Gila County –Tonto Creek Bridge
BUILD Grant Application
Benefit-Cost Analysis Executive Summary
May 18, 2020

Introduction

The Benefit-Cost Analysis (BCA) was performed following the guidance provided in the Benefit-Cost Analysis (BCA) Resource Guide. Many of the benefits of this project do not easily translate to simple quantification. The economic benefits of connecting to private developable land on the east side of Tonto Creek and providing a safe and efficient transportation network for the region cannot be easily quantified beyond impacts of construction activities and the inquiries the County has received from real estate agents representing clients interested in developing land on the east side of Tonto Creek once they know this project will be constructed. Providing an improved transportation network in the region does make an impact in terms of improving the per capita income in this area of the state that is below the national average.

Data was compiled, referenced, and analyzed using known or applicable monetary costs and benefits.

Current infrastructure within Tonto Basin (project area) mainly consists of unpaved two-lane rural roads with few paved roads. These roads are owned, operated, and maintained by either Gila County or the Tonto National Forest. Arizona State Route 188, a two-lane rural highway, runs parallel to Tonto Creek along the western edge of the project area and is the only road that provides the residents of Tonto Basin with access to Phoenix, Payson, and Globe. The Forest Service roads that cross Tonto Creek are at-grade dirt roads and provide the only access to SR 188.

The proposed project will construct a bridge, 1,980-ft in length, over Tonto Creek connecting the west side of Tonto Basin to the east side. Roadway improvements consisting of reconstruction and roadways leading up to the bridge are also included.

The Tonto Basin region of Gila County experiences seasonal flooding in the early winter and early spring. These events result in extended closures of the existing at-grade crossing of Tonto Creek. There are currently no structured crossings of Tonto Creek in the project area. Eight fatalities have been attributed to individuals attempting to cross Tonto Creek since 1995. School children on the east side of the creek must cross Tonto Creek in unsafe conditions or miss school for weeks and even months at a time during flood events. **Table 1** summarizes the findings of the BCA using a 3% and 7% discount.

Table 1: Benefit-Cost Analysis Results (3% and 7% Discounted)

Table 1 - Benefit-Cost Analysis Results (3% and 7% Discounted)

Base Year	2021
Lifetime	25 years

	Construction & Maintenance Costs			Safety Cost Benefit			Annual Maintenance Cost Benefit			Flood Response Cost Benefit			User Cost Delay from Closure/Detour Benefit		
Year	Non-Disc.	Discounted 3%	Discounted 7%	Non-Disc.	Discounted 3%	Discounted 7%	Non-Disc.	Discounted 3%	Discounted 7%	Non-Disc.	Discounted 3%	Discounted 7%	Non-Disc.	Discounted 3%	Discounted 7%
2021	$6,023,891	$5,848,438	$5,629,805	$3,072,000	$2,982,524	$2,871,028	$50,000	$48,544	$46,729	$62,255	$60,441	$58,182	$237,360	$230,447	$221,832
2022	$18,071,673	$17,034,285	$15,784,499	$3,072,000	$2,895,655	$2,683,204	$50,000	$47,130	$43,672	$62,255	$58,681	$54,376	$237,360	$223,735	$207,320
2023	$0	$0	$0	$3,072,000	$2,811,315	$2,507,667	$50,000	$45,757	$40,815	$62,255	$56,972	$50,818	$237,360	$217,218	$193,757
2024	$7,787	$6,918	$5,940	$3,072,000	$2,729,432	$2,343,614	$50,000	$44,424	$38,145	$62,255	$55,312	$47,494	$237,360	$210,892	$181,081
2025	$7,787	$6,717	$5,552	$3,072,000	$2,649,934	$2,190,294	$50,000	$43,130	$35,649	$62,255	$53,701	$44,387	$237,360	$204,749	$169,235
2026	$7,787	$6,521	$5,189	$3,072,000	$2,572,752	$2,047,003	$50,000	$41,874	$33,317	$62,255	$52,137	$41,483	$237,360	$198,786	$158,163
2027	$7,787	$6,331	$4,849	$3,072,000	$2,497,817	$1,913,087	$50,000	$40,655	$31,137	$62,255	$50,619	$38,769	$237,360	$192,996	$147,816
2028	$7,787	$6,147	$4,532	$3,072,000	$2,425,065	$1,787,932	$50,000	$39,470	$29,100	$62,255	$49,144	$36,233	$237,360	$187,374	$138,146
2029	$7,787	$5,968	$4,235	$3,072,000	$2,354,432	$1,670,964	$50,000	$38,321	$27,197	$62,255	$47,713	$33,862	$237,360	$181,917	$129,108
2030	$7,787	$5,794	$3,958	$3,072,000	$2,285,857	$1,561,649	$50,000	$37,205	$25,417	$62,255	$46,323	$31,647	$237,360	$176,618	$120,662
2031	$7,787	$5,625	$3,699	$3,072,000	$2,219,278	$1,459,485	$50,000	$36,121	$23,755	$62,255	$44,974	$29,577	$237,360	$171,474	$112,768
2032	$7,787	$5,461	$3,457	$3,072,000	$2,154,639	$1,364,005	$50,000	$35,069	$22,201	$62,255	$43,664	$27,642	$237,360	$166,480	$105,391
2033	$34,960	$23,806	$14,507	$3,072,000	$2,091,883	$1,274,771	$50,000	$34,048	$20,748	$62,255	$42,392	$25,833	$237,360	$161,631	$98,496
2034	$34,960	$23,112	$13,558	$3,072,000	$2,030,954	$1,191,375	$50,000	$33,056	$19,391	$62,255	$41,158	$24,143	$237,360	$156,923	$92,052
2035	$34,960	$22,439	$12,671	$3,072,000	$1,971,800	$1,113,434	$50,000	$32,093	$18,122	$62,255	$39,959	$22,564	$237,360	$152,353	$86,030
2036	$34,960	$21,786	$11,842	$3,072,000	$1,914,369	$1,040,593	$50,000	$31,158	$16,937	$62,255	$38,795	$21,088	$237,360	$147,915	$80,402
2037	$84,960	$51,402	$26,896	$3,072,000	$1,858,611	$972,517	$50,000	$30,251	$15,829	$62,255	$37,665	$19,708	$237,360	$143,607	$75,142
2038	$34,960	$20,535	$10,343	$3,072,000	$1,804,476	$908,894	$50,000	$29,370	$14,793	$62,255	$36,568	$18,419	$237,360	$139,424	$70,226
2039	$34,960	$19,937	$9,667	$3,072,000	$1,751,919	$849,434	$50,000	$28,514	$13,825	$62,255	$35,503	$17,214	$237,360	$135,363	$65,632
2040	$34,960	$19,356	$9,034	$3,072,000	$1,700,892	$793,863	$50,000	$27,684	$12,921	$62,255	$34,469	$16,088	$237,360	$131,421	$61,338
2041	$34,960	$18,793	$8,443	$3,072,000	$1,651,351	$741,928	$50,000	$26,877	$12,076	$62,255	$33,465	$15,035	$237,360	$127,593	$57,326
2042	$34,960	$18,245	$7,891	$3,072,000	$1,603,254	$693,391	$50,000	$26,095	$11,286	$62,255	$32,490	$14,052	$237,360	$123,877	$53,575
2043	$34,960	$17,714	$7,375	$3,072,000	$1,556,557	$648,029	$50,000	$25,335	$10,547	$62,255	$31,544	$13,132	$237,360	$120,269	$50,070
2044	$34,960	$17,198	$6,892	$3,072,000	$1,511,220	$605,634	$50,000	$24,597	$9,857	$62,255	$30,625	$12,273	$237,360	$116,766	$46,795
2045	$34,960	$16,697	$6,441	$3,072,000	$1,467,204	$566,013	$50,000	$23,880	$9,212	$62,255	$29,733	$11,470	$237,360	$113,365	$43,733
TOTALS:		**$ 23,229,225**	**$ 21,601,276**		**$53,493,190**	**$ 35,799,808**		**$ 870,657**	**$ 582,679**		**$ 1,084,050**	**$ 725,490**		**$ 4,133,191**	**$ 2,766,099**

	3% Discount	7% Discount
Discounted Benefits:	$ 59,581,088	$ 39,874,076
Discounted Costs:	$ 23,229,225	$ 21,601,276
Overall B/C:	**2.56**	**1.85**

Users of the project include, but are not limited to, Tonto Basin residents including school children; elderly persons receiving medical care; fire, police, and emergency medical services personnel; Tonto National Forest personnel; and visitors and recreational enthusiasts from around Arizona and the Southwest utilizing Tonto Basin and Tonto National Forest amenities. **Table 2** includes a summary of project benefits and costs as requested in the NOFO. Dollar values are estimated over a 25-yr period.

Table 2 – Summary of Project Benefits

<table>
<tr><th>Current Status/Baseline & Problem to be Addressed</th><th>Change to Baseline/Alternatives</th><th>Type of Impact</th><th>Population Affected by Impacts</th><th>Economic Benefit</th><th>Summary of Results</th></tr>
<tr><td>At-grade dirt road crossings of Tonto Creek</td><td rowspan="8">Construction of a bridge across Tonto Creek and associated approach roadway improvements will provide a year-round 100-yr dry crossing of Tonto Creek</td><td rowspan="2">Improved safety for local population and recreational visitors utilizing National Forest Lands</td><td>Tonto Basin region of Gila County - population of over 1,400</td><td rowspan="2">Improved safety by providing reliable transportation network and elimination of fatalities</td><td>$35,799,808</td></tr>
<tr><td>One half of area population live on east side of creek</td><td rowspan="6">Recreational users of National Forest Lands on the east side of Tonto Creek</td></tr>
<tr><td>Flows/flooding of Tonto Creek render at-grade roads impassable</td><td rowspan="2">Eliminate User Cost Delays due to 71 mile Detour</td><td rowspan="2">$2,766,099</td></tr>
<tr><td>Half of local population stranded until flows subside. Detour is a 71 mile one-way trip</td><td rowspan="3">Elimination of fatalities from creek crossings during high flow events</td></tr>
<tr><td>Eight fatalities have occurred over past 25 years from crossing during flow events</td><td>Elimination of emergency rescue costs associated with flooding</td><td>$725,490</td></tr>
<tr><td>County $ expenditures for maintenance and flood response</td><td>Reduction in annual maintenance $ expenditures by County</td><td>$582,679</td></tr>
</table>

Construction of the Tonto Creek Bridge will provide near-term construction jobs in economically distressed Gila County. The Tonto Creek Bridge will allow year-round tourism and recreational use of the surrounding area and facilities and provide safe and reliable access to the undeveloped private land located on the east side of Tonto Creek – the largest cluster of undeveloped land within Gila County. It will provide residents the ability to travel to work and school regardless of weather conditions. And finally, it will provide reliable, year-round access for law enforcement, fire, and emergency medical service personnel.

To the extent possible given the available data, the BCA prepared reflects the economic benefits in all major long-term impact areas identified in the grant application. These include:

- State of Good Repair – The project will reduce yearly maintenance costs in addition to the emergency repair and reconstruction costs Gila County currently expends annually to maintain the at-grade dirt roads improved by the project. This project is expected to generate **$39.87 million** in discounted benefits and **$21.60 million** in discounted costs using a 7% real discount rate over a 25-yr period.

- Long-Term Economic Competitiveness – Improved and reliable transportation facilities will eliminate residents' lost works days based on their inability to travel to work due to high creek flows and flooding. The year-round all-weather crossing of Tonto Creek also will provide greater opportunities to develop the existing large tracts of land into viable and sustainable residential and commercial facilities. Lost revenue from visitors and recreational users of the land in the region will also be greatly reduced with safe and reliable access. The area is well known for its year-round camping, hiking, mountain biking, boating, and fishing – 90% of which is accessed from the east side of Tonto Creek.

- Livability – Access to a safe transportation facility for the area that accommodates vehicles, pedestrians, bicyclists, hikers, and campers, as well as school children adds to the livability of the area. The project also provides enhanced job commuting options, improves connections between residential and commercial areas, and provides consistent access to emergency services.

- Environmental Sustainability – Air and water quality will be improved through the removal of at-grade vehicular traffic through Tonto Creek. Riparian habitat will re-establish with the removal of the at-grade crossings, which supports the Tonto Creek Riparian Unit's goal.

- Safety – Construction of the bridge will improve safety in a number of ways by providing:

    - A year-round, all-weather crossing for residents and visitors to the region.
    - A safe route to school for the students and teachers of Tonto Basin Elementary School.
    - Consistent access during emergency situations as fire fighters, police, and emergency personal will be able to access the east side of Tonto Creek regardless of the weather conditions.
    - Access for the Tonto National Forest to fight fires on lands located on the east side of Tonto Creek.
    - A means to eliminate fatalities experienced over the last 25 years from individuals attempting to cross the creek when the creek is flowing. As previously stated, five fatalities since 1995 have been attributed to the at-grade road crossings.

The total project cost is **$24,479,014**. The land acquisition (right-of-way) has been completed and paid for by the County. Utility relocations are pending construction funding. With the securing of construction funding, the project schedule will allow construction to begin on or before January 2022. **Table 3** summarizes the project costs and breakdown of financial commitment.

Table 3: Project Costs

Project Components	Breakdown		
	Costs	Gila County	BUILD Grant
Construction			
Land Acquisition	$383,450	$383,450	-
Utility Relocation	$200,100	-	$200,100
Final PS&E Package	$175,000	-	$175,000
Construction	$23,720,464	$3,000,000	$20,720,464
Total Project Cost:	**$24,479,014**		
Construction Funding:		$3,383,450	$21,095,564
	100%	14%	86%

Discounting

The following life-cycle costs and baseline benefits have been discounted following the Office of Management and Budget Circulars A-4 and A-94 at 7% and 3%. The 7% discount rate represents the average expected return on private capital. The 3% discount rate represents the social rate of time preference for households and individuals. The 3% rate may be more appropriate for the long-term benefits that accrue to current households and future generations and to lower-income households for whom long-term wealth accumulation or future social benefits will be more highly valued.

Assumptions and Data

The assumption used for elimination of fatalities associated with crossing during moderate to high flow events is based on the five documented fatalities that have occurred since 1995. The safety analysis used a 25-year period from 1995 to 2019. The yearly average of fatalities due to crossing incidents is 0.32 or 8 divided by 25.

Cost data for yearly maintenance and flooding-related emergency response is from Gila County records. Construction data and costs is based on the current Pre-Final Construction plans, specifications and estimate completed for the project.

Life-Cycle Costs

Discounted costs for the construction of the Tonto Creek Bridge is presented in **Table 4** (attached at end of document). Yearly maintenance and future rehabilitation needs were estimated following the guidelines furnished by the Arizona Department of Transportation (ADOT) Bridge Group – Operations Services. The costs include yearly maintenance after year 10 of between 0.20% and 0.25% of the cost of the bridge. A value of 0.25% was used in the analysis. Bridge deck joints are assumed to require replacement every 15 years. Deck rehabilitation is assumed to be required every 25 to 30 years.

Benefit Costs

The baseline benefits of the project were developed using recent and historical data compiled by Gila County. An analysis with monetized benefits was performed using available County resources and data. For the purposes of the analysis presented, three specific and quantitative items were included as follows.

1. Costs associated with seasonal flooding
    - Emergency Response
    - Gila County Public Works
    - Gila County Sheriff
2. Costs associated with yearly non-flood-related maintenance of the existing at-grade dirt roads across Tonto Creek
3. Costs associated with the loss of life from crossing-related fatalities
4. User Cost Delays resulting from the 71-mile detour around Roosevelt Lake when the crossings are closed

Since 2003 Gila County has spent **$1,058,330** on flood-related emergency response and rescue. This equates to a baseline benefit for emergency response and rescue of **$62,255** per year. Costs associated with yearly non-flood-related road maintenance of the existing at-grade dirt roads across Tonto Creek in Tonto Basin average **$50,000**. Construction of this project eliminates costs expended for this work.

Since 1995 (25-year period) five documented fatalities have been attributed to crossing Tonto Creek within Tonto Basin.

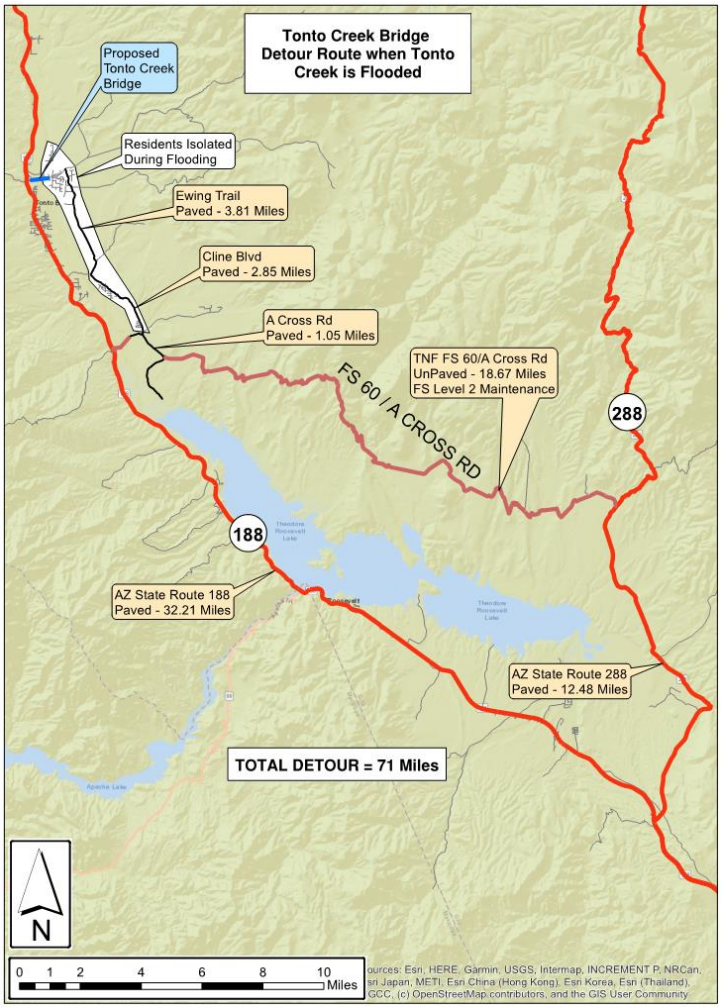
- 1995 – 1 man
- 1997 – 1 woman
- 2005 – 2 men
- 2008 – 1 woman
- 2019 – 3 children

The costs associated with fatalities was determined following the recommendations presented in the BUILD Benefit-Cost Analysis (BCA) Resource Guide for *Guidance on Treatment of the Economic Value of a Statistical Life U.S. Department of Transportation Analyses – 2016*. This value is set at $9,600,000 per fatality. Tonto Basin has averaged 0.32 crossing-related fatalities per year over the past 25 years. A value of $3,072,000 per year was used in the baseline benefit calculation for avoided fatalities with the construction of the bridge. **Table 5** (attached to end of document) presents the No Build Baseline Benefits used in the analysis.

When flooding of Tonto Creek occurs, the existing at-grade dirt roads are closed anywhere from 5 days to up to 5 weeks. For the user delay analysis performed, we have assumed that annually the crossings are closed for 5 days twice a year due to flooding events for a total of 10 days. The average daily traffic crossing Tonto Creek at the two at-grade dirt roads totals approximately 900 vehicles a day. When the crossings are closed the detour used by local residents is a 71 mile

one-way trip around Roosevelt Lake as shown in Figure 1. 18.7 miles of this detour route is classified as Level 2 per USFS maintenance guidelines. Level 2 roads require high-clearance vehicles. Due to the difficultly in traversing Level 2 roads, we have assumed in our analysis that only 20% of the 900 daily crossings of Tonto Creek are able to safely utilize the detour route or 180 vehicles. Using the Arizona DOT Long Term User Cost calculator user cost delays due to the detour are estimated to be $23,736 per day or $237,360 on an annual basis.

Figure 1: Tonto Creek Detour



To provide DOT with a reasonable and defensible BCA, several eligible project benefits described in Circulars A-4 and A-94 have not been monetized or included in our analysis. These include:

Valuation of Reduction in Health and Safety Risks to Children and Impacts on Children – The children that live in the area are subjected to the flooding and dangerous crossing conditions when going to school.

Potential loss of life from inability to respond to fire and emergency medical service calls on the east side of Tonto Creek – Data provided by the Tonto Basin Fire District indicates an average of 20 fire and 82 EMS related dispatches a year to the east side of Tonto Creek for first responders. Road closures due to flooding result in the existing at-grade crossings being closed an average of 26 days per year or 7% of the time. These closures equate to 1.4 non-responses for fire emergencies and almost 6 non-responses for EMS emergencies yearly. Assuming that 10% of all EMS calls are serious life-threatening emergencies resulting in death without assistance, this would equate to approximately 15 potential lives lost over a 25-yr period.

Non-fatal Health and Safety Risks – Historical data on the average number of law enforcement incidents per year that require crossing of Tonto Creek is unavailable, but is likely to exceed the number of medical emergencies and is estimated at 100 per year. If Tonto Creek cannot be crossed 7 percent of the time without a bridge, the number of law enforcement incidents that cannot be responded to per year is 7.

Benefits from Improved Air and Water Quality – An estimated 101 tons of PM_{10} will be removed from the air through the construction of the bridge and paving of the dirt roads (please see calculations in attached BCA spreadsheet).

Economic Development of Available Land on the East Side of Tonto Creek with Year-Round, Safe, Reliable Access – Developing the private land on the east side of Tonto Creek would provide Tonto Basin and Gila County with economic benefits in the form of higher land and tax values.

Loss of Worker Productivity – Specific data is not available for the number of lost work days or job terminations from the inability to cross Tonto Creek. A number of local residents have reported being terminated due to excessive work absence due to flooding.

Benefit-Cost Analysis Summary

Table 6 summarizes the calculated costs and benefits, discounted at 3% and 7% for the items discussed above. This project is expected to generate a Net Present Value of **$18,272,800** using a 7% discount rate resulting in a Benefit/Cost ration of 1.85.

Table 6: Benefit-Cost Ratio and Net Present Value

	Present Value @ 3%	**Present Value @ 7%**
Costs:		
Tonto Creek Bridge	$23,229,225	$21,601,276
Benefits:		
Emergency Response Exp.	$59,581,088	$39,874,076
Annual at-grade Maint. Exp.		
Deaths avoided (VSL)		
User Cost Delays		
Benefit/Cost Ratio:	2.56	1.85

Table 4 - Construction Costs for Tonto Creek Bridge[1]

Roadway:	$8,669,912	
Bridge:	$10,869,185	
Other:	$4,556,467	(Utility Relo, CE,Contingency, CPD)
Total:	$24,095,564	

1 - Source: Pre-Final Construction Cost Estimate Kimley-Horn April 2020
2 - Source: Arizona Department of Transportion Bridge Group Operation & Roadway Design Group

Estimate of Future Annual Maintenance Costs of Roadway per Lane-Mile[2]

Annual Maintenance Cost Per Lane Mile Using PeCoS Latest FY Data	
Category	**Other Locations**
1. Paved Surfaces & Shoulders	$420
2. Roadside	$230
3. Drainage & Environmental	$100
4. Rest Areas	$230
5. Traffic Operations - Signla & Lighting, Signing & Striping	$935
6. Landscaping	$85
7. Winter Storms	$155
8. Emergency Response	$30
9. Miscellaneous Maintenance	$300
10. Support and Other Operating Expenses	$1,165
11. Other Specialty Items	$0
MCL = Maintenance Cost per Lane Mile	$3,650
Annual Maintenance Cost of Project	
PW = Pavement Width	32
NL = Number of 12-ft Lanes	2.667
LP = Length of Project in Miles (1.18 miles less 2,012 ft bridge)	0.8
PMC = Current Project Maintenance Cost	**$7,787**

Estimate of Future Maintenance Cost of Bridge[2]

Maintenance Cost of Bridge using ADOT Bridge Group Operaion Data	
Category	
Bridge Deck Replacement after 30 years	$1,500,000
Bridge Joint Replacement after 15 years	$50,000
Annual Maintenance after year 10	0.25%
Annual Maintenance Costs (0.25% x Construction Cost)	$27,173

Costs - Construction & Maintenance

Year	Intial Constr.	Roadway Annual Maint.	Bridge Annual Maint.	Bridge Deck/Joint	Total Costs	3% Discount Rate	7% Discount Rate
2021	$6,023,891	$0	$0	$0	$6,023,891	$ 5,848,438	$ 5,629,805
2022	$18,071,673	$0	$0	$0	$18,071,673	$ 17,034,285	$ 15,784,499
2023	$0	$0	$0	$0	$0	$ -	$ -
2024	$0	$7,787	$0	$0	$7,787	$ 6,918	$ 5,940
2025	$0	$7,787	$0	$0	$7,787	$ 6,717	$ 5,552
2026	$0	$7,787	$0	$0	$7,787	$ 6,521	$ 5,189
2027	$0	$7,787	$0	$0	$7,787	$ 6,331	$ 4,849
2028	$0	$7,787	$0	$0	$7,787	$ 6,147	$ 4,532
2029	$0	$7,787	$0	$0	$7,787	$ 5,968	$ 4,235
2030	$0	$7,787	$0	$0	$7,787	$ 5,794	$ 3,958
2031	$0	$7,787	$0	$0	$7,787	$ 5,625	$ 3,699
2032	$0	$7,787	$0	$0	$7,787	$ 5,461	$ 3,457
2033	$0	$7,787	$27,173	$0	$34,960	$ 23,806	$ 14,507
2034	$0	$7,787	$27,173	$0	$34,960	$ 23,112	$ 13,558
2035	$0	$7,787	$27,173	$0	$34,960	$ 22,439	$ 12,671
2036	$0	$7,787	$27,173	$0	$34,960	$ 21,786	$ 11,842
2037	$0	$7,787	$27,173	$50,000	$84,960	$ 51,402	$ 26,896
2038	$0	$7,787	$27,173	$0	$34,960	$ 20,535	$ 10,343
2039	$0	$7,787	$27,173	$0	$34,960	$ 19,937	$ 9,667
2040	$0	$7,787	$27,173	$0	$34,960	$ 19,356	$ 9,034
2041	$0	$7,787	$27,173	$0	$34,960	$ 18,793	$ 8,443
2042	$0	$7,787	$27,173	$0	$34,960	$ 18,245	$ 7,891
2043	$0	$7,787	$27,173	$0	$34,960	$ 17,714	$ 7,375
2044	$0	$7,787	$27,173	$0	$34,960	$ 17,198	$ 6,892
2045	$0	$7,787	$27,173	$0	$34,960	$ 16,697	$ 6,441
						$ 23,229,225	**$ 21,601,276**

Table 5 - Project Benefits

Accidents - Tonto Creek crossing related deaths[1]

Year	Fatalities	Year	Fatalities
1995	1	2006	0
1996	1	2007	0
1997	0	2008	1
1998	0	2009	0
1999	0	2010	0
2000	0	2011	0
2001	0	2012	0
2002	0	2013	0
2003	0	2014	0
2004	0	2015	0
2005	2	2016	0
		2017	0
		2018	0
		2019	3
			0.32

average/year over previous 25 yrs

$9,600,000	2016 Economic Value of Statistical Life (VSL) per fatality
$3,072,000	Average Annual VSL

Annual Maintenance Costs for Existing Dirt Roads[1]

$50,000 - Gila County Public Works

1 - Source: Gila County Public Work and Emergency Management Division

Flood Response Costs[1]

Period:	2003-2010	2011-2018	2019
Public Works:	$389,730	$225,500	$0
Emergency Management:	$251,450	$155,250	$0
Sherriff Office:	$24,250	$12,150	$0
	$665,430	**$392,900**	**$0**

Average Cost 17 yr period: **$62,255**

User Cost Delays from Road Closure/Detour[2]

Daily User Cost:	$23,736
Average Days Closed per Event:	5
Average # Closure Events per Year:	2
Average Yearly Total:	$237,360

2 - ADOT Long Term User Cost Analysis (spreadsheet tab "ADOT Long Term User Cost")

Benefit - Eliminate Accidental Fatalities

Year	Average VSL	3% Discount Rate	7% Discount Rate
2021	$3,072,000	$2,982,524	$2,871,028
2022	$3,072,000	$2,895,655	$2,683,204
2023	$3,072,000	$2,811,315	$2,507,667
2024	$3,072,000	$2,729,432	$2,343,614
2025	$3,072,000	$2,649,934	$2,190,294
2026	$3,072,000	$2,572,752	$2,047,003
2027	$3,072,000	$2,497,817	$1,913,087
2028	$3,072,000	$2,425,065	$1,787,932
2029	$3,072,000	$2,354,432	$1,670,964
2030	$3,072,000	$2,285,857	$1,561,649
2031	$3,072,000	$2,219,278	$1,459,485
2032	$3,072,000	$2,154,639	$1,364,005
2033	$3,072,000	$2,091,883	$1,274,771
2034	$3,072,000	$2,030,954	$1,191,375
2035	$3,072,000	$1,971,800	$1,113,434
2036	$3,072,000	$1,914,369	$1,040,593
2037	$3,072,000	$1,858,611	$972,517
2038	$3,072,000	$1,804,476	$908,894
2039	$3,072,000	$1,751,919	$849,434
2040	$3,072,000	$1,700,892	$793,863
2041	$3,072,000	$1,651,351	$741,928
2042	$3,072,000	$1,603,254	$693,391
2043	$3,072,000	$1,556,557	$648,029
2044	$3,072,000	$1,511,220	$605,634
2045	$3,072,000	$1,467,204	$566,013
SUM (ALL YEARS)		**$53,493,190**	**$35,799,808**

Benefit - Elimination of Annual Dirt Rd Crossings Maintenance

Year	Maint. $	3% Discount Rate	7% Discount Rate
2021	$50,000	$48,544	$46,729
2022	$50,000	$47,130	$43,672
2023	$50,000	$45,757	$40,815
2024	$50,000	$44,424	$38,145
2025	$50,000	$43,130	$35,649
2026	$50,000	$41,874	$33,317
2027	$50,000	$40,655	$31,137
2028	$50,000	$39,470	$29,100
2029	$50,000	$38,321	$27,197
2030	$50,000	$37,205	$25,417
2031	$50,000	$36,121	$23,755
2032	$50,000	$35,069	$22,201
2033	$50,000	$34,048	$20,748
2034	$50,000	$33,056	$19,391
2035	$50,000	$32,093	$18,122
2036	$50,000	$31,158	$16,937
2037	$50,000	$30,251	$15,829
2038	$50,000	$29,370	$14,793
2039	$50,000	$28,514	$13,825
2040	$50,000	$27,684	$12,921
2041	$50,000	$26,877	$12,076
2042	$50,000	$26,095	$11,286
2043	$50,000	$25,335	$10,547
2044	$50,000	$24,597	$9,857
2045	$50,000	$23,880	$9,212
SUM (ALL YEARS)		**$870,657**	**$582,679**

Benefit - Elimination of Emergency Flood Response Costs

Year	Maint. $	3% Discount Rate	7% Discount Rate
2021	$62,255	$60,441	$58,182
2022	$62,255	$58,681	$54,376
2023	$62,255	$56,972	$50,818
2024	$62,255	$55,312	$47,494
2025	$62,255	$53,701	$44,387
2026	$62,255	$52,137	$41,483
2027	$62,255	$50,619	$38,769
2028	$62,255	$49,144	$36,233
2029	$62,255	$47,713	$33,862
2030	$62,255	$46,323	$31,647
2031	$62,255	$44,974	$29,577
2032	$62,255	$43,664	$27,642
2033	$62,255	$42,392	$25,833
2034	$62,255	$41,158	$24,143
2035	$62,255	$39,959	$22,564
2036	$62,255	$38,795	$21,088
2037	$62,255	$37,665	$19,708
2038	$62,255	$36,568	$18,419
2039	$62,255	$35,503	$17,214
2040	$62,255	$34,469	$16,088
2041	$62,255	$33,465	$15,035
2042	$62,255	$32,490	$14,052
2043	$62,255	$31,544	$13,132
2044	$62,255	$30,625	$12,273
2045	$62,255	$29,733	$11,470
SUM (ALL YEARS)		**$1,084,050**	**$725,490**

Benefit - Elimination of User Cost Delays from Road Closure/71 mile Detour

Year	User Cost $	3% Discount Rate	7% Discount Rate
2021	$237,360	$230,446.95	$221,832.11
2022	$237,360	$223,734.90	$207,319.73
2023	$237,360	$217,218.35	$193,756.76
2024	$237,360	$210,891.60	$181,081.08
2025	$237,360	$204,749.13	$169,234.65
2026	$237,360	$198,785.56	$158,163.23
2027	$237,360	$192,995.69	$147,816.10
2028	$237,360	$187,374.46	$138,145.89
2029	$237,360	$181,916.95	$129,108.31
2030	$237,360	$176,618.40	$120,661.97
2031	$237,360	$171,474.17	$112,768.20
2032	$237,360	$166,479.78	$105,390.84
2033	$237,360	$161,630.85	$98,496.11
2034	$237,360	$156,923.16	$92,052.44
2035	$237,360	$152,352.58	$86,030.32
2036	$237,360	$147,915.13	$80,402.17
2037	$237,360	$143,606.92	$75,142.21
2038	$237,360	$139,424.19	$70,226.37
2039	$237,360	$135,363.30	$65,632.12
2040	$237,360	$131,420.68	$61,338.43
2041	$237,360	$127,592.89	$57,325.63
2042	$237,360	$123,876.59	$53,575.36
2043	$237,360	$120,268.53	$50,070.43
2044	$237,360	$116,765.57	$46,794.79
2045	$237,360	$113,364.63	$43,733.45
SUM (ALL YEARS)		**$4,133,191**	**$2,766,099**