CR 40-2015

Howard County
MARYLAND

Solid Waste Management Plan 2014-2024

Draft

March 2015

Howard County
Internal Memorandum

SUBJECT: DRAFT 2014-2024 Solid Waste Plan
Executive Summary

TO: Lonnie R. Robbins,
Chief Administrative Officer

FROM: Mark De Luca
Bureau Chief, Environmental Services

DATE: March 23, 2015

Howard County maintains a comprehensive 10-year Solid Waste Plan that discusses the County's current solid waste program and projects the needs for the next ten years. The current Plan is for the ten-year period between 2014 and 2024. DPZ staff reviewed the Plan for consistency with Howard County's General Plan, PlanHoward 2030 and has provided a Statement of Certification. Also, the Maryland Department of the Environment (MDE) has provided a first review of the plan and found it currently meets the regulations, guidelines, and prior goals established by the Environment Article, Annotated Code of Maryland, Section 9-1703. The Plan will be subject to a second review and approval by MDE.

The Plan also adopts the future diversion, reduction and recycling goals of PlanHoward 2030 and MDE. While this Plan is a 10-year plan, it is subject to review and revision on a 3-year cycle and can be amended at any time as new state regulation and law may require.

Legislative Additions and Changes to the Plan:

The previously approved 2003 Plan was revised to incorporate four Plan amendments which were adopted either by bill or resolution by the County Council.

CR117-2010 addressed recycling in public schools

CR 110-2011 addressed collecting and recycling of fluorescent light bulbs that contain mercury

CR7-2014 required apartment and condominium to submit recycling plans to the county

CB2-2014 provided enforcement for compliance with the apartment/condo recycling law at the local level.

Additionally, in the 2014 legislative session, the Maryland General Assembly passed Senate Bill 781: Environment-Recycling-Special Events, which amended Sections 9-1703 (b) and (g) and added Section 9-1712 of the Environment Article, Annotated Code of Maryland. The law requires counties to revise their recycling plan to include special event recycling by October 1, 2015. The state law became effective October 1, 2014.

Specifically, the law requires special event organizers to provide for recycling in accordance with the county Solid Waste Management Plan. Special events subject to the law are those that:

a. Include temporary or periodic use of a public street, publicly owned site or facility, or public park;
b. Serve food or drinks; and
c. Are expected to have 200 or more persons in attendance.

Special event recycling has been included in this Plan under Section 5.6.3. It will be adopted as part of the Council-approved Solid Waste Plan.

Report Summary:

Trash

Currently, trash is exported out of the county through an export contract. This practice will continue through the plan period to 2024.

During the plan period, the county population will increase from approximately 300,000 residents in 2014 to 350,000 residents in 2024. Based on the population totals, we anticipate approximately 131,000 households by 2024. Not all of the projected household will receive public service. Some will retain private services. However, as service areas grow the size of trash and recycling routes will be evaluated for efficiency. Adjustments may be necessary to maintain the current level of service.

In 2013, the county residential curbside collections program picked up 100,000 tons of trash and 60,000 tons of recyclables. In the same year, commercial properties contributed 320,000 tons of trash and 192,460 tons of recyclables for a total of 672,460 tons of waste generated in the County. By 2024 we estimate the total waste generated in the County will be approximately 776,520 tons.

Considering population growth and the current waste-generation rate per capita, residential trash is expected to increase to approximately 114,000 tons by 2024. Based on these estimates, we do not foresee any change in our current export practice over the next ten–year period.

If we continue our trash export practice along with the minimal use of our landfill, the estimated life of the landfill is approximately 120 years.

Should we need to use the landfill in the absence of an export contract, the current landfill life is estimated to be 3 years. Design and implementation of the two remaining unconstructed cells would need to be expedited. Design and construction is estimated to take 2 years. Funds for design and construction are set aside and adjusted annually within the capital budget to accomplish this should it ever become necessary. With all cells constructed at the Alpha Ridge facility, landfill life would only be extended 6 to 10 years.

Recycling:

From the 2003 Plan, our mandated recycling goal has been 35 percent by 2015. The County is currently at a 52 percent recycling rate.

The voluntary state goal for 2020 is 60 percent. The PlanHoward 2030 recycling goal is 75 percent by 2030 and the current Maryland zero-waste recycling goal is 80 percent by 2040.

We have already met the mandated 2015 recycling goal. In order to meet the 2020 voluntary goal, we believe expansion of the curbside food scrap program to more county residents as well as to the county public schools will help the county meet or exceed the 60 percent target.

Moving forward, a multi-faceted strategy will be needed to meet future goals in 2030 and 2040. For example, an increase in business recycling through the existing cooperative or other future program coupled with better recording keeping will help us make great strides in meeting the goals. Other steps may include:

- increased recycling of targeted materials such as textiles and Styrofoam
- continued expansion of the food scraps program
- opening an eastern regional drop-off facility for residents
- increased efforts in reduction and reuse programs and activities.

Success of the plan depends not only on efforts of County staff, but support from residents, elected officials, local businesses and a continuing belief in the importance of being responsible environmental stewards.

HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
3430 Courthouse Drive ■ Ellicott City, Maryland 21043 ■ 410-313-2350

Marsha S. McLaughlin, Director

www.howardcountymd.gov
FAX 410-313-3467
TDD 410-313-2323

STATEMENT OF CERTIFICATION

December 2014

The Solid Waste Management Plan, 2014-2024, for Howard County is consistent with Howard County's General Plan, *PlanHoward 2030*, adopted on July 26, 2012 by the Howard County Council. The Solid Waste Management Plan has been developed based upon population estimates and land use objectives shown in the General Plan provided by the Department of Planning and Zoning. Per the Annotated Code of Maryland, the County planning agency shall certify that the plan, revision, or amendment is consistent with the County Comprehensive Plan prepared under Article 66B, § 3.05; Article 25A, § 5(X); or Article 25B, § 13 of the Code.

Marsha McLaughlin
Director

11/25/14
Date

PUBLIC WORKS BOARD
FOR
HOWARD COUNTY, MARYLAND

March 10, 2015

RESOLUTION NO. PWB-9-2015

WHEREAS, the Department of Public Works, pursuant to Section 18.100A of the Howard County Code, is required to develop, review and/or update annually the Solid Waste Management Plan.

WHEREAS, the Department of Public Works has prepared the Solid Waste Management Plan 2014-2024 (the "Solid Waste Management Plan 2014-2024") for review and approval of the Public Works Board and Planning Board, County Executive, and Howard County Council.

WHEREAS, on January 22, 2015, the Solid Waste Management Plan 2014-2024 was approved by the Planning Board of Howard County.

WHEREAS, in accordance with Sections 18.118 of the Howard County Code, the Department of Public Works, by publishing notices in the Howard County Times on February 26, 2015 and March 5, 2015.

WHEREAS, the Department of Public Works, in accordance with Section 18.100A, prepared and presented to the Public Works Board at the public hearing on March 10, 2015 the Solid Waste Management Plan 2014-2024.

THEREFORE, be it resolved that this 10th day of March, 2015, after due consideration of the testimony presented at the public hearing by the Department of Public Works and the public, the Public Works Board recommends to the County Executive that the Solid Waste Management Plan 2014-2024 be presented to the County Council for review and action.

AND BE IT FURTHER RESOLVED, that this Resolution will be published in accordance with Section 18.102(c) of the Howard County Code.

WITNESS:

Chaunta Taylor
Recording Secretary

BOARD OF PUBLIC WORKS FOR
HOWARD COUNTY

Lisa S. Spitulnik
Chairperson

APPROVED FOR FORM AND LEGAL SUFFICIENCY
this 9th day of March 2015

Margaret A. Nolan
County Solicitor

Reviewing Attorney:

Lisa S. O'Brien
Senior Assistant County Solicitor

Howard County

Internal Memorandum

Subject: *2014-2024 Solid Waste Management Plan*

To: Jim Irvin, Director
Department of Public Works

Thru: Josh Tzuker, Chair
Howard County Planning Board

From: Marsha S. McLaughlin, Director
Department of Planning and Zoning

Date: January 22, 2015

The Department of Planning and Zoning has reviewed the *2014-2024 Solid Waste Management Plan* and recommended the following.

GENERAL PLAN COMMENTS

The *2014-2024 Solid Waste Management Plan* includes a footnoted statement on page 12 (footnote 2) citing *PlanHoward 2030* as the source for the following statement: "Howard County's recycling goal is 75 percent by 2030." Although *PlanHoward 2030* states "The County's goal is to increase recycling to more than 75% by 2030" on page 107, *PlanHoward 2030* does not set this forth as a policy or an action item, nor is it the source of the goal. This goal is referenced by the text of *PlanHoward 2030*.

PlanHoward 2030 sets forth four action items related to solid waste under Policy 8.6 and Policy 12.1.

POLICY 8.6 – *Provide for environmentally sound and cost-effective solid waste management.*

IMPLEMENTING ACTIONS

a. **Promote Solid Waste Reduction.** Continue to expand programs for solid waste reduction, reuse, recycling, and composting. Expand recycling programs to include additional materials as technologies and markets become available including the possibility of recovery of items from the landfill.

b. **Plan for Future Capacity.** Ensure that the County has reliable options for solid waste processing and disposal that allow sufficient lead time for planning and construction of a new cell at the Alpha Ridge Landfill or other new facilities or for instituting new programs.

POLICY 12.1 – *Howard County Government will continue to lead by example as a good steward of the shared resources within the community and the region.*

IMPLEMENTING ACTIONS

e. **Enhanced Recycling.** Continue to look for additional ways to increase donation, recycling, and food waste collections to expand the County's progress in these areas.

f. **Commercial Options.** Consider reexamination of business recycling as an option for business and apartments in Howard County, if found to be cost-effective and efficient.

The *2014-2024 Solid Waste Management Plan* appears to reference Policy 8.6 but not Policy 12.1. Since Policy 12.1 is an overarching goal related to Stewardship, it need not be specifically addressed. Therefore, it the conclusion of DPZ that the 2014-2024 SWMP is consistent with *PlanHoward 2030*.

Cc: Allan Kittleman, County Executive
Mary Kay Sigaty, Chairperson, Howard County Council
B. Diane Wilson, Chief of Staff
Sandy Schrader, Director of Intergovernmental Affairs
Jennifer Sager, Legislative Officer
Jessica Feldmark, Administrator, Howard County Council
Mark DeLuca, Deputy Director, Department of Public Works

Howard County, Maryland

Solid Waste Management Plan

2014 - 2024

Howard County Department of Public Works
Bureau of Environmental Services
6751 Columbia Gateway Drive, Suite 514
Columbia, MD 21046
410-313-6444

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I. INTRODUCTION

I-1. STATEMENT OF PURPOSE

The purpose of this solid waste management plan is two-fold. One purpose is to provide the citizens of Howard County with a description of the County's current and future solid waste management system. The second purpose is to comply with Maryland regulations. Current regulations (COMAR 26.03.03) governing preparation of this Solid Waste Management Plan require that the plan address solid waste management needs for at least the succeeding ten-year period. While a ten-year planning horizon is required for regulatory compliance, the plan is also required to be reviewed and amended as necessary at a minimum frequency of every three years.

I-2. PLAN ORGANIZATION

The Plan is divided into five chapters. The first chapter presents the legal and institutional framework, including County goals and objectives. Chapter 2 presents County demographics and land use. Chapter 3 presents estimates for waste generation and characterization; a description of current waste/recyclables collection, disposal, and processing systems and current materials markets and potential energy markets. Chapter 4 details the evaluation of current and future alternative programs and facilities for solid waste management in the County. Chapter 5 presents the chosen implementation plan of action for programs and facilities.

CHAPTER 1 SUMMARY – LEGAL AND INSTITUTIONAL FRAMEWORK

Chapter 1 provides the planning framework, and the goals, objectives and policies that govern the County's integrated solid waste management system. The goals, objectives and policies are drawn from the general plan, PlanHoward 2030, as well as from the guiding vision of the Department of Public Works and of the Bureau of Environmental Services. The planning framework is also determined by the relevant federal, state and county solid waste laws and regulations, which are summarized in Chapter 1.

CHAPTER 2 SUMMARY – DEMOGRAPHICS AND LAND USE

Current demographics, including population, population distribution and population projections are given in Chapter 2. The key issues to be addressed by PlanHoward 2030, especially in land use, transportation and growth management are explained. A summary of zoning regulations is also provided.

CHAPTER 3 SUMMARY – WASTE CHARACTERIZATION AND MARKETS

This chapter includes current and historical waste quantities and provides estimates of expected waste generation during the planning period. The current collection and recycling programs and markets available for various types of materials are described. The information in Chapter 3 provides the basis for the recommendations in the following chapters.

CHAPTER 4 SUMMARY – ASSESSMENT OF INTEGRATED SOLID WASTE MANAGEMENT SYSTEM

An assessment of the current solid waste management system is provided in Chapter 4. Using the information from the preceding chapters, proposed alternatives are evaluated for their ability to meet any gaps in the current system and to meet the goals and objectives in Chapter 1. Siting constraints for solid waste facilities are also described and illustrated.

I. INTRODUCTION

CHAPTER 5 SUMMARY – IMPLEMENTATION/ACTION PLAN

Chapter 5 presents the chosen implementation and action plan for the planning period. This plan is based on the assessment provided in Chapter 4. Cost projections for operation and maintenance and capital improvements during the planning period are provided.

I-3. PLAN APPROVAL PROCESS

Plan preparation was directed by the Bureau of Environmental Services Department of Public Works. Affected County agencies, notably the County Department of Planning and Zoning and the County Health Department, reviewed the Plan during the draft stages and provided input. A draft version of the Plan was submitted to the Maryland Department of the Environment (MDE) for its preliminary review. The County Planning Board and the County Public Works Board also reviewed the draft Plan and provided comments. A final draft was then prepared and submitted to the County Council. A public hearing was held by the County Council on the Plan on _____.

The final Plan was approved by the County Council on _____. The approval resolution from the County Council is provided on page __.

The Plan received approval by the MDE on _____. The approval letter is provided on page __.

I-4. CERTIFICATION

The Solid Waste Management Plan, 2014 – 2024, has been prepared and is certified to be in accordance with Code of Maryland Regulations (COMAR) 26.03.03, and covers the planning period from 2014 through 2024. A copy of the certification letter issued by the County is provided on page ___.

I-5. SUMMARY OF ADDITIONS AND CHANGES TO THE PLAN

The 2003 Plan approved by MDE was revised to incorporate two Plan amendments which were adopted and approved after MDE approval of the 2003 Plan. Both amendments were adopted by resolutions of the County Council after public hearings. Council Resolution Number 117-2010 addressed the strategy for the collection, processing, marketing and disposition of recyclable materials from County public schools. Council Resolution Number 110-2011 addressed the County's strategy for the collection and recycling of fluorescent and compact fluorescent lights that contain mercury. The 2014 Plan incorporates these provisions.

These new state laws that affect recycling have been passed and incorporated into this Plan:

- Environment Article, Annotated Code of Maryland, §9-1711, effective June 1, 2014, provides for apartment and condominium recycling. Council Bill No. 2-2014, adopted February 3, 2014, and effective April 7, 2014, added Title 18, Subtitle 6A, Section 18.611, Apartment and condominium recycling, to the Howard County Code to address the enforcement of this new law and of the "apartment and condominium recycling plan". Council Resolution No. 7-2014, also adopted February 3, 2014, and effective April 7, 2014, amended the County's Solid Waste Management Plan to include this apartment and condominium recycling plan.
- Amendments to Environment Article, Annotated Code of Maryland, §9-1703 (b) and (c) and the addition of §9-1712, require special event recycling to be included in county Solid Waste Management Plans by October 1, 2015.

Both new laws are summarized in Chapter 1.

The following additions and changes have been incorporated into this County Plan from the previously adopted and approved 2003 County Plan and amendments:

I.5.1 NEW

- Statement identifying document version, approvals and amendments
- List of additions and changes from the 2003 Plan
- Incorporation of County Plan Amendments and/or Revisions, which are described above:
  - Council Resolution Number 117-2010
  - Council Resolution Number 110-2011
  - Council Bill No. 2-2014
  - Council Resolution No. 7-2014
- Public schools recycling plan
- Incorporation of Maryland apartment and condominium recycling requirements
- Incorporation of special event recycling requirements
- Description of the 2011 Master Plan for Water and Sewerage
- Description of the Disaster Debris Management Plan and Activities
- List of Action Items for the succeeding ten-year planning period.

I.5.2 UPDATED

- General revisions to format, text and laws and regulations
- Descriptions and calculations for historical and projected population and waste generation
- Listings and descriptions of currently used and proposed solid waste acceptance facilities
- Descriptions of various facets, activities and future needs assessment of Alpha Ridge Landfill
- Descriptions of enhancements and alternatives to the current solid waste management system
- Needs assessment for future alternatives to landfill disposal
- Description of municipal solid waste ten-year assessment
- Descriptions of recycling program implementation and new programs

I. INTRODUCTION

Council Resolution approving the Solid Waste Management Plan goes here.

I. INTRODUCTION

Approval Letter from Maryland Department of the Environment goes here.

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CHAPTER 1. LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter describes Howard County's goals, objectives and policies as well as existing and planned programs. These elements form the framework upon which the Howard County Solid Waste Management Plan (Plan) is developed.

An understanding of the organization within County government that implements and operates solid waste and recycling programs and facilities is important for system planning. A description of the organization of the Bureau of Environmental Services, a unit of the County Department of Public Works, is presented in this section.

Federal, state and local laws and regulations significantly affect solid waste management in Howard County. In this chapter, laws and regulations governing management of solid waste and recyclables are summarized.

1.1 SOLID WASTE PLANNING FRAMEWORK

One mission of the Howard County Bureau of Environmental Services is to provide effective solid waste management, including the collection of residential refuse and recyclables and the integrated disposal, recycling and reduction of residential and non-hazardous commercial solid waste generated by the County. It is anticipated that solid waste management within the County and region will be provided through a combination of public and private sector programs and facilities. This Plan embodies the goals, objectives and policies regarding the County's solid waste activities. All systems are operated in accordance with County, State and Federal laws. Specific solid waste management goals, objectives and policies are discussed below.

Of particular note, the development of regional solid waste management programs and facilities is most hopeful. Future programs and facilities required to manage the County's waste stream will be technically sophisticated and expensive. The economies of scale and facility siting opportunities available through regional approaches must be considered along with the associated transportation cost, rising fuel prices and greenhouse gas generation.

1.1.1 GOALS

The Vision Statement of the Howard County Department of Public Works is: *"Advancing the quality of life for our community by providing an exceptional level of public service."* The Bureau of Environmental Services has the following Mission Statement: *"Advancing environmental responsibility through responsive solutions and service."*

Within the Department Vision and the Bureau Mission Statement, the County has several goals which serve as a framework for solid waste management:

- Implement programs to promote reduction, reuse and recycling (including composting) of residential, county government, school and commercial waste.
- Continue to exceed the Maryland state recycling and waste diversion goals, which have been increased[1] to the following:
  - 35 percent recycling by December 31, 2015, as required by the Recycling Rate and Waste Diversion – Statewide Goals Act for counties with populations greater the 150,000, with a state-wide voluntary recycling goal of 55 percent by 2020, and

[1] Chapter 692 of Environmental Article 9-505, approved by the Governor, May 22, 2012

- Voluntary 60 percent waste diversion goal, as established by the Maryland General Assembly. The waste diversion goal is calculated by adding the recycling rate to the maximum of five percent source reduction credits.

- Howard County's recycling goal is 75 percent by 2030.[2]
- Provide efficient, cost-effective, county-wide collection of residential waste except in some private road areas where the residents have not signed a damage waiver.
- Provide efficient, county-wide collection, processing and marketing of residential, County government, downtown Ellicott City and school recyclables.
- Promote reduction in the quantity and toxicity of household hazardous waste, and provide environmentally sound management and collection of those household hazardous wastes requiring disposal.
- Provide efficient and environmentally sound processing and disposal of solid waste generated in the County, minimizing landfilling of waste at the Alpha Ridge Landfill.
- Operate the Alpha Ridge Landfill in accordance with applicable County and State laws and regulations including Howard County Code, Title 18 "Public Works," Subtitle 6 and State Refuse Disposal Permit Number 2010-WMF-0110.
- Investigate and participate in the implementation and operations of regional solid waste processing, disposal and recycling programs and facilities when determined feasible.
- Provide programs and facilities as necessary for the management of special wastes which must be handled separately from the general residential and commercial waste stream.

1.1.2 Objectives and Policies

To meet the solid waste management goals, the County has developed the following objectives and policies:

- Operate or oversee operation of all County facilities and equipment that directly provide for processing and disposal of solid wastes generated within the County.
- Review and evaluate private facilities to ensure conformance with the Solid Waste Management Plan, and assess the impact of private facilities on the County's solid waste management system.
- Manage, direct or administer, as appropriate, the residential refuse and recyclables collection and processing services provided by agencies and private firms under contract with the County.
- Evaluate alternative waste processing and disposal capacity, as necessary, to provide for future County needs.
- Implement a comprehensive solid waste management program in conformance with the approved Solid Waste Management Plan, including development of new programs, facilities and contractual arrangements with private service providers.
- Implement a comprehensive recycling program as described in the Solid Waste Management Plan, including programs to reduce solid waste quantities requiring landfill disposal through source reduction, reuse and recycling.
- Provide information and assistance to residents, county government, schools and businesses with regard to the County's solid waste management system. Implement education programs to promote waste reduction, reuse and recycling.

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[2] PlanHoward2030

1.1.3 Recycling and Waste Reduction

The overall Howard County goal of efficient and environmentally sound management of solid waste is reflected in the County's comprehensive recycling program. The goal presented in this Plan is to exceed both the minimum recycling requirements of the Recycling Rate and Waste Diversion – Statewide Goals Act (35 percent recycling by December 31, 2015) and the 60 percent voluntary waste diversion goal. The comprehensive recycling program has been designed to meet and exceed these goals with participation by residents, schools, County government and business operators. The County's Recycling goal is 75 percent by 2030.

Reduction of solid waste generation and reduction of household hazardous waste generation are objectives of the County solid waste management program. This is consistent with the EPA waste management hierarchy as shown in Figure 1-1. The County has implemented numerous initiatives regarding recycling and waste reduction, which are described in Chapter 3 of this Plan.

Figure 1-1 Non-Hazardous Waste Management Hierarchy

Source: http://www.epa.gov/waste/nonhaz/municipal/hierarchy.htm

1.1.4 Solid Waste Disposal Capacity

Howard County's sole active local solid waste disposal facility is the county-owned and operated Alpha Ridge Landfill. As described in the PlanHoward 2030-General Plan (PlanHoward 2030) adopted in 2012 and this Plan, the County has developed and implemented a regional approach to solid waste disposal which will have a substantial impact on the use of Alpha Ridge Landfill capacity. In July 2012, the County entered into a Waste Disposal Agreement with the Northeast Maryland Waste Disposal Authority (the Authority) to provide for the transfer of solid waste from the County to a private regional landfill located in King George County, Virginia. The Authority, in turn, entered into a Service Agreement with Waste Management, Inc., the owner of the landfill. The agreement stipulates that Howard County's maximum daily tonnage is 1,200 tons and the maximum annual tonnage is 150,000 tons of waste to the Annapolis Junction Transfer Station in Anne Arundel County, also owned by Waste Management, Inc. Howard County began delivering all residential waste collected curbside to the Annapolis Junction Transfer Station in March 1997, with the original June 1996 agreement. A substantial portion of the residential and commercial waste received at the Alpha Ridge Landfill is also transported to the transfer station.

The development of several large private disposal facilities and transfer facilities in the Mid-Atlantic region and the reduction of waste as a result of the economy and recycling, have led to aggressive

marketing of the available capacity. This competition among available facilities has resulted in relatively low tipping fees and has attracted the interest of both local governments and private generators of commercial, institutional and industrial waste. Howard County does not provide collection of non-residential waste nor does the County control its disposal. Businesses and industries contract directly with waste management firms for the collection and disposal of their waste. As out-of-county transfer and disposal facilities have become available, a substantial portion of this uncontrolled waste stream has been diverted from the Alpha Ridge Landfill to private facilities charging lower tipping fees. This trend is anticipated to continue, given that the existing private facilities have capacity projected to be available for up to 40 years and because Howard County does not plan to lower the tipping fee charged at the Alpha Ridge Landfill to attract additional waste quantities from private haulers.

As a result of the above developments, it is projected that the Alpha Ridge Landfill's operating life will be substantially extended, as discussed in Chapters 4 and 5. It is noted that this operating life projection is dependent on long-term implementation of waste management alternatives, which continue to minimize use of the Alpha Ridge Landfill. The current Waste Disposal Agreement with the Authority has a maximum term, including optional extensions, which will terminate in April 2023. A new long-term waste disposal alternative must be in place by that time. It is noted that potential solid waste management alternatives discussed in Chapter 4 of this Plan will result in continued minimized waste disposal at the Alpha Ridge Landfill.

1.1.5 Conformance with Local, Regional and State Plans

PlanHoward 2030 specifies the following policies and related actions regarding solid waste management, and this Plan addresses the specified policies and actions:

> "POLICY 8.6 - Provide for environmentally sound and cost effective solid waste management.
>
> **"Implementing Actions**
>
> a. **"Promote Solid Waste Reduction**. Continue to expand programs for solid waste reduction, reuse, recycling and composting. Expand recycling programs to include additional materials as technologies and markets become available including the possibility of recovery of items from the landfill.
> b. **"Plan for Future Capacity**. Ensure that the County has reliable options for solid waste processing and disposal that allow sufficient lead time for planning and construction of a new cell at the Alpha Ridge Landfill or other new facilities or for instituting new programs."

In implementing this policy, Howard County plans the following:

- *Promote Solid Waste Reduction.* Howard County plans to build on the existing public education program to promote solid waste reduction, with the goal of establishing and achieving further specific, numeric reductions in the amount of solid waste generated in the County. The County also plans to expand programs for food scrap recycling.
- *Plan for Future Landfill Capacity.* Howard County plans to use the annual option to extend its current contract for solid waste export until 2023, if this is deemed the most cost effective solution. During the contract period, waste-to-energy and other options will be explored.
- *Regional Coordination.* It will be necessary to ensure that regional solutions are available for environmentally sound and cost effective solid waste management, the County will continue active participation in the Authority and other organizations seeking regional options for solid waste management.
- *Waste Transfer Station.* The County will monitor the need for expansion of the waste transfer station at Alpha Ridge Landfill to be used for the County's waste transport needs.

- *Maintaining Capacity at Alpha Ridge.* The County will evaluate the need for a new cell at the Alpha Ridge Landfill on an annual basis. Approximately two years will be required to design and build a new fill cell at the Alpha Ridge Landfill. The County will initiate design and construction of a new cell if available space is projected to drop below a two-year capacity.
- *Timing of Solutions.* Ensure that the County has reliable options for solid waste processing and disposal that allow a lead time of ten years for planning and construction of new facilities or development of new programs.

Maryland's requirements for solid waste management plans are presented in Title 9, Subtitle 5 of the Environment Article, Annotated Code of Maryland, and the Code of Maryland Regulations (COMAR) 26.03.03. These requirements define the plan content and provide that a county develops and maintains a solid waste management plan that covers a ten-year planning period. The plan is required to be reviewed and updated by the county, as necessary, or at a minimum every three years. This Solid Waste Management Plan for Howard County is prepared in compliance with Maryland regulations.

Section 9-503 of Title 9, Subtitle 5 of the Environment Article, Annotated Code of Maryland, requires that the Solid Waste Management Plan incorporate all or part of the subsidiary plans of each town, municipal corporation, sanitary district, privately owned facility or local, state or federal agency that has existing or planned development in the County if such plans promote public health, safety and welfare. There are no incorporated municipalities in Howard County. Likewise, no towns, sanitary districts, private facilities or government agencies have developed subsidiary plans separate from the County's plan. Therefore no such plans have been incorporated.

1.2 COUNTY SOLID WASTE MANAGEMENT ORGANIZATION

1.2.1 LEGISLATIVE FRAMEWORK

Howard County is designated as a "home rule" or "charter" county, which means that the County has been granted broad powers to pass local laws specific to solid waste management. In addition, the Maryland General Assembly may not impose a Public Local Law upon Howard County. Instead, powers granted to a "home rule" County can be affected only by a Public General Law.

1.2.2 ADMINISTRATION

The Howard County Charter established the Office of County Executive and the County Council, which serve as the administrative and legislative branches of government respectively. Solid waste collection, waste disposal and recycling responsibilities fall under the Bureau of Environmental Services in the Department of Public Works. Bureau functions dealing with solid waste management are divided into four divisions: Administrative Services, Collections, Operations and Recycling. An organizational chart is provided in Exhibit 1-1.

The Administrative Services Division provides administrative support to the other divisions including such functions as budget development, revenue/expenditure tracking, personnel management, payroll, purchasing and coordination of clerical support and customer service.

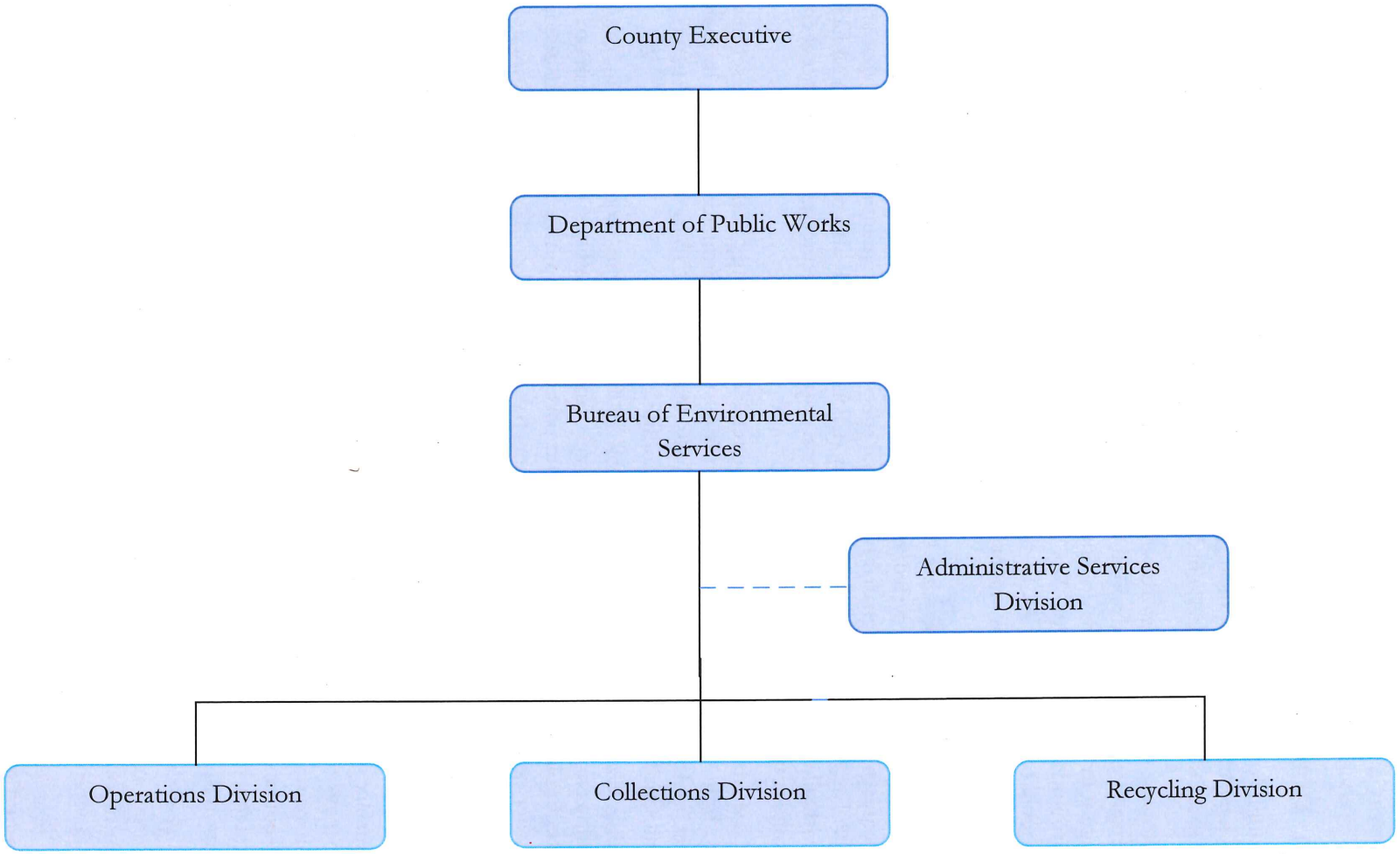
The Collections Division is responsible for managing the residential curbside collection of source separated recyclables and waste.

The Operations Division manages the County's Alpha Ridge Landfill and other on-site operations including a residential convenience (drop off) area, wood mulching area, household hazardous waste collection facility and scrap tire storage area. Professional engineering staff are responsible for the design and implementation of landfill improvements (including fill cells, closure caps and remediation systems), for the planning and implementation of other waste disposal facilities and for preparation of compliance reports.

The Recycling Division is responsible for managing the County's comprehensive recycling and waste reduction program, including long-term planning, public education/promotion and the preparation of performance data and compliance reports.

The direction of the Bureau of Environmental Services is provided by a Bureau Chief who is assisted by three Division Chiefs. The Bureau of Environmental Services has a total staff of 60 employees, of whom 20 are landfill operations personnel, plus six contingent employees. This includes one new authorized recycling and two new landfill staff who were added on July 1, 2014. Administrative support staff who report directly to the Bureau Chief, are responsible for providing for the Bureau's financial management needs. (The Stormwater Management division is also part of the Bureau of Environmental Services, with 12 employees.)

Exhibit 1-1
Howard County
Organization for Solid Waste Management



1.3 LAWS AND REGULATIONS

Though solid waste management is primarily a local responsibility, federal and state legislative and regulatory mandates often place requirements on local community programs. This section presents a brief overview of federal, state and local solid waste management legislative and regulatory initiatives.

1.3.1 FEDERAL LAWS

Although compliance monitoring and enforcement of several federal laws are delegated to the state level, state implementation must meet the minimum requirements of federal statutes and a state may choose to have more stringent requirements. Federal laws affecting solid waste management include:

- *Resource Conservation and Recovery Act (RCRA):* In 1965, the Solid Waste Disposal Act was passed to improve solid waste disposal methods. It was amended in 1970 by the Resource Recovery Act and again in 1976 by RCRA. Most recently, it was amended in 1984 by the Hazardous and Solid Waste Amendments (HSWA). The Act is divided into nine subtitles, A through I. Municipal solid waste is regulated under Subtitle D through technical standards for solid waste management facilities and through requirements under which states may develop and implement solid waste management programs.

  Subtitle F of RCRA requires the federal government to participate actively in procurement programs to foster the use of recycled materials. Government purchases that are subject to the Subtitle F requirements are designated in material specific "procurement guidelines" that are promulgated by the Environmental Protection Agency (EPA). Section F also requires federal facilities to comply with all federal, state, interstate and local requirements concerning the disposal and management of solid waste.

- *Clean Air Act (CAA):* The CAA requires EPA to identify pollutants and set performance standards to limit air emissions. Facilities must meet these performance standards by using the best available technology. The EPA has set standards for municipal solid waste combustors and has established standards for municipal solid waste landfills.

  The Clean Air Act Amendments of 1990 extend the requirements in the EPA standards by subjecting proposed (new) solid waste combustion facilities to the Maximum Achievable Control Technology (MACT) for air toxics and particulate. The Amendments also require EPA to establish other performance standards for municipal solid waste combustion facilities and regulate emissions monitoring and operator training.

- *Clean Water Act (CWA):* The Act is intended to restore and maintain the quality of surface waters through the National Pollutant Discharge Elimination System (NPDES) permitting system. The CWA requires solid waste disposal facilities generating ash-quench water, landfill leachate and surface water discharges to: (1) control discharges using best available technology and obtain a permit or (2) meet pretreatment standards and discharge to a sewer system. Furthermore, stormwater management plans are required and facilities sited in wetlands need a Section 404 permit. Facilities may be covered under the provisions of a General Discharge Permit for a specific land use category. The CWA declares there should be no discharges of oil or hazardous substances into or upon the navigable waters of the United States.

- *Safe Drinking Water Act (SDWA):* The Maximum Contaminant Levels developed under this Act are often referenced as standards for ground water monitoring programs for landfill facilities. Additionally, well head protection areas may affect siting of future facilities by placing restrictions on activities.

- *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):* CERCLA, or Superfund, addresses long-term liability for current and past waste disposal practices. The Act establishes both the legal and financial mechanisms to clean up abandoned or uncontrolled hazardous waste sites posing threats to public health or the environment. Sites meeting set criteria

are included on EPA's National Priorities List (NPL). Municipal landfills posing serious threats are eligible for clean up under this Act.

- *Public Utilities Regulatory Policies Act (PURPA):* PURPA was developed to encourage cogeneration and small power producers, such as municipal solid waste combustors, to supplement existing electrical utility capacity. The Federal Energy Regulatory Commission (FERC) is responsible for oversight and issuance of implementing regulations. FERC regulations set limits on the power output of qualifying small power production facilities.

1.3.2 FEDERAL REGULATIONS

Some of the relevant federal regulations affecting solid waste management, primarily for facility operation and construction, include the following:

- *Criteria for Municipal Solid Waste Landfills (40CFR Part 258):* The regulations address six landfill location restrictions (airport safety, floodplains, wetlands, fault areas, unstable areas, seismic impact zones); minimum operating requirements, such as hazardous waste exclusion programs, daily cover, gas management, stormwater management, surface-water discharge controls and facility operations recordkeeping; design criteria (composite liner); ground water monitoring and corrective action for detected releases; closure and post-closure care; and financial assurance. The requirements are designed to be self-implementing by landfill owners and operators unless a State has been delegated authority by EPA to manage its own program.
- *Greenhouse Gases (40 CFR Part 98):* Under the Mandatory Greenhouse Gas Reporting rule, owners and operators of certain facilities that directly emit Greenhouse Gases (GHG) must calculate and report quantities of emitted GHG or what would be emitted by GHG suppliers.
- *Standards of Performance for New Stationary Sources (40 CFR Part 60):* The regulations establish emissions limitations that apply to municipal solid waste combustors with a capacity of more than 250 tons per day. The limitations vary depending on the size of the facility. These limitations address organic compounds (dioxins and furans), acid gases (sulfur dioxide, hydrogen chloride), metals, particulate matter, opacity, carbon monoxide and nitrogen oxides. Requirements for performance testing, monitoring and operator certification and training are included in the rule. In addition to these regulations, EPA has published guidance for new source review (NSR) and prevention of significant deterioration (PSD) permits. Under these programs, states may include more stringent emissions requirements if warranted by ambient air quality conditions. EPA has published New Source Performance Standards (NSPS) emission limitations, emission guidelines and compliance requirements for municipal solid waste landfills. The limitations address volatile organic compound emissions.
- *Oil Pollution Prevention (40 CFR Part 112):* Originally published in 1973 under the authority of §311 of the CWA, the Oil Pollution Prevention regulation sets forth requirements for prevention of, preparedness for and response to oil discharges at specific non-transportation-related facilities. To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires these facilities to develop and implement Spill Prevention, Control and Countermeasure (SPCC) Plans, and establishes procedures, methods and equipment requirements (Subparts A, B and C). The SPCC Plan must include all oil stored aboveground in containers which hold 55 gallons or more. The SPCC Guidance for Regional Inspectors was revised in August 2013.
- *National Pollutant Discharge Elimination System (NPDES) Permits (40 CFR Parts 121 through 125):* An NPDES permit is required for a direct discharge (including stormwater) to navigable waters from existing or new sources. Permits may impose pollution control requirements including numerical limits on discharges based on technology-based guidelines and water quality standards, monitoring requirements and reporting requirements. Facilities within certain categories of industrial activity, including landfills, may be covered under general NPDES permits which specify control

requirements. Stormwater Pollution Prevention Plans for specific covered sites are required by an NPDES permit.

- *Hazardous Waste Regulations (40 CFR Parts 260 through 271):* The regulations set forth criteria to identify hazardous wastes and establish requirements for transportation, storage, treatment and disposal of such wastes.
- *Dredge or Fill Discharge Permit Program (33 CFR Parts 321, 323, 329):* The U.S. Army Corps of Engineers is authorized to issue permits for the discharge of dredged or fill material into the "waters of the United States." These waters include navigable waterways, tributaries, associated wetlands and isolated water bodies and wetlands.
- *Standards for the Use or Disposal of Sewage Sludge (40 CFR Part 503):* The regulations establish requirements for the final use and disposal of sewage sludge when the sewage sludge is applied to the land, distributed and marketed, placed in monofills (sludge-only landfills) or on surface disposal sites or incinerated. The rule requires pathogen reduction in sludge that is applied to land, sets standards for heavy metals and establishes limits for total hydrocarbons from incinerators.

1.3.3 STATE LAWS

The following are Maryland laws that affect solid waste management:

- *Maryland Landfill Siting Law (Environment Article, Annotated Code of Maryland Title 9, Water, Ice, and Sanitary Facilities; Subtitle 2 – Regulation by State):* This law sets forth requirements for public hearings for landfills; landfill permit requirements (issuance, denial, revocation , term); security requirements for landfills, incinerators and transfer stations; prohibitions on siting and waste acceptance; and requirements for the submission of plans and documents necessary for the State to conduct a technical review and approve proposed facilities.
- *Maryland Landfill Financial Assurance Law (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 2 – Regulation by State, §9-211.1, Regulations governing financial assurance for sanitary landfills accepting municipal solid waste):* This law sets forth financial assurance requirements for landfills in conformance with the requirements of federal regulations (40 CFR Part 258).
- *Maryland Wastewater Treatment Law (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 1 – Definitions; General Provisions and Subtitle 2 – Regulation by State):* This law requires permits prior to installation, alteration or extension of a water supply system, sewerage system or refuse disposal system (landfill or incinerator, waste transfer station or waste processing facility).
- *Maryland Scrap Tire Recycling Act (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 2 – Regulations by State):* This law establishes requirements for implementation of a scrap tire recycling system by the Maryland Environmental Service; provides for the licensure of scrap tire haulers, collection facilities and processing facilities; establishes a Used Tire Clean-Up and Recycling Fund and requires payment of fees to the Fund by tire dealers and prohibits the disposal of tires in landfills after January 1, 1994.
- *Maryland Sewage Sludge (Environment Article, Annotated Code of Maryland Title 9, Water, Ice, and Sanitary Facilities; Subtitle 2 – Regulations by State, Part III, Sewage Sludge):* This law establishes permitting and hearing processes regarding the utilization of sewage sludge and the siting of permanent sludge utilization facilities.
- *Maryland Water Pollution Control Law (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 3 – Water Pollution Control):* This law sets forth requirements for discharge permits, construction loans and grants, and other programs to prevent, abate and to control pollution of the waters of the state.

- *Maryland Drinking Water Law (Environment Article, Annotated Code of Maryland Title 9, Water, Ice, and Sanitary Facilities; Subtitle 4 - Drinking Water):* This law provides the state with the primary enforcement responsibility for drinking water standards under the federal Safe Drinking Water Act.
- *Maryland Water and Sewerage Plan Act (Environment Article, Annotated Code of Maryland, Title 9. Water, Ice, and Sanitary Facilities; Subtitle 5 – County Water and Sewerage Plans*): This law includes solid waste disposal and recycling plans. It requires regular submission of solid waste management plans by the counties and sets forth the minimum requirements of such plans. It provides for the appropriate coordination and review of the Plan and designation of the County agency responsible for formulation of the Plan.
- *Maryland Recycling Rate and Diversion Goal (Environmental Article, Annotated Code of Maryland, Title 9. Water, Ice, and Sanitary Facilities; Subtitle 5 – County Water and Sewerage Plans, §9-505):* This law establishes a voluntary state-wide waste diversion goal of 60 percent and the method for calculating county diversion rates. It requires that certain information be reported by each county to the MDE to be used in determining source reduction credits. It also requires that by July 1, 2014, the solid waste management plan include a Recycling Plan that provides for a reduction through recycling of at least 35 percent of a county's solid waste stream by weight and requires full implementation of the Recycling Plan by December 31, 2015. The law also establishes a voluntary recycling rate of 55 percent by 2020.
- *Maryland Recycling Law (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 17 – Office of Recycling):* This law established an Office of Recycling within the MDE. It requires the submittal of county recycling plans and establishes waste reduction/recycling goals based on county population. The law includes provisions requiring newsprint recycling by the newspaper industry, telephone directory recycling by directory publishers and stipulates labeling requirements for plastic containers. The law also addresses composting as a recycling method and prohibits refuse disposal systems from accepting separately collected yard waste for disposal.
- *Maryland Natural Wood Waste Recycling (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 17 – Office of Recycling):* This law establishes requirements for the operation of natural wood waste recycling facilities in the state; provides that those facilities may operate only in accordance with the provisions of this Act; authorizes the MDE to adopt additional regulations governing certain recycling facilities; requires the MDE to establish a permit system providing for exemptions and provides for the enforcement of this Act. The Act specifies that after July 1, 1992, a person may not operate a natural wood waste recycling facility in the State without a permit issued by the MDE.
- *Maryland Air Quality Control Act (Environment Article, Annotated Code of Maryland, Title 2, Ambient Air Quality Control):* This law allows for adoption of rules for air pollution control, including testing, monitoring, recordkeeping and reporting and allows for determination of air quality control areas, including emissions standards and ambient air quality standards, for the air quality control areas. It specifies permitting requirements and requires training for municipal solid waste incinerator operators.
- *Maryland Environmental Noise Act (Environment Article, Annotated Code of Maryland, Title 3, Noise Control):* This law establishes noise standards that are protective of human health and stipulates enforcement provisions.
- *Maryland Nonpoint Source Pollution Control Laws (Environment Article, Annotated Code of Maryland, Title 4, Water Management; Subtitle 1 – Sediment Control and Subtitle 2 – Stormwater Management):* This law allows for the adoption of criteria and procedures by counties and soil conservation districts to implement soil erosion control programs and for counties and municipalities to implement stormwater management programs.

- *Maryland Oil Pollution Control Act (Environmental Article, Annotated Code of Maryland, Title 4, Water Management; Subtitle 4 - Water Pollution Control and Abatement):* This law requires the MDE to regulate the transfer and storage of oil and other unctuous substances by setting approved methods, facilities, standards and devices for transfer, storage, separating, removing, treating, transporting or disposing of oil and other unctuous substances to prevent pollution of waters of the State.
- *Maryland Water Resources (Environment Article, Annotated Code of Maryland, Title 5, Water Resources; Subtitle 5 – Appropriation or Use of Waters, Reservoirs, and Dams):* This law provides for the appropriation of waters of the State and establishes the permitting process to regulate such appropriations.
- *Maryland Water Resources (Environment Article, Annotated Code of Maryland, Title 5, Water Resources; Subtitle 8 – Flood Control and Watershed Management):* This law provides that comprehensive flood and watershed management programs be prepared by each subdivision to control flooding and to protect the environmental quality of state watersheds. Allowable management techniques include storm drain and stream maintenance, local ordinances, land acquisition and stormwater detention/retention structures.
- *Maryland Wetlands Law (Environment Article, Annotated Code of Maryland, Title 5, Water Resources; Subtitle 9 – Nontidal Wetlands):* This law establishes a state-wide program to prevent the degradation and loss of nontidal wetlands due to human activity. It defines MDE responsibilities for regulating and conserving nontidal wetlands and provides for wetlands loss mitigation, banking and establishes a permitting program.
- *Maryland Used Oil Recycling Act (Environment Article, Annotated Code of Maryland, Title 5, Water Resources; Subtitle 10 – Used Oil Recycling):* This law requires MDE to develop a public education program and to designate used oil collection facilities. The Act prohibits disposal of used oil into sewers, drainage systems or natural water; incineration or disposal as refuse.
- *Maryland Hazardous Materials and Hazardous Substances Act (Environment Article, Annotated Code of Maryland, Title 7, Hazardous Materials and Hazardous Substances):* This law sets forth requirements for the control of defined hazardous substances, including their transportation, processing and disposal. It establishes permitting and certification requirements and empowers MDE to adopt regulations necessary to enact and enforce the law.
- *Maryland Environmental Service Act (Natural Resources Article, Annotated Code of Maryland, Title 3, Environmental Programs; Subtitle 1 – Maryland Environmental Service):* This law allows for establishment of service regions (water supply, wastewater purification, solid waste disposal) and requires preparation of five-year plans. It created the Maryland Environment Service (MES) to manage the service regions. MES has broad powers to plan, operate and finance solid waste management projects as well as water and sewerage, projects.
- *Northeast Maryland Waste Disposal Authority (Natural Resources Article, Annotated Code of Maryland, Title 3, Environmental Programs; Subtitle 9 – Northeast Maryland Waste Disposal Authority):* Created the Authority and specifies its powers. Enables the Authority to issue bonds under certain conditions. Provides ability for the Authority to undertake waste management projects on behalf of its member jurisdictions.
- *Maryland Forest Conservation Act (Natural Resources Article, Annotated Code of Maryland, Title 5, Forests and Parks; Subtitle 16 – Forest Conservation):* The Act requires all units of local governments with planning and zoning authority to develop a Forest Conservation Program. Prior to approval of grading permits or erosion and sediment control plans, applicants must provide information on the condition of the existing forest and provide a plan for conserving the most valuable portions for the forest. The Act requires the submittal of two major components: a Forest Stand Delineation and a Forest Conservation Plan. The submittal of these two items is required by anyone making an application for subdivision, a grading permit or a sediment control plan on a land parcel meeting minimum size criteria.

- *Maryland Public School Recycling Plan (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 17 – Office of Recycling):* §9-1703 was amended in 2010 to require a county recycling plan to address the collection, processing, marketing and disposition of recyclable materials from county public schools.
- *Maryland Fluorescent and Compact Fluorescent Light Recycling (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 17 – Office of Recycling):* §9-1703 was amended in 2010 to require a county to develop a strategy for the collection and recycling of fluorescent and compact fluorescent lights that contain mercury.
- *Apartment Buildings and Condominiums (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 17 – Office of Recycling):* §9-1711, effective October 1, 2012, requires that a property owner or manager of an apartment building containing ten or more dwelling units; and that a council of unit owners of a condominium containing ten or more dwelling units shall provide for recycling for the residents in the apartment building or condominium on or before October 1, 2014. The law allows the county to require the property owner or manager of the apartment building or the council of unit owners of the condominium "to report to the county on recycling activities in a manner determined by the county."
- *Maryland Special Events Recycling (Environment Article, Annotated Code of Maryland, Title 9, Water, Ice, and Sanitary Facilities; Subtitle 17 – Office of Recycling):* §9-1703 (b) and (c) were amended and §9-1712 was added in 2014, effective October 1, 2014, to require a county to address the collection and recycling of recyclable materials from special events. The law requires counties to include special event recycling in their recycling plans by October 1, 2015.

1.3.4 STATE REGULATIONS

Maryland regulations that apply to solid waste management include:

- *Maryland Solid Waste Management Regulation (COMAR 26.04.07):* This regulation establishes permitting (review, approval and public notification) requirements, design standards, operating procedures, closure requirements and post-closure monitoring requirements for sanitary, rubble, land clearing debris and industrial landfills. The regulations also include requirements for processing facilities, transfer stations and incinerators.
- *Development of County Comprehensive Solid Waste Management Plans (COMAR 26.03.03):* This law requires each county to maintain a current, comprehensive solid waste plan covering the succeeding ten-year period. It specifies plan content requirements and approval procedures.
- *Maryland Hazardous Waste Regulations (COMAR 26.13):* This regulation establishes rules concerning the Disposal of Controlled Hazardous Substances and special medical waste. It provides waste listing, criteria defining hazardous wastes, definitions of hazardous and medical wastes, record keeping requirements (manifest), permitting requirements and regulations governing waste storage, transport and disposal.
- *Maryland Air Pollution Control Regulations (COMAR 26.11.02, 26.11.03, 26.11.08 and 26.11.19):* Sets forth air pollution control requirements for solid waste incinerators and landfill gas flares and for the issuance of permits (construction, operation, prevention of significant deterioration). Specifies Part 70 Permit issuance, content and hearing requirements. Operator training and emissions standards are set forth in Section 26.11.08. Section 26.11.19 sets volatile organic compounds control requirements (emission standards and guidelines) for municipal solid waste landfills meeting specified size and age requirements.
- *Maryland Water Pollution Control Regulations (COMAR 26.08):* These regulations require a discharge permit for discharges of wastes or wastewaters into the waters of the state. They specify permit application, issuance and hearing procedures and establish surface water and groundwater quality criteria.

- *Maryland Stormwater Management Regulations (COMAR 26.17.02):* These regulations specify the minimum content of county and municipal ordinances and responsibilities for the review of stormwater management programs. They establish minimum control requirements and design criteria for stormwater management facilities and inspection and maintenance requirements.
- *Maryland Nontidal Wetlands Regulations (COMAR 26.23):* These regulations define activities allowed in nontidal wetlands that require a permit from MDE. They provide requirements for buffer areas and mitigation and specify permit application, processing, review and approval requirements.
- *Maryland Noise Regulation (COMAR 26.02.03):* This regulation sets noise standards that must be met through isolation of noise producing equipment, dampening of sound waves by insulation, equipment modification and redesign, land use management or other means.
- *Forest Conservation Regulations (COMAR 08.19):* These regulations define activity to provide for the retention of existing forest cover while allowing development to occur. They require local jurisdictions to establish a program that will require the applicant to map the existing forest cover and submit a forest conservation plan to protect any residual forests.
- *Natural Wood Waste Recycling Facilities Regulations (COMAR 26.04.09):* These regulate natural wood waste recycling, including the recycling of tree and other vegetative refuse. They establish permitting procedures and operating standards for these facilities and require that only natural wood waste is accepted. Facility discharges to air or water are limited to those allowable under permits governing solid waste disposal. Wood waste may not be burned at the facility, except as permitted by MDE.
- *Scrap Tire Storage, Collection, Transferring, Hauling, Recycling, and Processing Regulations (COMAR 26.04.08):* These regulations regulate the management of scrap tires with a focus on recycling. MDE authorizes scrap tire facilities and haulers by issuing licenses and approvals. The regulations provide technical and operational standards for scrap tire facilities. Scrap tire storage facility storage procedures, closure procedures, financial assurance requirements, license renewal and financial assistance are addressed.
- *Water Appropriation and Use Regulations (COMAR 26.17.04):* These regulations specify permitting requirements and approval criteria applicable to the appropriation and use of waters of the state, including ground water.
- *Construction on Nontidal Waters and Floodplains (COMAR 26.17.04):* This law provides evaluation criteria, permitting procedures and other requirements governing the construction, alteration or repair of structures or other obstructions located in the 100 year floodplain.
- *Sewage Sludge Management Regulations (COMAR 26.04.06):* These regulations regulate the collection, handling, burning, storage, treatment, land application, disposal and transportation of sewage sludge and septage waste. They establish a permitting system for sludge transporters, processors, disposal facilities and land application sites.
- *Compost Regulations (COMAR 15.18.04):* These regulations regulate the testing and distribution of compost, including branding and labeling of the product in addition to requirements for the facility operator.
- *Erosion and Sediment Control Regulations (COMAR 26.17.01):* These regulations identify activities for which controls are required and specify plan approval procedures. They specify control measure design standards and inspection/enforcement requirements. They also describe content requirements of local sediment and erosion control ordinances.
- *Maryland Oil Pollution and Tank Management Regulations (COMAR 26.10):* These regulations prohibit oil pollution, require report of any oil spill or discharge, specify a procedure for removal of any oil discharge and require an Oil Operations Permit from the MDE.

1.3.5 LOCAL ORDINANCES AND REGULATIONS

A summary of Howard County ordinances and regulations follows:

- *"Sanitary Landfill Regulations" (Howard County Code, Title 18, Subtitle 6, Sections 18.600 through 18.606):* These regulations provide authority to the Director of Public Works to adopt rules and regulations regarding the design, construction and operation of a sanitary landfill in the County. Subtitle 6 addresses numerous landfill operating and design requirements.
- *Permit and User Fees for use of Sanitary Landfills (Howard County Code, Title 14, Subtitle 6, Sections 14.600 and 14.601):* This law establishes the requirement that persons using the Howard County Landfill are required to pay permit and user fees. County solid waste collection contractors, residents disposing of household waste and County government operations are exempt from user fees.
- *Refuse Collection Charge (Howard County Code, Title 20, Subtitle 9, Sections 20.900 through 20.904; and Title 15, Subtitle 5, Section 16.511):* This law establishes charges applicable to residential properties and to mobile home parks to fund the collection and disposal of solid waste. It also establishes a financial assistance program and the ability to charge a per bag fee for refuse over a set quantity.
- *Forest Conservation Act (Howard County Code, Title 16, Subtitle 12):* This Act establishes a local Forest Conservation Program meeting the requirements of state law.
- *Unauthorized Removal of Recyclable Materials (Howard County Code, Title 18, Subtitle 6A, Section 18.610):* This law prohibits the removal of recyclable material that is separated for collection under the County's recycling program by persons other than a County employee or contractor and stipulates penalties for violations.
- *Stormwater Management (Howard County Code, Title 18, Subtitle 9):* This law establishes the framework, design criteria and financial components of the County's Stormwater Management Program.
- *Sediment and Erosion Control (Howard County Code, Title 3, Subtitle 4):* In compliance with state law, this law establishes the framework of the County's control program and stipulates requirements for sediment control plans content, approval, permit issuance, inspections, enforcement and required surety.
- *Garbage and Trash Collection Rules (Hoard County Code, Title 18, Subtitle 10, Section 18.101):* These rules establish that the Director of Public Works is responsible for specifying requirements for management and collection of solid waste and recyclables. Current rules are available on the county web site at http://www.howardcountymd.gov/trash.htm.
- *Sanitary Landfill Regulations (Howard County Code, Title 18, Subtitle 6; Title 14, Subtitle 6; and COMAR 26.04.07):* These regulations specify conditions for use of a County landfill and identify prohibited materials. The rules stipulate that users bringing waste to Howard County landfills must be permitted, that trucks must weigh at the scale house and that refuse in vehicles must be covered. The rules prohibit scavenging.
- *Energy Efficiency and Environmental Design (Howard County Code, Title 3, Subtitle 10, Section 3.10):* This law establishes requirements for Green Buildings for specific types and sizes of buildings. By reducing waste and increasing recycling, building owners can start to meet their required level rating.
- *Adequate Public Facilities Act (Howard County Code, Title 16, Subtitle 11, Section 16):* This Act ensures that public roads, schools and other infrastructure are adequate to accommodate new development in the County. By synchronizing new development with the availability of public facilities, this Act promotes orderly growth.
- *Fluorescent and Compact Fluorescent Light Recycling (Howard County Resolution No. 110-2011):* This law provides a strategy for the collection and recycling of fluorescent and compact fluorescent lights that contain mercury.

- *Apartment and Condominium Recycling (Howard County Resolution No. 7-2014 and Howard County Code, Title 18, Subtitle 6A, Section 18.611):* This law provides for the enforcement of apartment and condominium recycling.

CHAPTER 2. DEMOGRAPHICS AND LAND USE

2.1 INTRODUCTION

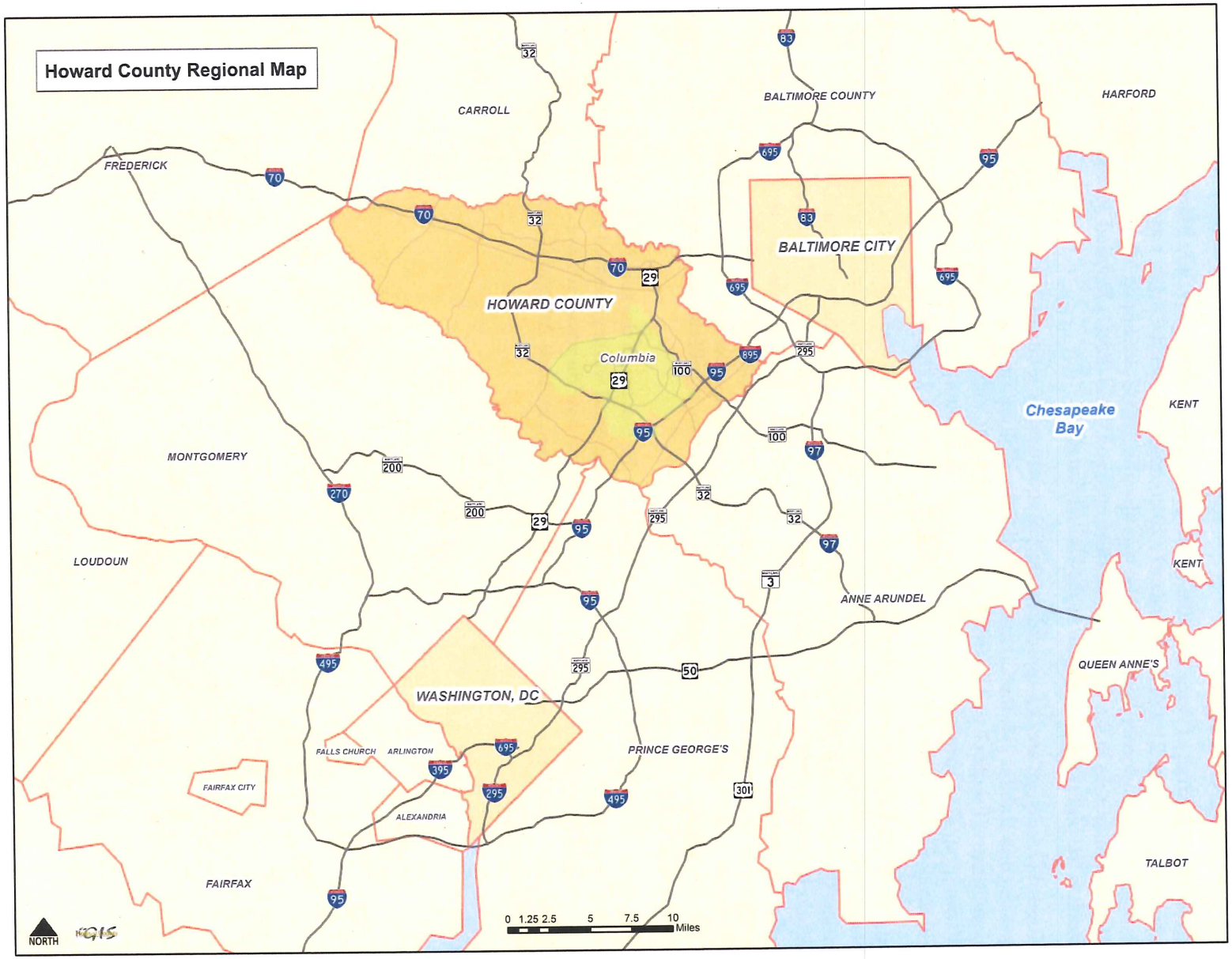
The Howard District of Anne Arundel County was designated in 1839. On March 7, 1851, the District officially became the 21st of the Maryland's 23 counties. Howard County was named after John Eager Howard, a Revolutionary War hero, who was also the fifth Governor of Maryland. Among the National Historic Landmarks in the County is the Baltimore and Ohio (B&O) Railroad Station in Ellicott City, which is the oldest railroad station in the United States.

Howard County, an area of approximately 250 square miles, is situated in central Maryland. As presented in Exhibit 2-1, the County is bounded by Baltimore, Anne Arundel, Prince George's, Montgomery, Frederick and Carroll Counties. Howard County lies between the Baltimore and Washington, D.C. metropolitan areas. As a result, the County has experienced substantial residential and industrial development along the Route 29, I-95 and Route 1 corridors.

In this chapter, the County's demographics and land use are described. For the purposes of overall planning for solid waste management, Howard County may be considered as a unit. Collection of municipal solid waste (MSW) from single-family residences is conducted by the Department of Public Works utilizing contractors. There are no incorporated towns or privately managed residential waste collection districts; however, with advent of private roads, which are not built to accommodate large trash trucks, some private areas are collected by private haulers. Solid waste from a small number of commercial waste generators is collected by private haulers under contract to the County (Ellicott City Historic District), and the remainder of commercial waste is collected by haulers contracting directly with commercial waste generators.

The Alpha Ridge Landfill, owned and operated by the County, is the sole MSW disposal facility located within the County. A significant portion of the commercial waste generated in the County is delivered to out-of-County transfer stations for transport to out-of-state disposal facilities. Likewise, waste collected from County residences is delivered to a transfer station in Anne Arundel County for transfer to a Virginia landfill.

Exhibit 2-1 Howard County Regional Map



2.2 POPULATION

Estimates of population, households and employment for the County are presented in this section. The recent population history for the County is given in Exhibit 2-2. The group quarters population is the population in group quarters, such as correctional institutions, nursing homes and homeless shelters.

Exhibit 2-2 Howard County Population History

Year	Household Population	Group Quarters Population	Total Population
1990	185,371	1,957	**187,328**
1991	192,696	1,957	**194,653**
1992	197,534	1,957	**199,491**
1993	204,874	1,957	**206,831**
1994	211,018	1,957	**212,975**
1995	214,943	3,618	**218,561**
1996	220,063	3,618	**223,681**
1997	224,768	3,618	**228,386**
1998	231,420	3,618	**235,038**
1999	239,389	3,618	**243,007**
2000	244,224	3,618	**247,842**
2001	251,593	3,618	**255,211**
2002	255,914	3,618	**259,532**
2003	259,568	3,618	**263,186**
2004	262,301	3,618	**265,919**
2005	264,972	3,618	**268,590**
2006	269,084	2,709	**271,793**
2007	272,487	2,709	**275,196**
2008	275,696	2,709	**278,405**
2009	280,352	2,709	**283,061**
2010	284,376	2,709	**287,085**
2011	289,146	2,322	**291,468**
2012	292,802	2,322	**294,477**
2013	295,410	2,322	**297,732**

Sources: 1990, 2000 and 2010 household and total populations from Decennial Census (U.S. Census Bureau).
2001 through 2009 total populations from U.S. Census Bureau, Population Division, September 2011 estimates.
2001 through 2009 household populations estimated based on extrapolated Decennial Census results.
1991 through 1999 total populations from U.S. Census Bureau, Population Estimates Branch, April 2002.
1991 through 1999 household populations estimated based on extrapolated Decennial Census results.
2011 through 2013 total and household population from Howard County DPZ Construction Report (July).

The Howard County Department of Planning and Zoning has been a participant in the Cooperative Forecasting Group for the Baltimore region since 1978. The Baltimore Metropolitan Council adopted "Round 8A Cooperative Forecasts" in 2013. The forecasts are a composite of information contained in currently adopted jurisdictional master plans, including the PlanHoward 2030-General Plan (PlanHoward 2030) adopted in 2012 for Howard County. The resulting population data and forecasts through 2040 are presented in Exhibit 2-3.

Exhibit 2-3 Howard County Population Projections, 2015 to 2040

Year	Households	Household Population	Group Quarters Population	Total Population
2015	112,160	306,720	2,320	309,040
2020	123,890	329,950	2,320	332,270
2025	130,950	344,200	2,320	346,520
2030	135,520	354,770	2,320	357,090
2035	138,520	361,180	2,320	363,500
2040	139,500	364,030	2,320	366,350

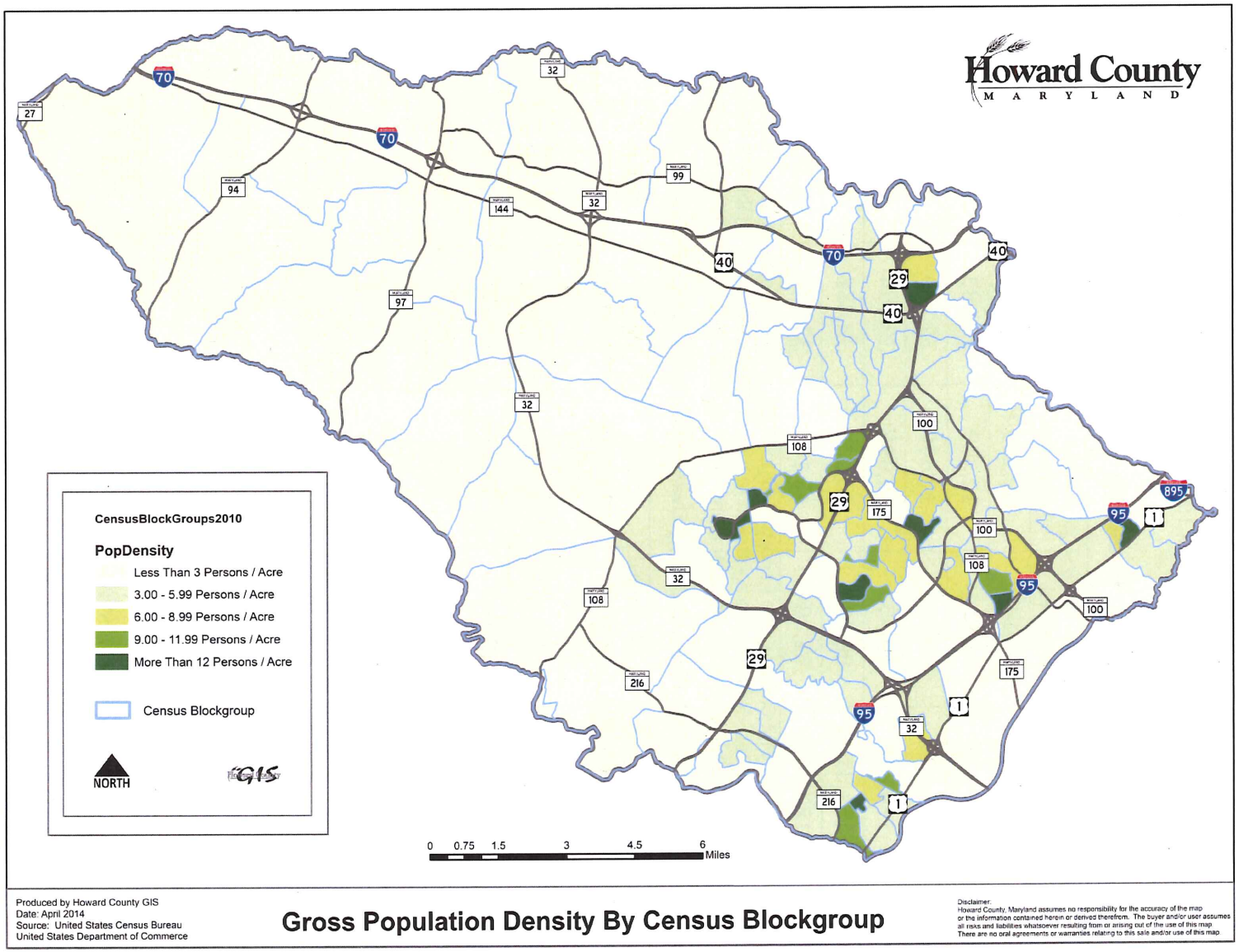
Source: Howard County Department of Planning and Zoning (DPZ), Round 8A, December 2013.

PlanHoward 2030 projections of residential growth take into consideration growth pressures from both the Baltimore and Washington metropolitan areas, as well as capacity limits in public facilities that will have the effect of controlling growth, particularly over the next five years. Effective April 10, 1992, the County implemented the Adequate Public Facilities Act (Howard County Code, Title 16, Subtitle 11, Section 16). This ordinance can delay residential and commercial development until capacity is available in transportation facilities and schools. Considering these growth pressures and growth constraints, the County Department of Planning and Zoning has predicted an average increase of slightly less than 1,230 additional households per year between 2015 and 2035.

2.3 POPULATION DISTRIBUTION

Population and development in Howard County are concentrated in the eastern part of the County. Maintenance of this distribution of development, and preservation of the rural character of the western part of the County, are two of Howard County's planning objectives in PlanHoward 2030. Development of more dense types of housing in the western portions of the County will be precluded due to the lack of public water and sewer. Exhibit 2-4 shows the distribution of population throughout the County (2013), and identifies the boundary of the planned public water and sewer service area.

Exhibit 2-4 Howard County Population Density – 2013



2.4 HOUSEHOLD CHARACTERISTICS

Exhibit 2-5 shows Howard County's historical household population by unit type from 2008 to 2013, as provided by the Howard County Department of Planning and Zoning (DPZ). Exhibit 2-6 gives the County's numbers of dwelling units by type from 2008 to 2013, as provided by Howard County DPZ.

Following these exhibits are projections for 2015 to 2040, upon which solid waste management planning for 2014 – 2024 is based.

Exhibit 2-5 Howard County Household Population by Unit Type, 2008 to 2013

Year	Single Family Detached	Single Family Attached	Condo Apartment	Rental Apartment	Mobile Home	Total
2008	173,134	55,146	12,189	31,344	3,882	**275,696**
2009	176,119	56,511	12,399	31,883	3,440	**280,352**
2010	178,029	58,014	12,600	32,399	3,334	**284,376**
2011	179,825	59,553	12,998	33,424	3,346	**289,146**
2012	181,310	60,729	13,101	33,688	3,327	**292,155**
2013	182,709	62,384	13,155	33,827	3,336	**295,410**

Source: Howard County DPZ Construction Reports (July 1) dwelling unit counts times household size and vacancy estimates. Results then controlled to household population in Exhibit 2-2, causing totals for 2008 and 2013 to be slightly different than if dwelling units for each of those years were added.

Exhibit 2-6 Howard County Dwelling Units by Type, 2008 to 2013

Year	Single Family Detached	Single Family Attached	Condo Apartment	Rental Apartment	Mobile Home	Total
2008	56,851	21,990	6,884	17,702	1,530	**104,957**
2009	57,332	22,340	6,942	17,851	1,344	**105,809**
2010	57,620	22,802	7,014	18,035	1,295	**106,766**
2011	57,993	23,323	7,210	18,539	1,295	**108,360**
2012	58,480	23,787	7,268	18,688	1,288	**109,511**
2013	58,967	24,450	7,302	18,777	1,292	**110,788**

Source: Howard County DPZ Construction Reports (July 1). January 1, 2014 land use database to determine percent rental apt (72%) vs. percent condo apt. (28%). This percentage is used to estimate condo apartment versus rental apartment breakdown.

In 2013, the average household size in Howard County was 2.66 persons. PlanHoward 2030 indicated that the household size in Howard County will decline due, in part, to an increase in the elderly population. Howard County DPZ, Round 8A maintained this projection.

The type of dwelling unit is significant for solid waste management planning due to differing product consumption rates and yard waste production among different household types. The distribution of Howard County households by dwelling unit type has been estimated in the PlanHoward 2030 and in the Round 8A forecasts. It is presented in Exhibit 2-7. Average projected household sizes for each dwelling unit type are given in Exhibit 2-8. Exhibit 2-9 shows projected household population by dwelling type.

Exhibit 2-7 Estimated Numbers of Households by Dwelling Unit Type, 2015 to 2040

Year	Single Family Detached	Single Family Attached	Condo Apartment	Rental Apartment	Mobile Home	Total
2015	58,940	24,830	7,590	19,530	1,270	**112,160**
2020	61,670	26,910	9,530	24,510	1,270	**123,890**
2025	64,410	28,260	10,360	26,640	1,280	**130,950**
2030	65,810	28,650	11,140	28,640	1,280	**135,520**
2035	66,420	28,700	11,790	30,330	1,280	**138,520**
2040	67,200	28,740	11,840	30,440	1,280	**139,500**

Source: Howard County DPZ, Round 8A, December 2013. January 1, 2014 land use database to determine percent rental apt (72%) vs. percent condo apt. (28%). This percentage is assumed to be constant into the future.

Exhibit 2-8 Household Size by Dwelling Unit Type, 2015 to 2040

Year	Single Family Detached	Single Family Attached	Condo & Rental Apartment	Mobile Home
2015	3.2007	2.6629	1.8997	2.6944
2020	3.1687	2.6363	1.8807	2.6675
2025	3.1370	2.6099	1.8619	2.6408
2030	3.1370	2.6099	1.8619	2.6408
2035	3.1370	2.6099	1.8619	2.6408
2040	3.1370	2.6099	1.8619	2.6408

Source: Howard County DPZ, Round 8A, December 2013.

Exhibit 2-9 Household Population by Dwelling Unit Type, 2015 to 2040

Year	Single Family Detached	Single Family Attached	Condo Apartment	Rental Apartment	Mobile Home	Total
2015	186,830	65,480	14,280	36,740	3,390	**306,720**
2020	193,180	70,130	17,720	45,570	3,350	**329,950**
2025	199,800	72,940	19,070	49,050	3,340	**344,200**
2030	204,210	73,960	20,520	52,740	3,340	**354,770**
2035	206,150	74,100	21,720	55,870	3,340	**361,180**
2040	208,580	74,220	21,810	56,080	3,340	**364,030**

Source: Howard County DPZ, Round 8A, December 2013.

2.5 EMPLOYMENT

As indicated in PlanHoward 2030, and based on recent adjustments from the U.S. Bureau of Economic Analysis (USBEA) employment data, employment in Howard County is expected to increase by approximately 2,800 jobs per year between 2010 and 2035. Forecasts for Howard County are given in Exhibit 2-10. A detailed employment breakdown is available for 2010. Future year projections are broken into two classifications – retail and non-retail.

Exhibit 2-10 Howard County Employment (Jobs in Howard County), 2010 to 2040)

Category	2010	2015	2020	2025	2030	2035	2040
Retail Trade	17,436	18,997	21,131	22,786	24,713	26,117	26,978
Farm employment	496	Detailed Projections Not Available					
Forestry, fishing, and related activities	102						
Mining	64						
Utilities	207						
Construction	12,023						
Manufacturing	6,094						
Wholesale trade	14,305						
Transportation and warehousing	4,600						
Information	4,309						
Finance and insurance	6,729						
Real estate and rental and leasing	5,718						
Professional, scientific and technical services	32,911						
Management of companies and enterprises	1,692						
Administrative and waste management services	12,187						
Educational services	4,193						
Health care and social assistance	14,997						
Arts, entertainment, and recreation	4,214						
Accommodation and food services	10,632						
Other services, except public administration	9,713						
Government	19,113						
Total Non-Retail	164,299	177,384	190,250	203,595	216,668	225,593	233,331
Total	181,735	196,381	211,381	226,381	241,381	251,710	260,309

Source: Howard County DPZ, Round 8A, December 2013. 2010 data based on BMC Cooperative Forecasting Methodology, combining BEA wage and salary plus non-employer statistics (NES) proprietors.

2.6 LAND USE

Significant changes in the County's population and employment since 1960 have been accompanied by changes in development patterns. High and medium density residential development is centered in Columbia and in areas along U.S. Route 29 and U.S. Route 40. Industrial development is located along Interstate 95 and U.S. Route 1 corridors in the eastern portion of the County and in several industrial parks located in Columbia. Agricultural and low density rural residential areas of the County lie to the west.

Of Howard County's 160,640 acres, all of which are zoned, approximately 133,000 acres (82.9 percent) are zoned residential, including 95,500 acres in rural zoning districts (RR & RC). Land zoned as special planning districts totals about 15,000 acres, including approximately 14,300 acres (9.4 percent) zoned for the New Town District, which is the special zoning classification for Columbia. Land zoned for commercial uses outside the New Town District totals approximately 2,200 acres.

Total land developed or committed in the County as of January 1, 2010 approximates 123,100 acres, or 77 percent of the total land. This total land developed includes 7,100 acres of land that is committed to government and institutional uses (4.5 percent). Also included are historical, agricultural and environmental easements on approximately 23,700 acres (15.1 percent) and approximately 22,600 acres committed to park land and open space (14.4 percent).

Howard County General Plan 2000 was adopted by the County Council on November 8, 2000. This plan consisted of a comprehensive evaluation of the County's status, trends and policies, as they relate to five points of concern:

1. Responsible Regionalism,
2. Preservation of the Rural West,
3. Balanced and Phased Growth,
4. Community Conservation and Enhancement, and
5. Working with Nature.

According to PlanHoward 2030, good progress was made in these areas. "Based on repeated national rankings for 'Best Place to Live' in magazines and by national organizations, the County's achievements are well documented." [3]

These are the key issues to be addressed through PlanHoward 2030

- Environmental Protection,
- Resource Conservation,
- Economic Development,
- Growth,
- Transportation,
- Public Facilities and Services,
- Housing,
- Community Design, and
- Implementation and Stewardship

PlanHoward 2030 includes the County's policies for land use, transportation and growth management over the next 20 years. County policies stated in PlanHoward 2030 related to solid waste management

[3] PlanHoward 2030, page 4

are summarized in Chapter 1. PlanHoward 2030 policies direct the rate of growth; the distribution of housing, employment and facilities throughout the County and the types of housing to be provided in the future. These policies have been considered by DPZ in the development of the population and employment forecasts presented in this Plan.

PlanHoward 2030 guides the pace of development in the county by stipulating the amount of residential development that can occur each year. The tool to implement this annual pace is the county's adequate public facilities ordinance. The Howard County Council adopts a resolution annually that sets the growth limits each year based on the level indicated in PlanHoward 2030. After PlanHoward 2030 was adopted, the county conducted a comprehensive re-zoning. This comprehensive re-zoning, which serves as another tool to implement the land use policies of PlanHoward 2030, became effective on October 6, 2013.

2.7 ZONING REGULATIONS RELATED TO SOLID WASTE MANAGEMENT

Solid waste management facilities are permitted under Howard County zoning regulations in several zoning districts, under different conditions, depending on the type of facility. There are three general methods for private facilities to be permitted:

1. Some facility types are permitted by right in industrial zoning districts.
2. The second method is by way of a conditional use approved by the Board of Appeals. This method is restricted to use in specific zoning districts discussed in this section.
3. The third method is by way of approval of a solid waste overlay zoning district designation by the Zoning Board.

Any solid waste management facility which is owned by the County is permitted as a government use in any zoning district other than CC (Convenience Centers) and R-MH (Residential: Mobile Home) Districts. Prior to establishment of a solid waste facility under the auspices of the County, approval of a site development plan and compliance with all applicable requirements is necessary.

Zoning regulations in Howard County were adopted as part of the Comprehensive Zoning Plan in 1993 and have been amended several times since then. This plan shall not be used to create or enforce local land use and zoning requirements. The following discussion presents the impacts on solid waste facilities of the current zoning regulations.

There are three general categories of Howard County zoning districts: residential, business and mixed use. Within each category there are numerous zoning districts which have been established for specific purposes. Privately-owned and operated solid waste management facilities, including junkyards, land clearing debris landfills, rubble landfills, rendering plants, horticultural mulch manufacturing facilities and yard waste composting facilities, may be permitted as a conditional use approval in these districts. A privately-owned and operated MSW landfill is not allowed in any zoning district. For each type of facility, the zoning regulations specify development requirements. These requirements may include types of materials permitted for processing or disposal, site development plan submission requirements, minimum and/or maximum acreage limitations, screening and buffer requirements, access roads requirements, operating hours and others. The zoning districts in which each type of facility may be located by special exception are given in Exhibit 2-11. In addition, material recovery facilities for source separated materials are permitted as a matter of right in the BR (Business: Rural), M-1 (Light Manufacturing) and M-2 (Heavy Manufacturing) districts.

Following is a discussion of the zoning districts in which certain types of solid waste facilities may be located.

- The RC District, Rural Conservation, was established to conserve farmland, encourage agricultural activities and preserve natural features and the rural landscape. Residential development is allowed

at low density, in a clustered development, when located and designed to minimize its impact on agricultural land, farming operations and sensitive environmental areas.

- The RR District, Rural Residential, was established to allow low-density, residential development within a rural environment. The RR District is intended for an area of the County which is already committed to low-density residential subdivisions. Agriculture and conservation areas are among the uses permitted as a matter of right in the RR District.
- The M-1 District, Light Manufacturing, permits a mix of light manufacturing, warehousing and business uses, with provisions for limited retail sales.
- The M-2 District, Heavy Manufacturing, was established to permit a mix of heavy manufacturing, warehousing, industrial and business uses with provisions for limited retail sales.
- The B-2 District, General Business, was established to provide for commercial sales and services that directly serve the general public.
- The SC District, Shopping Center, was established to permit local retail and office use areas.
- The BR District, Rural Business, was established to provide for the development of businesses supporting the agricultural industry and to serve the needs of the farming community.
- The Solid Waste (SW) Overlay District, created as part of the 1993 Comprehensive Zoning (ZB9), can be approved by the Zoning Board after its inclusion in this Solid Waste Master Plan, upon petition by a property owner, to land zoned M-1 or M-2. When approved for M-1 zoned land, this designation allows waste transfer stations and material recovery facilities for non-source separated material. When approved for M-2 zoned land, the SW District allows many types of non-hazardous solid waste processing facilities. Application of the SW District is summarized in Exhibit 2-11. Prior to Zoning Board approval of overlay district status, a project developer is required to submit detailed information for Zoning Board review related to the intended use of the land.

The Code of Maryland Regulations (COMAR) 26.04.07.02 (22) defines a "processing facility" as a combination of structures, machinery, or devices which reduces or alters the volume or characteristics of solid waste. Processing facilities, as well as landfills and transfer stations, require issuance of a Refuse Disposal Permit by the Maryland Department of the Environment (MDE). Recycling collection facilities and material recovery facilities accepting source-separated, including single-stream, recyclable materials are not subject to MDE permitting procedures.

Exhibit 2-11 Allowable Zoning Districts for Solid Waste Facilities

TYPE OF FACILITY	ZONING DISTRICT	
	By Conditional Use	By Right
Junk Yard	M-2	N/A
Rubble Landfill & Land Clearing Debris Landfill	M-1	M-2 with the SW Overlay
Composting Facility	RC	N/A
Sawmills, Bulk Firewood Processing, Mulch Manufacturing, or Soil Processing	RC and RR	BR, sawmills only in M-1 and M-2
Material Recovery Facility (for source-separated material)	N/A	M-1, M-2 & sites with CLI Overlay
Material Recovery Facility (for non- source-separated material)	N/A	SW Overlay over M-1 or M-2

TYPE OF FACILITY	ZONING DISTRICT	
	By Conditional Use	By Right
Recycling Collection Facilities	N/A	B-2, SC, M-1, M-2 & sites with CLI Overlay
Waste Transfer Facilities	N/A	SW Overlay over M-1 or M-2
Solid Waste Processing Facilities	N/A	SW Overlay over M-2

Source: Comprehensive Zoning Plan for Howard County, MD, 2013, as amended. **Note:** Zoning as currently effective. County Council is considering bills revising these regulations.

A number of zoning changes have taken place since the 2003 Solid Waste Management Plan. Among the significant changes are the following:

- "Rubble Landfill and Land Clearing Debris Landfill" have been merged into a single Conditional Use category. Under the SW Overlay section, however, they still are listed separately.
- "Yard Waste Composting Facility" Conditional Use and listing in the SW Overlay section have been totally eliminated from the Regulations. A new Conditional Use entitled "Composting Facility" replaced it as a Conditional Use.
- Conditional Use and Permitted By-Right use categories for "Mulch Manufacturing" have both been eliminated.
- The component of Mulch Manufacturing included within the Conditional Use for "Sawmills, Bulk Firewood Processing, Mulch Manufacturing or Soil Processing" is a secondary product produced from the processing of the milled wood and firewood.

A material recovery facility which accepts source-separated recyclable material is defined in Howard County zoning regulations as a facility where previously separated recyclable materials are sorted, processed and packaged for distribution to other facilities where the materials will be used as raw materials or will otherwise be returned to the marketplace. Processing means the preparation of material for efficient shipment, or to a user's specifications, by such means as baling, briquetting, compacting, grinding, crushing, shredding and cleaning.

Material recovery facilities which accept non-source-separated solid waste to remove recyclable materials for sorting, processing and packaging are considered to be "processing facilities" per COMAR 26.04.07.02 (22) and must obtain a Refuse Disposal Permit.

A recycling collection facility is defined in the zoning regulations as a facility where recyclable materials are accepted from the public for distribution to users who will accept and process the materials.

Current zoning does not necessarily imply either the current or the ultimate use of the land. Land is considered committed to a particular use when an appropriate facility is constructed on the land, or when an agricultural, environmental or other easement is established for the specific tract. Thus, it is important to understand the amount of land that is not yet developed within the zoning categories where solid waste management facilities would be allowed. This information provides a general picture of the potential to site solid waste management and recycling facilities in Howard County.

Exhibit 2-12 presents the total acreage in the zoning districts that allow for the solid waste facilities included in Exhibit 2-11, and it specifies the portion of each district that is yet undeveloped, representing potential acreage for these facilities. The information presented illustrates the small amount of acreage that could potentially be developed for solid waste management facilities. In addition, the small amount of land zoned for manufacturing highlights the potential that solid waste management facilities will have to compete with other types of allowable uses for the available sites.

Exhibit 2-12 Development Status of M-1, M-2, RC, RR, B-2, and SC Zoning Districts

	Developed Land		Undeveloped Land		
Zoning District	Acres	Percent of Total	Acres	Percent of Total	Total Acres
M-1	2,234	93.5	156	6.5	2,390
M-1/MXD3	389	99.0	4	1.0	393
M-2	3,478	90.5	363	9.5	3,841
B-2	979	87.8	136	12.2	1,115
SC	11	100.0	0	0.0	11
RR, RC	82,117	86.3	13,080	13.7	95,197

Source: Howard County Department of Planning and Zoning Land Use Database, 2013

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CHAPTER 3. WASTE CHARACTERIZATION AND MARKETS

3.1 INTRODUCTION

This chapter presents a description of the various types of solid waste managed within the county, including Municipal Solid Waste (MSW). Waste management refers to generation, processing, recycling, reduction and final disposal, or a combination of these activities. Current management methods for each waste type are described. Information regarding the following topics is presented in this chapter:

- Historical and projected types and quantities of waste streams managed in the county, including an estimated composition of MSW generated in the county;
- The existing solid waste management system in Howard County;
- Solid waste acceptance facilities
- Secondary materials markets used in the recycling program; and,
- Institutional or industrial facilities that, by their large consumption of energy, represent potential energy markets for a waste to energy resource recovery facility.

Acronyms and definitions used in this chapter and throughout the Howard County Solid Waste Management Plan 2014-2024 (Plan) are listed in Appendix A.

3.2 WASTE COMPOSITION

An understanding of the composition of waste managed by the solid waste system in the County is useful in the assessment of processing and recovery technologies. The viability of processing technologies for materials or energy recovery, or for the production of compost, is dependent upon predictable quantities, within ranges, of various materials in the waste stream.

In accordance with the Code of Maryland Regulations (COMAR) 26.03.03, which specifies requirements for county solid waste management plans, this Plan addresses the following types of waste:

- MSW, including four sub-types:
  - residential
  - commercial
  - industrial
  - institutional (including schools, hospitals, government facilities, and prisons);
- non-hazardous wastes including solids, liquids, and sludges;
- construction, demolition, and land clearing debris (C&D and CDL);
- controlled hazardous substances (CHS)
- dead animals;
- litter;
- bulky and special wastes including white goods, electronics (computers, CRT'S, etc.), and others;
- scrap tires;
- wastewater treatment plant sludges;
- septage; and
- other non-hazardous wastes.

Waste streams addressed in this chapter are restricted to those types generated or managed within the County. For waste types not generated or managed in the county, supporting information is presented.

3.2.1 Residential and Commercial Waste

Howard County has not conducted a comprehensive field sorting analysis to assess the composition of MSW generated in the County. For the purposes of solid waste management plan development, MSW composition has been estimated based on an understanding of the mix of residential, commercial and institutional waste generators in the County and on field waste composition studies conducted by two other nearby Maryland jurisdictions.

Residential waste is generated by households. In Howard County, residential waste is collected from households through a combination of curbside service, curbside bulk collection, dumpsters, community clean-up projects and drop-off facilities at the Alpha Ridge Landfill. Residential waste consists of discarded materials collected by these various programs. Due to local factors, the proportion of various materials in the waste stream would be expected to vary somewhat from that experienced in other communities.

Commercial waste is non-hazardous waste generated by businesses in the ordinary course of their operations. This waste is collected by private contractors in the County. It includes non-bulky waste that is normally stored outside in closed containers, due to the potential presence of food waste and other putrescible materials. Commercial waste excludes waste generated by construction and demolition activities. Industrial waste is generated by manufacturing operations. Institutional waste is generated by schools, hospitals, prisons, government offices and similar facilities. The composition of institutional and industrial waste is estimated to be the same as that for commercial waste.

3.2.1.1 Waste Generation in Howard County

Exhibit 3-1 shows the actual waste and recycling quantities disposed in Howard County in 2013. This exhibit also provides projections for the planning period of 2014 through 2024. 2013 waste disposed data was provided to Howard County by MDE, which is taken from waste tonnages reported to MDE by permitted solid waste facilities. Recycling totals are from the MRA reports completed by Howard County and submitted to MDE. Data from the historical recycling reports is presented later in the chapter, in Exhibit 3-15 and Exhibit 3-16. Future generation was calculated by multiplying the 2013 per capita rate for each waste category by respective future yearly population projections.

Exhibit 3-2 and Exhibit 3-3 present an estimate of waste composition created by MSW Consultants, in graphic form, for residential and commercial waste streams in Howard County, including industrial and institutional waste streams. This composition estimate is for all MSW generated in the County, including materials disposed at the Alpha Ridge Landfill or at private, out-of-county disposal sites and materials recycled.

The total composition percentages are estimates only, as Howard County has not had a recent countywide waste composition study. C&D debris is not included in the residential and commercial composition charts, as it is not traditionally considered part of MSW, but is a separate stream. C&D generation is described later in this chapter.

The estimated composition indicates that paper is the largest component of the waste stream. Paper, food scraps and yard trim make up approximately 50 percent of the waste stream, which indicates the importance of the planned full-scale composting program being successful.

Exhibit 3-1 Waste Generation in Howard County 2014-2024

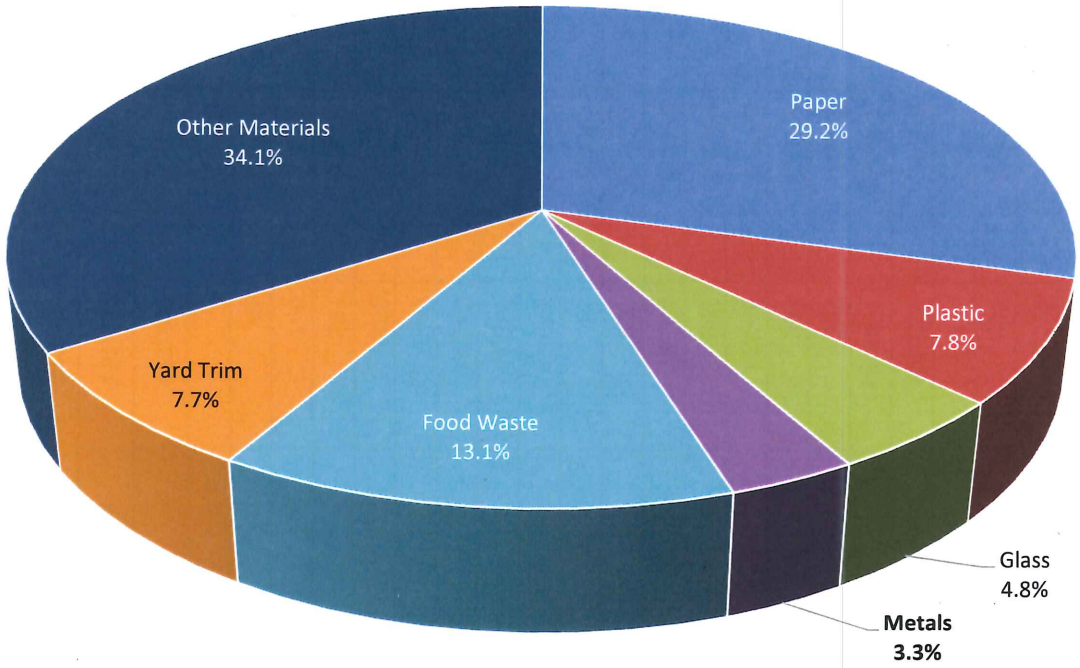
	2013 Projected [1] (tons)	2013 Per Capita Rate [2] (tons)	Ten Year Planning Period (2014-2024) [3] 2014	2016	2020	2024
Howard County Population	297,732	297,732	302,123	313,686	332,270	343,670
Waste Categories						
Residential Waste	98,564	0.3310	100,018	103,846	109,998	113,772
Commercial Waste	105,769	0.3552	107,329	111,437	118,039	122,088
Mixed Waste	81,716	0.2745	82,921	86,095	91,195	94,324
Industrial Waste	683	0.0023	693	720	762	788
Institutional Waste [4]						
C&D Debris (includes Land Clearing)	101,069	0.3395	102,560	106,485	112,793	116,663
Controlled Hazardous Substances (CHS)	unknown	unknown	unknown	unknown	unknown	unknown
Household Hazardous Waste (HHW)	245	0.0008	248	258	273	282
Dead Animals [5]	391	0.0013	397	412	436	451
Bulky (white goods, scrap metal)	1,745	0.0059	1,771	1,839	1,947	2,014
Vehicle Tires	263	0.0009	267	277	294	304
Wastewater Treatment Plant Sludge [6]	12,000	0.0403	12,545	13,636	15,818	18,000
Septage [7]	967	0.0032	981	1,019	1,079	1,116
Asbestos	54	0.0002	55	57	60	62
Asphalt	665	0.0022	675	701	742	768
ıcrete	1,959	0.0066	1,988	2,064	2,186	2,261
Soil	14,143	0.0475	14,352	14,901	15,784	16,325
Wood Waste	37	0.0001	38	39	41	43
Special Medical Waste	368	0.0012	373	388	411	425
Metals - FE	127	0.0004	129	134	142	147
Electronics	745	0.0025	756	785	831	860
Witness Burns	45	0.0002	46	47	50	52
Other		0.0000	0.0	0.0	0.0	0.0
Total MRA and Non-MRA Waste	421,292	1.42	427,505	443,867	470,163	486,294
Total MRA and Non-MRA Recyclables	251,432	0.84	255,140	264,905	280,599	290,226
Total Waste Generation [8]	**672,460**	**2.26**	**682,645**	**708,771**	**750,762**	**776,520**

(1) 2013 data provided to Howard County by MDE, which is taken from waste tonnages reported to MDE by permitted solid waste facilities and the MRA reports completed by Howard County.
(2) 2013 per capita generation computed by dividing 2013 tons for each waste category by 2013 County population.
(3) 2014-2024 tonnage projections calculated by multiplying 2013 per capita rate for each waste category by respective future yearly population projections.
(4) Institutional waste is collected and disposed with commercial and mixed waste
(5) Dead animals are recorded by count, not weight. In 2013, 29,020 animals under 50 pounds and 659 animals over 50 pounds were disposed. Tons were calculated by adding 29,020 animals multiplied by 25 pounds and 659 animals by 75 pounds, for a total of 781,108 pounds, or 390.6 tons.
(6) Approximate weight, in dry tons, reported by Little Patuxent Water Reclamation Plant, who projected generation to be 18,000 dry tons per year by 2024.
(7) Weight, in dry tons, calculated from 11.6 million gallons reported by Little Patuxent Water Reclamation Plant. MDE conversion factors: gallons @ 8.34 lbs./gal ÷ 2000 = wet tons; wet tons x % solids ÷ 100 + dry tons. For this calculation, assumed 2% solids for septage.
(8) Vehicle Tire tonnage is reported in both waste disposed and in MRA Recycling. In the total waste generation, tires are only counted once, in recycling

Exhibit 3-2 Estimated Residential Waste Composition

Other Materials includes:

Wood
Concrete, brick
Other C&D
Bulky waste
Carpet & rugs
Textile, rubber, leather
Diapers, sanitary products
E-waste
HHW



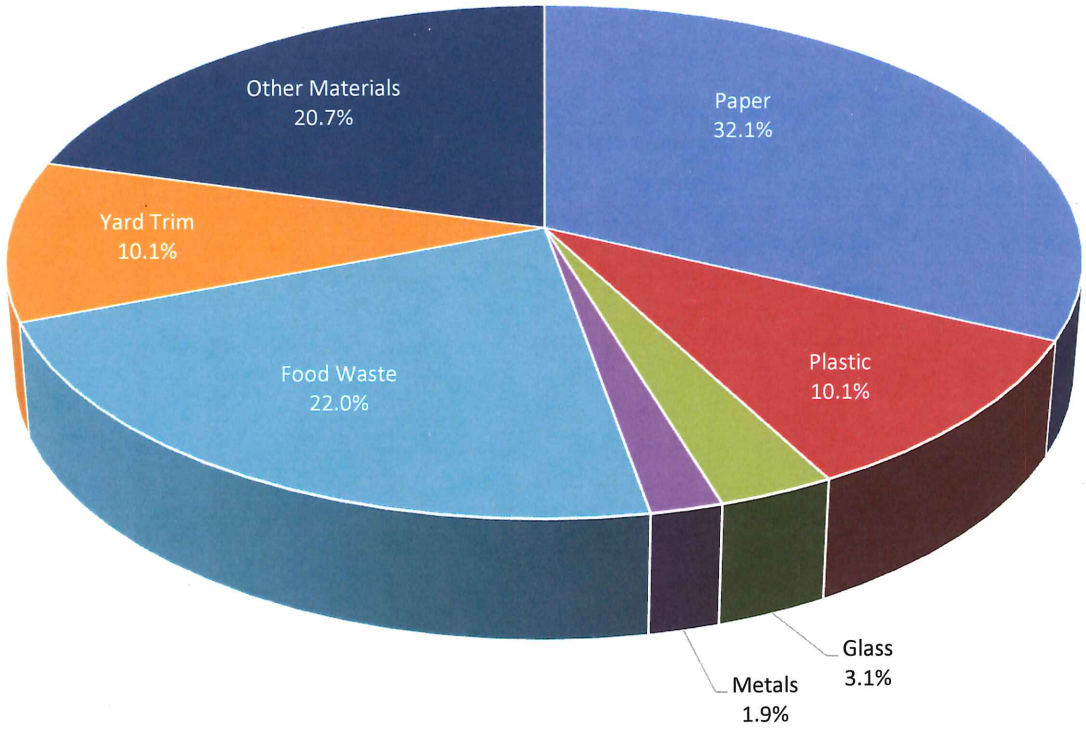
Paper includes:

Old newspapers
OCC
Magazines
Paperboard
Mixed paper
Gable top, aseptic
Other paper

Exhibit 3-3 Estimated Commercial Waste Composition

Other Material includes:

Wood
Concrete, brick
Other C&D
Bulky waste
Carpet & rugs
Textile, rubber, leather
Diapers, sanitary products
E-waste



Paper includes:

Old newspapers
OCC
Magazines
Paperboard
Mixed paper
Gable top, aseptic
Other paper

County records do not completely differentiate between commercial, industrial and institutional waste streams. Waste from all three types of generators, when delivered to the Alpha Ridge Landfill, are recorded as commercial waste. Similarly, private disposal and transfer facilities do not maintain records differentiating these waste categories. Since commercial waste collection companies collect and deliver for disposal waste generated in the County from commercial, institutional and industrial waste generators, waste from these three types of generators are commingled in collection trucks, thereby precluding the ability to segregate waste quantities by type of generator. Unless indicated otherwise, references to commercial waste in this plan include non-bulky institutional and industrial wastes.

3.2.2 Construction, Demolition and Land Clearing Debris

Construction, demolition and land clearing debris is assessed as one waste stream, and is referred to in this Plan as C&D debris. This is a waste type generated in the County which is categorized separately from residential and commercial waste. C&D composition differs from that of commercial waste. It is characterized by plastic, wooden and metal containers; lumber; brick; insulation; wallboard and a variety of other materials. Land clearing debris consists of tree stumps and limbs, soil, rock and other materials generated by land clearing activities. Construction and demolition debris may include only a nominal amount of putrescible material. C&D debris may be disposed of at a permitted municipal landfill (such as the County's ARL) or at a permitted C&D landfill. A third type of landfill to receive only land clearing debris has different construction and operation standards than MSW landfills.

In this Plan, the management of construction, demolition and land clearing debris is discussed separately from commercial waste, given that management options available for C&D debris differ from those available for commercial waste. Quantities of construction and demolition debris comprise a significant portion of the County's waste stream, as discussed later in this chapter. The County's strategy to minimize disposal of this type of waste at the ARL was implemented by imposing a tipping fee that was higher than that charged by private C&D landfills and processing facilities in the central Maryland region, thus providing an economic incentive for collection companies to take this waste type to these other landfills and facilities.

Precise information regarding the composition of construction, demolition and land clearing debris is not available. In an effort to improve upon the estimated composition of LC&D waste in Howard County, characterization studies from geographical areas similar to Howard County were reviewed:

- Construction and Demolition Debris Composition Study, Mecklenburg County, North Carolina, MSW Consultants, 2008.
- Master Plan for the Lexington-Fayette Urban County Government (LFUCG), Gershman, Brickner, & Bratton, Inc. (GBB), et al.
- Delaware Solid Waste Authority Statewide Waste Characterization Study, 2006-2007, Final Report, Cascadia Consulting Group, Inc., et al.

Exhibit 3-4 compares C&D waste categories across the three referenced studies, and provides an average for Howard County's estimate.

Exhibit 3-4 Estimated Composition of Construction, Demolition and Land Clearing Debris

Category	Material	Reference Study 1 (2)	Reference Study 2 (3)	Reference Study 3 (4)	Average
Rubble	Concrete/Brick/Block	23.30%	17.50%	11.70%	17.50%
	Drywall - Unpainted	6.80%	2.00%	9.80%	6.20%
	Asphalt Roofing	6.40%	30.80%	15.30%	17.50%
	Dirt/Sand/Gravel	6.10%	10.50%	6.90%	7.83%
				Sub-Total	49.03%
Wood	Untreated Wood	16.50%	6.40%	9.40%	10.77%
	Oriented Strand Board	6.00%	1.90%	4.70%	4.20%
	Treated/Painted/Processed Wood	6.80%	10.70%	11.20%	9.57%
				Sub-Total	24.53%
Other(5)	Metal	6.90%	3.80%	2.90%	4.53%
	Carpet/Carpet Backing	5.30%	1.50%	0.80%	2.53%
	Other Waste	15.90%	13.70%	27.50%	19.03%
				Sub-Total	26.10%
Total (2)		100%	99.70%	100.20%	99.67%

(1) Values do not always add to 100 percent, due to rounding.
(2) Mecklenburg County, NC 2008 C&D Composition Study (Figure E-1)
(3) Lexington-Fayette Urban County Government (LFUCG), KY, 2009 Master Recycling Plan (Material Details Table, C&D)
(4) Delaware Solid Waste Authority, Statewide WCS, 2007 (Table 28 - Waste Comp Profile: C&D Waste Stream)
(5) Other includes: unclassified (average 2.4%), bagged MSW (1.7%), other C&D (6.1%), pallets & crates (2.37%), glass (0.57%), green waste (2.57%), plastic (0.97%) and paper (2.7%)

Exhibit 3-5 presents an estimate of the composition of C&D materials generated in Howard County, based on the averages from the above studies.

Exhibit 3-5 Estimated Composition of C&D in Howard County

Component	Percent (by Weight)
Rubble (asphalt, brick, concrete, rock, dirt, etc.)	49%
Wood (stumps, tree limbs, lumber, etc.)	25%
Other (glass, metal, paper, etc.)	26%

3.2.3 Controlled Hazardous Substances

Controlled hazardous substances (CHS) are materials that meet one or more of U.S. EPA's criteria for hazardous properties. Generators and handlers of CHS must document their transportation, use and disposal through a manifest system. Manifests generated for CHS used in Maryland must be submitted to MDE. Howard County does not receive manifest copies or regulate CHS.

U.S. EPA defines a large quantity generator as one that disposes of more than 220 pounds (100 kg) of CHS in a year. Manifests from small quantity generators, who are generators that annually dispose of less than 220 pounds, are not reported to or recorded by MDE. Since the total quantity of CHS from sources in the County requiring disposal as hazardous waste is unknown, the quantity of CHS from large quantity generators and CHS composition, other than Household Hazardous Waste, is not addressed in this Plan.

3.2.3.1 Household Hazardous Waste

Part of the CHS waste stream is Household Hazardous Waste (HHW), which is generated from products found in the household. HHW is unregulated and may be disposed of in MSW landfills. For example, oil-based paints, solvents, swimming pool chemicals, pesticides and lawn care products are a few types of HHW. Exhibit 3-6 presents an estimated composition of HHW collected and diverted out of the landfill in Howard County. The decrease in tonnage from 2012 to 2013 is primarily due to the colored latex paint being removed for recycling.

Exhibit 3-6 Estimated Composition of Household Hazardous Waste (Pounds per Year)

Material	Percent of Total	2008	2009	2010	2011	2012	2013
Paint in cans (1)	55.2%	259,541	259,864	293,630	282,045	288,229	270,350
Labpacks (acids, reactives, bases, organics)	15.2%	71,623	71,712	81,030	77,833	79,540	74,606
Bulk Liquid Flammables (gas, kerosene, diesel)	9.9%	46,705	46,763	52,839	50,755	51,867	48,650
Aerosols	6.0%	28,033	28,067	31,714	30,463	31,131	29,200
Solid Fertilizer	5.9%	27,937	27,971	31,606	30,359	31,024	29,100
Solid Pesticides	4.8%	22,320	22,348	25,252	24,256	24,788	23,250
Fluorescent Light Tubes (Straight, U-Circle, HID)	1.4%	6,778	6,786	7,668	7,365	7,527	7,060
Batteries (NICADS, Nickel Metal Hydride)	0.6%	2,784	2,788	3,150	3,025	3,092	2,900
Other	0.9%	4,123	4,128	4,665	4,481	4,579	4,295
Totals	100.0%	469,843	470,428	531,554	510,582	521,777	489,411

Source: Howard County Household Hazardous Waste Manifest
(1) Paint in cans is a combination of latex and oil based paint.

3.2.4 Dead Animals

Dead animals are generated primarily by the County Animal Control Facility (euthanized animals and road kills), local veterinarians and agricultural operations. Dead animals are not disposed in the Landfill, and records are not maintained on the total tonnage of animal bodies generated each year from all private and public sources. Records are maintained, however, on the number of dead animals generated in the county.

The Animal Control Facility generates approximately 29,000 dead animals per year (approximately 560 animals per week), mainly from euthanizing unwanted or diseased animals. Dead animals are delivered to the Department of Agriculture facility in Frederick, Maryland for incineration. Another private firm, under contract to the County, collects animals killed on roads and delivers them to a contractor, Valley Protein, (if over 50 pounds) or to the Animal Control Facility (if under 50 pounds). Valley Protein also provides collection service to private generators such as farms. Valley Protein maintains a record of the number of animals received from sources located in Howard County, but does not maintain a record of dead animal tonnage received. Although other private firms are not prevented from providing this service to farms and others in the County, private companies other than Valley Protein are not active in the County.

Exhibit 3-7 provides the numbers of dead animals generated in Howard County and collected and disposed through cremation.

Exhibit 3-7 Number of Animals Disposed from Howard County

Year	2010	2011	2012	2013	2014 (1)	TOTALS
Animal Control Facility – cremated by Curtis Bay Energy	29,870	29,148	30,000	29,020	9,500	127,538
Removed from Roadways by Contractor – cremated by Valley Protein	652	592	604	659	286	2,793
Totals by Year	30,522	29,740	30,604	29,679	9,786	130.331

(1) Year-to-Date, June 2014, numbers provided by Howard County Animal Control

3.2.5 Bulky Waste

Bulky waste, as reported in the MDE Annual Tonnage Reports, includes white goods and scrap metal. In 2013, approximately 1,740 tons of bulky waste was delivered to the Alpha Ridge Landfill. This total does not include bulky waste dropped off at the Resident Convenience Center, which is not weighed when dropped off. The white goods and scrap metals are weighed, however, when they are recycled. Due to this practice, the total tonnage of white goods recycled, as reported to MDE, is higher than the total tonnage of bulky waste reported as delivered to ARL.

A portion of the bulky waste delivered to the Resident Convenience Center consists of white goods which contain refrigerants (refrigerators, air conditioners, etc.). These items are directed to a staging area at the Convenience Area. A contractor certified to remove Freon removes the refrigerant from these white goods prior to placement of the items in on-site scrap metal storage containers. Refrigerant is removed in accordance with existing regulations to prevent venting to the atmosphere.

In the fall of 2011, on-call curbside scrap metal collection was implemented for the households receiving County residential curbside collection. Approximately 318 tons of scrap metal have been collected curbside from October 2011 through June 2014. Exhibit 3-8 shows the number of loads collected, as well as the tonnage recycled, since the beginning of this program.

Exhibit 3-8 Curbside Scrap Metal Collected in Howard County

Year	2010 (1)	2011	2012	2013	2014 (2)	TOTALS
Number of loads collected	3	77	207	148	49	484
Total tons of scrap metal	.01	56.86	139.87	98.48	23.14	318.36

(1) Program began in fall 2010.
(2) Year-to-Date, June 2014, numbers provided by BRAT reports.

3.2.6 Sludge

As described in Chapter 4, the central and eastern parts of Howard County are provided with public sewerage service. Wastewater received from the public system is treated at two facilities. Howard County operates the Little Patuxent Water Reclamation Plant, in the Savage area, which treats wastewater from the central part of the County. The Patapsco Wastewater Treatment Plant, located in and operated by neighboring Baltimore City, serves the eastern portion of the County, including Ellicott City, Elkridge and Jessup. The western part of the County is primarily rural and served by septic tanks. Private contractors transport the waste from the septic tanks, by truck, to the Little Patuxent Plant.

The plant's primary and biological nutrient removal (BNR) treatment processes generated sludge. Primary and BNR sludge is dewatered and pasteurized using lime addition and heat treatment. Sludge is dewatered using centrifuges. All Sludge processing facilities are located on the Little Patuxent Water Reclamation Plant site.

All of the sludge generated by the Little Patuxent Plant is land applied, burned at BRESCO, a Waste-To-Energy facility in Baltimore or marketed as a lime product by State permit. Approximately 12,000 dry tons of dewatered, processed sludge was generated by the Plant in 2013. Sludge generated by the Patapsco Plant is managed by Baltimore City.

Pasteurized sludge currently is land applied, but may be marketed as a Class A sludge product. Due to ever increasing regulatory restrictions to the land application of sludge the County is moving towards heat drying of the sludge and producing a marketable fertilizer product. Preliminary engineering studies are underway with implementation in the next five years.

Currently, 11.6 million gallons per year of septage waste is collected by private contractors and delivered to Little Patuxent Plant, in accordance with Howard County's septage management plan (Management of Hauler Waste in Howard County, August, 1987). The plan was developed and is implemented by the Department of Public Works, which operates the Little Patuxent Plant.

Septage collection and disposal are regulated by the County Health Department and by the Department of Public Works. The Health Department issues licenses to each septage hauler operating in the County. Haulers must meet specified standards established by the Health Department and equipment must undergo regular inspection. The Health Department also investigates reports of improper disposal.

The Little Patuxent Water Reclamation Plant is the only authorized discharge location for septage waste available in Howard County. Septage handling facilities at the Plant consist of a receiving station which discharges into an aerobic digester. Septage haulers weigh in at the plant scale, then discharge into an inlet which feeds into the septage digester. Plant personnel can inspect and test loads as they flow into the receiving basins. The processed septage is discharged into the headworks of the plant. Septage waste may only be disposed at permitted receiving facilities, which essentially limits acceptance to treatment plants. It is not anticipated that private sector facilities will be implemented to handle this waste. As a result, it is anticipated that all septage waste will be received at public treatment plants.

3.3 WASTE AND RECYCLABLES QUANTITIES

3.3.1 HISTORIC MUNICIPAL SOLID WASTE QUANTITIES

Residential waste from Howard County is not delivered to the Alpha Ridge Landfill (ARL), but is transported directly to the Annapolis Junction Transfer Station (AJTS). Less than 10 percent of the waste generated in Howard County is landfilled at the ARL. A limited amount of residential and commercial waste received at the ARL, not suitable for waste export, is landfilled on site, while the majority of the waste received at the ARL is exported.

Until 2013, the majority of the waste delivered to the ARL was transported by transfer trailers to the King George Landfill in King George County, Virginia, which is 115 miles one-way. Beginning April 12, 2013, that waste is transported approximately 20 miles one-way to the AJTS, and then is taken by rail to the King George Landfill.

Haulers deliver waste to the ARL six days per week (except for six County holidays). The landfill accepts all non-hazardous solid waste, including construction, demolition, rubble and land clearing debris. However, minimal quantities of debris are disposed at the site.

Exhibit 3-9 presents the quantities of waste disposed in Howard County at the Alpha Ridge Landfill (ARL) and waste quantities delivered by the County to the Annapolis Junction Transfer Station (AJTS) in Anne Arundel County or the King George Landfill in King George, Virginia from 2008 through 2013. All Howard County waste delivered to AJTS is transferred by rail to the King George Landfill for disposal. Waste categories noted were those recorded at the landfills and transfer station scalehouses.

Exhibit 3-10 presents the combined waste tonnage, by category, for waste delivered to the Alpha Ridge Landfill and for waste delivered to the Annapolis Junction Transfer Station or directly to the King George Landfill by the County.

Exhibit 3-9 Historic Waste Quantities Disposed (1)

Alpha Ridge Landfill (ARL) (Tons per Year)								
Year	Residential	Commercial(2)	Construction and Demolition	Bulky(3)	Tires(4)	Liquid(5)	Total Transferred to AJTS(6)	Total Disposed at ARL(7)
2008	9,803.73	8,450.72	16,553.30	2,338.59	295.43	150.55	32,086.85	2,720.90
2009	8,396.89	7,457.01	15,911.44	2,208.00	284.11	170.24	29,022.72	2,880.72
2010	9,120.86	8,506.88	19,961.32	2,147.36	296.66	171.52	33,288.11	4,300.95
2011	9,031.65	7,340.67	19,898.61	1,953.96	310.25	165.37	34,636.49	1,875.34
2012	10,010.90	6,439.07	19,849.99	1,806.74	286.63	165.94	33,477.91	2,822.05
2013	9,999.30	6,574.79	19,702.42	1,739.47	257.10	205.02	32,565.55	3,710.96

Annapolis Junction Transfer Station (AJTS) (Tons per Year)				
Year	Residential(8)	Commercial(9)	Total Transferred from ARL(6)	Total Delivered
2008	66,533.23	6,313.64	32,086.85	104,933.72
2009	59,317.22	7,324.87	29,022.72	95,664.81
2010	58,072.69	8,135.89	33,288.11	99,496.69
2011	57,567.80	7,964.91	34,636.49	100,169.20
2012	56,251.28	7,634.05	33,477.91	97,363.24
2013	55,860.09	8,022.38	32,565.55	96,448.02

(1) Source: ARL Annual MDE Landfill Tonnage Reports; AJTS Scale Records.
(2) Includes institutional, industrial and mixed waste.
(3) Includes white goods and scrap metal which are recycled.
(4) Scrap tires collected are recycled in accordance with state law.
(5) Includes used antifreeze, motor oil and paint which are recycled/reused at offsite facilities.
(6) Waste transferred from ARL to AJTS; includes waste transferred directly to King George Landfill.
(7) Total waste delivered to Alpha Ridge Landfill (not including recycled material) less waste transferred.
(8) Includes curbside collection, direct delivery from Alpha Ridge Landfill Resident Convenience Center and community clean up waste.
(9) Includes residues, waste delivered directly to AJTS by County vehicles and waste collected by County from front-end route.

Exhibit 3-10 Historic Combined Waste Quantities Disposed (Tons) (1)

Year	Residential	Commercial	Construction and Demolition	Bulky	Tires	Liquid
2008	76,336.96	14,764.36	16,553.30	2,338.59	295.43	150.55
2009	67,714.11	14,781.88	15,911.44	2,208.00	284.11	170.24
2010	67,193.55	16,642.77	19,961.32	2,147.36	296.66	171.52
2011	66,599.45	15,305.58	19,898.61	1,953.96	310.25	165.37
2012	66,262.18	14,073.12	19,849.99	1,806.74	286.63	165.94
2013	65,859.39	14,597.17	19,702.42	1,739.47	257.10	205.02

(1) Combined tonnage for each waste category disposed at either the Alpha Ridge Landfill or at King George Landfill via the Annapolis Junction Transfer Station. Tonnages taken from Exhibit 3-9.

3.3.1.1 Residential Generation

Residential waste collected curbside decreased beginning in FY 2009, in part due to the increase in recycling after carts were delivered to all curbside County collection households, and in part due to the economic down-turn. Exhibit 3-11 presents historic generation rates for the residential waste stream and shows the decrease in trash per household and in total generation per household since 2008. The Residential Recycling rate has remained relatively steady over the past five years. Exhibit 3-12 presents historic generation rates for the residential waste stream, including Non-MRA recycling.

Waste generation rates have decreased during the last 5 years, averaging 0.57 (0.58, including Non-MRA recycling) tons/capita/year in 2008 to 0.456 (0.464, including Non-MRA recycling) tons/capita/year in 2012. The stability contrasts with the increasing per capita generation rates experienced in the 1980's The recent decrease is likely due to a number of factors, including the implementation of the County's waste reduction program described in this chapter and increase in recycling opportunities. Also, a recent trend among manufacturers has been to reduce product packaging and to "lightweight" product containers. Heavier materials are being replaced with lighter materials (e.g. – plastic bottles rather than glass) and container thickness is being reduced. Homeowners are encouraged to practice grasscycling instead of raking and bagging grass and leaves for collection. As the use of mulching mowers has become more prevalent, a greater portion of yard trim otherwise generated has been diverted from the waste stream.

Exhibit 3-11 Historic Residential Waste Generation Rates Including MRA Recycled Materials Only

Year	Household Population[1]	Recycled[2] (tons)	Disposed[3] (tons)	Total Generation[4] (tons)	Generation Rate[5] (tons)	Residential Recycling Rate
2008	244,352	62,539.25	76,336.96	138,876.21	0.57	45.0%
2009	248,469	60,537.66	67,714.11	128,251.77	0.52	47.2%
2010	251,977	63,099.58	67,193.55	130,293.13	0.52	48.4%
2011	255,722	62,894.84	66,599.45	129,494.29	0.51	48.6%
2012	258,467	55,876.26	66,262.18	122,138.44	0.47	45.7%
2013	261,583	53,340.48	65,859.39	119,199.87	0.456	44.7%

(1) Source: Exhibit 2-5 (Does not include rental apartment units.)
(2) Source: Exhibit 3-15
(3) Source: Exhibit 3-9
(4) Total Generation equal to disposed plus recycled quantities
(5) Generation rate, tons per person per year, equal to waste generation divided by household population.

Exhibit 3-12 Historic Residential Waste Generation Rates Including MRA + Non-MRA Recycled Tons

Year	Household Population[1]	Recycled[2] (tons)	Disposed[3] (tons)	Total Generation[4] (tons)	Generation Rate[5] (tons)	Residential Recycling Rate
2008	244,352	65,539.25	76,336.96	141,876.21	0.58	46.2%
2009	248,469	60,675.06	67,714.11	128,389.17	0.52	47.3%
2010	251,977	91,572.25	67,193.55	158,765.80	0.63	57.7%
2011	255,722	72,633.82	66,599.45	139,233.27	0.54	52.2%
2012	258,467	63,305.60	66,262.18	129,567.78	0.50	48.9%
2013	261,583	55,572.48	65,859.39	121,431.87	0.464	45.8%

(1) Source: Exhibit 2-5 (Does not include rental apartment units.)
(2) Source: Exhibit 3-16
(3) Source: Exhibit 3-9
(4) Total Generation equal to disposed plus recycled quantities
(5) Generation rate, tons per person per year, equal to waste generation divided by household population.

3.3.1.2 Commercial Generation

Since 1995, a substantial portion of the commercial waste generated in the County has been exported to private disposal facilities located outside of the County, primarily in Pennsylvania and Virginia. The County believes that 1994 is the last year that most (or all) commercial waste generated in the County was disposed at the Alpha Ridge Landfill. The total per employee commercial waste generation rate in 2013 was .27 tons per population per year of waste managed by Howard County. The portion of commercial waste to be managed by the County is, however, less than 10 percent of the commercial waste generated. The calculated generation rate is used to project future commercial solid waste generation to be managed by the County during the planning period of 2014 through 2024. This information is shown in Exhibit 3-13 and Exhibit 3-14.

Exhibit 3-13 Historic County Managed Commercial Waste Generation Rates
MRA Recycled Materials Only

Year	Population served(1)	Recycled(2) (tons)	Disposed(3) (tons)	Total Generation(4) (tons)	Generation Rate(5) (tons)
2008	59,234	2,218	14,764	16,982	0.29
2009	59,635	2,412	14,781	17,193	0.29
2010	60,415	2,327	16,642	18,969	0.31
2011	60,682	2,330	15,305	17,635	0.29
2012	61,733	2,313	14,073	16,386	0.27
2013	62,025	2,439	14,597	17,036	0.27

(1) Source: Howard County DPZ. This number includes County staff, HCPSS staff and students
(2) Source: County managed collections from front-end dumpsters and commercial style carts
(3) Source: Commercial tonnage added together from Exhibit 3-9
(4) Total Generation equal to disposed plus recycled quantities
(5) Generation rate, tons per employee per year, equal to total generation divided by number of employees.

Exhibit 3-14 Historic County Managed Commercial Waste Generation Rates
MRA + Non-MRA Recycled Tons

Year	Population served(1)	Recycled(2) (tons)	Disposed(3) (tons)	Total Generation(4) (tons)	Generation Rate(5) (tons)
2008	59,234	5,218	14,764	19,982	0.34
2009	59,635	2,549	14,781	17,330	0.29
2010	60,415	30,800	16,642	47,442	0.79
2011	60,682	12,069	15,305	27,374	0.45
2012	61,733	9,742	14,073	23,815	0.39
2013	62,025	4,671	14,597	19,268	0.31

(1) Source: Howard County DPZ. This number includes County staff, HCPSS staff and students
(2) Source: Exhibit 3-16 & 3-13. Note that Non-MRA tons may fluctuate by year, depending on County projects
(3) Source: Commercial tonnage added together from Exhibit 3-9
(4) Total Generation equal to disposed plus recycled quantities
(5) Generation rate, tons per employee per year equal to total generation divided by number of employees.

3.3.2 Historic Recycled Quantities

The Bureau of Environmental Services manages a comprehensive, multifaceted recycling program. Program details are presented later in this chapter.

The Bureau compiles the results of recycling programs operating in the County and submits annual reports to MDE. Categories of materials reported are determined by MDE and are included in its MRA report form. Quantities of recycled materials reported to MDE for 2008 through 2013 are presented in Exhibit 3-15. The quantities reported in this exhibit differ from the historical MRA report quantities because Exhibit 3-15 reports recyclables collected from apartments as commercial recyclables. This adjustment was made to reflect the fact that apartment waste is collected by private commercial haulers and is not captured as residential waste tonnage.

The County first reached the state mandated 20 percent recycling goal in 1993 and has increased its overall recycling rate each year since then. In 2012, Howard County's MRA recycling rate was calculated

by Howard County as 46.79 percent and the total waste diversion rate was 50.79 percent, assuming four percentage points for diversion. Improving results reflect increased recycling, increased awareness and knowledge of recycling, increased types of materials recycled, residential recycling carts and increasing levels of reporting among private parties responsible for commercial recycling.

In 2006 the County began single-stream recycling which allows those in the program to put all recyclables in one container. In 2008, recycling carts were delivered to households in the County's collection program, which made the recycling program even more convenient. Single stream recycling is collected from the curbside program, multi-family program, County government offices, County Schools and the Resident Convenience Center at the Alpha Ridge Landfill.

The County includes several types of paper in its recyclable mixed paper collection program. Metal, plastic and glass containers are also collected commingled. Mixed paper and commingled containers are collected from the curbside program, multi-family program and the Resident Convenience Center at the Alpha Ridge Landfill. Mixed yard trim (wood waste, leaves and grass) is collected at curbside and at the Convenience Center. As a result, most residential and some commercial recycling tonnage is reported as mixed or commingled material in Exhibit 3-15. Food scrap is shown separately, as it is collected in the pilot area and at the Resident Convenience Center, and is composted at the ARL.

Materials in the "Other" category in Exhibit 3-15 include such items as electronic waste, polyurethane foam, shingles and rendering waste. Electronic wastes collected for processing include computers, CRT's, televisions, printers, VCR's and other types of equipment. Significant quantities of "other" materials are recycled in the commercial sector.

In 2013 residential (not including apartments) recycling resulted in approximately 0.2 tons, or 408 pounds, of MRA recycled materials per resident in the County. When Non-MRA recycling is included in the total, approximately 0.21 tons, or 425 pounds was recycled per County resident.

In the commercial sector, recycling resulted in larger quantities per employee of approximately 1.17 tons, or 2,337 pounds of MRA recycling in 2013. Including Non-MRA recycling gives a total for 2013 of approximately 1.32 tons, or 2,640 pounds, of recycled material per employee.

Exhibit 3-15 shows the historical MRA recycled material, and Exhibit 3-16 provides the historical quantities of Non-MRA recycled material.

Exhibit 3-15 Historical MRA Recycled Materials Quantities (Tons) (1)

Commodity	2008		2009		2010		2011		2012		2013	
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm
Commingled Containers	0.00	9,612.40	0.00	11, 374 .00	0.00	10,693.91	497.68	8,207.82	0.00	0.00	454.84	0.00
Compost/Mulch (Yard) (2)												
Brush and Branches	0.00	8,088.25	0.00	1,179.00	0.00	5,496.00	0.00	6,835.00	0.00	0.00	0.00	0.00
Grass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,340.00	0.00	0.00	0.00	0.00
Leaves	0.00	653.00	0.00	241.00	0.00	5,447.00	0.00	3,343.00	0.00	0.00	0.00	0.00
Mixed Yard Trim	11,959.76	0.00	11,896.39	1,032 .00	10,696.09	2,546.00	11,513.81	3,000.00	11,309.71	13,000.00	10,420.35	36,535.68
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Compost/Mulch (Other)												
Food Waste	0.00	36,222.50	6 .34	46,619.11	0.00	34,520.40	0.00	56,027.23	128.61	59,479.49	300.12	37,542.60
Wood Materials (3)	17,143.62	11,100.00	13,959.95	10,217.92	17,227.48	0.00	16,145.76	0.00	10,573.19	4791.37	7,757.22	3,642.52
Other: Pallets	0.00	0.00	0.00	239.00	0.00	1,361.00	0.00	0.00	0.00	0.00	0.00	0.00
Other: Manure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,057.77	539.85	1,164.60
Glass												
Brown Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clear Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Green Glass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mixed Glass	0.00	0.00	0.00	0.00	4,103.20	4,390.77	4,704.07	7,075.15	4,664.21	7,082.21	4,613.31	5,836.42
Other: FL Tubes	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Metals												
Aluminum Cans	0.00	0.91	0.00	3.13	220.94	236.43	157.84	249.74	156.53	241.74	154.80	201.03
Lead Acid Batteries	35.19	357.30	48.17	441.92	47.16	1,021.06	34.01	814.93	23.52	92.49	12.66	440.00
Tin (Sn) Steel Cans	0.00	0.00	0.00	0.00	410.32	483.60	410.32	816.37	500.88	805.59	495.38	626.73
White Goods	0.00	535.00	0.00	3,491.00	2,027.66	3,369.49	1,857.07	0.00	1,691.04	400.00	1,644.16	212.53
Other: FES	2,338.59	1,362.08	2,092.31	538.66	0.00	359.66	0.00	76.00	0.00	0.00	0.00	0.00
Paper												

Commodity	2008		2009		2010		2011		2012		2013	
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm
Mixed Paper	0.00	14,974.80	0.00	9,513.03	0.00	13,646.12	0.00	4,838.50	0.00	0.00	0.00	0.00
Newspaper	0.00	1,193.82	0.00	1,077.80	24,776.99	21,479.22	23,432.33	23,804.53	23,604.20	44,740.99	23,345.20	48,238.11
Office/Computer Paper	0.00	3,458.64	0.00	4,829.62	0.00	12,354.50	0.00	1,677.62	0.00	0.00	0.00	0.00
Old Corrugated Cardboard	415.67	24,904.24	407.93	24,195.14	420.43	28,604.32	397.76	27,449.37	376.63	26,577.52	364.34	28,348.68
Other: Single Stream	29,031.60	15,529.23	31,133.32	14,643.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plastic												
Mixed Plastic	0.00	235.70	367. 16	335.75	1,433.08	1,400.03	1,859.55	249.74	1,189.60	1,566.56	1,671.91	1,763.08
Plastic #: Rigid	599.72	2.35	0.00	11. 66	0.00	0.00	154.72	776.38	375.66	920.56	190.56	470.05
Plastic #: Foam	0.00	0.00	35.15	0.00	34.38	0.00	33.37	0.00	18.13	0.00	29.43	0.00
Plastic: Film	0.00	247.83	0.00	308.15	0.00	154.38	0.00	122.40	0.00	83.55	0.00	71.44
Plastic: Latex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.50	0.00	76.76	0.00
Plastic: Carpet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.18	0.00	163.67	0.00
Other Materials												
Animal Protein/Solid Fat	0.00	0.00	0.00	202.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electronics	599.72	125.36	680.33	2,190.24	660.19	212.07	662.30	2,351.50	763.04	3,221.67	694.90	3,655.68
Pallets, Refurbished [4]	0.00	1,547.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,029.06	0.00	1,131.76
Textiles	15.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
Tires [5] (Recycled)	299.78	1,190.30	284.11	1,133.77	296.66	1,396.62	310.25	1,659.27	286.63	1,648.65	257.10	1,805.29
Tires [6] (Retread)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	564.35	0.00	0.00	0.00	0.00
Tires [7] (Cement Kiln 12%)	0.00	0.00	0.00	0.00	0.00	10.00	0.00	18.00	0.00	0.00	0.00	0.00
Other: Latex Paint	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other: Oil Filters	0.00	0.00	0.00	59.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other: Shingles	0.00	0.00	0.00	0.00	745.00	0.00	724.00	0.00	0.00	0.00	0.00	0.00
Other: Mattresses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	151.92	10.00
Subtotals:	**62,539.25**	**131,341.28**	**60,537.66**	**121,464.02**	**63,099.58**	**149,249.58**	**62,894.84**	**153,373.90**	**55,876.26**	**167,823.22**	**53,340.48**	**171,696.20**

Commodity	2008		2009		2010		2011		2012		2013	
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm
Annual Total:	193,880.53		182,001.68		212,349.16		216,268.74		223,699.48		225,036.68	
MRA Recycling Rate [8]:	42.51		42.71		45.94		48.50		46.79		Not yet calculated	
Population/Employees	244,352	148,318	248,469	143,580	251,977	146,016	255,722	151,066	258,467	158,982	261,583	159,434
Recycling Tons Per Capita/Tons Per Employee	0.26	0.89	0.24	0.85	0.25	1.02	0.25	1.02	0.22	1.06	0.20	1.08

(1) Recycled material collected from apartments reported as commercial.
(2) Grass, leaves, brush and branches and mixed yard trim generated from landscaping operations.
(3) Includes only wood materials that have been mulched or composted.
(4) Refurbished pallets only. Mulched or composted pallets are listed in Wood Materials.
(5) Tires that are recycled into new products containing rubber and whole tires used for playground and reef construction.
(6) Retread or recapped tires
(7) 12% of the total weight of tires used at cement kilns.
(8) Official MRA Recycling Rates for 2008, 2009, 2010 and 2011, as reported by MDE. Recycling rates for 2012 and 2013 calculated by Howard County, as MDE reports are not yet available.

Exhibit 3-16 Historical Non-MRA Recycled Materials (Tons) and Total MRA and Non-MRA Recycled Materials (Tons) (1)

Commodity	2008		2009		2010		2011		2012		2013	
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm
Antifreeze	0.00	0.00	11.54	0.00	6.63	110.35	6.63	110.35	27.45	7.63	0.00	13.48
Asphalt	3,000.00	0.00	2,500.00	0.00	7,857.00	745.00	9,612.00	620.00	6,457.22	0.00	2,200.00	0.00
C&D Debris	0.00	0.00	0.00	0.00	0.00	94,701.00	0.00	100,574.00	0.00	0.00	0.00	0.00
Concrete	0.00	0.00	0.00	0.00	2,522.36	1,701.16	0.00	2,890.51	0.00	1,801.05	0.00	188.18
Land Clearing Debris	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13,772.10	0.00	0.00
Scrap Automobiles	0.00	0.00	0.00	0.00	0.00	11,200.00	0.00	14,000.00	0.00	20,012.99	0.00	23,000.00
Scrap Metal	0.00	0.00	0.00	5,036.00	0.00	2,651.06	0.00	6,898.06	0.00	4,804.64	0.00	242.93
Copper Wire	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	106.00
Aluminum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	132.00
Sewage Sludge	0.00	0.00	0.00	0.00	0.00	1,910.68	0.00	1,900.50	0.00	0.00	0.00	0.00
Soil	0.00	0.00	0.00	0.00	16,597.68	2,651.06	0.00	208.01	0.00	632.34	0.00	125.57
Waste Oil	0.00	0.00	125.86	0.00	120.35	0.00	120.35	0.00	944.67	109.31	32.00	122.80
Oil Filters (2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.55	0.00	0.00
Other: Street Sweepings	0.00	0.00	0.00	0.00	1,368.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other: Gasoline	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	232.00
Total Non-MRA (Tons)	**3,000.00**	**0.00**	**137.40**	**5,036.00**	**28,472.67**	**115,670.31**	**9,738.98**	**127,201.43**	**7,429.34**	**41,195.61**	**2,232.00**	**24,162.96**
Total MRA + Non-MRA (Tons)	**65,539.25**	**131,341.28**	**60,675.06**	**126,500.02**	**91,572.25**	**264,919.89**	**72,633.82**	**280,575.33**	**63,305.60**	**209,018.83**	**55,572.48**	**195,859.16**
Population/Employees	**244,352**	**148,318**	**248,469**	**143,580**	**251,977**	**146,016**	**255,722**	**151,066**	**258,467**	**158,982**	**261,583**	**159,434**
MRA + Non-MRA Rec. Tons Per Capita/ Tons Per Employee	**0.27**	**0.89**	**0.24**	**0.88**	**0.36**	**1.81**	**0.28**	**1.86**	**0.24**	**1.31**	**0.21**	**1.23**

(1) Recycled material collected from apartments reported as commercial.
(2) Note: In 2009, oil filters were listed under MRA Recyclables, Other Materials
(3) Official MRA Recycling Rates for 2008, 2009, 2010 and 2011, as reported by MDE. Recycling rates for 2012 and 2013 calculated by Howard County, as MDE reports are not yet available.

3.3.3 Projected Municipal Solid Waste and Recyclable Quantities

Waste and recyclable quantity projections are the foundation for identifying facility and program needs. While actual experience may vary from projections, enough is known about waste generation in the County to develop projections that should adequately serve for facility sizing and program planning.

In Howard County, commercial waste and recyclables generation previously presented in this chapter was defined as industrial, government, institutional and apartments. While there are some common waste generation activities among these three subsectors, others are different. However, data are not available to demonstrate waste generation rates particular to each subsector. Thus for the purpose of projecting waste and recycling quantities, one estimated generation rate, in units of tons per employee per year, is used for all commercial subsectors.

Unit waste generation is projected to be stable throughout the planning period. Quantities are expected to rise due to increases in employment in the County. Employment projections are based on sector proportions for 2010 and overall five year employment projections, as reported by the Howard County DPZ (see Chapter 2, Exhibit 2-10).

As shown in Exhibit 3-17, MRA and Non-MRA recycling in the commercial sector is projected to increase from the 2013 level of 195,859 tons per year to 226,376 tons per year in 2024 which will result in an approximately 16 percent increase in the commercial recycling rate. This assumption reflects an increase in number of employees and a stable unit generation rate.

Exhibit 3-17 also shows that recycling in the residential sector is projected to increase by approximately 15 percent during the planning period (from 55,572 tons per year in 2013 to 63,850 tons per year in 2024). This is due to the projected increase in population, with a stable unit generation rate. The overall MRA recycling rate is projected to gradually increase through FY 2024 to 55 percent.

The total waste generation rate of 2.26 tons per capita per year is projected to remain relatively stable for the planning period ending in 2024.

Exhibit 3-17 presents all projected quantities of waste to be generated by the commercial and residential waste categories of MRA and Non-MRA recycling materials and all materials requiring disposal, both in-county and out-of-county. Population projections have been developed by extrapolating five year data presented in Chapter 2.

Exhibit 3-17 Commercial and Residential Projected Generation MSW and MRA and Non-MRA Recycling (1)

Year	Total Population(2)	Res. Waste Generation (tons/yr)	Comm. Waste Generation(3) (tons/yr)	Total Waste Generation (tons/yr)	Residential Recycling (tons/yr)	Commercial Recycling (tons/yr)	Total Recycling (tons/yr)	Total Waste & Recycling (tons/yr)
2014	302,123	100,018	190,943	290,961	56,131	199,009	255,140	546,101
2016	313,686	103,846	198,251	302,097	58,279	206,626	264,905	567,002
2020	332,270	109,998	209,996	319,994	61,732	218,867	280,599	600,593
2024	343,670	113,772	217,201	330,973	63,850	226,376	290,226	621,199

(1) Total waste generation numbers, disposed in-county and out-of-county, are from Exhibit 3-1. Residential and commercial recycling totals from Exhibit 3-1 have been calculated using the respective percentages from Exhibit 3-12 and Exhibit 3-14.
(2) Source: Extrapolated from Exhibit 2-3, Total Population.
(3) Commercial includes waste classified in Exhibit 3-1 as Commercial, Mixed and Industrial.

3.3.4 Historic and Projected Generation – Other Wastes

3.3.4.1 Construction and Demolition and Land Clearing Debris (C&D)

The generation of C&D debris has fluctuated over the past several years showing a slight increase of commercial C&D waste delivered to Alpha Ridge Landfill. This has increased from approximately 16,553 tons of C&D delivered to ARL in 2008 to about 19,702 tons in 2013. The volume of stone and rubble has remained constant or decreased over this time frame mostly due to higher tipping fees at the ARL. Several factors affect waste disposal rate including:

- construction activity levels;
- increase in alternative activities by contractors such as demolition and remodeling; and
- economic conditions.

Waste disposal rates only reflect materials disposed of at the Alpha Ridge Landfill. In 2013, generation of C&D generated in the County and disposed at ARL was approximately 0.07 tons, or about 132 pounds, per person.

The majority of C&D generated in the County is exported out-of-County for disposal. Total C&D generation in the County in 2013 was approximately 101,000 tons, or about 0.34 tons per person per year.

3.3.4.2 Tires

The nationwide average of tires discarded is approximately 1.0 tire per person per year. The average weight of passenger car and light truck tires is 20 pounds per tire. Generation in the County in recent years is estimated to be the national average of 1.0 tire per person per year. Projected waste tire generation in future years is estimated to continue to be the historic national average of 1.0 tire per person per year.

Tire delivery to the Alpha Ridge Landfill has recently varied from 295 tons in 2008 to 310 tons in 2011 to 257 tons in 2013, averaging 0.1 tires per person, all of which have been recycled. The small quantities of tires delivered to the Alpha Ridge Landfill reflect the fact that a majority of the tires discarded in the County are disposed of in some other manner, such as through tire dealers. Tire generators also have changed their method of disposing of tires since the statewide ban on landfilling tires became effective on January 1, 1994 and the Tire Recycling System developed by the Maryland Environmental Service was fully implemented.

The prohibition on disposal of tires in landfills is codified as §9-228 of the Annotated Code of Maryland. This prohibition can only be waived under terms and conditions specified by the Maryland Department of the Environment (MDE) if MDE determines that a scrap tire recycling system does not exist or have insufficient capacity available.

3.3.4.3 Sludge and Septage

The Little Patuxent Water Reclamation Plant (LPWRP) generates sludge from the primary and biological nutrient removal (BNR) treatment processes. Primary and BNR sludge is dewatered and pasteurized using lime addition and heat treatment. Sludge is dewatered using centrifuges. All Sludge processing facilities are located on the LPWRP site.

The LPWRP currently generates 12,000 dry tons of treated sludge annually. This quantity is anticipated to increase to 18,000 tons per year by the end of the planning period in 2024. In addition, the Plant receives 11.6 million gallons per year of septage from private contractors.

The Sludge is land applied by a contractor at permitted sites or marketed as a soil amendment or other product. Sewage sludge generated by the LPWRP is all processed on site.

Septage waste is collected by private septage haulers and delivered to wastewater treatment facilities. The LPWRP currently processes 11.6 million gallons of septage from Howard County residents. Projections of the quantities of sludge and septage waste requiring processing/disposal are presented in Exhibit 3-1.

3.3.4.4 Controlled Hazardous Substances (CHS) and Household Hazardous Waste (HHW)

Controlled hazardous substances (CHS) are generated in the County by commercial, industrial and institutional organizations. CHS refers to regulated quantities of materials having a hazardous nature. The solid waste management system focuses on CHS that are disposed of as waste. CHS may not be disposed of in the Alpha Ridge Landfill. Aside from Howard County's Household Hazardous Waste Program and County agency disposal of CHS described in Chapter 4, the County does not specifically regulate or manage CHS and it is not addressed further in this Plan. The management of this material is regulated by the MDE. Generators must arrange for CHS disposal through a permitted transportation and disposal firm. In addition to manifesting all disposal activities, types and quantities disposed must be reported annually to the MDE.

In 2013, 245 tons of Household Hazardous Waste (HHW) was collected at ARL. Based on the 2013 generation rate, the estimated quantities of HHW to be generated in Howard County from 2014 to 2024 are presented in Exhibit 3-1 and Exhibit 3-18.

3.3.4.5 Medical Wastes

Medical wastes are wastes that are bio-hazardous or infectious and are generated in the County by the hospital, clinics, nursing facilities and laboratories. Medical wastes include anatomical material (human and animal), blood-soiled articles, contaminated material, microbiological laboratory wastes or sharps. Two State agencies regulate the management of medical waste, the (MDE) and the Department of Health and Mental Hygiene (DHMH). Medical wastes are considered to be Controlled Hazardous Substances (CHS).

MDE regulations pertain to the identification, packaging, manifesting, transporting and disposal of special medical wastes. DHMH regulations outline acceptable methods for handling these wastes and rendering them non-infectious. Special medical wastes are considered infectious until they are properly treated. Disposal is not allowed at the Alpha Ridge Landfill. The County does not manage medical waste, thus medical waste is not included in the Plan and will not be addressed. It is noted that medical wastes generated in the home as a result of in home medical treatment is not regulated by MDE and may be disposed and managed as residential waste.

In 2013, approximately 368 tons of special medical waste was collected in Howard County by a permitted private company for transportation and incineration.

3.3.4.6 Asbestos

Friable asbestos is no longer delivered to ARL, and it may be disposed in permitted facilities located outside the County. Records are not available for friable asbestos disposed in permitted facilities.

In 2013, 996 tons of roofing shingles were collected at ARL and were recycled.

3.3.4.7 Used Oil and Anti-Freeze

Used oil and anti-freeze are generated by businesses, industry and do-it-yourself mechanics. The County collected the equivalent of approximately 107 tons of used oil at the Resident Convenience Center in 2013. The equivalent of approximately nine tons of anti-freeze was collected by the County and recycled in 2013.

3.3.4.8 Summary – Other Waste

Exhibit 3-18 shows tons of C&D Debris, tires and HHW disposed at ARL and the disposal rate in tons per capita. Exhibit 3-19 provides projections for delivery of these materials to ARL during the planning period

Exhibit 3-18 Alpha Ridge Landfill Historic Waste Disposal Quantities
Construction, Demolition and Land Clearing Waste; Tires and HHW

Year	Total Population[1]	C&D Debris[2] (tons)	C&D Debris Disposal Rate [3]		Tires[4] (tons)	Tires Disposal Rate[3]		HHW[5] (tons)	HHW Disposal Rate[3]	
			(tons/ capita)	(pounds/ capita)		(tons/ capita)	(pounds/ capita)		(tons/ capita)	(pounds/ capita)
2008	278,405	16,553.30	0.06	118.92	295.43	0.001	2.12	234.92	0.0008	1.69
2009	283,061	15,911.44	0.06	112.42	284.11	0.001	2.01	235.21	0.0008	1.66
2010	287,085	19,961.32	0.07	139.06	296.66	0.001	2.07	265.78	0.0009	1.85
2011	291,468	19,898.61	0.07	136.54	310.25	0.001	2.13	255.29	0.0009	1.75
2012	294,477	19,849.99	0.07	134.82	286.63	0.001	1.95	260.89	0.0009	1.77
2013	297,732	19,702.42	0.07	132.35	257.10	0.001	1.73	244.71	0.0008	1.64

(1) Source: Exhibit 2-2.
(2) Source: Exhibit 3-9.
(3) Tons/pounds disposed divided by population.
(4) Source: Exhibit 3-9. Disposal of tires is prohibited in accordance with state law. All tires received at ARL were recycled.
(5) Source: Exhibit 3-6.

Exhibit 3-19 ARL Projected Generation – C&D, Tires and HHW

Year	Total Population[1]	C&D Generation [2] (tons/yr)	Tires [3] (tons/yr)	HHW Generation[4] (tons)
2014	302,123	19,993	267	248
2016	313,686	20,758	277	258
2020	332,270	21,988	294	273
2024	343,670	22,742	304	282

(1) Source: Extrapolated from Exhibit 2-3.
(2) Based on 0.07 tons per capita per year. (See Exhibit 3-18.)
(3) Based on 0.0001 tons capita per year. (See Exhibit 3-18.)
(4) Based on 0.0008 tons capita per year. (See Exhibit 3-18.)

3.3.5 Summary – All Projected Waste and Recycling

A summary of projected quantities of all waste types that are addressed in the Plan is presented in Exhibit 3-1 above. The projections cover the planning period 2014 through 2024.

It should be noted that County operations generate small quantities of debris from cleaning streets, litter and catch basins. Quantities of debris generated from County maintenance operations are accounted for in the institutional and government portion of the waste stream, which is a component of the commercial waste category.

Additionally, agricultural wastes are typically recycled on the farm where they are generated. For example, manure is used as fertilizer and organic debris is applied to farmland. Although not identified as such, small quantities of agricultural waste entering the ARL are accounted for as commercial waste.

Approximately 1,165 tons of manure was collected at ARL for composting in 2013. This is included in the County's 2013 recycling report.

3.4 WASTE FLOW WITHIN THE COUNTY

In accordance with Maryland regulations, types and quantities of waste imported into and exported from the County are addressed in the Plan. To understand the topic of import/export, it is helpful to review the various flows of waste ordinarily experienced.

Each type of waste managed in the County is delivered to one of a variety of waste management or processing facilities or else is exported out of the County. Generally, processing facilities accept specific material types. These facilities prepare the material for use as new materials by product manufacturers and/or directly use the prepared material to manufacture a product. Management of recyclables often includes more than one step. For example, after collection, recyclable materials are typically separated and aggregated by an intermediate processor in preparation for transport to a final market, which uses them as raw material for manufacturing new products.

The County has two private transfer stations which receive waste and then export this waste to disposal facilities outside the County. The ARL and the Alpha Ridge Transfer Station receive no waste imported from out-of-County sources. In the next two subsections, the types and quantities of materials imported and exported are discussed.

3.4.1 Imported Waste

As mentioned above, no waste is known to be imported into Howard County. The ARL and the Alpha Ridge Transfer Station (located on the landfill site, which commenced operation in 2005) are the only public facilities located within the County permitted to accept MSW and C&D debris. Neither facility accepts out-of-County waste, as provided in Section 18.604(q) of the Howard County Code of Ordinances. Waste haulers not abiding by this rule may face penalties, including possible fines and suspension or revocation of the County permit to use the landfill or transfer station.

The Landfill tipping fee of $65.00 per ton is competitive with fees in neighboring jurisdictions, thus removing any incentive for haulers to import waste to these facilities. The County believes that no significant quantities of out-of-County MSW or C&D debris are being disposed of at ARL at or the Alpha Ridge Transfer Station.

3.4.2 Exported Waste

In this section, wastes generated in the County and delivered to out-of-County facilities are described.

3.4.2.1 Municipal Solid Waste

The County controls most residential waste collection and exports essentially all quantities collected through a service agreement with the Northeast Maryland Waste Disposal Authority (the Authority). Collected residential waste is delivered directly to and exported from the Annapolis Junction Transfer Station (AJTS), owned and operated by Waste Management, Inc., to the firm's King George Landfill located in northern King George County, Virginia. A portion of the residential and commercial waste received at the ARL and Alpha Ridge Transfer Station is also transported to the AJTS for export to King George Landfill. In addition, County agencies deliver waste directly to the AJTS.

The County has not imposed any prohibitions on deliveries of waste types that are allowed by permit and regulations, but has relied on economic pressures to reduce commercial waste quantities received at the Alpha Ridge Landfill and Alpha Ridge Transfer Station. The County will continue to landfill all waste quantities received which are not transported for export. In 2013, the County exported approximately 96,448 tons of waste generated through curbside collections and the landfill.

Because a small quantity of the commercial waste generated in Howard County is disposed at the Alpha Ridge Landfill, the County no longer has a record of total commercial waste disposal quantities. The County estimates quantities of commercial waste disposed based on projected levels of employment and on unit generation rates as detailed previously in this chapter. Using this information, it is estimated that approximately 187,500 tons of commercial waste (including waste collected from apartment complexes) was generated in Howard County and exported for disposal in 2013. The County does not control the disposal of commercial waste. Private companies providing collection service to the commercial sector are free to use any legally available disposal facility.

Landfills operated by local governments in the region restrict the acceptance of waste to that which is generated within the political subdivision, similar to Howard County. Also, tipping fees in the region are competitive with the County's, eliminating the economic incentive to use them. Thus, it is believed that waste is not exported to other public landfills in Maryland.

Private landfills charge a lower disposal fee than the County's $65 per ton of MSW, evidenced by the rate the County pays for export of its residential waste delivered to the AJTS. A significant amount of private landfill capacity has been constructed in Pennsylvania and Virginia in the past several years. Private operators have consistently offered this capacity at tipping fees lower than the fees charged by the County. It is reasonable to assume that private landfill operators offer this same capacity to private collection companies operating in the County. In addition, these landfills are owned by some of the companies that provide collection services to the County's commercial sector, including Republic, Allied Waste and Waste Management, Inc. It is likely that these companies use company-owned landfills whenever possible, in order to maintain their disposal costs at a competitive level.

Route collection trucks cannot economically transport waste to a distant landfill. Other options exist, however. The Wheelabrator Baltimore L.P. Waste-To-Energy facility has offered capacity for several years, and may be receiving some commercial waste from Howard County. The transfer station in nearby Annapolis Junction, Maryland, in the northwestern portion of Anne Arundel County, began operations in early 1997, under USA Waste Services. In 1998, USA Waste merged with Waste Management, Inc., and the AJTS is now operating under Waste Management's name. Waste Management, Inc., has also entered into a contract to utilize excess capacity at Baltimore County's Western Acceptance Facility in the Halethorpe area to transfer waste from private commercial sources.

On an annual basis, MDE collects data on waste deliveries to each solid waste acceptance facility in the state. The report for waste generated in Howard County and accepted at various facilities was used to prepare Exhibit 3-1 above.

The 2013 report identified the following private in-county and out-of-county facilities, other than the ARL and AJTS, which received waste from various sources in Howard County:

- Ameriwaste Processing & Transfer Station, Howard County
- Baltimore Processing & Transfer Center, Baltimore City
- Baltimore Recycling Center, LLC, Baltimore City
- C&D Recovery Processing Facility, Montgomery County
- Curtis Bay Energy Limited Partnership, Baltimore City
- Curtis Creek Processing Facility & Transfer Station, Anne Arundel County
- Days Cove Rubble Landfill - Lateral Expansion, Baltimore County
- Joppa Waste Energy Plant, Harford County
- Honeygo Run Rubble Landfill, Baltimore County
- Lawrence Street Solid Waste Acceptance Facility, Prince George's County
- MES - BCRRF Western Acceptance, Baltimore County
- Ritchie Land Reclamation Limited Partnership, Prince George's County
- Roll-Off Express, Inc., Carroll County
- Stericycle, Inc., Baltimore City
- Sun Services Processing And Recycling Center, Prince George's County
- Wheelabrator Baltimore, LP, Baltimore City
- Workplace Essentials, Inc., Howard County

These transfer stations and the waste-to-energy facilities have adequate capacity to take the waste generated by the commercial sector in the County. It is likely that these facilities are receiving most of the commercial waste generated in the County. Due to the availability of these private facilities and any potential new facilities approved in the County, it can be expected that essentially all commercial waste will continue to be exported in the long term future. Additional Waste-To-Energy facilities are in the planning stages in Baltimore and Frederick County which may continue to expand the available waste capacity in the region.

Workplace Essentials, Inc. operates a small scale transfer facility for the acceptance and transfer of waste generated from its own business operations only. The firm services restroom disposal containers for feminine hygiene products and consolidates small quantities of collected waste at its warehouse. Waste is placed in an on-site dumpster which is periodically emptied for export to a disposal facility.

3.4.2.2 Recyclable Materials

In 2013 nearly 225,040 tons of recyclables from residential and commercial sources were documented as being diverted. This includes recyclables normally found in MSW and allowed to be counted under the Maryland Recycling Act (MRA) toward the County's recycling goal. It excludes other recyclables for which all or a significant portion have historically been managed by the private sector, such as used oil and scrap metal.

Few manufacturers that use recycled materials are located in Howard County. Exceptions include yard and wood waste processor American Wood Fibers, Inc. C.R. Daniels, Inc. manufactures industrial and commercial plastics products and uses post-consumer regrind plastic and plastic pellets purchased from plastics processors. It is reasonable to assume that all other documented recyclables tonnage is exported to end-markets outside of Howard County.

The County directs its residential collection contractors collecting yard trimmings from the residential sector to deliver that material to one of two private composting facilities. One facility, Recycle Green Industries is located in Carroll County and the other facility, Top Soil, Etc. is located south of Baltimore. In 2013, Recycle Green received 1,547.4 tons of yard trimmings, and Top Soil, Etc. received 7,980.9

tons. In addition, Waste Management received 131.09 tons, Chesapeake Compost received 28.37 tons and the County processed 732.59 tons at ARL. Altogether, approximately 10,420 tons of yard trimmings were processed in 2013.

An additional 12,323 tons of wood waste were delivered to the ARL. 4,715 tons were composted and the rest was were mulched and sold in-county or transported to out-of-County end-markets.

To further increase recycling and decrease waste, the County began testing food scraps collection in 2010 within a small collection of 32 households. In 2011 a pilot food scraps collection program was started within one of the trash and recycling routes, over 1,000 people participated. The food scraps were collected with the yard trimmings and were taken to one of the yard trimmings contractors who were able to take the food scraps when the program was first planned. In the summer of 2012, a pilot food scraps and yard trims facility began operations at the ARL. Currently under design is an organic processing facility at ARL which will handle County residential yard trimmings, food scraps and the wood waste taken to the ARL. No out-of-county waste will be allowed at the facility.

Currently, WM Recycle America is receiving the recyclables generated and collected from Howard County's recycling program. Some of the commercial old corrugated cardboard (OCC) was accepted for recycling at Lawrence Street Solid Waste Acceptance Facility in Prince George's County and Roll-Off Express, Inc., in Carroll County

A diverse number of recyclable materials are also collected at the Residents' Convenience Center at the ARL. In addition to more traditional recyclables such as mixed paper, corrugated cardboard, food and beverage containers and yard trimmings, the Convenience Center also accepts electronic waste, lead acid car and truck batteries, asphalt roofing shingles, foam, carpet, textiles, shoes, polystyrene foam #6, rigid plastic, cooking oil, used motor oil, anti-freeze and white goods from residents and small businesses. These materials are collected by different contractors and delivered to out-of-County end-markets.

Ameriwaste, LLC operates a processing and transfer facility for the separation and recycling of certain material at a site on Kit Kat Road in Elkridge. The primary targeted waste component is metal. Other materials may be targeted as markets develop. This facility is permitted to process up to a maximum of 225,360 tons per year. Processed materials may be marketed to in-County and out-of-County markets. Waste which is not recycled is transported to a permitted disposal facility outside of Howard County.

Vintage Tech Recyclers, LLC operates an electronics recycling facility. Approximately 4,350 tons of electronics from the County were recycled in 2013. 100 percent of the material is recycled in compliance with regulations, Responsible Recycling (R2) and ISO 14001:2004.

Both scrap metal and cardboard are separated for recycling from waste received on the tipping floor of the Alpha Ridge Transfer Station. These materials are separated both manually and using mobile waste transfer equipment. Separated materials are loaded into roll-off containers and the materials are transferred to WM Recycle America (OCC) and Dirt Express Co. (scrap metal). The materials are subsequently transported out of the County for marketing.

3.4.2.3 Tires

Maryland law has prohibited the disposal of scrap tires in landfills located within the state since January 1, 1994. This prohibition can only be waived under terms and conditions specified by the MDE or if MDE determines that a scrap tire recycling system does not exist or has insufficient capacity available.

No processing facilities are located in the County. The majority of the waste tires generated are assumed to be exported out-of-County for processing. In 2013, 257 tons of tires were brought to ARL for recycling. The County is only responsible for the tires delivered to the ARL.

Using the national average of one tire per person, at an average weight of 20 pounds per tire, it is estimated that a total of approximately 2,950 tons of scrap tires were exported from all sources in Howard County.

3.4.2.4 Used Oil and Antifreeze

No facilities exist in Howard County for the processing of used motor oil and antifreeze for recycling. All collected quantities are exported. The County collected 107 tons of used oil and nine tons of antifreeze at the ARL for recycling. The total generation of these products in the County is not known, nor is it known what portions of the total quantities generated were recycled.

3.4.2.5 Controlled Hazardous Substances (CHS) and Household Hazardous Waste (HHW)

No CHS processing or disposal facilities are located in the County. All quantities of CHS are exported from the County. In 1997, the last year for which summary reports were available from MDE, CHS quantities transported for disposal equaled 1,137 tons.

In 2013, Howard County collected approximately 245 tons of HHW, all of which was exported for disposal or destruction.

3.4.2.6 Medical Waste

No processing or disposal facilities are located in the County. Medical waste is exported from the County. In 2013, 368 tons of special medical was delivered to Curtis Bay Energy Limited Partnership and Stericycle, Inc., both in Baltimore City, for disposal/destruction.

3.4.2.7 Dead Animals

Quantities managed by Howard County and generated by private sources are exported to Valley Protein Inc. and to the Department of Agriculture incinerator in Frederick. No rendering plants are located in Howard County. Estimated quantities generated in 2013 approximated 391 tons.

3.4.2.8 Construction, Demolition and Land Clearing (C&D) Debris

It is estimated that about 101,000 tons of C&D debris were generated in Howard County in 2013. Of this total, approximately 19,700 tons were delivered to ARL. The remaining 81,300 tons were exported from the County to various facilities, including Ameriwaste Processing & Transfer Station, Howard County; Baltimore Recycling Center, LLC, Baltimore City; C&D Recovery Processing Facility, Montgomery County; Curtis Creek Processing Facility & Transfer Station, Anne Arundel County; Days Cove Rubble Landfill - Lateral Expansion, Baltimore County; Honeygo Run Rubble Landfill, Baltimore County; Lawrence Street Solid Waste Acceptance Facility, Prince George's County; Ritchie Land Reclamation Limited Partnership, Prince George's County; Roll-Off Express, Inc., Carroll County; Sun Services Processing And Recycling Center, Prince George's County.

3.4.2.9 Sludge and Septage

Sludge production at the County's Little Patuxent Water Reclamation Plant equaled 12,000 dry tons in 2013, none of which was disposed at the ARL. Sludge produced was either land applied or marketed as a soil amendment or other product. The Little Patuxent plant received 11.6 million gallons in 2013, all of which was processed on-site.

3.4.2.10 Asbestos

No friable asbestos, which requires special handling, was disposed at the Alpha Ridge Landfill. All friable asbestos generated is assumed to have been exported to permitted out-of-County disposal sites.

3.4.3 WASTE AND RECYCLABLES COLLECTION SYSTEM

The Bureau of Environmental Services is responsible for County-wide curbside collection services for residential waste, recyclables and yard trim; as well as collection from those private condominium units in the residential collection program, public buildings, County Schools and two public housing complexes; and curbside waste and recyclables collection for businesses in the Ellicott city Historic District. Other than the Ellicott City Historic District, the County does not provide for commercial waste collection. Businesses must contract with private haulers for collection and disposal of solid waste.

The Bureau operates a curbside bulk trash collection for items such as sofas, desks, etc., which are collected with the regular curbside solid waste collection. Also a Residential Bulk Dumpster Program or community cleanup program is available for multi-family homes within the County's collection program. In this Program, the County coordinates with multi-family homes to provide collection containers for scheduled community waste clean-ups. Containers are delivered to collection sites by a County contractor, usually for use over a weekend, and are removed the beginning of the following week.

The Collections Division of the Bureau of Environmental Services manages the Residential Refuse Collection Program and the Residential Bulk Dumpster Program. The Collections Division uses private haulers under contracts awarded on a competitive basis. Approximately 5,000 housing units are collected per Trash and Recycling Zone (TRZ), including 5,086 condominium units. The County currently collects trash from 79,067 households, recycling from 79,351 households and yard trim from 63,450 households. Integrated collection of waste, recyclables and yard trim is provided by a single contractor within each zone. A single contractor also services the containers located at condominium developments and at public buildings.

The integrated routes offer separate waste collection including bulk items, recyclables collection and yard trim collection, each once per week. Recyclables collection is for metal cans, glass and plastic containers, rigid plastic and mixed paper. Yard waste collection for grass clippings, leaves and small wood trimmings, is provided in the eastern metropolitan area of the County. Collections are scheduled for Christmas trees in January of each year. In 2013, food scraps were collected in two of the 15 routes in the expanded pilot area. In 2011, curbside scrap metal collection began through scheduled collections. Integrated collection contracts to provide for refuse and recyclables collection are awarded for up to five year terms. The County funds waste and recycling collection and disposal with revenue from a dedicated Environmental Services Fund.

Collection contractors are not responsible for providing disposal of waste or processing of recyclable materials. Contracts provide that contractors deliver materials to facilities as directed by the Bureau of Environmental Services. The County has a service agreement with the Authority which provides that collected residential waste from Howard County be delivered to a transfer station operated by Waste Management, Inc., in Annapolis Junction. Waste Management transports waste to its landfill in King George County, Virginia.

In 2013, the Bureau directed yard trim to one of four composting facilities, Top Soil, Etc., Recycle Green Industries, Waste Management and Chesapeake Compost. The food scraps and yard trim in the pilot area go to the new ARL composting facility, as will future collections as the composting program is expanded. Recyclables are directed to a receiving facility operated by WM Recycle America, located in the Elkridge area. Scrap metal is directed to ARL for recycling through the scrap metal contractor, Dirt Express, Inc.

Commercial waste generators, including industry, institutions and retail and service businesses, contract directly with private contractors, who provide collection services for commercial waste. Private contractors also provide service for C&D debris, dead animals and septage. Collection contractors may deliver waste to any legally permitted transfer or disposal facility. As discussed previously, most commercial waste is being exported out-of-County for disposal.

The County collects HHW at a drop-off facility located at the Residents' Convenience Center. The facility is open to receive waste every Saturday from April through November, and the first Saturday of the month in January, February and March, during ARL operating hours. A contractor, Clean Harbors, Inc., operates the site and is responsible for receiving waste from citizens, identifying unknown wastes, properly packaging wastes for shipment and transporting packaged wastes to processing and disposal facilities.

3.4.4 Solid Waste Acceptance Facilities

The Alpha Ridge Landfill and Alpha Ridge Transfer Station are the only County-owned and operated public solid waste acceptance facilities. The new compost facility at Alpha Ridge is the only compost facility within the County. The Little Patuxent Water Reclamation Plant is a County-owned wastewater treatment facility that receives septage waste. Private solid waste acceptance facilities include WM Recycle America's Material Recovery Facility; and a transfer and processing facility operated by Ameriwaste, LLC which receives construction and demolition debris and MSW for separation, recycling and transfer. A small private transfer station operated by Workplace Essentials, Inc., receives small waste quantities form the firm's own operations only. Exhibit 3-20 presents a listing of solid waste acceptance facilities with specific information on each. Recycling and compost facilities are listed in Exhibit 3-21, with information on each facility. Exhibit 3-22 provides a map showing the location of each facility.

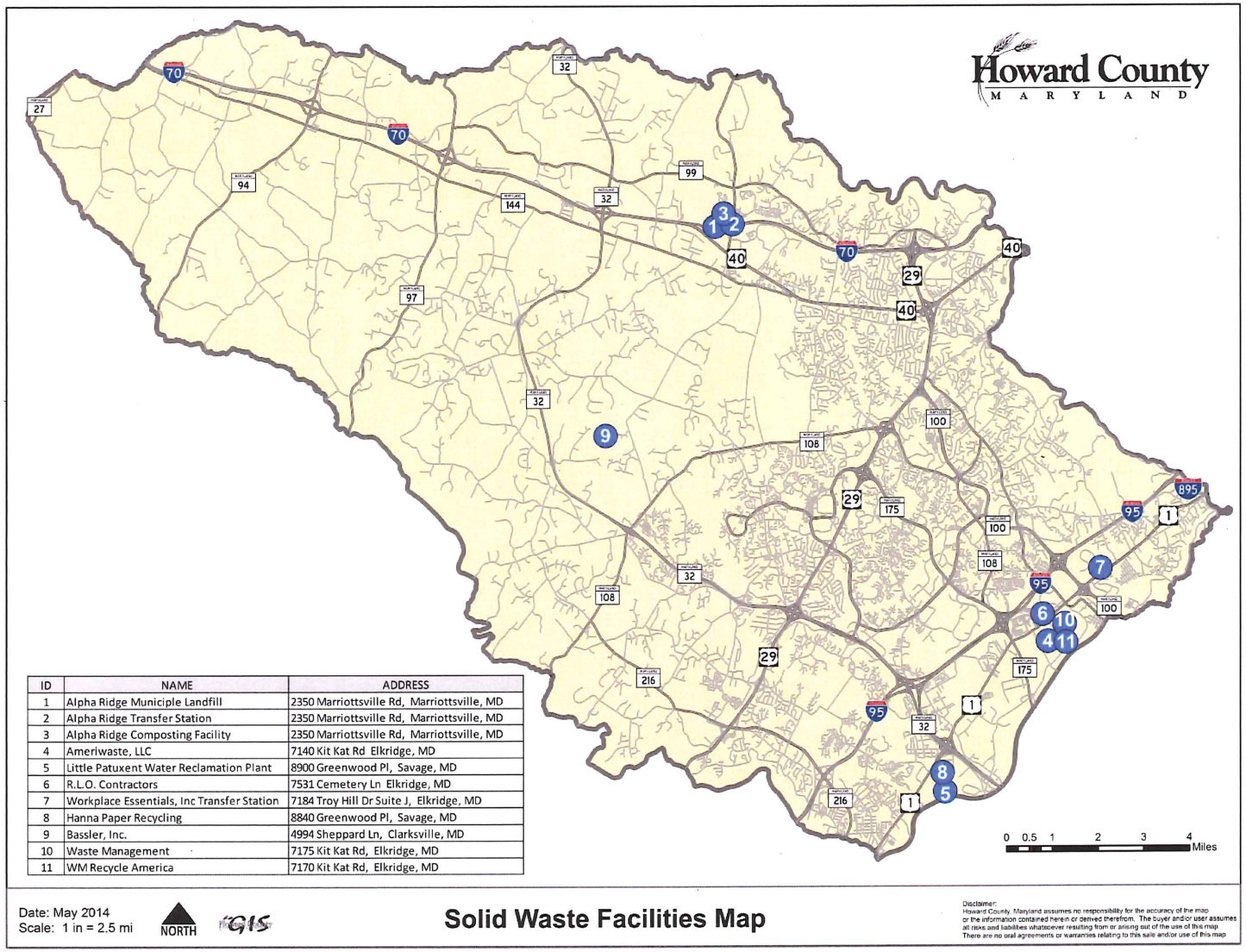
Exhibit 3-20 Description of Solid Waste Acceptance Facilities

Name	Location	Size and Facility Capacity	Type Solid Waste Accepted or Generated	Quantity Received 2013 (Tons)	Ownership	Permit Status	Estimated Service Years Remaining
Alpha Ridge Municipal Landfill	Intersection of Marriottsville Rd & 1-70 535,000 N, 825,000 E	Overall-590 acres; Permitted site -190 acres	Non-hazardous municipal solid waste	31,409	Howard County Government	Approved -MDE Permit No. 2010-WMF-0110	Greater than 50 years due to low waste quantities received.
Alpha Ridge Processing Facility and Transfer Station	Intersection of Marriottsville Rd & 1-70 535,000 N, 825,000 E	4 acre site; approximately 130,000 sq. ft. building. 500 tons per day capacity	Non-hazardous municipal solid waste	34,708	Howard County Government	Approved -MDE Permit No. 2012-WPT-0578	Greater than 20 years
Ameriwaste, LLC Processing Facility and Transfer Station	7140 Kit Kat Road, Elkridge, MD 21075 490,000 N, 868,000 E	Overall – 12.89 acres; approximately 20,000 sq. ft. under roof.	Construction and demolition debris including wood, metal, wallboard, concrete, bricks, other materials.	223,157	Potomac Abatement Holding, LLC	Approved -MDE Permit No. 2011-WPT-0572	Greater than 20 years
Workplace Essentials, Inc. Transfer Station	7184 Troy Hill Drive, Suite J, Elkridge, MD 496,000 N, 871,000 E	Transfer area of warehouse approx. 900 sq. ft.	Hygiene products waste	9	Workplace Essentials, Inc.	Approved -MDE Permit No. 2009-WTS-0594	Greater than 10 years

Exhibit 3-21 Description of Recycling and Compost Facilities

Name	Location	Size and Facility Capacity	Type Solid Waste Accepted or Generated	Quantity Received	Ownership	Permit Status	Estimated Service Years Remaining
Alpha Ridge Compost Facility	2350 Marriotsville Rd Marriotsville MD 21104	8 acres	Wood waste, yard trimmings and food scraps	18,000 tons per year	Howard County Government	Approved -MDE Permit No. 2010-WMF-0110	Greater than 20 years
Bassler, Inc.	4994 Sheppard Lane Clarksville, MD	Overall – 70 acres	Not accepting new material	Not accepting new material	Alfred S. Bassler	Operating under clean-up mode	Less than one year
Little Patuxent Water Reclamation Plant	Between U.S. Route 1 and the CSX rail lines south of Savage.	Overall site -48 acres; Capacity 29 mgd	Sludge generated on-site; septage accepted from private contractors.	Sludge generated-12,000 dry tons/yr. (includes lime); Septage -7.4 million gallons/year	Howard County Government	Approved Effluent Permit -MDE Permit No. 13-DP-1421	Greater than 20 years
Hanna Paper Recycling, Inc.	8840 Greenwood Pl Savage, MD 20763	52,000 sq. ft. Capacity 5,000 tons per month	Secure paper shredding; all types paper	3,000 tons/month	Richard Lock & George Miller	Not required	Greater than 10 years
WM Recycle America	7170 Kit Kat Rd. Elkridge, MD	Approx. 1 acre 12,000 sq. ft. building	Storage & glass sizing	120,000 tons/year	Gaulin Properties	Not required	Greater than 10 years
Waste Management, Inc.	7175 Kit Kat Rd. Elkridge, MD	12 acres	Recyclable Materials	12-15,000 tons/day	Kit Kat Partners, LLC	Not required	Greater than 10 years

Exhibit 3-22 Location of Solid Waste Facilities



ID	NAME	ADDRESS
1	Alpha Ridge Municiple Landfill	2350 Marriottsville Rd, Marriottsville, MD
2	Alpha Ridge Transfer Station	2350 Marriottsville Rd, Marriottsville, MD
3	Alpha Ridge Composting Facility	2350 Marriottsville Rd, Marriottsville, MD
4	Ameriwaste, LLC	7140 Kit Kat Rd Elkridge, MD
5	Little Patuxent Water Reclamation Plant	8900 Greenwood Pl, Savage, MD
6	R.L.O. Contractors	7531 Cemetery Ln Elkridge, MD
7	Workplace Essentials, Inc Transfer Station	7184 Troy Hill Dr Suite J, Elkridge, MD
8	Hanna Paper Recycling	8840 Greenwood Pl, Savage, MD
9	Bassler, Inc.	4994 Sheppard Ln, Clarksville, MD
10	Waste Management	7175 Kit Kat Rd, Elkridge, MD
11	WM Recycle America	7170 Kit Kat Rd, Elkridge, MD

3.4.4.1 Public Facilities

The Alpha Ridge Landfill is located on Marriottsville Road, north of Interstate 70, in the northern part of the County. The Landfill opened in 1980. It consists of 590 acres, of which 190 are permitted for fill. Since the majority of residential waste and commercial waste is disposed at private facilities, the ARL is expected to not reach capacity until after the year 2100 based on projections documented in Annual Capacity Utilization Reports submitted to the MDE. However, such extreme long term projections are not reliable, given changes in solid waste management practices which could occur prior to that time.

The Alpha Ridge Transfer Station is located on the property of the ARL in the vicinity of the maintenance building and leachate storage tank. The Transfer Station is a two-level 500-ton per day (tpd) MSW transfer facility which occupies a four acre area. Initial operations were projected to accept waste at a rate of 200 tpd, eventually increasing to 500 tpd (the permitted capacity). Generally, commercial haulers deliver solid waste onto a tipping floor utilizing self-unloading vehicles. There is a separate area provided for smaller vehicles requiring hand unloading.

The ARL and Transfer Station accept non-hazardous solid waste including MSW, construction, demolition and land clearing (C&D) debris. Operations are 6 days per week, 52 weeks per year, with the exception of specified County holidays. Daily receipts of all types of acceptable waste at the Landfill averaged about 120 tons per day in 2013, for a total of approximately 36,280 tons for the year. The major portion of the waste received is transported to the AJTS for disposal, leaving about 3,700 tons per year for disposal at the Landfill.

At the Residents' Convenience Center at the Landfill, residents may dispose of waste not collected at the curb. White goods, bulky waste, tires, wet cell batteries, used motor oil, antifreeze, mattresses, textiles, shingles, electronics (computers, CRT's, etc.), rigid plastics, carpet, polystyrene foam #6, textiles, shoes, cooking oil and other recyclables also can be brought to the Center by residents.

A permanent household hazardous waste drop-off facility is located in the vicinity of the convenience area. This facility is operated by a contracted hazardous waste disposal firm on every Saturday from April through November and the first Saturday in January, February and March.

Waste fill operation are conducted in a 35 acre cell which has a double geomembrane liner and a leachate collection system, in operation since 1993. A final cap and associated facilities for each fill area that reaches permitted capacity will be constructed in accordance with Maryland regulations.

In 1994 the County completed three studies to determine the extent of ground water contamination which had been previously identified at the ARL and two older closed landfills, Carrs Mill and New Cut Road. The studies identified remedial measures required to control ground water contamination at each site. Construction of recommended measures was completed at the Carrs Mill site in 1998, in 2002 at the New Cut Road site and in 2001 at ARL site. Remediation measures installed at each site include an impervious cap, a landfill gas control or venting system and a pump and treat ground water containment system. The containment system will operate for approximately 30 years with regular monitoring of groundwater quality to assess progress of the clean-up effort.

As discussed previously in this chapter, the Little Patuxent Water Reclamation Facility is the only facility permitted in the County to receive septage waste. Nearly 11.6 million gallons of septage were received at the plant in 2013.

As described earlier in this chapter, in Section 3.2.4, dead animals (road kills, euthanized animals) are stored at the County's Animal Control Facility for pick-up by a privately collector. Dead animals are also collected by local veterinarians and agricultural operations. Dead animals are not disposed in the Landfill, and records are not maintained on the total tonnage of animal bodies generated each year from all private and public sources. Records are maintained, however, on the number of dead animals

generated in the county. Two out-of-county facilities are used, depending on the size of the animal, Curtis Bay Energy, an incinerator, and Valley Protein, a rendering plant.

3.4.4.2 Private Facilities

Medical waste is shipped offsite for incineration at the Baltimore facility operated by Stericycle, Inc.

Workplace Essentials, Inc. operates a small scale transfer facility for the acceptance and transfer of waste generated from its own business operations only. The firm services restroom disposal containers for feminine hygiene products and consolidates small quantities of collected waste at its warehouse. Waste is placed in an on-site dumpster which is periodically emptied for export to a disposal facility.

WM Recycle America operates a Materials Recovery Facility (MRF) in Elkridge. The facility receives various grades of paper, cardboard and glass, rigid plastic and plastic and metal food and beverage containers. This facility receives and processes the single-stream recyclables collected from the County's curbside area, the County schools, County government buildings and multi-family and drop-off center recycling programs. WM Recycle America also receives recyclables from neighboring jurisdictions and a number of commercial customers. Total quantities of materials received per year from other sources are not disclosed by WM Recycle America. All materials are shipped to end-markets located outside of Howard County.

Ameriwaste, LLC operates a 20,000 square foot waste processing and transfer facility for mechanical separation, recycling and transfer of construction and demolition debris and MSW at a site on Kit Kat Road in Elkridge. Specific materials recycled and marketed include wood, metal, wallboard, cardboard, concrete and bricks. Other materials may be recycled as markets develop. The facility processes up to 335,000 tons per year.

The AJTS, owned and operated by Waste Management, Inc. and located in Anne Arundel County, receives both commercial and residential waste from Howard County. Most commercial waste is delivered by private sources. Residential waste, collected in Howard County by firms under contract to the County, also is delivered directly to the Transfer Station. In addition, residential and commercial waste received at the ARL is transported to the transfer station. Waste is delivered by the County under a Service Agreement with the Authority. The Authority, in turn, has a Waste Disposal Agreement with Waste Management, Inc. Under these agreements, Howard County may deliver a maximum of 1,200 tons per day or an annual maximum of 150,000 per year of residential and commercial waste to the Transfer Station for rail transport and disposal at the King George County, Virginia landfill, also owned by Waste Management.

In the event that a county's primary disposal option is an out-of-county disposal option, the MDE requires that the county identify the disposal facility to which waste will be transported and the facility that has been designated as the alternate or back up disposal site. Alternate or back up disposal capacity may be provided either through contractual arrangements with the transporter or by the county providing disposal capacity in a permanent landfill either within or outside of the county. MDE requires that any waste disposal system selected by a county provide a redundant and secure backup capability to assure that wastes are continually managed and properly disposed of in the event of an interruption or other problem with the primary disposal option. In addition to MSW which comprises the majority of a county's waste stream, secure and adequate disposal capacity must also be identified and provided for all other wastes in a county, including but not limited to non-transportable waste such as asbestos or bulky wastes.

In response to this policy, Howard County prepared a Contingency Plan, which was submitted to MDE. This plan identifies the ARL as the County's solid waste acceptance facility which will receive waste not delivered to the AJTS or other facilities. In addition, the ARL will be the backup facility to receive waste

in the event waste transfer operations cease or are interrupted, either due to a catastrophic event, contractual issues or for any other reason.

At present, no private landfills exist in Howard County which are permitted for disposal of construction and demolition debris (rubble) or land clearing debris. This material may be disposed at the ARL, although more economical disposal facilities are available outside the County. Rubble landfills are permitted on land in the County zoned M1 and M2 with the SW Overlay, as discussed in Chapter 2. County zoning regulations define the types of non-hazardous waste materials which can be accepted at a land clearing or a rubble landfill. Acceptable wastes for each type of facility are given below.

The following non-hazardous materials are acceptable for disposal in a land clearing debris landfill:

- earthen material such as clays, sands, gravels and silts;
- top soil;
- root mats;
- brush and limbs;
- logs;
- vegetation; and
- rock.

The following non-hazardous materials are acceptable for disposal in a rubble landfill:

- land clearing debris, as defined above;
- demolition debris:
  - Acceptable demolition debris associated with the razing of buildings, roads, bridges and other structures includes structural steel, concrete, bricks (excluding refractory type), lumber, plaster and plasterboard, insulation material, cement shingles and roofing material, floor and wall tile, asphalt, pipes and wires and other items physically attached to the structure, including appliances if they have been or will be compacted to their smallest practical volume. Asbestos waste and appliances may be accepted for disposal in accordance with state regulatory requirements for proper disposal of these materials.
  - Unacceptable demolition debris includes industrial waste or by-products, any waste materials contained within the structure or on the grounds of the structure being demolished that are not physically part of the structure, or which are comprised of or contain materials that pose an undue risk to public health or the environment.
- construction debris:
  - Acceptable construction debris is structural building materials including cement, concrete, bricks (excluding refractory type), lumber, plaster and plasterboard, insulation, shingles, floor, wall and ceiling tile, pipes, glass, wires, carpet, wallpaper, roofing, felt or other structural fabrics. Paper or cardboard packaging, spacing or building materials, provided that they do not exceed 10 percent by volume of the waste, may be accepted at the rubble landfill. Paint containers, caulk containers or glaze containers, provided that they are empty and any residual material is dried before acceptance at the rubble fill, and further provided that this waste category does not exceed one percent by volume of the waste accepted at the rubble fill.
  - Unacceptable construction debris includes commercial, domestic or industrial wastes or by-products, paint, tar or tar containers, caulking compounds, glazing compounds, paint thinner or other solvents or their containers, creosote or other preservatives or their containers, tile, paneling or carpet cement or other adhesives and other solid waste which may contain an

unacceptable waste or substance as may be determined by the approving authority to be unacceptable.

It is noted that the County Board of Appeals or County Council may further limit waste materials which may be accepted as allowed by the County's zoning regulations.

3.5 RECYCLING AND WASTE REDUCTION PROGRAM

Howard County has a multi-faceted and comprehensive recycling and waste reduction program which satisfies the requirements of the 1988 MRA. Data regarding waste quantities diverted through recycling and waste reduction programs is provided and discussed previously in this chapter. Since the inception of Howard County's recycling and waste reduction program, the percentage of waste recycled and diverted, as reported annually to MDE, has grown steadily. Documented recycling and waste reduction diversion has grown from zero percent before the County instituted recycling programs to 52.5 percent total diversion in 2011. Howard County's 2011 recycling rate of 48.5 percent surpassed the State's initial mandatory goal of 20 percent recycling by 1994, and also surpasses the voluntary goal of 35 percent recycling by 2015. Components of the program are discussed below.

3.5.1 WASTE REDUCTION

Reduction of solid waste generation by residents and commercial establishments, and reduction of household hazardous waste generation, are objectives of Howard County's solid waste management program. Since 2000, MDE, through a credit system, has allowed jurisdictions to count waste reduction efforts towards their overall recycling and waste reduction diversion rate goals. In 2011, Howard County was able to add an additional 4 percent, out of a maximum allowable of 5 percent, to its MRA diversion rate through documented waste reduction activities.

The County has implemented several waste reduction initiatives as described below.

3.5.1.1 Food Scraps Curbside Collection and Composting

In 2010, the County tested curbside food scraps collected with the yard trim. In 2011, a full scale pilot food scraps collection program started with over 1,000 households participating in one of the trash and recycling collection routes. Based on data from this pilot, it is estimated that approximately 25 percent of the residential trash at curbside is food scraps or about 14 percent of all the material at curbside is food scraps. A pilot organic processing facility which includes food scraps, yard trimmings and wood waste began operation in the summer of 2012. Current capacity is 3,300 tons and final capacity at the new site will be 8,100 tons. A description of the future plans can be found in Chapter 5.

3.5.1.2 Conversion from Twice To Once Per Week Trash Collection

In FY 1992 and 1993, the County switched from twice per week trash collection service. By exchanging one trash collection day for the recycling day, recycling collection service was added without a major increase in collection costs.

3.5.1.3 Backyard Composting

The County operates a multi-faceted backyard composting program in cooperation with the University of Maryland Cooperative Extension Service. The cornerstone of the program is the availability of free backyard composting bins to all County residents. Other elements of this program include literature and promotions, Master Gardener classes and four volunteer-managed backyard composting sites located at Schooley Mill Park, Rockburn Park, Centennial Park and the ARL. Volunteers from the Extension Service also manage the "Rake and Take" program, which helps match residents in need of yard trimmings for compost projects with residents who wish to divert their yard trimmings from disposal (mostly in the western portion of the County).

The objective of these programs is to encourage residents to compost yard trimmings on their property rather than place these materials out for collection at the curb. As noted earlier, MDE allows Maryland jurisdictions to credit source reduction efforts, including backyard composting, towards their overall recycling and waste diversion goals.

3.5.1.4 Grasscycling

Grasscycling refers to leaving grass clippings on the lawn after mowing, and is promoted through the County and the Extension Service as a waste reduction method. The practice is promoted through the distribution of literature and through various other promotional methods. This practice is especially encouraged in the western rural section of the County, where yard trimming collection is not offered. Grasscycling is also considered as a source reduction effort by MDE.

3.5.1.5 Household Hazardous Waste Reduction

Despite the small quantities involved, reducing disposal of Household Hazardous Waste (HHW) has had a positive impact on the overall toxicity of solid waste disposed. The County promotes the use of less toxic alternative household products for cleaning, painting, etc. through the distribution of County produced literature and literature from the U.S. EPA. The County also provides a permanent drop-off facility for HHW every Saturday from April through November, and on the first Saturday of January, February and March, of each year at the ARL Residents' Convenience Center. Approximately 245 tons of HHW were delivered to the drop-off area during 2013.

3.5.1.6 Donation and Reuse Programs

The County promotes and facilitates the donation of materials to non-profit organizations for reuse and recycling. County recycling webpages (www.HowardCountyRecycles.org) and literature suggest donation options and provide referral information for non-profit groups seeking reusable materials. Callers to the County's recycling hotline number receive referral information for many non-profit organizations in the area which accept or pickup reusable materials. In addition, the County hosts collection trailers for several non-profit groups collecting reusable and recyclable materials at the Residents' Convenience Center as noted below.

The Loading Dock is a non-profit organization, which serves as a clearinghouse for reusable building materials used in low-income housing projects. Items accepted include bathtubs, cabinets, counter tops, doors, hardware, lumber, lighting fixtures, white latex paint, molding, plumbing, shelving, windows and other building materials. A trailer is located at the Convenience Center. The Loading Dock collected 98 tons of reusable building materials in 2013.

Goodwill is a non-profit organization, which helps put people to work. Items accepted include household items, furniture, books and clothes. Every second and fourth Saturday, a Goodwill truck is at ARL accepting donations.

Go Green for the Cause is a non-profit, which supports children with medical, mental or psychological special needs. Several of their bins were placed at ARL in 2012 replacing the previous textile recycling option. 28 tons of textiles were collected for recycling in 2013.

Colored latex paint is collected for recycling by Repaint USA. Cell phones and ink cartridges are also collected at ARL for charities.

At the County's annual Greenfest, several options are available for donating to reuse operations such as Goodwill and Habitat for Humanity. A total of 18 tons of recyclable materials were dropped off at the County's semi-annual paper shredding and annual Greenfest in 2013.

3.5.2 RECYCLING

Howard County achieved a documented overall recycling rate of 48.5 percent for 2011. Approximately 216,268 tons of materials were diverted from the waste stream through County-sponsored recycling programs and through commercial recycling efforts. Since the inception of Howard County's recycling and waste reduction program, the percentage of waste recycled and diverted, as reported annually to MDE, has grown steadily. As mentioned above, Howard County's diversion rate continues to surpass both the State's mandatory recycling goal and voluntary diversion goal. The County's overall waste diversion rate was 52.5 for 2011. This rate also takes into account source and waste reduction efforts approved for credit by MDE.

The residential recycling program tonnage growth can be attributed to the fact that the County's recycling program has been fully implemented for a number of years, plus the beginning of single-stream recycling in 2006 and the distribution of recycling carts to all households in the County's curbside recycling program. The recycling rates would be higher, except a combination changes in packaging and economic conditions have contributed to a downward trend in recyclable waste tonnage over the past few years. For example, many beverage makers have gradually shifted from heavy glass containers to lighter plastic containers during this time. Many newspapers, magazines and other publications are also now smaller in size and have fewer subscribers.

Recycling programs and initiatives that the County has implemented are discussed below.

3.5.2.1 Curbside Recycling

The County provides weekly collection of designated materials for most single family homes and townhomes in the County, as well as some of the condominium units. Residents may set out single-stream, or commingled, food and beverage containers and paper in the County provided wheeled carts or bins, or, in the least preferred method of see-through plastic bags. Residents may also place residential mixed paper out for collection in paper bags, bundled with string or inside the recycling carts or bins. There is no limit on the amount of recyclables that can be set out per collection.

Single stream food and beverage containers and residential mixed paper are delivered to the County's recycling processing contractor as discussed previously in this chapter. Materials collected include:

- Steel and aluminum cans, including empty aerosol cans, aluminum foil and bake ware
- Any color glass bottle or jar
- All plastic bottles (with the exception of automotive fluid containers), jars, tubs and rigid plastic
- Residential mixed paper, including newspaper, cardboard, writing and copy paper, softback and hardback books, magazines, junk mail, catalogs, cereal and food boxes, etc. Waxed, foiled and plasticized papers are not accepted.

The curbside recycling program is voluntary. County performed field surveys have consistently shown participation to be in the 90 to 95 percent range. Over 23,000 tons of residential mixed paper and 455 tons of commingled containers were collected from Howard County residences at curbside in 2013.

Curbside collection of scrap metal began in the fall of 2011 from all households with curbside recycling collection. Residents call the Bureau of Environmental Services offices to schedule a pickup. A separate contractor is scheduled to pick up at approximately 30 stops a day. Depending on the demand and the volume, the contractor is scheduled for 5 days a week service or less. Between October 2011, when the program began, and June 2014, 318 tons of scrap metal have been collected which might have otherwise gone in the trash for disposal.

Beginning in 1996, separate collection of yard trimmings was mandated. All homes in areas zoned for medium or high-density development (in the metropolitan area of the County) receive weekly collection

of yard trimmings from April through the third week in January of each year. For areas with food scrap collection, the weekly collection service is year round. Leaves, grass, small brush and branches and other trimmings are collected. There is no limit in the amount of yard trimmings that can be set out per collection. Materials may be set out in plastic bags, paper bags or in reusable trash cans or containers. The County has considered banning plastic bags for yard trimmings, similar to the bans in nearby jurisdictions. At this time plastic bags are not banned, but the County is encouraging the use of paper yard trim bags. Food scraps are collected in a County-provided sealed, wheeled cart.

Yard trimmings (and food scraps where applicable) are collected on the same day as regular single-stream recycling. Food scraps are collected with the same collection crews and vehicles used to collect the yard trimmings.

Residents who receive regular yard trimmings collection service also receive Christmas tree recycling collection service during the first three weeks of January. The same collection crews and vehicles used to collect yard trimmings are used to collect Christmas trees. Christmas trees are also delivered to the same site as yard trimmings. More than 10,400 tons of yard trimmings, including 280 tons of Christmas trees, were collected at curbside from Howard County households during 2011. The County also operates Christmas tree recycling drop-off centers during January, primarily at County parks and at cooperating private nurseries and hardware stores throughout the County.

3.5.2.2 Apartment and Condominium Recycling

State law requires apartment buildings and condominiums with 10 or more dwelling units ("Multi-family Communities") to provide recycling of plastic, metal, glass containers and paper for their residents. Multi-family Community recycling must be carried out in accordance with the requirements of the County Solid Waste Management Plan. This section of the County Waste Solid Waste Management Plan details the requirements for Multi-family Community recycling. Additional information is available on the Howard County web site, http://www.howardcountymd.gov/apartmentcondorecycling.htm.

In order to implement State law, the County has notified all multi-family communities in the County of the new recycling requirement. Before March 15, 2014, the County will provide all Multi-family Communities in the County with the County Apartment and Condominium Recycling Plan and information about developing and submitting a proposed Recycling Plan to the County. The County requires that each Multi-family Community existing as of December 31, 2013, submit a proposed Recycling Plan to the Howard County Recycling Division before May 1, 2014.

Once the County approves the Recycling Plan, the Multi-family Community must begin publicizing the Recycling Plan to their residents. Multi-family Communities must provide weekly recycling collection In accordance with an approved Recycling Plan by October 1, 2014.

For new construction or redevelopment of Multi-family Communities, the site development plan must be reviewed by the Bureau of Environmental Services to verify accommodation is made for recycling. Recycling Plans must be approved before Use and Occupancy is issued and recycling collection must commence when the Multi-family Community has at least one resident.

Howard County maintains a list of Multi-family Communities that is updated every 3 years. A copy is attached as Appendix B. Interested parties may call the Howard County Recycling Division at 410-313-6444 to obtain information about the list or for assistance with development of a Recycling Plan.

The Property Owner or Manager of an apartment building that contains 10 or more dwelling units or the Council of Unit Owners for a Condominium that contains 10 or more dwelling units (the "Responsible Party") is responsible for submitting and implementing the Recycling Plan.

3.5.2.2.1 Multi-family Community Recycling Plans

At a minimum, the Recycling Plan must include the following:

- A map of the property showing all buildings and the intended location of all recycling collection containers.
- A description of the number, size, type and color of collection containers.
- A description of the weekly transportation of the recyclables, to a Recyclables Processor, End-user or to the Alpha Ridge Landfill.
- A description of how the recyclables will be marketed.
- A description of efforts to educate residents about the Recycling Plan and examples of the materials used to communicate the Plan to residents.
- Inspection and monitoring plans to verify that the Recycling Plan is properly implemented.

3.5.2.2.2 Annual Report

Responsible Parties must provide an Annual Report to the Howard County Recycling Division by March 1 of each year, which covers the previous Calendar Year and provides the following Information:

- Beginning and end dates for all services that began and ended in the previous Calendar Year.
- Contact information for all transporters of recyclables, whether the Responsible Party self-hauls or contracts with a third party.
- Contact Information for all Recyclables Processors, End-users or Brokers used to dispose of recyclables during the previous Calendar Year.
- A copy of at least one invoice for all third party haulers, Recyclables Processors, End-Users or Brokers used during the previous Calendar Year.
- Total tons of waste generated and disposed.
- The total tons of recycling hauled from the Multi-family Community during the previous Calendar Year.
- Documentation of efforts to communicate the Recycling Plan to residents.
- A letter signed by the Responsible Party that states that the residents of the Multi-family Community have had access to a weekly service with the minimum number, type, size and color of collection containers approved by the County in the Recycling Plan.

3.5.2.2.3 Monitoring and Enforcement

The Howard County Recycling Division will monitor the performance of each Recycling Program. The County has the right to inspect any Multi-family Community to assess any element of the Program. If the County identifies any deficiencies, the Responsible Party has 30 days to correct these deficiencies upon written notification by the County.

The Recycling Division may require changes to an approved Plan. In addition to the information provided in the Annual Report, Responsible Parties must provide documentation related to the Recycling Plan, when requested by the County.

Any Responsible Party who does not implement their Recycling Plan, does not submit an Annual Report or does not cooperate in providing access or information about its recycling program is in violation of Howard County Code §18.611 and is subject to a civil penalty for each day that that the violation continues. In addition to a civil penalty, the County may pursue other legal action to enforce State and County law.

3.5.2.3 Recycling at Alpha Ridge Landfill Residents' Convenience Center

The County operates a recycling drop-off center as part of the Residents' Convenience Center at the ARL in Marriottsville. The center is open daily during landfill operating hours and County residents may

use it at no charge for household waste. Everyone, however, pays tipping fees for C&D waste. Small businesses with a valid commercial permit may also drop-off reasonable quantities of recyclable materials.

Materials accepted for recycling, and in some cases reuse, include glass and plastic containers, mixed paper, corrugated cardboard, scrap metal and white goods, tires, wood waste, yard trimmings, car batteries, motor oil, anti-freeze, roofing shingles, building materials, textiles, carpet, cooking oil, rigid plastics and electronic waste. Over 15,000 tons of recyclables were delivered to ARL from both residential and commercial sources in 2013.

3.5.2.4 Recycling Processing Operations

The County has elected to privatize its recyclables processing operations rather than pursue a public option, due to high capital costs and to ensure cost-effectiveness and flexibility. There are two major contracts for processing large volume material, and a series of lesser contracts for processing individual materials collected at the ARL. Major contracts are described below:

- *Residential Curbside and Multi-Family Collected Materials*: Since 1992 the County has contracted the processing of curbside collected glass, plastic and metal containers and residential mixed paper. The contracts have been based on a processing fee, with no minimum or maximum tonnage commitment other than the contractor receives all materials collected from curbside collection and multi-family collection. Contract prices are established for both commingled containers, cardboard and mixed paper and prices fluctuate monthly based on prices quoted from regional market indices for all materials. The contract is set up so that the County benefits when market prices for recyclable materials increase. If the market prices are above the processing fee, then the County receives the difference. Conversely, when published market prices for recyclables are low, and below the processing fee the County does not pay the contractor. Markets for the various commodities vary.
- *Curbside Yard Trimmings:* The yard trimmings from the curbside collections are taken directly to Recycle Green Industries, Top Soil, Etc., Chesapeake Compost or Waste Management for composting. In the summer of 2012, the food scraps and yard trim from the pilot area began going to the new facility at ARL.
- *ARL Wood Waste and Yard Trimmings:* Beginning in 2013, the County took over the grinding into mulch of the wood waste and yard trimmings received at ARL. Ultimately, the wood waste will be included in the full scale compost facility to be built at ARL. The County is now able to retain the revenue from the sales of the material produced.

3.5.2.5 Education

Howard County is committed to a voluntary recycling program. To ensure program success, the County has invested in public education and outreach initiatives. Outreach focuses on a diversified series of media and community outreach to all County residents, including children, and to businesses. Outreach and education efforts are spearheaded by the Recycling Division.

The County uses the internet for education and outreach. The website, www.HowardCountyRecycles.org, is updated regularly and is a useful source for how to recycle or reuse many items, even beyond what the County collects. Included on the website are how-to videos, information on what is recycled curbside and at the ARL, County and other recycling waste reduction or environmental events, surveys, reports and links to other useful sites. The Recycling Division started a twitter page @HoCoRecycles in 2012. A monthly tips newsletter is also sent out to all who request to be on the list.

The County provides educational presentations to both private and public county schools. Recycling Coordinators provide classroom presentations, assemblies and brief lunchroom presentations. Students

learn responsibility, environmental science, math, energy, conversion and business during a fun, interactive presentation about recycling. It's important to encourage students to become better stewards of the environment and, in turn, to form life habits for recycling and improving the world. The children are the future of the Howard County recycling program.

The County also provides educational presentations to County organizations, including homeowner associations, churches and businesses.

Many of the local organizations in Howard County produce and maintain their own newsletters. The County sends regular reminders to these organizations so that they may include updates and new information in these publications.

The County attends local events to provide information and to be available to answer questions. Table-top displays include pertinent brochures and promotional items, as well as a variety of items that can be recycled. The Division has found that this display is very effective for providing information about what can be recycled in the County program.

Prerecorded recycling information on frequently asked questions (FAQs) is available 24 hours per day, seven days per week on the County's recycling hotline at (410) 313-6444. During regular business hours of 8:00 a.m. to 5:00 p.m., the hotline is staffed.

Recycling and Waste Reduction literature is displayed at information sites throughout the County including libraries and village centers. The County also maintains a lending library, including video tapes and books, on recycling, composting and waste reduction topics which are available to schools and community groups.

The County provides a reference and referral service for County businesses wishing to develop or expand recycling programs. Through the Howard County Chamber of Commerce, a Business Recycling Co-op was created which allows businesses easy access to affordable single-stream recycling. The webpage, http://howard.wliinc2.com/recycle.aspx, provides information on the program, a downloadable brochure, application form to sign up for the business co-op and the Recycling Co-op PowerPoint Presentation for downloading.

The County has a packet of business recycling and waste reduction materials from County, State and Federal sources. Business recycling and waste reduction materials include lists of local service providers, markets and technical assistance information. Businesses are also directed to visit the www.mdrecycles.org website, which is maintained by the Authority. This website developed at the direction of the Authority member jurisdictions, includes a comprehensive listing of business recycling services, markets and technical advice. County and Authority staff are available to visit business locations and assist in conducting waste stream evaluation and identifying recycling markets. Recent outreach has included direct mail, telephone calls, site visits, website information and working with business associations and the Howard County Chamber of Commerce.

The County each year implements its 'Merry Mulch' community outreach program to foster Christmas tree recycling. The program distributes fliers explaining Christmas tree recycling options, including curbside collection and identifying area drop-off locations. The fliers are distributed throughout the community and at all participating Christmas tree vendor stands. In exchange for the vendors displaying posters and fliers, the vendors earn the right to dispose of their unsold trees at the ARL Christmas tree drop-off site at no charge. Normally vendors would be required to pay a $25/ton tip fee to dispose of wood waste.

HOWARD COUNTY PUBLIC SCHOOLS RECYCLING PLAN

The Howard County Government does not govern or make policy for the Howard County Public Schools System (HCPSS) or the Howard Community College (HCC), but does provide funding to both entities.

The HCPSS and HCC will be responsible for maintaining recycling programs at their facilities. The School System maintains an informational web site at http://www.hcpss.org/parents/recycle.shtml which details their recycling program.

HCC maintains a sustainability website at http://www.howardcc.edu/Visitors/green/. The HCC recycling page can be found at http://www.howardcc.edu/Visitors/green/Recycling/index.html.

The Howard County Public Schools Recycling Plan, including a detailed list of the types of materials that will be accepted in the single-stream program, and a list of facilities, number of dumpsters and/or recycling carts at each facility and its collection frequency are attached as Appendix C.

3.5.3 Material Markets

The County has relationships with end-markets for each of the recyclable materials in its recycling program either directly or through contractors that provide collection and/or marketing services. This subsection provides an overview of the County's end-markets, including:

- Those accepting recyclables generated by the County's recycling program; and
- Other significant markets located within the County

The general strength or weakness and volatility of end-markets vary among recyclables. The County has reacted to market dynamics by periodically changing some of the end-markets it uses. The County has also changed some contract payment/rebate formulas based on changing market conditions. However, in general, the County contracts with stable firms for marketing of its recyclables. While these firms often have long-term contracts with recyclables buyers, often with floor prices built in for protection against market swings, these firms are also able to change markets if needed.

3.5.3.1 Single Stream Recyclable Materials

The County contracts with WM Recycle America, Inc. to process and market the paper, corrugated cardboard (OCC), metal food and beverage cans, glass bottles and jars and plastic bottles collected from curbside collection routes, the multi-family recycling program, County Schools, County buildings and from the ARL Residents' Convenience Center.

The per-ton processing fees paid for the single-stream material are adjusted monthly based on regional market prices. The processing contract is set up so that the County benefits when market prices for the materials are high, through receipt of revenues from the contractor. Conversely, when published market prices for materials are low, the County receives less or no revenues from the contractor. The processing fees are based on the weighted average makeup of the County's commingled stream (i.e., the percentage of aluminum, plastic, glass and steel per ton of material). These weighted averages are verified through sampling and are adjusted periodically throughout the course of the processing contracts.

3.5.3.2 Corrugated Cardboard, Paper

Several firms, including Waste Management, Inc., provide "dumpster" style (four to eight cubic yard) containers to their waste collection customers for the separate collection of select paper types, OCC being the most prevalent material collected. Collected material is taken to processing facilities for baling and marketing. In Howard County a total of approximately 29,000 tons of OCC were recycled in 2013.

Processors of cardboard and paper include:

- Hanna Paper is an intermediate processor located in Savage, which receives various grades of waste paper from within and outside the County. The company processes and delivers paper to end-markets.
- Athelas National Recovery Institute is an intermediate waste paper processor located in Columbia, which also provides document destruction services.
- Kline Paper Mill Supply, based in Columbia, receives printers' waste, office/computer paper, corrugated, magazines and other grades of paper for recycling. The company processes and markets paper to final markets.

A number of large retailers in Howard County, including Giant Food, Safeway, Target Corporation, Best Buy, Wal-Mart and others recycle a variety of materials, most notably corrugated cardboard. Many large retail businesses including the ones listed above back-haul recyclables from their Howard County stores to central distribution centers.

3.5.3.3 Yard Trimmings and Wood Waste

The bulk of yard trimmings delivered to Recycle Green Industries, Top Soil, Etc., Chesapeake Compost or Waste Management are composted to produce generally locally marketed products. The costs are set with a CPI adjustment based on current contracts. Approximately 10,420 tons from curbside were processed either by the private contractors or the facility at ARL in 2013.

The County shreds wood waste collected at the Residents' Convenience Center to produce a mulch product. Yard Trim and Food Scraps collected from the curbside pilot program, along with those materials dropped off at the Residents' Convenience Center are composted.

3.5.3.4 Textiles

Used clothing and other textiles are collected at the Residents' Convenience Center. Previously, the Linwood Children's Center, a non-profit organization in Howard County, received textiles in a trailer supplied by that organization and sent collected material to Philadelphia for recycling. Go Green for the Cause is the current non-profit collecting textiles and shoes. Approximately 28 tons of textiles were recycled in 2013.

3.5.3.5 Tires

Auston Contracting, Inc., located in Baltimore, takes scrap tires from the County's permitted secondary storage facility located at the Residents' Convenience Center at ÁRL. Approximately 260 tons of tires were collected at ARL in 2013.

3.5.3.6 Used Oil

The County has a contract with FCC Environmental, LLC, out of Baltimore, to collect waste oil from two 1,000-gallon tanks at the Residents' Convenience Center at the ARL. FCC Environmental pays the County $0.75 per gallon for all oil collected. 107 tons of waste oil was collected in 2013.

3.5.3.7 Antifreeze

The County also contracts with FCC Environmental to collect used antifreeze from a 1,000-gallon tank at the Residents' Convenience Center. Neither party receives payment for this service. Approximately nine tons of antifreeze was collected in 2013.

3.5.3.8 Auto Batteries

P and H Auto-Electric, Inc., in Baltimore, buys wet cell auto batteries that have been delivered to the Residents' Convenience Center. P and H Auto-Electric, Inc., pays the County $0.15 per pound, equating to $4.95 per standard (33 lb.) automobile battery. Approximately 30,000 pounds of batteries were marketed in 2013.

3.5.3.9 Scrap Metal

United Iron and Metal, LLC, is under contract with the County to take scrap metal, such as appliances, bicycles, metal chairs and other items. The contractor provides roll-off containers at the Residents' Convenience Center and provides transportation of full containers to its facility.

3.5.3.10 Non-Ferrous Metal

Maryland Recycle Company, located in Elkridge, is a dealer of all types of non-ferrous metals, including aluminum, brass, copper and others. The company separates cuts and bales metals it receives and in turn markets the metals to final markets.

3.5.3.11 Liquefied Petroleum Gas Bottles

Propane tanks and other fuel gas bottles are collected at the Residents' Convenience Center. Blue Rhino/Aero Energy transports the empty bottles to their facility for recycling. Payment is made by the County for this service. 21 tons were recycled in 2013.

3.5.3.12 Fluorescent and Compact Fluorescent Lights

The County was required, by the 2010 amendment to §9-1703 of the Annotated Code of Maryland, to develop a strategy for the collection and recycling of fluorescent tubes and compact fluorescent lamps (CFLs) containing mercury. There are several options for drop-off of these items. Information and a listing of retail locations accepting CFLs and/or fluorescent tubes is available on the Howard County web site, http://www.howardcountymd.gov/CFLs.htm.

For residents only, CFLs and fluorescent tubes may be dropped off at the Alpha Ridge Residents' Convenience Center on the County's Household Hazardous Waste collection days, which are Saturdays in April-November, 8 am to 4 pm.

3.5.3.13 Construction, Demolition and Land Clearing Debris (C&D)

Ameriwaste, LLC operates a processing and transfer facility for the separation and recycling of construction and demolition waste, as well as MSW at their site on Kit Kat Road in Elkridge. Ameriwaste recycles and markets several components of the waste processed, including wood, metal, wallboard, cardboard, concrete and bricks from construction sites and from waste generators both within and outside the County. Other materials may be recycled as markets develop. Waste is brought into an enclosed building and sorted by mechanical equipment. Process material is marketed to in-County and out-of-County markets.

3.5.3.14 Used Building Materials

Used building materials and white latex paint are collected at the Residents' Convenience Center by The Loading Dock, a non-profit organization. The Loading Dock provides the materials to low-income individuals and non-profit organizations in the region for housing repair and construction. Approximately 98 tons of used building materials were recycled in 2013.

3.5.3.15 Roofing Shingles

Roofing shingles and felt are collected at ARL. Asphalt Roof Recycling Center Inc. transports the material received to their processing facility in Frederick County. Approximately 996 tons of roofing shingles were recycled at ARL in 2013. The County charges a reduced tipping fee ($55/ton) for the delivered material.

3.5.3.16 Sawdust and Wood Shavings

American Wood Fibers, located in Jessup, receives sawdust and wood shavings from sources within and outside Howard County. Materials received are processed for sale to agricultural markets and to manufacturers requiring this raw material. Quantities received are unknown.

3.5.3.17 Electronics Recycling

Vintage Tech Recyclers, LLC, is the County's processing contractor. 100 percent of the material is recycled in compliance with regulations, Responsible Recycling (R2) and ISO 14001:2004. The electronic waste is handled in several ways, including the separation of the glass from CRTs in a special positive area ventilation system or ground into components such as wire, precious metals, plastic, lead, etc., which are then marketed.

The County has accepted electronic waste from residents and small businesses at the Residents' Convenience Center since December, 1999. Howard County was the first jurisdiction in Maryland to institute a permanent electronic waste recycling program. The program began accepting only CPU's and computer peripherals, but expanded in December, 2001 to include computer monitors and old televisions containing cathode ray tubes (CRTs), cell phones, PC mice, printers, copiers and electronics with a digital display. The program was expanded in partnership with the U.S. EPA's "eCycling" project.

Electronic waste is dropped off by residents onto special boxes in trailers located at the Residents' Convenience Center. The contractor picks up the boxes from ARL. The County receives revenue from the electronics recycling.

Approximately 745 tons of electronics were diverted through the County program in 2013.

3.5.3.18 Scrap Automobile Bodies

Four auto salvage firms that receive scrap automobiles are located in the County:

- Fremont Auto Parts, Washington Ave (U.S. Route 1), Laurel;
- Capitol Used Auto Parts, Montevideo Road, Jessup.
- Calton Cars and Parts, Washington Ave, Elkridge; and
- Ellis Wise Junkyard, Hall Shop Road, Clarksville.

These firms acquire automobiles that are no longer serviceable from a variety of sources, including private owners, businesses and other types of owners. These firms remove and sell parts from the vehicles. After marketable parts have been removed, the remaining portion of the vehicles is marketed to metal processors (shredders), who in turn market separated metal to steel mills. No shredder facilities are located in Howard County. Approximately 23,000 tons of automobiles were recycled in 2013.

3.5.4 Energy Markets

Howard County has taken advantage of the changing energy markets to produce and use renewable energy. Solar power has been installed on top of the closed New Cut Landfill producing 90 to 100 percent of the Worthington Elementary School's electricity needs. Solar power has also been installed at the George Howard Building to help off-set the electricity needs of the facility. A landfill gas-to-energy generator began operation in the summer of 2012 at ARL. Part of the electricity is used to power the landfill gas blowers, flare, generator, leachate system and an electric vehicle. The excess power is sold on the PJM market along with the Renewable Energy Credits (RECs).

Secure and stable markets for energy produced from incineration of solid waste are important for a Waste-To-Energy project to be successful. An assessment of the feasibility of implementing a Waste-To Energy facility therefore must begin with a survey of potential energy markets.

Known large energy users located in the County must be contacted as the first step in identifying potential energy markets. The next step in assessing their potential is to survey these users for their energy consumption and to determine their interest in purchasing energy from a waste-to-energy facility. Large energy users in the County include industrial facilities, institutional facilities such as universities and prison complexes and electric utilities.

A potential energy market should satisfy several requirements in order to justify further assessment. Survey activities focus on obtaining input addressing each of these requirements. First, users of steam or hot water should use such energy on a 24 hour per day, 365 day per year basis. Second, the energy user should express a positive interest in purchasing energy from a Waste-To-Energy facility. Third, the user should be willing and able to enter into a long-term agreement for the purchase of energy. Fourth, the user should have siting capacity of a minimum of 10 acres on-site for a Waste-To-Energy facility, or should be located in the vicinity of an industrially zoned area where there is a potential site of a minimum of 10 acres. An off-site location would involve constructing a steam or hot water line between the user and the waste-to-energy facility.

Another requirement is that the user would purchase enough of the energy recovered from solid waste to make the arrangement economically feasible. In the case of an electric utility, it would be expected that all of the electrical power generated, net of in-plant use, would be sold to the electric utility. In the case of thermal energy, steam or hot water, the facility could produce for sale a combination of electrical power to a utility and thermal energy to steam/hot water users.

The actual combination of thermal and electrical power sales that would be economically attractive would depend on prices that markets would be willing to pay for energy. For example, a thermal market able to take only a portion of a WTE facility's output, but willing to pay a relatively higher price than the electrical utility (on an equivalent energy basis), would be potentially attractive.

In general, however, the market survey should look to identify thermal markets that can purchase a significant portion of the total steam produced. For a facility that would generate steam only, and no electricity, processing 500 tons per day of MSW would result in steam production of approximately 100,000 to 110,000 pounds per hour, 24 hours per day, 365 days per year.

3.5.4.1 Patuxent Institution

The Patuxent Institution, located in Jessup, Maryland, has a steam plant which generates 15psi (Low Pressure), 230°F-steam for distribution. Steam produced for distribution at Patuxent Institution ranges from a low of approximately 16,000 pounds per hour for domestic Hot Water and cooking, to peak load exceeding 190,000 pounds per hour during the winter operation.

Currently this correctional institution has six (6) Bryan Boilers that are capable of running on Natural Gas or # 2 fuel oil as a backup. However, they are in the process of attempting to be removed from the (Interruptible Natural Gas Supply) to go strictly to a FIRM account.

This would not be an adequate steam market for a waste-to-energy facility.

3.5.4.2 American Wood Fibers

This industrial firm, located in the Howard County portion of Jessup, processes wood shavings and sawdust and sells them to various agricultural and manufacturing industries. The Plant does not generate or use any steam or other type of thermal energy. This company therefore does not represent potential to become an energy market.

3.5.4.3 Maryland – Virginia Milk Producers Co-Operative Association

This industrial firm, located in Laurel, processes milk. The firm operates three boilers to generate low pressure steam for milk pasteurization and drying purposes. The facility operates 7 days per week, 24

hours per day. Thermal energy requirements represent a potentially viable level of steam demand; however, the Co-op does not have an interest in purchasing steam from an outside source.

3.5.4.4 Trumbull Asphalt

Trumbull operates an asphalt manufacturing plant in the Howard County portion of Jessup. The company uses large quantities of fuel when in operation. The facility produces asphalt year round. Fuel is used in direct-fired heaters. The heaters are used to heat ingredients in the asphalt manufacturing process. Hot combustion gases are used directly in the process. Steam is generated in boilers to keep asphalt product hot and to provide fire extinguishing in the hot asphalt tanks. Steam quantities are nominal and not a suitable match with a waste-to-energy facility. The company does not have an interest in sourcing produced energy (heated process gas or steam) from an outside source.

3.5.4.5 Baltimore Gas and Electric

Baltimore Gas and Electric Company (BGE), based in Baltimore, provide electricity to users in most of Howard County, except for a small portion of the western end of the County. As a regulated electric utility, BGE is subject to the requirements of the Public Utilities Regulatory Policy Act (PURPA), a federal law enacted in 1978. PURPA requires regulated utilities to purchase electricity generated and offered for sale by unregulated generating units that meet certain requirements for availability.

A Waste-To-Energy facility designed to process waste on an around-the-clock basis could generate electricity sufficient to meet these requirements. Several other Waste-To-Energy facilities in the U.S. market electricity in this manner, including the Baltimore RESCO facility, which markets electricity to BGE. A Waste-To-Energy facility that would serve Howard County could similarly market electrical power to BGE. Revenues would be based on a rate schedule and on capacity payments negotiated with BGE.

3.5.4.6 Allegheny Power Co. (Potomac Edison Company)

Allegheny Power Company provides electrical power to a small area of the western portion of Howard County. Allegheny Power could offer to purchase electrical power from a Waste-To-Energy facility that would be located in its service territory. A proposed Waste-To-Energy facility has a much greater likelihood of being sited in the eastern portion of Howard County, closer to the areas of higher waste generation and for the purpose of siting in an industrially zoned area. Therefore, Allegheny Power is not likely a viable electricity market.

3.5.4.7 Potomac Electric Power Company (PEPCO)

PEPCO serves most of adjacent Montgomery County, Maryland, except for a band of territory in the northern region bordering Howard County. PEPCO could purchase electricity generated by a Waste-To-Energy facility. A Waste-To-Energy facility would have to provide transmission equipment to an appropriate PEPCO interconnection facility in northern Montgomery County. Considering the burden of implementing transmission equipment to transmit electrical power from a Waste-To-Energy facility located in Howard County to PEPCO transmission facilities in Montgomery County, PEPCO does not likely represent a viable electricity market.

3.5.4.8 Summary of Potential Energy Markets

There does not appear to be any viable markets within Howard County for electricity or steam from a potential WTE facility. In addition, it is unlikely that a WTE facility could be sited in Howard County, especially as the County has a long-term waste export contract with Waste Management. The County will, therefore, continue to look into regionalization of alternatives to landfilling, including WTE, during the planning period.

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CHAPTER 4. ASSESSMENT OF INTEGRATED SOLID WASTE MANAGEMENT SYSTEM

4.1 INTRODUCTION

This chapter describes the assessment of the existing County solid waste management system to determine its adequacy in meeting the goals and objectives of the Howard County Solid Waste Management Plan 2014-2024 (Plan). This assessment addresses program/facility alternatives grouped by the waste types to be managed. By focusing on the development of management programs that best fit various components of the waste stream, the County has embodied the practice of integrated waste management.

The needs to alter, extend, modify or add to the existing solid waste disposal systems in the County are included in this chapter. The assessment uses, when appropriate, the background information contained in Chapters 1, 2 and 3. The assessment also considers the constraints imposed upon the establishment of solid waste acceptance facilities. The assessment evaluates:

(a) The use of source reduction and source separation programs to reduce the quantities of solid wastes which are collected for disposal;
(b) Resource recovery options to reduce land disposal capacity needs;
(c) Consumer education programs, and cooperation with appropriate suppliers for the purchase of recycled products to encourage, and help create a market for resource recovery and source separation programs;
(d) Programs and procedures needed to respond to the unplanned (emergency) spillage or leaking of hazardous wastes within the county; and
(e) Whether existing local master plans and zoning regulations provide for the appropriate siting, operation, or both, of solid waste management systems or facilities.

This chapter assesses both regional and County programs and facilities to manage specific categories of solid waste. By addressing solid waste management on a regional basis, the County recognizes that combining waste streams and using shared facilities can result in economic and environmental benefits. In addition, unnecessary duplication of facilities and services can be avoided. It is not intended to discourage participation by the private sector in waste management. The regional and County facilities described in this Plan are not intended to preclude the development of private sector facilities necessary for a firm to serve the needs and interests of its clients and customers. However, new private facilities shall be in conformance with applicable zoning and other legal requirements and must be identified in this Plan. The design and siting criteria set forth in this chapter relate to programs and facilities which would be provided by the County and/or other jurisdictions in the region, and are not to be considered applicable to private sector facilities. As stated in Chapter 2, "this plan shall not be used to create or enforce local land use and zoning requirements".

4.2 REGIONALIZATION

Several components of the County's existing solid waste management program are regional in nature and involve cooperation between several jurisdictions and agencies. Likewise, implementation of new or expanded solid waste management facilities and programs may involve regional cooperation. For Howard County to participate in a regional solid waste management system with one or more counties, it is necessary to have an institutional structure that will facilitate multi-jurisdictional cooperation. The Baltimore Metropolitan Council (BMC) was formed to facilitate joint decision making related to a wide range of local government responsibilities. Council membership consists of the following six independent political subdivisions:

- Anne Arundel County
- Baltimore City
- Baltimore County
- Carroll County
- Harford County
- Howard County

The County is a participating Member of the Northeast Maryland Waste Disposal Authority (the Authority). The Authority is a multi-county agency that was established as a public corporation in 1980 (Chapter 871, Acts of 1980) to assist the participating local governments in Maryland, other public entities, and the private sector in developing adequate, environmentally friendly solid waste disposal facilities, by coordinating efforts and finding financing. The Authority also assists in finding ways to reduce waste, minimize costs of waste disposal, and providing services, such as recycling, composting, landfilling, and combustion and energy recovery (Chapter 163, Acts of 2004). Member jurisdictions participating in the Authority include all of the members of the BMC and Frederick and Montgomery Counties. Maryland Environmental Service (MES) is an ex-officio member.

To obtain support resources on a regional or state level within Maryland, the County maintains agreements with MES. MES is an independent agency that was created on July 1, 1970 (Chapter 240, Acts of 1970). The agency joined the Department of Natural Resources in 1972, and later separated from the Department to become a public instrumentality of the State in 1993 (Chapter 196, Acts of 1993). MES does not have any regulatory authority nor does it receive direct appropriations. MES is self-supporting, through fees for services, and is authorized to issue revenue bonds.

MES provides the following services: solid waste management, composting, recycling, water and wastewater treatment, dredged material management, hazardous materials clean up, and renewable energy for private entities and federal, State and local governments.

4.3 COLLECTION

4.3.1 RESIDENTIAL COLLECTION

As described in Chapter 3, the Bureau of Environmental Services provides curbside collection services for most of the residential waste, recyclables, and yard trimmings generated in Howard County. Approximately 5,000 housing units are collected per Trash and Recycling Zone (TRZ), including 5,086 condominium units. Total households for each material are as follows:

- Trash – 79,067
- Recycling – 79,351
- Yard Trim – 63,450

The residential exceptions include private residential areas which may not be included in the County's solid waste collection program due to the limitation of the large, more economical trash truck and the following issues:

- standards of construction for the roads,
- gated communities,
- residents preferring to use dead-end alleys, and/or
- communities that may not wish to sign a damage waiver allowing the County contractor's access to private roads.

As part of the County subdivision process, the standards and continuation of new construction of private roads are discussed. The site development plans with private roads state on the plans that private

trash and recycling collection is required on private roads. Roads are required to meet County minimum standards to receive County provided trash and recycling collection services. The Environmental Services Fund for financing Solid Waste facilities and operations in the County is re-evaluated yearly with various budget models and projections. The County's fund is in good financial standing and the fees can be evaluated yearly to cover the cost of the services provided.

Collections are provided once per week for waste, bulk items, scheduled scrap metal and recyclables, as outlined in Chapter 3, yard trimmings (between April and January in metropolitan areas of the county), Christmas trees (in the first three weeks in January) and, for areas with food scrap collections, the service will be expanded to year round. The County plans to continue the once per week collections for recycling and yard trimmings/food scraps for the planning period. The food scrap collections program is planned to be extended over time to the entire Metropolitan area once the facilities to process the material are fully operational. This limitation in processing is discussed later in this chapter.

Organics (yard trimmings and food scraps) can be used to reduce waste, increase recycling and provide a product (compost), as well to reduce costs. The County has considered a ban on the use of plastic bags in the collection of organics in order to increase the value and enhance the environmental benefits of the compost produced, reduce waste, and reduce costs. Currently there is not an official plastic bag ban, the County encourages the use of bio-degradable or paper bags for organics.

Through the planning period, curbside residential waste tonnages generated, including recyclables, are expected to increase by approximately 15 percent. As the food scraps are collected in the same collection truck as the yard trimmings, no additional trucks or contracts are expected. The current collection system has been designed to allow flexibility in redefining route boundaries so as to create new routes and keep existing routes to a manageable size. This flexibility should be adequate for the increase in waste projected.

The collection program also includes a dumpster or "toter" recycling collection at most condominium communities, County government buildings, and County Public Schools. As with the private curbside residential collection, the same issues exist at some of the condominium communities and will be handled the same way. The County will continue to offer these services and will provide additional toters or dumpsters as needed to handle the projected increase in recyclable materials over the planning period. The program also is flexible in that, if it is deemed necessary, the County can increase the frequency of pickup service to ensure program adequacy during the planning period with the main limitation being space to add additional containers. In the design stage, the site development and review process needs to consider the requirements for recycling and trash areas in these buildings.

The County does not provide for commercial waste collection; with the exception of the Ellicott City Historic District where curbside waste and recyclables are collected for businesses. Elsewhere, businesses must contract with private haulers for collection and disposal of solid waste. To assist businesses with recycling, the Howard County Chamber of Commerce provides a recycling Co-Op through a private contractor.

Existing collection programs have adequate flexibility to serve projected needs over the ten-year planning period. They are structured such that they can be expanded as detailed in Chapter 3.

4.3.2 Residents' Convenience Center Collection

As described in Chapter 3, the Residents' Convenience Center is located at the Alpha Ridge Landfill (ARL) for the acceptance of solid waste and recyclables at no cost to Howard County residents. Proof of Howard County residency must be shown before using the facility. The convenience center operates 6 days per week from 8:00 a.m. to 4:00 p.m.

Materials accepted at the convenience center include:

- Antifreeze (uncontaminated only)
- Appliances – refrigerators and air conditioners containing Freon must be placed in their designated areas. Other appliances go in the scrap metal dumpster.
- Batteries (wet cell)
- Reusable Building Materials, such as banisters, bathtubs, cabinets, counter tops, doors, hardware, lighting fixtures, lumber, molding, plumbing fixtures, shelving, stairs, toilets, windows and other building materials. They are collected by the Loading Dock, a nonprofit organization, for reuse.
- Cardboard (no pizza boxes, with grease, or waxed cardboard)
- Carpet (requires $55/ton tip fee payment)
- Christmas Trees and Wreaths (with all decorations removed)
- Clothing (including paired shoes) and Textiles
- Compressed Gas Tanks
- Construction & Demolition Debris (requires $65/ton tip fee payment)
- Cooking Oil
- Electronic Equipment
- Household Hazardous Waste, only on Saturdays from 8:00 am to 4:00 pm, from the first Saturday in April to the last Saturday in November.
- Mattresses and Box Springs
- Metal Items
- Motor Oil & Filters
- Polyurethane Foam, such as 100 percent soft foam mattresses, cushions, and carpet padding (to be deposited in Foam Container)
- Recycling, Single-Stream, including glass bottles and jars (all colors); cans and aluminum foil; plastic bottles, tubs, jars and trays; and paper (milk cartons, juice boxes, newspapers, magazines, junk mail, office paper, food boxes, books, etc.)
- Rigid Plastics (deposit in Rigid Plastics Container)
- Roofing Shingles
- Styrofoam™ (#6 plastics, polystyrene)
- Tires
- Trash (recyclable materials are not accepted with trash)
- Wood and Yard Trim
- Items for Goodwill – Goodwill receives reusable items at the Landfill from 8am to 3:30pm on the 2nd and 4th Saturday of each month.

Residents disposing of unusually large quantities of household trash using a greater than 3/4 ton vehicle, or disposing of waste for someone else, may be required to obtain a Special Exception Permit.

As more materials can be economically recycled, the County will expand the recycling opportunities at the convenience center. Since 2008, the recycling at the convenience center has expanded to include; carpet, #6 plastics (Styrofoam™), shoes, more types of electronics, cooking oil and availability of Goodwill to accept reusable items two Saturdays per month..

Emptying/servicing of containers and trailers at the Convenience Center is conducted daily. The number of times an individual container is emptied depends upon how many containers are available for filling on a given day, how fast they are loaded by center users, and the items filling the containers. As waste and recyclables quantities delivered increase, operations will be evaluated to determine if a greater frequency of servicing will be required. It is projected that waste quantities delivered to the Convenience Center will increase ten percent, while recyclables quantities are expected to increase 20 percent above 2013 levels during the planning period. Considering the inherent operational flexibility, including the ability to utilize other County agency truck drivers on Saturdays or in emergencies to provide additional staffing and flexibility to meet the needs, the convenience area will be adequate to manage waste and recyclables quantities delivered during the planning period. However, the County will continue to monitor the center to determine if additional expansion is needed. The entrance improvements were completed in 2012, which, along with the widening of Marriottsville Road improved the traffic in the area.

With the increasing numbers of residential private areas and apartment residents who do not pay into the Environmental Services fund for Solid Waste Management, the County will continue to evaluate the need to modify the landfill usage fees.

4.4 SOURCE REDUCTION

Source reduction is the design, manufacture, purchase, use or reuse of materials to reduce the amount of, or toxicity of, waste generated. Source reduction incorporates a philosophy of waste prevention, and thus differs from historic waste management practices, which manage materials after they have been discarded as wastes.

Reduction of solid waste generation by residents, schools, government operations and commercial establishments, and reduction of household hazardous waste generation, are objectives of Howard County's solid waste management program. In addition, MDE, through a credit system, allows jurisdictions to count waste reduction efforts towards their overall recycling and waste reduction diversion rate goals. MDE has allowed the waste reduction, or source reduction, credits since 2000. In the 2011 calendar year Howard County received four percent credit, through documented waste reduction activities, to be added to the county's reported 48.5 percent MRA diversion rate. This gave Howard County a total diversion rate of 52.5 percent for the 2011 calendar year (the most recent data available from MDE).

The County's existing source reduction programs components which need alterations, modifications, additions or extensions are described below. The program is more fully described in Chapter 3.

4.4.1 PUBLIC EDUCATION

The County will need to continue the coordination with local businesses, community organizations and public agencies to develop its source reduction education and outreach efforts. The existing outreach program provides source reduction information to citizens, businesses, community groups, educators and students. Source reduction outreach elements which will continue, include:

- Presentations to community organizations, schools and scout troops.
- Five active backyard composting demonstration sites that display different backyard composting methods.
- Distribution of backyard composting bins and accompanying literature.
- Sections on source reduction tips and techniques on the County's website.
- Frequent coverage of source reduction techniques in the Bureau's monthly tips email and Twitter.

- Continue to evaluate and expand, as possible, the use of other social media options and technical possibilities.
- Press releases, stories and advertisements on source reduction in local newspapers.
- A separate webpage for source reduction labeled "What Should I do With . . . ?" at:
- http://www.howardcountymd.gov/WhatShouldIDoWith.htm.
- Creative reuse ideas on the County website at: http://www.howardcountymd.gov/DisplayPrimary.aspx?id=6442474414.
- A Business Recycling guide on the County website at: http://www.howardcountymd.gov/BusinessRecycling.htm.
- Business referrals to the Authority's www.mdrecycles.org website and others which have a source reduction section.
- Greenfest- an annual environmental festival.
- Information on source reductions on the back of the County tax bills which goes to every tax payer in the County, both business owners and residents.
- Information in the water bill on source reduction, which goes to everyone connected to water and sewer, including residents, businesses, schools and government agencies.
- Continue cooperation with Howard County Chamber of Commerce and their Business Recycling Co-op
- Presentations and meetings with businesses to help them start or increase their recycling efforts.
- Presentations, meetings and direct mailings with downtown Ellicott City businesses and residents.

A Regional Strategy Document, produced by the BMC, recommended development of a regional education program for waste prevention, which addressed grasscycling, backyard composting and business waste reduction. It has been determined that public education and outreach is the most cost-effective way to achieve source reduction in these areas. The Strategy Document recommends an annual expenditure of $1.00 per household for public education and outreach on source reduction, which equates to approximately $95,000 for Howard County. The regional program has been coordinated through the Authority and has utilized regional media such as television, radio and print, which are not commonly utilized by individual jurisdictions.

Howard County's program has proven effective at distribution of public education and outreach materials to the public. This program, supported by regional efforts, will continue to provide effective levels of public education and outreach.

4.4.2 YARD TRIM MANAGEMENT

Yard trimmings represent about 12 percent of the County's residential waste stream. Source reduction programs can reduce the amount of yard trimmings that a community must manage, therefore reducing collection and composting costs. Such programs require continued public promotion and education to maintain desired participation. The County will continue to promote and encourage low maintenance landscaping, such as: rain gardens, bay conservation lawns, leaving grass clippings on the lawn (grasscycling), on-site (backyard) composting of yard trim, and planting non-deciduous vegetation.

Residents participating in backyard composting maintain small piles or bins where yard trimmings are layered and allowed to decompose into a soil-like material for gardening. A limited amount of kitchen scraps (vegetable and fruit wastes, eggshells, and coffee and tea grounds) can be managed with the yard trimmings. The County will continue to distribute free compost bins, at the landfill, the main Environmental Services office, demonstrations and events, to County residents in return for a pledge to

compost yard trim for at least a two-year period. More than 300 backyard composting bins were distributed to the public in 2013.

4.4.3 Household Hazardous Waste (HHW) Management

County residents are encouraged to reduce the amount of HHW generated. The County has developed information and promotional materials for general distribution to educate the public regarding products which can be used as alternatives to those containing hazardous materials. In addition, residents are encouraged to purchase hazardous products in quantities that will likely be used so as to avoid disposal of excess amounts. The types of materials targeted include solvents, pesticides, household cleaners, paints, fluorescent and compact fluorescent lights containing mercury, and similar materials.

4.4.4 Donations/Reuse

The County hosts collection trailers for several non-profit groups collecting reusable/recyclables at the Resident Convenience Center. The non-profit Loading Dock takes used building materials collected at the Convenience Center and distributes these materials to low-income individuals and non-profit organizations in the region for housing repair and construction. The Loading Dock is responsible for removal of the materials. The County also hosts a similar program, through Go Green for the Cause, for the collection of used clothing, shoes and other textiles. Starting in 2011 every other Saturday at the Landfill, Goodwill collects donations of usable household goods, books, clothes, toys, tools, electronics and miscellaneous items. The number of collections may increase. The current limitation is the space Goodwill uses, as it is used for the compost and rain barrel demonstrations and giveaways on the other Saturdays from Goodwill. Future expansion or reconfiguration of the area is being considered. However, increased materials quantities could be accommodated through changes in collection schedules.

The County also hosts collection trailers for several non-profit groups at the County's annual Greenfest, including Goodwill Industries, Habitat for Humanity, Bikes for the World and Nike Reuse-a-Shoe.

4.5 RECYCLING

Recycling is considered an integral component of solid waste management programs and is required by Maryland law. The State has established mandated recycling goals, which were increased in 2012 to 35 percent recycling by December 31, 2015, for Counties with populations greater the 150,000, with a state-wide voluntary recycling goal of 55 percent by 2020. In addition, the Maryland General Assembly established a voluntary 60 percent waste diversion goal, which is calculated by adding the recycling rate plus the maximum of five percent source reduction credits.

PlanHoward 2030 established a County recycling goal of 75 percent by 2030.

The County contracts for services including curbside collection, and processing and marketing of recyclable mixed paper, commingled containers and yard trim. Most of the yard trim and food scrap processing will be handled by the County in the near future, once the pilot compost facility has been expanded and is fully operational at the Landfill. Costs to operate the system are paid from the Bureau of Environmental Services' operating budget. Approximately 80,000 households (detached homes, town homes and condominium buildings) receive recyclable materials collection. A smaller number receive yard trim collection since homes in the western portion of the County are not part of this program; however, this will be changed once the food scrap collections program goes countywide. For each of the 15 collection zones, one contractor provides for yard trim and recyclables collection. As noted previously, the collection system can be readily adjusted to manage increasing collection volumes during the planning period and can include collection in carts.

The County provides recycling opportunities at its Resident Convenience Center located at the ARL. The recyclables collected at the center include those items collected curbside with the addition of textiles,

shoes, waste oil, antifreeze, vehicle batteries, tires without rims, wood, yard trimmings, shingles, cooking oil, plastic foam (Styrofoam ™), carpet, scrap metal, scrap propane tanks and electronics waste. The County also has a separate contractor for hauling scrap tires received at the Convenience Center. The wood grinding, previously handled by a contractor, was taken over by the County in May 2013. As discussed previously, the servicing of the Convenience Center can be adjusted to handle increases in materials received. This will insure that services provided remain adequate during the planning period.

4.5.1 Public Education and Assistance for Recycling

As described in Chapter 3, and above under Source Reductions, the County utilizes a diverse collection of media and community outreach approaches to promote recycling. Promotional and informational materials developed and circulated by the Recycling Division each year include the items listed previously in Section 4.3 Source Reduction.

Surveys have been completed which include Howard County phone and internet surveys and the Authority regional recycling phone survey in 2007. The survey recommended that public outreach and education is important to continue to increase the public awareness and participation in the programs. The County's 2011 phone survey by Baltimore Research Group of 400 randomly selected residents, showed most residents received recycling information via direct mail and the internet/email, 46 percent and 23 percent respectively. Surveyed residents reflected a variety of demographics including zip code, dwelling type, household size and length of time residing in Howard County. 81 percent of residents say they already recycle at least 25 percent of their garbage and 70 percent of residents recycle yard trim at least once a month. In addition, it showed two thirds of those surveyed would participate in a food scraps program prior to any education and outreach regarding the need for and benefits of food scrap recycling. 56 percent would like a county-provided food scrap container for collection of food scraps and most (68 percent) would prefer a ten-gallon bin. The biggest motivators for participating in food scrap collection are environmental reasons and receiving new service from the county.

The Authority maintains a comprehensive database of recycling collection, processing and end-market businesses throughout the State. Authority staff regularly assists member jurisdictions in obtaining recycled tonnage information from businesses in the region.

Staff from the Authority conduct site visits to interested businesses, offer assistance in refining existing recycling and waste reduction programs, and assist with the development of new programs. Moreover, the Authority has worked to implement regional market development programs for member jurisdictions, most notably for recycled glass. These efforts by the Authority are ongoing.

As discussed in the Source Reduction section, the County's comprehensive public education program has been effective at distributing recycling information, but can be enhanced through continued participation.

4.5.2 Environmentally Preferred Products

Howard County has sustained a procurement program to promote the purchase of Environmentally Preferred Products (EPP). "EPPs include, but are not limited to, recycled materials (asphalt, tires, paper), low or no VOC paint, non-toxic dyes, designated green certified cleaning products, low emission vehicles, etc."[4]

In FY 2013, Howard County spent $134,696 purchasing paper, which was approximately the same amount as in FY 2012. The percentage of recycled paper purchased, however, increased from 26 percent in FY 2012 to 56 percent in FY 2013.

[4] Howard County Office of Purchasing Annual Report – FY 2013

Excluding paper, the County spent $657,325 on office supplies in FY 2013, slightly less than in FY 2012. Those office supplies designated as "green", costing $329,622 represented 50 percent of office supply purchases in FY 2013. This was 2.5 percent over FY 2012.

Exhibit 4-1 lists the contracts awarded during FY 2013 year where all, or portions of, products or services meet the County's EPP standards.

Exhibit 4-1 Contracts Awarded in FY 2013 for EPP Products or Services

Contractor	Description	Amount
PCA LLC	Printing	$2,400,000
Interboro Packaging	Trash Bags	$10,602
Custom Modern Options	Resource Guide	Revenue Generating
Vulcan Signs	Signs and sign materials	$950,000
HD Supply Waterworks	Fire Hydrants Parts & Accessories	$875,000
Ferguson	Fire Hydrants & Accessories	$1,225,000
CPS Gumpert	Printing	$2,400,000
KM Printing	Printing	$2,400,000
McArdle Printing	Printing & Distribution of Activity Guide	$5,400,000
Lindsay Ford LLC	Hybrid Vehicles, Ford Fusion (4)	$98,907
TOTAL		**$15,759,509**

Source: Howard County Office of Purchasing annual report for 2013.

The County has ongoing development of EPP procurement programs, utilizing continued technical assistance from the Maryland Environmental Service (MES). In 2011, MES trained purchasing staff using their updated Buy Recycled Training Manual. The Howard County Buy Recycled committee, now called the Green Team, has met and will meet on an as-needed basis to discuss various EEP opportunities. Also the County Construction Inspections Division reviews construction product specifications to determine if recycled products can be used on County projects and roads.

4.5.3 Materials Recovery Facility

A materials recovery facility (MRF) is designed to receive large quantities of commingled or single-stream recyclables, separate them by type, and prepare finished quantities for transportation to markets. The type of process and the equipment used depends on the types of recyclables and the collection method. Separation includes a combination of mechanical and manual processes.

As described in Chapter 3, Howard County contracts with a private firm, Waste Management, Inc., for MRF services for the residential recyclables collected in the County. The contract is on a per-ton processing rate or rebate basis, with no minimum or maximum tonnage commitment other than the contractor receives all materials collected in the County from curbside collection and condominium collection. While there is direct revenue sharing, the contract is set up so that the County benefits when market prices for recyclable materials rise through receipt of revenues from the contractor. Conversely, when published market prices for recyclables are low, the County either receives less revenues or no revenue if the market falls too low. The County's FY 2013 revenue for single-stream recycling was $675,754.99. For FY 2014, $500,000 is budgeted for recycling revenue. The actual amount received each year can vary due to significant changes in recyclables markets. This type of arrangement is likely to

remain viable through the planning period. In the future, however, the County may elect to evaluate the feasibility of a publicly-owned and operated regional processing facility.

Some County businesses contract separately for collection and processing of recyclable materials. Such recyclables from the commercial waste stream are typically delivered either to a MRF or directly to a recycling market.

The County's current approach using contracted services is flexible and can respond to an increase or decrease in processed quantities. Also, the County can add materials to expand the processing contractor's services, although the cost and feasibility of adding any specific material must be negotiated with the contractor prior to adding the new material to the collection program. Addition of any materials to the curbside program that increase costs for processing and marketing would require revising the budget. The County's practice has been to plan program changes prior to the budget cycle and implement approved changes in a new fiscal year. In 2008, additional items such as aseptic packaging (i.e., juice/milk cartons), aluminum foil and bake ware, microwave plastic containers, yogurt containers, and rigid plastic were added to the single-stream recycling collection at no cost to the County. However, in 2011 for an additional cost, curbside scrap metal collection was added, which necessitated a separate collection vehicle. The material is taken to ARL and combined with the scrap metal collection at that location.

As presented in Chapter 3, in Exhibit 3-17, quantities of materials recycled from the residential sector are expected to increase approximately 15 percent through the planning period (to 2024). This is due to a projected increase in overall capture rate from 32 to 36 percent and an increase in the number of residences. The County's MRF contractor has the flexibility to expand operating hours and use alternative or additional final markets when quantities delivered increase. The contractor may consider an expansion to the Kit Kat Road facility used by the County in order to provide increased capacity to process deliveries from both public and private clients.

The County expects to continue to contract for MRF services during the planning period. However, consideration will be given to implementation of a regional facility owned and operated by the Maryland Environmental Service or the Authority, if it is determined that available private contractors are not capable of providing a reliable level of service, or if an adequate number of processing facilities is not available to assure competition during contract bidding.

4.5.4 Target Additional Recyclables

Maryland law and regulations limit the types of recyclable materials which can be credited toward the County's annual recycling goal. For example, CDL debris cannot be credited toward the goal even if recycled. Likewise, some scrap metal, such as automobile bodies, cannot receive recycling credit under the state law.

The County will consider adding materials to the recycling program where collecting additional materials is compatible with existing collection systems and stable, long-term, cost-effective markets exist. A key factor in adding a material to the curbside program would be to avoid significant changes to existing collection programs. That is, it is desirable that added materials allow the use of current collection equipment and existing collection routes. Another objective is that the net cost of additional recyclables collection, processing and marketing not exceed the cost of waste disposal for the added material. The County will consider adding materials when they can be collected, processed, and marketed by its existing contractors without a net cost increase.

4.5.5 Yard Trim and Food Scraps

Yard waste quantities are expected to increase by 20 percent over the planning period, although annual quantities vary substantially depending upon weather conditions which may promote or hinder growth

of vegetation. In calendar year 2013, the County collected and delivered 10,420.35 tons from curbside routes for processing to various processors.

Exhibit 4-2 lists the tons of yard trim and food scraps delivered to the various processors.

Exhibit 4-2 Yard Trim/Food Scraps Collected Curbside and Delivered for Processing FY 2013

Contractor/Facility	Tons
Top Soil, Etc.	7,980.90
Recycle Green Industries (1)	1,547.40
Waste Management	131.09
Chesapeake Compost (2)	28.37
County Compost Facility at ARL	732.59
TOTAL	**10,420.35**

(1) Recycled Green ceased food scrap composting in February 2012, after MDE notified the company of issues with permitting. They are still processing wood waste and yard trim.
(2) The grinder at the ARL was broken down for two weeks.

Food scrap composting is increasing exponentially in the U.S. In 2005, about 20 communities in the U.S. had food scrap composting programs. In 2013, more than 170 communities in 18 states had some type of residential food scrap composting program (Rhodes Yepsen, *BioCycle*). In addition, across the country, there are a number of private composting facilities accepting food scraps. According to the U.S. Environmental Protection Agency (EPA), nearly 35 million tons of food scraps were generated in the U.S. in 2010, but only three percent was recycled that year.

The Howard County pilot compost facility at the Landfill began accepting yard trim and food scraps from the pilot curbside area in April 2013. In September 2013, a second collection zone was added to the program. A third zone is scheduled to begin in the fall of 2014, with the plan to eventually offer this service county-wide.

In FY 2013, the Office of Purchasing awarded Chesapeake Compost Works, Benefit, LLC a one-year contract for the acceptance, processing and marketing of food scraps and yard trim. This contract, with a value of $60,500, has the option for three one-year renewals. This is a back-up contract to provide a contingency option in the event of the composting facility at the ARL being temporarily unable to operate.

Private food scrap and yard trim facilities are also looking to locate in or near the County to handle large volumes of commercial food scraps and yard trim. These facilities may include a public-private partnership for a digester or other type facility.

The County previously used an independent contractor who mulched wood waste at the ARL. The County began handling the wood waste taken to the Landfill, in May 2013. Wood waste also is projected to increase by 20 percent over the planning period. There is sufficient area at the site to increase the size of the operation. In addition, the time period during which the wood waste is processed into mulch can be increased to handle the additional materials.

4.5.6 Latex Paint Recycling

Latex paint dropped off by County residents at the Recycling Drop-Off Area at the Alpha Ridge landfill is recycled through a contract with Repaint USA. In FY 2013, this company was awarded a one-year contract for the recycling of colored latex paint. This contract, valued at $27,615 for one year, has the

option for four one-year renewals. The Contractor collects the latex paint from the landfill and transports the paint to the Contractor's facility for blending, repackaging and marketing.

4.5.7 ELECTRONICS RECYCLING

As described in Chapter 3, the County has accepted electronic waste, or E-waste, from residents and small businesses at the Resident's Convenience Area at the ARL since December 1999.

All material received is exported since there are no end-markets for these materials in Howard County, with the exception of the old cell phones recycled by the Sheriff's department for those in need.

The County uses Vintage Tech Recyclers, LLC for acceptance and recycling of electronic waste. With the changing markets for the commodities in electronics and the improvements in the processing facilities, the County is now paying for processing. Beginning in 2014, the County is paying $0.145 per pound for CPU's, CRT's and all other electronics.

In the 2013 calendar year, 744.90 tons of e-waste was recovered. This is significant growth since 2000, when about 14 tons of old PCs and peripherals were diverted through the County program.

With the changing market for electronics and the increases in electronics in the market, staffed electronic recycling events and drop off center(s) are planned for the future. In 2013, drop-off events at the County's semi-annual paper shredding and annual Greenfest collected a total of 18 tons. Future regulations for manufacture take-back programs may also change the need for drop-off events and centers.

4.5.8 C&D RECYCLING

As detailed in Chapter 3, construction, demolition, and land clearing (C&D) waste can be disposed in both MSW and rubble landfills. Construction waste is a mixture of packaging, excess or trimmed material, and residue from construction activities. Demolition waste contains components of structures resulting from partial or complete demolition. Generators of either waste type typically store the waste in open top, roll-off containers having 20 to 40 cubic yard capacities. Construction and demolition (C&D) waste cannot be disposed in land clearing landfills. Because C&D may include large pieces of wood, metal, and wall board, generated quantities may be sent to processing facilities for at least partial recovery and recycling.

With the County regulations for LEED certification, the push for Green buildings, and redevelopment; the need for more C&D recycling facilities is growing. In 2013, Howard County generated approximately 101,000 tons of C&D debris per year, expected to increase to approximately 116,700 tons per year in 2024. Most of the C&D is disposed of at private C&D and/or rubble landfills outside of Howard County. Portions of these materials may be recycled. Major C&D waste constituents that are recycled include asphalt roofing shingles, gypsum wallboard (drywall), wood, asphalt pavement, and concrete pavement. Two options for processing C&DL for recycling include: use of mobile processing equipment (owned or leased) by demolition contractors; and a C&D material recovery facility.

Facilities that receive this type of waste must be capable of processing large, heavy items, such as dimensional lumber, brick or concrete block and mortar, and various types of metal (pipe, structural steel, etc.). To satisfy markets, for example, fines and crushed wallboard need to be free of pieces of metal. C&D Waste processing systems have been designed to address specific characteristics of the materials received in loads. Using a combination of manual separation, mechanical separation, and handling systems these facilities are able to recover significant portions of materials received and sell these materials to available (usually local) markets. Residue remaining is disposed in permitted landfills.

Some facilities are designed to receive and process only wood waste in the form of pallets, fencing, and dimensioned lumber. These facilities usually do not accept treated or painted wood. While construction

and demolition projects generate wood waste materials that could be delivered to these facilities, it must be separated at the generation site and loaded into separate containers. Wood waste facilities will not accept mixed C&D waste loads. Exhibit 4-3 presents a tabulation of permitted Maryland C&D facilities that are processing C&D waste or wood waste. Facilities in Exhibit 4-3 are privately-owned and operated and thus, recover costs from fees charged to customers. Tipping fees at C&D facilities are dependent on costs to dispose of waste residues, operating costs and property (or lease) costs. It is projected that private facilities will continue to process C&D waste and wood waste for recycling. No County facilities are planned for this purpose during the planning period.

Ameriwaste, LLC constructed a facility for the separation, recycling and transfer of construction and demolition waste at a site on Kit Kat Road in Elkridge. Ameriwaste accepts and recycles construction and demolition debris from construction sites. Targeted materials include wood, metal, wallboard, cardboard, concrete and bricks, which are marketed. Other materials may be recycled as markets develop. Residue is transported to a permitted landfill for disposal.

Exhibit 4-3 Permitted Construction and Demolition Waste Processing Facilities in Maryland

County	Facility Name	Address	MDE Permit No. *Expiration Date*	Material Accepted
Anne Arundel County	Curtis Creek Recovery Station	23 Stahl Point Road, Baltimore MD 21226	2013-WPT-0539 *12/19/2018*	Accept C&D waste
Baltimore City	Baltimore Recycling Center	1030 Edison Highway Baltimore MD 21213	2008-WPT-0631 *11/19/2014*	Only C&D waste
	L & J Processing Facility	222 North Calverton Rd. Baltimore MD 21223	2008-WPF-0634 *6/29/2016*	Only C&D waste
Baltimore County	Recovermat Mid-Atlantic, LLC	2200 Halethorpe Farms Road Halethorpe MD 21227	2010-WPF-0341 *12/26/2015*	Only C&D waste
Carroll County	Roll Off Express	2900 Dede Road, Finksburg MD 21048	2012-WPF-0159 *6/9/2018*	Accept C&D waste
Howard County	Ameriwaste, LLC	7150 Kit Kat Road, Elkridge MD 21075	2011-WPT-0572 *11/3/2016*	Accept C&D waste
Montgomery County	C & D Recovery	24120 Frederick Road, Clarksburg MD 20871	2014-WPF-0581 *5/26/2019*	Accept C&D waste
Prince George's County	Lawrence Street C&D	4700 Lawrence Street, Hyattsville MD 20781	2012-WPF-0626 *1/30/2018*	Accept C&D and LCD waste
	Sheriff Road	5800 Sheriff Road, Fairmont Heights MD 20743	2012-WPT-0218 *2/21/2018*	Only C&D waste

Source: Maryland Department of the Environment

Existing C&D facility operators have consistently identified increased government purchases of recycled C&D products as an important way to improve the acceptance and economics of C&D recycling. Authority can work with the Maryland Department of Transportation (MDOT), the Maryland Department of General Services (DGS), builders and contractors to expand use of C&D products in government operations and projects, including road construction. The strategy document also recommends that Authority work to identify and expand markets for C&D materials such as wood, drywall, carpet, insulation, and roofing shingles as part of a regional market development program. This effort would involve identifying sources of supply and markets, and researching new materials end uses.

As mentioned previously, Authority can work with State agencies to provide business development support to C&D recyclers such as financial and permitting assistance.

Howard County currently provides for collection of roofing shingles in a ground level storage bunker and carpet in a roll-off container at the Resident Convenience Center. The materials are removed for recycling by an independent contractor. As quantities of this material increase, the County could contract for more frequent removal of the material. The current operation is adequate to handle quantities which will be delivered during the planning period.

4.5.9 Public Schools Recycling Plan

In 2010, §9-1703 of the Annotated Code of Maryland was amended to require a County recycling plan to address the collection, processing, marketing, and disposition of recyclable materials from County public schools. Howard County does not govern or make policy for the Howard County Public Schools System (School System) or Howard Community College (HCC). Howard County does, however, provide funding to the School System and HCC.

Both the School System and HCC collect single-stream recyclables, which means paper, cardboard, plastic, glass, and metals are placed in the same container for collection from the schools and are sorted by type at a materials recovery facility (MRF). This type of collection drastically increases convenience, and therefore participation. Single-stream recycling collection programs at the School System and HCC have been in place since 2006, although both entities established recycling collection programs prior to the introduction of single-stream recycling.

The School System's recycling website is http://www.hcpss.org/parents/recycle.shtml. There are two relevant websites at HCC, one for sustainability, http://www.howardcc.edu/Visitors/green/, and one for recycling, http://www.howardcc.edu/Visitors/green/Recycling/index.html.

The complete Howard County Public School Recycling Plan, which includes Howard County Community College, is addressed in Chapter 5 of this Plan, and is attached as Appendix C.

4.5.10 Apartment and Condominium Recycling Plan

As described in Chapter 1, the Environment Article of the Annotated Code of Maryland, Title 9, Subtitle 17, §9-1711, which became effective October 1, 2012, requires that recycling services be provided at all apartments and condominiums of 10 or more dwelling units, and allows the counties to enforce this law and to require reporting.

Council Bill No. 2-2014, adopted February 3, 2014, added Title 18, Subtitle 6A, Section 18.611, Apartment and condominium recycling, to the Howard County Code to address the enforcement of this new law and of the "apartment and condominium recycling plan", effective April 7, 2014. Council Resolution No. 7-2014, also adopted February 3, 2014, amended the County's solid waste management plan to include this apartment and condominium recycling plan.

Chapter 3 details the requirements for apartment and condominium recycling.

The current list of Multi-family Communities in Howard County is attached as Appendix B.

4.5.11 Special Event Recycling

The County was required, by the 2014 amendment to §9-1703 (b) and (c) and addition of §9-1712 to the Annotated Code of Maryland, to develop a strategy for the collection and recycling of recyclable materials from special events. The law requires Counties to include special event recycling in their recycling plans by October 1, 2015. This new initiative is described in Chapter 5 of this Plan.

4.5.12 INCREASE RECOVERY RATE

Howard County's calendar year 2011 recycling rate was 48.5 percent and the overall waste diversion rate, accounting for source reduction, was 52.5 percent. The reported recycling rate substantially exceeds the State's legislated 35 percent goal by 2015, and puts the County on-track to reach the state-wide voluntary recycling goal of 55 percent by 2020. The reported waste diversion rate exceeds the 40 percent goal originally established by the State in 2000, and the County is on-track to reach the new voluntary 60 percent waste diversion goal by 2020.

The new PlanHoward 2030 established a recycling goal of more than 75 percent by 2030. As discussed earlier in this chapter, the County will continue to work to increase the recycling rate by expanding collection of curbside food scraps county-wide in the future and working to encourage either a public-private food digester or other food scrap recycling program for commercial food scraps. An expanded public education program could further increase recycling quantities. The state's mandatory apartment recycling requirement should increase the recycling rate in the county. While several jurisdictions throughout the country institute mandatory commercial recycling, our program will encourage better reporting and follow-up.

4.6 WASTE PROCESSING AND DISPOSAL

Howard County provides and will continue to provide processing and disposal capacity for residential waste and the portion of commercial waste currently received at the ARL. The quantity of commercial waste delivered to the ARL has decreased by over 90 percent since 1994 when delivery of commercial waste to private facilities outside the County became prevalent. It is assumed that this practice of exporting commercial waste, as discussed in Chapter 3, will continue through the planning period, and the County will directly receive and manage no more than 15 percent of the commercial waste generated.

The processing and disposal system provided by the County will need to handle approximately 146,000 tons of waste per year in FY 2024. This tonnage is used as the basis for evaluating the adequacy of facility size or capacity share for each of the alternatives discussed below.

In Howard County, several technologies could be integrated into the existing solid waste management system to process wastes which must be directly managed by the County. At present, as noted in Chapter 3, the County relies primarily on waste export via the Annapolis Junction Transfer Station to manage waste collected or otherwise managed directly by the County. Waste is exported by rail to the King George Landfill in King George County, Virginia for disposal. In this section, three technologies, including waste export, are reviewed to determine their feasibility for use during the planning period as a contingency should the need arise.

- Waste-To-Energy
- Waste Export
- MSW Composting

4.6.1 WASTE-TO-ENERGY (WTE)

WTE facilities are the modern incarnation of the older municipal waste incinerators. As opposed to incinerator facilities, which operate primarily as furnaces for burning waste, WTE facilities are designed to serve as a reliable disposal option while generating significant quantities of power.

The predominant technology is mass-burn combustion. Mass-burn facilities contain five major "subsystems".

- A waste receiving area;
- A combustion system;
- An energy conversion system;

- An air pollution control system; and
- A residue handling system.

Most mass-burn facilities do not process incoming waste prior to combustion. Incoming waste is dumped into a tipping pit and fed into a conveyor. A crane removes bulky and non-processible objects (white goods, tires, etc.) and sets them aside for recycling or disposal. The remaining waste is transferred from the pit into the furnace by a horizontal moving ram.

The furnace is designed to continually agitate the waste as it burns. Waste particles are heterogeneous in size and agitation is required so that complete or near complete combustion is achieved. Within the furnace, the waste tumbles down a series of stepped grates, and is moved along by horizontal rams to maximize the rolling action. Controlled quantities of air must also be supplied to the furnace to support combustion and reduce problematic emissions.

The hot flue gases created by the combustion process rise upward through the furnace into the boiler, where they transfer heat to water-filled tubes. After passing through the boiler, the flue gases travel through a super heater, increasing the energy content of a portion of the steam previously manufactured by the boiler. The gases are directed through air pollution control equipment and discharged to the atmosphere via a stack.

The steam produced in the boiler and super heater can be used for industrial process purposes, central steam heating or to generate electricity by channeling it through a turbine.

As in any combustion process, a solid ash residue is produced. Bottom ash is formed by combusted material that exits at the bottom of the furnace chamber, while fly ash consists of ash and other solids captured from the boiler and air pollution control equipment. The ash residue is usually shipped to a landfill for disposal, although recycling options are becoming accepted practice as discussed below. In order to determine disposal requirements for ash, a Toxic Characteristics Leaching Procedure (TCLP) analysis must be performed for representative composite ash samples. The purpose of the analysis is to stimulate the concentrations of toxic substances in the ash which may be leached to water (precipitation) percolating through the landfill waste mass. If the TCLP procedure indicates that contaminant concentrations in the leachate will be at hazardous levels, then the ash must be managed and disposed of as hazardous waste at an appropriately permitted facility. Otherwise, disposal at a municipal solid waste landfill and recycling are options.

4.6.1.1 Air Emissions Control

The existing WTE facilities that are discussed in this plan have upgraded their air pollution control equipment to meet the more stringent standards that the EPA adopted for municipal waste combustors (MWC units). The standards are for dioxins, cadmium, lead, mercury, particulate matter, hydrogen chloride, nitrogen oxides, carbon monoxide and sulfur dioxides. MWC facilities built after 1994 were required to meet these more stringent emission guidelines and did not require upgrades.

4.6.1.2 Ash Recycling

Recycling and reuse of ash from MSW incinerators and WTE facilities are becoming more common practice. Ash is reused primarily at landfills; most often as an alternative daily cover, but is also being examined for use as a horizontal venting layer, drainage layer and as structural fill. The recycling of WTE ash is less common with only two operational facilities on the East Coast (located in York, Pennsylvania and New Jersey). The treated ash from these facilities is used as road base material, aggregate for asphalt, in concrete building blocks for mine reclamation. The Authority will continue to promote the recycling of ash residue.

4.6.1.3 Options for WTE

As part of contingency planning, Howard County could implement one of several WTE options:

- Build a new regional traditional mass-burn WTE facility;
- Build a smaller WTE facility using an emerging technology;
- Procure capacity at an existing traditional mass-burn WTE facility;
- Procure capacity at a planned WTE facility; or
- Participate in an expansion of the Baltimore Refuse Energy Systems Company (BRESCO).

4.6.1.3.1 Build a New Regional Traditional Mass-Burn WTE Facility

WTE facilities are difficult to implement and the amount of time required for siting, permitting and constructing a facility will take more than five years. There are several challenges with a new facility including a significant capital cost that must be financed, citizen acceptance and selection of a site that meets not only the technical requirements needed for the facility, but that is cost effective from a transportation standpoint and meets permitting requirements. Additionally, overall costs of a new WTE would need to be competitive with other disposal options in order for this option to be considered. Because of the low cost of out-of-county landfilling of waste, it will be difficult to site a new WTE facility in the County that is cost effective with landfilling.

4.6.1.3.2 Build a Smaller WTE Facility Using an Emerging Technology

There are several emerging technologies that are in the pilot/demonstration phase that hold some promise for use in the management of post-recycled waste. These technologies, such as pyrolysis, gasification and anaerobic digestion, face similar challenges as compared to the construction of a new regional traditional mass-burn facility. An additional challenge will be going through a regulatory process that may not be well defined and may have additional questions about the specific process and how it fits within Maryland's solid waste regulations. The County of Los Angeles, through the Southern California Conversion project, has spent several years researching these alternative processing technologies; their costs, processes and emissions.

4.6.1.3.3 Procure Capacity at Existing Traditional Mass-Burn WTE Facility

The Wheelabrator Baltimore, L.P., WTE plant is located 18.3 miles from Howard County. The plant is a mass-burn facility that processes approximately 740,000 tons of waste per year. Baltimore City has contracted to deliver all MSW except for fluff layers, which amounted to 172,392 tons in CY 2013. MSW delivered in preceding years was 178,860 tons in CY 2012; 188,166 tons in CY 2011; 194,285 tons in CY 2010; and 216,889 tons in CY 2009. Over these five years, this is an average of 190,118 tons per year. Baltimore County has contracted for a guaranteed 215,000 tons per year. The remaining capacity of approximately 334,882 tons per year (Nameplate minus the sum of Baltimore City average and Baltimore County guaranteed) is available for commercial users under long term contract or short term arrangement. This capacity could be procured and made available on a regional basis to participating jurisdictions.

At this time, all available capacity at the Wheelabrator Baltimore, L.P. WTE plant is under short-term or long-term contract, although this availability could change in the future. Projected post-recycling waste to be collected from Howard County residences in 2016 is 103,800 tons, increasing to 113,800 tons in 2024. In addition, the County anticipates the need to process 15 percent of the commercial and C&D waste generated (45,700 tons in 2016 and 50,100 tons in 2024). Total tonnage requiring processing will therefore range from approximately 149,600 tons in 2016 to 163,900 tons in 2024.

Ash generated by WTE facilities could be disposed of at the ARL, however, this would reduce the capacity of the Landfill, and, therefore, Howard County would prefer WTE not be landfilled at ARL.

The WTE facilities surveyed for the purposes of this plan make other provisions for disposal of ash. Wheelabrator Baltimore L.P., for example, currently has an arrangement to bring ash from the WTE facility to the Quarantine Road Landfill in the City of Baltimore, and to the Eastern Sanitary Landfill in Baltimore County, to be landfilled.

At the time of writing this plan there are several traditional mass-burn WTE facilities in Pennsylvania and Virginia that could have capacity available for Howard County. In order to successfully use these facilities, the County would need to transfer waste from the County via transfer trailer to these facilities. Transferring would require upgrading the transfer station at Alpha Ridge to be able to accommodate the volume of material or construction of a new transfer station or contracting with an existing transfer station in the region. Transferring of waste will increase the cost of an out-of-state WTE option.

Howard County's 500 tons per day capacity waste transfer station at the ARL allows for flexibility to transfer the waste. At present, the primary use of the station is for the transfer of waste received at the landfill to the Annapolis Junction Transfer Station, for subsequent transfer to the King George Landfill in Virginia. If the County elected to contract with an existing WTE facility for waste disposal, the County transfer station could be utilized to haul waste to that facility. County contracted residential waste collection firms and private commercial haulers would deliver waste loads directly to the transfer station tipping floor. Also, waste delivered by residents to the Resident Convenience Center is moved from that area to the tipping floor in roll off containers. The transfer station capacity exceeds the projected year 2024 daily waste delivery rate (440 tons per day). This delivery rate assumes that all residential and 15 percent of the non-residential waste stream will be received. Should the waste tonnage delivered exceed the transfer station's capacity any given day, or should waste be delivered which is not suitable for transfer or combustion, that waste can be diverted to the ARL working face for disposal. The cost of waste transfer, which would be in addition to WTE facility tip fees is discussed in the Waste Export Section of this chapter.

4.6.1.3.4 Procure Capacity at a Planned WTE Facility

At the time of writing this plan, there is one planned WTE facilities in the Howard County region. It is planned for construction in southern Baltimore City. The facility would require the waste to be shredded prior to acceptance, thus requiring the siting and constructing of a new waste processing facility. The facility is still in the planning stage, it is difficult to ascertain the cost of disposal at this facility. As this and other facilities develop and are constructed, they could be a future disposal location for Howard County, should pricing be competitive with other options for the County.

4.6.1.3.5 Participate in the Expansion of BRESCO

At the time of writing this plan, BRESCO is not seeking to expand. Should BRESCO change its approach, Howard County should investigate pricing and conditions to determine if participating in the expansion is a viable long term option for Howard County.

4.6.1.3.6 Evaluation of Options

The County has entered into a long term waste export contract with Waste Management, Inc. which is expected to be renewed annually through 2024. Therefore, pursuit of a long term contract to utilize existing WTE capacity or to participate in the expansion of BRESCO may not be economically feasible at this time. The cost of this option would include a service fee to Baltimore City, as well as added transportation costs.

In the event that Howard County has a future need for WTE, the most feasible option would be to secure capacity at an existing traditional mass-burn WTE facility.

Exhibit 4-4 lists available landfill and WTE facilities in the region.

Exhibit 4-4 Available Landfill and Waste-To-Energy Facilities

Facility Name	Type	Location	State	Operator	Distance (miles)
Annapolis Junction Transfer Station	TS	Anne Arundel County	MD	WMI	21
Modern Landfill	LF	York	PA	Republic Services	68
Mountainview Landfill	LF	Franklin County	PA	WMI	77
King George Landfill	LF	King George County	VA	WMI	109
King and Queen Landfill	LF	King and Queen County	VA	Republic Services	164
Charles City Landfill	LF	Charles City County	VA	WMI	168
Amelia Landfill	LF	Amelia County	VA	WMI	191
Alliance Landfill	LF	Scranton	PA	WMI	209
Wheelabrator Technologies	WTE	Baltimore	MD	Wheelabrator	18.3
Energy Resource Recovery Facility	WTE	Lorton	VA	Covanta	63.4
York County Resource Recovery Facility	WTE	York County	PA	Covanta (until 2015)	67
Delaware Valley Resource Recovery Facility	WTE	Chester	PA	Covanta	103
Wheelabrator Falls, Inc.	WTE	Morrisville (Bucks County)	PA	Wheelabrator	153

4.6.2 WASTE EXPORT

Howard County currently exports all of its residential waste and a small quantity of commercial waste. Solid waste collected curbside is hauled directly to the Annapolis Junction Transfer Station (AJTS), while smaller quantities of residential and commercial waste are transported to AJTS from the ARL. The transfer station in Anne Arundel County is owned and operated by WMI and, currently, waste received is transferred to a regional landfill in King George County, Virginia. The waste export service is available to the County through an Authority procurement completed in 2011 for Anne Arundel County and available to Howard County as a member of Authority. WMI has a contract with Authority to provide the export service to both Howard and Anne Arundel Counties. The Counties, in turn, have Service Agreements with Authority. The contract term for waste export extends until 2023 if all available annual renewal options are exercised, at the 2011 contract price per ton. When the contract was implemented in 2013, an annual adjustment for inflation began to be used to adjust the rate to current CPI rates. The tipping fee may also be increased during the contract period to allow WMI to recover increased costs directly attributable to a change in law (for example, imposition of a new tax) with a ten percent cap. Under the terms of the contract, WMI is obligated to accept a maximum of 1,500 tons per day of waste and a maximum of 150,000 tons per year from Howard County.

Other waste export options for possible future implementation include:

- Continue to transfer and dispose waste utilizing private facilities;

- Utilize the County-owned transfer station at the ARL and procure capacity at a private regional landfill or WTE facility.

4.6.2.1 Transfer Waste via Private Facility

If the projected waste deliveries exceed a maximum of 1,500 tons per year, due to an emergency or major change within the County's waste facilities, the County will be required to make other provisions for waste disposal. The County could negotiate with WMI for an increase in the allowable maximum waste tonnage delivered to AJTS, issue invitations for bids for contracted services similar to current services, or participate in a regional procurement with other Authority member jurisdictions. Authority's existing contract provides a transfer facility, transportation and disposal services.

The County's location criteria for a private transfer station or disposal facility suitable for direct haul by County residential collection trucks requires that the transfer station be within the I-95/Route 1 corridor either within the County or within 5 miles of its border. Locations not meeting the County's criteria are considered uneconomical for direct deliveries by collection trucks operating throughout the County. This is due to the combination of travel distance and low travel speeds within the (Maryland and D.C.) suburban areas required to reach the facilities. Several firms have existing transfer capacity in the region including the Ameriwaste, LLC processing facility. However, if an invitation for bid is issued for contracted waste transfer services, bidders' facilities would require evaluation regarding location and available capacity.

Pennsylvania and Virginia both have large landfills and WTE facilities accessible by truck and rail. A survey of out-of-state landfills and WTE facilities indicated that gate prices (non-negotiated and not including transportation) range from $20 to $65 per ton. The cost of transfer and disposal would likely range from $30 to $70 per ton depending upon transfer facility and disposal facility locations. Reliable prices can only be obtained through an actual bid process.

4.6.2.2 Alpha Ridge Transfer Station

Howard County has constructed its own 500 ton per day transfer station at the ARL and could contract (directly or through the Authority) with one or more contractors to transfer waste from this facility and dispose of this waste at a regional WTE or landfill facility. During the term of the current waste export contract with WMI, waste quantities exceeding the maximum 1,500 tons per day or maximum 150,000 per year limit which can be delivered to AJTS could be exported under separate contract through the County transfer station. The waste export system would consist of three major elements:

- The County transfer station;
- A transportation system, consisting of a fleet of tractors and trailers; and
- One or more disposal facilities.

The County-owned and operated transfer station would be used for consolidation and transferring of MSW. The transportation fleet, likewise, could be owned by the County or by a private contractor (although private ownership is preferred by the County). The County has purchased a tractor trailer truck, or yard jockey, to move the trailers around the ARL. Finally, a privately-owned and operated facility (WTE or landfill) would be used for disposal of MSW.

MSW consolidated in transfer trailers would be transported to a final disposal site. Private disposal facility information was reviewed and potential disposal sites that have the capacity to serve the County's needs were identified. Candidate landfill and WTE facilities included in the conceptual system are discussed below.

Information for specific WTE and landfill facilities was provided by the operators and is presented in Exhibit 4-4. Private companies and government agencies listed are within a reasonable travel distance

(less than 210 miles) and may have available capacity to take Howard County's projected waste quantities. Capacity availability is dependent on the status of both short and long term contracts. In addition, most of the facilities are operated by large national companies, including Waste Management Inc., Allied Waste and their operating units; Covanta and Montenay. These firms have multiple facilities in the region, which potentially would allow added flexibility in the event of an upset condition at the designated facility which requires that a backup facility be temporarily utilized.

Because most or all facilities contacted rely on long-term contracts for at least a portion of waste received, the operators conduct ongoing marketing efforts to monitor expiration dates and solicit customers as possible replacements. The market for solid waste processing and disposal in the mid-Atlantic region is quite competitive. As a result, facility operators in several cases would not offer even preliminary tipping fees. Tipping fees at landfills in the southern portion of the region (southern Virginia) have been reported as low as $25 per ton. WTE facilities may have difficulty in offering service at prices that low. However, due to the reluctance by most firms to discuss tipping fees, it is possible that WTE facilities may be fully competitive with landfills in a formal County procurement.

Total projected residential, commercial and C&D waste requiring disposal is 440 tons per day in 2024. Operation of the transfer station would most likely be six days per week although waste collected from residential routes would be delivered on a five day per week basis with the exception of after major holidays. The transfer station's capacity (500 tons per day) would be adequate if all residential, commercial and C&D waste requiring disposal is exported through this facility. During the term of the current waste export contract with WMI, waste quantities may not exceed a maximum of 1,500 tons per day. Howard County projections are not expected to reach this amount.

The County expects to receive residential waste, and a small quantity of commercial waste, based on maintaining a tipping fee that is above costs for commercial waste haulers to dispose of waste at privately-owned facilities. Thus, the County would equip the transfer station with mobile equipment and staff it with a number of personnel adequate to handle these expected waste quantities.

Transportation from the transfer station to a landfill or WTE facility would be accomplished with over-the-road tractors and open-top trailers capable of carrying 20 to 22 tons. For a conservative cost estimate, a 20-ton load is projected. A fleet of tractors and trailers could be County- or privately-owned and operated. The County's Bureau of Environmental Services does not currently own tractors or trailers; however, the Bureau purchased a road tractor for yard jockey duties in 2013 and the Bureau of Highways has a tractor which can be used as a backup. Should the County own the vehicle fleet, it would have to purchase adequate spares to allow for peak daily loads and for units out of service for scheduled and unscheduled repair and maintenance.

Costs have been estimated based on a private contractor providing transportation services. The fee paid to the transportation contractor would be expected to be a flat fee based on round trips between the transfer station and one or more designated private facilities. Fees would be based on mileage for these round trips. Thus, two potential mileage scenarios were investigated to present a range of transport costs. Available disposal facilities discussed previously are located between 15 and 200 miles from the ARL. This yields an estimated range of $3.81 to $41.50 per ton, respectively, in 2013 costs. Currently, the County cost for transportation of waste to the AJTS averages $5.06 per mile.

Operating costs for the County-owned transfer station at the ARL from 2005 through 2013 has averaged $25.00 per ton of waste processed. Adding County transfer station operating costs to the estimated transportation costs gives a total ranging from $28.81 to $66.50 per ton for transfer and transport. Tipping fees at the private disposal facility (WTE to landfill) would be in addition to the above costs.

Considering the favorable tipping fee available under the County's existing waste export contract with the Authority, it is unlikely that the County would pursue a replacement waste export arrangement

during the planning period. However, the County may need to make alternate arrangements for the export of waste in the event that quantities which can be delivered to AJTS from Howard County under the existing contract exceed the maximum of 1,500 tons per day or 150,000 tons per year.

4.6.3 MIXED SOLID WASTE COMPOSTING

Composting is generally recognized as aerobic decomposition of organic material. While composting of homogeneous waste streams such as yard trim have had success in the U.S. for a number of years, and food scrap composting is increasing, successful composting of mixed solid waste is limited. Mixed solid waste composting is the composting of residential or commercial trash streams.

Mixed solid waste composting facilities face significant obstacles to implementation. Facility costs, and related tipping fees, are generally not competitive with other available waste disposal options, particularly landfilling. Odor control is a significant design consideration and the potential exists for offsite odor as a result of operational problems or odor control system breakdown, even for a well-run facility. To insure a high quality usable end product, inorganic materials such as plastic, wire, household hazardous waste and metal must be removed from the waste stream at some point in the composting process. Based on experience at existing composting facilities, it is estimated that 35 to 45 percent of incoming solid waste quantities will require landfilling or incineration as residue. Residue includes inorganic materials and organics which may not be fully composted.

Capital costs for mixed solid waste composting facilities vary substantial depending upon the technology utilized and location. In 1997, Anne Arundel County solicited proposals for a 250 ton per day composting facility. Capital costs proposed were $35,000,000 which equated to a capital cost of $140,000 per ton of daily processing capacity.

In 2004, New York City did a Life-Cycle Analysis for a theoretical 300 ton per day Research and Development Pilot Materials-Recovery and Composting Facility. Total capital costs were $58,600,000 which equaled approximately $195,000 per ton of daily operating capacity. Total operating costs were $8,200,000. The calculated first year cost per MSW ton was $75.00, with a calculated cost of $100.00 per ton for biosolids. This gave an $85.00 per ton blended cost, assuming 90,600 tons per year of MSW and 60,400 tons per year of biosolids.[5]

It is estimated that the capital cost for a facility located in Howard County would be at the high end of the cost range given the need for aggressive odor control and other conservative design features since the facility would be located in a developed area.

It is also noted that residue generated from the mixed solid waste composting operations (35 to 45 percent of incoming solid waste quantities) would require landfilling or incineration. Residue disposal costs would be in addition to compost facility costs. It is assumed that an MSW composting facility would be located with the County since the total facility capacity would be needed to process the County's residential waste stream. Collected waste would be delivered directly to the facility, and waste transfer costs would not be applicable.

Given the potential for odors from a mixed solid waste composting facility, it would be inappropriate to site such a facility in the vicinity of residences or other sensitive receptors. It is unlikely that a suitable site for such a facility could be located in Howard County. Considering the relatively low tipping fee for waste disposal available under the County's existing waste export contract and the relatively high per-ton cost of mixed solid waste composting compared to other disposal alternatives, mixed solid waste composting would not present a competitive alternative. Therefore, implementation of a mixed solid waste composting facility in the County is not feasible during the planning period.

[5]Source: Chapter 7, Cost Estimates, http://www.nyc.gov/html/nycwasteless/downloads/pdf/mswcrch7.pdf

4.7 ALPHA RIDGE LANDFILL

Despite the environmental and public concerns associated with landfill operations, every waste management system requires landfill disposal. Recycling, composting and material separation and removal can divert significant portions of the waste stream from final disposal, but not all materials are compatible with processing methods. Combustion of solid waste significantly reduces waste volumes, but these facilities must dispose of non-recycled ash residuals. Also, waste may have to be landfilled during processing plant shutdown.

Since March 1997, residential waste from Howard County is being diverted from the ARL to the Annapolis Junction Transfer Station. Less than ten percent of the waste generated in Howard County is landfilled at the ARL. A limited amount of residential and commercial waste received at the ARL, not suitable for waste export, is landfilled on site. The majority of the waste received at the ARL is exported.

Until 2013, the majority of the waste delivered to the ARL was transported by transfer trailers to the King George Landfill, King George County, Virginia, which is 115 miles one-way. Beginning April 12, 2013, that waste is transported approximately 20 miles one-way to the Annapolis Junction Transfer Station, and then is taken by rail to the King George Landfill.

Haulers deliver waste to the existing landfill six days per week (except for six County holidays). The landfill accepts all non-hazardous solid waste, including construction, demolition, rubble and land clearing debris. However, minimal quantities of debris are disposed at the site.

It is Howard County's objective to continue to minimize the amount of waste disposed at the ARL. Disposal of substantial waste quantities at this facility will be limited to short time periods during which other preferred disposal options (WTE, waste export) are unavailable. For example, preferred options could become unavailable as a result of contract default or natural disaster. As noted in Chapter 3, the ARL is the County's back up facility for waste disposal as identified in the County's Contingency Plan.

4.7.1 LANDFILL DESIGN

From 1981, when the ARL opened, to 1993, waste disposed was placed in an unlined cell. A 38-acre cell constructed with a double synthetic liner and leachate collection system was put into operation in January 1993 and the unlined cell was closed. In 2005, a transfer station was built at the ARL.

The ARL has permitted space available on-site for two additional lined 38-acre cells, or for a larger number of smaller cells.

The existing liner system cross-section from top to bottom includes the following:

- 6 inches coarse sand;
- 12 inches pea gravel (leachate collection layer);
- Geotextile protection layer – 16 oz.;
- 50 mil High Density Polyethylene (HDPE) primary liner;
- Synthetic drainage net for leachate detection layer;
- 40 mil HDPE secondary liner; and
- 24 inches of compacted soil.

In the leachate detection layer, the synthetic drainage net drains to a 4-inch diameter perforated HDPE collection pipe. The 4-inch pipe conveys leachate to a terminal manhole which can be measured to assess leaks through the primary 50 mil liner. The leachate collection layer drains to a 6-inch diameter perforated HDPE collection pipe. The 6-inch diameter HDPE pipe conveys leachate to a pumping station which in turn pumps it to a 500,000 gallon storage tank. The pumping station has a 10,000 gallon overflow storage tank to prevent leachate spills. Stored leachate in the 500,000 gallon tank is pumped via

force main to the public sewerage system and, ultimately, to the Little Patuxent Water Reclamation Plant for treatment.

The cell design exceeds federal design requirements specified in 40 CFR Part 258. The liner design for future cells, as well as the closure of completed cells, will have to comply with state regulations (COMAR 26.04.07) and with the revised Federal Resource Conservation and Recovery Act (RCRA) Subtitle D requirements for leachate collection and removal (LCR). The leachate system is designed to constantly drain by gravity flow and never accumulate leachate on the liner. However, the regulations require that the LCR system perform such that the height of standing leachate above the liner does not exceed 12 inches (30 cm).

4.7.2 Landfill Life

There are approximately 754,900 cubic yards of space available in the active cell at the ARL as of December 26, 2013. There is additional area at the site to develop approximately 6.79 million cubic yards of disposal capacity. Under the current practice of waste export, there is an estimated 120 years of landfill life at this site. In the event of the preferred waste disposal method becoming unavailable, the landfill has adequate existing capacity in the currently active lined cell to provide waste disposal needs for approximately three years. This projection of available cell life assumes the disposal of approximately 115,000 tons per year at the compacted density of 1,000 pounds per cubic yard. This is an adequate timeframe to arrange for replacement of contracted waste disposal services. If it becomes apparent during the course of arranging for replacement services that a longer time period will be required to finalize these arrangements, then adequate time is also available to construct an additional landfill cell. It is assumed that a new lined cell can be placed in operation within two years (one year for design/approval and one year for construction).

4.8 CONSTRUCTION, DEMOLITION AND LAND CLEARING (CDL) DEBRIS LANDFILL

County zoning regulations provide a specific description of waste types which may be disposed at CDL debris landfills. CDL debris landfills are divided into two categories: land clearing debris landfills and rubble landfills. Land clearing debris landfills can receive land clearing debris only. A specific definition of materials which can be received at each type of facility is provided in Chapter 3.

The County regulates CDL debris landfills under Section 126 of the zoning regulations. Currently, private CDL debris landfills are allowed by special exception approval in M-1 districts. CDL debris landfills also are allowed on M-2 zoned sites if approved as part of a proposed Solid Waste Overlay District. Moreover, if the facility is government-owned, the landfill may be in any district by right except R-MH or CC.

Requirements for a CDL debris landfill are specified in COMAR 26.04.07 and in County zoning regulations and include control of site access, control of litter and evaluation of geology and hydrogeology. In addition, operating procedures which must address hours of operation, number and type of equipment, fire prevention provisions and number of employees are required as part of the permit process.

4.8.1 Regulatory Requirements

Rubble landfills constructed after September 22, 1997, must be equipped with liners and leachate collection systems. The design of the liner and leachate collection system must comply with COMAR 26.04.07. In summary, the regulations require that the liner system be designed to contain and facilitate the collection of leachate generated in the landfill in order to prevent the migration of pollutants out of the landfill to the surrounding subsurface soil, ground or surface water. The liner system may be constructed of natural earthen materials excavated from the site or of a synthetic or manufactured

membrane material. In addition, liners must be constructed of materials having sufficient strength and thickness to prevent failure. The liner thickness must be a minimum of one foot of clay or other impermeable material. The liner must be constructed with a minimum slope of two percent, and must be located entirely above the composite high ground water elevation. An engineered leachate collection and removal system, located immediately above the liner, must be designed, constructed, operated and maintained to collect and remove leachate from the landfill. Upon completion of the installation, the liner and leachate collection system must be covered with a minimum two feet of highly permeable material to provide for the passage of leachate to the liner and to serve as a protective layer for the liner and leachate collection systems.

Existing rubble landfills which were accepting waste as of the effective date of the regulation were required to meet the established requirements by July 1, 2001, or cease operations and complete closure.

4.8.2 CAPACITY

It is anticipated that most C&D debris generated in Howard County will be disposed of by private haulers at private C&D debris landfills. While provided for by current zoning, no permitted C&D debris landfills currently exist in Howard County. It is projected for the planning period that most C&D waste will be transported to private disposal facilities outside the County. The possibility exists that a private C&D debris landfill could be constructed in Howard County. However, the construction of a public C&D debris landfill is not anticipated during the planning period. As C&D waste quantities will continue to be generated locally, there must be adequate capacity to manage C&D. It is expected that permitted or planned facilities will be located and open throughout the region.

4.9 SPECIAL WASTE

As described in Chapter 3, several categories of special waste are generated in the County. Management of these materials varies according to their nature and regulatory status. Some of the materials are recycled such as sludge, tires and white goods. The County does not provide disposal or recycling services for most commercially generated special wastes. Provisions in Maryland statues or regulations prevent certain materials from being disposed at County facilities, such as controlled hazardous substances. Described below are those special wastes for which the County may need to alter, extend or modify disposal or processing or may need to add to existing solid waste disposal or processing systems during the next ten years.

4.9.1 WASTEWATER TREATMENT SLUDGE AND SEPTAGE PROCESSING AND DISPOSAL

The County's Little Patuxent Water Reclamation Plant (Plant) provides for treatment of wastewater generated in the portion of Howard County roughly bordered by Maryland Route 108 to the north, Maryland Route 176 to the east, the County's Metropolitan District boundary to the west and the border with Anne Arundel County to the south. Wastewater is carried to the Plant through 1,000 miles of gravity and force main sewer pipe.

Most of the western, rural part of the County is served by septic tanks. The waste from these septic tanks is transported by truck to the Plant. The eastern portion of the County, including Ellicott City, Elkridge and Jessup is served by the Patapsco Wastewater Treatment Plant in Baltimore City.

The plant's primary and biological nutrient removal (BNR) treatment processes generated sludge. Primary and BNR sludge is dewatered and pasteurized using lime addition and heat treatment. Sludge is dewatered using centrifuges. All Sludge processing facilities are located on the Little Patuxent Water Reclamation Plant site.

A virtual tour of the Plant, explaining the process, is available on the County web site.[6]

Pasteurized sludge currently is land applied, but may be marketed as a Class A sludge product. Sludge is transported to spreading sites by a contractor, who is responsible for permitting land application sites through MDE for Maryland sites and land applying sludge in accordance with those permits. As a backup disposal method, in the event that application sites or markets are not available, sludge may be delivered to a regional landfill in accordance with the landfill's operating permit. In recent years, all sludge produced has been land applied at various sites in the region.

The Little Patuxent Plant currently generates 12,000 dry tons of treated sludge annually. This quantity is anticipated to increase to 18,000 tons per year by the end of the planning period in 2024. In addition, the Plant receives 11.6 million gallons per year of septage from private contractors.

The existing sludge land application program requires that land application sites be permitted by MDE. Site permits, based on detailed state regulations (COMAR 26.04.06), specify on-site operating constraints including required buffers between application areas and waterways and residences, allowable application rates and operating requirements to minimize odors. The amount of acreage required to provide for the disposal of sludge generated by the Little Patuxent Plant is dependent on the allowable application rate specified in the permit for each site. Assuming an average allowable application rate on agricultural land of five dry tons per acre, a total of 2,333 acres was required for disposal of the sludge generated by the Little Patuxent Plant during 2013. Additional acreage will be permitted to provide adequate capacity for projected sludge quantities.

Sewage sludge generated by the Little Patuxent Plant is all processed on site. No sludge is disposed at ARL.

Due to ever increasing regulatory restrictions to the land application of sludge the County is moving towards heat drying of the sludge and producing a marketable fertilizer product. Preliminary engineering studies are underway with implementation in the next five years.

Septage waste is managed in accordance with the County's septage management plan, titled "Management of Hauler Waste in Howard County". Septage handling facilities at the Plant consist of a receiving station which discharges into an aerobic digester. Septage haulers weigh in at the plant scale, then discharge into an inlet which feeds into the septage digester. Plant personnel can inspect and test loads as they flow into the receiving basins. The processed septage is discharged into the headworks of the plant. Septage waste may only be disposed at permitted receiving facilities, which essentially limits acceptance to treatment plants. It is not anticipated that private sector facilities will be implemented to handle this waste. As a result, it is anticipated that all septage waste will be received at public treatment plants.

The Little Patuxent Plant facilities and contracted services will be adequate to handle the projected sludge and septage volumes produced during the planning period as given in Exhibit 3-1 in Chapter 3.

Howard County is also served by the Patapsco Wastewater Treatment Plant, which is managed by the Baltimore City Department of Public Works Bureau of Water and Wastewater. Both the Little Patuxent Plant and the Patapsco Wastewater Treatment Plant have assigned pollution caps to meet the Chesapeake Bay Total Maximum Daily Loads (TMDLs). Both plants either have or are currently undergoing upgrades to Enhanced Nutrient Removal (ENRs). The Little Patuxent upgrade was completed in 2012, and the Patapsco upgrade is planned for completion in 2016.

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[6] http://www.howardcountymd.gov/uploadedFiles/Home/Reports_and_Publications/Public_Works/LPWRP_VTour_3-12.pdf?n=6442465676

In October 2012, 19 million gallons of diluted but untreated effluent was released into the Little Patuxent River after Superstorm Sandy knocked out all power to the Plant. The Plant is served by two separate high voltage electrical feeds, one of which has in the past always been available. At that time, the Plant only had a backup power system with a 45 minute capacity. 45 minutes had, in the past, provided sufficient time for the electrical power supplier to correct system problems of a full power outage. In October 2013, the County broke ground on an $8.1 million electrical protection system, which will provide a 100 percent power back-up system to prevent a recurrence of overflows at the Plant. The reliability of the electrical grid continues to diminish requiring this investment in back up electrical power. In addition, the County is installing a 15,000 square foot photovoltaic array at the Little Patuxent Plant, which will save $22,800 per year in electricity costs.

4.9.2 Asbestos

The County does not accept friable asbestos for disposal at the ARL. Non-friable asbestos does not require special handling and is accepted at ARL. Residents desiring to dispose of asbestos must comply with COMAR Title 26, Chapter 21 regarding handling. The County may limit the quantity disposed by each individual. The County receives very small quantities of non-friable asbestos and believes that since most asbestos is generated by commercial contractors, it is disposed in out-of-County landfills.

Asbestos generation in the County in 2013 was estimated to be 54 tons. No friable asbestos was received at the ARL in 2013.

Landfills will continue to be the primary disposal facilities for asbestos through the planning period, although application of a processing technology could reduce the volume requiring disposal. Based on the available landfill capacity (see Alpha Ridge Landfill section of this chapter), there is adequate capacity for disposal of asbestos at the ARL during the planning period.

4.9.3 Hazardous Substances

The County operates the HHW collection facility at ARL on Saturdays from April 1st to November 30th of each year. Due to the large volume of HHW generated in the County and the need for safe disposal option during shutdown times, the County has expanded the HHW collections to include three off-season pickups.

Regarding the hazardous waste generated by the County agencies, quarterly collection has been set up and additional collection can be scheduled as needed. The Bureau of Environmental Services assists other agencies with the scheduling, training, record keeping and contractor selection.

4.9.4 Fluorescent And Compact Fluorescent Lights

There are several options for drop-off of these items. The Howard County web site, http://www.howardcountymd.gov/CFLs.htm provides information on recycling of CFLs and fluorescent tubes. The web site also provides a listing of retail locations accepting these items.

For residents only, CFLs and fluorescent tubes may be dropped off at the Alpha Ridge Residents' Convenience Center on the County's Household Hazardous Waste collection days, which are Saturdays in April-November, 8 am to 4 pm.

4.9.5 Bulky Waste

Bulky waste is delivered to the ARL Resident Convenience Center by residents or collected at curbside for those in the County's curbside collection program. Bulky waste collection in open top roll-off containers is scheduled twice per year at condominiums in the County's collection program. Scrap metal is collected at the ARL and at curbside for those in the County's collection program.

The bulky residential curbside collection programs were begun in 2011. The same truck which collects curbside garbage collects the bulky trash and garbage at the same time. The scrap metal, however, is collected by a separate truck with the scrap metal going to ARL. From there, it is hauled to the scrap metal processing contractor. Bulky rigid plastics have also been collected curbside since 2009, at the same time as the curbside recycling collection using the regular recycling truck. These collection methods will continue to be examined to determine if any additional or reduced collections are needed. Residents are encouraged through the County website to donate usable items instead of discarding them.

4.9.6 Wood Waste

Tree branches and other wood wastes received at the landfill are ground into primary and secondary grind mulch on-site, currently by a private contractor. The County took over the wood grinding operations in May 2013. In 2012, the County began a pilot food scrap and organics processing facility. The wood grindings are needed for composting processing. The County will own and operate both the wood grinding and composting operations.

A full scale food scraps and composting facility is intended to handle all of the wood waste delivered to the landfill, as well as the yard trimmings and food scraps collected curbside. The compost facility is being designed to handle the projected growth to 2030. While current capacity of the composting facility is 3,300, the ultimate capacity will be 8,100 tons. The windrows will be on concrete pavement with an aeration system and a biofilter, which will be pulling the air and filtering it to reduce odors. The windrows will also remain covered to control odors and decrease the processing time. The stormwater will be kept separate from the process and the process-water will be treated as leachate and put in the existing leachate storage tank. The storage area for the stable compost and the sales area will be on asphalt.

The transfer station will be doubled in size to accommodate the residential food scrap and yard trim program. The space will be needed for grinding operations and for odor control. Wood waste is projected to increase by 20 percent over the planning period to 10,100 tons in year 2024. There is sufficient area at the site to increase the size of the operation. In addition, the time period during which the mulch is produced can be increased to handle the additional materials.

4.9.7 Food Scraps

One of the easiest and largely untapped recyclables is food scraps generated by commercial businesses. The area has a need for facilities which can process commercial food scraps, either through aerobic composting or anaerobic digestion with composting of the final material. The County is currently evaluating an anaerobic digester to be located adjacent to the Little Patuxent Water Reclamation Plant. The digester could accept commercially generated organics along with residential items. All the electricity generated from the digester could be utilized by the treatment plant. This facility could be a publicly operated facility, but most likely would be a public-private partnership.

The majority of residential food scraps will continue to be composted, as described above, with the wood waste and yard trimmings at ARL.

4.10 EMERGENCY MATERIALS SPILL MANAGEMENT PROGRAM

This section describes the programs and procedures for responding to emergency spills or leakage of hazardous substances within the County.

The Howard County Department of Fire and Rescue Services (HCDFRS) is responsible for responding to emergency spills or releases of hazardous substances. Consequently, HCDFRS responds to all reported instances of releases of hazardous substances and calls upon other County and State resources to assist them on an as-needed basis. The County Department of Public Works does not operate a

separate program for responding to emergency spills or leakages of hazardous substances except at County facilities.

HCDFRS has two documents that describe primary policy and procedures for responding to emergency hazardous substances spills:

- The "Hazardous Waste Operations and Emergency Response – Emergency Response to Hazardous Substance Releases," commonly known as the Hazardous Materials Plan; and
- The Emergency Operating Plan (EOP), prepared by the County's Office of Emergency Management (OEM) which is within HCDFRS.

Each of these documents are briefly described below.

4.10.1 Hazardous Materials Plan

In accordance with applicable federal regulations, specifically 29 CFR 1910.120(q), the County is required to develop and implement an emergency response plan for employees engaged in mitigating hazardous substance releases.

This document covers pre-incident planning, personnel training, use of personal protective equipment, incident classification, operational procedures, decontamination planning and clean-up waste disposal procedures.

4.10.2 Emergency Operations Plan

HCDFRS has prepared an Emergency Operations Plan (EOP) which sets forth policy and procedures for effectively managing a variety of hazard related emergencies (e.g., civil disorder, major power outages, natural disasters, terrorist event, etc.).

The intent of the EOP is to provide a coordinated and integrated framework that will enable the various local, state, federal and private agencies in the County to:

- Mitigate the emergency condition;
- Minimize human suffering and loss of life;
- Contain property damage; and
- Return the community to a normal state as quickly as possible.

A chain-of-command policy also is set forth in the EOP to describe the responsibilities of the various personnel within HCDFRs.

4.10.3 Program Implementation

Three general types of emergency hazardous substance releases could occur in the County.

- The first type are releases from public agencies and private companies that maintain hazardous material on-site.
- The second type are releases from vehicles on public roads.
- The third type are releases from facilities not normally having hazardous material on-site. Inadvertent receipt and subsequent release of hazardous materials at a materials recovery facility would be an example of the third type of release.

The HCDFRS handles all three types of releases in the same manner; therefore, the general program implementation is described in this section.

Under federal legislation, specifically the Comprehensive Environmental Responsibility and Clean Up Act (CERCLA – as amended), a HCDFRS Local Emergency Planning Committee (LEPC) retains

primary responsibility for receiving annual reports from commercial and industrial establishments within the County that store or generate hazardous substances on-site. Based on these reports, HCDFRS has developed a plan to handle emergency situations at each of these locations. These site-specific plans are updated as new reports are received each year.

When a hazardous substance release is reported, HCDFRS dispatches a Special Operations Team (Special Ops). Special Ops consists of highly trained personnel in HCDFRS. Special Ops maintains dedicated response vehicles and a mobile command post used for response personnel when donning protective clothing and other gear at the spill site.

HCDFRS accomplishes four objectives when responding to hazardous substance emergencies in the following order of priority:

1) Ensure the safety of HCDFRS personnel responding to the emergency;
2) Ensure the safety of civilians involved in or near the emergency;
3) Contain the hazard and stop further contamination; and
4) Assure that recovery efforts are implemented.

To meet the first priority, HCDFRS can provide response personnel with the necessary level of OSHA-approved personal protective equipment. OSHA defines levels of personal protection using letter grades (A for the highest level through D for the lowest level).

Level A protection is readily available to HCDFRS personnel and is typically used in first response and/or unknown substance releases. This equipment provides the highest level of respiratory and skin-contact protection against hazardous substances.

HCDFRS also maintains, or has access to, additional equipment necessary to mitigate immediate threats to public health and to control the spread of any hazardous release. The nature of this equipment depends upon the specific nature of the emergency and the type of hazardous substance involved. Examples of control equipment include water sprays (for dilution of hazardous liquid spills), fans (for dispersal of gaseous emissions) and materials to build temporary containment systems (such as dikes).

In cases where a significant quantity of hazardous materials is expected to be recovered during the response, HCDFRS notifies the Maryland Department of the Environment (MDE). Once the immediate danger from a hazardous release has been mitigated, responsibility for the release site is relinquished to MDE.

Typically, MDE will supply the management personnel, technical resources and any necessary contractors to recover hazardous materials at the site (i.e., final clean-up). MDE is not notified of all hazardous substance spills, generally only those where significant hazardous substance recovery is deemed likely.

HCDFRS responds to reported hazardous releases on private and public property, even in cases where the affected facility maintains its own emergency response team. HCDFRS typically will dispatch a Special Ops team to a spill site and remain involved with the situation until Special Ops ascertains the four objectives described previously have been achieved.

4.10.4 Future Changes to the Existing Program

HCDFRS's hazardous substances response capability has proven to be adequate for the County's needs. HCDFRS continues to assess its response capability, equipment inventory and training needs. Upgrades in these areas will continue on an ongoing basis.

Specific to solid waste management, HCDFRS maintains open lines of communication with the County Department of Public Works (DPW). HCDFRS seeks review and comments on the adequacy of its

EOP from the DPW and other County agencies on a routine basis. A DPW representative is a member of the LEPC.

Given the demonstrated adequacy of the existing emergency hazardous spill response program, there is no need to implement a separate, dedicated program for County solid waste management facilities. Consequently, the County has no plans to alter or expand the existing program, other than as recommended by HCDFRS.

4.10.5 Spills of Hazardous Materials on County Facilities

The County has hazardous materials at several of the Fleet shops, Treatment Plant, Landfill and Park facilities. If a spill occurs at any of these facilities the agencies would follow their Spill Prevention Plans and Storm Pollution Prevention Plans. In addition, the agencies can always call the HCDFRS as needed.

4.11 SITING FACILITIES AND CONSTRAINTS

One of the largest obstacles to the development of new facilities is siting. Municipalities face a complexity of political, social, economic and environmental concerns posed by citizens and adjacent land users. In addition, compliance must be attained with a myriad of federal, state and local laws and regulations.

To ensure the adequacy of solid waste management facilities to serve Howard County's needs, local master plans and related regulations must provide for the siting and operation of these facilities. Other than this Plan, two master planning documents impact the implementation of solid waste management systems in Howard County. PlanHoward 2030 presents County policies for land use, transportation and growth management for a 20-year planning period. As discussed in Chapter 1, policies and recommended actions related to solid waste management are provided in this Plan. PlanHoward 2030 guides land use in the County by describing land use categories and specifying land use locations. The land use categories provided for in PlanHoward 2030 are implemented through County zoning regulations. Wastewater sludge management and disposal is addressed in the County's 2011 Master Plan for Water and Sewerage.

The zoning districts described in Chapter 2 accommodate a wide range of solid waste management facilities including those for recycling, waste processing and waste disposal. In addition, zoning regulations specify operational requirements and constraints applicable to the various types of solid waste facilities addressed in this plan. Of particular note, a Solid Waste Overlay District provides a mechanism for solid waste processing facilities to locate in Howard County.

This district was also created to encourage facilities that reuse and recycle solid waste in lieu of disposal. Recognizing that changes in technology will result in the creation of new approaches to solid waste management, the Solid Waste Overlay District regulations do not attempt to identify all specific types of solid waste processing which could be proposed for inclusion in the district. The district generally permits processing facilities for non-hazardous solid waste which are not covered elsewhere in the zoning regulations, while requiring detailed review of each proposed facility to evaluate its land use impacts and its potential contribution to the County's solid waste management system. The Solid Waste Overlay District can be applied to M-2 (heavy manufacturing) zoned land. The district also can be applied to M-1 (light industry) zoned land, provided that the proposed facility is a waste transfer station or a material recovery facility.

Siting efforts for major facilities of a heavy industrial nature face significant requirements. Solid waste facilities face additional obstacles due to the stigma associated with processing waste.

Neighbors want assurance that a proposed facility will not adversely impact their property values or immediate environment. Acceptance that a specialized facility, such as a factory or a solid waste facility, will not harm property values or the environment is difficult to gain. Where there are only a few such

facilities in the region to point to as references, those available come under scrutiny when a similar facility is proposed elsewhere. Problems at existing solid waste facilities, whether perceived or real, negatively affect a proposed facility siting.

Siting thus becomes a crucial element in implementing any solid waste facility. All sponsoring parties involved with any solid waste facility must ensure that features of any proposed facility successfully respond to concerns of neighbors in order to gain their support. In addition, the overall need for the facility must be well established. Even with a siting effort that responds to all of these challenges, success is not assured.

Implementation of a solid waste facility hinges on the successful completion of the siting effort. Should siting not be successful, the project would not be implemented, regardless of its ability to meet solid waste management needs. A siting effort will require attention to a variety of issues in order to be successful.

The process for identifying and/or siting solid waste facilities depends on whether the facility is being proposed by the County or by a private developer. Private developers are required to comply with the documentation and review procedures specified in the County zoning regulations which are a part of the County's site development plan review process. The developer of a private facility must petition for inclusion of a facility in the Plan. Public facilities, that is, those implemented by the County, are not required to be in a Solid Waste Overlay District. The County generally adheres to the site development review and approval process to ensure the same level of project review and scrutiny as would apply to a privately developed facility. It is assumed for the purpose of describing the process for siting a public solid waste facility that the facility has been previously addressed in the Plan.

The siting of a new facility or expansion of an existing one must consider siting constraints prescribed by Maryland regulations:

- Topography;
- Soil types and their characteristics;
- Geologic conditions;
- Location;
- Use and depth of aquifers;
- Location of wetlands;
- Location of surface water sources and their flood plains and watershed;
- Existing water quality conditions;
- Incompatible land uses;
- Planned long-term growth patterns; and
- Federal, state and local laws and areas of critical State concern.

A number of these factors are oriented towards facilities that are highly land dependent, including solid waste and C&D landfills. For other facilities, some of these factors will have minimal impact. Below is a general discussion of factors impacting facility siting.

4.11.1 TOPOGRAPHY

Howard County lies primarily in the Piedmont Plateau with a small portion along the southeastern border in the Atlantic Coastal Plain. The gently rolling terrain and soil characteristics throughout the middle and western parts of the County provide suitable areas for agricultural uses. Ground elevation varies from a low point of 20 feet in the east to as high as 875 feet in the west.

Landfill sites generally are located in broad valleys, flat plateau areas and areas which do not have steep slopes. Land which has slopes greater than 15 percent generally is not considered acceptable for landfills due to excessive site grading required to develop large landfill cells. Other waste management facilities are not as constrained by the slope of the land; however, cost factors associated with site work must be considered.

Low-lying areas along rivers and waterways may be regulated by federal, state and local laws due to the presence of non-tidal wetlands.

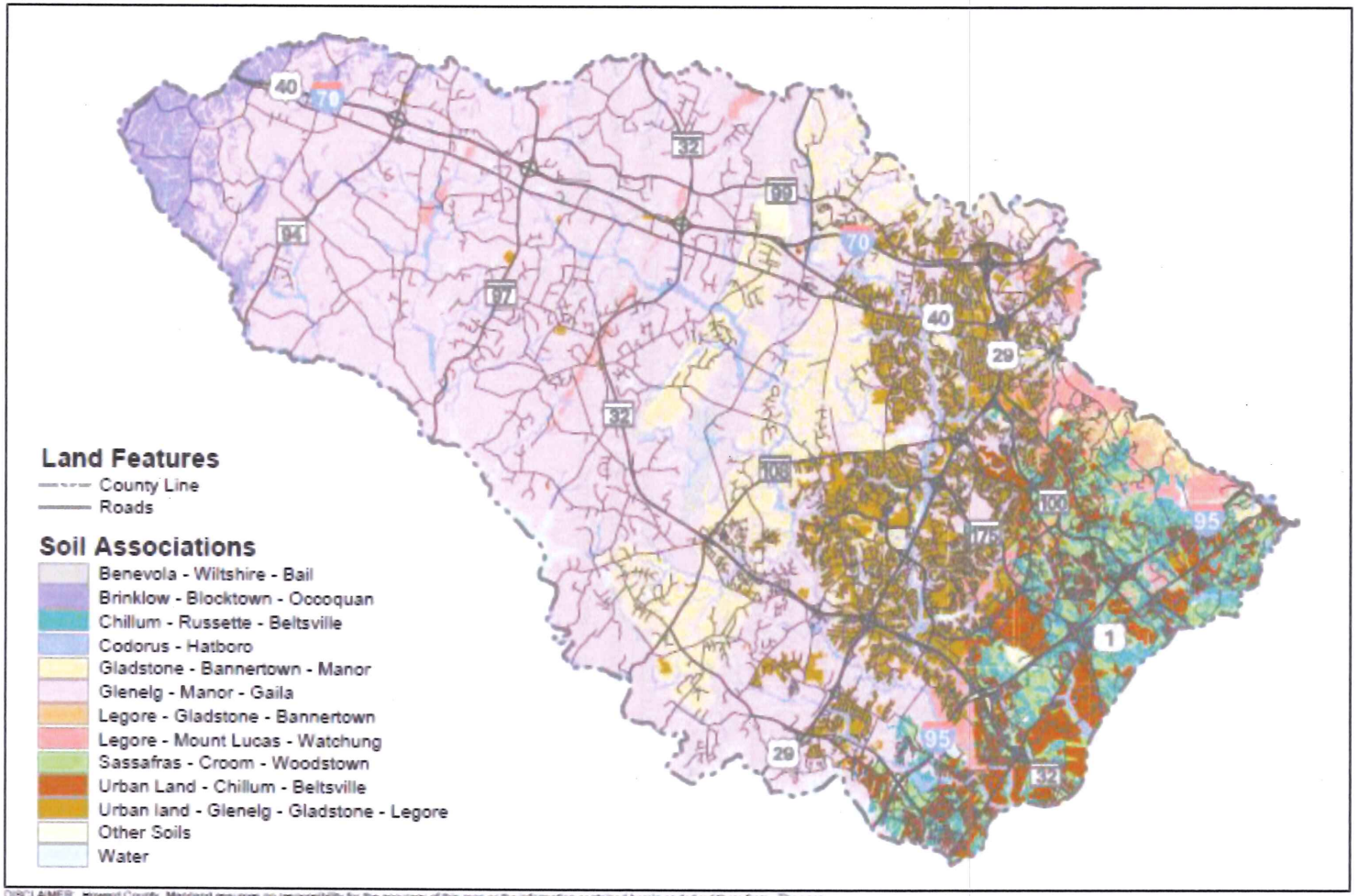
4.11.2 SOILS

Howard County is classified into eight primary soil associations. Exhibit 4-5 is a generalized soil map of the County which illustrates the location and extent of these soil associations. A soil association is an area that has a distinctive pattern of soils with similar characteristics. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern. An evaluation of soil characteristics shows that about 85 percent of Howard County consists of well drained and excessively drained soils. About ten percent of the County has somewhat poorly drained soils and only five percent has poorly drained soils. Approximately 65 percent of the soils are well suited for cultivation.

Unconsolidated soils throughout the County are generally too porous to meet MDE design standards for a MSW landfill liner and will require excavation and compaction to assure adherence with liner permeability requirements. The properties of the soils on which a landfill is sited should be considered in planning, design, construction and closure. Soil characteristics such as soil texture, erodibility, load-bearing capacity, resistance to slide, permeability, water table elevation and quantity should be addressed during the site selection process.

Clayey, impermeable soils are desirable soils for the base of a landfill; however, landfill operations require a loamy or silty soil which is easily spread and compacted for cover material. Soil types suitable for other waste management facilities are those which can provide adequate support for buildings, structures or concrete pads.

Exhibit 4-5 Generalized Soil Map



4.11.3 Geologic Conditions/Aquifer Characteristics

Generally, Howard County is underlain by several crystalline rock formations. Along the eastern edge of the County, from Elkridge to Laurel, the crystalline rock is overlaid by a northwestern outcrop area of the Patuxent Formation.

There is an adequate supply of good quality ground water to serve projected ultimate development demands for the portion of the County where public water will not be provided. However, because ground water supplies are stored in, and travel through, a network of fine cracks and fissures in the bedrock aquifer, the ability to locate and tap ground water supplies may vary significantly with well location.

Ground water yields are found to vary somewhat with geologic formation and topographic position. Because of variations in lithology, metamorphic grade and structure, the water yielding capacity of the crystalline rock underlying the study area varies from an expected low of 5.6 gpm to a maximum of 13.9 gpm. Topographic position (draw, valley, upland, valleyside, valley flat, hillside and hilltop) is also an important factor affecting yields. Wells drilled in either a valley or a valley flat have the highest yield potential while hilltop sites have the lowest average yield. The overall quality of ground water flowing through crystalline rock in the study area is good to excellent although its soft, acidic nature can cause corrosion.

Recharge of the aquifer occurs primarily through the infiltration of rain through surface soils and into the bedrock. Ground water is discharged naturally through streams and springs, or through wells.

Landfills can be designed to provide an engineered liner system which will protect ground water quality for most geologic conditions. However, it is prudent to avoid geologic areas where ground water contamination could spread rapidly if the liner system is breached by leachate flows. For example, location of landfill facilities in areas underlain by the Cockeysville Marble formation should be avoided. From a geological perspective, other solid waste facilities can be located in geologic areas where foundation design can accommodate site conditions.

4.11.4 Location

Facility siting requires consideration of technical, economic, legal and political issues. Economic and technical concerns are addressed in other portions of this plan. County land use policies are reflected in PlanHoward 2030 and in the Howard County Zoning Regulations and dictate the allowable locations of solid waste management facilities. Applicable zoning regulations are described in Chapter 2.

4.11.5 Wetlands

Areas of non-tidal wetlands are located in the County. Wetland areas are generally considered unsuitable for siting waste management facilities. However, site-specific study is required to establish the exact locations of wetlands within a potential site for a solid waste management facility and the impacts which will result. Wetland impacts which cannot be reasonably avoided may result in the need to provide for mitigation in compliance with MDE regulations.

4.11.6 Surface Waters/Floodplains

Surface waters are not available for development by Howard County as public water supply sources since the larger streams have already been developed by others to a high degree. The major surface waters in Howard County include the Patuxent River, the Middle and Little Patuxent Rivers, Dorsey Run, Deep Run and the Patapsco River.

Current plans by Washington Suburban Sanitary commission (WSSC) suggest that use of the Patuxent River is at its fullest extent. Existing reservoirs are required to discharge sufficient flow to maintain