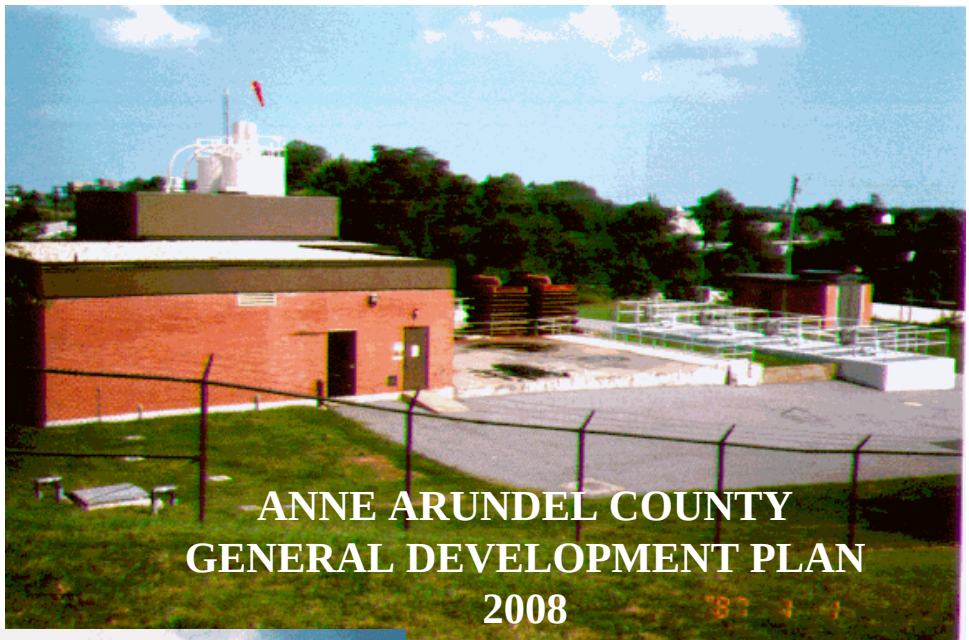
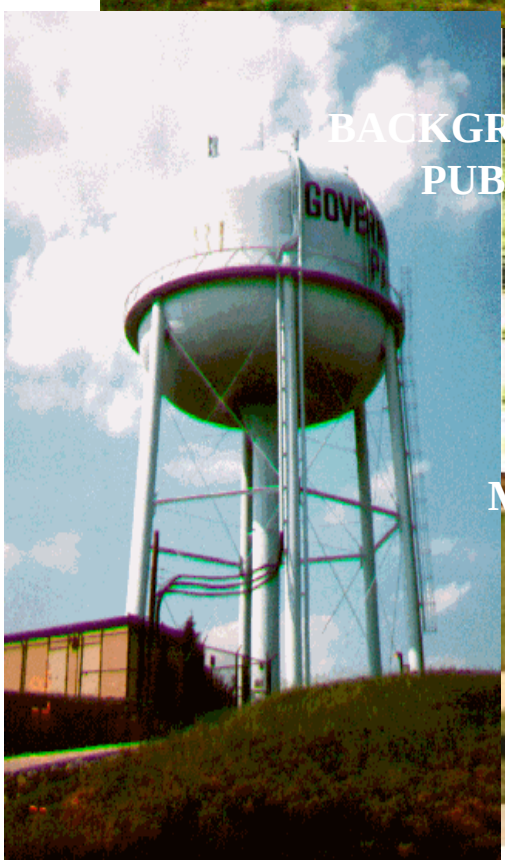


ANNE ARUNDEL COUNTY
GENERAL DEVELOPMENT PLAN
2008



BACKGROUND REPORT ON
PUBLIC UTILITIES

MAY 2008

I. Introduction

Anne Arundel County provides public water, sewer and solid waste collection services to its residents. Planning for these public utility services must be closely coordinated with comprehensive planning efforts. The County's *General Development Plan* determines the type and density of land uses in the County and directs growth and development to appropriate areas. The provision of public utilities is then planned in accordance with the *General Development Plan*. The GDP will guide County planners in determining where extensions of public utilities will be needed in the future, where capacity expansions will be required, and where deficiencies are likely to occur so that preventive steps can be taken.

The goals of the *1997 General Development Plan* relative to these services are to promote and encourage safe, efficient, economical and environmentally sound sewer, water and solid waste facilities; conserve water resources and protect aquifers; and efficiently manage, reduce and recycle solid waste.

The policies to achieve these goals include giving priority for extension of public service to areas that have septic or water problems, discouraging the extension of public utilities outside of planned growth areas except for health and safety reasons, cooperating with other jurisdictions to ensure that joint interests in public utilities are protected, promoting innovative methods for collection and treatment of private sewage, ensuring development requirements are consistent with water and sewer plan policies, encouraging the public to reduce solid waste and increase recycling, and encouraging stricter standards at rubble landfills.

To achieve the goals and policies, the GDP recommended several specific actions including the following:

- Target capital expenditures in existing and planned service areas to remedy deficiencies,
- Pursue public-private partnerships in funding sewer and water facilities,
- Revise development regulations to be consistent with water and sewer plan policies,
- Work with the State to monitor and conserve water supplies and determine actions necessary to maintain the stability of aquifers,
- Maintain periodic testing to assess saltwater intrusion, aquifer drawdowns, and related groundwater problems,
- Improve convenience centers for solid waste and recyclables, and
- Investigate methods and incentives to increase recycling.

The Small Area Plans adopted between 2000 and 2004 included additional recommendations that reiterated the GDP policies, such as:

1. Determine the maximum capacity for the wastewater treatment plants and ensure that future zoning does not exceed that capacity,
2. Adjust planned densities, types of development, and phasing of development to match the capacities,
3. Update the Water and Sewer Master Plan to reflect the changes made in the SAPs,

4. Do not expand the area currently planned for public utilities except to remedy a public health matter or to support the SAP changes,
5. Conserve resources and protect the environment,
6. Provide increased recycling opportunities,
7. Encourage more recycling by restaurants and businesses,
8. Encourage the use of recycled materials in homes and businesses through additional opportunities,
9. Use County resources and community groups to increase monitoring and legal enforcement as well as clean up of illegal dumping areas,
10. Encourage and promote neighborhood clean-up crews on roadways where dumping is an on-going problem,
11. Ensure that stringent requirements for environmental protection and significant and mandatory penalties for the failure to satisfy those requirements are incorporated into landfill permits, and
12. Strengthen standards for new or expansion of existing municipal / sanitary and rubble landfills.

In addition, the goals, policies and actions recommended in the GDP and Small Area Plans are carried out through policies and procedures that are found in supplemental plans including the *Water and Sewer Master Plan* and the *Solid Waste Management Plan*. These plans contain specific land use, environmental, social and economic objectives as well as the County's policies for achieving these objectives. These objectives and policies are implemented in part by the County's Zoning Ordinance (Article 18) and Subdivision Regulations (Article 17).

II. Public Water and Sewer

Title 9, Subtitle 5 of the Annotated Code of Maryland requires each county to develop water supply and sewerage systems in accordance with a County Master Plan which specifies the extent, adequacy, sizing, staging and other characteristics of such facilities so that they are in compliance with State laws relating to air pollution, water pollution, environmental protection and land use. The Anne Arundel County *Water and Sewer Master Plan* includes goals, objectives, policies and procedures as well as background information, descriptions of facilities and service areas, population and flow projections, strategies for facility optimization, and policies to address problem areas in both water supply and sewerage systems.

The goals of the *Water and Sewer Master Plan* are as follows:

1. Ensure a sufficient supply of water will be collected, treated and delivered to the points of use where it is programmed for service,
2. Wastewater will be collected from and extended to areas programmed for growth and delivered to points best suited for waste treatment and disposal or reuse,
3. Both services shall be monitored and maintained in a manner that strives to maximize the public health, safety and welfare for all while minimizing every environmental impact, and
4. Incorporate the water and sewer planning principles of the Maryland Department of Planning and Smart Growth initiatives to achieve best land management practices, highest water quality protection management, and partnered financial support.

The first *Master Plan for Water Supply and Sewerage Systems* was completed in 1966 and recommended providing public water and sewer service to 86 percent of the County's land area by the year 2000. At that time, public sewer was serving 10 percent of the County. The areas planned for water and sewer service have been reduced over the last 30 years based on growth management and environmental policies adopted in the 1978 and 1986 GDPs, and the revised service areas have been reflected in subsequent updates to the Water and Sewer Master Plan.

Since then, a detailed study titled *Comprehensive Water Strategic Plan* was conducted in 2003 for the County. It coordinated the findings of planning projections, peaking characteristics, demand forecasting, groundwater projections, hydraulic modeling analyses and criteria for system improvements to develop a proposed capital improvement schedule which includes cost estimates and an implementation time frame. Also, a *Comprehensive Sewer Strategic Plan* was completed in 2007 that consisted of a two-phase approach for planning future modifications and expansion of the County's existing wastewater collection and treatment system. These studies and more accurate data have led to revisions to existing and planned service. In addition, improvements to the County's Geographic and Information Systems (GIS) have led to an automated mapping of the water and sewer service areas and the facilities.

Both the water and sewer service areas are divided into service categories of Existing, Capital Facilities, Planned, Future, Other and No Public Service to indicate level of service. The Existing, Capital Facilities, Planned and Future categories represent the area to be ultimately served by public utilities. The Other category represents areas served by systems other than Anne Arundel County. The No Public Service category represents the area not planned for public utility service.

The most recent update to the *Water and Sewer Master Plan* was completed in 2007. The current area served by public water is 31% of the County's land area, and the ultimate area of the County to be served is 43 percent. The area currently served by public sewer is 27% of the County's land area, and the ultimate area to be served is 43 percent.

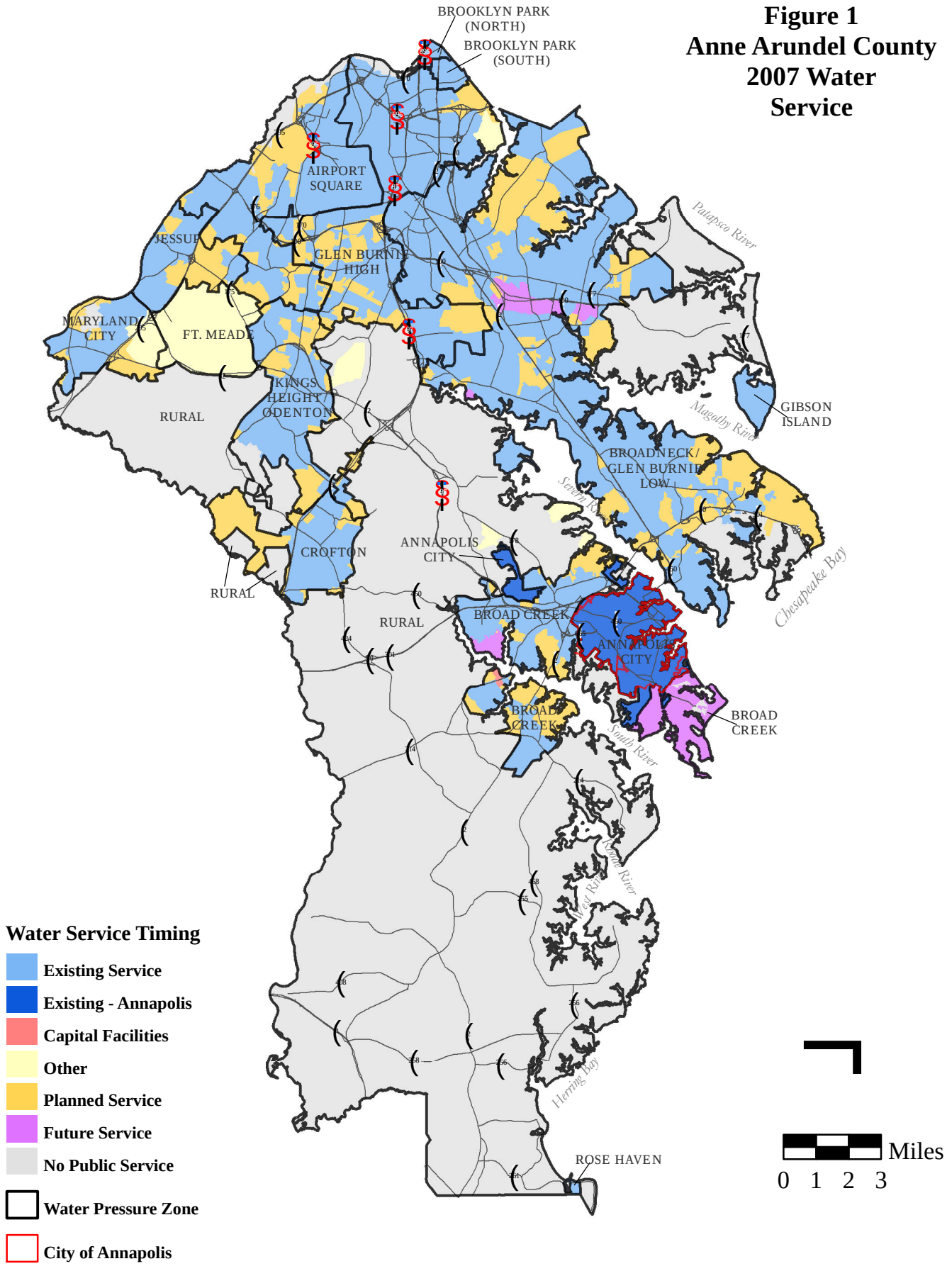
Water Supply

The water-bearing aquifers which supply most of the water for Anne Arundel County are from oldest to youngest, the Patuxent, Lower Patapsco, Upper Patapsco, Magothy and Aquia. These aquifers overlay much older, consolidated bedrock that has little or no water supply potential for the County. Approximately 22 percent of the water supply is purchased water from Baltimore City, which comes from surface water sources.

The County's water system contains interconnections between pressure zones, twelve areas established for the purpose of providing adequate water supply facilities. The remaining land is either served by the City of Annapolis, Fort Meade or is designated as Rural. The Rural area is not planned for service by public water facilities. Figure 1 shows the water pressure zones as well as the service categories.

The *2003 Comprehensive Water Strategic Plan* identified three objectives to guide the planning of facilities and infrastructure necessary for meeting expected growth while optimizing the use of potential County groundwater resources: (1) centralize facilities when possible, (2) create

Figure 1
Anne Arundel County 2007 Water Service



flexibility whereby water can be easily transmitted across water pressure zones via transmission mains, and (3) reduce reliance on the City of Baltimore. To meet these objectives, expansion of existing facilities and development of new facilities are proposed.

The County's public water supply system currently has 17 well fields that contain a total of 53 water supply wells that currently are permitted to produce up to 35.0 million gallons per day (MGD) on an annual average and 48.7 MGD on a monthly maximum. Thirteen future potential well fields have been identified and would add an additional 33.5 MGD. Considering new well construction, expansion of existing wells, demolition of older ones and subtracting out the wells located in the Rural service area, the total future groundwater potential is 112.7 MGD (maximum day).

The *2003 Comprehensive Water Strategic Plan* developed water demand projections for the planning period 2000 to 2025 and for build-out conditions, estimated to be in 2043. These demand projections were calculated using zoning, flow factors and water and sewer timing categories from the County's *Water and Sewer Master Plan*. Based on water billing records, the total 2006 annual average day demand was 31.1 MGD. The projected 2043 annual average day demand is 64.6 MGD and the maximum day demand is 123.9 MGD. Table 1 provides 2006 data based on billing records and the projected demand for annual average day, maximum day, and maximum day groundwater supply based on existing and future conditions.

Table 1
Water Demand and Supply By Pressure Zone

Water Pressure Zone	2006 Demand (MGD)	2043 Demand Annual Average Day (MGD)	2043 Demand Maximum Day (MGD)	Groundwater Supply Maximum Day (MGD)
Airport Square[1]	2.88	2.61	4.44	-
Broad Creek	2.56	6.00	15.00	22.7
Broadneck	2.67	6.44	16.10	17.1
Brooklyn Park[2]	0.60	0.89	1.51	-
Crofton	2.05	3.07	6.14	34.2
Gibson Island	0.06	0.17	0.43	0.4
Glen Burnie High	5.05	14.92	25.36	14.4
Glen Burnie Low	10.45	19.32	32.84	18.7
Herald Harbor	0.12	0.32	0.64	1.2
Jessup[3]	1.28	2.49	4.98	-
Kings Heights / Odenton	2.21	5.04	10.08	3.6
Maryland City[4]	1.18	3.20	6.40	-
Rose Haven	0.01	0.10	N/A	0.6
Total	31.1	64.6	123.9	112.7

1 There are no water production capabilities within this pressure zone. Water servicing this zone is received from the City of Baltimore and / or the Glen Burnie High Pressure Zone.
2 Water servicing this zone is received from the City of Baltimore.
3 There are no water production capabilities within this pressure zone. Water is received via the Montevideo Water Booster Pumping Station. In the future, the expanded Crofton Meadows Water Treatment Plant will also supply this zone.
4 There are no water production capabilities within this pressure zone. The two main supply sources for this pressure zone are the Baltimore City Zone and the Dorsey Road Water Treatment Plant (Glen Burnie High WPZ).

In addition to the water supply wells that the County owns and operates, agreements between the County and the City of Baltimore provide the rights to purchase up to 32.5 MGD (maximum day). The County used 10.3 MGD (maximum day) from the Baltimore City supply in 2006 and is projected to use 19.7 MGD (maximum day) by 2043.

Because of concerns over the reliability and future quality of the Baltimore City water supply, the *2003 Comprehensive Water Strategic Plan* promotes a self-reliance strategy by expanding County infrastructure. By optimizing the use of existing and potential supply wells, reliance on the Baltimore City system will be minimized. Any future deficiencies between supply and demand can be met by purchasing water from the City.

Sewerage Systems

Eleven separate and distinct sewer service areas have been established for the purpose of providing sewerage facilities to serve Anne Arundel County. The remaining land is designated as Rural and is not planned for service by public sewer facilities. Figure 2 displays the service areas and the categories of service. Of the eleven sewer service areas, eight are served by facilities owned and operated by the County. Two of the service areas have conveyance systems that are operated and maintained by the County but the treatment facilities are located in neighboring jurisdictions. Intra-jurisdictional agreements permit the transport of wastewater from the Baltimore City Sewer Service Area to the Patapsco Sewage Treatment Plant in Baltimore City and from the Rose Haven / Holland Point Sewer Service Area to the Chesapeake Beach Wastewater Treatment Plan in Calvert County. The Piney Orchard Sewer Service Area is a privately owned and operated treatment facility, however the collection system is owned and maintained by the County. The County currently has over 111,000 sewer connections and treats approximately 34.1 MGD (2005 total flow).

A *Comprehensive Sewer Strategic Plan* was conducted for the County between 2003 and 2007 in a 2-phase approach for planning the future modifications and expansion of the existing wastewater collection and treatment system. In Phase I of the study, the County's wastewater treatment plants were evaluated on a number of criteria including the State's anticipated effluent total nitrogen discharge goals and other future discharge permit requirements. Phase 2 evaluated ways to expand or modify the existing wastewater conveyance system to route flow toward treatment plants with the most available capacity to accommodate future growth in a cost effective manner. The major recommendations and findings of this study were incorporated into the *2007 Water and Sewer Master Plan*.

Consistent with the State's initiatives to address point-source pollutant loads from wastewater treatment plants, the County has upgraded and installed Biological Nutrient Reduction (BNR) processes and infrastructure at all of its major water reclamation facilities (WRFs). In addition, the County recently agreed to execute a Memorandum of Understanding (MOU) with the Maryland Department of the Environment (MDE) establishing targeted project schedules and respective commitments toward completing enhanced nutrient removal (ENR) upgrades at the Cox Creek, Annapolis, Broadneck, Broadwater, Mayo, Patuxent and Maryland City facilities. This is in response to the Chesapeake Bay 2000 Agreement that requires further reduction in nitrogen by about 20 million pounds and in phosphorus by about 1 million pounds per year. Subject to the availability of funds, MDE shall provide 100% of the eligible cost of planning,

design, construction, and upgrade of the County WRFs to achieve the reduction goal with ENR upgrades.

The current total design capacity with BNR upgrades is 46.64 MGD. The maximum total capacity based on the nutrient caps with the ENR upgrades is 62.2 MGD. The projected total flow at build-out is 74.1 MGD. Table 2 below provides the nitrogen load caps for each of the water reclamation facilities by watershed and the projected build-out wastewater flows assuming full development of all property in the sewer service area at current zoning.

Table 2
Nutrient-Based WRF Capacity Limits and Build-Out Wastewater Flows

Sewer Service Area	Current Design Capacity (with BNR upgrades) (MGD)	Maximum Capacity Based on Nutrient Cap (ENR upgrades) (MGD)	Build-Out Flows (MGD)
Annapolis	13	17.33	17.24
Broadneck	6	8.00	13.86
Broadwater	2	2.67	2.83
Cox Creek	15	20.00	22.67
Mayo	0.64	0.87	1.1
Total of Watershed	**36.64**	**48.87**	**57.7**
Maryland City	2.5	3.33	2.95
Patuxent	7.5	10.00	13.42
Total of Watershed	**10**	**13.33**	**16.37**
Total of All Watersheds	**46.64**	**62.2**	**74.1**

In some areas in Anne Arundel County the planned growth within the service area exceeds the WRF's permitted capacity. The County anticipates that during the planned expansions of these facilities, new Total Maximum Daily Load (TMDL) requirements will result in more stringent NPDES Permit limits thereby requiring costly facility upgrades. These upgrades will decrease available acreage at each WRF plant site. In order to support planned growth and accommodate the TMDL regulations, the County is investigating alternatives at those WRF sites with restricted acreage to redirect existing and future flows to service areas where facility sites can best support future upgrades and meet loading requirements. In the event that feasible alternatives cannot be identified or the advancement of treatment technologies lags, the TMDL regulations could restrict future land use and could conflict with Smart Growth initiatives.

III. Solid Waste Systems

The Resources Conservation and Recovery Act of 1976 and subsequent amendments provide Federal guidelines and standards for the environmentally sound reuse, handling and disposal of solid waste. The Environmental Protection Agency delegates the implementation of these guidelines and standards to the State and local level for implementation.

The Code of Maryland Regulations (COMAR) Title 16, Subtitle 3 requires each county to maintain a current, comprehensive, solid waste plan which covers at least a 10-year period and is updated at a three-year interval if necessary. The Plan must be prepared in accordance with the regulations set forth in COMAR. The Maryland Department of the Environment (MDE) is responsible for enforcing the regulations to insure that solid waste is handled properly. MDE also issues permits for the various types of waste facilities such as landfills, rubble landfills, processing facilities, transfer stations, compost facilities, material recovery facilities, incinerators and industrial and hazardous waste landfills.

The Anne Arundel County Code has regulations to implement the Federal and State laws. Article 13, Title 4 (Public Works, Solid Waste Collection) addresses collection service areas, collection practices, container removal, commercial recycling, County owned or operated landfills and solid waste disposal facilities, solid waste service charges and the need for a solid waste financial assurance fund. It also addresses the burying of refuse; permits, bonds, site requirements, operational requirements, fire protection and closure of landfills; general requirements for County-owned or operated landfills and solid waste disposal facilities and disposal of hazardous, toxic and special wastes. Article 15, Title 4 (Construction and Property Maintenance Codes) addresses enforcement, condition of premises, refuse containers, and maintenance of trash receptacles, storage of materials, inspection and removal of refuse. Article 18 (Zoning) governs where solid waste facilities can be located within the County. Sanitary landfills, rubble and land-clearing debris landfills are permitted by special exception in the RA and W3 Districts. Rubble processing facilities and solid waste transfer stations are permitted by special exception in the W3 Districts. Natural wood waste recycling facilities and recyclables recovery facilities are permitted by special exception in the W2 and W3 Districts. No other types of solid waste facilities such as incinerators are permitted.

The Anne Arundel County Solid Waste Plan's priority is to establish a basis for the conservation of resources and protection of the environment by maximizing waste reduction, employing operational facilities and vigorous application of recycling programs as well as continuance of alternatives to the practice of landfilling. The Plan provides a framework for implementing future solid waste disposal needs through an integrated system of reduction, reuse, recycling, resource recovery and disposal.

Municipal solid waste (MSW) is generated by activities of County residents, businesses, industries and institutions. Other types of waste include rubble, controlled hazardous substances, dead animals, bulky or special wastes, vehicle tire, wastewater treatment plant biosolids and septage. Residential waste is collected by means of curbside collection or self-haul and is either disposed or recycled. Most commercial and industrial solid waste disposed goes to non-County facilities. The County is divided into fifteen collection service areas for curbside collections (See Figure 3). The County contracts with private haulers for each service area for twice per week trash collection and once per week recyclables collection and once per week yard waste collection. For self-haul, the County offers community cleanup, three convenience centers (Millersville, Glen Burnie and Sudley) and the Millersville Landfill Resource Recovery Facility (MLFRRF) for disposal, Countywide cleanup events and household hazardous waste collection events. Other facilities include the Annapolis Junction Transfer Station and the Curtis Creek Transfer Station, which are privately owned and operated. Rubble waste that is not recycled is

disposed at facilities outside of the County with the exception of a small amount that is disposed at the MLFRRF. There are two proposed rubble landfill facilities, which could provide increased market competition, thereby lowering prices for disposal and provided an alternative outlet for commercial customers within Anne Arundel County.

To meet the objectives of reduction, reuse and recycling of solid waste, Anne Arundel County developed a new Recycling Outreach Initiative in 2008 that focuses on increasing the residential recycling rate from 31% to 50 %, decreasing waste generation, improving the ratio of recycling to disposal, and reducing collection and processing costs. In 2006, the County's overall Maryland Recycling rate was 46%, which includes both residential and commercial recycling as reported by the Maryland Department of the Environment. The County continues to implement literature distribution campaigns to inform the public of expanded recycling services, has established a recycling website to promote recycling and waste minimization and has pursued affordable and reliable outlets for yard waste disposal. In addition, the *4R's Project* provides an optional recycling curriculum for teachers in the public school system.

Although source reduction, recycling and resource recovery can significantly reduce the need for a landfill and combustion of solid waste can reduce waste volume, it will not eliminate the need for a landfill. Even though the MLFRRF has a disposal capacity that is projected to meet the annual landfill needs until 2030, the County uses several viable alternatives. For example, expanded recycling programs, diverting waste to out-of-County landfills via transfer stations and implementation of operational efficiencies such as higher compaction rates, minimization of soil for cover, increased recovery rates and reuse of materials help ensure the longevity of the MLFRRF.

In FY07, a total of 98,094 tons of solid waste was landfilled in the MLFRRF. Of the total, 75,855 tons were from residential sources and 22,209 tons were from commercial sources. Residential waste diverted to three different private disposal facilities totaled 146,359 tons. The total amount of material recycled by the County was 122,721 tons.

Currently there are no recyclables recovery facilities or rubble processing facilities located within the County. The Solid Waste Plan has identified that the establishment of these facilities in the County would conserve landfill space, increase recovery of recyclable materials, increase recycling rates, be cost-beneficial to the County and lessen the dependence on the Millersville facility. There is also concern regarding the availability of sufficient outlets for natural wood waste.

IV. Conclusions and Future Needs

The *1997 General Development Plan* adopted strategies and actions for meeting the goals of promoting and encouraging safe, efficient, economical and environmentally sound sewer, water and solid waste facilities; conserving water resources and protecting aquifers; and efficiently managing, reducing and recycling solid waste.

Since then, a *Comprehensive Water Strategic Plan* was conducted in 2003 that promotes a self-reliance strategy by expanding County infrastructure and optimizing the use of existing and

potential supply wells. In doing so, reliance on the Baltimore City system will be minimized. Any future deficiencies between supply and demand will be met by purchasing water from the City.

Between 2003 and 2007, a *Comprehensive Sewer Strategic Plan* evaluated the County's wastewater treatment plants on a number of criteria including the State's anticipated effluent total nitrogen discharge goals and other future discharge permit requirements. In some areas, it was concluded that the planned growth within the service area exceeds the WRF's permitted capacity. In order to support planned growth and accommodation of the TMDL regulations, the County is investigating alternatives at those WRF sites with restricted acreage to redirect existing and future flows to service areas where facility sites can best support future upgrades and meet loading requirements. In the event that feasible alternatives cannot be identified or the advancement of treatment technologies lags, the TMDL regulations could restrict future land use and could conflict with Smart Growth initiatives.

A new Recycling and Outreach Initiative has been developed in 2008 that focuses on increasing the residential recycling rate to 50%, decreasing waste generation, and improving the ratio of recycling to disposal. The County continues to implement literature distribution campaigns to inform the public of expanded recycling services, has established a comprehensive recycling website to promote recycling and waste minimization and has pursued affordable and reliable outlets for yard waste disposal. In addition, the *4R's Project* provides a Solid Waste Management Curriculum for use in the public school system.

In addition to these actions, items that the updated GDP may address include:

1. Additional strategies for meeting water demand,
2. Strategies for meeting TMDL regulations,
3. Recyclables recovery facilities,
4. Rubble processing facilities,
5. Outlets for natural wood waste,
6. Encouraging more recycling by restaurants and businesses, and
7. Encouraging the use of recycled materials in homes and businesses through additional opportunities.

A related *GDP Background Report on Water Resources* will provide additional detail on the topics of water supply and water quality protection and will assess the potential impacts of both point source and nonpoint source pollutant loads, including those from septic systems and stormwater runoff, on local waterways and suggest possible strategies for protecting water resources.