Expected Project Costs and Benefits

For the Notice of Funding Availability for Supplemental Discretionary Grants for Capital Investment in the Surface Transportation Infrastructure under the American Recovery and Reinvestment Act (FR Doc. E9-14232, Docket No. OST-2009-0115)

Southwest Florida International Airport

Southwest Florida International Airport Collector/Distributor Access Interchange

Florida Department of Transportation
September 2009

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Executive Summary

The final notice published in the Federal Register on June 17, 2009 stated that any applicant seeking a TIGER Discretionary Grant of more than $20 million but less than $100 million must include in its application, estimates of the project's expected benefits in the five long-term outcomes identified in Section II(A)(1)(a) (State of Good Repair, Economic Competitiveness, Livability, Sustainability, and Safety). In addition the notice states "applicants for TIGER Discretionary Grants are generally required to identify, quantify, and compare expected benefits and costs" in terms of these five long-term benefits.

The purpose of this report is quantify the monetary benefit in net present value of the Southwest Florida International Airport (SWFIA) Collector/Distributor Access Interchange. The Florida Department of Transportation is submitting a TIGER Discretionary Grant application and this report is a companion document to substantiate the expected benefits and costs in accordance with the final notice.

Anticipated traffic volumes, current crash rates, and other serious concerns are hindering growth of commerce and effectiveness of hurricane evacuation in this area of Southwest Florida. Both interchanges at Alico Rd. & Daniels Parkway will suffer operational failure if a new system access is not constructed to the SWFIA. The proposed project (C/D system) would provide a direct route between I-75, the primary commerce and evacuation corridor, and SWFIA. The C/D system will improve LOS at interchanges and associated intersections.

The current preliminary estimate for the design and construction of this project is $98,695,987

The purpose of this report is to comply with the final guidance provided relating to the benefit cost analysis development in accordance with Office of Management and Budget guidance for the preparation of Regulatory Analyses. Included are the methodologies, procedures, assumptions and references of how the concluding figures were determined.

The benefits contained within this report were derived using traffic and assumption from existing FDOT and Port Authority documents, including:

- I-75 Project Development and Environmental Study, (November 2002) and the associated July 2005 Reevaluation, FPID 406225-1-22-01.

- I-75 Systems Interchange Modification Report (SIMR-August 2002), FPID 202016-1-12-01.
- 2005 SWFIA Economic Impact Study
- 2004-2008 FDOT Off-System Crash data
- 2004 Final SWFIA Master Plan Update

In addition, other resources provided in the final notice guidance were utilized to derive monetary benefits.

The analysis summarizes net benefits and B/C ratio for a net present value utilizing a 7% discount rate scenario. Net benefits in excess of $700 million over the 20 year time horizon are attainable when applying a discount rate of 7%, and the B/C ratio is 7.3 for the 7% discount rate scenario.

Introduction

The Florida Department of Transportation (FDOT) is submitting a TIGER Discretionary Grant application for the Southwest Florida International Airport Collector/Distributor Access Interchange in Lee County. The project includes improvements to 4.8 miles of Interstate 75 (SR 93) from south of Alico Road to Daniels Parkway. A collector/distributor roadway will combine the interchanges for Alico Road and the new Southwest Florida International Airport (SWFIA) access road into a single point of exit/entry from the Interstate. Direct access to the recently completed SWFIA terminal facilities will utilize a new trumpet interchange at I-75 and a partial single point urban interchange at Ben Hill Griffin Parkway.

The final notice published in the Federal Register on June 17, 2009 provided additional guidance on how the US Department of Transportation (USDOT) will apply the selection criteria as well as how expected project costs and benefits would be evaluated. The final notice referenced the importance of a benefit cost analysis for surface transportation investment, and the need to identify, quantify, and compare the project's expected benefits and costs.

Study Alternatives

The required Environmental Studies and Documents previously done for this project evaluated various alternatives for meeting the purpose of the project. The purpose of the project is to provide an acceptable level of service along the section of I-75, the interchanges at Daniels Parkway and Alico Road, and affected arterials and intersections within the study area, through the design year, with the intent of providing an adequate traffic flow level of service and connectivity for area residents and businesses. The project would also provide for the safe and effective traffic demand along I-75 on a local and regional level. Furthermore, the project would address the maintenance of congested existing arterials.

The SIMR researched all reasonable alternatives to this new interchange and states "the need for the proposed configuration of the C-D road and trumpet interchange system is driven by the need for accessibility to support the expansion of the SWFIA, and to alleviate the traffic congestion on the I-75 general use lanes. Ramp metering, mass transit, and HOV lanes are not suitable alternatives in a no-build situation because traffic patterns are substantially different if the C-D and trumpet interchanges are not constructed.' Additionally the SIMR states the improvement is consistent with local and regional plans and has been coordinated with area development "particularly, the future expansion of SWFIA and FGCU are the driving force behind the need for modified access"

Long Term Outcome Benefits

State of Good Repair

This outcome improves the condition of existing facilities with an emphasis on minimizing life-cycle costs. The C/D system will reduce congestion at the existing Alico Road and Daniels interchanges and the network of roadways currently utilized to move traffic from SWFIA to I-75. This reduction in traffic volumes will translate to lower loading (ESAL's) on the existing paved facilities and can stretch the budget on resurfacing these existing facilities. Assuming:

- an average 10 years between resurfacing projects can be stretched to 15 years based on reduced traffic
- 24 lane-miles of affected existing pavement
- $150,000/lane-mile resurfacing - $3.6M affected system
- Discount rate of 7%
- Present Value of no-build resurfacing: $2,302,979
- Present Value of build resurfacing: $1,177,727
- Benefit Summary: $525,252 (No-Build minus Build)

	Summary of Life Cycle Cost Savings	
	No Build NPV	Build NPV
Year 10	$1,830,057	n/a
Year 15	n/a	$1,304,806
Year 20		n/a
Year 30	$472,922	$472,922
Total	$2,302,979	$1,777,727
Net Benefit	$525,252	

Table 1

Economic Competitiveness

Southwest Florida International Airport is an important contributor to the region's social and economic well-being.

In 2005, the airport conducted an Economic Impact Study that found Southwest Florida International Airport generated more than $3.6 billion annually of direct and indirect revenue into the local economy as a result of airport operations. This was a 74 percent increase in contribution from a study conducted in 1999. At that time, the airport contributed $2 billion to the region's economy.

The study, which was conducted by Ricondo & Associates for the Lee County Port Authority, analyzed the airport's direct and indirect contributions to the Southwest Florida economy. Direct impacts include economic activities that would not occur in the absence of the airport, including revenue from airlines,

airport shops and restaurants, cargo handlers and other airport operations. Indirect impacts are the effects of increased employment and expenditures created by successive rounds of local spending and hiring.

The total $3.6 billion economic output includes both direct and indirect impacts. It takes into account money spent by companies and agencies that do business at the airport, by visitors who arrive in the area via the airport, and by travel agencies within the airport's service area, according to the percentage of their business that is aviation-related.

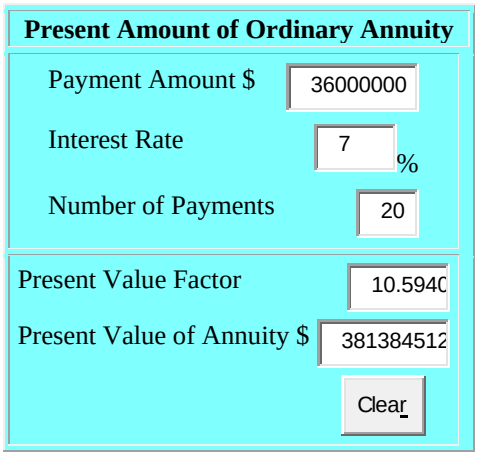
The data showed the airport's impact on regional employment increased from 1999 to 2006 by 48 percent - from 43,940 to 64,800. At the same time, the region's payroll increased 72 percent due to the airport - from $886 million to $1.5 billion.

The airport directly provided more than 2,500 full-time jobs in 2005, which almost doubled the 1,400 jobs provided in 1999. Approximately 60% of these jobs are with airport concessions, including parking, car rental, ground transportation, food and beverage, retail and advertising operations. Employment by airlines and government agencies each account for approximately one-fifth of the total.

The study also examined the economic impact of Page Field, the general aviation airport operated by the Lee County Port Authority. The regional economic impact increased 43 percent - from $35.4 million in 1999 to $50.7 million in 2005.

This study quantifies the fact that the airport's importance extends beyond moving people and cargo. Almost everyone in Southwest Florida, even those who never directly use the airport or its services, enjoys some economic benefit from airport operations. The economic impact of the airport will continue to increase as the region grows.

In the SWFIA 2004 Master Plan Update, one of the key issues cited for meeting the airports long term goals is improved “Surface Roadway and Interstate Access to the New Midfield Terminal” Conservatively, this important improvement to the accessibility and efficiency of SWFIA can contribute an additional 1% to the economic growth or $36M annually. This translates to a NPV of $381,384,512 over the 20-year design life of the project.



Livability

The benefit of this outcome is derived from the reduction in user delay and travel time for Florida residents to access this regionally significant intermodal facility. The quality of the trip is additionally improved by eliminating the time spent in traffic in travel speeds well under the posted speeds.

"The AASHTO Redbook", originally titled "A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements" published in 1977, is the standard professional reference for benefit/cost analysis for highway improvement projects based on a systematic benefit/cost methodology to evaluate proposed projects. In 1993, the Texas Transportation Institute (TTI) adapted the methodology into a computer application know as the MicroBENCOST software sponsored by the National Cooperative Highway Research Program (NCHRP) Project 7-12 and distributed by the McTrans Center. In 1997, TTI enhanced the software with new features, new relationships, and updated default data sets. The 1977 AASHTO Redbook was updated in 2003 by ECONorthwest and titled "User Benefit Analysis for Highways" but commonly known as the "Redbook" as part of NCHRP Project 02-23 in association with Parsons Brinckerhoff, Inc. and Kittelson & Associates, Inc. The Redbook was developed to assist planners in the transportation field in various levels within government in highway investment decision making. The distributed package includes the Redbook Wizard (a spreadsheet-based model) that prompts the user for input one step at a time and the necessary documentation to assist the user through the process.

The Redbook Wizard is an Excel-based software program that operates using a Visual Basic interface that guides the user through each step of the benefit/cost analysis process. During the process, the user inputs values that describe the characteristics of the project, the users, traffic volumes, and project financing. There are three main types of input data required for the Redbook: 1) Calculated/Observed Values, 2) User-Selected Values, and 3) Default/Database Values. Calculated/Observed Values are values that are either calculated by qualified personnel or observed on-site. These inputs include length, cost, accidents, volumes, capacity, and speeds. User-Selected Values are either dated, named, or selected from a list by the user. These inputs include the naming and classification of various aspects of the project. Default/Database Values are values that can be found in either a table of default values or a database. These inputs include vehicle occupancy, economic parameters, fuel costs, growth parameters, truck load values, accident costs, and traffic conversion factors.

The systematic methodology of the Redbook, its software and its updates, provides cost factors, nomographs, and guidelines for estimating the economic effects of highway projects on highway users. Traditionally, agencies applying the Redbook methodology supply physical and financial data on the improvement as well as estimates of its effects on highway capacity and traffic. More recently, agencies have also attempted to quantify the benefits and costs of innovative contracting practices to improve the quality of highway project construction, reduce public inconvenience, and manage owner risks. The new contracting practices, which are not addressed by the Redbook, include provisions for incentive/disincentive payments to reduce construction impacts and costs on the public. Such enhancements are being considered for a future Redbook.

The analysis highlighted in the latest version of the Red Book ("User Benefit Analysis for Highways") was used to determine the savings on road user costs for the No-Build and the Build alternatives of the SWFIA C/D system.

Savings in Travel Time

The input data for the calculation of travel times for No Build and Build alternatives was extracted from the "I-75 Final Preliminary Engineering Report", dated November 2002. The Florida Department of Transportation (FDOT) conducted a Project Development and Environment (PD&E) Study to evaluate capacity improvements for mainline Interstate 75 (I-75) from the Collier/Lee County Line to north of SR 78 (Bayshore Road) in Lee County. The total project length for this study is approximately 27.9 miles (mi).

This study documents the results of the environmental and engineering analyses conducted to assist the FDOT and Federal Highway Administration (FHWA) to reach a decision on the location and conceptual design for the long-range improvements to I-75. Additionally, the study complis with the requirements of the National Environmental Policy Act (NEPA) to qualify the proposed project for Federal-aid funding.

The design year for the proposed improvements is 2030. The proposed improvements to I-75 include widening the existing four-lane divided facility. In addition, the study recommends several improvements to the existing interchanges to alleviate current operational/safety problems and accommodate the future travel demand.

Of special interest for this effort are the highlighted recommended improvements for the segment between the interchanges of Alico Road and Daniel Parkway. For this segment, the previously mentioned study recommended the implementation of a collector/distributor roadway between Alico Road and Daniels Parkway, which will allow the six-lane local access freeway to operate at Level of Service (LOS) D or better in this area and will also facilitate improved access to/from the Southwest Florida International Airport (SWFIA).

In year 2000, this segment of I-75 presented an average two-way daily traffic volume (AADT) of approximately 68,100 vehicles per day (vpd). This traffic is expected to grow to more than 137,000 vpd by year 2030, which accounts for a 3.39% average yearly growth rate.

To accommodate this growth, and as mentioned before, a collector/distributor roadway is recommended for the segment. The study demonstrated that the implementation of the collector/distributor roadway between Alico Road and Daniels Parkway not only provides improved operations for vehicles entering/exiting I-75 at both the Alico Road and Daniels Parkway interchanges but also allows the six-lane local access freeway to operate at Level of Service D or better in this area, as the following Table 2 shows:

Segment and Alternative Year 2030	Direction	Number of Lanes	AM Peak Hour			PM Peak Hour		
			Volume	Density	LOS	Volume	Density	LOS
I-75 between Alico Road and Daniels Parkway - NO BUILD	NB	3	6800	>45	F	9000	>45	F
	SB	3	9000	>45	F	6800	>45	F
I-75 between Alico Road and Daniels Parkway - BUILD	NB	3	3800	20.7	C	5100	29.5	D
	SB	3	4900	28	D	3700	19.9	C

Table 2

Based on volume and densities provided by the analysis, differences in speeds were calculated to determine the savings in travel times. The travel times were calculated for automobiles and trucks. The existing average peak hour truck percentage on mainline I-75 are about 15 percent during the morning peak and about 13 percent during the afternoon peak. However, a 9 percent peak hour truck percentage was recommended for use by FDOT for the analysis, which also represents the midpoint value between the high end of the rural freeway design hour truck percentage (10 percent) and the high end of the urban freeway design hour truck percentage (8 percent). With these assumption, the vehicle composition of the segment for 2030 results in 123,300 vpd being automobiles and 13,700 vpd being trucks.

The following tables 3 and 4 summarize the calculations of travel time savings based on the speed differences achieved by the project.

Inputs				
Autos			**Trucks**	
Average hourly wage	$21.20[1]		Average hourly compensation	$18.10[1]
Percentage of hourly wage	50%[1]		Percentage of hourly compensation	100%[1]
Average vehicle occupancy	1.2		Average vehicle occupancy	1.05
Speed without Improvement (mph)	35		Speed without Improvement (mph)	35
Speed with Improvement (mph)	62		Speed with Improvement (mph)	62
or			or	
Delay without improvement (min.)			Delay without improvement (min.)	
Delay with improvement (min.)			Delay with improvement (min.)	
1: Revised Departmental Guidance: Valuation of Travel Time in Economic Analysis, February, 2003				

Table 3

Calculations				
Autos			**Trucks**	
Value of time per hour (wage X percentage X occupancy)	$12.72		Value of time per hour (wage X percentage X occupancy)	$19.01
For speed change:			For speed change:	
Time without improvement (min.)	8.229		Time without improvement (min.)	8.229
Time with improvement (min.) (1 / speed) X length X 60	4.431		Time with improvement (min.) (1 / speed) X length X 60	4.431
Travel time saved per vehicle (min.):	3.798		Travel time saved per vehicle (min.):	3.798
or			or	
For delay change:			For delay change:	
Travel time saved per vehicle (min.): (delay without - delay with)	0.000		Travel time saved per vehicle (min.): (delay without - delay with)	0.000
Value of time saved per vehicle (VOT per hour * time saved / 60)	$0.8051		Value of time saved per vehicle (VOT per hour * time saved / 60)	$1.2030
Value of time saved per VMT (VOT per vehicle / length)	$0.1677		Value of time saved per VMT (VOT per vehicle / length)	$0.2506

Table 4

Based on the value of time saved per vehicle (and per vehicle type), and assuming 260 days per year (weekday only),the annual savings on travel time yielded by the improvements are estimated to be about $30,100,000.

Using an annual rate of return of 7%, the net present value of these savings amount to more than $ 300 million dollars for the design life of the project.

Sustainability

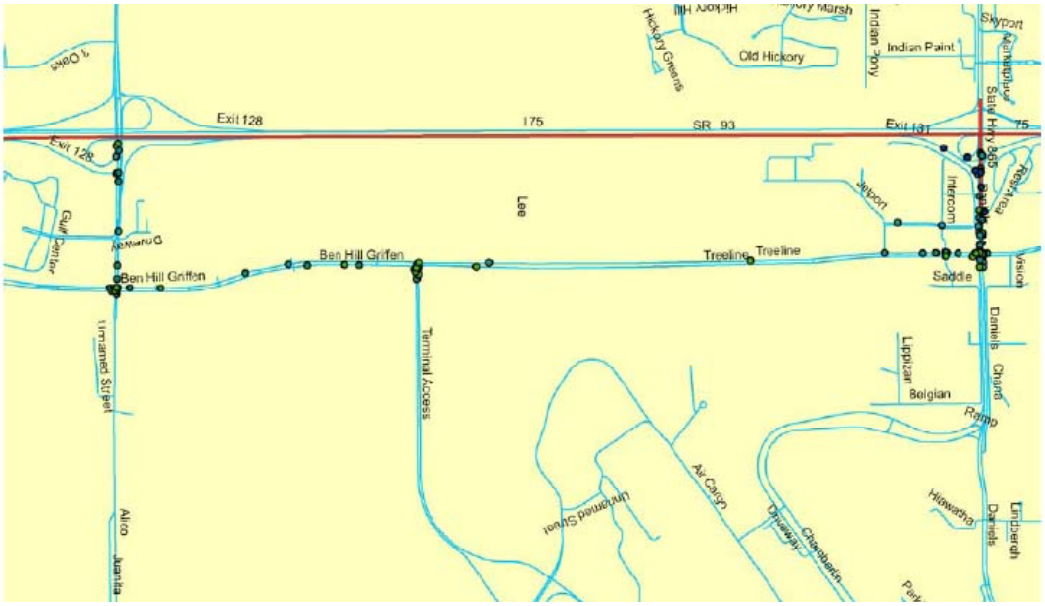
The SWFIA C/D system project includes the preservation of essential habitat for endangered Florida Panthers by obtaining panther credits from the appropriate mitigation banks. The C/D system anticipates 90 acres of impacts of low to medium quality wetlands. These wetlands are situated near development and constantly subjected to air and surface traffic noise. The mitigation for these wetlands will occur in conservation land that will preserve a more sustainable wildlife habitat for the panther and other species. The project anticipates obtaining 750 Panther Habitat Units (PHUs). Current estimates show a $3.6M investment toward environmental stewardship. The net gain based on the quality of the preserved land is assumed to be 50% of the investment. This generates $ 1.3M in environmental benefits

Additionally, vehicle travel time is being reduced by this system. This reduction translates to a reduction of greenhouse gas emissions and fuel consumption. With the Redbook Analysis the number of vehicle hours reduced by this improvement is 1,695,174 veh hours/year. With the average idling fuel consumption of 0.5 gal /hour, the fuel consumption benefit is $2,542,761/year. The NPV of this benefit is $26,938,046 dollars.

Present Amount of Ordinary Annuity	
Payment Amount $	2542761
Interest Rate	7 %
Number of Payments	20
Present Value Factor	10.5940
Present Value of Annuity $	26938046..
	Clear

The total sustainability benefit = $28,238,046. Additionally, based on idling calculators, this would reduce greenhouse gas emissions by 7,202 tons per year.

Safety



Crash Sites

The FDOT crash data for these off system roadways currently connecting I-75 to the SWFIA documented between 2005 and 2008, 154 vehicle property damage incidents on the affected roadways. Due to the source of the data, the type of injury was not provided, however, in 2005, Florida had a fatality rate of 0.0104 fatalities per crash. The characteristic of the driver accessing the airport can be inherently less safe than the drivers utilizing the local roads for commerce and leisure. These drivers can be unfamiliar with the area and/or prone to speeding and running yellow or red lights to meet arriving or departing flights. The segregation of this airport traffic from the normal local traffic will undoubtedly reduce the

annual traffic incidents. Within the same period, 102 crashes occurred on I-75 mainline, between Alico Road and Daniels Parkway. The following table illustrates a program developed by WSDOT to calculate benefit and costs of transportation improvements, updated in 2001. The applied reduction factors for injury, fatal and property damage only (PDO) accidents are derived from the "Informational Guide for Highway Safety Improvements"(1978). The annual safety benefit of the C/D system is calculated to be $1,173,780. The NPV of this benefit is $12,430,330 over a 20 year design life.

SAFETY BENEFITS

ACCIDENT SAVINGS-SAFETY PROJECTS

SR	SR 93		**Posted Speed:**	60	
Project Title:	Southwest Florida International Airport Collector/Distributor Access Interchange				
Subject Section:	**MP**	12.684	**to**	**MP**	16.427
Length of Subject Section:		5	**Miles**		
Number of Lanes:	**No - Build**	6	**Build**	6	

Safety Improvement

1) Roadway: Construct Interchange, Rural, Multi Lane

Annual safety Benefits in Number of Collisions:

Collision Type	(factor)	Total Acc.	Three (3) Year Study Period Ann. Ac	Ann. Benefit
a) Fatality (2)	0.30	3	1.00	0.30
b) Disabling injury (5)	0.30	0	0.00	0.00
c) Evident Injury (6)	0.30	0	0.00	0.00
d) Possible Injury (7)	0.30	72	24.00	7.20
e) PDO (1)	0.30	27	9.00	2.70

Costs Per Collision(FHWA-RD-91-005)

Collision Type	Costs
a) Fatality	$2,898,000
b) Disabling injury	$800,000
c) Evident Injury	$62,000
d) Possible Injury	$40,100
e) PDO	$5,800

Annual Safety Benefits by Costs of Collisions

a) Annual Benefit*Cost=	$869,400
b) Annual Benefit*Cost=	$0
c) Annual Benefit*Cost=	$0
d) Annual Benefit*Cost=	$288,720
e) Annual Benefit*Cost=	$15,660
f) Total, (B) =	$1,173,780

Service Life,(n) = 20 Salvage Value, (T) = 0 Interest Rate, (i) = 0.07

Present Worth of Cost, PWOC:

a) Present Worth Factor, PWni	0.26
b) Present Worth Factor, of a Uniform Service, SPWin	10.59

Present Worth of Benefits, PWOB = B (SPWin) $12,430,330

Table 5

Summary of Long Term Outcome Benefits

The following table summarizes the cost benefits associated with the long term outcomes defined in the Notice:

SUMMARY OF PROJECT BENEFITS - SWFIA C/D SYSTEM PROJECT		
TIGER Longterm Outcome	Calculated Benefit	Comment
State of Good Repair	$525,252	Reduced Life-Cycle Cost
Economic Competitiveness	$381,384,512	Increased GDP based on Economic Impact Study
Livability	$300,837,255	Reduced Travel Time
Sustainability	$28,238,046	Decreased Fuel Consumption, Environmental Stewardship
Safety	$12,430,330	Decreased Traffic Incidents
Total Benefit	$723,415,395	

Table 6

Project Costs

As provided by the FDOT, the total project cost estimated for the SWFIA C/D system is $98,695,987.

Benefit to Cost Ratio

The calculated B/C ratio is 7.3 using NPV for a 20-year design life and a 7% discount rate.