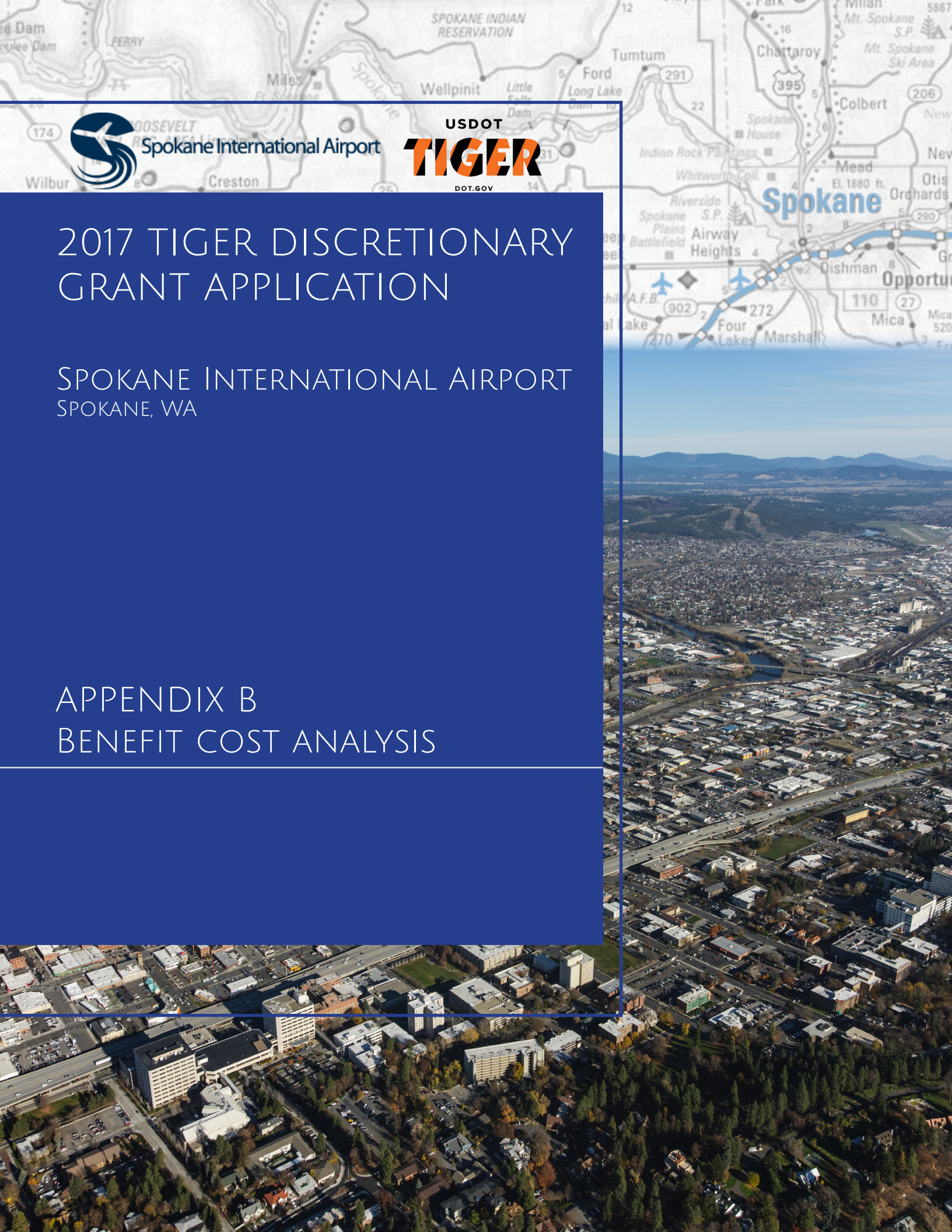
Spokane International Airport

USDOT TIGER DOT.GOV

2017 TIGER DISCRETIONARY GRANT APPLICATION

Spokane International Airport
Spokane, WA

APPENDIX B
Benefit cost analysis



Executive Summary

This Benefit-Cost Analysis (BCA) was completed for the Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project and was based on the Benefit-Cost Analysis Guidance for TIGER and INFRA Applications (2017). In summary, the economic value was estimated for the proposed transportation improvement project in terms of improvements to safety, mobility, health, decreased auto use, and reduced pollution benefits.

No-Build Baseline

The benefit cost analysis compares the Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project to a no-build scenario. This scenario assumes that no other improvements would be completed on the corridor and that current safety and economic factors would remain consistent through a 20 year life of the proposed project.

Net Benefits

Airport Drive is the only access to the Spokane International Airport Terminal. The $20.9 million Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project will conservatively provide up to $55.6 million in economic benefits, see **Table 1**. This results in a benefit cost ratio of 2.63:1. In addition, the project will benefit tourism and enhanced property values, which are more difficult to quantify.

The benefits table shown below summarizes the quantifiable selection criteria for this project, the description, inputs, value and monetized value at a seven percent (7%) and three percent (3%) discount rates. Project costs, benefits and net present value are showcased in the table, followed by the benefit-cost ratio in the bottom row.

TABLE 1 - BENEFIT COST ANALYSIS SUMMARY

BENEFITS	Present-Worth Value	7% Discount	3% Discount
Personal Travel Time	$4,823,806	$2,588,799	$3,607,562
Truck Travel Time	$5,547,651	$2,977,266	$4,148,901
Fuel Savings	$4,990,808	$2,678,424	$3,732,457
Emissions Reductions	$2,071,642	$1,111,791	$1,549,311
Safety	$37,743,374	$20,255,788	$28,226,997
Deferred Maintenance	$484,500	$288,494	$380,379
TOTAL BENEFITS	$55,661,780	$29,900,561	$41,645,606

COSTS	Present-Worth Value	7% Discount	3% Discount
Capital	$(20,907,000)	$(20,907,000)	$(20,907,000)
Maintenance	$(259,095)	$(122,891)	$(184,550)
TOTAL COSTS	$(21,166,095)	$(21,029,891)	$(21,091,550)

Net Present Value (NPV)	$34,495,685	$8,870,670	$20,554,056

Benefit Costs Ratio	2.63	1.42	1.97

Project Costs

The proposed Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project will cost a total of $20.9 million. The breakdown of the projected costs is included in the TIGER application narrative, BCA spreadsheet and Table 2 below. These costs include previously completed planning phases and future design and construction costs of the improvements. All property is currently owned by the City of Spokane therefore the project will not require any costs for right of way. Total project costs were estimates based on actual costs of projects recently constructed in the region. Maintenance costs for the new infrastructure have been included in the BCA calculations based on anticipated maintenance required.

TABLE 2 - PROJECT COSTS

PROJECT ITEM	NHFP GRANT	FAA GRANT	WSDOT GRANT	LOCAL MATCH	TIGER GRANT	COST	TIGER % OF TOTAL COST
SPOTTED ROAD OVERPASS							
Planning Studies			$150,000	$2,870,000		$437,000	0.0%
Enviro/Design		$1,000,000			$1,500,000	$2,500,000	60.0%
Construction	$8,000,000	$2,000,000		$1,500,000	$3,000,000	$14,500,000	20.7%
AIRPORT DRIVE TUNNEL							
Planning Studies				$20,000		$20,000	0.0%
Enviro/Design				$450,000		$450,000	0.0%
Construction		$2,000,000		$500,000	$500,000	$3,000,000	16.7%
TOTAL	**$8,000,000**	**$5,000,000**	**$150,000**	**$2,757,000**	**$5,000,000**	**$20,907,000**	**23.9%**

TABLE 3 - NET PRESENT VALUE BENEFITS					
MERIT CRITERIA	**DESCRIPTION**	**FACTORS**	**MONETIZED VALUE**	**MONETIZED VALUE DISCOUNT RATE (7%)**	**MONETIZED VALUE DISCOUNT RATE (3%)**
Economic Competitiveness	• Reduction in Travel Time (personal vehicle) • Reduction in Travel Time (truck/freight) • Fuel Cost Savings	• 342,000 hours saved in personal travel time • 203,000 hours saved in truck travel time • 1,650,000 gallons of fuel saved	$15,362,265	$8,244,488	$11,488,920
Safety	Accident Reduction Savings	• Fatality and accident cost savings • Safety Measures: - Two Grade Separated Interchanges	$37,743,374	$20,255,788	$28,226,997
State of Good Repair	Deferred Maintenance	Reduced maintenance costs. Maintenance costs for new infrastructure included in construction costs summary.	$484,500	$288,494	$380,379
Environmental Sustainability	Reduce Pollution	• 13.1 reduced short tons of VOC • 277.5 reduced short tons of NOx	$2,071,642	$1,111,791	$1,549,311
TOTAL COST			$(21,166,095)	$(21,029,891)	$(21,091,550)
TOTAL BENEFITS			$55,661,780	$29,900,561	$41,645,606
NET PRESENT VALUE			$37,267,685	$11,642,670	$23,326,056
BENEFIT COST RATIO			2.63	1.42	1.97

Project Matrix

A Project Matrix is provided to outline the proposed improvements, impacts, population affected, and economic benefits for the project. See **Table 4** on the following page for the Project Matrix.

TABLE 4- PROJECT MATRIX

PROJECT	CURRENT STATUS	IMPROVEMENTS	IMPACTS	AFFECTED POPULATION	ECONOMIC BENEFITS	SUMMARY
SPOTTED ROAD OVERPASS	Existing corridor has been identified as a high accident rate	Construct grade separated overpass interchange at Airport Drive/ Spotted Road intersection along corridor.	Reduce vehicle accidents. Reduce travel times, reduce congestion, reduce maintenance, improve safety & health.	5,000,000 annual, airport passengers, employees, shuttle bus passengers, tourist and residents accessing Airport Drive annually.	Monetized value of safety benefits, health, economic and environmental benefits.	Estimated value of mobility, health, and safety benefits.
AIRPORT ROAD SHUTTLE BUS TUNNEL	Shuttle Route currently negotiates four lanes of Airport Drive traffic to follow shuttle route.	Construct grade separated vehicle tunnel beneath Airport Road.	Reduce vehicle accidents, improve health, and increase mobility.	5,000,000 annual, airport passengers, employees, shuttle bus passengers, tourist and residents accessing Airport Drive annually.	Monetized value of safety benefits, health, economic and environmental benefits.	Estimated value of mobility, health, and safety benefits.

Long-Term Benefits

Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project meets all TIGER program primary and secondary criteria, as explained in the application and summarized below:

- Safety – Grade separated interchanges proposed in the Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project will provide safe buffers from commuter and freight traffic, thereby significantly improving safety in an area plagued by high numbers of vehicular accidents and will provide a safe efficient transportation corridor serve for residents, employees and visitors to the area and region.

- State of Good Repair - The existing infrastructure in the project vicinity, while receiving recent improvements and safety upgrades, continues to age and require additional maintenance and upgrades. New infrastructure along this corridor will reduce overall maintenance costs.

- Economic Competitiveness - The project will strongly enhance the multimodal transportation system at the Spokane International Airport and residents of the City and County of Spokane. The project will also promote economic development opportunities, stimulate development and increase property values along the transportation corridor.

- Quality of Life - In addition to providing safe and cost effective transportation alternatives for the millions of annual visitors and employees at the Spokane International Airport, the Multimodal Transportation Infrastructure Safety Improvement project will improve efficiency and safety for the transit network and the state's freight system.

- Environmental Sustainability - The project will improve environmental sustainability by reducing environmental impacts and costs from pollution by reducing traffic congestion and air pollution from automobiles, and will incorporate green infrastructure to reduce storm water runoff.

- Innovation - The project demonstrates innovation through the integration of multiple grade separated interchanges to the airport's multimodal transportation system.

- Partnership - The Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project builds on a long-term partnership with the Washington Department of Transportation, Spokane Regional Transportation Council, City of Spokane, Spokane County, and Spokane Transit Authority.

Benefits

Safety

A reduction in collision injuries and fatalities is the primary goal of the Spokane International Airport Multimodal Transportation Infrastructure Safety Improvement project. Proposed improvements are estimated to reduce accidents on the corridor by almost 80% which will reduce health costs. Injury and fatality numbers used for this calculation were drawn from the 2015 Airport Road Traffic Study and accident records provided the Spokane International Airport Police Department. These sources provided accident data for the Airport Drive Corridor and specifically the Spotted Road interchange from 1998-2013. The accident data was then scaled and monetized using data provided in the TIGER Benefit-Cost Analysis Resource Guide. Using the values provided in that guide, the Estimated Total Value of Fatalities and Injuries were developed.

The number of visitors, employees and motorists accessing the projects were estimated based on recorded vehicle traffic volumes and annual commercial aircraft operations at the airport. The reduction in injuries and fatalities benefit is estimated to be $1,477,544 per year, beginning in 2022 and continuing for 20 years. The present value of the safety benefit is $37,743,374 and $20,255,788 at a 7 percent discount rate. Calculations can be found in the "Accident Savings" tab of the supporting Excel spreadsheet.

Travel Costs

Benefits from a reduction in travel costs are primarily associated with the Spotted Road overpass. The overpass will provide faster more efficient access at this critical interchange. The grade separated interchange will reduce congestion at the interchange resulting in travel time savings for commuter and commercial traffic accessing the airport. Over the 20 year project life, the Spotted Road Interchange will reduce vehicle use by 545,000 hours based on travel time savings from the interchange improvements equating to 1,650,000 gallons in fuel saved and reduced pollution. The reduction in vehicle use (hours) was converted to miles based on the 35 mph speed limit on Spotted Road.

The reduced auto use benefit is estimated to be $601,389 a year, beginning in 2022 and continue for 20 years. The present value of the reduced auto use benefit is $15,362,265 and $8,244,488 at a 7 percent discount rate. Calculations can be found in the "Travel Time," "Fuel Savings," and "Emissions Savings" tabs of the supporting Excel spreadsheet.

State of Good Repair

Estimated annual maintenance costs for the current project infrastructure is $19,475 per year. At a 7% discount rate this equates to $288,494 of the 20 year life of the project. This number was derived from a standard operation and maintenance schedule for asphalt pavement in the region as well as unit cost acquired from recent pavement maintenance projects completed in the region from 2015-2017. This calculation is based on the assumption of a No-Build alternative and the requirement to continue maintaining the existing infrastructure for the 20 year life of the proposed improvements. This calculation also includes the cost of

major rehabilitation projects on the existing infrastructure due to the limited remaining life of the roadway. In this BCA the annualized costs are added to user benefits based on the assumption that the costs are deferred once the new infrastructure is in place and operational.

Environmental Sustainability

The reductions in pollution are a result of reduced congestion at the interchanges and reduce travel time resulting from the infrastructure improvements. Overall emissions reductions have been calculated for nitrogen oxides (NOx) and Volatile Organic Compounds (VOCs). Carbon dioxide (CO2) reductions were not included based on recommendations from the Benefit-Cost Analysis Guidance for TIGER and INFRA Applications (2017).

Based on these calculations, approximately 13.1 Short Tons of VOCs and 277.5 Short Tons of NOx will be removed from the environment over the life of the project. These reductions equal $2,071,642 in present worth dollars or $1,111,791 at a 7% discount rate. Costs for NOx and VOC reduction were calculated from rates provided by the Benefit-Cost Analysis Guidance for TIGER and INFRA Applications (2017).

Unquantified Benefits

Tourism

As a major transportation hub for the Inland Northwest, these proposed improvements will benefit the growing tourism economy for Eastern Washington. The Inland Northwest provides a wide array of attractions that promote tourism use of the Spokane International Airport. Investments in the TIGER project will thereby support the robust tourism economy in Spokane. Tourists visit the rivers, mountains and other natural attractions in Spokane and Spokane County to participate in a wide variety of activities. While this analysis cannot estimate the additional tourism value that the project will provide, it can be conservatively assumed that it will generate additional visitor spending, helping to support local jobs and tax revenues.

The proposed project will provide a safer more efficient access to the Spokane International Airport, with over 5 million visitors annually. Nearly all these visitors will access the facility via Airport Drive. Improvements to the access corridor will benefit tourism with direct economic benefits in restaurants, hotels, bed and breakfasts, and other retail establishments in the region.

Enhanced Property Values

Studies have shown that the commercial and industrial parks in and around the Spokane International Airport are seeing increased growth and development over the last decade. Airport Drive is the primary access to a large majority of the available development land part of this growth and development. Improvements to the access corridor will not only expedite the regions development but will result in increased property values for the area.

The grade separated interchanges proposed for the project will increase the efficiency and safety of the multimodal transportation system currently operating along the corridor. While this analysis does not estimate enhanced property value for existing and likely new development that would occur because of the TIGER projects, it is anticipated that it will generate significant property value benefits.