

Water Resources

2009

What is the Water Resources Element?

During its 2008 General Session, the Maryland General Assembly, as part of section 1.03 (iii) of Article 66B of the Annotated Code of Maryland, mandated that all Maryland counties and municipalities exercising planning and zoning authority prepare and adopt a Water Resources Element in their Comprehensive Plans.

Requirements:

- Identify drinking water and other water resources that will be adequate for the needs of existing and future development
- Identify suitable receiving waters and land areas to meet the storm water management and wastewater treatment and disposal needs of existing and future development

Purpose:

- To ensure the Comprehensive Plan integrates water resources issues and potential solutions
- To outline how management of water, wastewater and stormwater will support planned growth, given water resource limitations

Community Vision for Water

The City’s ability to provide water to residents and businesses has become an issue of great importance in recent years. According to the 2008 Community Survey, 65% of residents are satisfied with the quality of water in Westminster, while others were concerned with the quality of their water service.

Residents would like to improved water service in terms of improved communication. For example, residents would like the City give proper notification when performing sewer or water system repairs, as those repairs affect water pressure or the color of water.

Residents also suggested that the City create incentives for residents to conserve water in order to ensure reliable water service can continue into the future.

State Planning Visions found in this Element:

Infrastructure: Growth areas have the water resources and infrastructure to accommodate population and business expansion in an orderly, efficient, and environmentally sound manner.

Environmental Protection: Land and water resources are carefully managed to restore and maintain healthy air and water, natural systems, and living resources.

Resource Conservation: Waterways, open space, natural systems, scenic areas, forests, and agricultural areas are conserved.

Water Resources Priorities:

- Water supply availability
- Reclaimed water use
- Groundwater use
- Groundwater recharge
- Water quality
- Water conservation



Part 1: Vision & History of Water Resources

With the adoption of HB 1141 in the 2008 Maryland General Assembly, the City is now required to prepare a Water Resources Element in our Comprehensive Plan. The purpose of this element is to evaluate and plan for a sustainable impact on local water resources. These resources include ground- and surface-water supplies, as well as streams and rivers that are tributaries of the Chesapeake Bay.

Section 1: Vision

Since April 2007, the City of Westminster has been under a consent agreement with MDE, limiting growth until the City can bring enough new water supplies online to address a projected drought of record deficit of approximately 797,000 gallons per day (gpd). Due to this projected shortfall, it has become imperative that the City implement measures to ensure a more sustainable growth pattern, starting with the adoption of this plan.

Section 2: Physical Overview

The City of Westminster is located in the piedmont region of central Maryland. The City is positioned centrally in Carroll County and has no major water bodies or rivers within its boundaries. Named streams within the incorporated area are: Copp's Branch, Meadow Branch, and West Branch. Nearby major streams are Little Pipe Creek and Big Pipe Creek. The City is split, by Parr's Ridge, into two watersheds. Eastern portions of the City flow into the Liberty reservoir watershed, part of the Patapsco River watershed, and the Potomac/Back River Tributary Strategy Area. Western portions of the City fall into the Double Pipe Creek watershed, sub-watershed of the Middle Potomac, and part of the Upper Potomac Tributary Strategy Area.

As the largest incorporated area in the county, Westminster has always been an area planned for concentrated growth. This Smart Growth strategy has been recently reaffirmed in the 2009 Carroll County Pathways Plan. The City's water and sewer systems extend well beyond the corporate limits, serving almost as many customers outside as inside the City.

Chapter 11

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Section 3: Consent Agreement

Upon signing a consent agreement on April 3, 2007, MDE authorized the City to allocate 60,000 gallons per day (gpd) of the 139,000 gpd available in accordance with an Interim Allocation Policy. MDE has since authorized the City to release an additional 40,000 gpd of the 139,000 gpd available, leaving a current balance of 39,000 gpd available for release.

The release of water beyond the initial 60,000 gpd was based on the City completing certain tasks. For example, the City was required to complete the Medford Quarry Pipeline and the Roop's Mill Well projects. Additionally, the City was also required to implement a water loss reduction plan and a water conservation plan, in addition to planning for water hauling, if needed. Concurrently with the signing of the consent agreement with MDE, the City adopted an Interim Allocation Policy that governed the allocation of water to new projects. The Interim Allocation Policy was amended and readopted in early 2008 as a permanent Allocation Policy that created priority categories for projects and made other stipulations.

Since 2006, all of the City water resource management strategies have been focused on eliminating the 797,000 gpd drought of record deficit referenced above. The first 655,000 gpd of the drought of record deficit was eliminated when the Medford Quarry Pipeline became operational in July 2009. The City will reduce the drought of record by an additional 20,000 gpd when the Roop's Mill Well becomes operational in September 2009. The City will not receive credit for the full amount of the Roop's Mill Well permit of 135,000 gpd, since 115,000 gpd of the permitted amount was previously calculated into the drought of record.

Part 2: Existing Water Resources

Section 1: Watersheds

The City is divided into two watersheds by the Northeast-to-Southwest running Parr's Ridge (Map 11.1). The western portion of the City falls into the double Pipe Creek watershed, part of the Middle Potomac, and the Upper Potomac Tributary Strategy area. The City's Wakefield Valley water system is located in this watershed. Also in this watershed are nine of the City's supply wells, the Medford Quarry emergency Water supply, and the Wastewater Treatment Plant that discharges into Little Pipe Creek. Future projects in this watershed include the Gesell Property well, Greenvale Mews observation well, and the combined CPC Intake with back up by Hydes Quarry or a future Surface Water Impoundment Facility. The towns of New Windsor and Union Bridge also withdraw from and discharge into this watershed.

The eastern part of the City falls into the Liberty Reservoir watershed, in the Patapsco River watershed and the Patapsco/Back River Tributary basin. The City withdraws water from surface intakes on Cranberry Branch and Hull Creek in this watershed. Both creeks are tributaries of the West Branch of the

Potomac. Water withdrawn from Cranberry Branch is stored in the raw water reservoir North of Lucabaugh Mill Road. Also in this watershed are three supply wells and one streamflow augmentation well. Portions of the Hampstead and Freedom water and sewer systems are in this watershed. The City’s surface water resources are adversely affected by upstream agricultural uses that increase nutrients in the stream due to stormwater runoff carrying fertilizers and other nutrients. Furthermore, runoff from the County’s Lucabaugh Mill Road directly enters Cranberry Creek without any stormwater quality control.

Part 3: Water Resources Demand

Section 1: Buildable Land

Combining data from the Buildable Land Inventory (BLI) conducted by the Carroll County Department of Planning in 2005, with the City’s data on buildable land used for the Municipal Growth chapter of this plan, future water demand was forecasted for the City’s growth area boundary. This forecast accounts for complete build-out of all buildable land within the growth boundary, based on current land use designations. No changes to these designations are proposed in this plan (Map 11.2). The demand factors used were 235 gpd/residential unit, and 800 gpd/ acre of commercial or industrial land. This analysis yields a population projection for the buildable land within the growth boundary of 7,886 people (Table 11.1).

Table 11.1 Westminster Future Water Supply Demand (Gallons per Day)					
Community	Current Demand¹	Planned Future Demand²		Other Potential Demand³	Total Demand
		Infill Demand (W-1/3)	Future Demand(W-5)		
Westminster	2,960,000	775,090	325,480	340,890	4,401,460
Community	Current Demand¹	Additional Demand by Land Use		Total Demand	
		Residential	Commercial/Industrial		
Westminster	2,960,000	788,660	652,800	4,401,460	

¹ These data are the greatest annual average daily demand for the five-year period from 2003 through 2007.
² Data in this section represents the demand associated with the yield calculated by land use designation on buildable parcels in each of the water service categories identified.
³ This data represents demand calculated from land in the Growth Area Boundary that is not included in a planned water service category.

Source: City of Westminster WSCMP, 2008

Section 2: Water Usage & Allocation

The average water usage per residential connection was calculated to be 235 gallons per day (gpd) per connection, based on the existing connections and associated water usage. To project the number of units for residential development outside the City, land use designation assigned for the 2007 Westminster Environs Community Comprehensive Plan was utilized. For that plan, City staff worked with county planning staff to adjust the Growth Area Boundary to reflect the most realistic scenario for development in the area. For commercial and industrial uses, the usage is estimated at a rate of 800 gpd/acre. These water usage rates were calculated for use in the 2008 Water Supply Capacity Management Plan.

In order to satisfy the MDE consent order, development in the City has been regulated by an allocation policy, creating a prioritized “waiting list” of projects requesting available water supplies. Due to the use of the allocation policy, the City is not proposing changes to the Land Use Plan, service areas, or Growth Area Boundary. The City is continuing to evaluate options for more efficient use of existing resources, as well as development of new water sources to accommodate projected growth.

Until new sources are developed to balance the drought deficit and provide resources for growth, development will be tightly managed, on a project-by-project basis by the allocation policy. Once development of resources to support growth begins, the City will coordinate with the County planning staff regarding land use, growth boundary, and service area modification to best accommodate the development projected for the Westminster growth area. It is projected that until approximately 2015, growth will be relatively low and focused within the City limits due to a hold on annexations and Good Cause Waiver applications.

At the time of this plan, the City has received requests for water allocations under its Allocation Plan totaling over 228,000 gpd. Additionally, it is estimated that this demand could increase by approximately 50,000 gpd each year until build-out. It is anticipated that a portion of these requests may be fulfilled in the next three to four years by development of the Gesell Property well. Additional sources to fulfill the remaining requests are projected for development after 2015. Potential future sources have been identified, but not all have been fully evaluated.

Table 11.2 Withdrawal from Water Sources		
Water Source	Annual Avg. Permitted Withdrawal (MGD)	Reliable Annual Avg. Withdrawal*
Wakefield Wells Nos. 1&2	.197	.216
Wells Nos. 3-10	1.144	.848
Surface intakes on Cranberry system	1.838	1.87
Koontz Creamery**	.500	.209
Medford Quarry***	.655	-----

*Calculated in the WSCMP using a Flow Mass Analysis and historical production records
 **Water pumped from Koontz Creamery well is not delivered to the system due to water quality concerns
 ***Emergency supply only

Source: City of Westminster Public Works Department, 2009

Part 4: Water Supply

Section 1: Location of Water Supplies

The City relies on both ground and surface water for its potable supply. The unconfined fractured rock aquifer within the Wakefield Marble, Sam’s Creek Formation, Marburg Formation, Ijamsville Phyllite, and Wissahickon Formation provides the source for 11 groundwater wells. Four of these wells are located in the Wakefield Marble Formation. The remaining seven are located in crystalline rock formations. Table 11.2 shows the annual average permitted withdrawal from Westminster Water Sources.

Section 2: Inventory of Current Facilities

The City of Westminster serves the residents of the City and portions of Carroll County residences, as well as commercial and industrial connections both inside and outside the City. The City maintains two (2) separate water systems: Cranberry system and Wakefield Valley system. The two (2) systems are interconnected and can be integrated; however, normally they are operated as separate systems. Table 3 provides an inventory of Westminster’s water system components.

In summary, the City is permitted to withdraw 1.341 MGD from groundwater sources and 1.838 MGD from its surface water sources for drinking water. There is storage for 115 MG of untreated water. There is currently permitted 3.25 MGD of treatment capacity for the surface water and water from well No.7. Up to 6.0 MG of treated water can be stored in the system. Since the Cranberry Water Treatment Plant can be upgraded to treat 5.0 MGD of water, neither permitted or actual treatment capacity represents a constraint to growth.

Table 11.3 Westminster Water Facilities Inventory

Water Facility	Westminster Inventory
Surface Intakes	Hull Creek and Cranberry Run (tributaries of the Patapsco River)
Raw Water Storage	115 MG - Cranberry Reservoir
Finished Water Storage #1	0.9 MG - Clear Water reservoir
Finished Water Storage #2	6.0 MG - 4 above ground tanks
Emergency Source	0.655 MGD - Medford Quarry (pumped to Cranberry Reservoir)
Sources Under Development	0.135 MGD (permit) - Roop’s Mill well (No.11)
Water Treatment #1	2.75 MGD (upgradable to 5 MGD) - Cranberry Water Treatment Plant
Water Treatment #2	0.5 MGD Carfaro Water Treatment Plant (well No. 7)
Water Augmentation Well	1 ground water augmentation well (No. 5 - Koontz Creamery)
Pump Station	2 booster pump stations
Emergency Pump Station	1 emergency back - up pump (West Branch Patapsco River)

Source: City of Westminster Public Works Department, 2009

Section 3: Services to Areas Outside City Boundaries

The City’s service area currently extends outside the corporate limits to serve approximately 3,500 of the total 9,200 connections (Map 11.3). In other words, 38% of the City’s treated water serves properties in the County. In August 2002, The Mayor and Common Council adopted Good Cause Waiver criteria for the extension of public water and sewage beyond the corporate limits of Westminster. That legislation requires new or redevelopment projects to be in compliance with the Town/County Agreement, which stipulates that if the property is contiguous to the corporate limits, the project must initiate annexation into the City of Westminster if it is to be served with public water and sewer. If the property does not meet the legal test for annexation, its owner must file a Good Cause Waiver with The Mayor and Common Council. If approved, the applicant must execute an “Intent to Annex” agreement with the City of Westminster which is recorded in the Carroll County Land Records. This procedure provides control over the extension of City utilities outside of the corporate limits. Projects that would require a Good Cause Waiver are considered lower priority under the allocation policy than projects inside the City.

Section 4: Private Wells

The City does not maintain an inventory of private wells located within City limits or within its water service area. It is anticipated that very few, if any remain in operation within the City, since there are no city residences or businesses without access to a public water supply. Since the City did not operate a public water system prior to 1964, service extension to development outside the City prior to that date was at the discretion of the private entity operating the system. Consequently, there are residences and businesses in the water service area on private wells. It has been the policy of the city to work cooperatively with the Carroll County Health Department and the property owners to extend water service to these sites upon failure or contamination of the private supplies. This happens infrequently, and is not anticipated to have an adverse effect on the City's water system. The protection of these private water sources is under the jurisdiction of the Carroll County Health Department, which has implemented measures to require testing for all known contaminants in this area. The City does not plan to require connection to its system.

Section 5: Drinking Water Supply Assessment

One goal of the Maryland Department of the Environment's (MDE's) is to ensure that the water quality and quantity at all public water systems meets the needs of the public and is in compliance with Federal and State regulations. The City of Westminster will adhere to the guidelines of its allocation policy for the foreseeable future. Currently, the City is developing additional sources to meet the requirements of the drought of record demand. Once these requirements have been met, the City will develop identified sources to provide water to fulfill the 228,000 gpd of known requests plus the projected build-out demand of 4.33MGD.

Section 6: Drought Management

During the summer of 2002, the State of Maryland experienced a severe drought that required the City to take extensive emergency measures to ensure adequate water was in the system to serve the entire service area. In response to the drought, The Mayor and Common Council adopted a "Drought Management Plan" which provides for a series of water restrictions once drought conditions have been met. This plan also authorizes all police personnel and Westminster Code Officials to issue citations against any person who violates water restrictions. As a result of the drought, the Mayor and Common Council made it a priority to find alternative sources of water. In addition, the City has developed an emergency water supply, utilizing water from Medford Quarry to supplement the Cranberry system during drought emergency conditions.

Part 5: Water Supply Solutions

Section 1: Water Resources Alternatives Evaluation

The City of Westminster has joined with Carroll County, and the other seven municipal governments in the Water Resources Coordinating Council, to develop strategies for the developing an expanded water supply to meet future needs. The County hired a consultant, Malcolm Pirnie, to provide technical assistance with several of the background assessments that were needed to make well-informed decisions about water supply solutions. Malcolm Pirnie provided a County-wide assessment of water and wastewater options to assist with the development of Carroll County Comprehensive Plan's Water Resources Element. The City of Westminster has also been an active participant in the development of this County-wide Water Resources Element.

According to the Malcolm Pirnie 2009 Draft Report, Carroll County Water Resources Alternatives Evaluation, the following principles have guided the development of expanded water supply solutions and were used in the evaluation of various future options.

Principle 1: County-wide Planning

Much of the water supply planning that has been conducted historically within Carroll County has been somewhat incremental in that the needs of the individual towns have often been considered without a view toward a more County-wide perspective. The County-wide perspective used in the Alternatives Evaluation Report fostered development of several alternatives where the needs of multiple communities could be met by a single large project, thereby offering potential economies of scale. Another consideration is that large projects such as a reservoir, or large interconnections with other water systems, could have the added benefit of helping to avoid the sprawl that may otherwise occur. Sprawl could mean new development that is based on individual large lots dependent upon groundwater wells and septic systems.

Principle 2: Demand Management

Jurisdictions and associated utilities should be encouraging water conservation and efficiency to reduce long-term system costs and produce additional societal benefits. As part of moving forward with development of new water supply alternatives that require significant regulatory approvals, it is important to continue to document demand management practices that are currently being followed in Carroll County. It is recommended that water use tracking methods be established that will allow the County and towns to better quantify the effect of demand management efforts already being taken.

Principle 3: Diversification of Water Supplies

One of the most important recent trends in sustainable water supply planning is a move toward diversified water supply development, often referred to as integrated water resources planning, where

the system does not rely on groundwater supplies only. This ensures that options still exist to meet water supply needs even if the continued use of one water source becomes severely constrained.

Principle 4: Future Scenario Planning

The importance of diversifying the County's water supply becomes even clearer when considering the uncertainties that exist when trying to plan for multiple possible future scenarios.

Summary

Using these principles, the following water supply solutions were identified for the City of Westminster:

Section 2: Recommended Solutions

Below is a list of the recommended short and long-term solutions based on the collaborative work of the City and County Staff as well as recommendations from the 2008 Water Supply Capacity Management Plan and the Malcolm Pirnie 2009 Draft Report, Carroll County Water Resources Alternatives Evaluation: These solutions will be relevant to the entire service area.

Short-term Water Supply Solutions:

- Roop's Mill well - yield 0.135 MGD, project completed in September 2009
- Gesell Property well - in permitting phase
- Continue to reduce unaccounted for water - continue ongoing efforts to detect and repair leaks, resolve accounting errors, and reduce unaccounted for water to an acceptable range of 10-15%
- Continue to implement and refine the Allocation Plan - this plan ensures the adequacy of water supplies for each project
- Promote conservation - provide incentives, education, and enforcement of conservation practices to reduce overall demand
- Groundwater development at Union Mills - Big Pipe Creek has a large, relatively un-tapped watershed, and could potentially produce 0.5 MGD. Due to the cost, testing, and permitting involved, this source would not likely be developed until 2015 or later

Long-term Water Supply Solutions:

- Surface water intake on Little Pipe Creek - CPC Intake with back up by Hydes Quarry or a future Surface Water Impoundment Facility could potentially yield 0.150 MGD.

- Surface water intake at Union Mills – with offline storage_impoundment facility
- Reservoir at Union Mills (in cooperation with the County)
- Finished water purchase from City of Baltimore
- Finished water purchase from Pennsylvania private water system

Section 3: Westminster Major Water Supply Projects & Plan

The City staff carefully studied the various alternatives listed above and presented the Mayor and Common Council with a plan to provide additional water supply over the next 20 years. The water plan was endorsed by the Mayor and Common Council in the summer of 2009 and included the following five major projects:

1. Roop's Mill Well – this project is completed and operational, providing 20,000 gpd of additional water to the City as of September 2009
2. Roop's Mill Well Recharge – the City is working in conjunction with the County to obtain water rights on a property adjacent to the City boundary that will provide 46,000 gpd of new water to the City in 2010
3. Gesell Well – the City is working with the County on this estimated \$1.2 million project that will yield approximately 350,000 gpd in new water supply to the City in 2012
4. Big Pipe Creek Well Development – the City is working with the County on this estimated \$6.5 million project that will provide 500,000 in new groundwater to the City in 2015 from the Union Mills area
5. Little Pipe Creek Intake/Hyde's Quarry – the City is working with the County on this estimate \$4.5 million project that will provide 150,000 gpd in new water in 2017

It is likely that the City will receive authorization from MDE to allocate the remaining 39,000 gpd from the Consent Agreement by late 2009/early 2010. The City has allocation requests totaling 228,000 gpd beyond the 139,000 gpd total from the Consent Agreement. While the Gesell Well will allow the City to fulfill some of the backlogged requests in 2012, the completion of Big Pipe Creek Well Development project in 2015 will satisfy the drought of record deficit and move the City to a positive position. As part of the City staff's analysis, much attention was given to the Big Pipe Creek area. In fact, the City originally planned to complete the Little Pipe Creek Intake/Hyde's Quarry project prior to any project at Big Pipe Creek. However, after considering a variety of factors, the City determined that the Big Pipe Creek Well Development project should be implemented first. The justifications for this decision include:

1. Improved return on investment – there would be more “new” water supply created per dollar spent with the Big Pipe Creek Well Development project verses Little Pipe Creek Intake/Hyde’s Quarry Project
2. Elimination of backlog – the completion of the Big Pipe Creek Well Development project by 2015 will allow the City to eliminate most or all of the current or backlogged water allocation requests
3. Ease of development – development of groundwater resources is a more efficient use of limited technical and financial resources verses surface water development
4. Backbone infrastructure – the completion of the Big Pipe Creek Well Development project provides the “backbone” infrastructure for the future development of surface water sources at Big Pipe Creek (i.e. phase 2 – stream intake/inline reservoir and phase 3 – construction of an impoundment dam to create a regional reservoir)
5. Low impact development standards – the City has time to implement low impact development standards that can have positive long-term benefits such as extending “new” source life
6. Federal funds – the Big Pipe Creek Well Development is a model project for Federal funds due to its economic development significance to the Westminster community

The City has not lost sight of its future beyond the water supply solutions outlined in the May 2008 Water Supply Capacity Management Plan and those solutions referenced above. Even considering the Big Pipe Creek Well Development project as phase 1, there still needs to be cooperation amongst County and Regional planning agencies for the phases 2 and 3 of Big Pipe Creek. Cooperative, comprehensive regional solutions will be critical to insuring a positive water future for Westminster and the surrounding area.

Finally, Carroll County is also developing a Water Resource Element to add to its comprehensive plan. It is our intention to include the County’s Water Resources Element by reference to the 2009 Westminster Comprehensive Plan. There may be some changes and additions to the County’s Water Resources Element in the coming months because they have requested an extension of time. The City will also request Carroll County to include the Westminster Water Resource Element by reference in the County Comprehensive Plan.

Part 6: Wastewater Service & Demand Capacity Analysis

Section 1: Wastewater Assessment

The Westminster Wastewater Treatment plant is designed to handle 5.0 MGD. The average wastewater flow into the plant is 4.43 MGD (Map 11.4). The existing Infiltration and Inflow amount for the system is

1.7MGD. The projected build-out demand according to calculations by Malcolm Pirnie, Carroll County’s WRE consultant, is 5.706 MGD. The City plans to start engineering on upgrades to the plant to include additional treatment capacity and Enhanced Nutrient Removal (ENR) technology. With these upgrades, the plant will be capable of treating a flow of 6.5 MGD to the standards required by state and federal law. These capacities will be provided to the Carroll County Department of Planning for the next scheduled update of the Water Sewer Master Plan for Westminster.

Effluent from the plant discharges into Little Pipe Creek, in the Double Pipe Creek watershed. At this time there is no TMDL for nutrients in the Double Pipe Creek watershed, so a complete discussion on nutrient loading as a constraint is not possible. The plant does not currently exceed any of the loading limits imposed by its NPDES permit. After the planned upgrade to ENR at the Wastewater Treatment Plant, capacity will be limited, by available technology, to 6.5 MGD. However, this limit exceeds the projected demand, so it will not present a constraint. The upgraded plant is projected to be able to achieve the same loading rates as the current plant, while treating more flow (Table 11.4).

Should the loading rates approach the permitted limits prior to completion of the planned upgrades, the City will evaluate options for spray irrigation and onsite treatment/reclamation of industrial effluent to divert flow from the WWTP.

Table 11.4 Westminster Future Wastewater Demand (in Gallons per Day)					
Community	Current Demand ¹	Planned Future Demand ²		Other Potential Demand ³	Total Demand
		Infill Demand	Future Demand		
Westminster	4,440,000	387,295	204,770	673,840	5,705,905

¹ These data represent, in general, the annual average daily demand over the three-year period 2005-2007, and include I&I.
² These data relate to areas located within the designated planned sewer service area. Infill demand is calculated for areas classified in the “Existing/Final Planning” service category; Future demand is calculated for the combined area classified in the “Priority” or “Future” service category.
³ These data relate to areas designated in the “No Planned Sewer Service Area” but located within the Community Growth Area Boundary.

Source: Carroll County Department of Planning, December 2008

Part 7: Stormwater Management Analysis

Section 1: Point and Nonpoint Source Loading Status and Remediation

As discussed in previous sections, development activities in the City fall into two 8- digit watersheds. Both the Double Pipe Creek and Liberty Reservoir watersheds contain category 5 303(d) listed water bodies. Impairments to the Double Pipe Creek watershed include total phosphorus, biological assessments, fecal coliform, suspended solids, and PCBs in fish tissue. This watershed has an approved TMDL for sediments/siltation, and a pending TMDL for fecal coliform. The Liberty Reservoir watershed is listed as impaired by fecal coliform, and biological assessments. There is a pending TMDL for fecal coliform in this watershed. The Liberty Reservoir watershed also contains several Tier 2 water bodies, which require strict review of any proposed discharge applications. Water bodies in both of these watersheds are impacted heavily by agricultural run-off downstream of the City. As a major growth area in the County, land in the City is used with more intensity than in outlying areas. Table 11.5 shows the approximate acreage in the City by land use category, along with the impervious rate associated with the land use.

Table 11.5 Impervious Surface by Land Use in Westminster			
Land Use	Area (Ac)	Impervious Rate	Area of impervious (Ac)
Low Density Residential	872	0.14	122.08
Medium Density Residential	1261	0.28	353.08
High Density Residential	348	0.41	142.68
Commercial	632	0.72	455.04
Industrial	448	0.53	237.44
Open Urban Land	451	0.09	40.59
Totals	4012	n/a	1350.91

Source: Land Use categories from MDP, Impervious Rates from Center for Watershed Protection: *Urban Cover and Land Use in the Chesapeake Bay Watershed*, (2001), Capiella and Brown

Data Source: City of Westminster Planning, Zoning & Development Department, 2009

The acreages shown in the above table were calculated using existing use of land GIS data from the Carroll County Bureau of Comprehensive Planning. This basic assessment illustrates that in order for the City to continue to be a major center for growth in Carroll County; minimizing impervious surfaces in future development will have to be part of the strategy to reduce the City’s overall non-point source contribution. Critical to this effort will be increased densities for residential development, yielding more

dwelling units per acre of impervious surface. In addition, the City will work with county officials to prescribe better site design practices for commercial and industrial development.

Due to the scale at which current techniques are available to forecast non-point source nutrient loading rates, City staff have yielded to the County for this analysis. The watershed and county-level analyses and recommendations addressed in the Carroll County Water Resource Element are adopted as part of this plan by reference.

Part 8: Water Conservation Programs

Section 1: Nurseries & Garden Centers Educational Program

Xeriscaping promotes creative approaches to landscaping through the use of techniques and plants that reduce the need for water, maintenance and other resources. Residents that adopt principles of xeriscaping can reduce landscape water use by 60% or more. Efficient water use means reducing water waste, such as improper irrigation, and finding ways to achieve attractive, comfortable landscapes without excess water use.

In March 2008, the Westminster Department of Planning developed a program to partner with local nurseries and garden centers to develop xeriscaping educational materials and projects. The goal of the program was to provide practical information to those commercially raising and selling plants in Carroll County in order to reduce operational water demand and increase the use of drought-tolerant plant species. City Staff recognized that the use of xeriscaping among local residents could benefit the community water supply. Throughout the spring of 2008, all local nurseries and garden centers had the opportunity to meet with City Staff to discuss water conservation strategies and were also provided with informational materials about xeriscaping to offer their customers.

Section 2: Affordable Rain Barrel Program

The Maryland Green Building Program facilitates change in the way land development occurs throughout the State by increasing the awareness and use of environmentally responsible building practices, materials and site designs that provide comfortable, affordable and healthier buildings. The Maryland Green Building Program promotes the use of rain barrels.

A rain barrel is a system that collects and stores rain water from a roof that would otherwise be lost to runoff and diverted to storm drains, streams and the Chesapeake Bay. It is relatively simple and inexpensive to construct and can sit conveniently under any residential gutter down spout. Lawn and garden watering make up nearly 40% of total household water use during the summer. A rain barrel collects water and stores it providing an ample supply of free 'soft water' to homeowners, containing no chlorine, lime or calcium making it ideal for gardens, flower pots, and car and window washing. A rain barrel will save most homeowners about 1,300 gallons of water during the peak summer months.

In April 2009, Westminster partnered with the Woman's Club of Westminster and the Bear Branch Nature Center to host an informational workshop for residents about methods of landscaping that can conserve water. In preparation for the workshop, the Public Works and Planning Staff worked together to plan and construct rain barrels from reclaimed barrels from a local company in order to provide residents affordable rain barrels. The rain barrels were promoted at the workshop and the City was successfully able to provide over 65 rain barrels at an affordable price to residents.

Section 3: High Efficiency Toilet Rebate Program

Water Sense, a partnership program sponsored by the U.S. Environmental Protection Agency, makes it easy for Americans to save water and protect the environment. Older, inefficient toilets are responsible for most of the water wasted in American homes. Replacing these toilets with Water Sense labeled toilets could save nearly 2 billion gallons per day across the country.

In July 2009, the City of Westminster developed a High Efficiency Toilet Rebate Program to replace toilets which are inefficient. Older toilets consume 3.5 to seven gallons per flush (gpf) while the new water-efficient units consume 1.6 gallons per flush or even less, depending on the manufacturer. Ordinance 806 provided the authority for this program which was approved by the Mayor and Common Council on July 27, 2009.

The program began in August 2009 and was supported by the City of Westminster Water Conservation Fund. The rebates were subject to a pre-approval inspection to certify that the toilet to be replaced uses more than 3.5 gallons per flush. All users of the Westminster system with inefficient, tank type units were encouraged to participate. The rebate amount was intended to offset the cost of purchasing and installing high-efficiency units to conserve water, which relates to a dollar savings for the City resident. When each installation was completed, a post inspection was conducted and the old toilet was removed by the City. The High Efficiency Toilet Rebate Program was a success and the City of Westminster awarded 50 households the opportunity to receive a rebate.

Part 9: Summary & Conclusions

Based on the information presented in the preceding sections, the City has determined it is not necessary, at this time, to contract the Growth Area Boundary or water and sewer service areas, or to reduce the intensity of planned land uses within corporate limits. Efforts will be ongoing to develop the identified water sources to serve planned growth, while measures will be enacted to enforce and encourage water conservation. Once the ENR upgrade is complete at the Waste Water Treatment Plant, it will be possible to treat the necessary quantity of flow to the required quality to accommodate the planned growth. In addition, the City will collaborate with Carroll County officials to implement the State's Environmental Site Design practices to achieve a reduction in loading rates from new development, while developing programs to prescribe best practice retrofits to existing development.

Water Resources Element

The 2009 Comprehensive Plan studied how Westminster's future depends on adequate and dependable supplies of clean water for many uses. The City of Westminster recognizes that water is a finite resource and that it is critical to the physical and economic health of the community as well as the natural environment. The Water Resources Element identifies the strategies for Westminster to define and move toward a sustainable water future.

Goals and Objectives

Goal W1: Practice adaptive management strategies to incorporate new information, changes in capacity or respond to new threats to water resources as they become known

Objective 1: Update the 2008 Water Supply Management Plan as needed to keep the information relevant and to ensure accuracy

- a. Revise recommendations and projections after changes in the water allocation policy or the creation of new sources of water supply
- b. Reevaluate water demand projection using demographic trends and historic water use
- c. Review existing water supplies and decide if existing supplies do not meet the City's forecasted needs, to seek additional water supplies

Objective 2: Use the 2008 Water Supply Management Plan as a guide to study water supply reliability

- a. Monitor the probability that a water supply shortage or drought could occur
- b. Inform residents, business owner and City staff what should be done in the short term to reduce water demand during a water shortage or drought
- c. Evaluate and enforce the Westminster Drought Management Plan to require reductions water use during times of water supply shortage or drought

Objective 3: Coordinate with State and County agencies to develop long-term water resource strategies

- a. Monitor the proposed 2009 water supply project list and update as Westminster acquires new sources of water supply
- b. Determine how to best use the limited supply of water Westminster currently provides within the Water Service Area, including supplies that the City will have access to in the future
- c. Study strategies and solutions to ensure Westminster becomes more water efficient, in order to reduce the number of gallons used per day by residents and business owners

Objective 4: Conduct quality water resource planning to develop and implement sustainable strategies

- a. Establish coordinated, cost effective programs for monitoring water quality and water quantity so that changes can be identified and protection programs modified as necessary
- b. Maintain a local water resource management program to review new water uses and changes of use
- c. Utilize locally developed policies and water resource analysis in decision-making and project proposals
- d. Explore and use alternative and supplemental water resources and programs to conserve and replace the use of traditional potable water supplies

Goal W2: Secure and maintain adequate and sustainable water supplies to serve current and projected growth of Westminster

Objective 1: Implement priority water supply projects as they become financially feasible

- a. Develop Gesell property well
- b. Develop additional recharge area adjacent to the Roop's Mill Well
- c. Develop available groundwater in the Big Pipe Creek/Union Mills area
- d. Develop Little Pipe Creek and storage alternatives

Objective 2: Use available research and techniques to locate new water supplies

- a. Continue to evaluate and develop surface water sources
- b. Continue to develop known groundwater sources where feasible
- c. Evaluate and implement measures to ensure adequate recharge for each water source, such as through easements, preservation programs, or purchase

Objective 3: Provide safe drinking water for current and projected development

- a. Develop adequate treatment capacity to ensure quality drinking water
- b. Monitor the treatment capacity of newly constructed Cranberry Water Treatment
- c. Phase upgrades to the newly constructed Cranberry Water Treatment Plant to coincide with projected demand

Objective 4: Develop a partnership with State and County agencies to provide support to protect and manage of water resources in the Westminster water service area

- a. Collaborate with State and County agencies, as well as other County municipalities to develop a long-term program to ensure equitable water allocation
- b. Incorporate water quality and conservation efforts among City and County agencies with authority over development, water resources, public works and the environment
- c. Partner with Carroll County to develop nearby water sources that are outside City limits
- d. Coordinate with Carroll County government to obtain recharge credits to maximize withdrawal from current and planned sources
- a. Work with the County Health Department to evaluate and adopt policies allowing the use of greywater for non-potable uses such as in toilets and for irrigation

Goal W3: Develop a strategic plan to ensure Westminster has an adequate supply of potable water to meet the needs of residents and the demands of new development

Objective 1: Review and revise City water allocation policy, the Zoning Ordinance and development requirements to sustain or increase the available water to allocate

- a. Adopt land use policies that promote higher densities and clustering
- b. Limit annexation and Good Cause Waiver issuances until water supply is developed to fulfill currently known demand, or for 5 years, whichever is sooner
- c. Limit the extension of new water services to development in existing or priority water service areas, except on an emergency or special needs basis
- d. Require each new development project to provide a written analysis of methods to be employed to minimize impacts on groundwater, surface water, and wastewater quality

Objective 2: Develop water conservation standards and requirements to prioritize water allocation requests and minimize number of gallons of water used per day

- a. Study incentives and programs that encourage new development to meet green building and water conservation standards
- b. Develop a City of Westminster Green Building Principles Guide that ranks building and site design water management strategies as essential in all new development
- c. Revise the water allocation policy to incorporate the City of Westminster Green Building Principles as a tool to prioritize water allocation requests

Objective 3: Monitor water allocation requests and future demand for all known and potential development projects

- a. Continue to systematically track water allocation requests and the remaining gallons of water available to allocate
- b. Develop a standard notice to inform potential developers, as well as current residents and business owners, about the City of Westminster's limited ability to allocate water
- c. Analyze and track buildable vacant land and underutilized land to project future requests
- d. Ensure that Westminster has enough water supplies online to meet the required amount of gallons of water needed to address projected drought of record
- e. Revise the allocation plan to include allocation of wastewater capacity

Objective 4: Update the City of Westminster Landscape Manual to reflect the goals and objectives of the Water Resources Element

- a. Limit the amount of water intensive landscaping that can be installed in a development, and also limits the use of potable water for landscaping purposes
- b. Support the use of native and drought tolerant plant materials, where appropriate, to conserve energy and water in public parks, right-of-ways, and HOA common areas
- c. Promote the retention of healthy native soils, vegetation and forest cover, and reduce the conversion of land to lawn, structures, roads, and other impervious areas

Goal W4: Encourage community water conservation and efficiency strategies to ensure the sustainability of the City's limited water supply

Objective 1: Promote water conservation best practices, techniques, and technologies that improve the efficiency of water use

- a. Implement measures outlined in the Water Conservation Plan approved in 2007 by the Water Resource Coordinating Council
- b. Review and recommend policies requiring high-efficiency plumbing fixtures in all new construction
- c. Support the use of rainwater collection and reuse systems, such as rain barrels and cisterns
- d. Endorse greywater in industrial applications, boiler systems, cooling towers and fire suppression systems

Objective 2: Educate and motivate residents, as well as business owners, to reduce their everyday water consumption

- a. Provide programs to educate water customers about the benefits of water conservation and the appropriate use of available water supplies
- b. Ensure residents are up-to-date information on water resource issues
- c. Work with Carroll County Public Schools to develop a program to introduce water conservation to students
- d. Utilize the City of Westminster Website and the Carroll County Media Center to inform residents on techniques and technologies to reduce water consumption
- e. Expand existing programs that provide incentives for businesses and homeowners to retrofit existing structures using high-efficiency fixtures, such as the toilet rebate program

Goal W5: Restore and protect water quality, and contribute towards meeting the regulatory requirements for water bodies impacted by activities within the City and its environs

Objective 1: Evaluate and adopt land use controls to reduce impervious land area in new development

- a. Promote development in areas not environmentally sensitive, and locations with appropriate infrastructure
- b. Limit development in sensitive areas such as stream and wetland buffers, floodplains, areas underlain by carbonate rock, and steep slopes
- c. Implement recommendations from the December 2004 Source Water Assessment and Wellhead Protection report, prepared by Advanced Land and Water, Inc
- d. Continue collaboration with Carroll County planning staff to provide the most accurate land use/land cover data available for our jurisdiction

Objective 2: Promote the use of recharge areas as water-resource-protection areas designated as having the best potential for groundwater recharge

- a. Study and document the functions of natural ground water recharge areas, natural drainage features, and surface water bodies
- b. Develop regulations to protect recharge areas in order to ensure a healthy aquifer and a sustainable quality water supply
- c. Support land conservation programs designed to acquire property with particular value for protecting water quality, quantity and recharge

Objective 3: Reduce the amount of runoff from new development

- a. Evaluate and adopt amendments to parking requirements, imposing limits on the surface area of a site devoted to parking
- b. Develop a maximum standard for impervious surfaces for all new development
- c. Reduce the required width of streets and sidewalks in new development
- d. Limit the amount of stormwater permitted to enter public storm water systems, or otherwise leave the site

Objective 4: Provide a stormwater management system which promotes preservation of natural resources and improves the quality of surface water run-off

- a. Develop projects to improve the quality of stormwater discharging into water bodies to achieve compliance with regulatory requirements
- b. Require onsite infiltration of storm water through use of bio-retention areas
- c. Ensure adequate buffering of all water bodies
- d. Implement measures to increase the urban tree canopy, increasing interception of rainfall, and protection of water bodies

Objective 5: Ensure adequacy of wastewater treatment operations in terms of quantity and quality, while maintaining compliance with regulatory requirements

- a. Continue efforts for planned ENR upgrade, enabling the current facility to operate at the limits of technology in terms of nitrogen and phosphorus removal
- b. Evaluate methods of wastewater reclamation to divert and treat water suitable for industrial reuse
- c. Study the possible use and locations for spray irrigation
- d. Implement policies requiring water conservation from all users, to promote more efficient use of available treatment capacity