

<b>Agency:</b>	Glendale		<b>Title of Project:</b>	Installation of Traffic Signal at Northern Ave and 63rd Ave Intersection	
<b>Date:</b>	11/7/2019				
<b>Contact Name and Title:</b>		<b>Phone:</b>	<b>E-Mail:</b>		
Debbie Albert, City Traffic Engineer		623-930-2939	dalbert@glendaleaz.com		
<b>Roadway Safety Program (RSP) Project Scope</b>					
<b>1.</b>	<b>Describe your safety improvement project in detail: (50 words or less)</b>				
<b>1a.</b>	This is a 4-leg urban intersection with 2-way stop control. It has experienced a significant number of angle, left-turn crashes, and a pedestrian fatality over the last 5 years. It is proposed to install a new traffic signal at the intersection to mitigate such crashes. CMF Clearinghouse provides a 4-Star CMF (ID: 5534) for intersection signalization with a Crash Reduction Factor (CRF) of 31.6%, which was used to calculate the B/C ratio for this project.				
<b>2.</b>	<b>Describe the project location, include pertinent demographic and land development information:</b>				
<b>2a.</b>	The project is at the Northern Ave and 63rd Ave Intersection in Glendale, AZ. 63rd Avenue is a half-mile street currently classified as a collector.				
<b>3</b>	<b>For projects on State System:</b>	<b>BMP: (Begin Milepost)</b>		<b>EMP: (End Milepost)</b>	
<b>4.</b>	<b>What network screening method was used to identify this project?</b>			<input type="checkbox"/> MAG <input checked="" type="checkbox"/> ADOT <input type="checkbox"/> Other (Below)	
<b>4a</b>					
<b>5.</b>	<b>Was this project identified as a recommendation in a study? If so, what kind? (check all that apply)</b>				
<b>5a</b>	<input type="checkbox"/> RSA <input type="checkbox"/> PA <input type="checkbox"/> SRTS Study <input type="checkbox"/> LASS Study <input checked="" type="checkbox"/> Other				
<b>6.</b>	<b>Was the project identified using an agency adopted predictive safety analysis?</b>			<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
<b>7.</b>	<b>What is the safety justification for the proposed project?</b>				
<b>7a</b>	This intersection has experienced significant number of angle, left-turn crashes, and a pedestrian fatality in the last five years. The intersection meets Criteria B of Section 4C.08: Warrant 7 of MUTCD, therefore installation of a traffic signal was considered as an appropriate countermeasure to mitigate the crash risk associated with the angle left-turn crashes, one of which was fatal within the past 5 years (7/2018). Within the past 6 years, there was an additional fatal crash (6/2013).				
<b>8.</b>	<b>Is Public outreach required for your project? If "yes" Provide what was done, the date(s) and outcomes. (Attach documentation if applicable)</b>				
<b>8a</b>	Yes; public outreach will be included as part of the design process of this project.				
<b>9.</b>	<b>What safety related public education will your agency be providing before placing the safety improvement in service, if applicable?</b>				
<b>9a</b>	Public outreach will be included as part of the design process of this project.				
<b>10.</b>	<b>Equity: Input the largest percent for each element for the one-mile radius or offset (Click on the hyperlinks in the text to open maps. See directions on side on maps):</b>				
	<a href="#">65 yrs and Older</a>	<a href="#">Minority Groups</a>	<a href="#">No Vehicle Households</a>	<a href="#">Disabled</a>	<a href="#">Living in Poverty</a>
<b>10a</b>	20.50%	51%	35.60%	16.61%	58.50%
<b>11.</b>	<b>Avg Daily Traffic (ADT) Volume:</b>	21,900	<b>Year Collected:</b>	2018	
<b>12.</b>	<b>Total Crash Frequency:</b>	59	<b>Crash Rate (MVM or MEV):</b>	1.5	
<b>13.</b>	<b>What is the posted speed limit?</b>	<b>40 mph</b>	<b>Benefit/Cost:</b>	7.2	

## PROJECT COST ESTIMATE WORKSHEET

**(Cost Estimates Are Required Regardless of Programming)**

	REQUESTED PROGRAMMING (Complete if Item will be programmed in the MAG TIP)	Location Description	Northern & 63rd Avenue				
		Work Description	Installation of Traffic Signal at Intersection				
		Funding Source	Local				
		Preferred Year to Program Work	2019				
COST ESTIMATE FOR DESIGN			UNITS	QUANTITY	UNIT COST	TOTAL	
<b>DESIGN</b>	<b>PRELIMINARY ENGINEERING (15% plans) (Required for Budget)</b>	Topographic Survey	LS	1	10,000.00	\$ 10,000.00	
		Design Concept Report (DCR)	LS	1		\$ -	
		Federal Project Environmental Determination	LS	1		\$ -	
		HAZMAT Assessment	LS	1		\$ -	
		<b>SUBTOTAL – PRELIMINARY ENGINEERING COSTS</b>					<b>\$ 10,000.00</b>
	<b>FINAL DESIGN (30, 60, 95, 100% plans) (Required for Budget)</b>	Plans, Specifications, Cost Estimates, Bidding	LS	1	109,000.00	\$ 109,000.00	
		Geotechnical Report	LS	1		\$ -	
		Drainage Report	LS	1		\$ -	
		SWPPP	LS	1		\$ -	
		<b>SUBTOTAL – FINAL DESIGN COSTS</b>					<b>\$ 109,000.00</b>
	<b>TOTAL PRELIMINARY ENGINEERING AND DESIGN COST AVAILABLE FOR PROGRAMMING</b>						<b>\$ 119,000.00</b>
	<b>CONSTRUCTION</b>	REQUESTED PROGRAMMING (Complete only if Construction will be programmed in the MAG TIP)	Location Description	Northern & 63rd Avenue			
			Work Description	Installation of Traffic Signal at Intersection			
			Funding Source	RSP			
			Preferred Year to Program Work	2020			
COST ESTIMATE FOR CONSTRUCTION			UNITS	QUANTITY	UNIT COST	TOTAL	
<b>CONSTRUCTION (Required for Budget)</b>		Construction Survey and Layout	LS	1	65,000.00	\$ 65,000.00	
		Obliterate Marking	LS	1	6,200.00	\$ 6,200.00	
		Concrete Ramp	EA	8	5,000.00	\$ 40,000.00	
		Establish New Electrical Service Connection	EA	1	5,000.00	\$ 5,000.00	
		Traffic Signal	LS	1	259,781.72	\$ 259,781.72	
		Traffic Signage and Markings	LS	1	5,000.00	\$ 5,000.00	
		Landscape Establishment	LS	1	5,000.00	\$ 5,000.00	
		Thermoplastic Pavement Markings	LF	3,200	1.12	\$ 3,568.00	
<b>SUBTOTAL - CONSTRUCTION COST</b>					<b>\$ 389,549.72</b>		
<b>MOBILIZATION AND ADMINISTRATION COSTS</b>		CONTRACTOR MOBILIZATION (Typically 8% of construction cost)				8%	\$ 31,163.98
	TRAFFIC CONTROL (0-8% of construction cost)				5%	\$ 19,477.49	
	CONSTRUCTION CONTINGENCIES (Typically 5% of construction cost)				5%	\$ 19,477.49	
	CONSTRUCTION ADMINISTRATION (Averaging 18% of construction cost)				15%	\$ 58,432.46	
<b>SUBTOTAL – MOBILIZATION &amp; ADMINISTRATION COSTS</b>						<b>\$ 128,551.41</b>	
<b>TOTAL UTILITIES, CONSTRUCTION AND MOBILIZATION FOR PROGRAMMING</b>						<b>\$ 518,101.13</b>	
<b>TOTAL COST ESTIMATE</b>						<b>\$ 637,101</b>	

**Budget and Signature Page**

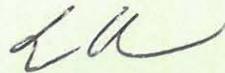
**Please describe the agency programming of this project in the agency's CIP**

Construction funds are identified in the City's Grant Reimbursement CIP account.

Phase	Location Description	Work Description	Year to be Programmed	Funding Source	Amount
Design	Northern & 63rd Avenue	Installation of Traffic Signal at Intersection	2019	Local	\$ 119,000
Construction	Northern & 63rd Avenue	Installation of Traffic Signal at Intersection	2020	RSP	\$ 518,101
<b>Total Cost</b>					<b>\$ 637,101</b>

**Signature: To be signed with printed hard copy that is sent to MAG**

**As the jurisdiction's manager/administrator or designated representative, I certify that the information contained in this application is accurate and complete and that the local funds for this project will be included in the Lead Agency's local current CIP/TIP or budget document if the project is selected for MAG Roadway Safety Program funding. I also certify the Lead Agency's commitment to maintain or operate the facility.**

Signature: 

Name: Trevor Ebersole

Title: Director of Transportation

Date: 11-06-2019

## RSP Application Benefit-Cost Tabulation Sheet

<b>Agency:</b>	Glendale	<b>Title of Project:</b>	Northern Ave and 63rd Ave Intersection
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### Annual Benefit Tabulation

Severity	Annual Average	Estimated CRF* Reduction	Total Reduction	Unit Cost	Annual Benefit
Fatal	0.20	32%	0.06	\$9,515,371	\$601,371
Incapacitating Injury	0.00	32%	0.00	\$550,499	\$0
Non-Incapacitating	1.20	32%	0.38	\$149,132	\$56,551
Possible Injury	2.40	32%	0.76	\$103,145	\$78,225
<b>Total Annual Benefits</b>					<b>\$736,147</b>

### Costs

Total Project Cost	\$637,101
Project Life (years)	10
Interest Rate (%)	8%
Capital Recovery Factor	0.1490
Annual Construction Cost	\$94,947
Annual Maintenance Cost	\$7,000.00
<b>Total Annual Costs</b>	<b>\$101,947</b>

Benefit / Cost		
Annual Benefit	Annual cost	Benefit / Cost Ratio
\$736,147	\$101,947	7.2

### List CMF(s) Used in the field below and its associated countermeasure(s)

CMF ID: 5534 (4-star); CMF is 0.684; Countermeasure is: Install a Traffic Signal; Reference Wang and Abdel-Aty, 2014

Glendale			Installation of Traffic Signal at Northern Ave and 63rd Ave Intersection																																
Incident ID	Incident Date & Time	Incident On Road	Incident Crossing Feature	Incident Offset	Incident Injury Severity Description	Incident First Harmful Description	Incident Collision Manner Desc	Incident Light Condition Desc	Incident Weather Desc	Incident Intersection Type Desc	Incident Junction Relation Desc	Incident Traffic Way Type Desc	Unit Travel Direction Desc	Unit Action Desc	Unit Road Condition Desc1	Unit Surface Condition Desc1	Unit Env Condition Desc1	Unit Defect Desc1	Unit Number	Unit Event Sequence Desc1	Unit Event Sequence Desc2	Person Type Desc	Person Safety Device Desc	Person Violation Desc1	Person Physical Desc0	Person Physical Desc1	Person Physical Desc2	Person Physical Desc3	Person Physical Desc4	Person Physical Desc5	Person Physical Desc6	Person Physical Desc7	Person Physical Desc9		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	25	26	27	28	29	30	31	32	33	34	35	36		
2868750	5/25/2014 1:36	Northern Ave	63rd Ave	0	Possible Injury	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Dark Lighted	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_DIVIDED_UNPROTECTED_PAINTED_4_FEET_MEDIAN	South	Making Left Turn	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	MOTOR_VEHICLE_IN_TRANSPORT		Passenger	Shoulder And Lap Belt		NO_APPARENT_INFLUENCE										
2970232	4/19/2015 16:15	63rd Ave	Northern Ave	0.0019	Possible Injury	Motor Vehicle in Transport	Head-on	Daylight	Clear	Four-way Intersection	Intersection Related Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	South	Slowing in Trafficway	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	2	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Shoulder And Lap Belt	OTHER	NO_APPARENT_INFLUENCE										
3030961	10/20/2015 7:51	63rd Ave	Northern Ave	0	Possible Injury	Curb	Single Vehicle	Daylight	Cloudy	Four-way Intersection	Intersection Non-Interchange	UNKNOWN	South	Making Left Turn	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	CURB_TREE_BUSH_STUMP_STANDING		Driver	Shoulder And Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										
3135032	6/18/2016 18:46	Northern Ave	63rd Ave	0	Possible Injury	Motor Vehicle in Transport	Left Turn	Dusk	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	South	Making Left Turn	No Data	Dry	No Data	BRAKES	1	MOTOR_VEHICLE_IN_TRANSPORT		Passenger	Air Bag Deployed/Shoulder-Lap Belt		NO_APPARENT_INFLUENCE										
3175048	10/22/2016 0:15	Northern Ave	63rd Ave	0	Possible Injury	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Dark Lighted	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	North	Going Straight Ahead	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Shoulder And Lap Belt	NO_IMPROPER_ACTION	NO_APPARENT_INFLUENCE										
3178662	9/30/2016 17:39	63rd Ave	Northern Ave	0.0104	Possible Injury	Motor Vehicle in Transport	Left Turn	Daylight	Clear	Four-way Intersection	Intersection Related Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	South	Going Straight Ahead	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	2	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Shoulder And Lap Belt	UNSAFE_LANE_CHANGE	NO_APPARENT_INFLUENCE										
3233227	2/25/2017 22:58	Northern Ave	07 63RD AVE	0	Possible Injury	Motor Vehicle in Transport	Rear-end	Dark Lighted	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED	West	Going Straight Ahead	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Shoulder And Lap Belt	SPEED_TOO_FAST_FOR_CONDITIONS	NO_APPARENT_INFLUENCE										
3234359	2/20/2017 19:55	Northern Ave	07 63RD AVE	0	Possible Injury	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Dark Lighted	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	North	Going Straight Ahead	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Air Bag Deployed/Shoulder-Lap Belt	RAN_STOP_SIGN	NO_APPARENT_INFLUENCE										
3301467	10/8/2017 9:11	Northern Ave	07 63RD AVE	0	Possible Injury	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Daylight	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_DIVIDED_UNPROTECTED_PAINTED_4_FEET_MEDIAN	North	Going Straight Ahead	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	MOTOR_VEHICLE_IN_TRANSPORT	UTILITY_POLE_LIGHT_SUPPORT	Driver	Shoulder And Lap Belt	RAN_STOP_SIGN	NO_APPARENT_INFLUENCE										
3324474	11/26/2017 7:13	Northern Ave	07 63RD AVE	0	Possible Injury	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Daylight	Clear	Four-way Intersection	Intersection Non-Interchange	UNKNOWN	North	Going Straight Ahead	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Shoulder And Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										
3341778	2/11/2018 20:35	07 NORTHERN AVE	63rd Ave	0	Possible Injury	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Dark Lighted	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_DIVIDED_UNPROTECTED_PAINTED_4_FEET_MEDIAN	North	Going Straight Ahead	No Contributing Circumstances	Dry	No Contributing Circumstances	No Contributing Circumstances	1	Motor Vehicle In Transport		Driver	Shoulder And Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										
3440280	11/24/2018 17:45	07 63RD AVE	Northern Ave	0	Possible Injury	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Dark Lighted	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	South	Making Left Turn	No Contributing Circumstances	Dry	No Contributing Circumstances	No Contributing Circumstances	1	Motor Vehicle In Transport		Driver	Shoulder And Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										
2970215	4/7/2015 19:27	Northern Ave	63rd Ave	0	Non-Incapacitating	Motor Vehicle in Transport	Rear-end	Dark Lighted	Clear	Four-way Intersection	Intersection Non-Interchange	UNKNOWN	West	Making Right Turn	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	2	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Air Bag Deployed/Shoulder-Lap Belt	SPEED_TOO_FAST_FOR_CONDITIONS	NO_APPARENT_INFLUENCE										
3268709	7/19/2017 6:14	Northern Ave	07 63RD AVE	0	Non-Incapacitating	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Daylight	Clear	Four-way Intersection	Intersection Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	South	Going Straight Ahead	NO_CONTRIBUTING_CIRCUMSTANCES	Dry	NO_CONTRIBUTING_CIRCUMSTANCES	NO_CONTRIBUTING_CIRCUMSTANCES	1	MOTOR_VEHICLE_IN_TRANSPORT		Driver	Air Bag Deployed/Shoulder-Lap Belt	RAN_STOP_SIGN	NO_APPARENT_INFLUENCE										
3354009	3/23/2018 8:15	07 NORTHERN AVE	63rd Ave	0	Non-Incapacitating	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Daylight	Cloudy	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	North	Going Straight Ahead	No Contributing Circumstances	Dry	No Contributing Circumstances	No Contributing Circumstances	1	Motor Vehicle In Transport		Driver	Air Bag Deployed/Shoulder-Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										
3408914	9/7/2018 14:05	07 NORTHERN AVE	63rd Ave	0	Non-Incapacitating	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Daylight	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	South	Going Straight Ahead	No Contributing Circumstances	Dry	No Contributing Circumstances	No Contributing Circumstances	1	Motor Vehicle In Transport	Curb	Driver	Air Bag Deployed/Shoulder-Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										
3426403	10/24/2018 7:01	07 63RD AVE	Northern Ave	0	Non-Incapacitating	Pedalcycle	Other	Daylight	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_DIVIDED_UNPROTECTED_PAINTED_4_FEET_MEDIAN	South	Stopped In Trafficway	No Contributing Circumstances	Dry	No Contributing Circumstances	No Contributing Circumstances	1	Pedalcycle		Driver	Shoulder And Lap Belt	UNKNOWN	NO_APPARENT_INFLUENCE										
3442206	11/27/2018 14:36	07 63RD AVE	Northern Ave	0	Non-Incapacitating	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Daylight	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	North	Going Straight Ahead	No Contributing Circumstances	Dry	No Contributing Circumstances	No Contributing Circumstances	1	Motor Vehicle In Transport	Motor Vehicle In Transport	Driver	Shoulder And Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										
3394230	7/26/2018 11:17	07 63RD AVE	Northern Ave	0	Fatal	Motor Vehicle in Transport	Angle (front to side)(other than left turn)	Daylight	Clear	Four-way Intersection	Intersection Non-Interchange	TWO_WAY_NOT_DIVIDED_WITH_CONTINUOUS_LEFT_TURN_LANE	South	Making Left Turn	No Contributing Circumstances	Dry	No Contributing Circumstances	No Contributing Circumstances	1	Motor Vehicle In Transport		Driver	Air Bag Deployed/Shoulder-Lap Belt	FAILED_TO_YIELD_RIGHT_OF_WAY	NO_APPARENT_INFLUENCE										

