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.

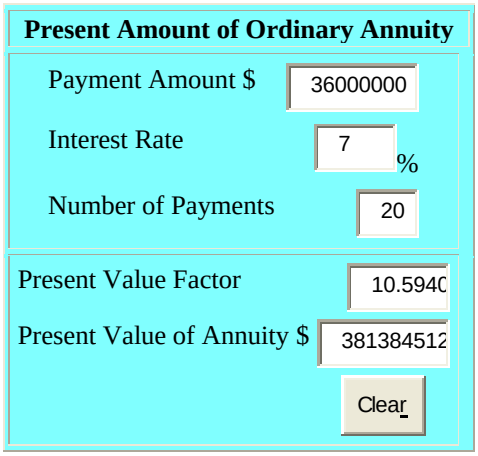
The data showed the airport's impact on regional employment increased from 1999 to 2006 by 48 percent - from 43,940 to 64,800. At the same time, the region's payroll increased 72 percent due to the airport - from $886 million to $1.5 billion.

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.

APPENDIX A

DESIGN TRAFFIC TECHNICAL MEMORANDUM

YOUR I-75 TEAM...PLANNING FOR OUR FUTURE

TRAFFIC MEMORANDUM

FLORIDA DEPARTMENT OF TRANSPORTATION - DISTRICT ONE

INTERSTATE 75

PHASE I
PROJECT DEVELOPMENT & ENVIRONMENT STUDY
From SR 951 to North of SR 78
Lee & Collier Counties, Florida

Financial Project ID Number: 406225 1 22 01
Federal Aid Project Number: 0755 068

September 2002

YOUR I-75 TEAM...PLANNING FOR OUR FUTURE

TRAFFIC MEMORANDUM

FLORIDA DEPARTMENT OF TRANSPORTATION - DISTRICT ONE

INTERSTATE 75

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PROJECT DEVELOPMENT & ENVIRONMENT STUDY
From SR 951 to North of SR 78
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Financial Project ID Number: 406225 1 22 01
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Prepared By:

URS Corporation Southern

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September 2002

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- Appendix H-2 – Ramp Merge/Diverge Analyses
- Appendix H-3 – Intersection Analyses

Section 1.0
INTRODUCTION

The Florida Department of Transportation (FDOT) is evaluating capacity improvements for mainline Interstate 75 (I-75) from south of SR 951 in Collier County to north of SR 78 (Bayshore Road) in Lee County, as shown in Figure 1-1. The total project length for this study is approximately 42.2 miles. The purpose of this Traffic Memorandum is to document the results of the forecasting methodology that was used to estimate the opening year and design year traffic volumes for the I-75 corridor as well as the results of the traffic analyses conducted to identify the geometric improvements required in the I-75 corridor to accommodate the design year peak hour traffic volumes. Subsequent sections of this report discuss the development of the travel demand model, the methodology used to assess the reasonableness of the travel demand forecasts, the design year laneage requirements associated with the I-75 mainline, the design year interchange improvements recommended for the I-75 corridor, and the opening year and design year levels of service project to occur with the implementation of the geometric improvements.

FIGURE 1-1
PROJECT LOCATION MAP

Section 2.0
TRAVEL DEMAND FORECASTING METHODOLOGY

2.1 OVERVIEW OF I-75 STUDY MODEL STRUCTURE

As stated in Section 1.0 of this report, the limits associated with the I-75 Phase I Traffic Memorandum extend from SR 951 in Collier County to SR 78 in Lee County. Since the I-75 study corridor traverses both Lee and Collier Counties, it was necessary to develop a travel demand model that included both counties and was, to the maximum extent feasible, consistent with the currently adopted Financially Feasible Long Range Transportation Plans (LRTPs) developed by both the Lee and Collier County Metropolitan Planning Organizations (MPOs). The Lee County MPO's travel demand model includes a significant portion of Collier County (and all of the I-75 study corridor) due to the strong interaction that occurs between the southern portion of Lee County and the urbanized portion of Collier County. An initial review of the Collier County traffic analysis zone (TAZ) data and roadway network that was included in the Lee County MPO's currently adopted Financially Feasible travel demand model was conducted to determine whether the socioeconomic forecasts (i.e., the ZDATA) and the roadway network were consistent with the Collier County MPO's current adopted Financially Feasible LRTP. The results of this review indicated that the Lee County MPO's travel demand model did not incorporate all of the data from the Collier County MPO's most recently adopted Financially Feasible LRTP.

Based on discussions with the FDOT, it was agreed that the Collier County roadway network and ZDATA contained in the Lee County MPO's current Financially Feasible LRTP travel demand model would be replaced with the roadway network and ZDATA contained in the Collier County MPO's current Financially Feasible LRTP travel demand model. The primary advantages associated with this approach are as follows:

- The use of Lee County data from the Lee County MPO's Financially Feasible LRTP and Collier County data from the Collier County MPO's Financially Feasible LRTP for the respective geographic areas ensures that a high level of consistency/compatibility is maintained with respect to both LRTPs.

- The use of one combined model that includes both Lee and Collier County allows the future trip making between these two counties to be treated as an internal phenomenon (e.g., the demand for travel on I-75 between Immokalee Road and Colonial Boulevard is estimated directly from the use of one model as opposed to indirectly using two models and a two-step process).

The horizon year associated with the current Collier County MPO's adopted LRTP is 2025. Although the horizon year associated with the current Lee County MPO's adopted LRTP is

2020, the total population forecast for all of the Lee County TAZs is equivalent to the latest Bureau of Economics and Business Research (BEBR) 2025 medium range population projection for Lee County. Consequently, the socioeconomic data contained in the Lee County MPO's 2020 travel demand model was assumed to be equivalent to the socioeconomic data contained in the Collier County MPO's 2025 travel demand model (i.e., representative of the same horizon year) and more importantly, all of the traffic projections obtained from the combined Lee/Collier County travel demand model (hereafter referred to as the "I-75 study model") were considered to be associated with the same horizon year.

2.2 NETWORK REVISIONS

The facility types and area types coded for the Lee and Collier County roadway networks were reviewed for reasonableness and consistency. Some changes in facility types and/or area types were made based on the results of the initial review. The most prevalent types of coding changes involved area type changes from transitioning areas to residential areas or outlying business districts and facility type changes that were made to eliminate situations where isolated segments of roadway were coded as a different facility than the adjacent segments of the same roadway. All of the I-75 roadway segments included in the model were coded to represent a freeway located within an urbanized area but not passing within five miles of the primary city central business district.

The model network was then "truthed" to ensure that the geographic locations of the roadway segments (and hence, the lengths of the roadway segments) were accurate. The model network was converted to a layer in a geographic information system (GIS) and then overlaid onto U.S. Geological Survey (USGS) digital ortho-quarter quad maps (digitized satellite photo images) of the area. The lengths of roadway segments were increased or decreased where necessary by changing the locations of the existing nodes and in some cases additional nodes were included to improve the alignment of certain roadways.

The network coding for the I-75/Alico Road interchange in Lee County was revised to reflect the FDOT's proposed improvements that were documented in the November 2000 I-75/Alico Road Interchange Modification Report (IMR) that was approved by the Federal Highway Administration (FHWA) on June 5, 2001. The network coding for the I-75/SR 951 interchange in Collier County was similarly revised to reflect the FDOT's preferred interchange improvement concept. These conceptual improvements were originally developed as a part of the FDOT's ongoing SR 84 Project Development and Environment (PD&E) Study, however, the evaluation and refinement of these geometric improvements is included as a part of the I-75 Phase I Traffic Memorandum. The only new interchange on I-75 that was included in the I-75 study model network is the I-75/Golden Gate Parkway interchange in Collier County. This new interchange was previously approved by FHWA and is currently in final design.

Network revisions were also made in the area surrounding the Southwest Florida International Airport (SWFIA). The SWFIA is currently in the process of updating its Master Plan to include a new midfield terminal complex as well as a revised airport access roadway system. Preliminary indications are that the existing terminal will either be abandoned or used exclusively for non-passenger aircraft operations (i.e., cargo) and the existing airport access

roadways (i.e., Chamberlin Parkway and Paul J. Doherty Parkway) will either be closed or limited to non-passenger vehicles.

A review of the roadway network included in the Lee County MPO travel demand model for the area surrounding the SWFIA indicated that both Chamberlin Parkway and Paul J. Doherty Parkway were coded in the model along with a new airport roadway connecting directly to Alico Road. All of these roadways were deleted from the I-75 study model network. The centroid connector from the TAZ containing the SWFIA to the Treeline Avenue Extension was retained since this centroid connector represents the new access roadway to/from the proposed SWFIA Midfield Terminal Complex.

2.3 DESIGN YEAR (2030) AADT VOLUME ESTIMATION PROCEDURE

Since the design year for the I-75 PD&E study is 2030, it was necessary to develop a methodology to derive 2030 Average Annual Daily Traffic (AADT) volumes. Population projections for the period 2000 to 2030 were obtained from BEBR for both Lee and Collier Counties. Since the county populations were estimated in five-year increments, population growth rates were calculated for the five-year period 2025 to 2030. Based on the BEBR data, the growth in total population forecasted to occur in both Lee and Collier counties between 2025 and 2030 was approximately 8.0 percent. This five-year population growth rate was used to derive the 2030 daily volumes.

The "internal" escalation of the person trips estimated by the model using the growth in population projected to occur between 2025 and 2030 allowed the I-75 study model output to be used as 2030 Peak Season Weekday Average Daily Traffic (PSWADT) volumes.

One other internal adjustment was applied to the person trip estimate to account for the potential future implementation of expanded public transit service. Both the Lee County and Collier County travel demand models are "highway-only" models (i.e., the models do not include transit networks and do not assign transit trips to the available transit routes). Currently, there is only limited transit (bus) service provided in both Lee and Collier Counties. Although there exists a strong possibility that the existing transit service will be expanded over the next 20 to 30 years, the use of a highway-only model precluded the ability to code transit networks and estimate the potential impact of transit improvements on travel demand in the I-75 corridor. Given the uncertainty associated with the exact nature of the transit improvements that will be implemented in Lee and Collier Counties in the future (both with respect to the overall urban area as well as in the vicinity of the I-75 corridor), it was agreed that the total number of person trips forecasted for each TAZ that was not located in a rural area would be reduced by one percent.

The 2030 PSWADT volume output obtained from the execution of the I-75 study model was multiplied by 0.90 and the resulting volumes were used as the 2030 AADT volume forecasts. The 0.90 value is the Model Conversion Factor (MOCF) for both the Lee and Collier County MPO models.

2.4 SOUTHWEST FLORIDA INTERNATIONAL AIRPORT AND FLORIDA GULF COAST UNIVERSITY TRIP GENERATION/DISTRIBUTION

The next issue that was addressed in the travel demand forecasting phase of the study was the estimation of the future travel demand associated with the SWFIA and the Florida Gulf Coast University (FGCU). Both of these land uses are located in the southern portion of Lee County and are expected to have a significant influence on the amount of vehicles traveling on I-75 due to the following:

- Both of these land uses can be categorized as regional facilities (i.e., land uses that provide specific services that are only available in a limited number of locations and hence, attract patrons from large geographical areas); and
- Both of these land uses are located in close proximity to I-75.

The SWFIA trip generation was estimated using the year 2020 aircraft enplanement forecast developed by Wilbur Smith and Associates for the Florida Aviation System Plan (FASP) Update Study along with the following airport trip generation equation documented in the May 1998 Institute of Transportation Engineering (ITE) Journal:

$$Y = 7.395(X)^{0.8526}$$

where: Y = Average Two-Way Daily Traffic Volume (vehicles/day)
X = Average Daily Origin/Destination Airport Passengers

The year 2020 FASP forecast for the SWFIA is approximately 7.69 million enplanements/year. The average number of daily airport passengers during the peak season was estimated from the annual enplanement forecast using the following equation:

Peak Season Average Daily Passengers = [(2) x (Annual Enplanements)/(12)(30)] x (1.345)

The annual enplanements are multiplied by 2.0 to yield an estimate of the annual origin/destination passengers. The yearly passengers are then converted to average daily passengers by dividing this value by the number of months per year (12) and the average number of days per month (30). The 1.345 factor is the peak season adjustment factor. This factor was calculated from the existing (2000) SWFIA monthly passenger data by dividing the number of passengers during the average month in the peak season by the average monthly passengers (based on all 12 months).

Prior to using the ITE airport trip generation equation to estimate the future number of vehicle trips to/from SWFIA, the existing number of SWFIA trips were calculated using this same equation and compared to the actual volume obtained from traffic count data. This comparison indicated that the ITE trip generation equation overestimated the existing number of vehicle trips to/from SWFIA by approximately 34 percent. Consequently, the year 2020 estimate was

reduced by 34 percent. Based on this methodology, the total number of vehicle trips entering and exiting SWFIA during the peak season was estimated to be 62,970 vehicles/day.

A large proportion of the airline activity associated with the SWFIA is recreational (tourist) in nature. The average automobile occupancy rates associated with airports that serve large tourist markets are higher than the automobile occupancy rates associated with airports that primarily serve business travel. In addition, as the number of daily origin/destination passengers increases, the percentage of private automobile use decreases. This is due to an increased availability of high-occupancy vehicle modes at larger airports (e.g., taxis, shuttle busses/vans, rental cars) coupled with an increased amount of off-site rental car areas that tend to increase the amount of shuttle busses (or vans) and decrease the amount of private automobiles. Based on data documented in the May 1998 ITE Journal, the percentage of non-private automobile usage associated with airport passenger activity levels greater than 10 million passengers/year ranges between 16 and 40 percent.

A High Occupancy Vehicle (HOV) factor was also applied to the SWFIA trip generation estimate to take into account the decreased percentage of the "drive-alone" mode that would be expected to occur by the year 2025. The HOV factors included in the Florida Standard Urban Transportation Model Structure (FSUTMS) vary depending on the trip purpose. For the purposes of this study, the HOV factor associated with the "home based work" trip purpose (i.e., 23 percent) was used for the airport trips.

The distribution of SWFIA trips was modeled separately using information contained in the 1989 SWFIA Origin and Destination (O&D) Survey. Based on the data contained in this report, the existing directional distribution of SWFIA trips is as follows:

- 41 percent to/from the south;
- 33 percent to/from the west;
- 20 percent to/from the north; and
- Six percent to/from the east.

Additionally, the O&D survey indicated that 33 percent of the SWFIA trips originated south of the Lee/Collier County Line while 9 percent originated north of the Lee/Charlotte County line. The remaining 58 percent of the SWFIA trips originate within Lee County.

An origin-destination trip table was developed for the SWFIA trips based on the seasonal population and hotel/resort occupancy forecasted for each TAZ. Weighting factors were assigned to the TAZs using a geographic information system to denote each zone's potential for attracting SWFIA trips. Each TAZ was assigned a weighting factor of 2.0 (high potential), 1.0 (medium potential), or 0.5 (low potential) based on the level of seasonal (non-resident) population forecasted to be present in a given zone. A second weighting factor was assigned to each TAZ based on the number of hotels/motels/resorts projected for each zone.

The SWFIA trips were first distributed by county (i.e., Lee, Collier, and Charlotte) in accordance with the percentages documented in the O&D study. The total number of SWFIA trips allocated

to each of the three counties were then distributed to the individual TAZs within each county based on their combined weighting factors. Once the airport trip distribution process was completed, a separate airport trip assignment process was developed to "preload" the SWFIA trips (i.e., to assign the airport trips to an unconstrained highway network).

The FGCU trip generation was estimated using future enrollment projections obtained from the FGCU along with the following trip generation equation for Land Use Code 550 (University/College) documented in the Institute of Transportation Engineer's Trip Generation Handbook (6th Edition):

$$T = 2.229(X) + 439.995$$

where: T = Average Two-Way Daily Traffic Volume (vehicles/day)
X = Number of Students

Based on student enrollment information provided by Mr. Jack Fenwick, FGCU Director of Facilities Planning, the total number of vehicle trips entering and exiting FGCU during an average weekday was estimated to be 50,338 vehicles/day.

An HOV factor was also applied to the FGCU trip generation estimate. The HOV factor associated with the "non-home based" trip purpose (i.e., 9 percent) was used for the FGCU trips. This value was selected because the FGCU is primarily a "commuter" school and is anticipated to continue operating as this type of facility in the future. A majority of commuter students drive alone to/from universities and hence the percentage of HOVs tends to be low.

One other adjustment to the FGCU trip generation estimate was required for use with the I-75 study model. This adjustment was necessary because the FGCU trip generation estimate represents an AADT volume while all of the other trips estimated by the I-75 study model are PSWADT volumes. As discussed earlier, the PSWADT volumes estimated by the I-75 model were automatically multiplied by 0.90 to convert the model output to AADT volumes. Since this output data conversion process was directly incorporated into the FSUTMS modeling process, the FGCU trip generation estimate was divided by 0.90 and this adjusted value of 55,931 vehicles/day was used as the input to the I-75 study model. This approach ensured that the converted I-75 model output (i.e., AADT volumes) reflected the total number of FGCU trips that were estimated based on student enrollment and HOV usage.

The distribution of FGCU trips was accomplished using a similar approach to the approach employed for the SWFIA trip distribution. A separate origin/destination trip table was developed for the FGCU trips based on each TAZ's potential to generate this type of trip. Each TAZ was assigned a weighting factor of either 2.0 (high potential), 1.0 (medium potential), 0.5 (low potential), or 0.0 (no potential). TAZs located in transitioning urban areas were assigned a weighting factor of 2.0 while TAZs projected to have either a large seasonal population or a large number of hotels/motels were assigned a weighting factor of 0.5. With the exception of the TAZs located in the Immokalee area, all of the other TAZs were assigned a weighting factor of 1.0. The Immokalee TAZs were assigned a weighting factor of 0.0 to prohibit the distribution/assignment of FGCU trips to this area.

Once the FGCU trip distribution process was completed (i.e., the FGCU trip table was created), a separate FGCU trip assignment process was conducted to preload the University trips. This same procedure was used for the SWFIA trips. Due to the lack of any readily available Origin/Destination data, a direct comparison between the model distribution and the actual distribution was not feasible; however, the estimated directional distribution of the FGCU trips in the immediate vicinity of the University was reviewed for reasonableness.

Section 3.0
FUTURE YEAR TRAFFIC PROJECTIONS

The Base Case Alternative that was used for this study included six lanes on I-75 from the SR 951 interchange in Collier County to the SR 78 interchange in Lee County. The number of lanes coded for all of the directional freeway links on I-75 between these two interchanges was increased from two (existing) to three for this alternative. After the I-75 study model was run and the resulting 2030 AADT volume assignment plot was obtained, a series of evaluations were conducted to assess the reasonableness of the model output. The following sections describe the primary procedures that were used to evaluate the reasonableness of the model output.

3.1 REASONABLENESS EVALUATIONS

A series of east-west screenlines were established and the total 2030 AADT volume projected at each screenline was calculated. The distribution of the total volume across the various north-south roadways associated with each screenline was reviewed with special emphasis placed on the percentage of the total screenline volume projected to use I-75. Volume-to-capacity (v/c) ratios were calculated for each north-south roadway crossing a given screenline and these v/c ratios were compared to assess the relative capacity utilization at each screenline.

The initial review of the v/c ratios indicated that significant disparities were projected to occur at several screenlines. Most of these disparities were not considered reasonable and, therefore, additional network adjustments (e.g., facility type changes, area type changes) were made to "equalize" the v/c ratios for the primary north-south roadways.

One of the key screenlines that was reviewed is the screenline located at the Caloosahatchee River in northern Lee County. This screenline consisted of the following five bridges:

- Cape Coral;
- Midpoint;
- US 41;
- Edison; and
- I-75.

The initial 2030 AADT volumes obtained from the I-75 study model indicated that the model was overassigning traffic to I-75 and underassigning traffic to the US 41 and Edison bridges.

A review of the network coding associated with these roadway segments indicated that the Lee County MPO's travel demand model had included a six-minute time penalty on all five of the river crossings listed above. The coding of time penalties on roadway segments crossing major rivers is a common occurrence and is used to account for various psychological factors that influence driver behavior when faced with choices regarding travel across geographical barriers. The specific values used for the time penalties and the specific roadway segments that are coded with time penalties are usually determined when a travel demand model is validated to a specific

base year (existing) condition. The magnitudes of the time penalties are chosen to best replicate the existing daily traffic volumes on the bridges.

Changes in the future year distribution of land uses and roadway capacities in the vicinity of a major river can be expected to result in different travel patterns across the river (as compared to the existing conditions). Therefore, the time penalty codings were revised. A series of model iterations were conducted using different values for the time penalties until the v/c ratios for the bridges were approximately equal.

The magnitude of the total north-south volume projected to cross the Lee/Collier County Line was also reviewed. The 2025 screenline volume at the Lee/Collier County Line estimated with the Collier County MPO's model is approximately 300,000 vehicles/day. Since the combined population in Lee and Collier Counties is projected to increase by approximately 8 percent over the five-year period from 2025 to 2030, it would not be unreasonable to expect that the 2030 screenline volume at the County line would reflect this same type of growth. A "target" 2030 screenline volume at the County line was estimated using the following procedure:

- Step 1: The total number of SWFIA trips and FGCU trips estimated in the Collier County MPO's model to travel across the County line into Collier County in the year 2025 was subtracted from the total 2025 screenline volume.
- Step 2: The value obtained from the calculation in Step 1 was multiplied by 1.08. As stated previously in Section 2.0, the average growth in total population forecasted to occur in Lee and Collier Counties between 2025 and 2030 was approximately 8.0 percent. This five-year population growth rate was used to derive the 2030 daily volumes from the 2025 daily volumes.
- Step 3: The total number of SWFIA trips and FGCU trips estimated in the I-75 study model to travel across the Lee/Collier County Line in the year 2030 was added to the value obtained from the calculation in Step 2.

Adjustments were made to the K-factor values contained in the I-75 study model until the revised 2030 Lee/Collier County screenline volume was approximately equal to the target volume. The K-factors are included in FSUTMS to control the level of interaction (i.e., travel demand) projected to occur between two geographical areas. Although K-factors are used infrequently (due to the high level of subjectivity associated with their use) these factors were present in both the Lee County MPO and Collier County MPO travel demand models. Consequently, K-factors were also included in the I-75 study model.

The origin/destination patterns of the vehicles projected to travel on I-75 were identified and reviewed using two different procedures. The complex weave analysis procedure contained in FSUTMS was employed to determine the number of trips occurring between each pair of interchanges within the I-75 corridor. A spreadsheet was then created to calculate the percentage distributions of entering (on-ramp) and exiting (off-ramp) traffic for each interchange ramp. The 2030 interchange-to-interchange trip distribution matrix is provided in Table 3.1. The existing (2000) interchange trip distribution data obtained from the I-75 Origin/Destination Survey is also provided in Table 3.1 for comparison purposes.

TABLE 3.1

I-75 INTERCHANGE TRIP DISTRIBUTION MATRIX
BASE CASE ALTERNATIVE

From \ To	SR 78		SR 80		Luckett Road		SR 82		Colonial Boulevard		Daniels Parkway		Alico Road		Corkscrew Road		Bonita Beach Road		Immokalee Road		Pine Ridge Road		Golden Gate Parkway		SR 951	
	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model	Survey	Model
North External Station	N/A	100%	23%	49%	18%	87%	33%	52%	20%	48%	25%	30%	9%	21%	10%	20%	8%	17%	6%	15%	5%	10%	N/A	7%	8%	8%
SR 78	---	---	77%	51%	48%	9%	30%	22%	26%	11%	19%	10%	9%	12%	6%	4%	7%	4%	2%	3%	2%	4%	N/A	1%	1%	1%
SR 80	29%	41%	---	---	34%	4%	26%	11%	41%	32%	19%	13%	10%	11%	6%	11%	4%	7%	3%	5%	3%	4%	N/A	2%	1%	1%
Luckett Road	5%	4%	6%	2%	---	---	11%	15%	12%	8%	5%	6%	3%	6%	2%	4%	2%	2%	2%	2%	0%	2%	N/A	1%	0%	0%
SR 82	11%	7%	7%	6%	15%	32%	---	---	2%	1%	6%	23%	6%	24%	10%	10%	5%	6%	2%	5%	2%	3%	N/A	6%	2%	3%
Colonial Boulevard	18%	12%	43%	34%	34%	19%	6%	1%	---	---	27%	18%	31%	18%	26%	16%	22%	9%	13%	8%	10%	6%	N/A	3%	8%	2%
Daniels Parkway	11%	7%	18%	10%	12%	10%	7%	21%	17%	15%	---	---	32%	7%	28%	20%	25%	16%	21%	14%	19%	9%	N/A	14%	13%	5%
Alico Road	6%	9%	7%	10%	11%	11%	36%	29%	23%	20%	19%	18%	---	---	11%	15%	7%	15%	9%	16%	9%	23%	N/A	13%	6%	9%
Corkscrew Road	5%	3%	5%	10%	6%	8%	17%	9%	14%	13%	12%	13%	13%	9%	---	---	20%	24%	13%	22%	11%	23%	N/A	16%	10%	9%
Bonita Beach Road	3%	4%	2%	8%	4%	6%	9%	8%	9%	11%	11%	17%	10%	16%	19%	21%	---	---	29%	10%	25%	11%	N/A	11%	15%	7%
Immokalee Road	6%	4%	4%	9%	5%	6%	7%	7%	12%	11%	19%	17%	24%	17%	33%	22%	39%	21%	---	---	15%	6%	N/A	18%	17%	17%
Pine Ridge Road	3%	5%	5%	6%	6%	4%	14%	6%	18%	9%	24%	11%	30%	28%	30%	24%	42%	24%	55%	9%	---	---	N/A	8%	19%	21%
Golden Gate Parkway	N/A	2%	N/A	3%	N/A	2%	N/A	11%	N/A	11%	N/A	13%	N/A	14%	N/A	18%	N/A	23%	N/A	34%	N/A	18%	---	---	N/A	15%
SR 951	2%	3%	2%	3%	1%	2%	5%	6%	7%	7%	13%	10%	16%	14%	17%	15%	17%	30%	43%	51%	83%	70%	N/A	65%	---	---
South External Station	1%	0%	3%	0%	5%	0%	0%	1%	8%	2%	3%	1%	7%	2%	2%	1%	1%	2%	2%	6%	17%	12%	N/A	35%	N/A	100%

The percentages listed in the SURVEY column are based on the Year 2000 I-75 Origin/Destination Study data.
The percentages listed in the MODEL column are based on the Year 2030 I-75 Study Model output.

Denotes percentage difference greater than 15%.

Since the additional land use and roadway capacity improvements forecasted to occur in the future will undoubtedly result in changes in travel patterns occurring over the next 30 years, a direct comparison between the existing percentage and the 2030 percentage for any individual interchange-to-interchange movement is not appropriate. An overall comparison of the existing and 2030 interchange trip distributions reveals the following:

- Most of the predominant travel patterns that currently exist are projected to continue in the design year (e.g., from Colonial Boulevard to SR 80, from Alico Road to SR 82, from Pine Ridge Road to Alico Road);
- Most of the minor travel patterns that currently exist are also projected to continue in the design year (e.g., from SR 951 to SR 78, from Luckett Road to Corkscrew Road, from SR 82 to Pine Ridge Road);
- Most of the 2030 interchange trip distribution percentages are within ±15 percent of the existing interchange trip distribution percentages.

A majority of the major discrepancies are either associated with the interchanges at the northern end of the study corridor (i.e., SR 78, SR 80, and Luckett Road) or associated with the future Golden Gate Parkway interchange in Collier County. The discrepancies projected to occur at the northern end of the study corridor are primarily attributable to the locations of these interchanges within the overall model (i.e., these interchanges are located at the northern edge of the model). Since traffic enters and exits the northern end of the I-75 study corridor via an external station, the model is unable to account for the specific interactions that will occur between the origins/destinations located in Charlotte County and the origins/destination served by the northernmost interchanges in Lee County. The implementation of new I-75 access at the Golden Gate Parkway interchange will redistribute a large percentage of the trips to/from I-75 that are made via the three existing Collier County interchanges, and in the process, will reduce the trip distribution percentages associated with the Immokalee Road, Pine Ridge Road, and SR 951 interchanges.

The second procedure that was used to review/evaluate the reasonableness of the future I-75 origin/destination patterns involved conducting select link trace assignments for each of the interchange on- and off-ramps within the study corridor. The individual on- and off-ramp "traces" (i.e., forecasted distributions of on- and off-ramp vehicles) were reviewed to determine if any abnormal or unreasonable travel paths were projected with the I-75 study model. The ramp traces were also used to identify excessively long or excessively short travel patterns. Abnormal travel paths often result from the presence of coding errors (e.g., two-way directional links incorrectly coded as one-way links, failure to code turn prohibitors at interchanges where specific movements cannot physically be made to or from the ramps, incorrect coding of roadway capacities) but can also result from an overall lack of facility capacity relative to the level of travel demand projected to occur. Adjustments were made to the I-75 study model coding to eliminate as many of the unreasonable travel paths as was practically possible.

3.2 DESIGN YEAR (2030) AADT VOLUMES – BASE CASE ALTERNATIVE

The 2030 AADT volumes projected to occur on the I-75 mainline with the Base Case Alternative are listed in Table 3.2. The 2030 AADT volumes are projected to range from 84,000 vehicles/day (north of the SR 951 interchange) to 155,400 vehicles/day (between the Bonita Beach Road and Corkscrew Road interchanges). The existing (2000) AADT volumes are also provided in Table 3-2 along with the magnitude of the increase in AADT volume projected to occur over the 30-year period and the average yearly growth rate. Table 3.2 indicates that the average yearly growth rate for the I-75 mainline ranges from approximately 3.39 percent/year (between the Alico Road interchange and the Daniels Parkway interchange) to 8.85 percent/year (between the Golden Gate Parkway interchange and the Pine Ridge Road interchange). The extremely high growth rate for the segment between Golden Gate Parkway and Pine Ridge Road is skewed due to the lack of existing interstate access at Golden Gate Parkway. The mainline segment projected to experience the largest increase in AADT volume is the segment located between the Bonita Beach Road interchange and the Corkscrew Road interchange. The overall average growth rate for the I-75 mainline (excluding the segment between the Golden Gate Parkway interchange and the Pine Ridge Road interchange) is approximately 4.65 percent/year.

TABLE 3.2

PROJECTED GROWTH IN I-75 MAINLINE VOLUMES
BASE CASE ALTERNATIVE

Segment					
From	**To**	**2000 AADT Volume**	**2030 AADT Volume**	**AADT Increase 2000 – 2030**	**Average Yearly Growth Rate**
SR 951	Golden Gate Parkway	28,500	84,000	55,500	6.49%
Golden Gate Parkway	Pine Ridge Road	28,500	104,200	75,700	8.85%
Pine Ridge Road	Immokalee Road	48,500	125,600	77,100	5.30%
Immokalee Road	Bonita Beach Road	61,900	139,600	77,700	4.18%
Bonita Beach Road	Corkscrew Road	57,000	155,400	98,400	5.75%
Corkscrew Road	Alico Road	58,000	140,000	82,000	4.71%
Alico Road	Daniels Parkway	68,100	137,300	69,200	3.39%
Daniels Parkway	Colonial Boulevard	60,200	130,000	69,800	3.86%
Colonial Boulevard	SR 82	57,900	134,900	77,000	4.43%
SR 82	Luckett Road	60,500	125,800	65,300	3.60%
Luckett Road	SR 80	58,300	129,500	71,200	4.07%
SR 80	SR 78	49,400	129,300	79,900	5.39%
Overall Corridor Average (excluding the segment between Golden Gate Parkway and Pine Ridge Road)					**4.65%**

Once the reasonableness checks were completed, a preliminary I-75 mainline level of service evaluation was conducted for the Base Case Alternative using the 2030 AADT volumes. Volume-to-capacity ratios were calculated for both Level of Service D and Level of Service E using the generalized daily level of service volumes for urbanized areas documented in the

FDOT 1998 Level of Service Handbook. Although the current minimum level of service standard for I-75 is Level of Service C, it is expected that the minimum standard will change to Level of Service D as soon as the urban boundary is extended to the east of I-75. The maximum volumes for Level of Service D and E for a Group 2 freeway (i.e., a freeway within an urbanized area not leading to or passing within five miles of a primary central business district) are 96,200 vehicles/day and 114,500 vehicles/day, respectively.

Table 3.3 summarizes the results of the preliminary I-75 mainline level of service evaluation conducted for the Base Case Alternative. The results indicate that if six lanes are implemented on the I-75 mainline from SR 951 to SR 78, Level of Service F operations are projected to occur in 2030 for the portion of I-75 from Pine Ridge Road to SR 78. Only the six-lane segment between SR 951 and Golden Gate Parkway is projected to operate at Level of Service D in 2030. The six-lane segment between Golden Gate Parkway and Pine Ridge Road is projected to operate at Level of Service E in 2030. The v/c ratios for Level of Service E listed in Table 3.3 indicate that the portion of I-75 between Pine Ridge Road and SR 78 is projected to operate between 10 percent and 36 percent over capacity in 2030. These preliminary results indicate that six lanes on the I-75 mainline will not be sufficient to accommodate the travel demand forecasted to occur in the year 2030 at an acceptable level of service.

TABLE 3.3

YEAR 2030 I-75 MAINLINE LEVELS OF SERVICE – BASE CASE ALTERNATIVE

Location	2030 AADT	# of Lanes	V/C Ratio		2030 LOS
			LOS D[1]	LOS E[2]	
Between SR 951 and Golden Gate Parkway	84,000	6	0.87	0.73	D
Between Golden Gate Parkway and Pine Ridge Road	104,200	6	1.08	0.91	E
Between Pine Ridge Road and Immokalee Road	125,600	6	1.31	1.10	F
Between Immokalee Road and Bonita Beach Road	139,600	6	1.45	1.22	F
Between Bonita Beach Road and Corkscrew Road	155,400	6	1.62	1.36	F
Between Corkscrew Road and Alico Road	140,000	6	1.46	1.22	F
Between Alico Road and Daniels Parkway	137,300	6	1.43	1.20	F
Between Daniels Parkway and Colonial Boulevard	130,000	6	1.35	1.14	F
Between Colonial Boulevard and SR 82	134,900	6	1.40	1.18	F
Between SR 82 and Luckett Road	125,800	6	1.31	1.10	F
Between Luckett Road and SR 80	129,500	6	1.35	1.13	F
Between SR 80 and SR 78	129,300	6	1.34	1.13	F

1 The maximum Level of Service D volume used in the v/c ratio calculation is 96,200 vehicles/day.
2 The maximum Level of Service E volume used in the v/c ratio calculation is 114,500 vehicles/day.

3.3 DESIGN YEAR(2030) AADT VOLUMES – RECOMMENDED ALTERNATIVE

Based on the results of the preliminary level of service evaluations conducted for the six-lane alternative, an additional alternative was modeled and evaluated for the I-75 study corridor. This alternative was coded to reflect the following laneage on mainline I-75:

- Six lanes from SR 951 to Pine Ridge Road;
- Ten lanes from Pine Ridge Road to SR 82; and
- Eight lanes from SR 82 to SR 78.

The ten-lane section was coded as two separate freeways. The six-lane freeway coded previously was used along with a new four-lane freeway that was coded on the inside of the six-lane freeway. This alternative is consistent with the current FDOT Interstate Policy. Access between the outer freeway and the interior freeway is provided via slip ramp connections. A limited number of slip ramps were coded to minimize the amount of access points to/from the interior freeway. The slip ramp locations were selected based on the desire to "balance" the demand with the capacity available on each freeway while at the same time maximizing the trip lengths associated with the interior freeway. By limiting the number of slip ramps, the interior freeway will operate as an "express" freeway serving primarily long distance trips.

Figures 3-1 through 3-4 summarize the 2030 AADT volumes projected for the I-75 study corridor. The total volume is projected to range from 92,400 vehicles/day (between SR 951 and Golden Gate Parkway) to 198,000 vehicles/day (between Bonita Beach Road and Corkscrew Road).

3.4 DESIGN YEAR (2030) PEAK HOUR VOLUMES – RECOMMENDED ALTERNATIVE

Design year peak hour volumes were developed for the I-75 mainline and the I-75 interchanges (including the interchange cross streets) by multiplying the 2030 AADT volumes by a K_{30}-factor of 9.3 percent and a D_{30}-factor of 57.0 percent. The K_{30}-factor represents the percentage of the average daily traffic volume that occurs during the 30th highest hour of the year while the D_{30}-factor represents the percentage of the two-way peak hour volume that is traveling in the peak direction.

The K_{30}-factor was estimated using the following procedure. First, three day average p.m. peak hour-to-daily volume ratios were calculated for each of the three I-75 mainline locations where 72-hour vehicle classification counts were conducted. These locations were as follows:

- Between SR 951 and Pine Ridge Road;
- Between Bonita Beach Road and Corkscrew Road; and
- Between Luckett Road and SR 80.

FIGURE 3-1

2030 AADT VOLUMES

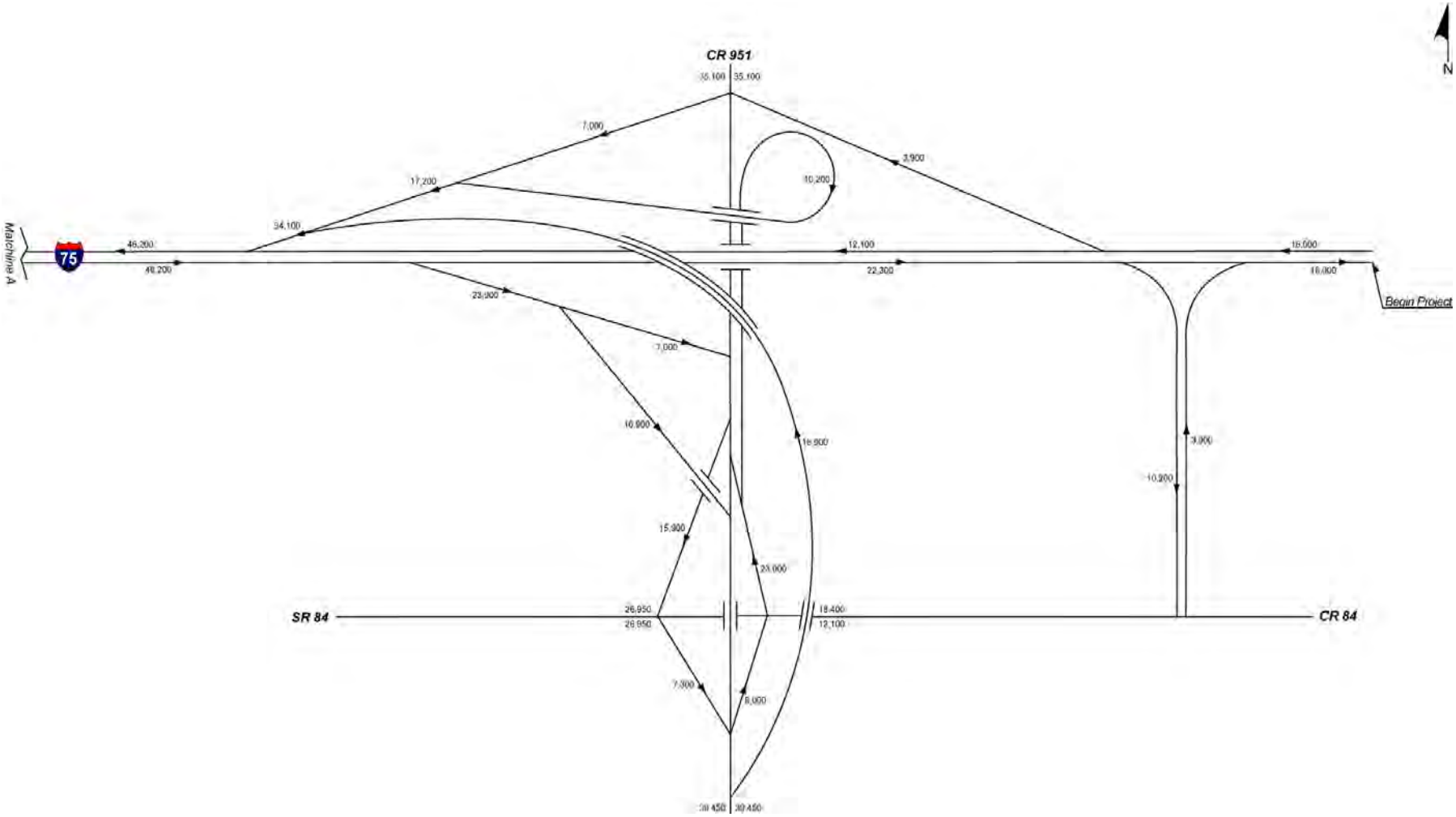


FIGURE 3-2

2030 AADT VOLUMES

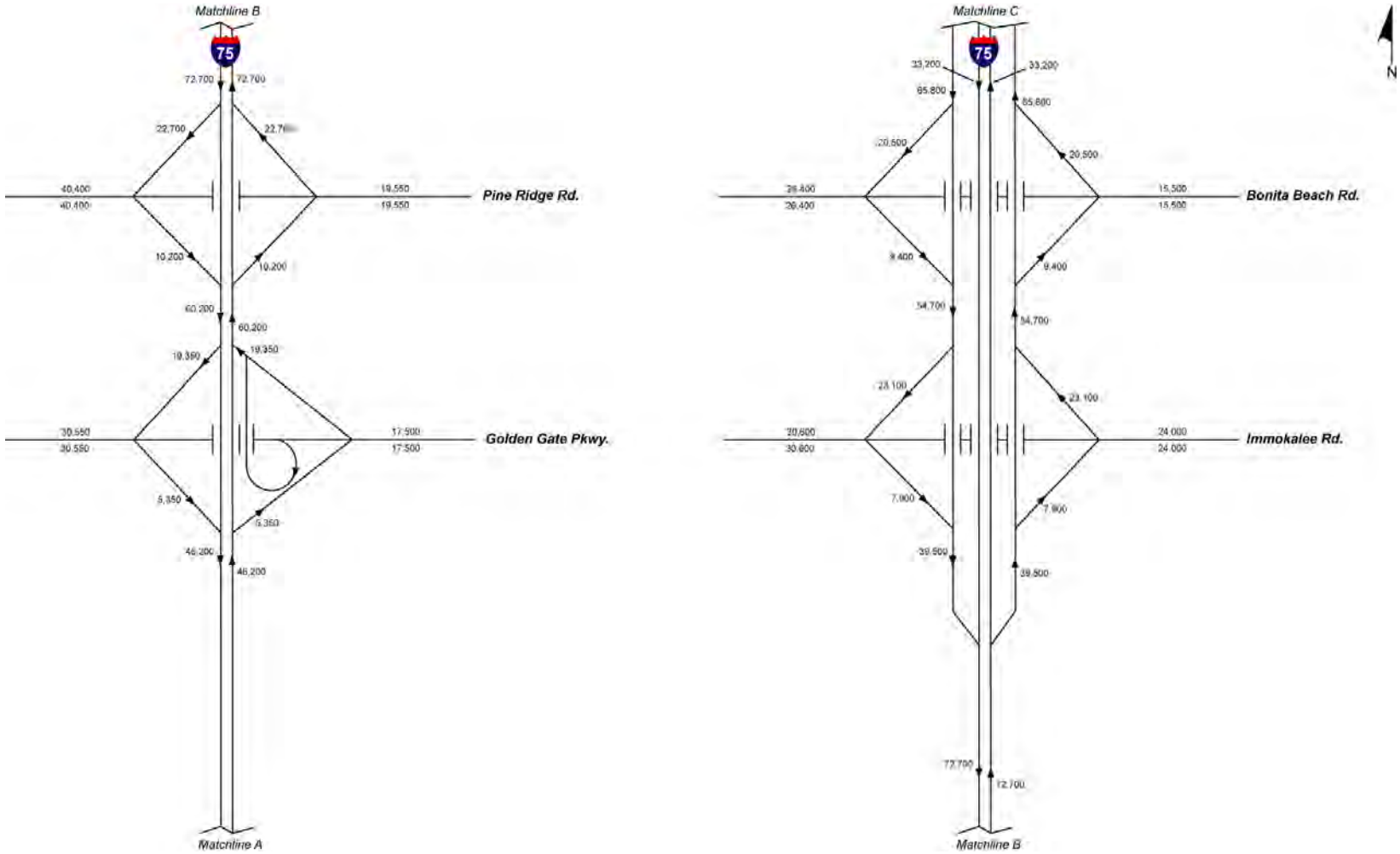


FIGURE 3-3

2030 AADT VOLUMES

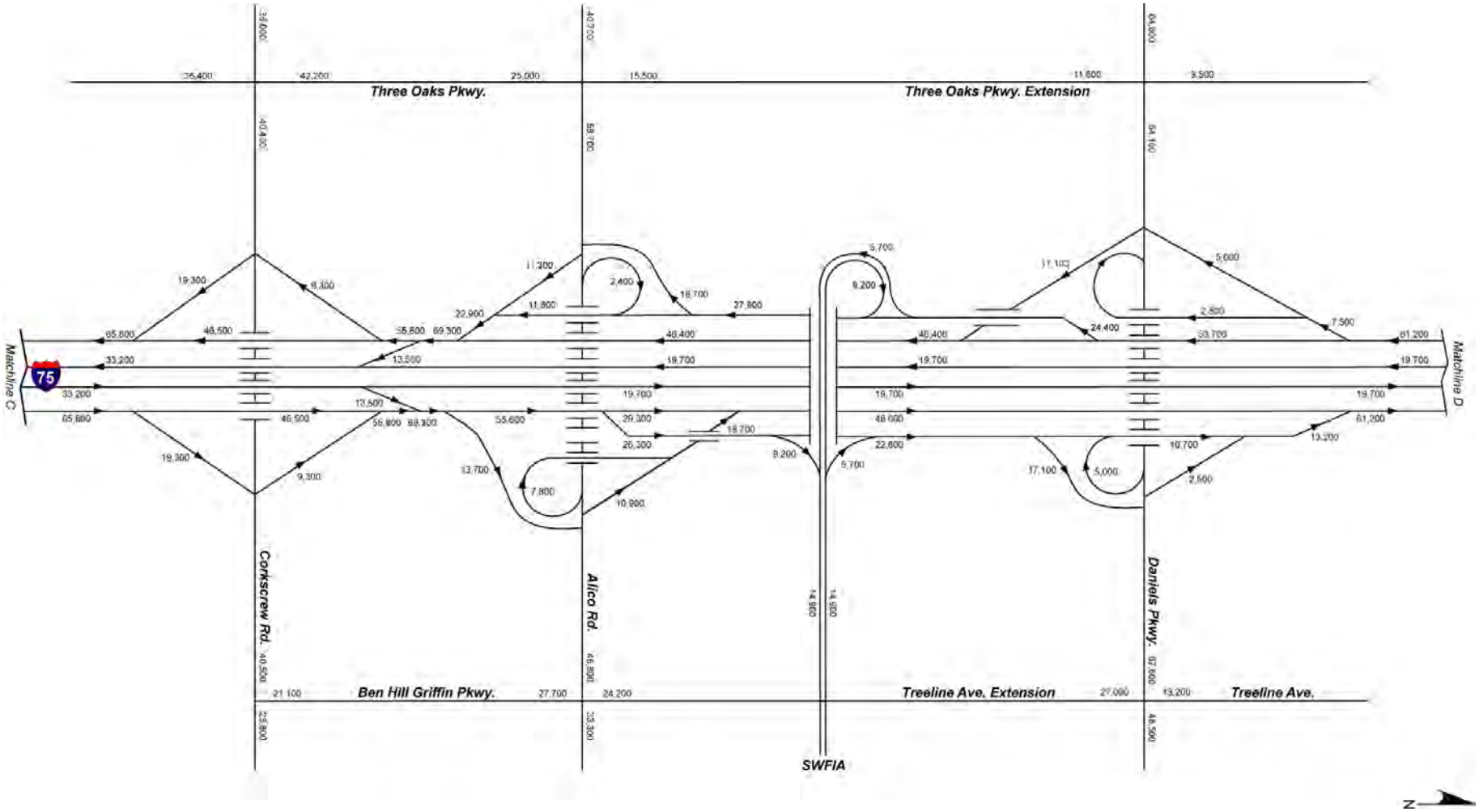
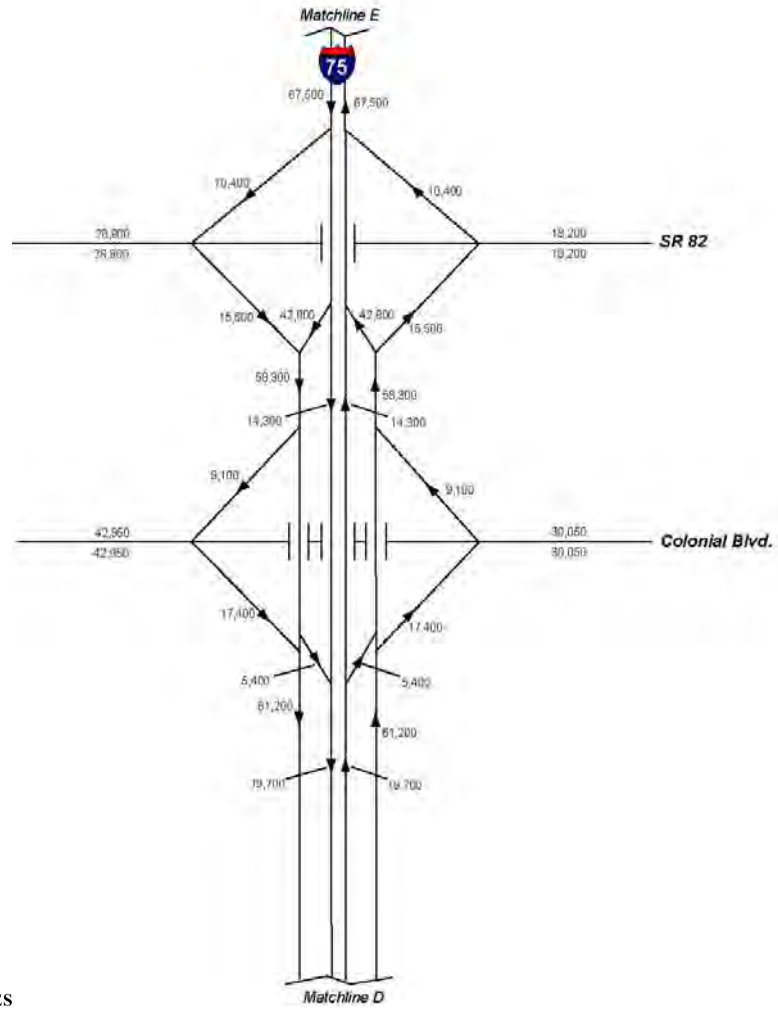
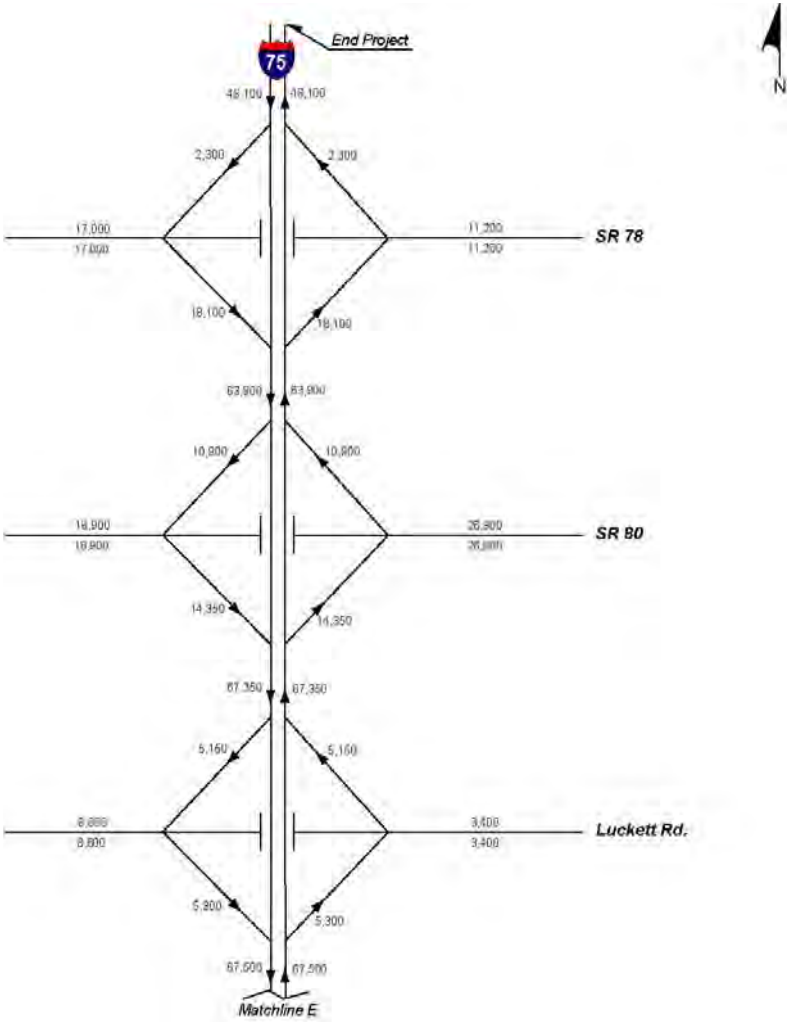


FIGURE 3-4

2030 AADT





VOLUMES

These three average peak hour-to-daily volume ratios were then averaged to yield an overall corridor peak hour-to-daily volume ratio of 8.35 percent. This average ratio was then divided by the seasonal adjustment factor of 0.90 to obtain an estimated K_{30}-factor of 9.28 percent.

A second independent estimate of the K_{30}-factor was obtained based on historical trend analysis of permanent count station data. The K_{30}-factors recorded at the I-75 permanent count stations in Lee and Collier Counties over the five-year period 1996-2000 were obtained from Florida Traffic Information CDs provided by the FDOT Statistics Office. The Lee and Collier County K_{30}-factors were averaged for each of the five years and the results are summarized in Table 3.4.

TABLE 3.4

5-YEAR K_{30}-FACTORS FOR I-75 IN LEE AND COLLIER COUNTIES

County	Year				
	1996	1997	1998	1999	2000
Lee	0.1060	0.1060	0.1019	0.0987	0.0993
Collier	0.1060	0.1060	0.1005	0.0967	0.0978
Average	0.1060	0.1060	0.1012	0.0977	0.0986

The historic data indicates that the K_{30}-factors on I-75 have been decreasing at a diminishing rate. This is not unexpected since the K-factor generally decreases as the AADT volume on a roadway increases and the adjacent development density increases. Based on a continuation of the historic trend, it was estimated that the K_{30}-factor on I-75 would continue to decrease over time until approximately the year 2014 where it would achieve its minimum value of approximately 9.34 percent. Since this estimate of the K_{30}-factor was close to the previous estimate obtained by using the 72-hour vehicle classification count data, the two estimated values were averaged and the resulting value of 9.3 percent was used for this study. This value is consistent with the typical K-factor value for Florida roadways in transitioning urban areas or urban areas as documented in Table 8-9 of the 2000 Highway Capacity Manual.

The D_{30}-factor was estimated using the following procedure. First, an average peak hour D-factor of 59.0 percent was calculated based on the 72-hour or 48-hour count data obtained at all eleven mainline I-75 locations (i.e., between each existing interchange). Second, an average peak hour D-factor of 56.0 percent was calculated based on the FDOT's permanent count station data for the years 1997-2000. The average of the two estimated D_{30}-factor values is 57.5 percent. Since this average value is almost equal to the average D_{30}-factor of 57.0 percent based on the permanent count station data for the year 2000, a D_{30}-factor equal to 57.0 percent was selected for use in this study. A D_{30}-factor of 57.0 percent is approximately at the midpoint between the minimum D_{30}-factor for rural freeways (52.3 percent) and the maximum D_{30}-factor for urban freeways (61.2 percent) as documented in Table 10.1 of Technical Resource Document 10 - Development of Design Traffic published by the FDOT Systems Planning Office.

The 2030 a.m. and p.m. peak hour volumes derived by using a K_{30}-factor of 9.3 percent and a D_{30}-factor of 57.0 percent are illustrated on Figures 3-5 through 3-8. The peak directions of travel for this study were assumed to be southbound and westbound in the a.m. peak hour and

northbound and eastbound in the p.m. peak hour. These peak directions generally reflect the predominant travel patterns that currently exist today within the I-75 study corridor.

3.5 OPENING YEAR (2010) AADT AND PEAK HOUR VOLUMES

AADT volumes and peak hour volumes were also developed throughout the I-75 study corridor for the year 2010. This represents the opening year for the I-75 PD&E study. The 2010 AADT volumes were initially estimated with the use of historic growth rates that were calculated on a segment-by-segment basis. The historic growth rates were calculated based on the AADT volumes contained in the 2000 Florida Traffic Information CD provided by FDOT's Statistics Office for the period 1997-2000. The historic growth rates ranged from a low of 1.28 percent/year (for the segment between Colonial Boulevard and SR 82) to a high of 9.46 percent/year (for the segment between Alico Road and Daniels Parkway). The overall average corridor growth rate for the period 1997-2000 was estimated to be approximately 6.32 percent/year. The existing (2000) AADT volumes were escalated to the year 2010 using the historic growth rates and then reviewed for reasonableness. A review of the 2010 AADT volumes estimated using the historic growth rate method indicated that the daily traffic volumes on the portion of I-75 between Corkscrew Road and Daniels Parkway were projected to range between 117,300 vehicles/day and 137,200 vehicles/day while the daily traffic volume on the segment of I-75 between Golden Gate Parkway and Pine Ridge Road was projected to be 46,000 vehicles/day. The volumes on I-75 between Corkscrew Road and Daniels Parkway were unreasonably high while the volume on I-75 between Golden Gate Parkway and Pine Ridge Road was unreasonably low. The growth rate method is unable to account for the impact that the implementation of new facilities (i.e., parallel roadways and/or interchanges) has on the future growth in traffic volumes on I-75. The programmed construction of the Three Oaks Parkway Extension and the Treeline Avenue Extension between Alico Road and Daniels Parkway is expected to reduce the growth in volumes on I-75 in the area between Corkscrew Road and Daniels Parkway. The programmed construction of the Golden Gate Parkway interchange located between the existing SR 951 and Pine Ridge Road interchanges in Collier County is expected to increase the daily volume on the portion of I-75 between Golden Gate Parkway and Pine Ridge Road.

A second set of 2010 AADT volumes were estimated by interpolating between the 2000 AADT volumes and the 2030 AADT volumes. The results of this procedure indicated that the 2010 AADT volumes were projected to range between 47,100 vehicles/day (between SR 951 and Golden Gate Parkway) and 92,800 vehicles/day (between Alico Road and Daniels Parkway). Average yearly growth rates were calculated based on the 2000 AADT volumes and the 2010 AADT volumes. The average yearly growth rates ranged between 3.16 percent/year (between Alico Road and Daniels Parkway) and 8.88 percent/year (between Golden Gate Parkway and Pine Ridge Road). As stated earlier during the discussion of the Base Case Alternative, the extremely high growth rate for the segment between Golden Gate Parkway and Pine Ridge Road is skewed due to the lack of existing interstate access at Golden Gate Parkway. The overall average growth rate for the I-75 mainline based on the interpolated 2010 AADT volumes (excluding the segment between the Golden Gate Parkway interchange and the Pine Ridge Road interchange) is approximately 4.59 percent/year.

FIGURE 3-5

2030 PEAK HOUR VOLUMES

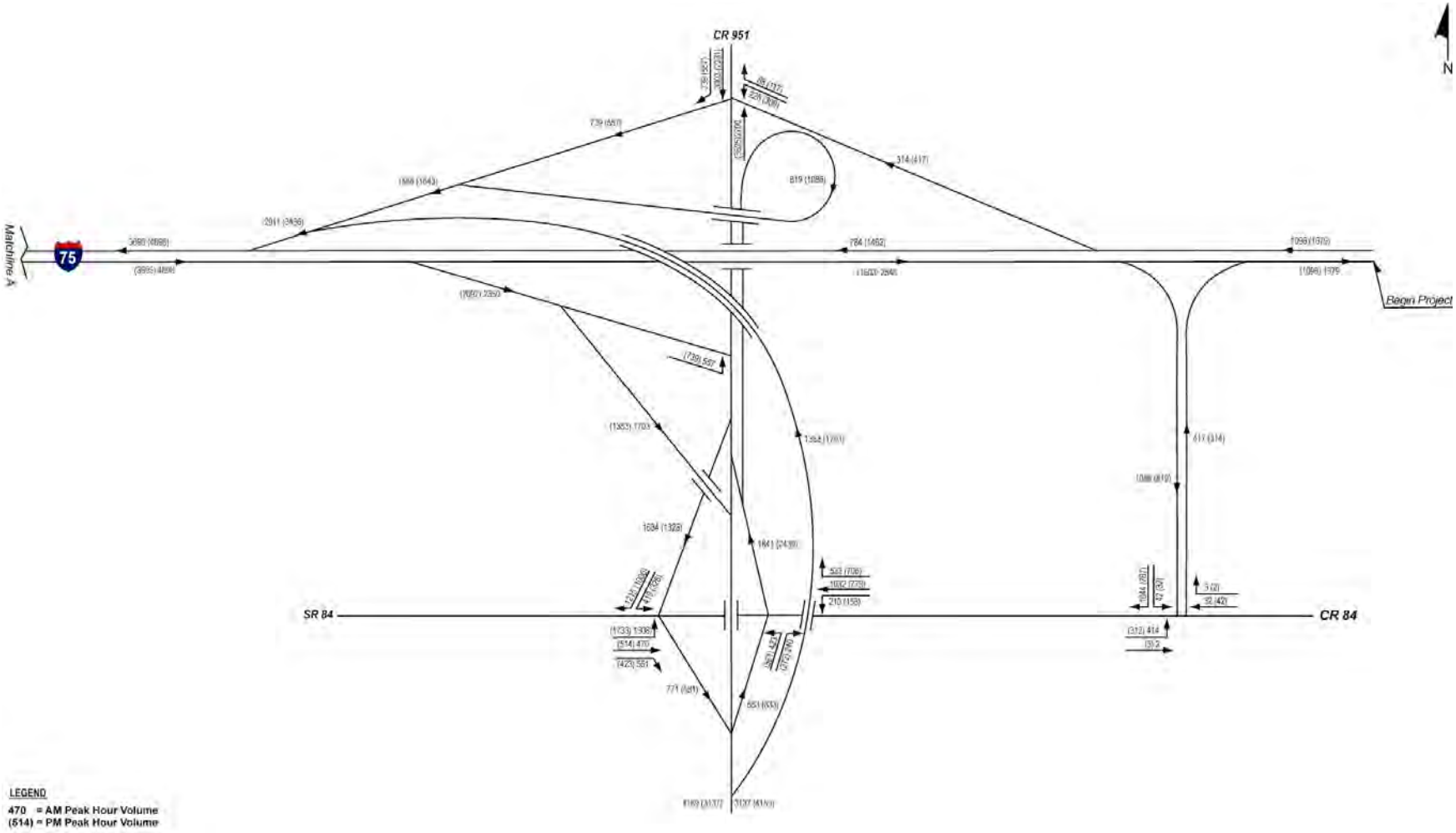


FIGURE 3-6

2030 PEAK HOUR VOLUMES

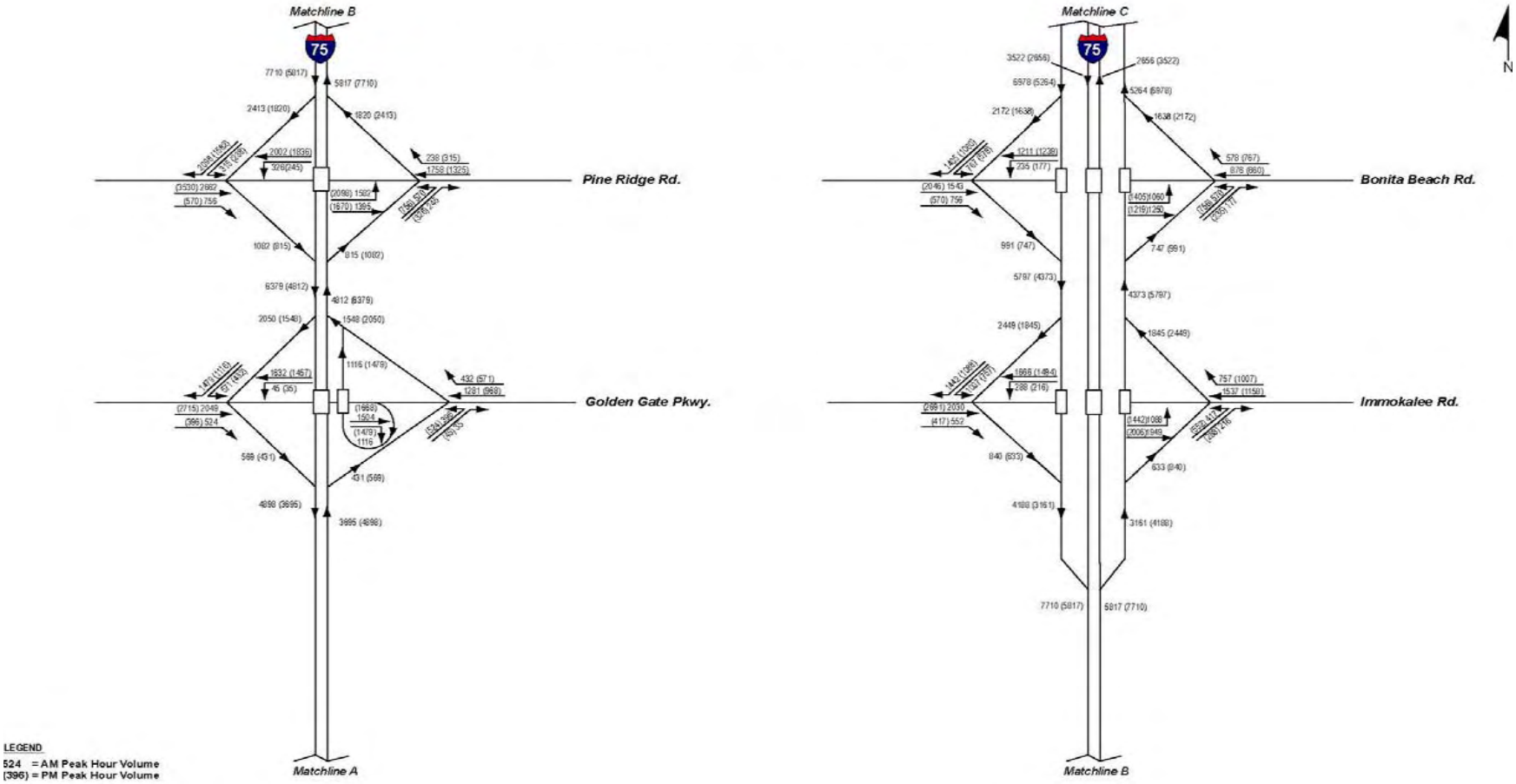


FIGURE 3-7

2030 PEAK HOUR VOLUMES

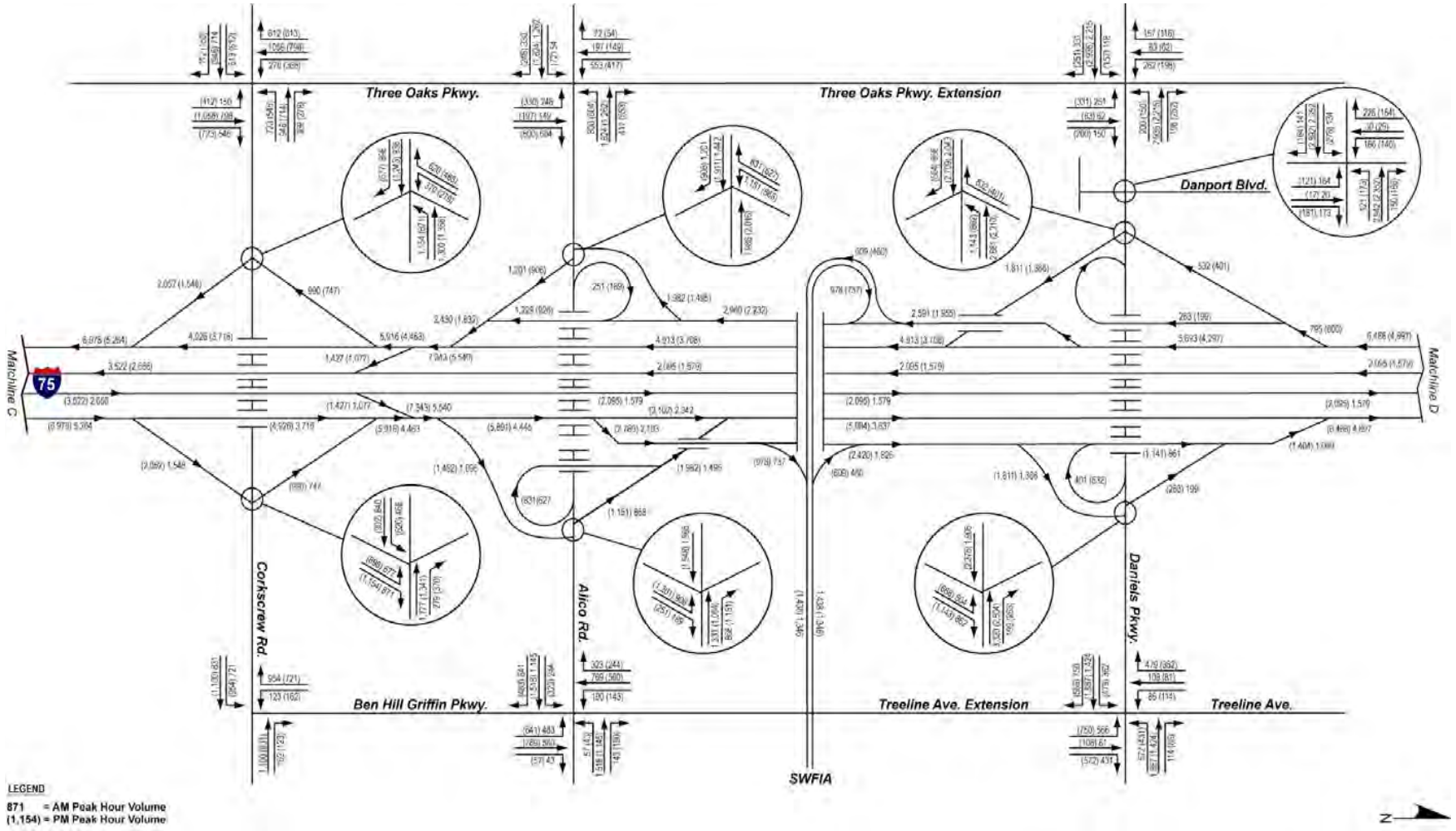
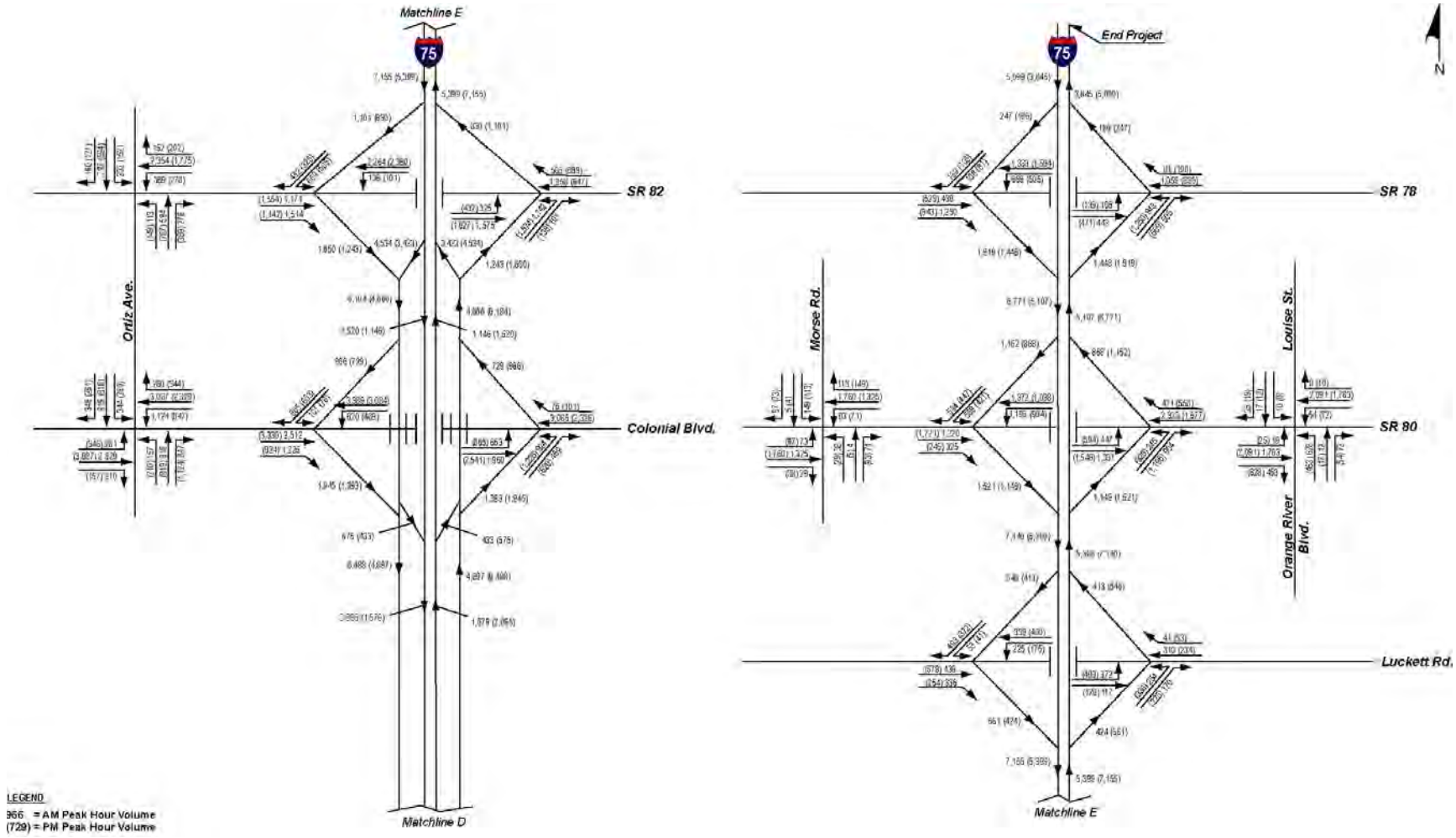


FIGURE 3-8

2030 PEAK HOUR VOLUMES



The use of interpolation to estimate the 2010 volumes assumes that all of the future year roadway improvements (widening of existing roadways and construction of new roadways) are open to traffic by the year 2010 and that traffic increases linearly over the entire time period. Since only a small portion of the total roadway improvements included in the Lee County MPO's Financially Feasible LRTP and the Collier County MPO's Financially Feasible LRTP are anticipated to be constructed by the year 2010, the use of interpolation will likely result in an underestimation of the daily volumes on I-75.

In recognition of this fact, an alternative methodology that represents a combination of interpolation as well as the use of the I-75 travel demand model was developed. The roadway network that was included in the 2025 travel demand model was modified by eliminating all of the roadway improvements that are not expected to be constructed and open to traffic by the year 2010. The I-75 travel demand model was run with this revised roadway network and the resulting 2030 AADT volumes were plotted. A series of east-west screenlines (one between each pair of interchanges within the I-75 study corridor) were established to measure the total north-south travel demand at various locations within Lee and Collier Counties. The traffic volume projected for each of the I-75 mainline segments was divided by the corresponding total east-west screenline volume to determine the percentage of the total north-south travel demand that was projected to travel on I-75 given the roadway network assumed to be present in the year 2010.

The 2010 east-west screenline volumes were estimated by interpolating between the east-west screenline volumes associated with the base year travel demand models for Lee and Collier County and the east-west screenline volumes associated with the 2030 I-75 study model. The resulting 2010 screenline volumes were then multiplied by the percentages of traffic projected to use I-75 with the 2010 roadway network to obtain an estimate of the 2010 AADT volumes on mainline I-75. Based on this procedure, the 2010 AADT volumes were estimated to range between 49,900 vehicles/day (between SR 951 and Golden Gate Parkway) and 99,900 vehicles/day (between Immokalee Road and Bonita Beach Road). Average yearly growth rates were once again calculated using the 2000 AADT volumes and the revised 2010 AADT projections. The average yearly growth rates ranged between 3.99 percent/year (between Alico Road and Daniels Parkway) and 13.37 percent/year (between Golden Gate Parkway and Pine Ridge Road). The overall average corridor growth rate (excluding the segment between Golden Gate Parkway and Pine Ridge Road) was estimated to be approximately 5.49 percent/year. This value is lower than the average corridor growth rate of 6.32 percent/year based on recent historic growth but higher than the average corridor growth rate of 4.59 percent/year that was calculated using the 2010 AADT volume projections based on simple straight-line interpolation.

Based on a comparison of the 2010 AADT volumes estimated using each of the three methodologies, it was determined that the hybrid methodology yielded the most reasonable opening year traffic projections. The 2010 AADT volumes that were developed using this hybrid forecasting methodology are illustrated on Figures 3-9 through 3-11. The 2010 peak hour volumes for the I-75 mainline were subsequently developed using a K_{30}-factor of 9.3 percent and a D_{30}-factor of 57.0 percent. These are the same factors that were used to develop the 2030 a.m. and p.m. peak hour volumes. The 2010 a.m. and p.m. peak hour volumes for the I-75 ramps and the ramp terminal intersections were derived by using a combination of the K_{30}- and D_{30}-factors as well as the existing turning movement percentages and interpolation. The 2010 peak hour volumes are illustrated on Figures 3-12 through 3-14.

FIGURE 3-9

2010 AADT VOLUMES

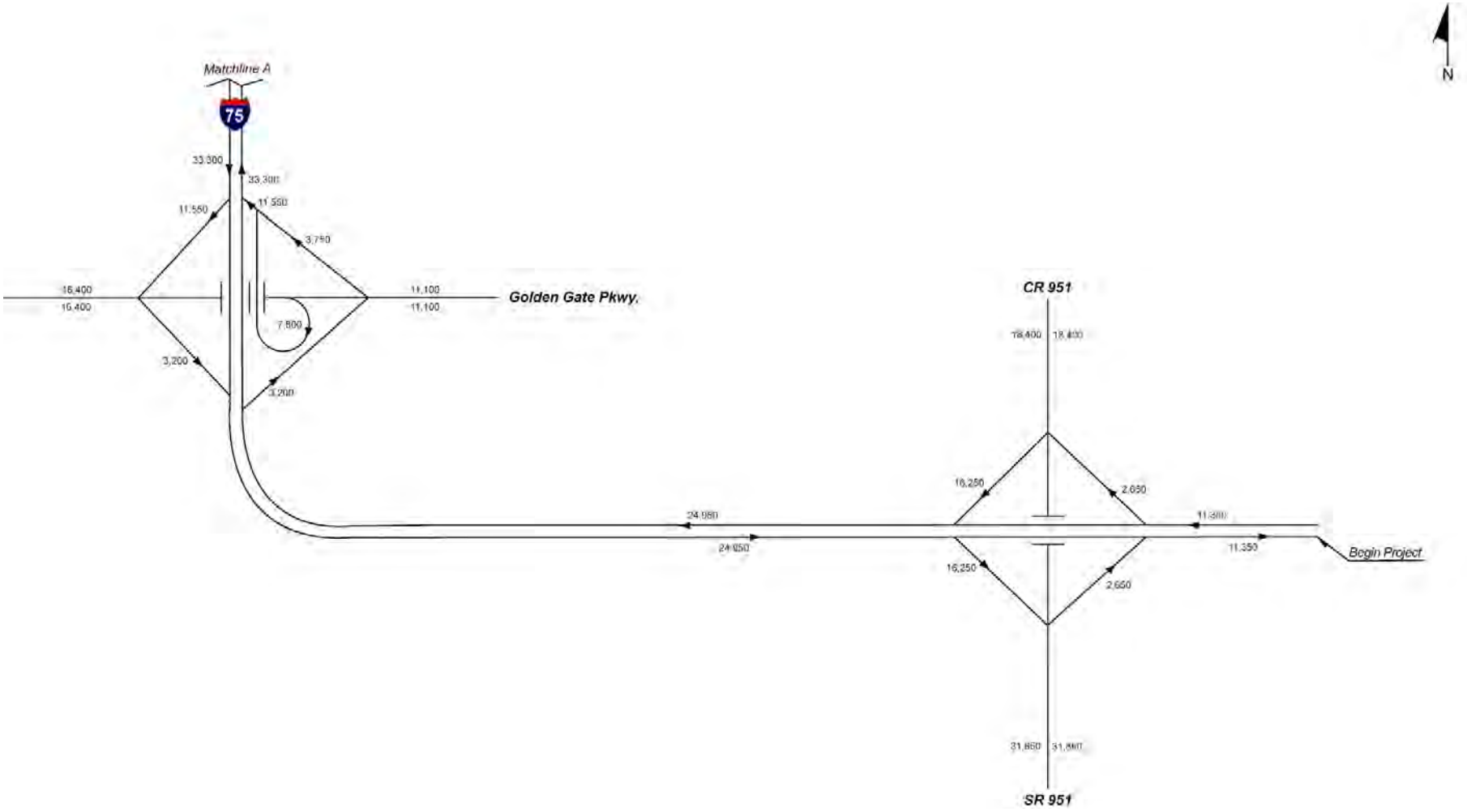


FIGURE 3-10

2010 AADT VOLUMES

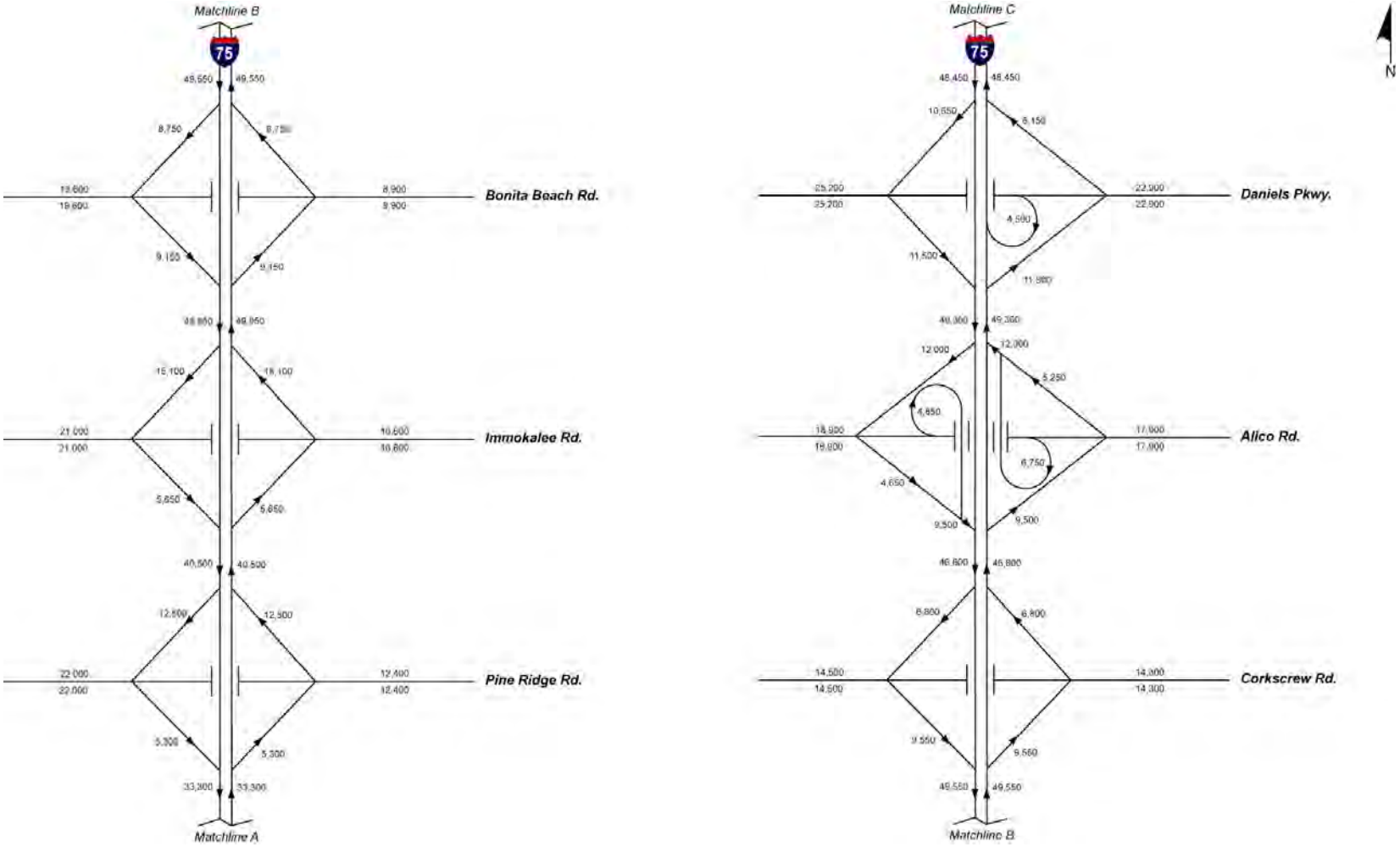


FIGURE 3-11

2010 AADT VOLUMES

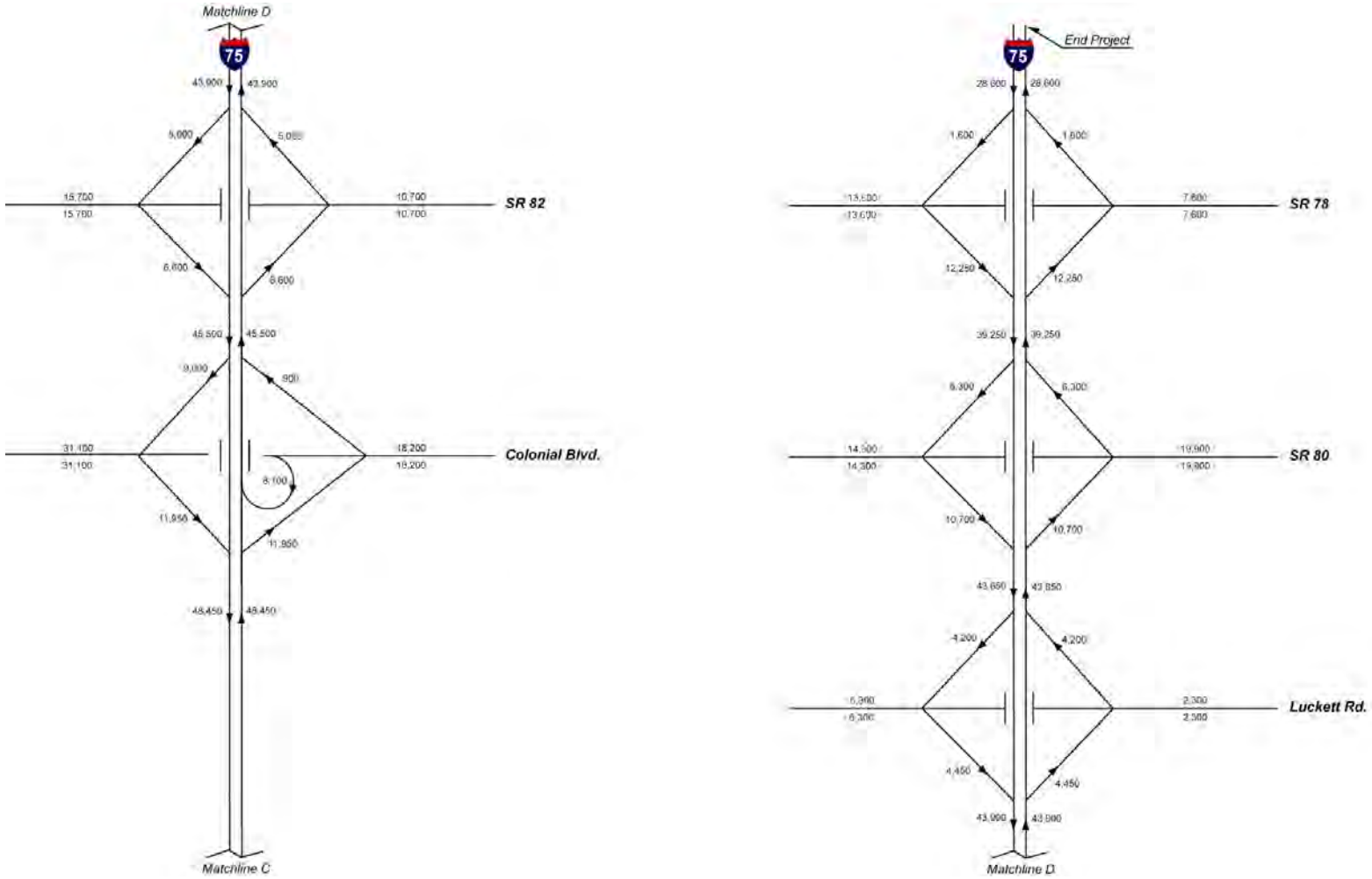


FIGURE 3-12

2010 PEAK HOUR VOLUMES

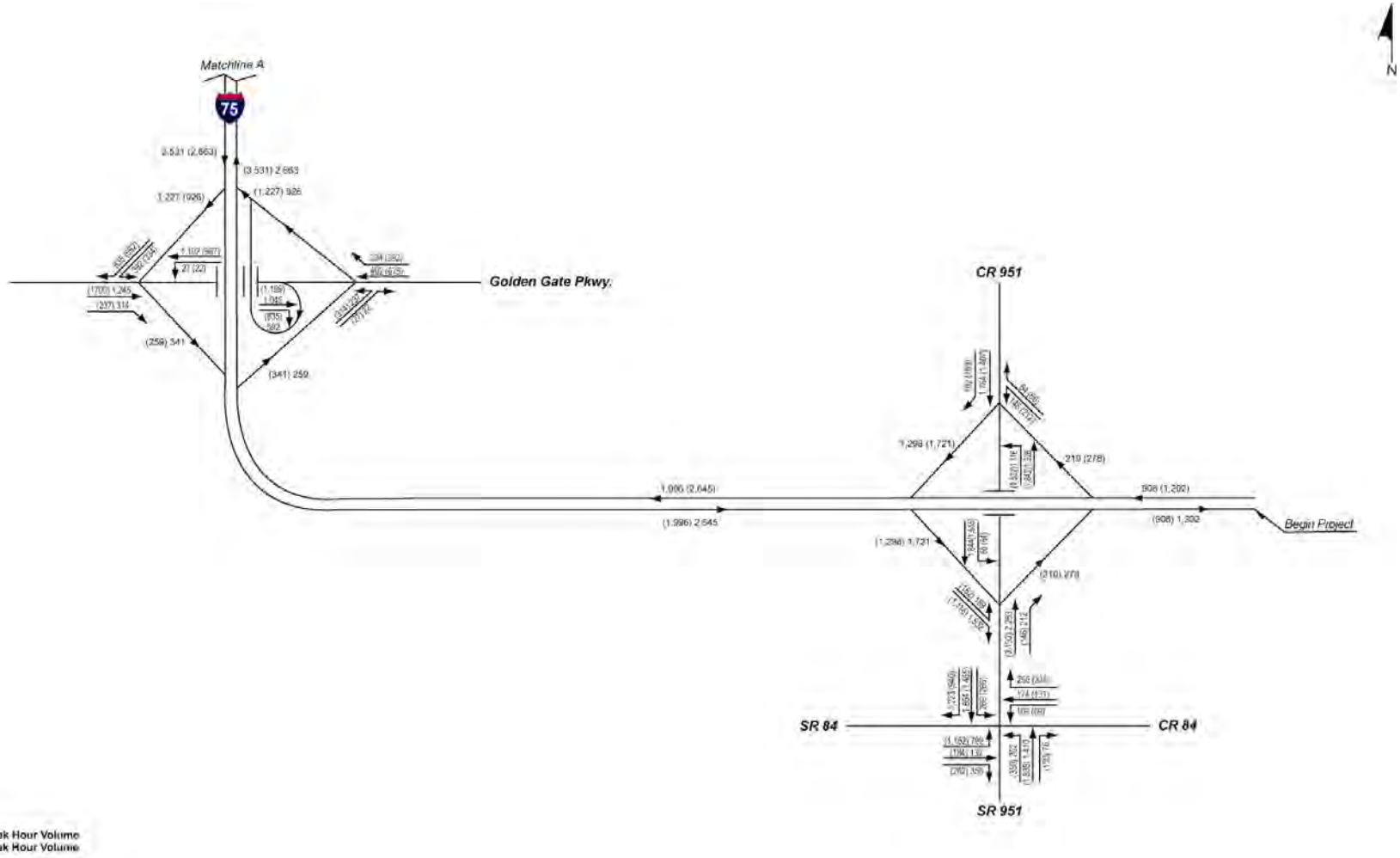


FIGURE 3-13

2010 PEAK HOUR VOLUMES

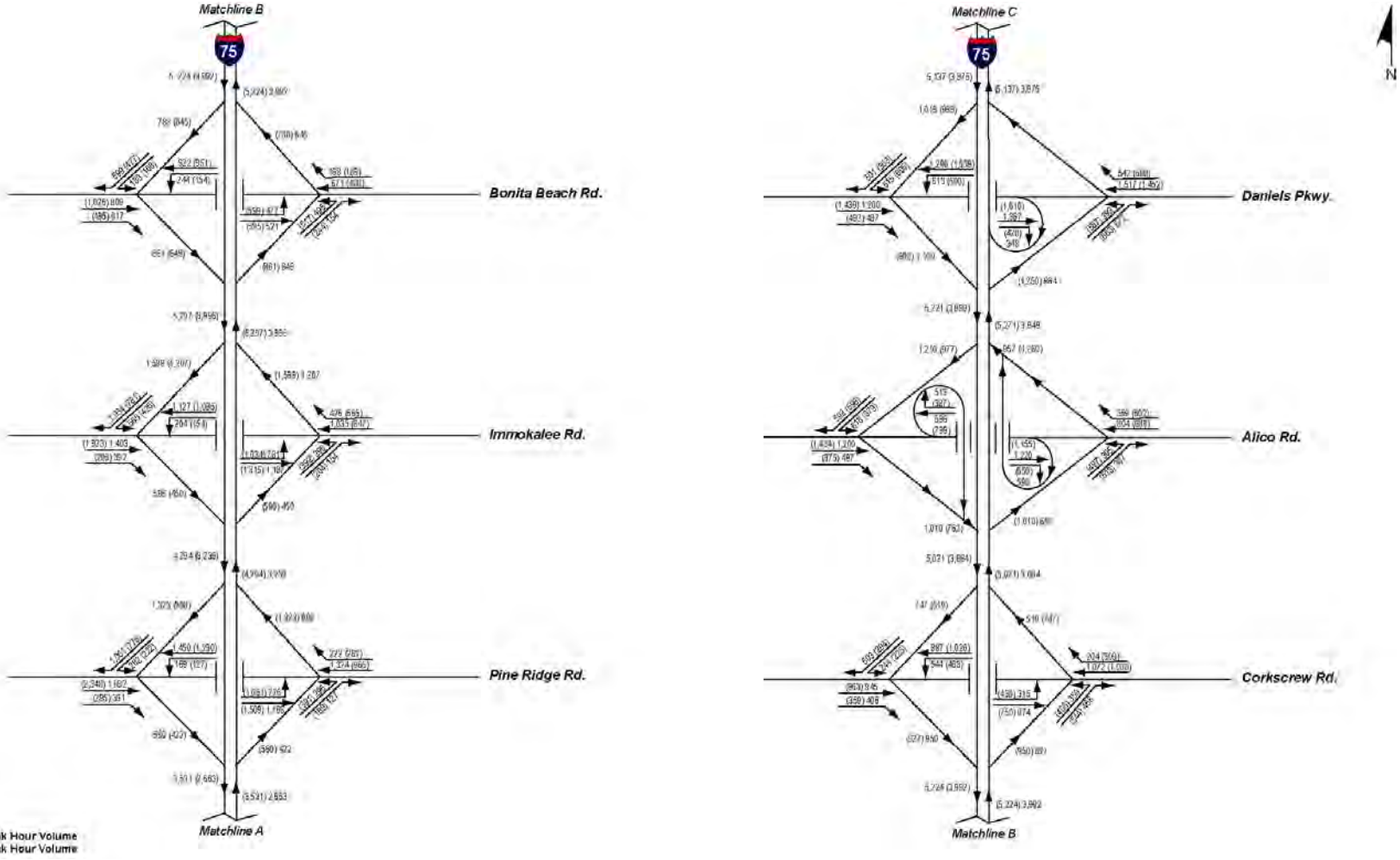
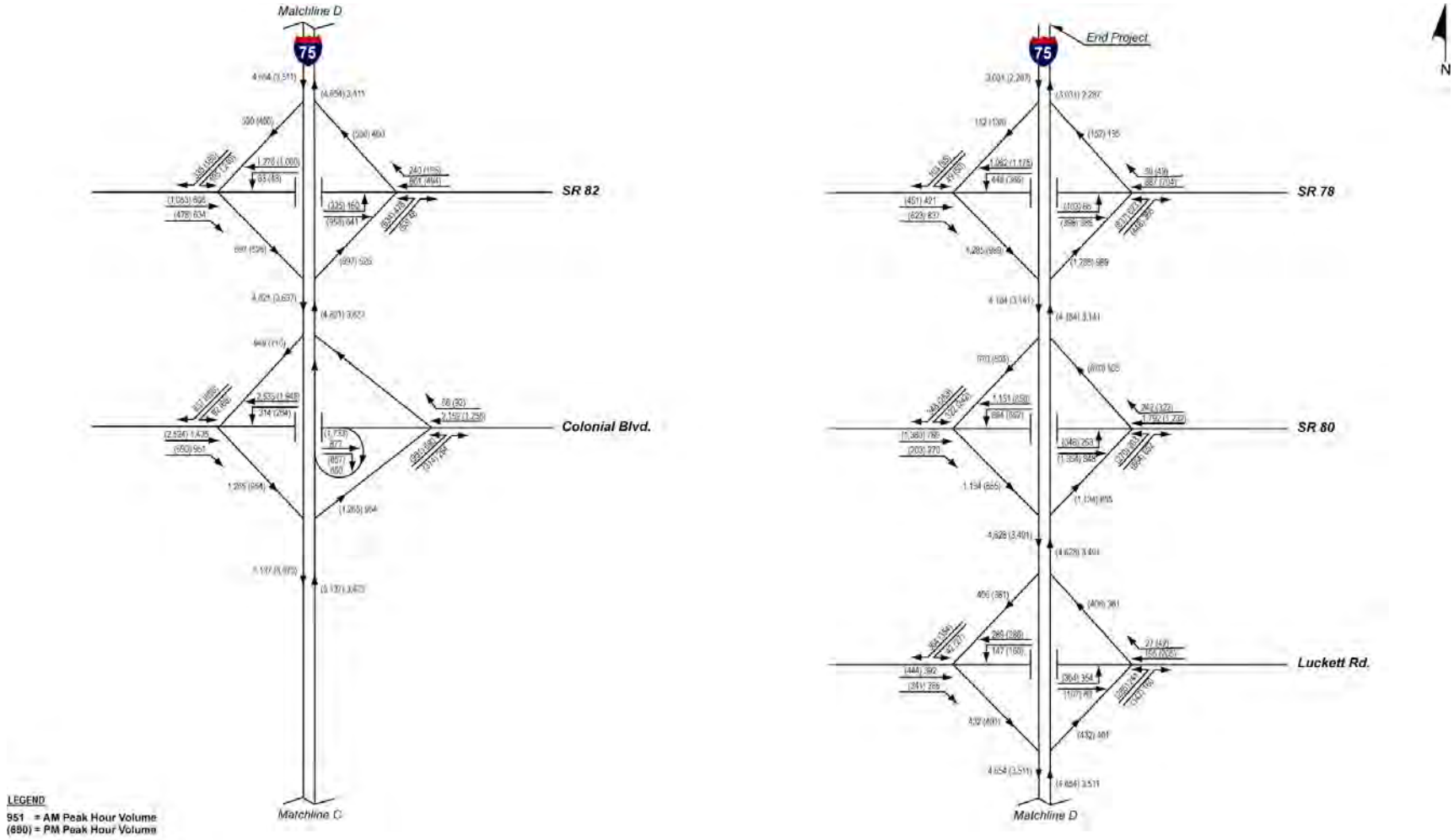


FIGURE 3-14

2010 PEAK HOUR VOLUMES



Section 4.0
FUTURE YEAR TRAFFIC OPERATIONS

The future year traffic operations in the I-75 study corridor were analyzed for both the opening year (2010) and the design year (2030) using the peak hour volumes documented in Section 3.0 of this report. The following alternatives were analyzed:

- Opening Year No-Build Alternative
- Opening Year Mobility 2000 Expansion Project
- Design Year No-Build Alternative
- Design Year Ultimate Improvements

The future year traffic analyses were conducted for the I-75 mainline freeway segments, the ramp merge/diverge areas, and the ramp terminal intersections using the 2000 Highway Capacity Software (HCS). The following parameter values were used in both the opening year and design year HCS analyses:

- Peak Hour Factor (PHF) = 0.95
- I-75 Mainline Base Free Flow Speed = 75 mi/hr
- Driver Population Factor (f_p) = 0.95
- Level Terrain

Although a large percentage of drivers are familiar with the area, it was assumed that some tourists and other non-regular drivers (i.e., non-commuters) will continue to use I-75 during the weekday peak hours. Therefore, a driver population factor of 0.95 was included in the analyses instead of the default value (i.e., 1.00).

The peak hour truck percentages that were used in the opening year analyses were different than the peak hour truck percentages that were used in the design year analyses. This was done to reflect the fact that although the magnitude of the truck volumes on I-75 are expected to increase over time, the percentage of the total volume on I-75 that is trucks is expected to decrease over time since passenger car volumes typically increase at a faster rate than truck volumes.

The existing average peak hour truck percentages on mainline I-75 are 15.2 percent in the a.m. peak hour and 12.9 percent in the p.m. peak hour. A 9.0 percent peak hour truck percentage was used for the I-75 mainline in the design year analyses. This value was recommended for use by the FDOT and is approximately equal to the existing average peak hour truck percentage on I-95 in Palm Beach County (8.94 percent). The existing AADT volumes on this portion of I-95 are of similar magnitude to the 2030 AADT volumes projected for the I-75 study corridor (i.e., they range between 78,000 vehicles/day and 197,000 vehicles/day). In addition, the existing land

uses and development densities in the I-95 corridor are comparable to the land uses and development densities projected to occur along the I-75 corridor by the year 2030. The 9.0 percent peak hour truck percentage also represents the midpoint value between the high end of the rural freeway design hour truck percentage (10.0 percent) and the high end of the urban freeway design hour truck percentage (8.0 percent) as documented in Technical Resource Document No. 10 – Development of Design Traffic published by the FDOT Systems Planning Office. A value of 5.0 percent was used for the I-75 on- and off-ramps in the design year analysis.

The mainline and ramp truck percentages used in the opening year analyses were estimated using the following procedure. The existing number of trucks on the I-75 mainline and the interchange ramps were calculated by multiplying the existing peak hour volumes by the existing peak hour truck percentages. The number of peak hour trucks assumed to be present on the I-75 mainline and the interchange ramps in the design year were calculated by multiplying the 2030 peak hour volumes by the assumed 2030 peak hour truck percentages of 9.0 percent and 5.0 percent, respectively. The number of peak hour trucks present on the I-75 mainline and the interchange ramps in 2010 was estimated by interpolating between the existing and 2030 peak hour truck volumes. The 2010 peak hour truck volumes were then divided by the 2010 total peak hour volumes that were previously estimated to obtain the 2010 peak hour truck percentages that were used in the opening year analyses.

4.1 OPENING YEAR ANALYSIS – NO-BUILD ALTERNATIVE

An opening year No-Build Alternative analysis was conducted to estimate the levels of service expected to occur on the I-75 mainline in the year 2010 with the existing four-lane freeway. The 2010 levels of service projected for the I-75 mainline in Collier County and Lee County are summarized in Tables 4.1 and 4.2, respectively. Table 4.1 indicates that the existing four-lane I-75 mainline freeway segments from the Pine Ridge Road interchange northward to the Lee/Collier County Line are projected to operate at Level of Service F in the peak directions during the a.m. and p.m. peak hours. The existing four-lane I-75 mainline freeway segments south of the Pine Ridge Road interchange are projected to operate at Level of Service D or better in both directions during both peak hours. Table 4.2 indicates that all of the existing I-75 mainline segments from the Lee/Collier County Line to SR 78 are projected to operate at Level of Service F in the peak travel directions during the a.m. and p.m. peak hours. Table 4.2 also indicates that, with one exception, all of the I-75 mainline freeway segments between the Lee/Collier County Line and Colonial Boulevard are projected to operate at Level of Service E in the off-peak travel directions during both peak hours. The one exception is the segment located between Corkscrew Road and Alico Road. This segment is projected to operate at Level of Service D in the off-peak travel directions; however, the estimated density for this segment (35.0 passenger cars per mile per lane) is at the boundary between Level of Service D and E operations. The results of the 2010 No-Build Alternative freeway analysis demonstrate the need for additional mainline capacity on I-75 within the study area.

TABLE 4.1

NO-BUILD ALTERNATIVE
YEAR 2010 FREEWAY MAINLINE ANALYSIS SUMMARY
COLLIER COUNTY

I-75 Freeway Segment	Direction	Number of Lanes	AM Peak Hour			PM Peak Hour		
			Volume[1]	Density[2]	LOS[3]	Volume[1]	Density[2]	LOS[3]
Between SR 951 and Golden Gate Parkway	NB	2	1,996	16.5	B	2,645	21.8	C
	SB	2	2,645	21.9	C	1,996	16.4	B
Between Golden Gate Parkway and Pine Ridge Road	NB	2	2,663	22.1	C	3,531	32.1	D
	SB	2	3,531	32.1	D	2,663	22.1	C
Between Pine Ridge Road and Immokalee Road	NB	2	3,239	28.1	D	4,294	>45.0	F
	SB	2	4,294	>45.0	F	3,239	28.1	D
Between Immokalee Road and Lee/Collier County Line	NB	2	3,996	41.4	E	5,297	>45.0	F
	SB	2	5,297	>45.0	F	3,996	41.4	E

1 Volume is expressed in terms of vehicles per hour.
2 Density is expressed in terms of passenger cars per mile per lane.
3 Level of Service.

TABLE 4.2

NO-BUILD ALTERNATIVE
YEAR 2010 FREEWAY MAINLINE ANALYSIS SUMMARY
LEE COUNTY

I-75 Freeway Segment	Direction	Number of Lanes	AM Peak Hour			PM Peak Hour		
			Volume[1]	Density[2]	LOS[3]	Volume[1]	Density[2]	LOS[3]
Between Lee/Collier County Line and Bonita Beach Road	NB	2	3,996	41.4	E	5,297	>45.0	F
	SB	2	5,297	>45.0	F	3,996	41.4	E
Between Bonita Beach Road and Corkscrew Road	NB	2	3,992	41.7	E	5,224	>45.0	F
	SB	2	5,224	>45.0	F	3,992	41.3	E
Between Corkscrew Road and Alico Road	NB	2	3,684	35.0	D	5,021	>45.0	F
	SB	2	5,021	>45.0	F	3,684	35.0	D
Between Alico Road and Daniels Parkway	NB	2	3,949	40.2	E	5,271	>45.0	F
	SB	2	5,221	>45.0	F	3,899	38.6	E
Between Daniels Parkway and Colonial Boulevard	NB	2	3,875	38.9	E	5,137	>45.0	F
	SB	2	5,137	>45.0	F	3,875	38.9	E
Between Colonial Boulevard and SR 82	NB	2	3,637	34.2	D	4,821	>45.0	F
	SB	2	4,821	>45.0	F	3,637	33.9	D
Between SR 82 and Luckett Road	NB	2	3,511	32.3	D	4,654	>45.0	F
	SB	2	4,654	>45.0	F	3,511	32.1	D
Between Luckett Road and SR 80	NB	2	3,491	31.7	D	4,628	>45.0	F
	SB	2	4,628	>45.0	F	3,491	31.5	D
Between SR 80 and SR 78	NB	2	3,141	27.1	D	4,164	>45.0	F
	SB	2	4,164	>45.0	F	3,141	27.1	D

1 Volume is expressed in terms of vehicles per hour.
2 Density is expressed in terms of passenger cars per mile per lane.
3 Level of Service.

4.2 OPENING YEAR ANALYSIS – MOBILITY 2000 EXPANSION

An opening year analysis was also conducted to estimate the levels of service expected to occur with the implementation of the Mobility 2000 Expansion improvements. The Mobility 2000 Expansion project involves widening the existing I-75 mainline from four lanes to six lanes from the new Golden Gate Parkway interchange in Collier County to north of the Daniels Parkway interchange in Lee County. Funding for the final design and right-of-way acquisition associated with the ultimate I-75/Daniels Parkway and I-75/Corkscrew Road interchange improvements is also included in Mobility 2000 Expansion.

The 2010 levels of service projected for the I-75 mainline in Collier County and Lee County are summarized in Tables 4.3 and 4.4, respectively. Table 4.3 indicates that all mainline freeway segments in Collier County are projected to operate at Level of Service D or better in the year 2010 and all of the segments between the SR 951 interchange and the Immokalee Road interchange are projected to operate at Level of Service C or better during both peak hours. Table 4.4 indicates that the six-lane portion of the I-75 mainline from the Lee/Collier County Line to north of the Daniels Parkway interchange is also projected to operate at Level of Service D or better during both peak hours. Table 4.4 also indicates that the existing four-lane portion of I-75 from north of Daniels Parkway to SR 78 is projected to operate at Level of Service F during the peak hours in the peak travel directions (i.e., southbound in the a.m. peak hour and northbound in the p.m. peak hour).

Tables 4.5 and 4.6 summarize the peak hour levels of service projected for the I-75 ramp merge/diverge areas in Collier County and Lee County, respectively. Table 4.5 indicates that with one exception (the southbound off-ramp to Immokalee Road), all of the ramp merge/diverge areas in Collier County are projected to operate at Level of Service D or better during both the a.m. and p.m. peak hours. Although the southbound off-ramp to Immokalee Road is projected to operate at Level of Service D in the p.m. peak hour, Level of Service E operations are projected to occur at this off-ramp during the a.m. peak hour. A majority of the I-75 merge/diverge areas in Collier County are projected to operate at Level of Service C or better in the year 2010.

Table 4.6 indicates that with two exceptions, all of the ramp merge/diverge areas at the Bonita Beach Road, Corkscrew Road, Alico Road, and Daniels Parkway interchanges are projected to operate at Level of Service D or better during both the a.m. and p.m. peak hours. In the a.m. peak hour, the southbound off-ramp to Bonita Beach Road is projected to operate at Level of Service E while in the p.m. peak hour; the northbound off-ramp is projected to operate at Level of Service E.

The estimated densities in the northbound and southbound diverge areas are, however, only slightly in excess of the maximum density for Level of Service D operations (i.e., 35.0 passenger cars per mile per lane). The additional mainline capacity that will be provided on I-75 from the Golden Gate Parkway interchange to the Daniels Parkway interchange as a result of the Mobility 2000 Expansion project is expected to allow the ramp merge/diverge areas to operate at acceptable levels of service during the peak hours in the year 2010.

TABLE 4.3

MOBILITY 2000 EXPANSION
YEAR 2010 FREEWAY MAINLINE ANALYSIS SUMMARY
COLLIER COUNTY

I-75 Freeway Segment	Direction	Number of Lanes	AM Peak Hour			PM Peak Hour		
			Volume[1]	Density[2]	LOS[3]	Volume[1]	Density[2]	LOS[3]
Between SR 951 and Golden Gate Parkway	NB	2	1,996	16.5	B	2,645	21.8	C
	SB	2	2,645	21.9	C	1,996	16.4	B
Between Golden Gate Parkway and Pine Ridge Road	NB	3	2,663	14.3	B	3,531	19.0	C
	SB	3	3,531	19.0	C	2,663	14.3	B
Between Pine Ridge Road and Immokalee Road	NB	3	3,239	17.4	B	4,294	23.6	C
	SB	3	4,294	23.6	C	3,239	17.4	B
Between Immokalee Road and Lee/Collier County Line	NB	3	3,996	21.7	C	5,297	31.8	D
	SB	3	5,297	31.8	D	3,996	21.7	C

1 Volume is expressed in terms of vehicles per hour.
2 Density is expressed in terms of passenger cars per mile per lane.
3 Level of Service.

TABLE 4.4

MOBILITY 2000 EXPANSION
YEAR 2010 FREEWAY MAINLINE ANALYSIS SUMMARY
LEE COUNTY

I-75 Freeway Segment	Direction	Number of Lanes	AM Peak Hour			PM Peak Hour		
			Volume[1]	Density[2]	LOS[3]	Volume[1]	Density[2]	LOS[3]
Between Lee/Collier County Line and Bonita Beach Road	NB	3	3,996	21.7	C	5,297	31.8	D
	SB	3	5,297	31.8	D	3,996	21.7	C
Between Bonita Beach Road and Corkscrew Road	NB	3	3,992	21.8	C	5,224	31.1	D
	SB	3	5,224	31.3	D	3,992	21.7	C
Between Corkscrew Road and Alico Road	NB	3	3,684	20.0	C	5,021	29.3	D
	SB	3	5,021	29.3	D	3,684	20.0	C
Between Alico Road and Daniels Parkway	NB	3	3,949	21.4	C	5,221	31.0	D
	SB	3	5,271	31.5	D	3,899	21.0	C
Between Daniels Parkway and Colonial Boulevard	NB	3/2	3,875	21.1/38.9	C/E	5,137	30.5/>45.0	D/F
	SB	2/3	5,137	>45.0/30.5	F/D	3,875	38.9/21.1	E/C
Between Colonial Boulevard and SR 82	NB	2	3,637	34.2	D	4,821	>45.0	F
	SB	2	4,821	>45.0	F	3,637	33.9	D
Between SR 82 and Luckett Road	NB	2	3,511	32.3	D	4,654	>45.0	F
	SB	2	4,654	>45.0	F	3,511	32.1	D
Between Luckett Road and SR 80	NB	2	3,491	31.7	D	4,628	>45.0	F
	SB	2	4,628	>45.0	F	3,491	31.5	D
Between SR 80 and SR 78	NB	2	3,141	27.1	D	4,164	>45.0	F
	SB	2	4,164	>45.0	F	3,141	27.1	D

1 Volume is expressed in terms of vehicles per hour.
2 Density is expressed in terms of passenger cars per mile per lane.
3 Level of Service.

TABLE 4.5

MOBILITY 2000 EXPANSION
YEAR 2010 FREEWAY RAMP MERGE/DIVERGE AREA ANALYSIS SUMMARY
COLLIER COUNTY

Interchange	Ramp	AM Peak Hour			PM Peak Hour		
		Volume[1]	Density[2]	LOS[3]	Volume[1]	Density[2]	LOS[3]
SR 951	NB Off	210	12.3	B	278	15.2	B
	NB On	1,298	16.1	B	1,721	21.8	C
	SB Off	1,721	28.0	D	1,298	21.4	C
	SB On	278	12.0	B	210	9.3	A
Golden Gate Parkway	NB Off	259	19.7	B	341	26.1	C
	NB On	926	17.3	B	1,227	22.9	C
	SB Off[(a)]	1,227	19.0/19.0	C/C	926	14.3/14.3	B/B
	SB On	341	21.0	C	259	15.2	B
Pine Ridge Road	NB Off	422	18.8	B	560	24.0	C
	NB On	998	20.6	C	1,323	27.3	C
	SB Off	1,323	31.3	D	998	25.0	C
	SB On	560	20.8	C	422	15.6	B
Immokalee Road	NB Off	450	23.3	C	596	29.1	D
	NB On	1,207	25.2	C	1,599	33.6	D
	SB Off	1,599	36.1	E	1,207	29.1	D
	SB On	596	25.4	C	450	19.3	B

1 Volume is expressed in terms of vehicles per hour.
2 Density is expressed in terms of passenger cars per mile per lane.
3 Level of Service.
(a) Density and level of service for freeway upstream/downstream of major diverge.

TABLE 4.6

MOBILITY 2000 EXPANSION
YEAR 2010 FREEWAY RAMP MERGE/DIVERGE AREA ANALYSIS SUMMARY
LEE COUNTY

Interchange	Ramp	AM Peak Hour			PM Peak Hour		
		Volume[1]	Density[2]	LOS[3]	Volume[1]	Density[2]	LOS[3]
Bonita Beach Road	NB Off	649	25.9	C	861	35.6	E
	NB On	645	24.5	C	788	31.7	D
	SB Off	788	35.4	E	645	29.1	D
	SB On	861	32.0	D	649	24.5	C
Corkscrew Road	NB Off	827	27.1	C	950	33.0	D
	NB On	519	19.9	B	747	28.0	D
	SB Off	747	31.9	D	519	24.7	C
	SB On	950	29.7	D	827	22.7	C
Alico Road	NB Off	692	25.2	C	1,010	32.4	D
	NB On	957	18.8	B	1,260	27.6	C
	SB Off	1,210	21.2	C	977	13.7	B
	SB On	1,010	25.1	C	762	16.9	B
Daniels Parkway	NB Off	964	14.0	B	1,250	21.5	C
	NB On (Loop)	348	15.5	B	428	22.2	C
	NB On	542	21.0	C	548	27.9	C
	SB Off	1,016	32.8	D	968	26.6	C
	SB On	1,100	30.6	D	992	22.7	C
Colonial Boulevard	NB Off	954	41.2	E	1,265	53.9	F
	NB On (Loop)	650	28.8	D	857	39.3	F
	NB On	66	35.0	D	92	45.7	F
	SB Off	949	50.7	F	716	38.6	E
	SB On	1,265	48.8	F	954	37.5	E
SR 82	NB Off	526	38.8	E	697	50.5	F
	NB On	400	33.2	D	530	43.4	F
	SB Off	530	49.1	F	400	37.3	E
	SB On	697	45.2	F	526	34.2	D

TABLE 4.6 (CONTINUED)

MOBILITY 2000 EXPANSION
YEAR 2010 FREEWAY RAMP MERGE/DIVERGE AREA ANALYSIS SUMMARY
LEE COUNTY

Interchange	Ramp	AM Peak Hour			PM Peak Hour		
		Volume[1]	Density[2]	LOS[3]	Volume[1]	Density[2]	LOS[3]
Luckett Road	NB Off	401	37.7	E	432	49.0	F
	NB On	381	33.8	D	406	44.0	F
	SB Off	406	48.6	F	381	37.0	E
	SB On	432	43.1	F	401	32.5	D
SR 80	NB Off	855	37.5	E	1,134	48.8	F
	NB On	505	30.7	D	670	39.9	F
	SB Off	670	44.1	F	505	33.8	D
	SB On	1,134	43.1	F	855	33.0	D
SR 78	NB Off	989	32.7	D	1,285	43.0	F
	NB On	135	21.9	C	152	28.6	D
	SB Off	152	27.3	C	135	19.8	B
	SB On	1,285	38.9	F	989	29.7	D

1 Volume is expressed in terms of vehicles per hour.
2 Density is expressed in terms of passenger cars per mile per lane.
3 Level of Service.

Table 4.6 also indicates that north of the Daniels Parkway interchange, many of the ramp merge/diverge areas are projected to operate at Level of Service E or F during one or both of the peak hours. In the a.m. peak hour, 13 of the 21 ramp merge/diverge areas are projected to operate at Level of Service E or F. In the p.m. peak hour, 14 of the 21 ramp merge/diverge areas are projected to operate at Level of Service E or F. The Level of Service E and F operations projected at these locations are a direct result of the lack of adequate peak hour capacity on the existing four-lane portion of I-75. It should be noted that improvements to the portion of mainline I-75 from north of the Daniels Parkway interchange to the SR 80 interchange are proposed for funding within the FDOT District One Year 2025 Financially Feasible Florida Intrastate Highway System (FIHS) Plan.

The Mobility 2000 Expansion project does not include any geometric improvements at the ramp terminal intersections, however, there are several other planned/programmed operational improvement projects that involve modifications to selected ramp terminal intersections. The operational improvement projects associated with the I-75 ramps in Collier and Lee Counties that were originally identified by the FDOT are listed below. Some of these improvements have already been constructed since the time the existing conditions analyses were conducted (e.g., the dual left-turn lanes on SR 80 and the dual left-turn and right-turn lanes at Pine Ridge Road).

Lee County

- **Bonita Beach Road**
  - Dual left-turn lanes on the northbound off-ramp.
  - Dual right-turn lanes on the southbound off-ramp.
  - Traffic signal on the west side of the interchange.
- **Daniels Parkway**
  - Two-lane northbound off-ramp.
  - Dual left-turn lanes on Daniels Parkway for the westbound-to-southbound movement.
- **Colonial Boulevard**
  - Dual left-turn and right-turn lanes on the northbound off-ramp.
  - Dual left-turn and right-turn lanes on the southbound off-ramp.
  - Dual left-turn lanes on Colonial Boulevard for the westbound-to-southbound movement.
- **SR 80**
  - Dual left-turn lanes on SR 80 for the westbound-to-southbound movement.
- **SR 78**
  - Dual left-turn lanes on the northbound off-ramp.