

CHAPTER I: LAND

Land Use & Growth Management

Objectives

- As an alternative to functioning primarily as a "bedroom community", adopt policies that will promote the County as a desirable location for high-technology industries, vacation destination, farming and aquaculture region, resource protection area (i.e., "greenbelt"), and retirement community.
- Manage the amount and rate of residential growth.
- Preserve the rural character of the County, its prime farmland, contiguous forests, historic resources, and environmentally sensitive areas.
- Develop town centers as attractive, pleasant, and convenient places to live, work, and shop.
- Direct commercial and industrial uses to appropriate locations; provide necessary infrastructure.
- Direct residential growth to appropriate locations; ensure a wide range of housing opportunities for all incomes and ages; maintain and enhance the quality of residential communities.

Sustainability Issues

Sustainable communities meet the needs of current and future County residents in the following ways:

- *The built environment does not conflict with the maintenance of a healthy natural environment.*
- *Land use development patterns promote a balanced mix of residential, recreational, commercial, and industrial uses.*
- *Land use development patterns support the efficient use of tax revenues, and is anti-sprawl.*
- *Communities are designed to promote a strong sense of community, promote energy efficiency, reduce dependence upon automobiles, and provide access to the natural environment.*

Is Our Current Development Pattern Sustainable?

The rapid population growth in Calvert County is part of a nationwide trend. Many people throughout the United States are moving away from central cities and suburbs to "rural fringe" areas such as Calvert County. The negative impacts of this development pattern on

urban areas include increased poverty and crime and underutilized infrastructure. Negative impacts on people in suburban and rural areas include a lack of infrastructure and increased long-distance commuting. Rural areas also experience a severe imbalance between housing and jobs and the rapid loss of farms, forests, and wildlife habitat. Air and water pollution created by automobile emissions and the overdevelopment of environmentally sensitive areas impact urban, suburban, and rural areas alike.

Toward a More Sustainable Community

A better alternative to the current pattern of development within metropolitan areas is to concentrate on making the cities and existing suburbs good places to live, shop, work, and go to school. When additional land is needed to accommodate population growth, it should be developed according to sound principles of community design within or adjacent to existing urban centers. Areas like Calvert County that lie at the outer edges of metropolitan areas should be maintained as natural resource protection areas, farming regions, and vacation/recreation /retirement areas. This approach would help to:

- Conserve natural resources.
- Maintain a healthy environment.
- Promote the health and well-being of residents throughout the region.
- Reduce expenditures for public infrastructure.
- Maintain a regional source of agricultural and forest products.

This alternative pattern of growth is supported by the Maryland Economic Growth, Resource Protection and Planning Act of 1992 which identifies the following seven visions:

1. Development is concentrated in suitable areas.
2. Sensitive areas are protected.
3. In rural areas, growth is directed to existing population centers and resource areas are protected.
4. Stewardship of the Chesapeake Bay and the land is a universal ethic.
5. Conservation of resources, including a reduction in resource consumption, is practiced.
6. To ensure the achievement of 1 through 5 above, economic growth is encouraged and

regulatory mechanisms are streamlined.

- 7. Funding mechanisms are addressed to achieve these visions.

Land Use Plan

In order to promote Calvert County as a desirable location for high-technology industries, vacation destination, farming region, resource protection area, and retirement community, Calvert Countians must continue to:

- Manage the amount and rate of residential growth.
- Preserve the rural character of the County, its prime farmland, contiguous forests, historic resources, and environmentally sensitive areas.
- Develop town centers as attractive, pleasant, and convenient places to live, work, and shop.
- Direct commercial and industrial uses to appropriate locations and provide necessary infrastructure.
- Direct residential growth to appropriate locations and ensure a wide range of housing opportunities for all incomes and ages.
- Maintain and enhance the quality of residential communities.

Manage the Amount and Rate of Residential Growth

The number of households in Calvert County increased from 5,540 in 1970 to 25,447 in 2000. During most of that 30-year period, Calvert County was the fastest growing County in the State. Two major objectives in the 1997 Comprehensive Plan were to:

- Establish measurable benchmarks to determine appropriate residential buildout.
- Reduce the rate of residential growth in order to limit highway traffic congestion, maintain good schools, maintain sound fiscal policies, and preserve rural character.

Soon after the adoption of the 1997 Plan, the Planning Commission conducted a thorough analysis of the costs and benefits of reducing buildout. More than 20 different buildout reduction options were developed for public review and comment and a program to reduce buildout to 37,000 households was adopted in

March 1999. The program included a combination of zoning ordinance changes, new funding for land preservation, and incentives which, taken together, reduced buildout by nearly 11,400 households.

In 2003, the Board of Calvert County Commissioners (BOCC) requested a status report on how well the adopted changes were working. At the same time, they reiterated the goal of limiting buildout to 37,000 households. The status report indicated that projected buildout had been reduced from an estimated 54,000 households to 42,600 households. The BOCC asked that additional buildout reduction options be presented to the public for review and comment. A joint public hearing with the Planning Commission was conducted in October 2003 and additional buildout reductions were adopted in December 2003.

A review of the existing Adequate Public Facilities Ordinance (APFO) was conducted in 2000 – 2001 and changes that strengthened the ordinance were adopted by the BOCC in May 2001. The APFO was again reviewed in 2003. Changes to further strengthen the ordinance were adopted in December 2003.

Actions

I-1 Continue to support policies that link the amount and rate of residential growth to County land use objectives, including highway, school, and aquifer capacities. [P&Z]

I-2 Monitor residential growth and evaluate the effectiveness of existing regulations to meet growth management objectives. [P&Z]

Preserve the Rural Character of the County, its Prime Farmland, Contiguous Forests, Historic Resources, and Environmentally Sensitive Areas

Ever since the first Calvert County Comprehensive Plan was adopted in 1966, one of the County’s primary goals has been the preservation of its rural character. In addition, the ability to develop a sustainable economy based upon high technology, heritage, recreation, ecotourism, retirement, leisure, farming, and aquaculture depends first on preserving

prime farmland, contiguous forests, historic resources, and sensitive areas.

In 1999, Calvert County celebrated the enrollment of 20,000 acres of prime farm and forestland in County and State land preservation programs. A goal to preserve an additional 20,000 acres was adopted that year. To help meet the new goal, the County allocated an additional \$2,000,000 per year toward land preservation including an additional \$500,000 added to the Purchase and Retirement (PAR) Fund, \$500,000 in local support for the Maryland Agricultural Land Preservation program, and \$1,000,000 for a new County leveraging program. The County also actively participated in the Maryland Rural Legacy Program. By June 1st, 2004, 22,291 acres had been preserved.

The preservation of historic structures and landscapes has been less successful. Too often, older buildings are bulldozed to accommodate new development and rural landscapes are routinely converted into residential subdivisions. The continued loss of these features threatens to undermine the objective of preserving the rural character of the County and developing heritage and ecotourism. In 2004, the National Trust for Historic Preservation named Southern Maryland tobacco barns as one of America's 11 most endangered places. This designation opened up new possibilities for the preservation of these beautiful and culturally important structures.

Actions

- I-3 Reserve Farm Community and Resource Preservation Districts (Priority Preservation Areas) for farming and natural resource-related uses and direct residential growth away from these areas. [P&Z]
- I-4 Continue to support the goal of permanently preserving a minimum of 40,000 acres of prime farm and forestland through County, State, and federal land preservation programs. [P&Z]
- I-5 Continue to support and strengthen the Purchase and Retirement Fund as a means of promoting participation in the Agricultural Preservation Program. Establish a procedure for collecting voluntary contributions to the PAR fund with payment of property tax. [P&Z, F&B]

Actions Continued

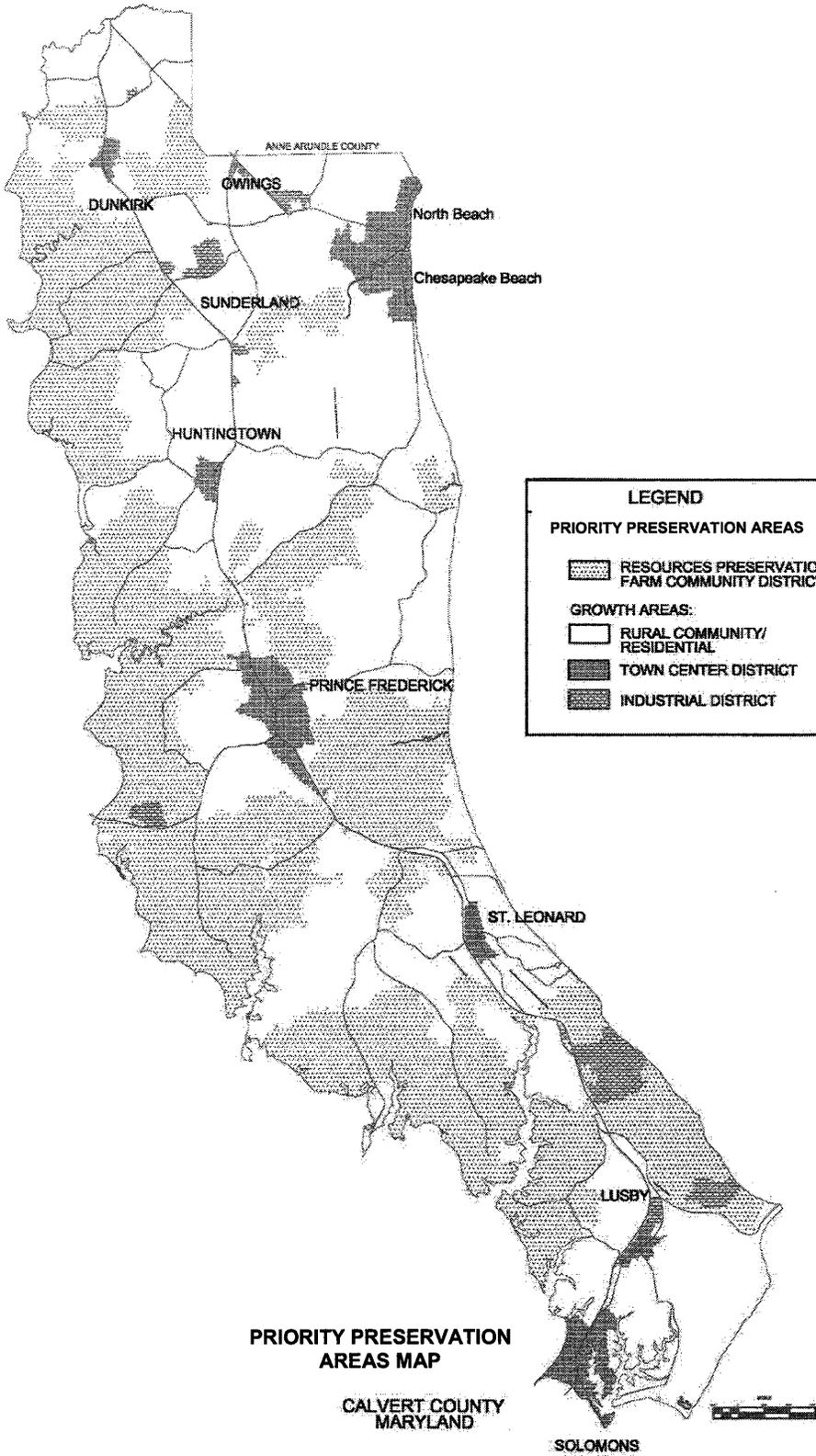
- I-6 Protect the scenic quality of existing rural landscapes and vistas. [P&Z]
- I-7 Work with the Calvert County Tourism Advisory Committee to explore opportunities for developing heritage sites and ecotourism. [P&Z, ED]
- I-8 Continue to support the land preservation efforts of local, State, and national land trusts. [P&Z]
- I-9 Provide local support to the Maryland Agricultural Land Preservation Program and other State and federal agricultural preservation programs. [P&Z]
- I-10 Do not locate public facilities such as sewer or water service areas, schools, and fire and rescue stations within the Farm Community District or the Resource Preservation District. [PW, PS, F&B, BOE]
- I-11 Do not increase highway capacity within the Farm Community or Resource Preservation District. [PW]
- I-12 Wherever possible, reduce negative environmental impacts of subdivision roads and make them visually compatible with the rural character of the surrounding area while maintaining road safety. [P&Z, PW]
- I-13 Strengthen regulations and incentives governing the preservation of older structures. [P&Z]

Develop Town Centers as Attractive, Pleasant, and Convenient Places to Live, Work, and Shop

The 1983 Comprehensive Plan called for the creation of town centers in order to accomplish several goals:

- Avoid scattered and/or strip commercial development along MD 2/4.
- Expand the choice of housing options by providing zoning and infrastructure for multifamily development, including low- and moderate-income and elderly housing.
- Reduce dependence on vehicles.
- Reduce growth within agricultural and forest areas.

Within less than two years of adoption of the 1983 Comprehensive Plan, the County had defined boundaries and developed new mixed-use zoning regulations for



seven town centers. Upgraded sewer and water systems in Solomons, Prince Frederick, North Beach and Chesapeake Beach followed shortly thereafter.

The 1983 Comprehensive Plan also recommended that towns be established around town centers and that single-family residential development be directed to towns. Areas within a one-mile radius of each town center were subsequently rezoned to permit higher density with the purchase of Transferable Development Rights.

Town centers are the County's primary designated growth areas. Thanks to active citizen participation in the development and implementation of Master Plans, town centers are becoming increasingly attractive and pleasant places to live, work, and shop. As town centers continue to improve, they will help attract the types of commercial uses that generate increased tax revenues and high-quality jobs and provide amenities that attract both visitors and retirees.

It is important to continue to promote a broad mix of commercial, office, residential, public, and quasi-public development within town centers as a means of promoting economic development, creating more local jobs, expanding cultural opportunities, reducing traffic congestion, preventing strip commercial development, providing a full range of housing opportunities, and providing convenient access to goods and services for County residents.

The provision of adequate roads, water, wastewater systems, public transportation, and high-quality internet communication systems, together with public amenities such as parks, town squares, trails, sidewalks, bikeways, and indoor recreational and cultural facilities, should remain a top priority, in accordance with master plans for town centers.

Emphasis should also be placed on creating a more compact pattern of development that will reduce dependence upon automobiles and enable people to live within convenient proximity to stores, offices, and services.

Actions

- I-14 Continue to promote a broad mix of commercial, office, residential, public, and quasi-public development within town centers. [P&Z]
- I-15 Designate North Beach, Chesapeake Beach, Prince Frederick and Solomons as major Town Centers. Designate Dunkirk, Owings, Huntingtown, St. Leonard and Lusby as minor Town Centers.
- I-16 Allow both major and minor Town Centers to have community water and sewer.
- I-17 Promote town centers as community cultural and activity centers by locating schools, colleges, recreational, and cultural facilities within or adjacent to town centers. [GS, F&B]
- I-18 Continue to improve the appearance of town centers by emphasizing Town Center Master Plan Capital Improvements Projects and Architectural Review. [P&Z]
- I-19 Review Town Center Master Plans and Zoning Ordinances to look for additional ways to reduce dependence upon automobiles by promoting "pedestrian-friendly" site design and increasing pedestrian and bicycle circulation within and between residential, commercial, and office uses. [P&Z, PW]
- I-20 As Master Plans are revised, look for ways to preserve and enhance the unique character of each town center. [P&Z]
- I-21 Consider ways to strengthen regulations regarding derelict buildings. [P&Z]
- I-22 Develop a schedule to review and update Town Center Master Plans. [P&Z]

Additional town center actions are listed in the remaining sections of this chapter.

Direct Commercial and Industrial Uses to Appropriate Locations and Provide Necessary Infrastructure

Commercial uses include industries, offices, services, retail, wholesale, marine-related businesses, farming, and forestry. Providing appropriate locations for these uses will not only help ensure that they have the infrastructure they need, but will also help to reduce the potential for conflicts and negative impacts that

can be associated with some commercial uses. Design standards can further help minimize these conflicts and negative impacts, allowing for more mixed-use development that can enhance quality of life as well as economic opportunity.

Commercial Uses in Town Centers

Town centers are the primary locations for most commercial uses except for farming and forestry. They promote business growth by providing infrastructure and enabling businesses to benefit from proximity to each other (agglomeration economies). They also promote business growth by providing attractive, mixed-use settings where offices, stores, restaurants, and homes are all within close proximity to each other. The strategy of directing commercial growth to town centers has been in effect since the adoption of the town center concept in the 1983 Comprehensive Plan. It has proven to be highly effective as a means of developing strong business growth.

Actions

- I-23 Continue to direct commercial growth to town centers. [P&Z]
- I-24 Continue to provide for the construction and maintenance of public infrastructure to support business growth such as roads, water and sewer, and high-quality communication systems in accordance with town center master plans. [PW]
- I-25 Promote strong business growth in town centers. Identify and implement ways to improve growth in town centers. [P&Z]
- I-26 Major town centers are to serve as regional centers, providing goods and services that attract visitors from the entire County and/or from outside the County (as in tourism). Minor town centers are to serve as local convenience centers unless individual town center master plans determine otherwise. [P&Z, BOCC]

Commercial Uses in Employment Centers

Employment Centers/Town Centers (EC/TCs) were established in 1992 in order to provide space specifically for targeted industries, such as high-

technology firms and research industries. The intent is to restrict retail and service uses in these districts in order to reserve adequate and flexible space for high-revenue-generating uses that provide high-quality jobs for County residents. In order to provide these types of uses with needed infrastructure, the County has a long-standing policy of only allowing EC/TC Districts to be located adjacent to town centers. That policy should be continued.

Actions

- I-27 To help ensure the efficient utilization of public funds for infrastructure and to promote strong markets for local businesses, continue to require that Employment Districts be located within and/or adjacent to town centers. [P&Z]
- I-28 Restrict retail and services uses in the Employment Center/Town Center District in order to reserve the EC/TC District for targeted businesses. Look for additional ways to encourage and promote these types of uses within the EC/TC District. [P&Z]
- I-29 Develop a long-range Infrastructure Plan for the EC/TC District. [P&Z]
- I-30 Maintain an inventory of EC/TC land. [P&Z]

Strip Commercial Development

One of the primary reasons for developing the town center concept in 1983 was to prevent any further “strip commercial development” along Calvert County’s highways. This type of development contributes to traffic congestion, increases the potential for highway traffic accidents, reduces the drawing power of commercial uses by preventing them from benefiting from proximity to other commercial uses, reduces the ability of government to provide needed infrastructure, and detracts from the visual beauty of the countryside.

Several commercial uses already existed in scattered locations along roadways before the town center concept was adopted. These uses are currently zoned as Rural Commercial (RC) Districts. Some of these districts are already developed for commercial use and many of them continue to be owned and managed by

local business people who provide valuable services to the community. At the same time, many of these sites have substantial redevelopment and expansion potential, which can undermine the town center concept and contribute to traffic congestion and highway traffic accidents. Regulations are needed to help ensure that these commercial uses maintain their existing small scale, rural character, and/or are phased out over time.

It is also imperative that the County continues to avoid creating new opportunities for strip commercial development along highways, except in existing, designated areas within existing town centers.

Actions

- I-31 Avoid the potential for strip commercial development along highways by using the following policies [P&Z, ED]:
 - a. Do not permit additional commercial development along highways outside town centers.
 - b. Do not expand existing town centers along MD 2, MD 4, or MD 2/4. In addition, do not expand Huntingtown, St. Leonard, or Lusby across MD 2/4 or Owings across MD 2.
 - c. Do not designate additional town centers.
 - d. Do not allow commercial uses to have direct access onto MD 2/4 in Huntingtown, St. Leonard, or Lusby.
 - e. Prohibit the expansion of rural commercial districts.
 - f. Evaluate existing regulations governing rural commercial uses and make changes as needed to ensure that they maintain their existing small-scale rural character.
 - g. Require that rural commercial properties meet the same site design and architectural design standards that are required for businesses that locate within the nearest town centers.
 - h. Develop a plan for phasing out some or all RC districts.

Commercial Uses in the Rural District

Very few commercial uses are permitted in the Rural District (RUR) and several of those that are permitted

have created conflicts in the past. A thorough review of commercial uses within the RUR District is needed.

As a general policy guide, commercial uses in the Farm Community and Resource Preservation Overlay Districts (FCDs and RPDs) within the RUR District should be limited to uses that support, complement, and promote farming, forestry, heritage, and ecotourism. Commercial uses in the Rural Community District should be more strictly limited to help avoid drawing traffic onto rural roads and creating conflicts with existing residential communities.

Actions

- I-32 Maintain a strong economic development program to promote agriculture and aquaculture, including the marketing of County-produced farm and fishing products. [ED]
- I-33 Maintain a strong program to promote forestry management, including timber harvesting and the maintenance of wildlife habitat protection areas. [P&Z]
- I-34 Consider permitting low-impact supplemental income opportunities within the Farm Community and Resource Preservation District that support, complement, and promote farming and heritage/ecotourism. [P&Z]
- I-35 Limit commercial uses in the Rural Community District to help avoid traffic congestion and conflicts with existing residential communities. [P&Z]

Commercial and Industrial Uses in Industrial Districts

Industrial Districts (I-1) are intended to provide areas in the County that are suitable for light industrial uses free from other uses which might affect such development.

Actions

- I-36 Maintain an inventory of Light Industrial (I-1) land. Periodically evaluate the need for additional I-1 land as part of a comprehensive rezoning process. [P&Z, ED]
- I-37 Allow EC/TC uses and restrictions in I-1 Districts when adjacent to town centers. [P&Z]

Commercial Uses in Marine Commercial Districts

Marine Commercial (MC) Districts provide locations adjoining waterways for businesses which supply and cater to marine activities and needs. These include: boat service and repair facilities, boat docks, marine equipment stores, wholesale and retail fish and shellfish sales, hotels, motels, restaurants, and cocktail lounges. Calvert's commercial waterfront is one of the County's main tourism attractions. The County needs to be proactive in facilitating its proper and effective use.

Actions

- I-38 Monitor the amount of marine zoning needed and the best locations in terms of the following factors: water depths, erosion potential, water quality, and critical navigation areas. [P&Z, ED]
- I-39 Allow maximum utilization of areas zoned Marine Commercial (MC) without causing significant adverse effects on aquatic resources, visual aesthetics, or neighboring residential uses (e.g., outdoor lighting projecting onto residential property.) [P&Z]
- I-40 To enhance tourism and guard against environmental degradation, conduct a study of County waterways, including issues related to derelict or sunken boats, mooring buoys, commercial boat sewage pumpout into sewer systems, outdoor lighting, unsightly vessels, boat lifts, and Molly's Leg. [P&Z]
- I-41 Request enabling legislation for the County to take control of its waterways in town centers. [P&Z]

Direct Residential Growth to Appropriate Locations; Ensure a Wide Range of Housing Opportunities for All Incomes and Ages; Maintain and Enhance the Quality of Residential Communities

Residential Land Use Patterns

Residential development has followed several different patterns throughout the history of Calvert County. Until the early 20th Century, most people lived and worked on farms. The small towns of North Beach, Chesapeake Beach, Prince Frederick, and Solomons were exceptions.

Until the late 1960s and early 1970s, most newcomers tended to settle in small-lot communities along the Chesapeake Bay. Most of these communities were created prior to the adoption of zoning in 1967 and had originally been designed for seasonal use only. In the 1970s, large-lot residential subdivisions began to replace farms, becoming the dominant residential land use pattern in the County. Only during the last decade have significant numbers of households settled in town centers.

By 2002, 42% of all households were located in small-lot communities created prior to the adoption of zoning in 1967, 43% lived in subdivisions in the RUR District, and 15% lived in town centers.

Each of these residential land use patterns presents challenges:

- *Residential Development in Town Centers and Areas within a One-Mile Radius of Town Centers*

Town centers and the area within a one-mile radius of town centers are the County's primary residential growth areas. It is important to evaluate current development standards to ensure that these areas develop efficiently and that they provide the kinds of amenities that are associated with good towns. These include sidewalks, bikeways, parks, pedestrian access to stores, offices, places of worship, libraries and schools, a low crime rate, good public services, and building and community design that serves a wide range of ages, interests, and incomes.

Actions

- I-42 Continue to permit a higher residential density with the use of Transferable Development Rights (TDRs) within a one-mile radius of the perimeter of North Beach, Chesapeake Beach, Prince Frederick, and Solomons; continue to permit a higher residential density with the use of TDRs within a one-mile radius of a defined central point within Dunkirk, Owings, Huntingtown, St. Leonard, and Lusby. [P&Z]
- I-43 Allow multi-family housing (apartment and townhouses) in major Town Centers; do not allow multi-family housing in minor Town Centers except as may be permitted in Town Center Master Plans. [P&Z]

Actions Continued

- I-44 Work with area residents and builders to establish new design standards for residential neighborhoods within a one-mile radius of town centers. Connect residential neighborhoods to town centers by way of non-arterial roads, bikeways, and sidewalks. [P&Z, PW]
- I-45 Identify and require or encourage amenities that will help retain and attract retirees. [P&Z]
- I-46 Conduct a study to determine why retirees choose to move out of the County and look for ways to encourage them to stay. Include a cost/benefit analysis. (Complete by 2005). [P&Z]

• *Residential Development in R-1 and R-2 Districts*

The challenge in small-lot communities, all of which are zoned R-1 or R-2, is that they were developed before many of the health and safety regulations that govern the layout and design of newer communities were adopted. Consequently, a number of these communities are experiencing problems with sewage disposal, stormwater management, and roads. Residents in these communities have also expressed concerns about the need for more than one road entrance in case of emergency and the need for more recreational facilities. The BOCC appointed a Private Infrastructure Advisory Committee to look into issues specifically related to these communities and to make recommendations to the BOCC.

While most of these communities are fully developed, a few still have a substantial number of platted, undeveloped lots that are exempt from most current regulations. These lots, totaling 4,100 in 2002 account for nearly one-quarter of the potential future households in the County. Efforts to address these issues are underway.

Approximately 1,300 acres of undeveloped land in scattered locations throughout the countryside are zoned R-1 and R-2. All were zoned in the late 1960s and early 1970s on the basis of criteria that are no longer consistent with the policy to direct higher-density residential growth to designated growth areas. Actions were taken in 1999 to encourage owners to

enroll these lands into land preservation programs or to serve as receiving areas for TDRs.

Actions

- I-47 Continue to work with existing small-lot communities to resolve issues specifically related to these communities. [P&Z, CR, PW, PS]
- I-48 To address health and safety issues in small-lot communities platted before the adoption of current regulations, look for ways to reduce the number of dwelling units that can be developed within these communities. [P&Z]

• *Residential Development in the RUR District*

Residential development within the RUR District has always come into conflict with the long-standing goal of preserving land for farming, forestry, and wildlife habitat. Over the years, the County has adopted a number of programs to try to minimize both the number and the impact of residential subdivisions in the RUR District while still trying to protect landowner equity. These programs include large lot zoning, critical area regulations, clustering, the TDR program, and several State and County purchase of development rights (PDR) programs.

The creation in 1992 of three overlay districts within the RUR District (Farm Community District, Resource Preservation District, and Rural Community District) was intended to help resolve some of the issues related to this development pattern. Farm Community and Resource Preservation Districts were identified as the County's prime preservation areas while the Rural Community District was identified as a receiving area (along with town centers and R1 and R2 Districts) for development rights transferred from Farm Community and Resource Preservation Districts.

Actions

- I-49 Continue to look for ways to direct residential growth away from Farm Community and Resource Preservation Districts. [P&Z]
- I-50 Give priority to farming (such as "right to farm" regulations), forestry, wildlife habitat

Actions Continued

protection, and heritage/ecotourism within Farm Community and Resource Preservation Districts. [P&Z]

I-51 Continue to look for ways to minimize potential negative impacts (such as traffic, trespassing, destruction of older buildings, and visual changes to the landscape) within Farm Community and Resource Preservation Districts. [P&Z]

daily life—parks, shopping, social, and institutional centers—into the pattern of residential living

- *Allow multiple trip purposes to be served with a single trip through mixed-use development and pedestrian-oriented design*
- *Allow for alternatives to the single-occupant vehicle to serve commuting travel*
- *Allow alternatives to the automobile to serve everyday travel needs, such as walking, bicycling, and public transit.*

Transportation

Objectives

- Stage the development of the transportation system to complement the overall development of the County.
- Maintain MD Routes 4 and 2/4 as the main transportation corridor, providing for safe and efficient travel.
- Maintain and improve the arterial and nonarterial highway systems to provide for safe and efficient travel.
- Improve and expand existing public transit services to capture the highest ridership possible.
- Promote transportation alternatives such as public transit, carpools, vanpools, bicycling, and walking.
- Develop a sustainable program for financing transportation construction and improvement.
- Continue a countywide transportation planning program that is integrated with State and regional planning programs.

Sustainability Issues

A sustainable transportation system provides an overall framework for good urban and rural development. However, its success will necessarily depend upon the settlement pattern. The land use settlement pattern determines the amount and spatial distribution of travel as well as the ability of various modes to serve travel demand. Sustainable communities promote energy efficient, safe, and convenient travel patterns because they:

- *Allow for shorter and fewer automobile trips by integrating land use activities that complement*

Trends In Transportation

Traffic volumes in Calvert County, especially on MD Routes 4 and 2/4, have more than doubled in recent decades. The traffic problem is most evident in Prince Frederick where a high level of automobile commuting has combined with highway-oriented commercial development to cause recurring, morning and evening, traffic congestion. Traffic signals at the entry to Prince Frederick back up the flow of traffic and increase travel delays, fuel consumption, and air pollution.

In 2000, according to the U.S. Census, about 61 percent of employed County residents, or 22,760 persons, commuted to jobs outside of the County. The commute for one-quarter of the County labor force exceeded one hour. Nearly 78 percent of commuters drove alone to work, 16 percent carpooled, about 4 percent worked at home, and only about 2 percent used public transit, walked, or bicycled to work. The County's low-density residential pattern and continued residential growth mean that these travel patterns and behaviors will continue and that congestion on the County's main highway will worsen. Indeed, the distribution of workplaces in southern Maryland has become more dispersed over the last decade, meaning that downtown Washington, D.C., the traditional destination for commuter bus services, represents a smaller proportion of workplace destinations. Over the long term, as job destinations disperse, it becomes more difficult and costly to expand commuter bus service. Therefore, expansions in commuter bus service will likely be limited to routes serving the Suitland Metro Center in Washington D.C. and perhaps Lexington Park in St. Mary's County.

Changes in the distribution of commuting patterns and the regional nature of travel suggest that the Thomas Johnson Bridge, which connects the County to Lexington Park, may need to be expanded. The County, region, and State must study the long-term land use and traffic implications of adding a new span to the bridge before the option is pursued. All alternatives studied should include priority for public transit.

The County looks to the level of service (LOS) on MD Routes 4 and 2/4 as one indicator of the impact of development on the quality of life in Calvert County. Maintaining an adequate LOS during peak periods, might serve as a benchmark for measuring how well the County is managing growth and development. LOS has worsened on MD 2/4 and severe congestion may be expected on MD 2/4 in the Prince Frederick area. LOS in Prince Frederick is no longer adequate and, absent major improvements in Prince Frederick, severe daily congestion and delays will persist.

To help resolve congestion in Prince Frederick, Calvert County planned a loop road system around the town center, two overpasses and an underpass, and the widening of MD 2/4. The County has made significant progress toward implementing the Prince Frederick Loop Road, including committing funds to engineering and construction. The projects in Prince Frederick will improve conditions for the future, provided that County growth does not significantly exceed 37,000 dwelling units.

Indeed, preventing severe congestion on MD Routes 4 and 2/4 over the long term will prove more costly and difficult as residential growth continues. To date, the County's use of zoning and its purchase of development rights to reduce residential buildout have proved the most effective step taken to addressing traffic on MD 2/4. The impacts of these decisions will be seen in future years. Still, more road construction will be needed if the County seeks to maintain an adequate LOS on MD Routes 4 and 2/4 over the long term.

Arterial Highways

Arterial highways such as MD Routes 2, 4, 2/4, 231, and 260 serve fast and heavy traffic between urban centers. Direct access to property along arterial

highways should be managed so that overall highway capacity can be preserved for through traffic.

The County considers the gradual conversion of MD Routes 4 and 2/4 into a controlled access expressway as key to resolving future traffic congestion. Making that conversion requires primarily four efforts:

- It is the policy of Calvert County that new access points to MD Routes 4 and 2/4 shall not be allowed.
- Development plan review in which new highway access is coordinated and the rights-of-way of future service roads and overpasses are reserved.
- The purchase of rights-of-way for new overpasses along MD Routes 4 and 2/4.
- Traffic engineering and town planning solutions that minimize new traffic signals.
- Highway construction including widening, overpasses, the upgrade of the older sections of MD Routes 4 and 2/4 that were retained when the highway was dualized, and the addition of acceleration and deceleration lanes and shoulders where needed.

Highway construction is the most expensive of the four actions required. To date, the County has relied on the State to fund needed improvements on the State highway system. To meet and expedite its highest priority transportation needs, the County may have to consider using local revenues in combination with State resources.

Actions

I-52 Continue to implement measures to maintain the safety and efficiency of travel:

- a. Reduce existing and prohibit future direct property access, especially to MD Routes 4 and 2/4.
- b. Require parallel connecting roads along MD Routes 4 and 2/4 during the development/subdivision process with the long-term goal of having all driveways served by connecting roads. [P&Z]

I-53 Continue to adopt and update a County transportation plan, including an arterial highway system element. [P&Z]

I-54 Promote the preparation and regular update of

Actions Continued

a regional transportation system plan based upon and designed to serve the land use development goals of Calvert County and the other units of government in the Southern Maryland region. [P&Z]

- I-55 Develop a funding strategy to expedite the planning and construction of needed projects on the State highway system in Calvert County. [P&Z, F&B]

Non Arterial Roads

Collector and local roads, such as subdivision streets, are also important components of the County’s overall transportation system. This is especially true of collector roads. These roads, which are generally County-owned and maintained, collect traffic from local roads and convey it to the arterial highways. In town centers, collector and local roads provide for local circulation and access to businesses.

Many of the non arterial roads in Calvert County were meant to be farm-to-market routes. The builders of these roads did not intend them to carry heavy traffic volumes. Under such conditions, they present safety and maintenance problems. Upgrading rural roads to modern design standards is costly and often makes rural lands more accessible to urban development. Major renovations to old County roads can cost up to \$1 million per mile.

Priority should be given to upgrading those roads that serve town centers. Roads that serve rural and natural areas generally have lower traffic volumes and do not warrant the same design improvements required of those serving growth areas. By coordinating road improvements with land development goals, the County can keep its road construction costs lower and support new growth where it is expected.

Each of the town center master plans proposes road construction projects. In most cases, implementation of these projects would help manage access onto MD Routes 4 and 2/4 and provide a framework for higher density residential and commercial development. In some cases, these improvements are needed to resolve

existing traffic congestion. In 1995, the County began constructing the Prince Frederick Loop Road. The first section, between MD 231 and West Dares Beach Road, is open to traffic. The County is implementing the other sections now according to a construction schedule it adopted.

Financing road improvements is a challenge. The County studied options for raising revenue for new road construction and has opted to use a combination of new development excise tax revenues, the sale of bonds, and general fund revenues.

Road maintenance is also costly and the County relies on gasoline tax revenues, which are transferred to the County, for this purpose. However, these funds cannot be used in Calvert County’s private communities, which are home to a large number of County residents.

Actions

- I-56 Maintain the program to renovate road sections and intersections. This includes widening roads, adding shoulders, removing dangerous curves, replacing bridges, correcting poor sight distance, and adding turning lanes and roundabouts. Prioritize improvements based on traffic counts and proximity and service to town centers. [PW]
- I-57 Continue the program for resurfacing. Prioritize resurfacing based on traffic counts, structural condition of paving, and skid resistance of existing surfaces. [PW]
- I-58 Continue systematic road maintenance and timely snow removal. Prioritize maintenance based on need per total length of roadway/section. [PW]
- I-59 If amendments are made in federal and/or State standards, amend the County road design requirements to allow for safe roads that are not over designed. [PW, P&Z]
- I-60 Develop a Countywide policy for building and maintaining sidewalks and bicycle ways at the time of new road construction. [P&Z, PW]
- I-61 Construct new roads as called for in the County Transportation Plan and as identified in the adopted town center master plans. Ensure that environmental impacts, including stormwater impacts, are taken into

Actions Continued

consideration in road design and are properly managed during road construction. [PW]

I-62 Continue to adopt and update a County transportation plan, including a nonarterial road system element. [P&Z]

I-63 Prepare traffic circulation studies and transportation plans as needed for town centers. [P&Z, PW]

I-64 Continue to retrofit existing roads with sidewalks, especially within town centers and connect communities within a one-mile radius of town centers by an internal network of sidewalks and roads. [PW]

I-65 Develop an approach to fund road maintenance in existing private communities. [F&B, PW]

Public Transit

Good transportation planning requires that highway and transit facilities be planned together. Highway capacity can be optimized when a highly accessible and efficient transit system is in place.

Rapid transit is intended to facilitate fast movement along heavily traveled corridors, such as MD 2/4. Rapid transit can be provided by commuter rail, light rail, and by buses operating in mixed traffic or over exclusive rights-of-way. The rail options require high urban population densities to justify their costs and to operate successfully. This condition is not likely in Calvert County: County planning policy promotes a rural development pattern with relatively small urban concentrations (town centers). However, commuter bus service is provided successfully by the Maryland Transit Administration to Washington D.C. and it is continually expanded. The County and Maryland Transit Administration continue to cooperate to expand transit service to other areas where high concentrations of jobs are located, such as Lexington Park in St. Mary's County.

The County operates two levels of local transit service. A fixed route service is operated between town centers. A demand-responsive service provides service to the elderly and disabled in the Prince Frederick Town Center and environs.

Waterborne commuter ferry service is a form of transit with potential for Calvert County especially as the southern part of the County becomes more economically integrated with Lexington Park. The potential must be kept viable. Any ferry service should be properly planned and integrated into the overall transportation system and land use pattern.

The County Transportation Plan recommends an overall framework for public transit service that should continue to be implemented by Calvert County. Specifically, it calls for the creation of local transit service areas in the major town centers and for express bus service between those centers. The plan also recommends expansion of commuter bus service and the park and ride lots that serve carpool, vanpool, and commuter bus ridership.

Actions

I-66 Provide adequate commuter parking lots at key locations throughout the County. Encourage the shared use of parking lots. [P&Z]

I-67 Expand and improve bus service as recommended in the County's Transportation Plan which recommends a significant improvement in the accessibility and convenience of fixed route transit service throughout the County. [CR]

I-68 Expand and improve demand-responsive transit services. [CR]

I-69 Promote the preparation and regular update of a regional transportation system plan based upon and designed to serve the land use development goals of Calvert County and the other units of government in the Southern Maryland region. [P&Z]

I-70 Prepare local transit development plans based on town centers as needed. [CR, P&Z]

I-71 Update the County transportation plan, including a public transit element. [P&W]

Transportation System Management

Building added highway capacity is expensive. Efforts must be directed to making the most efficient use of existing roads before building new capacity. Addressing transportation problems through

constructing new highways alone can prove exceedingly wasteful.

Transportation system management (TSM) uses non-capital-intensive improvements to achieve objectives such as: optimizing existing roads; encouraging the use of buses, vanpools, and carpools; reducing vehicle use and traffic congestion; effecting motor fuel savings and reducing emissions; and helping to modify travel demand and patterns. TSM measures with potential in Calvert County include:

- Traffic engineering techniques such as traffic signal synchronization, the proper placement of driveways, and exclusive turning lanes and roundabouts at intersections.
- The promotion and marketing of area-wide transit, carpools, and vanpools including expanded carpool lots.
- Town center and community land use planning and site design aimed at minimizing the need for travel by car.

Actions

- I-72 Continue to monitor traffic conditions and assess the potential for technological solutions to traffic problems. [PW]
- I-73 Enhance opportunities for walking and bicycling in town centers. [P&Z, PW]
- I-74 Establish bicycle routes to connect residential, commercial, employment, educational, and open space areas as feasible [P&Z]
- I-75 Provide or require sidewalks in established and newly developing commercial areas of town centers. [PW, P&Z]
- I-76 Provide adequate commuter lots at key locations throughout Calvert County, especially in town centers as part of coordinated land development plans. Such commuter lots may then become future transit stations. [P&Z, PW]
- I-77 Continue to update the County transportation plan, including a Transportation System Management element. [P&Z]

Energy

Objectives

- Develop policies, procedures, and practices that promote energy conservation and efficient use of energy resources.
- Use alternative energy sources when economically feasible and compatible with the environment.
- Encourage energy efficiency during site selection, site design, and building design for residential, commercial, and institutional developments.
- Reduce both residential and commercial average annual increase of energy consumption.
- Reduce the County government's energy consumption.
- Plan for the County's future energy needs.

Sustainability Issues

Sustainable communities meet the needs of current and future County residents in the following ways:

- *Renewable energy sources are used.*
- *Energy sources used do not adversely impact the environment.*
- *Energy consumption is reduced.*
- *Energy-efficient land use patterns promote economic and social activities that are less dependent on automobiles.*

There has been a growing awareness that most of the world's resources are limited and that we should be reducing our consumption and reusing and recycling whatever possible. This ethic applies not only to physical objects, such as paper, but also to the less tangible objects, such as energy.

Energy Facilities

Two major energy plants are located within Calvert County: the Calvert Cliffs Nuclear Power Plant and the Dominion Cove Point Liquefied Natural Gas (LNG) facility. The Calvert Cliffs Nuclear Power Plant is the County's most significant source of revenue, although it supplies little electricity directly to Calvert County. In March 2000, Calvert Cliffs Nuclear Power Plant became the first plant in the United States to earn 20-year extensions of its operating licenses from the U.S. Nuclear Regulatory Commission. One issue that affects

the County, but that must be resolved at the Federal level, is the long-term storage of spent nuclear fuel.

The Dominion Cove Point LNG facility was reactivated in July 2003 and receives LNG via ships that come from various producing basins throughout the world. This facility is the largest LNG import facility in the United States and is the County's second largest source of revenue.

County Trends in Energy Use

Calvert County's energy use has been increasing, due to population growth and higher per capita use. Southern Maryland Electric Cooperative (SMECO) supplies approximately 80% of all residential and commercial electricity while Constellation Energy supplies the rest. Calvert County's electric energy consumption peaks in the winter, unlike neighboring St. Mary's and Charles Counties. The reasons for Calvert's winter peak are uncertain, but it is beneficial because demand is spread throughout the year.

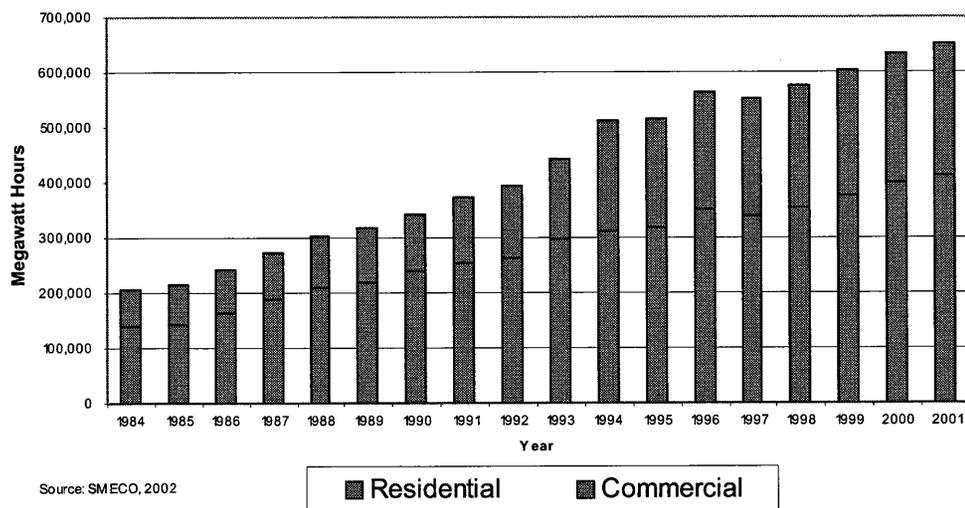


Figure I-A Energy Sales 1984-2001, Southern Maryland Electric Cooperative

SMECO's sale of energy to residences increased from 139,651 megawatt hours in 1984 to 411,698 megawatt hours in 2001, (see Figure I-A). While much of this increase was due to residential growth, SMECO figures show that electrical consumption per residence increased from 12,200 to 16,900 kilowatt hours from 1984 to 2001. SMECO's commercial energy sales increased from 66,000 megawatt hours in 1984 to 239,000 megawatt hours in 2001. Due to increased

demand for energy, SMECO constructed a new substation in Mutual, purchased sites in Huntingtown and Prince Frederick, and is securing a site in Dunkirk.

The State of Maryland passed the Electric Customer Choice and Competition Act of 1999. The Act allows customers to choose their power supplier (generator). Companies other than the local utility company may provide electricity, including environmentally friendly power such as solar, wind, and geothermal. Local utility companies continue to deliver power and maintain their distribution systems. The Maryland deregulation began in July 2000. Customer choice was available to SMECO customers in November 2001.

In order to provide utility service in the future, new or expanded utility corridors will need to be identified. Utility corridor planning can reduce the number of new corridors, thereby providing more cost-effective service, reducing impacts on neighboring uses, reducing tree removal, and providing known locations for future electromagnetic fields. While scientific evidence is not

conclusive about the public health effects of electromagnetic radiation, policy-based approaches advocate prudent avoidance, "limiting exposures which can be avoided with small investments of money and effort" (American Planning Association, 1991).

Lighting

Of all electricity sold in the U.S., lighting accounts for 25% to 30% of energy in commercial buildings (EPA 2001) and 5% to 10% for a typical home (SMECO Energy Tips, 2002). The nation's demand

for electricity could be cut by more than 10% if energy-efficient lighting were used (EPA2001). New lighting technology, such as compact fluorescent lighting and lighting emitting diodes (LEDs), can reduce energy consumption and at the same time save money. The initial cost of installing energy efficient technology should be compared to the life-cycle cost (operating cost times lamp life plus purchase price) of energy-efficient equipment versus standard

equipment. The County government is using solar energy to power the outdoor safety lights at three solid waste compactor sites. Although the initial cost was higher, the solar energy system paid for itself in two years, and there is no monthly electric bill. In addition to cost savings, reducing energy used for lighting also reduces environmental impacts; every kilowatt hour of lighting electricity not used prevents emissions of 1.5 pounds of carbon dioxide, 5.8 grams of sulfur dioxide, and 2.5 grams of nitrogen oxides.

While Calvert County is fortunate to have the Arthur Storer Planetarium, a unique science and cultural facility available to students and visitors, it is not a substitute for seeing real stars in the night sky, which is one of the pleasures of living in the country. Urban dwellers often marvel at the number and brightness of stars that can be seen in rural areas. As the character of Calvert County takes on more suburban qualities, residents express the desire to maintain aspects of its rural character. As the population and number of structures increase, there is the potential for Calvert Countians to lose this connection to the stars from light pollution. Lighting can be used effectively without overlighting an area. Some types of street and security lights, such as high-pressure sodium lamps, use less energy and produce more light. Lighting can be used to minimize shadows around buildings and parking areas. "Lighting on buildings, under trees and shrubs can be used effectively to illuminate the surroundings, while not blinding pedestrians and residents." (Community Forestry Network 1994). The County Commissioners created a Lighting Task Force in 2002 to research outdoor lighting issues and to make recommendations for regulations to address light pollution.

Cost Savings

The average amount an American single-family household spent on all energy use was \$1,492 in 1997 (U.S. Department of Energy 2001). The national percentage of household energy to run electric air conditioning and appliances was about 31% in 1997. In comparison, the amount was 46% for households in the South Atlantic (Delaware, Maryland, Washington, D.C, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida). The warmer climate contributes to the higher percentage of energy

consumption for these uses. Cost savings can be achieved by the choice of appliances and the choice of fuel used to heat and cool homes, for example, propane gas and geothermal. Heat pumps, especially ground-source, "are far more 'efficient' at converting electricity into usable heat because the electricity is used to move heat, not generate it." There are two types of ground-source heat pumps, closed-loop and open-loop systems. Closed-loop systems are the most common and preferred. Open-loop systems are less preferred and should be discouraged, due to risks of contaminating the water source or inadequately recharging the aquifer. (Department of Energy 2003)

Energy Conservation Programs

Energy efficiency is important in several ways; not only does it save money, it reduces environmental impacts and defers the need to build new power plants. SMECO offers several energy conservation programs. Home energy monitoring kits are available for loan through the Southern Maryland Public Libraries. The Energy Star Home Program is a program offered by SMECO and the U.S. Environmental Protection Agency that targets new home construction. "An Energy Star Home is built to use 30% less energy (for heating, cooling, and water heating) than a home built to the standards of the current national Model Energy Code." (SMECO 2003) Benefits to the homeowner are reduced energy use and reduced energy bills compared to homes built to standard codes. More details about this and other energy conservation programs are available from SMECO, 888-440-3311 or www.smeco.com.

Energy assistance is available to low-income citizens through the Maryland Energy Assistance Program and the Electric Universal Service Program, administered by the Maryland Department of Human Services, Office of Home Energy Programs. Weatherization and energy-efficiency measures are available. The Southern Maryland Tri-County Community Action Committee is the local contact for the program.

The State of Maryland offers a financing program to businesses for energy conservation and generation projects. The program is offered through the Maryland Energy Administration. The State offers a Green Building Tax Credit, free energy assessments for

manufacturers, the Community Energy Loan Program, and tax incentives through Maryland Clean Energy Incentive Act.

In addition to ways to reduce consumption, reusing materials can aid in efficient use of energy. A waste-to-energy plant is one way to produce energy while reducing the amount of waste that goes to the landfill. The waste-to-energy concept is discussed further in the Waste Management section.

Site Planning and Building Design

Before we became reliant on heating and cooling equipment, buildings were constructed to take advantage of breezes and the seasonal path of the sun. Within the County's older shore communities, many of the houses are comfortable even in the summer, due to windows that take advantage of breezes off the water and shading from mature trees. Today, building designers often ignore natural rhythms and rely totally on mechanical systems to heat and cool buildings, systems that are more expensive to own and operate. One of the primary ways to build in harmony with the natural environment is to be cognizant of the sun. Use of natural lighting and reduction of artificial lighting reduces energy needed for lighting and reduces air conditioning needed to cool buildings from heat generated by lights.

Site planning and building design can promote energy efficiency through the use of appropriate vegetation and building materials. For instance, properly planted trees can typically reduce energy used for cooling individual buildings by up to 75% and heating energy consumption by 30% (U.S. Department of Energy 2003). Another way to reduce air conditioning is by using white- or light-colored surfaces for external walls and roofs; energy use may be decreased by 40% (Center for Building Science News 1994).

“Green or sustainable building is the notion of designing, constructing, operating and maintaining buildings and landscapes in a manner that minimizes environmental impacts. It incorporates energy efficiency, water conservation, waste minimization, pollution prevention, resource efficient materials and indoor environmental quality into all phases of a

building's life...conventional building practices tend to consume enormous amounts of nonrenewable natural resources and raw materials, generate excessive waste, overbuild and disrupt natural hydrology and degrade natural ecosystems and wildlife habitat. All of this adversely impacts Maryland's communities, tributaries, watersheds and the Bay.” (Maryland Department of Natural Resources) Some green buildings have living roof structures –plant-covered roofs. The benefits of living roofs include reduced energy consumption and prevention of stormwater runoff. Green building techniques are being advocated by many organizations and governments, including the American Institute of Architects Committee on the Environment, the National Association of Home Builders, the Chesapeake Bay Foundation, the U.S. Department of Energy, the State of Maryland, and the City of Austin, Texas. Some local governments provide technical assistance, offer incentives, and/or require development projects to meet green codes.

Orientation of Buildings and Streets

Working with natural forces through passive solar heating and cooling can keep temperatures comfortable and reduce energy consumption. Street orientation relates directly to how much sunlight or shade a building receives. If streets are oriented with forethought, buildings can be shaded in the summer and receive sunlight in the winter, due to the sun's varying angle and height through the seasons. Streets oriented to the cardinal points (north, south, east, and west) receive very little shade during the summer. In the morning and afternoon, the north-south streets are shadowed, yet they receive the full force of the sun at midday. During the winter, almost all the streets are shadowed, thus the buildings are colder and require greater amounts of fuel to heat them. In contrast, streets oriented diagonal to the cardinal points (northeast, southeast, southwest, and northwest), take advantage of the sun's position. In the summer, shadows are cast most of the day, and in the winter, more sunlight is cast on the streets. Streets and buildings oriented in this manner can reduce the need for mechanical equipment to heat or cool the buildings.

Land Use and Automobiles

Calvert County's geography and development patterns have created an automobile-dependent community. Nationwide, automobile dependence has intensified since World War II. Creation of the Interstate highway network, decentralization of the cities, high home ownership, and the increase of two-income households are examples of trends that have intensified automobile use. The high percentage of County residents who commute out of the County for work, and the long duration of their commutes, combine to create high consumption of gasoline. Thus, land use—the location of homes, jobs, shopping, and recreation—affects energy consumption.

High automobile use is a concern from an energy standpoint as well as from an environmental standpoint. By directing development to town centers and promoting a mixture of land uses (residential, commercial, recreational, and institutional), the length of daily trips and the number of trips can be reduced. Promoting use of park and ride lots and buses are two more ways to reduce gas consumption. Given the County's peninsular shape and its previous patterns of scattered subdivisions, methods should be explored to reduce the impact of travel. Refer to the Transportation Section for more discussion of this topic.

Gasoline-powered vehicles negatively impact the environment by creating air pollution and continue the United States foreign-oil dependence. Methods that can reduce negative impacts include vehicles powered by alternative fuels, such as natural gas, bio-diesel, hydrogen, electric, hybrid electric, or solar. Improvements in these technologies have been made and greater improvements may result in the coming years. Natural gas for vehicles is an attractive alternative to gasoline since natural gas emissions of carbon monoxide are significantly reduced along with other emissions that produce ozone and other greenhouse gases. SMECO is using bio-diesel vehicles, and the County government and the Board of Education have a small fleet of propane forklifts. In 2000, the State of Maryland began allowing an excise tax exemption for electric and hybrid vehicles through the Maryland Clean Energy Incentive Act. The County purchases vehicles through a low-bid procurement

process. In order for the County to consider purchasing energy-efficient vehicles, the procurement process may need to be modified to account for environmental impact costs and fuel savings over the lifecycle of the vehicle.

Actions

- I-78 Reduce travel-related energy consumption by promoting compact mixed-use development in town centers. [P&Z, ED]
- I-79 Encourage telecommuting and flexible working schedules for employees to conserve energy used for transportation. [CA, ED]
- I-80 Encourage energy conservation through the County Transportation Plan (commuter parking lots, public transit service, commuter bus service, car and van pooling, and bicycle and pedestrian pathways). [P&Z, PS, F&B, PW]
- I-81 Consider converting a portion of the County vehicle fleet to alternative fuels based upon economic and environmental feasibility. [PW, PS]
- I-82 Conduct an assessment of the County government's energy use and seek ways to improve energy efficiency. [GS]
- I-83 Review the local building code for areas where greater energy efficiency could be promoted. [P&Z, GS]
- I-84 Promote education of energy-conserving techniques, including demonstration projects of energy-saving techniques, to the public, to school students, and to those who design local communities. [Constellation Energy, SMECO, P&Z, GS]
- I-85 Consider requirements and/or incentives for energy-efficient developments. [P&Z, PW]
- I-86 Consider using solar energy, natural gas, and geothermal energy for County facilities and consider promoting their use as alternative sources of energy. [GS, PW]
- I-87 Discourage light pollution. Enact regulations and incentives to minimize light pollution. [BOCC, P&Z, GS]
- I-88 Consider building orientation during site design to take advantage of solar energy and reduce the need for artificial heating and cooling. [P&Z, PW]

Actions Continued

- I-89 Plan for future utility needs by identifying areas for future and expanded distribution lines. Consider utility corridor planning. [P&Z]
- I-90 Promote and participate in Federal, State, and utility-sponsored energy efficiency programs. [P&Z, GS, PS]
- I-91 Encourage utilities to expand energy conservation programs. [CR]
- I-92 Encourage tree planting around homes to reduce heating and cooling. [P&Z]
- I-93 Consider elements of environmental and energy efficient design (“green” building) in appropriate County codes. [P&Z]

Waste Management

Objectives

- Ensure the safe and environmentally sound disposal of solid waste, wastewater, and hazardous waste generated in Calvert County.
- Reduce nutrient pollution from sewage treatment facilities and septic systems.
- Promote conservation of resources; e.g., solid waste source reduction, reuse and recycling of waste, and water conservation.
- Investigate efficiency and effectiveness of regional approaches to waste management.
- Allow for sewage treatment facilities for town centers.
- Identify and require correction of malfunctioning septic systems.

Sustainability Issues

Sustainable communities conserve natural resources, reduce consumption, reuse products, and recycle. Their citizens look at the long-term consequences of consumption practices to ensure that natural resources are not depleted nor degraded and, thus, are available for use by future generations. Waste is disposed of in ways that have the least environmental impact and are fiscally responsible. Toxic waste is avoided where possible, reduced, reused, recycled, or disposed of in a way that will not pollute drinking

water, subsurface groundwater, surface water, air, or land.

Calvert County will ensure the safe and environmentally sound disposal of solid waste, wastewater, and hazardous waste generated in Calvert County by providing adequate and efficient facilities and programs for disposal. In addition, the County will promote conservation of resources; e.g., solid waste source reduction, reuse and recycling, and water conservation. Such conservation will extend the useful life of County waste disposal facilities and groundwater supplies, reduce environmental impacts, and reduce waste disposal costs.

Solid Waste

Landfill Disposal Needs. A state of the art, double-lined landfill designed to protect the environment was opened in Appeal in 1993. In 1997, in order to head off the major cost of expanding the landfill, the County entered into a 20-year agreement with an independent private contractor to build and operate a solid waste transfer station at the Lusby landfill site. Waste is transferred out of the County, thereby extending the life of the landfill for many years. Also, in FY 1997, the County capped the landfill in Barstow.

Household Waste. Household waste collection, including recycling, is currently provided at the compactor sites, Appeal Landfill, or by private haulers. The most successful recycling programs are achieved by using curbside collection of waste and recyclables. Franchising curbside collection with recycling is an alternative approach that could be used in Calvert County.

Recycling Program. Calvert County citizens and businesses recycled 32% of the County waste stream in 2002, exceeding by more than two-fold the State goal of 15%. The recycling rate in Calvert County in 1994 was 17%. The sharp increase in recycling in 2002 was due to increased citizen and especially business participation and the recycling of large amounts of yard waste from tornado damage. The County should continue to increase recycling to lengthen the life of the landfill, reduce the cost of waste management, reduce the use of our natural

resources, and reduce the potential threat that domestic waste poses to the environment.

Yard and Land Clearing Waste. Citizens are encouraged to compost their own yard waste such as grass clippings, leaves, and twigs. Most yard waste that reaches the landfill is composted. A small percentage is disposed of with the household waste.

Land-clearing debris such as tree stumps are not allowed to be disposed of at the County Landfill; thus most are disposed of at private landfills which accept land-clearing debris. An increasing amount of this material is being ground into mulch, reused, and recycled. But problems associated with landfills for land-clearing debris, such as traffic, noise, visual blight and proximity to residences still pose problems.

Construction Waste. Much of this material is accepted at the landfill. However, to save space and extend the life of the landfill, more of it should be recycled or converted to mulch. There are no landfills in Calvert County that accept rubble (broken concrete, bricks, asphalt, etc).

Another method of solid waste disposal is to convert waste to energy through combustion. This process combusts much of the waste stream and produces usable energy, but causes air pollution. In addition, energy can be captured from the County's existing landfills. As garbage decomposes in landfills, methane is created which can be captured and burned to produce heat or electricity.

- Actions**
- I-94 Increase recycling (measured as a percentage of waste stream) and consider mandatory recycling, where and when long-term benefits result. Explore increasing the types of waste stream items that can be recycled. [PW]
 - I-95 Encourage franchised curbside collection and recycling. [PW]
 - I-96 Adopt a policy that ensures that the majority of land-clearing debris, yard waste, and construction waste is converted to mulch or is in other ways recycled or reused rather than landfilled. [PW]

- Actions Continued**
- I-97 Work jointly with local businesses on source reduction (e.g., decrease packaging), reuse, and recycling. [PW]
 - I-98 Provide public education on source reduction, reuse, and recycling of solid waste materials. [PW]
 - I-99 Explore the feasibility and environmental acceptability of a waste-to-energy plant in the Southern Maryland Region. [PW]
 - I-100 Increase enforcement of anti-littering regulations and increase fines. [PS]
 - I-101 Develop guidelines on how to dispose of stable wastes in a sustainable, non-polluting manner. [SCD, P&Z, PS, Extension Service]

Wastewater

Wastewater is all-liquid, non-hazardous waste produced by residential, commercial, industrial, and institutional uses. It mostly consists of human waste disposed of through community, shared, or individual sewer systems. Most of the domestic waste in Calvert County is disposed of in onsite sewage disposal systems (septic systems). The greatest threats from wastewater disposal are nutrient pollution (nitrogen and phosphorus) and disease transmittal. Nutrient pollution has been linked to the decline of living resources in the Chesapeake Bay.

Septic Systems. In Maryland, Calvert County has the highest percentage of sewage being disposed of into septic systems. The Maryland Department of Planning has estimated that septic systems contribute 25% of the non-point nitrogen pollution in Calvert County. Septic systems only remove about one-half of the nitrogen and release the effluent to the soil below the vegetated layers. It is estimated that about 8 lbs. of nitrogen per person per year is released to the environment. Recently, nitrogen-removing septic systems have been developed which could greatly reduce the discharge of nitrogen from septic system wastewater disposal.

To protect the environment from malfunctioning septic systems, the County requires that all new and replacement septic tanks are chambered to prevent

overflow to the environment if the tank fails. On existing lots, there is an additional requirement that sufficient and appropriate space be provided on the lot for one primary and two secondary drainage fields. These requirements have been in place since January 1993. Homeowners are encouraged to pump out their septic tanks every three to five years.

Septage Treatment. Septage is all wastewater and sludge collected from septic systems. Since 1995, all septage must be disposed of at a County approved septage treatment facility, currently at the Solomons Wastewater Treatment Plant, or on land that has received a State permit for such disposal.

Shared Wastewater Facilities. Shared wastewater facilities are systems that serve more than one lot or parcel in subdivisions. Shared facilities can also be used to serve areas of any size that are experiencing septic failures.

Allowing shared wastewater systems in cluster subdivisions could preserve more open space. The current requirements for septic recovery areas dictate that lots are larger than the minimum lot size allowed. Thus, lots consume more area than necessary. With shared facilities, more nutrients can be removed and less land consumed. However, the use of shared wastewater systems should not allow increased housing density, which could work against the County's growth control objectives.

Community Wastewater Systems. Community wastewater systems are defined as any public wastewater system that treats waste from more than one lot or parcel. Three town centers have large wastewater treatment plants to support the existing populations and allow growth in these areas. Treatment is slow-rate land application for Prince Frederick, biological-nutrient removal followed by rapid infiltration land application for Solomons and biological nutrient removal treatment with discharge into the Chesapeake Bay for Chesapeake Beach and North Beach.

Wastewater Policy. Slow-rate, land application of treated wastewater is the preferred method of wastewater disposal in the County and is the most

sustainable. The effluent is sprayed onto either forestland or cropland planted with certain grasses. Vegetation takes up the nutrients and then is harvested. The nutrients are thus recycled rather than discharged into waterways where they would have adverse impacts on aquatic resources. In addition, the shallow water aquifers are recharged in the area of the application. The disadvantages of land application are costs and land consumption.

In light of the County's intention to reduce growth and the growth rate, the provision of new community sewerage service should not allow an increase in residential density. When providing community wastewater treatment to correct an existing problem, such as failing septic systems, no increase in density will be allowed based upon provision of the sewerage system.

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Actions

- I-102 Continue to show preference for land application of wastewater effluent and explore other beneficial ways of reusing wastewater. [PW, P&Z]
 - I-103 Develop incentives for the use of nitrogen-removing technologies for new, replacement, and existing septic systems and for shared facilities to reduce nutrient pollution of our waterways. [HD, PW, P&Z]
 - I-104 Consider mandatory nitrogen-removing septic systems near sensitive areas. [CR]
 - I-105 For existing problem areas (failing septic systems), search for funding and means to correct the problem. This could include installation of a shared or community wastewater system, composting toilets or gray-water systems. [HD, PW, P&Z]
 - I-106 Permit water and sewer in all town centers when needed to support environmental health and/or support County-identified economic development goals, when and if cost-effective and economically feasible. [P&Z, PW]
 - I-107 Explore the feasibility, including cost-effectiveness, of allowing shared septic or wastewater treatment facilities with nitrogen removal and land disposal in clustered subdivisions without increasing overall housing density. [HD, PW, P&Z]
-

Actions Continued

- I-108 Explore an educational or mandatory program to have septic tanks pumped out on a regular basis (every 3 to 5 years). [CR]
- I-109 Provide public education on water conservation to reduce demands on our aquifers and reduce demands for wastewater disposal. [PW]
- I-110 Plan for expansion of the Prince Frederick Wastewater Treatment Plant. [PW]

Hazardous Waste

Hazardous waste, if improperly disposed of, is a threat to the health and safety of Calvert County citizens and the environment. Industry, commerce, farming, and homeowners generate hazardous waste. When these toxic materials enter our soils and waterways, they also enter the food chain. This can reduce the productivity of soils and have negative impacts on wildlife and fisheries. Hazardous waste disposal is currently regulated by the State.

Household Hazardous Waste Collection.

Educating the public on alternatives to using household products that create hazardous waste can reduce the use of these substances. Household hazardous waste collection can reduce the potential of these toxic substances being disposed of in the County Landfill or at other inappropriate places. The County currently accepts used motor oil and antifreeze, paints, herbicides, pesticides and other household hazardous waste at green box sites and the County landfill.

Commercial, Industrial, and Agricultural Hazardous Waste Disposal.

Federal and State regulations control the use and disposal of hazardous wastes. These wastes are not allowed in the County Landfill. Nuclear waste from the Calvert Cliffs Nuclear Power Plant is currently stored onsite because a federal repository is not yet available.

Leachate Treatment. The liquid that accumulates at the bottom of lined landfills, leachate, is considered a hazardous waste and is treated at an appropriate

wastewater treatment plant. Currently, the leachate from the Appeal Landfill is treated at the Solomons Wastewater Treatment Plant.

Actions

- I-111 Continue to collect hazardous household waste at the compactor sites and Appeal Landfill. [PW]
- I-112 Continue to press Congress to site and build a nuclear waste repository. Require that nuclear waste be moved from the County to the federal repository. [BOCC]
- I-113 Provide public education on use of safe alternatives to toxic compounds. [PS, PW]
- I-114 Continue to provide guidance and training to farmers and homeowners through the Soil Conservation District and University of Maryland Extension Service on the proper use and disposal of toxic compounds and application of fertilizers, pesticides, and herbicides. [CR]

Natural Resources and Sensitive Areas

Objectives

- Encourage preservation, protection, and conservation of natural resources.
- Establish a comprehensive approach to environmental planning with special emphasis on watershed planning.
- Protect environmental features that will help ensure continuance of a healthy and pleasant place to live for current residents and future generations.
- Protect environmentally sensitive areas (wetlands, floodplains, wetland and water way buffers, steep slopes) from development impacts to provide:
 - Sufficient habitat to maintain our current diversity of fauna and flora
 - Protection of habitat and individuals of rare, threatened, or endangered species
 - Nutrient removal
 - Flood control.
- Preserve stream valleys to maintain their important natural functions and to provide greenways

- throughout the County.
- Practice community planning and site design that conserves energy, protects natural resources, and minimizes impacts on the landscape.
 - Encourage restoration of lost and/or damaged natural environmental features.
 - Foster greater public awareness, education, and support of environmental concerns.
 - Accomplish a 40% reduction from 1985 levels in nutrients entering the Chesapeake Bay and Patuxent River by the year 2008.

Sustainability Issues

“A healthy ecosystem and natural environment are the foundation of all that we do. The natural environment, our life support system, is the basis for a healthy world, healthy economy, healthy society, and a healthy quality of life” - Citizen Planners of Ventura County. Policies that promote a sustainable environment include the following:

- *Environmentally sensitive areas (wetlands, floodplains, wetland and waterway buffers, steep slopes), large tracts of forested land and wildlife corridors are preserved or restored for the beneficial functions they provide:*
 - *Habitat for fauna and flora*
 - *Nutrient and sediment retention and removal*
 - *Flood control*
 - *Recreation, etc.*
- *Sufficient sensitive areas should be preserved such that our current diversity of fauna and flora are maintained.*
- *Solid waste, wastewater, and hazardous waste are disposed of safely, relative to public health, and in environmentally sound ways so that groundwater and surface water quality remain viable for fisheries and useful to humans in terms of consumption, irrigation, and recreation.*
- *Natural resources, such as groundwater, surface water, forests, and fisheries are used conservatively and in nonpolluting ways so that they will be available for future generations.*
- *Pollutants to the environment are kept to levels below which they might have significant impacts on human health and the health of natural living resources and ecosystems.*

- *True cost-pricing is established as the basis of economic viability. In true cost-pricing, long-term economic gains and preservation of the quality of life are valued above short-term profits. The value of natural capital and natural services should be evaluated in any determination of cost/benefit analysis. Long-term impacts on environmental and social issues must be considered as part of an economic analysis.*
- *Measures are taken to abate existing pollution problems.*

Watershed Planning

A watershed is all the land area that drains into the same water body (e.g., creek, river, bay). As the water quality of any waterway is dependent on the activities and land uses in its watershed, the watershed is the geographical unit that must be addressed when looking at water quality issues.

The watershed approach is comprehensive. Natural resources (e.g., wetlands, creeks, forest, and rare, threatened, and endangered species habitat), land preservation, cumulative impacts, water quality, impact minimization and mitigation, water supply, flood management, and stormwater management can be studied and solutions applied holistically.

In addition, citizens should participate in the development of the watershed plan, and thus the plan addresses local issues and the solutions proposed are developed with citizen input. As the plan is also reviewed and agreed upon by local, State, and federal permitting agencies, the solutions will have up-front multi-jurisdictional support.

There are two watershed management plans being developed in Calvert County, the Hunting Creek Watershed Management Plan and the Parkers Creek Watershed Management Plan. A watershed task force has worked on developing the plan in cooperation with local, State, and federal agencies.

Action

I-115 Complete watershed management plans for the major tributaries in the County. [P&Z]

Natural Resources

Natural resources are those actual and potential forms of wealth supplied by nature. This wealth can be measured by the value of the products supplied and by the services they provide. For example, a tree as lumber will have a given market value, but a tree also provides the services of producing oxygen, moderating temperatures, providing habitat, controlling flood waters and stormwater, reducing pollution, and stabilizing the soil. Often, our natural resources are considered only as products to be exploited without regard to the value of the services they provide. It is often the case that the value of their service is much greater than their value as products. To ensure their availability to future generations, care must be taken not to decimate our nonrenewable natural resources and to conserve the renewable ones. Conservation management, preservation, and regulatory protection are some of the means by which our natural resources are protected for future generations.

Groundwater

Calvert County is situated over a favorable geological formation of groundwater resources. Four major aquifers (the Piney Point, Nanjemoy, Aquia, and Magothy) supply nearly all of the County's potable water. These four aquifers are protected from surface water contamination by clay-confining layers. A fifth deeper aquifer, the Patapsco, is being explored for additional groundwater resources. Initial findings in Calvert County by the Maryland Geological Survey (MGS) are promising.

The recharge areas are located in Prince George's and Anne Arundel Counties, but it takes thousands of years for that water to reach the aquifers beneath Calvert County. Contamination of surface waters or near-surface groundwaters would not threaten the water quality of these aquifers. The major threat to groundwater quality in Calvert County is deep wells,

especially abandoned ones. These wells penetrate the confining layers and provide a direct potential conduit for pollutants to enter the deep aquifers.

The Aquia aquifer is receiving the greatest demand in Calvert County. Future water levels for the Aquia projected to 2025 for several areas of Calvert County are shown in Figure I-B (data from MGS, 2000). The MGS report looked at three scenarios of the effect of water usage on the Aquia and Piney Point-Nanjemoy aquifer water levels from 1999 to 2025. Scenario 1 used Calvert County's population projections based on decreased buildout (102,000 in 2025), Scenario 2 used Maryland Department of Planning (MDP) population projections (137,000 in 2025). Scenario 3, used the MDP population projections but assumed by 2025 that 20% of pumpage is from a fifth aquifer, the Patapsco (not part of the original study).

The Maryland Department of the Environment does not permit increased usage of groundwater from a particular aquifer if the aquifer is at or below the management level. When an aquifer is at 80% of its capacity it is considered at its management level. For North Beach, Chesapeake Beach, and Prince Frederick, the projected water levels in the Aquia in 2025 are well above the management level for all three scenarios (see Figure I-B). For the Chesapeake Ranch Estates (CRE) and Solomons, however, the water levels of the Aquia approach or exceed, respectively, the management level under scenario 2.F. In these two southern areas of the County, the Aquia water levels are above the management level under scenarios 1 and 3. The water levels in the Piney Point-Nanjemoy aquifer were always well above the management level for all three scenarios.

The results indicate the importance of the 50% reduction in future density that the County adopted in 1999 and the importance of directing future large users of water to the deeper Patapsco aquifer. The results of the MGS water supplies study of the deeper Patapsco aquifer in Southern Maryland will be very important to our future water planning efforts. A combination of Scenarios 1 and 3 could be important in maintaining groundwater supplies adequate to serve the Solomons and Lusby areas in the future. The accuracy of the

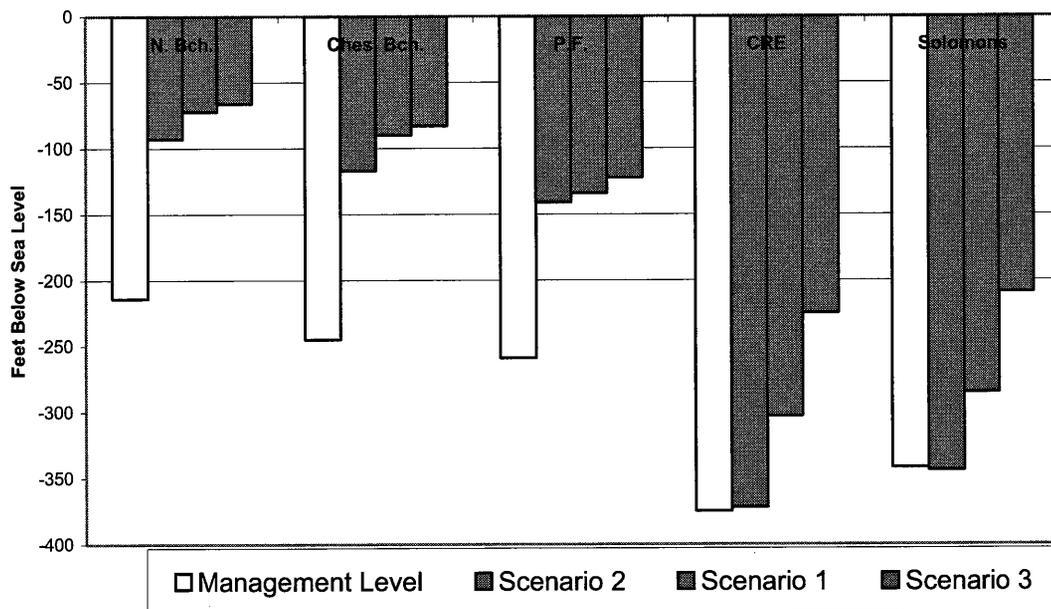
Lexington Park water usage projections is also important as pumpage in this area affects the water supply in Solomons and CRE. Subsidence in Southern Calvert County from groundwater removal is a potential problem in some areas.

Water conservation is also important in maintaining an adequate supply of groundwater. The County currently requires water conservation devices and provides public education on water conservation. New water facilities are designed to provide reasonable excess capacity to meet future expansion needs and to coordinate water facility expansion and development with population growth.

a variety of purposes including industrial, commercial (including fisheries), agricultural, and recreational activities. The health of the Chesapeake Bay and its tributaries declined in the mid to late 1900s. This is evident in the serious declines in living resources. Oysters, crabs, and submerged aquatic vegetation all showed serious declines in their populations.

In the 1990s, the phosphorous ban and improvements in point source pollution, especially from sewage treatment plants in the Patuxent River, improved water quality in the waters around Calvert County. However, in the face of a rapidly increasing population, the trend toward improving water quality could be reversed. It is

Figure I-B Simulated Aquia Water Levels in 2025 At Major Production Wells



important to reduce point source and non-point source pollution Baywide in the future if we are to continue to make progress in improving water quality.

The new Chesapeake Bay Agreement (named Chesapeake 2000 or C2K) between Maryland, Pennsylvania, Virginia, and Washington, D.C calls for a 40% reduction, over 1985 levels, in nitrogen and phosphorous entering the Bay. The 40% level was arrived at after extensive research.

Actions

- I-116 Require that abandoned wells be reported on subdivision preliminary plans and site plans and require that abandoned wells be sealed. [P&Z, HD].
- I-117 Continue to support groundwater studies so that predictions can be made as to future groundwater supplies. [P&Z, CR]

Surface Water

Surface water includes creeks, streams, rivers, lakes, ponds, and bays. These aquatic resources are used for

It is projected that, if nutrients could be reduced to this level, much of the Bay's previous biological productivity would be restored. In addition to reducing nutrients, C2K includes commitments to:

- Increase the numbers of oysters tenfold
- Expand bay grass beds and wetlands
- Remove the Bay from the impaired waters list
- Enhance cooperation with local governments
- Reduce harmful sprawl development by 30 percent
- Preserve from development 20 percent of the watershed's land area
- Provide for government agencies to "lead by example" when taking further actions to clean the bay.

To achieve this goal, the State of Maryland has established a tributaries strategy program in which the 40% reduction in nutrients and other parameters is addressed on a watershed basis. Calvert County is in the Patuxent and the Lower Western Shore basins. For each basin, Tributary Strategy Implementation Teams have been appointed to monitor and promote the implementation of the strategies.

Research used to develop the tributary strategies indicated some potential sources of surface water pollution for Calvert County. These include nitrogen pollution from functioning and malfunctioning septic systems; nitrogen and phosphorous in runoff from construction sites, farms, lawns, and impervious surfaces; and nitrogen from atmospheric deposition. In addition, overboard disposal of septage from boats is a direct but diffuse source of pollution (nutrients and potential pathogens).

The Chesapeake Bay Critical Area includes all land within 1,000 feet of the mean high tide line of tidal water or tidal wetlands. State law recognizes that the land immediately surrounding the Bay and its tributaries has the greatest potential to affect water quality and wildlife habitat vital for our crabs, oysters, herons and waterfowl. The purpose of the Critical Area Program is to mitigate the damaging impact of water pollution and loss of natural habitat, while also accommodating the County's future growth. The Program was adopted by Calvert County in 1988 in response to legislation passed by the State of Maryland. The Chesapeake Bay Critical Area Commission reviews and approves Calvert County's local Critical Area Program, including changes to ordinances, regulations, and maps.

Wastewater

Residential development in Calvert County is primarily served by septic systems. As septic systems discharge below the surface vegetative cover, little nitrogen is removed. On the other hand, phosphorous, which adheres to soil particles, is mostly removed by the septic system process. Calvert County, the smallest County in Maryland in terms of area, has the greatest percentage of households on septic systems. Thus, nitrogen from functioning and failing septic systems is

an important contributor to the total nitrogen load. MDP estimates that septic systems contribute 25% of the non-point source nitrogen load in Calvert County. In the Solomons Harbor Watershed, including Mill, St. John's, and Back Creeks, the percentage of nitrogen loading from septic systems is even greater and represents the greatest source of nitrogen loading in this watershed.

There is a preference in Calvert County for land application of wastewater (see Waste Management section). Two of the three town center wastewater systems use land application, the third uses tertiary treatment. The County has made a serious commitment to using environmentally sound wastewater treatment methods in its public sewerage treatment plants. In May 2004, the State of Maryland adopted the Bay Restoration Fund which is to be used to upgrade public wastewater treatment facilities and failing septic systems, particularly within the Critical Area. The source of funding is an annual fee collected from wastewater treatment plan users and septic system owners.

Development

Sediment from an improperly controlled development site can impact up to five or six miles of a stream or river, and the impacts can last up to a decade. Suspended sediment transports nitrogen and phosphorous, clogs aquatic animal feeding mechanisms, smothers fish eggs and other benthic animals, and reduces visibility of prey to finfish populations. Proper sediment and erosion control and stormwater management are very important to preserving the health of our aquatic ecosystems. Recently adopted stormwater management regulations give incentives to use low-impact development techniques, such as rain gardens and bioretention, that greatly reduce runoff by keeping water onsite. Also, so not to create additional nitrogen pollution, nitrogen-rich materials are not used by the County for ice and snow removal on County roads.

Farming

Farming also contributes to sediment and nutrient pollution. There are currently 1303 agricultural parcels in the County. Controlling sediment and nutrient

pollution on farms is currently a voluntary program, administered through the Calvert County Soil Conservation District (SCD). Via this program, farm "Water Quality and Soil Conservation Plans" are written, cost-sharing incentives to install appropriate best management practices recommended in the plan are offered and technical help is made available.

Due to a lack of State funding, not all agriculturally assessed properties have current farm plans. The reason for this is the lack of funding from the Maryland Department of Agriculture to the SCD to hire farm planners and technicians. Increasing the percent of farms with current farm plans could improve surface water quality in the County. Nutrient management plans are now required on all farms in the County. These plans are prepared by the University of Maryland Cooperative Extension Service or by private vendors who have been licensed by the Maryland Department of Agriculture.

Home Sites

Runoff from home sites is a significant source of nutrients, sediment, and other forms of pollution. Overfertilization of lawns, use of pesticides, pet wastes, car washing, improper disposal of domestic hazardous waste and runoff from rooftops and driveways (impervious surfaces) result in pollution of our waterways. Often the homeowners are not aware that they are a significant source of the problem.

Atmospheric Deposition

Another significant source of nitrogen is atmospheric deposition, estimated to contribute about 25% of the total nitrogen load. The nitric compounds are produced mainly by automobiles and coal- or fuel oil-burning power plants. Calvert County has the highest per capita commuting mileage in the State. This means that on a per capita basis, Calvert County citizens are significant contributors to the air pollution problem. In addition, Calvert County relies heavily for its energy needs (for other than transportation) on coal- or oil-burning power plants. A landscape model developed by the University of Maryland, Institute of Ecological Economics estimated that atmospheric deposition was the dominant source of nitrogen loading in the

Hunting Creek Watershed. The 2000 Census Stated that, "61 percent of employed County residents, or over 22,760 persons, commuted to jobs outside the County...The commute for one-quarter of the County labor force exceeded one hour."

Water Quality Monitoring

The success of our fisheries and other aquatic resources are dependent on good water quality. Thus, it is necessary that the water quality of our waterways be measured to recognize problem areas and estimate the success of our actions. Federal, State, and County government, as well as citizen monitoring programs are being conducted in the County.

- Actions**
- I-118 Move toward alternative technologies and approaches to reduce nutrient pollution; for example, nitrogen removing septic systems. [CR, GS, HD, P&Z]
 - I-119 Continue to avoid the use of nitrogen-rich materials for ice and snow removal. [GS, PW]
 - I-120 Develop and maintain Soil Conservation and Water Quality Plans on three-quarters of all farms and seek funding from local, State, and federal governments to support farm-planning activities of the Calvert Soil Conservation District. [SCD]
 - I-121 Provide technical assistance to communities in existing subdivisions with retrofit or repair of stormwater management facilities. [PW]
 - I-122 Improve enforcement of existing sediment control, stormwater management, and Critical Areas regulations. [PW, P&Z]
 - I-123 Ensure that all commercial marinas and community piers with more than 10 slips have septage pumpout stations. [P&Z]
 - I-124 Use growth management techniques to direct a greater proportion of growth to town centers or other areas where community wastewater facilities are available. [P&Z]
 - I-125 Develop environmental education materials such as brochures, flyers, and an environmental site on the County web page. [BOE, GS, TS, P&Z, University of Maryland Center for Environmental Studies]

Actions Continued

- I-126 Promote the use of cleaner sources of energy, such as solar, natural gas, and nuclear as opposed to coal and fuel-oil sources. [PW, GS, P&Z]
- I-127 Seek ways to correct existing areas of septic failures and explore measures to avoid future septic problems in existing small-lot subdivisions. [CR, PW]
- I-128 Maintain a policy of preference for land application of wastewater effluent. [PW, P&Z]
- I-129 Provide water quality monitoring or support citizen monitoring of waterways. If water quality is or becomes poor, investigate the problem and find solutions. [P&Z]
- I-130 Consider encouraging retention of storm water and sediment onsite using such low-impact development techniques as grassed swales, bio-retention, and green roofs. [PW]

Forests

Forest once covered more than 95% of the Chesapeake Bay watershed. Today less than 60% remains. For the first time in one hundred years, the percentage of forestlands in the watershed is declining. Some forests are cleared for farming, but development is the greatest threat.

Forest cover is the most natural and least polluting land use, and forest cover adjacent to streams (riparian forests) is essential to preserving water quality. Forests absorb nitrogen in both surface and shallow groundwater, trap phosphorous-laden sediment, and remove other pollutants resulting from adjacent land uses and from atmospheric deposition. In addition to pollution prevention, forests provide important habitat for wildlife, induce groundwater recharge and minimize flooding. Riparian forests provide organic matter, such as leaf litter, which serves as the basis of the food chain for aquatic species. The riparian forest canopy provides shade, which is critical for moderating stream temperature, and the roots of the trees stabilize stream banks and protect against erosion. In addition to all of these other benefits, forests are a renewal resource that can play an important role in developing and maintaining a sustainable economy.

Forest interior (forest more than 100 meters from a forest edge) provides important habitat to many species. Many species of birds can only reproduce in forest interior habitats. These are known as forest interior dwelling birds and some examples are: scarlet tanager, barred owl, pileated woodpecker, and whippoorwill.

Forest covers 81,781 acres or 58% of land use in Calvert County. Forest interior represents 37% of forest cover or 22% of the County land area. Forty-four percent of the estimated forest interior habitat is currently protected, 56% is thus threatened by development.

A model was used to determine the impact of land use decisions on potential forest interior habitat in Calvert County. Regulatory approaches can only protect an additional 11% of forest interior habitat and, therefore, in addition to regulatory approaches, land preservation measures must be pursued to achieve a higher level of protection.

Actions

- I-131 Map forest resources and track forest loss and gain. [P&Z]
- I-132 Replace 100% of forest loss outside the Critical Area and town centers. [P&Z]
- I-133 Preserve and restore riparian forests. [P&Z, SCD]
- I-134 Maintain large tracts of forest and especially forest interior in the rural areas. [P&Z]
- I-135 Maintain or establish habitat corridors between large tracts of forest and between urban areas and adjoining forested areas. [P&Z]
- I-136 Support land preservation that protects forested areas (e.g., local land trusts, County land trusts, easement programs, Forest Stewardship Program). [P&Z]
- I-137 Adopt a map of the forest interior in Calvert County to guide the Planning Commission in subdivision and site plan review. [P&Z]

Minerals

The primary mineral resources found in Calvert County are sand and gravel, used mainly in the construction industry. Most of the sand and gravel is

found in the higher, interior portions of the County, but supplementary amounts occur in the lowland terraces bordering the Patuxent River. With the rapid growth rate the County is experiencing, there is the potential that these valuable resources will be covered over by development. The County should encourage extraction of mineral resources outside of sensitive areas before the establishment of permanent uses on the mineral deposit site.

Ceramic clay suitable for face brick or structural tile is available in the Marlboro Clay, a relatively thin but persistent layer found at shallow depths in the northwestern part of the County. A further clay resource having a potential for lightweight aggregate occurs in the St. Mary's Formation in southern Calvert County. Extraction of other minerals, including small amounts of phosphorite, glauconite, and, in northern Calvert, impure diatomite, is not economically feasible at the present time.

Actions

- I-138 Require that significant mineral resources be shown on subdivision preliminary plans and on site plans. [P&Z]
- I-139 Make State maps of mineral resources in Calvert County available to the public. [P&Z]

Air Quality

Calvert County has been included as part of the Washington, D.C. severe nonattainment area for air quality. A nonattainment area means that air pollution levels are often unhealthy for County citizens. Calvert County has also been participating in the "Metropolitan Washington Air Quality Committee (MWAQC)" to address the requirements of the federal Clean Air Act.

Motor vehicle emissions are a significant source of air pollution in the Washington metropolitan area. Emissions from motor vehicle trips originating in Calvert County have been estimated to comprise just over one percent of these regional totals. The County's share of the regional air quality problem may increase if existing travel behavior continues or accelerates. In 2000, the average travel time to work for a Calvert

County resident exceeded 39 minutes (longest for the State), with about 60 percent of the County work force commuting to jobs outside of the County.

The other significant source of air pollution is fossil fuel-burning power plants. Air pollution reaches Calvert County from as far away as the Ohio valley. The fossil fuel burning power plant closest to Calvert County is Chalk Point located just across the Patuxent River from the mouth of Hunting Creek. A landscape model of nitrogen loading to Hunting Creek indicated that atmospheric deposition was the greatest source of nitrogen pollution.

A study by the Harvard school of medicine identified a serious public health problem caused by the fine-particulate pollution generated from five fossil-fuel plants within 50 miles of Washington, D.C. Fine-particulates, one-seventh of the width of a human hair, are formed when sulfur dioxide and nitrogen oxide gases react down wind from the power plant stacks. The researchers hypothesize that the health hazard could be greatly reduced by the installation of readily available pollution controls that effectively cut sulfur dioxide and nitrogen oxide emissions.

MWAQC data indicated that air quality in the Washington metropolitan area improved from 1986 to 1995 but then remained about the same through 2002.

Actions

- I-140 Promote car-pooling, public transit, pedestrian, and bicycle modes of transportation and land use planning that would decrease automobile travel. [P&Z, PS]
- I-141 Increase employment opportunities in the County for residents. [ED]
- I-142 Work with the Tri-County Council of Southern Maryland to take the necessary political steps to reduce emissions from the Chalk Point and Morgantown power plants. [BOCC]
- I-143 Reestablish the air quality monitoring station in Prince Frederick and encourage establishing additional sites in the County in the near future. [BOCC]

Fisheries

In the early 1900s, Calvert County's economy was primarily based on agriculture and fisheries. The abundant fisheries resources in Calvert County have been reduced significantly since the early 1900s due to reduction in stocks from poor water quality (see Surface Water section above), overfishing, and poor fisheries management. The fisheries industry in Calvert County has experienced a similar drastic decline. Water quality in the Patuxent River has been improving and the State has become more proactive in fisheries management. The State established a fishing moratorium on striped bass between 1985 and 1990. Since 1990, the striped bass spawning index has increased dramatically. If water quality continues to improve and the fisheries are properly managed, then fisheries and shellfisheries should increase to a sustainable level.

Actions

- I-144 Maintain and improve surface water quality by taking the actions listed in the Surface Water, Forest, and Clean Air sections above.
- I-145 Support effective fisheries management efforts that are fair and equitable to both watermen and sport fishermen. [P&Z]
- I-146 Support aquaculture that is practiced in an environmentally sensitive manner. [P&Z, ED]

Sensitive Areas

Sensitive areas include wetlands, waterways, vernal pools, flood plains, steep slopes, cliffs, and habitat for rare, threatened, and endangered species. These areas are very sensitive to the impacts of development and are generally unsuitable for development. In addition, wetlands, waterways, and flood plains filter pollutants and provide natural flood control, stormwater management, and habitat for wildlife including rare, threatened, and endangered species. The costs of providing these functions should be considered and mitigated when impacts to these areas are proposed. Most importantly, these areas should be preserved and conserved to the greatest extent possible.

Streams and Their Buffers

Streams are conduits to lowlands, rivers, and the Chesapeake Bay. They provide habitat for many

aquatic organisms, including areas for fish spawning and feeding. They also provide drinking water for wildlife and a means of transport for organic materials which support aquatic species. At the same time, streams provide a direct pathway for pollutants to move downstream into our rivers and the Chesapeake Bay. These pollutants, including sediment, nutrients, and toxic waste, can cause serious damage to aquatic ecosystems and the fisheries production within them. Forest and wetland buffers adjacent to streams serve the important function of removing pollutants before they enter the stream. They also provide excellent habitat and habitat corridors for wildlife.

Actions

- I-147 Address actions in Surface Water Section.
- I-148 Establish greenways systems along stream valleys to preserve as much of these low lands as possible. [P&Z]
- I-149 Require and maintain sufficient buffers from all perennial and intermittent streams to provide environmental protection. [P&Z]
- I-150 Reforest stream buffers wherever possible. [P&Z, SCD]

Wetlands

Wetlands are lands where water is the dominant factor determining the nature of soil development and the types of plant and animal communities. These are generally low lands covered with shallow water, sometimes temporarily or intermittently. Wetlands include both fresh and saline areas and are referred to by such common names as fresh and salt water marshes, swamps, wet meadows, and bogs.

Wetlands provide flood and water storage, pollution control, wildlife habitat, and a major food supply for aquatic organisms, migratory waterfowl, and other wildlife. It is estimated that Maryland has already lost about one-half of its wetlands to date. The State has set a goal of "no net loss" of wetlands.

Actions

- I-151 Maintain strong regulations restricting impacts on wetlands. [P&Z]
- I-152 Restore or create wetlands in disturbed areas. [P&Z, PW, SCD]
- I-153 Examine the effectiveness of 50 ft. buffers and alter buffer requirements, if the study so indicates. [P&Z]
- I-154 Establish or re-establish forested wetland buffers where possible and feasible. [P&Z, SCD]
- I-155 Develop substantial monetary penalties for the unauthorized destruction of wetlands. [P&Z]

Flood Plains

Flood plains are generally low-lying areas that are inundated with water (flooded), either due to high seas and sea level or excessive amounts of rainwater runoff. The 100 yr. flood plain is that area that would be flooded by a storm that would be expected to occur once every 100 years. Most of the flood plain areas in Calvert County consist of wooded wetlands, while some areas are farmland, residential, commercial or town center. The wooded wetlands serve as natural flood management devices, remove pollutants, and provide wildlife habitat. The Zoning Ordinance, Subdivision Regulations, and the Flood Management Ordinance regulate development in the 100 yr. flood plain.

Actions

- I-156 Continue to direct housing and other development out of the flood plain. [P&Z]
- I-157 For development in the flood plain, ensure that construction practices minimize damage to property and the environment during flooding. [P&Z]
- I-158 Require vegetation in flood plains to remain with the exception of removing vegetation for access and stormwater management. [P&Z]

Steep Slopes and Highly Erodible Soils

Most of the steep slopes in Calvert County are covered and stabilized by forest cover. Loss of this vegetative cover can result in severe erosion, landslides, loss of fertile topsoil, filling in of waterways, flooding, and a decrease in water quality. Preservation of severe slopes adjacent to waterways is especially important because of the potential harm to water quality and aquatic habitat. Steep slopes are also areas of both plant and animal diversity. These steep slope areas are, therefore, generally unsuitable for development.

Actions

- I-159 Review Subdivision Regulations, Zoning Ordinance, and the Sediment Control Ordinance concerning development, grading, and alteration of natural vegetation on areas with severe slopes. [P&Z, PW]
- I-160 Revise site planning criteria to encourage use of natural features of a site and discourage grading of steep slopes. [P&Z, PW]
- I-161 Develop regulations to address development on steep slopes of existing lots and parcels. [P&Z, PW, SCD]

Wildlife Habitat and Habitat for Rare, Threatened, and Endangered Species

Due to the large areas of the County still in forest and wetland, there is an abundance and wide diversity of wildlife. The rapid conversion of forest to developed land destroys or significantly alters valuable wildlife habitat resulting in a reduction of wildlife resources. The adoption of the mandatory subdivision cluster regulations has done much to reduce the impacts of residential development on wildlife habitat. The County should preserve sufficient amounts of sensitive land to maintain its current diversity of wildlife and plant life.

Calvert County is also home to several rare, threatened, and endangered species such as the Bald Eagle and the Puritan tiger beetle. The protection and conservation of these species is of global concern. Over the last 600 million years, the natural rate of extinction has been about one species per year. The

current rate of extinction worldwide is at least 1000 species per year. It is important that Calvert County do its part to protect the rare, threatened, and endangered species found within its boundaries. Protection of indigenous populations of rare, threatened, and endangered species and their habitats contributes to the maintenance of biological diversity, which is essential to the continuance of healthy ecosystems upon which the human species depends.

Actions

- I-162 Work with the State to map rare, threatened, and endangered species outside the Critical Area and develop protective measures. [P&Z]
- I-163 Protect from shore erosion control those areas of Calvert Cliffs that have significant Puritan tiger beetle populations. [P&Z]
- I-164 Develop methods to protect the habitats of rare, threatened, and endangered species. Take steps to increase their numbers if possible. [P&Z]

Environmental Education

As the population and accompanying development in the County increases, the amount of pollution caused by non-point runoff from individual home sites will increase. Many of the impacts originating from this type of runoff could be avoided or at least minimized. Pollution from individual home sites results from many activities including: overfertilization of lawns, pesticide application, house painting, running of lawn mowers, and use of septic systems, especially malfunctioning ones. Public education on the impact of citizen activities on the environment and what citizens can do to avoid these impacts is an important protection measure for our environment.

Actions

- I-165 Maintain, support, and improve the environmental education programs for school-aged children. [BOE]
- I-166 Develop environmental education programs for adults and families. [P&Z, GS, CR]