

**Adopted: June 17, 2010**

**GREENSBORO COMPREHENSIVE PLAN**

**2010**



**Greensboro Comprehensive Plan  
2010**

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## Chapter 1

## **BACKGROUND**

### **INTRODUCTION**

From its inception in 1732, Greensboro has been influenced by groups of citizens who thought about and planned for the Town's overall development. The community leaders of the colonial era, like today's Town officials, were attempting to provide a rational basis for meeting the current and projected development needs of the community. Their purpose was to ensure the Town's continued vitality for centuries to come.

When the Maryland General Assembly gave counties and incorporated communities general planning authority it also granted the zoning and land subdivision powers needed to regulate the development of individual properties so that they would conform to community standards. The Comprehensive Plan provides the overall statement of community policy on development. Along with the Zoning and Subdivision Regulations, which implement these development policies, the Comprehensive Plan is recognized as a major part of the overall growth management program for the Town.

It is the object of this document to trace recent trends, to analyze factors affecting future development, to assess the will and interests of Greensboro residents regarding the future of their Town, and to establish a Comprehensive Plan for the Town which will direct future development.

Such a document must be viewed as dynamic and thus, continually reappraised and updated to reflect changing needs and trends. This Plan is part of an on-going process – the process of formulating and intelligently planning the direction and character of future growth in Greensboro – to assure its serviceable form and the achievement of the many objectives and policies contained herein.

### **AUTHORITY**

The Comprehensive Plan of the Town of Greensboro has been prepared as required and in accordance with the provisions of Article 66B of the Annotated Code of Maryland (as amended), the Maryland Economic Growth, Resource Protection, and Planning Act of 1992 (as amended), and the Smart Growth Areas Act of 1997. The Plan also serves to meet the minimum requirements of State law as enumerated in Natural Resources Article 8-1808 and appropriate criteria established for local jurisdictions, like Greensboro, which are located within Maryland's Chesapeake Bay Critical Area.

### **RELATIONSHIP TO OTHER PLANS AND LAWS**

The Town of Greensboro, as required by State laws, has prepared and continues to prepare a variety of specific plans and ordinances. Among them are the Zoning Ordinance, Subdivision Regulations, Sediment Control Ordinance, Stormwater Management Ordinance, Critical Area Program, Forest Conservation Program, and Floodplain Ordinance. While providing greater detailed information and policy, all plans and laws shall be in compliance with and conform to the Town's Comprehensive Plan. Should policy or programs not conforming with the Plan be desired, when such changes would benefit the public as determined by the Greensboro Town Council, the Plan may be amended according to the procedures set forth in Article 66B of the Annotated Code of Maryland.

The Critical Area Overlay District, the Forest Conservation Program, and the Floodplain Ordinance are additions to the Town's traditional regulatory mechanisms. They are detailed and, in many instances, quite restrictive as to the nature and type of new development allowed in Greensboro. This Plan affirms the goals of the State and Federal legislation requiring these regulations and recognizes the importance of

applying them at the local level. All development affected by these regulations will be scrutinized for conformance to them.

## PURPOSE

The Plan is the principal document outlining the Town's direction, policy, and action regarding land use. It has been designed as a policy statement which can be valid in the face of change over many years. Properly used, the Plan is the basis for decision-making at all levels of government and will guide the private sector toward beneficial and profitable activities affecting the land and people.

The Plan calls for many specific tasks to achieve the Town's planning program. It will only be through concerted effort that many of the goals and objectives set forth herein can be achieved.

The many uses of a plan may be put under seven general purposes.

1. To create a unified set of goals for the development of the Town.
2. To formulate a plan that may be relied upon as a central source of proposed public projects. This plan will seek to exploit opportunities to coordinate all public construction to ensure that each project contributes in moving the community toward its adopted goals.
3. To restrain the public regulation of private land within fair limits. When a community wields the tools of planning without having a plan, the property owner finds his rights managed arbitrarily.
4. To guide private landowners in making individual plans to develop their property. The private landowner needs information that tells him the total direction of development his community will take.
5. To appraise unexpected problems or opportunities. The plan will give us an analysis of fact and a considered set of policies, with which to assimilate the unexpected to our advantage, turning problem into opportunity.
6. To preserve the more fragile among desirable land use arrangements. The plan should show how to harmonize the sometimes conflicting desires of preserving an asset in our landscape and using it, too.
7. To help Greensboro operate as a "citizen" of Maryland. The State has developed a growth management program to encourage economic growth, limit sprawl development, and protect its natural resources. The Maryland Economic Growth, Resource Protection, and Planning Act took effect on October 1, 1992, and has reshaped how citizens, developers, the State, counties, and towns think about planning, growth, and resource protection.

Most local jurisdictions in the State establish priority areas for growth and corresponding areas for resource protection. The 1992 Act encouraged building on that base with consistent development regulations and targeted infrastructure investment by the State. A premise of the Act is that the comprehensive plans prepared by counties and towns are the best place for local governments to establish priorities for growth and resource conservation, and that once those priorities are established, it is the State's responsibility to back them up.

During the 2009 Legislative session, the eight planning visions of Maryland's 1992 Planning Act were replaced with twelve new visions to address a broader spectrum of issues. These new planning visions are the State's land use policy, and a local jurisdiction is required to include them in their comprehensive plan and implement them through zoning ordinances and other regulations.

1. **Quality of Life and Sustainability:** A high quality of life is achieved through universal stewardship of the land, water and air resulting in sustainable communities and protection of the environment.
2. **Public Participation:** Citizens are active partners in the planning and implementation of community initiatives and are sensitive to their responsibilities in achieving community goals.
3. **Growth Areas:** Growth is concentrated in existing population and business centers, growth areas adjacent to these centers, or strategically selected new centers.
4. **Community Design:** Compact, mixed-use, walkable design consistent with existing community character and located near available or planned transit options is encouraged to ensure efficient use of land and transportation resources and preservation and enhancement of natural systems, open spaces, recreational areas, and historical, cultural, and archeological resources.
5. **Infrastructure:** Growth areas have the water resources and infrastructure to accommodate population and business expansion in an orderly, efficient, and environmentally sustainable manner.
6. **Transportation:** A well-maintained, multimodal transportation system facilitates the safe, convenient, affordable and efficient movement of people, goods and services within and between population and business centers.
7. **Housing:** A range of housing densities, types, and sizes provide residential options for citizens of all ages and incomes.
8. **Economic Development:** Economic development and natural resource-based businesses that promote employment opportunities for all income levels within the capacity of the State's natural resources, public services, and public facilities is encouraged.
9. **Environmental Protection:** Land and water resources, including the Chesapeake Bay and its coastal bays, are carefully managed to restore and maintain healthy air and water, natural systems and living resources.
10. **Resource Conservation:** Waterways, forests, agricultural areas, open space, natural systems and scenic areas are conserved.
11. **Stewardship:** Government, business entities, and residents are responsible for the creation of sustainable communities by collaborating to balance efficient growth with resource protection.
12. **Implementation:** Strategies, policies, programs and funding for growth and development, resource conservation, infrastructure, and transportation are integrated across the local, regional, State and interstate levels to achieve these visions.

These visions give local jurisdictions a succinct statement of Maryland's priorities for their plans. However, the visions are intended as the beginning of the planning process, not the end. Greensboro will start with the visions and interpret them to establish its priorities and directions.

## THE TOWN PLANNING PROGRAM

This Comprehensive Plan provides the basic framework and direction for all components of what may be considered the Town's Overall Comprehensive Planning Program. It will influence revisions in the companion documents which serve to implement the Plan, including the Zoning Ordinance and Land Subdivision Regulations.

### ZONING ORDINANCE

The Town Zoning Ordinance is the chief (though not exclusive) means through which the Plan is implemented. It prescribes ways in which lands located within the Town may or may not be used. It prescribes a series of zoning districts, and enumerates uses permitted and performance standards which must be met for each district. The standards are designed to ensure achievement of certain objectives established in the Plan, including protection of sensitive environmental features and preservation of the small-town character of Greensboro. Finally, the Ordinance establishes design standards and site planning standards for certain uses to require control of access to certain local streets and roads; to prescribe minimum landscaping requirements; and to enhance the established pattern of development in the Town.

### SUBDIVISION REGULATIONS

The Subdivision Regulations provide guidance and controls for the configuration and layout of land subdivision in the Town. They further establish standards for subdivision plat content and procedural submission requirements. Standards contained in these Regulations are also designed to ensure implementation of certain Comprehensive Plan policies and objectives.

### GREENSBORO CRITICAL AREA PROGRAM

The Town Critical Area Program was prepared in 1987. It establishes a protection program for natural resources located within 1000 feet of tidal waters or tidal wetlands within Greensboro. It also limits development densities in those portions of the Town's Critical Area which are dominated by farm or forested resources and designated "Resource Conservation Areas" in accordance with State guidelines. The Program sets forth standards for future development and protection of forest cover, agricultural lands, and plant and wildlife habitats within this defined geographic area of the Town. The Critical Area Program is therefore, by reference, part of this Plan.

### FOREST CONSERVATION PROGRAM

The Forest Conservation Program provides guidelines for the amount of forest land retained or planted after the completion of development projects. These guidelines vary for each development site and are based on land-use categories. These categories include agricultural and resource, medium-density residential, institutional development, high-density residential, mixed use, planned-units development, and commercial and industrial use areas.

Generally, rural areas with larger forests have higher thresholds to minimize the number of acres cleared. For example, an area zoned for medium-density residential use would require about 25% of the forests on the site to be retained. Areas zoned for commercial and industrial use would require about 15% retention. This allows development to occur in areas where it is appropriate while protecting forests.

Where little or no forest exists, the Program requires that forests be established by planting trees. Using the same example, in medium-density residential use areas 20% of a project site would be planted, but only 15% of the site requires planting in a commercial and industrial use area. Under some conditions

planting may occur outside of the project site where a forest would provide protection to other natural resources, such as streams or wetlands.

The Forest Conservation Act applies to all activities requiring a permit for subdivision, grading, or sediment control that is larger than 40,000 square feet, or slightly less than one acre.

#### STORMWATER MANAGEMENT REGULATIONS

The purpose of these regulations is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impacts associated with increased stormwater runoff. Proper management of stormwater runoff will minimize damage to public and private property, reduce the effects of development on land and stream channel erosion, assist in the attainment and maintenance of water quality standards, reduce local flooding, and maintain after development, as nearly as possible, the pre-development runoff characteristics.

#### FLOODPLAIN REGULATIONS

The purposes of these regulations are to protect human life and health, minimize property damage; encourage appropriate construction practices to minimize future damage; protect individuals from unwittingly buying land subject to flood hazards; and protect water supply, sanitary sewage disposal and natural drainage. The prevention of unwise development in areas subject to flooding will reduce financial burdens to the community and the state and will prevent future displacement and suffering of its residents. This protection is achieved through the review of all activities proposed within identified floodplains and by the issuance of permits for those activities that comply with the objectives of these regulations.

#### WASTEWATER ALLOCATION PROGRAM

The availability of sewer taps for future development is very limited without a significant sewer plant expansion. In response, the Town in 2006 limited the award of sewer taps to public uses, rehabilitative uses, and non-residential job-creating uses. This is a severe limitation and reflects Greensboro's cautious approach to growth beyond the substantial amount that is already approved. This will be discussed further in the chapter on Growth Considerations.

#### PROPERTY MAINTENANCE PROGRAM

The Town has adopted a Property Maintenance Code to establish minimum regulations governing the condition and maintenance of all property, buildings, and structures in Greensboro. The Code provides standards for utilities, facilities and the other physical conditions essential to ensure that structures are safe, sanitary, and fit for occupation and use. It also provides for the condemnation of buildings and structures unfit for human occupancy and use, and the demolition of such structures.

#### CONSTRUCTION STANDARDS

The Town has adopted design standards, specifications, and details that are made available to private contractors and developers as standards to be complied with in every water, sewer, stormwater, and street construction project in Greensboro. These standards are binding and may only be modified by the Mayor and Council.

#### THE COUNTY PLANNING PROGRAM

#### CAROLINE COUNTY COMPREHENSIVE PLAN

The County Plan for that portion of the County containing Greensboro is not complete but the West Caroline County Comprehensive Plan was completed in May, 2006, and contains the basic direction that will be applied to the eastern County Plan.

In 2004, the Caroline County Commissioners formed the “Caroline County Strategic Planning Committee” to produce a vision, goals, and objectives for achieving sustainable growth in the County. The Committee’s vision was to maintain Caroline County as the “quintessential rural place.” A broad set of goals were developed to support this vision:

1. Creating unity among local government officials and citizens about a numerical target for the County’s population by the year 2025;
2. Creating unity among local government officials and citizens about where new housing in the County will locate;
3. Developing increased coordination among the County and its towns for the provision of planning, zoning, development ordinances, and local services to maximize efficiency;
4. Protecting the value of land when managing the population growth process;
5. Supporting an economically viable farming industry;
6. Providing good job opportunities for young people;
7. Continuing to provide high quality public education;
8. Creating affordable housing for local residents;
9. Preserving the cultural and environmental assets in the County;
10. Promoting adequate public and private health care services’
11. Providing an adequate level of public infrastructure assets – roads, water and sewer systems, school buildings, etc. – to support public services, based on local funding and State and Federal support; and
12. Building a finance and revenue system that is publicly acceptable as an adequate response to citizen demands for public services.

To achieve these aims, the Committee recommended a series of implementation strategies including:

- Creating a target population goal between the County and municipalities of 47,848 people by 2025, which provides for a 2% annual growth rate rather than a projected 2.7% growth rate;
  - Relocating 80% of new homes in municipal areas consistent with State laws and the provision of adequate public infrastructure and services;
  - Developing County/Municipal Inter-Governmental Agreements for land use, land preservation, growth management, and infrastructure and services to achieve effective management and economies of scale;
  - Providing fair compensation for development rights located in agricultural areas and maintaining a viable farming industry through the expansion of the industry sector;
  - Developing enhanced revenue generating measures to address growth impacts such as excise taxes, impact fees, adequate public facilities ordinances for municipalities, developer’s rights and responsibilities agreements, etc; and
  - Guiding the location of growth away from rural areas to urban/suburban areas (municipalities) and enhancing policies for the preservation of rural areas, such as Transfer of Development Rights and existing preservation/conservation programs.

The primary growth management strategy for Caroline County in the West County Plan is the development of County and Municipal “Inter-Government Agreements “ (IGA’S) for land use, land preservation, growth management, and infrastructure and services. The following initiatives are proposed for West County and will very likely be prescribed for the eastern portion of the County as well:



1. Synchronizing County and Municipal growth areas to create “Inter-Jurisdictional Growth Areas;”
  2. Developing “Greenbelts” for Targeted Land Preservation/Conservation;
  3. Preparing an IGA Report and Municipal IGA Development Kit to assist inter-jurisdictional efforts;
  4. Developing a municipal “Build-Out Assessment” for each of Caroline County’s Towns;
  5. Developing a Countywide “Housing Plan” to address affordable housing;
  6. Developing a “Fiscal Impact Analysis” with municipalities; and
  7. Finalizing County and municipal IGA’s to preserve Caroline County’s rural character.

All of these ideas and directions require a high degree of cooperation between Greensboro and Caroline County. Greensboro is willing to cooperate in all of these fundamental initiatives and try to concentrate future growth in the municipal growth areas and preserve the predominantly rural character of Caroline County. At the same time, Greensboro will reserve its right to exercise its basic responsibility to choose directions that serve the best interests of its citizens and future even if they are at odds with County policy.

## DEVELOPMENT REGULATIONS

Caroline County revised its Transferable Development Rights (TDR) program in 2006 and these changes may have an impact on growth in and around Greensboro. The basic program allows the transfer of development rights from areas designated as sending areas to areas designated as receiving areas or municipal growth areas. It is designed to protect and preserve agricultural land, to give the owners of such property an equitable alternative to development, and to provide an essential countywide growth management tool.

The mechanics of the TDR program are:

- Each landowner of a parcel in a sending area (Transferor) has the right to remove one or more development rights from the parcel, and to hold, sell, trade, or barter these rights to another person or entity (Transferee)
  - The transferee may retire, resell, or apply the rights to land in a receiving area to obtain approval for development at a density greater than would otherwise be allowed on the land, up to the maximum density or intensity allowed.
  - No development right may be used to increase density with the Critical Area if such right is derived from a sending parcel that is outside the Critical Area.
  - Lands under a recorded restrictive covenant or conservation easement are not eligible to transfer development rights.
  - A development right shall be created, transferred, and extinguished only by means of documents approved by the Caroline County Planning Commission and recorded in the land records of Caroline County.

The R-Rural District shall be the TDR sending area and the receiving areas shall be specifically mapped, designated by the Planning Commission, and approved by the County Commissioners. Receiving areas shall be located in the R, Rural District or in a municipality with an approved intergovernmental agreement between the County and municipality for use of transferred development rights (an “IGA Area”). Receiving areas shall be designated where the Planning Commission has determined that the predominate land use in the neighborhood is rural-residential, or an IGA Area rather than agricultural, and where rural-major subdivisions are an acceptable land use and existing or planned public facilities and infrastructure are adequate. The Planning Commission shall review the TDR receiving area map each year in October.

## CAROLINE COUNTY WATER AND SEWER PLAN

This Plan meets the legal requirements of Article 43, Sections 387B and 387C of the Annotated Code of Maryland, which requires the County, including the incorporated municipalities, to adopt an overall County Water and Sewer Plan. Its purpose is to guide the development of adequate water supply and sewerage systems and facilities by establishing town development policies to prevent or minimize adverse health and environmental problems. It is designed to ensure that:

- An ample supply of water may be collected, treated, and delivered to points of use.
- Wastewater may be collected and delivered to points best suited for waste treatment, disposal, or re-use.

Wastewater can be either treated before any discharge into State waters, in compliance with applicable water quality standards and discharge permit conditions, or disposed of with minimum adverse effects on legitimate water uses.

### STATE PLANNING CONSIDERATIONS

In 1997, Maryland enacted the Neighborhood Conservation and Smart Growth Areas Act (Smart Growth Act). The intent of the legislation was to marshal the State's financial resources to support growth in Maryland's existing communities and limit development in agricultural and natural areas.

At the heart of the Smart Growth concept are "Priority Funding Areas" (PFA's), which represent local growth areas for targeted State funding. PFA's include municipalities that existed on January 1, 1997, existing rural villages, and planned communities/growth areas and industrial areas to be served by public water and sewer. Areas annexed after January 1, 1997, must meet new density requirements and have water and sewer service to qualify as PFA's. Communities that have not enacted local plans and ordinances to manage growth and establish the infrastructure required to accommodate growth may not receive State funding.

Plans must show designated growth areas. Lands within local growth boundaries may be designated as a PFA provided sewer service is planned in the County's 10-Year Water and Sewerage Plan provided such designation is a long-term and planned development policy that promotes efficient land use and public infrastructure and provided that certain density requirements are met.

Under the Smart Growth Act, all Maryland municipalities are automatically designated PFA's. As of 1998, State funding can only be applied to "growth related projects" in PFA's. Growth related projects include highway and road improvements and construction, water and sewer construction, and economic development assistance.

Municipalities annexing territory must determine whether the area is eligible for PFA status and is best achieved through joint review by municipal, county, and State planning agencies. Notice of PFA certification should be made to the Maryland Department of Planning to ensure that the State has the necessary information to make funding decisions.

### THE PROCESS OF PLAN DEVELOPMENT

In providing a context for subsequent understanding of various Plan ideas, the process of Plan development is as important as the Plan document. Noteworthy components of the Greensboro process were a Public Information Meeting in early 2005, a Visioning Session in the summer of 2005, and the

direct involvement of the Town Planning Commission and the Mayor and Council. Their involvement included periodic review, discussion, and selection of Plan elements. This process involved serious consideration of how the Plan might be implemented and was integral to the selection of Plan policies contained in the various sections of this document.

## CHAPTER 2 CONDITIONS

### HISTORICAL SKETCH OF GREENSBORO

Here's a toast. May her fame spread far and wide  
Then higher rise, like a Choptank tide.  
And though in distant lands we roam  
May we e'er be proud to call Greensboro--home.  
- from "A Rhyme of Bygone Years" by Bessie Edwards

The incorporated Town of Greensboro, pleasantly situated near the headwaters of the Choptank River, is one of the oldest inland towns on Maryland's Eastern Shore. An act passed in 1732 by the General Assembly legislated that twenty acres of land were to be purchased from Dorchester and Queen Anne's Counties where each bordered either side of the Choptank Bridge. The act also specified that this town at the "Great Bend" in the river was to be called "Bridge Town". That planned town, the ancestor of what we today know as Greensboro, was not exactly a successful venture. By 1737 only two non-adjacent settlers occupied lots within Bridge Town's limits. Of the twenty building lots parceled out at each end of the bridge, only one lot was sold. In 1740, the unsold lots reverted to their original owners.



As early as 1736, Peter Rich, an innkeeper, acquired two tracts adjoining the western side of the Choptank Bridge. During his lifetime Rich sold only one lot inside the "Great Bend". In 1779 another Peter, namely Peter Harrington (one of Rich's grandsons), began to sell building lots on the hill above the bridge's west side. By 1783 he had founded a town on this hill -- the town we now call Greensboro.

A few of the buildings which date from the time of the original Harrington settlement are still standing, including the founder's two-story brick house. It is located on the present-day northeast corner of Bernard Avenue and Church Street. Among the many structures from that era which no longer exist can be counted a tobacco warehouse (one of the first buildings erected near the bridge's west end) and a county wharf. Lot sales for the tracts at each end of the bridge remained sluggish, even into the nineteenth century.

When resurveyed in 1791, the name "Bridge Town" was changed to "Greensborough." The town was somewhat different in its plan in 1791 than it is today. Main Street at that time lay nearer the river. It joined Railroad Avenue a block below the present conjunction and, by a winding way, reached the Main Street of today (a short distance from the Riverside Hotel). The first mention of the street now called Sunset Avenue appeared in a deed circa 1793. There it was mentioned as the "new road leading from the village of Greensborough." There is also evidence, from a deed drawn up in the year 1812, that the present Main Street had by that time superseded the road from the Choptank Bridge (to Nine Bridges) in importance.

By the 1880s, Greensborough was firmly established as a Caroline County town; it was no longer halved between Dorchester and Queen Anne's Counties. At the turn of the century the village underwent a great period of prosperity. At this time the Choptank River was utilized as a transportation corridor for commercial shipping. It was during this boom period that the greatest population increase for Greensboro was recorded.

The need for Greensboro as a marketing and industrial center began to diminish with the advent of new transportation options. As a result, the growth rate declined and the Town became primarily a residential center. The Town has since shown a stable population pattern but with a significant increase recorded recently.

## PHYSICAL CHARACTERISTICS

### General

Greensboro is in the west-central part of the peninsula known as the Eastern Shore. The Town straddles the Choptank River where it turns through north-central Caroline County in a long, lazy S-bend. The Town is at the tidal limit of the Choptank. The National Rivers Inventory has identified an eight-mile segment (from Denton to Greensboro) and a separate sixteen-mile segment (from Greensboro to the headwaters of Tidy Island Creek at Marydel) of the Choptank River as potential National Wild and Scenic Rivers. (See the Natural Resources Map 1)

### Wildlife and Habitat

In and around the environs of Greensboro wildlife is abundant, which adds to the rural character of the Town. Various species of open-land wildlife (such as the rabbits and quail that normally frequent cropland, pastures, meadows, and lawns) thrive here. There is no lack of woodland wildlife (such as the deer, squirrel and raccoon which usually inhabit areas with hardwood trees, coniferous trees, shrubs, and mixtures of such plants). Wetland wildlife (such as the muskrat and numerous kinds of waterfowl that typically live in ponds, marshes, and swamps) are also plentiful in the Greensboro region. White perch, striped bass, catfish, alewife herring, and blueback herring spawn in the Choptank River, which threads through town. No rare, threatened or endangered species are known to be located within the Town.

### Topography

The topography in and around Greensboro is fairly level, with elevations varying from a few feet above sea level to a maximum elevation of 40 feet. Excessive slopes do not offer a major impediment to development.

## Soils

Greensboro is located near the junction of three major soil associations:

1. Pocomoke-Fallsington - Represents the majority of the soils in Greensboro. The soil is dominated by Pocomoke which is very poorly drained.
2. Sassafras-Fallsington-Woodstown - These soils are well-drained to poorly drained soils that developed in silty or sandy clay. The soils in this association retain moisture and plant nutrients better than the other two types found in the Greensboro vicinity.
3. Sassafras-Galestown-Fallsington - This soil association is very well drained. Of the three main soils which surround the Greensboro area, only the Sassafras-Galestown-Fallsington association is suitable for purposes of development involving on-site septic systems. This type is found southeast of the town.

In the non-tidal wetland areas the substrate is predominately un-drained hydric soils. Soils typed as hydric are wet frequently enough to periodically produce anaerobic (oxygen-absent) conditions, thereby influencing the species composition or growth, or both, of plants in those soils. These soils, noted on the Natural Resources Map, offer limitations to development not only due to their saturated condition, but because they are generally associated with protected non-tidal wetland areas.

## Waterbodies

The Town of Greensboro is drained on the west side by Forge Branch and on the east by the Choptank River. The River is deep enough at Greensboro to accommodate pleasure boats, gasoline or electric-powered jonboats, rowboats, and canoes. At the same time, the River is shallow enough to maintain its role as an important spawning and nursery ground for a number of anadromous fish species.

## Floodplain

The Natural Resources Map indicates the location of the 100-year floodplain within the Town. Over 15 % of the Town lies within the designated floodplain, 48 acres along the Choptank River and 8 acres along Forge Branch. These areas incur high flood risk, as well as additional regulatory restrictions when developed. Bordering the Choptank River, these areas are developed primarily with single-family residential homes and some commercial structures. The flooding problems in the Town result from a combination of heavy rainfall, high river discharge, and storm tides. Development in these areas is currently regulated by the Town's Floodplain District Ordinance.

## Wetlands

The area bordering the Town's two water bodies is comprised of a system of tidal and non-tidal wetlands and potential protected habitat areas. The undeveloped areas in the Town bordering the Choptank River and its tributaries are areas that have been found unsuitable for development, either because of wetlands or unsuitable soil conditions.

Non-tidal wetlands have been identified and are shown on the Natural Resources Map. The non-tidal wetlands inventoried are found upland from and contiguous to the tidal wetlands that line the Choptank River. These wetlands are classified as Palustrine-Forested-Broadleaved deciduous.

Along the banks of the Choptank River are coastal wetlands of the swamp forest type. Red Maple and Ash are the trees common to this freshwater portion of the wetland system. The wetland area bordering the River is periodically flooded by tidal waters.



The non-tidal wetlands described above fall predominately within the Critical Area 100-foot buffer; therefore, they will receive the protection built into the buffer preservation requirements. Other areas of non-tidal wetlands border Forge Branch and will be protected primarily by wetland permitting processes.

#### The Critical Area

The Chesapeake Bay Critical Area boundary, as established in Greensboro, follows the guidelines set forth in the legislation. It extends 1000 feet inland from mean high water or the upland limits of tidal wetlands. The Critical Area described encompasses 130 acres, representing 36 % of the land area of the Town. Consequently, the Critical Area Local Program has significant ramifications for the overall planning, land development, and economic growth of the Town. The Critical Area includes much of the most intensely developed part of the Town. See Map 2 (not included).

#### Sensitive Areas

The Maryland Economic Development, Resource Protection and Planning Act of 1992 established requirements that County and Municipal Comprehensive Plans include a sensitive area element that contains goals, objectives, principles, policies, and standards designed to protect certain environmentally sensitive areas from the adverse effects of development. Such areas are defined in the 1992 Planning Act to include: streams and their buffers, 100-year floodplains, steep slopes, and habitats of threatened and endangered species.

The sensitive areas in Greensboro, as defined by the 1992 Planning Act, are generally found within those portions of the Town located within the Chesapeake Bay Critical Area.

#### SOCIO-ECONOMIC CHARACTERISTICS

## Population

With a total population of 1,632 in 2000, Greensboro was the third largest municipality in Caroline County. Following a dramatic increase in population for the period 1940 to 1950, when Greensboro grew by over 60%, the Town's population remained relatively stable through 1970. During the period 1970 to 1980, the Town's rate of growth increased to 6.8 % as the town population grew from 1,173 to 1,253 residents. From 1980 to 1990 the Town population increased 15 %, the highest rate of growth for any decade since the 1940s. This growth continued to 2000 increasing by 13% or 191 persons. From 2001 through 2006, 130 residential units and approximately 326 people were added for a current population of 1,958. This recent growth rate of 21% is the second highest in the town's history.

	1940	1950	1960	1970	1980	1990	2000	2006
Maryland	1,821,244	2,343,001	3,100,689	3,923,897	4,216,975	4,781,468	5,296,486	5,615,727
Upper Eastern Shore	90,681	99,274	121,498	131,322	151,380	180,726	209,280	234,409
Caroline	17,549	18,234	19,462	19,781	23,143	27,035	29,772	32,617
Town of Greensboro	737	1,181	1,160	1,173	1,253	1,441	1,632	1,958

Source: All tables, unless otherwise noted, use data from the US Census Bureau

To place recent growth in context, note that it took fifty years from 1940 to 1990 to double Greensboro's population; if the current proposed developments take five years to complete, the population will increase by 50% by 2013.

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2006
Maryland	28.6	32.3	26.5	6.9	13.4	10.7	6.0
Upper Eastern Shore	7.2	17.9	7.4	16.1	19.4	15.8	12.0
Caroline	3.9	6.7	1.6	17.0	16.8	10.0	9.6
Town of Greensboro	60.2	-1.8	1.1	6.8	15	13.2	19.4

During the 1970 to 2000 period, the Upper Eastern Shore Region population growth reversed a long standing trend in relative growth rates. As can be seen in Table 2, between 1950 and 1970 the State of Maryland consistently experienced substantially higher rates of growth than did the Upper Eastern Shore, Caroline County, and Greensboro. However, the 1980, 1990, and 2000 Censuses revealed that, whereas the rate of growth for the State slowed considerably, the rate for much of the Upper Eastern Shore grew to exceed that of the State. Caroline County experienced higher rates of growth in the 1980's and 1990's than



in any decade since 1930. Although the Town of Greensboro's growth rate for the 1980 to 1990 period (15%) was not as substantial as the County's (16.8%), it exceeded the County in the 1990's.

### Household Formation

In 2000, there were 616 households in Greensboro compared to 595 in 1990 and 450 households in 1980. Average household size declined 13% from 1980 to 1990 from 2.78 persons per household in 1980 to 2.42 persons per household by 1990 but rose 10% in 2000 to 2.64.

Table 3 - HOUSEHOLDS BY TYPE - TOWN OF GREENSBORO		
Type	Number	%
Family Households	407	66.1
With own children under18	250	40.6
Married couple family	257	41.7
With own children under18	140	22.7
Female householder, no husband present	121	19.6
With own children under18	94	15.3
Nonfamily Households	209	33.9
Householder living alone	179	29.1
Householder 65 years and older	84	13.6
Total	616	100.0

By way of comparison, in 1980 the average household size for Caroline County (2.81 persons per household) was quite similar to Greensboro's (2.78). By 1990, the County average household size declined to 2.66, only a 5 % decrease.

### Age

The age distribution of the population of Greensboro reported in the 1990 Census was very similar to that of the County. Between 1990 and 2000, some differences appeared. There is a higher percentage of Town residents 5 to 17 (33.5%) as compared to the County (22.9%) and the State (21.5%) and a lower percentage in the 45 to 64 group. This may mean that the Town will be facing a larger than normal loss of younger residents as they leave to seek education, jobs, and more affordable housing. Fewer residents in the 45 to 64 age group may mean a smaller than normal loss of residents as the “boomers” of this group retire and move.



Table 4 - AGE DISTRIBUTION COMPARISON			
	Town of Greensboro	Caroline County	Maryland
Age	2000 %	2000 %	2000 %
Under 5 years	8.0 (132)	6.2	6.7
5-17 years	33.5 (551)	22.9	21.5
18-44 years	29.7 (489)	34.1	37.3
45-64 years	16.3 (269)	23.1	23.2
65 +	12.2 (201)	13.6	11.4

### Income

The median household income for Greensboro recorded in 1989 was \$20,946. The median family income in 1989 was \$25,508, nearly 22 % higher than the median household income for the Town. By 1999, household income had risen to \$31,397 (+13% adjusted for inflation) and family income had risen to \$36,083 (+5% adjusted for inflation). Family income (3.28 persons/family) remained higher than household income (2.64 persons/household) by 15%. Both household and family income for Caroline County and the State remained significantly higher than Greensboro.

Table 5 - HOUSEHOLD AND FAMILY INCOME, 1989 & 1999				
Income	1989 Households	1999 Households	1989 Families	1999 Families
Less than \$9,999	125	92	39	47
\$10,000 - \$14,999	103	55	63	28
\$15,000 - \$24,999	105	83	92	59
\$25,000 - \$34,999	111	90	103	61
\$35,000 - \$49,999	84	113	69	86
\$50,000 - \$74,999	38	88	29	68
\$75,000 or more	12	61	6	54
Greensboro Median	\$20,946	\$31,397	\$25,508	\$36,083
Caroline Median	\$27,758	\$38,832	\$32,093	\$44,825
Maryland Median		\$52,868		\$61,876

Of the total population in the Town, 217 individuals had incomes at or below poverty level in 1980, as compared with 175 classified by the 1990 Census as below the poverty level. In 2000, 258 persons were identified as below the poverty level and 103 of these were children under 18 years old.

### Housing

The 1980 Census recorded 483 housing units in the Town of Greensboro. By 1990, the Census indicates that housing stock grew substantially - to 628 units, an increase of 146 units for the 10-year period. By 2000, the number had increased to 674 and, by 2005, to 804 units.

Other changes in the composition of housing stock occurring during the 10-year period are noteworthy. In 1980, 85 % of the Town's total housing stock took the form of detached single-family homes, with attached and multi-family housing representing only 11% of Town housing stock. By 1990, attached and multi-family units grew to represent roughly 30 % of total housing stock. By 2000, this number had increased to 35%.

Table 6 - HOUSING CHARACTERISTICS - TOWN OF GREENSBORO				
	1980	1990	2000	2005 (est.)
Single-family detached	409 (85%)	376 (60%)	416 (62%)	512 (64%)
Single-family attached	11	29	39	73
Multi-family 2-4 units	28	62	92	92
Multi-family 5 or more units	15	98	102	102
Mobile homes	20	63	21	21

Total - All Units	483	628	674	800
Total - Occupied Units	450	595	616	-
Total - Vacant Units	32	33	58	-

These trends in the type of housing also appear to have influenced the occupancy characteristics of housing in Greensboro. Approximately one-quarter of the occupied housing units in 1980 were renter-occupied. By 1990, 45 % of the total occupied units were renter-occupied. By 2000, this figure had risen slightly to 47%. Another explanation for the rise in rentals is that the relatively low cost of housing in Greensboro created a pool of affordable housing and encouraged speculative purchases for rental purposes. In 1990, the median rent was \$267, by 2000 the median rent had risen to \$452. Anecdotal evidence has monthly rents at over \$1000/month for a single-family home in 2006.

	1980	1990	2000
Owner- Occupied	344 (76%)	329 (55%)	324 (53%)
Renter- Occupied	106 (24%)	266 (45%)	292 (47%)
Total	450	595	616

Of the 42 towns in Maryland with a population between 1,500 and 5,000, only eight have a higher percentage of rental housing than Greensboro. This trend toward an increasing number of rental units has led the Town to restrict rental housing in the downtown area and discourage it in the rest of the community. As can be seen in Table 8, 37 % of the housing units in Greensboro are over 65 years old, and nearly 20% or 130 units have been constructed within the past 5 years.

Period	Units	Distribution %
2001-2005	130	19.0
1995-2000	42	6.0
1990-1994	40	6.0
1980-1989	105	15.0
1970-1979	50	7.0
1960-1969	42	6.0
1940-1959	135	19.0
1939 or earlier	256	37.0
Total	700	

## Employment

In 1980, a total of 453 persons 16 years old and over were employed in the civilian labor force. By 1990, the Town civilian labor force grew to 634 persons 16 years old and over and by 2000 had increased to 683. The vast majority (529 or 77 %) was classified as private wage and salary workers. The next major class of workers was government workers (local, state and federal), which comprised 14.5 % of the employed labor force in the Town. The remaining 7 % were classified as self-employed workers.

Table 9 - LABOR FORCE - 16 YEARS AND OVER - TOWN OF GREENSBORO		
	1990	2000
Armed Forces	2	2
Civilian Employed	634	683
Civilian Unemployed	29	48
Not in Labor Force	406	397
Total	1,071	1,130

As shown in Table 9 a total of 48 persons (7 %) in the labor force were unemployed in 2000. An additional 397 persons 16 years or over were not in the labor force.

Table 10 provides a breakdown of the industry of employment for employed persons 16 years and over in 2000. As can be seen, the leading industry of employment for Town residents is education, health and social services followed by manufacturing and construction. Together these sectors accounted for 51% of all jobs.



Table 10 - EMPLOYED PERSONS 16 & OVER BY INDUSTRY 2000 - TOWN OF GREENSBORO		
Industry	Number	%
Agriculture, Forestry, Fisheries, Mining	7	1.0
Construction	104	15.2
Manufacturing	108	15.8
Transportation	24	3.5
Wholesale Trade	33	4.8
Retail Trade	68	10.0
Information	25	3.7
Finance, Insurance, & Real Estate	13	1.9
Professional, Scientific, Management, and Administrative Services	53	7.8
Education, Health & Social Services	137	20.1
Arts, Entertainment, Recreation, Accommodation & Food Services	57	8.3
Public Administration	40	5.9
Other Services	14	2.0
Total	683	

Table 11 shows the leading occupation in 2000 was the category of sales and office workers. The second leading occupation class was production, transportation, and material moving.

Table 11 -EMPLOYED PERSONS 16 YEARS & OVER BY OCCUPATION 1990 & 2000 - TOWN OF GREENSBORO		
Occupation	Number	%
Managerial & Professional	133	19.5
Sales & Office	164	24.0
Service	119	17.4
Farming, Forestry, Fishing	9	1.3
Construction, Extraction, & Maintenance	113	16.5
Production, Transportation & Material Moving	145	21.2
Total	683	

The mean travel time to work for workers in 1990 was 27 minutes and by 2000 the travel time was 29 minutes. Of the total reported (674 persons), the vast majority (72 %) drove alone, and 19 % carpooled (only 13% carpooled in 1990). Over 6% of workers reported that they either walked to work or worked in their homes.

## COMMUNITY FACILITIES

### Water

Greensboro's water is provided by three wells located throughout the Town. The Hobbs Street Well and the Academy Street Well were rehabbed in 2007 to ensure their efficient production. All three wells draw from the Piney Point formation. The total permitted average daily appropriation of water in 2008 was 325,000 gpd (gallons per day). The greatest annual average daily demand from 2002 to 2007 was 184,512 gpd.

State design recommendations for water distribution systems call for a well capacity equal to the peak daily flow rate with the largest well out of service, and all remaining wells running 24 hours per day. With a current maximum daily demand of 455,000 gpd and a capacity of 300 gpm (gallons per minute) with the largest well out of service, the total well-field can produce 864,000 gpd, a surplus of 409,000 gallons per day.

The water quality from the Piney Point Aquifer is generally good and relatively uniform. Currently, disinfection is the only water quality measure performed in Greensboro.

Many improvements have been made to the water distribution system during the past 15 years, including the replacement of nearly all the water mains on Sunset Avenue and Main Street. The eastern section of town including mains to the north and south of Rt. 314 were replaced in 1990 and 2000, respectively. Portions of Cedar Lane were replaced in 1990. The newly completed subdivisions of Cedar Run and Caroline Farms have piping that was installed in the early 1990's. The remainder of town consists of the original Greensboro water distribution system constructed between 1915 and 1920.

### Sewer

The Town's wastewater treatment plant is a fixed film, activated sludge type facility originally constructed in 1968 and land modified in 1996. Its permitted capacity is 280,000 gpd. The latest three-year average flow is 142,000 gpd. The facility consists of an influent screen, primary clarifier, dual rotating biological contactors, two secondary clarifiers, disinfection, post aeration, and sludge drying beds. Wastewater effluent flows by gravity through the plant to an outfall that discharges into an unnamed tributary of the Choptank River.

The sewer system is divided into two collection zones, with the divide located in the vicinity of Bernard Avenue. The system to the north of this divide flows by gravity directly to the wastewater treatment plant. The system to the south collects at the East Side Pump Station along Sunset Avenue and is pumped to a manhole near the Main Street and Cedar Lane intersection. From this manhole, flow continues by gravity to the treatment plant.

The collection system consists of approximately 46,000 feet of 8", 10", and 12" mains. The majority of the gravity sewer system is 8" PVC. All pipes within the system are the appropriate size and slope to carry the flow. Inflow and infiltration rates into the collection system were analyzed in 2002 and 2003 and the average daily flows per capita were found to be below the accepted national averages and non-

excessive.

### Parks and Public Buildings

The new (2005) Town Offices on Main Street are centrally located and adequately meet the functional needs of Town government operations for office space and a meeting room for various appointed boards and commissions. Use of the former Town office location for the police and public works departments has increased the availability of space to support policing functions. The former police station now houses a styling and barber shop. The completion of the Town library and Community Center in 1997 satisfied a need identified in the 1988 Comprehensive Plan for library facilities in the Town and added to the space available for community and civic organization activities.

The Town has a well-developed and maintained park, Ober Park, located behind the Schoolhouse Apartments at Horsey Street and Bernard Avenues. Park/ballfield facilities are also located at Cedar Lane and School Street to support northern Town resident recreational needs.



A developed picnic area on Forge Branch provides some opportunities for outdoor enjoyment on the west side of Town. Public boat launching facilities on the Choptank River and an adjacent picnic area near the Town carnival grounds, south of the bridge, provide additional recreation facility offerings to Town residents. Tot lot facilities have been provided at Rolling Meadows and at the new community center to meet community needs. The Choptank River Park, located on the north side of the Sunset Avenue bridge, will provide additional recreational opportunities for Town residents.

Greensboro will be gaining parkland in the newly annexed development south of town. This will consist of eight acres of contiguous space for active recreation and several smaller parcels dedicated to planting and passive activities.

Overall, park development within the Town indicates adequate service levels by most standard measures. This is especially true given the rural setting of the Town and the numerous outdoor recreational opportunities nearby.



## CURRENT LAND USE

The existing pattern of land uses was surveyed in the field in July, 1995, recorded in detail on a 1"=300' scale map, and updated in August 2006. Map 3 identifies the pattern of existing land use in Greensboro at a reduced scale. Once identified and mapped, the land use distribution was calculated by type, as represented in Table 12, for description and further analysis.

Greensboro is located in an agricultural area with very little urban development beyond the community's corporate limits. Except for the "South Greensboro" annexation and the "Kinnamon/Baldwin" tract, most of the usable land within the corporate limits of Greensboro has been built upon or is otherwise in use. Approximately 35 % of the land located within the corporate limits remains undeveloped but much of this land is currently in the subdivision and development process. Specifically, 71 infill lots remain and approved but undeveloped subdivisions total 336 lots.

### Residential

Single-family residential is the dominant land use type in Greensboro, representing 31% of the developed land area in the Town. Land devoted to residential use totals an estimated 196 acres. Much of this development is on small lots but, in 2005, during the build-out of Caroline Farms, a small lot subdivision dating from the early 1990's, the Town increased its low density, single-family lot size requirements from 7,475 sq. ft. to 12,000 sq. ft. This was in response to significant development pressure within Greensboro and dissatisfaction with the appearance of the town's older subdivisions.

Multi-family residential use increased substantially in Greensboro in the 1980s with construction of Greensboro Heights Apartments and Rolling Meadows Apartments. In 1995, roughly 14.7 acres was occupied by multi-family residential uses. A significant number of single-family residences were converted to apartments in the 1990's and, in the early 2000's, a duplex project known as Cedar Run was completed. By 2006, land occupied by multi-family had increased to 22.7 acres. To preserve the stock of available space in the downtown and limit the demand for parking, the Town in 2005 limited the conversion of single-family dwellings in the Central Commercial District to ten units annually and required more land and open space for the units that are allowed to convert.

In 2004, Greensboro annexed two parcels at the southern entry to the town along Rt. 480 containing 172 acres for a master planned residential and commercial development. The project ("South Greensboro") will include approximately 230 single-family homes on 80 acres and a commercial section on 21.5 acres. It is designed as a mix of large lot and "traditional neighborhood" homes. The project will probably receive final approval for recordation in 2009.

An in-town, 44 acre single-family residential parcel (the "Kinnamon/Baldwin" tract) on Cedar Lane was reviewed in 2006 and has received approval for the first phase of development. This development will contain 101 lots and is designed to extend the grid system of town streets and integrate with the character of the surrounding community.

### Commercial

The traditional business center of the Town is the intersection of Sunset and Main Streets. In 1988, the Central Business District (CBD), combined with several smaller nodes of business activity and miscellaneous scattered commercial sites throughout the Town, represented a total of 8 acres. In 1995, commercial land uses occupied an estimated 12.5 acres and represented 3 % of the area of the Town.



The increase in commercial land area is due to development of commercial uses along MD Route 313 (Greensboro Road), including a grocery store and automotive services. This particular area has become a major highway-oriented commercial center in contrast with the traditional CBD, which provides the ambiance of a traditional walkable downtown. The next major increase in commercial land area will be 21.5 acres within the newly annexed planned development south of town on Rt. 480. A small commercial node is also developing at Sunset Avenue and Granby Street which could grow larger with the development of the planned community.

#### Industrial

In spite of the solid manufacturing employment base found in Greensboro, the land used for industry totals only 9.3 acres or 2 % of Town land area. However, total land area shown as industrial on the existing land use map as industrial represents 26.4 acres, which includes vacant land near the rail corridor adjacent to Sunset Avenue. Within this area there are opportunities for expansion of existing industries or the location of new businesses in the Town. The only identifiable concentration of industrial activity in the Town is on the west side, along the rail line at Sunset Avenue. The rest of the sites are in scattered locations within or adjacent to established residential areas.

Table 12 - LAND USE - TOWN OF GREENSBORO			
Land Use	Acres Developed 1995	Acres Developed 2006	Full Development
Single-family residential	164.3 (40%)	196.3 (31%)	305.3 (48%)

Multi-family residential	14.7 (4%)	22.7 (4%)	22.7 (4%)
Commercial	12.5 (3%)	14.5 (2%)	36.0 (6%)
Industrial	9.3 (2%)	9.3 (1%)	26.4 (4%)
Public	8.2 (2%)	44.0 (7%)	44.0 (7%)
Semi-Public	10.5 (5%)	15.0 (2%)	15.0 (2%)
Parks/Open Space	22.8 (6%)	29.8 (5%)	74.6 (12%)
Streets and Roads	75 (18%)	79.25 (13%)	109.5 (17%)
Subtotal developed land	334.4 (81%)	427.9 (68%)	633.5 (100%)
Undeveloped land	94.7 (23%)	222.7 (35%)	0
Total	412	633.5	633.5

Source: Redman/Johnston Associates Field Survey, July 1995, and updated by the Greensboro Planning Commission in August 2006.

### Parks and Open Space

There are 29.8 acres of land developed as parks or designated as open space in the Town. These areas are well distributed throughout the Town. In addition, the cemetery property on the south side serves the function of providing permanent “open space” within the developed Town. Additional active and passive parks and open space will be provided in both the “South Greensboro” and the “Kinnamon/Baldwin” developments for a new total of nearly 75 acres.

### Public Lands

Public lands represent some 44 acres of land in Greensboro and include land owned by the Town or County and committed to public uses. These include the Municipal Building, Police Department, Fire Department, the elementary school, and sites supporting various components of the Town sewer and water systems, but not including Town parkland.

### TRANSPORTATION

Greensboro is located on the main north-south artery in Caroline County, MD Route 313, a minor arterial which bypasses the Town center on the east. The Town is linked to the US Route 50 corridor via MD Route 480 to MD Route 404. MD Route 480, or Main Street, functions as a minor north-south local collector. Sunset Avenue, running through the Town center and connecting with MD Route 314, serves as minor east-west local collector, linking the Town to US Route 13 via MD Route 12. Traffic counts for these major routes are shown on the Traffic Trends Map 4. The traffic is generally light on these roads and, therefore, there are no planned improvements related to capacity. Even though State roads are adequate and far from reaching capacity, the residents may notice the steady incremental increase annually in daily traffic counts shown on the Transportation Map.

The remainder of the Town's streets function as local streets. Though they serve existing land uses adequately, many do not meet minimum standards for paving width. Future development in the Town will require upgrading the streets to meet the newly adopted construction and right-of-way standards.

This section describes the existing situation for key road links for Greensboro in terms of average daily

traffic volumes and the degree of congestion in terms of level of service. The initial effort involved an inventory and analysis of existing transportation facilities using the best available data. Based on published materials, the following information relating to highways was analyzed: functional classification, average daily traffic volumes, roadway capacity/level of service, and available excess capacity.

### Traffic Volumes

Average daily traffic (ADT) volumes prepared by the Maryland State Highway Administration were reviewed for the years 1983, 1989, 1993, 2004, and 2006 to identify changes in traffic volume for major routes in recent years. Information concerning trends in volume are shown Map 4. The highest ADT (5,900 vehicles) in Greensboro in 2004 was on MD Route 313, the Intermediate Arterial in the region. Maryland Route 314 is currently classified as a Major Collector, and in 2004 handled an average of 2,931 vehicles per day on the west side of Town and 4,631 on the east side. MD Route 480 (Main Street), also functions as a Major Collector, and in 2004 carried 4,531 vehicles per day at the southern Town limit and 2,951 at the northern Town limit. The other streets and roadways in the Town are local in function.

Significant to modest increases in traffic volumes are evident for the period from 1993 to 2004 for each of the major routes and with anticipated development these numbers will continue to grow.

Main St. south of Town	95 vehicles
Main St. north of Town	40 vehicles
Sunset Ave. west of Town	28 vehicles
Sunset Ave. east of Town	135 vehicles
Md 313 north of Town at Main St.	117 vehicles

### Capacity/Level of Service

To evaluate the operation of specific road sections, the capacity of the major roadways was determined. Roadway capacity is a function of the roadway classification, number of lanes, pavement type, and intersection control. The daily service capacity for each roadway classification was determined from the Maryland State Highway Capacity Manual. MD Route 313 has a capacity of 7900 vehicles per day to maintain a Level of Service (LOS) C as a two lane highway. MD Routes 314 and 480 likewise have an approximate capacity of 7900 vehicles per day.

Using the 2006 ADT volumes and the estimated capacity, a volume to capacity ratio (V/C) was determined. A V/C of 1.0 means that the road is at capacity. The ratio ranges from values of 0.37 on less trafficked routes, such as Sunset Rt. 314 on the western side of town, to volumes which are three-quarters of route capacity (0.75) on Route 313 north of Town. MD Route 480 has a volume to capacity ratio of 0.37 on the north end of Town and a ratio of 0.57 on the south end of Town. The eastern end of Sunset is operating at a ratio of 0.59.

### Pedestrian/Bicycle Circulation

Pedestrian safety has been a long-time concern of the Town. There are gaps in a continuous pedestrian circulation system. Some existing sidewalks are hazardous to walkers and need to be upgraded. This

process began with a State Highway Administration project in 1999 to improve streets and sidewalks along Sunset Avenue and Main Street. This work is complete and the next phase is to include improvements along North Main Street from School Street to the Greensboro Elementary School.

Another notable improvement was the addition of a walkway in conjunction with the new bridge across the Choptank, thus eliminating what was a formidable barrier to residents on the east side of Town who might walk to the Town center. However, this bridge walkway amplifies a larger problem of the Town, which is to provide safe pedestrian crossing across MD Route 313 at Sunset Avenue. A traffic light has been added at this intersection but pedestrian crosswalks or other safety improvements have not been made.

Greensboro is a very walkable and bikeable community in terms of size, scale, and neighborliness but facilities are lacking to provide a basic network of walks, trails, and “parking/resting.” This important topic will be discussed further in the Visions chapter.

### Public Transportation

There are two public transportation facilities for Greensboro residents. Neither is suitable for commuting to a job. Maryland Rural Development Corporation provides a medical transportation service with three days advance notice. Upper Shore Aging provides public transportation services (U-STAR) to anyone requesting such services in Greensboro with 24-hour notice. This service is used primarily by special populations (handicapped and elderly), but is available for general public use. The service is suitable for shopping, medical visits, or any planned trip within the region.

## CHAPTER 3 GROWTH CONSIDERATIONS

### POPULATION SCENARIOS

The amount, distribution, and timing of projected population growth and residential and industrial development in Greensboro will continue to influence the character of the Town and its capacity to provide services to a changing population. These factors determine the cost of providing the public facilities needed to support the new population and are extremely important elements when thinking about Greensboro's future.

Greensboro has grown significantly during the past several years and, while this rapid pace has recently slowed along with the rest of the US economy, the eventual completion of two major development projects now in the pipeline will bring more growth. Table 14 contains four growth scenarios for Greensboro.

Scenario 1 assumes that the 386 recorded or to-be-recorded Town building lots are built upon and occupied by 2015. Using the current Greensboro and Caroline County household size of 2.64 persons/unit, this would add approximately 1,000 residents and yield a population of roughly 3,000 persons. This level of growth can be accommodated by the current water and wastewater treatment system without expansion and would not require an expansion of the Town's boundaries. This scenario does not allow any new residential annexations or new major residential projects during the period between this Plan and the next required Plan in 2015. This is the default growth strategy adopted by this Plan. The focus for the coming years will be to absorb the growth that is currently in the development pipeline, provide employment opportunities for residents, and revitalize the Town's economic base. The preferred growth strategy is outlined in Scenario 3 following and depends upon construction of a new wastewater treatment plant to serve Greensboro and North Caroline County.

Scenario 2 assumes build-out by 2015 at a population of 2,995 and continued growth at Caroline County's 1970 to 2000 annual growth rate of 1%. By 2030, the population would grow by 463 persons and add approximately 176 units over the 2015 population. Modifications to the water and wastewater treatment system would likely be required and the Town boundaries would have to enlarge.

	Scenario 1 - Cap	Scenario 2 - 1%	Scenario 3 - 2%	Scenario 4 - 3%
1990	1,441	1,441	1,441	1,441
2000	1,632	1,632	1,632	1,632
2005	1,975	1,975	1,975	1,975
2010	2,485	2,485	2,485	2,485
2015	2,995	2,995	2,995	2,995
2020	2,995	3,144	3,294	3,444
2030	2,995	3,458	3,952	4,477

Scenario 3 follows the County's assumption of focusing more growth in municipalities by building upon

existing sewer capacity and projecting an annual growth rate of 2%. In Greensboro, this would yield roughly 957 new residents and 363 new dwelling units over the 2015 population of 2,995. This scenario would definitely require expansion of the Town’s water and wastewater treatment capacity and a significant addition to the Town’s borders. A new project, the North County Wastewater Extension, has been proposed to accomplish the required expansion and meet the critical disposal needs of the North County communities of Goldsboro, Henderson, Marydel, and Templeville (referred to as the “Authority”). The recommendation is to construct a new wastewater treatment facility north of Greensboro in two phases. The first phase would have a capacity of 540,000 gpd and the second phase would meet the proposed build-out capacity in Scenario 3 of 814,000 gpd for the Authority and Greensboro. The first phase would accommodate Greensboro’s current capacity of 280,000 gpd plus the capacity required by the Authority of 260,000 gpd. The second phase would add 274,000 gpd to allow a 2030 Greensboro build-out population of approximately 4,000 residents and 1,500 dwellings. Construction of a new wastewater treatment plant with a treatment capacity of 814,000 gpd serving both Greensboro and North County is the preferred growth strategy of this Plan.

Scenario 4 also follows a County assumption that if local communities expand their water/sewer capacities and growth areas, the annual growth rate could reach 3%. In Greensboro, this would add about 1,482 residents and 562 dwellings over the 2015 population of 2,995 and a very large expansion of the Town’s boundaries.

#### LAND USE CONSIDERATIONS

In this section, the current land use statistics of Greensboro are compared with an average land use breakdown of comparable communities in an effort to pinpoint major deficiencies in the present land use pattern, and to serve as a general guide in determining the most desirable range of development activity for the future development of Greensboro. Since no two communities are identical, it is cautioned that this average breakdown of major land uses in a typical small town is intended to serve only as a rough guide in projecting a desirable range of development activity in each major land use category.

Table 15 shows the land use breakdown for an average of 10 other Eastern Shore towns. This comparison indicates that residential use is higher in Greensboro than in other towns, while commercial use is lower but gaining. Industrial land use in Greensboro is significantly less than the comparable towns.

Table 15 - LAND USES - GREENSBORO AND COMPARABLE TOWNS			
Land Use Type	Percentage of Developed Area		
	Greensboro 2006	Greensboro Full Development	Comparable Towns in the Eastern Shore Region
Residential	51 %	52 %	42 %
Commercial	3 %	6 %	4.3 %
Industrial	2 %	4%	9.4 %
Public/Semi-Public	14 %	9 %	9.4 %
Parks/Open Space	7 %	12 %	8.1 %
Streets	18 %	17 %	26.8 %

Source: Comparable town data from Redman/Johnston Associates (1987)

Land for future growth beyond that now in the development process or held as infill lots can only be found outside the current Town limits. The Eastern Shore Regional GIS Cooperative prepared a Municipal Development Capacity Analysis, Caroline County, Maryland in November, 2008, that included Greensboro. This analysis showed that within our mapped Growth Area, there are 625 developable parcels of land with a dwelling unit capacity of 2,158. See Appendix B for a summary analysis and a series of Growth Area maps. At our highest projected growth rate of 3%, 948 dwelling units would be added from 2009 until 2030. This rate would consume roughly 44% of the dwelling unit capacity of the Town and surrounding Growth Area.

To add the population projected in Scenario 2 (+463 residents and 176 units) at the current single-family zoning would require roughly 352 acres (includes lot, open space, stormwater, forest conservation, and streets).

Table 16 - Scenario 2 - 1% Growth Rate					
	Total Population	Added Population (cumulative)	Added Dwellings (cumulative)	Added Acres (cumulative)	Acreage Available
2005	1,975	0	0	0	
2010	2,485	510	218	0	
2015	2,995	1,020	386	0	2,307
2020	3,144	1,169	442	112	2,195
2030	3,458	1,483	562	352	1,955

To add the population projected in **preferred** Scenario 3 (+957 residents and 363 units) at the current single-family zoning would require roughly 726 acres.

Table 17 - Scenario 3 - 2% Growth Rate					
	Total Population	Added Population (cumulative)	Added Dwellings (cumulative)	Added Acres (cumulative)	Acreage Available
2005	1,975	0	0	0	
2010	2,485	510	218	0	
2015	2,995	1,020	386	0	2,307
2020	3,294	1,319	500	227	2,080
2030	3,952	1,977	749	726	1,581

To add the population projected in Scenario 4 (+1,482 residents and 562 units) at the current single-family zoning would require roughly 1,124 acres.

Table 18 - Scenario 4 - 3% Growth Rate					
	Total Population	Added Population (cumulative)	Added Dwellings (cumulative)	Added Acres (cumulative)	Acreage Available
2005	1,975	0	0	0	
2010	2,485	510	218	0	



2015	2,995	1,020	386	0	2,307
2020	3,444	1,469	556	340	1,967
2030	4,477	2,502	948	1,124	1,183

All of these scenarios will require additional land for expanded commercial, industrial, and public uses.

Absent a new wastewater treatment plant, the Town will focus on absorbing the growth that is currently in the development pipeline, providing employment opportunities for residents, and revitalizing the Town's economic base. If the new treatment plant becomes a reality, opportunities for annexation will present themselves and they will be evaluated primarily on their ability to improve natural resource preservation, provide recreational opportunities, or add significant employment. It is expected that annexation interest will be focused first on the large parcels north of Greensboro along Rt. 313 (See Growth Area and Greenbelt map). These parcels should be considered for mixed use residential and employment uses at a density comparable to overall Town densities and for a large preservation and recreational park use along the Choptank. The next extension of Town is expected adjacent to the eastern boundary on several small parcels north and south of Sunset Ave. The third phase of growth should probably be considered in the northeast quadrant on the eastern side of the Choptank. Close to Town, this area should reflect Town residential densities with larger lots allowed as development approaches the outer greenbelt. The final areas for potential growth or annexation is the large area south of Town on both sides of the Choptank extending to the southern greenbelt. Close to Town, there may be some opportunity for higher density uses along Rt. 213 but, in large part, the area should retain a rural flavor with lower residential densities and small residential clusters to preserve farmland.

## COMMUNITY INFRASTRUCTURE CONSIDERATIONS

### Water Resources

Due to unexpectedly high quantities of unaccounted-for water, the Town exceeded its groundwater appropriations permit on several occasions and applied for an increased withdrawal permit in 2007. The new permit allows withdrawal of 325,000 gpd. Average daily demand in 2007 was 183,561 gpd. Adding a drought allowance of 10%, the remaining flow available is 123,083 gpd. Seventy-one infill lots would add a demand of 15,975 gpd and the approved but undeveloped subdivisions (336 dwelling units) would add another 75,600 gpd. A withdrawal permit of 325,000 gpd will allow build-out of the Town under Scenario 1 with a 31,500 gpd margin of safety.

Given current maximum daily demand of 455,000 and a capacity of 300 gallons per minute with the largest well out of service, the total well-field in Greensboro can produce 864,000 gpd; a surplus of 409,000 gpd. This indicates that water supplies and pumping capacity should be suitable to support projected growth to the year 2030. However, any development beyond Scenario 1 and its 2,995 residents will require further modifications to the groundwater appropriations permit and improvements to the water distribution and storage facilities to provide adequate fire flows beyond the year 2015.

### Sewage Treatment

Greensboro's current wastewater treatment capacity using average daily flows and a 250 gpd projected use rate per equivalent dwelling unit (EDU) is:

Rated Design Capacity of WWTP	280,000 gpd
Permitted Capacity of WWTP	280,000 gpd

Improved parcels with sewer service	799
3 year average flow	142,000 gpd
Gross available wastewater capacity	138,000 gpd
Estimated flows for infill	
Individual Town parcels @ 72 lots	18,000 gpd
Baldwin subdivision @ 101 lots	25,250 gpd
Greensboro Farms residential @ 230 lots	57,500 gpd
Total estimated flows for infill	100,750 gpd
Net available wastewater capacity	37,250 gpd or 149 EDU

As the above tabulation makes clear, the availability of sewer taps for future development is very limited without a significant sewer plant expansion and treatment upgrade. Infill and approved projects put the plant very close to its permitted capacity and any additional development will require new permitting and expansion. In response, the Town in 2006 limited the award of sewer taps to public uses, rehabilitative uses, and non-residential job-creating uses.

To add the population projected in the preferred growth Scenario 3 (+2,000 residents and +750 units by 2030) will require a total treatment capacity of 375,000 gpd. This capacity would be provided under the North County proposal which allocates 431,000 gpd to future flows from Greensboro with a total plant treatment capacity of 814,000 gpd.

Expansion of treatment capacity will require the facility to achieve more stringent discharge criteria compared to existing requirements, especially with respect to nutrients. Presently, only a modest degree of nitrogen and phosphorus removal is required with allowable effluent mass loadings of 9,867 lbs/year of nitrogen and 1,644 lbs/year of phosphorus. For disposal to the Choptank River at 814,000 gpd capacity, it is anticipated that the allowable effluent mass loadings will be at enhanced nutrient removal (ENR) levels of 9,196 lbs/year of nitrogen and 594 lbs/year of phosphorus. The current wastewater treatment plant in Greensboro cannot achieve these levels of treatment and a new plant as contemplated in the North County proposal would be required.

### Transportation

Under average daily traffic conditions, most of the local roads and streets in the Greensboro area are expected to operate at acceptable levels of service. The following table shows the average annual increase in traffic volume in each 2030 scenario distributed to each major road.

	2006	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Main St. south of Town	4531	5260	5593	5946	6322
Main St. north of Town	2951	3437	3659	3894	4145
Sunset Ave. west of Town	2931	3417	3639	3874	4125
Sunset Ave. east of Town	4631	5395	5743	6114	6508

Md 313 north of Town at Main St.	5900	6872	7316	7787	8288
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The only road that exceeds its capacity of 7,900 vehicles per day is Rt. 313 north of town. Fortunately, road improvements to increase capacity on Rt. 313 in Town are feasible due to its location outside the Central Business District and away from right-of-way constraints. Few significant major highway improvements will be necessary to manage the future traffic projected. The remainder of the Town roads will need only repaving and maintenance, since high delays are not likely to occur in the near future.

### Parks and Recreation

The Parks and Open Space category includes all lands with any of the identified factors recommended for preservation from development as explained in the next section, Natural Environmental Constraints. These areas occur throughout the Town in and near developed areas. Preservation of these areas in natural vegetated open space through the site review process has significantly enhanced the visual quality of the Town's landscape and the health of the natural environment. Retention of wooded creeks as natural open space within the Town's developed areas would greatly improve recreational opportunities and protect vital natural areas and water quality. Forested buffers are natural filters of pollution that protect streams and rivers. Land management techniques, such as protecting wooded areas, are recommended in the Town's Critical Area regulations.

For planning purposes, the State of Maryland uses a ratio of 30 acres of parkland per 1,000 persons; 15 of these acres must be locally-owned. Greensboro currently has 75 acres of parkland developed or committed.

Table 20 - Additional Parkland Required in acres				
2006	Scenario 1	Scenario 2	Scenario 3	Scenario 4
None	+15	+28.5	+43.5	+59.0

To provide targets for the provision of parks and recreation facilities, Greensboro will apply the following standards when considering the adequacy of the current network and the requirements brought by any future growth. These standards are based on those of the National Recreation and Parks Association and the Rural Planning Institute.

Regional County Park	5 acres per 1000 population
Community Park	5 - 8 acres per 1000 population
Neighborhood Park	1 -2 acres per 1000 population
Playgrounds	1 per 1000 population
Tennis Courts	1 per 2000 population
Soccer Fields	1 per 5000 population
Baseball Fields	1 per 5000 population
Softball Fields	1 per 5000 population
Volleyball Courts	1 per 5000 population
Basketball Courts	1 per 5000 population
Trails	1 mile per 1000 population

### Police

1.6 officers/1,000 people is the standard recommended by MDP and the Town now has the equivalent of

4.5 officers. Under the various scenarios, the MDP standard would require:

Table 21 - Additional Police Officers Required				
2006	Scenario 1	Scenario 2	Scenario 3	Scenario 4
4.5	+0.5	+1.0	+1.8	+2.7

### Fire Engines

The formula used by the Insurance Services Office (ISO) is the number of engines =  $0.85 + [0.12 \times (\text{population in 1,000s})]$ . Currently the Fire Company has two engines, one tanker, one rescue vehicle, one brush truck, one utility vehicle, and one command vehicle. The number of engines now operated by the Fire Company is adequate to serve the highest projected 2030 population

### Libraries

The American Library Association standard is 1,000 square feet of library space needed per 10,000 population. No additional library facilities would be needed in 2030.

### Schools

The Caroline County student generation rates per dwelling unit in 2005 were .24 elementary students per dwelling unit (du), .10 middle school students per du, and .18 high school students per du. Using these rates, the various growth scenarios would produce the following:

Table 22 - Additional Students Generated				
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Elementary	93	135	180	228
Middle	39	56	75	95
High School	69	101	135	171
Total	+201	+292	+390	+494

There are currently 6,114 students in Caroline County's ten schools. The highest 2030 population scenario would increase the number of elementary students by 9.1%, middle school students by 7.6%, and high school students by 9.4%.

### Financing of Infrastructure Expansion

The growth scenarios following Town build-out will require substantial outlays for infrastructure and services. Financing such infrastructure and service expansions will be governed by the following policies:

- New development will pay its fair-share of the costs associated with community facilities, infrastructure, and transportation needs whose demand is generated by the new development.
- Current residents, businesses, and property owners will not be required to fund capital improvement costs for community facilities, infrastructure, and transportation improvements necessitated by demands solely generated by new development.

- No new development will be approved within the Town unless it can be determined that adequate public facilities and infrastructure either already exists or has been planned and funded for construction within a reasonable time period in conjunction with the proposed development.
- The timing and phasing of community facilities, infrastructure, and transportation improvements requiring public investment will occur over time in conjunction with coordinated Town and County Capital Improvement Programs. Improvements recommended for areas within the Town should receive highest public-sector funding priority.

#### Greensboro's Rural Buffer and Protection of Sensitive Areas Near the Town

Several farms and lands in the Critical Area form a rural greenbelt around Greensboro and function as a growth boundary. The Town's willingness to accept regional growth near its boundaries is meant to suggest that these conservation areas constitute permanent buffers in the landscape and will be off limits to intensive development for the future. Private lands under conservation easement or proposed to be placed under conservation easements and known sensitive areas such as stream buffers, shoreline buffers, wetland areas, or important forested areas are areas around Greensboro where future development should be significantly limited or prohibited. The buffer is described on Growth Area Map 5.

Owners in land conservation areas will also be urged to participate in any of the various land conservation programs available such as the Maryland Agricultural Land Preservation Foundation (MALPF) farm easement purchase program and the conservation easement programs offered by the Eastern Shore Land Conservancy (ESLC), the Maryland Environmental Trust (MET) and the Maryland Historic Trust (MHT). The MALPF allows rural property owners to derive equity from their lands without actually developing them in return for placing easements on the property which prohibits or limits its future development. The ESLC, MET and MHT conservation easement programs provide tax credits and estate planning benefits to property owners who voluntarily place their lands under easements prohibiting or limiting future development.

#### NATURAL ENVIRONMENTAL CONSTRAINTS

This analysis reviewed all major proposed future use categories for Greensboro in relation to the natural and built environmental conditions to identify those factors that are particularly relevant to determine the suitability of any given area for a specific use. For example, areas containing wetlands or floodplains are best suited for open space and natural parks.

Map 6 shows the areas of natural environmental constraint in the Town of Greensboro. They include:

- Severe soil constraints for construction of buildings exist on the hydric soils;
  - Development within the 100-year floodplain is subject to Federal regulation and is both a potential hazard for life and property, and a constraint upon the natural function of this important element in the surface water system;
  - On the other hand, the alluvial soils typically deposited in hydric areas are usually fertile soils for farming and are ideal for parks and open space;
  - Erodible soils and soils with a high runoff potential require special measures during the construction process to prevent sedimentation of the surface water system. Where such conditions are severe, the affected lands are poorly suited for playfields and other activities that repeatedly disrupt the vegetation needed to mitigate them;
  - Forest cover has value for both protection of water quality and the small-town environment, which suggest that it requires protection, particularly in areas to be developed for suburban

residential densities or commercial, office or industrial uses.

The second step was to identify those conditions that virtually preempt land from development. Two such conditions were identified. The first condition is lands that are already developed. The second is a set of environmental characteristics that represent such natural value, fragility, susceptibility to damage from encroachment, or importance to the maintenance of the quality of the Chesapeake Bay that it is recommended that lands with these characteristics be preserved in their natural state.

The characteristics defining this preservation category include:

- A 25-foot buffer area adjacent to all non-tidal wetlands and streams, and a 100-foot buffer adjacent to all tidal wetlands;
- The 100 year floodplain;
- Tidal and non-tidal wetlands and marshes;
- Slopes greater than 25 percent.

It should be noted that these characteristics are only those requiring the greatest degree of protection.

The defining characteristics of the preservation category are generally protected by State and, in some cases, Federal legislation. While there are circumstances under which some such areas might be developed, the fact is that the majority of the land in Greensboro is better suited for development and amply able to accommodate foreseeable future growth. Lands recommended for the Preservation category are illustrated on Map 7.

## **WATER RESOURCES CONSIDERATIONS**

### **Water Resources Element Greensboro Comprehensive Plan**

The Greensboro Comprehensive Plan's "Water Resources Plan Element" (WRE) is a new plan element added to the Comprehensive Plan. This plan element is mandated to assure compliance with the requirements of Maryland House Bill 1141 (HB 1141). The purpose of the WRE is to provide additional layers of planning for water resources in relation to existing use and proposed land use, based on an analysis of growth and development trends to assure demands for water supply can be satisfied as Town growth occurs and to assure measures are taken to minimize impacts to water quality.

The Greensboro WRE is directly linked a number of other Plan elements. They include: 1) the Land Use Plan; 2) the Municipal Growth Element; 3) Community Facilities; and 4) Resource Conservation elements. The Water Resources element addresses three major areas including water (both supply and quality), wastewater treatment and discharge, and stormwater management.

Among other things, preparation of the WRE is an exercise intended to test water resource capacity limits, determine the potential implications of water resource issues for future growth, and facilitate development of coordinated management strategies. The Town of Greensboro represents a very small portion of the much larger Choptank River watershed. Since water resource protection issues are of concern watershed wide, much of the effort to protect or enhance water quality will be dependent on County and State actions and programs. Nevertheless, this plan element evaluates Greensboro's role in protection of Water Resources in this larger context.

The purpose of the Water Resources Element (WRE), as defined in Maryland House Bill 1141, is to establish a clear relationship between existing and proposed future development; it further establishes the relationship between drinking water sources and wastewater facilities that will be necessary to serve that

development and measures to limit or control the stormwater and nonpoint source water pollution that will be generated by new development.

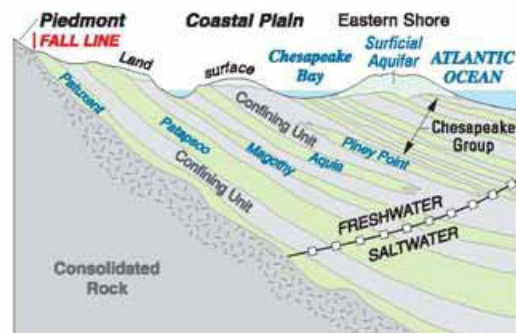
Specifically, the statutory requirements are:

- Identify drinking water and other water resources that will be adequate for the needs of existing and future development proposed in the land use element of the plan, considering available data provided by the Maryland Department of the Environment (MDE).
- Identify suitable receiving waters and land areas to meet the stormwater management and wastewater treatment and disposal needs of existing and future development proposed in the land use element of the plan, considering available data provided by MDE.
- Adopt a WRE in the comprehensive plan on or before October 1, 2009, unless extensions are granted by Maryland Department of Planning (MDP) pursuant to law. Zoning classifications of a property may not be changed after October 1, 2009 if a jurisdiction has not adopted a WRE in its comprehensive plan.

This element of the Plan assesses the Town’s drinking water sources and wastewater treatment facility and their ability to support existing and future development. It also identifies suitable receiving waters for existing and future wastewater and stormwater discharges. The Town of Greensboro, with substantial assistance and support from the Caroline County Department of Planning and Zoning, has prepared this Water Resources Element to assure the Town will focus growth to areas best suited to use the existing and planned water and wastewater infrastructure; to nurture efficient patterns of growth, protect and preserve the natural environs, promote economic growth, and support diversity of living environments in the Town.

### Water Resources

The Town of Greensboro and Caroline County within the Northern Atlantic Coastal Plain (NACP) aquifer system. The NACP system extends from the North/South Carolina border to Island, New York. In Maryland the NACP is bounded in the west by the Fall Line and in the east by the Atlantic Ocean. The Coastal system consists of sand and gravel aquifers interspersed with layers of silt and clay called confining beds. Beneath this system lies a layer consolidated rock at depths ranging from zero at Fall Line to about 8,000 feet at Ocean City.



The Northern Atlantic Coastal Plain Aquifer System

Source: A Science Plan for a Comprehensive Regional

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Greensboro’s water system is supplied by the Piney Point aquifer which is one of many located within the Atlantic Coastal Plain. The Piney Point aquifer is a confined aquifer.

A confined aquifer has a layer of clay or fine silt above it (a ‘confining’ layer) that allows very little water to travel vertically into the aquifer. Confined aquifers receive recharge from leakage through confining beds from surficial aquifers and lateral movement of water from adjacent aquifers and thus are less vulnerable to drought conditions.

Water quality in the Piney Point aquifer that serves Greensboro is generally good. A

In 2003, Maryland Department of the Environment conducted Source Water Assessments for 19 community water systems and 9 non-community systems located in Caroline County. MDE researched and identified potential sources of contamination for confined aquifers and analyzed each water system for susceptibility to pollutants originating at the land surface. MDE concluded that due to the protected nature of confined aquifers, the water supplies were not susceptible to surface contaminants. Some naturally occurring pollutants, such as arsenic and fluoride, do pose a risk to water systems supplied by the Aquia and Piney Point Aquifers but do not exceed EPA's maximum contaminant level (MCL). Tests conducted as part of MDE's Source Assessments indicated that that arsenic and fluoride levels measured less than 50 percent of the EPA's MCL in Greensboro's water supply. Water supply quality will continue to be monitored. Since the recharge area for the aquifer is located on the Western Shore of Maryland, the Town can do little to protect its source of water supply.

In 2000, USGS recorded that surface and groundwater withdrawals in Caroline County totaled 21,380,000 gallons per day (Tables 2 and 3 provide details of water withdrawals in the County). Unlike counties on the western shore, the largest water use in Caroline County was irrigation, which averaged 15.48 million gallons per day. The amount of groundwater withdrawn for irrigation purposes in the County is nearly five times higher than the next heaviest use (mining) and more than six times higher than domestic use.

### **Watershed Characteristics and Conditions**

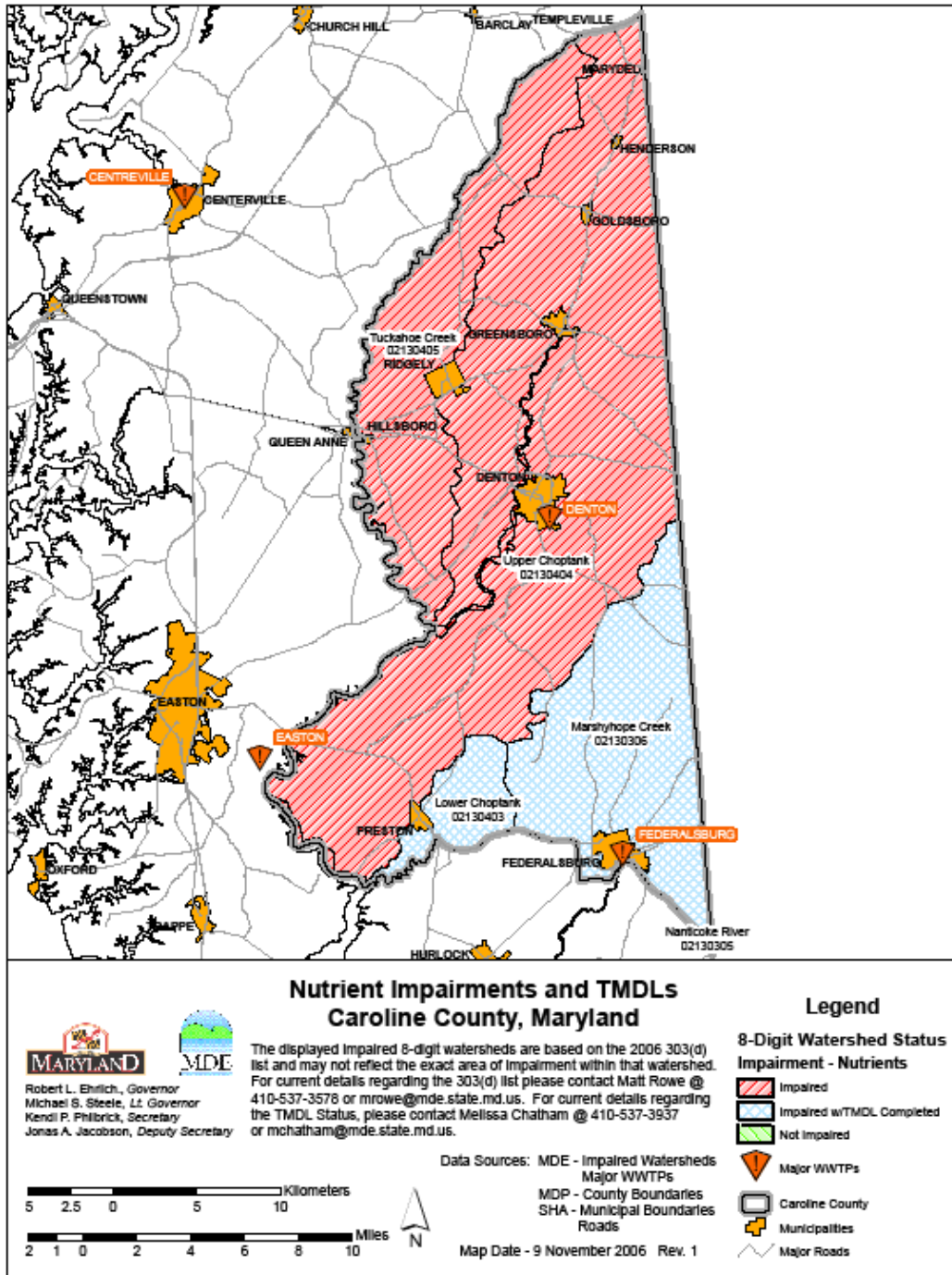
Greensboro drains into the Choptank River Basin which is a State-designated 6-digit watershed. State designated 8 digit watersheds (subsets of the 6-digit basins) within the Choptank Basin include the Tuckahoe River, Upper Choptank, and Lower Choptank Watersheds. 58% of Caroline County including the Town of Greensboro is located in the Upper Choptank Watershed.

The Upper Choptank River Watershed covers approximately 118,000 acres of land in Caroline County. Land use within the Caroline portion of the watershed is predominantly agriculture (59 percent), followed by forest (29 percent), urban land (8 percent), and wetlands (3 percent). As of 2005, the largest source of nitrogen in the Choptank River Basin was agriculture (70 percent). Agriculture was also the largest contributor of phosphorus (62 percent) and sediment loads (85 percent). In 2007, agricultural land contributed more than two-thirds of the total nutrient loads in the Basin.

A significant portion of the land in the Basin is drained via public ditches that were dug decades ago, primarily to drain land for farming. These ditches cover 368 miles, and including their buffers, occupy 70,137 acres of County land. They are generally kept clear of plants and other vegetative growth, which contributes to increased stream flows and speeds delivery of nutrients to water bodies before they have had a chance to be absorbed into the soil.

The Upper Choptank River is included on the State's 2008 Integrated Report as a Category 5 impaired water body, with increases in total nitrogen and phosphorus recorded between 2006 and 2008. Category 5 indicates that a water body is impaired and an assignment of Total Maximum Daily Loads (TMDL) for nitrogen and phosphorus is needed, but not yet established. The watershed has been cited for several impairments including biological, fecal coliform, nutrients and sediments. A watershed plan prepared for the Upper Choptank in 2003 recommended a number of strategies to address water quality issues; a plan update is currently scheduled and will include the establishment and funding of a long-term cover





crop program, implementation of improved maintenance and buffer programs for public drainage ditches, better enforcement of local sensitive areas protection measures, flood protection and

stormwater management ordinances, and management policies for on-site sewage disposal systems.

### Total Maximum Daily Loads (TMDLs)

A TMDL is a calculation of the maximum amount of a pollutant that a body of water can receive and still meet water quality standards. Point sources include urban stormwater systems and wastewater treatment plants with direct discharge permits into waterways (National Pollutant Discharge Elimination System Permits-NPDES). Non-point sources are all discharges other than point source discharges, including stormwater runoff from

land and erosion of stream and river banks. A TMDL is used as a regulatory mechanism to identify and implement additional controls on both point and non-point source discharges in water bodies that are impaired from one or more pollutants and are not expected to be restored through normal point source controls.

TMDLs establish limits or “caps” on the amount of pollutants permitted from point and non-point sources through an allocation system. A primary determinant of future growth is the assimilative capacity of local receiving waters for the input of pollutants. Assimilative capacity is expressed in the TMDLs for the receiving waters.

According to a report issued by DNR in 2002, the impairments in the Upper Choptank and Tuckahoe Creek watersheds “will be the subject of TMDL programs within the next few years.” However, to date no nutrient TMDLs have been set for either watershed, or for any of Caroline County’s major tributaries or sub watersheds, however, MDE’s Statewide Implementation Plan includes data on basin nutrient loads and “recommended” nutrient caps the Choptank River Basin.

Caroline County’s allocations of the load caps for each basin were determined by using the percentage of Caroline County land in each basin, and calculating Caroline County’s share using the same percentage of each basin’s caps. Caroline County comprises about 40 percent of the land in the Choptank River Basin. Table 1 identifies possible loading caps for County portion of the basin assuming the County would be allocated 40 percent of the total recommended caps that are yet to be established,

<b>Table 1: Possible future Nutrient Caps for Caroline County Portion of Choptank River Basin</b>		
<b>Source</b>	<b>Nitrogen Cap (lbs/yr)</b>	<b>Phosphorus Cap (lbs/yr)</b>
Point Sources	70,076	6,510
Non Point Sources	705,124	64,890
Total Sources	775,210	71,400

Source: Caroline County Dept. of Planning, Codes and Engineering, 2008.

An estimate of nutrient loads to the watershed from point and non-point sources within the Town of Greensboro are provided later in this Chapter.

### **Watershed Improvement Initiatives**

The Federal Clean Water Act (CWA) provides the framework for managing the nation’s water resources. Water quality standards were developed “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters” (Clean Water Act §101). The standards include designated uses for waterways as well as specific criteria that indicate whether or not the uses are able to be achieved in each waterway. Uses are identified through a public process and are based on the use and value of the water body for 1) public water supply; 2) protection of fish, shellfish, and wildlife; and/or 3) recreational, agricultural, industrial, and navigational purposes.

A waterway is identified as impaired when it no longer meets the water quality criteria

established for it and it is unable to achieve the use for which it is designated.

All of Caroline County's major tributaries – Choptank River, Marshyhope Creek and Tuckahoe Creek – are all listed as impaired on the State's 2008 Integrated Report (formerly the 303(d) list).

A report on water quality in Maryland issued by the U.S. Geological Survey in 2004 indicates that the combination of soil and aquifer conditions and the regional predominance of agricultural land use are responsible for the concentrations of nitrogen, phosphorus, and pesticides in streams and rivers on the Eastern Shore. While there are other, lesser contributors to nutrient levels in the region's tributaries including septic systems, wastewater treatment plants, and urban and suburban chemical applications, the study noted that primary sources of nutrients on the Delmarva Peninsula are inorganic fertilizer, and that the concentrations of nitrogen, phosphorus, and herbicide compounds in streams on the Delmarva Peninsula are similar to those in other predominantly agricultural areas of the United States.

In addition to the Federal Clean Water Act, a number of Federal and State programs exist to provide support for achieving Bay water quality goals and assurance that goals can be reasonably met, including:

### **Bay Restoration Fund Enhanced Nutrient Removal (ENR)**

The Bay Restoration Fund (BRF) ENR program uses funding from public sewer taxes to provide up to 100 percent state grant funds to local governments to retrofit or upgrade sewage treatment plants to reduce the nutrient levels in plant discharge to 3 mg/l total nitrogen (TN) and .3 mg/l total phosphorus (TP). Upon completion of an ENR upgrade, the permitting authority (MDE) requires the permittee to make a best effort to meet the load goals, providing reasonable assurance of implementation. At present, funding priority is given to those wastewater treatment plants with a permitted flow of 500,000 GPD or greater. Funding for other facilities may be considered on a case-by-case basis in consideration of cost-effectiveness, water quality benefits, readiness to proceed, and nitrogen/phosphorus load.

### **The Maryland Water Quality Improvement Act**

The Maryland Water Quality Improvement Act "requires that comprehensive and enforceable nutrient management plans be developed, approved and implemented for all agricultural lands throughout Maryland." This act specifically requires that nutrient management plans for nitrogen be developed and implemented by 2002, and plans for phosphorus to be done by 2005. To date Dozens of Caroline County farmers are enrolled in cost-share programs to implement agricultural BMPs. These programs are managed by the Maryland Agricultural Water Quality Cost-Share Program (MACS), Maryland Department of Agriculture's NRCS, and FSA, and University of Maryland Cooperative Extension Service. At the end of 2008, over 80 percent of Caroline County farms were implementing nutrient management plans; nearly one-fifth of all farms utilized some form of conservation tillage. Just over 17,000 acres of cover crops were planted in the County in 2008, and over 4,000 tons of manure (mainly from chickens) was transported out of the County. Since 2008, about 4,200 acres of grass buffers and 142 acres of forest buffers have been installed on farms in the County, and 149 acres of agricultural lands were restored to wetlands.

The cumulative result of the buffers, wetlands and cover crops was a total reduction of nutrients (466,155 lbs. of nitrogen and 99,012 lbs. of phosphorus) in the Choptank River Basin, where the farms enrolled in these programs were located. However, the total reduction of nutrients fell far short of the Choptank Basin Tributary Goals.

## Tributary Strategies

Tributary Strategies are river-specific cleanup strategies that detail the "on-the-ground" actions needed to reduce the amount of nutrients and sediment flowing into the Chesapeake Bay. When all 36 strategies are added together, cleanup plans will be in place in every part of the Chesapeake Bay's 64,000 square-mile watershed. The strategies outline how the Bay states and the District will develop and implement a series of "best management practices" to minimize pollution. This includes planting new riparian forest buffers, upgrading sewage treatment plants, implementing nutrient management on farms, wisely managing storm water runoff, and other innovative programs to accelerate the restoration of the Bay and its rivers.

Each strategy is tailored to that specific part of the Bay watershed - there is no "one-size-fits-all" strategy for the entire Bay watershed. Pollution reduction actions needed in rural watersheds, like the Choptank River Basin, vary greatly from those needed in more urban areas. The strategy prepared for the Upper Choptank in 2003 recommended a number of strategies to address water quality issues. As noted earlier, a plan update is currently scheduled for the coming year.

## Water System

### Water supply

Greensboro withdraws its water from the Piney Point Aquifer via three wells located throughout the Town. The Hobbs Street Well, located on the west side of Town has a design pumping capacity of 300 gallons per minute (GPM). The Academy Street well, located near the center of Town has a capacity of 325 GPM. The Town's third well, located in the Eastern portion of Town, along MD Route 313 has a capacity of 350 GPM. The Hobbs Street Well and Academy Street Well were rehabilitated in 2007 to ensure efficient production. The Town's MDE Appropriation and Use Permit was increased from 200,000 gpd average annual use to 325,000 gpd in 2007. Maximum daily withdrawal was also increased from 300,000 gpd to 455,000 gpd. A map included in the 2005 Water System Evaluation and Study identifies the extent of the Town Water Service area and system components. There are no private wells in Town.

In 2007, the average daily demand on Greensboro's water system was 183,551 gpd, about 57 percent of its permitted average daily capacity. The five-year average daily use was 183,000 gpd, approximately 55 percent of the system's permitted average daily capacity.

**Table 2: Greensboro Water System Characteristics - 2008**

Source	Permitted Avg Annual Use (gpd)	Five-Year Avg Withdrawal 2007 (gpd)	% Avg. Annual Capacity Used	Projected Additional Demand* (gpd)	Water Quality**	Planned Upgrades/ Expansions
Piney Point Aquifer	325,000	185,000	58%	75,600	Good	Permit increase recently approved

\* From approved but undeveloped projects and municipal estimates of growth

\*\* 1992 Caroline County Comprehensive Water & Sewerage Plan

Sources : MDE Water Appropriation and Use Permits; Caroline County Departments of Environmental Health and Planning, Codes and Engineering, 2008.

State design recommendations for water systems call for well capacity equal to the peak daily flow rate with the largest well out of service and remaining wells pumping 24 hours per day. Under current maximum daily demand of 455,000 gpd and a pumping capacity of 300 gpm (gallons per minute) with the largest well out of service, the total well-field in Greensboro can produce 864,000 gpd; a surplus of 409,000 gallons per day.

### Water Storage Capacity

Two elevated storage tanks located at the east and west ends of Town maintain the systems water pressure. Each tank has a storage capacity of 150,000 gallons. Applying State standards for storage capacity and fire flow rates, the Town has a storage surplus of just under 100,000 gallons in capacity.

### Water Distribution System

A number of improvements have been made to the Town’s water distribution system over the past 20 years. These include the replacement of nearly all of the water mains on Sunset Avenue and Main Street. Mains to the north and south of MD Route 314 in the eastern section of Town were replaced in 1990 and 2000 respectively. Portions of Cedar Lane were replaced in 1990. More recent subdivisions toward the north end of Town are served by piping installed when they were approved in the early 1990’s.

A study of the Water distribution system, prepared by Davis, Bowen and Friedel, on behalf of the Town in 2005, provided a number of recommendations for upsizing water mains in various locations from 4” to 8” or 6” to 8” lines, to increase fire flows to hydrants.

### Projected Water Demand

To calculate future demand on Greensboro’s water system, a per-household water usage multiplier of 250 gpd (MDE estimate of single family household daily water usage) was applied to projected dwelling unit increases forecast for the Town. Projections are based on those identified as Scenario 1 in Chapter 3 of the Comprehensive Plan (see table 14) and assumes no new annexations. Water demand is based on existing dwellings as well as potential units, which may be built through infill development of vacant and underutilized lots within the current municipal boundary and/or in Town designated municipal growth areas. (see Table 6-2).

**Table 3: Greensboro Projected Water Demand based on projected population growth**

Year	2000	2010	2015	2020	2025	2030	Increase 2010-2030
Population*	1,632	2,485	2,995	3,144	3,301	3,458	973 ***
Household Units**	618	941	1,134	1,191	1,250	1,310	369
Water (GPD)	154,500	235,250	283,500	287,750	312,500	327,500	92,250 (GPD)
Non-Res. (sq.ft.)	-	-	5,000	10,000	15,000	20,000	20,000 sq. ft.
Non-Res. Demand (GPD)†	-	-	500	1,000	1,500	2,000	2,000 (GPD)
Total Water Demand	154,500	235,250	284,000	288,750	313,000	329,500	94.250 (GPD)

% average daily flow capacity****	48%	72%	87%	89%	96%	101%	----
% maximum daily flow*****	34%	52%	62%	63%	69%	72%	----

Projections shown here based on incremental 10 year projections established by methodology defined in Chapter 3 (Municipal Growth Element) and as shown in Table 3-6, for consistency.

Notes:

\* Population Projection based on assumption that 386 recorded or to be recorded lots are built on and occupied by 2015. Projections after 2015 assume a growth rate of 1% resulting in additional 463 residents between the years 2015 and 2030.

\*\* Household units projection assuming a sustained average of 2.64 persons per household as evident in 2000.

\*\*\* Population totals include growth of existing population plus increased population as a result of infill development.

\*\*\*\* Average daily flow capacity/maximum daily flow: 325,000 gpd/455,000 as per current Groundwater Appropriation Permit.

† Non-residential demand based on demand for .1 gallons per square feet per day utilizing estimates of future non-residential growth.

Projections indicate that demand for water in the Town will increase by, just over 94,000 gallons per day or 29% from 2010 levels by 2030. Related to Greensboro's Groundwater Appropriation Permit (GAP), MDE determined that annual average withdrawals of 325,000 gpd and 455,000 gpd during the month of maximum use were reasonable and that no significant negative impacts would occur to the aquifer resource or neighboring water users.

Table 3 illustrates that by 2015, projected water usage will be at 87% of the system's average daily flow capacity as limited by the Groundwater Appropriation Permit.

Chapter 3 of this plan clearly indicates that the Town does not plan to "allow any new residential annexations or new major residential projects during the period between this Plan and the next required Plan in 2014. This is the growth strategy adopted by this Plan. Given this policy, the Town's water system should be adequate to support the Town's current overall development policy.

Given current maximum daily demand of 455,000 gpd and a capacity of 300 gpm (gallons per minute) with the largest well out of service, the total well-field in Greensboro can produce 864,000 gpd; a surplus of 409,000 gallons per day. This indicates that water supplies and pumping capacity should be suitable to support projected growth to the year 2030.

However, the actual system capacity that presently exists may be limited by the water distribution and storage facilities necessary to provide adequate fire flows beyond the year 2015. Therefore, replacement of sections of the distribution system will probably be priority projects to enhance the water system over the next several years.

If other improvements to the water system are determined necessary in the future and need to be made by 2020 to accommodate growth that may occur after that time then they should be implemented. Any development beyond 2,995 residents or 1,134 households anticipated between 2015 and 2020 will require further modifications to the groundwater appropriation permit and possible improvements to pumping and storage capacity. In addition to system expansion, the Town will need to continue to implement recommendations for improvements to existing water distribution lines identified in the 2005 Town water system evaluation. Many of these recommended line repairs and replacements may serve to conserve water resources or effectively increase fire flows in the current water supply system.

## Wastewater Treatment System

The Town of Greensboro currently operates a fixed film, activated sludge type wastewater treatment plant located on the northwest bank of the Choptank River. The facility was originally constructed in 1968 and last modified in 1996. The plant consists of an influent screen, primary clarifier, dual rotating biological contactors, two secondary clarifiers, disinfection, post aeration, and sludge drying beds. Wastewater effluent flows by gravity through the plant to an outfall that discharges into an unnamed tributary of the Choptank River. A map of the extent and components of the System is available in the “Sewer Collection System Evaluation” conducted in May, 2005 by Davis, Bowen and Friedel.

The Town’s Wastewater Treatment Plan has a permitted design capacity of 280,000 gallons per day (gpd). In 2008, the plant’s three-year average daily flow was 142,000 gpd, with gross available capacity of 138,000 gpd. Study of the systems capacity conducted in May, 2005 by Davis, Bowen and Friedel indicated unused wastewater treatment capacity could accommodate up to 483 equivalent dwelling units (EDU’s)

The Town calculates that infill development will create demand for treatment of an additional 120,750 gpd, which would leave 17,250 gpd in remaining capacity and place the system at 94 percent of capacity. Page 31 of this Comprehensive Plan evaluates the capacity of Wastewater Treatment infrastructure to support existing improved parcels with sewer service, together with additional capacity required to support planned development. These estimated treatment demands will be prompted by infill development and development of subdivisions that have been planned and/or approved, and are located within the current corporate limits of the Town. As shown in Table 4, this combination of system demands would leave a remaining available wastewater treatment capacity of only 17,250 gpd or 69 equivalent dwelling units. These projected flows would exceed 80% of the systems permitted treatment capacity, indicating the Town may need to determine actions needed to increase permitted treatment capacity before build-out as shown in Table 4.

As a result, in 2006 the Town limited the sewer allocation to public uses, rehabilitative uses, and non-residential job-creating uses. Policies established in Chapter 3 of this Comprehensive Plan, limit any future growth to these uses and infill development of recently approved subdivisions. Any annexation of land or additional development would require expanding the plant and upgrading it to ENR treatment level.

Table 4: Current and Projected Wastewater Treatment Capacity Demand		
Development type	Number of equivalent dwelling units (EDU’s)	Demand for Treatment Capacity (GPD)
Currently improved parcels	799	142,000 *
Baldwin Subdivision	101	25,250
Greensboro Farms	230	57,500
Town parcels (currently unimproved)	72	18,000
Projected Non-Res. Demand**	80	20,000
<b>Total</b>	<b>1,202</b>	<b>262,750</b>
Total current System Design and Permitted Capacity = 280,000 GPD		
Reserve Capacity = 17,250 GPD		

Note; All new development assumed to generate 250 gpd per unit treatment demand.

\* Figure shown denotes most recent three year average daily flows which is less than 250 gpd per EDU.

\*\* Non-residential demand based on demand for .1 gallons per square feet per day utilizing estimates of future non-residential growth and are converted to equivalent dwelling units.

Chapter 3 of this plan also examined the implications of annexations into surrounding areas designated as the Town’s mapped growth areas. A Municipal Development Capacity Analysis for Caroline County was prepared by the Eastern Shore Regional GIS Cooperative in November, 2008. This analysis indicated that within the mapped growth area, there is capacity for 2,158 residential units in areas beyond the current corporate limits. Page 30 of the Plan (Table 18) reflects the highest projected growth rate (3% annually) considered among scenarios explored in Chapter 3. This growth rate resulted in 948 additional dwelling units between 2009 and 2030, many of which would have to locate in new growth areas, which would consume 44% of growth area development potential, and require more than double the current permitted wastewater treatment capacity. This consideration serves as the basis for the previously referenced Town policy in the near term to limit development to infill, public uses, rehabilitative uses and non-residential job creating uses.

**Point Source Pollution Considerations**

Point sources are measurable inputs of pollutants that are discharged into streams, rivers and lakes via pipes or drains, primarily from industrial facilities, and municipal treatment plants. Since Caroline County does not currently operate any wastewater treatment facilities, issues related to managing or reducing point source nutrient loads delivered from the Town’s municipal Wastewater treatment plan need to be addressed in this Plan.

The Town of Greensboro shares the Choptank River Basin with numerous municipalities that operate public wastewater facilities (Denton, Preston, Cambridge, Easton, St. Michaels, Trappe, East New Market, Secretary, and Hurlock). As shown in Table 5, Point Source discharges in the Upper Choptank portion of the Choptank River basin represent 8.3% of Nitrogen loadings to the watershed and 11.7% of Phosphorus loadings.

<b>Table 5: Upper Choptank River Watershed Sources of Impairment</b>			
<b>Watershed</b>	<b>Nitrogen</b>	<b>Phosphorous</b>	<b>Sediment</b>
Point Source	8.3%	11.7%	0.0%
Non-Point Source			
• Agricultural Land	72.7%	66.6%	86.9%
• Mixed Open Land	6.5%	12.2%	4.4%
• Urban Land	5.6%	7.7%	3.4%
• Forest Land	5.4%	0.8%	5.2%
• Atm. Dep.	1.6%	1.0%	0.0%

Source: Maryland Tributary Strategy Choptank Basin Summary Report for 1985-2003 and Caroline County Dept. of Planning, Codes and Engineering, 2008.

Table 1 on page 5 of this plan element, identified possible point source loading caps recommended by Caroline County for the County portion of the Choptank River Watershed assuming that Caroline would be allocated 40 percent of the total recommended caps that are yet to be established ( a percentage equivalent to the County’s proportionate land area in the basin). Point Source load limits established in



these prospective TMDLs were 70,076 lbs. per year for Nitrogen (TN) and 6,510 lbs. per year for Phosphorus (TP).

Review of available data indicates that the combined flows from Wastewater Treatment Facilities in the Caroline County portions of the Choptank River Watershed are within TMDL limits that may be established in the next few years. Table 6 identifies estimated 2007 point source loads generated from the Greensboro Wastewater Treatment Plant as well as other plants located in Caroline County. Total nitrogen loadings from Town treatment facilities discharging into the Caroline portion of the Choptank River basin are 34,155 lbs/yr. This figure includes all nitrogen loadings shown in table 6 excepting loadings from the Federalsburg WTP. These totals represent roughly ½ the total prospective point source TMDL, indicating current loadings are sustainable. This conclusion assumes that the future TMDLs assigned to the Upper Choptank remain consistent with those currently recommended, and that load allocations are based on land area rather than the number of point sources throughout the entire Choptank Watershed.

**Table 6: Caroline County Municipal Wastewater Treatment Facilities Effluent Nitrogen and Phosphorus concentrations and loadings**

Wastewater System	2007 Avg Daily Flow (mgd)	Design Capacity (mgd)	2007 CONCENTRATION		2007 AVG FLOW LOAD	
			TN mg/l	TP mg/l	TN lbs/yr	TP lbs/yr
Denton	0.349	0.800	8.10	1.18	8,605	1,254
Federalsburg	0.274	0.750	19.85	0.68	16,557	570
Greensboro	0.111	0.280	47.92	3.29	16,192	1,112
Preston	0.058	0.116	11.34	1.00	2,016	177
Ridgely	0.134	0.180	18.00	3.00	7,342	1,224
Totals					50,712	4,336

Source: Chesapeake Bay Program and Caroline County Dept. of Planning, Codes and Engineering, 2008.

Note: Total Nitrogen (TN) is the sum of Organic Nitrogen, Ammonia, TKN or Total Kjeldal Nitrogen, and Nitrate+Nitrite

The same findings apply to Phosphorus loadings since Upper Choptank loadings in 2007 totaled 3,766 lbs/year; representing approximately 58% of total prospective loadings to be allocated.

If more restrictive TMDL limits are established, the State will need to give consideration to BNR/ENR technology upgrades to “minor” wastewater treatment facilities, (facilities treating less than 500,000 GPD) including the Greensboro treatment plant. Review of table 6 indicates that the 2007 flow from the Greensboro Wastewater facility demonstrated a particularly high concentration of over 47 mg./l (milligrams per liter) in its nitrogen loadings.

More recent information indicates that these concentrations are lower than shown in table 6. Review of monthly reports for the 2008 calendar year indicate average concentrations for this most recent year were 23.67 mg./l. This data also indicates that total nitrogen loads for the year resulted in discharges of 8,522 lbs of nitrogen, well below the 9,876 lbs per year permitted level.

In spite of this reduction in TN concentrations and lower TN loads, this is much higher than other plants in the basin and suggests that the State should consider funding to support BNR/ENR upgrades to the current facility. Phosphorus concentration in current loadings is also higher than other treatment facilities in the County. Table 6A identifies projected pollutant loads for the year 2030 assuming demand for treatment increases from the treatment plants current average daily flow of 111,000 GPD to 231,750 GPD by 2030. This reflects an increase in treatment volume of 120,750 per day as shown in Table 4. Figures shown assume that nitrogen and phosphorus concentrations in effluent remain as shown in Table 6.

Table 6A: Projected increases in point-source pollutant loads 2007 - 2030			
	2007 estimated load	2030 estimated load (lbs/yr.)	Estimated net load increase
Nitrogen	16,192 lbs./yr.	33,683 lbs./yr.	17,491 lbs./yr.
Phosphorous	1,112 lbs./yr.	2,213 lbs./yr.	1201 lbs./yr.

The Chesapeake 2000 Agreement outlined a goal for Maryland towns and counties to work cooperatively to achieve a 40 percent reduction from 1985 Bay nutrient levels. This goal was applied to point and non-point sources of pollution. State and Federal funding to reduce point source loads has been concentrated on upgrades to the state's 66 major treatment plants because they are estimated to contribute 95 percent of wastewater flow into the Bay. The required reduction in major WWTP nutrient loads is made with plant upgrades to first BNR then ENR technology, which reduces total nitrogen (TN) load to 3mg/l and total phosphorus (TP) to .3mg/l.

While upgrades to BNR and ENR treatment levels could result in a significant reduction in nutrient loading from WWTP point sources, the full potential of the advanced technology will go unrealized in plants like Greensboro's whose flow volumes don't qualify for funding assistance.

Current MDE, funding policies indicate that ENR upgrades to smaller plants will begin only after all major plant upgrades are completed, and then only if funding is still available. Most minor plants are at secondary treatment levels and concentrations of Nitrogen are at 18 milligrams per liter or less. However, Greensboro's particularly high concentrations indicate that the facility may presently be discharging more pounds of nitrogen per year than some major treatment facilities.

EPA and MDE need to consider developing programs in conjunction with local governments to monitor projected growth and increases in flow allocations and resulting impacts from small plants and provide access to funding to support restoration efforts for Towns like Greensboro. This includes exploring the feasibility of continuing funding for the Bay Restoration Fund program to ensure ENR upgrade funding for all minor plants when cost-effective results can be realized.

### Point Source Strategy

- Encourage the Chesapeake Bay Program and MDE to re-evaluate funding policies to include funding for ENR/BNR upgrades to minor treatment facilities when Total Nitrogen and/or Total Phosphorus concentrations are particularly high (e.g. TN concentrations over 20 mg/liter)
- Manage Wastewater Treatment facility operations to reduce flows per household to the extent possible.

- Encourage use of water conservation fixtures and design techniques in new development to reduce water system demands and reduce flows to the wastewater treatment facility.
- Monitor nutrient load increases and adjust the scale and pace of growth so that the average daily flow results in nutrient loads that are within established nutrient thresholds.
- Where future growth may exceed the 40 percent nutrient reduction goal, work with MDE to find technical and/or fiscal support for decreasing wastewater treatment plant effluent concentrations of TN and TP.

**Non-Point Source Pollution and Stormwater Management Considerations**

Non-point source pollution occurs when rainfall, snowmelt, or irrigation runs over land or through the ground and gathers pollutants. Pollutants are then deposited into streams and rivers or introduced into ground water. Stormwater runoff is a significant contributor to non-point source pollutant loading. As of 2005, the largest non-point source of nitrogen in the Choptank River Basin was agriculture (70 percent). Agriculture was also the largest contributor of phosphorus (62 percent) and sediment loads (85 percent).

According to the Maryland Tributary Strategy Choptank Basin Summary Report for 1985-2003, the Town of Greensboro, together with other Urban Uses in the Watershed contribute approximately 5.6% of non-point source nitrogen loadings, 7.7% of the non-point source phosphorus loadings and 3.4% of the sediment loadings to watershed tributaries.

Stormwater runoff is part of the natural hydrologic process. Human activities and landscape changes resulting from urbanization can alter natural drainage patterns and add pollutants to rivers. Urban runoff is often a significant source of water pollution, including flows discharged from urban land uses into stormwater conveyance systems and receiving waters.

In the past, efforts to control the discharge of stormwater focused on quantity (e.g. drainage, flood control etc.) and only to a limited extent on quality. More recently, awareness of the need to improve water quality has increased. With this awareness Federal, State and, Local programs have been established to reduce pollutants contained in stormwater discharges to our waterways. These programs promote the concept and practice of preventing pollution at the source, before it can cause environmental problems.

**Greensboro’s Projected Non-Point Source Loading**

Table 7 illustrates estimated nitrogen and phosphorous loadings from stormwater runoff based on projected growth in the Town through 2030. To assist Caroline County with preparing a methodology for calculating nutrient loading rates for each of the County’s land uses, MDE developed estimates of the County’s nutrient loading rates and loads.

Land use acreage totals are applied to a formula developed by MDE that includes soil factors, average annual rainfall and impervious surface percentages (impervious surface percentages vary according to land use – generally, developed land has a higher percentage of impervious surface than undeveloped land). The result is a per-acre rate of loading for each land use. The “Developed Land” per acre rate of loading was applied to the Town of Greensboro since it reflects a mix of residential, commercial and industrial uses.

Table 7: Greensboro estimated non-point source loading rates and loads (2009 and 2030)				
Estimated Acres of	Nitrogen	Phosphorus	Estimated	Estimated

Developed Land*	Loading Rate (lbs/ac)	Loading Rate (lbs/ac)**	Nitrogen Load (lbs)**	Phosphorus Load (lbs)
Year 2009 428 acres	8.77	1.14	3,754	488
Year 2030† 634 acres	8.77	1.14	5,560	723
Net Increase	---	---	1,806	235

Notes: Loading rates are based on MDE/CBP land use load estimates.

\* “Developed” includes residential, commercial, industrial and institutional land uses.

\*\* Represents average load per acre of all acres including estimated 29.5 acres of Town parkland

† Year 2030 estimates assume build-out of Baldwin and Greensboro Farms subdivisions and development on 21 existing vacant parcels within the Town with no new annexations.

Estimates shown in Table 7 indicate that approximately 1,806 additional pounds in Nitrogen loading and 235 additional pounds in phosphorus loading can be expected as a result of currently planned development over the period. This estimate does not account for any annexation of land but assumes the build-out of the Baldwin Development and Greensboro Farms subdivision as well as infill development of 21 existing vacant parcels currently located within the corporate limits of the Town.

Table 8 represents results from use of an alternative method used to estimate future levels of pollution from non-point sources in Greensboro. This method utilizes the "Watershed Treatment Model for Urban Watersheds", developed by MDE and the Center for Watershed Protection. The model incorporates estimates made using measurements of annual rainfall and impervious surface area based on land use and Environmental Protection Agency (EPA) estimates of standard concentrations of nitrogen and phosphorous in urban area stormwater runoff. This model, also known as the “simple model” for calculating pollutant loads is as follows:

$$L = 0.226 * R * C * A$$

Where

L = Annual Load (lbs),

R = Average Annual rainfall (inches),

C = Pollutant concentration (mg/l),

A = Acres of impervious surface, and

0.226 is the unit conversion factor for converting milligrams to pounds.

<b>Table 8: Greensboro stormwater pollutant loadings from projected infill development and growth within currently planned municipal areas.</b>					
	0.226 conversion factor for converting milligrams to pounds.	(R) Average Annual Rainfall ††	(C) Pollutant Concentration (2.0 mg/l)	(A) Impervious Surface (acres) †††	(L) Total load (lbs/year)
Estimated Nitrogen loadings †	0.226	42.8 inches	2.0 mg/l Nitrogen concentration	88.88	1719 lbs/year Nitrogen
Estimated	0.226	42.8 inches	0.26 mg/l	88.88	223

Phosphorus loadings †			Phosphorus concentration		lbs/year Phosphorus
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- † Source: Stormwater Manager's Resource Center (SMRC), EPA Offices of Water and Wastewater Management, "Watershed Treatment Model for Urban Watersheds", MDE and the Center for Watershed Protection. Medium density land use impervious surface multiplier (0.28) was used to calculate future impervious surfaces for residential use and (0.72) for commercial.
- †† Source: Worldclimate.com Global Historical Climatology Network (GHCN) for Denton, MD.
- ††† Impervious surface calculation assumes 352 new residential units at 3.5 units per acre and assumes 266 acres will be converted to single family residential land use between 2009 and 2030 and 20 acres converted to commercial use at Greensboro Farms.

As can be seen in Table 8, use of the simple formula results in loadings for nitrogen and phosphorus that are very similar to that shown in Table 7. The two methods establish an estimated range of expected increases in non-point source nitrogen loadings of between 1,719 and 1,806 lbs per year. Likewise, an estimated range for projected phosphorus loadings falls between 223 and 235 lbs. per year.

These estimates further assume that the loading rates per acre will remain the same through the period to 2030. Greater use of Best Management Practices (BMPs) for management of stormwater quality, which is expected in future Town development, could reduce the projected increases in nitrogen and phosphorus loadings. An estimate of increases in nutrient loadings from both point (wastewater treatment facility) and non-point (stormwater) loads is shown in Table 9.

	Estimated load increase from point source	Estimated load increase from non-point sources	Estimated load increase From both sources
Nitrogen	17,491 lbs./yr.	1,719 (lbs/yr.)	19,210 (lbs./yr.)
Phosphorous	1201 lbs./yr.	223 (lbs/yr.)	1,424 (lbs./yr.)

Review of these increases, though sizable, indicate that Greensboro's growth will represent a small proportion of total TMDL's likely to be allocated for non-point sources, and may therefore be able to be accommodated in watershed-wide context. However, until such time as final TMDL's are assigned to non-point sources of pollution in the watershed, no conclusion can be drawn regarding the assimilative capacity of the Watershed to indicate it is suitable to support the combined additional loads resulting from wastewater and stormwater increases attributable to future growth projected in the Town's Land Use Plan.

This evaluation also does not take into account the demands on the assimilative capacity of the Watershed from other growth or activities within the watershed (e.g., County growth and Agricultural use) and underscores the importance of coordinated land use and growth management strategies based on sound watershed planning principles. It also underscores the importance of inter-jurisdictional coordination and cooperation between Caroline County, Greensboro, and the County's need to support the Agricultural industry's efforts to reduce non-point loadings in the Watershed.

For both TMDLs, Maryland has several well established programs that will be drawn upon: the Water Quality Improvement Act of 1998 (WQIA), the Clean Water Action Plan (CWAP) framework, and the State's Chesapeake Bay Agreement's Tributary Strategies for Nutrient Reduction. Also, Maryland has

adopted procedures to assure that future evaluations are conducted for all TMDLs that are established. The implementation of point source nutrient controls will be executed through the use of NPDES permits. The NPDES permit for the Greensboro WWTP will have compliance provisions, which provide a reasonable assurance of implementation.

Finally, Greensboro's Land Use and Municipal Growth Plans reflect "smart growth" strategies. They are designed to concentrate development adjacent to the existing developed areas within the corporate limits. Growth will be permitted on annexed lands at net densities ranging from 2 to 4 units per acre. The result is development concentrated in cluster form with annexation of additional lands limited over the next 10 years. This approach maximizes opportunities to minimize deterioration in the Upper Choptank River watershed.

### **Water Resources Goals and Objectives**

The Water Resources goal for Greensboro is:

- to maintain a safe and adequate water supply and adequate capacities for wastewater treatment to serve projected growth; to take steps to protect and restore water quality; and to meet water quality regulatory requirements in the Upper Choptank River watershed.

Objectives to support this goal are:

- Assure that existing and planned public water systems meet projected demand.
- Assure that existing and planned public wastewater collection and treatment systems meet projected demand without exceeding their permitted capacity.
- Assure that the Town's stormwater management policies reflect the most recent state requirements, and encourage Low Impact Development (LID) practices in both new development and by existing homeowners.
- Maintain land use patterns that limit adverse impacts on water quality.
- Continue to focus growth to areas best suited to utilize the existing and planned water and wastewater infrastructure efficiently.

### **Water Resource Strategies and Recommendations**

Beyond establishing a land use planning framework that is supportive of water quality protection efforts, the Town can also initiate measures that further support sound management of stormwater flows to improve water quality. These include:

- Use of "Environmental Site Design (ESD) Principles to manage Stormwater in new development. The Maryland Stormwater Management Act of 2007 is based upon Environmental Site Design (ESD) Principles, which attempt to mimic natural hydrology on developed sites. The Stormwater Management Act of 2007 is based upon 13 core principles, which are listed below:
  1. Increase onsite runoff reduction volumes
  2. Require a unified early ESD map
  3. Establish nutrient-based stormwater loading criteria

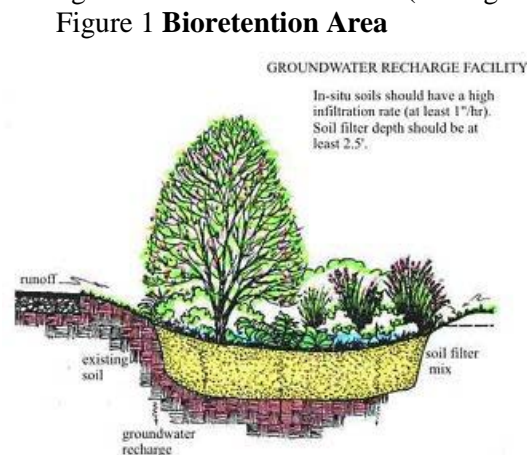
4. Apply ESD techniques to redevelopment
5. Integrate ESD and stormwater management together at construction sites
6. Provide adequate financing to implement the Act and reward early adopters
7. Develop an ESD ordinance that changes local codes and culture
8. Strengthen design standards for ESD and stormwater practices
9. Ensure all ESD practices can be adequately maintained
10. Devise an enforceable design process for ESD
11. Establish turbidity standards for construction sites
12. Craft special criteria for sensitive and impaired waters of the state
13. Implement ESD training, certification and enforcement

The Town should consider amendment to Stormwater Management Regulations to incorporate these principles in standards for future development and site planning.

- Promoting bio-retention as a means of treating stormwater runoff. Bio-retention, such as a rain garden, provides stormwater treatment that enhances the quality of downstream water bodies by using soil and both woody and herbaceous plants to remove pollutants from stormwater runoff.
- Consider the implementation of a lot coverage limit on all new development.
- Encourage water quality improvements for existing development through stormwater management techniques such as rain barrels, rain gardens, and native planting plans.

Rain gardens (see figure 1) are vegetated surface depressions, often located at low points in landscapes, designed to receive stormwater runoff from roads, roofs, and parking areas. The gardens' sandy soils allow stormwater to infiltrate quickly to the native soils below and eventually contribute to groundwater recharge. Pollutants and nutrients in stormwater runoff are removed by rain garden vegetation and soils through biological and physical processes such as plant uptake and sorption to soil particles. In comparison with stormwater release to receiving waters through conventional storm drain systems, infiltrating stormwater through rain gardens reduces peak flows and stressor loadings.

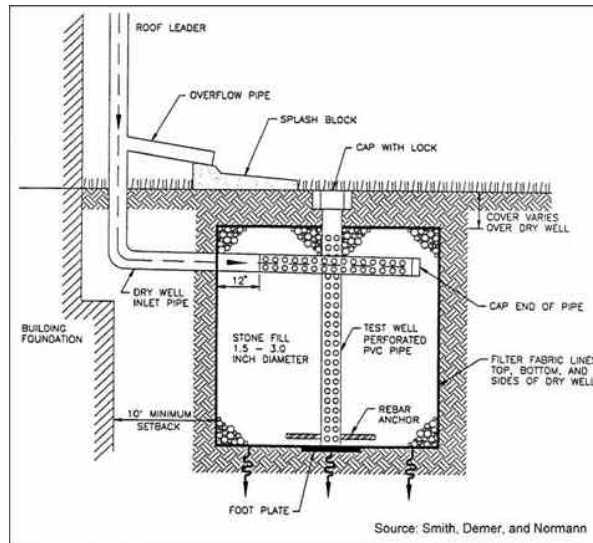
- Utilize Low Impact Development (LID) stormwater management techniques and devices in new developments to minimize flows and attenuate impacts near their source. These include:
  - Bioretention or vegetated depressions that collect runoff and facilitate its infiltration into the ground. These include rain gardens as discussed above. (See figure 1)



Source: Prince Georges County DER

- Infiltration Trenches: Trenches filled with porous media such as bioretention material, sand, or aggregate that collect runoff and infiltrate it into the ground.
- Dry Wells: Gravel- or stone-filled pits that are located to catch water from roof downspouts or paved areas.

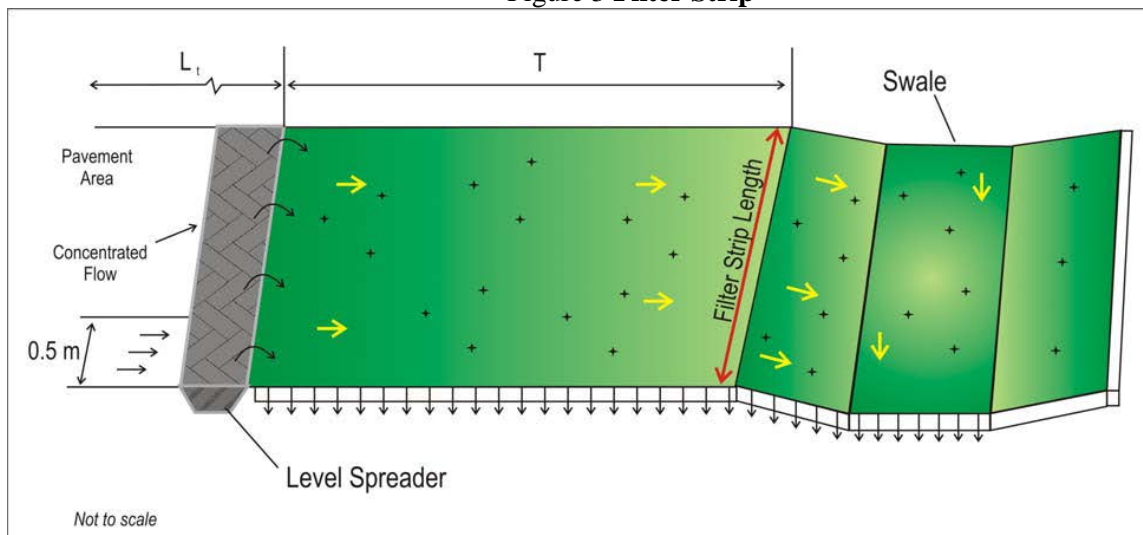
Figure 2. Dry Well Schematic



Source: Stormwater Management for Maine, 1995.

- Filter Strips: Bands of dense vegetation planted immediately downstream of a runoff source designed to filter runoff before entering a receiving structure or water body.

Figure 3 Filter Strip

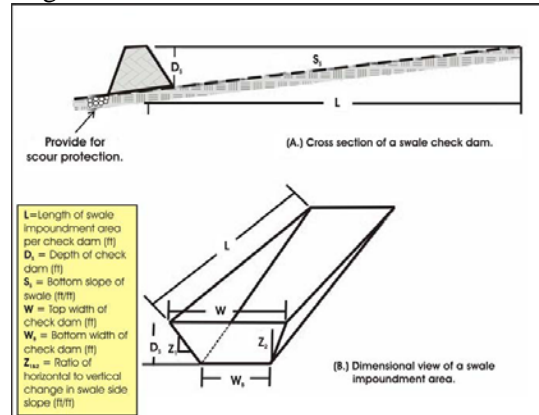


Source: Low Impact Design Manual, US Army Corps of Engineers, 2004



- Inlet Pollution Removal Devices: Small stormwater treatment systems that are installed below grade at the edge of paved areas and trap or filter pollutants in runoff before it enters the storm drain.
- Grassed Swales: Shallow channels lined with grass and used to convey and store runoff.

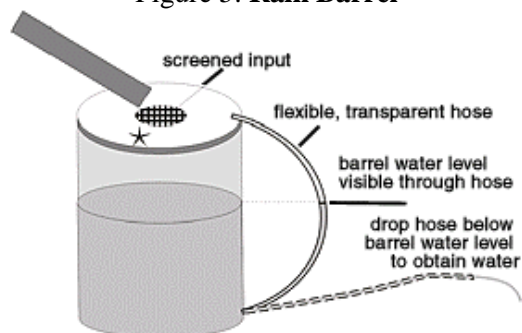
Figure 4. Grassed Swale Schematic



Source: NVPDC, 1991. In EPA, 1999d.

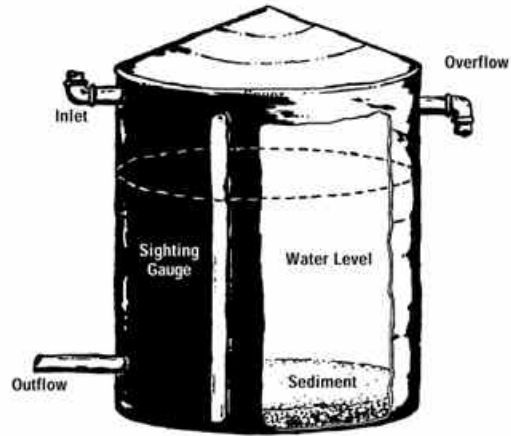
- Permeable Pavement: Asphalt or concrete rendered porous by the aggregate structure.
- Permeable Pavers: Manufactured paving stones containing spaces where water can penetrate into the porous media placed underneath.
- Rain Barrels and Cisterns: Containers of various sizes that store the runoff delivered through building downspouts. Rain barrels are generally smaller structures, located above ground. Cisterns are larger, are often buried underground, and may be connected to the building's plumbing or irrigation system. Rain barrels and cisterns are low-cost water conservation devices that reduce runoff volume and, for very small storm events, delay and reduce the peak runoff flow rates. Both rain barrels and cisterns can provide a source of chemically untreated 'soft water' for gardens and compost, free of most sediment and dissolved salts.

Figure 5. Rain Barrel



Source: Maryland DNR Green Building Program.

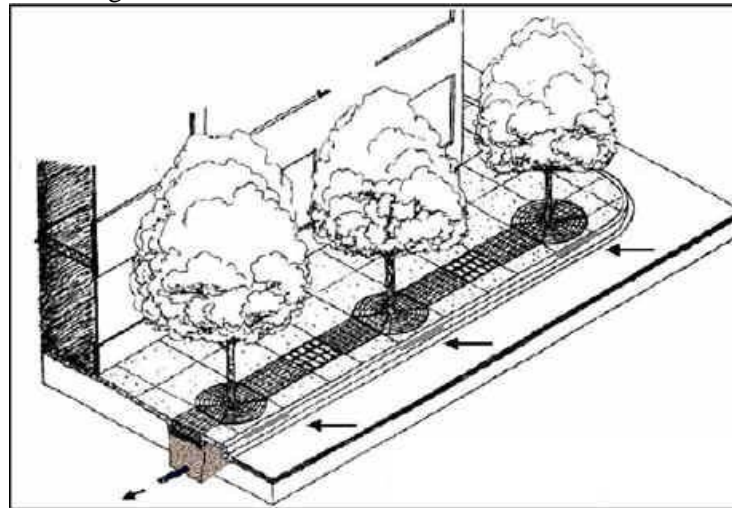
Figure 6. Cistern



Source: Texas Guide to Rainwater Harvesting.

- Soil amendments: Minerals and organic material added to soil to increase its capacity for absorbing moisture and sustaining vegetation.
- Tree Box Filters: Curbside containers placed below grade, covered with a grate, filled with filter media and planted with a tree in the center.

Figure 7. **Manufactured Tree Box Filter**



Source: Virginia DCR Stormwater Management Program.

- Vegetated Buffers: Natural or man-made vegetated areas adjacent to a water body, providing erosion control, filtering capability, and habitat.

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## **CHAPTER 4**

### **VISIONS FOR GREENSBORO**

**A First Vision: Greensboro’s careful management and preservation of its character and community identity is at the heart of its social and economic vitality.**

*The highest priority in Greensboro is the care and protection of its great resource – the character of the town itself. Greensboro is a community of diversity; the town is a vital, year-round working community with a mixture of ages, income levels, architectural styles, commercial activities, and physical environments. The threads binding these diverse elements are a quiet and slow town pace, a sense of intimacy produced by a traditional layout and small scale, and a habit of pride in the “City.” These qualities are enhanced by certain physical characteristics of the town such as easy walking distances, houses close to the street, sidewalks, vegetation, and key focal points of activity.*

**Strategy:** Greensboro is a community of diversity in age, income, race, and background and low density, single-family residential development, carefully regulated as to quality, will be maintained as the most appropriate use of land throughout the town.

Over the past several years, housing development has exploded on the Eastern Shore and has brought with it new residents, new expectations, and new house and community designs. The new notion of “Traditional Neighborhood Design” has been incorporated into the development at the southern end of Town and the ideas of extending the grid system of Greensboro’s streets and not allowing garage doors to face the street have been incorporated into the project on the former Kinnamon property. As Greensboro absorbs its hundreds of new residents over the next several years, it will remain open to new ideas in housing and design and will strive to create within its residential communities opportunities for all income groups. Displacement, dislocation, and gentrification would be a tragic mistake.

Although housing in Greensboro is predominately well-structured and maintained, there are a number of homes in need of repair. The Town's housing efforts should focus on those properties identified by the Town as substandard. Substandard housing includes those homes that are damaged, decayed, dilapidated, unsanitary, and/or unsafe for both the residents' and the general public's health and well-being.

Several substandard housing units east and west of the railroad tracks along Sunset Avenue and along Granby Street are in need of repair, reconstruction, redevelopment, or a combination of all three. Additional properties scattered throughout the Town, on both the east and west sides of MD Route 313 and on Boyce Mill Road, also require repair, reconstruction, and/or redevelopment. The Town should apply for County, State and Federal programs that provide low interest loans for home improvements and redevelopment to assist the owners in improving or replacing these housing units.

**Actions:**

- Make every effort to preserve historic or characteristic structures and landmarks. To care for the historic charm of the community, historic houses should be preserved as single family dwellings.
- Reinforce and revitalize what exists today through the maintenance and reuse of existing structures and elimination of physical blight.
- Track the supply and demand for the various types of housing needed by elderly residents who wish to remain in Greensboro and ensure that the governing regulations allow the need to be met by public and private suppliers.
- Investigate "cottage housing" and other innovative housing types for integration into various zoning districts as a means of helping to meet affordable and elderly housing needs.
- Track the supply and demand for affordable and workforce housing and seek innovative means of providing such housing in a variety of locations throughout Town. Emphasis will be placed on affordable and workforce home ownership opportunities, not on rental solutions unless the rental market becomes underserved.
- Develop an Intergovernmental Agreement with Caroline County to govern the use of Transfer of Development Rights within Greensboro that conforms with the Town's water and wastewater policies and assists in the provision of housing that is not competitively offered by the private market.
- The conversion of single-family homes to apartments has been disruptive to the community. The zoning ordinance should continue to prevent the conversion of single-family homes to multi-family dwellings except in carefully selected areas and situations.
- Improve the maintenance of multi-family rental housing through strong code enforcement. Where cases of overcrowding or maintenance neglect exist, regular and recurring oversight and enforcement must be provided by the Town.

**Strategy:** Protect and extend the character of the best of Greensboro's existing neighborhoods.

The housing styles, vegetation, walking scale, and overall visual quality of Greensboro are among its greatest assets. These assets should be protected and enhanced for future generations. Educational guidelines for architectural and historic appearance should be established. They should not be intrusive

but rather should seek to provide guidance for individual owners on how to blend with or extend the visual qualities of Greensboro. Guidelines should be provided on vegetation, housing styles, materials, setbacks, signs, and other aspects of the streetscape. See Appendix A for an example of design guidelines.

A comprehensive Plan is not the place to develop specific regulations governing historic preservation or community design, but it is the proper place to spell out a path for examining and resolving the overall concern. The town should examine three areas: the preservation of historic structures, architectural standards for new or modified structures, and modifications of its current site plan review procedures.

**Actions:**

- General community workshops should be held on the current community design situation, the problems, the opportunities, the nature of controls used in other communities, and the impact of those controls on community appearance and land values.
- On the historic preservation side, the basic parameters of what is “historic” and worthy of preservation should be suggested. On the community design side, basic guidelines should be assembled and proposed. These first proposals would establish the potential range and impact of controls as well as the context for the community discussion to follow.
- Community debate must take place over the aims, basic parameters, application (e.g. all building permits, demolitions, subdivisions, partitions, site plans), and administration of any guidelines governing historic preservation, community design, and site plan review.
- Based on community input, specific ordinance modifications should be developed and put forward for additional debate. As noted earlier, without strong community support, ordinance modifications are unlikely.
- Finally, the suggested ordinance modifications should be placed into the adoption process.

In the search for an appropriate means to “manage” the visual and historic texture of the Greensboro of the future, the town realizes that community design is both an art and a science and that appropriate solutions are difficult and prey to many political and economic judgments. It also realizes that its views of community needs may not match the views or economic needs of all potential applicants. To this end, the town will examine (1) means to be as flexible as possible in the administration of any regulations to preserve the “freedom to build” for an applicant who is working to produce a thoughtful and responsive addition to the community, (2) incentive programs that offer benefits to those who participate in historic or design quality efforts, and (3) limitations on the applicability of historic or design regulations to particular zoning districts or structure characteristics. It may be appropriate, for example, to “go slow” and apply any new standards only to entirely new construction, to substantial increases in existing size, or to modifications to only a substantial part (e.g., 75% or more) of existing space. Or it may be that a public consensus actually emerges first for modest quantitative changes (e.g. paint color limitations or additional height/roof-type restrictions) while more long-term solutions are further explored.

**Strategy:** Improve the town’s road, pedestrian, and bicycle network to ensure safe and efficient travel and minimize the impact of destination and through traffic on the community.

The movement of people and goods is an important concern in any community's growth plan. To provide a safe and efficient transportation network with minimal disruption of the area can sometimes be difficult to achieve. Too often, transportation planning begins in reaction to a problem. The comprehensive planning process and the Maryland Planning Act of 1992 suggest that a proactive approach to mobility

issues is needed. Caroline County and its municipalities need to plan their transportation in coordination with their growth management planning. Land use growth and development patterns in the past have in large part been a product of transportation policies, rather than vice versa. When major roads were created, development along those corridors soon followed. This new growth ran counter to traditional development patterns, where commercial, public, residential, and light industrial land uses were placed in a centralized area. These traditional central areas were designed to the human scale, where pedestrian, motor, and bicycle traffic co-existed and personal interactions took place daily.

The Town should, therefore, institute transportation policies that support the Comprehensive Plan. Improving streets and sidewalks, developing nature trails for recreation, and promoting alternatives to motorized traffic will support the Comprehensive Plan.

Paths are the lines of movement we take by auto, by foot, by bicycle, or boat. From the most familiar and frequently traveled paths we receive our impressions of the area we call our "home ground". Paths lead from one place to another and the changes along them give us the notion of arriving and leaving. Major highways, residential streets, sidewalks, and parking lots are all part of a system of paths that should lend character to the Town. The future vision for Greensboro is streets that are pleasant to walk along; an interconnected network of walking trails and bike routes; effective incentives for carpools and vanpools; and a network of roads that moves people and goods efficiently throughout the Town. The goal must be to preserve and enhance the Town's traditional grid system of streets. This system, if preserved and enhanced, will result in balancing the need for cars and trucks, transit riders, bike riders, and walkers.

Transit service for the general public in Caroline County is not feasible at this time without a substantial subsidy and would not likely prove to be cost-effective under any circumstances given the existing settlement pattern. At such time as settlement patterns, demand, or other circumstances warrant, the Town and County should explore the feasibility of providing public or private bus service between major residential, commercial, and employment centers within the County. In the immediate future, the Town can be most effective in reducing drive-alone auto trips by cooperating with the State in the planning and provision of "park and ride" facilities to encourage ride-sharing and commuting.

Possible reduction in car use within the Town may be achieved by the improvements in the sidewalks accessing the central part of Town and developing a crosswalk across MD Route 313 at the Choptank River bridge stoplight.

To become a less car-dependent community, there must be more opportunities to live closer to work, in safe, walkable neighborhoods. In addition, streets must be well connected to make travel from one place to another as straightforward as possible. The key to achieving this vision is to redefine streets as a network that will serve the pedestrians, bike riders, and vehicles that will use them. In areas where we want to increase density and where we want more people to live and work, existing streets need to be retrofitted with sidewalks and street trees. These improvements will help attract people back to these streets and encourage investors to redevelop these areas.

Bicycle traffic should be encouraged in the Town of Greensboro. Sidewalks are the most used bicycle paths in Town and current plans to upgrade deteriorating sidewalks should therefore enhance bicycle access. In addition, the Town, in coordination with County and the State Department of Transportation, should identify "popular" bicycle routes for designation as such, in the near future. Town, County, and State transportation policies should support these bicycle routes as they are designated. As opportunities present themselves, appropriate Town streets should be enhanced to provide adequate bicycle routes.

This Comprehensive Plan brings a new awareness of the importance of streets to the quality of life in Greensboro. Again, the form that the streets take and the newly defined functions they serve will

determine how quickly the Town vision is achieved, or whether the vision can be achieved at all.

**Actions:**

- Continue the grid pattern of town streets in any future developments and do not allow any dead-end arrangements. Ensure that any modifications to existing streets are carried out in a grid or network that produces alternate routes to every destination.
  
- Identify the opportunities to expand and extend the internal system of walkways and bikeways throughout the town and design a program to reserve land for future walkways and bikeways in new developments and ensure their connection with planned overall circulation systems. Specifically...
  - Develop a hike-n-bike "greenway" trail along the Choptank River corridor, from Christian Park to Denton. Coordinate with the State Greenways Commission and the County. Utilize State Highway Administration ISTEA funds and Maryland Department of Natural Resources Open Space funds to finance the trail.
  
  - Create trail linkages to the Town's Central Business District to improve the downtown's tourism viability.
  
  - Investigate the potential for a walking/biking trail along the Forge Branch from the vicinity of Holly Road to its connection with the newly annexed land south of Greensboro.
  
- Promote the redevelopment of the old Penn-Central rail line to enhance economic opportunities for the Town. If such redevelopment is not economically feasible, then consideration should be given to a rail-to-trail program to turn the rail line into a hiking/riding trail. (Coordination with other localities as well as County, State, and Federal agencies and non-governmental organizations will be necessary.)
  
- Identify and establish resting areas for pedestrians, e.g. benches, flower gardens, or fountains, in important activity areas.
  
- The Town should amend the Zoning Ordinance to require a provision of bicycle parking spaces in non-residential developments and permit an appropriate reduction in parking based on the availability of space for parking bicycles. Bicycle parking spaces should also be provided at all public buildings and parks.
  
- Develop a multi-year plan to repair, replace, and construct sidewalks in areas of identified need.
  
- Enhance the four road entryways into the town by encouraging the renovation of buildings, planting, creation of parks, and placement of business and organization signs.
  
- Provide for the safety of vehicles and pedestrians at intersections by ensuring adequate sight distances and by using traffic control devices and geometric design features such as 'T' intersections, marked crosswalks where sidewalks and road meet, traffic signals, stop signs, and other strategies where appropriate.
  
- Promote, in coordination with the County and other County municipalities, the development of public transportation services that are responsive to the needs of the community, including



specialized clients such as elderly, handicapped, and transit-dependent residents.

- Encourage business and industry to provide reserved parking spaces for carpools, vanpools, and bicycle racks at office and industrial sites to accommodate and encourage high-occupancy vehicle (HOV) commuting.

**Strategy:** Encourage the identification, preservation, and restoration of historic or significant buildings within the Town, regardless of location.

The past is a building block for the future and, if a plan is to be comprehensive, it must incorporate that past as a key element of planning for the future. History is kept alive through education and preservation, both of which can take many forms and vary in intensity. Old homes can be restored such that they are comfortable homes of today or they can be refurbished as an office. Historic sites can honor the past while providing a place for leisure activities. An old church can hold worship services similar to those held one hundred years ago. A number of programs exist to help individuals and groups temporarily or permanently protect sites and structures considered significant.

Historic preservation is a program which involves the inventorying, researching, restoration, and ongoing protection of sites and structures having a significant local or national historic interest. Continued historic and cultural resource preservation and enhancement, through sensitive land use planning and other administrative means, would provide Greensboro with a number of benefits.

There are a number of structures and sites within the Town that are of historic, cultural, or architectural significance. These structures, given proper concern and recognition, have tremendous potential to serve as physical reminders of the history and heritage of our past. In recent years, there has been considerable public concern that the vestiges of our heritage will be irretrievably lost. It has been found that an active historic and architectural preservation program can have beneficial social, economic and aesthetic impacts on an area.

Therefore, rather than permit demolition, destruction, or abandonment of our rich heritage, an active historic preservation program is recommended. Such a program should permit the continued use of the identified sites and structures, while simultaneously discouraging inappropriate exterior alterations. The development of a Historic Preservation Program for the Town should be the result of a cooperative effort between the public and private sectors of the community.



**Actions:**

- The Town should adopt zoning provisions that promote the adaptive reuse of historic structures for public and private uses, including, but not limited to, bed and breakfast establishments, craft/gift shops, museums, and studio space for artisans, when such uses minimize exterior structural alteration.
- The Town should encourage the preservation of historic structures through the use of various incentives, including tax incentives for major structural or exterior renovation or the donation of protective historic easements.
- The Town should develop a Historic Preservation Program with specific targets to be achieved over 5-year periods.
- The Zoning Ordinance and Subdivision Regulations for the Town should require developers to identify cemeteries/burial grounds/archaeological sites/historical structures on a property prior to any disturbance of the site and to support archaeological and historical research through preservation of significant sites.

**A Second Vision: Greensboro's prudent guidance of its geographic expansion and population growth has extended the characteristics of unity, variety, order, and balance that typify the community.**

*New development in and around Greensboro reflects the "Greensboro character" and is judged with consistent standards of design quality, environmental soundness, and fiscal impact. Greensboro is very careful in assessing opportunities for expansion and change and its standards are applied to maintain the rural character, environmental soundness, and overall visual quality of the town; to retain its predominant residential character along with its housing styles, walking scale, and history; and to encourage the pride of its residents and its stability and independence as a community.*

**Strategy:** Absent a new wastewater plant, the default growth strategy of this Plan is to complete current subdivision projects and infill lots and cap current growth at a build-out size of approximately 3,000 residents. The preferred growth strategy depends upon construction of a new sewage treatment plant to serve Greensboro and North Carolina County and contemplates a 2030 build-out of 4,000 residents and 1,500 homes.

The default strategy will not allow any new residential annexations or new major residential projects during the period between this Plan and the next required Plan in 2015. The focus for the coming years will be to absorb the growth that is currently in the development pipeline, provide employment opportunities for residents, and revitalize the Town's economic base.

The key control for managing growth within this strategy is the allocation of wastewater capacity. Current regulations allow for the award of fifteen hookups or EDUs (equivalent dwelling units) to public uses such as municipal offices, municipal meeting places, and municipal services and/or rehabilitative uses which could not be carried out without the allocation of additional wastewater capacity. The remaining 53 EDUs are reserved for non-residential job-creating uses which are allocated by the Town on a first-come, first-served basis, except that any proposed retail use for which there is no clearly identified need may be rejected for that reason.



**Actions:**

- Continue with the current controls on the manner in which wastewater capacity will be awarded.
- Identify key decision points for determining the need for expansion or non-expansion of the Town's water and sewer system as well as determine thresholds and benchmarks for the wastewater treatment nutrient load based on population/housing units and the Clean Water Act point source reduction goal of 40%. This will involve developing a system to monitor and address nutrient load increases over time and adjusting the scale and pace of growth so that the average daily flow results in a nutrient load that is within established nutrient thresholds or results in zero nutrient gain.
- Annexations will be limited to situations that improve natural resource preservation, provide recreational opportunities, or add significant employment.

The new North County Wastewater Extension Project has been proposed to meet the critical disposal needs of the North County communities of Goldsboro, Henderson, Marydel, and Templeville (the "Authority"). The recommendation is to construct a new wastewater treatment facility north of Greensboro to meet a proposed build-out capacity of 814,000 gpd for the Authority and Greensboro. The first phase would accommodate Greensboro's current capacity of 280,000 gpd plus the capacity required by the Authority of 260,000 gpd. The second phase would add 274,000 gpd to allow a 2030 Greensboro build-out population of approximately 4,000 residents and 1,500 dwellings. Construction of a new wastewater treatment plant with a treatment capacity of 814,000 gpd serving both Greensboro and North County is the preferred growth strategy of this Plan.

Effluent volume could be reduced by reclaiming the highly treated wastewater through implementation of a "purple pipe system." The Town's proposed facility should meet State-mandated nutrient reductions year round, enabling the reclaimed water to be used for irrigation and other non-potable uses such as flushing toilets in commercial buildings, air conditioning, car washes, and fire hydrant discharge. The purple pipe system would provide the additional benefit of reducing demands on the public water supply.

**Actions:**

- Become a strong partner with the County and the North County communities to construct a new wastewater treatment plant to serve both Greensboro and North County.
- The Authority and the Town should reach an agreement for the Town to own and operate the new plant with the Authority paying fees to discharge its wastewater to the plant.
- To help keep the plant at its lowest required treatment capacity, Greensboro should begin an infiltration/inflow reduction program for its gravity sewer system.

**Strategy:** In the absence of new growth in the next few years, the Town will concentrate on protecting and enhancing the community's investments in infrastructure and service provision by thorough advance planning, continuous maintenance, and proper service pricing.

The Town Commissioners should consider implementation of a comprehensive process leading to the preparation of a multi-year Capital Improvements Program, which would constitute both an effective public financial management tool and a mechanism for coordinating development.

The primary value of the Capital Improvements Program is to provide a public framework for establishing priorities and evaluating projects according to local needs. As various community needs are identified, and detailed engineering and cost data accumulated, the Town Commissioners are better able to project the impact of proposed projects on the Town's fiscal resources. By projecting residents' needs over a multi-year span, various improvement projects can be effectively coordinated with local development policy.

Each project advocated for community development purposes should be described as to purpose, location, type of improvements, and cost estimates. All projects requiring allocation of municipal funds should be numbered, briefly described, and added to each year's capital program. Categories should be divided according to basic functional classifications, such as streets, sewer and water extensions, and parks.

The entire program should be revised annually and projects which receive approval should be included in the Capital Improvements Schedule. Projects should be kept in the program until completed or canceled.

**Actions:**

- Carefully plan for future public service needs by:
  - Identifying needs for future public service expansion;
  - Identifying and preserving sites for future public service expansion;
  - Taking action to prevent sites identified for future public facilities from being lost through development for other purposes;
  - Make the most of alternative uses of Town, school, and public building spaces; and
  - Developing and applying basic standards for facility maintenance and cleanliness.
- Prepare a multi-year Capital Improvement Program.
- Opportunities for cooperative planning with County and State officials should be investigated in regard to traffic controls, signage, sidewalks, improvement of recreational areas, and preservation and use of natural areas.
- Investigate ways to improve the funding and operation of the maintenance programs for public landscaping, sidewalks, and streets.

- Ensure that private developers continue to bear their fair share of the burden of providing public facilities and services to the residents or users of their projects.

**Strategy:** A portion of the Town’s human and financial resources should be focused on providing and supporting the local institutions necessary to maintain superior quality of life services.

Greensboro is fortunate to have varied and effective community services. Its parks, police and fire protection, trash collection, street lighting, and water and sewer services underpin a high quality of life and opportunities for improvement remain. The parks could always look better, more streets could be lighted, and more police could be added but Greensboro also needs to look outside its typical government supported functions and to the activities and interests of its residents. The Town has a high percentage of residents under 17, a fair share of elderly, a large number of renters, and very large number of “newcomers” on the way. It also has a large number of churches, an active Community Center, and, seemingly, a good number of people interested and involved in the Town’s future. Greensboro needs to support not only its physical infrastructure but also its human infrastructure.



**Actions:**

- Expand the opportunities for Greensboro's young residents by providing a broader range of activities and participation in community life.
- Carefully monitor school population and pupil projections to assure retention of the local facility for the future.
- Create new opportunities for the elderly in terms of housing and their ability to contribute to community life.
- Provide the maximum level of support possible for the Town's community-serving organizations particularly in the area of housing.

**A Third Vision: The natural amenities and environmental resources of the Greensboro region have been protected to be enjoyed by and serve generations to come.**

*Greensboro is a community that takes special pride in the appearance of its urban and rural spaces, the*

*quality and the preservation of its natural environment, the carrying capacity of its natural resources and infrastructure, and the retention of its places of special beauty and interest. Its residents always have the time to give attention to the connections between past and present, between the natural and the manmade, and between residents and visitors.*

Disregard of natural processes in a city is, always has been, and always will be both costly and dangerous and, as a result of various public and private initiatives, strong resource protection requirements are mandated for most development in Maryland. Resources such as tidal and non-tidal wetlands, stream valleys, and sensitive plant and wildlife habitats in coastal areas are protected under the requirements of the Chesapeake Bay Critical Area Program. Non-tidal woodlands are protected wherever they occur and the adoption by the State of a forest conservation law affords protection for existing forest and will result in the planting of new forest cover on sites currently unforested. In addition, flood regulations protect many riparian stream areas, albeit for reasons related to risk management as opposed to water quality and habitat protection.



Greensboro is located between Forge Branch and the Choptank River, a tidal tributary of the Chesapeake Bay. The Choptank River is among the many bodies of water which feed the Chesapeake Bay, the nation's largest and most productive estuary. The balance of the Bay's delicate ecosystem has been damaged by development, which creates runoff that overloads the Bay with nutrients and clouds it with sediments. Therefore, it is important that the Choptank River be protected, and that development which could degrade the water quality of the Bay be controlled.

In adopting the Chesapeake Bay Critical Area Law, the Maryland General Assembly specifically found that there is a critical and substantial State interest in fostering more sensitive development activity along tidal shorelines of the Bay to minimize damage to water quality and wildlife habitats. The Critical Area Law required the Town to adopt and implement a Critical Area Program consistent with the guidelines established by the Chesapeake Bay Critical Area Commission. Greensboro's Chesapeake Bay Critical Area Protection Program was adopted on May 24, 1990.

Concern for the conservation and protection of the sensitive natural features of the Town transcends arbitrary boundaries, i.e. the 1,000-foot Critical Area. Issues such as the loss of forest and trees, sedimentation of streams, and loss of wildlife habitat are now of concern throughout the Town. Many realize that growth and development in the Town must be balanced with consideration for the positive contributions that the natural setting in Greensboro makes to the quality of community life. The limitations of natural systems in some areas to withstand the impacts of major disturbance in or near them must be addressed through public policy and implementation provisions.

The Maryland Economic Growth, Resource Protection and Planning Act of 1992 added the requirement to Article 66B that the Comprehensive Plan contain a Sensitive Areas Element which describes how the jurisdiction will protect the following sensitive areas: streams and stream buffers, 100-year floodplain, endangered species habitats, steep slopes, and other sensitive areas a jurisdiction wants to protect from the adverse impacts of development. The Town is also concerned about the protection of groundwater resources, and has added them as sensitive areas in its Critical Area Program.

Finally, the Town firmly believes that natural and scenic resources can play several roles in economic development programs by...

- Generating tourist activity;
- Enhancing the value of other investments;
- Strengthening the overall image and attractiveness of the city as a place to live; and
- Offering specific development opportunities such as rejuvenation of waterfront areas for commercial, residential, and recreational uses.

There are environmental restoration techniques and statutory initiatives that will award work done to create environmental improvement in terms of scientific functions and values. These techniques, such as conservation banking, wetland mitigation, nutrient reduction strategies, and forest preservation, may result in “credits” that are sold to fund the work undertaken. Greensboro encourages and authorizes the use of market-based ecosystem service credit tools to promote its underlying vision and help satisfy Chesapeake Bay Water Quality initiatives. Nothing in this Plan shall be interpreted to prevent the use of currently available and future credit tools to restore, protect, and improve the environmental amenities of the Planning Area.

#### **Strategy: Stream Buffer Protection**

Streams and their buffers are important resources. Streams provide drinking water for local communities, natural drainage, and irrigation for farmers. Streams are prime spots for recreation and fishing, serve as spawning areas for sport and commercial fish stock, and provide wildlife habitat. Streams also transport valuable nutrients to the Chesapeake Bay. Natural growth adjacent to our streams often serves as a natural screen between different types of land use.

The floodplain, wetlands and wooded slopes along streams are important parts of the stream ecosystem. As development activity becomes more intense, a large amount of open land, forests, and natural vegetation along streams is diminished. The cumulative loss of large amounts of open space and natural vegetation reduces the ability of the land along streams to buffer the effects of such intrusions as high stormwater runoff.

Buffers serve as protection areas adjacent to streams to preserve some of the biological and hydrological integrity of the stream basin. These areas act as run-off and groundwater pollution control systems by filtering pollutants through the soil and root zone of natural growth. For example, microscopic organisms that inhabit the soils in a forested buffer assist in the decomposition of pollutants much like microbes in a

sewage treatment plant.

Buffer areas provide protection from flooding that might otherwise cause loss of life and/or property. Development near streams compromises this protection. Buffers also provide wetland habitats. In view of the fact that most of Greensboro is in the Chesapeake Bay Critical Area, buffer protection is already required for the Choptank River.

Outside of the Critical Area, the Town should define a stream corridor as being measured 100 feet from stream banks. Any development occurring within this area should be evaluated for its potential impact on adjacent streams. The minimum stream buffer requirement for areas outside the Critical Area should be 50 feet from the banks of all streams. This stream buffer should be expanded (to as much as 100 feet) if the Town determines it to be in the best interest of protecting the stream. Forge Branch has been identified as appropriate for a stream buffer at such time as development may occur in its vicinity.

**Strategy:** Natural Feature Protection

Greensboro, like the rest of the Eastern Shore, has a rich variety of natural features that should be conserved. These features include wetlands, floodplain, wildlife habitats, creeks, and aquifers, among others. Such features help maintain the ecological balance of life and contribute to the quality of our environment, both urban and rural. Alteration of wetlands and floodplains through public or private development may have the most immediate effect on the community; wetlands because they are essential to our fisheries, and therefore affect the economy; and floodplains because they are essential to effective stormwater management, thereby minimizing flooding.

**Strategy:** Floodplain Protection

Some areas in the Town are subject to periodic flooding which pose risks to public health and safety, and potential loss of property. Flood losses and flood-related losses are created by inappropriately located structures which are inadequately elevated or otherwise unprotected and vulnerable to floods. In addition, development in sensitive areas that disturb natural features, increases flood damage to other lands or development. While protection of life and property provided the initial basis for protection of floodplains, there has been a growing recognition that limiting disturbances within floodplains can serve a variety of functions with important public purposes and benefits.

Floodplains moderate and store floodwaters, absorb wave energies, and reduce erosion and sedimentation. Wetlands, found within floodplains, help maintain water quality, recharge groundwater supplies, protect fisheries, and provide habitat and natural corridors for wildlife.

The minimum requirements of the National Flood Insurance Program do not prohibit development within the 100-year floodplain. However, to adhere to the minimum Federal requirements the Town requires development and new structures in the floodplain to meet certain flood protection measures including elevating the first floor of structures a minimum of one foot above 100-year flood elevations and utilizing specified flood proof construction techniques.

Moreover, where alternative building sites on a parcel are available for construction outside the 100-year floodplain, then construction in the floodplain is prohibited. These requirements are established in Caroline County's Floodplain Management Ordinance, to which the Town adheres.

The floodplain areas in Greensboro are determined by the Flood Hazard Boundary Maps developed by the Federal Insurance Administration. The Town participates in the regular phase of the National Flood Insurance Program.



**Strategy: Tidal Wetlands Protection**

Public and private tidal wetlands are important natural areas protected by State law, which sets forth strict licensing procedures for any alteration of wetlands. They are also within the protective jurisdiction of the Federal Government through the US Army Corps of Engineers. Town policies and regulations regarding wetlands should be reviewed for conformance with and implementation of appropriate State and Federal legislation.

**Strategy: Steep Slope Protection**

Although there are not a lot of steep lands in Greensboro, development is regulated on steep slopes wherever they occur in the Town's Critical Area. This same type of land management practice should be applied outside of the Critical Area.

Placement of structures or impervious surfaces should be severely limited on any slope with a grade of 25 percent outside of the Critical Area. On slopes between 15 percent and 25 percent, good engineering practices should be required to ensure sediment and erosion control and slope stabilization before, during and after disturbance activities, and to minimize cut and fill. The Town's Zoning Ordinance and Subdivision Regulations should include these requirements.

**Strategy: Endangered Species Habitat Protection**

To ensure the protection and continued existence of endangered species within the Town's jurisdiction, Zoning Ordinance and Subdivision Regulations should include the following protective measures.

- Require that anyone proposing development activities must address protection of State and Federally designated endangered species. The developer must determine through contact with the Town and the Maryland Fish, Heritage and Wildlife Administration (MFHWA) whether proposed activities will occur within or adjacent to identified endangered species habitat and whether the activities will affect the area.
- If it is established that an activity will occur within or adjacent to an endangered species habitat, the Town should require that the developer provide protection measures in the project design. A written environmental assessment, including site design plans and a description of measures to be taken to protect the endangered species, should be submitted to the Town as part of the development review process. The developer must work with the Maryland Natural Heritage Program in establishing species/site-specific protection measures. Protection measures may include:
  - Designation of protection areas around the essential habitat of the designated species. Development activities or other disturbances shall be prohibited in the protection area, unless it can be shown that these activities or disturbances will not have or cause adverse impact on the habitat. The protection area designation will be made with input from the MFHWA.
  - Implementation of design strategies that work to protect the species and essential habitat. These strategies should include (but are not limited to) restrictions on siting of structures, use of cluster design, establishment of undisturbed open space areas, restrictive covenants, and restrictions on noise levels and timing of construction activities.

**Strategy:** Dark Sky Protection

Another area of environmental concern is the control of lights in the City. Good outdoor lighting at night benefits everyone. It increases safety, enhances the Town's nighttime character, and helps provide security. But new lighting technologies have produced lights that are extremely powerful and may be improperly installed so that they create problems of excessive glare, light trespass on individual properties and the night sky, and higher energy use. Excessive glare can be annoying, light trespass reduces everyone's privacy and enjoyment of the night sky, and higher energy use results in increased costs for everyone. The Dark Sky Initiatives of the International Dark-Sky Association ([www.darksky.org](http://www.darksky.org)) are a good place to begin to stop the adverse effects of light pollution.

Eliminating light pollution will save the City money on its electric bill, and rid the community of the upward orange glow of wasted light, which blocks both our and wildlife's ability to see and enjoy the stars and glories of the sky. There is no downside or cost to this idea, as it can be implemented as lights are replaced over time. It does not impact public safety, as the light on the ground remains equal to, if not brighter than currently. It will directly benefit wildlife, especially migrating birds. And it will benefit everyone who enjoys the majesty of our night skies, seeing the Milky Way and stars.

**Actions:**

- This Plan endorses a policy of reducing the effects of light pollution and recommends a program of education about the values of environmentally responsible outdoor lighting and the promotion of responsible legislation, public policy, and standards for lighting in Greensboro.

**Strategy:** Reestablish Greensboro's historic connection with the Choptank River and enhance its long-term protection.

Over 100 years ago, the Choptank River was a key avenue of commercial shipping and Greensboro boomed. It was during this period that the greatest population increase for Greensboro was recorded. One hundred years later, Greensboro has had another population boom but the Choptank played no role whatsoever. The River has receded as a part of the daily life of residents and has nearly vanished as a part of the experience of a visitor to Town.

Improvements to Firemen's Park, the Town gazebo near the water, shoreline protection measures, and plantings along the River represent some new recognition of the Choptank but it remains underused and underappreciated for much of its passage through Town. A serious and thorough look must be taken at how to "reattach" the Choptank to Greensboro with both visual and physical connections.

**Actions:**

- Promote the navigation of the Choptank River by maintaining access for recreational boaters from Greensboro to all points north and south. Special locations should be identified on public lands for launch and retrieval points for small craft such as kayaks and canoes. Promote cultural activities and identify unique sites along the River and provide access to those points. Incorporate public access points and unique sites as a component of a heritage tourism strategy.
- Any future expansion of the wastewater treatment plant will use the highest level of treatment available to protect the Choptank River and the Town's investment.

**Strategy:** Bring the forest to the city and preserve the forests around the city.

A new awareness of the importance of streets to the quality of life in our growth centers is needed. We must plan for streets that are pleasant to walk along. Existing streets and developments and new development can and should create an exciting, attractive and vibrant community. New concepts — using the successful communities of our past — should be permitted, encouraged and preferred. Street trees improve the quality of life and ensure the "sense of place" to which small communities on the Eastern Shore have become accustomed.



As part of this philosophy, street tree planting should be required and specimen trees should be saved

where possible. The Town should enforce its street tree requirements in new developments and in parking lots, and should invest in street trees along existing roadways and in older developments.

The potential exists to establish a Greenbelt around the Town of Greensboro. Such a system would provide resource land protection, cultural heritage preservation, and aesthetic value to both the Town and the County. The Greenbelt will not inhibit future growth, but rather direct that growth to appropriate lands adjacent to Greensboro. The system could build upon the private lands surrounding the Town already designated as Agricultural Preservation Districts, Agricultural Preservation Easements, Rural Legacy Easements, and lands controlled by the State, County, or private conservation organizations.

**Actions:**

- Establish a program of continuous tree planting and maintenance throughout the town as a way of preserving Greensboro's physical beauty and community identity. Develop an Urban Forestry Plan that would increase the stock of trees through tree planting programs; encourage the planting of trees by both public and private entities; adopt high standards of maintenance and replacement; diversify the variety of new trees; replacing trees affected by disease; preserve natural forests within the town; and assure that a maximum (or optimum) number of trees would be retained or replaced when property is improved, developed, or redeveloped by implementing tree preservation requirements in the Zoning Ordinance.
- As part of the Town's long-term growth area planning, develop a greenbelt of permanently protected agricultural land and forests around Greensboro.

**Strategy:** Maintain and improve the quality of the natural environment and its sensitive areas throughout the town.

The cost of disregarding nature extends also to the quality of life. From a resource protection perspective, all land is not equally capable of sustaining the impacts associated with development without a substantial alteration of environmental quality. Development sites containing extensive sensitive natural resources and land areas with development constraints (e.g. steep slopes, highly erodible soils, floodplain, etc.) are less suitable for development from this perspective than those that do not. Put another way, sites with few or no development constraints are said to have a higher carrying capacity to successfully absorb the impacts of development, while minimizing adverse environmental effects than those that do.

This phenomenon should be recognized in the development approval process. One way of doing this is to apply permitted density provisions on a modified base site area basis. Permitted density should be calculated on the "net buildable base site area." Net buildable base site area is calculated by subtracting certain sensitive lands from the gross site area. For example, if the gross site area is 50 acres, 5 acres of which are classified resource protection land (e.g. tidal and/or non-tidal wetlands, steep slopes, or other characteristics), the net buildable base site area would be 45 acres. Density would be calculated on 45 acres.

The Town should adopt net buildable base site area provisions that require that sensitive lands be subtracted from the gross site area to derive a net buildable base site area with which to calculate density. Sensitive lands should include: tidal and non-tidal wetlands; slopes in excess of 25 percent; highly erodible soils, i.e. soils with a K value of 0.35 or greater on slopes in excess of 15

percent; and the 100-year floodplain. These regulations would come into play when considering development in the long-term growth area.

**Actions:**

- Public capital improvement projects and private developments are to be designed and constructed in a manner that completely avoids harmful environmental effects.
- Encourage energy conservation in all development and establish regulations and guidelines that accommodate techniques that achieve greater energy efficiency. Development review by the Planning Commission should consider energy conservation practices, including building orientation, shading, natural ventilation, and accessibility to service areas.
- Cooperate with the County and the State to achieve a level of water quality in the Bay and its tributaries which sustains and improves its recreational and food-producing value.

**Strategy:** Expand, improve, and maintain the Town's parks and recreation system.

Greensboro has a well developed parks and recreation system. In and around Town, there is also an adequate amount of open space which supports the recreational needs of the community. Natural areas, open spaces, and parks should be considered valuable assets of the community. Existing natural areas, and those that could be acquired, particularly north of Town along Rt. 313, support habitat for living resources and ensure safe drinking water for the Town's residents. In addition, natural areas and open spaces act as natural buffers which support floodplain management. These natural areas should be considered natural infrastructure of the Town because of their ability to filter pollutants, buffer potential flooding and protect water quality. Town actions to preserve natural areas in and out of the regulated Critical Area should be supported through the Town's Subdivision Ordinance and Zoning Regulations.

Park facilities are also critical to the quality of life of the residents of Greensboro. Parks are common meeting places that bring the community together for events, ball games and recreational outings. Greensboro has adequate park facilities. The parks of Greensboro include the Choptank River Park, Fireman's Park, Forge Branch Park, Greensboro Elementary School (ballfields and open space), Ober Park, Senior League Park, and T-Ball Park. With the addition of the Choptank River Park and park and recreational facilities at the Greensboro Elementary School, the Town is demonstrating its commitment to enhancing the quality of life of its residents through the development of park and recreation facilities. Greensboro should continue to support its parks and recreation system, and maintain that system to ensure safe and aesthetically pleasing recreational activity. Particular attention should be given to any opportunities for regional recreational facilities that could be purchased and managed in cooperation with the County. Tying these regional parks into the Town's network of trails and bike paths would be a dramatic addition to the Town's menu of recreational outlets. See Map 9 for distribution of these facilities. (Map not complete)

**Actions:**

- The main thrust of the Town's efforts to expand its park system will be toward site development and maintenance with strengthened citizen involvement.
- Pursue all means, including Maryland's Project Open Space Program, to further

develop and enhance the Choptank River Park. Enhancements to the Park should include, but not be limited to, continued acquisition of flood-prone property in the Park area; purchase and plantings of streamside buffers and native plants; and the purchase of park benches.

- Ober Park needs to be refurbished and enhanced. Add new play equipment, enhance basketball courts, add a skateboard park, upgrade boat launch facilities and consider adding display gardens to feature plants of the Eastern Shore. Clean up the signage and add sidewalks and walkways.

- Public amenities such as small "green spaces" should be provided.

**A Fourth Vision: Greensboro is a well-rounded town that supports its residents with job opportunities and the elements of community life required for a rich and varied experience.**

*Greensboro is a self-sufficient entity that fully encompasses and serves its residents and their changing needs with the facilities that support and enhance community life. It is not only the key supplier of essential needs and services to its own residents and visitors but also to the residents of surrounding areas. This regional function helps maintain services that the community cannot supply on its own. It has identified the community-serving elements that are critical to maintain living quality such as open spaces, libraries, and places of worship and strives to provide them.*

**Strategy:** Prepare for economic development opportunities in the areas of heritage and eco-tourism, new retail services, housing, nurseries; sports, and other market sectors.

Towns with strong, distinctive identities are more likely than others to negotiate a successful economic transition in the coming years. Each city must identify its strongest and most distinctive features and develop them or run the risk of being all things to all people and nothing special to any. This holds both for a town's general image and amenity characteristics as well as for economic function. Cities that do not understand their realistic possibilities in a changing economy will have trouble competing.

For many cities the critical success factor will be the quality of their public and private institutions and their ability to collaborate effectively. As traditional location factors become less important, Greensboro's overall ability to plan, decide, and implement development programs will become more important for its success. Towns will have to become even more active as developers and businesses must expand their understanding of self-interest to include that of the surrounding community.

The basic economic development plan for Greensboro is to build long-term organizational capacity, construct public improvements to enhance appearance and accessibility, create new sites for both public and private uses by taking advantage of inactive or underutilized space and land, encourage private improvements, and attract new activities that are compatible with Greensboro's community history and setting.

Part of this process is answering several important questions about Greensboro's economic function:

- What is the Town's reason to be?
- Who generates jobs locally?
- Why did the community prosper at certain periods in its history?
- Why did the growth stop or turn to decline?

- Where are the likely places for new growth to occur?
- What are Greensboro's competitive strengths and weaknesses?



**Actions:**

- Create a local organization whose purpose is community revitalization and job creation. Long-term responsibility for revitalization, area-wide promotion, and assistance to merchants should fall to a local, "independent" organization whose express purpose is community revitalization and job creation with no other conflicting agenda. One of its first tasks should be to promote the re-use of the Riverside Hotel. It should offer leadership in the following areas:

- Organization - Bring together the groups necessary for engendering change.
- Physical Design - Oversee the transition of the downtown physical environment and its associated entrances and activities to a more efficient and attractive operating environment.
- Economic Strengthening - Help existing businesses expand, recruit new businesses, convert unused and underused property into productive space, and improve the competitiveness of local merchants.
- Promotion - Seek out the most appropriate markets for promoting Greensboro and the goods and services it can offer.
- Protection - Guard the unique cultural and environmental assets of Greensboro as scarce commodities that create much of the town's special value.

- Assure that the Zoning Regulations offer mixed use zoning that allows the blending of residential, commercial, and employment uses in a single location.

- Rezone the self-storage site off of Rt. 313 on Wheeler Drive from Multi-family Residential to Light Commercial to allow a broader range of possible uses at this important location.

- Continue the application of adaptive re-use in the Zoning Regulations to preserve important structures by allowing a variety of uses to occur within them.

- The “Heritage Area and Tourism Areas” Act of 1996, Chapter 601 of the Laws of 1996 requires that each jurisdiction included in a certified heritage area amend its Comprehensive Plan to include by reference the management plan for the heritage area. The Maryland Heritage Area Authority certified, with conditions, the Stories of the Chesapeake Heritage Area, thereby recognizing heritage areas in Kent, Queen Anne’s, Talbot, and Caroline Counties and their municipalities and offering a mechanism for coordinated and enhanced heritage tourism in these counties. Therefore, Greensboro recognizes and references The Stories of the Chesapeake Heritage Area Management Plan as a means to further opportunities for heritage tourism and economic development.

- Ensure that townspeople, businesses, government officials are aware of the Harriet Tubman Underground Railroad Byway Corridor Management Plan and SHA’s Context Sensitive Solutions for Work on Scenic Byways when considering economic development and road improvement programs. Enhancing character-defining resources along local byways can have a very positive effect on economic development initiatives. Because of national, state, and local byway marketing and product development efforts, the Harriet Tubman Underground Railroad Scenic Byway is planned to receive more exposure from heritage tourists who value the travel experience as much as the visitor attraction. The value of marrying environmental, scenic, and historic resources when designing public improvements is proven in stronger economic benefits.

**Strategy:** Prepare a menu of financial and other incentives to attract jobs to Greensboro and expand the jobs offered by businesses currently in Greensboro.

It is likely that an array of financial and other incentives will have to be offered to gain acceptance of job creation efforts. The types of financial strategies available to Greensboro to leverage private investments and cooperation are:

- Financial incentives to induce private investment that should be considered include: direct low-interest loans; blended-rate loans combining conventional and low-interest loans; buy-down of commercial interest rates; guarantees of commercial loans; reduced processing costs to lenders through loan packaging; and reduced risks to lenders through pooling of loans;
- Whenever possible, the active involvement of local lending institutions should be sought using techniques such as those listed above to reduce risks and processing costs to those institutions when necessary to secure their services at rates borrowers can afford;
- Tax abatement is a technique of reducing total costs of improvements to businesses and owners, although it does not reduce the direct cost of making or financing those improvements; application should be limited to approved investments in designated areas for a specified period;
- The Town could seek out firms that can qualify for Small Business Administration program loans; the Town could also endeavor to provide supplemental loans or other financial assistance to bolster borrower equity for SBA loans, where needed and permitted under SBA regulations;
- Tax increment financing reserves the increased tax revenues from property improvements to help defray public costs in support of those improvements. Tax increment financing could be instituted throughout the downtown, and revenue generated



could be earmarked for public improvements, low-interest loans or other financial incentives, or for other public purposes in the area.

- Public purchase of easements can be a form of sale-leaseback for making revitalization improvements to private property; for example, the Town could purchase an easement to improve the facade of a store, then recoup its costs by leasing the improvements back to the store owner; when the easement expires, the improvements pass to the owner;
- Technical assistance can be a Town contribution in the form of services for revitalization improvements to private property; this technical assistance could include planning and design activities, or assistance in obtaining the services of architects, engineers, or contractors.
- Non-financial development incentives can be instrumental in stimulating and guiding revitalization improvements in much the same way the proffer technique used in Northern Virginia guides new development; examples are trade-offs or relaxation of planning or zoning requirements or restrictions on signs, parking, or other controls to obtain landscaping or other improvements of desired type or quality. Clearly, however, such trade-offs cannot be allowed to have an adverse impact on existing conditions or violate Maryland enabling legislation.

**A Fifth Vision: Greensboro's commercial areas are busy, bright, and attractive with a distinctive, pedestrian character.**

*The “downtowns” of Greensboro are readily identifiable in extent, contain a mix of businesses, and are controlled in architecture and signage. The scale of their buildings is linked to their surroundings and the pedestrian. They oriented to walkers rather than automobiles and contain a mix of private and public uses and local and regional operations. All of the business operators share a responsibility for the year-round care and appearance of their establishments as a way of maintaining the overall viability of the downtown areas.*

**Strategy:** Brighten the downtown with a variety of physical improvements, preserve and emphasize its historic features, and manage downtown traffic to emphasize the pedestrian.

There are several categories of downtown physical improvements available for Greensboro including special pavements, landscaping, lighting, signage (regulatory, way-finding, informational, directional, and store front), street furniture, public art, gateways, fencing, screening, and the development of public open space for plazas and squares. But physical improvements are only one small part of the total effort required for the revitalization of the downtown. The addition of brick paving and street trees will not, by themselves bring visitors and businesses into the downtown. However, site improvements that reflect the history and indicate an optimistic attitude toward the future will go a long way to create an environment that will foster development and make the visitor to Greensboro feel safe and comfortable. Obvious and traditional uses, updated in format should be kept dominant. This will in turn enhance the reputation and image of Greensboro for everyone who lives and works there. It is called pride of place.

Some possible improvements include:

- Improve the existing municipal parking lot. This could include shade trees, lighting, landscape buffers, re-surfacing as needed, and striping. A permanent "Farmer's Market"

structure could be placed in the parking lot. The structure could also be used for picnics, flea markets, and other festival events during the year.

- Create pedestrian connectors that use public properties for “shortcuts” to special features such as the River. These connectors would be narrow brick sidewalks with decorative lighting, perennial beds, and picket fences. This technique could also be used in a Riverfront Walk.
- Widen the sidewalks where possible and install brick pavers, street trees, and ornamental lights where needed. Hedge wall or fence-type buffers should be used where the sidewalk abuts a parking lot.
- Create gateways and other minor entrance features at all of the entry points into the downtown. Install "Chokers" or "Bump-outs" at these points to slow traffic and alert the drivers that they are entering a pedestrian locale.
- Clean and paint all building facades in the core area whether occupied or vacant. Give the appearance of a Town that is dedicated to preservation and restoration. The cost of paint and elbow grease will go a long way to reduce the perception of decline in the core area.

A sense of order and place should be the overall design aim. "Order" is a function of cohesiveness and safety; "place" is a function of distinctive quality (whether handsome or ugly).

#### **Actions:**

- A Facade Rehabilitation Program should be set up through the MD Department of Housing and Community Development. This program would provide grants and low interest loans to individual property owners to clean, repair, or restore the facades of their downtown buildings. In return, the Town would receive an easement for the facade that would allow control of design and maintenance over a 10-year period.
- The Town should commission an urban design study of the downtown, the River, and the Rt. 313 commercial area extending from the bridge. The study would deal with site design, buildings and structures, planting, signs, civic art, street hardware, sidewalks, non-sidewalk pedestrian connections, streets, parks, and any other aspect of the physical and natural environment that would improve the appearance and usability of the downtown area.
- The Central Commercial zoning district should be expanded along the west side of Main Street from Maple Avenue to the existing light industrial district to allow a wider variety of uses for the structures along Main Street.



## **CHAPTER 5 LAND USE PLANS**

### **Current Planning**

Because of the national economic downturn that began in 2008, both recent large development projects -- South Greensboro and Kinnamon/Baldwin -- have curtailed their development pacing and have produced a total of one model home. The remainder of Greensboro has seen the addition of three homes since the beginning of 2008. Seventy-one scattered infill lots remain in the Town and 336 approved but undeveloped lots remain in the two large subdivisions.

This dramatic slowdown may call for a change in the way our community considers new, large scale developments. Instead of the rigid application of single-use residential and commercial zoning districts, we should consider mixed use districts that are better able to respond to changing economic realities and shifting housing desires. A good example is the single-family residential parcel (the Kinnamon/Baldwin tract) on Cedar Lane. It was approved for 101 homes with an opportunity to include a small commercial node tied to the Sunset Avenue and Granby Street area which should benefit from the South Greensboro and Kinnamon/Baldwin developments. The market for the product planned in 2006 has diminished and shifted to a new direction. Smaller homes, less expensive homes, “greener” homes, a variety of occupancy options, walkable commercial locations, and live/work structures are some of the ideas being explored. The Town is very interested in promoting opportunities for greener development in homes, offices, commercial facilities, and overall site planning.

The Town should consider implementing a new mixed use zoning category that could be applied, even after plan approvals, to situations similar to the Kinnamon/Baldwin project to allow greater flexibility to respond to changing market and social dynamics. The aim would be to allow mixed-use centers and infill development that are planned and designed in such a way that they provide a sense of place, offer a wide-range of uses and activities so that they are vibrant and well-used during all seasons, and serve a variety of people of all ages, races and economic levels.

Such a mixed use district should allow maximum development flexibility in uses and housing types and include the following objectives:

- Design buildings to a human scale for aesthetic appeal, pedestrian comfort, and compatibility with other land uses.
- Create, maintain and enhance public spaces, such as sidewalks, plazas, parks, public buildings and places of assembly, to allow for informal meetings and social interaction.
- Build on-site vehicle and pedestrian circulation systems that are safe, convenient, attractive, and comfortable for pedestrians.
- Develop different types of compatible land uses close together in appropriate locations, to shorten trips and facilitate alternative modes of transportation, such as walking and bicycling.
- Take advantage of opportunities for infill and redevelopment and to shape development in centers.

### **Future Growth**

As explained in Chapter 3, the default Growth Scenario 1 assumes that the 386 recorded or to-be-recorded Town building lots are built upon and occupied by 2015. Using the current Greensboro and Caroline County household size of 2.64 persons/unit. This would add approximately 1,000 residents and yield a total Town population of roughly 3,000 persons. This level of growth can be accommodated by the current water and wastewater treatment system without expansion (but probably with an improvement in treatment levels for nitrogen and phosphorus) and would not require an expansion of the Town's boundaries.

The preferred Scenario 3 follows the County's assumption of focusing more growth in municipalities by building upon existing sewer capacity and projecting an annual growth rate of 2%. In Greensboro, this would yield roughly 957 additional new residents from 2015 and 363 new dwelling units for a total of approximately 4,000 residents and 1,500 homes by 2030. This scenario would definitely require expansion of the Town's water and wastewater treatment capacity and a significant addition to the Town's borders. The Land Use Plan Map shown in this Chapter is based on this growth projection.

The North County Wastewater Extension Project has been proposed to accomplish the required expansion and meet the critical disposal needs of the North County communities of Goldsboro, Henderson, Marydel, and Templeville. The recommendation is to construct a new wastewater treatment facility north of Greensboro to meet a proposed build-out capacity of 814,000 gpd for the North County area and Greensboro. Construction of a new wastewater treatment plant with a treatment capacity of 814,000 gpd serving both Greensboro and North County is the preferred growth strategy of this Plan.

The total area selected as the Growth Area to accommodate expansion outside of current Town boundaries is 2,307 acres and is shown on the Growth Area Map in this Chapter. The Growth Area Map also shows the "Preserved Land Greenbelt" meant to surround the designated Growth Area and mark the ultimate expansion of Greensboro.

When opportunities for annexation do present themselves, they will be evaluated primarily on their ability to improve natural resource preservation, provide recreational opportunities, or add significant employment. It is expected that annexation interest will be focused first on the large parcels north of Greensboro along Rt. 313 (See Growth Area and Greenbelt map). These parcels should be considered for mixed use residential and employment uses at a density comparable to overall Town densities and for a large preservation and recreational park use along the Choptank. The next extension of Town is expected adjacent to the eastern boundary on several small parcels north and south of Sunset Ave. The third phase of growth should probably be considered in the northeast quadrant on the eastern side of the Choptank. Close to Town, this area should reflect Town residential densities with larger lots allowed as development approaches the outer greenbelt. The final areas for potential growth or annexation is the large area south of Town on both sides of the Choptank extending to the southern greenbelt. Close to Town, there may be some opportunity for higher density uses along Rt. 213 but, in large part, the area should retain a rural flavor with lower residential densities and small residential clusters to preserve farmland.

The final map in this Chapter, Map 11 Caroline County Future Land Use Planning, shows the lands already preserved around Greensboro and Caroline County's Transfer of Development Rights Receiving Area. The receiving area partially overlaps the Town's Growth Area on its southern edge and is consistent with the future growth scenarios.

## **CHAPTER 6 REGULATORY STREAMLINING**

### **Intergovernmental Coordination**

One way of developing improved cooperation is for Caroline County and the Town to enter into an “intergovernmental cooperative agreement” for an agreed-upon growth area. Another method is to coordinate the language of the Comprehensive Plans of both jurisdictions. Either method should accomplish the following purposes:

- Establish a process by which the County and the Town will achieve consistency between their comprehensive plans and land development ordinances including adoption of conforming ordinances for growth areas, future growth areas, and rural resource areas within an agreed-upon time period along with a method for resolving disputes.
- Establish a process for review and approval of developments of regional significance and impact (a land development that, because of its character, magnitude, or location, will have substantial effect upon the health, safety, or welfare of citizens in either the Town or the County) proposed within the Town or County.
- Establish the implementation role and responsibilities of the Town and the County including provisions for public infrastructure services, transportation, affordable housing, and the purchase of real property.

If agreement is reached between the Town and County, the resulting cooperative plans should include the following elements:

- Designated growth areas where 1) orderly development to accommodate the projected residential growth over a designated period is planned and 2) commercial, industrial, and institutional uses are planned to provide for the economic and employment needs of the area and to ensure that the area’s tax base will be adequate.
- Services are provided or planned for such development.
- Plans for the accommodation of all categories of uses within the area, including housing for all income levels and a reasonable allocation of affordable and workforce housing. All uses need not be provided in every participating government, but shall be provided over the area of the plan.
- Plans for developments of areawide significance, especially those involving transportation, community facilities, and utilities.
- Plans for the conservation and enhancement of the natural, scenic, historic, and aesthetic resources of the area.

### **General Administrative Guidance**

It is important to the improvement and sensible development of Greensboro that the Town work closely with Caroline County officials. Land use and development decisions outside the Town limits profoundly affect the quality of life within the town. This Plan encourages cooperative and coordinated planning in the Greensboro region for the benefit of both the Town and the County.

The Planning Commission should play a key role in all issues of physical development. The Commission should advise the Mayor and Commissioners on proposed projects, programs, and activities giving particular emphasis to the consistency of proposals with the goals and policies of the Comprehensive Plan.

### **Streamlining**

The Planning Act directs local governments to streamline regulations to assure achievement of growth management and resource protection goals. Streamlining, in the context of growth management, has a substantive focus -- the Act specifically encourages streamlining within areas designated for development and growth. This Plan designates Greensboro and several adjacent parcels as a growth area. Therefore, all of the Town's development regulations are candidates for streamlining.

The development regulations of the town must be modified to achieve consistency with this Plan and to efficiently carry out its purposes. These modifications shall follow several guidelines:

- Clear areas of responsibility will be assigned within Town government to guide development applications through the regulatory process.
- The Town's policy shall be to make its development control process clear, current, consistent, and accessible to all concerned and ensure that it does not drive up the cost of construction or sales through unnecessary regulation or complication.
- Any required interagency reviews, i.e. with Caroline County, will be conducted in a coordinated and concurrent manner.
- All review procedures should be examined to promote administrative efficiency. All review periods should be time certain.
- Regulatory requirements for establishing or expanding businesses should be examined to remove any unnecessary procedures and improve the timeliness of review.
- All development regulations should be examined so that unnecessary impediments to Plan-designated growth are systematically eliminated and flexible means of granting relief are introduced.

In keeping with the Plans of Caroline County, Greensboro will cooperate with other jurisdictions to assure that any growth around its limits is carefully coordinated, consistent in both character and scale, governed by compatible land use regulation, and appropriately served by utilities and roads. The Town will also continue to participate in the opportunities offered by the County to engage in land use decision-making for the areas outside the Town limits.

Regulatory consistency with this Plan is required in all implementing ordinances, capital improvement programs, and functional plans. This Plan is the dominant policy document and guide for all other land use plans, programs, and regulations and is to be directly linked to the drafting, interpretation, application, and amendment of land use laws and programs.

### **Create Human Scale**

Human scale is the proportional relationship of buildings and spaces to people. When components in the built environment are ordered in such a way that people feel comfortable then human scale has most likely been used. By contrast, a place that is out of human scale, either too small or too large, will tend to make people feel uncomfortable. The reaction is to avoid such a place or to move through it quickly. Significant buildings and sites use monumental scale to create a sense of importance. In these cases, the human scale elements are often incorporated into the project as well. Human scale can be further reinforced by the choice of materials, textures, patterns, colors, and details.

#### Characteristics of Human Scale Development

- a. The dimensions of building height and width, street width, streetscape elements, building setback, and other elements are combined so that they establish a comfortable realm for people to move around in and interact in. The dimensions of human interaction govern the design rather than the dimensions of vehicular circulation and convenience.
- b. Buildings are arranged to enclose and define space. This may include locating buildings close to a sidewalk, creating spatial definition.
- c. Buildings have limited height at pedestrian paths and sidewalks. Taller buildings have upper stories that are set back. There is a gradual transition of heights and mass, with the greatest concentration in the center of activity centers.
- d. Building articulation and design details reduce the perceived mass of large buildings. Elements such as openings at street level, decorative elements that mark floor heights such as cornices, porches, and awnings are used to break the building down to human dimensions.
- e. Residential forms and proportions are used on commercial and office buildings next to residential areas.
- f. Street trees with protective canopies enclose and define the streetscape.
- g. Street widths are limited when possible, bulb-outs are used at crosswalks, and medians are used to break the street into dimensions comfortable for pedestrians.
- h. Streetscape elements such as sidewalks wide enough for comfortable pedestrian movement, distinctive sidewalk paving, pedestrian- scale streetlights and other fixtures are used to relate to the human dimension.

#### **Create a Sense of Place**

A “sense of place” creates an image that remains in your mind when you leave that area. This sense can be built on a particular distinctive element, such as a landmark building or a grove of mature trees or a special view. It also can be a mosaic of details that creates a fine-grained streetscape. Individuality of design can give a sense of place, and so can a theme of common design elements, particularly in the public realm.

#### Characteristics of Sense of Place

- a. Civic open spaces may be located in central parts of a development.
- b. Amenities such as fountains, clocks, or seating areas are provided.
- c. Gateways into an area are marked with signature architecture, public art, and/or landscaping.
- d. A landscaping and/or streetscape theme is used to define the area or the inherent features of a place.
- e. The architecture relates to human scale, is pedestrian friendly and is harmonious with neighboring buildings and the setting.

- f. Outdoor spaces are defined by building arrangement, landscaping, and/or site elements such as fences or walls.
- g. A materials palette or architectural theme may be established for specific areas.
- h. Special features and buildings may be used to terminate vistas.
- i. While an architectural style or landscape theme may create a unified design, some variety and individual expression within that theme provides vitality to an area.

## **Connect Uses**

A community is made up of both social and physical connections. Connecting uses means making clear pedestrian and vehicular pathways between developments. It also means intermingling compatible uses. A strong sense of community, the highly valued “small-town atmosphere,” depends on having such convenient and easy access to a variety of activities and uses. This connection of uses is very important to the function of a livable, pedestrian-oriented community such as Greensboro desires. Because many policies of recent decades have resulted in or even required the separation of projects and uses, this all-important design principle perhaps will require the greatest adjustment in how development occurs.

### Characteristics of Connectivity

- a. Individual developments are joined together with roads and continuous sidewalks and paths versus a collection of separate development pods. Within a development, easy-to-use internal circulation is provided not only for cars but for pedestrians and bicyclists between all buildings and spaces.
- b. Street stubs to adjacent developable sites are provided in existing developments for future connections between new projects and uses.
- c. Common streetscape elements, materials and designs are used to visually link different areas.
- d. Buildings are oriented to roads and sidewalks with orientation to parking areas being secondary. Buildings and whole developments are not isolated from one another with extensive buffers.
- e. Pedestrian and vehicular links are provided to parks, schools, and other public destinations.

## **Provide Transitions**

As Greensboro moves into a pattern of integrated uses and development projects, transitions become more important than ever to ensure compatible neighbors. Traditionally, uses have been separated and projects were designed to stand alone, buffered by landscaping and spatial separation. Greensboro’s vision calls for bringing activity centers closer together and requiring connections. With good transitions, potential conflicts can be forestalled.

### Characteristics of Transitions Among Uses

- a. Complementary architectural design including building height, style, color, materials, mass, footprint and decoration is used to make a transition between diverse land uses.
- b. Manipulation of massing is used to buffer abrupt changes of scale. For instance, the mass of a multistory development can be stepped back from the street when adjacent to smaller scale development.
- c. Transitions between residential and larger commercial areas are created with mid-sized developments that may include higher density residential, small office and/or retail uses.



- d.. Primary building elevations that are visible from the street or neighboring developments generally are not devoted to service functions such as delivery, loading docks, maintenance areas, utility equipment, etc.
- e. Planted buffers or fences and walls are used when architectural transitions would not be sufficient to reduce negative impacts such as rear service entries.
- f. Parks and open spaces can be transition zones between residential and commercial uses.

### **Reduce Parking Impacts**

A key principle of Greensboro’s design vision is to reduce the visual impact of parking. This goal includes reducing the image of the “sea of parking” one finds along corridors at retail centers and the “garage-scape” in neighborhoods. Parking is necessary at work, at home, and at destinations throughout the town. However, there is no reason why it needs to dominate the view. Following the Town’s design principles should result in a decreased need for parking spaces, as more sites are accessible on foot and in combined trips. At the same time, the careful placement and design of parking areas will do much to determine how successfully Greensboro can achieve its other goals of full pedestrian access and good connections.

#### Characteristics of Reduced Parking Impacts

- a. A portion of parking is placed to the rear or sides of commercial buildings that face a street. This parking is essentially overflow parking for peak usage during the year.
- b. Buildings are more prominent than parking lots.
- c. On-street parking is provided when feasible to reduce the area of parking lots.
- d. Parking is shared between complementary uses such as churches and office buildings.
- e. Plantings and pedestrian paths are used to divide large lots into smaller lots.
- f. Parking lots are screened with low walls and/or year-round plantings.
- g. Parking lots are well-shaded with trees in order to create a more desirable parking area.
- h. Garages do not dominate the residential street view. In some cases, access and parking are provided at the rear of some residential units.
- i. Structured parking is used in high-density commercial/office areas to reduce the area of necessary surface parking.

### **Plan for Pedestrians, Bicyclists, and Transit Users**

Emphasis on the pedestrian experience looms large throughout the vision for Greensboro. It is intended that it be possible to bike or walk between most destinations. Overcoming obstacles to walking from place to place requires evaluation of all components of development, from road dimensions to building arrangement and to parking lot design. It also requires amenities such as sidewalks, plantings, and street furniture. Continuous routes are the key.

#### Characteristics of Planning for Pedestrians, Bicyclists, and Transit Users

- a. Overall, sidewalks, paths and greenways are connectors between communities, between and within neighborhoods, block-to-block and at mid-block to schools and other high volume pedestrian destinations.
- b. Sidewalks are continuous along public streets.
- c. Sidewalks connect buildings to the public sidewalk and to each other.
- d. A system of bicycle and pedestrian paths is provided town-wide.
- e. Sidewalks are designed to match the future volume of pedestrian traffic.
- f. Safe and frequent crossings are provided for pedestrians.

- g. Amenities such as street furniture, shade, and shelter are provided for pedestrians where there is a high volume of usage.
- h. Sites for transit stops are reserved at locations appropriate for commuters and activity center users.
- i. Bicycle storage is provided at appropriate locations, including parks, focus areas, and office parks.

### **Provide Open Space**

Even as the amount of land consumed generally has outstripped raw population growth, modern patterns of development generally offer little space for recreation, social gathering, and preservation of natural areas. This design principle calls for outdoor space to be just as integral to the overall development plan as the construction of buildings, roads, and other structures. A wide range of open spaces are possible: public gathering areas in activity centers and office parks; common play areas and mini-parks shared by nearby residences; and natural preserves. Setting aside well-designed open areas makes the immediate environs pleasant and fulfilling, giving citizens a convenient outlet for recreation and socialization and doing much to make continued development sustainable in the long run.

#### **Characteristics of Usable Community Open Space**

- a. Open space is provided in central, pedestrian-oriented areas in activity centers neighborhoods and in large office/industrial parks.
- b. Scenic views, mature woods or specimen trees, and riparian areas are reserved in new development.
- c. Residential areas have recreation areas within a five-minute walk of each home.

# **Water Resources Element**

## **Greensboro Comprehensive Plan**

The Greensboro Comprehensive Plan's "Water Resources Plan Element" (WRE) is a new plan element added to the Comprehensive Plan. This plan element is mandated to assure compliance with the requirements of Maryland House Bill 1141 (HB 1141). The purpose of the WRE is to provide additional layers of planning for water resources in relation to existing use and proposed land use, based on an analysis of growth and development trends to assure demands for water supply can be satisfied as Town growth occurs and to assure measures are taken to minimize impacts to water quality.

The Greensboro WRE is directly linked a number of other Plan elements. They include: 1) the Land Use Plan; 2) the Municipal Growth Element; 3) Community Facilities; and 4) Resource Conservation elements. The Water Resources element addresses three major areas including water (both supply and quality), wastewater treatment and discharge, and stormwater management.

Among other things, preparation of the WRE is an exercise intended to test water resource capacity limits, determine the potential implications of water resource issues for future growth, and facilitate development of coordinated management strategies. The Town of Greensboro represents a very small portion of the much larger Choptank River watershed. Since water resource protection issues are of concern watershed wide, much of the effort to protect or enhance water quality will be dependent on County and State actions and programs. Nevertheless, this plan element evaluates Greensboro's role in protection of Water Resources in this larger context.

The purpose of the Water Resources Element (WRE), as defined in Maryland House Bill 1141, is to establish a clear relationship between existing and proposed future development; it further establishes the relationship between drinking water sources and wastewater facilities that will be necessary to serve that development and measures to limit or control the stormwater and nonpoint source water pollution that will be generated by new development.

Specifically, the statutory requirements are:

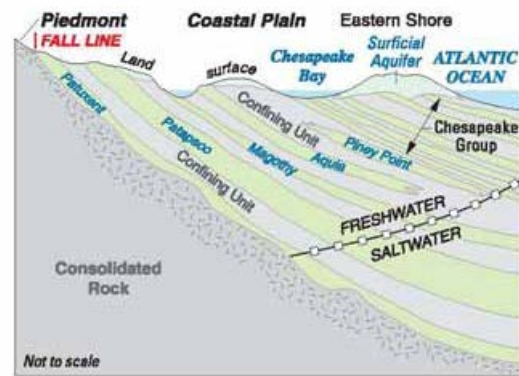
- Identify drinking water and other water resources that will be adequate for the needs of existing and future development proposed in the land use element of the plan, considering available data provided by the Maryland Department of the Environment (MDE).
- Identify suitable receiving waters and land areas to meet the stormwater management and wastewater treatment and disposal needs of existing and future development proposed in the land use element of the plan, considering available data provided by MDE.

- Adopt a WRE in the comprehensive plan on or before October 1, 2009, unless extensions are granted by Maryland Department of Planning (MDP) pursuant to law. Zoning classifications of a property may not be changed after October 1, 2009 if a jurisdiction has not adopted a WRE in its comprehensive plan.

This element of the Plan assesses the Town’s drinking water sources and wastewater treatment facility and their ability to support existing and future development. It also identifies suitable receiving waters for existing and future wastewater and stormwater discharges. The Town of Greensboro, with substantial assistance and support from the Caroline County Department of Planning and Zoning, has prepared this Water Resources Element to assure the Town will focus growth to areas best suited to use the existing and planned water and wastewater infrastructure; to nurture efficient patterns of growth, protect and preserve the natural environs, promote economic growth, and support diversity of living environments in the Town.

## Water Resources

The Town of Greensboro and Caroline County lie within the Northern Atlantic Coastal Plain (NACP) aquifer system. The NACP system extends from the North/South Carolina border to Long Island, New York. In Maryland the NACP is bounded in the west by the Fall Line and in the east by the Atlantic Ocean. The Coastal Plain system consists of sand and gravel aquifers interspersed with layers of silt and clay called confining beds. Beneath this system lies a layer of consolidated rock at depths ranging from zero at the Fall Line to about 8,000 feet at Ocean City.



The Northern Atlantic Coastal Plain Aquifer System  
 Source: *A Science Plan for a Comprehensive Regional Assessment of the Atlantic Coastal Plain Aquifer System*

Greensboro’s water system is supplied by the Piney Point aquifer which is one of many located within the Atlantic Coastal Plain. The Piney Point aquifer is a confined aquifer. A confined aquifer has a layer of clay or fine silt above it (a ‘confining’ layer) that allows very little water to travel vertically into the aquifer. Confined aquifers receive recharge from leakage through confining beds from surficial aquifers and lateral movement of water from adjacent aquifers and thus are less vulnerable to drought conditions.

Water quality in the Piney Point aquifer that serves Greensboro is generally good. A In 2003, Maryland Department of the Environment conducted Source Water Assessments for 19 community water systems and 9 non-community systems located in Caroline County. MDE researched and identified potential sources of contamination for confined aquifers and analyzed each water system for susceptibility to pollutants originating at the land surface. MDE concluded that due to the protected nature of confined aquifers, the

water supplies were not susceptible to surface contaminants. Some naturally occurring pollutants, such as arsenic and fluoride, do pose a risk to water systems supplied by the Aquia and Piney Point Aquifers but do not exceed EPA's maximum contaminant level (MCL). Tests conducted as part of MDE's Source Assessments indicated that that arsenic and fluoride levels measured less than 50 percent of the EPA's MCL in Greensboro's water supply. Water supply quality will continue to be monitored. Since the recharge area for the aquifer is located on the Western Shore of Maryland, the Town can do little to protect its source of water supply.

In 2000, USGS recorded that surface and groundwater withdrawals in Caroline County totaled 21,380,000 gallons per day (Tables 2 and 3 provide details of water withdrawals in the County). Unlike counties on the western shore, the largest water use in Caroline County was irrigation, which averaged 15.48 million gallons per day. The amount of groundwater withdrawn for irrigation purposes in the County is nearly five times higher than the next heaviest use (mining) and more than six times higher than domestic use.

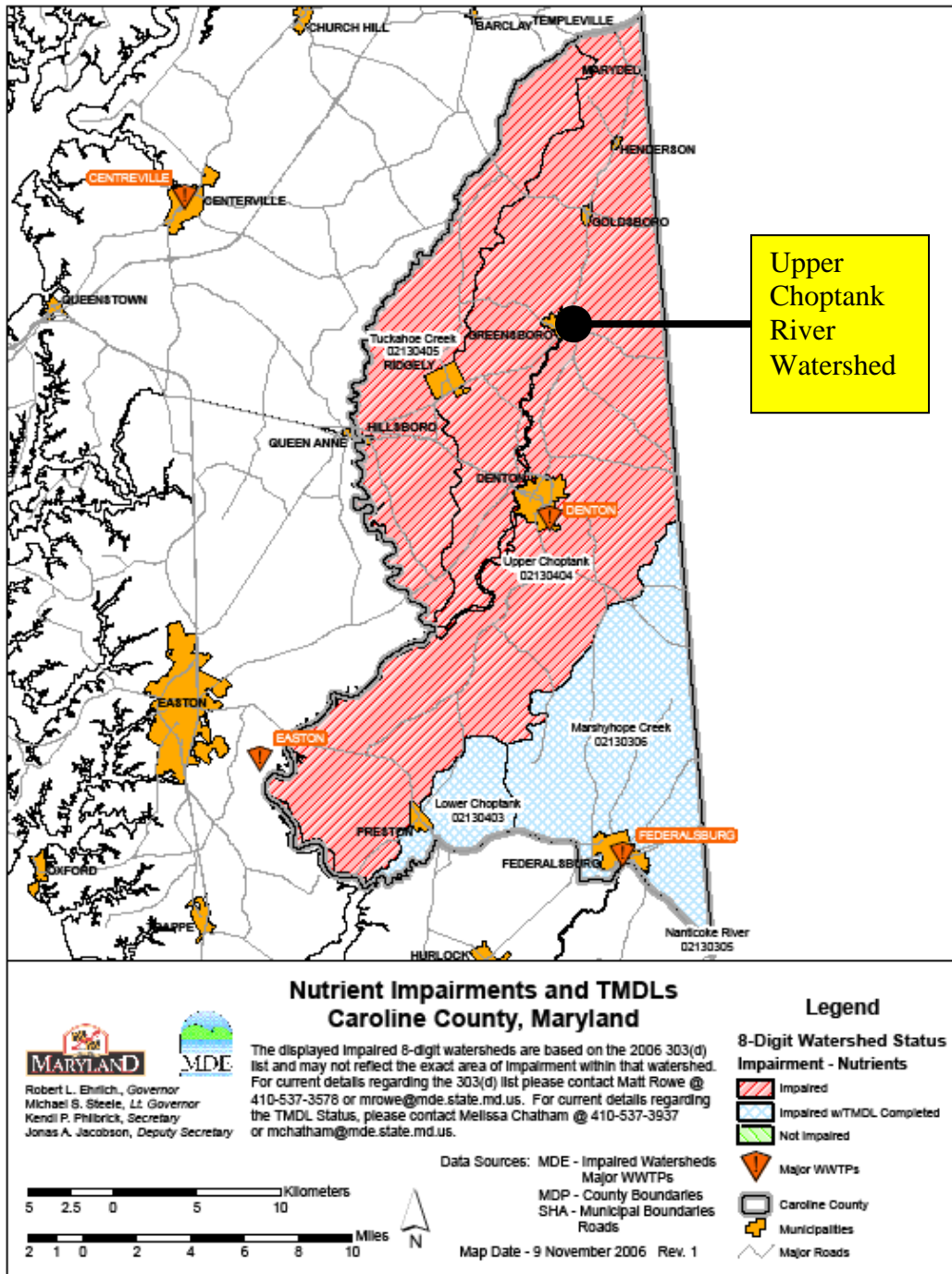
## **Watershed Characteristics and Conditions**

Greensboro drains into the Choptank River Basin which is a State-designated 6-digit watershed. State designated 8 digit watersheds (subsets of the 6-digit basins) within the Choptank Basin include the Tuckahoe River, Upper Choptank, and Lower Choptank Watersheds. 58% of Caroline County including the Town of Greensboro is located in the Upper Choptank Watershed.

The Upper Choptank River Watershed covers approximately 118,000 acres of land in Caroline County. Land use within the Caroline portion of the watershed is predominantly agriculture (59 percent), followed by forest (29 percent), urban land (8 percent), and wetlands (3 percent). As of 2005, the largest source of nitrogen in the Choptank River Basin was agriculture (70 percent). Agriculture was also the largest contributor of phosphorus (62 percent) and sediment loads (85 percent). In 2007, agricultural land contributed more than two-thirds of the total nutrient loads in the Basin.

A significant portion of the land in the Basin is drained via public ditches that were dug decades ago, primarily to drain land for farming. These ditches cover 368 miles, and including their buffers, occupy 70,137 acres of County land. They are generally kept clear of plants and other vegetative growth, which contributes to increased stream flows and speeds delivery of nutrients to water bodies before they have had a chance to be absorbed into the soil.

The Upper Choptank River is included on the State's 2008 Integrated Report as a Category 5 impaired water body, with increases in total nitrogen and phosphorus recorded between 2006 and 2008. Category 5 indicates that a water body is impaired and an assignment of Total Maximum Daily Loads (TMDL) for nitrogen and phosphorus is needed, but not yet established. The watershed has been cited for several impairments including biological, fecal coliform, nutrients and sediments. A watershed plan prepared for the Upper Choptank



in 2003 recommended a number of strategies to address water quality issues; a plan update is currently scheduled and will include the establishment and funding of a long-term cover crop program, implementation of improved maintenance and buffer programs for public drainage ditches, better enforcement of local sensitive areas protection measures, flood protection and stormwater management ordinances, and management policies for on-site sewage disposal systems.

## Total Maximum Daily Loads (TMDLs)

A TMDL is a calculation of the maximum amount of a pollutant that a body of water can receive and still meet water quality standards. Point sources include urban stormwater systems and wastewater treatment plants with direct discharge permits into waterways (National Pollutant Discharge Elimination System Permits-NPDES). Non-point sources are all discharges other than point source discharges, including stormwater runoff from land and erosion of stream and river banks. A TMDL is used as a regulatory mechanism to identify and implement additional controls on both point and non-point source discharges in water bodies that are impaired from one or more pollutants and are not expected to be restored through normal point source controls.

TMDLs establish limits or “caps” on the amount of pollutants permitted from point and non-point sources through an allocation system. A primary determinant of future growth is the assimilative capacity of local receiving waters for the input of pollutants. Assimilative capacity is expressed in the TMDLs for the receiving waters.

According to a report issued by DNR in 2002, the impairments in the Upper Choptank and Tuckahoe Creek watersheds “will be the subject of TMDL programs within the next few years.” However, to date no nutrient TMDLs have been set for either watershed, or for any of Caroline County’s major tributaries or sub watersheds, however, MDE’s Statewide Implementation Plan includes data on basin nutrient loads and “recommended” nutrient caps the Choptank River Basin.

Caroline County’s allocations of the load caps for each basin were determined by using the percentage of Caroline County land in each basin, and calculating Caroline County’s share using the same percentage of each basin’s caps. Caroline County comprises about 40 percent of the land in the Choptank River Basin. Table 1 identifies possible loading caps for County portion of the basin assuming the County would be allocated 40 percent of the total recommended caps that are yet to be established,

<b>Source</b>	<b>Nitrogen Cap (lbs/yr)</b>	<b>Phosphorus Cap (lbs/yr)</b>
Point Sources	70,076	6,510
Non Point Sources	705,124	64,890
Total Sources	775,210	71,400

Source: Caroline County Dept. of Planning, Codes and Engineering, 2008.

An estimate of nutrient loads to the watershed from point and non-point sources within the Town of Greensboro are provided later in this Chapter.

## **Watershed Improvement Initiatives**

The Federal Clean Water Act (CWA) provides the framework for managing the nation's water resources. Water quality standards were developed "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Clean Water Act §101). The standards include designated uses for waterways as well as specific criteria that indicate whether or not the uses are able to be achieved in each waterway. Uses are identified through a public process and are based on the use and value of the water body for 1) public water supply; 2) protection of fish, shellfish, and wildlife; and/or 3) recreational, agricultural, industrial, and navigational purposes.

A waterway is identified as impaired when it no longer meets the water quality criteria established for it and it is unable to achieve the use for which it is designated. All of Caroline County's major tributaries – Choptank River, Marshyhope Creek and Tuckahoe Creek – are all listed as impaired on the State's 2008 Integrated Report (formerly the 303(d) list).

A report on water quality in Maryland issued by the U.S. Geological Survey in 2004 indicates that the combination of soil and aquifer conditions and the regional predominance of agricultural land use are responsible for the concentrations of nitrogen, phosphorus, and pesticides in streams and rivers on the Eastern Shore. While there are other, lesser contributors to nutrient levels in the region's tributaries including septic systems, wastewater treatment plants, and urban and suburban chemical applications, the study noted that primary sources of nutrients on the Delmarva Peninsula are inorganic fertilizer, and that the concentrations of nitrogen, phosphorus, and herbicide compounds in streams on the Delmarva Peninsula are similar to those in other predominantly agricultural areas of the United States.

In addition to the Federal Clean Water Act, a number of Federal and State programs exist to provide support for achieving Bay water quality goals and assurance that goals can be reasonably met, including:

### **Bay Restoration Fund Enhanced Nutrient Removal (ENR)**

The Bay Restoration Fund (BRF) ENR program uses funding from public sewer taxes to provide up to 100 percent state grant funds to local governments to retrofit or upgrade sewage treatment plants to reduce the nutrient levels in plant discharge to 3 mg/l total nitrogen (TN) and .3 mg/l total phosphorus (TP). Upon completion of an ENR upgrade, the permitting authority (MDE) requires the permittee to make a best effort to meet the load goals, providing reasonable assurance of implementation. At present, funding priority is given to those wastewater treatment plants with a permitted flow of 500,000 GPD or greater. Funding for other facilities may be considered on a case-by-case basis in consideration of cost-effectiveness, water quality benefits, readiness to proceed, and nitrogen/phosphorus load.



## **The Maryland Water Quality Improvement Act**

The Maryland Water Quality Improvement Act “requires that comprehensive and enforceable nutrient management plans be developed, approved and implemented for all agricultural lands throughout Maryland.” This act specifically requires that nutrient management plans for nitrogen be developed and implemented by 2002, and plans for phosphorus to be done by 2005. To date Dozens of Caroline County farmers are enrolled in cost-share programs to implement agricultural BMPs. These programs are managed by the Maryland Agricultural Water Quality Cost-Share Program (MACS), Maryland Department of Agriculture’s NRCS, and FSA, and University of Maryland Cooperative Extension Service. At the end of 2008, over 80 percent of Caroline County farms were implementing nutrient management plans; nearly one-fifth of all farms utilized some form of conservation tillage. Just over 17,000 acres of cover crops were planted in the County in 2008, and over 4,000 tons of manure (mainly from chickens) was transported out of the County. Since 2008, about 4,200 acres of grass buffers and 142 acres of forest buffers have been installed on farms in the County, and 149 acres of agricultural lands were restored to wetlands.

The cumulative result of the buffers, wetlands and cover crops was a total reduction of nutrients (466,155 lbs. of nitrogen and 99,012 lbs. of phosphorus) in the Choptank River Basin, where the farms enrolled in these programs were located. However, the total reduction of nutrients fell far short of the Choptank Basin Tributary Goals.

## **Tributary Strategies**

Tributary Strategies are river-specific cleanup strategies that detail the "on-the-ground" actions needed to reduce the amount of nutrients and sediment flowing into the Chesapeake Bay. When all 36 strategies are added together, cleanup plans will be in place in every part of the Chesapeake Bay’s 64,000 square-mile watershed. The strategies outline how the Bay states and the District will develop and implement a series of “best management practices” to minimize pollution. This includes planting new riparian forest buffers, upgrading sewage treatment plants, implementing nutrient management on farms, wisely managing storm water runoff, and other innovative programs to accelerate the restoration of the Bay and its rivers.

Each strategy is tailored to that specific part of the Bay watershed - there is no "one-size-fits-all" strategy for the entire Bay watershed. Pollution reduction actions needed in rural watersheds, like the Choptank River Basin, vary greatly from those needed in more urban areas. The strategy prepared for the Upper Choptank in 2003 recommended a number of strategies to address water quality issues. As noted earlier, a plan update is currently scheduled for the coming year.

# Water System

## Water supply

Greensboro withdraws its water from the Piney Point Aquifer via three wells located throughout the Town. The Hobbs Street Well, located on the west side of Town has a design pumping capacity of 300 gallons per minute (GPM). The Academy Street well, located near the center of Town has a capacity of 325 GPM. The Town’s third well, located in the Eastern portion of Town, along MD Route 313 has a capacity of 350 GPM. The Hobbs Street Well and Academy Street Well were rehabilitated in 2007 to ensure efficient production. The Town’s MDE Appropriation and Use Permit was increased from 200,000 gpd average annual use to 325,000 gpd in 2007. Maximum daily withdrawal was also increased from 300,000 gpd to 455,000 gpd. A map included in the 2005 Water System Evaluation and Study identifies the extent of the Town Water Service area and system components. There are no private wells in Town.

In 2007, the average daily demand on Greensboro’s water system was 183,551 gpd, about 57 percent of its permitted average daily capacity. The five-year average daily use was 183,000 gpd, approximately 55 percent of the system’s permitted average daily capacity.

Table 2: Greensboro Water System Characteristics - 2008						
Source	Permitted Avg Annual Use (gpd)	Five-Year Avg Withdrawal 2007 (gpd)	% Avg. Annual Capacity Used	Projected Additional Demand* (gpd)	Water Quality**	Planned Upgrades/ Expansions
Piney Point Aquifer	325,000	185,000	58%	75,600	Good	Permit increase recently approved

\* From approved but undeveloped projects and municipal estimates of growth

\*\* 1992 Caroline County Comprehensive Water & Sewerage Plan

Sources : MDE Water Appropriation and Use Permits; Caroline County Departments of Environmental Health and Planning, Codes and Engineering, 2008.

State design recommendations for water systems call for well capacity equal to the peak daily flow rate with the largest well out of service and remaining wells pumping 24 hours per day. Under current maximum daily demand of 455,000 gpd and a pumping capacity of 300 gpm (gallons per minute) with the largest well out of service, the total well-field in Greensboro can produce 864,000 gpd; a surplus of 409,000 gallons per day.

## Water Storage Capacity

Two elevated storage tanks located at the east and west ends of Town maintain the systems water pressure. Each tank has a storage capacity of 150,000 gallons. Applying State

standards for storage capacity and fire flow rates, the Town has a storage surplus of just under 100,000 gallons in capacity.

## Water Distribution System

A number of improvements have been made to the Town’s water distribution system over the past 20 years. These include the replacement of nearly all of the water mains on Sunset Avenue and Main Street. Mains to the north and south of MD Route 314 in the eastern section of Town were replaced in 1990 and 2000 respectively. Portions of Cedar Lane were replaced in 1990. More recent subdivisions toward the north end of Town are served by piping installed when they were approved in the early 1990’s.

A study of the Water distribution system, prepared by Davis, Bowen and Friedel, on behalf of the Town in 2005, provided a number of recommendations for upsizing water mains in various locations from 4” to 8” or 6” to 8” lines, to increase fire flows to hydrants.

## Projected Water Demand

To calculate future demand on Greensboro’s water system, a per-household water usage multiplier of 250 gpd (MDE estimate of single family household daily water usage) was applied to projected dwelling unit increases forecast for the Town. Projections are based on those identified as Scenario 1 in Chapter 3 of the Comprehensive Plan (see table 14) and assumes no new annexations. Water demand is based on existing dwellings as well as potential units, which may be built through infill development of vacant and underutilized lots within the current municipal boundary and/or in Town designated municipal growth areas. (see Table 6-2).

**Table 3: Greensboro Projected Water Demand based on projected population growth**

Year	2000	2010	2015	2020	2025	2030	Increase 2010-2030
Population*	1,632	2,485	2,995	3,144	3,301	3,458	973 ***
Household Units**	618	941	1,134	1,191	1,250	1,310	369
Water (GPD)	154,500	235,250	283,500	287,750	312,500	327,500	92,250 (GPD)
Non-Res. (sq.ft.)	-	-	5,000	10,000	15,000	20,000	20,000 sq. ft.
Non-Res. Demand (GPD)†	-	-	500	1,000	1,500	2,000	2,000 (GPD)
Total Water Demand	154,500	235,250	284,000	288,750	313,000	329,500	94.250 (GPD)
% average daily flow capacity****	48%	72%	87%	89%	96%	101%	----
% maximum daily flow*****	34%	52%	62%	63%	69%	72%	----

Projections shown here based on incremental 10 year projections established by methodology defined in Chapter 3 (Municipal Growth Element) and as shown in Table 3-6, for consistency.

Notes:

- \* Population Projection based on assumption that 386 recorded or to be recorded lots are built on and occupied by 2015. Projections after 2015 assume a growth rate of 1% resulting in additional 463 residents between the years 2015 and 2030.
- \*\* Household units projection assuming a sustained average of 2.64 persons per household as evident in 2000.
- \*\*\* Population totals include growth of existing population plus increased population as a result of infill development.
- \*\*\*\* Average daily flow capacity/maximum daily flow: 325,000 gpd/455,000 as per current Groundwater Appropriation Permit.

† Non-residential demand based on demand for .1 gallons per square feet per day utilizing estimates of future non-residential growth.

Projections indicate that demand for water in the Town will increase by, just over 94,000 gallons per day or 29% from 2010 levels by 2030. Related to Greensboro's Groundwater Appropriation Permit (GAP), MDE determined that annual average withdrawals of 325,000 gpd and 455,000 gpd during the month of maximum use were reasonable and that no significant negative impacts would occur to the aquifer resource or neighboring water users.

Table 3 illustrates that by 2015, projected water usage will be at 87% of the system's average daily flow capacity as limited by the Groundwater Appropriation Permit.

Chapter 3 of this plan clearly indicates that the Town does not plan to "allow any new residential annexations or new major residential projects during the period between this Plan and the next required Plan in 2014. This is the growth strategy adopted by this Plan. Given this policy, the Town's water system should be adequate to support the Town's current overall development policy.

Given current maximum daily demand of 455,000 gpd and a capacity of 300 gpm (gallons per minute) with the largest well out of service, the total well-field in Greensboro can produce 864,000 gpd; a surplus of 409,000 gallons per day. This indicates that water supplies and pumping capacity should be suitable to support projected growth to the year 2030.

However, the actual system capacity that presently exists may be limited by the water distribution and storage facilities necessary to provide adequate fire flows beyond the year 2015. Therefore, replacement of sections of the distribution system will probably be priority projects to enhance the water system over the next several years.

If other improvements to the water system are determined necessary in the future and need to be made by 2020 to accommodate growth that may occur after that time then they should be implemented. Any development beyond 2,995 residents or 1,134 households anticipated between 2015 and 2020 will require further modifications to the groundwater appropriation permit and possible improvements to pumping and storage capacity. In addition to system expansion, the Town will need to continue to implement recommendations for improvements to existing water distribution lines identified in the 2005 Town water system evaluation. Many of these recommended line repairs and replacements may serve to conserve water resources or effectively increase fire flows in the current water supply system.

## **Wastewater Treatment System**

The Town of Greensboro currently operates a fixed film, activated sludge type wastewater treatment plant located on the northwest bank of the Choptank River. The facility was originally constructed in 1968 and last modified in 1996. The plant consists of an influent screen, primary clarifier, dual rotating biological contactors, two secondary clarifiers, disinfection, post aeration, and sludge drying beds. Wastewater effluent flows by gravity

through the plant to an outfall that discharges into an unnamed tributary of the Choptank River. A map of the extent and components of the System is available in the “Sewer Collection System Evaluation” conducted in May, 2005 by Davis, Bowen and Friedel.

The Town’s Wastewater Treatment Plan has a permitted design capacity of 280,000 gallons per day (gpd). In 2008, the plant’s three-year average daily flow was 142,000 gpd, with gross available capacity of 138,000 gpd. Study of the systems capacity conducted in May, 2005 by Davis, Bowen and Friedel indicated unused wastewater treatment capacity could accommodate up to 483 equivalent dwelling units (EDU’s)

The Town calculates that infill development will create demand for treatment of an additional 120,750 gpd, which would leave 17,250 gpd in remaining capacity and place the system at 94 percent of capacity. Page 31 of this Comprehensive Plan evaluates the capacity of Wastewater Treatment infrastructure to support existing improved parcels with sewer service, together with additional capacity required to support planned development. These estimated treatment demands will be prompted by infill development and development of subdivisions that have been planned and/or approved, and are located within the current corporate limits of the Town. As shown in Table 4, this combination of system demands would leave a remaining available wastewater treatment capacity of only 17,250 gpd or 69 equivalent dwelling units. These projected flows would exceed 80% of the systems permitted treatment capacity, indicating the Town may need to determine actions needed to increase permitted treatment capacity before build-out as shown in Table 4.

As a result, in 2006 the Town limited the sewer allocation to public uses, rehabilitative uses, and non-residential job-creating uses. Policies established in Chapter 3 of this Comprehensive Plan, limit any future growth to these uses and infill development of recently approved subdivisions. Any annexation of land or additional development would require expanding the plant and upgrading it to ENR treatment level.

<b>Table 4: Current and Projected Wastewater Treatment Capacity Demand</b>		
<b>Development type</b>	<b>Number of equivalent dwelling units (EDU’s)</b>	<b>Demand for Treatment Capacity (GPD)</b>
Currently improved parcels	799	142,000 *
Baldwin Subdivision	101	25,250
Greensboro Farms	230	57,500
Town parcels (currently unimproved)	72	18,000
Projected Non-Res. Demand**	80	20,000
<b>Total</b>	<b>1,202</b>	<b>262,750</b>
<b>Total current System Design and Permitted Capacity = 280,000 GPD</b>		
<b>Reserve Capacity = 17,250 GPD</b>		

Note; All new development assumed to generate 250 gpd per unit treatment demand.  
 \* Figure shown denotes most recent three year average daily flows which is less than 250 gpd per EDU.

\*\* Non-residential demand based on demand for .1 gallons per square feet per day utilizing estimates of future non-residential growth and are converted to equivalent dwelling units.

Chapter 3 of this plan also examined the implications of annexations into surrounding areas designated as the Town’s mapped growth areas. A Municipal Development Capacity Analysis for Caroline County was prepared by the Eastern Shore Regional GIS Cooperative in November, 2008. This analysis indicated that within the mapped growth area, there is capacity for 2,158 residential units in areas beyond the current corporate limits. Page 30 of the Plan (Table 18) reflects the highest projected growth rate (3% annually) considered among scenarios explored in Chapter 3. This growth rate resulted in 948 additional dwelling units between 2009 and 2030, many of which would have to locate in new growth areas, which would consume 44% of growth area development potential, and require more than double the current permitted wastewater treatment capacity. This consideration serves as the basis for the previously referenced Town policy in the near term to limit development to infill, public uses, rehabilitative uses and non-residential job creating uses.

### Point Source Pollution Considerations

Point sources are measurable inputs of pollutants that are discharged into streams, rivers and lakes via pipes or drains, primarily from industrial facilities, and municipal treatment plants. Since Caroline County does not currently operate any wastewater treatment facilities, issues related to managing or reducing point source nutrient loads delivered from the Town’s municipal Wastewater treatment plan need to be addressed in this Plan.

The Town of Greensboro shares the Choptank River Basin with numerous municipalities that operate public wastewater facilities (Denton, Preston, Cambridge, Easton, St. Michaels, Trappe, East New Market, Secretary, and Hurlock). As shown in Table 5, Point Source discharges in the Upper Choptank portion of the Choptank River basin represent 8.3% of Nitrogen loadings to the watershed and 11.7% of Phosphorus loadings.

<b>Table 5: Upper Choptank River Watershed Sources of Impairment</b>			
<b>Watershed</b>	<b>Nitrogen</b>	<b>Phosphorous</b>	<b>Sediment</b>
Point Source	8.3%	11.7%	0.0%
Non-Point Source			
• Agricultural Land	72.7%	66.6%	86.9%
• Mixed Open Land	6.5%	12.2%	4.4%
• Urban Land	5.6%	7.7%	3.4%
• Forest Land	5.4%	0.8%	5.2%
• Atm. Dep.	1.6%	1.0%	0.0%

Source: Maryland Tributary Strategy Choptank Basin Summary Report for 1985-2003 and Caroline County Dept. of Planning, Codes and Engineering, 2008.

Table 1 on page 5 of this plan element, identified possible point source loading caps recommended by Caroline County for the County portion of the Choptank River Watershed assuming that Caroline would be allocated 40 percent of the total recommended caps that are yet to be established ( a percentage equivalent to the County's proportionate land area in the basin). Point Source load limits established in these prospective TMDLs were 70,076 lbs. per year for Nitrogen (TN) and 6,510 lbs. per year for Phosphorus (TP).

Review of available data indicates that the combined flows from Wastewater Treatment Facilities in the Caroline County portions of the Choptank River Watershed are within TMDL limits that may be established in the next few years. Table 6 identifies estimated 2007 point source loads generated from the Greensboro Wastewater Treatment Plant as well as other plants located in Caroline County. Total nitrogen loadings from Town treatment facilities discharging into the Caroline portion of the Choptank River basin are 34,155 lbs/yr. This figure includes all nitrogen loadings shown in table 6 excepting loadings from the Federalsburg WTP. These totals represent roughly ½ the total prospective point source TMDL, indicating current loadings are sustainable. This conclusion assumes that the future TMDLs assigned to the Upper Choptank remain consistent with those currently recommended, and that load allocations are based on land area rather than the number of point sources throughout the entire Choptank Watershed.

**Table 6: Caroline County Municipal Wastewater Treatment Facilities Effluent Nitrogen and Phosphorus concentrations and loadings**

Wastewater System	2007 Avg Daily Flow (mgd)	Design Capacity (mgd)	2007 CONCENTRATION		2007 AVG FLOW LOAD	
			TN mg/l	TP mg/l	TN lbs/yr	TP lbs/yr
			Denton	0.349	0.800	8.10
Federalsburg	0.274	0.750	19.85	0.68	16,557	570
Greensboro	0.111	0.280	47.92	3.29	16,192	1,112
Preston	0.058	0.116	11.34	1.00	2,016	177
Ridgely	0.134	0.180	18.00	3.00	7,342	1,224
<b>Totals</b>					<b>50,712</b>	<b>4,336</b>

Source: Chesapeake Bay Program and Caroline County Dept. of Planning, Codes and Engineering, 2008.

Note: Total Nitrogen (TN) is the sum of Organic Nitrogen, Ammonia, TKN or Total Kjeldal Nitrogen, and Nitrate+Nitrite

The same findings apply to Phosphorus loadings since Upper Choptank loadings in 2007 totaled 3,766 lbs/year; representing approximately 58% of total prospective loadings to be allocated.

If more restrictive TMDL limits are established, the State will need to give consideration to BNR/ENR technology upgrades to “minor” wastewater treatment facilities, (facilities treating less than 500,000 GPD) including the Greensboro treatment plant. Review of table 6 indicates that the 2007 flow from the Greensboro Wastewater facility demonstrated a

particularly high concentration of over 47 mg./l (milligrams per liter) in its nitrogen loadings.

More recent information indicates that these concentrations are lower than shown in table 6. Review of monthly reports for the 2008 calendar year indicate average concentrations for this most recent year were 23.67 mg./l. This data also indicates that total nitrogen loads for the year resulted in discharges of 8,522 lbs of nitrogen, well below the 9,876 lbs per year permitted level.

In spite of this reduction in TN concentrations and lower TN loads, this is much higher than other plants in the basin and suggests that the State should consider funding to support BNR/ENR upgrades to the current facility. Phosphorus concentration in current loadings is also higher than other treatment facilities in the County. Table 6A identifies projected pollutant loads for the year 2030 assuming demand for treatment increases from the treatment plants current average daily flow of 111,000 GPD to 231,750 GPD by 2030. This reflects an increase in treatment volume of 120,750 per day as shown in Table 4. Figures shown assume that nitrogen and phosphorus concentrations in effluent remain as shown in Table 6.

Table 6A: Projected increases in point-source pollutant loads 2007 - 2030			
	2007 estimated load	2030 estimated load (lbs/yr.)	Estimated net load increase
Nitrogen	16,192 lbs./yr.	33,683 lbs./yr.	17,491 lbs./yr.
Phosphorous	1,112 lbs./yr.	2,213 lbs./yr.	1201 lbs./yr.

The Chesapeake 2000 Agreement outlined a goal for Maryland towns and counties to work cooperatively to achieve a 40 percent reduction from 1985 Bay nutrient levels. This goal was applied to point and non-point sources of pollution. State and Federal funding to reduce point source loads has been concentrated on upgrades to the state's 66 major treatment plants because they are estimated to contribute 95 percent of wastewater flow into the Bay. The required reduction in major WWTP nutrient loads is made with plant upgrades to first BNR then ENR technology, which reduces total nitrogen (TN) load to 3mg/l and total phosphorus (TP) to .3mg/l.

While upgrades to BNR and ENR treatment levels could result in a significant reduction in nutrient loading from WWTP point sources, the full potential of the advanced technology will go unrealized in plants like Greensboro's whose flow volumes don't qualify for funding assistance.

Current MDE, funding policies indicate that ENR upgrades to smaller plants will begin only after all major plant upgrades are completed, and then only if funding is still available. Most minor plants are at secondary treatment levels and concentrations of Nitrogen are at 18 milligrams per liter or less. However, Greensboro's particularly high concentrations indicate that the facility may presently be discharging more pounds of nitrogen per year than some major treatment facilities.



EPA and MDE need to consider developing programs in conjunction with local governments to monitor projected growth and increases in flow allocations and resulting impacts from small plants and provide access to funding to support restoration efforts for Towns like Greensboro. This includes exploring the feasibility of continuing funding for the Bay Restoration Fund program to ensure ENR upgrade funding for all minor plants when cost-effective results can be realized.

### **Point Source Strategy**

- Encourage the Chesapeake Bay Program and MDE to re-evaluate funding policies to include funding for ENR/BNR upgrades to minor treatment facilities when Total Nitrogen and/or Total Phosphorus concentrations are particularly high (e.g. TN concentrations over 20 mg/liter)
- Manage Wastewater Treatment facility operations to reduce flows per household to the extent possible.
- Encourage use of water conservation fixtures and design techniques in new development to reduce water system demands and reduce flows to the wastewater treatment facility.
- Monitor nutrient load increases and adjust the scale and pace of growth so that the average daily flow results in nutrient loads that are within established nutrient thresholds.
- Where future growth may exceed the 40 percent nutrient reduction goal, work with MDE to find technical and/or fiscal support for decreasing wastewater treatment plant effluent concentrations of TN and TP.

### **Non-Point Source Pollution and Stormwater Management Considerations**

Non-point source pollution occurs when rainfall, snowmelt, or irrigation runs over land or through the ground and gathers pollutants. Pollutants are then deposited into streams and rivers or introduced into ground water. Stormwater runoff is a significant contributor to non-point source pollutant loading. As of 2005, the largest non-point source of nitrogen in the Choptank River Basin was agriculture (70 percent). Agriculture was also the largest contributor of phosphorus (62 percent) and sediment loads (85 percent).

According to the Maryland Tributary Strategy Choptank Basin Summary Report for 1985-2003, the Town of Greensboro, together with other Urban Uses in the Watershed contribute approximately 5.6% of non-point source nitrogen loadings, 7.7% of the non-point source phosphorus loadings and 3.4% of the sediment loadings to watershed tributaries.

Stormwater runoff is part of the natural hydrologic process. Human activities and landscape changes resulting from urbanization can alter natural drainage patterns and add pollutants

to rivers. Urban runoff is often a significant source of water pollution, including flows discharged from urban land uses into stormwater conveyance systems and receiving waters. In the past, efforts to control the discharge of stormwater focused on quantity (e.g. drainage, flood control etc.) and only to a limited extent on quality. More recently, awareness of the need to improve water quality has increased. With this awareness Federal, State and, Local programs have been established to reduce pollutants contained in stormwater discharges to our waterways. These programs promote the concept and practice of preventing pollution at the source, before it can cause environmental problems.

## Greensboro’s Projected Non-Point Source Loading

Table 7 illustrates estimated nitrogen and phosphorous loadings from stormwater runoff based on projected growth in the Town through 2030. To assist Caroline County with preparing a methodology for calculating nutrient loading rates for each of the County’s land uses, MDE developed estimates of the County’s nutrient loading rates and loads.

Land use acreage totals are applied to a formula developed by MDE that includes soil factors, average annual rainfall and impervious surface percentages (impervious surface percentages vary according to land use – generally, developed land has a higher percentage of impervious surface than undeveloped land). The result is a per-acre rate of loading for each land use. The “Developed Land” per acre rate of loading was applied to the Town of Greensboro since it reflects a mix of residential, commercial and industrial uses.

Table 7: Greensboro estimated non-point source loading rates and loads (2009 and 2030)				
Estimated Acres of Developed Land*	Nitrogen Loading Rate (lbs/ac)	Phosphorus Loading Rate (lbs/ac)**	Estimated Nitrogen Load (lbs)**	Estimated Phosphorus Load (lbs)
Year 2009 428 acres	8.77	1.14	3,754	488
Year 2030† 634 acres	8.77	1.14	5,560	723
Net Increase	---	---	1,806	235

Notes: Loading rates are based on MDE/CBP land use load estimates.

\* “Developed” includes residential, commercial, industrial and institutional land uses.

\*\* Represents average load per acre of all acres including estimated 29.5 acres of Town parkland

† Year 2030 estimates assume build-out of Baldwin and Greensboro Farms subdivisions and development on 21 existing vacant parcels within the Town with no new annexations.

Estimates shown in Table 7 indicate that approximately 1,806 additional pounds in Nitrogen loading and 235 additional pounds in phosphorus loading can be expected as a result of currently planned development over the period. This estimate does not account for any annexation of land but assumes the build-out of the Baldwin Development and Greensboro Farms subdivision as well as infill development of 21 existing vacant parcels currently located within the corporate limits of the Town.

Table 8 represents results from use of an alternative method used to estimate future levels of pollution from non-point sources in Greensboro. This method utilizes the "Watershed Treatment Model for Urban Watersheds", developed by MDE and the Center for Watershed Protection. The model incorporates estimates made using measurements of annual rainfall and impervious surface area based on land use and Environmental Protection Agency (EPA) estimates of standard concentrations of nitrogen and phosphorous in urban area stormwater runoff. This model, also known as the "simple model" for calculating pollutant loads is as follows:

$$L = 0.226 * R * C * A$$

Where

L = Annual Load (lbs),

R = Average Annual rainfall (inches),

C = Pollutant concentration (mg/l),

A = Acres of impervious surface, and

0.226 is the unit conversion factor for converting milligrams to pounds.

<b>Table 8: Greensboro stormwater pollutant loadings from projected infill development and growth within currently planned municipal areas.</b>					
	0.226 conversion factor for converting milligrams to pounds.	(R) Average Annual Rainfall ††)	(C) Pollutant Concentration (2.0 mg/l)	(A) Impervious Surface (acres) †††	(L) Total load (lbs/year)
Estimated Nitrogen loadings †	0.226	42.8 inches	2.0 mg/l Nitrogen concentration	88.88	1719 lbs/year Nitrogen
Estimated Phosphorus loadings †	0.226	42.8 inches	0.26 mg/l Phosphorus concentration	88.88	223 lbs/year Phosphorus

† Source: Stormwater Manager's Resource Center (SMRC), EPA Offices of Water and Wastewater Management, "Watershed Treatment Model for Urban Watersheds", MDE and the Center for Watershed Protection. Medium density land use impervious surface multiplier (0.28) was used to calculate future impervious surfaces for residential use and (0.72) for commercial.

†† Source: Worldclimate.com Global Historical Climatology Network (GHCN) for Denton, MD.

††† Impervious surface calculation assumes 352 new residential units at 3.5 units per acre and assumes 266 acres will be converted to single family residential land use between 2009 and 2030 and 20 acres converted to commercial use at Greensboro Farms.

As can be seen in Table 8, use of the simple formula results in loadings for nitrogen and phosphorus that are very similar to that shown in Table 7. The two methods establish an estimated range of expected increases in non-point source nitrogen loadings of between 1,719 and 1,806 lbs per year. Likewise, an estimated range for projected phosphorus loadings falls between 223 and 235 lbs. per year.

These estimates further assume that the loading rates per acre will remain the same through the period to 2030. Greater use of Best Management Practices (BMPs) for management of stormwater quality, which is expected in future Town development, could reduce the

projected increases in nitrogen and phosphorus loadings. An estimate of increases in nutrient loadings from both point (wastewater treatment facility) and non-point (stormwater) loads is shown in Table 9.

Table 9: Projected increases in point-and nonpoint source pollutant loads 2007 - 2030			
	Estimated load increase from point source	Estimated load increase from non-point sources	Estimated load increase From both sources
Nitrogen	17,491 lbs./yr.	1,719 (lbs/yr.)	19,210 (lbs./yr.)
Phosphorous	1201 lbs./yr.	223 (lbs/yr.)	1,424 (lbs./yr.)

Review of these increases, though sizable, indicate that Greensboro’s growth will represent a small proportion of total TMDL’s likely to be allocated for non-point sources, and may therefore be able to be accommodated in watershed-wide context. However, until such time as final TMDL’s are assigned to non-point sources of pollution in the watershed, no conclusion can be drawn regarding the assimilative capacity of the Watershed to indicate it is suitable to support the combined additional loads resulting from wastewater and stormwater increases attributable to future growth projected in the Town’s Land Use Plan.

This evaluation also does not take into account the demands on the assimilative capacity of the Watershed from other growth or activities within the watershed (e.g., County growth and Agricultural use) and underscores the importance of coordinated land use and growth management strategies based on sound watershed planning principles. It also underscores the importance of inter-jurisdictional coordination and cooperation between Caroline County, Greensboro, and the County’s need to support the Agricultural industry’s efforts to reduce non-point loadings in the Watershed.

For both TMDLs, Maryland has several well established programs that will be drawn upon: the Water Quality Improvement Act of 1998 (WQIA), the Clean Water Action Plan (CWAP) framework, and the State's Chesapeake Bay Agreement's Tributary Strategies for Nutrient Reduction. Also, Maryland has adopted procedures to assure that future evaluations are conducted for all TMDLs that are established. The implementation of point source nutrient controls will be executed through the use of NPDES permits. The NPDES permit for the Greensboro WWTP will have compliance provisions, which provide a reasonable assurance of implementation.

Finally, Greensboro’s Land Use and Municipal Growth Plans reflect “smart growth” strategies. They are designed to concentrate development adjacent to the existing developed areas within the corporate limits. Growth will be permitted on annexed lands at net densities ranging from 2 to 4 units per acre. The result is development concentrated in cluster form with annexation of additional lands limited over the next 10 years. This approach maximizes opportunities to minimize deterioration in the Upper Choptank River watershed.

## **Water Resources Goals and Objectives**

The Water Resources goal for Greensboro is:

- to maintain a safe and adequate water supply and adequate capacities for wastewater treatment to serve projected growth; to take steps to protect and restore water quality; and to meet water quality regulatory requirements in the Upper Choptank River watershed.

Objectives to support this goal are:

- Assure that existing and planned public water systems meet projected demand.
- Assure that existing and planned public wastewater collection and treatment systems meet projected demand without exceeding their permitted capacity.
- Assure that the Town's stormwater management policies reflect the most recent state requirements, and encourage Low Impact Development (LID) practices in both new development and by existing homeowners.
- Maintain land use patterns that limit adverse impacts on water quality.
- Continue to focus growth to areas best suited to utilize the existing and planned water and wastewater infrastructure efficiently.

## **Water Resource Strategies and Recommendations**

Beyond establishing a land use planning framework that is supportive of water quality protection efforts, the Town can also initiate measures that further support sound management of stormwater flows to improve water quality. These include:

- Use of "Environmental Site Design (ESD) Principles to manage Stormwater in new development. The Maryland Stormwater Management Act of 2007 is based upon Environmental Site Design (ESD) Principles, which attempt to mimic natural hydrology on developed sites. The Stormwater Management Act of 2007 is based upon 13 core principles, which are listed below:
  1. Increase onsite runoff reduction volumes
  2. Require a unified early ESD map
  3. Establish nutrient-based stormwater loading criteria
  4. Apply ESD techniques to redevelopment
  5. Integrate ESD and stormwater management together at construction sites
  6. Provide adequate financing to implement the Act and reward early adopters
  7. Develop an ESD ordinance that changes local codes and culture
  8. Strengthen design standards for ESD and stormwater practices
  9. Ensure all ESD practices can be adequately maintained

10. Devise an enforceable design process for ESD
11. Establish turbidity standards for construction sites
12. Craft special criteria for sensitive and impaired waters of the state
13. Implement ESD training, certification and enforcement

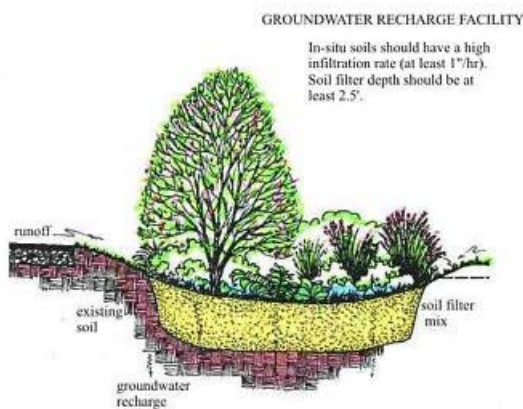
The Town should consider amendment to Stormwater Management Regulations to incorporate these principles in standards for future development and site planning.

- Promoting bio-retention as a means of treating stormwater runoff. Bio-retention, such as a rain garden, provides stormwater treatment that enhances the quality of downstream water bodies by using soil and both woody and herbaceous plants to remove pollutants from stormwater runoff.
- Consider the implementation of a lot coverage limit on all new development.
- Encourage water quality improvements for existing development through stormwater management techniques such as rain barrels, rain gardens, and native planting plans.

Rain gardens (see figure 1) are vegetated surface depressions, often located at low points in landscapes, designed to receive stormwater runoff from roads, roofs, and parking areas. The gardens' sandy soils allow stormwater to infiltrate quickly to the native soils below and eventually contribute to groundwater recharge. Pollutants and nutrients in stormwater runoff are removed by rain garden vegetation and soils through biological and physical processes such as plant uptake and sorption to soil particles. In comparison with stormwater release to receiving waters through conventional storm drain systems, infiltrating stormwater through rain gardens reduces peak flows and stressor loadings.

- Utilize Low Impact Development (LID) stormwater management techniques and devices in new developments to minimize flows and attenuate impacts near their source. These include:
  - Bioretention or vegetated depressions that collect runoff and facilitate its infiltration into the ground. These include rain gardens as discussed above. (See figure 1)

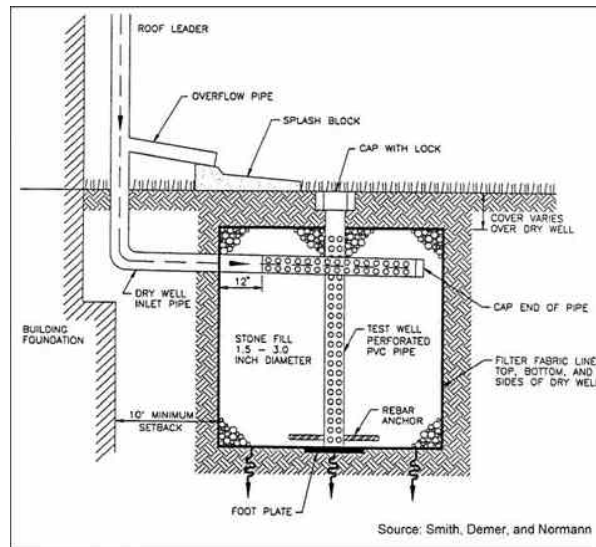
Figure 1 **Bioretention Area**



Source: Prince Georges County DER

- Infiltration Trenches: Trenches filled with porous media such as bioretention material, sand, or aggregate that collect runoff and infiltrate it into the ground.
- Dry Wells: Gravel- or stone-filled pits that are located to catch water from roof downspouts or paved areas.

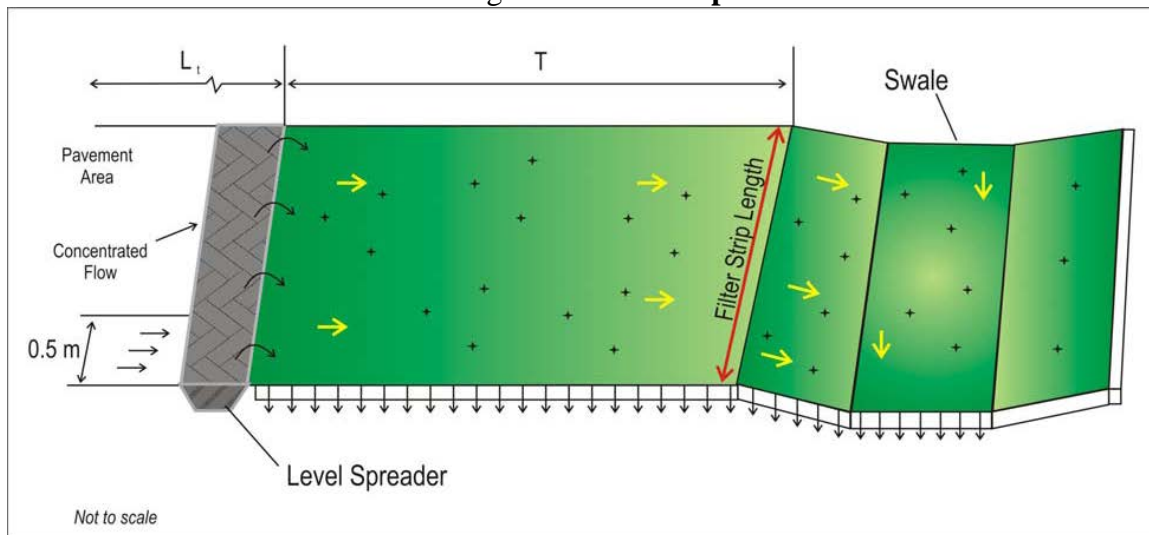
Figure 2. Dry Well Schematic



Source: Stormwater Management for Maine, 1995.

- Filter Strips: Bands of dense vegetation planted immediately downstream of a runoff source designed to filter runoff before entering a receiving structure or water body.

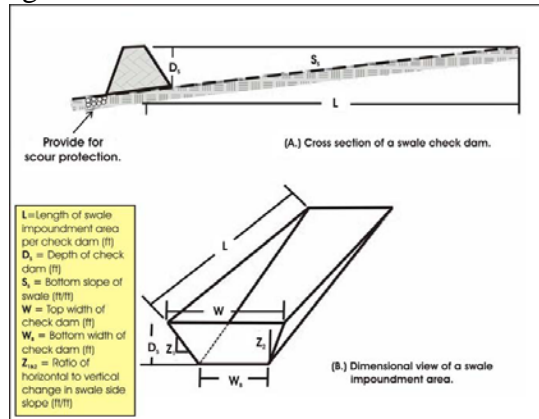
Figure 3 Filter Strip



Source: Low Impact Design Manual, US Army Corps of Engineers, 2004

- **Inlet Pollution Removal Devices:** Small stormwater treatment systems that are installed below grade at the edge of paved areas and trap or filter pollutants in runoff before it enters the storm drain.
- **Grassed Swales:** Shallow channels lined with grass and used to convey and store runoff.

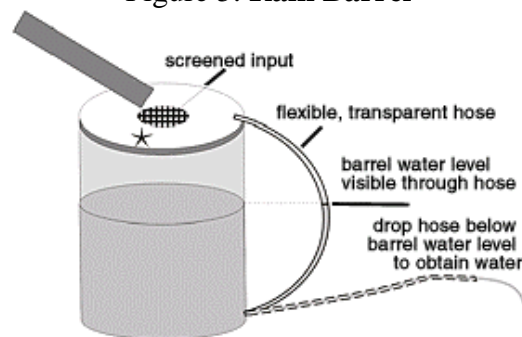
**Figure 4. Grassed Swale Schematic**



Source: NVPDC, 1991. In EPA, 1999d.

- **Permeable Pavement:** Asphalt or concrete rendered porous by the aggregate structure.
- **Permeable Pavers:** Manufactured paving stones containing spaces where water can penetrate into the porous media placed underneath.
- **Rain Barrels and Cisterns:** Containers of various sizes that store the runoff delivered through building downspouts. Rain barrels are generally smaller structures, located above ground. Cisterns are larger, are often buried underground, and may be connected to the building's plumbing or irrigation system. Rain barrels and cisterns are low-cost water conservation devices that reduce runoff volume and, for very small storm events, delay and reduce the peak runoff flow rates. Both rain barrels and cisterns can provide a source of chemically untreated 'soft water' for gardens and compost, free of most sediment and dissolved salts.

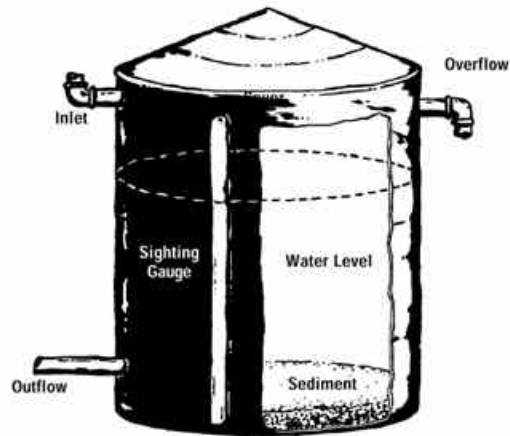
**Figure 5. Rain Barrel**



Source: Maryland DNR Green Building Program.



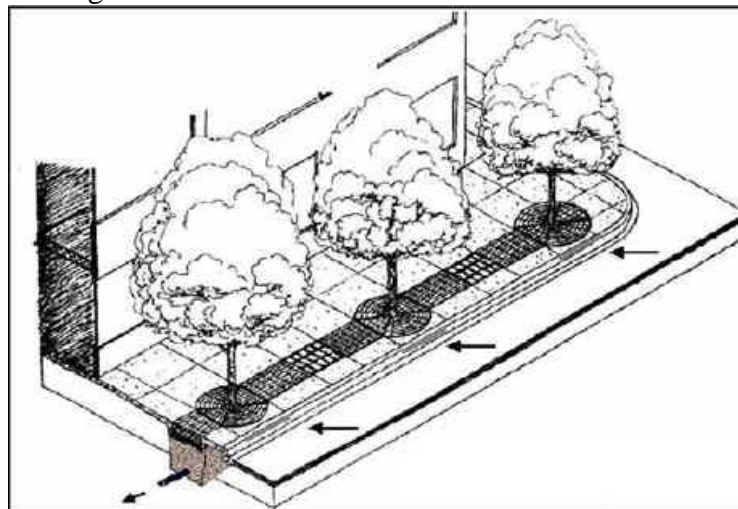
Figure 6. Cistern



Source: Texas Guide to Rainwater Harvesting.

- Soil amendments: Minerals and organic material added to soil to increase its capacity for absorbing moisture and sustaining vegetation.
- Tree Box Filters: Curbside containers placed below grade, covered with a grate, filled with filter media and planted with a tree in the center.

Figure 7. Manufactured Tree Box Filter



Source: Virginia DCR Stormwater Management Program.

- Vegetated Buffers: Natural or man-made vegetated areas adjacent to a water body, providing erosion control, filtering capability, and habitat.

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# Town of Greensboro, MD

## Critical Area Map



Maryland Department of Planning

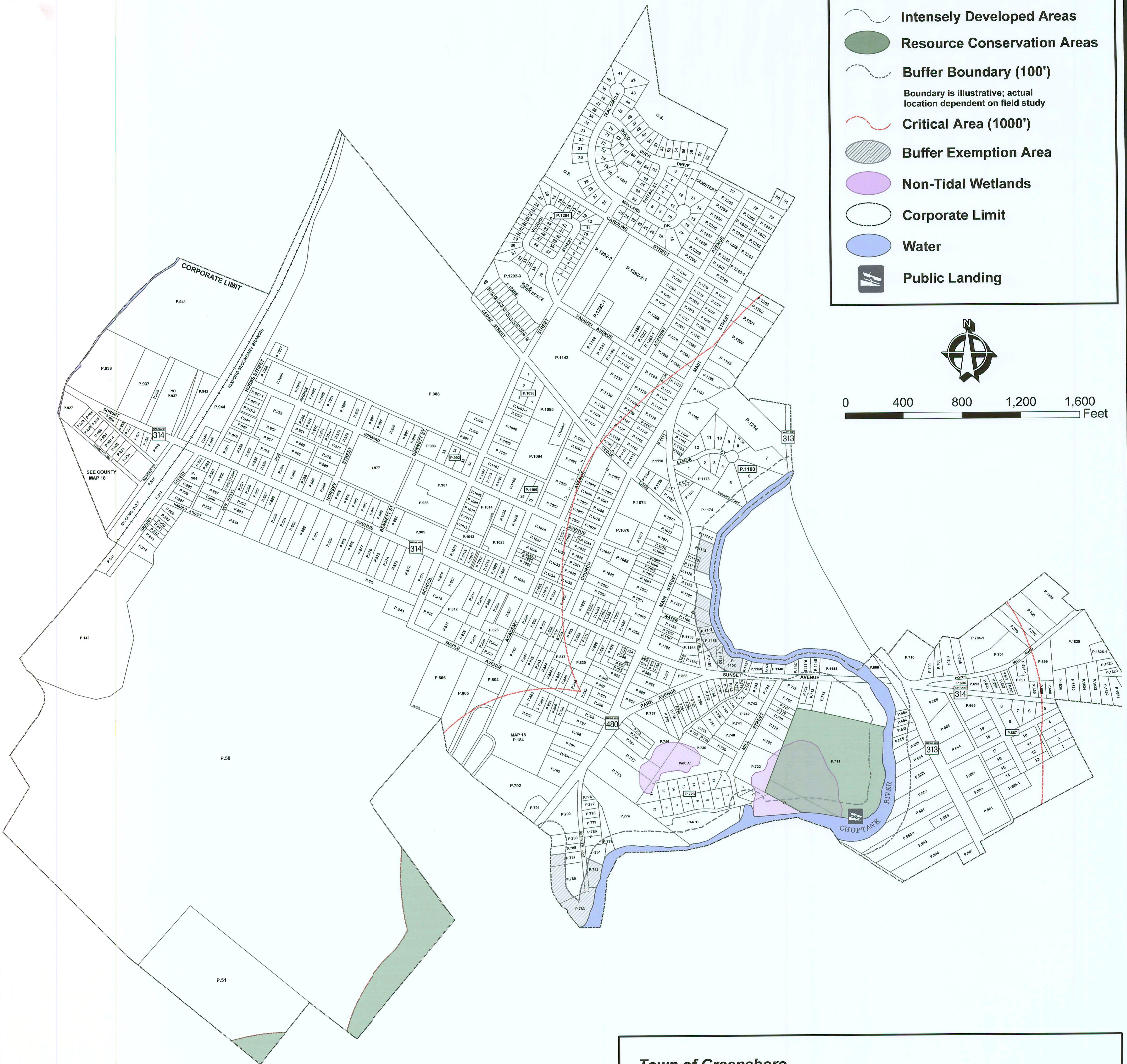
Governor - Martin O'Malley  
 Lt. Governor - Anthony G. Brown  
 Secretary - Richard Eberhart Hall

### Legend

- Intensely Developed Areas
- Resource Conservation Areas
- Buffer Boundary (100')  
Boundary is illustrative; actual location dependent on field study
- Critical Area (1000')
- Buffer Exemption Area
- Non-Tidal Wetlands
- Corporate Limit
- Water
- Public Land



0 400 800 1,200 1,600 Feet



### Revisions

Description	Date

**Town of Greensboro**  
 Mayor and Commissioners

\_\_\_\_\_ (Mayor)

\_\_\_\_\_

\_\_\_\_\_

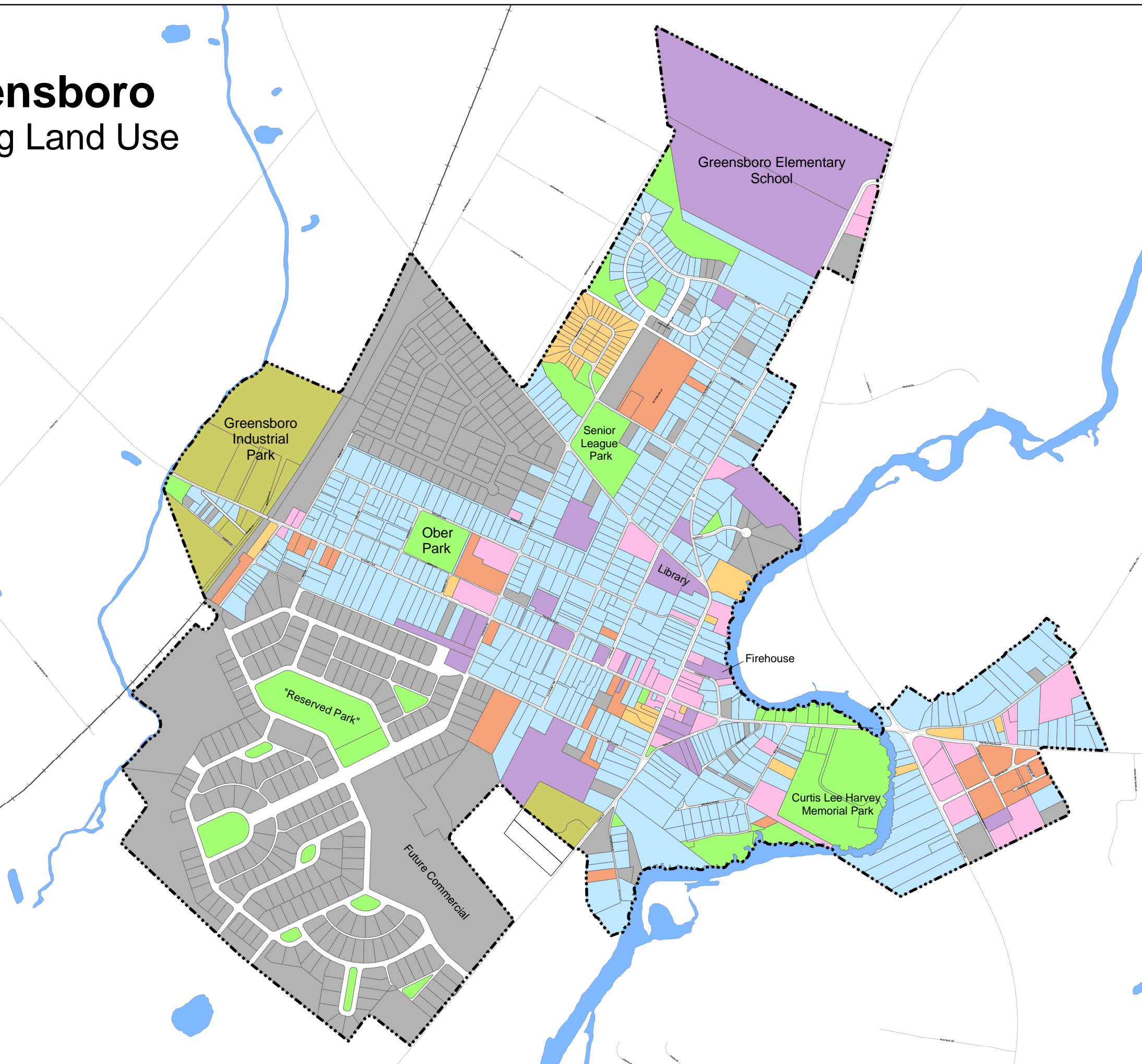
\_\_\_\_\_

\_\_\_\_\_

8/2007  
 \_\_\_\_\_  
 Date

# Greensboro Existing Land Use

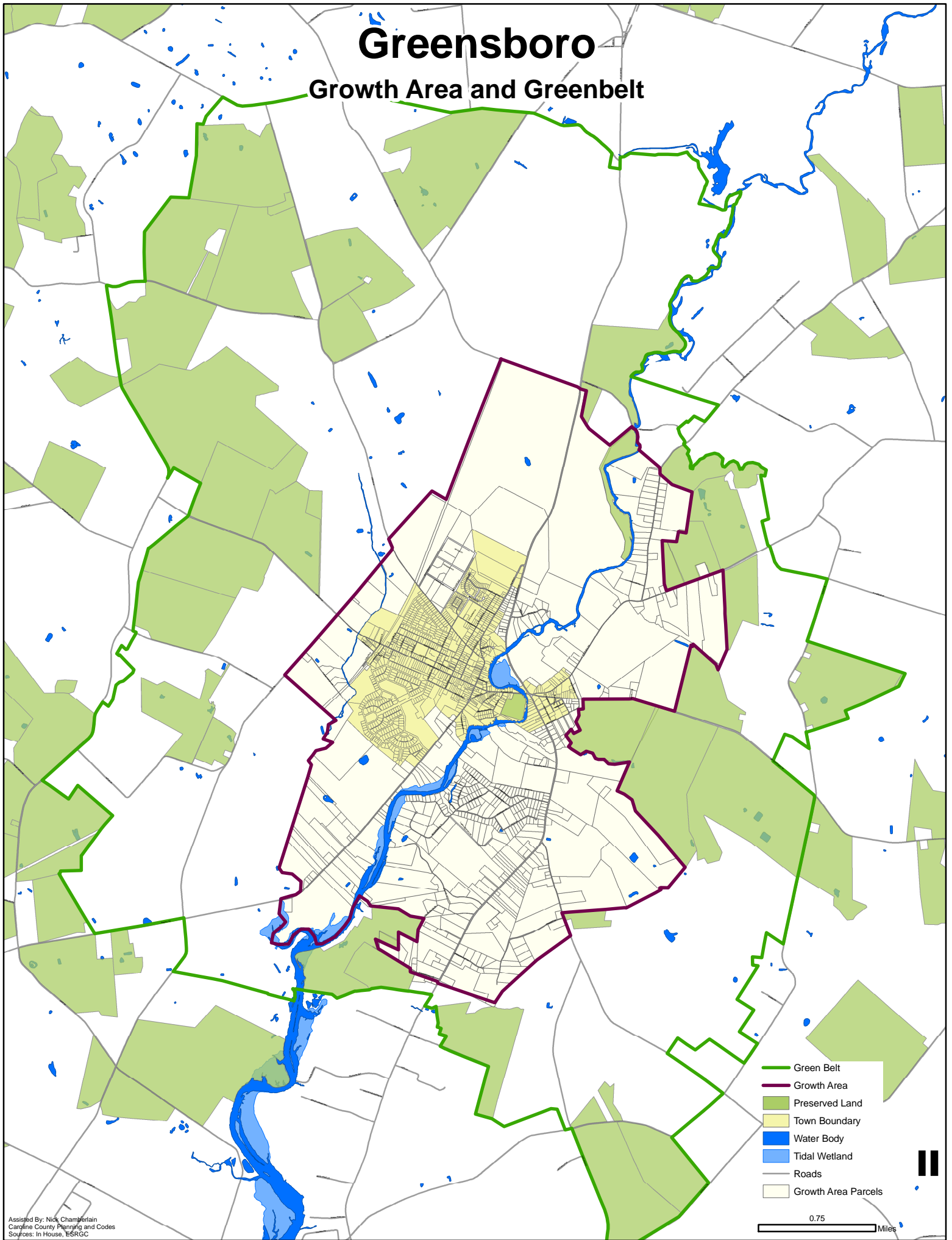
- Land Use**
- 2 Family Residential
  - Commercial
  - Industrial
  - Multi-Family Residential
  - Open Space
  - Public/Semi Public
  - Single-Family Residential
  - Unknown
  - Vacant
  - Water Body
  - Road
  - Railroad
  - Town Boundary



Assisted By: Nick Chamberlain  
Caroline County Planning and Codes  
Sources: ESRGC, MD DNR

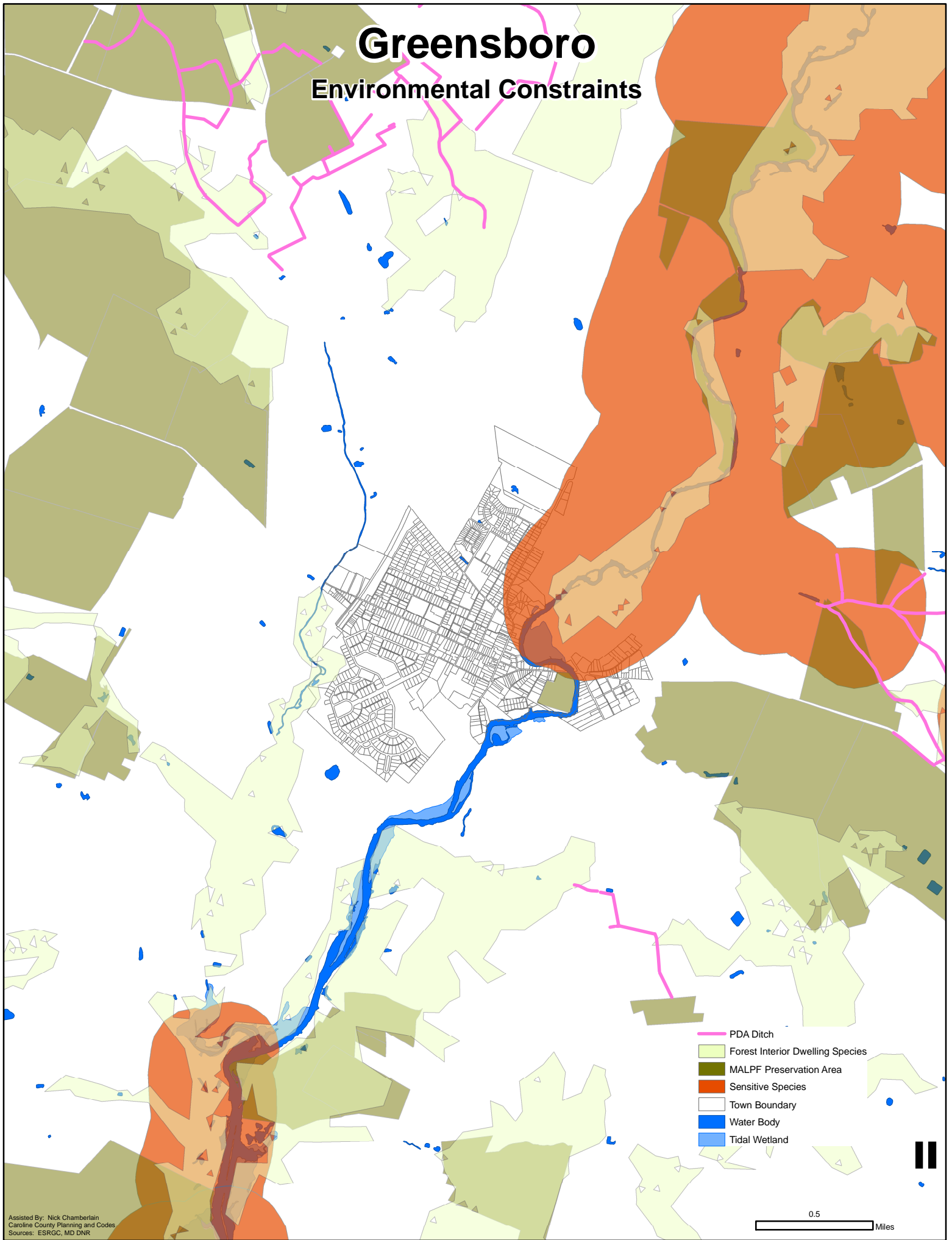
# Greensboro

## Growth Area and Greenbelt



# Greensboro

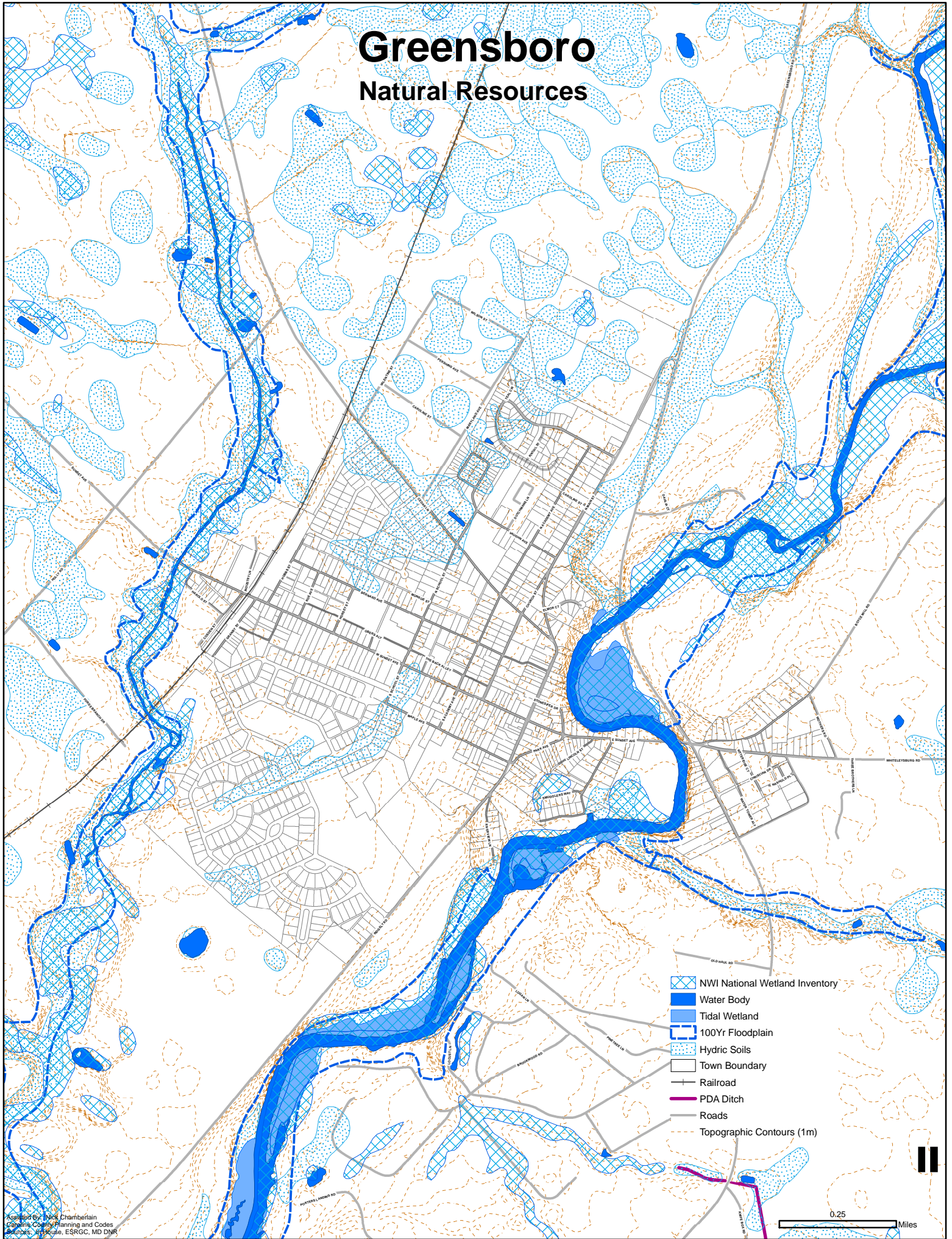
## Environmental Constraints



- PDA Ditch
- Forest Interior Dwelling Species
- MALPF Preservation Area
- Sensitive Species
- Town Boundary
- Water Body
- Tidal Wetland

# Greensboro

## Natural Resources



# Greensboro

## Traffic Trends

Year - Traffic  
## - #####

### SUNSET AVE

83 - 2275  
86 - 1900  
89 - 2400  
93 - 2650  
04 - 3225  
06 - 2931

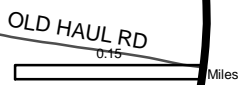
MD 480  
83 - 2325  
86 - 2100  
89 - 2200  
93 - 2550  
04 - 4125  
06 - 4531

MD 313  
83 - 3200  
86 - 3900  
89 - 4600  
93 - 4575  
04 - 5950  
06 - 5900

MD 314  
83 - 1525  
86 - 1800  
89 - 2500  
93 - 3250  
04 - 3825  
06 - 4631

MD 480  
83 - 2325  
86 - 2100  
89 - 2200  
93 - 2550  
04 - 4125  
06 - 4531

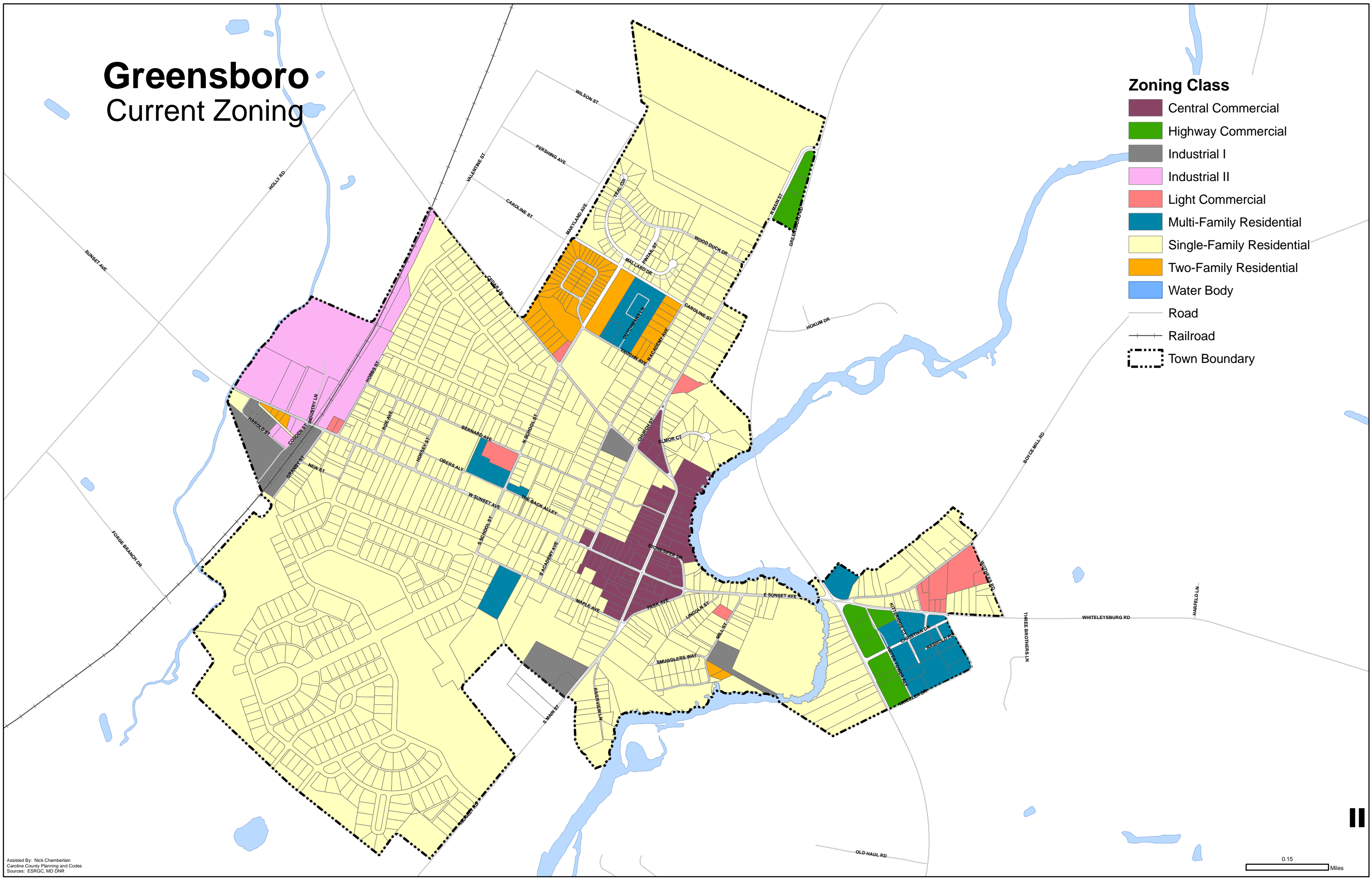
— TrafficTrend\_Mjr\_Rds2\_Merge





# Greensboro Current Zoning

- Zoning Class**
- Central Commercial
  - Highway Commercial
  - Industrial I
  - Industrial II
  - Light Commercial
  - Multi-Family Residential
  - Single-Family Residential
  - Two-Family Residential
  - Water Body
  - Road
  - Railroad
  - Town Boundary

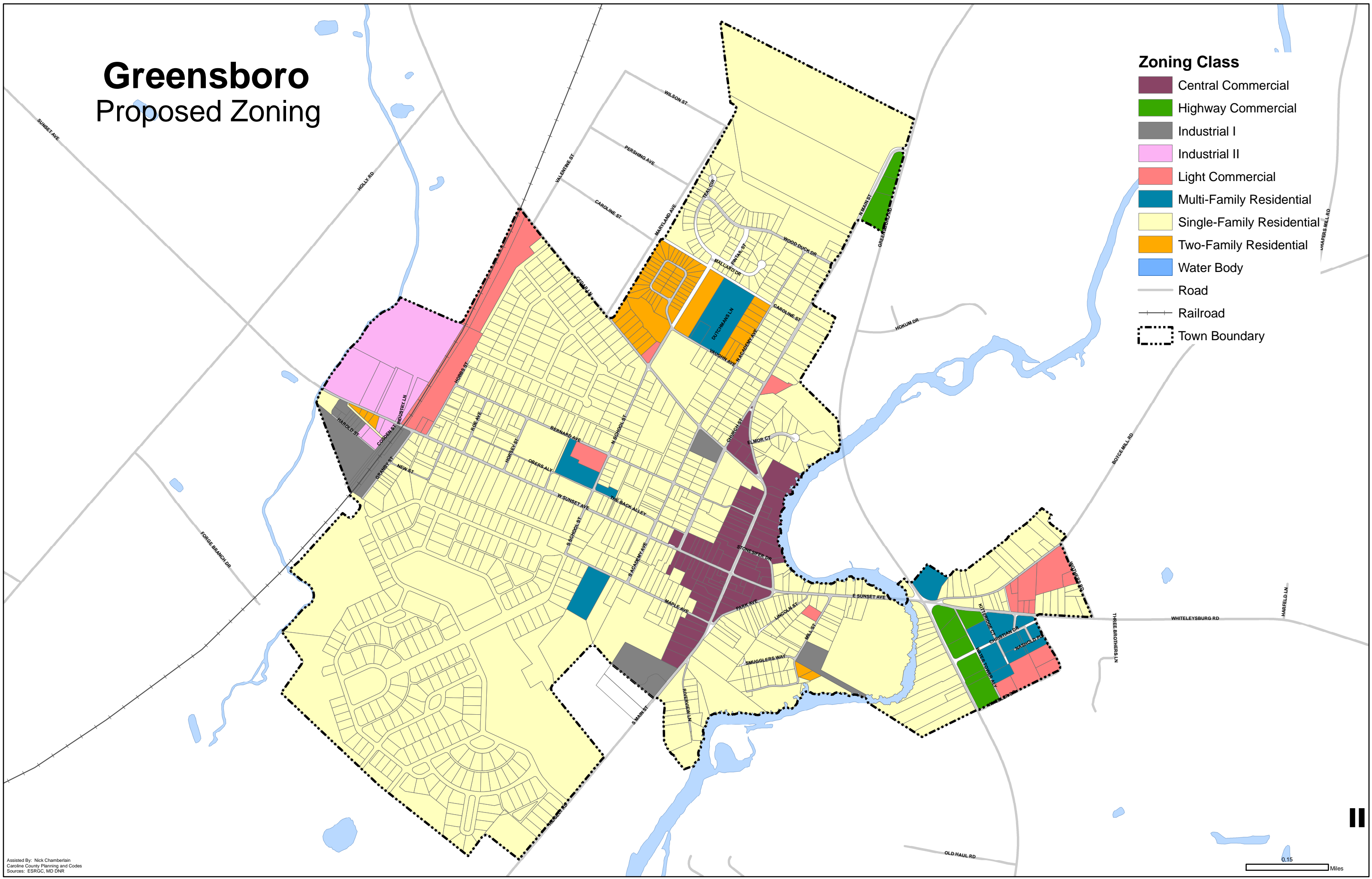


Assisted By: Nick Chamberlain  
Caroline County Planning and Codes  
Sources: ESRGC, MD DNR

# Greensboro Proposed Zoning

## Zoning Class

- Central Commercial
- Highway Commercial
- Industrial I
- Industrial II
- Light Commercial
- Multi-Family Residential
- Single-Family Residential
- Two-Family Residential
- Water Body
- Road
- Railroad
- Town Boundary



Assisted By: Nick Chamberlain  
Caroline County Planning and Codes  
Sources: ESRGC, MD DNR