

## AGENCY LETTERHEAD

April 20, 2018

Ms. Mona Aglan-Swick, P.E.  
Transportation Systems Management & Operations, Traffic Safety  
Arizona Department of Transportation  
1615 W. Jackson ST., MD 065R  
Phoenix, AZ 85007-3217

**RE: Highway Safety Improvement Program (HSIP) Project Determination and Application**

**Agency:**

**Project Name:** City of Phoenix

**Project Location:** Installation of HAWK/PHB signals

Dear Ms. Aglan-Swick:

The City of Phoenix is submitting herewith a project application for Highway Safety Improvement Program (HSIP) funding. This road safety improvement project was identified through the local network crash data screening process and meets all requirements of Title 23. The proposed request is for the installation of Pedestrian Hybrid Beacons (HAWK) signals, crosswalks, and street lights at 13 locations in the City of Phoenix and does not include any non-infrastructure funding request. Installation of the HAWK signals will require vehicle to stop at the stop bar and protect the pedestrian at the crosswalk. In addition the street lights installed on the HAWK signal pole will increase illumination of the cross-walk for better visibility of the crossing pedestrians and bicyclists. City staff will hire a consultant to complete the design, then procure bids for a contractor to build the project. There will be ground disturbing activities, including drilling for foundations, and trenching. It is anticipated that some minor utility relocations will need to happen.

During the most recent five year period ending December 2016, City of Phoenix experienced 63 total pedestrian intersection related crashes including 25 fatal and 38 incapacitating crashes at these 13 roadway segments. With a Crash Reduction Factor (CRF) of 87% obtained from the ADOT 4/5 Star list for all pedestrian crashes, the City could see a 5-year reduction of 54.8 crashes including 21.8 fatal and 33.1 serious injury crashes.

The City of Phoenix has determined that, in accordance with 23 USC 148(a)(4)(A), this project is consistent with the MAG and State's 2014 SHSP. It supports MAG's STSP Goal No. 4: Eliminate Death and Severe Injury for vulnerable road users - Pedestrian, bicycles and persons with disabilities. And supports the State's goal of (Nonmotorized users) Reduce frequency and severity of nonmotorized users by reducing nonmotorized exposure to vehicle traffic.

B/C Ratio =41.4

The City of Phoenix has estimated the total project cost of this project to be \$ 4,309,334. Of that amount we request ADOT determine if \$2,920,152 is HSIP eligible, with \$1,389,182 being non-HSIP eligible, no local match, and \$1,389,182 being other funds. In accordance with Title 23, the Federal share for safety improvement items are eligible to be funded at 100% Federal share per 23 U.S.C. 120(c) as described in Code of Federal Register 23 CFR Part 924. Table 8 summarizes the anticipated cost estimate projected for this project.

**RE: Highway Safety Improvement Program (HSIP) Project Determination and Application**

**Agency:**

**Project Name:** City of Phoenix

City of Phoenix is aware that, if funded, additional HSIP funds above the attached estimated cost are not available to pay for excess costs and that other funds whether STP, local or other will have to be provided or secured by City of Phoenix to cover the additional costs or the project will have to be withdrawn and resubmitted in the next call-for-projects.

City of Phoenix agrees to conduct and provide to ADOT TSS on a yearly basis a written before-and-after study utilizing the same crash data included in the countermeasure influence area in order to determine the effectiveness of the countermeasure on fatal and serious injury crashes.

City of Phoenix further understands that Federal funds can only be used once to install or upgrade either a spot or systemic countermeasure and that once installed, the City of Phoenix will maintain the countermeasure at or above the standard to which it was installed.

If you have any questions, please contact me at 602.262.4613 or email [carl.langford@phoenix.gov](mailto:carl.langford@phoenix.gov)

Sincerely,

Carl Langford, PE  
Safety and Neighborhood Traffic Engineer  
City of Phoenix - Street Transportation Department  
200 W Washington Street, 6th floor  
Phoenix, AZ 85003

Attachments: Application (excel format)  
B/C Ratio Calculations  
Detailed Cost Estimate  
Vicinity Map  
CMF Documents

**FY 21 and FY22 HSIP Application**

<b>Agency:</b>	City of Phoenix	<b>Title of Project:</b>	Installation of HAWK/PHB signals
<b>County:</b>	Maricopa	<b>COG/MPO:</b>	MAG
<b>District:</b>	Central	<b>Date:</b>	4/23/2018
<b>Contact:</b>		<b>Phone:</b>	<b>E-Mail:</b>
Carl Langford		602-262-4613	<a href="mailto:carl.langford@phoenix.gov">carl.langford@phoenix.gov</a>
<b>Type of Safety Improvement:</b>	<b>Spot:</b> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<b>Systemic:</b> <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
<b>Mark all that apply to your project:</b> <input type="checkbox"/> Design <input checked="" type="checkbox"/> Const. <input checked="" type="checkbox"/> Procurement <input type="checkbox"/> Non-Infrastructure			
<b>Anticipated Total Cost Estimate:</b>		<b>\$4,309,333.78</b>	
<b>Anticipated dollar amount of HSIP Funding:</b>		<b>\$2,920,151.57</b>	
<b>Anticipated Dollar amount of Local Match (5.7%) (5.66%):</b>		<b>\$0.00</b>	
<b>Anticipated Dollar amount of Other:</b>		<b>\$1,389,182.20</b>	
<b>Funding Source:</b> <input checked="" type="checkbox"/> 100% HSIP <input type="checkbox"/> 94.3% HSIP <input type="checkbox"/> 94.34% HSIP	<b>Cost Estimate Tab:</b>		8. 94.3% Spot Improvement
<b>Administration of Project:</b>	<b>Agency:</b> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<b>ADOT:</b> <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
<b>Name and Title of COG/MPO Representative:</b>		Mohammad Shaheed	
<b>Basic Project Information</b>			
<b>Anticipated Design Year (Construction year cannot be the same):</b>		<input checked="" type="checkbox"/> FY21	
<b>If additional ROW is needed, what FY is purchase anticipated?:</b>		<input checked="" type="checkbox"/> FY21 <input type="checkbox"/> FY22	
<b>Anticipated Construction Year:</b>		<input type="checkbox"/> FY21* <input checked="" type="checkbox"/> FY22	
<b>1.</b>	<b>Have lower cost countermeasures been considered or implemented?</b>		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
<b>1a.</b>	If "Yes", describe: If "No", explain why not:		
<b>2.</b>	<b>Which 23 USC 148 highway safety improvement project category does this project come under?</b>		
<b>2a.</b>	26. Pedestrian hybrid beacons		
<b>3.</b>	<b>Describe your safety improvement project in detail: (50 words or less)</b>		
<b>3a.</b>	The project will install pedestrian hybrid beacons at 13 locations. First countermeasures used CMF 9022 - Install PHB or HAWK with advance yield or stop marking and signs. Second countermeasure CMF 433-Provide Intersection illumination		
<b>4.</b>	<b>Describe the location of this safety project:</b>		

**FY 21 and FY22 HSIP Application**

<b>Agency:</b>	<b>City of Phoenix</b>	<b>Title of Project:</b>	<b>Installation of HAWK/PHB signals</b>
<b>County:</b>	<b>Maricopa</b>	<b>COG/MPO:</b>	<b>MAG</b>
<b>District:</b>	<b>Central</b>	<b>Date:</b>	<b>4/23/2018</b>
<b>4a.</b>	Indian School Rd 33rd Drive to 31st Place, Indian School Rd. between N 23rd Ave & N 20th Ave, Indian School Rd. between N 9th St & N 10th Place, McDowell Rd. between N 23rd St & N 7th St, N 19th Ave between W Bell Rd & W Grovers Ave, N 35th Ave between W Indian School Rd & W Campbell Rd, Northern Ave between N 39th Ave & N 35th Ave, Bethany Home Rd. between N 7th St & N 10th St, 35th Ave and Eva St, Thomas Rd. between N 32nd St & N 34th Pl, McDowell Rd & 41st St, 27th Ave and Road Ln, 19th Ave and Sunnyside Dr		
<b>5.</b>	<b>What crash data screening method was used to identify this project?</b>		
<b>5a.</b>	Evaluated locations that had higher crash rates especially those roadway segments with high pedestrain/bicycle fatality and serious injuries. These locations were mapped and looked for appropriate locations for pedestrain hybrid signals. The location for the PHB were identified based on location of transit stops, access/connections to residentials/ park/office/shopping or schools		
<b>6.</b>	<b>What is the safety justification for the proposed project?</b>		
<b>6a.</b>	The intent of this project is provide a safe and controlled crosswalk for pedestrains and bicyclists. Typically streets lights are also installed on the signal pole of the PHB, thereby providing more visibility of the crossing pedestrians.		
<b>7.</b>	<b>Will there be ground disturbing activities?</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>8.</b>	<b>Is project within applicants permanent ROW?</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>8a.</b>	<b>If NO please explain:</b>		
<b>9.</b>	<b>Will any temporary right-of-way acquisitions be required?</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>10.</b>	<b>Will there be any utility relocation needed?</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>10a.</b>	<b>If YES please explain:</b>	It is likely to need some utility relocation as there are overhead powerlines or some underground utilities in the lcoation of the poles	
<b>11.</b>	<b>Does Section 4(f) apply to any portion of this project?</b>	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
<b>11a.</b>	<b>If YES please explain:</b>		
<b>12.</b>	<b>Are there any other issues that may impact or delay development or construction of this project?</b>	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO

FY 21 and FY22 HSIP Application

<b>Agency:</b>	<b>City of Phoenix</b>	<b>Title of Project:</b>	<b>Installation of HAWK/PHB signals</b>		
<b>County:</b>	<b>Maricopa</b>	<b>COG/MPO:</b>	<b>MAG</b>		
<b>District:</b>	<b>Central</b>	<b>Date:</b>	<b>4/23/2018</b>		
<b>12a.</b>	If YES please explain:				
<b>13.</b>	Is this project in compliance with revised ADA Standards?			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>13a.</b>	If NO please explain: <b>New ADA ramps will be installed as part of this project</b>				
<b>14.</b>	Does the project support Arizona's Strategic Highway Safety Plan?			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>15.</b>	Are there any Studies, RSA's or Other evaluations that support this project?			<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
<b>16.</b>	<b>HSIP Roadway Functional Classification:</b>		Urban Principal Arterial - Other		
<b>17.</b>	<b>Average Daily Traffic Volume and Year Collected:</b>		<b>10,000 - 56,000</b>	<b>Year: 2016</b>	
<b>18.</b>	<b>What is the source of ADT?:</b>	City of Phoenix Volume map			
<b>19.</b>	<b>What is the posted speed limit?</b>	<b>45 mph</b>			
<b>20.</b>	Detailed engineer's cost estimate attached:			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>"Systemic" Safety Project</b>					
<b>21.</b>	<b>Completed B/C Ratio Tabulation Sheet Attached (Required):</b>			<input type="checkbox"/> YES	<input type="checkbox"/> NO
<b>22.</b>	<b>Most current 5 Years Crash Data from ADOT ALISS database sorted by year &amp; severity (required):</b>			<input type="checkbox"/> YES	<input type="checkbox"/> NO
<b>23.</b>	What are the inclusive dates of the crash data?				
<b>24.</b>	<b>Have all crashes that will not be influenced by this countermeasure been deleted from the crash list? (pedestrian, pedalcycle, etc. as applicable)</b>			<input type="checkbox"/> YES	<input type="checkbox"/> NO
<b>25.</b>	<b>If purchasing equipment or materials, who will install?</b>		<input type="checkbox"/> Town/City	<input type="checkbox"/> County	
			<input type="checkbox"/> Contractor	<input type="checkbox"/> Tribe	
<b>26.</b>	<b>Does the project require proprietary Items (23CFR 635.411)?:</b>			<input type="checkbox"/> YES	<input type="checkbox"/> NO
<b>27.</b>	<b>Is a list of locations for systemic projects provided on the attached form?</b>			<input type="checkbox"/> YES	<input type="checkbox"/> NO
<b>28.</b>	<b>How are (will) the proposed locations be prioritized for replacement? (explain below)</b>				
<b>28a.</b>					

FY 21 and FY22 HSIP Application

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County:	Maricopa	COG/MPO:	MAG
District:	Central	Date:	4/23/2018
29.	Are the supporting structures in good condition, meet local standards and have an anticipated service life longer than the countermeasure being installed?		<input type="checkbox"/> YES <input type="checkbox"/> NO
<b>"Spot" Improvement Projects Only</b>			
30.	Completed B/C Ratio Tabulation Sheet Attached (required):		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
31.	Is the most current 5 Years Crash Data from ADOT ALISS database sorted by year & severity attached and in correct format? (required):		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
32.	What are the inclusive dates of the crash data?	2012-2016	
	Have all crashes that will not be influenced by this countermeasure been deleted from the crash list? (pedestrian, pedalcycle etc. as applicable)		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
33.	Have any infrastructure changes occurred within the work limits of this project during the years the crash data covers?		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
34.	If YES please explain:		
35.	Project vicinity map is provided:		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
36.	Project work limits map is provided:		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
<b>SHSP - All Projects</b>			
37.	Which SHSP Emphasis Area (EA) does this project support?:	Nonmotorized_Users	
37a.	Which EA Strategy does it support?:	(Pedestrians) Reduce pedestrian exposure to vehicle traffic.	
37b.	Does this project support a second SHSP EA? If so, which EA.:	Roadway_Infrastructure_and_Operations	
37c.	Which EA Strategy supports the second EA?	(Intersections) Reduce frequency and severity of intersection crashes through traffic-control and operational improvements.	
37d.	Does this project support a third SHSP EA? If so, which EA.:		

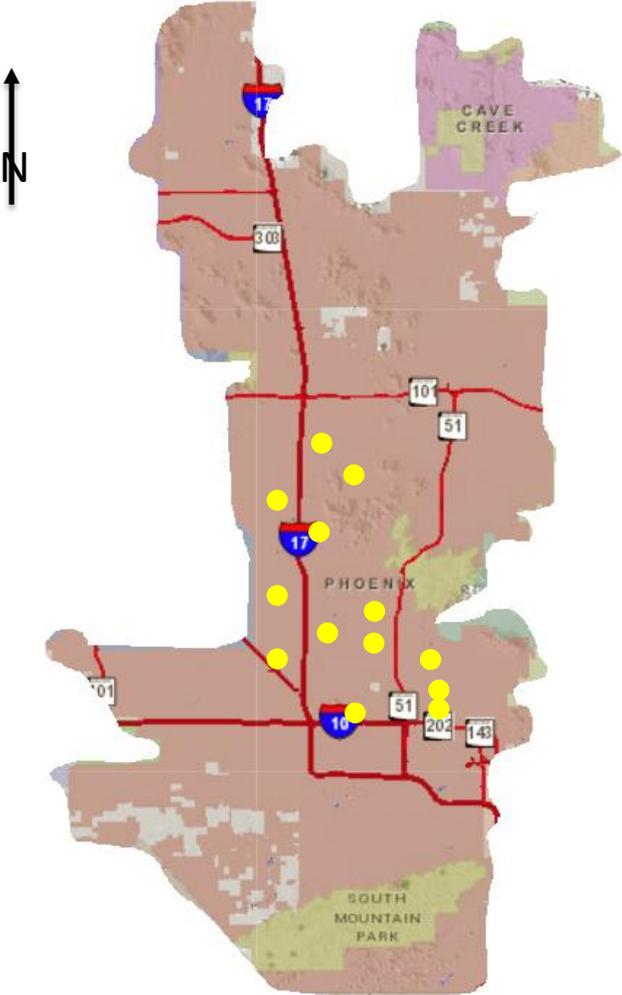
FY 21 and FY22 HSIP Application

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<b>District:</b>	Central	<b>Date:</b>	4/23/2018
<b>37e.</b>	Which EA Strategy supports the third EA?		
<b>38.</b>	Does this project support one of the nine FHWA proven countermeasures?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
<b>38a.</b>	If so, which countermeasure?: Pedestrian Hybrid Beacon		
<b>39.</b>	Does this project support one of the three Arizona Focus Areas?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
<b>39a.</b>	If so, which focus area?: Pedestrian		
<b>40.</b>	Which HSIP Improvement Category does this project support?:		Pedestrians_and_Bicyclists
<b>40a.</b>	Which HSIP Improvement Sub-Category does this project support?: Pedestrian beacons		
<b>41.</b>	Does your COG/MPO have a Strategic Transportation Safety Plan (STSP)?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
<b>41a.</b>	If "YES", does this project support an Emphasis Area in the COG/MPO STSP?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
<b>41b.</b>	List the EA:	Eliminate Death and Severe Injury for vulnerable road users - Pedestrian, bicycles and persons with disabilities	
<b>41c.</b>	If your COG/MPO has a STSP and it was Federally Funded and you answered NO in 41a, explain why this project is being submitted over a STSP identified project. (For Local Agencies Only)		
<b>41d.</b>	Rational		
<b>42.</b>	Are any temporary safety countermeasures needed prior to this permanent solution being installed? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
<b>42a.</b>	If yes, please explain:		
<b>43.</b>	For State Agencies, has the Regional Traffic Engineer been made aware of this potential project and does he/she concur with it? <input type="checkbox"/> YES <input type="checkbox"/> NO		
<b>B/C Ratio</b>			
<b>44.</b>	The calculated B/C Ratio is:	41.40	

**City of Phoenix HSIP Application – FY 2021-22  
Pedestrian Hybrid Beacon - Study Segments**

**Project Locations within the City of Phoenix**

Project Location ●



City of Phoenix HSIP Application – FY 2021-22  
Pedestrian Hybrid Beacon (HAWK) - Study Segments

Map with location for the Spot Improvement for each study segment  
Map 1 of 3



35<sup>th</sup> Avenue – Indian School Rd to Campbell Ave



Northern Avenue – 35<sup>th</sup> Ave to 39<sup>th</sup> Ave



Bethany Home Rd – N 7<sup>th</sup> St to N 10<sup>th</sup> St



Indian School Rd – N 31<sup>st</sup> Dr to N 33<sup>rd</sup> Dr

City of Phoenix HSIP Application – FY 2021-22  
Pedestrian Hybrid Beacon (HAWK) - Study Segments

Map with location for the Spot Improvement for each study segment  
Map 2 of 3



Indian School Rd – N  
20<sup>th</sup> Ave to N 23<sup>rd</sup> Ave



Indian School Rd – N 9<sup>th</sup>  
St to N 10<sup>th</sup> Pl



McDowell Rd – N 3<sup>rd</sup> St  
to 7<sup>th</sup> St



19<sup>th</sup> Ave – Bell Rd to  
Grovers Ave



Thomas Rd – N 32<sup>nd</sup> St  
to N 34<sup>th</sup> Place

City of Phoenix HSIP Application – FY 2021-22  
Pedestrian Hybrid Beacon (HAWK) - Study Segments

Map with location for the Spot Improvement for each study segment  
Map 3 of 3



35<sup>th</sup> Avenue at Eva Street



McDowell Road at  
41<sup>st</sup> Street



27<sup>th</sup> Ave at Rose lane



19<sup>th</sup> Avenue at  
Sunnyside Avenue

**HIGHWAY SAFETY IMPROVEMENT PROGRAM  
APPLICATION - COST ESTIMATE**

Agency:	City of Phoenix	Name of Project:	Spot Improvement with Non-HSIP construction included						
HSIP Project Cost Estimate Worksheet									
Project Cost Estimate:	Description:	Unit	Quantity:	Unit Cost:	Total Cost:	HSIP:	Local Match:	Other Amt:	TOTAL COST
						100.00%	0.00%		
Design:			1	\$409,727.00	\$ 409,727.00	\$ -	\$ -	\$ 409,727.00	\$ 409,727.00
ROW Acquisition:			1	\$ 484,500.00	\$ 484,500.00	\$ -	\$ -	\$ 484,500.00	\$ 484,500.00
Environmental Clearance			1	\$ 100,000.00	\$ 100,000.00	\$ -	\$ -	\$ 100,000.00	\$ 100,000.00
ADOT Admin Costs:			1	\$ 10,000.00	\$ 10,000.00	\$ -	\$ -	\$ 10,000.00	\$ 10,000.00
<b>Design Sub-Total</b>					<b>\$ 1,004,227.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,004,227.00</b>	<b>\$ 1,004,227.00</b>
Construction	ADA RAMP (per corner)	EA	26	\$ 8,400.00	\$ 218,400.00	\$ 218,400.00	\$ -		
	Removal of Concrete Sidewalks, Driveways And Slabs	Sq Ft	1600	\$ 7.00	\$ 11,200.00	\$ 11,200.00	\$ -		
	Removal of Concrete Curb And Gutter	L. Ft	650	\$ 7.00	\$ 4,550.00	\$ 4,550.00	\$ -		
	Pavement Marking (White Extruded Thermoplastic) (0.090")	L. Ft	2995	\$ 2.00	\$ 5,990.00	\$ 5,990.00	\$ -		
	Pavement Marking Symbol	EA	52	\$ 70.00	\$ 3,640.00	\$ 3,640.00	\$ -		
	Sign Post (Perforated) (2 S)	L. Ft	260	\$ 0.15	\$ 39.00	\$ 39.00	\$ -		
	Sign Post (Perforated) (2 1/2 S)	L. Ft	0	\$ 0.15	\$ -	\$ -	\$ -		
	Foundation For Sign Post	EA	26	\$ 100.00	\$ 2,600.00	\$ 2,600.00	\$ -		
	Warning, Marker, Or Regulatory Sign Panel (Type XI	Sq Ft	468	\$ 22.00	\$ 10,296.00	\$ 10,296.00	\$ -		
	No. 5 Pull Box	EA	36	\$ 400.00	\$ 14,486.96	\$ 14,486.96	\$ -		
	No. 7 Pull Box	EA	52	\$ 500.00	\$ 26,000.00	\$ 26,000.00	\$ -		
	Electrical Conduit (3") (PVC) (Schedule 40) (Horizontal	L. Ft	2440	\$ 52.00	\$ 126,880.00	\$ 126,880.00	\$ -		
	Electrical Conduit (2") (PVC) (Schedule 40)( Trench)	L. Ft	12520	\$ 30.00	\$ 375,600.00	\$ 375,600.00	\$ -		
	Signal Pole Foundation (Type Q)	EA	23	\$ 3,000.00	\$ 69,000.00	\$ 69,000.00	\$ -		
	Signal Pole Foundation (Type R)	EA	2	\$ 4,000.00	\$ 8,000.00	\$ 8,000.00	\$ -		
	Signal Pole Type Q	EA	23	\$ 4,400.00	\$ 101,200.00	\$ 101,200.00	\$ -		
	Signal Pole Type R	EA	2	\$ 7,500.00	\$ 15,000.00	\$ 15,000.00	\$ -		
	Mast Arm (25 ft)	EA	2	\$ 2,000.00	\$ 4,000.00	\$ 4,000.00	\$ -		
	Mast Arm (35 ft)	EA	16	\$ 2,000.00	\$ 32,000.00	\$ 32,000.00	\$ -		
	Mast Arm (45 ft)	EA	6	\$ 2,800.00	\$ 16,800.00	\$ 16,800.00	\$ -		
	Mast Arm (56 ft)	EA	2	\$ 3,500.00	\$ 7,000.00	\$ 7,000.00	\$ -		
	Luminaire(Mast Arm)	EA	26	\$ 600.00	\$ 15,600.00	\$ 15,600.00	\$ -		
	CONTROLLER CABINET FOUNDATION	EA	13	\$ 3,000.00	\$ 39,000.00	\$ 39,000.00	\$ -		
	CONTROLLER CABINET	EA	13	\$ 25,000.00	\$ 325,000.00	\$ 325,000.00	\$ -		
	POWER SERVICE PEDESTAL FOUNDATION	EA	13	\$ 3,000.00	\$ 39,000.00	\$ 39,000.00	\$ -		
	POWER SERVICE PEDESTAL	EA	13	\$ 4,000.00	\$ 52,000.00	\$ 52,000.00	\$ -		
	Traffic Signal Face (HAWK)	EA	94	\$ 800.00	\$ 75,200.00	\$ 75,200.00	\$ -		
	Pedestrian Push Button	EA	26	\$ 350.00	\$ 9,100.00	\$ 9,100.00	\$ -		
	Traffic Signal Mounting Assembly (Type II)	EA	68	\$ 600.00	\$ 40,800.00	\$ 40,800.00	\$ -		
	Traffic Signal Mounting Assembly (Type V)	EA	26	\$ 500.00	\$ 13,000.00	\$ 13,000.00	\$ -		
	Traffic Signal Mounting Assembly (Type XI)	EA	26	\$ 600.00	\$ 15,600.00	\$ 15,600.00	\$ -		
	Pedestrian Signal (Man/Hand) (Countdown)	EA	26	\$ 800.00	\$ 20,800.00	\$ 20,800.00	\$ -		
	Luminaire(LED)	EA	26	\$ 800.00	\$ 20,800.00	\$ 20,800.00	\$ -		
	Conductors	L. Sum	1	\$ 60,000.00	\$ 60,000.00	\$ 60,000.00	\$ -		

**HIGHWAY SAFETY IMPROVEMENT PROGRAM  
APPLICATION - COST ESTIMATE**

	Furnish and Install street lighting per COP Street lighting procedure, sandards and specifications manual latest edition	EA	10	\$ 5,000.00	\$ 51,086.96	\$ 51,086.96	\$ -		
<b>HSIP Eligible Sub-Total</b>			0		\$ 1,829,668.91	\$ 1,829,668.91	\$ -	\$ -	\$ -
Construction:	ITS Cable	L. Ft	11120	\$ 10.00	\$ 111,200.00			\$ 111,200.00	\$ 111,200.00
Construction:	Wireless Network Radio	EA	13	\$ 10,000.00	\$ 130,000.00			\$ 130,000.00	\$ 130,000.00
Consturction:									
Construction:					\$ -			\$ -	\$ -
<b>Non-HSIP Eligible Sub-Total</b>					\$ 241,200.00			\$ 241,200.00	\$ 241,200.00
<b>Construction Sub-Total</b>					\$ 2,070,868.91	\$ 1,829,668.91	\$ -	\$ 241,200.00	\$ 2,070,868.91
Traffic Control:				<b>10.00%</b>	\$ 207,086.89	\$ 182,966.89	\$ -	\$ 24,120.00	\$ 207,086.89
Mobilization:				<b>10.00%</b>	\$ 207,086.89	\$ 182,966.89	\$ -	\$ 24,120.00	\$ 207,086.89
<b>Construction Sub-Total</b>					\$ 2,485,042.70	\$ 2,195,602.70	\$ -	\$ 289,440.00	\$ 2,485,042.70
Construction Admin :				<b>22.00%</b>	\$ 546,709.39	\$ 483,032.59	\$ -	\$ 63,676.80	\$ 546,709.39
Contingencies :				<b>5.00%</b>	\$ 124,252.13	\$ 109,780.13	\$ -	\$ 14,472.00	\$ 124,252.13
Post Design:				<b>1.00%</b>	\$ 24,850.43	\$ 21,956.03	\$ -	\$ 2,894.40	\$ 24,850.43
Communications:				<b>5.00%</b>	\$ 124,252.13	\$ 109,780.13	\$ -	\$ 14,472.00	\$ 124,252.13
					\$ -	\$ -	\$ -	\$ -	\$ -
<b>Post Sub-Total</b>					\$ 820,064.08	\$ 724,548.88	\$ -	\$ 95,515.20	\$ 820,064.08
<b>Post Const Sub-Total</b>					\$ 3,305,106.78	\$ 2,920,151.57	\$ -	\$ 384,955.20	\$ 3,305,106.77
<b>TOTAL REQUEST</b>					\$ 4,309,333.78	\$ 2,920,151.57	\$ -	\$ 1,389,182.20	\$ 4,309,333.77

Comments:

**Required for all HSIP Applications**

<b>Agency:</b>	City of Phoenix	<b>Title of Project:</b>	Installation of HAWK/PHB signals
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**Benefit / Cost Ratio Tabulation**

**Annual Benefit Tabulation**

Severity	Annual Average	Estimated CRF* Reduction	Total Reduction	Unit Cost	Annual Benefit
Fatal	<b>5.00</b>	<b>82%</b>	4.10	\$5,800,000	\$23,780,000
Incapacitating Injury	<b>7.60</b>	<b>93.2%</b>	7.08	\$400,000	\$2,833,280
Total Annual Benefits					\$26,613,280

**Costs**

Total Project Cost	\$4,309,334
Project Life (years)	10
Interest Rate (%)	8%
Capital Recovery Factor	0.1490
Annual Construction Cost	\$642,218
Annual Maintenance Cost	\$0.00
Total Annual Costs	\$642,218

**Benefit / Cost**

Annual Benefit	Annual cost	Benefit / Cost Ratio
\$26,613,280	\$642,218	41.4

**\*REQUIRED: Use 4 and 5 star CMFs from ADOT Lists Only at Tabs 14 - 15 preferred. The CMF's CRF is used in the above calculation**

IncidentID	AccDateTime	Day	Collision Manner	Light Condition	First Harmful Event	Onroad	Crossing Feature	Surface Condition	Weather	InjuryStatus	NonMotoristLocation	UnitType	UnitAction
2725023	5/27/2013 19:55	Monday	HEAD_ON	DARK_LIGHTED	Not Reported	INDIAN SCHOOL RD	33RD AVE	DRY	CLEAR	INCAPACITATING_IN	MARKED_CROSSWALK_A T_INTERSECTION	PEDESTRIAN	CROSSING_ROAD
2725787	5/1/2013 14:42	Wednesday	OTHER	DAYLIGHT	Not Reported	INDIAN SCHOOL RD	33RD AVE	DRY	CLEAR	INCAPACITATING_IN	MARKED_CROSSWALK_A T_INTERSECTION	DRIVER	GOING_STRAIGHT_AHEAD
2994487	9/16/2015 11:44	Wednesday	OTHER	DAYLIGHT	PEDALCYCLE	INDIAN SCHOOL RD	33RD AVE	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDALCYCLIST	GOING_STRAIGHT_AHEAD
2858488	3/17/2014 23:24	Monday	OTHER	DARK_LIGHTED	PEDESTRIAN	INDIAN SCHOOL RD	31ST DR	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2609888	1/14/2012 18:29	Saturday	OTHER	DARK_LIGHTED	PEDESTRIAN	INDIAN SCHOOL RD	23RD AVE	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	UNKNOWN
2789527	12/23/2013 19:52	Monday	HEAD_ON	DARK_LIGHTED	Not Reported	INDIAN SCHOOL RD	20TH AVE	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	WALKING_AGAINST_TRAFFIC
2757402	7/20/2013 0:50	Saturday	OTHER	DARK_LIGHTED	PEDESTRIAN	INDIAN SCHOOL RD	20TH AVE	WET	CLOUDY	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2777090	11/8/2013 20:02	Friday	ANGLE (front t	DARK_LIGHTED	Not Reported	INDIAN SCHOOL RD	20TH AVE	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2864655	4/30/2014 19:57	Wednesday	OTHER	DARK_LIGHTED	PEDESTRIAN	INDIAN SCHOOL RD	20TH AVE	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3160313	11/25/2016 17:54	Friday	OTHER	DARK_LIGHTED	PEDESTRIAN	INDIAN SCHOOL RD	23RD AVE	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	DRIVER	GOING_STRAIGHT_AHEAD
3054935	2/23/2016 6:47	Tuesday	OTHER	DAWN	PEDESTRIAN	INDIAN SCHOOL RD	22ND AVE	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2839364	10/31/2013 20:50	Thursday	OTHER	DARK_LIGHTED	Not Reported	INDIAN SCHOOL RD	10TH ST	DRY	CLEAR	INCAPACITATING_IN	AT_INTERSECTION_BUT_ NO_CROSSWALK	PEDESTRIAN	CROSSING_ROAD
2836992	5/9/2014 12:05	Friday	OTHER	DAYLIGHT	Not Reported	INDIAN SCHOOL RD	10TH PL	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2935163	3/24/2015 14:47	Tuesday	OTHER	DAYLIGHT	Not Reported	INDIAN SCHOOL RD	9TH ST	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3128197	9/8/2016 19:28	Thursday	OTHER	DAYLIGHT	MOTOR_VEHIC	INDIAN SCHOOL RD	9TH ST	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3166339	12/10/2016 19:12	Saturday	OTHER	DARK_LIGHTED	PEDESTRIAN	INDIAN SCHOOL RD	10TH PL	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	OTHER
2679213	10/20/2012 20:31	Saturday	ANGLE (front t	DARK_LIGHTED	PEDESTRIAN	MCDOWELL RD	3RD ST	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2779963	11/22/2013 17:51	Friday	OTHER	DARK_LIGHTED	PEDESTRIAN	MCDOWELL RD	5TH ST	WET	RAIN	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2597480	1/25/2012 17:03	Wednesday	ANGLE (front t	DUSK	Not Reported	19TH AVE	GROVERS A	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDALCYCLIST	CHANGING_LANES
3032077	9/28/2015 22:14	Monday	OTHER	DARK_LIGHTED	PEDESTRIAN	19TH AVE	BELL RD	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3086616	4/21/2016 18:29	Thursday	REAR_END	DAYLIGHT	PEDALCYCLE	19TH AVE	VILLAGE DR	DRY	CLEAR	INCAPACITATING_IN	UNKNOWN	DRIVER	GOING_STRAIGHT_AHEAD
3097625	6/11/2016 20:18	Saturday	OTHER	DARK_LIGHTED	PEDALCYCLE	19TH AVE	ANGELA DR	DRY	CLEAR	INCAPACITATING_IN	UNKNOWN	PEDALCYCLIST	GOING_STRAIGHT_AHEAD
2686554	10/25/2012 1:25	Thursday	OTHER	DARK_LIGHTED	Not Reported	35TH AVE	MONTEROS	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2771499	10/29/2013 7:01	Tuesday	OTHER	DAYLIGHT	Not Reported	35TH AVE	GLENROSA A	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD

2757030	9/9/2013 9:15	Monday	OTHER	DAYLIGHT	Not Reported	35TH AVE	INDIAN SCH	WET	RAIN	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2898568	9/26/2014 20:28	Friday	OTHER	DARK_LIGHTED	PEDALCYCLE	35TH AVE	TURNEY AVE	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDALCYCLIST	GOING_STRAIGHT_AHEAD
2908386	9/23/2014 20:57	Tuesday	OTHER	DARK_LIGHTED	PEDESTRIAN	35TH AVE	MONTEROS	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	WALKING_AGAINST_TRAFFIC
2890919	11/14/2014 20:30	Friday	OTHER	DARK_NOT_LIGHTED	Not Reported	35TH AVE	MONTEROS	DRY	CLEAR	INCAPACITATING_IN	SHARED_USE_PATH_OR_ TRAILS	PEDESTRIAN	CROSSING_ROAD
2918719	3/11/2014 4:46	Tuesday	OTHER	DARK_LIGHTED	Not Reported	35TH AVE	MONTEROS	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3053900	11/12/2015 17:41	Thursday	OTHER	DUSK	PEDESTRIAN	35TH AVE	INDIAN SCH	UNKNOWN	UNKNOWN	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2997999	8/27/2015 20:40	Thursday	ANGLE (front t	DARK_NOT_LIGHTED	Not Reported	35TH AVE	GLENROSA A	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3151927	11/1/2016 19:03	Tuesday	REAR_END	DARK_LIGHTED	PEDESTRIAN	35TH AVE	CAMPBELL A	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	DRIVER	GOING_STRAIGHT_AHEAD
3183765	10/27/2016 21:08	Thursday	OTHER	DARK_LIGHTED	PEDESTRIAN	35TH AVE	MONTEROS	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3103051	4/24/2016 1:25	Sunday	OTHER	DARK_UNKNOWN_LIG	PEDALCYCLE	35TH AVE	MONTEROS	UNKNOWN	UNKNOWN	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDALCYCLIST	CROSSING_ROAD
2880025	7/25/2014 22:55	Friday	OTHER	DARK_UNKNOWN_LIG	PEDESTRIAN	36TH AVE	NORTHERN	UNKNOWN	UNKNOWN	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2936471	8/5/2014 19:40	Tuesday	OTHER	DARK_LIGHTED	PEDESTRIAN	NORTHERN AVE	36TH AVE	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2821261	3/28/2014 9:37	Friday	ANGLE (front t	DAYLIGHT	Not Reported	NORTHERN AVE	35TH AVE	DRY	CLEAR	INCAPACITATING_IN	MARKED_CROSSWALK_A T_INTERSECTION	DRIVER	MAKING_RIGHT_TURN
2993281	9/19/2015 11:01	Saturday	ANGLE (front t	DAYLIGHT	Not Reported	NORTHERN AVE	37TH AVE	DRY	CLEAR	INCAPACITATING_IN	SIDEWALK	DRIVER	MAKING_RIGHT_TURN
2992913	9/15/2015 14:51	Tuesday	OTHER	DAYLIGHT	PEDESTRIAN	BETHANY HOME RD	7TH ST	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	OTHER
2777986	11/17/2013 0:46	Sunday	OTHER	DARK_LIGHTED	Not Reported	PEORIA AVE	18TH AVE	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	DRIVER	UNKNOWN
2730800	1/3/2013 18:39	Thursday	OTHER	DARK_LIGHTED	PEDESTRIAN	PEORIA AVE	17TH AVE	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2733767	3/23/2013 0:23	Saturday	OTHER	DARK_LIGHTED	PEDESTRIAN	THOMAS RD	34TH ST	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	OTHER
3031415	1/2/2016 18:20	Saturday	OTHER	DARK_LIGHTED	PEDALCYCLE	THOMAS RD	34TH PL	DRY	CLEAR	INCAPACITATING_IN	UNKNOWN	PEDALCYCLIST	MAKING_LEFT_TURN
2847750	6/20/2014 8:27	Friday	ANGLE (front t	DAYLIGHT	Not Reported	35TH AVE	EVA ST	DRY	CLEAR	INCAPACITATING_IN	MARKED_CROSSWALK_A T_INTERSECTION	PEDALCYCLIST	GOING_STRAIGHT
2923963	10/21/2014 15:36	Tuesday	OTHER	DAYLIGHT	PEDESTRIAN	35TH AVE	EVA ST	DRY	CLEAR	INCAPACITATING_IN	MARKED_CROSSWALK_A T_INTERSECTION	PEDESTRIAN	CROSSING_ROAD
2925292	2/17/2015 11:43	Tuesday	ANGLE (front t	DAYLIGHT	Not Reported	35TH AVE	EVA ST	DRY	CLEAR	INCAPACITATING_IN	NON_INTERSECTION_CR OSSWALK	PEDESTRIAN	CROSSING_ROAD
3169944	11/12/2016 20:50	Saturday	OTHER	DARK_NOT_LIGHTED	PEDESTRIAN	35TH AVE	EVA ST	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2710449	12/31/2012 19:30	Monday	OTHER	DUSK	PEDESTRIAN	MCDOWELL RD	41ST ST	DRY	UNKNOWN	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDALCYCLIST	CHANGING_LANES
2951465	9/8/2014 19:56	Monday	OTHER	DARK_LIGHTED	PEDESTRIAN	MCDOWELL RD	41ST PL	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2959669	3/22/2015 1:41	Sunday	OTHER	DARK_LIGHTED	PEDESTRIAN	MCDOWELL RD	41ST PL	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD

3094926	5/31/2016 13:39	Tuesday	ANGLE (front t	DAYLIGHT	PEDALCYCLIST	MCDOWELL RD	40TH ST	DRY	CLEAR	INCAPACITATING_IN	NOT_REPORTED	PEDEALCYCLIST	ENTERING_ROADWAY
3103038	4/8/2016 2:04	Friday	OTHER	DARK_UNKNOWN_LIG	PEDESTRIAN	MCDOWELL RD	41ST PL	DRY	UNKNOWN	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3001143	7/23/2015 21:15	Thursday	OTHER	DARK_UNKNOWN_LIG	PEDESTRIAN	MCDOWELL RD	41ST ST	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3141626	9/11/2016 19:11	Sunday	OTHER	DARK_LIGHTED	PEDESTRIAN	MCDOWELL RD	41ST ST	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2737252	4/3/2013 20:10	Wednesday	OTHER	DARK_LIGHTED	PEDESTRIAN	27TH AVE	ROSE LN	DRY	UNKNOWN	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2784672	12/7/2013 19:23	Saturday	OTHER	DARK_LIGHTED	PEDESTRIAN	27TH AVE	ROSE LN	DRY	CLOUDY	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2964421	5/1/2014 8:17	Thursday	OTHER	DAYLIGHT	PEDESTRIAN	27TH AVE	ROSE LN	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
2699696	11/5/2012 18:02	Monday	OTHER	DARK_LIGHTED	PEDESTRIAN	19TH AVE	SUNNYSIDE	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	UNKNOWN
2735253	4/12/2013 20:57	Friday	ANGLE (front t	DARK_LIGHTED	PEDESTRIAN	19TH AVE	SUNNYSIDE	DRY	CLEAR	INCAPACITATING_IN	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTE RSECTION	PEDESTRIAN	CROSSING_ROAD
3019550	12/2/2015 17:53	Wednesday	OTHER	DARK_LIGHTED	PEDESTRIAN	19TH AVE	SUNNYSIDE	DRY	CLEAR	INCAPACITATING_IN	UNKNOWN	PEDESTRIAN	CROSSING_ROAD



## CMF / CRF Details

**CMF ID: 9022**

### Install pedestrian hybrid beacon (PHB or HAWK) with advanced yield or stop markings and signs

**Description:** Install a combination of a pedestrian hybrid beacon (PHB) and advanced yield or stop markings and signs

**Prior Condition:** No PHB or advanced yield or stop markings and signs

**Category:** Pedestrians

**Study:** [Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, Zegeer et al., 2017](#)

**Star Quality Rating:** ★★★★★ [\[View score details\]](#)

#### Crash Modification Factor (CMF)

**Value:** 0.82

**Adjusted Standard Error:**

**Unadjusted Standard Error:** 0.078

#### Crash Reduction Factor (CRF)

**Value:** 18 (This value indicates a **decrease** in crashes)

**Adjusted Standard Error:**

**Unadjusted Standard Error:** 7.8

#### Applicability

**Crash Type:** All

**Crash Severity:** All

**Roadway Types:** Minor Arterial

**Number of Lanes:** 2 to 8

**Road Division Type:****Speed Limit:****Area Type:** Urban and suburban**Traffic Volume:** Minimum of 6634 to Maximum of 48791 Annual Average Daily Traffic (AADT)**Time of Day:** All***If countermeasure is intersection-based*****Intersection Type:****Intersection Geometry:****Traffic Control:****Major Road Traffic Volume:****Minor Road Traffic Volume:****Development Details****Date Range of Data Used:** 2004 to 2013**Municipality:****State:** AZ, FL, IL, MA, NY, NC, OR, VA, WI**Country:** USA**Type of Methodology Used:** Before/after using empirical Bayes or full Bayes**Sample Size (crashes):** 286 crashes before, 341 crashes after**Sample Size (sites):** 27 sites before, 27 sites after**Other Details****Included in Highway Safety Manual?** No**Date Added to Clearinghouse:****Comments:** Study sites were a combination of intersection and mid-block locations.[\[View the Full Study Details\]](#)

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For more information, contact Karen Scurry at karen.scurry@dot.gov



## CMF / CRF Details

**CMF ID: 433**

### Provide intersection illumination

**Description:**

**Prior Condition:** *No Prior Condition(s)*

**Category:** Highway lighting

**Study:** [Handbook of Road Safety Measures, Elvik, R. and Vaa, T., 2004](#)

**Star Quality Rating:** ★★★★★

#### Crash Modification Factor (CMF)

**Value:** 0,62

**Adjusted Standard Error:** 0,13

**Unadjusted Standard Error:**

#### Crash Reduction Factor (CRF)

**Value:** 38 (This value indicates a **decrease** in crashes)

**Adjusted Standard Error:** 13

**Unadjusted Standard Error:**

#### Applicability

**Crash Type:** Nighttime

**Crash Severity:** A (serious injury),B (minor injury),C (possible injury)

**Roadway Types:** Not Specified

**Number of Lanes:**

**Road Division Type:**

**Speed Limit:**

**Area Type:** Not Specified

**Traffic Volume:**

**Time of Day:**

***If countermeasure is intersection-based***

**Intersection Type:** Roadway/roadway (not interchange related)

**Intersection Geometry:** Not Specified

**Traffic Control:** Not Specified

**Major Road Traffic Volume:**

**Minor Road Traffic Volume:**

**Development Details**

**Date Range of Data Used:**

**Municipality:**

**State:**

**Country:**

**Type of Methodology Used:** Meta-analysis

**Other Details**

**Included in Highway Safety Manual?** Yes, HSM lists this CMF in **bold** font to indicate that it has the highest reliability since it has an adjusted standard error of 0.1 or less.

**Date Added to Clearinghouse:** Dec-01-2009

**Comments:** Countermeasure name changed to match HSM

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For more information, contact Karen Scurry at karen.scurry@dot.gov

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