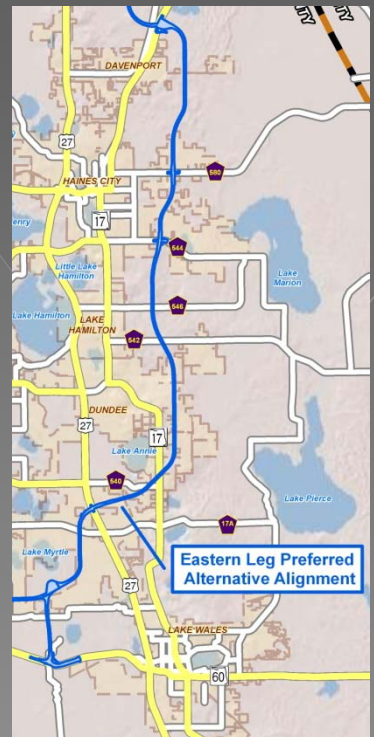
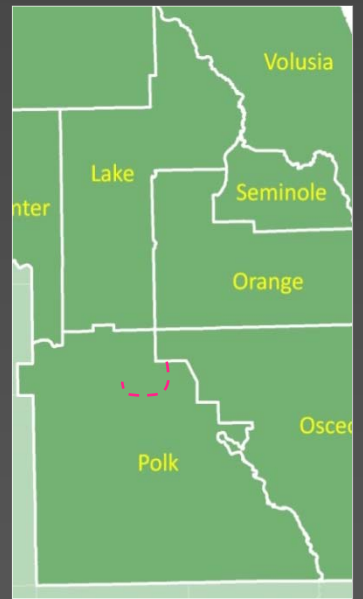




# Preliminary Traffic & Revenue Study

## Central Polk Parkway Polk County, FL



March 2011

# **Preliminary Traffic and Revenue Study**

## **Central Polk Parkway**

Prepared by: Florida Department of Transportation / Florida's Turnpike Enterprise  
Date: March 2011

The traffic-revenue study performed for this project is of the most preliminary nature, appropriate only for use in planning-level evaluation of the project. It is not intended to support final financial decisions and is not sufficiently detailed for that purpose. The study was based on the best available assumptions as to future land use and population growth in the region, as well as future transportation infrastructure that will serve the area. Unanticipated events or influences affecting the national or local economy, future regional growth, the condition or extent of transportation networks, or other influencing factors could produce substantially different conclusions.

### **Executive Summary**

Florida's Turnpike Enterprise (the Turnpike)—the toll road operating entity of the Florida Department of Transportation (FDOT)—has completed a preliminary traffic and revenue (T&R) study to estimate the earning potential of a proposed new limited-access expressway that would be located in Polk County, Florida. The proposed project is known as the Central Polk Parkway and is the subject of a Project Development and Environment (PD&E) study performed by FDOT District One. The District has no programmed funding or schedule for advancing the project beyond the PD&E phase at this time. At the request of District One, the Turnpike performed the T&R study to determine what part of project financing could be contributed by toll revenue earnings, if the project were implemented as a toll road.

The T&R study utilized a travel demand model called the Turnpike Central Florida Model (TCFM), developed by the Turnpike specifically for evaluating proposed toll roads and toll road improvements within a 10-county Central Florida area, including Polk County. Toll traffic projections from the model were used to predict the 30-year revenue stream the project could produce, from an assumed opening year of fiscal year (FY) 2018 through FY 2047. The study found that the estimated bonding capacity of the projected revenue stream could cover approximately 16 percent of the project implementation costs.

This report includes a brief description of the project, followed by a summary of the travel demand model, the study methods and assumptions, and the findings from the traffic and revenue analyses based on the model forecasts.

## 1.0 Project Description

The Central Polk Parkway project, as proposed in the FDOT District One PD&E study, is conceptualized as a multi-lane, divided, limited-access expressway that would follow a new alignment in Polk County, Florida. In the PD&E study, which began in the summer of 2008, the District evaluated a broad corridor for the Parkway, studied numerous alignment locations within the corridor, and narrowed the field of options to a “Preferred Alternative” alignment, as depicted in **Figure 1**.

The purpose and need for the Central Polk Parkway is described at length in PD&E study documents. That study predicts that major roadways in the area will not be sufficient to accommodate traffic with anticipated future population and growth. According to the PD&E study, the major roadway segments within the Central Polk Parkway project study area that run parallel to the proposed facility will begin to fail between the years of 2015 and 2035. Those roadways are specifically identified in the PD&E study as:

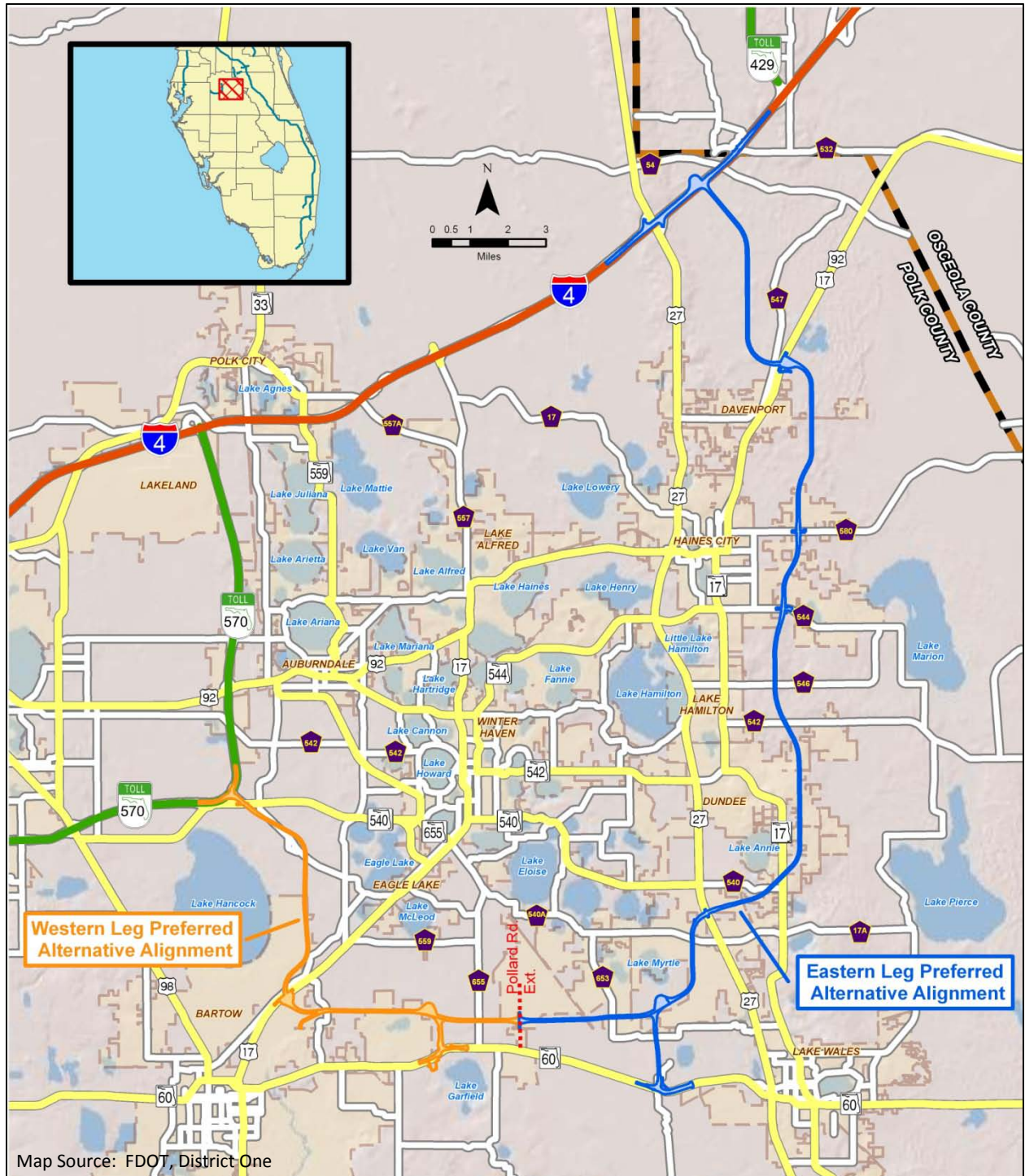
- U.S. 98, from S.R. 60 to Polk Pkwy.
- U.S. 17, from S.R. 60 to U.S. 92
- U.S. 27, from S.R. 60 to I-4
- S.R. 60, from U.S. 17/98 to U.S. 27

This T&R study by the Turnpike has not undertaken to verify, supplement, or expand on the multi-disciplinary studies completed during the PD&E phase by FDOT District One. The sole and explicit purpose of the T&R study is to evaluate what part of project funding could be contributed by toll revenues, if the road were implemented as a toll road. The physical details of the proposed project, including the alignment, interchange locations, proposed design speed, and other operational characteristics have been accepted “as is” from the PD&E study.

### 1.1 Preferred Alternative Alignment and Interchange Locations

The PD&E Preferred Alternative alignment depicted in **Figure 1** was the basis for the Turnpike’s T&R study. It is approximately 44 miles in length, forming a loop around the Polk County communities of Winter Haven, Auburndale, Eagle Lake, Dundee, Lake Hamilton, Haines City, and Davenport. It would connect on the west with the Polk Parkway (S.R. Toll 570) and on the east with Interstate 4, near the Polk/Osceola county line. Along its length, the proposed Parkway would include interchanges with a number of major crossing roads and streets. It would also have two new-alignment, limited-access connections to S.R. 60, one located west of a future Pollard Road extension and one located east of that extension.

**FIGURE 1**  
**Central Polk Parkway – Project Location Map**



In the PD&E study, the portion of the proposed project from its connection to the Polk Parkway to the Pollard Road extension was identified as the “Western Leg,” while that portion from the Pollard Road extension to Interstate 4 was described as the “Eastern Leg.” The Western Leg

would be approximately 13 miles in length; the Eastern Leg approximately 31 miles. As depicted in the **Figure 1** map, interchange locations on the Western Leg would include:

- Polk Parkway (S.R. Toll 570)
- U.S. 17
- Bartow Northern Connector (Future)
- Connector to S.R. 60 (West)
- Pollard Rd. Extension (Future)

Interchange locations on the Eastern Leg would include:

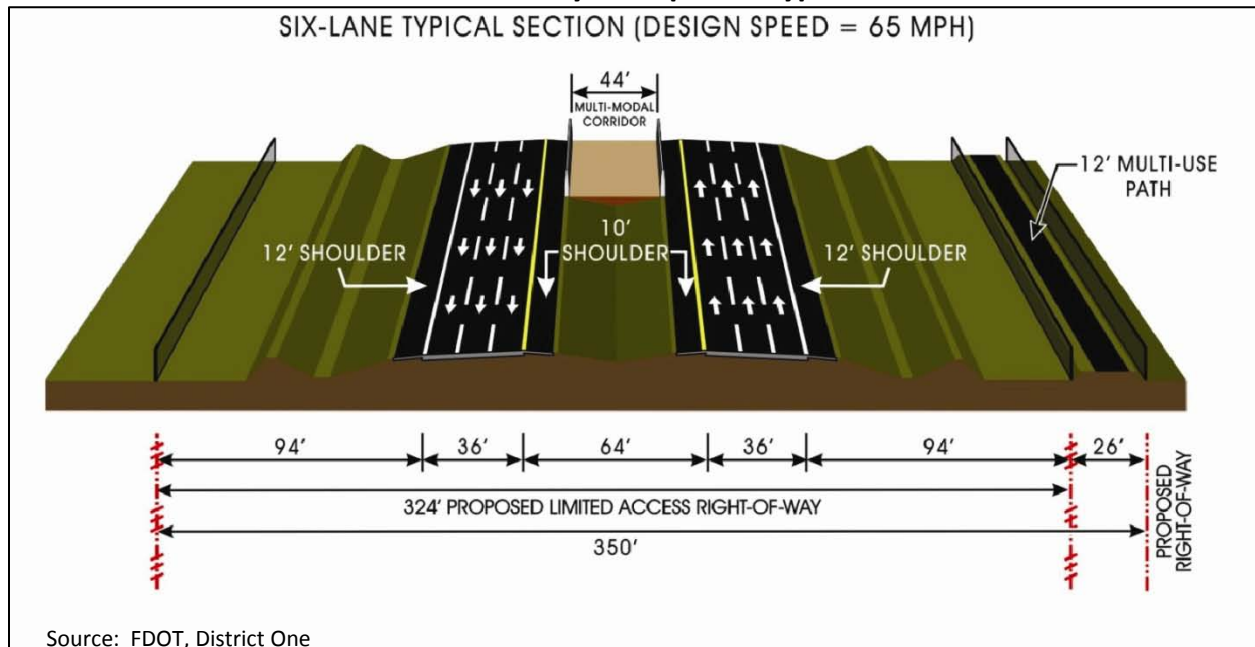
- Pollard Rd. Extension (Future)
- Connector to S.R. 60 (East)
- U.S. 27
- C.R. 544
- C.R. 580
- U.S. 17/92
- Interstate 4

### **1.2 Proposed Typical Roadway Section**

The typical roadway cross-section evaluated for the Parkway in the PD&E study is illustrated in **Figure 2**. It is a six-lane, divided, limited-access typical section that would be located within a right-of-way width of 350 feet. Design speed of the proposed facility would be 65 miles per hour. It should be noted that the proposed six-lane typical section resulted from PD&E traffic forecasts that modeled the facility as a toll-free route. This Turnpike study indicated that the Parkway—if implemented as a toll road—would not attract a sufficiently large volume of traffic to warrant more than four-lanes.

For this study of the Parkway as a proposed toll road, the Turnpike assumed toll collection would be all-electronic, using the state's pre-paid SunPass toll collection service and a license plate photo tolling option (video tolling) for those vehicles not equipped with a SunPass transponder. There would be no toll booths and no stopping or slowing of traffic to pay tolls. Vehicles would pass at normal highway speeds under overhead gantry structures equipped with SunPass readers and cameras. For SunPass customers, the toll charges would be automatically drawn from their pre-paid accounts. For video tolling customers, they could optionally have a pre-paid account tied to their auto license plate, or they could be invoiced by mail.

**FIGURE 2**  
**Central Polk Parkway – Proposed Typical Section**



### 1.3 Estimated Project Costs

Estimated project costs used in this study have been accepted directly from the PD&E study and are summarized in **Table 1**. It should be noted that the PD&E study cost estimate is for a six-lane typical section, as depicted in **Figure 2**. As mentioned above, that typical section is based on the PD&E’s traffic forecasts assuming the road would be toll-free. This T&R study found that, if the road were a toll road, the traffic volumes would not warrant more than four lanes. However, it was beyond the scope of this T&R study to revise the cost estimate developed for the PD&E study.

The lone item in the cost estimate that does not come from the PD&E study is the toll equipment cost. As the PD&E team evaluated the project as a toll-free road, there was no cost included in their estimate for the toll-collection equipment that would be required if it were a toll road. This equipment includes all the SunPass reader equipment and cameras, as well as the overhead gantry structures that the equipment would be mounted on, as discussed above. For that cost, the Turnpike provided the estimate, based on recent toll equipment cost experience on other Florida toll roads operated by the Turnpike.

In **Table 1**, the estimated costs are expressed in present day (FY 2011) dollars, and they are also inflated to the anticipated year of expenditure, using the cost inflation factors prescribed by

FDOT Work Program instructions for FY 2012 through FY 2016. This inflation of costs to the anticipated year of expenditure is appropriate for comparing against the toll revenue bonding capacity estimate discussed in later pages.

**TABLE 1**  
**Central Polk Parkway**  
**Estimate of Project Costs**

<b>Cost Item</b>	<b>Year of Expenditure</b>	<b>Cost (FY 2011 \$)</b>	<b>Cost (Inflated \$)</b>
Design Engineering	FY 2012	\$ 142,610,000	\$ 147,316,000
Right-of-Way	FY 2014	285,682,000	314,822,000
Construction	FY 2016	950,733,000	1,118,062,000
Wetlands Mitigation	FY 2016	48,164,000	56,641,000
Construction Engineering & Inspection	FY 2016	142,610,000	167,709,000
Toll Equipment, Gantries, etc.	FY 2016	25,719,000	30,246,000
	<b>TOTAL</b>	<b>\$1,595,518,000</b>	<b>\$1,834,796,000</b>

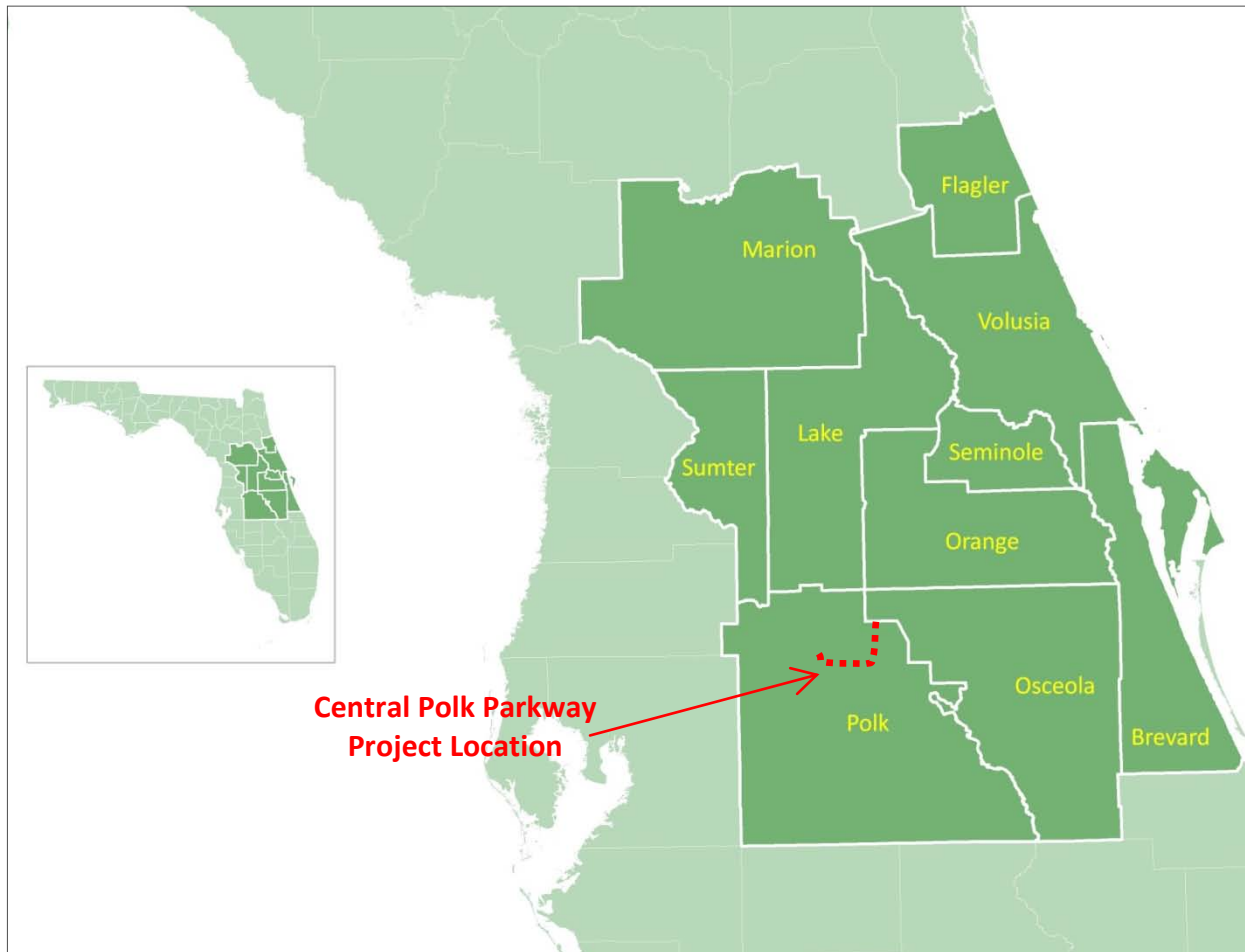
## 2.0 Travel Demand Model

A fundamental step in the preliminary T&R study was the forecasting of how much traffic may use the Parkway in future years, if it were implemented as a toll road. For this task, the Turnpike used the Turnpike Central Florida Model (TCFM). The TCFM was developed by the Turnpike specifically for evaluating toll roads in the 10-county Central Florida region, including the counties of Polk, Brevard, Flagler, Lake, Marion, Orange, Osceola, Seminole, Sumter, and Volusia (see **Figure 3**).

### 2.1 About the Model

The TCFM is a customized travel demand modeling tool developed specifically to forecast toll traffic. The standard Florida model used by Florida Metropolitan Planning Organizations (MPOs) is designed to simulate regional travel preferences and patterns, and works acceptably for that purpose. However, to more precisely simulate drivers’ decisions to use toll roads, a number of improvements are incorporated into the TCFM. Full documentation for this model is included with the report *“Turnpike Central Florida Model (TCFM),”* published by the Turnpike.

**FIGURE 3**  
**Turnpike Central Florida Model (TCFM) 10-County Regional Area**



For estimating future toll traffic, the TCFM is an improvement over the standard forecasting tool used in Florida for the last 25 years. With the traditional modeling methods, specific toll amounts on tolled roadway network links were simply converted to travel time penalties, or impedances. The TCFM departs from the standard four-step modeling approach and incorporates new components such as matrix estimation and ramp-to-ramp tolling, and is a vehicle trip model. Among other notable features of the TCFM are:

- A GIS database model platform that allows enhanced levels of detail and precision for roadway network definition, land use, and socioeconomic data, as well as refinements for road network speed/capacity relationships by road type and area type classifications

- A toll sensitivity component based on a measure of travelers’ “willingness to pay” and extensive travel surveys, speed studies, traffic counts, and other empirical data collected specifically for the model study area
- A web-based Household Travel Diary Survey that provides details about region-wide travel patterns and origins/destinations of trips (approximately 500 households participated)

The TCFM is an annual average daily traffic (AADT) model. Future years for which model datasets were available for this preliminary study were FY 2015 and FY 2035. As the study did not assume the Parkway could open to traffic before FY 2018 at the earliest, the traffic forecast for FY 2018 was determined by straight-line interpolation between the modeled volumes for FY 2015 and FY 2035.

The model incorporates all roadway improvements in the current FDOT work program into the future-year networks. This includes the on-going six-lane widening of major competing routes U.S. 27 and U.S. 98. Also included is the proposed Bartow Northern Connector project that is to be constructed by Polk County.

The model also utilizes posted speed limits and the appropriate roadway capacities based on ground traffic counts and road classification. The trip generation for the productions and attractions is vehicle-based. A gravity model was used to distribute the trips based on free-flow travel times and produced a seed table used in model calibration.

A “matrix estimation” procedure was applied to calibrate a final trip table. This procedure evaluates the ratios of model-assigned vehicle trips to the actual traffic counts on the links where counts have been performed, modifies the origin/destination trips, and reassigns the modified trip matrix until a user-specified number of passes is reached. To verify the accuracy of the validation, the root mean square error (RMSE) statistics were reviewed. The TCFM produced an overall error statistic of less than 12 percent for the entire model and less than 12.5 percent for Polk County, well within adopted standards for model accuracy.

### **2.2 Travel Model Socioeconomic Assumptions**

As noted above, the TCFM was used to produce traffic forecasts for the proposed Central Polk Parkway “Preferred Alternative” and other area roadways for the years 2015 and 2035. Among the important basic assumptions for the modeling task was the timing and scale of the socioeconomic growth that is expected to occur in the region, particularly in Polk County.

The determination of the appropriate level of forecast socioeconomic growth was particularly important in light of the impacts in recent years from the Great Recession. As an example of

the recession’s impact, annual revenues for FY 2010 on the Polk Parkway—the only other toll road in Polk County—were set back to the level of FY 2006.

The Turnpike’s source for projections of future population growth in this study is the University of Florida Bureau of Economic and Business Research (BEBR). BEBR statistics show Polk County’s population growth during the years FY 2000 – FY 2009 averaged 2.1 percent per year, with a FY 2009 population of approximately 584,340. BEBR’s projection of county population growth for the post-recession future is significantly lower—averaging approximately 1.3 percent per year, and resulting in a FY 2035 population estimate for the county of 816,700. This is the BEBR “medium” forecast for the county, which BEBR publications describe as “the most accurate forecasts of future population change.”

The TCFM uses dwelling units (DUs) and employment numbers as socioeconomic variables. Therefore, it was necessary to derive values for those items from the BEBR “medium” population forecast for FY 2035. To do this, the study used BEBR factors and historical trends. **Table 2** shows the resulting basic socioeconomic data for FY 2035.

**TABLE 2**  
**FY 2035 Socioeconomic Data**  
**Turnpike Central Florida Model (TCFM)**

Socioeconomic Factor	TCFM Value	Source
Population	816,700	BEBR medium population forecast
Dwelling Units (DUs)	332,231	BEBR medium population forecast and BEBR factor for occupancy per DU
Employment	319,283	BEBR medium population forecast and employment trends, 1990-2009

### 2.3 Evaluation of Planned/Proposed Major Traffic Generators

As with any forecast of future traffic, an important influence on which roads attract traffic is the assumed location and intensity of large-scale future development projects of various types. These include proposed Developments of Regional Impact (DRIs) and other sub-DRI size developments that could be significant generators of vehicle trips.

For this study, an assessment of such proposed developments in Polk County was performed by an independent land use/traffic specialist. More than 25 such developments were identified through research of growth management records and interviews with representatives of local and regional government agencies responsible for reviewing, monitoring, and permitting major development. Interviews were also conducted with the proponents of most of the

developments. The focus of this independent review was to determine the appropriate level of each development to assume in the future traffic model years. This task is typically included in Turnpike T&R studies, as history indicates it is not appropriate to simply assume all planned developments will succeed to their fullest proposed or permitted extent.

### 2.4 Toll Rates

Another important influence on the volume of traffic that would use the Parkway is the proposed toll rate. Establishing the appropriate toll rate considers a balance of revenue earnings, traffic service, and consistency with the toll rates existing on other toll roads in the area. If the toll rate is set too high, it will discourage some potential customers from using the facility, as they may judge the toll charge an unfair trade-off for the service received. If the rate is set too low, the project's revenue-earning potential will not be realized.

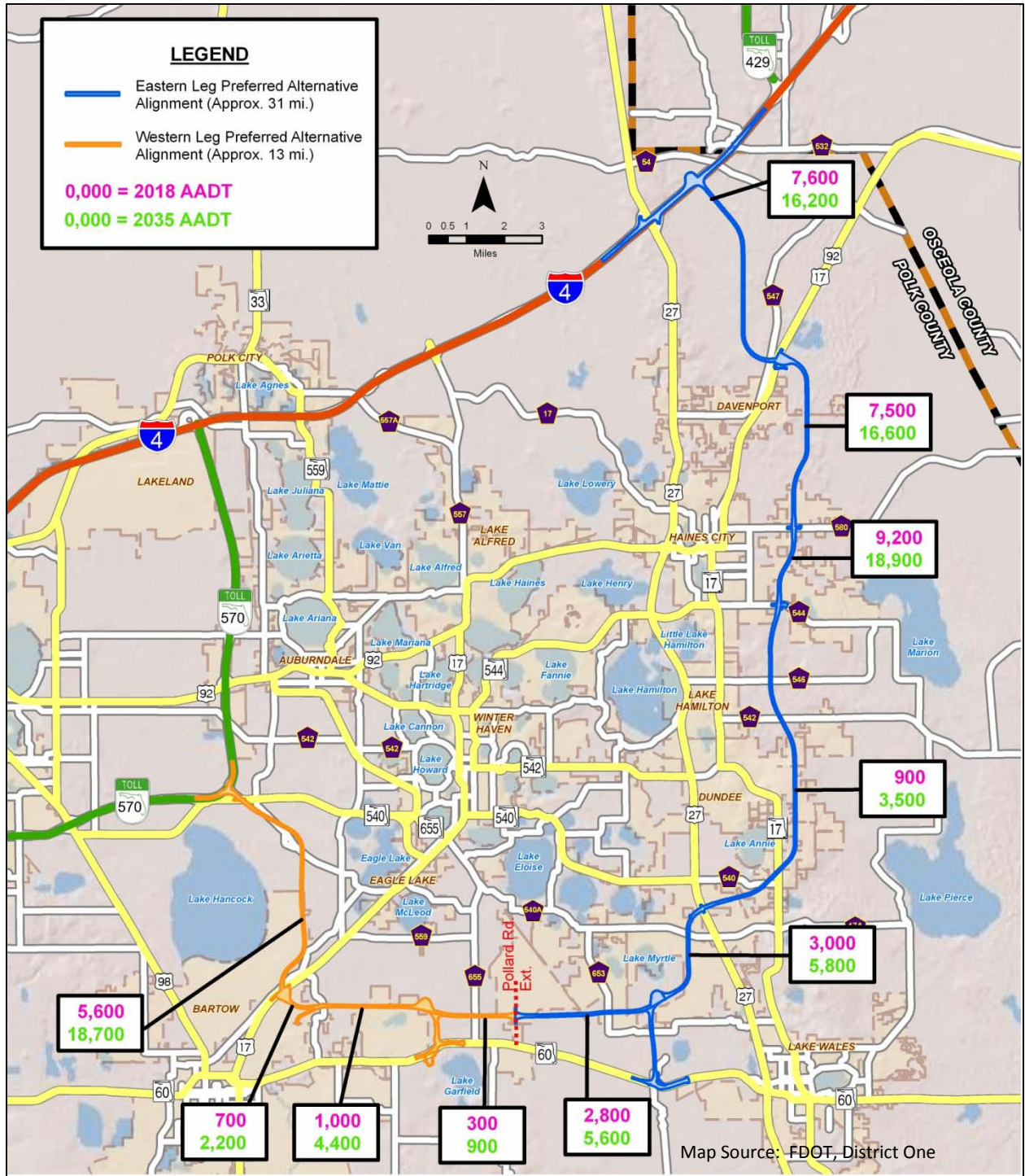
For the present study, several different toll rates were tested in the model, ranging from \$0.10/mile to \$0.30/mile. Based on those initial tests, it was determined the appropriate toll rate would be similar to what is in place on the Polk Parkway. That is presently \$0.12/mile, with annual indexing for inflation planned to begin in FY 2013, in keeping with a Florida law enacted by the 2007 legislative session. With the indexing assumed at approximately 2.5 percent/year, the "startup" SunPass toll rate for the opening year FY 2018 would be approximately \$0.15/mile, with a minimum SunPass toll charge of \$0.50. Customers using the video tolling option would pay an additional \$0.25.

### 3.0 Traffic Forecasts

**Figure 4** summarizes the model-predicted traffic forecasts for the opening year (FY 2018) and the future year (FY 2035) for the Central Polk Parkway, based on the assumptions discussed in previous sections. As illustrated, the segments at either end—nearest the connections to the Polk Parkway on the west and Interstate 4 on the east—are predicted to draw the highest volumes of toll-paying traffic.

The pattern of forecasted toll traffic also indicates that there would be little demand from traffic desiring to travel the length of the proposed Parkway. In fact, the two "legs" of the proposed project seem to have separate utility from one another. The link where the Western Leg would connect to the Eastern Leg at the Pollard Road extension is projected to attract less

**FIGURE 4**  
**Central Polk Parkway – Toll Traffic Forecast**



than 1,000 Annual Average Daily Traffic (AADT) in FY 2035. Another link which is forecast to have quite limited toll traffic demand is the 9.7-mile segment on the Eastern Leg between U.S. 27 and C.R. 544 (900 AADT in FY 2018 / 3,500 AADT in FY 2035).

Overall, the forecasts predict annual growth in traffic volumes for the Western Leg would average 7.6 percent between FY 2018 and FY 2035. On the Eastern Leg, projected annual growth in traffic is forecast to average 5.6 percent.

### 4.0 Revenue Projections

The next step in the preliminary T&R study was the estimation of annual gross revenues that the tolled Central Polk Parkway would earn each year for a period of 30-years following opening-to-traffic. (The 30-year period is the term of State of Florida toll road revenue bonds.) The gross revenue estimate was derived by applying the proposed toll rates to the traffic forecasts for the opening year (FY 2018) and the future year (FY 2035), with straight-line interpolation for the years in between and straight-line extrapolation for the years beyond 2035. In the calculation of gross revenues, some additional factors are required, which cannot be accounted for in the travel demand model. They include:

- A factor to account for the added revenue from heavy trucks in the traffic mix. Heavy trucks would pay a higher rate than passenger vehicles, based on the number of axles. The estimate assumes trucks would represent 8.0 percent of the Central Polk Parkway traffic mix, based on historic truck percentages observed on U.S. 27, U.S. 98, and S.R. 60.
- “Ramp up” factors for the first three years after opening-to-traffic, based on historical observation that it typically requires this ramp-up time for toll road traffic to fully establish. The factors are 90 percent from opening through the first full year, 93 percent for the second year, and 96 percent for the third year.
- A factor based on the assumption that 25 percent of the vehicles using the facility in the opening year will not have SunPass and will therefore pay the higher rate for the video tolling option. The study assumed that, by 2035, the number of vehicles without SunPass would reduce to 10 percent.
- A video tolling collection factor, which accounts for the fact that some of the traffic that does not have SunPass or a video tolling pre-paid account will not respond to the video toll billing, thereby evading toll payment. For this study, it is estimated that video tolling collection will be 75 percent successful in the opening year, increasing to 95 percent successful by 2035.

## Preliminary Traffic and Revenue Study – Central Polk Parkway

- An “off-peak” factor that accounts for the fact that the toll road would be used less frequently during hours of the day when the competing toll-free roads are less likely to be congested. Based on a review of historic hourly traffic counts for the competing toll-free roads, off-peak hours represent approximately 10 percent of daily traffic.

The gross revenue estimates are summarized in five-year increments in **Table 3**. Also included in the table are estimates of operating and maintenance expenses. Operating expenses are those associated with collecting the tolls, including the operation and upkeep of the electronic tolling equipment and gantries, as well as backroom staff costs and overhead. Operating expenses are estimated based on the projected number of toll transactions and the known costs for equipment operations. Maintenance expenses are those routine costs associated with roadway and bridge upkeep and repair. They are estimated based on the number of new lane-miles added with the project. Both operating and maintenance costs are assumed to increase annually with inflation.

To obtain an estimate of net toll revenue, the projected gross revenues were reduced by the estimated operating and maintenance (O&M) expenses for the Parkway. The net revenue stream is summarized in the final column of **Table 3**. The net revenues are projected to grow from \$4.8 million in 2018 to \$58.5 million in 2047, with a 30-year net present value (NPV) of \$296.9 million.

**Table 3**  
**Central Polk Parkway – Revenue Forecast**

Analysis Year	Fiscal Year	Gross Toll Revenue	Operating Expense	Maintenance Expense	Net Toll Revenue
1	2018	\$ 9,576,000	\$ 1,553,000	\$ 3,184,000	\$ 4,839,000
5	2022	16,212,000	2,386,000	5,315,000	8,511,000
10	2027	24,659,000	3,427,000	7,889,000	13,343,000
15	2032	35,047,000	4,468,000	9,370,000	21,209,000
20	2037	47,739,000	5,509,000	11,129,000	31,101,000
25	2042	63,162,000	6,551,000	13,217,000	43,394,000
30	2047	81,814,000	7,592,000	15,699,000	58,523,000
				<b>30-Year NPV <sup>1</sup></b>	<b>\$ 296,926,000</b>

<sup>1</sup> NPV based on 5.0 percent interest rate.

## 5.0 Bonding Capacity vs. Project Costs

The 30-year NPV of the revenue stream is an approximation of that portion of project costs that could be contributed by the sale of revenue bonds based on the project's projected toll earnings. This is also referred to as the "bonding capacity" of the project. When the \$296.9 million bonding capacity from **Table 3** is compared against the \$1.835 billion project costs from **Table 1**, the result shows the project's bonding capacity could cover just over 16 percent of project costs.