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[This is a new Section, no corresponding MUTCD section exists. Tables 4A-101 and 4A-102 appear on the following pages.

Other ATMS sections with related changes are:

Section 2A.01 Function and Purpose of Signs

Section 3B.18 Crosswalk Markings]

### **Section 4A.03 Traffic Control Device Alternatives for Crossings**

#### *Guidance:*

*01 Traffic control devices or strategies for improving higher use crossing locations should be selected to provide warning to motorists or to assist pedestrians with gaps for crossing. Traffic control devices or strategies should be matched to conditions at the crossing location with consideration of the following factors associated with the potential for vehicle-pedestrian conflict: pedestrian volume, traffic volume, roadway width, and traffic speed.*

*02 Table 4A-101 should be used to evaluate conditions at crossing locations to determine the grouping of traffic control devices (non-electrical, electrical warning, or electrical regulatory) which most efficiently meets the level of conflict. Pedestrian volumes used in Table 4A-101 should be frequent and routinely occurring, such as an average annual peak hourly volume which recurs on a daily or weekly basis or a seasonal peak hourly volume which recurs over three or more months. Where the operating speed of traffic has been studied and found to be significantly different from the posted speed limit (such as a posted advisory speed, an entry to a roundabout, or a segment with good sight distance and little roadside activity), the operating speed should be used in Table 4A-101, otherwise the posted speed limit should be used.*

*03 Table 4A-102 should be used to select traffic control devices or strategies within the grouping of traffic control devices identified in Table 4A-101. Performance of traffic control devices or strategies should be evaluated with engineering judgment before moving to a device grouping with higher command of motorist attention.*

#### *Option:*

*04 Crash history, walking speed, pedestrian age, and maintenance and operations needs may also be considered when selecting traffic control devices or strategies. These additional factors may be used with engineering judgment to adjust upward or downward from the initial traffic control device selection.*

**Table 4A-101. Grouping of Traffic Control Device Alternatives Based on Conditions at Uncontrolled Crossing Locations**

Recurring Hourly Pedestrian (PED) Crossing Volume	Vehicular Traffic Volume and Speed																	
			Vehicle AADT (vpd)															
			<= 4500	>4500 to 9,000			> 9,000 to 12,000			>12,000 to 15,000			>15,000					
	No. of Lanes		Raised Median or Refuge?		Speed (MPH)													
All					<=30	35	40	>=45	<=30	35	40	>=45	<=30	35	40	<=30	35	40
< 20 /hr	Any	Any	NE See also 2C.01 and 3B.18															
>=20 /hr	2,3	Yes	NE: See also 2C.01 and 3B.18	NE	NE	EW	ER	NE	NE	EW	ER	NE	NE	ER	NE	EW	ER	
	2	No		NE	NE	EW	ER	NE	NE	EW	ER	NE	NE	ER	NE	EW	ER	
	3	No		NE	NE	EW	ER	NE	EW	EW	ER	EW	EW	ER		ER	ER	
	>=4	Yes		NE	NE	EW	ER	NE	EW	ER	ER	EW	EW	ER	ER	ER	ER	
	>=4	No		NE	EW	ER	ER	EW	EW	ER	ER	ER	ER	ER	ER	ER	ER	
School Crossing	EW - See Part 7 for school routes, beacon systems, and Part 4 for Signal Warrants																	
>= 20 /hr	ER - See Part 4 for Pedestrian Hybrid Beacon Guidelines and School Crossing Warrants ( <i>Engineering Study required</i> )																	
>=75 /hr	ER - See Part 4 for Traffic Control Signal Warrants ( <i>Engineering Study required</i> )																	

**DEVICE GROUPING**

**NE:** Non-electrical devices (sight distance, signs, striping, medians, etc.)

**EW:** Electrical warning devices (beacons, lighting, sign borders, in-pavement lights, etc.)

**ER:** Electrical regulatory devices (hybrid beacons, signals)

**Abbreviations**

**vpd:** vehicles per day (typically annual average daily traffic or ADT)

**AADT:** Annual Average Daily Traffic (volume in vehicles per day)

**MPH:** Miles per hour

**PED Crossing Volume:** Frequent and recurring, e.g. average annual peak hourly volume or seasonal peak hourly volume over three months or more  
Reduce PED volume to 15 / hr for NE, EW devices, or by by 50% for ER devices if elderly and/or child pedestrians recur frequently.

Table 4A-102. Recommended Order of Selection for Traffic Control Devices or Strategies at Uncontrolled Crossing Locations

DEVICE GROUPING	Priority of factors for consideration after Table 4A-101				TRAFFIC CONTROL STRATEGIES FOR A CROSSING LOCATION	ORDER OF DEVICE SELECTION	OPTIONAL DEVICES
	1	2	3	4			
NE - Non-electrical <sup>1</sup>	< 20/hr and factors 2, 3, or 4	< 75 %ile crash history	Above Minimum PSD	≥ 1 per minute average or ≥ 1 per adjacent signal cycle	Devices not provided for sites with adequate gaps, good visibility, low pedestrian volume or low crash history	None	
					Locate or provide alternative crossing location (primarily to improve sight distance)		
					Median refuge island or divided/split highway lanes (primarily to achieve gaps) <sup>2</sup>		
					Standard retroreflective signs (primarily for warning or drawing attention)		
					High visibility warning signs, markings, delineators, or post reflectors (primarily for warning or drawing attention)		
Flag-carry Portable in-street signs <sup>3</sup>							
EW - Electrical Warning	>20/hr and factors 2, 3, or 4 OR > 75 /hr	> 95 %ile crash history, primarily crossing related	Below minimum PSD, Above minimum SSD with high visibility devices	< 1 per 2 minutes average or < 1/ adjacent signal cycle	Pedestrian street lighting electrolier(s) <sup>4</sup>	Increasing Command of Attention/Respect	
					Ped Activated Rectangular Rapid Flashing Beacons RRFB (when ≥40 MPH; >2 lanes; or roundabout exits) <sup>5</sup>		
					Overhead active alternating LED beacon w/ped detection <sup>5</sup>		
					Continuous single round LED beacons above sign <sup>6</sup>		
					Continuous single Overhead LED beacon		
					LED bollards for walkways (primarily used in transit areas)		
					Continuous LED flashing borders in-sign		
					Ped activated LED flashing borders in-sign		
					Combined side mount and Overhead ped activated beacons		
					in pavement crosswalk lights <sup>7</sup> Other electrical warning devices		
ER - Electrical Regulatory <sup>8</sup>	≥ 20/hr ≥ 75/hr	> 95 %ile crash history, primarily crossing related	Below minimum SSD	< 1 per 2 minutes average or < 1 per adjacent signal cycle	Pedestrian Hybrid Beacon (Engineering Study required)	Increasing Command of Attention/Respect	
					Signal, Midblock signal, or Half-signal (Engineering Study required)		

FOOTNOTES to Table 4A-102

- NE - nonelectrical project solutions are acceptable until an electrical project can be determined as needed
- Median refuge may be used to convert undesirable gaps into adequate two stage gaps
- Consider portable in-street signs primarily for special events and school control. These require active onsite oversight.
- Provide overhead lighting at marked crosswalks when feasible to address nighttime ped crossing issues
- Active flashing beacon systems are preferable to passive beacon systems
- Flashing beacon systems may be used to mark zones not identifiable as a single crossing, or areas without overhead lighting
- In pavement lights should only be considered in a low risk environment for damage, where there is extensive maintenance capability
- Should be 1/4 mile or more from existing signals on arterial 2 way roadways, unless coordinated with existing signals

DEVICE GROUPING

- NE: Non-electrical devices. See Section 3B.18.
- EW: Electrical warning devices - use at unsignalized, midblock locations where conflict with signals is not a concern.
- ER: Electrical regulatory devices.
- OPT: Optional devices which are low priority enhancements due to frequent maintenance and resource limitations

OTHER FACTORS/TERMS

- PED VOLUME:** Frequent and recurring, e.g. average annual peak hourly volume or seasonal peak hourly volume over three months or more  
Reduce PED volume to 15 / hr for NE, EW devices, or by 50% for ER devices if elderly and/or child pedestrians recur frequently
- SAFETY HISTORY:** Analysis of ped-vehicle crash data related to crossing attempts, including experience at locations with similar characteristics  
%ile: Percentile grouping of locations based on analysis of statewide crossing-related ped-vehicle crash data
- SIGHT DISTANCE:** Unobstructed road distance visible to a pedestrian or motorist providing time necessary to execute crossing or driving maneuvers  
PSD: Pedestrian Sight Distance (PSD) = (2.5 s + Crossing Distance/3.5 fps) x Posted Speed fps  
SSD: Motorist Stopping Sight Distance (SSD), See Tables 3-1 and 3-2, AASHTO Policy on Geometric Design of Highways and Streets
- GAPS:** Spacing of vehicular traffic, such that pedestrians have an opportunity to execute a crossing  
avg: Average measurement per hour  
LED: Light Emitting Diode or alternative light source



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Insert this Section 4F.01 into the 2012 ATMS ahead of Section 4F.02.

## **Section 4F.01 Application of Pedestrian Hybrid Beacons**

Support:

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

Option:

02 A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at a location that does not meet traffic signal warrants (see Chapter 4C), or at a location that meets traffic signal warrants under Sections 4C.05 and/or 4C.06 but a decision is made to not install a traffic control signal.

**Standard:**

03 **If used, pedestrian hybrid beacons 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 beacon shall only be installed at a marked crosswalk.**

*Guidance:*

04 *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.*

05 *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 beacon 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.*

05A *Installation of pedestrian hybrid beacons should be limited to uncontrolled locations evaluated according to Figure 3B-101 as “M - marginal” or “N – should not be installed”. Locations evaluated according to Figure 3B-101 as “C – candidate” for marked crosswalks at uncontrolled locations typically should not be considered for pedestrian hybrid beacons.*

06 *For a major street where the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed is 35 mph or less, the need for a pedestrian hybrid beacon 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.*

07 *For a major street where the posted or statutory speed limit or the 85<sup>th</sup>-percentile speed exceeds 35 mph, the need for a pedestrian hybrid beacon 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.*

07A *Meeting or exceeding minimum pedestrian volume guidelines indicated in Figure 4F-1 or Figure 4F-2 at a proposed location should not be the sole criterion used for installing a pedestrian hybrid beacon.*

08 *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.*

**Support:**

08A **Pedestrian hybrid beacons are best used on higher volume multiple lane approaches and roads where other methods have not provided adequate improvement in pedestrian crossing opportunities or safety. Lower cost treatments can be employed at most locations with low to moderate volumes and/or shorter crossing distances to alert motorists of the presence of pedestrians, slow traffic, shorten the crossing distance, or create adequate gaps for crossing.**

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Substitute the section below for the same section in the 2012 ATMS.

## **Section 4F.02 Design of Pedestrian Hybrid Beacons**

### **Standard:**

- 01 **Except as otherwise provided in this Section, a pedestrian hybrid beacon shall meet the provisions of Chapters 4D and 4E.**
- 02 **A pedestrian hybrid beacon 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).**
- 03 **When an engineering study finds that installation of a pedestrian hybrid beacon is justified, then:**
  - A. At least two pedestrian hybrid beacon faces shall be installed for each approach of the major street,**
  - B. A stop line shall be installed for each approach to the crosswalk,**
  - 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 beacon shall be pedestrian actuated.**
  - E. If a pedestrian hybrid beacon is installed at or immediately adjacent to an intersection with a side road or driveway, vehicular traffic on that side road or driveway shall be controlled by STOP signs.**

### *Guidance:*

- 04 *When an engineering study finds that installation of a pedestrian hybrid beacon is justified, then:*
  - ~~*A. The pedestrian hybrid beacon should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs,*~~
  - B. Parking and other sight obstructions should be evaluated and prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk, or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance if necessary,*
  - C. The installation should include suitable standard signs and pavement markings, and*
  - D. If installed within a signal system, the pedestrian hybrid beacon should be coordinated.*
- 05 *On approaches having posted or statutory speed limits or 85<sup>th</sup>-percentile speeds in excess of 35 mph and on approaches having traffic or operating conditions that would tend to obscure visibility of roadside hybrid beacon face locations, both of the minimum of two pedestrian hybrid beacon faces should be installed over the roadway.*
- 06 *On multi-lane approaches having a posted or statutory speed limits or 85<sup>th</sup>-percentile speeds of 35 mph or less, either a pedestrian hybrid beacon face should be installed on each side of the approach (if a median of sufficient width exists) or at least one of the pedestrian hybrid beacon faces should be installed over the roadway.*
- 07 *A pedestrian hybrid beacon should comply with the signal face location provisions described in Sections 4D.11 through 4D.16.*

**Standard:**

08 **A CROSSWALK STOP ON RED (symbolic circular red) (R10-23) sign (see Section 2B.53) shall be mounted adjacent to a pedestrian hybrid beacon face on each major street approach. If an overhead pedestrian hybrid beacon face is provided, the sign shall be mounted adjacent to the overhead signal face.**

**Option:**

09 A Pedestrian (W11-2) warning sign (see Section 2C.50) with an AHEAD (W16-9P) supplemental plaque may be placed in advance of a pedestrian hybrid beacon. A warning beacon may be installed to supplement the W11-2 sign.

*Guidance:*

10 *If a warning beacon supplements a W11-2 sign in advance of a pedestrian hybrid beacon, it should be programmed to flash only when the pedestrian hybrid beacon is not in the dark mode.*

**Standard:**

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

*Guidance:*

11A *If installed at a midblock location, a pedestrian hybrid beacon should not be installed less than 300 feet from the nearest location that provides a controlled crossing of the major street or an intersection where pedestrians are permitted to cross the major street.*



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## **Section 4L.100 Rectangular Rapid Flashing Beacons**

[This is a new section. There is no corresponding section in the MUTCD.]

Support:

01 A Rectangular Rapid Flashing Beacon is a pedestrian actuated warning beacon with two sections that operate in a flashing mode. It provides emphasis to motorists for existing marked and signed uncontrolled pedestrian and school crosswalk locations. The beacons are not signals and do not establish a regulatory requirement for yield or stop control for motorist.

Option:

02 A Rectangular Rapid Flashing Beacon may be installed where all conditions A through F are present:

- A. The crosswalk is installed in accordance with Table 3B-101 of the Alaska Traffic Manual Supplement;
- B. There are more than two lanes;
- C. The posted speed is 40 mph or greater;
- D. The nearest controlled crossing location is more than 300 feet away;
- E. The yield-to-pedestrian compliance is low; and,
- F. The regional traffic and safety engineer (RTSE) or other public or private authority or official having jurisdiction over traffic control devices (Agency Official) determines adjacent signal operations will not be negatively impacted.

03 A Rectangular Rapid Flashing Beacon may be installed at other locations where the Agency Official determines adjacent signal operations will not be negatively impacted and unsatisfactory site-specific conditions exist, such as:

- A. Pedestrian accident history;
- B. High occurrence of avoidance maneuvers by motorists or pedestrians, or;
- C. School crossings on a rural NHS route.

**Standard:**

04 **Rectangular Rapid Flashing Beacon units and their mountings shall comply with the following FHWA guidance:**

- A. **Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11) 7/16/2008; and,**
- B. **Applicable FHWA official interpretations published on the FHWA MUTCD Interim Approvals webpage at the time of installation.**

05 **Rectangular Rapid Flashing Beacon units shall not be installed for overhead applications or with the combined Bicycle/Pedestrian (W11-15) sign without prior written approval of the Agency Official.**

06 **Pushbutton detectors and R10-25 signs, or passive detection, shall be installed for each crossing direction and on the median if pedestrians cross in two stages using a refuge island.**

07 **Rectangular Rapid Flashing Beacons shall not be installed at signalized, stop or yield controlled approaches.**

*Guidance:*

08 *Other crosswalk enhancements should be considered prior to installation of Rectangular Rapid Flashing Beacons.*

**Standard:**

09 **Provide the following information to the State Traffic and Safety Engineer for each Rectangular Rapid Flashing Beacon installation:**

- A. Location;**
- B. Date installed; and,**
- C. List of FHWA official interpretations applied in the installation.**

