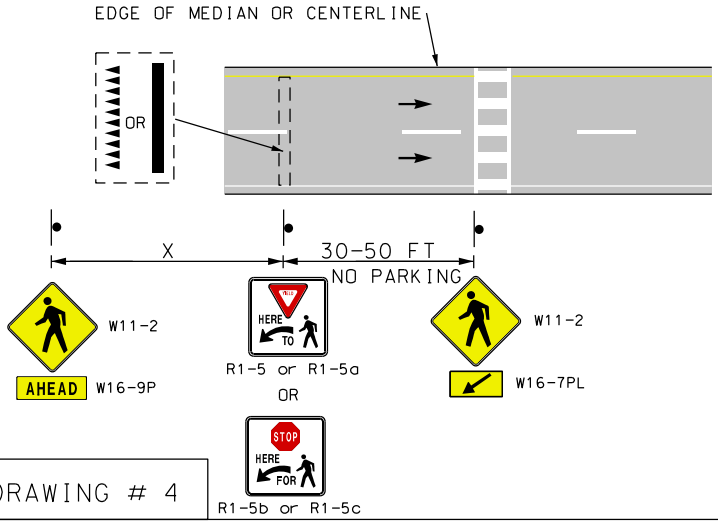
DRAWING # 2

YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT (USE FOR MULTILANE APPROACHES ONLY)



DRAWING # 3

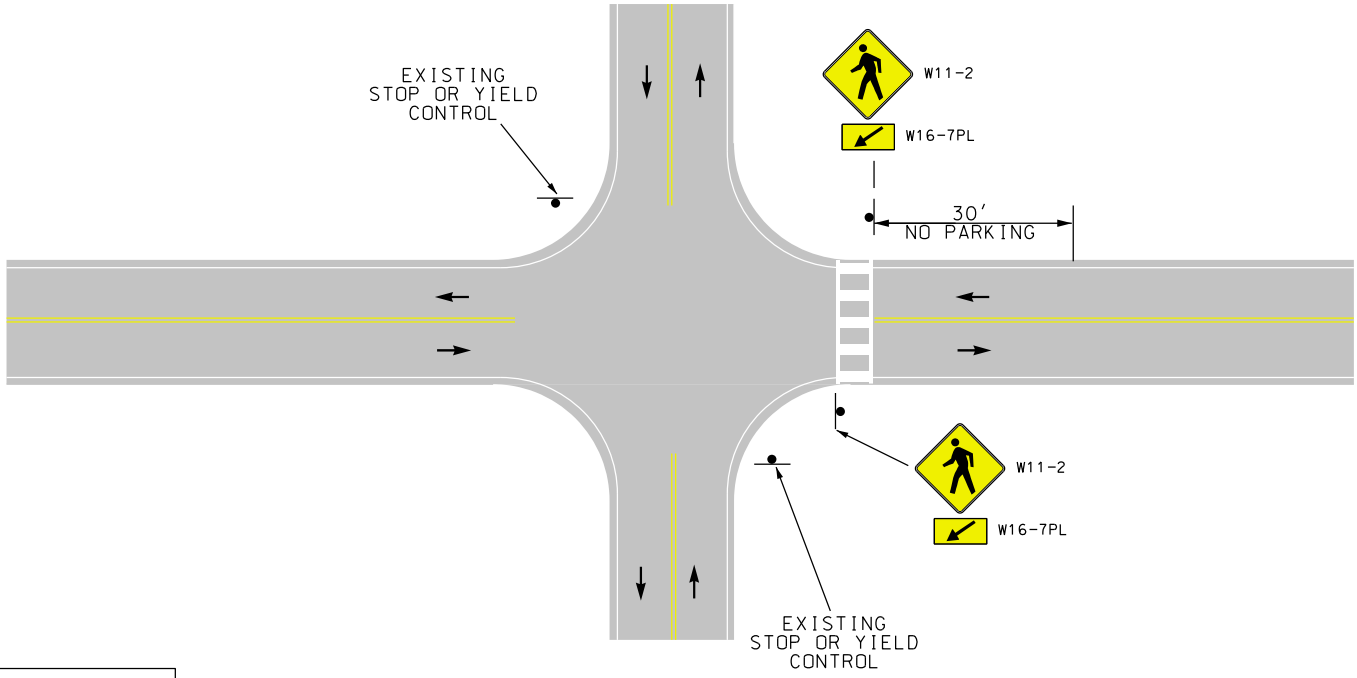
YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT WITH ADVANCE PEDESTRIAN CROSSING SIGN (USE FOR MULTILANE APPROACHES ONLY)



DRAWING # 4

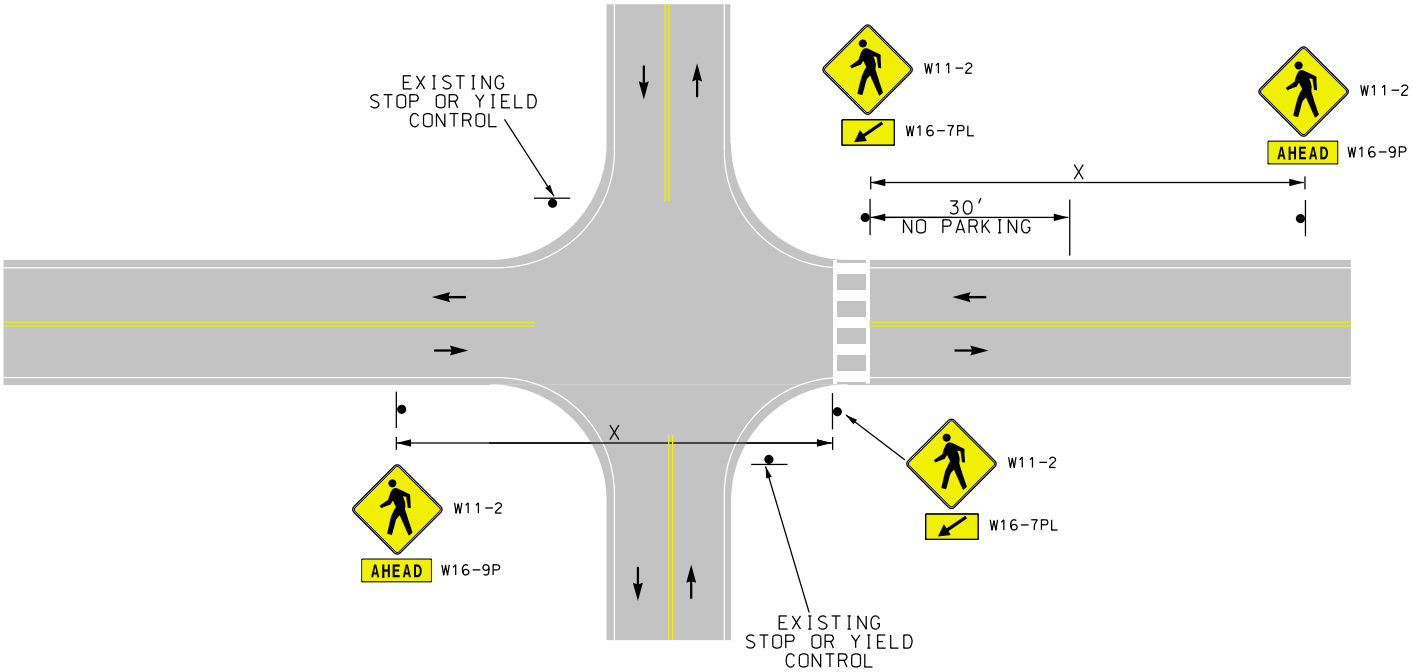
SIGNING AND STRIPING LAYOUTS
(UNCONTROLLED APPROACHES TO INTERSECTIONS)

PEDESTRIAN CROSSING LAYOUT



DRAWING # 5

PEDESTRIAN AHEAD CROSSING LAYOUT

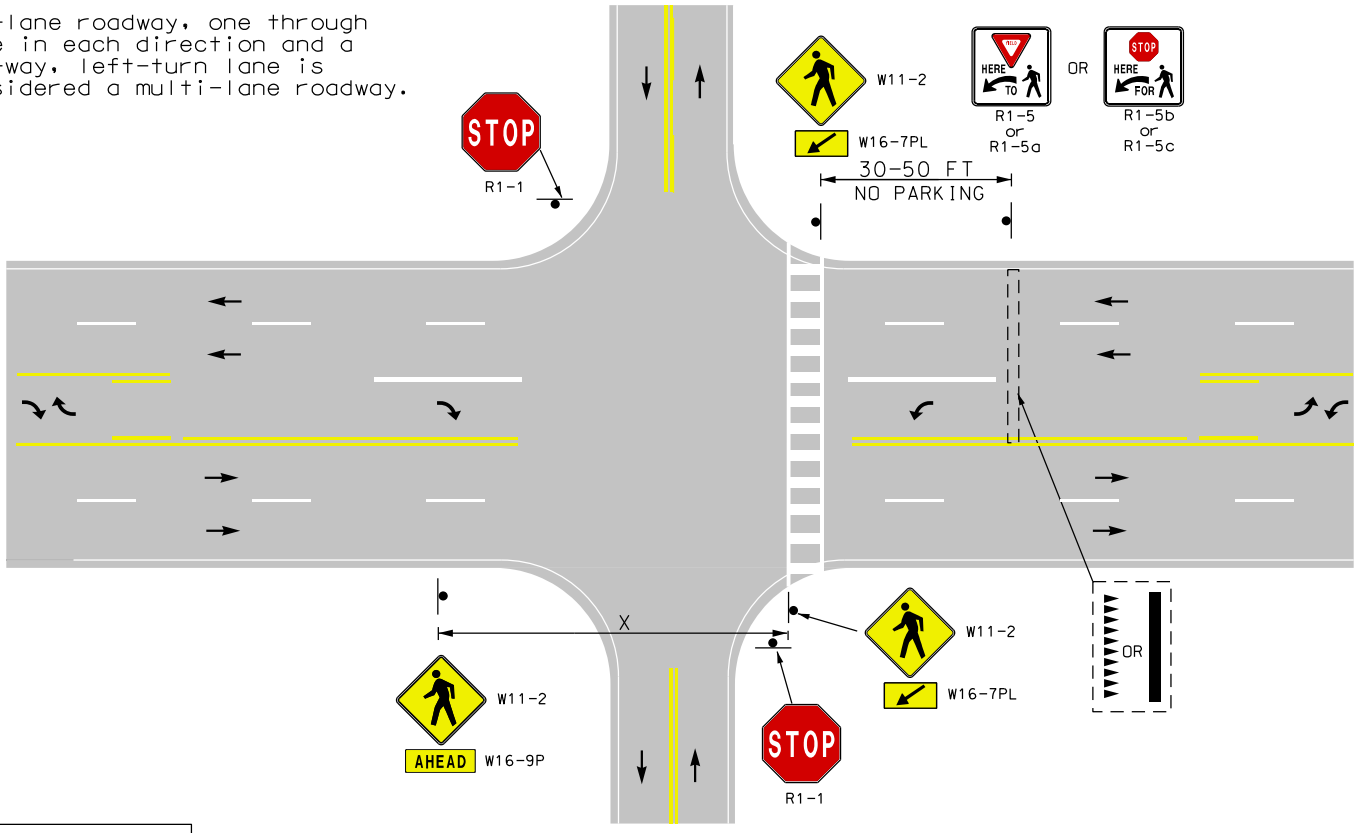


DRAWING # 6

SIGNING AND STRIPING LAYOUTS
(UNCONTROLLED APPROACHES TO INTERSECTIONS)

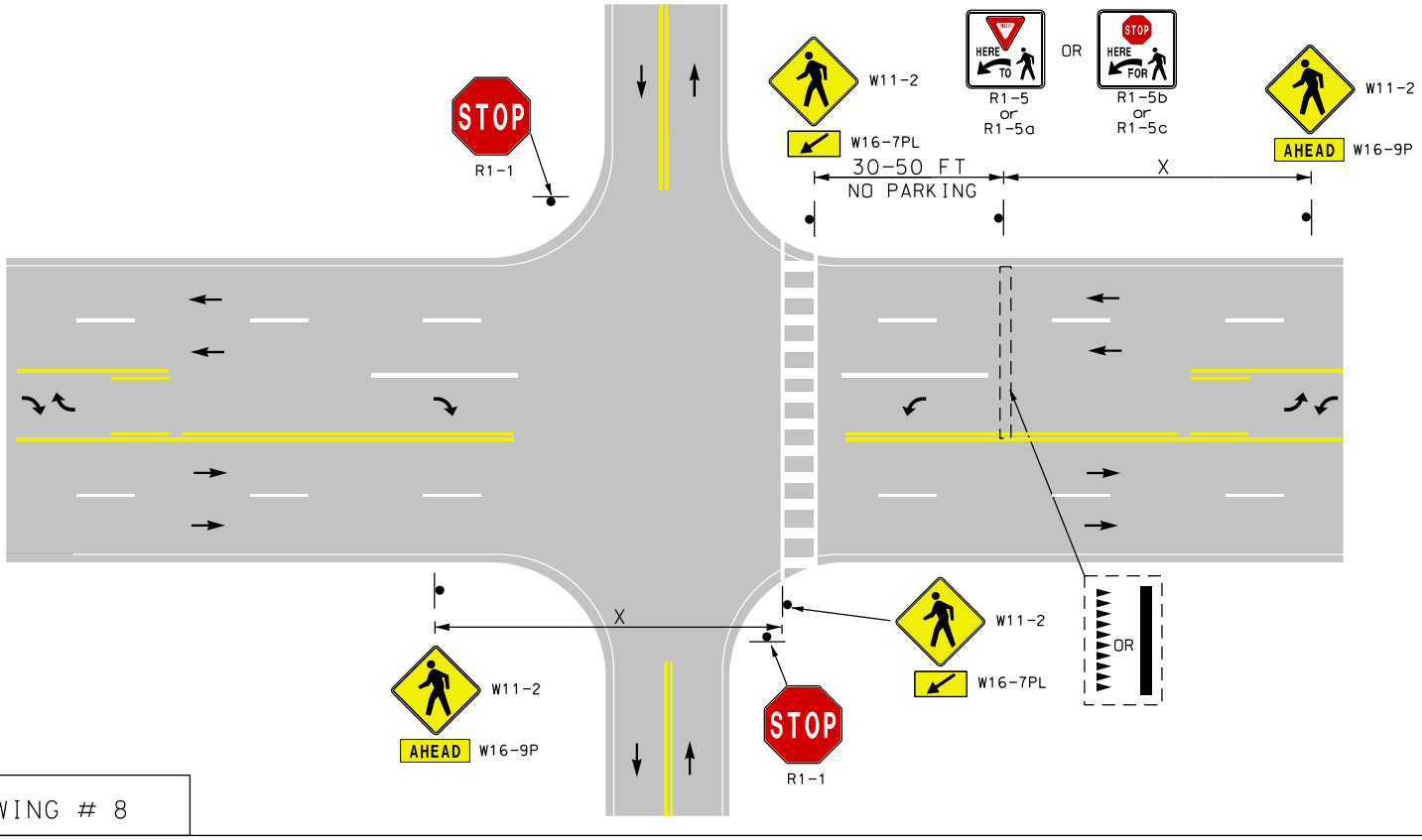
YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT
(USE FOR MULTILANE ONLY✳)

✳ A 3-lane roadway, one through lane in each direction and a two-way, left-turn lane is considered a multi-lane roadway.



DRAWING # 7

YIELD TO (STOP FOR) PEDESTRIANS CROSSING LAYOUT
WITH PEDESTRIAN AHEAD SIGN
(USE FOR MULTILANE ONLY✳)



DRAWING # 8

TRAFFIC CONTROL SIGNAL AND PEDESTRIAN HYBRID BEACON LAYOUTS (MIDBLOCK AND UNCONTROLLED APPROACHES TO INTERSECTIONS)

GENERAL NOTES (APPLICABLE TO DRAWINGS 9-14):

1) ALL REFERENCES ARE TO THE 2009 NATIONAL MUTCD, UNLESS OTHERWISE NOTED.

2) PEDESTRIAN HYBRID BEACONS SHALL BE IN ACCORDANCE WITH WITH SECTION 4F.

3) MIMIMUM WARRANTS AND GUIDELINES MUST BE MET PRIOR TO HYBRID BEACON AND TRAFFIC SIGNAL INSTALLATION - SEE SECTION 4F.01 FOR PEDESTRIAN HYBRID BEACON INSTALLATION GUIDELINES OR SECTION 4C.05 FOR THE PEDESTRIAN VOLUME SIGNAL WARRANT.

4) STOP AND YIELD LINES SHALL BE IN ACCORDANCE WITH SECTION 3B.16.

5) CROSSWALK MARKINGS SHALL BE IN ACCORDANCE WITH SECTION 3B.18.

6) CROSSWALKS SHALL NOT BE SIGNALIZED IF THEY ARE LOCATED WITHIN 300 FT FROM THE NEAREST TRAFFIC CONTROL SIGNAL, UNLESS THE PROPOSED TRAFFIC CONTROL SIGNAL WILL NOT RESTRICT THE PROGRESSIVE MOVEMENT OF TRAFFIC.(SECTION 4D.01).

7) THE "CROSSWALK - STOP ON RED (SYMBOLIC CIRCULAR RED)" (R10-23) SIGN SHALL BE USED WITH PEDESTRIAN HYBRID BEACONS. (SECTION 4F.02). IT SHALL NOT BE SUBSTITUTED WITH A PEDESTRIAN CROSSING (W11-2) WARNING SIGN.

8) THE "CROSSWALK - STOP ON RED (SYMBOLIC CIRCULAR RED)" (R10-23) SIGN SHALL ONLY BE USED WITH PEDESTRIAN HYBRID BEACONS. (SECTION 2B.53). IT SHALL NOT BE USED FOR OTHER APPLICATIONS.

9) IF A PEDESTRIAN HYBRID BEACON IS INSTALLED AT OR IMMEDIATELY ADJACENT TO AN INTERSECTION WITH A SIDE ROAD OR DRIVEWAY, VEHICULAR TRAFFIC ON THE SIDE ROAD OR DRIVEWAY SHALL BE CONTROLLED BY A STOP SIGN.

10) TRAFFIC CONTROL SIGNAL FEATURES; SUCH AS THE DESIGN/SIZE OF SIGNAL INDICATIONS, NUMBER/LOCATION OF SIGNAL FACES, AND SEQUENCING; SHALL BE IN ACCORDANCE WITH CHAPTER 4D.

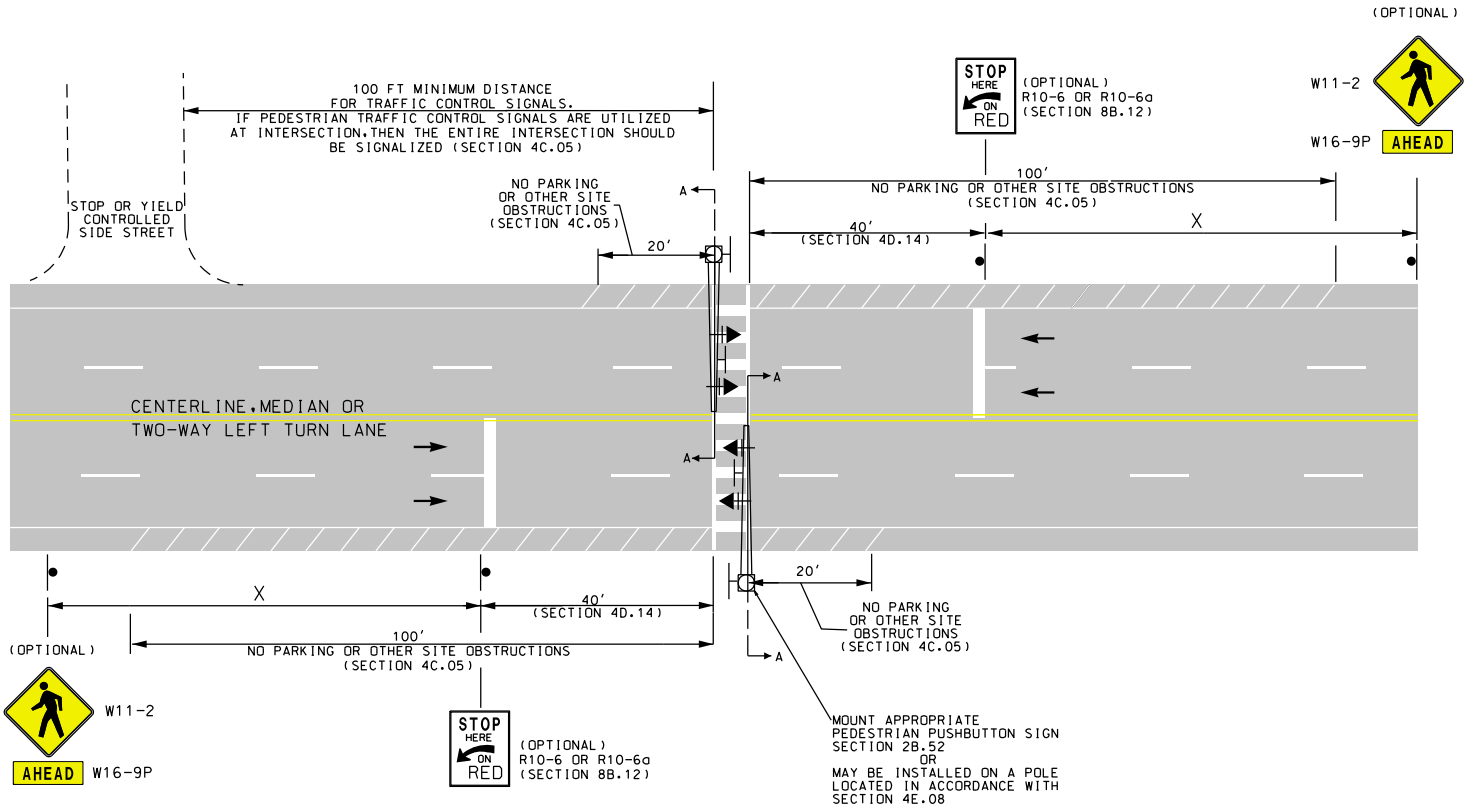
11) PEDESTRIAN SIGNAL HEADS AND DETECTORS SHALL COMPLY WITH CHAPTER 4E AND SECTION 4D.03 OR CHAPTER 4F FOR PEDESTRIAN HYBRID BEACONS.

12) UNLESS OTHERWISE NOTED, INTERSECTION PARKING RESTRICTIONS SHALL BE IN ACCORDANCE WITH SECTION 3B.19.

SIGN SPACING DISTANCE
TABLE 2C-4

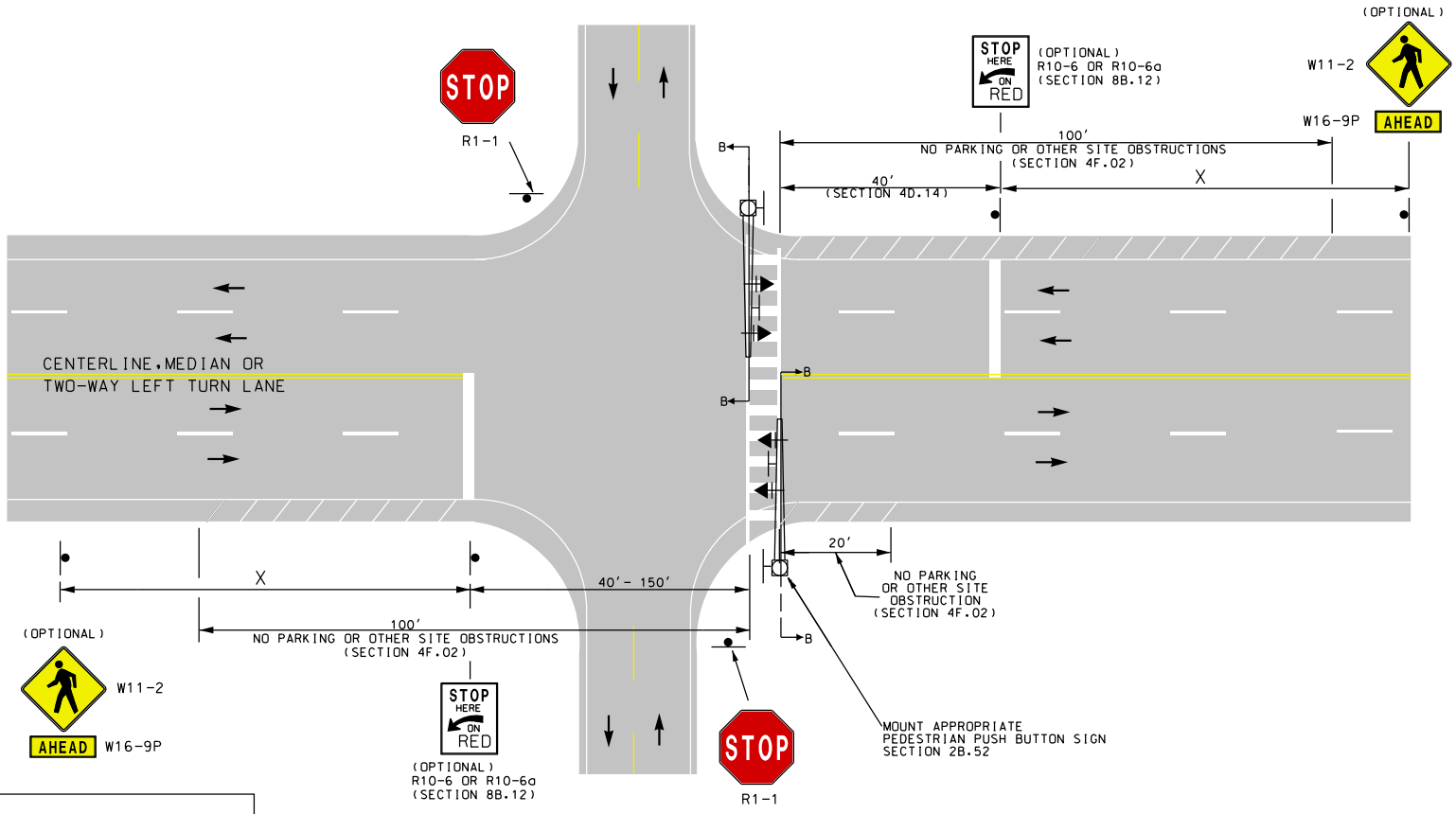
POSTED OR 85TH PERCENTILE SPEED	"X" DISTANCE
35 MPH OR LESS	100 FT
40 MPH	125 FT
45 MPH	175 FT
50 MPH	250 FT
55 MPH	325 FT

TRAFFIC CONTROL SIGNAL LAYOUT (MIDBLOCK)



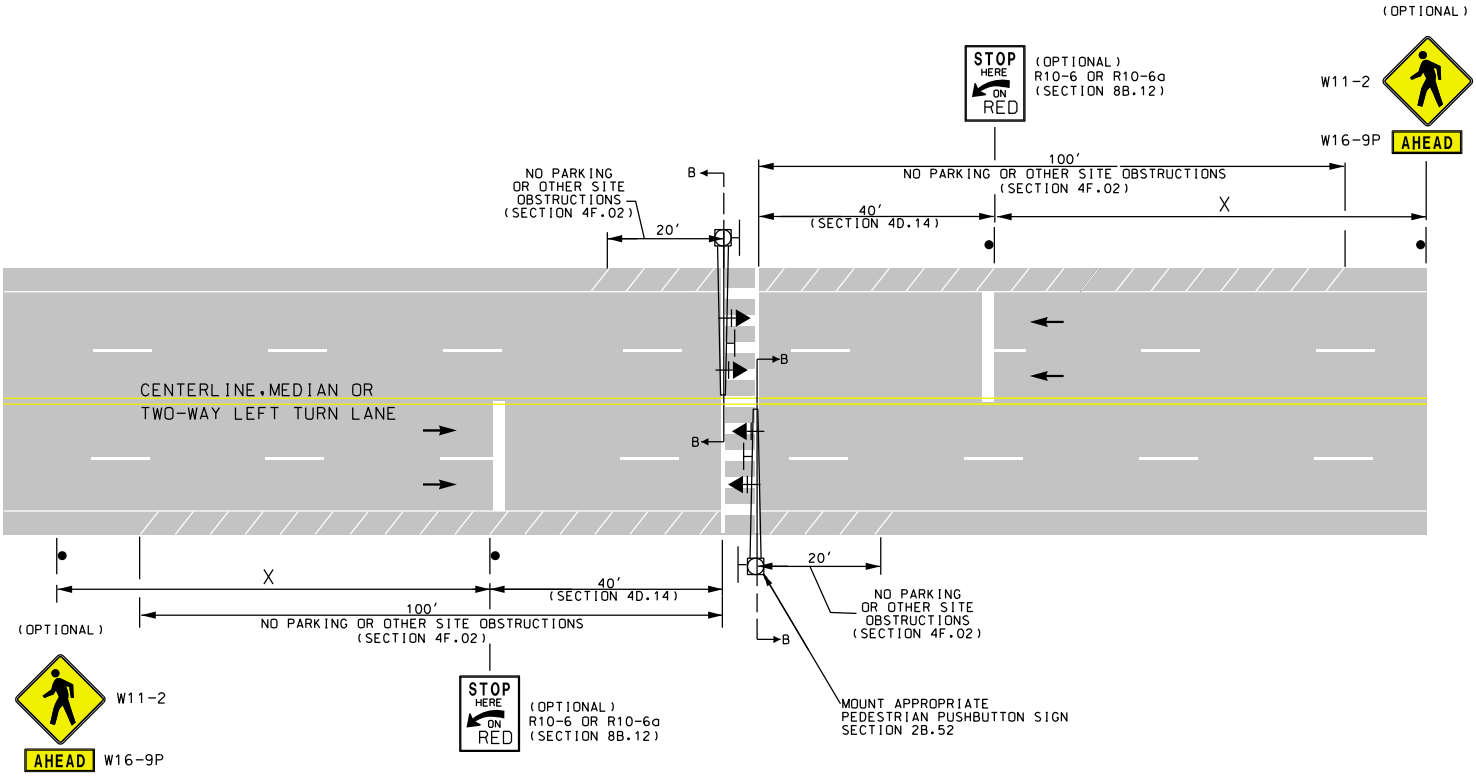
DRAWING # 9

PEDESTRIAN HYBRID BEACON LAYOUT
(UNCONTROLLED APPROACHES TO INTERSECTIONS)



DRAWING # 10

PEDESTRIAN HYBRID BEACON LAYOUT
(MIDBLOCK)

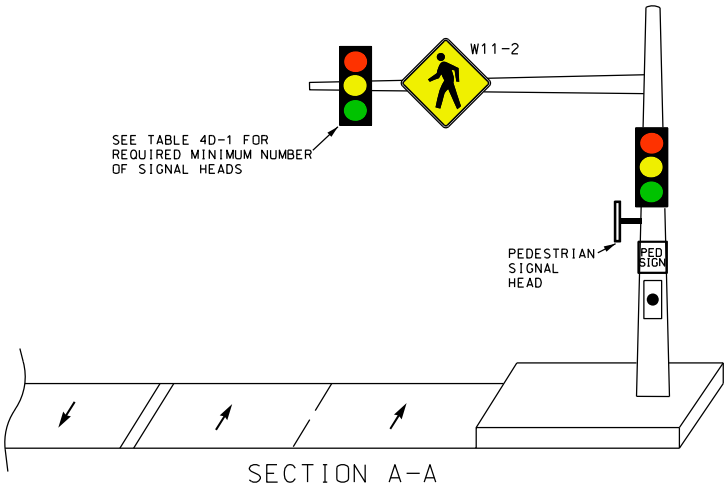


DRAWING # 11

TRAFFIC CONTROL SIGNAL AND PEDESTRIAN HYBRID BEACON LAYOUTS (CROSS SECTIONS)

TRAFFIC CONTROL SIGNAL APPLICABLE FOR ALL SPEEDS

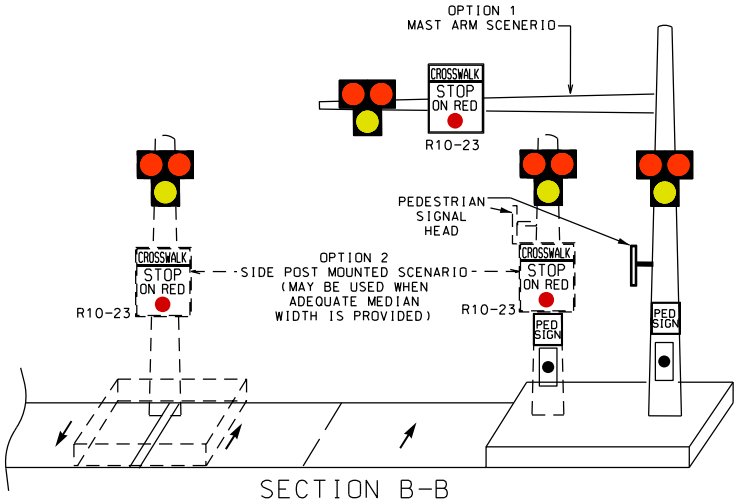
(WITH OR WITHOUT MEDIAN)



DRAWING # 12

PEDESTRIAN HYBRID BEACON SPEEDS ≤ 35MPH

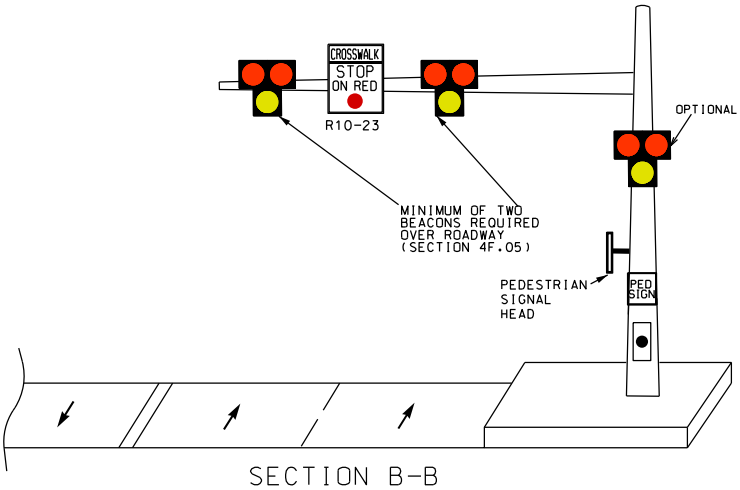
(IF APPROACH LANES EQUAL 3 OR MORE PER DIRECTION, UTILIZE OPTION 1 - MAST ARM LAYOUT)



DRAWING # 13

PEDESTRIAN HYBRID BEACON SPEEDS > 35MPH

(WITH OR WITHOUT MEDIAN)



DRAWING # 14