

City of Savannah, Georgia

Capital Improvements Element

Addressing:

Parks and Recreation

Fire Protection Law Enforcement

Road Improvements

For 2.23.23 Adoption



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Introduction

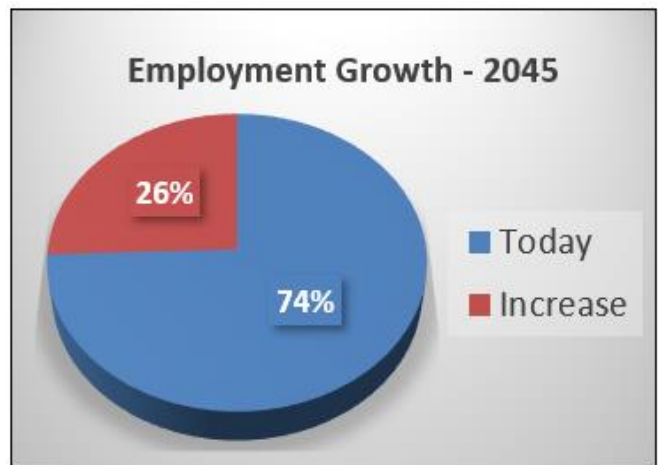
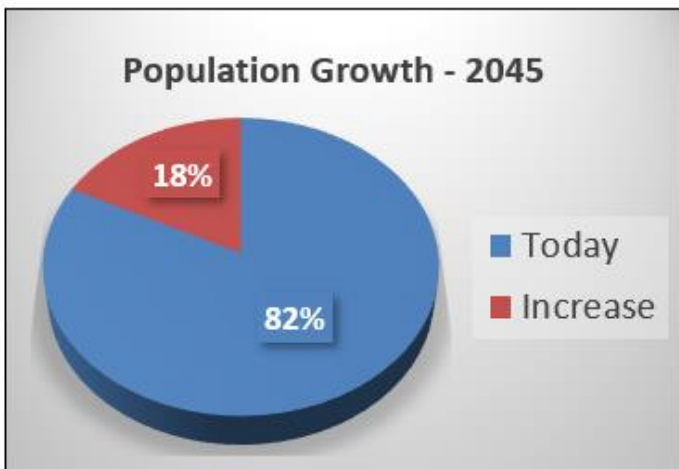
The purpose of a Capital Improvements Element (CIE) is to establish where and when certain new capital facilities are planned to be provided within a jurisdiction and the extent to which they may be financed through an impact fee program. A Capital Improvements Element is adopted as a chapter, or 'element', in a local government's Comprehensive Plan. This CIE addresses the following public facility categories: **Parks and Recreation** (which includes 'Parks and Recreation Components' and the 'Trail System'), Public Safety Facilities (including **Law Enforcement** and **Fire Protection**), and **Road Improvements**.

As required by the Georgia Development Impact Fee Act ("State Act" of "DIFA"), and defined by the Department of Community Affairs in its Development Impact Fee Compliance Requirements, the CIE must include the following for each capital facility category for which an impact fee will be charged:

- a **projection of needs** for the planning period (a minimum of 20-years);
- the designation of **service areas** - the geographic area in which a defined set of public facilities provide service to development within the area;
- the designation of **levels of service** (LOS) - the service level that will be provided;
- a **schedule of improvements** ("Community Work Program") listing impact fee related projects and costs for at least the coming 5 years; and
- a description of **funding sources** anticipated for the planning period.

■ Looking Ahead

Forecasts indicate continued growth ahead for Savannah as people continue to move into the city, propelled by favorable living conditions, a variety of housing types, and exceptional access to jobs and services. Over the next 23 years to 2045, it is expected that about 18% of the people that will be living in Savannah then are not here today.



Population Outlook

The future increase in population is not unprecedented. Looking back, since 2005, following a slump during the first half of the 2000s, the city's population grew from 131,126 to 150,201 in 2022—a 12.7% increase over 2005, which included the collapse of the housing market and the onset of the Great Recession in 2008. The average annual rate of increase, through bumps and starts, was 0.75% per year. As the city further matures, development and redevelopment opportunities continue, and given the attraction of Savannah itself, the annual rate of population growth is expected to continue at an overall average of 0.93% per year for the 23-year period, reflecting a total increase of almost 32,000 people, an overall growth of 21.3% over 2022.

Increased Job Opportunities

New employment opportunities will continue to be attracted to the city as well. It is expected that job growth in 'value-added' categories¹ will outpace population increase such that, by 2045, there will be almost as many value-added jobs as there will be people living in the city. About two-thirds of the increase in jobs will be in four employment categories: the most notable being office administrators (20% of all new jobs), accommodation & food services (18%), transportation & warehousing (16%), and health care & social assistance (12% of all new jobs). Together, these four categories account for two-thirds of all new jobs created in the city. Compared to today's total value-added employment of 132,000, new jobs will have added more than 45,000—a 34% increase over today. Bottom line – 26% of all value-added jobs in the city in 2045 are not here now.

With all of this projected population and employment growth by 2045, Savannah will be called upon to increase the capacity of its facilities and infrastructure. This expansion will be necessary in order to maintain the attractive quality of life and business environment enjoyed today by residents and businesses alike.

For more information on anticipated growth, see the Forecasts section of this report. In addition, detailed growth forecast methodologies are presented in Technical Appendix A, *Future Growth Forecasts*.

■ Impact Fees

Impact Fees Authorized by State

Impact fees are a form of revenue allowed by the State, and strictly defined and regulated through State law. Impact fees are authorized in Georgia under Code Section 37-71, the Georgia Development Impact Fee Act (DIFA), and are administered by the Georgia Department of Community Affairs (DCA) under Chapter 110-12-2, Development Impact Fee Compliance Requirements.

Under DIFA, a city or county can collect money from new development based on that development's proportionate share—the 'fair share'—of the cost to provide future public facilities that will be needed. An impact fee is assessed as new development occurs and can help shift the burden for funding public facilities from the tax base as a whole to the new growth and development actually creating the need for these capital improvement projects.

The provisions of the DIFA are extensive in order to assure that new development pays no more than its fair share of the costs and that impact fees are not used to solve existing service deficiencies.

¹ 'Value-added' jobs exclude government, construction and agricultural workers, since they are not assessed impact fees.

Ultimately, and importantly, the services provided in the public facility categories for which impact fees are being charged must be the same for both the existing community and future growth. Under DIFA, these categories include:

- parks, open space, and recreation areas and related facilities;
- public safety facilities, including law enforcement, fire, emergency medical services, and E-911 emergency communications;
- animal control;
- libraries;
- roads, streets, and bridges;
- stormwater and flood control facilities;
- water supply, treatment, and distribution; and,
- wastewater collection, treatment, and disposal.

The table below shows the public facility categories that are eligible for impact fee funding (in whole or in part) under Georgia law and that were selected by the Savannah City Council to be included in an impact fee program.

Table 1: Overview of Impact Fee Program Facilities

	Public Safety		Parks and Recreation		Road Improvements
	Fire Protective Services	Police Protective Services	Parks & Recreation Components	Trail System	
Eligible Facilities	Fire Stations, fire trucks and other apparatus, training facilities	Headquarters and support space, precinct stations, and long-lived vehicles	Recreation buildings and components such as community centers, ballfields, and playgrounds	Comprehensive system of multi-use trails	Road projects creating capacity for Savannah residents and workers
Service Area	Citywide	Citywide	Citywide	Citywide	Citywide
Level of Service Standard Based on ...	Floor area and number of vehicles per day-night population	Floor area and number of vehicles per day-night population	Number of acres and number of recreation components per housing unit	Length of trail per 2045 day/night population	LOS "C" and LOS "D"
Historic Funding Source(s)	General Fund, Sales Taxes	General Fund, Sales Taxes	General Fund, Sales Taxes	General Fund, Sales Taxes	General Fund, Sales Taxes

* See also Road Improvements chapter of this report.

The following terms are used in the Overview Table:

Eligible Facilities under the State Act are limited to capital items having a life expectancy of at least 10 years, such as land, buildings and other facilities, and major rolling stock (such as fire trucks). Impact fees cannot be used for maintenance, supplies, personnel salaries, or other operational costs, or for short-term capital items such as desktop computers, furniture and tennis nets and balls. None of these costs are included in the impact fee system.

Service Areas are the geographic areas that the facilities serve, and the areas within which the impact fee would apply. Monies collected in a service area for a particular type of facility may only be spent for that purpose, and only for projects that serve that service area.

Level of Service Standards are critical to determining new development's fair share of the costs. The same standards must be applied to existing development as well as new to assure that each is paying only for the facilities that serve it. New development cannot be required to pay for facilities at a higher standard than that available to existing residents and businesses, nor to subsidize existing facility deficiencies.

■ Editorial Conventions

This report observes the following conventions:

- The capitalized word 'City' applies to the government of Savannah, the City Council or any of its departments or officials, as appropriate to the context. An example is "the City has adopted an impact fee ordinance".
- The lower-case word 'city' refers to the geographical area of Savannah, as in "the population of the city has grown".
- The same conventions are applied to the words 'County' and 'county', 'State' and 'state'.
- Single quote marks (' and ') are used to highlight a word or phrase that has a particular meaning as used in this report or refers to a heading in a table.
- Double quote marks (" and ") are used to set off a word or phrase that is a direct quote taken from another source, such as a passage or requirement copied directly from a law or report.

Importantly ...

- Numbers shown on tables are often rounded from the actual calculation of the figures for clarity, but the actual calculated number of decimal points is retained within the table for accuracy and further calculations.

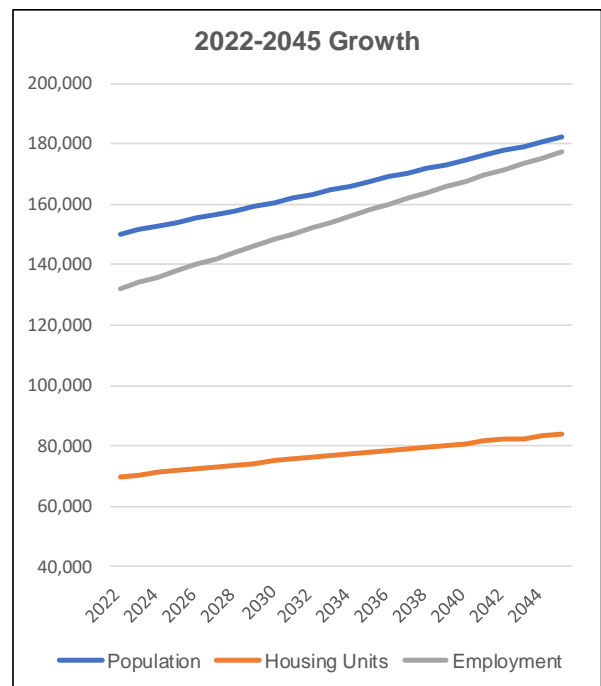
Forecasts

In order to accurately calculate the demand for future services in Savannah, new growth and development must be quantified in future projections. These projections include forecasts for population, households, housing units, and employment over the next 23 years to 2045. The projections provide the baseline conditions from which the current (2022) Level of Service calculations are produced. Also, projections are combined to produce what is known as 'day-night population'. This is a method that combines resident population and employees to produce an accurate picture of the total number of persons that rely on certain 24-hour services, such as fire protection. The projections used for each public facility category are specified in each public facility chapter.

This table below presents a summary of the forecasts that have been identified as the most likely for Savannah, based on an analysis of past trends. The specific methodologies are detailed in the attached Appendix A.

Table 2: Future Growth Projected in the City

	Population	Housing Units	Value-Added Employment	Day-Night Population
2022	150,201	69,818	131,923	282,124
2023	151,467	70,407	133,962	285,429
2024	152,743	71,298	136,002	288,745
2025	154,030	71,898	138,041	292,071
2026	155,328	72,504	140,084	295,412
2027	156,637	73,115	142,117	298,754
2028	157,957	73,731	144,157	302,114
2029	159,288	74,353	146,196	305,484
2030	160,630	74,979	148,234	308,864
2031	161,984	75,611	150,190	312,174
2032	163,349	76,248	152,147	315,496
2033	164,726	76,890	154,104	318,830
2034	166,114	77,538	156,061	322,175
2035	167,514	78,192	158,020	325,534
2036	168,925	78,853	159,969	328,894
2037	170,349	79,518	161,927	332,276
2038	171,784	79,851	163,883	335,667
2039	173,232	80,190	165,841	339,073
2040	174,692	80,866	167,796	342,488
2041	176,164	81,548	169,673	345,837
2042	177,648	82,234	171,552	349,200
2043	179,146	82,855	173,429	352,575
2044	180,655	83,280	175,308	355,963
2045	182,178	83,982	177,185	359,363
2022-2045 Increase	31,977	14,164	45,262	77,239



	Population	Housing Units	Value-Added Jobs
2022	150,201	69,818	131,923
2045	182,178	83,982	177,185
Increase	31,977	14,164	45,262
Percent	21.3%	20.3%	34.3%

* Day-Night Population is the total of all residents living in the city and all jobs located in business uses subject to impact fees (i.e., the total population served on a 24-hour basis).

Parks and Recreation

■ Parks and Recreation Components

Introduction

Public recreational opportunities are available in Savannah through a number of park and recreation facilities maintained by the City's Recreation and Leisure Services Department. Demand for these facilities is almost exclusively related to the city's resident population. Businesses and visitors make some incidental use of public recreation facilities, such as basketball courts, but the use is minimal compared to that of the families and individuals who live in the city. Thus, the impact fee for parks and recreation facilities is limited to future residential growth.

Conversely, the City's trail system (Tide to Town Trail) will provide connectivity between parks, neighborhoods and business centers. Since the trail system is for use by residents and local employees alike for walking, jogging, cycling and as access to parks and other destinations, its impact fee addresses the needs of both residential and nonresidential future growth. Because the 'service population' is different from that for public parks, the trail system is addressed later in this chapter under its own sub-heading.

The following sections focus on the City's active parks and recreation facilities and its passive neighborhood parks.

Service Area

The parks and recreation facilities maintained by the City are operated as a citywide system. Facilities are provided equally to all residents, and often used on the basis of the programs available, as opposed to proximity of the facility. For instance, children active in tennis play on courts at various locations, based on scheduling rather than geography. Other programs are located only at certain centralized facilities, to which any a resident can come. Thus, the entire city is considered a single service area for parks facilities and services.

Level of Service and Forecasts for Service Area

'Level of Service' (LOS) is the relationship between service capacity and service demand for public facilities. LOS calculations are the basis for determining the facilities needed to serve new growth so that the adopted LOS is maintained for both existing and future development. The LOS standards for park acres and for recreational buildings and components are determined by the inventory of existing City facilities, which is summarized on Table 3. Detailed listings of park acres and community centers are provided on Table 4.

Table 3 includes components the City does not currently have in its recreation system but plans to add in the future (i.e., skate parks). The table then provides LOS calculations based on the 'Current Inventory' divided by the number of housing units in the city (69,818), yielding the number of recreational components provided for each dwelling (since impact fees are assessed per housing unit when building permits are issued, not population).

The LOS calculations from Table 3 determine the existing demand for recreation components by today's population. This is the adopted Level of Service. For the purposes of impact fee calculations, the City has determined that this Level of Service, based on the existing services being provided, would be appropriate to serve the future service area population. The LOS standard (under 'Current LOS by Housing Unit') is then multiplied by the increase in housing units between 2022 and 2045

(14,164) to produce the future demand created by future growth, as shown under 'Future Demand' on Table 3.

Table 3: Level of Service and Forecasts for Service Area

Component Type	Current Inventory	Current LOS per Housing Unit*	Future Demand**	Total Needed (Rounded)	% Impact Fee Eligible
Park Acres	934.55 acres	0.013385474	189.59	0***	-
Recreation Buildings & Supporting Facilities					
Community Center/Gyms	149,859 sq. ft.	2.146423558	30,401.94	30,401	100.00%
Administrative Office Space	4,500 sq. ft.	0.064453293	912.92	912	100.00%
Concession Stands	2	0.000028646	0.41	1	41.00%
Restroom Buildings	7	0.000100261	1.42	2	71.00%
Park and Recreation Components					
Baseball Field	15	0.000214844	3.04	4	76.00%
Basketball Court, Outdoor	47	0.000673179	9.53	10	95.30%
Dog Park	3	0.000042969	0.61	1	61.00%
Fishing Pier	1	0.000014323	0.20	1	20.00%
Multi-Purpose Field	16	0.000229167	3.25	4	81.25%
Pavilion	32	0.000458335	6.49	7	92.71%
Playground	59	0.000845054	11.97	12	99.75%
Skate Park	0	n/a	2.00	2	16.87%
Softball Field	15	0.000214844	3.04	4	76.00%
Splash Pad	9	0.000128907	1.83	2	91.50%
Swimming Pool	9	0.000128907	1.83	1	100.00%
Tennis Court	35	0.000501303	7.10	8	88.75%
Volleyball Court, Outdoor	1	0.000014323	0.20	1	20.00%
Park Trails	7.82 miles	0.000112063	1.59	1.59	100.00%

* LOS based on the current inventory divided by current housing units (69,818).

** Future Demand (2045) calculated by multiplying the LOS by the 2022-2045 increase in housing units (14,164).

*** The amount of undeveloped city-owned land (900+ acres) that is slated for future park use exceeds future demand.

For all components except park trails the future demand is rounded to whole numbers in the 'Total Needed' column. This is because the City cannot build a portion of a facility; it must build entire facilities. As a result, the '% Impact Fee Eligible' column may reflect a percentage less than 100%.

For park acres, the 'Total Needed' is shown as '0' due to future demand being met through existing City-owned acreage that is undeveloped but is intended to be utilized for future park use. Over 900 acres have been acquired by the City in the New Hampstead and Highlands communities through donation, dedication, or parcel trade. The acreage will include opportunities for both active and passive recreation.

A component's impact fee eligibility ('% Impact Fee Eligible') is based on the extent to which future improvements are needed to specifically serve new growth and development, and only at the LOS applicable citywide.

For example, the City has 3 dog parks, but the adopted level of service indicates that only a portion of an additional dog park (.61) is needed to serve the future population. Since the City cannot build part of a dog park for it to fully serve its intended purpose, this number is rounded up to a single dog park, of which 61% is the amount that new growth mathematically demands. This is therefore the percentage of future dog parks that is impact fee eligible.

Capital Improvements Element Parks and Recreation

Additionally, 2 skate parks that are currently proposed will serve both the existing and future population. Of the projected total number of housing units in 2045 (83,982), 14,164 will be generated by new growth, or 16.87% of the total, which establishes the percent of impact fee eligibility of the improvement.

Table 4: Current Inventory of Park Lands and Community Buildings

Active Parks / Community Centers	Acres	Neighborhood Passive Parks/ Greenspace	Acres
38th Street	0.33	Adams Park	1.04
Alpine	0.89	Ambush Park	1.20
Atwood	0.21	Ashley Homes Park	1.20
Avondale	1.01	Ashley Homes Square	1.20
Bacon Park Golf Course	260.77	Atlantic Mall	2.64
Bacon Park Forest	163.39	Baker Street	2.91
Bacon Park Tennis	7.50	Brinkman Park	0.22
Baldwin	0.99	Chesterfield Circle	0.20
Barjan Terrace	2.22	Dixon Park	1.18
Blackshear	2.45	Entleman Park	1.01
Blueberry Hill	1.88	Floyd "Pressboy" Adams Park	1.13
Boaen	1.41	Gaudry Park	0.95
Bryan, Charlie S.	0.61	Guckenheimer Park	0.87
Cann	2.21	John Henry Murphy	0.68
Carver Village	0.93	Kavanaugh Park	0.95
Cedar Grove	6.30	Lattimore Park	1.04
Clark, Ben	1.42	Lorraine Court	0.11
Cloverdale*	3.98	Malibou Circle	0.25
Coffee Bluff Marina	3.21	Mary Musgrove	1.68
Crossroad Villa	0.96	McCaughey Park	0.87
Crusader*	4.01	Myers Park	1.13
Cuyler	0.50	Nathaniel Green Park	3.29
Daffin	74.81	Pierpont Circle	0.52
Davant	0.19	Rockwell Park	0.67
Delaware*	0.52	Savannah Gardens	1.28
Dixon	1.09	Solomon Park	0.87
Edgemere/Sackville	1.02	Sunrise Park	1.45
Fairgrounds	41.20	Theus Park	0.86
Feiler	2.40	Tiedeman Park	2.85
Fellwood	1.84	Twickenham Park	2.80
Femwood/Parkwood	6.28	Vetsburg Park	1.04
Flourmoy, Mary C*	0.80	Wessels Park	0.68
Ford, Bowles	57.27	West Side Park	2.80
Forrest Hills	7.39		
Forsyth Park	11.66	Passive Park Acres	41.57
Grant*	1.20		
Gray, Rebecca (Hudson Hill)	5.08		
Habersham	3.68		
Harmon Creek	1.10		
Hitch	2.21		
Holly Heights	1.35		
Hull	3.05		
Jackson, Moses*	0.50		
Jefferson Street	0.13		
Kennedy (Carver Heights)*	4.31		
Lamara Heights	1.02		
Law, WW*	1.98		
Liberty City*	7.32		
Magnolia	2.20		
Mohawk Lake	27.50		
Ogeecheeton	0.28		
Paulson, Allen Complex	17.79		
Pierpont Circle	0.51		
Ridgewood	1.02		
River's End	0.51		
Robinson, Robbie	0.80		
Savannah Gardens	1.49		
Scarborough, William Complex	6.50		
Soldiers Field	3.00		
Summerside	6.98		
Sunset	3.86		
Sylvan Terrace	1.22		
Tatemville*	40.80		
Thomas Square	1.94		
Tompkins*	3.85		
Treat	0.33		
Tremont	0.20		
Tremont Center*	0.41		
Tribble, Joe (Tribble Lake)	51.17		
Victory Heights	0.93		
Wells	1.37		
Westside	0.63		
Wils hire	0.40		
Windsor	10.36		
Yamacraw	0.35		
Active Park Acres	892.98		

TOTAL PARK ACRES	934.55
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Community Centers/Gymnasiums	Building Area
square feet	
Carver Village Neighborhood Center	7,100
Cloverdale Community Center	5,350
Crusader Neighborhood Center	6,800
Eastside Regional Center (Shuman)*	9,800
Grant Center Gymnasium**	10,380
Hudson Hill Community Center**	4,800
John S. Delaware Regional Center*	7,700
Liberty City Neighborhood Center	10,800
Mary Flourmoy Golden Age Center	6,100
Moses Jackson Neighborhood Center	16,100
Pennsylvania Avenue Resource Center	18,000
Tatemville Neighborhood Center	4,600
Tompkins Regional Center*	8,300
Tremont Neighborhood Center	3,000
W.W. Law Regional Center*	5,039
Windsor Forest Regional Center*	22,090
Woodville Neighborhood Center	3,900
Total Building Area	149,859

* Center includes a gymnasium

** Under construction

* Includes a community center

Future Costs

The following table lists the future capital projects costs to provide the additional recreation components needed to attain the applicable Level of Service standards.

Table 5: Project Costs to Meet Future Demand for Parks and Recreation Components

Component Type	Total Needed	Estimated Cost Per Unit*	Gross Cost Per Unit**	Total Cost (2022)	% Impact Fee Eligible	New Growth Share (2022)	Net Present Value***
Park Acres	0	-	-	-	-	-	-
Recreation Buildings & Supporting Facilities							
Community Centers/Gyms (sq. ft.)	30,401	\$ 500.00	\$ 610.00	\$ 18,544,610.00	100.00%	\$ 18,544,610.00	\$ 21,271,177.18
Administrative Office Space	912	\$ 191.00	\$ 233.02	\$ 212,514.24	100.00%	\$ 212,514.24	\$ 243,759.67
Concession Stands	1	\$ 35,000.00	\$ 42,700.00	\$ 42,700.00	41.00%	\$ 17,507.00	\$ 20,081.01
Restroom Buildings	2	\$ 100,000.00	\$ 122,000.00	\$ 244,000.00	71.00%	\$ 173,240.00	\$ 198,711.04
Park and Recreation Components							
Baseball Field	4	\$ 500,000.00	\$ 610,000.00	\$ 2,440,000.00	76.00%	\$ 1,854,400.00	\$ 2,067,496.71
Basketball Court, Outdoor	10	\$ 100,000.00	\$ 122,000.00	\$ 1,220,000.00	95.30%	\$ 1,162,660.00	\$ 1,296,266.03
Dog Park	1	\$ 125,000.00	\$ 152,500.00	\$ 152,500.00	61.00%	\$ 93,025.00	\$ 103,714.88
Fishing Pier	1	\$ 1,000,000.00	\$ 1,220,000.00	\$ 1,220,000.00	20.00%	\$ 244,000.00	\$ 272,039.04
Multi-Purpose Field	4	\$ 800,000.00	\$ 976,000.00	\$ 3,904,000.00	81.25%	\$ 3,172,000.00	\$ 3,536,507.54
Pavilion	7	\$ 50,000.00	\$ 61,000.00	\$ 427,000.00	92.71%	\$ 395,890.06	\$ 441,383.41
Playground	12	\$ 125,000.00	\$ 152,500.00	\$ 1,830,000.00	99.75%	\$ 1,825,425.00	\$ 2,035,192.08
Skate Park	2	\$ 150,000.00	\$ 183,000.00	\$ 366,000.00	16.87%	\$ 61,727.80	\$ 68,821.19
Softball Field	4	\$ 500,000.00	\$ 610,000.00	\$ 2,440,000.00	76.00%	\$ 1,854,400.00	\$ 2,067,496.71
Splash Pad	2	\$ 150,000.00	\$ 183,000.00	\$ 366,000.00	91.50%	\$ 334,890.00	\$ 373,373.58
Swimming Pool	1	\$ 3,000,000.00	\$ 3,660,000.00	\$ 3,660,000.00	100.00%	\$ 3,660,000.00	\$ 4,080,585.62
Tennis Court	8	\$ 80,000.00	\$ 97,600.00	\$ 780,800.00	88.75%	\$ 692,960.00	\$ 772,590.88
Volleyball Court, Outdoor	1	\$ 30,000.00	\$ 36,600.00	\$ 36,600.00	20.00%	\$ 7,320.00	\$ 8,161.17
Park Trails	1.59	\$ 300,000.00	\$ 366,000.00	\$ 581,940.00	100.00%	\$ 581,940.00	\$ 648,813.11
				\$ 38,468,664.24		\$ 34,888,509.10	\$ 39,506,170.88

* Sources: City of Savannah (Recreation & Leisure Department, SustainabilityDepartment); comparable facilities in Georgia communities; previous expenditures by the City.

** Includes 22% for contingency and AE services, with the exception of park acres.

*** Actual implementation dates vary. NPV based on CPI for land, BCI for buildings and CCI for components, in an average construction year of 2032.

Estimated 2022 cost figures are increased to the gross cost by 22% to account for architectural and engineering services as well as contingencies. These 'Total Cost (2022)' figures in the table above are converted to 'New Growth Share (2022)' dollars based on the percentage that each improvement is impact fee eligible (from Table 3).

The Net Present Value of new growth's share of the cost for each component is calculated as follows:

Since the actual pace and timing of construction for the improvements proposed to meet future demand have not been programmed, an 'average' year of 2032 is used for Net Present Value calculations—some improvements will occur earlier for less money, and some later at greater cost. All will average out.

To calculate the Net Present Value (NPV) of the impact fee eligible cost estimate for the construction of the recreation components, the NPVs are calculated by increasing the current (2022) estimated costs using Engineering News Record's (ENR) 10-year average building cost inflation (BCI) rate for buildings (such as gymnasiums) and the 10-year average construction cost inflation (CCI) for all

other projects. All project costs are then reduced to current NPV dollars using the Net Discount Rate.

Scheduling Individual Projects and Improvements

Improvements listed on Table 5 cannot be scheduled on an annual basis over the coming 20 years with any certainty. Accordingly, and as noted in the previous section, an 'average' year of 2032 is assigned to all projects in order to calculate estimated project costs. Over the next 5 years, however, specific projects drawn from the table by the City Council are scheduled as part of the annual budget adoption process. These projects are then shown on the Community Work Program, included in this CIE, and may be subsequently updated each year as part of the City's Annual CIE Update report reflecting decisions by City Council regarding capital project funding decisions made during consideration and adoption of that year's annual budget.

■ Trail System

Introduction

The City's Tide to Town trail system is intended to be major component of its overall recreation and parks services. The previous Chapter addressed the City's public parks, including the recreation facilities within the parks, which primarily serve Savannah's residents. Those facilities include park trails, which are trails located within the boundaries of public parks.

Tide to Town is a stand-alone multi-use trail system that will link parks, neighborhoods, and business centers. Unlike parks and recreational components such as ball fields and community centers that are primarily viewed as 'residential' amenities, a comprehensive trail system is used by residents and local employees alike for walking, jogging, and as access to parks and other destinations. There is thus a clear benefit to businesses as residents access the shops and offices in the city using the walkways and employees take advantage of the walkways to walk or exercise on their time off, to walk to lunch or a shop nearby, or to access local parks or recreation facilities.

This section of the Parks and Recreation chapter focuses on the City's trail system that, by its very nature, will serve both the residential and employee populations.

Service Area

The trail system operates as an interrelated citywide system. Thus, the entire city is considered a single service area.

Level of Service and Forecasts for Service Area

The first phase of Tide to Town, the Truman Trail, is underway. Three miles have been installed, leaving 27 additional miles of the total planned Tide to Town system to be installed. Twenty-seven miles is the length remaining to complete the system for the city's residents and businesses today and for future growth over the coming 20+ years.

Table 6 shows the calculation of the Level of Service (LOS) for the trail system. For these system improvements, the adopted LOS is based on the total day-night population forecasted for 2045 since the entire trail system, as it exists today (three miles) and is proposed to be expanded (27 additional miles), will serve all of the city's residents and businesses collectively by that target year.

Table 6: Level of Service and Forecasts for Service Area

Facilities	Service Population	Level of Service	Service Area Growth	New Growth Demand
Existing & Planned Miles	Day-Night Population (2045)	Miles Per 2045 Day-Night Population	Day-Night Pop Increase to 2045	Net New Miles Demanded
30	359,363	0.0001	77,239	6.45

To determine the Level of Service, in Table 6 the total length (in miles) of the trail system (existing and planned miles combined) is divided by the day-night population expected to live or work in the city by 2045, resulting in the number of miles per person—resident or employee—that will benefit from the total path system when it is completed.

Applying this LOS standard to the increase in the day-night population that is projected for the city by 2045 results in a figure that establishes the maximum number of trail miles that are needed to serve future growth. Specifically, only 6.45 miles of the 27 planned miles are technically required to serve growth over the next two decades. This represents 23.88% of the 27 miles that are planned to be added to the trail system.

Future Costs

The cost to construct the remaining 27 miles of the 30-mile Tide to Trail project is shown below. As stated above, 6.45 trail miles are “demanded” by future growth, which is 23.88% of the additional 27 miles planned for construction. This percentage therefore represents the portion of the 27 future miles that is impact fee eligible.

Table 7: Project Costs to Meet Future Demand for Trail Facilities

Year	Facility	Planned Miles	Estimated Cost Per Unit*	Total Cost (2022)**	% Impact Fee Eligible***	New Growth Share (2022)	Net Present Value****
2032	Trail System	27	\$3,000,000.00	\$16,200,000.00	23.88%	\$3,868,795.62	\$4,313,374.80

* Source: City of Savannah Sustainability Department.
 ** Represents the City’s anticipated share (20%) of the overall project cost.
 *** Based on the number of impact fee eligible miles (6.45) divided by the total number of planned miles.
 **** NPV based on CCI in an average construction year of 2032.

The Net Present Value of new growth's share of the cost for additional trail miles is calculated as follows:

Since the actual pace and timing of trail construction has not been programmed, an 'average' year of 2032 is used for Net Present Value calculations—some portions of the trail will be constructed earlier for less money, and some later at greater cost. All will average out. Over the next 5 years, however, trail segments can be scheduled as part of the annual budget adoption process by City Council. These specific projects are then shown on the Community Work Program, included in this CIE, and may be subsequently updated each year as part of the City's Annual CIE Update report reflecting decisions by City Council regarding capital project funding decisions made during consideration and adoption of that year's annual budget.

To calculate the Net Present Value (NPV) of the impact fee eligible cost estimate for the construction of the trail system, the NPV is calculated by increasing the current (2022) estimated costs using the 10-year average construction cost inflation (CCI). All project costs are then reduced to current NPV dollars using the Net Discount Rate.

Fire Protection

■ Introduction

Fire protection services are provided by the City through its Fire Rescue Department (more commonly known as the Savannah Fire Department or SFD). The SFD is organized into three primary divisions: Operations, Logistics and Emergency Management. Altogether, services provided by the SFD include fire suppression, hazardous material mitigation, technical rescues, Emergency Medical Services (EMS), fire education and prevention, fire investigations, emergency management preparedness, and mitigation, response and recovery operations.

■ Service Area

The city is considered a single service area for the provision of fire protection services because all residents and employees in Savannah have equal access to the benefits of the services provided.

■ Level of Service and Forecasts for Service Area

'Level of Service' (LOS) is the relationship between service capacity and service demand for public facilities. The LOS calculations are the basis for determining the facilities needed to serve new growth so that the adopted LOS is maintained for both existing and future development. The LOS for fire protection services in Savannah is determined by an inventory of square footage (fire stations and training facilities) and fire apparatus (heavy vehicles) and supporting vehicles currently used by the Fire Department, and by future system improvements planned to serve the city (the service area). Together, the existing and planned facilities will meet the needs of the city in 2045. This is the basis for the adopted LOS, as shown in Table 10. The following table presents the current inventory of SFD facilities and vehicles.

Table 8: Inventory of Existing Building Area and Vehicles

Existing Fire Stations and Facilities			Existing Vehicles*	
Name	Location	Floor Area	Type and Number	
Station 1 / Paulsen Street Station	535 E. 63rd Street	5,508	<i>Fire Apparatus</i>	
Station 2 / Lorwood Station	5 Skyline Drive	4,461	Pumper	24
Station 3 / Headquarters	121 E. Oglethorpe Avenue	7,590	Aerial	8
Station 4 / Augusta Avenue Station	2401 Augusta Avenue	5,625	Rescue	4
Station 5 / Fire Investigations & Fire Marshal	10 West 33rd	16,786	Air/Light	1
Station 6 / Paulsen Street Station	3000 Liberty Parkway	9,474	Hazmat	1
Station 7 / Eisenhower Station	6902 Sallie Mood Drive	4,650	IFE Truck	2
Station 8 / Bee Road Station	2824 Bee Road	4,576	Marine	2
Station 9 / Pine Gardens Station	2235 Capital Street	13,826	Total Existing Fire Apparatus	42
Station 10 / Coffee Bluff Station	13710 Coffee Bluff Road	2,840	<i>Support Fleet</i>	
Station 11 / Savannah Mall Station	11844 Apache Avenue	10,320	Arson Investigation	1
Station 12 / Bradley Point Station	1205 Bradley Blvd	9,600	Brush Truck	2
Station 13 / Airport Station	11 McKenna Drive	9,600	Fire Chief SUV	6
Station 14 / Highlands Station	480 Highlands Blvd	9,680	Fire Marshal Truck	6
Station 15 / Sweetwater Station	1751 Grove Point Road	9,600	Service Support Center Van	1
Fire Training Academy	380 Agonic Road	9,100	Training Van	2
Training Tower	380 Agonic Road	1,800	Specialized Support Truck	14
Burn Building	380 Agonic Road	1,800	Total Existing Support Fleet	32
Total Existing Square Footage		136,836		

* Vehicles having a service life of 10 years or more.

Currently, fire protection is provided by facilities with a combined square footage of 136,836, utilizing a total of 42 fire apparatus and an additional 32 vehicles that support the operations of the SFD. Future proposals to provide adequate fire protection services citywide include 6 new fire stations strategically located throughout the city. As the city grows, these stations will be needed to maintain and possibly increase service and decrease response times. The future system to be achieved by 2045, as currently envisioned, is summarized on the table below.

Table 9: Planned System Improvements

Additional Fire Station and Facility Space		Additional Fire Apparatus					Additional Support Fleet		
Name	Floor Area	Pumper	Aerial	Rescue	Marine	Total	Type and Number		
Palms Station	10,000	1				1	Responder Truck	1	
Bush Road Station	10,000	1				1	Quick Response Vehicle (QRV)	6	
New Hampstead Station*	14,000	1	1			2	Utility Task Vehicle (UTV)	4	
Hutchinson Island Station*	14,000	1	1			2	Hazmat Container Hauler	2	
Jimmy DeLoach Station*	14,000	1		1		2	Mobile Fuel Trailer	1	
Chatham Parkway Station	10,000	1	1			2	Service Support Center Forklift	1	
Training Tower Replacement**	7,200					0			
Burn Building Replacement**	3,200					0			
					1	1			
Total Additional Square Footage	82,400	Total Additional Fire Apparatus					11	Total Additional Support Fleet	15

* Proposed public safety building that will contain fire and police functions. The square footage reflects the portion of the total area (20,000 sq.ft.) in the building to be occupied by the Fire Department.

** The square footage shown is the increase in size between the existing and replacement structure. The training tower replacement project will be a total of 9,000 sq.ft, and the burn building replacement will be 5,000 sq.ft.

Table 9 includes the construction of 6 fire stations and the acquisition of fire apparatus for those stations. Three of the stations are proposed to occupy space (approximately 70%) in ‘public safety buildings’ that will also include space for police functions. In addition, enhancements to training facilities are identified as future needs. These include replacements of the existing fire training tower and burn building with larger structures. As noted in the table, the square footage reflects only the addition of building area relative to the existing structure size; the ‘replacement’ space (i.e., the existing square footage shown in Table 8) is excluded. Fifteen support vehicles are also proposed to be added to the Fire Department’s fleet.

Table 10 presents the calculation of the Level of Service (LOS) for the system as proposed to fully serve the city over the next 23 years. These LOS figures are based on the future 2045 day-night population. This is because the existing building area and vehicles utilized by the Fire Department (see Table 8), combined with the proposed additional square footage and vehicles identified on Table 9, are expected to serve the current and future population to 2045. These combined figures are shown under the ‘Facilities’ column in Table 10, and they are divided by the ‘Service Population’ (the 2045 day-night population) to calculate the adopted Level of Service for square feet and all vehicles. Day-night population is used as a measure in that fire protection is a 24-hour service provided continuously to both residences and businesses in the service area.

Table 10: Level of Service and New Growth Demand

Facilities	Service Population	Level of Service	Future Service Population	New Growth Demand*
Existing & Planned Square Feet	2045 Day-Night Population	Square Feet per 2045 Day-Night Population	Day-Night Population Increase (2022-45)	Net New Square Feet Demanded
219,236	359,363	0.610068	77,239	47,121
Existing & Planned Fire Apparatus	2045 Day-Night Population	Fire Apparatus per 2045 Day-Night Population	Day-Night Population Increase (2022-45)	Net New Apparatus Demanded
53	359,363	0.000147	77,239	11.39
Existing & Planned Support Fleet	2045 Day-Night Population	Support Fleet per 2045 Day-Night Population	Day-Night Population Increase (2022-45)	Net New Support Fleet Demanded
47	359,363	0.000131	77,239	10.10

* 11 fire apparatus will be added to the inventory, all of which are 100% eligible for impact fee funding. 10 support vehicles will be added at 100% impact fee eligibility.

Table 10 also shows the fire protection facilities that are needed to serve new growth in 2045. These 'New Growth Demand' figures show the actual number of building area (square feet), fire apparatus, and support vehicles, that are 'demanded' by new growth. New growth is defined and quantified as the increase in population from 2022 to 2045, which is also known as the 'Future Service Population' above.

Using this future-system approach to determine new growth demand, only 47,121 square feet in additional building area is needed to serve future growth. This reveals a shortfall in space serving the current day-night population. Thus, of the total 82,400 square feet in space proposed (see Table 9), only 47,121 square feet can be supported with impact fees (57% of the total proposed), leaving the remaining 35,279 square feet (43%) to be funded by the existing tax base.

This same principle applies to the fire apparatus and supporting fleet in Table 10. New growth only requires 11.39 and 10.10 vehicles, respectively. But since a portion of a vehicle cannot be acquired, the numbers are rounded to whole vehicles. As noted in the table, 11 new fire apparatus will be acquired. This number is slightly less than what is technically required to meet the demand for the future system and is therefore 100% impact fee eligible. In addition, 10 support vehicles will be added to the Fire Department's fleet, all of which are also fully impact fee eligible.

■ **Future Costs**

There are three categories of future costs: those for needed building area, those for fire apparatus, and those for support vehicles. The estimated improvement cost for needed building area (in 2022 dollars) are based on prevailing construction costs for fire stations. This per square foot dollar amount (\$351) is applied to the 47,121 square feet for 'new building area'.

Should the City undertake the burn building or training tower replacement projects, it is important to note that the projects are not fully impact fee eligible. The impact fee eligible portion is the increase in size from the existing structure to the new replacement structure, since it is these additional square feet that are needed to meet future demand. Based on the existing and proposed sizes of the replacement buildings, the new burn building (5,000 square feet) would be 64% impact fee eligible (3,200 – see Table 9– divided by 5,000). The proposed 9,000 square feet training tower would be 80% impact fee eligible (7,200 square feet in additional square feet relative to the existing 1,800 square feet structure, divided by 9,000).

Vehicle costs are based on prevailing rates for similar vehicles equipped to local specifications.

Table 11: Project Costs to Meet Future Demand

Description	Number	2022 Cost Each*	Total 2022 Cost	Estimated Cost 2032 (NPV)**	% Impact Fee Eligible	Total Impact Fee Eligible Cost
New Building Area (sq.ft.)	47,121	\$ 351.00	\$ 16,539,495.89	\$ 18,971,256.20	100%	\$ 18,971,256.20
New Fire Apparatus	11	\$ 1,181,818.18	\$ 13,000,000.00	\$ 14,908,121.06	100%	\$ 14,908,121.06
New Support Fleet	10	\$ 58,066.67	\$ 580,666.67	\$ 665,896.07	100%	\$ 665,896.07
Totals		\$ 1,240,235.85	\$ 30,120,162.55	\$ 34,545,273.33		\$ 34,545,273.33

*Building cost estimates information provided by the Savannah Fire Department. Vehicle costs based on current prevailing rates for fire apparatus and supporting vehicles equipped to local specifications.

**2022 cost estimate inflated to 'average' year (2032) using the CPI or BCI, as applicable, reduced to NPV using the Discount Rate.

The Net Present Value (NPV) of new growth's share ('% Impact Fee Eligible') of the costs for future improvements is calculated as follows:

Since the exact pace and timing of construction for the additional square footage and the purchase of vehicles proposed to meet future demand cannot be programmed with certainty for each year between now and 2045, an 'average' year of 2032 is used for Net Present Value calculations—some improvements will occur earlier for less money, and some later at greater cost. All will average out.

To calculate the NPV of the impact fee eligible cost estimate for the construction of the new floor area, the NPV is calculated by increasing the current (2022) estimated cost using Engineering News Record's 10-year average building cost inflation (BCI) rate. The projected costs are then reduced to current NPV dollars using the Net Discount Rate (see Appendix D: *Cost Adjustments*).

The NPV of the cost for all vehicles is calculated by increasing the current (2022) estimated cost using the Consumer Price Index (CPI) rate. The projected costs are then reduced to current NPV dollars using the Net Discount Rate.

■ Scheduling Individual Capital Projects

As noted above, exact project details and implementation years cannot be identified with certainty over the next two decades. The table below reflects a tentative program of system improvements, drawn from Table 11, scheduled in pace with annual demands generated by population and business growth. Actual implementation dates will be determined through the annual budget adoption process. In addition, the number of new or expanded facilities – and the size of each – may vary from what is shown below. Regardless of the future building configurations, the additional building area is fully impact fee eligible as long as the total does not exceed 47,121 square feet.

Table 12: Schedule of Fire Department Capital Improvements

Year*	Day-Night Population		Facility Addition (sf)**	Additional Vehicles		% Impact Fee Eligible***
	Total	Cumulative Additions		Fire Trucks	Support Fleet	
2022	282,124					
2023	285,429	3,305			1	100%
2024	288,745	6,621				
2025	292,071	9,947	9,424	2	1	100%
2026	295,412	13,288		1		100%
2027	298,754	16,630			1	100%
2028	302,114	19,990				
2029	305,484	23,360	9,424	2	1	100%
2030	308,864	26,740				
2031	312,174	30,050			1	100%
2032	315,496	33,372	9,424	2		100%
2033	318,830	36,706			1	100%
2034	322,175	40,051				
2035	325,534	43,410			1	100%
2036	328,894	46,770	9,424	2		100%
2037	332,276	50,152			1	100%
2038	335,667	53,543				
2039	339,073	56,949			1	100%
2040	342,488	60,364	9,424	2		100%
2041	345,837	63,713				
2042	349,200	67,076			1	100%
2043	352,575	70,451				
2044	355,963	73,839				
2045	359,363	77,239				
Totals			47,121	11	10	

*Actual implementation dates will be determined through the annual budget adoption process.

**The number of facilities and size of each may vary.

***The total building area of all new facilities combined cannot exceed 47,121 sf in order to be eligible for funding with impact fees.

Law Enforcement

■ Introduction

Law enforcement services are provided by the City through the Savannah Police Department (SPD). The SPD is organized into three primary divisions (Field Operations, Criminal Investigations, and Administrative and Management Services) and consists of four precincts (Northwest, Southside, Eastside, and Central).

■ Service Area

The city is considered a single service area for the provision of law enforcement services because all residents and employees in Savannah have equal access to the benefits of the services provided.

■ Level of Service and Forecasts for Service Area

'Level of Service' (LOS) is the relationship between service capacity and service demand for public facilities. LOS calculations are the basis for determining the facilities needed to serve new growth so that the adopted LOS is maintained for both existing and future development. The LOS for law enforcement services in Savannah is determined by an inventory of building area (square footage) and specialized vehicles currently used by the Police Department to serve the day-night population in the city (the service area). Day-night population is used as a measure in that law enforcement is a 24-hour service provided continuously to both residences and businesses in the service area. The following table presents the current inventory of SPD facilities and vehicles, and the LOS is shown in Table 14.

Table 13: Inventory of Existing Building Area and Vehicles

Description	Location	Quantity
Building Area		<i>Square Feet</i>
Police Headquarters	201 Habersham	33,000
Central Precinct	1710 Martin Luther King Jr. Blvd.	13,300
Eastside Precinct	2250 Victory Drive	9,608
Southside Precinct	7804 Abercorn St.	5,100
Northwest Precinct	602 E. Lathrop Ave.	28,810
Northwest Substation	Armestead Ave. (Savannah Airport)	1,100
Property and Evidence Building	78 Ross Road	6,021
Vehicle Forensics Processing Garage	78 Ross Road	2,400
Garage for Specialized Vehicles	78 Ross Road	5,000
Professional Development Training	3401 Edwin Street	20,000
Total Square Feet		124,339
Specialized Vehicles*		<i>Number</i>
Armored Vehicle		1
Mounted Patrol Trailer		1
Specialized Unit Equipment Trailer		3
Total Specialized Vehicles		5

* Vehicles having a service life of 10 years or more.

Table 14 presents the calculation of the current Level of Service (LOS) standards for law enforcement system facilities (building area and specialized vehicles) in the city. The inventory of each category is divided by the current (2022) day-night population to obtain the LOS per person enjoyed throughout the city.

Table 14: Level of Service and New Growth Demand

Facilities	Current Service Population	Level of Service	Service Area Growth	New Growth Demand
Existing Square Feet	Day-Night Population (2022)	Square Feet of Floor Area per Person	Day-Night Pop Increase to 2045	Square Feet of New Floor Area Needed
124,339	282,124	0.4407	77,239	34,041
Existing Specialized Vehicles	Day-Night Population (2022)	Vehicle per Person	Day-Night Pop Increase to 2045	New Specialized Vehicles Needed*
5	282,124	0.000018	77,239	1.37

* Two vehicles will be purchased: one that is 100% impact fee eligible and a second that is 37% impact fee

Table 14 also shows the law enforcement facilities that are needed to serve new growth in 2045. For the purposes of impact fee calculations, the City has determined that a Level of Service, based on the current LOS (i.e., the portions of existing building area and vehicles that serve one person today), would be appropriate to serve the future service area population. This is the adopted LOS.

In the table, the building area (square feet), and specialized vehicle LOS standards are next multiplied by the forecasted citywide day-night population increase to produce the expected demand that future growth and development will place on the city. This 'demand' equates to 34,041 square feet in additional building area and 1.37 additional specialized vehicles. Since only whole vehicles can be purchased, this number is rounded up and will result in the addition of two vehicles to cover expansion of the existing fleet. However, since only 1.37 vehicles are technically needed to serve new growth, the second vehicle only be partially (37%) impact fee eligible.

The building area required to meet the demands of new growth – 34,041 square feet – is 100% impact fee eligible. The square footage may be allocated across future projects that add building area, as follows: expansion of an existing building, construction of a new building (such as a garage or an additional precinct or substation), and/or replacement of an existing building. It should be noted that building replacement projects are impact fee eligible to the extent that the new building adds square footage to the existing building footprint. By way of example, if the existing 2,400 square feet vehicle forensics processing garage is replaced by a 4,000 square foot garage, the difference between the two (1,600 square feet) is what is impact eligible. This results in the new garage being 40% (1,600 divided by 4,000) impact fee eligible. The other 60% percent of the project cost would

have to come from other funding sources. Building replacement projects that result in the same or smaller building size are not impact fee eligible.

■ Future Costs

There are two categories of future costs: those for needed building area and those for specialized vehicles. The estimated improvement cost for needed building area (in 2022 dollars) is based on recent police precinct construction in the city. This per square foot dollar amount (\$669) is applied to the 34,041 square feet for 'new building area'. Vehicle costs are based on prevailing rates for similar vehicles equipped to local specifications.

Table 15: Facility Costs to Meet Future Demand

Description	Number	Unit Cost*	Total Cost	% Impact Fee Eligible	Total Impact Fee Eligible	Net Present Value**
Future Building Area (sq.ft.)	34,041	\$ 669.00	\$ 22,773,429.00	100%	\$ 22,773,429.00	\$ 27,595,087.55
Specialized Vehicle 1	1	\$ 162,500.00	\$ 162,500.00	100%	\$ 162,500.00	\$ 186,351.51
Specialized Vehicle 2	1	\$ 162,500.00	\$ 162,500.00	37%	\$ 60,125.00	\$ 68,950.06
Totals			\$ 23,098,429.00		\$ 22,996,054.00	\$ 27,850,389.12

* Source: Savannah Police Department. Floor area cost estimates based on recent SPD police precinct construction costs. Vehicle costs are estimated using the average of current prevailing rates for existing specialized vehicles in the city's fleet.

** NPV for building area based on the 2018 construction costs of the Central Precinct. NPV for building area and vehicle based on 10-year average annual Building Cost Inflation (BCI) and Consumer Price Index (CPI), respectively, projected to an 'average' year of 2032.

The Net Present Value (NPV) of new growth's share ('% Impact Fee Eligible') of the costs for future improvements is calculated as follows:

Since the actual pace and timing of construction for the additional square footage and the purchase of vehicles proposed to meet future demand have not been programmed, an 'average' year of 2032 is used for Net Present Value calculations—some improvements will occur earlier for less money, and some later at greater cost. All will average out.

To calculate the NPV of the impact fee eligible cost estimate for the construction of the new floor area, the NPV is calculated by increasing the current (2022) estimated cost using Engineering News Record's 10-year average building cost inflation (BCI) rate. The projected costs are then reduced to current NPV dollars using the Net Discount Rate (see Appendix D: *Cost Adjustments*).

The NPV of the cost for all vehicles is calculated by increasing the current (2022) estimated cost using the Consumer Price Index (CPI) rate. The projected costs are then reduced to current NPV dollars using the Net Discount Rate.

■ Scheduling Individual Capital Projects

As noted above, exact project details and implementation years cannot be identified with certainty over the next two decades. The table below reflects a tentative program of system improvements,

drawn from Table 15, scheduled in pace with annual demands generated by population and business growth. Actual implementation dates will be determined through the annual budget adoption process. In addition, the number of new or expanded facilities – and the size of each – may vary from what is shown below. Regardless of the future building configurations, the additional building area is fully impact fee eligible as long as the total does not exceed 34,041 square feet.

Table 16: Schedule of Police Department Capital Improvements

Year*	Day-Night Population		Facility Addition (sf)**	Additional Vehicles	% Impact Fee Eligible***
	Total	Cumulative Additions			
2022	282,124				
2023	285,429	3,305		1	100%
2024	288,745	6,621		1	37%
2025	292,071	9,947	6,808		100%
2026	295,412	13,288			
2027	298,754	16,630			
2028	302,114	19,990			
2029	305,484	23,360	6,808		100%
2030	308,864	26,740			
2031	312,174	30,050			
2032	315,496	33,372	6,808		100%
2033	318,830	36,706			
2034	322,175	40,051			
2035	325,534	43,410			
2036	328,894	46,770	6,808		100%
2037	332,276	50,152			
2038	335,667	53,543			
2039	339,073	56,949			
2040	342,488	60,364	6,808		100%
2041	345,837	63,713			
2042	349,200	67,076			
2043	352,575	70,451			
2044	355,963	73,839			
2045	359,363	77,239			
Totals			34,041	2	

*Actual implementation dates will be determined through the annual budget adoption process.

** The number of facilities and size of each may vary.

***The total building area of all new facilities combined cannot exceed 34,041 sf in order to be eligible for funding with impact fees.

Road Improvements

■ Introduction

The information in this chapter is derived from road project information reflecting proposed road improvement projects that create new capacity.

■ Service Area

The service area for these road projects is defined as the entire city, in that these projects are recognized as providing primary access to all properties within the city as part of the citywide network of principal streets and thoroughfares. All new development within the city will be served by this citywide network, such that improvements to any part of this network to relieve congestion or to otherwise improve capacity will positively affect capacity and reduce congestion throughout the city.

■ Level of Service

For impact fee purposes, the City has set its Level of Service for road improvements at either LOS "C" or "D", depending on the improvement and as shown in Table 17. Using these LOS classifications maximize roadway capacity before traffic conditions actually break down (LOS "F"). See the Level of Service Standards section below for a description of these levels.

All road improvement projects benefit existing and future traffic proportionally to the extent that relief from over-capacity conditions eases traffic problems for everyone. For example, since new growth by 2045 will represent a certain portion of all 2045 traffic, new growth would be responsible for that portions' cost of the road improvements.

It is noted that the cost-impact of non-Savannah generated traffic on the roads traversing the city ('through' traffic) is off-set by state and federal assistance. The net cost of the road projects that accrues to Savannah reasonably represents (i.e., is 'roughly proportional' to) the impact on the roads by Savannah residents driving to and from their homes, commuters that come in to work in the city, and those coming into Savannah to shop, do business or recreate.

The basis for the road impact fee would therefore be Savannah's cost for the improvements divided by all traffic generated within the city in 2045 (existing today plus new growth)—i.e., the cost per trip—times the traffic generated by new growth alone. For an individual land use, when a building permit is issued, the cost per trip would be applied to the number of trips that will be generated by the new development, assuring that new growth would only pay its 'fair share' of the road improvements that serve it.

Level of Service Standards

Level of Service (LOS) for roadways and intersections is measured on a 'letter grade' system that rates a road within a range of service from A to F. Level of Service A is the best rating, representing roads operating with unencumbered travel; Level of Service F is the worst rating, representing operational conditions of heavy congestion and long delays. This system is a means of relating the connection between speed and travel time, freedom to maneuver, traffic interruption, comfort, convenience and safety to the capacity that exists in a roadway. This refers to both a quantitative measure expressed as a service flow rate and an assigned qualitative measure describing parameters. The *Highway Capacity Manual, Special Report 209*, Transportation Research Board (1985), defines operational design Level of Service A through F as having the following characteristics:

1. LOS A: free flow, excellent level of freedom and comfort;
2. LOS B: stable flow, decline in freedom to maneuver, desired speed is relatively unaffected;
3. LOS C: stable flow, but marks the beginning of users becoming affected by others, selection of speed and maneuvering becomes difficult, comfort declines at this level;
4. LOS D: high density, but stable flow, speed and freedom to maneuver are severely restricted, poor level of comfort, small increases in traffic flow will cause operational problems;
5. LOS E: at or near capacity level, speeds reduced to low but uniform level, maneuvering is extremely difficult, comfort level poor, frustration high, level unstable; and
6. LOS F: forced/breakdown of flow. The amount of traffic approaching a point exceeds the amount that can transverse the point. Queues form, stop & go. Arrival flow exceeds discharge flow.

The traffic volume that produces different Level of Service grades differs according to road type, size, signalization, topography, condition and access.

Roadway Capacity

Roadway capacity is closely linked to the Level of Service that a roadway provides. Table 17 presents the LOS standard applicable to each of the road improvement projects included in the impact fee program, along with the existing capacity before improvement and the resulting capacity after the improvement is completed.

Table 17: Roadway Capacity Data

Project Description	Roadway Classification	Existing Facility Type	Build Facility Type	LOS Standard	Existing Year	Build Year	Existing Capacity	At Build Capacity
Stiles Ave. Widening Phase 2	Urban Minor Arterial	2 lanes Undivided	4 lanes Divided	D	2022	2023	13,320	29,160
Benton Blvd. Widening Phase 1	Local	2 lanes Undivided	4 lanes Divided	C	2022	2028	15,120	34,110
Benton Blvd. Widening Phase 2	Local	2 lanes Undivided	4 lanes Divided	C	2022	2028	15,120	34,110
Skidaway Rd. Widening	Urban Principal Arterial	2 lanes Undivided	2 lanes Divided	D	2022	2028	14,060	14,800
Highlands Blvd. Widening	Local	2 lanes Undivided	4 lanes Divided	C	2022	2028	18,000	52,600
Jimmy DeLoach Pkwy. Widening	Principal Arterial	4 lanes Divided	6 lanes Divided	D	2022	2032	39,800	59,900
Louisville Rd. Widening	Minor Arterial	2 lanes Undivided	2 lanes Divided	D	2022	2032	13,300	14,000

■ Forecasts for Service Area

Projects that provide road capacity that will serve new growth have been identified by the City and are shown on the following table. This is not a list of all City road projects. These projects were selected for inclusion in the City’s impact fee program because the specific improvements proposed will increase traffic capacity and reduce congestion to some extent through road widening.

Table 18: Road Projects and Eligible Costs

Project Description	Total City Cost*	Year of Completion	Net Present Value**	% Impact Fee Eligible***	New Growth Cost (NPV)
Stiles Ave. Widening Phase 2	\$ 5,000,000.00	2023	\$ 5,054,685.57	25.4%	\$ 1,281,662.55
Benton Blvd. Widening Phase 1	\$12,500,000.00	2028	\$13,343,042.17	25.4%	\$ 3,383,252.47
Benton Blvd. Widening Phase 2	\$14,000,000.00	2028	\$14,944,207.23	25.4%	\$ 3,789,242.76
Skidaway Rd. Widening	\$15,000,000.00	2028	\$16,011,650.61	25.4%	\$ 4,059,902.96
Highlands Blvd. Widening	\$10,000,000.00	2028	\$10,674,433.74	25.4%	\$ 2,706,601.97
Jimmy DeLoach Pkwy. Widening	\$ 5,000,000.00	2032	\$ 5,574,570.52	25.4%	\$ 1,413,484.21
Louisville Rd. Widening	\$ 8,000,000.00	2032	\$ 8,919,312.83	25.4%	\$ 2,261,574.74
Total	\$69,500,000.00		\$74,521,902.67		\$ 18,895,721.66

* Total estimated cost of project in 2022 dollars less non-City assistance.

** Net Present Value = current cost inflated to target year using the ENR Construction Cost Index, (CCI) reduced to NPV using the Discount the *Trip Generation* section in the Appendix. Actual % of trips: 25.3559303%

The cost figures shown in Table 18 above are in current (2022) dollars and are then calculated in Net Present Value (as discussed in Appendix D: *Cost Adjustments*) and shown in the 'Net Present Value' column, based on the anticipated year of project expenditure.

As discussed thoroughly in Appendix C: *Traffic Demand*, new growth and development will represent 25.4% of the traffic on Savannah’s road network in 2045. To that extent, new growth’s fair share of the road project costs that are attributed to new growth are shown in the last two columns of Table 18.

Community Work Program

2023-2027

5-Year Work Program: Impact Fee Eligible Projects

Category	Action/Item	2023	2024	2025	2026	2027	Responsible City Party	Cost Estimate*	Funding Source**	Notes
Parks and Recreation Components	New Community Center	✓	✓				Recreation & Leisure Services Department	\$6,100,000	Up to 100% Impact Fees; Local Taxation Sources	New 10,000 square foot facility
Parks and Recreation Components	Skate Park	✓					Recreation & Leisure Services Department	\$183,000	Up to 16.87% Impact Fees; Local Taxation Sources	
Parks and Recreation Components	Splash Pads (2)	✓					Recreation & Leisure Services Department	\$366,000	Up to 91.50% Impact Fees; Local Taxation Sources	
Parks and Recreation Components	Playground	✓					Recreation & Leisure Services Department	\$152,500	Up to 99.75% Impact Fees; Local Taxation Sources	
Trail System	Tide to Town Trail	✓	✓	✓	✓	✓	Sustainability Department	\$600,000 / mile	Up to 23.88% Impact Fees; Local Taxation Sources	# of miles to be constructed per year is TBD
Fire Protection	New Hampstead Station (new)	✓					Fire Department	\$4,914,000	Up to 100% Impact Fees; Local Taxation Sources	New 14,000 square foot facility
Fire Protection	Pumper Truck	✓					Fire Department	\$750,000	Up to 100% Impact Fees; Local Taxation Sources	For New Hampstead FS
Fire Protection	Aerial Truck	✓					Fire Department	\$1,500,000	Up to 100% Impact Fees; Local Taxation Sources	For New Hampstead FS
Fire Protection	Quick Response Vehicles (2)	✓					Fire Department	\$106,000	Up to 100% Impact Fees; Local Taxation Sources	
Fire Protection	Utility Task Vehicle (2)	✓					Fire Department	\$84,000	Up to 100% Impact Fees; Local Taxation Sources	

Capital Improvements Element Community Work Program

Category	Action/Item	2023	2024	2025	2026	2027	Responsible City Party	Cost Estimate*	Funding Source**	Notes
Fire Protection	Service Support Center Forklift	✓					Fire Department	\$50,000	Up to 100% Impact Fees; Local Taxation Sources	
Fire Protection	Mobile Fuel Trailer		✓				Fire Department	\$25,000	Up to 100% Impact Fees; Local Taxation Sources	
Fire Protection	Hutchinson Island Station (new)			✓			Fire Department	\$4,914,000	Up to 100% Impact Fees; Local Taxation Sources	New 14,000 square foot facility
Fire Protection	Pumper Truck			✓			Fire Department	\$750,000	Up to 100% Impact Fees; Local Taxation Sources	For Hutchinson Island FS
Fire Protection	Aerial Truck			✓			Fire Department	\$1,500,000	Up to 100% Impact Fees; Local Taxation Sources	For Hutchinson Island FS
Fire Protection	Responder Truck			✓			Fire Department	\$60,000	Up to 100% Impact Fees; Local Taxation Sources	
Fire Protection	Palms Station (new)				✓		Fire Department	\$3,510,000	Up to 100% Impact Fees; Local Taxation Sources	New 10,000 square foot facility
Fire Protection	Pumper Truck				✓		Fire Department	\$750,000	Up to 100% Impact Fees; Local Taxation Sources	For Palms FS
Fire Protection	Hazmat Container Hauler				✓		Fire Department	\$125,000	Up to 100% Impact Fees; Local Taxation Sources	
Law Enforcement	Mounted Patrol Trailer	✓					Police Department	\$50,000	Up to 37% Impact Fees; Local Taxation Sources	
Law Enforcement	SWAT Vehicle		✓				Police Department	\$270,000	Up to 100% Impact Fees; Local Taxation Sources	
Law Enforcement	Northwest Substation (replacement)		✓				Police Department	\$2,528,000	Up to 27.50% Impact Fees; Local Taxation Sources	% that may be funded with impact fees based on difference between existing (1,100 sf) and proposed building size (4,000 sf)

Capital Improvements Element Community Work Program

Category	Action/Item	2023	2024	2025	2026	2027	Responsible City Party	Cost Estimate*	Funding Source**	Notes
Law Enforcement	Southside Substation (new)		✓				Police Department	\$2,528,000	Up to 100% Impact Fees; Local Taxation Sources	New 4,000 square foot facility
Law Enforcement	Southside Precinct (replacement)		✓				Police Department	\$8,697,000	Up to 39.23% Impact Fees; Local Taxation Sources	% that may be funded with impact fees based on difference between existing (5,100 sf) and proposed building size (13,000 sf) Actual construction date(s) may vary based on the terms of current lease arrangements
Law Enforcement	Eastside Precinct (replacement)			✓			Police Department	\$8,697,000	Up to 73.91% Impact Fees; Local Taxation Sources	% that may be funded with impact fees based on difference between existing (9,608 sf) and proposed building size (13,000 sf) Actual construction date(s) may vary based on the terms of current lease arrangements
Law Enforcement	Northwest Precinct (replacement)			✓			Police Department	TBD	Impact Fees; Local Taxation Sources	% that may be funded with impact fees to be based on the difference between existing (28,810 sf) and proposed building size (TBD) Actual construction date(s) may vary based on the terms of current lease arrangements
Road Improvements	Stiles Ave. Widening Phase 2	✓					Traffic Engineering Department	\$5,000,000	Up to 25.4% Impact Fees; Local Taxation Sources	

* Building cost estimates based on unit costs in the respective public facility chapter of this CIE; actual costs may vary

** Local Taxation Sources include but are not limited to the City General Fund, SPLOST, or other City taxation sources, as determined during the annual budget adoption process

Glossary

The following terms are used in this and other impact fee reports. Where possible, the definitions are taken directly from the Development Impact Fee Act.

■ Definitions

Capital improvement: an improvement with a useful life of ten years or more, by new construction or other action, which increases the service capacity of a public facility.

Capital Improvements Element: a component of a comprehensive plan adopted pursuant to Chapter 70 of the Development Impact Fee Act which sets out projected needs for system improvements during a planning horizon established in the comprehensive plan, a schedule of capital improvements that will meet the anticipated need for system improvements, and a description of anticipated funding sources for each required improvement.

DCA: The Georgia Department of Community Affairs.

Development: any construction or expansion of a building, structure, or use, any change in use of a building or structure, or any change in the use of land, any of which creates additional demand and need for public facilities.

Development impact fee: a payment of money imposed upon development as a condition of development approval to pay for a proportionate share of the cost of system improvements needed to serve new growth and development.

Eligible facilities: capital improvements in one of the following categories:

- (A) Water supply production, treatment, and distribution facilities;
- (B) Waste-water collection, treatment, and disposal facilities;
- (C) Roads, streets, and bridges, including rights of way, traffic signals, landscaping, and any local components of state or federal highways;
- (D) Storm-water collection, retention, detention, treatment, and disposal facilities, flood control facilities, and bank and shore protection and enhancement improvements;
- (E) Parks, open space, and recreation areas and related facilities;
- (F) Public safety facilities, including police, fire, emergency medical, and rescue facilities; and
- (G) Libraries and related facilities.

Impact cost: the proportionate share of capital improvements costs to provide service to new growth, less any applicable credits.

Impact fee: the impact cost plus surcharges for program administration and recoupment of the cost to prepare the Capital Improvements Element.

Level of service: a measure of the relationship between service capacity and service demand for public facilities in terms of demand to capacity ratios or the comfort and convenience of use or service of public facilities or both.

Project improvements: site improvements and facilities that are planned and designed to provide service for a particular development project and that are necessary for the use and convenience of the occupants or users of the project and are not system improvements. The character of the

improvement shall control a determination of whether an improvement is a project improvement or system improvement and the physical location of the improvement on site or off site shall not be considered determinative of whether an improvement is a project improvement or a system improvement. If an improvement or facility provides or will provide more than incidental service or facilities capacity to persons other than users or occupants of a particular project, the improvement or facility is a system improvement and shall not be considered a project improvement. No improvement or facility included in a plan for public facilities approved by the governing body of the municipality or county shall be considered a project improvement.

Proportionate share: means that portion of the cost of system improvements which is reasonably related to the service demands and needs of the project.

Rational nexus: the clear and fair relationship between fees charged and services provided.

Service area: a geographic area defined by a municipality, county, or intergovernmental agreement in which a defined set of public facilities provide service to development within the area. Service areas shall be designated on the basis of sound planning or engineering principles or both.

System improvement costs: costs incurred to provide additional public facilities capacity needed to serve new growth and development for planning, design and engineering related thereto, including the cost of constructing or reconstructing system improvements or facility expansions, including but not limited to the construction contract price, surveying and engineering fees, related land acquisition costs (including land purchases, court awards and costs, attorneys' fees, and expert witness fees), and expenses incurred for qualified staff or any qualified engineer, planner, architect, landscape architect, or financial consultant for preparing or updating the capital improvement element, and administrative costs, provided that such administrative costs shall not exceed 3 percent of the total amount of the costs. Projected interest charges and other finance costs may be included if the impact fees are to be used for the payment of principal and interest on bonds, notes, or other financial obligations issued by or on behalf of the municipality or county to finance the capital improvements element but such costs do not include routine and periodic maintenance expenditures, personnel training, and other operating costs.

System improvements: capital improvements that are public facilities and are designed to provide service to the community at large, in contrast to 'project improvements.'

Appendix A: Future Growth Forecasts

In order to accurately calculate the demand for future services for Savannah (and thus the public facilities needed to provide those services), new growth and development must be quantified in future projections. These projections include forecasts for population, households, housing units, and employment to the year 2045. These projections provide the base-line conditions from which the current (2022)² or future (2045) Level of Service calculations are produced.

■ Types of Projections

Accurate projections of population, households, housing units, and employment are important in that:

- Population data and forecasts are used to establish current and future demand for services where the Level of Service (LOS) standards are per capita based.
- Household data and forecasts are used to forecast future growth in the number of housing units.
- Housing unit data and forecasts relate to certain service demands that are household based, such as parks. The number of households—defined as *occupied* housing units—is always smaller than the total number of housing units, which include vacant units. Over time, however, each housing unit is expected to become occupied by a household, even though the unit may become vacant during future re-sales or turnovers.
- Employment forecasts are refined to reflect 'value-added' employment figures. This reflects an exclusion of jobs considered to be transitory or non-site specific in nature, and thus not requiring building permits to operate (i.e., are not assessed impact fees), as well as governmental uses that are not subject to impact fees.
- 'Value-added' employment data is combined with population data to produce what is known as the 'day-night population.' These figures represent the total number of persons receiving services, both in their homes and in their businesses, to produce an accurate picture of the total number of persons that rely on certain 24-hour services, such as fire and police protection.
- The projections used for the parks & recreation and public safety (fire and police) categories are citywide forecasts because these public facility categories are delivered by the City throughout the city.

Note that, for the road improvements public facility category, vehicle trip data is used as the basis for impact fee calculations (presented in Appendix C), although some socioeconomic data from this Appendix are used in those calculations as well.

² All data in this Appendix are technically as of July 1 of each year shown, consistent with data reported by the Census Bureau.

■ Historic Population Growth

Every year, the US Census Bureau estimates the population in Savannah between decennial censuses (e.g., 2000 and 2010). After a decennial census, the Bureau revises the preceding annual estimates based on the actual Census count. Unlike the decennial censuses, which are 'as of' April 1, the annual estimates are 'as of' July 1 of each year. Those annual estimates are shown in Table A-1, adjusted to the 2020 estimated population (as most recently revised in 2022 by the Bureau).

Table A-1: Annual Census Population Estimates

	Population Estimate (as of July 1 each year)										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Savannah	132,895	132,388	132,332	131,391	131,812	131,126	132,259	133,452	133,651	135,734	
	2010*	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Savannah	137,424	140,529	142,517	142,832	144,177	145,535	146,297	146,292	146,379	145,049	147,701

* 2010 estimate revised by Census Bureau in 2020.

Note: All data as of July 1 of each year. 2000, 2010 and 2020 differ from Decennial Census counts, which are as of April 1.

Sources: For 2000 to 2010: Intercensal Estimates, US Bureau of the Census: Annual Estimates Program. For 2011-2019 intercensal estimates adjusted to revised 2020 population estimates published by Census Bureau in 2022.

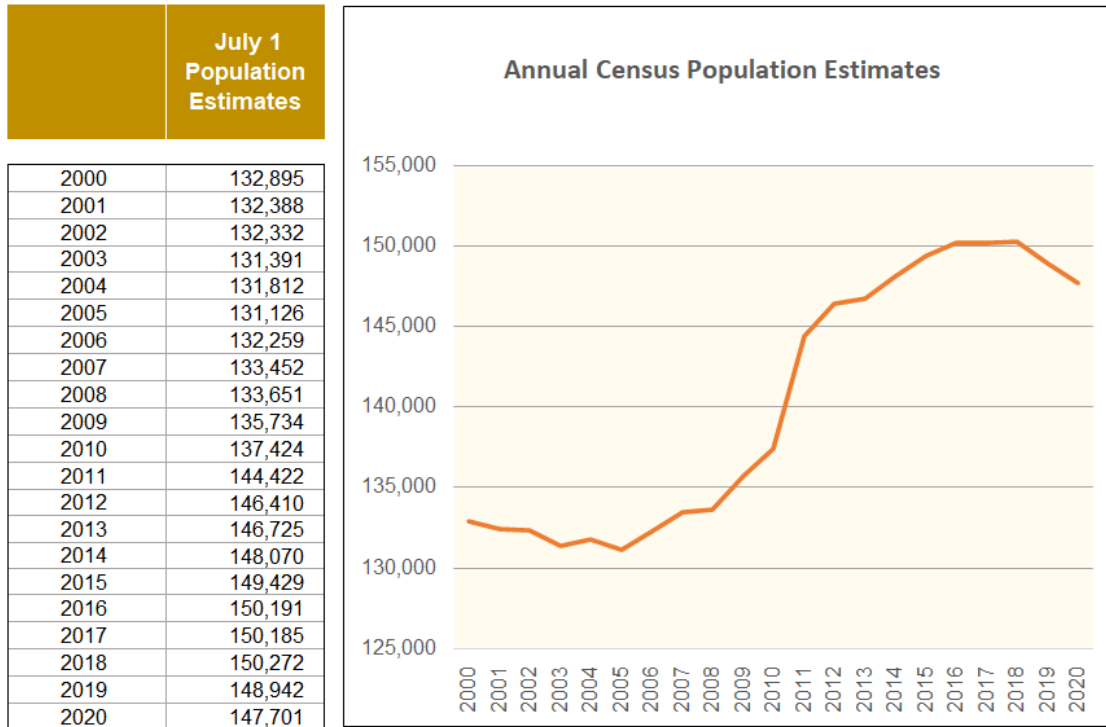
It should be noted that visitors to the city are not counted as part of the population forecasts, since they are either not staying in the city as residents or are possibly staying in hotels. On the other hand, their visits to the city on a daily basis are captured somewhat in the employment forecasts which address both employees, deliveries and customers as part of the calculations.

Ultimately, residential impact fees are based on the number of housing units in the city. It makes no difference in the impact fee calculations whether the unit is occupied by a permanent resident, a family that only comes to stay during a particular season, or the use of the unit for visitors staying only a week or so (like an Air B&B). The demand for public services, such as fire and police protection, does not vary by occupancy characteristics such as rental vs. ownership and full-time versus part-time residency.

A close look at the City’s population growth year-by-year reveals an interesting trend over the past two decades. Table A-2, below, plots the Census Bureau’s annual estimates from the 2000 Census year to 2020. After a minor ‘slump’ following the 2000 Census that persisted until 2005, the city’s population increased every year but one since then until 2018.

Inexplicably, the Census Bureau’s estimates for 2019 and 2020 show a loss in population. Inexplicable because the city’s population has increased every year since the end of the Great Recession. Nonetheless, this ‘downturn’ is not expected to persist in the future.

Table A-2: Annual Census Estimated Population



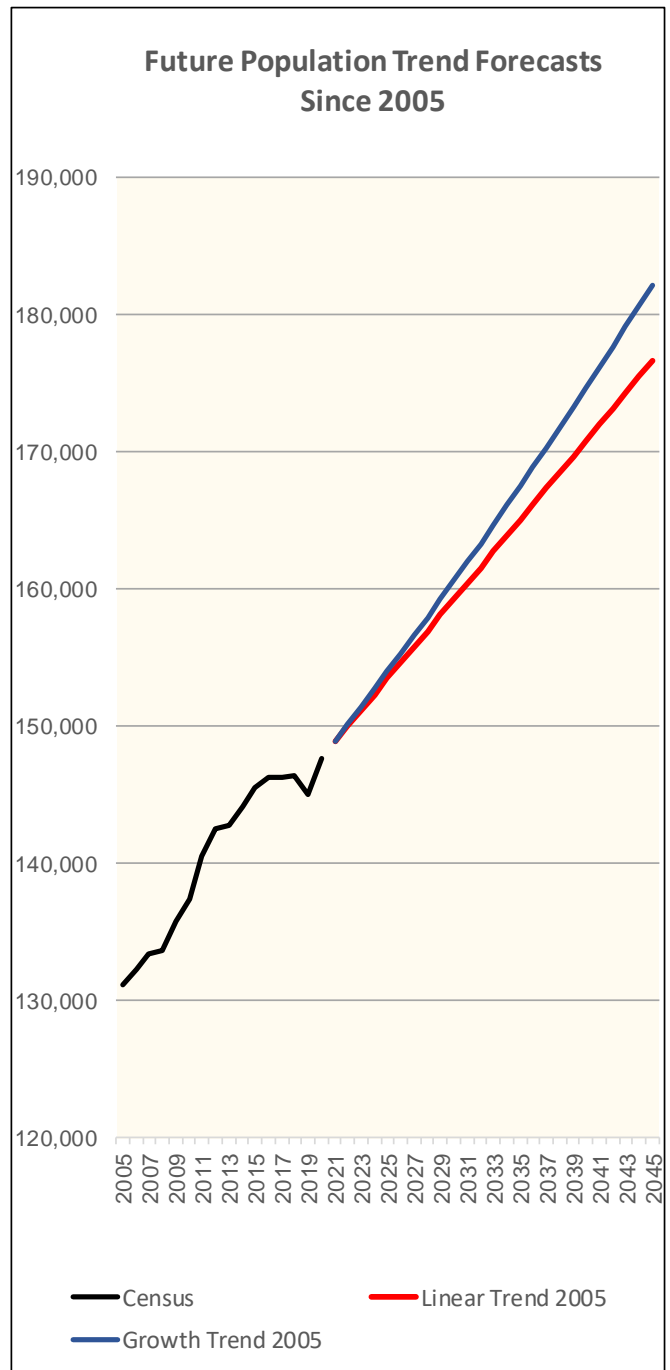
Population Forecasts

Two forecast methods were used to project the city’s past population growth forward to 2045, one using a ‘linear trend’ (straight line) forecast algorithm and the other a ‘growth trend’ (curved line) forecast algorithm. Table A-3 shows the results based on the Census estimates for the city’s historic growth period 2005-2018. The graph accompanying the table shows the 2005-2018 Census estimates and the results of the two projections.

The forecast algorithms ‘fit’ the data points to a smooth straight or curved line, including the 2005-2018 Census data points. ‘Fitting’ the projections to a specific curve also changes the data points for each year between 2005 and 2018. The projections, therefore, must be ‘rectified’ to the actual Census data for those years to produce the final projections.

Table A-3: Population Forecasts Reflecting Past Growth Period

	Linear Trend		Growth Trend	
	Raw Data Results	Rectified to Census	Raw Data Results	Rectified to Census
2005	131,898	131,126	131,996	131,126
2006	133,070	132,259	133,109	132,259
2007	134,241	133,452	134,230	133,452
2008	135,413	133,651	135,361	133,651
2009	136,584	135,734	136,502	135,734
2010	137,756	137,424	137,652	137,424
2011	138,927	140,529	138,812	140,529
2012	140,099	142,517	139,982	142,517
2013	141,270	142,832	141,162	142,832
2014	142,442	144,177	142,351	144,177
2015	143,613	145,535	143,551	145,535
2016	144,785	146,297	144,761	146,297
2017	145,956	146,292	145,981	146,292
2018	147,128	146,379	147,211	146,379
2019	148,299	145,049	148,451	145,049
2020	149,471	147,701	149,702	147,701
2021	150,642	148,859	150,964	148,946
2022	151,814	150,016	152,236	150,201
2023	152,985	151,174	153,519	151,467
2024	154,157	152,332	154,813	152,743
2025	155,328	153,489	156,117	154,030
2026	156,500	154,647	157,433	155,328
2027	157,671	155,804	158,759	156,637
2028	158,843	156,962	160,097	157,957
2029	160,014	158,120	161,446	159,288
2030	161,186	159,277	162,807	160,630
2031	162,358	160,435	164,179	161,984
2032	163,529	161,593	165,562	163,349
2033	164,701	162,750	166,958	164,726
2034	165,872	163,908	168,365	166,114
2035	167,044	165,065	169,783	167,514
2036	168,215	166,223	171,214	168,925
2037	169,387	167,381	172,657	170,349
2038	170,558	168,538	174,112	171,784
2039	171,730	169,696	175,579	173,232
2040	172,901	170,854	177,059	174,692
2041	174,073	172,011	178,551	176,164
2042	175,244	173,169	180,056	177,648
2043	176,416	174,327	181,573	179,146
2044	177,587	175,484	183,103	180,655
2045	178,759	176,642	184,646	182,178



The raw numbers of each projection method are shown in the left column for each forecast method (linear and growth). The two projections, as rectified to the actual Census figures for 2005-2020, are shown in the right-hand column under each forecast method.

The graph next to Table A-3 compares the two projections, each of which assume that the past trend will be continued into the future.

A closer examination of the line describing the 2005-2020 Census estimates suggests that the city's population growth has proceeded more along a straight line than an ever-increasing rate of expansion. It is therefore determined that the 'linear trend' algorithm more realistically describes future population growth as a continuation of the trend established by the past Census population estimates.

■ Housing Unit Forecasts

Projecting new growth and development in terms of housing units is important because residential impact fees are assessed when building permits are issued for new units. Thus, the housing unit is used as the basis for assessing impact fees rather than the number of residents that may occupy the housing unit. Since the number of people residing in a particular housing unit will most likely vary — both at the time of initial occupancy and in the years ahead as resident's lifestyles and family characteristics change, families grow, children grow up, occupants age, or the unit becomes occupied by a different household as the previous occupants move out— using average occupancies based on the size of the unit as the basis will vary widely as the years go by. In addition, for instance, many services by the Fire Department are not related to the size of one's house—kitchen fires occur in all sizes of houses with the same frequency, as well as medical emergencies. Basing impact fees on the number of residents living in a dwelling would result in a constant reassessment of the impact fees due because the demand for services would vary as the number of residents in the unit varies. Instead, using an average fee per housing unit based on average household sizes results in 'averaging' the demand for services which would otherwise vary as the population in the unit changes over the coming 20 years.

The future increase in the number of housing units in the city is based on the population forecasts for the linear trend algorithm presented in the previous section. The table on the next page shows how the housing projections were calculated. The approach is to determine the number of households each year (which equates to the number of occupied housing units) and then to expand that to the total number of housing units by adding in vacant units. As noted above regarding the population forecasts, the housing unit forms the basis for many of the impact fee calculations. The type of occupancy is not relevant, whether the housing unit is one's personal home, used by the owner seasonally, or available as a vacation rental or Air B&B, the demand for such City services as public safety remain essentially the same.

Household Projections

First, future population numbers for the growth trend projection from Table A-3 are converted into the number of households expected in future years. The results are shown on Table A-4, on the next page.

The left-hand section of the table shows the Woods & Poole³ forecasts for population, group quarters and households for the entire county. These figures are used only to allow a calculation of the average number of people per household countywide, and to reveal how W&P projects those averages to change in the future. Given the tightly knit sociometric model that W&P uses, the relationship between population and households relative to average ratios between them is considered viable as guides to such ratios for Savannah.

³ Woods & Poole Economics is a nationally recognized source of annual economic and demographic projections for the country as a whole, individual states, regions and counties. See Appendix B for a description of their model categories and projection techniques.

Table A-4 shows the average population per household, countywide, based on the population living in households and the total number of households projected by Woods & Poole.

Table A-4: Housing Unit Forecasts: 2022-2045

	Chatham County (Woods & Poole)					Percent of 2020	Savannah			
	Total Population	Group Quarters	Household Population	Households	Avg Pop per HH*		Population	Avg Pop per HH	Households	Housing Units
2020	291,127	15,157	275,970	114,037	2,420004	100.0000%	147,701	2,505573	58,949	68,089
2021	293,443	15,295	278,148	115,414	2,410002	99.5867%	148,946	2,495217	59,693	68,948
2022	295,802	15,825	279,977	116,657	2,400002	99.1735%	150,201	2,484863	60,446	69,818
2023	298,104	15,341	282,763	117,818	2,399998	99.1733%	151,467	2,484860	60,956	70,407
2024	300,399	16,190	284,209	118,916	2,389998	98.7601%	152,743	2,474506	61,727	71,298
2025	302,680	15,983	286,697	119,957	2,389998	98.7601%	154,030	2,474506	62,247	71,898
2026	304,940	15,872	289,068	120,949	2,389999	98.7601%	155,328	2,474507	62,771	72,504
2027	307,173	15,834	291,339	121,899	2,390003	98.7603%	156,637	2,474511	63,300	73,115
2028	309,375	15,871	293,504	122,805	2,390000	98.7602%	157,957	2,474508	63,834	73,731
2029	311,551	16,016	295,535	123,655	2,389996	98.7600%	159,288	2,474504	64,372	74,353
2030	313,702	16,252	297,450	124,456	2,390001	98.7602%	160,630	2,474509	64,914	74,979
2031	315,825	16,549	299,276	125,220	2,390002	98.7602%	161,984	2,474509	65,461	75,611
2032	317,914	16,922	300,992	125,938	2,390001	98.7602%	163,349	2,474509	66,013	76,248
2033	319,971	17,349	302,622	126,620	2,390002	98.7602%	164,726	2,474509	66,569	76,890
2034	321,988	17,810	304,178	127,271	2,390002	98.7603%	166,114	2,474510	67,130	77,538
2035	323,961	18,306	305,655	127,889	2,390002	98.7603%	167,514	2,474510	67,696	78,192
2036	325,884	17,520	308,364	128,485	2,400000	99.1734%	168,925	2,484861	67,982	78,523
2037	327,757	18,013	309,744	129,060	2,400000	99.1734%	170,349	2,484861	68,555	79,184
2038	329,593	18,529	311,064	129,610	2,400000	99.1734%	171,784	2,484861	69,132	79,851
2039	331,393	17,763	313,630	130,137	2,409999	99.5866%	173,232	2,495213	69,426	80,190
2040	333,168	18,285	314,883	130,657	2,409997	99.5865%	174,692	2,495212	70,011	80,866
2041	334,923	18,745	316,178	131,194	2,410004	99.5868%	176,164	2,495218	70,601	81,548
2042	336,663	19,121	317,542	131,760	2,410003	99.5867%	177,648	2,495218	71,195	82,234
2043	338,394	18,114	320,280	132,347	2,420002	99.9999%	179,146	2,505570	71,499	82,585
2044	340,122	18,388	321,734	132,948	2,419999	99.9998%	180,655	2,505567	72,101	83,280
2045	341,855	18,671	323,184	133,547	2,420002	99.9999%	182,178	2,505570	72,709	83,982
2022-2045							31,977		12,263	14,164

* Total households + total population living in households each year.

Vacancy rate based on 2020 Census data = 13.4%
 Source: 2020-2045 City Population based on 2005-2020 Growth Trend forecast.

Source: Woods & Poole Economics, Inc., 2021 Georgia Data Book, Chatham County.

Setting the 2020 countywide average population per household at 100%, the percentage of the average population per household in each subsequent year is calculated as a percentage of the 2020 figure. In 2021, for instance, the average is 99.59% of the figure in 2020, while by 2045, the average is 99.99% of the 2020 figure.

The assumption is that the average household population-per-household sizes in Savannah will 'track' proportionally the trend projected by Woods & Poole countywide. For 2020, Woods & Poole figures show the average population per household in Chatham County to be a little more than 2.42 (based on dividing the household population by the number of households). These Woods & Poole population figures ('household population', which is the total population less group quarters population) and household figures for each subsequent year also produce the average annual population per household out to 2045. These countywide annual average population per household figures are then shown as percentages of the 2020 average figure to show the extent to which these ratios vary over time.

Dividing the 2020 population figure for Savannah of 147,701 people (from Table A-3) and the 58,949 households reported by the Census, yields an average gross population of slightly fewer than 2.51 people per household. For household population figures in the city in subsequent years, the 2020 average per household is varied in concert with the percentage changes countywide. For instance, the 2021 countywide average is 99.5867% of the 2020 figure. This percentage, multiplied times the city's 2020 average population per household figure yields an average population per household of 2.495217 for 2021. By dividing the projected population in the city each year (from Table A-3) by the average population per household each year, the number of households is calculated.

Housing Units

Finally, the number of housing units (i.e., the number of households plus vacant units) is calculated.

The 2020 Census reported a total of 68,089 housing units in the city, of which 58,949 were occupied and 9,140 were vacant. Thus, the vacancy rate indicated by the Census figures was 13.4% of the total number of housing units. In order to convert the number of households into the number of housing units, however, each household total must be multiplied by 1.155049 (which is derived by dividing 68,089 housing units in 2020 by 58,949 households).

Over the forecast period, a net total of 14,164 new housing units are projected to be added to the city, a 20.3% increase over 2022 producing almost 17% of the total housing stock in 2045.

It is worth noting that more than the 14,164 units will most likely be constructed. However, replacing a housing unit with a new housing unit is not impact fee eligible because there is no net increase in the demand for public services. Thus, the net total increase will produce increased demands for public services and will therefore be eligible for impact fee assessments.

■ Employment Forecasts

For the employment projections, we looked first to the forecasts prepared by Woods & Poole Economics for Chatham County.

Woods & Poole Economics has proven to be a valuable resource for employment data at the county level, both in terms of the wide range of types of jobs and its long-range annual projections. Importantly, while the Census Bureau counts the number of employed people, Woods & Poole counts jobs, which captures people holding two or more jobs, self-employed sole proprietors and part-time workers, and vacant jobs available. This gives a more complete picture than Census figures as to the employment vitality and economic base of a community.

Table A-5 shows the forecasts for employment countywide in Chatham County for several benchmark years as well as the projected increase (or decrease) in the projected number of jobs between 2022 and 2045. The employment figures for the county are based on forecasts published by Woods & Poole Economics in their latest (2021) *Georgia Profile* for Chatham County, published in 2022.

Table A-5: County-wide Employment Forecast (Jobs)

	2022	2025	2030	2035	2040	2045	2022-2045 Change	
							Number	Percent
Total Employment	222,407	231,362	246,148	260,537	274,487	288,034	65,627	22.8%
Farm Employment	54	52	50	48	46	44	-10	-22.7%
Forestry, Fishing	232	230	225	221	216	211	-21	-10.0%
Mining	86	81	73	65	57	50	-36	-72.0%
Construction	9,232	9,221	9,195	9,158	9,114	9,064	-168	-1.9%
Total Non-Building	9,604	9,584	9,543	9,492	9,433	9,369	-235	-2.5%
Federal Civilian	2,640	2,605	2,548	2,493	2,439	2,384	-256	-10.7%
Federal Military	5,234	5,238	5,246	5,254	5,262	5,270	36	0.7%
State & Local Government	16,760	17,001	17,374	17,710	18,014	18,285	1,525	8.3%
Total Government	24,634	24,844	25,168	25,457	25,715	25,939	1,305	5.0%
Utilities	401	387	363	337	311	285	-116	-40.7%
Manufacturing	16,899	16,965	17,009	16,990	16,897	16,720	-179	-1.1%
Wholesale Trade	6,547	6,573	6,600	6,581	6,499	6,358	-189	-3.0%
Transportation & Warehousing	18,919	20,213	22,390	24,592	26,815	29,059	10,140	34.9%
Subtotal: Industrial	42,766	44,138	46,362	48,500	50,522	52,422	9,656	18.4%
Retail Trade	22,320	22,602	23,050	23,425	23,693	23,861	1,541	6.5%
Information	2,647	2,640	2,628	2,616	2,602	2,587	-60	-2.3%
Finance & Insurance	7,096	7,397	7,727	7,866	7,851	7,724	628	8.1%
Real Estate	10,285	11,028	12,352	13,680	15,020	16,374	6,089	37.2%
Professional & Technical Services	10,068	10,776	11,928	13,052	14,159	15,256	5,188	34.0%
Management of Companies	982	935	855	773	691	613	-369	-60.2%
Administrative & Waste Services	19,062	20,525	23,083	25,814	28,744	31,902	12,840	40.2%
Educational Services	5,770	6,258	7,063	7,865	8,673	9,496	3,726	39.2%
Health Care & Social Assistance	23,781	24,921	26,846	28,667	30,289	31,635	7,854	24.8%
Arts, Entertainment & Recreation	5,047	5,465	6,192	6,960	7,774	8,638	3,591	41.6%
Accommodation & Food Services	25,560	27,086	29,609	32,118	34,629	37,157	11,597	31.2%
Other Private Services	12,785	13,163	13,742	14,252	14,692	15,061	2,276	15.1%
Subtotal: Commercial & Services	145,403	152,796	165,075	177,088	188,817	200,304	54,901	27.4%
Total Value-Added	188,169	196,934	211,437	225,588	239,339	252,726	64,557	25.5%

Source: Woods & Poole Economics, Inc., 2021 Georgia Data Book, Chatham County.

Various individual employment categories are grouped together in Table A-5 to better understand broad types of employment in the county and to facilitate identification of those types of businesses that would come under an impact fee program.

- The first grouping is referred to as ‘non-building’ related jobs. These types of jobs are those that do not normally require issuance of a building permit, and thus would not be assessed an impact fee. Such jobs include any employment that is considered to be transitory in nature, such as those working on construction sites, or are strictly land-based such as farming and other agricultural workers.
- The table also shows the number of workers employed by governmental entities (county, state and federal) as estimated by Woods & Poole for each year. Governments are exempt from impact fees, whether a building is to be constructed or not.
- The last grouping on the table shows what is called ‘value-added’ employment. This category encompasses private sector jobs, including nonprofits and institutions. Businesses employing these ‘private sector’ workers are the ones that would be most likely to be assessed an impact fee.

As can be seen on the table, notable changes are forecast for the non-building types of employment between 2022 and 2045. Construction jobs comprise the vast majority of all ‘non-building’ types of jobs (over 96%) and will drop the smallest percentage by 2045 compared to the other non-building types.

Table A-6: Commuting Patterns

Number of Commuters Working in Chatham County	Percent of all County Workers	Residence of Chatham County Workers
108,826	74.61%	Chatham County
13,142	9.01%	Effingham County
7,171	4.92%	Bryan County
4,113	2.82%	Liberty County
3,620	2.48%	Bulloch County
3,368	2.31%	South Carolina
1,608	1.10%	Beaufort County
1,040	0.71%	Jasper County
142,888	97.96%	Total from Region
145,867	100.00%	Total from All Counties
Total Workers in Savannah	102,266	Includes City Residents and Commuters
Percent of Chatham County	70.1091%	

Sources: Commuter-Adjusted Daytime Population for Cities and Counties, and Daytime Residence County to Chatham County Flows by Workplace, Bureau of the Census, 2010.

Government jobs are expected to increase by only 5% overall, with gains at the state and local level tempered by a reduction in federal civilian jobs.

The greatest employment growth by 2045 is projected in the ‘value-added’ grouping—an increase of an additional 25.5% over the total number of such jobs today. The jobs in this category are grouped under two sub-categories: ‘industrial’ types of companies (most notably including manufacturing and transportation & warehousing in terms of total employment), and ‘commercial and services’ types of companies.

Overall, jobs in the ‘value-added’ category will gain in prominence countywide and are projected to increase from 84.6% of all jobs in the county today to 87.7% of all jobs by 2045. Those ‘value added’ employment categories are projected to add almost 55,000 net new jobs to the county’s employment base.

In order to isolate jobs data for Savannah itself, we turn first to the latest commuting data available, which was published as part of the 2010 Census. Table A-6 shows where in the region the vast majority (98%) of people working in

Chatham County actually lived, with the final 2% (about 3,000 commuters) coming from much farther away.

The Census also reported the total number of people working in Savannah, comprising both residents of the city and commuters living outside of the city. While the data for the city did not include places of origin, we know the total number of people working in the city. Using a rule-of-thumb correlation between the total workers in the city (102,266) compared to the total number of people working in Chatham County (145,867), it can be deduced that Savannah workers represented a bit over 70.1% of all of the workers in the county.

That percentage (70.1091%) is then applied to the 'value-added' jobs data on Table A-5 to estimate the number of jobs in Savannah in each 'value-added' category. The results are shown on Table A-7, which details an overall increase of 25.5%: an additional 45,262 jobs moving from a total of almost 132,000 jobs in 2022 to well over 177,000 by 2045.

Table A-7: Savannah Value-Added Employment Forecast (Jobs)

	2022	2025	2030	2035	2040	2045	2022-2045 Change	
							Number	Percent
Utilities	281	271	254	236	218	200	-81	-40.5%
Manufacturing	11,848	11,894	11,925	11,912	11,846	11,722	-126	-1.1%
Wholesale Trade	4,590	4,608	4,627	4,614	4,556	4,458	-132	-3.0%
Transportation & Warehousing	13,264	14,171	15,697	17,241	18,800	20,373	7,109	34.9%
Subtotal: Industrial	29,983	30,944	32,503	34,003	35,420	36,753	6,770	18.4%
Retail Trade	15,648	15,846	16,160	16,423	16,611	16,729	1,081	6.5%
Information	1,856	1,851	1,842	1,834	1,824	1,814	-42	-2.3%
Finance & Insurance	4,975	5,186	5,417	5,515	5,504	5,415	440	8.1%
Real Estate	7,211	7,732	8,660	9,591	10,530	11,480	4,269	37.2%
Professional & Technical Services	7,059	7,555	8,363	9,151	9,927	10,696	3,637	34.0%
Management of Companies	688	656	599	542	484	430	-258	-60.0%
Administrative & Waste Services	13,364	14,390	16,183	18,098	20,152	22,366	9,002	40.2%
Educational Services	4,045	4,387	4,952	5,514	6,081	6,658	2,613	39.2%
Health Care & Social Assistance	16,673	17,472	18,821	20,098	21,235	22,179	5,506	24.8%
Arts, Entertainment & Recreation	3,538	3,831	4,341	4,880	5,450	6,056	2,518	41.6%
Accommodation & Food Services	17,920	18,990	20,759	22,518	24,278	26,050	8,130	31.2%
Other Private Services	8,963	9,228	9,634	9,992	10,300	10,559	1,596	15.1%
Subtotal: Commercial & Services	101,940	107,124	115,731	124,156	132,376	140,432	38,492	27.4%
Total Value-Added	131,923	138,068	148,234	158,159	167,796	177,185	45,262	25.5%

Ratio of Savannah workers to County workers. 70.1091%

Table A-8 provides a more detailed look at the city’s job projections from Table A-7, for every ‘value-added’ employment category for each year from 2022 to 2045.

The ‘Industrial’ and the ‘Commercial’ groupings are used in calculations regarding vehicle trip projections related to road improvements.

Of the additional 45,262 jobs generated by 2045, two-thirds of all new jobs are projected to be created in only four business categories: Administrative Services (20% of total value-added jobs), followed closely by Accommodation & Food Services (18%), Transportation & Warehousing (16%), and finally Health Care and Social Assistance (12%).

Overall, the jobs in these four categories in 2045 will represent 25.6% of all value-added jobs in 2045 and an increase of 34.3% over 2022.

Table A-8: Savannah Value-Added Employment by Year

	INDUSTRIAL							COMMERCIAL									TOTAL
	Utilities	Manufacturing	Wholesale Trade	Warehousing	Retail Trade	Information	Finance & Insurance	Real Estate	Technical Services	Management	Admin Services	Education Services	Health & Social	Rec, Entertainment	Lodging & Food Svcs	Other Services	
2022	281	11,848	4,590	13,264	15,648	1,856	4,975	7,211	7,059	688	13,364	4,045	16,673	3,538	17,920	8,963	131,923
2023	278	11,858	4,595	13,568	15,712	1,854	5,030	7,392	7,222	677	13,716	4,158	16,942	3,638	18,275	9,047	133,962
2024	274	11,867	4,599	13,872	15,776	1,853	5,086	7,573	7,385	666	14,069	4,272	17,210	3,739	18,630	9,131	136,002
2025	271	11,877	4,604	14,176	15,840	1,851	5,141	7,754	7,548	655	14,421	4,385	17,479	3,839	18,985	9,215	138,041
2026	268	11,887	4,609	14,481	15,904	1,849	5,196	7,936	7,711	644	14,774	4,499	17,747	3,940	19,340	9,299	140,084
2027	264	11,896	4,613	14,785	15,968	1,847	5,251	8,117	7,874	632	15,126	4,612	18,016	4,040	19,694	9,382	142,117
2028	261	11,906	4,618	15,089	16,032	1,846	5,307	8,298	8,037	621	15,478	4,725	18,284	4,140	20,049	9,466	144,157
2029	257	11,915	4,622	15,393	16,096	1,844	5,362	8,479	8,200	610	15,831	4,839	18,553	4,241	20,404	9,550	146,196
2030	254	11,925	4,627	15,697	16,160	1,842	5,417	8,660	8,363	599	16,183	4,952	18,821	4,341	20,759	9,634	148,234
2031	250	11,917	4,620	16,007	16,205	1,840	5,426	8,847	8,519	588	16,580	5,065	19,062	4,452	21,111	9,701	150,190
2032	247	11,909	4,613	16,318	16,250	1,838	5,434	9,034	8,676	576	16,977	5,178	19,304	4,563	21,463	9,767	152,147
2033	243	11,901	4,606	16,628	16,295	1,837	5,443	9,221	8,832	565	17,374	5,291	19,545	4,674	21,815	9,834	154,104
2034	240	11,893	4,599	16,938	16,340	1,835	5,452	9,408	8,989	553	17,771	5,404	19,787	4,785	22,167	9,900	156,061
2035	236	11,886	4,592	17,249	16,386	1,833	5,461	9,595	9,145	542	18,168	5,517	20,028	4,896	22,519	9,967	158,020
2036	232	11,878	4,584	17,559	16,431	1,831	5,469	9,782	9,301	530	18,564	5,629	20,269	5,006	22,870	10,034	159,969
2037	229	11,870	4,577	17,869	16,476	1,829	5,478	9,969	9,458	519	18,961	5,742	20,511	5,117	23,222	10,100	161,927
2038	225	11,862	4,570	18,179	16,521	1,828	5,487	10,156	9,614	507	19,358	5,855	20,752	5,228	23,574	10,167	163,883
2039	222	11,854	4,563	18,490	16,566	1,826	5,495	10,343	9,771	496	19,755	5,968	20,994	5,339	23,926	10,233	165,841
2040	218	11,846	4,556	18,800	16,611	1,824	5,504	10,530	9,927	484	20,152	6,081	21,235	5,450	24,278	10,300	167,796
2041	214	11,821	4,536	19,115	16,635	1,822	5,488	10,720	10,081	473	20,595	6,196	21,424	5,571	24,632	10,352	169,673
2042	211	11,796	4,517	19,429	16,658	1,820	5,468	10,910	10,235	462	21,038	6,312	21,613	5,692	24,987	10,404	171,552
2043	207	11,772	4,497	19,744	16,682	1,818	5,451	11,100	10,388	452	21,480	6,427	21,801	5,814	25,341	10,455	173,429
2044	204	11,747	4,478	20,058	16,705	1,816	5,433	11,290	10,542	441	21,923	6,543	21,990	5,935	25,696	10,507	175,308
2045	200	11,722	4,458	20,373	16,729	1,814	5,415	11,480	10,696	430	22,366	6,658	22,179	6,056	26,050	10,559	177,185
Change 2022-2045	(81)	(126)	(132)	7,109	1,081	(42)	440	4,269	3,637	(258)	9,002	2,613	5,506	2,518	8,130	1,596	45,262

Appendix B: Woods & Poole Methodology

Selected data from Woods & Poole for the years 2012 to 2045 have been used as critical factors in the creation of population, household and employment estimates for Savannah. The following has been excerpted from the 2021 State Profile for Georgia, prepared by Woods & Poole Economics, Inc., Washington, D.C., in explanation of the methodology W&P uses in creating their estimates and projections, definitions of employment categories, and the interconnected nature of their econometric model approach.

■ Introduction

The Woods & Poole Economics, Inc. database contains more than 900 economic and demographic variables for every county in the United States for every year from 1970 to 2050. This comprehensive database includes detailed population data by age, sex, and race; employment and earnings by major industry; personal income by source of income; retail sales by kind of business; and data on the number of households, their size, and their income. All of these variables are projected for each year through 2050. In total, there are over 200 million statistics in the regional database. The regional model that produces the projection component of this database was developed by Woods & Poole. The regional projection methods are revised somewhat year to year to reflect new computational techniques and new sources of regional economic and demographic information. Each year, a new projection is produced based on an updated historical database and revised assumptions.

The fact that the proprietary Woods & Poole economic and demographic projections rely on a very detailed database, makes them one of the most comprehensive county-level projections available. A description of some characteristics of the database and projection methods is contained below.

■ Overview of the Projection Methods

The strength of Woods & Poole's economic and demographic projections stems from the comprehensive historical county database and the integrated nature of the projection model. The projection for each county in the United States is done simultaneously so that changes in one county will affect growth or decline in other counties. For example, growth in employment and population in Houston will affect growth in other metropolitan areas, such as Cleveland. This reflects the flow of economic activity around the country as new industries emerge or relocate in growing areas and as people migrate, in part because of job opportunities. The county projections are developed within the framework of the United States projection made by Woods & Poole. The U.S. projection is the control total for the 2021 regional projections and is described in the 'Overview of the 2021 Projections' chapter included in Woods & Poole publications.

The regional projection technique used by Woods & Poole—linking the counties together to capture regional flows and constraining the results to a previously determined United States total—avoids a common pitfall in regional projections. Regional projections are sometimes made for a city or county without regard for potential growth in surrounding areas or other areas in the country. Such projections may be simple extrapolations of recent historical trends and, as a result, may be too optimistic or pessimistic. If these county projections were added together, the total might differ considerably from any conceivable national forecast scenario; this is the result of each regional projection being generated independently without interactive procedures and without being integrated into a consistent national projection.

The methods used by Woods & Poole to generate the county projections proceed in four stages. First, forecasts to 2050 of total United States personal income, earnings by industry, employment by

industry, population, inflation, and other variables are made. Second, the country is divided into 179 Economic Areas (EAs) as defined by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). The EAs are aggregates of contiguous counties that attempt to measure cohesive economic regions in the United States; in the 2021 Woods & Poole model, EA definitions released by the BEA in May 2007 are used. For each EA, a projection is made for employment, using an 'export-base' approach; in some cases, the employment projections are adjusted to reflect the results of individual EA models or exogenous information about the EA economy. The employment projection for each EA is then used to estimate earnings in each EA. The employment and earnings projections then become the principal explanatory variables used to estimate population and number of households in each EA.

The third stage is to project population by age, sex, and race for each EA on the basis of net migration rates projected from employment opportunities. For stages two and three, the U.S. projection is the control total for the EA projections. The fourth stage replicates stages two and three except that it is performed at the county level, using the EAs as the control total for the county projections.

The 'Export-Base' Approach

The specific economic projection technique used by Woods & Poole to generate the employment, earnings, and income estimates for each county in the United States generally follow a standard economic 'export-base' approach. This relatively simple approach to regional employment projections is one that has been used by a number of researchers.

Certain industrial sectors at the regional level are considered 'basic.' This means that these sectors produce output that is not consumed locally but is 'exported' out of the region for national or international consumption. This assumption allows these sectors to be linked closely to the national economy, and hence follow national trends in productivity and output growth. Normally, the 'basic' sectors are mining, agriculture, manufacturing, and the Federal government. In contrast, 'non-basic' sectors are those such as retail trade, transportation, communication, and construction, the output of which is usually consumed locally. The growth of the 'non-basic' sectors depends largely on the growth of the 'basic' sectors that form the basis of the region's economy.

Intuitively, this approach has great appeal and there are numerous examples that seem to support the 'export-base' theory. Automobile production in Detroit, for instance, is obviously much more sensitive to national and international price and demand for transportation equipment than to local demand. In Texas, oil and natural gas exploration and production are tied closely to the worldwide demand and supply of petroleum resources and not tied primarily to energy consumption in Texas.

Although the theory is appealing, some shortcomings do exist in the 'export-base' approach. For example, some 'basic' commodities produced locally are consumed locally. Producers of durable equipment used in other manufacturing processes are often affected not by the national demand for their product but by the regional demand. Machine tool makers that supply the local automobile industry in Detroit will prosper to the extent Detroit's automobile producers prosper. In Houston, the strength of the local oil industry will affect the demand and production of equipment for oil and natural gas production and exploration. In both of these instances, some durable manufacturing industries exist to serve local, not national, markets.

However, despite the shortcomings, the availability of relatively clean data for sub-national geographic areas makes the 'export-base' approach very useful. The analytical framework for projections using the 'export-base' approach entails estimating either demand equations or calculating historical growth rate differentials for output by sector. The principal explanatory variable, or the comparative data series for growth rate differentials, is the national demand for the output of that sector.

Employment-by-sector data are often used as a surrogate variable since county output-by-sector data are not available; employment-by-sector data is used by Woods & Poole. Earnings projections are then obtained by using earnings-per-employee data either estimated as part of the model or imposed exogenously on the system. The complementary relationship could also be estimated, i.e., using earnings forecast to derive employment based on earnings-per-employee data; this procedure has been used previously in some Woods & Poole regional models.

A modification of the 'export-base' approach is used by Woods & Poole to account for regional variants to normal 'basic'/'non-basic' industry definitions. Some 'non-basic' sectors can be more appropriately modeled as 'basic' sectors in certain regional economies. The finance and insurance sector or wholesale trade sector in New York City, for example, and the accommodation and food services sector in Las Vegas, are cases in which traditionally 'non-basic' sectors are really 'basic.' New York is a world-wide financial and trade center and thus 'exports' these services outside of the region; Las Vegas, as a vacation and entertainment center, similarly 'exports' the output of its accommodation and food services sector to other parts of the country. Activity in these sectors, in these specific geographic areas, is therefore linked more closely to the performance of these same sectors in the surrounding regions and the nation as a whole than to the other 'basic' industries in the region.

The Demographic Model

The demographic portion of the regional model follows a traditional cohort-component analysis based on calculated fertility and mortality in each county or EA. The 'demand' for total population is estimated from the economic model: if the demand for labor is forecast to rise for a particular county or EA, then either the labor force participation rate will rise or population in-migration will be positive. The inverse is true for counties and EAs with projected declines in employment. Therefore, future EA and county migration patterns for population by age, sex, and race are based on employment opportunities. Individuals and families are assumed to migrate, at least in part, in response to employment opportunities with two exceptions: for population aged 65 and over and for college or military-aged population, migration patterns over the forecast period are based on historical net migration and not economic conditions. The integration of economic and demographic regional analysis is a significant strength of the Woods & Poole approach.

The age, sex, and race distribution of the population is projected by aging the population by single year of age by sex and by race for each year through 2050 based on county or EA specific mortality, fertility, and migration rates estimated from historical data. In the Woods & Poole model, projected net mortality and migration are estimated based on the historical net change in population by age, race, and sex for a particular county or EA. Similarly, projected net births and migration of age zero population by race are estimated based on the historical change in age zero population by race per female population age 15 to 44 by race for a particular county or EA.

The United States population by age, sex, and race projections, 2020 to 2050, are based on Bureau of the Census population estimates for 1990 through 2019. Woods & Poole forecasts these U.S. estimates with a cohort-component model based on the year to year change in U.S. population by single year of age, race, and sex. Forecast fertility, mortality, and international migration are estimated from the Census population estimates and are applied exogenously to the Woods & Poole U.S. projections. Woods & Poole produces only a 'middle' U.S. population forecast - this forecast is similar to the Census 'middle' forecast scenario for the U.S. population. The U.S. population by age, sex, and race forecast is the control total for the EA projections. Each EA projection serves as the control totals for the county projections.

The 2021 Woods & Poole U.S. population projections, 2020 to 2050, are higher than the 2020 Woods & Poole population projections because historical fertility and net migration 2010 through 2019, based on U.S. Census post-censal estimates, are higher than previously projected resulting in higher fertility and migration assumptions over the forecast period.

■ Population

Population is defined as July 1 residential population and includes: civilian population; military population except personnel stationed overseas; college residents; institutional populations, such as prison inmates and residents of mental institutions, nursing homes, and hospitals; and estimates of undocumented aliens. Excluded are persons residing in Puerto Rico, U.S. territories and possessions, and U.S. citizens living abroad.

For the years 1990 to 2050 the population data are broken down by five race/ethnic groups: White not including Hispanic or Latino (i.e. Non-Hispanic), Black Non-Hispanic, Native American or American Indian Non-Hispanic, Asian American and Pacific Islanders Non-Hispanic, and Hispanic or Latino. Population by race as defined by the Census Bureau is based on self-identification by respondents. **White population** includes people who identify themselves as White and people who do not identify themselves by any race but identify themselves by nationality, such as Canadian, German, Italian, Arab, Lebanese, Near Eastern, or Polish. **Black population** includes people who identify themselves as Black and people who do not identify themselves by any race but identify themselves by nationality, such as African American, Afro-American, Black Puerto Rican, Jamaican, Nigerian, West Indian, or Haitian. **Native American population** includes people who identify themselves as Alaska Native or American Indian by Indian tribe or classify themselves as Canadian Indian, French American Indian, Spanish-American Indian, Eskimos, Aleuts, and Alaska Indians. **Asian American and Pacific Islander** American Indian and Alaska Native population includes people who identify themselves as Alaska Native or American Indian by Indian tribe or identify themselves as Canadian Indian, French American Indian, Spanish-American Indian, Eskimos, Aleuts, and Alaska Indians.

Hispanic or Latino population includes people who identify themselves as having origins in Spain, the Spanish-speaking countries of Central or South America, the Dominican Republic, and who identify themselves generally as Spanish, Spanish-American, Hispanic, Hispano, or Latino. Hispanic population is not a race group but rather a description of ethnic origin. Although Hispanics are part of the other four race groups they are shown separately in the Woods & Poole database so that the four race groups plus Hispanic equals total population.

■ Households

Households are defined as occupied housing units. A housing unit is a house, an apartment, a group of rooms, or a single room occupied as separate living quarters. The occupants of a housing unit may be a single family, one person living alone, two or more families living together, or any group of related or unrelated persons who share living quarters. All people are part of a household except those who reside in group quarters. Group quarters include living arrangements such as prisons, homes for the aged, rooming houses, college dormitories, and military barracks. The average size of households is defined as total population less group quarters population divided by the number of households. Mean household income is defined as total personal income less estimated income of group quarters population divided by the number of households.

■ Employment

The employment data in the Woods & Poole database are a complete measure of the number of full- and part-time jobs by place of work. Historical data, 1969-2017, are from the U.S. Department of

Commerce, Bureau of Economic Analysis. Because part-time workers are included, a person holding two part-time jobs would be counted twice.

Data on proprietors include farm and non-farm proprietors by sector. Proprietors include not only those people who devote the majority of their time to their proprietorship, but people who devote any time at all to a proprietorship. Thus, a person who has a full-time wage and salary job and on nights and weekends runs a small business legally defined as a proprietorship would be counted twice. The employment data therefore include full- and part-time proprietors.

Private household employment data include persons employed by a household on the premises, such as full-time baby-sitters, housekeepers, gardeners, and butlers. Miscellaneous employment data include judges and all elected officials, persons working only on commission in sectors such as real estate and insurance, students employed by the colleges or universities in which they are enrolled, and unincorporated subcontractors in sectors such as construction.

The employment data used by Woods & Poole comprise the most complete definition of the number of jobs by county. Woods & Poole data may be higher than that from other sources because they measure more kinds of employment.

Employment by Sector

The employment data is by two-digit North American Industry Classification System (NAICS) industry. The two-digit industries are defined in the 2002 North American Industry Classification System Manual. The employment data in the Woods & Poole 2021 database are no longer based on the Standard Industrial Classification (SIC) system definitions. For the years 1969-2000 BEA provided employment industry data by SIC rather than by NAICS; Woods & Poole has estimated the NAICS industry data for 1969-2000 from the BEA SIC 1969-2000 employment industry data and the NAICS employment industry data for the years 2001-2019.

As a rule, employment is classified in a given industry depending on the primary activity of the establishment. For example, employees of a large oil company are classified in many different sectors depending on the specific establishment in which they worked, even though the company as a whole would be considered a mining company: employees at a refinery are in manufacturing; employees at the company headquarters are in services; pipeline operators are in transportation; and oil field workers are in mining. If a given establishment is engaged in activities in different sectors, all employees are classified according to the primary activity of the establishment regardless of their actual occupations; thus, a secretary for a trucking company is a transportation worker and an accountant at a small plumbing company is a construction worker. The main exception to this rule is the classification of government workers in the Woods & Poole database: all government employees are classified in Federal civilian, Federal military, or state and local government employment, regardless of the usual classification of the establishment in which they work. Definitions for each sector, based on NAICS industries, in the Woods & Poole database are as follows:

Farming includes establishments such as farms, orchards, greenhouses, and nurseries primarily engaged in the production of crops, plants, vines, trees (excluding forestry operations), and specialties such as Christmas trees, sod, bulbs, and flower seed. It also includes establishments such as ranches, dairies, feedlots, egg production facilities, and poultry hatcheries primarily engaged in the keeping, grazing, or feeding of cattle, hogs, sheep, goats, poultry of all kinds, and special animals such as horses, bees, pets, fish farming, and animals raised for fur.

Forestry, fishing, related activities, and other includes establishments primarily engaged in harvesting timber, and harvesting fish and other animals from their natural habitats. The sector also

includes agricultural support establishments that perform one or more activities associated with farm operation, such as soil preparation, planting, harvesting, and management, on a contract or fee basis. Excluded are establishments primarily engaged in agricultural research and establishments primarily engaged in administering programs for regulating and conserving land, mineral, wildlife, and forest use. Other consists of jobs held by U.S. residents who are employed by international organizations and by foreign embassies and consulates in the United States.

Mining includes establishments that extract naturally occurring mineral solids (e.g. coal and ores), liquid minerals (e.g. crude petroleum), and gases (e.g. natural gas.) Mining includes quarrying, well operations, beneficiating (e.g., crushing, screening, washing, and flotation), and other preparation customarily performed at the mine site, or as a part of mining activity.

Utilities includes establishments engaged in the provision of electric power, natural gas, steam supply, water supply, and sewage removal. Utilities include electric power generation, electric power transmission, electric power distribution, natural gas distribution, steam supply provision, steam supply distribution, water treatment, water distribution, sewage collection, sewage treatment, and disposal of waste through sewer systems and sewage treatment facilities. Excluded from this sector are establishments primarily engaged in waste management services that collect, treat, and dispose of waste materials but do not use sewer systems or sewage treatment facilities. Also excluded from this sector are federal or state or local government operated establishments.

Construction includes establishments primarily engaged in building new structures and roads, alterations, additions, reconstruction, installations, and repairs. It includes general contractors engaged in building residential and nonresidential structures; contractors engaged in heavy construction, such as abridges, roads, tunnels, and pipelines; and special trade contracting, such as plumbing, electrical work, masonry, and carpentry. Construction includes establishments primarily engaged in the preparation of sites for new construction, including demolition, and establishments primarily engaged in subdividing land for sale as building sites. Construction work done may include new work, additions, alterations, or maintenance and repairs.

Manufacturing includes establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. The assembling of component parts of manufactured products is considered manufacturing, except in cases where the component parts are associated with structures. Manufacturing establishments can be plants, factories, or mills as well as bakeries, candy stores, and custom tailors. Manufacturing establishments may either process materials or may contract with other establishments to process their materials for them. Broadly defined, manufacturing industries include the following: food processing, such as canning, baking, meat processing, and beverages; tobacco products; textile mill products, such as fabric, carpets and rugs; apparel; wood products, including logging, sawmills, prefabricated homes, and mobile homes; furniture; paper; printing; chemicals, such as plastics, paints, and drugs; petroleum refining; rubber and plastics; leather products; stone, clay, and glass; primary metals, such as steel, copper, aluminum, and including finished products such as wire, beams, and pipe; fabricated metals, such as cans, sheet metal, cutlery, and ordnance; industrial machinery, including computers, office equipment, and engines; electronics and electrical equipment; transportation equipment, such as cars, trucks, ships, and airplanes; instruments; and miscellaneous industries, such as jewelry, musical instruments, and toys. Excluded from manufacturing is publishing of printed materials.

Wholesale trade includes establishments engaged in wholesaling merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The merchandise described in this sector includes the outputs of agriculture, mining, manufacturing, and certain information industries, such as publishing. Wholesale establishments are primarily engaged in selling

merchandise to retailers; or to industrial, commercial, institutional, farm, construction contractors; or to professional business users; or to other wholesalers or brokers. The merchandise sold by wholesalers includes all goods used by institutions, such as schools and hospitals, as well as virtually all goods sold at the retail level. Wholesalers can be merchant wholesalers who purchase goods from manufacturers or other wholesalers and sell them; sales branches of manufacturing, mining, or farm companies engaged in marketing the products of the company to retail establishments; or agents, merchandise or commodity brokers, and commission merchants.

Retail trade includes establishments engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. Retail trade includes store retailers such as motor vehicle and parts dealers including automobile, motorcycle and boat dealers as well as tire and automobile parts stores; furniture and home furnishing stores; electronics and appliance stores; food and beverage stores, including supermarkets, convenience stores, butchers, and bakeries; health and personal care stores such as pharmacies and optical goods stores; gasoline stations; clothing and clothing accessory stores; sporting goods, hobby, book and music stores; department stores; and miscellaneous establishments, including office supply stores, mobile home dealers, thrift shops, florists, tobacco stores, and pet shops. Retail trade also includes nonstore retailers such as internet and catalog sellers, as well as home delivery establishments such as heating oil dealers. Retail trade excludes eating and drinking places, including restaurants, bars, and take-out stands.

Transportation and warehousing includes industries providing transportation of passengers and cargo and warehousing and storage for goods. Establishments in these industries use transportation equipment or transportation related facilities as a productive asset. Transportation includes railroads, highway passenger transportation, trucking, shipping, air transportation, pipelines, and transportation services. Transportation also includes private postal services, and courier services but excludes the U.S. Postal Service. Warehousing includes refrigerated storage and grain elevators.

Information includes establishments engaged in producing and distributing information and cultural products; providing the means to transmit or distribute these products as well as data or communications; and processing data. The main components of this sector are the publishing industries, including software publishing, and both traditional publishing and publishing exclusively on the Internet; the motion picture and sound recording industries; movie theaters; the broadcasting industries, including traditional broadcasting and those broadcasting exclusively over the Internet; the telecommunications industries; the industries known as internet service providers and web search portals; data processing industries; and the information services industries.

Finance and insurance includes establishments primarily either engaged in or facilitating financial transactions (e.g. transactions involving the creation, liquidation, or change in ownership of financial assets.) Establishments include depository institutions, such as commercial banks, credit unions savings and loans, and foreign banks; credit institutions; credit card processing; investment companies; brokers and dealers in securities and commodity contracts; security and commodity exchanges; carriers of all types of insurance; insurance agents and insurance brokers. Also included are central banks and monetary authorities charged with monetary control.

Real estate and rental and leasing includes establishments primarily engaged in renting, leasing, or otherwise allowing the use of tangible or intangible assets, and establishments providing related services. Real estate includes real estate leasing establishments, real estate agencies and brokerages, property management establishments, appraisals establishments, and escrow agencies. Rental and leasing includes car and truck rental, consumer goods rentals such as video stores and formal wear rental stores, and commercial equipment renting and leasing construction, transportation, office

and farm equipment. Also included are establishments that lease nonfinancial and noncopyrighted intangible assets such as patents and trademarks.

Professional and technical services includes establishments that specialize in performing professional, scientific, and technical activities for others. These activities include legal advice and representation; accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer services; consulting services; research services; advertising services; photographic services; translation and interpretation services; veterinary services; and other professional, scientific, and technical services. Excluded are establishments primarily engaged in providing office administrative services, such as financial planning, billing and recordkeeping, personnel, and physical distribution and logistics.

Management of companies and enterprises includes bank holding establishments, other holding establishments, corporate management establishments as well as regional and subsidiary management establishments. Company or enterprise headquarters are included.

Administrative and waste management includes establishments engaged in office administration, hiring and placing of personnel, document preparation and similar clerical services, solicitation, collection, security and surveillance services, cleaning, and waste disposal services. Among many other establishments administrative includes call centers, tele-marketers, janitorial services, armored cars, temporary employment agencies, locksmiths, landscaping, and travel agencies. Waste management includes, among other establishments, solid waste collections and disposal, landfill operations and septic tank maintenance. Excluded from administrative and waste management are establishments involved in administering, overseeing, and managing other establishments of the company or enterprise. Also excluded are government establishments engaged in administering, overseeing, and managing governmental programs.

Educational services include private elementary schools, junior colleges, colleges, universities, and professional schools. Also included are trade and vocational schools, business and secretarial schools, computer training services, language schools, fine arts training, sports training establishments, driving schools, flight schools and establishments that provide test preparation and tutoring. Educational services may be provided in part in educational institutions, the workplace, or the home through correspondence, television, or other means. Public schools, including colleges and universities, are excluded from educational services.

Health care and social assistance includes establishments providing health care and social assistance for individuals. Health care establishments include ambulatory care services (e.g., physician offices, dentists, specialists, HMOs, dialysis centers, blood banks, ambulance services), hospitals, and nursing and residential care facilities. Social assistance establishments include individual and family services (e.g., adoption agencies and youth centers) and community services such as food banks and homeless shelters. Excluded from this sector are aerobic classes and nonmedical diet and weight reducing centers. Also excluded are public hospitals and clinics.

Arts, entertainment, and recreation includes establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure time interests. The sector includes establishments engaged in the performing arts, sporting events, museums, zoos, amusement and theme parks, golf courses, marinas, casinos, and gambling establishments. Excluded are movie theaters.

Accommodation and food services includes hotels, motels, casino hotels, bed and breakfasts, campgrounds and recreational vehicle parks and other lodging places as well as eating and drinking places, including restaurants, bars, and take-out stands. Also included are caterers and food service contractors.

Other services, except public administration includes churches and establishments engaged in equipment and machinery repairing, promoting or administering religious activities, grantmaking, advocacy, and establishments providing dry-cleaning and laundry services, personal care services, death care services, pet care services, photofinishing services, temporary parking services, and dating services. Private households that engage in employing workers on or about the premises in activities primarily concerned with the operation of the household are included in this sector.

Federal civilian includes all Federal government workers regardless of their establishment classification. Federal civilian employment includes executive offices and legislative bodies; courts; public order and safety; correctional institutions; taxation; administration and delivery of human resource programs, such as health, education, and public assistance services; housing and urban development programs; environmental programs; regulators, including air traffic controllers and public service commissions; the U.S. Postal Service; and other Federal government agencies.

Federal military includes Air Force, Army, Coast Guard, Marine Corps, Merchant Marine, National Guard, and Navy. Personnel deployed abroad are counted in their home base or port. Reserves who receive regular training are included. Civilians working on a military base are classified in the sector appropriate to their occupation.

State and local government is defined the same as Federal civilian except that the activities are run by state and local governments. At the local level, this includes all public schools as well as police and fire departments; at the state level, it includes all public junior colleges, colleges, and universities.

■ The Accuracy of the Projections

Unlike other sciences, economics and demographics cannot rely on experimentation to test theories and verify hypotheses. Rather, historical data are analyzed and theories are developed that explain the historical data. The resulting models are then used to make a projection. Woods & Poole projections, like all economic and demographic projections, utilize this approach: analyzing historical data to make estimates of future data. There are, of course, inherent limitations to projections, and the Woods & Poole projections should never be interpreted as an infallible prediction of the future; future data may differ significantly from Woods & Poole projections and Woods & Poole does not guarantee the accuracy of the projections. In all Woods & Poole publications, the word 'forecast' is used as a synonym for 'projection' and refers to Woods & Poole estimated data for any year from 2020 to 2050; in Woods & Poole publications 'projections,' or 'forecasts,' both mean estimates of future data (2020 to 2050).

One key limitation to all projections, and Woods & Poole projections in particular, is that the future is never known with any certainty. The model on which the projections are based may not accurately reflect future events. In addition, there is always the possibility of an unanticipated shock to the economy, or of some other event that was not foreseen based on an analysis of historical data. For instance, a local government may enact a new industrial policy that has an unexpected, beneficial effect on employment growth. Or an abrupt economic change, although anticipated, may occur with much greater intensity or in a shorter time period than expected. For example, the projection may assume an increase in the price of a commodity, such as oil, over a five-year period, but an embargo may raise the price to that level in only one year. In addition, the projections may not be accurate

because historical data is revised; or because the projection model does not accurately reflect demographic or economic phenomena; or because the projections contain errors; or because the smooth growth path of the long-term projections inaccurately reflects important variance in economic or demographic growth for particular regions; or because assumptions about national or regional growth, upon which the projections are based, turn out to be incorrect. There are many other types of economic and demographic events that could create outcomes far different from Woods & Poole's projections.

Another limitation results from doing forecasts for small geographic areas for small data series. Statistically, models are more reliable the larger the area and/or the series being studied. For example, a small area forecast for White men age 84 in the county would be subject to greater error because of the small sample size. This error can be reduced, although never eliminated, by constraining the small area forecasts to the forecast totals for a larger area or series; this is the method used by Woods & Poole.

Appendix C: Traffic Demand

In order to calculate new growth and development's fair share of the cost of road improvements, it is necessary to establish how much of the future traffic on Savannah's roads will be generated by new growth, over and above the traffic generated by the city's residents and businesses today. This Appendix describes the process through which this determination is made.

■ Summary

A Level of Service must be established for road improvements in order to assure that, ultimately, existing development and new growth are served equally. This Appendix also presents the process through which new growth and development's 'fair share' of road improvement costs is calculated, and tables summarizing the technical portions of this methodology are included.

Level of Service

For impact fee purposes, the City has set its Level of Service for road improvements at LOS "C" or LOS "D" (see the Road Improvements chapter for more information).

All road improvement projects benefit existing and future traffic proportionally to the extent that relief from over-capacity conditions eases traffic problems for everyone. For example, since new growth by 2045 will represent a certain portion of all 2045 traffic, new growth would be responsible for that portions' cost of the road improvements.

It is noted that the cost-impact of non-Savannah generated traffic on the roads traversing the city ('through' traffic) is off-set by state and federal assistance. The net cost of the road projects that accrues to Savannah reasonably represents (i.e., is 'roughly proportional' to) the impact on the roads by Savannah residents driving to and from their homes, commuters that come in to work in the city, and those coming in to Savannah to shop, do business or recreate.

The basis for the road impact fee would therefore be Savannah's cost for the improvements divided by all traffic generated within the city in 2045 (existing today plus new growth)—i.e., the cost per trip—times the traffic generated by new growth alone. For an individual land use, when a building permit is issued, the cost per trip would be applied to the number of trips that will be generated by the new development, assuring that new growth would only pay its 'fair share' of the road improvements that serve it.

Approach


This methodology proceeds along the following lines:

- Total traffic currently generated by Savannah residents and businesses in 2022 on the road system within the city is calculated from trip generation and commuting data. Various data sources are relied upon to determine current conditions, as explained in each appropriate section, below.
- Future Savannah-generated traffic from new growth in the city is calculated from housing unit and employment forecasts to 2045.
- The portion of total 2045 traffic that is generated by new housing units and employment in the city establishes the percentage of Savannah's cost of the future road improvements that can be included in an impact fee.

Summary Table

The table below shows how the portion of 2045 traffic generated by new growth is calculated. The figures represent all trips generated by land use, including pass-by and diverted trips.


Table C-1: Average Daily Trip Ends Generated by New Growth

	2022	2045	Increase	% New Growth Trip Ends
Residential Trips	590,432	710,214	119,782	
Nonresidential Trips	3,663,166	5,018,955	1,355,789	
Less: Internal Commutes*	(236,507)	(284,488)	(47,981)	
Net Trip Ends	4,017,091	5,444,681	1,427,590	

* Residents who work in Savannah. These trips to and from work are included in the residential trips.

The next table, below, calculates the Primary Trip Ends generated by existing and future traffic by deleting pass-by and diverted trips, as discussed below.

Table C-2: Primary Daily Trip Ends Generated by New Growth

	% Primary Trip Ends*	Primary Trip Ends			% New Growth Primary Trip Ends
		2022	2045	Increase	
Residential Trips	100%	590,432	710,214	119,782	
Commercial & Services	51%	1,776,348	2,447,059	670,710	
Industrial	92%	165,720	203,137	37,417	
Less: Internal Commutes		(236,507)	(284,488)	(47,981)	
Net New Primary Trip Ends		2,295,993	3,075,921	779,929	25.4%

* Derived from 'Trip Generation Handbook' chapter, *Trip Generation*, 11th Edition, Institute of Transportation Engineers.

Overall, new residents and businesses located within Savannah will generate 25.4% (more precisely, 25.3559303%) of all Savannah vehicles on its roads. Thus, new growth's 'fair share' of the cost to the City to provide road improvements to serve current and future traffic cannot exceed this figure.

■ Pass-by and Diverted Trips

The impact of new growth and development on Savannah's road network is the increased traffic added to the system, expressed by transportation engineers as 'trips'. Every 'trip' has two ends—a beginning at its origin and an end at its destination (known as 'trip ends'). There are three types of trips, defined as:

A **Primary Trip** (and its trip ends)—a vehicle travelling from its original beginning to its intended final destination. Driving from one's home directly to one's place of work is an example of a primary trip.

A **Pass-by Trip**—a vehicle travelling along its usual route from its origin to its final destination that stops off at an intermediate location for any reason. A trip from home to work that stops along the way for gas, dropping off a child at daycare, picking up coffee or dinner, or for any other reason, represents a 'pass-by' trip at the intermediate location.

A **Diverted Trip** (previously called a diverted 'link' trip)—a vehicle that diverts from its normal primary route between its origin to its final destination, and takes a different route to stop off at an intermediate location for any reason. While a pass-by trip remains on its normal route, a diverted trip changes its route to other roads to arrive at the intermediate stop.

New primary trips add vehicles to the road network. Pass-by and diverted trips involve the same vehicles stopping off between their original beginnings and their final destinations, and therefore do not add new vehicles to the road network—the vehicles were already there on their way to their final destinations.

These different types of trips result in different types of 'trip ends'. On a home-to-daycare-to-work trip, for instance, there are two primary trip ends (home and work) and two pass-by or diverted trip ends: arriving at the daycare center and leaving from there to drive to work, for instance. The net impact on the road network, however, is created by the one vehicle and its two primary trip ends.

Impact fee calculations take note of these pass-by and diverted trip ends as not adding to the overall traffic on the road network and deletes them from the total trip ends reported in ITE's *Trip Generation* manual. While the table above uses overall average percentages of primary trip ends derived from ITE for broad land use categories, the actual percentage for each land use listed on the impact fee schedule for roads is applied to the total trip ends to determine the primary trip ends attributed to that particular land use.

The increase in primary trip ends shown on Table C-2 plays the most important role in calculating the per-trip road impact fee and defines new growth's share of traffic generated by residents and businesses located within the city.

Residential Trip Generation

Average trip generation rates published by the Institute of Transportation Engineers (ITE) differentiate between 'single-family detached housing' and 'apartments'. The closest correlations with the US Census definitions are 'single-family units' and 'multi-family units', which are shown on the following table.

Table C-3: Residential Units by Type: 2022 to 2045

	2019*	Percent**	Total in 2022***	Increase 2022-2045	Total in 2045
Single-Family Units	39,001	62.95%	43,952	8,917	52,869
Multi-Family Units	22,952	37.05%	25,866	5,247	31,113
Total	61,953	100.00%	69,818	14,164	83,982

* Based on most recent 5-Year American Community Survey 1-Year data report (Census Bureau).


** Percent of 2019 total housing units.

*** See Appendix A: Future Growth for housing unit projections.

The 2019 breakdown of housing units by type on the table above are taken from the most recent American Community Survey for Savannah (published by the Census Bureau). The 2019 percentage by housing type (single-family and multi-family) is calculated and applied to the total number of housing units projected in 2022 (taken from the Future Growth Appendix of this report). It is assumed that these percentages will persist into the future, producing a breakdown of the projected 14,164 new housing units forecast for the 2022-2045 period.

The next table, below, calculates the amount of traffic that is generated by the city's housing stock today, and the amount that will be generated in 2045.

Table C-4: Residential Trip Generation: 2022-2045 New Growth Increase

	ADT* Trip Ends	2022 Units	2022 ADT Trip Ends	2045 Units	2045 ADT Trip Ends	Increase 2021-2045	% New Growth Trip Ends
Single-Family Units	9.52	43,952	418,423	52,869	503,313	84,890	
Multi-Family Units	6.65	25,866	172,009	31,113	206,901	34,892	
Total		69,818	590,432	83,982	710,214	119,782	

* Average Daily Traffic (trip ends) on a weekday; Institute of Transportation Engineers *Trip Generation*, 11th Edition. Total includes trips to/from work.

The calculations are made on the basis of ‘average daily traffic’ on a normal weekday, using average trip generation rates derived from multiple traffic studies (350 for single-family and 86 for apartments) and published by ITE. The rates are expressed for ‘trip ends’—that is, traffic both leaving and coming to a housing unit.

Comparing traffic in 2022 to 2045, the future increase in trip ends can be calculated, which will represent 16.9% of all residential trip ends generated in the city.

It should be noted that the traffic generated includes trips to and from work and, more particularly, residents who commute to work at a business within the city.

■ Nonresidential Trip Generation

Calculating traffic generated by businesses located in Savannah is more problematical than residential trips because there is no breakdown of types of businesses in the city that is readily available. In addition, while employment forecasts have been made in terms of the number of jobs, there is no data available for floor areas, much less by detailed type of use.

The alternative is to view nonresidential traffic generation on a broad ‘average’ basis. For this, there is data available from ITE for a number of individual uses relating to the total number of trips generated per employee. These trips, of course, include not only trips taken by the employees (to/from work, lunch, etc.) but also customers and others that are attracted to the use, serve it or are served by it in some way.

The Average Daily Traffic (ADT) numbers on the following table, therefore, are calculated by dividing all trips to a use—employees, customers, deliveries to or from, etc.—by the number of employees alone. Since there is more data available for the average number of employees per 1,000 square feet of floor area, it enables a determination of the average total trips generated by the use by the same floor area (and thus the number per ‘1’ square foot of floor area for impact fee calculations).

The table on the following page shows the ‘trips per employee’ per 1,000 square feet of floor area for those uses for which impact fees are commonly collected and for which the data is available.

Overall, the average trip generation rate of all uses shown on the following table is 4.21 total trips per employee for ‘industrial’ uses and 23.95 for all ‘commercial’ uses. The ‘industrial’ category includes such uses as manufacturing and assembly, storage and transportation of goods; the ‘commercial’ category includes all sales and service uses such as stores, offices, motels, banks, amusements, and private institutions). The last column shows the average rate for all ‘commercial’ uses listed, as opposed to the ‘industrial’ uses shown in the column on its left.

Although the ‘overall’ averages are useful for projecting total traffic generation, impact fees for particular uses will reflect the actual average trip generation rate for the specific use.

Table C-5: ITE Trips-per-Employee Data

	ITE Code	Land Use	ADT Trip Ends per Employee	Average by Category	Average All Commercial
<i>Industrial (100-199)</i>	110	General Light Industrial	3.10	4.21	23.95
	140	Manufacturing	2.51		
	150	Warehousing	5.05		
	156	High-Cube Hub Warehouse	6.77		
	180	Specialty Trade Contractor	3.63		
<i>Lodging (300-399)</i>	310	Hotel or Conference Motel	14.34	13.58	
	320	Motel	12.81		
<i>Recreational (400-499)</i>	445	Movie Theater	55.12	38.03	
	480	Amusement Park	24.02		
	491	Racquet/Tennis Club	45.71		
	495	Recreational Community Center	27.25		
<i>Institutional (500-599)</i>	560	Church/Place of Worship	20.02	33.05	
	565	Day Care Center	21.38		
	566	Cemetery	57.75		
<i>Medical (600-699)</i>	610	Hospital	3.77	6.99	
	620	Nursing Home	3.31		
	630	Clinic	13.90		
<i>Office (700-799)</i>	710	General Office Building	3.33	4.27	
	714	Corporate Headquarters Building	2.31		
	715	Single-Tenant Office Building	3.85		
	720	Medical-Dental Office Building	8.71		
	760	Research and Development Center	3.37		
<i>Retail (800-899)</i>	770	Business Park	4.04	30.21	
	812	Building Materials and Lumber Store	24.77		
	814	Variety Store	95.59		
	815	Free-Standing Discount Store	24.63		
	816	Hardware/Paint Store	27.69		
	817	Nursery (Garden Center)	21.83		
	818	Nursery (Wholesale)	23.40		
	820	Shopping Center	17.42		
	826	Strip Retail Plaza	25.63		
	840	Automobile Sales (New)	11.20		
	843	Auto Parts Store	33.73		
	848	Tire Store	16.78		
	850	Supermarket	43.86		
	857	Discount Club	32.21		
861	Sporting Goods Superstore	4.44			
881	Pharmacy/Drugstore w/drive-through	69.17			
890	Furniture Store	10.93			
<i>Services (900-999)</i>	912	Drive-in Bank	32.73	25.19	
	932	High-Turnover (Sit-Down) Restaurant	21.26		
	934	Fast-Food Restaurant	44.52		
	941	Quick Lubrication Vehicle Shop	16.00		
	943	Automobile Parts & Service	11.44		

Source: Trip Generation, 11th Edition, Institute of Transportation Engineers, where survey results given for key land uses.

The next table provides a breakdown between commercial and industrial employment in the city and calculates trip ends generated by each.

The number of employees in the city in 2022 and 2045 are summarized from the detailed employment forecasts presented in Appendix A for the two employment categories on the table.

Table C-6: Nonresidential Trip Generation: 2022-2045 New Growth Increase

	Average ADT	2022 Employees	2022 Trip Ends	2045 Employees	2045 Trip Ends	2021-2045 Increase	% New Growth Trip Ends
Commercial & Services	23.95	145,403	3,483,036	200,304	4,798,154	1,315,118	
Industrial*	4.21	42,766	180,130	52,422	220,801	40,671	
Total		188,169	3,663,166	252,726	5,018,955	1,355,789	
Less: Internal Commutes at 40.06%			(236,507)		(284,488)	(47,981)	
Net Nonres Trip Ends			3,426,659		4,734,467	1,307,808	

* Industrial includes utilities, manufacturing, wholesale trade, and transportation & warehousing.

The table calculates the total number of trips using the average rates for commercial and industrial from the ITE Trips-per-Employee Data table on the previous page. From the total of all nonresidential trips is deducted the number of trips to/from work generated by city residents, since these trips have already been calculated as part of the residential trip generation rates (i.e., city residents driving to/from work at city establishments).

The results of the residential and nonresidential trip generation analyses are combined on the Summary table at the beginning of this Appendix Section for an overall calculation of new growth’s share of future traffic generated by Savannah residents and businesses. From these figures, pass-by and diverted trip ends are then deleted to determine primary trip ends, which more closely relates to vehicles on the road and thus contribute to traffic congestion.

■ Terminology

This Traffic Demand Section uses the term ‘average daily traffic’ (ADT) for a weekday, which is defined by ITE as the ‘average weekday vehicle trip ends’, which are “the average 24-hour total of all vehicle trips counted from a study site from Monday through Friday.”

Additionally, ITE defines a ‘trip or trip end’ as “a single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site. For trip generation purposes, the total trip ends for a land use over a given period of time are the total of all trips entering plus all trips exiting a site during a designated time period”.

Lastly, ITE defines ‘average trip rate’ as “the weighted average of the number of vehicle trips or trip ends per unit of independent variable (for example, trip ends per occupied dwelling unit or employee) using a site’s driveway(s). The weighted average rate is calculated by dividing the sum of all independent variable units where paired data is available. The weighted average rate is used rather than the average of the individual rates because of the variance within each data set or generating unit. Data sets with a large variance will over-influence the average rate if they are not weighted”.

Appendix D: Cost Adjustments

■ Cost Adjustments

Calculations related to impact fees are made in terms of the ‘present value’ of past and future amounts of money.

The Georgia Development Impact Fee Act defines ‘present value’ as “the current value of past, present, or future payments, contributions or dedications of goods, services, materials, construction, or money.” This Appendix describes the methodologies used to make appropriate adjustments to project cost figures, both past and future, to convert these costs into current dollars when such an adjustment is appropriate.

Calculations for present value (PV) differ when considering past expenditures versus future costs. In both cases, however, the concept is the same—the ‘actual’ expenditure made or to be made is adjusted to the current year (2022) using an inflation rate to bring past expenditures up to current values, and a deflator for future costs representing interest that would be added to funds being saved up until the expenditure is to be made. In essence, the present value is considered in light of the value of money as it changes over time.

Past Expenditures

Past expenditures are considered in impact fee calculations only for previous expenditures for projects that created capacity for new development and are being recouped. An expenditure that was made in the past is converted to PV using the inflation rate of money—in this case the Consumer Price Index (CPI). Although this approach ignores the value of technological innovation (i.e., better computers are available today for the same or lower historic prices) and evolving land prices (often accelerated beyond inflation by market pressures), the approach best captures the value of the money actually spent. For instance, it is not important that you can buy a better computer today for the same price that was paid 5 years ago; what is important is the money was spent 5 years ago and what that money would be worth today had it been saved instead of spent.

Future Project Costs

In order to determine the present value of a project expenditure that will be made in the future, the Net Present Value (NPV) of the expenditure is determined. To calculate the NPV of any project cost, two figures are needed—the future cost of the project anticipated in the year the expenditure will be made, and the Net Discount Rate. Given the current cost of a project, that cost is first inflated into the future to the target expenditure year to establish the estimated future cost. The future cost is then deflated to the present using the Net Discount Rate, which establishes the NPV for the project in current dollars. These two formulas are:

$$\text{Future Cost} = \text{Current Cost} \times (1 + \text{Inflation Rate})^{\text{Year of Expenditure} - \text{Current Year}}$$

$$\text{Net Present Value} = \text{Future Cost} \times (1 + \text{Net Discount Rate})^{\text{Current Year} - \text{Year of Expenditure}}$$

In this Appendix, two important adjustments are discussed that are required to convert current cost estimates into future cost figures, and then back into current dollars. First, an appropriate cost inflator is identified. This adjustment factor is important in determining the future cost of a project, based on current cost estimates. The cost inflator may be based on anticipated inflation in construction or building costs, or on anticipated inflation in the value of money (for capital projects that do not include a construction component). In essence, costs increase over time. By identifying the appropriate inflation rate that is related to the type of project (building construction, project

construction or non-construction), current 2022 estimates can be used to predict future costs in the year they are expected to occur.

The second cost adjustment is a deflator—the Net Discount Rate. In essence, the Net Discount Rate is the interest rate that accrues to monies being held in escrow. That is, as impact fees are collected and ‘saved up’ over the years for the future expenditure, they increase at the rate that the account is accruing interest. Having determined the inflated cost of a project at some future date, the cost in today’s dollars can be reduced to the extent that interest will increase the funds on hand. In essence, the calculation determines how much money needs to be added to the account so that, with interest, it will grow to the amount needed for that future expenditure at that time. This is the Net Present Value of that future expenditure.

■ Cost Inflatons

Three different cost inflators are used in the impact fee calculations, based on the type of project being considered.

For projects that require construction of a structure (such as a fire station), a ‘building cost inflator’ is used as the appropriate inflation rate.

For infrastructure projects, such as roads or ball fields, a ‘construction cost inflator’ is used.

For all non-construction types of projects (such as a fire truck or park land), an inflation rate is used that is based on the Consumer Price Index. These different types of inflators are discussed below.

Engineering News-Record’s Cost Indexes

The Engineering News-Record (ENR)⁴ publishes both a Building Cost Index (BCI) and a Construction Cost Index (CCI), both of which are widely used in the construction industry. The indexes are based on monthly and annual cost increases of various construction materials and applicable labor rates and are calibrated regionally.

Building Cost Inflator

Table D-1 presents a calculation of the annual average rate of increase reflected in the construction costs of a building. For this analysis, the 2012-2022 ten-year period is used as a base time period for an estimate of average future construction cost increases due to inflation in labor and materials costs.

⁴ Engineering News-Record is a magazine devoted to providing those in the construction business with up to date information concerning innovations and policy changes related to their field of work. This includes tracking monthly increases in the relative costs of construction and building projects, as well as features on the business and management aspects of construction

Table D-1: Building Cost Inflator - BCI

Year	Amount	BCI*		Effect of Inflation	
		1913=100	2012=1.0	BCI	Avg. Rate =
					2.5825565%
2012	\$ 100,000.00	3,970.93	1.000000	\$ 100,000.00	\$ 100,000.00
2013		4,022.11	1.012888	\$ 101,288.76	\$ 102,582.56
2014		4,076.81	1.026663	\$ 102,666.31	\$ 105,231.81
2015		4,108.05	1.034529	\$ 103,452.93	\$ 107,949.48
2016		4,126.72	1.039232	\$ 103,923.20	\$ 110,737.34
2017		4,278.39	1.077428	\$ 107,742.79	\$ 113,597.19
2018		4,408.94	1.110303	\$ 111,030.32	\$ 116,530.90
2019		4,523.59	1.139176	\$ 113,917.60	\$ 119,540.38
2020		4,615.43	1.162304	\$ 116,230.36	\$ 122,627.58
2021		5,335.09	1.343535	\$ 134,353.48	\$ 125,794.50
2022		6,314.94	1.590292	\$ 159,029.21	\$ 129,043.22
				\$ 1,253,634.96	\$ 1,253,634.96

* Building Cost Index, Engineering News Record, Annual Average Indices: Atlanta Region.

Table D-1 assumes a building construction project that cost \$100,000 in 2012, and how much the same project would cost in each subsequent year due to inflation using the Building Cost Index published by ENR for the Atlanta area.

Setting the 2011 Building Cost Index (BCI) at '1.0,' the increase in the BCI as a multiple of 2012 is also shown on the table. The equivalent cost of the same project in each subsequent year is calculated by multiplying the BCI multiplier times \$100,000.

When the total for all such projects is summed for the 2012-2022 period, the equivalent average annual rate of increase is calculated as the percentage that would produce the same total. This percentage is used in the text of this report as the applicable inflator for building construction projects that will begin in future years.

Construction Cost Inflator

Table D-2 presents a calculation of the annual average rate of increase reflected in the cost of construction of a capital project other than a building. (These would include such projects as road improvements, trails, baseball fields and other projects that do not involve buildings.) For this analysis, the 2012-2022 ten-year period is also used as a base time period for an estimate of average future construction cost increases due to inflation in labor and materials costs. The Construction Cost 10-year average inflation rate is calculated in the same manner as described above for the Building Cost Inflator.

Table D-2: Construction Cost Inflator - CCI

Year	Amount	CCI*		Effect of Inflation	
		1913=100	2012=1.0	CCI	Avg. Rate =
					2.2916719%
2012	\$ 100,000.00	5,892.64	1.000000	\$ 100,000.00	\$ 100,000.00
2013		5,983.23	1.015374	\$ 101,537.38	\$ 102,291.67
2014		6,147.52	1.043254	\$ 104,325.44	\$ 104,635.86
2015		6,245.74	1.059922	\$ 105,992.22	\$ 107,033.77
2016		6,277.14	1.065250	\$ 106,525.03	\$ 109,486.63
2017		6,433.18	1.091732	\$ 109,173.24	\$ 111,995.71
2018		6,592.98	1.118850	\$ 111,885.00	\$ 114,562.28
2019		6,681.50	1.133872	\$ 113,387.16	\$ 117,187.68
2020		6,750.41	1.145567	\$ 114,556.65	\$ 119,873.23
2021		7,414.97	1.258344	\$ 125,834.41	\$ 122,620.33
2022		8,361.71	1.419010	\$ 141,901.02	\$ 125,430.39
				\$ 1,235,117.55	\$ 1,235,117.55

* Construction Cost Index, Engineering News Record, Annual Average Indices: Atlanta Region.

CPI Inflator

For projects that do not involve construction, only the future value of money needs to be considered (without regard to inflation in labor or materials costs). For this calculation, the Consumer Price Index (CPI) is used, assuming past experience will continue into the foreseeable future.

By 2021 the CPI had risen considerably over the 1982 CPI. The first column under the 'CPI' heading on Table D-3 shows the average annual CPI figures. Using 2021 as the base (2021=1.0), the second column under 'CPI' on the table shows the multipliers that would convert an amount of money spent in each year into current present value dollars.

Table D-3 shows the CPI figures for every year since 1982.

Using an annual expenditure of \$10,000 as an example, the multipliers on Table D-3 yield the figures shown for the CPI on the table under the 'present value' heading. Cumulatively, the \$400,000 spent over the 1982-2021 period would have a total present value of \$674,001.84 in today's dollars. Considering the present value figures for the \$10,000 annual expenditures, an average annual inflation rate of almost 2.5% yields the same total amount over the 1982-2021 period.

The 39-year average of annual CPI change (the period of 1982-2021) shown on Table D-3 would be useful in estimating the present value (PV) of past expenditures, but would not be the best indicator of future change because of the long time-frame covered. Looking only at the change in CPI for the 10 years from 2011 to 2021, an average annual inflation rate of almost 2.6% best captures the change over that period. Even though this 10-year rate is somewhat skewed by the 2021 one-year rate influenced by the pandemic, this rate (compared to the 1982-2021 period) is assumed to be experienced 'on average' in future years, and is used for inflator calculations for future non-construction expenditures where the value of money is the issue.

Table D-3: Non-Construction Cost Inflator - CPI

Year	Amount	CPI*		Present Value: CPI	Long Term Inflator =	10-Year Inflator =
		1982-84=100	2021=1.0			
					2.49984150%	
1982	\$ 10,000.00	96.50	2.88029	\$ 28,802.90	\$ 26,194.17	
1983	\$ 10,000.00	99.60	2.79064	\$ 27,906.43	\$ 25,555.32	
1984	\$ 10,000.00	103.90	2.67515	\$ 26,751.49	\$ 24,932.06	
1985	\$ 10,000.00	107.60	2.58316	\$ 25,831.60	\$ 24,324.00	
1986	\$ 10,000.00	109.60	2.53602	\$ 25,360.22	\$ 23,730.77	
1987	\$ 10,000.00	113.60	2.44673	\$ 24,467.25	\$ 23,152.00	
1988	\$ 10,000.00	118.30	2.34952	\$ 23,495.18	\$ 22,587.36	
1989	\$ 10,000.00	124.00	2.24152	\$ 22,415.16	\$ 22,036.48	
1990	\$ 10,000.00	130.70	2.12661	\$ 21,266.11	\$ 21,499.04	
1991	\$ 10,000.00	136.20	2.04073	\$ 20,407.34	\$ 20,974.70	
1992	\$ 10,000.00	140.30	1.98110	\$ 19,810.98	\$ 20,463.16	
1993	\$ 10,000.00	144.50	1.92352	\$ 19,235.16	\$ 19,964.09	
1994	\$ 10,000.00	148.20	1.87549	\$ 18,754.93	\$ 19,477.19	
1995	\$ 10,000.00	152.40	1.82381	\$ 18,238.06	\$ 19,002.16	
1996	\$ 10,000.00	156.90	1.77150	\$ 17,714.98	\$ 18,538.72	
1997	\$ 10,000.00	160.50	1.73176	\$ 17,317.63	\$ 18,086.59	
1998	\$ 10,000.00	163.00	1.70520	\$ 17,052.02	\$ 17,645.48	
1999	\$ 10,000.00	166.60	1.66836	\$ 16,683.55	\$ 17,215.13	
2000	\$ 10,000.00	172.20	1.61410	\$ 16,141.00	\$ 16,795.27	
2001	\$ 10,000.00	177.10	1.56944	\$ 15,694.41	\$ 16,385.66	
2002	\$ 10,000.00	179.90	1.54501	\$ 15,450.14	\$ 15,986.03	
2003	\$ 10,000.00	184.00	1.51059	\$ 15,105.87	\$ 15,596.15	
2004	\$ 10,000.00	188.90	1.47140	\$ 14,714.03	\$ 15,215.78	
2005	\$ 10,000.00	195.30	1.42318	\$ 14,231.85	\$ 14,844.69	
2006	\$ 10,000.00	201.60	1.37871	\$ 13,787.10	\$ 14,482.65	
2007	\$ 10,000.00	207.34	1.34053	\$ 13,405.29	\$ 14,129.43	
2008	\$ 10,000.00	215.30	1.29096	\$ 12,909.62	\$ 13,784.83	
2009	\$ 10,000.00	214.54	1.29557	\$ 12,955.71	\$ 13,448.64	2.580330%
2010	\$ 10,000.00	218.06	1.27466	\$ 12,746.63	\$ 13,120.64	
2011	\$ 10,000.00	224.94	1.23566	\$ 12,356.59	\$ 12,800.65	\$ 12,901.52
2012	\$ 10,000.00	229.59	1.21061	\$ 12,106.07	\$ 12,488.46	\$ 12,576.99
2013	\$ 10,000.00	232.96	1.19313	\$ 11,931.30	\$ 12,183.88	\$ 12,260.63
2014	\$ 10,000.00	236.74	1.17408	\$ 11,740.84	\$ 11,886.73	\$ 11,952.22
2015	\$ 10,000.00	237.02	1.17269	\$ 11,726.92	\$ 11,596.83	\$ 11,651.57
2016	\$ 10,000.00	240.01	1.15808	\$ 11,580.82	\$ 11,313.99	\$ 11,358.49
2017	\$ 10,000.00	245.12	1.13393	\$ 11,339.26	\$ 11,038.06	\$ 11,072.77
2018	\$ 10,000.00	251.11	1.10689	\$ 11,068.91	\$ 10,768.86	\$ 10,794.25
2019	\$ 10,000.00	255.66	1.08719	\$ 10,871.93	\$ 10,506.22	\$ 10,522.72
2020	\$ 10,000.00	261.56	1.06265	\$ 10,626.55	\$ 10,249.98	\$ 10,258.03
2021	\$ 10,000.00	277.95	1.00000	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00



1982-21	\$ 400,000.00	\$ 674,001.84	\$ 674,001.84
2011-21	\$ 110,000.00	\$ 125,349.20	\$ 125,349.20

*Consumer Price Index data is from the U. S. Department of Labor, Bureau of Labor Statistics.

Calculating Net Present Value

Determining the NPV of future project expenditures depends on the type of 'project' being funded, as discussed above. Specifically ...

- For a building construction project (such as a fire station), the current cost estimate for the project is inflated into the future using the average Building Cost Inflater (from Table D-1) applied to the number of years until the year planned for its construction. This future cost is then deflated back to the present using the Net Discount Rate (currently 1.185%) since this reflects the present value of a future amount of money.
- For other construction projects (such as recreation facilities and roads), the current cost estimate for the project is inflated into the future using the average Construction Cost Inflater (from Table D-2) applied to the number of years until the year planned for its construction. Like building construction projects, this future cost is then deflated back to the present using the Net Discount Rate.
- For non-construction capital projects (such as fire truck purchases or land acquisition), the 10-year average CPI inflater is used to estimate the project expenditure in future dollars while, again, the Net Discount Rate is applied to deflate that future cost to present value.

Appendix E: Exemption Policy

■ Exemptions

(a) The Board of Aldermen recognizes that certain office, retail trade, and industrial development projects may provide extraordinary benefit in support of the economic advancement of the city's citizens over and above the access to jobs, goods, and services that such uses offer in general. To encourage such development projects, the Board of Aldermen may grant a reduction in the impact fee for such a development project upon the determination and relative to the extent that the business or project represents extraordinary economic development and employment growth of public benefit to Savannah.

(b) In addition, the Board of Aldermen recognizes that impact fees, in some circumstances, may negatively affect the affordability of housing, particularly "workforce" housing.

(c) If it wishes to encourage development projects of public benefit to Savannah, the Board of Aldermen shall first adopt exemption criteria to guide the granting of a reduction in the impact fee for:

- (1) A business development project that represents extraordinary economic development and employment growth, and/or
- (2) A residence or housing project that will increase the supply of housing that would be affordable to disadvantaged individuals or families.

(d) In the absence of adopted applicable exemption criteria for either extraordinary economic development and employment growth or for affordable housing, no applicable exemption shall be approved.

(e) It is recognized that the Georgia Development Impact Fee Act (under O.C.G.A. 36-74-4(h)(3)) requires that any amount of money granted as an exemption must be reimbursed by the city into the city's impact fee accounts from revenue sources other than impact fees.