Report to the Board of County Commissioners of Cecil County

Recommended Strategies for Cecil County relative to Maryland's Chesapeake Bay Tributary Strategy Statewide Implementation Plan

Presented by the
Cecil County Implementation Plan Committee

March 20, 2007

1. INTRODUCTION

The Board of County Commissioners of Cecil County appointed the Cecil County Implementation Plan Committee for Tributary Strategies at its June 6, 2006 public meeting. The purpose of this report is to brief the Commissioners on the implications of the statewide implementation plan for tributary strategies and outline recommended means to implement those strategies within Cecil County in a manner that supports the Comprehensive Plan goals of encouraging development activity within the designated growth area.

2. CECIL COUNTY IMPLEMENTATION PLAN COMMITTEE

The Committee consists of the following members.

- Dan Schneckenburger – Past President of Cecil County Chamber of Commerce, Member of the Cecil County Water and Wastewater Task Force (2005), Member of the Cecil County Water and Wastewater Advisory Committee.
- Paul Raech – Cecil County farmer
- Bill Kilby – Cecil County dairy farmer, President of Cecil Land Trust, Chair of the Upper Western Shore Tributary Strategy Team
- David Dodge – Owner of Smart Growth Land Management Company, Member of Maryland Association of Engineers, Member of Cecil County Chamber of Commerce
- David Almquist – County Extension Director, Extension Agent for Agriculture and Natural Resources for the University of Maryland Cooperative Extension
- Van Funk – Sediment and Stormwater Program Manager for Cecil County Department of Public Works
- Al Wein – Cecil County Administrator
- Eric Sennstrom – Director of the Office of Planning and Zoning (Cecil County Government)
- Matt Carter – Capital Facilities Administrator (Cecil County Government)

George, Miles & Buhr (GMB) was retained by the Capital Facilities Administrator on a limited basis to assist with technical aspects of the Committee's work. GMB is represented by Brice Foxwell and Jim Dieter.

The Board of County Commissioners of Cecil County charged the Committee as follows: The Committee shall be charged with development of a draft County Implementation Plan that maximizes the County's ability to encourage development in the designated growth area within the challenges of the Governor's[1] Chesapeake Bay Cabinet (February 22, 2006 draft) Statewide

[1] The Bay Cabinet was established under Governor Robert L. Ehrlich, Jr.; it is unknown whether the Bay Cabinet will remain in its current form under Governor Martin O'Malley.

Implementation Plan. The draft plan should be submitted to the Board of County Commissioners of Cecil County no later than January 31, 2007.

3. BACKGROUND

The *Chesapeake 2000 Agreement* is the latest version of agreements that have evolved over time between the Bay watershed jurisdictions (six states[2] and the District of Columbia) and EPA. This agreement requires Bay-wide reduction of nutrients by half from 2000 levels; 110 million pounds of nitrogen and 6.3 million pounds of phosphorus. Failure to achieve these reductions by 2010 is expected to result in a Bay-wide TMDL (total maximum daily load; a legally binding determination, authorized by the Clean Water Act, of the maximum point and non-point source pollutant loads that are permitted in a given water body to maintain established water quality goals).

In Maryland, the Governor appointed his Bay Cabinet (the Secretaries of the Departments of Natural Resources, Environment, Planning, and Agriculture) to head the State's efforts to meet the goals of the *Agreement*. In April 2004, Maryland's Tributary Strategy was released, identifying the level of effort needed to meet the water goals of the *Agreement*. In February 2006, the Bay Cabinet issued the draft Statewide Implementation Plan, which identified a host of point and non-point strategies to achieve the established water quality goals. The draft Statewide Implementation Plan establishes dramatic nutrient caps on existing point sources (wastewater treatment plants) and a variety of non-point source Best Management Practices, for many of which there are substantial obstacles to implementation. As of the writing of this report, the Statewide Implementation Plan remains a draft.

The *Agreement* established Bay-wide nutrient caps (all six states and District of Columbia) of 175 million pounds of nitrogen and 12.8 million pounds of phosphorus per year. The draft Statewide Implementation Plan addresses Maryland's allocation of 37.5 million pounds of nitrogen and 2.92 million pounds of phosphorus.

Maryland's Tributary Strategy and the draft Statewide Implementation Plan distinguish between significant wastewater treatment plants (WWTP) and non-significant WWTPs at the design capacity of 500,000 gallons per day (gpd). The 66 significant WWTPs (sometimes called "majors"), according to MDE, comprise more than 95% of the total sewage flow generated in Maryland. In the draft Statewide Implementation Plan, significant WWTPs are nutrient capped on the basis of their planned capacity as of April 30, 2003 and a treatment level of 4.0

[2] Maryland, Virginia, Pennsylvania, New York, West Virginia, and Delaware.

mg/l total nitrogen and 0.3 mg/l total phosphorus[3]. In Cecil County, the significant WWTPs are as follows:

- Elkton WWTP. 3.05 million gallons per day (mgd) design capacity. Capped at 37,156 pounds per year total nitrogen and 2,787 pounds per year total phosphorus.
- Northeast River WWTP (aka Seneca Point). 2.0 mgd design capacity. Capped at 24,364 pounds per year total nitrogen and 1,827 pounds per year total phosphorus.
- Perryville WWTP. 1.65 mgd design capacity. Capped at 20,101 pounds per year total nitrogen and 1,508 pounds per year total phosphorus.

If each of these three plants were upgraded to achieve effluent limitations of 4.0 mg/l total nitrogen and 0.3 mg/l total phosphorus, they would not be permitted to expand beyond the design capacities shown above. However, if they were upgraded instead to 3.0 mg/l total nitrogen[4] and 0.3 mg/l total phosphorus, they would be able to expand to the following design capacities:

- Elkton WWTP. 4.07 mgd design capacity.
- Northeast River WWTP (aka Seneca Point). 2.67 mgd design capacity.
- Perryville WWTP. 2.20 mgd design capacity.

In each case, the strategy allows for a 25% increase in design capacity if the more stringent nitrogen removal standard is achieved. Beyond the capacities above, significant WWTPs are prohibited from expanding, except in instances where MDE has approved a point source to point source or non-point source to point source trade of nutrient reductions. Such a program has not yet been officially developed by MDE[5].

By contrast, the draft Statewide Implementation Plan caps non-significant WWTPs at their design capacity, 18 mg/l total nitrogen, and 3 mg/l total phosphorus. Expansions of non-significant WWTPs cannot exceed 6,100 pounds per year total nitrogen or 457 pounds per year total phosphorus; these equate to a 500,000 gpd WWTP treating to 4 mg/l total nitrogen and 0.3 mg/l total phosphorus.

[3] For context, most WWTPs, until recently, provided so-called "secondary treatment", resulting in perhaps as low as 18 mg/l total nitrogen and minimal treatment for phosphorus. The Biological Nutrient Removal (BNR) upgrades that many significant WWTPs in Maryland undertook since 1983 were designed to reduce total nitrogen to 8 mg/l. Enhanced Nutrient Removal (ENR) is generally considered to be the limits of technology for nitrogen removal, 3.0 mg/l total nitrogen in most cases. Phosphorus removal to the levels indicated requires chemical precipitation, but is generally achievable.

[4] Generally understood to be the practical limits of technology for nutrient reduction.

[5] However, MDE is working on a point source to point source trading strategy. To date, the strategy has been released only as a preliminary discussion draft for purpose of input from the regulated community via listening sessions and other venues. A fully implemented version is not practically expected until at least late 2007. A non-point source to point source trading strategy has not even been drafted.

Point sources (both significant and non-significant WWTPs) are expected to contribute only one third the nutrient reductions called for in the *Agreement*. Non-point sources, according to the draft Statewide Implementation Plan, are expected to contribute the remaining two thirds of the reductions. Non-point source strategies include areas such as urban sources, stormwater, septic systems, growth management, agriculture, and air deposition. However, for nearly all of the non-point source strategies, the draft Statewide Implementation Plan acknowledges that significant obstacles to implementation exist and most lack the legislation to require them or the funding to encourage them. Despite this, MDE has indicated that no nutrient credit can be obtained by a jurisdiction using any of the non-point source strategies identified in the draft Statewide Implementation Plan, on the rationale that it is assumed that those will, indeed, be carried out fully and therefore those nutrient reductions are already considered to have been achieved[6].

Because Cecil County anticipates the need for far greater than the 2.0 mgd wastewater treatment capacity that exists at the Northeast River WWTP and because the Elkton and Perryville WWTPs are capped at levels reflective or even short of their planned growth goals, the Comprehensive Plan goal of attracting development activity to the designated growth area has been seriously threatened by the strategies within the draft Statewide Implementation Plan. Moreover, the rapidly increasing residential development pressures evident in Cecil County make it impossible to wait for MDE to complete its development of a robust trading strategy, which may take many years. Typically, the design, permitting, and construction of a significant WWTP or plant upgrade takes approximately three years; if Cecil County waits to begin this process at the Northeast River WWTP or relative to the conceptual Elkton West WWTP, the result may be a chilling effect on the County's recent success[7] in attracting this activity to the designated growth area. During such a delay in expansion of the treatment capacity, unnecessary pressures will result on the farms and forests of the northern and southern agricultural areas of the County.

[6] This circular logic is not lost on MDE staff and leadership, but they have thus far not seen a way to avoid it, given the mandate for a plan to reduce nutrients to discrete levels.

[7] For example, Victoria Park (a 50 unit senior housing facility), Ridgley Forest (~300 single family homes), Chesapeake Club (~1200 additional single family homes), Village at North East (an over-55 community of ~700 single family homes), the Courts of Mallory (89 single family homes) and others were made possible by the County's expansion of sanitary sewers in Mauldin Avenue. Chesapeake Ridge (267 apartments), the expansion of C&S Wholesalers, the cross dock facilities in North East Commerce Center, the Holiday Inn Express, new activity within the Peninsula Industrial Park, and the North East WalMart were made possible by the County's expansion of sanitary sewers through Lakeside Park. Also, replacement of the Meadowview WWTP has resulted in Burris Refrigerated Logistics, Panattoni/Michelin, and the expansion of West Creek Village (mixed use residential), along with encouraging W.L. Gore and Basell Polyolifins to remain and expand their operations.

Given the urgent need to move forward with design, permitting and construction of expanded wastewater treatment capacity, Cecil County must identify nutrient reduction strategies that are not included in the draft Statewide Implementation Plan (for which no nutrient reduction credit can be obtained), that can be quantified to MDE's satisfaction, and that can be memorialized within the County's Planning Limits and the NPDES Discharge Permit for its WWTPs.

The Committee has interviewed a number of experts to gain a better understanding of the strategies within the draft Statewide Implementation Plan and innovative ideas beyond the draft Statewide Implementation Plan. These include:

- Catherine Shanks and Carrie Decker, Maryland Department of Natural Resources
- Ron Miller, Cecil County Farmer
- Nick Inglisa, Owner/Operator, Forest Green MHP Water and Wastewater Treatment Facilities
- Representatives of the Denitrifying Septic System Industry[8]
- Artesian Water Company
- Tidewater Utilities
- Gary Slagle, Cecil County Homebuilder
- Stewart R. Comstock, P.E., Maryland Department of the Environment, Stormwater Programs
- Dr. Robert Summers, Director, Water Management Administration, Maryland Department of the Environment
- Charles Hayes, Cecil Soil Conservation District

These interviews, individual and collective research, and the expertise of the various Committee members then enabled deliberation that has resulted in the summaries and recommendations that follow later in this report.

4. LOAD CAP IMPLICATIONS ON COUNTY'S ABILITY TO SERVE

Currently, the County operates five wastewater treatment plants.

Cherry Hill WWTP. Design capacity is 0.250 mgd. Permitted capacity is the same. 2005 average flow was 0.112 mgd. Design capacity of the plant is sized for the infill development of the designated service district. Hence, this plant has no excess hydraulic capacity to take pressure off other areas of the designated growth area. This plant is likely subject to the developing trading strategies discussed later in this report; however, the 2003 reconstruction of this plant

[8] Allison Blodig, Biomicrobics/FAST(r); Richard Page/Roy Freemire, Freemire Associates; Matthew Byers, Zoeller Company; Ramona Trovato, NITREX™ Filter; Scott Hetrick, Norweco

leaves considerable unretired debt, which will influence the economics of any renovation.

Harbourview WWTP. Design capacity is 0.065 mgd. Permitted capacity is the same. 2005 average flow was 0.025 mgd. This plant is located well outside the designated growth area. This plant is likely subject to the developing trading strategies discussed later in this report.

Highlands WWTP. Design capacity is 0.050 mgd. Permitted capacity is the same. 2005 average flow was 0.039 mgd. This plant discharges to the West Branch of the Christina River, which is outside the Chesapeake Bay Watershed. This aging plant may be consolidated into the Meadowview WWTP.

Meadowview WWTP. Design capacity is 1.0 mgd. Permitted capacity is 0.700 mgd. 2005 average flow was 0.434 mgd. Application will be made in 2007 to expand permitted capacity to 1.0 mgd. Design for expansion to 1.5 mgd capacity was included in 2004 plant construction; this future design capacity exceeds the infill development projections of approximately 1.35 mgd for the service district. This plant discharges to the West Branch of the Christina River, which is outside the Chesapeake Bay Watershed. A Delaware TMDL applies to the West Branch (58.38 #/d TN; equates to 2.33 mgd at 3.0 mg/l TN).

Northeast River Advanced WWTP (aka Seneca Point). Design capacity is 2.0 mgd. Permitted capacity is the same. 2005 average flow was 0.910 mgd. Current flows plus allocated flows total approximately 1.6 mgd and a 2006 Resolution by the Board of County Commissioners of Cecil County directed that 0.279 mgd (approximately 1268 ELU) be reserved for residential uses and 0.120 mgd (approximately 545 ELU) be reserved for industrial and commercial uses. The Northeast River TMDL for nutrients limits the allowed expansion of this plant to a maximum of 5.33 mgd (at 3.0 mg/l TN), but the draft Statewide Implementation Plan's nutrient load caps limit the plant to a maximum of 2.67 mgd (at 3.0 mg/l TN). The draft Statewide Implementation Plan governs at this point and the additional 0.67 mgd capacity that could be built would only represent approximately 3,000 ELU for some combination of industrial, commercial, institutional, and residential uses.

Future Elkton West WWTP. This conceptual plant would be potentially located within the proposed Villages at Lake Herron (Zeitler Road), although it could be placed elsewhere in the area. Preliminary determinations from MDE suggest that they would permit as much as a 1.5 mgd regional WWTP if flows from the existing WWTPs at Triumph Industrial Park, Forest Green MHP, CECO Utilities (Manchester Park), and Cherry Hill WWTP were consolidated into the regional plant. These four WWTPs' approximately 0.375 mgd flow, together with the approximate 0.400 mgd demand from Villages at Lake Herron (approximately

1500 homes plus commercial) would leave approximately 0.7 mgd (3200 ELU) for other new uses.

Construction of new or expanded WWTP capacity takes considerable time to complete. The shortest realistic timeframe for design, permitting, and construction is 36 months, which does not anticipate delay factors such as property acquisition, public buy-in processes, financing lead times, and unusual regulatory hurdles (such as nutrient load caps).

At first glance, it would appear that the County might have considerable inventory: namely, more than 4200 ELU at Seneca Point, 4700 ELU at a future Elkton West, and 4000 ELU at Meadowview. But, only 1200 ELU are available for allocation at Seneca Point, design of Elkton West cannot even begin until agreements are in place with the developer and owners of the three existing private WWTPs, and only 2000 ELU are available at Meadowview at this time (assuming an expanded discharge permit to 1.0 mgd) for both residential and industrial/commercial. By historical trends, this represents many years of residential development, but as growth pressures intensify and are then accelerated by BRAC, 1000 new homes per year may become more normal. Also, because there is generally a lag of a year or years between the time that a sewer allocation can be requested and the time it is actually placed into service, the remaining capacity may be allocated long before new capacity can be pressed into service, causing those (particularly residential) developers to look to the northern and southern agricultural areas instead.

To the extent that residential units cannot be accommodated within the designated growth area on public water and sewer (where four units per acre is easily obtained under existing zoning and 16 units per acre density is sometimes permitted), the same, say, 50 units that we would prefer be constructed there (on 12.5 acres) would consume 500 acres of farms or forest in the NAR and 1000 acres in the SAR. If 500 homes per year started appearing outside the designated growth area, the impact would be some mix of 5000 acres of the NAR lost per year or 1000 acres of the SAR, one or both of those areas would be quickly consumed, and a proliferation of conventional septic systems would result (producing more nutrients to the Bay).

5. STRATEGIES

For consistency, nutrient reduction strategies and potential nutrient offset opportunities will be discussed in the same general structure as the draft Statewide Implementation Plan.

5.1. Point Source Strategies

5.1.1. Nutrient Caps

As noted earlier, Maryland's Tributary Strategy and the draft Statewide Implementation Plan distinguish between significant wastewater treatment plants (WWTP) and non-significant WWTPs at the design capacity of 500,000 gallons per day (gpd). In the draft Statewide Implementation Plan, significant WWTPs are nutrient capped on the basis of their planned capacity as of April 30, 2003 and a treatment level of 4.0 mg/l total nitrogen and 0.3 mg/l total phosphorus. If each of Cecil County's significant WWTPs were upgraded to achieve effluent limitations of 4.0 mg/l total nitrogen and 0.3 mg/l total phosphorus, they would not be permitted to expand beyond the design capacities shown earlier. However, if they were upgraded instead to 3.0 mg/l total nitrogen and 0.3 mg/l total phosphorus, they would be able to expand to the following design capacities:

- Elkton WWTP. 4.07 mgd design capacity.
- Northeast River WWTP (aka Seneca Point). 2.67 mgd design capacity.
- Perryville WWTP. 2.20 mgd design capacity.

Beyond the capacities above, significant WWTPs are prohibited from expanding, except in instances where MDE has approved a point source to point source or non-point source to point source trade of nutrient reductions. Such a program has not yet been officially developed by MDE.

By contrast, the draft Statewide Implementation Plan caps non-significant WWTPs at their projected 2020 capacity, 18 mg/l total nitrogen, and 3 mg/l total phosphorus. Expansions of non-significant WWTPs cannot exceed 6,100 pounds per year total nitrogen or 457 pounds per year total phosphorus; these equate to a 500,000 gpd WWTP treating to 4 mg/l total nitrogen and 0.3 mg/l total phosphorus.

Cecil County's minor wastewater treatment plants discharging to surface waters are summarized below. The flow permitted by the nitrogen load cap (which ruled over the phosphorus load cap in all instances) is often an increase in the existing design capacity, but in two instances is actually a reduction. Overall, the total from of these plants can increase, theoretically, from 1.319 mgd to 5.599 mgd within their load caps.

Treatment Plant	Design Capacity (mgd)	2003-2005 Average Flow (mgd)	2020 Projected Flow	Total Nitrogen Load Cap (lbs/yr)	Total Phosphorus Load Cap (lbs/yr)	Nitrogen Capped Flow @ 3mg/l TN
Cecilton	0.050	0.064	0.045	2,466	411	0.270
Cherry Hill	0.250	0.122	0.144	7,881	1,314	0.863
Chesapeake City (North)	0.075	0.073	0.103	4,112	685	0.450
Chesapeake City (South)	0.088	0.057	0.081	4,441	740	0.486
Elk Neck St. Park	0.108		0.030	1,645	274	0.180
Forest Green	0.013		0.011	597	99	0.065
Harbor View	0.065	0.022	0.008	460	77	0.050
Manchester Park	0.035		0.030	1,619	270	0.177
Morning Cheer	0.030		0.022	1,197	199	0.131
Triumph Ind. Park	0.063		0.042	2,276	379	0.249
Bohemia Manor H.S.	0.015		0.007	398	66	0.044
Benjamin's Tr. Pk.	0.040		0.021	1,128	188	0.124
Camp Shadow Brook	0.040		0.001	30	4	0.003
Donaldson Brown Ctr	0.006		0.002	132	22	0.014
Maple Hill Park	0.016		0.007	360	60	0.039
Port Deposit	0.150	0.133	0.163	8,223	1,371	0.900
Rising Sun	0.275	0.217	0.277	15,076	2,513	1.651
Total	1.319		0.994	52041	8672	5.699

5.1.2. Offset Strategy

Point sources (both significant and non-significant WWTPs) are expected to contribute only one third the nutrient reductions called for in the *Agreement*. However, they are essentially the only strategy component for which there are defined caps and a means to achieve through enforcement.

To expand a Significant WWTP beyond the hydraulic capacities noted above, an approved nutrient trading program is necessary, but one does not yet exist. The Maryland Department of the Environment has released a "preliminary discussion draft" of an Approach/Policy for Managing Nutrient Caps (April 7, 2006) and has

held listening sessions. There is considerable disagreement among the stakeholders from whom MDE has heard and it is uncertain when the Policy will be finalized/implemented or how it will be changed.

However, within the "preliminary discussion draft" MDE projects a point source to point source strategy related to Insignificant (Minor) WWTPs. The algorithms are complicated and subject to change, but the basic concept follows. If a Minor WWTP upgrades to an ENR treatment capability (4 mg/l total nitrogen and 0.3 mg/l total phosphorus) or if its flow is connected to a Major WWTP operating at ENR treatment capability, 75% of the difference in pollutant loading would be credited as a nutrient reduction that could be used to provide increased expansion at a Major WWTP (if the minor WWTP is located outside a Priority Funding Area, the "preliminary discussion draft" suggests that an additional 25% reduction may apply, but we believe that is unintentional). For example, assume a 70,000 gpd WWTP is currently treating to 18 mg/l total nitrogen (a typical assumption for a Minor WWTP), and it is upgraded to ENR treatment capability (4 mg/l total nitrogen), the resulting load is reduced from 3,835 #/yr total nitrogen to 852 #/yr total nitrogen, a difference of 2983 #/yr. After retiring the required 25%, this is reduced to 2237 #/yr. If applied at a Major WWTP treating to 3 mg/l total nitrogen, the 2237 #/yr credit would mean that the Major WWTP could be expanded by 245,000 gpd.

Upgrading such a small WWTP (70,000 gpd) will generally be much more expensive (assume $20/gallon) than a larger, Major WWTP, where economies of scale and other factors take place (assume $12/gallon). In the aforementioned example, the upgrade of the Minor WWTP would cost $1.4 million. It is helpful to think of this as a "Permission Cost;" i.e., the cost of being permitted to expand the Major WWTP by 245,000 gpd (980 ELU) in this case is $1.4 million and that is before the anticipated $2.94 million cost of actually expanding the Major WWTP. Translated into a per equivalent living unit basis, the cost of providing wastewater service at the Major WWTP would then be $4,429/ELU ($4.34 million/980 ELU), of which the Permission Cost is $1,429/ELU.

Alternatively, the "preliminary discussion draft" allows for the Minor WWTP to be decommissioned altogether and the flow connected to the Major WWTP. Assume that the Minor WWTP could be connected to the existing sanitary sewer system for the Major WWTP via 13,000 linear feet of force main (assume $60/LF to construct), a pump station (assume $400,000), and demolition of the existing Minor WWTP (say, $200,000) for a total cost of $1.38 million. This cost would again yield the Permission to expand the Major WWTP by 245,000 gpd, but in this instance, the 70,000 gpd flow would have to be built into the Major WWTP as well at a cost of $3.78 million (315,000 gpd x $12/gallon). The resulting cost would then be $5,265/ELU ($5.16 million/980 ELU), of which the Permission Cost is $1,408/ELU.

The purpose of the above exercise is to illustrate the complexity of even a simple example and how variable the costs are. It is likely that obtaining nutrient credits through upgrade of many Minor WWTPs in Cecil County would be expensive and in some cases, prohibitively so[9]. Each Minor WWTP that we would consider would require a more in-depth feasibility study to assess the economics and a number of other considerations.

The table above shows that the nutrient load caps would provide for an overall increase of 4.38 mgd from existing design flows, but some of those component flows will be reduced by at least 25% within the forthcoming strategy and some of those plant owners will want that expansion flow for their own project needs. For example, Morning Cheer/Sandy Cove has recently announced its desire to rebuild their existing wastewater treatment plant as a 0.1 mgd facility at 4 mg/l TN, which will consume their 1,197 #/year nitrogen load cap.

In addition to the above, one should not assume that all owners of Minor WWTPs will wish to cooperate with Cecil County, even if the County bears all construction costs. Their existing Minor WWTP may have low operational costs and the County's $4.89/1,000 gallon User Fee ($293.40 per year, based on a 15,000/quarter usage) may be more than they are used to. Alternatively, if we upgraded their plant to ENR treatment capability, the increased operational costs might be unwelcome to them.

5.1.3. Land Application

Maryland Department of the Environment has not yet established clear direction as to how land application (spray irrigation, drip irrigation, rapid infiltration basins, etc.) of reclaimed wastewater will apply under the Tributary Strategies, but MDE has strongly indicated that this is the area they wish local jurisdictions to proceed wherever possible.

However, MDE's "Guidelines for Land Treatment of Municipal Wastewaters" falls short of encouraging the use of land application. Despite the aggressive treatment that will be required prior to land application (in most instances, it is expected that MDE will require ENR level treatment prior to land application), the required separation from seasonally high, mounded groundwater, buffer requirements, and storage requirements are more reflective of treatment technology and monitoring techniques from twenty years ago. The result is that many areas that are suitable for land application on a scientific level will not be

[9] If a developer is choosing between a parcel in our designated growth area on sanitary sewers and a parcel outside the designated growth area on a conventional septic, at some point he will be sensitive to the Sewer Connection Fee (and any additional benefit assessments that may also apply) relative to his anticipated cost of septic system installation. If, for example, he expects to be able to build septic systems for $7,000/ELU, a $6,000/ELU Connection Fee would encourage him to lean towards the designated growth area , particularly in light of increased density he could achieve there.

on a regulatory level and, unless the Guidelines are updated substantially with the goal of responsibly encouraging land application, land application will remain highly underutilized in Cecil County.

To the extent that land application is used in Cecil County, we must be cognizant that its past application, most notably with the Highlands WWTP, leave a legacy that will worry residents considerably. While the Highlands experience, in particular, was very poor (and ultimately had to be abandoned in favor of the stream discharge that now is used), it resulted from a string of poor investigation, poor regulatory oversight, now-archaic treatment and application means, overzealous pursuit of alternative technology and poor maintenance. It is true that these need not be repeated and we have means to properly design, construct and maintain land application facilities, but an education campaign will be necessary to calm the concerns that many residents may understandably have.

One means by which the County can proactively pursue a far superior approach to land application is to identify those areas of the County most suitable to various forms of land application. An expected update to the Cecil County Soils Map in electronic form will enable a GIS approach that would provide a cost-effective determination of those areas. The soils mapping units most suitable for each land application method (considering drainage, depth to groundwater, etc.) would form the algorithm to isolate those areas in excess of, say, 100 contiguous acres. Some of those areas could then be reserved through various means to serve this purpose over time. For example, areas could be purchased, preservation easements could be established, subdivision regulations could be used, etc.

5.1.4. Inflow and Infiltration Reduction

Infiltration is a term used for the various means by which groundwater or surface water leaks into sanitary sewers, whereas inflow encompasses a number of means by which inappropriate connections (roof gutters, sump pumps, storm drains, etc.) contribute non-wastewater flow to the system. Combined, I/I causes substantial peak flows at the treatment plant during precipitation events or high groundwater periods, but it can also contribute to the base flow of a wastewater treatment plant, needlessly reducing the amount of actual wastewater it can accept. With improved construction materials (PVC pipe, etc.), infiltration has been reduced considerably and changes in design philosophy (and regulation) have reduced inflow somewhat, but inflow redevelops over time, particularly in shore communities where storm sewer systems are not in place (and hence, no receptor for sump pumps and roof drains).

Historically, most owners of sanitary sewer systems investigated their I/I and found it was a significant portion of their base flow and a driving factor in

hydraulic peaking at their treatment plants. However, when they compared the cost per gallon to eliminate portions of their I/I (including political difficulty, in the case of removing illegal connections of household sump pumps and roof leaders) relative to the cost per gallon to construct and operate additional hydraulic treatment capacity at their plants, it was rare that I/I remediation was shown to be cost effective.

With the development in recent years of more reliable and cost effective remediation techniques and materials (such as chemical grouting, pipe slip lining, etc.) the costs of remediation have reduced, but are typically still not competitive with the cost of simply building additional treatment capacity at the plants. But, with nutrient load caps making that hydraulic capacity more precious than ever, I/I remediation is becoming a strategy that must be employed, even when the cost per gallon of removal is many times that of the cost of new plant capacity.

The County has programmed into its Capital Improvements Plan a multi-year program to identify and reduce I/I in its sanitary sewer collection systems.

5.1.5. Other Point Source Minimization Strategies

EPA and many universities, among other sponsors, continue to develop and evaluate a host of strategies to minimize point source discharges. For example, composting toilets have been evaluated for small flows in remote areas, separate gray water systems have been designed for clusters of commercial buildings, etc. Often, these strategies are practical (from a cost efficiency, public acceptability, or compatibility with the project standpoint) in select instances and don't serve well on a large scale. However, just as the nutrient load caps will require a different perspective on the cost/benefit of removing infiltration and inflow from sewer systems, we should perhaps take a fresh look at some of these strategies to determine how they fit into the tributary strategies and how nutrient offsets might be possible.

5.2. Urban Source Strategies

The draft Statewide Implementation Plan addresses Urban pollutant sources in two broad categories: stormwater strategies; and septic strategies.

The following sections include a search for means by which the County could obtain nutrient offsets, as non-point source to point source trading that can be used as permission to expand one of the Major WWTPs beyond the hydraulic capacity established by the nutrient caps. However, no such trading program exists as yet.

It must also be understood that MDE has indicated that any such program will, at a maximum, give credit for nutrient reduction only above those strategies and

goals established in the draft Statewide Implementation Plan, regardless of the obstacles to implementation expressed in the Plan. For example, despite the fact that the State has no legislation to require new septic systems to have a denitrifying component added (and legislation is not anticipated by anyone asked), the draft Statewide Implementation Plan assumes there will be one; if Cecil County acted to create such a local requirement, it would receive no nutrient offset/credit, because the draft Statewide Implementation Plan already assumes such a requirement will exist.

5.3. Stormwater Strategies

Stormwater strategies in the draft Statewide Implementation Plan cover a broad range of initiatives, reflective of the E3 approach (Everything, by Everyone, Everywhere) applied by its authors: urban nutrient management, tree planting, forest buffers, erosion & sediment control, stormwater management (new and retrofit), wetland restoration, and stream restoration.

The Committee focused on stormwater management potential with Stewart Comstock (stormwater programs, MDE). Mr. Comstock encouraged all efforts to upgrade existing SWM facilities and enhance the design of new ones;[10] however, he cautioned that applying specific nutrient reduction numbers is very difficult, due to a host of factors, not the least of which is the variability in the frequency, duration, and intensity of storms in a given year. MDE has not yet broached the subject of SWM upgrade offsets. However, it is plausible that a credit program could be developed in the future: one part could be targeted at the pre-1984 period (i.e., providing SWM facilities for a project that required none prior to 1984 or upgrading the facilities to the more robust water quality requirements of the current ordinance); another part of the program could be directed at retrofitting facilities constructed in the interim period of 1984-2001; and yet a third part could provide incentives for projects completed under the "new" statute (post 2001) to incorporate features exceeding the minimum requirements of the SWM ordinance (or employing additional features such as green roofs, constructed or expanded wetlands, etc.).

Mr. Comstock's caution notwithstanding, the Committee observed that assigning nutrient reduction factors to agricultural practices was equally challenging and yet there has been success in achieving concurrent there.

The E3 approach is even more evident in the other initiatives of the overall SWM strategy (nutrient management, tree planting, etc.). In the urban environment, these initiatives are often redundant of existing regulations (street tree requirements, wetland buffer requirements, etc.). When the Basin Level

[10] Increasingly, MDE is addressing SWM facilities as pre-1984 (local implementation of the State's first SWM Statute, before which few SWM facilities existed), post 2001 (the local implementation of the State's current SWM Ordinance), and the period between the two.

Implementation Plans are established for the Upper Eastern Shore and Upper Western Shore, the resulting goals of these initiatives may provide a baseline goal that the County could then attempt to achieve.

5.4. Septic Strategies

The draft Statewide Implementation Plan contains two basic septic strategies: septic connection; and septic denitrification.

Septic connection is a strategy whereby existing, conventional septic systems are decommissioned as those homes and facilities are connected to a sanitary sewer system that flows to an advanced WWTP (presumption is an ENR capable plant). Because a conventional septic system releases its effluent to the soil at a total nitrogen content that typically ranges 26-32 mg/l and the ability of the soil to nitrify and/or denitrify can be limited, the ability to collect that flow and treat it for discharge at 3 mg/l total nitrogen is of obvious benefit. The "preliminary discussion draft" nutrient offset policy effectively would allow a two for one credit for each equivalent living unit (ELU) connected under the strategy; meaning, for each ELU connected, construction of capacity for one additional ELU would also be permitted.

Using some assumed figures again for illustration, if a large scale expansion of a WWTP is assumed at a cost of $12/gallon, construction of one new home would require connection of one existing home and the new home would presumably (but not necessarily) need to underwrite the cost of connection for the existing home. The existing home's treatment capacity would cost $3,000 and we must assume that the construction of a sewer line to the existing home would be part of a larger project involving a number of homes and might be on the order of $10,000. Hence, the new home would have to underwrite some $13,000 in addition to the standard Connection Fee (currently, $4,500/ELU). Clearly, this strategy depends upon identifying communities that can be sewered for far less than $10,000/ELU and our recent experience suggests that will be very difficult.

Septic denitrification is a strategy whereby an existing or new conventional septic system is upgraded with additional tankage and equipment to provide for some reduction of nitrogen prior to release into the drain field. Under the most aggressive goals of the draft Statewide Implementation Plan and the Bay Restoration Fund implementation group at Maryland Department of the Environment, treatment to 15 mg/l total nitrogen could be achieved, which is five times higher than can be achieved by connection with a WWTP treating to 3 mg/l total nitrogen.

Estimates of cost for denitrification systems (for purposes here, the costs discussed will be those additive costs beyond the cost of constructing all of the pieces of a conventional septic system – the primary tank, the piping, the drain

field, grinder pumps, etc.) vary widely and some have speculated that manufacturers have aggressively priced the systems temporarily in order to stimulate their widespread use. Additive costs range from lows of $7,000/home to highs of $20,000/home[11]. If $10,000/home is used, the resulting $40/gallon capital cost does not compare favorably with $12/gallon at a WWTP, particularly when the result if five times the pollutant load from a WWTP. Clearly, if a given facility (home or otherwise) can be connected to an ENR WWTP, there is a clear advantage to the environment and a clear economic benefit. Talbot County is completing case studies that illustrate this on a more detailed basis.

The relative merits of denitrifying septic systems continues to be debated and there is no clear conclusion. Most, but not all, agree that if connection to a sanitary sewer is reasonably available, denitrifying systems are a poor alternative, both environmentally and economically. In more remote areas, the analysis becomes less clear. Regardless, any analysis should not focus just on the capital cost of these systems. Afterwards, the homeowner must properly monitor and maintain a more complex septic system and if they do not, the result for the environment can actually be worse than a properly functioning conventional septic system. Therefore, some program to ensure the proper monitoring and maintenance of these systems is essential and that will increase the operational cost for a given homeowner as well.

The draft Statewide Implementation Plan assumes that all new septic systems will be denitrifying systems (despite there being no law requiring it) and that all existing septic systems will be upgraded through the Bay Restoration Fund (at current funding, the estimated 420,000 septic systems in Maryland will be upgraded over a nearly 700 year period). The "preliminary discussion draft" nutrient offset policy provides no credit if a County were to attempt to implement a local requirement for these systems (in Cecil County's case, because we lack home rule, this would probably require enabling legislation from the State), because the draft Statewide Implementation Plan already includes the strategy.

5.5. Growth Management Strategies

The draft Statewide Implementation Plan includes only one growth management strategy, 30% reduction in the rate of harmful sprawl, but it recognizes that the means to identify this rate or how to reduce it remains elusive.

There are other opportunities for growth management relative to potential nutrient offsets. Cecil County Government has recently developed such a proposal, relative to the recent Transfer of Development Rights ordinance, and submitted it for consideration to Maryland Department of the Environment. The November 6, 2006 proposal (see Appendix A), in brief, demonstrated that the TDR ordinance eliminated an approximate 24,000 homes that would have

[11] Talbot County is currently reporting that their denitrification upgrades are actually costing $30,000.

otherwise been built in the Northern Agricultural-Residential (NAR) and Southern Agricultural-Residential (SAR) zoning districts of Cecil County and, together with more minor contributions from protected lands and the sewering of the Carpenters Point area, will reduce the nitrogen load (adjusted to also account for phosphorus reduction goals) to the Chesapeake Bay by nearly 300,000 pounds per year. If half of this reduction is credited to Maryland's nutrient reduction goals under the Bay Agreement, the remaining 150,000 pounds per year could be applied within Cecil County's designated growth area to permit the construction of as much as 13.75 mgd of capacity at one or more WWTPs operating at 3 mg/l total nitrogen and 0.3 mg/l total phosphorus.

While Cecil County Government was able to anticipate nearly every conceivable flaw in the TDR ordinance offset proposal, at a November 20, 2006 meeting with Maryland Department of the Environment, officials embraced the proposal but cautioned that the Bay water quality model that formed the basis for the Tributary Strategies may have incorrectly reflected the zoning designations of the NAR and SAR in Cecil County. The relevant State agencies are investigating the Bay model to answer this question and, if necessary, begin the necessary corrections to permit full consideration of Cecil County's proposal. Cecil County Government continues to interact aggressively with MDE on this proposal, given the urgent need for Planning Limits resulting from this and other proposals. Despite the seemingly clear logic in the proposal, Cecil County cannot afford to assume that the requested offset will be fully granted and we must continue to aggressively seek out other potential offset strategies.

5.6. Agricultural Strategies

Agricultural strategies in the draft Statewide Implementation Plan also cover a broad range of initiatives, again reflective of the E3 approach (Everything, by Everyone, Everywhere) applied by its authors: soil conservation water quality plans, conservation tillage, cover crops (commodity and otherwise), alternative crops, waste management (livestock and poultry), runoff control, off-stream watering (with and without fencing), nutrient management, precision agriculture, forest buffers, grass buffers, wetland restoration, retirement of highly erodible land, tree planting, ammonia emissions reduction, phytase feed additive, manure transport, and horse pasture management.

The Committee focused on the cover crop program as an example. Most agree that participation in the Maryland program is not as high as would be expected, but not everyone agrees why. The costs (and risks/complications) of planting a winter cover crop are theoretically reflected in the payments to farmers made through the program, but certainly can fall short when, for example, fuel costs rise dramatically after formulas are established, as was seen in the past year. However, some farmers disagree and say the payments fail to cover their costs, the program entails too much risk (farmers must front fund the cost and only

receive payment in the spring; weather conditions in the spring can mean the farmer fails to meet performance criteria of the program; successful performance with the cover crop can interfere with successful spring planting, etc.), and the program fails to include methods that would encourage participation (minimum farm size, costs of air application of seed, etc.). It is likely that the program works well on some farms in some areas for some farmers in some years and doesn't work as well in other instances.

Regardless, because the draft Statewide Implementation Plan follows the E3 approach, anything that Cecil County Government would attempt to do in the area of agricultural nutrient management, including improvement or augmentation of existing programs, would either receive no nutrient offset or receive only a small offset at very high cost, as the County would have to first achieve the goals of the draft Statewide Implementation Plan and then exceed them, receiving an offset only for that portion that exceeded the strategy but at a cost for the entire program. Short of identifying strategies beyond those in the draft Statewide Implementation Plan (attempts to do so are underway with some staff at Department of Natural Resources and elsewhere), there are seemingly few opportunities to obtain nutrient offsets through Agricultural strategies at this time.

However, the Committee kept returning to these strategies, believing that there may be avenues for improvement upon the draft Statewide Implementation Plan and opportunities for nutrient offsets. For example, Russell Brinsfield (University of Maryland) estimates that August planting of wheat (which generally requires application of seed from the air because the summer crop is still in place) can double the nitrogen uptake of planting that occurs in late October (which is reflected in the cover crop program by paying more per acre). Bill Kilby estimates that, while some 1700 acres in Cecil County are aerially seeded currently, there is potential for another 1000 acres for early planting that could result in 20,000 #/year nitrogen uptake.

Another potential area for exploration with the Bay Cabinet concerns livestock feeding. For example, Rick Lawrence, a regional dairy nutrition consultant, has estimated that by decreasing the phosphorus in dairy cow rations from 0.5% to 0.4%, 1.65 pounds of phosphorus has been saved per cow per month and by reducing protein in the feed (changing to an amino acid based feeding program) by 1%, 2.5 pounds of nitrogen has been saved per cow per month. Bill Kilby estimates that, of the 2800 dairy cows in Cecil County, 1000 could potentially change their diets, resulting in 30,000 pounds of nitrogen and 19,800 pounds of phosphorus saved per year. This program appears to be outside of the strategies in the draft Statewide Implementation Plan and may be suitable for a nutrient offset through MDE.

Indeed, the agricultural community has been and continues to be innovative in the area of nutrient reduction, despite the obstacles in the draft Statewide Implementation Plan noted above. According to Charles Hayes, from the Cecil Soil Conservation District, agriculture's nitrogen loads to the Bay reduced from 32.19% in 1985 to 20.9% in 2004 with a strategic goal of 11.6%, while point source nitrogen loads reduced from 31.4% to 16.1% in the same period, with a strategic goal of 10.1 %.

The Committee noted that the draft Statewide Implementation Plan contains aggressive and feasible strategies in agriculture, but many barriers must be overcome to implement them; among others, these include increased staffing for Soil Conservation Districts, increased resources for agricultural programs, modification or expansion of conservation programs and best management practices, and increased education and outreach. The draft Statewide Implementation Plan recommends that local governments provide staff and funding to local Soil Conservation Districts to combat some of these barriers, but that MDE does not intend to offer nutrient offsets for those strategies included in the draft Statewide Implementation Plan.

John Rhoderick of the Maryland Department of Agriculture (MDA) offered to include the Cecil Soil Conservation District in its effort with MDE to offer the first nutrient trading pilot project for Maryland. Such a pilot project would likely not be available until at least late 2007, but a pilot trading project could provide a lower risk means for Cecil County to work cooperatively with MDA and MDE to develop agricultural and other non-point strategies beyond those identified in the draft Statewide Implementation Plan and, potentially, obtain nutrient reduction offsets.

5.7. Air Deposition Strategies

The draft Statewide Implementation Plan looks to expand emission control programs for vehicles and enhance the ozone and fine particle air quality standards. Because air emission concerns are generally regional in nature and must be addressed regionally, the Committee was largely unable to identify any areas where Cecil County could uniquely pursue air deposition strategies for nutrient offset purposes or otherwise. However, two areas of potential opportunity were identified.

Cecil County is currently constructing a landfill gas (LFG) collection system at it Central Landfill. Modeling of the landfill predicted that an estimated annual average of 444 cubic feet per minute (cfm) of LFG in 2005 would rise to a peak of 981 cfm in 2043; because LFG is 40-60% methane, a substantial amount of nitrogen is found in LFG. Depending upon the makeup of the landfill gas, the fugitive methane removed by this system may represent millions of pounds per year. When the LFG collection system is complete, the gas will be combusted (by flare), converted to electrical energy, or distributed (after filtering,

compressing, and dewatering) for direct use as heating fuel. The County may be able to obtain nutrient offsets reflective of the massive reduction in fugitive gases from the landfill.

In similar form, anaerobic digestion of dairy waste may also present residual benefits in the form of reduction of nitrogen air deposition. At least one agricultural bio-gas unit is planned in Cecil County at this time (Kilby farm).

6. LOCAL INITIATIVES

Cecil County has undertaken several initiatives that relate, at least tangentially, to the goals of the draft Statewide Implementation Plan.

Land preservation. Cecil County has over 42,000 acres of protected lands and the Purchase of Development Rights program initiated in 2006 intends to expand upon them. Protected lands have resulted from MALPF easements, DNR lands, County owned lands, Cecil Land Trust, Natural Lands Trust, Maryland Environmental Trust, and many others. Cecil County Government's November 6, 2006 proposal to MDE for nutrient offsets included a component reflective of the County's protected lands programs; if this proposal is successful, it may embolden the County to continue land preservation programs.

Green infrastructure. Cecil County Government has recently contracted with the Conservation Fund for the development of a Green Infrastructure Plan. This plan will have a water quality component related to some of the goals of the draft Statewide Implementation Plan.

Watershed planning. Through a Coastal Communities Grant, the County will review its environmental codes and policies and develop the foundation for what may subsequently become the County's first watershed management plan.

Land application on DNR lands. In an April 26, 2006 memorandum to Ron Guns, DNR Deputy Secretary, Cecil County inquired as to DNR's position for the use of such lands for application of reclaimed wastewater or as recharge easements for groundwater appropriation. An internal task force at DNR is reportedly studying the topic, but no position has been forthcoming.

7. SUMMARY/CONCLUSIONS

The Committee examined a range of strategy categories, but cannot claim to have exhausted all areas of investigation. The work of identifying initiatives to reduce nutrient discharges to the Bay will continue indefinitely at the local, state, federal, and private level. The conclusions and recommendations of this report should be considered interim in nature and should be revisited and built upon over time. However, the Committee arrived at the following general conclusions.

7.1. Need/Urgency. The point source caps on both the Significant WWTPs (Perryville, Northeast River, Elkton) and the Insignificant WWTPs, without some means to offset them, will severely challenge Cecil County's ability to manage the growth (particularly, residential growth) that is only now beginning. Ironically, the nutrient caps may mean that the only place where substantial residential growth does occur is outside of the designated growth area, meaning our farms and forests will drop at an alarming rate, we will see extensive growth in our rural areas, and, because of a proliferation of conventional septic systems, there will be more nutrients discharged to the Bay instead of less. The urgent need for Planning Limits for expanded WWTP capacity cannot be overemphasized.

7.2. Upgrade of Minor WWTPs. While the developing MDE strategy is expected to provide nutrient offsets for Minor WWTPs, the willingness of private system operators to cooperate should not be assumed and the cost and benefit of a given system will have to be individually studied to encompass the many variables associated with each one.

7.3. Land Application of Reclaimed Wastewater. Land application of treated wastewater through spray and drip irrigation and rapid infiltration basins will be an important alternative to point source discharge.

7.4. Stormwater Strategies. Despite the potential for water quality improvement and the number of potential existing sites that could be upgraded in Cecil County, there is no nutrient offset available to Cecil County at this time in this area.

7.5. Septic Strategies. The economic feasibility of connecting existing septic system areas to sanitary sewers severely limits this strategy for Cecil County, unless a more robust nutrient offset policy emerges from Maryland Department of the Environment. The denitrification system strategy provides no nutrient offset for Cecil County.

7.6. Growth Management Strategies. There is no defined strategy in the draft Statewide Implementation Plan or otherwise that would provide a nutrient offset for Cecil County at this time. However, Cecil County Government's November 6, 2006 proposal to obtain offsets related to the recent TDR ordinance should yield a substantial nutrient offset for the County. While Cecil County Government intends to pursue this urgently with Maryland Department of the Environment, we must not assume that the proposed offset will be granted fully and must continue to search for other offsets.

7.7. Agriculture Strategies. The E3 approach in the draft Statewide Implementation Plan seemingly identifies every imaginable means to reduce agricultural nutrient contributions. While new or expanded strategies may emerge in the future, the Committee found only limited (potential) opportunity for nutrient offset in this area at this time.

7.8. Air Deposition Strategies. The control of air emissions and deposition is an inherently regional undertaking and Cecil County cannot singularly affect this area, except in two areas (LFG collection and agricultural bio-gas treatment), but with further study and discussion with MDE, these may yield tangible nutrient offsets.

7.9. Water Quality Monitoring. Non-point source reduction practices may require verification over time of their effectiveness through water quality monitoring. It may be necessary to begin a water quality monitoring program of the various streams as they enter the Chesapeake Bay.

7.10. Cost Recover Differences. Some strategies will require only a one time investment to obtain a nutrient offset, but some will require annual expenditures indefinitely, along with diligence to maintain long term agreements. One time fees can likely be reflected in Connection Fees or Benefit Assessments paid by developers, whereas annual fees would likely have to be incorporated into User Fees and would be partly borne by existing ratepayers. An example of a one time investment would be where the County upgraded a minor wastewater treatment plant; presumably, the County would pay the costs of upgrade, take ownership of some nutrient offset, and have no further obligation to the owner of the minor wastewater treatment plant. An example of annual commitments would be where the County paid a farmer to exercise some practice each year; the County would presumably have to pay annually for this and monitor and maintain those agreements indefinitely.

8. RECOMMENDATIONS

The Committee recommends the following minimum activities.

8.1. Continue aggressive pursuit of TDR offset proposal. Cecil County Government should aggressively pursue agreement from MDE, in the form of Planning Limits, regarding the November 6, 2006 proposal related to the TDR ordinance.

8.2. Map areas most suitable for land application. Land application of reclaimed wastewater will surely be an important part of Cecil County's growth management strategy and Cecil County Government should map those areas of the County that area most suitable to spray irrigation, drip

irrigation, and rapid infiltration basins as soon as the updated and electronic version of the soils maps are made available by the Soil Conservation District. Means should then be developed to secure some of those lands for land application through purchase, preservation easements, subdivision regulation modifications or other means. In particular, if a Cecil County airport is pursued, the inclusion of additional buffer area should be considered if the area is suitable for land application of reclaimed wastewater.

8.3. **Pursue a revised "Guidelines for Land Treatment of Municipal Wastewaters."** Cecil County Government should join forces with other State jurisdictions and groups (such as MACo, MAMWA, etc.) and call upon the Maryland Department of the Environment to update the Guidelines consistent with modern investigation and design techniques and with the goal of encouraging land application of reclaimed wastewater.

8.4. **Pursue a determination on the use of DNR lands for the application of reclaimed wastewater and/or as recharge easements for groundwater appropriation.** DNR should be encouraged to complete their internal evaluation and issue a policy on the use of controlled lands for these purposes and the terms under which they would entertain these uses.

8.5. **Aggressively pursue remediation of I/I in sanitary sewer collection systems.** Cecil County Government should continue its Capital Improvements Program project of infiltration and inflow remediation, and strongly enforce prohibitions of illegal connections, to remove the greatest practicable amount of I/I in the systems, thereby freeing that treatment capacity at the plants.

8.6. **Call for changes in the draft SIP that allow offsets if local governments overcome obstacles to implementation.** Cecil County Government should call upon the Bay Cabinet and/or the Legislature to acknowledge that many of the strategies in the draft Statewide Implementation Plan are not likely to be implemented by the State, but that individual counties may be able to implement them in some instances. An offset program would provide some incentive for a county to implement a strategy that would otherwise not happen or accelerate its implementation by many years. Examples include stream restoration work, denitrifying septic systems, and many other areas.

8.7. **Pursue SWM trading strategy.** Cecil County Government should call upon the Maryland Department of the Environment to identify nutrient

reductions associated with upgrades beyond the requirements of the state stormwater management statute.

8.8. Pursue nutrient credit associated with landfill gas (LFG) collection. Cecil County's current construction of a LFG collection system will provide opportunity to convert this waste gas to energy and a nutrient offset may be possible, depending upon the final outcome of this system. Similar opportunities may develop in connection with private endeavors, such as the manure digester at the Kilby farm.

8.9. Commission a feasibility study (FS) to determine how the Meadowview nutrient allocation could be maximized. Beginning with a verification of the West Branch TMDL and its underlying details, a FS should examine the best means by which the hydraulic and pollutant loading capacity of the plant could be maximized under the TMDL, what it's capital and operational costs would be, and how that capacity could be best used (i.e., by expanding a service district in that area, by pumping flow from the Route 40 corridor, etc.).

8.10. Commission a feasibility study (FS) to examine upgrading the Harbourview WWTP to ENR treatment levels. This aging facility will soon need significant renovation and upgrade to ENR levels could yield a nutrient offset under the developing trading policy. In addition, this FS could also examine a more regional approach that included the two existing Chesapeake City WWTPs. While there are considerable challenges to bringing these three flows together, the economics might show that collaboration makes sense.

8.11. Promote an early cover crop nutrient offset program to the Bay Cabinet. Cecil County should explore the opportunity for a nutrient offset from MDE for early cover crop implementation. If MDE agrees that early planting is an improvement upon the strategy in the draft Statewide Implementation Plan, the County could then enlist the assistance of MDA to develop the parameters by which a County-sponsored early cover crop program could be used for nutrient offsets and the program cost/benefit could be analyzed.

8.12. Pursue an MDE trading strategy for altered livestock feed programs. Cecil County Government should propose a nutrient offset program for reducing the proteins and phosphorus in dairy cow rations. If MDE accepts such an offset, the County could again enlist the help of MDA to develop parameters for the program, at which time the cost effectiveness could be evaluated.

8.13. Request a partnership with MDE and MDA to begin a pilot program for non-point source to point source nutrient offsets in Cecil County. Some of the Bay Cabinet agencies' personnel have encouraged Cecil County to pursue a pilot program in this area. Cecil County Government should request MDE endorsement of such a program, but obtain reasonable assurances that the County will be supported if the program falls short of full success and the County has already constructed expanded capacity that relied upon it.

8.14. Consider beginning annual water quality monitoring of County streams. Non-point source trading strategies, if they are developed or approved by MDE, may require periodic verification of effectiveness. Cecil County Government should evaluate the cost of such a program and consider implementing it in the near future to begin a baseline assessment of water quality.

APPENDIX A

NUTRIENT OFFSET PROPOSAL (NOVEMBER 6, 2006) RELATED TO CECIL COUNTY TRANSFER OF DEVELOPMENT RIGHTS ORDINANCE

CECIL COUNTY GOVERNMENT
129 East Main Street
Elkton, MD 21921

Alfred C. Wein, Jr.
County Administrator
410-996-5203

Board of County Commissioners
107 North Street, Elkton, MD 21921
410-996-5201 Fax: 410-996-1014

Cecil County Information
410-996-5200
410-658-4041

November 6, 2006

Maryland Department of Environment
Water Management Administration
1800 Washington Blvd.
Baltimore, MD 21230

Attn: Robert M. Summers, Ph.D.
Director

Re: Proposed Nutrient Reduction Credit and Request for Planning Limits Downzoning – Cecil County

Dear Dr. Summers:

On August 14, 2006 the Board of County Commissioners of Cecil County passed a local ordinance to establish Transfer of Development Rights (TDR) as a means of managing the increasingly intense development pressure facing the County. Within this ordinance, allowable density within our Northern Agricultural-Residential (NAR) and Southern Agricultural-Residential (SAR) zoning districts were substantially reduced and Bonus Density was eliminated in those areas. The effect will be a dramatic decrease in the number of homes constructed in the NAR and SAR and, hence, a substantial reduction in nutrients that will impact the Chesapeake Bay.

However, the viability of the TDR ordinance, together with the NAR/SAR downzoning depends upon the County's ability to offer receiving areas in its designated growth area. Indeed, many property owners in the NAR/SAR are rumored to be considering a legal challenge to the TDR ordinance on the basis that the County cannot support receiving areas, in light of the nutrient caps on the Northeast River Advanced Wastewater Treatment Plant (aka, Seneca Point WWTP). Without the ability to substantially expand wastewater capacity at Seneca Point, the TDR ordinance may yet be invalidated by the Courts. For that matter, a future Board of County Commissioners of Cecil County could reverse the downzoning if it is not tied to some external limitation.

We believe that we can be successful if the TDR and downzoning are challenged, <u>if</u> we provide the designated growth area with the water and sewer infrastructure that will support the receiving areas and so, planning limits for the short, medium, and long term are essential.

Based on your encouragement at our meeting at MACo, we asked George, Miles & Buhr (GMB) to analyze the effects of downzoning on the NAR and SAR. The results of their work, together with their methodology, are enclosed with this letter. As you see, the effect of downzoning is dramatically positive for the Bay and its Cecil County tributaries. More than 24,000 future homes would be eliminated if the downzoning prevails. The result would be the reduction of 255,004 pounds of nitrogen per year! This considers only the effect of septic systems that would not be built; it does not consider the additional benefit of reduced impervious area, reduced vehicle activity, reduced pesticides/herbicides/fertilizers, protection of forest canopy, etc. We plan to calculate those effects in the future as resources allow.

GMB also analyzed protected lands within the County and determined that 24,810 pounds of nitrogen per year have already been saved through land preservation initiatives within the County or are pending.

Additionally, MDE has not yet granted Planning Limits based on the County's connection of some 768 equivalent living units in Carpenters Point. We believe the credit that should be issued is 17,079 pounds of nitrogen per year, based on modifications made following our May 2006 discussion with your staff.

In each of the septic system analyses, GMB reduced the nitrogen savings to also account for phosphorus reduction goals, reflective that septic systems reduce phosphorus only marginally.

These reflect an estimated 296,893 pounds per year reduction in nitrogen (corrected to offset phosphorus loading) and Cecil County asks that MDE recognize these reductions at this time. We then propose that MDE issue planning limits for Cecil County (to be used at Seneca Point WWTP and the envisioned Elkton West WWTP) that can be applied over time and as growth warrants expansion of those treatment plants. We understand that the Planning Limits should be reflective of the Tributaries Plan's goal of enhanced septic systems (although there remains no legislative means to require them) and so we asked GMB to prepare calculations that reflect that scenario as well.

Thus, we request that MDE acknowledge Cecil County's nutrient reduction of 296,893 pounds per year of nitrogen (corrected to offset phosphorus loading) and ask that MDE issue Planning Limits of approximately 150,000 pounds per year of nitrogen for Cecil County's designated growth area. These Planning Limits include a credit for the downzoning of the NAR and SAR of 125,614 pounds per year of nitrogen (corrected to offset phosphorus loading), in addition to the 24,364 pounds per year of nitrogen nutrient cap in the draft Statewide Implementation Plan.

This proposed nutrient credit and Planning Limits would enable the construction of treatment capacity (at 3.0 mg/l TN and 0.3 mg/l TP) of 13.75 mgd in excess of the Seneca Point WWTP's nutrient caps in the draft Statewide Implementation Plan. A soon to be completed analysis of our designated growth area suggests a buildout demand of approximately 12 mgd beyond the existing capacity at Seneca Point; we request that the balance of Planning Limits beyond our

projected need at Seneca Point WWTP and the envisioned Elkton West WWTP be reserved to Cecil County for assistance with our incorporated towns, potential future trading, or other uses.

Cecil County is willing to accept permit conditions that will require maintaining downzoning commensurate with these nutrient savings, if these Planning Limits are issued by MDE. In so doing, the County's recent TDR ordinance and downzoning would more likely survive anticipated legal challenges as the Courts would perhaps view the actions as properly balanced.

We recognize that MDE is still developing its nutrient offset program, but our urgent need for your concurrence with these planning limits cannot be over-emphasized. Development pressure is mounting on our rural areas, despite the TDR ordinance and we must move forward with the infrastructure construction that will draw that activity away from the SAR and NAR. To do otherwise will result in explosive sprawl growth in Cecil County and more, rather than less, nutrients entering the Bay. We are prepared to meet with you as soon as possible and provide additional information on an expedited basis so that planning limits can be in place by January.

Cecil County's actions rise to the challenge of the Tributary Strategies Plan and we are glad to be partners with MDE in memorializing these Bay protections. To that end, we are anxious to meet with you at your earliest opportunity to address any questions you may have related to this proposal. Please contact me at (410) 996-5201 or our Capital Facilities Administrator, Matt Carter, at mcarter@ccgov.org or (410) 996-5617 if we can facilitate the expedition of your response in any way. Thank you for your assistance and that of your staff as we have attempted to support the nutrient reduction goals in the Chesapeake Bay.

Sincerely,

Nelson K. Bolender, President
Board of County Commissioners of Cecil County

Encl.

cc: Kendl P. Philbrick, Secretary, Maryland Department of the Environment
Virginia Kearney, Deputy Director, Water Management Administrations
Board of County Commissioners of Cecil County
Alfred C. Wein, Jr., County Administrator
Eric S. Sennstrom, AICP, Director, Planning, Zoning, Parks & Recreation
Vernon Thompson, Director, Economic Development
W. Scott Flanigan, P.E., Director, Department of Public Works
Matheu J. Carter, P.E., Capital Facilities Administrator
W. Brice Foxwell, P.E., George, Miles & Buhr

GMB
GEORGE, MILES & BUHR, LLC

ARCHITECTS
ENGINEERS

120 SPARKS VALLEY RD SUITE A
SPARKS MD 21152
PH 410.329.5005
PH 888.455.4462
FAX 410.329.5881

SALISBURY
BALTIMORE
SEAFORD
LEWES
YORK
DOVER

www.gmbnet.com

November 3, 2006

Cecil County Government
107 North Street
Elkton, Maryland 21921

Attn: Mr. Matheu J. Carter, P.E.
Capital Facilities Administrator

Re: Cecil County Nutrient Credit Study - Revised
Cecil County, Maryland
GMB Job No. 2006.275

Dear Mr. Carter:

We have completed the requested study of three (3) of the potential non-point source to point source nutrient trading opportunities in Cecil County. The first part of this report quantifies the impact of the developable density reduction for the Northern Agricultural-Residential (NAR) and the Southern Agricultural-Residential (SAR) districts as it relates to the Transfer of Development Rights (TDR) recently passed by the Board of County Commissioners of Cecil County. The second part of this study quantifies the build-out residential sanitary flow that could be associated with the Protected Lands within Cecil County. The final part of this study revisits the Carpenters Point area based on the comments made by the Maryland Department of the Environment (MDE).

A. NAR/SAR Development Density Reduction

This analysis was conducted using the Maryland Property View database and the zoning region shapefiles provided by Cecil County. Within ArcView, the Maryland Property View database was spatially referenced to the zoning shapefiles to identify if a parcel is associated with either the NAR or SAR zoning region. In doing so, the cumulative acreage of each parcel within these regions differed slightly from the area provided by Cecil County Department of Planning & Zoning. The total difference was approximately 0.6-percent. This difference is negligible considering the quantity of acres for these regions (84,000 acres for NAR and 55,000 acres for the SAR).

Each of the parcels for the NAR and SAR regions were exported to an Excel spreadsheet and the potential for subdivision was calculated for the old zoning using the allocated density along with bonus density. Each parcel was also calculated using the new zoning development density for the applicable zoning region. This calculation was performed by dividing the acreage of the parcel by the development density for each scenario and then rounding down to the nearest whole number. The result of this calculation was then reduced by one (1) unit based on the assumption that each existing parcel currently contains one (1) Equivalent Living Unit (ELU).

The NAR development densities were previously 5 to 1, but could be increased to 3 to 1 under the zoning bonus density provisions. The new development density for this

region reduced the density to 10:1 and eliminated the bonus density provisions. These density revisions for the NAR result in a reduction of 16,206 units comparing the new zoning to the old zoning under bonus density.

The SAR development densities were previously 8 to 1, but could be increased to 5 to 1 under the zoning bonus density provisions. The new development density for this region reduced the density to 20:1 and eliminated the bonus density provisions. These density revisions for the SAR result in a reduction of 7,965 units comparing the new zoning to the old zoning under bonus density.

A sample of the calculations for both the NAR and SAR are provided for reference as Attachment A. Based on these calculations, the total reduction of developable parcels due to the recent downzoning completed by Cecil County is 24,171 units or ELU. This reduction results in a credit of 255,004 pounds of total nitrogen annually due to the reduction of development from the NAR and SAR. This nutrient loading relates to an ENR treatment plant discharge of approximately 27.92 million gallons per day (MGD) at 3.0 mg/L total nitrogen.

Calculation of the above nitrogen credit is based on information provided by MDE to determine the nitrogen loading per septic system. These calculations were completed in accordance with guidance from MDE's draft nutrient trading document and previous correspondence regarding Carpenters Point. The proposed credit includes a reduction to offset the increased phosphorus load based on MDE's guidance of 7 pounds nitrogen credit reduction for every 1 pound phosphorus increase in the treatment facility discharge. Details of the proposed credit calculations are provide in Attachment B for reference.

B. Protected Lands Build-Out:

GMB was also requested to calculate the potential residential build-out of those tracts of land that are now protected from future development. The protected lands shapefile as provided by Cecil County was calculated to total approximately 42,000 acres of land that is no longer capable of being developed. A large quantity of the protected lands is zoned as Open Space; however, a significant portion is included in other zoning designations.

Using the development densities for onsite septic systems as per the Cecil County Zoning Ordinance, these land areas are zoned for 2,349 ELU at residential development build-out. This equates to 24,810 pounds of total nitrogen annually as calculated using the same procedure as Part A of this report. Please note that this proposed credit excludes any nitrogen loading associated with those areas zoned for non-residential use. The breakdown of the Protected Lands by zoning region and calculation of the proposed nitrogen credit for these areas are provided for reference as Attachment C.

C. Response to MDE Comments on Carpenter's Point Proposal:

GMB submitted a nutrient credit proposal to the Maryland Department of the Environment (MDE) dated December 12, 2005, which proposed a credit of 20,365 pounds of total nitrogen annually due to the incorporation of the Carpenters Point on-site septic systems into the Northeast Advanced Wastewater Treatment Plant (NEAWWTP). A copy of this proposal and MDE's response letter are included for reference as Attachment D.

We offer the following responses to MDE's comments dated May, 2006:

1. Persons per Equivalent Living Unit (ELU):

   a. According to the Maryland Department of Planning Traffic Analysis Zones the persons per household for the Carpenters Point Area (TAZ 570) is 2.75 persons per household (ELU). This value has been utilized in the revised calculations herein.

   b. The ELU provided for mobile homes and trailer parks was provided based on a ratio of mobile homes and trailer parks per ELU. The mobile homes were calculated to be 1 dwelling per ELU. The trailer parks were calculated at 5 sites per ELU. This ratio is utilized since these units would be expected to have lower occupancy rates, as commented, as well as reduced wastewater flows. However, by using the above ratio the occupancy rate and wastewater flow is anticipated to be equivalent to that of a standard dwelling.

2. Pass-through Factor – We continue to believe that the 40-percent value utilized as pass-through from the septic system to the surface water is not appropriate in this instance due to the relatively close proximity of Carpenters Point to the Northeast River (typical distance from drainfield to the Northeast River is less than 300-feet) and the soils (sand and sandy silts) in this vicinity. The proximity of these lots to the Northeast River essentially places the septic drainfield of these lots at the surface water interface. Therefore, there is minimal soil for denitrification between the edge of the drainfield and the surface water interface. We believe this item requires further discussion and possible compromise from both parties for resolution.

3. Upgrade of On-site systems – We also continue to hold that Maryland's Tributary Strategy call for upgrades of the average on-site septic system to reduce total nitrogen load by 50-percent is not applicable for Carpenters Point. Considering the soil conditions, proximity to the river, required setbacks to adjacent properties and small existing lot sizes satisfactory on-site repairs or upgrades are not likely feasible. This is supported by the June, 2000 letter from the Cecil County Health Department included as Attachment E. Therefore, it is clear that the existing systems can not be repaired or upgraded to hydraulically satisfy the public health concern and thus it is not possible to upgrade these

systems for nutrient reduction and have a successfully operating septic system. Furthermore, there currently exists no regulatory mechanism to require existing septic systems to be upgraded for additional nutrient removal. We believe this item requires further discussion and compromise from both parties for resolution.

Based on the comments provided by MDE, we have revised the calculations and propose that the revised credit associated with the incorporation of the Carpenters Point on-site septic systems into the NEAWWTP should be approximately 17,079 pounds of total nitrogen annually as shown in the revised calculations included as Attachment F.

D. Summary:

Based on the above calculations, the proposed non-point source to point source credits are as follows:

A.	NAR/SAR Development Density Reduction	=	255,004 lbs TN
B.	Protected Lands Build-Out Credits	=	24,810 lbs TN
C.	Carpenter's Point Proposal	=	17,079 lbs TN

The total proposed credit for these items is approximately 296,893 pounds of total nitrogen annually. This nutrient credit would relate to an additional 32.51 MGD in treatment capacity at an effluent concentration of 3.0 mg/L total nitrogen.

If you have any questions or wish to discuss the above information, please do not hesitate to contact our office.

Sincerely,

Jason M. Lytle, P.E.
Project Manager

Enclosures

JML/WBF/sb

ATTACHMENT A

NAS & SAR Build-Out Comparison

ATTACHMENT A
NAR Zoning Comparison Sample

ACCTID	DIGXCORD	DIGYCORD	ACRES	LANDAREA	LUOM	Zone_Layer	Old Zoning		New Zoning		
							Straight	Bonus			
0805031214	494195.9	207324.6	198.270	198.270	A	NAR	38	65	18		
0806000673	477249.7	222217.5	202.320	202.320	A	NAR	39	66	19		
0809001301	488415.5	222245.5	204.520	204.520	A	NAR	39	67	19		
0806012744	478028.6	226715.5	206.070	206.070	A	NAR	40	67	19		
0805040418	484744.1	209358.7	210.400	210.400	A	NAR	41	69	20		
0802010984	503858.2	212123.6	210.460	210.460	A	NAR	41	69	20		
0802023954	500240.6	211118.9	215.000	215.000	A	NAR	42	70	20		
0808002606	467179.8	227680.5	218.000	218.000	A	NAR	42	71	20		
0808007934	473705.0	224052.6	225.240	225.240	A	NAR	44	74	21		
0806011101	477270.4	225926.9	226.820	226.820	A	NAR	44	74	21		
0805011787	494251.8	208286.5	227.410	227.410	A	NAR	44	74	21		
0804011066	496238.6	226884.1	228.100	228.100	A	NAR	44	75	21		
0802008297	504024.1	210778.3	228.340	228.340	A	NAR	44	75	21		
0808009163	467884.9	226024.3	232.930	232.930	A	NAR	45	76	22		
0806012450	475278.9	224163.9	255.650	255.650	A	NAR	50	84	24		
0806009786	478207.0	221274.1	261.000	261.000	A	NAR	51	86	25		
0807008732	476324.9	218311.8	262.060	262.060	A	NAR	51	86	25		
0808009740	468898.5	224945.0	293.390	293.390	A	NAR	57	96	28		
0804028929	497471.3	225909.6	300.000	300.000	A	NAR	59	99	29		
0809005617	492241.8	223028.7	319.100	319.100	A	NAR	62	105	30		
0805056896	484541.6	211304.3	342.000	342.000	A	NAR	67	113	33		
0805061180	488146.3	203989.0	352.290	352.290	A	NAR	69	116	34		
0805012988	489782.8	204000.1	432.970	432.970	A	NAR	85	143	42		
0805022371	492003.0	206340.7	470.350	470.350	A	NAR	93	155	46		
0802015978	500677.0	208922.7	478.400	478.400	A	NAR	94	158	46		
0805060656	488301.6	205708.0	853.070	853.070	A	NAR	169	283	84		
0804021266	497470.3	225927.0	4237.740	4237.740	A	NAR	846	1411	422		
			84,107	**Acres**			11,537	21,014	4,808	6,729	Difference
			83,595	**Acres by Zoning**						16,206	Difference
			0.6%	Difference							@ Bonus

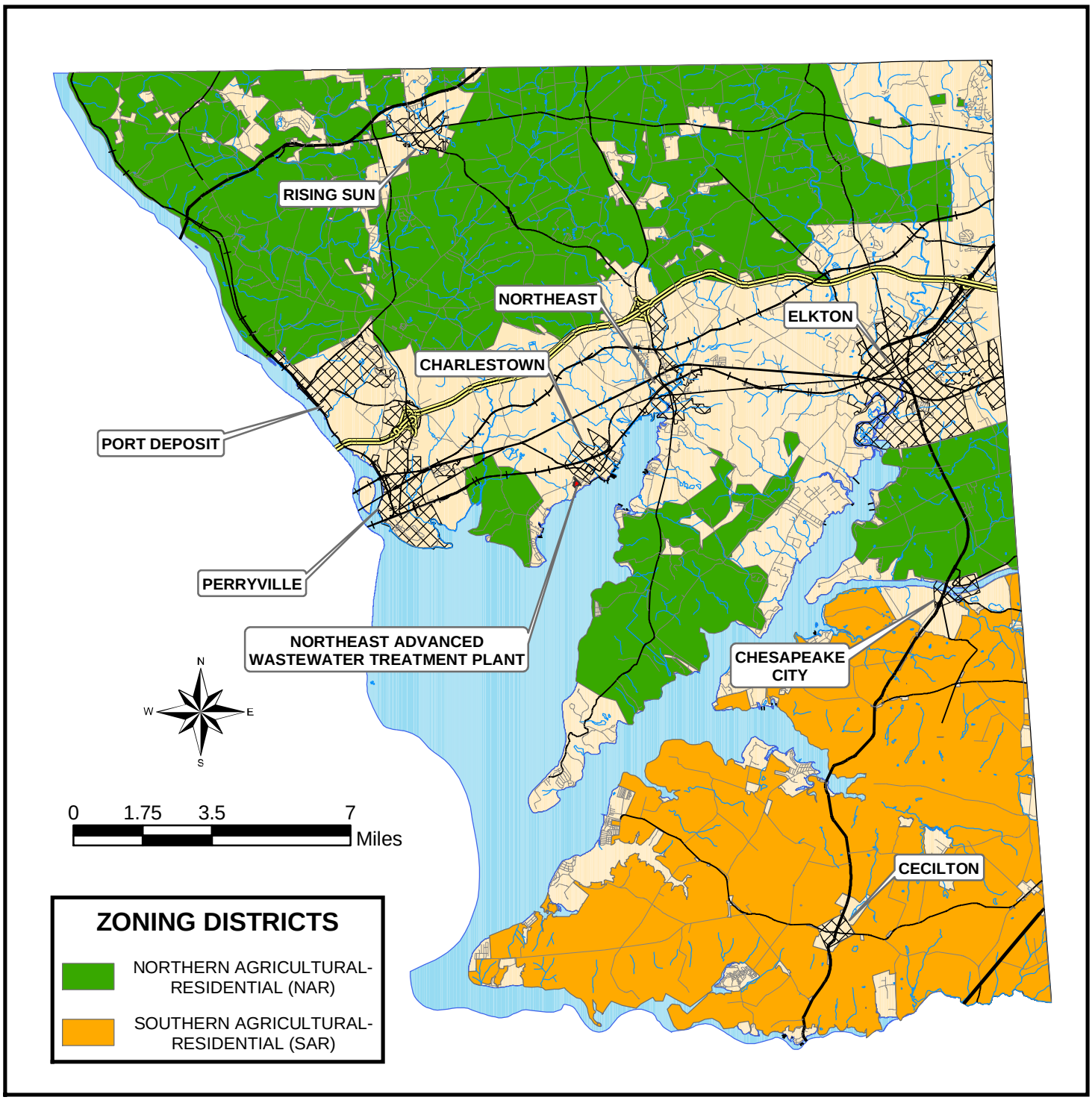
60,555 Acres in 20+ Acre parcels

ATTACHMENT A
SAR Zoning Comparison Sample

ACCTID	DIGXCORD	DIGYCORD	ACRES	LANDAREA	LUOM	Zone_Layer	Old Zoning		New Zoning		
							Straight	Bonus			
0802004348	496650.3	202036.0	306.000	306.000	A	SAR	37	60	14		
0801006517	493911.8	195738.1	321.800	321.800	A	SAR	39	63	15		
0802015870	501352.5	202705.5	322.020	322.020	A	SAR	39	63	15		
0801019759	505546.1	191526.5	322.740	322.740	A	SAR	39	63	15		
0802008009	501706.9	200911.2	323.350	323.350	A	SAR	39	63	15		
0801012657	497704.5	196957.2	323.380	323.380	A	SAR	39	63	15		
0801007386	501089.7	193424.5	331.210	331.210	A	SAR	40	65	15		
0801020412	495322.0	198116.7	333.140	333.140	A	SAR	40	65	15		
0802009986	497819.5	202418.9	335.000	335.000	A	SAR	40	66	15		
0802011093	497636.7	203326.0	336.140	336.140	A	SAR	41	66	15		
0802027542	499980.3	201713.6	336.880	336.880	A	SAR	41	66	15		
0802013541	498240.7	205164.0	338.790	338.790	A	SAR	41	66	15		
0801007416	491942.6	195261.8	346.510	346.510	A	SAR	42	68	16		
0801009915	497987.5	197818.5	354.930	354.930	A	SAR	43	69	16		
0802019221	503225.5	200616.2	358.070	358.070	A	SAR	43	70	16		
0801018949	497099.5	189921.4	359.940	359.940	A	SAR	43	70	16		
0801020633	490219.3	198042.5	366.580	366.580	A	SAR	44	72	17		
0801012746	487962.3	193798.3	386.800	386.800	A	SAR	47	76	18		
0802016451	503478.1	199218.9	387.470	387.470	A	SAR	47	76	18		
0802007991	500965.2	199573.6	400.000	400.000	A	SAR	49	79	19		
0801023128	489691.6	191704.9	400.000	400.000	A	SAR	49	79	19		
0802028603	498043.2	206740.9	406.000	406.000	A	SAR	49	80	19		
0801020846	498543.5	193713.9	411.000	411.000	A	SAR	50	81	19		
0801025619	491822.9	199665.3	422.990	422.990	A	SAR	51	83	20		
0801020870	503514.2	195020.1	449.570	449.570	A	SAR	55	88	21		
0801008412	498442.5	190831.6	455.640	455.640	A	SAR	55	90	21		
0802016443	501069.5	198742.1	464.410	464.410	A	SAR	57	91	22		
0802004321	498001.2	201062.2	473.000	473.000	A	SAR	58	93	22		
0801003550	487199.4	192104.1	487.000	487.000	A	SAR	59	96	23		
0801006363	496564.4	197283.5	518.000	518.000	A	SAR	63	102	24		
0801009079	494122.3	198266.5	552.500	552.500	A	SAR	68	109	26		
0801015842	491829.2	192361.5	556.920	556.920	A	SAR	68	110	26		
0801026828	485693.8	192331.5	714.470	714.470	A	SAR	88	141	34		
			55,064	**Acres**			5,939	9,974	2,009	3,930	Difference
			55,355	**Acres by Zoning**						7,965	Difference
			-0.5%	Difference							@ Bonus
			51,934	**Acres in 20+ Acre parcels**							

NON-POINT SOURCE POINT SOURCE TRADING STUDY

ATTACHMENT A
NAR & SAR ZONING MAP



GMB
GEORGE, MILES & BUHR, LLC
ARCHITECTS & ENGINEERS

CECIL COUNTY, MARYLAND
GMB JOB NO. 2006.275
NOVEMBER, 2006

ATTACHMENT B

NAR & SAR Nitrogen Credit Calculation

ATTACHMENT B
Estimation of Total Nitrogen Load Allowance
NAR/SAR Development Density Reduction

A. Calculation of Reduced Nitrogen Loading:

Average Maryland Unit Residents =	3.2	persons per ELU
Average Maryland Resident TN =	9.5	lbs-N/(year * person)
Pass Through Factor =	40%	Delivered to surface waters
Septic System Upgrades =	0%	Septic Upgrade Reduction

Average Maryland Unit TN to Suface Waters = 3.2 persons per ELU * 9.5 lbs-N/(year * person) * 40% Delivered to surface waters * 0% Septic Upgrade Reduction
= 12.16 lbs-N/year/ELU

NAR Region Reduction =	16,206	ELU
SAR Region Reduction =	7,965	ELU
Existing ELU to be Incorprated into NEAWWTP =	24,171	ELU

Reduced TN Load = 24171 ELU * 12.16 lbs-N/year/ELU
= 293,919 lbs/year

B. Calculation of TN Reduction due to TP Treatment

Prop. TP Treatment =	0.30	mg/L-P
Flow per ELU =	250	gpd/ELU

TP Load Contribution per Unit = 0.3 mg/L-P * 250 gpd/ELU * 8.34 (lbs*L/mg*MG)* 365 days/year / 1,000,000 gal/MG
= 0.23 lbs-P/year/ELU
Reduction in TN Load to Compensate = 0.23 lbs-P/year/ELU * (7 lbs-N / lb-P) * 24171 ELU
= 38,915 lbs-N/year

C. Calculation of Proposed TN Credit

TN Load Credit = 293919 lbs/year - 38915 lbs-N/year
= 255,004 lbs/year

= 27.92 MGD

ATTACHMENT C

Protected Land Build-Out

ATTACHMENT C
Protected Lands Build-Out
Summary & Credit Calculation

A. Summary of Protected Lands Build-Out Acreage:

	Acres	Build-out ELU	Build-out Flow (gpd)	Protected Land Designation
	1,351	136	34,000	Pending District
	2,891	180	45,000	Maryland Environmental Trust
	11,538	146	36,500	Maryland DNR
	12,760	835	208,750	MALPF Easements
	6,205	522	130,500	MALPF Districts
	688	69	17,250	Forest Legacy
	2,534	4	1,000	Federal Lands
	674	33	8,250	ESLC
	412	44	11,000	Natural Lands Trust
	505	88	22,000	County Lands
	746	181	45,250	Cecil Land Trust
	1,877	111	27,750	Rural Legacy
TOTALS -	**42,182**	**2,349**	**587,250**	

B. Calculation of Reduced Nitrogen Loading:

Average Maryland Unit Residents = 3.2 persons per ELU
Average Maryland Resident TN = 9.5 lbs-N/(year * person)
Pass Through Factor = 40% Delivered to surface waters

Septic System Upgrades = 0% Septic Upgrade Reduction

Average Maryland Unit TN to Suface Waters = 3.2 persons per ELU * 9.5 lbs-N/(year * person) * 40% Delivered to surface
= 12.16 lbs-N/year/ELU

Reduced TN Load = 12.16 lbs-N/year/ELU * 2349 ELU
= 28,564 lbs/year

C. Calculation of TN Reduction due to TP Treatment

Prop. TP Treatment = 0.30 mg/L-P

TP Load Contribution per Unit = 0.3 mg/L-P * 587250 gpd * 8.34 (lbs*L/mg*MG)* 365 days/year / 1,000,000 gal/MG
= 536.29 lbs-P/year
Reduction in TN Load to Compensate = 536.29 lbs-P/year * (7 lbs-N / lb-P)
= 3,754 lbs-N/year

D. Calculation of Proposed TN Credit

TN Load Credit = 28564 lbs/year - 3754 lbs-N/year
= 24,810 lbs/year

= 2.72 MGD

ATTACHMENT C
Protected Lands Build-Out
Build-out of Parcels

Area ID	Zoning Layer	GEN LU	Area Acres	ELU /ACRE	ELU	FLOW /ELU	FLOW
Cecil Land Trust	BG	COM	0.0670	N/A	N/A	N/A	N/A
Cecil Land Trust	BI	COM		N/A	N/A	N/A	N/A
Cecil Land Trust	BL	COM		N/A	N/A	N/A	N/A
Cecil Land Trust	DR	RES	94.7120	1.00	94	250	23,500
Cecil Land Trust	M1	IND		N/A	N/A	N/A	N/A
Cecil Land Trust	M2	IND	137.8220	N/A	N/A	N/A	N/A
Cecil Land Trust	MB	COM		N/A	N/A	N/A	N/A
Cecil Land Trust	MEA	IND	0.4900	N/A	N/A	N/A	N/A
Cecil Land Trust	MH	RES		2.00	-	250	-
Cecil Land Trust	NAR	RES	429.7430	0.10	42	250	10,500
Cecil Land Trust	OS	OPEN		-	-	250	-
Cecil Land Trust	RM	RES		2.00	-	250	-
Cecil Land Trust	RR	RES	10.2070	0.20	2	250	500
Cecil Land Trust	SAR	RES	30.8680	0.05	1	250	250
Cecil Land Trust	SR	RES	42.1050	1.00	42	250	10,500
Cecil Land Trust	TR	RES		1.00	-	250	-
Cecil Land Trust	VR	RES		1.00	-	250	-
County Lands	BG	COM	6.5780	N/A	N/A	N/A	N/A
County Lands	BI	COM		N/A	N/A	N/A	N/A
County Lands	BL	COM		N/A	N/A	N/A	N/A
County Lands	DR	RES	1.4710	1.00	1	250	250
County Lands	M1	IND	29.3940	N/A	N/A	N/A	N/A
County Lands	M2	IND		N/A	N/A	N/A	N/A
County Lands	MB	COM		N/A	N/A	N/A	N/A
County Lands	MEA	IND		N/A	N/A	N/A	N/A
County Lands	MH	RES	0.1600	2.00	-	250	-
County Lands	NAR	RES	193.2340	0.10	19	250	4,750
County Lands	OS	OPEN	204.9450	-	-	250	-
County Lands	RM	RES	1.0980	2.00	2	250	500
County Lands	RR	RES	1.4310	0.20	-	250	-
County Lands	SAR	RES		0.05	-	250	-
County Lands	SR	RES	62.0240	1.00	62	250	15,500
County Lands	TR	RES	4.9510	1.00	4	250	1,000
County Lands	VR	RES	0.0160	1.00	-	250	-

ATTACHMENT C
Protected Lands Build-Out
Build-out of Parcels

Area ID	Zoning Layer	GEN LU	Area Acres	ELU /ACRE	ELU	FLOW /ELU	FLOW
ESLC	BG	COM		N/A	N/A	N/A	N/A
ESLC	BI	COM		N/A	N/A	N/A	N/A
ESLC	BL	COM		N/A	N/A	N/A	N/A
ESLC	DR	RES		1.00	-	250	-
ESLC	M1	IND		N/A	N/A	N/A	N/A
ESLC	M2	IND		N/A	N/A	N/A	N/A
ESLC	MB	COM		N/A	N/A	N/A	N/A
ESLC	MEA	IND		N/A	N/A	N/A	N/A
ESLC	MH	RES		2.00	-	250	-
ESLC	NAR	RES		0.10	-	250	-
ESLC	OS	OPEN	1.0740	-	-	250	-
ESLC	RM	RES		2.00	-	250	-
ESLC	RR	RES		0.20	-	250	-
ESLC	SAR	RES	672.9970	0.05	33	250	8,250
ESLC	SR	RES		1.00	-	250	-
ESLC	TR	RES		1.00	-	250	-
ESLC	VR	RES		1.00	-	250	-
Federal Land	BG	COM	-	N/A	N/A	N/A	N/A
Federal Land	BI	COM	-	N/A	N/A	N/A	N/A
Federal Land	BL	COM	-	N/A	N/A	N/A	N/A
Federal Land	DR	RES	-	1.00	-	250	-
Federal Land	M1	IND	-	N/A	N/A	N/A	N/A
Federal Land	M2	IND	-	N/A	N/A	N/A	N/A
Federal Land	MB	COM	-	N/A	N/A	N/A	N/A
Federal Land	MEA	IND	-	N/A	N/A	N/A	N/A
Federal Land	MH	RES	-	2.00	-	250	-
Federal Land	NAR	RES	30	0.10	2	250	500
Federal Land	OS	OPEN	2,489	-	-	250	-
Federal Land	RM	RES	-	2.00	-	250	-
Federal Land	RR	RES	6	0.20	1	250	250
Federal Land	SAR	RES	8	0.05	-	250	-
Federal Land	SR	RES	-	1.00	-	250	-
Federal Land	TR	RES	1	1.00	1	250	250
Federal Land	VR	RES	-	1.00	-	250	-

ATTACHMENT C
Protected Lands Build-Out
Build-out of Parcels

Area ID	Zoning Layer	GEN LU	Area Acres	ELU /ACRE	ELU	FLOW /ELU	FLOW
Forest Legacy	BG	COM	-	N/A	N/A	N/A	N/A
Forest Legacy	BI	COM	-	N/A	N/A	N/A	N/A
Forest Legacy	BL	COM	-	N/A	N/A	N/A	N/A
Forest Legacy	DR	RES	-	1.00	-	250	-
Forest Legacy	M1	IND	-	N/A	N/A	N/A	N/A
Forest Legacy	M2	IND	-	N/A	N/A	N/A	N/A
Forest Legacy	MB	COM	-	N/A	N/A	N/A	N/A
Forest Legacy	MEA	IND	-	N/A	N/A	N/A	N/A
Forest Legacy	MH	RES	-	2.00	-	250	-
Forest Legacy	NAR	RES	683	0.10	68	250	17,000
Forest Legacy	OS	OPEN	-	-	-	250	-
Forest Legacy	RM	RES	-	2.00	-	250	-
Forest Legacy	RR	RES	5	0.20	1	250	250
Forest Legacy	SAR	RES	-	0.05	-	250	-
Forest Legacy	SR	RES	-	1.00	-	250	-
Forest Legacy	TR	RES	-	1.00	-	250	-
Forest Legacy	VR	RES	-	1.00	-	250	-
M.E.T.	BG	COM	-	N/A	N/A	N/A	N/A
M.E.T.	BI	COM	-	N/A	N/A	N/A	N/A
M.E.T.	BL	COM	-	N/A	N/A	N/A	N/A
M.E.T.	DR	RES	-	1.00	-	250	-
M.E.T.	M1	IND	-	N/A	N/A	N/A	N/A
M.E.T.	M2	IND	-	N/A	N/A	N/A	N/A
M.E.T.	MB	COM	-	N/A	N/A	N/A	N/A
M.E.T.	MEA	IND	-	N/A	N/A	N/A	N/A
M.E.T.	MH	RES	-	2.00	-	250	-
M.E.T.	NAR	RES	335	0.10	33	250	8,250
M.E.T.	OS	OPEN	3	-	-	250	-
M.E.T.	RM	RES	-	2.00	-	250	-
M.E.T.	RR	RES	3	0.20	-	250	-
M.E.T.	SAR	RES	2,529	0.05	126	250	31,500
M.E.T.	SR	RES	-	1.00	-	250	-
M.E.T.	TR	RES	21	1.00	21	250	5,250
M.E.T.	VR	RES	-	1.00	-	250	-

ATTACHMENT C
Protected Lands Build-Out
Build-out of Parcels

Area ID	Zoning Layer	GEN LU	Area Acres	ELU /ACRE	ELU	FLOW /ELU	FLOW
MALPF Districts	BG	COM	1	N/A	N/A	N/A	N/A
MALPF Districts	BI	COM		N/A	N/A	N/A	N/A
MALPF Districts	BL	COM	1	N/A	N/A	N/A	N/A
MALPF Districts	DR	RES		1.00	-	250	-
MALPF Districts	M1	IND	1	N/A	N/A	N/A	N/A
MALPF Districts	M2	IND		N/A	N/A	N/A	N/A
MALPF Districts	MB	COM		N/A	N/A	N/A	N/A
MALPF Districts	MEA	IND		N/A	N/A	N/A	N/A
MALPF Districts	MH	RES	0	2.00	-	250	-
MALPF Districts	NAR	RES	3,872	0.10	387	250	96,750
MALPF Districts	OS	OPEN	1	-	-	250	-
MALPF Districts	RM	RES		2.00	-	250	-
MALPF Districts	RR	RES	21	0.20	4	250	1,000
MALPF Districts	SAR	RES	2,290	0.05	114	250	28,500
MALPF Districts	SR	RES	16	1.00	16	250	4,000
MALPF Districts	TR	RES		1.00	-	250	-
MALPF Districts	VR	RES	1	1.00	1	250	250
MALPF Easements	BG	COM		N/A	N/A	N/A	N/A
MALPF Easements	BI	COM		N/A	N/A	N/A	N/A
MALPF Easements	BL	COM		N/A	N/A	N/A	N/A
MALPF Easements	DR	RES		1.00	-	250	-
MALPF Easements	M1	IND	0	N/A	N/A	N/A	N/A
MALPF Easements	M2	IND	0	N/A	N/A	N/A	N/A
MALPF Easements	MB	COM		N/A	N/A	N/A	N/A
MALPF Easements	MEA	IND		N/A	N/A	N/A	N/A
MALPF Easements	MH	RES	2	2.00	3	250	750
MALPF Easements	NAR	RES	3,313	0.10	331	250	82,750
MALPF Easements	OS	OPEN	3	-	-	250	-
MALPF Easements	RM	RES		2.00	-	250	-
MALPF Easements	RR	RES	38	0.20	7	250	1,750
MALPF Easements	SAR	RES	9,377	0.05	468	250	117,000
MALPF Easements	SR	RES		1.00	-	250	-
MALPF Easements	TR	RES	26	1.00	26	250	6,500
MALPF Easements	VR	RES	1	1.00	-	250	-

ATTACHMENT C
Protected Lands Build-Out
Build-out of Parcels

Area ID	Zoning Layer	GEN LU	Area Acres	ELU /ACRE	ELU	FLOW /ELU	FLOW
Maryland DNR	BG	COM		N/A	N/A	N/A	N/A
Maryland DNR	BI	COM		N/A	N/A	N/A	N/A
Maryland DNR	BL	COM		N/A	N/A	N/A	N/A
Maryland DNR	DR	RES	31	1.00	30	250	7,500
Maryland DNR	M1	IND	0	N/A	N/A	N/A	N/A
Maryland DNR	M2	IND	1	N/A	N/A	N/A	N/A
Maryland DNR	MB	COM		N/A	N/A	N/A	N/A
Maryland DNR	MEA	IND		N/A	N/A	N/A	N/A
Maryland DNR	MH	RES		2.00	-	250	-
Maryland DNR	NAR	RES	401	0.10	40	250	10,000
Maryland DNR	OS	OPEN	10,829	-	-	250	-
Maryland DNR	RM	RES	0	2.00	-	250	-
Maryland DNR	RR	RES	12	0.20	2	250	500
Maryland DNR	SAR	RES	199	0.05	9	250	2,250
Maryland DNR	SR	RES	65	1.00	65	250	16,250
Maryland DNR	TR	RES		1.00	-	250	-
Maryland DNR	VR	RES		1.00	-	250	-
Pending District	BG	COM	3	N/A	N/A	N/A	N/A
Pending District	BI	COM		N/A	N/A	N/A	N/A
Pending District	BL	COM	5	N/A	N/A	N/A	N/A
Pending District	DR	RES		1.00	-	250	-
Pending District	M1	IND		N/A	N/A	N/A	N/A
Pending District	M2	IND		N/A	N/A	N/A	N/A
Pending District	MB	COM		N/A	N/A	N/A	N/A
Pending District	MEA	IND		N/A	N/A	N/A	N/A
Pending District	MH	RES	0	2.00	-	250	-
Pending District	NAR	RES	593	0.10	59	250	14,750
Pending District	OS	OPEN	0	-	-	250	-
Pending District	RM	RES		2.00	-	250	-
Pending District	RR	RES	9	0.20	1	250	250
Pending District	SAR	RES	699	0.05	34	250	8,500
Pending District	SR	RES	43	1.00	42	250	10,500
Pending District	TR	RES		1.00	-	250	-
Pending District	VR	RES		1.00	-	250	-

ATTACHMENT C
Protected Lands Build-Out
Build-out of Parcels

Area ID	Zoning Layer	GEN LU	Area Acres	ELU /ACRE	ELU	FLOW /ELU	FLOW
Private Easement	BG	COM		N/A	N/A	N/A	N/A
Private Easement	BI	COM		N/A	N/A	N/A	N/A
Private Easement	BL	COM		N/A	N/A	N/A	N/A
Private Easement	DR	RES	12	1.00	12	250	3,000
Private Easement	M1	IND		N/A	N/A	N/A	N/A
Private Easement	M2	IND		N/A	N/A	N/A	N/A
Private Easement	MB	COM		N/A	N/A	N/A	N/A
Private Easement	MEA	IND		N/A	N/A	N/A	N/A
Private Easement	MH	RES		2.00	-	250	-
Private Easement	NAR	RES	30	0.10	3	250	750
Private Easement	OS	OPEN		-	-	250	-
Private Easement	RM	RES		2.00	-	250	-
Private Easement	RR	RES	3	0.20	-	250	-
Private Easement	SAR	RES	354	0.05	17	250	4,250
Private Easement	SR	RES	12	1.00	12	250	3,000
Private Easement	TR	RES		1.00	-	250	-
Private Easement	VR	RES		1.00	-	250	-
Rural Legacy	BG	COM		N/A	N/A	N/A	N/A
Rural Legacy	BI	COM		N/A	N/A	N/A	N/A
Rural Legacy	BL	COM		N/A	N/A	N/A	N/A
Rural Legacy	DR	RES		1.00	-	250	-
Rural Legacy	M1	IND		N/A	N/A	N/A	N/A
Rural Legacy	M2	IND		N/A	N/A	N/A	N/A
Rural Legacy	MB	COM		N/A	N/A	N/A	N/A
Rural Legacy	MEA	IND		N/A	N/A	N/A	N/A
Rural Legacy	MH	RES		2.00	-	250	-
Rural Legacy	NAR	RES	377	0.10	37	250	9,250
Rural Legacy	OS	OPEN	3	-	-	250	-
Rural Legacy	RM	RES		2.00	-	250	-
Rural Legacy	RR	RES	0	0.20	-	250	-
Rural Legacy	SAR	RES	1,497	0.05	74	250	18,500
Rural Legacy	SR	RES		1.00	-	250	-
Rural Legacy	TR	RES		1.00	-	250	-
Rural Legacy	VR	RES		1.00	-	250	-
TOTALS =			**42,182**		**2,349**		**587,250**

ATTACHMENT D

Carpenters Point Correspondence

GMB
GEORGE, MILES & BUHR, LLC

ARCHITECTS
ENGINEERS

[illegible] SPARKS VALLEY RD SUITE A
SPARKS, MD 21152
PH 410 329 5005
PH 885 455 4462
FAX 410 329 5881

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1 of 2.

December 12, 2005

JC

Maryland Department of the Environment
Water Management Administration
Wastewater Permits Program
1800 Washington Boulevard, Ste. 455
Baltimore, Maryland 21230-1708

Attn: Mrs. Virginia Kearney,
Deputy Director

2003.271

Re: Total Nitrogen Credit for Incorporation of Existing Septic Systems MDE
Carpenters Point Collection System
Cecil County, Maryland
GMB Job No. 2003.271

Dear Mrs. Kearney:

Recently, Cecil County has completed the first phase of a project at Carpenters Point to incorporate a number of existing septic systems into the Northeast Advanced Wastewater Treatment Plant (NEAWWTP). This effort was completed since many of these systems were failing and the risk to public health due to the proximity of these septic systems to the Northeast River.

The Carpenters Point Collection System is being accomplished in two (2) phases. Phase 1 is scheduled to be completed in December 2005. Phase 2 is scheduled to begin construction in 2006. Upon completion of both phases of this project, it is anticipated to connect existing septic systems of approximately 290 equivalent living units (ELU) attributed to single family dwellings and approximately 478 ELU attributed to existing mobile home / trailer parks.

The Chesapeake Bay Nutrient Strategy requires that nutrient loads in a watershed not be increased. Upon completion of the Carpenters Point projects, we would propose that a nutrient credit to the NEAWWTP be issued for total nitrogen (TN) based on this strategy. This credit is proposed to be equivalent to the TN load reduction associated with incorporation of the existing septic systems to maintain the TN loading for this watershed at current levels.

The Carpenters Point projects are anticipated to result in the abandonment of existing septic units (approximately 768 ELU) many of which are failing. The sanitary flow from these existing units shall be treated to ENR levels at the NEAWWTP. We believe the credit associated with the incorporation of these septic systems into the NEAWWTP should be approximately **20,365 lbs TN per year**.

Calculation of this proposed credit is attached for your reference (Attachment A). Within the attached calculations, the septic systems are assumed to provide no treatment between the septic system effluent and the river and thus result in a pass-through factor of 100% due to the relatively close proximity of Carpenters Point to the Northeast River and the soils in this vicinity. We also feel that the Maryland's Tributary Strategy call for upgrades of the average septic system to reduce total nitrogen load by 50-percent is not applicable in this instance. Considering the soil conditions, proximity to the river, required setbacks to adjacent properties and since these properties are within the planned service district the installation of new upgraded septic systems at this location would likely be prohibited. Furthermore, there currently exists no regulatory mechanism to require existing septic systems to be upgraded for additional nutrient removal.

After you have had an opportunity to review the proposed total nitrogen loading credits for the NEAWWTP and have discussed this matter with your staff, we feel it would be helpful to schedule a meeting to discuss this matter in detail. If you should have any immediate questions, please do not hesitate to give me a call.

We greatly appreciate your assistance and cooperation with respect to addressing the wastewater needs for the NEAWWTP and Cecil County.

Sincerely,

Jason M. Lytle, P.E.
Project Manager

JML/sb

Enclosure

cc: Mr. Matheu Carter, P.E. – Cecil County Capital Facilities Administrator

Estimation of Total Nitrogen Load Allowance

Calculation of TN per ELU

Average Maryland Unit Residents =	3.2	persons per ELU
Average Maryland Resident TN =	9.5	lbs-N/(year * person)
Pass-through Factor =	100%	Delivered to surface waters

Average Maryland Unit TN to Suface Waters = 3.2 persons per ELU * 9.5 lbs-N/(year * person) * 100% Delivered to surface waters
= 30.4 lbs-N/year/ELU

Calculation of TN Reduction due to TP Treatment per ELU

Prop. TP Treatment =	0.30	mg/L TP
Flow per ELU =	250	gpd/ELU

TP Load Contribution per Unit = 0.3 mg/L TP * 250 gpd/ELU * 365 days/year / 1,000,000 gal/MG
= 0.23 lbs-P/year/ELU
Reduction in TN Load to Compensate = 0.23 lbs-P/year/ELU * 7
= 1.60 lbs-N/year/ELU

Calculation of TN Credit

Septic System Upgrades = 0% Septic Upgrade Reduction in TN

Existing TN Load per ELU = 30.4 lbs-N/year/ELU * (1 - 0% Septic Upgrade Reduction in TN) - 1.6 lbs-N/year/ELU(Due to TP Treatment)
= 28.80 lbs-N/year/ELU

Existing Single Family Dwellings =	290	ELU
Existing Mobile Home / Trailer Park Units =	478	ELU
Existing ELU to be Incorprated into NEAWWTP =	768	ELU

Exisitng TN Load = 28.8 lbs-N/year/ELU * 768 ELU
= 22,118 lbs/year

Proposed TN Load at ENR Treatment = 768 ELU * 250 gpd/ELU / 1,000,000 * 8.34 *3.0 mg/L TN * 365 days/year
= 1,753 lbs/year

TN Load Credit = 22,118 lbs/year - 1,753 lbs/year
= 20,365 lbs/year

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

Kendl P. Philbrick
Secretary

Jonas A. Jacobson
Deputy Secretary

Jason M. Lytle, P.E.
George, Miles and Buhr
120 Sparks Valley Road, Suite A
Sparks, MD 21152

Dear Mr. Lytle:

I have received your proposal for "Total Nitrogen Credit for Incorporation of Existing Septic Systems" at Carpenters Point. The Department is interested in working with you and Cecil County to achieve an appropriate offset determination.

Your analysis includes several assumptions that the Department questions, including the following:

1. Use of 3.2 persons per equivalent living unit (ELU) for 768 ELU. While the Bay Program uses 3.2 persons per living unit in their calculations, as noted in your proposal, 478 of the ELU at Carpenter's Point are attributed to mobile homes and/or trailer parks. Facilities such as mobile homes and trailer parks may be expected to have a lower occupancy rate than 3.2 persons per unit. You should provide supporting data for the use of this occupancy rate. Also, the Maryland Department of Planning uses a statewide average of 2.61 based on the 2000 census.

2. Your proposal assumes that 100 percent of the nitrogen discharged from septic tanks reaches surface waters. The Bay Program calculation uses a 40 percent pass though of septic tank nitrogen to surface water. Much of this potential loss of nitrogen comes as the groundwater enters surface water and is subject to denitrification at the groundwater/surface interface or to losses to deeper aquifers. and nutrient uptake. At Carpenter Point MDE would still use a 40 percent pass through rate for total nitrogen.

3. You also propose that basing the offset on upgraded onsite sewage disposal systems consistent with Maryland's Tributary Strategy would not be appropriate

since site conditions, and being in the planned service area, would prohibit the upgrade of onsite systems. The upgrade of onsite systems to reduce the discharge of nitrogen is independent of site characteristics. Any offset program for nitrogen should be based, in part, on meeting the nitrogen reducing goals of Maryland's Tributary Strategy, which assumes upgraded onsite sewage disposal systems.

Please be aware that MDE has begun a dialogue with various stakeholders on trading and offsets, with the goal of developing a trading and offset policy document and perhaps regulations. MDE will continue to work with you and Cecil County on the capacity issues facing the County. If I can be of any further assistance on this matter, please call me at 410-537-3512 or via email at vkearney@mde.state.md.us.

Sincerely,

Virginia F. Kearney

Virginia F. Kearney, Deputy Director
Waster Management Administration

cc: Matheu Carter, Cecil County
Edwal Stone
Jay Prager
Marya Levelev

C:\My Documents\Ed\GMBNcredit.doc

ATTACHMENT E

Health Department Letter

VIRGINIA R. BAILEY M.D., M.P.H.
HEALTH OFFICER

Cecil County
Health Department

John M. Byers Health Center
401 Bow Street
Elkton, Maryland 21921-5515

June 23, 2000

Mr. Fred F. Orr, Acting Director
Department of Public Works
129 East Main Street, Room 308
Elkton, Maryland 21921

Re: Carpenters Point Sanitary Sewer Project

Dear Mr. Orr:

The need for public sewers in the Carpenters Point area has been recognized for a number of years, as the majority of on-site sewage disposal systems there do not comply with present Maryland Department of the Environment Regulations for sewage disposal and are considered to be failing. A "failure" would be sewage discharging to the surface, sewage backing up into the house plumbing, and/or partially treated sewage discharging to the groundwater (and from there to the North East River.) Any of these conditions would constitute a potential health hazard, as well as an environmental problem for the Bay.

The same soil conditions, i.e., high water tables and clay, that cause the septic systems to fail, along with small lot sizes, also prevent satisfactory on-site repairs. The Health Department therefore unreservedly supports the extension of public sewers from the North East River Advanced Wastewater Treatment Plant to serve the Carpenters Point area.

The Health Department would also like to take this opportunity to thank you and your staff for all of the effort which has gone into this project, and if this office can provide any further assistance please let us know.

Very truly yours,

Virginia R. Bailey, MD, MPH

Virginia R. Bailey, M.D., M.P.H.
Health Officer

Charles E. Smyser

Charles E. Smyser, Director
Environmental Health Services

VRB/CES/rg

ATTACHMENT F

Revised Carpenters Point Nitrogen Credit Calculation

ATTACHMENT F

Estimation of Total Nitrogen Load Allowance

Carpenters Point Septic System Incorporation to ENR WWTP

A. Calculation of Reduced Nitrogen Loading:

Average Carpenters Point (TAZ 570) Unit Residents =	2.75	persons per ELU
Average Carpenters Point Resident TN =	9.5	lbs-N/(year * person)
Pass Through Factor =	100%	Delivered to surface waters
Septic System Upgrades =	0%	Septic Upgrade Reduction

Average Carpenters Point Unit TN to Suface Waters = 2.75 persons per ELU * 9.5 lbs-N/(year * person) * 100% Delivered to surface waters * 0% Septic Upgrade Reduction

= 26.13 lbs-N/year/ELU

Existing Single Family Dwellings =	290	ELU
Existing Mobile Home / Trailer Park Units =	478	ELU
Existing ELU to be Incorprated into NEAWWTP =	768	ELU

Reduced TN Load = 768 ELU * 26.13 lbs-N/year/ELU

= 20,068 lbs/year

B. Calculation of TN Reduction due to TP Treatment

Prop. TP Treatment =	0.30	mg/L-P
Flow per ELU =	250	gpd/ELU

TP Load Contribution per Unit = 0.3 mg/L-P * 250 gpd/ELU * 8.34 (lbs*L/mg*MG)* 365 days/year / 1,000,000 gal/MG

= 0.23 lbs-P/year/ELU

Reduction in TN Load to Compensate = 0.23 lbs-P/year/ELU * (7 lbs-N / lb-P) * 768 ELU

= 1,236 lbs-N/year

C. Calculation of TN Loading to ENR Tratement Plant

Proposed TN Load at ENR Treatment = 250 gpd/ELU * 768 ELU * 8.34 (lbs*L/mg*MG) *3.0 mg/L TN * 365 days/year / 1,000,000 gal/MG

= 1,753 lbs/year

D. Calculation of Proposed TN Credit

TN Load Credit = 20068 lbs/year - 1236 lbs-N/year - 1753 lbs/year

= 17,079 lbs/year

= 1.87 MGD

GMB
GEORGE, MILES & BUHR, LLC

ARCHITECTS
ENGINEERS

120 SPARKS VALLEY RD., SUITE A
SPARKS, MD 21152
PH: 410.329.5005
PH: 888.455.4462
FAX: 410.329.5881

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November 6, 2006

Cecil County Government
107 North Street
Elkton, Maryland 21921

Attn: Mr. Matheu J. Carter, P.E.
Capital Facilities Administrator

Re: Cecil County Nutrient Credit Study Follow-up
Cecil County, Maryland
GMB Job No. 2006.275

Dear Mr. Carter:

As requested, we have reviewed the impact of the Septic Upgrades as called for in Maryland's Tributary Strategy to our letter report revised November 3, 2006. The Tributary Strategy calls for upgrades of the average on-site septic system to reduce total nitrogen load by 50-percent. With this included in the calculations, the results are as follows:

A.	NAR/SAR Development Density Reduction	=	108,045 lbs TN
B.	Protected Lands Build-Out Credits	=	10,528 lbs TN
C.	Carpenter's Point Proposal	=	7,041 lbs TN

The total proposed credit for these items including upgraded septic systems in accordance with the Tributary Strategy is approximately 125,614 pounds of total nitrogen annually. This nutrient credit would relate to an additional 13.75 MGD in treatment capacity at an effluent concentration of 3.0 mg/L total nitrogen. The revised attachments from the Nutrient Credit Study are enclosed for your use and reference.

If you have any questions or wish to discuss the above information, please do not hesitate to contact our office.

Sincerely,

Jason M. Lytle, P.E.
Project Manager

Enclosures

JML/sb

ATTACHMENT B - REVISED
Estimation of Total Nitrogen Load Allowance
NAR/SAR Development Density Reduction

A. Calculation of Reduced Nitrogen Loading:

Average Maryland Unit Residents =	3.2	persons per ELU
Average Maryland Resident TN =	9.5	lbs-N/(year * person)
Pass Through Factor =	40%	Delivered to surface waters
Septic System Upgrades =	50%	Septic Upgrade Reduction

Average Maryland Unit TN to Suface Waters = 3.2 persons per ELU * 9.5 lbs-N/(year * person) * 40% Delivered to surface waters * 50% Septic Upgrade Reduction
= 6.08 lbs-N/year/ELU

NAR Region Reduction =	16,206	ELU
SAR Region Reduction =	7,965	ELU
Existing ELU to be Incorprated into NEAWWTP =	24,171	ELU

Reduced TN Load = 24171 ELU * 6.08 lbs-N/year/ELU
= 146,960 lbs/year

B. Calculation of TN Reduction due to TP Treatment

Prop. TP Treatment =	0.30	mg/L-P
Flow per ELU =	250	gpd/ELU

TP Load Contribution per Unit = 0.3 mg/L-P * 250 gpd/ELU * 8.34 (lbs*L/mg*MG)* 365 days/year / 1,000,000 gal/MG
= 0.23 lbs-P/year/ELU
Reduction in TN Load to Compensate = 0.23 lbs-P/year/ELU * (7 lbs-N / lb-P) * 24171 ELU
= 38,915 lbs-N/year

C. Calculation of Proposed TN Credit

TN Load Credit = 146960 lbs/year - 38915 lbs-N/year
= 108,045 lbs/year

= 11.83 MGD

ATTACHMENT C - REVISED
Protected Lands Build-Out
Summary & Credit Calculation

A. Summary of Protected Lands Build-Out Acreage:

	Acres	Build-out ELU	Build-out Flow (gpd)	Protected Land Designation
	1,351	136	34,000	Pending District
	2,891	180	45,000	Maryland Environmental Trust
	11,538	146	36,500	Maryland DNR
	12,760	835	208,750	MALPF Easements
	6,205	522	130,500	MALPF Districts
	688	69	17,250	Forest Legacy
	2,534	4	1,000	Federal Lands
	674	33	8,250	ESLC
	412	44	11,000	Natural Lands Trust
	505	88	22,000	County Lands
	746	181	45,250	Cecil Land Trust
	1,877	111	27,750	Rural Legacy
TOTALS -	**42,182**	**2,349**	**587,250**	

B. Calculation of Reduced Nitrogen Loading:

Average Maryland Unit Residents = 3.2 persons per ELU
Average Maryland Resident TN = 9.5 lbs-N/(year * person)
Pass Through Factor = 40% Delivered to surface waters

Septic System Upgrades = 50% Septic Upgrade Reduction

Average Maryland Unit TN to Suface Waters = 3.2 persons per ELU * 9.5 lbs-N/(year * person) * 40% Delivered to surface
= 6.08 lbs-N/year/ELU

Reduced TN Load = 6.08 lbs-N/year/ELU * 2349 ELU
= 14,282 lbs/year

C. Calculation of TN Reduction due to TP Treatment

Prop. TP Treatment = 0.30 mg/L-P

TP Load Contribution per Unit = 0.3 mg/L-P * 587250 gpd * 8.34 (lbs*L/mg*MG)* 365 days/year / 1,000,000 gal/MG
= 536.29 lbs-P/year
Reduction in TN Load to Compensate = 536.29 lbs-P/year * (7 lbs-N / lb-P)
= 3,754 lbs-N/year

D. Calculation of Proposed TN Credit

TN Load Credit = 14282 lbs/year - 3754 lbs-N/year
= 10,528 lbs/year

= 1.15 MGD

ATTACHMENT F - REVISED

Estimation of Total Nitrogen Load Allowance

Carpenters Point Septic System Incorporation to ENR WWTP

A. Calculation of Reduced Nitrogen Loading:

Average Carpenters Point (TAZ 570) Unit Residents =	2.75	persons per ELU
Average Carpenters Point Resident TN =	9.5	lbs-N/(year * person)
Pass Through Factor =	100%	Delivered to surface waters
Septic System Upgrades =	50%	Septic Upgrade Reduction

Average Carpenters Point Unit TN to Suface Waters = 2.75 persons per ELU * 9.5 lbs-N/(year * person) * 100% Delivered to surface waters * 50% Septic Upgrade Reduction

= 13.06 lbs-N/year/ELU

Existing Single Family Dwellings =	290	ELU
Existing Mobile Home / Trailer Park Units =	478	ELU
Existing ELU to be Incorprated into NEAWWTP =	768	ELU

Reduced TN Load = 768 ELU * 13.06 lbs-N/year/ELU

= 10,030 lbs/year

B. Calculation of TN Reduction due to TP Treatment

Prop. TP Treatment =	0.30	mg/L-P
Flow per ELU =	250	gpd/ELU

TP Load Contribution per Unit = 0.3 mg/L-P * 250 gpd/ELU * 8.34 (lbs*L/mg*MG)* 365 days/year / 1,000,000 gal/MG

= 0.23 lbs-P/year/ELU

Reduction in TN Load to Compensate = 0.23 lbs-P/year/ELU * (7 lbs-N / lb-P) * 768 ELU

= 1,236 lbs-N/year

C. Calculation of TN Loading to ENR Tratement Plant

Proposed TN Load at ENR Treatment = 250 gpd/ELU * 768 ELU * 8.34 (lbs*L/mg*MG) *3.0 mg/L TN * 365 days/year / 1,000,000 gal/MG

= 1,753 lbs/year

D. Calculation of Proposed TN Credit

TN Load Credit = 10030 lbs/year - 1236 lbs-N/year - 1753 lbs/year

= 7,041 lbs/year

= 0.77 MGD