Tampa Interstate Study (TIS)
Supplemental Environmental Impact Statement (SEIS):
Economic and Fiscal Impact Analysis (Final)

September 2018

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The Tampa Bay Regional Planning Council is an association of local governments from Citrus, Hernando, Hillsborough, Manatee, Pasco and Pinellas Counties.

About the Economic Analysis Program

Since 1999, the Tampa Bay Regional Planning Council has been producing economic impact studies for a variety of public and private sector clients.

Using the most powerful analytical tools, including IMPLAN and REMI PI+, TBRPC's Economic Analysis Program has produced hundreds of reports covering topics such as job creation, land use, natural resources and energy, as well as a variety of public policy questions.

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Contents

Tables

Figures

EXECUTIVE SUMMARY OF THE ECONOMIC IMPACT STUDY

Tampa Bay Next (TB Next) is a collaborative process focused on investing in interstate modernization, transit, complete streets and other projects to improve mobility in the Tampa Bay Area. During this process, the City of Tampa Community Redevelopment Agency (CRA) Board requested that the Florida Department of Transportation (FDOT) prepare an economic impact study to document the potential effects of major interstate improvements in Tampa's urban core (letter dated October 4, 2016). FDOT District 7 contracted with Tampa Bay Regional Planning Council (TBRPC) to prepare an independent Economic Impact Analysis of the Tampa Interstate Study (TIS) Supplemental Environmental Impact Statement (SEIS). The TIS SEIS includes I-275 from the Howard Frankland Bridge to north of Martin Luther King Jr. Boulevard and I-4 from the I-275/I-4 interchange to east of 50th Street.

TBRPC has prepared a study focused on the broad economic impacts of the TIS SEIS on Hillsborough County and on the project's economic and fiscal impacts on the CRAs in Tampa, particularly Central Park, Channel District, Downtown Tampa, East Tampa, Tampa Heights/Riverfront, and West Tampa. Those impacts cover issues such as land use, personal income, employment, property values and other implications for the future of the Community Redevelopment Areas.

TBRPC used TranSight to evaluate alternative project designs to alleviate congestion in the Tampa Bay Area. TBRPC evaluated three economic scenarios for the TIS SEIS: No Further Action, Non-Tolled Express Lanes, and a Tolled Express Lane. If no further action is taken on building either the non-tolled or tolled express lane projects, congestion in the region would likely increase. With many highway facilities in the region already exceeding their design capacity, increasing congestion could cause the regional economy to suffer. Those findings are summarized in Table ES1.0.

Table ES1.0: Comparing Economic Impact Scenarios Compared to Trend Forecast**

	Average Annual No Further Action	Average Annual Construction Impacts	Average Annual Non-Tolled Express Lanes	Average Annual Tolled Express Lanes	Differences between Non-Tolled and Tolled Express Lanes
Total Employment*	-25,652	4,110	9,757	12,413	2,656
Gross County Product ($Mil)	-3,243	355	1,283	1,634	351
Output ($Mil)	-5,625	658	2,222	2,832	610
Personal Income ($Mil)	-2,280	220	638	803	165

*Employment is in job-years, one job held for one year. **Trend Forecast are discussed in Section 5. Dollar impacts are 2015 $. Source: TBRPC, 2018

TBRPC used the results from TranSight, local data and plans, and the Tampa Bay Regional Planning Model outputs to analyze potential impacts of TIS SEIS on the Community

Redevelopment Areas (CRAs). Using a 'triangulation' of data from these sources, as well as insights from the research literature, TBRPC extended the countywide analysis in the scenarios to the CRAs.

Generally, the No Further Action scenario is likely to have negative impacts on employment growth in the CRAs, and may contribute to lower than trend population growth in some community areas. On the other hand, No Further Action would result in traffic rerouting from an over-congested interstate to CRA arterials running parallel with the highway right-of-way. Higher traffic counts on arterials may have adverse impacts on single-family home values because of nuisances of noise and congestion while increased arterial traffic could stimulate growth in commercial and even multi-family residential property values because higher traffic volumes raise the visibility of those properties.

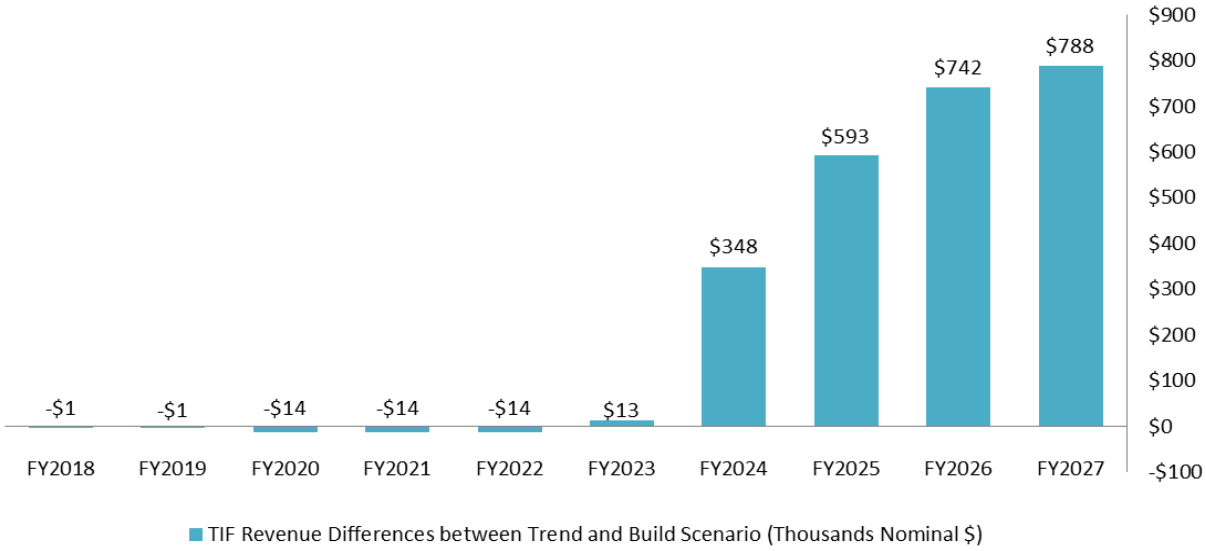
Of each of the scenarios studied in this analysis, the tolled-express lanes alternative, especially the construction phase, is likely to have the most direct and positive impact on economic conditions in the CRAs. Construction may bring hundreds of jobs to CRA residents and attract new sales to CRA businesses. Because construction of a $2.65 billion project is an economic stimulus, rising household incomes and new investment in commercial activities is likely to increase property values.

While system performance improvements are likely to improve economic performance throughout Hillsborough County, impacts to CRAs are likely to be roughly proportionate to countywide impacts. That means that, unlike construction impacts, system performance is more likely to be the tide that 'lifts all boats' rather than a boon that provides benefits to specific CRAs. On the other hand, because Ybor and Downtown would benefit from increased accessibility after the project opens, there may be a higher increase in discretionary spending in those CRAs, compared to the others.

Because these investments in highway modernization are adjacent to most CRAs and because construction is likely to have a significant impact on the CRAs, TBRPC looked at the potential fiscal impacts to CRA finances. The CRAs are funded through Tax Increment Financing (TIF). TIF districts retain the revenue derived from property assessment gains and use that revenue to fund various capital projects.

Since both the Tolled and Non-tolled Alternatives would require some right-of-way purchases and may impact overall property values, TBRPC analyzed two fiscal scenarios from 2018 to 2027, spanning the impacts of right-of-way acquisition, construction and project opening in 2027, when primary highway impacts on property values peak. A 'trend' analysis assumes that there is no project, and TIF revenues grow at the average historical rate. A 'Build' scenario uses those same growth rates, but analyzes the impacts of each project phase on TIF revenue. Figure ES1.0 depicts the excess revenues that the Build scenario TIF revenue generates over trend TIF revenue.

Figure ES1.0: Build Scenario TIF Revenue over CRA Trend TIF Revenue ($ thousands)



Source: TBRPC, 2018

As the figure shows, between FY18 and FY19, there are no significant differences between the trend and the build revenue estimates. Between FY20-FY22, TBRPC estimates a small decrease in expected revenues due to the impacts of right-of-way acquisition and construction nuisance impacts to property values. In subsequent years, however, the positive impacts of economic stimulus from construction and improved accessibility capitalize into property values and increase the Build scenario TIF revenues over the trend.

1. INTRODUCTION

1.1 About the Tampa Bay Regional Planning Council

Established as Florida's first regional planning council in 1962, the Tampa Bay Regional Planning Council (TBRPC) provides a forum to foster communication, coordination and collaboration among its member governments. Serving six counties (Citrus, Hernando, Hillsborough County, Manatee, Pasco and Pinellas) and twenty-one municipalities therein, TBRPC provides a wide range of services, including:

- Economic Modeling and Analysis
- Economic Development District
- Community Visioning and Planning
- Spatial Growth Modeling
- Hurricane and Hazard Preparedness Planning
- The Official Disaster Planning Guide
- Geographic Information Systems (GIS) Mapping Services
- Local Emergency Planning Committee: Hazardous Materials
- Technical Assistance to Local Governments
- Agency on Bay Management
- Bay Soundings Quarterly Environmental Journal
- Future of the Region Awards
- Regional Information Center

As one of the first Regional Economic Models (REMI) users in Florida, TBRPC has been providing economic analysis services to government agencies, non-profits and the private sector. Since 1999, TBRPC has conducted over 400 economic impact studies, covering topics such as transportation, environmental and natural resources management, land use decisions, business investment incentives, taxation, sports and other events and festivals. Many of these reports are available from the TBRPC website, http://www.tbrpc.org/eap/eap_projects.shtml.

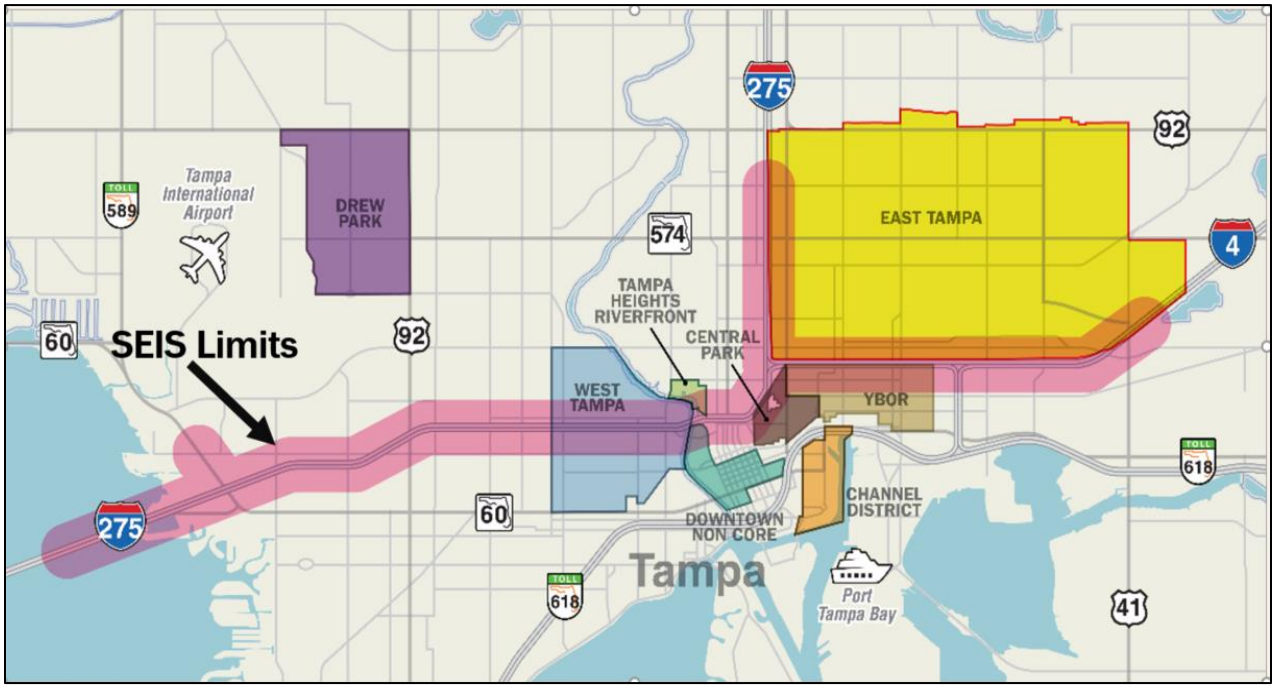
1.2 About the Tampa Core Urban Area Economic Impact Study

Tampa Bay Next is a collaborative process focused on investing in interstate modernization, transit, complete streets and other projects to improve mobility in the Tampa Bay Area. During this process, the City of Tampa Community Redevelopment Agency (CRA) Board requested that the Florida Department of Transportation (FDOT) prepare an economic impact study to document the potential effects of major interstate improvements in Tampa's urban core (letter dated October 4, 2016). FDOT District 7 contracted with Tampa Bay Regional Planning Council (TBRPC) to prepare an Economic Impact Analysis in support of the Tampa Interstate Study (TIS) Supplemental Environmental Impact Statement (SEIS). The TIS SEIS includes I-275 from the Howard Frankland Bridge to north of Martin Luther King Jr. Boulevard and I-4 from the I-275/I-4 interchange to east of 50th Street.

There are three deliverables in the Economic Impact Analysis. Deliverable 1 is a methodology memorandum. Deliverable 2 focused on the countywide economic impacts. Deliverable 3 is focused on local impacts to the City of Tampa, particularly the CRAs adjacent to I-275 and I-4, including Central Park, Channel District, Downtown Tampa, East Tampa, Tampa Heights/Riverfront, and West Tampa as shown in Figure 1.0. TBRPC has evaluated three economic scenarios for the TIS SEIS: No Further Action, Non-Tolled Express Lanes, and Tolled Express Lanes in the context of impacts to the economy and to the fiscal conditions of the CRAs.

The primary focus is on the economic impacts within the TIS SEIS project area include parts of I-275 and I-4 in the Westshore Downtown Tampa areas also shown in Figure 1.0.

Figure 1.0: TIS SEIS Project Location



Source: FDOT, 2018

2. EXISTING CONDITIONS

According to the US Bureau of Economic Analysis (BEA), the Tampa Bay Area economy is the 24th largest metropolitan area in the United States (2017)[1]. Home to the largest concentration of medical device manufacturers outside of California, to thriving health care and finance industry clusters, and to many other industries, the Tampa Bay Area provides more than 1.1 million jobs to its residents and to commuters from outside the region (TBRPC, 2017).

Out of 384 metropolitan regions in the United States, the Tampa Bay Area is third in the nation in the diversity of its patents, and it is a hotbed of new business formation—ranking tenth in the nation for new businesses to total employment and ninth in terms of the overall business dynamism of the nation's business activity, according to StatsAmerica (2017).

All of that dynamism is sustained by an extensive transportation system, including its interstate highway components. Because of the region's strong growth in recent years, however, congestion has become more of a problem. According to the Texas Transportation Institute's Urban Mobility Index report, the Tampa Bay Area is ranked as the 7th most congested metropolitan area among similarly sized cities in the United States and 22nd overall (TTI, 2015). According to TTI, congestion is much more than just an inconvenience, the delays that come with congestion cost commuters and businesses money. Those costs add up to billions of dollars of lost opportunity, investment and future potential.

Even as congestion adversely impacts the region's growth potential, the region's highways continue to influence the quality of life and socio-economic characteristics of its adjacent neighborhoods. CRAs that are most directly impacted include Central Park, Channel District, Downtown Tampa, East Tampa, Tampa Heights/Riverfront, West Tampa, and Ybor.

Together, these areas are home to about 57,725 residents and over 104,000 jobs. With lower rates of homeownership and lower average household incomes than average for Hillsborough County, about 20 percent of all households earn less than $10,000 a year. While there are many jobs overall, those jobs are concentrated in Downtown and to a lesser extent in East Tampa and Ybor. Generally, there is also a shortage of employers in a diverse set of industries offering well-paid employment in most CRAs. Large areas of vacant lots and underutilized properties in some CRAs also point to unmet potential. A more in-depth treatment of CRA existing conditions appears in Section 6.

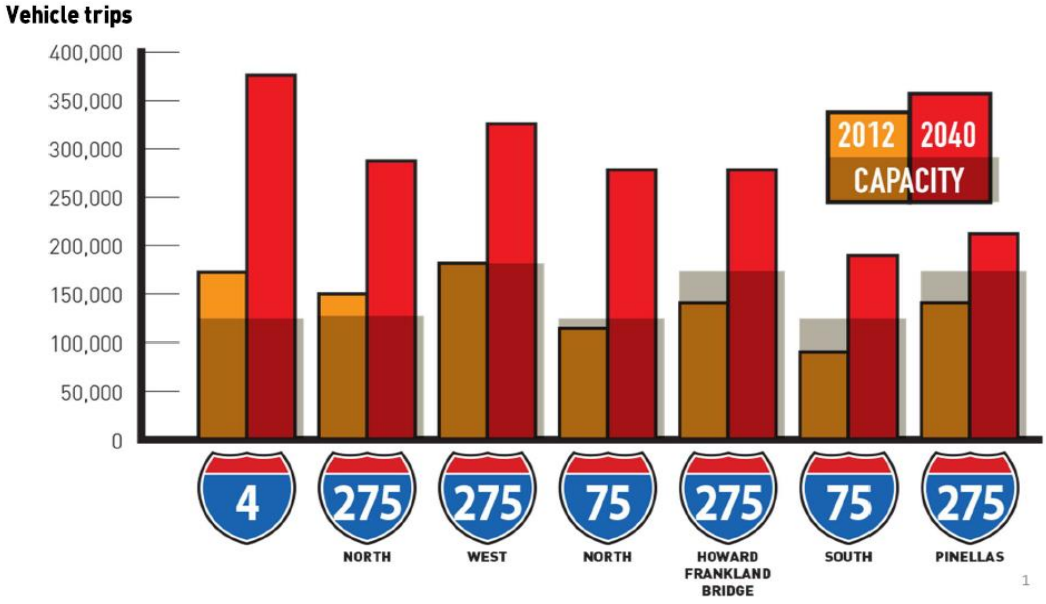
[1] Tampa Bay Area's economy for the six county region (Citrus, Hernando, Hillsborough, Manatee, Pasco and Pinellas) as estimated by TBRPC's REMI model to be $167 billion. Benchmarked against a 2016 Bureau of Economic Analysis ranking, the region's economy is larger than Charlotte, North Carolina, the 21st largest metro economy. (https://www.bea.gov/newsreleases/regional/gdp_metro/gdp_metro_newsrelease.htm).

3. DEFINING THE PROBLEM OF CONGESTION

Transportation and logistics costs account for a significant share of business turnover, often exceeding ten percent (Engblom et al, 2012, 29). While the concentration of business activities in urban areas reduces those costs, traffic congestion erodes the advantages of proximity. Defined as "a condition of traffic delay because the number of vehicles trying to use a road exceeds the capacity of the traffic network to handle it, congestion slows the movement of consumers and producers and raises costs for both (Weisbrod, Vary and Treyz, 2003, 2).

As such, congestion costs the economy income and jobs. Figure 3.1 depicts traffic volumes in 2012 and anticipated volumes in 2040 by major highway facility in the Tampa Bay Area. The grey boxes indicate the traffic volume design capacity of each facility. Most of the area's interstates have reached or are nearing capacity.

Figure 3.1: Interstate Traffic Volumes in 2012 versus 2040 compared to Design Capacity



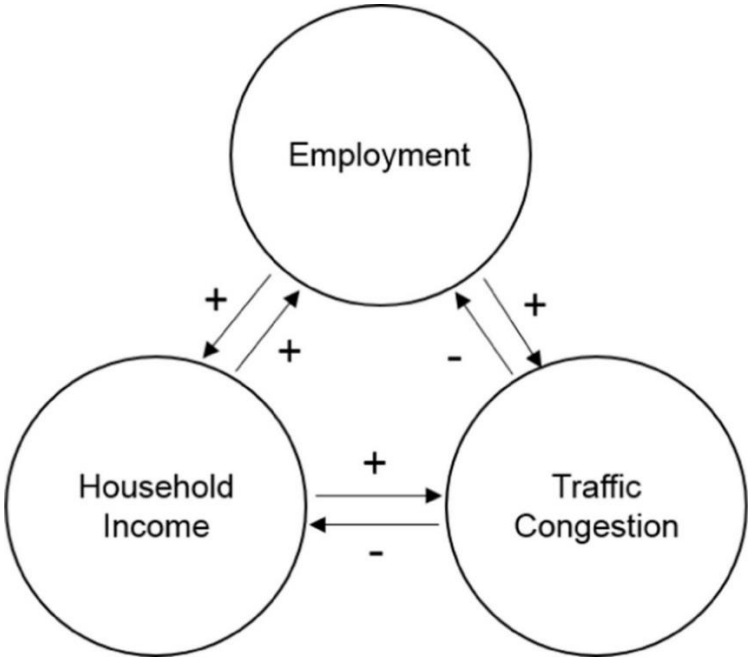
Source: Tampa Bay Express Master Plan, 2015

While congestion impacts all users, perhaps its most visible impact is the effect of congestion on commuters. Extended travel times, resulting in the spread of peak travel times across the day, affect commuters' productivity at work and raise household costs of commuting. Congestion leads commuters to stagger their work hours—and indirectly impact other family members' travel-to-work patterns. In the Tampa Bay Area, Tampa Bay Regional Planning Model (TBRPM) anticipates that peak hour travel would spread from 6:45 through 8:45 in the morning to 6:00 and 9:00 in the morning by 2035, as shown in Figure 3.1. Over the same time period, evening peak travel times would increase from 3:30 through 6:00 to 3:00 through 6:30 by 2035.

As depicted in Figure 3.2, Jin and Rafferty (2017) graph the relationship between employment, household income and traffic congestion as a feedback loop. As employment rises, so does

income and with it, traffic congestion. Conversely, congestion imposes costs on commuters, reducing employment and household income.

Figure 3.2: Simultaneous relationship between traffic congestion, employment and income



Source: Jin and Rafferty, 2017

Beyond impacts to the finances of commuters and other travelers, congestion most directly affects economic productivity. Productivity measures how much output is generated from a given amount of input, such as labor and capital.

Rising transportation costs diminish labor productivity and when the production process requires the circulation of inputs on crowded roads, industries pass on those additional costs to consumers. Beyond time spent in traffic, congestion effects cascade through the economy, influencing business practices. Weisbrod and Fitzroy (2008, Pg. 6) made the following points about the disadvantages of congestion:

- Because congestion limits time-sensitive delivery areas, distributors must increase the number of delivery vehicles to maintain and grow distribution markets. Routes must also change. These demands require more drivers and vehicle costs, and increase congestion.
- Longer truck operating hours, fewer deliveries or completed jobs per crew trip and exceeding safe limits on driver time. For example, businesses in Portland with chronic delivery issues have had to increase inventories by as much as 5-8 percent (Engblom, 2012).
- At manufacturing plants, slower turn around between plants can result in additional shifts or cutbacks in production schedules.
- Afternoon congestion has reduced late deliveries in large urban areas and forced restocking restrictions on businesses after 3pm. It also forces businesses to open early if

they cannot offer drop services to carriers. Moreover, delays in receiving deliveries result in overtime payments and in costs related to refused deliveries (Weisbrod and Fitzroy, 6).

- Congestion affects bus speeds by directly limiting maximum speeds, double parking, turning queues and need for frequent access to the curb lane at bus stops as well as the need to re-merge with traffic (McKnight, 6). As such, buses are doubly affected: first, by the low speed of the stream of traffic, and second by interference from other vehicles when moving in and out of the stream of traffic at bus stops (McKnight, 6).
- As with commuters in single-occupancy vehicles, transit riders must build in additional travel time to arrive at work or at school in a timely fashion. Similar to freight companies, transit operators must consider the operational issues of more buses and shorter headways to compensate for longer travel times, raising peak hour employee costs.

Conversely, Weisbrod and Fitzroy note (pg. 8) that the expansion of the transportation system and alleviating congestion yields economic benefits:

- Improvements enlarge customer markets and enable "scale economies" of production (which increase sales and reduce unit cost) as well as enable "scope economies" (which increase sales as a result of more highly specialized and differentiated products).
- System improvements can affect the size and density of labor markets, facilitating "agglomeration economies" that allow firms to access broader labor pools, hire employees with better matched skills, and innovate from interaction with workers at other firms.
- System improvements can affect supply chain efficiency, as more reliable and faster transportation can lower logistics costs by reducing the need for delivery vehicles, warehouse space, and investment in safety stocks.

4. METHODOLOGY: TRANSPORTATION FORECASTING AND ECONOMIC MODELS

New residential and commercial projects in an urban area tend to generate and attract new vehicle trips. As new trips are created, transportation engineers considering the efficiency of the road network account for which routes those trips take, and whether those trips are undertaken in automobiles, transit, bicycles, walk, or by bus. Traffic engineers also consider issues such as peak hour volumes of traffic and peak direction, meaning which lanes might be most heavily traveled, in order to plan future improvements to the roadway network.

Those new trips can also affect the overall system performance of the road network by introducing incremental changes to the total number of vehicles on existing roads, which routes are used, and average travel speeds. Moreover, those changes can affect how other vehicles using the road network behave. Anticipating the net impacts of all of these changes is highly complex, especially since the cost of road upgrades means that the long-term effects of those projects must be considered.

Transportation engineers and planners use Travel Demand computer models to consider the implications of proposed or potential transportation projects for the system performance of the road network. Transportation planning involves the determination of the need for new or expanded highways, transit systems, freight facilities, and transportation terminals. Furthermore, engineers and planners must consider the location, capacity and the management of demand in development of new projects. Typically, transportation planning involves a forecast of travel patterns 15 to 25 years into the future with an aim to develop a future transportation system that would work effectively at that time (Beimborm, 2006).

In order to provide all of this detail, travel demand models simulate current roadway conditions to contrast with alternative future conditions. This allows for engineers to compare and contrast future actions, including new road projects. For example, since highway congestion in the Tampa Bay area is already high, anticipated future growth is likely to make congestion even worse. Transportation engineers consider a range of potential projects that might alleviate that present and future congestion with roadway projects. In some cases, additional road capacity is considered, in others, technological solutions may help offset the need for new investment. In more congested urban areas, there may be a need for a package of projects.

Those projects are then entered into the Travel Demand model as one alternative scenario. They then consider the impacts to the transportation network if those projects are not built, even as the region continues to add jobs and population as a second scenario. Comparing the differences between two scenarios yields many different indicators, such as how many vehicles are anticipated on a road compared to the design capacity that road was built for; which types of vehicles (automobiles, trucks and transit), and hourly distribution of trips over the day. Other related indicators calculate average vehicle trip travel speeds.

In the Tampa Bay Area, planners use a custom designed travel model call the Tampa Bay Regional Planning Model (TBRPM) to forecast anticipated changes to the roadway system. TBRPM produces a wide range of indicators that are used by engineers, planners, and decision-makers to consider the impacts of potential transportation impacts. Since the model contains such a comprehensive view of the transportation system, it is also useful for analyzing how the transportation system interacts with the economy. Appendix 1 provides information on the project design and assumptions that provide the basis for TBRPC's economic analysis.

4.1 Linking Travel Demand Models to Economic Models through *Effective Distance*

Because large scale projects often influence the entire performance of the road network, transportation planners can be concerned with the effects those projects have upon the economy. Since increased congestion slows the flow of both the workforce and freight, traffic congestion is more than an inconvenience to travelers; it can also adversely affect the economy, which is more dependent than ever before on the timely delivery of goods and services. At the same time, decreasing congestion through new transportation capacity removes obstacles to the movement of goods and services.

For economists, one of the principal means through which the transportation network's system performance influences the economy may be termed the "effective distance" between producers and consumers. Effective distance is a combination of transportation costs and accessibility costs that industries pay to move inputs and outputs. The effective distance impacts the relative delivered cost of the good or service produced. For example, if two regional economies were perfectly equal and one economy overnight underwent transformative transportation network improvements, that economy would become more competitive and would be expected to grow at a faster rate than the other economy.

Transportation costs represents the offset between shorter travel times and additional miles traveled, both of which are consequences of an upgraded transportation network. Cost savings come from the increase in average travel speeds, which reduces the effective distance between sellers and their markets.

Economists use accessibility costs to bridge business and consumer interests by assessing a monetary value for increased accessibility. This value is based on how much an industry relies upon modes of transportation for intermediate inputs sold by other businesses (for example, tires and engines are intermediate inputs in the manufacture of vehicles). While widened roads may only marginally improve accessibility, other infrastructure upgrades such as new bus routes and highways may result in real decreases in accessibility costs. In particular, expansions of network capacity facilitate greater flow of inputs to production. Such a growth in inputs augments the variety of available goods and thereby enhances regional productivity, particularly for industries with heavy dependence on intermediate inputs and transportation.

4.2 Using TranSight to simulate the economic impacts of transportation investments

TBPRC conducts transportation economic studies using computer scenarios with Regional Economic Models Inc. (REMI)'s TranSight. Scenarios compare and contrast travel demand outputs for events such as modernizing the interstate versus no further action. Just as the TBRPM juxtaposes before and after conditions of both a set of projects versus no projects, TranSight compares the economic impacts of building a set of projects to the economic effects of not upgrading the transportation network. Both sets of impacts are benchmarked against a baseline, which we call the trend forecast.

Scenarios answer "what-if" kinds of questions about the relationship between transportation and the economy. For example, let us say that the trend employment for Hillsborough County in 2015 is 855,112. Moreover, let us say that an added lane or additional transit service cuts average travel times by a minute along some transportation corridor. If a forecasted impact in TranSight is an above trend change of 1,000 jobs, then the total number of jobs is 856,112. On the other hand, a below-trend change of 1,000 jobs results in 854,112 jobs in the County.

As such, TranSight tracks the interrelationships between different components of the economy to produce a detailed account of the jobs and industries impacted by transportation projects. TranSight also accounts for how new infrastructure investment influences prices and the demand for goods and services. Since different industries are variably dependent upon the transportation system, projects can influence economic outcomes by their very nature. For example, a freight corridor may primarily influence the movement of trucks. That in turn, would influence how many jobs are created in staffing distribution centers versus how many jobs are created driving trucks. Dedicated bus lanes may influence commuter costs, primarily, and other roadway users indirectly.

Construction is another example. Roadway construction would create thousands of jobs in construction, simply because of the scale of the project, but construction is dependent on other activities—design services, raw materials, financial services and so forth. Because supply chain relationships are clearly specified in TranSight, we can estimate how many jobs in affiliated industries are created as the result of construction. Household spending is also clearly specified in TranSight, therefore spending by new construction employment can be tracked through spending on health care, retail and food services, among many other industries.

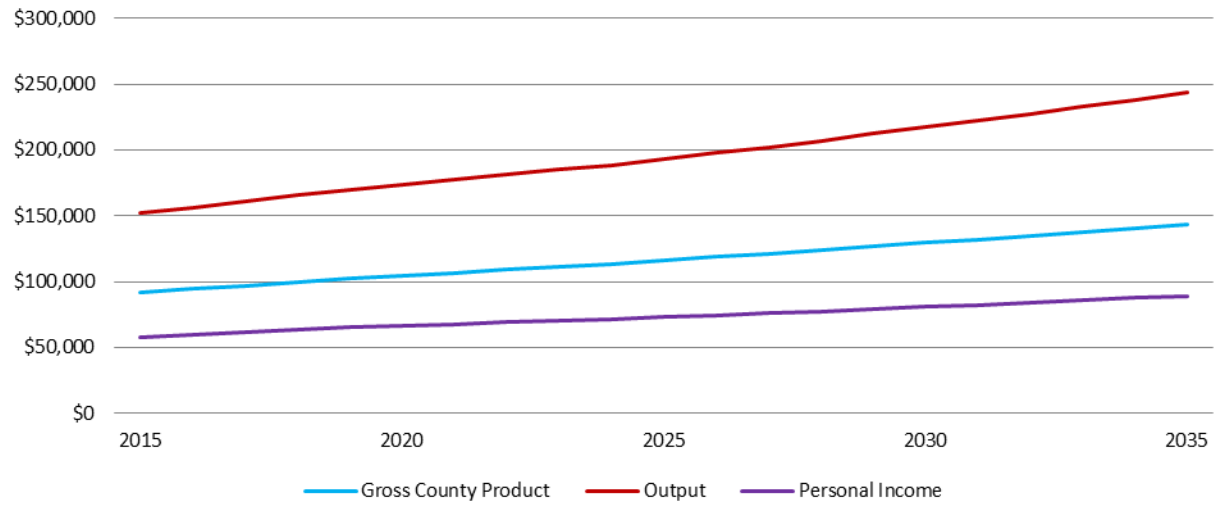
Transportation system performance also creates (or reduces) jobs. Jobs in manufacturing, for example, are heavily dependent on minimizing congestion delays as manufacturing is a highly competitive field where balancing costs is a priority. System performance improvements, therefore, plays a powerful role in creating and sustaining employment in that industry. Software publishing, on the other hand, is less dependent upon system performance, and consequently system performance improvements have a smaller impact on job creation or destruction in that industry.

4.3 Trend Forecasts and Economic Impacts

Both travel demand models and TranSight compare current conditions versus anticipated or planned future conditions. In simulating economic impacts to the economy, TranSight measures 'shocks' or economic impacts of a transportation project to a trend forecast. Trend forecasts are reference points economic analysts use to judge the direction and magnitude of potential economic impacts. Trend forecasts are not important in themselves other than placing employment change and other impacts to the economy due to some shock, such as the construction of the Express Lanes project, in the context of the overall economy. As such, it is more useful to think of the shock as generating an 'underperforming' effect on expectations or an 'over-performing' effect on trend employment. Throughout this report we call that underperforming effect 'below trend,' and over-performing, 'above trend.'

For example, REMI's forecasted employment growth for Hillsborough County is anticipated to be steady and somewhat faster than the national growth in employment over the same period (REMI, 2017). Figure 4.1 depicts the trend forecast for Hillsborough County through 2035.

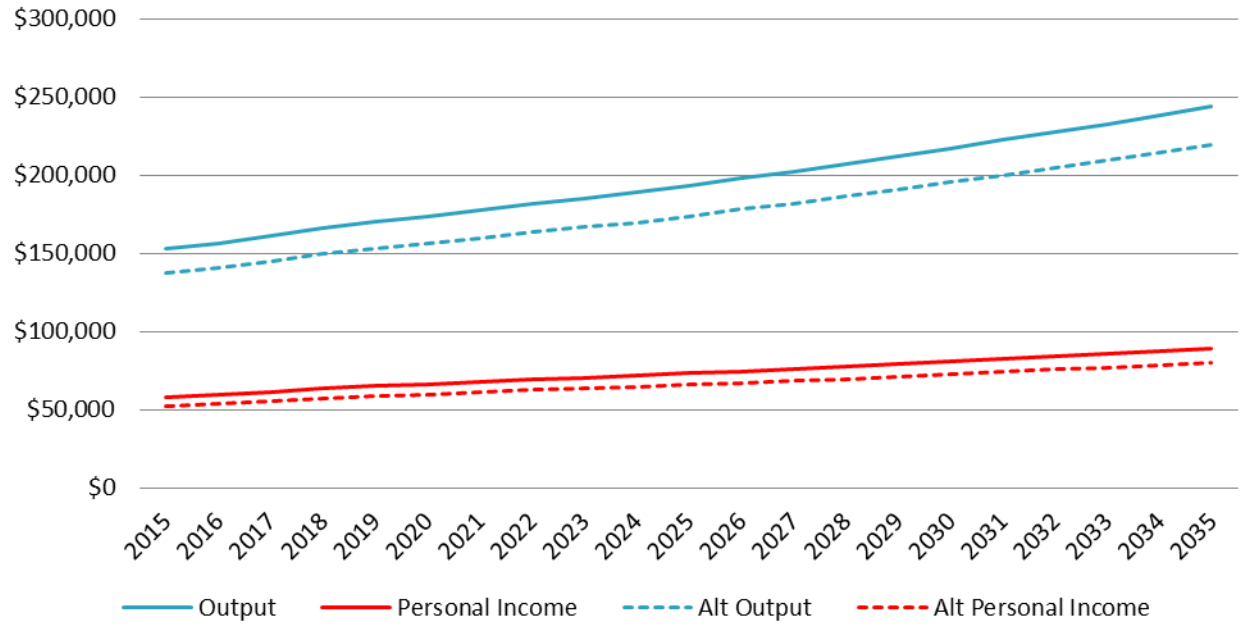
Figure 4.1: Trend Forecast Hillsborough County 2015-2035 (Millions of 2015 $)



Source: TBRPC, 2018

Let us say that a hypothetical economic impact, such as the loss of major employers, causes Output and Personal Income to drop by ten percent in each year between 2015 and 2035. That hypothetical impact is depicted in Figure 4.2. A solid line is shown for both trend forecast output and personal income, while the alternative impact (Alt Output and Alt Personal Income) is shown in the same colors but with dashed lines.

Figure 4.2: Comparing Trend Forecast with a Hypothetical Post-Impact Forecast Hillsborough County (Millions of 2015 $)



Source: TBRPC, 2018

A summary table of the results of this hypothetical analysis would show average and total values of the differences between the trend and the alternative impact. As shown in the TIS SEIS scenarios, those tables summarize the impacts of building express lanes and taking no further actions. A trend forecast for each major indicator is provided to contextualize each scenario, using above trend or below trend to characterize the impact to the economy.

5. TIS SEIS CONSTRUCTION AND SYSTEM PERFORMANCE SCENARIOS

In this study, TBRPC focuses on the economic impacts of taking no further action (not modernizing the interstate) compared to building either the Non-Tolled or Tolled Express Lanes. TBPRC prepared three scenarios to analyze those impacts on the Hillsborough County trend forecast. Those scenarios are:

1. No Further Action
2. Non-Tolled Express Lanes
3. Tolled Express Lanes

Since both the Non-Tolled and Tolled Express Lane scenario combine some aspect of construction and financing conditions, Table 5.1 summarizes how each scenario compares to the other and with respect to the resulting change in average travel speeds (Miles per Hour [MPH]). Information on Scenario assumptions are identified in Appendix 1.

Table 5.1: Comparison of Scenario Characteristics

Scenario	Construction Costs	Operations & Maintenance Costs	Toll Revenue	Percent change in Avg. MPH
No Further Action	No	No	No	-15.6%
Non-Tolled Express Lanes	Yes	Yes	No	+3.9%
Tolled Express Lanes	Yes	Yes	Yes	+5.2%

Source: Regional Travel Demand Model, TBRPC 2018

5.1 Construction, Operations and Maintenance Costs and Toll Revenue Impacts

As shown in Figure 1.0, both of the Express Lanes scenarios consider the impact of proposed express lanes along I-275 from the Howard Frankland Bridge to north of Martin Luther King Jr. Boulevard and I-4 from the I-275/I-4 interchange to east of 50th Street. As treated in this analysis, the Express Lanes project consists of a minimum of two express lanes. The construction impacts considered in this analysis comprise segments 4 through 6 in Figure 1.0. Express lanes could be tolled or non-tolled.

Generally, highway projects deliver a range of impacts to the economy through the demand for goods and services that come with construction activity, through variations in how operations and maintenance costs are allocated to the public and through system performance of additional capacity, lowering travel costs for highway users. All reported economic impacts occur in Hillsborough County.

5.1.1 Economic Impacts of Construction

Florida Department of Transportation (FDOT) estimates that the costs of building either the non-tolled or tolled express lanes would be approximately $2.65 billion (present day costs), just in construction labor and supply purchases, and not counting the costs of right-of-way acquisition, engineering design, and utilities (FDOT, personal communication, May 2018). Since the precise timing of each project component has not been determined, the TBRPC has analyzed the impacts of construction separately from the system performance, assuming a build out of approximately seven years.

Construction impacts are the one-time economic impact of building either the tolled or non-tolled alternatives. Transportation investments are complex and, as such, construction projects have both important but limited term impacts on the economy. Large construction projects, like highways, are capital intensive investments that generate high demand for labor, materials, and equipment. Employment rises in the building trades and civil engineering as a direct impact. Other indirect effects in demand for finance, wholesale goods and building supplies create additional waves of employment that filter through the economy. TBRPC's economic models account for further household level spending, when wages are transferred to purchases of goods and services by wage earners. When the construction project is complete, demand from those wage earners relaxes and the employment gains during construction dissipate.

In terms of modeling the economic impacts of construction in TranSight, TBRPC treats construction as a business activity resulting in investment occurring mostly in the capital stock (non-residential structures) of Hillsborough County. TranSight is designed to estimate how much labor, equipment, and supplies are needed to build a project relative to its cost. Based on an underlying set of relationships between construction and other related economic activities, TranSight converts project expenditures into employment for construction workers as well as architects, engineers, and other professional services.

Both construction workers and all other affiliated employees go on to spend their wages on household needs. Spending in this area creates new jobs in retail, food services, healthcare, and other services. Table 5.2 summarizes the total economic impacts of construction in Hillsborough County. All terms are defined in the Glossary.

Table 5.2: Project Construction Impacts Compared to Trend Forecast

Hillsborough County	2020 Trend	Total Construction Impacts 2020-2027
Total Employment*	910,014	28,773
Gross County Product ($Mil)	104,390	2,488
Output ($Mil)	173,702	4,606
Personal Income ($Mil)	73,584	1,538

*Employment is in job-years, one job held for one year. Dollar impacts are 2015 $. Source: TBRPC, 2018

Table 5.2 indicates that construction 28,773 jobs above the 2020 trend forecast, a 3 percent increase above trend in employment. Gross County Product rises 2.4 percent over trend while personal income increases 2.1 percent over trend.

Construction Direct and Indirect Employment by Industry

Total employment created by construction activities generates both direct and indirect employment from business needs of construction, induced investment generated by overall increased business activity and household expenditures. Those jobs are identified by industry category in Table 5.3.

Table 5.3: Project Construction Scenario Direct and Indirect Average Annual Jobs by Industry

Category	Average Annual Construction Scenario Related 2020-2027 Jobs
Construction	2,595
Retail Trade	260
Professional, Scientific, and Technical Services	145
Health Care and Social Assistance	138
Accommodation and Food Services	138
Administrative and Waste Management Services	115
Other Services, except Public Administration	95
Wholesale Trade	84
Manufacturing	79
Transportation and Warehousing	74
Real Estate and Rental and Leasing	63
Finance and Insurance	57
Management of Companies and Enterprises	20
Information	16
Educational services; private	15
Arts, Entertainment, and Recreation	8
Mining	8
Utilities	3
Forestry, Fishing, and Related Activities	2
Other	193
Total	4,110

Source: TBRPC, 2018

Construction-related Employment by Occupation

Another way of considering the impacts of construction on the economy is to identify the specific occupations that would be affected by the project. Doing so is useful in terms of identifying the skills that would be most attractive to employers as a result of construction activity. Just as employment in industry groupings is stimulated by increased business activity, employment in different occupations are affected. Since there are over 90 occupations identified by TranSight, Table 5.4 lists the twenty occupations that would be most in demand. The full list is in Appendix 2.

Table 5.4: Project Construction Average Annual Jobs by Twenty Most-Demanded Occupation

Category	Average Annual Construction Related Jobs 2020-2027
Construction trades workers	1,375
Other installation, maintenance, and repair occupations	204
Retail sales workers	160
Supervisors of construction and extraction workers	148
Other office and administrative support workers	122
Business operations specialists	118
Secretaries and administrative assistants	112
Motor vehicle operators	106
Other management occupations	100
Top executives	93
Helpers, construction trades	92
Financial clerks	87
Material moving workers	82
Information and record clerks	79
Material recording, scheduling, dispatching, and distributing workers	78
Food and beverage serving workers	62
Computer occupations	51
Building cleaning and pest control workers	51
Preschool, primary, secondary, and special education school teachers	48
Financial specialists	48

Source: TBRPC, 2018

5.1.2 Economic impacts of Operations and Maintenance

Once construction is complete and the project opens, new transportation facilities require ongoing outlays for operations and maintenance (O&M) costs. Both non-tolled and tolled highways require the same maintenance costs. Table 5.5 lists those costs through 2035 that both non-tolled and tolled projects would have to pay. Dollar figures are in nominal terms, that is, they are unadjusted for inflation.

Table 5.5: Annual Operations and Maintenance Costs 2020-2035

Annual Operations & Maintenance Costs (thousands of nominal $)	
Year	Total
2020	$1,962
2025	$2,510
2030	$3,208
2035	$4,084

Source: Tampa Bay Express Traffic and Revenue Study, 2016

Since one scenario is a tolled facility, a separate income stream was added to its analysis to account for the principal operating differences between that alternative and the Non-Tolled Express Lanes.

5.1.3 Net Toll Revenues

Table 5.6, Net Toll Revenues, applies only to the Tolled Express Lanes scenario as tolls would be collected at gantry points along the express lanes. Table 5.6 represent revenue in excess of O&M for the tolled alternative. Revenues were added to the same module within TranSight that relates to O&M.

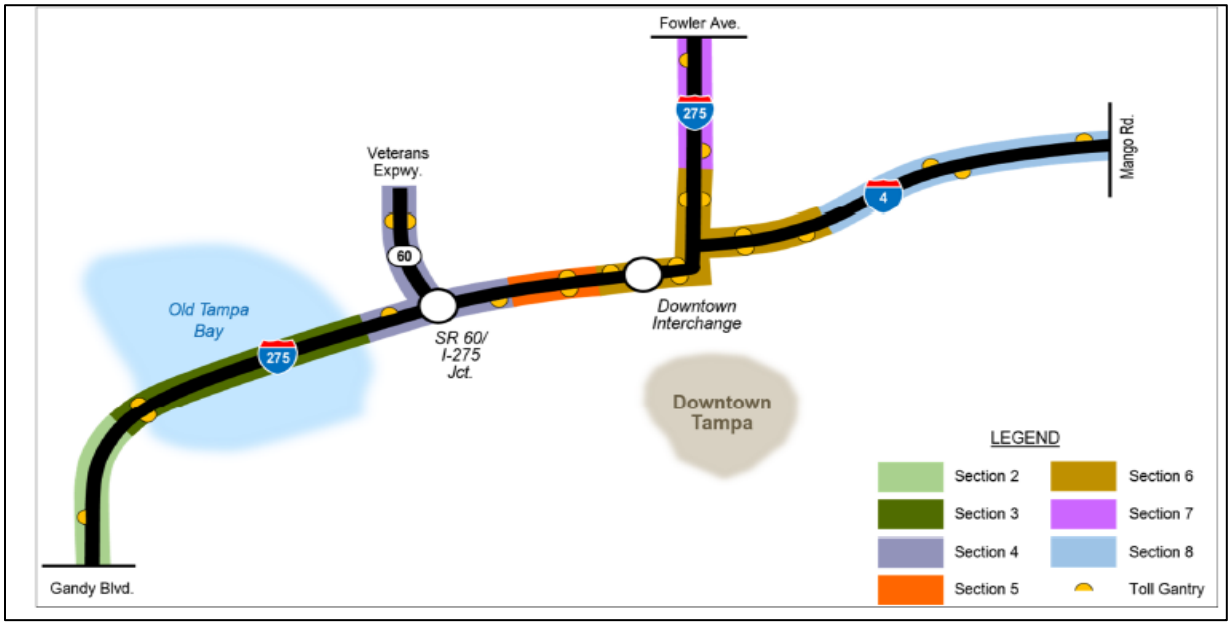
Since O&M and Toll Revenues are analyzed concurrently with the impacts of Systems Performance, their impacts are included in Scenario 2: Non-Tolled Express Lanes and Scenario 3: Tolled Express Lanes, respectively. Table 5.6 provides the net toll revenues for the tolled express lanes, while Figure 5.1 depicts the assumed location of toll gantries and project sections; however, this is subject to change as the project progresses.

Table 5.6: Net Toll Revenues, 2020-2035

Net Toll Revenues (thousands of nominal $)	
Year	Total
2020	$4,976
2025	$7,026
2030	$9,664
2035	$12,979

Source: Tampa Bay Express Traffic and Revenue Study, 2016

Figure 5.1: Draft Tolled Express Lanes Phase 1 Toll Gantries and Project Sections



Source: Tampa Bay Express Traffic and Revenue Study, 2016

5.2 Scenario 1: No Further Action

The No Further Action scenario is defined as the impact of forecasted traffic growth upon the existing transportation system, plus any improvement provided for in the Hillsborough MPO's *Imagine 2040: Hillsborough Long Range Transportation Plan (LRTP)*. The No Further Action Alternative includes construction of the general use lanes (outer roadways) within the I-275/SR 60 Interchange, which was approved under the 1999 Record of Decision (ROD) but excludes the proposed express lanes. Within the TIS SEIS study area, the remainder of the Imagine 2040 projects have already been built. No Further Action scenario therefore provides a forecast against which the build alternatives can be compared. As such, this scenario assumes that over the next 20 years, population and employment growth in Hillsborough County would continue to grow while capacity on Hillsborough County highways would only grow as shown in the LRTP.

As a result, the Regional Travel Demand Model forecasts that Vehicle Miles Traveled (VMT) would nearly double while Vehicle Hours Traveled (VHT) would more than double in this period. Under these circumstances, the Hillsborough County economy is forecasted to suffer from a 15.6 percent decline in average travel speeds on the region's highways, arterials, and collectors by 2035. That deterioration impacts both direct transportation costs and accessibility costs of highway users, and indirectly affects users of the entire road network in the region.

As discussed in the Methodology (Section 4), time and accessibility are definitive aspects of transportation's role in the economy. Cutting average speeds, and by extension, making the entire system less reliable has profound consequences for the competitiveness of Hillsborough County in particular and the Tampa Bay area in general. As discussed in Defining the Problem of Congestion (Section 3), increasing volume but slowing traffic can raise overall fuel and maintenance costs for commuters and transit operators. Congestion can force freight carriers and businesses to adapt their processes, expanding safety stocks, non-revenue hours of operation, and routing changes and other investments to cope with heightened congestion.

Unlike the two other scenarios, No Further Action reports impacts for 2015. That is because congestion is already impacting the Tampa Bay area economy has been doing so for a number of years. The Regional Travel Demand Model anticipates that congestion would only worsen under No Further Action, and as such, the costs to businesses and employment would only increase. While the region anticipates widespread economic growth and an increase jobs, the negative impacts of congestion would slow that growth in jobs.

As shown in Table 5.7, the Tampa Bay Regional Planning Model (TBRPM) produces several key statistics that describe the magnitude of congestion if no further action is taken to modernize the interstate.

Table 5.7: No Further Action Scenario Summary

	Total Trips			
	Trips	Vehicle Miles Traveled (VMT)	Vehicle Hours Traveled (VHT)	Average Speed (MPH)
Year 2006	4,324,962	43,695,389	1,424,927	30.67
Year 2035 No Further Action	7,057,463	74,716,754	2,885,654	25.89

Source: Tampa Bay Regional Planning Model; AECOM, 2017

Table 5.7 shows the change in the total number of trips by passenger vehicles, trucks, and transit in Hillsborough County between 2006 and 2035. Each trip has an origin and a destination, whose distance is estimated by TBRPM in terms of VMT and the estimated time each trip took, as shown by VHT. Dividing VMT by VHT yields average travel speeds, MPH.

As shown in Table 5.8, with even longer commute times and greater business costs, the Hillsborough County economy would underperform economic trends an average of 25,652 jobs a year through 2035. Job decreases compared to the trend employment and losses to productivity would underperform economic trends by about $68 billion in Gross County Product through 2035.

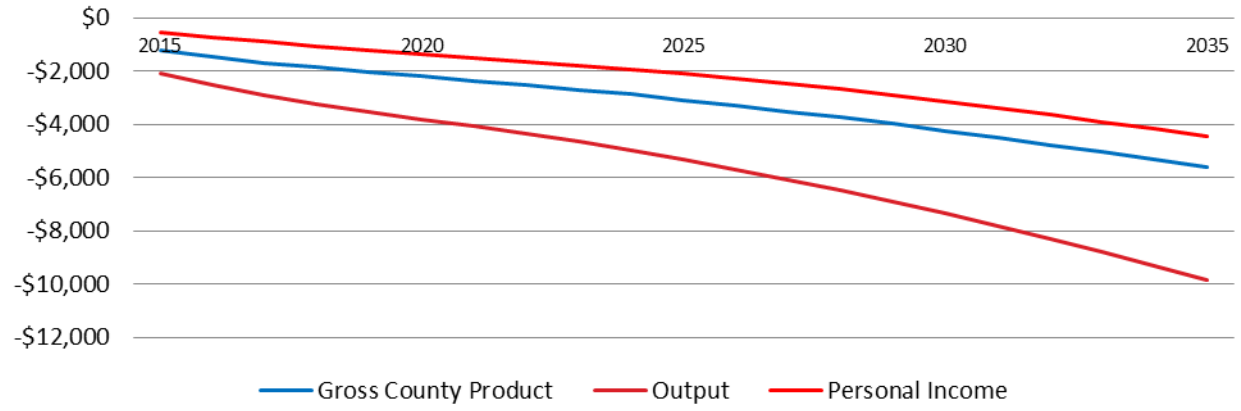
Table 5.8: Hillsborough County: No Further Action Scenario Compared to Trend Forecast

Hillsborough County	2015 Trend	Impact in 2015	Impact in 2035	Annual Average	Twenty Year Total Impacts
Total Employment*	855,511	-11,525	-39,386	-25,652	-538,694
Gross County Product ($Mil)	91,945	-1,214	-5,621	-3,243	-68,093
Output ($Mil)	152,674	-2,102	-9,844	-5,625	-118,125
Personal Income ($Mil)	58,196	-569	-4,477	-2,280	-47,877

*Employment is in job-years, one job held for one year. Dollar impacts are 2015 $. Source: TBRPC, 2018

Figure 5.2 shows how No Further Action impacts the economy through 2035 in terms of below trend growth to Gross County Product, Output, and Personal Income.

Figure 5.2: Economic Impact of No Further Action in Hillsborough County (Millions of 2015 $)



Source: TBPRC, 2018

No Further Action Employment by Industry

Because No Further Action results in increased congestion, there are resulting costs to the economy in losses to employment between 2015 and 2035. Those jobs are identified by industry category in Table 5.9.

Table 5.9: Annual Average Impact of No Further Action by Industry

Category	Annual Average Impact of No Further Action
Health Care and Social Assistance	-2,801
Construction	-2,446
Finance and Insurance	-2,294
Professional, Scientific, and Technical Services	-2,278
Administrative and Waste Management Services	-2,073
Retail Trade	-2,021
Accommodation and Food Services	-1,642
Public Administration	-1,581
Other Services, except Public Administration	-1,200
Manufacturing	-1,157
Transportation and Warehousing	-1,128
Wholesale Trade	-1,024
Real Estate and Rental and Leasing	-575
Information	-524
Educational Services; private	-400
Arts, Entertainment, and Recreation	-385
Management of Companies and Enterprises	-208
Mining	-133
Forestry, Fishing, and Related Activities	-85
Utilities	-1,695
Public Administration and Farming	-2,801
Total	-25,652

Source: TBRPC, 2018

No Further Action Employment by Occupation

No Further Action impacts certain occupations more directly than others. Since there are over 90 occupations identified by TranSight, Table 5.10 lists the twenty occupations that would be most affected by No Further Action. The full list is in Appendix 2.

Table 5.10: Construction Average Annual Jobs by Occupation

Category	Annual Average Impact of No Further Action
Construction trades workers	-1,402
Retail sales workers	-1,248
Information and record clerks	-1,167
Business operations specialists	-957
Motor vehicle operators	-931
Other office and administrative support workers	-926
Computer occupations	-901
Material moving workers	-865
Food and beverage serving workers	-830
Secretaries and administrative assistants	-825
Financial specialists	-784
Other installation, maintenance, and repair occupations	-747
Building cleaning and pest control workers	-685
Health diagnosing and treating practitioners	-664
Financial clerks	-626
Sales representatives, services	-584
Material recording, scheduling, dispatching, and distributing workers	-541
Top executives	-517
Other personal care and service workers	-502
Other management occupations	-450

Source: TBRPC, 2018

5.3 Scenario 2: Non-Tolled Express Lanes

The Non-Tolled Express Lane scenario generally reflects the original Tampa Interstate Study (TIS) Long Term Preferred Alternative from 1996, as updated by reevaluations throughout the years. The proposed improvements along I-275 consist of a four-roadway system (local access freeway lanes and non-tolled express lanes in each direction of travel) throughout the study limits as well as the preservation of a high occupancy vehicle (HOV)/Transitway corridor within the interstate alignment. For the purposes of this study, the express lane access points are provided to Tampa International Airport, Westshore Business District, Downtown Tampa, Ybor City, and the I-4/Selmon Expressway Connector. The current access to Floribraska Avenue from the general use lanes would be closed.

The Non-Tolled Express Lanes is a project with construction and O&M costs, but does not include toll revenue to recover O&M costs. Instead, simulating the impacts of Non-Tolled Express Lanes combines the total effects of the system performance improvements and the additional burden

of O&M, which are assumed to be expenses covered by FDOT. Each of these scenarios is summarized in Table 5.11.

Table 5.11: No Further Action Compared with Non-Tolled Express Lanes

	Total Trips			
	Trips	Vehicle Miles Traveled (VMT)	Vehicle Hours Traveled (VHT)	Average Speed (MPH)
Year 2006	4,324,962	43,695,389	1,424,927	30.67
Year 2035 No Further Action	7,057,463	74,716,754	2,885,654	25.89
Year 2035 Non-tolled Express Lanes	7,057,463	74,996,105	2,788,831	26.89

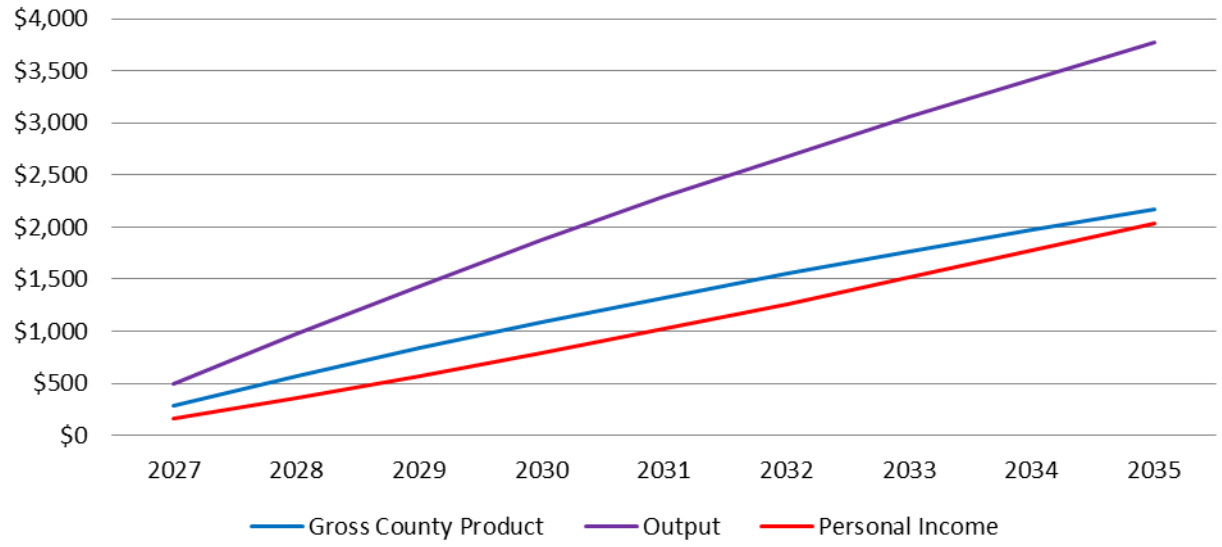
Source: Tampa Bay Regional Planning Model

Non-Tolled Express Lanes Results

TBRPC's TranSight results of the Non-Tolled Express Lanes analysis are depicted in Figure 5.3 and are shown in Table 5.12. Compared to the 2027 Trend, the 'business as usual' forecast of economic activity in 2027, the number of jobs added as a result of system performance is just a small fraction (0.2 of a percent) of total employment in 2027.

Even by 2035, when the effects of an improved system are fully manifest, employment gains account for just 1.5 percent of employment in that year. The same can be said of gains in Gross County Product and Output.

Figure 5.3: Economic Impacts of Non-Tolled Express Lanes in Hillsborough County (Millions of 2015 $)



Source: TBRPC, 2018

Table 5.12: Non-Tolled Express Lanes Scenario Compared to Trend Forecast

Hillsborough County	2027 Trend	Impact in 2027	Impact in 2035	Annual Average	2027-2035 Total Impacts
Total Employment	955,375	2,378	15,690	9,757	87,811
Gross County Product ($Mil)	121,173	287	2,166	1,283	11,548
Output ($Mil)	202,327	493	3,771	2,222	19,995
Personal Income ($Mil)	76,086	116	1,157	638	5,742

*Employment is in job-years, one job held for one year. Dollar impacts are 2015 $. Data do not show construction impacts, which are shown in Table 2. Source: TBRPC, 2018

Under the Non-Tolled Express Lanes scenario, 9,757 additional jobs are created on average each year, generating an additional average annual personal income of $638 million, or $5.7 billion in personal income through 2035.

Non-Tolled Express Lanes Employment by Industry

Total employment created by system performance improvement generates indirect employment from both business needs and household expenditures. Those jobs are identified by industry category in Table 5.13.

Table 5.13: Average Annual Jobs by Industry in Non-Tolled Express Lanes Scenario

Category	Annual Average of System Performance Related Jobs
Construction	1,331
Retail Trade	768
Professional, Scientific, and Technical Services	715
Health Care and Social Assistance	991
Accommodation and Food Services	638
Other Services, except Public Administration	643
Administrative and Waste Management Services	933
Wholesale Trade	392
Manufacturing	360
Real Estate and Rental and Leasing	397
Finance and Insurance	733
Transportation and Warehousing	465
Management of Companies and Enterprises	63
Educational Services; private	171
Information	199
Arts, Entertainment, and Recreation	117
Public Administration and Farm	841
Total	9,757

Source: TBRPC, 2018

Non-Tolled Express Lanes Employment by Occupation

Another way of considering the impacts of system improvements on the economy is to identify the specific occupations that would be affected by the project. Doing so is useful in terms of identifying the skills that would be most attractive to employers as a result of lower transportation costs. Since there are over 90

occupations identified by TranSight, Table 5.14 lists the twenty occupations that would be most in demand. The full list is in the Appendix 2.

Table 5.14: Average Annual Jobs by Occupation in Non-Tolled Express Lanes Scenario

Category	Annual Average of System Performance Related Jobs
Construction trades workers	628
Retail sales workers	490
Information and record clerks	407
Food and beverage serving workers	362
Material moving workers	333
Motor vehicle operators	329
Business operations specialists	324
Computer occupations	307
Other office and administrative support workers	300
Other installation, maintenance, and repair occupations	282
Secretaries and administrative assistants	275
Financial specialists	270
Building cleaning and pest control workers	265
Health diagnosing and treating practitioners	264
Financial clerks	209
Material recording, scheduling, dispatching, and distributing workers	203
Sales representatives, services	199
Other personal care and service workers	194
Top executives	185

Source: TBRPC, 2018

5.4 Scenario 3: Tolled Express Lanes

The Tolled Express Lane scenario is generally the same as the major components of the Non-Tolled Scenario; however, the express lanes would be tolled. For the purposes of this study, the express lane access points are provided to Tampa International Airport, Westshore Business District, Downtown Tampa, Ybor City, and the I-4/Selmon Expressway Connector. The current access to Floribraska Avenue from the general use lanes would be closed.

Scenario 3 considers the impact of the Tolled Express Lanes scenario compared to the effects of No Further Action by 2035. Those toll net revenues were included in the scenario of the effects of Tolled Express Lanes on the economy and are identified in Table 5.15.

Compared to No Further Action, Tolled Express Lanes scenario increases average travel speeds and adds employment to Hillsborough County. Tolled Express Lanes provide better system performance and self-sustains operations and maintenance through toll revenue.

As Table 5.15 indicates, the Tolled Express Lanes scenario would generate the same total number of trips as the Non-Tolled scenario, but because of its design features would reduce total VMT and total VHT, increasing average travel speeds.

Table 5.15: All Regional Travel Demand Model Scenarios Compared by Performance Statistics

	Trips	Vehicle Miles Traveled (VMT)	Vehicle Hours Traveled (VHT)	Average Speed (MPH)
Year 2006	4,324,962	43,695,389	1,424,927	30.67
Year 2035 No Further Action	7,057,463	74,716,754	2,885,654	25.89
Year 2035 Non-Tolled Express Lanes	7,057,463	74,996,105	2,788,831	26.89
Year 2035 Tolled Express Lanes	7,057,463	75,393,835	2,768,213	27.24

Source: Tampa Bay Regional Planning Model, 2018

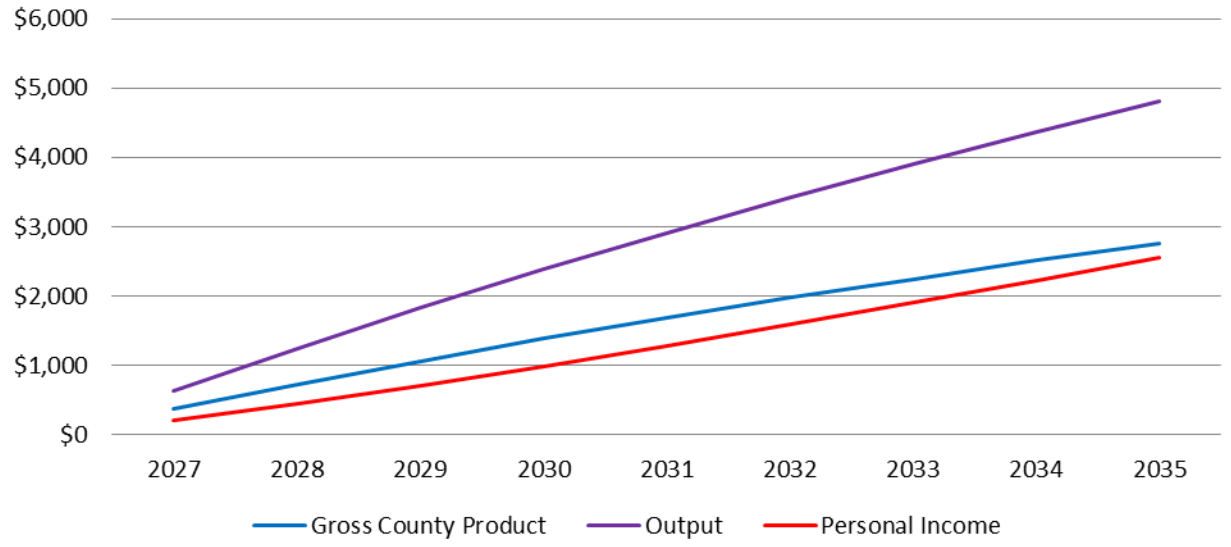
Since average travel speeds increase in the Tolled Express Lanes Scenario, the economy benefits from decreased congestion more than it does in the Non-Tolled Express Lanes Scenario. Those economic benefits are summarized in Table 5.16.

Tolled Express Lanes Economic Impacts

TranSight's analysis of the Tolled Express Lanes are shown in Table 5.15. Compared to the 2027 Trend, the 'business as usual' forecast of economic activity in 2027, the annual average number of jobs created as a result of system performance is just a small fraction (1 percent) of total employment in 2027.

Even by 2035, when the effects of an improved system are fully manifest, employment gains account for just 2 percent of employment in that year. The same can be said of gains in Gross County Product and Output.

Figure 5.4: Economic Impacts of Tolled Express Lanes in Hillsborough County (Millions of 2015 $)



Source: TBRPC, 2018

While the Tolled Express Lanes scenario yields better results compared to the Non-Tolled Express Lanes scenario because the former provides higher average speeds, both alternatives' impact on

the overall county economy is small, but consistent with its effects on commuter and business costs. Results are summarized in Table 5.16.

Table 5.16: Tolled Express Lanes Results Compared to Trend Forecast

Hillsborough County	2027 Forecast	Impact in 2027	Impact in 2035	Annual Average	2027-2035 Total Impacts
Total Employment	955,375	3,055	19,992	12,413	111,715*
Gross County Product ($Mil)	121,173	367	2,765	1,634	14,707
Output ($Mil)	202,327	632	4,817	2,832	25,486
Personal Income ($Mil)	76,086	150	1,454	803	7,229

*Employment is in job-years, one job held for one year. Dollar impacts are 2015 $. Data do not show construction impacts, which are shown in Table 4. Source: TBRPC, 2018

Tolled Express Lanes Employment by Industry

Total employment created by system performance improvement generates both direct and indirect employment from both business needs and household expenditures. Those jobs are identified by industry category in Table 5.17. Since the Tolled Express Lane scenario yields higher speeds, there are is a higher number of jobs created in most industries because of productivity gains.

Table 5.17: Average Annual Jobs by Industry

Category	Annual Average of System Performance Related Jobs
Construction	1,778
Health Care and Social Assistance	1,229
Administrative and Waste Management Services	1,207
Retail Trade	984
Public Administration	930
Finance and Insurance	924
Professional, Scientific, and Technical Services	916
Other Services, except Public Administration	815
Accommodation and Food Services	794
Transportation and Warehousing	578
Wholesale Trade	502
Real Estate and Rental and Leasing	500
Manufacturing	446
Information	262
Educational Services; private	215
Arts, Entertainment, and Recreation	150
Management of Companies and Enterprises	66
Utilities	53
Total	12,416

Source: TBRPC, 2018

Tolled Express Lanes Employment by Occupation

Another way of considering the impacts of system improvements on the economy is to identify the specific occupations that would be affected by the project. Doing so is useful in terms of identifying the skills that would be most attractive to employers as a result of lower transportation costs. Since the Tolled Express Lanes scenario yields higher speeds, there are higher numbers of jobs created in most occupations because of productivity gains. Since there are over 90 occupations identified by TranSight, Table 5.18 lists the twenty occupations that would be most in demand. The full list is in the Appendix 2.

Table 5.18: Tolled Express Lanes Average Annual Jobs by Occupation

Category	Annual Average of System Performance Related Jobs
Construction trades workers	996
Retail sales workers	604
Information and record clerks	526
Food and beverage serving workers	444
Material moving workers	439
Motor vehicle operators	436
Business operations specialists	431
Computer occupations	404
Other office and administrative support workers	402
Other installation, maintenance, and repair occupations	361
Secretaries and administrative assistants	358
Financial specialists	358
Building cleaning and pest control workers	358
Health diagnosing and treating practitioners	317
Financial clerks	266
Material recording, scheduling, dispatching, and distributing workers	261
Sales representatives, services	259
Other personal care and service workers	250
Top executives	248
Construction trades workers	996

Source: TBRPC, 2018

5.5 Comparing Scenarios

Table 5.19 compares the total impacts of No Further Action to the Non-Tolled Express Lanes and Tolled Express Lanes scenarios per year.

Table 5.19: Scenario Summary of No Further Action Compared to Build Scenarios per Year

	Average Annual No Further Action	Average Annual Non-Tolled Express Lanes	Average Annual Tolled Express Lanes	Avg. Differences between Non-Tolled and Tolled Express Lanes
Total Employment*	-25,652	9,757	12,413	2,656
Gross County Product ($Mil)	-3,243	1,283	1,634	351
Output ($Mil)	-5,625	2,222	2,832	610
Personal Income ($Mil)	-2,280	638	803	165

*Employment is in job-years, one job held for one year. Dollar impacts are 2015 $. Source: TBRPC, 2018

As Table 5.19 shows, No Further Action has a larger negative impact than either express lanes scenarios have positive impacts. This finding is consistent with the changes in system performance by scenario in Table 5.2, where No Further Action results in a greater drop in average travel speeds than either express lanes scenario adds.

5.6 Summary Discussion of Scenarios

No Further Action exacts a high price for worsening congestion, a trend "underperformance" of about $50.3 billion of Gross County Product over 20 years. Adding average travel speeds "back" to the network through the Express Lanes scenario would add jobs to the economy and would reap significantly more in Gross County Product, Output, and Personal Income than the costs of the project.

As conditions worsen, businesses would have to increase safety stocks and add more delivery trips to compensate for the increased unreliability of the transportation system. Adding more delivery trips as compensation for existing congestion perpetuates even more congestion. Commuters would find that more of their time away from home goes uncompensated.

Even though the Tolled Express Lanes scenario offers greater overall impact than the Non-tolled Express Lanes scenario, there are trade-offs between financing the project and incremental gains in employment per percentage change in average travel speeds. For each percent increase in average travel speeds under the tolled alternative, 4,543 jobs are created. For each percent increase in average travel speeds under the non-tolled alternative, 4,755 jobs are created. The primary reason for the difference between the two is that as consumers pay tolling costs, that money cannot be invested elsewhere in the economy.

There are also land use impacts to the loss of jobs. Congestion may contribute to business relocations outside of the area. Vacancies would increase, there would be fewer new employment opportunities and a concurrent drop in aggregate personal income, while consumer costs would increase even as the value of total capital stock experiences small decreases. Generally speaking, these impacts affect the purchasing power and assets of residents, depressing local consumption.

On the other hand, reducing transportation costs through transportation investment would increase the region's economic productivity, raising personal income and creating new jobs. While improved access to local and proximate markets would sustain the region's competitiveness, improved highway speeds may prevent the need for businesses to invest in various solutions to increased congestion.

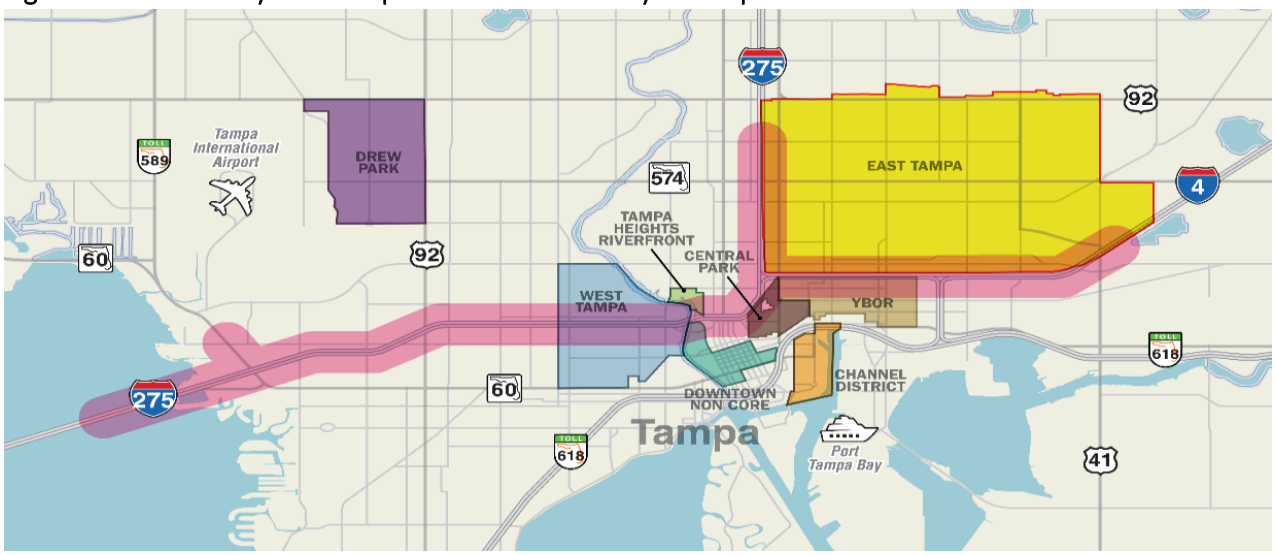
6. COMMUNITY IMPACTS IN THE TAMPA URBAN AREA

While interstate modernization is designed to deliver performance improvements to the Tampa Bay Area's road network, the potential effects of construction and growing traffic volumes raise community concerns about quality of life impacts to neighborhoods, property owners, and all residents. Even if a project can provide new economic opportunities to area residents, sometimes there are unintended consequences of highway construction and performance that may inhibit access to those opportunities.

Concerns about those unintended consequences are well founded and have been studied in the research literature since the 1950s, just as the postwar construction of the interstate system began and prior to protective legislation in the late 1960s. Communities in many parts of the United States were divided and sometimes displaced, exacerbating racial and social inequities. In neighborhoods divided by the highway system, local transportation was disrupted in places while the system facilitated the suburbanization of employment and, eventually, widespread disinvestment in the urban core. On the other hand, highways supported the rapid growth of the US economy, connecting markets and lowering transportation costs.

As mentioned previously in this report, the City of Tampa Community Redevelopment Agency, in a letter dated October 4, 2016, requested that the Florida Department of Transportation (FDOT) prepare an economic impact study to document the potential effects of major interstate improvements on the City's Community Redevelopment Areas (CRAs). The CRAs are shown in Figure 6.1.

Figure 6.1: Community Redevelopment Areas in the City of Tampa



Source: City of Tampa, 2018; Florida Department of Transportation, 2018

In addition to incorporating the CRA concerns into this report, the study includes a discussion of the socioeconomic elements in accordance with Part 2, Chapter 4 of FDOT's Project Development and Environment Manual (FDOT, 2017). This section focuses on the following issue areas:

1. Existing Conditions
2. Traffic Patterns
3. Business Access and Business and Employment
4. Special Needs Patrons
5. Additional CRA Comments (Parks, parking, office vacancies)
6. Property Values

Concerns about impacts to the CRA tax base are considered in Section 7 of this Report.

6.1 CRA Existing Conditions

Even as transportation projects can be designed to alleviate congestion, transportation projects themselves bear direct, indirect and cumulative impacts on the land use pattern around new and expanded transportation facilities. As such, the region's highways continue to influence the quality of life and socio-economic characteristics of neighborhoods. CRAs that are most directly impacted include Central Park, Downtown, East Tampa, Tampa Heights/Riverfront, West Tampa, and Ybor.

Together, these areas are home to approximately 57,725 residents. With lower rates of homeownership and lower average household incomes than average for Hillsborough County, a third of all households are below the poverty line. There is also a shortage of employers in a diverse set of industries offering well-paid employment. The following section highlights existing conditions in the CRAs from both socio-economic and land use perspectives.

Using data from CRA and the City of Tampa plans, TBRPC considered the range of allowed land uses and potential future projects. Table 6.1 is a summary developed by TBRPC of all CRA property by parcels, grouped by land use category. Residential uses are the largest land use, and are split half and half by households between single-family and multi-family housing. Next to residential uses, a variety of community uses such as community focal points (schools, parks, and other community facilities) dominate the mix of land uses.

Table 6.1: Community Redevelopment Area Land Use Composition

CRA Land Use	Acres	Percent of Total
Residential	2,124	36.4%
Community	1,747	30.0%
Commercial	757	13.0%
Industrial	563	9.7%
Other	244	4.2%
Vacant/Open Space	241	4.1%
Mixed Use	158	2.7%
Total	5,834	100%

Source: Hillsborough County Property Appraiser, 2017

6.1.1 CRA Socioeconomic Characteristics

This analysis is based on socioeconomic data from the US Census using Geographic Information Systems (GIS) and from the FDOT's Efficient Transportation Decision Making (ETDM) Environmental Screening Tool (EST) sociocultural data report for each CRA. TBRPC uses that data to present summary data for the most impacted CRAs and the following analysis focuses on collective impacts to the CRAs, with notes on particular CRAs when information is available.

As shown in Table 6.2, a quarter or more of the households in Central Park and West Tampa earn less than $10,000 a year, compared to 10 percent of Tampa's households, and five percent of the county's households. In the two largest CRAs, East Tampa and West Tampa, 45 percent of households earn between $10,000 and $35,000, a low-income category. In total, 19.9 percent of all CRA households earn less than $10,000 a year, compared to just 10.2 percent of all Tampa households. A further calculation by TBRPC shows that very low-income households ($10,000 below) in the CRAs make up 29.9 percent of the City's total in that income category.

Table 6.2: CRA Socioeconomic Summary, 2012-2016

CRA NAME	Total Population	Households (HH)	HH Income less than $10K	$10K to $35K	$35K to $75K	$75 to $150K	$150K+
Central Park	1,329	749	67.6%	27.9%	4.5%	0.0%	0.0%
Channel	6,896	1,701	2.6%	6.9%	33.7%	34.4%	22.5%
Downtown	5,751	3,388	11.1%	14.8%	21.6%	28.0%	24.5%
East Tampa	33,274	11,502	19.3%	45.7%	27.0%	7.2%	0.7%
Tampa Heights/Riverfront	29	10	n/a	n/a	n/a	n/a	n/a
Ybor City	1,402	795	21.2%	34.1%	26.3%	16.1%	2.3%
West Tampa	8,594	3,382	28.6%	45.3%	18.4%	6.8%	0.9%
Total	**57,275**	**21,527**	**19.9%**	**36.6%**	**24.5%**	**12.6%**	**6.2%**
City of Tampa	355,603	142,232	10.2%	29.8%	28.4%	9.4%	22.3%
Hillsborough Co.	1,302,884	486,078	4.8%	21.3%	32.2%	28.4%	13.3%

Source: US Census, American Community Survey, 2018.

As a group, the CRAs comprise about 16 percent of the city of Tampa's population but comprise 21.3 percent of the city's households earning under $35,000 a year. However, those summary statistics obscure concentrations of low income households in East Tampa, West Tampa and Central Park, and to a lesser extent in Ybor. As Table 6.3 indicates, 62 percent of housing units in the CRAs are rental compared to 51 percent of Tampa housing units. As such, a larger than average share of CRA residents may face compounding long-term disadvantages in not building equity or being able to access additional lines of credit that come with homeownership.

While household income figures indicate concentrations of poverty in the CRAs, the relatively higher levels of post-high school education short of a bachelor's degree suggests that many residents were unable to finish their pursuit of college degrees. It is likely that for many CRA

residents, low household income is a constraint on access to education because of tuition costs, mobility limitations and the high costs associated with not working in order to study.

6.1.2 CRA Housing Characteristics

Housing characteristics are another important dimension of socioeconomic characteristics of the CRAs. Table 6.3 provides a summary of total housing units, occupancy versus vacancy rates, and housing ownership.

Table 6.3: Housing Occupancy, 2012-2016

CRA NAME	Housing Units	Occupied Units (%)	Vacant Units (%)	Single Family Units (%)	Multifamily Units (%)	Owner Occupied (% of occupied units)	Renter Occupied (% of occupied units)
Central Park	804	93.0%	7.0%	4.4%	95.6%	1.2%	98.8%
Channel	1,963	90.7%	9.3%	5.7%	94.3%	24.6%	75.4%
Downtown	3,806	89.0%	11.0%	17.2%	82.8%	41.8%	58.2%
East Tampa	13,295	86.5%	13.5%	77.6%	20.1%	45.5%	54.5%
Tampa Heights /Riverfront	12	75.0%	25.0%	83.3%	16.7%	56.6%	43.4%
Ybor City	977	81.5%	18.5%	24.6%	75.4%	29.9%	70.1%
West Tampa	3,945	85.7%	14.3%	41.9%	57.2%	24.0%	76.0%
Total	**24,802**	**87.1%**	**12.9%**	**52.5%**	**46.1%**	**37.8%**	**62.2%**
City of Tampa	161,527	88.1%	11.9%	55.3%	38.1%	49.1%	50.9%
Hillsborough County	549,024	88.50%	11.50%	62.90%	29.40%	58.50%	41.50%

Source: US Census, American Community Survey, 2018

Whether or not residential property is owner occupied influences sale prices. There are 13,023 single family homes in the CRAs. With slightly higher than average vacancy rates (12.9 percent compared to 11.9 percent citywide), higher rental rates (62.2 percent compared to 50.9 percent) higher poverty rates, empirical research suggests that housing prices in the CRAs are likely to be lower than citywide prices.

Positive price impacts are found for the percent of the block group homes that are owner-occupied, where a 10 percent increase in owner-occupancy increases price by approximately 1 percent, a $10,000 increase in neighborhood median household income translates into a $1,300 price increase for the median priced house, a 1.3 percent impact. A negative impact of 8 percent is found if the block group contains any vacant homes that are boarded-up (Mikelbank, 2004, 718).

In 2017, CRA Single-Family homes sold for $28.40 a square foot, while homes throughout Tampa sold for an average of $40.53 a square foot. While there are several potential factors that may account for the price difference, a $12 dollar per square foot is a significant difference (30 percent)[2].

[2] TBRPC analysis of qualified single-family sales, Hillsborough County Property Appraiser data, 2018.

6.1.3 CRA Employment Characteristics

Next to the Downtown CRA, East Tampa and Ybor have the largest concentrations of employment, according to state covered wages data. Those three CRAs comprise more than 90% of all of the employment in the CRAs.

Table 6.4: Employment by CRA, 3rd Quarter 2017

CRA	2017 Employment Estimate
Downtown	73,375
East Tampa	14,166
Ybor City	9,449
Channel	3,496
West Tampa	3,167
Central Park	Less than 500
Tampa Heights/Riverfront	Less than 500
Total	Approximately 104,000

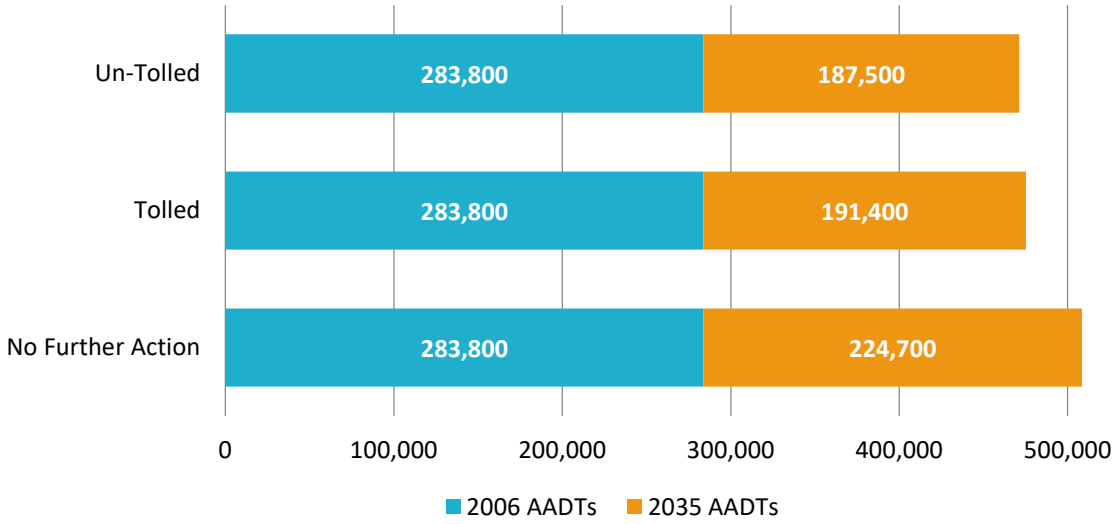
Source: Florida Bureau of Labor Market Statistics, 2017. Some data are suppressed due to privacy restrictions.

6.2 Traffic Patterns

When population and employment growth take place in a widely dispersed geographic area, highway investments can add to the region's overall automobile dependence in the absence of high quality transit alternatives. In the absence of highway capacity, however, many passenger and commercial load trips would divert to arterials that offer both speed and access to destinations. On the other hand, additional highway capacity can shift vehicle trips back to the interstate and out of the local neighborhoods.

Figure 6.2 sums traffic counts on selected arterials in the CRAs by scenario as changes over 2006 average annual daily trips (AADT) through 2035 by transportation scenario. Taking No Further Action delivers the highest traffic count impacts as congested traffic diverts to alternative routes to avoid congestion on the interstate system. The next highest impacts occur with a tolled scenario, as some traffic diverts to adjacent arterials to avoid tolls while the non-tolled long-term alternative absorbs much of the traffic that would otherwise go to adjacent arterials. According to the TBRPM, only about 100 truck trips a day divert to those arterials from the interstate in the tolling scenario.

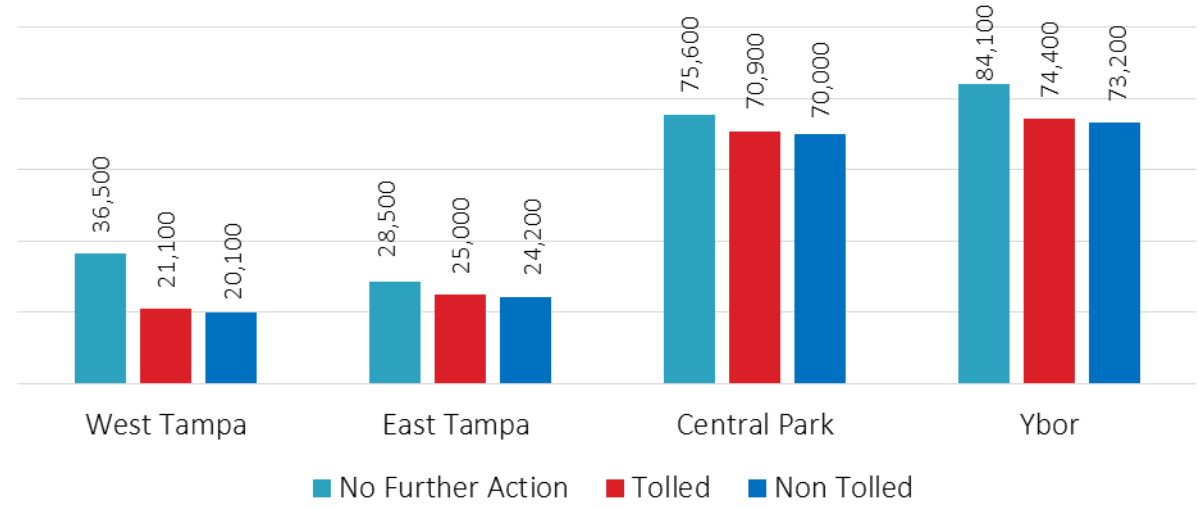
Figure 6.2: CRA Arterial Traffic Volumes 2006-2035 by Transportation Scenario



Source: Tampa Bay Regional Planning Model, 2018

While all CRA traffic counts for 2035 show larger growth in AADT on CRA arterials for No Further Action than the Tolled or Non-tolled Express Lane alternative, each CRA is impacted by anticipated traffic growth differently. Figure 6.3 breaks down Figure 6.2's data by the four most impacted residential CRAs: West Tampa, East Tampa, Central Park, and Ybor.

Figure 6.3: Increase in Annual Average Daily Trips over 2006 volumes to 2035 by Scenario



Source: Tampa Bay Regional Planning Model

Clearly, interstate modernization shifts where the growth in AADT takes place, but does not stem its overall increase. For some areas, such as West Tampa, interstate improvements can limit some of the growth in arterial traffic that would occur if no interstate improvements were made. For

other areas, such as East Tampa and Central Park, the diverted traffic differences between Express Lanes and No Further Action are relatively small.

6.3 Business Access and Business and Employment

While the project may temporarily divert some traffic during construction, Business Access, as described in FDOT's Sociocultural Effects Manual, is not permanently affected once the project opens. However, the re-routing of traffic and overall volume increases in all three scenarios do impact business and employment. Industry employment would be influenced by the employment impacts of each scenario, as described in Section 5. Table 6.5 recaps those outputs as well as shifts in resident population and labor force.

Table 6.5: Comparing Socioeconomic Impacts Above/Below Trend by Scenario

	Average Annual No Further Action	Average Annual Construction Impact	Average Annual Non-Tolled Express Lanes	Average Annual Tolled Express Lanes
Total Employment*	-25,652	4,110	9,757	12,413
Personal Income ($Mil)	-2,280	220	638	803
Population	-28,763	3,056	10,897	11,724
Labor Force	-17,846	2,114	6,795	11,117

*Employment is in job-years, one job held for one year. Dollar impacts are 2015 $. Source: TBRPC, 2018

No Further Action, Construction, and System Performance all have demographic consequences for Hillsborough County. Table 6.5 show population and labor force loss or gain, by scenario results for the County relative to the underlying trend in labor force. While TranSight does not provide local impact results, TBRPC anticipates that construction activities may attract some new residents to the CRAs because of new construction jobs and related employment in other industries.

No Further Action Impacts

Under No Further Action, local congestion increases greatly in the CRAs. Increasing congestion within the Downtown CRA may not necessarily influence employment patterns; on the contrary, a certain level of congestion is expected in an employment center and is built-into the cost of doing business for some industries, such as finance and other professional services. On the other hand, for businesses in manufacturing and wholesaling, increased local congestion encourages relocation to areas with greater overall accessibility, all other factors being equal.

Increased and unabated congestion is anticipated to slow economic growth by an average of 25,652 jobs a year through 2035. TBRPC estimates (Table 5.9) that job losses would be concentrated in construction trades, retail, business support and transportation. Given the sector's sensitivity to transportation costs, manufacturing jobs may be adversely affected in more congested areas. If so, then wholesalers and goods movement jobs may also be affected. As a result of increased congestion, business accessibility may be adversely

affected with arterial traffic growing as more trips divert from the over-capacity interstate system.

Construction Impacts (Non-Tolled or Tolled Express Lanes)

Construction of either highway alternative would create about 4,110 jobs each year over an assumed seven year construction period, generating about $220 million in personal income. With training and jobs programs, CRA residents may benefit from a large share of those jobs. Indirect effects such as increased spending by workers in the area may also benefit local retail and other services. Increased economic activity tends to attract more trips but business accessibility may not improve unless there is adequate parking.

The increase in total household income may spur additional local spending and induce the creation of jobs related to household spending, such as jobs in grocery and convenience stores. Also, retail and food sales may increase as construction workers may choose to shop in the immediate vicinity of the project.

Demand for additional office and industrial space as the result of construction related economic growth is likely to follow new job creation, but there is no certainty in whether new jobs are created in new firms in any particular place in Hillsborough County or whether new jobs are created in existing firms within the CRAs. Those outcomes are partly the result of some specific steps that FDOT may undertake to focus hiring in the CRAs, while construction related spending as well as new household spending by CRA residents may generate more local jobs, and therefore more community-oriented businesses.

System Performance Impacts (Non-Tolled and Tolled Express Lanes)

As discussed in the Parsons-Brinkerhoff study (1998), new highway capacity projects tend to redistribute the pattern of metropolitan growth. While there is an overall trend of decentralizing population and employment, growth also occurs along corridors and interchanges. Since CRA boundaries are partly defined on the north and north-easterly edges by the interstate, the CRAs may see additional above-trend growth in population and employment from added highway capacity.

While system performance impacts would create more jobs throughout Hillsborough County, those impacts may not disproportionately affect CRAs, with the possible exception of Downtown, Channel, and Ybor. Improved access and the concentration of service jobs in those areas are likely to attract new jobs due to increased aggregate consumer spending. With redevelopment opportunities in the Channel District, system performance may drive more intense urban residential development, as more commercial uses are also attracted to the area.

As Tables 5.13 and 5.17 indicate, construction, health, administrative services, and retail industries see the largest gains in employment due to improved system performance. Employment benefits from system performance, under the Non-Tolled or Tolled Express Lane alternatives are likely to benefit existing commercial centers, such as Westshore and Downtown, as the Parsons Brinckerhoff report suggests; development tends to

concentrate in areas served by interchanges. Improved access to and from the Channel District would lower transportation costs of goods shipping out for export.

6.4 Special Needs Patrons

Changes in traffic volumes and speeds may affect employment accessibility, accessibility to services and goods, overall mobility and safety. Those changes frequently disproportionately impact older residents, youth, disabled, and transit dependent residents. Of those special needs patrons, children aged 5 to 9 years have the highest population-based injury rate, and people older than 80 years have the highest population-based fatality rate (Traffic Safety Facts, 2002). Pedestrians older than 65 years are more likely than younger pedestrians to be struck at intersections (Insurance Institute for Highway Safety, 2001; Knoblauch, 1995).

While pedestrian accidents increase with increased traffic volumes, vehicle speed strongly predicts injury severity—the chance of a fatal vehicle-pedestrian collision increasing from 5% at 20mph to 85% at 40mph (UK Department of Transportation, 1987). Moreover, because there are numerous important arterials mixing intra-urban traffic with local traffic, some CRAs have experienced higher than average accident rates. In West Tampa, for example, the 2013 accident rate per acre (0.158) was near double the citywide rate of 0.091 (City of Tampa, 2015).

Mitigating the potential negative impacts of increased congestion, FDOT is providing improved bike/pedestrian crossings underneath the Interstate and is providing a greenway connection from Tampa Heights to Cypress Point Park. There would also be noise barriers, landscaping and aesthetic treatments and ponds which will be designed as community features. FDOT is also advanced funding for the Heights Mobility Study to improve safety and mobility on Florida Avenue and Tampa Street.

No Further Action Impacts

As shown in Figure 6.2, local congestion increases greatly in the CRAs under No Further Action. For transit dependent commuters, increased congestion and fewer jobs under that scenario means that those commuters may have to travel further for work with less reliable transit, as bus transit is susceptible to the same increasing travel time delays that single-occupancy vehicles are.

For other Special Needs Patrons, pedestrian accidents are expected to increase as volumes increases on arterials. However, the severity of pedestrian collisions may decrease overall as regional average travel speeds decrease, as predicted by the Regional Travel Demand Model.

Construction Impacts (Non-tolled or Tolled Express Lanes)

Construction may create short-term detours during each phase of the project but are unlikely to affect most Special Needs Patrons. Transit dependent commuters may need to adjust to different bus routes as well as arrival/departure schedules.

As an economic stimulus, construction would stimulate more local spending, which means even more traffic on local streets and arterials. For the disabled, however, the combination of construction in a few areas, detouring traffic, and the more widespread increased traffic due to increased discretionary spending may present mobility challenges in some CRAs.

FDOT is providing improved bike/pedestrian crossings underneath the Interstate and there would be greenways throughout the project.

System Performance Impacts (Non-Tolled and Tolled Express Lanes)

Once the project opens, there would be less diverting traffic through the CRAs but more traffic on CRA arterials than today. With relatively higher travel speeds, bus transit would be more efficient for transit dependent commuters than the No Further Action scenario.

FDOTs pedestrian and bicycle mobility improvements would improve safety for non-motorized travelers. On the other hand, the project itself is unlikely to affect children or older adults or the disabled once it opens if they do not use the interstate.

6.5 Additional CRA Comments (Parks, parking, office vacancies)

Generally, there is overlap between the concerns raised by the City of Tampa CRA's letter and the legal requirements of the Sociocultural Effects manual. However, the letter raised some additional concerns including questions about project impacts to parks, parking and office vacancies.

6.5.1 Community parks

Since the full reconstruction of the downtown Tampa interchange would not require property from any parks, TBRPC only considers the indirect impacts of the project on community parks. Indirect impacts to parks, such as increased patronage, are generally related to local population increases. Urban planners have rules-of-thumb that are often incorporated into local land development regulations, requiring added park acreage for a specific increase in population or in response to per capita based measures. While there is a potential for population increase, there is not enough information to suggest that new residents to Hillsborough County would settle in CRAs in enough numbers to justify increasing park acreage.

Since park patronage is unrelated to express lanes related system performance and since the City of Tampa does not collect key data such as park patronage, TBRPC does not have any comment on project impacts on community park usage. FDOT is considering adding parking to an event space adjacent to Julian B. Lane Park as well as park type improvements to Downtown and to Robles Park.

6.5.2 Parking

The full reconstruction of the downtown Tampa interchange would alter the parking areas underneath the downtown Tampa interchange in the vicinity of the Marion Transit Center. More generally, however, sufficient supplies of parking in the CRAs are related to street parking requirements, density and intensity of land uses, and the types of businesses in CRAs. Potential losses to the economy under No Further Action would loosen demand for parking spaces because a decline in disposable income tends to result in fewer trips and therefore less spending at commercial establishments.

Increases in business activities under the Construction and System Performance scenarios would drive demand for more parking because of the increase in disposable income that TBRPC anticipates because of the project. Since Ybor is an entertainment district, for example, system performance driven gains in employment and personal income are likely to induce more spending in Ybor, along with more demand for parking.

While certain aspects of construction may cause temporary obstructions to the flow of traffic, TBRPC is not able to address questions about parking space sufficiency given the many other factors at play, especially over the construction period and the forecast through 2035.

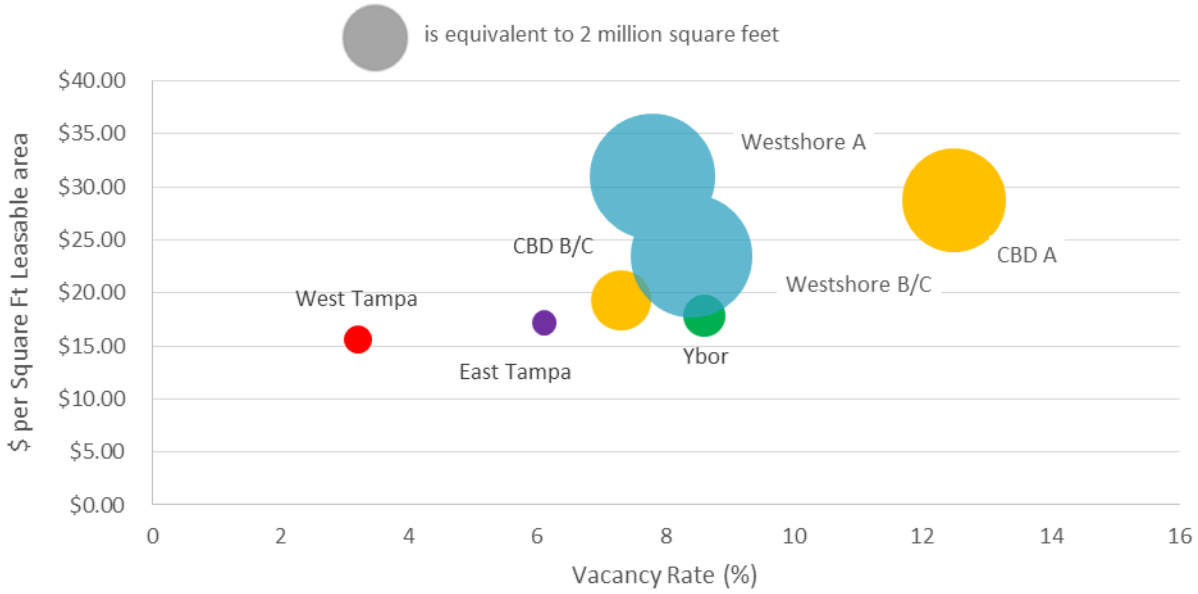
6.5.3 Vacancy Rates

Commercial vacancy rates vary in the interaction between metropolitan economic trends and land use and built environment constraints. While TBRPC makes extensive use of economic models with national, state, and countywide geographic scopes, those models do not incorporate information about the availability of suitable land or information about how 'tight' demand for office space is at the firm-level of location decisions in sub-county markets.

As such, any forecasted changes to vacancy rates due to the impacts of interstate modernization must rely upon existing short-term real estate 'outlooks' of local conditions. According to Collier International's Tampa Bay 4th Quarter 2017 report, demand for Classes A, B, and C (defined in the Glossary) is rising in Tampa, vacancies remain low (10.4 percent compared to 12.1 percent in Q4 2016) and Colliers believes that this trend would continue even with higher anticipated interest rates and a quarter million new square feet in the pipeline (Colliers International, 2017).

As Figure 6.4 depicts, vacancies in the Downtown area are relatively high, especially for Class A properties (11.9 percent), the Westshore area continues to experience high demand for Classes A (7.5 percent direct vacancy) and for Classes B and C (7.7 percent), as did East Tampa. Moreover, vacancy rates are not determined by leasing costs; instead, Figure 6.4 shows how there are distinct office markets within Tampa.

Figure 6.4: Asking Rental Rates and Commercial Vacancy Rates in Tampa Commercial Property



Source: Colliers International, 2018; TBRPC, 2018. "A" is premium space, "B" good quality, "C" older economy space

With little information on local land availability, TBRPC must make certain simplifying assumptions about the marketplace. For example, rental rates and vacancy rates are influenced by many factors outside of the scope of this study such as macroeconomic trends or emergent trends in how office space is used. Using basic microeconomic theory, TBRPC considers how changing traffic conditions affect business decisions and, indirectly, the demand for office space.

No Further Action Impacts

Under No Further Action, congestion on surface streets would grow while the economy would lose personal income and experience a loss of non-residential capital investment. According to Sweet (2014), however, financial firms are less sensitive to increases to local congestion and are therefore unlikely to move from Downtown, even though they may lose some workers to a slowed economy. Manufacturing, on the other hand, is sensitive to congestion increases because of the impacts on input prices and delivery costs and would be more likely to relocate away from congested areas.

Construction Impacts (Non-tolled or Tolled Express Lanes)

As shown in Figure 6.4, vacancy rates in West Tampa and East Tampa are very low, suggesting that construction spending may stimulate demand either for more office space in those areas or encourage leasing in other areas with greater office space availability.

System Performance Impacts (Non-Tolled and Tolled Express Lanes)

Local congestion on arterials would increase with either the Non-Tolled or with the Tolled Express Lanes, just as system performance would induce more non-residential capital investment. However, there is not enough information to assess how office vacancies

would be affected in the CRA areas over the long term associated with system performance improvements.

6.6 Property Values

The project may impact property values in the CRAs in several different ways. First, property values may increase due to the increase in greenbelts, increased pedestrian accessibility and bicycle routes (Crompton, 2001) which FDOT would invest in as part of the project. Second, the economic activity of construction influence area property values. A third way is how shifts in highway alignment influence the amenity value of highway access for CRA properties.

Since 1959, there have been dozens of empirical studies of the impacts of transportation infrastructure on property values. Generally, these studies rely upon statistical techniques, such as regression analysis, to unbundle the characteristics of a property's sale price or property value that are not typically traded in a sale, such as the value of an additional bathroom or proximity to jobs. Those "hedonic pricing" studies are useful in weighing the indirect impacts of highway capacity projects by identifying the implicit value or amenity premium that highway proximity conveys to property values. Those studies are also useful in identifying the costs that highways impose on nearby properties that are exposed to noise or pollution.

As Sherry Ryan notes, hedonic study results of property value impacts of transportation have been inconsistent (Ryan, 1999). For example, some studies find that there are net positive sale price or property value gains of a study area due to its proximity to a highway. Other studies find that there is a decreasing gradient of sale prices the further single-family homes are from a highway. A third group of studies finds that a U-shaped pattern prevails, where sales prices are lower next to a highway and much further away, while properties at intermediate distances from highway see sale price gains. However, these results are not all necessarily mutually exclusive.

The most relevant studies are summarized in Table 6.6, illustrating the wide range of observed effects on either property values or sale prices from transportation investment in highways.

Table 6.6: Hedonic Price Studies of Highway Impacts on Home Values

Author	Published	Location	Observed effect on property values/sale price
Carey	2011	Tempe, AZ	Proximity to US 60 was observed to have an adverse effect on single-family sales prices, but had a positive impact on multifamily residential and commercial properties.
Concas	2013	Tampa, FL	+4.6% to 5.2% price premium over control prices for single-family less than 1.6 miles from highway during/after market downturns.
Hughes and Sirmans	1992	Baton Rouge, LA	Ea. additional 1,000 vehicles per day reduced urban single-family property values by 1% on high-traffic streets.
Iacono and Levinson	2011	Hennepin, MN	Transportation amenities impact house prices but not as much as other housing characteristics. Proximity to an access point had a positive impact, while proximity to the right-of-way itself had a negative impact, although this effect was to a 1⁄4 mi distance of right-of-way.
Mikelbank	2003	Columbus, OH	Negative rent gradient up to 6.7 miles, then house price increases with distance from the highway, providing a ''remoteness'' premium.
Palmquist	1982	Washington State	+15-17% value gain next to highway access but -0.2 to -1.2% per A-weighted decibel.
Ten Siethoff and Kockleman	2002	Austin, TX	Negative rent gradient from highway ROW; ½ mile from highway discounts land value by $50,000/acre & $3/SF of improved value. Temporary negative impacts from construction.

Sources: Identified in References.

Based on these studies, TBRPC has prepared a summary of the property value impacts of each major phase of construction, and concludes with an analysis using hedonic pricing to test the applicability of the literature findings to the CRAs.

6.6.1 Right-of-Way Acquisition and Construction Activity Impacts Property Values

In a study of a highway project in Austin, Texas, Siethoff and Kockleman (2002) found that following a short speculative boom in prices during right-of-way acquisition, construction non-cumulatively depressed the value of land by 2.46 percent on frontage facing properties along US 183 (Research Boulevard). At the end of construction, values 'bounced back' by 5.67 percent, "more than negating the marginal yearly effects of construction and right-of-way acquisition [and a contemporaneous] speculative downturn (-$1.21 per square foot)." (Siethoff and Kockelman, pg9, 2002).

6.6.2 Property Value Impacts of Economic Stimulus from Construction

Billions of dollars of transportation investment create thousands of new direct jobs in engineering, construction labor, and other project related fields. Through the purchase of supplies and equipment, as well increased household spending, thousands of additional jobs are created by indirect spending. Those dollars raise incomes throughout the Tampa Bay Area.

In fact, construction activity drives economic change across a range of indicators, including property values (Weisbrod and Weisbrod, 1997). Transportation investment impacts on property values include residential and commercial values (Swenson, Eathington, and Otto, 1998), as well as manufacturing property values (Cohen and Paul, 2007).

A large highway project exercises indirect effects on property values through growth in the economy as increased demand for new homes and office space spur further investment in Hillsborough County's capital stock. Increases in capital stock manifest in new buildings and added value to existing properties.

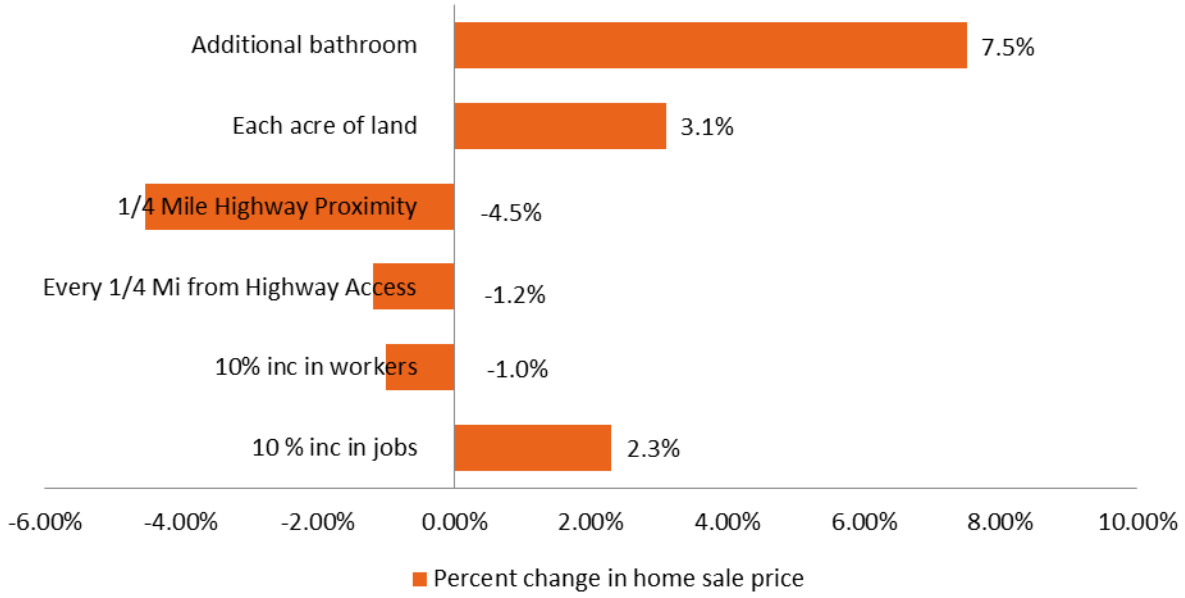
For this study, TBRPC calculated the property value impacts of Gross County Product generated by the project and adjusted property values accordingly in the fiscal impact scenario in Section 7.4.4 of this report. Appendix 6 provides technical details of that analysis.

6.6.3 Amenity Value of Highway Access Literature Review

Generally, the literature finds that the access premium of highways exceeded the negative external costs of proximity to highway right-of-way and its noise and air pollution. Most studies TBRPC reviewed (Iacono and Levinson (2011), Siethoff and Kockleman (2002), and Mikelbank (2003) found negative rent gradients for homes, that is, home price premiums decreased with increased distance from a highway access point. While Concas (2013) described his results in terms of a net positive impact, all of these results are essentially the same: the closer a property is to highway access, the higher the premium. That premium sometimes disappears when the property is along a frontage road during construction and after project opening with continual noise and air pollution, or when the property is further away and the access premium fades.

A frequently mentioned public concern is the impact that new transportation investment has on residential property values and sale prices. Iacono and Levinson (2011) studied how different aspects of transportation performance and facilities influenced housing prices compared with other factors in Hennepin County, MN. Figure 6.5 indicates how amenities change sale prices.

Figure 6.5: Percent Change in Single-Family Residential Sale Prices by Factor in Hennepin County, MN



Source: Iacono and Levinson, 2011

Iacono and Levinson found that a 10 percent increase in jobs within a 30 minute drive of a residential study area increased the average home sale price by 2.3%. On the other hand, a 10% increase in workers living in the study area decreased home sale prices by 1 percent. Moreover, there are downward sloping gradients for access to highways, so that for every ¼ mile away from a highway access point decreases average home sale prices by 1.2 percent, while being within a quarter mile of a highway decreases the average sale price by 4.5 percent. In contrast, each additional acre of land associated with a house added 3.1 percent to the average sale value while adding an additional bathroom to a house increased average sale prices by 7.5 percent.

As such, while transportation amenities and access improvements do affect sale prices, those amenities did not deliver as much additional value as additional land, or an additional bathroom. Also, as shown in Section 6.2.2, empirical research has found there are other factors that influence housing prices, such as concentration of poverty and of vacant homes.

Construction impacts, however, do not take place in isolation from larger economic conditions. For example, in a study of Selmon Expressway Reversible Express Lanes (REL) project in Tampa, Concas (2013) investigated the relationship between the accessibility improvements of the Selmon REL project and housing values, focusing on premiums accruing to house prices during project construction, at the opening year and in the following years after the 2008 Recession.

Selecting areas within three kilometers (1.86 miles) of the Selmon Expressway, Concas found that during construction, housing units saw a 1.1 percent increase in average prices over similar properties in Hillsborough County, while the same housing units experienced a 3.4 percent increase after the project opening, and increasing after that to 4.6 percent, persisting through

the 2008 Recession. This finding supported Concas' hypothesis that single-family properties with better highway access retained their values over an economic crisis, demonstrating the relative advantages of highway proximate residential property.

6.6.4 Highway Access Premiums and Tampa CRA Property Value Impacts

Since interstate modernization has the potential to influence property values TBRPC analyzed the potential impacts of the project on property values in the CRAs. First, TBRPC downloaded data from Hillsborough County Property Assessors into a Geographic Information System (GIS) and then identified all of the residential properties within a mile-wide buffer around the existing highway alignment. Average single family "Just Values"[3] throughout the mile-wide corridor are (as of 2017) $113,309, but only $80,367 in the CRAs ($21.00/SF compared to $17.32/SF). In other words, even adjusting for average lot size (6,790 square feet per lot in the mile-wide buffer compared to 6,231 square feet), there are clearly other factors influencing property values.

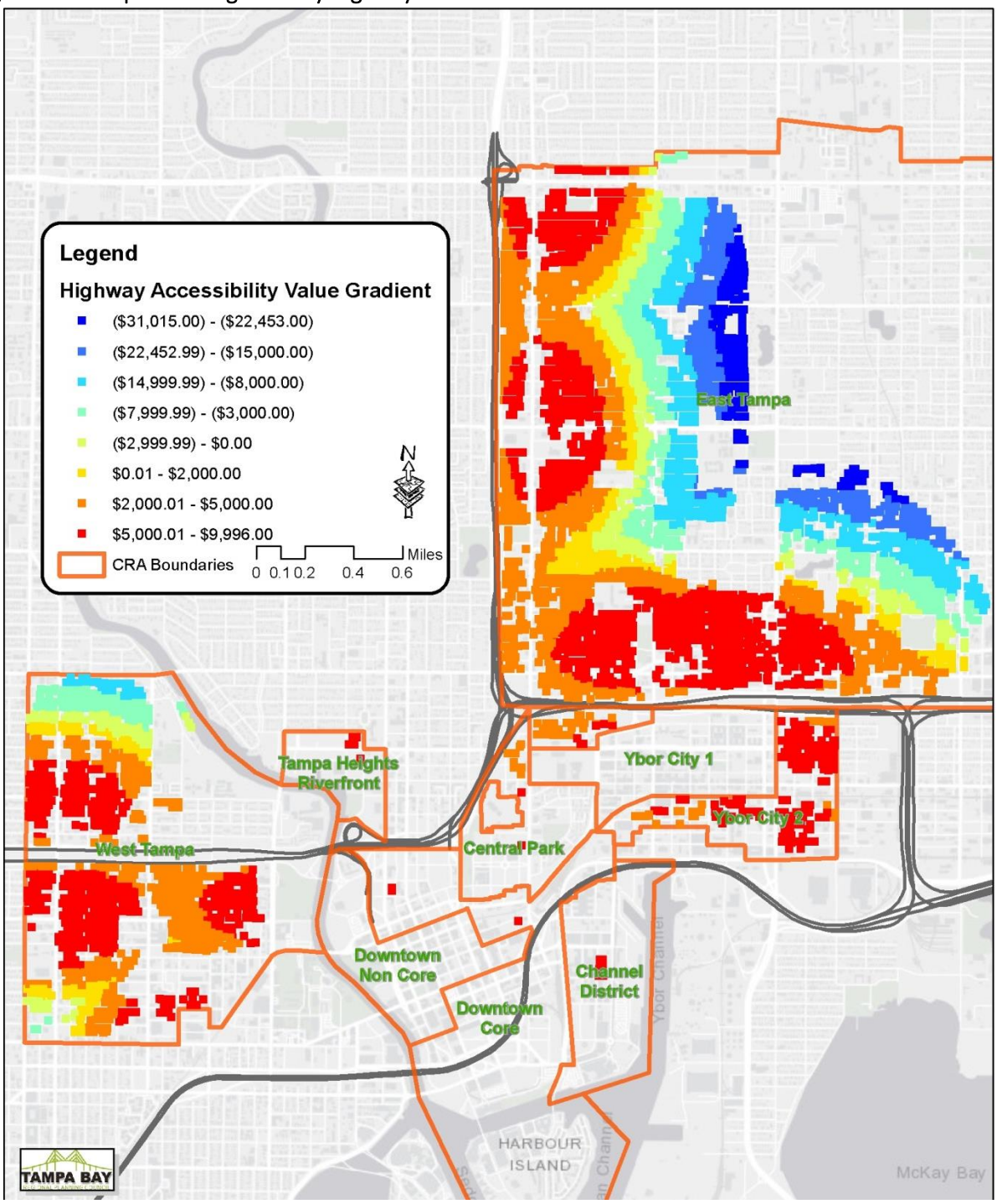
Using the same statistical approaches as used in the research discussed in Section 6.6.3, TBRPC developed a hedonic price model to unbundle the various factors that affect property values and to isolate the discrete impacts that highway access have on single-family and multi-family property values within the CRAs[4].

The hedonic model was estimated to predict the total value of each single-family home parcel within one mile of the project right-of-way within the CRAs[5]. The model accounted for 54.7 percent of the variation (R-squared) in single-family housing values suggesting a reasonable but not definitive model fit[6]. The predictor variables included the housing material (wood construction adds $13,000 to an average single-family home over masonry construction), age of the house, living area, and overall lot size, along with distance to the highway right-of-way and to highway access points (ramps).

Figure 6.6 is a 'heat map' showing how the highway access premium value changes along a gradient of distance to both right-of-way and to access points within the Tampa Community Redevelopment Areas. Generally, single family property value impacts from transportation infrastructure tend to cluster in distance bands parallel to the highway alignment. As shown in Figure 6.6, the lighter colors indicate property value gains as the result of proximity to the highway, while the darker colors indicate relative losses.

[3] Just Values are property values of the property as assessed at market value, without adjustments such as homestead exemptions.
[4] TBRPC is grateful to Professor Greg Newmark, Kansas State University, for technical assistance with this section.
[5] More information on the regression analysis is located in Appendix 6.
[6] An R-square model fit of .565 suggests that there are other factors that influence the variation in single-family property values.

Figure 6.6: Tampa CRA Single-Family Highway Access Premium Gradient



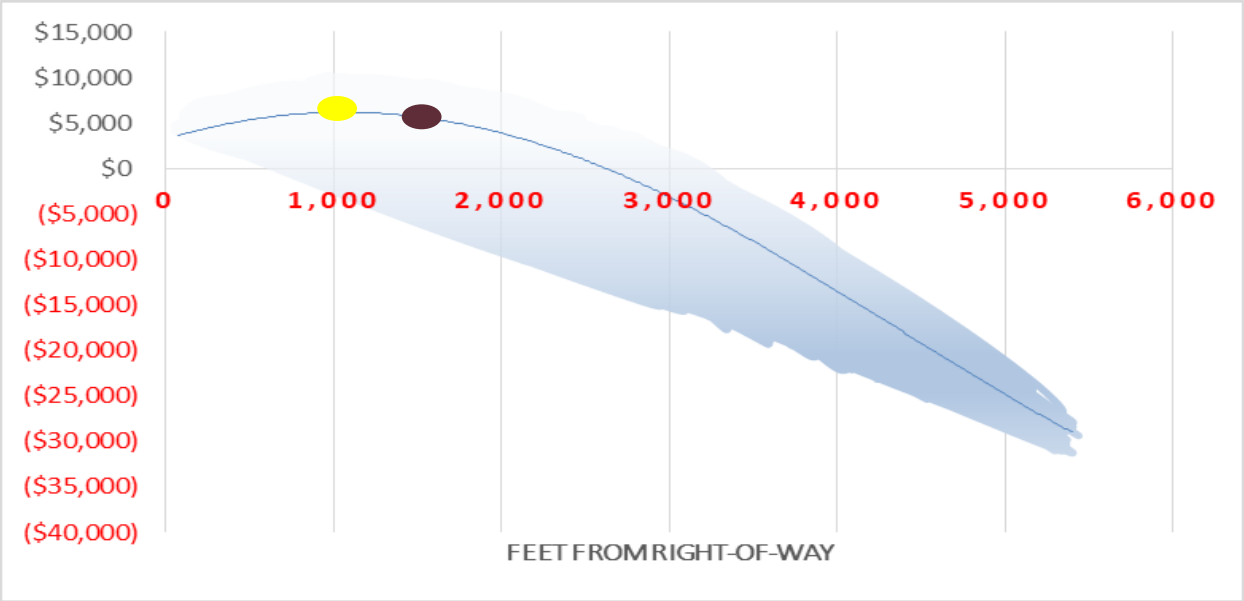
Source: TBRPC 2018; Hillsborough County Property Appraiser, 2018; City of Tampa, 2017

The results of this analysis are consistent with much of the existing research literature: some single-family properties immediately adjacent to the highway right-of-way face negative impacts from proximity but most see property value advantages, premiums, over properties further away because of the amenity value of proximity to transportation access. In other words, relative

accessibility is capitalized into the value of single-family homes and the further a house is away from highway access the less amenity value it has relative to properties closer to access points.

Figure 6.7 shows what happens when the relative distance to the highway for the average single-family home 'shifts' and property values rise or fall, based on their starting point along the blue trend line. Let us say that the highway alignment is shifted toward a residential area, thereby shifting the relative distance of a house at about 1,500 feet away (the purple oval) from the highway right-of-way to a 1,000 feet away (the yellow oval). As shown in the figure, there would be a slight gain in the highway access premium associated with that house. If the alignment moves even closer, there could be a decline in value as the negative impacts of highway proximity increase.

Figure 6.7: Change in Single-Family CRA Highway Access Premium by Distance to Highway ROW



Source: TBRPC, 2018

TBRPC also prepared analyses of multifamily property values (R-squared of 0.796) and commercial values (R Squared of 0.144) as they vary by distance from highway right-of-way and access points. Impacts on commercial values were excluded due to the low explanatory power of the commercial property value model. While TBRPC uses estimates of residential amenity values in Section 7, caution should be exercised in how these results are interpreted.

Rather than thinking about the change in relative distance as a gain or loss in real property value, TBRPC's models reflect how distance impacts an amenity value holding all other relevant factors constant. Actual property value changes would reflect a much larger set of economic conditions and market demand than TBRPC can account for in this analysis. For the purposes of the tax impacts of the project, however, we treat the change in amenity value as equivalent to change in property values.

7. TAX IMPACTS: CRA TAX INCREMENT FINANCING FISCAL SCENARIO

Tax Increment Financing (TIF) is the principal funding source of the Community Redevelopment Areas (CRAs). TIF is a financing tool that uses increased revenues generated by taxes gained from growth in property values as the result of successful redevelopment activities over a base year value. TIF can be used for development in a declared redevelopment area only.

Because TIF revenues are based on a percentage of the increment in taxable value over a base year total taxable value, changes in both the total area and the valuation of an area's tax base are key concerns of the CRAs. Since FDOT may need to acquire right-of-way in CRA areas for interstate modernization, there is a concern that interstate modernization may adversely impact the City's tax roll and consequently TIF revenues.

While there are other sources of CRA revenue, such as interest payments and revenues from the Tourist Development Tax, TBRPC has prepared a fiscal impact scenario of the potential impacts of the first phase of construction and its opening year impacts on taxable property and upon TIF revenue. Simulated TIF revenues are calculated from a forecasted tax roll using the adopted 2017 City, County, Port, HART, and Children's Board millage rates. Interest, and Tourist Development Tax revenue are excluded from the analysis.

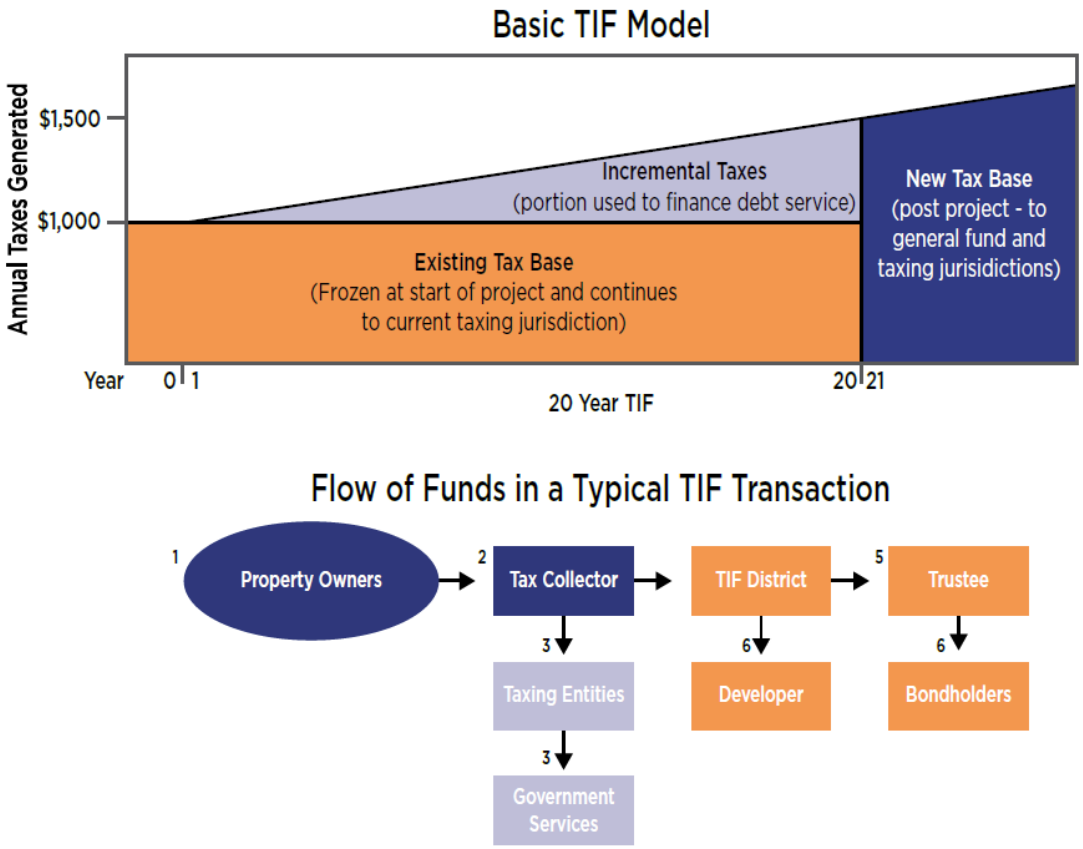
In this section, TBRPC considers the following components of TIF Revenue Impacts:

- The Mechanics of Tax Increment Financing
- Tax Increment Financing Forecasting
- Fiscal Impact Assumptions
- Fiscal Impact Analysis of Tampa Bay Next Impacts on CRA TIF Revenue

7.1 The Mechanics of Tax Increment Financing

TIF is used by the City of Tampa CRA to finance planning and capital improvement activities in the CRAs. The Basic TIF Model Diagram (Figure 7.1) illustrates the relationship between the TIF district and the underlying tax base.

Figure 7.1: Basic TIF Model Diagram



Source: RILA TIF Primer, ND

The Retail Industry Leaders Association elaborates on the TIF revenue process as:

1. Property taxes are levied and collected just as non-TIF property taxes
2. Base year (taxes generated at the time TIF was adopted) accrue to the benefit of taxing jurisdictions
3. Increases of the tax revenues above the base amount accrues to the benefit of the TIF district
4. Once bonds are issued, incremental property tax funds equal to the debt service flow to the trustee for payment to bondholders
5. Annual tax increment not needed for debt service flow either to the CRA or the developer, per development agreement (Retail Industry Leaders Association, ND).

In Florida, the gross incremental CRA revenue is discounted back for inflation at 95 percent to calculate the net incremental CRA revenue, which is deposited into the Redevelopment Trust Fund.

7.2 About Tax Increment Finance Scenarios

Like economic impact scenarios in Section 6, a trend forecast is compared to a scenario trend of potential fiscal impacts across the same time period. The differences between the trend and the scenario quantify the magnitude and direction of the fiscal impact, yielding a contrast between potential future revenue outcomes that help frame the discrete impacts of taking a specific action, such as Non-Tolled or Tolled Express Lanes, versus No Further Action[7]. In this study, TBRPC only compares a trend forecast to a build scenario forecast.

While methods differ, public authorities around the world forecast tax revenues as part of the budgeting process. With budgeting needs stretching out several years, governments must take the economy into account as well as anticipated events when considering the balance of revenue versus expenses.

Some financial forecasters use simple trends to anticipate future budgets. An example would be a forecast that assumes that revenue grows at a fixed rate, based on the average of past growth projected forward. TBRPC uses this deterministic approach in forecasting the trend growth in property values in the CRAs. Because we are concerned with the impact of interstate modernization on the TIF revenues of the CRAs, we are interested in the project's impacts, isolated from all other considerations. Analyzing the discrete impacts of construction and opening year impacts on property values required the use of statistical methods to understand how economic events influence local property values. We then compare the trend forecast to a simulated forecast accounting for project impacts.

Scenarios are conducted under quasi-experimental conditions: as many potential variables as possible are held constant while the researcher models the impact of one or more independent variables on outcomes of a dependent variable. For example, let us say the trend growth rate for CRA TIF revenue is 2.5 percent. For the purposes of this example, the Tampa Bay Next scenario raises that growth rate by quarter of a percent in one year and lowers it by the same rate the next, so that the simulated growth rate is 2.75 percent or 2.25 percent, respectively. As such, scenarios are not comprehensive predictions because researchers must constrain other potential effects that are outside the scope of study in order to focus on the discrete impacts that the project has on the margin. This requires that we state our assumptions about what is in the study and what is not.

[7] See Section 4.3 of this study for a more in-depth treatment of how scenarios work.

7.3 Fiscal Impact Assumptions

The assumptions used in this analysis can be briefly stated as:

- Property purchased for right-of-way is removed from the tax roll over three years, FY 2018-FY 2020.
- Construction begins in FY 2020 and ends in FY 2027, opening year is FY 2027
- The City of Tampa produces a cashflow analysis of CRA TIF revenue with a forecast through 2025 whose growth rates vary somewhat across years and CRAs, TBRPC used the same *revenue* assumptions as the City and extended that forecasted *revenue growth* out to 2027 using a 3 percent annual growth rate for each CRA.
- TBRPC used the forecasted growth rate to produce a trend forecast of *assessed property values* and an associated increment in *value* for each year, based on the 2017 millage rates.
- Because there is a mix of land uses in each CRA, the overall proportion of land uses is assumed to remain the same through 2027.
- Consistent with Siethoff and Kockleman (2011), each year of construction depresses property values within a highway adjacent buffer non-cumulatively by 2.46%. When construction ends on a nearby highway segment, negative impacts from construction activity are zeroed-out in TBRPC's TIF revenue scenario[8].
- All other properties see property value gains consistent with changes to countywide Gross County Product as occurs during heightened economic activity (called 'stimulus'), scaled to the historical relationship between GCP and CRA property values using a regression model calculated price elasticity (Jung and Kang, 2007).
- As discussed in Section 6.6.4, TBRPC calculated property value impacts from a potential shift in highway alignment based on the regression analysis.

7.4 Fiscal Impact Analysis of Tampa Bay Next Impacts on CRA TIF Revenue

While the following steps use the sum of all CRA forecasts, there is a separate forecast for each CRA in Appendix 6. As such, a Fiscal Impact Analysis of interstate modernization on the CRAs requires several steps in order to project changes to revenue streams from TIF.

These steps are:

1. Identify CRA annual TIF increment and projected TIF revenue growth as a baseline trend
2. Subtract ROW acquisition from the total assessed base value, identifying a revised property tax assessment

[8] Consistent with Siethoff and Kockelman, opening year should result in a 5.6% gain in CRA property values. Since such a large share of CRA properties affected by the project are single-family homes a gain of that magnitude would not be possible under Save Our Homes, which prevents assessment increases over 3% on homesteaded properties, TBRPC elected to not apply an impact that would yield unrealistic gains in taxable assessment in a single year.

3. Calculate Tax Increment Related to Construction Economic Stimulus
4. Calculate marginal increment to CRA revenue
5. Compare trend and construction related impacts

7.4.1 Identify CRA annual TIF increment and projected TIF revenue growth as a baseline.

Millage rates change over time but for the purposes of this analysis, TBRPC used the same rates adopted in 2017 for each year of the scenario. First, data on the base year taxable property values, past increment values in property values, and any changes to the properties on the tax rolls must be considered.

Table 7.1: Baseline Property Values, Increment and Revenues FY 2018-2027

Millions nominal $	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
CRA Baseline Assessment	$4,543	$4,634	$4,728	$4,824	$4,924	$5,027	$5,132	$5,241	$5,353	$5,469
TIF Increment	$3,040	$3,131	$3,225	$3,321	$3,421	$3,524	$3,629	$3,738	$3,851	$3,966
Trend TIF Revenues	$21.79	$22.45	$23.12	$23.81	$24.53	$25.26	$26.02	$26.80	$27.61	$28.44

Source: TBRPC, 2018

7.4.2 Subtract ROW acquisition, with new baseline property tax base

FDOT is considering a number of project design options, each with its own ROW acquisition needs. In this analysis, TBRPC considers the impacts of the ROW requirements of full reconstruction, removing $380,125 in total tax assessed value from the baseline property assessment of the CRAs over three years (simultaneously affecting the increment in value). $44,021 has already been purchased by FDOT and removed from the tax rolls. While interstate modernization would require millions of dollars of ROW purchases in other parts of Tampa, total purchases in the CRAs are $424,146.

Also, because property values are assumed to grow at 3.0 percent a year, the revised increment (Post-ROW) reflects that growth rate after the ROW has been removed, affecting the property growth trend in absolute dollars.

Table 7.2: Right-of-Way Acquisition and Costs

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
CRA Increment (millions $)	$3,040	$3,324	$3,410	$3,510	$3,614	$3,720	$3,829	$3,942	$4,122	$4,246
ROW Acquisition (Thousands $)	-$76.0	-$228.1	-$76.0							
Post-ROW Increment	$3,040	$3,324	$3,410	$3,510	$3,614	$3,720	$3,829	$3,942	$4,122	$4,246

Source: TBRPC, 2018

7.4.3 Subtract construction activity impacts during construction period

Following Siethoff and Kockleman (2002), TBRPC applied a -2.46 percent non-cumulative impact to the value increment of highway adjacent properties within an eighth of a mile of the ROW. As such, construction activity resulted in a total of $9.2 million in unrealized assessed property value gains due to construction nuisances.

Table 7.3: Construction Activity Impacts to Assessed Value

Millions nominal $	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Post-ROW Increment	$3,040	$3,324	$3,410	$3,510	$3,613	$3,720	$3,829	$3,941	$4,122	$4,246
Post-Construction Increment	$3,040	$3,324	$3,409	$3,509	$3,612	$3,718	$3,828	$3,940	$4,121	$4,246

Source: TBRPC, 2018

7.4.4 Calculate TIF Revenue Related to Construction Economic Stimulus

Economic activity drives growth in taxable property values. With $2.65 billion in construction spending, it is important to consider how that spending would influence CRA property values. How much property values change in relation to change in Gross County Product is measured by its elasticity. Appendix 6 provides details of the linear regression model used to derive the elasticity of CRA property values as the result of the economic stimulus of construction activity.

Table 7.4 adds the Gross County Product property value change associated with the construction stimulus to the CRA assessed value increment, producing the Stimulus Related Assessment Increment. The last row in the table shows the TIF revenue after the stimulus effects were accounted for.

Table 7.4: Construction Economic Stimulus TIF Revenue

Millions nominal $	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Post-Construction Impact	$3,040	$3,324	$3,409	$3,509	$3,612	$3,718	$3,828	$3,940	$4,121	$4,246
GCP % Change related to Build	0.00%	0.00%	0.00%	0.03%	0.36%	0.49%	0.58%	0.46%	0.33%	0.11%
Stimulus related Assessment Increment	$0.00	$0.00	$0.00	$0.00	$0.00	$3.80	$50.79	$85.31	$106.35	$96.64
Post-Stimulus Assessed Value	$3,040	$3,324	$3,409	$3,509	$3,612	$3,722	$3,878	$4,025	$4,227	$4,342

Source: TBRPC, 2018 GCP is Gross County Product and defined in the Glossary.

7.4.5 Calculate Property Value Impacts of Relative Distance to New Highway Alignment

TBRPC modeled hedonic regression equations for single-family, multi-family and commercial uses where the change in relative distance to highway right-of-way and to access points is anticipated to influence property values. Model results for residential distance-value relationships are given in Appendix 6. While the commercial value model was statistically significant, its explanatory power was unsatisfactory (r-squared of .144), indicating that there were too many other unaccounted factors to have confidence in forecasting commercial property value changes, and consequently, were not considered in this analysis. Table 7.5 calculates the impacts of the change in highway alignment on residential properties in the project opening year.

Table 7.5: Property Value Impacts of Relative Distance to New Highway Alignment

Millions nominal $	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Post-Stimulus Impact	$3,040	$3,324	$3,409	$3,509	$3,612	$3,722	$3,878	$4,025	$4,227	$4,342
Change in Property Values	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$9.39
Post-Stimulus Assessed Value	$3,040	$3,324	$3,409	$3,509	$3,612	$3,722	$3,878	$4,025	$4,227	$4,352

Source: TBRPC, 2018

Table 7.6 compares the trend CRA TIF revenue growth to the build scenario TIF revenue.

7.4.6 Compare Trend TIF Revenue to Construction-Related Results

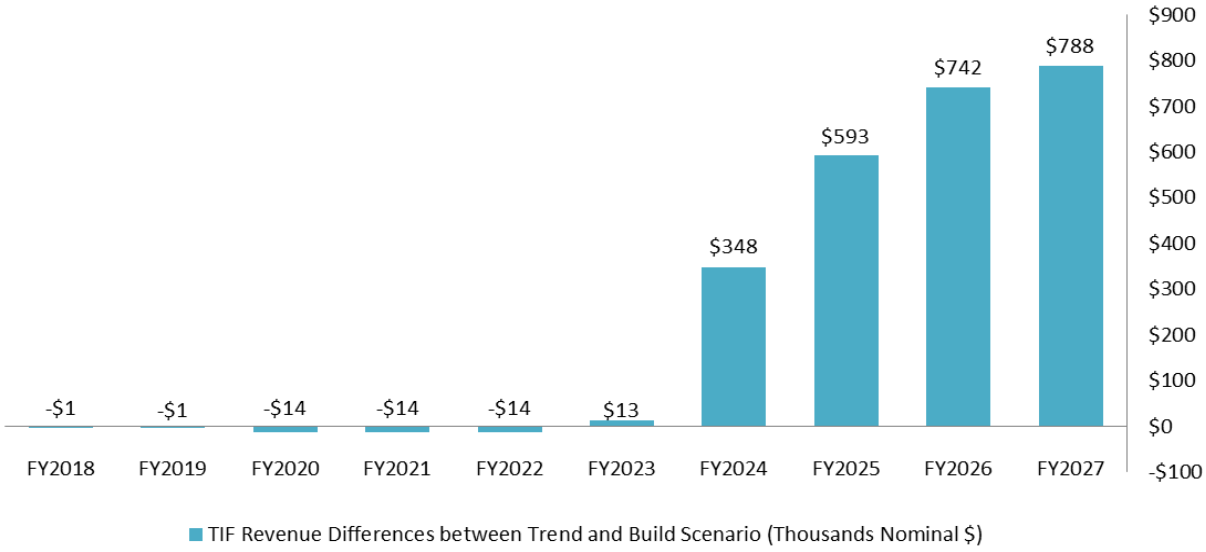
Table 7.6: Trend TIF Revenue Compared to Construction-Related TIF Revenue

Millions nominal $	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Trend Revenue	$21.79	$23.69	$24.27	$24.97	$25.70	$26.45	$27.22	$28.02	$29.47	$30.35
Build-Related Revenue	$21.79	$23.69	$24.25	$24.96	$25.69	$26.47	$27.57	$28.61	$30.21	$31.14

Source: TBRPC, 2018

Figure 7.2 depicts the build TIF revenue over trend TIF revenue.

Figure 7.2: Simulated Build revenue impacts over trend CRA TIF revenue (Thousands of Nominal $)



Source: TBRPC, 2018.

7.5 Fiscal Impact Summary

TBPRC's fiscal impact analysis takes a middle-of-the road approach to Tampa Bay Next's impacts on CRA TIF revenues. Some potentially positive impacts, such as the likelihood of speculation driving up housing prices did not appear to be appropriate as the focus is on property values not sale prices. Commercial property value impacts were also excluded from the analysis because the regression model was not robust enough for TBRPC to have confidence in that aspect of property value change.

Based on TBRPC's analysis, there are early year negative impacts on CRA TIF revenues due to the right-of-way acquisition and construction activity, which would reduce the taxable assessment of the CRAs. Beginning in 2023, TB Next related economic stimulus contributes to a relatively small increase in average yearly revenues over the CRA trend through opening year in 2027.

8. CONCLUSIONS

Without major investment in the Tampa Bay Area network, highway level of service may decline over the coming years and cost the region billions of dollars in lost productivity, jobs and wages every year. In addition to direct business losses, existing businesses may have to adapt their business practices, staffing decisions, and even location decisions to a heightened level of congestion. If, instead, FDOT completes its planned major investments to modernize the interstate, Hillsborough County may gain thousands of jobs over current trends and add billions of dollars to Gross County Product and personal income.

Community Redevelopment Areas (CRAs) may face major changes regardless of FDOT's final decision. Just as congestion forces changes in land use, so do new transportation facilities and the need to analyze their impacts on communities. Construction itself may bring jobs to the CRAs and change the need for specific land uses within their boundaries. While system improvement impacts may be more indirect than construction, there are significant potential impacts for employment growth in CRA areas.

TBRPC's major conclusions are, by category:

No Further Action

Under No Further Action, job growth, labor force and population will continue to grow, but at a slower rate due to increased congestion. As jobs become scarcer, commuters may need to travel further for work. For transit dependent commuters, this means even longer journeys to work.

As the highway system becomes more congested, traffic increase in neighborhood arterials as drivers seek alternatives to the mounting costs of delay. Increased congestion could lower future job growth and induce some people to leave the area, potentially raising existing commercial vacancy rates. Overall, however, lower countywide employment and spending is likely to lower demand for parking from non-residents. There are no impacts to parks.

Increases in arterial traffic may lower single-family property values but those same increases may benefit local businesses and multi-family property values as more traffic is equivalent to greater visibility to potential customers or residents. However, increased arterial traffic diverting through CRAs are likely to travel at higher speeds, especially on one-way roads and increase the potential risk to bicyclists, pedestrians and special users such as children and the disabled.

Construction and System Performance Impacts

Construction activities, its direct effects on employment as well as its indirect effects in terms of economic stimulus in indirect investment and employment are strong drivers of economic growth in the Tampa area.

Construction impacts are likely to provide up to hundreds of jobs for CRA residents but System Performance related impacts may not impact CRA employment any differently than the rest of Hillsborough County. During construction, increased local hiring and higher incomes in the CRAs are likely to attract new local business, potentially lowering office vacancy rates even though the market in some areas is 'tight.' Currently, asking rates are about average for C class office space and it is unlikely rents will rise. Instead of pushing rates higher, it is more likely that demand for office space will go to other neighborhoods with more capacity. Parking is likely to be in greater demand.

System performance impacts are further out in time, and would indirectly affect the economic productivity of the entire Tampa Bay Area. From an economic impact perspective, the Tolled Express Lanes provides relatively more jobs and personal income than the Non-Tolled Express Lanes. On the other hand, tolling clearly would cause some trips to divert from the interstate to arterials, which may impact residents and businesses of the CRAs—but not as much as No Further Action.

Traffic impacts due to overall population and employment growth, especially from No Further Action but also from the Tolled Express Lanes—relative to the Non-Tolled Express Lanes, may create obstacles for non-motorized travel, including pedestrians, cyclists, as well as special users. There are no impacts to parks.

Since highway modernization would be adjacent to most CRAs and because construction is likely to have a significant impact on the CRAs, TBRPC looked at the potential fiscal impacts to CRA finances. Because interstate modernization would require some right-of-way purchases and may impact overall property values, TBRPC analyzed two fiscal scenarios through 2027. A trend' analysis assumes that Tax Increment Financing (TIF) revenues grow at certain set rates, while a construction-related scenario uses those same growth rates, but analyzes the impacts of each project phase on TIF revenue.

Results of the TIF analysis indicate that there are small losses to TIF revenue as some property is purchased by FDOT and removed from the tax rolls in the short term (FYs 2020-2023). Between FYs 2023-2027, the positive impacts of the project from economic stimulus and from next proximity amenity to the new highway alignment will generate very modest increases to TIF revenue.

9. GLOSSARY

Capital Stock is the value of actual built non-residential and residential stock and optimal residential and non-residential stock. Optimal capital stock represents demand while actual capital stock is the supply.

Office Space Classes are generally classified into A, B and C. Class A buildings represent the newest and highest quality buildings in their market. They are generally the best looking buildings with the best construction, and possess high-quality building infrastructure. Class A buildings also are well located, have good access, and are professionally managed. Class B buildings are generally a little older, but still have good quality management and tenants. Oftentimes, value-added investors target these buildings as investments since well-located Class B buildings can be upgraded to Class A through renovations such as facade and common area improvements. Class C These are older buildings and are located in less desirable areas and are often in need of extensive renovation. Architecturally, these buildings are the least desirable, and building infrastructure and technology is outdated. As a result, Class C buildings have the lowest rental rates, take the longest time to lease, and are often targeted as re-development opportunities. (Golden, 2013).

Effective Distance adjusts the geographic distance between two centers of economic activity, based on the efficiency of multi-modal transportation between them. Hence, improvements in the transportation infrastructure reduce effective distance between two locations and, consequently, increase their interaction, in terms of the flows of labor, intermediate inputs, and end-use commodities. In general, as effective distance increases, the costs that deter economic activity rise through an exponential process called 'distance decay.' The rate of change by economic sector of the distance decay curve (known as the distance decay parameter) captures both the increased deterrence and the variable impact on flows by sector.

Employment or Job-years a standard description of a job held for one year. For example, if a construction worker works five years in one job, REMI counts that as five job-years. Alternatively, a REMI estimate of 10 jobs could either represent 10 workers working one year or 1 worker in one job for ten years.

Externalities are costs or benefits that affects a party who did not choose to incur that cost or benefit.

Gross County Product as a value added concept is analogous to the national concept of Gross County Product. It is equal to output excluding the intermediate inputs. It represents compensation and profits. This analysis refers to Hillsborough County.

Hedonic pricing is a model for identifying both internal characteristics of an asset and external factors that affect its cost or value.

Just Value is the market value of property, under Florida law, as used by property appraisers in assessing property. That value may not reflect either its true sale value or even its true valuation, as there are legal exemptions such as homesteading and Save Our Homes, which limit increases to valuation.

Output The amount of production in dollars, including all intermediate goods purchased as well as value-added (compensation and profit). Can also be thought of as sales.

Personal Income This is a US Bureau of Economic Analysis concept based on place of residence; the sum of wage and salary disbursements, other labor income, proprietors' income, rental income, personal dividend income, personal interest income, and transfer payments, less personal contributions for social insurance. Reported as a nominal dollar concept.

Rent Gradient: the slope along which the price or value of a property varies by distance from an economic center, such as a Central Business District.

Vehicle Hours Traveled (VHT) Total vehicle hours spent by vehicles in zone waiting to access link.

Vehicle Miles Traveled (VMT): s the total distance traveled by all vehicles on the link.

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Appendix 1: Scenario Description of Interstate Modernization Assumptions

From: Chunyu Lu (AECOM)

To: Alice Price (FDOT)

CC: Elaine Martino (FDOT); Randy DeShazo (TBRPC)

Subject: Scenario Description of Tampa Bay Next Economic Impact Study (TranSight)

The purpose of this report is to describe each scenario that has been used in the Tampa Bay Next Economic Impact Study using TranSight by Florida Department of Transportation (FDOT) and Tampa Bay Regional Planning Council (TBRPC). The Tampa Bay Regional Planning Model with Managed Lane (TBRPM-ML) was used for this study with a base year of 2006 and future year of 2035.

In earlier stage, the model results including number of trips, Vehicle Miles Travelled (VMT), and Vehicle Hour Travelled (VHT) have been reported to project team as tabulated below. The descriptions of Express Lanes in each scenario including Express Lane segments, project limits, and number of lanes for Express Lane are included in this report.

Appendix Table 1.1: Study Scenarios by Number of Trips, VMT and VHT

Region	Auto Trips				Truck Trips				Transit Trips			
	Trips	VMT	VHT	Average Speed (MPH)	Trips	VMT	VHT	Average Speed (MPH)	Trips	VMT	VHT	Average Speed (MPH)
Year 2006	9,003,096	73,518,426	2,442,991	30.09	373,742	4,062,909	124,298	32.69	59,004	278,715	9,932	28.06
Year 2035 No Build	14,471,656	126,523,941	4,853,968	26.07	578,343	6,687,096	236,274	28.3	77,964	320,218	13,305	24.07
Year 2035 Starter Project Updated	14,471,656	127,238,425	4,737,165	26.86	578,343	6,740,799	229,712	29.34	77,964	321,491	12,933	24.86
Year 2035 Starter Project without Toll	14,471,656	126,819,502	4,758,269	26.65	578,343	6,710,322	230,909	29.06	77,964	320,757	12,922	24.82

Appendix Figure 1.1 Scenario 1: Year 2006 Base Year
Freeways are highlighted in green

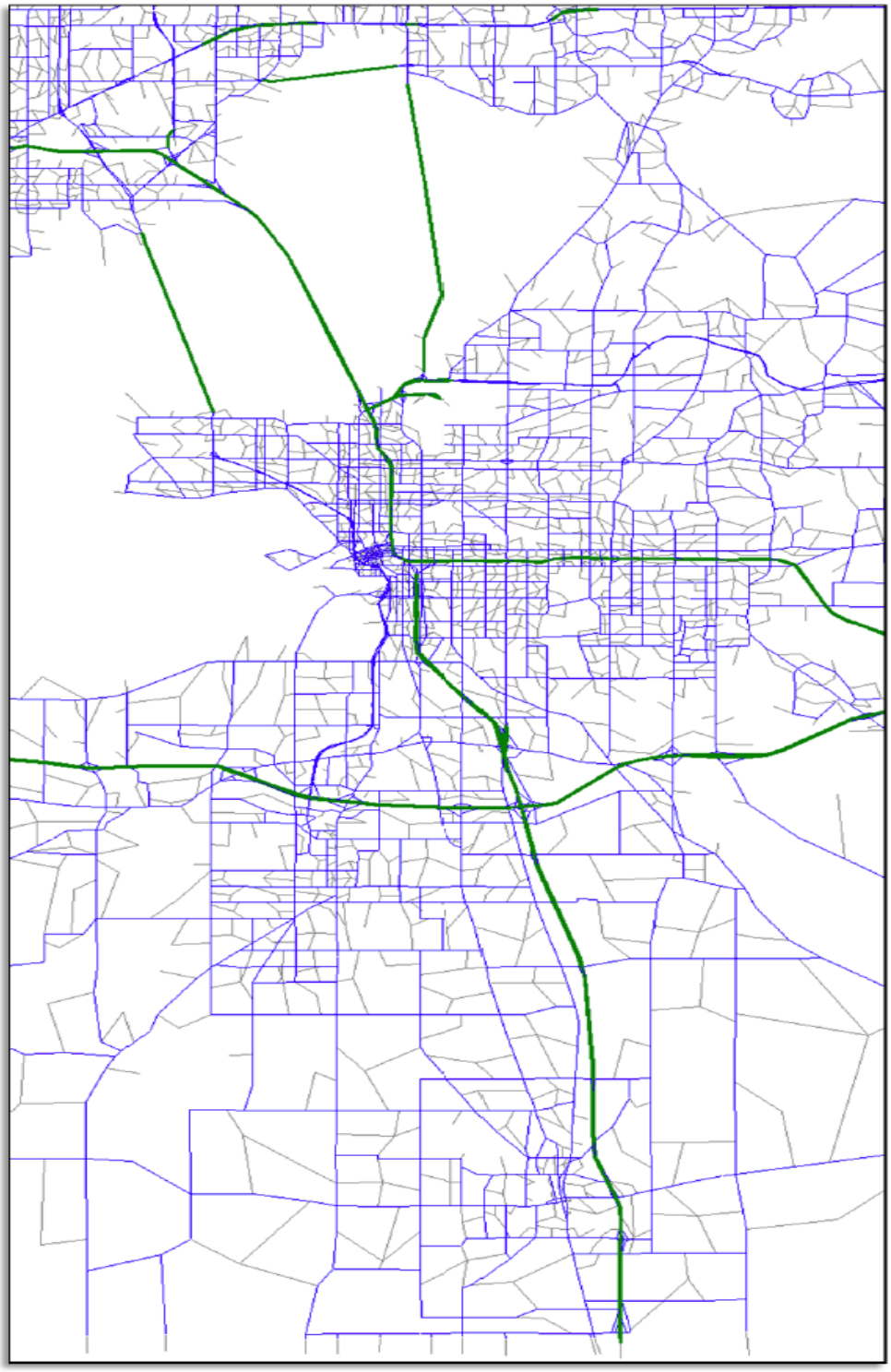


Figure 1: Year 2006 Base Year Network

Appendix Figure 1.2: Year 2035 No Build

Scenario 2: Year 2035 No Build

2035 No-Build network does not include Express Lanes, and it was running analyses for all of the PD&E studies concurrently. In Figure 2, freeways that will be included in the Starter Project study area are highlighted in Yellow, and other freeways are highlighted in Green.

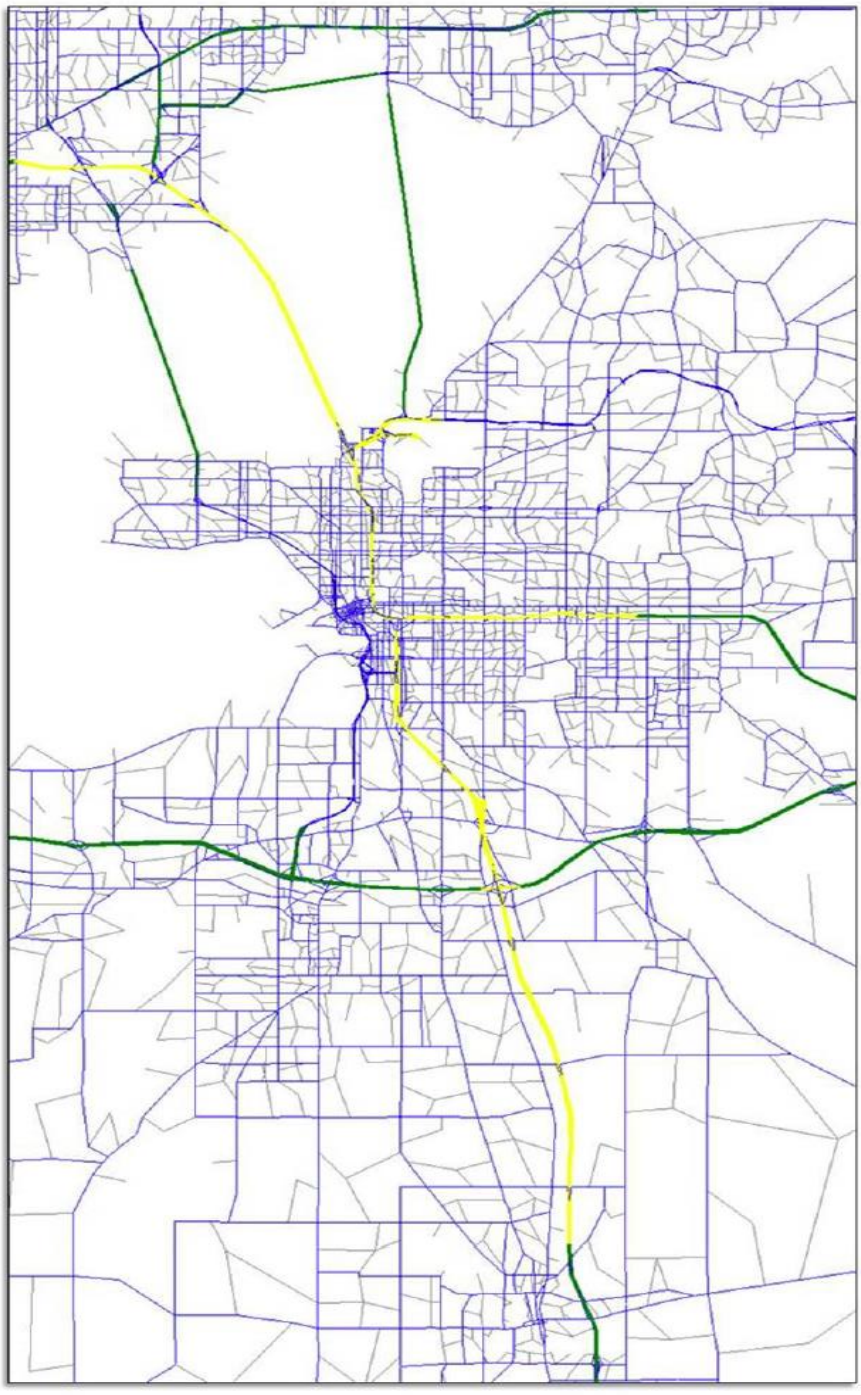


Figure 2: Year 2035 No Build Network

Appendix Figure 1.3: Scenario 3 Year 2035 Starter Project

Scenario 3: Year 2035 Starter Project

2035 Starter Project network includes Express Lanes as shown in Figure 3 below:

- Express Lanes with Number of Lanes = 1 are highlighted in Red.
- Express Lanes with Number of Lanes = 2 are highlighted in Yellow.
- Express Lanes with Number of Lanes = 3 are highlighted in Brown.
- Freeways are highlighted in Green.

2035 Starter Project network includes the following segment:

- Express Lanes Segment 2 (Pinellas): extend from S. of Gandy to E. of 4th St with 1 lane in each direction;
- Express Lanes Segment 3 (Howard Frankland Bridge): Howard Frankland Bridge with 1 lane in each direction;
- Express Lanes Segment 4 (Veterans Expressway and SR 60): Veterans Expressway and SR 60 with 2-3 lanes in each direction;
- Express Lanes Segment 5 (Westshore to Tampa Downtown): Westshore to Tampa Downtown with 2-3 lanes in each direction;
- Express Lanes Segment 6 (I-275/I-4 Downtown Interchange): I-275/I-4 Downtown Interchange with 1-3 lanes in each direction;
- Express Lanes Segment 7(I-275 north of Downtown Interchange): I-275 north of Downtown Interchange with 1-2 lanes in each direction;
- Express Lanes Segment 8(I-4 east of Downtown Interchange to Plant City): I-275/I-4 Downtown Interchange to I-4 east of Branch Forbes Road with 1-3 lanes in each direction;
- Express Lanes on I-75 were removed since they were not part of the PD&E studies.

Appendix Figure 1.4 Year 2035 Starter Project Network

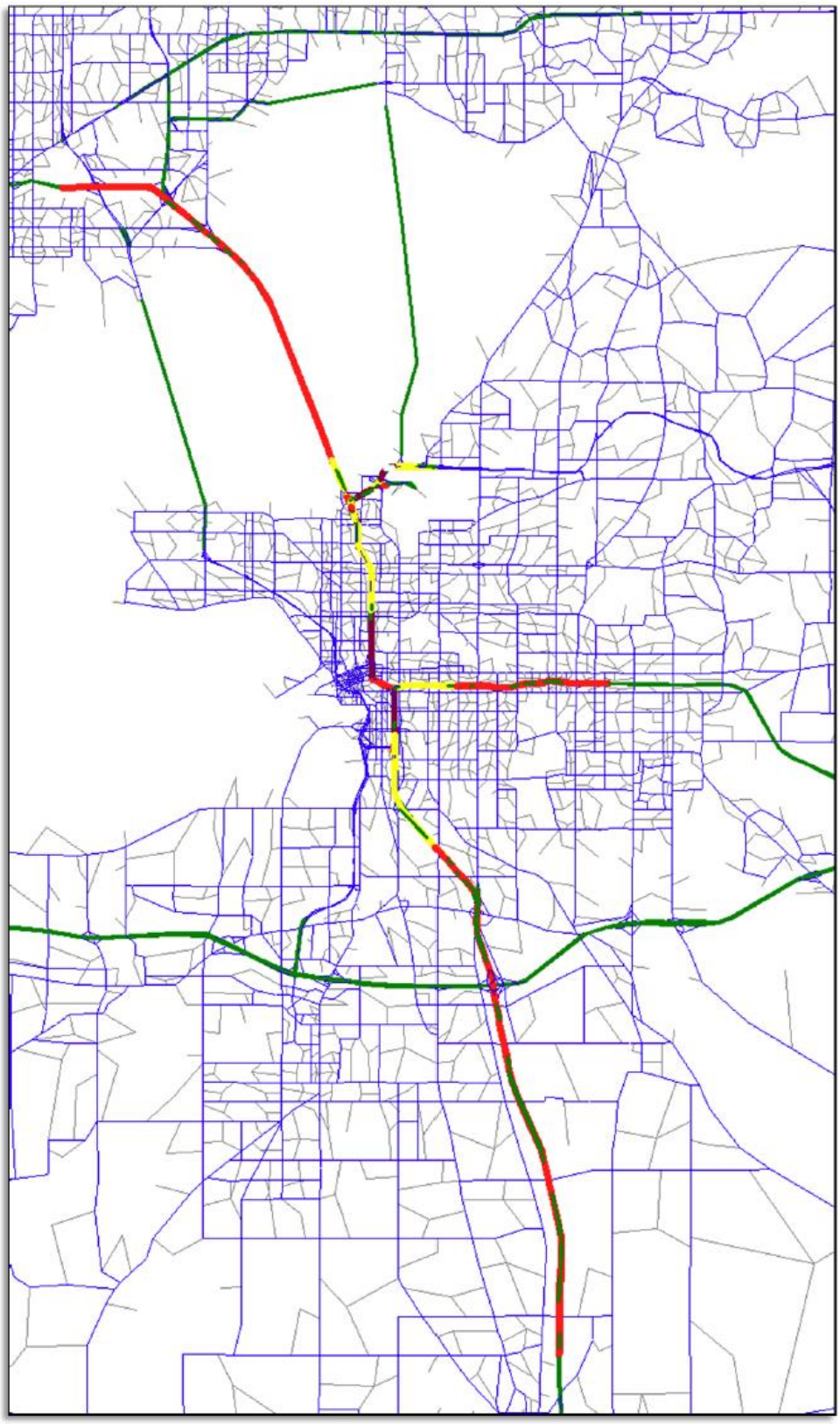


Figure 3: Year 2035 Starter Project Network

Appendix 2: Employment by Occupation in Construction, Non-Tolled and Tolled Express Lanes

Appendix Table 2.0: Employment by Occupation

Category	Average Annual Construction	Average Annual Non-Tolled Express Lanes	Average Annual Tolled Express Lanes
Top executives	93	195	248
Advertising, marketing, promotions, public relations, and sales managers	10	48	61
Operations specialties managers	26	120	152
Other management occupations	100	176	223
Business operations specialists	118	339	431
Financial specialists	51	285	358
Computer occupations	51	316	404
Mathematical science occupations	2	14	17
Architects, surveyors, and cartographers	5	12	16
Engineers	33	91	115
Drafters, engineering technicians, and mapping technicians	15	36	46
Life scientists	3	20	25
Physical scientists	3	20	25
Social scientists and related workers	2	11	14
Life, physical, and social science technicians	4	21	27
Counselors and Social workers	11	63	78
Miscellaneous community and social service specialists	6	43	54
Religious workers	0	1	2
Lawyers, judges, and related workers	9	47	60
Legal support workers	5	29	37
Postsecondary teachers	15	78	98

Preschool, primary, secondary, and special education school teachers	38	154	194
Other teachers and instructors	10	52	66
Librarians, curators, and archivists	3	11	14
Other education, training, and library occupations	14	61	77
Art and design workers	9	41	52
Entertainers and performers, sports and related workers	3	30	38
Media and communication workers	6	48	61
Media and communication equipment workers	3	16	21
Health diagnosing and treating practitioners	44	255	317
Health technologists and technicians	29	150	187
Other healthcare practitioners and technical occupations	4	8	11
Nursing, psychiatric, and home health aides	16	124	153
Occupational therapy and physical therapist assistants and aides	2	11	13
Other healthcare support occupations	19	90	112
Supervisors of protective service workers	3	11	15
Fire fighting and prevention workers	3	12	15
Law enforcement workers	12	42	52
Other protective service workers	17	112	144
Supervisors of food preparation and serving	11	51	64

workers			
Cooks and food preparation workers	34	151	189
Food and beverage serving workers	78	354	444
Other food preparation and serving related workers	14	63	79
Supervisors of building and grounds cleaning and maintenance workers	4	23	29
Building cleaning and pest control workers	48	283	358
Grounds maintenance workers	19	98	126
Supervisors of personal care and service workers	2	14	17
Animal care and service workers	4	26	33
Entertainment attendants and related workers	2	22	28
Funeral service workers	1	7	9
Personal appearance workers	19	106	136
Baggage porters, bellhops, and concierges; Tour and travel guides	1	8	10
Other personal care and service workers	25	199	250
Supervisors of sales workers	25	85	108
Retail sales workers	148	473	604
Sales representatives, services	48	204	259
Sales representatives, wholesale and manufacturing	40	120	154
Other sales and related workers	20	77	98
Supervisors of office and administrative support	31	105	133

workers			
Communications equipment operators	1	4	5
Financial clerks	87	208	266
Information and record clerks	82	414	526
Material recording, scheduling, dispatching, and distributing workers	62	206	261
Secretaries and administrative assistants	112	283	358
Other office and administrative support workers	122	316	402
Supervisors of farming, fishing, and forestry workers	0	4	5
Agricultural workers	2	24	29
Fishing and hunting workers	0	4	5
Forest, conservation, and logging workers	1	14	17
Supervisors of construction and extraction workers	160	89	118
Construction trades workers	1,375	748	996
Helpers, construction trades	92	48	65
Other construction and related workers	35	31	41
Extraction workers	11	19	24
Supervisors of installation, maintenance, and repair workers	24	39	50
Electrical and electronic equipment mechanics, installers, and repairers	20	39	50
Vehicle and mobile equipment mechanics, installers, and repairers	44	127	161
Other installation, maintenance, and repair	204	281	361

occupations			
Supervisors of production workers	8	27	34
Assemblers and fabricators	15	77	97
Food processing workers	6	34	43
Metal workers and plastic workers	31	60	77
Printing workers	1	11	13
Textile, apparel, and furnishings workers	4	47	60
Woodworkers	5	23	29
Plant and system operators	4	19	25
Other production occupations	31	123	156
Supervisors of transportation and material moving workers	8	31	39
Air transportation workers	1	13	17
Motor vehicle operators	106	346	436
Rail transportation workers	0	3	3
Water transportation workers	1	6	8
Other transportation workers	6	31	39
Material moving workers	79	345	439
Military	0	0	0

Source: TBRPC 2017, TranSight

Appendix 3: Socioeconomic Characteristics of Community Redevelopment Areas

TBRPC requested data from the Efficient Transportation Decision Making (ETDM) Web site for each of the CRAs.

The website is at https://etdmpub.fla-etat.org/est/ and the data that were pulled for the Tampa area CRAs are in a separate attachment to this report.

Appendix 4: Office Space Characteristics in Tampa and CRAs

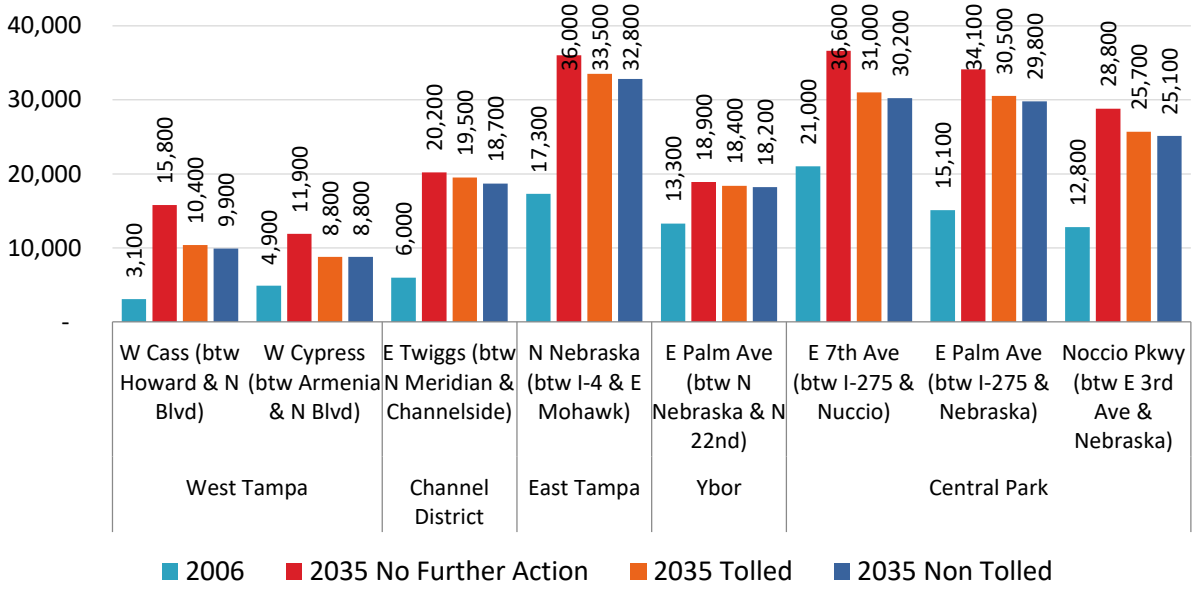
Appendix Table 4.1: Office space characteristics in Tampa and available CRAs

	SF Inventory	Direct Vacancy %	Total Vacancy %	Rental Rate
CBD "A"	5,069,661	11.9	12.5	$28.72
CBD "B" and "C"	1,708,755	6.5	7.3	$19.31
Westshore "A"	7,416,033	7.5	7.8	$30.99
Westshore "B" and "C"	7,064,684	7.7	8.4	$23.45
East Tampa "C"*	289,518	6.1	6.1	$17.19
West Tampa "C"*	385,962	3.2	3.2	$15.63
Ybor "B" and "C"*	830,142	7.1	8.6	$17.87

Source: Colliers International, 2018. *Ybor has some A class office space, and both East and West Tampa have B class office space, but lack of data or data suppression excludes those statistics.

Appendix 5: Growth in Trip Volumes 2006-2035 in CRAs

Appendix Figure 5.0: Growth in Trip Volumes by Major Arterial



Source: Tampa Bay Regional Planning Model

Appendix 6: CRA Property Value Statistical Analysis and Price Elasticity

CRA Single-Family Hedonic Price Model

One of the most important questions in analyzing the potential impacts of Tampa Bay Next on the CRAs was whether proximity to the existing highway alignment exerts positive impacts on property values, especially single-family property, or whether those impacts are negative. However, those results do not provide enough data to consider the overall effects that distance from the highway has on property values, controlling for other factors. Table 6.1 provides the regression coefficients from the hedonic price model for single-family homes in the CRAs discussed in Section 6.5.3.

Appendix Table 6.1: CRA Single Family Hedonic Price Model

Coefficients	Unstandardized Coeff	Std. Error	t	Sig.
(Constant)	4.707	0.009	532.964	0.000
TOT_LVG_AR	0.000	0.000	56.847	0.000
Age	-0.007	0.000	-50.288	0.000
Interaction	-1.623E-08	0.000	-17.361	0.000
LND_SQFOOT	9.683E-06	0.000	16.078	0.000
DistROW	4.016E-05	0.000	8.316	0.000
Wood	0.016	0.004	3.698	0.000

Source: TBRPC, 2018 Significance codes: estimate significant at '***' 0.001 '**' 0.01
Multiple R-squared: 0.548, Adjusted R-squared: 0.5475

The Hedonic Price Model was constructed for the distance premium by controlling for total property size (LND_SQFOOT), construction materials (Wood), the age of the house (Age) and Total Living Area, accounting for 54.75% of the variance.

Appendix Table 6.2: CRA Multi-Family Hedonic Price model

Coefficients	Unstandardized Coeff	Std. Error	t	Sig.
(Intercept)	291053.344	66004.917	4.410	0.000
LND_SQFOOT	63.227	2.503	25.256	0.000
TOT_LVG_AR	39.084	1.946	20.087	0.000
NEAR_ACCESS_Exist	-405.912	66.030	-6.147	0.000
NEAR_ROW_Exist	288.520	70.020	4.121	0.000

Source: TBRPC, 2018 Significance codes: estimate significant at '***' 0.001 '**' 0.01
Multiple R-squared: 0.797, Adjusted R-squared: 0.796

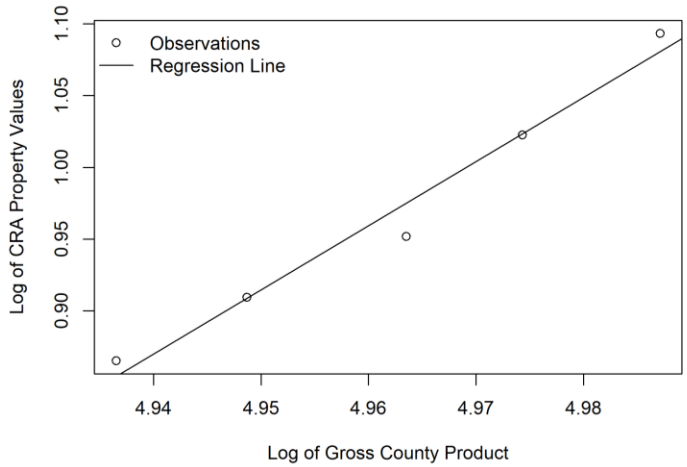
Calculating the Elasticity of CRA Property Values with respect to Gross County Product

Using a double log linear regression model, TBRPC derived the elasticity of property values for all taxable land uses with respect to Gross County Product by using historical Hillsborough County Property Appraiser data for the CRAs as the dependent variable and historical Gross County Product data as the independent variable. Because statistical parameters of small areas, such as

individual CRAs, can exhibit volatile trends in property values, all CRAs were grouped into a single property assessment base (sub-market) and all taxable properties were grouped together, rather than by individual land use code (there are more than 60 property codes).

The regression model follows the form $log(Y) = a + b * log(X)$ and the elasticity is derived from it as: $\epsilon = \frac{bY}{X}\frac{X}{Y} = b$. In this case, each percent change in GCP yields a 4.464% change in CRA property values. The relationship between CRA property values and Gross County Product is depicted in Figure 19. Regression results are reported in Appendix Table 8.

Appendix Figure 6.2: Relationship of CRA Property Values to Gross County Product



Source: TBRPC, 2018

Appendix Table 6.3: Regression Results for Property Value Elasticity

Coefficients	Coefficient Estimate	Interpretation
Constant Term	-21.184, t-stat -10.377	Intercept
Gross County Product	4.464, t-stat 10.852	Elasticity of Property Values with respect to Gross County Product at the mean
Model T-Statistic and P-Value	3.18, 0.002	See notes
Durbin-Watson	1.7	See notes
Model Summary		
R-squared (Adj. R-squared)	0.975 (0.967)	Predicted LnRIC_CRA = -21.184 + 4.464*LnGCP

Source: TBRPC, 2018

The adjusted R-squared statistic measures goodness of fit, and ranges from zero to one. The model's adjusted R-squared value of 0.967 means that 96.7 percent of the variation property values across land uses is explained by the Gross County Product regressor. For a time series model, this R-squared value is quite high.

Second, the Durbin-Watson statistic near 2.0 tells us that the model has been largely corrected for autocorrelation, an effect that can artificially shrink the coefficients' standard errors, making a driver appear to be significant when it is really not.

The t- and p-statistics are two ways of measuring the probability that the observed statistical relationships are actually true. A t-statistic is simply the ratio of the coefficient to its standard error, and, as a rule of thumb, a value of 1.96 or greater means that the coefficient is significant. A p-value measures the probability that the observed coefficient is equal to its true value. A p-value of less than 0.05 is a universally accepted threshold in economics and the social sciences.

Appendix 7: TIF Scenario Results by CRA

Appendix Table 7.0: CRA TIF Trend Revenue versus CRA TIF Build Revenue (thousands of nominal $)

	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027
Downtown Trend	$11,980	$12,340	$12,710	$13,091	$13,484	$13,888	$14,305	$14,734	$15,176
Downtown Build	$11,980	$12,339	$12,710	$13,091	$13,497	$14,072	$14,614	$15,120	$15,523
Ybor Trend	$2,009	$2,049	$2,090	$2,132	$2,174	$2,218	$2,262	$2,512	$2,588
Ybor Build	$2,008	$2,048	$2,089	$2,131	$2,176	$2,246	$2,311	$2,572	$2,675
Channel Trend	$5,464	$5,519	$5,684	$5,855	$6,030	$6,211	$6,397	$6,956	$7,165
Channel Build	$5,464	$5,519	$5,684	$5,855	$6,036	$6,294	$6,536	$7,129	$7,326
Drew Trend	$984	$1,014	$1,044	$1,075	$1,108	$1,141	$1,175	$1,243	$1,280
Drew Build	$984	$1,014	$1,044	$1,075	$1,109	$1,156	$1,201	$1,274	$1,309
East Tampa Trend	$1,912	$1,969	$2,028	$2,089	$2,152	$2,216	$2,283	$2,377	$2,448
East Tampa Build	$1,911	$1,960	$2,019	$2,079	$2,144	$2,236	$2,322	$2,428	$2,493
Tampa Heights/Riverfront Trend	$121	$125	$129	$133	$137	$141	$145	$152	$156
Tampa Heights/Riverfront Build	$121	$125	$129	$133	$137	$142	$148	$156	$160
Central Park Trend	$181	$187	$192	$198	$204	$210	$216	$223	$230
Central Park Build	$181	$186	$192	$198	$204	$213	$221	$229	$234
West Tampa Trend	$1,035	$1,066	$1,098	$1,131	$1,165	$1,200	$1,236	$1,273	$1,311
West Tampa Build	$1,035	$1,063	$1,095	$1,128	$1,163	$1,213	$1,260	$1,304	$1,422

Appendix 8: Technical Description of TranSight

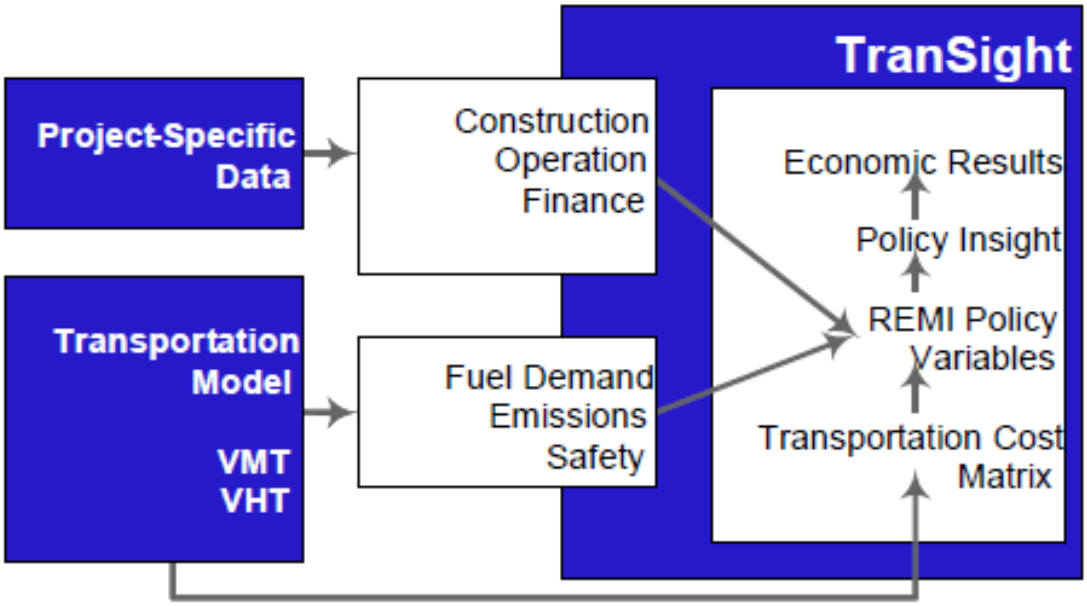
TBRPC used REMI's TranSight software package to conduct the countywide impact study. REMI, Inc. produces several products, among them PI+ and TranSight. The Policy Insight (PI+) economic model calculates the economic effects of a variety of policies and investments by building on the strengths of four major modeling approaches: Input-Output, General Equilibrium, Econometric, and Economic Geography. More detailed information about the model can be found at www.remi.com.

REMI TranSight integrates leading travel-demand and transportation forecasting models with REMI PI+. While stand-alone transportation models produce forecasts of travel-demand response to a proposed transportation project, TranSight provides a more complete perspective by predicting the full array of economic and demographic effects that would result from completing the project. It translates the key outputs generated by the transportation models into a series of cost and amenity variables that can be incorporated into a single-region or multi-region impact analysis, as driven by the powerful PI+ engine, which is also the core of REMI's PI+ model. The output of this process shows such key economic indicators as employment by industry, output, and value added by industry, personal income, population, and many more.

TranSight allows the user to specify the financial dimensions of an upgrade to the transportation infrastructure, including expected construction costs, financing, and annual operation/maintenance costs. In addition, it calculates several *indirect* types of costs and benefits that may ensue from the project, including changes in safety, emissions, operating costs, and transportation costs. Some of these computations require user input regarding construction, finance, and operations, while others use the output from travel-demand model scenarios. Collectively, this information is transferred into PI+, which produces multi-year forecasts of economic and demographic trends under the transportation upgrade, and compares them with a trend forecast. In capturing the full effects of the project, TranSight can assist governments in determining whether allocating funds to a particular transportation investment is a winning proposition relative to funding other policy initiatives.

The model structure is represented in Figure 8.0, which reveals both the components of the model and the manner in which information flows between them. Outputs from the transportation model are combined with built-in cost parameters and project-specific information to produce values for policy variables designed to simulate the project's direct impact. The PI+ engine processes these results to generate comprehensive forecasts of the project's macroeconomic effects.

Appendix Figure 8.0: Model Structure of TranSight



Source: REMI, Inc., 2016

The system contains over 6,000 exogenous "policy variables" used to simulate the impact of public or private decisions on the regional economy. PI+ relies on four chief methodologies from economics and regional science. The simultaneous application of these methodologies highlights their individual strengths while allowing the others to compensate for any of their individual weaknesses:

Input/Output (IO) Tabulation – At the core of PI+ is an IO table. An IO model illustrates the explicit structure of the regional economy in terms of transactions from industry-to-industry. For example, an automobile assembly plant in Michigan would often have several parts manufacturers in Ohio associated with it, with metal fabricators in Indiana or in Pennsylvania supplying that facility.

This idea of a supply-chain "multiplier" is at the heart of an IO model. This is an important concept to include in modeling; on the other hand, there are several significant drawbacks and limitations to "pure" IO models. They include only a "demand-side" effect and include no variables on price, which are critical considerations with regards to a mechanism tied to consumption and prices like a carbon tax. An IO model has no "sense of scale"—a $1 billion input, though 1,000 times bigger, has exactly 1,000x the impact of a $1 million input. Such a setup misses the fact that larger influxes of dollars create significant "distortions" to the economy at the regional-level in terms of wages, real estate prices, and the budgetary situation of the state and local government.

Computable General Equilibrium (CGE) Model – CGE models are a broad class of systems relying on the general principles of equilibrium economics. Adding principles from CGE modeling into PI+ adds market-level concepts to its economic structure. The typical supply-and-demand graph illustrates a "partial equilibrium"—the point where demand meets supply for a given price and

quantity, the market therefore "clearing" at equilibrium. This concept from Economics 101 is important but, in reality, markets are complex and interact with one another. For example, a new factory moving into a small city would increase the availability of jobs. Given that labor is a scarce commodity, this would bid the price of labor (wages) up in the area. Having more jobs and higher wages in the example city would draw more people into the area looking for employment opportunity, high real wages, and a higher quality of life. The new population would affect the real estate market in the area, induce more housing construction, and drive demand for services from the local government. If a young family moved into the area, then the children would attend school, which falls on local taxpayers to finance. These different markets adjust in their own way at their own rate, and PI+ includes CGE modeling principles to account for them. CGE models usually include some concept for energy prices as well, which PI+ does too with explicit energy cost variables for households, businesses, and the government and in different categories for electricity, natural gas, gasoline, and other petroleum products.

New Economic Geography – Economic geography is the theory and study of the idea that there is an economy of scale for the whole economy and not just with individualistic firms, industries, and households. PI+ uses this approach to illustrate how specialization of labor pools and supply-chains for specific tasks and industries in certain cities and in certain regions increases the productivity of the economy. For instance, the selection and availability of trained cardiologists in metropolitan areas recognized for their healthcare clusters (such areas as Rochester, MN or Nashville, TN) is higher than other cities that lack such clusters. Hospitals operating in these areas would have more of a chance to find the ideal employer/employee match than similar facilities in, for instance, Boise, ID or Helena, MT due to sheer economies of scale alone.

Econometrics – REMI uses historical data to determine the parameters and inputs necessary to make the mathematics of PI+ function. This involves the estimation of elasticity parameters (the slope of the response curves for supply and demand), the structure of the IO table, and the "time lag" on how long it takes a market to clear back to a new equilibrium after upset. Time factors are particularly important towards making REMI into a fully dynamic model. Some markets, such as those for employment and labor, adjust rapidly while others, such as those for economic migration and for the housing market, take more time. Companies are quicker to demand labor and look to fill it than households are to up and move themselves to another county or state in pursuit of better opportunities somewhere else in the country.