

ECONOMIC DIVERSIFICATION OF CAMDEN COUNTY, GEORGIA

Infrastructure Management Report

Prepared for

The Camden Partnership
Camden County Public Service Authority
Camden Children Alliance & Resources, Inc.

Prepared by

Georgia Institute of Technology's
Center for Quality Growth and Regional Development
760 Spring Street, Suite 213, Atlanta, GA 30308
www.coa.gatech.edu/cqgrd
404.385.5133

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Atlanta, GA 30332

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RESEARCH TEAM

Catherine L. Ross, PhD • Director, Center for Quality Growth and Regional Development (CQGRD)
Jason Barringer • Research Scientist, CQGRD
Saskia Benjamin • Graduate Research Assistant, CQGRD
Mine Hashas, PhD • Post-Doctoral Fellow, CQGRD
Karen Leone de Nie • Research Scientist, CQGRD
David Pierce • Graduate Research Assistant, CQGRD

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OVERVIEW¹

This section outlines the most important infrastructure issues confronting Camden decision-makers, along with recommendations for solutions. Some of the issues listed here also appear in other parts of the report, including a list of some of the most critical issues. This section also presents three scenarios of population projections to provide an idea of the scope of development facing Camden County in the short and long terms.

Camden's infrastructure can be thought of as its skeleton, the underlying structure that helps determine the form of an area. To function effectively, these systems need to be maintained and monitored to ensure they are operating as efficiently and safely as possible. Managing agencies must ensure that the infrastructure provides an adequate level of service to the county's citizens.

The county and other governmental units need to have a good understanding of the level and kinds of current assets and their capacity and ability to provide short- and long-term service. These must be examined and planned according to county-wide needs. Future land use and development planning should be undertaken knowing the cumulative effects of these actions on Camden's infrastructure. Without this, there will be piecemeal development of infrastructure, which often results in higher costs and a reduction in or loss of ability to direct the form of development and related outcomes. Such planning has a direct impact on Camden's potential for growing the higher-quality economic base so desired by community stakeholders.

This section of the report deals with three key aspects of infrastructure planning: transportation, water/sewer, and green infrastructure. It first describes existing conditions, then addresses the effect of projected growth, and finally identifies key issues and recommendations on how to address those issues.

¹ This report is part of the "Economic Diversification of Camden County, Georgia" series of reports that were completed by Georgia Tech in October 2005. For information on other reports in the series, please contact the Camden Partnership.

POPULATION PROJECTIONS

In planning for smart growth in Camden County, various future scenarios must be explored to grasp the extent of planning and preparation needed to ensure smart growth in the future. The development of these scenarios depends heavily on the expected demographics of the county's future population. Currently, there are few definitive population projections for Camden County.

Camden County experienced explosive growth in the 1980s and 1990s, mostly driven by the construction of the Kings Bay Submarine Base. Anecdotal evidence from discussions with county officials and citizens provided guesses on current and future population levels that are inconsistent with each other and with the State of Georgia's projections and associated extrapolations. The state's projections show a 6 percent increase in population for the decade 2000-2010 after growth rates of 45 percent and 126 percent in the previous two decades. In light of these disparities, a more definitive approach was needed to develop alternative population scenarios.

The state of Georgia's Office of Planning and Budget has released population projection numbers through 2010 for Camden County. These numbers were projected to 2030 using a linear extrapolation method adding the average absolute change of population to the current year to project the following year's population (Scenario A). This projection serves as the basis for the first population scenario, a scenario with low population growth in the future. While this low growth is a possibility, past and current growth trends suggest that there is also a distinct possibility of a more moderate to fast-paced growth rate in the future. To create a range of potential future population scenarios, models accounting for current trends and potential single-occurrence events like the expansion of the submarine base need to be considered and analyzed.

To this end, a population projection model using an interregional cohort-component method was created for Camden County (Scenario B). County population from the 2000 U.S. decennial census was used as the base for this method. This method applies specific rates of in-migration, out-migration, birth, and death to each specific age and sex cohort. These rates were obtained from the 2000 U.S. census and the Georgia Department of Human Resources. This method projects population in five-year increments for both sexes in standard five-year age cohorts. An aggregation of these cohort projections provides county-wide numbers for each five-year period through 2030. With all projections, there is a certain amount of guesswork involved, but the value of population projections lies not in the accuracy of the numbers, but in their ability to help direct questions about the future (Isserman, 1993). Therefore, the focus should not be on the actual numbers, but rather on what implications those numbers will have on the future of Camden County.

A third version of population projections for Camden County (Scenario C) was created by adding estimates of the effect of the potential expansion of Kings Bay Submarine Base later in this decade to the cohort-component model. As of the completion of this report, however, the Base Realignment and Closure Committee (BRAC) has reevaluated its plans and Kings Bay will not be expanding. This scenario still illustrates the potential effects of a large influx of residents over the next 10 to 15 years and shows the possible consequences of a future expansion of the base. This scenario also represents a high end of possible population growth in Camden County. Even with a significant base expansion resulting in an influx of new residents, Camden would experience a projected growth rate of 45 percent over the next 25 years.

Table 1 shows the results of each of the scenarios. Each of the projection methods and their results are explained in Appendix A.

Table 1 - Population Projection Scenarios

	2000	2005	2010	2015	2020	2025	2030
Scenario A	43,664	45,029	46,345	47,686	48,691	49,948	51,204
Scenario B	43,664	49,437	53,939	57,837	60,922	63,651	66,086
Scenario C	43,664	49,437	69,024	72,900	71,570	71,408	71,779

These three scenarios provide a range of possible future population levels. Scenario A shows the potential future population with slow population growth. Scenario B uses the current levels of birth, death, and migration rates to project future population, with the assumption that these rates will remain steady. Scenario C factors in the potential effects of a significant increase in the number of in-migrants on Camden’s future population. These are only three of an infinite number of possibilities for future population levels, but they do provide a range of legitimate levels and a benchmark for future planning efforts.

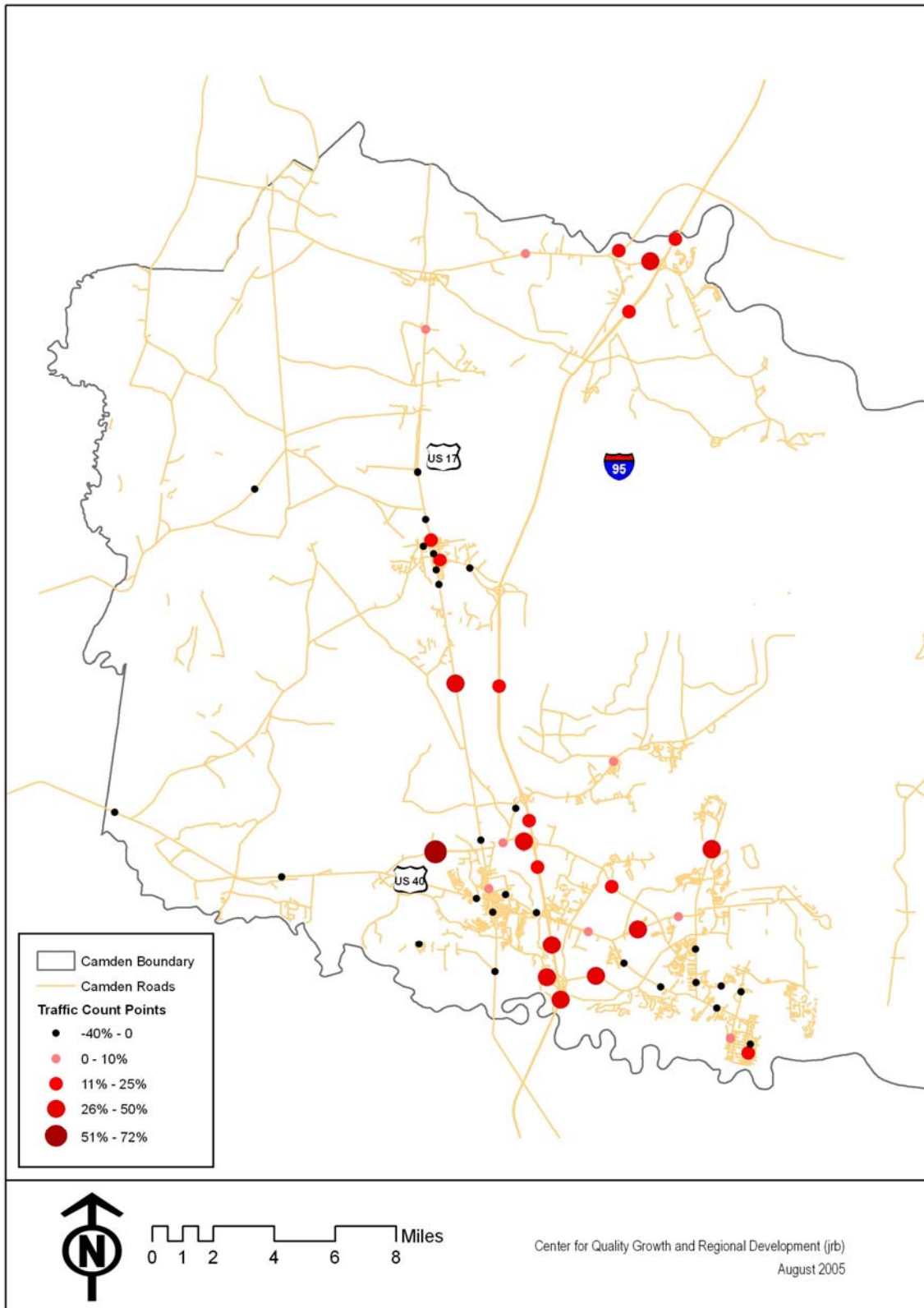
TRANSPORTATION INFRASTRUCTURE

Camden's transportation system relies heavily, although not quite exclusively, on private motor vehicles. In 2000, 91.4 percent of workers traveled to their jobs by private vehicle, most of them alone. About 4.7 percent walked to work; 0.6 percent used bicycles; and 0.4 percent took public transit. Transportation mode choice is undoubtedly somewhat different for shopping, school, social, and other trips, but the journey-to-work statistics give a good general picture: Transportation in Camden is auto-dependent (as is the United States as a whole, where nearly 88 percent of workers travel by car). Whether the dominant role of the auto is due to personal preference or the lack of alternative transportation infrastructure is impossible to say; it is most likely some combination of the two. The lack of options other than auto travel most immediately affects those who are too young, too old, or too poor to drive, or who suffer from physical impairments that limit their ability to drive. Car dependence constrains Camden's ability to sustain entry-level jobs, as a large percentage of a worker's income must be devoted to transportation. Auto dependence also threatens air and water quality, as well as Camden's visual beauty. Property values and growth can be threatened by rising fuel prices, and roadway construction and maintenance costs can become a burden to county taxpayers.

While traffic has grown considerably on I-95 in recent years and on some road segments, widespread congestion does not yet seem to be a major issue. In 2000, mean commute time was a moderate 21.6 minutes, reflecting relatively un-congested roads. In contrast, mean commute time in Nassau County, Fla., was 28.2 minutes, and the national average was 24.3 minutes. In neighboring Glynn County, with its greater employment base, it was 19.6 minutes.

Traffic has actually decreased considerably on S.R. 40 in the St. Marys area, in part reflecting the closure of the Durango paper mill. Figure 1 shows the changes in average daily traffic (ADT) in Camden County from 1997 to 2004. The detailed numbers are shown in Appendix 2.

Figure 1 - ADT Changes in Camden County



This does not mean, however, that individual road segments and intersections are problem-free. Heavy dependence on autos has spurred the development of auto-oriented strip shopping centers, particularly along S.R. 40. This in turn has weakened the position of the traditional, walking-scale centers of commerce—downtown St. Marys, Kingsland and Woodbine—and created unsightly car-oriented commercial strips, with low inter-parcel connectivity and wide expanses of impervious surfaces. Also, new residential developments that rely on arterial and large connector roadways for access to commercial destinations are posing localized traffic issues, which threaten to become more widespread. And if Camden continues to grow as a bedroom community for Jacksonville and Brunswick, lack of commuting options could create big-city rush hour conditions on I-95.

The Georgia Department of Transportation's (GDOT) six-year work plan envisions widening of both S.R. 40 and I-95 in the "long range" future—beyond six years (Table 2). It also provides for planning of a new I-95 interchange at Horse Stamp Church Road, although construction is more than six years away and right-of-way acquisition is a local responsibility.

Table 2: Six-year construction work plan

Description	PE	ROW	CST
I-95 - Reconstruction of northbound welcome center	Authorized	2006	LR
SR 40 from E of St Marys Cutoff/mp 5.0/Charlton Co CR 61	Authorized	LR	LR
SR 40 Add left turn storage lane at I-95 interchange	2006	2009	2012
CR 90/Colerain Rd from I-95 to Kings Bay Rd	LR	Locals	LR
I-95 from Florida line to Harriett's Bluff Rd (8 lanes)	LR	N/A	LR
I-95 from Harriett's Bluff Rd to SR 25 Spur (8 lanes)	LR	N/A	LR
I-95 from SR 25 Spur to CR 138 (8 lanes)	LR	N/A	LR
I-95 from CR 138 to US 17/Glynn Co & Bridges (8 lanes)	LR	N/A	LR
I-95 new Interchange at CR 138/Horse Stamp Church Rd	2005	Locals	LR
SR 40 from W of CR 61 to SR 25/US 17	Authorized	2007	2010

PE (Preliminary Engineering) includes concept development, survey, design, environmental activities. The year listed is the GDOT fiscal year that the funding is scheduled to be authorized for use.

ROW (Right of Way) is the negotiations and acquisition of the necessary right of way for the project—again this is the GDOT fiscal year that the funding is scheduled to be authorized for use.

CST (Construction) is the actual letting to contract and building of the project—most of these are scheduled out in long range. (LR)—anytime after the six years of the construction work program.

SOURCE: Georgia Department of Transportation.

The Coastal Georgia Regional Development Center (RDC) in May produced a bicycle-pedestrian plan for the region, including Camden. Its major recommendations include paved bike lanes along U.S. 17 in Camden County, as part of Coastal Georgia/East Coast Greenway, and—much more ambitious—a rail-to-trail conversion between Kingsland and Riceboro. Although it does address general design issues for bicycle and pedestrian facilities, the report's infrastructure emphasis is on the greenway and on walking and riding for recreational, rather than functional transportation, purposes.

The RDC is also investigating new transit options for the Coastal Georgia region, including Camden, with a report due out in October.

Transportation Infrastructure Issues

ISSUE: Recent development within the county has not balanced residential expansion with economic development. If current trends continue, Camden County has the potential to become a bedroom community for Jacksonville and Brunswick. The economic development issues are dealt with elsewhere in the report. In terms of transportation, residential growth without commensurate job growth raises the prospect of increased long-distance commuting.

Recommendation 1: Strategically, planning should attempt to match residential growth with job growth. While “bedroom community” development may seem attractive, such unbalanced growth brings a host of difficulties, including greater need for transportation and transportation infrastructure, which are costly and can be socially and environmentally destructive. The county should not court population growth as an economic strategy, but rather let economic development drive residential growth. This can be accomplished through land use planning, which can assess future housing needs based on projected employment and develop a future land use plan that dedicates an appropriate amount of new land to support this need²

Recommendation 2: Because some long-distance commuting already exists and will likely grow even if balanced planning is successful, Camden should investigate the provision of commuter bus service to Jacksonville and/or Brunswick. See Recommendation 4 below.

ISSUE: The existing transportation system lacks connectivity and transportation options. With its water and marshland, Camden cannot put into place a traditional roadway grid; it will instead have to rely to some degree on a more suburban-style system, with local roads emptying onto major collectors and arterials. However, it should be recognized that this pattern can generate frustrating traffic bottlenecks, and generally exacerbate the need to drive, as it tends to spread out destinations and limit walking, bicycling, and potential transit access. Thus, the road network poses a serious challenge to Camden’s future quality of life. Existing bicycle and pedestrian plans treat these modes mostly as recreation, but with good connectivity and design features, they can also accommodate other trip purposes. The county has taken a first step toward providing public transit with on-demand van service, but it lacks scheduled, fixed-route service.

Recommendation 1: Encourage more development with a mixture of uses—places where people can live, work and play—to minimize the need for longer trips.³

Recommendation 2: Wherever possible, provide multiple connections between destinations. For example, avoid developments that access only one thoroughfare; require inter-parcel connectivity in strip developments; and provide walking/bicycle access from residences to schools and other regular, short-distance destinations.

² For further information on assessing future housing needs, see companion report “Economic Diversification of Camden County, Georgia: Quality Growth and Development Report.”

³ For further information on developing mixed-use centers, see companion report “Economic Diversification of Camden County, Georgia: Quality Growth and Development Report.”



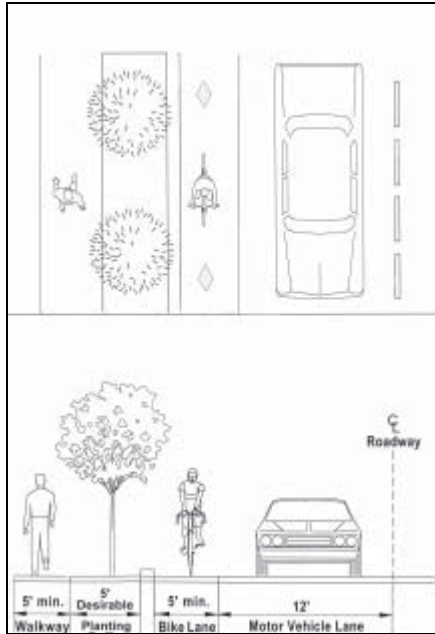
Inter-parcel connectivity ties together residential and/or commercial land uses along an artery, reining in the use of inefficient and pedestrian-unfriendly curb cuts and unsightly street-front parking.
 Source: Reid Ewing, National Center for Smart Growth, University of Maryland.

Recommendation 3: Design and retrofit roadways to accommodate all uses—motor travel, walking, and biking. All non-freeway road projects should include sidewalk or shoulder walkway and pedestrian-crossing facilities, and all non-freeway projects at the collector and arterial level should include bike lanes (bike lanes are generally not necessary on local, residential streets where automobiles typically travel at slower speeds). The following diagrams illustrate how pedestrian facilities, like sidewalks and shoulder walkways, can be designed. The shoulder walkways may be appropriate for more rural parts of the county where both automobile and pedestrian traffic is less intense.



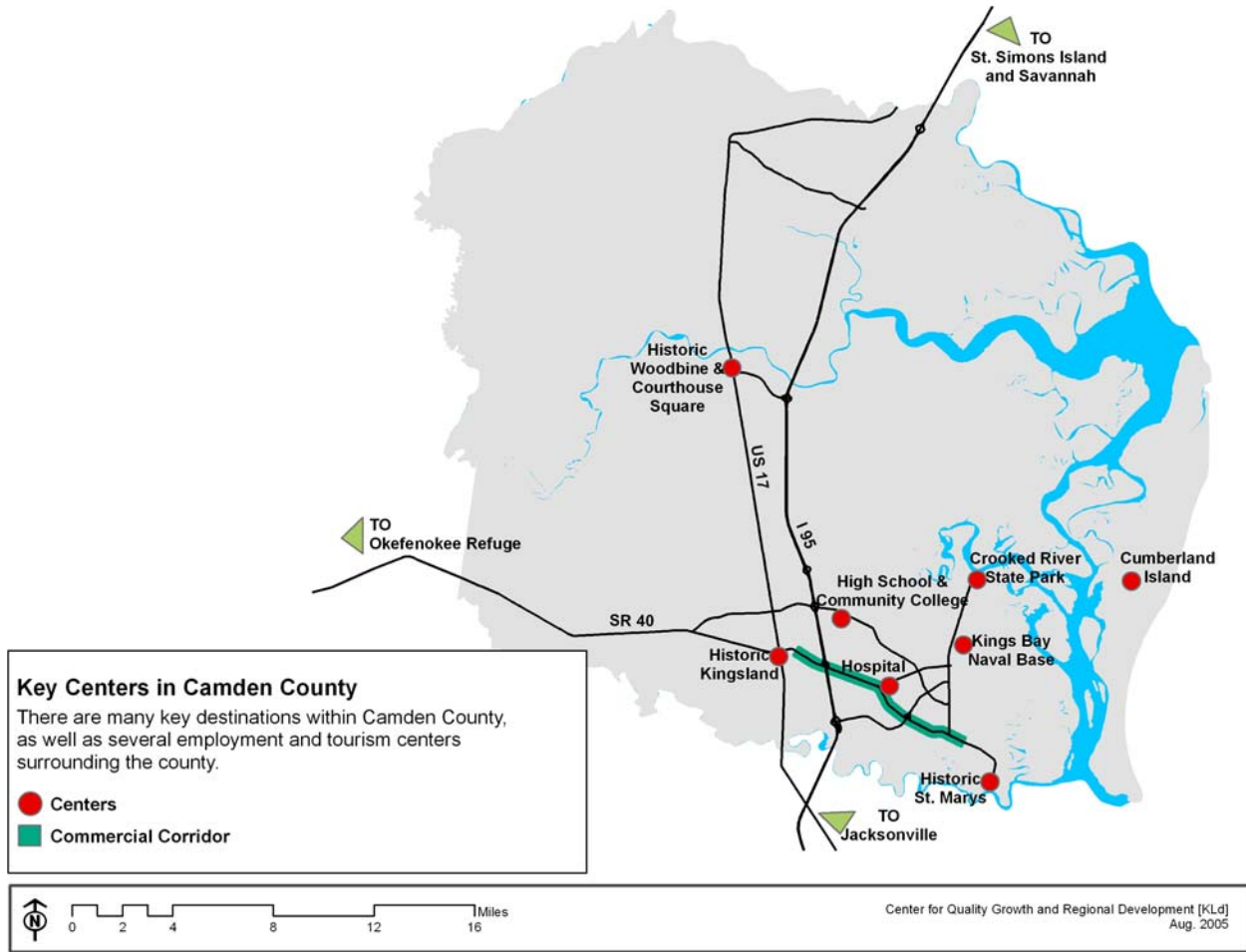
Source: Georgia Department of Transportation Pedestrian & Streetscape Guide

In addition, roadways should be designed to minimize speeding by means of traffic-calming devices and great judiciousness on widening. For example, three-lane roads with center turn lanes can often function as well or better than four-lane roads, and any extra space can be devoted to bike lanes. Each project will require its own design, but for general reference, GDOT offers guidance on bicycle and pedestrian infrastructure at www.dot.state.ga.us/dot/plan-prog/planning/projects/bicycle/index.shtml.



Source: Georgia Department of Transportation Pedestrian & Streetscape Guide

Recommendation 4: Investigate both fixed-route and on-demand transit provision, both for travel within Camden and for long-distance commuting to Jacksonville and Brunswick. Camden faces some admitted difficulty in providing transit, as its density is low. Camden County has already initiated a commuter van service. This service can be used to explore developing a fixed-route service to connect large residential areas with shopping and employment opportunities. The following map identifies some of the key activity centers in the county that may be part of a fixed-route transit system.



Similar areas do provide transit, and they may provide models: the Muncie, Ind., region's New Interurban (www.lifestreaminc.org); Hunterdon County, N.J.'s LINK (www.ridethelink.com); Gogebic County, Mich., Transit (www.gogebic.org/transit.htm); Kings Area, Calif., Rapid Transit (www.kartaits.com/karthome.htm); and Central Virginia's JAUNT (www.ridejaunt.org).

ISSUE: Camden County is a gateway to Georgia's coast, and its coastal lifestyle is one of its leading assets for attracting future business, tourism, and residential investors. Growth of the auto-oriented transportation system threatens all of these: Strip developments can be unsightly; pavement creates runoff that threatens water quality; growing traffic threatens air quality and makes walking-scale amenities less feasible. Some of the recommendations above address these issues, as does the section on remedies for underperforming corridors.⁴ This recommendation is additional:

Recommendation 1: Drop all quantity-based parking requirements in favor of quality-based parking requirements. For example, require parking lots be positioned in the rear of or beside buildings, never between buildings and the street.

⁴ For further information, see companion report "Economic Diversification of Camden County, Georgia: Quality Growth and Development Report."

ISSUE: Changes in land use affect the transportation system, and vice versa. It appears from the most recent state and local transportation plans, and listings of proposed developments of regional impact—some of which may generate more than 10,000 trips a day—that there is not sufficient coordination between transportation and land-use planning.

Recommendation 1: While planning individual developments to minimize travel (see above), acknowledge that these will generate considerable traffic on county thoroughfares. Land use planners and transportation planners must coordinate with each other; transportation planners should have input before any significant rezoning takes place.

Additional Information and Resources for Transportation Funding:

Resources:

Innovative Finance for Surface Transportation Officials

InnovativeFinance.org is an internet based clearinghouse providing information on innovations in all areas of surface transportation financing. This site offers information on federal, state, local and private funding of all types of surface transportation projects. This clearing house is sponsored by the American Association of State Highway and Transportation Officials (AASHTO) with additional financial support provided by the Federal Highway Administration (FHWA). In addition to financing information, this clearinghouse also provides information on technical topics, projects, legislation, publications, application guidance, and institutional issues relevant to all areas of surface transportation.

More Information: <http://www.innovativefinance.org/>

WATER AND WASTEWATER INFRASTRUCTURE

Areas with a combination of aging infrastructure and growing population can face a struggle when trying to ensure adequate levels of infrastructure service. These areas often are challenged by a lack of past planning and maintenance of infrastructure systems and are faced with a massive financial undertaking merely to provide an acceptable level of service with their systems. In fast-growing rural and exurban areas, provision of infrastructure is also important because it can help shape the character of the area as it grows.

These issues are especially important with respect to water and wastewater infrastructure in Camden County. New residential and industrial/business development will place pressure on wastewater systems, and a sudden wave of development can quickly outpace the capacity of existing systems, leading to piecemeal and ultimately inefficient expansion of the infrastructure. It may also become difficult to attract future economic development. Not only will this type of infrastructure expansion be costly, the county could lose control of development patterns, allowing infrastructure provision to follow rather than direct development. In addition, without adequate wastewater provision, expected new development would be served by septic systems or small, privately operated package type systems.

Municipal wastewater treatment in Camden County is provided by the three incorporated cities and the Kings Bay Submarine Base. Camden County does not currently provide wastewater treatment services to its unincorporated areas. These unincorporated areas of the county are served by either septic systems or privately managed on-site package or land application systems. In most cases, there is not explicit knowledge, on the part of county officials, of the extent and condition of many parts of the systems.

Table 3 shows the current permitted wastewater treatment capacity in Camden County. Current aggregate usage is at 63 percent of the total capacity available in the county. Table 4 shows the provision and capacity of the water distribution systems. Although their current provision is adequate and there is excess capacity available, the growth of population, along with the associated increase of residential development, could soon result in inadequate capacity.

Camden County is undergoing a feasibility study on wastewater provision and is planning on providing some level of service in the future. County stakeholders have expressed an interest in exploring county-wide provision of water and wastewater infrastructure. At the time of this study, that plan had not been completed and initial results are not available. Neither Woodbine nor Kingsland has a specific water and wastewater master plan, but both are planning some expansion of their current systems in the near future, according to city officials. The city of St. Marys recently completed a water and wastewater master plan. The analyses in this plan show that several improvements in the water and wastewater system of St. Marys will be needed in the next 20 years. The costs of these improvements over the next five years are projected to be approximately \$18 million. Rate increases, along with increases in other types of financing, will be required to adequately provide water and wastewater services to St. Marys' customers.

Table 3 - Wastewater Treatment Capability

	Kingsland	St. Marys	Woodbine	Total
Usage (mgd)	1.5	1.3	0.1	2.9
Capacity (mgd)	2.2	2	0.368	4.57
Usage %	68%	65%	27%	63%
Increased Usage from current DRIs	2.56	1.97	0.75	5.3
Usage %	185%	164%	231%	179%

Source: Community Resource Studies, Camden County & City of St. Marys Water and Wastewater Master Plan, Current Camden County DRIs from the Georgia Department of Community Affairs (DCA).

Table 4 - Water capacity/usage (annual averages)

	Kingsland	St. Marys	Woodbine
Usage (mgd)	1.6	2.5	.083
Capacity (mgd)	2.5	3.0	.325
Usage %	64%	83%	26%

Source: Camden Partnership

There are currently 12 developments of regional impact (DRIs) under consideration in various jurisdictions of Camden County. Although it is not expected that all of these DRIs will be completed at the same time or that all of the development in any single DRI will occur at once, an analysis of the potential cumulative impacts of these developments will allow Camden County to identify potential future shortcomings in its infrastructure systems and plan for them in advance. This analysis also shows the importance of considering the aggregate effect of development on Camden County's infrastructure.

Table 5 -Potential Water and Wastewater Costs of DRI Development

	Proposed Increase in Wastewater Demand (MGD)	Miles of pipe needed	Cost per mile (\$75/LF)*	Estimated cost of additional in-ground infrastructure	Proposed Increase in Water Demand (MGD)	Miles of pipe needed	Cost per mile (\$34/LF)*	Estimated cost of additional in-ground infrastructure
Kingsland	2.56	25	\$396,000	\$9,864,360	9.0952	34.63	\$179,520	\$6,216,778
St. Marys	1.97	1	\$396,000	\$396,000	1	1	\$179,520	\$179,520
Woodbine	0.75	2	\$396,000	\$792,000	7.5	5	\$179,520	\$897,600
Total	5.66	34		\$11,052,360	23.3952	46.43		\$7,293,898

*Costs taken from the City of St. Marys Wastewater Master Plan for 8" pipes.

When potential wastewater flows taken from the 12 DRIs currently under consideration are added into the system, there is aggregate county usage that is 38 percent higher than current capacity (Table 5). This shows that without wastewater system expansion, developments in the planning process could potentially result in a situation where there is not enough wastewater capacity to meet demand. This analysis does not account for any potential development other than those currently under consideration, so the potential for and even higher wastewater capacity deficit is great, especially with the continued population growth expected.

It is estimated that the costs of the additional in-ground water and wastewater infrastructure to provide service to these DRIs is approximately \$18 million. This does not take into account the costs of the necessary capacity upgrades or construction of new treatment and distribution facilities. Capacity upgrades of 1 million gallons per day (MGD) at the existing Point Peter plant in St. Marys is projected to cost \$1.9 million over the next five years. Costs of constructing new plants would be substantially more. These developments are not guaranteed to materialize, but this brief cost analysis does illustrate the magnitude of the aggregate capital costs necessary to provide adequate water and wastewater infrastructure to a growing county. Investment of this magnitude must be properly planned and executed on both a short- and long-term basis.

In addition to the effect they will have on Camden County's housing stock, large developments should be evaluated based on their cumulative effect on the network of various infrastructure systems within the county. This will provide an idea of the adequacy of the infrastructure networks to provide for the immediate, short-term needs of development as well as the potential future needs of the infrastructure system. Population projections and future growth scenarios provide a tool for gauging the ability of infrastructure to meet future needs. These scenarios also are useful to monitor the short- and mid-term adequacy of the infrastructure networks.

The number of housing units recorded in the 2000 U.S. decennial census and scenario-specific projections based on those numbers are shown in Table 6. These projections are based on the population projections mentioned in the projection section of this report and the current number of people per household, 2.58. Under Scenario C, there is a potential demand for approximately 11,300 extra housing units by the year 2015, or an increase of 67 percent. Using proportions from the 2000 census, approximately 6,850 of those units would be single-family detached and 4,450 would be either single-family attached, mobile home, or multi-family units.

Table 6 - Projection of Occupied Housing Units

	2000	2005	2010	2015	2020	2025	2030
Scenario A	16,940	17,470	17,980	18,500	18,890	19,378	19,865
Scenario B	16,940	19,180	20,926	22,439	23,635	24,694	25,639
Scenario C	16,940	19,180	26,779	28,282	27,766	27,704	27,848

These projections can act as a guide for future land use and development planning. It should be noted that these numbers are projected to occur within 10 years under this scenario, a relatively short time frame with respect to planning for the large capital expenditures that can accompany infrastructure provision. The approval of large-scale development projects should be considered in the context of not only the immediate effects of the development, but also the cumulative effect on overall housing stock in the county and how this development will affect the provision of water and wastewater services. Camden County can use this knowledge to provide input into the phasing in of new development over time.

Water and Wastewater Infrastructure Issues

ISSUE: Water and wastewater infrastructure provision is following instead of directing development.

Recommendation: Create a comprehensive master plan that phases the expansion of water and wastewater infrastructure to support economic development and redevelopment goals.

Camden’s expected growth and development could very well outpace infrastructure adequacy, especially with respect to water and wastewater service provision. Camden County and its cities need to approach future development with an eye on the cumulative effects on their infrastructure networks. The future planning of infrastructure networks plays a role in the spatial allocation of development as well as the phasing in of developments. It should be a priority for all municipalities/agencies involved in wastewater management and water distribution in Camden County to have comprehensive water/wastewater infrastructure master plans detailing existing conditions, as well as future plans and limitations. This will better allow the consideration of cumulative effects of future development scenarios on the county’s infrastructure and will help avoid the high costs/impact of piecemeal infrastructure expansion. This strategic consideration of service consolidation may help control growth patterns, allowing Camden County to grow responsibly while maintaining its quality of life. Without the ability to affect development through provision of water, wastewater, and transportation infrastructure, the county could find it difficult to contain sprawling growth patterns.

The expected growth in Camden County will stress the current water and wastewater infrastructure. To keep pace with the associated residential, commercial, and industrial development, Camden County and its cities will have to expand current infrastructure capacities and create new pieces of infrastructure to provide service to new growth areas. When combined with the costs associated with current operation and maintenance of the infrastructure, the costs of providing this extra service could be substantial. Creation of a comprehensive asset management program for the current systems, as well as any new systems brought on line, will allow Camden County and its cities to better plan and manage their water and wastewater infrastructure with consideration of the expected growth. Better control of these assets will also allow the county and its municipalities to play a role in the directing and phasing in of growth, ensuring that it fits within the long-range infrastructure and land use plans.

In the United States, comprehensive asset management planning for water and wastewater infrastructure is a new concept. The Government Accounting Office (GAO) released a 2004 report (GAO-04-461) on water utility asset management. This report studied the benefits seen by agencies currently employing comprehensive asset management for their water utilities. Operators cited improved decision-making due to the more accurate and integrated information about their capital assets and more productive relationships with governing authorities, rate payers, and other stakeholders because they can provide better information in a more transparent way. Operators have also seen an increase in interdepartmental information-sharing, leading to more coordinated planning and decision-making.

Figure 2 – Elements of Comprehensive Asset Management



Source: GAO.

Camden County and its cities should develop a comprehensive asset management plan(s) for their water and wastewater infrastructure planning needs. This approach to planning and management of assets focuses on the management of the entire system through key data collection and the application of analytical tools such as life-cycle cost analysis and risk assessment (Figure 2). This level of management also requires an integrated decision process involving accounting, finance, operations and maintenance, engineering, and planning. This type of management will provide for an integrated, organization-wide viewpoint when setting the goals and priorities for the water and wastewater plan(s).

ISSUE: The lack of wastewater treatment capabilities in the county's unincorporated areas can lead to the increased use of septic and small package systems in new developments.

Recommendation: Develop a county-wide water and wastewater master plan that coordinates county efforts and provision with those of its municipalities to provide an adequate level of service as Camden continues to grow. Use this plan to help direct future growth to areas that are consistent with the future land use plan.

Camden needs to develop a clear view of its current and planned water and wastewater assets, their capacity, and the ability of the county and its cities to provide services. Future land use and development planning should be approached, in part, in the context of the cumulative effects on this infrastructure. This plan should also provide for the phasing in of infrastructure to support the future land use plan. Without this, it is possible that piecemeal development of infrastructure could follow sprawling growth patterns or worse, the county could have a continued reliance on septic systems for residential wastewater treatment. This type of development could cause Camden County to incur more short- and long-term infrastructure costs, lose the ability to direct the form of future development with potential negative effects on the quality of life, and lead to environmental degradation of this sensitive coastal area.

A major cause of groundwater contamination in many areas of the United States is effluent, or outflow, from septic tanks, cesspools, and privies. Approximately one-fourth of all homes in the United States rely on septic systems to dispose of their human wastes. If these systems are improperly sited, designed, constructed, or maintained, they can allow contamination of the groundwater by bacteria, nitrates, viruses, synthetic detergents, household chemicals, and chlorides. Although each system can make an insignificant contribution to groundwater contamination, the sheer number of such systems and their widespread use in every area that does not have a public sewage treatment system make them serious contamination sources (Environmental Protection Agency).

Concerns about groundwater contamination from septic systems are especially crucial in coastal areas with high water tables and soils that are not conducive to filtering and containing waste. The 1992 Camden County Comprehensive Plan cites as a concern the pressures that increasing development may have on groundwater quality due to the poor soils, as well as the amount of wetlands, floodplains, and marshes in the county. Higher-density residential development will be increasingly difficult, if not impossible, to site with the natural constraints on septic systems. A continued reliance on septic systems will lead to sprawling residential growth patterns that will degrade the rural character of Camden County and stress the environment.

Small package plants are being used in some residential developments in Camden and are proposed for others. According to officials at the Georgia Environmental Protection Division, reliance on small-scale, privately operated, package plants is a bad idea. These plants require knowledgeable operators and money for operation and maintenance; but most often, these plants are underfunded and improperly operated.

Provision of Water and Wastewater Infrastructure not Proactive

Case Studies and Resources:

GAO Report on Comprehensive Asset Management

The Government Accounting Office (GAO) recently released a report to the U.S. Senate Committee on Environment and Public Works. This report details the benefits of implementing a comprehensive asset management program for water and wastewater utilities. The report includes case studies and further references on this process.

More information: www.gao.gov/new.items/d04461.pdf

Georgia Environmental Facilities Authority

The Georgia Environmental Facilities Authority (GEFA) has several low interest loan programs available to Counties and Municipalities for water and wastewater projects.

More information: <http://www.gefa.org/>

Next Steps:

- Working with the community and stakeholders, develop a vision and goals for future land use in Camden County.
- Inventory the extent and condition of existing water and wastewater infrastructure.
- Create a wastewater master plan for the county and its cities. Ensure that this master plan coordinates the provision of wastewater infrastructure with the future land use goals of the county and cities.
- Create a comprehensive asset management plan for the county and its cities that is based on the master plan and future land use plans.
- Coordinate future infrastructure and land use planning with all of the affected county departments such as planning, public works, and economic development.
- Coordinate future infrastructure and land use planning with all of Camden's cities and their respective departments. This will allow for county-wide coordination and a better knowledge of the cumulative county-wide impacts of development. This coordination may also uncover synergies in the provision of water and wastewater services to the county.
- Establish a process for evaluating proposed developments based on the planned provision of wastewater services. This decision-making process should involve representatives from the planning department(s), public works department(s), and economic development department(s) of the county and its cities.
- Develop regulations for allowing developments that require package systems. These regulations should include guidelines on management responsibilities and performance criteria in the short and long term.

GREEN INFRASTRUCTURE

As Camden County's infrastructure—water systems, power lines, and roads—connects its people and businesses, so could green infrastructure connect its natural spaces: parks, forests, undeveloped lands and waterways. Green infrastructure is a strategically planned network of undeveloped land, parks, waterways, working lands, and other natural areas connected to community facilities and cultural sites that is designed to improve quality of life, sense of place, habitat, and the environment. Unlike traditional conservation strategies that seek to restore environmentally important areas after development takes place, green infrastructure planning begins by identifying ecologically, socially, and economically important natural systems to guide future development patterns.

Such planning is particularly important in Camden County, home to vital natural resources such as coastal marshes, wetlands, beaches, and sand dunes, as well as significant historical sites. Camden County is also home to the Cumberland Island National Seashore, a 36,500-acre island containing marshes, mud flats, tidal creeks, and an abundant mix of coastal wildlife. These coastal features provide a rich and diverse habitat and protect inland areas of the coast. They also enhance the rural feel of Camden County, acting as a draw for tourism and playing a significant role in resident's quality of life. Additionally, Camden County has twenty-seven parks managed by the Camden Public Service Authority. More parks are currently in either the planning or construction phase. To ensure these and other natural assets function as green infrastructure, they need to be connected and work as a system.

A well-developed green infrastructure network provides many benefits by: increasing biodiversity; maintaining natural ecological processes; reducing flooding; improving air and water quality; increasing recreational and transportation opportunities; enriching wildlife habitat; linking people to natural places; and creating a sense of place. These benefits are provided through the use of "hubs" and "links." Hubs are larger tracts of land that sustain a variety of natural processes and provide a home for wildlife. Hubs can also be recreational or educational destinations for people. Examples include reserves, working lands (farms and forests), parks, large marshes or swamps, and public lands. Links connect the hubs and facilitate the flow of ecological processes and transportation for both people and wildlife. Links can be formed by connected pieces of property used for farming, timber, park, or public facilities, or they may be rivers and streams protected with land buffers. Links can also be parks and streetscapes that feature native trees and plants. This allows the green infrastructure system to connect to historical and cultural resources in urban areas.

Links may or may not be open to the public. If they are, they must include paths or sidewalks. These paths should be located along the boundaries of the link to protect the interior natural systems. Links that are intended to enhance the viability of native flora and fauna must meet specific thresholds—ranges in size, location, etc. based on purpose—as determined by scientific research. For guidance on thresholds for hubs and links, consult a wildlife biologist.⁵

A large amount of land (approx. 84 percent) of Camden County's land area can be considered green infrastructure. This infrastructure consists of institutional lands, lands protected as conservation/preservation tracts (including state and national parks), historic districts, county-operated parks and recreation facilities (27), and privately held lands currently used for agriculture and forestry. Table 7 shows the amount of the various types of green infrastructure lands. Figure 3 shows the spatial allocation of those lands.

⁵ A compendium of research on conservation thresholds is available in *Conservation Thresholds for Land Use Planners*. Kennedy, Christina, Jessica Wilkinson, and Jennifer Balch. *Conservation Thresholds for Land Use Planners*. Environmental Law Institute. 2003.

Table 7 - Camden Green Infrastructure Acreage

	Acres*	% of Green Infrastructure
Institutional**	9,446	2.40%
Agriculture/Forestry	296,354	75.18%
Conservation/ Preservation	96,849	24.57%
Parks/Recreation - not included above***	910	0.23%
Historic District	82	0.02%
Total GI Acres	394,195	
Total Camden Acres	470,707	
GI Percentage	83.75%	

*Land area calculations taken from 2003 Camden County parcel data acquired from the Camden County GIS department

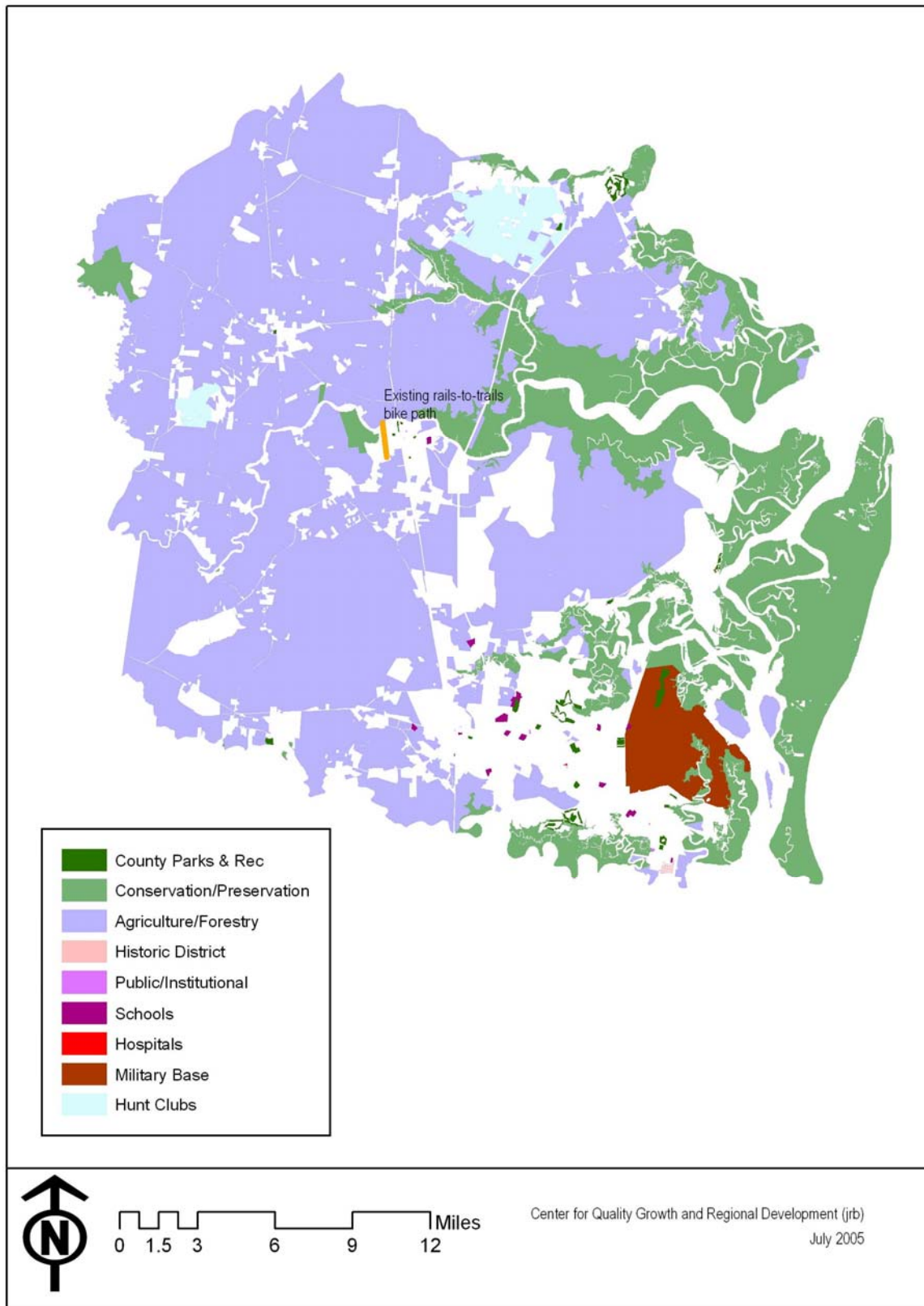
**Includes Military, Schools, Hospitals and Municipal Government

***Camden County managed parks and rec lands.

Approximately 400 of the total 1,310 acres of parks and rec lands are included in the other green infrastructure categories

Source: Camden County Parcel Data from Camden County GIS Department

Figure 3 - Camden Potential Green Infrastructure

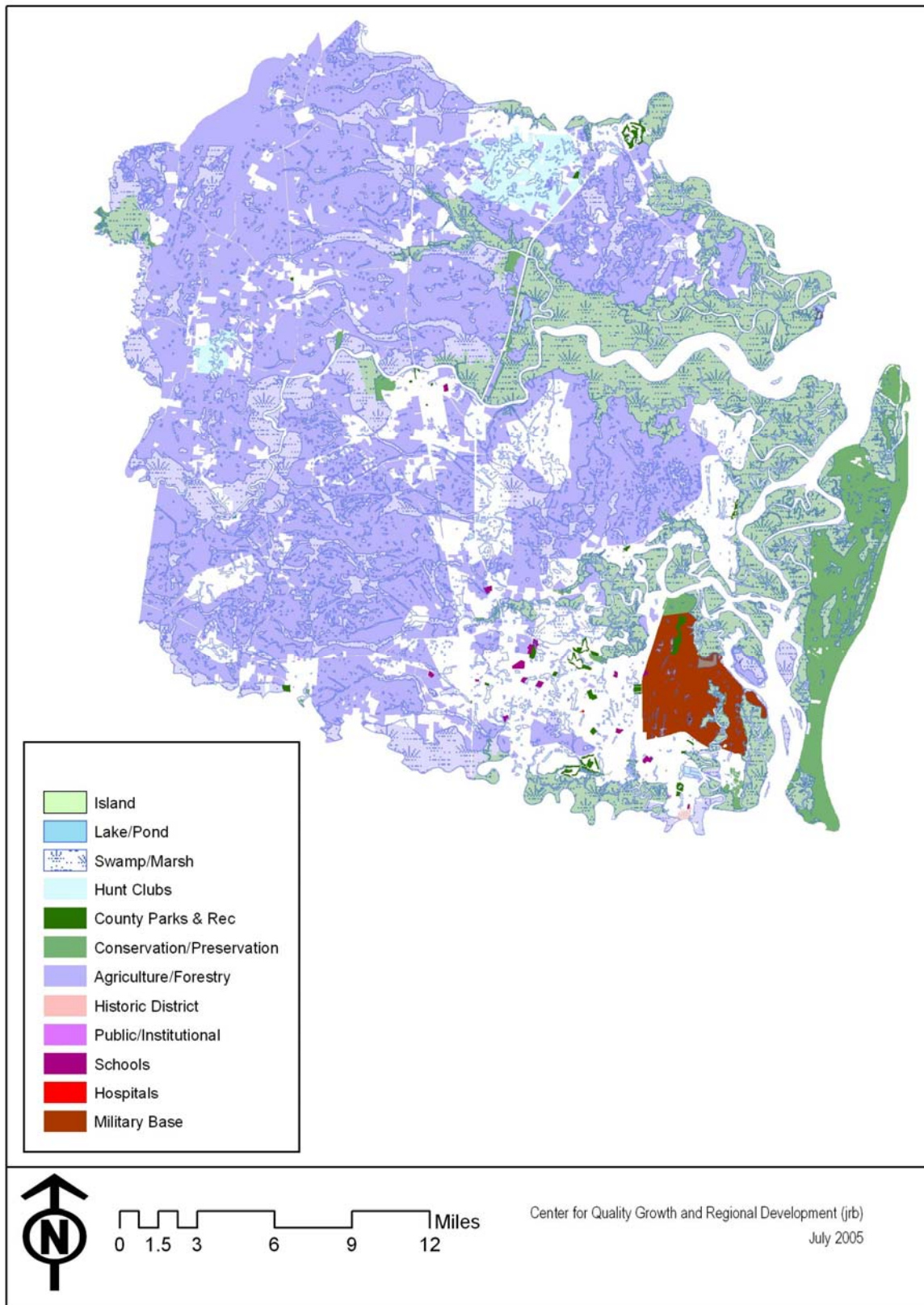


Much of the land area available as green infrastructure contains swamps and marshes (Figure 4). These natural features provide for much of the coastal feel of Camden County. The large amount of available green infrastructure in Camden County is an ecological asset, an economic asset, and an asset to the quality of life. Green infrastructure can also provide communities with gateways, links, and boundaries. This can create an overall sense of place unique to Camden County. Lack of planning and protection of green infrastructure will result in a depletion of these assets and ultimately a loss of identity.

Of the total amount of green infrastructure available in Camden County, approximately 296,000 acres (75 percent) of the existing green infrastructure is only considered such because of its current land use as agriculture or forestry. These lands have no protection from future development. If no plans are made to protect this land, pressures from business expansion and a growing population could lead to development in some of the land now used for agriculture and forestry. These changes could make it difficult to implement county- and region-wide green infrastructure projects like the RDC's proposed bicycle-pedestrian plan.

As mentioned in the transportation infrastructure section, Camden County has the potential to participate in the RDC's proposed bicycle-pedestrian plan. There is an existing stretch of paved bike path and a riverside boardwalk in Woodbine (Figure 3) and water access points for water trails in St. Marys. State bike route 95 follows U.S. Hwy 17 through the county. The RDC's plan would take advantage of these assets and expand on them. This plan is proposing that approximately 28 miles of off-road trails and 15 miles of designated on-road routes become part of the greenway. The off-road trails could be created from abandoned rail corridors in the county and, along with the designated on-road sections, would connect many of Camden County's ecological, historic, and tourist destinations.

Figure 4 - Camden Potential Green Infrastructure and Marshlands



Green Infrastructure Issues

ISSUE: Natural, cultural, and historic resources are disconnected.

Recommendation: Camden County should take measures to develop a county-wide green infrastructure network that strategically fits with the Coastal Georgia Greenway proposed by the RDC. This network should connect community amenities such as marshlands, tidal areas, critical habitats, historic sites, town centers, and recreation opportunities providing environmental and social benefits.

Much of Camden County's potential green infrastructure is not protected and there is little connectivity among the existing amenities. Without provisions for some form of protection, it will be difficult to plan for and guarantee future provision of green infrastructure, and its benefits, as population and development increase. Failure to plan for and protect these assets may detract from Camden County's rural character, rich biodiversity, and quality of life, and the draw these assets have for potential residents, tourists and businesses.

Wetlands, a crucial component of Camden's green infrastructure network, are protected by legislation at the state and federal level. Georgia manages wetlands through section 401 of the Federal Clean Water Act and the Georgia Coastal Marshlands Protection Act. Development and construction activity in wetlands is overseen by the U.S. Army Corps of Engineers for freshwater wetlands and by the Coastal Resources Division of the Georgia Department of Natural Resources (DNR) for tidal wetlands. Developers must obtain permits from the applicable agency before any activity involving erecting structures, dredging, filling, draining or otherwise altering a wetland area. This permitting process may involve mitigation—allowing development in one wetland area in exchange for protection of another wetland area or participation in a wetland mitigation banking program. Permits are generally granted for projects that do not harm or alter the natural flow of navigational waters; do not increase erosion, shoaling channels or stagnant pools; and do not interfere with conservation of marine life, wildlife, or other resources.

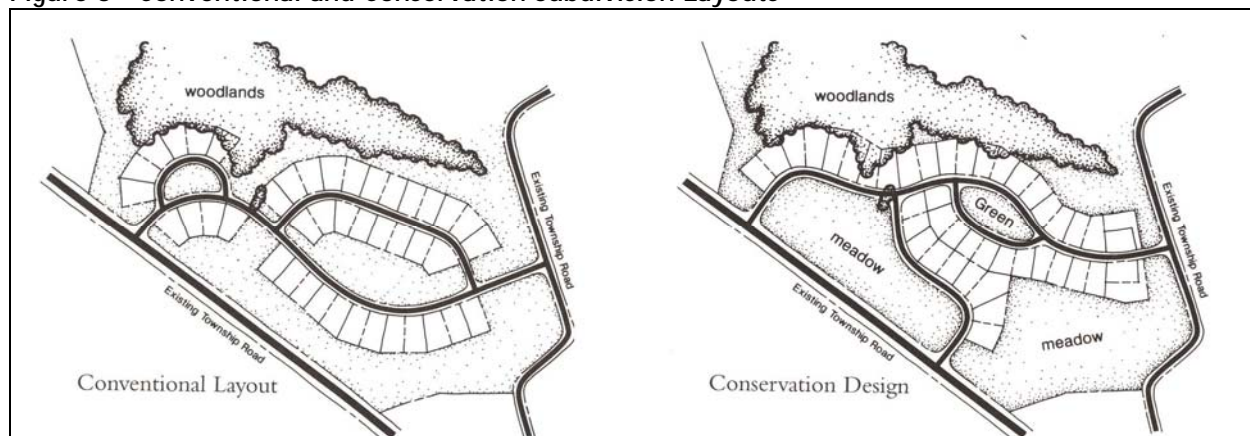
While mitigation does provide for no net loss of wetlands, it does not protect specific wetlands. Therefore, local protection of critical wetlands and wetlands that provide important connections with in a larger network is needed to create a green infrastructure system.

There are many strategies available for protecting land as green infrastructure. Critical lands can be purchased outright, but this can be a cost-prohibitive strategy. A better tool for Camden might be conservation easements that can provide for prohibition of development or land-use change. These easements can also be crafted to allow certain restricted public access if that is desired for greenway trails. Greenway trail easements can also be combined with utility rights-of-way providing links in a greenway system.

The use of conservation subdivisions may also provide a strategy for constructing residential development while preserving critical pieces of the green infrastructure. Conservation subdivisions are developments in which a significant portion of the site is set aside as permanently protected open-space with dwelling units clustered in the remaining portions.⁶ The general technique used to design conservation subdivisions is to first outline the open space(s) and then let that become the organizing element driving the design of the subdivision. Figure 5 shows a comparison of a conventional method of subdivision layout and a conservation subdivision layout.

⁶ Detailed explanations of Conservation Subdivisions along with model ordinances can be obtained from the Georgia DCA Quality Growth Toolkit Website located on-line at: <http://www.dca.state.ga.us/toolkit/ToolDetail.asp?GetTool=31>

Figure 5 - Conventional and Conservation Subdivision Layouts



Source: Arendt, 1999

Floodplain regulations and stream buffer requirements also provide certain protections to sensitive lands. To provide adequate protection, however, these requirements must be enforced. In areas such as Camden County, where the increase in growth over the past two decades and the expected growth may fundamentally alter the size and characteristics of floodplains, it is imperative that floodplain mapping and designation be kept up to date. Finally, county officials should work with developers to ensure that any open-space requirements fit into the county-wide green infrastructure network, where applicable.⁷

Camden County has the opportunity to participate, along with the Coastal Georgia RDC, in the implementation of the RDC's bicycle-pedestrian plan. There are cases throughout the nation where greenways have served to increase the quality of life while protecting the natural environment. Two excellent examples come from the state of Georgia; the Silver Comet Trail in North Georgia, and Columbus' riverwalk.

Growing rural and exurban counties are faced with the challenge of balancing necessary growth and expansion with preservation of quality of life and natural resources. Counties in this position can strategically use green infrastructure planning, along with other planning tools, to shape their future development and urban form. Utilization of a green infrastructure plan, along with future land use plans, will allow county officials to direct the type and location of future development, ensuring that it matches the community's vision of preserving the quality of life in Camden County. County officials should ensure that future commercial and residential developments fit conceptually and spatially into the green infrastructure plan.

It is recommended that Camden County hire a consultant to assist in the creation of a green infrastructure plan. This will allow Camden County to come up with the best strategy and tools to protect and preserve its green infrastructure while growing in a responsible manner.

⁷ For further information, see companion report "Economic Diversification of Camden County, Georgia: Quality Growth and Development Report."

Natural, Historic, and Cultural Resources are Disconnected

Case Studies and Resources:

Silver Comet Trail

The Silver Comet Trail is a regional greenway trail currently crossing three North Georgia counties and planned to eventually run from Atlanta to Anniston, Alabama. It is primarily located on abandoned rail corridors. In the four years since completion, rural towns and counties adjacent to the Silver Comet have seen a multitude of benefits, such as increased tourism and greater economic activity in previously lagging town centers. The trail is spurring residential and economic development focused on the quality of life provided by proximity and access to such an amenity. The Silver Comet is also spurring development of connecting greenways in nearby communities, leading to a region-wide network of greenway trails

More information: www.railtrails.org, www.pathfoundation.org

Columbus, Ga. Riverwalk

The riverwalk in Columbus, Ga. is a 22-mile linear park on the banks of the Chattahoochee River. A greenway trail runs the length of the park and connects downtown Columbus, nearby Fort Benning, and other historic areas. This trail has provided the citizens of Columbus and the connected areas with an alternative transportation and an outlet for recreation. The City of Columbus is also planning connector trails to link the riverwalk to city parks, schools, and other public facilities. This trail will utilize an abandoned rail corridor and will help create a green network in and around Columbus.

More information: www.railtrails.org, www.columbusga.com/MPO/index.htm

More information: Georgia DCA smart growth tool kit for conservation subdivisions.
<http://www.dca.state.ga.us/toolkit/ToolDetail.asp?GetTool=31>

Georgia Environmental Facilities Authority

The Georgia Environmental Facilities Authority (GEFA) will be rolling out a Land Conservation Revolving Loan Fund to assist local governments in the acquisition of conservation easements and other conservation lands. Contact: Beverly McElroy 404-962-3000

More information: http://www.gefa.org/new_programs.html

Next Steps:

- Working with the community and stakeholders, develop a vision and goals for a green infrastructure network in Camden County. This network should include elements focusing on human and natural connectivity.
- Hire a consultant to merge these visions and goals into a green infrastructure master plan that is integrated into the County's comprehensive plan.
- Inventory the existing extent of the county's green infrastructure.
- Coordinate with the Regional Development Commission and with the cities to connect Camden's green infrastructure networks within the county and also with the proposed bicycle-pedestrian plan.
- Establish a process requiring proposed developments needing greenspace or open-space set-asides to design these set-asides so they integrate with the County's green infrastructure network.

APPENDICES

Appendix 1 - Population Projection Details

Scenario A - This projected population scenario is based on the population projections through 2010 compiled by the Georgia Office of Planning and Budget. These population numbers were projected to 2030 Using LINAVE method (Isserman, 1977). This is a simple linear projection method that adds the average absolute past decade(s) change to the current period to project the next period. This method projects a population of 51,204 in 2030. This population projection represents the low end of the range of future population scenarios.

Scenario B - This population scenario is derived from an interregional cohort-component model. The base numbers and rates for the model come from the 2000 U.S. decennial census. Unlike the linear extrapolation model used in scenario A, this method separately models the effects of birth, death, in- and out-migration in the calculation of population projections. Each of these components of population change is measured and applied to individual age and sex cohorts. For the purposes of this study, 18 5-year age cohorts were used. They begin with the under-5-year cohort, continue with the 5-to-9 cohort, 10-to-14 cohort and so on through the 85-and-older cohort. The cohorts are also separated by gender, leading to a total of 36 cohorts in the model.

This model uses a five-year time period, and for each time period the population change components are calculated for each cohort and that cohort is moved into to the next five-year time period. The application of the population change components to individual cohorts allows this method to account for the variation of those components across cohorts for Camden County. The underlying assumption is that each of these population change components happens to people with varying probability based on their belonging to a specific age and sex cohort. This assumption is considered the at-risk principle of demography. Namely, the birth, death, and in- and out- migration rates should be applied to the associated cohort, or at-risk cohort, of people who will give birth, die, or migrate. For example, births for a given time period are calculated by the population of each female cohort of childbearing age by the birth rate for that cohort. Deaths are calculated in a similar manner. Each cohort is survived through a five-year time period by multiplying the cohort population by the associated survival rate for that cohort. Out-migration and in-migration are calculated by applying the associated migration rates to the appropriate at-risk population. For out-migration, the at-risk population is the population currently residing in Camden County. For in-migration, the at-risk population is the population that does not currently reside in Camden County, namely the population of the rest of the United States.

The population component change rates applied to the at-risk cohorts are calculated using migration and base population data from the 2000 U.S. decennial census and birth and death rates from vital statistics reports published by the Georgia Department of Human Resources, Division of Public Health. The migration rates are based on the census long form question regarding residence in 1995. These rates are available for all cohorts with the exception of the under-5-cohort. The migration of this cohort is accounted for by migrating babies with their mothers in the birth rate calculations. The birth and death rates are calculated by averaging the reported Camden County rates for 1999, 2000, and 2001 for each respective cohort.

This interregional cohort-component model projects a 2030 population of approximately 66,000.

Scenario C - This population projection scenario takes into account the possible expansion of Kings Bay Submarine Base in St. Marys. During the 2005 Base Realignment and Closure (BRAC) process, it was announced that Kings Bay Submarine Base would be the recipient of 3,367 new base positions. This scenario is developed to show the potential effects of the influx of these new base employees on Camden County's future population. This scenario adds these new people, as well as those associated with them, to the cohort-component population projection model above in scenario B.

As of the completion of this report, however, BRAC officials have reevaluated their plans and Kings Bay will not be expanding. This scenario still depicts the potential effects of a large influx of residents over the next 10 to 15 years and shows the possible consequences of a future expansion of the base. This scenario also represents a high end of possible population growth in Camden County. Even with a significant base expansion resulting in an influx of new residents, Camden would experience a projected growth rate of 45 percent over the next 25 years.

The first step in the development of this scenario was to estimate the total amount of people, along with their age and sex, who will potentially move to Camden as a direct result of this increase in base employees. These additions include the actual job holders, their spouses, and their children. Demographic characteristics of the Kings Bay Census Designated Place as recorded in the 2000 census are used to calculate these numbers. These population estimations were added to the appropriate age and sex cohort for the 2005-2010 time period in the Scenario B projection model.

Additionally, the model needs to account for the additional support jobs that will indirectly be created as a result of this base expansion. It is estimated that the number of off base jobs added in Camden County as a result of the base expansion will equal the number of jobs added on base (3,367). The model assumes that these jobs will be filled by people migrating into the county due to the low rate of unemployment currently seen in Camden County. Demographic characteristics of Camden County as recorded in the 2000 US Decennial Census are used to estimate the number of associated family members that would also move to the county. It is expected that the creation of these jobs will lag behind the addition of the base jobs. To integrate these numbers into the model, half of the expected in-migrants were added into the 2005-2010 time period and half were added into the 2010-2015 time period.

This scenario shows a sharp increase in population in the 2005-2010 and 2010-2015 time periods, then the population growth levels out. This projection method estimates Camden County's 2030 population to be just under 72,000.

Appendix 2: Traffic counts, 1997-2004. Road segments with more than 1,000 AADT are ranked from lowest to highest traffic counts.

Route	Type	AAADT '97	AAADT '04	Pct change	Beginning Intersection	Ending Intersection
Old Still Road	CR	1269	1040	-18	Laurel Island Pkwy	Harrietts Bluff Rd
Dover Bluff Road	CR	838	1060	26	Dover Bluff Rd	Ocean Hwy
Burnt Fort Road	SR	1169	1140	-2	Fish Camp Rd	Butler Johnson Rd
Fourth Street	SR	1462	1230	-16	Newton Ave E	Oak St
Colerain-St Marys Road	CR	763	1310	72	Okefenokee Pkwy	Ocean Hwy
US 17	SR	2028	1990	-2	White Oaks School Rd	Burnt Fort Rd
US 17	SR	2625	2510	-4	Escott Rd	Scrubby Bluff Rd
US 17	SR	2277	2510	10	Horse Stamp Ch Rd	No Name
US 17	SR	2355	2570	9	Providence Rd	Boston Way
US 17	SR	3344	2890	-14	Refuge Rd	Refuge Rd
US 17	SR	2712	3090	14	Dover Bluff Rd	No Name
US 17	SR	4034	3130	-22	No Name	Enterprise Ch Rd
US 17	SR	4008	3140	-22	17th St	12th St
Point Peter Road	CR	4393	3240	-26	Okefenokee Pkwy	Clarks Bluff Rd
SR 25 Spur	SR	2936	3290	12	Bedell Ave	Brewster St
US 17	SR	4220	3340	-21	Martin Luther King Blvd	North Fork Cr
Harrietts Bluff	CR	3164	3350	6	Howard Gilman Hw	White Oak Pl
US 17	SR	2558	3480	36	Harrietts Bluff Rd	Colesburg Tompkins Rd
SR 40	SR	4242	3510	-17	No Name	No Name
SR 25 Spur	SR	3639	3610	-1	Brewster Ave	Billyville Rd
SR 40	SR	4556	3620	-21	Sr 110	Vacunna Ruhamah Rd
US 17	SR	3091	3780	22	3rd St	James Edwin Godley
SR 40	SR	5293	3890	-27	Colerain Rd	Meadows Dr
Colerain-St Marys Road	CR	3230	4120	28	Martin Luther King Blvd	I-95 Sb On
SR 40 Spur	SR	3254	4170	28	Colerain Rd	Mush Bluff Rd
Dilworth St.	CS	4180	4300	3	Osborn St	Osborn St
Colerain-St Marys Road	CR	4007	4340	8	Ocean Hwy	Martin Luther King Blvd
Osborne Road	CS	4010	4530	13	Church St	St Marys St
Scrubby Bluff Road	CR	4109	5270	28	Cedar St	Ocean Hwy
US 17	SR	5387	5370	0	Powell St	William Ave
SR 40	SR	9472	5730	-40	Dilworth St	Church St
US 17	SR	6154	5770	-6	9th St	4th St
US 17	SR	6538	6590	1	King Ave	Farmer Ave
SR40	SR	9474	8410	-11	Wolf Bay Cir N	Seaboard St
Colerain-St Marys Road	CR	8159	9640	18	Howard Gilman Hwy	No Name
Colerain-St Marys Road	CS	n/a	10010	n/a	Kings Bay Rd	Charlie Smith Sr Hwy

Route	Type	AADT '97	AADT '04	Pct change	Beginning Intersection	Ending Intersection
SR 40 Spur	SR	12402	10480	-15	Magnolia St	St Marys Rd
SR 40	SR	11387	10600	-7	N Lee St	Boyce St
Kings Bay Road	CS	10609	11060	4	Charlie Smith Sr Hwy	Mission Trace Dr
St Marys Road	CS	9636	12390	29	Haddock Rd	Sr 40 Sp
Kings Bay Road	CS	10170	13350	31	Colerain St Marys Rd	Scotchville Rd
SR 40 Spur	SR	15708	13680	-13	Osborn St	Hightower St
SR 40	SR	16622	14660	-12	Scotchville Rd	Eb Off To St Marys Rd
SR 40	SR	18266	15800	-14	Howard St	Howard Gilman Hwy
SR 40	SR	20194	15970	-21	St Marys Rd	Food Lion Plaza
SR 40	SR	20029	16420	-18	City Smitty Rd	Dilworth St
SR 40	SR	23586	24610	4	Howard Gilman Hwy	Kings Bay Rd
I-95	SR	34042	41700	22	Sb Off To Sr25sp	Sb On Fm Dover Bluff Rd
I-95	SR	34690	43260	25	Dover Bluff Rd	Sb Off To Dover Bluff Rd
I-95	SR	37810	44330	17	Harrietts Bluff Rd	Sb On Fm Sr25sp
I-95	SR	37494	44960	20	Kingsland St Marys Rd	Laurel Island Pkwy
I-95	SR	34792	45500	31	Sb On Fm St Marys Rd Wb	Nb On Fm St Marys Rd
I-95	SR	41209	47240	15	Laurel Island Pkwy	Nb Off To Harrietts Bluff Rd
I-95	SR	40678	54400	34	Nb Off To St Marys Rd	St Marys Rd

SOURCE: Georgia Department of Transportation.

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