Charles County Comprehensive Solid Waste Management Plan

2011 - 2021

Table of Contents

Table of Contents **2**

INTRODUCTION ..... **i**

I.1 STATE REGULATORY REQUIREMENTS & CONFORMITY WITH *COMAR* i

I.2 CHARLES COUNTY RESOLUTION ADOPTING PLAN i

I.3 MDE APPROVAL LETTER i

I.4 NATIONAL TRENDS AND FACTORS INFLUENCING SOLID WASTE MANAGEMENT iii

I.5 PURPOSE AND SCOPE OF PLAN iii

I.6 PLAN ORGANIZATION iv

1 CHAPTER 1 ..... **1-1**

1.1 CHAPTER SUMMARY 1-1

1.2 GOALS, OBJECTIVES, AND POLICIES 1-1

1.3 STRUCTURE OF COUNTY GOVERNMENT 1-4

1.4 PUBLIC PARTICIPATION 1-4

1.5 LAWS AND REGULATIONS GOVERNING MANAGEMENT FACILITIES 1-4

1.5.1 Federal 1-7

1.5.2 **State** 1-12

1.5.3 Charles County 1-20

1.5.4 Household Hazardous Waste 1-23

1.5.5 Incorporated Towns and Federal Facilities 1-23

1.6 PLAN AMENDMENT PROCEDURE 1-24

2 CHAPTER 2 ..... **2-1**

2.1 CHAPTER SUMMARY 2-1

2.2 BACKGROUND 2-1

2.2.1 Location and Setting 2-1

2.2.2 History 2-3

2.2.3 Natural Characteristics and Resources 2-3

2.3 POPULATION AND EMPLOYMENT 2-5

2.3.1 Regional Setting and Growth Trends 2-5

2.3.2 Population and Employment Projections 2-6

2.3.3 Effect of Growth on the Provision of Solid Waste Management Services 2-6

2.4 INCORPORATED TOWNS 2-7

2.5 FEDERAL FACILITIES 2-8

2.6 COMPREHENSIVE LAND USE POLICIES 2-8

2.7 ZONING REQUIREMENTS 2-9

3 CHAPTER 3 ..... **3-1**

3.1 CHAPTER SUMMARY 3-1

3.2 GENERAL 3-1

3.3 Waste Quantities 3-2
3.3.1 Waste Characteristics 3-3
3.4 HISTORIC RECYCLING QUANTITIES 3-7
3.5 BASELINE STATISTICS FOR WASTE GENERATION 3-8
3.5.1 Residential Waste Generation 3-8
3.5.2 Commercial/Industrial Waste Generation 3-8
3.5.3 Institutional Waste Generation 3-8
3.5.4 Rubble Waste Generation 3-8
3.6 WASTE PROJECTIONS 3-12
3.6.1 Residential Waste 3-12
3.6.2 Commercial/Industrial Waste 3-12
3.6.3 Institutional Waste 3-13
3.6.4 Rubble Waste 3-13
3.6.5 Controlled Hazardous Substances Including Medical Waste 3-14
3.6.6 Dead Animals 3-15
3.6.7 Bulky Wastes 3-15
3.6.8 Scrap Tires 3-15
3.6.9 Sludge 3-16
3.6.10 Septage 3-17
3.6.11 Asbestos 3-17
3.6.12 County Maintenance Debris 3-17
3.6.13 Agricultural Waste 3-18
3.6.14 Recreational Waste 3-18
3.6.15 Mining Waste 3-18
3.6.16 Used Oil and Antifreeze 3-18
3.7 IMPORTED WASTES 3-18
3.6.17 Wastewater Sludge 3-18
3.6.18 Municipal Waste 3-19
3.7 EXPORTED WASTES 3-19
3.7.1 Recyclables 3-19
3.7.2 Rubble 3-21
3.7.3 Controlled Hazardous Substances 3-21
3.7.4 Dead Animals 3-21
3.7.5 Scrap Tires 3-21
3.7.6 Asbestos 3-21
3.7.7 Household Hazardous Waste 3-21
3.8 COLLECTION SYSTEMS 3-22
3.8.1 Solid Waste Collection 3-22
3.8.2 Recyclables Collection 3-24
3.9 RECYCLING PROGRAMS 3-25

3.9.1 Residential Programs 3-25
3.9.2 Commercial, Industrial, and Institutional Programs 3-31
3.9.3 Electronics Recycling (E-cycling) 3-37
3.9.4 Office Building Recycling 3-38
3.10 SOLID WASTE ACCEPTANCE FACILITIES 3-41
3.10.1 Charles County Landfill #2- Active 3-41
3.10.2 Yard Waste Processing Facility - Inactive 3-43
3.10.3 Composting Facility – Active 3-43
3.10.4 Mulch Processing Facility - Active 3-44
3.10.5 Naval Surface Weapons Center Incinerator - Active 3-46
3.10.6 Recycling Centers - Active 3-46
3.10.7 Sludge Land Application Sites - Active 3-46
3.10.8 Mattawoman WWTP - Active 3-46
3.11 ILLEGAL DUMPING AND LITTER 3-46
3.12 REGIONAL RECYCLING ACTIVITIES 3-47
3.12.1 MULTI-JURISDICTIONAL SOLUTIONS 3-47
4 CHAPTER 4 4-1
4.1 CHAPTER SUMMARY 4-1
4.2 COLLECTION SYSTEM (MUNICIPAL WASTE AND RECYCLABLES) 4-1
4.2.1 Assessment of Collection System Alternatives 4-1
4.2.2 Evaluation of the Existing Collection System 5
4.3 RECYCLING 6
4.3.1 Technology Assessment 7
4.3.2 Evaluation of the Existing Recycling Program 15
4.4 YARD WASTE COMPOSTING 17
4.4.1 Technology Assessment 17
4.4.2 **Evaluation of Existing Yard Waste Composting Program** 4-21
4.5 MIXED ORGANICS COMPOSTING (INCLUDING FOOD) 4-22
4.5.1 Traditional Windrow 4-23
4.5.2 Aerated Static Pile 4-24
4.5.3 Covered Pile 4-24
4.5.4 In-Vessel Composting 4-24
4.5.5 Anaerobic Digestion (AD) 4-25
4.5.6 Products 4-26
4.5.7 Facilities in the U.S. 4-27
4.6 SOLID WASTE COMPOSTING 4-27
4.6.1 Technology Assessment 4-28
4.6.2 Operations and Equipment 4-28
4.6.3 **Costs** 4-31
4.6.4 **Advantages** 4-31

4.6.5 **Disadvantages** 4-32
4.6.6 **Feasibility Evaluation** 4-32
4.7 TRANSFER AND DISPOSAL (T&D) 4-32
4.7.1 Why Are Waste Transfer Stations Needed? 4-33
4.7.2 Types of Waste Accepted 4-33
4.7.3 Determining Transfer Station Size and Capacity 4-34
4.7.4 Number and Sizing of Transfer Stations 4-34
4.7.5 Site Selection 4-35
4.7.6 Siting Criteria 4-36
4.7.7 Host Community Agreements 4-36
4.7.8 Transfer Station Design 4-37
4.7.9 Transfer Station Operations 4-37
4.7.10 Environmental Issues 4-37
4.7.11 Safety Issues 4-38
4.7.12 Applicable Regulations 4-38
4.8 MUNICIPAL WASTE COMBUSTION AND WASTE TO ENERGY 4-38
4.8.1 **Technology Assessment** 4-38
4.8.2 **Feasibility Evaluation** 4-43
4.9 LAND DISPOSAL - MUNICIPAL WASTE 4-44
4.9.1 **Technology Assessment** 4-44
4.9.2 Costs 4-45
4.9.3 Advantages 4-45
4.9.4 Disadvantages 4-46
4.9.5 Evaluation of the County's Existing Sanitary Landfill 4-46
4.10 LAND DISPOSAL - RUBBLE WASTE 4-46
4.10.1 **Technology Assessment** 4-47
4.10.2 Costs 4-47
4.10.3 Advantages 4-48
4.10.4 Disadvantages 4-48
4.10.5 Evaluation of Existing Rubble Disposal 4-48
4.11 SLUDGE MANAGEMENT 4-49
4.11.1 Technology Assessment 4-49
4.11.2 Lime Stabilization/Land Application 4-50
4.11.3 Sludge Composting 4-53
4.11.4 Heat Drying/Pelletization 4-56
4.12 Evaluation of Existing Sludge Management 4-64
4.13 SPECIAL WASTE MANAGEMENT 4-64
4.13.1 Asbestos 4-64
4.13.2 Special Medical Waste 4-65
4.13.3 Hazardous Waste 4-65

4.13.4 Household Hazardous Waste 4-65
4.13.5 Emergency Response for Hazardous Waste Spillage or Leakage 4-66
4.13.6 Non-hazardous Contaminated Soils 4-67
4.14 LANDFILL MINING 4-67
4.15 MUNICIPAL SOLID WASTE (MSW) COMPOSTING FACILITY 4-67
4.16 PUBLIC EDUCATION PROGRAM 4-68
4.17 SUMMARY OF SOLID WASTE MANAGEMENT ALTERNATIVES 4-68
4.18 SITING NEW ACCEPTANCE FACILITIES 4-69
4.18.1 CONSTRAINTS ON THE SITING OF SOLID WASTE MANAGEMENT FACILITIES 4-73
4.19 COMPREHENSIVE PLAN REQUIREMENTS 4-82
4.20 ZONING REQUIREMENTS 4-83
5 CHAPTER 5 5-1
5.1 INTRODUCTION 5-1
5.2 ACTION PLAN OVERVIEW 5-1
5.3 WASTE STREAM CHARACTERIZATION 5-9
5.4 SOURCE REDUCTION 5-9
5.5 COLLECTION (SOLID WASTE AND RECYCLABLES) 5-11
5.6 RECYCLING 5-12
5.6.1 Residential Collection 5-12
5.6.2 Commercial, Industrial and Institutional Recycling 5-13
5.6.3 Material Recovery Facility (MRF) 5-15
5.6.4 Rubble Recycling/Processing Facility 5-15
5.7 YARD WASTE 5-17
5.8 LAND DISPOSAL FACILITIES 5-17
5.8.1 Municipal Sanitary Landfill 5-17
5.8.2 Rubble Landfills 5-18
5.9 SLUDGE 5-19
5.10 HOUSEHOLD HAZARDOUS WASTES 5-19
5.11 CONTROLLED HAZARDOUS SUBSTANCES 5-19
5.12 OTHER WASTES 5-20
5.13 LITTER CONTROL 5-20
5.14 PUBLIC INFORMATION PROGRAM 5-21
5.15 FINANCING 5-21
5.16 LEGISLATIVE INITIATIVES 5-22
GLOSSARY 1
APPENDIX A 1
COMAR 26.03.03 1
APPENDIX B 8
County Commissioners of Charles County, Maryland Resolution No. 2014-32 Adoption of the

Comprehensive Solid Waste Management Plan for 2011-2021. 9
APPENDIX C 19
Population Projection Data 19
APPENDIX D 21
Charles County MRA Calculations..... 21

CHARLES COUNTY, MARYLAND
Comprehensive Solid Waste Management Plan
2011 – 2021
LIST OF TABLES / CHARTS / FIGURES

TABLE 1-1 SOLID WASTE MANAGEMENT GOALS AND OBJECTIVES 1-3
TABLE 1-2 SUMMARY OF FEDERAL LAWS AFFECTING SOLID WASTE MANAGEMENT 1-8
TABLE 1-3 SUMMARY OF FEDERAL REGULATIONS AFFECTING SOLID WASTE MANAGEMENT (CFR, TITLE 40, SUB-CHAPTER 1) 1-9
TABLE 1-4 SUMMARY OF MARYLAND LAWS AFFECTING SOLID WASTE MANAGEMENT 1-14
TABLE 1-5 SUMMARY OF SECTIONS OF THE ENVIRONMENT ARTICLE, ANNOTATED CODE OF MARYLAND-AFFECTING SOLID WASTE MANAGEMENT 1-16
TABLE 1-6 SUMMARY OF MARYLAND REGULATIONS AFFECTING SOLID WASTE MANAGEMENT 1-17
TABLE 1-7 SUMMARY OF CHARLES COUNTY WASTE DIVISION RATES 1-23
TABLE 1-8 REQUIREMENTS AND PROCESS FOR SOLID WASTE MANAGEMENT PLAN AMENDMENTS 1-25
TABLE 2-1 POPULATION AND EMPLOYMENT PROJECTIONS 2-7
TABLE 3-1 WASTE LANDFILLED (2000-2010) 3-3
TABLE 3-2 ESTIMATED MUNICIPAL WASTE STREAM COMPOSITION 3-6
TABLE 3-3 RECOVERED MATERIALS 3-9
TABLE 3-4 ESTIMATED WASTE GENERATION IN CHARLES COUNTY 2009 - 2021 3-11
TABLE 3-5 CHARLES COUNTY CONVENIENCE (RECYCLING) CENTERS 3-20
TABLE 3-6 ACTIVE SOLID WASTE ACCEPTANCE FACILITIES 3-43
TABLE 4-1 LICENSED WOOD PROCESSING FACILITIES IN CHARLES COUNTY, MD 4-22
TABLE 4-2 SUMMARY OF SOLID WASTE MANAGEMENT ALTERNATIVES 70
TABLE 4-3 GENERAL PROCEDURE FOR SITING WASTE MANAGEMENT FACILITIES 4-74
TABLE 4-4 MINIMUM ZONING STANDARDS 4-84
TABLE 5-1 RECOMMENDED SOLID WASTE MANAGEMENT 5-2
TABLE 5-2 RECOMMENDED SOLID WASTE MANAGEMENT PLAN 5-4
TABLE 5-3 ESF PLAN 5-7

FIGURE 2-1 CHARLES COUNTY, MARYLAND 2-2
FIGURE 2-2 FEDERAL FACILITIES IN AND AROUND CHARLES COUNTY 2-8
FIGURE 3-1 LOCATION OF SOLID WASTE/RECYCLING ACCEPTANCE FACILITIES 3-45
FIGURE 4-1 COMPOSTING PROCESS FLOW DIAGRAM 4-23

CHART 1-1: CHARLES COUNTY GOVERNMENT ORGANIZATIONAL CHART 1-5
CHART 1-2: CHARLES COUNTY DEPARTMENT OF PUBLIC WORKS ENVIRONMENTAL RESOURCES / VEHICLE MAINTENANCE DIVISIONS 1-6

COUNTY COMMISSIONERS OF CHARLES COUNTY, MARYLAND

RESOLUTION NO. 2019-12

WHEREAS, the County Commissioners of Charles County, Maryland, by the authority of Environment Article, Title 9, Subtitle 5, of the Annotated Code of Maryland, and Title 26, Subtitle 3, Chapter 3, of the Code of Maryland Regulations (COMAR), as well as other provisions of the Annotated Code of Maryland and the provisions of the Code of Public Local Laws of Charles County, are directed to adopt and submit to the Maryland State Department of the Environment a comprehensive plan for the provision of adequate solid waste management systems throughout the County to include all towns and municipal corporations within Charles County; and

WHEREAS, said Comprehensive Solid Waste Management Plan has been prepared and submitted to the County Commissioners of Charles County, Maryland, in order that it may be adopted by said County; and

WHEREAS, said Comprehensive Solid Waste Management Plan has been reviewed by the County Commissioners of Charles County, Maryland, and it appearing that all requirements of State law have been complied with; and

WHEREAS, the Charles County Commissioners held a public hearing to solicit public comment followed by a work session on the updated draft Comprehensive Solid Waste Management Plan for 2011-2021 on July 23, 2019; and

WHEREAS, changes to the text, tables and figures were made to the Charles County Comprehensive Solid Waste Management Plan 2011-2021, dated July 23, 2019; and

WHEREAS, the said solid waste management plan is found to be consistent with land

use master planning in Charles County; and

WHEREAS, after serious deliberation and study the County Commissioners of Charles County, Maryland, are of the opinion that it is in the best interest of the citizens of Charles County that the Comprehensive Solid Waste Management Plan be adopted and approved; and

NOW, THEREFORE BE IT RESOLVED, this 23rd day of July 2019, by the County Commissioners of Charles County, Maryland, that the Comprehensive Solid Waste Management Plan, dated November 18, 2014, and its subsequent amendments as approved by the Maryland Department of the Environment is hereby repealed; and

BE IT FURTHER RESOLVED, this 23rd day of July, 2019, that attached Charles County Comprehensive Solid Waste Management Plan 2011-2021, dated July 23, 2019, Known as Exhibit A, is hereby adopted by the County Commissioners of Charles County, Maryland and IT IS FURTHER RESOLVED, that said Plan, replace and supersede all previous plans.

FURTHER, IT IS RESOLVED, that the Charles County Comprehensive Solid Management Plan 2011-2021, dated July 23, 2019, shall be submitted to Maryland Department of the Environment for review and approval.

IT IS FURTHER RESOLVED, that if any clause, sentence, article, section, part or parts of said Comprehensive Solid Waste Management Plan 2011-2021 shall be held unconstitutional or invalid for any reason whatsoever, such unconstitutionality or invalidity shall not affect the validity of the remaining parts of said Plan or any action thereof; the County Commissioners of Charles County, Maryland, hereby declare that they would have

adopted the remaining parts of said Plan, or any section thereof, if they had known any such clause, sentence, article, section, part or parts of said Plan would be declared unconstitutional or invalid.

FINALLY, IT IS RESOLVED that said Comprehensive Solid waste Management Plan 2011-2021 shall take effect on the 23rd day of July 2019.

COUNTY COMMISSIONERS OF
CHARLES COUNTY, MARYLAND

Reuben B. Collins, II, Esq., *President*

Bobby Rucci, *Vice President*

Gilbert O. Bowling, III

Thomasina O. Coates, M.S.

Amanda M. Stewart, M.Ed.

ATTEST: Carol A. DeSoto, Acting Clerk

Exhibit A: Comprehensive Solid Waste Management Plan 2011-2021, dated July 23, 2019

INTRODUCTION

I.1 STATE REGULATORY REQUIREMENTS & CONFORMITY WITH *COMAR*

Solid waste management regulations and policies exist at the federal, state, and local government levels. Traditionally, the federal government has provided the overall regulatory direction and minimum national standards for protecting human health and the environment. The implementation of these regulations is the responsibility of the state and local governments.

The Maryland Department of the Environment (MDE) administers and implements federal and state solid waste management regulations. Each county is required to prepare and adopt a solid waste management plan which addresses a 10 year planning period. The plan is to be reviewed and updated, if necessary, by the county every 3 years. Upon adoption by the county, the plan is then submitted to MDE for approval.

The *Charles County, Maryland Comprehensive Solid Waste Management Plan 2011 - 2021*, was prepared in accordance with the requirements of the *COMAR* 26.03.03, a copy of which is provided in Appendix A.

I.2 CHARLES COUNTY RESOLUTION ADOPTING PLAN

The governing authority is the Charles County Commissioners. The *Charles County Comprehensive Solid Waste Management Plan* was approved and adopted by the Charles County Commissioners as stipulated in Resolution *2014-32* dated *November 18, 2014.*

I.3 MDE APPROVAL LETTER

The letter approving this *Charles County Comprehensive Solid Waste Management Plan* from the Maryland Department of the Environment follows [to be inserted, once approved].

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Suite 610 • Baltimore, MD 21230-1719
410-537-3314 • 800-633-6101 • www.mde.maryland.gov

Larry Hogan
Governor

Boyd Rutherford
Lieutenant Governor

Ben Grumbles
Secretary

March 27, 2015

Mr. Peter Aluotto, Director
Charles County Department of Planning and Growth Management
P. O. Box 2150
La Plata, MD 20646

Dear Mr. Aluotto:

The Maryland Department of the Environment (the "Department") has completed its review of Charles County's Resolution No. 2014-32 for adopting Charles County's 2011-2021 Solid Waste Management Plan (the "Plan"). The Charles County Commissioners adopted the Plan on November 18, 2014 and forwarded the Plan to the Department for its review and approval in response to the requirements of Section 9-503(a) of the Environment Article, Annotated Code of Maryland. The Department received the adopted Plan on January 14, 2015.

Based on this review, the Department has determined that the adopted resolution satisfies the requirements of Section 9-503(a) of the Environment Article and Code of Maryland Regulations 26.03.03. In accordance with Section 9-507(a) of the Environment Article, Annotated Code of Maryland, the Plan is Approved.

Be advised that Section 9-506(b)(2) of the Environment Article, Annotated Code of Maryland, requires the county to submit a progress report at least every two years including any revisions or amendments to the county Plan that have been adopted. Since Charles County's Plan was adopted on November 18, 2014, the county must submit to the Department its progress report on or before **November 18, 2016**.

Thank you for your continuing interest and cooperation in providing sound and long-term solid waste management planning for the county. If you have questions or need additional clarification on these matters, please contact Mr. A.Hussain Alhija, Program Manager, Waste Diversion and Utilization Program, at 410-537-3314 or hussain.alhija@maryland.gov, or you may contact me at 410-537-3304.

Sincerely,

Horacio Tablada, Director
Land Management Administration

cc: Mr. Jason R. Groth, Chief, Charles County's Resource and Infrastructure Management Division
Mr. A.Hussain Alhija, Land Management Administration

Recycled Paper www.mde.maryland.gov TTY Users 800-735-2258
Via Maryland Relay Service

I.4 NATIONAL TRENDS AND FACTORS INFLUENCING SOLID WASTE MANAGEMENT

More solid waste is produced in the United States of America than any other country. Solid waste generation has almost doubled in the last 20 years despite the increased public awareness of the necessity for waste reduction.

This increase is not only the direct effect of increased population, but the effect of an increase in the per capita waste generation. We generated a daily average of 2.6 pounds of trash per person 20 years ago; today we produce an average of 4.0 pounds.

As a nation, our previous disposal practices underestimated the importance of solid waste management. Improper planning, design, operation, and maintenance of our landfills and incinerators provided a source of air, water, and soil contamination. Today, we realize that appropriate planning, design, operation, and maintenance are essential to reduce the potential of adverse environmental impacts from solid waste facilities.

Throughout our country, many existing landfills and incinerators will close due to stricter regulations. Numerous landfills are nearing capacity; therefore, the need to site new landfills is immediate. However, new landfill sites are limited due to stricter regulations, public concerns, costly environmental controls, and limited space in densely populated areas. Landfill capacity in the older, densely populated areas of the Northeast is declining. An increasing amount of waste generated in the Northeast is being transported to Midwestern and Southern States for disposal.

I.5 PURPOSE AND SCOPE OF PLAN

The highest priority of this Plan, as established by the Charles County Department of Planning and Growth Management, Charles County Department of Public Works (Environmental Resources Division) and the Charles County Commissioners, is to ensure the conservation of resources and protection of the environment by maximizing waste reduction and recycling, thus minimizing the requirement for disposal facilities.

An equally important priority is the establishment of tighter county and local control over the permitting and operation of required solid waste management facilities. This monitoring program will encourage adherence to permit requirements and serve to inform the county staff and residents of the activities at these facilities.

Charles County will use this document as a planning tool for solid waste management during the next decade. The Plan provides the framework that will be relied upon to make numerous decisions on the implementation of required capital construction and management programs for the next 10 years. It is the intent of this Plan to develop and articulate issues that must be addressed in order to focus the community on the goals and objectives and concepts of solid waste management through open and active public participation. When consensus is reached through this process; additional planning, engineering, and community involvement will define the specific settings, technologies, regulations, and policies needed to achieve these goals and objectives. This Plan will be continuously updated to reflect these specific decisions as they are approved.

I.6 PLAN ORGANIZATION

The *Charles County Comprehensive Solid Waste Management Plan* addresses the management of solid waste including generation, waste reduction, collection, transportation, processing, and disposal. Ultimately, this document will provide Charles County with a plan of action during the 10-year planning period. Topics to be included for discussion in the solid waste management plan are outlined in *COMAR* 26.03.03.03. A listing of these topics and a cross reference for locating topic discussions is provided prior to this introduction. This Plan contains an introduction, five chapters, a glossary of terms, and a list of references. A brief summary of the five chapters follows.

I.6.1 Chapter 1 -- Goals and Regulatory Framework

The goals and objectives guiding solid waste management in Charles County are presented in this chapter. The intent of these goals and objectives is carried through to the evaluation of alternatives and the formulation of recommended actions in Chapters 4 and 5. The procedure to amend this Plan is also presented in this chapter.

The planning and decision-making process governing solid waste management facilities and issues in Charles County is guided by regulatory requirements and input from the public. This chapter describes the structure of Charles County Government as it relates to solid waste management, and the impact of existing federal, state, and county regulations on the planning, establishment, and operation of solid waste disposal systems in the County. Additionally, a general description of public involvement in the planning and decision-making process for solid waste management facilities is presented.

I.6.2 Chapter 2 -- County Background Information

General historical and geological information for Charles County is presented. A description of

the regional setting and history provides the background for discussing the effect of growth on the provision of solid waste management services and facilities.

Population projections for the County are presented in this chapter. These projections are the basis for the prediction of solid waste generation and the sizing of solid waste management facilities. Also, there is a summary of the current requirements and policies in the County's comprehensive plan and zoning requirements relating to solid waste management.

I.6.3 Chapter 3 -- Existing Solid Waste Management

The purpose of this chapter is to compile a data base on current solid waste management in Charles County and to serve as a baseline for the development of recommendations in the following chapters. An analysis of the Charles County waste stream is provided, including historic data, projections of waste generation, waste stream composition, imported wastes, and exported wastes. A description of the existing collection systems for solid waste and recyclables, the current recycling program, and existing and proposed solid waste management facilities is also provided.

I.6.4 Chapter 4 -- Assessment of Solid Waste Management Alternatives

Using the data presented in the first three chapters, an assessment of the adequacy of existing and planned management facilities regulations and policies to meet the goals and objectives for the planning period is presented. Alternatives available to meet identified deficiencies are evaluated. In addition, a review of siting constraints for solid waste facilities within the County is presented.

I.6.5 Chapter 5 -- Solid Waste Management Plan of Action for – 2011-2021

Based on the assessment of needs and alternatives presented in Chapter 4, a solid waste management action plan for Charles County is presented. The recommended plan includes the sizing and staging of needed management facilities, organization of the collection system for waste and recyclables, and required modifications to county policies and regulations during the 10-year planning period. Cost projections and methods to finance the recommended plan are also presented.

1 CHAPTER 1

GOALS AND REGULATORY FRAMEWORK

1.1 CHAPTER SUMMARY

Chapter 1 presents the goals and regulatory framework for establishing a Solid Waste Management Plan for Charles County for the period 2011 to 2021. The essence of the planning process centers on developing realistic goals and objectives as well as accurately defining the regulatory requirements.

Topics discussed in this chapter include: Charles County goals, objectives and policies; the general structure of the Charles County Government as it relates to solid waste management; and public participation in the planning and implementation of the Plan. This chapter also describes the impact of federal, state, and County regulations on the planning, establishment, and operation of solid waste facilities in Charles County. The requirements and procedures to amend this Plan are also provided in this chapter.

1.2 GOALS, OBJECTIVES, AND POLICIES

Goals, objectives, and policies are fundamental elements for developing an effective and efficient solid waste management plan. Broad, generalized statements which reflect the values of the County are defined as the goals of the plan. Goals represent the fundamental desires and visions for the management of solid waste within Charles County. The goals are attainable by accomplishing specific objectives.

The four goals considered critical in developing the *Charles County Comprehensive Solid Waste Management Plan* include the following:

- Preservation and protection of the environment;
- Protection of human health and safety to provide a quality living environment;
- Providing a cost-effective and self-sufficient solid waste management program;
- Promote recycling and reuse of materials throughout the County.

Table 1-1 lists the goals and objectives for the management of solid waste in Charles County. Several common themes are developed in the goals and objectives, the foremost of which is to

maximize the available landfill space by continuing and expanding environmentally-sound waste management technologies, including waste reduction, reuse, and recycling.

In pursuing this strategy, the County affirms its commitment to foster public involvement in solid waste management issues, to protect the environment by developing a state-of-the-art landfill maximizing environmental protection, and to ensure a future source of funding for its solid waste management program. Charles County will develop policies to guide the direction of solid waste. Management policies must be recorded, scrutinized, and revised so that they are compatible with the goals and objectives of the solid waste management plan. The County recognizes that in order to implement the goals and objectives of this Plan, policies will need to be developed. Solid waste management policies will be added to the Plan by amendment.

Table 1-1 SOLID WASTE MANAGEMENT GOALS AND OBJECTIVES

GOALS

1. Preserve and protect the natural environment.
2. Protect human health and safety, and provide a quality living environment.
3. Provide a cost-effective, self-sufficient solid waste management program.
4. Promote recycling, waste reduction, and reuse of materials throughout the County.
5. Continue to explore the feasibility of the use and/or sale of methane gas.

OBJECTIVES

A. COLLECTION

1. Ensure that adequate solid waste collection services are available to all county citizens and commercial establishments at a reasonable cost.
2. Continue to provide curbside collection of recyclables and yard waste to the more densely populated areas of Charles County. Expand the program when economically feasible.
3. Evaluate the feasibility of providing Municipal Solid Waste (MSW) collection services within the County Development District.

B. WASTE REDUCTION AND RECYCLING

3. Promote the expansion of solid waste reduction, reuse, and recycling through diligent implementation of the approved Charles County Comprehensive Solid Waste Management Plan.
4. Examine the use of innovative technology to reduce the reliance on landfilling solid wastes.
5. Continue to exceed the countywide recycling rate of fifteen (35) percent.

C. LAND DISPOSAL

6. Provide continuous disposal capacity within the County for municipal solid waste and rubble, in an environmentally protective manner.
7. All MSW landfills shall be owned and operated by Charles County Government.

D. SPECIAL WASTE MANAGEMENT

8. Continue the ongoing Charles County Household Hazardous Waste Program.
9. Manage and regulate sludge storage and land application to ensure environmental and land use compatibility.

E. MISCELLANEOUS

10. Eliminate roadside dumps, and prevent the establishment of new roadside dumps; establish an effective litter control program.
11. Pursue regional solutions for solid waste management problems, as feasible.
12. Achieve and maintain compliance with all federal, state and county regulatory requirements; develop a monitoring system to ensure continued compliance.
13. Establish a comprehensive public information and involvement program for solid waste issues, including facility siting, permitting, operation, waste reduction, reuse, and recycling.
14. Establish a financing structure that will adequately fund all required solid waste facility capital construction, operations, and administration expenditures.
15. Provide a mechanism for regularly updating the Charles County Comprehensive Solid Waste Management Plan to ensure future demands for services are efficiently met; provide an annual progress report.
16. Encourage public/private partnerships to help meet the demand for solid waste management facilities and services.
17. Link solid waste services to cost in the market place.
18. Establish a solid waste management facility siting policy; conduct site selection studies, as required, to ensure required facilities may be constructed as needed.

1.3 STRUCTURE OF COUNTY GOVERNMENT

Charles County is governed by elected County Commissioners who enact all County ordinances, establish an annual operating and capital budget, and perform all legislative functions, including the adoption of the *Charles County Comprehensive Solid Waste Management Plan*. The Department of Planning and Growth Management prepares and coordinates the solid waste management plan and its amendments while the operation of the landfill and the recycling program is conducted within the Department of Public Works, Environmental Resources Division. The overall County government structure is illustrated in Figure 1-1. The Chief of Environmental Resources oversees the operation of the landfill and the recycling program. The Environmental Resources Division organization structure is shown in Figure 1-2.

1.4 PUBLIC PARTICIPATION

Goals and objectives for the Charles County Comprehensive Solid Waste Management Plan were established as a joint effort among the Charles County Department of Planning and Growth Management, Charles County Department of Public Works, Charles County Commissioners, and citizen input.

1.5 LAWS AND REGULATIONS GOVERNING MANAGEMENT FACILITIES

Solid waste management laws and regulations exist at the federal, state, and county levels. Overall, regulatory direction and minimum nationwide standards for protecting human health and the environment are established at the federal level. State regulations meet or exceed those mandated by federal regulations. State regulations specify minimum design criteria and the permitting, construction, operation, maintenance, and monitoring requirements for many solid waste management facilities. County regulations must be compatible with federal and state laws and regulations, but may augment federal and state laws and regulations. The more specific issues of land use, zoning, procurement, financing, and operation related to solid waste management facilities are left entirely to the County to regulate.

Descriptions of responsible agencies, responsibilities, and the applicable federal, state, and county laws and regulations are discussed in the following paragraphs.

Chart 1-1: Charles County Government Organizational Chart

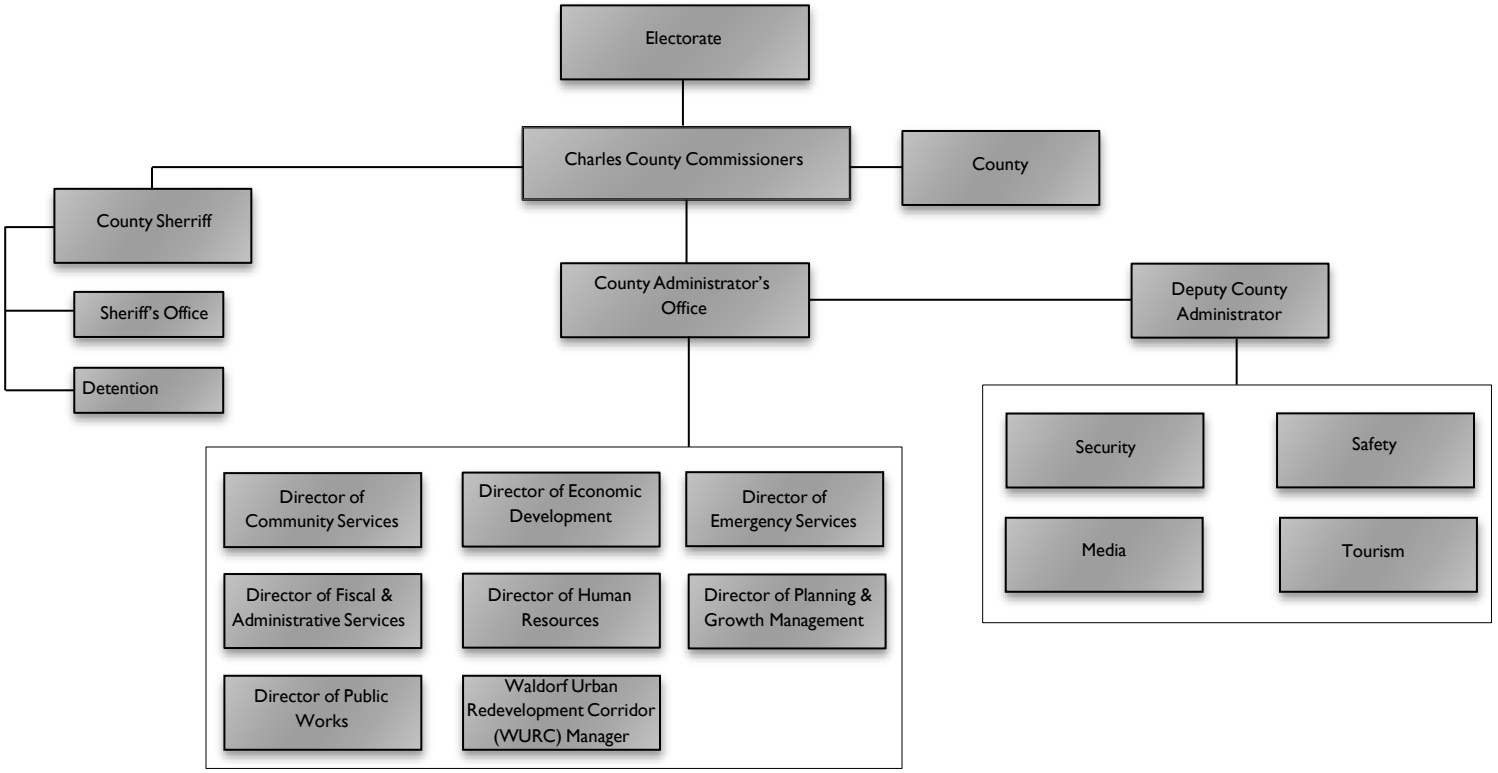
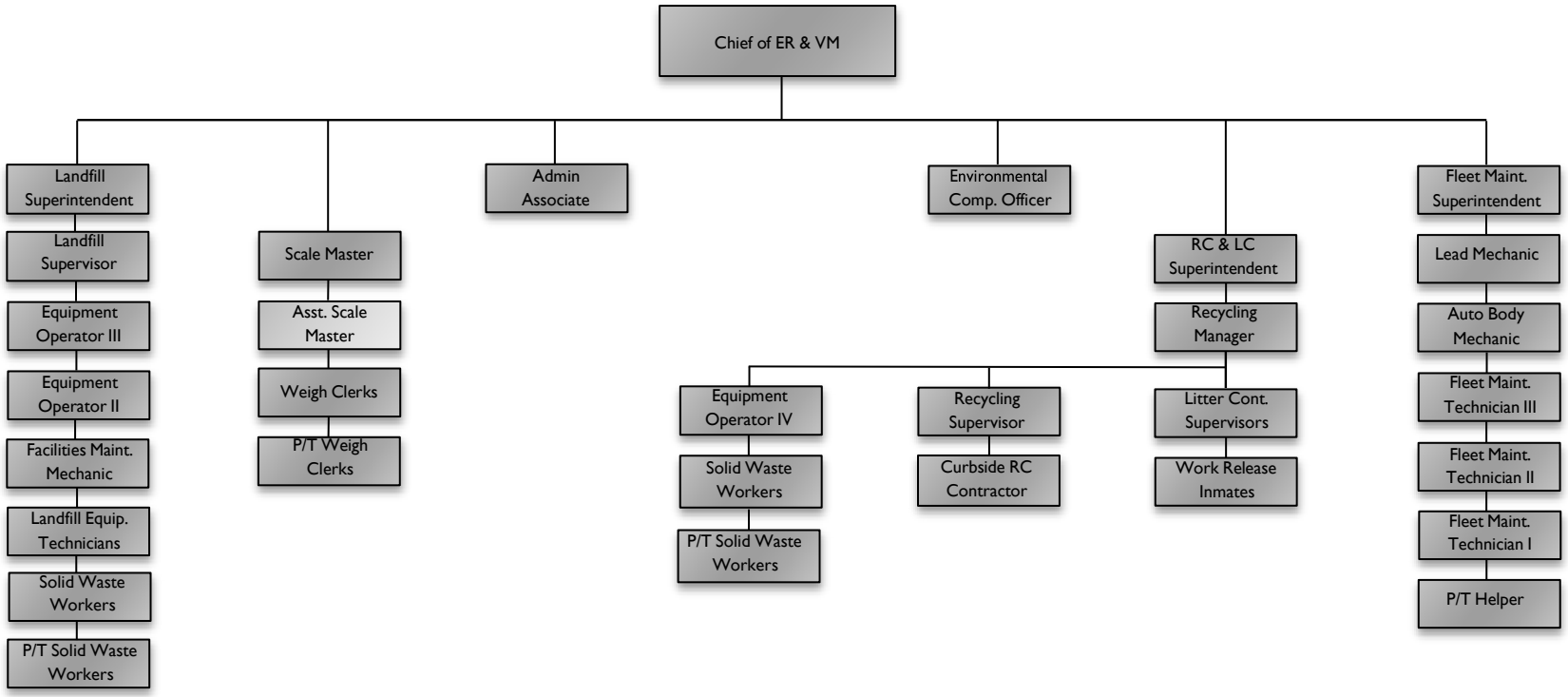


Chart 1-2: Charles County Department of Public Works Environmental Resources / Vehicle Maintenance Divisions



1.5.1 Federal

Table 1-2 provides a summary of applicable federal laws, judged to be most significant, regulating solid waste. Foremost among those laws is the *Resource Conservation and Recovery Act (RCRA)* of 1976, amended in 1980 and 1984, that provides federal guidelines and standards for the environmentally sound reuse, handling, and disposal of solid waste. The act requires that states incorporate these guidelines into their solid waste management programs. Under RCRA provisions, Subtitle D provides federal standards for municipal sanitary landfills. These standards include the location, design, operation, groundwater monitoring, corrective action, closure, post-closure, and financial assurance criteria for all municipal sanitary landfills.

The *Code of Federal Regulations (CFR)* provides documentation of the rules established in the Federal Register by the executive departments of the federal government. The Code is divided into 50 titles which are further divided into chapters and subparts thereof. *CFR Title 40* is titled *Protection of the Environment*, which includes *Sub-chapter I-Solid Wastes* (Parts 240 through 272).

Solid waste management, on the federal level, is the responsibility of the United States Environmental Protection Agency (EPA). Federal regulations establish overall regulatory direction and minimum nationwide standards for protecting human health and the environment. Direct implementation of solid waste programs is delegated to state and local governments. A summary of federal regulations important to solid waste management contained in *CFR, Title 40, Subchapter I - Solid Wastes* is provided in Table 1-3.

In addition, *CFR Title 40* (258) places restrictions on siting waste disposal facilities near airports. This code provides guidance concerning the establishment of new landfills in the vicinity of airports and stipulates that the following criteria must be met for sanitary landfills:

- Waste disposal sites may not be located within 10,000 feet of any runway end (used or proposed) to be used by a turbine powered aircraft.

- Waste disposal sites may not be located within 5,000 feet of any runway end used only by piston powered aircraft.

- Waste disposal sites may not be located within a five-mile radius of a runway end that attracts or sustains hazardous movements from feeding, water, or roosting areas into, or across the runways and/or approach and departure patterns of aircraft.

Table 1-2 SUMMARY OF FEDERAL LAWS AFFECTING SOLID WASTE MANAGEMENT

Resource Conservation and Recovery Act:

A primary objective of this act is to promote recycling and reuse of recoverable materials. The act also provides guidelines for environmentally-sound handling and disposal of both hazardous and non-hazardous solid waste. Subtitle D of the act specifies criteria for municipal solid waste landfills.

Comprehensive Environmental Response, Compensation and Liability Act (Superfund):

Establishes programs for the identification and remediation of waste disposal sites containing hazardous substances; establishes standards for clean-up efforts and disposal of wastes; and provides a mechanism for assigning liability for contaminated sites.

Clean Water Act:

Section 402 of this act establishes the National Pollutant Discharge Elimination System (NPDES) program which regulates effluent limitations for the discharge of wastewater and runoff from solid waste management facilities into bodies of water. The construction of facilities which may impact rivers, lakes, marshes, swamps, or wetlands is regulated by Section 404 which is administered by the Army Corps of Engineers. Section 405 addresses the disposal of wastewater treatment sludge.

Clean Air Act:

Regulates emissions from landfill gas management systems and resource recovery facilities. Landfill operators must comply with requirements of the State implementation plan established under Section 110.

Safe Drinking Water Act:

Establishes maximum contaminant levels for parameters included in groundwater monitoring programs.

Federal Emergency Management Act:

Prohibits siting of facilities within the 100-year floodplain.

Endangered Species Act:

Prohibits construction or operation of facilities that would result in the "taking" of an endangered or threatened wildlife species, or in the destruction of their critical habitat.

Table 1-3 SUMMARY OF FEDERAL REGULATIONS AFFECTING SOLID WASTE MANAGEMENT (CFR, TITLE 40, SUB-CHAPTER 1)

Part 240: Guidelines for the Thermal Processing of Solid Wastes

Minimum performance level for municipal solid waste incinerators with a capacity of 50 tons per day, or greater.

Part 241: Guidelines for the Land Disposal of Solid Wastes

Minimum performance levels for any municipal solid waste disposal site operation.

*Part 243: Guidelines for the Storage and Collection of Residential, Commercial and Institutional Solid Waste**

Minimum performance levels for solid waste collection operations. Issues addressed include storage, safety, equipment, frequency, and management.

*Part 244: Management Guidelines for Beverage Containers**

Minimum actions for reducing beverage container waste; covers use of returnables, information requirements, and implementation.

*Part 245: Promulgation of Resource Recovery Facilities Guidelines**

Guidelines for the recovery of resources from residential, commercial, and institutional solid wastes, including regionalization and planning techniques.

*Part 246: Source Separation for Materials Recovery Guidelines**

Minimum actions for the recovery of resources from solid wastes, including high-grade paper, residential materials, and corrugated containers.

Part 247: Guidelines for the Procurement of Products That Contain Recycled Materials

Recommended guidelines for procedures that can be used in the specifications for procurement of products to increase the use of recycled materials.

Part 255: Identification of Regions and Agencies for Management

Procedures for the identification of regional solid waste management planning districts pursuant to Section 4002(a) of the Solid Waste Disposal Act.

Part 256: Guidelines for Development and Implementation of State Management Plans

Guidelines for development and implementation of State solid waste management plans.

Regulations marked with an asterisk (*) are mandatory for federal agencies and recommended for state and local governments.

TABLE 1-3

SUMMARY OF FEDERAL REGULATIONS AFFECTING SOLID WASTE MANAGEMENT (CFR, TITLE 40, SUB-CHAPTER 1) – (Continued)

Part 257: Criteria for the Classification of Disposal Facilities and Practices

Criteria to determine which solid waste facilities pose a reasonable probability of adverse effects on health or the environment. Facilities in violation will be considered open dumps. Does not apply to municipal landfills (covered under Section 258).

Part 258: Criteria for Municipal Landfills (Subtitle D Regulations)

Establishes minimum national criteria for the design and operation of municipal solid waste landfills. Includes location restrictions, operating criteria, design criteria, groundwater monitoring and corrective action, closure and post-closure care, and financial assurance criteria. Design standards apply only to new landfills and lateral expansions of existing facilities.

Part 260: Hazardous Waste Management System - General

Provides definitions of terms and a general overview of Parts 260 through 265.

Part 261: Identification and Listing of Hazardous Waste

Provides identification of materials that are subject to regulation as hazardous wastes under Parts 270, 271, and 124.

Part 262: Standards Applicable to Generators of Hazardous Waste

Establishes standards for generators of hazardous wastes including EPA identification numbers, manifest, pre-transportation requirements, record keeping, and reporting.

Part 263: Standards Applicable to Transporters of Hazardous Waste

Establishes regulations for transporters of materials requiring a manifest as defined in Part 262.

Part 264: Standards for owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

Establishes minimum national standards for the management of hazardous waste.

Part 265: Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

Establishes minimum national standards that define the management of hazardous wastes during the period of interim status and until the certification of post-closure or closure of the facility.

TABLE 1-3

SUMMARY OF FEDERAL REGULATIONS AFFECTING SOLID WASTE MANAGEMENT (CFR, TITLE 40, SUB-CHAPTER 1) – (Continued)

Part 266: *Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Disposal Sites*

Establishes minimum national standards for the recyclable materials used in a manner to constitute disposal, hazardous waste burned for energy recovery, used oil burned for energy recovery, recyclable material used for precious metal recovery, and spent lead-acid batteries being reclaimed.

Part 267: *Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities*

Establishes minimum national standards, which define the management of hazardous waste for new land disposal facilities.

Part 268: *Land Disposal Restrictions*

Identifies a schedule to evaluate listed wastes for prohibition of land disposal and establishment of treatment standards for these wastes.

Part 270: *EPA Administered Permit Programs: The Hazardous Waste Permit Program*

Application requirements, standard permit conditions, monitoring, and reporting requirements for EPA permitting for the treatment, storage, and disposal of hazardous waste.

Part 271: *Requirements for Authorization of State Hazardous Waste Programs*

Identifies the requirements that state programs must meet to fulfill interim and final authorization as well as the procedures EPA uses to approve, revise, and withdraw approval of State programs.

Part 272: *Approved State Hazardous Waste Programs*

Establishes the applicable State hazardous waste management programs.

Part 503: *Sewage Sludge Regulations*

Requirements and standards for the treatment, land application, surface disposal, and incineration of sewage sludge.

Regulations marked with an asterisk (*) are mandatory for federal agencies and recommended for state and local governments.

1.5.2 State

The State of Maryland has adopted a number of laws that address solid waste management issues. The development of recycling programs in Charles County is governed by the following laws and codes:

- Maryland Recycling Act
- Newsprint Recycled Content Act
- Telephone Directory Recycling Act
- Plastic Material Code Act
- Composting Act
- Mercury Oxide Battery Act
- E-Waste Recycling Law
- Maryland Florescent and Compact Fluorescent Light Recycling Act
- Maryland Public Schools and College Recycling Law
- Apartment and Condominium Recycling Program (Section 9-1703 (b) (12))
- Recycling Rate and Waste Diversion – Statewide Goals Act (2012)

A summary of the State laws affecting solid waste management is provided in Table 1-4. State laws are codified under the articles of the *Annotated Code of Maryland*. Laws addressing solid waste management are included throughout the code; the *Title 9 Environment Article* contains many of the laws affecting the location, design, and operation of solid waste disposal facilities. These laws are developed into regulation by the agency to which the responsibility is delegated by the State Legislature. Table 1-5 provides an abbreviated summary of the *Annotated Code of Maryland* titles affecting solid waste management.

Administrative rules and regulations adopted by State agencies pursuant to State laws are compiled into a document entitled *Code of Maryland Regulations (COMAR). Title 8* contains the regulations of the Maryland Department of Natural Resources (DNR) which must be considered when siting solid waste facilities. *COMAR Title 26* contains the administrative rules and regulations for MDE including solid waste management regulations. The full description of *Title 26, Chapter 3* is presented in Appendix A. A summary of the regulations which affect solid waste management is provided in Table 1-6.

1.5.2.1 Maryland Department of the Environment

The MDE is the primary State agency having responsibility for solid waste management within the State of Maryland. MDE implements federal and state solid waste regulations, and enforces Maryland environmental regulations addressing surface water and groundwater protection, erosion and sediment control, preservation of wetlands, and recycling. MDE reviews solid waste facility plans and management plans, issues permits, and inspects facilities.

MDE issues permits for the various types of waste facilities that could be sited in Charles County including sanitary landfills, land-clearing debris landfills, rubble landfills, processing facilities (e.g., materials recovery facilities, recycling centers, rubble processing facilities, etc.), transfer stations, incinerators, and industrial and hazardous waste landfills. Industry and the private sector are responsible for permitting and providing industrial and/or hazardous waste facilities for disposal of their wastes, as required. One way that Charles County is able to regulate industrial and hazardous waste facilities is through public review of permit applications for waste management facilities.

Table 1-4 SUMMARY OF MARYLAND LAWS AFFECTING SOLID WASTE MANAGEMENT

Maryland State Implementation Plan (SIP):
Limits emissions from specific pollutant sources to prevent air quality from falling below National Ambient Air Quality Standards (NAAQS).

Nontidal Wetland Regulations:
Prevents net loss of nontidal wetlands by establishing a stringent permitting process.

Chesapeake Bay Critical Area Protection Program (1984):
Controls human intervention in the Chesapeake Bay drainage area.

Maryland Recycling Act (1988, modified 2012):
Establishes a requirement for Maryland counties to plan and implement a recycling system by 1994. Charles County was mandated to reduce the County's waste stream by 15 percent in 1994. In 2012, House Bill 929 (Recycling Rate and Waste Diversion – Statewide Goals Act) increased the waste reduction rate to 20% for Maryland counties with populations of less than 150,000 and 35% for Maryland counties with populations of greater than 150,000.

Maryland State Senate Joint Resolution 6 (2000):
Established a voluntary statewide diversion of goal of 40% by the year 2005 in order to reduce the amount of waste going to solid waste disposal facilities.

Asbestos Control - Asbestos Hazard Emergency Response Act (1990):
Requires completion of a teaming program by those who do asbestos-related work within schools; deals with asbestos controls.

Land-clearing Debris Landfills - Amount of Surety (1990):
Addresses the amount of surety required for each acre of land-clearing debris landfills.

Newsprint Recycled Content Act (1991):
Regulates newsprint recycling by imposing specified recycling content percentage requirements on the Maryland newspaper industry.

Telephone Directory Recycling Act (1991):
Regulates telephone directory publishers to meet specified recycling content percentage requirements for telephone directories.

Plastic Material Code (1991):
Bans rigid plastic containers or bottles from distribution or sale in the State unless appropriately labeled indicating the plastic resin used to produce them.

Composting Act (1992):
Includes composting in the definition of recycling. Requires that County recycling plans address composting issues, and bans yard waste from landfills effective in 1994.

Mercury Oxide Battery Act (1992):
Makes battery manufacturers responsible for collection, transportation, and recycling or disposal of batteries sold or offered for promotional purposes in the State.

TABLE 1-4

SUMMARY OF MARYLAND LAWS AFFECTING SOLID WASTE MANAGEMENT
Title 9 Environment Article, Annotated Code of Maryland – (Continued)

Sludge Application:

Regulates land application procedures to maintain the public health.

Medical Waste Legislation:

Regulates identification, record keeping, treatment, transport, and disposal of special medical wastes; infectious wastes are prohibited in solid waste landfills in the State.

Natural Wood Waste Recycling Facilities (1991):

Wood waste recycling facilities must be appropriately permitted and operated, and may accept only natural wood waste.

Scrap Tire Recycling Fees:

Regulates the storage of scrap tires, including prohibition against landfill disposal or scrap tires after January 1, 1994; establishes tire recycling fee on new tires sold in Maryland.

Waste Information and Assessment Program (1998):

Requires MDE to create a waste information and assessment program and to submit an annual report on the volume of certain types of waste disposed in or exported from Maryland. Requires permitted waste acceptance facilities to provide at least yearly information necessary to MDE.

Maryland E-Waste Recycling Law (2005, modified 2007, 2012):

Requires computer manufactures to submit a registration and fee into the Maryland State Recycling Trust Fund, which can be used to give grants to municipalities to implement local electronics and increases registration fee under (HB 488). In 2012 a tiered registration fee and required educational and instructional materials related to material destruction and sanitization of data on covered electronics (HB 879).

Maryland Public School and College Recycling Law (2009):

Requires recycling in all publicly –funded schools with the exception of State Universities and each counties' recycling plan implement a strategy for collection, processing, marketing, and disposing of recyclable materials from its public schools and colleges (under HB 1290).

Maryland Mercury Switch Removal from Vehicle Law (2009):

Requires motor vehicle manufactures to develop and submit to the Maryland Department of the Environment (MDE), a mercury minimization plan that includes information on mercury switch removal from motor vehicles (HB 1263).

Maryland Fluorescent and Compact Fluorescent Light Recycling Act (2010):

Requires each county to address the recycling of certain fluorescent and compact fluorescent lights and in an updated recycling plan (HB 685).

Maryland Apartment Buildings and Condominiums Recycling Act (2012):

An Act requiring a county recycling plan to address the collection and recycling of recyclable materials from residents of apartment buildings and condominiums that contain 10 or more dwelling units by property owners or managers of apartment buildings and councils of units owners of condominiums.

Table 1-5 SUMMARY OF SECTIONS OF THE ENVIRONMENT ARTICLE, ANNOTATED CODE OF MARYLAND- AFFECTING SOLID WASTE MANAGEMENT

Annotated Code of Maryland

Title 3 – Environmental Programs
Subtitle 1 Maryland Environmental Service
Subtitle 9 Northeast Maryland Waste Disposal Authorities

Title 4 - Water Management

Title 5 – Forest and Parks

Title 6 - Toxic, Carcinogenic, and Flammable Substances

Title 7 - Hazardous Materials and Substances

Under Title 9 - Water, Ice and Sanitary Facilities; MDE regulates the location, design, and operation of sanitary landfills through refuse disposal permits issued and enforced under authority of the following sections:

Section 204	*Installing, Altering, or Extending Water Supply Systems, Sewerage Systems, or Refuse Disposal Systems*
Section 204.1	*Installing, Altering, or Extending Incinerators*
Section 204.2	*Installing, Altering, or Extending Landfill Systems*
Section 209	*Landfill System Hearings*
Section 210	*Prerequisites for Issuance of Permit*
Section 211	*Landfills, Incinerators, and Transfer Stations; Requirements for Security*
Section 212	*Landfill Systems - Options to Purchase*
Section 212.1	*Denial of Permit to Non-government Person(s)*
Section 213	*Term of Permit (five years)*
Section 214	*Revoking or Refusal to Renew a Permit*
Section 215	*Closure and Cover when Operation Ends*
Section 225	*Landfills near Hospitals Prohibited (2-mile radius)*
Section 226	*Certification of Public Necessity Required for Hazardous Waste Landfill System*
Section 227	*Infectious Waste in Landfill System Prohibited*
Section 228	*Scrap Tires*

Title 9 Subtitle, County Water and Sewerage Plans

Section 503/505/506	*County Plan, Content, Reviews, Approvals and Amendments*

Title 9, Subtitle 17, Office of Recycling

Section 1703/1794	*County Recycling Plan and Content*
Section 1703	*Fluorescent and Compact Fluorescent Light that Contain Mercury Recycling (House Bill 685)*
Section 1703	*Public School and Public College Recycling Program (House Bill 1290)*
Section 1703	*Apartment Buildings and Condominiums Recycling (House Bill 1)*
Section 1708	*Natural Wood Waste Processing and Recycling*
Section 1728.1	*Statewide Electronics Recycling Program (House Bill 488)*

Table 1-6 SUMMARY OF MARYLAND REGULATIONS AFFECTING SOLID WASTE MANAGEMENT

COMAR REGULATIONS

Under Title 8 (Department of Natural Resources), the following sections must be considered in the siting solid waste management facilities:

Subtitle 3, Chapter 8, Threatened and Endangered Species
Subtitle 9, Chapters 1-6, Forest Conservation

Title 26, Subtitle 3, Water Supply, Sewerage, Solid Waste, and Pollution Control Planning and Funding, Chapter 3, Development of County Comprehensive Solid Waste Management Plans:

Requires that each county maintain a current solid waste management plan and establishes the format for these plans.

Title 26, Subtitle 3, Chapter 10, Financial Assistance for the Construction of Processing and Disposal Facilities:

Stipulates the requirements, priority listing criteria, and ranking system for counties to receive financial assistance from the State of Maryland.

Title 26, Subtitle 4, Regulation of Water Supply, Sewerage Disposal and Solid Waste, Chapter 7 Solid Waste, Solid Waste Management:

Regulates permitting, designing, constructing, operating, and closing municipal, land-clearing debris, rubble, and industrial waste landfills, processing facilities, transfer stations, and incinerators.

Other regulations under *Title 26* that are important to solid waste management include:

Subtitle 4, Chapter 6, Sewage Sludge Management
Subtitle 4, Chapter 8, Scrap Tire Regulations
Subtitle 4, Chapter 9, Natural Wood Waste Recycling Facilities
Subtitle 8, Water Pollution
Subtitle 9, Chapter 1, Erosion and Sediment Control
Subtitle 9, Chapter 2, Stormwater Management
Subtitle 11, Air Quality
Subtitle 13, Disposal of Controlled Hazardous Substances
Subtitle 5, Chapter 3, Construction on Nontidal Waters and Flood plains
Subtitle 5, Chapter 4, Nontidal Wetlands
Subtitle 5, Chapter 7, Wetlands Regulations

All solid waste disposal and processing facilities are required to operate in a manner that reduces health hazards and minimizes environmental impacts. Discharges to water or air are limited to those permitted by solid waste disposal, water pollution control, or air pollution control regulations. The permitting process described in the following paragraphs is for a refuse disposal permit, which is a requirement for all solid waste management facilities. Additional permits are required for constructing and operating these facilities. These permitting requirements are included for use in planning and are not intended to provide a complete description of *COMAR* permitting requirements. An applicant for a permit must obtain a copy and strictly follow all requirements of the applicable *COMAR* regulations.

A. Municipal Landfills *(COMAR 26.04.07.06-.08):*

The permitting process for municipal landfills proceeds in three phases and requires that the public be notified of a proposed sanitary landfill. The siting of proposed solid waste acceptance facilities is accomplished and approved at the local or county level. Public notice is required for permit applications to construct, modify, or extend a landfill. The first phase of the permit application is a detailed site selection study and a site recommendation; once the landfill site is selected, a site-specific hydrogeologic study for the recommended landfill site is presented in the second phase and a conceptual design of the proposed sanitary landfill is presented in the third phase.

Section 9-210, Environment Article, Annotated Code of Maryland clarifies the local approvals required in the permitting process. The MDE may not issue a permit until the following steps are taken.

- MDE completes the preliminary review and sends its written findings to the County Commissioners and the Planning Commission.

- Charles County completes its review and provides MDE with a written statement that the proposed refuse disposal system: (a) meets all applicable county zoning and land use requirements; and (b) is in conformity with the Charles County Comprehensive Solid Waste Management Plan.

Public notification of applications for the construction of new landfills and the modification of existing landfills are required by Title 1 - Subtitle 6 - *Environment Article, Annotated Code of Maryland*. The regulation requires that the applicant publish notice of the application once a week for two weeks in a newspaper of general circulation within the County. In addition, the applicant must give notice by certified mail to land owners adjacent to the site, the chairman of the legislative body, and any elected executive of the County, the elected executive of any municipal corporation within the county, and any other county within one mile of the site. Should MDE receive a request to conduct a public information meeting, a meeting will be conducted prior to the approval of the first phase of the permit application. The applicant and interested parties will be invited to this meeting.

B. Land Clearing Debris Landfills *(COMAR 26.04.07.11):*

Land clearing landfills are restricted by COMAR regulation to accepting only those naturally occurring wastes that have been generated from land clearing operations. Construction and demolition waste is prohibited from this specific class of landfill. Information required for a permit is included in a single-phase permit application report. Prior to issuance of the refuse disposal permit, MDE will hold a public hearing for the debris landfill.

C. Rubble Landfills *(COMAR 26.04.07.13-18):*

The refuse disposal permitting process for a rubble landfill follows the three phase procedure used for municipal landfills. The MDE review procedure, and public participation requirements are also similar.

D. Nonhazardous Industrial Waste Landfills *(COMAR 26.04.07.03, .19 and .20):*

The permit application requirements for an industrial waste landfill are similar to those for a municipal landfill. A detailed waste characterization is required for industrial landfills. The information required for an industrial waste landfill is included in a single phase permit application report.

E. Processing Facilities *(COMAR 26.04.07.23):*

The refuse disposal permit application for a solid waste processing facility consists of a letter briefly describing the project followed by detailed engineering drawings and specifications.

Processes requiring unloading, separation, reduction, or alteration of solid waste must be performed within an enclosed building. Composting, white goods storage, and tire storage may be conducted outdoors. Composted materials for distribution must be non-pathogenic, biologically and chemically stable, and free of injurious components. A public hearing or notification is not required for processing facilities. These facilities may also require permits issued by the Air and Radiation Management Administration of the MDE.

F. Transfer Stations *(COMAR 26.04.07.24):*

Procedures and requirements for obtaining a transfer station refuse disposal permit are similar to those for processing facilities. Additionally, transfer station permitting requirements include information on procedures and methods for identifying and segregating unacceptable wastes. These facilities may also require permits issued by the Air and Radiation Management Administration of the MDE.

G. Incinerators *(COMAR 26.04.07.25):*

Procedures and requirements for obtaining an incinerator refuse disposal permit are similar to those for transfer stations. Additional requirements include location of storage areas for incinerator ash and other non-combustible products generated by the process, identification of a disposal site for the non-combustible materials, and a written operational plan for disposal of the waste in the event that the facility is non-operational. A public hearing will be held prior to the issuance of the permit.

These facilities may also require permits issued by the Air and Radiation Management Administration of the MDE.

1.5.2.1 Maryland Environmental Service

The Maryland Environmental Service (MES) is an independent state agency that provides environmental services at competitive rates to government and the private sector. MES has the authority to plan, acquire, construct, and operate water, wastewater, and solid waste facilities; institute and charge user fees; and create and administer funding authorities for issuing revenue bonds to provide project financing. MES is available to provide support to any locality which requests assistance. Additionally, MES will provide remedial services requested by MDE for a locality which has not complied with regulations. MES has been delegated the responsibility for overseeing Maryland's used oil and scrap tire recycling programs. MES currently operates waste oil and antifreeze collection stations and a tire stockpile facility in Charles County.

1.5.3 Charles County

Charles County regulates solid waste management activities through the Code of Public Laws, the administrative regulations adopted pursuant to the code, the Charles County Zoning Ordinance, and the resolutions adopted by the County Commissioners. Specific county regulations addressing solid waste management are described in the paragraphs below:

1.5.3.1 Code of Public Laws of Charles County

Section 132 of the Charles County *Code of Public Laws* enables the County to establish trash disposal areas and regulates the importation of solid waste into the County. Section 49 of the code requires that the County Commissioners establish trash disposal areas. It authorizes them to regulate the use of such disposal areas and to collect reasonable fees for their use.

1.5.3.2 County Commissioners of Charles County, Maryland Resolution No. 92-63. Regulations Governing the Use of Charles County's Sanitary Landfills

These regulations (Appendix B) were established and adopted by the County Commissioners on July 2, 1992 and are contained in Chapters 2 through 4, Article II of the Code of Charles County, Maryland.

The regulations specify the types of wastes that are and are not accepted, authorized users, permit requirements for commercial haulers, procedures for paying fees to use the landfill, and the penalty structure for bringing out-of-county waste into a county-owned sanitary landfill.

1.5.3.3 County Commissioners of Charles County, Maryland Resolution No. 92-75. Landfill Tipping Fees

These regulations establish the Charles County tipping fee at the Pisgah Landfill at $70 per ton commencing on October 15, 1992. Since the closure of the Pisgah Landfill, the tipping fee is applicable to the Charles County #2 Landfill. Additionally, in emergency situations only, sludge may be disposed of in the landfill for the established municipal solid waste tipping fee.

1.5.3.4 Charles County Comprehensive Solid Waste Management Plan, October 2006

The *Charles County Comprehensive Solid Waste Management Plan* provides a framework for establishing a long-range action plan for solid waste management. The document is a general guidance tool and is not intended to provide specific guidelines regarding solid waste management. Issues included in the comprehensive plan related to solid waste management are land use, general status report of solid waste management issues, policy considerations, and implementation strategies.

1.5.3.5 Charles County Zoning Ordinance, Maryland, October 1992

The *Charles County Zoning Ordinance* implements the planning policies and objectives presented in the *Charles County Comprehensive Plan*. The *Charles County Comprehensive Solid Waste Management Plan* serves as a policy guide as the Charles County Commissioners consider amendments to the *Charles County Zoning Ordinance*.

1.5.3.6 Charles County Chesapeake Bay Critical Area Management Program

This program identifies the extent of the Chesapeake Bay Critical Area within Charles County, and establishes detailed criteria to protect natural resources and regulate development within the critical area. The critical area is defined as those lands along tidal shorelines extending 1,000 feet landward of mean high tide or the landward boundary of tidal wetlands.

1.5.3.7 Zekiah Swamp Management Program

This program stresses the need for protection of the watershed from intense development and habitat degradation.

1.5.3.8 Patuxent River Policy Plan

Charles County, along with other counties neighboring the Patuxent River, is striving to protect river resources through land management strategies to control pollution in the watershed.

1.5.3.9 Charles County Floodplain Management Ordinance

This ordinance establishes and delineates a floodplain district within Charles County for issuance of permits and imposes certain regulations on construction and development within floodplain districts.

1.5.3.10 Charles County Recycling Plan, June 1990

The recycling plan fulfills the requirements of the 1988 Maryland Recycling Act, as confirmed by its approval by the MDE. This plan is the foundation of Charles County's recycling program and provides a comprehensive treatment of waste stream composition, markets, collection alternatives, processing alternatives, and implementation.

The Charles County Recycling Plan, which was adopted in 1990, was developed in close consultation with the Recycling Advisory Committee, and is the approved basis for meeting mandated recycling goals within the County. Per MDE requirements, the Charles County Recycling Plan has been incorporated into the County Comprehensive Solid Waste Management Plan.

Since the adoption of the County's Recycling Plan, the County has continued to responded to legislative intent and new industry technologies by implementing various solid waste reduction, diversion, and recycling programs. These programs include household hazardous waste collection, electronics recycling, florescent light recycling, single stream recycling, public schools and colleges recycling, recycling in County buildings, textile recycling, scrap metal recycling, yard waste composting, mulch give away, used motor oil and antifreeze recycling, automobile and household battery recycling, used cooking oil recycling, oyster shell recycling, scrap tire recycling, community and watershed cleanup events, public outreach and education, and apartment building and condominium recycling.

In the 2012 legislative session, the Maryland general Assembly passed House Bill (HB) 929: Environment -- Recycling Rates and Waste Diversion -- Statewide Goals, Chapter 692, Acts of 2012 (the "law"). The law took effect on October 1, 2012, and required each county to revise its recycling plan by July 1, 2014 and full implementation of the county's revised recycling plan by December 31, 2015. The plan must include a provision that provides for a reduction through recycling of at least 35% for a county with a population greater than 150,000 or 20% for a county with a population less than 150,000, of the County's solid waste stream by weight, or submits adequate justification, including economic and other specific factors, as to why the reduction cannot be met.

The County has consistently exceeded the new mandated waste diversion rate of 35% since 2003. The County plans to continue to exceed the new state mandated waste diversion rate through continued outreach and promotion of its current programs and expansion of programs where feasibly possible. Table 1-7 contains the Charles County's Waste Diversion Rates from 2000 to 2012.

Table 1-7 SUMMARY OF CHARLES COUNTY WASTE DIVISION RATES

(2000 – 2012)

Year	MRA Rate	Source Reduction Rate	Waste Division Rate
2000	31.00%		
2001	29.00%		
2002	29.00%	5%	34.00%
2003	32.60%	5%	37.60%
2004	30.06%	5%	35.06%
2005	43.43%	5%	48.43%
2006	39.68%	5%	44.68%
2007	34.96%	5%	39.96%
2008	42.80%	5%	47.80%
2009	50.79%	5%	55.79%
2010	39.03%	5%	44.03%
2011	53.57%	5%	58.57%
2012	49.12%	4%	53.12%

1.5.4 Household Hazardous Waste

Household hazardous waste is collected nine (9) times a year on the first Saturday of the month, April through December, at the Charles County Department of Public Works in La Plata. The County contracts with a hazardous waste handler to remove the materials from resident's vehicles on collection days, segregate the materials, pack and arrange for disposal of the materials. The materials are stored in a "90 day" facility on site and handled as if they were regulated waste under COMAR regulations. Shipments are made when there are full drums of material; the building is completely emptied after the December collection. Examples of these wastes would be gasoline, herbicides, pesticides, household cleaners and oil-based paints.

1.5.5 Incorporated Towns and Federal Facilities

The *Annotated Code of Maryland* and the *COMAR* address the potential for incorporation of subsidiary solid waste plans developed by individual municipalities into the *Charles County Comprehensive Solid Waste Management Plan*. If the Charles County Commissioners determine that incorporation of a subsidiary plan meets the environmental protection goals of the *Charles County Comprehensive Solid Waste Management Plan*, it can be incorporated by reference. The specific citations from the codes are as follows:

- *Annotated Code of Maryland, Title 9-504* - "(a) Required incorporation. - To the extent that the incorporation will promote the public health, safety, and welfare, each county plan shall 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 that county."

- *COMAR 26.03.02.B* - "Each county plan shall include all or part of the subsidiary plans of the towns, municipal corporations, sanitary districts, privately owned facilities, and local, state and federal agencies having existing, planned or programmed development within the county to the extent that these inclusions shall promote the public health, safety, and welfare. These subsidiary plans may be incorporated by reference into the county plan."

As stated above, *COMAR* provides Maryland municipalities the option to develop their own, or portions of their own solid waste plan and have it incorporated into the *Charles County Comprehensive Solid Waste Management Plan*. Charles County developed a cooperative working relationship with the municipalities of Indian Head, La Plata and Port Tobacco to provide for a solid waste management program which benefits the entire county. The special needs and requirements of the municipalities as are reflected in the *Charles County Comprehensive Solid Waste Management Plan*. The incorporated towns of Charles County follow the solid waste management program as detailed within this Plan.

1.6 PLAN AMENDMENT PROCEDURE

Amendments to the *Charles County Comprehensive Solid Waste Management Plan* will be required for the establishment of new solid waste facilities, and for revisions or updates to the plan. Amendments to the Plan may occur at any time and may originate from within the Charles County government or from the general public.

The process for amending this Plan is guided by the Charles County Department of Planning and Growth Management to meet the requirements stipulated by Sections 9-503 and 9-507 of the Environment Article, Annotated Code of Maryland and *COMAR 26.03.03.05* for revising the Plan. The amendment process includes a public information meeting and a public hearing before the Charles County Commissioners. Table 1-7 lists the general requirements and process for amending the *Charles County Comprehensive Solid Waste Management Plan*.

This amendment procedure is not intended to provide specific information such as the level of detail in the amendment request, criteria for approval, and types of facilities, which require amendments. The intent is to provide decision-makers with a framework for the amendment procedure. The County recognizes that the specifics for the amendment procedure will need to be developed to ensure the consistency of the amendment procedure.

Table 1-8 REQUIREMENTS AND PROCESS FOR SOLID WASTE MANAGEMENT PLAN AMENDMENTS

GENERAL REQUIREMENTS

- Required for the establishment of new solid waste management facilities/processes, and for revisions to the solid waste management plan's goals, objectives, policies, or action plan and supporting sections related to the amendments.
- Amendments may originate from within Charles County Government, from the general public or when the Department requires a revision/amendment.
- Consideration of amendments may occur at any time.
- An amendment proposal shall contain a description of the proposed amendment, justification statement, and supporting information as necessary. The County may establish technical criteria or standards for the evaluation of amendments. The County may reject proposed amendments that are incomplete or technically inadequate.
- The amendment process shall meet the plan revision requirements of COMAR 26.03.03.05 and Sections 9-503 and 9-507 of the Environment Article, Annotated Code of Maryland.

AMENDMENT PROCESS

1. Amendment submitted to or prepared by the Charles County Planning and Growth Management Division.
2. Staff recommendation developed prior to public hearing.
3. Legal notice and press release issued for public hearing on the amendment at least two weeks prior to the hearing.
4. Hold a public hearing before the Charles County Commissioners.
5. Commissioners action on the amendment.
6. Adopted amendment forwarded to the MDE for approval.

Note: The special exception process substitutes for this process when applicable, although a Commissioners' resolution to amend the Charles County Comprehensive Plan will be necessary to incorporate a solid waste facility/process approved by special exception into the Charles County Comprehensive Solid Waste Management Plan.

2 CHAPTER 2

COUNTY BACKGROUND INFORMATION

2.1 CHAPTER SUMMARY

Chapter 2 presents background information, including general historical and geographical information, on Charles County. Current and projected population, used to develop waste generation projections in Chapter 3, is presented in this chapter. A discussion of the solid waste management practices, policies, and intergovernmental and private sector agreements regarding municipalities and federal facilities within the County is also included. The status of zoning requirements and the *Charles County Comprehensive Plan* is also discussed.

2.2 BACKGROUND

2.2.1 Location and Setting

Charles County is a rapidly developing area located about 30 miles south of the Washington,

D.C. Metropolitan Area. Over the years, Charles County has been able to remain as a diversified community with extensive waterfront, unique environmental resources, agriculture, woodlands, a rich historical heritage, and urbanized areas.

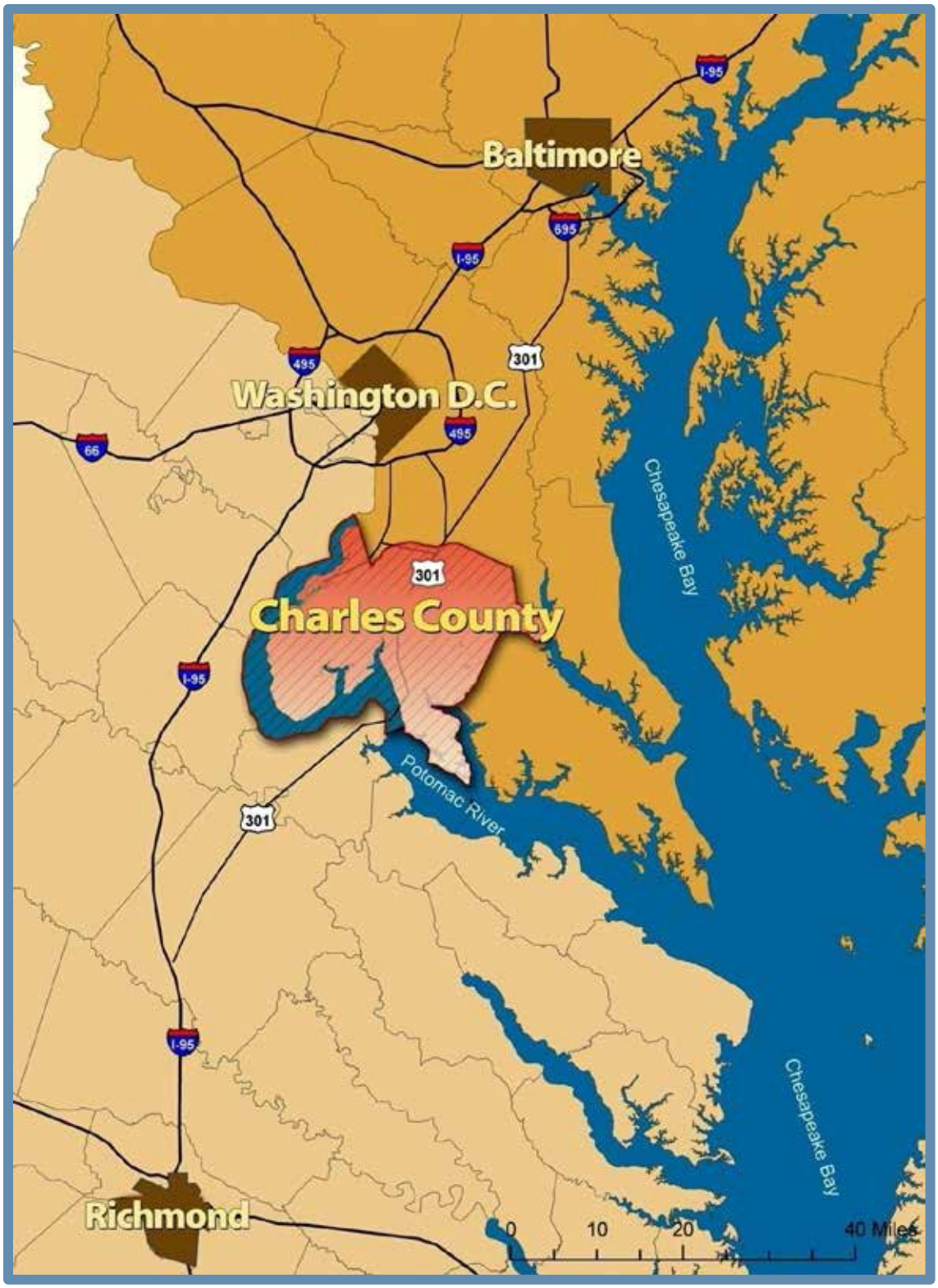
Charles County is located in southern Maryland, bordered by Prince George's County to the north and Calvert and St. Mary's Counties to the east. The County is bordered by the Potomac and Wicomico Rivers to the south, and the Patuxent River to the east (Figure 2-1).

Most of the land area in Charles County contains elevations ranging from 0 to 230 feet above sea level and is drained by tributaries of the Potomac River. The County is part of the Atlantic Coastal Plain, which forms the western shore of the Chesapeake Bay Region. Charles County is 458 square miles (293,120 acres) in area, with 183 miles of shoreline primarily on the Potomac River.

Growth and economic development is strongly influenced by the Baltimore and Washington highway corridors. Military installations, agriculture, and seafood harvesting industries also contribute to the local economy. As the County continues to urbanize, increasingly built-up areas are concentrating along the major highways (U.S. Route 301 and Maryland Routes 228 and 210).

Links with other cities in the Washington, D.C. suburban area and beyond are facilitated by Interstates 495 and 95, Maryland Routes 3, and 4, and US Route 50, as well as points south via the Potomac River Bridge.

Figure 2-1 Charles County, Maryland



2.2.2 History

Founded in 1658, Charles County is steeped in the traditions of Southern Maryland and retains many of the tobacco customs dating back three centuries. It is Maryland's fifth oldest county and is unique among the old counties in that it has all of its official records. Until 1895 the county seat was Port Tobacco, which also served as the business and cultural center of Maryland in colonial days. By 1890, Port Tobacco was losing its eminence as a port due to the silting of the river and the resulting impacts on the sailing vessels. The burning of the Port Tobacco courthouse in 1892 added to this loss of eminence and, in 1895, the county seat was relocated to La Plata.

Charles County was one of Maryland's least known counties until 1940 when the Potomac River Bridge was constructed. The opening of the bridge created an important north/south travel corridor on U.S. Route 301. Since 1950, population, housing and commerce have all expanded greatly due in part to the proximity to the Washington metropolitan area. The County is now a mixture of suburban development in the north-central and northwest sections of the County, interspersed with older rural and semi-rural development patterns elsewhere in the County.

2.2.3 Natural Characteristics and Resources

2.2.3.1 Geography

Charles County has a land area of about 458 square miles, seventh in size among Maryland's 23 counties. The County measures approximately 29 miles from north to south and 32 miles from east to west. It is bounded by the Potomac River on the west and south; by Prince George's County on the north; and by St. Mary's County on the southeast. Elevations vary from sea level along the Potomac River to 230 feet near Waldorf. The Washington Beltway (I-495) is only 15 miles from Waldorf, affording access to Washington, Baltimore, and other points on the eastern seaboard.

2.2.3.2 Drainage Basins

All streams and water bodies in Charles County empty into the Potomac or Patuxent Rivers, and ultimately the Chesapeake Bay. Major water bodies within the County include the Wicomico River, Zekiah Swamp, Gilbert Swamp, Port Tobacco River, Nanjemoy Creek, Mattawoman Creek, and the Pomonkey Creek. The eastern half of the County is drained by the Zekiah Swamp and its tributaries, including the Gilbert and Jordan Swamp Runs. The northern portion of the County is drained by the Mattawoman and Pomonkey Creeks. The central and southwestern portions of the County are drained by the Port Tobacco River, Nanjemoy Creek, Wards Run, and Mill Run.

2.2.3.3 Water Resources

Although Charles County is bordered by both the Patuxent and Potomac Rivers, their use as surface water supply sources is constrained because of their salinity concentrations. The County also has a large number of smaller rivers and streams which are not capable of any large-scale water supply. There are presently three lakes in Charles County with a surface water area of about 12 square miles.

Five major water-bearing formations, or aquifers, are found beneath Charles County, sloping from west to east. They are found in the Patuxent, Patapsco, Raritan, and Magothy formations of the Cretaceous system, and the Aqua Greenstone of the Eocene series. The major water supply sources are the Magothy, Patapsco and Patuxent aquifers. These aquifers are found at depths ranging from 300 to 1,000 feet below the ground elevations. Groundwater provides the vast majority of the drinking water in Charles County, with a supplemental supply of surface water from the Potomac River, via a single connection to the Washington Suburban Sanitary Commission (WSSC) in Waldorf. In a few places, water is available from springs, but in most locations water is drawn from wells.

2.2.3.4 Topography

Located in the Atlantic Coastal Plain, Charles County is a relatively low-lying area. Elevations range from 10 feet above sea level near the Potomac River to approximately 230 feet near Waldorf. Large portions of the County are exceedingly flat, with a gentle slope toward the Chesapeake Bay, or toward local drainage features. Broad plateau formations with sides dissected by drainage features are common throughout most of the County. The dissections show the easily eroded clays, sands, and gravels underlaying the plateaus. In some areas, dissection is incomplete and flat areas, several miles across, have not yet been reached by headward cutting streams. Stream valleys affect local topography throughout the County.

Adjacent to the Potomac and Patuxent rivers are low-lying flats not more than 10 to 25 feet above sea level. Steeply-sided terrace formations are often present in these locations as well. These flats vary in width from a few feet, where the river current of the Potomac River washes strongly against the shoreline (e.g., northern areas near Indian Head and Potomac Heights), to more than a mile in the southern part of the County, such as Allen's Fresh. The interior of the County, along U.S. Route 301 from Faulkner (VA) to Prince George's County, is predominately flat. Outward from this plateau, dissection becomes more pronounced and the land is gently rolling and hilly.

2.2.3.5 Geology and Soils

The geologic formations beneath Charles County are composed of gravel, sand, silt, and clay. These materials were transported by streams, particularly the Potomac River, from the Appalachian and Piedmont regions west and north of the County and were deposited in the form of alluvial fans and deltas. Tidal and marine mud and silt layers overlay dense, hard crystalline,

metamorphic, and igneous rocks of the Precambrian Age. The crystalline rocks are deep below the surface. Diatomaceous deposits are unique to this part of Maryland and are found throughout the County.

In the vicinity of Faulkner County, VA are unique surficial sediments which are a relatively young, thin veneer, approximately 30 feet in thickness, occupying elevations of 30 feet above mean sea level and consisting of gravel, sand, and silt. These sediments were deposited by the eastward flowing Potomac River as the river migrated slowly southeastward to its present location. Beneath this granular deposit is the Calvert formation of the Chesapeake Group, which is composed of the Fairhaven and Plum Point Marls. This formation overlies and tends to seal the surficial granular deposit from the older geologic units.

2.2.3.6 Minerals

There are abundant mineral resources throughout Charles County which are found as alluvial deposits, chiefly in the form of construction-grade sand and bank-run gravel found just below ground surface. These minerals are used by the construction industry as aggregate material. Sand and gravel mining operations and processing facilities are found throughout the County. Clay and diatomaceous earth deposits are also prevalent in the Coastal Plain Province, but have limited distribution in Charles County. These clays and diatomaceous earth deposits are not currently mined in significant quantities. Mining of these materials may accelerate if market conditions change.

2.2.3.7 Climate

Charles County has a temperate climate, affected to some degree by the water masses of the Potomac and Chesapeake Bay. Situated in the mid-Atlantic, the County has four well-defined seasons. The frost-free growing season typically occurs between April 20 to October 20. The coldest temperatures usually are in late January and early February. Snowfall may occur from November to April. The warmest temperatures usually occur in late July and early August. Mean temperatures (Fahrenheit) are 74.1 degrees in the summer and 36.3 degrees in the winter. The prevailing wind pattern is from the northwest during October to April and from the south and southwest from May to September. Annual precipitation averages 42.6 inches.

2.3 POPULATION AND EMPLOYMENT

2.3.1 Regional Setting and Growth Trends

Population distribution reflects the influence of the proximity to Washington, D.C. and the influences of local employment. The County's development district encompasses the northwest quadrant of the County from Waldorf to Indian Head, where the most densely populated areas of the county are located. Since 1990, the County has been achieving the Comprehensive Plan goal of directing 75 percent of new growth in the development district. Other population centers include the election districts of Pomonkey, La Plata, and Bryantown.

According to the 1990 Census, Charles County had a population of 101,154. The 1990 population was approximately 39 percent above the 1980 population of 72,751, making Charles County the third fastest-growing county in Maryland during this period. The latest figures released by the Census Bureau in 2010 showed the County's estimated population was 146,551.

The Metropolitan Washington Council of Governments considers Charles County among the outer suburbs (outside 20 mile radius of Washington, D.C.) which will be influenced by the metro area. The outer suburbs are forecasted to experience a 118 percent increase in employment during the period 1990 to 2020. Employment in Charles County is responding to the increase in residential growth with an increase in retail and commercial services. Industrial and manufacturing sectors generally respond to economic factors rather than residential growth.

In 2000, the largest sectors of employment were trade (retail and wholesale) at 28 percent, services (26 percent), government (17 percent) and construction (11 percent). While in 2010, the largest sectors of employment were services at 20 percent, government (19.4 percent), manufacturing (16.6 percent) and trade (11.7 percent). The largest single employer in Charles County is the Naval Surface Warfare Center at Indian Head.

2.3.2 Population and Employment Projections

Population projections for the County were developed using projections for housing units and the average number of persons per housing unit which were developed by the Charles County Planning and Growth Management Department. Charles County population and employment projections for the years 1990 through 2025 are provided in Table 2-1. These projections indicate that the population will increase by approximately 32 percent between the years 2010 and 2025 to a population of 193,914; employment in Charles County is projected to increase by approximately 13 percent from 2010 to 2025 to 68,150.

2.3.3 Effect of Growth on the Provision of Solid Waste Management Services

New development activity within Charles County is primarily located in the Development District and along the U.S. Route 301 corridor. The Development District includes the areas of Waldorf, St. Charles, Bryans Road, Indian Head and White Plains.

Increased residential growth provides for increased building and construction waste (rubble) and increased waste from the commercial sectors of the community. Building and construction waste as well as land-clearing waste comprises a large portion of the waste generated in the County and is making an additional demand on existing landfill capacity. The disposal of rubble and land-clearing debris in the County landfill is costly and significantly reduces available landfill capacity. Due to this circumstance, the county has not allowed rubble waste to enter the current landfill. Charles County considers the combined effort of recycling and the diversion of

disposing of rubble and land-clearing debris in other designated landfills an excellent opportunity to significantly extend the life of the sanitary landfill.

Charles County officials realize that the planning of growth is critical to the provision of efficient and cost-effective solid waste management services. The presence of existing development, infrastructure, and transportation reduce the cost and maximize the efficiency of solid waste and recyclable collection services. Controlled growth within development districts would minimize collection costs and increase the opportunity for modifying collection practices to meet the goals and objectives of this plan. Wide-spread growth, resulting in sparsely populated areas, would increase collection costs, increase vagrant dumping to avoid collection fees or trips to the landfill, and minimize the opportunity for modifying collection practices.

The primary growth management and land use concept developed in the *Charles County Comprehensive Plan* is that of the establishment of the "development district" generally located in northwestern Charles County. The development district is intended to serve as the principal center for population growth, services, and employment. Comprising the most suitable area for new population growth, by virtue of existing development, infrastructure, and transportation networks, this area is planned to receive 75 percent of the County's growth through the year 2025.

Table 2-1 POPULATION AND EMPLOYMENT PROJECTIONS

Year	Housing Units	Population	Employment
1990	34,487	101,154	39,400
1995	38,941	111,600	45,900
2000	43,903	120,546	49,800
2010	53,532	146,550	60,300
2020	65,245	177,181	66,900
2025	72,754	193,914	68,150

Source: 2006 Charles County Comprehensive Plan

2.4 INCORPORATED TOWNS

There are three incorporated towns within Charles County: the Town of Indian Head, the Town of La Plata, and the Town of Port Tobacco. The locations of the three incorporated towns are shown in yellow in Figure 2-2.

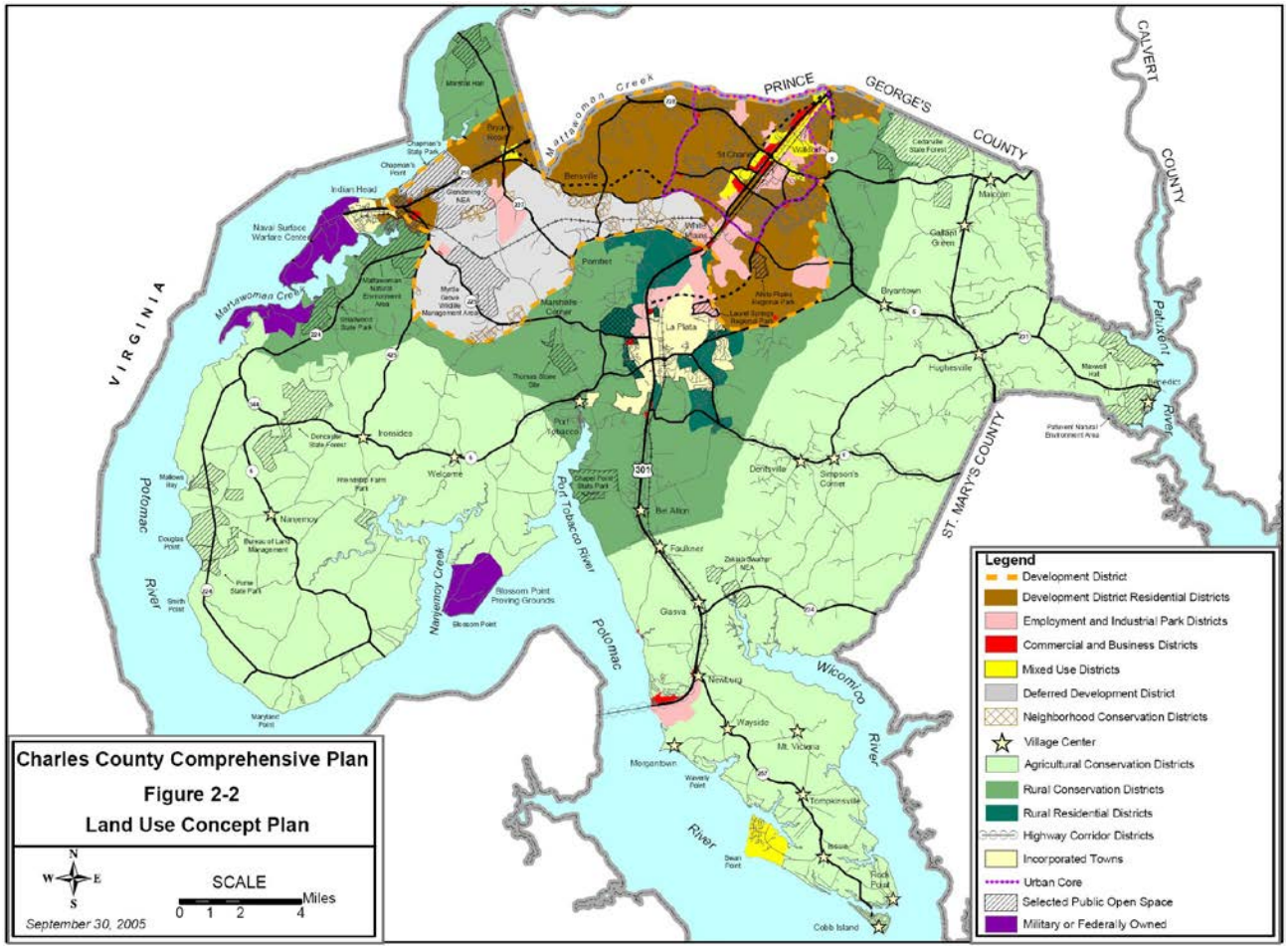
The 2010 Census reports that the population for the Town of Indian Head is 3,844, the Town of La Plata is 8,753, and there are approximately 50 people in the Town of Port Tobacco. Due to its small size, the smallest incorporated town in the State, the Town of Port Tobacco is generally

discussed as part of Charles County rather than as an incorporated town. The Town of La Plata serves as the center of the Charles County Government's administrative and institutional services.

2.5 FEDERAL FACILITIES

Federal facilities in Charles County include the U.S. Naval Surface Warfare Center and Naval Explosive Disposal Facility in Indian Head and the Blossom Point Proving Grounds. In addition, there are two properties owned by the National Parks Service in Charles County: the Thomas Stone Historical Site and the Piscataway National Park. The locations of these federal facilities are also shown in Figure 2-2.

Figure 2-2 Federal Facilities in and Around Charles County



2.6 COMPREHENSIVE LAND USE POLICIES

The County Commissioners adopted the *Charles County Comprehensive Plan* on April 24, 2006. The Plan is the result of a joint effort of elected and appointed officials, professional land use planners, and a Citizens Work Group. The Plan presents policies and guidelines to serve the

County for the duration of the 20-year planning horizon (2025).

The *Charles County Comprehensive Plan* consists of a land use map (Figure 2-2), goals, objectives, policies, and recommendations that will guide future land development. Other elements of the Charles County overall comprehensive planning program include: documents prepared to complete the comprehensive plan (e.g., *Charles County Critical Area Program*, and *Charles County Land Preservation, Parks, and Recreation Plan*); documents which will serve to implement the comprehensive plan (e.g., *Zoning Ordinance*, *Subdivision Regulations*); and documents which influence the comprehensive plan (e.g., *Comprehensive Sewer and Water Plan, Capital Programming, Comprehensive Plan for Schools, Charles County Comprehensive Solid Waste Management Plan, Public Safety Plan, Emergency Operations Plan, and Fire and Rescue Plan).* The *Charles County Comprehensive Solid Waste Management Plan* coordinates the siting and operation of solid waste management facilities with the land use goals, objectives, and policies of the *Charles County Comprehensive Plan.*

Topics discussed in the *Charles County Comprehensive Plan* include the following:

- Growth Management and Land Use
- Economic Development
- Community Facilities and Services
- Historic/Cultural Preservation
- Agricultural and Forestry
- Community Development
- Transportation
- Natural Resource Protection
- Housing
- Implementation

In relation to solid waste management, the comprehensive plan presents goals, policies, and implementation strategies for many public services, including the management of solid wastes.

2.7 ZONING REQUIREMENTS

The *Charles County Zoning Ordinance* was adopted by the County Commissioners in August 1992, and has numerous text and map amendments since that time. This plan shall not be used to create or enforce local land use and zoning requirements. The zoning ordinance is designed to implement the comprehensive plan. The *Charles County Zoning Ordinance* presents one conservation zone, two rural zones, two village zones, four residential zones, four commercial zones, two industrial zones, one planned unit development zone, one waterfront planned community, four planned development zones, and four overlay zones. A brief description of each zone is provided below.

- The Agricultural Conservation zone (AC) provides a full range of agricultural and farming activities, protects these established uses from encroaching development which may adversely affect the agricultural economy of the County, and encourages the right to farm in the County without undue burden on the

landowner.

- The Rural Conservation (RC) and Rural Residential (RR) zones are intended to maintain rural character in the County areas consistent with the Charles County Comprehensive Plan objectives.

- The Village Residential (RV) and Village Commercial (CV) zones are located at existing centers of population or commerce in areas of the County outside the development district.

- The Low-density suburban Residential (RL), Medium-density suburban Residential (RM), High-density Residential (RH), and Residential Office (RO), concentrate residential development in areas identified as development districts in the *Charles County Comprehensive Plan*.

- The County has adopted an Urban Design Study to transform the central core of Waldorf into a vibrant urban center for the broader Waldorf area and Charles County. This area, known as Downtown Waldorf, is envisioned to be developed as a cohesive, attractive and walkable urban environment that serves as a hub for public transit. The County adopted new zoning in this area to establish this new type of mixed use development. Those zones are the Waldorf Central (WC) zone in the central core of Waldorf and the Acton Urban Center (AUC) zone, adjacent to the WC zone in the northern portion of the Waldorf core.

- Neighborhood Commercial (CN) and Community Commercial (CC) zones provide standards for the range of commercial uses from neighborhood business to highway-oriented commercial uses. The Central Business (CB) zone provides appropriate locations for high intensity commercial uses and encourages development consistent with a traditional "downtown" area. The Business Park (BP) zone concentrates business and light industrial uses in a park-like setting to promote economic development and job creation while protecting the environment and reducing impacts on the surrounding residential neighborhoods.

- General Industrial (IG) and the Heavy Industrial (IH) zones strengthen the economic environment of the County by recognizing existing industrial uses and promoting industrial development in order to broaden the County's tax base and create new jobs.

- The Planned Unit Development (PUD) zone is designated for St. Charles. Activity within this zone is bound by the requirements of Docket 90 and all other legally binding agreements executed between the County and the developer.

- Swan Point is designated as a Waterfront Planned Community (WPC). The activities within this zone are bound by Docket 250. No additional waterfront planned community zones will be considered.

- Planned Residential Development (PRD), Mixed-use Development (MX), Planned

Employment Park (PEP), Transit Oriented Development (TOD), and Planned Manufactured Home Park (PMH) zones encourage innovative and creative design of residential, commercial, and industrial development, and provide a broad range of housing and economic opportunities to residents of the County consistent with the *Charles County Comprehensive Plan*.

- The Intense Development (IDZ), Limited Development (LDZ), and the Resource Conservation (RCZ) overlay zones provide special regulatory protection for the land and water resources located within the Chesapeake Bay Critical Area in Charles County. These zones implement the Charles County Critical Area Program, the Maryland Critical Area Law, and the Critical Area Criteria.

The purpose of the *Charles County Zoning Ordinance* is to regulate land uses in order to protect and promote the health, safety, morals, comfort, and welfare of the present and future inhabitants of Charles County. Zoning requirements implement the land use objectives of the *2006 Charles County Comprehensive Plan*. The solid waste management plan is an important component of the *Charles County Comprehensive Plan* and zoning requirements for solid waste management facilities and activities should support the above requirements.

3 CHAPTER 3 EXISTING SOLID WASTE MANAGEMENT

3.1 CHAPTER SUMMARY

Chapter 3 compiles a database on existing solid waste management facilities and programs. Historic volumes of solid waste and recovered recyclables are used to project solid waste generation for the 10-year planning period. The descriptions of the existing collection system, disposal facilities, and recycling program provide the basis for the evaluation and needs assessment of subsequent chapters.

3.2 GENERAL

A realistic and accurate analysis of the Charles County waste stream is essential for developing and implementing an integrated solid waste management program in Charles County. This analysis addresses the quantity, composition, and characteristics of the solid waste stream including recovered recyclables.

The quantity and types of solid waste and recyclables produced in the County affects planning in the following three ways:

- The sizing and design for proposed solid waste management facilities.
- The relative location and size of waste generation centroids which affect the location of facilities, and may result in the need for regional sub-systems.
- The financial planning and management of proposed facilities.

It is difficult to obtain an accurate determination of the quantities and types of waste produced within the County for the following reasons:

- Since some residents collect and dispose of their own waste, it is difficult to determine how much waste is burned, disposed of on-site, recycled, or otherwise improperly disposed of in the County.
- Since the majority of waste is collected by private haulers, it is difficult to define service areas represented by the data and to identify the waste types.
- Comparison with other, similar counties is difficult as many counties have limited accurate and reliable historical weight and analytical data for their solid waste stream composition.

Based on these limitations, the most direct and accurate method of obtaining information on the quantities and types of solid waste and recyclables is through the interpretation of County records. Estimates of solid waste stream composition are determined using all available information and incorporating data collected since the opening of the Charles County Sanitary Landfill #2.

3.3 Waste Quantities

Waste quantities have dropped significantly in recent years as a direct result of the 1994 Supreme Court ruling commonly known as the "Carbone Decision". This landmark decision stated that refuse was in fact a commodity, and therefore, subject to laws of the Interstate Commerce Commission. The result was that local jurisdictions could not pass any laws directing the flow of waste to a particular waste acceptance facility. Until this decision, it was common practice for local governments to do so to insure a revenue source for landfills or waste to energy incinerators, particularly in the more densely populated East Coast states.

Almost immediately the impact was felt in Charles County when a number of large landfills were opened up in Southern Pennsylvania and Central Virginia with disposal rates much less ($45) than Charles County ($70). At the same time a number of private transfer stations opened in neighboring Prince George's County and the District of Columbia which allowed the local haulers to take advantage of dumping at a discounted rate ($35-$45) without driving to Pennsylvania or Virginia. The situation was even more critical in Charles County when one national hauler, Waste Management Inc., controlled 50 percent of the market and owned a transfer station in D.C. and a mega-fill in Pennsylvania. Their decision to utilize these facilities resulted in an overnight decrease of trash by 50 percent. In 1997, a large landfill opened in King George County which is the neighboring county across the Potomac River Bridge, approximately 30 miles south. The new King George County Landfill attracted several small haulers. The results of these changes can be seen in Table 3-1.

Table 3-1 WASTE LANDFILLED (2000-2010)

	Fiscal Year		Calendar Year	
Year	Waste (Tons)	Average Monthly (Tons)	Waste (Tons)	Average Monthly (Tons)
2000	44,201	3,683	40,768	3,397
2001	45,347	3,778	47,947	3,995
2002	69,433	5,786	69,858	5,821
2003	72,073	6,006	64,472	5,372
2004	74,291	6,226	74,486	6,207
2005	79,026	6,476	77,718	6,585
2006	88,457	7,371	74,603	6,216
2007	61,399	5,116	59,805	4,983
2008	58,517	4,876	55,372	4,617
2009	55,782	4648.5	61,536	5,128
2010	59,201	4933	81,999	6833

Source: Charles County Department of Public Works, Environmental Resources Division, 2011

In 2008, the County's largest hauler, Waste Management, Inc., disposed of approximately 45,000 tons of waste in out-of-county facilities, resulting in a revenue shortfall for the County landfill.

Currently, the annual flow of waste has stabilized to approximately 50,000 to 60,000 tons, which is significantly lower than historic volumes. At the current rate of flow and the current disposal fee of $70, the landfill remains slightly under the break-even point. As the County approaches the completion of the final pay-back of the debt service of the Pisgah landfill closure costs in 2011, the County's Landfill No. 2 will be operating at a solvent break-even point.

Since the outstanding debt for landfill construction was minimal as the majority of the landfill was financed with "pay-go money," the decrease of revenue has a profound positive effect. Finding the right balance for saving the proper capital was accomplished by reviewing the current rate of fill, available air space, compaction rate and corresponding revenue. This formula can be adjusted by changing any of the variables and computing through a software program developed by the Charles County Fiscal Services Department.

3.3.1 Waste Characteristics

Prior to 1989, the Charles County Department of Fiscal Services retained Landfill records for the purposes of financial accounting. These records do not contain adequate information on the breakdown of waste types and quantities. The 1990 Charles County Recycling Plan provided an analysis of the 1989 fiscal year landfill records including the source (i.e., residential or

commercial), type (i.e., rubble or municipal), and composition (e.g., plastic, paper, etc.) of the municipal solid waste generated in Charles County. Since 1989, Charles County has kept accurate records of the source, composition, and type of solid waste accepted at the County Landfill.

3.3.1.1 Hauler Designations

The financial records classify the waste delivered to the landfill based on the hauler designation. However, the hauler designations are not synonymous with the source (e.g., residential or commercial/industrial) or type (e.g., rubble or non-rubble) of waste delivered to the landfill. Prior to the ban for landfilling sludge, all of the hauler designations were approved to transport sludge.

Hauler designations include the following categories which are described below:

- Commercial Garbage/Solid Waste (G/SW) Haulers
- Municipal Haulers
- Non-commercial Haulers
- Private Haulers
- Building Rubble Haulers

A. Commercial Garbage/Solid Waste (G/SW) Haulers

Commercial G/SW is waste that is delivered by commercial (private) haulers, permitted by the Charles County Health Department to haul waste generated by households, businesses, and restaurants. Commercial G/SW may include solid waste, tires, and rubble; however, the landfill records do not provide a reliable means to classify or quantify the waste types.

B. Municipal Haulers

Waste generated within the municipalities of La Plata and Indian Head is brought to the landfill by haulers designated as "municipal waste haulers". Waste generated by households, commercial establishments, and institutional services within the municipalities are collected by municipal waste haulers. Waste types delivered to the landfill by municipal waste haulers may include solid waste, tires, and rubble; however, the landfill records do not provide a reliable means to classify or quantify the waste types. Prior to the ban for landfilling sludge, sludge was also delivered by this hauler designation.

C. Non-commercial Haulers

The non-commercial waste designation includes waste delivered to the landfill by county, state and federal departments (e.g., state highway, county maintenance, etc.); institutions; individuals who deliver their waste to the landfill; community clean-ups which are generally bulky waste; and tires. Non-commercial waste haulers collect residential and institutional waste. Although a significant portion of the waste delivered by non-commercial haulers is rubble, landfill records identify only a small percentage of the rubble. Prior to the ban for landfilling sludge, sludge was also delivered by this hauler designation.

D. Private Haulers Without Permits

Haulers who deliver commercially generated rubble to the landfill without a building rubble permit are included in this designation. The haulers are allowed to dispose of only one load without a permit; subsequent loads from the same hauler must be permitted. Private haulers without permits generally haul rubble and tires.

E. Building Rubble Haulers

The building rubble designation includes commercial and institutionally-generated rubble and tires. Prior to the ban for landfilling sludge, sludge was also delivered by this hauler designation.

3.3.1.2 Waste Source and Type

Charles County is very similar to Frederick County, Maryland, except that we produce less residential waste, and Charles County recycles a larger percentage per capita of its waste. Since the County has a self imposed ban on homogenous loads of rubble from commercial generators and haulers, and the tipping fee for such is relatively cost prohibitive, the actual amount of rubble is estimated to be approximately 4,000 tons per year.

3.3.1.3 Municipal Waste Composition

Previous analyses of the Charles County municipal (residential and commercial/industrial) waste stream composition were taken from the Charles County Recycling Plan. The analysis, performed by Gershman, Brickner, & Bratton, Inc. (GBB), used waste composition studies for similar counties to approximate the composition of waste generated in Charles County. Currently, the County estimates waste stream composition through monthly reports of waste received at the landfill and recycling centers throughout the County. The estimated municipal waste composition at the Charles County Sanitary Landfill is shown in Table 3-2.

3.3.1.4 Rubble Composition

Composition of the rubble waste stream has not been well documented and may vary significantly with location, season, and economy. A study conducted in Clearwater, Florida determined the following composition (by weight) for rubble accepted at the recently established recycling facility.

- Wood - 32 Percent
- Paper - 18 Percent
- Metal - 7 Percent
- Plastic - 2 Percent
- Other - 23 Percent
- Roofing - 13 Percent
- Concrete - 3 Percent
- Earth Materials - 2 Percent

This data may not reflect the exact composition of the Charles County rubble waste, but could serve as an approximation for preliminary consideration and discussion of the possible rubble processing requirements.

Table 3-2 ESTIMATED MUNICIPAL WASTE STREAM COMPOSITION

Component	Percent of Municipal Waste Stream		
	Residential	Commercial, Industrial, & Institutional	Total Municipal
Newspaper	0.00%	0.13%	0.13%
Corrugated Cardboard	0.00%	14.69%	14.69%
Other paper	5.24%	11.75%	16.99%
Glass	1.29%	2.32%	3.61%
Aluminum	0.00%	0.09%	0.09%
Ferrous	2.70%	0.85%	3.55%
Plastics	0.98%	1.78%	2.76%
Food Waste	0.00%	0.96%	0.96%
Yard Waste	23.04%	16.12%	39.16%
White Goods	1.01%	1.01%	2.02%
Textiles/Leather	0.00%	0.55%	0.55%
Tire/Rubber	0.29%	1.23%	1.52%
Household Hazardous Waste	0.03%	0.00%	0.03%
Other	0.31%	13.77%	14.08%
Total	35%	65%	100%

Source: Charles County Department of Public Works, Environmental Resources Division
2009 Maryland Recycling Tonnage Report.

3.4 HISTORIC RECYCLING QUANTITIES

In 2009, approximately 51,537 tons of recyclable material was recovered from the waste stream. The following items were recycled in Charles County in 2009:

- Commingled Containers
- Mixed Yard Waste
- Wood Shavings, Bark, & Sawdust
- Mixed Glass & Fluorescent Bulbs
- Aluminum Cans, &, Mixed Cans,
- Lead Acid Batteries
- White Goods, & Front-end Scrap Metal
- Metal & Litho Plates
- Magazines, Mixed Paper, Newspaper, Office/Computer Paper, Cardboard, & Other Paper
- Mixed Plastic, Film Plastic, & Shrink Wrap
- Electronics
- Animal Protein
- Motor Oil, Oil Filters Solvents, & Antifreeze
- Scrap Tires
- Pallets
- Asphalt
- C&D Debris
- Coal Ash
- Concrete
- Land Clearing Debris
- Sewage Sludge
- Soils
- Cardboard
- Textiles

3.5 BASELINE STATISTICS FOR WASTE GENERATION

The Charles County recycling effort was initiated 1989 and this effort is reflected in the quantity of waste landfilled. The total waste generated in 2009 was 101,462. Total waste generated is equal to waste disposed, 49,925, plus waste recycled, 51,537. Recycling efforts have continued to reduce the amount of waste landfilled as shown in Table 3-3. In 2009, approximately 35 percent (17,977 tons) of the recovered materials were from residential efforts; the remaining 65 percent (33,560 tons) was recovered from the commercial sector of the County, including commercial, industrial, and institutional establishments.

Table 3-1 has an accurate representation of the amount of waste landfilled for the calendar year records of 2000 through 2010. The average-annual statistics during this period (calendar years) were used to calculate waste generation rates through 2021 (Table 3-4). Population and Employment data from the Charles County Department of Planning and Growth Management were used with the waste generation rates to calculate the projected waste quantities.

3.5.1 Residential Waste Generation

Based on the 2009 population of 141,981 people, the average daily residential waste generation in Charles County is 3.92 pounds per person or .71 tons per person, per year.

3.5.2 Commercial/Industrial Waste Generation

Based on an average employment of 73,480 as of January 1, 2009, the average daily generation rate for commercial/industrial waste is 14.18 pounds per employee, or 2.59 tons per year, per employee.

3.5.3 Institutional Waste Generation

Prior to 1994, the average institutional waste generation was 5,572 tons per year. The average-daily institutional waste generation is 0.56 pounds per employee based on an average employment of 34,700. The Charles County Landfill is no longer able to track institutional waste quantities or types due to commercial haulers combining institutional waste with commercial waste prior to disposal at the landfill.

3.5.4 Rubble Waste Generation

The average annual rubble waste landfilled in Charles County in 2009 was approximately 20,638 tons. Therefore, residential rubble waste or single-trip commercial loads are the primary contribution of rubble waste to the landfill, not commercial contractors. Although this “rubble waste” arrived at the County landfill, it was not considered demolition waste debris, since it did not contain putrescible waste. Examples of this type of waste would be small contractors remodeling a kitchen, residents cleaning out a garage, or residents disposing of an old shed, as opposed to large scale demolition projects of commercial buildings, bridges, roadways, or other large scale projects. Landfill personnel have indicated that there is a high probability that rubble waste generated in Charles County (particularly in the northern part of the County) is being exported out-of-county for disposal. Therefore, the rubble landfilled in Charles County is not reflective of the rubble generated in the County. This is due in part to the County’s self imposed ban on homogenous loads of rubble from commercial contractors and haulers, and the relatively cost prohibitive tipping fee.

Table 3-3 Recovered Materials

	2009			2010			2011			2012			2013		
	Residential (Tons)	Commercial (Tons)	Total (Tons)	Residential (Tons)	Commercial (Tons)	Total (Tons)	Residential (Tons)	Commercial (Tons)	Total (Tons)	Residential (Tons)	Commercial (Tons)	Total (Tons)	Residential (Tons)	Commercial (Tons)	Total (Tons)
Comingled Containers	0	142	142	0	85	85	0	88	88	0	90	90	0	93	93
Aluminum Cans	0	46	46	0	98	98	0	101	101	0	104	104	0	107	107
Front End Scrap	1,144	0	1,144	996	0	996	1,026	0	1,026	1,057	0	1,057	1,088	0	1,088
White Goods	519	519	1,039	0	14,731	14,731	0	15,173	15,173	0	15,628	15,628	0	16,097	16,097
Lead Acid Batteries	16	196	212	18	1,836	1,854	19	1,891	1,910	19	1,948	1,967	20	2,006	2,026
Mixed Cans	246	440	686	244	459	704	251	473	724	259	487	746	267	502	768
Other (Oil Filters)	0	67	67	0	47	47	0	48	48	0	50	50	0	51	51
Other (Litho Plates)	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Paper															
Newspaper	0	66	66	0	74	74	0	76	76	0	79	79	0	81	81
Corrugated Cardboard	0	7,570	7,570	0	5,837	5,837	0	6,012	6,012	0	6,192	6,192	0	6,378	6,378
Office / Computer	0	87	87	0	421	421	0	434	434	0	447	447	0	460	460
Magazines	0	207	207	0	88	88	0	91	91	0	93	93	0	96	96
Mixed Paper	2,701	5,682	8,383	2,695	5,696	8,391	2,776	5,867	8,643	2,859	6,043	8,902	2,945	6,224	9,169
Other Paper	0	13	13	0	0	0	0	0	0	0	0	0	0	0	0
Compost / Mulch															
Mixed Yard Waste	11,874	0	11,874	11,094	0	11,094	11,427	0	11,427	11,770	0	11,770	12,123	0	12,123
Wood Shavings	0	8,306	8,306	0	8,200	8,200	0	8,446	8,446	0	8,699	8,699	0	8,960	8,960
Other (Bark)	0	4,358	4,358	0	8,468	8,468	0	8,722	8,722	0	8,984	8,984	0	9,253	9,253
Other (Sawdust)	0	1,456	1,456	0	1,200	1,200	0	1,236	1,236	0	1,273	1,273	0	1,311	1,311
Plastic															
Mixed Plastic	504	918	1,422	502	1,040	1,542	517	1,071	1,588	533	1,103	1,636	549	1,136	1,685
LDPE	0	2	2	0	3	3	0	3	3	0	3	3	0	3	3
Film Plastic	0	22	22	0	20	20	0	21	21	0	21	21	0	22	22
Shrink Wrap	0	0	0	0	33	33	0	34	34	0	35	35	0	36	36
Other Plastic	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1
Glass															
Mixed Glass	667	1,195	1,861	663	1,246	1,909	683	1,283	1,966	703	1,322	2,025	724	1,362	2,086
Fluorescent Bulbs	0	2	2	0	2	2	0	2	2	0	2	2	0	2	2
Other															
Animal Protein / Fat (Solid)	0	496	496	0	200	200	0	206	206	0	212	212	0	219	219
Electronics	158	190	347	231	80	311	238	82	320	245	85	330	252	87	340
Toner Cartidges	0	55	55	0	60	60	0	62	62	0	64	64	0	66	66
Pallets	0	605	605	0	500	500	0	515	515	0	530	530	0	546	546
Textiles / Cloth	0	284	284	51	340	391	53	350	403	54	361	415	56	372	427
Tires (Recycled)	149	555	704	93	477	570	96	491	587	99	506	605	102	521	623
Tires (Retread)	0	35	35	0	0	0	0	0	0	0	0	0	0	0	0
Tire-to-Cement Kilns	0	43	43	0	8	8	0	8	8	0	8	8	0	9	9
Total:	**17,978**	**33,561**	**51,538**	**16,587**	**51,250**	**67,838**	**17,085**	**52,788**	**69,872**	**17,597**	**54,371**	**71,968**	**18,125**	**56,002**	**74,127**

Table 3-3: Recovered Materials

	2019			2020			2021		
	Residential (Tons)	Commercial (Tons)	Total (Tons)	Residential (Tons)	Commercial (Tons)	Total (Tons)	Residential (Tons)	Commercial (Tons)	Total (Tons)
Comingled Containers	0	111	111	0	114	114	0	118	118
Metal									
Aluminum Cans	0	128	128	0	132	132	0	136	136
Front End Scrap	1,300	0	1,300	1,339	0	1,339	1,379	0	1,379
White Goods	0	19,221	19,221	0	19,797	19,797	0	20,391	20,391
Lead Acid Batteries	23	2,396	2,419	24	2,467	2,492	25	2,541	2,566
Mixed Cans	318	599	917	328	617	945	338	635	973
Other (Oil Filters)	0	61	61	0	63	63	0	65	65
Other (Litho Plates)	0	0	0	0	0	0	0	0	0
Paper									
Newspaper	0	97	97	0	99	99	0	102	102
Corrugated Cardboard	0	7,616	7,616	0	7,844	7,844	0	8,080	8,080
Office / Computer	0	549	549	0	566	566	0	583	583
Magazines	0	115	115	0	118	118	0	122	122
Mixed Paper	3,516	7,432	10,948	3,622	7,655	11,277	3,731	7,885	11,615
Other Paper	0	0	0	0	0	0	0	0	0
Compost / Mulch									
Mixed Yard Waste	14,475	0	14,475	14,909	0	14,909	15,357	0	15,357
Wood Shavings	0	1,0699	10,699	0	11,020	11,020	0	11,351	11,351
Other (Bark)	0	11,049	11,049	0	11,380	11,380	0	11,722	11,722
Other (Sawdust)	0	1,566	1,566	0	1,613	1,613	0	1,661	1,661
Plastic									
Mixed Plastic	655	1,357	2,012	675	1,398	2,072	695	1,440	2,134
LDPE	0	4	4	0	4	4	0	4	4
Film Plastic	0	26	26	0	27	27	0	28	28
Shrink Wrap	0	43	43	0	44	44	0	46	46
Other Plastic	0	1	1	0	1	1	0	1	1
Glass									
Mixed Glass	865	1,626	2,491	891	1,675	2,566	918	1,725	2,643
Fluorescent Bulbs	0	3	3	0	3	3	0	3	3
Other									
Animal Protein / Fat (Solid)	0	261	261	0	269	269	0	277	277
Electronics	301	104	406	310	108	418	320	111	430
Toner Cartidges	0	78	78	0	81	81	0	83	83
Pallets	0	652	652	0	672	672	0	692	692
Textiles / Cloth	67	444	510	69	457	525	71	471	541
Tires (Recycled)	121	622	744	125	641	766	129	660	789
Tires (Retread)	0	0	0	0	0	0	0	0	0
Tire-to-Cement Kilns	0	10	10	0	11	11	0	11	11
Total:	**21,642**	**66,870**	**88,512**	**22,292**	**68,876**	**91,167**	**22,960**	**70,942**	**93,902**

Table 3-4 ESTIMATED WASTE GENERATION IN CHARLES COUNTY 2009 - 2021

	Annual Generation (Tons)												
Waste Category	**2009 (Actual)**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Residential	33,621	34,630	35,669	36,739	37,841	38,976	40,145	41,350	42,590	43,868	45,184	46,539	47,936
Commercial	16,272	16,760	17,263	17,781	18,314	18,864	19,430	20,013	20,613	21,231	21,868	22,524	23,200
Industrial (solids, liquid, etc.)	90	93	95	98	101	104	107	111	114	117	121	125	128
Institutional (schools, hospitals etc.)	0	0	0	0	0	0	0	0	0	0	0	0	0
Demolition Debris (rubble)	28,199	29,045	29,916	30,814	31,738	32,690	33,671	34,681	35,722	36,793	37,897	39,034	40,205
Land Clearing	0	0	0	0	0	0	0	0	0	0	0	0	0
Controlled Hazardous Substance (CHS)	0	0	0	0	0	0	0	0	0	0	0	0	0
Dead Animals	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulky or Special Waste	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Tires	0	0	0	0	0	0	0	0	0	0	0	0	0
Wastewater Treatment Plant Sludges	0	0	0	0	0	0	0	0	0	0	0	0	0
Septage	0	0	0	0	0	0	0	0	0	0	0	0	0
Soil	1,057	1,089	1,121	1,155	1,190	1,225	1,262	1,300	1,339	1,379	1,421	1,463	1,507
Special Medial Waste	137	141	145	150	154	159	164	168	174	179	184	190	195
Additional Waste Reported by Charles County	6,090	6,273	6,461	6,655	6,854	7,060	7,272	7,490	7,715	7,946	8,184	8,430	8,683
Total Waste Disposed	**85,467**	**88,031**	**90,672**	**93,392**	**96,194**	**99,080**	**102,052**	**105,114**	**108,267**	**111,515**	**114,861**	**118,306**	**121,856**
Total Recyclables Recovered	**206,086**	**212,269**	**218,637**	**225,196**	**231,952**	**238,910**	**246,077**	**253,460**	**261,064**	**268,895**	**276,962**	**285,271**	**293,829**
Total Waste Generation	**291,553**	**300,300**	**309,309**	**318,588**	**328,145**	**337,990**	**348,130**	**358,573**	**369,331**	**380,411**	**391,823**	**403,578**	**415,685**

3.6 WASTE PROJECTIONS

In Charles County, solid waste is generated through the activities of residents, businesses, industries, and institutions. Section 26.03.03.03D of COMAR requires that this Plan identify and quantify existing and projected solid waste generated within the County for the following waste categories:

- Residential
- Non-Hazardous Industrial
- Rubble
- Dead Animals
- Tires
- Septage
- Commercial
- Institutional
- Controlled Hazardous Substances
- Bulky wastes
- Wastewater Treatment Plant Sludge
- Other waste (which may be generated in significant quantities.)

Waste generation within Charles County during the period 2009 through 2021 is presented in Table 3-4 and discussed in the following paragraphs. Descriptions of each waste category and the methodology used to estimate quantities are presented in subsequent sections.

3.6.1 Residential Waste

Residential waste includes wastes generated by households in Charles County, except for dead animals, bulky wastes, and tires which are described in subsequent sections. Residential waste is either collected by commercial (private) haulers, municipal haulers, or brought to the landfill by individual residents. The projected generation of residential solid waste within the County is based on the residential waste delivered to the landfill plus the amount of residential recyclables recovered. Historic records were used to develop a baseline residential waste generation for the county as described in Section 3.5. The average daily residential waste generation for Charles County is 2.52 pounds per person.

3.6.2 Commercial/Industrial Waste

Commercial and non-hazardous industrial waste delivered to the landfill are not recorded separately, but are reported under a single category, as commercial waste. For the purpose of this Plan, commercial waste is defined as waste generated by private businesses and non-hazardous waste generated by industry. Commercial waste quantities discussed in this section do not include rubble, dead animals, bulky waste, tires, or sludge. Commercial waste is generally collected by commercial (private) or municipal haulers and then taken to the landfill. The projected generation of commercial waste within the County is based on the commercial/industrial waste delivered to the landfill plus the amount of commercial recyclables recovered.

Baseline data for the commercial/industrial waste generation in Charles County was presented in Section 3.5. The average daily commercial/industrial waste generation in Charles County is estimated to be 2.99 pounds per employee.

3.6.3 Institutional Waste

Institutional waste includes wastes generated by federal, state, and county government facilities including the military, schools, hospitals, county maintenance, and state highway department, except for dead animals, bulky wastes, tires, or sludge which are described in subsequent sections. Institutional waste is either collected by commercial (private) haulers or by municipal haulers and then taken to the landfill. Institutional waste is collected by commercial, municipal, and non-commercial waste haulers.

As discussed in Section 3.5, the quantity and type of institutional waste is not available through the Charles County Sanitary Landfill records due to commingling of materials with commercial/industrial waste. Haulers collect waste from institutional establishments within the same trip or route to collect commercial/industrial wastes. Therefore, the quantity and type of wastes generated at these establishments is immeasurable at the landfill. Institutional waste is combined with commercial/industrial wastes for statistics of quantity and type of waste generated.

Higher institutional recycling participation can be attributed to new recycling programs instituted in public schools, County and State government buildings, as well as mandated recycling rates for state agencies. Recovered institutional waste for recycling is also collected by commercial or municipal haulers making actual recycling tonnage not possible.

3.6.4 Rubble Waste

For the purpose of this plan, rubble includes land-clearing debris, construction debris, and demolition debris. Specific examples of waste permitted to be disposed of in a rubble landfill according to *COMAR* 26.04.07.13.B include trees, brush, rock, earthen materials, concrete, bricks, asphalt, wood, structural steel, plaster, insulation, roofing shingles and felt, household appliances, paper, and asbestos.

Reported rubble generation rates are highly variable, and are likely influenced by a variety of factors including home construction, business development, employment, reuse and recycling, disposal costs, available disposal space, proximity of generation point to the disposal facility, practices of illegal dumping, the importation of rubble waste generated outside the county for disposal, and exportation of rubble wastes generated within the county for disposal elsewhere. Verifiable historical data on the rubble waste generated within Charles County is not available. As of December 1999, the amount of rubble generated in the County remains unknown since Charles County still prohibits large commercial loads from the landfill.

3.6.5 Controlled Hazardous Substances Including Medical Waste

The term controlled hazardous substance (CHS) is used interchangeably with the term hazardous waste in Maryland regulations. Section 26.13.02.03 of *COMAR* provides a specific definition of hazardous waste, as any substance:

- That produces toxic, lethal or other injurious effects;
- That causes sub-lethal alterations to plant, animal or aquatic life;
- That may be injurious to human beings; and
- That is identified as a hazardous substance by EPA.

A Special Medical Waste (SMW) is classified as a CHS by the Maryland Department of the Environment (MDE), and is defined in Section 26.13.11.02.B(10) of *COMAR* as a solid waste that is composed of anatomical material, blood, blood-soiled articles, contaminated material, microbiological laboratory wastes, or sharps (e.g., syringes, needles, surgical instruments, etc.) and otherwise not excluded under Section 26.13.11.03 of *COMAR*. SMW is typically generated by hospitals and clinics, nursing facilities, doctor and dentist offices, and veterinary clinics. SMWs do not include household wastes, ash from authorized medical waste incinerators, and wastes from animals not suspected of carrying diseases infectious to humans.

CHS is not permitted to be disposed of in a municipal landfill, but must be handled, stored, collected, transported, processed, and/or disposed of in a specific manner that meets stringent state and federal regulations and guidelines. The MDE tracks the generation of CHS in Charles County and maintains a database using travel manifests for CHS. The database includes a listing of CHS generators and corresponding types and volumes of CHS reported. The MDE database for Charles County is provided in Appendix D.

CHS waste generation in the County is calculated as the total of the waste reported in the MDE travel manifests. The total CHS waste generated in Charles County is estimated to be 3,527 tons per year or an average of 0.16 pounds per person per day (based on the estimated January 1, 2008 population of 148,500).

It should be noted that from a regulatory perspective, household hazardous wastes (HHW) are not the same as CHS. HHW are wastes classified as hazardous wastes that are generated in small quantities by residential users, whereas CHS are produced in larger quantities by businesses, industry and institutions. Examples of HHW are paints; prescriptive drugs, fluorescent light bulbs, organic solvents such as paint thinner, gasoline, and lighter fluid; household cleaners; lead acid batteries; and pesticides. It is permissible, under current state and federal regulations, to dispose of many HHWs in a municipal landfill. While these wastes can be disposed of legally in a

municipal landfill, it is encouraged to bring these materials to the monthly HHW acceptance day at the landfill. HHW can be properly stored until the next county HHW collection day. HHW collected during these events is handled and disposed of in a similar fashion as CHS.

3.6.6 Dead Animals

Dead animals generated within Charles County include unwanted and dying animals euthanatized at the Tri-County Animal Shelter and by local veterinarians, animals killed by vehicles along county roadways, and farm animals that die or are euthanized. The Tri-County Animal Shelter reported that approximately 40 tons of dead cats, dogs and other small animals were handled in 2010 at the shelter. This facility accepts animals from residents, animal clinics, veterinarians, and the highway department. Animals are cremated on-site at the shelter.

3.6.7 Bulky Wastes

Bulky wastes are primarily metal wastes contained in large items such as major appliances (i.e., white goods) and other scrap metals. In Charles County, bulky wastes are processed and recycled by commercial scrap metal dealers. White goods and other appliances are collected and processed for recycling by county personnel, commercial scrap metal dealers, and appliance dealers. Prior to disposal of white goods, refrigerant gases are vented and collected. White goods delivered to the landfill by residents and private haulers are segregated, compacted, and stored for pick-up by a local scrap-metal dealer.

Traditionally, the scrap metal industry has provided adequate recycling opportunities and economic incentives to recycle the majority of scrap metal and old automobiles. Accurate records on the amount of scrap metal and old automobiles generated and recycled in Charles County is not currently available. Applying historical records of accepted materials at the County Landfill to the population of 141,981 people in 2009, the per capita generation rate is estimated

0.04 pounds of white goods per day per person.

3.6.8 Scrap Tires

The majority of scrap tires generated in the County are taken to a recycling or storage facility directly from the retailers who change tires. Currently, the Charles County Sanitary Landfill prohibits the disposal of scrap tires at the facility; however, a scrap tire collection location is provided at the landfill. Scrap tires collected at the landfill are recycled. A statewide “tire recycling fee” of $0.80 per new tire sold in Maryland was established in 2005. This fee is assessed to fund the clean up and recycling of used tires. Any tire disposal fee that is assessed by commercial tire facilities or at the county landfill is a local charge and not a state fee.

EPA documentation recommends a generation rate of two free scrap tires per visit for Charles County residents. This generation rate is used to project the generation of scrap tires in Charles County. Charles County handled 356 tons in 2009 through its recycling centers.

3.6.9 Sludge

3.6.9.1 Wastewater Treatment Plant Sludge

As previously stated in Section 1.5.3.3, Charles County Resolution No. 92-75 bans the disposal of sludge in the landfill, except in emergency situations. In the event of an emergency situation, sludge may be disposed in the Charles County landfill for the established tipping fee. Generally, sludge is used as a soil conditioner and land-applied to permitted agricultural or reclaimed gravel mine sites throughout Charles County.

As of July 2011, there are 30 agricultural sites permitted for land application on approximately 3,000 acres of land. In addition, there are 5 reclaimed gravel mine sites permitted to utilize sludge.

Charles County currently receives sewage sludge for land application from the following Maryland Department of the Environment approved treatment plants:

- Parkway
- Little Patuxent
- Back River
- Broadwater
- York
- Alexandria
- Patuxent
- Patapsco
- Hanover
- Herrington Harbor
- Maryland City
- Annapolis
- Broadneck
- Penn Township
- Mattawoman
- Cox Creek
- Seneca
- Fredrick
- Naval Academy
- Damascus
- Piscataway
- Blue Plains

The County reviews all transportation sludge permit applications. These applications are reviewed for compliance with County policies, as well as other rules and regulations. Applications are approved with conditions, or denied by the County Commissioners.

3.6.9.2 Water Treatment Sediments

Water treatment systems that use surface water as their source (e.g., streams, rivers, reservoirs) produce sediments or sludge as a waste by-product of the treatment process. There are no water treatment systems currently operating in Charles County and no water treatment sediment is imported into the County for land disposal.

3.6.10 Septage

Septage is the material removed from chemical toilets, septic tanks, seepage pits, privies, or cesspools. Since 1992, MDE regulations require that septage be treated as raw sewage at a permitted wastewater treatment plant. The disposal of raw septage directly on land surfaces is illegal in Maryland. In Charles County, septage is accepted for treatment at the Mattawoman WWTP.

Records from the Mattawoman WWTP indicated that a total of 11,949 tons of septage was delivered to the waste water treatment facility by scavengers (septage haulers) during Fiscal Year 2011. Based on the 2010 US Census Bureau, the population for Charles County, Maryland is 146,551. The average daily generation of septage is 0.08 pounds per person.

3.6.11 Asbestos

Prior to 1970, asbestos was frequently used as insulation for boilers, heating systems, and piping in buildings and as structural material in floor and ceiling tile and exterior siding. The discovery that asbestos is carcinogenic when inhaled prompted the EPA and MDE to require its removal from certain structures (e.g., schools) and to regulate its handling and disposal. Thus, asbestos waste is generated from the demolition and rehabilitation of structures containing asbestos materials. Municipal and rubble landfills can accept asbestos waste provided that it is allowed by the MDE refuse disposal permit and specific handling procedures are followed to prevent fibers from becoming airborne. At present, it is the County's policy not to accept asbestos at the Charles County Sanitary Landfill; therefore, no county records exist on asbestos disposal. Asbestos is not classified as a controlled hazardous substance; therefore, no tracking records are available for asbestos waste generated within the County.

There is no substantial demand or requests for asbestos disposal from Charles County residents and agencies. The absence of significant quantities of asbestos is largely due to the development history of the County. In 1950, the population was approximately 23,415 which grew to approximately 47,683 in 1970 and to 101,154 in 1990. Therefore, the vast majority of development and construction occurred after 1970 when asbestos was no longer used as a building material. In addition, asbestos has already been removed from the facilities operated by the Charles County Board of Education and the Charles County Government. There has been no asbestos accepted at the Charles County Landfill during the past ten years, and there is projected to be very little in the pending 10 years covered in the Solid Waste plan.

3.6.12 County Maintenance Debris

County operations generate small quantities of debris from cleaning streets, litter, and catch basins. The quantities of debris generated from Charles County maintenance operations are accounted for in the institutional (commercial/industrial) portion of the waste stream projections.

3.6.13 Agricultural Waste

Agricultural wastes include organic residues from crop production, livestock manure, and used containers from pesticides and herbicides. Generally, agricultural wastes are reused on the farm. For example, manure is used as fertilizer and organic debris is plowed into the land. Although not identified as such, small quantities of agricultural waste entering the Charles County Sanitary Landfill are accounted for as commercial waste. Because most of these wastes are recycled on-site, agricultural wastes are not a significant solid waste management issue within the County.

3.6.14 Recreational Waste

Waste from parks and other recreational facilities including solid waste and septage are accounted for as institutional or septage waste.

3.6.15 Mining Waste

Several sand, gravel, and clay surface mines are operated in Charles County. The primary solid waste associated with quarrying operations is overburden (soil) which is usually stockpiled on-site or sold as clean fill to the construction industry. Although quantities of this material are significant, it does not currently pose a solid waste management problem in the County.

3.6.16 Used Oil and Antifreeze

Many industries and businesses collect their used oil and antifreeze for recycling or reuse. However, the "do-it-yourselfers" are estimated to handle approximately 60 percent of waste oil in Maryland. Waste oil and antifreeze are collected for recycling by the Maryland Environmental Service (MES) and commercial establishments such as garages and service stations. Maryland Environmental Service provides a waste oil and antifreeze collection service in Charles County. There are numerous garages, service stations, and retailers which collect waste oil and antifreeze for recycling. Charles County also offers several oil and antifreeze recycling locations as listed in Table 3-5.

A total of 1,730 tons of waste oil was collected in Charles County during 2009. The antifreeze collection program has collected 62 tons during the same time period. MES reports that approximately 4 to 6 million gallons of waste oil are generated annually in Maryland.

As mentioned above, Charles County citizens recycled 1,730 tons of used motor oil and 62 tons of antifreeze in 2009.

3.7 IMPORTED WASTES

Currently, WWTP sludge is the only waste imported to Charles County for disposal or processing. The quantity of WWTP sludge imported into the County as well as the procedures for ensuring that imported waste is not disposed in the Charles County Sanitary Landfill are discussed in the following sections.

3.6.17 Wastewater Sludge

Approximately 1,500 dry tons of municipal wastewater sludge from the Blue Plains WWTP and Anne Arundel County was transported into the County in 2006 for land application at permitted

farms and marginal mine sites throughout the County as discussed in Section 3.6.9.1. For 2007 and 2008 the quantity of sludge hauled into the County was trending downward as the contractors moved sludge to other counties and out of state.

Charles County has received sewage sludge from ten MDE approved WWTPs (Section 3.6.9.1). Permits for the transportation of sewage sludge within Charles County are issued by the Charles County Commissioners.

3.6.18 Municipal Waste

As outlined in Section 3.3.1, the ultimate disposal of solid waste is market driven as opposed to local regulatory laws. The County still has in effect its regulation that prohibits the importation of solid waste into its landfill. Although not disposed of in the Charles County landfill, it is interesting to note that several times more waste travels through Charles County each day on

U.S. Route 301 than is generated within the County. This waste is destined for one of several large landfills in Virginia and is hauled in large tractor trailers. The waste is hauled in a large transfer trailers which look very similar to cargo trailers so that the average individual has no idea of its contents.

St. Mary's County has been exporting their waste into the Charles County Landfill. Since August of 2009, St. Mary's County has exported about 36,421 tons per year.

3.7 EXPORTED WASTES

Neighboring counties in Maryland have municipal waste importation policies similar to Charles County, and may have higher tipping fees; therefore, it is believed that no significant amounts of municipal waste generated in the County are sent to other Maryland jurisdictions. As previously discussed, recyclables, rubble, controlled hazardous substances, dead animals, and asbestos are exported out-of-county for processing and disposal. However, as discussed Section 3.3.1, almost 50% of waste generated in Charles County is landfilled in Virginia by means of transfer stations in Calvert County and the District of Columbia.

3.7.1 Recyclables

As discussed in Section 3.4, 51,537 tons of recyclables were reported during the period of January 1, 2009 through December 31, 2009. These recyclables were transported out-of-county for processing.

Table 3-5 CHARLES COUNTY CONVENIENCE (RECYCLING) CENTERS

Location	Hours	Household Hazardous Waste	Compact Fluorescent Light bulbs	Batteries	Newspaper & Magazines	Tag - a- Bag	Aluminum Cans	Tin Can	Plastics	Glass	Oil & Antifreeze	Scrap Metal	Yard Waste	Electronics	Textiles	Cardboard
County Landfill Recycling Center (Billingsley Road)	Mon - Sat 7am- 7pm			X	X	X	X	X	X	X	X	X	X	X	X	X
Pisgah Park (Masons Springs Road)	Mon - Sat 7am- 7pm			X	X	X	X	X	X	X	X	X	X	X	X	X
Gilbert Run Park	Wed 11am - 7pm & Sat 8am - 4pm			X	X	X	X	X	X	X	X	X	X	X	X	X
Cobb Island / Breeze Farm	Wed 11am - 7pm & Sat 8am - 4pm			X	X	X	X	X	X	X	X	X	X	X	X	X
Department of Public Works 10430 Audie Lane	First Saturday of Every Month April - December	X	X													
Pinefield	24 - Hours										X					
Piney Church Mulch Facility	Mon – Sat 7:30 am- 4 pm												X			
Ruth B. Swann Park	24 - Hours										X					
Charles County Department of Public Works	24 - Hours										X					

* Electronic Recycling - Vendor: Creative Recycling Systems, Inc. (CRS), 230 tons diverted from landfill

3.7.2 Rubble

A significant amount of the rubble generated in the northern part of the County is disposed at out-of-county rubble landfills. Landfill personnel estimated that approximately 20,000 tons of waste that arrive at the landfill would be acceptable at a C & D landfill, even though it is not truly rubble. Based on the generation rate of similar counties, approximately 63,637 tons of rubble is estimated to be generated within Charles County annually (Section 3.6.4). This suggests that approximately 67 percent (42,637 tons) of rubble generated within Charles County is transported out-of-county for disposal. This estimate should be interpreted cautiously since there are no reliable records on rubble generation in the County.

Within recent years, Chaney Enterprises in Waldorf, a company that mines and sells aggregates currently processes old concrete into a recycled aggregate. Their processing figures are unknown.

3.7.3 Controlled Hazardous Substances

Controlled hazardous substances generated within the County are exported out-of-county for processing or disposal, as previously discussed in Section 3.6.5. As shown in Table 3-5, an estimated 3,847 tons of controlled hazardous substances were generated in 1999 and subsequently exported out-of-county for processing. Based on the 1999 population of 120,800, the CHS generation rate was 0.17 pounds per person each day.

3.7.4 Dead Animals

Approximately 40 tons of dead animals were removed from the Tri-County Animal Shelter and transported to a renderer outside the County (Section 3.6.6) during 2009.

3.7.5 Scrap Tires

Charles County handled approximately 149 tons of scrap tires through its tire recycling program in 2009. These tires were collected and transported out-of-county for recycling.

3.7.6 Asbestos

Charles County did not accept any measurable amount of asbestos containing material during the 2009 calendar year at the Landfill. The Charles County Sanitary Landfill only accepts asbestos materials from government facilities within the County. Asbestos materials within government buildings are believed to be removed and no materials are expected in the future.

3.7.7 Household Hazardous Waste

The County conducts a household hazardous waste collection program the first Saturday of every month at a County satellite office, located on 10430 Audie Lane, except for January, February and March. This service is provided by a private contractor (as of 2009, the contractor is HazTrain) with an annual budget of $65,000 for the year 2009. It is estimated that this waste accounts for 60,000 pounds of material annually.

The county accepts these materials as part of Household Hazardous Waste:

- Dried Latex Paint
- Pesticide/Herbicide/Fertilizer
- Oil Based Paints
- Prescription Drugs
- Other Household Chemicals
- Household Cleaners
- Gasoline
- Pool Chemicals
- Fluorescent/Compact Fluorescent Lights

3.7.7.1 Fluorescent and Compact Fluorescent Light bulbs (CFL)

The County accepts CFL bulbs for recycling in conjunction with our household hazardous waste collection program as described in section 3.8.7. The service is free to County residents. Under

§ 9-1703(b)(11) of the Environment Article, Annotated Code of Maryland, the counties and Baltimore City are required to address by October 1, 2011 the strategy for the collection and recycling of fluorescent and compact fluorescent lights that contain mercury.

Collection of Fluorescent/Compact Fluorescent Light bulbs (CFL) has been emphasized to reduce the amount of mercury poisoning into the environment. Along with the above collection dates, some hardware retailers accept CFL bulbs for recycling free of charge to the consumer.

3.8 COLLECTION SYSTEMS

The existing collection system for solid waste and recyclables in Charles County includes privately owned collection companies, municipal collection, self-hauling, and facilities handled by the county roll-offs. These systems are described in the following sections.

3.8.1 Solid Waste Collection

Residential, commercial, industrial, and institutional waste generated in Charles County is collected and hauled to the Charles County Sanitary Landfill for disposal. The majority of waste generated within the unincorporated areas of the County and Port Tobacco is collected by privately owned companies contracted for collection services by individuals. The incorporated Towns of Indian Head and La Plata provide municipal collection services for waste generated within these areas. Charles County provides a roll-off system for several county facilities and projects. The option for individuals to self-haul waste to the landfill is also available for any resident of Charles County. Four recycling centers for recyclables exist through the County, as well as several locations where residents can purchase tickets for the "Tag-A-Bag" program.

3.8.1.1 Free Enterprise

Most residential, commercial, and industrial waste generated in Charles County is collected and delivered to the Charles County Sanitary Landfill by privately owned companies. This free enterprise system allows individuals, residents, landlords, businesses, industries, and institutions to contract with the private company of their choice to provide waste collection services.

The frequency of collection, frequency of billing, and cost for the collection service varies depending on the company. Payment for collection service is provided directly from the individual contracting for the service to the collection company.

The 2011 Charles County Sanitary Landfill records indicate that the following private collection companies (22) collect waste from the unincorporated areas of the County and Port Tobacco.

- 1-800 Got Junk
- Affordable Refuse
- Amber's Disposal
- Atlantic Waste
- Bay Area Disposal
- Calvert Trash Systems
- Goode Companies
- Knott Just Trash Industries
- Nutwell Rolloff
- S&F Refuse
- Waste Management
- AA Reliable Trash Service
- Allied Waste / BFI
- AR Ridner
- Bartlett Company
- Burch Trash Service
- Evergreen Disposal
- Junk Be Gone
- LSI / Lawrence Street
- Newburg Trash Service
- Refuse Rescues
- T&S Trash

3.8.1.2 Municipal Programs

Solid waste generated within the incorporated Towns of Indian Head and La Plata is collected by services provided by the respective municipalities.

The Town of Indian Head provides semi-weekly curbside collection for residents (1,400 households) and either curbside or dumpster service to commercial establishments. The Town of Indian Head also provides a special bulky waste collection service in the spring and fall. Residents and businesses are billed monthly for solid waste collection services.

The Town of La Plata provides weekly curbside collection services to about 3,000 households and commercial establishments. In the fall and summer, the Town of La Plata also provides special collection for yard waste which is taken to a private processor. Residents are billed monthly for solid waste collection services. Commercial and institutional customers may use the Town or private company.

3.8.1.3 Self Hauling

Individuals in Charles County have the option to haul their own waste to the Charles County Landfill or the three recycling centers that have trash compactors (Breeze Farm, Gilbert Run or Pisgah Recycling Center). Self-hauling is the primary method to dispose of large bulky items such as furniture or appliances since municipal and private collection services do not provide for bulk pick-up on a regular basis. Residents take their waste to the residential convenience center located near the entrance of the landfill. This waste is collected in roll-off boxes and taken to the working face of the landfill by County personnel for disposal.

Currently self-haulers are assessed a fee of $1.75 per bag or container of refuse, no larger than 32 gallons. Refuse not in bags or containers are subject to the tipping fee rate (currently $70 per ton).

3.8.1.4 County Roll-Off System

Charles County provides roll-off containers for several county facilities and projects. Waste deposited in these containers is collected by Charles County personnel. Currently, the County is providing roll-off containers for the White Plains Golf Course, Department of Public Works Maintenance Facility, Mattawoman WWTP, Charles County Detention Center, public facility maintenance projects, county construction projects, and community clean-ups.

3.8.1.5 Tag-A-Bag Program

The recycling centers at Gilbert Run Park, Pisgah, Breeze Farm, and the Landfill provide means for residents to dispose of their solid waste. Residents are assessed a fee of $1.75 per bag or container of refuse, no larger than 32 gallons.

3.8.2 Recyclables Collection

Recyclables source-separated from the Charles County waste stream are collected by privately owned companies, municipal services, and by residents taking their recyclables to recycling centers. Curbside collection of residential recyclables from the unincorporated areas of the County is provided through a county contract with private collection companies. Recycling centers located throughout the County are used by county residents living in areas not served by curbside collection.

Curbside collection of residential recyclables is provided in the Towns of Indian Head and La Plata by the use of a private company. Commercial, industrial, and institutional recyclables are mostly collected through private subscription. The recyclables collection program employed by the County is described in the following sections.

3.8.2.1 Residential Curbside Collection – Unincorporated Areas

The County contracts with privately owned collection companies to provide curbside collection of recyclables and yard waste in unincorporated areas of the County. Curbside collection is available to approximately 38,370 households within an area generally north of the La Plata area in the Development District. Due to the number of ever-growing homes within the County, annual Route Audits are conducted to identify new growth and determine the expansion of the program.

Each household within the collection area is given a 95 gallon recycling cart to collect their recyclables and to place at the curb for biweekly collection. Recyclables collected include metal containers, plastic bottles and containers, glass bottles and jars, paper, and cardboard. The collection company collects the recyclables single stream and delivers it to a MRF located in Capital Heights, Maryland. Records of all materials processed at the facility is provided to the County and is incorporated in the annual MRA report. Yard Waste consisting of grass, leaves,

and small branches is also collected on a weekly basis nine months a year. Collection services for recyclables and yard waste in the unincorporated area of the County are paid through an environmental service fee.

The residential recycling program in unincorporated areas had an average participation rate of 30-50 percent from 2003 to present. Curbside-recycling tonnage has doubled as a result of conversion to larger 95-gallon collection containers in 2013. The County's Maryland Recycling Act (MRA) recycling rate exceeds the mandated State recycling goal of 35 percent for a county with a population of more than 150,000. The MRA calculation for Charles County can be found in Appendix D.

3.8.2.2 Residential Curbside Collection - Incorporated Areas

The Town of Indian Head provides approximately 1,400 households with curbside collection of recyclables. The recyclables collected include metal containers, plastic bottles and containers, glass bottles and jars, paper, and cardboard. The residents of Indian Head place commingled materials in their recycling bin once a week for collection. A contracted hauler collects the recyclables and delivers them to a MRF located in Capital Heights, Maryland. Recyclable collection in Indian Head is paid for by the individual as part of solid waste collection services.

The Town of La Plata provides curbside collection of recyclables to approximately 3,000 households. Collected recyclables includes metal containers, plastic bottles and containers, glass bottles and jars, paper, and cardboard. Residents place the commingled recyclables in their recycling bin for weekly curbside collection. Residential curbside collection in La Plata is also paid by the individual as part of the monthly bill for waste collection services.

The Town of La Plata and Indian Head staff collect yard-waste and delivers the material to the Charles County Landfill on a year round basis.

3.8.2.3 Recycling Centers

Charles County provides the Piney Church Mulch Facility and four (4) permanent recycling centers with a range of materials accepted at each center. Table 3-5 identifies these recycling centers, their locations, hours of operation, and materials accepted. Figure 3-1 shows the locations of the various acceptance facilities throughout the County.

3.9 RECYCLING PROGRAMS

A combination of public and private programs serve the two main sectors of potential recyclers: residents and commercial businesses (commercial, industry, and institutions). Recycling programs for each of these sectors are described in the following sections.

3.9.1 Residential Programs

Residential recycling programs are provided by Charles County in the form of curbside collection or recycling centers. The curbside collection program provided for the unincorporated areas of the County is described in Section 3.9.2.1; curbside programs for the Towns of Indian Head and La Plata are presented in Section 3.9.2.2. The County operates a number of recycling centers which accept recyclable materials from county residents. These recycling centers are identified and detailed in Table 3-5.

Other residential recycling opportunities for Charles County residents include the following:

- Christmas Tree collection sites
- Scrap metal such as old appliances and bicycles may be taken to the Charles County Landfill Recycling Center, Pisgah Recycling Center, Gilbert Run Recycling Center or the Breeze Farm Recycling Center.
- Lead-acid batteries may be taken to any of the above mentioned facilities or Waldorf Metal, Inc. in Bryantown, Maryland. Batteries may also be taken to auto parts retail stores for recycling.
- Used motor oil may be taken to one of the four recycling centers or four used motor oil recycling drop-off locations.
- Plastic grocery bags may be returned to grocery stores and select retail stores.
- Electronics which include: computers, monitors, peripherals, televisions, telephones, cellular phones & PDA's, printers, copiers, stereos, VCR & DVD players, camcorders, CD players, fax machines, projection equipment, calculators, scanners, electronic typewriters, consumer electronics, electronic toys, and microwaves. Accepted items also include "covered electronic items," which are defined by MDE as "a computer or video display device with a screen that is greater than 4 inches measured diagonally."

  Textiles consisting of clothings, linens, and leather goods are collected at four recycling centers by Mid-Atlantic Clothing Recyclers (MAC) who make annual donations to the Drug Abuse Resistance Education (D.A.R.E.) Program in the amount of $100 per collection container utilized. In 2009, a total of six textile containers were in use at recycling centers. All collected materials are sorted and reused and/or recycled.

3.9.1.1 Apartment Building and Condominium Recycling (Moved from Ch 5)

In April, 2012, the Maryland General Assembly passed House Bill 1, Environmental-Recycling-Apartment Buildings and Condominiums requiring recycling in all apartment buildings and condominiums that contain 10 or more dwelling units. The law became effective on October 1, 2012 (amending Section 9-1703 of the Environment Article, Annotated Code of Maryland). The County revised its recycling plan within the Solid Management Plan in 2013 and Apartment Building and Condominium Recycling Program was implemented in 2014 as required per Section

9-1703 (b) (12) of the Environment Article, Annotated Code of Maryland.

Apartment Building and Condominium Recycling Program

Through the cooperation of Charles County Department of Public Works, Environmental Resources Division and owners or managers of apartment buildings or councils of unit owners of condominiums ("apartment and condominium officials"), and other stakeholders involved in the implementation of this law, the County has identified fifty six (56) apartment buildings and condominiums that fall under the scope of the law. The Charles County Department of Public Works, Environmental Resources Division has relayed the requirements of the law, including the materials that must be recycled; at a minimum, recyclables must include plastic containers, metal

& glass containers, cardboard and paper to the apartment and condominium officials.

Apartment and condominium officials shall complete and send to the Charles County Department of Public Works, Environmental Resources Division a Maryland Recycling Act (MRA) Survey Form, reporting to the County on an annual basis details on the required recycling activities.

Collection of Materials

Apartment and condominium officials directly, or through contracting with a private sector company, are responsible for providing all containers, labor, and equipment necessary to fulfill recycling requirements throughout their buildings. Distinctive colors and/or markings of recycling containers should be provided to avoid cross contamination. The apartment and condominium officials must ensure collection and transportation of recyclable materials from apartment and condominium locations to markets, or other legal recycling destinations. Residents will be responsible for placing recyclables in recycling containers prior to their removal on the scheduled pick up day.

Apartment and condominium officials identified how the materials will be stored, collected, and transported to the recycling markets for the collected materials. Apartment and condominium officials must report to the County on an annual basis details on the required recycling activities.

Marketing of Materials

Apartment and condominium officials are responsible for the marketing or other legal recycling and waste disposition of their recyclables. The apartment and condominium officials shall submit annual reports detailing the recycling and waste tonnage removed from the apartment and condominium and the markets for the materials or legal recycling destinations for the materials.

Materials Required to be Recycled

Apartment and condominium officials of Condominium shall recycle the following materials:

- Plastic bottles, jugs, and wide-mouth containers
- Metal Cans and Beverage Containers
- Glass bottles and jars
- Paper
- Cardboard

Responsible Parties

Entities that will be involved in implementing the law are:

A. Charles County Commissioners

- Responsible for adopting the MDE approved language of ABCR Program for the Solid Waste/Recycling Management Plan amendment.

B. Charles County Department of Public Works, Environmental Resources Division -

- Responsible for overseeing County Office of Recycling activities and assuring that all apartment buildings and condominiums that fall under the requirements are included in the ABCR Program.
- Communicate the requirements of the law to the apartment and condominium officials. Assist apartment and condominium officials in developing a recycling program, if so requested. Monitor the progress and performance of the ABCR Program.
- Develop the requirements of an ABCR Program in conjunction with input from apartment and condominium officials.
- Update the County's recycling plan to include the ABCR Program and amend the Comprehensive County Solid Waste Management Plan.
- Develop a recycling reporting survey to be used by apartment and condominium officials in reporting recycling activities.

C. Charles County Department of Planning and Growth Management –

- Responsible for amending the Solid Waste Management Plan to include ABCR Program.

D. Owner or Manager of the Apartment Building or Councils of the Unit Owners of Condominium –

- Responsible for providing recycling to the residents of each apartment building or condominium by October 1, 2014.
- Indicate level of self-performance to provide recycling collection from residential building locations or secure and manage recycling contracts with a contractor.
- Perform record keeping and report to the County on an annual basis.

Participating Apartment Buildings or Condominiums (56) in ABCR Program

Complex Name	Location	Units
327 St. Mary's Avenue	327 St. Mary's Avenue La Plata, MD 20646	12
604 Kent Avenue LLC	604 Kent Ave La Plata 20646	10
Adams Crossing	12330 Vivian Adams Dr Waldorf 20602	192
Westchester at Pavilions	St Patricks Dr Waldorf 20601	491
Bannister Associates, d/b/a Smallwood Gardens	Hamilton, Hunt, & Husk Pl Waldorf 20602	208
Blair House	6 Blair Rd Indian Head 20640	11
Brookmont	Wedgewood Pl Waldorf 20602	104
Chaney Properties Inc.	2135 Crain Hwy Waldorf 20601	20
Coachman's Landing	Thoroughbred Ct Waldorf 20603	104
Crossland Apartments	Heritage Pl Waldorf 20602	96
Carols Apartments	101 Carols Pl La Plata 20646	21
Carols Condominiums	201 Carols Place La Plata, MD 20646	42
Edelen Station	100/200/600/800 Edelen Station Pl La Plata, MD 20646	64
Pineview Apartments	12171/12173 Ell Ln Waldorf 20602	32
Fennell Christopher A	6325 Fennell Pl La Plata 20646	12
Fox Chase Apartments LLC	Night Heron Ct Waldorf 20603	176
Gleneagles Apartments LLC	Lewisham and Monaghan Pl Waldorf 20602	184
Jaycees Apartments	12150 Ell Ln Waldorf 20602	36
Charles Landing Apartments	Blair Rd Indian Head 20640	33
Charles Landing South	41 Jameson Ct Indian Head, MD 20640	60
Headen House Associates	October Pl Waldorf 20602	180
Heritage Place II	301 Dorchester Ave La Plata 20646	30
Heritage Place	601 Piney Branch Way, 605/609 Zekiah Run Way La Plata, MD 20646	32
Holly Station	3001 Hollins Lane Ln Waldorf 20601	150
Holly Station Ltd Partnership #2	3001 Hollins Lane Ln Waldorf 20601	60
Holly Station Ltd Partnership 3	Hollins Lane Ln Waldorf 20602	150
Holly Station Ltd Partnership IV	Hollins Lane Ln Waldorf 20603	150
Hunter's Run Apartments	4136 Falcon Pl Waldorf, 20603	104
Complex Name	**Location**	**Units**
Huntington	Gallery Pl Waldorf 20602	204
Indian Head Elderly Ltd. Partnership	106 Gentry Ct Bryans Road 20616	32

JSB Apartments	2165 Crain Hwy Waldorf 20601	48
K & S Indian Head	4085 Indian Head Hwy Indian Head 20640	10
Fenwick Landing	11655 Doolittle Dr Waldorf 20602	15
La Plata Garden Apartments	310 Caroline Dr La Plata 20646	52
Victory Lakeside	2005 St Thomas Dr Waldorf 20602	54
The Maples	101 Wesley Dr La Plata 20646	75
Benedict Apartments	7320 Benedict Ave Benedict 20612	10
La Plata Grande Garden I (Carroll La Plata Village)	656 Piscataway Ct La Plata 20646	32
La Plata Grande Garden II	Kent Ave La Plata 20646	36
La Plata Manor	1 Hickory Ln La Plata 20646	100
New Forest Apartments LLC	New Forest Ct Waldorf 20603	256
Palmer Apartments LP	Palmer Pl, Prince Albert Sq, Pilgrims Sq, Orangeman Sq, Otter Sq Waldorf 20602	152
Sheffield Greens Apartments	Prestancia Pl Waldorf 20602	252
Southwinds Active Adult Community	4210 Southwinds Pl White Plains 20695	94
Southwinds Active Adult Community	4225 Southwinds Dr White Plains 20695	100
The Nines	Litchfield, Flossmoor, and Indian Hills Waldorf 20602	120
Thunderbird Apartments	Crain Highway Bel Alton, MD 20611	32
Victory Brookside, Inc.	Wingate Ct Waldorf 20602	56
Village Green Ltd. Partnership	12131 Ell Ln Waldorf 20601	60
Village Lake Apartments LLC	2009 St Thomas Dr Waldorf 20602	122
Wakefield Terrace Associates	2000 Amberleaf Pl Waldorf 20602	204
Waldorf Astor Apartments	3605 Moses Way Waldorf 20602	96
Waldorf Elderly LLC	11080 Weymouth Ct Waldorf 20601	108
Waldorf Elderly Phase II LP	11060 Weymouth Ct Waldorf 20603	60
Woodcrest Apartments	800 Washington Ave La Plata 20646	11
Woodcrest Apartments	300 Harford St La Plata 20646	10
327 St. Mary's Avenue	327 St. Mary's Avenue La Plata, MD 20646	12
604 Kent Avenue LLC	604 Kent Ave La Plata 20646	10

Source: *Maryland Department of Assessments and Taxation. Updated by DPW October 2014.*

Note: New apartment buildings or condominiums that will fall under the requirements of the law will begin participating in the ABCR program within three months of being notified by the Charles County Department of Public Works, Environmental Resources Division.

Program Monitoring

The Charles County Department of Public Works, Environmental Resources Division shall monitor the progress and performance of the ABCR Program. However, the apartment and condominium officials will conduct inspections, review service levels, investigate reported or

unreported pick-up and disposal complaints, meet with residents or recycling contractor staff to educate or review practices, and review contractor compliance with the recycling contract. Any issues which arise from these visits that are deemed deficiencies on the part of the residents or recycling contractor will be detailed in writing and reported to the violator. The apartment and condominium officials shall initiate actions to correct all deficiencies within 60 days of being notified.

The apartment and condominium officials shall be responsible to keep the residents current on new regulations, laws, and mandates affecting recycling in the apartment buildings or condominiums.

Program Enforcement

The Charles County Department of Public Works, Environmental Resources Division will ensure that the recycling at apartments and condominiums will be implemented in accordance with Section 9-1703 and 9-1711 of the Environment Article, Annotated Code of Maryland and enforcement will be performed in accordance with the County Code.

Upon receiving a complaint or report of violation, the Charles County Department of Public Works, Environmental Resources Division shall institute an investigation, and if a violation exists, a notice shall be issued, in writing, to the responsible party requiring them to correct all deficiencies and perform any other tasks necessary to achieve compliance with the Environment Article.

Any person, firm or corporation who or which fails to correct, within thirty (30) days from notice from Charles County, all cited in said violation notice shall be subject to citation for a civil infraction, in accordance with 9-1711 of the Environment Article of the Annotated Code of Maryland, punishable by a fine of not exceeding $50 for each day on which the violation occurs and each day said violation shall be permitted to exist shall constitute a separate offense.

If the citation is not timely paid, Charles County may enforce the fine by an action in a Maryland court of competent jurisdiction

3.9.2 Commercial, Industrial, and Institutional Programs

Numerous commercial, industrial, and institutional establishments are collecting recyclables such as office paper, corrugated cardboard, aluminum cans, glass, plastics, newspapers, oil, and antifreeze for recycling. Most businesses contract for collection and/or marketing of their recyclables. Some larger organizations, such as grocery store chains, department stores and paper companies, generate quantities of recyclables that make it practical to provide their own collection and marketing.

Recycling programs are in operation at several local institutions including the Naval Surface

Weapons Center, Civista Hospital, County Board of Education (including all Public Schools), and county and state offices. The recyclables recovered by commercial, industrial, and institutional sources are transported outside the County for processing.

3.9.2.1 Charles County Public Schools Recycling Program

In July 2009, the Maryland General Assembly passed House Bill 1290, Environmental- Recycling – Public School Plans requiring recycling in all publicly-funded schools with the exception of State Universities. The law became effective on July 1, 2009 (amending 9-1703 of Environment Article, Annotated Code of Maryland). This bill requires each county's recycling plan to implement a strategy for collecting, processing, marketing, and disposing of recyclable materials from county public schools.

Charles County Public Schools

1. (a) Program

Since 1990 the Charles County Board of Education (CCBOE) has administered a recycling program in all county public schools. The program initially began with collecting and recycling white paper and corrugated cardboard. The Charles County Department of Public Works, Environmental Resources Division (DPW-ERD), provided in classroom collection containers and pick-up service was contracted through a private vendor.

In November 2008, the Charles County Government initiated a new contract with a private collection vendor, which expanded the accepted recyclable materials for both curbside collection and transfer facilities. The Charles County Board of Education also contracted with this vendor, which expanded the variety of materials recycled within the School and Administrative facilities. All public school facilities recycle paper, paperboard, cardboard, plastics (no.'s 1-7), metal containers, electronics, rigid plastic containers, plastic film (plastic bags & shrink-wrap), and books. Many also recycle their used motor oil from equipment. Education, training, and technical assistance to administrators, teachers, and students regarding the recycling program is provided by the Charles County DPW-ERD.

Collection bins are located throughout each school and administrative facility for staff and students to dispense recyclable materials. Students and staff are instructed to place all recyclable materials in these designated receptacles. Within the elementary school facilities, CCBOE staff empty these collection bins into dumpsters provided by the private vendor. The middle school and high school students and staff collect and empty the collection bins into the associated dumpsters located on their school campus. These materials are collected by the vendor for hauling and processing. After collection has been made, all recyclables are taken to a Materials Recovery Facility (MRF).

1. (b) Materials that must be included in the Program

- Plastic bottles, jugs, and wide-mouth containers
- Metal Cans and Beverage Containers
- Glass bottles and jars
- Paper
- Cardboard

The following materials may also be recycled on a voluntary basis.

- Rigid Plastics which include plastic milk/soda crates, plastic buckets with metal handles, plastic laundry baskets, plastic lawn furniture, plastic totes, plastic drums, plastic coolers, plastic flower pots, plastic drinking cups/glasses, plastic 5- gallon water bottles, plastic pallets, plastic toys, and empty plastic garbage/recycling bins
- Bagged Plastic Film (for example: grocery bags contained within 1-bag, or stretch film and/or shrink/wrap contained within 1-bag
- Printer Cartridges
- Electronics
- Food Waste

Additional items may be added to the recycling collection program as markets become available or as collection vendor contracts allow.

1. (c) Collection of Materials

Recycled materials shall be placed in the same recycling container as single-stream recycling materials. While Charles County DPW-ERD is responsible for providing all in classroom

collection containers, the contractor is responsible for all labor and equipment necessary to fulfill necessary recycling container removal services for Charles County Public Schools on a scheduled basis (non-emergency), throughout the County's school system. Distinctive colors and markings recycling containers shall be provided to avoid cross contamination with general waste (non-recyclable) materials. The work shall consist of collecting, transporting and disposing recyclable materials from schools, office and learning locations considered as property of the Charles County Public School System. All material that is set out in designated recycling areas for each of these facilities shall be collected. Eight cubic yard containers are to be used for recyclable materials.

1. (d) Marketing of Materials

The contractor shall submit annual reports and a route schedule on all recycling tonnage removed from the CCPS facilities to the CCPS special assistant for Environmental Safety and Risk Management. Recycling data is to include tonnage and market outlets.

2. Stakeholders

Stakeholders include the Charles County Public School System (CCPSS) including the, the Board of Education, Charles County DPW-ERD, and all the students and staff. This Plan will be amended in conjunction with the adoption of the County's 2011-2021 Comprehensive Ten Year Solid Waste Management Plan.

The CCPSS stakeholders are responsible for ensuring all publicly-funded schools are participating in the School Recycling Program. The Special Assistant for Environmental Safety and Risk Management will ensure the contractor is providing the recycling services to each facility including collection boxes and regularly scheduled pick-up service. The Board of Education will submit every three years to DPW-ERD any changes and updates to the School Recycling Program to be included in the Ten Year Solid Waste Management Plan.

3. Participating Schools

All Charles County Public Schools that receive county public funding must participate in the Charles County Public School Recycling Plan.

Elementary Schools

C. Paul Barnhart Elementary School	4800 Lancaster Circle, Waldorf, MD 20603
Berry Elementary School	10155 Berry Road, Waldorf, MD 20603 Dr. Gustavus
Brown Elementary School	421 University Drive, Waldorf, MD 20602
Dr. James Craik Elementary School	7725 Marshall Corner Road, Pomfret, MD 20675
William A. Diggs Elementary School	2615 Davis Road, Waldorf, MD 20603
Gale-Bailey Elementary School	4740 Pisgah-Marbury Road, Marbury, MD 20658
Dr. Thomas L. Higdon Elementary School	12872 Rock Point Road, Newburg, MD 20664
Indian Head Elementary School	4200 Indian Head Highway, Indian Head, MD 20640
Daniel of St. Thomas Jenifer Elementary School	2820 Jenifer School Lane, Waldorf, MD 20603
Malcolm Elementary School	14760 Poplar Hill Road, Waldorf, MD 20601
T.C. Martin Elementary School	6315 Olivers Shop Road, Bryantown, MD 20617
Mary H. Matula Elementary School	6025 Radio Station Road, La Plata, MD 20646
Mary B. Neal Elementary School	12105 St George's Drive Waldorf Md. 20602

Arthur Middleton Elementary School	1109 Copley Avenue, Waldorf, MD 20602
Walter J. Mitchell Elementary School	400 Willow Lane, La Plata, MD 20646
Mt. Hope/Nanjemoy Elementary School	9275 Ironsides Road, Nanjemoy, MD 20662
Dr. Samuel A. Mudd Elementary School	820 Stone Avenue, Waldorf, MD 20602
Mary Burgess Neal Elementary School	12105 St. Georges Drive, Waldorf, MD 20602
J.C. Parks Elementary School	3505 Livingston Road, Indian Head, MD 20640
J.P. Ryon Elementary School	12140 Vivian Adams Drive, Waldorf, MD 20601
Eva Turner Elementary School	1000 Bannister Circle, Waldorf, MD 20602
William B. Wade Elementary School	2300 Smallwood Drive West, Waldorf, MD 20603

Middle Schools

Theodore G. Davis Middle School	2495 Davis Road, Waldorf, MD 20603 Benjamin
John Hanson Middle School	12350 Vivian Adams Drive, Waldorf, MD 20601
Matthew Henson Middle School	3535 Livingston Road, Indian Head, MD 20640
Mattawoman Middle School	10145 Berry Road, Waldorf, MD 20603
Piccowaxen Middle School	12834 Rock Point Road, Newburg, MD 20664
General Smallwood Middle School	4990 Indian Head Highway, Indian Head, MD 20640
Milton M. Somers Middle School	300 Willow Lane, La Plata, MD 20646
Benjamin Stoddert Middle School	2040 St. Thomas Drive, Waldorf, MD 20602

High Schools

La Plata High School	6035 Radio Station Road, La Plata, MD 20646
Henry E. Lackey High School	3000 Chicamuxen Road, Indian Head, MD 20640
Maurice J. McDonough High School	7165 Marshall Corner Road, Pomfret, MD 20675
North Point High School	2500 Davis Road, Waldorf, MD 20603
Thomas Stone High School	3785 Leonardtown Road, Waldorf, MD 20601
Westlake High School	3300 Middletown Road, Waldorf, MD 20603

Alternative Schools

Lifelong Learning Center (Adult Ed. Programs)	12300 Vivian Adams Drive, Waldorf, MD 20601
F.B. Gwynn Educational Center	5998 Radio Station Road, La Plata, MD 20646
Nanjemoy Creek Environmental Education Center	Nanjemoy, MD 20662
Robert D. Stethem Educational Center	7775 Marshall Corner Road, Pomfret, MD 20675

Colleges

College of Southern Maryland, La Plata	8730 Mitchell Road, La Plata, MD, 20646

All new school facilities will be included in the School Recycling Program within three months of opening.

4. Schedule for the Development and the Program

The recycling program for CCPS was started in 1990 and continues to evolve with the recycling industry as new materials are added to the recycling stream. The current funding source for this program is the CCPS Operation Funds Operating Budget.

5. Program Monitoring

The school system shall conduct inspections, review service levels, investigate reported or unreported pick-up and disposal complaints, meet with CCPS and Contractor staff to educate or review practices, and review Contractor compliance with the school recycling contract. Any issues which arise from these visits that are deemed deficiencies on the part of the Contractor will be detailed in writing and reported to the contractor. The Special Assistant for Environmental Safety and Risk Management must notify the contractor in writing within 30 days of non-compliance with the school recycling contract. The Contractor must initiate actions to correct all deficiencies found within 7 days of receipt of notice.

The contractor shall be responsible to keep CCPS current on new regulations, laws, and mandates affecting recycling in the State of Maryland.

The Contractor, throughout the life of the contract, shall also be required to work with the school system to further develop, implement and expand the system's existing recycling program.

The Charles County Public School System Special Assistant for Environmental Safety and Risk Management will monitor the Public School Recycling Program to ensure participation.

College of Southern Maryland

The College of Southern Maryland is run by the President of the College on a daily basis. The main branch that is located in La Plata has an extensive recycling program. The recycling program is led by the Executive Director of Physical Plant. This facility is currently recognized as a PGCC Maryland Green Registry Member. This designation was established in November of 2009.

1. (a) Program

The College launched its recycling program in 2008. This program recycles all paper products (cardboard, newspaper, books, and periodicals/magazines), aluminums, glass and plastics. The recycling program has been implemented using the contracting company Allied Waste, account# 3-0411-0038596. The program collects all recyclables as single stream, and is collected in two (2) 8 cubic yard containers, twice a week. The two (2) 8 cubic yard containers

are provided to the school by the contracted collection company. As collections are single stream, there is no specific breakdown for amounts of materials recycled.

The College of Southern Maryland also collects and recycles on a voluntary basis small electronics communication devices (cell-phones, PDA's and pagers), maintained through the Student Government Association (SGA), and is collected through a separate entity.

1. (b) Materials that must be included in the Program

- Plastic bottles, jugs, and wide-mouth containers
- Metal Cans and Beverage Containers
- Glass bottles and jars
- Paper
- Cardboard

The following materials may also be recycled on a voluntary basis.

- Rigid Plastics which include plastic milk/soda crates, plastic buckets with metal handles, plastic laundry baskets, plastic lawn furniture, plastic totes, plastic drums, plastic coolers, plastic flower pots, plastic drinking cups/glasses, plastic 5- gallon water bottles, plastic pallets, plastic toys, and empty plastic garbage/recycling bins
- Bagged Plastic Film (for example: grocery bags contained within 1-bag, or stretch film and/or shrink/wrap contained within 1-bag
- Printer Cartridges
- Electronics
- Food Waste Program Monitoring

The private contractor oversees all recycling procedures for the college. The College of Southern Maryland's implementation of this plan is student and staff driven. Any issues which arise and are deemed deficiencies on the part of the Contractor will be detailed in writing and reported to the contractor. The Executive Director of Physical Plant must notify the contractor in writing within 30 days of non-compliance with the school recycling contract. The Contractor must initiate actions to correct all deficiencies found within 7 days of receipt of notice.

3.9.3 Electronics Recycling (E-cycling)

Currently the Pisgah, Breeze Farm, and Landfill Recycling Centers accept electronic equipment and items for recycling. These facilities accept items in a closed top roll-off box for customers to freely deposit unwanted goods. These items are then palletized and our Vendor collects the pallets. Items accepted for e-cycling include:

- Computers
- Televisions
- Printers & Copiers
- VCR & DVD players
- Fax Machines
- Scanners
- Microwave Ovens
- Electronic Toys
- Monitors
- Cellular Phones & PDA's
- Stereos
- CD Players
- Calculators
- Electronic Typewriters
- Consumer Electronics

An additional item that is accepted is "covered electronics", which the MDE classifies as "a computer or video display device with a screen that is greater than 4 inches measured diagonally". All collected electronics are collected from the recycling centers and loaded into vendor provided covered trailers.

Electronics are recycled for any precious metals within the material and are reused to produce new electronic equipment. Recycling helps in preservation of the environment, and helps conserve landfill space.

3.9.4 Office Building Recycling

In 2019, the Maryland General Assembly passed Senate Bill 370, *Environmental-Recycling – Office Buildings* requiring all office buildings that have 150,000 square feet or greater of office space provide separate collection of recyclable materials by October 1, 2021. The law became effective on October 1, 2019 amends *Sections 9-1703 and 9-1714 of the Environmental Article, Annotated Code of Maryland. Section 9-1703 (b) (15) of the Environment Article, Annotated Code of Maryland* requires Charles County to revise its recycling plan within the Solid Waste Management Plan by October 1, 2020. The Department approved language should be inserted in Chapter 3, "Plan of Action," of the Solid Waste Management Plan.

1. Office Building Recycling Program

Through the cooperation of Charles County Department of Public Works, Environmental Resources Division and owners or managers of office buildings ("office building officials"), and other stakeholders involved in the implementation of this law, the County has identified nine (9) office buildings that fall under the scope of the law. The Charles County Department of Public Works, Environmental Resources Division has relayed the requirements of the law, including the materials that must be recycled; at a minimum, recyclables must include paper and cardboard, metal, and plastic materials to the office building officials.

Office building officials shall complete and send to the Charles County Department of Public Works, Environmental Resources Division a Maryland Recycling Act (MRA) Survey Form, reporting to the County on an annual basis details on the required recycling activities.

2. Collection of Materials

Office building officials directly, or through contracting with a private sector company, are responsible for providing all containers, labor, and equipment necessary to fulfill recycling requirements throughout their buildings. Distinctive colors and/or markings of recycling containers should be provided to avoid cross contamination. The office building officials must ensure collection and transportation of recyclable materials from office building locations to markets, or other legal recycling destinations. Tenants will be responsible for placing recyclables in recycling containers prior to their removal on the scheduled pick up day.

Office building officials identified how the materials will be stored, collected, and transported to the recycling markets for the collected materials. Office building officials must report to the County on an annual basis details on the required recycling activities.

3. Marketing of Materials

Office building officials are responsible for the marketing or other legal recycling and waste disposition of their recyclables. The office building officials shall submit annual reports detailing the recycling and

waste tonnage removed from the office building and the markets for the materials or legal recycling destinations for the materials.

4. Materials Required to be Recycled

Office building officials shall recycle the following materials:

- Plastic material (bottles and containers)
- Metal (cans)
- Paper
- Cardboard

5. Responsible Parties

Entities that will be involved in implementing the law are:

A. Charles County Commissioners

- Responsible for adopting the MDE approved language of Office Building Recycling Program for the Solid Waste/Recycling Management Plan amendment.

B. Charles County Department of Public Works, Environmental Resources Division -

- Responsible for overseeing County Office of Recycling activities and assuring that all office buildings that fall under the requirements are included in the Office Building Recycling Program.
- Communicate the requirements of the law to the office building officials. Assist office building officials in developing a recycling program, if so requested. Monitor the progress and performance of the Office Building Recycling Program.
- Develop the requirements of an Office Building Recycling Program in conjunction with input from office building officials.
- Update the County's recycling plan to include the Office Building Recycling Program and amend the Comprehensive County Solid Waste Management Plan.
- Develop a recycling reporting survey to be used by office building officials in reporting recycling activities.

C. Charles County Department of Public Works, Environmental Resources Division & Department of Planning and Growth Management –

- Responsible for amending the Solid Waste Management Plan to include an Office Building Recycling Program.

D. Owner or Manager of the Office Building –

- Responsible for providing recycling to the tenants of each office building by October 1, 2021.
- Indicate level of self-performance to provide recycling collection from office building locations or secure and manage recycling contracts with a contractor.
- Perform record keeping and report to the County on an annual basis.

6. Participating Office Buildings (9) in Office Building Recycling Program

OWNER	ADDRESS	CITY	ZIP	CLASS	TOTAL SQFT
Berkshire Properties LLC.	200 Kent Ave	La Plata	20646	Commercial Office Building	226,125
Board of Education of Charles Co. MD	5980 Radio Station Road	La Plata	20646	Commercial Office Building	196,800
The Wills Group Inc.	102 Centennial St	La Plata	20646	Commercial Office Building	267,000
Smallwood Family Limited Partnership	2670 Crain Hwy	Waldorf	20601	Commercial Office Building	269,100
One White Plains Center LLC	10665 Stanhaven Pl	White Plains	20695	Commercial Office Building	179,256
Medstar Ambulatory Services Inc	10 Saint Patrick's Dr	Waldorf	20603	Commercial Office Building	210,000
Waldorf Plains Inc	4490 Regency Pl	White Plains	20695	Commercial Office Building	182,709
County Commissioners of Charles Co. MD	200 Baltimore St	La Plata	20646	Commercial Office Building Public Government Building	150,000
Old Line Professional Centre	12070 Old Line Center	Waldorf	20602	Commercial Condominium Office Building Medical	241,632

Source: *Maryland Department of Assessments and Taxation. Updated by PGM December 2019.*

Note: New office buildings that will fall under the requirements of the law will begin participating in the Office Building Recycling program within three months of being notified by the Charles County Department of Public Works, Environmental Resources Division.

7. Schedule for the Development and Implementation of the Program

The Office Building Recycling Program will be implemented according to the following schedule:

- April 30, 2021, Charles County will distribute MDE approved language of the Office Building Recycling Program to the office building officials for Office Building Recycling Program implementation.
- August 1, 2021, office building officials will educate the tenants about the Office Building Recycling Program and discuss the requirements of the law.
- September 1, 2021, office building official will provide training or assistance to the tenants and advise them of the date when the tenants can start collecting the materials.
- September 1, 2021, office building officials finalize and secure recycling services contracts with the private contractors.

- On or before October 1, 2021, tenants start collecting and recycling the materials at the participating office buildings.

8. Program Monitoring

The Charles County Department of Public Works, Environmental Resources Division shall monitor the progress and performance of the Office Building Recycling Program. However, the office building officials will conduct inspections, review service levels, investigate reported or unreported pick-up and disposal complaints, meet with tenants or recycling contractor staff to educate or review practices, and review contractor compliance with the recycling contract. Any issues which arise from these visits that are deemed deficiencies on the part of the tenants or recycling contractor will be detailed in writing and reported to the violator. The office building officials shall initiate actions to correct all deficiencies within 60 days of being notified.

The office building officials shall be responsible to keep the tenants current on new regulations, laws, and mandates affecting recycling in the office buildings.

9. Program Enforcement

The Charles County Department of Public Works, Environmental Resources Division will ensure that the recycling at offices will be implemented in accordance with *Section 9-1703 and 9-1714 of the Environment Article, Annotated Code of Maryland* and enforcement will be performed in accordance with the County Code.

Upon receiving a complaint or report of violation, the Charles County Department of Public Works, Environmental Resources Division shall institute an investigation, and if a violation exists, a notice shall be issued, in writing, to the responsible party requiring them to correct all deficiencies and perform any other tasks necessary to achieve compliance with the Environment Article.

Any person, firm or corporation who or which fails to correct, within thirty (30) days from notice from Charles County, all cited in said violation notice shall be subject to citation for a civil infraction, in accordance with *9-1711 of the Environment Article of the Annotated Code of Maryland*, punishable by a fine of not exceeding $50 for each day on which the violation occurs and each day said violation shall be permitted to exist shall constitute a separate offense.

If the citation is not timely paid, Charles County may enforce the fine by an action in a Maryland court of competent jurisdiction.

3.10 SOLID WASTE ACCEPTANCE FACILITIES

Information on existing solid waste acceptance facilities in Charles County is presented in Table 3-6. Locations of the facilities are illustrated in Figure 3-1.

3.10.1 Charles County Landfill #2- Active

The Charles County Sanitary Landfill is located on Billingsley Road, about 3/4 of a mile west of the intersection of Maryland Route 5 and Billingsley Road. MDE issued a Refuse Disposal Permit for the purpose of establishing the facility in 1994. Since then the permit has been renewed every five years.

The landfill consists of four cells with a total disposal capacity of approximately 4,339,9000 cubic yards.

- Cell I - 826,000 Cubic Yards
- Cell II – 651,100 Cubic Yards
- Cell IIIA – 679,200 Cubic Yards
- Cell IIIB – 871,600 Cubic Yards
- Cell IV – 988,700 Cubic Yards

The base liner consists of a two-foot bentonite-amended soil layer (permeability, k = 1x10-7 = 1x10-7 centimeters per second) overlain by a high density polyethylene (HDPE) geomembrane. A drainage layer, geotextile, and protective soil layer was placed over the liner. Leachate is collected by a perforated pipe network within the drainage layer; and collected leachate is trucked to a sanitary sewer.

Ancillary facilities at the site include a public refuse disposal area, a recycling area, scale house and platform scale, a guard house, and a maintenance building including administration facilities. New software programs that maintain billing and waste records have significantly improved record keeping methods. The landfill operates

7:30 a.m to 4:00 p.m., the convenience center operates from 7:00 a.m. to 7 p.m., six days a week.

The Charles County Landfill will have a useful life of approximately 25 to 30 years depending on the type of daily cover used (soil or synthetic) and the amount of rubble disposed. Section 4.7.2 provides a discussion of the operational procedures and calculation for determining the life expectancy of the landfill.

Table 3-6 Active Solid Waste Acceptance Facilities

Facility	Location	Size	Maryland Grid Coordinat	Waste Accepted	Type of Quantity	Owner	Permit Status	Service Life Remaining
Charles County Landfill	12305 Billingsley Road, Waldorf	70/114 Acres	269 N/823 E	Municipal Solid Waste Landfill	-	Charles County	2014-WMF-0076A	25 Years
Naval Surface Warfare Center Incinerator	Naval Surface Weapons Center	Classified	275 N/823 E	Classified Documents	One Ton per year	Federal Government	1997-Win-0529	Greater than 10 years
Charles County Landfill Recycling Center	12305 Billingsley Road, Waldorf	N/A	269 N/823 E	Bagged Trash and Recyclables		Charles County	Not Required	Not Applicable
Calvert Wood Recycling	6585 Ripley Road, La Plata	23 Acres	38,32,2.2164/-77,5,44.2342	Tier I: Yard Trimmings	10,000 tons per year	Calvert Wood Recycling, LLC	2016-GCF-0008	Not Applicable
Pisgah Recycling Center	6645 Mason Springs, Pisgah	N/A		Bagged Trash and Recyclables		Charles County	Not Required	Not Applicable
Gilbert Run Recycling Center	13140 Charles Street, Charlotte Hall	N/A		Bagged Trash and Recyclables		Charles County	Not Required	Not Applicable
Breeze Farm Recycling Center	15950 Cobb Island Road, Cobb Island	N/A		Bagged Trash and Recyclables		Charles County	Not Required	Not Applicable

3.10.2 Yard Waste Processing Facility - Inactive

The Charles County Yard Waste Processing Facility, which was located at the Charles County Sanitary Landfill in Waldorf, has ceased operation. Prior to being located at the Landfill, the site was located off Radio Station Road in La Plata. All yard waste delivered to County facilities is now ground for mulch at the Piney Church Road site (see next section).

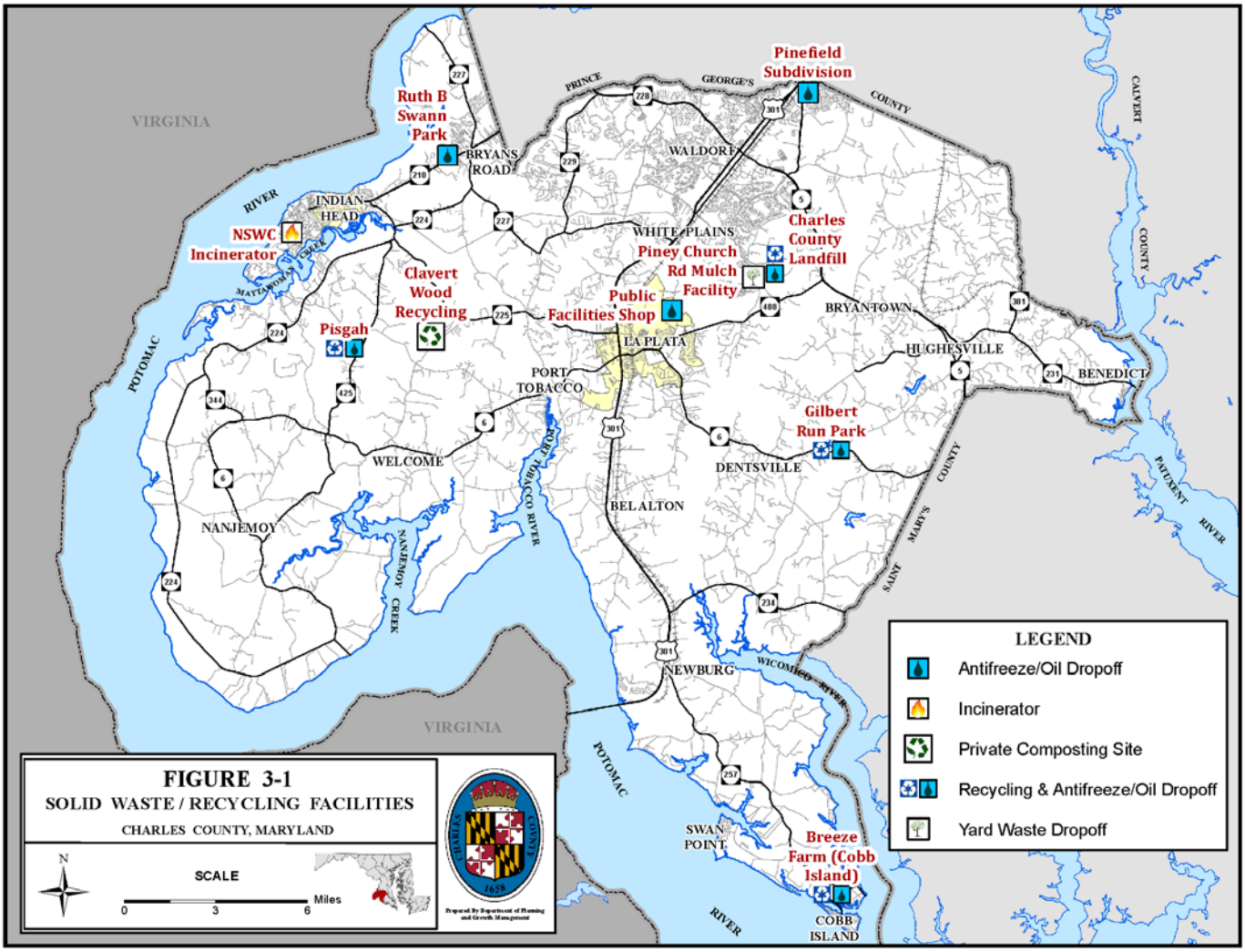
3.10.3 Composting Facility – Active

Calvert Wood Recycling is a 23-acre facility located at 6585 Ripley Road, La Plata. The facility is privately owned and operated. The facility is permitted by the Maryland Department of the Environment for Tier 1 composting operations and for natural wood waste operations. The Facility services residents and businesses within Charles County. The County's curbside yard waste is currently delivered to Calvert Wood for processing into compost.

3.10.4 Mulch Processing Facility - Active

As of August 2018, the County has a wood mulching site located at 5370 Piney Church Road. The facility processes clean wood into mulch. Residents can deliver wood waste or yard waste at no charge. Residents can also deliver yard waste to the other three recycling centers. Dump trailers and commercial vehicles can deliver wood waste or yard waste to the Piney Church Road. The mulch produced at the site is available to residents for self-loading at no charge.

Figure 3-1 Location of Solid Waste/Recycling Acceptance Facilities



3.10.5 Naval Surface Weapons Center Incinerator - Active

The incinerator at the Naval Surface Weapons Center processes about 1 ton of classified documents annually at the facility. Personnel at the facility indicate that the documents are increasingly being shredded into fine elements and then collected by a recycler. Metals collected from the facility which are potentially explosive (e.g., spent shells) are burned on-site prior to being sent to a recycler.

3.10.6 Recycling Centers - Active

A number of public recycling centers are located in Charles County which accept recyclable materials from county residents. These facilities have been identified and detailed in Table 3-5. Locations of these facilities are also shown in Figure 3-1.

3.10.7 Sludge Land Application Sites - Active

Approximately 3,220 acres of privately held land within Charles County is permitted for the land application of sludge. Currently, there are 5 reclaimed mine sites and 35 farms which are eligible to receive de-watered, treated sludge for land application.

3.10.8 Mattawoman WWTP - Active

The Mattawoman WWTP is owned and operated by Charles County. The facility is located near the intersection of Maryland Routes 224 and 225. All of the wastewater generated from the public water and sewerage system within the Charles County Development District flows to the Mattawoman plant for treatment. In addition to wastewater, the WWTP accepts approximately 25,000 wet tons of septage for treatment.

3.11 ILLEGAL DUMPING AND LITTER

The County has an aggressive litter control program to reduce to help prevent littering activities

- Anti-Litter Billboards
- Presentations at Area Schools
- Exhibits at Trade Fairs/County Fairs
- Distribution of Anti-Litter Promotional Items
- Anti-Litter “Theme” Contests with Schools
- Press Releases
- Space Ads in the Printed Media

- Signage on County Vehicles
- Memorandum to County Staff encouraging them to "Catch-A-Dumper"
- Adopt-A-Road Program
- Daily Inmate Litter Crews
- Volunteers in Community Service Litter Crews
- Watershed Cleanups
- Community Cleanups

3.12 REGIONAL RECYCLING ACTIVITIES

Charles County is a diversified community with unique solid waste and recycling resources as a result of its close proximity to Washington D.C. and Virginia. Waste Disposal facilities in D.C. and Virginia offering lower tipping fees result in many waste haulers exporting waste out of the County. The closest material recovery facility (MRF) is located in Prince George's County, only 20 miles from the County's border. The short haul distance to the MRF encourages many haulers to recycle opposed to landfilling collected recyclable materials. This MRF is currently accepting all materials collected by the County's curbside recycling program, recycling centers, and the Town of Indian Head and La Plata's curbside recycling programs.

The County is actively involved in supporting community cleanups and watershed cleanups in a regional effort to promote anti-littering and recycling initiatives. In partnership with the Alice Ferguson Foundation the County annually promotes the bi-state Potomac River Watershed Cleanup. This event is a regional effort to clean the waterways of the Potomac River Watershed. The County promotes the program through paid advertisements and press releases, which focus on educating the public on the environmental impacts of litter and the importance of recycling. The County's pay-as-you-throw (PAYT) program provides financial incentive for residents to recycle as a means to reduce the cost of trash disposal.

Charles County is a member of the Washington Council of Governments (COG). COG serves as a regional council for Maryland, Virginia, and Washington, D.C. and holds meetings to educate, review, and study the feasibility of numerous regional and/or national recycling, source reduction, and waste diversion activities. Charles County Environmental Resources Division supervisors maintain memberships to Solid Waste Association of North America (SWANA), attending trainings and maintaining certifications in Recycling Systems. Finally, Charles County Environmental Resources Division is included in MDE's regional recycling online resources for recycling information and listing of recycling vendors/businesses. The Environmental Resources Division also attends quarterly Solid Waste and Recycling manager meetings coordinated by MDE. These meetings keep County Solid Waste and Recycling managers informed of regulations and laws as well as provide an opportunity for program information sharing and networking with other regional and state solid waste and recycling managers.

3.12.1 MULTI-JURISDICTIONAL SOLUTIONS

The Regional Solid Waste Management Task Force of the Tri-County Council for Southern Maryland developed the following recommendations for long-term solid waste management within the tri-county region.

- Regional Waste-to-Energy Facility
- Regional Materials Recovery Facility (MRF)
- Regional Rubble Landfill
- Regional Collection of Household Hazardous Waste
- Regional Yard Waste Composting
- Regional Policy and Management Efforts (e.g., public education, procurement, market development, volume-based fees)
- Citizens Advisory Committees (regional and county)

4 CHAPTER 4

ASSESSMENT OF SOLID WASTE MANAGEMENT ALTERNATIVES

4.1 CHAPTER SUMMARY

Chapter 4 evaluates the ability of the existing solid waste management system to meet the stated goals and objectives in the Charles County Comprehensive Solid Waste Management Plan. Feasible alternative technologies, management techniques, and regulatory modifications that could be used to meet identified deficiencies are discussed. In addition, siting constraints for potential new management facilities are reviewed.

A summary of the alternatives is presented in a series of tables at the end of this chapter. This information will also be assessed in the Action Plan.

4.2 COLLECTION SYSTEM (MUNICIPAL WASTE AND RECYCLABLES)

Alternatives for the collection of residential and other non-rubble waste and recyclables include the free enterprise system, licensing, franchising, and public operation. Each of these collection alternatives is described below to provide a basis for evaluating the County's existing collection system.

4.2.1 Assessment of Collection System Alternatives

4.2.1.1 Free Enterprise System

The free enterprise system operates by private subscription for waste collection services. Individual homeowners, apartment complexes, commercial establishments, industries, or institutions contract directly with a private hauler to collect their solid wastes and recyclables. Individual clients are billed for services by the private hauler. The remaining residents who do not contract with a private company haul their own solid waste directly to the landfill and take their recyclables to drop-off centers. The advantages and disadvantages of the free enterprise system are described below.

A. Advantages:

The free enterprise system requires minimal involvement and financing by the local government (i.e., Charles County, Town of Indian Head, Town of La Plata). The individuals or commercial establishments are free to deal with the hauler of their choice. If service is unsatisfactory, there are no barriers to choosing another hauler. The cost for hauling and disposal of the waste is billed directly to the customer. Private enterprise is encouraged with the free enterprise system. Opportunities exist for any small entrepreneur who desires to go into business. Residential customers in the Town of La Plata and Indian Head must have their trash collected by the Town.

B. Disadvantages:

In a free enterprise system, overlapping routes are prevalent. Often, a neighborhood or block will be serviced by several private haulers. In terms of labor, equipment, operation, and maintenance, this system is potentially less cost effective than a system with assigned routes that do not overlap. However, it is difficult to determine the potential cost savings, or if current charges are excessive.

Due to the lack of public involvement with the free enterprise system, it is often difficult to implement modifications to collection practices that may be desirable to meet the goals and objectives of a local government's solid waste management plan, such as volume-based billing for collection services and mandatory collection of recyclables by solid waste haulers. Waste flow control is more difficult to attain under the free enterprise system. When collection is voluntary, vagrant dumping to avoid collection fees or trips to the landfill could also pose a problem.

4.2.1.2 Franchising

Under a franchise system, a local government contracts with one or more private waste haulers to provide collection services. For large jurisdictions, such as a county government, the local government's jurisdiction can be divided into collection districts with approximately equal residential population. Municipalities could comprise a separate collection district, or could form a district with adjacent unincorporated areas, at the discretion of elected municipal officials. One private hauler is awarded the collection contract for each district based on competitive bidding. Collection and disposal services would occur according to the rate established in the competitive bidding process.

The local government would be responsible for determining the number and geographic location of collection districts, and establishing uniform performance requirements and standards for the franchisee. Local government staff members would be required to conduct the franchise award process and administer the contracts. The following considerations must be addressed by the local government in order to implement a franchise system:

- Contract Duration
- Mandatory or Voluntary Collection
- Collection of Recyclables
- Provision of Containers for Refuse and Recyclables
- Frequency of Collection (refuse, recyclables, yard waste, white goods, and bulky items)
- Servicing of Multi-family Housing, Commercial, Institutional, and Industrial Establishments
- Collection Hours and Days
- Performance Standards (e.g., spillage, litter, noise, equipment)
- Personnel Training
- Designated Disposal or Processing Facility
- Annual Adjustments to Service Rates Based on a Certified Operating Cost Statement
- Billing and Bill Collection Procedures
- Performance Bond
- Insurance, Indemnification, and Record-keeping

A. Advantages:

The elimination of overlapping collection routes and the competitive bidding for those routes should result in the reduction of collection costs for homeowners and businesses. More efficient routing for collection vehicles results in less fuel consumption, traffic, and exhaust emissions. The franchise system gives a local government the opportunity for flow control, and facilitates the implementation of new management policies through incorporation of requirements in franchise contracts.

Although recyclable collection and volume-based billing can be implemented in the free enterprise system, the increased control afforded to a local government in a franchise system would facilitate implementation and monitoring of these measures.

Mandatory collection can significantly reduce the occurrence of vagrant dumping, roadside litter, and the introduction of waste generated outside the local jurisdiction into the local solid waste management system.

B. Disadvantages:

Franchising results in increased bureaucracy at the expense of the free market. Establishment of a franchise system would probably result in the elimination of several private haulers from collection activities within the local jurisdiction. The severity of this impact can be mitigated through the number of collection districts established, and by limiting the number of franchises that can be awarded to a single private hauler.

4.2.1.3 Licensing

A licensing system allows existing private haulers to continue to operate within a free enterprise system; however, haulers are required to meet standards imposed by the local government. The haulers would still be responsible for billing customers for collection and disposal services.

The local government would be responsible for establishing uniform performance standards for the haulers. Additionally, the local government would also establish procedures and policies for licensing haulers. The following considerations must be addressed by the local government in order to implement a licensing system:

- Length of License
- Mandatory or Voluntary Collection
- Collection of Recyclables
- Provision of Containers for Refuse and Recyclables
- Collection Frequency (refuse, recyclables, yard waste, white goods, and bulky items)
- Performance Standards (e.g., spillage, litter, noise, equipment)

A. Advantages:

This system allows individuals and commercial establishments to deal with the hauler of their choice. Therefore, small private haulers would be given an equal opportunity to compete with large haulers. In addition to customer choice, the licensing system gives the local government the opportunity for flow control, and facilitates the implementation of new management policies through the requirements of the license.

B. Disadvantages:

Overlapping routes would remain. The private haulers may oppose a licensing system that regulates collection and disposal practices. The local government would be required to establish and enforce standards and licensing procedures and policies.

4.2.1.4 Public Operation

Under this option, collection and hauling services would be provided by local government employees, using equipment owned or leased by the local government. Collection could be made either voluntary or mandatory throughout the local government's jurisdiction. Financing of the system could either be through the tax system, or by direct billing based on the actual cost of providing collection services.

A. Advantages:

This alternative provides the most control for the local government. This can be important for implementation of source reduction and recycling programs, as well as providing uniform quality

of service. Theoretically, economies of scale in the procurement of equipment and supplies could be realized by such a large operation. In addition, the public operation does not have to earn a profit or pay taxes, so such costs are not passed on to the consumer.

B. Disadvantages:

In spite of the potential advantages discussed above, studies by Columbia University have found that private collection typically costs 28 to 40 percent less than a comparable public operation. This is attributed to more efficient management and operation characteristic of private industry. A very large capital expenditure would be required by the County to procure the necessary equipment to take over all collection and hauling. A complicated fee structure would be required to reflect the actual costs of collecting and hauling refuse to solid waste disposal facilities. A uniform county-wide fee structure would not be equitable. This option increases government control to the detriment of private enterprise by forcing many local private haulers out of business.

4.2.2 Evaluation of the Existing Collection System

Three of the four collection systems described above are currently employed within Charles County. In the unincorporated areas of Charles County, most municipal waste is collected by private haulers through a free enterprise system. The remaining residents who do not contract with a private company haul their own waste directly to the landfill. Curbside collection of residential recyclables is accomplished by a franchising system to the more densely populated areas of the County. The incorporated Towns of Indian Head and La Plata operate their own collection systems (public operation). These two municipalities use their own employees and equipment to provide curbside collection of municipal waste for their residents. The Towns of La Plata and Indian Head uses a private company to do their residential curbside collection for recyclables.

The existing free enterprise waste collection system requires minimal involvement and financing by the County. However, due to the unregulated nature of the system and the number of haulers, it will be more difficult to implement modifications to the collection practices that are necessary to meet the goals and objectives of the Charles County Comprehensive Solid Waste Management Plan. Volume-based billing for collection services or waste flow control measures is an example. A competitive environment fostered by the free enterprise system should produce the lowest cost for consumers. However, the inefficiencies of overlapping routes may raise operating costs incurred by the haulers which are likely to be passed on to the consumers. Additionally, the use of two separate systems for the collection of municipal waste and recyclables produces extra paper work and confusion for consumers as well as county staff. Based on available information, it appears that the waste collection system in the unincorporated areas could be improved to meet the following objectives:

- Ensure that the County has sufficient control of the collection system so that provisions

of the *Charles County Comprehensive Solid Waste Management Plan* can be implemented.

- Ensure that modifications to collection practices will be made in a timely and efficient manner.
- Provide a cost-effective and efficient collection system for the residents of Charles County.
- Reduce the redundancy in the municipal waste and recyclables collection systems.

The franchising system for recyclables collection enables the County to ensure the quality of service by establishing performance standards, and to maintain control over the types and quantities of recyclables collected. Although residents of Charles County have expressed concern for expanding curbside recyclable collection countywide, it does not seem feasible at this time to offer collection to the more rural areas of the County. Besides expanding curbside collection services, the County should continuously monitor and evaluate the effectiveness and efficiency of the franchising system compared with licensing, free enterprise, or public operation.

Large commercial, industrial, and institutional establishments currently contract directly with private haulers for collection. These establishments often have unique requirements related to collection frequency, containers, and collection hours, which are best addressed by individual contracts; therefore, the existing arrangements for these facilities should be maintained. Alternatively, commercial establishments should have the option of being included in the residential waste or recyclable collection system, if satisfactory service can be provided.

4.3 RECYCLING

Although recycling is not new to the management of solid waste, it is gaining wider acceptance as a viable approach to the solid waste management and disposal problems. State mandated recycling goals and increased public awareness is resulting in an increased amount of material being recovered for recycling. Along with this increase, problems associated with expanding the recycling programs and increased recycling costs are emerging. Although costs associated with recycling are increasing, recycling is considered to be a worthwhile solid waste management tool even at a net loss in order to conserve landfill space.

Recycling issues facing communities today include mandatory versus voluntary programs, flow control, accounting and reporting procedures, compatibility of recycling with other waste management practices and market development. Possible components of a municipal recycling program include curbside collection, drop-off centers, buy-back centers, and processing facilities to recover recyclables from the municipal or rubble waste streams. Each of these components are described in the following sections to provide a basis for evaluating the existing recycling program.

4.3.1 Technology Assessment

4.3.1.1 Curbside Collection

In curbside programs, residents place their recyclables at the curb for collection and subsequent delivery to processing facilities.

A. Operations:

There are several variations of curbside recycling, the three major systems are described below.

1. Resident Sort - Residents segregate target materials by type into separate containers. Typically, three containers are provided to each resident for collection of newspaper, metal cans, glass and plastic.

2. Curbside Sort - In these programs, target materials are placed into a single container, separate from other residential wastes. Collection crews sort the materials at curbside as they place recyclables in the collection vehicle.

3. Single Stream - Target materials are placed in a single container, separate from the other residential wastes. The materials are not sorted by collection crews, but placed into the collection vehicle in a mixed state.

When evaluating curbside collection program variations, it should be recognized that differing approaches may affect the level of participation achieved, material processing requirements, the investment required to fund the program, and operational costs. Some programs are structured to pick up refuse and recyclables at the same time; others collect recyclables separately from refuse. Curbside programs typically target newspaper, glass, plastics, and aluminum, but other materials may be included.

Material processing requirements for the curbside programs are dependent upon the collection option selected, and the specific market requirements. Typically, an intermediate processing facility is used to prepare each material for market specifications and to package the material for shipment to the markets. These services may be contracted to private industry or the facility may be operated by the local government.

B. Equipment:

Municipal refuse collection crews and private haulers both have been used to service curbside routes. As a result of single stream recycling haulers can utilize traditional solid waste collection vehicles to collect recyclables. Some programs require dual stream collection, which would

require compartmentalized collection vehicles. The type of vehicle is dependent on availability, the collection route, and the method of collection.

Containers are typically provided to each household for curbside programs. The number and size of container depends on the collection system selected. The containers are typically imprinted with a county, municipal, or recycling logo. Container selection should consider convenience and ease of use from the perspective of the residents and haulers.

C. Costs:

Curbside collection of recyclables could be accomplished by franchising, licensing, or public operation (Section 4.2.1). In general, the public operation of a curbside collection program would be a greater cost to the local government than a franchised program or licensing.

Equipment associated with curbside collection programs include collection vehicles, collection containers, and processing equipment. Operating costs are highly variable and include labor, fuel, supplies, and maintenance. Collection equipment costs can range from $30,000 for a flatbed trailer to $240,000 for a self-loading truck. Labor costs can range from $20 to $135 per ton of material collected.

D. Advantages:

Most curbside programs are now collecting materials through single stream collection. This is the result of new technologies at the Material Recovery Facilities. The greatest advantage is increased productivity during collection and the least burden to residents. Curbside programs provide a convenient way for homeowners to recycle and single stream increases this convenience.

E. Disadvantages:

Curbside collection programs experience high start-up and operating costs. The success of the curbside collection program is dependent on an ongoing public education program. Curbside collection would not be a cost-effective or efficient method for collecting recyclables in remote, rural areas.

4.3.1.2 Drop-Off Centers

Drop-off center recycling is accomplished through the establishment of stations where recyclable materials can be brought by the public. These centers are generally publicly owned and operated. As with curbside programs, no payment is made for the recyclable materials. Drop-off centers can range from small, mobile operations to permanent processing facilities which accept, process, and store recyclables until they are shipped to market.

A. Operations:

Small drop-off centers can use a number of containers for collection of recyclables. Containers successfully used for drop offs include roll-off drums, 55-gallon drums, and igloo bins which are bell-shaped containers. Material processing requirements are dependent upon the type of drop-off center operation, and are similar to the requirements of the curbside programs. Materials from unmanned centers would typically require a higher level of intermediate processing.

B. Equipment:

Drop-off centers require containers for depositing the recyclables. Collection vehicle requirements are dependent on the type of container. Staffed drop-off centers require office or warehouse facilities and storage containers.

C. Costs:

Costs associated with drop-off centers include the collection containers, transportation of the materials to a central facility, site maintenance, administrative costs of record-keeping, and labor for stations which are staffed. These costs are highly variable depending on the level of sophistication. The estimated cost for the Charles County drop-off centers is in the range of $10 - $75 per ton of material processed. To determine the true cost of recycling operations, a comprehensive analysis would be required, especially when the drop off centers are funded by two enterprise funds.

D. Advantages:

Capital and operating costs are lower for drop-off center recycling than curbside programs. Unmanned locations can be located close to population centers and can operate 24 hours per day.

E. Disadvantages

Drop-off centers are less convenient than curbside collection programs. Vandalism and theft may present problems at unmanned drop-off centers. Often, drop-off centers can become unkempt and littered with trash; community or municipal workers must be committed to keep the site clean. Material recovery levels are typically lower than curbside programs. Contamination of recyclable materials is higher than for curbside collection programs.

4.3.1.3 Buy-Back Center

Private buy-back centers operate similarly to drop-off centers; however, individuals are paid for their materials based on current market prices.

A. Operations:

Buy-back centers can be permanent or mobile facilities. Permanent buy-back centers function as an intermediate collection point/processing center taking materials in and distributing them directly to the end processors.

B. Equipment:

At a minimum, a buy-back center requires scales and containers for weighing and storing the recyclables. Other equipment requirements are dependent on the approach or the combination of approaches used.

C. Costs:

Local governments incur no costs associated with the use of buy-back centers since they are privately owned.

D. Advantages:

Paying the public for recyclables provides an incentive to some who would otherwise not recycle.

E. Disadvantages:

Low material recovery rates are typical of these facilities. Market prices may significantly affect participation.

4.3.1.4 Mixed Waste Processing Facility (MWPF)

A mixed waste processing facility or "dirty MRF" recovers recyclables from the mixed municipal waste stream.

A. Operations and Equipment:

For a typical MWPF, mixed municipal solid waste is dumped onto the tipping floor and pushed onto a below-ground conveyor by a front-end loader. Usually, this waste must go through a bag-breaking operation, especially if the MWPF is receiving large quantities of residential waste. Bag-breaking is most often performed manually, although some specialized bag-breaking devices are now available.

Screening drums or other special equipment such as air classification units are used to separate the mixed waste stream, generally into two components:

1. An "undersize" stream, which consists mostly of fine particles fewer than one or two inches in length. This stream contains fine aggregate materials (e.g., glass, stones, etc.) and compostables, such as soil and food particles.

2. An "oversize" stream, which contains recyclable food and beverage containers, paper, film, plastic, and other large objects.

One of the primary objectives of this process is to separate the compostable components of the waste stream from the larger particles of paper and plastic that are more useful as fuel. Size classification can also help improve hand-sorting efficiency. Since the finer material has already been removed, sorters picking materials from the oversize fraction do not have to dig through as much material to reach and pick out the recyclables.

The first recyclable item that is typically removed is ferrous metal. The overhead electromagnetic separator is the device used almost universally in the industry. These separators, which are manufactured by a number of companies, consist of an electromagnet surrounded by a moving conveyor belt. The electromagnet attracts ferrous metals which "adhere" to the magnetic separator belt. The separator belt then dumps the metal onto another conveyor which transports it to crushing equipment or directly loads it into trucks for shipment to market. Since magnetic separators are not 100 percent efficient, some facilities station hand-sorters before or after the magnet to increase the amount of ferrous captured.

After the magnetic separation process, the remaining waste often proceeds onto hand-sorting conveyors. These are slow-moving conveyors, located 10 to 15 feet above floor level. The sorters stand on elevated platforms that are adjacent to the conveyors and pick recyclable materials, which they then drop into chutes. The chutes convey the material to one of the following:

- Concrete storage bunkers, located underneath the sorting conveyors.

- Processing equipment (e.g., glass crushers, aluminum can flatteners, or plastics granulators).

- Other conveyors, which transport the recyclables to processing equipment or storage areas.

Very often, MWPFs will receive loads of waste that are dry and contain primarily paper materials from commercial generators. The number of loads containing primarily dry material would be affected by the existence of programs that source-separate cardboard and paper. These dry paper loads can be baled and shipped to market after a minimal amount of sorting to remove contaminants. Such sorting can be done on the tipping floor (in the manner of the "dump and pick" MWPF). In other words, these loads do not have to be processed through the entire sorting system.

Once they are baled, crushed, or otherwise processed, recyclables are either stored within the building or loaded directly into waiting trucks for shipment to markets.

The MWPF may further process non-recovered waste. Non-recovered waste which comes off the sorting conveyor may be shredded to make it easier to burn or compost. The loose, fluff-like material that emerges from the shredder is directed to an on-site fuel pelletization or composting process or loaded into transfer trailers for shipment to off-site fuel production or composting facilities.

B. Costs:

Capital costs for a MWPF are highly variable dependent on the level of mechanization and sophistication of the facility, as well as land acquisition and site development. A typical capital cost range is $20,000 to $30,000 per ton of daily capacity, exclusive of land acquisition. For Charles County, capital cost for a 300 ton per day MWPF are estimated to range from $6 million to $9 million. Operation and maintenance costs are estimated to range from $40 to $60 per ton of municipal waste processed, exclusive of revenues gained from marketing recycled materials.

C. Advantages:

The primary advantage of a MWPF is the convenience to residents and business; therefore, there is no need to segregate wastes at the source. This typically results in higher recovery rates for recyclables.

D. Disadvantages:

Capital and operations costs are significantly higher than for a Material Recovery Facility (MRF) (Section 4.3.1.5). Contamination of materials is a problem, resulting in lower quality recyclables that are more difficult to market. The potential exists for environmental impacts from odors, aesthetics, and contaminated runoff from the facility.

4.3.1.5 Material Recovery Facility (MRF)

A material recovery facility or "clean MRF" processes recyclables that have been source- separated from the waste stream.

A. Operations and Equipment:

Material recovery facilities receive and process recyclables that have been source-separated from the waste stream. They vary in level of sophistication from "recyclable transfer stations" to highly mechanized processing plants for commingled recyclables. Equipment requirements are based upon the level of separation of the incoming recyclables and the type and quality of recycled materials required. Most MRFs will include concrete storage bunkers, compaction and

baling equipment. Sophisticated MRFs can include conveyer lines, screening and picking stations, electromagnetic separators, and air classifiers as previously described for the MWPF.

B. Costs:

As with the MWPF, capital and operations costs vary over a wide range, dependent on the level of technology employed by the facility. A typical capital cost range is $40,000 to $70,000 per ton of daily capacity. For Charles County, capital costs for a 20-ton-per-day MRF are estimated to range from $1.6 million to $2.8 million, exclusive of land acquisition. Operations and maintenance costs can range from $20 to $60 per ton, exclusive of revenues gained from marketing recycled materials.

C. Advantages:

MRF's generally produce a higher quality of recyclable materials than a MWPF; therefore, capital and operations costs are significantly lower. There is better control over the types and sources of waste that is accepted. In addition, environmental impacts, including odors, are less of a concern than with a MWPF.

D. Disadvantages:

In order to utilize the MRF concept, residents and businesses must separate recyclables from their waste stream prior to collection. This typically results in a lower participation and recovery rate than for the MWPF.

4.3.1.6 Rubble Material Recovery Facility (RMRF)

A large portion of land-clearing, construction, and demolition debris is recyclable. A few examples of recyclable rubble materials include wood, paper, concrete, asphalt, gypsum wallboard, and glass. These wastes are most often mixed when received from project sites, creating an obstacle for recycling. Some separation of wastes can be accomplished at the job site by encouraging contractors to segregate major recyclable components in separate disposal containers. However, segregation of wastes at demolition sites is an expensive, labor-intensive process. Alternatively, a central rubble MRF can be established to separate and process the recyclable components of the rubble waste stream.

A. Operations and Equipment:

Rubble is not as amenable to the highly mechanized separation technology used in some municipal waste MRFs. Since rubble waste is generally large, bulky, and heavy, sorting equipment is limited to front-end loaders, dozers, and human labor. Processing equipment can include grinders, balers, crushers, shredders, and chippers depending on the level of processing at the facility.

Wood waste makes up a significant portion of the rubble, including pallets, stumps, and brush from land-clearing operations. Large tub grinders and wood chippers are often used to reduce these wastes to wood chips for marketing. Chips can be marketed as fuel, mulch, and animal bedding. Depending on the market, painted or treated wood products may be excluded from the chipping operation. In addition, magnetic separation of metal wastes (e.g., nails from pallets) is often used.

Paper waste is primarily corrugated materials which can be easily baled and readily marketed after separation from the rubble waste stream. Contaminated and plastic coated cardboard must be excluded. Recycled paper products are made with the recovered paper waste.

Asphalt roofing waste has a high resale value due to the high percentage of petroleum; however, recycling has not been widespread due to problems associated with the removal of contaminants (e.g., paper backing, stone, gutter scraps, and nails). Sorted shingles and aggregate are mixed, reduced in volume, and passed over magnets to remove metals. The recovered asphalt can be used to manufacture paving products.

Metal waste is separated into the various types (e.g., ferrous, aluminum, copper) and marketed to scrap metal dealers. The scrap metal is used to manufacture new metal products.

The volume of concrete in rubble is highly variable. Waste concrete can be crushed and then passed over magnets to remove rebar and wire which is marketed to scrap metal dealers.

Crushed concrete can be used as aggregate for septic fields, driveways, pipe bedding material, and landfill cover.

Plastic materials are shredded or crushed, depending on the market, and used to manufacture new plastic products.

Earth materials such as soil and yard waste can be used as landfill cover or sent to a yard waste composting facility.

Other products recovered from the rubble waste include the following:

- Bricks - Crushed and used as aggregate or ornamental stone.
- Carpet - Landfill cover.
- Glass - Ground and used to manufacture fiberglass insulation, for sand blasting, or asphalt aggregate.
- Gypsum Wallboard - Crushed and used as agricultural gypsum, wallboard, or cat litter.
- Porcelain - Crushed and used as concrete aggregate.
- Tires - Shredded and used in roadways, to manufacture rubber products (e.g., bumpers, mudflaps, car mats, shoes, gloves).

A. Costs:

Typical capital costs for a rubble MRF ranges from $5,000 to $30,000 per ton of daily capacity, exclusive of land acquisition. For Charles County, the capital cost for a 250 ton per day rubble MRF is estimated to range from $1.2 to $7.5 million. Operation and maintenance costs are estimated to range from $20 to $60 per ton of rubble processed, exclusive of revenues gained from marketing processed materials.

B. Advantages:

Rubble recycling reduces the amount of land required for landfills, and extends the life of existing facilities. Rubble recycling provides a beneficial use for materials which would otherwise be considered waste.

C. Disadvantages:

Depending on available markets, costs for this technology will typically exceed costs for land filling. Depending upon location and adjacent land use there may be adverse impacts from truck traffic and noise.

4.3.1.7 Commercial Recycling

Recycling is provided in the commercial sector primarily through private industry contractors who collect and market recyclables for large- and small-scale businesses. Many smaller businesses collect material and take it to publicly operated recycling centers to minimize costs. Larger businesses and shopping centers often ship recyclables directly to markets.

4.3.2 Evaluation of the Existing Recycling Program

Since 2004, Charles County achieved a waste diversion rate of 35 percent or higher (including yard waste - Section 4.4). Reports show that the recycling program has emerged from one that was primarily dependent on the commercial sector of the community to one which has increased recycling opportunities for the residential sector. The Charles County recycling program consists of five areas:

1. Collection - A combination of curbside collection and citizen drop-off locations collect newspaper, telephone books, office paper, cardboard, textiles, glass, metals, plastics, electronics, batteries, white goods, used oil and antifreeze, yard waste, and tires. The implementation of “single stream” recycling at the curb and centers increased convenience by eliminating the need to presort, making it easier for residents to recycle. There is one buy-back center located in Charles County (Waldorf Metals). Recent

favorable metal prices have resulted in more residents opting for buy-back programs opposed to the County's collection centers. Expansion of the recycling program continues with over 38,370 households receiving service.

2. Processing - The County operates a mulch facility. The County uses the composted material on the public grounds and athletic fields and offers free mulch, made from recycled yard waste collected within the County, to the public.

3. Public Education - Charles County conducts extensive public education program aimed at community leaders, business organizations, tourist promotion groups, large commercial generators, schools, residents, to promote participation in the recycling effort.

4. Administrative - Administrative programs have been expanded to include a recycling superintendent. Training programs for landfill and drop-off center staff as well as administrative and supervisory personnel are regularly conducted. Training programs focus on general education about recycling and the County's recycling program.

5. Market - The County continues to monitor the market for recyclables to ensure the best price. Factors including transportation, traffic, processors acceptance standards, and the amount of material available are all evaluated in deciding the best possible market.

The existing recycling program has shown significant results, increasing the percentage of the waste stream recycled from 15 percent in 1992, 29 percent in 1999, and 50 percent in 2009. In 1999, approximately 36,266 tons of recyclables were recovered in Charles County and approximately 44 percent of this total was obtained from the residential sector (recyclables and yard waste) and 56 percent from the commercial sector. In 2009, 51,537 tons was recycled in Charles County, with 35 percent from the residential sector and 65 percent from the commercial sector.

Rubble waste is not considered an "eligible waste" under the Maryland Recycling Act, and as such, recycling rubble would not count toward the County's recycling rate. However, Charles County will evaluate the options for a rubble processing facility to process the rubble and reduce the amount and/or volume of rubble landfilled.

The Tri-County Council for Southern Maryland Regional Task Force prepared a Report and Recommendations in October 1993. This report discusses regional solid waste management solutions for Calvert, Charles, and St. Mary's Counties. The following regional opportunities were recommended as long-term solutions:

- Cooperative Marketing of Recyclables

- Regional MRF
- Cooperative Public Education Programs
- Cooperative Procurement Policies

Charles County will continue with an aggressive recycling program to recycle as much of the eligible waste generated in the County as possible.

4.4 YARD WASTE COMPOSTING

Yard waste composting is becoming an increasingly popular waste management option as communities look for ways to divert this portion of the waste stream from landfills. Composting is a simple, low-cost operation which can handle large portions of the waste stream and significantly benefit other waste management operations environmentally and economically.

The availability of and access to outlets which will use or purchase compost is fundamental in determining composting program success. Typically markets include farms, nurseries, municipal operations (parks and landfills). Although compost can generate revenue, the revenue is not likely to exceed the cost of collecting, processing, and distributing the compost. However, reduced disposal costs and environmental benefits of are attractive features of yard waste composting.

4.4.1 Technology Assessment

Yard waste compost is a material which has undergone a biological decomposition of organic matter and is stabilized to the stage of being beneficial to plant growth. Composted yard waste products can be generated for use as a mulch, soil amendment, topsoil, or potting soil. A proper

balance of environmental conditions is required to ensure successful composting. The following four factors are critical to the composting process:

- Moisture - Too much or too little may slow down the composting process.
- Oxygen - Required for the bacteria to decompose the organic material.
- Nutrients (nitrogen-to-carbon ratio) - A balance of thirty parts carbon to one part nitrogen promotes efficient composting (e.g., grass clippings have a higher nitrogen- to-carbon ratio than do leaves).
- Temperature - Self generated heat from the bio-decomposition of the waste material naturally rises as the action of the microorganisms increase. This increase has the positive effect of enhancing decomposition and destroying weed seeds that may be present in the material being composted.

Types of yard waste includes leaves, wood, and green waste such as grass clippings, sod, hay, straw, weeds, brush, and hedge clippings. Leaves and wood generally decompose slower than green waste. Wood waste is the slowest to compost because of its density and its high carbon content and low nitrogen content. Green waste is an excellent source of nitrogen and moisture for the composting process. When mixed with leaves and woody material which lack these ingredients, the overall process is enhanced.

The types of compost from yard waste includes mulch, soil amendments, and soil mediums. Mulch is partially decomposed wood waste which can be used as a barrier to retain moisture and insulation to protect plants. Types of mulch includes bark, wood chips and shredded wood. Bark is generally ground or broken up into small pieces rather than chunks; wood chips are generally derived from wood/brush chipping equipment; shredded mulch is produced by running woody material through a tub grinder and is then composted to stabilize the material.

Soil amendments consist of compost that is mixed with soil to improve the physical and nutrient characteristics of the soil. Examples of soil amendments include humus and screened compost. Humus is a dark, rich, well-decomposed organic material; screened compost is the peat-like, fine portion of composting material that has been screened from large, woody particles.

Soil mediums are typically a mixture of soil amendments such as compost, sand, and vermiculite to produce planting mixtures and potting soils.

4.4.1.1 Operations and Equipment

Yard waste composting technologies range from small scale backyard systems to larger scale systems for processing waste within a regional area.

A. Backyard Composting

The type of backyard system is only limited by the imagination of the homeowner. Systems include the following:

- Backyard windrows - elongated piles constructed by layering.
- Cylindrical pens - using woven wire to form a cylindrical pen and layering materials within the pen.
- Perforated steel drums partially filled with compostable material. The drum is rolled to provide for aeration of the compost.

The Charles County Department of Public Works holds subsidized compost bin sales every year and encourages residents to grasscycle lawn clippings.

B. Low-Level Technology for Large Scale Operations

Process involves forming large windrows (12 feet high by 24 feet wide) that are turned once a year with front-end loaders. Compost is ready for use in approximately 1 to 2 years. This technology requires little attention and is relatively inexpensive. The space required for this technology is also minimal in comparison to the other technologies. However, odor is a common characteristic due to the infrequent turning.

C. Mid-level Technology for Large Scale Operations

Process involves medium size piles (6 to 7 feet high by 15 to 18 feet wide). The composting process is completed in approximately 16 to 18 months. Piles are turned more frequently, hence the odor problem occurs less frequently.

D. High-Level Technology for Large Scale Operations

A multi-step control approach involving grinding, shredding, and frequent windrow-turning. Additional process control is provided through moisture addition and temperature monitoring.

Compost is ready for use in 3 to 6 months. Capital and initial operating costs are higher due to the additional shredding, grinding, mixing, and screening equipment.

4.4.1.2 Costs:

The planning of yard waste composting programs must take into consideration four cost components:

- Capital cost of processing facilities and possibly transfer stations.
- Annual site operation and maintenance costs.
- Annual yard waste collection costs.
- Annual product marketing costs.

The capital cost of the compost processing facilities will vary widely depending on the sophistication of the process used, the amount of waste received, and the type of waste received. A careful evaluation of options versus cost implications is required when planning and financing such facilities.

Site operational costs are more predictable and these typically range from $2 to $5 per cubic yard of material produced, exclusive of collection and marketing costs. Generally, the greatest cost associated with yard waste management arises from waste collection. Curbside pick-up can represent as much as 75 to 80 percent of total project costs. Typical collection costs can range from $8 to $20 per cubic yard of waste.

Marketing costs will vary and will be a function of the demand for the material, influence of competing products, quality of the material produced, and the desired revenue. Marketing costs are minimal when compost products are used by government agencies or when "giveaway" programs with citizens consume all of the product. If revenue is derived from product sales, increasing levels of marketing are required. A good rule of thumb is that wholesale "bulk" marketing results in the high-volume sales and low revenue; whereas, wholesale "bagged" marketing results in low volume but high revenue.

4.4.1.3 Advantages:

Composting is a low-cost operation and saves valuable landfill space. Composting has minimal operation and maintenance requirements. The final product is useable and is potentially marketable.

4.4.1.4 Disadvantages:

Composting has the potential for odor problems. Markets for compost may vary and excess compost may require a separate storage area.

4.4.2 Evaluation of Existing Yard Waste Composting Program

Yard waste is estimated to comprise approximately 14 percent of the residential waste stream and 5 percent of the eligible commercial/industrial and institutional waste stream. In total, yard waste represents approximately 9 percent of the municipal waste stream in Charles County. Charles County has ceased composting of yard waste at this time. Yard waste generation has increased steadily in recent years and the projected yard waste generation for FY19 is 11,500 tons (FY2019 Budget Book). The solid waste management objective is to recycle all yard waste, in order to keep it out of the Landfill. This means that as much material must be mulched as possible.

A waste composition study is needed to provide information for detailed planning of collection and processing systems that will be necessary to reinstitute composting of yard waste in Charles County. When a characterization study is completed, a more definite assessment of the feasibility of an organic composting system can be made.

Once an organic composting system is in place, increasing participation from the commercial sector and expanding the collection system throughout the County can help raise the yard waste composting rate.

The mulching operations will have to vacate the Piney Church Road location. The site will be used by the County for other purposes. The DPW is evaluating where to locate the operations, or whether to divert the material to one of the four licensed natural wood waste processing facilities in the County, shown in **Table 4-1**, or to one of the composting facilities operated by the Maryland Environmental Service.

Table 4-1 Licensed Wood Processing Facilities in Charles County, MD

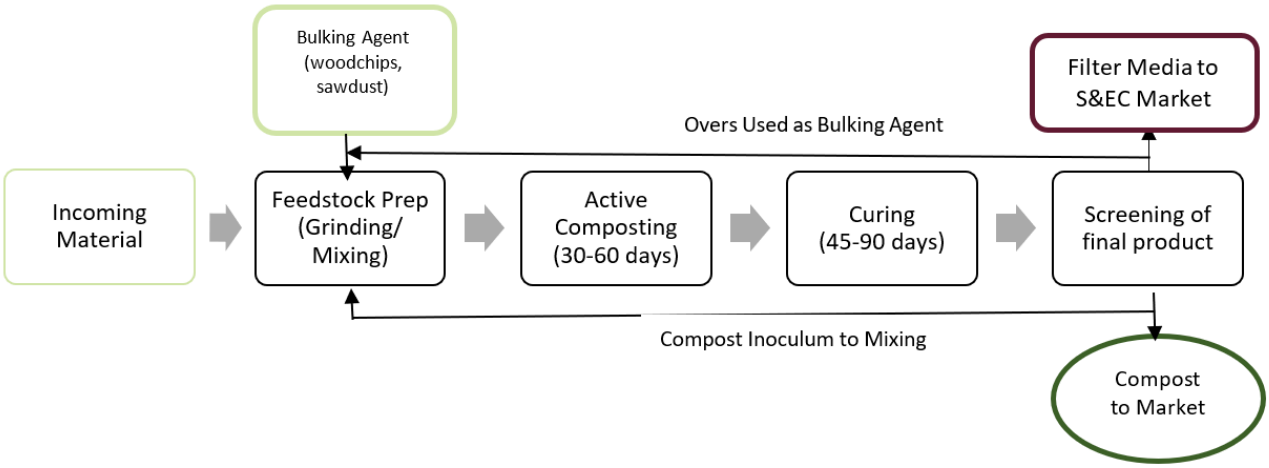
AI No.	Facility Name	Permit No.	Permit Expiration	Site Acreage	Site Location
36735	Calvert Wood Recycling, LLC	2016-NWW-GP01	04/03/2021	8.50	6585 Ripley Rd, La Plata, MD 20646
66095	Beuchert Excavating, Inc.	2014-NWW-GP01	03/24/2019	12.50	12340 Crain Hwy, Newburg, MD 20664
22039	Mona Recycling	2014-NWW-0002	11/19/2019	7.60	6970 Our Place, Port Tobacco, MD 20677
159237	Chesapeake Environmental Materials, LLC	2017-NWW-GP01	11/15/2022	11.70	12110 Forgotten Farm Place, St. Charles, MD 20602

4.5 MIXED ORGANICS COMPOSTING (INCLUDING FOOD)

The County would like to include the aspirational goal of developing public-private partnerships for food composting and expanding composting operations. Composting is a natural process whereby microorganisms break down organic matter in aerobic conditions. The composting process starts with grinding the incoming material and mixing it with bulking agent and composting inoculum. This material goes through three stages of processing: active composting, curing, and screening, as outlined in Figure 4-1 Composting Process Flow Diagram. The full cycle lasts up to 150 days.

Five factors that influence the composting process are moisture, oxygen, temperature, carbon to nitrogen balance, and particle size. The type of waste used for composting determines the carbon to nitrogen balance and particle size. Large composting facilities must screen waste received to ensure nonorganic material (contamination usually found in food waste deliveries) is not present. Prepared waste material then goes through the composting process where moisture, oxygen, and temperature are controlled to create a product. Yard waste such as green waste, plant material, and woody waste traditionally have been the most common feed materials for composting. The addition of food waste as a feed material has become more prevalent recently and more facilities have started to accept and incorporate it into the composting process. Biosolids have also been used as a feed source for composting.

Figure 4-1 Composting Process Flow Diagram



(Source: State of Composting in the U.S.- Institute for Local Self-Reliance, July 2014)

4.5.1 Traditional Windrow

Traditional windrow composting uses piles that are placed in long rows, the size of which is determined by turning capabilities. Piles must be turned manually through the use of shovels for small facilities, end loaders, top turners, or pull behinds. End loaders are not as efficient at mixing evenly and require a smaller pile size to be effective. For large scale facilities either top turners or pull behinds are ideal to allow for better mixing and larger piles. Top turners are driven over the pile and pull behinds are towed at a distance behind a tractor over the pile. Proper mixing is important so that conditions are consistent throughout the pile to make sure that the whole pile reaches temperatures high enough to kill pathogens and to produce a consistent product. The pile size can also create concerns with the composting process. Smaller piles have less insulation creating a concern that temperatures high enough to kill pathogens will not occur. Larger piles create a concern for anaerobic conditions near the center of the pile where it is harder for air to circulate, requiring more turning of the pile. Aerated turned piles are suitable for yard waste and some food waste.

Due to the difficulties of maintaining aerobic conditions, turning the correct amount, and the limitations of traditional windrow composting, technology has shifted towards adding air to the pile

through the use of aeration systems. Aeration systems are advantageous because they require less space for similar throughputs, since they don't need to be turned and, when designed correctly, will maintain aerobic conditions throughout the pile. Because of this, an aeration system also has a shorter composting duration than a traditional windrow system.

4.5.2 Aerated Static Pile

Aerated static piles require a system to supply oxygen to the composting pile, such as an aeration floor. There are multiple aeration floor systems that can be used including piping systems, trench systems, and a combination of piping and trenching. Aeration blowers are used to force air (positive aeration) or pull air (negative aeration) through the pile from the aeration floor. The feed waste moisture and porosity for aerated static pile composting is important, since it is difficult to alter moisture or porosity once the pile is created. The feed waste usually requires bulking so that the porosity is great enough that oxygen can get through the whole pile from the aeration floor. The amount of bulking agent used is dependent upon the particle size and moisture content of the feed stock; smaller particle size and greater moisture content both require the use of more bulking agent. Common bulking agents include woodchips, crop residue, bark, and leaves.

Some composting systems employ both forced aeration and turning. Feed material will be processed using an aerated static pile method and the compost will then be placed into piles for curing, where the compost is turned. Both forced aeration and turning can be used simultaneously, although this is not very common. A larger space is required to incorporate both forced aeration and turning into the aerated composting process.

4.5.3 Covered Pile

Aerated static piles can remain open or be covered to help control the composting process. Finished compost and textile covers are the two types of covers used to cover aerated static piles. Finished compost that is at least 6 inches thick and placed on top of piles can be used as coverage and to reduce water infiltration and leachate generation while keeping moisture in and insulating the pile.

The temperature of the pile is greatest in the center and decreases near the edges of the pile. Insulation provided by a cover helps to ensure that a temperature high enough to kill pathogens is maintained throughout the whole pile.

Textile covers provide additional benefits to finished compost coverage. The textile covers capture order, shed water, reduce leachate, and help to manage stormwater while maintaining a breathable environment to allow airflow into the pile.. Several covers also offer oxygen-controlled systems and provide oxygen and temperature monitoring to aid in process control. Pile covers are a more economical option than full coverage through structures such as canopies or buildings, particularly when odor and runoff are of concern. Pile covers can also be used on a temporary basis when rainfall, odor, or other events are anticipated for both static and turned piles.

4.5.4 In-Vessel Composting

Shipping containers, silos, rotating drums, tunnels, and trenches can all be used for in-vessel

composting. Aeration is forced in the vessel to maintain aerobic conditions and proper decomposition. Forced aeration occurs through moving paddles or piping systems that bring air to the material. Depending on the system the vessel can be covered or must remain open. Co-composting is an example of an aerated in-vessel system where biosolids and wood waste are combined to make compost. The aerated in- vessel system is good for organics.

4.5.5 Anaerobic Digestion (AD)

Anaerobic digestion is a biochemical process facilitated by microorganisms that decomposes organic material to biogas and digestate in an oxygen depleted environment. The performance of AD systems is sensitive to rapid changes in the environment, due to the living conditions that the microorganisms require. The composition of the organic material, the rate at which it is introduced to the microorganisms, and the temperature of the system must remain consistent throughout the process. Frequent or rapid variation of these factors can reduce the efficiency of the biochemical conversion process and can result in damage or destruction of the microorganism population. Anaerobic digestion is a technology developed for the treatment of a wide range of organic materials, including source-separated food waste, biosolids, organics from MSW, residues from industrial food processing and packaging, manure, etc.

There are several types of AD technology and the appropriate type and size to be used is determined by a variety of factors. The primary characteristics of the waste stream that must be defined to select the appropriate AD technology include the volume of the waste stream, the total solids content, the volatile solids content, and the chemical oxygen demand. The volume and total solids of the waste stream dictate the type of technology that is most appropriate to maintain uniform contact between the organic material and the microorganisms. The total volatile solids and chemical oxygen demands dictate the size of the system, and in some cases, the need to apply multiple AD technologies to properly treat the waste stream. The performance, operational requirements, and cost of the waste treatment process vary significantly depending on the characteristics of the waste stream and the type of AD technology.

There are technical, logistical, and economic challenges to the successful integration of AD in the MSW industry. The primary technical challenges are the separation of organic material from the MSW waste stream and the potential for inorganic material such as plastic and packaging to reduce the value of the digestate. These challenges can be overcome by the careful planning and implementation of organics separation and collection programs, the details of which are unique to each application. Dry AD technologies are more tolerant to the presence of inorganic materials (as the material stays in chamber away from the most of the mechanical equipment), but such contamination directly affects the quality of the final solid compost, which may play an important role in the entire economic proposition of the plant.

Logistical AD challenges include the transportation of the organic waste stream to the AD facility and the transportation of the solid and liquid digestate from the AD facility. Depending on the specifics of the existing infrastructure, the location of the AD facility can be coordinated to facilitate the transfer of waste and digestate with minimal impact on the existing logistics system.

Economic challenges to the integration of AD into the MSW treatment system include the higher

capital cost, the lower revenue potential of AD systems relative to conventional incineration or waste-to-energy processes, and the increased operational costs of the additional treatment step. Factors unique to each application include local regulations, the cost of current treatment processes, the cost of electricity and natural gas, the market for compost and soil amendment products, and the characteristics of the waste stream, all of which impact the economic feasibility of an AD system and which must be evaluated on a case-by-case basis.

The capital cost of an AD facility is highly dependent upon its location, the characteristics of the waste stream, the type of AD technology, and the inclusion of pre- and post- AD processing infrastructure, such as screening, grinding, composting, and packaging. The capital cost of an AD facility to process the organic fraction of an MSW waste stream and combust biogas in a CHP generator is estimated to be between $400 and $700 per ton-per-year of capacity. The capital cost of an AD facility with capacity to process 10,000 tons per year of separated organic MSW, for example, would be estimated to be between $4 million and $7 million. The operational costs of AD facilities are highly dependent on the type of facility, the method of biogas utilization, and the pre- or post-processing infrastructure. Typical AD operations do not require 24-hour staffing but do require one daily shift of O&M support, with high solids AD systems being much more operator intensive because all material is transported via bucket loaders.

4.5.6 Products

Different qualities of composts have different certifications or grades. Composting products that are produced and sold are assigned one of three grades: Grade 1, Grade 2, or Waste Grade. Each grade has different standards that must be maintained. Grade 1 compost has the strictest level of standards, and the standards loosen as the product moves from Grade 1 to Grade 2 to Waste Grade. Waste Grade compost does not have set standards, but is classified as compost that fails to meet Grade 2 standard requirements. Compost produced from biosolids has stricter standards, since it has a higher potential risk for odor, contaminants, and pathogens. Similar to grades, the different certification levels for compost are based on quality, the higher the quality the higher the certification level. Each grade and certification of compost can be used for different uses, such as compost, stormwater management, and landscaping. Specifications can be found through the U.S. Composting Council.

The products of the AD process are similar regardless of the type of AD technology used. Some of the solids are converted to biogas, and the remaining solid and liquid materials are discharged from the AD system. These materials are referred to as “digestate.” The volume of the digestate is typically similar to that of the original waste stream. The total solids of the digestate is generally slightly lower than that of the original waste stream, due to the conversion of some of the solids to biogas and the breakdown of some of the physical structure of the remaining solids. Suspended solids can be separated from the digestate stream and processed to produce compost, dried and pelletized or combusted as a fuel, or land applied directly as a soil amendment. In the case of dry AD, most of the liquid material is kept within the process (closed loop) and the solid fraction can be directly composted and used on several applications, subject to its quality and regulatory approvals. The liquid fraction of the digestate can be treated by conventional wastewater treatment technology or land applied as a soil amendment. Depending on the characteristics and composition of the waste stream, digestate can be beneficial as a soil amendment, due to the fact that the AD process does not

remove typical fertilizer nutrients such as nitrogen, potassium, or phosphorous from the waste stream. In some cases, the AD process can increase the value of the waste stream as a fertilizer by converting the nitrogen bound in the organic material to a form that is more readily absorbed by plants. The most beneficial method of processing and disposal of AD system digestate is highly dependent on the characteristics of the waste stream and must be evaluated on a case-by-case basis.

The biogas produced by the AD process contains varying concentrations of methane (around 60%), carbon dioxide, hydrogen sulfide, water vapor, and trace amounts of other gases, depending on the type of AD system and the characteristics of the waste stream. Biogas can be a valuable product of the AD process, due to the combustible properties of methane. Biogas can be combusted directly in a boiler; processed to remove the water vapor and corrosive gases and combusted in a reciprocating engine or turbine; or further processed to isolate the methane and used as a substitute for natural gas. Use of the biogas in a boiler or combined-heat and power (CHP) generator can be beneficial, as some of its thermal energy can be used to support the AD process (typical AD systems require the waste stream to be maintained at temperatures between 95 and 120 degrees Fahrenheit). Processing of biogas to produce a natural gas equivalent can be beneficial as methane isolated from biogas and purified to commercial standards, referred to as renewable natural gas or RNG, can be injected into the natural gas grid or compressed and used as a vehicle fuel. The production of RNG may be eligible for various environmental credits and tradable commodities. More information can be found on the U.S. Environmental Protection Agency website (www.epa.gov/renewable-fuel-standard-program/renewable-identification-number-rin-data-renewable-fuel-standard).

4.5.7 Facilities in the U.S.

Based on the report published by the Institute for Local Self-Reliance and Biocycle in July 2014, there are about 5,000 composting facilities in the U.S. that process around 20 million tons of organic material annually. Most of these facilities are in California, Florida, Iowa, Washington, and New York. The material processed at the existing composting facilities is predominantly yard waste, at 70% of the incoming feedstock, followed by farm/ agricultural waste at 8% and food scraps at 7%.

According to the American Biogas Council, there are 38 operating AD plants that process food waste as a feedstock. Out of those, 18 are stand-alone AD facilities processing food waste.

Many policies on the state level have been enacted to encourage or require diversion of source separated organics. Back in the 1990s more than 20 states instituted yard waste landfilling bans that resulted in more than 20 million tons of organic waste diverted from landfills every year. More recently, a handful of states have instituted food waste disposal bans although the impact of these policies is not yet apparent. In addition to landfilling bans, waste diversion laws and goals help increase the diversion of organics from landfills to composting or other processing facilities.

4.6 SOLID WASTE COMPOSTING

Municipal Solid Waste (MSW) composting has been practiced for many decades around the world. In the United States, it has met with limited success because of high cost, production odors, faulty technology, and poor product quality. In the past decade, however, interest in solid

waste composting has increased in the United States, and more facilities are being built. Typically, the economics of solid waste composting require high landfill tipping fees to justify the high cost of capital, operation, maintenance, and product marketing. Solid waste composting is often used to further process residual wastes generated by a Municipal Waste Processing Facility.

About 70 to 75 percent of a typical solid waste stream consists of newspaper, corrugated, mixed paper, food and yard wastes which can be composted. The remaining 25 to 30 percent must be landfilled, recycled, or processed by some other method. The composted material may be used as landfill cover material, for agricultural purposes, or for landscaping. The market for composted municipal solid waste within Charles County has not been investigated. In the event that a MSW composting facility is considered for Charles County, the determination of markets for the composted material should be a priority.

4.6.1 Technology Assessment

There are several composting technologies available today; however, the general process involves mechanical preparation of the incoming waste, materials recovery (in some cases), active composting, curing, and product screening.

4.6.2 Operations and Equipment

The composting processes considered potentially applicable for Charles County are the windrow-with-forced air aeration (WWFA), aerated static pile (ASP), horizontal silo, and in-vessel. When used for MSW, all of these processes normally include pre-processing, post processing, and curing stages. Despite having different digestion processes, all systems have three distinct phases; namely, pre-processing, composting or digestion, and post-processing. The specific design of the composting facility and equipment used depends on the following:

- The quantity and composition of the waste stream being processed.
- The desired quality of the end-product.
- The desired recovery levels of auxiliary products such as recyclables and fuel products.
- The site conditions and proximity of the plant to its neighbors.

In particular, the degree of pre- and post-processing depends on the market for the final compost product. If it will be used as landfill cover, non-compostable materials may be allowed to remain in the compost. If it will be used as a soil conditioner for landscaping, most or all inorganic material will need to be removed. The pre-processing, digestion and post-processing systems are described below.

A. Pre-Processing

Purely organic waste streams, such as yard wastes, food waste or agricultural wastes require little or no pre-processing. However, MSW is normally more heterogenous in composition and will

contain a large percentage of inorganic material. The objective of pre-processing is to remove inorganic materials and recyclables from the waste stream and isolate the organic fraction for composting.

Pre-processing at MSW composting facilities include the following processes:

- Removal of bulky, non-processible wastes.
- Size reduction (shredding and bag-breaking).
- Size classification (screening, air separation, density separation).
- Magnetic separation and recovery of ferrous metals.

Often water and/or sewage sludge is added to the organic fraction of the waste stream to promote decomposition of the material into compost. Water must be added since MSW does not contain a sufficient water content for rapid and efficient composting to occur. Sludge is an optional ingredient that can increase the nitrogen content of the MSW, thus maintaining a suitable carbon/nitrogen ratio for composting. Forced air is required for the completion of the composting process. Often a biofilter consisting of a bed of mature compost or bark chips, 3 to 6 feet thick, is used to filter the exhaust air.

Shredding is a key element of the pre-processing procedure. Shredded waste generally composts more quickly than non-shredded waste and tends to form a more uniform end-product.

B. Digestion

Several methods are commonly used to digest or compost MSW, including the following:

1. The WWFA process is performed in a large, enclosed hanger with concrete floors. The incoming waste stream is deposited into windrows (long, piled rows) which are then routinely and strategically moved by windrow turners so that the completed compost is located at an outermost windrow by the end of the process. The windrow turners turn and rebuild the windrows by picking up the material with a screw like conveyor and transferring it to an adjacent windrow. Water is added to the material as it is being turned to maintain the materials optimum moisture content for effective composting. The WWFA process uses negative forced aeration to activate the biological digestion process. This process takes approximately 60 days.

2. The ASP process is similar to the WWFA process, except that the piles are not turned for approximately 2 weeks. During this time, anaerobic decomposition of the material

occurs and negative forced aeration occurs. The exhaust air is processed through a biofilter prior to release into the ambient atmosphere. The measurement and monitoring of oxygen and carbon dioxide concentrations within the piles alerts the operators when the majority of the material has begun to decompose aerobically. At this occurrence, the forced air is reversed (air is blown into the process). The material is then sent through a trommel where oversized elements are removed. The pile is then processed again using the ASP method for approximately 4 weeks. After the second processing, the material is placed outdoors into a static pile for stabilizing the material.

3. In the horizontal silo system, shredded waste from the pre-processing area is placed into the concrete silos by conveyor belts. The silos are usually between 5 and 15 feet wide, 4 and 8 feet high, and may be over 200 feet in length. The entire composting area is covered by a roof to prevent rain water from entering the piles and subsequently leaching out Agitation is provided by a turning machine which is mounted on the silo walls. Forced aeration which may be activated by temperature is supplied to the silos. Often the exhaust air from the silos is conveyed through a biofilter to reduce odors.

4. In-vessel systems have a unique vessel design, consisting of rotating drums and stationary domes. The rotating drums introduce waste into the digester after the pre-processing procedure. In some cases, the drums are equipped with metal spikes or bars to assist in the breaking of garbage bags and in agitating the waste to quicken the degradation process.

The drums are usually between 10 and 15 feet in diameter and range from 80 to 150 feet in length. The drums may contain a single chamber or be divided into multiple chambers, with the waste being transferred from one chamber by screw conveyors. The MSW water, and a nitrogen source are added to the drum which is rotated for anywhere between 12 hours to 3 days. Forced aeration is also provided to the drums.

Dome reactors are usually constructed of concrete/steel and range from 20 to 150 feet in diameter. MSW is piled to a depth of 6 to 10 feet in the dome, and is placed and removed from the dome with a screw conveyor. Aeration is activated by temperature sensors located in the waste. The material remains inside the dome for a period ranging from 3 days to 2 weeks.

In-vessel systems generally utilize a secondary digestion process to promote further decomposition and stabilization of the raw compost. This process will consist of an aerated static pile, windrows, horizontal silos, or even a second vessel. In most systems,

the material will remain in the secondary digestion system for a period of 3 weeks.

C. Curing and Post-Processing

In many systems, compost emerging from the horizontal silos or digester vessels must be further stabilized or cured. This is necessary because when compost is applied to the land before the compost process has completely ceased, it may chemically remove essential nutrients, such as nitrogen, from the soil.

Like pre-processing, post-processing operations concentrate on removing inorganic material from the compost. These contaminants include glass, grit, paper, plastic, and textiles. The methods for extracting these materials include:

- Screening
- Magnetic Separation
- Fluidized-Bed "Destoners" (removes paper, plastics, glass, grit, and rocks)

The residuals generated from this process may be further processed and either landfilled or recovered for fuel.

4.6.3 Costs

Typical costs associated with MSW composting include capital costs and operation and maintenance costs. Depending on the process selected and the quality of the end product, these costs can vary greatly. Costs for a municipal solid waste composting facility, excluding land, range from $55,000 to $75,000 per design ton per day.

4.6.4 Advantages

Composting has the potential to result in large-scale weight and volume reduction of the MSW stream. Depending on the composition of the input waste stream and the process used, a volume reduction of between 55 and 70 percent could be achieved, thus extending the life of the existing landfill significantly.

MSW composting systems are able to accept yard waste directly into the waste process. In fact, the addition of the yard waste may improve the efficiency of the process because of its high nitrogen and moisture content.

4.6.5 **Disadvantages**

Charles County's municipal waste stream is projected to produce approximately 404 tons per day in 2009 and 529 tons per day in 2020. Substantial operating costs are attributed to MSW composting facility with a capacity this large.

For compost used in agricultural or landscaping applications, the risks posted by heavy metals are not well understood. This has prompted several states, including Maryland, to investigate stringent standards regarding heavy metals content of the compost and permissible rates of application to the land.

A number of operating facilities have had serious problems controlling odor, arousing complaints from neighbors and sometimes compelling the facilities to shut down or install expensive odor control systems. The facility must utilize effective odor control equipment and techniques, such as aeration systems, exhaust air treatment (biofilters and/or scrubbers), enclosed digestion buildings, and frequent turning/agitation of the decomposing material.

The financial community is aware of the problems composting facilities are having securing necessary state approvals for marketing their end-product and in obtaining reliable customer outlets. Any MSW composting project that wishes to be financed will have to demonstrate a sound outlet for the compost or a well-conceived marketing plan with realistic, achievable goals.

4.6.6 **Feasibility Evaluation**

Because of the uncertainties and problems currently associated with MSW composting, it is not recommended as a suitable solid waste management technique for Charles County during the 10-year planning period for this Plan.

4.7 TRANSFER AND DISPOSAL (T&D)

Waste transfer stations play an important role in a community's total waste management system, serving as the link between a community's solid waste collection program and a final waste disposal facility. While facility ownership, size, and services offered vary significantly among transfer stations, they serve the same basic purpose—consolidating waste from multiple collection vehicles into larger, high-volume transfer vehicles for more economical shipment to distant disposal sites. In its simplest form, a transfer station is a facility with a designated receiving area where waste

collection vehicles discharge their loads. The waste is often compacted, then loaded into larger vehicles (usually transfer trailers, but intermodal containers, railcars, and barges are also used) for long-haul shipment to a final disposal site—typically a landfill, waste-to-energy plant, or a composting facility. No long-term storage of waste occurs at a transfer station; waste is quickly consolidated and loaded into a larger vehicle and moved off site, usually in a matter of hours.

A transfer station is different than a convenience center or a drop-off center. At a convenience center, residents manually discard waste into containers where it is consolidated for transport to an appropriate site, but the waste might be accumulated for several days. A transfer station is designed and intended for commercial vehicles to deliver material, and that material is removed quickly by other vehicles, not in containers. However, many communities have installed full-service operations that provide public waste and recyclables drop-off accommodations on the same site as their transfer stations.

4.7.1 Why Are Waste Transfer Stations Needed?

The nationwide trend in solid waste disposal has been toward the construction of larger and more remote regional landfills. Economic considerations, heavily influenced by regulatory and social forces, are compelling factors leading to this result. As older landfills near urban centers reach capacity and begin closing, cities must decide whether to construct new landfills or to seek other disposal options. Many communities find the cost of upgrading existing facilities or constructing new landfills to be prohibitively high and opt to close existing facilities. Social and community resistance to building new landfills close to population centers also pushes landfills to more remote locations. The economics of a highly-engineered landfill also encourage locating them in farther-out locations, where the scale of the facility can keep tipping fees within reason. Because landfills with affordable fees are increasingly in remote locations, rural and urban communities alike are finding that the most economically viable solution to their waste disposal needs is shipping their waste to these facilities. In these circumstances, a transfer station serves as the critical consolidation link in making cost-effective shipments to these distant facilities.

In addition to processing mixed municipal solid waste (MSW), some transfer stations offer programs that manage specific materials separately to divert waste from disposal and to achieve recycling objectives. These materials could include construction and demolition debris, yard waste, household hazardous waste, or recyclables. The types of materials processed often vary depending on where the facility is located (urban, suburban, rural) and who owns and operates the transfer station (public entity or private industry).

4.7.2 Types of Waste Accepted

The following types of waste are commonly handled at transfer stations:

Municipal solid waste (MSW) is generated by households, businesses, institutions, and industry. MSW typically contains a wide variety of materials including discarded containers, packaging, food wastes, and paper products. MSW includes a mixture of putrescible (easily degradable) and nonputrescible (inert) materials. This will typically include:

- Refuse, garbage, or household trash.

- Yard waste
- Household hazardous waste.
- Recyclables.

Construction and demolition (C&D) debris results from demolition or construction of buildings, roads, and other structures.

Some transfer stations provide public access to the facility rather than restricting access only to waste collection vehicles. The types of customers accommodated vary depending on where the facility is located and who owns and operates the transfer station. Publicly operated transfer stations are more likely to be open to public use. Private transfer stations might not be open to the public because residents deliver small amounts of waste with each visit, require more direction for safe and efficient use of the transfer station, and generally pay small fees for using the transfer station. The general public usually is allowed to use a transfer station for any of several reasons: waste collection is not universally provided in the area; some wastes, such as bulky items or remodeling debris, are not collected; or public access is part of a strategy to prevent illegal dumping by providing a convenient, cost-effective place for people to deposit waste. Public unloading areas and traffic patterns are usually kept separate from commercial vehicles for safety and efficiency.

4.7.3 Determining Transfer Station Size and Capacity

The physical size of a planned transfer station and its features are typically determined based on the following factors:

- The definition of the service area.
- The amount of waste generated within the service area, including projected changes such as population growth and recycling programs.
- The types of vehicles delivering waste (such as car or pickup truck versus a specially designed waste-hauling truck used by a waste collection company).
- The types of materials to be transferred (e.g., compacted versus loose MSW, yard waste, C&D), including seasonal variations.
- Daily and hourly arrival patterns of customers delivering waste.
- The availability of transfer trailers, intermodal containers, barges, or railcars, and how fast these can be loaded.
- Expected increases in tonnage delivered during the life of the facility.
- The relationship to other existing and proposed solid waste management facilities such as landfills, recycling facilities, and waste-to-energy facilities.

4.7.4 Number and Sizing of Transfer Stations

Design capacity is determined by the maximum distance from which waste can be economically delivered to the transfer station. The area that can efficiently reach the waste transfer station determines the volume of waste that must be managed, which is the facility's initial design capacity. Beyond a certain distance, another transfer station might be necessary, or it might become just as cost-effective to direct haul to the disposal facility.

Transfer stations serving rural or tribal areas tend to be small. They are optimally located within a reasonable driving time from the service area's largest concentration of homes and businesses. For example, a rural transfer station could be located near one of the service area's larger towns and sized to take waste from all waste generators within about 30 miles. As an example, two 50-ton-per-day transfer stations might serve six small communities each. Alternately, fewer transfer stations could be used, necessitating longer average travel distances. For example, one 100-ton-per-day transfer station could be used to serve the same 12 small communities, but it would be located farther from the outlying communities.

The biggest advantage of constructing large transfer stations is the economies of scale that can significantly reduce capital and operational costs. Centralizing waste transfer operations allows communities to reduce equipment, construction, waste handling, and transportation costs. The siting of a single facility may often prove easier than siting multiple facilities. Large facilities are also conducive to barge or rail operations that can further decrease traffic related impacts on the community. Along related lines, however, a major drawback to building a single large facility is locating a tract of land that adequately meets facility requirements. Large facilities also tend to concentrate impacts to a single area, which can create the perception of inequity, especially when one neighborhood is shouldering the burden for the entire city. A single facility can result in longer travel times, which leads to increased down time for the collection crew and increased wear and tear on collection vehicles. Another consideration is that a single facility cannot divert waste to a backup facility if a need arises. The single facility must have additional equipment in case of equipment failure or other emergencies.

In other situations, multiple smaller sites might better address a community's waste management needs. Decentralizing waste transfer operations spreads lesser impacts over a wider area, which helps address equity issues. Although it is generally more expensive to build and operate several small transfer stations rather than one large station with the same total capacity, savings from reduced travel times might offset these capital costs and result in lower overall system costs. Multiple facilities also are better able to serve as backups for one another in case of scheduled or emergency shutdowns of facilities. The major disadvantage to building multiple facilities is that the difficulties encountered in siting a single facility can be exacerbated.

4.7.5 Site Selection

Identifying a suitable site for a waste transfer station can be a challenging process. Site suitability depends on numerous technical, environmental, economic, social, and political criteria. When selecting a site, a balance needs to be achieved among the multiple criteria that might have competing objectives. For example, a site large enough to accommodate all required functions and possibly future expansion, might not be centrally located in the area where waste is generated. Likewise, in densely developed urban areas, ideal sites that include effective natural buffers simply might not be available. Less than ideal sites may still present the best option due to transportation, environmental, and economic considerations. Yet another set of issues that must be addressed relates to public concern or opposition, particularly from people living or working near the proposed site. The relative weight given to each criteria used in selecting a suitable site will vary by the community's needs and concerns. Whether the site is in an urban, suburban, or rural setting will also

play a role in final site selection.

During the site selection process, steps should be taken to ensure that siting decisions are not imposing a disproportionate burden upon low-income or minority communities. Overburdening a community with negative impact facilities can create health, environmental, and quality of life concerns. It can also have a negative economic impact by lowering property values and hindering community revitalization plans. These are just a few of the reasons environmental justice concerns need to be addressed when selecting a site for a waste transfer station.

A siting process that includes continuous public participation is integral to developing a transfer station. The public must be a legitimate partner in the facility siting process to integrate community needs and concerns and to influence the decision-making process. Addressing public concerns is also essential to building integrity and instituting good communications with the community.

4.7.6 Siting Criteria

After generating public involvement, criteria should be developed for identifying and evaluating potential sites. All siting criteria must be developed before identifying potential transfer station sites. This approach ensures siting decisions are based on objective criteria. Three categories or sets of criteria applied during various stages of the siting process are exclusionary, technical, and community-specific criteria. It is important to note that no site may meet all of the criteria, in which case each criterion's relative weight and importance must be considered.

Exclusionary criteria might include areas such as wetlands and floodplains; endangered and protected flora and fauna habitats; protected sites of historical, archeological, or cultural significance; prime agricultural land; and/or, parks and preserves. Federal laws are likely involved in exclusionary criteria, along with state laws and local land use regulations.

Technical criteria provide guidance on specific engineering, operation, and transportation conditions that should be considered to ensure that potential sites are feasible from technical, environmental, and economic perspectives.

Community-specific criteria are typically less technical in nature and incorporate local, social, and cultural factors. Examples of these criteria include Environmental Justice considerations; impacts on air quality and odor management; impact on the local infrastructure businesses; adjacent land uses, including other environmental stressors that might already exist; proximity to schools, churches, recreation sites, and residences; traffic compatibility; and/or impact on historical or cultural features.

4.7.7 Host Community Agreements

Siting any type of solid waste management facility has often been met with strong community opposition. Whether the facility is publicly or privately owned, many residents may not be confident that the siting, permitting, and oversight process will be sufficiently rigorous to address their concerns and to protect them from future impacts. When this type of opposition arises, it is often advantageous for the developer to enter into a separate agreement with the surrounding community, laying out all issues of concern and the developer's action plan in response. These "host community

agreements" are most frequently used when private companies are developing a facility, but public agencies might also find them useful in satisfying community concerns. These agreements typically specify design requirements, operating restrictions, oversight provisions, and other services and benefits that the immediate community will receive.

4.7.8 Transfer Station Design

After determining who will use the facility and how, a site design plan can be developed. A facility's design must accommodate its customers' vehicles and the technology used to consolidate and transfer waste, provide for employee and public safety, and address environmental concerns related to safeguarding health and being a good neighbor to the surrounding community. The most important factors to consider when designing a transfer station are:

- Will the transfer station receive waste from the general public or limit access to collection vehicles? If access will not be limited, how will citizen traffic be separated from commercial traffic to ensure safe and efficient unloading?
- What types of waste will the transfer station accept?
- What additional functions will be carried out at the transfer station (i.e., material recovery programs, vehicle maintenance)?
- What type of transfer technology will be used? How will waste be shipped? Truck, rail, or barge?
- What volume of material will the transfer station manage? How much waste will the facility be designed to receive during peak flows?
- How will climate and weather affect facility operations?
- How will environmental impacts to the surrounding area be minimized?
- How will employee health and safety be ensured?

Once a site is identified for the transfer station, planners, architects, and engineers use the factors described above to develop a site plan for the proposed facility. A site plan shows the layout of the transfer station site's major features, including access points, roadways, buildings, parking lots, utilities, surface water drainage features, fences, adjacent land uses, and landscaping.

4.7.9 Transfer Station Operations

Operations and Maintenance Plans: Although a transfer station's basic function as a waste consolidation and transfer facility is straightforward, operating a successful station involves properly executing many different tasks. Some tasks are routine and easily understood, while others occur infrequently and might be difficult to conduct properly without step-by-step directions. To help ensure proper operations, transfer stations should have written operations and maintenance plans. These plans are often required by state, tribal, or local regulations. They should address the facility operating schedule; the staffing plan; acceptable and unacceptable wastes; operating methods for each component of the facility; a description of maintenance procedures for each component; employee training and safety rules and regulations; recordkeeping procedures; and, contingency plans and emergency procedures.

4.7.10 Environmental Issues

Developing transfer stations that minimize environmental impacts involves careful planning, design, and operation. It is important to be "good neighbor." Design and operational issues include traffic, noise, odors, air emissions, water quality, vectors, and litter. Proper facility siting, design, and operation can address and mitigate these potential impacts on the surrounding natural environment and the community. Careful attention to these issues begins with the initial planning and siting of a facility and should continue with regular monitoring after operations begin. Transfer station design must account for environmental issues regardless of surrounding land use and zoning.

4.7.11 Safety Issues

Thoughtful facility design coupled with good operating practices help ensure transfer stations are safe places. Transfer stations should be designed and operated for the safety of employees, customers, and even persons illegally trespassing when the facility is closed. Federal Occupational Safety and Health Administration (OSHA) regulations require facilities to provide safe working conditions for all employees. State, tribal, and local workplace safety regulations, which can be more stringent than federal regulations, also might apply. Some state, tribal, or local governments might require a facility's development permit to directly address employee and customer safety. State and tribal solid waste regulations, for instance, often require development of operating plans and contingency plans to address basic health and safety issues. Transfer station safety issues are the facility operator's responsibility.

4.7.12 Applicable Regulations

Transfer stations are affected by a variety of federal, state, tribal, and local regulations, including those related to noise, traffic impact mitigation, land use, workplace safety, taxes, employee right-to-know, and equal employment opportunity that are applicable to any other business or public operation. Many jurisdictions also have regulations specifically applicable to transfer stations. These regulations typically emphasize the protection of public health and the environment.

4.8 MUNICIPAL WASTE COMBUSTION AND WASTE TO ENERGY

Before 1970, municipal waste incinerators in the United States were refractory-lined units that functioned solely to reduce the volume of waste destined for disposal. Over the past several decades, the vast majority of incinerators or "waste-to-energy" facilities also produced steam and/or electricity through the combustion process. Waterwall combustion chambers are used to generate steam that is either sold directly, or is used to drive turbines to generate electricity.

4.8.1 **Technology Assessment**

There are two types of facilities used for the incineration of municipal solid waste; a mass-burn facility and a refuse derived fuel facility. Both types of facilities are described in the following sections.

4.8.1.1 Mass-Burn Facility Operations and Equipment

Mass-burn facilities can be constructed and operated with or without energy recovery. The singular identifying feature of mass-burn facilities is they do not process incoming waste prior to combustion. Incoming waste is dumped into a tipping pit and fed into a charging hopper using a crane or conveyor. The crane removes bulky and non-processible objects (white goods, sofas, tires, etc.) and sets them aside for recycling or landfill 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 very heterogenous 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 shoved along by horizontal rams to maximize the rolling action. Controlled quantities of air must also be supplied to the furnace to support combustion.

In a waste-to-energy mass-burn facility, 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. In many facilities, the tubes are located in the boiler walls, a configuration aptly known as a waterwall boiler. Both stationary and rotating waterwall units are commercially available, though stationary units are much more common. One key advantage of the waterwall design is that by absorbing the heat created, the tubes help protect the boiler walls from thermal destructive effects such as slagging. As a result, less excess air is needed for cooling the furnace (too much excess air generally will lower a boiler's energy production efficiency).

After passing through the boiler, the flue gases travel through a superheater, where they increase the energy content of a portion of the steam previously manufactured by the boiler. They are then directed through air pollution control equipment, such as scrubbers and fabric filter baghouses, and discharged to the atmosphere via a stack.

The steam produced in the boiler and superheater can be used for industrial process purposes, central steam heating, or to generate electricity by channeling it through a turbine. The turbine-generator and steam circulation systems employed at mass-burn facilities are identical to those used at fossil fuel power plants. The quantities of steam and/or electricity produced largely depend on the waste capacity of the facility.

As in any combustion process, a solid ash residue is produced. Bottom ash is formed by combusted material that exists 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. Fly ash often is treated by processing it through a pug mill, where it is wetted and reduced in size. Bottom ash may be

passed under a magnetic separator and through a trommel screen to recover ferrous and non-ferrous metals for recycling. The ash streams may either be combined prior to shipping them to a landfill or shipped and disposed independent of each other.

4.8.1.2 Refuse Derived Fuel Facility Operations and Equipment

The fuel properties of mixed municipal solid waste can be improved by reducing it to particles less than six inches in length and removing the materials that have little or no heat value. This is precisely what refuse derived fuel (RDF) processing facilities are designed to accomplish. An auxiliary function is the recovery of recyclables, although modern RDF facilities do not sort out nearly as much recyclable material as mixed waste processing or even municipal solid waste composting facilities.

Municipal solid waste is dumped onto a tipping floor where front-end loaders and dozers compact the waste and push it onto in-feed conveyors. Bulky and non-processible items are segregated either on the tipping floor or are lifted off the in-feed conveyor by cranes at designated picking stations. The bulk of the waste enters a series of shredding and screening machines, which convert between 60 and 80 percent of it to loose RDF. Equipment utilized in the processing lines often consists of the following:

- Low-speed shredders of flail mills for breaking open bags of waste.
- High-speed hammermill shredders which use rotating hammers to drive waste through fixed grates, thus pulverizing it to the size of the grate openings.
- Overhead magnetic separators, which recover ferrous metals. They either may be of the belt variety (like those at MRFs), or they may be rotating beltless drums which function in essentially the same manner as the belt separators.
- Trommel screens, similar to those used in the pre-processing areas of municipal solid waste composting facilities.
- Steel-belt and rubber-belt conveyors, which transfer the waste between the different pieces of processing equipment.

The processed RDF consists of paper, plastic, and other particles one to six inches in length. Fine particles (those under one inch) typically consist of non-combustibles such as dirt, food waste, and broken glass. This material is screened out by the trommels and deposited on conveyors, which load it into trailers for shipment to landfills. Ferrous metal is also collected on separate conveyors and transferred into waiting trailers for shipment to scrap markets.

After processing, the RDF normally is stored on a second enclosed tipping floor. This is an obvious difference from mass-burn systems, where the fuel product (raw waste) is stored in a pit. The RDF is pushed onto in-feed conveyors by front-end loaders and enters a feeding system, which may be a complicated series of vibrating screens, auger conveyors, and pneumatic feeders. The purpose of this system is to carefully regulate the flow of RDF into the combustion chamber, thus maximizing combustion efficiency.

The furnaces and waterwall boilers utilized at RDF combustion facilities are similar to those at mass-burn plants. However, in RDF combustion systems, much more of the fuel burns in suspension (combusts while airborne in the furnace), as opposed to on the grates. In addition, RDF boilers do not need to accommodate the larger, heavier objects from the waste stream since

- RDF boilers are generally smaller than those at mass-burn facilities.
- Only one set of moving grates is typically employed (i.e., there is no stepped series of grates).
- The grates themselves are of less-rugged construction than those used in mass-burn systems.

Steam generation, air pollution control, and ash handling systems are similar in design to those used at mass-burn facilities.

There are a number of other general differences between RDF and mass-burn facilities:

- Because some components of the waste stream with poorer heat value and combustion properties are removed during pre-processing, RDF facility will produce approximately 5 percent more energy than an equivalently-sized mass-burn facility.
- Because RDF processing is a more mechanically complex process, RDF systems often exhibit lower availability than mass-burn systems. As with mixed waste processing, very complex processing lines tend to have more mechanical shutdowns and lower overall availability.
- Due to the relative complexity of the pre-processing systems, RDF systems require operators with greater skill and experience.
- Because processed RDF is stored on a separate tipping floor, a larger site is required than for a mass-burn facility.

- RDF facilities may send a greater percentage of their incoming waste stream to landfills, since they screen out the finer materials with poor combustion properties. In a mass-burn system, much of this material will come out in the ash, but some of it may burn and not have to be landfilled.

4.8.1.3 Biomass Processing into Biogas

In this process, MSW is delivered by collectors and sorted twice. The first sorting removes unsuitable materials. The waste is then solubilized, or "pulped." The second sorting process removes recyclable materials which did not hydrate in the pulping process. These materials can be marketed as recyclable commodities. The remaining organic biomass becomes either a feedstock for anaerobic digestion, wherein biogas is produced, or a feedstock that can go through additional processing for production of other biofuels or biochemicals.

4.8.1.4 Gasification into Fuel and Biochemical Production

MSW and other non-recyclable feedstocks are minimally prepared and then gasified into syngas. The technology separates contaminants and water at this point, and the syngas is converted into a fuel for energy generation, such as methanol or ethanol, or to feed production of other products and materials. The fuel products can be used to power vehicles or other engines.

4.8.1.5 Costs

Capital costs for a waste-to-energy plant, as well as operation and maintenance costs, are generally high and vary greatly depending on the type of facility. Construction costs alone may range from $50,000,000 to $100,000,000 per 500 tons of rated daily capacity.

4.8.1.6 Advantages

The primary environmental benefit of waste-to-energy facilities is the conservation of natural resources. Solid waste that would otherwise end up in a landfill is used to generate energy, thus conserving fossil fuels.

After combustion, the volume of material requiring land disposal is reduced by 85 to 90 percent.

Both mass-burn and RDF systems are commercially proven, as evidenced by the number of commercial-scale facilities in operation and their cumulative years of operating experience. Particularly for mass-burn systems, there are multiple vendors with strong business positions and significant amounts of construction and operational experience. Biomass processing into biogas and gasification for fuel and chemical production have been commercially viable for nearly ten years, and are increasingly being developed in communities across the U.S.

Waste-to-energy facilities are net energy producers, although they cannot produce electricity on the scale of a normal-sized fossil-fired power plant. Revenues from energy sales usually cover a portion of the plant's operating expenses and debt service.

Improvements in air pollution control technology have resulted in significant reductions in the quantities of major air pollutants emitted from waste-to-energy facilities.

4.8.1.7 Disadvantages

The primary environmental issues associated with municipal waste combustion are air pollution and ash disposal. Because of these issues, there is often significant public opposition to the operation of municipal waste combustion facilities.

Waste-to-energy facilities are difficult to site and permit; the amount of time required for siting, permitting, and construction is considerably greater than for other waste processing and disposal technologies.

The capital cost of a waste-to-energy facility is substantially greater than for any other waste disposal alternative considered in this Plan.

The Clean Air Act, Title 5, holds strict parameters for any facility that discharges emissions into the air. In addition, the U.S. Environmental Protection Agency requires that the ash material from an incinerator facility must pass a TLCP test to characterize the ash prior to disposal in a landfill facility. If more stringent air emissions standards are promulgated, and ash is classified as hazardous waste under Resource Conservation and Recovery Act reauthorization, capital and operating costs for a typical plant could increase appreciably.

4.8.2 Feasibility Evaluation

With a daily waste stream of approximately 200 to 300 tons per day, processing of waste for generation of one or more energy products for decentralized use is most appropriate for Charles County. To capitalize and operate a mass-burn facility with any economic efficiency would require Charles County to procure additional tons from other out-of-county sources, and become a net importer of waste. It would also require a transportation network capable of bringing the waste into the facility efficiently. More appropriate for waste-to-energy in Charles County would be a process that generates fuel (ethanol, biomethanol, etc.) or other valuable chemicals. There are facilities already being developed or operating in the U.S. which intake and process 200 to 300 tons per day

of waste. They can be built modularly and are much less capital-intensive than a mass burn combustion facility.

4.9 LAND DISPOSAL - MUNICIPAL WASTE

Landfilling will remain an important component of every integrated solid waste management program. Source reduction, recycling, and resource recovery can significantly reduce, but not eliminate, the need for landfills.

4.9.1 **Technology Assessment**

A municipal waste landfill contains compacted solid waste within an enclosed lined area to minimize potential adverse environmental impacts. All landfills within Maryland must satisfy requirements established for construction, operation, maintenance, expansion, modification, and closure as stipulated by MDE.

Despite environmental and public concerns associated with landfills, every integrated waste management system must have access to a landfill. Recycling, composting, and material separation and removal can divert significant portions of the waste stream from final disposal, but not all materials are recyclable. Combustion of solid waste significantly reduces waste volumes, but even the most advanced facilities must dispose of ash residues. Also, waste may need to be disposed of during plant shutdowns.

Today, municipal waste landfills are significantly more sophisticated than the open dumps of the past. "State-of-the-art" landfills use a variety of specific technologies and practices including:

- Liner Systems
- Leachate Collection and Removal Systems
- Leachate Treatment and Disposal Systems
- Leachate Recirculation
- Closure Techniques (i.e., reducing the amount of leachate generation)
- Gas Collection, Venting/Reuse, and Monitoring Systems
- Provisions for Closure and Post-Closure Care and Maintenance
- Ground and Surface Water Monitoring Systems
- Monitoring and Control of Materials Entering the Site

4.9.2 Costs

Municipal sanitary landfill construction and operations costs have increased dramatically over the past decade. Factors contributing to the rising landfill costs include:

- Stricter, more comprehensive environmental regulations.
- Increased public awareness and demand for environmental protection.
- Time delays, engineering and legal costs in obtaining permits.
- Design of remediation measures at the existing landfill.
- Property costs for new landfill sites.

Typical costs for landfills include predevelopment, land acquisition, landfill development, construction, operating, and closure and post-closure costs. These costs vary over a wide range.

Pre-development costs are associated with site selection, investigation, and permitting costs. Land costs vary widely in Charles County. Remote, rural areas of Charles County generally have lower land costs, but will have higher transportation costs. As environmental and legal requirements become more complex, the costs associated with obtaining a permit rise. The cost of obtaining a permit depends on the changing requirements of the federal and state regulations and the complexity of the site. The costs for developing a landfill can include roadways, fencing, monitoring wells, and on-site facilities.

Costs for construction of a municipal waste landfill are dependent on the following major activities including:

- Excavation
- Liner Construction
- Leachate Collection and Treatment/Disposal Systems
- Ground and Surface Water Monitoring Systems
- Stormwater and Sediment and Erosion Controls
- Ancillary Facilities and Equipment

The liner and leachate collection/removal system are generally the most expensive components of a landfill. Construction costs for a double-lined landfill are estimated to be in the range of $400,000 to $500,000 per acre.

4.9.3 Advantages

Municipal waste landfills are a necessary element of solid waste management for Charles County. State-of-the-art landfills are more sophisticated and environmentally protective than the unlined landfills of the past. Cost on a per-ton-basis for municipal waste landfills are often substantially lower than other management options (e.g., incineration, composting). Other management options

are generally more labor intensive, have more extensive maintenance requirements, and are more reliant on high-technology machinery.

4.9.4 Disadvantages

Landfilling represents a long-term potential liability, with the post-closure period extending for many years after the cessation of operation. Post-closure costs will be incurred annually during the time that the County owns the property. Post-closure requirements include leachate collection and treatment, gas management, and groundwater monitoring. In addition, costs of construction are increasing, and the potential for adverse environmental impacts is present. Because of this potential, there is significant public opposition to siting new municipal waste landfills. A municipal waste landfill requires a substantial amount of land which is diverted from other beneficial uses.

4.9.5 Evaluation of the County's Existing Sanitary Landfill

The Charles County Sanitary Landfill (also referred to as Charles County Landfill #2) opened on July 1, 1994 in Waldorf, Maryland. The Pisgah landfill closed as a result of a Consent Order issued by the Maryland Department of the Environment on July 31, 1994.

The new landfill has several features which provide several environmental safeguards as well as serving the citizens more efficiently and effectively. The environmental safeguards include a composite liner of clay and a 60 mil HDPE membrane, a leachate collection system, two stormwater management ponds for the entire site, and a passive methane collection system. To better serve the citizens of Charles County, the landfill was built with a citizen disposal area on asphalt with a volume based payment system named “Tag-A-Bag”. A staffed recycling center that accepts a wide variety of materials, and a small drop off area on concrete for bulk loads of waste from pick-ups, van, and trailers. Dual scales expedite truck traffic with a fully computerized scale house.

The landfill was designed with a life expectancy of 12 years and 8 months based on historical volumes and compaction rates. Since opening, the volume of refuse entering the landfill is approximately half of the previous rates and a more aggressive compaction rate was adopted resulting in a landfill life expectancy of over 30 years.

Since constructing the landfill in July 1994, the County has meticulous records regarding the amount of waste accepted and volume of fill material used to cover the refuse. This information combined with aerial surveys using the latest technology have resulted in a series of reports.

4.10 LAND DISPOSAL - RUBBLE WASTE

4.10.1 Technology Assessment

As specified in COMAR 26.04.07, rubble landfills may accept the following:

- Land-Clearing Debris
- Demolition Debris
- Construction Debris
- Asbestos Waste
- Household Appliances and White Goods

As with a municipal waste landfill, rubble landfill technology involves compacting and covering solid waste within a confined area. All new rubble landfills are required to have liners and leachate collection systems and existing rubble landfills must meet these requirements by July 1, 2001 or cease accepting waste.

Rubble landfills have requirements similar to those described for municipal solid waste landfills for separation to groundwater, stormwater management, and water quality monitoring systems. Waste is placed and compacted in lifts of up to 8 foot thickness; 6 inches of soil cover must be applied at least every 3 days and 12 inches of intermediate cover must be placed within one month of completing a lift. Final cover consists of a two layer of vegetated soil.

Volume requirements for rubble landfills may be minimized through removal and recycling of certain components of the waste stream (Section 4.3.1.6). Grinding and chipping wood waste and shredding tires prior to disposal can also be employed to increase the density of the waste, thus conserving landfill space.

4.10.2 Costs

Depending on whether the landfill is a lined or unlined facility, costs for a rubble landfill may be similar to a municipal waste landfill. Costs for pre-development, development, construction, operation and maintenance, and closure and post-closure for a unlined and lined rubble landfill are summarized below.

Lined Rubble Landfill costs include:

- Predevelopment costs are similar to the municipal waste landfill.
- Development costs are similar to the municipal waste landfill.
- Construction is similar to the municipal waste landfill.

- Annual operation and maintenance costs are similar to the municipal waste landfill.

- Closure and post-closure are similar to the municipal waste landfill, except landfill gas venting is usually not required. Closure costs are estimated to range from $90,000 to $140,000 per acre. Annual post-closure costs are estimated to range from $40,000 to $180,000.

4.10.3 Advantages

Rubble landfills or a joint municipal waste/rubble landfill is a necessary element of solid waste management in Charles County. This is for the simple reason that there are no other economically feasible solutions for a portion of the rubble waste stream.

4.10.4 Disadvantages

Landfilling represents a long-term potential liability, with the post-closure period extending for many years after the cessation of operation. Post-closure costs will be incurred annually during the time that the County owns the property. Post-closure requirements may include leachate collection and treatment, and groundwater monitoring. In addition, costs of construction are increasing, and the potential for adverse environmental impacts remain present. Because of this potential, there is significant public opposition to siting new rubble landfills. A rubble landfill requires a substantial amount of land which is diverted from other beneficial uses.

4.10.5 Evaluation of Existing Rubble Disposal

Only a fraction of the rubble generated in Charles County is disposed at the County's Sanitary Landfill. This due to two reasons: (1) there is no economic incentive; and (2) the County Commissioners have adopted a policy banning disposal of rubble from large commercial haulers in an effort to increase landfill life. Small contractors and homeowners who have building construction debris utilize the landfill due to its convenience. An additional factor is that most often the loads brought to the Charles County Landfill are charged up to $70 per ton.

There appears to be adequate capacity for locally-generated rubble at the Prince George's County landfill facilities during the ten-year scope of this plan. There are also a rubble fills in Anne Arundel County, King George County, VA and Lorton, VA.

Due to the fact that these rubble fills are not required to document the place of origin of the inbound waste, there is no mechanism available to verify the estimates of rubble generated in Charles County

The estimates generated for Frederick County would be very similar adjusted for population. Although the Regional Solid Waste Task Force that was in existence in 1994 recommended a regional rubble fill, there has been no action or further discussion of the matter.

4.11 SLUDGE MANAGEMENT

The Clean Water Act requires municipalities to cleanse wastewater prior to discharging it into the environment. This cleansing process generates sludge which in turn must be disposed or reused. Sludge management begins with sludge generation, and continues through treatment and ends with reuse and/or disposal. When properly reused, sludge can be a valuable resource as a soil conditioner and partial fertilizer. The EPA and the MDE encourage the beneficial reuse of sludge wherever environmentally feasible. As previously discussed in Section 3.6.9, wastewater treatment plant sludge from the Mattawoman WWTP and the Blue Plains WWTP is land disposed in Charles County.

4.11.1 Technology Assessment

The characteristics of sludge depend on both the initial wastewater composition and subsequent wastewater and sludge treatment processes utilized. The characteristics affect the various reuse/disposal options available to a municipality. The constituents that are usually the most important in the decision-making process for sludge management practices are:

- Organic Content
- Metals
- Pathogens
- Nutrients
- Toxic Organic Chemicals

For a treatment facility that receives primarily municipal wastewater, such as Charles County's Mattawoman WWTP, the quality of sludge does not limit the types of reuse/disposal options available. When treatment facilities receive large volumes of industrial waste, the facility does not generate a "clean sludge" (i.e., low concentration of metals in the sludge), thereby limiting the options available for sludge disposal.

The most common and accepted practices for the reuse or disposal of wastewater sludge include the following:

- Lime Stabilization/Land Application

- Heat Drying/Pelletization
- Composting
- Landfilling
- Incineration

4.11.2 Lime Stabilization/Land Application

Lime stabilization is a process where lime is added to sludge to increase the pH to a level which is destructive to pathogens and odor-producing organisms. The effectiveness of the lime stabilization process is directly related to the pH level achieved in the sludge and the contact time. Numerous studies performed have indicated that a significant reduction in pathogens and odors occurs when the pH is increased to 12 or more and maintained for 2 hours. Design criteria commonly recommend increasing the pH of the sludge to 12.5 by lime addition and maintain above 12.5 for 30 minutes. This method should keep the sludge pH above 12 for a period of 2 hours.

Lime stabilization does not result in the reduction of organic matter as do some biological stabilization methods such as digestion, but, rather the inactivation of biological activity. If the pH is allowed to decrease significantly, biological activity will resume and the production of odors will result. Lime addition should be sufficient to ensure that the pH of sludge does not drop to low levels after prolonged storage. When the lime dosage is too low, the stabilized sludge may attain the pH of 12 initially, but a rapid pH decay may occur. However, if the pH is raised above and maintained for 30 minutes, the pH can remain above 11 for up to 22 hours. Lime dosage depends on a number of factors which include the following:

- Type of Sludge (e.g., primary, waste activated, etc.)
- Chemical Composition (including organic content)
- Sludge Alkalinity
- Solids Concentration

The actual lime dosage should, therefore, be determined on a case-by-case basis. Studies have shown that primary sludges typically require the lowest dosages, whereas waste activated sludges usually require the highest dosages. In addition, the studies have shown that chemical sludges, such as iron and alum, require high lime dosages.

The location of the lime stabilization process within the sludge processing treatment train can also impact the required lime dosage. Pre-lime stabilization consists of a lime slurry added and mixed into a liquid sludge prior to dewatering. Post-lime stabilization involves adding lime in a powdered form to dewatered sludge cake and blending the two together. The mixing is typically accomplished using a pug mill, or paddle mill mixer.

Odors are substantially reduced because the high pH level eliminates or suppresses the growth of microorganisms producing malodorous gases. Hydrogen sulfide, one of the major odors in a sludge processing operation is converted to the nonvolatile forms of hydrogen sulfide and sulfur compounds as the pH is increased to 9 and above.

Pathogens can be reduced 99 percent or more in sludges that have been lime treated to a pH of 12 or greater. The pathogen concentration in lime stabilized sludges can be 10 to 1000 times less than concentrations in anaerobically digested sludges. Studies have shown that lime dosages are typically lower in post-lime stabilization than in pre-lime stabilization operations to achieve the same degree of pathogen destruction. It is suggested that the destruction of pathogens may be enhanced in post-lime stabilization due to the heat generated during hydration of dry quicklime in the sludge.

Land application, defined as the spreading of stabilized sludge on or just below the surface of the land, is a sludge utilization technique utilized by many wastewater treatment facilities in the nation. The land application process incorporates wastewater sludges into soils, thereby providing a valuable resource to improve the characteristics of the land. The sludge can serve both as a soil conditioner and as a partial replacement for commercial fertilizers. Agricultural use of sludge is the most widely used land application method and is often the most economical of sludge disposal methods.

Municipal wastewater sludge is also recognized to have valuable soil nutrients and can serve as a partial replacement for expensive chemical fertilizers; nitrogen, phosphorus, and small amounts of potassium, are found in wastewater sludge. For beneficial reuse, the sludge is typically applied at agronomic rates to agricultural land. An agronomic rate is the rate at which nitrogen and/or other nutrients supplied by the sludge meet the nutrient requirements of the crops being grown. Nitrogen is usually the limiting parameter.

The purpose of applying sludge at these rates is to minimize the leaching of sludge nutrients into the groundwater. Controlled application rates also limit the buildup of heavy metals and other contaminants in the soil.

Site characteristics greatly affect the potential environmental impacts of sludge application. Factors of concern include depth to groundwater, distance to surface waters, slope of the site, soil permeability, and soil pH. Other site characteristics of importance are the proximity of the site to social and cultural activities such as homes and public buildings.

As with commercial fertilizers, the primary means of managing land application of municipal wastewater sludge is by controlling the application rate to optimally disperse sludge constituents. The application rate is the principle factor to be considered in determining the amount of land

required. The greater the application rate, the less land needed to handle the sludge produced. Rates of application are calculated based on permissible sludge constituent concentrations and soil characteristics.

Land application is a suitable disposal technology for either liquid or dewatered sludge. Liquid sludge is commonly applied by surface or subsurface injection techniques. If applied on the surface, the sludge can be incorporated into the upper layer of soil by plowing or discing. This is accomplished after application by a tractor pulling a plow-like applicator.

The other method of liquid sludge application is subsurface injection, which is a commonly used method of application in Prince George's County, Maryland. This method requires specially designed sludge application vehicles, which allows the sludge to be injected beneath the surface without turning the soil. Sludge injection essentially eliminates odors associated with land application of municipal domestic sludges.

Dewatered sludge can be surface applied or injected. In surface application, the sludge is first spread on the soil surface and subsequently incorporated into the upper layer of soil by plowing and discing. The operation is similar to an application of animal manure and requires a spreader, followed by a tractor to plow or disc the material into the soil. For subsurface injection, the hauler typically adds water to the sludge at the site to facilitate injection.

All land application programs require storage facilities for periods of inclement weather, and in the event of equipment failures and other service disruptions. Sludge disposal trucks are not able to enter disposal sites when the ground is soft. Storage is also required because MDE does not permit land application during periods in which the surface soils of the sludge land application area are water saturated or frozen.

A. Advantages

Municipalities in every part of the country are successfully using land application programs and have been doing so for many decades. Land application has been used successfully by both small towns and large cities. Currently, about 25 percent of the nation's sludge is land applied. This breadth of experience has shown land application to be a safe and effective wastewater sludge use option.

Lime stabilization of the sludge is not sensitive to toxic substances in the sludge and pathogens can be reduced 99 percent or more. The land application of sludge is a relatively easy technology to use which can be operated on an intermittent basis. By maintaining pH levels, odors are eliminated. The land application of sludge provides a beneficial use and is the most cost- effective sludge management option.

B. Disadvantages

The lime stabilization process increases the volume of sludge to be disposed when compared to biologically stabilized sludges. This is an important consideration since the volume of sludge increases annually, while the land available for land application decreases. The stabilization processes produces a drier sludge cake which makes subsurface injection more difficult.

The stabilization process requires the handling of dry lime throughout the process. Additionally, the process is mechanically dependent; and scaling of the equipment must be maintained at appropriate levels.

Odor is a potential problem if the process is not managed properly. In addition, storage facilities may impact the environment if not managed properly.

4.11.3 Sludge Composting

Sludge composting is the controlled, aerobic, thermophilic decomposition of organic matter to a relatively stable humus-like material. Bacteria, fungi, and actinomycetes are primarily responsible for the decomposition process. Environmental factors which control the rate and course of the reaction are the volatile solids and moisture content, oxygen concentration, temperature and nutrient concentration of the compost. The composting process generates heat, raising the temperature of the material in the range of 55 to 80°C (130 to 175°F). The heat increases the rate of decomposition, evaporates moisture, and effectively destroys or inactivates pathogenic microorganisms and parasites. The end-product of the process, compost, is an organic material which can be easily stored, handled and applied to land as a soil conditioner and low-grade fertilizer. The finished compost is relatively odorless with a slight ammonia or "wet earth" odor.

Composting is classified by the EPA as a Process to Further Reduce Pathogens (PFRP), which allows unrestricted use of compost. Although composting is not a true sludge disposal process, the finished product is valuable enough to warrant removal and reuse by an outside source.

Initially in composting systems, dewatered sludge and bulking material are mixed together. The bulking material usually consists of sawdust, wood chips, or other carbonaceous material. In addition to serving as a carbon source, the bulking material will increase the porosity and decrease the moisture content of the mixture, so that aerobic conditions can be maintained. Shredded tires and other non-carbonaceous material may also be used to provide porosity; however, an additional carbon source as amendment may then be required.

The three basic compost processes utilized in the United States includes the windrow, aerated static piles, and in-vessel methods. Each method of composting may vary in the time required for stabilization, the degree and quality of process control, and the complexity of the system. However, the finished product from each method is essentially the same.

The active composting process occurs for 2 to 6 weeks depending on the composting method employed and other environmental factors. During that time, the mixture is either mechanically or force aerated and the process generates temperatures in excess of 50° to 60°C (122° to 140°F), resulting in pathogen destruction, moisture removal, volume reduction and solids stabilization. After the active composting period, the material is generally cured for an additional 2 to 6 weeks. Further stabilization and drying takes place during this period. The oxygen requirements during the curing are significantly less than during the composting step. The cured compost may be screened, if required, to remove bulking material for distribution as finished product.

Finished compost is a stable humus-like substance with valuable properties as a soil conditioner. Although compost is not high enough in nitrogen to be considered a fertilizer, it contains several macro- and micronutrients that are favorable to plant growth. As a soil conditioner, compost will improve a soil's physical properties. The addition of compost to sandy soils will increase the soil's ability to retain water. In heavy-textured clay soils, the added organic matter will increase permeability to water and air, and minimize runoff by increasing the water infiltration into the soil.

A. Systems

1. **Windrow Composting** - Windrow composting involves mixing dewatered sludge (digested or stabilized to minimize odor generation) with a bulking material and forming long triangular windrows. The windrows are generally 10 to 16 feet wide and 4 to 6 feet high. The operation is typically conducted on a paved, uncovered area. Aeration of the compost is achieved by mechanically mixing or turning the windrows using specialized equipment. The frequency of turning varies from three to five times per week depending on the actual composting process. Windrow turning is the only means of effecting process control such as temperature and oxygen concentration in a conventional windrow.

   A conventional windrow may be modified by providing a single aeration channel under the entire length of the windrow. This is called an aerated windrow and provides a more positive means of odor, temperature and process control than a conventional windrow. Any bulking material may be used. The quantity of the bulking material is adjusted to obtain a solids content of approximately 35 to 40 percent. If wood chips or other large bulking material are used, a final screening operation is required to produce a marketable product. After the composting period, the mixture must be cured for an additional 20 to 30 days to provide a dry, stable finished product.

2. **Aerated Static Piles** - Aerated pile composting consists of mixing the dewatered sludge with wood chips or other large bulking material, forced aeration during the composting process, and screening. Aerated pile composting systems have utilized primary or unstablized sludge; however, odor generation has been a problem. In aerated composting, the mixture is formed into extended piles approximately 8 feet high. These piles rest on top of perforated aeration piping, which is embedded and covered with bulking agent to promote even air distribution within the pile. The entire compost pile is then covered with finish compost to provide insulation and minimize odor generation. Aerobic conditions are maintained during the typical 20 to 30 day active composting period. Aeration can be either positive, blowing air up through the piles, or negative, drawing air down through the piles. With negative aeration, odor can be minimized by exhausting the off-gases through odor control devices. Following the composting period, the compost must be cured for 20 to 30 days to completely stabilize and ensure dryness. The finished compost is then generally screened to remove bulking material.

3. **In-Vessel** - An in-vessel composting system generally consists of two enclosed mechanical reactor vessels, a bioreactor, and a cure reactor. Some systems, however, use a single vessel for both steps or replace the enclosed cure reactor with an open concrete cure pad.

Initially a feed mixture of dewatered sludge, bulking agent, and recycled compost is introduced into the first-stage reactor. Digested and undigested, primary and secondary sludges are suitable for in-vessel composting. Due to operation and economic considerations, it is desirable to have a high solids concentration in the feed sludge. The feed mixture (sludge, new bulking agent, and recycled compost) flows through the reactor as composting occurs within the vessel. The hydraulic residence time (HRT) in the bio-reactor is approximately 14 days. Each manufacturer's composting system employs various methods of air feed to provide uniform aerobic conditions and to control the composting process. Temperatures developed in the bioreactor result in moisture removal, volume reduction, pathogen kill and solids stabilization. Compost from the bioreactor is transferred to the cure reactor for additional organic conversion and stabilization. Aerobic conditions are maintained to promote additional drying and stabilization during a typical 14-day residence time. Finished compost is discharged from the cure reactor for distribution or recycle. Recycling of finished compost will reduce the amount of bulking material required in the feed mixture, and decrease the moisture content of the mixture.

In-vessel systems can be configured in many ways. Typical configurations currently being marketing in the United States include:

- Vertical, Plug-Flow Cylindrical Silos
- Vertical, Plug-Flow Rectangular Silos
- Circular, Agitated-Bed Reactors

- Rectangular, Agitated-Bed Bin Reactors
- Rectangular, Plug-Flow Tunnel Reactors

B. Advantages

Leachate and condensate produced during composting are minimal and easily treated by standard wastewater treatment plants. Sludge composting is a viable stabilization process which further reduces pathogens. The process produces a good soil amendment and nutrient source which may be used for landscaping, potting soil, or agricultural purposes. The sludge is reused as a resource.

C. Disadvantages

Sludge composting provides the potential for odor generation. Large amounts of carbonaceous bulking material is required for the process. Compost must be screened prior to marketing to separate bulking material from the finished product. High capital costs, especially for the mechanical systems. Not an ultimate disposal method — requires distribution and marketing.

4.11.4 Heat Drying/Pelletization

Heat drying is a unit operation process that involves evaporating water from sludge by thermal means. This process raises the temperature of the incoming sludge to remove moisture which reduces total volume. The temperature to which the sludge is raised is too low to destroy organic matter, therefore, the nutrient properties of the sludge are retained. The end product contains soil nutrients and is free of pathogenic organisms.

Heat drying is classified by the EPA as a Process to Further Reduce Pathogens (PFRP). Although heat drying/pelletization is not a true sludge disposal process, the finished product is valuable enough to warrant removal and reuse by an outside source.

Sludge moisture content is normally expressed in percent moisture, percent solids, or pounds water per pound dry sludge. The minimum sludge moisture content, practically attainable with heat drying, depends upon the design and operation of the dryer, moisture content of the sludge feed, and the chemical composition of the sludge. For ordinary domestic wastewater sludges, sludge moisture contents as low as 5 percent may be achieved. Chemical bonding of water within the sludge, which can occur through chemical addition for sludge conditioning, can increase the amount of water retained in the dried sludge product beyond the 5 percent moisture level. Heat-dried sludge typically has a moisture content of 10 percent or less.

In heat drying of sludge, water is transferred to the gas phase. The driving force for transfer is the

difference between absolute humidity (pounds water per pounds dry gas) at the wetted solid/gas interface and the absolute humidity in the gas phase. The difference in temperature between the heating medium and the sludge/gas interface provides the driving force for heat transfer in a sludge heat-drying process. Dryers are commonly classified on the basis of the predominant method of transferring heat to the wet solids being dried. The most common methods include convection (direct drying) and conduction (indirect drying).

Heat transfer by convection (direct drying) is accomplished by direct contact between the wet sludge and hot gases. The sensible heat of the inlet gas provides the latent heat required for evaporating the water. The vaporized liquid is carried off by the hot gases. Direct dryers are the most common type used in heat drying of municipal sludge and consist primarily of rotary dryers.

Heat transfer by conduction (indirect drying) is accomplished by contact of the wet solids with hot surfaces, such as a retaining wall separating wet sludge and the heating medium. The type of indirect dryers used with municipal sludges include dryers with large rotors and a vertical multiple stage dryer.

Thermal evaporation of water from sludge requires considerable energy. The amount of fuel required to dry sludge depends upon the amount of water evaporated. It is imperative that a dewatering step precede heat-drying so that overall energy requirements can be minimized. The heat required to evaporate water from wet sludge is comprised of the following:

- Heat to raise the sludge solids and associated residual water to the temperature of the sludge produce as it leaves the dryer.
- Heat to raise the water temperature to the point where it can evaporate and then to vaporize the water (latent heat).
- Heat to raise the temperature of the exhaust gas, including water vapor, to the exhaust temperature.
- Heat to offset heat losses.

Since the energy required to operate a sludge heat dryer is directly related to the volume of moisture required to be removed, most drying systems recycle dried sludge back to the feed end of the dryer. The dried sludge is blended with the incoming dewatered sludge (typically at 15 to 20 percent solids) to reduce the overall moisture content of the sludge. The desired sludge feed is typically around 55 to 60 percent solids. Below this solids concentration, the feed sludge is in a "glue-like" phase and does not move through the dryer easily. The drier feed solids reduce agglomeration (large balls) of sludge, thus exposing a greater solids surface area to the drying medium. Regardless of the type of drying system, the process should be preceded by mechanical dewatering and followed by air pollution control systems.

A. Dryers

1. Direct Rotary Dryers - This type of dryer is the most commonly used in the United States for drying municipal wastewater sludges. Hot drying gases at temperatures of 1200°F (650°C) are added to the dryer, usually in a concurrent flow pattern. Gas velocities must be limited to 4 to 12 feet per second to prevent dust from being entrained with the exhaust gases. The dryers are typically built as either a single pass or triple pass dryer. The triple pass dryers are more advantageous than single passdryers in that better control and contact time between the sludge and drying gases are provided, as well as the length of the dryer can be reduced.

   The rotary drum usually consists of a cylindrical steel shell that revolves at 5 to 8 revolutions per minute. One end of the dryer is slightly higher than the other, and the wet sludge which has been blended with dried sludge product, is fed into the high end. Flights projecting from the inside of the shell continually raise the material and shower it through the drying gases, moving the material toward the outlet. After the sludge has been held in the dryer for 20 to 60 minutes, the dried sludge is discharged at a temperature of 180° to 200°F (82° to 93°C). Exhaust gases are conveyed to a cyclone where entrained solids are separated from the gases. The spent gases exist at about 300°F (149°C). A portion of the dried product is recycled (blended with wet sludge feed), and the balance goes to storage. The sludge product from this type of drying system is shaped into little round balls due to the rotating action of the dryer. Therefore, a separate pelletization step is not required to produce a marketable product. Gaseous discharge from the cyclone is exhausted to an air pollution control system for deodorization and particulate removal as necessary.

2. Indirect Rotary Disc Dryers - The dryer consists of a rotor mounted in a stator formed as a horizontal shell. This rotor is built up by a tabular shaft carrying a number of hollow disc filled with steam or a thermal oil and provided with agitator blades to ensure transport of the material. The rotor (discs and shaft) is completely submerged in the sludge. The sludge is transported through the dryer in a plug-flow fashion, passing through the annulus between the discs and the drum.

   Scraper bars project into the space between the discs to prevent coating of the heating surfaces and stop the material from following the rotation of the rotor. The scraper also produces a vigorous turbulent action within the dryer that improves heat transfer by inducing maximum particle contact with the heating surfaces and releases the vapor from the bulk mass of the sludge into the vapor dome. The stator can also be supplied, if necessary, with a steam or oil jacket for additional heat transfer.

   The dryer is operated as a closed system; therefore, it does not require sweep air or

drying gases. With a closed dryer system, particulates and odors are a minor problem. The heating medium enters the dryer through the central shaft and is distributed inside the rotor by a vacuum created through condensation. Each individual disc is accordingly filled with steam or thermal oil to ensure that the entire heating surface achieves the maximum temperature. Although some air will enter with the sludge, the exhaust vapor is, for all practical purposes, considered low pressure steam. The waste heat contained in the exhaust vapor can be easily and efficiently recovered for thermal conditioning of the sludge feed, which will increase the overall efficiency of the drying system.

The dried sludge leaving the dryer is in a powder form. A portion of the sludge is returned to the front of the dryer and blended with the dewatered (wet) feed sludge.The remainder of the sludge is sent to a pelletizing operation so that a marketable product can be produced.

3. Indirect Vertical Multistage Dryer - This type of dryer resembles a multiple hearth furnace. Incoming sludge is fed into the top inlet and moved by rotating arms from one heated tray (level) to another in a zig-zag motion until the sludge exits at the bottom as a dried, granular (pelletized) product. The dryer trays are hollow and are heated by steam or recirculating thermal oil.

   The rotating arms are equipped with adjustable scrapers, which move and tumble the sludge in thin layers and small windrows over the heated trays enhancing heat and mass transfer. The drying and pelletizing process starts with fine particles which gradually, layer by layer, grow larger, drying from the center to the outside. Formation of dust and oversized chunks is minimized. By recycling the dried sludge, the dryer feed is kept at a moisture content between 60 and 70 percent total solids avoiding the glue-like phase inside the dryer and facilitating granulation.

B. Advantages

Sludge pelletization is considered a process to further reduce pathogens. The process is compatible with various disposal options (e.g., landfilling, incineration, land application). Sludge pelletization produces a marketable product and allows sludge to be reused as a resource (e.g., fuel or soil amendment). Pelletization provides large volume reduction.

C. Disadvantages

Sludge pellitization requires high operational costs, primarily due to fuel requirements. The

process is highly mechanical and requires highly trained operators. There is a high potential for odor production unless control devises are utilized. The process is not an ultimate disposal method; therefore, the product requires distribution and marketing, unless coupled with an incineration process.

4.11.4.1 Incineration

Incineration is a high temperature, two-step oxidation process in which wastewater sludge and a fuel source (if needed) are combusted in an enclosed reactor. The combustion reaction may be divided into two process steps. The first step raises the temperature of the feed sludge to 212°F (100°C) which evaporates water from the sludge and increases the temperature of the mixture. Combustion actually occurs in the second step which increases the temperature of the mixture until the combustible elements in the sludge and fuel ignite. The heat produced by the combustion reaction induces organic and microbial destruction and additional moisture evaporation. The by-products of the reaction are suspended particulates, off-gases, and an inert ash residue. The suspended particulates are contained in the off-gases and are removed by air pollution control devices, such as a wet scrubber, venturi, or electrostatic precipitator. The off- gases are a mixture of nitrogen oxides, sulfur oxides, carbon dioxide, and hydrocarbons and are released to the atmosphere after particulate removal. The inert ash is typically disposed in a sanitary landfill.

The amount of oxygen supplied and the heating value and moisture content of the feed sludge affect the efficiency of the combustion process. Incineration is complete combustion and occurs when air (oxygen source) is supplied 50 to 150 percent in excess of the stoichiometric or theoretical requirement. When the amount of air is inadequate for complete combustion, soot, carbon monoxide and odorous hydrocarbons are produced. Since the excess air exerts a heat demand, it should be held to the minimum amount required for complete combustion. The amount of heat released from a given sludge is dependent upon the amount of combustible elements present which is quantified as the heating value of a sludge. Sludge stabilization prior to incineration is undesirable.

Chemical stabilization will produce chemical sludges which have low heating values, therefore requiring excess fuel to incinerate. Biological stabilization (digestion) reduces the volatile concentration and consequently the heating value of a sludge, which increases the amount of supplemental fuel required for the process.

A combustion process is termed autogenous when the heating value of the sludge is sufficient to raise the temperature of all incoming substances to combustion levels. If the heating value of the sludge is not sufficient, supplemental fuel must be burned to make up the heat deficit. Moisture in the sludge exerts a significant energy demand to vaporize the water. After considering radiation losses, and for heating of gas streams and sludge feed solids, approximately 3,500 BTU are required for every pound of water evaporated in an incineration process. Therefore, sludges containing a

low solids content will require supplemental fuel for moisture reduction. Typically, wastewater sludge must be dewatered to about 30 to 35 percent solids to enable autogenous combustion to occur. Sludge incineration systems burning autogenously have nominal fuel requirements and require auxiliary fuel only during start-up. In addition, a smaller capacity incineration system is needed with a drier sludge.

A. Systems

Two types of systems commonly used in the United States for sludge incineration are the multiple hearth incinerator and the fluidized bed incinerator.

1. Multiple Hearth Furnace - The multiple hearth furnace (MHF) has been the most widely used type of sludge incinerator. It is designed for continuous operation and is relatively simple to operate, durable and capable of handling varying feed patterns. A MHF is cylindrically shaped, containing a series of horizontally mounted hearths. MHFs are available with diameters ranging from 4 to 29 feet and can have from 4 to 14 hearths. However, for wastewater sludge incineration, a maximum of 8 hearths is usually recommended. Feed sludge is introduced into the uppermost hearth and is radially transported by either two or four rabble arms sweeping across the top of the hearth. The central shaft and rabble arms are air-cooled. The rabble arms are designed to move the sludge either inward, away from the hearth periphery, or outward, toward the hearth periphery. As the transported sludge reaches the inside or periphery of the hearth, it cascades downward onto the next lower hearth where a rabble arm transports the sludge radially as in the hearth above. The sludge moves inward and outward across the hearths, while traveling downward through the incinerator.

   An MHF can be divided into four process zones. The first zone, which consists of the upper hearths, is the drying zone where most of the water is evaporated. Since this zone operates at 600 to 900°F, uncombusted volatiles and hydrocarbons can be released in the exhaust gas causing odor and air pollution problems. In many instances, an afterburner must be installed to heat the exhaust gases to combustion temperatures (1400°F) oxidizing the odorous pollutants. The operation of an afterburner results in added fuel consumption. The second zone, consisting of the central hearths, is the combustion zone. In this zone, the majority of combustibles are burned in temperatures ranging from 1400° to 1700°F. The third zone is the fixed carbon burning zone, where the remaining carbon is oxidized to carbon dioxide in temperatures reaching 1800°F. The fourth and last zone consists of the lowest hearths and is the cooling zone (temperatures of approximately 300°F). In this zone, ash is cooled by the incoming combustion air. The sequence of these zones is always the same; however, the number of hearths in each zone is dependent on the quality of the feed, the design of the furnace, and the operational conditions. An MHF can be provided with heat recovery equipment such as air to air heat exchangers and heat recovery boilers.

2. Fluidized Bed Furnaces - These type of incinerators have also been widely used for sludge incineration. Combustion in a fluidized bed furnace (FBF) occurs within an expanded sand bed inside a cylindrical incineration chamber. An FBF is normally available in sizes ranging from 9 to 25 feet in diameter. Sludge, auxiliary fuel (if required) and combustion air are introduced into a sand bed located in the lower portion of the incinerator. Combustion air is injected into the bottom of the incinerator at a pressure of 3 to 5 pounds per square inch (gauge). This causes the sand bed to expand to approximately twice its original volume. The turbulent mixing within the expanded bed induces complete combustion of the sludge particles by allowing the sludge in the reactor to move throughout each section of the reactor during the combustion process. The bed temperature is controlled between 1400° and 1500°F by auxiliary burners located either above or below the sand bed. The air requirement of an FBF is determined by several factors including bed expansion, sand loss in the exhaust gas, and complete combustion. The quantity of excess air for complete combustion ranges from 25 to 45 percent which is less than the requirements for an MHF. As the sludge combusts, the moisture and combustible organics are eliminated, leaving a low density ash residue which is then carried by the gas stream out of the reactor vessel. Sand is also carried out with the ash and must be replaced. Sand losses are approximately 5 percent of the bed volume for every 300 hours of operation. The sand in the fluidized bed furnace also retains combustion heat when the system is not operating; thereby enabling a fluidized bed incinerator to economically endure periods of downtime lasting 18 to 20 hours without using substantial quantities of fuel upon start-up. A venturi scrubber air pollution control system removes ash from the incinerator off- gas. The ash is then thickened and/or dewatered for disposal. Energy recovery through the use of a hot windbox can reduce fuel costs. A hot windbox uses recoverable heat from the exhaust gases to preheat the fluidizing air prior to injection into the combustion chamber.

B. Advantages

Incineration requires no prior sludge stabilization and affords the maximum volume reduction of sludge (approximately 95%). Minimal land requirements and labor requirements. Energy recovery can be incorporated into the system to lower operating costs.

C. Disadvantages

The primary environmental issues for sludge incineration are air pollution and ash disposal. Incineration is an energy intensive process. The process has high capital operation costs. Sludge incineration is mechanically complex requiring highly skilled operators.

4.11.4.2 Landfilling

Co-disposal of sludge with refuse in municipal solid waste landfills has a long and well- established history. It continues today as an acceptable method of sludge management and is allowed under Maryland solid waste and sludge management regulations. However, the Charles County Commissioners have banned the disposal of sludge within the County's Sanitary Landfill.

The basic criteria and requirements for determining the acceptability of landfilling sludge in Maryland include the following:

- A separate permit is required for sludge disposal at any landfill.
- All sludge disposed in a sanitary landfill must be stabilized.
- The landfill must have adequate on-site equipment capable of handling the incoming sewage sludge.
- The owner/operator of the landfill must approve the project.

The following is a list of methods used to dispose of sludge in municipal solid waste landfills:

- Mix sludge with refuse and apply it to the working face.
- Blend sludge with soil and apply it as daily cover material.
- Apply sludge to finished cover to promote vegetation growth and enhance erosion control.

Blending sludge with daily or final cover involves essentially the same practices as land application. As such, these methods are subject to the same climatological problems as land application and are not considered a good emergency back-up system. Co-disposal with municipal solid waste is much better suited for emergency disposal operations.

When mixing sludge and refuse in a municipal solid waste landfill, sludge and solid waste are blended with dozers in the working face and compacted. Usually, landfill operators attempt to keep the ratio of solid waste to sludge very high in order to minimize problems associated with sludge sticking to the undercarriages and frames of dozers and compactors. Timing of sludge deliveries is also an important factor since there must be sufficient refuse available to blend with the sludge.

A. Advantages:

The landfilling of sludge is a good all-weather emergency disposal method; can increase gas production in municipal waste landfills, thus, increasing energy recovery. Land filling is a simple, reliable management approach.

B. Disadvantages:

Landfilling affords no beneficial reuse of the sludge and takes up valuable space in the municipal waste landfill. Operational problems with blending of municipal solid waste and the potential for affecting municipal solid waste leachate quality have negative effects on the environment. Landfilling sludge may be costly, depending upon municipal solid waste tipping fees.

4.12 Evaluation of Existing Sludge Management

The most cost-effective and environmentally acceptable sludge management disposal alternative is lime stabilization/land application. Capital expenditures and potential impacts associated with sewage sludge composting, incineration, and pellitization make these alternatives less feasible at this time. Additionally, Charles County has a policy that does not allow for the disposal of sewage sludge in the municipal waste landfill. For these reasons, the existing sludge management method of land application is, at this time, the most feasible option.

The MDE is responsible for reviewing and issuing permits for the land application of sludge in Maryland. Charles County residents have expressed a great deal of concern regarding the land application of sewage sludge in Charles County. As a result, the County initiated an inspection process to investigate and respond to concerns regarding land application practices in Charles County.

In addition, the County requires a separate transportation permit to haul sludge to land application sites within the County. Permit applications for the transportation of sludge into the County are reviewed by the County Commissioners for compliance with Charles County policies, as well as other rules and regulations. Applications are approved, conditionally approved, or denied by the Charles County Commissioners.

4.13 SPECIAL WASTE MANAGEMENT

Special waste management requirements for asbestos, special medical waste, hazardous waste, household hazardous waste, emergency response for hazardous waste spillage or leakage, and procedures for handling non-hazardous contaminated soils will be discussed in this section.

4.13.1 Asbestos

The Charles County Landfill is permitted to receive asbestos, however, currently only accepts asbestos materials from government institutions (schools, government buildings, etc.).

Asbestos disposed at the site must be packaged and labeled in accordance with *COMAR*

Procedures for disposal are as specified in *COMAR* 02.04.07.13.

- A minimum 24 hour notice to the landfill supervisor to provide information regarding delivery time, source, and quantity.
- Personnel handling the asbestos wear disposal protective clothing and respirators.
- The asbestos is handled with care to reduce the emission of fibers into the air. Asbestos is delivered to a separate area of the landfill for disposal.
- The asbestos is placed in a trench and completely covered with soil.

The above procedure recognizes that the health threat posed by asbestos is the release of asbestos fibers to the atmosphere and inhalation by humans. Once properly buried within a landfill and isolated from the atmosphere, asbestos poses no known health risks.

4.13.2 Special Medical Waste

The County landfill will not accept special medical wastes, including infectious and/or bio-hazardous medical waste. Currently, special medical waste generated at the hospital is incinerated on-site.

The management of special medical waste is strictly regulated by the MDE under specific medical waste regulations. However, the County reserves the right to address the management of special medical waste under a separate plan.

4.13.3 Hazardous Waste

The County landfill does not accept hazardous substances for disposal other than small quantities of household hazardous wastes. Currently, hazardous waste generators within the County contract with a licensed hauler of hazardous waste for collection and disposal. Hazardous waste storage, transport and disposal is strictly regulated by the MDE. However, the County reserves the right to address the management of hazardous waste under a separate plan.

4.13.4 Household Hazardous Waste

Several options are available to local governments for reducing the quantity of household hazardous waste disposed in landfills. These options include the following:

- Promoting source reduction through public information programs that emphasize the use of alternative non-hazardous products and the proper handling and disposal of hazardous household materials.
- Holding periodic hazardous waste collection days for residents.
- Establishing a permanent residential hazardous waste collection center where such waste can be collected on a continuous basis.

One drawback with the second option is that citizens must store quantities of hazardous materials in their homes between collection days, sometimes for extended periods of time. And while both the second and third options are costly, the third option requires substantially greater staffing, facilities, and disposal costs.

Charles County holds a household hazardous waste collection day the first Saturday of every month at the Landfill, from April through December. Waste quantities continue to rise as citizen participation continues to increase.

Collection programs can be costly; however, it is a good idea to prevent household hazardous waste from entering the landfill. Expanding the County's public education program in conjunction with a collection program continues to contribute to the environmental quality of the landfill, as well as sensitizing the public to their role in responsibly managing their waste.

4.13.5 Emergency Response for Hazardous Waste Spillage or Leakage

Charles County's adopted *Hazardous Materials Response Plan* prescribes, to the extent possible, actions to be taken in the event of an emergency or unplanned spillage of hazardous materials within the county. U.S. Route 301, a major north-south truck route along the Eastern Seaboard, traverses the county. Hazardous materials spillage events occur there several times per year. The *Hazardous Material Response Plan* assigns responsibilities for notifications and responses to various agencies within the County. In addition, the Charles County Government administers an emergency preparedness and risk management program, and in conjunction with the Sheriff's Department, provides lead staff in the event of such incidents.

The *Hazardous Material Response Plan* is based on the concept that emergency functions for the various groups responsible for responding to hazardous materials accidents will generally parallel their normal day-to-day functions. All emergency vehicles carry a U.S. Department of Transportation "Emergency Response Guidebook", which contains federal and industry approved protective measures. The *Hazardous Material Response Plan* is consistent with the emergency plans of other agencies/organizations, including the Charles County Sheriff's Department and the Maryland State Police. When implemented, this Plan will abate the hazard and restore conditions to normal.

4.13.6 Non-hazardous Contaminated Soils

The disposal method for soil contaminated with petroleum or petroleum products which are generated within Charles County is dependent on test results indicating the level of toxicity and contamination. The following information is required before the contaminated soil may be disposed in the County landfill.

- A statement from the generator certifying that the soil is non-hazardous waste as defined by federal regulations under Subtitle C, Resource Conservation and Recovery Act.
- The amount of petroleum contaminated soil to be disposed.
- A description of the sampling protocol and a copy of all laboratory analyses.

A minimum of one composite sample shall be analyzed for each required test for every 100 cubic yards of soil to be disposed. In the case of soil reclaimed by thermal treatment, a minimum of one sample shall be analyzed for every production day composited hourly.

4.14 LANDFILL MINING

A county owned landfill that is excavated to recover valuable waste materials. In the case of a sanitary landfill, areas that were filled prior to the implementation of waste-to-energy, materials separation, and recycling programs may contain combustible materials (for waste-to-energy); metals and other recyclable materials. In addition to recovering materials, landfill space and cover material (i.e., soil) can be reclaimed. In addition to excavation and hauling equipment, material separation equipment such as that magnetic separators, optical separation systems (glass), balers, and crushers would also be used.

4.15 MUNICIPAL SOLID WASTE (MSW) COMPOSTING FACILITY

A centralized facility that accepts and processes the biodegradable portion of pre-separated municipal solid waste. In addition to yard waste, a MSW compost facility would process food waste, paper products and other clean wood wastes. MSW is usually composted within an

enclosed reactor or building to optimize waste decomposition and to control odors. Several acres of land will be required to process and store the final composted product. Chippers and grinders are required to process wood waste. Front-end loaders and windrow turners may be required to

move and turn the piles depending on the type of composting process. Trommels and screening equipment will be required to sort and remove large materials from the final product.

4.16 PUBLIC EDUCATION PROGRAM

Public awareness of, and concern for solid waste management issues has heightened considerably over the past 20 years. As a result, public opinion has played an important role in shaping public policy over such issues as the siting of solid waste management facilities, concerns over the increased cost of waste disposal, and widespread support for recycling. Informed and participating citizens is a key to a successful solid waste management program. In its publication entitled, *Decision Makers Guide to Solid Waste Management*, the EPA makes the following recommendations regarding public information and involvement

- Decision makers should involve the public early in the waste management planning process.
- Promotion and education programs should be tailored to the needs of each community and maintained throughout the year.
- Planning for public education and involvement requires that decision makers understand their audience, prepare a formal plan, and establish a method for evaluating the success of the programs.
- The public has a right and a responsibility to understand the full costs and liabilities of managing the wastes they produce.

Thus, the public should be involved in decision making with respect to solid waste management planning, and public education is critical to enable the public to make sound decisions.

In order to promote sound solid waste management practices, and encourage waste reduction and recycling and other appropriate waste disposal behaviors, Charles County's public education program informs county residents, businesses, and institutions about related county policies and programs. The County's education program consists of press releases, television commercials, the County webpage, online banner ads, fliers, tax bill insert, mailings, public workshops, school visits, and seminars.

4.17 SUMMARY OF SOLID WASTE MANAGEMENT ALTERNATIVES

Table 4-1 presents a summary of the alternatives discussed above and their ability to meet the goals and objectives of this Plan. In addition, the summary indicates whether or not each alternative will be considered in the Action Plan presented in Chapter 5.

4.18 SITING NEW ACCEPTANCE FACILITIES

The decision making process for selecting a solid waste management facility site involves the interaction of several factors. These factors include environmental, technical, economic and socio-economic, and socio-political considerations. Site selection develops a hierarchy of factors influencing the decision, and incorporates objective (quantitative) and subjective (value judgments) considerations into the evaluation of sites through a multi-level screening process.

- Environmental concerns deal with the effects that the facility will have on the ecosystem of the site and surrounding area, and permitting requirements. It includes impacts on wetlands, groundwater, surface water, endangered species, archaeological sites, historical sites, and environmentally-sensitive areas.

- Technical concerns involve the physical location and daily operational requirements such as access to roads, buffers, size and type of facility, soils, easements, sediment and erosion controls, stormwater management, and site utilization.

- Economic and Socio-economic concerns involve costs incurred to establish the site and the financial impact on near-by neighbors of the facility, particularly in comparison to any site being considered.

- Socio-political concerns deals with the reaction of local citizens, industry, and others to the siting process and final decision.

In order for the siting process to be effective, the methodology must consider the future impacts of the decision, involve the public, take conflicting views into consideration, and provide a usable tool with which county decision makers may make the final decision.

Table 4-2 SUMMARY OF SOLID WASTE MANAGEMENT ALTERNATIVES

Alternative	Rec*	Potential for Meeting Goals and Objectives of the *Charles County Comprehensive Solid Waste Management Plan.*
		Collection:
Free Enterprise	N	Existing system of collection (municipal waste). Allows competitive pricing for services based off of competition for business. Promotes private business and the freedom for consumers to choose their service provider.
Franchising	R	Provides opportunities for flow control and waste reduction incentives. However, private haulers could be negatively impacted and bureaucracy is increased. Best alternative for flow control.
Licensing	R	Allows for customer selection of haulers and a means for the county to implement policies for flow control and waste management practices.
Public Operation	N	Provides highest level of flow control. This alternative is not judged to be as cost-effective or efficient. Does not provide a mechanism for efficient integration of county and municipal efforts.
		Recycling:
Curbside Collection	R	Curbside collection is an important program for meeting the county's recycling goals. Necessary to achieve the required recycling rate.
Drop-Off Centers	R	Drop-off centers will continue to partially meet the objective for increased recycling. Provides more cost-effective and efficient means of recycling within the remote, rural areas of the county.
Buy-Back Centers	R	Buy-back centers provide an incentive to some who would otherwise not recycle. Existing centers are privately owned and operated and no cost is incurred by the county. Can help achieve the objective of maximizing recycling
Mixed Waste Processing Facility (MWPF)	N	This system ("dirty MRF") does not meet the *Charles County Comprehensive Solid Waste Management Plan* objectives of cost-effectiveness, environmental protection, and increased recycling. Does not provide for a high quality of recyclables
Material Recovery Facility (MRF)	N	Recommended for inclusion within the county program to provide a readily accessible outlet for recyclables. More information will be required from pilot recycling programs to evaluate options concerning regional and private material recovery facilities.
Rubble Material Recovery Facility (RMRF)	R	Would complement the county's efforts at waste reduction and recycling, and would increase the longevity of the county landfill where the rubble is disposed.
Commercial Recycling	R	Commercial waste comprises about 56 percent of the waste stream; commercial recycling provides an excellent opportunity for Charles County to reduce the amount of solid waste requiring final disposal. Costs to the county for this program are minimal.

* Recommendation:
R: Recommended for further consideration.
N: Not recommended; eliminated from further consideration.

TABLE 4-2

SUMMARY OF SOLID WASTE MANAGEMENT ALTERNATIVES

(continued)

Alternative	Rec *	Potential for Meeting Goals and Objectives of the *Charles County Comprehensive Solid Waste Management Plan.*
Recycling (continued):		
Yard Waste Composting	R	A critical component of the County's recycling program. Cost-effective and efficient method in which to reduce the amount of waste requiring final disposal, conserving landfill space.
Mixed Organics Composting (Including Food)	R	Recent advancements in food composting technologies have made this a promising alternative that should be considered.
Solid Waste Composting	N	At the present time, the relatively high cost for solid waste composting eliminates this alternative from further consideration. Technology is not proven in the long run.
Municipal Waste Combustion and Waste-To-Energy:		
Municipal Waste Combustion	N	This alternative would be very costly for Charles County. Potential environmental impacts do not meet the goals and objectives of the *Charles County Comprehensive Solid Waste Management Plan.*
Waste-to-Energy	NC	This alternative would be very costly for Charles County. The Tri-County Regional Task Force has identified this as a long-term solid waste management option for the tri-county region.
Land Disposal:		
Landfills (Municipal Waste and Rubble)	R	Necessary, most cost-effective alternative for the management of wastes that cannot be recycled or reused. State-of-the-art facilities are necessary to protect public health and the environment.
Transfer and Disposal (T&D)	R	While facility ownership, size, and services can vary significantly, a waste transfer facility would consolidate waste from multiple collection vehicles into larger, high-volume transfer vehicles for more economical shipment to distant disposal sites.
Sludge Management:		
Lime Stabilization/Land Application	R	Cost-effective and environmentally acceptable sludge management methodology; beneficial use of resource. Existing program permitted by MDE.
Heat Drying/Pelletization	NC	At this time, capital expenditures to implement this system are not warranted.
Composting	NC	At this time, capital expenditures to implement this system are not warranted.
Incineration	N	Highest capital and operations cost; potential environmental impacts; does not reuse resource.

TABLE 4-2

SUMMARY OF SOLID WASTE MANAGEMENT ALTERNATIVES

(continued)

Alternative	Rec*	Potential for Meeting Goals and Objectives of the *Charles County Comprehensive Solid Waste Management Plan.*
		Special Waste Management:
Asbestos	R	County should reevaluate the current prohibition against asbestos waste in order to provide its citizens with a safe area to dispose of asbestos waste.
Household Hazardous Waste	R	County should expand public education program to include proper management, disposal, and alternatives for household hazardous waste. Periodic collection days should continue.
Special Medical Waste, Hazardous Waste, Emergency Response for Hazardous Waste Spillage or Leakage, Non-hazardous Contaminated Soils	R	The County's current management of these special wastes should continue.
Public Education	R	Critical component of the recycling and overall solid waste management program. Expansion is recommended to cover other aspects of solid waste management such as household hazardous wastes and source reduction.

* Rec = Recommendation:

R: Recommended for further consideration.
N: Not recommended; eliminated from further consideration.
NC: Not currently recommended; may be reconsidered in the future after further study and evaluation

Site selection for a solid waste management facility is one of the most politically volatile issues that local governments face. Public attitudes and concerns are an integral part of the process of siting a new waste management facility. The public and political acceptability of the facility rests on the shoulders of the Charles County Commissioners and the local officials.

A sound framework for establishing a site is essential to providing the County and local officials with a solid foundation from which to arrive at a decision. Once the site decision is made, the County may continue forward to provide the community with an integrated solid waste management system.

The siting process for disposal and processing facilities involves a multi-level screening process, as described in Table 4-2. The first level screening process identifies areas in the County that are unsuitable for siting of land disposal and processing facilities based upon broad technical, environmental and land use criteria.

If a site passes first level screening, it is subjected to more stringent site-specific screening criteria as described in Table 4-2. The suitability of the site will also be evaluated through the requirements of the MDE permitting process, Charles County Department of Public Facilities, Charles County Planning and Growth Management Department, Charles County Commissioners, and through extensive public review through the Charles County citizen groups.

4.18.1 CONSTRAINTS ON THE SITING OF SOLID WASTE MANAGEMENT FACILITIES

Existing physical features and existing and planned uses of the land within Charles County affect the siting of waste management facilities. Solid waste management facility siting should be planned to minimize impacts on the citizens of Charles County and the environment.

A brief description of these constraints imposed on solid waste acceptance facilities based on technical environmental and land use concerns follows.

4.18.1.1 Topography

Charles County is located in the Atlantic Coastal Plain, therefore is a relatively low-lying area. Elevations range from 10 feet above sea level near the Potomac River to approximately 230 feet near Waldorf. Large portions of the County are exceedingly flat, with a gentle slope toward the Chesapeake Bay, or toward local drainage features. Broad plateau formations with sides dissected by drainage features are common throughout most of the County. This dissection reflects the nature of the soils underlying the County which are easily eroded clays, sands and gravels. In some areas, dissection is incomplete and flat areas several miles across have not as yet been reached by headward cutting streams. Stream valleys affect local topography throughout the County.

Table 4-3 GENERAL PROCEDURE FOR SITING WASTE MANAGEMENT FACILITIES

The process of site selection can be defined in stages or levels by which numerous possible sites is reduced to a few probable sites. Involvement of and communication with Charles County and citizens throughout the entire process is essential to provide input for the site evaluation planning parameters, determination of and ranking of site suitability criteria and the matrix evaluation process.

Establish Site Evaluation Planning Parameters as a framework for the site search direction. These parameters should include, but not be limited to, items such as size, service life, major areas excluded, minimum buffer zone requirements, compatible surrounding and adjacent land uses, preferred site distance from centers of development, acreage requirements.

Data Collection of Baseline Information including previous studies and reports and conducting meetings with the interested county departments, citizen groups, and regulatory agencies to discuss the proposed process.

Prepare Land Use Opportunities and Constraint Maps depicting technical, environmental, economic, and socio-economic concerns relevant to solid waste management facility siting.

Identify Primary Potential Solid Waste Management Facility Sites by a "windshield" survey, U.S.G.S. topographic maps, floodplain maps, aerial photographs, plat maps, zoning maps, project planning parameters, meetings with county officials, and regulatory agency representatives.

Develop Screening Criteria taking the planning parameters into account, several key factors may be identified in screening sites. Key factors which are common to solid waste management facilities are that the site should:

- Have a minimum impact on the community
- Be served by adequate road systems
- Be technically sound, environmentally suitable, and economically feasible
- Have the support of elected officials and citizens groups

First Level Screening (absolutes) involves an inherent constraint which does not allow a solid waste management site at the location due to conditions that, if found, would eliminate a site from further investigation. First level screening criteria may include, but is not limited to, highly developed areas, areas within 5,000 feet of a airport runway, areas within the 100-year floodplain, site boundaries with reasonable direct access beyond two miles of a major arterial road or transportation network, national parks, or critical environmental areas.

Develop a Site Feasibility Matrix to rank and provide a comparison of the sites based on the first level screening criteria. The site comparison will provide for elimination of non-feasible sites from further investigation. This site elimination is important as it would be inefficient (time wise and momentarily) to attempt to investigate all the primary potential sites in terms of the level two screening criteria. The end result is a listing of potential sites for further investigation as well documentation of the non-feasible sites and why they were eliminated.

TABLE 4-3

GENERAL PROCEDURE FOR SITING WASTE MANAGEMENT FACILITIES

(continued)

Conduct Field Inspection of the potential sites with county officials and MDE officials.

Second Level Screening (non-absolutes) involves assessing the constraints which, by virtue of their nature, are not absolutely disqualifying. Second level screening is an evaluative process in qualitative and quantitative terms. Criteria for qualitative evaluation include, but is not limited to, buffer, easements, habitat impact, surface water quality impact, archaeological/historical, surrounding land-use, aesthetics (screening) and land ownership. Quantitative criteria are definable in terms of standard engineering practices and include haul distances, access, site size/shape, soils, availability of site resources (cover soil), site drainage, groundwater/aquifer impacts, site utilization, wetlands impacts, well inventory, proximity to sensitive areas, proximity to residential developments, and development costs.

Determine Matrix Rating Methodology for evaluation of the second level screening criteria as a joint effort of the citizens group, and county officials. Two of the more common matrix rating systems used are the ranking method and the rating method.

The rating method simply assigns an unweighted numerical value for each screening criteria (1 - very good, 2 - good, 3 - fair, and 4- poor). The numbers are tallied and the lesser overall total is the most desirable site. This method assumes that each criteria is of equal importance.

The ranking system uses a weighted numerical value for each criteria. The impact factors (1 - negligible impact, 2 - less significant impact, 3 - significant impact, and 4 - most significant impact) are used to reflect the relative value of each screening criteria. The impact factor is then multiplied by the numerical rating criteria to provide a weighted value.

Develop a List of Preferred Sites based on the matrix evaluation of the sites, a selected number of sites should be selected for further analysis.

Conduct a Workshop with the Charles County Commissioners to present the findings and list of preferred sites and the recommendations of the consultant of the final sites for detailed investigation.

Conduct Final Site Investigation of the sites selected for detailed study.

Conduct Public Participation meetings to obtain community input into the decision making process and to present site-specific data obtained in the final site investigation. The Charles County Commissioners shall oversee this meeting.

Final Site Selection shall be made by the Charles County Commissioners based on the final site investigation data, the recommendations of citizens groups, and public opinion. The site will be selected and procured by the Charles County Commissioners.

Adjacent to the Potomac and Patuxent Rivers are low-lying flats not more than 10 to 25 feet above sea level. Steeply-sided terrace formations are often present in these locations as well. These flats vary in width from a few feet where the river current of the Potomac washes strongly against the shoreline, such as is found at several locations in western Charles County near Indian Head and Potomac Heights, to more than a mile in the southern part of the County, such as Allen's Fresh. The interior of the County, along U.S. Route 301 from Faulkner to the Prince George's County line is predominantly flat. Outward from this plateau, dissection becomes more pronounced and the land is gently rolling and hilly. Approximately 65 percent of the County is nearly level or gently sloping, 24 percent moderately or strongly sloping, and 11 percent is greater than 15 percent.

Landfill sites are generally located in topographic high areas, broad flat plateau areas, and areas which do not have steep ridges. Land which has slopes greater than 15 percent is not considered acceptable for landfills due to excessive site grading required to develop the landfill. 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 county laws protecting these areas due to critical areas, tidal wetlands, and non-tided wetlands. Additionally, low-lying areas within the 100-year flood plain are not acceptable for development as a land disposal facility due to state and federal regulations.

4.18.1.2 Soils

Predominant soil types of Charles County are gravels, sands, silts, and clays. For landfills, the porous nature of the unconsolidated soils does not provide the impervious layer needed to contain leachate within the waste fill area. However, measures such as geomembranes, leachate collection and treatment systems, and monitoring systems aid in reducing the potential for migration of leachate into the environment.

The *Charles County Soil Survey* provides more detailed information on the types and locations of soils within the County which should be used for the initial stages of siting a landfill. Based on this survey approximately 19 percent of the County has soils with slight or moderate limitations for septic systems indicating that these soils are moderately permeable. The remaining 81 percent of the County is mapped as having poor drainage, and permeability. Approximately one-quarter of the County's land area is characterized as tidal marsh and swamp. However, this survey is somewhat limited as it is primarily concerned with the first 5 feet of the soil profile and more information is required before the final site selection decision can be made.

The properties of the soils on which a landfill is sited should be considered in planning, design, construction operation, closure, and post-closure of the landfill. 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. Impermeable soils are desirable soils for the base of the landfill; however, landfill operations require a loamy or silty soil which is easily spread and compacted for cover material. Soil types for other waste management facilities are those which can provide adequate support for the building, structure, or concrete pad.

4.18.1.3 Geologic Conditions

Although landfill facilities can be engineered to be environmentally protective in most geologic settings, it is desirable to have sites in areas in which geologic conditions provide backup attenuation capacity. In Charles County, optimum geologic conditions for a landfill site include adequate depth to groundwater and the presence of a low permeability formation (aquiclude) beneath the site. Geologic conditions should be such that an effective groundwater monitoring system can be established.

The geologic formations beneath Charles County are composed of gravel, sand, silt, and clay. These materials have been transported by streams, particularly the Potomac River, from the Appalachian and Piedmont region west and north of the County throughout the geological history of the County and were deposited in the form of alluvial fans and deltas. Tidal and marine muds and silt layers overlay dense, hard crystalline, metamorphic and igneous rocks of Precambrian age. The crystalline rocks are deep below the surface. Diatomaceous deposits are unique to this part of the state and are found throughout the County.

In the vicinity of Faulkner, there are unique surficial sediments which are a relatively young, thin veneer approximately 30 feet in thickness, occupying elevations of 30 feet above mean sea level and consisting of gravel, sand, and silt. These sediments were deposited by the eastward flowing Potomac River as the river migrated slowly southeastward to its present location. Beneath this granular deposit is the Calvert formation of the Chesapeake Group which is composed of the Fairhaven and Plum Point Marls. This formation overlies and tends to seal the surficial granular deposit from all of the older geologic units.

4.18.1.4 Location

Locating a site for a solid waste management facility involves the interaction of regulatory, environmental, technical, economic, and socio-political considerations. General regulatory, legal (laws), environmental, technical, and economic concerns for siting a waste management facility are discussed in other chapters of this plan. Socio-political considerations are dynamic and volatile. Charles County encourages and provides procedures and policies for public involvement in considerations associated with proposed solid waste management facilities within the County. In summary, the location of a solid waste management facility is governed by engineering, technical, and economic considerations which are generally straightforward with little controversy. As stated previously, these concerns are addressed in other sections of this Plan.

The socio-political issues are very dynamic and are a function of historic and recent events within the County. The variables for siting solid waste management facilities are that of socio- political issues which are constantly changing and are not easily documented.

4.18.1.5 Aquifers

The geologic formation underlying Charles County are sedimentary sands and gravels, capable of yielding substantial quantities of fresh water. There are five major water-bearing aquifers located in Charles County which slope from west to east. These aquifers are found in the Patuxent, Patapsco, Raritan and Magothy formations of the Cretaceous system, the Aqua Greenstone of the Eocene series, and in the Pleistocene deposits. Contamination of the aquifers within Charles County is a possibility due to geology of the area, and the numerous recharge areas.

4.18.1.6 Wetlands

Wetlands are of major importance to ecosystems in the County and Chesapeake Bay. The County has approximately 139,800 acres of wetland areas, of which approximately 81 percent are tidal and the remaining 19 percent are non-tidal. The tidal wetlands provide a transition zone between dry land and open water. Non-tidal wetlands are referred to as inland or upland wetlands and included swamps, bogs, and hardwood forests. Solid waste management sites should not encroach upon, or negatively, impact wetlands.

4.18.1.7 Surface Water and Floodplains

Charles County is bordered by the Patuxent, Potomac and Wicomico Rivers, and has three lakes or reservoirs within the county limits with a surface area of approximately 171 acres. The three lakes, Jamesian, Trinity, and Wheatley were constructed for flood control as part of the Gilbert Run Swamp improvements. The use of the Patuxent, Potomac or Wicomico Rivers as a water source is constrained by their salinity concentrations.

Along these rivers are areas associated with the 100-year flood plain. Facilities located within the 100-year floodplain may hinder the flow, reduce the temporary storage capacity of the floodplain, or wash out the waste within the landfill and endanger human health and the environment.

Floodplains are not suitable for siting solid waste management facilities within Charles County. Federal regulations (*CFR* 40) contains provisions banning the location of solid waste facilities within 100-year flood plains. Additionally, Charles County's Floodplain Management Program establishes floodplain districts within the County and provides for the issuance of permits, and imposes regulations on construction and development within these districts.

4.18.1.8 Water Quality

As described above for aquifers and surface waters, poorly sited, designed or managed solid waste disposal or processing facilities can cause water quality degradation. While current federal and state regulations and criteria for these facilities require design features to mitigate for potential water quality impacts, it is important, where possible, to site such facilities where they pose the least risk to drinking water supplies and other sensitive water resource areas.

As stated in the *Charles County Comprehensive Plan*, it is critical that the County improve and maintain water quality in the coastal, estuarine, and upper basin tributary streams. The County's policy considerations addressing water quality issues include:

- Ensure that point source discharge of pollutants are maintained at safe levels of environmental quality through strict enforcement of state water quality standards for point source discharges.

- Establish effective shoreline erosion-control regulations and work with state and federal agencies to identify and stabilize existing problem areas.

- Protect the County's finfish and shellfish areas by requiring full compliance with state and federal regulations relating to discharge into Class I and Class II waters.

- Encourage the establishment of soil conservation and water quality plans on all farms in Charles County to reduce sediment and nutrient export from agricultural activities.

- Strengthen stormwater management regulations to addresses both quantity and quality control of runoff and incorporate urban best management practices for sites undergoing development or redevelopment.

- Identify and map important aquifer recharge areas and develop protection measures to maintain the quality and quantity of these resources.

- Conduct a thorough analysis to determine the feasibility of developing surface water impoundment sites for potable water, storm water management, recreation, and/or fire flow.

- Continue to implement the recommendations of the *Patuxent River Policy Plan*.

- Continue to implement the recommendations of the *Charles County Comprehensive Water and Sewage Plan.*

Prior to the establishment of any solid waste management facility in Charles County, each of these water quality issues should be considered.

4.18.1.9 Adjacent Incompatible Land Use

Solid waste management facilities have the potential to create odor, noise, dust, and/or adverse traffic impacts for adjacent land users. Charles County is aware of the problems and nuisances which may be created by solid waste management facilities. The *Charles County Zoning Ordinance*, *Charles County Comprehensive Plan*, and requirements for public notification of potential new solid waste management facility locations will aid the County in reducing the possibility of adjacent incompatible land uses.

Similarly, new developments or land uses adjacent to existing solid waste management facilities must consider potential impacts due to any existing solid waste facility.

4.18.1.10 Airports

The U.S. Department of Transportation, *Federal Aviation Authority Order 5200.5, FAA guidance Concerning Sanitary Landfills on or Near Airports* stipulates the following criteria for sanitary landfills.

- Waste disposal sites may not be located within 10,000 feet of any runway end (used or proposed) to be used by a turbine powered aircraft.

- Waste disposed site may not be located within 5,000 feet of any runway end used only by piston powered aircraft.

- Waste disposal sites may not be located within a 5-mile radius of a runway end that attracts or sustains hazardous bird movements from feeding, water, or roosting areas into, or across the runways and/or approach and departure patterns of aircraft.

4.18.1.11 Hospitals

The *Annotated Code of Maryland* Environment Article, Section 9-225 prohibits the location of any landfill within a 0.5 mile radius of any hospital.

4.18.1.12 Planned Growth Patterns

The *Charles County Comprehensive Plan* is the planning document designed to plan and direct the development of growth patterns within the County. The planned growth pattern is supported by the *Charles County Zoning Ordinance.*

Planning for land use and growth management in the County will provide the necessary guidance in siting solid waste management facilities. Using the County's development and growth management plan as a basis to site solid waste management facilities, provide assurance that projects do not impact or nullify the County's long-term objectives.

4.18.1.13 Areas of Critical Federal, State, or County Concern

Critical concern areas established by the State of Maryland are classified into three categories:

- The first category includes those areas which can tolerate little or no interference from human activity due to physical or regulated constraints. This category includes marshes or endangered species habitats.

- The second category comprises conservation areas in which development that does not adversely impact the area, is allowed. Areas such as historic places or recreational areas are included.

- The third category includes lands which are designated for some future use. Generally, such sites are vacant and are designated as such due to its unique location or situation.

The development of a landfill within areas of critical federal, state, or county concern is not allowed due to regulatory requirements. However, certain solid waste management facilities may be located in these areas, provided the facility does not adversely impact the area. For example recycling drop-off centers may be located within parks. Charles County has several areas considered to be of critical concern. These areas are discussed in the following paragraphs.

4.18.1.14 Chesapeake Bay Critical Area

The Maryland General Assembly adopted the Chesapeake Bay Critical Area Law in 1984. The law requires that Charles County adopt and implement a critical area management program to protect the water quality and wildlife habitats of the Bay and its tributaries. The County is preparing a development guidance system for critical area growth allocations. The critical area is defined as the land along the tidal shoreline extending 1,000 feet inland of mean high tide or the landward boundary of tidal wetlands.

4.18.1.15 Zekiah Swamp Management Area

The Zekiah Swamp originates in Southern Prince George's County and flows through Charles County forming the headwaters of the Wicomico River. The Zekiah Swamp is part of the watershed of the Wicomico Scenic River, originally designated in 1968 by the Maryland Legislature. The Smithsonian Institution in conjunction with DNR described the Zekiah Swamp as one of the most important ecological areas on the East Coast and the largest natural hardwood swamp in Maryland.

4.18.1.16 Patuxent River

The County is participating with neighboring counties which border the Patuxent River in protecting the river's resources through land management strategies to control pollution within the watershed. The County was able to acquire an agricultural preservation easement on 222 acres through the State Agricultural Preservation Program and 615 acres with the State Open Space Program.

4.18.1.17 Parks

Additional areas of critical concern include national, state, and county parks which are located throughout the county.

Benedict Community Park	Maxwell Hall
Bensville Park	Myrtle Grove Wildlife Management Area
Bryantown Soccer Complex	Oak Ridge Park
Cedarville State Park	Pinefield Park
Charlie Wright Park	Piscataway National Park
Doncaster State Forest	Pisgah Park
Friendship Farm Park	Robert B. Stethem Memorial Park
General Smallwood State Park	Ruth B. Swan Memorial Park
Gilbert Run Park	Southern Park
La Plata Park	Strawberry Hills Park
Laurel Springs Regional Park	Thomas Stone National Park
Mallows Bay Park	Tilghman Park
Mattawoman Natural Environmental Area	Turkey Hill Park
Mattingly Park	White Plains Regional Park

4.19 COMPREHENSIVE PLAN REQUIREMENTS

Charles County Comprehensive Plan is a general guidance tool and is not intended to provide specific guidelines concerning solid waste management. The Plan has established guidelines for

the County to develop an integrated solid waste system. In general, the Plan encourages the search for short- and long-term solutions for solid waste management. The Plan has established guidelines for the County to develop an integrated solid waste management system. It implies no discouragement from future consideration of new technologies not addressed within it, or of new developments in existing technologies that at present are not recommended, provided they are consistent with goals and objectives of the *Charles County Comprehensive Solid Waste Management Plan*.

4.20 ZONING REQUIREMENTS

Charles County has recognized that solid waste management technologies are in a process of development and evolution. While land filling was the primary mode of solid waste management in past decades, today it is only one component of solid waste management. Solid waste management encompasses waste-to-energy facilities, recycling facilities, reuse facilities and composting facilities, in addition to the more traditional landfills. As the County moves towards the twenty-first century, the need for warehousing facilities, separation and processing facilities, transfer stations, holding and temporary storage facilities, waste-to-energy facilities and compost facilities all may play an important role in current and future solid waste management practices. As technologies and practices evolve, the *Charles County Zoning Ordinance* may need to be revised and amended. Nevertheless, the objectives of the code will remain as stated above, and the County will endeavor to retain flexibility in its zoning provisions in recognition that facilities/processes and the property on which they are located can be tailored to become compatible with a wide variety of surrounding land uses.

4.20.1.1 Permissible Uses

Section 62 of the *Charles County Zoning Ordinance* states that "Uses such as incinerators, private prison, private landfills and rubblefills, toxic and hazardous waste disposal facilities, private sludge storage facilities, and other uses that have similar impacts that are not listed on the Table of Permissible Uses are not allowed."

4.20.1.2 Minimum Zoning Standards

The *Charles County Zoning Ordinance Article IX: Minimum Standards for Special Exceptions and Uses Permitted With Conditions* reflects the items in Table 4-3. The minimum standards supplement the base requirements for the zone in which the proposed use is located. The intent of the standards is to minimize the potential impacts which the solid waste management facility may have upon adjacent properties. Items such as minimum setbacks, buffer requirements, hours of operation, security (perimeter fencing), provisions for traffic access, and utility services are addressed.

Table 4-4 MINIMUM ZONING STANDARDS

Section 7.06.000 - Pozzolan management facility.

This use is permitted by Special Exception in the AC, RC, IG and IH Zones subject to the following:

(a) *Minimum Area:* 20 acres when the site is in the IG or IH Zones and is completely surrounded by the IG, IH, or BP Zones**.** 50 acres when the site is in the AC, RC, IH or IG Zone and not completely surrounded by the IG, IH, or BP Zones.

(b) The Board of Appeals will establish a maximum time limit on the approval of the application. Extensions of specific periods may be granted if a new Special Exception is applied for and no substantial adverse impact is found in the continuation of the use.

(c) All fixed installations shall be located at least 750 feet from any existing homes and shall not be less than 300 feet from any property line. However, in the case where the site is completely surrounded by the IG, IH, or BP Zones, the fixed installations shall not be less than 100 feet from any property line.

(d) Roads for ingress and egress from the site to public roads shall not be less than 20 feet wide, and shall be hard-surfaced, and shall be maintained for a distance of 150 feet from the public road into the site. All other roads shall be treated as needed to control dust. For any roads which cross a utility right-of-way, the applicant shall obtain a permit for the crossing from the utility company and shall submit copies of the permit with the Special Exception petition.

(e) Operation hours shall be established by the Board. The Board may establish hours of operation based on the impact of noise, traffic, and operation of the use on the surrounding community.

(f) A site plan shall be submitted for approval to the Board with the application, showing the following:

i. Setback area, including screening and fencing.

ii. Portion of tract being used.

iii. Existing and proposed structures and major mechanical equipment.

iv. Existing and proposed access roads.

v. Water supply and sewage disposal.

vi. All necessary pollution control measures.

vii. Stockpile areas and height.

viii. Points of access to the site and provisions to control unauthorized entry to the site along the entire perimeter.

Table 4-4 MINIMUM ZONING STANDARDS (continued

xii. The Board may request that an environmental impact analysis be submitted by the applicant.

xiii. All operations on site, including outdoor storage of machinery and equipment, may be required to be screened from any adjoining land or public street. The applicant shall submit plans showing the location and type of any proposed screening material.

xiv. Leachate collection system discharge point be shown if applicable to the site.

g. All operations shall be conducted in a safe manner with respect to hazard to persons, physical or environmental damage to lands and improvements and all operations shall minimize damage to any street, bridge, or public right-of-way. The Special Exception permit holder shall immediately report to the Board any non-pozzolan residuals in the material being landfilled. The land filling of such residuals may be ground for suspension or revocation of the Special Exception. The escape of any pollutants into the air, ground water or surface water beyond the site, shall require immediate disclosure to the appropriate state regulating agencies, and may be grounds for suspension or revocation of the Special Exception.

h. The applicant must demonstrate conformance with the standards in Article II Sections 31-34.

i. A sediment and erosion control plan shall be reviewed and approved by the Charles County Soil Conservation District.

j. A post-use land reclamation plan reviewed by the Charles County Soil Conservation District and approved by the Charles County Department of Planning and Growth Management is required prior to the commencement of any activity on site.

k. There shall be no land filling within a minimum of 200 feet of any surface water including springs, seeps, or intermittent streams. This buffer shall be modified for steep slopes and soil conditions in the same manner as the Resource Protection Zone is modified in Article VIII. Any existing Pozzolan management facilities are exempt from this requirement; however, the expansion or extension of any existing facility must comply.

l. The maximum number of truck loads hauled to or from a site shall not exceed the following:

Site of more than 100 acres	10-200 loads per day
Site of 51- 100 acres	20-150 loads per day
Site less than 51 acres	100 loans per day or less

The Board may reduce the maximum loads per day after weighing factors such as haul roads, routes, traffic patterns, number of trucks, nature of the community, and proximity to schools, churches, businesses, and inhabited dwellings.

The Pozzolan must be hauled wet so as to prevent any airborne material from escaping from the container.
In the case of sites adjoining or in close proximity to the generation plant, hauling on public roads shall be minimized.

Table 4-4

MINIMUM ZONING STANDARDS(continued)

m. A plan to reclaim or mine the Pozzolan may be included and approved with the application. An approval to reclaim or mine the Pozzolan shall expire five years from the date of approval unless renewed as specified in Section 415. If mining the Pozzolan is not approved as part of the original application, a mining plan may be submitted subsequently as a modification to the Special Exception provided all the submittal requirements of use 7.05.110 surface mining of more than 10 acres are met.

n. Only Pozzolan created as a by-product of a power generation facility located in Charles County may be utilized by Pozzolan management facilities located in the County.

o. Compliance with all applicable local, State or federal laws, regulations or permitting requirements including Section 7-464 of the Natural Resources Article, Annotated Code of Maryland, as amended. No Special Exception for a Pozzolan management facility shall be valid unless all necessary operating permits are obtained including an NPDES permit, if necessary.

5 CHAPTER 5

SOLID WASTE MANAGEMENT PLAN OF ACTION (2011 - 2021)

5.1 INTRODUCTION

Chapter 5 presents the recommended actions to be taken and an implementation schedule for the planning period to effectively meet the goals and objectives presented in Chapter 1. The recommended technologies and management programs are based on the evaluations presented in Chapter 4. This Plan presents an overall framework for managing solid wastes projected to be generated in Charles County in the next 10 years. The goals and objectives are to be achieved through an integrated solid waste management program based on the following hierarchy of management alternatives: source reduction, recycling, yard waste composting, and land disposal.

The Charles County's Comprehensive Solid Waste Management Plan must respond to the requirements of the state-mandated recycling goals and all other federal, state and county regulations and laws. The goals and objectives presented in Chapter 1 address these requirements. Additional objectives that exceed regulatory requirements, or address areas not specifically covered by regulations will also be addressed in this chapter.

An integrated solid waste management plan provides specific management tools to handle the various components of the waste stream. The program elements are interrelated; modification to one element invariably impacts all elements of the Plan. For instance, the waste reduction and recycling rates directly impact disposal capacity projections for the landfill. The numerous programs which comprise the Plan are used in combination to complement each other. This Solid Waste Management Plan identifies the programs and also addresses how and when these programs will be implemented.

The *Action Plan* is not intended to provide specific information such as manufacturers, models of equipment to be purchased, or specific sites to be used for required solid waste management facilities. Rather, it provides county decision-makers with a framework upon which to base these decisions during the planning period. The Plan is a dynamic document that must be continuously updated to reflect changing conditions and management decisions that will be made when sufficient additional data is available. Implementation of the Plan will be facilitated through a proactive public information and public participation program.

5.2 ACTION PLAN OVERVIEW

The recommended schedule and funding scenarios for the *Charles County Solid Waste Management Program* for the years 2011 through 2021 are summarized in Tables 5-1 and 5-2, respectively. Detailed

descriptions of plan elements are presented in the following sections of this chapter. Table 5-1 presents a detailed summary of milestones and action items, and corresponding implementation dates, necessary to effectively attain the goals of the integrated program. As previously noted, the schedule will be periodically revised and updated throughout the planning period as elements are implemented.

Table 5-1 RECOMMENDED SOLID WASTE MANAGEMENT ACTION PLAN SCHEDULE 2011-2021

Program or Facility	Description	Date
Source Reduction Program	1. Continue to produce brochures, reference documents; public meetings for citizens and businesses on alternatives available for waste reduction 2. Continue technology transfer, public education program	2011-2021 2011-2021
Solid Waste/Recyclable Collection	1. Continue the licensing/volume-based billing system feasibility study 2. Continue meeting with haulers 3. Implement recommended program 4. Examine feasibility of a franchising pilot solid waste collection program 5. Collection system evaluation 6. Continue to maintain a recycling rate of 35% or more in 2015 and beyond	2011-2021 2011-2021 2011-2021 2011-2021 Annually
Residential Recycling	1. Expand curbside collection program 2. Continue to evaluate additional drop-off centers 3. Expand materials accepted as markets become available 4. Promote recycling in multi-family, apartment building, and condominium complexes	2011-2021 2011-2021
Commercial Recycling	1. Produce, distribute business recycling informational materials 2. Continue commercial recycling education program 3. Continue to evaluate reporting system; develop alternatives for improvement, as necessary 4. Coordination of joint business recycling programs	2011-2021 2011-2021 2011-2021 2011-2021
Rubble Recycling	1. Meetings with contractors on benefits of rubble recycling 2. Meeting with contractors and haulers to initiate rubble MRF feasibility study 3. Encourage public-private partnerships for the development of a rubble recycling facility.	2011-2021 2011-2021
Municipal Sanitary Landfill	1. Continue operation of Cell IIB and Cell IIIB 2. Construction of Cell 4 3. Continue to explore the feasibility of the use and/or sale of methane gas.	2011 2013 2013 2011-2021
Solid Waste Transfer Station	1. Conduct feasibility study of an MSW transfer station in order to extend useful life of the Municipal Sanitary Landfill	
Yard Waste	1. Waste prevention/backyard composting publicity program 2. Meet with farmers to evaluate agricultural reuse opportunities 3. Develop and promote home food composting program 4. Explore public-private partnership for additional processing of organics, including food waste	2011-2021 2011-2021
Sludge	1. Evaluate the expansion of sludge stabilization facility at Mattawoman WWTP	Annually
Household Hazardous Waste	1. Continue monthly household hazardous waste collection day using private contractors nine times a year.	2011-2021
Other Solid Wastes	1. Waste oil and antifreeze should continue to be collected at the drop-off centers and the NSWC recycling program. Institute semi-annual update listing for county oil and antifreeze acceptance facilities; publicize list through media	2011-2021
Legislative Initiatives	1. Amend county polices for solid waste management as needed 2. Modify zoning regulations for solid waste facilities	2011-2021 2011-2021
Financing	1. Reevaluate the landfill tipping fee and Environmental Service Fee annually	2011-2021

Cost estimates and projections presented in Table 5-2 are based upon Charles County Environmental Resources Division budgets and "rule-of-thumb" parameters for the various components of the Solid Waste Plan. The data is not intended to represent a highly accurate projection of the tipping fee over the planning period. This evaluation is used to compare the overall impact of alternative management strategies on program costs over the planning period. Many scenarios were considered during the formulation of this Action Plan.

Source reduction through decreasing the volume of materials produced, consumed and disposed, as well as through reuse of materials, will continue to be the highest priority solid waste management alternative for Charles County. Source reduction decreases the potential environmental impact of solid waste management, and can result in significant cost savings to the community. In addition, reducing the volume of waste results in the deferment of capital expenditures for recycling, processing, and disposal equipment and facilities.

Along with source reduction, Charles County has exceeded the state-mandated 35% waste diversion rate with a 35% to 50% per year rate since 2003. The County will continue to build upon existing recycling programs, and work to expand residential, commercial/industrial, and institutional recycling, and yard waste composting. The effective implementation of this Plan requires the cooperative effort of officials of the county and municipal governments, federal installations, waste industry personnel, and waste generators within the county.

The proposed management alternative includes county-financed expansion of the Charles County Landfill.

Table 5-2 provides a detailed summary of the projected facility capacity requirements, and expenditures from 2011 to 2021. The County currently charges a tipping fee of $70 per ton at the landfill and an environmental service fee of $70 for improved properties. The environmental service fee (ESF) funds the recycling, mulching, and litter control programs as well as the household hazardous waste collections.

Table 5-2 RECOMMENDED SOLID WASTE MANAGEMENT PLAN ACTION PLAN FINANCING Fiscal Year 2011-2021

	FY 2011 Actual	**FY 2012 Actual**	**FY 2013 Actual**	**FY 2014 Adopted**	**FY 2015 Adopted**	**FY 2016 Estimate**
Revenues:						
Permits/Miscellaneous	$8,795	$5,673	$1,076	$5,400	$5,400	$5,400
Tipping Fees	4,172,079	5,903,993	4,866,268	4,317,500	4,646,900	4,707,300
Tag-A-Bag	205,195	229,205	270,747	348,500	295,500	307,900
Fund Balance Appropriation- Pisgah	599,800	599,800	118,300	66,700	0	0
Total Revenues	**$6,057,092**	**$6,858,191**	**$5,384,866**	**$5,309,200**	**$5,520,800**	**$6,194,100**
Expenses:						
Salary & Fringe	$1,781,465	$1,969,886	$1,918,817	1,935,700	$2,141,300	$2,248,400
Operating	706,200	767,017	913,473	848,800	909,100	936,400
Capital Reserve for Replacement	0	0	0	445,600	460,000	1,059,100
Transfers Out: Pisgah Closure	599,800	599,800	0	0	0	0
Total Operating Expenses	$3,087,465	$3,918,281	$3,407,554	$3,867,500	$3,986,600	$4,554,600
Reserve for Future Costs:						
Closure/Post Closure	584,939	555,951	562,680	327,400	343,800	354,700
Cell 3A Construction	1,641,561	1,465,949	1,270,020	1,098,300	1,178,100	1,215,300
Cell 3B Construction						
Total Reserve	$2,226,500	$2,021,900	$1,832,700	$1,425,700	$1,521,900	$1,570,000
Total Expenses	**$5,346,174**	**$5,971,161**	**$5,271,222**	**$5,309,200**	**$5,520,800**	**$6,194,100**
Surplus/Deficit:	**$710,918**	**$5,346,174**	**$113,644**	**($0)**	**($0)**	**($0)**
ESTIMATED NET CASH	**$5,070,196**	**$4,482,696**	**$3,775,296**	**$2,533,696**	**$1,747,396**	**$805,196**
Expected Billable Tonnage:	**82,619**	**87,276**	**73,075**	**64,576**	**68,988**	**69,885**

TABLE 5-2 (Continued)
RECOMMENDED SOLID WASTE MANAGEMENT PLAN
ACTION PLAN FINANCING
Fiscal Year 2011-2021

	FY 2017 Estimate	**FY 2018 Estimate**	**FY 2019 Estimate**	**FY 2020 Estimate**	**FY 2021 Estimate**
Revenues:					
Permits/Miscellaneous	$5,400	$5,400	$5,400	$5,400	$5,400
Tipping Fees	4,767,700	4,828,100	4,889,200	4,951,100	5,013,800
Tag-A-Bag	315,700	319,800	323,900	328,100	0
Fund Balance Appropriation- Pisgah	0	0	0	0	
Total Revenues	**$5,534,700**	**$5,830,400**	**$5,337,400**	**$5,405,000**	**$5,473,500**
Expenses:					
Salary & Fringe	$2,360,800	$2,478,800	$2,602,700	$2,732,800	$2,869,400
Operating	996,300	1,058,700	1,123,600	1,157,300	1,192,000
Capital Reserve for Replacement	0	0	0	0	0
Transfers Out: Pisgah Closure	0	0	0	0	0
Total Operating Expenses	$3,687,100	$4,097,200	$3,726,300	$3,890,100	$4,061,400
Reserve for Future Costs:					
Closure/Post Closure	365,900	377,300	389,100	401,300	406,400
Cell 3A Construction	1,253,500	1,292,800	1,333,200	1,375,000	1,392,400
Cell 3B Construction					
Total Reserve	$1,619,400	$1,670,100	$1,722,300	$1,776,300	$1,798,800
Total Expenses	**$5,824,200**	**$6,416,600**	**$6,177,200**	**$6,660,800**	**$6,931,200**
Surplus/Deficit:	**($289,500)**	**($586,200)**	**($839,800)**	**($1,255,800)**	**($1,457,700)**
ESTIMATED NET CASH	**$5,070,196**	**$4,482,696**	**$3,775,296**	**$2,533,696**	**$1,747,396**
Expected Billable Tonnage:	**70,781**	**71,678**	**72,586**	**73,506**	**74,437**

Table 5-3 provides a detailed summary of the projected program costs associated with the Environmental Service Fee (ESF). The ESF funds the recycling, mulching, and litter control programs, as well as household hazardous waste collection. The fee is included on all property tax accounts that have an improved property status. Revenues and expenditures for the 5-year planning period is reflected. The revenue neutral fee required to fully finance the various programs is estimated to vary from the current fee of $65 to $128 per eligible tax account.

This fund is used to pay for recycling and environmental programs throughout the County. The primary source of revenue is generated by a $74 environmental serve fee charged annually to each improved property. The FY12-FY16 CIP is currently programmed for $21.6 million in bond funding over the next five years. In addition to this, the County will need to issue $7.5 million in bonds to cover existing capital improvement projects. Bond funds are not issued until projects are in progress.

Table 5-3 ESF Plan

	FY 2009 Actual	FY 2010 Actual	FY 2011 Actual	FY 2012 Actual	FY 2013 Actual	FY 2014 *Adopted	FY 2015 *Adopted	FY 2016 *Estimate	FY 2017 *Estimate	FY 2018 *Estimate	FY 2019 *Estimate	FY 2020 *Estimate	FY 2021 *Estimate
Revenues:													
Environmental Service Fee	$3,130,879	$3,435,183	$3,476,052	$3,539,854	$3,638,448	$3,349,000	$3,842,300	$3,892,200	$3,942,000	$3,992,100	$4,042,800	$4,094,100	$4,146,100
Other Service Charges/Misc.	161,599	177,393	381,235	402,649	282,804	228,800	205,700	205,700	205,700	205,700	205,700	205,700	205,700
Total Operating Revenues	$3,292,478	$3,612,576	$3,857,287	$3,942,503	$3,921,252	$3,577,800	$4,048,000	$4,097,900	$4,147,700	$4,197,800	$4,248,500	$4,299,800	$4,351,800
Fund Balance Appropriation	239,952	36,700	19,900	160,500	340,248	123,500	252,400	23,100	23,800	24,500	25,200	26,000	26,800
Total Revenues	$3,532,430	$3,649,276	$3,877,187	$4,103,003	$4,261,500	$3,701,300	$4,300,400	$4,121,000	$4,171,500	$4,222,300	$4,273,700	$4,325,800	$4,378,600
Expenses:													
Salary & Fringe: Recycling / Litter Control	$958,639	$925,567	$995,196	$1,040,990	$1,034,331	1,104,400	1,095,800	1,150,600	1,208,100	1,268,500	1,331,900	1,398,500	1,468,400
Salary & Fringe: NPDES	0	54,691	49,451	102,358	267,351	0	0	0	0	0	0	0	0
Operating: Recycling / Litter Control	1,949,990	1,676,168	1,750,732	1,824,184	1,916,910	2,144,000	2,314,000	2,383,400	2,454,900	2,528,500	2,604,400	2,682,500	2,763,000
Operating: NPDES	184,198	180,315	167,183	143,604	291,817	0	0	0	0	0	0	0	0
New/Small Capital/Equipment	35,570	0	0	164,309	32,348	23,500	202,400	23,100	23,800	24,500	25,200	26,000	26,800
Operating Contingency	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Operating	$3,128,397	$2,836,741	$2,962,562	$3,275,445	$3,542,757	$3,271,900	$3,612,200	$3,557,100	$3,686,800	$3,821,500	$3,961,500	$4,107,000	$4,258,200
Debt Service: P & I Recycling / Litter Control	$91,222	$103,230	$74,124	$71,571	$58,511	$308,400	$567,200	$593,700	$589,100	$584,500	$321,200	$60,100	$30,300
Debt Service: P & I NPDES	144,225	182,812	217,867	262,259	327,851	0	0	0	0	0	0	0	0
Debt Service: P & I (future Recycling Projects)	0	0	0	0	0	0	0	0	16,200	86,000	86,000	86,000	86,000
Debt Service: P & I (future equipment leases)	0	0	0	0	0	0	0	28,700	110,800	178,600	416,650	640,300	705,800
Total Debt Service	$235,447	$286,042	$291,991	$333,830	$386,362	$308,400	$567,200	$622,400	$716,100	$849,100	$823,850	$786,400	$822,100
Capital\Equipment Reserve	$120,030	$121,000	$121,000	$121,000	$121,000	$121,000	$121,000	$121,000	$121,000	$121,000	$121,000	$121,000	$121,000
Total Expenses	$3,483,874	$3,243,783	$3,375,553	$3,730,275	$4,050,119	$3,701,300	$4,300,400	$4,300,500	$4,523,900	$4,791,600	$4,906,350	$5,014,400	$5,201,300
Surplus\(Deficit):	$48,556	$405,493	$501,634	$372,728	$211,381	$0	$0	($179,500)	($352,400)	($569,300)	($632,650)	($688,600)	($822,700)
Estimated Improved Properties:	48,866	49,325	49,826	50,518	51,467	51,588	52,104	52,781	53,457	54,136	54,824	55,520	56,225
Estimated Annual Environmental Service Fee Adjustment		$6	$0	$0	$1	($6)	$9	$3	$7	$11	$12	$12	$15
Annual ESF Fee per Improved Property	$68	$74	$74	$74	$75	$69	$78	$81	$85	$89	$90	$90	$93
% rate change		*8.8%*	*0.0%*	*0.0%*	*1.4%*	*-8.0%*	*13.0%*	*3.8%*	*4.9%*	*4.7%*	*1.1%*	*0.0%*	*3.3%*

*In FY 2014 NPDES costs were moved to the WPRF Fund.

Table 5-3: ESF Fund

Capital Improvement Program Operating Impact (continued)

Bond Issues	**Total**	**FY 2011**	**FY 2012**	**FY 2013**	***FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**
Recycling Projects (prior approved)	$1,011,500	$0	$0	$0	$0	$0	$1,011,500	$0	$0	$0	$0	$0
NPDES Projects	2,100,000	1,400,000	700,000	0	0	0	0	0	0	0	0	0
FY15-FY19 Approved Recycling Projects	0	0	0	0	0	0	0	0	0	0	0	0
Total	$3,111,500	$1,400,000	$700,000	$0	$0	$0	$1,011,500	$0	$0	$0	$0	$0
Debt Service Payments (lag bond issues by one year)												
Annual Payment per Bond Issue												
2011 Bond Issue			$25,183	$49,541	$0	$0	$0	$0	$0	$0	$0	$0
2012 Bond Issue	0	19,445	0	0	0	0	0	0	0	0	0	0
2016 Bond Issue (future)	0	0	0	0	0	16,200	86,000	86,000	86,000	86,000		
Cumulative Debt Service: P&I (future)	$25,183	$68,986	$0	$0	$0	$16,200	$86,000	$86,000	$86,000	$86,000		

**In FY 2014 NPDES costs were moved to the WPRF Fund.*

5.3 WASTE STREAM CHARACTERIZATION

Charles County will continue to research other waste stream characterization studies to establish the required database for the effective planning of collection and waste management facilities. The assessment will include an evaluation of the quantity, composition, and source of waste generated within the county. Sources to be characterized will include residences, businesses, and institutions. Ultimately, the characterization will include surveys and interviews with generators and waste management officials to more accurately determine the quantities of waste imported and exported from the county, and the breakdown of residential versus commercial waste. The waste characterization will address all disposal and processing facilities within the county, including the landfill, yard waste mulching site, and recycling drop-off centers. Random samples of incoming loads will be obtained, and the following waste fractions will be characterized:

- Aluminum/non-ferrous metal
- Ferrous metal
- Glass
- Plastic
- Newspaper
- Cardboard
- Batteries
- Yard waste
- Other organics
- Scrap Tires
- Textiles
- Wood
- Household hazardous waste
- Electronics
- Rubber

Waste stream characterization studies will be conducted throughout the planning period as programs are implemented, and more specific data is required to evaluate the effectiveness of components of the integrated solid waste management plan.

5.4 SOURCE REDUCTION

Source reduction continues to become an increasingly important component of the Charles County solid waste management program. Reduction of the amount of waste generated extends the useful life of the county landfill and reduces expenditures required for collection, recycling, and disposal programs. Source reduction programs generally fall into the following categories: product reuse, reduced material volume, reduced toxicity, increased product lifetime, and decreased consumption. Examples of source reduction alternatives are presented below.

Buying in Bulk	*Reusable Drink Containers*	*Waste Exchange (Swaps)*
Cloth Diapers	*Minimizing Packaging*	*Double-Sided Copying*
Repairing Broken Items	*Buying Durable Products*	*Junk Mail Reduction*
Donating Clothing	*Mulching Mowers*	*Reusable Air Filters*
Cloth Shopping Bags, Lunch Bags	*Repairing Pallets* *Printer Cartridge*	*Reduce Use of Disposable Cups, Plates*
Drink Concentrates	*Remanufacturing*	*Hand Driers*

Source reduction will continue to be encouraged through a publicity campaign designed to keep citizens aware of the available options. Public information booklets and presentations have been prepared to identify available source reduction methods. The campaign emphasizes the benefits of source reduction and identifies source reduction as the highest priority waste management tool for Charles County. The Charles County Department of Public Works will continue its publicity program on the benefits of mulching mowers and backyard composting.

The County has implemented a waste exchange program with a private non-profit organization. The waste exchange facility accepts types of wastes that can potentially be reused by other consumers rather than disposed of in the landfill, including paint, toys, sports equipment, clothes, furniture, and appliances. The waste exchange is a functional relay, staffed by volunteers and members of the ReUse Barn.

Source reduction can be implemented through education and research, financial incentives and disincentives, and by regulation. In Charles County, source reduction is primarily implemented through voluntary public participation. The source reduction program is designed to make citizens and businesses aware of the options available to reduce the generation of waste, as well as the benefits and cost advantages. The program includes production and distribution of additional informational materials, and conducting educational seminars for homeowners and commercial establishments. Topics, for example, include backyard composting and "green shoppers lists" for buying environmentally friendly products.

Providing financial incentives for source reduction on a county-wide basis will also be evaluated. The County has initiated a volume-based billing system for waste hauled to the landfill or the designated drop-off locations. Alternatives available for expanding the program include tax credits/exemptions, product disposal charges, and volume-based billing for all waste collected within the County. Governmental agencies and businesses can continue to reduce waste through measures such as double-sided copying, reuse of scrap paper, and implementing a procurement policy that encourages the minimization of packaging.

5.5 COLLECTION (SOLID WASTE AND RECYCLABLES)

The incorporated towns of La Plata and Indian Head provide municipal waste and recycling collection. In the unincorporated areas of the county, residents as well as commercial and institutional establishments, currently contract with a hauler of their choice. Recyclables are collected from approximately 38,370 homes via a contract with a private hauler and funded by the ESF.

The institution of a licensing system is recommended in order to give the County more control over haulers' services, such as requirements for recyclable collection, record keeping, and billing methods. This system would provide for county flow control and accounting of recyclables, while affording haulers and residents the advantages of a "controlled" free-enterprise system. This system should give the County positive control over collection systems that may be needed to meet recycling goals.

Implementation should begin with a feasibility study to determine the standards and policies for licensing haulers. Elected officials from incorporated municipalities should make a decision early in the process about whether or not their jurisdictions will be included. A committee representing private haulers should be consulted during the planning process to develop a system that will best serve the needs of the community.

Standards and policies for the licensing system should address the following requirements:

- Qualifications for company owners
- Collection frequency and hours
- Billing procedures
- Point of collection, containers
- Vehicles and equipment
- Personnel training
- Requirements for collection of recyclables, including yard waste
- Bulk item pick-up

Once the licensing procedure has been established, the implementation of a volume-based billing system is recommended. Municipalities throughout the country have invariably found that volume-based billing results in significant waste reduction and increases in recycling quantities. Volume-based billing means that the residential or commercial customer is charged based on the number and size of containers put out for collection each week. In a "pay-as-you-throw" (PAYT) system, standardized collection containers are issued, with a set monthly collection fee associated with each size. Stickers can be purchased for any excess waste placed in bags. Volume-based billing encourages waste reduction and recycling, minimizes the size and number of disposal containers, and reduces costs. The system provides a direct economic incentive for citizens and businesses to reduce the amount of waste that they generate.

Institution of a volume-based billing system can result in some increase in illegal dumping to avoid increased collection fees. This practice can be minimized by providing convenient outlets for all residents to recycle, and also through an effective public information program that reinforces the attitude that illegal dumping is a socially unacceptable practice.

The County may also implement a limited pilot program to evaluate the feasibility of franchised collection. A pilot franchised collection district may be established in an unincorporated area of the County. The franchise would be awarded to a private hauler based on competitive bidding. The limited pilot program could include volume-based billing and economic incentives for recycling. The pilot program could provide a good data base for the evaluation of the cost-effectiveness of the existing free enterprise system, and the effectiveness of volume-based billing.

5.6 RECYCLING

Based on the goals and objectives of the 1994-1999 Comprehensive Solid Waste Management Plan, the County intended to incrementally increase its recycling rate to 25 percent or more by the year 2004. Charles County achieved a waste diversion rate of 55% in 2009.

5.6.1 Residential Collection

Approximately 50 percent of the residential waste generated in Charles County was recycled during 2009. Waste Diversion rates have ranged from at 35 percent to 50 percent each year since 2004. The collection system expansion and increased effectiveness will provide increased opportunities for yard waste collection. This is important due to the increased volume of yard waste to be composted over the planning period.

The County has taken the following steps which have proven effective for the residential recycling program:

- Expanded the curbside recycling collection program to over 70 percent of unincorporated improved properties in the County.
- Increase participation in the curbside recycling program to 50 to 75 percent
- Expanded the curbside recycling collection area, as recommended by the feasibility study.
- Established additional recyclable drop-off center locations.
- Single Stream recycling program with additional items accepted
- Expanded the public information and education program.
- Changed curbside collection container from a 18 gallon bin to 95 gallon wheeled cart
- Implemented yard waste collection.

Commingled single-stream collection of recyclables was initiated in 2007 and all material is currently transferred to Waste Management's materials recovery facility (MRF)

Yard waste collection has been implemented and runs from April through December each year.

Charles County recycled approximately 51,537 tons of residential and commercial solid waste in 2009 through implementation of the programs described above. If necessary, additional options to increase participation and residential recycling rates will be developed and evaluated, including:

- Financial incentives
- Increased collection frequency
- Mandatory recycling
- Landfill disposal bans
- Recycling of additional types of materials

5.6.2 Commercial, Industrial and Institutional Recycling

Offices, stores, institutions, and industries typically generate 30 to 40 percent of the municipal solid waste stream in a community. As documented in Chapter 3, approximately 60 percent of Municipal Solid Waste generation in Charles County can be attributed to commercial/institutional sources. Commercial recycling is inclusive of commercial, industrial, and institutional sources (excluding yard waste). The county recycled over 65 percent of commercial solid waste in 2009.

An effective commercial recycling program is critical to meeting diversion rate objectives. Commercial wastes contain a high percentage of recyclable materials, including corrugated cardboard (10 to 15 percent), office paper (20 to 40 percent), glass, aluminum, tires, ferrous metals, and landscaping debris.

The high percentage of recyclable materials within the commercial waste stream provides an excellent opportunity for increasing the current commercial recycling rate. The County has gradually increased the commercial recycling rate from 30 percent in 2000 to approximately 65 percent in 2009. Charles County's business community strongly supports channeling as many programs as possible through the private sector. That philosophy, combined with limited public funds, means the County's emphasis will be on privately provided recycling collection and marketing. The County will serve mainly as a vehicle for education and coordination of the various business sectors to increase commercial recycling.

As the majority of commercial and institutional establishments are located within the municipalities and federal installations, the success of commercial recycling will depend heavily on the effectiveness of their programs. The Charles County Department of Public Works will work closely with the municipalities and the Naval Surface Warfare Center to implement and expand programs within their limits.

Municipalities will be encouraged to contact commercial establishments to:

- Explain the program and elicit support.
- Distribute the County's educational literature on waste reduction and recycling.
- Provide follow-up to encourage implementation of the program and provide assistance.
- Serve as a liaison between the County's recycling coordinator and commercial establishments.
- Obtain data on waste generation and recycling.

Strategies for accomplishing additional commercial recycling throughout the county include:

- Production of a Business Recycling Brochure. This brochure will summarize how to start-up recycling programs, including waste audits, market information, government and private resources, etc.
- Organization of an Annual Business Recycling Forum.
- Assessment of Existing Business Recycling. The County, in preparation for reporting recycling information, will develop a tracking system to determine the extent of business recycling. An assessment of areas (regional and type of business) that are not recycling will be compiled and a strategy developed to expand recycling in those areas.
- Coordination of Business Efforts. Based on the results of the assessment, the County will begin coordinating the stimulation of recycling efforts where they are lacking. This could include bringing together individual businesses in shopping centers/industrial parks/towns to jointly recycle.

5.6.3 Material Recovery Facility (MRF)

Private in conjunction with the nearby jurisdiction of Prince Georges County have made significant into a single stream material recovery facility (MRF). This facility, located in Landover Maryland, is currently accepting all materials accepted by the County's curbside collection program. The volume of recyclables is but a small fraction of the total.

Construction of an MRF in Charles County would not be cost effective when existing facilities are close by and are willing to accept the material. Recyclables would further that such an endeavor would be in the best of times.

The County will consider conducting an MRF feasibility study to determine if this type of facility will aid in meeting or surpassing the goals of the Solid Waste Management Plan. The evaluation will examine the materials for recycling and the type of facility configuration (level of mechanization, etc.) needed. An updated market survey for recycled materials may be conducted; the survey will enable the county to effectively evaluate private sector proposals in comparison to projected public ownership and operation costs. The study will include an evaluation of the need for flow control to improve the economic feasibility of the proposed MRF.

The size and level of technology depends directly on recycling targets, collection methodology, and types of materials chosen for recycling.

As presented in Table 5-2, the County's action plan to achieve a 35 percent reduction in waste disposal will not require a county MRF. A low-technology MRF would include, at a minimum, storage bins and roll-offs, a baler, a glass crusher, and a conveyor line for hand sorting. Charles County does not estimate the need for an MRF during the planning period discussed in this document due to the current achievement of surpassing set recycling goals and because of the new state-of-the-art single stream facility opened in Largo, Maryland by Waste Management, Inc. The additional capital expenditure would not be economically feasible for the desired result.

5.6.4 Rubble Recycling/Processing Facility

Charles County will encourage the establishment of a rubble recycling/processing facility within or in close proximity to the County. Such facilities currently exist within several of the private sand and gravel mining sites. These sites act as a rubble material recovery facility and/or a facility to shred the rubble (including used concrete) to be reused as aggregates or in the production of concrete. These materials could also be used as an alternative daily cover material for the landfill. These facilities and possible future facilities could significantly reduce land disposal capacity requirements for county-generated rubble. Future facilities can be either publicly or privately owned and/or operated. The most economically viable location for the facility will be on the site for a new rubble landfill within the county. It is the County's ultimate objective to landfill only those construction and demolition waste materials that cannot be effectively reused or recycled.

In the future, the County hopes to conduct a feasibility study that will address technologies to be employed, facility location, materials to be recycled, markets, and public information requirements. The feasibility study will be initiated by a meeting with contractors and haulers, and their input will be solicited throughout the evaluation process. The waste characterization study, previously described, will provide the database to determine types and capacity of required equipment and facilities. The county will evaluate the feasibility of establishing a material reuse center at the facility, in which used or off-spec construction materials can be accumulated and used directly by other contractors or homeowners. This could include such items as cabinets, doors, plumbing fixtures, electrical and heating supplies, windows and hardware.

At a minimum, the rubble MRF should recycle wood, paper, cardboard, asphalt, concrete, and metal. Other waste categories that will be evaluated for recycling include drywall, other masonry wastes, packing materials, clean fill and topsoil. The rubble MRF will require the following equipment, at a minimum:

- Front-end loaders
- Concrete/asphalt crushing plant
- Stump grinder
- Tub grinder/shredder
- Magnetic separators
- Vibrating screens/trommel screens
- Storage pad/bins
- Paved sorting area and/or conveyor sorting line

In order for a rubble recycling facility to be successful, an effective public information program must be implemented to educate contractors on the merits and mechanisms for rubble recycling. The county will encourage contractors to separate recyclables at construction and demolition sites, on a voluntary basis.

Implementation of the program will begin with a feasibility study to evaluate markets for recycled materials, types of materials to be recycled, processing technologies, facility siting, and collection alternatives. The feasibility study will be initiated by a meeting with contractors and haulers to gain their input and support for the program.

In order to provide an economic incentive for contractors to recycle, the rubble recycling facility will charge a reduced tipping fee for source-separated recyclables from construction sites. During initial stages of the facility operation, this may require that the program be subsidized by the county, similar to the subsidy given to the MSW recycling program. As rubble landfill tipping fees increase throughout the region, and additional markets for recycled materials are established, the requirement for subsidies should be reduced. The economic incentive of the free market should result in a significant increase in the recycling of rubble waste over the planning period. Alternatively, the county may evaluate the applicability of flow control to enhance the economic viability of the proposed facility.

A facility for producing an alternative daily cover material would process the entire rubble waste

stream through large shredders, and the rubble would be handled using front-end loaders and cranes. The facility would also require sufficient space for storage pads and bins.

5.7 YARD WASTE

Backyard composting and leaving grass clippings on the lawn will continue to be encouraged as the preferred method of managing yard waste. The County will continue public outreach to promote backyard composting and grasscycling. An expanded publicity program explaining the merits of not bagging grass clippings and backyard composting will be continued.

Collection and transportation are the most costly elements of a yard waste management program. Curbside collection of yard waste was implemented in and will continue to be expanded.

An additional market which Charles County is well positioned to utilize is the farming community. Farmers will be encouraged to work with local haulers and landscaping/tree trimming companies to utilize their yard wastes in manure pits, compost piles, and soil incorporation.

An estimated 8 percent of the municipal waste generated in Charles County is yard waste. Charles County has recycled virtually all of this material in recent years through its mulch and composting operations, and through the efforts of private companies in the county that will continue to produce mulch from wood waste obtained from landscaping, tree trimming, and maintenance contractors.

5.8 LAND DISPOSAL FACILITIES

Charles County will continue to provide disposal capacity for municipal solid waste throughout the planning period. Reliance on disposal facilities in other counties or states can mean the loss of control over the availability of capacity and the charges that will be incurred for disposal.

Regional landfill solutions could be considered if firm commitments for capacity and tipping fees can be obtained for the planning period. However, the Southern Maryland region is far from resolving this issue. Charles County will continue its participation in regional efforts for waste disposal planning.

5.8.1 Municipal Sanitary Landfill

The Charles County Landfill will provide the County with disposal capacity for county- generated solid waste for approximately 30 years, assuming the county uses 50 percent rubble in the landfill and solid cover material is applied. At the end of Fiscal Year 2017, the landfill had five open cells: Cell I, Cell IIA, Cell IIB, Cell IIIA, and Cell IIIB. According to the 2017 Charles County Landfill Analysis Report prepared by AECOM, the cells have approximately 856,495 cubic yards of remaining airspace combined. Provided that the county maintains its average incoming waste of 100,000 tons per year with an effective density of 0.55 tons/ cy, the report estimates that the county landfill's currently open cells will reach capacity in 2022.

To extend the life of the landfill, the county is assessing the feasibility of alternatives, such as the use

of alternate daily cover materials such as foams, synthetic granular materials, geosynthetics, and landfill mining. Additionally, the county is considering the feasibility of building a transfer station to make cost-effective shipments of waste to distant landfills. In addition to processing mixed municipal solid waste (MSW), some transfer stations offer programs that manage specific materials separately to divert waste from disposal and to achieve recycling objectives. These materials could include construction and demolition debris, yard waste, household hazardous waste, or recyclables.

The county is also considering the feasibility of expanding the landfill by creating an additional cell. The landfill has a modular design that allows for a new cell to be built and prepared to receive waste when older cell closes. If feasible, the County can build an additional cell to receive county- generated waste (Cell IV) provided that the availability of space on the landfill premises and the surrounding area is adequate.

5.8.2 Rubble Landfills

Based on the current tipping fee of $70 and the environmental service fee of $65, nearly all commercial rubble waste is transported out-of-county for disposal. Therefore, the life of the County Sanitary Landfill has been extended 2025. Should the amount of rubble waste delivered to County landfill increase significantly, the county may conduct a feasibility study to evaluate the construction and operation of a rubble landfill and the associated processing technology. The need for disposal could be significantly reduced through the implementation of a rubble recycling facility.

A new rubble landfill would be under private ownership. The facility will be sited in accordance with the siting criteria presented in Chapter 4, and constructed and operated in compliance with all state and county regulatory criteria previously discussed.

The process of siting, permitting and constructing a new rubble landfill will take several years. Two years are projected for the siting and land acquisition process, which will allow for extensive public review and input, including workgroup meetings, public meetings and public hearings. Two years should be allotted for the permitting process. This process will include a detailed hydrogeologic site evaluation and detailed design of the facility; with review periods for citizen groups, county personnel and the MDE. The new MDE regulations for the construction of a rubble landfill facility require the facility to have a liner and leachate management system. Construction of the first cell of the rubble landfill and ancillary facilities is projected to take one year.

Under the authority granted in Section 9-210 of the Environment Article of the Maryland Annotated Code, the County, via this Plan, may designate certain types of waste that may or may not be accepted at a rubble landfill permitted by MDE within its jurisdictional limits. Pursuant to that authority, a rubble landfill in Charles County may accept the following wastes for disposal:

- Land-clearing debris as defined in *COMAR* 26.0-4.07.11B
- Acceptable demolition debris as defined in *COMAR* 26.04.07.13B(2)(a)
- Acceptable construction debris as defined in *COMAR* 26.04.07.13B(3)(a)

An unlined rubble landfill in Charles County is prohibited from accepting asbestos waste. A rubble landfill in Charles County is prohibited from disposing of household appliances, white

goods, and tires.

As previously mentioned, a rubble landfill is not necessary to accomplish the goals of the Comprehensive Solid Waste Management Plan. However, a feasibility study may be conducted if the acceptance of rubble material begins to significantly increase, therefore reducing the expected time of operation of the current landfill facility.

5.9 SLUDGE

The land application of sludge is regulated by the MDE, including the review and issuance of individual site permits. According to the 2017 Synagro Annual Report on the Mattawoman WWTP, there are currently 27 farm sites and 1 reclaimed gravel site permitted for land application of sludge in the County. An estimated 739.63 dry tons per day of waste water treatment sludge is applied to farmland, and 1,336.27 dry tons per day is taken to off-site storage. Charles County citizens have raised concerns that the land application process is not adequately supervised or regulated by the MDE, which could result in environmental problems such as sludge runoff and odors.

The County issued a contract for the construction of additional sludge management facilities at the Mattawoman WWTP, including lime stabilization, thickening/dewatering, odor control, and storage tanks.

In 1994, the County initiated a *Comprehensive Sludge Management Plan*. The Plan projected sludge volumes to be managed as well as evaluated disposal/land application and storage alternatives. The Plan evaluated the environmental protectiveness of the land application program and recommended changes, where appropriate. This effort included county participation in the permitting and inspection of storage and land application sites.

5.10 HOUSEHOLD HAZARDOUS WASTES

The County will continue holding periodic household hazardous waste collection days in order to divert these materials from the landfill and potential illegal dumping. The feasibility of establishing a permanent receiving and processing facility at the landfill will also be evaluated. The public information program will incorporate a household hazardous waste component which will provide assistance in identifying these materials, as well as information on proper handling, storage and disposal procedures. Through the public information program, citizens and businesses will be encouraged to use non-toxic materials, as possible, for activities such as cleaning, painting and yard maintenance. A reference list of these "environmentally sensitive" products will be included in the plan, and updated as necessary.

5.11 CONTROLLED HAZARDOUS SUBSTANCES

Industries and commercial establishments in the County that generate and ship controlled hazardous substances, including special medical wastes, are closely regulated by the Hazardous Waste Program of MDE's Waste Management Administration, and are not under the jurisdiction of this plan. Each shipment must be manifested, and volumes and types of materials reported to the MDE. No additional actions for hazardous waste management are recommended under this plan; however, the County may address the management of controlled hazardous substances under a separate plan.

5.12 OTHER WASTES

Miscellaneous or special solid wastes that must be managed include asbestos, dead animals, tires, septage, water treatment sludge, and agricultural wastes. Existing management practices for these wastes were described in Section 3.6 of Chapter 3, and proposed management practices for these wastes were described in Table 5-1 of this chapter.

All asbestos wastes generated within the County are currently exported to out-of-county land disposal facilities. As discussed in the land disposal section of this chapter, the County will reevaluate provisions for the disposal of asbestos wastes at the Charles County landfill. However, there currently seems to be little need for the disposal of asbestos due to the ban of asbestos building materials.

Current practices employed for the disposal of dead animals are adequate, and will be continued for the planning period.

The current ban on landfilling tires will be continued. Tires will be collected at the landfill and service facilities and taken out-of-county to a processing facility.

Currently, no water treatment plant residues are generated or disposed within the County. Sewage is currently collected and processed at the Mattawoman WWTP; this practice will be continued throughout the planning period.

Current practices for the disposal of agricultural waste in the county are adequate and will be continued for the planning period.

5.13 LITTER CONTROL

Charles County operates a Litter Abatement Program with three full-time county crews and one contractor crew to assist with regular litter removal from county-maintained roadways. Additionally, community volunteers participate in litter removal initiatives that include community cleanups, the Adopt-A-Road Program, and annual Watershed Cleanup Events.

5.14 PUBLIC INFORMATION PROGRAM

As discussed throughout this chapter, an effective public information and education program is the key to the success of many of the components of the integrated solid waste management plan, including waste reduction and reuse, residential and commercial recycling, and household hazardous waste management. The County's Comprehensive Solid Waste Management public information and education plan addresses the following issues:

- Source Reduction
- Residential Recycling
- Commercial Recycling
- Yard Waste Composting
- Household Hazardous Waste
- Municipal Solid Waste Landfill
- Rubble
- Recycling/Processing
- Electronic Recycling

The County will continue its participation with regional efforts for public education and information programs.

5.15 FINANCING

The County plans to finance capital improvements and operating expenses for the solid waste program through the solid waste management fund based on solid waste fees collected at the Charles County Landfill and an annual environmental services fee on improved properties. Tables 5-2 and 5-3 present a detailed breakdown of estimated capital and operating costs for implementation of the recommended solid waste program for the planning period.

Construction of new cells at the Charles County Landfill are approved within the County's 5-year Capital Improvement Plan. The County funds the related construction costs by reserving a portion of each landfill fee into a sinking fund so that sufficient reserves are available to finance the next cell expansion. This method of financing, known as Pay-go, provides the County with the maximum flexibility associated with operating a landfill. Pay-go funding alleviates the need to borrow funds and the dependency upon waste stream to meet debt obligations

It is imperative that costs for solid waste management are kept separate from general revenue taxes; in this way, citizens are made aware of the actual cost of the program, and the County has the flexibility to institute financial incentives for waste reduction and recycling, such as volume-based billing. When citizens and businesses are reminded by each month's bill of the growing solid waste management costs, there will be more public support for recycling and other programs

that will ultimately help control costs. In addition, under this "user pays" system, commercial establishments have an incentive to initiate programs that will lower their monthly solid waste bill. As previously discussed, the implementation of a volume-based billing system is recommended as an incentive for waste reduction and recycling.

The County's recycling program is funded by the enterprise fund termed the "Environmental Service Fund". It derives its revenue from a separate line item on the property tax bill as a flat fee that is currently $65.00 per improved property. The assessment is estimated to generate $3.5 million in FY 2012. Expenditures for recycling operations are approximately $2.8 million per year. The remaining balance is distributed for several other environmental programs that include funding for the Litter Control Program.

5.16 LEGISLATIVE INITIATIVES

Meeting certain goals and objectives presented in Chapter 1 will require modifications or additions to county regulations and policies, including the following:

- Establish County policies to ensure that the goals and objectives of this Plan are achieved.
- Establish a mechanism for County approval of solid waste facility permit applications in order to certify conformance with this Plan, prior to application to the MDE. Approval must include adequate public notice and public hearings.
- Eliminate government-imposed impediments to the use of recycled products, and encourage the use of recycled product through government procurement regulations. The municipalities will be encouraged to establish a "buy recycled" policy for supplies.
- Encourage public-private partnerships for development of new facilities and services, such as CDD recycling, organics composting, recyclables processing, and energy recovery.

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GLOSSARY

Aeration - The process of exposing waste material, such as compost, to air to promote aerobic decomposition. *Forced aeration* refers to the use of blowers in compost piles.

Aerobic - A biochemical process or condition occurring in the presence of oxygen.

Agricultural Waste - "Domestic animal manure or residuals in liquid or solid form generated in the production of poultry, livestock, fur-bearing animals, and their products. Agricultural waste includes residuals generated in the production and harvesting but not of subsequent processing of all agricultural, horticultural, or aquacultural commodities. Agricultural waste does not include land clearing debris unless the cleared land is intended solely for agricultural purposes." (*COMAR* 26.04.07.02)

Air Classification - A process in which a stream of air is used to separate mixed material according to the size, density and aerodynamic drag of the pieces.

Anaerobic - A biochemical process or condition occurring in the absence of oxygen.

Baler - A machine used to compress recyclables into bundles to reduce volume. *Balers* are often used on newspaper, plastics and corrugated cardboard.

Biodegradable Material - Waste material which is capable of being broken down by microorganisms into simple, stable compounds such as carbon dioxide and water. Most organic wastes, such as food wastes and paper, are *biodegradable*.

Biosolids - A recently adopted industry term for wastewater treatment sludge.

Borrow Pit- A facility that provides daily cover and capping material for sanitary landfills. Heavy equipment and adequate roads are required for the excavation and transport of earth materials that are mined for landfill cover.

Bulking Agent - A material used to add volume to another material to make it more porous to air flow. For example, municipal solid waste may act as a *bulking agent* when mixed with water treatment sludge.

Bulky Waste - Large items of refuse including, but not limited to, appliances, furniture, large auto parts, non-hazardous construction, demolition materials, trees, branches and stumps which cannot be handled by normal solid waste processing, collection and disposal methods.

Buy-Back Center - A facility where recyclable materials are bought from citizens. The materials are collected in separate disposal containers for different categories of recyclable materials.

Co-composting - Simultaneous composting of two or more waste types.

Co-disposal Plants: Facilities that burn sewage sludge combined with either prepared processed or unprocessed municipal solid waste.

Co-fired Plants- Facilities that burn coal and highly processed RDF.

Co-generation- The production of electric power or steam for sale by a non-utility which is then sold to a regulated utility in accordance with contracted guidelines.

Commercial Waste - Waste materials originating in wholesale, retail, institutional or service establishments, such as office buildings, stores, markets, theaters, hotels or warehouses.

Commingled Recyclables - A mixture of several recyclable materials in one container.

Compactor - Power-driven device used to compress materials to a smaller volume.

Compost - The relatively stable decomposed organic material resulting from the composting process. Also referred to as humus.

Composting - "The process in which organic solid waste is biologically decomposed under controlled conditions to yield a nuisance-free humus-like product." (*COMAR* 26.04.07.02)

Construction and Demolition Waste - Materials resulting from the construction, remodeling, repair or demolition of buildings, bridges, pavements and other structures.

Corrugated Paper - Paper or cardboard manufactured in a series of wrinkles or folds, or into alternating ridges and grooves.

Cullet - Clean, generally color-sorted, crushed glass used to make new glass products.

Curbside Collection - Programs where recyclable materials are collected at the curb, often from

special containers, to be brought to various processing facilities.

Decomposition - Breaking down into component parts or basic elements

Diversion Rate - A measure of the material being diverted for recycling compared with the total amount that was previously thrown away.

Drop-off Center - A method of collecting recyclable or compostable materials in which the materials are taken by individuals to collection sites and deposited into designated containers.

Emission - Discharge of a gas into atmospheric circulation.

Enterprise Fund - A fund for a specific purpose that is self-supporting from the revenue it generates.

Ferrous Metals - Metals that are derived from iron. They can be removed using large magnets at separation facilities.

Flow Control - A legal or economic means by which waste is directed to particular destinations. For example, an ordinance requiring that certain wastes be sent to a combustion facility is waste *flow control*.

Garbage - Spoiled or waste food that is thrown away, generally defined as wet food waste. It is used as a general term for all products discarded.

Ground water - Water beneath the earth's surface that fills underground pockets (known as aquifers) and moves between soil particles and rock, supplying wells and springs.

Hammermill - A type of crusher or shredder used to break up waste materials into smaller pieces.

Hazardous Waste - Waste material that may pose a threat to human health or the environment, the disposal and handling of which is regulated by federal law.

Hazardous Waste Landfill. A sanitary (lined) landfill that accepts hazardous waste. Hazardous waste may pose a threat to human health or the environment; therefore, the handling and disposal of the waste is strictly regulated by federal law. Waste processing procedures and facilities are highly dependant on the type of waste disposed at the landfill.

Heavy Metals - Hazardous elements including cadmium, mercury and lead which may be found in the waste stream as part of discarded items such as batteries, lighting fixtures, colorants and inks.

High Grade Paper - Relatively valuable types of paper such as computer printout, white ledger, and tab cards. Also used to refer to industrial trimmings at paper mills that are recycled.

Humus - Organic materials resulting from decay of plant or animal matter. Also referred to as compost.

Incinerator. A facility in which the combustion of solid waste (e.g., municipal, medical) occurs. The recovery of energy from the combustion process may or may not occur.

Incinerators are generally classified as a mass-burn facility , a refuse derived fuel facility, or waste to energy facility.

Mass-Burn Facility. An incinerator where the incoming waste is not processed prior to combustion is a mass-burn facility. Bulky and non-processible objects (e.g., white goods, furniture, etc.) are removed prior to processing; however, the waste is not shredded or separated further. A mass-burn facility may or may not provide energy recovery from the combustion process. The components of a mass-burn facility include facilities for waste handling and storage, a combustion unit, energy recovery (optional), ash collection, and air emission pollution control equipment.

Refuse Derived Fuel Facility. An incinerator where the incoming waste is processed prior to combustion to improve the fuel properties of the waste is a refuse derived fuel (RDF) facility. The purpose of a RDF facility is recover energy from the combustion of waste. After the removal of non-processible waste and bulky items, the waste is shredded and screened to produce RDF. RDF consists of waste materials which are usually one to six inches in length. Ferrous material is removed from the RDF by magnetic separators and collected for shipment to scrap metal markets. Components of a RDF facility include facilities for waste handling and storage, a combustion unit, energy recovery, ash collection, and air emission pollution control equipment.

Waste-to-Energy Facility (WTEF) . A centralized facility that reduces the quantity of MSW and recovers energy (as steam or electricity) through the combustion of MSW. A WTEF generally includes the following components: (1) a waste handling and storage facility (e.g., storage pit, cranes, front-end loaders, etc.); (2) a combustion unit;

(3) energy recovery facilities (boiler, turbine, generator, etc.); (4) ash collection; and

(5) air emission pollution control equipment (e.g. bag house, electrostatic precipitators, scrubbers, etc.). A WTEF may be either a mass-burn or a refuse derived fuel facility.

Incinerator Ash - Remnants of solid waste after combustion, including non-combustibles (e.g., metals) and soot.

Industrial Waste - "Any liquid, gaseous solid, or other waste substance, or combination thereof, resulting from: a) any process of industry, manufacturing, trade or business; or b) the development of any natural resource, including agriculture." (*COMAR* 26.08.01.01)

Infectious Waste - "Any waste that comes from a hospital, clinic, or laboratory and that is known or suspected to be contaminated with organisms capable of producing disease or infection in humans. Infectious waste includes disposable equipment, instruments, utensils, contaminated needles, scalpels, and razor blades, human tissue and organs that result from surgery, obstetrics, or autopsy, feces, urine, vomitus, and suctionings, live vaccines for human use, blood and blood products, laboratory specimens such as tissue, blood elements, excreta, and secretions." (*COMAR* 26.04.07.02)

Institutional Waste - Waste materials originating in schools, hospitals, prisons, research institutions and other public buildings.

Integrated Solid Waste Management - A practice of using several alternative waste management techniques to manage and dispose of specific components of the municipal solid waste stream. Waste management alternatives include source reduction, recycling, composting, energy recovery and landfilling.

Intermediate Disposal - "The preliminary or incomplete disposal of solid waste including, but not limited to, transfer stations, incineration, or processing." (*COMAR* 26.04.07.02)

In-Vessel Composting - A composting method in which the compost is produced in an enclosed mechanical reactor under controlled environmental conditions.

Land-Clearing Debris- A facility for the land disposal of land clearing and naturally occurring debris**.** Land-clearing wastes must be compacted to the greatest extent possible, and thus may include processing equipment such as grinders crushers, and shredders. These facilities do not require liners.

Landfill - (Sanitary Landfill) “an engineered method of disposing of solid wastes on land in a manner that minimizes public health and environmental hazards, and is designed, installed, and operated according to the provission of these regulations.” (*COMAR* 26.04.07.02)

Leachate - Liquid that has percolated through solid waste or another medium and has extracted, dissolved, or suspended materials from it, which may include potentially harmful materials.

Leachate collection and treatment is of primary concern at municipal waste landfills.

Magnetic Separation - A system to remove ferrous metals from other materials in a mixed municipal waste stream. Magnets are used to attract the ferrous metals.

Manual Separation - The separation of recyclable or compostable materials from waste by hand sorting.

Mass Burn - A municipal waste combustion technology in which the municipal solid waste is burned in a controlled system without prior sorting or processing.

Materials Recovery Facility (MRF)- A centralized facility that receives, separates, processes and/or market recyclable materials that have been previously separated from the municipal solid waste stream. A MRF for separated recyclables can be designed to handle all types of recyclables or just certain categories (e.g., paper, corrugated, plastics, glass, steel, aluminum, etc.), and may include a variety of processing equipment such as balers, crushers, air classifiers, magnetic separators, optical separation systems (for glass), and loading and transportation equipment.

Mechanical Separation - The separation of waste into various components using mechanical means such as cyclones, trommels and screens.

Methane - An odorless, colorless, flammable and explosive gas produced by municipal solid waste undergoing anaerobic decomposition. *Methane* is emitted from municipal solid waste landfills.

Microorganisms - Microscopically small living organisms that digest decomposable materials through metabolic activity. *Microorganisms* are active in the composting process.

Mixed Waste Processing Facility (MWPF). A centralized facility that receives, separates, processes and/or markets recoverable fractions of municipal solid waste, including recyclable materials, combustible materials and compostable materials. Processing equipment may include balers, crushers, air classifiers, magnetic separators, optical separation systems (for glass), rotating screens (trommels), wood grinders, compactors and loading and transportation equipment.

Modular Incinerator - Smaller-scale waste combustion units prefabricated at a manufacturing facility and transported to the Municipal Waste Combustion (MWC) facility site.

Monitoring Well - "Any hole made in the ground to examine groundwater." (*COMAR* 26.04.07.02)

Municipal Solid Waste Composting - The controlled degradation of municipal solid waste after some form of preprocessing to remove non-compostable inorganic materials.

Mulch - Ground wood waste used as a protective ground covering around plants to prevent evaporation of moisture and freezing of roots and to nourish the soil.

Municipal Sanitary Landfill - An engineered solid waste acceptance facility permitted under the requirements of MDE. The facility is designed, installed, and operated to minimize public health and environmental hazardous. The municipal sanitary landfill is the final disposal site for wastes generated by a community with the exception of those wastes specifically prohibited by MDE and Charles County regulations.

Municipal Solid Waste - Includes non-hazardous waste generated in households, commercial and business establishments, institution and light industrial wastes, agricultural wastes, mining waste and sewage sludge.

Municipal Solid Waste (MSW) Drop-off Center- A facility where MSW can be dropped off by individual citizens at the County's sanitary landfill or at regional drop-off centers; includes vehicle access to disposal containers.

Municipal Solid Waste Landfill- A county owned, centralized facility for the long-term land disposal of MSW without creating nuisances or hazards to public health or safety. A

state-of-the-art municipal waste landfill includes the following technologies and operating features: (1) covering the disposed MSW with clean soil or other suitable cover material at the end of each day; (2) composite, double, or double composite liners; (3) leachate collection and storage systems; (4) leachate treatment; (5) landfill gas control and recovery; (6) proper closure and capping of filled landfill cells; and (7) environmental protection monitoring (i.e., check of incoming landfill wastes for hazardous or other unsuitable materials, groundwater monitoring wells, domestic water supply monitoring, etc.). Operation of a municipal waste landfill requires heavy machinery for distributing and compacting the MSW; excavating; hauling and stockpiling cover material; and constructing new landfill cells and closing old landfill cells.

Open Dump - "A land disposal site that is not designed and operated in accordance with the requirements for a sanitary landfill as defined in COMAR

Organic Waste - Waste material containing carbon. The organic fraction of municipal solid waste

includes paper, wood, food wastes, plastics and yard wastes.

Participation Rate - A measure of the number of people participating in a recycling program compared to the total number that could be participating.

Processing Facility - A combination of structures, machinery, or devices used to reduce or alter the volume, chemical, or physical characteristics of solid waste. For the purpose of these regulations, collection points serving rural residential areas are not considered to be processing facilities, provided that solid waste is not transferred from collection vehicles to another transportation unit. A generator who processes his or her own solid waste at the site of generation and disposes of the processed solid waste off the site of generation at a disposal site permitted by the Department is not considered to be a processing facility." (*COMAR* 26.04.07.02)

Recyclables - Materials that still have useful physical or chemical properties after serving their original purpose and that can, therefore, be reused or remanufactured into additional products.

Recycling - The process by which materials otherwise destined for disposal are collected, reprocessed or remanufactured and reused.

Recycling Drop-off Center- A facility where recyclable materials can be dropped-off for collection by the agency. Facilities similar to MSW drop-off center (and could be combined with an MSW, yard waste, or waste oil and antifreeze drop-off center), including separate disposal containers for different categories of recyclable materials.

Refuse - See Solid Waste

Refuse-Derived Fuel (RFD)- Product of mixed waste processing system in which certain recyclable and non-combustible materials are removed, and the remaining combustible material is converted for use as a fuel to create energy.

RDF, Coarse - Shredded municipal waste with minimal separation of recyclable materials.

RDF, Prepared - Municipal waste is shredded and mechanically processed to remove recyclable metals and glass. Optionally the material can be further shredded to produce a "fluff", or compacted into pellets prior to incineration.

Residential Waste - Waste materials generated in single and multiple-family homes.

Residue - Materials remaining after processing, incineration, composting, or recycling have been completed. *Residues* are usually disposed of in landfills.

Resource Recovery - A term describing the extraction and utilization of materials and energy from the waste stream. The term is sometimes used synonymously with energy recovery.

Resource Recovery Facility - "A processing facility at which component materials of solid waste are recovered for use as raw material or energy sources." (*COMAR* 26.04.07.02)

Retention Basin - An area designed to retain runoff and prevent erosion and pollution.

Reuse - The use of a product more than once in its same form for the same purpose; e.g., a soft-drink bottle is reused when it is returned to the bottling company for refilling.

Rubble Material Recovery Facility- A centralized facility that receives, separates and processes land-clearing and construction and demolition (LC&C&D) debris, such as trees, brush, rock, concrete, asphalt, brick, plaster and steel. Rubble processing may utilize crushers and grinders to reduce the volume of LC&C&D wastes, and thus maximize the efficiency and handling of such wastes. LC&C&D wastes can be processed for reuse and recycling (e.g., crushed rock, wood compost, scrap metal, etc.) or for disposal in a rubble landfill.

Scrap - Discarded or rejected industrial waste material often suitable for recycling.

Scrap Tire Collection Facility. A facility for the collection and temporary storage of scrap tires.

Septage - Material removed from chemical toilets, septic tanks, seepage pits, privies or cesspools.

Sewage - "The water-carried human, domestic and other wastes and includes all human and animal excreta." (*COMAR* 26.04.02.01)

Sludge - A semi-liquid residue remaining from the treatment of municipal and industrial water and wastewater.

Sludge Storage Facility. A facility designed to hold (temporarily) sewage sludge for a period of time prior to disposal, processing, or land application.

Soil Liner - Landfill liner composed of compacted soil used for the containment of leachate. **Solid**

Waste - "Any garbage, refuse, sludge, or liquid from industrial, commercial, mining, or agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage or in irrigation return flows." (*COMAR* 26.03.03.01)

Solid Waste Acceptance Facility - "Any landfill, incinerator, transfer station, or processing facility whose primary purpose is to dispose of, treat, or process solid waste." (*COMAR* 26.04.07.02)

Solid Waste Management - "The systematic administration of activities which provide for the collection, source separation, storage, transportation, transfer, processing, treatment, re-use, or disposal of solid waste." (*COMAR* 26.03.03.01)

Source Reduction - The design, manufacture, acquisition and reuse of materials so as to minimize the quantity and/or toxicity of waste produced. *Source reduction* prevents waste either by redesigning products or by otherwise changing societal patterns of consumption, use and waste generation.

Source Separation - The segregation of specific materials at the point of generation for separate collection. Residences source separate recyclables as part of a curbside recycling program.

Special Medical Waste - See Infectious Waste.

Special Waste - Refers to items that require special or separate handling, such as household hazardous wastes, bulky wastes, tires and used oil.

Solid Waste Transfer Station. A centralized facility where waste is unloaded from several small collection vehicles and loaded into larger vehicles for hauling to processing or disposal facilities; could include the use of loading and compacting machinery.

Subtitle C - The hazardous waste section of the Resource Conservation and Recovery Act (RCRA).

Subtitle D - The solid, non-hazardous waste section of the Resource Conservation and Recovery Act (RCRA).

Tipping Fee - A fee, usually dollars per ton, for the unloading or dumping of waste at a landfill, transfer station, recycling center, or waste-to-energy facility; also called a disposal or service fee.

Transfer Station -A centralized facility where waste is unloaded from several small collection

vehciles and loaded into larger vehicles for hauling to processing or disposal facilities; could include the use of loading and compacting machinery.

Tub Grinder - Machine to grind yard and wood wastes for mulching, composting or size reduction.

Variable Container Rate - A charge for solid waste services based on the volume of waste generated measured by the number of containers set out for collection.

Volume Reduction - The processing of waste materials so as to decrease the amount of space the materials occupy, usually by compacting or shredding (mechanical), incineration (thermal), or composting (biological).

Waste Oil and Antifreeze Drop-off Facility- A facility where used motor oil and antifreeze can be dropped-off for collection by the agency or private operator, includes vehicle access to drop-off tanks for oil and antifreeze.

Waste Stream - A term describing the total flow of solid waste from homes, businesses, institutions and manufacturing plants that must be recycled, burned or disposed of in landfills; or any segment thereof, such as the "residential waste stream" or the "recyclable waste stream."

Waste-to-Energy - Conversion of solid waste to energy, generally through the combustion of processed or raw refuse to produce steam and electricity.

Water Table - Level below the earth's surface at which the ground becomes saturated with water. Landfills and composting facilities are designed with respect to the water table in order to minimize potential contamination.

Wet Scrubber - Anti-pollution device in which a lime slurry (dry lime mixed with water) is injected into the flue gas stream to remove acid gases and particulates.

Wetland - Area that is regularly wet or flooded and has a water table that stands at or above the land surface for at least part of the year. Coastal wetlands extend back from estuaries and include salt marshes, tidal basins, marshes and mangrove swamps. Inland non-tidal wetlands consist of swamps, marshes and bogs. Federal regulations apply to landfills sited at or near wetlands.

White Goods - Large household appliances such as refrigerators, stoves, air conditioners and washing machines.

Windrow - A large, elongated pile of composting material.

Yard Waste - leaves, grass clippings, brush, prunings, and other natural organic matter discarded from yards and gardens.

Yard Waste Composting Facility- A centralized facility that receives and processes yard waste (e.g., grass clippings, weeds, brush, trees, leaves and other plant materials) into compost. Centralized (e.g., municipal, commercial) yard waste composting facilities usually require several acres of land to grind, pile and turn the yard waste during the decomposition process, and to process and store the final composted product. Facilities that accept trees, stumps, brush and other wood wastes require the use of chippers and grinders for processing. Front-end loaders are used to move and pile the wastes for composting, and front-end loaders and specially designed windrow turning machines are used to periodically turn the compost piles. Trommels and other screening machines are used to sort and remove large materials from the final compost product. Centralized facilities would also include drop-off and staging areas, as well as compost pick-up areas.

Yard Waste/Sludge Composting Facility- A facility where yard wastes and sewage sludge are combined to create a compost. The yard waste is processed in a similar manner to that described for yard waste composting, but is mixed with nutrient-rich sewage sludge. The facilities used for yard waste/sludge composting are similar to those used for yard waste composting, except that composting with sludge may require building the compost piles over a paved pad and enclosing the piles for odor control.

Yard Waste Drop-off Facility- A facility or at regional drop-off centers are where citizens can drop-off compostable yard waste. Facilities include roll-off containers and vehicle access.

Many of the definitions in this glossary were obtained from EPA's Decision Maker's Guide to Solid Waste Management, Volume II, (EPA 530-R-95-023), 1995. Project Co-Directors: Phillip R. O'Leary and Patrick W. Walsh, Solid and Hazardous Waste Education Center, University of Wisconsin-Madison/Extension.

APPENDIX A

COMAR 26.03.03

Title 26 DEPARTMENT OF THE ENVIRONMENT

Subtitle 03 WATER SUPPLY, SEWERAGE, SOLID WASTE, AND POLLUTION CONTROL PLANNING AND FUNDING

Chapter 03 Development of County Comprehensive Solid Waste Management Plans

Authority: Environment Article, Title 9, Subtitle 5, Annotated Code of Maryland

.01 Definitions.

A. In this chapter, the following terms have the meanings indicated.
B. Terms Defined.

(1) "County" means any of the 23 Maryland counties or Baltimore City.
(2) County Plan.

(a) "County plan" means a comprehensive plan for adequately providing throughout the county (including all towns, municipal corporations, and sanitary districts) the following facilities and services by public or private ownership:

(i) Solid waste disposal systems;
(ii) Solid waste acceptance facilities; and
(iii) Systematic collection and disposal of solid waste, including litter.

(b) "County plan" includes all revisions to the plan.

(3) "Department" means the Department of the Environment.
(4) "Governing body" means the Board of County Commissioners, or the County Executive and Council, or the Mayor and City Council of Baltimore.
(5) "Litter" means any waste materials, refuse, garbage, trash, debris, dead animals, or other discarded material.
(6) "Refuse" means any solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations, or from community activities, which:

(a) Is discarded, or is being accumulated, stored, or physically, chemically, or biologically treated before being discarded; or
(b) Has served its original intended use and sometimes is discarded; or
(c) Is a manufacturing or mining by-product and sometimes is discarded.

(7) "Revision" means either an adopted amendment to, or a periodic update of, a county plan.
(8) "Solid waste" means any garbage, refuse, sludge, or liquid from industrial, commercial, mining, or agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage or in irrigation return flows.
(9) "Solid waste acceptance facility" means any sanitary landfill, incinerator, transfer station or plant, whose primary purpose is to dispose of, treat, or process solid waste.

(10) Solid Waste Disposal System.

(a) "Solid waste disposal system" means any publicly or privately owned system that:

(i) Provides a scheduled or systematic collection of solid waste;
(ii) Transports the solid waste to a solid waste acceptance facility; and
(iii) Treats or otherwise disposes of the solid waste at the solid waste acceptance facility.

(b) A solid waste disposal system includes each solid waste acceptance facility that is used in connection with it.

(11) "Solid waste management" means the systematic administration of activities which provide for the collection, source separation, storage, transportation, transfer, processing, treatment, re-use, or disposal of of solid waste.

.1 General Provisions.

A. Each county shall maintain a current, comprehensive, solid waste plan which covers at least the succeeding 10-year period. Each plan shall be prepared in accordance with these regulations, and shall be arranged with an introduction and five chapters as set forth in Regulation .03 of this chapter.
B. Each county plan shall include all or part of the subsidiary plans of the towns, municipal corporations, sanitary districts, privately owned facilities, and local, State and federal agencies having existing, planned, or programmed development within the county to the extent that these inclusions shall promote the public health, safety, and welfare. These subsidiary plans may be incorporated by reference into the county plan.
C. The Department may require the installation of a solid waste disposal system, if deemed necessary, after considering the factors listed in Environment Article, Title 9, Subtitle 5, Annotated Code of Maryland. The Department may permit the establishment of a solid waste acceptance facility without a collection and transportation system if a solid waste disposal system is either not available or not required to be installed in the area.

.2 Plan Content.

A. The introduction shall contain:

(1) A statement certifying that the plan has been prepared in accordance with these regulations and that it has been officially adopted by the governing body of the county; and
(2) The letter of approval from the Department.

B. Chapter One shall contain a:

(1) Statement of the county's goals regarding solid waste management, the objectives and policies necessary to achieve these goals, and a discussion of the conformance of these objectives and policies with those of State, regional, and local comprehensive land use plans and programs;
(2) Brief discussion, with charts, of the structure of the county government as it relates to solid waste management; and
(3) Brief discussion of State, federal and local agencies, laws, and regulations which affect the planning, establishment, and operation by the county of solid waste disposal systems.

C. Chapter Two shall contain a:

(1) Table which shows the county's present and projected population (if more than one set of projections is shown, the set upon which the plan is based shall be noted);
(2) Map which shows the location of municipalities and federal facilities within the county;
(3) Discussion of current county zoning requirements as they relate to solid waste management activities; and

(4) Discussion of the current status of the county comprehensive land-use plan, including the date that the plan was adopted and last updated.

D. Chapter Three shall contain:

(1) A table that shows the existing and projected, for at least the succeeding 10-year period, annual generation (in tons, cubic yards, or gallons, as appropriate) of:

(a) Residential (household, domestic) wastes;
(b) Commercial wastes;
(c) Industrial (nonhazardous) solids, liquids, and sludges;
(d) Institutional (schools, hospitals, government buildings) waste;
(e) Land clearing and demolition debris (rubble);
(f) Controlled hazardous substances (CHS);
(g) Dead animals;
(h) Bulky or special wastes (automobiles, large appliances, etc.);
(i) Vehicle tires;
(j) Wastewater treatment plant sludges;
(k) Septage; and
(l) Other wastes (water treatment plant sludges, residues collected by a pollution control device, agricultural wastes, mining wastes, litter, street sweepings, recreational wastes, etc.) unless they are generated in insignificant quantities. However, the Department may require the county to substantiate any omission.

(2) A discussion of the bases for the data presented in the table required by §D(1) of this regulation.
(3) A discussion of the types and quantities of solid waste, if significant, which are entering or leaving the county for processing, recovery, or disposal.
(4) A description of existing solid waste collection systems, including service areas.
(5) Information concerning each existing public or private solid waste acceptance facility (incinerators, transfer stations, major composting sites, sanitary and rubble landfills, dumps, major resource recovery facilities, CHS facilities, injection wells, and industrial waste liquid holding impoundments) including:

(a) Its location on a map;
(b) Its Maryland grid coordinates;
(c) Its size in acres;
(d) The types and quantities of solid wastes accepted;
(e) Ownership;
(f) Permit status; and
(g) Anticipated years of service life remaining.

E. Chapter Four.

(1) Chapter four shall contain an assessment (using a narrative description, maps, charts, and graphs as appropriate) of the county's needs to alter, extend, modify, or add to existing solid waste disposal systems during the next 10 years.
(2) The assessment above shall use, when appropriate, the background information contained in chapters one, two, and three.
(3) The assessment shall consider the constraints imposed upon the establishment of solid waste acceptance facilities by:

(a) Topography;
(b) Soil types and their characteristics;
(c) Geologic conditions;
(d) Location;
(e) Use and depth of aquifers;

(f) Location of wetlands;
(g) Location of surface water sources and their flood plains and watersheds;
(h) Existing water quality conditions;
(i) Incompatible land use;
(j) Planned long-term growth patterns;
(k) Federal, State and local laws and areas of critical State concern (as designated by the Department of State Planning).

(4) The assessment shall evaluate:

(a) The use of source separation and source reduction programs to reduce the quantities of solid wastes which shall be 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) The need for disposal capacity for asbestos;
(e) Programs and procedures needed to respond to the unplanned (emergency) spillage or leaking of hazardous wastes within the county; and
(f) Whether existing local master plans and zoning regulations provide for the appropriate siting, operation, or both, of solid waste management systems or facilities.

F. Chapter Five.

(1) Chapter five shall contain the county's plan of action with respect to all types of solid waste and all phases of solid waste management.
(2) The plan of action in §F(1), of this regulation, shall cover at least the succeeding 10-year period and, at a minimum, shall:

(a) Discuss the solid waste disposal systems and solid waste acceptance facilities, both public and private, which will be in use during the planning period, including proposed systems and facilities;
(b) Provide a mechanism for managing each of the waste streams identified in §D(1) of this regulation;
(c) Demonstrate, through tables, charts and graphs, that the sizing, staging, and capacity of all systems and facilities in §F(2)(a) and (b), of this regulation, will be adequate for the county's needs during the planning period;
(d) Establish schedules for placing new public or private solid waste disposal systems or solid waste acceptance facilities into operation, including a description of necessary actions and their timing, to bring the county's solid waste disposal systems into compliance with the mandates of pertinent federal and State laws, and any permits or orders issued under these laws;
(e) Describe provisions and methods for financing existing and proposed solid waste disposal systems, including planning and implementation;
(f) Include a projected closure date for each public solid waste acceptance facility which is scheduled to cease operations during the planning period, the projected use of each closed site, and the relationship of that use to the county's comprehensive land use plan; and
(g) Discuss changes in programs, plans, regulations, and procedures as a result of the assessment conducted under §E, of this regulation.

.3 Technical Requirements Applicable to County Plans.

A. Maps in the county plans shall be of sufficient scale and clarity to clearly show the required information.
B. Projections in the county plans shall be given for at least the succeeding 10-year period at intervals of not more than 5 years.

.4 Plan Revisions.

A. Except as provided in §B, of this regulation, each county plan shall be:

(1) Revised if deemed necessary by the Department;
(2) Reviewed in its entirety at the interval specified by Environment Article, Title 9, Subtitle 5, Annotated Code of Maryland; and
(3) Revised to include the installation or extension of either a solid waste acceptance facility, or solid waste disposal system, before the issuance of a permit by the Department under Environment Article, Title 9, Subtitle 2, Annotated Code of Maryland.

B. Exceptions. A revision for the sole purpose of including a private facility is not necessary if the:

(1) Facility accepts only wastes generated by the owner's operations;
(2) Facility is in general conformance with the management mechanism described in Regulation .03F(2)(b) of this chapter; and
(3) Information listed in Regulation .03D(5), of this chapter, is provided for the facility when the county plan is reviewed and revised in accordance with §A(2), of this regulation.

C. Revisions pertaining to county plans shall be adopted and submitted in accordance with the following process:

(1) The county shall solicit input concerning the proposed revision from each of the entities listed in Regulation .02B, of this chapter, and from any other entity likely to be affected by the proposed revision.
(2) The county shall provide a reasonable opportunity for a public hearing concerning the proposed revision to the county plan. Prince George's County and Montgomery County are required by Environment Article, Title 9, Subtitle 5, Annotated Code of Maryland, to conduct a public hearing. The Department, the public, and the entities listed in Regulation .02B, of this chapter, shall receive prior notice of a hearing.
(3) Following the public hearing or public meeting, or a decision not to conduct a public hearing or public meeting, the governing body of the county shall adopt the revision and submit seven copies of it to the Department. This submittal shall be accompanied by a discussion of substantive issues raised at the public hearing or public meeting, and how they were resolved.

D. The Department shall distribute copies of the adopted revision to the Departments of Natural Resources, State Planning, and Agriculture, for review and comment.
E. The Department shall, within 90 days after receiving the submission, approve, disapprove, or approve in part, the adopted revision unless the review period has been extended under Environment Article, Title 9, Subtitle 5, Annotated Code of Maryland. If the submittal is disapproved in whole, or in part, the Department shall, in a written notice to the county, clearly define the inadequacies of the submittal, and provide a suggested outline of the tasks needed to improve the submittal so that it can be approved by the Department.
F. The governing body shall, for 6 months following the disapproval, have the right to appeal the Department's action by sending a written notice of appeal to the Department's Office of Hearings at 201 West Preston Street, Baltimore, Maryland 21201.

Administrative History

Effective date: January 1, 1971

Regulations .01—.05 repealed and new Regulations .01—.05 adopted effective November 4, 1985 (12:22 Md. R. 2104) ----------

Chapter recodified from COMAR 10.17.08 to COMAR 26.03.03

APPENDIX B

County Commissioners of Charles County, Maryland Resolution No. 2014-32 Adoption of the Comprehensive Solid Waste Management Plan for 2011-2021.

COUNTY COMMISSIONERS OF CHARLES COUNTY, MARYLAND

RESOLUTION NO. 2014-32

WHEREAS, the County Commissioners of Charles County, Maryland, by the authority of Environmental Article, Title 9, Subtitle 5, of the Annotated Code of Maryland, and Title 26, Subtitle 3, Chapter 3, of the Code of Maryland Regulations (COMAR), as well as other provisions of the Annotated Code of Maryland and the provisions of the Code of Public Local Laws of Charles County, are directed to adopt and submit to the Maryland State Department of the Environment a comprehensive plan for the provision of adequate solid waste management systems throughout the County to include all towns and municipal corporations within Charles County; and

WHEREAS, said Comprehensive Solid Waste Management Plan has been prepared and submitted to the County Commissioners of Charles County, Maryland, in order that it may be adopted by said County; and

WHEREAS, said Comprehensive Solid Waste Management Plan has been reviewed by the County Commissioners of Charles County, Maryland, and it appearing that all requirements of State law have been complied with; and

WHEREAS, the Charles County Commissioners held a public hearing on the draft Comprehensive Solid Waste Management Plan for 2011-2021 on 11/18/14 to solicit public comment; and

WHEREAS, the County Commissioners of Charles County, Maryland, held a public work session on all public testimony and all comments submitted during the public record on 11/18/14 and subsequently on the 11/18/14; and

WHEREAS, changes to the text, tables and figures were made to the Charles County Comprehensive Solid Waste Management Plan 2011-2021, dated 11/18/14, subsequent to comments receive during the period of public record; and

WHEREAS, the said solid waste management plan is found to be consistent with land use master planning in Charles County; and

WHEREAS, after serious deliberation and study the County Commissioners of Charles County, Maryland, are of the opinion that it is in the best interest of the citizens of Charles County that the Comprehensive Solid Waste Management Plan be adopted and approved; and

NOW, THEREFORE BE IT RESOLVED, this 18th day of November 2014, by the County Commissioners of Charles County, Maryland, that the Comprehensive Solid Waste Management Plan, dated 4/23/01, and its subsequent amendments as approved by the Maryland Department of the Environment is hereby repealed; and

BE IT FURTHER RESOLVED, this 18th day of November 2014, that attached Charles County Comprehensive Solid Waste Management Plan 2011-2021, dated 11/18/14, Known as Exhibit A, is hereby adopted by the County Commissioners of Charles County, Maryland and IT IS FURTHER RESOLVED, that said Plan, replace and supersede all previous plans.

FURTHER, IT IS RESOLVED, that the Charles County Comprehensive Solid Management Plan 2011-2021, dated 11/18/14, shall be submitted to Maryland Department of the Environment for review and approval.

IT IS FURTHER RESOLVED, that if any clause, sentence, article, section, part or parts of said Comprehensive Solid Waste Management Plan 2011-2021 shall be held

unconstitutional or invalid for any reason whatsoever, such unconstitutionality or invalidity shall not effect the validity of the remaining parts of said Plan or any action thereof; the County Commissioners of Charles County, Maryland, hereby declare that they would have adopted the remaining parts of said Plan, or any section thereof, if they had known any such clause, sentence, article, section, part or parts of said Plan would be declared unconstitutional or invalid.

FINALLY, IT IS RESOLVED that said Comprehensive Solid waste Management Plan 2011-2021 shall take effect on the 18th day of November, 2014.

COUNTY COMMISSIONERS OF
CHARLES COUNTY, MARYLAND

Candice Quinn Kelly, *President*

Reuben B. Collins, II, Esq., *Vice President*

Debra M. Davis, Esq.

Ken Robinson

Bobby Rucci

ATTEST: Danielle Mitchell, Clerk

Exhibit A: Comprehensive Solid Waste Management Plan 2011-2021, dated November 18, 2014

COUNTY COMMISSIONERS OF CHARLES COUNTY, MARYLAND

RESOLUTION NO. 92-63

WHEREAS, the County Commissioners of Charles County, Maryland, are authorized by Article 25, Section 14A of the Annotated Code of Maryland, as well as other provisions of the Annotated Code of Maryland and provisions of the Code of Public Local Laws of Charles County, to prescribe and enforce rules and regulations concerning the operation and manner of use of Charles County Sanitary Landfills, and

WHEREAS, the County Commissioners have heretofore adopted Regulations Governing the Use of Charles County Sanitary Landfills, and

WHEREAS, a public hearing was held to consider amendments to said Rules and Regulations on the 24th day of February, 1992, and

WHEREAS, the County Commissioners of Charles County, Maryland, are of the opinion that it is in the best interest of the citizens of Charles County to amend the Rules and Regulations Governing the Use of Charles County's Sanitary Landfills.

NOW, THEREFORE, it is this 1st day of September, 1992, RESOLVED by the County Commissioners of Charles County, Maryland, that the attached Regulations Governing the Use of Charles County's Sanitary Landfills be and they are hereby adopted, and

FURTHER, IT IS RESOLVED, that if any clause, sentence, article, section, part or parts of this Resolution shall be held unconstitutional or invalid for any reason whatsoever, such unconstitutionality or invalidity shall not effect the validity of

the remaining parts of the Resolution or any section thereof; the County Commissioners of Charles County, Maryland, hereby declare that they would have adopted the remaining parts of the Resolution or any section thereof, if they had known any such clause, sentence, article, section, part or parts of this Resolution would be declared unconstitutional or invalid, and

Finally, IT IS RESOLVED that this Resolution shall take effect on the 1st day of September, 1992.

ATTEST:

Shirley M. Gore

Shirley M. Gore, Clerk

COUNTY COMMISSIONERS OF
CHARLES COUNTY, MARYLAND

Thomas Mac Middleton

Thomas Mac Middleton, President

Robert J. Fuller

Robert J. Fuller

Murray D. Levy

Murray D. Levy

Nancy J. Sefton

Nancy J. Sefton

Dale E. Speake

Dale E. Speake

REGULATIONS GOVERNING THE USE OF CHARLES COUNTY'S SANITARY LANDFILLS

1. Trash shall be defined as any domestic refuse from households or commercial establishments.

2. Refuse Not Acceptable

   A. Hazardous Waste as defined in the Environmental Article of the Annotated Code of Maryland (COMAR) 26.13.01.03B (26)

   B. Industrial Waste as defined in the Environmental Article of the Annotated Code of Maryland (COMAR) 26.13.01.03B (26)

   C. Infectious Waste as defined in the Environmental Article of the Annotated Code of Maryland (COMAR) 26.13.01.03B (26)

   D. Radioactive Materials as defined in the Environmental Article of the Annotated Code of Maryland (COMAR) 26.13.01.03B (26)

   E. Free or Liquid Waste as defined in 47 CFR 8311 (1982). This shall include any raw sewage, effluent or sludge from a wastewater treatment process or septic system.

   F. Any animal, animal carcass or parts, of any description.

   G. Garbage, trash or refuse collected or generated outside the geographical limits of Charles County. The presence of addressed mail, correspondence or shipping tags within the trash which indicates addresses which are outside the geographical limits of Charles County shall create a presumption that the trash was collected or generated

outside the geographical limits of Charles County.

H. Tree stumps or limbs larger than four (4) inches in diameter.

3. Authorized Users

A. Residents of Charles County may dispose of trash at any Sanitary Landfill during normal business hours.

B. Business establishments of Charles County may dispose of trash at any Sanitary Landfill during normal business hours subject to these regulations.

C. Commercial trash haulers which dispose of garbage at a Charles County Sanitary Landfill must obtain a permit as provided in these regulations.

D. All persons using the facilities provided at a Charles County Sanitary Landfill shall do so under the supervision of County personnel and failure to dispose of garbage, trash, or refuse as directed shall constitute a violation of these regulations.

E. No permit shall be issued pursuant to these regulations unless the applicant furnishes satisfactory evidence of having obtained all permits pertaining to the disposal of garbage, trash, or refuse required by the Charles County Health Department.

4. Permits

Permits for the use of the Charles County Sanitary Landfill will be issued in accordance with the following procedure: Commercial Haulers who transport garbage, as defined in the Charles County Code 132(a) shall be required to have their

vehicles inspected annually and comply with Charles County Code 132(b). An annual fee of $25.00 will be assessed. The permit period begins on August 1 of each year.

5. Fees

Fees for use of the Charles County Sanitary Landfills shall be paid in advance and shall be in accordance with the schedule of fees adopted by Charles County. Failure to make payment of any required fees shall constitute a violation of these regulations.

6. Penalties

A. The County is empowered to revoke any permit for reasonable cause.

B. Violation of these regulations shall constitute a misdemeanor and, upon conviction thereof, the violation shall be subject to punishment by a fine of not to exceed $500.00.

C. County Sanitary Landfill personnel will, on a regular basis, check for the contents of trash which is brought into the Landfill for disposal by commercial haulers to insure its acceptability. The Sanitary Landfill staff will search for any correspondence, envelopes, invoices, bill of lading for receiving goods, etc., that contain addresses for places outside the geographical limits of Charles County.

D. Six (6) individual bags of refuse containing multiple correspondence as described in Paragraph C above will be considered adequate evidence of out-of-County refuse.

E. Any person or entity found to be in violation of bringing out-of-County garbage, trash, or refuse into a Charles County Sanitary Landfill will be subject to the following:

(1) 1st Offense: $1,000 fine; removal of all out-of-County garbage, trash or refuse, and suspension of truck permit until all refuse is removed.

(2) 2nd Offense: $1,000 fine; 30 day suspension of truck permit; and removal of all out-of-County garbage, trash or refuse, and suspension of truck permit until all refuse is removed.

(3) 3rd and subsequent Offense: $2,500 fine; 6 month suspension of truck permit; and removal of all out-of-County garbage, trash or refuse, and suspension of truck permit until all refuse is removed.

F. Failure to comply with conditions stipulated in Subsection E above within one (1) working day shall result in revocation of truck permit.

G. The County reserves the right to prohibit the use of the Landfill to anyone who violates any of these regulations.

APPENDIX C

Population Projection Data

Projected Population Interpolation Summary For Charles County

2009-2021

Year	Housing Units	Persons per Housing Unit	Population
2009	50,178	2.83	143,716
2010	51,225	2.83	146,551
2011	52,029	2.83	148,603
2012	52,846	2.82	150,683
2013	53,676	2.82	152,792
2014	54,519	2.81	154,931
2015	55,375	2.81	157,100
2016	56,705	2.8	160,408
2017	58,066	2.79	163,785
2018	59,460	2.79	167,234
2019	60,888	2.78	170,754
2020	62,350	2.77	174,350
2021	63,847	2.76	178,021

APPENDIX D

Charles County MRA Calculations

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Land Management Administration • Technical Services and Operations Program
1800 Washington Boulevard • Suite 610 • Baltimore, Maryland 21230-1719
410-537-3314 • 800-633-6101 x3314 • www.mde.state.md.us/recycling

Maryland Recycling Act (MRA) Tonnage Reporting Survey
FORM A – County Solid Waste Accounting Form for 2009

County: Charles County **Reporting Period:** Jan. thru Dec.

Solid Waste Manager: Dennis Fleming **Phone Number:** 301-932-3440

Recycling Coordinator: Lowry Phelps **Phone Number:** 301-932-3568

TABLE A1 – Waste Disposed*

Name and Location of Disposal Facility Accepting Waste Collected in Your County ^	Type of Facility	MRA Waste (tons)	Non-MRA Waste (tons)	Total Waste Disposed (tons)
West Virginia Tire, West Virginia	Monofill		122.28	122.28
Fort Totten, DC	Landfill		10.40	10.40
PA Transfer, Lewisberry, PA	Transfer Station		5.00	5.00
King George Landfill, VA	Landfill		5,953.00	5,953.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
TOTAL	A	0.00	6,090.68	6,090.68

* For more detailed guidelines, refer to the *Maryland Recycling Act (MRA) Tonnage Reporting System Guidelines*, available under "County Coordinator Resources" on MDE's recycling web page.

^ **This list should ONLY INCLUDE waste not accepted at a Maryland Permitted Solid Waste Acceptance Facility (a list of which is available in the "County Coordinator Resources" section of the Maryland Department of the Environment's (MDE) waste diversion web page at www.mde.state.md.us/recycling). Waste reported to MDE by Solid Waste Acceptance Facilities, as required by § 9-204(n)(4)(i) of the Environment Article, will be included in County waste totals by MDE. See *MRA Tonnage Reporting Survey Guidelines* for more**

A For use in Table C1 – Maryland Recycling Act Waste Diversion Rate Calculation.

Please provide a brief explanation of how the weight of Non-MRA waste was determined

I certify, to the best of my knowledge, that the tonnage claimed on this form is accurate and based upon actual records maintained by solid waste acceptance facilities. These tonnage records will be made available to MDE for auditing purposes, if requested ***(Complete "Signature", "Title", and "Date" by hand)***.

Signature , Chief of Environmental Services , 6/17/10
Title Date

County: Charles Reporting Period: Jan. thru Dec. 2009

FORM B – County Recycling Accounting Form

TABLE B1 – MRA Materials Recycled*

Category	MRA Recyclables	Residential (Tons)	(Tons)	Total (Tons)	
Commingled Containers	Commingled Containers		141.51	141.51	
Compost/Mulch (Yard)	Brush and Branches			0.00	
Landscaping material only. Landclearing materials included in Table B2 (1)	Grass			0.00	
	Leaves			0.00	
	Mixed Yard Waste	11,874.13		11,874.13	
	Other (8):			0.00	
Compost/Mulch (Other)	Food Waste			0.00	
	MSW Compost (2)			0.00	B
	Wood Materials (3)			0.00	
	Other (8): Wood Shavings		8,306.00	8,306.00	
Glass	Brown Glass			0.00	
	Clear Glass			0.00	
	Green Glass			0.00	
	Mixed Glass	666.52	1,194.97	1,861.49	
	Other (8): fluorescent		1.69	1.69	
Metals	Aluminum Cans		46.35	46.35	
	Back-End Scrap			0.00	C
	Lead Acid Batteries	15.86	196.19	212.05	
	Mixed Cans (Al, Sn, Steel)	245.56	440.48	686.04	
	Tin (Sn)/Steel Cans			0.00	
	White Goods		1,038.75	1,038.75	
	Other (8): Front End	1,143.85		1,143.85	
Paper	Magazines		206.83	206.83	
	Mixed Paper	2,701.17	5,682.20	8,383.37	
	Newspaper		66.06	66.06	
	Office/Computer Paper;		86.87	86.87	
	Old Corrugated Cardboard		7,570.07	7,570.07	
	Other (8): Books		13.00	13.00	
Plastic	Mixed Plastic	504.28	917.70	1,421.98	
	Plastic #: LDPE		1.93	1.93	
	Plastic #: bags		0.54	0.54	
	Other (8): film		21.77	21.77	
Other Materials	Animal Protein/Solid Fat		495.99	495.99	
	Electronics	157.82	189.60	347.42	
	MSW-to-Energy Ash			0.00	D
	Pallets (4)		604.61	604.61	
	Textiles		283.63	283.63	
	Tires (5) (Recycled)	148.69	555.29	703.98	
	Tires (6) (Retread)		35.20	35.20	
	Tires (7) (Cement Kiln 12%)		43.02	43.02	
	Other (8): Toner Cartridges		54.93	54.93	
Table B1b Total (Tons)	[redacted]	0.00	5,884.35	5,884.35	
TOTAL MRA (TONS)		17,457.88	34,079.53	51,537.41	E

* For more detailed guidelines, refer to the *Maryland Recycling Act Tonnage Reporting System Guidelines*, available under "County Coordinator Resources" on MDE's recycling web page.

(1) information.

(2) Report only that portion that is marketed. See Guidelines for further instructions.

Number: MDE/WAS/COM.019
January 13, 2010
Fees: 800-201-7165

County: Charles Reporting Period: Jan. thru Dec. 2009

(3) Includes recycling of wood products (*e.g.*, pallets, crates, barrels, wood furniture, canes, crutches, etc.). Materials must be mulched or composted ONLY. Otherwise, include in "Other Materials" category.
(4) Refurbished pallets ONLY. List mulched or composted pallets in "Wood Materials" – "Compost/Mulch (Other)" category.
(5) Tires that are recycled into new products containing rubber (*e.g.*, trashcans, storage containers, rubberized asphalt, etc.), and use of whole tires for playground and reef construction.
(6) Retread or recapped tires.
(7) Tires-to-cement kilns. Enter 12% of the total weight of tires used at cement kilns.
(8) List the MRA recyclable material. Use Table B1b – Other MRA Recyclables for additional space if listing more than 1 "Other" recyclable.
B, C, D, E For use in Table C1.

TABLE B1b – Other MRA Recyclables*

Category	MRA Recycables	Residential (Tons)	(Tons)	Total (Tons)
Compost/Mulch (Other)	Bark		4,358.21	4,358.21
Compost/Mulch (Other)	Sawdust		1,456.12	1,456.12
Metal	Oil Filters		66.62	66.62
Metal	Litho-AL Plates		3.20	3.20
Plastic	Shrink Wrap		0.20	0.20
				0.00
				0.00
				0.00
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				0.00

* For more detailed guidelines, refer to the *Maryland Recycling Act Tonnage Reporting System Guidelines*, available under "County Coordinator Resources" on MDE's recycling web page.

County: Charles Reporting Period: Jan. thru Dec. 2009

TABLE B2 – Non-MRA Materials Recycled*

Non-MRA Recyclables	Residential (Tons)	(Tons)	Total (Tons)
Antifreeze	14.72	47.78	**62.50**
Asphalt		49,706.90	**49,706.90**
C&D Debris		953.00	**953.00**
Coal Ash (Fly Ash, Pozzolan)		15,341.00	**15,341.00**
Concrete		52,065.00	**52,065.00**
Landclearing Debris (1)		520.00	**520.00**
Scrap Automobiles		11.00	**11.00**
Scrap Metal		2,945.49	**2,945.49**
Sewage Sludge		3,934.39	**3,934.39**
Soil		96.06	**96.06**
Waste Oil	155.00	1,201.75	**1,356.75**
Other (2): **Gypsum (Mirant)**		12,189.00	**12,189.00**
Other (2): **Freon**		0.09	**0.09**
Other (2): **ADCM (By product of Scrap Automobile**		14,327.77	**14,327.77**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
Other (2):			**0.00**
TOTAL NON-MRA (TONS)	**169.72**	**153,339.23**	**153,508.95**

* For more detailed guidelines, refer to the *Maryland Recycling Act Tonnage Reporting System Guidelines*, available under "County Coordinator Resources" on MDE's recycling web page.

(1) Earthen materials (*i.e.*, clays, sands, gravels, and silts), topsoil, tree stumps, root mats, brush and branches, logs, vegetation, and rock from land clearing operations that if not recycled are discarded in landclearing debris, Rubble, or C&D landfills. See Table B1 for landscaping

(2) List the Non-MRA recyclable material.

County: Charles **Reporting Period:** Jan. thru Dec. 2009

TABLE C1 – Maryland Recycling Act Waste Diversion Rate Calculation

Non-permitted MRA Waste ("A" in Table A1)	0.00	**A**
Permitted MRA Waste (from MDE)		**A2**
Total MSW Compost ("B" in Table B1)	0.00	**B**
Total Back-End Scrap Metal ("C" in Table B1)	0.00	**C**
Total MSW-to-Energy Ash ("D" in Table B1)	0.00	**D**
Total MRA Tons Recycled ("E" in Table B1)	51,537.41	**E**
Total (A + A2 - B - C - D + E)	51,537.41	**F**
MRA Recycling Rate ((E ÷ F) x 100)	100.00%	**G**
County Source Reduction Credit		**H**
County Waste Diversion Rate (G + H)	**100.00%**	

* I certify, to the best of my knowledge, that the tonnage claimed on this form is accurate and based upon actual records maintained by the County. These tonnage records will be made available to MDE for auditing purposes, if requested ***(Complete "Signature", "Title", and "Date" by hand)***.

Signature | Chief of Environmental Services | Title | 6/17/10 | Date