

PRIORITY PRESERVATION AREA PLAN



A Master Plan for the Next Generation



Introduction and Background

In response to the Agricultural Stewardship Act of 2006, Harford County adopted a Priority Preservation Plan in 2008 which applied to the Lower Deer Creek Rural Legacy Area. In 2009, the Deer Creek Rural Legacy Area and the Priority Preservation Area (PPA) were expanded to include the majority of the upper Deer Creek watershed (Figure 1). To date over 34,000 acres have been protected within the PPA, and the County continues working toward an 80% preservation rate for the undeveloped lands in that area (Figure 2).

To enhance preservation efforts, the 2016 Priority Preservation Area Plan expands the PPA boundary to include all lands north of the 2009 boundary and the Harford County portion of the Manor Rural Legacy Area (Figure 3). This new PPA encompasses portions of several watersheds (Figure 4), and this designation is consistent with the goals of the Sustainable Growth and Agricultural Preservation Act of 2012 (SB 236). The area is designated Agricultural on the County's 2012 Land Use Map and is located outside of the designated growth area (Figure 5).

Defining the Priority Preservation Area

To be designated as a Priority Preservation Area, the area should exhibit the characteristics noted in the Agricultural Stewardship Act. These are:

1. Contain productive agricultural or forest soils, or be capable of supporting profitable agricultural and forestry enterprises where productive soils are lacking;
2. Be governed by local policies that stabilize the agricultural and forest land base so that development does not convert or compromise agricultural or forest resources;
3. Be large enough to support the kind of agricultural operations that the County seeks to preserve, as represented in the comprehensive plan; and
4. Be accompanied by the County's acreage goal for land to be preserved through easements and zoning in the PPA equal to at least 80% of the remaining undeveloped areas of land in the area.

Another important consideration in selecting an area for designation as a PPA is how well the area exemplifies the goals of the MALPF Program. The state goals for agricultural land preservation are:

1. Permanently preserve agricultural land capable of supporting a reasonable diversity of agricultural products;
2. Protect natural, forestry, and historic resources and the rural area character of the landscape associated with Maryland's farmland;
3. To the greatest degree possible, concentrate preserved land in large, relatively contiguous blocks to effectively support long-term protection of resources and resource based industries;
4. Limit the intrusion of development and its impacts on rural resources and resource-based industries;

2008 & 2009 PRIORITY PRESERVATION AREAS

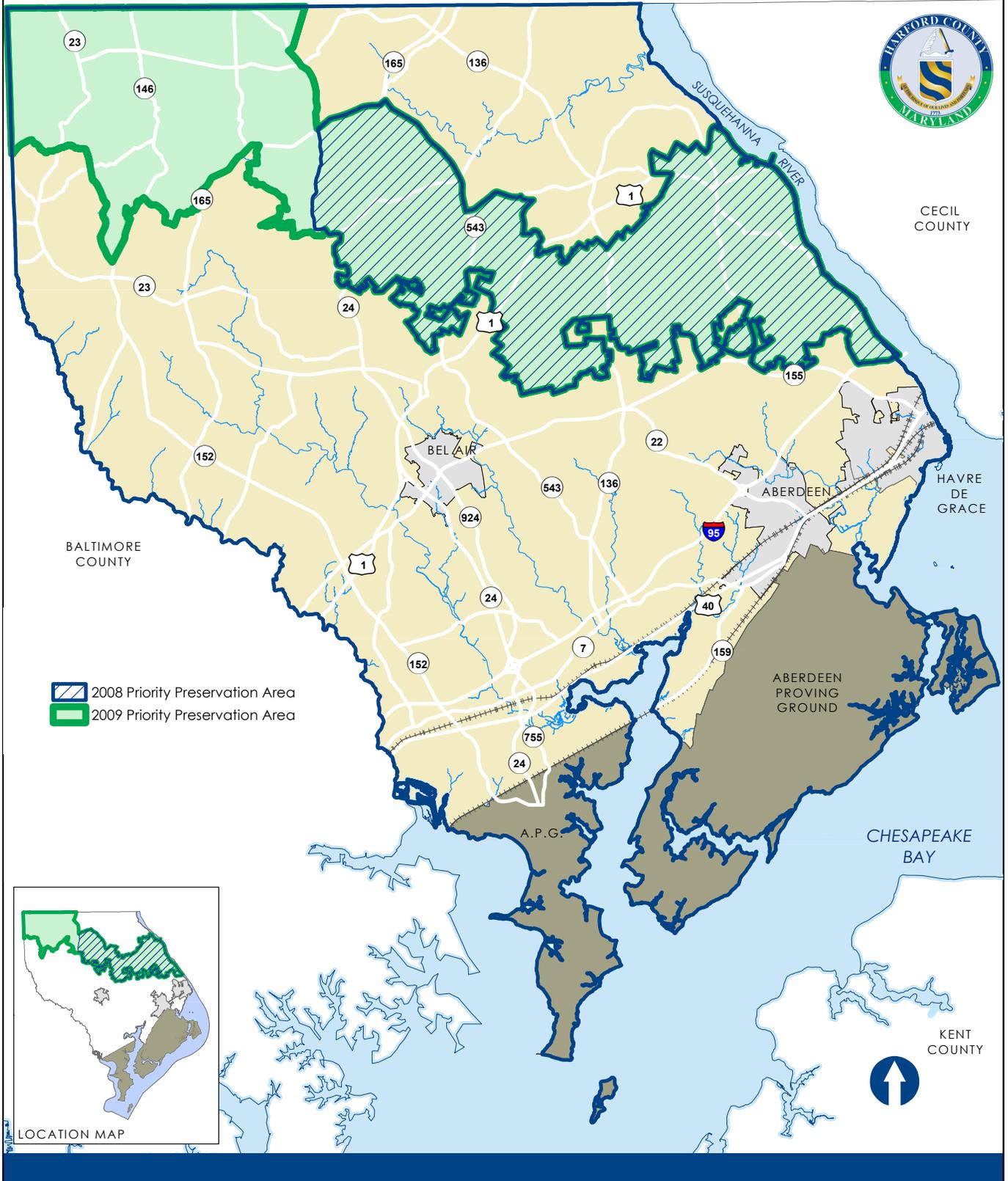


FIGURE 1

AGRICULTURAL PRESERVATION

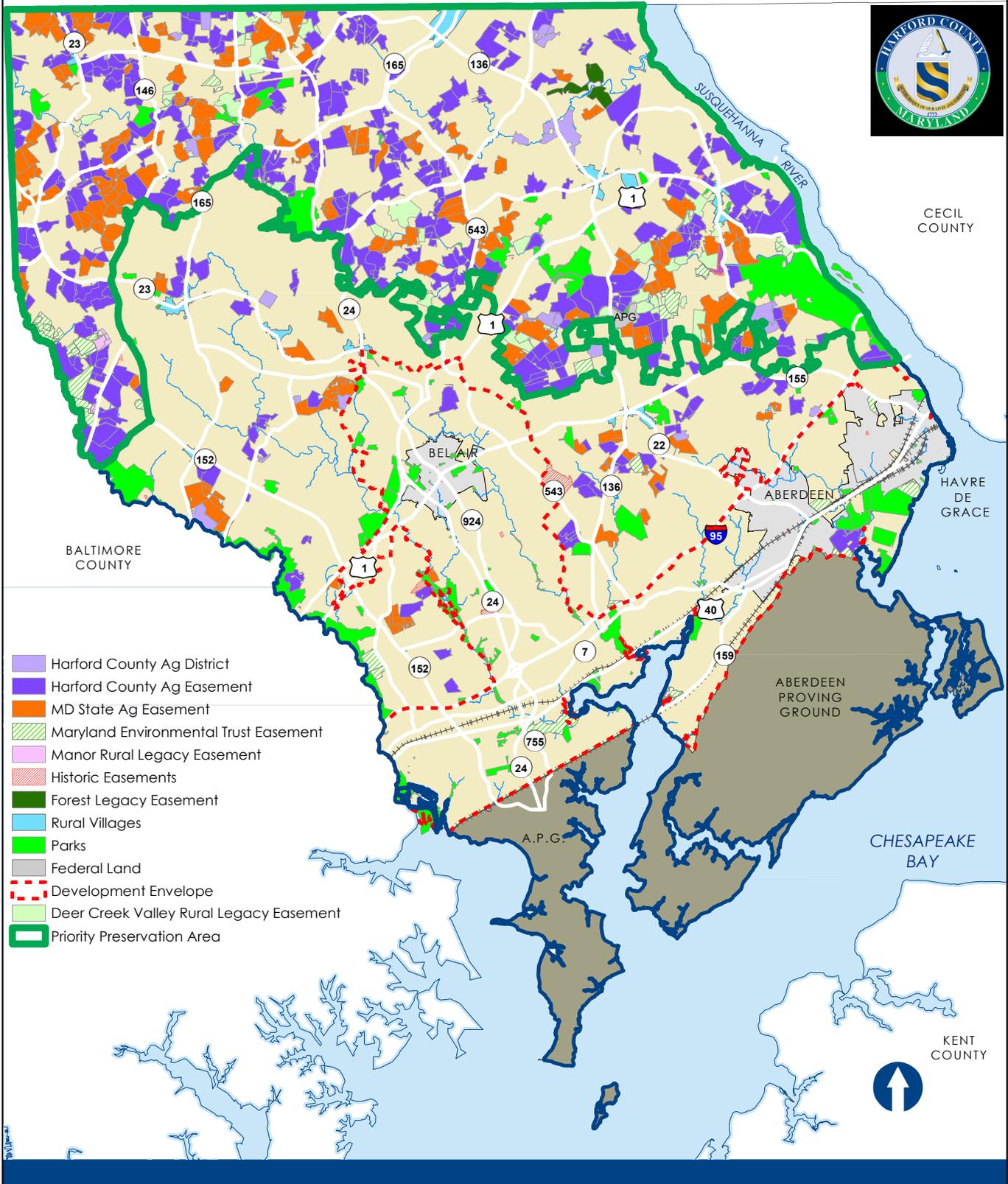


FIGURE 2

NEW PRIORITY PRESERVATION AREA

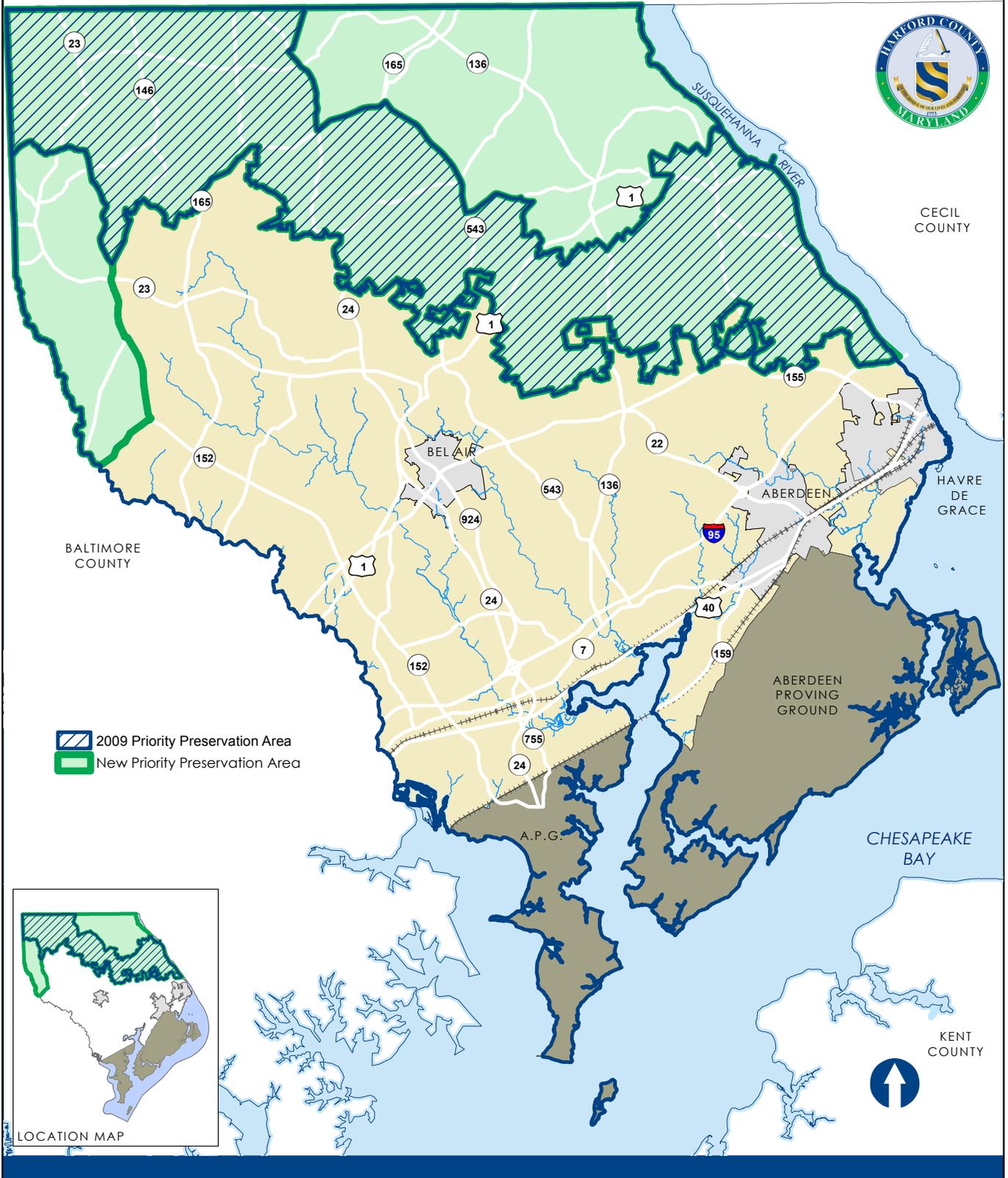


FIGURE 3

EXISTING LAND USE

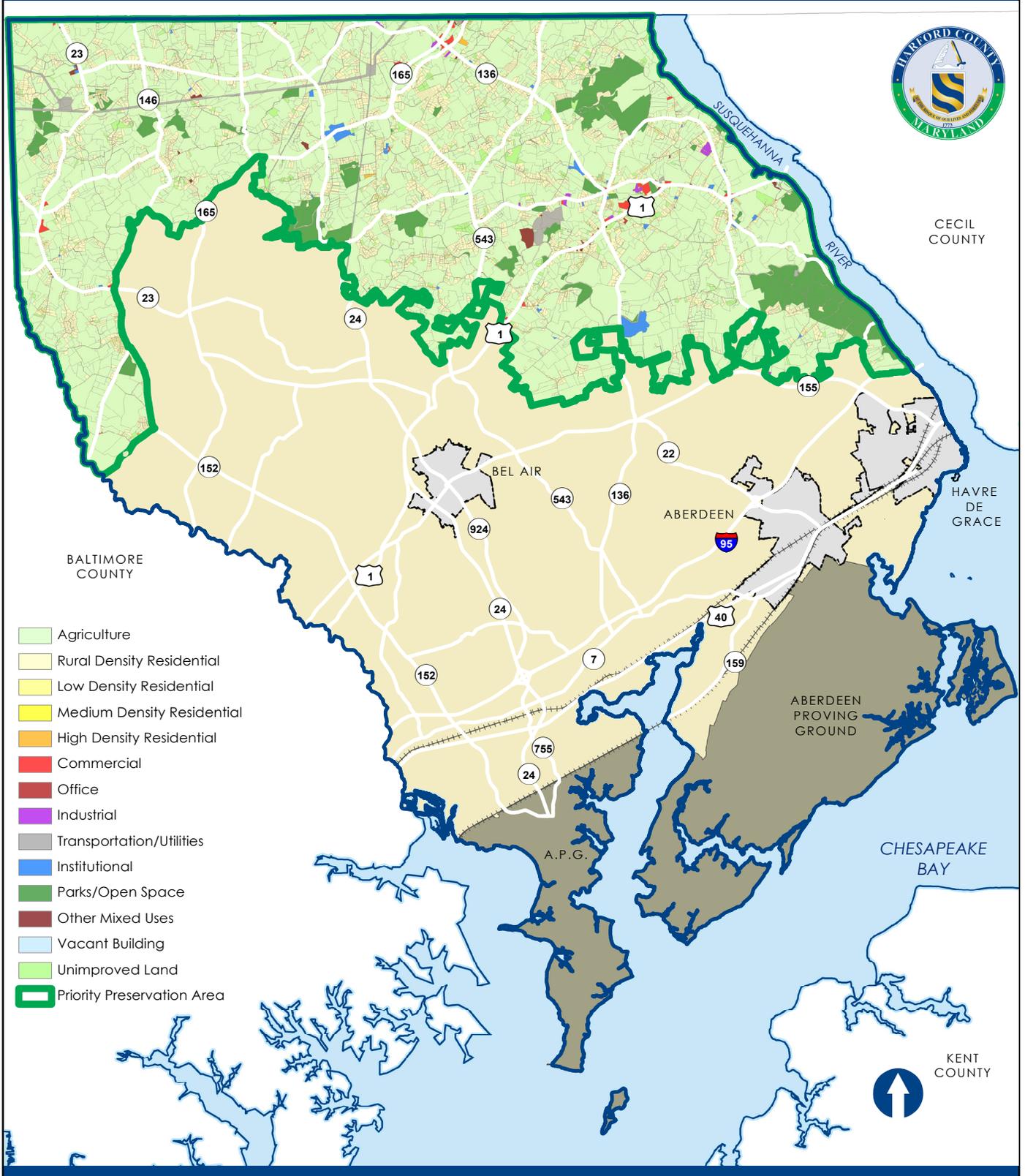


FIGURE 5

5. Preserve approximately 1,030,000 acres of productive agricultural land by 2020;
6. Ensure good return on public investment by concentrating state agricultural land preservation funds in areas where the investment is reasonably well supported by both local investment and land use management programs; and
7. Work with local governments to:
 - a) Establish preservation areas, goals, and strategies through local comprehensive planning processes that address and complement state goals;
 - b) In each area designated for preservation, develop a shared understanding of goals and the strategy to achieve them among rural landowners, the public at large, and state and local government officials;
 - c) Protect the equity interests of rural landowners in preservation areas by ensuring sufficient public commitment and investment in preservation through easement acquisition and incentive programs;
 - d) Use local land use management authority effectively to protect public investment in preservation by managing development in rural preservation areas; and
 - e) Establish effective measures to support profitable agriculture, including assistance in production, marketing, and the practice of stewardship, so that farming remains a desirable way of life for both the farmer and public-at-large.

Thus, the PPA should be capable of supporting profitable agricultural and forestry enterprises and should be managed by local policies that help stabilize the land base so that agricultural and/or forest resources are not compromised. The area should also be large enough to support traditional large-scale agricultural operations, such as dairy, grain, and horse and beef cattle, that the County seeks to preserve.

Based on the PPA goal of protecting 80% of the remaining undeveloped land, and program goals to concentrate preserved land in large relatively contiguous blocks, the Lower Deer Creek Valley was selected as the County's first PPA. There was, however, strong support to include the upper portion of the watershed. In 2009, the PPA was expanded concurrent with the expansion of the Deer Creek Valley Rural Legacy Area (See Figure 1). The area encompasses 66,701 acres of which 52% (34,683 acres) has been protected.

In 2012, the Maryland General Assembly enacted the Sustainable Growth and Agricultural Preservation Act. Subsequent to its implementation, the Tier IV areas of the County were reevaluated to determine if they also met the criteria for potential designation as a PPA (Figure 6). Utilizing the same criteria employed previously (percentage of the area already preserved, acreage needed to reach the 80% goal, and the percentage of the area developed), it was determined that the expansion of the PPA should include the area north of the current boundary and the Harford County portion of the Manor Rural Legacy Area (See Figure 3).

SUSTAINABLE GROWTH & AGRICULTURAL PRESERVATION ACT OF 2012

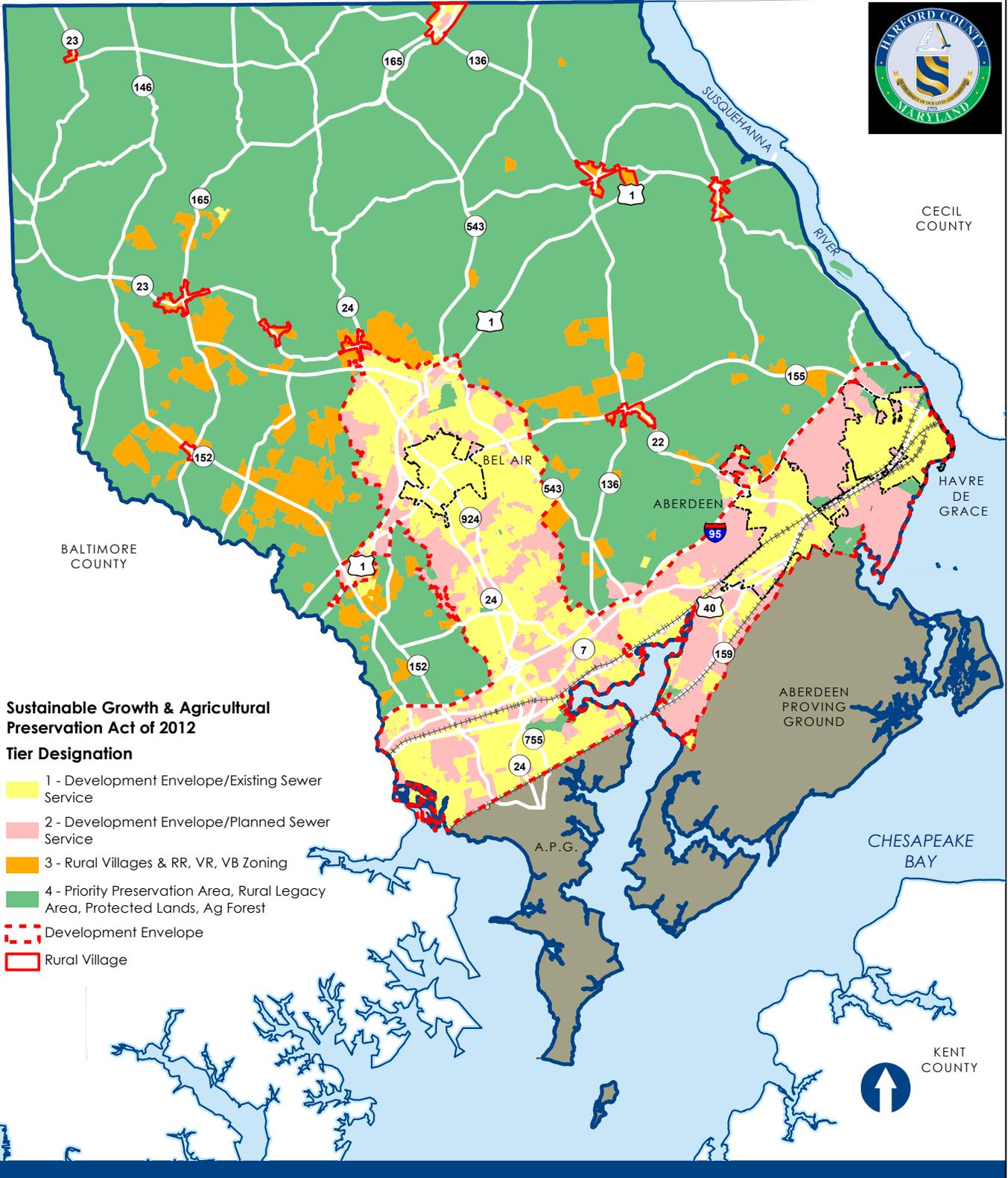


FIGURE 6

Characteristics of the Harford County Priority Preservation Area

The newly defined PPA now encompasses over 110,000 acres of which 96,373 are zoned agricultural. Of the agriculturally zoned land, 47% (45,224 acres) has been preserved through a variety of measures. Preservation efforts in the PPA reflect a combination of easements and other protected lands. A mix of state parks and camps are located within the area; including Parker Conservation Area, Rocks, Palmer, and Susquehanna State Parks along with the Broad Creek Memorial Scout Reservation. The majority of the easements are held through Harford Agricultural Land Preservation Program (HALPP), Maryland Agricultural Land Preservation Foundation (MALPF), or Rural Legacy, with the Maryland Historical Trust and Maryland Environmental Trust holding the remainder. A portion of the 1,600 acre Broad Creek Memorial Scout Reservation has been preserved through the Forest Legacy and the

While the largest blocks of contiguous preserved lands tend to be located within the Deer Creek and Manor Rural Legacy Areas, the Broad Creek area offers a strong opportunity for continuing this pattern of land preservation which will help to maintain the viability of agricultural operations in the area.

With its high concentration of prime agricultural soils, the PPA is a major contributor to the County's agricultural economy. Almost 48% of the area is comprised of Class I, Class II, and Class III soils for crops, and over 37% of the area is comprised of Class I and Class II soils for forests. This highly productive base supports a diversified mix of agricultural and forestry enterprises.

Land uses in the area are a mix of agriculture, woodland, and residential with small areas of commercial and industrial uses. Agriculture and woodland uses comprise almost 85% of the area. There are also 55 state identified habitat sites within the area.

According to the 2012 Census of Agriculture, there are 582 farms in Harford County, and a substantial portion of these farms are located in the PPA. The average producing farm is approximately 112 acres with many farmers owning or renting multiple parcels. The area is home to some of the County's largest grain and soy producers.

While traditional beef, dairy, and cash grain operations are the major agricultural enterprise, other sectors such as equine, orchards, vineyards, and commercial horticulture are expanding. Area farmers have also demonstrated their ability to adapt to changing demographics by moving to more value added products through direct marketing aimed at the County's growing population.

Area farmers participate in Farmer's Markets, both in and outside the County, as well as the operation of roadside stands, "pick your own" fields, and Community Supported Agriculture (CSA) programs. The processing of their products into cheese, ice cream, and retail ready beef and lamb have given producers access to new markets. Many stores and restaurants actively promote their utilization of locally grown products on their shelves and farm to table menus.

National and international markets play an important role for producers within the PPA. Local horticulture operations have developed a marketing edge through the introduction of unique

plants that are being grown and developed for innovative uses. Several beef and dairy farms within the PPA are nationally known for their quality stock. Likewise, local wineries and viticulture operations continue to grow and be recognized for their international award winning wines.

Serving the racing industry and pleasure riders, the equine industry has a strong presence in the area. County thoroughbred breeders and trainers are nationally recognized for their quality bloodstock. Numerous riding stables operate throughout the PPA, providing recreational opportunities as well as competitive show events. These businesses are also providing a strong market for local hay growers and support infrastructure businesses such as feed stores, farriers, and veterinarians. The Manor Area is renowned for its long history of fox hunting and steeplechase. Steeplechase racing is showcased by races which occur each spring, and many of the farms already have horse jumps built into them.

Equally important as their quality products, many area farmers have earned recognition for taking environmental stewardship beyond mandated levels. They have taken leadership roles in their respective state, regional and national industry organizations. Their innovative land preservation, environmental stewardship, and production practices draw tour groups from across the country.

The selection of the northern portion of Harford County as a PPA clearly supports the state's goals for land preservation. This area also includes the County's two designated Rural Legacy Areas, a Certified Heritage Area, and three Scenic Byways – Horses and Hounds, Mason and Dixon, and Lower Susquehanna. All of these programs promote and support tourism while retaining the rural and natural characteristics of the area.

The Master Plan and Land Use Element Plan

The Harford County Charter requires the development of a Master Plan, and it requires the inclusion of a series of elements or components which “further advance the purposes” of the Master Plan. In 2015, the Department of Planning and Zoning initiated the update to the 2012 Master Plan and Land Use Element Plan. The Department's approach to the update is based on a thematic structure which incorporates the Transportation, Priority Preservation Area, Natural Resources, and Historic Preservation Element Plans into one cohesive and streamlined document known as HarfordNEXT.

The designation of the PPA is consistent with HarfordNEXT, as well as other County plans, policies, and programs. HarfordNEXT supports the continuation of agriculture and preservation of the rural quality of life that has been an important part of Harford County's history. The PPA is consistent with the Grow With Purpose, Economic Vitality, Environmental Stewardship, Promoting Healthy Communities, and Preserving Our Heritage themes explored in HarfordNEXT. These themes serve as the common thread that provides continuity and consistency throughout HarfordNEXT. In addition, various County boards and programs help to implement these policies that are designed to protect the character of the rural area.

As a component of the County's Master Plan, the PPA promotes an integrated approach to preservation efforts by establishing appropriate goals for the amount of land to be preserved, and by describing the kind of agricultural production this area will support along with the way the preservation goals will be accomplished.

Senate Bill 236 the Sustainable Growth and Agricultural Preservation Act of 2012

The Sustainable Growth and Agricultural Preservation Act was passed by the Maryland General Assembly in the spring of 2012. The three main purposes of the bill are:

1. To reduce the impacts of nitrogen that is deposited in the soil by septic systems and the resulting impacts on the Chesapeake Bay;
2. To preserve agricultural and forestry uses in rural areas; and
3. To direct new growth where public infrastructure already exists such as sewer service, roads, schools, police, and fire in keeping with statewide growth policies.

The Sustainable Growth and Agricultural Preservation Act requires the creation of four growth tiers and applies only to residential development. It specifies where subdivisions may occur and what type of sewerage system will serve them. The tiers are defined as follows:

1. Tier I – Areas currently served by public sewer and within a Priority Funding Area or currently served by public sewer and mapped as a locally designated growth area;
2. Tier II – Areas currently planned for public sewer and in the municipal growth element or mapped locally as a designated growth area;
3. Tier III – Areas not planned for public sewer and not dominated by agriculture or forests; areas not planned or zoned for agricultural or resource protection; and is one of the following:
 - a. A municipality not served by public systems;
 - b. A defined rural village;
 - c. A mapped designated growth area; or areas planned and zoned for large lot and rural development.
4. Tier IV – Areas not planned for public sewer and that are:
 - a. Planned and zoned for agricultural and resource protection;
 - b. Dominated by agricultural and resource areas;
 - c. Rural Legacy, Priority Preservation Areas; or
 - d. Areas protected to the benefit of the state or local jurisdiction.

Zoning Code

Through the years, the Zoning Code has been amended to address changes in the agricultural industry and development in agriculturally zoned areas. The Code details the various zoning classifications and establishes regulations regarding permitted uses and buffers. It also addresses the development potential associated with agriculturally zoned lands. Within the PPA, 96,373 acres or 87% is zoned agricultural, and the remaining area is a mix of residential, commercial,

and industrial zoning.

The Code states that an agricultural operation or facility cannot be considered a nuisance as a result of changes to the surrounding lands. Agriculturally related commercial opportunities and agricultural public events have been added to the Code to improve the economic viability of farms.

Agriculturally zoned land can be developed at a density of one unit per 10 acres on parcels described in the land records as of February 8, 1977. On parcels where the individual owner was also the owner of record as of the 1977 date, additional lots may be permitted for the immediate family members. Development rights, purchased under an easement program, are determined in part on these criteria, thereby supporting the landowners' equity.

The passage of the Sustainable Growth and Agricultural Preservation Act placed limits on the number of lots that would be permitted on any property that is designated as a Tier IV property. It also required that local jurisdictions have legislation in place that defines major and minor subdivisions. Major subdivisions are prohibited in Tier IV areas.

The Code also includes Conservation Development Standards (CDS) to provide for increased preservation opportunities when development occurs. Under CDS, a buffer is required between the development and adjoining active farms.

Countywide Preservation Program Evaluation

There are four major preservation programs used throughout the County; including the Harford County Agricultural Land Preservation Program (HALPP), Maryland Agricultural Land Preservation Foundation (MALPF), Rural Legacy, and Maryland Environmental Trust (MET). These programs have protected over 49,000 acres in the County (Figures 6 and 7). The Rural Legacy Program has protected over 3,100 acres while the County program has protected over 29,500 acres. The state program has protected an additional 13,757 acres through December 2015. There are also 2,915 acres preserved through MET, and 539 acres of donated easements through MHT.

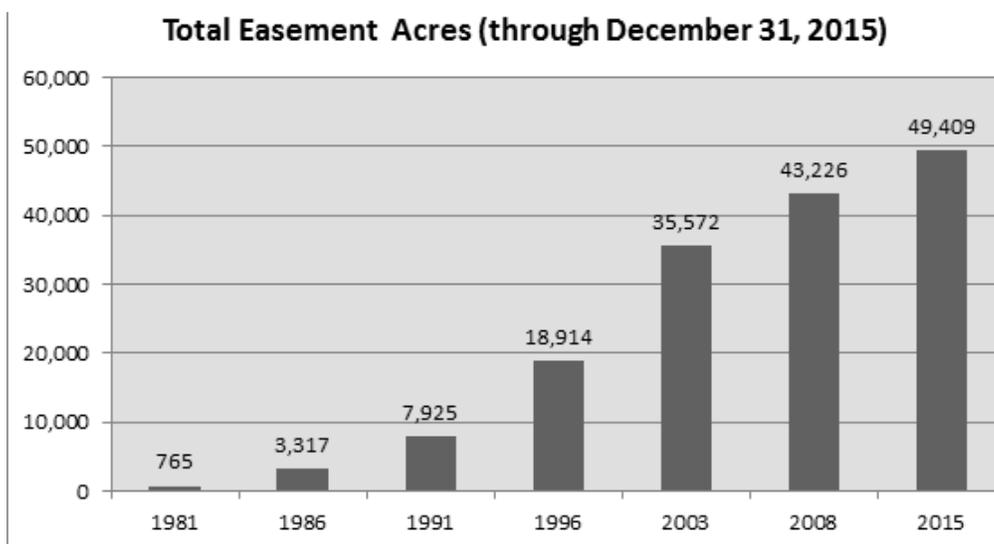


Figure 7

Preservation efforts in the PPA also include parklands owned by the state and County. The Maryland Department of Natural Resources (DNR) manages publicly owned lands in the County, overseeing approximately 4,100 acres of public land and protected open space including Susquehanna, Palmer, and Rocks State Parks. County parks in the PPA comprise nearly 800 acres.

Continued development pressure on areas outside of the Development Envelope as well as changing agricultural markets and practices have continued to impact the County’s remaining farmland. The 2012 Census of Agriculture shows that between 2007 and 2012, the County lost 9,694 acres of farmland which is about 3,000 acres more than during the previous five year reporting period (Figure 8).

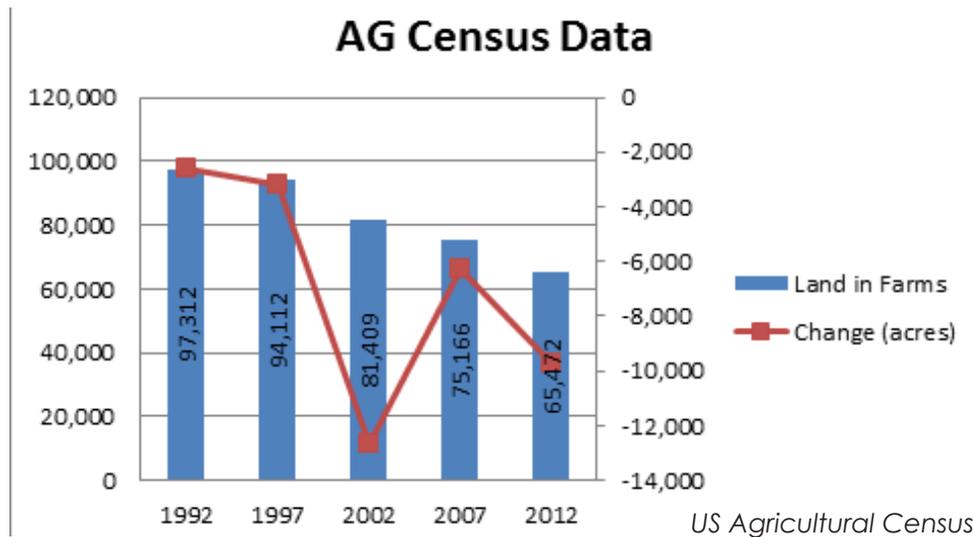


Figure 8

The Census of Agriculture statistics also reported that while the number of farms in the County declined between 2007 and 2012, the average farm size increased slightly (Figure 9).

Farm Number and Size	1997	2002	2007	2012
Number of Farms	651	683	704	582
Average size (acres)	145	119	107	112

Figure 9

During the period 2002-2012, the value of land fluctuated requiring adjustments in the per acre offer prices. Recently, discounting has been part of the negotiations for most preservation settlements. The average cost per acre has markedly decreased significantly since 2008, and the market remains farmer driven versus development driven. Concurrent with this downturn in the market, County offers have been lowered by half since the 2008 peak.

Since the adoption of the 2009 PPA, funding for preservation efforts has been impacted by the downturn in the economy. Since funding for agricultural preservation is linked to the land transfer tax, funding sources are taking longer to accumulate. To help stretch available funds, the County continues to encourage discounting of up to 50% from the original Rural Legacy

formulas, and MALPF has established a 70% fair market value as its cap. The County's ability to offer interested parties a variety of preservation options has helped to keep preservation efforts moving forward even through tougher economic times. The County maintains a waiting list of farms interested in receiving offers for preservation.

Protected Lands

Protection Program	Countywide	PPA
Maryland Agricultural Land Preservation Foundation (MALPF)	13,757	10,843
Harford County Agricultural Land Preservation Program	29,572	24,704
Rural Legacy	3,136	3,136
Maryland Environmental Land Trust	2,915	1,453
Maryland Historical Trust	539	141
State Parks	7,087	4,158
County Parks	5,020	789
Total	62,025	45,224

Figure 10

Program Marketing

The County's marketing program emphasizes a one-on-one effort to interested landowners. In addition, the County has taken a proactive approach to soliciting participants by offering a regular series of workshops. These workshops present the benefits of estate planning and demonstrate how selecting a preservation option can benefit the landowner and their heirs. The County also holds an annual Celebration of Agriculture that recognizes farming in Harford County with several awards including Preservationist of the Year.

Purchase of Development Rights

In 2006, the County updated its Purchase of Development Rights Program to enable the Harford County Agricultural Land Preservation Advisory Board to adjust the County's per acre value on an annual basis to ensure that offers remained competitive with the real estate market. In early 2007, legislation was adopted that again updated the County's 10 year old Purchase of Development Rights Program to make the program and process clearer to those interested participants. The ranking system was also adjusted to add points for properties located within or adjacent to designated PPA and Rural Legacy Areas.

Principles, Goals, and Policies for Priority Preservation Area (PPA)

FOCUS PRESERVATION EFFORTS IN THE PRIORITY PRESERVATION AREA TO MAINTAIN THE CONTINUED VIABILITY OF THE AREA'S AGRICULTURAL INDUSTRY.

Within the designated PPA, approximately 15,489 additional acres will need to be preserved to meet the requirements of the Agricultural Stewardship Act. Zoning and development procedures in Harford County must continue to direct development into the Development Envelope while discouraging development outside of the designated growth areas. Harford County must do this in a manner that respects and values its multi-generational farms, while demonstrating support for its young farmers as they face the challenges and opportunities of farming for future generations.

The commitment to agricultural preservation must be combined with efforts to provide for a diversification of agricultural businesses and the continued promotion of its agricultural products.

PPA 1.1 Preserve 80% of the remaining undeveloped lands within the designated Priority Preservation Area.

Under the State's Agricultural Stewardship Act, jurisdictions with a designated PPA are required to establish a goal of preserving 80% of the remaining undeveloped lands within the PPA. While Harford County's PPA encompasses an area of about 110,000 acres, just over 87% is zoned agricultural. However, not all of these agriculturally zoned lands are eligible for preservation.

To determine the amount of additional acreage that must be preserved to achieve the Agricultural Stewardship Act's goal of

80%, an analysis of the PPA was completed in 2014. Within the PPA, 45,112 acres have been protected through easements or as parks. There is also an additional 24,900+ acres that consist of larger active agricultural lands and parcels - some containing a residential structure on 20 or more acres - while others are woodlands or agricultural fields. Most of these properties lack development rights; however, they continue to support the agricultural operations within the PPA while also contributing to the agricultural nature of the area. There are approximately 7,000 additional acres that have been developed for non-agricultural uses. This leaves 19,361 acres, of which 80% or 15,489 acres will need to be preserved to meet the preservation goal within the PPA.

Implementation

- (a) Continue to preserve a minimum of 1,000 acres per year in the PPA.
- (b) Investigate the possibility of designating the Broad Creek watershed as a Rural Legacy Area.
- (c) Continue to utilize the Harford County Agricultural Land Preservation Program, MALPF, and Rural Legacy to fund preservation efforts.
- (d) Work with the State to shorten the timeframe for MALPF settlements.
- (e) Maintain the County's MALPF certification to leverage state funds with County funds.
- (f) Work with local land trusts to seek alternative funding sources including state, federal, and private funds along with donations and match challenges to support preservation efforts.
- (g) Investigate opportunities and programs to create additional incentives to preserve farmland.

(h) Continue to encourage the application of Conservation Development Standards for proposed residential development and include the 75% of the parcel that is preserved in preservation totals.

PPA 1.2 Monitor current preservation programs and residential development patterns to determine the impact on working farmland.

Each year the Department of Planning and Zoning prepares an Annual Growth Report to meet the requirements of the Adequate Public Facilities legislation and the 2009 Smart Green and Growing legislation enacted by the Maryland General Assembly. This reporting requires the tracking of development inside and outside the County's designated growth areas. In addition, the Department monitors agricultural preservation efforts countywide, as well as changes to the agricultural land base.

The Department also maintains a data base which monitors development of properties that are designated as either Tier III or Tier IV properties under the Sustainable Growth and Agricultural Preservation Act of 2012. A separate data base is maintained to track subdivisions grandfathered under this legislation since their grandfathered status is subject to an expiration date.

These data bases enable the Department to identify any changes in development or preservation patterns, and it provides a foundation for identifying changes that might be needed to programs and regulations to continue to meet plan goals. These efforts are important to identifying where preservation efforts should be focused or the additional marketing of programs would be beneficial.

Implementation

(a) Continue to track projects grandfathered by the Sustainable Growth and Agricultural Preservation Act of 2012.

(b) Continue to direct a minimum of 80% of all new development to the designated growth areas.

(c) Continue to report preservation efforts and development impacts as part of the Annual Growth Report and determine if additional steps should be taken to further stabilize the agricultural land base.

PPA 1.3 Ensure that within the Priority Preservation Area there is support for a range of agricultural enterprises and the potential to adapt to new markets.

Harford County has a long and rich agricultural history, sustained by farm families that have managed to evolve with the changing agricultural climate. While recent years have seen farmers continue to focus on traditional agricultural practices, they have also begun to expand their operations to include products, services and events that appeal to the changing demographics of Harford County.

As more families opt to "Buy Local" participation at local Farmer's Markets have risen, and the number of Community Supported Agriculture co-ops within the County has also increased. The CSAs involve a network or association of individuals who have pledged to support one or more local farms, with growers and consumers sharing the risks and benefits of food production. CSA members or subscribers receive a share of the anticipated harvest; once harvesting begins, they receive weekly shares of vegetables and fruit. CSA's can also include herbs, honey, eggs, dairy products and meat, in addition

to cut flowers and various ornamental plants as part of their weekly pickup arrangement.

Production and marketing of value added products along with farm centered events such as corn mazes, pumpkin patches, and wineries help to attract business from non-county residents. Agricultural related tourism is also supported by State Heritage Area and Scenic Byway programs, but continued marketing of rural tourism is needed if the County is to compete with regional attractions. In addition, the Agricultural Economic Development Advisory Committee should focus on taking the necessary steps to support local farming operations while also helping them maintain their competitive edge.

Implementation

(a) Promote community supported agriculture, farmer's markets, and other emerging local and regional markets and distribution systems.

(b) Continue to support agricultural and rural based tourism.

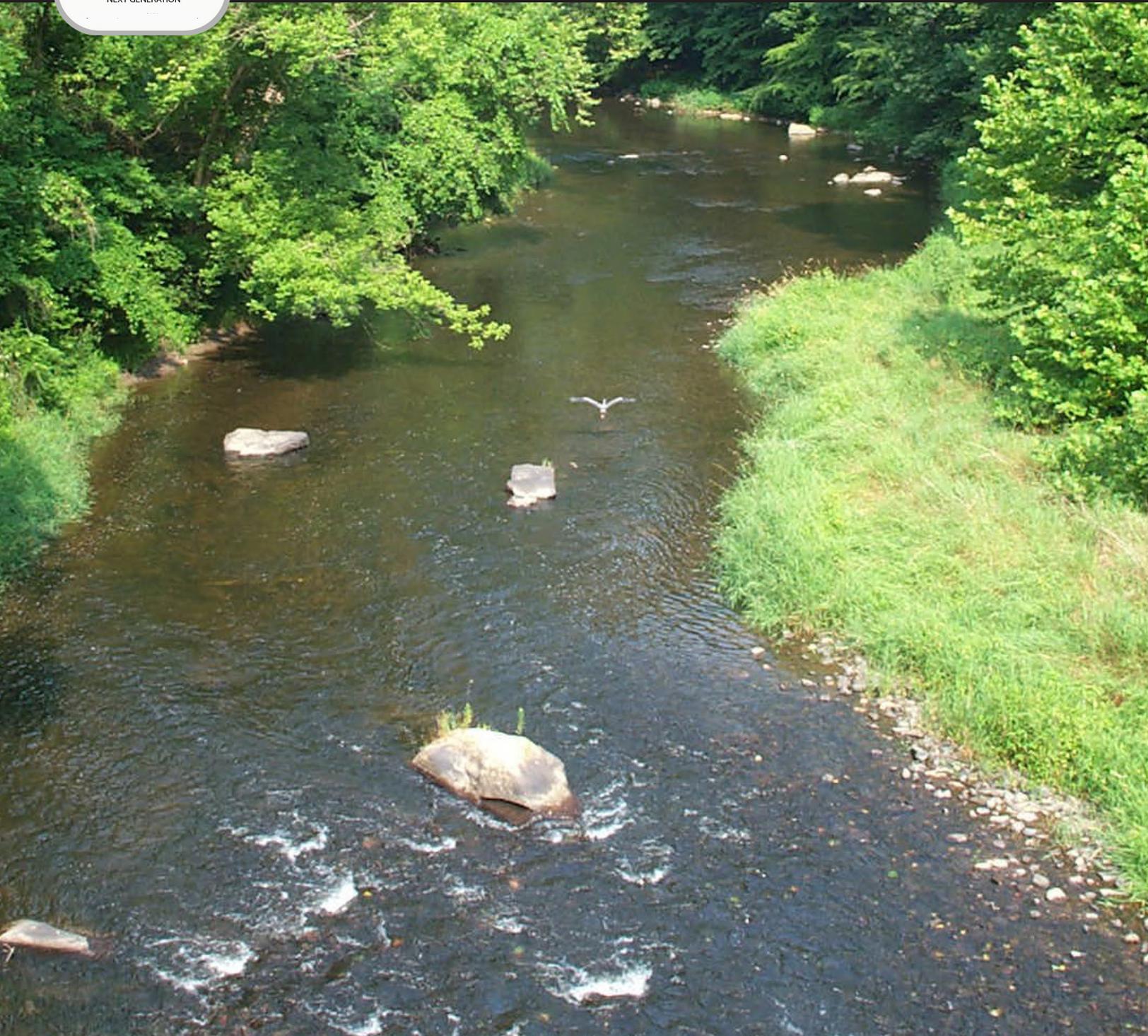
(c) Review and update the Agricultural Economic Development Initiatives to specifically support agriculture within the PPA.

(d) Continue to review and revise zoning regulations to permit compatible agriculturally related uses in areas easily accessible to farm operators while also minimizing impacts to surrounding properties.

WATER RESOURCE ELEMENT PLAN



A Master Plan for the Next Generation



Introduction

A primary objective of HarfordNEXT is to protect and conserve the County's water resources. The provision of safe drinking water and clean water for recreational pursuits and environmental health is fundamental to the public's quality of life.

In 2006, the Maryland General Assembly passed HB1141 which mandated that local jurisdiction's develop a Water Resources Element (WRE) as part of their Master Plan. This appendix to HarfordNEXT addresses the requirement of HB1141 to develop a WRE within the Master Plan. The main purpose of the WRE is to ensure that Harford County has adequate water resources to meet its current and future needs for drinking water and wastewater treatment. In addition, HB1141 requires that there be suitable receiving waters and land areas to meet the stormwater management needs of existing and future developments as identified in HarfordNEXT. Policies and strategies will be presented to ensure an adequate and safe supply of drinking water resources and wastewater facilities, and protection of water quality through adequate stormwater management.

HarfordNEXT and the Land Use Map identify designated growth areas which will accommodate new development while minimizing impacts to agricultural lands and other natural resources. The County's designated growth areas include the Development Envelope (which incorporates the three municipalities of Bel Air, Aberdeen and Havre de Grace) and several other areas designated for economic development. These areas, along with nine Rural Villages, are recognized as Priority Funding Areas (PFA) by the State. The Development Envelope, designated in 1977, is a growth management tool designed to ensure that development is targeted to areas planned for public water and sewer while discouraging development in rural areas. The Development Envelope is generally defined as those areas along the MD 24/MD 924 corridor and the I-95/US 40 corridors. The County's Water and Sewer Master Plan provides for planned service within this area.

The Water and Sewer Master Plan provides for an adequate supply of clean drinking water and environmentally responsible conveyance and treatment of waste water discharges within the Water & Sewer Service Area. The Water and Sewer Service Areas are closely linked to the Development Envelope. Adequate water and sewer capacity must exist for all new development within the Development Envelope in accordance with the requirement of the County's Adequate Public Facilities regulations (APF). If sufficient capacity does not exist, then development shall not occur. Thus, to facilitate the planned and orderly growth of the County, the provision of adequate water and sewer service is essential.

The WRE begins with an analysis of the drinking water supply in the County. The drinking water supply is analyzed both inside the Development Envelope where public drinking water is provided by seven major water purveyors and outside the Development Envelope where individual and community systems rely on groundwater. The County's wastewater treatment systems are analyzed next, not only in terms of capacity but also in terms of pollutant loading rates and nutrient caps imposed by State permits. An overview of the County's stormwater management program is also presented as part of the WRE. Policies and key implementation strategies to achieve the County's water resources goals are presented.

The WRE is built upon work contained in other planning and technical documents already prepared by the County, namely the Water and Sewer Master Plan and the MS-4 (NPDES) Permit, as well as other documents that will be identified throughout this Section. It is not the purpose of the WRE to duplicate this material, but to summarize and reference it where needed.

Coordination with Municipalities

The Departments of Planning and Zoning and Public Works coordinated with representatives from the Town of Bel Air, Maryland American Water Company, City of Aberdeen and City of Havre de Grace for the development of this WRE. Although each jurisdiction prepares its own WRE, it is critical that the County and municipalities coordinate their efforts to address water resource issues. Population projections were coordinated and verified.

The Cities of Aberdeen and Havre de Grace operate their own water and wastewater systems while the Town of Bel Air receives its water supply from the private Maryland American Water Company and is provided sewer service by the County. As a result of these coordination meetings, the study period was agreed to begin with the baseline year of 2010 and project forward to 2035. Water and sewer service area boundaries were reconfirmed, and population projections for these service area boundaries were determined by Harford County and shared with the municipalities for their planning purposes.

Drinking Water Assessment

Public Water Supply

Within the County's Development Envelope there are seven distinct and separately owned, operated and managed water purveyors who meet the needs of a majority of the County's population. For the purposes of this document these major water systems are collectively named the "Major Water Systems". These Major Water Systems are: Harford County Government (known as "The County System"), Maryland American Water Company (MAWC), City of Aberdeen (Aberdeen City), City of Havre de Grace (HDG), APG – Aberdeen Area (APG – AA), APG – Edgewood Area (APG – EA), and Green Ridge Utilities (GRU). The current and future service areas for these seven water systems are shown on Figure 1 and Figure 2, respectively. Based on the 2010 Population Census, collectively these purveyors served approximately 174,000 people and it is estimated that approximately 183,000 people were served by the public water systems in 2015.

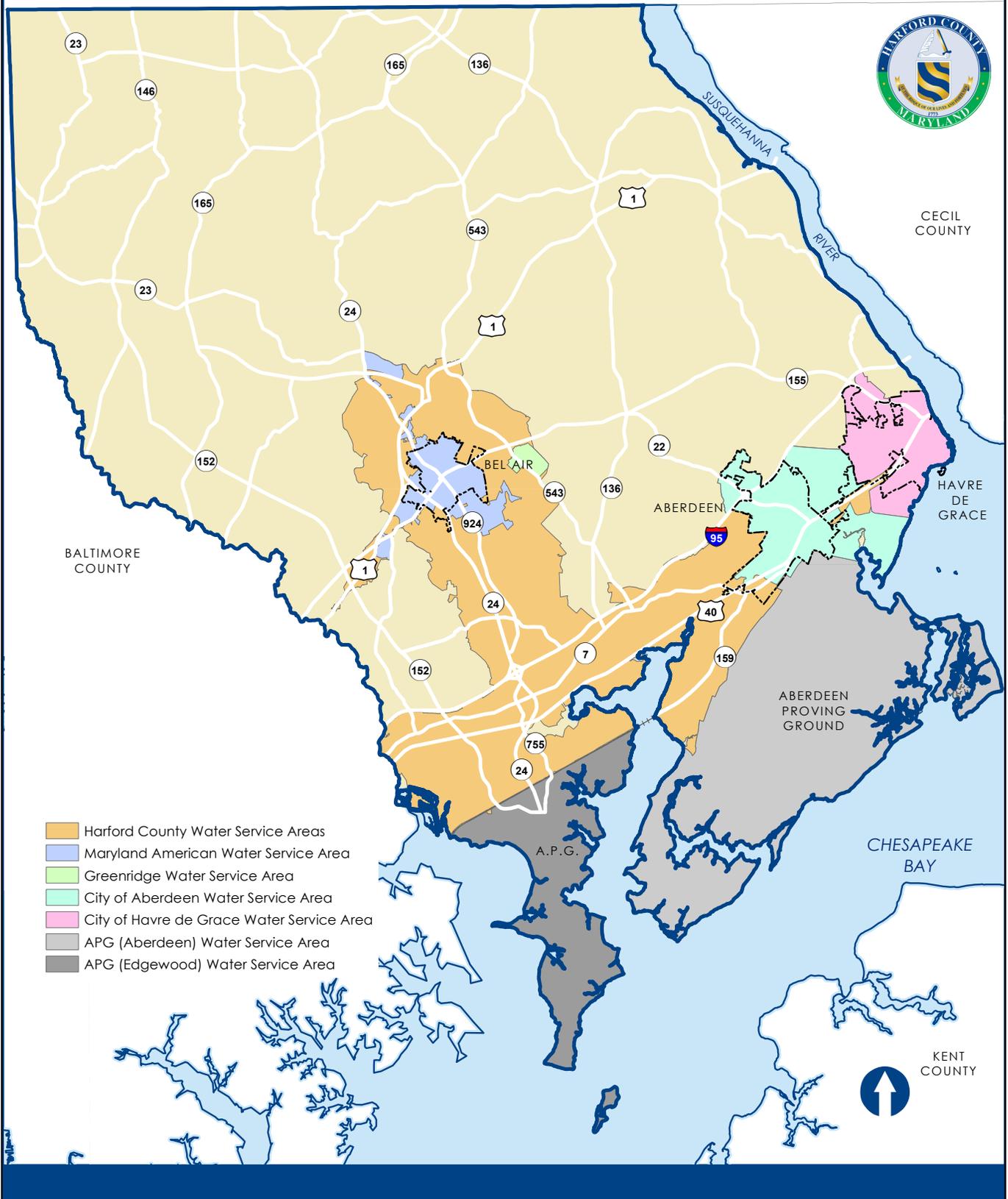
Existing Conditions

Table 1 presents the current and projected water supply demands and planned capacities for the Major Water Systems. Data for the APG-AA system and APG-EA system were unavailable. In addition, population projections and other informational facts concerning each large water system within Harford County are presented.

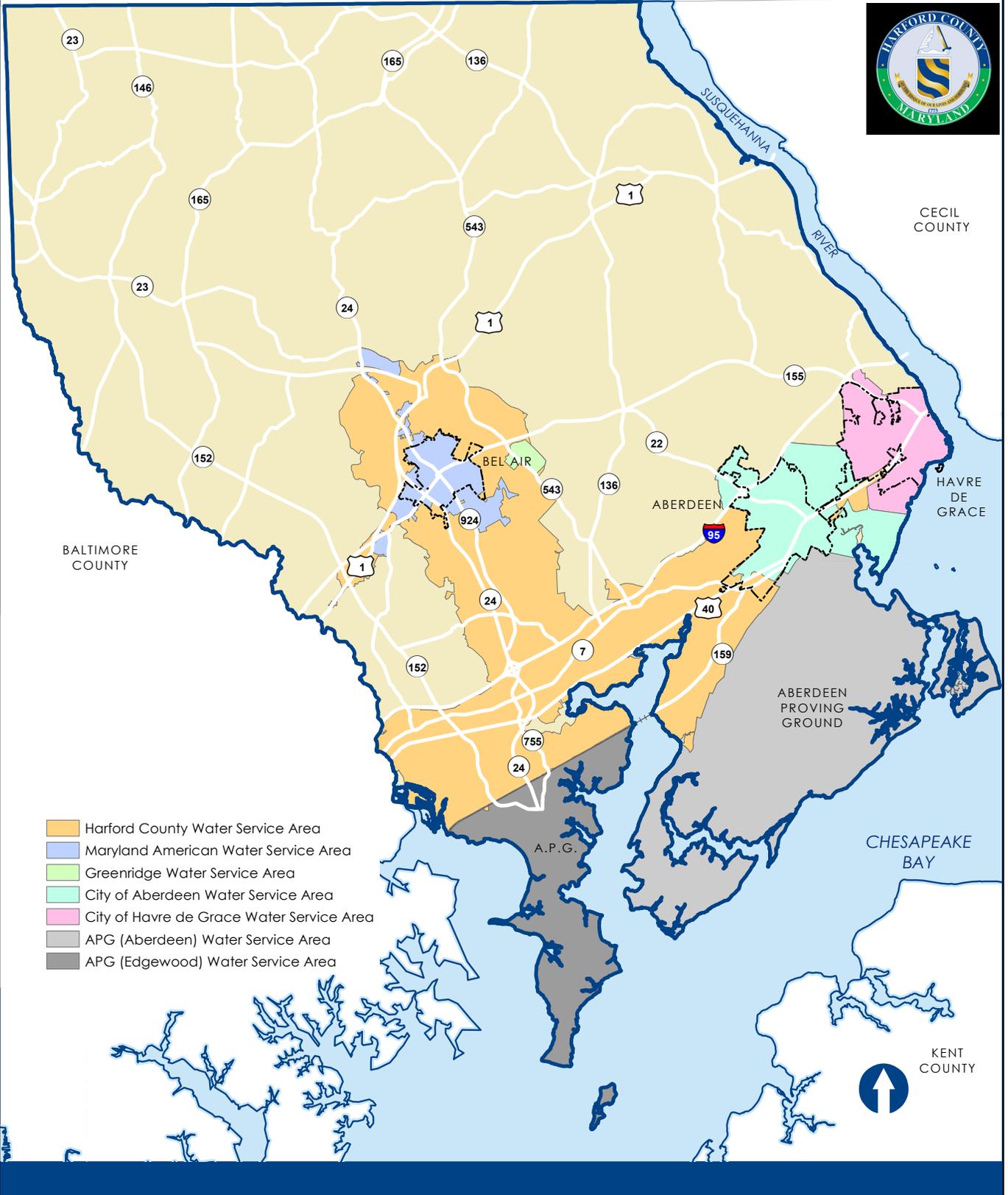
The County System

The County System is the largest purveyor of water in the County with the largest service area

Water Service Areas



Future Water Service Areas



- Harford County Water Service Area
- Maryland American Water Service Area
- Greenridge Water Service Area
- City of Aberdeen Water Service Area
- City of Havre de Grace Water Service Area
- APG (Aberdeen) Water Service Area
- APG (Edgewood) Water Service Area

APPENDIX II | WATER RESOURCE ELEMENT PLAN

of approximately 30 square miles. The County System served approximately 125,000 residential people in 2010 and had 39,690 customer connections. In 2010, the County had supply capability of 19.6 mgd and the County's average daily demand was 13.8 million gallons per day (mgd). The maximum day demand was 15.1 mgd. Of the 13.8 mgd of average use, 12.29 mgd was needed to meet the County's domestic demand, while the commercial and industrial demand was 1.12 mgd and 0.39 mgd, respectively. In 2011, the County completed the 10.0 mgd expansion (9.5 mgd net production) to its major water treatment plant, known as the Abingdon Water Treatment Plant. This expansion brought the system's supply capability to 29.1 mgd. Growth within the County has slowed from its historic highs in the 1990's and early 2000's and contracted over the past five years. Only 1,100 new connections were made to the County's water system between 2010 and 2015. In addition, water usage per capita has decreased. The County's Municipal contractual customers did not require the use of their maximum allowable appropriation from the County system during this timeframe. Based on nine months of data for 2015 it is estimated that the average and maximum day demands will be 12.40 mgd and 14.30, respectively.

The orderly development of the County's public water supply system is controlled through the Water and Sewer Master Plan (WSMP) and the County's Capital Budget and Five Year Capital Improvement Program (CIP). The WSMP outlines phased improvements to its water supply system required to satisfy existing and future development. In addition, the County's APF regulations require adequate capacity to service planned development within the Development Envelope.

The central water supply system serving Harford County is operated by the Department of Public Works, Division of Water and Sewer. The County's service area generally lies outside of the incorporated Town of Bel Air, and Cities of Aberdeen and Havre de Grace, and also excludes the Federal land area of APG-AA and APG -EA (see Figure 2). The County System is planned in conformance with HarfordNEXT. In addition to serving the planned Development Envelope, the County System also has Water Purchase Agreements for a set amount of water to several of the other major water suppliers: Aberdeen City – 0.9 million gallons per day (mgd), Aberdeen City – APG-AA backup supply – 1.7 mgd with an option until 2018 for an additional 0.3 mgd, Maryland American – 0.5 mgd, and Green Ridge Utilities – 0.35 mgd.

Four different water treatment plants service the Development Envelope: the City of Havre de Grace Water Treatment Plant (by way of a 1980 contractual agreement), the Harford County Havre de Grace Water Treatment Plant, Perryman Water Treatment Plant, and the Abingdon Water Treatment Plant. Current combined safe treatment capacity of the four sources is 29.1 mgd, comprised of 1.3 mgd from the City of Havre de Grace Water Treatment Plant, 3.6 mgd from the Harford County Havre de Grace Water Treatment Plant, 5.2 mgd from Perryman and 19.0 mgd net production from the Abingdon Water Treatment Plant. The safe yield of each source is decreased from the raw water appropriation amount by the amount of water required by the plant itself.

The raw water source for the City of Havre de Grace and Harford County Havre de Grace Water Treatment Plant is the Susquehanna River. The intakes for these plants are located downstream of the southern-most railroad bridge crossing and are below the authority of the Susquehanna

Present and Projected Water Supply Demands and Planned Capacities (MGD)
SOURCE: Data Provided by Each Individual Water System

TABLE 1

	PLANNING YEAR	HARFORD COUNTY GOVERNMENT		MARYLAND AMERICAN WATER COMPANY		CITY OF ABERDEEN		CITY OF HAVRE DE GRACE		GREEN RIDGE UTILITIES	
SOURCE WATER/SAFE YIELD OF TREATMENT PLANT CAPACITY MGD [Permitted Max. Daily Appropriation - mgd]	2010	Susquehanna River – County HDG Plant – 3.6 [6.0]		Winters' Run Stream – 1.4 [1.7]		Ground Water – Aberdeen Well Field – 1.73		Susquehanna River – City HDG Plant – 4.0 [5.0]		Ground Water – Port Deposit Gneiss Aquifer – 20 active wells – 0.137	
		Ground Water – Talbot Formation and Potomac Group – Perryman – 5.2 [4.39]		Bynum Wells – 0.144 [271]		Harford County Contract Purchase – 0.9				Harford County Contract Purchase – 0.35	
		Loch Raven Reservoir/Susquehanna River – Abingdon Plant – 20* [25]		Winters' Run Wells – 0.132 [246]							
		Havre de Grace City Water Purchase – 1.3									
TOTAL SAFE YIELD (ALL PLANTS, SOURCES AND CONTRACTS)	2010	19.6		2.144**		2.63		3.86		0.487	
	2035	33.54		2.184**		3.5 (source unknown)		3.86		0.487	
ANNUAL AVERAGE DAILY DEMAND (2005 IS BASED ON 5 PREVIOUS YEAR – PLUS 10% FOR DROUGHT FACTOR)	2010	13.80		1.5		1.67		City	County		
	2035	20.15		1.65		1.97		1.63	1.3	0.092	
	BUILD OUT	25.11						2.65	0	0.092	
MAXIMUM DAY DEMAND *INCLUDES CONTRACTUAL DEMANDS 2005 ACTUAL	2010	15.1		1.7		2.66		2.12	1.3	0.182	
	2035	28.71		1.84		3.12		3.9	0	0.182	
	BUILD OUT	35.65									
RESIDENTIAL POPULATION SERVED	2010	125,531		15,029		14,831		12,553		1,736	
	2035	165,737		15,027		17,008		15,355		1,736	
COMMERCIAL CONSUMPTION	2010	AVG	PEAK	AVG	PEAK	AVG	PEAK	AVG	PEAK	AVG	PEAK
		1.12	1.57	0.56	0.66	0.91	1.39	UNAVAILABLE		NONE	
	2035	4.50	6.29	0.48	0.56	1.40	2.43	UNAVAILABLE		NONE	
INDUSTRIAL CONSUMPTION	2010	0.39	0.66	UNAVAILABLE		UNAVAILABLE		UNAVAILABLE		NONE	
	2035	0.77	1.07								
DOMESTIC CONSUMPTION	2010	12.29	12.87	0.94	1.04	0.76	1.27	UNAVAILABLE		.184	.182
	2035	14.89	21.35	1.17	1.28	.57	.70	UNAVAILABLE		.184	.182
WATER USAGE PER CAPITA	2010	98	103	63	69	51	85	127	169	53	105
	2035	90	129	78	85	33	41	173	254	53	105
NUMBER OF CONNECTIONS	2010	39,690		4878		4,759		5000		855	
	2035	48,069		5000		6,077		7,000		855	
WATER USAGE PER CONNECTION	2010	348	295	308	349	351	558	320	423	108	213
	2035	419	527	330	368	381	606	379	557	108	213
NUMBER OF INDIVIDUAL PRIVATE WELLS WITHIN SERVICE AREA	2010	2995		71		0		150		0	
	2035	0		0				118			
CONTRACTUAL DEMANDS	2010	Aberdeen City 0.9									
		APG-AA 1.7									
		MAWW 0.5									
		GRU 0.35									

*Net production is 19 mgd, 1 mgd is used by the Treatment Plant internally
 APF Report ** In 2029 agreement for finished water from HDG expires and not included *** Prepared by HC in 2013 based on 2010 census
 1. New contracted flow
 ** Per Table 3-6, Harford County Water and Sewer Plan dated October 2015

River Basin Commission. The Perryman Water Treatment Plant uses a well field comprised of seven deep wells drawing ground water from the Talbot Formation and Potomac Group of the Coastal Plain. Source water protection regulations within the Harford County Zoning Code provide protections to the Perryman Wellfield Protection District. These regulations include prohibition of potential contaminant uses within the wellfield district, limitation of impervious surfaces within the district, and promotion of recharge of the groundwater supply.

The Abingdon Water Treatment Plant is fed from the 108-inch Susquehanna Aqueduct which is owned and maintained by the City of Baltimore. Raw water for the Abingdon Water Treatment Plant is obtained by agreement between the City of Baltimore and Harford County. The Aqueduct can provide water from two supplies: the City's Loch Raven Reservoir by gravity flow and from the Susquehanna River through Baltimore City's Deer Creek Booster Station. The primary source for the Abingdon Water Treatment Plant is the Loch Raven Reservoir. During drought conditions and possible future operational changes by the City of Baltimore, water from the Susquehanna River will be the primary source via the 108-inch Aqueduct. When Baltimore City requires water from the Susquehanna River, typically during drought times, the water source is from the Conowingo Pond north of the Conowingo Dam, thus within the authority and permitting purview of the Susquehanna River Basin Commission. The current agreement with Baltimore City allows the County to withdraw up to 25.0 mgd from the Aqueduct.

In addition to providing a water supply for domestic consumption and firefighting to its population, the County is responsible for maintaining the quality of water in the distribution system. As a result, while planning for improvements to the system to meet future demands, the County must also consider the effects of these improvements in order to maintain a high quality of water within the distribution system. A comprehensive evaluation of the entire water distribution system was previously completed. As a part of this effort, the County developed a long range Capital Improvement Program (CIP) to provide the additional facilities required to meet projected future demands through 2025.

Municipal Systems

The City of Havre de Grace owns and operates its own 4.0 mgd water treatment plant and water distribution system. The source of this water is the Susquehanna River. Over 13,000 residents are currently served by this system as well as commercial and industrial customers. The City's plant produces water to supply the needs of Havre de Grace as well as for small service areas just outside the City limits but within the Harford County Development Envelope. In 1980, the City and County entered into a forty-year water agreement whereby the County upgraded the City's plant to a safe capacity of 3.86 mgd in return for the right of the County to build its own water treatment plant adjacent to the City's and for the right for any remaining water capacity in the upgraded facility to be used by the County. The 1980 agreement allows the City to buy back this capacity over time and the City has been exercising this option routinely over the life of the contract. As of July 1, 2015, the City supplied the County with 1.39 mgd as per year-by-year terms. Based on current projections, the City will need the entire safe yield capacity of the facility by the end of the agreement and no renewal is currently anticipated. This water agreement contract ends in 2020.

The City of Aberdeen currently owns and operates a 1.5 mgd average (2.0 mgd peak) well field located near the boundary of APG-AA. Through a contract purchase agreement with the County, the City may purchase up to 900,000 gallons per day from the County to supplement this supply. In addition, in 2004 the County and City amended the agreement to include an additional 1.5 mgd to be used at the Chapel Hill Interconnection in order for the City to provide a reliable back up to the Deer Creek supply for APG-AA. In 2013, the agreement was once again amended for a temporary allocation of up to 0.5 mgd to be used until 2018. By 2018, a new source of water treatment at APG-AA, known as Building 250, is proposed to be brought back online. Building 250 is a previously used but now decommissioned groundwater treatment plant. If Building 250 is not brought back online by 2018, the temporary allocation must be bought and become permanent. The City owns and maintains its own water distribution system including the Chapel Hill Water Treatment Plant. The City of Aberdeen system served approximately 14,831 residential people in 2010 and had 4,759 customer connections. The City's average day demand was 1.67 million gallons per day and its maximum day demand was 2.66 mgd.

Private Systems

Maryland American Water Company (MAWC) provides service to the Town of Bel Air as well as County areas adjoining the Town, serving approximately 15,029 residents. Its water treatment plant draws water from Winters Run (up to 1.4 mgd) and two wells (up to 0.355 mgd). In addition, MAWC may receive up to 540,000 gpd through a contract purchase agreement with the County. The company's average day demand was 1.5 mgd and its maximum day demand was 1.7 mgd. The water supply withdrawals from Winters Run are limited during times of drought and during late summer and early fall when rainfall is not plentiful due to minimum stream "flow-by" requirements.

Green Ridge Utilities, Inc. provides water service to approximately 1,736 people via 855 customer connections outside of the Town of Bel Air and immediately adjacent to the County's water system in the Green Ridge community. The source water for the utility is a series of 20 active wells, as well as a contract purchase agreement with the County for 0.35 mgd of water. There are no foreseen future customers to its system. The service area has no plans for expansion.

Federal Systems

The Aberdeen Proving Ground is divided into two areas: Aberdeen area (APG-AA) and Edgewood Area (APG-EA) and is served by two independent water supply systems. APG-EA is served by a water treatment plant in the Van Bibber area which has an allocation permit to withdraw a maximum of 4.5 mgd of water from Winters Run. The Winters Run stream has a zero safe yield as a water source, due to the required flow-by criteria which frequently necessitates the plant to stop production due to low flows in the stream during late summer and early fall. In seven of the last eight summers, this plant was unable to withdraw water from Winters Run due to low stream flows. Privatization of this Federal facility is pending.

The water system for APG-AA was "privatized" by the City of Aberdeen. APG-AA is served by the Chapel Hill water treatment plant which is supplied from Deer Creek. Deer Creek also has a zero safe yield during times of drought due to flow-by requirements that can't be

APPENDIX II | WATER RESOURCE ELEMENT PLAN

maintained during moderate drought conditions. A water availability study of the Deer Creek watershed, recently conducted by the Susquehanna River Basin Commission, has revealed insufficient water in times of drought for Deer Creek to become a major drinking water source without back-up supplies. Therefore, the water allocation from this source is tied to adequate reliable backup supplies. The permitted withdrawal rate from Deer Creek is 1.5 mgd. Back-up supply is provided by the County (1.7 mgd).

Summary of Major Water Suppliers' Existing Supply and Demand

Table 2 presents the total supply and demand of the Major Water Suppliers as of 2010.

TABLE 2
Major Water Suppliers' 2010 Supply and Demand
(includes both residential and non-residential)

2010	County	MAWC	Aberdeen	APG-AA	APG-EA	HDG	GRU	TOTAL
Residential Population Served	125,531	15,029	14,831	3,339	913	12,553	1,736	173,932
Independent Supply* mgd	19.6	.992	1.73	0	0	3.86	.137	26.32
Average Day Demand mgd	13.80	1.50	1.67	0.927 ¹	1.0 ²	2.9	.092	21.89
Maximum Day Demand mgd	15.1	1.7	2.66	1.28 ¹	1.5 ²	3.42	.182	25.84

* Independent Supply is defined as the available safe yield supply to an entity without the use of any contractual relief from one purveyor to another. The Capacity is what is available for the purveyor's solely owned treatment plant(s).

¹ Flow data taken from Harford County meter records from delivery from the County system to APG.

² Flow data taken from Harford County meter records from delivery from the County system to APG-EA; no flow from APG-EA Van Bibber Plant is being produced during these times due to flow-by conditions of the Winters Run stream being below the pass-by requirement of the withdrawal permit.

Future Needs - Water Supply

The County anticipates that of the total population projection for 2035 of 281,030 people, nearly 75%, or 210,830 people, will be on a public water supply located within the current Development Envelope. This is an anticipated 15.6% increase since 2010 in the population to be served by public water, including the municipalities and Federal land.

The County System

In 2011, the County completed its expansion of the Abingdon Water Treatment Plant from 10.0 mgd to 20.0 mgd (19.0 mgd net production). Additionally, in 2012 the County and Baltimore City amended its raw water purchase contract to increase the County's allocation from 20.0 mgd to 25.0 mgd. With this increased allocation from Baltimore City and another expansion of the Abingdon Water Treatment Plant, the County will have adequate water supply to meet its 2035 needs. The average day demand for the Harford County system is projected to be 20.15 mgd with a maximum day demand of 28.71 mgd in 2035.

Municipal Systems

The City of Havre de Grace will serve a population of approximately 15,300 residents by 2035. The average and maximum day demands of 2.65 mgd and 3.86 mgd, respectively, will be met by the current Havre de Grace Water Treatment Plant supply of 3.86 mgd. The City will be able to meet its future needs as it gradually buys back the capacity it was selling to the County through a 1980 agreement. By 2020, the City will no longer be providing water to the County system.

The City of Aberdeen has been actively searching a new water source for its short and long-term needs. In 2035, the City of Aberdeen will have a projected average day demand of 1.97 mgd and a maximum day demand of 3.12 mgd. As shown in Table 1, the total safe yield for the City is 2.63 mgd; therefore, additional water supply will be needed. The City indicates that it will seek additional capacity increases either through construction of an Aberdeen Plant or seek approval to purchase water from Harford County Government, if the County has adequate supply and appropriation available. The need for additional water sources will be addressed in the Water Resources Element of the Aberdeen Comprehensive Plan.

Private Systems

Maryland American Water's need for water is projected to slightly increase to 1.65 mgd average day demand by 2035. Under drought conditions MAWC cannot meet its current or future maximum day demand. In 2015, MAWC entered into a Consent Order to develop an additional safe supply to meet the current and future demands of their system. MAWC is currently in the process of designing an off-line earthen dam structure and associated pump station to augment their source of supply during drought conditions. The operation of the facility would include withdrawing water from Winters Run when stream flow is sufficiently high to fill the upland reservoir and store it for future use when stream flow is not adequate to meet permit conditions, or when raw water quality is not optimal.

Green Ridge Utilities, Inc. is currently meeting its needs through a combination of their well system and water provided by a contract with the County. There are no plans for expansion.

Federal Systems

Additional sources of water will be required for both the APG-AA and APG-EA service areas. APG is pursuing a strategy to bring APG Building 250 back online by June 30, 2018. Building 250 is a previously used but now decommissioned groundwater treatment plant that is capable of producing up to 3.0 mgd of potable water, thus eliminating the need to rely on any reserved

APPENDIX II | WATER RESOURCE ELEMENT PLAN

potable water capacity purchased by the City of Aberdeen as back up to the Chapel Hill WTP. When the treatment plant is placed into service again, the City of Aberdeen would release the 1.5 mgd, currently serving as reserve capacity, back to the County. The County, through a separate water purchase agreement, would then provide up to 1.5 mgd of potable water to APG-EA, thus solving both Federal installations' future water inadequacies. On September 22, 2015, the County and the City executed the 10th amendment to their water purchase contract to provide for this exchange in the future. Also on September 22, 2015 the County and APG-EA entered into a separate long term agreement to provide 1.5 mgd to APG-EA, contingent on APG constructing a new water source and treatment plant by June 30, 2018.

2035 Development Envelope Region (no growth allotment for either APG-AA or APG-EA)

Table 3 collectively addresses the future needs of all of the Major Water Purveyors as a region. Future demand requirements for the Federal areas of Aberdeen and Edgewood were not made available; therefore, Federal water service areas are held at their 2015 demand. Following the concept of regional availability in the future, (neglecting pressure zones, services areas and contractual requirements) Table 3 illustrates the need for additional water sources and treatment systems to be planned and developed in Harford County. The water supply availability shown in Table 3 takes into account actual water supply projects that are currently listed in the Harford County Water and Sewer Master Plan, Fall 2015, including the Abingdon Water Treatment Plant expansion to 25.0 mgd by 2030.

TABLE 3
Region's Future Supply and Demand (2035)
(includes both residential and nonresidential)

2035	County	MAWC	Aberdeen	APG-AA	APG-EA	HDG	GRU	TOTAL
Residential Population Served	165,737	15,027	17,008	3,332	911	15,355	1,736	219,106
Independent Supply* (mgd)	33.54	1.644	2.60	2	0	3.86	.137	43.27
Average Day Demand1 (mgd)	20.151	1.65	1.37	1.4	0	2.65	.092	27.31
Maximum Day Demand2 (mgd)	28.712	1.84	2.22	2.0	0	3.9	.182	38.85

* Independent Supply is defined as the available safe yield supply to an entity without the use of any contractual relief from one purveyor to another. The Capacity is what is available for the purveyor's solely owned treatment plant(s).

1. HC [20.15 includes 0.25 to MAWC; 0.60 to Aberdeen City; 1.0 to APG-EA], Aberdeen City [1.37 is determined by 1.97-0.60].

2. HC [28.71 includes .5 to MAWC, 0.9 to Aberdeen City and 1.5 to APG-EA], APG-AA is assumed that Building 250 water treatment plant is up and running with a new well water source equal to at least 2.0 safe yield. See City of Aberdeen/Harford County Water Purchase Agreement 10th Amendment.

As a result of the expansion of the Abingdon Water Treatment Plant to 20.0 mgd, Harford County will be able to meet its expected maximum day demand through 2035. The future demand is based on population projections, and small increases (40,000 gpd a year) in commercial and industrial demands. This table does not reflect the total water supply required by the County to meet build-out conditions of its current planned Development Envelope contemplated in HarfordNEXT.

Future Total Supply and Demand of the Development Envelope Region – Predicated on Build-out of HarfordNEXT.

Table 4 presents future water needs of the County based on the buildout of the service area.

TABLE 4
Region’s Future Supply and Demand
County Build Out of Service Area
(includes both residential and nonresidential)

Beyond 2025 Build out of 2015 Development Envelope	County	MAWC	Aberdeen	APG-AA	APG-EA	HDG	GRU	TOTAL
Independent Supply* (mgd)	33.54	2.0	1.73	2.0	0	3.86	.137	43.27
Average Day Demand 1 (mgd)	25.111	1.65	2.9	1.4	0	2.65	.100	33.81
Maximum Day Demand 2 (mgd)	35.642	1.9	4.1	2.03	0	4.0	.137	45.79

* Independent Supply is defined as the available safe yield supply to an entity without the use of any contractual relief from one purveyor to another. The Capacity is what is available for the purveyor's solely owned treatment plant(s).

1. HC [25.11 includes 0.25 to MAWC; 0.60 to Aberdeen City; 1.0 to APG-EA], Aberdeen City [2.9 is determined by 3.5-.60].

2. HC [35.64 includes 0.5 to MAWC, 0.9 to Aberdeen City and 1.5 to APG-EA], Aberdeen City [4.10 is determined by 5.0-0.9], APG-EA [0.0 is determined by 1.5-1.5].

3. APG-AA max. demands are being met with 2.0 mgd from new Building 250 ground water treatment plant.

The County has, since 1993, envisioned the need for a total of 30.0 mgd plant capacity at the Abingdon Water Treatment Plant site with raw water supply from Baltimore City. The County is currently negotiating with Baltimore City to execute the option for the 30.0 mgd allocation and a possible additional 10.0 mgd (for a total of 40.0 mgd) in order to ensure adequate supply for all of these service areas.

Table 4 shows that at a minimum, an additional 12.0 mgd of supply allocation is required to meet provide a safe supply to APG-EA, and to meet the build-out needs of HarfordNEXT. The estimated increased allocation for the Federal lands is based on various estimates received by the County over the last several years for the provision of water to private development on APG through enhanced use leases. In addition to this increase in allocation, additional allocation should be planned due to drought demands and the impact on MAWC’s Winters Run Plant. For this reason, the region should be looking at studying and permitting an additional 20.0 mgd beyond the region’s current approved levels. The County and local municipalities have recently obtained funding for a study that evaluates the regionalization alternatives and feasibility for the water supply needs of Harford County and the major water systems.

Drinking Water – Rural Area

In keeping with the County’s goal to target planned growth within designated growth areas, the provision of public utilities in the rural area (outside of the designated growth areas) is prohibited unless it is needed to address a public health issue. Therefore, drinking water needs outside the County water and sewer service areas are supplied by groundwater resources. Table 5 presents the current and future population and households in the rural area relying on groundwater resources. In 2005, this accounted for approximately 30% of the County’s population.

**TABLE 5
Population and Households in the Rural Area on Private Systems**

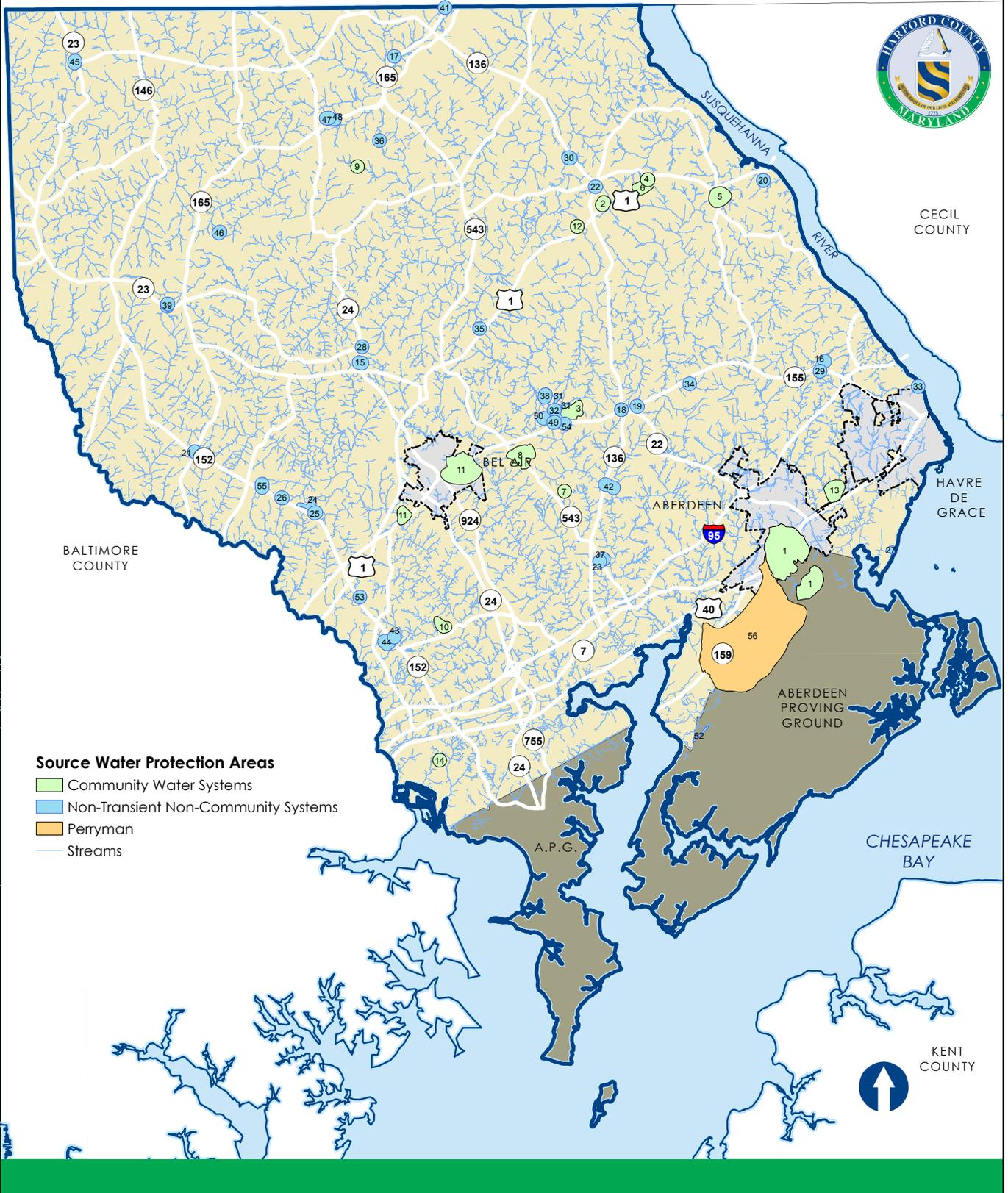
	2010	2035 (Projected)
Population	62,433	70,199
Households	22,336	26,426

The groundwater resources of Harford County are divided into two physiographic provinces: the unconfined aquifers of the Piedmont, encompassing approximately 80% of the County, and the confined or semi-confined aquifers of the Coastal Plain. The Coastal Plain aquifers typically provide an abundant yield of water, and are currently tapped by the County and the City of Aberdeen as part of their public water supply.

A majority of the rural area lies within the Piedmont where the aquifers have more limited water-yielding potential and well yields are extremely variable. One area especially prone to low water yields is the Lower Pellitic Schist of the Wissahickon formation, particularly in the Upper Fallston/Jarrettsville area. The majority of properties, even those in these low yield areas, are generally able to obtain a satisfactory water supply.

Even though the Piedmont formations supply a large number of individual residences and industrial and commercial facilities, the reported low well yields (average reported well yields of 10.0 to 15.0 gpm with higher yields of about 50.0 gpm in draws and valleys) are not sufficient for consideration of these formations as a major groundwater source for a County water system. These formations can continue to supply individual residences, small residential developments and commercial facilities not readily accessible to the County’s central water system. All requests for groundwater appropriations in the County will follow the MDE permit process.

Water Source Protection Districts



Agriculture

The Harford Soil Conservation District reports there are no current supply issues for existing dairy and livestock operations in the County. The Piedmont area is not conducive to intensive agricultural operations requiring large amounts of irrigation, such as the grain crop operations prevalent on the Eastern Shore of Maryland.

The Soil Conservation District will assist the agricultural community with compliance related to setbacks requirements stated in the Nutrient Management Regulation through the Maryland Department of Agriculture. These setbacks were created to provide a natural buffer to open surface water (perennial/intermittent streams and ponds) from runoff of farm land. Technical assistance for best management practices that will reduce the nutrient and sediment loads to tributaries located adjacent to farms will be the primary function of the Soil Conservation District.

Community Water Systems

Several community water systems, including six small mobile home parks, are served by private well systems in the Piedmont (Table 6). In keeping with previous master plans, no new community water systems will be considered to serve new development outside of the Water & Sewer service area.

The Darlington and Campus Hills water systems are operated by the Maryland Environmental Service and serve populations of approximately 250 each. The Lakeside Vista subdivision serves approximately 220 people through 81 service connections. Six mobile home parks in the Piedmont serve from a low of 28 at one park to a high of 150 people at another park. One additional mobile home park is located in the southern portion of the County and taps into the Coastal Plain aquifer for its source of drinking water. All of these private community water systems outside of the Development Envelope are expected to maintain economically viable and physically reliable resources to serve the existing communities. Extensive expansion of these systems will not be encouraged, as reported in the County's Water and Sewer Plan; however, minor additions to the customer base may be logical and appropriate.

In addition to community water systems, there are 43 nontransient-noncommunity water systems that rely on groundwater to meet their drinking water needs. These systems are defined as public water systems that are not a community and serve at least 25 of the same individuals over 6 months per year. Located throughout the Piedmont are schools and day care centers which fall within this category.

The County has source water protection regulations for the County's Perryman wellfield as well as other community and nontransient-noncommunity systems. These regulations prohibit potential contaminant uses within designated wellhead protection districts and promote recharge of the groundwater supply. Figure 3 identifies these regulated wellhead areas.

Water Quality

Overall, the water quality of Harford County aquifers is relatively good. Source water assessments have been prepared by or for MDE for the community and nontransient-noncommunity

Community Water Systems Outside the Water and Sewer Service Area											
Service Areas											
TABLE 6	Darlington	Campus Hills (from 2004 MDE source water assessment)	Lakeside Vista	Darlington MHP	Fountain Green MHP	Swan Harbor Dell	Williams MHP	Hart Heritage	Clearview MHP	Queen Castle MHP	Atkins Retreat (R&R Estates)
Public Water System Identification Number	012-0009	012-0007	012-0014	012-0214	012-0208	012-0215	012-0207	012-0021	012-0204	012-0213	012-0210
SOURCE WATER	Unconfined Quartzite Gabbro/Quartzite Gneiss	Unconfined fractured rock aquifer - Port Deposit Gneiss and Wissahickon Formations	James Run Gneiss	Piedmont - Baltimore Gabbro Complex	Piedmont - James Run Gneiss formation	Piedmont - Metagabbro and Amphibolite	Coastal Plain	Piedmont - Metagraywacke	Piedmont - Baltimore Gabbro Complex	Piedmont - Baltimore Gabbro Complex	Piedmont - Baltimore Gabbro Complex
ANNUAL AVERAGE DAILY DEMAND (Based on 5 previous years plus 10% drought factor)	.0077 mgd	.059 mgd	.014 mgd	10,000 gpd	3000 gpd	15,000 gpd	4000 gpd	.014 mgd	2100 gpd	6300 gpd	4,700 gpd
NUMBER OF CONNECTIONS	105	75	81	65	23	175	25	2	20	40	41
NUMBER OF WELLS	4	6	3	5	2	2	1	1	3	2	2
RESIDENTIAL POPULATION SERVED	250	250	219	150	55	500	35	37	28	60	85
DOMESTIC CONSUMPTION	.012 mgd	.0125 mgd (estimate based on 50 houses @ 250gpd)	.014 mgd	10000	3000	15000	4000		2100	6300	4700
COMMERCIAL CONSUMPTION	.0010 mgd	.0555 mgd	0	0	0	0	0	0	0	0	0
PLANS FOR EXPANSION			No	No	No	No	Yes		No	No	
QUANTITY/QUALITY POTENTIAL ISSUES	High nitrate levels, susceptible to VOC and SOC	Susceptible to nitrates	May be susceptible to radon	Moderate susceptibility to VOC and radon	May be susceptible to radon; had to deepen well 200' to increase volume and flow	Highly susceptible to VOCs and Nitrates	Susceptible to VOC's and SOC's; maybe radon; threat from Oak Rubble Landfill	Susceptible to VOC's, nitrates, radon and SOC's	Susceptible to nitrates, maybe radon	Susceptible to nitrates and VOC	Susceptible to nitrates, VOC's, SOC's and maybe radon

APPENDIX II | WATER RESOURCE ELEMENT PLAN

drinking water systems in the County. These assessment reports map wellhead protection areas, identify potential sources of contaminants, and identify strategies to address protection of the water supply.

The most common threats to drinking water identified in the source water assessment reports are nitrates and volatile organic compounds (VOCs). When found, these contaminants are readily treatable by individual removal systems. The Health Department has worked with communities where contamination has been detected and has recommended appropriate water treatment options to ensure that Safe Drinking Water Act standards are met. When groundwater contamination is detected, the Harford County Health Department may conduct sampling to determine the scope of the contamination and the area that is at risk. Based on the results of the sampling, community outreach is conducted when needed.

Water Resources Policy 1: Provide the infrastructure and facilities necessary to meet water demands within the Harford County water service area.

Implementation

- (a) Expand the Abingdon Water Treatment Plant by 5.0 mgd prior to exceeding maximum day demands; anticipated to beyond 2035.
- (b) Implement projects in the Capital Improvement Program and reevaluate these projects annually.
- (c) Promote water conservation and leak repair.
- (d) Continue to prohibit new private community water systems to service new development outside of Designated Growth Areas.
- (e) Adhere to the County's Adequate Public Facilities regulations and Capital Management Plan provided to MDE.
- (f) Continue to restrict new multi-use systems greater than 10,000 gpd (peak rate) in no-planned-service areas.
- (g) Encourage the use of treated effluent for non-potable needs.

Water Resources Policy 2: Coordinate and share information with the municipalities and Aberdeen Proving Ground so that all entities can make informed decisions with regard to the adequacy of their systems.

Implementation

- (a) Continue coordination on the reallocation of water back to the City of Havre de Grace.
- (b) Support and monitor the progress of the MAW and the proposed construction of an upland raw water storage impoundment and APG-AA construction of the a new ground water drinking source and treatment plant, known as Building 250. Hold biannual water utility meetings with the municipalities and Aberdeen Proving Grounds to share and monitor progress with respect

to meeting the demands of each service area.

Water Resources Policy 3: Protect the quality and quantity of drinking water sources.

Implementation

(a) Implement the Source Water Protection regulations pertaining to the Perryman wellfield, community water supplies, and nontransient-noncommunity water supplies.

(b) Pursue implementation of the Bush River WRAS and the Deer Creek WRAS to protect water quality in the Winters Run and Deer Creek watersheds.

(c) Promote low impact development and the use of green building design principles to decrease impervious surfaces and impacts to water quality.

(d) Continue to review and comment on all plans and annexations to ensure consistency with the WRE.

(e) Continue to evaluate water quality based on various weather related and water use scenarios.

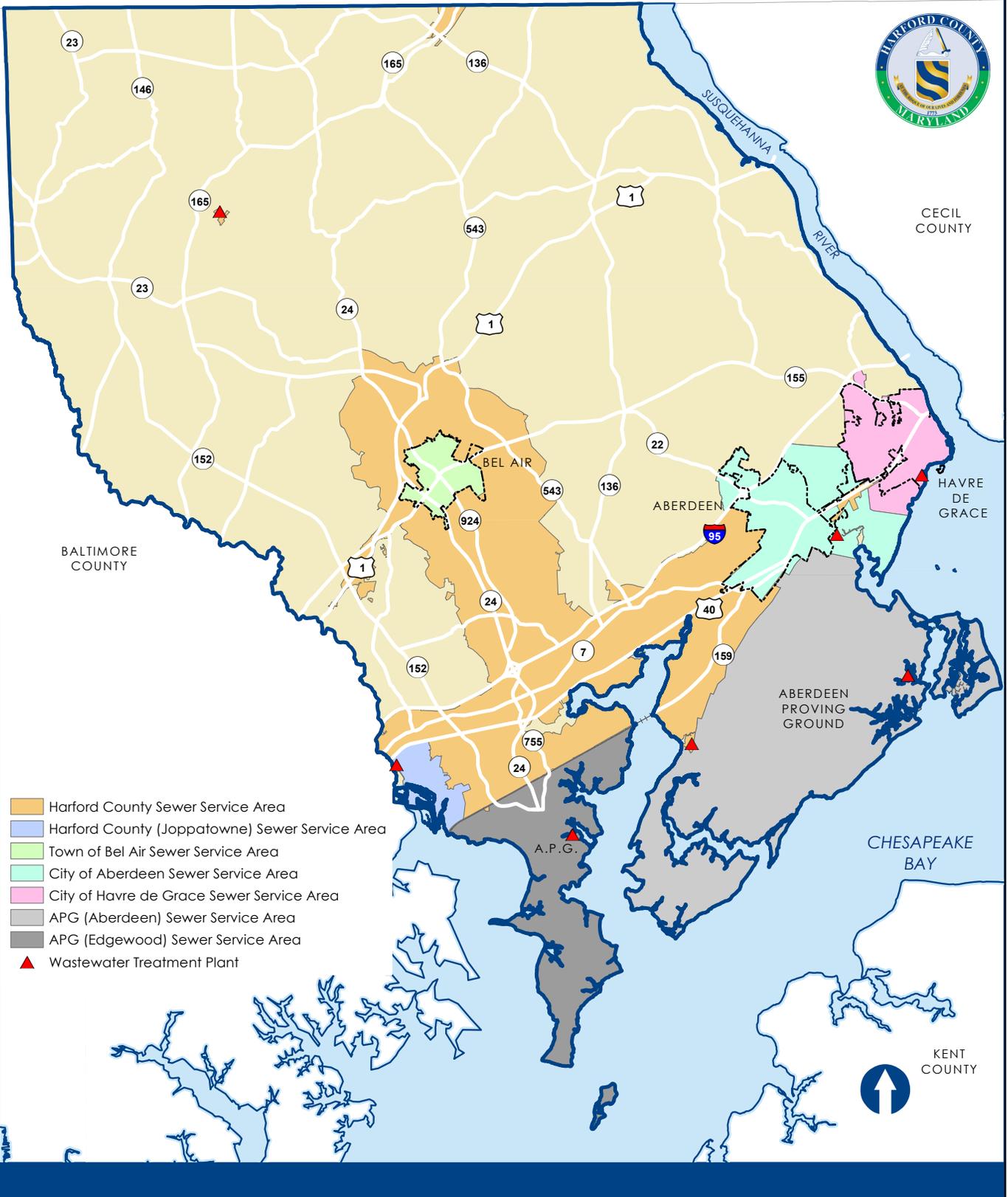
Wastewater Assessment

It is estimated that approximately 70% of the County's population is presently served by the County's central sewerage facilities or by a municipal owned treatment and collection system. In the Development Envelope, as shown on Figure 1, waste water is collected and treated at six waste water treatment plants each greater than 500,000 gallons per day in capacity. These major plants are: Harford County Government – Sod Run and Joppatowne Waste Water Treatment Plants (known as "The County System"), City of Aberdeen (Aberdeen City), City of Havre de Grace (HDG), APG – Aberdeen Area (APG – AA), and APG – Edgewood Area (APG – EA). The current and future service areas for these six waste water treatment plants are shown on Figures 4 and 5, respectively. The Spring Meadows WWTP, a small (.01 mgd) plant outside the Development Envelope and taken over by the County in 1976, is also included as part of the County system.

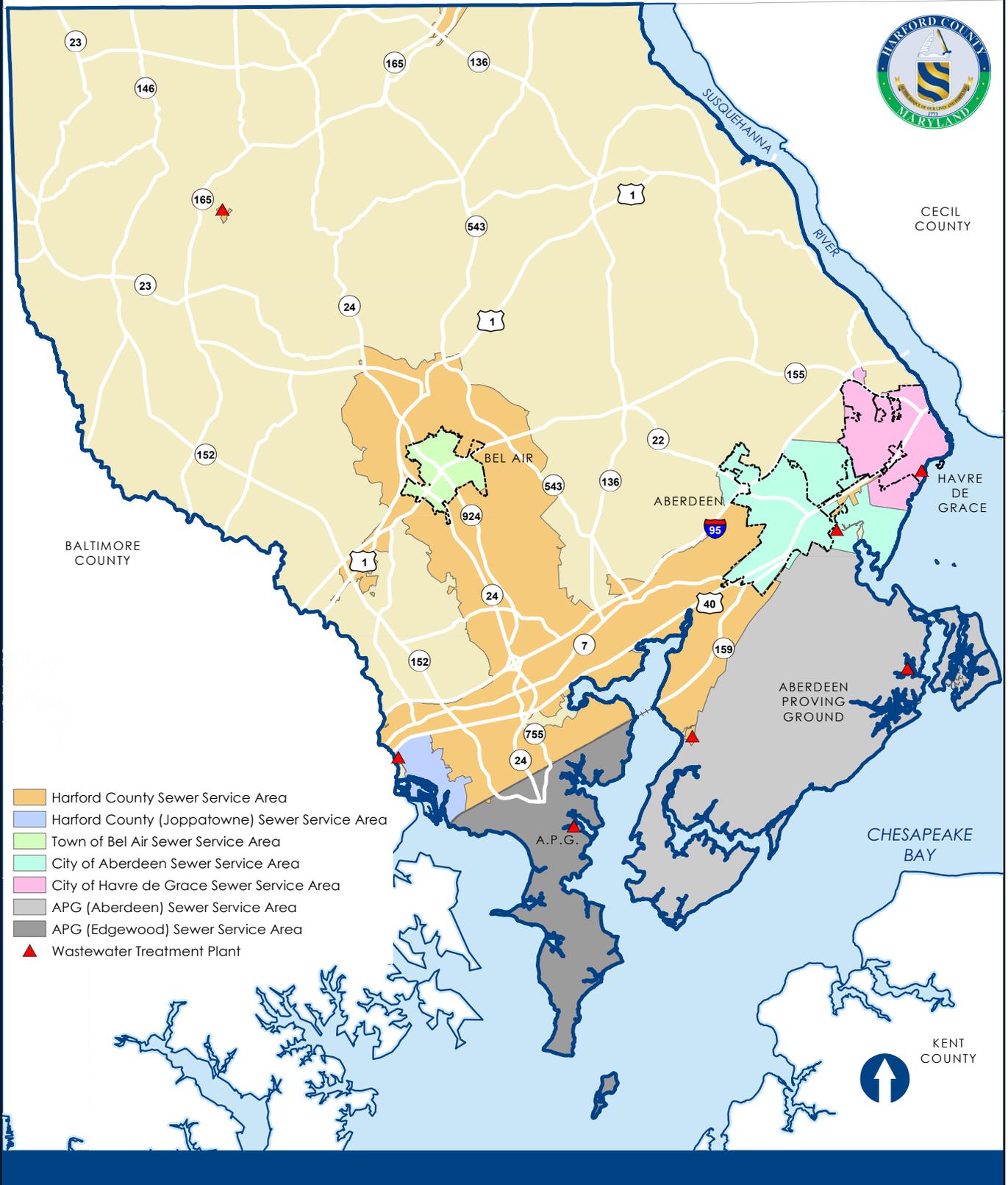
In addition to the major publicly-owned waste water treatment plants, there are multiple private waste water treatment systems, including those owned by the Board of Education serving public schools, mobile home parks and other commercial/community establishments, plus a large population on private individual septic systems outside of the Development Envelope. Since 1972, the County has prohibited any additional privately owned community or multi-use treatment plants with a peak capacity larger than 10,000 gpd outside its Development Envelope in order to encourage growth to remain within the growth corridor, maintain financial stability and protect the environment.

There are approximately 25,500 private septic systems that serve residential and commercial uses. Of the 25,500, approximately 3,000 septic systems are located within the Development Envelope. The number of septic systems was determined by analyzing Bay Restoration Fund accounts within Harford County.

Sewer Service Areas



Future Sewer Service Areas



Water Quality/Nutrient Loading

Increased nutrient loading is one of the key factors that have been attributed to the decline in water quality and living resources in the Chesapeake Bay. Sources of these nutrients include run-off from the land, waste water treatment plants and septic systems, and atmospheric deposition. All sources of nutrients that enter the Bay have been studied extensively and quantified. Scientists have estimated the maximum amount of nutrients that the Bay can accommodate without adverse water quality affects.

In order to meet the goals of the Chesapeake Bay Initiatives, all of the major public waste water treatment plants in Harford County have been upgraded to ENR standards of 4.0 mg/l total nitrogen and 0.3 mg/l total phosphorus. These Enhanced Nutrient Removal standards are being utilized for today's National Pollutant Discharge Elimination System (NPDES) permits. Each of the individual treatment plant owners have completed the upgrades and are achieving the ENR goals.

In response to the new pollution limits, also known as the Total Maximum Daily Load (TMDL), the seven Bay jurisdictions have created individual Watershed Implementation Plans (WIPs), or restoration blueprints that detail specific actions each would take to meet their pollution reduction goals by 2025. The blueprints guide local and state Bay restoration efforts through the next decade and beyond. The Bay jurisdictions also set two-year pollution reduction milestones to track and assess near-term progress towards completing their restoration actions; EPA regularly reviews each jurisdiction's milestones and confirmed that Maryland achieved both the 2010-2011, 2012-2013, and 2014-2015 milestones. Harford County submitted its Phase II WIP to MDE in 2012, and recently submitted new 2016-2017 programmatic milestones to track water quality improvements.

Antidegradation Policy

Another policy used by the State to protect water quality is the Antidegradation Policy. For any amendments to a County water and sewer plan or discharge permit, MDE must review the proposed change in light of the Maryland Antidegradation Policy. This policy ensures that water quality continues to support designated uses. In addition to protecting designated uses, Federal and State laws require protection of waters that are of higher quality than the minimum standards. These waters are designated "Tier II". Tier II waters in Harford County occur mostly in the Deer Creek, Broad Creek and Little Gunpowder Falls watersheds and are depicted on the Sensitive Areas Map. All but one occurs outside of the Development Envelope. None of the major wastewater treatment plants in Harford County discharge to Tier II waters, and there are no plans for any future discharges to these waters. One small treatment plant, Spring Meadows, services an existing community in the Deer Creek watershed; there are no plans for expansion.

Existing Conditions

Table 7 shows the present and projected waste water demands and planned capacities for the County's and local municipalities' sewer systems. In addition, population projections and nutrient (nitrogen and phosphorus) loadings are shown now and into the future. Also included

**Present and Projected Waste Water Demands and Planned Capacities
Million Gallons Per Day – MGD**

TABLE 7		PLANNING YEAR		HARFORD COUNTY GOVERNMENT				CITY OF ABERDEEN		CITY OF HAVRE DE GRACE	
PLANT		SOD RUN		JOPPATOWNE		SPRING MEADOWS		CITY OF ABERDEEN		CITY OF HAVRE DE GRACE	
STATE PERMIT# NPDES PERMIT# RECEIVING STREAM LOCATION		DP-1580 MD00056545 Bush River Perryman		DP-0675 MD0022525 Little Gunpowder Joppatowne		DP-0670 MD0024953 Rock Hollow Branch Jarrettsville		Swan Creek Aberdeen		06-DP-0673 MD0021750 Chesapeake Bay Havre de Grace	
SYSTEM CAPACITY HYDRAULIC CAPACITY Average and Maximum Day		AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
		20	52	0.95	3.2	0.01	0.04	4		1.89	7.25
CURRENT/FUTURE PERMIT REQUIREMENTS WITH REGARD TO NITROGEN AND PHOSPHORUS		Current	Future	Current	Future	N/A		Current	Future	Current	Future
		8.0 mg/l goal N 1.7 mg/l P	4.0 mg/l N 0.3 mg/l P	8.0 mg/l goal N 2.0 mg/l P	4.0 mg/l N 0.3 mg/l P			8.0 mg/l goal N 0.65 mg/l P	4.0 mg/l N 0.3 mg/l P	8.0 mg/l goal N 2.0 mg/l P	4.0 mg/l N 0.3 mg/l P
NPDES LIMITS FOR NITROGEN AND PHOSPHORUS(LBS/YR)		374,865 N 25,029 P		243,645 N 18,273 P		12,614 N 1,665 P		48,729 N 3,655 P		27,715 N 2,079 P	
PLANNED HYDRAULIC CAPACITY		AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
2010		20	52	0.95	3.2	0.01	0.04	4		1.89	7.25
2035		20	52	0.95	3.2	0.01	0.04	4		3.3	11
EXPECTED POUNDS LOADING (TMDL) N-NITROGEN P-PHOSPHORUS		N	P	N	P	N	P			N	P
2010		374,865	25,029	12,614	1,665	N/A				33,624	2,241
2035		241,397	18,105	10,959	822					27,715	2,079
RESIDENTIAL POPULATION SERVED		HC	Bel Air	Total							
2010		119424	9135	128559	9610		155		16556		12,762
2035		163955	8914	172869	10120		155		18459		18,847
NUMBER OF CONNECTIONS		37,000			3209		51				3,933
2035		51844			3379		51				7,000
ANNUAL FLOWS (includes I & I)		AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
2010		12.603	27.693	0.760	1.850	0.01	0.03	1.872		1.67	4.2
2035		19.83	45.60	0.90	3.06	0.01	0.03	4		2.8	6
Buildout		20.00	46.00	0.95	3.23	0.01	0.03	4		3.3	11
INFILTRATION/INFLOW (I & I)		BASE INFILTRATION		BASE INFILTRATION		BASE INFILTRATION		BASE INFILTRATION		BASE INFILTRATION	
2010		2.02	4.44	0.08	0.20	0.0004	0.02			0.53	1.35
2035		2.78	6.38	0.09	0.31	0.0004	0.02			0.90	1.92
TOWN OF BEL AIR FLOW		AVG	INF	MAX	N/A		N/A		N/A		N/A
2010		1.02	0.80	1.39							
2035		1.00	0.64	1.17							
WASTE WATER USAGE PER CAPITA		AVG	MAX	AVG	MAX	AVG	MAX			AVG	MAX
2010		69	155	67	264	65	196			63	329
2035		70	169	76	264	65	196			52	318
WASTE WATER USAGE PER CONNECTION		341		748		237		920		189	
2035		382		880		266		906		189	
COMMERCIAL CONSUMPTION		AVG	MAX	AVG	MAX					AVG	MAX
2010		1.364	2.728	0.038	0.075	N/A				0.214	0.428
2035		4.304	8.608	0.040	0.079					0.754	1.508
INDUSTRIAL CONSUMPTION		2010		0.313		0.626		N/A		0.109	
2035		0.673		1.346		N/A		N/A		0.169	
DOMESTIC CONSUMPTION		2010		8.912		19.897		0.641		2.392	
2035		10.289		24.932		0.770		2.675		0.01	
NUMBER OF INDIVIDUAL PRIVATE SEPTIC WITHIN SERVICE AREA		2010		3,276		0		0			
2035		0		0		0		0			

APPENDIX II | WATER RESOURCE ELEMENT PLAN

is this table is the small (10,000 gpd) Spring Meadows waste water treatment plant, privately developed in 1966 and taken over by the County in 1976.

The County Waste Water System

The orderly development of the County's public sewer system is controlled through HarfordNEXT, the County Water and Sewer Master Plan and the County's Capital Budget and Five Year Capital Improvement Program (CIP). The Water and Sewer Master Plan outlines phased improvements to its sewer collection and treatment systems required to satisfy existing and future development. In addition, the County has established an Adequate Public Facilities regulation (APF) within the Harford County Zoning Code and issues an annual report on the status of capacity within the waste water treatment and conveyance systems that are owned and operated by the County. Through the APF regulations, Harford County reviews and approves all planned residential, commercial, and industrial development utilizing the County's Public Sewer System. A model is being developed and maintained by the Division of Water and Sewer to account for existing, planned and future flows so that sewerage infrastructure can be planned and constructed in an economical and timely manner.

Individual septic systems will continue to provide sewerage service within rural areas of Harford County. When the County's public sewerage system is extended into the areas served by septic systems, within the growth corridor, the individual systems may be abandoned and the area(s) will be incorporated into the County's public sewerage system, where economically feasible. Septic systems which are taken out of service and connected to the County's wastewater treatment plants are being tracked in order to use nutrient loadings for future credits and possible future expansions of the County's Waste Water Treatment Plant system. Based on the current number of private septic systems within the Sod Run service area, approximately 800,000 gallons a day will need to be provided at the treatment plant. Table 8 below charts the private household septic systems removed and connected to public sewer since 2005.

Table 8
Private Household Septic Systems
Abandoned and Connected to Public Waste Water Treatment

Treatment Plant Service Area	Septic Systems Removed									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Sod Run	19	23	12	40	3	9	10	5	4	3
Joppatowne	2	0	1	0	0	0	0	0	1	0

The Sod Run Waste Water Treatment Plant is owned and operated by Harford County, Department of Public Works, Division of Water and Sewer and is located at the southern terminus of Chelsea Road in the Perryman area. Sod Run receives sewage from three major interceptor systems that serve the County's designated growth area. In addition Sod Run Waste Water Treatment Plant receives effluent from the Town of Bel Air and conveys and treats the sewage pursuant to an agreement between Harford County Government and the Town of Bel Air. This plant, which is the largest publicly-owned facility in Harford County, is designed to treat an annual average daily flow of 20.0 million gallons per day (mgd) and peak daily flows of 52.0

mgd. The most recent upgrade of the treatment facility was completed in December of 2014, when the facility was upgraded to achieve the effluent ENR standards of 4.0 mg/l of Nitrogen and 0.3 mg/l of Phosphorus. The plants hydraulic capacity was not changed in this upgrade. This plant currently provides for both secondary and tertiary levels of waste water treatment utilizing both chemical and biological processes to achieve the ENR standards. The biosolid residuals are anaerobically digested, dewatered and distributed to permitted farmland. The treated effluent is discharged to the Bush River.

Based on a Waste Water Capacity Management Plan that was completed and submitted to the Maryland Department of the Environment in April 2008 the Sod Run Waste Water Treatment Plant drainage area has approximately 9,000 equivalent dwelling units encumbered under S-1 Infill flow. MDE defines Infill in its Waste Water Capacity Management Plan Guidance Document as the number of existing unimproved (infill) parcels and lots within a Service Area. More specifically, this number includes both residential and commercial/industrial approved building permits not yet connected, vacant lots from previously recorded plats that are required to connect to public sewer and existing communities on private septic systems within the Development Envelope. Vacant land within the Sod Run drainage area can yield an additional 11,000 equivalent dwelling units based on the designations shown on the Land Use Map contained in HarfordNEXT. Combining the S-1 Infill equivalent dwelling units with vacant land potential yields 20,000 equivalent dwelling units. With appropriate allowance for infiltration and inflow, this will complete the build-out of the Sod Run Service Area.

The Joppatowne Waste Water Treatment Plant is owned and operated by Harford County, Department of Public Works, Division of Water and Sewer and is located south of US Route 40 on the western boundary of Harford County, in Joppatowne, Maryland. Joppatowne receives sewage from three major interceptor systems that serve the County's designated growth area. It is designed to treat an annual average daily flow of 0.95 million gallons per day (mgd) and peak daily flows of 3.2 mgd. The most recent upgrade of the treatment facility was completed in the Summer of 2013. Similar to the Sod Run WWTP the Plant was modified to achieve the ENR standards of 4.0 mg/l of Nitrogen and 0.3 mg/l of Phosphorus in the plant effluent. The plant's hydraulic capacity was not changed. This plant currently provides for both secondary and tertiary levels of waste water treatment utilizing both chemical and biological processes to achieve the ENR standards. The plant's waste biosolids are discharged into the collection system that conveys the waste to the Sod Run Waste Water Treatment Plant. The treated effluent is discharged to the Little Gunpowder River.

Based on a Waste Water Capacity Management Plan that was completed and submitted to MDE in January 2015, the Joppatowne Waste Water Treatment Plant drainage area has approximately 80 residential and 3 commercial lots on approved S-1 record plats that have not applied for building permits and associated flow, and 72 lots (197 EDU) proposed future connections (S-2 & S-3). In addition, the Joppatowne service area includes a pumping station known as PS 47 which currently has the capability to pump the station's higher flows to the Sod Run Waste Water Treatment Plant collection system instead of going to the Joppatowne Waste Water Treatment Plant. A pumping station modification is currently under construction to increase the capacity of the station and bring all of its flows to the Joppatowne Waste Water Treatment Plant. This project will save infrastructure investment while optimizing the

APPENDIX II | WATER RESOURCE ELEMENT PLAN

available Waste Water Treatment Plant capacity at both Sod Run and Joppatowne. These additional units and redirection of PS 47, with appropriate allowance for infiltration and inflow, are planned to complete the build-out of the Joppatowne Service Area.

The Spring Meadows Waste Water Treatment Plant is owned and operated by Harford County, Department of Public Works, Division of Water and Sewer and is located outside of the County's planned Development Envelope, in Jarrettsville, Maryland. This plant serves a portion of Spring Meadows and Northampton subdivisions. It is designed to treat an annual average daily flow of 10,000 gallons per day (mgd) and peak daily flows of 40,000 gallons per day. The original plant was built by a developer in 1966 and taken over by the County in 1976. The most recent upgrade of the treatment facility was completed in 1987. The plant provides secondary level of treatment and is too small for consideration of nutrient removal. The treated effluent is discharged to the Rock Hollow Branch, which is within the Deer Creek sub drainage basin. Deer Creek is not listed on the State's 303(d) list of impaired waterbodies.

Municipal Waste Water Systems

City of Havre de Grace

The City of Havre de Grace presently owns and operates a sewage collection and treatment facility which provides service throughout the majority of the corporate limits of Havre de Grace. The treated effluent from this facility is discharged to the Chesapeake Bay.

In 2002, the treatment plant was upgraded for BNR with a rated capacity of 1.89 million gallons per day. The treatment plant has been modified to increase its rated hydraulic capacity to 3.3 million gallons per day and add ENR technology in compliance with the Chesapeake Bay Program.

City of Aberdeen

The City of Aberdeen owns, operates and maintains a waste water treatment facility located at the end of Michaels Lane which discharges to Swan Creek. The plant has a design capacity of 4.0 mgd and a peak flow capacity of 6.0 mgd. This plant has recently been modified and currently provides for both secondary and tertiary levels of waste water treatment utilizing ENR technologies.

Federal Waste Water Systems

The Aberdeen Proving Ground is divided into an Aberdeen area (APG-AA) and an Edgewood Area (APG-EA) and is served by two complete and independent waste water collection and treatment systems. APG-EA is served by a waste water treatment plant which has an NPDES permit to discharge to the Bush River. This treatment plant provides a secondary level of treatment and has an existing design capacity of 3.0 mgd and average daily flow of 0.97 mgd. Privatization of this Federal facility is pending. APG-AA is served by a waste water treatment plant that is owned by the City of Aberdeen. It discharges to Spesutie Narrows and into the Chesapeake Bay. The facility has an existing design capacity of 2.8 mgd and an average daily flow of 0.83 mgd. MDE reports that this facility is in operation for ENR and is capable of achieving an effluent with Total Nitrogen of 3.0 mg/l and a Total Phosphorus goal of 0.3 mg/l.

No further information is available from the Federal government.

Future Wastewater Needs

It is projected, based on the current availability of land and current zoning that the population served by public waste water treatment plants will grow by approximately 59,000 to approximately 217,000 by 2035. The County anticipates that of the total population projection in year 2035 to increase to approximately 281,030, nearly 77% will be on public sewer located within the current Development Envelope including the Town of Bel Air and Cities of Aberdeen and Havre de Grace.

The County System

Currently the Sod Run and Joppatowne Waste Water Treatment Plants will be able to provide adequate hydraulic capacity to treat the projected waste water generated by residential, commercial, and moderate industrial development throughout the County's sewer service area beyond 2035. The plants are both successfully meeting the ENR standards and complying with the nutrient loading caps outlined in the Chesapeake Bay Initiative. The County is currently evaluating the Sod Run WWTP Biosolids handling systems for both improvement and reliability with regard to the MDE regulations that will be limiting future land application based on Phosphorus levels in the soils of Maryland. Future systems may include improved dewatering and drying processes.

The Spring Meadows Waste Water Treatment Plant's service area is completely built out and there are no plans to expand the service area or hook up any additional existing homes.

Municipal Systems

In order for Havre de Grace's Waste Water Treatment Plant to remain within the cap limits for nitrogen and phosphorus and still provide waste water treatment to the City's planned service area, the City will need to seek land application (i.e. spray irrigation) of its effluent when daily average flows are over three million gallons per day to remain in compliance with the NPDES permit.

Currently the City of Aberdeen's waste water plant does not have enough hydraulic or cap loading capacity to meet the projected future development needs as outlined in the City Land Use Element Plan. The City will address this need in the Water Resources Element of its Comprehensive Plan.

Federal Systems

The APG-AA waste water treatment plant has been privatized by the City of Aberdeen and will be addressed by the City in its water resources element. The APG-EA Waste Water Treatment Plant is in the process of being privatized and will be addressed by the future owner.

Water Resources Policy 4: Provide the infrastructure and facilities necessary to meet waste water demands within the Sod Run and Joppatowne Waste Water Treatment Plant designated drainage areas.

Implementation

- (a) Continue to implement projects in the Capital Improvement Plan and reevaluate these projects annually.
- (b) Continue to hire and train qualified professional wastewater managers and operators.
- (c) Maintain the County's infrastructure with regard to excess infiltration and in-flow.
- (d) Continue to implement Code requirements to prohibit new community wastewater systems outside designated growth areas.
- (e) Complete an annual Capital Management Plan as required by MDE and ensure that it adheres to the County's Adequate Public Facilities requirements.

Water Resources Policy 5: Protect the quality of discharge waters from wastewater treatment plants.

Implementation

- (a) Continue to maintain and operate all County wastewater treatment plants in accordance with all State and Federal requirements.
- (b) Limit allocations and connections that would cause the system to exceed its maximum daily capacity rating.
- (c) Promote the re-use of clean waste water effluent for non-potable uses, such as lawn and golf course irrigation, power plants, incinerators, etc.

Water Resources Policy 6: Optimize the available waste water treatment capacity and cap loadings in Harford County and the municipalities to service the Development Envelope.

Implementation

- (a) Review and comment on all municipal annexation plans to ensure consistency with this plan and the Water and Sewage Master Plan.
- (b) Hold regularly scheduled meetings with the municipalities to coordinate and monitor service area capacity needs.
- (c) Participate with MDE in the development of a nutrient trading program.
- (d) Assist the City of Aberdeen to develop a regional drainage area and recoupment policy for the east Aberdeen portion of the Development Envelope.
- (e) Continue to track and pursue nutrient offsets through septic tank connections and abandonment of smaller waste water treatment.

Stormwater Management and Urban Pollutant Loads

Managing stormwater is of critical importance in protecting the quality of Harford County's stream systems. As development occurs, forest and farm land are converted to impervious surfaces, resulting in increased stormwater runoff and decreased infiltration. With development, stormwater runoff increases in volume and velocity and can result in degraded stream channels, erosion, and increased pollutant loads. This chapter of the Water Resources Section will describe the County's current efforts toward managing and mitigating stormwater runoff, and describe a proposed restoration plan to address urban pollutant loadings from Harford County into the Chesapeake Bay.

Stormwater Management

In order to address the effects of increased stormwater runoff, the State of Maryland enacted the first stormwater law in 1982. This law required local governments to enact stormwater ordinances to control the quantity of stormwater resulting from development. Historically, runoff from development was only managed during the construction phase by sediment control practices. In 1984, Harford County enacted its first stormwater management ordinance to control the quantity of stormwater leaving a site after development. This can be found in Chapter 214 of the Harford County Code—Sediment Control and Stormwater Management. Best management practices used to control stormwater runoff include stormwater management ponds, infiltration and flow attenuation.

In 2002, Harford County updated Chapter 214 to incorporate the 2000 Maryland Stormwater Design Manual in which stormwater quality must now be addressed as well as stormwater quantity. This manual encourages the use of environmentally sensitive site design techniques and requires that redevelopment decrease impervious surfaces by 20% or treat an equivalent area. Examples of these techniques include rain gardens, rooftop disconnection and reduced impervious surfaces. Harford County updated Chapter 214 again in 2009 to incorporate the Maryland Stormwater Management Act of 2007 which mandates that Environmental Site Design (ESD) techniques be used to address stormwater runoff wherever feasible. Innovative site design along with properly designed and well-maintained stormwater best management practices can help reduce pollutant loads, impervious surfaces and negative impacts associated with uncontrolled stormwater runoff.

Stormwater management is an integral component of another County program which comprehensively addresses water quality problems. This program is the National Pollutant Discharge Elimination System (NPDES) Program, administered by Harford County the Watershed Protection and Restoration Office (MS4 Office) within the Department of Public Works. Harford County obtained its first municipal NPDES permit in 1994. This permit addresses stormwater discharges from municipal separate storm sewer systems (MS4s). Recertification is required every five years. Stormwater retrofits and stream restoration projects within the Development Envelope are implemented through this program.

Urban Pollutant Loading Analysis

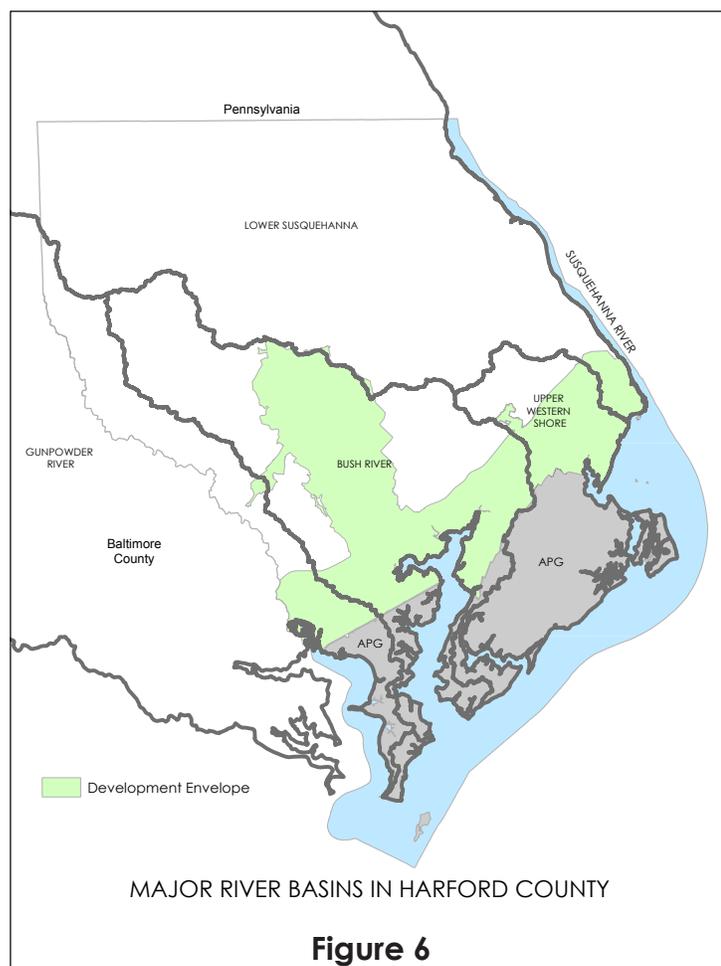
APPENDIX II | WATER RESOURCE ELEMENT PLAN

As required under the County's MS4 permit Part IVF2, Harford County has developed preliminary Restoration Plans for the EPA approved TMDLs for Harford County including Bynum Run for sediment, Swan Creek for nutrients, and the Chesapeake Bay for nutrients and sediment. Drafts for all three plans will be posted for public review and comment before being finalized.

The Chesapeake Bay Restoration Plan for Harford County includes an updated model of the pollutant loads calculated using the Maryland Assessment Scenario Tool (MAST) which was developed by the State to mimic the modeling of the Chesapeake Bay Model at a local level. MAST scenarios were developed for baseline (2002), current (2015) and proposed conditions for the three major river basins in Harford County; Bush River, Northern Chesapeake Bay, and Gunpowder River

Proposed scenarios were developed based on watershed restoration strategies such as new stormwater management facilities, retrofits of existing stormwater management facilities, stream restorations, and tree plantings. The cost for implementing TMDL restoration goals for Harford County is estimated at over \$400 million. If implemented by 2025, the County would need to allocation \$50 million.

There are currently 58,500 urban acres within Harford County excluding the municipalities, state owned properties including state highways and federally-owned properties including Aberdeen Proving Grounds. The results of the analysis below only reflects pollutant loads and restoration strategies for urban land uses.



Basin Results

Since the land use and recommended restoration strategies vary between the river basins, the loads were calculated separately for the Bush River, Gunpowder River and Northern Chesapeake Bay (which includes Lower Susquehanna River and Upper Western Shore) Figure 15 delineates the major river basins in Harford County.

The Susquehanna Basin is the largest basin in the County, comprising over 50% of the land area of the County. It is mostly rural in nature and located predominately outside of the County’s Development Envelope. The greatest nutrient contributions come from agricultural land. As developed land is expected to grow by over 20%, with over 2,500 new septic systems projected, developed land will comprise a greater percentage of the nutrient load in the future. No major point sources contributed to the nutrient loads nor, are any planned in the future.

The Bush River Basin is the second largest basin in the County, comprising approximately 30% of its land area. This basin contains the greatest amount of developed acreage, with half of the basin lying within the County’s Development Envelope.

The Gunpowder Basin comprises approximately 10% of the County. Currently, the predominant contributor of total nitrogen loading in this basin is agricultural. By 2025, agriculture will remain the predominant contributor of total nitrogen; however, the major contributor of total phosphorus will be developed land.

Figure 7 and Figure 8 presents graphs for nitrogen and phosphorus loads for the 2010 baseline, the 2015 current loads, and compares them to the TMDL loads for Harford County urban areas.

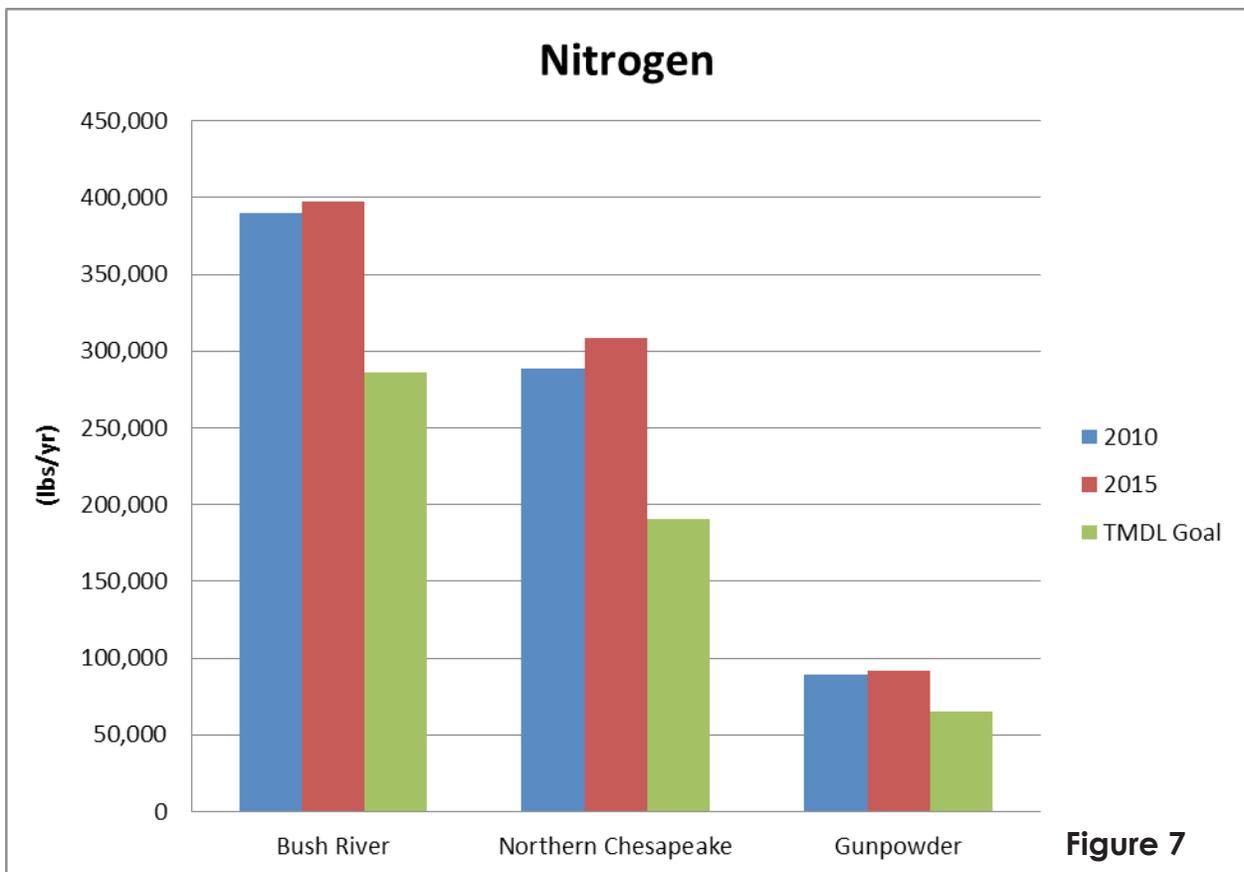


Figure 7

Water Resources Policy 7: Optimize the County’s Stormwater Management Program to reduce the impacts of stormwater runoff.

Implementation

(a) Educate homeowners and community associations on the proper maintenance of stormwater management best management practices and on-site stormwater best management practices.

(b) Promote a decrease in impervious surfaces vs. stormwater treatment as a mechanism to meet stormwater management regulations.

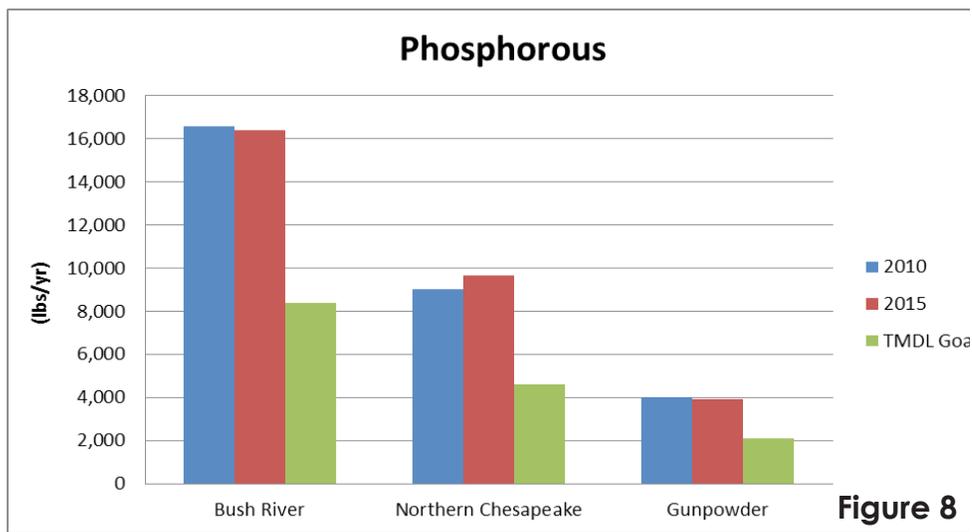


Figure 8

Water Resources Policy 8: Reduce urban loading of pollutants to the County’s stream systems

Implementation

(a) Continue coordination with the State and the Soil Conservation District to improve stream water quality.

(b) Research and develop nutrient offset projects for subdivisions built outside of the Development Envelope using standard septic systems.

(c) Promote the use of denitrifying septic systems through the use of the Bay Restoration funds.

(d) Implement watershed restoration as required under the County's MS4 permit through stormwater retrofits and stream restoration projects.

(e) Implement the County's Bush River and Deer Creek Watershed Restoration Action Strategies.

(f) Build the capacity within County government to promote and enhance the establishment of stream buffers.

(g) Finalize and implement the MS4 Watershed Restoration Plans for Bynum Run, Swan Creek and the Chesapeake Bay.

FUNCTIONAL CLASSIFICATION OF ROADS



A Master Plan for the Next Generation



Functional Classification

The basic functions of all roads are the movement of vehicular traffic and the provision of access to adjacent land. The Harford County Highway Classification System is exclusively based on these functions and divides the components of the overall road system into various roadway classifications, each serving the two basic functions to different degrees. These classifications are based on general plan guidelines and design data developed from alignment studies and/or traffic studies. Below are the roadway classifications and their characteristics according to US Department of Transportation Federal Highway Administration Highway Functional Classification Concepts, Criteria and Procedures.

Interstate – Interstates are the highest classification of Arterials and are designed and constructed with mobility and long-distance travel in mind. Since their inception in the 1950s, the Interstate System has provided a superior network of limited access, divided highways offering high levels of mobility while linking the major urban areas of the United States.

Expressways/Freeways – These roadways look very similar to Interstates. Like Interstates, these roadways are designed and constructed to maximize mobility and abutting land uses are not directly served by them. Roads in this classification have directional travel lanes, are usually separated by some type of physical barrier, and their access and egress points are limited to on- and off-ramp locations or a very limited number of at-grade intersections.

Principal Urban Arterial – These roadways serve major centers of metropolitan areas, provide a higher degree of mobility and can also provide mobility through rural areas. Link major centers of activity of a metropolitan area. Its primary function is for mobility and carries a high proportion of total trips entering, existing, or passing through an urbanized area. Unlike Interstates and Expressways/Freeways, forms of access include driveways to specific parcels and at-grade intersection with other roadways.

Principal Rural Arterial – These roadways serve major centers of metropolitan areas, provide a higher degree of mobility and can also provide mobility through rural areas. Serves trips of Statewide or Interstate travel. Principal Rural Arterials connects all or nearly all Urbanized Areas and a large majority of urban clusters with a population of 25,000 or more and provides an integrated network of continuous routes without stub connections (dead ends).

Minor Urban Arterial – These roadways provide service for trips of moderate length, serve geographic areas that are smaller than the Principal Arterials and offer connectivity to the higher Arterial system. Minor Urban Arterials interconnects with and augments Principal Urban Arterials and provides intra-community continuity. Spacing between Minor Urban Arterials varies from 1/8 mile – 1/2 mile in central business districts to 2 – 3 miles in the suburban areas. Although mobility is the primary function of this type of arterial system, it may provide limited access to major community centers along its path.

Minor Rural Arterial – These roadways provide service for trips of moderate length, serve geographic areas that are smaller than the Principal Arterials and offer connectivity to the higher Arterial system. Minor Rural Arterials are spaced at intervals consistent with population density, so that all developed areas are within a reasonable distance of a higher level Arterial.

Additionally, these roadways are typically designed to provide relatively high overall travel speeds, with minimum interference to through movement.

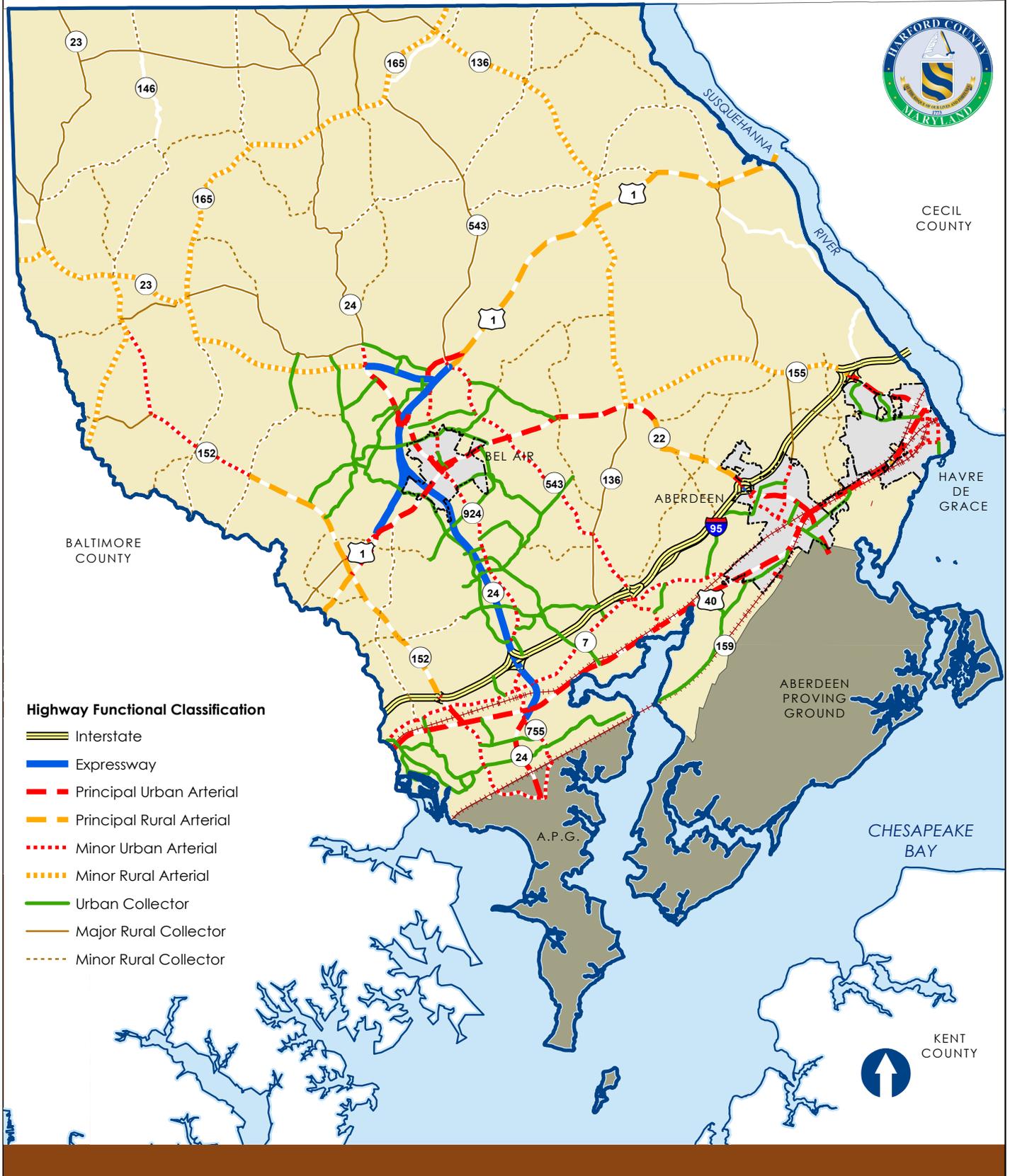
Urban Collector – Provides both access to abutting land and circulation within neighborhoods and business areas. It serves residential, commercial, and industrial areas by collecting and distributing trips from local streets and channelizing it into arterials for reaching their final destination. Operating characteristics include higher speeds and more signalized intersections.

Major Rural Collector – Provides service to towns that are not served by Principal Arterials. Intra-county travel between centers of activity such as major parks and agricultural areas of farming communities are connected via this system. It provides access to arterials for one or more neighborhoods, providing direct connections to residential roads and other collectors and has a limited amount of direct driveway access to abutting properties. These routes are spaced at intervals consistent with population density in which traffic is collected from local roads and channeled into a higher classified roadway to reach their destination in agricultural centers and towns. Also provides internal distribution within a rural neighborhood, or part of one, and has limited direct driveway access to abutting properties.

Minor Rural Collector – Provides access and service to neighborhoods, and direct access to residential, commercial, and industrial land use. The amount of access this type of road provides is important. The length of the minor collector road should remain limited to a few miles and create an efficient network to major collectors and arterials to effectively channel trips through the roadway network.

Local Roads – All unclassified roads are considered local roads. Harford County's Department of Public Works further categorizes local roads as Business District Roads and Residential Roads. Note that all developer constructed new roads will fall into one of the following Local Road categories unless otherwise specifically defined in the Planning and Zoning – Preliminary Plan Approval Letter.

Functional Classification



APPENDIX III | FUNCTIONAL CLASSIFICATION OF ROADS

EXISTING ROADWAY SYSTEM FUNCTIONAL CLASSIFICATION			
ROAD NAME	BEGIN POINT	END POINT	MILEAGE
INTERSTATE			
I-95 (JFK Highway)	Baltimore County Line	Cecil County Line	18.29
Total Interstate Miles (rounded to the nearest tenth of a mile)			18.3
FREEWAY/EXPRESSWAY			
MD 23	MD 24	US 1 (Hickory Bypass)	1.99
MD 24	US 1 Bypass Interchange	MD 755	8.83
US 1 Bypass	MD 543	MD 147/US 1 Business	5.41
Total Freeway/Expressway Miles (rounded to the nearest tenth of a mile)			16.2
PRINCIPAL URBAN ARTERIAL			
MD 22	US 1 Business (Baltimore Pike/Main Street)	MD 156	6.31
MD 22	Long Drive	APG (Aberdeen)	3.53
MD 24	MD 23	US 1 Bypass	1.81
MD 24	MD 755	APG (Edgewood)	1.75
MD 155	I-95	US 40	2.53
MD 924	US 1 Bypass	US 1 Business	1.88
US 1 (Conowingo Road)	US 1 (Hickory Bypass)	US 1 (Hickory Bypass)	1.58
US 1 Business (Baltimore Pike/Bel Air Road)	MD 22	US 1 (Bel Air Road)/US 1 Bypass	2.67
US 1 (Bel Air Road)	MD 152	MD 147/US 1 Business	1.54
US 40	Baltimore County Line	Cecil County Line	18.64
Total Principal Urban Arterial Miles (rounded to the nearest tenth of a mile)			42.2
PRINCIPAL RURAL ARTERIAL			
MD 22	MD 156	Long Drive	3.11
MD 152	Pleasantville Road	I-95	6.89
US 1	Baltimore County Line	MD 152	1.34
US 1	MD 543	Cecil County Line	11.75
Total Principal Rural Arterial Miles (rounded to the nearest tenth of a mile)			23.1
Total Principal Arterial Miles (Urban and Rural – rounded to the nearest tenth of a mile)			65.3
MINOR URBAN ARTERIAL			

APPENDIX III | FUNCTIONAL CLASSIFICATION OF ROADS

EXISTING ROADWAY SYSTEM FUNCTIONAL CLASSIFICATION			
ROAD NAME	BEGIN POINT	END POINT	MILEAGE
Edgewood Road	MD 24	US 40	1.24
Juniata Street	MD 763	Revolution Street	0.92
MD 7	Baltimore County Line	US 40	11.32
MD 24	MD 23	Jarrettsville Road	0.63
MD 132 (W. Bel Air Avenue)	I-95	APG (Aberdeen)	2.30
MD 147	MD 152	US 1/US 1 Bypass	1.08
MD 152	MD 146	Pleasantville Road	5.64
MD 152	US 40	APG (Edgewood)	2.25
MD 159	US 40	Perryman Road	0.67
MD 462 (Paradise Road)	Old Robinhood Road	MD 132	1.62
MD 543	US 1 (Conowingo Road)	US 40	10.04
MD 715	US 40	APG (Aberdeen)	0.53
MD 755	US 40	APG (Edgewood)	1.69
MD 763 (Superior Street)	Juniata Street	MD 155 (Ohio Street)	0.32
MD 924	US 1 Business (Baltimore Pike/Fulford Avenue)	MD 24	5.42
Otsego Street	US 40	Union Avenue	0.53
Revolution Street	US 40	Union Avenue	1.48
Union Avenue	Otsego Street	Revolution Street	0.64
US 1 Business (Conowingo Road/Hickory Avenue/Broadway)	US 1 Bypass	MD 924	1.76
Total Minor Urban Arterial miles (rounded to the nearest tenth of a mile)			50.1
MINOR RURAL ARTERIAL			
MD 23	MD 138	MD 165	4.56
MD 23	MD 165	MD 24	4.81
MD 136	MD 165	MD 22	12.94
MD 138	Baltimore County Line	MD 23	0.90
MD 146	Baltimore County Line	MD 23	5.34
MD 155	MD 22	I-95	6.49
MD 165	MD 23 (East-West Highway)	Pennsylvania State Line	13.48

APPENDIX III | FUNCTIONAL CLASSIFICATION OF ROADS

EXISTING ROADWAY SYSTEM FUNCTIONAL CLASSIFICATION			
ROAD NAME	BEGIN POINT	END POINT	MILEAGE
Total Minor Rural Arterial miles (rounded to the nearest tenth of a mile)			48.5
Total Minor Arterial miles (Urban and Rural – rounded to the nearest tenth of a mile)			98.6
URBAN COLLECTOR			
Abingdon Road	MD 924	US 40	2.95
Beards Hill Road	MD 132	MD 462	1.14
Bel Air South Parkway	Tollgate Road	MD 924	0.36
Box Hill South Parkway	MD 924	Abingdon Road	0.77
Brass Mill Road	MD 543	MD 7	0.89
Brierhill Road	MD 22	MacPhail Road	0.80
Bulle Rock Parkway	MD 155	Chapel Road	1.08
Bush Chapel Road	MD 132 (Bel Air Avenue)	Stepney Road	1.44
Bynum Road	Water Tower Way	MD 24	1.07
Canvasback Drive	MD 155	Chapel Road	0.79
Carrs Mill Road	Grafton Shop Road	MD 152	1.92
Chapel Road	Bulle Rock Parkway	Ohio Street	1.59
Commerce Drive	Jarrettsville Road	MD 23	0.43
East Bel Air Avenue	Old Post Road	MD 22	0.69
Forest Valley Drive	MD 24	Bernadette Drive	0.73
Grafton Shop Road	Jarrettsville Road	Red Pump Road	3.53
Hanson Road	MD 152	MD 755	1.66
Henderson Road	MD 543	North Avenue	1.69
Hickory Avenue	Fulford Avenue	US 1 Business (Broadway)	0.60
High Point Road	Jarrettsville Road	Pleasantville Road	1.63
Hookers Mill Road	Abingdon Road	MD 136	1.84
Jarrettsville Road	MD 24	US 1	2.05
Joppa Road	MD 7	Trimble Road	0.81
Joppa Farm Road	MD 7	Trimble Road	0.48
Laurel Bush Road	MD 924	Abingdon Road	2.55
MD 132	MD 22	US 40 (Oakington Road)	1.41
MD 136	I-95	MD 7	0.33
MD 159 (Perryman Road)	Old Philadelphia Road	Bush River	4.39
MacPhail Road	MD 924	Wheel Road	3.01

APPENDIX III | FUNCTIONAL CLASSIFICATION OF ROADS

EXISTING ROADWAY SYSTEM FUNCTIONAL CLASSIFICATION			
ROAD NAME	BEGIN POINT	END POINT	MILEAGE
Moore's Mill Road	MD 22	MD 924	2.19
Mt. Royal Avenue	MD 132	MD 22	0.63
North Avenue	Henderson Road	MD 924	0.29
Old Philadelphia Road	US 40	MD 159	1.52
Old Post Road	MD 22	East Bel Air Avenue	0.30
Osborne Parkway	MD 24	Grafton Shop Road	1.28
Patterson Mill Road	MD 924	Wheel Road	1.77
Perryman East (new)	Michaelsville Road	MD 715	
Perryman West (new)	US 40 at Mitchell Lane	Canning House Road	
Plumtree Road	MD 924	Cypress Drive	0.52
Prospect Mill Road	MD 22	MD 543	2.63
Red Pump Road	Tollgate Road	MD 24	2.07
Ring Factory Road	Whitaker Mill Road	MacPhail Road	3.11
Shore Drive	Joppa Farm Road	Bridge Drive	0.91
Singer Road	MD 924	Winters Run Road	1.58
Spesutia Road	US 40	MD 159	0.76
Southampton Road	Moore's Mill Road	MD 543	0.64
Stepney Road	I-95	MD 7	1.68
Thomas Run Road	MD 543	Prospect Mill Road	0.97
Towne Center Drive	Joppa Farm Road	Shore Drive	0.70
Trimble Road	Joppa Farm Road	Willoughby Beach Road	4.53
Union Avenue	Revolution Street	Commerce Street	0.32
Vale Road	MD 924	Grafton Shop Road	1.96
Water Tower Way	MD 23	US 1 Bypass	0.54
Watervale Road	MD 152	Vale Road	1.72
Wheel Road	Schucks Road	Deadora Drive	4.58
Willoughby Beach Road	Trimble Road	Flying Point Road	3.01
Woodbridge Center Way	US 40	Hanson Road	0.80
Woodsdale Road	MD 924	Present Terminus	0.56
Total Urban Collector miles (rounded to the nearest tenth of a mile)			84.2
MAJOR RURAL COLLECTOR			
Hess Road	MD 146	MD 152	1.83
Jarrettsville Road	MD 24	MD 23/MD 165	6.10
MD 23	MD 138	Pennsylvania State Line	7.91

APPENDIX III | FUNCTIONAL CLASSIFICATION OF ROADS

EXISTING ROADWAY SYSTEM FUNCTIONAL CLASSIFICATION			
ROAD NAME	BEGIN POINT	END POINT	MILEAGE
MD 24	Pennsylvania State Line	Jarrettsville Road	11.15
MD 136	MD 23	MD 165	10.89
MD 136	MD 22	I-95	5.82
MD 147	Baltimore County Line	MD 152	1.86
MD 161	US 1	MD 155	5.35
MD 439	Baltimore County Line	MD 23	1.16
MD 462 (Paradise Road)	MD 155	Old Robinhood Road	2.53
MD 543	MD 165	US 1 (Conowingo Road)	8.60
MD 624 (Graceton Road)	Pennsylvania State Line	MD 165	3.75
Schuster Road	MD 146	MD 23	1.76
Total Major Rural Collector miles (rounded to the nearest tenth of a mile)			68.7
MINOR RURAL COLLECTOR			
Boggs Road	High Point Road	Grafton Shop Road	1.35
Bradenbaugh Road	MD 23	Madonna Road	3.90
Carea Road	Pennsylvania State Line	MD 136	1.23
Carsins Run Road	MD 156	Creswell Road	5.90
Castleton Road	MD 623	MD 440	3.09
Cedar Lane	Wheel Road	MD 136	2.12
Cedarday Drive	Cedar Lane	Cedar Lane	1.46
Chapel Road	MD 462 (Paradise Road)	Bulle Rock Parkway	2.08
Cherry Hill Road	MD 24	MD 543	3.94
Connolly Road	MD 152	US 1	1.13
Constitution Road	Pennsylvania State Line	MD 24	1.34
Cool Spring Road	Thomas Run Road	MD 136	1.40
Creswell Road	MD 543	Carsins Run Road	0.53
Deep Run Road	MD 623	Prospect Road	2.45
Earlton Road	Webster-Lapidum Road	Chapel Road	1.96
Fawn Grove Road	Pennsylvania State Lane	MD 165	4.11
Greene Road	Baltimore County Line	MD 165	1.89
Grier Nursey Road	MD 165	MD 24	6.29

APPENDIX III | FUNCTIONAL CLASSIFICATION OF ROADS

EXISTING ROADWAY SYSTEM FUNCTIONAL CLASSIFICATION			
ROAD NAME	BEGIN POINT	END POINT	MILEAGE
Harford Creamery Road	Bradenbaugh Road	Madonna Road	2.93
Hess Road	Baltimore County Line	MD 146	0.41
Houcks Mill Road	Baltimore County Line	MD 146	2.05
Jerrys Road	Madonna Road	Fawn Grove Road	2.44
Jerusalem Road	Baltimore County Line	MD 152	1.19
Line Road	Pennsylvania State Line	MD 136	0.27
Madonna Road	Bradenbaugh Road	MD 23	4.39
MD 156	MD 22	MD 155	5.97
MD 165	Baltimore County Line	MD 23 (East-West Highway)	5.52
MD 440	MD 543	US 1	5.63
MD 623	Pennsylvania State Line	US 1	7.04
MD 646	MD 543	MD 136	3.29
Old Federal Hill Road	Jarrettsville Road	MD 165	2.79
Old Joppa Road	MD 7	US 1 Business	5.94
Old Pylesville Road (Main Street)	Pennsylvania State Line	MD 136	1.04
Pleasantville Road	Baltimore County Line	High Point Road	4.34
Prospect Road	Pennsylvania State Line	MD 136	2.21
Reckord Road	Old Fallston Road	MD 152	3.48
Robinhood Road	Chapel Road	US 40	2.43
Schucks Road	MD 22	MD 136	3.09
Singer Road	MD 152	Winters Run Road	1.85
St. Clair Bridge Road	MD 165	MD 24	3.26
Stepney Road	MD 22	I-95	2.24
Thomas Run Road	Prospect Mill Road	MD 22	6.34
Whitaker Mill Road	US 1	Ring Factory Road	1.81
Total Minor Rural Collector miles (rounded to the nearest tenth of a mile)			128.1
Total Collector miles (Urban, Major Rural and Minor Rural – rounded to the nearest tenth of a mile)			281.0

APPENDIX IV
HARFORD COUNTY LANDMARKS



A Master Plan for the Next Generation



HARFORD COUNTY LANDMARKS

§ 267-112 HISTORIC LANDMARKS

INVENTORY #	PROPERTY NAME	PROPERTY ADDRESS	CITY
HA-937	Christopher's Camp	1219 South Fountain Green Rd	Bel Air
HA-441	Churchville Presbyterian Church & Cemetery	2844 Churchville Rd	Churchville
HA-225	Hays House	324 South Kenmore Ave	Bel Air
HA-609	Little Falls Meeting House Burial Ground	719 Old Fallston Rd	Fallston
HA-610	Fallston Friends Schoolhouse	719 Old Fallston Rd	Fallston
HA-855	Nelson-Reardon-Kennard House	3604 Philadelphia Rd	Abingdon
HA-4	Rigbie House	2422 Castleton Rd	Darlington
HA-1312	St. Francis De Sales Church	1450 Abingdon Rd	Abingdon
HA-5	Sophia's Dairy	4602 Pulaski Highway	Belcamp
HA-168	St. Mary's Church	1 St. Mary's Church Rd	Abingdon
HA-561	Stansbury Mansion	1616 Eden Mill Rd	Pylesville
HA-49	Thomas Run Church	Thomas Run Rd	Bel Air
HA-165	Deer Creek Harmony Presbyterian Church	2202 Shuresville Rd	Darlington
HA-12	Deer Creek Friends Meeting House & Cemetery	1212 Main St	Darlington
HA-6	Bon Air	2501 Laurel Brook Rd	Fallston
HA-307	McComas Institute	1911 Singer Rd	Joppa
HA-249	Spesutia Church Vestry House & Cemetery	1504 Perryman Rd	Aberdeen
HA-867	Bush Hotel	4014 Philadelphia Rd	Abingdon
HA-1315	Joppa Historic District		Joppa
HA-44	D. H. Springhouse	3000 Sandy Hook Rd	Bel Air
HA-469	King and Queen Seats	Rt. 24	Street
HA-1117	Whitaker Mill & Miller's House	1212 Whitaker Mill Rd	Joppa
HA-103	Tabernacle Church	Tabernacle Rd	Whiteford
HA-66	Old Brick Baptist Church	Baldwin Mill Rd	Forest Hill
HA-1590	St. James African Methodist Episcopal Church Cemetery	4139 Gravel Hill Rd	Havre de Grace
HA-693	Woodside	400 Singer Rd	Abingdon
HA-240	Swansbury	111 Beards Hill Ext.	Aberdeen
HA-1279	Greenwood	331 Glenville Rd	Churchville
HA-1435	Historical Society Headquarters/Old Bel Air Post Office	143 N. Main St	Bel Air
HA-356	Joshua's Meadows	300 N. Tollgate Rd	Bel Air
HA-1244	Hopkins House	141 N. Main St	Bel Air
HA-1394	Mrs. Dunnigan's Building	31 West Courtland St	
HA-1456	Survey Stones for Bel Air at 220 South Main Street	220 South Main Street	Bel Air
HA-1396	Survey Stones for Bel Air at 33 West Courtland Street	33 West Courtland Street	Bel Air
HA-1311	Bel Air M.E. Church (Main Street)	20 N. Main Street	Bel Air
HA-1267	Asbury M.E. Church	114 Asbury Road	Churchville
HA-448	Ivory Mills	4916 Harford Creamery Road	Norrisville
HA-458, HA-459	George N. Wiley Mill	4907 Jolly Acres Road	Norrisville
HA-997	Calvary United Methodist Church	1321 Calvary Road	Churchville
HA-1228	Woodview	1326 Somerville Road	Bel Air
HA-1605	Dembytown Church	800 Trimble Road	Joppatowne
HA-258	Proctor House	54 East Gordon Street	Bel Air
HA-1689	Orthodox Friends Meeting House & Caretaker's House	2225 Old Quaker Road	Darlington

HARFORD COUNTY PROPERTY

HA-1393	Old Aegis Building	29 West Courtland St	Bel Air
HA-1780	Old Aberdeen High School	34 N. Philadelphia Blvd.	Aberdeen
HA-1395	Mrs. Dunnigan's Hotel & Restaurant	33 West Courtland St	Bel Air
HA-1463	Harford Mutual Fire Insurance Company Building	18 Office Street	Bel Air
HA-2181	Darlington Library	1134 Main Street	Darlington
HA-218	Harford County Courthouse	20 West Courtland Street	Bel Air
HA-1413	Bel Air Colored School	205 Hays Street	Bel Air
HA-1409	Old Bel Air Academy	45 East Gordon Street	Bel Air

PARK PROPERTY

HA-2180	Francis Silver Park (Darlington)	2428 Shuresville Road	Darlington
HA-370	Scott House (Equestrian Center)	608 Tollgate Road	Bel Air
HA-230	Liriodendron	502 W. Gordon Street	Bel Air
HA-562	Eden Mill Park	1617 Eden Mill Road	Pylesville
HA-1081	Stone House & Spring House (Edgeley Grove Farm)	864 Smith Lane	Benson

BRIDGES

HA-439	Franklinville Road		Joppa
HA-1119	Old Carrs Mill Road		Fallston
HA-336	Nobles Mill Road		Darlington
HA-799	Cherry Hill Road		Street
HA-1982	Forge Hill Road		Dublin
HA-1038	Ring Factory Road		Bel Air
HA-1237	Whitaker Mill Road		Joppa
HA-1098	Green Road		Whitehall

BOARD OF EDUCATION

HA-699	Harford Glen	60 W. Wheel Road	Bel Air
HA-2179	Darlington Elementary School	2119 Shursville Road	Darlington

HARFORD COMMUNITY COLLEGE

HA-152	Hays-Heighe House	401 Thomas Run Road	Bel Air
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