

City of Tempe  
Transportation Department  
Mail Stop 04-1  
PO Box 5002  
Tempe, AZ 85280



April 19, 2018

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

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

**Agency:**

**Project Name:** City of Tempe

**Project Location:** Installation of HAWK/PHB signal on Scottsdale Rd at  
Cavalier Dr/Lilac Dr

Dear Ms. Aglan-Swick:

The City of Tempe is submitting herewith a project application for Highway Safety Improvement Program (HSIP) funding. This road safety improvement project was identified through the State 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 one(1) location in the City of Tempe and does not include any non-infrastructure funding request. Installation of the HAWK/PHB signals will require vehicles to stop at the stop bar and provide priority to the pedestrians at the crosswalk. In addition luminaires installed on the HAWK/PHB signal pole will increase illumination of the cross-walk and provide better visibility for all users. City staff will hire a consultant using local funds to complete the design, then procure bids for a contractor to built the project. There will be ground disturbing activites, 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 Tempe experienced 7 total pederstrian intersection related crashes including 2 fatal and 5 incapacitating crashes on Scottsdale Road between Curry Road and McKellips Road. With a Crash Reduction Factor (CRF) of 82% obtained from the ADOT 4/5 Star list for all pedestrian crashes, the City could see a 5-year reduction of 6 crashes including almost 0 fatal and 4 serious injury crashes.

MAG 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: Eleminate 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 =45.6

MAG has estimated the total project cost of this project to be \$ 327,931. Of that amount requested from ADOT, it is determine that the full \$206,811 construction cost is HSIP eligible, with zero required local match, and \$121,121 being Other local 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. The City will cover the full cost of design, environmental and ADOT review fees using local funds. Furthermore, the City of Tempe is not requesting reimbursement for staff time for installation. 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 Tempe

City of Tempe 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 Tempe to cover the additional costs or the project will have to be withdrawn and resubmitted in the next call-for-projects.

City of Tempe 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 Tempe 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 Tempe will maintain the countermeasure at or above the standard to which it was installed.

If you have any questions, please contact me at 480.350.8025 or email [julian\\_dresang@tempe.gov](mailto:julian_dresang@tempe.gov)

Sincerely,



Julian Dresang, PE  
City Traffic Engineer  
City of Tempe - Transportation Department  
200 E. 5th Street  
Tempe, AZ 85281

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

**FY 21 and FY22 HSIP Application**

<b>Agency:</b>	<b>City of Tempe</b>	<b>Title of Project:</b>	<b>Installation of HAWK/PHB signal on Scottsdale Rd at Cavalier Dr/Lilac Dr</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>Contact:</b>		<b>Phone:</b>	<b>E-Mail:</b>
Julian Dresang		480.350.8025	julian_dresang@tempe.gov
<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>\$327,930.45</b>	
<b>Anticipated dollar amount of HSIP Funding (100%):</b>		<b>\$206,809.56</b>	
<b>Anticipated Dollar amount of Local Match (0%):</b>		<b>\$0.00</b>	
<b>Anticipated Dollar amount of Other Local Funds (100%):</b>		<b>\$121,120.89</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>	<b>If "Yes", describe: If "No", explain why not:</b>	The City of Tempe does not stripe unsignalized midblock crosswalks on high speed (40 mph), wide (7 lanes) arterial streets.	
<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 a pedestrian hybrid beacon at 1 location. First countermeasure used CMF # 9022 - Install HAWK/PHB 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 Tempe</b>	<b>Title of Project:</b>	<b>Installation of HAWK/PHB signal on Scottsdale Rd at Cavalier Dr/Lilac Dr</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>	The study section included Scottsdale Rd between McKellips Rd and Curry Rd. In the study area, Scottsdale Rd is a six-lane roadway with a center turn lane and posted speed limit of 40 mph. The Spot improvement is proposed for the intersection of Scottsdale Rd at Cavalier Dr/Lilac Dr. At this location Cavalier Dr are Lilac Dr are offset. There are bus stops and shopping facilities on either side of Scottsdale Rd. During field observation, several mid-block pedestrian crossings were observed.		
<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 pedestrian/bicycle fatality and serious injuries. These locations were mapped and looked for appropriate locations for pedestrian hybrid signals. The location for the PHB was identified based on location of transit stops, access/connections to residential/park/office/shopping and schools.		
<b>6.</b>	<b>What is the safety justification for the proposed project?</b>		
<b>6a.</b>	The intent of this project is to provide a safe and controlled crosswalk for pedestrians and bicyclists to cross a very wide and heavily travelled arterial street. Typically street luminaires are also installed on the signal pole of the PHB, thereby providing more visibility of the crossing pedestrians to the drivers.		
<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 type="checkbox"/> YES	<input checked="" 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 some underground utilities at the proposed pole locations	
<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

Agency:	City of Tempe	Title of Project:	Installation of HAWK/PHB signal on Scottsdale Rd at Cavalier Dr/Lilac Dr
County:	Maricopa	COG/MPO:	MAG
District:	Central	Date:	4/23/2018
12a.	If YES please explain:		
13.	Is this project in compliance with revised ADA Standards? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
13a.	If NO please explain: New ADA ramps will be installed as part of this project		
14.	Does the project support Arizona's Strategic Highway Safety Plan? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
15.	Are there any Studies, RSA's or Other evaluations that support this project? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
16.	HSIP Roadway Functional Classification:	Urban Principal Arterial - Other	
17.	Average Daily Traffic Volume and Year Collected:	42,396	Year: 2016
18.	What is the source of ADT?:	City of Tempe Traffic Counts map	
19.	What is the posted speed limit?	40 mph	
20.	Detailed engineer's cost estimate attached: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
<b>"Systemic" Safety Project</b>			
21.	Completed B/C Ratio Tabulation Sheet Attached (Required): <input type="checkbox"/> YES <input type="checkbox"/> NO		
22.	Most current 5 Years Crash Data from ADOT ALISS database sorted by year & severity (required): <input type="checkbox"/> YES <input type="checkbox"/> NO		
23.	What are the inclusive dates of the crash data?		
24.	Have all crashes that will not be influenced by this countermeasure been deleted from the crash list? (pedestrian, pedalcycle, etc. as applicable)		<input type="checkbox"/> YES <input type="checkbox"/> NO
25.	If purchasing equipment or materials, who will install?	<input type="checkbox"/> Town/City <input type="checkbox"/> County <input type="checkbox"/> Contractor <input type="checkbox"/> Tribe	
26.	Does the project require proprietary Items (23CFR 635.411)?: <input type="checkbox"/> YES <input type="checkbox"/> NO		
27.	Is a list of locations for systemic projects provided on the attached form? <input type="checkbox"/> YES <input type="checkbox"/> NO		
28.	How are (will) the proposed locations be prioritized for replacement? (explain below)		
28a.			

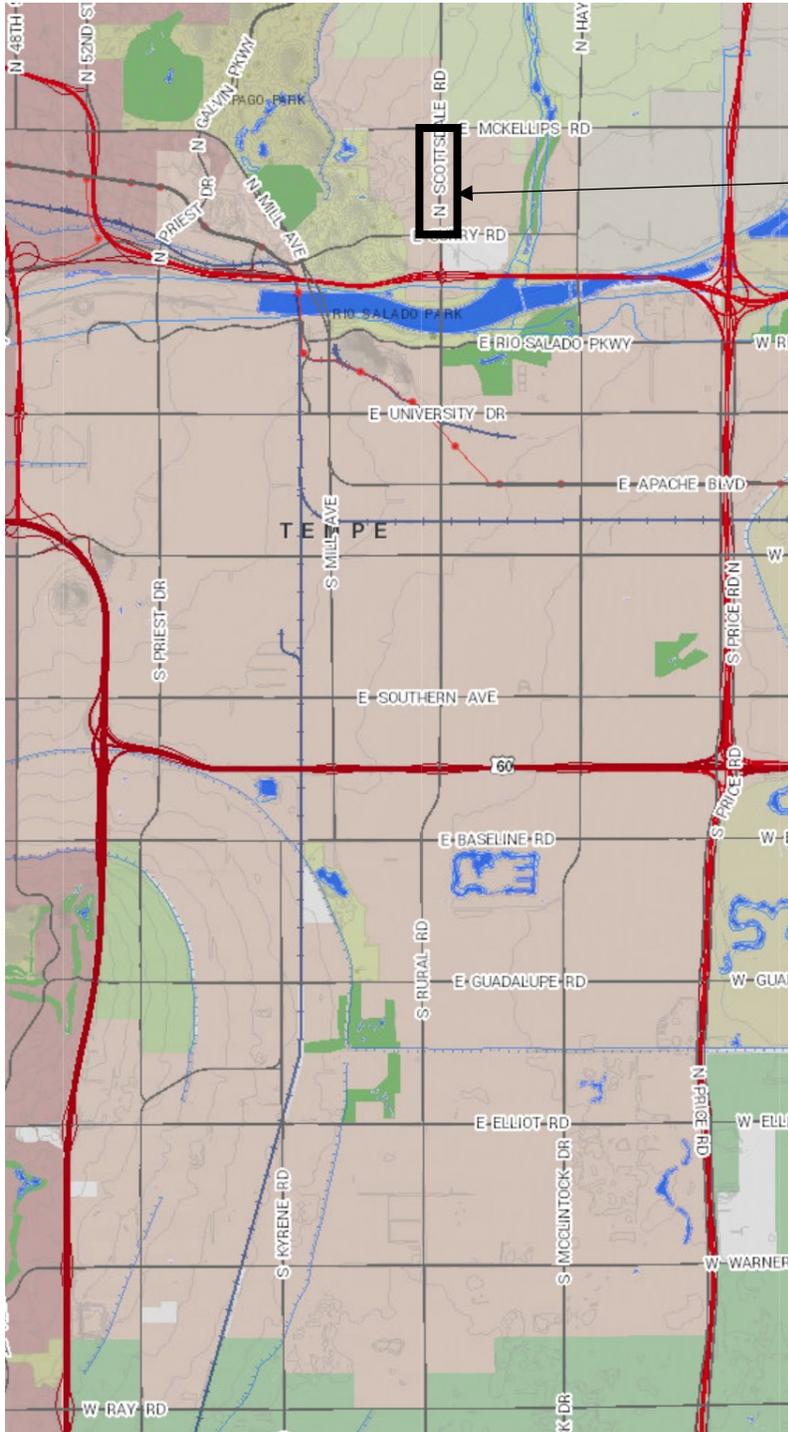
Agency:	City of Tempe	Title of Project:	Installation of HAWK/PHB signal on Scottsdale Rd at Cavalier Dr/Lilac Dr
County:	Maricopa	COG/MPO:	MAG
District:	Central	Date:	4/23/2018
29.	Are the supporting structures in good condition, meet local standards and have an anticipated service life longer than the 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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County:	Maricopa	COG/MPO:	MAG
District:	Central	Date:	4/23/2018
37e.	Which EA Strategy supports the third EA?		
38.	Does this project support one of the nine FHWA proven countermeasures?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
38a.	If so, which countermeasure?:	Pedestrian Hybrid Beacon	
39.	Does this project support one of the three Arizona Focus Areas?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
39a.	If so, which focus area?:	Pedestrian	
40.	Which HSIP Improvement Category does this project support?:	Pedestrians_and_Bicyclists	
40a.	Which HSIP Improvement Sub-Category does this project support?: Pedestrian beacons		
41.	Does your COG/MPO have a Strategic Transportation Safety Plan (STSP)?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
41a.	If "YES", does this project support an Emphasis Area in the COG/MPO STSP?: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
41b.	List the EA:	Eliminate Death and Severe Injury for vulnerable road users - Pedestrian, bicycles and persons with disabilities	
41c.	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)		
41d.	Rational		
42.	Are any temporary safety countermeasures needed prior to this permanent solution being installed? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
42a.	If yes, please explain:		
43.	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>			
44.	The calculated B/C Ratio is:	45.60	

City of Tempe HSIP Application – FY 2021-22  
Pedestrian Hybrid Beacon

Project Location within the City of Tempe



Study Corridor with the location identified for the PHB/HAWK Spot Improvement

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

Agency:	City of Tempe	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%	100.00%	
Design:	Funded with City Funds		1	\$51,120.89	\$ 51,120.89	\$ -	\$ -	\$ 51,120.89	\$ 51,120.89
ROW Acquisition:	None anticipated		0		\$ -	\$ -	\$ -	\$ -	\$ -
Environmental Clearance	Funded with City Funds		1	\$ 50,000.00	\$ 50,000.00	\$ -	\$ -	\$ 50,000.00	\$ 50,000.00
ADOT Admin Costs:	Funded with City Funds		1	\$ 20,000.00	\$ 20,000.00	\$ -	\$ -	\$ 20,000.00	\$ 20,000.00
<b>Design Sub-Total</b>					<b>\$ 121,120.89</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 121,120.89</b>	<b>\$ 121,120.89</b>
Construction	ADA RAMP (per corner)	EA	2	\$ 8,400.00	\$ 16,800.00	\$ 16,800.00	\$ -	\$ -	\$ -
Construction	Removal of Concrete Sidewalks, Driveways And Slabs	Sq Ft	50	\$ 7.00	\$ 350.00	\$ 350.00	\$ -	\$ -	\$ -
Construction	Removal of Concrete Curb And Gutter	L. Ft	50	\$ 7.00	\$ 350.00	\$ 350.00	\$ -	\$ -	\$ -
Construction	Pavement Marking (White Extruded Thermoplastic) (0.090")	L. Ft	255	\$ 2.00	\$ 510.00	\$ 510.00	\$ -	\$ -	\$ -
Construction	Pavement Marking Symbol	EA	4	\$ 70.00	\$ 280.00	\$ 280.00	\$ -	\$ -	\$ -
Construction	Sign Post (Perforated) (2 S)	L. Ft	20	\$ 0.15	\$ 3.00	\$ 3.00	\$ -	\$ -	\$ -
Construction	Sign Post (Perforated) (2 1/2 S)	L. Ft	0	\$ 0.15	\$ -	\$ -	\$ -	\$ -	\$ -
Construction	Foundation For Sign Post	EA	2	\$ 100.00	\$ 200.00	\$ 200.00	\$ -	\$ -	\$ -
Construction	Warning, Marker, Or Regulatory Sign Panel (Type XI	Sq Ft	36	\$ 22.00	\$ 792.00	\$ 792.00	\$ -	\$ -	\$ -
Construction	No. 5 Pull Box	EA	2	\$ 400.00	\$ 800.00	\$ 800.00	\$ -	\$ -	\$ -
Construction	No. 7 Pull Box	EA	4	\$ 500.00	\$ 2,000.00	\$ 2,000.00	\$ -	\$ -	\$ -
Construction	Electrical Conduit (3") (PVC) (Schedule 40) (Horizontal	L. Ft	250	\$ 52.00	\$ 13,000.00	\$ 13,000.00	\$ -	\$ -	\$ -
Construction	Electrical Conduit (3") (PVC) (Schedule 40)( Trench)	L. Ft	50	\$ 30.00	\$ 1,500.00	\$ 1,500.00	\$ -	\$ -	\$ -
Construction	Signal Pole Foundation (Type Q)	EA	0	\$ 3,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Construction	Signal Pole Foundation (Type R)	EA	2	\$ 4,000.00	\$ 8,000.00	\$ 8,000.00	\$ -	\$ -	\$ -
Construction	Signal Pole Type Q	EA	0	\$ 4,400.00	\$ -	\$ -	\$ -	\$ -	\$ -
Construction	Signal Pole Type R	EA	2	\$ 7,500.00	\$ 15,000.00	\$ 15,000.00	\$ -	\$ -	\$ -
Construction	Mast Arm (25 ft)	EA	0	\$ 2,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Construction	Mast Arm (35 ft)	EA	0	\$ 2,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Construction	Mast Arm (45 ft)	EA	0	\$ 2,800.00	\$ -	\$ -	\$ -	\$ -	\$ -
Construction	Mast Arm (56 ft)	EA	2	\$ 3,500.00	\$ 7,000.00	\$ 7,000.00	\$ -	\$ -	\$ -
Construction	Luminaire(Mast Arm)	EA	2	\$ 600.00	\$ 1,200.00	\$ 1,200.00	\$ -	\$ -	\$ -
Construction	CONTROLLER CABINET FOUNDATION	EA	1	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ -	\$ -	\$ -
Construction	CONTROLLER CABINET	EA	1	\$ 25,000.00	\$ 25,000.00	\$ 25,000.00	\$ -	\$ -	\$ -
Construction	POWER SERVICE PEDESTAL FOUNDATION	EA	1	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ -	\$ -	\$ -
Construction	POWER SERVICE PEDESTAL	EA	1	\$ 4,000.00	\$ 4,000.00	\$ 4,000.00	\$ -	\$ -	\$ -
Construction	Traffic Signal Face (HAWK)	EA	8	\$ 800.00	\$ 6,400.00	\$ 6,400.00	\$ -	\$ -	\$ -
Construction	Pedestrian Push Button	EA	2	\$ 350.00	\$ 700.00	\$ 700.00	\$ -	\$ -	\$ -
Construction	Traffic Signal Mounting Assembly (Type II)	EA	6	\$ 600.00	\$ 3,600.00	\$ 3,600.00	\$ -	\$ -	\$ -
Construction	Traffic Signal Mounting Assembly (Type V)	EA	2	\$ 500.00	\$ 1,000.00	\$ 1,000.00	\$ -	\$ -	\$ -
Construction	Traffic Signal Mounting Assembly (Type XI)	EA	2	\$ 600.00	\$ 1,200.00	\$ 1,200.00	\$ -	\$ -	\$ -
Construction	Pedestrian Signal (Man/Hand) (Countdown)	EA	2	\$ 800.00	\$ 1,600.00	\$ 1,600.00	\$ -	\$ -	\$ -
Construction	Luminaire(LED	EA	2	\$ 800.00	\$ 1,600.00	\$ 1,600.00	\$ -	\$ -	\$ -
Construction	Conductors	L. Sum	1	\$ 6,000.00	\$ 6,000.00	\$ 6,000.00	\$ -	\$ -	\$ -
<b>HSIP Eligible Sub-Total</b>			<b>0</b>		<b>\$ 124,885.00</b>	<b>\$ 124,885.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
Construction:					\$ -	\$ -	\$ -	\$ -	\$ -
Construction:					\$ -	\$ -	\$ -	\$ -	\$ -
<b>Non-HSIP Eligible Sub-Total</b>					<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Construction Sub-Total</b>					<b>\$ 124,885.00</b>	<b>\$ 124,885.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 124,885.00</b>
Traffic Control:			<b>10.00%</b>		\$ 12,488.50	\$ 12,488.50	\$ -	\$ -	\$ 12,488.50
Mobilization:			<b>10.00%</b>		\$ 12,488.50	\$ 12,488.50	\$ -	\$ -	\$ 12,488.50
<b>Construction Sub-Total</b>					<b>\$ 149,862.00</b>	<b>\$ 149,862.00</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 149,862.00</b>
Construction Admin :					\$ 40,462.74	\$ 40,462.74	\$ -	\$ -	\$ 40,462.74
Contingencies :			<b>5.00%</b>		\$ 7,493.10	\$ 7,493.10	\$ -	\$ -	\$ 7,493.10
Post Design:			<b>1.00%</b>		\$ 1,498.62	\$ 1,498.62	\$ -	\$ -	\$ 1,498.62
Communications:			<b>5.00%</b>		\$ 7,493.10	\$ 7,493.10	\$ -	\$ -	\$ 7,493.10
					\$ -	\$ -	\$ -	\$ -	\$ -
<b>Post Sub-Total</b>					<b>\$ 56,947.56</b>	<b>\$ 56,947.56</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 56,947.56</b>
<b>Post Const Sub-Total</b>					<b>\$ 206,809.56</b>	<b>\$ 206,809.56</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 206,809.56</b>
<b>TOTAL REQUEST</b>					<b>\$ 327,930.45</b>	<b>\$ 206,809.56</b>	<b>\$ -</b>	<b>\$ 121,120.89</b>	<b>\$ 327,930.45</b>

**Required for all HSIP Applications**

<b>Agency:</b>	City of Tempe	<b>Title of Project:</b>	Installation of HAWK/PHB signal on Scottsdale Rd at Cavalier Dr/Lilac Dr
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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>0.40</b>	<b>82%</b>	0.33	\$5,800,000	\$1,902,400
Incapacitating Injury	<b>1.00</b>	<b>93%</b>	0.93	\$400,000	\$372,800
Total Annual Benefits					\$2,275,200

**Costs**

Total Project Cost	\$327,930
Project Life (years)	10
Interest Rate (%)	8%
Capital Recovery Factor	0.1490
Annual Construction Cost	\$48,871
Annual Maintenance Cost	\$1,000.00
Total Annual Costs	\$49,871

**Benefit / Cost**

Annual Benefit	Annual cost	Benefit / Cost Ratio
\$2,275,200	\$49,871	45.6

**\*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**

CMF 9022 - Install PHB or HAWK with advance yield or stop marking and signs  
 CMF 433 - Provide Intersection illumination

HSIP Application 2021-22  
 CRASH DATA 2012-2016  
 Scottsdale Rd: Curry Rd to McKellips Rd

IncidentID	AccDateTime	Day	Collision Manner	Light Condition	First Harmful Event	Onroad	Crossing Feature	Surface Condition	Weather	InjuryStatus	NonMotoristLocation	UnitType	UnitAction
2646297	3/26/2012 22:43	Monday	ANGLE (front to side)(other than left turn)	DARK_LIGHTED	PEDESTRIAN	SCOTTSDALE RD	HANCOCK AVE	DRY	CLEAR	INCAPACITATING_INJURY	MARKED_CROSSWALK_A_T_INTERSECTION	PEDESTRIAN	CROSSING_ROAD
2629262	5/18/2012 19:35	Friday	ANGLE (front to side)(other than left turn)	DARK_LIGHTED	PEDESTRIAN	SCOTTSDALE RD	WEBER DR	DRY	CLEAR	INCAPACITATING_INJURY	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTERSECTION	PEDESTRIAN	CROSSING_ROAD
2885512	8/7/2014 20:27	Thursday	OTHER	DARK_UNKNOWN_LIGHTING	PEDESTRIAN	SCOTTSDALE RD	HANCOCK AVE	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTERSECTION	PEDESTRIAN	CROSSING_ROAD
3053785	12/19/2015 19:50	Saturday	OTHER	DARK_LIGHTED	PEDESTRIAN	SCOTTSDALE RD	MCKELLIPS RD	DRY	CLEAR	FATAL	IN_ROADWAY_NOT_IN_A_CROSSWALK_OR_INTERSECTION	PEDESTRIAN	CROSSING_ROAD
3031079	12/11/2015 16:40	Friday	OTHER	DUSK	PEDALCYCLE	SCOTTSDALE RD	TEMPE DR	DRY	CLOUDY	INCAPACITATING_INJURY	SIDEWALK	PEDALCYCLIST	GOING_STRAIGHT_AHEAD
3158039	11/3/2016 13:16	Thursday	OTHER	DAYLIGHT	PEDESTRIAN	SCOTTSDALE RD	CAVALIER DR	DRY	CLEAR	INCAPACITATING_INJURY	MEDIAN_BUT_NOT_ON_SHOULDER	DRIVER	MAKING_LEFT_TURN
3234787	12/14/2016 17:48	Wednesday	OTHER	DARK_LIGHTED	PEDESTRIAN	SCOTTSDALE RD	CAVALIER DR	DRY	CLEAR	INCAPACITATING_INJURY	AT_INTERSECTION_BUT_NO_CROSSWALK	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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