

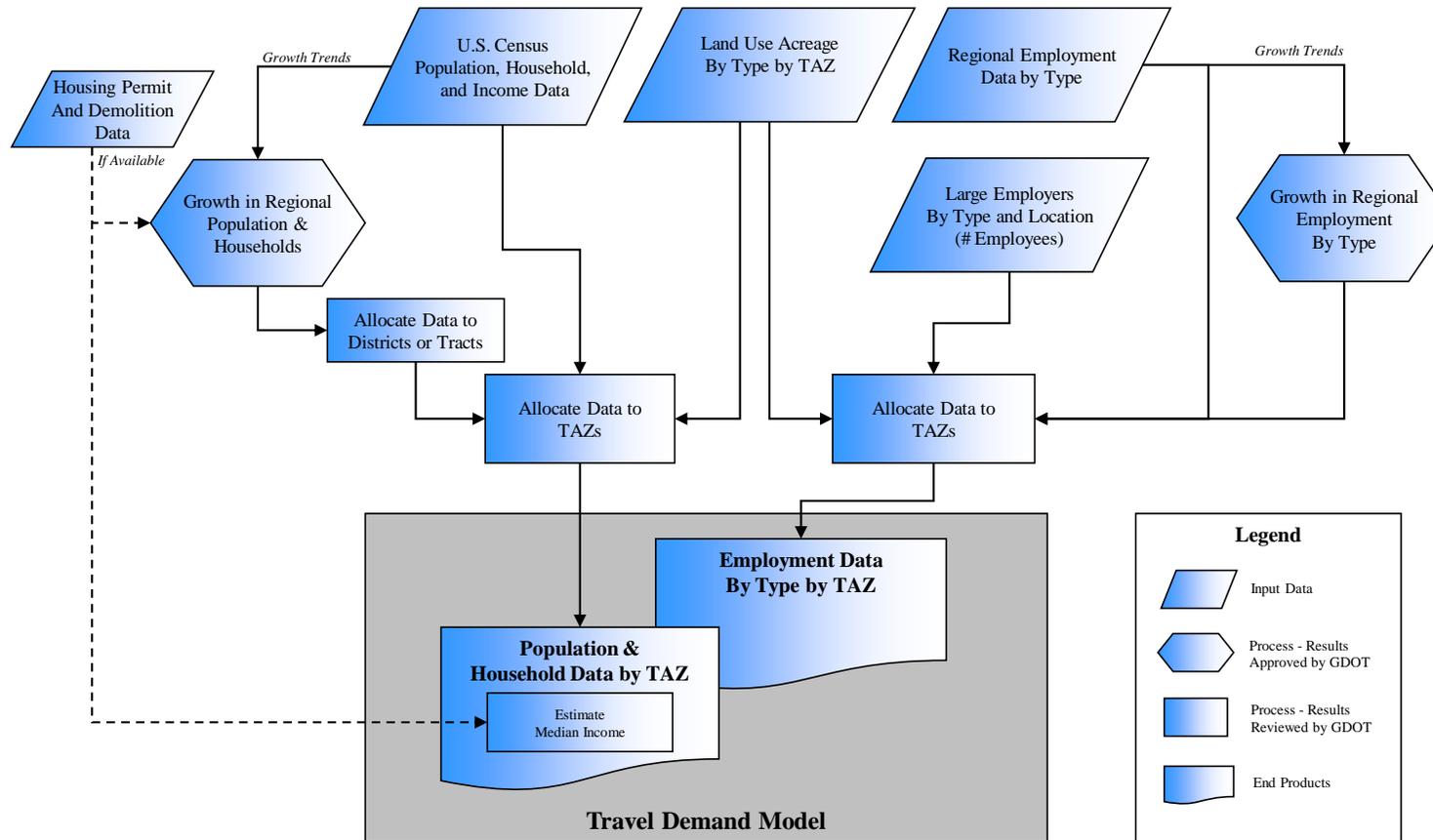
Socio-Economic Data

This section is intended to serve as a guide for preparing socio-economic data for Georgia's regional travel demand models. This guide is intended for consultants or planners in MPOs that may not have established methodologies or are considering revising their current methodologies. Base year data produced by MPOs is critical for the calibration of the regional travel demand model.

Figure 4-1 displays a generalized socio-economic data development process that is recommended by GDOT. This process can be applied in developing base year and future year data, although specific steps in the process may differ. This section provides an overview of a generalized data development process.

To support the development and review of socioeconomic data, a review panel (i.e., MPO's Transportation Coordinating Committee (TCC) and/or other local government technical personnel) should be formed. The purpose of the panel is to provide another level of review of control totals and the socio-economic data for reasonableness.

Figure Error! No text of specified style in document.-1 – Generalized Travel Model Socio-Economic Data Development Process



Base Year Data

The data required for each TAZ and potential data sources are shown below.

Table Error! No text of specified style in document.-1 - Socio-Economic and General Data Required by TAZ

Data Variables	Potential Data Sources
Population	U.S. Census block-level data (www.census.gov) and local building and demolition permits
Households	
Median Income	
Total Employment	U.S. Census, Georgia Department of Labor (www.dol.state.ga.us), commercial sources (such as Dun & Bradstreet), local county building permit data, and local employment data Bureau of Economic Analysis (www.bea.gov) Census Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES)
Retail Employment	
Service Employment	
Manufacturing Employment	
Wholesale Employment	
School Enrollment	Georgia Department of Education, County/Municipalities Boards of Education, Georgia Independent Schools Association, local school systems, private schools, and Georgia Board of Regents
Acres	Geographic Information Systems

Population, Households, and Income

U.S. Census data is the primary source for developing population and household data at the TAZ level. Population and household totals are available at the Census block level in the Decennial Census. TAZ boundaries should not cross Census block boundaries, so estimation of population and household data are usually aggregation processes.

Growth or decline that occurs between Census counts must be reflected in base year data (for base years between Census years). American Community Survey (ACS) provides 1 year, 3 year and 5 year estimates. TAZ specific adjustments can usually be made using local building and demolition permit data, supplemented by local knowledge of building activity. If building activity data is unavailable, planners should use a step-down estimation process. Begin by estimating the regional growth in population, then allocate that growth to planning districts (perhaps based on discussions with people who are knowledgeable of local building patterns), then further disaggregate the growth to TAZs. Existing land uses can be used as a basis for TAZ level allocation.

Adjustments to population and households need to be taken for instances where group quarters exist. Common examples of this type of housing include prisons, hospitals, nursing homes and dormitories. While these group quarters have a distinct population, residents do not make trips in a typical fashion. For prisons and hospitals, the population should be removed from the socioeconomic data used in the modeling process. In other examples, a more representative population should be used to model the population utilizing the transportation network. In all of these examples, these group quarters should also correspond to a certain level of employment, e.g., hospital staff. In the case of a hospital, this employment will generate trips to the TAZ that is more representative of true conditions.

Income data is available at the Census Tract (and Block Group) level. Since detailed income data is not available for smaller geographic areas, TAZ income data can be estimated from its associated Census Tract's (or Block Group's) data. Relatively large changes in development patterns (e.g., high cost homes constructed in a low income area) are usually necessary to produce significant changes in median income at the Census tract level. Such changes often occur slowly, so most TAZs will not require adjustments from Census income data. However, if specific TAZs have experienced considerable changes in development patterns since the last Census (e.g., new residential areas in a rural tract), some adjustments to income data are recommended.

Employment by Type

There are multiple sources of employment data. The Georgia Department of Labor (GDOL) provides county profiles and other reports that include county employment

totals by employment class¹. The US Census Bureau produces County Business Patterns reports, which provide employment by type at the county level. The US Department of Commerce Bureau of Economic Analysis (BEA) produces county employment estimates by North American Industry Classification System (NAICS) categories that should be used as control totals for Georgia MPO models. County level employment data can be downloaded from the BEA website². BEA data serves as a good source for control totals because the estimates include employment for industries that are not covered, or not fully covered, by unemployment insurance programs, where most other data sources exclude a significant amount of employment. Table 4-2 summarizes how NAICS employment data should be grouped to produce the required GDOT control totals for employment by type.

Table Error! No text of specified style in document.-2 - GDOT NAICS Employment Equivalency Table

NAICS Employment Category	GDOT Employment Category
Farm employment	Service Employment
Forestry, fishing, and related activities	Service Employment
Mining	Service Employment
Utilities	Service Employment
Construction	Service Employment
Manufacturing	Manufacturing Employment
Wholesale trade	Wholesale Employment
Retail trade	Retail Employment
Transportation and warehousing	Wholesale Employment
Information	Service Employment
Finance and insurance	Service Employment
Real estate and rental and leasing	Service Employment
Professional, scientific, and technical services	Service Employment
Management of companies and enterprises	Service Employment
Administration and waste services	Service Employment
Educational services	Service Employment
Health care and social assistance	Service Employment
Arts, entertainment, and recreation	Service Employment
Accommodation and food services	Retail Employment
Other services, except public administration	Service Employment
Government and government enterprises	Service Employment

¹ <http://explorer.dol.state.ga.us/mis/profiles.htm>

² <http://www.bea.gov> [GDP by State and Metropolitan Area > Local Area Personal Income & Employment > Total full-time and part-time employment by industry (CA25, CA25N) > NAICS (2001 forward) > County > Georgia > Select applicable counties > Select year > then download]

If geocoded GDOL data is available for a base year it can be allocated to TAZ using a GIS system such as ArcGIS. This is a good option for assigning employment to TAZs because it represents relatively accurate estimates of small area employment by type and offers a systematic method to allocate employment to TAZs. GDOL data and even private vendor data sources (e.g. Dun & Bradstreet) often experience common issues that should be considered when used, including:

- Some employer headquarters may be outside the county in which the employment is actually located.
- Some employer records are not geocoded.
- Some records may be grouped to an arbitrary location within the county when the address could not be geocoded.
- There may be some duplication of records.
- GDOL data does not include sole proprietorships or other classes of employment that are not covered by unemployment compensation through the state.

In each instance these items will need to be checked to determine if the GDOL data or geocoding need to be modified to correctly represent the amount and location of employment within the county. Employment for large employers and the geocoded location of large employers should be verified because they have significant potential influence on work trips. Employment for school districts should be checked to ascertain that it represents employment at individual schools rather than just the school district headquarters location.

Census Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) serves as a useful source for employment by type for small areas, when DOL data is unavailable. LODES employment data is available at the Census Block level, but it should not be used or applied at such small geographies due to methods that are employed to produce the data. It is reasonable to accumulate LODES data for all Census Blocks that are within a TAZ to estimate TAZ level employment data, however. As with all small area employment data sources, LODES data summarized at the TAZ level should be reviewed for reasonableness, including the issues previously described regarding GDOT and private vendor data.

If small area employment data is unavailable, TAZ estimates should be developed using a step-down process. The largest employers in a county should be identified and employment totals (by category) assigned to their respective TAZ. Employment is then allocated to TAZs based on each TAZ's share of the county's corresponding land use category³. Retail employment can be allocated based on a TAZ's share of the county's

³ Future data development can be supported by similar land use acreage assignments based on proposed future land use plans.

commercial land use acreage. Service employment can be allocated based on a TAZ's share of the commercial and residential acreage. Manufacturing employment can be allocated based on a TAZ's share of the county's industrial land use acreage. Wholesale employment can be allocated based on a TAZ's share of the county's industrial and commercial acreage. Residential acreage can be used in conjunction with Census data to allocate county population to TAZs (particularly in future allocation). Rural/vacant developable acreage and un-developable acreage is useful in determining developable acreage for each TAZ (i.e., subtracting from total acreage). Developable acreage can serve as a weighting factor for data allocation (growth from the base year to the future year). A step-down process can also begin with exogenously estimated district-level employment control totals. Then the previously described step-down process could be applied within each district separately, instead of the county-level.

Table Error! No text of specified style in document.-3 - Potential TAZ Land Use Database Variables

Total Acres
Existing Commercial Acres
Existing Residential Acres (best if stratified into density classes)
Existing Industrial Acres
Existing Rural/Vacant Developable Acres
Undevelopable Acres
Future Commercial Acres
Future Residential Acres (best if stratified into density classes)
Future Industrial Acres
Future Rural/Vacant Developable Acres

School Enrollment

It is preferable to obtain enrollment totals for each school in the study area (Elementary, Middle, High School, Private Schools, Technical Schools, Colleges, and Universities). If individual enrollments are not available, then system-wide totals by type of school could be an option. When combined with a comprehensive list of schools, an average school size could be calculated and allocated to each school (by type) equally. School enrollments should be available from school systems or through directly contacting individual schools. However, other potential data sources also exist, such as the State Board of Education, the Georgia Department of Technical and Adult Education, or the State Board of Regents.

Acres

TAZ acreage can be estimated best using GIS. MPOs should each maintain a GIS layer for TAZ boundaries. A regularly maintained land use database would also assist in developing consistency in socio-economic data estimates.

Future Year Projections

All MPOs are encouraged to consider future land use plans and significant infrastructure changes (sewer extensions, new highway access, economic development plans, etc.) into future long-range socio-economic forecasts.

The first step in developing future year projections is estimating regional population growth. Control totals for other forecast variables can be estimated based on the projected growth rate in population. For example, future total employment can be estimated by multiplying the base year ratio of employment and population to the projected population. The socio-economic data committee could provide guidance on shifts in the employment base that may need to be applied to future employment totals by type (e.g., reflect national trends of shifting to a more service oriented economy). Future school enrollment control totals (by type of school) can be estimated using the base year ratio of enrollment and population. Average enrollments can then be allocated to schools by type. Unless significant changes in unemployment rates and age distributions are expected, assuming employment and school enrollments follow the growth in population should be sufficient for transportation planning purposes.

There are many methods (and assumptions) for projecting population. Each MPO is responsible for developing future population forecasts. GDOT is responsible for ensuring that growth forecasts are reasonable. **Prior to allocating future projections to TAZs, MPOs should provide GDOT documentation of the process and assumptions for their growth forecasts.** GDOT conducts reasonableness checks on county population growth forecasts. Reasonableness checks will compare MPO forecasts to population projections using various methods (linear, exponential, share, etc.). If MPO forecasts are substantially different from GDOT's expectations, GDOT will work with the MPO to resolve any disparities.

There are many approaches to developing socio-economic data for travel demand models. This section provides relatively simple approaches for developing data. Provided below are simplified descriptions of the approaches that have been presented.

Population and Households

- Primary data source: Existing US Census block-level data for distribution
- Assign each block to a TAZ
- Aggregate block-level data to produce TAZ-level Census data
- If the base year is different than the Census:

- Estimate growth in population & households since the last Census
- Allocate the growth in population & households using share of residential acreage (perhaps weighted by district or area type) or some other rational process
- Collect county growth forecasts from the Georgia Office of Planning and Budget (OPB) to use as a potential guide or MPO growth forecasts from GDOT's REMI model
- Socio-economic data review panel reviews data and recommends appropriate modifications
- Submit base year population and households data for use in developing the travel demand model to GDOT for review (if GDOT is responsible for building the model)
- Develop and document the future regional projection methodology
- Socio-economic data review panel reviews methodology and projections and recommends appropriate modifications
- Submit projection methodology and proposed control totals to GDOT
- GDOT concurs or works with the MPO to reach an agreement on the methodology and control totals
- Allocate future population growth to TAZs
- Socio-economic data review panel reviews data and recommends appropriate modifications (may include multiple growth scenarios – at the discretion of the MPO and the data review panel)
- Submit future year data for developing the future year travel models to GDOT for review (if GDOT is responsible for building the model)

Median Income

- Primary source: US Census Tract or Block Group level data
- Assign each TAZ to a Tract or Block Group
- Assign the Census median income to each TAZ
- If the base year is different than the Census (or for future data):
 - Estimate the share of new households that fall within each income group (likely based on tract or planning level assumptions and/or local knowledge of specific new developments).
 - Estimate the median income by calculating a weighted average of the Census data and the assumed distribution of new households.
 - Income should be reported in 2010 dollars.

Employment by Type

- Primary data sources:
 - Bureau of Economic Analysis (BEA)
 - Georgia Department of Labor (supplemented with County Business Patterns, private vendor sources, etc.)

- Census Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES)
- Assign the employment data to their respective TAZs based on the latitude and longitude coordinates, if available (i.e. geocode)
- Geocode or aggregate small area employment data to TAZs and review for reasonableness
- Identify the area's largest employers, determine employment levels for them, and categorize the employment by type
- Assign the largest employers' data to their respective TAZs
- Subtract the largest employers from the county-level data
- If small area employment data is unavailable, allocate the remaining employment using the share of appropriate land-use acreage (perhaps weighted by district or area type) or some other rational process
 - Employment Class and Potential Associated Land Use Categories
 - Retail – Commercial
 - Service – Commercial & Residential
 - Manufacturing – Industrial
 - Wholesale – Industrial & Commercial
- Socio-economic data review panel reviews data and recommends appropriate modifications
- Submit base year employment data for use in developing the travel demand model to GDOT for review (if GDOT is responsible for building the model)
- Estimate future employment control totals as a function of projected population growth and projected shifts in the economic base of the region
- Socio-economic data review panel reviews employment projections and recommends appropriate modifications
- Submit employment projection assumptions and proposed control totals to GDOT
- GDOT concurs or works with the MPO to reach an agreement on the assumptions and control totals
- Allocate future employment growth to TAZs
- Socio-economic data review panel reviews data and recommends appropriate modifications (may include multiple growth scenarios – at the discretion of the MPO and the data review panel)
- Submit future year data for GDOT review and use in developing the future year travel models

School Enrollment

- Primary data sources: Local school boards, private schools, State Board of Education, State Board of Regents, and the Georgia Department of Technical and Adult Education.
- Manually assign school enrollment data to TAZs

- If specific school enrollments are unavailable:
 - Obtain school system total enrollments by type of school
 - Obtain lists of schools and assign each school to its appropriate TAZ
 - Determine the number of schools by type and calculate an average school size by type
 - Assign the average number of students in each school by type to each school's TAZ
- Ensure TAZ service employment is reasonable for zones with schools to account for employment at schools

Acres

- Develop a GIS-based TAZ layer and calculate total acres using the geography of the zones (if possible determine and report the total acreage that is developable and undevelopable)

Procedures to Check the Socio-Economic Data

Population per Household Ratio

- Generally does not exceed 7 persons per household.
 - Anything over 7 persons per household should be explainable by some form of group housing within the TAZ.
 - Do not include population in hospitals, nursing homes, and prisons since the people who reside in these facilities are not making trips on the network. These populations are removed from the TAZ. For these types of businesses, the employment alone will reasonably generate the trips associated with these facilities.
- Will decrease gradually over time, but not more than a few tenths. A drop of more than 0.5 persons per household over a 20 year span is significant.
- Will typically be greater in suburban counties than in the center of a city.
- Is not less than 1.0 – this would correspond to a household that has no population which by definition does not exist (household is a populated home).

Households (Occupied)

- **Do not decrease** from existing to future projections without an explainable reason (e.g., redevelopment of a residential area into a commercial property – not a common occurrence).
- Change in households should show a similar pattern to change in population.

Households per Acre

- Over 4 households per acre would represent multifamily housing. Multifamily housing is typically located nearby a higher functional classification road (i.e., they are not generally located in rural or isolated areas).
- Over 6 households per acre would signify multistory buildings. Again, check location for reasonableness.

Employment

- About half of the available land can generally be considered for the building. Use the following to see if the size of the building is in line with the acreage of the TAZ. Include households as well (4 households per acre unless it is multifamily).
 - Office 250 square feet per employee
 - Retail 300 square feet per employee
 - Wholesale 700 square feet per employee
 - Manufacturing 700 square feet per employee

Workforce Utilization

- Ratio of Population to Employees generally stays constant. There should not be a significant change.

Income

- Generally does not change. Keep in similar dollars for future forecasts. Do not adjust for inflation.

School Enrollment

- School enrollment is generally around 20% of population. This number may be higher if there are large universities within the region.
- The ratio of school enrollment to population should remain relatively similar from the base to future year.