

AN AMENDMENT TO THE 2005 NEW MARKET MASTER PLAN

NEW MARKET WATER RESOURCES ELEMENT

11/17/2010

MAPS

- 1. New Market Proposed Land Use**
- 2. Frederick County Water and Sewer Service Area**

TABLES

- 1. Frederick County Projected Dwelling Needs to 2030**
- 2. Zoning District Household Capacity**
- 3. New Market 2030 Population Estimates**
- 4. Water and Sewer Tap Allocations**
- 5. Current Drinking Water Capacity and Demand**
- 6. Current Drinking Water Capacity and Potential Demand**
- 7. Current Wastewater Treatment Capacity and Demand**
- 8. Current Wastewater Treatment Capacity and Potential Demand**
- 9. Developed Area in the New Market Area**
- 10. Nitrogen Loading Rates**
- 11. Phosphorus Loading Rates**

FIGURES

- 1. Bioretention Area**
- 2. Dry Well Schematic**
- 3. Filter Strip**
- 4. Grassed Swale Schematic**
- 5. Rain Barrel**
- 6. Cistern**
- 7. Manufactured Tree Box Filter**

Introduction

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

New Market's water and sewage treatment facilities are managed by Frederick County and provided to the Town based on Water Service Area Agreements that detail the timing and process for allocating water and sewer taps by the County to the Town. Because of the limited influence that the Town exerts in managing growth and the provision of water and sewer facilities in the watershed and County, the Town WRE will freely reference and refer readers to the Frederick County WRE adopted in 2010. New Market is identified as a Community Growth Area (CGA) in the overall County Comprehensive Plan.

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

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

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

Specifically, the statutory requirements are:

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

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

This element of the Plan assesses the Town's access to drinking water sources and wastewater treatment facilities and their ability to support existing and future development. It also identifies suitable receiving waters for existing and future wastewater and stormwater discharges. The Town of New Market, has prepared this Water Resources Element to assure the Town will focus growth to areas best suited to use the existing and planned water and wastewater infrastructure; to nurture efficient patterns of growth, protect and preserve the natural environs, promote economic growth, and support diversity of living environments in the Town.

Frederick County Watersheds [From Frederick County WRE p.7]

Water in Frederick County flows across two major watersheds: the Catoctin Creek watershed to the west of the Catoctin Mountains and the Monocacy River watershed to the east. Both watersheds lie within the larger Potomac River Basin, which drains to the Chesapeake Bay. The headwaters of the Monocacy River are in the Gettysburg, PA vicinity; the free flowing river then meanders 58 miles south to its confluence with the Potomac near the Montgomery County line. Approximately 75% of Frederick County's land area drains to the Monocacy River. There are seven municipalities within the watershed including Emmitsburg, Frederick, Mount Airy, New Market, Thurmont, Walkersville and Woodsboro. In addition, ten unincorporated communities are located in the watershed, which include: Adamstown, Ballenger Creek, Buckeystown, Holly Hills, Libertytown, Linganore, Monrovia, Point of Rocks, Spring Ridge/Bartonsville, and Urbana.

The Monocacy River is an impaired stream and Total Maximum Daily Loads (TMDLs) have been issued by the Maryland Department of the Environment (MDE) for fecal coliform bacteria in the upper and lower reaches of its watershed. Other Draft TMDL's are under review/comment for biological impairment (fish and stream insects), nutrients, and sediment. Two sub-watersheds, Linganore Creek and Double Pipe Creek, have been issued TMDL's for sediment and phosphorus as well as sediment and fecal coliform bacteria, respectively.

Planning Framework [From Frederick County WRE p.3]

The County's land use plan designates twenty-two Community Growth Areas (CGAs) where residential, commercial, and employment uses will be concentrated. Ten of the CGAs are municipalities (New Market is in this category) and their future annexation areas; the remaining twelve are unincorporated communities located in the county. The intent of the land use plan is to direct development to the designated CGAs while protecting the county's green infrastructure and agricultural/rural resources. CGAs will be targeted for public facility and infrastructure financing and improvements. A higher level of available community services is to be expected within a CGA.

Water and sewer service is provided or planned for all CGAs whereas areas beyond the CGA will only be served by future individual well and septic systems. The only exception to this policy, referenced in the County Water and Sewerage Master Plan, is reconciliation of a public health emergency, where public water or sewerage service would be required to maintain health, safety and welfare.

Population Projections

The County projects a population of 331,700 in 2030, which is an increase of approximately 98,300 people. This population increase would result in a need for an estimated 37,100 new dwelling units. Since new residential development is targeted to CGAs in the land use plan, the majority of new growth should occur in water and sewer service areas. With approximately 61% of the County’s current population located within community growth areas it would be expected that approximately 22,631 dwellings, of the estimated 37,100 dwellings needed by 2030, would be located within the community growth areas, where public water and sewer service is provided. [From Frederick County WRE p.6]

Table 1: Frederick County Projected Dwelling Needs to 2030

| | | | |
|---------------------------|---------|---|--------|
| Projected 2030 Population | 331,700 | Projected Additional Population 2009-2030 | 98,300 |
| Current 2009 Population | 233,439 | Projected 2030 Household Size | 2.65 |
| Current Household Size | 2.72 | Gross Dwellings Needed | 37,100 |

[From Frederick County WRE p.6]

Until recently, New Market was typical of most rural communities in physical form, with single-family homes placed on narrow lots lining a single main street. Almost without exception, building followed the original plat lines laid out in 1793. Interspersed, but concentrated in the center of Town, were a few small-scale commercial uses serving the local needs of townspeople, such as a grocer, post office, and auto garage. Gradual yet hardly noticeable changes occurred when the occasional new residence was built. This image changed somewhat in 1980 when a major subdivision of single-family homes (Sponseller’s Addition) was built on the west end of New Market, distinctly changing its physical shape and practically doubling its population (from 110 to 192). Since then, another large parcel on the north boundary of the Town (Royal Oaks) was annexed in 1989 and also laid out for residential use, with the potential for adding another 120 homes, again almost doubling the population. Brinkley Manor was annexed in 1999 and designed for 109 homes. Still another annexation in 2004, the Orchard at New Market, will bring 104 single-family homes, over 300 new residents, and 43,000 sq ft of retail and office space. The three annexations total 333 lots. As of May, 2010, 90 homes were occupied and 20 more were under construction.

Based on the Census Bureau's most recent population estimates, the Town of New Market had a population of 480 in 2005, an increase of 53 since the 2000 Census (427). In 2000, the City had a total of 159 households. According to the Maryland Department of Planning, the Town of New Market is expected to grow from 179 households in 2005 to 647 by 2030, an increase of 468.

The results of the MDP growth model use the default MDP assumptions and the current zoning of the Town. According to MDP's capacity analysis (see Table 2), there is a total capacity of 365 households within the Town limits. There is not sufficient capacity for New Market's projected growth of an additional 468 households by 2030. The capacities for each zoning category are show in Table 2 below.

Table 2. Zoning District Household Capacity

| Zoning District | New Household Capacity | Acres |
|-------------------------------|------------------------|-------|
| AP Amusement Park | | 17.7 |
| I Institutional | | 3.4 |
| MC Mixed Commercial | | 5.2 |
| MRS Mixed Residential Service | 26 | 21.7 |
| OS Open Space* | | 6.3 |
| R1 Low Density Residential | 336 | 266.9 |
| R2 Medium Density Residential | | 1.0 |
| RM Residential Merchant | 3 | 41.2 |
| Total | 365 | 363.4 |

* This category does not include the acreage contained in the “100-acre Park.” This land has no development capacity.

The Planning Area considered by the community has changed from the 2005 Plan. It is a larger area, still includes the Casey and Blentlinger properties, and adds three new land parcels adjacent to New Market, the Delaplaine Property, the Ganley Property, and the Audubon Property on Boyers Mill Road. The Planning Area also includes the Smith/Cline parcel west of Boyers Mill Road. The Planning Area is not a projected “Growth Area” but rather a collection of properties whose future use will directly impact the residents and businesses of New Market and their neighbors in Frederick County. The Planning Area is a layer of geography between the County’s New Market Planning Region which extends from Bartonsville to Mount Airy and the current municipal Town Limits.

2030 population estimates for the various New Market residential development configurations follow. The numbers reflect added population growth over the 2008 current population of 465.

Table 3. New Market 2030 Population Estimates

| Source of Estimates | Town of New Market | New Market Growth Area (by County) | New Market Planning Area (by Town) | Total Population | Land Needed in acres (1) |
|---------------------|--------------------|------------------------------------|------------------------------------|------------------|--------------------------|
| MDP | + 967 | + 273 | NA | +1,240 | 156 |
| Frederick County | + 816 | + 628 | NA | +1,444 | 182 |
| New Market | + 816 | + 628 | +2,450 (2) | +3,894 | 490 |

(1) Density yield with sewer @ 3.0 du/acre

(2) Includes 925 dwelling units on Smith/Cline at a household size of 2.65

The selected direction of growth and use of land is shown on Map 1 New Market Proposed Land Use. The properties identified as Smith/Cline (266 acres), Delaplaine (160 acres), and Ganley (55 acres) are shown as annexation areas and proposed for planned residential (Smith/Cline) and mixed commercial/industrial (Delaplaine and Ganley). The properties south of I-70 identified as mixed commercial/industrial and planned residential are also included as growth areas per the County Plan. Long-term conservation with minimal development opportunities exist in the larger Planning Area on the Casey, Blentlinger, and Audubon parcels.

New Market's Municipal Growth Element contains a detailed discussion of the joint planning required with Frederick County. Key to this discussion and the future of water and sewer planning is that "New Market must develop a detailed, cooperative relationship with Frederick County to assure that any growth around its limits is carefully coordinated, consistent in both character and scale, governed by compatible land use regulation, and appropriately served by utilities and roads."

Water Service Area Agreement Background

The entire New Market Community Growth Area is identified for public water and sewer service, however, many older Town properties currently rely on individual well/septic. The County and Town have executed a series of Water Service Area Agreements (WSAA) that detail the timing and process for allocating water and sewer taps by the County to the Town. The initial phase of extending water to the Main Street properties was completed in 2009. Existing subdivisions and undeveloped land outside the municipal borders of New Market have the opportunity to connect to public water and sewer service.

New Market is served by the Monrovia Wastewater Treatment Plant (WWTP) and the New Market WWTP. Both of these facilities are interim plants that will be closed when the Bush Creek Sewer Interceptor, a developer-funded project, is constructed which will ultimately convey sewage from the New Market area to the Ballenger/McKinney WWTP.

In April, 2003, the Town entered into a Water Service Area Agreement with the County.

The original agreement and its two amendments resulted in a total of 620 water and sewer taps or equivalent dwelling units (EDU). However, the allocation of 500 of these taps was controlled by an Initial Allocation Schedule contained in Section 8 of the WSAA, which limited the number of taps available to the Town and to two new subdivisions until certain infrastructure improvements for the Potomac River Water system were completed.' This original Allocation Schedule was developed long before the Potomac River water system infrastructure was fully designed or under construction. The original language of the agreement requires the completion of the entire 26 MGD New Design Road water system expansion before the later year allocations can be utilized.

The Initial Allocation Schedule was necessary when the original agreement was executed because there was a limited amount of water capacity available from the County's Lake Linganore water supply. Since that time the required infrastructure has been permitted, all of the

treated water transmission line has been constructed, the Potomac River (New Design Road) WWTP has been increased in capacity by 2.2 MGD and the construction project to expand the WWTP to 25 MGD (Maximum) is 57% complete and the new portion of the WWTP is scheduled to be commissioned in early 2010 providing capacity in excess of 16 MGD.

In addition to the treatment and transmission infrastructure outlined above, the County completed 2,180 linear feet of water along Royal Oak Drive and Wicomico Court in 2008 and constructed 6,370 feet of water line along Main Street in 2009.

As a result the progress of these infrastructure projects, the Third Amendment to the WSAA provides for the elimination of the initial Allocation Schedule and recognizes the immediate availability of all 620 water and sewer taps, with their allocation based on actual existing sewer service connections and vacant lots within the area of the Town covered by the WSAA, as well as those taps associated with existing Multi-Year Tap Agreements (MYTA), which the County has with two developers.

The original WSAA also limited the total number of sewer taps that would be available for use inside the Town of New Market for new construction to 256 EDUs, until the completion of certain wastewater conveyance and treatment projects. These projects include the Bush Creek interceptor project, the first phase of the McKinney VVWWTP project, including its Potomac River Effluent Conveyance lines. Although these projects are not yet complete, their description and scope has changed sufficiently to amend the WSAA so that a clear understanding exists as to what infrastructure needs to be in place to allow for the allocation of additional wastewater capacity to the Town of New Market.

The first Phase of the McKinney WWTP expansion referenced in the early WSAA included the construction of a new WWTP in the McKinney Industrial Park and its associated Potomac River effluent outfall lines. Since the WSAA was executed the planning and design of the McKinney project has changed such that it is now an Expansion of the Ballenger Creek WWTP and the Potomac River effluent outfall will not be needed until flows to the new Ballenger-McKinney WWTP exceeds 15 MGD. Therefore the availability of additional wastewater system capacity, beyond the 256 taps identified for new construction, will only be limited to the construction of the Bush Creek Interceptor and the Ballenger-McKinney WWTP construction, not the treated effluent outfall line.

The Town of New Market has also expressed a desire to recognize additional water and sewer system capacity (beyond the 620) in the third amendment to the WSAA, which would become available with the completion of the referenced wastewater conveyance and treatment plant improvements. This Future water and sewer capacity are shown in Table 4 below and memorialized in the Third Amendment to the WSAA.

Since periodic WWTP plant capacity evaluations performed by the DUSWM can occasionally result in the allocation of some additional taps, based on lower than anticipated actual per EDU flow, a provision has been added to the Third Amendment that would allow for the accelerated allocation of water and sewer taps shown as Future in Table 4 subject to such evaluation. This

accelerated allocation of these Future taps would be subject to any County reservation for other MYTA, other agreements or public need as it is defined in the DUSWM Rules and Regulations.

After the Bush Creek Interceptor and the Ballenger-McKinney WWTP construction is completed and operational, the Taps shown in Table 4 as Future would become available to provide additional capacity for existing commercial customers and service to additional properties within the area of the Town covered by the WSAA.

Table 4. Water and Sewer Tap Allocations

| | Total Allocated | Town of New Market | Royal Oaks | Brinkley Manor | Orchard |
|---------------------------|-----------------|--------------------|------------|----------------|---------|
| Original | 500 ea | 275 ea | 120 ea | 105 ea | 0 |
| 2 nd Amendment | 120 ea | 40 ea | 0 | 0 | 80 ea |
| Total Available | 620 ea | 315 ea | 120 ea | 105 ea | 80 ea |
| Future | 150 ea | 126 ea | 0 | 0 | 24 ea |
| Total | 770 ea | 441 ea | 120 ea | 105 ea | 104 ea |

Drinking Water Capacity and Demand

In 2010, New Market had 152 dwelling units on public water and 153 dwelling units on private wells. In Frederick County, drinking water service is either currently provided or planned for properties within the municipal and unincorporated community growth areas. The designated water service areas for the County generally mirror the various community growth areas. Nearly 60% of the County’s residents obtained their drinking water from community water systems in 2006 with the remaining 40% of the population relying on individual wells. [From Frederick County WRE p.16]

Table 5 references the current capacities of the individual County and municipal water systems. Under the county systems are listed the community growth areas served by that particular systems. In particular the County’s New Design System serves several of the County’s unincorporated growth areas in addition to the City of Frederick and the Town of New Market. It is important to note that the capacities referenced in both Tables 5 and 6 are based on existing treatment facilities and water sources and do not include additional water supplies in the planning or development stages. Table 6, however, compares the potential demand from the residential build out of the community growth areas, which may occur over a 20+ year time frame with the current available capacity. While this table illustrates obvious discrepancies between current capacities and potential demand several systems have programmed and planned improvements that will increase their drinking water supplies. [From Frederick County WRE p.16]

Table 5. Current Drinking Water Capacity and Demand

| Water System | Permitted Capacity gpd | Current Demand | Current Available Capacity gpd | Current Available Capacity EDU (1) |
|--|------------------------|----------------|--------------------------------|------------------------------------|
| New Design System (serving New Market) | 16,000,000 | 3,602,000 | 9,998,000 | 26,991 |

(1) Assumes 250 gpd per dwelling [From Frederick County WRE p.18]

Table 6. Current Drinking Water Capacity and Potential Demand

| Water System | Pipeline Dwellings | Undeveloped Potential Dwelling Units | Total Potential Dwelling Units | Current Available Capacity EDU |
|--|--------------------|--------------------------------------|--------------------------------|--------------------------------|
| New Design System (serving New Market) | 13,842 | 10,247 | 24,079 | 26,991 |

[From Frederick County WRE p.19]

The County’s New Design System serves the following Unincorporated Growth Areas: Adamstown, Buckeystown, Ballenger Creek, Frederick Southeast, Holly Hills, Linganore, Monrovia, New Market, Point of Rocks, Spring Ridge and Urbana. The New Design Water Treatment Plant (WTP) has a Potomac River allocation of 16 mgd (daily average) and 26 mgd (month of maximum use). This system also provides water to the City of Frederick has defined in the Potomac River Water Supply Agreement. Using daily average water demand, this system has the capacity to serve about 27,000 additional households. [From Frederick County WRE p.22]

Water Demand Created by Projected Town Growth

For general planning purposes, one dwelling unit will be considered to use 250 gallons of water per day. Using the MDP estimate of 179 households in 2005 and assuming that all homes were connected to a public water system, usage would be 44,750 gallons per day (gpd). Build-out to a population of 4,359 or 1,645 dwelling units would increase that figure to 411,000 gpd. Assuming that the pipeline dwellings in Table 6 include the New Market subdivisions that are under construction (333 du), the proposed addition of slightly over 1,000 dwelling units within the Town and in the Smith/Cline annexation would represent roughly 4% of the currently available County water capacity for EDUs in the New Design System.

The 215 acres of mixed commercial/industrial proposed for the Delaplaine and Ganley properties at full build-out could add another 350,000 gpd (at .1 gpd per square foot of commercial and

industrial space). This would represent approximately 5% of the currently available County water capacity in the New Design System.

Wastewater Treatment Capacity and Demand

In 2010, New Market had 305 dwelling units on public sewer and 3 dwelling units on septic systems. Eight municipalities, Fort Detrick, and Frederick County provide community sewerage service. There are three privately owned small community systems serving mobile home and trailer parks. Thirty-one multi-use systems exist in the County; these facilities serve individual businesses or institutional uses such as places of worship and schools. It is important to note that the wastewater treatment capacities described in Tables 7 and 8 reflect current design capacities, which may be increased in the future. In Table 7 the current capacities are compared with the potential demand, which reflects the build out of all of the community growth areas, which may occur over a 20+ year time frame. [From Frederick County WRE p.34]

Table 7. Current Wastewater Treatment Capacity and Demand

| Wastewater System | Receiving Streams | Permitted Capacity gpd | Current Demand gpd | Current Available Capacity gpd | Current Available Capacity EDU |
|--|-------------------|------------------------|--------------------|--------------------------------|--------------------------------|
| Ballenger/McKinney System (serving New Market) | Monocacy River | 7,000,000 | 5,238,000 | 796,000 | 3,184 |

[From Frederick County WRE p.35]

Table 8. Current Wastewater Treatment Capacity and Potential Demand

| Wastewater System | Pipeline Dwellings | Undeveloped Potential Dwelling Units | Total Potential Dwelling Units | Current Available Capacity EDU |
|--|--------------------|--------------------------------------|--------------------------------|--------------------------------|
| Ballenger/McKinney System (serving New Market) | 13,795 | 10,851 | 24,636 | 3,184 (1) |

(1) Existing Ballenger WWTP only, McKinney expansion will add 11 MGD average daily design flow [From Frederick County WRE p.36]

Quality of Effluent/Impact to Water Resources [From Frederick County WRE p.33]

Wastewater treatment plants (WWTPs) treat raw wastewater to meet effluent requirements established by the Maryland Department of the Environment (MDE). WWTP’s are considered point sources since they discharge the effluent directly into streams at single point. MDE issues a National Pollution Discharge Elimination System (NPDES) permit for each WWTP, which specifies the allowable ranges for chemical, physical and biological parameters of discharge. Permits are issued on a five-year planning horizon and set discharge limits for WWTPs.

The contribution of nutrients (nitrogen and phosphorus) from WWTPs is a major water quality problem facing Frederick County streams and impacts the larger Chesapeake Bay watershed. Frederick County WWTPs discharge to main stem sections of the Monocacy River, Catoctin Creek and the Potomac River as well as their tributaries. The type of treatment required at each WWTP is determined by the ability of the receiving stream to assimilate effluent discharge and the overall impacts to the watershed. The County's major streams have limited ability to assimilate pollution due to low flow, seasonal variation in flow, and slow moving stream conditions.

Catoctin Creek has reached its maximum capacity of permitted pollutant loads from the existing WWTPs. Expansion of the WWTPs serving Middletown, Myersville, Fountaindale and Jefferson would require a corresponding reduction in nutrient effluent concentration. Existing WWTP's in the Catoctin Creek watershed are located in the Middletown (two separate plants), Fountaindale, Myersville, and Jefferson.

The Monocacy River is close to reaching its nutrient load limitations. Upgrades to existing plants and diversion of flow from sub-regional plants to the Ballenger/McKinney WWTP where major BNR/ENR facilities are in progress to reduce overall nutrient loading. Smaller plants are also going offline as flow is diverted into the regional WWTPs, reducing pollution in smaller tributary streams. Emmitsburg, Fort Detrick, Frederick, Thurmont, Woodsboro, and Frederick County (Ballenger Creek/McKinney, Crestview, Libertytown, Mill Bottom, Monrovia, New Market, Pleasant Branch, and White Rock) operate treatment facilities that discharge either directly to the Monocacy River or its tributaries.

To take advantage of the higher degree of treatment at the Ballenger/McKinney WWTP the County has been closing smaller, sub-regional plants and diverting the flows to the Ballenger/McKinney plant. In addition to the Libertytown WWTP, which has just recently been closed and diverted to Ballenger/McKinney, four other plants at Monrovia, New Market, the County Landfill, and an Urbana High School plant are expected to be closed and their flows diverted.

As with drinking water supply, the Potomac River has emerged as the panacea for meeting future wastewater disposal needs in Frederick County. Two wastewater treatment plants currently discharge directly into the Potomac River (Brunswick and Point of Rocks) and both the Monocacy River and Catoctin Creek flow directly to the Potomac. The City of Frederick and Frederick County may utilize an outfall line to the Potomac River from the Ballenger/McKinney WWTP to handle the excess of treated effluent that cannot be assimilated by the Monocacy River.

Discharge permits for the Potomac River require the use of denitrification plants with filters. This requirement protects downstream water users and serves to protect the Chesapeake Bay. In the future, the majority of new or expanded wastewater treatment plants will need to employ filtration and nitrification/denitrification to meet strict discharge permits.

Frederick County's Ballenger/McKinney WWTP [From Frederick County WRE p.39]

The County's Ballenger WWTP, expanded to a 6 mgd Biological Nutrient Removal (BNR) facility in 1995, is undergoing significant improvements and expansion to reduce effluent loads while meeting projected demand. The existing facility has a collection system that conveys raw sewage from a large service area to the WWTP and currently discharges directly into the Monocacy River. The current population served is estimated to be 19,900 people. The growth areas served are Adamstown, Ballenger Creek, Linganore, Holly Hills, Spring Ridge/Bartonsville,

Walkersville and Urbana. Two residential areas in Buckeystown are served by the system although the remainder of the community utilizes onsite septic systems.

The average daily flow through the Ballenger WWTP was 5.146 mgd in 2007. Remaining capacity was 0.854 mgd. This capacity could serve an additional 3,416 households at 250 gpd per household. Currently, the plant has a Total Nitrogen Load Cap of 73,093 lbs/year and a Total Phosphorus Load Cap of 5,482 lbs/year. A 1 mgd expansion to the plant is scheduled in 2008 to allow for a 7 mgd capacity while other improvements are occurring.

Future plans are to develop the adjacent McKinney WWTP (12 mgd capacity) south of Ballenger Creek and rename the facility the Ballenger/McKinney WWTP. The expansion will include an upgrade to Enhanced Nitrogen Removal (ENR) treatment requirements. ENR design began in 2006 and project completion is estimated by 2012. MDE has approved an average daily design flow of 18 mgd (6 mgd Ballenger, 12 mgd McKinney) and a combined nutrient loading allocation based on 18 mgd of 219,280 lbs/year total nitrogen (TN) and 16,446 lbs/year total phosphorus (TP). The treatment plant will only be permitted 15 mgd discharge to the Monocacy River; flow beyond 15 mgd could result in increased effluent loading beyond permitted amounts. The County plans to divert treated effluent beyond 15 mgd to a future Potomac River outfall, subject to the acquisition of permits.

Concurrently, the County is decommissioning several County-owned sub-regional WWTPs and diverting their flow to the Ballenger-McKinney WWTP. Since these smaller plants were not required to meet BNR or ENR treatment requirements, this diversion reduces effluent loading to the smaller streams. Recently, five small WWTPs have been decommissioned and diverted; they include Lake Linganore WWTP, Spring Ridge WWTP, Pinecliff WWTP, Buckingham Hills WWTP, and Libertytown WWTP. Four others are planned for decommissioning/diversion; they are Urbana High School WWTP, New Market WWTP, Monrovia WWTP, and Reich's Ford Road Landfill WWTP. Once complete, three additional growth areas will be served by Ballenger/McKinney; they include the Town of New Market, Libertytown and Monrovia. The County's goal is to retain credit from the decommissioning projects to apply to Ballenger/McKinney where additional nutrient capacity will be needed within the next 20 years.

The decommissioning plants and the Ballenger-McKinney WWTP are all located within the Monocacy River watershed. The County's Division of Utilities and Solid Waste Management (DUSWM) anticipates that 20-year demand at Ballenger/McKinney will reach 24 mgd, which is 6 mgd above its design capacity. This is subject to approval by MDE.

Limitations to future service:

1) Middle Bush Creek Interceptor – decommissioning of New Market and Monrovia WWTPs is subject to completion of this project which is completely developer funded; almost complete, right of ways secured.

2) New Market/Monrovia Service Area [From Frederick County WRE p.43]

The County maintains two wastewater treatment plants that serve this area; the Monrovia WWTP located on Bush Creek south of I-70 and the New Market WWTP located on Davis Branch north of I-70. Bush Creek flows directly into the Monocacy River near MD 355 and the Monocacy Battlefield. Davis Branch enters Bush Creek near MD 75. Both plants are planned for decommissioning once the Middle Bush Creek Interceptor project is completed; at that time, wastewater will be transported to the Ballenger-McKinney WWTP.

The New Market WWTP has a current capacity of 240,000 gpd. In 2007, average daily flow was 76,000 gpd. A maximum flow of 229,000 gpd occurred in April of 2007. The average flow per capita in New Market is estimated to be 47 gpcd, which indicates that infiltration and inflow are not excessive in the system. The Monrovia WWTP has a 200,000 gpd capacity and flow averaged 81,000 gpd in 2007. The Monrovia plant also experienced maximum flows in April 2007; the flow was reported to be at 239,000 gpd. The effluent limits for the Monrovia WWTP are established by the discharge stream (like all other plants); in this case Bush Creek.

Sewer Demands Created by Projected Town Growth

One dwelling unit is considered to produce 250 gallons of wastewater per day. Using the MDP estimate of 179 households in 2005 and assuming that all homes were connected to a public sewer system, usage would be 44,750 gallons per day (gpd). Build-out to a population of 4,359 or 1,645 dwelling units would increase that figure to 411,000 gpd. Assuming that the pipeline dwellings in Table 8 include the New Market subdivisions that are under construction (333 du), the proposed addition of slightly over 1,000 dwelling units within the Town and in the Smith/Cline annexation would represent roughly 2% of the available County wastewater capacity for EDUs at completion of the Ballenger/McKinney system.

The 215 acres of mixed commercial/industrial proposed for the Delaplaine and Ganley properties at full build-out could add another 350,000 gpd (at .1 gpd per square foot of commercial and industrial space). This would represent approximately 3% of the currently available County wastewater capacity in the Ballenger/McKinney System.

Stormwater and Non-Point Source Assessment

Development, industry, transportation, and agriculture all increase non-point source pollution to the Chesapeake Bay and its tributaries. Although residential and commercial development can decrease nutrient and sediment delivery to adjacent surface water bodies, increased storm runoff has been linked with higher rates of stream bank erosion and delivery of toxins. Agriculture,

especially corn and soybean row crops, has been linked with elevated nitrogen and phosphorus loads and deteriorated water quality.

This section of the WRE first provides an overview of New Market's Stormwater Management Program. Second, it presents an evaluation of the alternate land use plans (current, county-zoned, and build-out conditions) on impervious cover and non-point source loads to local Chesapeake Bay tributaries.

Stormwater Management Program

The primary goal of the New Market stormwater management program is to reduce flooding, stream channel erosion, and sediment, nutrient, and toxin delivery to the Chesapeake Bay and its tributaries. The Town currently uses the County stormwater regulations and relies upon them for review and enforcement of stormwater plans. The Town intends to adopt the County regulations in the near future and assume responsibility for their enforcement.

In addition, the Town program will discourage structural Best Management Practice measures and will strongly favor nonstructural and Low Impact Development stormwater management measures. This approach is now suggested by the Maryland Department of the Environment in their model stormwater management ordinance.

The Stormwater Management Act of 2007 is based upon Environmental Site Design (ESD) Principles which attempt to mimic natural hydrology on developed sites. As the Town prepares to assume stormwater regulation enforcement, it will incorporate the core principles of Environmental Site Design which are:

1. Increase onsite runoff reduction volumes
2. Require a unified early ESD map
3. Establish nutrient-based stormwater loading criteria
4. Apply ESD technique to redevelopment
5. Integrate ESD and stormwater together at construction sites
6. Provide adequate financing to implement the Act and reward early adopters
7. Develop an ESD ordinance that changes local codes and culture
8. Strengthen design standards for ESD and stormwater practices
9. Ensure all ESD practices can be adequately maintained
10. Devise an enforceable design process for ESD
11. Establish turbidity standards for construction sites
12. Craft special criteria for sensitive and impaired waters of the state
13. Implement ESD training, certification and enforcement

Non-Point Source Assessment

Non-point source (NPS) pollution comes from many diffuse sources, including excess fertilizers and pesticides from agriculture and development, oil, grease, and toxins from development, sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks, and bacteria and nutrients from livestock, pet wastes, and septic systems. The NPS

pollution is delivered to lakes, rivers, wetlands and coastal waters by groundwater discharge and surface water runoff. Excess loading rates have been linked with harmful effects on drinking water supplies, recreation, fisheries, and wildlife. In particular, elevated plant nutrient loads, including total nitrogen (TN) and phosphorus (TP) cause excessive algal blooms which ultimately can cause a reduction in dissolved oxygen concentrations. Survival of open water fish and shellfish requires dissolved oxygen concentrations consistently above 3.2 mg/L (MDE 2006b).

To determine how growth trends and land cover/land use will affect nutrient loadings to the Monocacy River, we used the Maryland Department of Planning’s Nutrient Assessment Spreadsheet. Total nutrient loads were generated for current conditions and future growth scenarios by multiplying loading coefficients and acreages specific to different land cover classes. Within a land cover class, different loading coefficients are applied for pervious and impervious surfaces. Loading coefficients were provided by the Maryland Department of Planning.

Impervious Surface Cover: Impervious surface cover, including rooftops and pavement, prevents rainwater from infiltrating the ground and adversely affects stream habitat and water quality by increasing peak storm flow, reducing base flow conditions, and increasing toxins loads from industry and automobiles (e.g., salts, heavy metals, and volatile organic chemical compounds). Stream biotic integrity and water quality generally decline when more than ten percent of a watershed is developed. For the New Market region, impervious surface cover was determined according to the proportion of impervious area associated with different land use/land cover classes (Maryland Department of Planning 2009).

Table 9. Developed Area in the New Market Area

| Developed area (acres) in the New Market Area estimated from the 2002 MD LULC data | | | |
|---|---------|----------|--------|
| Land Cover Scenario | Current | Buildout | Change |
| Current Town Boundary | 150 | 330 | +180 |
| County Growth Area | 512 | 1,331 | +819 |
| Town Growth Area | 512 | 1,757 | +1,245 |

Nutrient Pollution: Nitrogen loading rates (lbs/yr) estimated for the three growth scenarios are shown in Table 10.

Table 10. Nitrogen Loading Rates

| Land Cover Scenario | Current | Buildout | Change |
|-----------------------|---------|----------|--------|
| Current Town Boundary | 2,048 | 3,363 | +1,315 |
| County Growth Area | 4,892 | 10,522 | +5,630 |
| Town Growth Area | 4,892 | 13,509 | +8,616 |

Phosphorus loading rates (lbs/yr) estimated for the three growth scenarios are shown in Table 11.

Table 11. Phosphorus Loading Rates

| Land Cover Scenario | Current | Buildout | Change |
|-----------------------|---------|----------|--------|
| Current Town Boundary | 193 | 313 | +120 |
| County Growth Area | 441 | 915 | +474 |
| Town Growth Area | 441 | 1,174 | +733 |

The Monocacy River is an impaired stream and Total Maximum Daily Loads (TMDLs) have been issued by the Maryland Department of the Environment (MDE) for fecal coliform bacteria in the upper and lower reaches of its watershed. Other Draft TMDL's are under review/comment for biological impairment (fish and stream insects), nutrients, and sediment. Given the changing status of the Ballenger/McKinney WWTP and the lack of nutrient and sediment TMDL's for the Monocacy, there is insufficient information available at this time to determine the suitability of the River as "receiving waters." In any case, the Town will make every effort to offset any additional impacts to the Monocacy through sound land use planning, site plan review, stormwater management, and local water quality improvements.

The presence of a TMDL is a sign that pollution control efforts must outweigh additional pollution impacts from future land use change and WWTP flows to prevent further degradation of the waterbody. For the receiving waters in the Town of New Market without a nutrient TMDL, a determination of the suitability of receiving waters cannot be made. However, for waterbodies with nutrient TMDLs, a preliminary assessment can be made. Pollution forecasts, although capable of comparing the relative benefits of different land use plans, are not precise enough to allow for a direct comparison to nutrient TMDLs. The Town of New Market recognizes though that waterbodies with nutrient TMDLs can only be considered suitable

receiving waters if future nutrient impacts are offset. The New Market WRE includes recommendations for pollution control efforts to help achieve that goal. In addition, the Town of New Market recommends refining the pollution forecast in the future to allow for direct comparison to nutrient TMDLs as information becomes available.

Water Resources Goals and Objectives

The Water Resources goal for New Market is:

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

Objectives to support this goal are:

Assure that existing and planned public water systems meet projected demand.

Assure that existing and planned public wastewater collection and treatment systems meet projected demand without exceeding their permitted capacity.

Assure that the Town's stormwater management policies reflect the most recent state requirements, and encourage Low Impact Development practices in both new development and by existing homeowners.

Maintain land use patterns that limit adverse impacts on water quality.

Continue to focus growth to areas best suited to utilize the existing and planned water and wastewater infrastructure efficiently.

Water Resource Strategies and Recommendations

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

Promoting bio-retention as a means of treating stormwater runoff. Bio-retention, such as a rain garden, provides stormwater treatment that enhances the quality of downstream water bodies by using soil and both woody and herbaceous plants to remove pollutants from stormwater runoff.

Consider the implementation of a lot coverage limit on all new development.

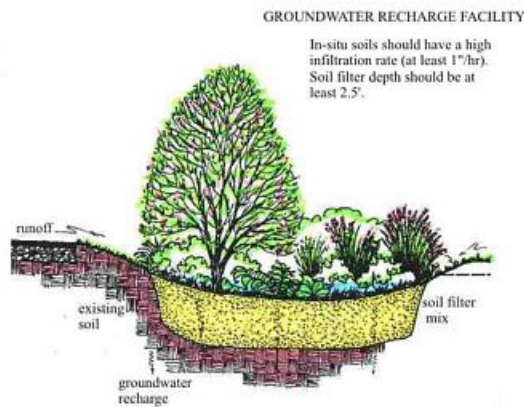
Encourage water quality improvements for existing development through stormwater management techniques such as rain barrels, rain gardens, and native planting plans.

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

Utilize Low Impact Development (LID) stormwater management techniques and devices in new developments to minimize flows and attenuate impacts near their source. These include:

Bioretention or vegetated depressions that collect runoff and facilitate its infiltration into the ground. These include rain gardens as discussed above. (See Figure 1)

Figure 1 Bioretention Area

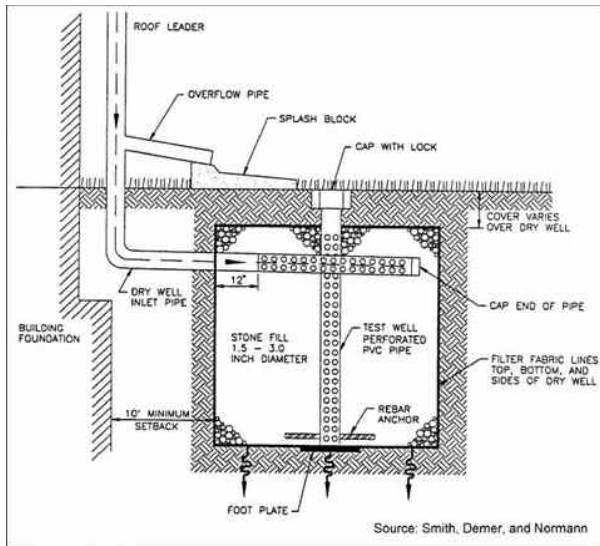


Source: Prince Georges County DER

Infiltration Trenches: Trenches filled with porous media such as bioretention material, sand, or aggregate that collect runoff and infiltrate it into the ground.

Dry Wells: Gravel- or stone-filled pits that are located to catch water from roof downspouts or paved areas.

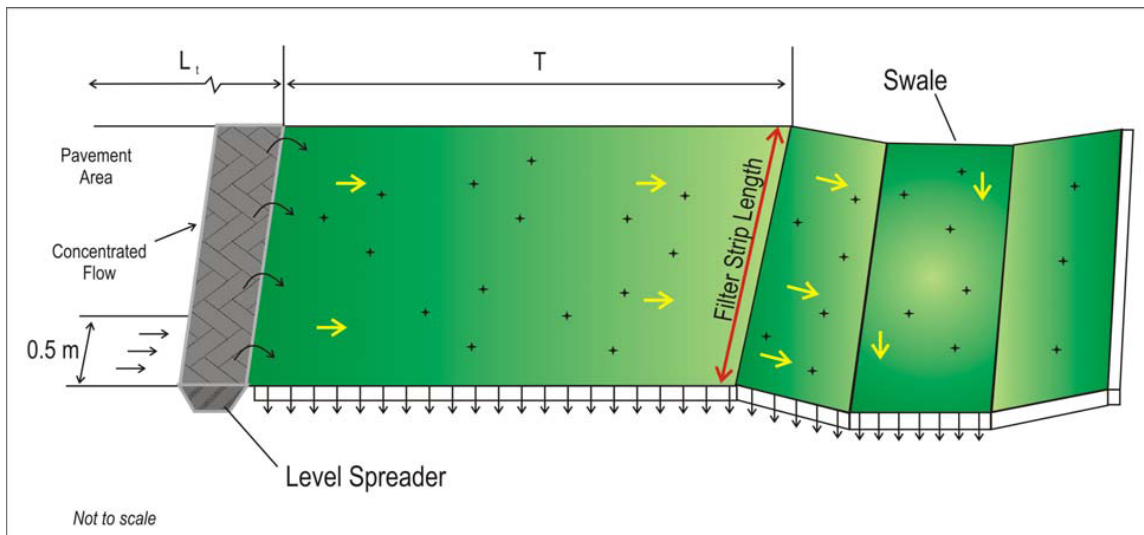
Figure 2. Dry Well Schematic



Source: Stormwater Management for Maine, 1995.

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

Figure 3 Filter Strip

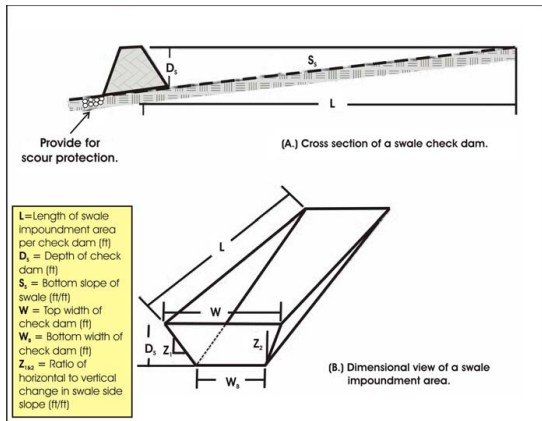


Source: Low Impact Design Manual, US Army Corps of Engineers, 2004

Inlet Pollution Removal Devices: Small stormwater treatment systems that are installed below grade at the edge of paved areas and trap or filter pollutants in runoff before it enters the storm drain.

Grassed Swales: Shallow channels lined with grass and used to convey and store runoff.

Figure 4. Grassed Swale Schematic



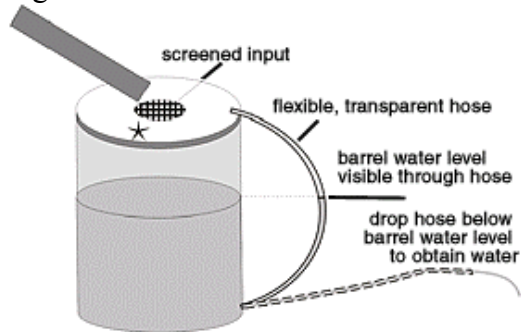
Source: NVPDC, 1991. In EPA, 1999d.

Permeable Pavement: Asphalt or concrete rendered porous by the aggregate structure.

Permeable Pavers: Manufactured paving stones containing spaces where water can penetrate into the porous media placed underneath.

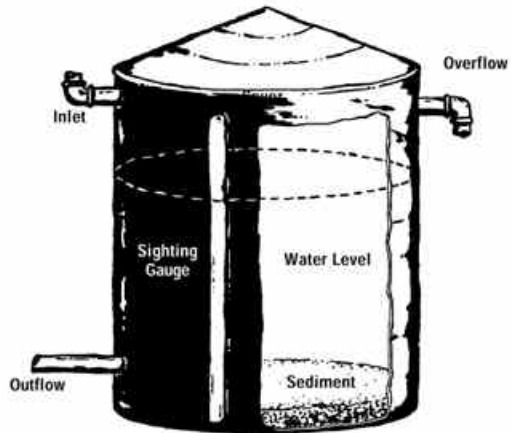
Rain Barrels and Cisterns: Containers of various sizes that store the runoff delivered through building downspouts. Rain barrels are generally smaller structures, located above ground. Cisterns are larger, are often buried underground, and may be connected to the building's plumbing or irrigation system. Rain barrels and cisterns are low-cost water conservation devices that reduce runoff volume and, for very small storm events, delay and reduce the peak runoff flow rates. Both rain barrels and cisterns can provide a source of chemically untreated 'soft water' for gardens and compost, free of most sediment and dissolved salts.

Figure 5. Rain Barrel



Source: Maryland DNR Green Building Program.

Figure 6. Cistern

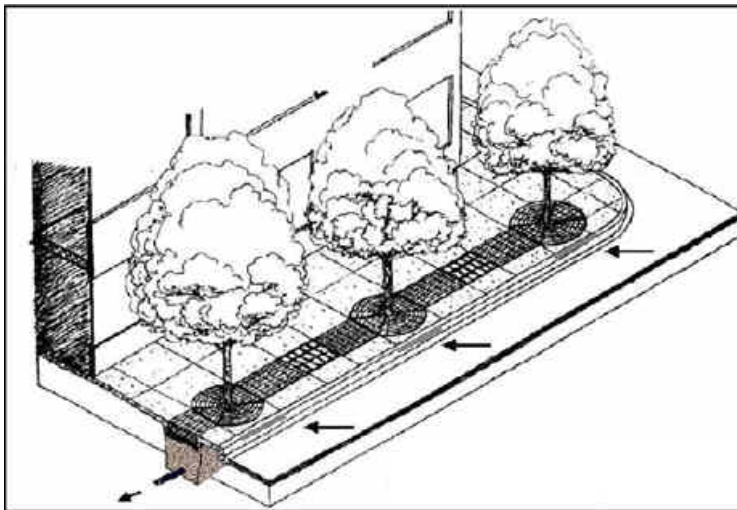


Source: Texas Guide to Rainwater Harvesting.

Soil amendments: Minerals and organic material added to soil to increase its capacity for absorbing moisture and sustaining vegetation.

Tree Box Filters: Curbside containers placed below grade, covered with a grate, filled with filter media and planted with a tree in the center.

Figure 7. Manufactured Tree Box Filter



Source: Virginia DCR Stormwater Management Program.

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