



**CAMA
2006**



Wilmington – New Hanover County Joint Coastal Area Management Plan 2006 Update

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Wilmington – New Hanover County 2006 CAMA Plan Update



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TABLE OF ACRONYMS USED IN THE PLAN

AEC	Areas of Environmental Concern
BMP	Best Management Practices
CAMA	Coastal Area Management Act
CFCC	Cape Fear Community College
CIP	Capital Improvement Program
COD	Conservation Overlay District
COE	Corps of Engineers, United States
CRAC	Coastal Resource Advisory Committee
CRC	Coastal Resource Commission
CRS	Community Rating System
CZMA	Coastal Zone Management Act
DCM	Division of Coastal Management
DENR	Department of Environment and Natural Resources
DOT	Department of Transportation
DWR	Division of Water Resources
DWQ	Division of Water Quality
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
gpd	Gallons per day
HQW	High Quality Waters
ICC	Infrastructure Carrying Capacity
ICW	Intracoastal Waterway
LID	Low Impact Development
LPO	Local Permit Officer
LOS	Level of Service
LSA	Land Suitability Analysis
LUP	Land Use Plan
MG	Million Gallons
MGD	Millions of Gallons per Day
MHWL	Mean High Water Line
MLWL	Mean Low Water Line
MS4	Municipal Separate Storm Sewer System
NC	North Carolina
NCAC	North Carolina Annotated Code
NCDENR	NC Department of Environment and Natural Resources
NCDOT	North Carolina Department of Transportation
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NSW	Nutrient Sensitive Waters
ORW	Outstanding Resource Water
OSDS	Onsite Sewage Disposal System
PL	Public Law
SW	Swamp Waters
TDR	Transfer of Development Rights
TMDL	Total Maximum Daily Loading
UNCW	University of North Carolina at Wilmington
U.S.	United States
USA	Urban Services Area
USB	Urban Service Boundary
WMPO	Wilmington Metropolitan Planning Organization
WTA	Wilmington Transit Authority

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PART I
INTRODUCTION

A. BACKGROUND

CAMA is an acronym for the North Carolina Coastal Area Management Act, established in 1974. CAMA requires the establishment of a cooperative program of coastal land management between local government and the State of North Carolina for preparing, adopting, and enforcing local land use plans. CAMA requires that local governments within the 20 coastal counties prepare land use plans which provide for the protection, preservation, orderly development, and management of the coastal area of North Carolina.

New Hanover County and Wilmington have jointly prepared a CAMA plan since the law was enacted in 1974. The State provides funding for the plan to be updated on a six-year cycle. The primary focus of the plan has been protection and appropriate development of coastal areas of environmental concern on a countywide perspective. This plan will be the fifth update to the original plan, which was adopted by the City and County in 1976. Previous updates to the original plan have been made in accordance with State Rules and planning guidelines in 1981, 1986, 1993, and 1999.

The Wilmington-New Hanover County 2006 CAMA Plan Update is an official public document of the Wilmington City Council and the New Hanover County Board of Commissioners. Public hearings for the Plan were held in March 2006 and were followed by adoption. The Plan will act as a set of long range, general guidelines for local decision making. The Plan is also officially certified by the State and used by regional, State, and Federal agencies in making project consistency determinations and funding and permit decisions.

B. PURPOSE OF THE PLAN

The City of Wilmington and New Hanover County continue to experience a high level of population and employment growth. This growth will exert increasing pressure on the City and County's ability to provide services, insure wise development of the land, and minimize further degradation of our resources and loss of our natural landscape.

The CAMA plan provides guidance to the City and County officials in their decisions on new development proposals and redevelopment plans, development and zoning regulations, and new policies and programs. The plan also serves as a vehicle to communicate local government policies to interested citizens, businesses, and other organizations. While the CAMA Plan is not statutorily binding in the sense of an ordinance, it is an important compilation of policies that is adopted, amended, and updated by formal action of the City Council, the Board of County Commissioners, and the North Carolina Coastal Resources Commission.

The main purpose of the City-County CAMA Plan is summarized by the following.

- Recognize the need for effective environmental and conservation management measures to ensure environmental protection.
- Guide and monitor land use changes as a result of development.
- Meet the transportation challenge with diverse solutions including automobile, bus, bicycle, and pedestrian.
- Maintain and enhance the fiscal sustainability and community infrastructure needs.
- Support and enhance affordable housing and minimum housing programs.
- Increase efforts to improve economic diversification, and attract employers paying higher wages.
- Protect and nurture our historic heritage.
- Ensure that there is a proactive plan for storm and natural hazards in the event of a hurricane or other natural disaster.
- Provide a land classification system and map to chart a course of growth, development, and conservation.

C. PLAN ORGANIZATION

I. Introduction

This section contains details of the planning process and the public participation process. The planning process was developed to draw on the plan adopted in 1999, to evaluate its merits relative to today, and to refine policies and strategies to create a plan more amenable to successful implementation.

II. Analysis of Existing and Emerging Conditions

Technical reports and analyses were used to identify and confirm validity of the issues of concern and to support the development of planning policies and strategies. These analyses are provided in the plan to provide information for the public and demonstrate the basis for the plan elements. Technical information required under State rules for developing this Plan is contained in these analyses. Sections of this part include analyses of population, housing, economy, natural resources, land use, and infrastructure.

III. Plan for the Future

The heart of the plan consists of the following key elements: vision statement and goals; issue statements; policies; and strategies accompanied by the land classification map. Any changes, additions, or deletions to these elements will require an amendment to this Plan.

Vision and Goals

This section contains the vision and goals of the Plan. The vision and goals were synthesized in the previous plan and reviewed by staff, the Advisory Panel, and the public during the update process to determine their relevance today. The vision and goals of the 1999 plan are brought forward into this plan substantively unchanged.

Issues Policies and Strategies

This section lists the community issues that were brought forward from the 1999 plan, reviewed by the public and Advisory Panel, and updated and refined as needed. The issues, policies, and strategies are developed covering eight primary areas, including natural resources, land use and urban design, community infrastructure, transportation, housing, historic preservation, economy, and storm and natural hazards.

IV. Land Classification Map

The land classification map shows the location of the land categories which are: urban; transition; community; rural; resource protection, and conservation. These categories are intended to guide and promote wise development and natural resource conservation for the Plan. The policies and implementation actions fit within the architecture provided by the land classification scheme. This section also provides a revised urban services boundary map.

V. Policy Analysis

This section contains a matrix of the policies provided as a ready cross reference to the CAMA planning rules “Land Use Management Topics.”

VI. Appendices

The appendices include additional data, analysis, and related documents and were developed and included to augment the plan.

D. PLAN UPDATE PROCESS

Citizen Participation Plan

One requirement for developing a plan under CAMA is a plan for citizen participation. The Wilmington City Council and New Hanover County Commissioners adopted a Citizen Participation Plan in January 2004 to assure involvement by Citizens throughout the Plan update process. The Citizen Participation Plan outlined the measures to be taken to gain public input and participation, including:

- A Public Opinion Survey of Registered Voters
- Citizen Participation Plan
- Advisory Panel
- Public Input Meetings
- Public Awareness through Brochures, Cable Television, and Internet
- Public Outreach through Discussion Forums with Interested Community Groups
- Public Hearings on Draft Plan

Public Opinion Survey

The 2004 New Hanover County and City of Wilmington CAMA Registered Voter Survey was conducted during March 2004. A total of 686 registered voters were interviewed by telephone about a wide range of issues and concerns related to development and land use planning. The sampling error for a survey of this size is +/- 4%. The survey instrument was provided by New Hanover County and the City of Wilmington. Detailed findings of the survey are found in Appendix G.

The interviews were conducted and data compiled by the Survey Research Lab at the University of North Carolina at Wilmington and overseen by Dr. Stephen Meinhold and Dr. Lloyd Jones.

The survey covered many issues that can be broadly grouped into three primary focus areas:

- Growth and Development
- Planning
- Environment

Some of the key findings are highlighted below.

- The rate of growth and related development issues continue to be important areas of concern for New Hanover County voters. Nearly two-thirds of respondents indicated that the County is growing too quickly.
- Eighty four percent of registered voters said developers should “be required to help pay the costs of new public facilities needed because of growth.”
- In all but two instances (housing and billboards) there is a considerable agreement *and the voters in every case favored positions to improve land use decisions, aesthetics, and environmental conditions.*
- A comparison of the common items from the 2004 and 1997 surveys generally shows that respondents see progress on some of the environmental and zoning issues facing the County.
- The five top-ranked issues include three items related to open space and the appearance of our community including: preservation of open space and greenways (73%), requiring new development to set aside natural areas for preservation (70%), and improving the appearance of our community (68%).
- Respondents expressed almost complete agreement (96%) that the county and city should address the issue that they chose as the most important and nearly as many (88%) said that they would support the city and county spending additional dollars to address this issue.

Plan Update Advisory Panel

One element of the Citizen Participation Plan was the development of an Advisory Panel to facilitate public input and feedback to assist in updating the plan. The Advisory Panel is made up of eight members - two appointed by the Wilmington City Council, two by the New Hanover County Commissioners, two by the City Planning Commission, and two by the County Planning Board. An orientation meeting with the Panel was held in late May 2004, and a total of 17 meetings have been held by the Advisory Panel to provide review and feedback on the issues, policies, strategies and maps that are part of the plan.

Public Information and Input Meetings and Public Hearings

Another important component of the Citizen Participation Plan was holding a series of public information and input meetings. The first such meeting was held on July 22, 2004 at which attendees were asked to provide feedback on how well the City and County have done implementing the existing plan adopted in 1999. The second meeting was held Thursday, August 22, 2004. At this meeting, input from the public was solicited on the issues and concerns they have that can be addressed through the CAMA planning process. Any members of the public who were interested in the CAMA plan process were invited. A third public meeting was held on February 22, 2005 to present the draft revised policies that are incorporated into the Plan update. In addition, four public hearings were held:

- City Planning Commission, February, 2006
- County Planning board, February, 2006
- County Commissioners regular meeting March, 2006
- City Council regular meeting March, 2006

Public Outreach

Public outreach forums were offered to community groups and were held at the request of community groups representing a broad spectrum of citizens:

- League of Women Voters
- Cape Fear River Watch
- Senior Men's Club of Wilmington
- Castle Hayne Steering Committee
- Wilmington Rotary Club
- Council of Neighborhood Associations

E. PLAN IMPLEMENTATION

In order to be a meaningful tool, any plan has to be implemented, and to be implemented effectively and efficiently requires an implementation strategy. The following is an outline of the implementation strategy for this plan.

- Distribute plan and communicate plan elements to parties responsible for implementation.
- Establish interdepartmental reporting procedures.
- Assess resource needs and timeline for implementation.
- Develop tracking database and distribute to responsible parties.
- Develop a review and update process for the implementation action schedule.
- Annually review and update the implementation action schedule.
- Secure support for code amendments.
- Identify barriers to implementation.
- Establish process for next update cycle.

For each of the main topics the implementation strategies have been summarized into tables with the following detail: the priority given to the action item; an assessment of resources required for implementation; the fiscal year in which it is proposed to be initiated; and the responsible agency. The implementation summary (Appendix B) will be used to evaluate progress in implementing the Plan.

State Rules require the completion of an implementation status report every two years. The implementation report will be prepared, submitted to DCM, and made available to the public. The report will identify the following:

- Actions that have been undertaken to implement the certified plan
- Actions that have been delayed and the reasons for delay
- Unforeseen land use issues that have arisen since certification of the plan
- Consistency of land use and development ordinances with the certified CAMA Plan
- Policies that create desired land use patterns and protection of natural systems

F. FUNDING

Many of the policies and strategies identified in this plan will require additional staff and significant funds if they are to be fully implemented. Organizations wishing to acquire funds for these programs will be competing with numerous other programs that rely on public revenue sources for funding – from schools to fire and disaster response. City and County general fund priorities are driven by need and decisions are made based on the priorities as perceived by the sitting group of elected officials. In order for this plan to be successfully implemented, it will be necessary to develop a varied pallet of funding sources. Many of these items may go beyond the traditional range of tax and fee revenue sources, especially the recommendations for land acquisition to accomplish a variety of goals. Only through exploration of outside funding sources – including bonds, grants, gifts, and donations – can some of these strategies become reality.

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PART II
ANALYSIS OF EXISTING CONDITIONS

SECTION A: Population

The first fundamental step to shaping Wilmington and New Hanover County’s future is to examine past growth trends and to project plausible future growth based on historic growth rates and patterns. This assessment examines historic and projected population as well as residential and nonresidential development trends in order to establish reasonable growth parameters against which future community growth preferences may be assessed. The City and County’s future land use composition, its desired urban form, public infrastructure/service demands, and fiscal stability will be gauged using the information presented in this assessment.

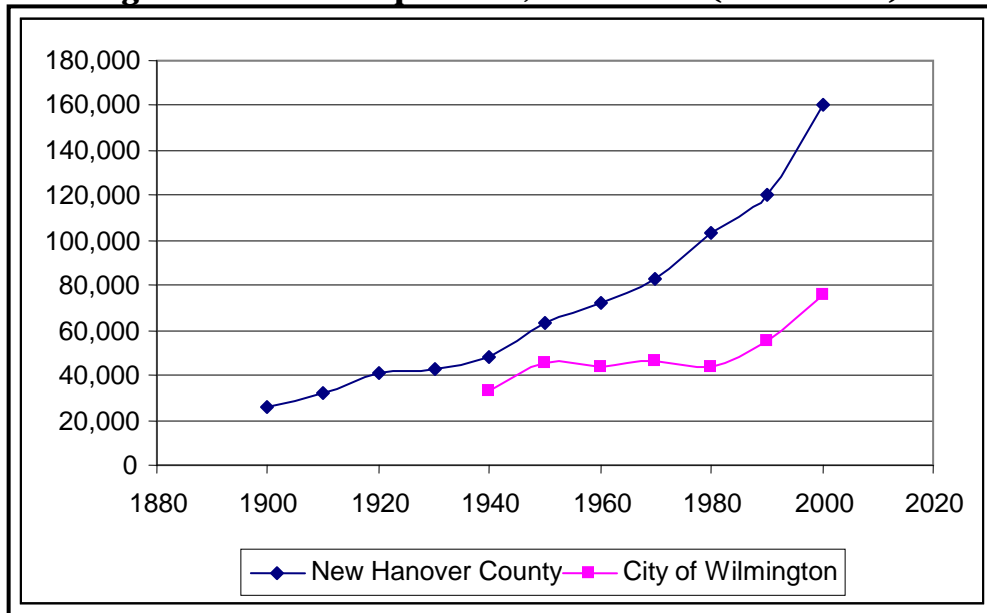
Since 1790, the United States Bureau of the Census has conducted decennial population counts throughout the nation. According to historical census data, (Figure A-1 and A-2), the population of New Hanover County steadily increased from 47,935 (1940) to 160,307 (2000). The City of Wilmington grew from 33,407 to 75,838 during that same time. However, the 2000 Census data for Wilmington did not include approximately 13,600 residents within a significant area annexed in 1998. Additionally, the incorporated small towns of Carolina Beach, Kure Beach, and Wrightsville Beach have demonstrated significant population growth between 1960 (2,208 people) and 2000 (8,878 people).

Figure A-1: Total Population (1900-2000)

Year	New Hanover County	Unincorporated	Wilmington	Small Towns
1900	25,785	25,785		
1910	32,037	32,037		
1920	40,620	40,620		
1930	43,010	43,010		
1940	47,935	14,528	33,407	
1950	63,272	18,229	45,043	
1960	71,742	25,521	44,013	2,208
1970	82,996	33,069	46,169	3,758
1980	103,471	53,950	44,000	5,521
1990	120,284	57,568	55,530	7,186
2000	160,307	75,591	75,838	8,878

Source: U.S. Census Bureau (Does not include 1998 annexation)

Figure A-2: Total Population, Illustrated (1900-2000)



Source: U.S. Census Bureau

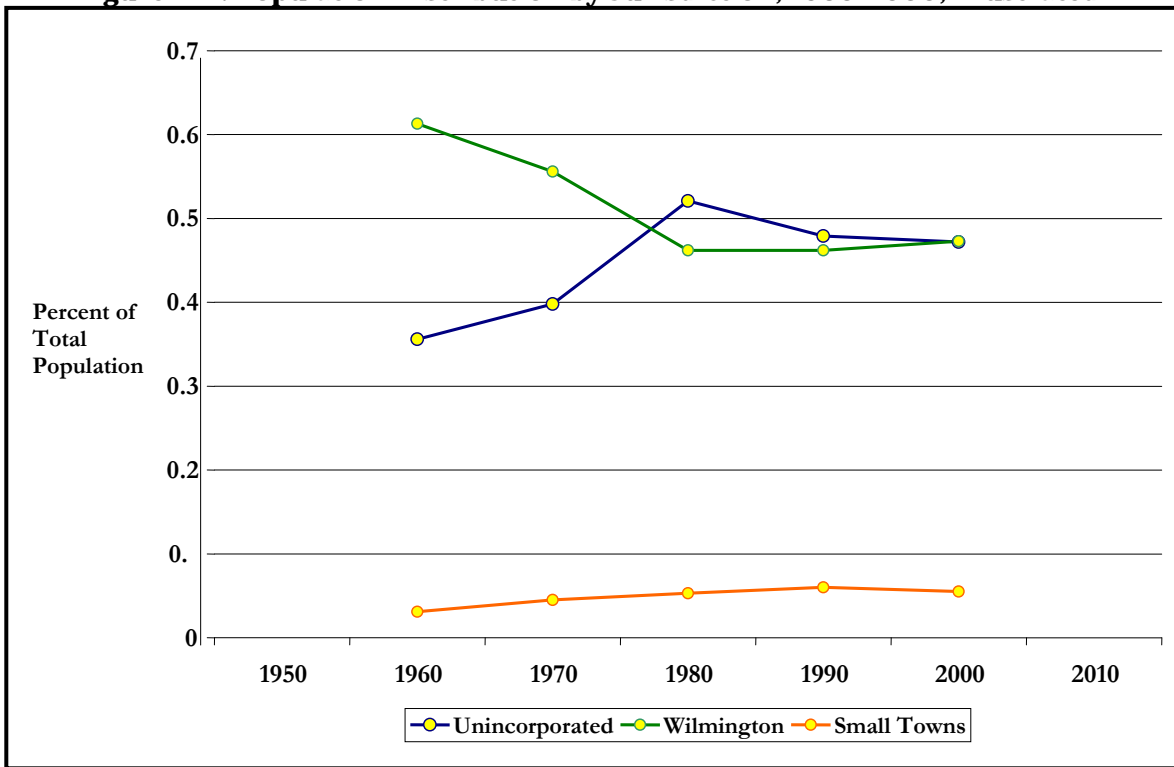
The portion of total county population within Wilmington’s municipal boundary has fluctuated since 1960. Figure A-3 and Figure A-4 illustrate the percent of total population within the unincorporated county, the City of Wilmington, and the incorporated small towns. Since 1960, the City’s share of total county population has decreased. In 1960, 61.3% of New Hanover County’s population lived in Wilmington but by 1980 this percent had declined to 42.5%. Suburban growth within the unincorporated county outpaced urban residential growth. This trend was made possible by rural water and sewer service accompanied by favorable County decision-making. In recent decades, Wilmington’s annexations have reversed this trend as the portion of people living in the city has increased from 42.5% in 1980 to 56% in 2000, which includes the 1995 and 1998 annexations. Small-town population growth as a percent of total County population has steadily increased since 1960. The substantial growth rate of small towns within New Hanover County is evident by their increased percentage of a growing countywide population.

Figure A-3: Population Distribution by Jurisdiction (1960-2000)

Year	Unincorporated	Wilmington	Small Towns
1960	35.6%	61.3%	3.1%
1970	39.8%	55.6%	4.5%
1980	52.1%	42.5%	5.3%
1990	47.9%	46.2%	6.0%
2000	47.2%	47.3%	5.5%

Source: U.S. Census Bureau (Does not include annexations)

Figure A-4: Population Distribution by Jurisdiction, 1960-2000, Illustrated



As is evident in Figure A-2, the population growth trend within New Hanover County is comparable to that of the City. Wilmington has experienced greater growth percentages in recent years due to annexing county lands, but the overall growth is similar. Significant areas of New Hanover County adjacent to the City of Wilmington are developed with low-density suburban-style residential subdivisions with some commercial establishments. This sprawling land use pattern is made possible by widespread availability of public water and wastewater systems in unincorporated areas. These services are provided in part by the City through contracts and cooperative agreements between the City and County. Annexation statutes require that significant portions of an area proposed for annexation must be substantially developed with urban uses at specified densities. Since annexed areas must be partially developed prior to annexation, County growth rates impact the rate of population growth for the City due to annexation. Substantial annexations during the decade of the 1990's contributed to bloated population growth rates for the City and artificially decreased growth rates for the County. The most recent annexations officially added 13,600 new residents. It is unlikely that large-scale annexations will occur in the near future. Currently, the newly annexed land and City services are being upgraded to the full range of urban services.

Figure A-5: Regional County Annual Growth Rates (1980-2000)

Local County	1980	2000	Annual Growth Rate
Brunswick	35,777	73,143	3.64%
New Hanover	103,471	160,307	2.21%
Pender	22,262	41,082	3.11%
Wilmington	44,000	90,400	3.67%

Source: U.S. Census Data (Includes annexations)

Population Projections

Future population growth will create demands for public services and infrastructure as well as influence the use of land. Typically, this assessment would establish a probable growth population range by projecting Wilmington and New Hanover County’s future population using differing methods. Once the probable range was established, the high and low figures would be identified along with the midpoint figure which would represent the medium projection. Slow, medium and rapid growth rates are then determined according to the population range. However, the methods typically utilized for such projections include annexed population as part of the growth rate. These methods and the resultant projections are included in the Appendix for informational purposes. Staff calculated the City and County’s historical natural growth rate based on census years without significant annexations. This best available data analysis indicates a growth rate of 0.6%. While appearing to go against the common belief that Wilmington is experiencing “high” growth, staff’s analysis is supported by population projections in the *2001 Wastewater Management Master Plan* and the State Demographer’s official municipal population calculations. In 2001 and 2002, the State Demographer established an annual population change of 0.66% and 0.55% respectively. Based on this analysis, staff established slow, medium and rapid growth scenarios as depicted in Figure A-6.

Figure A-6: Population Change

Wilmington		Change	
Year	Population	Total Change	% Change
1940	33407	-	-
1950	45043	11,636	34.83%
1960	44013	-1,030	-2.28%
1970	46169	2,156	4.90%
1980	44000	-2,169	-4.70%
1990	55,530	11,530	26.20%
2000	75,838	20,308	36.57%
2001*	90,981	15,143	19.97%
2002	91,458	477	0.52%

Unincorporated New Hanover County		Change	
Year	Population	Total Change	% Change
1940	14,528	-	-
1950	18,229	3,701	25.47%
1960	25,521	7,292	40.00%
1970	33,069	7,548	29.58%
1980	53,950	20,881	63.14%
1990	57,568	3,618	6.71%
2000	74,778	17,210	29.90%
2001*	63,275	-12,316	-16.47%
2002	65,054	1,779	2.81%

Source: US Census: 2001 & 2002 from State Demographer * Reflects 1998 Annexation

The accompanying report, focusing on land use, compares the projected growth rates and population range to the capacity of the community to accommodate population growth. Evaluation of the community’s population capacity, under current development form and trends, will be represented through the “build-out” scenario described in the land use report. The build-out scenario evaluates the amount of population that can be accommodated on developable vacant land within the existing city limits under current regulations. In addition, potential commercial and industrial development will be analyzed.

Figure A-7 sets forth slow, medium, and rapid growth scenarios based on these projections. These growth projections will be used to evaluate the City’s current development capacity and for the analysis of future development scenarios.

Figure A-7: Slow, Medium, Rapid Projected Growth Projections

Growth Projection 2020 Population - Wilmington *	2020	Increase	2000-2020 Annual Growth Rates
Slow	100,024	9,043	0.5%
Medium	109,915	18,934	1.0%
Rapid	120,727	29,746	1.5%

* - Based on post – 1998 annexation population

Growth Projection 2020 Population – Unincorporated New Hanover County *	2020	Increase	2000-2020 Annual Growth Rates
Slow	81,719	12,027	1.00%
Medium	91,989	22,297	1.75%
Rapid	103,458	33,766	2.50%

* - Based on post-1998 annexation population; includes small incorporated towns

SECTION B: Housing

In general terms, the demand for shelter increases with population growth. In order to accommodate growing demands for housing, private investment, public services, and regulatory approvals, the construction industry must respond in a timely and equitable fashion. The timing and form of residential construction reflects the needs and wants of consumers. Therefore, changes in population quantity and characteristics are determinants of residential construction activity. This section reviews the nature of residential construction over the past decade and projects the amount and mix of new residential development.

Recent Residential Growth Trends

New Hanover County has an agreement with the City of Wilmington and other jurisdictions to provide building inspection and permitting services countywide. While this arrangement minimizes city expense, development coordination and information sharing is somewhat hampered. However, there has been no indication from City officials that a significant problem exists with this arrangement and it is expected to continue. Permitting data presented herein have been compiled and reported by the New Hanover County Planning Department and are summarized below and in Figures B-1 through B-4.

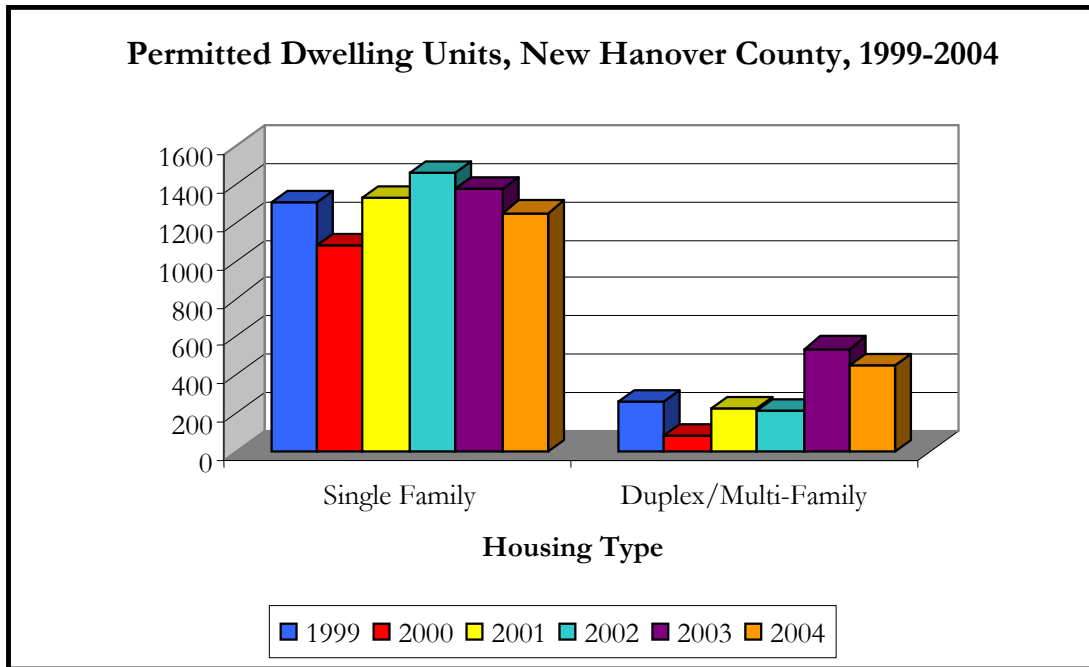
In Wilmington, between 1999 and 2004, there were a total of 4,696 new dwelling units permitted. In the same time period, 8,949 new dwelling units were permitted in unincorporated New Hanover County. Single-family detached residential construction fluctuated between 219 units (2001) and 571 units (2004) in Wilmington, and between 1018 units (2000) and 1332 units (2002) in unincorporated New Hanover County. The number of permitted units in duplex or multi-family developments ranged from 220 (2001) and 810 (2004) units per year within Wilmington, and 70 (2000) and 508 (2003) units in unincorporated New Hanover County.

Figure B-1: Permitted Dwelling Units, Unincorporated New Hanover County, 1999-2004

Year	Single Family	Duplex/Multi-Family	Annual Total
1999	1182	236	1418
2000	1018	70	1088
2001	1257	209	1466
2002	1284	208	1492
2003	1194	508	1702
2004	1332	451	1783
Totals	7267	1682	8949

Source: New Hanover County Planning Department, January 2005

Figure B-2: Permitted Dwelling Units, New Hanover County, 1999-2004- Illustrated



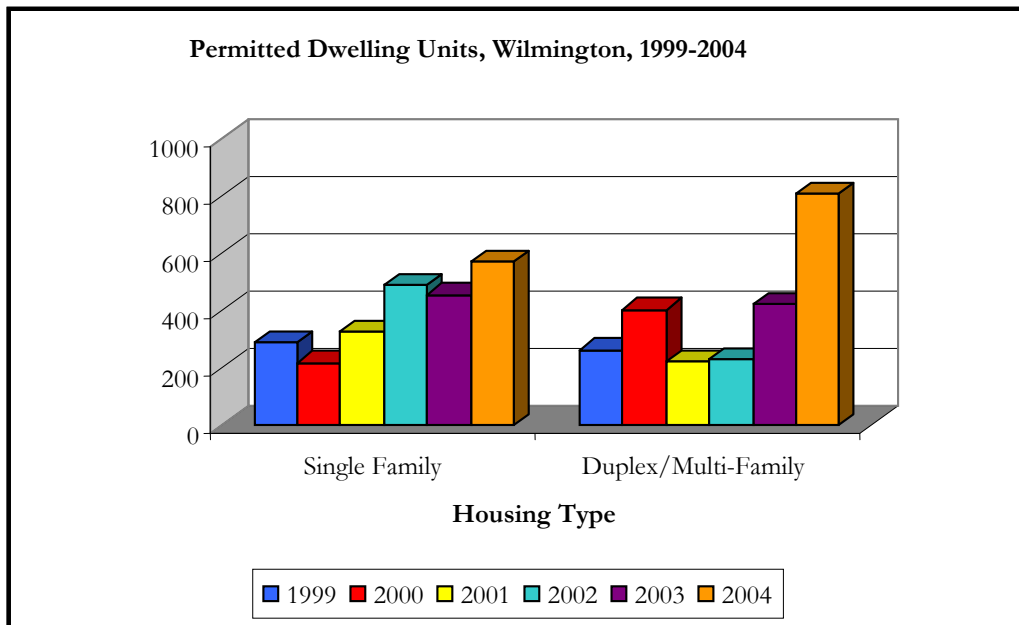
Source: New Hanover County Planning Department, January 2005

Figure B-3: Permitted Dwelling Units, Wilmington, 1999-2004

Year	Single Family	Duplex/Multi-Family	Annual Total
1999	291	262	553
2000	219	404	623
2001	328	220	548
2002	487	229	716
2003	455	420	875
2004	571	810	1381
Totals	2351	2345	4696

Source: New Hanover County Planning Department, January 2005

Figure B-4: Permitted Dwelling Units, Wilmington, 1999-2004 – Illustrated



Source: New Hanover County Planning Department, January 2005

An examination of housing characteristics (Figure B-5) reveals an increase in the construction of multi-family housing units in both the City of Wilmington and unincorporated New Hanover County. This general trend coupled with the gradual decline in average household size results from the increase in the significant college student population and the migration of "empty-nesters" - adults, generally retired or semi-retired, who never had children or no longer live with their children. In addition, land values throughout the City of Wilmington and in Coastal areas of New Hanover County have risen dramatically making the cost of single family homes unobtainable for many. The relatively modest amount of single family construction within the City of Wilmington has occurred as infill development on vacant lots in recently annexed areas where land was subdivided to provide typical suburban density patterns. Despite the trend towards smaller household sizes, construction of Single Family Housing within the unincorporated County continued at a very rapid pace between 1999 and 2004.

**Figure B-5: New Development: Mix of Dwelling Unit Type (1999-2004)
 Unincorporated New Hanover County**

Year	Single Family	% of Total	Duplex/Multi-Family	% of Total	Total
1999	1182	83%	236	17%	1418
2000	1018	94%	70	6%	1088
2001	1257	86%	209	14%	1466
2002	1284	86%	208	14%	1492
2003	1194	70%	508	30%	1702
2004	1332	75%	451	25%	1783
Totals	7267	81%	1682	19%	8949

Source: New Hanover County Planning Department, January 2005

Wilmington					
Year	Single Family	% of Total	Duplex/Multi-Family	% of Total	Total
1999	291	53%	262	47%	553
2000	219	35%	404	65%	623
2001	328	60%	220	40%	548
2002	487	68%	229	32%	716
2003	455	52%	420	48%	875
2004	571	41%	810	59%	1381
Totals	2351	50%	2345	50%	4696

Source: New Hanover County Planning Department, January 2005

Projected Growth of Residential Units

The demand for shelter may be projected using projected population, household size, and dwelling unit mix ratios. Although the growth in total residential units may be projected, numerous social and political factors influence the ultimate breadth and quality of future residential construction. These factors include, but are not limited to, the regulatory environment, interest rates, fluctuations in the local job base, natural disasters, and changing migration patterns. In order to account for some variability, projected residential unit growth will be based on the slow, medium, and rapid population projections to establish a range of future housing construction. Housing construction will be projected using the formula illustrated in Figure B-6. A significant difference exists between household size and vacancy rates for owner-occupied and renter-occupied housing (housing tenure). Due to these differences, the projection method uses owner-occupied dwelling units and renter-occupied dwelling units, including vacant homes. The projected population figures will be divided by the average household size, multiplied by the tenure percents and multiplied by the vacancy rate to determine the number of projected dwelling units. Projected dwelling units will be determined by housing tenure and added together to arrive at a total projected number of dwelling units.

Figure B-6: Dwelling Unit Projection Formula

Dwelling Units =

(Projected Population) X (Tenure Percent) X (1+Vacancy Rate)

÷ People per Household

Housing Tenure

Tenure refers to the ownership status of the person or household occupying the dwelling. Real estate and structures are either owned or rented by the person or people living there. Wilmington and New Hanover County exhibit extreme differences in housing tenure. Since 1990, Wilmington’s portion of owner-occupied dwellings grew slightly to 48.61% while renter-occupied units decreased slightly to 51.39%. New Hanover County as a whole has a much larger portion of owner-occupied dwellings than the City of Wilmington. The County’s owner-occupied units grew from 62.72% of all housing units in

1990 to 64.69% in 2000. Renter-occupied dwellings were reduced to 35.31% of the total countywide housing units by 2000 (Figure B-7).

Figure B-7: Housing Tenure, 1990-2000

Tenure	1990		2000	
	Units	%of Units	Units	%of Units
Wilmington				
Owner	11,099	47.12%	22,939	56.42%
Renter	12,458	52.88%	19,390	43.58%
New Hanover County				
Owner	30,193	62.72%	44,109	64.69%
Renter	17,946	37.28%	24,074	35.31%

Source: U.S. Census Bureau and City of Wilmington Development Services-Post Annexation Data

The City of Wilmington’s relatively low rate of owner-occupied dwellings is a function of a number of factors. Wilmington has relatively high student and retiree populations that tend to live in institutional settings or to rent homes and apartments to avoid property responsibility and long-term investment. In addition, and perhaps more importantly, single-family residential development beyond the City boundary is rampant due to widespread public service availability, no City tax levy, and substandard development practices in formerly rural areas. Finalization of the 1995 and 1998 Annexations significantly increased the percent of owner-occupied units under City jurisdiction.

Since household size and vacancy rates vary greatly based on tenure, projected residential growth will be determined by applying owner-occupied characteristics and renter-occupied characteristics to the slow, medium, and rapid population growth projections. Due to the shift in the owner/renter ratio that occurred as a result of the 1995 and 1998 Annexations, projecting housing tenure for 2020 involves two steps: establishing the tenure ratio in 2000 and applying ratio trends from the 1990’s to the determined post-annexation ratio.

Housing types within the annexation areas almost exclusively consist of low- to moderate-density detached single-family development. This housing type tends to be overwhelmingly owner-occupied. This is reflected in the New Hanover County tenure ratio in the year 2000, in which 64.69% of dwellings were occupied by owners. As Figure B-8 illustrates, when the last annexation occurred, the owner-occupied ratio in the City shifted from 48.61% to 56.42%.

Figure B-8: Post Annexation Tenure

	Owner	Renter	Total
2000 Population	36,865	38,973	75,838
Annexation	13,600	0	13,600
Post-Annexation Population	50,465	38,973	89,438
Post-Annexation Tenure	56.42%	43.58%	100.00%

Source: Calculated by the City of Wilmington from U.S. Census Data

From 1990 to 2000, the percent of owner-occupied units in Wilmington grew by 1.49% with an identical decrease in renter-occupied units. A decennial owner-occupied unit increase of 1.49% will be held constant through the dwelling unit projections.

Household Size

The average number of people per household has decreased since 1990. Figure B-9 shows the household size for Wilmington and New Hanover County for both renters and owners. Household sizes in Wilmington have been smaller than corresponding households in New Hanover County. Between 1990 and 2000, the number of people per household in the City dropped from 2.35 to 2.20 for those who owned their home and decreased from 2.18 to 2.01 for households that rented their dwelling. A similar trend occurred countywide with household size decreases for both owners and renters.

Figure B-9: Household Size by Tenure, 1990-2000

Tenure	People per Household	
	1990	2000
Wilmington		
Owner	2.35	2.20
Renter	2.18	2.01
New Hanover County		
Owner	2.54	2.39
Renter	2.25	2.11

Source: U.S. Census Bureau

The reduction in household size is a widespread phenomenon and the U.S. Census Bureau projects that household sizes will continue to decrease past 2010. Using linear regression, household sizes are expected to decrease to 1.90 for owner households and to 1.67 for renter households by 2020 (Figure B-10). These projected household sizes will be used to calculate the number of dwellings necessary to accommodate the population growth scenarios.

Figure B-10: Projected Household Size, 2000-2020

Tenure	2000	2005	2010	2015	2020
Wilmington					
Owner	2.2	2.13	2.05	1.98	1.9
Renter	2.01	1.93	1.84	1.76	1.67
Average	2.11	2.03	1.95	1.87	1.79
New Hanover County					
Owner	2.39	2.32	2.24	2.17	2.09
Renter	2.11	2.04	1.97	1.90	1.83
Average	2.25	2.18	2.11	2.03	1.96

Source: Calculated by the City of Wilmington from U.S. Census Data

Vacancy Rates

Vacancy rates measure the percent of residential structures that are vacant at a given point in time. As Figure B-11 illustrates, both City- and County-owner market structures were increasingly vacant from 1990 to 2000, although the vacancy rate increase was not as pronounced countywide as it was in Wilmington. Vacancy rates for rental houses and apartments decreased modestly during the 1990's in both the City and County.

Figure B-11: Vacancy Rates by Property Tenure, 1990-2000

Tenure	Vacancy Rate	
	1990	2000
Wilmington		
Owner	2.8%	3.6%
Renter	11.2%	11.0%
Average	7.0%	7.3%
New Hanover County		
Owner	3.0%	3.2%
Renter	14.2%	14.1%
Average	8.6%	8.65%

Source: Calculated by the City of Wilmington from U.S. Census Data

Vacancy rates fluctuate based on numerous variables including, but not limited to, job creation, housing starts, housing stock condition, and housing costs. Due to the changing nature of vacancy rates, an average vacancy rate of 3.2% will be used for owner market housing and 11.1% will be used for renter market housing. These two figures will be held constant and represent the midpoint between the 1990 and 2000 U.S. Census reported vacancy rates.

Calculations

The total number of dwellings needed to accommodate the projected population growth scenarios is shown in Figure B-12. Represented is the number of new dwellings projected for each growth scenario in 5-year intervals, based on 2000 Census findings and post-2000 annexation populations. The number of total units needed by 2020 under the slow growth scenario in Wilmington is 54,912, while the rapid growth scenario would require 66,937 dwelling units. This represents a change of 22.21% and 41.78 %, respectively. The number of dwelling units needed for the slow growth scenario in New Hanover County is 41,693, while under the rapid growth scenario, the total is 52,785 dwellings. These figures represent a 29.12% and 61.09 % change from present numbers, respectively.

**Figure B-12: Total Dwelling Units Needed
 Wilmington**

Year	Slow	Medium	Rapid
2005	44,930	46,059	47,210
2010	47,954	50,394	52,945
2015	51,268	55,231	59,477
2020	54,912	60,643	66,937

Unincorporated New Hanover County *

Year	Slow	Medium	Rapid
2005	32,289	32,528	32,768
2010	35,061	36,653	38,304
2015	38,302	41,549	45,045
2020	41,693	46,933	52,785

Source: New Hanover County Planning Department *

SECTION C: Economy

Wilmington and New Hanover County have a diverse economic base relying on tourism, trade, pharmaceuticals/healthcare, manufacturing, and government. As the population continues to grow, the area becomes more attractive to national retailers and companies. Downtown revitalization efforts successfully attracted a large pharmaceutical research company, PPD, to locate its corporate headquarters in downtown Wilmington, thereby adding over 1000 new jobs to the economy over the next several years, in addition to employment related to the construction of the \$85 million facility. The largest employers in the County and City include Corning, General Electric, New Hanover Regional Medical Center, PPD, the University of North Carolina at Wilmington, local and state governments, and Cape Fear Community College. Figure C-1 provides a breakdown of employment by the top 25 employers, while Figure C-2 shows employment by sector.

Figure C-1: Top 25 New Hanover County Employers, 2003

No.	Company	Product/Service	Employees
1	New Hanover Regional Medical Center	Hospital	4600
2	New Hanover County Schools	Education	3126
3	General Electric	Aircraft/Nuclear	1650
4	UNC-Wilmington	Higher Education	1627
5	New Hanover County	Government	1368
6	City of Wilmington	Government	1131
7	Progress Energy	Electricity	1100
8	Wall-Mart	Retail	1055
9	International Paper	Bleached Pulp & Paperboard	900
10	PPD	Pharmaceutical & Biotech Research & Development	900
11	Corning	Optical Fiber	800
12	Cape Fear Community College	Higher Education	648
13	aaiPharma	Pharmaceutical Development & Sales	630
14	DAK Americas LLC	Dacron Polyester	514
15	Louisiana Pacific Corporation	Laminated Veneer Lumber	300
16	KoSa	Chemicals	299
17	DEL Laboratories	Pharmaceutical and Cosmetic Manufacturing & Distribution	290
18	LL Building Products	Home Building Products	286
19	The Wilmington Star	Communications	255
20	Vision Air	Law Enforcement Software Development	197
21	Bedford Fair Industries	Women's Apparel – Mail Order	196
22	Chemtex	Engineering – Plant Consulting	185
23	Elementis Chromium LP	Sodium Bichromate	183
24	International Paper Carton Division	Paperboard Cartons	175
25	Sam's Club	Retail - Wholesale	165

Source: Greater Wilmington Chamber of Commerce

Figure C-2: 2003 New Hanover County Employment

	Employment	% Total Workforce	Payroll (in \$ millions)	Weekly Wage/Employee
Agriculture, Forestry, Fishing, Mining	920	1.1%	5.5	\$458.78
Goods	16,062	18.3%	169.9	\$813.80
Manufacturing	8,974	10.3%	113.1	\$969.14
Construction	7,088	8.1%	56.9	\$617.14
Services	70,567	80.6%	492.3	\$536.60
Transportation, Communication, Utilities	3,976	4.5%	33.3	\$645.08
Wholesale trade	3,779	4.3%	36.2	\$737.85
Retail trade	21,079	24.1%	88.4	\$322.68
Finance/Real Estate	3,200	3.7%	30.7	\$738.01
Misc. Services	23,332	26.7%	173.3	\$571.40
Government	15,201	17.4%	130.2	\$659.03
Local	856	1.0%	10.5	\$946.29
State	3,649	4.2%	29.7	\$627.11
Federal	10,696	12.2%	90.0	\$646.93
Total	87,547		667.7	\$586.66

Tourism

A major source of income for New Hanover County is tourism. Many people visit Wilmington, the beach communities, and other County attractions annually. State analysis reveals that a majority of visitors elect to stay in one of the three beach communities when visiting. In 2001, 56.75% of visitors stayed in one of the three beach communities, with Carolina Beach receiving the most visitors. The generated revenue not only benefits local merchants, but through the room tax, New Hanover County receives millions of dollars that are used to assist local communities and help fund beach renourishment programs. Figure C-3 shows tourism revenues generated in New Hanover County over the past several years. Figure C-4 shows the amount of revenue generated locally through the 6% room tax. The tax revenue is split into two halves. Sixty percent of the first half goes toward beach renourishment and erosion control in the County, with the remaining 40% applied toward tourism development activities in the County. The second half of tax revenue is divided between funding the proposed Downtown Convention Center in Wilmington, and tourism development in Wilmington and Carolina Beach.

Figure C-3: New Hanover County Tourism Revenue, 1998-2003

Year	Total Revenue
1998	\$257,410,000
1999	\$294,080,000
2000	\$309,770,000
2001	\$30,750,000
2002	\$309,220,000
2003	\$312,330,000

Source: NC Department of Commerce

Figure C-4: 2003-2004 Distributed Room Tax Revenue, By Quarter

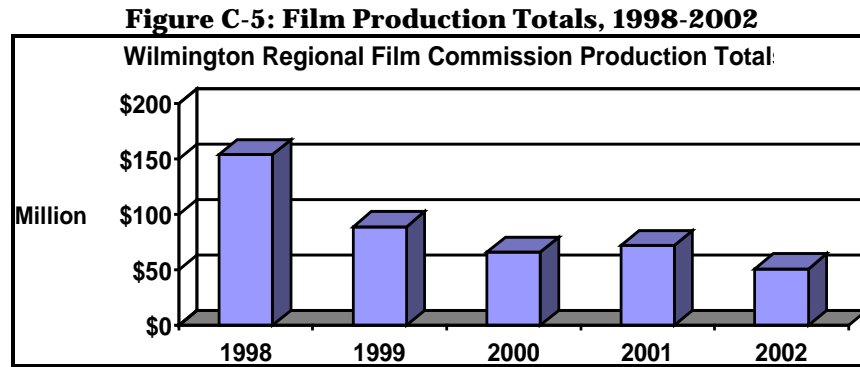
Months	Distributed Room Tax Revenue
July-September 2003	\$2,176,086.55
October-December 2003	\$841,712.54
January–March 2004	\$760,921.86
April-June 2004	\$1,926,172.23
July-September 2004	\$2,449,261.25
October-December 2004	\$917,309.88
Total	\$9,071,464.31

Source: New Hanover County Finance Department

New Hanover County consistently draws large numbers of visitors, and although it is the second smallest county in the state in size, it was ranked 8th among all counties for tourism impact in 2003. That impact resulted in Over 500 jobs directly attributable to tourism in the County, generating a 2003 payroll of \$85.57 million.

The Film Industry

In the past 5 years, the film industry has brought in over \$432 million in revenue. Productions such as *Dawson's Creek* and *One Tree Hill* have brought in revenue that has helped Wilmington's reputation with producers across the nation. The industry has become very competitive on an international scale with Canada, Mexico, and Australia fighting for the same productions. Figure C-5 contains direct film production revenue in New Hanover County between 1998 and 2002.



Source: Wilmington Regional Film Commission

General Economic Indicators

Securing the PPD deal allowed the area to reverse a decline in new commercial investment during the last decade. The combination of increased population, a city with a population soon to exceed 100,000, and new commercial developments such as the mixed use development – Mayfaire - will provide incentives for new investment that will continue to expand the economic base of Wilmington and New Hanover County.

The labor market remains slightly better than the state and national averages. (Figure C-6) The cost of living also is more favorable in the Wilmington area than state and national averages in most categories. Figure C-7 displays a comparison of Wilmington and other selected North Carolina cities.

Figure C-6: New Hanover County Employment Data

	New Hanover County	State/National Rates
Total Labor Force	87,951	
Total Employed	80,063	
Total Unemployed	5,519	
Unemployment Rate (2004)	4.8%	5.8%/5.6%
Average Labor Force Change (1992-2002)	2.6%	

Source: Greater Wilmington Chamber of Commerce

Figure C-7: Cost of Living Comparisons *,**

City	Composite	Grocery	Housing	Utilities	Transportation	Healthcare	Misc. Goods & Services
Wilmington	96.4	100.7	91.2	105.0	97.9	101.7	96.1
Asheville	102.9	95.0	117.2	96.3	96.5	102.2	96.9
Atlanta	98.2	95.9	96.7	88.3	104.1	104.9	100.5
Charlotte	92.9	89.3	82.7	84.3	104.8	115.5	99.4
Charleston	97.3	99.4	88.9	100.9	95.1	98.3	103.4
Raleigh	97.7	105.7	90.6	106.8	93.9	106.1	98.4
Richmond, VA	101.5	107.2	100.8	100.8	97.8	83.9	103.2

Washington, DC	140.0	119.6	196.4	109.6	126.7	129.3	117.7
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Source: Greater Wilmington Chamber of Commerce, * - 3rd Quarter 2004, ** - National Average 100.0

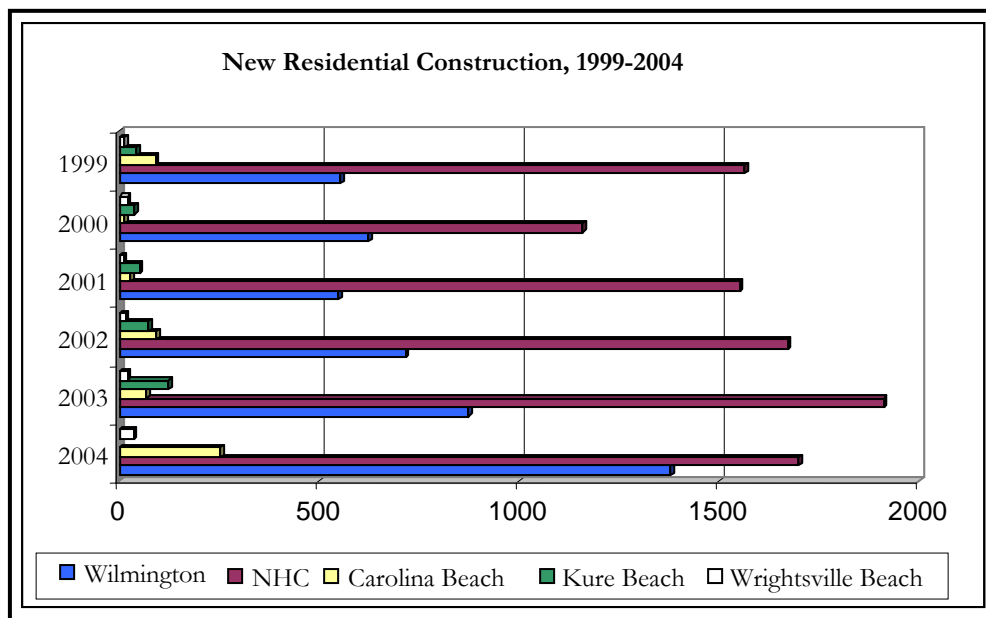
Per Capita Income has remained slightly above the state average, as noted in Figure C-8 below.

Figure C-8: New Hanover County Per Capita Income Statistics

Average Per Cap Income (2001)	\$28,969
Avg. annual change (1993 – 2003)	4.6%
Percent of State avg.	106%
1980 Per Cap Inc.	\$9,444
Median Family Income (MFI)	\$46,700
Percent of NC MFI	93%
MFI 1991	\$34,000
Percent of 91 NC MFI	100%
Population on food stamps	7.4%
Poverty Rate	14.1%
Per Capita retail sales	\$19,505
Avg. annual change	3.9%

One economic indicator that has remained strong over the last decade is the housing market, particularly new home construction. Low interest and mortgage rates have allowed the housing market to continually increase. Many units are occupied by retirees or as secondary homes, especially in the beach communities. Figure C-9 shows new construction data for 2004, as well as over the previous decade.

Figure C-9: New Construction in New Hanover County, 1999-2004



SECTION D: Land Use and Development

Introduction

This report is part of the technical analysis for the Joint City-County CAMA Plan 2005 Update. The purpose of this technical report is to describe and discuss the current inventory of land use within New Hanover County and compare current data to historical land use data. Data comparison is used to identify land use trends, shortcomings in service provision, and other land use characteristics that will be instrumental in shaping the direction, type, and rate of growth in Wilmington and New Hanover County.

As part of the data collection process for this study, numerically-coded land use maps were prepared on current County and City property maps (1"=500') and entered into the geographic information system (GIS) to make the data easy to access and to analyze. Land Use is presented by parcel size totals. Parcel size statistics for 1985, 1990, 1997 and 2004 are presented in tables to determine the most significant changes in land uses that have taken place in the previous 19 years. The methods used for collecting and calculating each set of data are described in detail in Appendix K-i. The Land Use Codes assigned to each parcel are given in Appendix K-ii.

It is important to note that the summary information provided in the figures in this section presents a different set of data which may not be directly comparable to data shown in other tables or to data from previous land use studies. Briefly;

Figure D-1 compares the total parcel acreage per land use type for the combined area of the unincorporated County, the Beaches, and the City of Wilmington for December 2004.

Figure D-3 shows the percentage of the total parcel acreage by land use type for the unincorporated County, the City of Wilmington and the beaches for December 2004.

Figure D-4 shows the percent of the total amount of developed land that each land use category represents in the unincorporated County, the City of Wilmington and the beaches for December 2004.

Figure D-5 shows the average percentage of land use type in other areas throughout the country.

Appendix K-iii compares land use by parcel size for Wilmington and the unincorporated County from 1985 to 1990.

Appendix K-iv shows land use by parcel size for the unincorporated County for 1985 and 1990.

Appendix K-v contains land use figures for the City of Wilmington for 1985 and 1990.

Comparability of Land Use Statistics

It should be noted that several difficulties exist in collecting and computing land use information. These problems can reduce the accuracy and hence the comparability of the results from one year to the next. Some of the major difficulties that affect the results of a study such as this include:

- Judgmental decisions in assigning the proper land use code (the land use categories used in this report are listed in Appendix K-ii).
- Utilization of different data sources and methodologies for calculating statistics in 2002 as compared to 1985 and 1990.
- Verification of whether or not a parcel is developed or undeveloped. For example, a two acre lot with one house may be considered to be fully developed even though the parcel may be subdivided into additional lots in the future. Or, a five acre lot with one single family home may be considered a single family lot or an undeveloped lot.

Because of these types of problems, some fairly large differences are apparent when one compares data from 1985 and 1990 to data from the 2004 inventory. Some of these differences are obviously due to methodology and do not reflect trends in the County's land use while some of them are due to the fact that more sophisticated computer equipment has made calculating land use totals more precise.

The values given for Tables 1, 2 and 3 have been calculated using methods which were not used in 1985 and 1990; therefore these values are not directly comparable to the data from those years. These methods are explained in Appendix K-i. Again, the same kinds of problems were encountered as mentioned above in collecting and calculating these data. As a result, the figures were compiled using data from 2002 and 2004.

Major Findings

Land Use by Parcel Size

Figure D-1 shows the land use acreage for the combined area of the unincorporated County, the City of Wilmington, and the beach communities, using total parcel acreage's per land use category. Figure D-3 shows the percentage of each land use as part of total acres. Figure D-4 shows the percent of each land use category of the total amount of developed acres only. The values used in the Appendices K-i, K-ii, and K-iii were obtained from the County Tax Appraisal Office's Data Bank for 1990 and 1985, thus these data are generally not comparable.

Figure D-1.

<i>Land Use Totals by Parcel Acreage in New Hanover County</i>						
<i>Land Use Category</i>	<i>New Hanover County</i>	<i>Wilmington</i>	<i>Carolina Beach</i>	<i>Wrightsville Beach</i>	<i>Kure Beach</i>	<i>Total</i>
Residential Total	15802.86	11185.54	464.01	239.25	210.93	27902.59
Single Family	13745.71	9783.44	409.07	192.85	200.93	24332
Multi Family	585.36	1084.13	33.46	46.4	4.96	1754.31
Mobile Home	1471.79	317.97	21.48	0	5.54	1816.78
Office and Institutional	5890.94	2367.85	24.45	43.79	5.59	8332.62
Commercial	695.9	1043.65	54.08	17.52	12.37	1823.52
Transportation, Utilities & Communications	4081.11	774.51	6.09	29.33	0.77	4891.81
Industrial	4141.36	664.56	3.85	0.69	0	4810.46
Recreation	1547.89	2593.57	102.79	83.82	14.7	4342.77
Total Developed	32160.06	18629.68	655.27	414.4	244.86	52104.27
Agriculture	3267.46	64.16	0	0	0	3331.62
Undeveloped	47292.87	6769.39	457.68	223.16	118.49	54861.59
Other (Water, ROW, unknown)	23548.84	6747.72	960.3	1569.55	363.2	33189.61
Total	106269.23	32210.95	2073.25	2207.11	726.55	143.487.10

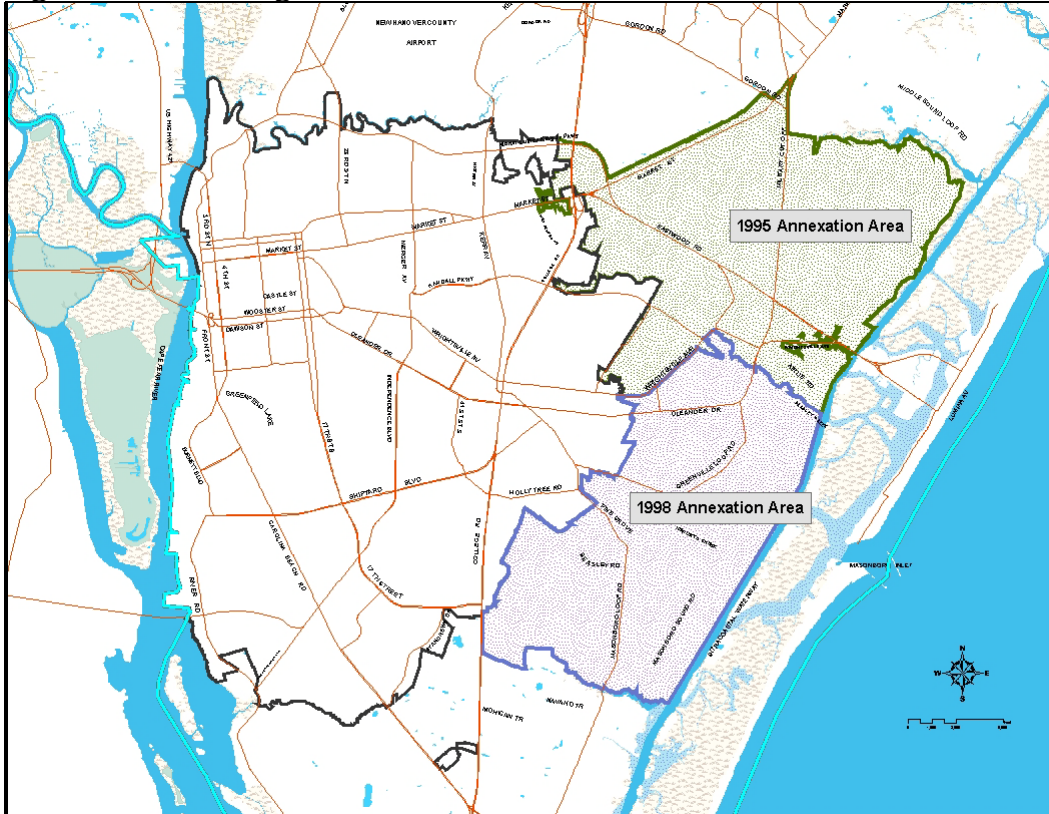
As mentioned in Section II in the discussion of the comparability of land use statistics, some of the major differences between the 1990 and 1985 statistics can probably be attributed to inconsistencies in assigning land use codes in the Tax Appraisal Office’s Data Bank. It should be noted that these values reflect total land use by parcel size and do not indicate actual land utilization acreage’s.

Until recently, values contained in the Tax Appraisal Office’s Data Bank were not consistently updated over time. Many of the discrepancies which occur in the Data Bank will be reconciled now that new technology such as the GIS, which can measure land features more accurately and in less time, is being used. Surveyors frequently discover lots which have been recorded in deeds for hundreds of years that are much larger than stated in the deed. Improvements in the way spatial data are stored and accessed also will aid in the classification of land use types and the compilation of utilization statistics or parcel size tabulations.

It should be noted that in 1990 data by parcel size was not available for the City of Wilmington alone. Thus, the City of Wilmington acreage included Wrightsville Beach (851 ac), Carolina Beach (1,075 ac), and Kure Beach (518 ac). However, because these values are quite small, and constitute less than 2,500 acres of the City’s approximately 21,000 acres (pre-annexation), they have only a minor affect on the overall totals and proportions per land use type for Wilmington.

Since the 1997 data was collected, a significant change in the total areas of the City of Wilmington and the unincorporated County occurred. Two annexations, shown in Figure D-2, transferred 23.50 square miles (12,674 acres) of land to Wilmington, extending its municipal boundary eastward.

Figure D-2: Wilmington Annexations



The first annexation, approved in 1995, transferred 12.52 square miles (6759.80 acres) to the City, and the second annexation in 1998 transferred an additional 10.95 square miles (5914.74 acres). These transactions explain the shifts in various category acreages and inconsistent trends when compared to previous data. In addition, the implementation of better GIS techniques and more consistent techniques in figuring acreage by category for the various municipalities resulted in changes in the data when compared to previous figures.

Figure D-3: Comparison of Land Use by Area

<i>Percent of Total Land Use by Parcel Acreage in New Hanover County</i>						
<i>Land Use Category</i>	<i>New Hanover County</i>	<i>Wilmington</i>	<i>Carolina Beach</i>	<i>Wrightsville Beach</i>	<i>Kure Beach</i>	<i>Total</i>
Residential Total	15%	35%	22%	11%	29%	19%
Single Family	13%	30%	20%	9%	28%	17%
Multi Family	1%	3%	2%	2%	1%	1%
Mobile Home	1%	1%	1%	0%	1%	1%
Office and Institutional	6%	7%	1%	2%	1%	6%
Commercial	1%	3%	3%	1%	2%	1%
Transportation, Utilities & Communications	4%	2%	0%	1%	0%	3%
Industrial	4%	2%	0%	0%	0%	3%
Recreation	1%	8%	5%	4%	2%	3%
Total Developed	30%	57%	32%	19%	34%	36%
Agriculture	3%	0%	0%	0%	0%	2%
Undeveloped	45%	21%	22%	10%	16%	38%
Other (water, ROW, unknown)	22%	20%	46%	71%	50%	23%
Total	100%	100%	100%	100%	100%	100%

Summary of Land Use by Parcel Size

Examination of the land use totals in Figure D-3 shows that residential land use constitutes the largest category of developed land for the combined area of the unincorporated County, the City of Wilmington, and the beach communities. The residential land use category when compared to figures in Appendix K-iii shows a decrease in total acreage from 1990 through 2004, while increases are recorded for all other land use categories with the exception of industrial. As mentioned before, although there are problems with using parcel size as an indicator of land use and with using the Tax Appraisal Data Bank, the overall proportions for each category are generally consistent with other land use data.

The values in Figures D- 3 through D-5 and Appendix K were obtained from the Tax Parcel Data Base for 2004, 1997, 1990 and 1985. It is important to note that these values reflect totals by parcel size for each specified area and may not accurately represent actual land utilization acres.

Figure D-4.

<i>Land Use Category</i>	<i>New Hanover County</i>	<i>Wilmington</i>	<i>Carolina Beach</i>	<i>Wrightsville Beach</i>	<i>Kure Beach</i>	<i>Total</i>
Residential Total	49%	60%	71%	58%	86%	54%
Single Family	43%	53%	62%	47%	82%	47%
Multi Family	2%	6%	5%	11%	2%	3%
Mobile Home	5%	2%	3%	0%	2%	3%
Office and Institutional	18%	13%	4%	11%	2%	16%
Commercial	2%	6%	8%	4%	5%	4%
Transportation, Utilities & Communications	13%	4%	1%	7%	0%	9%
Industrial	13%	4%	1%	0%	0%	9%
Recreation	5%	14%	16%	20%	6%	8%
Total	100%	100%	100%	100%	100%	100%

The decrease in the percentage of developed land that is attributed to residential land use is probably the result of differing measurement techniques used in the land use inventories. New Hanover County and each of the municipalities have seen significant growth in residential land use since 1990. The increase in the percentage of Office and Institutional, Commercial, Transportation, Communications and Utilities would logically follow the kind of unprecedented residential growth that has occurred in this area.

A large percentage of the growth in residential land use has been in the form of golf course developments. The significant growth in the amount of recreational land from 1990 to 1997 reflects the development of several new golf courses during that period. Additionally, new parks have been added to try to meet the demands of the growing population.

Figure D-5: Land Utilization Compared to Other Areas

<i>Wilmington and the Beaches Compared to Other Cities</i>						
<i>Land Use Category</i>	<i>Wilmington</i>	<i>Carolina Beach</i>	<i>Wrightsville Beach</i>	<i>Kure Beach</i>	<i>Small Cities</i>	<i>Large Cities</i>
Residential Total	60%	71%	58%	86%	48%	48%
Office and Institutional	13%	4%	11%	2%	13%	N/A
Commercial	6%	8%	4%	5%	7%	9%
Transportation, Utilities & Communications	4%	1%	7%	0%	19%	N/A
Industrial	4%	1%	0%	0%	8%	12%
Recreation	14%	16%	20%	6%	4%	N/A

Land Use Issues of Concern in the Unincorporated County

A period of unprecedented growth in New Hanover County and the surrounding counties began in the early 1990's. As the County has risen to become the regional service and trade center for southeastern North Carolina, some problems have evolved. For example, urban services need to be provided, land use conflicts must be solved, and traffic congestion has increased in some areas. The following land use issues are of particular concern:

- 1.) **Commercial Development** - It is obvious that a certain amount of commercial development is needed to service the local area. However, New Hanover County has developed into a regional retail center, providing shopping opportunities for people well beyond its geographic borders. As a result, growth in commercial development should continue as long as the regional population continues to expand.

While the retail opportunities may be good for the local economy, they are not without problems. First, the push to provide commercial opportunities to satisfy regional demand has meant that more vacant land has been rezoned. When that happens, land use conflicts occur, especially when commercial development is located adjacent to residential uses. Second, commercial expansion is sometimes ill-planned, resulting in strip commercial development. In addition, over-development in some areas has resulted in under-utilized commercial properties in traditional commercial corridors. Though these commercial centers may be unoccupied, they still are allotted services, reduce open space, and potentially impact the environment.

- 2.) **Transportation** – As anticipated, the opening of Interstate 40 (I-40) was the impetus for rapid development of all types in the County. The interstate has had a major impact on some types of growth in the County. I-40 has provided convenient access into and out of the County, but construction of new companion roads to facilitate cross-county travel has not kept pace.

Two study areas, located just north of the City, were selected for the location of the western link of the Martin Luther King Jr. Parkway connecting I-40 and Eastwood Road to Downtown Wilmington and US 17. The Parkway, linking Eastwood Road with I-40 and I-40 to Third Street in northern downtown, has been completed.

It is important to remember that new roads, particularly thoroughfares (like Independence Boulevard, South 17th Street Extension, Military Cutoff Extension, and Randall Parkway), have a dramatic impact on land use patterns. The County and City should be prepared to identify specific needs and possible conflicts as these roads are constructed. If this foresight is achieved, long-term negative impacts can be minimized.

- 3.) **Sewer Services and Land Development** - As can be expected, development in the unincorporated County has been brisk where County sewer service has been installed. Areas once not fit for development because soil conditions would not support septic tanks have now been transformed into buildable lots.

The County continues to pursue a County-wide sewer system, but funding shortfalls have delayed completion of some parts of the system. Alternative revenue sources are being sought, and decisions are being made on a piecemeal basis as to future expansion plans.

If and when the needed funding is identified, the County must be prepared to insure that the availability of sewer services does not open up lands to development that would not ordinarily

be considered suitable. For example, wetlands are still abundant in the County, but many tracts which contain these resources - large and small - are rapidly being converted into buildable land through engineered drainage trenching and filling. Additionally, many of the County's estuarine watersheds may require buffers and density restrictions to protect water quality, and in turn aid our fishing and tourism industries.

Septic tanks cannot function in poorly-drained soils or wetland areas, and although public sewer availability eases the sewerage concern, it subjects these wetland resources to development pressures. To the greatest extent practical, these wetlands should be protected. The County must demonstrate that it is committed to striking a palatable balance between development needs and the larger issues of environmental conservation and resource protection.

- 4) International Airport - The County's airport poses a possible threat to development through the potential for airplane crashes mainly within designated flight zones. Development, in turn, poses a threat to air traffic by the intrusion of towers or other tall structures into the flight zones; by the need to minimize excessive airplane engine noise during landing and taking off over developed areas, which may impact the safe operation of airplanes; and by the use of lighting or signals that could interfere with airplane navigation.

The County, therefore, has created Airport Residential and Industrial Districts. Both districts restrict the density and height of development and restrict the use of pulsating lights or similar devices interfering with navigation. The erection of tall structures must also comply with Federal Aviation Administration regulations. The City has an Airport Industrial District within its Zoning Ordinance. The County has also adopted a separate Airport Height Ordinance.

A small private airfield associated with a residential subdivision has been constructed in the southern part of the county between U.S. Highway 421 and River Road. The county has not adopted regulations specifically controlling airparks or uses surrounding this or other potential commercial or private airstrips.

Land Use Issues of Concern in the City of Wilmington

- 1) Addressing Land Use Conflicts - The City adopted its first Future Land Use Plan (FLUP) in 2004. Land use planning and the land development code of the City are intended to guide choices which ensure that future changes are beneficial to the city. The plan guides decisions regarding development regulation, rezoning, and capital improvements. There are a number of primary development trends that are expected to occur over the next twenty years. Infill development of vacant land, transition of residential uses in developed areas, and redevelopment of existing commercial properties compose the primary trends. Planning is a guide, with land use principles supported by measurable objectives and specific strategies of development trends. Additional guidance for land use planning is provided with plan elements addressing environmental resources, historic resources, neighborhoods, public spaces, recreation, transportation and levels of service.

Infill development of vacant land is a primary development trend. Approximately ten percent of the City's land area remains undeveloped. Some of the vacant land consists of large parcels along southern Independence Boulevard, Martin Luther King, Jr. Parkway, and near the State Port. There are also hundreds of small vacant pieces of land left. Commercial and

neighborhood infill is one of the most significant development issues in Wilmington since all the vacant land remaining is in someone's "back yard." In addition, many of the undeveloped parcels have remained vacant due to wetlands or other environmental constraints. A review of vacant parcels to determine those most suitable for preservation as natural areas is an important step to assuring that development does not permanently eliminate what little remaining natural areas exist in the City.

Transition of residential uses in developed areas is another development trend. Transition of land uses is inevitable in a maturing, substantially built-out city such as Wilmington. The land use transitions are primarily single-family residential uses transitioning to either higher-density residential uses or commercial or office uses. Transitions are occurring or are expected to occur because of changing demographic and economic factors and outdated subdivision patterns.

Redevelopment of existing commercial properties on strip developments along major corridor roads and the downtown, especially along the river, is a third major land use development trend. As a mature community nearing build out, we are faced with the need to redevelop aging, underused properties. Redevelopment typically involves expanding or renovating existing commercial or industrial buildings. Redevelopment can also be characterized by demolishing substandard buildings and reducing blighted conditions. Recent market changes have also shortened the expected life span of many commercial developments (example: stores abandoning smaller buildings for super centers); therefore, redevelopment needs and opportunities are expected to increase. The redevelopment strategies in the FLUP attempt to make the most of change by promoting improvements to declining or underused sites.

The 1998 Wilmington-New Hanover County Policies for Growth and Development recommends against allowing strip development along major city thoroughfares. Unfortunately, most of the corridors in the City are built out, and change will have to occur incrementally by redevelopment. City corridor planning efforts include the recently completed 2004 plans for Market Street, College Road, Oleander Drive, and Carolina Beach Road. A combination of the CAMA land use plan, the Future Land Use Plan and corridor plans will provide guidance for land development in a manner that will minimize the negative impacts of conflicting land uses.

- 2.) Transportation - The City of Wilmington has engaged in an aggressive plan to build new thoroughfares within the city limits. As part of the FLUP process, staff has prepared plans for four major road corridors: Carolina Beach Road, College Road, Market Street, and Oleander Drive. The Corridor Plans will support and enhance the Future Land Use Plan by providing more specific policy guidance for future rezoning proposals, long-term capital expenditures and potential regulatory changes. These new corridor plans will incorporate features of previous plans, such as the South Seventeenth Street Extension Plan, that provided the blueprint for development within that area.

The completion of the US 17 bypass has continued to gain urgency since the opening of I-40 and the increased traffic impacts on the Market Street corridor. The City of Wilmington and New Hanover County have pushed for the development of this bypass as a means of alleviating traffic congestion and providing greater efficiency in cross-county vehicular passage.

- 3.) Redevelopment of the Inner City Area - Within the past five years, the City of Wilmington, in partnership with private residential and commercial property owners, Historic Wilmington

Foundation, and Wilmington Downtown, Inc. (formerly DARE, Inc.) has had great success in the redevelopment of the historic core of the inner city. The preservation and reuse of significant portions of the downtown have been accomplished through this effort. New Hanover County has also contributed to the stabilization of the downtown through the revitalization of the historic New Hanover County Courthouse for administrative and meeting space.

However, continued effort is needed in the residential neighborhoods within the National Register Historic District, including Hemenway and the Bottom, and the North Fourth Street and Castle Street commercial areas. The Department of Housing and Neighborhoods, in conjunction with Wilmington Housing Finance and Development, is continuing their efforts to provide affordable, rehabilitated housing within these neighborhoods, as well as redevelopment of the historic commercial corridors on North Fourth Street and Castle Street. The Historic Wilmington Foundation and Wilmington Downtown, Inc. will continue to play key roles in the respective residential and commercial rehabilitation efforts.

- 4) Since earlier drafts of this Plan, failures in the aging sewer collection system have risen as a major issue. Increased volumes of sewage from rapidly growing areas served by the Northeast Interceptor line have stressed this aged critical conduit resulting in several significant spills in 2005-06 and a partial moratorium imposed by the State. Correcting the deficiencies in this line and improving the condition of the collection system in general has become a top priority that is essential to supporting continued growth.

SECTION E: Community Infrastructure

Introduction

This section of the Plan examines the City and County public facilities, the basic systems that support life in an urban environment. The studied facilities include water distribution facilities, wastewater collection and treatment, transportation, solid waste and recycling, and storm water management. Although the City and County operate some of these facilities together, many differences exist in how others are provided in the rural county compared to the more urban City. As land suitable for development in the City and County becomes more scarce, the provision of these essential services will determine the location and form of future development.

Water Facilities

New Hanover County

The New Hanover County Water and Sewer District operates a public water system in the Unincorporated County. All of the County systems depend on groundwater for potable water and are withdrawn from the Pee Dee aquifer, the Castle Hayne aquifer and the surficial aquifer. The existing County well system consists of 27 small, developer built systems that have been acquired by the County over the last decade. Three of the 27 wells have been abandoned, while 24 wells are active. In 2004, the County had an average day water demand of 2.35 mgd. This average day demand does not include Porters Neck and Figure Eight Island. Additionally, there are many individual residences in the County that rely on groundwater systems not operated by the County.

The County disinfects all of the wells with chlorine prior to distribution to customers. Two of the existing wells employ greensand filtration for additional treatment. The lack of a countywide treatment system has prompted the majority of the County's customers to install water-softening equipment due to hardness, sulfur, and iron content.

The County's existing 24 active well systems produce water at a rate of between 35 and 410 gallons per minute (gpm). The 12-hour yield of the existing well system is approximately 5.9 mgd. The majority of the wells are tapped into the Pee Dee aquifer. The County water system reaches from Wrightsboro across Northchase, along Murrayville Road to Market Street and up to Porters Neck Road. The County also operates the public water systems for Kings Grant and Prince George Estates. The County relies on **five systems** for the distribution of well water. The following describes these systems:

System 1: New Hanover County Water System 04-65-232

Population served: 16,477

of Connections: 7,195

Average Daily Demand: 1.92 MGD

2004 Peak Day Demand/Date: 3.41 MG/May 28th

2004 Peak Month: 78.41 MG / May

12 Hr. Pumping Capacity: 3.25 MG

24 Hr. Pumping Capacity: 6.50 MG

Available Capacity (based on ½ days available storage): 0.89 Mg
of wells: 21
of treatment plants: 20
Total Water System Storage: 1.97 MG
Total Elevated Storage: 1.85 MG
Total Hydro pneumatic Tank Storage: 0.12 MG
of Elevated tanks/Sizes: 4 / 2=500,000 gallon, 1=600,000 gallon, 1=15,000 gallon
of Hydro pneumatic Tanks/Sizes: 17 / 11=5,000 gallon, 5=10,000 gallon, 1=15,000 gallon

System 2: New Hanover County 421 Water System 04-65-191

Population served: 400
of Connections: 73
Average Daily Demand: 0.10 MGD
2004 Peak Day Demand/Date: 0.19 MG/June 15th
2004 Peak Month: 3.81 MG / May
12 Hr. Pumping Capacity: 0.16 MG
24 Hr. Pumping Capacity: 0.32 MG
Available Capacity (based on available 12 hr pumping capacity): 0.05 Mg
of wells: 2
of treatment plants: 1
Total Water System Storage: 0.11 MG
Total Elevated Storage: 0.10 MG
Total Hydro pneumatic Tank Storage: 0.005 MG
of Elevated tanks/Sizes: 1 = 100,000 gallon
of Hydro pneumatic Tanks/Sizes: 1=5,000 gallon

System 3: Kings Grant Water Supply 04-65-191

Population served: 4,680
of Connections: 2,044
Average Daily Demand: 0.43 MGD
2004 Peak Day Demand/Date: 0.782 MG/May 28th
2004 Peak Month: 16.87 MG / May
12 Hr. Pumping Capacity: 0.65 MG
24 Hr. Pumping Capacity: 1.30 MG
Available Capacity: None -0.015 Mg over capacity
of wells: 4
of treatment plants: 4
Total Water System Storage: 0.20 MG
Total Elevated Storage: 0.20 MG
of Elevated tanks/Sizes: 1 = 200,000 gallon

System 4: Monterey Heights Water Supply 04-65-137

Population served: 3,905
of Connections: 540
Average Daily Demand: 0.14 MGD
2004 Peak Day Demand/Date: 0.265 MG/May 25th
2004 Peak Month: 5.42 MG / June
12 Hr. Pumping Capacity: 0.53 MG
24 Hr. Pumping Capacity: 1.07 MG

Available Capacity: 0.43 Mg
of wells: 3
of treatment plants: 3
Total Water System Storage: 0.51 MG
Total Elevated Storage: 0.50 MG
Total Hydro pneumatic Tank Storage: 0.01 MG
of Elevated tanks/Sizes: 1 = 500,000 gallon
of Hydro pneumatic Tanks/Sizes: 2=5,000 gallon

System 5: New Hanover County Airport Water System 04-65-010 (Water purchased from City of Wilmington)

Population served: 3,905
of Connections: 28
No onsite storage

Facility Plans

New Hanover County plans to improve its existing water supply and treatment strategy for the northeast part of the County. The strategy would result in better management of the randomly spaced, non-uniform well system that has resulted from the installation of individual well systems. To do this the County would construct a new 6-mgd groundwater treatment plant and well field system. The plan calls for the withdrawal of approximately half of the raw water supply from the Castle Hayne Aquifer and the other half from the Pee Dee, so that annual average withdrawal from the Pee Dee can be maintained approximately at or below the existing annual average withdrawal. The County does not anticipate that this development will induce growth, but rather it will better manage groundwater resources to meet the needs of future projected growth.¹

The City of Wilmington

City of Wilmington water service is administered by the Department of Public Utilities and consists of supply, treatment, storage and delivery facilities and systems. Since the 1950's, the surface water system has provided most of the potable water needs for Wilmington's citizens and businesses. However, as the City annexed land, it began to encounter privately-owned water systems. In July 1999, the City purchased the groundwater system that was providing service in the annexation area, which previously had been two separate privately-owned systems and which the City plans to phase out through facility and infrastructure improvements to the surface water system.²

Surface Water System

The primary raw water supply for the City is the Cape Fear River. Water from the Cape Fear River is pumped 23 miles by the King's Bluff Pumping Station to the Sweeny Water Treatment Plant. The Sweeny Plant has the capacity to pump and treat 25 MGD, which significantly exceeds current city demand (see Figure E-1). The excess capacity will be used to serve former groundwater customers and growth in the City and County.

¹ New Hanover County Water and Sewer District, Environmental Assessment for the New Hanover County Water Treatment Plant and Well Field, DRAFT, (June 2005), p 1-2.

² City of Wilmington, North Carolina, Water and Wastewater Cost of Service and Rate Study (June 2001), p. 2.

The surface water storage and distribution system consists of water storage reservoirs, elevated storage tanks, service pumps and main distribution lines. Disinfection is achieved through ozone treatment. Treated water is stored at the treatment plant in storage reservoirs until it is pumped through mains to system users and the elevated storage tanks. There are 3 elevated storage tanks with a total storage capacity of 3.5 MG and 18 MG in concrete tanks and reservoirs. Water static pressure is maintained between 56 psi and 75 psi with an average of 70 psi. Water is distributed to properties through approximately 611 miles of pipe with a range of diameters (1¼ to 30 inches) and pipe material.³

In 2000, the monthly amount of net unaccounted water loss through the system ranged from 6% (Jan.) to 17% (Jul., Aug., Sept., and Oct.) with an average lose of 13%.⁴ This rate of water loss is reasonable compared to the industry average that ranges between 5% and 15%. Among North Carolina communities, Winston-Salem (8.6%, 1998) and Greensboro (9%, 1997) fall within the average water loss range while High Point (20%, 1998) and Durham (25%, 1998) experience significantly greater water loss.⁵ Reducing water loss throughout the system will enhance the City's ability to adequately and efficiently serve water customers with the existing treatment facility level of service.

Service Analysis

A description of water system capabilities necessitates an understanding of the water system terminology, which includes the following:

- **Average day demand** is the total amount of water pumped on average every 24-hour day. This includes both sold water and unaccounted water.
- **Max-day demand** is the historical maximum amount of water pumped during a 24-hour period.
- **Peak-hour demand** is the maximum pumpage required to meet consumer demands during the hour when there is the greatest usage on the system.
- **Fire flows** represent the amount of water the system should deliver to a fire hydrant at a residual pressure of 20 psi. Typically these flows create the highest demand on the system for a 2 to 4 hour period. The capacity of a system to meet these flows is one of the limiting factors in City classification for insurance risk assessment as measured by the ISO rating.
- **Max-day demand plus fire flow** is the recommended design standard which the water system should be capable of meeting and maintaining for the duration of a fire.
- **Service Demand** provides data regarding recent annual water treatment and consumption. The plant pumped and treated approximately 15 MGD while consumption has averaged 10.4 MGD from 2000 to 2002.

³ American Water Works Association, 2002 Distribution Survey (July 2002).

⁴ City of Wilmington, North Carolina - Public Utilities Department, Water Accounting Report, (November 14, 2001).

⁵ Ammons, *supra* note 10, p. 449.

Figure E-1: Surface Water System Treatment and Consumption (2000-2002)

Statistic	2000	2001	2002
Pumped and Treated	14.6 MGD	16.0 MGD	15.1 MGD
Percent of Total Pump Capacity	51%	56%	53%
Average Daily Consumption	9.5 MGD	11.4 MGD	10.2 MGD
Maximum Daily	14.9 MGD	15.8 MGD	16.0 MGD
Minimum Daily	8.8 MGD	10.4 MGD	11.0 MGD

Source: City of Wilmington, Water Accounting Reports

In 2000, the average daily pumped and treated water was 14.6 MGD, which represented 51% of the total source water pump capacity. The Average Day Demand was 9.5 MGD with a Max-Day Demand of 14.9 MGD. Based on Wilmington’s historical data, between 1989 and 1993 the Peak Hour Demand ranged from 1.15 to 1.40 times the Max-Day Demand.⁶ Assuming a ratio of 1.40, the Peak Hour Demand was 20.9 MG for the entire system in 2000. The per capita demand was approximately 122 gpd in the year 2000.

Wilmington’s pattern of water consumption by land use is shown in Figure E-2. “Residential” land use includes single family and multifamily development. The “commercial” category includes a wide range of office, retail and light industrial uses. The “institutional” category is significant because it includes the University of North Carolina at Wilmington and Cape Fear Community College as well as other institutional uses.

Figure E-2: 2000 Water Consumption by Land Use Category

Land User Category	Percent of Water Consumption
Residential	49.0 %
Commercial	19.6 %
Industrial (finished)	2.1 %
Institutional	10.9 %
Other	4.4 %
Total	86 %
Unaccounted Water	14.0 %

Source: City of Wilmington, Public Utilities Department

⁶ City of Wilmington, North Carolina, Water Distribution Study Update (January 1995), p. 7.

Projected Demand and Carrying Capacity

To project future water demand based on the growth scenarios, it is necessary to evaluate the impact of different land use classifications on water consumption. The approach used herein establishes a consumption demand measure called “Equivalent Dwelling Units” (EDU), which represents a particular land use’s consumption rate compared to the local single-family dwelling unit. Total EDU’s are tallied for each land use and multiplied by standard water consumption rates by land use. This evaluation does not account for an increase in water demand for unincorporated New Hanover County or other municipalities, but only for increased demand within the City’s existing municipal boundaries. In addition to the assumptions identified with development of the growth scenarios, the following assumptions are made in this evaluation:

- Water consumption rates in Wilmington mirror the standard consumption rates by land use, as identified in ULI’s Development Assessment Handbook;
- All uses within the corporate city limits will receive water service;
- Standard consumption generation represents an acceptable level of service;
- The household sizes for single-family and multi-family dwellings will be 2.20 and 2.01, respectively; and
- The mixture of single-family and multi-family dwellings will remain constant.

Different land uses have varying water demands. The differential in water consumption between single-family and multifamily dwellings per capita is due to differences in lifestyle, such as a reduction of lawn space per dwelling unit and fewer persons per household. Retail, office and industrial land uses require water for employee and customer consumption, as well as for a component of doing business, such as for use in manufacturing and assembly processes. Figure E-3 provides water consumption rates by land use type.

Figure E-3: Water Consumption Measures (LOS)⁷

Water Consumption Measure	Gallons Per Day
Per Capita for Single-family Units	100
Per Capita for Multifamily Units	75
Per 1,000 Sq. Ft. of Office Space	93
Per 1,000 Sq. Ft. of Retail Space	106
Per Industrial Employee	150

With 2.2 people per household and a per capita consumption rate of 100 gpd, each single-family

⁷ Burchell, *supra* note 14, p. 263.

dwelling unit accounts for 220 gpd. Therefore, 220 gpd is equal to one Equivalent Dwelling Unit (EDU). Figure E-4 shows consumption rates expressed in EDU's for general land use classifications.

Figure E-4: Equivalent Dwelling Units Calculation

Residential Water Impact Fee Standards per Dwelling Unit Type				
Land Use	Persons/DU⁸	Gallons per Person	Gallons per DU	Equivalent Dwelling Unit
Single Family DU	2.20	100	220	1.00
Multi-Family DU	2.01	75	151	0.69
Typical Non-Residential Water Impact Fee Standards per 1000 gallons				
Land Use	Employees per 1000 SF GFA⁹	Gallons per Employee	Gallons per 1,000 SF GFA	Equivalent Dwelling Unit
Office, General	3.29	28	93	0.42
Commercial/Retail	2.72	39	106	0.48
Industrial	2.16	69	150	0.68

Based on the Slow, Medium and Rapid Growth projections presented in Phase One of this study, Figure E-5 shows the effect each growth scenario would have on water treatment capacity to meet average daily demand, which represents a minimum level of service by 2020. The projected dwelling units from Phase One of this report were allocated to single-family (60%) and multifamily (40%) based on the distribution reported in the 2000 U.S. Census. The following comments summarize the effects each growth scenario would have on water demand:

Slow Growth Scenario

- Daily water consumption would be approximately 18.7 MGD; and
- Existing water treatment capacity would exceed future needs.

Medium Growth Scenario

- Daily water consumption would be approximately 20.7 MGD; and
- Existing water treatment capacity would exceed future needs.

Rapid Growth Scenario

- Daily water consumption would be approximately 22.8 MGD; and
- Existing water treatment capacity would exceed future needs.

⁸ 2000 U.S. Census.

⁹ Institute of Transportation Engineers, *Trip Generation*, 5th ed (Washington: ITE, 1991).

Figure E-5: Water Treatment Carrying Capacity Relative to New Growth Scenarios

Land Use	Slow		Medium		Rapid	
	Units	ERU's	Units	ERU's	Units	ERU's
Single Family Dwelling (Dwellings)	42,701	42,701	47,413	47,413	52,126	52,126
Multi-Family Dwelling (Dwellings)	29,073	19,922	32,282	22,120	35,490	24,319
Total Residential	71,774	62,623	79,695	69,534	87,616	76,445
Office (1,000 SF GFA)	12,656,477	5,350	14,053,221	5,941	15,449,965	6,531
Retail (1,000 SF GFA)	16,761,945	8,076	18,611,760	8,967	20,461,575	9,859
Industrial (1,000 SF GFA)	12,860,023	8,768	14,279,230	9,736	15,698,437	10,703
Total Non-residential	42,278,445	22,195	46,944,210	24,644	51,609,976	27,093
Total ERU's		147,440		163,711		179,982
Total Water Consumption (MGD)		32.4		36.0		39.6
2002 Treatment Capacity (MGD)		25		25		25
Capacity Needed (MGD)		7.4		11		14.60

Wastewater Facilities

Introduction

City of Wilmington wastewater service is administered by the Department of Public Utilities and consists of collection and treatment facilities. The City operates two wastewater treatment facilities: the Northside Plant and the Southside Plant. The Northside Plant is located in the extreme northwest region of the city while the Southside Plant is located in the extreme southwest part of the City. Treated wastewater from both plants is discharged into the Cape Fear River, which has recently been classified as impaired by the North Carolina Department of Environment and Natural Resources (DENR).¹⁰ Due to DENR’s determination, wastewater discharge from Wilmington’s system will likely have to meet stringent limits on biochemical oxygen demand (BOD) and nitrogen levels. These impending treatment requirements along with continued population growth in New Hanover County prompted the creation of the City of Wilmington and New Hanover County – Wastewater Master Plan, completed in July 2001.

Wastewater System

The sewage collection system consists of gravity flow interceptors, forced mains and pump stations, which convey wastewater to the Northside and Southside treatment facilities. There are over 30 pump stations and over 115,000 linear feet of interceptor lines ranging in diameter from 8-inch to 48-inch.¹¹ Although a detailed evaluation of the collection system capacity has not been completed, a recent study indicated that the main collection system is adequate to handle growth until 2020.¹² Due to recent failures in the Northeast Interceptor (NEI) the City is currently conducting an extensive evaluation of the integrity of the NEI as well as overall evaluation of the entire collection system. As growth occurs, the system’s capacity should be reviewed to ensure adequate service.

The New Hanover County Engineering Department is responsible for the operation and maintenance of a waste water utility system serving over 30,000 customers. The County’s sewer collection system is maintained by 17 employees and is comprised of approximately 500 miles of gravity sewer, 83 miles of sewer force main, 105 sewer lift stations and one waste water treatment plant. The wastewater collected by the County is treated in the City’s wastewater facilities.

The wastewater system has two treatment plants with the capacity to treat 20 MGD. Figure E-6 provides demand and capacity information for the two treatment plants.

Figure E-6: Treatment Facility Demand and Capacity (2000)

Treatment Facility	Average Daily Demand (MGD)	Daily Treatment Capacity (MGD)	Percent of Capacity Used	Percent of Capacity Available
Northside Plant	5.0	8.0	62.5%	37.5%
Southside Plant	8.2	12.0	68.3%	31.7%

¹⁰ City of Wilmington, North Carolina, Wastewater Master Plan (July 2001), p. 1-1.

¹¹ City of Wilmington, *supra* note 53, p. 5-9:5-16.

¹² City of Wilmington, *supra* note 53, p. 5-19. Based on modest growth projections.

Total	13.2	20.0	66.0%	34.0%
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In addition to meeting the demands of New Hanover County and Wilmington residents, the wastewater system serves Wrightsville Beach, as shown in Figure E-7. Approximately one-half of the treatment capacity (6 MGD) of the Southside Plant is reserved for New Hanover County. Since 2000, the demand on the Southside Plant has increased by approximately 34% due to growth in the southern portion of the City and in unincorporated areas south of the City. Currently, the wastewater treatment plants have approximately 3.5 MGD capacity to serve new growth.

Figure E-7: Wastewater Demand Generators (2002)

Demand Generator	Northside Average MGD	Southside Average MGD	Generator Total
City of Wilmington	3.5	3.1	6.6
New Hanover County	1.4	6.0	7.4
Wrightsville Beach	0.0	0.7	0.7
Inflow/infiltration	0.6	1.2	1.8
Total	5.5	11.0	16.5

Source: City of Wilmington

In 2005, the City and County jointly established a Utilities Consolidation Committee with representatives from both elected boards. The Committee agreed to recommend the establishment of an interjurisdictional authority for the consolidated delivery of water and sewer service. County and City staff have been charged with developing a proposed implementation plan to address legal, financial, engineering, and administrative aspects of authority formation.

Roadway Facilities

Introduction

Roadway facilities exert substantial and lasting influence and impacts on the configuration and characteristics of land use and development within the area they serve. They can support economic development and enhance circulation system level of service while at the same time diminishing pedestrian safety, adjacent land values, a community or neighborhood character, and quality of life. The impact of the road system on adjacent land use and development should in each instance be identified, accommodated, and mitigated as appropriate, consistent with local transportation goals and objectives and other local values.

The Wilmington metropolitan area (includes New Hanover County and part of Brunswick County) is one of the fastest-growing regions in North Carolina. The impacts of existing and projected growth trends on mobility throughout the region significantly affect the quality of life of area residents. The transportation network within the Wilmington metropolitan area impacts the existing land uses and development trends throughout New Hanover County and will impact how the County will grow in the future.

Wilmington assumes a subordinate role in regard to planning transportation system upgrades and major roadway improvements because of two circumstances:

- Wilmington's status as the center of a metropolitan area in which major transportation planning activities are conducted by the Greater Wilmington Metropolitan Planning Organization (WMPO); and
- The North Carolina Department of Transportation has jurisdiction over most major roadway facilities within the Wilmington region.

North Carolina has the second largest roadway system that is State-owned and maintained. State law prohibits county involvement in the road system while municipalities maintain a relatively minor role in the overall transportation network. Roads that are annexed into the City are State owned and maintained.

Major Road System

The road system within the Wilmington metropolitan area consists of local, minor thoroughfare, major thoroughfare, and freeway roads that serve distinct functions to allow a wide range of mobility throughout the region. The primary function of a road is based upon its intent to provide either a high level of mobility or a high level of accessibility, with intermediate roads providing a transition between mobility and accessibility. This continuum is characterized by roadways that permit traffic movement at the highest speeds with no direct site access versus roadways that restrict traffic to the lowest speeds and provide frequent site access. Roadways are classified by length of trip, average travel speed, frequency of access points, and continuity.

Traffic volumes, conversely, do not determine road function but may affect mobility and

accessibility. The function of road types is described below:¹³

- ***Local Access Streets*** provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located such that only traffic with origins and destinations on the streets would be served. Examples of local access streets include: Harris Road, Wayne Drive, Chestnut Street, Masonboro Sound Road, Amber Drive, and Windemere Road.
- ***Minor Thoroughfares*** collect traffic from local access streets and carry it to the major thoroughfare system. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function that may be performed is that of providing access to abutting property. Examples of minor thoroughfares include: Independence Boulevard, Gordon Road, Myrtle Grove Road, and Greenfield Street.
- ***Major Thoroughfares*** are the primary traffic arteries. Their function is to move intracity and intercity traffic. The streets that comprise the major thoroughfare system may also serve abutting property; however, their major function is to carry traffic. Examples of major thoroughfares include: Market Street, Oleander Avenue, Eastwood Road, Carolina Beach Road, - and College Road.
- ***Freeways*** provide rapid and efficient movement of large volumes of through traffic between areas and across the urban area. They are controlled access, multi-lane, divided highways devoted to high-speed, long distance traffic movement with little or no access to adjacent land. Examples of freeways in the Wilmington region include: U.S. Highway 74/76, U.S. Highway 421, U.S. Highway 17, and U.S. Highway 132.

New Hanover County's major road system is configured in a radial pattern of arterial and collector roads with multiple nodes. Market Street, Wrightsville Avenue, Oleander Drive, 17th Street and Carolina Beach Road radiate from historic downtown Wilmington towards the east and south. These radial roads are intersected by major north/south roads such as College Road, Military Cutoff Road, Castle Hayne Road, River Road, and Kerr Avenue. Newly completed Martin Luther King Jr. Parkway serves as a major west/east arterial running east from the north edge of downtown to College Road and Hwy 17. Loop roads such as Middle Sound Loop Road and Greenville Loop Road provide access to the street network for City and County residents tucked between the County's tidal creeks. Long distance travelers enter the County along U.S. Highway 74/76, U.S. Highway 421, U.S. Highway 17, U.S. Highway 132, and Interstate Highway 40.

Level of Service

The goal of a roadway network is to effectively and efficiently transport people and goods from one point to another. This pattern of movement influences development patterns and land uses, though other transportation forms should not be minimized (such as bike, pedestrian, air, rail, mass transit, etc.). The capacity of roads is directly linked to a myriad of factors, key among them being the number of lanes, design, signalization, presence of left and right turn lanes and/or acceleration/ deceleration lanes, lane width, shoulders and others. These design features

¹³ North Carolina Department of Transportation, Technical Report for the 1997/2025 Transportation Study Computer Model Analysis of the Greater Wilmington Urban Area Metropolitan Planning Organization Transportation Plan (March 20, 2001), Appendix B-4.

culminate in the roadway’s design capacity. The amount of traffic on the roadway represents the road’s volume. The degree to which the roadway accommodates traffic demand is a measure of the roadway’s level of service (LOS), which is reflected through a comparison of the volume and capacity referred to as the volume/capacity (v/c) ratio. In addition to the quantitative measure of the v/c ratio, road LOS is typically described in qualitative terms that describe the characteristics of traffic flow.

Roadway LOS Measures

Figure E-8 provides qualitative and quantitative descriptions of traffic flow LOS standards. The volume/capacity ratio measures traffic demand relative to the roadway capacity, which is a direct measure of functional service levels.

Figure E-8: Descriptions of Roadway Service Levels

Level of Service	Traffic Flow	Effect on System Users	Delays at Intersections	Volume to Capacity Ratio
A	Free.	Individual users are virtually unaffected by the presence of others in the traffic stream.	0 - 5 seconds/vehicle	<= to .33
B	Stable.	Presence of other users in the traffic stream begins to be noticeable to other users.	5 - 15 seconds/vehicle	.33 to 0.50
C	In the range of stable.	Operation of individual users becomes significantly affected by interaction with others in the traffic stream.	5 -25 seconds/vehicle	.50 to .65
D	High density, but stable level of traffic flow.	Speed and freedom to maneuver are severely restricted, and the user experiences a poor level of comfort and service.	25 - 40 seconds/vehicle	.65 to .80
E	Operation at capacity level.	All speeds are reduced to a low, but relatively uniform value; comfort and convenience levels are extremely poor and driver frustration is generally high.	40 - 60 seconds/vehicle	0.80 to 1
F	Represents forced or breakdown of traffic flow; this condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse that point.	Operations within the queues are characterized by stop and go waves, which are extremely unstable.	> 60 seconds/vehicle	>1

Source: Transportation Research Board, National Research Council. Highway Capacity Manual. Special Report 209. 3rd ed. 1998. at 3-8 to 3-11.

Though the WMPO has designated a design level of service "D" for the major roadway system within the Wilmington metropolitan area, there is an existing LOS of "E" or "F" at signalized intersections along Castle Hayne, Market Street, College Road, Oleander Drive, Eastwood Road, 17th Street, and Pine Grove Drive. Figure E-9 identifies the LOS "E" and "F" road segments as "overcapacity". Most of the roads experiencing overcapacity in 1997 were located in the recently annexed portions of the city, which lie east of Kerr Avenue. Similarly, Figure E-9 shows the v/c ratios and LOS for select major road segments based on 2002 traffic volume counts. The highest v/c ratio exists on Kerr Avenue North of Wilshire Boulevard located in the north central quadrant of the City. Oleander Drive west of College Road had a v/c ratio of 0.66 for a LOS of "C".

Figure E-9: Major Roadway Volume/Capacity Ratios and LOS (2002)

Street	Location	2002 Volume (VPD)	Road Capacity Volume (VPD)	2002 V/C Ratios	LOS
College Road	South of Oleander Drive	42,000	35,000	1.20	F
Oleander Drive	West of College Road	33,000	50,250	0.66	C
Kerr Avenue	North of Wilshire Boulevard	24,170	16,500	1.46	F
Randall Parkway	East of Kerr Avenue	20,940	16,500	1.27	F
Market Street	East of Kerr Avenue	46,260	33,000	1.40	F
College Road	South of New Centre Drive	55,015	50,250	1.09	F
Shipyard Boulevard	East of 17th Street	30,420	33,500	0.91	E
17th Street	North of Shipyard Boulevard	33,445	33,500	1.00	E
Military Cutoff Road	North of Eastwood Road	28,380	34,500	0.82	E
Eastwood Road	East of Cardinal Drive	24,870	33,000	0.75	D
Carolina Beach Road	North of Shipyard Boulevard	31,250	31,200	1.00	E
Wrightsville Avenue	West of Kerr Avenue	15,000	16,500	0.91	E

Source: City of Wilmington

While the network accommodated 662,000 vehicle trips per day in 1997, the *1999 Transportation Plan* projects 1,047,000 vehicle trips per day by year 2025. The projection assumes that all of the system improvements proposed in the *1993 Transportation Plan* were

completely implemented. Based on the WMPO projections, after full implementation of the 1993 Thoroughfare Plan, most roads within the major system would be overcapacity.¹⁴

Figure E-10 shows the major road improvements proposed in the *1999 Transportation Plan*, which incorporated projects from the *1993 Transportation Plan* that were not constructed. Of these proposed projects, those located in Wilmington including new roads and road-widening activities would cost an estimated \$2.1 billion. Nearly 11.5 miles of new major roads would be constructed and over 36 miles would be widened. While these priorities were due to be updated in 2005, more current plans have not been adopted at the time of this writing.

Figure E-10: Wilmington Transportation Plan Major Road Improvements

	Project Length (Miles)	Construction and ROW Costs (Millions)
College Road at Oleander Drive Interchange	0.00	\$1,672.1
Kerr Avenue Extension	0.15	\$0.7
Martin Luther King Jr. Parkway Interchanges	0.00	\$123.3
Independence Boulevard Extension	5.56	\$7.5
Randall Parkway Extension	2.46	\$6.6
Monkey Junction Interchange	0.00	\$30.7
Martin Luther King Jr. Parkway	3.25	\$135.0
Totals Major New Projects	11.42	\$1,975.9
Major Widening Projects		
23rd Street	2.50	\$9.9
River Road	8.12	\$23.8
College Road	5.50	\$36.1
Kerr Avenue	5.22	\$12.7
Wrightsville Avenue	6.60	\$19.9
Greenville Loop Road	4.55	\$13.4
Rogersville Road	1.43	\$4.9
Military Cutoff Road	2.27	\$8.0
Total Major Widening Projects	36.19	\$129
Total Project Cost		\$2,104.6

¹⁴ Greater Wilmington Urban Area Metropolitan Planning Organization, *Transportation Plan* (August 2, 1999), p. 14.

In addition to major roads, the system includes intersection improvements, sidewalks and traffic control devices such as stoplights, signs and pavement marking. All of the elements of the major roadway system will be impacted by new development.

While the WMPO projects congestion to be an on-going challenge, the fiscal plan to meet this challenge is built on optimistic assumptions. Total transportation projects would require an estimated \$3.1 billion, of which \$2.9 billion dollars would be used for road projects. Under the current State funding structure, less than \$1.7 billion would be provided by the State. The WMPO proposes to exceed the shortfall of \$1.3 billion through Federal funds (\$1.9 billion) and local funds (\$513 million). Federal funding is assumed to grow at an annual rate of 5%. The local \$513 million contribution would be raised through a ½ cent local sales tax. Recent economic events indicate that government entities at all levels are facing budget deficits that make increased funding unlikely.

Projected Trips

A primary measure of road infrastructure demand is the number of trips generated by land uses within the study area. The WMPO projected that the total number of trips for the WMPO planning area would be 1,047,000 by 2025. Based on the WMPO's projected trip growth trend, there would be 994,500 trips in 2020.¹⁵

Stormwater Services

New Hanover County

In September of 2000, the County took its first large step to address drainage concerns in the unincorporated areas of the County by adopting a stormwater management ordinance. The new ordinance and accompanying manual outline how storm water quality and quantity must be addressed for new development and redevelopment in the County.

- The ordinance requires development to limit post-development discharge rates of storm water (based on 25 year storm rates) to the rate of discharge prior to the development. The restriction of discharge rate will better protect all new development while it helps keep the flooding problem in existing areas from getting worse for the design storm. As part of this ordinance, the maximum design storm was changed from a 10 year storm to a 25 year storm which means less storm water is allowed to be discharged and more storm water is required to be detained on site, in ponds.
- Also, the ordinance addresses water quality by encouraging non-direct discharges, requiring the ponds to draw down from below water surface which prevent oils and floating debris from being discharged, and establishing an enforcement provision to resolve illegal discharges from any source.

¹⁵ Based on a linear regression using the WMPO's 1990 and 2010 number of trips reported in Table 13 of footnote 63. For a detailed evaluation of projected design capacity and traffic volume, review Appendix B-9 to B-22 of the note 61.

- Finally, the ordinance establishes a mechanism to require owners of property that adjoins a ditch to maintain the ditch or channel in working order. This provision allows the County to correct problems that are causing or contributing to the flooding of an area. The ordinance does not provide for maintenance of existing drainage ways by the County.¹⁶

City of Wilmington

The City of Wilmington Storm Water Services Division maintains and improves the public drainage system within the City limits.

In Wilmington, runoff flows through a complex, interconnected system of pipes, ditches, creeks and other natural and man-made features. In Wilmington, the storm drainage system consists of approximately:

- 9,000 catch basins and manholes
- 220 miles of pipe
- 200 miles of open drainage (ditches, creeks, and channels)
- 145 acres of retention ponds including Randall Pond and Silver Stream Pond
- 12 miles of culverts under roads
- Greenfield Lake
- Love Grove Tide gates

Storm Water Services provides comprehensive management of Wilmington's public storm drainage system. Funding, maintaining, and improving the storm drainage system comes from the Storm Water Service fee included on utility bills. The fee is based on the amount of impervious surface area on a property. Rooftops, driveways, parking lots, streets, and sidewalks are examples of impervious surfaces.

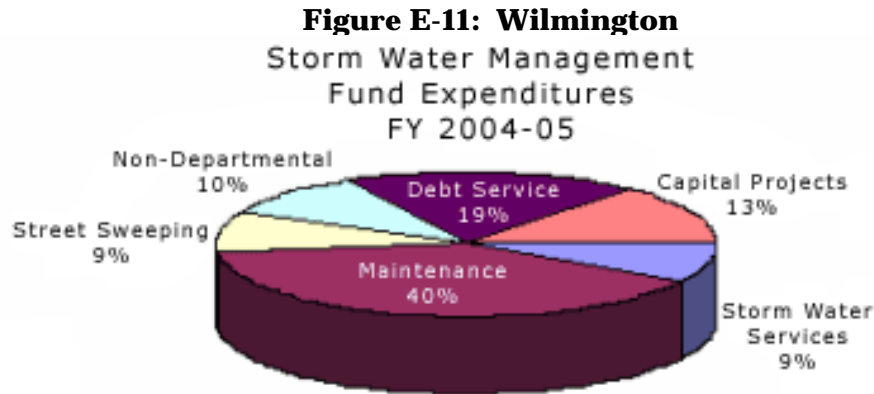
- **Single Family Fees** - Single family households pay a basic flat rate of \$4.75 per month (\$9.50 per utility bill). The fee is scheduled to increase to \$5.00 per month in July 2006.
- **Commercial Fees** - Commercial-type properties typically have more impervious surface area than residential properties, thus creating more runoff and a greater burden on the drainage system. To determine fees, the City measures the amount of impervious surface area on a parcel of property and the owners are charged \$4.75 per month (to increase to \$5.00 per month in July 2006) for every 2,500 square feet of impervious surface.

Comprehensive management allows Storm Water Services to budget and set storm water utility fees based on the actual cost of providing services, preventative maintenance, and funding for much needed drainage improvement projects (see Figure E-11).

Storm water utility fees pay for capital projects or improvements that require construction or repairs beyond standard maintenance. These projects are necessary when the existing storm

¹⁶ New Hanover County Engineering Department; <http://www.nhcgov.com/eng/Stormwaterpage.asp>

drainage system is inadequate and can result in flooded streets, homes, and businesses or impaired water quality. Utility fees also pay for maintenance activities including street sweeping, pipe and culvert cleaning, ditch cleaning, replacing and repairing drainage structures, repairing cave-ins, mowing right-of-ways and practicing preventative maintenance.



Solid Waste and Recycling

New Hanover County

New Hanover County has no solid waste collection system, requiring County residents and businesses to contract directly with private vendors for waste collection. The New Hanover County Department of Environmental Management oversees an integrated solid waste disposal system. Through waste-to-energy, recycling and lined landfilling techniques, the resulting system minimizes the use of land resources for burying waste, and minimizes the potential risks for contaminating the area's groundwater.

The County's present solid waste management system is a direct result of long-term planning put in motion in 1981. The resulting system accomplishes the primary goals set in 1981, which were to minimize our reliance on landfilling as a means of managing solid wastes, and to minimize the potential impacts of managing solid wastes on the area's coastal environment. With proactive planning and maintenance, the community has a solid waste system that can provide environmentally sound disposal well into the future.

The primary concern that shaped the County's solid waste management decisions was the area's coastal environment. Traditional landfilling methods were not suitable for the characteristically permeable sandy soils and high groundwater table of the area. Aside from the natural beauty of the area, the local economy and recreation revolve around the area's coastal water resources. The potential for leaking landfills contaminating the County's groundwater, rivers, and marshes was determined to be too great to ignore.

Another factor that affected the decision-making process was that New Hanover County was the second smallest county and one of the more densely populated counties in North Carolina. As a result, demand for local land resources are at a premium.

In October 1980, the County requested consulting engineers recommend ways to manage the local solid waste stream that would also protect the quality of the coastal resources. After

studying the engineering firm's report, a citizens Solid Waste Task Force concluded that the most appropriate long-term system for handling the County's growing solid waste problem was to:

1. Construct the state's first high-tech, synthetically lined landfill to minimize the risk of landfill leachate (or wastewater with the pollutant characteristics of the wastes) escaping from the landfill cells.
2. Construct the state's first on-site leachate treatment system consisting of leachate collection pipes placed under the trash, a holding lagoon capable of storing 4 million gallons of leachate, and an extended aeration treatment plant for biologically treating the leachate to meet water quality standards before discharge into the Northeast Cape Fear River.
3. Construct WASTECC -the state's first waste-to-energy conversion facility with the purpose of (i) minimizing the amount of material placed in the Landfill, and (ii) rendering the resulting landfilled ash to an environmentally inert state. As an added feature, equipment was installed to recover and convert the energy created from trash combustion into marketable steam and electricity to help offset operating costs.

Since 1990, the use of recycling has increased as a solid waste management tool. In 1990, the City of Wilmington instituted a curbside recycling program, with the Town of Wrightsville Beach, Town of Carolina Beach and the County starting drop-off collection programs. The Town of Carolina Beach began collecting recyclables at the curb in 1992, with the Town of Kure Beach beginning its drop-off program the same year. The Town of Kure Beach began curbside recycling in 1997. A cardboard recovery operation was put in place in 1997 that nearly doubled the amount of material recycled through the County's operations.

In 2004 the County's landfill received 207,000 tons of waste. In the same time period over 10,000 tons of materials came to the facility to be recycled. ¹⁷

City of Wilmington

The mission of the City of Wilmington Solid Waste Management Division is to provide the citizens of Wilmington expert services through a comprehensive solid waste and recycling program.

The City's Solid Waste Management Division is an enterprise fund whose revenues are based primarily on monthly fees charged to solid waste customers based on the chosen level of refuse service.

The selected number and size of the refuse containers and the frequency of collection determine monthly fees. The monthly rates include weekly refuse, recycling, and yard waste collections as well as bulky item collection on an as-needed basis. At the present time, the fee for a maxi cart is \$19.10 a month and for a mini cart, \$16.10 a month.

Section 11-2.2 of the Code of Ordinances of the City of Wilmington permits some single-family residents to receive a reduction on the rates for water, sewer, and refuse. To receive these

¹⁷ New Hanover County Department of Environmental Management,
<http://www.nhcgov.com/DEM/DEMmain.asp>

reduced rates, the household must have a total gross income of \$18,800 or less AND either be 65 or older or be totally and permanently disabled.

Yard waste is collected once a week on the same day as trash collection. Yard waste is required to be placed neatly in the right-of-way (sidewalk or curb). Loose yard waste such as grass clippings, leaves, pinecones, straw, and vines must be containerized. The following are additional requirements for yard waste collection:

- Limbs may be no longer than 4 feet and no larger in diameter than 6 inches.
- All loose yard wastes (grass clippings, pine straw, vines, pinecones and leaves) must be containerized. A container may be a plastic bag, a box or a personal 30 gallon trash can.
- Yard waste is collected on the same day as regular trash. Items must be placed in the right-of-way for collection.
- Non-organic items (roofing tiles, scrap lumber, rocks, etc.) may not be mixed with yard waste.

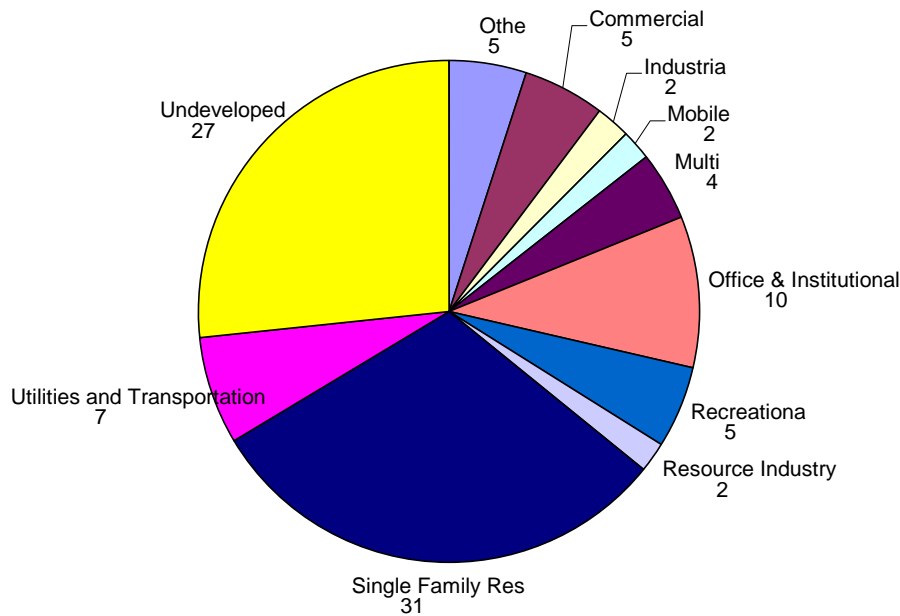
Land Classification and Holding Capacity Analysis

The land classification system is a means of assisting in the implementation of the Comprehensive Plan policies. It allows the local government and its citizens to specify those areas where certain policies will apply. The land classification system is intended to be supported and complemented by zoning, sub-division, other land use management tools and the provision of infrastructure. The following analysis examines the infrastructure needs for each of the designated land classification categories:

Urban

The Urban land class is to provide for continued intensive development and redevelopment in areas that have all of the urban services necessary to support that development. Figure E-12 shows the land use in the Urban class by area.

Figure E-12: Land Use - Percent of Total Area in Urban Land Class



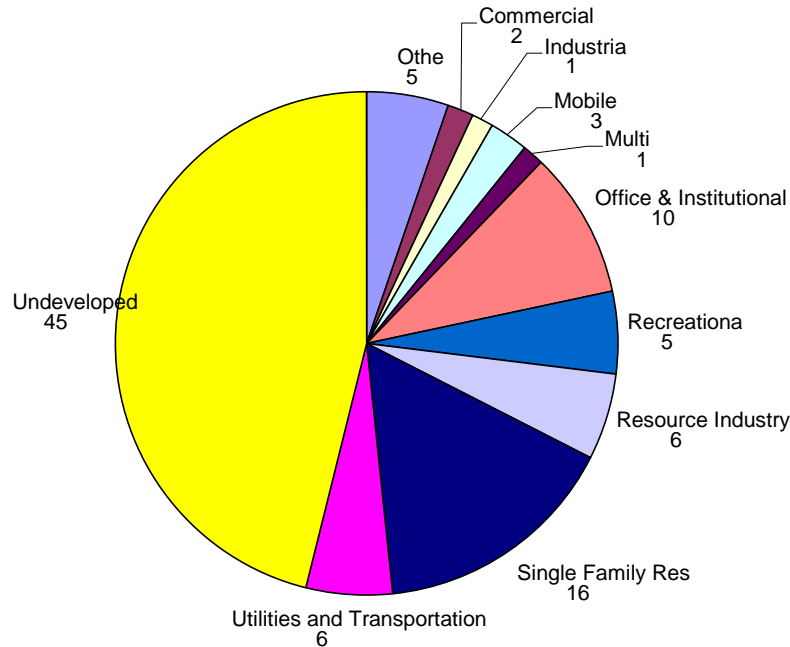
With relatively little land undeveloped, available land will eventually begin to either require that development become denser or that new development takes place in other areas. The policies contained in the land use plan support increased density in areas that have the necessary services. The plan also allows for this development to occur with no specific limits for impervious surface. Facilities planned for transportation, water, sewer and school expansion have been made to accommodate the growth that is projected to occur in these areas.

Transition

The purpose of the Transition class is to provide for future intensive urban development on lands that have been or will be provided with necessary urban services. Much of the land in Transition areas display the same characteristics as the Urban land class. The entire Transition

class is in the Urban Services Boundary and plans for the provision of services to support projected growth in these areas are in place. Figure E-13 shows the current breakdown of land uses in the Transition Areas. Sufficient land will be available to support the growth projected for Transition areas.

Figure E-13: Land Use - Percent of Total Area in Transition Land Class

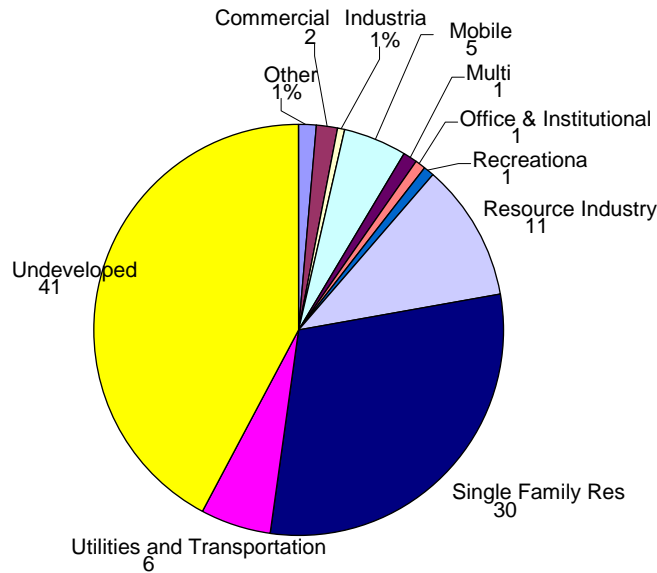


Community

Areas designated Community fall within the Urban Service Boundary. Figure E-14 shows the current mix of land uses by area in this land class. The City of Wilmington and New Hanover County plan to provide urban services to areas within this land class. Urban services providing an adequate level of service for the projected 2020 population have been accounted for in each service plan. As the summary chart at the end shows, the projected population growth in the Community classification does not exceed the build-out capacity in this class. The Community Class, with its emphasis on the provision of a mix of land uses serving a small, compact community, should result in more efficient provision of urban services including water, sewer, streets, schools, recreation and open space.

The community classification does not recommend any specific impervious surface guidelines. However, since the classification promotes an urban development pattern and since the designated community areas adjoin both conservation and resource protection areas, the degree of impervious surface that may be expected as the designated areas reach build-out is summarized in Table E-18 at the end of this section.

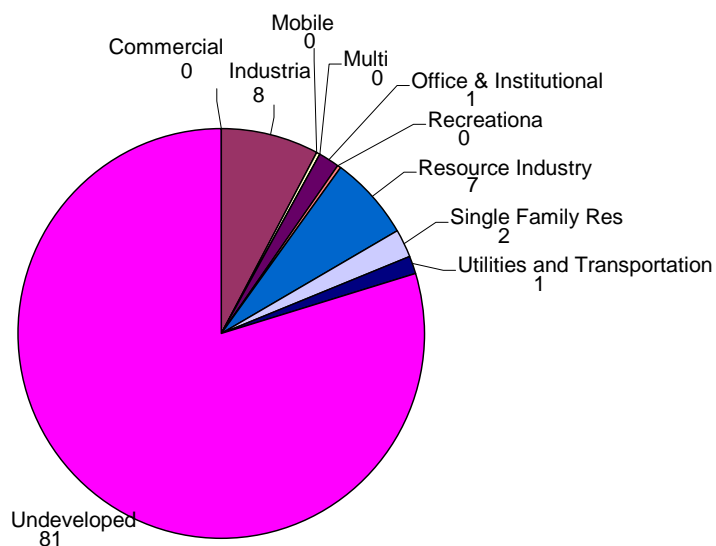
Figure E-14: Land Use - Percent of Total Area in Community Land Class



Rural

The purpose of the Rural class is to provide for areas of low intensity land uses, such as agriculture, forest management, mineral extraction and other traditional agrarian uses. Figure E-15 shows the current mix of uses in this class. This classification discourages the premature conversion of these lands into urban-type uses and the subsequent loss of resource production. Areas classified as rural fall outside of the urban services boundary. Intensive growth is neither planned nor anticipated in this area. 80% of the land in this category is vacant. Industrial uses requiring large acreage tracts may locate in designated Rural areas.

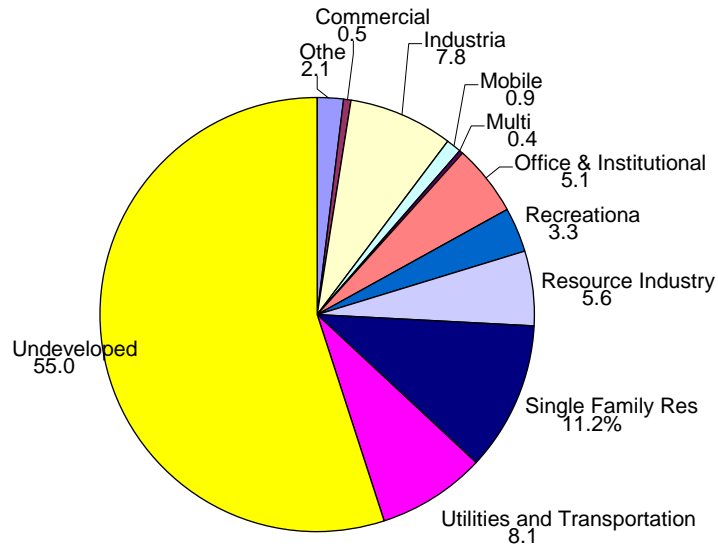
Figure E-15: Land Use - Percent of Total Area in Rural Land Class



Conservation

The conservation class contains the second highest amount of land in Wilmington and New Hanover County and the largest amount of undeveloped land. Figure E-16 shows the mix of uses in the Conservation land class.

Figure E-16 Land Use: Percent of Total Area in Conservation Land Class



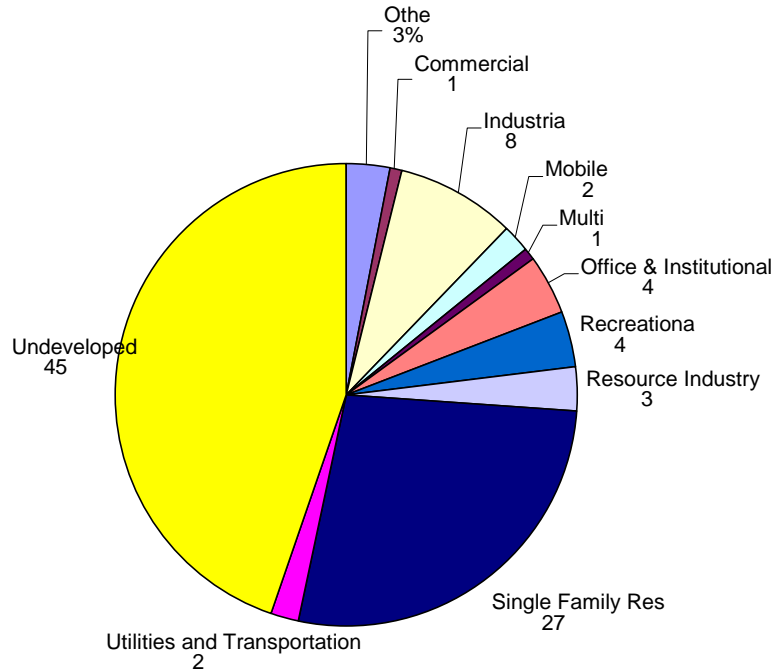
Although some areas of Conservation fall within the Urban Services Boundary, density and impervious surface standards are in effect to protect water quality in nearby waterways and limit the exposure of citizens to flood hazards. Conservation areas along the tidal creek system are approaching their build out capacity. Continued residential development along the waterways will occur within the Urban Services Boundary in accordance with building and floodplain management guidelines.

Resource Protection

More land in New Hanover County and Wilmington is classified as Resource Protection than any other single classification. There is more vacant land remaining in the resource protection classification than any other class. Figure E-17 shows the mix of current land uses in this class.

The urban services boundary has been extended into some of the resource protection areas to accommodate projected future growth in these areas. New plan policies for exceptional development will aid in protecting sensitive resources while allowing development as services become available. Capital facility planning for extension of utilities has accounted for projected growth in these areas. However, delays in permitting for an expansion to the City/County north side wastewater treatment plant may slow growth in Resource Protection areas north of Wilmington.

Figure E-17 Land Use: Percent of Total Area in Resource Protection Land Class



Carrying Capacity Summary

Based on current policy in the City and County, the necessary infrastructure expansion and improvements that will be necessary based on projected future population in each land classification will not be a limiting factor. The following best summarizes this evaluation:

- Current policy is to provide sewer to all development within the county;
- Sewer capacity is not the limiting factor with build-out carrying capacity;
- Primary carrying capacity issue is built-out impervious surface area and associated pressure on water quality.

The impervious surface build-out potential and density build-out potential for each land classification is summarized in Figure E-18

Figure E-18: Summary Holding Capacity Analysis by Land Classification

Land Class	Parcels in Class	Total Acres in Class	Acres Developed	Percent Developed (Area)	Potential Future Developed (Acres)	Estimated Impervious Area (Percent)	Potential Impervious Area (%)	Estimated Current Population	Estimated density (persons per square mile)	2020 Growth Projection	Projected Build Out Population	Projected Density (persons per square mile)
Urban	33699	23322	17092	73.3%	6230	13.4%	31.7%	70227	1927	94188	95826	2630
Transition	4842	7315	3944	53.9%	3370	9.1%	26.0%	7715	675	10348	14308	1252
Community	835	1876	1084	57.8%	792	6.7%	18.3%	1762	601	2363	3049	1040
Rural	111	4276	864	0.0%	3411	5.0%	29.7%	113	17	151	557	83
Conservation	6598	23620	10634	45.0%	12986	10.5%	33.9%	14882	403	19959	33054	896
Resource Protection	33236	40386	22284	55.2%	18103	8.9%	25.0%	61497	975	82480	111455	1766
Total	79321	100794	55902	55.5%	44893	9.3%	28.8%	156195	992	209489	258249	1640

* impervious surface ratios from GIS sample data for listed land use category
 ** population growth based on assumed rapid growth rate based on historical growth patterns
 *** estimated current population based on average household size for unincorporated county

SECTION F: Natural Resources

INTRODUCTION

The purpose of this technical report is to describe the environmental resources and constraints that will be instrumental in shaping the direction, type and rate of growth in the City of Wilmington and New Hanover County. This report examines water resources, sensitive areas, natural and cultural resource areas, hazard areas, soils, air quality, and resource potential areas.

WATER RESOURCES

The New Hanover County Water System is a groundwater system which pumps water up from the Pee Dee, Castle Hayne, and other superficial aquifers, utilizing twenty-one wells located throughout the northern end of the county. Water is stored in four water towers with a combined storage capacity of 1,850,000 gallons. The system primarily serves the northern part of the county. Wilmington residents and certain residents in the unincorporated county are presently served by a municipally owned and operated water system utilizing raw surface water from the Cape Fear River pumped from just above Lock and Dam #1 at the Kings Bluff Pumping Station.

Water resources in the County can be broken down into groundwater and surface water systems, although it is important to note that water moves with limited restrictions between the two systems. Approximately 53% of the population of New Hanover County receives their water supply from groundwater and 47% receive their water from the Cape Fear River. The County report, "*Drinking Water in New Hanover County*" (1989), summarizes the various water systems currently utilized by county residents and examines some of the factors associated with possible implementation of a county-wide water system.

Groundwater

Physical Characteristics

The County's fresh groundwater system consists primarily of a near-surface, unconfined aquifer and two deeper, confined aquifers. The unconfined aquifer is generally sandy and wells exposed to it range in depth from approximately 20 to 75 feet. The two deeper confined aquifers are composed of limestone and sandstone, respectively. Wells exposed to these aquifers range in depth from about 75 to 200 feet.

Yield and Hydraulic Characteristics

Wells deeper than 200 feet will usually yield brackish water. These confined aquifers slope southeastward from where they approach the surface in the Castle Hayne and Wrightsboro areas and extend in the subsurface to a maximum depth of 200 feet along the coast. The degree of connectivity between all of these aquifers varies considerably.

Very little information is available on the attributes of the near surface, unconfined aquifer. As a general rule, the water yield from a shallow well is sufficient to supply a single family residence on a 1/3

acre lot. However, in the industrial corridor along Highway 421, where the unconfined aquifer is thick and composed of coarse-grained sand, a large well can produce 200 to 600 gallons per minute (*gpm*) on a 24-hour sustained yield. Due to its shallow depth and highly transmissive nature, this aquifer is extremely vulnerable to pollution.

The confined aquifers are the principally-used aquifers in the County. Estimates by the N.C. Department of Environmental Management, Groundwater Section indicate that approximately 71.7 MGD of groundwater *could* be available on a continually sustained basis for the entire County. Sustained yield in any one area may be between 200,000 to 2,000,000 gpd per square mile.

A “*Groundwater Field Evaluation Report*” to the New Hanover County Groundwater Task Force in December, 1996 estimated that a water supply of 23 MGD is readily available from the Pee Dee and Castle Hayne aquifers in the mid-county area.

Although the amount of groundwater utilized across New Hanover County has not been documented since 1980, a shift in usage has occurred and should be noted. As a result of annexations, many residential areas formerly relying on private groundwater systems are now being served by City surface water systems. In addition, the continued development of the beach communities, new golf course projects, new lawn irrigation systems, and new commercial centers are in many cases increasing the demand for groundwater. The extent of these changes and the total amount of groundwater being used is not available to date.

It is estimated that the groundwater aquifer system could theoretically support a maximum population of approximately 441,000 (“*Drinking Water in New Hanover County*”, 1989), based upon an average per capita use of approximately 140 gallons per day and some estimates from 1980 usage figures. However, it is unlikely that the groundwater aquifer alone could support a population of this size, as the withdrawals and resultant aquifer drawdown would result in problems with lateral saltwater intrusion, sinkhole development, and increased iron and total hardness. Coastal areas to the north of New Hanover County are experiencing declining aquifer levels and increased saltwater intrusion into the aquifer prompting the State to activate Capacity Use Area Rules to regulate water use through permits to avoid depletion of groundwater resources and to maintain the availability of those sources of water indefinitely

Groundwater Quality

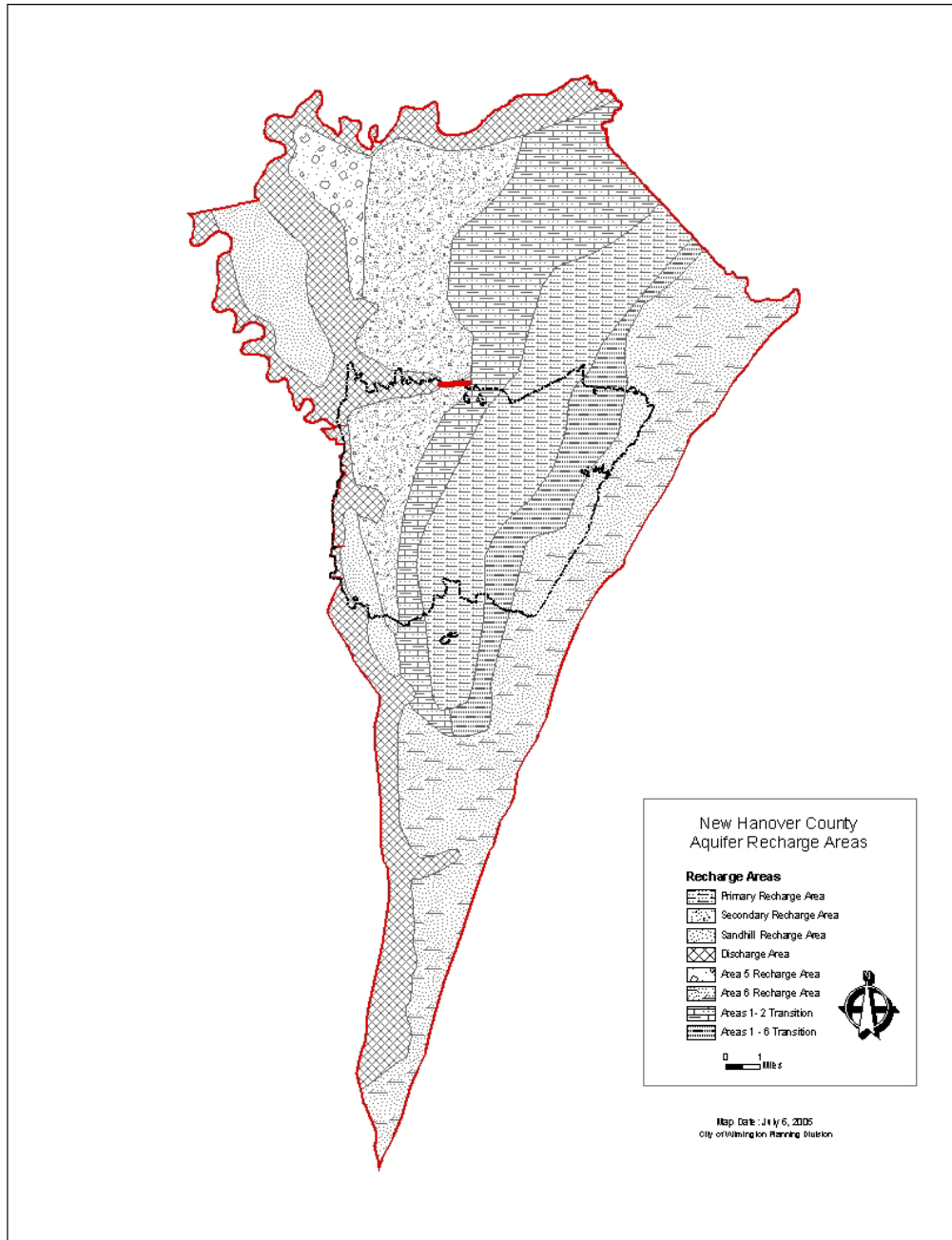
Presently, the groundwater system is still relatively free of pollution, but there are a growing number of incidents of contamination. As of March 2005, a total of 462 documented contamination incidents existed. The NCDENR Aquifer Protection Section reported 223 incidents, and the NCDENR Underground Storage Tank had recorded 239 incidents. This total represents a decrease in the total number of incidents reported in the 1999 version of this report, due to some of the incident cases being closed or cleaned up. It also displays a 25% decrease in the number of Underground Storage Tank contamination incidents. These sites are located throughout the county but are somewhat more abundant in the industrial sectors of the county which are adjacent to the Cape Fear and Northeast Cape Fear Rivers.

The aquifer in the Flemington area along Hwy. 421 became polluted from an old landfill site, resulting in the County’s provision of a small 280,000 gpd water system. A well-monitoring system has been established for this area to determine the extent of groundwater impacts. Another area along Castle Hayne Road in the Wrightsboro Community was also recently found to be contaminated by fuel leaking from tanks at a nearby service station. The wells in this area are being monitored and the affected homes are being connected to the County’s water system.

The natural quality of the near-surface, unconfined aquifer system is extremely variable. Generally, it is characterized by the presence of iron, carbon dioxide and sodium, resulting in an acidic, soft, and slightly corrosive water quality. Iron content can range from none to high. The deep, confined aquifers are characterized by the presence of calcium bicarbonate, resulting in a typically hard quality of water, with an alkaline pH.

The unconfined aquifer is recharged by rainfall. In turn, water in the shallow aquifer eventually moves down into the deep aquifer system. The deep aquifer has a primary and a secondary recharge area as shown in Figure F-1. The primary recharge area is where the greatest quantity of recharge takes place. The secondary recharge area, though smaller in area, is more vulnerable to pollution due to its shallow depth. Thus, it has become increasingly important to closely control and monitor development activities within that recharge area.

Figure F-1: Aquifer Recharge Areas



Groundwater Classes

The state has classified all groundwaters for purposes of monitoring and regulation. The different classes are defined in terms of depth, salinity, and best possible use. The classes in New Hanover County include the following:

GA - These waters can be best used for drinking and food preparation without treatment, except that necessary to correct naturally occurring conditions. They have a chloride content less than 250 milligrams per liter (*mg/l*) and begin at the top of the near-surface water table, generally at depths of about 10 feet.

GSA - These waters are similar to GA waters except that they have a chloride concentration greater than 250 mg/l and cannot be used for drinking without reduction of salinity.

GC - This class includes those groundwaters that do not meet quality criteria of FA or GSA waters and for which efforts to restore these waters to a higher classification, while still in place, would not be feasible or in the best interest of the public.

The North Carolina Department of Environment and Natural Resources has developed extensive standards for regulating pollution of these different water classes. These water quality standards deal with maximum allowable concentrations of heavy minerals, bacteria, and synthetic organic compounds. The regulations do allow some degradation of the groundwater resources; however, degradation is not allowed beyond either established compliance boundaries or property boundaries. It is the intent of the regulations to preserve the quality of the groundwater and allow no degradation of any class below the standards established for that class.

Cape Fear River

The Cape Fear River basin is the largest in the state, covering approximately 9,322 square miles. There are 26 counties and 116 municipalities located fully or partially within the basin. Major industries include textiles, chemical manufacturing, silviculture, and agriculture. While over half of the river basin is forested, the last decade has found the amount of developed land steadily increasing while the amount of cropland has been on the decline. The lower Cape Fear basin also encompasses the most concentrated turkey and hog producing areas in the state, in Sampson and Duplin counties.

Water Use

The City of Wilmington operates a 25 million gallon per day water treatment plant withdrawing water from the Cape Fear River. Raw water is pumped to the plant from above the lock and dams on the river to eliminate the intake of salty water during tidal changes. The City's Sweeney filtration plant, at 407 Hilton Street, originally began service in 1943. The plant operation is a combination of conventional treatment and upflow clarification with ozonation as the primary disinfection method followed by filtration and chlorine disinfection, fluoridation, corrosion control, and pH adjustment. The Sweeney Water Plant receives raw water from the Cape Fear River directly into the ozone contactor where ozone is applied. Upon leaving the contactor, the raw water is then split at the desired rate to either the North Plant or the South Plant.

- The North Plant is the new 10 MGD plant
- The South Plant is the existing 15 MGD plant

Additional raw water is also available to the City from the Lower Cape Fear Water and Sewer Authority.

The City of Wilmington presently uses a conventional multi-step treatment process for purification of its drinking water supply. Raw water is injected with chemicals such as alum and polymers to coagulate mud, silt, and organic matter. Caustic or lime are also added as needed for alkalinity and pH adjustment. Chlorine dioxide is added for disinfection, oxidation, and to assist with control of formation of disinfection by-products. These by-products such as trihalomethanes (THM's) are generated by the addition of chlorine to water containing organic matter. Coagulated water is then mixed and the coagulated material then is allowed to settle before the water is filtered. The water is then adjusted for pH with caustic soda or lime. Fluoride for dental care, a phosphate compound to reduce the water's corrosiveness, and chlorine are added.

River Water Quality

In North Carolina, all named streams have been classified as to their “best usage. This “use support” classification is based upon water chemistry data and involves computing percentages of the values in violation of applicable North Carolina standards. For example, “fully supporting” is defined as standard exceedences less than or equal to 10% of the total observations with the mean of measurements less than the standard.

By comparison, species richness values are calculated for three groups of pollution-intolerant, benthic fauna. These biological classifications generally correspond to the “use support” rankings:

- Poor = not supporting
- Fair = partially supporting
- Good-fair = support threatened
- Good-excellent = supporting

For planning and monitoring purposes, the Cape Fear River Basin is divided into 24 sub-basins. Each is monitored for a variety of quality measures and indicators. For the total Cape Fear River basin “stream miles” (6408 miles), the 2004 DWQ Cape Fear Basin Assessment shows that 71% fully support or are support-threatened, 5% partially support, and 2% do not support their uses (22% were not evaluated).

New Hanover County is drained by three of the 24 Cape Fear sub-basins, specifically numbers 17, 23 and 24. Sub-basins 17 and 24 include the coastal areas, composed of tidal, estuarine waters, as well as the extreme southern portion of the Cape Fear River and streams located inland in New Hanover and Brunswick Counties. Sub-basin 23 occupies the northern end of New Hanover County, north of Wilmington. It also includes portions of Pender, Duplin and Onslow Counties.

According to the **2005 Cape Fear River Basinwide Water Quality Management Plan** the major causes of partially supporting or impaired streams (including sounds and estuaries) in Cape Fear River sub-basins 17, 23 and 24 are multiple nonpoint sources of pollution including agriculture, urban runoff, septic tanks, and marinas. The results from 2004 monitoring efforts are listed in Figure F-2 for the three relevant sub-basins.

Figure F-2: Impaired Waters – Cape Fear River Sub-basins

Sub-basin	% of Waters Impaired in 2004 Sampling		
	Aquatic Life	Shellfish Harvesting	Recreational Use
17	27.5% of estuarine acres	24.8% of estuarine acres	<1% estuarine acres, 20.6% of coastline acres
23	6.8% of stream miles	N/A	Not reported
24	<1% of estuarine acres	59.8% of estuarine acres	0% of estuarine acres

Turbidity in the mainstream of the Cape Fear River exceeds state water quality standards, while turbidity in the blackwater tributaries is very low. In addition to the increased cost of water treatment, turbidity decreases the ability of plants to photosynthesize, it clogs the gills of fish, and fills in creek beds which are home to many juvenile fish and other aquatic organisms.

The Lower Cape Fear River Program

A coalition of industries, municipalities, and educators has evolved to develop a water quality monitoring program for the Lower Cape Fear River. In June of 1995, a broad-scale water sampling program was begun on the Cape Fear River under the auspices of the *Lower Cape Fear River Program (LCFRP)*. UNCW Center for Marine Science Research is overseeing the group and performing the monitoring - collecting water quality data on numerous physical, chemical, and biological parameters. Originally, 16 stations throughout the estuary and the lower Cape Fear River, Black River, and Northeast Cape Fear River were sampled monthly. The number of stations has increased since the program's inception and now stands at 35.

The data is sent to the North Carolina Division of Water Quality where it is entered into the EPA STORET national water quality database. Comprehensive reports are issued to interested parties annually. Current and recent research projects in this watershed include analysis of animal waste lagoon spills, effects of hurricanes and storms on water quality, factors controlling phytoplankton production in the estuary and tributary rivers, factors contributing to BOD loads in the Cape Fear watershed, and the effect of nutrient loading on the biota and metabolism of blackwater streams. In conjunction with the water quality sampling, benthos are analyzed by the UNCW Benthic Ecology Lab and finfish research is carried out by UNCW researcher Dr. Tom Lankford

For 2003-2004, 26 percent of the sampling sites had either poor or fair water quality in terms of fecal coliform bacterial contamination; 51 percent of the sites had poor or fair water quality in terms of dissolved oxygen concentrations; and 26 percent of the sites were impacted by excessive nutrient loading. The LCFRP provides its data to the public without charge on their website (<http://www.uncwil.edu/cmsr/aquaticceology/lcfrp/>).

Wilmington and New Hanover County formed a Watershed Management Advisory Board in 2005 to facilitate the implementation of projects and studies to enhance water quality throughout the County. The Advisory Board's major role will be in formulating, prioritizing, and recommending water quality enhancement projects, as well as monitoring their progress. Projects may include:

- Acquisition of conservation easements and riparian buffer areas
- Constructed water quality enhancements (eg-detention ponds and other drainage controls)
- Development of watershed/stormwater management plans
- Limited dredging projects
- Public education & outreach
- Coordinate water quality monitoring

Priorities for implementation of these enhancement strategies will be established by the Advisory Board based upon the specific objectives and defined needs of each watershed as provided by on-going research and monitoring by the State of North Carolina, the UNCW Center for Marine Science, and other research organizations.

Tidal and Non-Tidal Watershed Monitoring

In 1993 continuing closures of shellfishing waters in New Hanover County led to the initiation of a broad-based tidal creek sampling program. This program began monthly sampling of physical parameters, nutrients, chlorophyll *a*, fecal coliform bacteria, and benthic fauna in Bradley, Futch, Hewletts, Howe, and Pages Creeks. This program was funded initially by New Hanover County, the Northeast New Hanover Conservancy, and UNCW. The research and monitoring work was carried out by scientists from the University of North Carolina at Wilmington’s Center for Marine Science Research (CMSR). A series of annual reports was published by the University detailing water quality in the tidal creeks as well as the results of a number of closely related research projects. This project culminated with the publication of the Four Year Environmental Analysis of New Hanover County Tidal Creeks, 1993-1997. Among other findings, this report detailed some important findings concerning how developed land, particularly land covered by impervious surfaces, increased bacterial pollution of local waterways.

In 1997 the City of Wilmington initiated an agreement with the UNC Wilmington Center for Marine Science Research to conduct a comprehensive water sampling program in watersheds within Wilmington City limits. These watersheds include parts or all of Barnard’s Creek, Bradley Creek, Burnt Mill Creek, Greenfield Lake, Mott’s Creek, Smith Creek, and the Cape Fear River. This project is being carried out as part of the City’s compliance with the EPA Phase II Stormwater Regulations, and comprehensive activities associated with this effort are coordinated by the City of Wilmington Stormwater Services Division. Because several of the watersheds are shared by both jurisdictions the results of the two projects have been combined into a single annual report.

The 2004-2005 report showed that fecal coliform bacterial conditions for the Wilmington City and New Hanover County watersheds system (40 sites) showed 30 percent to be in good condition, 20 percent in fair condition, and 50 percent to be in poor condition. Dissolved oxygen conditions system-wide (54 sites) showed 59 percent of the sites were in good condition, 9 percent wer in fair condition, and 32 percent were in poor condition. The Watersheds/Tidal Creeks Program makes the annual reports available to the public without charge on their website: (<http://www.uncwil.edu/cmsr/aquaticceology/TidalCreeks/Index.htm>).

Fisheries Resources

Water quality constraints strongly influence the intensity and location of future growth. Maintenance of an adequate level of high quality surface water is extremely important to the County’s economy and environment. Finfishing, shellfishing and clean water for recreational activities help support the area’s high quality of life that is enjoyed by both residents and tourists.

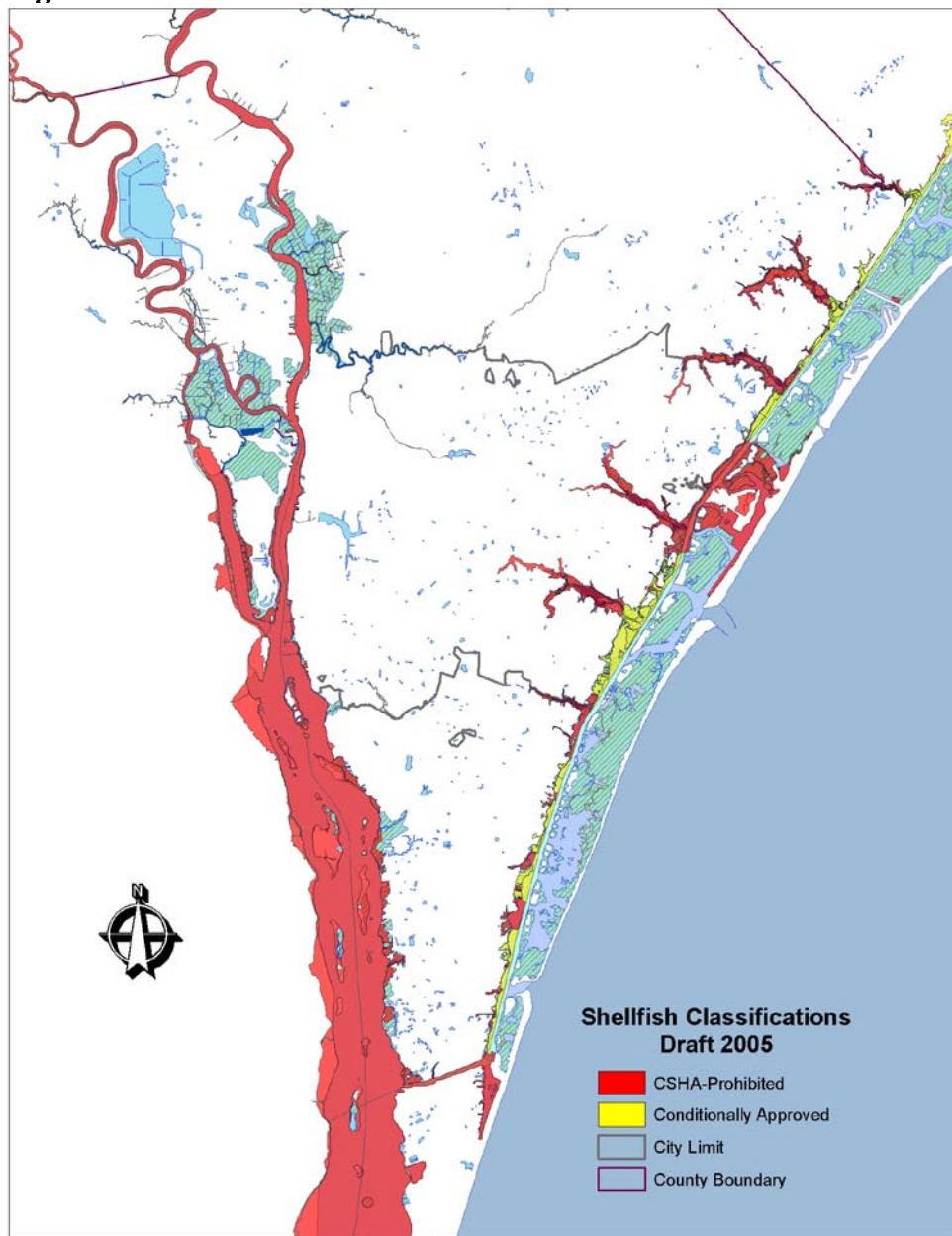
The dockside ex-vessel values (prices paid to fishing vessel captain for the catch) of finfish and shellfish which were reported for New Hanover County from 2000 – 2004 are shown in Figure F-3. Note that these numbers represent landings only (e.g. - the amount which was sold to commercial fish houses) and are therefore extremely conservative. The average amount of finfish and shellfish caught per year is 1,766,467 pounds. The average total price of these fish was \$2,471,863 per year. Ex-vessel values for total price and pounds caught decreased approximately 10% from the previous decade.

Figure F-3: Economic Impact of Fisheries

	2000	2001	2002	2003	2004
Finfish	\$1,294,739	\$1,037,156	\$1,189,951	\$1,211,499	\$996,023
Shellfish	\$1,251,022	\$1,378,766	\$1,435,269	\$1,432,932	\$1,131,962
Total	\$2,545,761	\$2,415,922	\$2,625,220	\$2,644,431	\$2,127,985

Primary Nursery Areas (PNA's) have been designated by the State as being highly suitable habitat for juveniles of marine species. Destruction of these areas, either physically by dredging and filling or by pollution, damages the ecosystem, decreases or eliminates certain economically valuable sport and commercial fishing, and reduces the overall attractiveness of the County and it's adjacent water. Figure F-4 indicates where shellfish beds are closed as a result of pollution. This designation declares it unlawful to possess, sell or take oysters, clams or mussels in these areas. These closed beds are generally near the most developed areas of the waterfront, e.g. near dense subdivisions, marinas, and waste treatment plant outfalls. Note that the extent of closure surrounding marinas is dependent on size and other characteristics of the marina. Historically, once an area has been closed, it is likely that the closure will become permanent. However, the tidal creek research and resulting demonstration project on Futch Creek that led to part of it being reopened is indicative of what can be done.

Figure F-4: Closed Shellfish Areas



Degradation Sources

There are basically three sources of pollution that influence water quality: septic systems, urban runoff, and waste treatment and disposal systems.

Septic systems

Septic system failure can result from septic systems that are inadequately designed, placed in poor soils, or inadequately maintained. The result may be leaching of untreated or partially treated domestic waste into surface waters. Now that more stringent regulations and setbacks are in place governing septic tank installation, the more common causes of septic tank failure are attributed to unsuitable soil conditions and users exceeding the system design capability.

In a 1982 report, “The Impact of Septic Tanks on Shellfish Waters,” the State Shellfish Sanitation Section demonstrated that shellfish beds on New Hanover County creeks tend to become closed if septic system density exceeded one system per seven acres. With the increasing intensity of development this “seven acre” ideal situation is not feasible. However, with improved design and installation, negative environmental impacts of these systems can be mitigated. The development of watershed management plans and additional sewer system construction will help to reduce this problem.

Urban Runoff

Urban runoff pollution is a rather broad term used to describe a number of sources and types of pollution. Urban runoff includes the washing off of petroleum products, animal wastes, and other debris from roads, parking lots and roofs; runoff of lawn pesticides and fertilizer; and the intrusion of large “slugs” of freshwater and sediment-laden water from impervious surfaces which upset the estuarine salinity and turbidity balance. A special case of urban runoff is marina operations that not only involve runoff pollution and intrusion from impervious surfaces, but also petroleum product leakage and wastewater flushing from boats. A number of studies, including the Nationwide Urban Runoff Program (NURP) sponsored by the US Environmental Protection Agency, have shown that urban storm water runoff is a significant contributor to water quality impairment. Approximately 300 miles of streams in the Cape Fear River Basin are thought to be impaired by urban storm water. Greenfield Lake is one of several water bodies identified as being at least partially impaired from urban runoff based on DWQ’s most recent biological monitoring.

Sedimentation is of great concern in the Cape Fear River Basin. It is a widespread nonpoint source-related water quality problem which results from land-disturbing activities. Major types of these activities include agriculture and land-development. Subbasins 17, 23 and 24 of the Lower Cape Fear River and coastal waters have experienced significant increases in land-development and urbanization, contributing to rising sedimentation impacts.

In 1990, the U.S. Environmental Protection Agency (EPA) began requiring that municipalities and most industries apply for a permit for point source storm water discharges to state waters or to municipal separate storm water systems. The intent of the new legislation was to monitor and more closely control pollution impacts associated with storm water discharges. Phase I, initiated in December 1990, requires a NPDES permit for the following:

- municipal storm sewer systems serving populations of 100,000 or more
- for 11 categories of industry
- construction sites that are five acres or more

In November 1999, the EPA initiated Phase II, requiring NPDES permits for the following:

- municipal storm sewer systems serving populations under 100,000 that are located in urbanized areas
- construction sites that are one to five acres

Phase II also provides incentives to industrial facilities covered under Phase I for protecting operations from stormwater exposure.

Municipal and county facilities with certain industrial activities must apply for the permits. In New Hanover County, this includes vehicle maintenance facilities, landfills, wastewater treatment plants, airports, “waste to energy” facilities and certain wastewater sludge disposal facilities.

New Hanover County adopted a Conservation Overlay District (COD) in 1984 as part of the Zoning Ordinance, and was adopted in 1999 by the Wilmington as part of its Zoning Ordinance. This plan is further described below in the section titled, “Sensitive Areas”. The COD regulations can significantly reduce urban runoff pollution by utilizing stormwater retention, buffer strips, setbacks and the preservation of wetlands in their natural state.

Waste Treatment and Disposal Systems

There are two types of treatment and disposal systems: (1) “discharge systems” - those that discharge treated effluent into surface waters (which are regulated by DENR and require a NPDES permit) and are considered to be point source discharge sites; and, (2) “non-discharge systems” -those that disperse treated wastes onto the ground through spray irrigation or into the ground using a subsurface disposal system (private systems are regulated by the County Health Department and public systems are regulated by DENR and require an NPDES permit).

Approximately two-thirds of these systems are from local industries, including several from licensed public utilities and privately operated waste treatment facilities. Approximately one third handles domestic wastes from subdivisions. According to the NC Division of Water Quality, in addition to the 244 NPDES permits in the Cape Fear River Basin, there are an additional 678 permitted stormwater discharges.

Surface Water Quality Classes

The State has classified the water quality of surface water bodies in the County as summarized in the ***Cape Fear River Basinwide Water Quality Plan***. These classes are based upon the “best usage” for each water body, as determined through studies, evaluations and the holding of public hearings to consider the proposed classification schemes. Each class is subject to protection toward maintaining “best usage” and regulation of discharges into the waters. Some waters have multiple supplemental classifications. More details on each class can be found in “Classifications and Water Quality Standards Assigned to the Waters of the Cape Fear River Basin” (1990) by the Division of Environmental Management. The classifications are subject to change.

Fresh Waters:

Class WSIV waters are those that can serve as an alternative source of drinking water for the city, assuming adequate treatment was provided. This class can only be found at one location in the county - Toomer's creek, 0.8 mile upstream of Wilmington's water supply intake. Toomer's Creek is sometimes used as a source of drinking water in emergency situations.

Class WSIII waters are protected as water supplies. These areas are usually found in undeveloped watersheds. Point source discharges of treated wastewater must follow rules of the State surface water standards. In addition, local programs are required to control non-point sources and stormwater discharges of pollution. These waters are suitable for all usage specified by the C classification.

Class B waters are protected for primary recreation which includes swimming on a frequent or organized basis and other uses specified by the C classification.

Class C waters are those areas best used for aquatic life propagation and survival, fishing, wildlife, secondary recreation and agriculture. (Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner)

Tidal Salt Waters:

Class SA waters are best used for commercial shellfishing and other uses specified by SB and SC. Many of the County's SA waters are also classed as Outstanding Resource Waters, described below.

Class SB waters are best used for primary recreation and other uses specified by the SC class.

Class SC waters are best used for aquatic life propagation and survival, fishing, wildlife, and secondary recreation. All saltwaters at a minimum are classified as SC. Note that shellfishing is not allowed in Class SC waters.

Supplemental Classes:

Swamp waters (Sw) are waters that have low velocities and other natural characteristics which are different from adjacent streams.

High Quality Waters (HQs) are waters which are rated as excellent based on biological and physical or chemical characteristics through Division of Environmental Management monitoring or special studies. This class includes, native and special trout waters (and their tributaries), some Primary Nursery Area's and other functional nursery areas, critical habitat areas, special water supply watersheds and all class SA waters.

Outstanding Resource Waters (ORW) are unique and special waters of exceptional state or national, recreational or ecological significance which require special protection to maintain existing areas. This designation, which applies to many SA waters in the County, requires that new development within 575 feet of the waters meet coastal stormwater management regulations as specified by DEM. For example, the built-upon area for development within this 575 foot area is limited to 25% of the parcel. The ORW designation also prohibits new or expanded discharges and new or expanded marinas. Also, additional stormwater control and land development restrictions may apply to areas with this classification.

SENSITIVE AREAS

Sensitive areas in the County cover a wide range of environmental resources, some of which have been briefly mentioned in previous sections of this report. There are County, State and Federal levels of classification and regulation schemes which apply to the sensitive and hazard areas described below. Note that there is considerable overlap of the resource areas regulated by each level of government and some areas may fall under the auspices of all three.

For example; a parcel of marsh may lie in an area described and mapped as part of the County's "Conservation Overlay District" and thus be protected from certain levels of development. It may also be positioned along the estuarine system, thus designating it as part of the State's Coastal Wetlands Area of Environmental Concern (AECs) and eligible for protection under the Coastal Area Management Act (CAMA) regulations. And finally, the parcel may be defined as a "404" Wetland and be protected by Section 404 of the Federal Clean Water Act from being dredged or filled.

Local regulations may be more stringent than federal regulations, but in all cases the strictest regulations imposed on an area apply.

City and County Classifications

The County Zoning Ordinance and the City Land Development Code established a Conservation Overlay District (COD) designation to help protect sensitive areas through required preservation of the conservation resource, as well as requiring setbacks, vegetated buffers and stormwater runoff performance measures. Setback distances range from 25 to 100 feet, depending on the COD classification. The sensitive areas have been mapped on aerial photos and transparencies at a scale of 1" = 400'. The map areas within the City limits have been digitized for use in GIS applications. The COD includes the following areas, referred to as Conservation Resources in the Ordinances. These resources are more fully described in the County Planning Report, "Conservation Resources in New Hanover County," prepared in 1984 by wetlands consultant David Dumond.

Swamp Forests

Swamp forest communities occur along all major and many minor freshwater streams and rivers of the County. Swamp forests are also associated with pocosins located at heads of streams. Much of the swamp forest is subject to tidal influence. The major tracts of swamp forest are along the Northeast Cape Fear River and its tributaries.

Swamp forests generally have a highly organic soil. Characteristic tree species include cypress, red maple, black gum, sweet gum, and swamp chestnut oak.

Pocosins

Pocosins, meaning "pond on a hill", make up the greatest acreage of any natural vegetation in the County. Pocosins include Carolina Bays, transition areas between swamp forests and upland areas, and any other broad, level terrain where water is perched. Although the soil type may vary considerably, the County has expressed concern for those pocosins overlying highly organic soils.

Pocosin vegetation usually consists of a scattered or diffuse canopy of pond or longleaf pine and a varied inventory of largely evergreen shrubs and briers, including fetter bush, several species of hollies and bays, and others. Venus fly traps and pitcher plants may be found in pocosins.

Savannahs

Savannahs, relatively rare in the County, are characterized by longleaf pine and wire grass. Periodic fires are instrumental in preventing this vegetation type from becoming pocosin. Venus fly traps, pitcher plants, orchids, and other relatively rare herbaceous plants are associated with savannahs.

Ponds

Natural ponds are found throughout the County, usually where underlying marl has dissolved and the surface has slumped into the water table. Often less than an acre in size, they contain rare and diverse combinations of plants. Some County ponds contain loose water milfoil and dwarf bladderwort, both listed as threatened species in North Carolina. These natural ponds are exceedingly sensitive and vulnerable to impacts from recreational vehicle use and indiscriminate drainage and filling.

Freshwater Marsh

Freshwater marshes occurs along the Northeast Cape Fear River and its tributaries and is associated with natural ponds. This type of marsh is characterized by pickerelweed, cattails, water willow, and other relatively salt intolerant species.

Brackish Marsh

Brackish marshes intergrade between freshwater and saltwater marshes. They include most of the Cape Fear River marshes from Ness Creek south to Snow's Cut and are dominant at the headwaters of generally saline creeks such as Hewlett's and Whiskey Creeks. The characteristic species, in rough order of decreasing salinity preference, are black needlerush, sawgrass, giant cordgrass, cattails, tearthumbs, and others. Brackish marsh also encompasses the old rice fields north and west of Wilmington that were cultivated in the 1700s and 1800s.

Barrier Island-Beach Complex

The barrier island-beach complex represents the linear shoreline islands fronting the Atlantic Ocean. They are composed of unconsolidated sand, and therefore, are unstable and vulnerable to hurricanes and natural erosion processes. Vegetation is generally sparse, consisting of such grass species as sea oats, beach grass, and coarse panic grass on the seaward dunes. Scattered woody vegetation, including yaupon holly, wax myrtle, and red cedar, may be found in more sheltered areas further back from the ocean.

Barrier island-beach complexes include Zeke's Island (1,165 acres in Brunswick and New Hanover Counties), and Masonboro Island (5,097 acres in New Hanover County), which are part of the North Carolina National Estuarine Research Reserve Program, the beach area south of Kure Beach, and Figure Eight Island. Zeke's Island is technically part of Brunswick County but is more accessible from New Hanover County.

The North Carolina Natural Heritage Trust Fund was established in 1987 to allow state agencies and non-profit organizations to purchase property for conservation purposes. Masonboro Island is a prime example of such an area. The State, which owns 90% of the island, has spent millions of dollars preserving it. It is the longest strip of undeveloped beach south of Cape Lookout.

Maritime Shrub Thickets

These thickets of shrubby vegetation are characterized by an alternately wet and dry environment, subject both to storm and spring high tides and to salt spray. The typical species is wax myrtle, with some silverling, loblolly pine, yaupon holly, and live oak. These thickets also contain the northernmost extensions of the natural range of cabbage palm.

Salt Marsh

Salt marsh occurs in the regularly saltwater flooded muck soils of estuarine streams and behind barrier islands. These well documented productive systems are characterized by smooth cordgrass, saltmeadow cordgrass, salt grass, and other salt tolerant species.

Primary Nursery Areas

Primary Nursery Areas (PNA) are areas which include primary, secondary and special secondary areas that are important for initial post-larval and juvenile development of finfish and crustaceans. They are found in the uppermost reaches of the estuaries. Division of Marine Fisheries (DMF) marks these locations by posting signs at the downstream boundaries.

State Classifications

Due to the sensitive nature of the coastal region, the 1974 Coastal Areas Management Act (CAMA) directed the Coastal Resources Commission to involve local governments in preparing planning guidelines for each coastal county. The local governments are required to identify and designate "Areas of Environmental Concern" (AEC's) in order to control land disturbance that might cause irreversible damage to property, public health and the natural environment. CAMA permits are required to develop or build within these areas and specific guidelines apply to each category. There are four categories of AEC, as described below. These are the Estuarine System, Ocean Hazard System, Public Water Supplies, and Natural and Cultural Resource Areas.

Estuarine System

The Estuarine System is a complex, highly productive biotic system that contributes enormous social, economic, and biological values to North Carolina. Any project in the Coastal Wetland, Estuarine Waters or Public Trust Areas that requires a CAMA permit must meet certain standards, as officially stated in Title 15, Subchapter 7H, Section .0208 of the N.C. Administrative Code.

Coastal Wetlands - These wetlands include any marsh subject to regular or occasional tidal flooding. They have tremendous value in contributing vegetative material to the food chain, filtering pollutants, trapping sediment, providing nursery areas to some marine life, and serve to reduce flooding and shoreline erosion.

Estuarine Waters - These are the sounds and creeks that serve as the bonding element of the entire estuarine system, supporting finfish and shellfish populations. These waters transport nutrients and plankton, control salinity and cleanse the estuarine system of pollutants. Estuarine Waters also support boating, swimming, hunting, fishing, and other human activities.

Public Trust Areas - These include waters of the Atlantic Ocean under State jurisdiction and the lands under the ocean and estuarine waters. These areas hold valuable resources and are open by right to the public for recreation, navigation, and other activities.

Estuarine Shorelines - Estuarine shorelines include the area 75 feet landward of *Estuarine Waters*. This area is important because of its vulnerability to flooding and erosion and the impacts of shoreline development activities on the estuarine system. Within this area impervious surfaces are limited to less than 30 percent of the lot area unless the project uses innovative designs demonstrating equal or greater protection. In areas that lie adjacent to ORW's, development activities are restricted within 575 feet of the water.

Ocean Hazard System

These areas are described in detail in the section below titled HAZARD AREAS.

Public Water Supplies

Small surface water supply watersheds are designated for possible use as public water supplies. Toomer's Creek, as previously discussed, has been classified as WSIII by the Division of Environmental Management for this purpose.

Natural Heritage Resource Areas

The Natural Heritage Resource Areas include complex natural areas, areas that sustain remnant species, unique geologic formations, and significant historic architectural structures. These AEC's are important to the entire state because of their role in maintaining the coastal ecosystem, value for scientific research and education, historic significance, and/ or aesthetic value. This class of sensitive area includes important breeding animal locations (four sites), important animal and plant species locations (14 sites), potential natural areas (14 sites), and important community complexes (12 sites). Figure F-5 is a map of natural heritage areas and rare species occurrences in New Hanover County. This map shows the location of Dedicated Nature Preserves, Registered Heritage Areas, Managed Areas (public lands and private nature preserves that are of conservation interest), and Natural Heritage Element Occurrences (rare plants and animals, natural communities and animal assemblages).

Significant Historical, Archaeological, and Architectural Sites

The County has hundreds of historical and archaeological sites where either Native Americans or early settlers left evidence of their existence. Based on information provided by the North Carolina Department of Archives and History, 25 have been designated as significant. These sites tend to be located along the streams and rivers of the County. Such areas of special significance can be nominated as "Areas of Environmental Concern" (AEC's) as described by the Coastal Area Management Act (CAMA). If the site is designated as an AEC, the Coastal Resources Commission will either adopt a management plan or use standards that apply to the site in order to preserve and protect the resource.

The architectural resources of unincorporated New Hanover County plus Wrightsville, Carolina and Kure Beaches have been inventoried. Of those 197 structures which were examined, 143 have been judged to be historically and/or architecturally significant. These have been described and photographed in the publication "Historic Architecture of New Hanover County, North Carolina" (1986), which is available for purchase from the County Planning Department. Two structures, Mt. Lebanon Chapel and the Bradley-Latimer Summer Home, are listed on the National Register of Historic Places. The Masonboro Sound Historic District is still under consideration for National Register listing.

Figure F-6 is a map of the historic resources and historic districts within the county.

Figure F-5: New Hanover County Natural Heritage Map

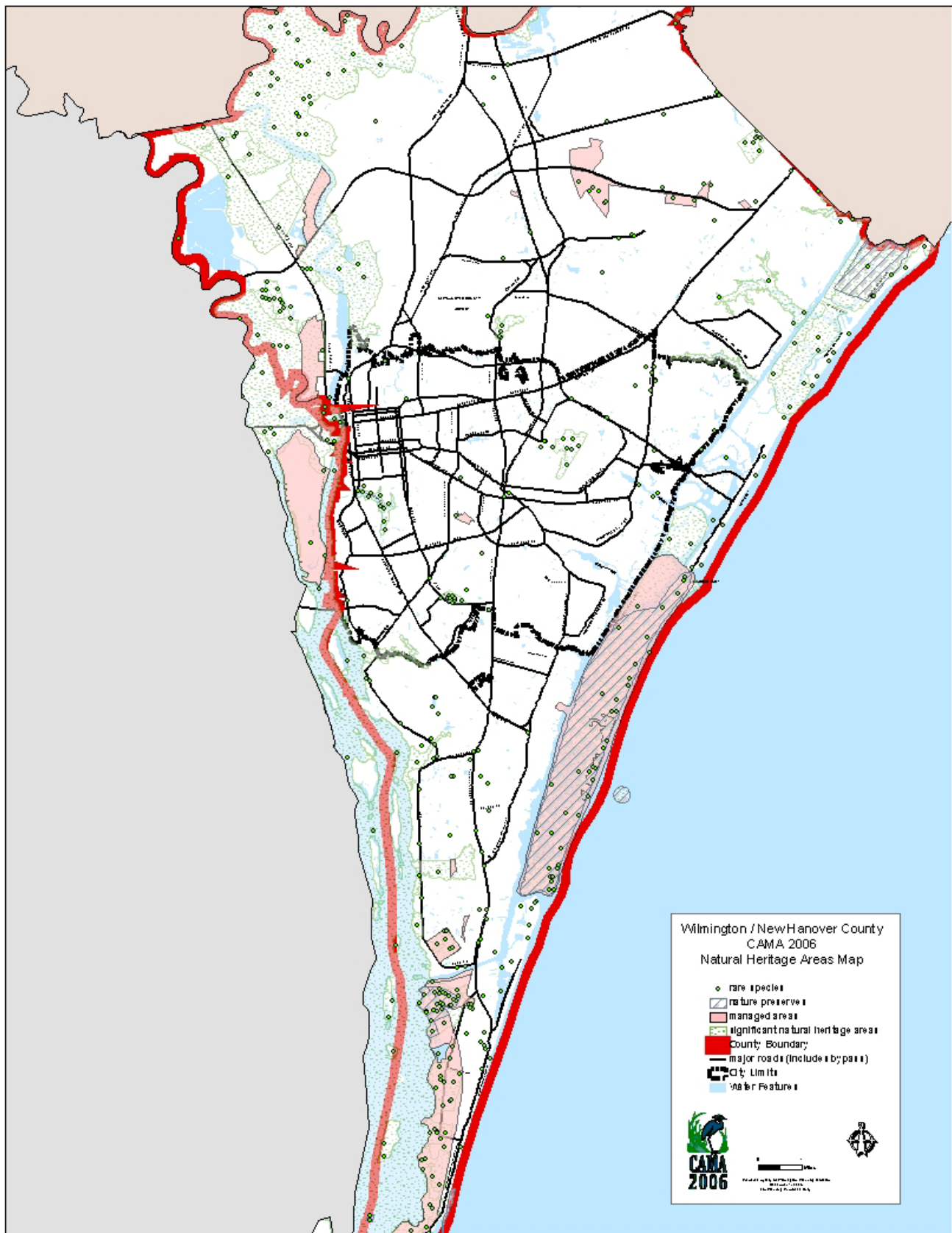
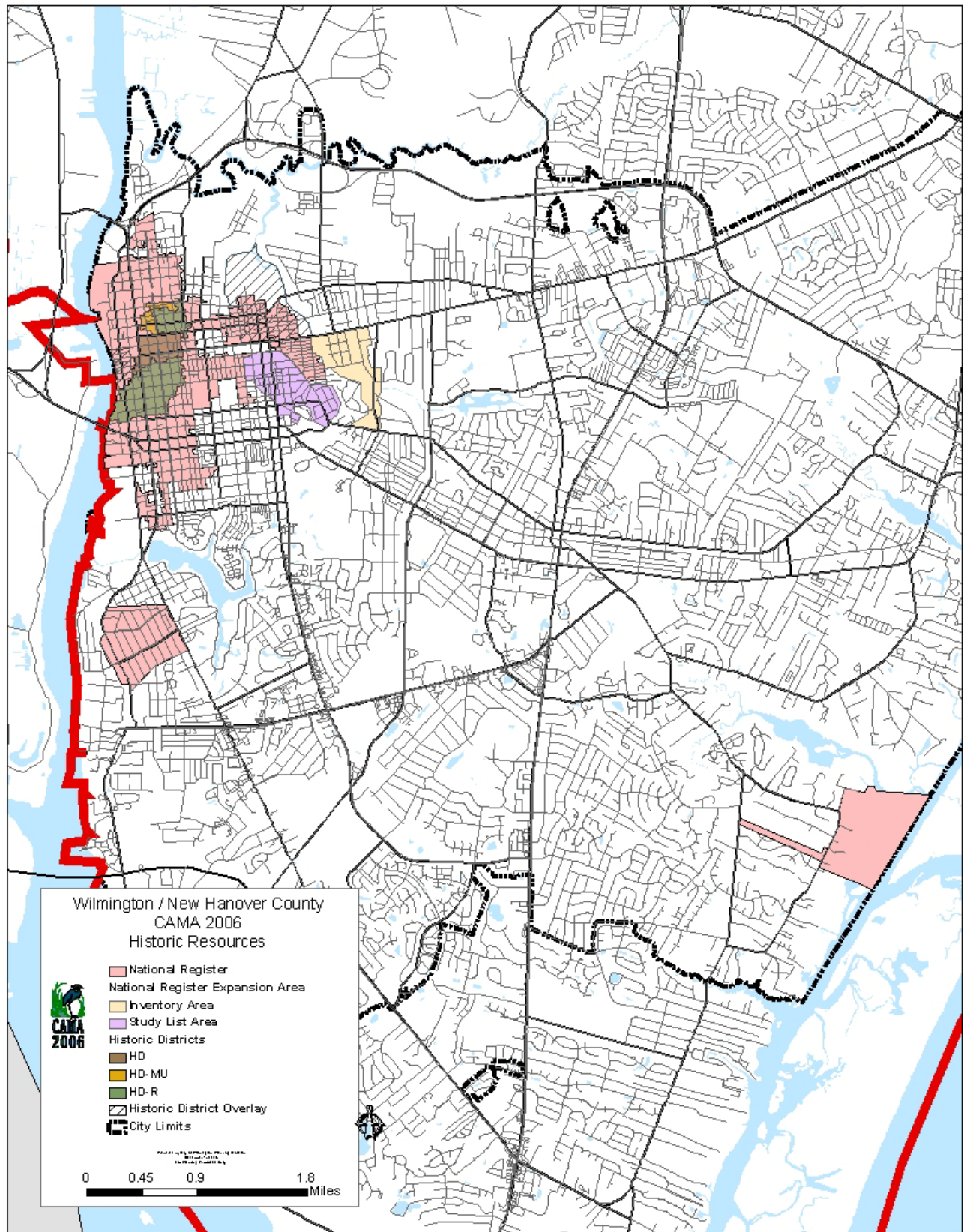


Figure F-6: Wilmington / New Hanover County Historic Resources



Federal Classifications

According to the “Federal Manual for Identifying and Delineating Jurisdictional Wetlands” (1988), an interagency cooperative publication, wetlands can be characterized by three parameters. These are hydrophytic vegetation, hydric soils, and wetland hydrology. This 1988 manual is presently undergoing review. To date, wetland areas that meet these criteria are protected by Section 404 of the Clean Water Act. This Act regulates the filling or disposal of dredge material in waters of the U.S. such as open water areas, mud flats, vegetated shallows and other aquatic habitats.

In New Hanover County, environments protected by Section 404 include salt, brackish and fresh tidal marshes, swamp forests, and pocosins and ponds that are not isolated. These areas can sometimes be developed with certain federal restrictions.

In addition to the three classification schemes described above (e.g. County, State, and Federal), the Natural Resources Conservation Service (NRCS) delineates wetlands on agricultural land in assessing farmer eligibility for agricultural benefit programs, in accordance with the “Swampbuster” provision of the 1985 Food Security Act. The 1996 farm bill underwent a number of policy changes to existing Swampbuster provisions. These allowed farmers to comply with wetland conservation requirements with more flexibility while continuing to protect natural resources.

HAZARD AREAS

Hazard areas are defined as those locations where development should be controlled due to the existence of natural or man-made dangers to human safety. Hazard areas in the county include the Ocean Hazard System, consisting of Ocean Erodible, High Hazard Flood (including estuarine “V” zones) and Inlet Hazard Areas of Environmental concern (AEC’s), Floodplains, New Hanover County Airport, Industrial Hazards, and areas directly impacted by Sea Level Rise.

Ocean Hazard System

The Ocean Hazard System includes those lands along the oceanfront and inlets that are vulnerable to storms, flooding, and erosion. These hazard areas are defined and regulated by the State through the Coastal Area Management Act (CAMA). CAMA standards for development within or adjacent to these areas are designed to minimize loss of life and property due to storms and reduce damage to the natural environment.

Ocean Erodible Areas

This includes the area between mean ocean low water and a distance landward from the first line of vegetation equal to 60 times the natural erosion rate, plus the distance equal to the erosion caused by a 100 year storm. This width varies for different sections of the oceanfront, ranging between about 145 feet to over 700 feet. Within this area, development is regulated.

High Hazard Flood Areas

These areas include lands subject to flooding, wave action, and high velocity water currents caused by a major storm. Any “V-zone” (defined in the section below titled “Floodplains”) located within an oceanfront community as well as any estuarine “V zone” is included in this area. These are shown as “V zones” on flood insurance maps prepared for oceanfront communities by the Federal Insurance Administration.

Inlet Hazard Areas

These areas are delineated on an individual basis depending on an analysis of the stability and migration rate for the inlets. The individual Inlet Hazard Areas range in width from about 250 feet for more stable inlets to about 4,000 feet for the most dynamic inlets.

Floodplains

New Hanover County flooding problems are associated with hurricane-induced storm surges and inland flooding in low lying areas with poorly drained soils. In 1978, the City and County both adopted a Floodplain Ordinance regulating development, construction, and use within all areas of special flood hazard. The Ordinances has been amended several times since their adoption.

The City and County floodplain maps have also been revised as recently as April 2006, with the major change being the reclassification of areas along the sounds from **A to V** zones. Floodplains in the County can be generally grouped into the following classes:

V Zone - The V zone is the most hazardous zone. It is defined as those areas which would be flooded by a 100-year storm and would be subject to battering and erosive wave action.

A Zone - The A zone encompasses those areas which would be flooded by a 100 year storm but would not be subject to wave action.

Shaded X Zone - The shaded X zone replaces the B zone and encompasses those areas between the limits of the 100-year flood and 500- year flood.

CBRA Zone is the colloquial name for the area mapped and designated as Coastal Barrier Resources System (CBRS) units. The National Flood Insurance Program does not insure properties in CBRA zones.

In 1990, the County established a Hazard Mitigation Plan to further establish alternative measures to prevent damage from flooding. The Hazard Mitigation Plan has been updated regularly. Participation in the Community Rating System (CRS), as established by the Federal Emergency Management Agency, requires a number of regulatory, public outreach and other measures of flood awareness.

Industrial Hazards

Industrial Hazard areas generally result from the presence of volatile, reactive or toxic chemicals (i.e. hazardous materials) in quantities sufficient to pose fire or health hazards to residences in the event of a fire, spill or release. These hazard areas tend to be concentrated along the Cape Fear and Northeast Cape Fear Rivers, as indicated by the existing land use study. Most major industries have developed plans and procedures in case of emergency.

The transportation of volatile or toxic chemicals can also pose hazards to residences. Major highways and rail lines serve as the primary conduits for these hazards. These highways include U.S. 74-76, U.S. 421 north of Wilmington, I-40, U.S. 17 and 117, and NC 133. The rail line looping through Wilmington also poses a potential risk. In addition, the State port along the Cape Fear River frequently handles and temporarily stores materials which could pose a health hazard to County residents in the event of an accident.

The New Hanover County Department of Emergency Management is the lead agency for the County in support of hazardous materials inventory and Emergency Response Planning in conjunction with the Superfund Amendments and Reauthorization Act (SARA) of 1986. At present, the department has recorded approximately 23 billion pounds of chemicals at 161 business and industrial sites. The Hazardous Material Emergency Response Plan, which is regularly updated, serves as a reference for activating response teams and procedures in case of a disaster. The department of Emergency Management also coordinates the activity of the New Hanover County Hazardous materials and Emergency planning committee, as required by the SARA legislation.

The National Fire Protection Association (NFPA) has established a system of identification of the fire hazards of materials which may present a danger to life and health of individuals exposed to or handling the material under conditions of fire, spill or similar emergency. The system applies to industrial sites, businesses, or institutions that manufacture, process, use, or store bulk amounts of hazardous materials.

The NFPA system identifies the hazards of materials on colorful, diamond-shaped signs that are posted on the exterior of buildings and within view of approaching emergency personnel. The hazards are displayed in terms of 4 categories: health-located on the left with a blue background; flammability-located at the top and center on a red background; reactivity-located on the right on a yellow background; and special hazard located on the bottom and center on a white background. The NFPA system also indicates the degree of severity by a numerical rating that ranges from four (4) indicating severe hazard, to zero (0) indicating no hazard.

Presently, nearly any industrially-zoned area in the County could pose a potential threat depending on the use and association of materials on site. The County, however, attempts to buffer these areas from high density residential areas through transitional zoning of commercial, light industrial, and low density residential uses. Wilmington attempts to provide transitional zoning designations of light industrial or commercial zoned areas. It is important to note that there are also a number of industrial sites across the Cape Fear River and in adjoining counties which utilize hazardous materials and could, in an emergency, pose a potential threat to residents of New Hanover County.

Sea Level Rise

A wide range of potential sea level rise projections have been developed by many respected authorities. Sea level rise may range from 11 to 50 inches by the year 2050, and 30 to 144 inches by the year 2100¹⁸, but will most likely be in the mid range of these estimates due to slower than anticipated temperature increases. An EPA report, *"The Probability of Sea Level Rise,"* estimates that there is a 50% chance that the sea level will rise at least 1 foot by 2050 and 2 feet by 2100.

Potential impacts from sea level rise are numerous and diverse. They include inundation of developable land, increased flooding impacts, increased shoreline erosion, migration and loss of wetlands, and saltwater intrusion into fresh groundwater. The impacts would be significant in the County because much of the County's barrier island and estuarine shorelines are less than 15 feet above sea level.

The range of measures that a local government can take to mitigate sea level rise impacts can be broadly classified as whether the measure attempts to halt the approach of the sea, i.e. "no retreat", or allows the sea to rise and avoid the impacts, i.e. "retreat." "No retreat" measures include construction of levees, sea walls, and revetments to protect the shoreline, development of groins and breakwaters to

¹⁸ Hoffman, J., D. Keyes, and J. Titus. 1983. Projecting Future Sea Level Rise. U.S. GPO No. 055-000-00236-3. Washington, D.C.:

reduce wave energy and trap sand, and other shoreline stabilization measures. “Retreat” measures include such regulations as increased setback distances and building elevations for new construction, policies for purchase of low-lying lands, restriction on reconstruction of damaged structures after severe hurricane damage, and other planning-oriented measures.

SOILS

The suitability of soils for septic systems historically has been a major factor in determining the density of development in New Hanover County. The construction of a county-wide sewer system will eliminate soil suitability for septic systems as a major constraint to development. Although certain highly organic soils may pose construction difficulties, these can often be overcome through certain engineering and land modification practices. Detailed information on County soils may be obtained from a previous Technical Report, prepared as part of the 1981 Land Use Plan Update, called “Classification of Soils in New Hanover County for Septic Tank Suitability”. This report, along with 1”=400’ transparency maps, classifies all soil types with regard to septic system suitability as being either suitable, suitable with moderate limitations, severely limited, or unsuitable. Generally, the more unsuitable soils tend to be found in the flat, wet parts of the County along drainage ways. Additional information on soil types can also be found in the NRCS (formerly Soil Conservation Service) report, “Soil Survey of New Hanover County, North Carolina”, which discusses soil productivity, permeability, and other factors.

AIR QUALITY

The Division of Air Quality monitors compliance with National Ambient Air Quality Standards (NAAQS) in New Hanover County. New Hanover is part of a seven county region which includes Brunswick, Carteret, Columbus, Duplin, Onslow, and Pender Counties. The EPA has established primary and secondary Ambient Air Quality Standards for six criteria air pollutants: total suspended particulate matter (TSP) and particulate matter less than ten micrometers (PM-10), carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide and lead. The Federal Clean Air Act of 1990 states that the primary AAQS must “protect the public health with an adequate margin of safety”, and the secondary standards must “protect the public welfare from known or anticipated adverse effects (aesthetics, crops, architecture, etc.) The primary standards were established, with a margin of safety, considering long term exposures for the most sensitive groups in the general population (i.e., children, senior citizens, people with breathing difficulties). The state of North Carolina has also adopted these standards, with some minor differences.

The DENR Division of Air Quality currently operates three air monitoring systems within the county, and has a total of five within the region. These stations measure particulate matter less than 10 microns in diameter (PM-10) and less than 2.5 microns in diameter (PM-2.5). Such particulates are respirable. In addition to particulates, the stations also measure levels of sulfur dioxide (SO₂), carbon monoxide (CO) and ground-level ozone. In 2004, the most recent year data are available, the Wilmington stations recorded data summarized in Figure F-7.

Figure F-7: Ambient Air Quality - 2004

Measured Substance	Arithmetic Mean	Federal Standard	NC Standard
PM-10	15.0 microns	50 microns	50 microns
PM-2.5	12.51 microns	15 microns	15 microns
SO2	0.0052 ppm	0.03 ppm	0.03 ppm
CO	2.3 ppm (8 hour)	9 ppm (8 hour)	9 ppm (8 hour)
Ozone	0.073 ppm (8 hour)	0.12 ppm (8 hour)	0.12 ppm (8 hour)

In accordance with the Federal 1990 Clean Air Act Amendments, all areas within the state are designated as attainment or non-attainment with respect to the AAQS. Areas that meet the AAQS are designated as attainment. New Hanover County has been designated as an attainment area for all six criteria pollutants. By comparison with other metropolitan areas in the state, New Hanover’s air quality is considered excellent as none of the counties within the region have exceeded any ambient air quality standards.

According to the latest Toxic Air Emissions Inventory and Hazardous Air Pollutants (HAP’s) monitoring data from the EPA, New Hanover County ranks 11th in the state for highest emissions levels of smog and particulates, and 11th for health risks associated with HAP’s. New Hanover County also ranked in the 80% or 90% percentile for worst counties in the US for emissions in 4 of 10 categories and 4 of 4 health risks associated with HAP’s. These values are generated from emissions reports which are subject to change. The inventory included all 202 of the HAPS as specified by the EPA. The most abundant chemicals in New Hanover County in decreasing order are as follows: Hydrochloric acid, methanol, acetic acid, p-xylene, ammonium, toluene, chlorine, N-hexene, formaldehyde, and hydrofluoric acid. Diesel emissions and acrolein are also top contributors to health hazards. The largest emitters in decreasing abundance were: Hoechst Celanese, Progress Energy, Corning, International Paper, Arcadian fertilizer, Paktank, General Electric, B.F. Goodrich, Takeda Chemical, Koch Refining, and Occidental.

It should be noted that in terms of air pollution, New Hanover County has a natural advantage over inland areas. Due to the differential cooling and heating rates of land and water, sea breezes blow air offshore in the evenings and onshore during the day. According to the state’s Air Quality Division, this sea breeze effect provides ample air movement to limit accumulation of airborne toxic chemicals. However, it should be noted that emissions blowing inland from New Hanover County may be contributing to non-attainment of air quality standards in inland areas.

RESOURCE POTENTIAL AREAS

Resource potential areas refer to lands, other than those previously discussed, that are of value to the County in terms of their natural characteristics. They include prime farmland, forestland, mineral sites, and publicly owned land to be used for low intensive outdoor recreation.

Prime Farmland

Prime farmland, as specified by the Governor’s Executive Order No. 96, includes land that has the best combination of physical and chemical characteristics and is available for producing food, feed, forage, fiber, and oil seed crops. These characteristics include the presence of proper climate, soil, and water table conditions for a specified portion of the growing season. These conditions are described in greater detail in U.S. Department of Agriculture Regulations (DR9500-3).

Craven, Norfolk, Onslow, and Wrightsboro soil types found in New Hanover County can meet these conditions. Prime farmland is defined as that which consists of at least one of these soil types, is ten acres or greater in size and is undeveloped. Additional farmland areas sustain farming ventures but do not fall into these particular soil types and are therefore not considered prime farmland.

Note that most of the prime farmland is located in the Castle Hayne area and the northwest part of the County. Additional farmland is located as small tracts distributed across the county. Individually owned agricultural land consisting of at least ten contiguous acres, in actual production, and having produced an average gross agricultural income of at least \$1,000.00 for the past 3 years may qualify for “present use value” for property tax purposes. The property must be in production under a sound management program, as designed by the NCSU Cooperative Extension Service and available to the public.

In the northeast corner of the County, several tracts of Kenansville soil are excellent for the production of peanuts and sweet potatoes and will probably be used for this purpose until ongoing development absorbs these lands. New Hanover County has a few areas of “unique” farmlands devoted to the production of blueberries, a high value crop. The soils where blueberries are grown support wetlands in their natural state. Unless present rules are modified, no more areas can be cleared for blueberry production because the wetlands are protected from destruction.

According to the NRCS 1987-88 “Annual Strategy Plan”, New Hanover County had approximately 6,320 acres of cropland. By 1997, that number had been reduced to approximately 5,000 acres of cropland. The New Hanover Soil and Water Conservation District estimated that the amount of cropland had declined to 1676 acres in 2004. The 2000 summary of Agriculture and Agribusiness by the NC State University reports that approximately \$ 31.5 million was derived from farming and forestry ventures in the County. Of this \$ 31.5 million, food crops, ornamental trees and shrubs, greenhouse crops and outdoor flowers made up 93%, and forestry made up 7% of this total.

Crops grown in the County include corn, wheat, soybeans, oats, hay, tobacco, peas, sweet potatoes, leafy greens, tomatoes, blueberries, strawberries, peaches, grapes and pecans.

Forestry Resources

According to the U.S. Forest Services’ “Forest Statistics for North Carolina (2002),” 52,200 acres of the County’s total 118,106 acres have forest coverage. In 1973, the Forest Service documented that the County had 60,312 acres of coverage, and in 1990 this figure was 49,807. Thus (according to the Forest Service methodology), the County lost 18% of its forest coverage from 1973 to 1990, but recovered 5% between 1990 and 2002. Timberland coverage increased from 49,329 acres in 1990 to 51,800 acres in 2002. The Forest Service defines timberland as “land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, not currently developed for non-forest use, capable of producing 20 cubic feet of industrial wood per acre per year and not withdrawn from timber utilization by legislative action.” The remaining land is classified as productive reserved, meaning that it is not eligible for harvesting.

Of the 51,800 timberland acres: 27,000 are owned by individuals; 19,200 by corporations, and 5500 total by county/municipal, state and federal governments. Individually-owned forestland consisting of at least 20 contiguous acres, in actual production and not part of a farm unit, may qualify for “present use value” for property-tax purposes. The property must be commercially growing trees under a sound management program, as designed by the Forest Service. This service is available to the public and can be obtained by contacting the Division of Forest Resources.

The most abundant forest types are in order of descending abundance; oak-gum cypress, loblolly-short leaf pine, oak-pine, longleaf-slash pine and oak-hickory.

Mineral Resource Sites

The County's major mineral resource sites are along the Northeast Cape Fear River. These limestone deposits support several major cement and crushed stone manufacturing firms. In addition, several small borrow pits are located around the County for mining sand. The need for soil for fill and sand for beach nourishment will increase the importance of these operations.

Public Lands

Public low-intensity, recreational-use lands in the County include several large County and City Parks. Hugh MacRae Park, including an adjoining tract of County property across College Road, is probably the most utilized park facility in the City and County.

As recommended in the County's "Master Plan for Parks, Recreation and Open Space" (February 2006), the County is seeking to increase park acreage through the purchase of additional land. The City has also completed a "Master Plan" which identifies park and open space needs within Wilmington's city limits. A bond referendum has been proposed for May 2006 with much of the funds earmarked for acquisition and development of new park facilities as indicated in these plans.

Several new parks have been opened in the City and County since 1999. These properties include the Castle Hayne Park, Ogden Park, Veteran's Park and Halyburton Park. Properties acquired through the New Hanover County Tidal Creeks Program will complement this inventory and add to the amount of Parkland available for passive recreation. Properties on Futch, Pages, Howe, and Hewletts Creek will be opened in the next ten years.

State facilities and land also include Carolina Beach State Park, Ft. Fisher, the Marine Resources Center, and the undeveloped lands surrounding these facilities in the Federal Point Township. In addition, the existence of a buffer area for the Sunny Point Military Terminal also limits intense development in the Federal Point area.

Masonboro Island and Zeke's Island, perhaps the two most significant low intensity public lands available to the county, are managed as part of the North Carolina National Estuarine Research Reserve Program. These sites have been dedicated as nature preserves through the state's Natural Heritage Program. Both islands provide research and educational opportunities in addition to low-intensity recreational uses.

Wilmington – New Hanover County
2006 CAMA Plan Update



PART III: PLAN FOR THE FUTURE

VISION AND GOALS

VISION

“Wilmington and New Hanover County are rich in history, natural resources, and tradition. These are the characteristics that have formed our way of life and have made the area attractive to those who live and visit here. This way of life has adapted to changing times and to new people of differing ethnic proportion, customs, and background. The natural resources have contributed to the areas economic prosperity and beauty.”

“Our Vision is to continue to adapt to growth as we preserve the values that make our community a great place to live in harmony with the earth and the sea and give our people unique opportunities to make a living.”

“Thus, we combine the legacy of the past with the promise of the future.”

GOALS

Our Way of Life

- Our overall quality of life will be enhanced through the preservation, renovation, and restoration of our neighborhoods.
- We will have parks, greenways, and bike paths that provide recreational opportunities for every citizen.
- Our region will offer outstanding, affordable health care systems and facilities.
- All these elements will continue to make this area a very desirable place to live, work and raise a family.

Government

- There will be cooperation among all government agencies.
- We will defeat crime, drugs, and violence through community-wide commitment and action and coordinated educational, preventive, enforcement, and rehabilitative programs and initiatives.

Infrastructure and Transportation

- Our infrastructure systems will meet the needs of our economy and provide a high level of service to a growing population in a fiscally responsible manner.
- Our highways will meet the appropriate levels of service and scheduled plans will be ahead of anticipated growth patterns.
- There will be an inter-modal transportation system serving our County, State, and Region.

Housing and Economics

- Safe, sanitary and affordable housing will be available to every citizen.
- Business development and diversity will embrace all economic, ethnic, social, and cultural segments of the community.
- We will have grown our economic base and average wages/salaries by growing our high technology, heritage tourism, movie industry, and port industry.

- We will be recognized for our culturally diverse and highly inclusive business community.
- The business and industrial sectors will first look within our community for human resources development.
- Employment and financial opportunities will be provided for all citizens.
- Our historic and commercial districts will flourish and continue to be a hub for economic and cultural activities.

Education

- Our children and their education will be this community's highest priority beginning at the pre-school level.
- Our school system test results will be among the leaders in the state.
- Vocational and technical training alternatives will begin at the middle school level.
- Cape Fear Community College and UNC-Wilmington will continue to grow and offer advanced vocational and post-secondary educational opportunities.

Environment

- We envision that in the year 2025, Wilmington and New Hanover County will be an environmentally clean area with a healthy economy.
- Our natural resources, including our beaches, rivers, sounds, aquifers, natural vegetation, and tree canopy will be preserved and protected.

ISSUES, POLICIES, AND IMPLEMENTATION STRATEGIES

The issues identified in this plan are statements derived from the previous plan as modified by the public input process and represent situations perceived by the public to require attention. Policy statements are general statements that provide direction or guidance in addressing the issue. The implementation strategies are more detailed concrete actions that should be taken to support the policy statements.

SECTION A: Natural Resources

Issue 1: Water Quality

- Degraded water quality has led to a strong community desire for greater protection and enhancement of surface and ground water resources and to bring all coastal water up to the highest quality possible.
- The fact that much of the land of New Hanover County is already built upon – especially within the City limits – means improving water quality will require a focused effort on reducing pollutants from existing developments.

Policies

The City of Wilmington and New Hanover County shall:

- Policy 1.1 Make every effort to prevent further deterioration of estuarine water quality and loss of public trust uses in the creeks and sounds and improve water quality in all surface water bodies so that each water body meets its use designation as determined by the Divisions of Water Quality, Marine Fisheries, Health, and E.P.A.**

Implementation Strategies for Policy 1.1

- 1.1.1 Continue and enhance a regional water quality program to include ocean, river and estuarine water quality monitoring in cooperation with UNCW.
- 1.1.2 Continue to support the Lower Cape Fear River Program and the UNCW Tidal Creeks Program.
- 1.1.3 Identify watershed-specific indicators of water quality degradation and establish baseline measures.
- 1.1.4 Establish water quality improvement goals in cooperation with the Watershed Management Advisory Board, UNCW, and State water quality specialists.
- 1.1.5 Identify and prioritize water quality improvement projects, including wetland and stream restorations, which will improve water quality.
- 1.1.6 Identify and pursue funding sources for priority projects in cooperation with the Watershed Management Advisory Board and non-profit agencies.

Policy 1.2 Maintain water quality levels in all surface water bodies once their use-designation has been achieved.

Implementation Strategies for Policy 1.2

- 1.2.1 Develop an expanded joint City/County water quality monitoring program in coordination with the Watershed Management Advisory Board to include rivers, lakes, streams, and adjacent ocean and estuarine systems.
- 1.2.2 Develop drainage systems and design standards that reflect the natural carrying capacity of the watershed (i.e. -soils, slope, permeability, and other natural features).
- 1.2.3 Develop specific water quality standards and development performance standards for each watershed, to include maximum impervious surface and appropriate BMPs.
- 1.2.4 Develop standards to ensure the retention, acquisition, and management of natural vegetative buffers to preserve, maintain and protect water quality.
- 1.2.5 Update/develop subdivision design standards to protect and improve water quality in sensitive areas.
- 1.2.6 Identify and pursue funding sources for these programs.

Policy 1.3 Ensure the protection of water quality throughout the Cape Fear River Basin and the management and maintenance of drainage within coastal watersheds through the development of countywide water quality / stormwater management programs.

Implementation Strategies for Policy 1.3

- 1.3.1 Establish a County stormwater services department, including addressing Phase II requirements for all unincorporated areas of the County.
- 1.3.2 Seek legislation to require that NCDOT modify its standards for management of runoff to ensure the protection and enhancement of water quality.
- 1.3.3 Develop educational programs and other strategies to deal with point and non-point source impacts on water quality, such as pet waste and other sources.
- 1.3.4 Establish funding mechanisms to support these programs.
- 1.3.5 Request that the State establish less cumbersome procedures to recognize and accept innovative stormwater BMPs.

Policy 1.4 Ensure the protection, preservation and wise use of our natural resources by careful review and consideration of the potentially adverse environmental impacts of development through the creation and implementation of an environmental review process.

Implementation Strategies for Policy 1.4

- 1.4.1 Update City and County development processes and ordinances to incorporate the site inventory requirements as a necessary first step in preparing a site plan application.
- 1.4.2 Prepare guidelines for conducting site inventories.
- 1.4.3 Make data necessary to conduct site inventories readily available to all applicants.
- 1.4.4 Assist applicants with conducting site inventories and preparing site plans that are sensitive to site features.
- 1.4.5 Develop an environmental review process to be conducted by staff as part of the technical review process for all major development projects or any development that requires a land disturbing permit. This process will include:
 - a) guidelines for the evaluation of cumulative impacts on the environment;

- b) guidelines for review of impacts in accordance with goals of wetland avoidance, minimization, compensation, and/or mitigation;
 - c) identification and protection of historical, archaeological, and other conservation resources;
 - d) identification and preservation of protected trees and significant tree clusters;
 - e) guidelines for mitigation of impacts; and
 - f) guidelines for incorporating low impact development techniques into site design.
- 1.4.6 Revise and update development/permit review process to incorporate environmental review as a seamless component.
- 1.4.7 Include new standards to address resource protection, urban design, tree preservation, landscaping and other identified issues.

Policy 1.5 Provide further protection and improvement of water quality through revisions to City and County ordinances that specify standards for water quality, buffers, setbacks, density, impervious surface, and overlay corridors. Such standards should consider estuarine, lake, river and stream water quality; and should build upon existing information, including the Cape Fear Basinwide Plan, and ordinances.

Implementation Strategies for Policy 1.5

- 1.5.1 Develop specific water quality standards and drainage performance standards for each watershed.
- 1.5.2 Revise City and County Code to incorporate standards.

Policy 1.6 Employ stormwater BMP retrofits to mitigate water quality impacts resulting from existing development.

Implementation Strategies for Policy 1.6

- 1.6.1 Develop drainage systems and design standards that reflect the natural carrying capacity of the watershed (i.e.-soils, slope, permeability, and other natural features).
- 1.6.2 Prioritize watersheds and sub-watersheds based on current degree of impervious surfaces and degree of degradation with the most degraded or those most in need of protection receiving the highest priority.
- 1.6.3 Target priority pollutants to identify most appropriate control measures.
- 1.6.4 Identify, evaluate, and prioritize an inventory of retrofit opportunities to reduce or eliminate water quality impacts from stormwater on receiving waters.
- 1.6.5 Identify watershed-specific sources of pollutants to help direct improvement measures.
- 1.6.6 Establish a funding mechanism to support these efforts.
- 1.6.7 Provide incentives for innovative solutions.

Policy 1.7 Continue and expand programs to reduce the effects of existing development on water quality.

Implementation Strategies for Policy 1.7

- 1.7.1 Expand a joint city/county drainage and water quality program to include ocean, river, and estuarine water quality monitoring.
- 1.7.2 Expand educational programs and other strategies to deal with point and non-point source impacts to water quality, such as pet waste and other sources.
- 1.7.3 Continue to support the Lower Cape Fear River Program and the UNCW Tidal Creeks Program.

- 1.7.4 Seek legislation to require that NCDOT modify its standards to ensure the protection and enhancement of water quality.
- 1.7.5 Establish a program for public involvement to identify and acquire buffer land.

Policy 1.8 Continue and expand programs for stream, buffer, wetland and vegetation restoration in and adjacent to areas that have already been developed.

Implementation Strategies for Policy 1.8

- 1.8.1 Identify and prioritize disturbed areas in degraded watersheds that restoration projects might benefit.
- 1.8.2 Cooperate with the Watershed Management Advisory Board and non-profit organizations to identify and pursue funding sources for highest priority restoration projects.
- 1.8.3 Cooperate with New Hanover Soil and Water Conservation District in promoting an urban cost share program for restoration work on individual private properties.

Issue 2: Open Space

- There is strong community desire to preserve remaining natural areas and to provide for the creation of additional public use areas, natural open space, greenways, bike paths, hiking trails, conservation areas, and access to our waterways.

Policies

The City of Wilmington and New Hanover County shall:

Policy 2.1 Ensure the provision and preservation of adequate open space for the continuing enjoyment of residents, for its contribution to the community today and for generations to come, to protect our natural environment and wildlife habitats, and to provide educational and recreational opportunities.

Implementation Strategies for Policy 2.1

- 2.1.1 Develop and implement a comprehensive, joint City – County open space, greenways, and trails master plan.
- 2.1.2 Develop and fund a downtown parks plan to include riverfront parks.
- 2.1.3 Develop a funding program to ensure adequate resources are allocated.
- 2.1.4 Develop public access/boat access area plans.
- 2.1.5 Identify areas of opportunity for open space on the Future Land Use and Land Classification Maps.
- 2.1.6 Revise the development code to differentiate recreational open space requirements from natural area open space requirements.
- 2.1.7 Identify as part of the environmental review process opportunities for preservation of open space in new development projects.
- 2.1.8 Evaluate the development of a transfer of development rights (TDR) program.
- 2.1.9 Seek authorization from the General Assembly for TDR as necessary.

Policy 2.2 Identify and protect greenways as a part of a natural areas master plan and protect these resources or mitigate their loss as part of the development process.

Implementation Strategies for Policy 2.2

- 2.2.1 Identify and prioritize greenways for natural area preservation and passive recreation, particularly along drainageways of the tidal creeks, Smith Creek, and the Cape Fear River along River Road.
- 2.2.2 Identify and secure funding to acquire land and easements along high priority corridors.
- 2.2.3 Develop incentives for private development to dedicate land and or easements to provide key links in the greenway system.
- 2.2.4 Develop guidelines for mitigation.
- 2.2.5 Establish greenway links between adjacent communities.

Policy 2.3 Encourage development patterns that preserve natural areas, buffers, and trees by developing standards for cluster development and other development types that allow greater design flexibility.

Implementation Strategies for Policy 2.3

- 2.3.1 Evaluate mechanisms to include transfer of development rights (TDR), conservation development, and cluster development.
- 2.3.2 Develop guidelines and standards for use of preservation mechanisms.
- 2.3.3 Identify high priority preservation areas during the development review process.
- 2.3.4 Develop awards and incentives programs to encourage use of preservation mechanisms.

Policy 2.4 Identify mechanisms to preserve high quality farmlands and woodlands.

Implementation Strategies for Policy 2.4

- 2.4.1 Inventory high quality farmlands and woodlands.
- 2.4.2 Identify incentives, including transfer of development rights and acquisition opportunities to preserve high priority remnants.

Policy 2.5 Develop a greenway master plan that integrates Airlie Gardens with other parks, open space, and natural areas targeted in a natural areas preservation plan to achieve the following goals: provide public open space; protect water quality, the natural environment, and the coastal landscape; provide educational opportunities; and assure perpetual accessibility for the community.

Implementation Strategies for Policy 2.5

- 2.5.1 Inventory existing natural areas.
- 2.5.2 Develop criteria for natural area preservation.
- 2.5.3 Develop and implement a joint city-county master plan for natural areas preservation in cooperation with the Watershed Management Advisory Board, Downtown Parks Committee, and City and County Parks Departments.
- 2.5.4 Develop a comprehensive open space, greenways, and trails system.
- 2.5.5 Pursue preservation strategies, to include acquisition through grants, bonds, and other mechanisms.
- 2.5.6 Initiate a program to connect communities with greenways.
- 2.5.7 Address preservation of natural areas in the County Master Plan for Parks Recreation and Open Space.

Policy 2.6 Ensure the protection of trees and the provision of adequate landscaping to address urban design and resource protection issues and encourage the use of native vegetation in landscaping through updating of City and County development ordinances and processes and establishment of a joint City-County Tree Advisory Commission.

Implementation Strategies for Policy 2.6

- 2.6.1 Establish a joint City-County Tree Advisory Commission to develop City and County recommendations and ordinances addressing urban design and tree protection.
- 2.6.2 Develop standards that prohibit clear-cutting and allow only clearing of trees necessary for construction activities.
- 2.6.3 Develop guidelines and incentives for use of native vegetation in landscaping.
- 2.6.4 Utilize the UDO Oversight Committee recommendations for revisions to the landscaping and tree protection code to update the County Code.

Policy 2.7 Encourage and support the replacement of trees lost to natural disaster and ensure the protection of significant community trees.

Implementation Strategies for Policy 2.7

- 2.7.1 Establish a heritage tree program to protect species important to the area.
- 2.7.2 Conduct a tree inventory of public properties.
- 2.7.3 Establish a list of locations for trees to be replaced or planted.
- 2.7.4 Identify funding sources to enhance tree maintenance and planting activities.

Policy 2.8 Provide for the protection and development of public shorefront and boat access areas.

Implementation Strategies for Policy 2.8

- 2.8.1 Inventory existing public shorefront and access areas.
- 2.8.2 Develop public access/boat access area plans.
- 2.8.3 Identify and prioritize opportunities for providing additional public shorefront and access areas.
- 2.8.4 Identify funding opportunities for acquisition of priority sites.
- 2.8.5 Aggressively pursue the acquisition of remaining potential access locations.

Policy 2.9 Pursue opportunities for acquisition as a critical strategy in the provision and protection of open space and public spaces.

Implementation Strategies for Policy 2.9

- 2.9.1 Identify priority preservation areas on Future Land Use and Land Classification Maps.
- 2.9.2 Develop a funding program to ensure adequate resources are allocated.

Issue 3: Environmental Protection / Quality of Life

- Preserving and enhancing the special qualities of our coastal environment and its natural resources is an important component of our overall quality of life, and generates sustainable economic growth.

Policies

NATURAL RESOURCES PROTECTION

The City of Wilmington and New Hanover County shall:

- Policy 3.1 Preserve and restore shell fishing to all SA waters and restore the water quality of all non-supporting surface waters to levels necessary to support their *use designations*.**

Implementation Strategies for Policy 3.1

- 3.1.1 Continue and enhance a regional water quality program to include ocean, river and estuarine water quality monitoring in cooperation with UNCW.
- 3.1.2 Continue to support the Lower Cape Fear River Program and the UNCW Tidal Creeks Program.
- 3.1.3 Identify watershed specific indicators of water quality degradation and establish baseline.
- 3.1.4 Establish water quality improvement goals in cooperation with the Watershed Management Advisory Board, UNCW, and State water quality specialists.
- 3.1.5 Identify and prioritize water quality improvement projects, including wetland and stream restoration, which will improve water quality.
- 3.1.6 Identify and pursue funding sources for priority projects in cooperation with the Watershed Management Advisory Board and non-profit agencies.

- Policy 3.2 Protect the Cape Fear River from the cumulative impacts of development by supporting the development and implementation of a Total Maximum Daily Limit (TMDL) to balance impacts from wastewater treatment plant and industrial discharges with upstream point and nonpoint sources of pollutants.**

Implementation Strategies for Policy 3.2

- 3.2.1 Support the protection of the Cape Fear River from the cumulative impacts of development.
- 3.2.2 Track progress on the TMDL currently being developed in cooperation with the Lower Cape Fear River Program and interested stakeholders.
- 3.2.3 Identify and propose non-point source reduction strategies that will relieve pressure on potential future point sources.
- 3.2.4 Support the Lower Cape Fear River Program, Cape Fear River Assembly, Cape Fear Resource, Conservation & Development Council, and the Cape Fear River Basin Modeling Program (NC Div. of Water Quality) in the TMDL development process.
- 3.2.5 Demand the use of best management practices and pursue their implementation for upstream non-point sources of pollution, including agricultural (hog, poultry, etc) and forestry operations.

- 3.2.6 Support a continued moratorium on new or expanded industrial hog farming operations pending a basinwide environmental impact assessment.

Policy 3.3 Protect the Cape Fear River from the cumulative impacts of development by carefully reviewing development plans and enforcing measures to eliminate or mitigate potential impacts from runoff or discharge of sediment, nutrients, and other pollutants to the river.

Implementation Strategies for Policy 3.3

- 3.3.1 Establish development review guidelines which consider cumulative impacts on the River.
- 3.3.2 Develop standards as necessary to address identified resource protection issues.
- 3.3.3 Develop guidelines for mitigation of impacts.

Policy 3.4 Eliminate water pollution resulting from malfunctioning or inadequate septic systems, package treatment plants, and municipal wastewater treatment plants by continuing the phased development, expansion, and upgrades of public sewer systems within the urban services area to address these problems.

Implementation Strategies for Policy 3.4

- 3.4.1 Update/develop subdivision design standards to protect water quality in sensitive areas not currently serviced by public sewer systems.
- 3.4.2 Phase out existing package treatment plants and prohibit new package treatment plants in areas where City / County capacity becomes available.
- 3.4.3 Identify areas currently served by septic systems and package treatment plants that are inadequate, malfunctioning, or exceeding permit requirements.
- 3.4.4 Identify sewer lines and pump stations that have released untreated sewage in the past.
- 3.4.5 Set priorities for extension, repair, or upgrade of sewer lines and facilities and include in capital improvements budgets.
- 3.4.6 Ensure routine inspection, maintenance and repair of all wastewater treatment facilities.

Policy 3.5 Conduct an environmental review to include an analysis of cumulative impact prior to sewer system development or extension.

Implementation Strategies for Policy 3.5

- 3.5.1 Develop specific standards for extension of sewer systems into sensitive areas.
- 3.5.2 Develop guidelines for consideration of cumulative impacts.
- 3.5.3 Develop guidelines for review of impacts in accordance with goals of avoidance, minimization, compensation and/or mitigation.
- 3.5.4 Develop and implement BMPs to minimize impacts to natural resources from utility line placement, maintenance, and repairs.
- 3.5.5 Develop guidelines for mitigation of impacts.

Policy 3.6 Protect surface water quality by allowing only tertiary sewage treatment plants of the highest quality, whose standards of operation provide the greatest measure of water quality protection, to discharge into public surface waters. Prohibit on- or off-site land application of untreated wastewater. Allow land application of dewatered sludge at sites located such that it does not degrade surface waters.

Implementation Strategies for Policy 3.6

- 3.6.1 Inventory and review all existing land application sites.
- 3.6.2 Discontinue any land application in sensitive watersheds.
- 3.6.3 Discontinue any land application of treated or untreated wastewater or byproducts that may result in increased nutrient loading to the receiving water body.
- 3.6.4 Develop specific performance standards for setbacks and natural vegetated buffers to assure assimilation of nutrients and pathogens for any land application site.

Policy 3.7 Ensure the protection of coastal and federally regulated wetlands and exceptional and substantial non-coastal wetlands that have important functional significance through early identification in the development process. Review of development proposals should seek to achieve the hierarchical goals of impact avoidance, minimization, and/or mitigation.

Implementation Strategies for Policy 3.7

- 3.7.1 Identify exceptional and substantial wetlands as resource protection areas on the land classification map.
- 3.7.2 Develop standards for protection of exceptional and substantial wetlands and include them in the Conservation Overlay District ordinance to accomplish goals of wetland avoidance, minimization, or mitigation.
- 3.7.3 Require delineation of wetlands and describe steps taken to protect wetlands prior to site plan development for new projects.
- 3.7.4 Develop standards for low impact development and site planning for projects in conservation, resource protection, coastal wetlands, 404 wetlands or other sensitive areas.
- 3.7.5 Develop and adopt wetland mitigation standards.
- 3.7.6 Utilize existing wetland mitigation funds to help mitigate the loss of wetlands.

Policy 3.8 Ensure the protection of undeveloped barrier and estuarine system islands by prohibiting development, supporting research and passive recreation as their primary uses, and identifying such islands as prime candidates for public acquisition.

Implementation Strategies for Policy 3.8

- 3.8.1 Identify properties on these islands as priority targets for acquisition and protection.
- 3.8.2 Cooperate with non-profit agencies and private landowners to acquire property or conservation easements.
- 3.8.3 Develop partnerships with conservation organizations and private entities sharing the goal of acquiring these islands.
- 3.8.4 Identify and pursue sources of funding.
- 3.8.5 Continue to support efforts for protection of Masonboro Island Estuarine Research Reserve.

Policy 3.9 Carefully control development activities within the 100-year floodplain (1% annual chance floodplain) according to density and impervious surface limits to protect the public safety, reduce the risk of property damage, and provide for the long-term protection and management of these environmentally significant resources. The following standards shall apply:

- a. Limited, exceptionally designed industrial, commercial, and residential development

projects may be allowed within the floodplain only where it can be demonstrated that the project cannot be located out of the floodplain and where adverse impacts to the estuarine system can be shown to be negligible.

- b. Low intensity uses on a site, such as open space and recreation, should be located in areas most susceptible to flooding.
- c. All projects shall comply with hierarchical review standards of impact avoidance, minimization, and mitigation for unavoidable impacts.

Implementation Strategies for Policy 3.9

- 3.9.1 Limit density and impervious surface areas in floodplain as stated elsewhere in this plan.
- 3.9.2 Develop specific performance standards for “*exceptionally designed*” residential, commercial and industrial projects that would be allowed in the floodplain.
- 3.9.3 Develop guidelines for review of impacts in accordance with goals of avoidance, minimization, and mitigation.
- 3.9.4 Incorporate review of exceptionally designed projects into the development review process.
- 3.9.5 Develop guidelines for mitigation of impacts.
- 3.9.6 Identify funding for acquisition of properties in the flood plain that are unsuitable for development.

Policy 3.10 Protect the health of coastal ecosystems by requiring the consideration in all land use decisions and in the development or revision of local plans, capital facilities, services, and ordinances of the *cumulative and secondary impacts* of land use and development, and the limited *carrying capacity* of coastal ecosystems.

Implementation Strategies for Policy 3.10

- 3.10.1 Identify how limited carrying capacity and cumulative and secondary impacts relate to development patterns.
- 3.10.2 Convey results of site inventory review to include identification of historical, archaeological and natural resources to the permitting body.
- 3.10.3 Develop guidelines for the evaluation by the permitting body of cumulative impacts on the community.

Policy 3.11 Allow channel and inlet maintenance projects, including the continued use and development of the Wilmington Harbor and the State Ports, maintenance of the Atlantic Intracoastal Waterway, and beach renourishment projects only where the public trust interest is preserved or enhanced; significant economic or recreational benefits will occur for New Hanover County residents; no significant adverse impacts will occur on shoreline dynamics; and all possible measures to monitor and limit impacts to barrier island and estuarine habitat will be considered and implemented. Support State and Federal channel and inlet maintenance projects.

Implementation Strategies for Policy 3.11

- 3.11.1 Request that the Corps of Engineers implement an integrated regional dredging and renourishment program.
- 3.11.2 Encourage cooperation among the beach towns in prioritizing and balancing local projects.

Policy 3.12 Carefully control development and redevelopment activities within the Watershed Resource Protection and Conservation areas identified on the Land Classification Map to prevent the degradation of water quality in the creeks and sounds, to protect the public health, and to ensure the protection of these vital natural resources by reducing nutrient, pesticide, sediment, and other pollutants. The following standards shall apply

- a. Impervious surface coverage shall be limited to twenty-five percent (25%) in the Watershed Resource Protection and Conservation areas.
- b. Projects that conform to adopted exceptional design standards for enhanced stormwater controls may exceed 25% in the Watershed Resource Protection areas.
- c. Natural vegetative buffers shall be established to effectively filter runoff before it enters surface waters.

Implementation Strategies for Policy 3.12

- 3.12.1 Identify Watershed Resource Protection areas and Conservation areas on the Land Classification map.
- 3.12.2 Revise standards for exceptionally designed residential projects to be applied to impervious surface limits.
- 3.12.3 Develop exceptional design standards for commercial projects that allow exceeding the impervious surface limit in the Watershed Resource Protection areas.
- 3.12.4 Develop exceptional design standards for redevelopment projects allowing the same or greater impervious surface coverage on the lot as exists in Conservation and Watershed Resource Protection areas.
- 3.12.5 Implement the 25% impervious surface cover threshold for commercial and redevelopment projects once exceptionally designed project standards have been developed.
- 3.12.6 Develop standards to relax height limits in Resource Protection areas.
- 3.12.7 Revise City and County Code to incorporate standards.
- 3.12.8 Develop specific water quality standards and development performance standards for each watershed, to include maximum impervious surface, buffers, permeable paving, reduced parking surfaces, and others.
- 3.12.9 Update/develop subdivision design standards to protect and improve water quality in sensitive areas.

Policy 3.13 Designate streams on which to establish standards for vegetated buffers to preserve, protect, and restore water quality and vital estuarine resources.

Implementation Strategies for Policy 3.13

- 3.13.1 Develop criteria for designated streams.
- 3.13.2 Define designated streams on a map.
- 3.13.3 Develop standards for the determination of appropriate vegetative buffer width.
- 3.13.4 Develop specific performance-based buffer standards for each watershed [based on use designation].
- 3.13.5 Adapt standards to maintain, alter, and properly manage vegetation within the buffer areas from existing COD standards.
- 3.13.6 Develop standards for stream restoration.
- 3.13.7 Develop procedures to ensure the preservation, acquisition, and management of natural vegetative buffers.

- 3.13.8 Revise and update the County and City Development Ordinances and development review process.
- 3.13.9 Continue to support the Lower Cape Fear River Program, the UNCW Tidal Creeks Program, and the Watershed Management Advisory Board.
- 3.13.10 Continue to enforce the setbacks and buffers on Conservation Resources as adopted in the COD ordinance.

Policy 3.14 Encourage development away from exceptional and substantial wetlands, sensitive areas and natural heritage areas by allowing greater design flexibility in cluster development and other alternative development types.

Implementation Strategies for Policy 3.14

- 3.14.1 Identify exceptional and substantial wetlands and natural heritage areas as Resource Protection areas on Land Classification Maps.
- 3.14.2 Develop a plan for prioritization and protection of natural heritage areas.
- 3.14.3 Develop awareness of and protective measures for natural heritage areas.
- 3.14.4 Adopt specific development standards to preserve wetlands and a protective buffer.
- 3.14.5 Develop standards for design flexibility that will encourage preservation of wetland areas and sensitive natural heritage areas.
- 3.14.6 Identify and pursue funding mechanisms to acquire high priority sensitive areas and natural heritage areas.
- 3.14.7 Establish incentives, including transfer of development rights, to protect high priority sensitive areas and natural heritage areas.

AREAS OF ENVIRONMENTAL CONCERN:

Policy 3.15 Prohibit the use of estuarine waters, estuarine shorelines and public trust areas for development activity which would result in significant adverse impact to the natural function of these areas.

Implementation Strategies for Policy 3.15

- 3.15.1 Develop standards based on natural functions to protect estuarine shorelines and public trust areas from significant adverse impact.
- 3.15.2 Develop and implement a strategy for review and enforcement.

Policy 3.16 Prohibit incompatible development in ocean erodible areas, inlet hazard areas, high hazard flood areas, and coastal and federally regulated wetlands and required buffers to protect public safety, reduce the risk of property damage, and provide for the long-term protection and management of these environmentally significant resources due to their natural role in the integrity of the coastal region.

Implementation Strategies for Policy 3.16

- 3.16.1 Identify areas of concern and regulate development accordingly.

Policy 3.17 Support the preservation, protection, and addition of remaining privately held properties to the Masonboro Island Estuarine Research Reserve.

Implementation Strategies for Policy 3.17

- 3.17.1 Support the protection and preservation of Masonboro Island Estuarine Research Reserve.
- 3.17.2 Pursue additional land acquisition and preservation strategies in cooperation with the Watershed Management Advisory Board.
- 3.17.3 Develop guidelines for the environmental review process to ensure no significant adverse effects from mainland development activities.
- 3.17.4 Support the scientific research activities of the Reserve.

Policy 3.18 Provide public access to public trust waters by allowing the development of marinas, dry stack storage, and moorings to the extent that their development shall not adversely affect estuarine resources or public trust waters. The following standards shall apply:

- a. Marinas as defined in this plan shall not be allowed in Primary Nursery Areas (PNA), Outstanding Resource Waters (ORW), or open Shellfishing Waters (SA). Limited exceptions may be allowed in the Urban Water Front District, to the extent that they are consistent with the goals and objectives of the Cape Fear River Corridor Plan (1997) and the Wilmington Vision 2020 Plan (2004), and in designated areas zoned Waterfront Urban Mixed Use Districts. Community boating facilities of any size that may be permitted by the Division of Coastal Management may be allowed for waterfront communities.
- b. Moorings and mooring fields shall not be allowed where they may have an adverse effect on navigation channels.
- c. Pump out facilities shall be required for existing marinas with more than 10 slips which have boats containing enclosed heads.

Implementation Strategies for Policy 3.18

- 3.18.1 Adopt standards for community boating facilities for the County and City codes.
- 3.18.2 Join NC Clean Marina program and require marinas and community boating facilities to develop a management plan incorporating BMPs of the Clean Marinas Program.
- 3.18.3 Develop standards to prohibit activities at marinas and boating facilities that result in water pollution.

Policy 3.19 Allow uses of estuarine and public trust waters that provide benefits to the public and satisfy riparian access needs of private property owners while encouraging shared use facilities. In tidal waters, individual docks shall be allowed only when shared use facilities are not provided for.

Implementation Strategies for Policy 3.19

- 3.19.1 Develop public access/boat access area plans and integrate with parks and open space plans.
- 3.19.2 Identify public access area opportunities on Future Land Use and Land Classification Maps.
- 3.19.3 Work with NCDOT to create and maintain public access for small craft at DOT stream crossings.
- 3.19.4 Identify funding strategies for acquisition of high priority sites.

Policy 3.20 Prohibit new dredging activities in Primary Nursery Areas (PNA), Outstanding Resource Waters (ORW), and Shellfishing Waters (SA), except for the purpose of scientific research, projects designed for the purpose of protecting and enhancing water quality, and where supported by sound scientific and technical knowledge. Limited exceptions may be allowed for the urban waterfront and Wilmington’s ports, consistent with the goals and objectives of the Cape Fear River Corridor Plan (1997) and the Wilmington Vision 2020 Plan (2004) and for inlet management projects as permitted by the U.S. Army Corps of Engineers, and in accordance with the provisions in the implementation strategies below.

Implementation Strategies for Policy 3.20

- 3.20.1 Identify heavily silted areas that are blocking navigation and flushing of tidal area.
- 3.20.2 Develop standards to allow dredging in heavily silted areas where independent scientific data documents a water quality benefit.
- 3.20.3 Identify specific exceptions based on adopted plans.
- 3.20.4 Exceptions may be permitted for maintenance dredging as permitted by the Division of Coastal Management provided they meet these criteria:
 - a. The applicant demonstrates that a water dependent need exists for the excavation; and
 - b. There exists a previously permitted channel which was constructed or maintained under permits issued by the State or Federal Government. If a natural channel was in use, or if a human-made channel was constructed before permitting was necessary, there shall be clear evidence that the channel was continuously used for a specific purpose; and
 - c. Excavated material can be removed and placed in an approved disposal area without significantly impacting adjacent nursery areas and beds of submerged aquatic vegetation; and
 - d. The original depth and width of a human-made or natural channel will not be increased to allow a new or expanded use of the channel.
- 3.20.5 Identify navigational channels to establish baseline data.

Policy 3.21 Prohibit clearcutting, mowing, or removal of coastal wetland vegetation within any coastal wetland AEC.

Implementation Strategies for Policy 3.21

- 3.21.1 Identify coastal wetland areas to be protected on an environmental composite map.

Policy 3.22 Prohibit floating home development in order to protect our public trust and estuarine waters and to avoid impacts to hurricane mitigation efforts.

Implementation Strategies for Policy 3.22

- 3.22.1 Adopt measure to implement in City and County codes.

Policy 3.23 Accommodate existing properties and structures along our coastal and estuarine shorelines by allowing for retreat from migrating shoreline and wetlands. Develop strategies to reduce property damage from future threats.

Implementation Strategies for Policy 3.23

- 3.23.1 Request that the State develop a policy of retreat for coastal areas.
- 3.23.2 Identify areas where shoreline properties may be subject to future threats from erosion or inundation.
- 3.23.3 Make available to the public information related to erosion rates, inlet movements and other factors that could affect coastal properties.

Policy 3.24 Allow shoreline erosion control and stabilization above marsh wetlands only where the public trust interest is not impacted and the public shoreline will be the primary beneficiary. The shoreline stabilization method chosen shall, to the maximum extent feasible, maintain water quality and avoid or minimize adverse effects on nearshore habitat or natural resources.

Implementation Strategies for Policy 3.24

- 3.24.1 Develop specific performance standards for shoreline stabilization projects.
- 3.24.2 Encourage alternatives to bulkheads, such as setbacks, marsh sills and vegetative stabilization.

Policy 3.25 Ensure the continued protection of ecologically sensitive ocean and estuarine shoreline areas through monitoring and control of off-road vehicle use, including signage programs, rewards, fees, increased fines, and other means.

Implementation Strategies for Policy 3.25

- 3.25.1 Identify sensitive areas for restricting off-road use.
- 3.25.2 Identify problem areas.
- 3.25.3 Develop and enhance standards, awareness programs, and enforcement to improve control.

POTABLE WATER SUPPLY:

Policy 3.26 Ensure that all land use and development decisions protect groundwater aquifers.

Implementation Strategies for Policy 3.26

- 3.26.1 Monitor changes to the freshwater aquifers resulting from groundwater pumping activities and river channel dredging activities.
- 3.26.2 Develop strategies to avoid degradation of freshwater aquifers from salt water intrusion.
- 3.26.3 Balance groundwater extraction with recharge to optimize long term aquifer viability.
- 3.26.4 Update standards to ensure that land use in the critical aquifer recharge areas are protective of groundwater quality.
- 3.26.5 Promote development patterns that promote aquifer recharge.

Policy 3.27 Protect groundwater aquifers by prohibiting activities if adverse impacts to the ground water aquifer will likely occur.

Implementation Strategies for Policy 3.27

- 3.27.1 Develop guidelines for review of mining operations and other intrusive operations to determine their potential impact on groundwater resources.
- 3.27.2 Require BMPS to prevent adverse impacts for intrusive operations.

Policy 3.28 Preserve the Castle Hayne and Pee Dee aquifers in their present unpolluted state as the primary groundwater resources for the County.

Implementation Strategies for Policy 3.28

- 3.28.1 Conduct a study to determine best practices to ensure continued groundwater recharge in Aquifer Resource Protection Area as development occurs and implement recommended strategies.
- 3.28.2 Limit density to 2.5 units per acre until standards are developed for land use in the secondary recharge area of the aquifers to encourage development patterns that prevent groundwater contamination.
- 3.28.3 Maintain the Aquifer Resource Protection classification of this area on the Land Classification map.
- 3.28.4 Allow density to increase to urban densities in the Aquifer Resource Protection Areas as sewer service is provided.
- 3.28.5 Require on-site infiltration to the extent soils allow.
- 3.28.6 Retain natural sinkholes and drainageways for recharge.

OTHER FRAGILE OR HAZARDOUS AREAS

Policy 3.29 Review and update plans for the safe transportation of hazardous materials, the prevention and clean-up of spills of toxic materials, and the evacuation of area residents in response to hazardous releases.

Implementation Strategies for Policy 3.29

- 3.29.1 Review current spill and hazardous incident response plans.
- 3.29.2 Update plans based on experience and current state of practice.

Policy 3.30 Protect area residents by designating suitable locations for the siting of all industries, including energy facilities and high voltage power lines, and opposing the development of all off-shore mineral, oil, and gas resources.

Implementation Strategies for Policy 3.30

- 3.30.1 Develop use specific siting guidelines and zoning restrictions.
- 3.30.2 Request resolution from the General Assembly opposing development of off-shore mineral, oil and gas resources.

AIR QUALITY:

Policy 3.31 Ensure the protection and enhancement of air quality in the community through continued commitment and actions to meet or exceed State and National Air Quality Standards.

Implementation Strategies for Policy 3.31

- 3.31.1 Promote compact development and infill that minimizes vehicle trips and vehicle miles traveled with a mix of integrated community uses (e.g., housing, shops, workplaces, schools, parks, and civic facilities) within walking or bicycling distance.
- 3.31.2 Encourage development patterns and neighborhood street designs that are conducive to pedestrian and bicycle use (e.g., narrower streets with bike paths).

- 3.31.3 Encourage development located and designed to be convenient for access to public transit, thereby bringing potential riders closer to transit facilities and increasing ridership.
- 3.31.4 Provide information regarding the air quality implications of traffic congestion to the public in order to encourage utilization of mass transit, car and vanpooling, and other transportation management strategies that reduce air pollution.
- 3.31.5 Promote street designs that support and enhance access between neighborhoods and to neighborhood-based commercial developments.
- 3.31.6 Evaluate opportunities for expanding park and ride facilities throughout the County.
- 3.31.7 Encourage the use of alternatives to the automobile.
- 3.31.8 Continue to cooperate with the Citizens Advisory Panel to the Chemical Industry
- 3.31.9 Review industry toxic release inventories to assure compliance.

SECTION B: Land Use and Urban Design

Issue 4: Land Use Demand

- There is no process to systematically allocate sufficient land for all desirable land use types.
- Residents of the community have expressed a desire to enhance the quality of the built environment while preserving and protecting the area's natural environment.

Policies:

The City of Wilmington and New Hanover County shall:

LOCATION AND DEMAND:

Policy 4.1 Designate sufficient land area and suitable locations for the various land use types.

Implementation Strategies for Policy 4.1

- 4.1.1 Use projected needs and available services identified in the technical studies as the basis for land use allocations.
- 4.1.2 Prepare new land classification map.
- 4.1.3 Compare projections with land classification map.
- 4.1.4 Perform periodic review of land consumption.
- 4.1.5 Locate land use types based on the land suitability analysis, environmental composite analysis, and urban services area map.
- 4.1.6 Make land use decisions based on the land classification map, other plans and technical studies including the Parks, Recreation, and Greenway Master Plan, Corridor studies, Wilmington's Future Land Use Plan, and transportation plans.
- 4.1.7 Inventory open space and vacant lands and identify priority lands for preservation on a land preservation map.

INDUSTRIAL USES:

Policy 4.2 Delineate areas for industrial use which will maximize the efficient use of infrastructure while protecting the fragile ecosystem from harm and protecting residents from undue impacts.

Implementation Strategies for Policy 4.2

- 4.2.1 Provide services for heavy industrial uses in locations with adequate land area to accommodate expansive sites required for such uses.
- 4.2.2 Locate industrial uses outside of environmentally sensitive areas and areas designated Resource Protection and Conservation on the land classification map.

- 4.2.3 Ensure that necessary infrastructure (i.e. utilities, transportation facilities) for industrial development is available or planned for industrial development in areas identified as suitable on the Land Classification Map and consistent with the Urban Services Boundary and the Future Land Use Plan.
- 4.2.4 Extend water and sewer service along the 421 Corridor where land is suitable for industrial development.
- 4.2.5 Pursue development of an industrial and manufacturing center that is sensitive to the environmental limitations along the I-140 corridor between US 117 and NC 133.
- 4.2.6 Allow light industrial (clean) uses in mixed use areas with clear requirements for location on no less than collector streets, where utilities are available.
- 4.2.7 Develop appropriate performance controls to address odor, noise, lighting, and other impacts on surrounding uses.
- 4.2.8 Revise development regulations to include provisions for clean light industrial uses in mixed use areas.
- 4.2.9 Provide a wide choice of sites with good access to labor markets, suppliers, and buyers through consultation with the Wilmington Industrial Development, the State Ports, and other economic development interests.
- 4.2.10 Develop an inventory of sites to aid in attracting new industrial development to suitable areas.
- 4.2.11 Develop and enforce standards to ensure that heavy industrial areas have adequate access and are properly distanced from adjoining non-industrial areas to minimize impacts such as noise, fumes and lighting.

COMMERCIAL USES:

Policy 4.3 Maximize effectiveness of commercial uses by assuring that land is available for commercial uses within close proximity to the markets they serve and by ensuring that such commercial uses do not diminish the quality of life in nearby residential areas.

Implementation Strategies for Policy 4.3

- 4.3.1 Locate regional commercial nodes at major intersections consistent with the Land Classification Map, the Wilmington Future Land Use Plan, and corridor plans to accommodate uses that serve a regional market.
- 4.3.2 Follow recommendations of the Wilmington Bypass Steering Committee on designated interchanges.
- 4.3.3 Designate the central business district as a regional trade/office center.
- 4.3.4 Support development of the downtown convention center and quality development and design of the northern waterfront including provision of public access.
- 4.3.5 Encourage any future development of CFCC downtown campus in an urban form.
- 4.3.6 Locate commercial centers to provide community level service and trade needs at key intersections or on major thoroughfares with appropriate performance and design requirements.
- 4.3.7 Develop design standards for neighborhood level commercial development.

Issue 5: Urban Design and Character

- Flexible and innovative site plan criteria are needed to guide the development process throughout the county.
- Existing land use patterns and lack of facilities for alternative methods of transportation result in sustained dependence on the automobile.
- Allowing higher density where adequate infrastructure exists and where natural conditions will not be adversely affected would take pressure off areas that are more sensitive.
- Land use plans and regulations effecting land are not systematically coordinated between the City and County and do not always incorporate the conclusions of other planning efforts (i.e. Community Growth, Downtown 2020, WMPO Long Range Transportation Plan, Cape Fear River Corridor Plan, and Wilmington Future Land Use Plan).
- There are no urban growth boundaries preventing the continuation of urban sprawl and undesirable growth patterns.
- There is no system to identify elements that define quality of life and determine the impacts of the built environment on those elements.

Policies:

The City of Wilmington and New Hanover County shall:

MIXED USE DEVELOPMENT:

Policy 5.1 Promote mixed use development outside of sensitive areas within the urban services area and higher density mixed use in redevelopment projects in order to maximize benefits from available infrastructure, preserve valuable natural resources including open space, and reduce dependence on the automobile.

Implementation Strategies for Policy 5.1

- 5.1.1 Utilize performance criteria similar to the City's mixed use development ordinance to ensure proper design, density, access, etc. in the unincorporated County.
- 5.1.2 Conduct design charettes, research regulations in other communities, and incorporate results into revised mixed use development regulations and site specific projects.
- 5.1.3 Designate undeveloped and underdeveloped areas including those identified in the Wilmington Future Land Use Plan as mixed use to accommodate residential and low intensity commercial, office, and industrial uses with strict performance controls.
- 5.1.4 Make location decisions consistent with the Future Land Use Map, the Land Classification Map, the Urban Service Area Map, existing land use, and zoning maps.
- 5.1.5 Provide incentives for redevelopment to high intensity mixed use in areas that have been abandoned or that are underutilized.

DESIGN AND REGULATION:

Policy 5.2 Encourage innovative development strategies while providing flexible design guidelines that enhance the aesthetics and minimize adverse environmental impacts of the built environment.

Implementation Strategies for Policy 5.2

- 5.2.1 Develop performance standards that will allow the mingling of compatible uses.
- 5.2.2 Develop specific urban design standards to emphasize the creation of public spaces.
- 5.2.3 Conduct design charettes to develop models (examples) of desirable characteristics of development elements (streets, parks, neighborhood services).
- 5.2.4 Provide incentives to property owners to preserve and reclaim key natural resources through innovative design.
- 5.2.5 Use available public and private resources to develop creative approaches toward acquisition.
- 5.2.6 Conduct research of regulations in other communities and incorporate appropriate changes to development regulations.
- 5.2.7 Build partnerships at the community level to educate citizens on issues ranging from low impact development to the protection of natural vegetative buffers.
- 5.2.8 Continue strict adherence to setbacks and zoning district regulations while implementing recommendations contained in corridor studies and the I-140 Bypass plan.
- 5.2.9 Provide clear requirements for mixed use development to include maximum square footage, buildable area ratio, commercial to residential ratios, impervious surface coverage, landscape buffering, lighting, access, height, density, exterior materials, parking, orientation to the street, and other design parameters.
- 5.2.10 Identify opportunities to reduce visual impacts and incompatibility of telecommunication towers.
- 5.2.11 Explore the creation of a design- or form-based zoning code.

Policy 5.3 Adopt specific performance criteria – including connectivity, transit facilities, and pedestrian and bike facilities - for new development and redevelopment that promote efficient transport of goods and services and provide alternatives to the automobile.

Implementation Strategies for Policy 5.3

- 5.3.1 Provide design criteria for regional nodes to ensure the appropriate relationship to the existing streetscape. Criteria will address the issues of congestion, visual clutter, utilities and the proper relationship with adjoining properties.
- 5.3.2 Assure consistency with plans for bike, pedestrian and other transportation facilities, and the extension of public utilities.
- 5.3.3 Promote alternative modes of transportation in design guidelines.
- 5.3.4 Review regional plans and plans for adjoining communities including Pender County, Brunswick County, Leland, Southport, and Hampstead to maximize efficiency and accommodate growth.

Policy 5.4 Require new private and public development and redevelopment to be consistent with the intent and policies of this Plan, and any other applicable City or County plans including Community Growth, Wilmington Vision 2020, WMPO Long Range Transportation Plan, Cape Fear River Corridor

Plan, and Wilmington Future Land Use Plan, corridor plans, and neighborhood plans.

Implementation Strategies for Policy 5.4

- 5.4.1 Develop a process to review development and redevelopment proposals to assure consistency with adopted planning documents.
- 5.4.2 Reference approved plans, such as Wilmington Downtown Plan, Vision 2020 and the historic district guidelines, in applicable development regulations.
- 5.4.3 Utilize regional planning efforts and plans from neighboring counties and cities to assure consistency.

INFRASTRUCTURE:

Policy 5.5 Establish mechanisms to guide development to urban service areas defined by the existence of essential urban services or the planned provision of those services.

Implementation Strategies for Policy 5.5

- 5.5.1 Modify applicable plans, regulations, and budgets to direct provision of urban-level services within the areas designated as “Urban,” “Transition,” and “Community” on the land classification map.
- 5.5.2 Incorporate into the CIP for future years.
- 5.5.3 Consider bond funding for planned infrastructure improvements.
- 5.5.4 Perform full cost analysis on service provision and review rates.
- 5.5.5 Encourage development within the Urban Services Area where existing infrastructure is available.
- 5.5.6 Consider the cost of infrastructure that is land use driven in modifying development regulations.
- 5.5.7 Initiate innovative capital facilities financing as part of the development approval process.
- 5.5.8 Pursue joint ownership by the City and County of major utility systems.
- 5.5.9 Consider feasibility of joint City / County utilities authority.
- 5.5.10 Develop schematic collector street plan as a guide in the development approval process and implementation of an effective transportation network.
- 5.5.11 Complete work on the collector street network in the metropolitan planning area and urban service area.
- 5.5.12 Consider providing state of the art technical services such as fiber optic lines which make the area more attractive to prospective commercial & industrial companies when planning other essential urban services.

OPEN SPACE, CULTURAL AND RECREATION:

Policy 5.6 Develop a plan to acquire, protect and beautify historic and cultural sites, corridors along key roadways, railways, utilities, streams, and significant natural areas.

Implementation Strategies for Policy 5.6

- 5.6.1 Identify opportunities for preservation of natural areas and explore acquisition alternatives.

- 5.6.2 Establish protective corridors such as the scenic byway along key roadways, historic and cultural sites, and other areas that are visually significant.
- 5.6.3 Monitor railroad and other rights-of-way for abandonment and pursue as potential open space, trailways, and recreation areas.
- 5.6.4 Identify environmentally sensitive land as potential open space and recreation areas and key sites for parks. Incorporate into Parks Master Plan and Capital Improvement Programs.
- 5.6.5 Develop a local open space fund.

RESIDENTIAL NEIGHBORHOODS:

Policy 5.7 Preserve the character of the area’s existing residential neighborhoods and quality of life.

Implementation Strategies for Policy 5.7

- 5.7.1 Protect existing residential neighborhoods and integrate development and growth with input from residents.
- 5.7.2 Encourage NC DOT to seek public input on new and expanding roadways and to mitigate impacts to neighborhoods.
- 5.7.3 Develop design standards to replace use standards where appropriate.

SECTION C: Transportation

Issue 6: Traffic

- Traffic volume exceeds the capacity of street networks.
- The full impact and cost of transportation systems to serve new development and resultant changes in land use are not adequately addressed.
- Transportation systems are planned and designed without adequate opportunities for local input.
- Alternative forms of transportation which could alleviate traffic volume are not given enough emphasis.
- There is too much strip development along thoroughfares.
- Driveway access on major roadways is not sufficiently controlled.

Policies:

The City of Wilmington and New Hanover County shall:

TRAFFIC:

Policy 6.1 Initiate and support increased funding from local state, and federal agencies to improve the flow of people and products to and in the City and County.

Implementation Strategies for Policy 6.1

- 6.1.1 Coordinate with the Wilmington Urban Area Metropolitan Planning Organization (WMPO) to improve the flow of people and products.
- 6.1.2 Implement WMPO plans.
- 6.1.3 The WMPO's transportation planning horizon shall be at a minimum 25 years to anticipate future growth.
- 6.1.4 Update the Long Range Transportation Plan every five years.
- 6.1.5 Explore and support innovative and technologically advanced transportation solutions.

Policy 6.2 Support the WMPO and the urban area jurisdictions in encouraging State and Federal authorities to provide interstate connections to areas south and west of the urban area.

Implementation Strategies for Policy 6.2

- 6.2.1 Determine feasibility of creating an interstate type facility to connect with I-20 at Florence, South Carolina and encourage cooperation with South Carolina DOT.
- 6.2.2 Continue to support the extension of Interstate 20 from Florence to Wilmington and Interstate 74 from Charlotte to Wilmington.

Policy 6.3 Collaborate with the WMPO and NCDOT and implement strategies of corridor and thoroughfare plans to improve the functioning of the existing street network to operate at a level of service of D or better.

Implementation Strategies for Policy 6.3

- 6.3.1 The City, the WMPO and NCDOT shall implement the corridor planning initiatives contained in Wilmington's Future Land Use Plan and corridor plans.
- 6.3.2 Develop an Urban Congestion Management System and level of service standard.
- 6.3.3 Coordinate with all appropriate law enforcement agencies to improve the enforcement of traffic laws.
- 6.3.4 The City shall continue to provide continuous upgrade of traffic operations data and equipment to improve the area's signal system and to provide the public with more information on this program.
- 6.3.5 Continue to work with NCDOT to improve that portion of the signal system under their control.
- 6.3.6 Work with the WMPO and NCDOT to create a plan for interchanges at major intersections throughout the street network concurrent with the WMPO Comprehensive Transportation Plan improvements. Where necessary the City will participate in these improvements using impact fees, bonds and / or tax increases.
- 6.3.7 Cooperate with NCDOT and other appropriate agencies to develop a plan to construct separate bicycle and pedestrian facilities where appropriate.
- 6.3.8 Develop and implement a *connecting communities initiative* to encourage communities to provide multiple connections for automobile and alternative transportation modes.
- 6.3.9 Coordinate new development timing to coincide with necessary road improvement completion schedules.

Policy 6.4 Reduce the impact of new driveways on the roadway networks.

Implementation Strategies for Policy 6.4

- 6.4.1 Prepare and adopt driveway standards that promote better traffic flow in the County.
- 6.4.2 Develop and enact land use policies that minimize driveway access to major thoroughfares.
- 6.4.3 Establish and implement access management plans, programs and strategies through development review and capital project programming.
- 6.4.4 Adopt and enforce street standards containing access management provisions.

Policy 6.5 Require street connectivity and prohibit cul-de-sacs that impede connectivity through better collector street planning.

Implementation Strategies for Policy 6.5

- 6.5.1 Develop collector street networks for small areas.
- 6.5.2 Prepare and adopt collector street plans in cooperation with property owners and affected neighborhoods.
- 6.5.3 Require paving of street stubouts to the property line and require signage to warn adjacent property owners of potential future road connections.
- 6.5.4 Implement collector street plan as areas are developed.
- 6.5.5 Coordinate with DOT to complete collector network through unincorporated areas
- 6.5.6 Reduce the number of private streets that impede interconnectivity.
- 6.5.7 Clearly identify existing and future stub outs as potential future road connections.

Policy 6.6 Improve the ability of existing and planned thoroughfares to operate more efficiently by requiring all new development and redevelopment to meet the intent and policies of this Plan, and any applicable corridor or thoroughfare plan.

Implementation Strategies for Policy 6.6

- 6.6.1 Conform to the CAMA Plan policies by examining all proposed rezoning and subdivisions for compatibility with the intent and policies of the plan.
- 6.6.2 Continue to require traffic impact analysis in the development review process for major development and redevelopment projects.

ALTERNATIVE FORMS OF TRANSPORTATION:

Policy 6.7 Support improved non-highway transportation facilities, including rail, airport, and shipping facilities for both passengers and freight to access the area.

Implementation Strategies for Policy 6.7

- 6.7.1 Encourage the improvement of freight and passenger rail service to Wilmington and New Hanover County.
- 6.7.2 Encourage the growth of the North Carolina State Port at Wilmington with infrastructure improvements and increased channel depths.
- 6.7.3 Support State Port projects such as an internal connector roadway, north expansion and security projects.
- 6.7.4 Encourage and support an alternative rail access to the Port of Wilmington
- 6.7.5 Plan an alternative rail routing that bypasses the downtown area. Consider the west side of the Cape Fear River.
- 6.7.6 Encourage the growth of the Wilmington International Airport.
- 6.7.7 Support airport capital projects, access projects, and beautification projects.

Policy 6.8 Collaborate with the NCDOT and the WMPO to encourage alternative forms of transportation including regional rail, local transit, bicycle and pedestrian movement, Transportation Demand Measures such as van-pooling and ride sharing, and an inter-modal transportation system.

Implementation Strategies for Policy 6.8

- 6.8.1 Implement the Transportation Demand Measures program being developed by the Cape Fear Breeze Program.
- 6.8.2 Implement the Cape Fear Public Transportation Authority's (formerly Wave Transit) Transit Master Plan.
- 6.8.3 Periodically evaluate the feasibility of all forms of public transportation including buses, trolleys, and light rail for any or all portions of the area.
- 6.8.4 Prepare a conceptual light rail master plan for the urban area and participate in ongoing NCDOT passenger rail and multi-modal feasibility studies.
- 6.8.5 Monitor existing public transit service and identify potential service expansion and modification opportunities.
- 6.8.6 Evaluate areas outside of Wilmington's jurisdiction to be included in the transit system.
- 6.8.7 Actively participate in ongoing NCDOT passenger rail and multi-modal facilities studies. Support funding objectives of the NCDOT in order to assure viability of the Raleigh to

- Wilmington passenger rail service. Support NCDOT efforts to provide passenger rail service between Wilmington and Raleigh.
- 6.8.8 Design and construct the Wilmington Multimodal Transportation Center in downtown Wilmington.
 - 6.8.9 Develop regional connections for bike and pedestrian uses such as the East Coast Greenway.

Policy 6.9 Provide alternatives to automobile transportation by requiring all new development, redevelopment, and improvements to existing facilities to make provisions for a comprehensive network of bicycle and pedestrian facilities, including pedestrian causeways, bridges, and crossings on collector streets and major arterials.

Implementation Strategies for Policy 6.9

- 6.9.1 Implement the recommendations of the New Hanover County Bicycle Advisory Committee.
- 6.9.2 Seek Federal, State, and local funding to implement the Plan.
- 6.9.3 Develop and implement a capital improvements schedule for construction of facilities.
- 6.9.4 Strongly encourage the State to provide and improve bicycle and pedestrian facilities in conjunction with new construction and improvements to transportation facilities.
- 6.9.5 Identify bike route and greenway network in the Parks, Recreation and Open Space Master plan so that links can be provided during the development process.
- 6.9.6 Initiate a connecting communities program to provide links for bike and pedestrian connections between adjacent communities.

Issue 7: Environment

- The construction and maintenance of transportation facilities negatively impacts the environment, particularly water quality.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 7.1 Strengthen environmental protection and mitigation of impacts during planning, construction and maintenance of transportation facilities.

Implementation Strategies for Policy 7.1

- 7.1.1 NCDOT shall adhere to or exceed State and Federal environmental regulations for the construction and maintenance of transportation facilities.
- 7.1.2 Review proposed NCDOT actions to insure compliance with applicable regulations.
- 7.1.3 Establish standards for the construction of transportation facilities that meet or exceed State and Federal requirements for water quality and surface water management.
- 7.1.4 Prepare and adopt specific design standards and ordinances to reflect community standards for resource protection to give specific guidance as to the required level of water quality protection.

Policy 7.2 Protect natural resources by requiring all projects to consider reasonable and feasible road construction and design alternatives.

Implementation Strategies for Policy 7.2

- 7.2.1 The City and County shall seek legislation to require NCDOT to meet or exceed State and Federal requirements for water quality and surface water management.
- 7.2.2 Identify specific concerns with NCDOT's current practices and seek legislation to address these issues.

Policy 7.3 Require all projects to avoid or mitigate noise, air quality, and other environmental impacts on existing residential areas when constructing and maintaining transportation facilities.

Implementation Strategies for Policy 7.3

- 7.3.1 Review all proposals for the construction and maintenance of transportation facilities for noise and other environmental impacts on existing neighborhood areas.
- 7.3.2 All appropriate review boards shall review proposed local government and private actions to insure compliance with applicable regulations.

Issue 8: Corridors

- The appearance of road corridors needs improvement.
- The preservation of land for transportation corridors is inadequate.

Policies

The City of Wilmington and New Hanover County shall:

AESTHETICS:

Policy 8.1 Collaborate with the WMPO to encourage the State to improve the community through enhancements of the streetscape, as identified in the 2004 Corridor Plans, and ensuring the preservation and use of indigenous flora on new and existing streets.

Implementation Strategies for Policy 8.1

- 8.1.1 Coordinate with NCDOT to enhance streetscapes through the use of regulations, impact fees, bonds, and / or tax increases.
- 8.1.2 Identify corridors needing enhancement.
- 8.1.3 Develop plan for needed enhancements.
- 8.1.4 Request funding from NCDOT for enhancements.
- 8.1.5 Seek necessary local funding for enhancements and maintenance.
- 8.1.6 Encourage private initiatives to improve streetscapes.
- 8.1.7 Enforce regulations to create less obtrusive commercial signage and billboards.
- 8.1.8 Promote undergrounding or relocation of utility lines and poles for aesthetic purposes in key areas such as gateways.

Policy 8.2 Ensure through revised standards the provision of adequate landscaping and tree protection for parking lots, sidewalks, and in street rights-of-way for both public and private projects.

Implementation Strategies for Policy 8.2

- 8.2.1 Develop design standards, ordinances, and regulations to improve parking lot and streetyard landscaping in new development and redevelopment projects.
- 8.2.2 Develop guidelines to limit light pollution at the entryways to Wilmington and along other roadways.

CORRIDOR PROTECTION:

Policy 8.3 Identify and utilize sources of funds and incentives to purchase or preserve thoroughfare and rail corridors in a timely and equitable manner. Where necessary, the City and County will participate in these improvements using impact fees, bonds, and/or tax increases.

Implementation Strategies for Policy 8.3

- 8.3.1 Collaborate with DOT to identify road and rail corridors as rapidly as possible through appropriate environmental studies.
- 8.3.2 The WMPO and NCDOT will prepare phased environmental studies after adoption of the Thoroughfare Plan to identify proposed corridors as closely as possible in compliance with guidelines established by the National Environmental Policy Act (NEPA).
- 8.3.3 Identify and enforce provisions of State and local law that protect Thoroughfare Plan Corridors.
- 8.3.4 Cooperate with NCDOT to protect the Southern Bridge right-of-way through planning efforts.
- 8.3.5 Explore state legislation to expedite and fund right-of-way purchase.

Policy 8.4 Investigate and use regulatory provisions for preserving thoroughfare and rail corridors.

Implementation Strategies for Policy 8.4

- 8.4.1 Identify and enforce provisions of State and local law that protect Thoroughfare Plan Corridors.
- 8.4.2 Modify local ordinances where necessary to provide the maximum amount of corridor protection allowed under State law.

Policy 8.5 Cooperate with NCDOT, railways, and other entities for the purchase of rail and road corridors for future transportation systems development concurrent with the WMPO Comprehensive Transportation Plan.

Implementation Strategies for Policy 8.5

- 8.5.1 Cooperate through an agreement to allow for the purchase of rail and road corridors.
- 8.5.2 Establish an agreement between the City and the County to allow the County to request that the City proceed with necessary actions to improve or expand the street network.
- 8.5.3 Map planned corridors as required in State Statutes so that they can be preserved through the development review process.

SECTION D: Community Infrastructure

Issue 9: Facilities and Services

- The provision of community services and facilities is uncoordinated and costly.
- The high cost of infrastructure investment places a burden on public and private financial resources.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 9.1 Provide timely, cost-effective, and efficient capital facilities and community infrastructure consistent with specific infrastructure plans, to suitable areas within the urban services area and develop criteria for future expansion of the urban services area.

Implementation Strategies for Policy 9.1

- 9.1.1 Evaluate the cost impact of extending community facilities within the urban services area.
- 9.1.2 Develop a program for joint public/private infrastructure investment opportunities for infrastructure expansion.
- 9.1.3 Develop a joint City-County Task force to review financing alternatives and to recommend alternative financing methods.

Policy 9.2 Coordinate, rationalize, and consolidate where appropriate, City, County and other governmental agency programs for the provision and maintenance of infrastructure and community facilities and services.

Implementation Strategies for Policy 9.2

- 9.2.1 Develop interlocal agreements and development codes to establish consistency.
- 9.2.2 Strengthen infrastructure inspection and maintenance programs in the County.
- 9.2.3 Determine staffing requirements and develop infrastructure requirements.
- 9.2.4 Develop guidelines for the interregional sharing of sewer facilities when economically feasible.
- 9.2.5 Develop criteria for a cost sharing formula between jurisdictions.

Policy 9.3 Explore alternative forms of financing for the infrastructure improvements needed to have a high quality level of service and to prevent a decline in the levels of service provided to County and City residents. Infrastructure needs to be addressed in this effort shall include transportation, education, sewer, water, recreation, libraries, police, fire, storm water management, schools, and other services deemed to be appropriate.

Implementation Strategies for Policy 9.3

- 9.3.1 Develop a joint City-County Committee to review financing alternatives and to recommend financing methods.
- 9.3.2 Develop criteria, conditions, requirements, and cost sharing formula for the development of financing structure.
- 9.3.3 Create mechanism to collect and allocate fees.

Issue 10: Storm Water

- Poorly controlled storm water management from existing and future developments causes problems for adjacent residents.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 10.1 Expand storm water management to include areas not incorporated in existing programs.

Implementation Strategies for Policy 10.1

- 10.1.1 Develop a storm water management and water quality program for existing and new development in the County.
- 10.1.2 Coordinate and join this program with the existing City Stormwater Management Program.
- 10.1.3 Establish a stormwater management program funding mechanism.

Policy 10.2 Develop a City and County storm water management program that balances the financial cost between existing and new development and provides incentives for redevelopment that includes retrofits to address existing problems.

Implementation Strategies for Policy 10.2

- 10.2.1 Develop a County storm water management financing program.
- 10.2.2 Coordinate and join this program with the existing City program.
- 10.2.3 Ensure that there is an equitable and balanced financing program for existing and new development in the County and City.

Policy 10.3 Protect surface water quality by prohibiting new, and eliminating existing collection systems that directly discharge storm water to surface waters, including stormwater runoff from roadways.

Implementation Strategies for Policy 10.3

- 10.3.1 Identify collection systems discharging directly into surface waters.
- 10.3.2 Create a program to prohibit collection systems that directly discharge stormwater to surface waters.
- 10.3.3 Continue to seek methods to fund and construct BMP's to treat direct storm water discharge.

Policy 10.4 Protect water quality by ensuring that drainage from land use activities has rate of flow and volume characteristics as near to predevelopment conditions as possible.

Implementation Strategies for Policy 10.4

- 10.4.1 Develop low impact development (LID) standards that ensure that drainage from land use activities has rate of flow and volume characteristics as near to predevelopment conditions as possible to provide for the protection of our water quality.
- 10.4.2 Prepare LID standards for inclusion in the technical standards and development codes.
- 10.4.3 Enforce provisions of storm water management ordinance pertaining to pre- and post-development conditions.

Issue 11: Sewer and Water

- Some unincorporated areas lack adequate sewer and water services.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 11.1 Provide public sewer service to existing development in unincorporated areas that have inadequate and malfunctioning septic systems and package treatment plants.

Implementation Strategies for Policy 11.1

- 11.1.1 Develop a Capital Facilities Plan for areas that should be provided with sewer and water services based on environmental concerns, water quality concerns and servicing costs.

Policy 11.2 Consolidate the City and County sewer and water system.

Implementation Strategies for Policy 11.2

- 11.2.1 Develop uniform standards for the installation of utilities throughout the County and City.
- 11.2.2 Implement the recommendations of the City/County Water and Sewer Consolidation Study Committee.

Policy 11.3 Ensure optimal use of sewage treatment facilities.

Implementation Strategies for Policy 11.3

- 11.3.1 Develop fiscal and environmentally responsible strategies for the long term management and disposal of sewage sludge to utilize available nutrients without resulting in nutrient pollutant loading to streams.
- 11.3.2 Require water reuse for appropriate industrial processes.
- 11.3.3 Encourage water reuse for irrigation purposes and groundwater recharge.

Policy 11.4 Ensure the provision of sufficient, affordable water and sewer services to proposed new urban service areas and industrial sites in the unincorporated areas of the County.

Implementation Strategies for Policy 11.4

- 11.4.1 Identify and prioritize new service centers and industrial areas consistent with the Urban Service Boundary.
- 11.4.2 On completion of the Thoroughfare Plan update, review existing zoning and development patterns to identify potential service centers where it is feasible and cost effective to provide water, sewer, and other infrastructure needs.
- 11.4.3 Prioritize the servicing of existing and new industrial sites that are identified in the Bypass Plan and other planning efforts.
- 11.4.4 Incorporate priority areas in the City and County plans for service extensions.
- 11.4.5 Evaluate the need for improved procedures for sewer service allocation to new development.

Issue 12: Education Facilities

- Some schools are overcrowded, inconveniently located, require maintenance, and need improvements.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 12.1 Give priority to the maintenance and optimal use of existing education facilities.

Implementation Strategies for Policy 12.1

- 12.1.1 Provide annual funding for the sustained maintenance of facilities that serve both the existing and future education needs of the community.
- 12.1.2 Include adequate funding for maintenance and upkeep in the annual education budget.
- 12.1.3 Ensure that education facilities in older areas of the City and County receive adequate maintenance.

Policy 12.2 Locate schools in areas where they provide the maximum benefit to adjoining neighborhoods.

Implementation Strategies for Policy 12.2

- 12.2.1 Determine the needs and plan for the optimal location of elementary schools and kindergartens.
- 12.2.2 Plan and locate schools to allow for future expansion and to ensure better and shared use of the facilities and campus.

Policy 12.3 New schools shall be constructed by New Hanover County to maintain an adequate level of service.

Implementation Strategies for Policy 12.3

- 12.3.1 Explore the use of alternative forms of financing for improving New Hanover County Schools.
- 12.3.2 Adequately fund the New Hanover County new school facility program.
- 12.3.3 Coordinate school facility program with the other County and City departments utilizing the capital facilities review process.
- 12.3.4 Create a quality control program to ensure high quality construction.
- 12.3.5 Assure that all school children have access to high quality athletic fields, ball fields, tracks, pools, gymnasiums, and outdoor playgrounds.
- 12.3.6 Program routine maintenance of athletic facilities and playgrounds into the school budget.
- 12.3.7 Identify the long-term costs and implications of computer technology.
- 12.3.8 Anticipate needs and technological trends and consider adaptable systems.

Policy 12.4 Encourage greater coordination between the School Board and County and City government in planning and budgeting.

Implementation Strategies for Policy 12.4

- 12.4.1 Coordinate new education facilities and maintenance upgrade program.
- 12.4.2 Hold regular meetings with concerned parties for increased coordination with New Hanover County Schools, School Board and other pertinent branches of County and City government.
- 12.4.3 Coordinate safe access to existing and new schools for automobile, bike and pedestrian transportation through the transportation planning process.

Issue 13: Culture and Recreation Facilities

- Existing community open space, recreation, and cultural facilities are insufficient for present and future needs.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 13.1 Identify economically distressed neighborhoods with inadequate facilities and prioritize for new recreation and cultural facilities.

Implementation Strategies for Policy 13.1

- 13.1.1 Continue to implement, fund, and join together the County and City Park Plans.
- 13.1.2 Prepare and Implement a joint Greenway/Open Space/Natural Areas Preservation Plan.
- 13.1.3 Develop public/private partnerships for the provision of recreation facilities.

Policy 13.2 Recognize the downtown Wilmington area as the cultural nucleus that nurtures, supports, and strengthens other cultural centers throughout the region.

Implementation Strategies for Policy 13.2

- 13.2.1 Support and implement the goals and recommendations of the Wilmington Downtown Plan: Vision 2020; the Cape Fear River Corridor Plan; and Wilmington Downtown, Inc. that reinforce the cultural importance of the Downtown area.
- 13.2.2 Develop additional and support existing programs that specifically promote, strengthen, and support Downtown Wilmington as the regional cultural center.
- 13.2.3 Determine expected future growth and needs for library facilities.
- 13.2.4 Continue to expand and enlarge existing library facilities to maintain the current level of service to the community.
- 13.2.5 Determine expected future growth and needs and formulate a long-term cultural resources development strategy.
- 13.2.6 Continue to support and improve the museum facilities.
- 13.2.7 Investigate the feasibility of providing a performing arts center to serve the needs of the community and its surrounding area.
- 13.2.8 Encourage the provision of social and cultural opportunities for the aging population.

Policy 13.3 Develop a joint master plan for a comprehensive system of natural areas, greenways, parks, and trails throughout the City and County that meet or exceed State level of service standards for the needs of the projected population.

Implementation Strategies for Policy 13.3

- 13.3.1 Prepare and implement a Countywide Greenways, Open Space and Natural Areas Preservation Plan for the establishment of a continuous Greenway System that links neighborhoods to community activity centers and exceeds recreational and open space level of service needs for both present and expected population growth.
- 13.3.2 Establish, in the unincorporated areas, requirements for commercial and residential development to reserve land for non-recreation open space or provide a fee in lieu.
- 13.3.3 Develop acquisition and protection options for significant open space and recreation sites, such as fee simple purchase, public/private partnerships, conservation easements, and conservation trusts.
- 13.3.4 Develop a public participation process for the acquisition and preservation of significant sites for open space and recreation.
- 13.3.5 Utilize the Parks, Recreation, and Open Space Planning process to identify opportunities for park land and open space in Downtown Wilmington.
- 13.3.6 Allow density bonuses and flexibility in design to increase preservation of open space.
- 13.3.7 Apply payment-in-lieu funds to develop parks in areas where they are needed in a timely and efficient manner.
- 13.3.8 Allow payment-in-lieu for smaller developments rather than requiring small non-contiguous open space.
- 13.3.9 Identify funding mechanisms and pursue funds for open space acquisition and park development.

Policy 13.4 Preserve rail and utility easements as part of a greenway system and link them with trails and greenways where possible.

Implementation Strategies for Policy 13.4

- 13.4.1 Identify rail and utility easements and preservation opportunities which provide linkages in the greenway system for inclusion in a Greenways, Open Space, and Natural Areas Preservation Plan.

- 13.4.2 Work with rail and utility companies to identify financing mechanisms or other arrangements for the right to use these important corridors.

Policy 13.5 Identify a suitable corridor and cooperate with public and private entities to develop the New Hanover County component of the East Coast Greenway.

Implementation Strategies for Policy 13.5

- 13.5.1 Work with the East Coast Greenway project to identify an optimal corridor(s) through New Hanover County that includes both scenic coastal byways and urban throughways.
- 13.5.2 Develop acquisition/protection options for routes for the East Coast Greenway such as purchase, public/private partnerships, conservation easements, and conservation trusts.

Issue 14: Police and Fire Services

- New growth will require additional resources to ensure that adequate levels of police and fire services in unincorporated areas are provided.
- Some unincorporated areas of the county are not provided fire hydrants.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 14.1 Provide timely and adequate staffing and facilities to maintain and improve the level of police and fire services.

Implementation Strategies for Policy 14.1

- 14.1.1 Plan and provide staffing and facilities for police and fire services at least proportionate to the growth in the community.
- 14.1.2 Develop a long range plan for the location of police, fire, and EMT facilities that accounts for population growth into underserved and expanding areas within the urban services area.

Issue 15: Solid Waste Management

- Growth and development put strains on the capacity of the current system to handle solid waste.

Policies:

The City of Wilmington and New Hanover County shall:

Policy 15.1 Establish and maintain an environmentally responsible, cost effective system for managing solid waste that protects public health and provides adequate waste disposal capacity, solid waste collection and recycling services, and waste reduction opportunities.

Implementation Strategies for Policy 15.1

- 15.1.1 The County and City, together with the Towns of Carolina Beach, Kure Beach, and Wrightsville Beach, will continue the joint update of the Comprehensive Solid Waste Management Plan every 3 years and establish programs and set goals for the management and reduction of solid waste for the next 10 years.
- 15.1.2 Provide continued support for innovative waste management systems.

Policy 15.2 Reduce and manage the solid waste stream through efficient waste collection, expanded recycling programs, encouraging composting, expanded household hazardous waste collection, multi-jurisdictional cooperation, and public education.

Implementation Strategies for Policy 15.2

- 15.2.1 Expand local government provided recycling services.
- 15.2.2 Promote local private recovery and recycling initiatives.
- 15.2.3 Encourage composting.
- 15.2.4 Expand household hazardous waste pick-up and education.
- 15.2.5 Promote local construction and demolition debris recycling and recovery programs.
- 15.2.6 Consider a county-wide waste collection and recycling program.

Policy 15.3 Eliminate illegal trash dumping through strict monitoring and enforcement, including increased fines, a signage program, rewards, and other means.

Implementation Strategies for Policy 15.3

- 15.3.1 Identify illegal dump sites and reduce illegal trash dumping through aggressive enforcement of the illegal dumping ordinance, strict monitoring, increased fines, a signage program, rewards, and other means.
- 15.3.2 Review the illegal dumping ordinance and strengthen as appropriate.

Policy 15.4 Continue to implement and improve the County's Comprehensive Solid Waste Management Plan.

Implementation Strategies for Policy 15.4

- 15.4.1 The County and City, together with the Towns of Carolina Beach, Kure Beach, and Wrightsville Beach, will continue the joint update of the Comprehensive Solid Waste Management Plan every 3 years and establish programs and set goals for the management and reduction of solid waste for the next 10 years.

SECTION E: Housing

Issue 16: Demand

- The City minimum housing program is inadequate and the County lacks a minimum housing code and enforcement program.
- There is a documented need for affordable housing, particularly for low and moderate-income residents.
- The City and County need to ensure that they are receiving the maximum amount of federal and state funding opportunities for community and economic development.
- There is a need to provide an increased amount of affordable rental housing.

Policies:

The City of Wilmington and New Hanover County shall:

MINIMUM HOUSING PROGRAMS:

Policy 16.1 Enhance the minimum housing program within the City and adopt a minimum housing program with provisions for enforcement in the County.

Implementation Strategies for Policy 16.1

- 16.1.1 Improve the City minimum housing enforcement program.
- 16.1.2 Develop code enforcement strategies that emphasize improvements in housing quality and preservation recognizing a balance between expenses to property and home owners and better living conditions for occupants.
- 16.1.3 Adopt a County minimum housing code and establish an enforcement program.
- 16.1.4 Ensure that there is strong code enforcement to remedy neighborhoods and lots with abandoned vehicles, trash, debris, and boarded up housing.
- 16.1.5 Ensure adequate regulations and code enforcement staff to implement regulations.

AFFORDABLE HOUSING PROGRAMS:

Policy 16.2 Support and enhance a broad range of affordable housing programs.

Implementation Strategies for Policy 16.2

- 16.2.1 Develop strategies to facilitate the creation of affordable housing opportunities.
- 16.2.2 Develop a program to educate the public on the need for affordable housing.
- 16.2.3 Support and cooperate with the Affordable Housing Coalition.

Policy 16.3 Increase the supply of affordable rental housing.

Implementation Strategies for Policy 16.3

- 16.3.1 Conduct a study to improve and expand the City rental rehabilitation loan program.
- 16.3.2 Establish a County rental rehabilitation loan program.
- 16.3.3 Ensure that there is funding for a rent-to-own program in both the City and County, which enable a renter to apply rent payments towards the purchase of a home.
- 16.3.4 Explore the possibility of requiring apartment complexes that are converted to condominiums to provide affordable units, or payments into a City and County affordable housing or non-profit housing program.

FUNDING

Policy 16.4 Maximize funding opportunities from federal and state sources for community and economic development.

Implementation Strategies for Policy 16.4

- 16.4.1 Consider creating a consolidated County and City Housing Program.

Policy 16.5 Explore alternative forms of financing for affordable housing.

Implementation Strategies for Policy 16.5

- 16.5.1 Ensure that all available Federal and State community and economic development funding opportunities are being utilized.

Issue 17: Special Populations

- Estimates for 2005 are that there are 564 homeless persons Countywide with the majority living in the City.
- Residents need a mechanism to voice their concerns regarding growth and change, and the County and City need an efficient way to provide information to residents
- There is a need for adequate housing for the special needs population, elderly, and disabled in the City and County.
- With the growth of UNC-Wilmington and Cape Fear Community College, there is an increased demand for on- and off-campus housing.

Policies:

The City of Wilmington and New Hanover County shall:

HOMELESS:

Policy 17.1 Cooperate with non-profit organizations to provide temporary and transitional shelter and better job referral services to persons who are homeless.

Implementation Strategies for Policy 17.1

- 17.1.1 Expand programs for homeless shelters to include adequate quality accommodations with emphasis on housing for the mentally disabled.
- 17.1.2 Ensure continued funding and support for Continuum of Care and other related programs that address counseling and job referral needs to assist homeless persons and households achieve self sufficiency.
- 17.1.3 Ensure that the areas of the City and County that have high homeless concentrations receive specific neighborhood outreach.
- 17.1.4 Expand job referral programs for the homeless.

SPECIAL NEEDS AND ELDERLY:

Policy 17.2 Cooperate with non-profit organizations to ensure an adequate supply of housing for special needs, the elderly, and the disabled.

Implementation Strategies for Policy 17.2

- 17.2.1 Establish a housing program for the special needs, elderly, and disabled, that is integrated throughout the community.
- 17.2.2 Conduct a study to develop recommendations for a program to include group living arrangements and nursing homes for the elderly, and other special needs populations
- 17.2.3 Initiate a program to address special housing needs with the private sector.
- 17.2.4 Modify zoning regulations where appropriate to encourage housing populations with special needs such as the elderly and disabled.

UNCW AND CFCC STUDENT HOUSING:

Policy 17.3 Cooperate with UNC-Wilmington and Cape Fear Community College to meet student housing needs.

Implementation Strategies for Policy 17.3

- 17.3.1 Conduct a study to identify on- and off-campus student housing needs for UNC-Wilmington and Cape Fear Community College.
- 17.3.2 Monitor and regulate student housing in established single family neighborhoods.

NEIGHBORHOOD ASSOCIATIONS:

Policy 17.4 Encourage the use of neighborhood associations by the County, City, and residents for outreach information and education.

Implementation Strategies for Policy 17.4

- 17.4.1 Create neighborhood guidelines.
- 17.4.2 Conduct public discussions and use other methods for public outreach to address the impact of new development on adjoining neighborhoods.
- 17.4.3 Prepare and distribute guidance for associations.

SECTION F: Economic Development

Issue 18: Needs

- There needs to be improved economic diversification and continued effort to attract employers that provide high paying jobs.
- There is a need to balance tourism and the retirement community with a diversified economy.
- There is a need to increase workforce preparedness, especially for the marginally trained and under-educated.

Policies:

The City of Wilmington and New Hanover County shall:

GENERAL ECONOMY:

Policy 18.1 Develop a coordinated economic development strategy to attract high paying employers that are diverse and environmentally mindful.

Implementation Strategies for Policy 18.1

18.1.1 Enhance collaboration to attract high paying diverse employers and develop an incentives program.

18.1.2 Create a County-City economic development program. Select a lead public agency or consultant to study the following items:

Strengthen existing public and private programs that target businesses for expansion and job creation.

Establish a Research and Development Park including infrastructure, with business connections to UNCW and CFCC.

Investigate establishing a local branch of the Office of Industrial Extension Service in the County.

Increase public outreach and improve awareness of the importance of business and industry to the tax base.

18.1.3 Continue to support the pre-engineering cooperative education program between UNCW, NC State, NC A&T, and UNC Charlotte:

Expand the engineering program to include graduate-level curricula.

Enhance ties to local businesses.

18.1.4 Take steps to promote the local film industry.

- Provide incentives to attract new productions.
- Meet with the Wilmington Regional Film Commission regarding continuous updates of "Film Guidelines."

- Improve existing procedures for on-location filmmaking with Police, Fire, and other branches of government.
 - Create a program to improve public relations with the community regarding on-location film making.
- 18.1.5 Offer incentives for companies to assist employees with high quality affordable child day care.
- 18.1.6 Develop a program to attract professional sports teams and events.

TOURISM:

Policy 18.2 Encourage tourism as part of a balanced and diversified economy.

Implementation Strategies for Policy 18.2

- 18.2.1 Promote Wilmington and the County as an area for heritage and historic preservation tourism.
- 18.2.2 Support promotion of Wilmington as a recreation and tour boating destination.
- 18.2.3 Promote the area's natural environment to support the eco-tourism industry and draw attention to our fragile ecosystem.

SKILLED WORKFORCE AND EDUCATION:

Policy 18.3 Partner with the private sector and schools to develop training to maintain an employable work force with skills to meet current and projected demands.

Implementation Strategies for Policy 18.3

- 18.3.1 Enhance support for vocational education programs.
- 18.3.2 Expand the existing Dual Enrollment high school and community college program that emphasizes vocational training.
- 18.3.3 Expand cooperative internship programs for students.
- 18.3.4 Expand the Job Ready internship program between business and the New Hanover County Public Schools.
- 18.3.5 Expand a job skills program for the post high school aged under-prepared population.
- 18.3.6 Expand and seek grants to adequately fund the Human Resources Development Program and Adult Basic Education programs for disadvantaged and dislocated workers.
- 18.3.7 Study and consider establishing an independent Board of Education supplemental education tax to improve the quality of public school education.
- 18.3.8 Address the public school drop-out rate and address the needs of high school students that work during the school year.

Issue 19: Opportunities

- Downtown Wilmington is important as the regional cultural nucleus and a regional trade center.
- Economically distressed areas would benefit by retaining existing businesses and attracting new businesses.
- To remain competitive into the next decade the State port will need to deepen its harbor, improve inland highway and rail access, and upgrade the terminal.
- Opportunities exist for business development and employment growth in marine related businesses.
- The Wilmington International Airport needs to expand to improve its competitiveness while working to ensure community compatibility.

Policies:

The City of Wilmington and New Hanover County shall:

ECONOMICALLY DISTRESSED AREAS:

Policy 19.1 Cooperate with non profit and for profit organizations to attract and retain business in areas that are economically distressed.

Implementation Strategies for Policy 19.1

- 19.1.1 Use Community Development Block Grant funds for programs and activities that create jobs for low and moderate income persons.
- 19.1.2 Encourage and support the federal Small Business Administration HUB Zone program to attract business and jobs to the economically challenged areas of Wilmington.
- 19.1.3 Encourage and support the expansion of family resource centers and programs.
- 19.1.4 Expand family resource centers and programs into distressed areas.
- 19.1.5 Create flexible regulations in the development code to encourage public and private business partnerships to develop speculative properties in economically distressed areas.
- 19.1.6 Evaluate opportunities for the economic revitalization of the Greenfield Industrial Park.

WILMINGTON STATE PORT:

Policy 19.2 Support the continued competitiveness of the State port by achieving mutually acceptable development goals that address the need to maintain the harbor, improve inland highway and rail access, and upgrade the terminal.

Implementation Strategies for Policy 19.2

- 19.2.1 Follow the recommendations of the ports Master Capital Development Plan, including, deepening the shipping channel, and upgrading the terminal.
- 19.2.2 Follow the recommendations of the Transportation section of this Plan for improved inland highway and rail access.
- 19.2.3 Balance the needs of the State Port with recreational boating on the Cape Fear River.

19.2.4 Adhere to Cape Fear River Corridor Plan recommendations.

MARINE ECONOMY

Policy 19.3 Support the water dependent marine economy

Implementation Strategies for Policy 19.3

- 19.3.1 Support aquaculture research and marine technology.
 - Enhance promotion of environmentally friendly aquaculture research technology.
 - Increase financial support of the existing marine technology education program at UNCW and CFCC.
- 19.3.2 Support the efforts of marine trade services for expanded boat manufacturing and boating services such as marinas in suitable locations.
- 19.3.3 Address the need for more public boat slips and marinas to accommodate both local and traveling boaters.

Policy 19.4 Support the continued productivity of commercial and recreational fisheries through the protection of the unique coastal ecosystems, including primary nursery areas, shellfish waters and coastal marshes upon which they depend, and the Masonboro Island Estuarine Research Reserve.

Implementation Strategies for Policy 19.4

- 19.4.1 Support implementation of the Coastal Habitat Protection Plan.
- 19.4.2 Support the protection and preservation of Masonboro Island Estuarine Research Reserve:
 - Continue pursuing island acquisition and preservation strategies
 - Support the scientific research activities of the Reserve.

WILMINGTON INTERNATIONAL AIRPORT:

Policy 19.5 Cooperate with the New Hanover County Airport Authority to increase the competitiveness of the Wilmington International Airport while being mindful of the compatibility with adjacent businesses and homes.

Implementation Strategies for Policy 19.5

- 19.5.1 Encourage airport economic growth and development.
- 19.5.2 Support the airport master plan with regard to economic growth.
- 19.5.3 Address compatibility with the Land Use and Transportation policies of this Plan.

SECTION G: Historic Preservation

Issue 20: Historic Preservation

- The City and County need to identify and preserve historic and cultural resources.

Policies

The City of Wilmington and New Hanover County shall:

Policy 20.1 Cooperate with non-profit and for profit organizations to preserve and provide regulatory and cultural guidance for historic sites and historic areas.

Implementation Strategies for Policy 20.1

20.1.1 Update and revise existing historic district design guidelines to provide direction to the homeowners, builders, and contractors to preserve visual and historic character in the redevelopment of downtown Wilmington.

Policy 20.2 Identify and protect important historic and archaeological resources.

Implementation Strategies for Policy 20.2

- 20.2.1 Conduct a county-wide historic resource survey update that identifies additional historic resources and significant architectural and natural areas or sites.
- 20.2.2 Update existing National Register District survey to identify contributing and noncontributing resources for tax credit purposes and demolished resources and new construction.
- 20.2.3 Develop a historic preservation plan for protection of sensitive areas and sites; or where preservation is not possible, a plan for the mitigation and recovery of historic data.
- 20.2.4 Offer density credits as incentives for implementing area and site protection plans.
- 20.2.5 Update current regulations to require identification of potential impacts to historic resources.
- 20.2.6 Support a community archaeological program that will provide assistance to help salvage threatened land and water archaeological sites and promote public education and participation.
- 20.2.7 Coordinate historic preservation efforts and public education with non-profit historic preservation groups.

Policy 20.3 Continue the redevelopment of historic downtown Wilmington as a high priority, building on past successes and carefully matching public incentives with private investment. Care should be taken to preserve the visual character and historic atmosphere of old Wilmington.

Implementation Strategies for Policy 20.3

- 20.3.1 Expand boundaries of Wilmington’s local historic districts towards the north and south.
- 20.3.2 Conduct reconnaissance survey with recommendations to expand the boundaries of the National Register District to encompass adjoining areas that have become eligible for inclusion.
- 20.3.3 Enhance existing affordable housing programs within the historic districts.
- 20.3.4 Adopt design guidelines and building codes to facilitate renovations in low-income areas.
- 20.3.5 Protect and maintain historic brick street pavers.
- 20.3.6 Reference the CAMA Plan Historic Preservation Element for guidance in historic preservation issues.
- 20.3.7 Initiate the establishment of Conservation Districts and conduct public education.
- 20.3.8 Establish local historic districts in early 20th-century neighborhoods such as Forest Hills and Sunset Park.
- 20.3.9 Use guidelines created by other county jurisdictions as a model to establish a County Historic Preservation Commission to identify historic structures and develop historic resource design guidelines that pertain to districts and landmarks.

SECTION H: Storm and Natural Hazard

Issue 21: Land Use and Safety

- The hurricane prone nature of the area requires focused attention on existing ordinances and building codes.
- Improper use of land susceptible to hurricane and flooding damage poses risk to the safety of visitors and citizens.

Policies

The City of Wilmington and New Hanover County shall:

Policy 21.1 Assess measures to respond to a hurricane or other natural disaster to safeguard future populations from development which may put increased numbers of people at risk in hazard incidents.

Implementation Strategies for Policy 21.1

- 21.1.1 Discourage high intensity uses and large structures from being constructed within the 100 year floodplain (1% annual chance floodplain), erosion prone areas, and other locations susceptible to hurricane and flooding hazards.
- 21.1.2 Enforce current zoning and subdivision regulations regarding development in the floodplain.
- 21.1.3 Following a storm event, take advantage of opportunities to acquire or purchase land located in storm hazard areas which are rendered unbuildable or have sustained substantial damage. The property should satisfy objectives including, but not limited to the conservation of open space and scenic areas and the provision of public water access.
- 21.1.4 Review repetitive loss properties and apply for grant funding when available.
- 21.1.5 Follow recommendations of Project Impact and the Hazard Mitigation Planning Initiative.
- 21.1.6 Any update to this part of the CAMA Plan should be reviewed for consistency with the Hazard Mitigation Plan and vice versa.
- 21.1.7 Identify areas impacted by hazards.
- 21.1.8 Declare a moratorium on the acceptance of any request for rezoning in flood prone areas other than for rezoning to a less intense use.
- 21.1.9 Declare a moratorium on the permitting of any new construction, new utility hook-ups, or redevelopment construction that would increase the intensity of the land uses existing in disaster prone areas.
- 21.1.10 Request that new assessments of hazard areas be performed periodically due to the changes to the floodplain, shoreline and inlets caused by natural and man made forces.

Policy 21.2 Limit density to 2.5 units / acre or less in conservation areas (100 year, or 1% annual chance floodplain).

Implementation Strategies for Policy 21.2

- 21.2.1 Continue enforcing the limit as specified.

- 21.2.2 Develop a program for density tradeoffs to encourage development outside the floodplain.

Issue 22: Government Response

- Citizens and visitors depend upon the governments of New Hanover County, the City of Wilmington, and the beach Communities to provide a plan of action to protect their lives and property.

Policies

The City of Wilmington and New Hanover County shall:

- Policy 22.1 Appoint a Recovery Task Force, as needed, with the responsibility for directing reconstruction within New Hanover County after a damaging storm.**

Implementation Strategies for Policy 22.1

- 22.1.1 The Task Force shall be responsible for assessing storm damages and impacts and advising the Board of the County Commissioners on a diverse range of post-storm issues.
- 22.1.2 A building moratorium may be authorized or extended by the Recovery Task Force through a resolution by the Board of County Commissioners and/or City Council.
- 22.1.3 The City and County shall closely monitor all reconstruction efforts involving both public and private utilities, including roads, to provide for less vulnerable redevelopment after a hurricane.
- 22.1.4 Planning and Inspections department review process must be intact and ready to respond in case of a hazard event. Follow recommendations of Project Impact and Hazard Mitigation Planning Initiative.

- Policy 22.2 Retain on a seasonal basis an assistance facilitator/consultant who, as directed by the County Manager, will be responsible for making recommendations and coordinating assistance to elected officials, the Recovery Task Force, and the citizenry in the event of a natural hazard occurrence.**

Implementation Strategies for Policy 22.2

- 22.2.1 The assistance facilitator/consultant will be charged by the County Manager with the following tasks:
- Determining the types of assistance available to the City and County and the type of assistance most needed.
 - Assisting in the coordination of federal disaster recovery effort.
 - Coordinating State and Federal programs of assistance.
 - Informing the citizenry of the types of assistance programs available.
 - Recommending to the Recovery Task Force and Board of Commissioners programs that are available and acting as facilitator in securing those programs.

Policy 22.3 Immediately restore services and remove and clean up debris following a major storm event.

Implementation Strategies for Policy 22.3

- 22.3.1 The City and County shall be responsible for the overall supervision of cleanup and disposal of debris resulting from an intense storm event.
- 22.3.2 In hurricane damaged areas, give priority to those repairs that restore service to the greatest number of people.
- 22.3.3 Where economically feasible replace, strengthen, or relocate public utilities that have sustained major damage due to a hurricane storm event.
- 22.3.4 Perform damage assessment, determine facilities that should be replaced, seek grants or other funding, and relocate facilities.
- 22.3.5 Follow recommendations in the All Hazard Mitigation Plan.
- 22.3.6 The North Carolina Department of Transportation (NCDOT) will be responsible for the removal and clean up of debris from State maintained roads immediately following a major storm event.
- 22.3.7 Develop a strategy to include funding for expediting the onset and completion of disaster recovery and debris removal following a storm.
- 22.3.8 The City of Wilmington will be responsible for the clean-up of City streets.
- 22.3.9 Private development homeowners will be responsible for the clean-up of debris on private roads or public roads not yet accepted by NCDOT.

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PART IV LAND CLASSIFICATION MAP

LAND CLASSIFICATION MAP DESCRIPTION AND DEFINITIONS

The land classification system is a means of assisting in the implementation of the Comprehensive Plan policies. It allows the local government and its citizens to specify those areas where certain policies will apply. The land classification system is intended to be supported and complemented by zoning, subdivision and other land use management tools. Together they provide the guidance to help realize the desired future land uses. The land classifications for the 2005 Wilmington-New Hanover County Comprehensive Plan Update are as follows:

Urban

The purpose of the Urban class is to provide for continued intensive development and redevelopment of existing urban areas. These areas are already developed at a density approaching 1,500 dwelling units per square mile. Urban services are already in place or scheduled within the immediate future. Most of the land within the City of Wilmington is designated as Urban, except for some land designated as Transition, Conservation, or Resource Protection within the estuarine watershed areas. Development may exceed the 25 percent impervious surface area limit and density limits of 2.5 units per acre within the Urban class, depending upon local zoning regulations. Mixed use, cluster and higher density development may be appropriate within Urban areas.

Transition

The purpose of the Transition class is to provide for future intensive urban development on lands that have been or will be provided with necessary urban services. The location of these areas is based upon land use planning policies requiring optimum efficiency in land utilization and public service delivery.

Residential development can exceed the 25 percent impervious surface limit and density limits of 2.5 units per acre within the Transition area provided the development is adequately designed to be compatible with existing and proposed surrounding land uses and it is served by:

1. Sewer - the development shall be served by City or County sewer systems.
2. Municipal or County water system - the development shall be served by City or County water systems or a private water system constructed in accordance with City of Wilmington standards.
3. Direct access to a minor arterial or larger access road, as classified under the New Hanover County Thoroughfare Classification System - the development may be required to fully provide or to share in the cost of the provision of roadway improvements needed to adequately serve the proposed development and the community in general.

Community

The purpose of the Community class is to provide for a village type of development to help meet housing, shopping, employment and public service needs within the more rural areas of the County. Services may be provided to these areas.

These formerly rural areas of the planning jurisdiction are typically characterized by a small grouping of mixed land uses, such as community shopping, strip commercial, church, school and residences, which provide low intensity retail service and housing opportunities. The areas currently designated as “Community” include Seabreeze and Castle Hayne.

Rural

The purpose of the Rural class is to provide for areas of low intensity land uses, such as agriculture, forest management, mineral extraction and other traditional agrarian uses. This classification discourages the premature conversion of these lands into urban-type uses and the subsequent loss of resource production.

Other land uses of a noxious or hazardous nature with the potential for negative impacts on adjacent uses may be allowed, provided that they can be sited in a manner which will minimize their negative effect on surrounding land uses and natural resources.

Only low density residential development not exceeding 2.5 units per acre is permitted, since the extension of urban services into the Rural class would be an inefficient use of resources. Compatible commercial and industrial uses may also be allowed, provided that natural resources are not adversely impacted.

Conservation

The purpose of the Conservation class is to provide for effective long-term management and protection of significant, limited or irreplaceable natural resources while also protecting the rights of the property owner. Management of these areas may be required for a number of reasons, including natural, cultural, recreational, productive or scenic values, but are primarily flood prone areas.

Lands placed in the Conservation class present challenges from a land use standpoint, as they are often the most desirable from a development perspective and they may be, at the same time, the most undesirable to develop from an environmental or public safety perspective.

Lands placed in the Conservation class are generally the least desirable for development because:

1. They are too fragile to withstand development without losing their natural value; and/or
2. They have severe or hazardous limitations to development; and/or
3. Though they are not highly fragile or hazardous, the natural resources they represent are too valuable to endanger by development.

In order to promote the highest and best use while preventing a negative impact on water quality, site specific flexibility and creativity is desirable. The application of regulations regarding issues such as

density, buffers and impervious surfaces should enhance this flexibility. The use of incentives such as density credits and performance criteria is encouraged.

Generally, estuarine areas of environmental concern (AEC's) as defined by the State of North Carolina and adjacent lands within the 100-year floodplain have been classified as Conservation.

Conservation areas should be preserved in their natural state. Woodland, grassland and recreation areas not requiring filling are the most appropriate uses. Exceptions to this standard are limited to water-dependent uses (i.e., uses that cannot function elsewhere), shared industrial access corridors, and those exceptional development proposals which are sensitively designed so as to effectively preserve the natural functions of the site. The following guidelines clarify these Conservation area objectives and development of property should be limited to the following uses:

1. Water dependent uses - may include: utility easements, docks, wharves, boat ramps, dredging, bridge and bridge approaches, revetments, bulkheads, culverts, groins, navigational aide, moorings, pilings, navigational channels, simple access channels and drainage ditches. In some instances, a water-dependent use may involve coverage of sizeable land areas with limited opportunities to integrate the use with the site's natural features. This would require reclassification of the site. By contrast, water dependent uses which can be designed to preserve a site's natural features may not require reclassification. This would be the preferred type of development.
2. Shared industrial access corridors - as discussed in the U.S. Army Corps of Engineers' The Wilmington Harbor: Plan for Improvement, would provide necessary access to the channel of the Northeast Cape Fear River for industries located on high ground while minimizing the adverse environmental impacts of such access.
3. Exceptional developments preserving natural features are projects which are sensitively designed to be in harmony with the site's natural features and natural functions, and provide a balance with the highest and best use of the property. Such projects minimize erosion, runoff and siltation; minimize impervious surfaces impacts and protect estuarine resources; do not interfere with access to or use of navigable waters; do not require extraordinary public expenditures for maintenance; ensure that ground absorption sewage systems, if used, meet applicable standards; and should be aware of and not damage historic, architectural or archeological resources.

In no case, with the exception of the Wilmington National Register Historic District, shall residential density in the Conservation class be permitted to exceed 2.5 units per acre or greater than 25% impervious surface coverage, regardless of the existence of public urban services. Residential densities and impervious surface coverage may be required to be as low as 1.0 unit/acre or 15% or less respectively, depending on the environmental constraints within a particular area. While certain Conservation areas may be served by public sewer in order to eliminate septic system pollution, this should not be misconstrued as an incentive to facilitate increased development density.

Resource Protection

The purpose of the Resource Protection class is to provide for the preservation and protection of important natural, historic, scenic, wildlife and recreational resources. The Resource Protection class has been developed in recognition of the fact that New Hanover County, one of the most urbanized

counties in the State, still contains numerous areas of environmental or cultural sensitivity which merit protection from urban land uses.

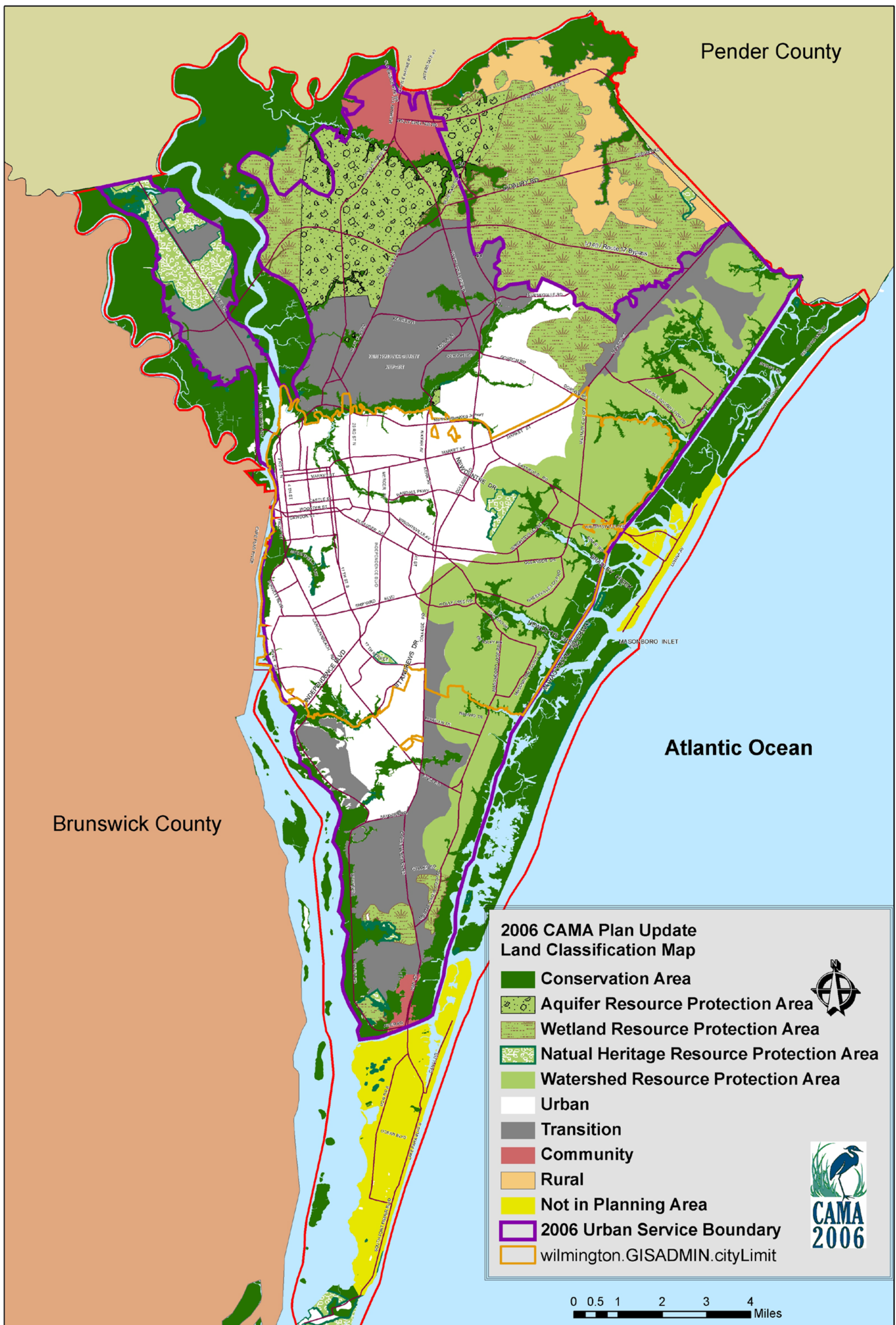
There are four subclasses within the Resource Protection land classification, based on the character of the resource targeted for protection – Watershed Resource Protection, Aquifer Resource Protection, Wetland Resource Protection, and Natural Heritage Resource Protection. The protection strategies developed for each of the subclasses is intended to be more in tune than previous plans with the specific resource being protected and not a one-size-fits-all approach. The following paragraphs summarize the nature of the resource, the threat to the resource, and the focus of protection strategies.

1. **Aquifer Resource Protection** – This subclass occurs in the Northwest part of the County North of Smith Creek, and is the area where the Castle Hayne and Pee Dee Aquifers secondary recharge occurs. The impacts that the resource is being protected from is diminished recharge of the aquifer and contamination of the aquifer by inappropriate land uses. The focus of strategies to protect this Resource Protection subclass is encouraging larger lot development if septic systems are used to prevent cross contamination of wells, extension of water and sewer service to curtail septic system use, prevention of uses that pose risk of spill of hazardous materials, and encouraging development practices that promote sustained recharge.
2. **Wetland Resource Protection** – This Resource Protect subclass is primarily in the northeastern part of the county. The impact from which protection is needed is loss of wetland areas to development. The primary resource protection strategies focus on encouraging preservation of wetlands and wetland functions.
3. **Natural Heritage Resource Protection** – This subclass of Resource protection areas are predominantly in the northwest corner of the County with smaller segments scattered elsewhere. These are areas identified by the NC DENR Natural Heritage Program as generally unique habitats that warrant special attention and protection. The threat to these areas is loss of habitat or fragmentation of habitat that may be crucial to a particular natural community identified as important. The focus of strategies for this subclass is to better identify these areas and develop specific protection strategies.
4. **Watershed Resource Protection** – This subclass occurs along the tidal creeks and is defined as the area within ½ mile of the 100-year flood plain for those creeks. The impact that the resources is being protected from is pollutant laden stormwater runoff from impervious surfaces within the watershed. The protection strategy for this subclass of resource protection area focuses on minimizing new impervious surface, retrofitting protection measures to improve water quality of runoff from existing impervious surfaces and to promote low impact best management practices for development and redevelopment.

LAND CLASSIFICATION MAP

Included on the next page is the Land Classification Map. This map indicates the location of each of the land classes previously described in this section. It is intended for general location purposes only and should not be utilized for site-specific interpretive purposes due to its scale. For more detailed information regarding the land classification for a specific site, contact the New Hanover County Planning Department or the City of Wilmington Development Services Department.

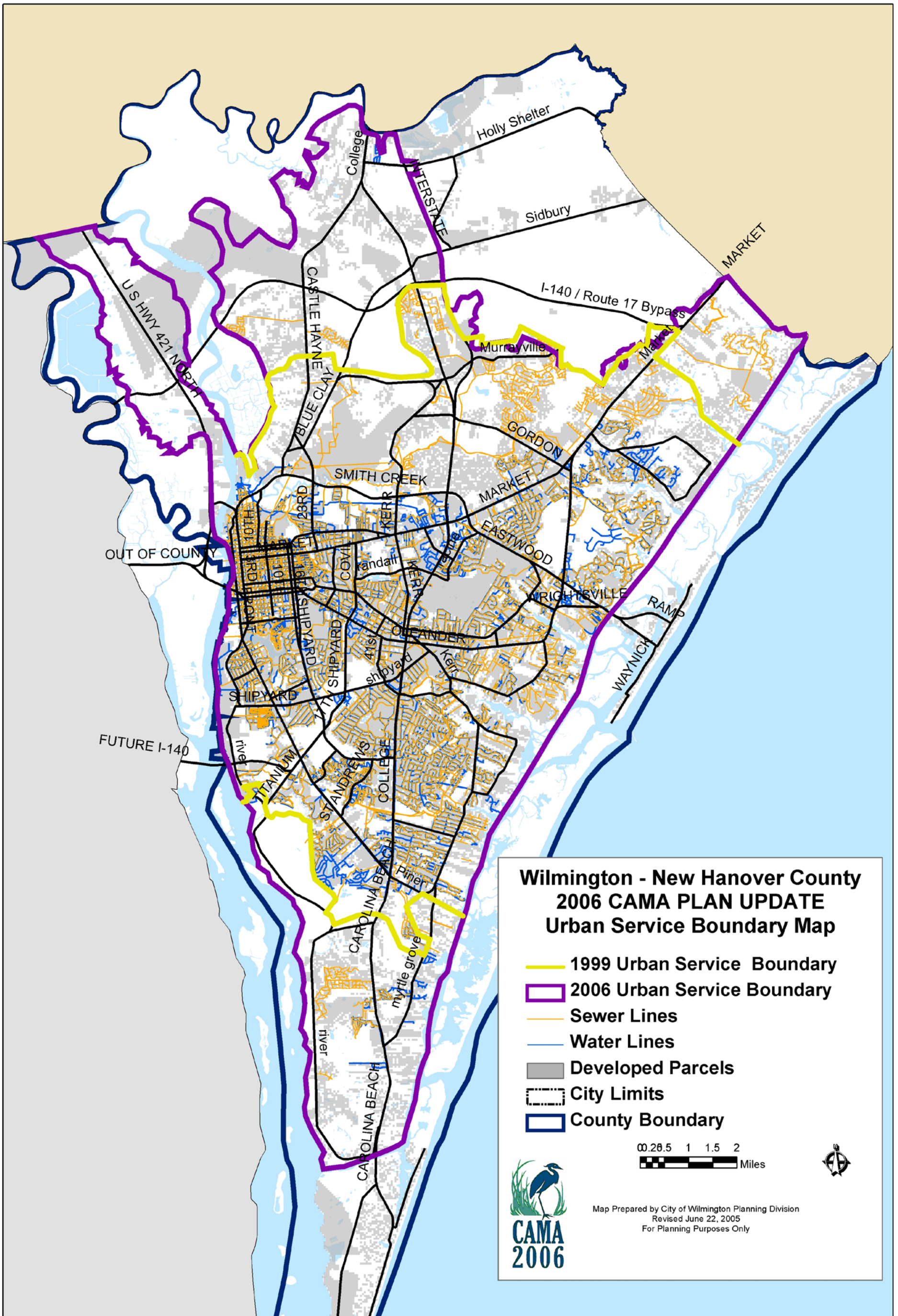
2006 Wilmington - New Hanover County CAMA Plan Land Classification Map Update



URBAN SERVICES AREA BOUNDARY MAP

The boundary line referred to as the Urban Services Boundary on the Land Classification map defines the extent of the planned Urban Services Area. The Urban Services Area Boundary, in combination with the Land Classification Map provides direction for the location and type of new development that may occur within New Hanover County. Areas within the Urban Services Boundary are considered to be Urban Service Areas, which either already receive a full range of urban services, or are areas to which urban services may be extended in the future. Extension of services will be based on development needs, economics, timing of capacity upgrades, and the relevant policies contained in this plan. The basis for these provisions is that adequate urban facilities and services are a prerequisite for new urban development. The Urban Services Area is intended as a rational tool for the planning and extension of urban services. For the purposes of this plan, urban services will refer primarily to water and sewer lines, but which also might include fire protection, public roads, public schools, and other public infrastructure.

CAMA 2006 Urban Services Boundary Map



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PART V: POLICY ANALYSIS

Role of the CAMA Plan in Local Decisions

The 2006 CAMA Plan Update serves a variety of functions and the plan for the future contains a broad range of:

- **Goals:** Desired ends toward which policies and programs of the Plan are directed. Many of the goals reflect requirements set forth in the Division of Coastal Management's (DCM's) Coastal Resource Commission (CRC) rules;
- **Issues:** More specific and measurable than the general goals – these identify the specific issues and concerns in the community that the plan is designed to address;
- **Policies:** A consistent set of policies for making a variety of local decisions designed to accomplish the goals and address the issues. These policies guide decisions by the County and City and their elected and appointed boards, and staff.
- **Implementation Strategies:** Specific strategies that can be implemented and advance the plan's policies. Many of these recommended strategies are nonregulatory in nature and will be addressed through the City and County capital improvement program (CIP) or through subsequent planning efforts or programs.

Collectively, the goals, issues, policies, and implementation strategies provide guidance for long range planning decisions and directions and help guide day to day operations and development. The daily functions relate primarily to the decisions of actions of elected and appointed officials and administrative staff.

While the CAMA Plan policies do not have the same weight as a local zoning ordinance, except in matters related to development or land uses within Areas of Environmental Concern (AECs), the policies and implementation strategies and the land classification map help guide decisions on future ordinances and zoning decisions. Moreover, the elected officials will use the CAMA Plan policies and strategies to support actions when making decisions on capital improvement program (CIP) and annual operating budgets. The City and County will also review the implementation strategies and make periodic adjustments based on budgetary considerations, emerging issues, problems or community needs, or to coordinate with future planning efforts and ongoing projects. All changes to the CAMA Plan policies and recommended actions will be submitted to the Coastal Resources Commission (CRC) for its subsequent approval.

Other boards and committees will also use the CAMA Plan. The City's Planning Commission and County Planning Board will use the plan and its policies to determine the consistency of project plans and development proposals with community issues and aspirations. Its policies and recommendations will provide an additional layer of guidance for decisions on whether to grant or deny requests for such things as ordinance amendments, special use permits, variance requests, or the approval of project plans.

Staff in the City's Development Services Department and the County Planning Department will use the policies and strategies when reviewing site plans and development proposals. Other City and County departments will use the policies and recommended implementation strategies to guide proposals for projects and plans for public facilities and programs. Many of the plan's policies and strategies also guide ongoing operations and programs within other departments as well, particularly the City Public Utilities Department, Public Services Department and County Engineering Department and their efforts to manage infrastructure and address problems associated with stormwater runoff. Accordingly, staff will use the implementation strategies to provide additional guidance to budget preparation, the

development of the CIP, and make reference to the plan when applying for various sources of federal, state, and private funds.

The CAMA Plan will also be used by federal and state officials, in particular DCM for consistency determinations for major permits issued pursuant to CAMA regulations. Other state and federal agencies will also use the plan to determine the consistency of their projects and programs with the policies contained in this plan.

The CAMA Land Use Plan will also be of use to a variety of community members. The Plan is a useful tool for developers and property owners because it provides guidance on the types of land use and development that are desired within the community. The Plan's policies and recommendations will also help developers to craft proposals that are consistent with the Plan's policies and strategies, thereby increasing the likelihood that these projects will be approved. The plan also provides information that will help owners and developers to better understand the potential and limitations of their property. The plan also provides community members with information to reference when evaluating the appropriateness of projects within the community.

Tools For Managing Development

All land development in Wilmington and New Hanover County is subject to a wide range of state and local permits pursuant to a comprehensive set of state regulations and local ordinances. The County also enforces some provisions of the state building code. The report contained in **Appendix F** summarizes the major plans, policies and regulatory provisions of both the City and the County that provide additional tools for managing development.

Implementation Schedule

In order to be a meaningful tool, any plan has to be implemented, and to be implemented effectively and efficiently requires a strategy for implementation. The implementation summary included as **Appendix B** is an attempt to guide implementation of the many strategies in the Plan for the Future.

For each of the main topics the policies and implementation strategies have been summarized into tables with the following detail:

- The priority given to the action item;
- An assessment of resources required for implementation;
- The fiscal year in which it is proposed to be initiated; and
- The responsible agency.

The implementation summary in the appendix will be used to evaluate progress in implementing the Plan.

Consistency of the Policies with Management Topics

The Division of Coastal Management requires local governments to analyze the policies and strategies of the CAMA Plan and the future land use map. This section provides a clear and substantive guide for review and certification of the future planning elements of this document by examining:



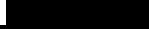
- The consistency of the plan with the management topics;
- The impact of the policies and recommended actions on the management topics specified in the rules.


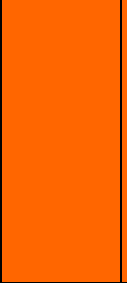




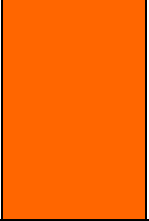
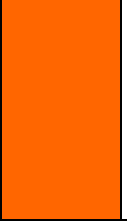
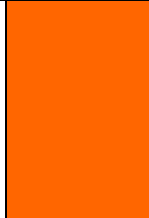
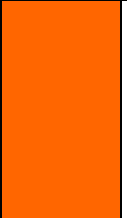
This analysis is provided to demonstrate that the plan's policies and strategies are consistent with the management topics required under the CAMA rules. Management topics are the categories of local land use and development policies determined by the Coastal Resources Commission (CRC) to be essential for proper use, development, and protection of natural and manmade resources in coastal areas. The rules identify six management topics:

- **Land Use Compatibility:** Management of land use and development in a way that minimizes its primary and secondary impacts on natural and man-made resources;
- **Infrastructure Carrying Capacity:** Strategies to ensure that infrastructure is available to support anticipated and planned development and that it is managed to protect AECs and other fragile areas;
- **Public Access:** Strategies for maximizing community access to beaches and public trust areas;
- **Water Quality:** Land use and development policies and strategies to protect quality waters and restore quality in waters that are non-supporting;
- **Natural Hazard Areas:** Policies to reduce the communities vulnerability to natural hazards; and,
- **Local Areas of Concern:** Specific policies and strategies to address local planning and development goals.

The Matrix that follows demonstrates consistency between the policies of the eight elements of the plan and the management topics identified in the rules. The matrix examines each policy and evaluates whether it has a positive or negative impact on the management topics or whether it is neutral with regard to the management topic.

ConsistencyMatrix

Key	
Positive	
Neutral	
Negative	

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
Natural Resources								
	<i>Water Quality</i>	1.1 Make every effort to prevent further deterioration of estuarine water quality and loss of public trust uses in the creeks and sounds and improve water quality in all surface water bodies so that each water body meets its use designation as determined by the Divisions of Water Quality, Marine Fisheries, Health, and E.P.A.						
		1.2 Maintain water quality levels in all surface water bodies once their use-designation has been achieved.						
		1.3 Ensure the protection of water quality throughout the Cape Fear River Basin and the management and maintenance of drainage within coastal watersheds through the development of countywide water quality / stormwater management programs.						
		1.4 Ensure the protection, preservation and wise use of our natural resources by careful review and consideration of the potentially adverse environmental impacts of development through the creation and implementation of an environmental review process.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		1.5 Provide further protection and improvement of water quality through revisions to City and County ordinances that specify standards for water quality, buffers, setbacks, density, impervious surface, and overlay corridors. Such standards should consider estuarine, lake, river and stream water quality; and should build upon existing information, including the Cape Fear Basinwide Plan, and ordinances.						
		1.6 Employ stormwater BMP retrofits to mitigate water quality impacts resulting from existing development.						
		1.7 Continue and expand programs to reduce the effects of existing development of water quality.						
		1.8 Continue and expand programs for stream, buffer, wetland and vegetation restoration in and adjacent to areas that have been developed.						
		2.1 Ensure the provision and preservation of adequate open space for the continuing enjoyment of residents, for its contribution to the community today and for generations to come, to protect our natural environment and wildlife habitats, and to provide educational and recreational opportunities.						
		2.2 Identify and protect greenways as a part of a natural areas master plan and protect these resources or mitigate their loss as part of the development process.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		2.3 Encourage development patterns that preserve natural areas, buffers, and trees by developing standards for cluster development and other development types that allow greater design flexibility.						
		2.4 Identify mechanisms to preserve high quality farmlands and woodlands.						
		2.5 Develop a greenway master plan that integrates Airlie Gardens with other parks, open space, and natural areas targeted in a natural areas preservation plan to achieve the following goals: provide public open space; protect water quality, the natural environment, and the coastal landscape; provide educational opportunities; and assure perpetual accessibility for the community.						
		2.6 Ensure the protection of trees and the provision of adequate landscaping to address urban design and resource protection issues and encourage the use of native vegetation in landscaping through updating of city and county development ordinances and processes and establishment of a joint City-County Tree Advisory Commission.						
		2.7 Encourage and support the replacement of trees lost to natural disaster and ensure the protection of significant community trees.						
		2.8 Provide for the protection and development of public waterfront and boat access areas.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		2.9 Pursue opportunities for acquisition as a critical strategy in the provision and protection of open space and public spaces.						
	<i>Environmental Protection/Quality of Life</i>	3.1 Preserve and restore shell fishing to all SA waters and restore the water quality of all non-supporting surface waters to levels necessary to support their use designations.						
		3.2 Protect the Cape Fear River from the cumulative impacts of development by supporting the development and implementation of a Total Maximum Daily Limit (TMDL) to balance impacts from wastewater treatment plant and industrial discharges and upstream point and nonpoint sources of pollutants.						
		3.3 Protect the Cape Fear River from the cumulative impacts of development by carefully reviewing development plans and enforcing measures to minimize their potential impacts from runoff or discharge of sediment, nutrients, and other pollutants to the river.						
		3.4 Eliminate water pollution resulting from malfunctioning or inadequate septic systems, package treatment plants, and municipal wastewater treatment plants by continuing the phased development, expansion, and upgrades of the public sewer system within the urban services area to address these problems.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		3.5 Conduct an environmental review to include an analysis of cumulative impact prior to sewer system development or extension.						
		3.6 Protect surface water quality by allowing only tertiary sewage treatment plants of the highest quality, whose standards of operation provide the greatest measure of water quality protection, to discharge into public surface waters. Prohibit on- or off- site land application of untreated wastewater. Allow land application of dewatered sludge at sites located such that it does not degrade surface waters.						
		3.7 Ensure the protection of coastal and federally regulated wetlands and exceptional and substantial non-coastal wetlands that have important functional significance through early identification in the development process. Review of development proposals should seek to achieve the hierarchical goals of impact avoidance, minimization, and/or compensation.						
		3.8 Ensure the protection of undeveloped barrier and estuarine system islands by avoiding development, supporting research and passive recreation as their primary uses, and identifying such islands as prime candidates for public acquisition.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		3.9 Carefully control development activities within the 100-year floodplain (1% annual chance floodplain) according to density and impervious surface limits to protect the public safety, reduce the risk of property damage, and provide for the long-term protection and management of these environmentally significant resources. The following standards shall apply:						
		a. Limited, exceptionally designed industrial, commercial, and residential development projects may be allowed within the floodplain only where it can be demonstrated that the project cannot be located out of the floodplain and where adverse impacts to the estuarine system can be shown to be negligible.						
		b. Low intensity uses on a site, such as open space and recreation, should be located in areas most susceptible to flooding.						
		c. All projects shall comply with hierarchical review standards of impact avoidance, minimization, and compensation for unavoidable impacts.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		3.10 Protect the health of coastal ecosystems by requiring the consideration in all land use decisions and in the development or revision of local plans, capital facilities, services, and ordinances of the <i>cumulative and secondary impacts</i> of land use and development, and the limited <i>carrying capacity</i> of coastal ecosystems.						
		3.11 Allow channel and inlet maintenance projects, including the continued use and development of the Wilmington Harbor and the State Ports and maintenance of the Atlantic Intracoastal Waterway, and beach renourishment projects only where the public trust interest is preserved or enhanced; significant economic or recreational benefits will occur for New Hanover County residents; and no significant adverse impacts will occur on shoreline dynamics. Support State and Federal channel and inlet maintenance projects.						
		3.12 Carefully control development and redevelopment activities within estuarine watersheds and other AECs to prevent the degradation of water quality in the creeks and sounds, to protect the public health, and to ensure the protection of these vital natural resources by reducing nutrient, pesticide, sediment and other pollutants. The following standards shall apply:						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		a. Impervious surface coverage shall be limited to twenty-five percent (25%) in Watershed Resource Protection and Conservation areas with increases allowed for exceptionally designed projects with stormwater controls that demonstrate equivalent protection.						
		b. Natural vegetative buffers shall be established to effectively filter runoff before it enters surface waters.						
		3.13 Designate streams on which to establish standards for vegetative buffers to preserve, protect, and restore water quality and vital estuarine resources.						
		3.14 Encourage development away from exceptional and significant wetlands and Areas of Environmental Concern (AECs) and by allowing greater design flexibility in cluster development and other alternative development types.						
		AREAS OF ENVIRONMENTAL CONCERN:						
		3.15. Prohibit the use of estuarine waters, estuarine shorelines and public trust areas for development activity which would result in significant adverse impact to the natural function of these areas.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		3.16 Prohibit incompatible development in ocean erodible areas, high hazard flood areas, inlet hazard areas as identified on the Flood Hazard Map, and coastal and federally regulated wetlands and required buffers to protect public safety, reduce the risk of property damage, and provide for the long-term protection and management of these environmentally significant resources due to their natural role in the integrity of the coastal region.						
		3.17 Support the preservation, protection, and addition of remaining privately held properties to the Masonboro Island Estuarine Research Reserve.						
		3.18 Provide public access to public trust waters by allowing the development of marinas, dry stack storage, and moorings to the extent that their development shall not adversely affect estuarine resources or public trust waters. The following standards shall apply:						
		a. Marinas as defined in this plan shall not be allowed in Primary Nursery Areas (PNA), Outstanding Resource Waters (ORW), or open Shellfishing Waters (SA). Community boating facilities of any size permitted by the Division of Coastal Management may be allowed for waterfront communities.						
		b. Moorings and mooring fields shall not be allowed where they may have an adverse effect on navigation channels.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		c. Pumpout facilities shall be required for existing marinas with more than 10 slips which have boats containing enclosed heads.						
		3.19 Allow uses of estuarine and public trust waters that provide benefits to the public and satisfy riparian access needs of private property owners while encouraging shared use facilities. In tidal waters, individual docks shall be allowed only when shared use facilities are not provided for.						
		3.20 Prohibit new dredging activities in Primary Nursery Areas (PNA), Outstanding Resource Waters (ORW), and Shellfishing Waters (SA), except for the purpose of scientific research, designed for the purpose of protecting and enhancing water quality, and where supported by sound scientific and technical knowledge. Limited exceptions may be allowed for the urban waterfront and Wilmington’s ports, consistent with the goals and objectives of the Cape Fear River Corridor Plan (1997) and the Wilmington Vision 2020 Plan (2004) and for inlet management projects as permitted by the U.S. Army Corps of Engineers, and in accordance with the provisions in the implementation strategies below.						
		3.21. Prohibit clearcutting, mowing, or removal of coastal wetland vegetation within any coastal wetland AEC.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		3.22. Prohibit floating home development in order to protect our public trust and estuarine waters and to avoid impacts on hurricane mitigation efforts.						
		3.23. Accommodate existing properties and structures along our estuarine shorelines by allowing flexibility for retreat from migrating shoreline and wetlands. Develop strategies to reduce property damage from future threats.						
		3.24. Allow shoreline erosion control and stabilization above marsh wetlands only where the public trust interest is not impacted and the public shoreline will be the primary beneficiary. The shoreline stabilization method chosen shall, to the maximum extent feasible, maintain water quality and avoid or minimize adverse effects on nearshore habitat or natural resources.						
		3.25. Ensure the continued protection of ecologically sensitive ocean and estuarine shoreline areas through monitoring and control of off-road vehicle use, including signage programs, rewards, increased fines, and other means.						
		POTABLE WATER SUPPLY:						
		3.26. Ensure that all land use and development decisions protect groundwater aquifers.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		3.27. Protect groundwater aquifers by prohibiting activities if adverse impacts to the ground water aquifer will likely occur.						
		3.28. Preserve the Castle Hayne and Pee Dee aquifers in their present unpolluted state as the primary groundwater resources for the County.						
		OTHER FRAGILE OR HAZARDOUS AREAS						
		3.29. Review and update plans for the safe transportation of hazardous materials, the prevention and clean-up of spills of toxic materials, and the evacuation of area residents in response to natural or man-made hazardous releases.						
		3.30. Protect area residents by designating suitable locations for the siting of all industries, including energy facilities and high voltage power lines and opposing the development of all off-shore mineral, oil, and gas resources.						
		AIR QUALITY:						
		3.31. Ensure the protection and enhancement of air quality in the community through continued commitment and actions to meet or exceed State and National Air Quality Standards.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
Land Use and Urban Design								
	<i>Land Use Demand</i>	LOCATION AND DEMAND:						
		4.1 Designate sufficient land area and suitable locations for the various land use types.						
		INDUSTRIAL USES:						
		4.2 Delineate areas for industrial use which will maximize the efficient use of man made resources while protecting the fragile ecosystem from harm and protecting residents from undue impacts.						
		COMMERCIAL USES:						
		4.3 Maximize effectiveness of commercial uses by assuring that land is available for commercial uses within close proximity to the markets they serve and by ensuring that such commercial uses do not diminish the quality of life in nearby residential areas.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
	<i>Urban Design and Character</i>	MIXED USE DEVELOPMENT:						
		5.1 Promote mixed use development away from sensitive areas within the urban services area and higher density mixed use in redevelopment projects in order to maximize benefits from available infrastructure, preserve valuable natural resources including open space, and reduce dependency on the automobile.						
		DESIGN AND REGULATION:						
		5.2 Encourage innovative development strategies while providing flexible design guidelines that enhance the aesthetics and minimize adverse environmental impacts of the built environment.						
		5.3 Adopt specific performance criteria – including connectivity, transit facilities, and pedestrian and bike facilities - for new development and redevelopment that promote efficient transport of goods and services and provide alternatives to the automobile.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		5.4 Require new private and public development and redevelopment to be consistent with the intent and policies of this Plan, and any other applicable City or County plans including Community Growth, Wilmington Vision 2020, MPO Long Range Transportation Plan, Cape Fear River Corridor Plan, and Wilmington Future Land Use Plan, corridor plans, and neighborhood plans.						
		INFRASTRUCTURE:						
		5.5 Establish mechanisms to guide development to urban service areas defined by the existence of essential urban services and the planned provision of those services.						
		OPEN SPACE, CULTURAL AND RECREATION:						
		5.6 Develop a plan to acquire, protect and beautify historic and cultural sites, corridors along key roadways, railways, utilities, and streams, and significant natural areas.						
		RESIDENTIAL NEIGHBORHOODS:						
		5.7 Preserve the character of the area's existing residential neighborhoods and quality of life.						
Transportation								
	<i>Traffic</i>	6.1 Initiate and support increased funding from local, state, and federal agencies to improve the flow of people and products to and in the City and County.						

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			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		6.2 Support the MPO and the urban area jurisdictions in encouraging State and federal authorities to provide interstate connections to areas south of the urban area.						
		6.3 Collaborate with the MPO and NCDOT and implement strategies of corridor and thoroughfare plans to improve the functioning of the existing street network to operate at a level of service of D or better.						
		6.4 Reduce the impact of new driveways on the roadway networks.						
		6.5 Require street connectivity and minimize cul-de-sac development through better collector street planning.						
		6.6 Improve the ability of existing and planned thoroughfares to operate more efficiently by requiring all new development to meet the intent and policies of this Plan, and any applicable corridor or thoroughfare plan.						
		ALTERNATIVE FORMS OF TRANSPORTATION:						
		6.7 Support improved non-highway transportation facilities, including rail, airport, and shipping facilities for both passengers and freight to access the area.						

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			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		6.8 Collaborate with the NCDOT and the MPO to encourage alternative forms of transportation including regional rail, local transit, bicycle and pedestrian movement, Transportation Demand Measures such as van-pooling and ride sharing, and an inter-modal transportation system.						
		6.9 Provide alternatives to automobile transportation by requiring all new development, redevelopment, and improvements to existing facilities to make provisions for a comprehensive network of bicycle and pedestrian facilities, including pedestrian causeways, bridges, and crossings on collector streets and major arterials.						
	<i>Environment</i>	7.1 Strengthen environmental protection and mitigation of impacts during planning, construction and maintenance of transportation facilities.						
		7.2 Protect natural resources by requiring all projects to consider reasonable and feasible road construction and design alternatives.						
		7.3 Require all projects to avoid or mitigate noise, air quality, and other environmental impacts on existing residential areas when constructing and maintaining transportation facilities.						

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			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
<i>Corridors</i>		AESTHETICS:						
		8.1 Collaborate with the MPO to encourage the State to improve the community through enhancements of the streetscape, as identified in the 2004 Corridor Plans, and ensuring the preservation and use of indigenous flora on new and existing streets.						
		8.2 Ensure through revised standards the provision of adequate landscaping and tree protection for parking lots, sidewalks and in street right-of-ways for both public and private projects.						
		CORRIDOR PROTECTION:						
		8.3 Identify and utilize sources of funds and incentives to purchase or preserve thoroughfare or rail corridors in a timely and equitable manner. Where necessary, the City and County will participate in these improvements using impact fees, bonds and/or tax increases.						
		8.4 Investigate and use regulatory provisions for preserving thoroughfare and rail corridors.						
		8.5 Cooperate with NCDOT, railways, and other entities for the purchase of rail and road corridors for future transportation systems development.						

Section	Plan Issues	2005 Plan Policies	Management Topics					
			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
Community Infrastructure								
	<i>Facilities and Services</i>	9.1 Provide timely, cost-effective and efficient capital facilities and community infrastructure consistent with specific infrastructure plans, to suitable areas within the urban services area and develop criteria for future expansion of the urban services area.						
		9.2 Coordinate, rationalize, and consolidate where appropriate City, County, and other governmental agencies programs for the provision and maintenance of infrastructure and community facilities and services.						
		9.3 Explore alternative forms of financing for the infrastructure improvements needed to have a high quality level of service and to prevent a decline in the levels of service provided to County and City residents. Infrastructure needs to be addressed in this effort shall include transportation, education, sewer, water, recreation, libraries, police, fire, stormwater management, schools and other services deemed to be appropriate.						
	<i>Storm Water</i>	10.1 Expand storm water management to include areas not incorporated in existing programs.						

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			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		10.2. Develop a City and County storm water management program that balances the financial cost between existing and new development and provides incentives for redevelopment that includes retrofits to address existing problems.						
		10.3. Protect surface water quality by prohibiting new, and eliminating existing collection systems that directly discharge storm water to surface waters, including stormwater runoff from roadways.						
		10.4. Protect water quality by ensuring that drainage from land use activities has a rate of flow and volume characteristics as near to predevelopment conditions as possible.						
	<i>Sewer and Water</i>	11.1 Provide public sewer service to existing development in unincorporated areas that have inadequate and malfunctioning septic systems and package treatment plants.						
		11.2 Consolidate the City and County sewer and water system.						
		11.3 Ensure optimal use of sewage treatment facilities.						
		11.4 Ensure the provision of sufficient, affordable water and sewer services to proposed new service centers and industrial sites in the unincorporated areas of the County.						

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	<i>Education Facilities</i>	12.1 Give priority to the maintenance and optimal use of existing education facilities.						
		12.2 Locate schools in areas where they provide the maximum benefit to adjoining neighborhoods.						
		12.3 New schools shall be constructed by New Hanover County to maintain an adequate level of service.						
		12.4 Encourage greater coordination between the School Board and County and City government in planning and budgeting.						
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	<i>Culture and Recreation Facilities</i>	13.1 Identify economically distressed neighborhoods with inadequate facilities and prioritize for new recreation and cultural facilities.						
		13.2 Recognize the downtown Wilmington area as the cultural nucleus that nurtures, supports and strengthens other cultural centers throughout the region.						
		13.3 Develop a joint master plan for a comprehensive system of natural areas, greenways, parks and trails throughout the City and County that meet or exceed State level of service standards for the needs of the projected population.						
		13.4 Preserve rail and utility easements as part of a greenway system and link them with trails and greenways where possible.						

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			Public Access	Land Use Compatibility	Infrastructure Carrying Capacity	Natural Hazard Areas	Water Quality	Local Area Concerns
		13.5 Identify a suitable corridor and cooperate with public and private entities to develop the New Hanover County component of the East Coast Greenway.						
	<i>Police and Fire Services</i>	14.1 Provide timely and adequate staffing and facilities to maintain and improve the level of police and fire services.						
	<i>Waste Management</i>	15.1 Establish and maintain an environmentally responsible, cost effective system for managing solid waste that protects public health and provides adequate waste disposal capacity, solid waste collection and recycling services, and waste reduction opportunities.						
		15.2 Reduce and manage the solid waste stream through efficient waste collection, expanded recycling programs, encouraging composting, expanded household hazardous waste collection and education, and multi-jurisdictional cooperation.						
		15.3 Eliminate illegal trash dumping through strict monitoring and enforcement, including increased fines, signage program, rewards, and other means.						
		15.4 Continue to implement and improve the County's Comprehensive Solid Waste Management Plan.						

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Housing								
	<i>Demand</i>	MINIMUM HOUSING PROGRAMS:						
		16.1. Enhance the minimum housing program within the City and adopt a minimum housing program with enforcement in the County.						
		AFFORDABLE HOUSING PROGRAMS:						
		16.2. Support and enhance a broad range of affordable housing programs.						
		16.3. Increase the supply of affordable rental housing.						
		FUNDING:						
		16.4. Maximize funding opportunities from federal and state sources for community and economic development.						
		16.5. Explore alternative forms of financing for affordable housing, including impact fees, bonds, user fees, and tax increases.						
Special Populations								
	<i>Special Populations</i>	HOMELESS:						
		17.1. Cooperate with non-profit organizations to provide temporary and transitional shelter and better job referral services to persons who are homeless.						
		SPECIAL NEEDS AND ELDERLY:						
		17.2. Cooperate with non-profit organizations to ensure an adequate supply of housing for special needs, the elderly, and the disabled.						

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		UNCW AND CFCC STUDENT HOUSING:						
		17.3. Cooperate with UNC-Wilmington, and Cape Fear Community College to meet student housing needs.						
		NEIGHBORHOOD ASSOCIATIONS						
		17.4. Encourage the use of neighborhood associations by the County, City, and residents for outreach information and education.						
Economic Development								
	<i>Needs</i>	GENERAL ECONOMY:						
		18.1. Develop a coordinated economic development strategy to attract high paying employers that are economically diverse and environmentally mindful.						
		TOURISM:						
		18.2. Encourage tourism as part of a balanced and diversified economy.						
		SKILLED WORKFORCE AND EDUCATION:						
		18.3. Cooperate with the private sector and schools to develop training to maintain an employable work force with skills to meet current and projected demands.						

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	<i>Opportunities</i>	ECONOMICALLY DISTRESSED AREAS:						
		19.1. Cooperate with non profit and for profit organizations shall work to attract and retain business in areas that are economically distressed.						
		WILMINGTON STATE PORT:						
		19.2. Support the continued competitiveness of the State port by achieving mutually acceptable development goals that address the need to maintain the harbor, improve inland highway and rail access, and upgrade the terminal.						
		MARINE ECONOMY:						
		19.3. Support the water dependent marine economy.						
		19.4. Support the continued productivity of commercial and recreational fisheries through the protection of the unique coastal ecosystems, including primary nursery areas, shellfish waters and coastal marshes upon which they depend, and the Masonboro Island Estuarine Research Reserve.						
		19.5. Cooperate with the New Hanover County Airport Authority to increase the competitiveness, of the Wilmington International Airport while being mindful of the compatibility with adjacent businesses and homes.						

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Historic Preservation								
	<i>Historic Preservation</i>	20.1 Cooperate with non-profit and for profit organizations to preserve, and provide regulatory and cultural guidance for historic sites and historic areas.						
		20.2 Identify and protect important historic and archaeological resources.						
		20.3 Continue the redevelopment of historic downtown Wilmington as a high priority, building on past successes and carefully matching public incentives with private investment. Care should be taken to preserve the visual character and historic atmosphere of old Wilmington.						
Storm and Natural Hazards								
	<i>Land Use and Safety</i>	21.1 Assess measures to respond to a hurricane or other natural disaster to safeguard future populations from development which may put increased numbers of people at risk in hazard incidents.						
		21.2 Limit density to 2.5 units / acre or less in conservation areas (100 year, or 1% annual chance floodplain).						
	<i>Government Response</i>	22.1 Appoint a Recovery Task Force, as needed, with the responsibility for directing reconstruction within New Hanover County after a damaging storm.						

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		22.2 Retain on a seasonal basis an assistance facilitator/consultant who, as directed by the County Manager, will be responsible for making recommendations and coordinating assistance to elected officials, the Recovery Task Force and the citizenry in the event of a Natural Hazard occurrence.						
		22.3 Immediately restore services and remove and clean up debris following a major storm event.						

