DDOT Experience with the Pedestrian Hybrid Beacon– AKA HAWK signal

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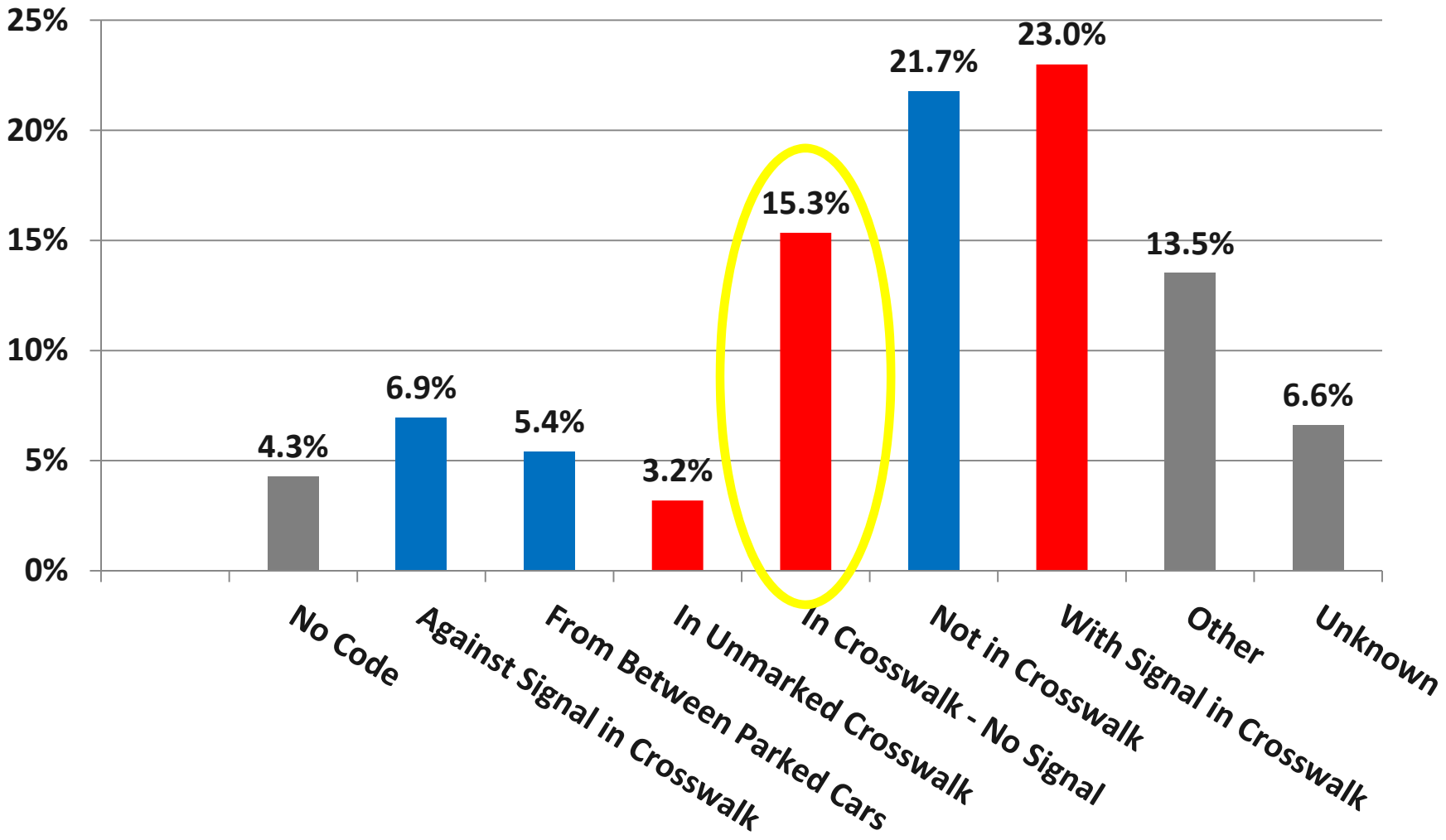
George Branyan
Pedestrian Program Coordinator
District Department of Transportation

DC Pedestrian Crash Types

Pedestrian Action, 2004-2010

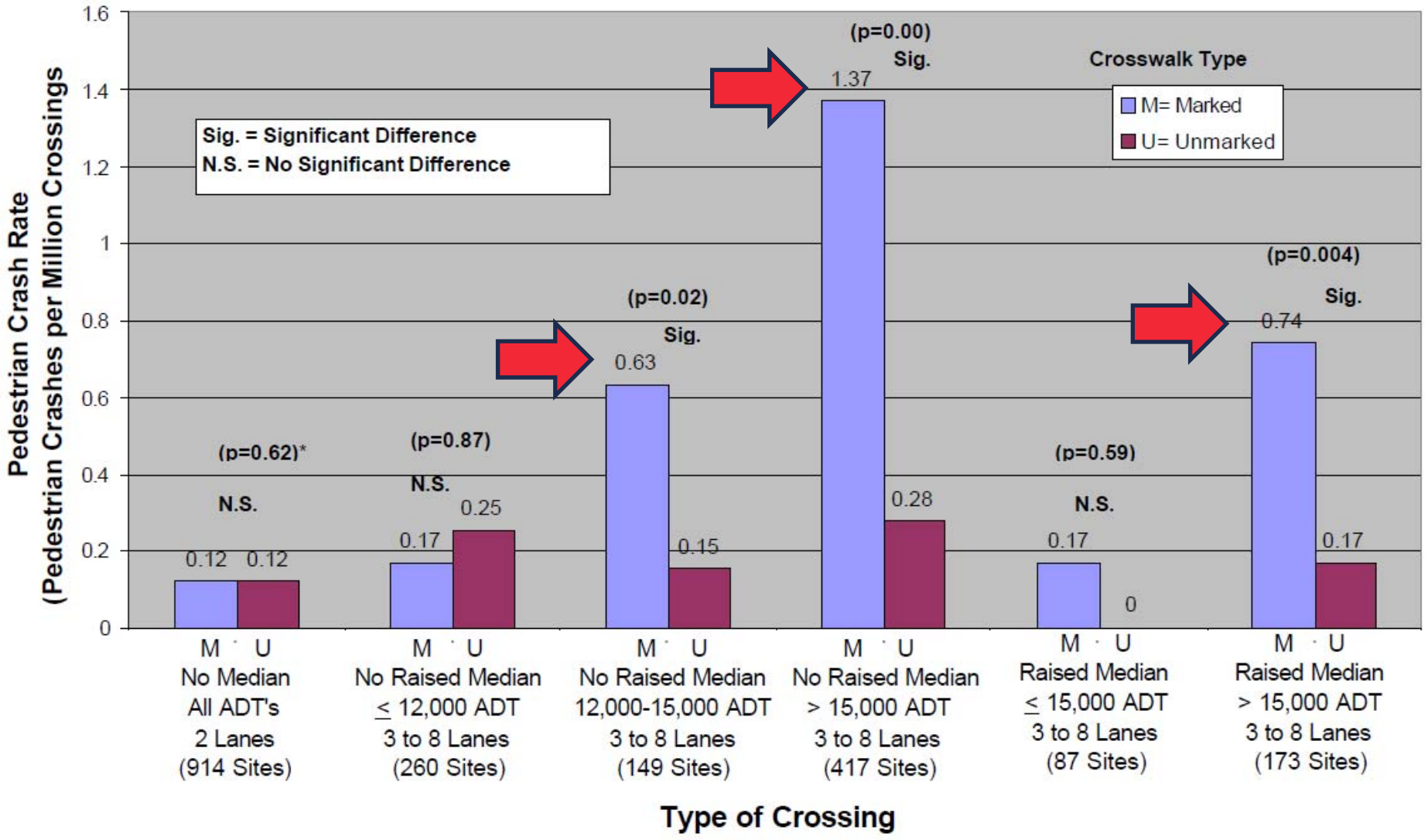


DC Pedestrian Master Plan: Major policy recommendations:

District Department of Transportation

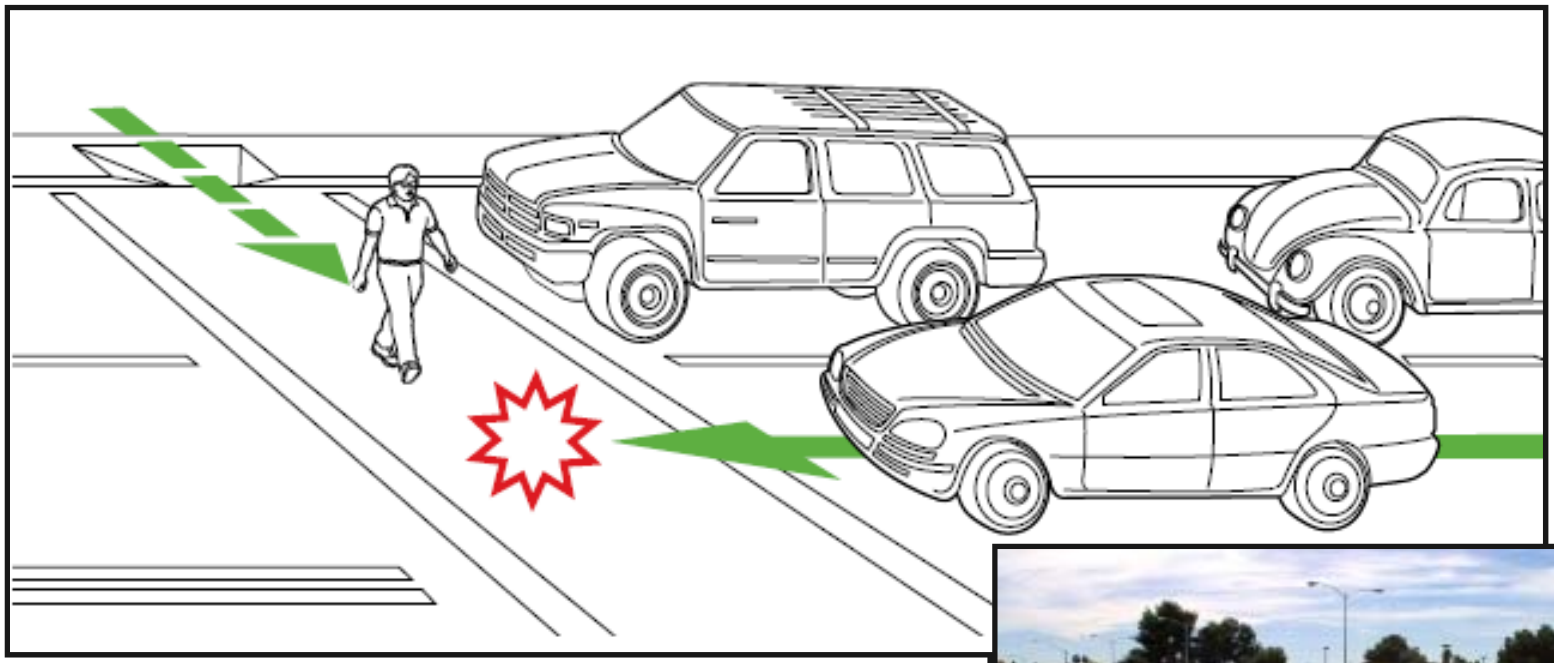
1. Crosswalk Marking Policy
   - Recommends enhancements for multi-lane arterials with high traffic volumes
2. Advance Stop Lines on multi-lane arterials at:
   - Uncontrolled marked crosswalks
3. Uncontrolled Crosswalk Side-of-Street Sign (Boulder, CO and MDSHA)
4. Rapid Flash Beacons (St. Petersburg, FL and Boulder, CO)
5. HAWK Pedestrian Hybrid Beacons (Tucson, AZ)
6. Far Side Bus Stops (Arlington, VA and Portland, OR)
6. Pedestrian Crossing/Refuge Islands
7. Curb Extensions
8. Leading Pedestrian Interval Signal Timing

Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations (Zegeer, 2002):



High Risk Crashes, Unsignalized Crosswalk:

- "Multiple Threat" crash type



In crosswalk, no signal, multiple threat

FHWA Guidance on Uncontrolled Crosswalks

The results of this study should not be misused as justification to do nothing to help pedestrians to safely cross streets. Instead, pedestrian crossing problems and needs should be routinely identified, and appropriate solutions should be selected to improve pedestrian safety and access. Deciding where to mark or not mark crosswalks is only one consideration in meeting that objective.

– *Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations: Final Report and Recommended Guidelines*, HRT-04-100, September, 2005

FHWA Guidance on Uncontrolled Crosswalks

New marked crosswalks alone, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:

A. The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or

B. The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater.

- 2009 MUTCD, Section 3B-18 (page 384)

FHWA Guidance on Uncontrolled Crosswalks

- Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations:

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT >9000 to 12,000			Vehicle ADT >12,000 - 15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h
2 Lanes	C	C	P	C	C	P	C	C	N	C	P	N
3 Lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multi-Lane (4 or More Lanes) With Raised Median***	C	C	P	C	P	N	P	P	N	N	N	N
Multi-Lane (4 or More Lanes) Without Raised Median	C	P	N	P	P	N	N	N	N	N	N	N

- Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations (Zegeer, 2002)

DDOT Uncontrolled Crosswalk Policy

District Department of Transportation

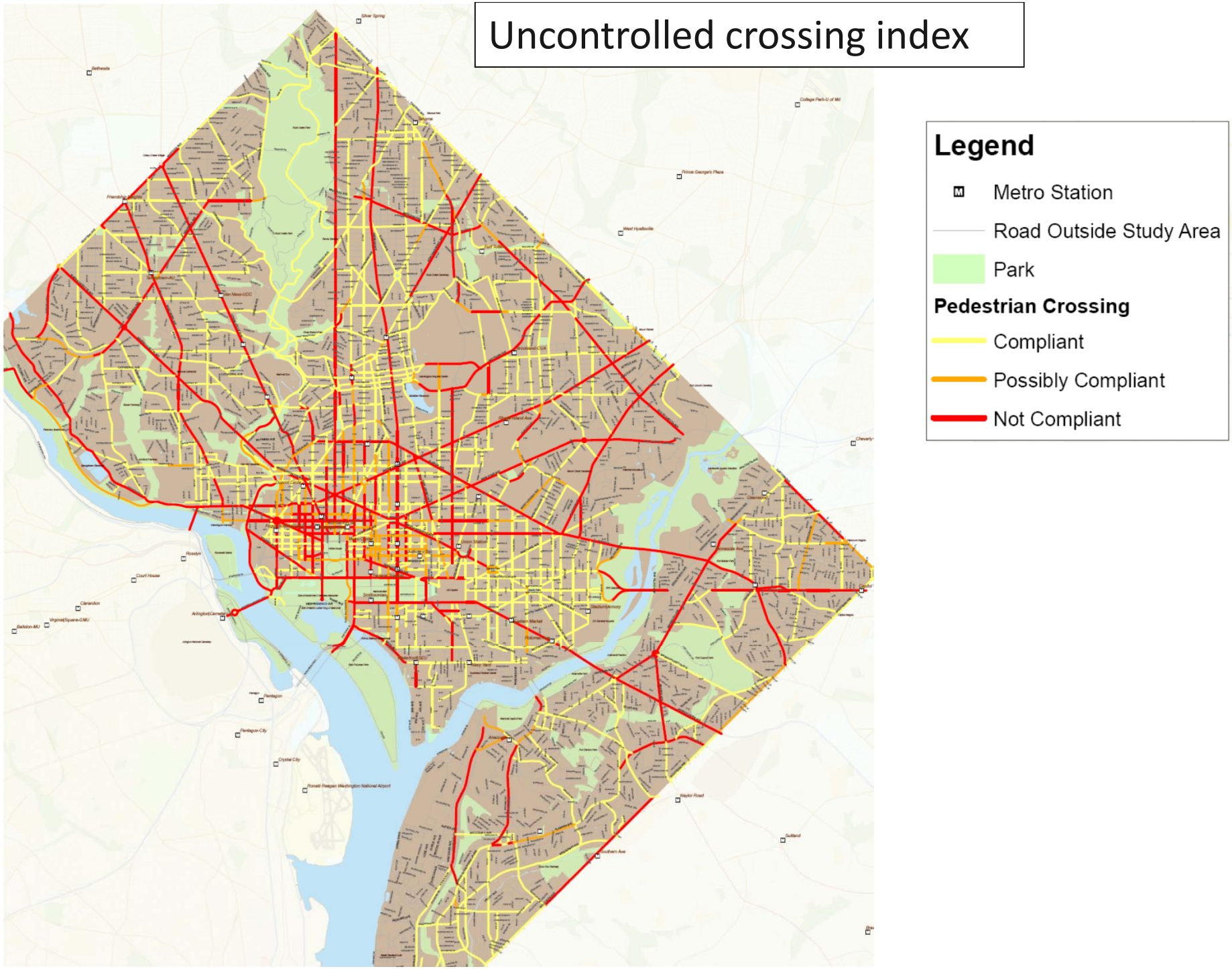
Table 1 - Proposed DC Uncontrolled Crosswalk Engineering Treatments

For roadways posted 30mph or less

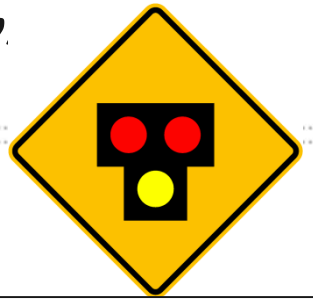
Roadway Configuration	1,500 - 9,000 vpd	9,000 - 12,000 vpd	12,000 - 15,000 vpd	> 15,000 vpd
2 Lanes[1]	A	A	A or B	B or C
2 Lanes with CTL[1]	A	A	B	B or C
2 Lanes One Way	B	B	C	C
4 Lanes w/Raised Median[2]	B	B	C	C
3 Lanes No Median[3]	B	B	C	C
5 Lanes w/Raised Median[3]	B	B	C	C
6 Lanes w/Raised Median[4]	B	B	C	D
4 Lanes No Median[4]	B	B or C	C	D
5 Lanes No Median[3]	B	B or C	D	D
6 Lanes No Median[4]	B	B or C	D	D

Volumes Below 1500 vpd	Parallel Crosswalk and/or W11-2 assembly
Treatment A	High Visibility Crosswalk and Side of Street Ped Law Sign
Treatment B	In-Street Stop For Peds Sign and/or Traffic Calming
Treatment C	Activated Pedestrian Device (RRFB, In-road LEDs, etc.)
Treatment D	Something with a red signal (PHB, Full Signal)

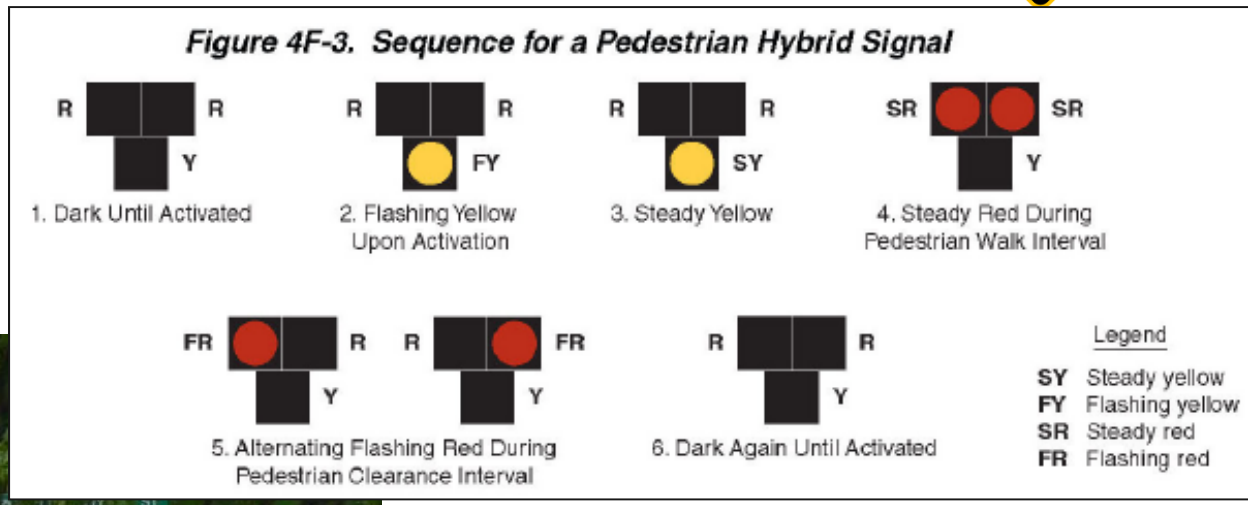
Uncontrolled crossing index



Pedestrian Hybrid Beacon/"HAWK" Signal:



For use at selected
uncontrolled crosswalks
on major arterial streets



HAWK Pedestrian Hybrid Beacon in DC

District Department of Transportation

- Major roadway sees a beacon/signal
- Minor roadway sees a stop sign
- Dark when not in use

- FHWA Study: Up to a 69% reduction in pedestrian crashes
- Up to a 29% reduction in total crashes.

- DDOT study showed 97% compliance

- No problem observed with stop-controlled side street

- Minor roadway gets less cut-through traffic

DC HAWK Brochure and Video

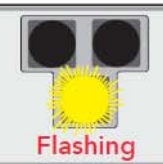
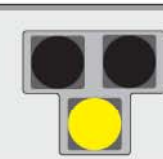
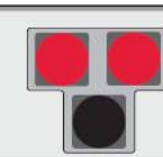
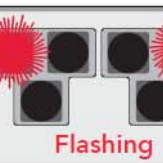
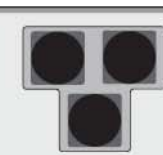
How does a HAWK Signal Work?

What is a HAWK Signal?

A HAWK (High-Intensity Activated crossWalK) signal is a signal-beacon designed to help pedestrians safely cross busy streets.

While different in appearance for motorists, for the pedestrian, this signal works like other push-button activated traffic signals in the District by stopping traffic with a red signal, allowing pedestrians to cross with a WALK signal. At certain locations, the signal can automatically detect the presence of pedestrians waiting to cross and will activate the signal.

HAWK signals can be installed on streets with regular traffic signals as part of the District's coordinated signal system.

Pedestrians		Motorists	
Will see this...	Will do this...	Will see this...	Will do this...
	Push button to call for WALK signal (some locations automatically detect pedestrians)		Proceed
	Wait (It may take up to one minute for the signal to change)		Proceed with Caution (Signal has been activated)
	Wait		Slow down and prepare to STOP
	Start crossing after you see the WALK signal (Be sure traffic has stopped)		STOP!
	Continue Crossing (Countdown signal)		STOP! Then proceed with caution if clear
	Push the button to cross		Proceed

HAWK GENERAL FIELD OBSERVATIONS:

- Motorists turning onto Georgia Avenue from Hemlock Street who took advantage of the stopped traffic on GA Ave. generally yielded to pedestrians using the crosswalk.
- A few drivers exhibited aggressive driving characteristics, such as hesitating or slowing down briefly for crossing pedestrians to clear the driver's travel path, and then proceeding to drive across the intersection on the flashing red without stopping.
- Even though the signal is "hot response" and not coordinated, there were minimal traffic operational issues at the intersection and, in general.

DC HAWK-PHB Evaluation:

- Nearly half of pedestrians (49% overall) did not activate the HAWK signal when crossing the intersection.
- This led to more pedestrian-vehicle conflicts than crossing with the signal activated.

Table 6: Qualitative Analysis of Pedestrian – Vehicle Conflicts

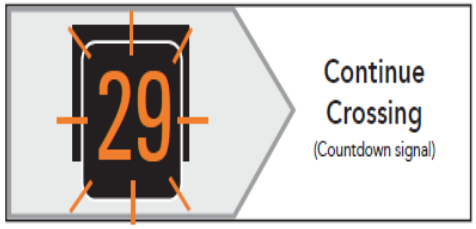
BEGIN TIME	PEDESTRIAN – VEHICLE CONFLICTS		
	No. of Conflicts upon Activating HAWK Signal	No. of Conflicts Without Activating HAWK Signal	Total No. of Pedestrian – Vehicle Conflicts
7:00 AM	1	-	1
7:15 AM	-	-	-
7:30 AM	-	-	-
7:45 AM	-	-	-
8:00 AM	-	-	-
8:15 AM	-	-	-
8:30 AM	-	-	-
8:45 AM	-	-	-
9:00 AM	-	1	1
9:15 AM	-	-	-
9:30 AM	-	-	-
9:45 AM	-	1	1
10:00 AM	-	2	2
10:15 AM	-	3	3
10:30 AM	-	1	1
10:45 AM	-	-	-
AM TOTALS	**1**	**8**	**9**
2:00 PM	1	-	1
2:15 PM	1	-	1
2:30 PM	-	-	-
2:45 PM	-	-	-
3:00 PM	-	-	-
3:15 PM	-	-	-
3:30 PM	-	-	-
3:45 PM	-	-	-
4:00 PM	-	1	1
4:15 PM	-	-	-
4:30 PM	1	3	4
4:45 PM	-	2	2
5:00 PM	-	-	-
5:15 PM	-	-	-
5:30 PM	1	-	1
5:45 PM	-	-	-
PM TOTALS	**4**	**6**	**10**

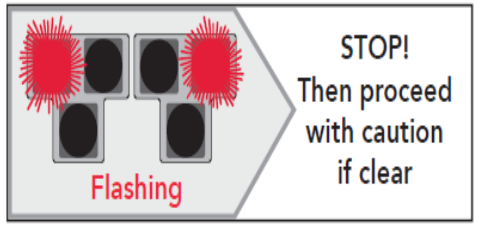
Operational Issues with the PHB/HAWK in DC

District Department of Transportation

1. Some drivers do not understand that they may proceed on Flashing Red:

- Not observed as a safety problem
- Reduces somewhat the operational advantage of the PHB
- DDOT posted a sign to help explain the Flashing Red phase





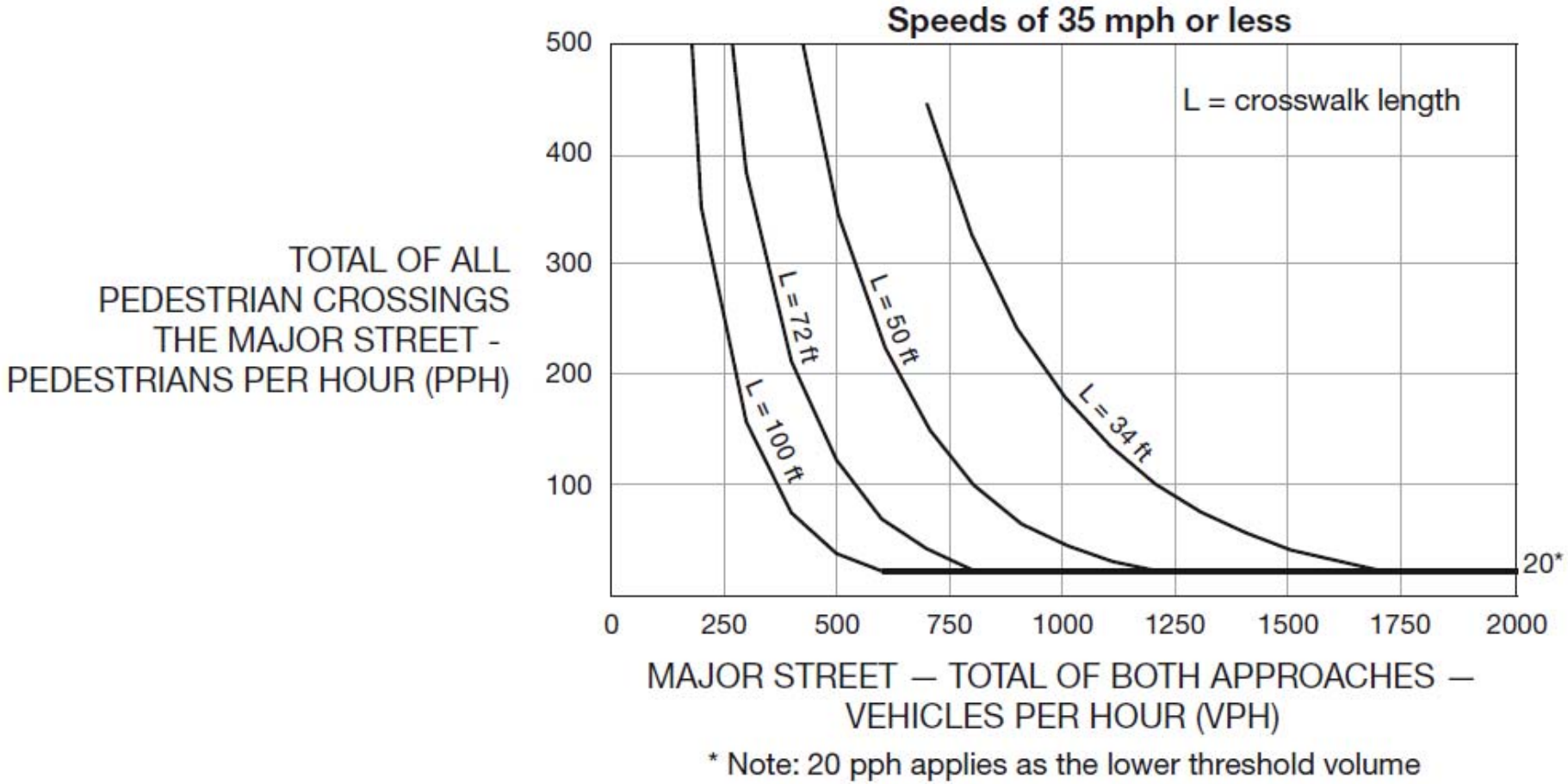
2. Some reports of drivers moving on the Flashing Red in a manner that seemed hazardous to pedestrians:

- Lengthen the solid red phase
- Enforcement

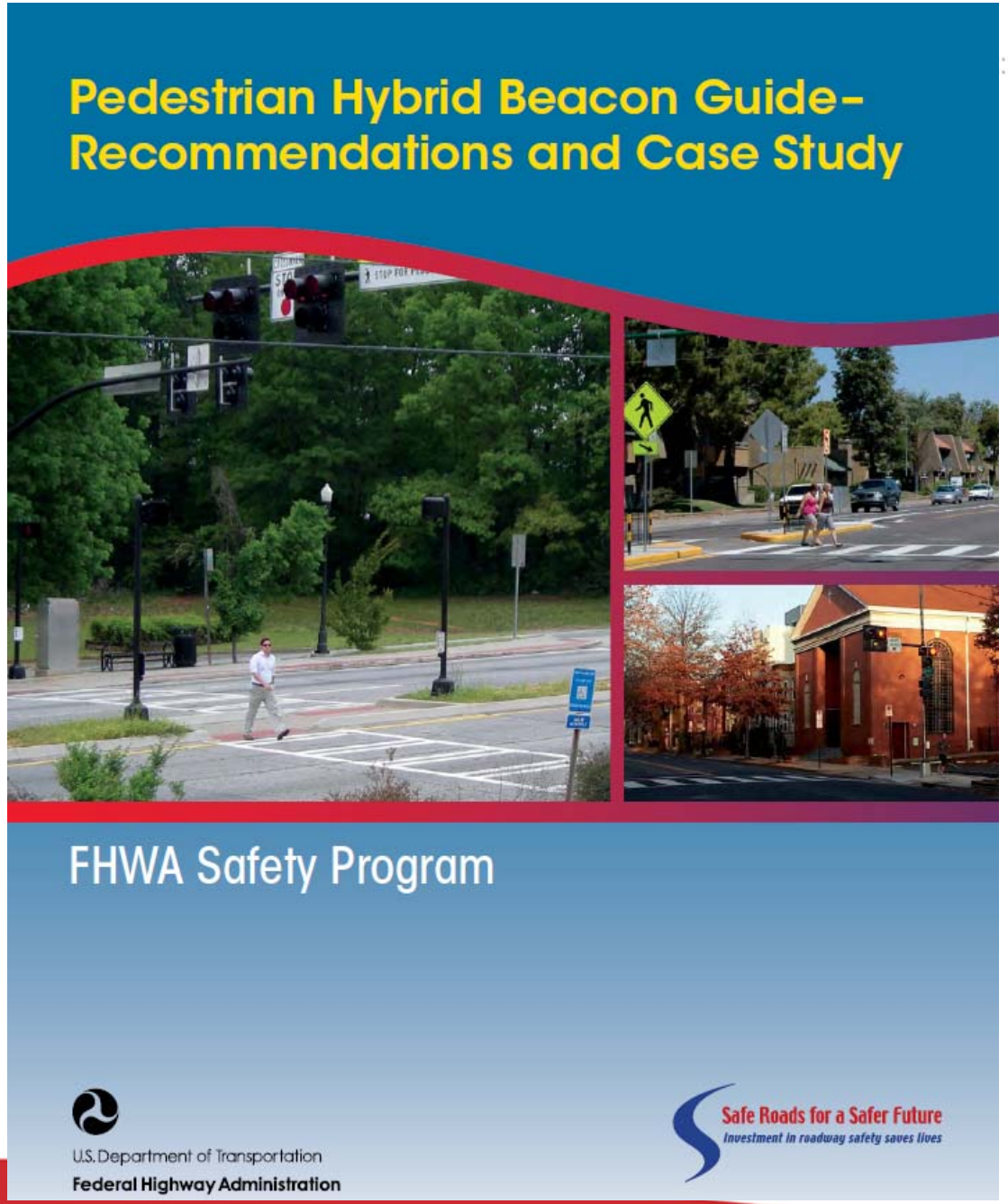
PHBs in the suburban context

- Most pedestrian fatalities occur at mid-block crossings or on multi-lane roadways at nonsignalized locations.

PHB Factors/thresholds



- FHWA PHB Guide, 2014
- PHBs have been shown to significantly reduce pedestrian crashes. A Federal Highway Administration (FHWA) study published in 2010 found that pedestrian hybrid beacons can reduce pedestrian crashes by 69 percent and total crashes by 29 percent.
- http://safety.fhwa.dot.gov/ped bike



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George Branyan
Pedestrian Program Coordinator

202-761-2561
george.branyan@dc.gov