

South Jersey Transportation Planning  
Organization  
Demographic Analysis  
2020 to 2060

Economic and Demographic Projections  
2020 to 2060  
Methodology

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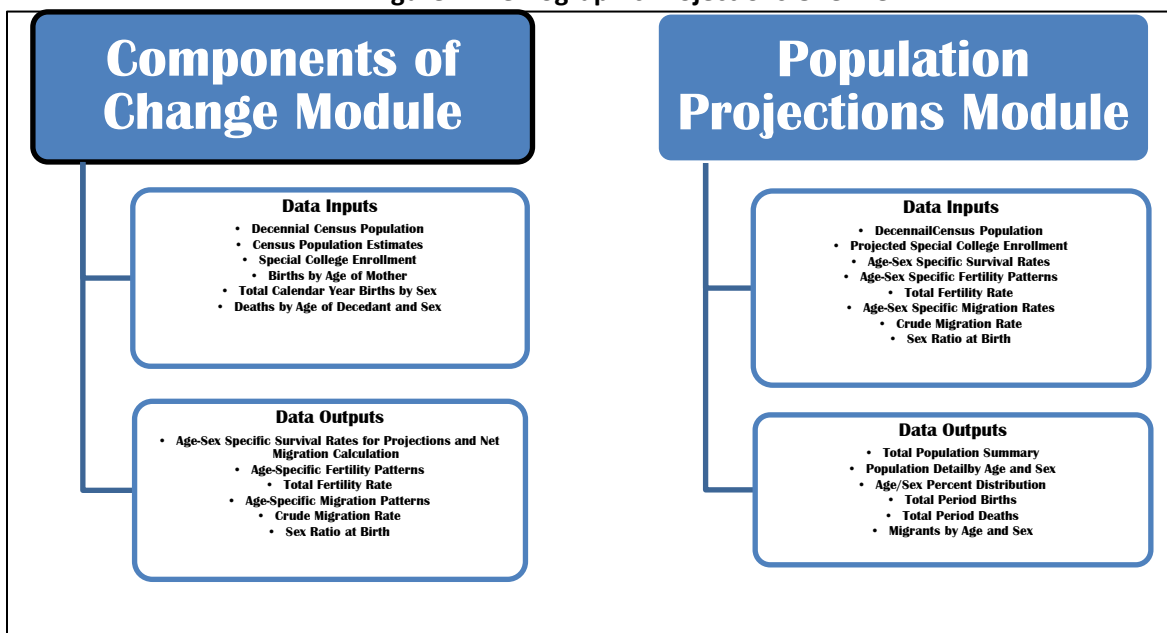
## Introduction

This report presents the final methodology description for the 2060 demographic and employment projections in the four counties of the South Jersey Transportation Planning Organization region. There are five major components of the complete project, and all result in 5-year period projections from 2020 to 2060: 1) analysis of the components of demographic change and projection of population by 5-year age group and sex; 2) projection of the number of households, household population and average household size; 3) historical analysis of employment trends at the county and industry sector level and projection for each 5-year period; 4) distributing the employment projections into seasonal and weekday/weekend employment; and 5) projection of median household income. These county level projections are disaggregated to the Minor Civil Division and Traffic Analysis Zone areas based on shares of the county projections which will be described in more detail below.

## Demographic Projections by Age and Sex – Process Overview

The historical components of change analysis is the first step in development of transition rates for the Cohort Component Projection model. Figure 1 illustrates the link between analysis of the historical population change and the inputs to the model projecting future populations. The projection model requires age-sex specific rates of mortality and migration, and fertility rates by age of mother and their county of residence. These transition rates provide the initial starting point for population projections beyond the base 2020 Census results.

Figure 1: Demographic Projections Overview



The Population Estimates Program of the U.S. Census Bureau utilizes a nationwide methodology for estimating total population and age, race, sex characteristics at the county level which follows this basic balancing equation concept. Table 1 presents these historical estimates and components of change for the four county SJTPO region and the individual counties.

### Components of Change

**Table 1: SJTPO Region Historical Components of Change, 2000 to 2020**

<b>SJTPO Region</b>	<b>April 1, 2000</b>	<b>July 1, 2005</b>	<b>April 1, 2010</b>	<b>July 1, 2015</b>	<b>April 1, 2020</b>
<b>Total Population</b>	566,259	587,011	594,481	582,757	588,786
<b>Population Change</b>	x	20,752	7,470	-11,724	6,029
<b>Percent Change</b>	x	3.7%	1.3%	-2.0%	1.0%
<b>Cumulative Births</b>	x	38,972	37,082	36,381	29,176
<b>Cumulative Deaths</b>	x	32,620	27,857	31,717	30,855
<b>Natural Increase</b>	x	6,352	9,225	4,665	-1,678
<b>Net Migration</b>	x	12,710	-1,112	-7,771	4,273
<b>Crude Net Migration Rate</b>	x	2.2%	-0.2%	-1.3%	0.7%
<b>Atlantic County</b>					
<b>Total Population</b>	253,210	270,332	274,525	270,153	274,534
<b>Population Change</b>	x	17,122	4,193	-4,372	4,381
<b>Percent Change</b>	x	6.8%	1.6%	-1.6%	1.6%
<b>Cumulative Births</b>	x	18,348	17,306	16,924	13,411
<b>Cumulative Deaths</b>	x	13,937	12,001	13,525	13,303
<b>Natural Increase</b>	x	4,412	5,305	3,399	108
<b>Net Migration</b>	x	12,710	-1,112	-7,771	4,273
<b>Crude Net Migration Rate</b>	x	5.0%	-0.4%	-2.8%	1.6%
<b>Cape May County</b>					
<b>Total Population</b>	102,323	99,269	97,257	94,160	95,263
<b>Population Change</b>	x	-3,054	-2,012	-3,097	1,103
<b>Percent Change</b>	x	-3.0%	-2.0%	-3.2%	1.2%
<b>Cumulative Births</b>	x	5,197	4,461	4,793	3,817
<b>Cumulative Deaths</b>	x	6,975	5,732	6,808	6,282
<b>Natural Increase</b>	x	-1,778	-1,272	-2,015	-2,466
<b>Net Migration</b>	x	-1,276	-741	-1,083	3,569
<b>Crude Net Migration Rate</b>	x	-1.2%	-0.7%	-1.1%	3.8%

**Table 1: New Jersey Historical Components of Change, 2000 to 2020 (cont'd)**

	April 1, 2000	July 1, 2005	April 1, 2010	July 1, 2015	April 1, 2020
<b>Cumberland County</b>					
<b>Total Population</b>	146,454	152,022	156,627	154,712	154,152
<b>Population Change</b>	x	5,568	4,605	-1,915	-560
<b>Percent Change</b>	x	3.8%	3.0%	-1.2%	-0.4%
<b>Cumulative Births</b>	x	11,309	11,599	11,005	8,792
<b>Cumulative Deaths</b>	x	7,990	6,661	7,659	7,646
<b>Natural Increase</b>	x	3,319	4,938	3,347	1,145
<b>Net Migration</b>	x	2,250	-333	-5,262	-1,705
<b>Crude Net Migration Rate</b>	x	1.5%	-0.2%	-3.4%	-1.1%
<b>Salem County</b>					
<b>Total Population</b>	64,272	65,388	66,072	63,732	64,837
<b>Population Change</b>	x	1,116	684	-2,340	1,105
<b>Percent Change</b>	x	1.7%	1.0%	-3.5%	1.7%
<b>Cumulative Births</b>	x	4,119	3,717	3,659	3,157
<b>Cumulative Deaths</b>	x	3,719	3,463	3,725	3,623
<b>Natural Increase</b>	x	400	255	-66	-466
<b>Net Migration</b>	x	716	430	-2,274	1,571
<b>Crude Net Migration Rate</b>	x	1.1%	0.7%	-3.4%	2.5%

Source: U.S. Census Bureau, Intercensal Estimates of Population, 2000 to 2019, 2020 Decennial Census, New Jersey Department of Health, Annual Vital Statistics, 2000 to 2020.

### Age-Sex Specific Population Projections

The projections model moves the population forward in 5-year increments of time for each 5-year age group up to the age of persons 85 and over. The future assumptions for fertility, mortality and net-migration rates are specified for each 5-year age group and can be modified for each 5-year time period. It is important to note that the presence of special populations living in group quarters can distort the calculation and application of fertility and migration rates. These populations include state and federal prisons, college dormitories, nursing homes and other non-household populations. The total resident population is adjusted by subtracting these age-sex populations at the beginning of each projection period and then added back in at the end of the period. All population results represent the total resident population.

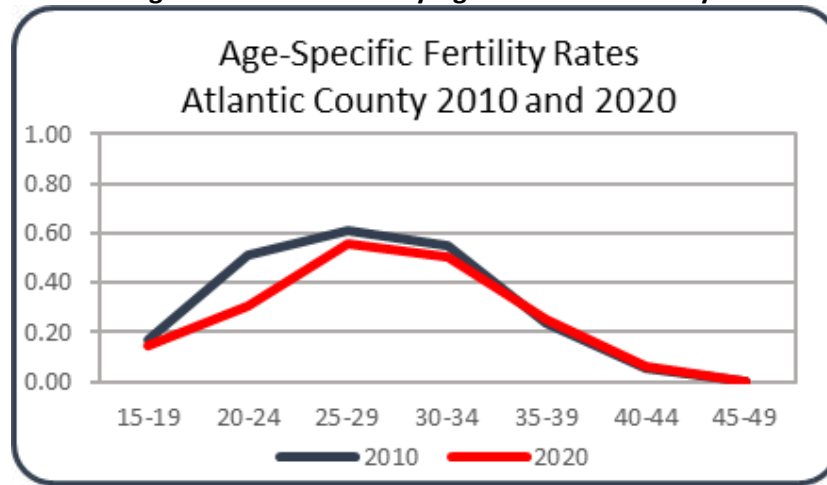
### Fertility

Fertility data comes from the New Jersey Department of Public Health which reports the number of births annually by age of mother. Annual data from 2000 to 2022 is used in the analysis. Fertility rates nationwide have declined resulting from generational shifts in delayed age of marriage and age of childbearing. Each of the SJTPO counties exhibit this pattern which is illustrated in Table 2 and graphically in Figure 2 for Atlantic County.

**Table 2: Age Specific Fertility Rates**

Age Group	2010	2020
15-19	0.1712	0.1435
20-24	0.5143	0.3033
25-29	0.6096	0.5555
30-34	0.5456	0.4999
35-39	0.2363	0.2509
40-44	0.0543	0.0625
45-49	0.0028	0.0040
<b>TFR</b>	<b>2.13</b>	<b>1.82</b>

**Figure 2: Atlantic County Age Pattern of Fertility<sup>1</sup>**



In the Cohort-Component model, the age-specific fertility rates are used as the age pattern of fertility and unique to each county. In the current projections, the 2020 based rates were held constant throughout the projection period with the assumption that women would continue to follow the pattern of delayed marriage and childbearing.

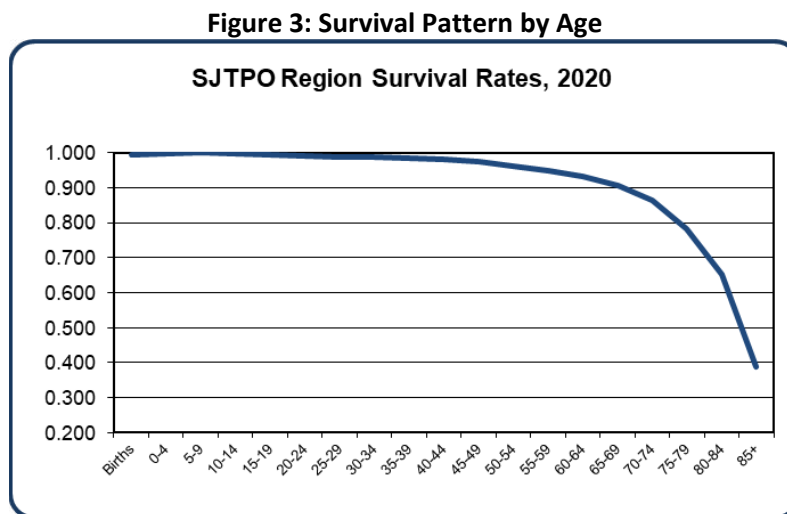
There is an interactive effect of applying these age-specific fertility rates to women of childbearing age. As the number of women at each age group changes, the absolute number of births generated will change based on the specified fertility rate. The model allows for an overall control on the number of births using the specified Total Fertility Rate (TFR). The TFR specifies the average number of children women will bear over their childbearing years. A level of 2.1 is a measure of replacement fertility. The U.S. rate is well below that level. The SJTPO counties are specified as: Atlantic – 2.02; Cape May – 1.81; Cumberland – 2.21; and Salem – 1.84. These rates are held constant throughout the projection period. Total births are separated into male and female by applying the reported sex ratio at birth which is approximately 0.51 males and 0.49 females.

<sup>1</sup> Atlantic County is shown here though similar graphics have been prepared for all SJTPO counties.

## Mortality

Similarly, mortality rates are based on reported age and sex specific deaths and are used to calculate life table survival rates. The life table is a demographic tool for mortality analysis and is the source of the common expectation of life at birth. Expectation of life varies by gender with women living longer than men. The SJTPO regional summary using the latest death and 2020 Census data result in an expectation of life at birth of 73.3 years for men and 79.6 years for women. The total population survival distribution for the region is illustrated in Figure 3

These survival rates are used to “age” the population from one 5-year age group to the next age group 5-years later. Mortality is the least volatile of the components. The county age-sex specific rates are adjusted for future increases in life expectancy based on nation Social Security Administration projections and are held constant throughout the projection period.



## Migration

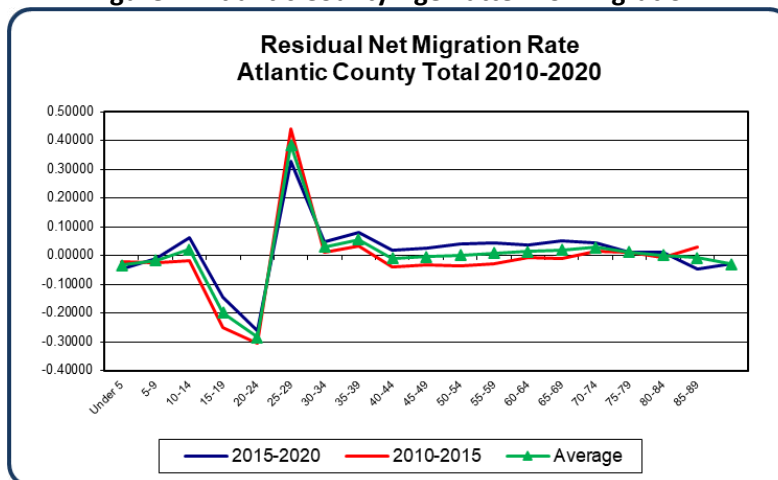
Migration is the most volatile of the components of change however, it is the one component where rates of migration must be estimated rather than based on the direct reporting of data. The Life Table Residual Migration (LTRM) method is used to calculate county, age-sex specific migration rates. This method “ages” each 5-year age-sex cohort of the population in 5-year time periods and compares the “expected” population to the “observed” population five years older. This is done in two consecutive 5-year periods between decennial census dates.

For example, the 2010 census population age 35 to 39 is aged to the year 2015 when they will be age 40 to 44. This is done by applying the appropriate survival rate to account for the small number of deaths that might occur and yields an expected 2015 population age 40 to 44. The expected population is compared to the observed population and the difference is, by definition, migration. As there is no official census count for the mid-decade period, the Census Bureau’s annual county population estimates by age and sex are used as the observed population. The same process is carried out aging the 2015 population to 2020 and comparing the expected population to the official 2020 Census counts by age and sex.

Similar to the fertility rate model, the age-sex specific migration rates result in a pattern of migration which in many areas follows a common life-cycle pattern. Figure 4 illustrates the migration age pattern for the total population of Atlantic County. While cyclical economic trends can have a large impact on migration, these age patterns tend to be very stable over time. What is often the case, is that the entire age pattern will rise or fall in response to economic changes but preserve the age-to-age propensity to migrate. The effect of those economic trends was seen in Table 1 with the components of change. In each of the four counties the Crude migration rate was negative between 2010 and 2015. For all but Cumberland County, the 2015 to 2020 rate turned positive. However, the age pattern for both periods shown in Figure 4 remains stable.

This stability supports the assumption used in the model that the age pattern of migration can be held constant through the projection period. As in the fertility model where the Total Fertility Rate is used to control the absolute number of future births, the Crude Migration Rate is used to control the level of migration – either positive or negative in each projection period.

**Figure 4: Atlantic County Age Pattern of Migration<sup>2</sup>**



### Fertility and Migration Rate Calibration

The fertility, migration and mortality rates developed in the Components of Change module utilize the Census Bureau’s Population Estimates Program estimates for July 1, 2015 and the Census results of April 1, 2020. As estimates for 2015, there is always some unmeasurable error because there is no actual census count that can be used to evaluate the estimates. As a result of this potential error, the 5-year period calculated Total Fertility Rates, the Crude Migration Rates and survival distributions may not exactly duplicate actual data.

The 2020 Census provides the best total population and the actual reported births and deaths from the New Jersey Department of Health provide the most accurate totals for the model to

<sup>2</sup> Atlantic County is shown here though similar graphics have been prepared for all SJTPO counties.

replicate. This is done through a calibration process whereby a historical projections model is run for the 2010 to 2020 period making adjustments to the fertility, migration and mortality rates to most closely represent the actual reported data and most closely result in a 2020 population to compare with the official Census results.

This is an iterative process where fertility and mortality rates are adjusted to reflect the actual reported births and deaths. There is no corresponding migration total so migration rates are adjusted to reflect the final 2020 Census population. The adjusted rates through the calibration process will be the starting point for the 2020 to 2060 projections.

### Migration Rate Scenarios

Various migration rate scenarios were conducted based on the highest, lowest and most current 5-year period Crude Migration Rates in the Components of Change analysis. These rates were held constant throughout the test projection period and result in the widest possible range of future population – more often showing decline rather than growth. The most recent (2015 to 2020) period rates resulted in extreme population decline in all counties except Salem. The lowest rate resulted in even greater decline in all counties and the highest rate resulted in extreme growth in Atlantic, continued decline in Cape May, a brief increase followed by decline in Cumberland and a stable population in Salem.

The migration analysis of these scenarios concluded that, given 20-year historical migration experience of the 2000 to 2020 period, it is increasingly difficult to raise the projected population of the region. Given the aging Baby Boom population of the region, there is negative pressure on the level of natural change (births minus deaths). When an area experiences natural decline, net migration must more than compensate for the decline in order for the population to grow. Based on the 5-year Components of Change analysis, both Cape May and Salem counties are already at that point of natural decline and Atlantic and Cumberland counties will likely reach that point in the next five years due to the aging population and low fertility rates.

Large migration rate increases, outside of the historical range, would be necessary to insure continued population growth. The anticipated development of the National Aerospace Research & Technology Park is an important development project affecting Atlantic County and the region. The Atlantic County planning department expects an employment impact over the next 10 years of around 4,000. In light of this project and the multi-agency support for the development, it's reasonable to introduce more positive migration rates for Atlantic County. Additional Atlantic County scenarios were run:

- A slight increase in the short-term (2020 to 2030) migration rates reflecting initial development but holding long-term migration constant at a reduced level,
- A larger increase in the 2020 to 2030 migration rates still holding long-term rates constant, and
- The larger increase in 2020 to 2030 rates and continued through 2060.

In Atlantic County, net in-migration is assumed to increase through 2030 then drop back through 2040 and remain constant through the projection period. Cape May County is also assumed to increase net in-migration through 2030, remain at that high level through 2040 before a slight decline through the rest of the period. In Cumberland County the recent net out-migration is held through 2025 then increasing to positive net migration through 2040 and declining slightly through the remaining periods. In Salem County, the rates for the periods 2025 through 2040 stay constant then increase through the remaining periods, driven mainly by the expectation of continued growth in the transportation and warehousing industry sector. Table 3 shows the final Crude Migration Rates for each county and future period.

**Table 3: Projected Crude Migration Rates by County and Sex**

County	Sex	Projected Crude Migration Rate							
		2020-25	2025-30	2030-35	2035-40	2040-45	2045-50	2050-55	2055-60
Atlantic	Male	2.60	3.10	2.90	2.80	2.80	2.80	2.80	2.80
	Female	2.70	3.30	3.10	3.00	3.00	3.00	3.00	3.00
Cape May	Male	3.70	3.95	3.95	3.95	3.90	3.90	3.90	3.90
	Female	4.60	4.85	4.85	4.85	4.70	4.70	4.70	4.70
Cumberland	Male	-1.10	1.20	1.40	1.40	1.20	1.20	1.20	1.20
	Female	0.50	2.00	2.20	2.20	2.00	2.00	2.00	2.00
Salem	Male	2.80	2.80	2.80	2.80	3.40	3.40	3.40	3.40
	Female	1.80	1.70	1.70	1.70	2.30	2.30	2.30	2.30

## Households and Population in Households

An area’s resident population is classified as either living in households or in group quarters facilities. Housing units that are occupied are, by definition, households and all of the residents are classified as household population. Persons living in group quarters are residents of prisons, college dormitories, nursing homes, military barracks and other non-household dwelling units. The average household size is simply the population living in households divided by the number of households. In the projections, the 2020 Census provides the base of total resident population, total occupied housing units (households) and population living in households.

### Population in Households

The projected population living in households is function of the county population projections by age group and the 2020 Census percentage of population living in households. The calculation of the 2020 population in household percentage for Atlantic County is shown in Table 4.<sup>3</sup>

<sup>3</sup> Atlantic County percentages are shown here though similar calculations were prepared for all SJTPO counties.

**Table 4: Percent of Population in Households**

Age	2020 Population	2020 Population in Households	Percent
Under 15	46,038	46,025	99.972%
15 to 24	35,599	32,522	91.356%
25 to 34	32,181	31,902	99.133%
35 to 44	30,836	30,534	99.021%
45 to 54	35,337	35,078	99.267%
55 to 59	21,528	21,323	99.048%
60 to 64	21,040	20,810	98.907%
65 to 74	30,882	30,476	98.685%
75 to 84	15,329	14,930	97.397%
85+	5,764	5,279	91.586%
<b>Total</b>	<b>274,534</b>	<b>268,879</b>	<b>97.940%</b>

For each projection period, the population in households by age is derived by applying the age-specific percentage to the projected population by age. The sum across all ages provides the projected county total population in households.

#### Households and Household Headship Rates

The projection of households is based on the household population projections by age and the 2020 Census derived headship rates by age of householder at the county level. The household headship rate is simply the percentage of household population of a given age that are householders of the same age. Another example for Atlantic County illustrates this calculation in Table 5<sup>4</sup>.

**Table 5: Headship Rates by Age of Householder**

Age	2020 Population in Households	2020 Householders	Headship Rate
15 to 24	32,522	2,820	0.0867
25 to 34	31,902	12,335	0.3867
35 to 44	30,534	15,360	0.5031
45 to 54	35,078	19,584	0.5583
55 to 59	21,323	12,355	0.5794
60 to 64	20,810	12,911	0.6204
65 to 74	30,476	19,193	0.6298
75 to 84	14,930	9,969	0.6677
85+	5,279	3,852	0.7297
<b>Total</b>	<b>268,879</b>	<b>108,379</b>	<b>0.4031</b>

<sup>4</sup> Atlantic County headship rates are shown here though similar calculations were prepared for all SJTPO counties.

The 2020 headship rates by county and age are held constant throughout the projection period and applied to the projected population in households yielding the number of households by age of householder. The sum across all ages provides the county level total number of households. The average household size is equal to the household population divided by the number of households.

## Minor Civil Division (MCD) Demographic Projections

Minor Civil Divisions – cities, townships and boroughs – make up 100 percent of the land area of their respective county. As such, they each represent a specific share of the county population, number of households and household population. Those shares are used in the distribution of the previously described county totals.

### Total Population

The 2020 Census MCD share of total population is calculated by dividing the total MCD population by the total county population. The sum of the shares will always equal 100 percent of the total county population. The projected MCD total population is calculated as the county total population independently prepared using the Cohort-Component methodology times the 2020 Census MCD share of population. The general assumption is that the MCD shares remain constant throughout the projection period.

However, Census building permit data for the period 2015 to 2022 provided a basis for adjusting MCD shares to account for areas of increased development and local development knowledge. Table 6 indicates the areas where permit activity indicated an increasing share of building and population would occur. It's important to remember that MCD shares must always account for 100 percent of the county measure. The shares for other communities in each county were decreased and this occurred in communities with declining population between 2010 and 2020 and little or no permit activity.

**Table 6: MCD's Adjusted with Building Permit Data**

<b>Atlantic</b>	<b>Cape May</b>	<b>Cumberland</b>	<b>Salem</b>
Atlantic City city	Avalon borough	Millville city	Alloway township
Brigantine city	Cape May Point borough	Upper Deerfield township	Oldmans township
Egg Harbor township	Middle township	Vineland city	Pennsville township
Galloway township	Ocean City city		Pilesgrove township
Hamilton township	Sea Isle City city		Pittsgrove township
Hammonton town	Stone Harbor borough		Woodstown borough
Margate City city	West Cape May borough		
Northfield city	West Wildwood borough		
Ventnor City city	Wildwood city		

## Households

A similar process was used to distribute the county total number of households to MCD's. The 2020 Census data on households for each MCD was used to calculate the share of the county total households computed previously. These shares were held constant throughout the projection period.

## Household population

The distribution of the county total household population distribution to MCD's was calculated using a different methodology. Using the MCD household population share of the county resulted in a logical inconsistency. There were a number of cases where the share of household population was larger than the share of total population and this resulted in a household population greater than the total – which is not possible.

In order to preserve the relationship between the MCD total population and the population in households, the 2020 Census was used to calculate the percentage of total population that lived in households for each MCD. This MCD level percentage was held constant throughout the entire projection period and applied to the projected MCD total population. This results in the appropriate relationship between total population and the population in households.

## **Employment Projections**

Available federal and state data on employment and jobs at the county level have both conceptual differences in what they measure and they apply to different universes of population and employers covered. The data used in the employment analysis generally covers the period 2000 to 2022. In addition to the official historical estimates provided by the federal and state sources, third-party projections data from Woods and Poole has also been included in the analysis and development of future assumptions.

## Sources

*The U.S. Bureau of Labor Statistics (BLS)* prepares estimates of both resident employment and employer jobs data. Resident employment data is based on the Current Population Survey which is a national household survey. It does not provide county level data but is the basis for the BLS method for estimating employment and labor force at the county level. Employer data is based on employer surveys and required reporting of employment and wages for the state unemployment insurance programs and provides estimates of jobs based on the employer's location. It's important to recognize the difference between counts of employed persons by county (resident employment) versus counts of employees at their county place of employment (jobs). **The employment results prepared for this contract represent employee jobs at their place of employment.** These two measures can yield vary different pictures and one of the

primary factors contributing to the difference is worker commutation from place of residence to place of work.

County level employment and labor force estimates are a product of the Local Area Unemployment Statistics (LAUS) program. This source provides estimates of the labor force, employed and unemployed persons and the unemployment rate by county of residence. Data are released monthly and are **unadjusted** for seasonal variations.

The Current Employment Statistics (CES) is a monthly survey of approximately 122,000 businesses and government agencies providing employment, hours and earnings estimates covering all nonfarm employment of workers on payrolls. It is based on business establishment payroll records. While a national survey, model estimates data by industry sector is only available for states and metro areas.

The Quarterly Census of Employment and Wages (QCEW) publishes a quarterly count of employment and wages reported by employers and covers more than 95 percent of all jobs. QCEW data is available for counties and metro areas in addition to the states and nation by industry sector.

*The U.S. Bureau of Economic Analysis – Regional Economic Accounts (BEA-REA)* annual county level estimates provide job counts by industry sector. These differ from the BLS resident employment measure. An individual worker may hold multiple jobs but is counted as one employed person by the BLS LAUS estimates based on their place of residence. The BEA-REA data is a count of all jobs located in an area. BEA-REA data includes wage and salary workers, proprietors, private household workers and miscellaneous workers. It is important to note that this employment source is a jobs measure based on place of work rather than residence of the employee. As such, part-time workers holding two or more jobs would be included multiple times based on each job. The regional accounts data is the primary employment source used in the projections.

*Woods & Poole Economics, Inc.* provides economic and demographic profiles at the county level and include historical data from 1970 through 2022. The profiles also include annual projections to 2060 by industry sector. The BEA-REA data is the Woods & Poole primary source of current and historical employment (jobs) and income data in the Woods and Poole profile. The projections are informative but are based on national econometric models and distributed to regional, metropolitan and county areas.

### Total Employment

Historical analysis of 2000 to 2022 county employment trends is an important basis for the assumptions about future change. As with the migration analysis in the demographic components of change, measures of employment change over various time periods were used to establish the range of lowest to highest periods of employment growth and decline. The region's heavy reliance on tourism and casino gambling have led to many increases and

decreases over the two decades. Compounding the difficulty inherent in capturing economic changes, the COVID-19 pandemic represented an immediate shock to the national and regional economies.

There are two important comparisons that bear on assumptions about the future trend of SJTPO employment: 1) the consistent and large recovery reported in 2022 after the decline brought on by the pandemic; and 2) in each county, that large recovery put the 2022 actual employment above the previous employment projections 2025. The rapid recovery raises an important question – will that period of growth continue in the short-term, long-term or will the historical trends of flat or declining employment change continue in the future?

Three scenarios of total employment growth were tested: 1) applying the pre-pandemic 2010 to 2015 change throughout the projection period to 2060; 2) applying the more recent pre-pandemic 2015 to 2019 period throughout; and 3) applying the rapid increase 2020 to 2022 period throughout. Each of these period changes were calculated from the annual BEA-REA historical series and adjusted to reflect the 5-year periods used in the projections. The post-pandemic 2022 employment provides the base for the projections.

In Atlantic County, all of the employment loss due to the pandemic was regained by 2022 to a level 7,000 above the 2015 employment. That followed a loss of 20,000 jobs between 2005 and 2015. Anticipated development at the aviation tech park is assumed to continue short-term growth to 2030 then flattening as the historical trend shows.

Cape May County shows a similar pattern as Atlantic with COVID loss of 2,000 jobs followed by recovery to 5,000 above 2015. However, the period from 2001 through 2020 showed 5-year periods of gain and loss reflecting a relatively flat total employment change. There is little information on planned development so the historical data suggests reducing the recent growth rate in the short term and relative stability throughout the projection period.

Cumberland County also shows job losses between 2005 and 2020 with more than 1,000 due to COVID. It also shows the same strong post-pandemic recovery to 2022 to just over 80,000 jobs. Cumberland is the oldest county, based on the median age, and there is little information on development though growth could come through transportation and warehousing. This also suggests a future flattening of employment growth with some modest impact due to transportation and warehousing.

Salem County employment has declined in each 5-year period between 2005 and 2020, though it also saw a large post-pandemic recovery to 2022. The historical trend would suggest a stable employment in the future though also experiencing some modest growth like Cumberland due to transportation and warehousing.

The post-pandemic increase in employment in all four counties was significant and suggests some continued short-term growth. A number of other factors need to be considered: changes in workplace decisions on the part of employers and employees (work from home); changes in

commutation patterns; and changes in labor force participation. Even in the face of historical declines or stable employment, it is reasonable to expect short-term gains and future flattening rates of growth. Table 7 presents the final employment growth rates by county.

**Table 7: Total Employment Growth Rates**

County	2022-25	2025-30	2030-35	2035-40	2040-45	2045-50	2050-55	2055-60
<b>Atlantic</b>	1.76%	1.76%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
<b>Cape May</b>	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%
<b>Cumberland</b>	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%
<b>Salem</b>	1.60%	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%	1.10%

### Industry Sectors

The North American Industry Classification System is the basis for classifying business establishments for statistical purposes. employer reporting of employment by employer’s primary business activity. This is a standard for reporting that groups establishments into industries according to the similarity of the processes used to produce goods and services. The classification system is very detailed but is summarized into industry sectors identifying major categories of activity.

The transportation planning activity of the SJTPO uses four categories that further group the more detailed sectors. Table 8 shows the NAICS 2-digit major categories and how they are grouped for the SJTPO model purposes. The base BEA-REA industry data provides annual employment counts for each of the 2-digit categories shown in the table.

**Table 8: SJTPO Sector Classification**

NAICS Sector	Description	Sector
21	Mining, Quarrying, and Oil and Gas Extraction	Industrial
22	Utilities	Industrial
23	Construction	Industrial
31-33	Manufacturing	Industrial
48-49	Transportation and Warehousing	Industrial
44-45	Retail Trade	Retail
72	Accommodation and Food Services	Retail
51	Information	Office
52	Finance and Insurance	Office
53	Real Estate and Rental and Leasing	Office
54	Professional, Scientific and Technical Services	Office
55	Management of Companies and Enterprises	Office
56	Administrative and Support and Waste	Office
62	Health Care and Social Assistance	Office
92	Public Administration	Office
11	Agriculture, Forestry, Fishing and Hunting	Other
42	Wholesale Trade	Other
61	Educational Services	Other
71	Arts, Entertainment, and Recreation	Other
81	Other Services (except Public Administration)	Other

Aggregating the reported sector data to the SJTPO categories is straight-forward with one important exception. Most federal and state data that is obtained from individuals or business is protected by privacy and confidentiality restrictions. The restrictions prevent the reporting of detailed data that might allow for identification of an individual or business. Agencies still provide as much useful public data as possible and in order to do that, will suppress small cell sizes and complementary cells that would allow for reconstructing the original data. This process is done at detailed NAICS sector levels and therefore affects higher level sector summaries also such as those used in this analysis. Often the numbers are small but the need for complementary suppress can also affect large employment categories. Summation of the NAICS sectors to the four SJTPO categories often required estimation of the suppressed data.

Suppression affects different sectors in each county and in different years. In some cases, almost all years in a particular sector are suppressed and in other cases, only a few years are affected. The SJTPO category of Retail includes the total NAICS retail sector and the Accommodation and Food Service sector, both of which had no suppression.

The specific method of estimating the Industrial, Office and Other SJTPO categories follow a four-step process:

- 1) Individual sector/year suppressed categories were estimated as described below.
- 2) The adjusted sector employment detail was summed to the SJTPO sector category.

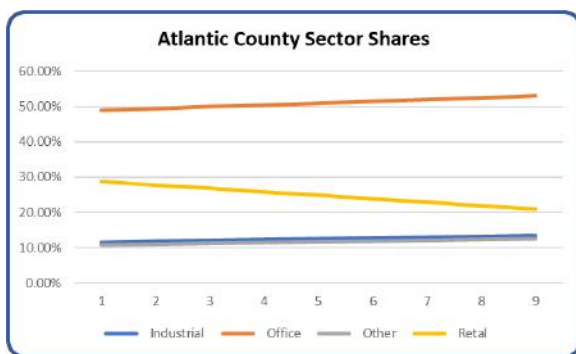
- 3) The sum of the adjusted employment totals was compared to the actual BEA reported employment total at the county level.
- 4) The difference between the adjusted total and the reported total was redistributed to the adjusted sectors in the proportion they represented of the total adjusted sector.

For example, the Atlantic County BEA total employment in 2001 was 171,600. Sectors were suppressed in the Industrial and Other categories and the adjusted total of those two categories was 34,339. Subtracting the unadjusted Office and Retail categories from the BEA total left a difference of 34,416. The ratio of 34,416 to 34339 results in an adjustment factor of 1.002242 which was applied to the adjusted Industry and Other categories thus forcing the adjustments to the reported total. These adjustments are generally very small and have little impact of the aggregate SJTPO sector totals even at the county level. The “suppression adjusted” annual sector employment is then aggregated to the SJTPO sector categories for each year and the sector share of county total employment is calculated.

As a starting point, the Microsoft Excel Forecast Sheet function was used to smooth the historical series and “predict” the future trend to the year 2060 for each county and SJTPO sector. It’s a useful illustration but in some cases quite unreasonable. The function trended the retail sector in Atlantic county to near zero by 2060 because of the continuous historical decline. The industry sector in Cape May County is trended flat from 2022 to 2060 because of a sharp decline from 2006 to 2011 followed by nearly continuous increases from 2011 to 2022.

The future trend results were evaluated for each individual county and sector and also in relation to the Bureau of Labor Statistics 2032 projections and the Woods & Poole forecasts. The BLS national projections expect the Health Care and Social Assistance sector to add the most jobs and grow the fastest. This subsector is part of the SJTPO “Office” sector and impacts all four counties. That suggests that the Office sector shares should all increase through the 2060 projection period. Other sectors are more variable across the counties and receive different trending. Other national trends that are important to the region include projected e-commerce growth driving employment in transportation and warehousing, declines in retail trade resulting from continued growth in online shopping and continued automation of manufacturing processes. Figures 5 through 8 illustrate the projected county sector trends.

**Figure 5**



**Figure 6**

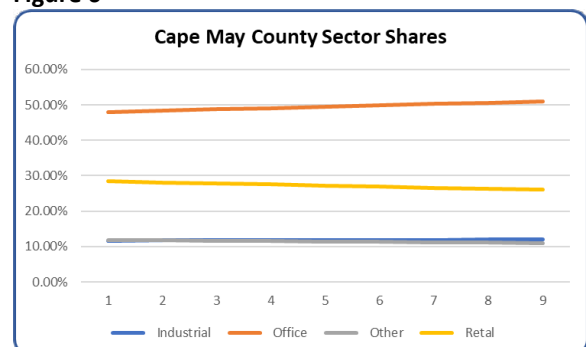


Figure 7

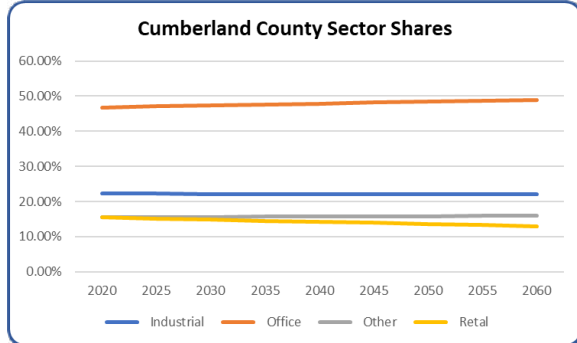
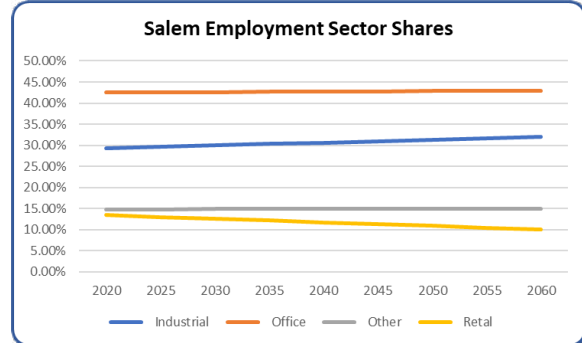


Figure 8



## Minor Civil Division Employment Projections

While the BEA-REA data source provides employment counts at the county level by 2-digit NAICS code, it does not provide employer location detail at the MCD level. However, federal, state and Census Bureau data on employers and employees have been brought together under the Census Bureau's Local Employment Dynamics partnership to produce additional, and more detailed, public use data. These data are part of the Longitudinal Employer-Household Dynamics (LEHD) program which provides a comprehensive database of employer and household data. This source is used to generate employment counts for MCD's by NAICS sectors and allows for the computation of industry shares at the MCD level.

The LEHD Origin-Destination Employer Statistics files provide both resident area characteristics and workplace area characteristics at the Census block level. The workplace area characteristics file provides counts of the number jobs and 2-digit NAICS code at the Census block group level of the workplace. The full geographic detail includes: county, census tract and census block group. Summarizing the data for use in computing MCD shares of industry sector data is a multi-step process. The file structure provides a single record for each census block group with area geographic coding to identify the census tract and county of workplace location. Each block group record includes the count of jobs by worker's age and monthly earnings and, most importantly, for each 2-digit NAICS sector.

- 1) The block group level employment data is first summarized to the census tract level by 2-digit NAICS code.
- 2) Census tracts do not always uniquely match to MCD's so the Missouri Census Data Center GeoCorr geographic correspondence application is used to match tract boundaries to MCD boundaries.
- 3) The matched MCD/tract level employment data by NAICS code is then summarized to the MCD level.
- 4) The SJTPO/NAICS industry sector code crosswalk cited above is used to sum individual NAICS sectors to the four SJTPO industry sectors for each county and MCD.

- 5) The MCD sector employment share of the county is calculated as the MCD sector employment divided by the county sector employment total.
- 6) Finally, the MCD sector share of county sector employment is applied to the independently derived county sector employment projections, holding the shares constant throughout the projection period.

Table 9 presents the share results for Atlantic County.<sup>5</sup>

**Table 9: Example of LEHD Industry Sector Share**

Area	LEHD Workplace Employment				Share of County Total			
	Industrial	Retail	Office	Other	Industrial	Retail	Office	Other
<b>Atlantic County</b>	11,952	40,086	40,865	18,624	1.0000	1.0000	1.0000	1.0000
<b>Absecon city</b>	115	985	1,226	366	0.0096	0.0246	0.0300	0.0197
<b>Atlantic City city</b>	1,232	21,779	9,108	2,938	0.1031	0.5433	0.2229	0.1578
<b>Brigantine city</b>	114	538	494	249	0.0095	0.0134	0.0121	0.0134
<b>Buena borough</b>	296	174	141	152	0.0248	0.0043	0.0035	0.0082
<b>Buena Vista township</b>	827	210	237	551	0.0692	0.0052	0.0058	0.0296
<b>Corbin City city</b>	194	57	192	131	0.0162	0.0014	0.0047	0.0070
<b>Egg Harbor City city</b>	254	376	556	545	0.0213	0.0094	0.0136	0.0293
<b>Egg Harbor township</b>	2,904	4,242	8,040	2,831	0.2430	0.1058	0.1967	0.1520
<b>Estell Manor city</b>	0	0	0	0	0.0000	0.0000	0.0000	0.0000
<b>Folsom borough</b>	497	96	263	120	0.0416	0.0024	0.0064	0.0064
<b>Galloway township</b>	1,251	1,922	5,766	2,232	0.1047	0.0479	0.1411	0.1198
<b>Hamilton township</b>	931	3,092	2,515	2,693	0.0779	0.0771	0.0615	0.1446
<b>Hammonton town</b>	1,270	1,635	2,271	2,078	0.1063	0.0408	0.0556	0.1116
<b>Linwood city</b>	186	173	1,382	515	0.0156	0.0043	0.0338	0.0277
<b>Longport borough</b>	0	0	0	0	0.0000	0.0000	0.0000	0.0000
<b>Margate City city</b>	88	735	676	282	0.0074	0.0183	0.0165	0.0151
<b>Mullica township</b>	338	53	184	214	0.0283	0.0013	0.0045	0.0115
<b>Northfield city</b>	272	652	2,151	686	0.0228	0.0163	0.0526	0.0368
<b>Pleasantville city</b>	839	902	2,510	1,138	0.0702	0.0225	0.0614	0.0611
<b>Port Republic city</b>	0	0	0	0	0.0000	0.0000	0.0000	0.0000
<b>Somers Point city</b>	240	2,051	2,737	573	0.0201	0.0512	0.0670	0.0308
<b>Ventnor City city</b>	104	414	416	330	0.0087	0.0103	0.0102	0.0177
<b>Weymouth township</b>	0	0	0	0	0.0000	0.0000	0.0000	0.0000

## Traffic Analysis Zone Projections

Traffic Analysis Zones (TAZ) are geographic units used by travel demand models to generate and distribute trips throughout the counties and entire region. The SJTPO region is divided into 1175 TAZs, although many of them are considered “spare” zones which are not formally utilized in the modeling process and do not contain any demographic data. The TAZ boundaries are loosely based on the 2010 Census block group boundaries and no TAZ is split by census tract boundaries. The TAZs are also unique within MCD’s and do not cross MCD boundaries. These boundaries have not been realigned to reflect any changes in the 2020 Census geographic tract and/or block group boundaries.

<sup>5</sup> Atlantic County is shown here though similar calculations were prepared for all SJTPO counties.

SJTPO provided the socioeconomic data file from the 2020 travel demand model base year scenario, which was then used to determine each TAZ's share of the MCD total for that particular sector, as described in more detail below. RLS Demographics utilized these updates for incorporation in the current projection project.

As such, the projections of population, households and employment reflect 2010 TAZ geography applied to the current population and employment data described previously. However, there are important differences:

- 1) The population, household and employment projections use shares based on the share of the MCD totals rather than the county totals,
- 2) The population and household shares are based on the TAZ percentage of land area in the MCD which is consistent with the previous 2012 SJTPO disaggregation.
- 3) Employment industry sector shares are consistent with the 2012 NAICS industry classification and do not reflect the revised industry crosswalk discussed previously and shown in Table 8. The impact of this inconsistency is mitigated, to some extent, because the shares are applied to the MCD projected sectors which do reflect the updated crosswalk. Within each TAZ, the sector share of total employment is based on the socioeconomic data from the SJTPO's travel demand model 2020 base year scenario.

The TAZ share of 2020 MCD total population is used to disaggregate projected MCD population and households. The TAZ shares of MCD industry sector projections are used to disaggregate MCD sector totals to the TAZ level. TAZ demographics are shared out using the same growth factors as the MCDs and the counties.

## Seasonal and Weekday/Weekend Projections

The final results of the municipal employment and population projections are the basis for determining seasonal shifts by county and municipality, and the separation of weekday versus weekend employment. Visitors represent an added component which is projected as the difference between the total resident population and the estimated seasonal population in the communities most impacted by tourism and recreation.

The SJTPO regional economy is heavily dependent upon the tourism, resort and casino industries. The tourism, recreation and resort economy is especially influenced by seasonal factors and the primary impact is in Atlantic and Cape May counties. However, the BEA-REA employment data used throughout this project provides annual average employment. It is necessary to estimate the seasonal population and employment impacts based on indirect methods and other data sources. These estimates are used to define the seasonal components including: in-season and off-season employment; the seasonal visitor population; and the weekday versus weekend employment shift.

## Seasonal Population

In order to create the seasonal population estimates within the SJTPO region, SJTPO staff used a comprehensive data driven approach, gathering data from a variety of sources. Data sources including the U.S. Census Bureau for permanent resident and housing unit statistics in Atlantic and Cape May Counties and the New Jersey Department of Environmental Protection for Non-Public Potable Water System permits for all four counties. Additionally, sewer flow data was acquired from both the Atlantic County Municipal Utilities Authority and the Cape May County Municipal Utilities Authority (CMCMUA) with particular focus on monthly and some daily sewer flows from CMCMUA to analyze transient housing and campground occupancy.

A detailed examination of Non-Public water systems, particularly campgrounds and marinas, was conducted to assess seasonal occupancy. This review revealed a notable concentration of seasonal campsites in Cape May County, totaling 25,925 campsites, potentially housing four occupants per site, which would significantly surpass the census population of 95,634. Conversely, Atlantic County's 2,600 campsites indicated a more modest increase in total housing units. Using this method, Salem and Cumberland Counties contributed minimally to the seasonal population and an alternative method was used as discussed below.

Analyzing sewerage flows provided substantial insights, particularly for areas serviced by municipal sewer systems, allowing for the differentiation between seasonal and off-season flows. The seasonal population estimate was further refined by comparing these flows, considering the average water usage rate of 82 gallons per person per day according to the USGS. This analysis yielded a significant seasonal population increase, particularly in Cape May County, where the estimated seasonal population reached 300,896, marking a 315% increase over the off-season population in the barrier Island communities. Since the mainland areas are only partially serviced, it is difficult to create a clear picture with this method. The data suggests that Atlantic County is less variable with only Atlantic City, Brigantine, Margate, and Longport showing substantial summer increases. Given these populations are larger the impact is still significant.

The findings highlight the substantial impact of seasonal occupancy on the region, with a notable influx of seasonal residents in Cape May County especially and underline the complexity of establishing a robust criterion for seasonal population analysis. This comprehensive approach, leveraging data from water permits, sewer flows, and census statistics, provides a foundation for understanding the dynamics of seasonal population changes within the SJTPO region.

The result of this analysis is the identification of the communities in each of the counties that are impacted by seasonal populations shown in Table 10 along with the seasonal population adjustment factor which is applied to the resident population. The difference between the seasonal population estimate and the resident population yields an estimate of total seasonal visitors.

**Table 10: Seasonal Communities and Population Factor**

Atlantic County		Cape May County		Salem County	
Community	Seasonal Factor	Community	Seasonal Factor	Community	Seasonal Factor
Atlantic City city	158.1%	Avalon borough	1564.7%	Pilesgrove township	219.5%
Brigantine city	181.7%	Cape May city	560.7%	Pittsgrove township	133.9%
Egg Harbor township	102.8%	Cape May Point borough	372.3%		
Estell Manor city	474.1%	Dennis Township	723.5%		
Galloway township	101.3%	Lower Township	202.6%		
Hamilton township	105.6%	Middle Township	216.4%		
Longport borough	335.9%	North Wildwood City	525.0%		
Margate City city	214.5%	Ocean City	445.1%		
Port Republic city	216.3%	Sea Isle City	888.0%		
Somers Point city	107.8%	Stone Harbor Borough	971.8%		
Ventnor City city	109.3%	Upper Township	224.0%		
		West Cape May Borough	290.1%		
		West Wildwood Borough	395.4%		
		Wildwood City	412.6%		
		Wildwood Crest Borough	410.1%		
		Woodbine Borough	132.9%		

Feedback from Cumberland and Salem counties indicated that the water system method wasn't appropriate and that both counties do experience seasonal fluctuation in visitors and population. The New Jersey Visitor Economy Report for 2023 produced by Tourism Economics provides the basis for projecting visitors in Cumberland and Salem counties.

This source refers to the IMPLAN national economic impact model using data from the Bureau of Economic Analysis and various other public sources of demographics, GDP and additional data from MMGY Travel Intelligence. The 2023 report provides five years of estimated visitor volume (2019 through 2023) by county.

Trending the 2019 to 2023 data to the projection of 2060 results in a large and continuous increase in visitors to Cumberland County from 930,000 annually to 1.3 million by 2060. Given the likely limits to visitor housing accommodations, labor supply and other resources, the 2060 projection was limited to an increase of no more than 1.2 million. In Salem County, the 5-year trend results in a continuous projected decline in visitors from about 430,000 annually to 370,000 by 2060. Given the continued attraction of the region, the Salem visitor projection was held constant at 410,000 throughout the projection period. These visitor projections were disaggregated to the MCD level within both Cumberland and Salem counties using their shares of vacant units.

**Seasonal Employment**

Seasonal employment is estimated from the Bureau of Labor Statistics, Current Employment Statistics (CES) program data. The CES provides unadjusted monthly and annual average employment data at the metropolitan area level but is only available for the Atlantic-

Hammonton, Ocean City and Vineland-Bridgeton areas. The total for the unadjusted employment data for the months of January and July is used to calculate the seasonal adjustment factors which are applied to the total employment. Table 11 shows the 10-year annual data for Atlantic County as an example, along with the 10-year summation and calculation of each of the metro areas.

**Table 11: Off-Season and In-Season Adjustment Factor**

	Total Non-Farm (000's)			% of Annual Avg	
	Annual Avg.	January	July	January	July
<b>Atlantic-Hammonton</b>					
<b>2014</b>	132.0	127.3	136.9	0.9644	1.0371
<b>2015</b>	128.2	122.9	131.1	0.9587	1.0226
<b>2016</b>	128.2	122.3	131.9	0.9540	1.0289
<b>2017</b>	126.6	121.3	129.4	0.9581	1.0221
<b>2018</b>	130.3	120.9	136.1	0.9279	1.0445
<b>2019</b>	132.6	127.4	135.9	0.9608	1.0249
<b>2020</b>	111.5	127.8	107.6	1.1462	0.9650
<b>2021</b>	121.0	110.4	124.3	0.9124	1.0273
<b>2022</b>	128.1	120.1	131.1	0.9375	1.0234
<b>2023</b>	130.2	123.3	133.3	0.9470	1.0238
<b>10-year Summation</b>					
<b>Atlantic-Hammonton</b>	1,268.7	1,223.7	1,297.6	<b>0.9645</b>	<b>1.0228</b>
<b>Vineland-Bridgeton</b>	583.0	576.1	565.9	<b>0.9882</b>	<b>0.9707</b>
<b>Ocean City</b>	422.1	329.5	565.1	<b>0.7806</b>	<b>1.3388</b>

When employers report the number of employees and wages at the establishment level, it is only the count of employees on payroll and does not provide any indication of the days of the week that individuals are at work. Most of the nation’s businesses and workers are at work Monday through Friday with weekends off. In many industry sectors, work goes on through the weekends and holidays and represent a different set of workers. This is especially true in the seasonal/resort areas of the SJTPO region.

The available data on the separation of weekday/weekend work is limited though the Bureau of Labor Statistics, American Time Use Survey (ATUS) provides national information on employment and person hours worked by day of the week. This national survey data for 2022 is used to calculate the percentage of seasonal workers (July) that work on weekdays and on weekends. This is not an either/or work situation as some workers work some days during the work week and then days on weekends or holidays. As national figures, these percentages are applied uniformly to the seasonal July employment for all counties and MCD’s and held constant throughout the projection period. The national survey results indicate that 81.27 percent of workers work during weekdays while 29.35 percent work on weekends.

## Median Household Income Projections

The Census Bureau's American Community Survey 5-year estimates is the source of data on median household income. The 5-year estimates are used to provide data for all counties and MCD's in the region. Income measures over the 5-year estimate period in the ACS is affected by both real income changes and inflation. To account for inflation, the Census Bureau adjusts the reported income for inflation using the Consumer Price Index. Over the course of the 5-year period, incomes are adjusted to represent nominal income at the end year of the period.

Historical compound annual growth rates (CAGR) were calculated using each adjusted annual 5-year period for the 2011 to 2022 period. The most recent ACS data is heavily impacted by the COVID-19 pandemic so income changes for pre- and post-COVID periods were computed. The 2019 to 2022 COVID period results in very large increases in median household income changes due to the COVID recover period. For most MCD's, the CAGR for the period 2011 to 2018 reflected more typical income changes. These rates were held constant and applied to the 2020 ACS median income throughout the projection period.

However, two problems resulted: 1) areas with already high median income levels also experienced very high income growth due to the consistent compounding of rates when applied to ever increasing high incomes; and 2) some areas experienced negative rates of growth in some years during the 2011-2018 period.

In the first case, the CAGR was constrained to 2.7 percent from 2035 through the remaining projection periods and the rates between 2020 and 2035 were interpolated from the high base rate to 2.7 percent. The constraint level of 2.7 percent is based on the national real median household income for the U.S. between 2011 and 2019 reported by the St. Louis Federal Reserve Bank using Census Bureau data. In the second case, the initial period rate was set to a positive growth rate of 1.0 percent and through interpolation, trended to 2060 using the national rate of 2.7 percent or the area's 2011 to 2022 CAGR.