

**Indian River County MPO  
Long Range Transportation Plan (LRTP)  
2035 Update**

**Development of Socio-Economic Data  
Summary Report**

*Prepared for:*

Indian River County  
Metropolitan Planning Organization



*Prepared by:*

CivaTerra, Inc.



## Introduction

This technical memorandum (TM) details the methods employed to develop the socio-economic (SE) data, also referred to as Z-data, for the Indian River County Metropolitan Planning Organization's (MPO) 2035 Long Range Transportation Plan (LRTP) Update. This TM describes the need for socio-economic data in the transportation modeling process and the information and methods utilized to develop the socio-economic data.

The SE data developed for the 2035 LRTP consist of geographically discrete information about households, employees and students within the county's 154 traffic analysis zones (TAZs) as well as TAZs in portions of Brevard and St. Lucie counties. Future year SE data projections were developed for the years 2015, 2025 and 2035. These data are used in the transportation modeling process to project the amount and location of vehicular traffic on the county's roadways over the next 25 years. The MPO uses the results of the transportation modeling process to plan and prioritize improvements to Indian River County's transportation infrastructure.

## Data Sources

Numerous data sources were utilized to develop the SE data. The table below details the data sources and associated applications of the data.

**Table 1: Data Sources**

Source	Application
University of Florida's Bureau of Economic and Business Research (BEBR)	<ul style="list-style-type: none"> <li>▪ Existing population</li> <li>▪ Population control totals for year 2015, 2025 and 2035</li> </ul>
U.S. Census Bureau's 2007 American Community Survey	<ul style="list-style-type: none"> <li>▪ County-wide household data</li> </ul>
U.S. Census Bureau 2000 Census	<ul style="list-style-type: none"> <li>▪ TAZ-level household and employment data</li> </ul>
Indian River MPO Vacant Land Inventory	<ul style="list-style-type: none"> <li>▪ TAZ-level residential development status and future household capacity</li> </ul>
Florida Department of Transportation	<ul style="list-style-type: none"> <li>▪ 2005 TAZ-level household and employment data</li> </ul>
School District of Indian River County	<ul style="list-style-type: none"> <li>▪ Current and future student enrollment</li> </ul>
Local governments	<ul style="list-style-type: none"> <li>▪ Development and land use data</li> </ul>

County-wide population control totals were established initially in order to develop TAZ-level SE data projections. BEBR annually prepares population projections for Florida's



counties based on several trends including changes in population over the past several years and monthly electric customer data. BEBR is considered the foremost authority for population projections in Florida and their projections are often relied upon for planning purposes. BEBR's mid-range population estimates were used as the total population control totals for years 2015, 2025 and 2035.

Data from the U.S. Census Bureau's 2007 American Community Survey (ACS) were used to convert total population estimates to household estimates. Household data are necessary because of the lifestyle data parameters of the Florida Department of Transportation's (FDOT) Greater Treasure Coast Regional Planning model (GTCRPM). The GTCRPM is the transportation model utilized by the MPO to develop its 2035 LRTP. The GTCRPM is a "lifestyle model" and requires specific household-level SE data. Because of this requirement, total population data must be converted to household-level data. This conversion is completed by dividing the population by the average household size. Table 3-2 details the population control totals.

**Table 2: Population Control Totals**

<b>Control Total (Year, Source)</b>	<b>Estimate</b>
Total population (2008, BEBR)	141,667
Average household size (2007, ACS)	2.19
Total households (2007, ACS)	58,175
2015 population (BEBR, 2009)	155,000
2015 households (BEBR/ACS)	70,776
2025 population (BEBR, 2009)	183,400
2025 households (BEBR/ACS)	83,744
2035 population (BEBR, 2009)	209,000
2035 households (BEBR/ACS)	95,434
Household growth 2007 to 2035	37,259

The county-wide household data were further disaggregated to the TAZ level. TAZs are the basic unit of analysis for the transportation modeling process. TAZ-level household data allow the transportation model to capture the spatial variability of the SE data across the county and more accurately project future travel patterns.

The MPO's GIS-based Vacant Land Inventory (VLI) application was used to develop the TAZ-level SE data projections. The VLI incorporates parcel data, zoning and future land use data, residential development data, and environmental data to estimate the number of existing developed housing units. The VLI also provides an estimate of housing unit capacity for each parcel in the county. The parcel-level estimates are then aggregated to the TAZ level. These estimates are based on parcel data attributes that indicate the development status for each parcel.



For vacant or under-developed land, the VLI estimates the future housing unit capacity based on the size of the parcel and the potential yield from the parcel's associated zoning and/or future land use attributes. The VLI data allow the MPO to project both the existing number of housing units and the projected housing unit capacity for each TAZ. The VLI data have proven to be accurate and reliable and were a valuable resource in the development of the SE data. Following the VLI analysis, housing unit data were converted to household data. A household is defined as an occupied housing unit. To convert from a housing unit to a household, the housing unit data from the vacant land inventory were multiplied by the 2000 Census TAZ-level occupancy rates.

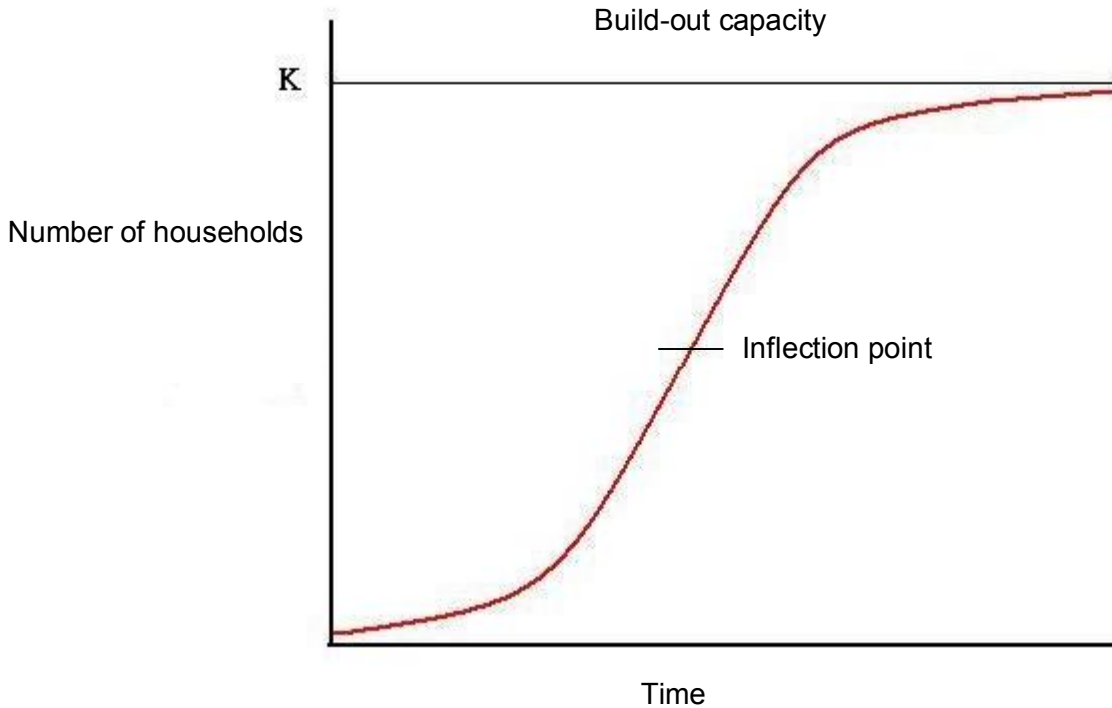
## **Data Development**

### **Household Data**

A logistic growth model was used to estimate the total number of future households for each TAZ. The logistic growth model simulates a logistic curve since over time many populations tend to grow at a rate that approximates a logistic curve. Generally, population growth increases at an increasing rate over time until the growth reaches an inflection point, at which point the increase in population growth occurs at a decreasing rate until it reaches the upper growth limit (Van Buskirk, Ryffel, and Associates, 2004). The logistic growth curve is illustrated in Figure 3-1.



Figure 1: Logistic Growth Curve



The logistic growth model was derived from the following equation.

$$A(t) = \frac{A_0 e^{rt}}{1 + A_0(e^{rt} - 1)/K}$$

A = population at time t

A<sub>0</sub> = initial population

r = growth rate

K = build-out capacity

e = Euler's number

The logistic growth model has two primary predictive variables. These variables are the build-out household capacity and the historic household growth rate. Both of these variables were primarily derived from the MPO's VLI application.



The household build-out capacity is the total future units value derived from the MPO's VLI application. The ability to accurately estimate the household build-out value for each TAZ allows for the use of the logistic growth model as opposed to a straight linear or exponential growth model. The logistic growth model produces more accurate projections than a linear or exponential model because it incorporates the parcel-based build-out capacities for each TAZ.

The second predictive variable is historic growth rates. These rates were derived from household data from the 2000 Census, FDOT's 2005 GTCRPM model validation, and 2008 data from the MPO's VLI application. Historic household growth rates between the years 2000 to 2008 were calculated for each TAZ. Both the household growth rates and build-out capacity for each TAZ were reviewed and validated by MPO staff and the MPO's Technical Advisory Committee (TAC).

Modifications to the growth rates or build-out capacity were made on a case-by-case basis. Growth rates were modified for TAZs that had a very low historic growth rate but are anticipated to absorb a significant amount of future household growth due to the anticipation of new residential development and large build-out capacity values. Several TAZs in Fellsmere, along CR 510, and in the South County Initiative area met these criteria, and the data were adjusted based on input from MPO staff and the TAC. Growth rates and build-out capacity were also manually adjusted when irregularities were discovered in the historical household data.

The logistic growth model produced unique household projection values for each TAZ. The model under-allocated future household growth in the years 2025 and 2035. Specifically, the 2035 household control total was 95,434 but the model under-allocated approximately 7,300 households. In 2025, the model under-allocated approximately 3,700 households. Based on discussions with MPO staff and the TAC, it was determined that the under-allocated households should be manually assigned to TAZs in Fellsmere. This decision was justified on the grounds that the logistic growth model does not perform as well in areas such as Fellsmere that exhibit both very low historic growth rates and high anticipated future growth rates. Additionally, Fellsmere is actively planning for future growth and is seeking to amend its Comprehensive Plan to accommodate increased residential and commercial growth.

Following the estimation of future year household population totals, calculations were completed for each TAZ to derive the remainder of the household-based SE data. These calculations are ratio operations that proportion the total number of households into the more specific categories required by the GTCRPM. Table 4 details these household variables. TAZ-level household attribute data from the 2000 Census and the FDOT's 2005 GTCRPM model validation were used to estimate the specific SE data household characteristics. TAZ-level household information is collected primarily during the decennial census. Because of this consideration, it was assumed that the TAZ-level household characteristics from the 2000 census will remain constant through 2035. The primary exception to this assumption is for TAZs with low historic growth rates and high



anticipated future growth rates. In these cases, County-wide averages were used in the household ratio calculations.

## Employment

Employment projections for years 2015, 2025 and 2035 were also developed. The employment projections were derived from multiple sources of information. These sources included the 2030 Urban Land Allocation Model (ULAM) data utilized during the previous 2030 LRTP Update, the Community Vision ~ 2035 developed by the Treasure Coast Regional Planning Council (TCRPC), FDOT's 2005 GTCRPM, and current employment data. Total employment control totals were established by multiplying the household control totals for years 2015, 2025 and 2035 by the County's current 0.83 jobs per household value. The employment control totals are detailed in Table 3-3.

**Table 3: Employment Control Totals**

	<b>2015</b>	<b>2025</b>	<b>2035</b>
Total Employment	58,744	69,508	79,210

The GTCRPM requires unique data for the number of commercial, industrial and service employees in each TAZ. The total number of employees per TAZ is also required. A percent-share method using the 2005 GTCRPM model validation data coupled with the 2030 ULAM employment data was used to estimate future employment. It was determined that the ULAM data from the previous 2030 LRTP Update were still applicable because many of the underlying land uses and future population estimates did not significantly change between the 2030 and 2035 LRTP Updates. In fact, the future population estimates from BEBR, and resulting employment estimates, have declined since the last update due to changes in the economy and residential housing market.

The 2005 percent share ratio of employees per TAZ to total county-wide employees was calculated for each employment sector and each TAZ. The resulting ratios were then multiplied by the county-wide employment control totals to derive employment projections for each TAZ. The results of the percent-share method were compared to the ULAM 2030 data and the TCRPC Community Vision ~ 2035. The data were modified as needed to account for TAZs identified for increased employment activity in the TCRPC Community Vision ~ 2035.



## **School Enrollment**

The GTCRPM requires data on the location of schools and their associated enrollments. The School District Facility Planning Department provided current year enrollments, student population projections, and planned locations for future schools or capacity improvement projects. In consultation with School District staff, the TAZs associated with the proposed future schools were identified and this information was incorporated into the SE data. It should be noted that some of the facilities identified for 2025 and 2035 are for planning purposes only, subject to School Board approval, and may change.

## **Brevard and St. Lucie Counties**

The GTCRPM model is a multi-county model. Therefore, SE data is needed for areas other than Indian River County. The MPO staff coordinated with Brevard, St. Lucie and Martin County staff in order to ensure consistent SE data. Specific tasks included serving on the Brevard LRTP Advisory Committee, and assisting in developing the scope of services and serving on the consultant selection committee for the St. Lucie/Martin LRTP Update. For the initial development of the 2035 LRTP Update, SE data were developed for northern St. Lucie County and southern Brevard County. Meetings were held with staff from the Space Coast Transportation Planning Organization and the St. Lucie County Planning Department to discuss future land use and development conditions in these areas. Brevard County SE data from their current LRTP update were utilized along with 2005 validation and 2030 GTCRPM SE data. St. Lucie County is in the process of updating its SE data for its 2035 LRTP. Because the St. Lucie 2035 SE data were incomplete, a percent-share method with the 2005 and 2030 GTCRPM SE data was utilized along with input from St. Lucie County planning staff to develop 2035 SE data for northern St. Lucie County.

## **Data Attributes**

Table 3-4 summarizes the SE data fields used by the GTCRPM.



**Table 4: GTCRPM Data Field**

<b>Data Field</b>	<b>Description</b>
ID	Auto-generated number by GIS
SORT_INDX	Index value required by model
COUNTY_NUM	County Number
COUNTY_COD	County Name
TAZ_TCRPM	Treasure Coast Regional Planning Model TAZ number
CFRPM_TAZ	Central Florida Regional Planning Model TAZ number
BR_CTPP_TA	Brevard CTPP TAZ number
TZGL2005	Temporary TAZ variable
REFTAZGL	Temporary REF TAZ variable
TAZ_2003	Traffic Analysis Zone in year 2003
TAZ_2005	Traffic Analysis Zone in year 2005
ACRES	Total acreage
SQ_MILES	Total square miles
N	Highway code number
X	X geographic coordinate
Y	Y geographic coordinate
PCT_LEFT	Percentage of usable (Net area) to gross area
REF_TAZ	Reference number to connect TAZ to STP 60 data
TAZ	Traffic Analysis Zone
GSC_TAZ	Grade school TAZ number assigned to students living in current TAZ
MSC_TAZ	Middle school TAZ number assigned to students living in current TAZ
HSC_TAZ	High school TAZ number assigned to students living in current TAZ
ENR_GSC	Enrollment in grade school if exists in current TAZ
ENR_MSC	Enrollment in middle school if exists in current TAZ
ENR_HSC	Enrollment in high school if exists in current TAZ
ENR_PRV	Enrollment in private school if exists in current TAZ
HHNOC	Number of households without children
HHWC	Number of households with children
AUTONC	Number of autos in households without children
AUOWC	Number of autos in households with children
WRNC	Number of workers in households without children
WRWC	Number of workers in households with children



**Table 4: GTCRPM Data Field (Continued)**

<b>Data Field</b>	<b>Description</b>
PERNC	Number of persons in households without children
PERWC	Number of persons in households with children
HMDATA	Number of hotel/motel rooms
CBD_DATA	Specifies if the TAZ is Central Business District
INDS_EMP	Industrial employment
COM_EMP	Commercial employment
SER_EMP	Service employment
TOT_EMP	Total employment
EXAREA	Non-overlapping exceptional areas (water, parks and road right-of-way)
GRAREA	Gross area in square feet
NETAREA	Net area

## Conclusion

The SE data were presented at a workshop of the Technical Advisory Committee on August 28, 2009. The TAC and MPO staff provided insightful comments and suggestions, and the suggested changes were incorporated into the SE Data.

## Works Cited

Van Buskirk, Ryffel and Associates, Inc. 2004. *Population Model to Forecast Population Growth of Lehigh Acres over Time to Build-Out.*