

TOWN OF NORTH EAST, MARYLAND

WATER RESOURCES ELEMENT

(House Bill 1141, 2006 Session)

An Amendment to the

**COMPREHENSIVE PLAN
OF THE TOWN OF NORTH EAST**

June 8, 2009

DRAFT

ACKNOWLEDGEMENTS

Financial assistance provided by:
Department of Natural Resources
Maryland Department of Housing and Community Development

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I. PURPOSE OF ELEMENT

Article 66B of the Maryland Annotated Code, as amended by House Bill 1141 (2006 Session), requires a Water Resources element in the Comprehensive Plan that addresses the adequacy of water supply and the suitability of receiving waters for point and non-point discharges. The WRE must evaluate the adequacy and suitability of water resources on the basis of existing and future land use, both within the Town and within the Town's growth area. Thus, the WRE is based on the Land Use and Municipal Growth elements of the Comprehensive Plan. It is also tied to the Community Facilities element (for water and sewer), and to the Plan's environmental goals and policies for protecting water supply and water quality.

II. WATER SUPPLY

Setting

The Town of North East straddles the geographic fall line that separates the Atlantic Coastal Plain province (composed of unconsolidated sediments) from the Piedmont Plateau province (composed of crystalline rock). In terms of water resources, the Town's dual hydro-geological settings offer two advantages: 1) the potential for high-yield wells from Coastal Plain aquifers, and 2) the potential for raw water impoundments fed by rapidly flowing year-round non-tidal streams, coming out of the Piedmont. While the Town's water system relies on reservoirs of raw water, fed by North East Creek and Little North East Creek, the following review of groundwater supply may be useful for long term planning.

The potential for high-yield groundwater production in the Coastal Plain is substantial. Long term quantity is not a problem. The productivity is about ten times greater than wells in crystalline rock. The peninsula south of Town (between the Northeast and Elk Rivers) is a favorable location for wells, with potential well depths ranging from 30 to 500 feet (brackish water exists at depths greater than 500'). Some large wells in this part of the Coastal Plain can produce over 1000 gallons per minute.

In and around North East, groundwater is stored in the Potomac group aquifers. Wells that reach the bottom horizons of the aquifer can produce yields of 200 to 500 gallons per minute. Withdrawals of groundwater can cause a "cone of

depression” in the immediate area (a lowering of groundwater levels), making the placement, depth, and adequate separation of wells important considerations for planning. Although the Potomac aquifers are confined, they can leak in places, causing shifts and exchanges over time. In general, estimates of groundwater yield in Coastal Plain wells are fairly accurate (and more so than in Piedmont wells).

The quality of the ground water in all of Cecil County is generally acceptable for all uses. The groundwater is soft; many Coastal Plain wells contain iron and have a low pH. All of these conditions can be treated. With properly constructed wells, pollution of groundwater poses little problem as the surface geology provides protective filtering of potential contaminants.

Town Water System

The Town has two water filtration plants; one is located at Rolling Mill Road and the other at Leslie Road. Northeast Creek feeds raw water impoundments at both facilities, and the Rolling Mill WTP also uses Little Northeast Creek. The Leslie Road reservoir holds 2.5 million gallons and the Rolling Mill reservoir holds 4.8 million gallons.

The Town recently obtained an MDE permit to withdraw water from the tidal portion of the Northeast River, which is then pumped to the Rolling Mill WTP. The permit is valid until May 1, 2016 and allows a daily average withdrawal of .559 MGD and a maximum daily withdrawal of 3.862 MGD.

During periods of low creek flows, the Leslie Road WTP shuts down, and the difference is made up by water from the Rolling Mill WTP. The Rolling Mill WTP is notable as the first surface water direct filtration plant approved for water supply in Maryland.

A reserve capacity of about 2 million gallons is stored in seven tanks, three of which are underground and four are elevated. Significant improvements to the system have been accomplished since 2000 and are on-going. A new Rolling Mill WTP came on-line in May 2009. Additional details are summarized below.

Table 1: Water System

Plant Name	Actual Avg. Daily Flow (mgd) (Apr 08 - Mar 09)	Max Daily Flow permitted (mgd)	Avg. Daily Flow Permitted (mgd)	Design Capacity: Avg. / Max. (mgd)
Rolling Mill	0.211	3.200	1.383	Phase One: 1.15 / 2.0 Phase Two (future): 2.3 / 4.0
Leslie	0.401	0.620	0.325	0.547 / 0.830
TOTAL	0.612	3.820	1.708	Current: 1.697 / 2.830 With Phase Two:

				2.847 / 4.830
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Projected Water Demand for the Town and the Growth Area

The customer base in 2004 was reported to be 8,000 people. Based on the number of residential units served with water (in and out of Town), the current customer base is estimated to be 8,300. The Town of North East also serves the State’s I-95 Rest Stop, which uses an average of 35,000 gallons per day, although usage varies widely from month-to-month. Slightly more than one-half of the 3,225 units served (residential, commercial, and mixed use) are in Town. In terms of only the residential units served, 47 percent (1304) are in Town and 53 percent (1446) are outside the Town.

According to the water service area map, approximately 38 percent of the area with service or planned service is located within the Town, and 62 percent of the service area is County territory (much of which is within the Town Growth Area and planned for annexation).

The following tables summarize the water needed to accommodate existing and future development under the North East Comprehensive Plan, including needs associated with the Town’s Growth Area Map. Projections for the Town are based on population projections from the Maryland Department of Planning (MDP) and are expressed in five-year increments for the period 2010 to 2030. Table 2 includes two methods for projecting population: constant share and high development pressure. Need is expressed as a range, based on the two projection methods.

	2000	2010	2015	2020	2025	2030
Population (Constant percent of County method ¹)	2744	3455	3888	4299	4709	5112
Population (High development pressure method ²)	2744	3566	4246	5030	5942	6969
Housing units: (range ³)	1020 to 1215	1309 to 1608	1495 to 1947	1679 to 2328	1861 to 2768	2037 to 3263
Water Needs (range ³)	.224 to .267mgd	.288 to .354mgd	.329 to .428mgd	.369 to .512mgd	.409 to .447mgd	.448 to .718mgd
Percent of Average Daily flow (range ³)	13 to 16	17 to 21	19 to 25	22 to 30	24 to 36	26 to 42
Percent Maximum Daily flow (range ³)	6 to 7	8 to 9	9 to 11	10 to 13	11 to 16	12 to 19

¹Data for each year represents 3.2 percent of MDP population projection for Cecil County (2009).
²Source: MDP growth modeling (2009). See also, Municipal Growth Element.
³Data represents a range between “constant percent” and “high development pressure” and assumes each unit requires 220 gallons of water per day. Percent assumes Phase One status at Rolling Mill WTP.

Projections for the Growth Area are based on data from the Municipal Growth Element, including the number of households and net acres for development. These projections also include demand from Cecil County’s Urban Growth Boundary Area 1 for North East. See Table 3. (For testing purposes, the population and number of households were also projected using TAZs. The results were within the “constant-to-high pressure range” derived from MDP data.)

The total amount of water needed for existing and future development under the Comprehensive Plan and Growth Area Map is provided in Table 4.

Land Use	Households (Residential) Acres (Commercial, Industrial)	Water Needed (gallons per day)
All Planned Residential (Tiers 1 and 2)	4080 households	897,600
Tier 1 Planned Residential (20 year horizon)	2377 households	522,940
Commercial, Industrial (Planned Economic Growth)	1655 net acres	1,655,000
Cecil County Urban Growth Boundary site (Econ. Growth) ²	224 net acres	224,000

TOTAL (includes Tier 1 and 2)		2,776,600
TOTAL (includes Tier 1 only)		2,401,940
¹ Assumes 220 GPD per household and 1,000 GPD per net acre for commercial and industrial. ² Cecil Co. UGB Study, 2002 amendment, reports a total of 1700 acres in this site, but that figure appears to be a typo error. The total area measures to be 350 acres, of which 298 acres are outside the Town growth area. This area yields 224 net acres for development and represents an additional source of future demand for water.		

Table 4: Total 2030 Water Needs* for the Town and the Growth Area: 1) Constant and High Pressure Population Growth Scenarios and 2) Growth Area Map (Tiers One and Two) (gallons per day)		
Needs Based on Pop Growth	Constant Growth	High Development Pressure
Town Customers	448,064	717,860
Existing County Customers	299,880	299,880
Total	747,944	1,017,740
Needs Based on Land Area		
Growth Area: Tier One	2,401,940	
Growth Area: Tier Two	374,660	
Town Infill	165,220	
Usage in 2009	612,000	
Total	3,553,820	
Total without Tier Two	3,179,160	

*Assumes 220 GPD/Household and 1000 GPD/net acre of commercial and industrial

Summary of Water Supply and Demand

Based on Population Growth

Based on the 2030 population projections, the Town needs .748MGD of water for growth at the constant rate, and 1.02MGD of water for growth under the high development pressure scenario. This estimate assumes that there is no growth in non-municipal customers, and that all future County customers are annexed

into the Town. The Town has adequate design capacity (without needing to implement Phase Two at Rolling Mill), and an adequate permitted daily flow to serve projected population growth.

Based on Land Area

The land for development in the Growth Area (Tiers One and Two), new infill development, and current Town and County customers, requires 3.6MGD of water. Without Tier Two, 3.2MGD of water are needed. The demand from full build out of the Growth Area would exceed the Town's average flow design capacity (even with Phase Two at Rolling Mill) by about 12 percent.

This is a long term and relatively modest shortfall, and the Town has adequate time and tools to plan for improvements as needed. Raw water supply for the WTP reservoirs does not appear to be a limiting factor. Facility improvements, if required, should likely be focused on the Rolling Mill plant. Modest adjustments to MDE permits may provide additional water to make up the long term shortfall. Finally, since the land supply in the Growth Area purposefully exceeds the amount needed for population growth to 2030 (to account for market choices), full build out of the Growth Area by 2030 is not likely.

The largest variable in projecting the supply of water needed in the future appears to be water usage by future industrial, commercial, and business uses. This element uses 1000 gallons per net acre, but this number is probably on the high end (and thus needs are overstated). Appendix C is a table used in Cecil County for estimating the water needs of an array of non-residential uses. As specific uses are proposed in the future, the table should be used as part of a water supply capacity management system to track the impacts of new economic growth on available supply.

2008 Water Service Area Maps

The Master Water Plan on the following page shows the service areas in and around North East. The Map includes the boundary of the Town's Growth Area. Nearly 100 percent of the Growth Area has public water, or is planned for water.

Conclusion

Ensuring an adequate supply of water for growth should not present difficult technical or regulatory obstacles, or higher than ordinary costs. Additional supply can be accommodated through continued improvements to the Town's two Water Treatment Plants and by using groundwater as a supplemental source. The Northeast River Wastewater Treatment Plant (and not the water plant) is the major constraint on growth

Water and Sewer Service and Town Growth Area

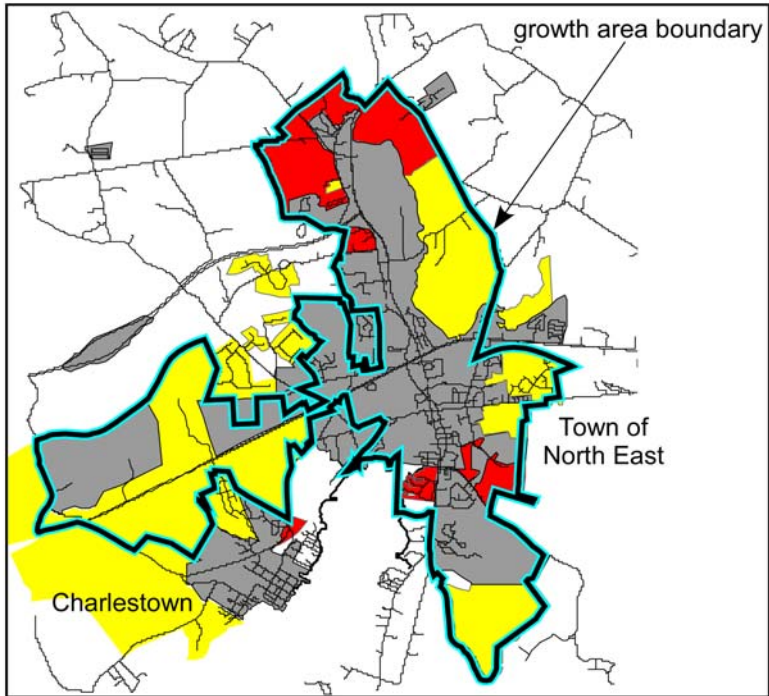
Map adapted from Cecil County
Office of Planning & Zoning
Updated December 2, 2008
Drawn by DRB

Legend

Master Water Plan

Service Area

-  W-1 (Existing)
-  W-2 (0 to 5 years)
-  W-3 (6 to 10 years)

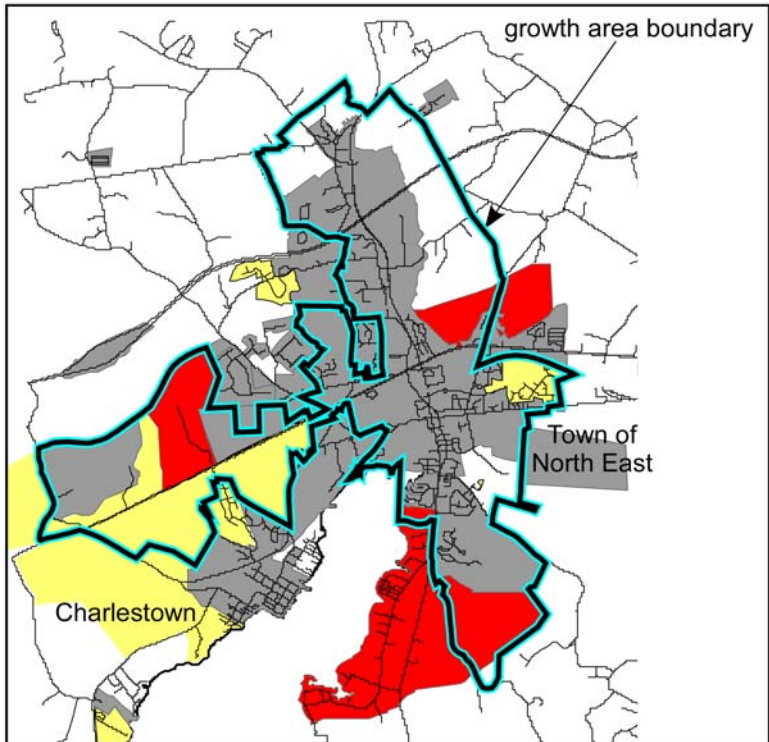


Legend

Master Sewer Plan

Service Area

-  S-1 (Existing)
-  S-2 (0 to 5 years)
-  S-3 (5 to ten years)



III. WATER QUALITY

North East is wholly contained within the Northeast River watershed; the River receives pollution discharges from both point and non-point sources in the Town. Point sources, primarily the Town's wastewater treatment plant, are controlled by State permits. Non-point source impacts are not controlled directly via permit, but rather are a consequence of how land is used and how stormwater runoff is managed. North East has experience with water quality issues under its Chesapeake Bay Critical Area Program, where water quality plays a heightened role in the Town's decision-making.

Point Source Discharge to Northeast River

The Northeast River Advanced Wastewater Treatment Plant (WTTP) located at Seneca Point (just south of Charlestown) serves the Town of North East and most of the Town's Growth Area. The WTTP also serves the Town of Charlestown and areas in Cecil County proximate to North East (the I95 Rest Stop, several neighborhoods, institutions, industrial parks, and a shopping center).

Recent and Planned Improvements

In 2005, the County completed an upgrade of the WTTP for biological nutrient removal (BNR). As of 2009, the County is in the process of planning design modifications to improve the plant to meet enhanced nutrient removal (ENR) standards. This action, alone, would only increase maximum design (and permitted) capacity from the present 2.0MGD to 2.67MGD. Most important, the WTTP will still be grossly inadequate to handle planned County and municipal growth. A 2007 study by George, Miles and Buhr determined that the WTTP should be sized to handle 9.1MGD.

The WTTP's expansion is limited by an MDE-issued nutrient allocation (a cap) of 24,364 pounds per year of total nitrogen (TN), and 1,827 pounds per year of total phosphorous (TP). This is equal to operation at 4.0 mg/L of TN and 0.3 mg/L of TP.

In order to expand beyond the technical cap limit of 2.67MGD, the County plans to use a comprehensive program of credits and other mitigating actions that will require approval by MDE (see County Master Water and Sewer Plan, as amended April 7, 2009, p. 4-8). As planned, the County proposes to expand the WTTP in four phases up to a maximum of 9.1MGD, while maintaining the nutrient cap:

- Phase One: from 2.0 to 3.7MGD
- Phase Two: increase to 5.0MGD
- Phase Three: increase to 7.5MGD
- Phase Four: increase to 9.1MGD

The WTPP is planned to operate at 4.0 mg/L of TN and 0.3 mg/L of TP (note: this is below the nutrient cap for TP). Demand will trigger implementation of phases two through four. Design is expected to be completed in 2009 and construction of phase one completed by 2012.

WTPP Demand

In 2006, the WTPP was treating approximately .930MGD, which was already about one-third higher than the need projected by the State for the year 2020. Concern about capacity led Cecil County to adopt a resolution in 2006 that reserves .279MGD for residential growth and .120MGD for non-residential growth. As of 2008, the plant was treating about 1MGD of wastewater. It is estimated that current and allocated flows are at 1.6MGD, leaving about 400 to 500 gallons per day of treatment capacity.

Official studies prepared by, or for, Cecil County in recent years suggest that sewerage treatment capacity is a key constraint on growth; that absence of adequate sewer will result in lost economic opportunities, sprawl development in the rural environs, and greater environmental harm. See, for example: the County Growth Study, Sage Group (2007); BRAC Report (2007); and the Cecil County State of the County Report (2007).

The map on the previous page shows areas of existing and planned sewer within the Town's Growth Area. Those areas without sewer (primarily at the north end, and two small areas at the south), are designated as Tier Two areas under the Town's Municipal Growth element.

The projected sewer demand for the Town and its Growth Area are summarized in the tables below:

- Table 5 presents data for the Town using the MDP high development pressure scenario. It shows that the Town will require more wastewater treatment than available before the year 2015, and this assumes that the Town is given all of the remaining allocation of .4MGD (which is unlikely). (For example, Charlestown is projecting sewer needs on the order of .16MGD by 2015.)
- Table 6 is based on land area within the Town's Growth Area.
- Table 7 summarizes the total demand for sewer from implementing the North East Comprehensive Plan including the Growth Area Map. It also shows the combined demands of the Towns of North East and Charlestown and of their respective Growth Areas.

Table 5: Projected Sewer Demand for the Town of North East Based on Population Projections						
	2000	2010	2015	2020	2025	2030
Population ¹	2744	3566	4246	5030	5942	6969
Households	1020	1608	1947	2328	2768	3263
Sewer Use (GPD) ²	224,400	353,760	428,340	512,160	608,960	717,860
% of permit capacity ³	n/a	18	21	26	30	36
% of avail. Sewer ⁴	n/a	88	[107] capacity exceeded	[128]	[152]	[179]
% capacity: Phase 1 Upgrade ⁵	n/a	n/a	12	14	16	19

¹Projections are based on MDP high development pressure scenario
²Assumes per household use of 220GPD
³Assumes WTPP is at 2.0MGD
⁴Assumes .4MGD available without competition from other jurisdictions
⁵Assumes WTPP is upgraded, and credits permitted, to handle 3.7MGD by 2012

Table 6: Projected Sewer Demand for the North East Growth Area Based on Households and Net Acres for Development ¹			
Land Use	Households (Residential) Acres (Commercial, Industrial)	Sewer Needed (gallons per day)	
All Planned Residential (Tiers 1 and 2)	4080 households	897,600	
Tier 1 Planned Residential (20 year horizon)	2377 households	522,940	
Commercial, Industrial (Planned Economic Growth)	1655 net acres	1,655,000	
Cecil County Urban Growth Boundary site (Econ. Growth) ²	224 net acres	224,000	
			% Phase 1 upgrade ³
TOTAL (includes Tier 1 and 2)		2,776,600	75
TOTAL (includes Tier 1 only)		2,401,940	65

¹Assumes 220 GPD per household and 1,000 GPD per net acre for commercial and industrial.
²Cecil Co. UGB Study, 2002 amendment, reports a total of 1700 acres in this site, but that figure appears to be a typo error. The total area measures to be 350 acres, of which 298 acres are outside the Town growth area. This area yields 224 net acres for development and represents an additional source of future demand for wastewater treatment.
³Assumes WTPP is upgraded to 3.7MGD under Phase 1 of the County's Water and Sewer Plan by 2012.

Table 7: Total 2030 Sewer Needs for the Town and the Growth Area¹:			
1) Constant and High Pressure Population Growth Scenarios and			
2) Growth Area Map (Tiers One and Two)			
(gallons per day)			
Need Based on Pop Growth	Constant Growth	High Development Pressure	
Total	448,064	717,860	
Need Based on Land Area			
Growth Area – Tier One	2,401,940		
Growth Area – Tier Two	374,660		
Town Infill	165,220		
Usage in 2009	612,000		
Total	3,553,820		
Total (without Tier Two)	3,179,160		
Towns of North East and Charlestown: Projected demand for both Towns and Growth Areas ²	North East Charlestown TOTALS	GPD 3,179,160 755,000 3,934,160	% Phase 1 upgrade 86 20 [106] exceeds capacity
¹ Assumes 220 GPD/Household and 1000 GPD/Net Acre of Commercial and Industrial			
² Based on Charlestown Water Resources Element, Scenario 1, and North East MGE Tier One and assumes WTPP is upgraded to 3.7MGD under Phase 1 of the County's Water and Sewer Plan by 2012.			

Based on Population Growth

Based on the 2030 population projections, the Town needs .448MGD of sewer for growth at the constant rate, and .718MGD of sewer for growth under the high development pressure scenario. The Northeast River Advanced WTPP should have adequate capacity under its phased upgrades of the plant, which will be triggered by demand and planned for a maximum of 9.1MGD. The County controls the allocation of treatment capacity, thus there are no concrete assurances as to how the WTPP will be shared between the County and the Towns of North East and Charlestown. However, based on mutual Town and County planning goals for growth and annexation (see the Municipal Growth element), it is reasonable to expect County support for the Town's Tier One Growth Area.

Based on Land Area

The land for development in the Growth Area (Tiers One and Two), new infill development, and current Town needs, require 3.6MGD of sewer. Without Tier Two, 3.2MGD of sewer are needed. The County's Phase One upgrade of the WTPP will handle 3.7MGD of treatment, but demands will also come from Charlestown and the County.

Table 7 indicates that within the 20 year time frame of the plans for North East and Charlestown, the Phase 1 upgrade will be exceeded. Thus, additional phased upgrades (as already planned) will be needed.

Except for the County's North East Urban Growth Boundary (site 1), the assessment does not account for growth on sewers in the County. The Towns of North East and Charlestown now use about 22 percent and 6 percent, respectively, of the WTP capacity, and the remainder is used in the County.

However, it is not reasonable to assume that North East's current 22 percent share is a useful guide for the future; the Town's plan is for territorial growth and the annexation process will change the arithmetic significantly. All existing and planned sewer (as of 2009) consists of 9,657 acres. Land in the Town and the Growth Area, amounts to 78 percent of the acreage of all existing and planned service. (Note: this 78 percent is the same land designated as Tier One on the Town's Growth Area Map.) Therefore, it is clear that in the future the Town will be using a larger share of the sewer system.

Importantly, the County plans to move from Phase 1 to subsequent phases based on demand, thus the planning process is set up to change the Town's allocation as growth and development occur. The following discusses the implications of the Phase 1 upgrade (to 3.7MGD) in the context of the Town's plans for growth.

Phase One Upgrade to 3.7MGD

Under the Phase 1 WTP upgrade, North East would be allocated .814MGD out of a total 3.7MGD (22 percent, based on current trend). This amount would be adequate to serve population growth in Town to the year 2030 under the High Development Pressure Scenario. However, the remaining allocation (about .1MGD) would permit only about 100 acres of industrial and commercial growth within the Growth Area. This is about 6 percent of all planned economic growth in the Growth Area.

If the Town grows at a constant rate (trend growth), about .448MGD would be needed by 2030 and this would leave capacity for about 336 net acres of economic growth (about 22 percent of planned economic growth in the Growth Area).

In order to ensure adequate sewer capacity for North East, the County would have to advance to Phase 2 well before 2015. By 2015, the Town's population plus one-fourth of growth area (2015 represents one-fourth of the planning period to 2030) would need 1.2MGD of capacity (in excess of the Town's theoretical .814MGD share).

Full Upgrade to 9.1MGD

Assuming the County is successful at implementing the full expansion of the WTP to 9.1MGD, the North East Comprehensive Plan for the Town and Growth Area will ultimately use about 34 percent of the treatment capacity.

Non-Point Sources: Stormwater Runoff

Non-point source pollution involves the pollutants that wash off the land and into the Northeast River and its Creeks. The watershed contains 40,400 acres, with an estimated 2010 population of 23,601 (Cecil County). Nearly 49 percent of the watershed is forested and nearly 31 percent is agriculture. Residential development is about 20 percent, with 85 percent of that acreage consisting of either low density or very low density development (sprawl growth on septic systems).

The Town of North East makes up only three percent of the watershed while accommodating nearly 15 percent of the watershed's population on public water and sewer. The Town's Growth Area (7,061 acres outside the Town limits) amounts to an additional 17 percent of the watershed. See map below of the Watershed, 2007 Land Use, and North East Growth Area boundaries (see also Municipal Growth element).

At the State level, goals for reducing non-point pollution are primarily established by the Department of Natural Resources (the Tributary Strategies) and MDE (TMDLs: total maximum daily loads). There are also programs designed:

- to protect the designated use classification of water (e.g., shellfish harvesting, swimming, drinking supply, and so on),
- to prevent the degradation of waters down to minimum quality standards,
- to protect Critical Area and Forest Conservation stream buffers, and
- to protect source water supplies and wellheads

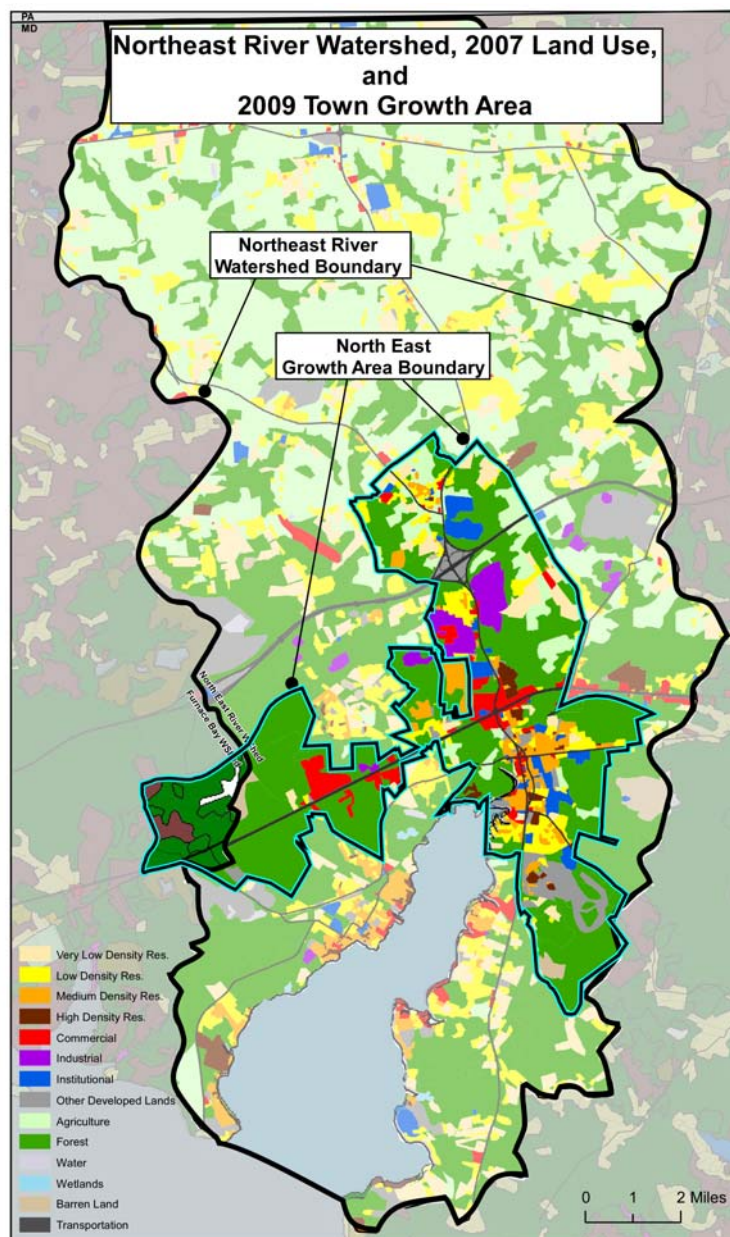
Estimating Non-Point Pollution

There are two basic methods for estimating the non-point impacts of land use and land use change. One method consists of a set of equations that use impervious surface, rainfall, and pollutant concentrations to estimate pollutant loadings. The second method relies on land use acreages and corresponding land use coefficients as developed by the State and the EPA's Chesapeake Bay program.

The Town tried both methods for estimating stormwater pollutant loadings. The "impervious surface/rainfall" approach was selected for the Water Resources element. The "land use/pollutant coefficient" method was found to produce improbable results (for example, achieving MDE's TMDL literally required forestation of most of the watershed). This second method, however, is useful for understanding the dynamics involved when land changes (for example) from agriculture-to-urban, or from forest-to-agriculture.

Exhibit A summarizes the non-point impacts of existing conditions for the Town of North East and for the Town's Growth Area for total nitrogen, total phosphorous, and sediment. The results of both estimation methods are included for information, but the impervious surface equations are the results used as a basis for the Water Resources element.

Exhibit B summarizes the non-point impacts of post-growth and development conditions for the Town of North East and for the Town's Growth Area for total nitrogen, total phosphorous, and sediment. Again, the results of both estimation methods are included for information, but the impervious surface equations are used as a basis for the Water Resource element.



Impervious Surface/Rainfall Equation

This method involves three equations:

Step 1: determine the watershed's runoff coefficient

Step 2: use the coefficient, the annual inches of rainfall, and the runoff probability factor (0.9), to determine the annual runoff

Step 3: use the annual runoff, pollutant concentration, acreage, and a metric conversion factor to determine the annual load of TN and TP

The equations were used to estimate pollutant loads for existing conditions and for post-growth and development conditions. Certain assumptions were made in assigning future land use. Basically 55 percent of agricultural and forest land (45 percent is saved for environmental and open space needs) is allocated to the following future land uses: 44 percent used for residential, 26 percent used for commercial, and 26 percent is used for industrial.

Land Use Coefficient Method

This method involves the land use loading coefficients developed by the Tributary Strategies (2006 data), and the acres of land use in the Town of Growth area (pre- and post-development). Future land use was assigned as described in the above paragraph.

Conclusions of the Impervious Surface Method

- Existing Conditions – Town of North East:
 - For Total Nitrogen, the Town produces about 419 pounds per month. This is about 7 percent of the non-point TMDL (6229 pounds per month)
 - For Total Phosphorous, the Town produces about 54 pounds per month. This is about 17 percent of the non-point TMDL (314 pounds per month)

- Existing Conditions – Town and Growth Area
 - For Total Nitrogen, the area produces about 2502 pounds per month. This is about 40 percent of the non-point TMDL (6229 pounds per month)
 - For Total Phosphorous, the area produces about 325 pounds per month. This is about 104 percent of the non-point TMDL (314 pounds per month).

- Post Growth and Development – Town of North East:
 - For Total Nitrogen, the Town produces about 567 pounds per month. This is about 9 percent of the non-point TMDL (6229 pounds per month)
 - For Total Phosphorous, the Town produces about 74 pounds per month. This is about 23 percent of the non-point TMDL (314 pounds per month)

- Post Growth and Development – Town and Growth Area
 - For Total Nitrogen, the area produces about 3212 pounds per month. This is about 52 percent of the non-point TMDL (6229 pounds per month)
 - For Total Phosphorous, the area produces about 418 pounds per month. This is about 133 percent of the non-point TMDL (314 pounds per month)

As the major Town and Growth Area within the watershed, comprising 20 percent of the watershed, the Town of North East can reasonably claim a large share of the TMDL. Based on the above results, the Town can fully develop within today's corporate limits (through infill and redevelopment) and produce a very low 9 percent of the TMDL for nitrogen, and a low 23 percent of the TMDL for phosphorous.

The non-point problem is primarily with the Growth Area, where a large of amount of forest will be used for growth. This land use change will have a high impact on non-point phosphorous and nitrogen loadings in the watershed. Still, with full development in the Town and its Growth Area, the nitrogen loads will be only 52 percent of the TMDL. Phosphorous, on the other hand, will rise to 133 percent of the TMDL.

This suggests a two-fold strategy for the Town to achieve water quality goals in the Growth Area:

1) Encourage preservation of as much forest as possible. For residential development, higher net densities can result in significant forest retention on each development site. For commercial and industrial uses, a program for reforestation within the watershed (or for payment of fees for tree planting) could be used to offset loss of forest land on developing sites. Site design could also be used to save on-site trees.

2) Maximize efforts to control sediment during and after construction, and follow through with timely inspection and enforcement actions. Since most phosphorous enters the waterways attached to sediment, sediment controls will help minimize phosphorous loadings.

Urban best management practices include a variety of methods for controlling non-point sources of pollution. The success of preventing runoff pollutants from entering waterways depends on selecting the right practice, making sure it is properly constructed in the proper location, and following up with maintenance over the long term. Controls for sediment and phosphorous can be very effective. Up to 100 percent of suspended solids and 30 to 80 percent of phosphorous can be eliminated, depending on specific circumstances.

A program for requiring state-of-the-art BMPs for new development on forested sites may be able to bring development of the Growth Area within the limits of the TMDL for phosphorous. If a 50 percent reduction is achieved, the post-development phosphorous loadings for the Town and Growth Area will fall to about 67 percent of the TMDL.

WATER RESOURCE GOALS AND OBJECTIVES

Water Supply

GOALS:

- The Town will provide an adequate supply and a good quality of water for existing and planned development, consistent with the Comprehensive Land Use Plan and with the State's goals and programs for water resources.
- The Town will implement measures to avoid or minimize risks associated with potential contamination or degradation of water sources from the surface.

OBJECTIVES:

- The Town will provide and maintain infrastructure including a system of raw water impoundments, filtration plants, pumps, underground and elevated tanks, distribution lines, and other components for water treatment, storage, and delivery.
- The Town will continue to monitor water usage to periodically assess the adequacy of water supply, and will continue to make individual and cumulative assessments about the resource demands and impacts associated with development projects.
- The Town will encourage Cecil County to protect water quality of the streams that the Town depends upon for raw water supply. This includes implementation of the County's plans for rural conservation and preservation, and reforestation. The Town recommends that the County implement the use of 200-foot buffers along stream edges, and require reductions in impervious surfaces for future development.
- The Town will consider new study results from USGS, MDE, and other sources as part of the State-mandated six year Plan review process, and make adjustments and recommend actions, as appropriate.
- The Town will adopt a Water Supply Capacity Management Plan, using MDE's model as input.

Water Quality

GOALS:

- The Town will strive to achieve MDE's TMDL for point and non-point sources in the Northeast River watershed.
- The Town will minimize the adverse impacts of development and growth in the watershed and the larger Eastern Shore Basin.

OBJECTIVES:

- The Town will require that developers identify and map wetland areas on-site and in adjacent areas using the following sources:
 - National wetlands Inventory
 - DNR wetland data layers (GIS)
 - MDE's associated priority preservation and restoration areas
 - Hydric soils maps
 - 100 year floodplain maps
- The Town will require the use of Best Management Practices (BMPs) for development on infill parcels and in growth areas. BMP's that are effective in phosphorous, nitrogen, and sediment removal will be required. BMPs include, but are not limited to, low impact design, stream setbacks, tree plantings, creation of natural areas around streams and wetlands, minimized impervious surface, avoidance of sensitive areas, and stormwater management.
- The Town will require that impervious surfaces be minimized insofar as possible, consistent with the type of land use planned and zoned. High levels of impervious surface will be offset with suitable plantings and large setbacks, especially around associated streams and wetlands.
- The Town will continue implementation of its Critical Area Program, and will require superior BMPs, including 200 foot stream buffers, for future development using growth.
- The Town will use the Tributary Strategy as a guide for planning and as a consideration in decision-making.
- The Town will consider new study results from USGS, MDE, and other sources as part of the State-mandated six year Plan review process, and make adjustments and recommend actions, as appropriate.
- The Town will identify, as part of the on-going planning process, potential sites for wetland and stream mitigation that can be used to mitigate impacts of capital projects where impact avoidance is not possible.
- The Town will update the Water Resources Element to incorporate new TMDLs.
- The Town will adopt a Wastewater Capacity Management Plan, using MDE's model as input.