THE WATER QUALITY PROTECTION PLAN

Adopted By The Chesterfield County Board of Supervisors November 13, 2002

Prepared By The Chesterfield County Office of Water Quality and The Chesterfield County Planning Department

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Introduction

The purpose of this plan is to establish a series of goals, policies and implementation strategies that will promote water quality protection throughout Chesterfield County and help the County meet the planning requirements of the Chesapeake Bay Preservation Act. The Act, adopted by the Virginia General Assembly in 1988, requires localities to employ criteria to ensure that the use and development of land shall be accomplished in a manner that protects the quality of state waters. The regulations adopted in support of the Act state that the water quality components of the comprehensive plan should "consist of the following basic elements: (i) summary of data collection and analysis; (ii) a policy discussion; (iii) a land use plan map; (iv) implementing measures, including specific objectives and a time frame for accomplishment." The purpose of these measures is to ensure that the use and development of land shall be accomplished in a manner that protects the quality of state waters. This water quality protection plan provides a framework for the incorporation of water quality issues in land use decision-making.

The protection of the county's water resources is a complex process that involves not only guiding future growth, but also controlling pollution from existing residential, commercial, industrial, agricultural and forestry uses. Effective water quality planning can provide for the preservation of valuable water resources for the current and future citizens of Chesterfield County.

Chesterfield County's Waters

Surface Waters

Chesterfield County is fortunate to have an abundant complex of waters, including 124 miles of riverfront along the James and Appomattox Rivers and 1,342 miles of streams. Additionally, there are 4,870 acres of surface water in the Swift Creek, Falling Creek and Lake Chesdin Reservoirs. There are also many tidal and non-tidal wetlands either connected to other water resources or that are isolated.

There are roughly 10,000 parcels in Chesterfield that are adjacent to these waters. Citizens become concerned when any of these water bodies become either physically or chemically impaired as evidenced by numerous inquiries to county staff. Concerns related to water quality problems are not confined to any one area of the County. Problems such as algae blooms in lakes, sediment plumes in streams, fish kills and loss of property have been reported.

Drinking Water

Chesterfield County is fortunate because it enjoys an abundant water supply from three sources. The three sources that supply the County's potable water are the Swift Creek Reservoir, Lake Chesdin, and the James River. The Department of Utilities owns and operates a water treatment plant at Swift Creek Reservoir, which has a capacity of 11.5 million gallons a day (MGD). The county is one of five members of the Appomattox River Water Authority (AWRA). The AWRA is located on the northern side of Lake Chesdin. The county has a daily allocation of 24.54 MGD from the authority. The third water source is the James River, which supplies the treatment facility owned and operated by the City of Richmond. This plant supplies water to the City of Richmond and to the counties of Henrico, Goochland, Hanover, and Chesterfield. The county's contract with the city assures an available supply of 27 MGD.

The County should have sufficient water supply through 2014, based on these available supplies.

Additional treatment capacity should be available from the Appomattox River Water Authority and/or the City of Richmond at that point in time.

As identified in the County's Public Facilities Plan, "system expansion over the planning period includes new pumping stations, storage tanks, water mains, and pressure zone/service area improvements. If growth occurs as projected, approximately 96 miles of 12 through 36 inch diameter water mains will be added to the County's system by 2015."

Groundwater - There are a variety of uses and activities that can potentially enter groundwater and migrate to surface water resources such as reservoirs and streams. Some of these uses include failing septic systems, landfills, superfund sites, industries that improperly store and or dispose of hazardous materials, and leaking underground storage tanks. Such activities pose a threat not only to groundwater resources, but to surface waters as well.

Sources of Surface Water Quality Degradation

Most water quality pollution comes from either "point" or "nonpoint" sources. While pollution from point sources (effluent from an industrial facility pipe) is more easily identifiable, nonpoint source pollution is a greater threat than once understood. Non-point source pollution occurs when pollutants, which accumulate on the land during dry weather, are carried to water bodies by storm water runoff during a rain event. The major components of nonpoint pollution are sediment, fertilizers, pesticides, heavy metals and bacteria.

There are three categories of water quality degradation: chemical, physical, and biological. All categories of degradation, if unchecked, have an effect on the quality of life for Chesterfield's citizens. Of equal importance, water quality degradation in streams severely limits the use of these waters by citizens. Activities such as fishing and swimming, for example, would have to cease in waters impaired due to high levels of bacteria.

Chemical - Storm water runoff from roads and other paved surfaces washes pollutants, such as motor oil, pesticides, toxic substances animal waste, pathogens, and soils from construction sites into nearby waters. These pollutants, in high enough concentrations, can adversely affect aquatic organisms and fish in the water body.

Physical - Impervious surfaces also cause water to flow in greater volumes and with increased speed into the storm water drainage system or streams. The increased flows cause a stream to adjust its shape, widening or down cutting the stream bed, eroding stream banks and degrading habitat for animals and plants. Studies have shown that there is a direct link between increased amount of storm water flows and stream degradation.

Biological - Sediment from construction sites, chemical such as chlorine and other toxic substances will result in adverse impact on aquatic organisms and fish. Further, changes in the physical features of a stream or river will also impact stream life.

Land Uses and Other Activities Affecting Water Quality

Existing Residential, Commercial, Governmental and Industrial Land Uses - Such uses typically result in the wash off of fertilizers, pesticides, metals (from vehicles), oil, grease and bacteria (from animal waste) into waters.

Construction Sites - Clearing and construction practices, if inadequately controlled, can result in the release of sediment and discolored water into a nearby water body. If sediment and erosion controls are inadequate or not properly maintained, excess amounts of sediment can be washed into adjacent water bodies. Construction can also fundamentally change natural hydrology often resulting in increased stream water flows, and greater potential for flash flood flows. Such hydrologic change can induce streambed and bank erosion and other adverse physical changes within the stream channel. These changes to in-stream processes can increase sediment yield years beyond the initiating activity.

Agriculture - Agricultural uses typically generate nutrients from fertilization. For those farms that maintain livestock, bacteria and

pathogens from animal waste can adversely affect nearby waters. Further, if sediment and erosion controls are inadequate, excess amounts of sediments and nutrients can be washed into adjacent water bodies. It is to be noted that for agricultural uses, compliance with erosion & sediment control measures is voluntary. Agricultural practices such as row cropping and removal of natural streamside vegetation can also fundamentally change natural hydrology, often resulting in increased stream water flows, and greater potential for flash flows. Such hydrologic change can induce streambed and bank erosion and other adverse physical changes within the stream channel. These changes to in-stream processes can increase sediment yield years beyond the initiating activity.

Silviculture - Logging activities that do not use adequate best management practice controls can affect adjacent water bodies in two ways. First, excess amounts of sediment can be washed into the stream. Second, increased flows can be generated as a result of the removal of vegetation, which in turn, can result in adverse physical changes to the stream or other water body.

Discharges or Illicit Connections - Illicit discharges or connections typically are found in areas of existing development, primarily in commercial areas and are intermittent in nature. In most instances the discharges are petroleum products or detergents.

Landfills – There are currently no municipal solid waste landfills being operated by Chesterfield County. There are, however, several privately operated landfills and several older, closed municipal landfills. Landfills present a potential threat to water quality through the generation of liquid waste or "leachate" seeping from the landfill to adjacent waters. Landfill leachate can contain a number of pollutants that adversely affect the quality of water. Both existing and new landfills must conform to the Department of Environmental Quality's comprehensive regulations pertaining to the operation and closure of landfills. These regulations require measures to reduce, if not eliminate, potential impacts from landfills on water supplies. These regulations do not, however, fully address potential impacts on surface water resources.

Hazardous Waste Handling & Storage Facilities – There are numerous categories of industrial, commercial and public facilities that handle, store or transfer hazardous materials within Chesterfield County. Such facilities can sometimes prove a threat to Chesterfield's waters through direct, or "point" discharges to waters, through accidental releases, or by the hazardous materials coming into contact with storm water runoff. Industries falling within this category are generally concentrated along the eastern portion of the Interstate Route 95 corridor. Many such facilities have Virginia Pollutant Discharge Elimination System (VPDES) permits that are issued and monitored by the Department of Environmental Quality. These facilities are also monitored as part of the County's NPDES Storm water Management Program.

Roads - Roads can also be a source of water pollution in that the materials that accumulate on them during dry weather such as sediment; metals and petroleum products wash off into nearby waters.

Septic Systems – Septic systems have the potential to impact both surface water resources as well as drinking water resources, particularly in the rural portions of the County where homeowners rely upon private wells for potable water. The Health Department, however, has a well-established process for the regulation of septic systems as well as private wells. This process ensures that septic systems are located in such a manner as to minimize, if not eliminate, any potential impacts upon private wells. The same process also ensures that septic systems are located outside of Resource Protection Areas that are adjacent to constantly flowing streams, wetlands and lakes. Septic systems are permitted only in lower density areas. The County Code requires a minimum of a forty thousand square foot lot for parcels with septic systems. The requirement is to allow for a reserve drain field. As a result of this provision, The Plan for Chesterfield, including the Public Facilities Plan, requires the extension of county sewer and water facilities wherever higher density residential growth is planned or anticipated. For example, the Southern and Western Area establishes a "Deferred Development Area," where intensive growth is not planned for at least twenty years into the future. Accordingly, the public facilities component of that Plan does not call for the

extension of water and sewer lines in that area. The County's overall policy with regard to on-site septic systems, as expressed in the Public Facilities Plan and the Introduction to the Plan for Chesterfield, is to establish public water and sewer into targeted growth areas. Areas that are designated for large lot (one-acre or more) residential or rural uses do not require public water and sewer.

Golf Courses – Golf courses have historically been a source of surface water quality problems when excess amounts of nutrients, pesticides and herbicides are applied to tees and greens and wash off into adjacent water bodies. Impacts to streams include algae blooms and low oxygen levels. In severe instances, fish kills can occur resulting from low oxygen levels. In recent years, golf course developers have worked cooperatively with County staff to minimize these impacts. In some instances, the developers have agreed to conduct stream sampling in order to establish the specific impact of golf course on area waters. Currently, however, there are no state or local regulations controlling this source of pollution.

Underground Storage Tanks – Underground storage tanks (USTs) have the potential to adversely affect groundwater resources through leaks and accidental spills. Surface waters can also become affected as pollutants migrate through groundwater aquifers to adjacent water bodies. Although USTs are potentially a significant source of water quality problems, the Department of Environmental Quality oversees a comprehensive program to reduce their impact on waters of the State. This program, which was initiated in Virginia in 1987, requires all USTs to maintain leak detection devices, have corrosion protection, and have spill prevention measures in place. As with hazardous waste storage and handling facilities, USTs are also generally concentrated along the Interstate Route 95 and Jefferson Davis Turnpike corridors.

Stream Bank and Shoreline Erosion – Both stream bank erosion along the County's streams and shoreline erosion along riverfront areas can adversely affect water resources in two ways. First, severe erosion can result in the loss of property, the undermining of trees and other vegetation, and, in serious cases result in the loss of homes and appurtenant structures. Second, the erosion becomes a source of sediment deposition in lakes, rivers and streams. In certain stream segments, stream bank erosion is the greatest source of the stream's impairment.

This has become a serious problem in Chesterfield County's older developed areas where the highly impervious land uses have generated water flows that exceed the capacity of the stream, which has resulted stream bank erosion, sediment deltas and other problems.

Summary of Data Collection and Analysis

Land Features that Present Physical Constraints to Development

There are several types of physical land features that can potentially prove a constraint to development. These features can either result in problems for the proposed development or for adjacent properties. The features that can present such concerns include: floodplains, Chesapeake Bay Preservation Areas, steep slopes adjacent to water bodies, wetlands, highly erodible soils, and shrink swell soils. Below is a discussion of these features.

Floodplains

Floodplains are lands that border rivers, streams and other water bodies. They are normally dry but can be covered with water for varying periods of time during and after storms. Continued flooding can damage structures that are placed within floodplains and can block water flow and increase the width, depth or velocity of floodwaters. In light of this fact, Chesterfield County adopted a Floodplain Ordinance in 1983, which establishes limitations for certain activities in floodplains. Residential structures are required to be set back twenty-five feet from the floodplain. Fill and grading in these areas can result in flooding problems on neighboring properties. Man-made changes to the floodplain have also been found to result in significant changes to the adjacent stream or river by causing it to become wider or deeper. Floodplains that are left in their natural state benefit water quality by providing a buffer between adjacent land uses and the nearby waters.

Chesapeake Bay Preservation Areas

a. Resource Protection Areas

Resource Protection Areas, as defined by the Chesapeake Bay Preservation Act regulations include sensitive environmental features such as streams and rivers bodies that flow all the time, non-tidal wetlands adjacent to or near streams, tidal wetlands, tidal shores, and a 100-foot naturally vegetated buffer landward of these features. There are 469 miles of perennial streams throughout the County that have designated Resource Protection Areas adjacent to them.

The RPAs serve an important water quality function by providing a buffer adjacent to the county water bodies. The natural process occurring in the RPA include:

- Filtration of sediments;
- Plant “up-take” of nutrients;
- Stabilization of slopes by root material;
- Reduction of the erosional force of rain by the tree canopy; and
- Transformation of nitrogen and toxic substances through biodegradation.

Given the important function of RPAs, only water dependent uses and redevelopment are permitted to take place in these areas.

b. Resource Management Areas

The second "protection" area is a Resource Management Area or RMA. RMAs include 100-year floodplains, highly erodible and highly permeable soils, and steep slopes. All but fifteen to twenty per cent of the County contains highly erodible and highly permeable soils. Highly erodible soils are a concern for surface waters in that disturbance of these soils can lead into erosion, and the generation of sediment to adjacent water bodies. It is critical to manage growth in such areas through both the proactive implementation of the Erosion & Sediment Control and Floodplain Ordinances. Permeable soils can be a concern to groundwater and surface waters if septic systems are permitted in areas containing such soils. The Health Department’s permitting process for septic systems takes such issues into account. . This process ensures the location of on-site septic systems in a manner that reduces the impact on ground and surface waters to the maximum extent practicable. Given that most lands throughout County contain some of these features, the entire County (outside of Resource Protection Areas) has been designated as a Resource Management Area. Development in RMAs typically reduce pollutants in storm water runoff by a variety of means such as reducing impervious area, reducing the overall project density or installing retention or detention basins. Such basins are commonly known as Best Management Practice (BMP) facilities. Proposed development has the option of requesting to be “opted” out of the Resource Management Area requirements only after it has been demonstrated that RMA features do not exist. In most instances where the County permits new development to opt out, that opt-out only covers part of the project site. The Environmental Engineering Department has a formal opt-out process requiring the submission of detailed information by a “qualified expert.” That information is reviewed by engineering staff and the County Soil Scientist for accuracy.

Steep Slopes

Steep slopes present constraints to development in general in that where slopes are sever; a greater amount of land disturbance is needed in order to permit the construction of roads and structures. Te greater the amount of land disturbance, the more difficult it becomes to adequately control the amount of sediment that is generated and prevent the material from entering adjacent to water bodies. This is particularly true if the steep slopes are closer to the water body.

Soils

Certain types of soils can present constraints to development in several ways. For example, in areas that are not served by sewer it is important to ensure that the soils are adequate for the installation of septic systems. In areas where the soils have high shrink swell potential, measures are necessary to ensure that the foundations of structure will not be compromised. In addition, highly erodible soils on steep slopes can lead to sediment entering adjacent water bodies.

Wetlands

Wetlands present constraints to development given their importance as an environmental resource and their contribution to the protection of the quality of other water resources such as streams, rivers and lakes. Wetlands benefit water quality by acting as filters in trapping and holding nutrients and other pollutants contained in storm water runoff. Wetlands also act as a sponge by slowing down fast moving and erosive storm water and act as a buffer against wave action. Finally, wetlands serve as a source of groundwater recharge.

Infill Development Areas

Chesterfield County does not have any areas formally designated as "Intensely Developed Areas," as defined by the Chesapeake Bay Preservation Area Designation and Management Regulations. The "Chesterfield County Development Strategy" map, found on page ii of the *Plan For Chesterfield* Introduction, identifies infill areas, planned growth areas and deferred growth areas. The area denoted as "Infill Areas" have been so designated because they represent the older parts of the county and are mostly built out. The older areas of Chesterfield County present a number of opportunities for water quality improvement. The Nationwide Urban Runoff Program study conducted by the Environmental Protection Agency in the 1980's revealed that in older, more urbanized areas, the generation of pollutants such as petroleum products, fecal coliform and certain metals increases. Similar findings have also been made in the older parts of Chesterfield County. The State Department of Environmental Quality revealed that streams and other waterways are impaired due to high levels of fecal coliform bacteria, dissolved oxygen and nutrients. Many of these problems can be partially addressed by implementing a proactive and long-term educational program.

For development projects on infill parcels and for sites proposed for redevelopment, the County's current Chesapeake Bay Preservation requirements new development and for redevelopment will continue to be applied. For existing commercial, industrial and residential uses, existing educational efforts should be enhanced.

Shoreline Structures

Unlike many other localities that are conforming to the requirements of the Chesapeake Bay Preservation Act, Chesterfield County does not have a significant amount of shoreline structures such as boats ramps, docks, piers and marinas. Since 1980, the Virginia Marine Resource Council (VMRC) has approved 68 such facilities along the James and Appomattox Rivers. These facilities are concentrated in subdivisions located along the two riverfront areas. Potential impact on water resources related to these structures is addressed through a comprehensive permitting process that is currently in place and implemented by several environmental agencies. The VMRC, U.S. Corps of Engineers and the State Department of Environmental Quality regulate shoreline structures as a means of minimizing their impact on environmental resources such as wetlands, sub aquatic vegetation and water quality. In addition, along Lake Chesdin, which is part of the Appomattox River, the Appomattox River Water Authority (ARWA) has a permitting process for shoreline structures as well as guidelines for the management of shoreline buffer area. The ARWA coordinates this approval process with Chesterfield County. In this way, the County is able to monitor and have input into the permitting of shoreline structures along the Appomattox River. County jurisdiction along the James River lies with Henrico rather than Chesterfield County, since river ownership lies with Henrico along the James.

Marinas

Marinas can have potential impacts on water quality if there is overnight or long-term mooring of boats, which would require sewage pump-out facilities. There are three marinas located within Chesterfield County. One is a small marina located on Swift Creek Reservoir that is only for pontoon boats that do not have toilets. Of the remaining two marinas in the County, one is located on the Appomattox River, while the other is on the James. For both of those marinas, there is no overnight or long-term mooring where boats would require a pump out facility.

Existing Water Quality Protection Efforts

Beginning in 1974, with the adoption of the Erosion and Sediment Control Ordinance, Chesterfield County began implementing of several ordinances aimed at controlling the quality and quantity of storm water runoff. This effort has evolved into a comprehensive storm water management program. The major components of the program include:

- A review process to ensure that new development and redevelopment does not result in the increase of pollutants to area water bodies. The Chesapeake Bay Preservation Act requires this review.
- The enforcement of Resource Protection Area limitations, as required by the Chesapeake Bay Preservation Ordinance.
- Implementation of the Floodplain Management Ordinance.
- The enforcement of Erosion & Sediment Control measures.
- A program requiring the maintenance of retention and detention basins that are constructed to reduce pollutants and control storm water flows.
- The implementation of the Swift Creek Reservoir Watershed Management Plan & Maintenance Program.
- Stream Restoration

In addition to the above efforts, the County began implementing a comprehensive monitoring and management program to reduce pollutants in storm water runoff to the "maximum extent practicable." This program known as the National Pollutant Discharge Elimination System (NPDES) Program is a requirement of the Federal Clean Water Act and entails the following:

- Comprehensive sampling of streams and storm water discharges throughout Chesterfield County.

- Mapping of sub watersheds and identifying sources of pollution within those watersheds.

- The implementation of management strategies to reduce or eliminate identified sources of water quality problems.

- Identify areas where stream bank and shoreline erosion is taking place and develop strategies such as stream restoration to address those problems.

The management strategies are modified based on information gained from the stream and storm water sampling.

Water Quality Protection Goals and Policies

While the existing efforts described above help to reduce pollutants in storm water runoff, it is important to ensure that future growth in the county in undertaken in a manner that is consistent with good water quality.

The following recommended goals and policies provide a framework for implementing improved water quality protection strategies in Chesterfield County. These goals are statements of general direction and reflect fundamental factors and considerations that are intended to guide future land use decisions.

Goal 1 - Maintain or improve the Chemical, Physical, and Biological Integrity Chesterfield County's Waters

Goal 2 - Manage future growth within the County in a manner that protects streams, rivers, reservoirs and other water resources.

Goal 3 - Develop strategies to address water quality degradation resulting from existing and infill development.

Goal 4 - Minimize nonpoint water pollution created by agricultural and silvicultural activities.

Related Policies

Related policies identify courses of action that can be followed in reaching stated goals. These individual policies may be applicable to more than one goal.

Policy 1

Control the amount of sediment, nutrients and other pollutants entering the county waters from new and existing development.

Recommendations:

- Partner with the development community to create opportunities that permit the use of Low Impact Design techniques.

- Establish measures that would limit the amount of land cleared, grubbed and graded on large construction sites at any given time. Such measures would reduce the amount of sediment exposed to storm water runoff.

- Promote the use of alternative BMPs.

- Promote the retrofitting of existing Best Management Practice facilities in older portions of the County where development took place prior to the implementation of the Chesapeake Bay Preservation Ordinance. The County should undertake this effort. Such facilities should address both water quality and water quantity issues where site conditions permit.

- Continue to follow the County's existing comprehensive storm water management program as required in conjunction with the Federal Clean Water Act, including continued implementation of the Chesapeake Bay Preservation; Floodplain Management; and Erosion & Sediment Control Ordinances.

- Continue the program for the maintenance of best management practice facilities to minimize pollutants from residential and non-residential development.

- Increase County public education efforts in newly developed areas as well as older developed areas on water quality issues. Specific steps should include increased funding for the development and distribution of "Water Quality Watch Fact Sheets" and other information to county residents, and commercial and industrial facilities. The education program should focus on informing citizens and businesses of daily practices that adversely affect area waters such as improper use of fertilizers, car washing and the improper disposal of petroleum products and other pollutants.

- Amend the Code of Chesterfield County to require pollution prevention measures for new commercial and industrial uses within certain designated standard industrial codes that have the potential to release pollutants to County waters. This effort should be limited to those facilities that are not already required to implement such measures by the Department of Environmental Quality. Conduct educational and outreach efforts to encourage existing industrial facilities to utilize pollution prevention measures.

- Amend the Chesapeake Bay Preservation Ordinance to require measures to reduce pollutants from new golf courses. Measures such as the implementation of nutrient and pest management plans and channeling storm water to best management practice basins have traditionally been incorporated as zoning conditions for proposed land uses that include golf courses. It is recommended that these measures be incorporated into the Chesapeake Bay Preservation Ordinance, so that they will be consistently applied.

- Continue to implement Watershed Management Plan & Maintenance Program for the Swift Creek Reservoir Watershed. Continue to monitor the water quality of Swift Creek Reservoir and determine if modifications to the Plan are necessary.

- Implement Watershed Management Strategies and stream and shoreline restoration projects that are identified through the comprehensive stream and storm water monitoring program.

Conduct stream restoration on a priority basis, focusing on streams in the Falling Creek Reservoir watershed first. For stream bank stabilization projects, conduct physical assessments of the streams to determine the most appropriate type of restoration.

- Monitor the existing environmental permitting process for shoreline structures such as docks, piers, bulkhead structures and marinas to ensure that shoreline environmental features such as wetlands and sub aquatic vegetation are receiving adequate protection.

While structural Best Management Practice (BMP) facilities, which have been used in the county for the past decade, are a test means of removing pollutants from development, it is only one among several control measures available. Traditional BMPs such as retention and detention basins result in negative impacts on other environmental resources, including wetlands and streams. Using alternative BMPs that avoid such impacts, where the site conditions allow, should be encouraged.

Another equally important measure is controlling pollutants at the sources by promoting clustered development and natural area preservation. These measures, combined with structural or non-structural BMPs will ensure a greater chance of success in reducing pollutants to area waters without having collateral impacts on other resources such as wetlands.

Continued pro-active maintenance of BMP facilities is necessary to ensure that the facilities will continue providing adequate pollutant removal over the long term. It is also necessary to monitor them on an intermittent basis to determine how well they are performing their pollutant removal function.

Continuous public education efforts will promote improved pollution prevention at the sources for residential and commercial areas alike. Education will be particularly important for older areas within the County.

Policy 2

Guide future growth into areas more physically suited for development in order to minimize or avoid impacts on environmentally sensitive areas.

Recommendations:

- Include and environmental resource map in the Plan for Chesterfield to identify the location of water and other natural resources in the County that should be protected.

- Establish a policy whereby environmental constraints are considered as part of the technical analysis conducted prior to the development of new or revisions to existing Area Plans of the Plan for Chesterfield.

In order to guide growth into areas physically suited for development, a comprehensive map identifying areas that are not suited for development is necessary. The constraints that should be included on this map include the following:

1. Streams, rivers and reservoirs
2. Resource Protection Areas
3. Floodplains
4. Steep slopes
5. Hydric soils

Since the County does not have wetland areas mapped, a layer in GIS has been developed that shows the location of “hydric” soils. These types of soils are one of the indicators of the presence of wetlands. County staff has found hydric soils to be a more reliable indicator for the presence of wetlands than the National Wetland Inventory maps. Accordingly, a map denoting hydric soils throughout the County is included in this document. This map, along with four other physical constraints maps, will be used to guide future growth into areas that are the most suitable for development.

Policy 3

Develop a program to promote the preservation of naturally vegetated riparian corridors.

Recommendations:

- Partner with the development community to seek opportunities for the establishment of conservation

easements in development projects adjacent to water bodies, including rivers, streams, lakes, and wetlands.

- Where practicable, use the zoning process to require the preservation of vegetated buffers adjacent to water bodies for new development projects. Also, review existing County ordinances to determine if it is feasible to incorporate amendments to require the preservation of naturally vegetated buffers adjacent to intermittent streams.

- Seek opportunities to establish a linkage between the preservation of riparian corridors and the establishment of future "greenway" corridors by the Chesterfield County Parks Department.

- Inventory streams within the County to determine where stream restoration efforts should be maximized.

- Proactively conduct public education and outreach efforts to educate citizens and the business community about the important role of riparian corridors in water quality protection.

- In conjunction with the technical analysis performed prior to the development of or revisions to Area Plans, conduct inventories of shoreline access points and structures such as docks, piers, boat ramps and marinas. Assess such facilities to determine their impact on water quality and any existing problems resulting from erosion and sewage disposal.

- Seek funding opportunities to acquire important, environmentally sensitive open space areas.

The County is fortunate to have roughly 1300 miles of streams and 124 miles of riverfront within its borders. Of the 1300 miles of streams, however, only 469 miles are protected with Resource Protection Area buffers. The remaining 873 miles of intermittent stream have limited protection through the County's Floodplain Management Ordinance. Should all of the intermittent streams become impaired, the perennial streams will also be affected. It is important, therefore, to adopt measures to protect intermittent streams as well as those that constantly flow.

Although there are a number of existing ordinances that help to reduce pollutants from development activities, there has never been a formal county program to set aside or acquire environmentally sensitive lands. Not only will such areas be protected for the long term, but they can also provide opportunities for public education.

There are currently many streams within the County's borders that are in need of varying levels of restoration and/or stabilization. Many of these streams are within the older, developed parts of the County. The development of a prioritized listing of stream sites with the greatest need of restoration will ensure that the most degraded stream segments are addressed first.

The Virginia Marine Resource Commission, the Corps of Engineers, and the Department of Environmental Quality currently regulate the construction of shoreline structures such as docks, piers, marinas, and boat ramps. It is important, however, to assess any potential impact of such facilities in shoreline areas such as the Appomattox and James Rivers, and establish measures to address any identified problems in conjunction with the development of Area Plans.

Policy 4

Develop a program to reduce sediment and nutrient from agricultural and silvicultural uses entering County waters.

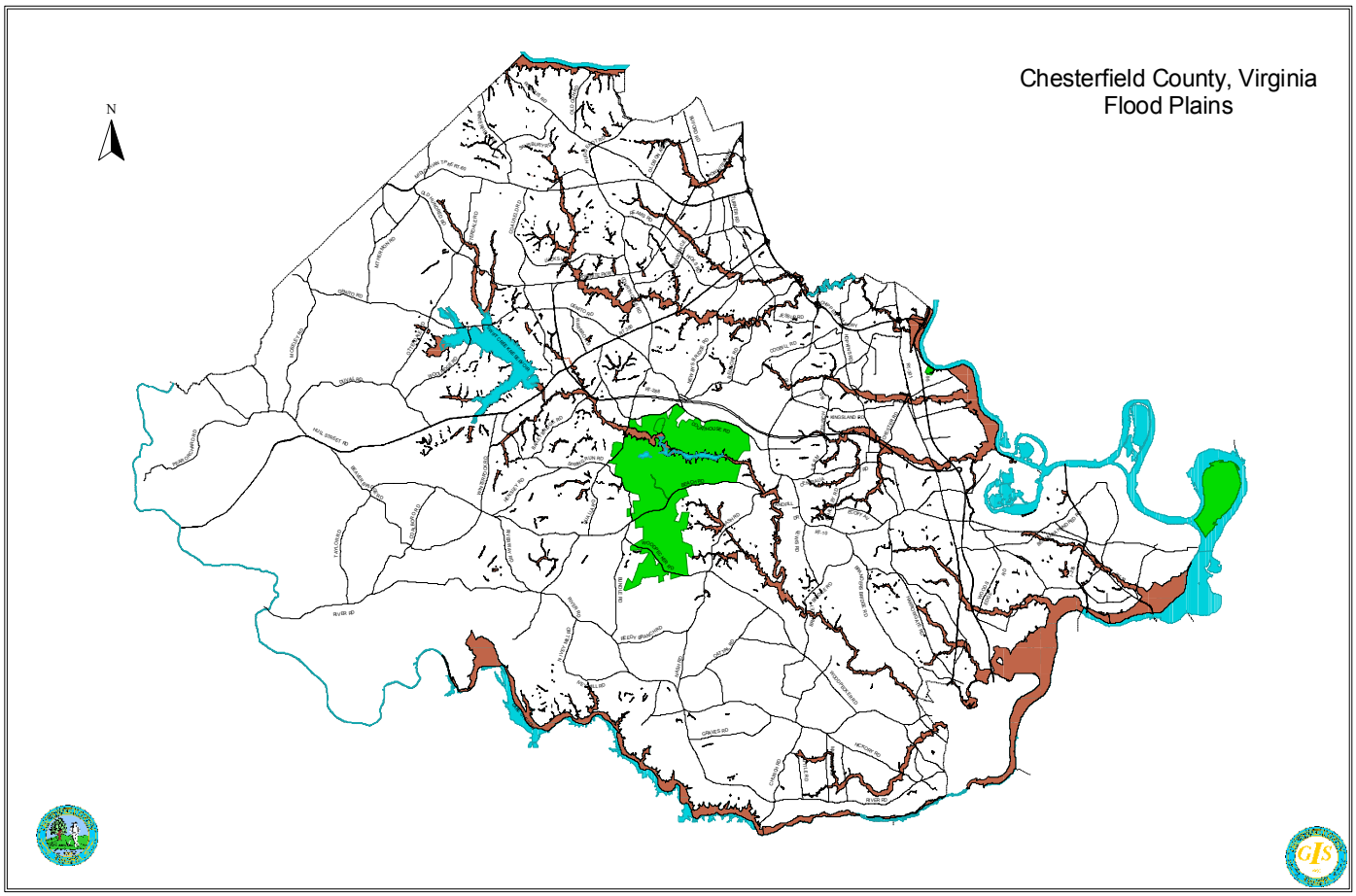
Recommendations:

- Partner with the Department of Forestry and the Soil & Water Conservation District to educate owners of lands in agricultural or silvicultural use on measures to reduce pollutants from those uses.

- Partner with the Soil & Water Conservation District to promote the use by farmers of the Conservation Reserve Program.

Both the Department of Forestry and the Soil & Water Conservation District maintain proactive

programs, working with farmers and the forestry communities to reduce pollutants resulting from those uses. The County has an opportunity to augment these existing programs by developing educational activities aimed at farming and forestry activities and by encouraging the farming community to take part in Conservation Reserve Program.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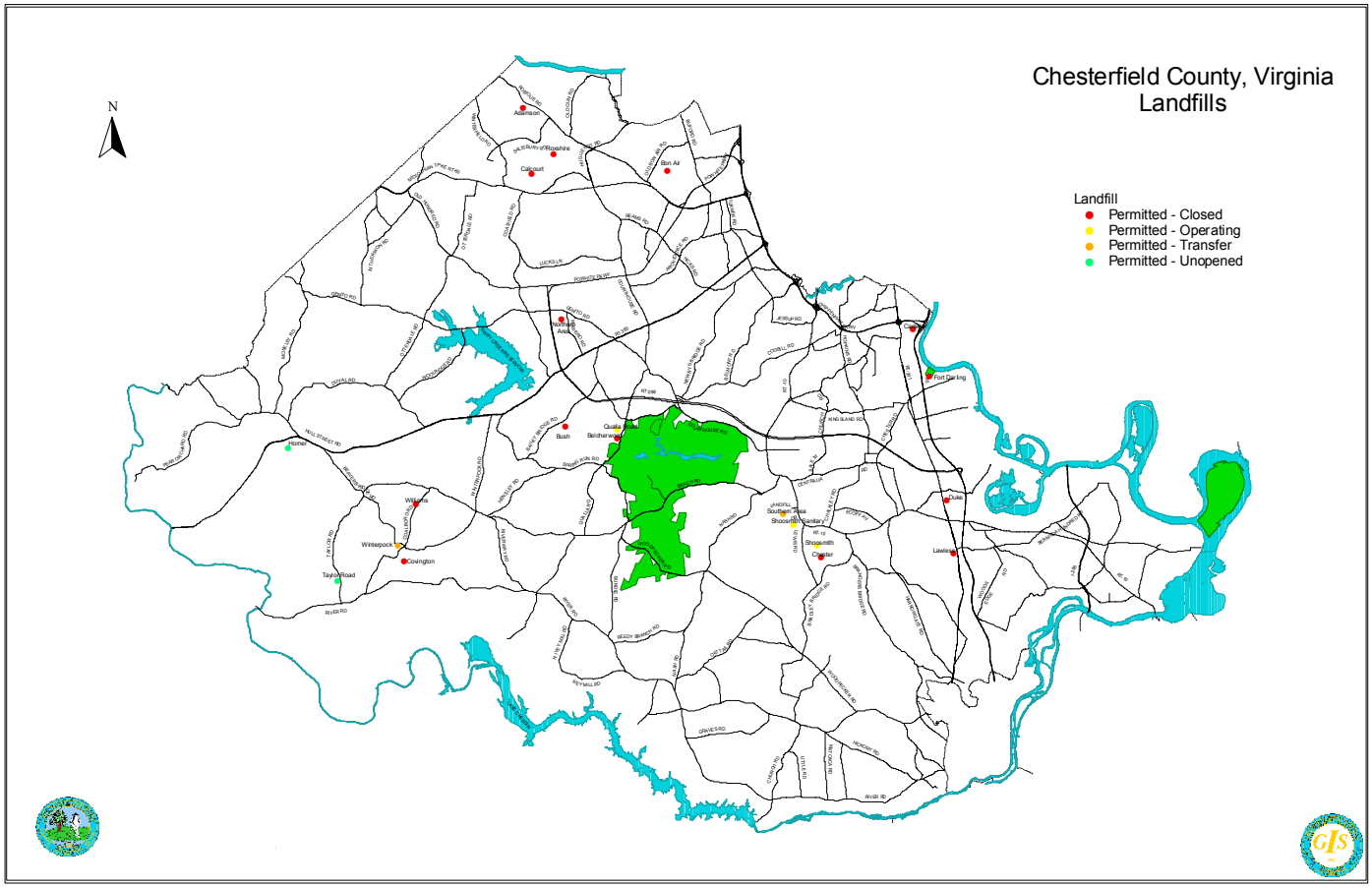
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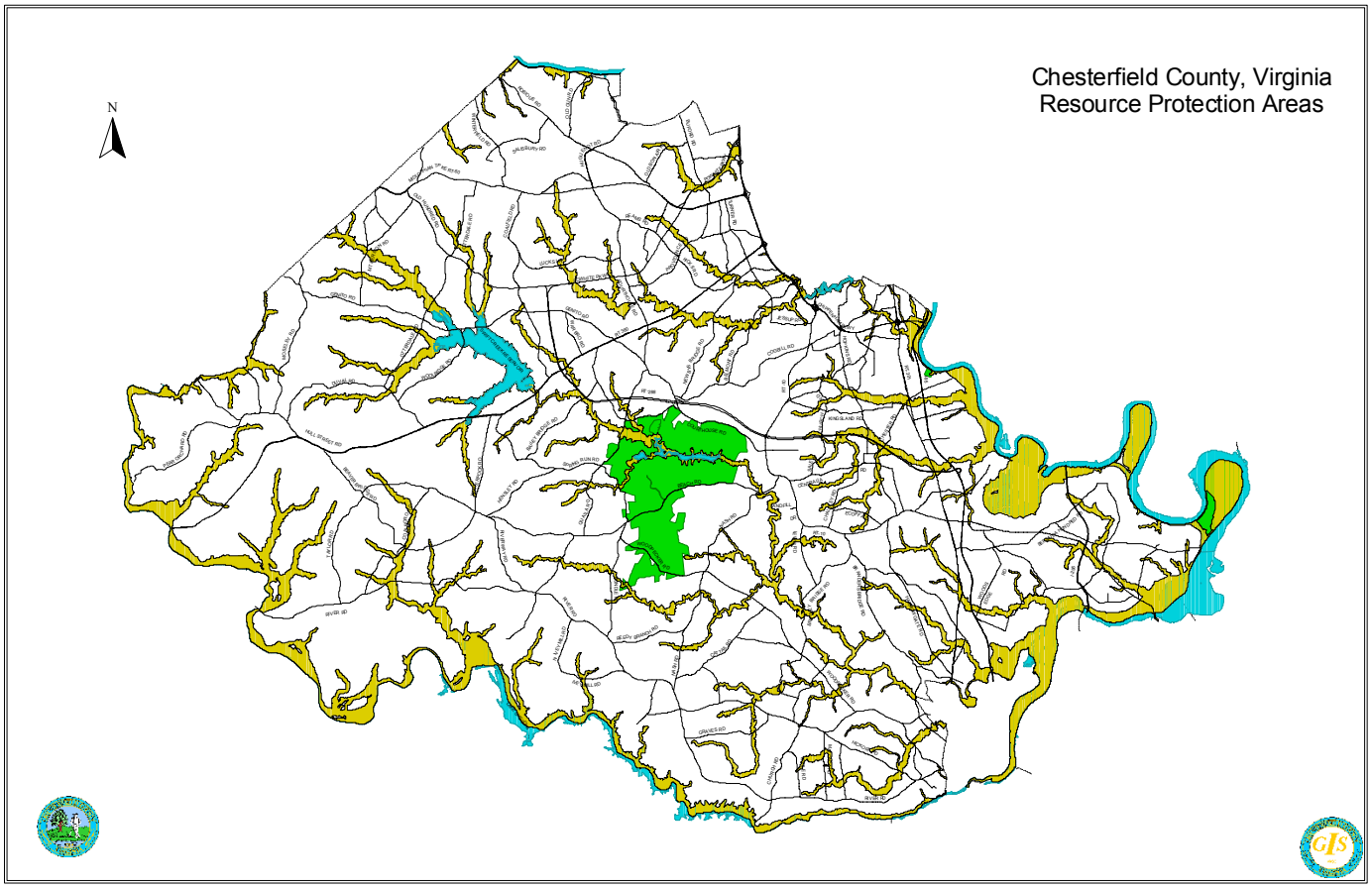
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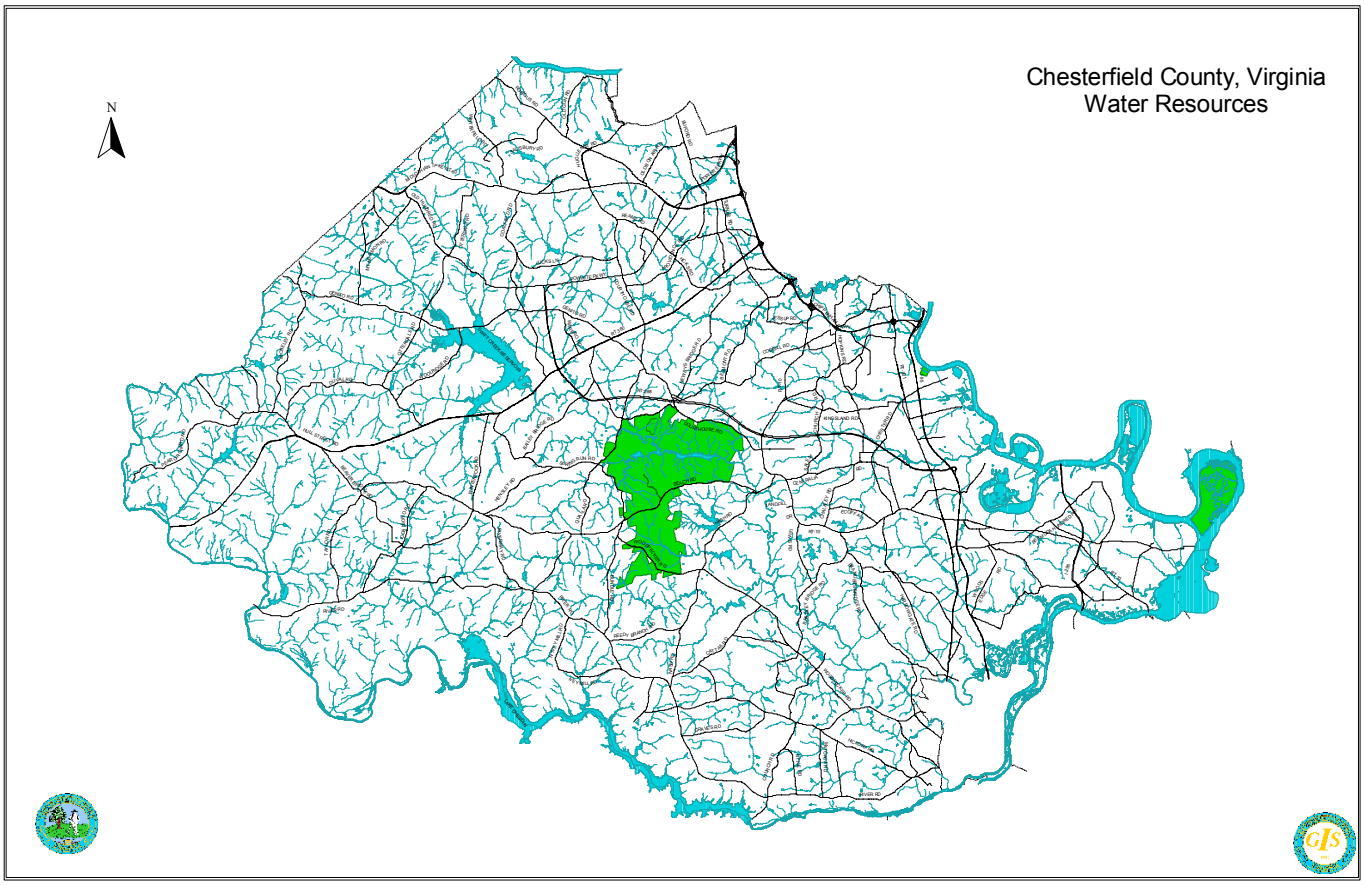
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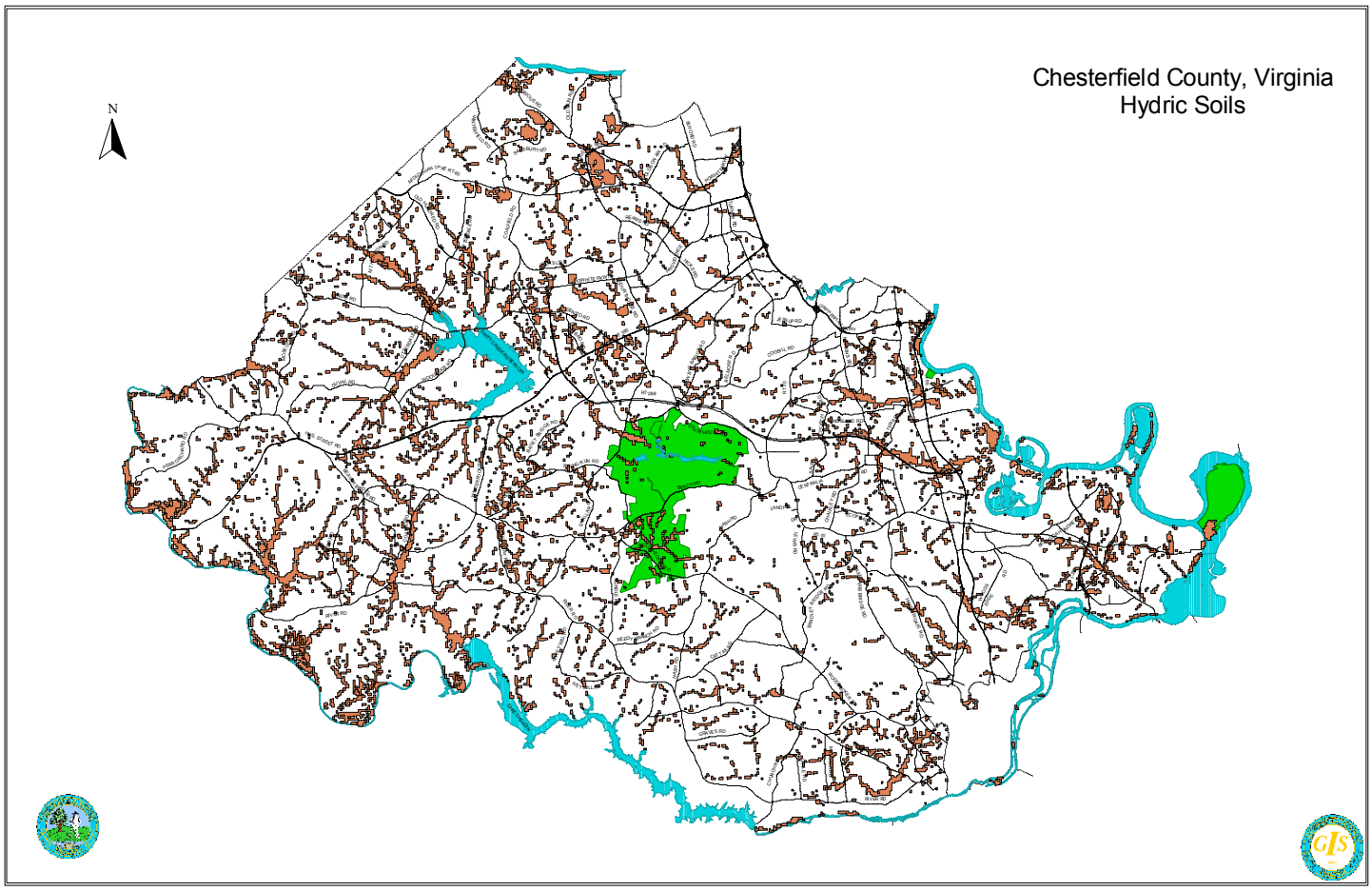
Chesterfield County, Virginia
Hydric Soils
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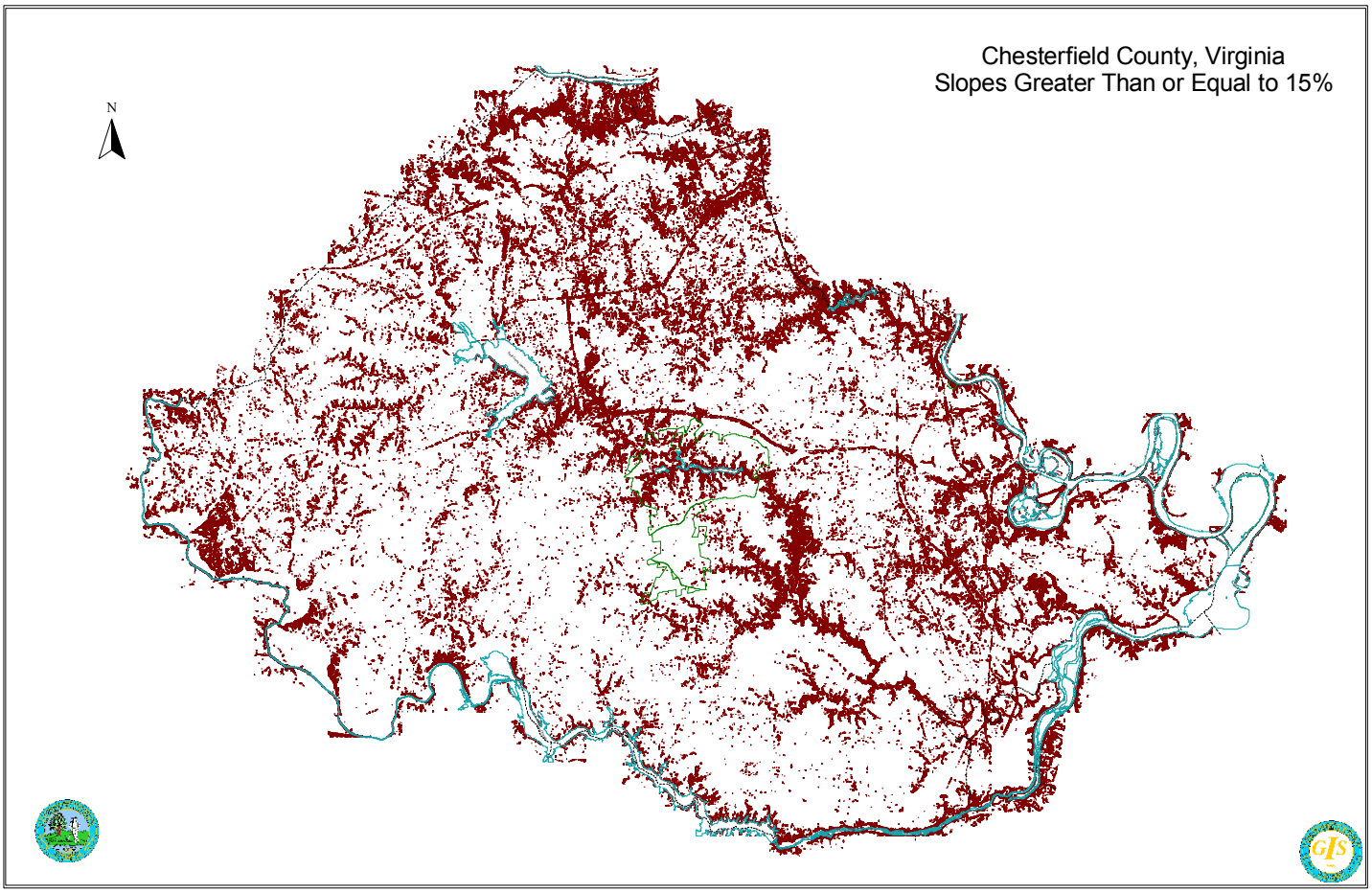
Chesterfield County, Virginia
Slopes Greater Than or Equal to 15%
N